BEFORE THE ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION

IN THE MATTER OF THE NAVIGABILITY OF THE SANTA CRUZ RIVER FROM THE MEXICAN BORDER TO THE CONFLUENCE WITH THE GILA RIVER, SANTA CRUZ, PIMA AND PINAL COUNTIES, ARIZONA	No. 03-002-NAV

FIRST ADDENDUM TO THE REPORT, FINDINGS AND DETERMINATION REGARDING THE NAVIGABILITY OF THE SANTA CRUZ RIVER FROM THE MEXICAN BORDER TO THE CONFLUENCE WITH THE GILA RIVER DATED OCTOBER 18, 2006

The Arizona Navigable Stream Adjudication Commission ("ANSAC" or "Commission"), having considered all of the historical and scientific data and information, documents and other evidence (collectively, "Evidence in the Record") regarding the issue of whether the Santa Cruz River from the Mexican border to the confluence with the Gila River ("Santa Cruz River" or "the Santa Cruz" or "the River") was navigable for title purposes as of February 14, 1912, the date of Arizona's statehood, and being fully advised by counsel, hereby submits this addendum to the *Report, Findings and Determination Regarding the Navigability of the Santa Cruz River from the Mexican*

Border to the Confluence of the Gila River published October 18, 2006 ("2006 Report").

While the Commission's navigability determination remains unchanged, unless otherwise discussed herein, this Report supersedes the 2006 Report in its entirety.

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I. PROCEDURAL HISTORY

The Commission held two sets of public hearings over the course of a decade to receive evidence, testimony, and legal memorandum regarding the navigability of the Santa Cruz River.

A. 2003-2004 Hearings

The first set of hearings was held in 2003 and 2004 ("2003-04 Hearings"). Hearings were held on March 11, 2003, in Nogales, Santa Cruz County, Arizona; on January 22, 2004, in Tucson, Pima County, Arizona; and on March 9, 2004, in Florence, Pinal County, Arizona. Each of the 2003-04 Hearings was properly noticed pursuant to the applicable statutes. All parties were advised that anyone who desired to appear and give testimony at the hearings could do so and that, in making its findings and determination as to navigability, the Commission would consider all matters presented to it at the hearings or at any time prior to the date of the hearings.

Various individuals submitted documents or oral testimony in connection with the 2003-04 Hearings. The Commission received over 23 separate documentary filings, including studies, articles, newspapers and other historical accounts, photographs, maps, and recordings. A list of the evidence submitted in connection with the 2003-04 Hearings, together with a summarization, which originally appeared as Exhibit D to the 2006 Report, is reproduced here as Exhibit A.

On September 16, 2004, at a public hearing in Phoenix, Arizona, after considering all of the evidence, testimony, and legal memoranda submitted by the parties, and the comments and oral argument made at the 2003-04 Hearings, and having been fully advised by counsel, the Commission determined by a unanimous vote that the Santa Cruz River was nonnavigable for purposes of title at statehood. Following the hearing, the Commission issued its 2006 Report.

The Arizona Center for Law in the Public Interest ("ACLPI") appealed the 2006 Report and determination on July 18, 2006. The parties agreed to stay the appeal (as well as several others) while the Arizona Court of Appeals considered a related challenge to the Commission's determination that the Lower Salt River was nonnavigable for purposes of title at statehood.

B. Lower Salt River Appeal (*Winkelman*)

On June 19, 2006, the Arizona State Land Department ("ASLD") appealed the Commission's determination that the Lower Salt River was nonnavigable at the time of statehood. ASLD alleged that the Commission misapplied the federal test for navigability-for-title by concluding that the Lower Salt River's "ordinary and natural condition . . . includes irrigation diversions, canals, and other human impacts," which "dramatically and drastically altered" the River. Complaint for Judicial Review of Administrative Decision regarding Lower Salt River, *State ex rel. Winkleman v. Ariz. Navigable Stream Adjudication Comm'n*, 2006 WL 6616118 (Ariz. Super. June 19, 2006), at ¶ 22(A).

The superior court affirmed the Commission's determination regarding the Lower Salt River by order dated August 7, 2007. The determination was further appealed to the court of appeals, which vacated the order and remanded to the Commission with instructions to determine "what the [Lower Salt] River would have looked like on February 14, 1912, in its ordinary (i.e., usual, absent major flooding or drought) *and* natural (i.e., without man-made dams, canals, or other diversions) condition." *State ex rel. Winkleman v. Ariz. Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 241 ¶¶ 28-29, 229 P.3d 242, 253 (Ct. App. 2010) (emphasis added).

Subsequent to the court of appeals' decision in *Winkleman* concerning the Lower Salt River, the superior court (in both Maricopa and Pima Counties) remanded to the

Commission the navigability determinations for the five other watercourses on which judicial appeals were then pending (Upper Salt, Gila, Verde, San Pedro, and Santa Cruz Rivers). On December 14, 2011, the Commission issued a notice confirming the remand of its navigability determinations and requesting that interested parties submit memoranda recommending a course of action for the Commission to comply with the *Winkelman* decision.

C. U.S. Supreme Court Ruling in *PPL Montana, LLC v. Montana*

In February 2012, the U.S. Supreme Court issued a decision that impacted the way navigability determinations are made in Arizona and required the Commission to resolve whether individual segments of the affected watercourses were navigable at the time of statehood. *PPL Montana, LLC v. Montana*, 132 S.Ct. 1215 (2012). In *PPL Montana*, the U.S. Supreme Court held that, with *de minimis* exception, a watercourse's navigability must be determined on a segment-by-segment basis, even where only "short interruption[s] of navigability in a stream otherwise navigable" exist. 132 S.Ct. at 1229, 1230. The Court observed that shifts in physical conditions, and topographical and geographical indicators provide a means to determine start and end points. *Id.* at 1230.

The Court in *PPL Montana* also addressed the relevance of evidence of present-day, primarily recreational use to the issue of a river's susceptibility to use as a highway for commerce. Specifically, the Court ruled that evidence of "present-day use may be considered to the extent it informs the historical determination whether the river segment was susceptible of use for commercial navigation at the time of statehood." *Id.* at 1233. However, because navigability-for-title is determined at the time of statehood and concerns a river's usefulness for "trade and travel," rather than for other purposes, the Court ruled that such evidence "must be confined to that which shows the river could sustain the kinds of commercial use that, *as a realistic matter*, might have occurred at the time of statehood." *Id.* at 1233 (emphasis added). The Court therefore held that before

this type of evidence can be considered in a navigability-for-title determination, "the party seeking to use present-day evidence for title purposes must show: (1) the watercraft are meaningfully similar to those in customary use for trade and travel at the time of statehood; and (2) the river's post-statehood condition is not materially different from its physical condition[1] at statehood." *Id.*

D. Reopening of the Record

On October 22, 2012, the Commission voted to reopen the record and hold additional public hearings to receive supplemental evidence relevant to the principles addressed in *Winkleman* and *PPL Montana* for the six remanded watercourses.

In accordance with A.R.S. §§ 37-1123(B) and 37-1126, the Commission gave proper public notice (a copy of which is attached as Exhibit B) of its intent to reopen the record and hold an additional public hearing to receive supplemental evidence on the Santa Cruz for consideration of the principles addressed in *Winkleman* and *PPL Montana.* The hearing was conducted on March 28, 2014, in Tucson, Pima County, Arizona ("2014 Hearing"), and the record kept open until April 15, 2014. At the conclusion of the 2014 Hearing, all parties were advised that they could file post-hearing legal briefs and proposed findings of fact and conclusions of law ("FF/CL") pursuant to Commission Rules.

Freeport McMoRan Corporation ("Freeport"), the Salt River Project Agricultural Improvement and Power District and Salt River Valley Water Users' Association (collectively, "SRP"), the Gila River Indian Community ("GRIC"), and the San Carlos Apache Tribe submitted briefs and/or proposed FF/CL in favor of non-navigability (collectively, "Opponents"). The ACLPI, on behalf of Defenders of Wildlife, Donald

[1] In light of *Winkleman* and our obligation to consider a river's "ordinary and natural condition" at statehood, we interpret the phrase "physical condition" in *PPL Montana* to mean "ordinary and natural condition."

Steuter, Jerry Van Gasse, and Jim Vaaler (collectively, "ACLPI" or "Proponents") submitted briefs and proposed FF/CL in favor of navigability.[2]

On November 19, 2014, at a properly noticed public hearing in Phoenix, Arizona, after considering all of the new and existing Evidence in the Record, the parties' briefs and proposed FF/CL, and the testimony, comments, and oral arguments made at the 2003-04 and 2014 Hearings, and having been fully advised by counsel, the Commission determined by a unanimous vote that no segment of the Santa Cruz River was navigable or susceptible to navigation in its "ordinary" and "natural" condition at the time of statehood.[3]

II. BURDEN OF PROOF

Arizona Revised Statute § 37-1128(A) provides:

> [i]f the preponderance of the evidence establishes that the watercourse was navigable, the commission shall issue its determination confirming that the watercourse was navigable. If the preponderance of the evidence fails to establish that the watercourse was navigable, the commission shall issue its determination confirming that the watercourse was nonnavigable.

The proponent of navigability bears the burden of proof of establishing navigability by a preponderance of the evidence. *Winkleman*, 224 Ariz. at 238-39, 229 P.3d at 250-51.

The "preponderance of the evidence" standard is sometimes referred to as requiring "fifty percent plus one" in favor of the party with the burden of proof. If the evidence on each side weighs exactly even, then the party without the burden of proof necessarily prevails. Proponents, as the party with the burden of proof, must convince the Commission that the Evidence in the Record, considered in its totality, weighs in favor of a finding of navigability. *See generally United States v. Fatico*, 458 U.S. 388, 403-06

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[2] The parties' briefs and proposed FF/CL are available on the Commission's website, http://www.ansac.az.gov/RemandCaseLegalMems.asp.

[3] The minutes from the November 19, 2014 hearing are available on the Commission's website, http://www.ansac.az.gov/UserFiles/File/pdf/minutes/20141119SantaCruzDetermine.pdf.

(E.D.N.Y. 1978), *aff'd*, 603 F.2d 1053 (2d Cir. 1979), *cert. denied*, 444 U.S. 1073 (1980); *United States v. Schipani*, 289 F.Supp. 43, 56 (E.D.N.Y. 1968), *aff'd*, 414 F.2d 1262 (2d Cir. 1969).

While the Proponents bear the burden of proof as to navigability, the Commission "may not begin its determination with any presumption against navigability." *Winkleman*, 224 Ariz. at 239, 229 P.3d at 251. Indeed, "determinations regarding the title to beds of navigable watercourses in equal footing cases must begin with a strong presumption *against* defeat of state's title." *Defs. of Wildlife v. Hull*, 199 Ariz. 411, 426, 18 P.3d 722, 737 (Ct. App. 2001) (emphasis added). A presumption, however, only applies "in the absence of any evidence to the contrary," *In re Westfall's Estate*, 74 Ariz. 181, 186, 245 P.2d 951, 955 (1952), and "should never be placed in the scale to be weighed as evidence," *In re Hesse's Estate*, 62 Ariz. 273, 282, 157 P.2d 347, 351 (1945). *See also Sheehan v. Pima County*, 135 Ariz. 235, 238, 660 P.2d 486, 489 (Ct. App. 1982) ("a presumption disappears entirely upon the introduction of any contradicting evidence and when such evidence is introduced the existence or non-existence of the presumed fact is to be determined exactly as if no presumption had ever been operative").

III. NAVIGABILITY STANDARD

"The standard of navigability for equal footing claims is established by federal law." *Defs. of Wildlife*, 199 Ariz. at 419, 18 P.3d at 730 (citing *Utah v. United States*, 403 U.S. 9, 10 (1971)); *accord PPL Montana*, 132 S.Ct. 1227 ("questions of navigability for determining state riverbed title are governed by federal law"). The federal standard has remained virtually unchanged since 1870, when the U.S. Supreme Court provided the classic definition of navigability in *The Daniel Ball*, 77 U.S. (10 Wall.) 557 (1870):

> 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.

Id. at 563; *see PPL Montana*, 132 S.Ct. at 1228 (collecting cases applying the *Daniel Ball* formulation to determine navigability-for-title under the equal-footing doctrine).

In Arizona, the federal test for navigability-for-title is codified at A.R.S. § 37-1101(5), which states:

> "navigable" or "navigable watercourse" means 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 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.

"'Watercourse' means the main body or a portion or reach of any lake, river, creek, stream, wash, arroyo, channel or other body of water. Watercourse does not include a man-made water conveyance system described in paragraph 4 of this section, except to the extent that the system encompasses lands that were part of a natural watercourse as of February 14, 1912." A.R.S. § 37-1101(11). "'Highway for commerce' means a corridor or conduit within which the exchange of goods, commodities or property or the transportation of persons may be conducted." *Id.* § 37-1101(3).[4]

As relevant here, the Commission's task is to determine: (1) the characteristics of the Santa Cruz River at the time of statehood in its "ordinary" (i.e., usual, absent major flooding or drought) and "natural" (i.e., without man-made dams, canals, or other diversions) condition; and (2) whether, at the time of statehood, the Santa Cruz River was

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[4] The Commission also considered the following definitions in A.R.S. § 37-1101 in making this determination:

> 2. "Bed" means the land lying between the ordinary high watermarks of a watercourse.
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> 6. "Ordinary high watermark" means the line on the banks of a watercourse established by fluctuations of water and indicated by physical characteristics, such as a clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation or the presence of litter and debris, or by other appropriate means that consider the characteristics of the surrounding areas. Ordinary high watermark does not mean the line reached by unusual floods.

used or was susceptible of being used as a highway for commerce in that condition. *Winkleman*, 224 Ariz. at 239, 229 P.3d at 251. In so doing, the Commission must consider the River on a segmented basis, unless doing so is unnecessary. *See PPL Montana*, 132 S.Ct. at 1229, 1230.

IV. EVIDENCE RECEIVED AND CONSIDERED BY THE COMMISSION

Pursuant to A.R.S. § 37-1123, the Commission undertook to receive, compile, and review supplemental evidence regarding the issues of segmentation and whether the Santa Cruz River was navigable for title purposes as of statehood in both its ordinary and natural condition. A list of supplemental evidence and records submitted in connection with the 2014 Hearing is attached as Exhibit C.[5] Documents and testimony submitted in connection with the 2003-04 Hearings remain part of the Record and were also considered by the Commission in making this Report and determination.

Three experts submitted supplemental evidence regarding segmentation and navigability of the Santa Cruz in its "ordinary and natural condition" prior to statehood: Richard Burtell, on behalf of Freeport; T. Allen J. Gookin, on behalf of GRIC; and Win Hjalmarson, on behalf of ACLPI and its clients.

Burtell testified at the 2014 Hearing and submitted a declaration in which he discussed the existing and supplemental Evidence in the Record as of October 2013, and concluded that "the Santa Cruz River was not susceptible to navigation in its ordinary and natural condition at and prior to statehood." Supp. EIN x004, Declaration of Rich Burtell on the Non-Navigability of the Santa Cruz River At and Prior to Statehood (Oct. 2013)

[5] Citations to the record are identified as "Supp. EIN," for evidence submitted in connection with the 2014 Hearing, or "EIN," for evidence submitted in connection with the 2003-04 Hearings. The 2014 Hearing was audio recorded and later transcribed. The transcript of the audio recording is available at http://www.ansac.az.gov/SupplementalEvidence.asp, Supp. EIN x008.

("Burtell Decl.") ¶ 7. Burtell further opined that "if the San Pedro River was divided into segments, none of the segments would have been navigable at that time." *Id.*

Hjalmarson submitted a report in which he criticized the methods used by Burtell in the Burtell Declaration, and concluded that the Santa Cruz River from the Mexican border (river mile ("RM") 180) to the Picacho-Redrock area (RM 78), was susceptible to navigation 75% of the time during a typical year at the time of Arizona statehood in its ordinary and natural condition. Supp. EIN x005, Hjalmar W. Hjalmarson, *Navigability Along the Natural Channel of the Santa Cruz River* (Mar. 20, 2014) ("Hjalmarson Report"), at 5, 98-103. During his testimony at the 2014 Hearing, Burtell responded to Hjalmarson's criticisms of his analysis and calculations with further evidence supporting his methodology and conclusion. Hjalmarson did not testify at the 2014 Hearing.

Gookin submitted a report in which he reviewed the Hjalmarson Report and the Burtell Declaration and concluded that the Middle Santa Cruz was not navigable in its ordinary and natural condition at Statehood. *See generally* Supp. EIN x007, T.A.J. Gookin, *Navigability of the Santa Cruz River* ("Gookin Report"). Gookin did not testify at the 2014 Hearing.

V. ANALYSIS OF THE EVIDENCE

The Santa Cruz River has its headwaters in the southern base of the Canelo Hills in Santa Cruz County, and flows generally south as a shallow perennial stream through the San Rafael Valley before crossing into Mexico near the town of Loquiel. The River makes a 25-mile loop through Mexico before reentering the United States about 6 miles east of Nogales, Arizona. It then flows northward from the Mexican Border up to its confluence with the Gila River, just southwest of Phoenix.

The entire Santa Cruz River basin encompasses approximately 8,581 square miles. The elevation at the point the River crosses the Mexican Border near Nogales is

approximately 3,875 feet and the elevation at the confluence with the Gila River is approximately 940 feet. The major tributaries of the River from south to north are Nogales Wash, Sonoita Creek, Rillito Creek, Canada del Oro Wash, and the Altar-Brawley Wash. 2006 Report, at 4.

A. Segmentation

Although the 2006 Report studied the Santa Cruz River as one entire watercourse, it included discussions that divided the River into an upper and lower reach. *See* 2006 Report, at 4-5. These reach divisions were defined based on criteria related to, but somewhat different from, the specific navigability criteria outlined in *PPL Montana*. *See id.* at 4 (noting that the River could be "broken into two reaches based on environmental, geomorphic and hydrologic characteristics"). In *PPL Montana*, the U.S. Supreme Court observed that "practical considerations," shifts in a river's physical conditions, and topographical and geographical indicators provide a means to determine start and end points for segmentation. 132 S.Ct. at 1230.

Following the *PPL Montana* decision, the Commission invited the parties to file legal memoranda regarding the decision's effect on the six remanded waterways.[6] In June 2012, ASLD submitted a memo in which it proposed that application of the *PPL Montana* criteria to these waterways requires consideration of the following factors: (1) whether the river is located in a canyon or runs through flats or wide river valleys; (2) the river's flow rate (including tributary inflow and watershed size); (3) the classification of rapids by degree of difficulty; (4) whether the river is a losing or gaining stream; and (5) the river's slope or steepness. Based on these factors, ASLD recommended that the Santa Cruz be divided into three segments: Headwaters to Mexican Border, Mexican Border to Marana,

[6] The parties' legal memoranda regarding the *PPL Montana* decision can be found on the Commission's website at http://www.ansac.az.gov/montana_memorandums.asp.

and Marana to Gila River Confluence. ASLD Memorandum Regarding Effect of United States Supreme Court's *PPL Montana* Decision and Segmentation of Remanded Cases dated June 8, 2012, at 7. ACLPI agreed that "for purposes of a segment by segment analysis," these segments are "logical stretches to consider." ACLPI Memorandum Regarding the Navigability of the Santa Cruz River dated September 7, 2012, at 11.

Burtell likewise agreed with the segments proposed by ASLD, with one exception. Rather than end the middle segment at Marana, where regular flow historically ended, Burtell proposed extending the middle segment approximately twenty-nine river miles downstream to where the channel historically first became undefined and its streamflow spread out across the Santa Cruz Flats. Burtell Decl. ¶ 12; *see also id.* App. B (survey maps depicting where the channel historically ended); Supp. EIN x008, Transcription of Audio Tape 2 of 4 ("Trans. 2 of 4"), at 2. Burtell argued that the Santa Cruz should be segmented by shifts in channel characteristics rather than changes in flow, because portions of the middle Santa Cruz were historically perennial in some reaches and intermittent/ephemeral in other reaches. Trans. 2 of 4, at 2. Burtell also observed that the last reach of the River—beginning about ten miles upstream of its confluence with the Gila River—is better addressed in combination with Santa Cruz Flats. Burtell Decl. ¶ 13.

The Commission finds that both proposed ending points are reasonable and further, that no material difference exists between the two, for purposes of the navigability-for-title determination. Nonetheless, the Commission agrees with Burtell that segmenting by channel characteristics rather than occurrence of flow is the superior approach for the Santa Cruz and, therefore, adopts the following segments for purposes of this Report and determination:

- Headwaters to Mexican Border (Upper Reach)
- Mexican Border near Nogales (RM 0) to Santa Cruz Flats (Middle Reach)
- Santa Cruz Flats to Gila River Confluence (Lower Reach)

The Upper Reach, as defined herein, is considered a small or minor watercourse and is considered in a separate report. In any event, the parties agree that neither the Upper or Lower Reach was navigable or susceptible to navigation in its ordinary and natural condition at or before statehood—the only disputed segment is the Middle Reach. *See* Hjalmarson Report (opining that a portion of the Middle Reach is navigable, but not the Upper or Lower Reaches); Gookin Report, Ch. I, p. 3; Supp. EIN x008, Transcription of Audio Tape 1 of 4 ("Trans. 1 of 4"), at 11. Therefore, this Report briefly summarizes the unrefuted Evidence in the Record regarding the nonnavigability of the Lower Reach, before turning to the focus of this Report—the evidence regarding navigability of the Middle Reach.

B. Uncontested Status of the Lower Reach

In predevelopment times, the Lower Reach was ephemeral, with the exception of the portion of the River on the Gila River Indian Reservation. Gookin Report, Ch. I, p. 4; Burtell Decl. ¶ 53. This wet area on the Reservation was a combination of a relatively large cienega and a dense thicket of mesquite that transpired great quantities of water. Burtell Decl. ¶ 53; Hjalmarson Report, at 22. Even during predevelopment, however, the Lower Reach apparently did not support perennial flows, and only during flood times did it continuously flow to the Gila River. EIN x006(9), J.E. Fuller, *Arizona Stream Navigability Study for the Santa Cruz River, Final Report* (Nov. 1996; revised Jan. 12, 2004) ("State Report"), at 3-5, 3-8.

Historic accounts confirm a general lack of permanent water along the Lower Reach of the Santa Cruz. For example, Captain Manje observed in November 1697 that the River disappeared in the area where the Santa Cruz Flats began and reappeared near its confluence with the Gila River. Burtell Decl. ¶ 56. The fact that Father Kino, who made numerous expeditions along the Santa Cruz River in the 1690s, never continued north of where the Santa Cruz Flats began, and instead proceeded in a north-northwest

direction and reached the Gila River about twenty to thirty miles upstream of its confluence with the Santa Cruz River, likewise suggests an absence of permanent water. *Id.* ¶ 55.

In 1864, Mowry described the Lower Reach of the Santa Cruz as a sinuous channel with a width that "varies from 20 to 100 feet, and during very dry seasons portions of it disappear." Hjalmarson Report, at 22. The channel historically reappeared about ten miles upstream of its confluence with the Gila River, where historic accounts indicate an occurrence of marsh-like conditions and heavy vegetation. Burtell Decl. ¶¶ 58-60. Although uncommon, when flood waters did occasionally reach Santa Cruz Flats, they divided into numerous smaller channels and spread out over a large plain. Burtell Decl. ¶ 57; Hjalmarson Report, at 12. Based on these factors, Burtell opined that "[i]t would not have been possible to navigate a commercial vessel in such an environment." Burtell Decl. ¶ 57. Hjalmarson likewise agreed that the reach of the River north of RM 78 in the Red Rock-Picacho Peak area was probably not navigable at the time of statehood. Hjalmarson Report, at 23.

Not surprisingly, there is no record of boating or boating attempts at any time along the Lower Reach. Burtell Decl. ¶ 61; State Report, at 3-64. The most that can be said is that during one high flood event, a Tucson resident opined that the River was "big enough to float a steamboat all the way to the sea." State Report, at 3-64. There is also no evidence that anyone ever attempted to float the Lower Reach. Finally, there is no evidence that Americans used the Lower Reach to supply military posts or mines, either before or after 1860 when increased development in the region began and affordable supply routes were in demand. *Id.* ¶¶ 62-63.

C. Evidence Applicable to Navigability of Middle Reach

As defined herein, the Middle Reach of the Santa Cruz River covers approximately 128 stream miles from where the River crosses back into the United States from Mexico to the Santa Cruz Flats. Burtell Decl. ¶ 25.

1. Climate

The climate in the Santa Cruz Valley is typical of desert climates, with violent summer thunderstorms and sporadic rain in the winter. State Report, at 4-5. In the upper reaches of the Santa Cruz, total precipitation during the summer monsoons is typically greater than the total for the remaining months of the year. *Id.* at 4-6. Consequently, the majority of "flow events" along the Santa Cruz occur during the summer monsoons. *Id.* at 4-8. The 30-year precipitation averages show that at no place along the Santa Cruz was the rainfall average greater than 22 inches. Supp. EIN x007, Leonard C. Halpenny and Philip C. Halpenny, *Review of the Hydrogeology of the Santa Cruz Basin in the Vicinity of the Santa Cruz-Pima County Line* (1997) ("Halpenny"), at 4-4.

2. Hydrology

a. Evidence Applicable to the Whole River

During prehistoric times, the Santa Cruz River was apparently intermittent and did flow periodically above ground, especially when fed by springs in the Canoa, San Xavier, and Tucson areas. The watershed was hydrologically diverse because of the diversity of climate, geology, and topography. *See* Hjalmarson Report, at 3-4. The mountainous areas of the south and central parts of the watershed typically received more than 20 inches of precipitation per year, with the hot-dry northern areas typically receiving less than 8 inches per year. *Id.* at 5. Precipitation fell during late summer and midwinter. *Id.* There was also light snow accumulation in the mountains, which occasionally melted to produce spring runoff. *Id.* at 4.

When rain fell in the watershed it moved according to basic principles of hydrology. A portion of the precipitation seeped into the ground to replenish ground water. Some of the water flowed downhill on the land surface as direct runoff and appeared in surface streams. *Id.* at 4. Most of the runoff from storms (direct runoff) in the Santa Cruz River watershed reached the River channel directly through tributary stream channels all along the watershed. Direct runoff was confined to the Santa Cruz channel and floodplain to the Marana area where high flows would spill onto the floodplain and become separated from the River. Between the Picacho Peak area and the mouth at the Santa Cruz River, direct runoff was not confined to a single channel and instead spread over a wide area (Santa Cruz Flats). *See id.* App. A & App. B, T8S R7E Santa Cruz Flats. Direct runoff was seasonable because storms were seasonal. *Id.* at 4.

b. Evidence Specific to the Middle Reach

Historic accounts from periods of low diversions before 1860 indicate that the Middle Reach of the Santa Cruz was perennial in some reaches and intermittent/ephemeral in other reaches. Burtell Decl. ¶¶ 28-29 & Tbl. 2; *see also* State Report, at 3-13, 3-15, 3-47; Gookin Report, Ch. 1, p. 3-4. In the upper valley in Santa Cruz County, it was described as a low-flowing perennial stream with some marshy areas and cienegas. Near the Pima County line, not far north of Tubac, the River generally went subsurface and disappeared for most of the year, but surfaced again and had at least three reaches of regular flow from San Xavier to a few miles north of Tucson. *See* Burtell Decl. ¶ 29 & Tbl. 2. This was apparently due to a geological change from high bedrock in Santa Cruz County to a deep alluvial system in Pima County.

Where flow was regular, these accounts indicate that it was typically shallow (1 foot or less) and narrow in places. *Id.* Bentacourt (1990, p. 58) summarized the historic accounts of streamflows in the Middle Reach as follows:

> All accounts agree that the flow of the Santa Cruz first disappeared not far north of Tubac, near the ford at La Canoa. . . . The flows from the Punta de Agua and Agua de la Mision springs disappeared at San Xavier and the eastern base of Martinez Hill, respectively. Permanent water reappeared 3.5 km (about 2 miles) north of Martinez Hill, quitting again in less than 2 km. Another brief stretch of perennial flow existed half way to Tucson in the northern half of Section 2, T15S, R13E... The evidence for where the flow disappeared north of Tucson is less clear.

Burtell Decl. ¶ 29. Based on these and other historic accounts in the Record, Burtell opined that flow in the Middle Reach was discontinuous for extended sections that would have likely required long portages to navigate. Burtell Decl. ¶ 30; *see also* Trans. 2 of 4, pp. 1-2.

3. Geomorphology

a. Evidence Applicable to the Whole River

There are no known documented observations of the Santa Cruz River's predevelopment morphology. Hjalmarson Report, at 22. What evidence there is suggests that the Santa Cruz "constructed its own geometry between river mile 78 in the Picacho area to river mile 180 at the Mexican border." *Id.* at 4; *see also id.* at 19 ("Along the study reach, the channel morphology was self-formed."); *accord* Gookin Report, Ch. II, p. 4 & Ch. VI, at p. 4. Droughts followed by severe storms, coupled with human activity, resulted in flooding in 1890 and 1905, which caused a great deal of erosion and arroyo-cutting in the River channel. Gookin Report, at Ch. VI, at p. 4. In 1915, a Federal Land Survey depicted the River as meandering, with a 12-20 foot incised channel. Hjalmarson Report, at 8 & App. A, at 19-20.

b. Evidence Specific to the Middle Reach

Along the upper Santa Cruz, south of Marana, the channel lies within an inner valley flanked by mountains. State Report, at 4-2. Historically, the channel first became undefined and its streamflow spread out across the Santa Cruz Flats. *See* Burtell Decl.

¶ 12 & App. B (GLO survey maps from 1905, 1911). In 1871, the channel below the present site of Valencia Road was described as having vertical banks 60 feet apart and up to 10 feet high. State Report, at 4-46. Braiding in the Middle Reach is also shown on surveys from the 1870s. Gookin Report, Ch. II at p. 4.

By 1912, portions of the Middle Reach were a compound and/or braided channel. Gookin Report, Ch. II, p. 4. There is also some indication that the channel may have been more than 20 feet deep in some parts of the Middle Reach at the time of statehood. State Report, at 3-60.

4. Human Impacts[7]

a. Evidence Applicable to the Whole River

In the 1860s, the River was diverted to create two lakes, Warner Lake and Silver Lake, near downtown Tucson. State Report, at 3-40. These lakes were short-lived, however, as the drought and flood cycles of the late 1880s and 1890s severely affected these lakes and washed out the dams that impounded them. *Id.* at 3-43.

Beginning in the 1880s, a large number of cattle were brought to the Valley and cattle ranches established. The cattle grazed until much of the Valley was denunded. *Id.* at 3-35. There is also evidence of a handful of small mining operations that began pumping water into their mines prior to statehood. *Id.* at 3-49. Groundwater pumping was brought to the area in 1890, which expanded the number of crops grown and, compounded with the need for water for mining activities and for the increasing population, significantly lowered the water table. *Id.* By 1910, the entire base flow of the River at both Nogales and Tucson was diverted for agriculture, leaving the mines to

[7] This Section discusses human activities in the Santa Cruz River valley during the territorial period from 1850 to 1912, when the Santa Cruz River underwent significant changes. *See* State Report, at 3-32 to 3-49. For a thorough discussion of the history of human settlement in the valley dating back to prehistoric times, see the 2006 Report at 19-25.

pump subsurface water for their operations. *Id.* at 3-44 to 3-45. Population growth, mining, and agriculture led to the loss of perennial water, an increase in groundwater withdrawal, and an extensive change in the vegetation structure. These factors, combined with the alternate drought and flood conditions of the late 1880s and 1890s and the early part of the 20th century caused a great deal of erosion, channel cutting, and arroyoization of the upper Santa Cruz River valley.

According to the State Report, "[a]t the time of statehood, the river was probably still perennial–flowing year round–in some of the reaches that had historic surface flow, but intermittent–flowing only during portions of the years–in more areas than previously." State Report, Executive Summary, at 4.

b. Evidence Specific to the Middle Reach

The Record reflects that irrigation has been practiced along the Middle Reach of the Santa Cruz River for centuries, albeit not continuously. Gookin Report, Ch. III, p. 1; Burtell Decl. ¶¶ 26, 31 & Tbl. 3. During the Spanish, Mexican, and Early American periods, agricultural activity was apparently intermittent, presumably due to Apache unrest and changes in water availability. Burtell Decl. ¶¶ 26, 31 & Tbl. 3. It also appears that, prior to increased settlement in the late 1860s, agricultural diversions were relatively minor. At any given time, no more than 300 to 400 acres were being irrigated from the Mexican Border to Canoa, and less than 1,000 total acres were being irrigated in the entire San Xavier-Tucson area. Burtell Decl. ¶ 31 & Tbl. 3. According to Burtell, "[a]t the height of the growing season, irrigation along both reaches would not have depleted, on average, a total of more than 10 to 20 cfs from the stream. In light of the water shortages that Spanish and Mexican officials periodically recorded, there were times when stream flows were insufficient even for this limited cultural demand." *Id.* at ¶ 31. Burtell thus concluded that these diversions would not have had a substantial impact on the River's

susceptibility to navigation, because "[c]learly it would have been impractical to conduct commercial navigation under such flow conditions, even if there were no diversions." *Id.*

That is not to say, however, that these diversions did not have an impact on flows—the Record reflects that they did. For example, during the Spanish and Mexican occupation, water shortages were reported during the irrigation season at both Tubac and Tucson, and became more common in the 1870s as more Americans settled in the area. Burtell Decl. ¶ 26. Certainly by 1912, flows in the Middle Reach had been artificially depleted. Gookin Report, Ch. II, p. 4. The River was no longer perennial at Nogales, but instead was intermittent during the spring, summer, and fall, and perennial only during the winter season, when discharges averaged about 15 cfs. State Report, at 4-20. By 1915, the River flowed less than half the year. State Report, at 3-62. The perennial segment near Tucson, however, probably had some regular flow in 1912. *Id.* at 3-5. In fact, according to the State Report, the perennial segment near the San Xavier Mission remained continuous until 1949, and supported native fish until at least 1937. *Id.* at 3-57.

Median monthly streamflows from the Nogales gage in the two decades after statehood suggest that channel depths were likely relatively shallow in this part of the River. *See* Burtell Decl. ¶¶ 32, 34 & tbls. 3 & 4. During 165 of 169 months with data (97.6%), flow rates at the Nogales gage were less than 100 cfs, corresponding to stream depths of less than 1 foot. *Id.* ¶¶ 32, 34 & tbls. 3 & 4. Burtell opined that "[s]uch shallow water would have precluded commercial boat travel along this portion of the Santa Cruz River." *Id.* ¶ 34. Of the four months with median flows greater than 100 cfs, two were during monsoon season in August, and two were during the winter months of January and February. *Id.* ¶ 34. Burtell concluded that, even during these months of higher flows, average stream depths would have likely been less than 2 feet, which is still too shallow to support commercial boat travel. *Id.* ¶ 34.

D. The Santa Cruz River in its Ordinary and Natural Condition

The Record reflects that, at the time of statehood, the natural hydrology of the Santa Cruz River had been altered by human activity, though the extent of the impact is less clear. The groundwater and surface water removals discussed in Section V(C)(4) above, likely resulted in somewhat lower flow rates in the River than there would have been had it remained in its ordinary and natural condition. Therefore, in order to determine the "ordinary and natural condition" of the River, it is necessary to consider the effect of these impacts.

Unfortunately, little Evidence in the Record exists from the time period before prehistoric people arrived in the Santa Cruz River valley and developed diversions on the River. As an initial matter, therefore, it is necessary to identify the "best evidence" in the Record of the River's ordinary and natural condition. In *Winkleman*, the Arizona Court of Appeals held that the "best evidence" of the Lower Salt River's natural condition was from the time period after the effects of prehistoric diversions had ceased to affect the River, but before the commencement of modern-era settlement and farming. *See Winkleman*, 224 Ariz. at 242, 229 P.3d at 254. Significantly, however, the Winkleman court did not rule out consideration of evidence of a river's condition after man-made diversions. *See id.* at 243, 229 P.3d at 255. Rather, it observed that such evidence, while not dispositive, may nonetheless be informative and relevant and that, as long as "the evidence has indicia of reliability, the determination of the relevance and weight to be afforded the evidence is generally for [the Commission] to make." *Id.*

1. Historic Accounts from Periods of Low Diversions

The Record includes a wealth of historic accounts of the Middle Santa Cruz from periods of low diversions. These accounts, which are tabulated in Table 2 to Burtell's Declaration, were made by missionaries, military personnel, surveyors, and Forty-Niners, during the autumn harvest or winter season, "when there was little or no irrigation going

on." Trans. 1 of 4, p. 18; Burtell Decl. ¶¶ 26-31 & Tbl. 2. Many of these accounts were also made from 1849 through the late 1850s and during the Civil War, during a time period when the region was essentially abandoned due to Apache unrest. Trans. 1 of 4, p. 18; Burtell Decl. ¶¶ 26-31 & Tbl. 2. Because these accounts were made during periods involving little if any agricultural or other diversions, the Commission finds that they provide an invaluable record of the Middle Reach in its ordinary and natural condition.

These accounts reveal a Middle Reach that included multiple discontinuous stretches. For instance, the stream flowed through Calabasas and went dry a few miles north of Tubac. Trans. 1 of 4, pp. 18-19; Burtell Decl. ¶ 29 & Tbl. 2. From that point, the Middle Reach went "underground all the way to San Xavier del Bac. Only during years of exceptionally heavy rainfall does it water the flat land between Tubac and San Xavier." Trans. 1 of 4, p. 19; Burtell Decl. ¶ 29 & Tbl. 2 (Zuniga, 1804). This ephemeral stretch of the Middle Reach is approximately twenty miles in distance, meaning that travel north from the Tubac area would, under ordinary and natural conditions, require a twenty mile-portage. This factor alone counsels strongly in favor of finding that navigation of the Middle Reach was not "a commercial reality." *PPL Montana*, 132 S.Ct. at 1234. The historic accounts indicate that the series of gaps in flow continued north of Tucson through the end of the Middle Reach at Santa Cruz Flats, necessitating additional portages. *See* Burtell Decl. Tbl. 2 (accounts by Cook, Manje, and Font in December 1846, November 1697, and October 1775, respectively).

In addition to a series of gaps in flows, the historic accounts in the Record demonstrate that, even where flow did exist, under ordinary conditions (i.e., in the absence of heavy rainfall), the stream was small and very shallow, typically 1 foot or less. *Id.* ¶ 29 & Tbl. 2. This is consistent with the State Report's finding that "[t]he river was much too shallow most of the time for small boats, even in the perennial stretches." State Report, at 12. For example, one report from February 1857 noted that the River was a mere 12

inches deep in the Calabasas area. Burtell Decl. Tbl. 2 (Reid, Feb. 1857). The River between San Xavier to Tucson was described in October 1849 as "divided to a mere brook, the grassy banks of which are not more than two yards apart." *Id.* (Powell, Oct. 1849). In the Tucson area, the stream was described by Parke in February 1854 as being merely a foot in depth. *Id.* (Parke, Feb. 1854).

2. Streamflow Records

In addition to the historic accounts described above, the Commission considers streamflow measurements taken at the USGS gage near Nogales in the two decades after statehood, to be the "best evidence" of ordinary and natural conditions in the Middle Reach. Table 4 of Burtell's Declaration presents median monthly flows – which the State Report found are "best representative" of ordinary conditions (State Report, at 7-9) – and associated depths at the Nogales gage for a period of 165 months from 1913-1920 and 1930-1939.

As a general matter, evidence of a river's conditions after statehood and man-made diversions is less probative of ordinary and natural conditions at statehood. *See Winkleman*, 224 Ariz. at 243, 229 P.3d at 255. Here, however, the evidence under consideration is actual data that was collected during a time period in which there was no groundwater pumping, and from a location with relatively minor upstream diversions (Nogales). *See* Trans. 2 of 4, pp. 8-9; *see also* Burtell Decl. ¶¶ 33-36 & Tbl. 4. USGS measured the number of acres being irrigated upstream of the Nogales gage during these periods, as well as the other diversions that were made through an irrigation canal. Burtell Decl. ¶ 28; Trans. 2 of 4, pp. 3-4, 9. Based on these figures, Burtell estimated that these relatively minor upstream diversions reduced the flow at the gage by only about 5 cfs. Trans. 2 of 4, pp. 3-4, 9.

Burtell also calculated average stream depths at the Nogales gage based on the median monthly flows using a rating curve developed by Plateau, which was based on 200 empirical field measurements by USGS. *Id.* pp. 3-4; *see also* Burtell Decl. ¶ 33 & Tbl. 4 (compiling median monthly streamflow data and estimated stream depths at Nogales gage). Burtell concluded that, during 165 of 169 months with data (97.6%), flow rates at the Nogales gage were less than 100 cfs, corresponding to stream depths of less than 1 foot. Burtell Decl. ¶¶ 32, 34 & tbls. 3 & 4. Two of the four months during which estimated average stream depths were greater than 1 foot occurred during the monsoon season in August. *Id.*

3. Hjalmarson's Study

Hjalmarson undertook an analysis of the Santa Cruz River that attempted to reconstruct the Santa Cruz River in its ordinary and natural condition. This analysis, which is discussed in some detail below, employed essentially the same methodology that Hjalmarson used to support his previous testimony before the Commission that the San Pedro River was navigable. Hjalmarson derived predevelopment discharge figures; he used an equation to calculate width based on discharge; he used another equation to determine depth based on discharge and width; and he developed a flow duration curve that purports to reveals the percentage of days each year that the stream had a certain amount of flow and depth. He then applied his findings to the same two standards of assessing instream flows that are primarily used for modern recreational boating.

Opponents argue that Hjalmarson's methodologies and conclusions are flawed in several respects, and that his ultimate conclusion that the Middle Santa Cruz from the Mexican border to RM 78 was navigable in its ordinary and natural condition cannot be reconciled with the law, or the Evidence in the Record. The Commission addresses each of Opponents' criticisms below.

First, and most fundamentally, Opponents argue that Hjalmarson's study disregards the applicable legal standard. The Commission agrees. As he did with the San Pedro River, Hjalmarson again relied on standards that relate to a river's usefulness for present-day recreational boating, and made no attempt to apply the conclusions he derived from his model to commercial uses or commercial watercraft that were commonly used at statehood. *See* Hjalmarson Report, at 26-27; Trans. 1 of 4, p. 2. The first standard he used, developed by the U.S. Bureau of Outdoor Recreation, rates navigability based on the amount of water discharged and watercourse gradient. *See* Hjalmarson Report, at 26-27. The second standard he used, established by the U.S. Fish and Wildlife Service, rates navigability based on minimum depth and width requirements for canoes, kayaks, and other small watercraft. *Id.* Using these standards as justification, Hjalmarson once again employed the assumption that any stream with a maximum depth of 1 foot for most of the year is navigable. He then constructed a flow duration curve from which he concluded that "[d]uring ordinary years the river was susceptible to navigation 75% of the time." Hjalmarson Report, at 26-27, 30; *see* Gookin Report, Ch. VII, pp. 1-2.

Having disregarded the applicable legal standard, which concerns a river's susceptibility to "the kinds of commercial use that, as a realistic matter, might have occurred at the time of statehood," *PPL Montana*, 132 S.Ct. at 1233, the Commission gives little weight to Hjalmarson's ultimate conclusion that the Santa Cruz River was navigable in its ordinary and natural condition.

Opponents next criticize Hjalmarson's discharge figures. Hjalmarson relied principally on two published reports to determine the natural hydrology of the Santa Cruz: (1) Freethey & Anderson, USGS Hydrologic Investigations Atlas HA-664, Pre-development hydrologic conditions in the alluvial basins of Arizona and adjacent parts of California and New Mexico (1986) ("HA-664"); and (2) a 1952 U.S. Bureau of Reclamation Report on water supply in the Lower Colorado River Basin ("White Book").

Hjalmarson used specific drainage areas from within the Central Arizona reach of the White Book to interpolate average flows between Nogales and Rillito (aka Cortaro).

Gookin argues that proportioning of average flows should only be done using the White Book at points where the River was perennial or nearly so from 1914 to 1945; otherwise, significant parts of the depleted flow, if it had been present in the Santa Cruz River, could have been flowing underground through the sand. Gookin Report, Ch. IV, p. 4. The Commission agrees.

Gookin also argues that HA-664 should not be used as a source of the base flow for the Santa Cruz, and that, Hjalmarson's method for converting the HA-664 plates to numbers is "wrong." *Id.* at pp. 4-5. Gookin is correct that HA-664 is intended to be only "a conceptual model" that depicts the "magnitude" of values for base flow. *Id.*; HA-664 at Plate 1. Nonetheless, the Commission does not agree that HA-664 cannot be used, as Hjalmarson does, to estimate base flow for the Santa Cruz. With regards to Hjalmarson's method for converting the HA-664 plates into numbers, Gookin points out that Hjalmarson lists values for baseflow at points that the HA-664 plates do not have data, including at Tubac and Tucson, and shows no baseflow at Rillito (aka Cortaro), even though the HA-664 plates do show some baseflow at Rillito. Gookin Report, Ch. IV, p. 5. Gookin also aptly notes that Hjalmarson's total for the groundwater flows in and out of the various areas on the HA-664 plates are not always equal to the same totals printed on the HA-664 plates. For example, the HA-664 plates say that 11,000 acre feet per year flow into and out of area 58. Hjalmarson estimates the flow in and out of the same area is 4,100 acre feet per year. *Id.* The Commission agrees.

Opponents also take issue with Hjalmarson's width equation. Hjalmarson relies on the Hydraulic Geometry method to compute the widths of the Middle Santa Cruz River at different flows. (This is the same equation he used for determining the width of the San Pedro.) According to Gookin, in so doing, Hjalmarson "overgeneralizes the equation,

which is meant to predict widths only at specific points, and uses it for the entire river." Gookin Report, Ch. V, p. 1. Gookin also contends that Hjalmarson applied the "wrong" Hydraulic Geometry equations to portions of the Middle Reach, and failed to account for the large margin of error – in other words, Hjalmarson's model (according to Gookin) is not calibrated for the Middle Santa Cruz. *Id.* pp. 1, 8-14; Supp. EIN x008, Transcription of audio tape 3 of 4 ("Trans. 3 of 4"), pp. 3-4.

To be sure, the widths Hjalmarson generated for the Middle Reach appear to understate the actual channel widths in the Record, including USGS measurements and historic photographs of the Santa Cruz River near the Nogales Gage. *See* Gookin Report, Ch. V, p. 1; Trans. 3 of 4, pp. 3-4; Supp. EIN x008, USGS, Historic Photographs at the Santa Cruz River streamflow gaging station near Nogales, Arizona (No.09480500). Additionally, for the reasons discussed below, the Commission finds that Hjalmarson's study likely overestimates stream depth as well.

First, Hjalmarson input his discharge figures into a depth equation that assumes that the Santa Cruz consists of a smooth parabolic channel, despite that the vast majority of Evidence in the Record depicts a highly variable channel, both spatially and temporally. *See* Trans. 3 of 4, pp. 2, 4; Trans. 1 of 4, p. 16; Trans. 2 of 4, pp. 3-5; Gookin Report Ch. VI, pp. 1-2. Second, Hjalmarson's analysis uses maximum cross-section depths instead of average cross-section depths, which appears at odds with his own boating standard, which uses average stream depths. *See* Trans. 2 of 4, pp. 7-8. Burtell testified in detail why average channel depth is evaluated rather than maximum depth, and countered Hjalmarson's criticism of his use of average stream depths by citing several examples in which evaluations of stream depths in navigability contexts were based on average, not maximum, stream depths. *Id.* pp. 5-8. Examples cited by both Burtell and Gookin include the State Report, and the Special Master in *United States v. Utah*, 283 U.S. 64 (1931) ("Utah Decision"). *Id.*; Gookin Report, Ch. VII, pp. 5-6.

Finally, Hjalmarson's analysis assumes the Nogales flow duration curve is a typical curve and uses that curve for all locations on the Middle Reach. But the Record reflects that numerous portions of the Middle Reach from the Continental Gage downstream are ephemeral or intermittent; thus, the Commission finds that using the Nogales curve on these portions of the River is unreasonable. *See* Gookin Report, Ch. IV, p. 8; Trans. 2 of 4, p. 18. The Commission likewise finds Hjalmarson's flow duration curve unreliable to the extent it portrays the Middle Santa Cruz's several ephemeral reaches as containing active flow 90% of the time.

Notwithstanding the above, given the approximate nature of the inquiry and the absence of any contradicting scientific study in the Record, the Commission treats Hjalmarson's study as some evidence of the River's ordinary condition. *See Nw. Steelheaders Ass'n v. Simantel*, 199 Ore. App. 471, 485, 112 P.3d 383, 391 (2005) (cited with approval in *Winkleman*, 224 Ariz. at 241-42, 229 P.3d at 253-54) (expert testimony regarding historic hydrology may be especially probative of a stream's susceptibility to navigation in its "ordinary" condition at statehood). On the other hand, the Commission affords little weight to Hjalmarson's ultimate navigability opinion because it is based on standards that relate to modern, primarily recreational watercraft, and Hjalmarson acknowledged that he made no effort to apply his conclusions to commercial uses or give any consideration to the type of watercraft that would have been used for commercial purposes at the time of statehood.

4. Traditional Navigable Waters Determination

ACLPI submitted a report entitled, "Determination of the Two Reaches of the Santa Cruz River as Traditionally Navigable Waters" dated May 23, 2008 ("TNW Determination"). *See* Supp. EIN x003, TNW Determination. In the TNW Determination,

the U.S. Army Corps of Engineers concluded that two reaches of the Santa Cruz River constitute "traditionally navigable waters" under the Clean Water Act ("CWA"). *See id.*

To the extent that ACLPI argues that the TNW Determination supports its contention that the Santa Cruz River was navigable or susceptible to navigation in its ordinary and natural condition at statehood, the Commission disagrees. The TNW Determination is not based on the navigability-for-title test, but instead appears based on an expansive concept of "traditionally navigable waters" that until recently applied to determine jurisdiction to enforce water quality standards under the CWA. The purpose and meaning of the terms "navigable" and "navigability" under the CWA are not remotely related to how those terms are used in the navigability-for-title context. Further undermining the relevancy of the TNW Determination to the present proceeding is the fact that it relies heavily on post-statehood evidence that drastically exaggerates average flows, apparently without regard to whether the evidence is indicative of ordinary and natural conditions at statehood. This evidence includes the following:

- Mean and average flows based on post-statehood flow data, including *highest and lowest outliers*;
- *Modern-day measurements of effluent flows*;
- A 1951 *post-statehood* account of the Tucson City Engineer navigating the River from San Xavier del Bac Mission to Congress Street in Tucson;
- A 1994 *post-statehood* account of two people canoeing the River for 3 miles;
- A 2005 *post-statehood* account of a radio disk jockey floating down the River *after a large monsoon*;
- Navigation of *manmade* lakes;
- *Modern-day* public accessibility to the relevant reaches of the Santa Cruz; and
- The historic use of *manmade* lakes to power a flour mill.

TNW Determination, at 1.

In sum, the TNW Determination is based on a stream that is made up mostly of effluent water from an upstream wastewater treatment plant, current accessibility to the banks of the River by tourists, and almost exclusively post-statehood accounts of navigation. As such, the Commission finds it is not relevant to its determination of whether the River was navigable or susceptible to navigation in its ordinary and natural condition at statehood.

E. Santa Cruz River's Susceptibility to Commercial Navigation

1. Susceptibility to Navigation Prior to Spanish Exploration

The 2006 Report chronicles archaeological evidence of inhabitation in the Santa Cruz River Valley dating back to approximately 8,000 B.C. *See* 2006 Report, at 19-25. During the period before Spanish exploration, the River was utilized as a source of water for early indigenous inhabitants and sometimes in flood season could be used for irrigation. Gookin Report, Ch. II, pp. 2-3.

Despite a long history of human occupation in the Valley, and the well-documented use of the River as a transportation and settlement corridor in historic times, the State Report found "[n]o archaeological evidence of navigation along the Santa Cruz River." State Report, at 2-32, 3-4. The fact that various archaeological studies found evidence of prehistoric agricultural activities, as well as tools, ceramic artifacts, and ruins containing granaries and dwellings, but no evidence of boating, suggests that prehistoric cultures did not view the Santa Cruz River as a navigable stream, and supports a finding of nonnavigability. *See id.* at 2-32. Nonetheless, because such evidence could have easily been destroyed over time or swept away in a major flood, the Commission finds that the absence of archaeological evidence of boating is not, in itself, sufficient to defeat a finding of navigability.

2. Evidence of Actual Navigation or Susceptibility to Navigation During Early Exploration and Before Anglo-Settlement

Although Pimas lived in the Santa Cruz Valley when the first Spanish travelers or settlers arrived in 1691, there is no Evidence in the Record that they navigated or attempted to navigate the Santa Cruz. Gookin Report, Ch. II, p. 3. Likewise, early Spanish explorers and missionaries, while traveling along the River, did not appear to use watercraft. For example, Father Kino traveled extensively along the River from 1691 until his death in 1711, beginning south of the current international boundary and ending near Santa Cruz Flats. Burtell Decl. ¶ 42 & Fig. 6. During these trips, he visited Indian villages and established missions along the River. His journals from this time period make no mention of boating along the Santa Cruz River, regardless of the season, though he does describe two crossings he made of the Colorado River in November 1701. Burtell Decl. ¶ 42.

Presidios were established in Tubac and Tucson in the mid-1700s. Gookin Report, Ch. III, p. 1. Beginning around 1849, a large number of people traveled along the Santa Cruz River on their way to the gold fields of California. These people, nicknamed "Forty-Niners," passed through the area at all times of the year and during a period when diversions on the River were likely minimal due to Apache unrest. Burtell Decl. ¶ 43. Significantly, none of the numerous accounts by Forty-Niners in the Record ever mentions using the stream as a means of transportation. *Id.* ¶ 43 & Tbl. 2.

Military forts were also established in the area in the early 1800s. Gookin Report, Ch. III, p. 2. Prior to the Civil War, American soldiers stationed at Fort Buchanan, located east of Calabasas along Sonoita Creek, were supplied via wagon trains from the port at Guaymas, Mexico. Burtell Decl. ¶ 44. Small mines were also developed in the nearby Patagonia Mountains during and after the Civil War and were also supplied via Guaymas. *Id.* There is no evidence that the River was ever used to transport equipment,

supplies, or people to military camps and mines at this time, despite that the need clearly existed. *Id.* The need for commercial transportation in the region grew even stronger after the Civil War. *Id.* ¶ 45:

As discussed above in Section V(C)(2)(b), historic accounts from periods of low diversions during the time period before increased American settlement generally agree that the Middle Santa Cruz was a shallow (typically 1 foot or less) perennial stream in some reaches and intermittent/ephemeral in others. Burtell Decl. ¶¶ 28-29 & Tbl. 2; *see also* State Report, at 3-13, 3-15, 3-47; Gookin Report, Ch. I, pp. 2-3. These accounts also indicate a series of gaps in flow along the Middle Reach, some of which would likely have required long portages to navigate. Burtell Decl. ¶ 30 & Tbl. 2. In the lower end of the Middle Reach, from Marana onto the confluence with the Gila River, the River only flowed intermittently and as a result of precipitation. *Id.*

3. Settlement and Conditions in the Santa Cruz River Valley During the Last Half of the 1800s

After the Civil War in 1865, a number of military posts were established in Arizona to quell the marauding Apaches. The end of the Indian Wars in 1886, along with the introduction of the railroad in the mid-1800s, ushered in an era of increased commerce, mining, and ranching in the Santa Cruz River Valley. Again, however, there is no evidence of use of the River for commercial or military navigation during this time. Gookin Report, Ch. III, pp. 1-2. Nor is there any substantiated evidence that the River – as opposed to manmade lakes along the River — was ever used for recreational boating. *See* State Report, at 3-14; Burtell Decl. ¶¶ 46-48. There is some evidence of fish being caught in pools along the perennial reaches of the River, but there is no record that boats were ever used, much less that a commercial fishing industry was ever developed. State Report, at 2-10, 2-12 & Executive Summary, at 3.

a. Types of Commerce Contemplated Prior To and At Statehood

The Record indicates that the following types of commerce were contemplated prior to and at statehood: transport of mining loads, materials, and equipment; transport of agricultural goods; travel or transport of people; and transport of military supplies.

Almost immediately after the Treaty of Guadalupe Hidalgo was signed in 1846, gold was discovered in California, and large numbers of people traveled through Arizona along the River on their way to California. Incidentally, the late 1840s and early 1850s were also a time when there were little to no diversions on the River due to Apache unrest. Burtell Decl. ¶ 43. Mines and military forts were also established in the area in the early 1800s, which further necessitated the transportation of equipment and goods. Gookin Report, Ch. III, p. 2. Given the clear need and undiverted River, the Commission expects there would be some evidence of the River being used to transport people and/or supplies if in fact navigation were possible. However, no such Evidence exists in the Record. Burtell Decl. ¶ 44.

There is also evidence that the handful of small mining operations in the Santa Cruz Valley prior to statehood were stifled from reaching full production potential due to the limited means by which to obtain the newest technologies. Had the Santa Cruz been considered navigable, one would assume that miners and investors would have utilized the River as a means to transport goods and materials necessary for the mines to thrive. State Report, at 3-35. However, no such Evidence exists in the Record.

F. Instances of Boating on the Santa Cruz River

1. Historic Boating Attempts

The Record reveals that human populations have inhabited the area for over 11,000 years, yet there is no evidence of boating on the Santa Cruz River during the early history of inhabitation. State Report, at 2-10, 2-11 & Executive Summary, at 3. Likewise,

although the Santa Cruz River Valley has served as an important trade corridor since prehistoric times, all travel occurred on overland routes along or near the River and not by boat on the River. *Id.* at 3-34 ("No archaeological evidence of navigation along the Santa Cruz River has been found" despite the "well-documented use of the river as a transportation and settlement corridor in historic times"), 3-64; *see also id.* at 6-5 (no evidence that anyone ever attempted to navigate the River in historic times).

Nor is there any evidence of regular trade or travel at any time before statehood. *Id.* at 3-23, 3-28. One of the two instances of alleged boating of any kind on the Santa Cruz prior to statehood is a portrayal by a land speculator that the River was capable of "floating steam boats," which was immediately and widely recognized as "pure fiction." *Id.* Executive Summary, at 5 & 3-36. The only other evidence of historic boating is an unsubstantiated account of a Mexican settler who purportedly constructed a watercraft to cross the River when a road was flooded. *See id.* at 3-32. This account, even if true, occurred during flooding; consequently, it does not support a finding that the River was used or susceptible for use for regular trade or travel in its "ordinary" and "natural" condition.

There is also limited evidence of people boating on manmade lakes in the 1880s, which were created by damming the River for industrial purposes and later washed away by floods in 1890. *See id.* at 3-39, 3-43. This evidence of occasional boating on temporary, manmade (*i.e.*, not natural) lakes does not sufficiently demonstrate the River was susceptible for use as a "highway for commerce" in its "ordinary" and "natural" condition. *See United States v. Oregon*, 295 U.S. 1, 23 (1935) ("At most, the evidence shows such an occasional use of boats, sporadic and ineffective, has been observed on lakes, streams, or ponds large enough to float a boat, but which nevertheless were held to lack navigable capacity.").

2. Post-Statehood Boating Attempts

The Record reflects that the two attempts to navigate the River during flooding in 1914 were unsuccessful. *See* State Report, 3-20, 3-32. That year, the National Guard abandoned a rescue attempt to save people stranded on their rooftops near Sahuarita because the strong and violent currents made using a rescue boat too dangerous (the stranded were ultimately rescued by horseback). *Id.* at 3-20. Also in 1914, three sailors attempted to navigate the River from Nogales to Tucson in a small wooden boat but ran aground shortly after leaving Nogales due to the River's shallow depth and low flow. *Id.*

Although there are a few documented instances of rafters floating the River since the 1970s, it appears that these instances occurred in effluent-dominated reaches and/or during exceptional high-flow events, when the River was neither in its "ordinary" or "natural" condition. *See* Burtell Decl. ¶¶ 50-52; State Report, at 3-62 to 3-64; *see also PPL Montana*, 132 S.Ct. at 1233 (requiring proponent of present-day recreational boating evidence to show that "the river's post-statehood condition is not materially different from its physical condition at statehood," before such evidence can be considered in a navigability-for-title determination). More importantly, however, there been no showing that modern watercraft "are meaningfully similar to those in customary use for trade and travel at the time of statehood." *PPL Montana*, 132 S.Ct. at 1233. Consequently, under *PPL Montana*, the Commission cannot consider this evidence in making its navigability determination.

VI. FINDINGS AND DETERMINATION

The Commission finds, as a matter of fact, that the following physical characteristics existed in the Middle Santa Cruz under ordinary and natural conditions and support a finding that the Middle Reach was nonnavigable: seasonal flows, shallow depths, marshy cienegas, braiding, and a series of discontinuous flows.

The Commission also finds, as a matter of fact, that the geomorphologic Evidence in the Record indicates that the Middle Reach was not susceptible to navigation in its ordinary and natural condition. The Middle Reach had a partly perennial and partly intermittent/ephemeral flow. The Commission further finds that, even in its most favorable condition prior to downcutting and entrenchment, the River was not susceptible to commercial navigation.

Based on all of the new and old Evidence in the Record, the Commission finds that Proponents have not met their burden of showing that any identifiable reach of the Santa Cruz River was used or susceptible to being used, in its ordinary and natural 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 as of February 14, 1912.

In sum, based on all of the Evidence in the Record (both old and new) and the Commission's review of the applicable law, including the principles addressed in *Winkleman* and *PPL Montana*, the Commission finds, as a matter of law and fact, that on February 14, 1912, no segment of the Santa Cruz River was used or was susceptible to being used in its ordinary and natural 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. Thus, it is not and was not "navigable" as defined by A.R.S. § 37-1101(5), and federal case law. The Commission further finds that all notices of these hearings and proceedings were properly and timely given.

In view of the foregoing, the Commission, pursuant to A.R.S. § 37-1128(A), finds and determines that the Santa Cruz River in Santa Cruz, Pima, and Pinal Counties, Arizona, was not navigable as of February 14, 1912.

VII. ADOPTION AND RATIFICATION

The Commission, having considered all of the historical and scientific data and information, documents and other evidence, including the oral and written presentations made by persons appearing at the public hearings and being fully advised in the premises, hereby adopts and ratifies this report containing its findings and determination regarding the Santa Cruz River.

DATED this 28th day of June, 2018.

Wade Noble, Chair

Jim Henness
Deceased, May10, 2018

Jim Horton

Bill Allen

Commission Staff:

George Mehnert
Executive Director

Matthew L. Rojas
Counsel to the Commission

Exhibit A

Evidence Log

Hearing No. 03-002-NAV

Arizona Navigable Stream Adjudication Commission

Santa Cruz County, Santa Cruz River
March 11, 2003

Item Number	Received Date	Source to ANSAC	Description	Entry By
1	6/9/00 approx	Evidence on hand at ANSAC.	Draft Final Report Small &Minor Watercourses Analysis for Santa Cruz County, Arizona dated June 9, 2000.	George Mehnert
2	8/1/00 approx	Evidence on hand at ANSAC.	Final Report Small &Minor Watercourses Analysis for Santa Cruz County, Arizona dated August 1, 2000.	George Mehnert
3	8/16/00 approx	Evidence on hand at ANSAC.	Computer printout pages of PowerPoint slide presentation by Stantec and Jon Fuller, titled ANSAC Public Hearing Santa Cruz County.	George Mehnert
4	9/?/98	Evidence on hand at ANSAC	Small and Minor Watercourse Criteria Final Report.	George Mehnert
5	9/?/99	Evidence on hand at ANSAC	Final Report, 3 County Pilot Study.	George Mehnert
6	Received on various dates.	Evidence on hand at ANSAC previously submitted for watercourse hearings in Santa Cruz County and included in Commission report to legislature, 1 volume.	1. Letter from David Baron dated February 18, 1997. 2. Letter from Al Anderson dated December 26, 1997. 3. Letter from Mark Larken dated February 9, 1998. 4. Memorandum from Lee A. Storey dated February 19, 1998. 5. Comments and Exhibits submitted by Richard Lee Duncan February 22, 1998 6. Letter from James Braselton dated September 19, 1997. 7. Review of	George Mehnert

D

Evidence Log Continuation Page

Hearing No. 03-002-NAV

Arizona Navigable Stream Adjudication Commission

Santa Cruz County, Santa Cruz River
March 11, 2003

Item Number	Received Date	Source	Description	Entry By
			Hydrogeology submitted by Leonard and Philip Halpenny. 8. 1992 Boating Survey by Central Arizona Paddlers Club. 9. Santa Cruz River final report by SFC Engineering, George V. Sabol, SWCA, Inc., and J. E. Fuller, dated November 1996.	
7	1/22/03	Frank C. Brophy Jr	Ltr Re: Babacomari River (Creek), Tributary of the San Pedro River.	
8	3/11/03	Jack August	Paper entitled The Upper Santa Cruz River: History of Lessening Stream.	George Mehnert
9	3/1/03	Brian Woodford	Map of Arizona on which it is alleged Baca Float Number 3 is outlined in red.	George Mehnert
10	3/11/03	Jack August	Paper entitled Baca Float Number Three: An Institutional and Legal History.	George Mehnert
11	3/11/03	Amy Langenfeld	Memorandum submitted for hearing March 11, 2003.	George Mehnert
12	3/10/03	Vera Kornylak	Letter dated 3/7/03 and Book titled The Lessening Stream by Michael F. Logan.	George Mehenrt
13	3/10/03	Vera Kornylak	Sonorensis, Arizona Sonora Desert Museum Newsletter, Summer 1998	George Mehnert
14	3/10/03	Vera Kornylak	Article, Desert Plants by Dean A. Hendrickson and W.L. Minckley.	George Mehnert
15	3/10/03	Vera Kornylak	Article Water Follies by Robert Glennon	George Mehnert
16	3/10/03	Vera Kornylak	Article Arroyos and Environmental Change in the SouthWest by Ronald U. Cooke and Richard W. Reeves—excerpts.	George Mehnert
17	3/10/03	Vera Kornylak	Ariticle, Arizona Highways April 1988, El Rio de la Santa Cruz.	George Mehnert

Evidence Log Continuation Page

Hearing No. 03-002-NAV

Arizona Navigable Stream Adjudication Commission

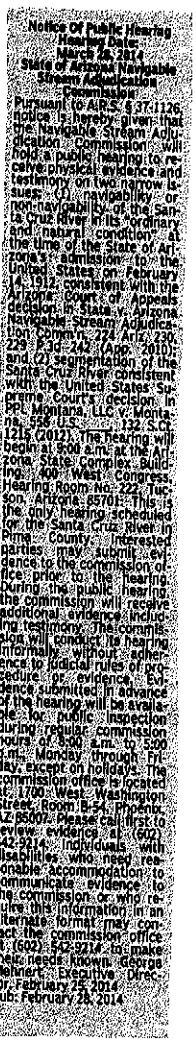
Santa Cruz County, Santa Cruz River
March 11, 2003

Item Number	Received Date	Source	Description	Entry By
18	3/11/03	Cheryl Doyle	Letter from Arizona State Land Department dated March 11, 2003.	George Mehnert
19	1/12/04	Cheryl Doyle	Final Report from J.E. Fuller.	George Mehnert
20	1/20/04	Cheryl Doyle	8 Pages to be added to J.E. Fuller Final Report of 1/12/04.	George Mehnert
21	1/22/04	Cheryl Doyle	10 Pages to replace 8 pages received 1/20/04 to be added to J.E. Fuller Final Report of 1/12/04.	George Mehnert
22	1/23/04	Jeanne Keller	Letter from Jeanne Keller, one page.	George Mehnert
23	7/11/04	Nancy Orr	Letter from Nancy Orr, one page.	George Mehnert

Exhibit B

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC



Notice Of Public Hearing
Hearing Date:
March 28, 2014
State of Arizona Navigable Stream Adjudication Commission

Pursuant to A.R.S. § 37-1126, notice is hereby given that the Navigable Stream Adjudication Commission will hold a public hearing to receive physical evidence and testimony on two narrow issues: (1) navigability or non-navigability of the Santa Cruz River in its "ordinary and natural condition" at the time of the State of Arizona's admission to the United States on February 14, 1912, consistent with the Arizona Court of Appeals decision in State v. Arizona Navigable Stream Adjudication Comm'n, 224 Ariz. 230, 229 P.3d 242 (App. 2010); and (2) segmentation of the Santa Cruz River consistent with the United States Supreme Court's decision in PPL Montana, LLC v. Montana, 556 U.S. ___, 132 S.Ct. 1215 (2012). The hearing will begin at 9:00 a.m. at the Arizona State Complex Building, 400 West Congress, Hearing Room No. 222, Tucson, Arizona 85701. This is the only hearing scheduled for the Santa Cruz River in Pima County. Interested parties may submit evidence to the commission office prior to the hearing. During the public hearing, the commission will receive additional evidence, including testimony. The commission will conduct its hearing informally, without adherence to judicial rules of procedure or evidence. Evidence submitted in advance of the hearing will be available for public inspection during regular commission hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except on holidays. The commission office is located at: 1700 West Washington Street, Room B-54, Phoenix, AZ 85007. Please call first to review evidence at: (602) 542-9214. Individuals with disabilities who need reasonable accommodation to communicate evidence to the commission or who require this information in an alternate format may contact the commission office at: (602) 542-9214 to make their needs known. George Mehnert, Executive Director: February 25, 2014.
Pub: February 28, 2014

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tabitha Weaver, being first duly sworn, upon oath deposes and says: That she is a legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

February 28, 2014

Sworn to before me this
28st day of
February A.D. 2014

MANUEL VARGAS
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 30, 2015

Notary Public

ARIZONA DAILY STAR

Tucson, Arizona

STATE OF ARIZONA)
COUNTY OF PIMA)

Debbie Capanear, being first duly sworn deposes and says: that she is the Advertising Representative of **TNI PARTNERS,** a General Partnership organized and existing under the laws of the State of Arizona, and that it prints and publishes the Arizona Daily Star, a daily newspaper printed and published in the City of Tucson, Pima County, State of Arizona, and having a general circulation in said City, County, State and elsewhere, and that the attached ad was printed and

Legal Notice

published correctly in the entire issue of the said Arizona Daily Star on each of the following dates, to-wit:

FEBRUARY 28, 2014

Debbie Capanear

Subscribed and sworn to before me this 5 day of March, 2014

Lydia Fimbres
Notary Public

LYDIA FIMBRES
Notary Public - Arizona
Pima County
My Comm. Expires Oct 18, 2015

My commission expires

AD NO. 8176462

Notice Of Public Hearing
Hearing Date: March 28, 2014
State of Arizona
Navigable Stream
Adjudication Commission

Pursuant to A.R.S. § 37-1126, notice is hereby given that the Navigable Stream Adjudication Commission will hold a public hearing to receive physical evidence and testimony on two narrow issues: (1) navigability or non-navigability of the Santa Cruz River in its "ordinary and natural condition" at the time of the State of Arizona's admission to the United States on February 14, 1912, consistent with the Arizona Court of Appeals decision in State v. Arizona Navigable Stream Adjudication Comm'n, 224 Ariz. 230, 229 P.3d 242 (App. 2010); and (2) segmentation of the Santa Cruz River consistent with the United States Supreme Court's decision in PPL Montana, LLC v. Montana, 565 U.S. ___, 132 S.Ct. 1215 (2012).

The hearing will begin at 9:00 a.m. at the Arizona State Complex Building, 400 West Congress, Hearing Room No. 222, Tucson, Arizona 85701. This is the only hearing scheduled for the Santa Cruz River in Pima County. Interested parties may submit evidence to the commission office prior to the hearing. During the public hearing, the commission will receive additional evidence including testimony. The commission will conduct its hearing informally without adherence to judicial rules of procedure or evidence. Evidence submitted in advance of the hearing will be available for public inspection during regular commission hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except on holidays. The commission office is located at 1700 West Washington Street, Room B-54, Phoenix, AZ 85007. Please call first to review evidence at (602) 542-9214. Individuals with disabilities who need reasonable accommodation to communicate evidence to the commission or who require this information in an alternate format may contact the commission office at (602) 542-9214 to make their needs known.

George Mehnert, Executive Director. February 25, 2014

Publish February 28, 2014
Arizona Daily Star

AFFIDAVIT OF PUBLICATION

ELISA BERMUDEZ

STATE OF ARIZONA)
: SS
COUNTY OF SANTA CRUZ)

[redacted] being first Duly sworn, deposes and says: That (he) (she) is the Agent to the Publisher of the NOGALES INTERNATIONAL newspaper printed and published two days week in the City of Nogales, County of Santa Cruz, State of Arizona. That the notice, a copy of which is hereto attached, described as follows:

[redacted]

Notice Of Public Hearing
Hearing Date: March 28, 2014
State of Arizona Navigable Stream Adjudication Commission
Pursuant to A.R.S. § 37-1126, notice is hereby given that the Navigable Stream Adjudication Commission will hold a public hearing to receive physical evidence and testimony on two narrow issues: (1) navigability or non-navigability of the Santa Cruz River in its "ordinary and natural condition" at the time of the State of Arizona's admission to the United States on February 14, 1912, consistent with the Arizona Court of Appeals' decision in State v. Arizona Navigable Stream Adjudication Comm'n, 226 Ariz. 20, 229 P.3d 242 (App. 2010); and (2) segmentation of the Santa Cruz River consistent with the United States Supreme Court's decision in PPL Montana, LLC v. Montana, 556 U.S. ___, 132 S.Ct. 1215 (2012). The hearing will begin at 9:00 a.m. at the Arizona State Complex Building, 400 West Congress, Hearing Room No. 222, Tucson, Arizona 85701. This is the only hearing scheduled for the Santa Cruz River in Pima County. Interested parties may submit evidence to the commission office prior to the hearing. During the public hearing, the commission will receive additional evidence, including testimony. The commission will conduct its hearing informally without adherence to judicial rules of procedure or evidence. Evidence submitted in advance of the hearing will be available for public inspection during regular commission hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except on holidays. The commission office is located at 1700 West Washington Street, Room B-54, Phoenix, AZ 85007. Please call first to review evidence at (602) 542-9214. Individuals with disabilities who need reasonable accommodation to communicate evidence to the commission or who require this information in an alternate format may contact the commission office at (602) 542-9214 to make their needs known. George Mehnert, Executive Director, February 25, 2014
Req: MK consultants Inc
Pub: 3/4/14

was printed and published in the regular and entire issue of said

NOTICE OF PUBLIC HEARING STATE OF ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION

NOGALES INTERNATIONAL for 1 issues, that the first was made on the 4th day of MARCH 20 14 and the last publication thereof was made on the 4th day of MARCH 20 14 that said publication was made on each of the following dates, to wit:

03/04/14

Request of MK CONSULTANTS (LEGAL)

NOGALES INTERNATIONAL
268 W VIEW POINT, NOGALES, AZ 85621 (520)375-5760
By

Subscribed sworn to before me this 4th day of MARCH 20 14

Manuel C. Coppola
Notary Public
Santa Cruz County, Arizona
My Comm. Expires 02-20-15

Notary Public in and for the County of Santa Cruz, State of Arizona

My Commission Expires: 2/20/15

STATE OF ARIZONA }
COUNTY OF PINAL } ss.

Notice Of Public Hearing
Hearing Date: March 28, 2014
State of Arizona Navigable Stream
Adjudication Commission

Pursuant to A.R.S. § 37-1126, notice is hereby given that the Navigable Stream Adjudication Commission will hold a public hearing to receive physical evidence and testimony on two narrow issues: (1) navigability or non-navigability of the Santa Cruz River in its "ordinary and natural condition" at the time of the State of Arizona's admission to the United States on February 14, 1912, consistent with the Arizona Court of Appeals decision in State v. Arizona Navigable Stream Adjudication Comm'n, 224 Ariz. 230, 229 P.3d 242 (App. 2010); and (2) segmentation of the Santa Cruz River consistent with the United States Supreme Court's decision in PPL Montana, LLC v. Montana, 556 U.S. ___, 132 S.Ct. 1215 (2012). The hearing will begin at 9:00 a.m. at the Arizona State Complex Building, 400 West Congress, Hearing Room No. 222, Tucson, Arizona 85701. This is the only hearing scheduled for the Santa Cruz River in Pima County. Interested parties may submit evidence to the commission office prior to the hearing. During the public hearing, the commission will receive additional evidence including testimony. The commission will conduct its hearing informally without adherence to judicial rules of procedure or evidence. Evidence submitted in advance of the hearing will be available for public inspection during regular commission hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except on holidays. The commission office is located at 1700 West Washington Street, Room B-54, Phoenix, AZ 85007. Please call first to review evidence at (602) 542-9214. Individuals with disabilities who need reasonable accommodation to communicate evidence to the commission or who require this information in an alternate format may contact the commission office at (602) 542-9214 to make their needs known. George Mehnert, Executive Director.
February 25, 2014
2/28/14
CNS-2593222#
CASA GRANDE DISPATCH

Affidavit of Publication

RUTH A. KRAMER first being duly sworn deposes and says: That he/she is a native born citizen of the United States of America, over 21 years of age, that I am an agent and/or publisher of the Casa Grande Dispatch, a daily newspaper published at Casa Grande, Pinal County, Arizona, Tuesday through Sunday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for ONE issues the first publication thereof having been on the

28TH day of FEBRUARY A.D., 2014

Second publication _____

Third publication _____

Fourth publication _____

Fifth publication _____

Sixth publication _____

CASA GRANDE DISPATCH

By _____
agent and/or publisher of the Casa Grande Dispatch

Sworn to before me this 3rd

day of March A.D. 2014

Debbie L. Mumme

Notary Public in and for the County
of Pinal, State of Arizona

Official Seal
NOTARY PUBLIC, State of Arizona
County of Pinal
DEBBIE L. MUMME
My Comm. Expires 10-23-17

A0000033560 39

Exhibit C

Supplemental Evidence - Santa Cruz River

Item Number	Submitted By	Description	Link
X001	SRP	SRP, Information Regarding Navigability of Selected U.S. Watercourses (April 2003)	PDF
X002	GRIC	~~AINSAC 2006 Santa Cruz Report, V.R. Baker, *Paleoflood Hydrology and Hydroclimatic Change* (1987); H.H. Barnes, Jr., *Programs & Plans - Estimating Flow Characteristics from Channel Size* (1975); J.L. Betancourt, *Tucson's Santa Cruz River and the Arroyo Legacy* (Doctoral Dissertation) (1990); A.C. de la Torre, *Streamflow in the Upper Santa Cruz River Basin, Santa Cruz and Pima Counties*, USGS Water Supply Paper 1939-A (1970); K. Engstrom, *Belle of Louisville: Steamboats and the Ohio River* (2009); A.K.L. Freeman, *Middle to Late Holocene Stream Dynamics of the Santa Cruz River, Tucson, Arizona: Implications for Human Settlement, The Transition to Agriculture and Archaeological Site Preservation* (Doctoral Dissertation) (1997); J.M. Friedman *et al.*, *Channel Narrowing and Vegetation Development Following a Great Plains Flood*, 77(7) Ecology (1996), 2167-2181; C.V. Haynes & B.B. Huckell, *Sedimentary Successions of the Prehistoric Santa Cruz River Tucson, Arizona* (1986); E.R. Hedman & W.R. Osterkamp, *Streamflow Characteristics Related to Channel Geometry of Streams in Western United States*, USGS Water Supply Paper 2193 (1983); H.W. Hjalmarson, *Flood-Hazard Zonation in Arid Lands*, Arid Lands: Hydrology, Scour, and Water Quality (1988); Ronald Hyra, Methods of Assessing Instream Flows for Recreation (June 1978) (excerpts); Jason M. Cortell & Assoc., Inc., *Recreation and instream flow, Volume 1 Flow requirements, analysis of benefits, legal and institutional constraints* (1977); Jason M. Cortell & Assoc., Inc. (1977), *Recreation and*~~	PDF
X003	ACLPI	Letter from Benjamin H. Grumbles to John Woodley, Jr., Assistant Secretary of the Army (Civil Works) (Dec. 3, 2008)	PDF
X003	ACLPI	Thomas H. Magness, US Army, Memorandum re: Determination of Two Reaches of the Santa Cruz River as Traditional Navigable Waters (TNW) (May 23, 2008)	PDF
X004	Freeport	Declaration of Rich Burtell on the Non-Navigability of the Santa Cruz River At and Prior to Statehood (Oct. 2013)	PDF
X005	ACLPI	Hjalmar W. Hjalmarson, PE, Navigability Along the Natural Channel of the Santa Cruz River (From the Mexican border to the mouth at the Gila River near Buckeye, Arizona) (Mar. 20, 2014) (with appendices)	PDF

Supplemental Evidence - Santa Cruz River

Item Number	Submitted By	Description	Link
X006	San Carlos	Letter from Benjamin H. Grumbles to John Woodley, Jr., Assistant Secretary of the Army (Civil Works) (Dec. 3, 2008); Thomas H. Magness, US Army, Memorandum re: Determination of Two Reaches of the Santa Cruz River as Traditional Navigable Waters (TNW) (May 23, 2008); Memorandum to Chairmans of the House Committee on Oversight & Government Reform and Transportation & Infrastructure re: Decline of Clean Water Act Enforcement Program (Dec. 16, 2008); Numerous Internal EPA Emails from 2007-2008 re: TNW Determination	PDF
X007	GRIC	S.F. Turner *et al.*, *Ground-water Resources of the Santa Cruz Basin, Arizona* (May 14, 1943) (excerpts)	PDF
X007	GRIC	T.A.J. Gookin, PE, Navigability of the Santa Cruz River (with appendices)	PDF
X008	Freeport	USGS, Historic Photographs at the Santa Cruz River Streamflow Gaging Station Near Nogales, Arizona (No. 09480500) (2014)	PDF
X008	Freeport	R. Burtell, *Width vs. Discharge of the Santa Cruz River Near Nogales (USGS Gage 09480500) Based on Field Measurements* (Mar. 2014)	PDF
X008	Freeport	ADWR, Arizona Water Atlas, Vol. 8: Active Management Area Planning Area (April 2010) (excerpts)	PDF
X008	Freeport	Kristine Uhlman, *Arizona Nemo*, Santa Cruz River Research Day (Mar. 19, 2010) (excerpt)	PDF
X008	Freeport	Christopher S. Magirl & Theresa D. Olsen, *Navigability Potential of Washington Rivers and Streams Determined with Hydraulic Geometry and a Geographic Information System* (2009) (excerpts)	PDF
X008	Freeport	Jonathan Mabry, *The Ancient Oasis: 4,000 Years of Agriculture and Irrigation in Tucson* (Sept. 23, 2008) (excerpt)	PDF
X008	Freeport	Emails between Steven L. Stockton & Don T. Riley re: Santa Cruz TNW dated June 30, 2008 - July 3, 2008	PDF
X008	Freeport	Robert H. Webb *et al.*, *The Ribbon of Green: Change in Riparian Vegetation in the Southwestern United States* (2007) (excerpt)	PDF
X008	Freeport	JE Fuller/Hydrology & Geomorphology, Inc., Arizona Stream Navigability Study for the Santa Cruz River: Gila River Confluence to the Headwaters (rev'd Jan. 12, 2004)	PDF

Supplemental Evidence - Santa Cruz River

Item Number	Submitted By	Description	Link
X008	Freeport	JE Fuller/Hydrology & Geomorphology, Inc., Arizona Stream Navigability Study for the San Pedro River: Gila River Confluence to the Mexican Border (rev'd Jan. 2004)	PDF
X008	Freeport	William H. Bradshaw, Wyoming Game & Fish Dept, LaBarge Creek Instream Flow Report (Nov. 1990) (excerpts)	PDF
X008	Freeport	Ronald Hyra, Methods of Assessing Instream Flows for Recreation (June 1978) (excerpts)	PDF
X008	Freeport	Ken D. Bovee & Robert Milhous, *Hydraulic Simulation in Instream Flow Studies: Theory and Techniques* (June 1978) (excerpts)	PDF
X008	Freeport	Luna B. Leopold & Thomas Maddock, Jr., *The Hydraulic Geometry of Stream Channels and Some Physiographic Implications* (1953) (excerpts)	PDF
X008	Freeport	Email from Arizona Riparian Council re: State of the Santa Cruz River - Conservation Inventory dated Apr. 7, 2014	PDF
X008	Freeport	Santa Cruz River, Northern Sonora, Mexico - Time Series of Landsat "False Color" images, 2008-2011	PDF
X008	Freeport	*The Vanishing Santa Cruz River*, Sonoran Desert Network (2013)	PDF
X008	Freeport	William R. Krug *et al.*, *Preparation of Average Annual Runoff Map of the United States, 1951-80* (1989) (excerpt)	PDF
X008	Freeport	Ray K. Linsley, Jr. et al., Hydrology for Engineers (3d ed. 1982) (excerpt)	PDF
X008	Freeport	*United States v. Utah*, Report of the Special Master (1930)	PDF
X008	Freeport	Transcript of San Pedro River Hearing in Bisbee, Arizona on June 7, 2013	PDF
X008	Freeport	Transcript of Santa Cruz Hearing in Tucson, Arizona on Mar. 28, 2014 (Audio Tape 1 of 4)	PDF
X008	Freeport	Transcript of Santa Cruz Hearing in Tucson, Arizona on Mar. 28, 2014 (Audio Tape 2 of 4)	PDF
X008	Freeport	Transcript of Santa Cruz Hearing in Tucson, Arizona on Mar. 28, 2014 (Audio Tape 3 of 4)	PDF
X008	Freeport	Transcript of Santa Cruz Hearing in Tucson, Arizona on Mar. 28, 2014 (Audio Tape 4 of 4)	PDF
X009	ANSAC	Transcript of Gila River Hearing, June 16, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, June 17, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, June 18, 2014	PDF

Supplemental Evidence - Santa Cruz River

Item Number	Submitted By	Description	Link
X009	ANSAC	Transcript of Gila River Hearing, June 19, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, June 20, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, August 18, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, August 19, 2014	PDF
X009	ANSAC	Transcript of Gila River Hearing, August 20, 2014	PDF