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**BEFORE THE**

**ARIZONA NAVIGABLE STREAM ADJUDICATION COMMISSION**

IN THE MATTER OF THE NAVIGABILITY  
OF THE VERDE RIVER FROM ITS HEAD-  
WATERS AT SULLIVAN LAKE TO THE  
CONFLUENCE WITH THE SALT RIVER,  
YAVAPAI, GILA AND, MARICOPA  
COUNTIES, ARIZONA

No. 04-009-NAV

**ARIZONA STATE LAND  
DEPARTMENT'S PROPOSED  
FINDINGS OF FACTS AND  
CONCLUSIONS OF LAW  
REGARDING THE VERDE RIVER**

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## INTRODUCTION

1. In 1985, Arizona officials first asserted a sovereign interest in Arizona's streambeds. *Land Dep't v. O'Toole*, 154 Ariz. 43, 739 P.2d 1360 (1987).
2. The Legislature enacted a law in 1987 substantially relinquishing the State's interest in any such lands. Laws 1987, Ch. 127, § 4, effective April 21, 1987.
3. The Arizona Center for Law in the Public Interest filed a lawsuit challenging the legislation, and the court of appeals ultimately found that the legislation violated the public trust doctrine and the Arizona Constitution's gift clause and that navigability – and thus bed ownership – must be determined pursuant to federal law. *Center for Law in the Public Interest v. Hassell*, 172 Ariz. 356, 837 P.2d 158 (App. 1991).
4. The Legislature thereupon enacted statutes establishing the Arizona Navigable Streams Adjudication Commission (ANSAC) and providing for ANSAC to conduct public hearings for all of the watercourses. 1992 Arizona Session Laws, ch. 297.
5. In 1994, as ANSAC began to take evidence on certain watercourses, the Legislature amended the underlying legislation. 1994 Arizona Session Laws, ch. 178.
6. In 2001, the court of appeals struck down the 1994 statutes as inconsistent with the federal test for navigability. *Defenders of Wildlife v. Hull*, 199 Ariz. 422, 18 P.3d 711 (App. 2001).
7. The Legislature once again amended the statutes, to comply with the Court of Appeals' mandate. 2001 Arizona Session Laws, ch. 166, § 1.
8. Pursuant to Title 37, Chapter 7, Arizona Revised Statutes, ANSAC conducted a public hearing on the Verde River on January 18, 2006, and, after post-hearing briefing, found the River to be non-navigable as of February 14, 1912, by unanimous vote.
9. ANSAC issued its Report, Findings and Determination Regarding the Navigability of the Verde River on March 24, 2008.
10. On April 27, 2010, the Arizona Court of Appeals issued its opinion in the matter of *State of Arizona v. ANSAC* [“*Winkleman*”], 1 CA-CV 07-0704 (Lower Salt River), finding that ANSAC had misapplied the *Daniel Ball* test. The court vacated the judgment of the superior court and remanded the matter to ANSAC for further proceedings.
11. On October 21, 2011, the Superior Court remanded all matters to ANSAC for all further proceedings consistent with *Winkleman*.

12. On February 22, 2012, the U.S. Supreme Court issued its opinion in *PPL Montana, LLC, v. Montana*, 132 S. Ct. 2115 (2012).

13. Pursuant to *Winkleman* and *PPL*, ANSAC conducted hearings on the navigability of the Verde River on December 15 - 19, 2014; on February 18 - 20 and 23 - 25; and on March 30 - April 3, 2015.

### **FINDINGS OF FACTS (“FOF”)**

The State’s Findings of Facts and Conclusions of Law may not contain all the facts and law relied upon by the State in its briefs. Notwithstanding, all facts cited within the State’s briefs are supported by the Commission’s official record.

14. The Verde River (the “River”) is a perennial stream that heads in Chino Valley in north-central Arizona and drains between 6,188 and 6,600 square miles of Arizona's high Colorado Plateau and mid-level river basin region. It flows generally southeast through a transitional region between the high, relatively flat Colorado Plateau and the lower Basin and Range province of southern and western Arizona, a region characterized by rugged high mountain ranges and deeply dissected alluvial basins. The uppermost portion of the drainage basin is relatively undissected, but downstream from Chino Valley the River is entrenched into a narrow deep canyon, and it remains so to its confluence with the Salt River, east of the Phoenix metropolitan area. 031, pp. 5-1, 7-3 (ASLD Report)<sup>1</sup>; X001-25, p. 31 (*Log of the Verde*).

15. In the Verde Valley and below Bartlett Dam the valleys are relatively wide. 031, p. 5-3, Fig. 5-1 (ASLD Report).

16. Arizona's basic climatic pattern is for warm and relatively dry summers with intense, late summer monsoonal rainfall, and cool winters with less intense Pacific frontal storms bringing snow to high elevations and rain to lower elevations. 031, pp. 7-24 – 7-25 (ASLD Report).

17. Generally, the amount of rainfall varies with regional topography. 031, p. 7-3

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<sup>1</sup>*Arizona Stream Navigability Study for the Verde River: Salt River Confluence to Sullivan Lake: Draft Final Report*, prepared for the Arizona State Land Department (“ASLD”), November 1993; revised by JE Fuller/Hydrology & Geomorphology, Inc., June 2003. This study considered the River in three reaches: Upper Verde (from Chino Valley to Sycamore Canyon near Perkinsville); Middle Verde (from Sycamore Canyon through Cottonwood, Clarkdale, and Camp Verde, to Fossil Creek); and Lower Verde (from Fossil Creek to the Salt River confluence). 031, pp. 7-1 – 7-2, Fig. 7-1 (ASLD Report).

(ASLD Report). The Mogollon Rim and Black Hills cause moisture-laden air masses to rise and cool, resulting in precipitation along the Rim averaging 18 to 27 inches and in the Black Hills upwards of 18 inches. 031, pp. 7-24 – 7-25 (ASLD Report).

18. Annual precipitation at Granite Reef [on the Salt River just below the Salt-Verde confluence] is 8.9 inches; at Cottonwood, 11.8 inches; and at Prescott, 18.2 inches. 031, p. 7-5, Table 7-2 (ASLD Report).

19. Precipitation rates affect average and high-flow discharge rates in the Verde but not the low-flow discharges because of steady outflow from springs. 031, pp. 7-3 – 7-6 (ASLD Report).

20. There was sufficient water in the Territory from its rivers to irrigate nearly all the arable lands with a system as perfect as that which once prevailed, as evidenced by the ubiquitous acequias found in almost every valley showing that hundreds of thousands of acres now relegated to the desert were once under cultivation. X035-143, p. 361 (*Resources of Arizona*, 1884).

21. Arizona's climate at statehood was generally not very different from its pre-statehood condition; the same basic climatic pattern applied, except that tree-ring calculations and gage records show that the period from 1905 to 1920 was the wettest period since 1580 in the River's watershed. 031, p. 7-24 (ASLD Report).

22. Vegetation in the River's watershed ranges from pine-oak woodlands on the Mogollon Rim and upper elevation areas to Sonoran Desert scrub along the lower River. Significant portions of the watershed upstream of Sullivan Lake are grassland transitioning to chaparral and juniper-pinyon woodland at higher elevations. Along the River, deciduous riparian woodland and emergent marshland communities are found. The extent of marshland in the central Verde Valley was drastically reduced during the period preceding and around statehood. 031, p. 7-4 (ASLD Report).

23. The River's major perennial tributaries are: Granite, Sycamore, Oak, Beaver, West Clear, and Fossil Creeks, and the East Verde River. Other major intermittent or ephemeral tributaries are Williamson Wash, Big Chino Wash, and Partridge Creek. 031, p. 7-3 (ASLD Report).

## **I. Segmentation**

24. ASLD has segmented the River to reflect its changing geology and flows as it

moves downstream. Over its course, there are bedrock canyons and alluvial valleys, and its channel characteristics of depth, width, degrees of pattern and character of rapids, and flow rates, are different for each proposed segment. Tr. 12/15/14, p. 47 (Fuller);<sup>2 3</sup> X035-167, PPT 39.

25. Based on the River's diverse physical characteristics it is appropriate to segment the River as follows:

26. Segment 0-A (from Sullivan Lake to Granite Creek) is rocky and steep with a pool and drop pattern; Segment 0-B (from Granite Creek to Forest Road ["FR"] 638) has a pool and riffle pattern; part is in a narrow bedrock canyon. From Sullivan Lake to FR 638 is 7.1 River Miles ["RM"]. Tr. 12/15/14, pp. 48-61 (Fuller); X035-167, PPT 40-45.

27. Segment 1 (from FR 638 to Sycamore Canyon [30 RM]) has a pool and riffle pattern inside a moderately deep bedrock canyon. Tr. 12/15/14, pp. 61-79 (Fuller); X035-167, PPT 46-52.

28. Segment 2 (Sycamore Creek to Beasley Flat [49 RM]) has a pool and riffle pattern in an alluvial valley. Tr. 12/15/14, pp. 79-92 (Fuller); X035-167, PPT 53-58.

29. Segment 3 (Beasley Flat to Childs [16.5 RM]) is a "whitewater reach" but has a predominantly pool and riffle pattern. Tr. 12/15/14, pp. 92-97 (Fuller); X035-167, PPT 59-64.

30. Segment 4 (Childs to Needle Rock [70 RM]) has a pool and riffle pattern; part is in a bedrock canyon; and it contains two major post-statehood dams. Tr. 12/15/14, pp. 97-113 (Fuller); X035-167, PPT 65-70.

31. Segment 5 (from Needle Rock to the Salt River confluence [19.7 RM]) is in an alluvial valley and has a pool and riffle pattern. Tr. 12/15/14, pp. 113-116 (Fuller); X035-167, PPT 71-76.

## **II. Hydrology and Geomorphology**

### **A. Flow**

32. The earliest historical and archaeological records indicate the presence of

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<sup>2</sup>Transcript of ANSAC hearing. The name of the testifying witness appears in parentheses.

<sup>3</sup>Jon Fuller has performed Section 404 permitting work on the River, which is directly related to an assessment of the River's ordinary and natural condition and of the ordinary high water marks of the River's current condition. He has performed various studies: floodplain (for 30 years), erosion hazard, and hydrology; in addition he has prepared master plans in tributaries, particularly in the Verde Valley. Tr. 12/15/14, pp 13 (Fuller); X035-167, PPT 6.

reliable, perennial, flow in all three reaches of the River. 031, p. 7-5 (ASLD Report).

33. Early descriptions of the River include discussions of flowing water (as opposed to descriptions of dry or intermittent flow mentioned in early descriptions of some other Arizona rivers) and of beaver and fish populations, as well as occasional floods. 031, p. 3-22 (ASLD Report).

34. Discharge from springs in the highest reach insulates the River's low flows from the effects of climatic variation. 031, p. 7-12 (ASLD Report).

35. The River is perennial, spring fed, and [was] a gaining stream in its ordinary and natural condition through Segment 4 but a losing stream in Segment 5 - the only Segment in which (a few) sandbars are found. Tr. 12/15/14, p 190 (Fuller), X035-167, PPT 154.

36. Vincent Randall, an elder of the Apache Tribe, testified that the Apache name for the River above Beasley Flat, Tu Cho Lii, means a big wide river, and below Beasley Flat, the River is named Tu Cho Linii, meaning a “real big river, swift and hard – a lot more water and it moves faster,” which indicates a change in the River’s character at this point. Tr. 2/20/15, pp. 1753-54; 1782-84 (Randall).

37. Records from an 80-year period of time show a discharge of 657 cfs near the mouth. X001-25, p. 31 (*Log of the Verde*, Birkit, 1978).

38. The United States Geological Survey (USGS) operated two gages before statehood: near McDowell [Segment 5], established in 1888, and near Camp Verde [Segment 2], established in 1911. 031, pp. 7-5, 7-8 (ASLD Report). The USGS installed other gages after statehood. 031 p. 7-8 (ASLD Report).

39. ASLD has used data from these gages to estimate the River's flows and has verified the numbers from numerous other sources, including tree-ring data. Using the USGS data alone results in underestimating the flow because of pre-gage diversions and groundwater depletion. Tr. 12/15/14, pp. 191-93; X035-167, PPT 155.

40. The flows of the Salt and Verde Rivers have been measured for the longest period and most accurately of all of the irrigating streams in Arizona. X001-26, p. 39 (*Irrigation and Agricultural Practice*).

41. Annual flow measurements of the River below Bartlett Dam [Segment 5] for the water years 1888-1986 are: 493,000 acre feet [“af”] (mean); 391,000 (median) af. X017-118, p. 11 (*Predevelopment Hydrology*).



42. The average annual discharge of the predevelopment Salt-Verde drainage basin equals 1,250,000 af, based on recorded data, results of tree-ring studies, and estimates of upstream diversions and reservoir evaporation. The median annual discharge is estimated at 950,000 af. X017-118, p. 12 (*Predevelopment Hydrology*).

43. Historical accounts of the River and other reports on its hydrology corroborate the USGS gage readings. 031, pp. 7-1, 7-10 – 7-12 (ASLD Report).

44. The River's flow fluctuates seasonally in a regular pattern: higher in winter and lower in the summer. Tr. 12/15/14, pp. 34-35, 193-94 (Fuller); X035-167, PPT 26; 156-58, 60; X053-174, PPT 159; Tr. 12/16/14, p. 320 (Lynch). Low flow in May and June is now partially due to increased diversions for irrigation. Tr. 12/15/14, p. 199 (Fuller); X035-167, PPT 160; Tr. 12/16/14, p. 300 (Lynch). May is one of the driest months. High flows are common in February and March; flow is variable during that time. Tr. 2/18/15, pp. 1337-38 (Hjalmarson). High flow periods on the River typically occur from January to April and have average monthly flow rates in excess of 1,000 cfs.

45. Seasonal fluctuations are normal and predictable on the Verde, as they are on all rivers. The ordinary condition of the River is between 90% and 10% duration; thus, 80% of the time the River's flows are within the normal range. Tr. 12/15/14, pp. 193-94 (Fuller); X035-167, PPT 156-60.

46. Upstream of the dams, the River's flow has diminished due to diversions; downstream of the reservoirs there is decreasing duration of low flows, and the seasonal variation has been changed to fit the needs of downstream users. Tr. 12/15/14, pp. 200-01 (Fuller); X035-167, PPT 161-63.

47. Data from modern non-natural USGS gages show the following flow numbers in each Segment. The first number represents the median flow rate; the second number represents the 90% flow rate, meaning the River has at least this flow 90% of the time. Segment 1: 26 cfs/22 cfs (the small variation is because the River here is spring-fed); Segment 2: 86 cfs/70 cfs; Segment 3: 188 cfs/82cfs; Segment 4: 240 cfs/123 cfs; Segment 5: 781 cfs (the McDowell gage is not a USGS gage and shows no flow duration curve). The downstream increase in flow is from tributaries. Tr. 12/15/14, pp. 196-199 (Fuller); X053-174, PPT 159; X035-167, PPT 160.

48. The USGS data underestimate the River's virgin flows. Tr. 12/15/14, pp. 191-2

(Fuller).

49. The hydrology of today's River has been impacted by irrigation diversions and return flow, groundwater pumping, evapotranspiration, groundwater-surface interactions, reservoir impoundments, and watershed impacts including grazing, timber, and fire. 031, p. 7-4 (ASLD Report).

50. Win Hjalmarson calculated the River's virgin flow three ways and assessed the River's base flow at 200 cfs 90% of the time; median flow at the mouth at 550 cfs 50% of the time; and the average annual flow at 750 cfs. These numbers are consistent with the 2005 USGS study. Tr. 12/18/14, p. 1004 (Hjalmarson), X036-1, PPT 70; Tr. 2/18/15, pp. 1390-96 (Hjalmarson); X059, Supp. 6, pp. 66-69; Supp. 8, pp 99-100; X036-2, p. 60.

51. The River's ordinary and natural flow was 60 cfs at Sullivan Dam near the headwaters and 116 cfs at Clarkdale. Tr. 2/18/15, p. 1248 (Hjalmarson); X015 (Hjalmarson Report), p. 7.

52. Mr. Hjalmarson calculated the River's mean annual virgin flow, adjusted for loss from evapotranspiration, at 78 cfs at the Paulden gage and 210 cfs at the Clarkdale gage; calculated another way, the River's mean annual virgin flow at three gages was 76 cfs, 207 cfs, and 494 cfs. Tr. 2/18/15, pp. 1253-54 (Hjalmarson); X015, pp. 27-28 (Hjalmarson Report).

53. For centuries, humans and ecosystems have been sustained by base flow in the Verde River and its perennial tributaries. X080, p. 3 ("Spatial and Seasonal Variability").

## **B. Depth**

54. Mr. Hjalmarson, an expert in river gages, has provided median depths for eleven points on the River: 2.4, 2.6, 3.9, 2.4, 3.3, 3.1, 4.2, 2.5, 1.9, 3.0, 3.1 feet. Tr. 12/19/14, pp. 1102-03 (Hjalmarson), X036-1, PPT 90.<sup>4</sup>

55. The Upper River, from RM 3.3 downstream to the Clarkdale gage was at least three feet deep 90% of the time in its natural condition. Tr. 12/18/14, pp. 1023 (Hjalmarson), X036-1, PPT 91.

56. GLO surveyors provided reliable observations regarding the River's depths in

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<sup>4</sup>Mr. Hjalmarson has evaluated rating curves for 2,000 gages in the Western United States and for all of the gages in Arizona as a service water specialist; as a former USGS employee, he was involved in placing the gages at Paulden and Clarkdale. Tr. 12/18/14, pp. 969-72; 1063-72 (Hjalmarson); X036-1, PPT 36.

their surveys, information that is consistent with other historical observations. The GLO depth information provided a general characterization of the River in that area during the period of their observation. Tr. 4/03/15 (Fuller), pp. 3505-07.

57. Federal surveyors generally found depths of at least three feet. A crossing on the middle Verde averaged three feet; depths of three and four feet were recorded at other parts of the lower River. The surveyors noted some depletion from irrigation and mining diversions. Tr. 12/18/14, pp. 1028-29 (Hjalmarson), X036-1, PPT 100.

58. There was consistency in flow and depth throughout the River. Tr. 12/18/14, p. 1034 (Hjalmarson).

59. Actual depths vary from average depths – rating curves, depending on the geometry of each river and material of the bed, such as in a pool and riffle pattern. Tr. 12/15/14, pp. 209-12 (Fuller); X035-167, PPT 171-73.

60. Numerous pools were more than 2.9 feet deep. Tr. 2/18/15, p. 1248 (Hjalmarson).

61. ASLD's stated rating curves underestimate actual conditions, but still come within federal minimum boating requirements (except for Segment 0). Tr. 12/15/14, p 214 (Fuller); X035-167, PPT 173.

### C. Channel Configuration

62. The main, or low-flow, channel is where the water is most of the time and is within the ordinary high water mark. Occasionally, the main channel may split. Tr. 12/15/14, pp. 16-17, 22 (Fuller); X035-167, PPT 10.

63. When a river starts to flood it inundates land that is usually dry – that is the flood channel. Tr. 12/15/14, p 18 (Fuller); X035-167, PPT 11.

64. The bankfull concept is when the frequency of discharge shapes the main channel; the main part of the channel fills with water – where most of the geomorphic work gets done – moving the water and sediment. Tr. 12/18/14, pp. 884-85 (Fuller).

65. The large rivers in Arizona have compound channels consisting of the main or low-flow channel within the flood channel. Tr. 12/15/14, pp. 19, 23 (Fuller); X035-167, PPT 13 (Army Corps of Engineers definition of compound channel).

66. All along the River, a low-flow channel exists that conveys the perennial base-

flow discharges.<sup>5</sup> Typically, in modern times, this channel is a few feet deep, about 50 to 299 feet wide, and is located within a larger channel that is shaped by annual large floods. This is a “compound channel.” 031, pp. 5-6, 5-15 (ASLD Report); Tr.12/15/14, pp. 187-88 (Fuller); X035-167, PPT 151.

67. The wet part of the River, the main channel – not the braided flood channel – is where boating occurs. Tr. 12/15/14, pp. 20-21 (Fuller); X035-167, PPT 12. Braided, meandering, compound rivers can be navigated if there's enough water to float a boat. Tr. 12/15/14, p. 29 (Fuller); X035-167, PPT 21.

68. The River flows through a series of bedrock canyons and intervening alluvial valleys. Even in the alluvial reaches, the River is incised into sediments. Tr. 1/18/06, pp. 17-20 (Pearthree).

69. The River's channel is a typical natural channel that migrates laterally by erosion of one bank and deposition on the other; it remains a single channel. This was so even after the 1891 flood. Tr. 12/18/14, pp. 1025-26 (Hjalmarson).

70. The channel pattern is dominantly (95%) a single sinuous channel; there is local braiding at some riffles. 031, p. 5-6 (ASLD Report); Tr. 12/15/14, p 188 (Fuller); X035-167, PPT 151.

71. Surveys in 1873 and 1877 in the Verde Valley [Segment 2] document a through-going stream about two feet deep and 50 to 100 feet wide with a sandy bottom. 031, p. 5-15 (ASLD Report).

72. Cadastral surveys from the 1870s record evidence of a continuous low-flow channel similar to the modern low-flow channel. Tr. 12/19/14, p. 1186 (Hjalmarson, citing Pearthree).

73. In calculating the natural channel depth, Hjalmarson used representative cross-sections from the U.S. Forest Service [“USFS”]. He used Manning’s equation, conveyance and slope computations – standard engineering practice – to put the flow information together with the cross sections. Tr. 12/18/14, pp. 1060-62; 12/19/14, p. 1084 (Hjalmarson).

74. Widths shown in pre-statehood federal surveys and as shown by the U.S.

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<sup>5</sup>Historical aerial photographs, data, and notes from land surveys were used to evaluate the nature of any possible changes in character or position of the River's channels. 031, p. 5-7 (ASLD Report).

Geological Survey [“USGS”], Sierra Club, and Forest Service, support the conclusion that the upper reach had 30 cfs more base flow pre-statehood. Tr. 12/19/14, pp. 1089-90 (Hjalmarson).

75. Nineteenth century surveys show wider channels than present-day channels because there was more water then. Tr. 12/18/14, p. 1020 (Hjalmarson), X036-1, PPT 88.

76. The River's low-flow channels are located within larger floodplains that are shaped by annual and large floods. 031, p. 5-6 (ASLD Report). Low-flow channels wind through the floodplains [the Verde Valley (Segment 2) and the Lower Verde (Segments 4, 5)] and are often lined with trees because of the perennial flow. 031, p. 5-26 (ASLD Report); Tr. 1/18/06, p. 20 (Pearthree).

77. Where the River is confined within narrow valleys [Segments 1 and 3], the floodplain is limited and potential for changes in low-flow channel position is also limited. Therefore, the channel positions were about the same at statehood as they are today. *See* 031, p. 5-26 (ASLD Report).

78. Although the low-flow channels in the alluvial valleys have shifted positions over time, large-scale features of the flood plains have been fairly consistent. The size and general form of the low-flow channel in the Verde Valley [Segment 2] has not changed significantly from the 1870s. 031, p. 5-26 (ASLD Report).

79. In the alluvial reaches, large floods change the position of the low-flow channels, but their geomorphic characteristics (width and pool-and-riffle sequences) do not change. Tr. 1/18/06, pp. 24, 27 (Pearthree); Tr. 1/18/06, p. 28 (Fuller).

80. The River's flood plains vary in width, from about 200 feet in the confined areas [Segments 1 and 3] to 3,000-4,000 feet in the Verde Valley [Segment 2] and the Lower Verde [Segments 4 and 5]. 031, pp. 5-6, 5-26 (ASLD Report).

81. The River has no waterfalls but has Class I and II riffles defined by boulders, a couple of Class IIIs, and one Class IV - Verde Falls, which is created by bedrock. Tr. 12/15/14, p. 190 (Fuller); X035-167, PPT 154.

82. A 1923 USGS topographical map of the Camp Verde quadrant shows the River in Segment 2 as a solid line, meaning a continuous perennial river. This map lists no rapids and shows several ford crossings. In 1932, another USGS topographical map, again in the Camp Verde quadrant, shows the River as a solid but wider line below Oak Creek. Its

channel is in basically the same location as it is today. Tr. 12/5/14, pp. 137-38 (Fuller); X035-167, PPT 100-01.

83. A 1929 USGS topographical map shows the River in Segment 3 as a single channel in the same location as today. Tr. 12/15/14, pp 138-39 (Fuller); X035-167, PPT 102.

84. USGS topographical maps from Turret Peak and Cave Creek quadrants dated 1929 and 1930 show the River in Segment 4 as dominantly a wide, single channel (with some occasional splitting) in the same location as today. Tr. 12/15/14, pp. 139-51 (Fuller); X035-167, PPT 103-04, 109 (1932 photo looking upstream at proposed Bartlett Dam site), 125 (1934 photo showing River at Horseshoe Bend as a dominantly single channel).

85. A 1904 USGS topographical map near Fort McDowell and the 1930 map show that the channel in Segment 5 moved during this time. The maps also show irrigation canals and ford crossings. A photograph from 1932 shows the River as a single channel. Tr. 12/15/14, pp. 140-41; 141 (Fuller); X035-167, PPT 105, 126.

86. No braiding is shown on the River in early USGS maps. Tr. 12/18/14, pp. 964-65 (Hjalmarson); X036-1, PPT 18.

87. There is always a low-flow channel no matter what the level of the River is. Tr. 12/16/14, p. 476 (Farmer).

#### **D. Floods**

88. A flood is the inundation of normally dry land which overtops the ordinary high water mark; it is not expected seasonal high flow. Tr. 12/15/14, pp. 14-15 (Fuller); X035-167, PPT 9.

89. All rivers are subject to drought and floods. Tr. 2/23/15, p. 2030 (Mussetter).

90. Floods leave persistent marks on the floodplain and move around boulders, sand, and vegetation, but it is the ordinary flows that shape the main, or low-flow, channel, which returns after being inundated. Tr. 12/15/14, pp 30-33; X035-167, PPT 23 (photos of River near McDowell [in Segment 5] from 1992 and 2014, showing the low-flow channel in almost the same place as before the 1993 flood).

91. The 1891 flood, one of the largest in 1,000 years, may have caused a considerable amount of change in flood-channel position and morphology. 031, p. 5-12 (ASLD Report); Tr. 1/18/06, p. 26 (Pearthree). However, data show no significant changes in flood channel positions in Segments 2 and 5 after the flood. 031, pp. 5-8, 5-12, Fig. 5-3a

(ASLD Report); Tr. 12/15/14, pp. 188-89 (Fuller); X035-167, PPT 152; X053-174, PPT 153.

92. Large floods also occurred in 1868, 1874, 1888, and in 1905. 031, p. 7-21 (ASLD Report).

93. Except at the Paulden station, the largest floods occurred during winter-type storms. 031, p. 7-21 (ASLD Report).

94. Floods account for less than 1% of the year. Tr. 12/15/14, p. 195 (Fuller); Tr. 2/23/15, p. 2076 (Mussetter).

95. In August of one year, a flash flood prevented commercial boating in Segment 2; that lasted for one day. Tr. 12/16/14, pp. 307-08 (Lynch).

96. Photographs show the upper River [Segment 1] before the 1993 flood and after; the channel is in about the same positions. Tr. 12/18/14, pp. 975-76 (Hjalmarson); X036-1, PPT 41.

97. In a large storm, the water would take about two days to reach the Salt from Camp Verde; smaller events might take up to four days, and sometimes a flood dissipates over the course of its journey. Tr. 4/03/215 (Fuller), pp. 3513-14.

### **III. Ordinary and Natural Condition and Subsequent Changes**

98. For many thousands of years the River's waters have been a magnet for all animals, including man. X001-25, p. 31 (*Log of the Verde*).

99. People have occupied this area for at least 14,000 years. 031, p. 2-5 (ASLD Report). Irrigation has been practiced along the River since prehistoric times. 031, pp. 3-15 – 3-16 (ASLD Report); X001-25, p. 31 (*Log of the Verde*); X001-26, p. 9 (*Agricultural Practice*).

100. Among the irrigators were the Hohokam, who left the Verde area around 1425 A.D. Yavapai and Apache people arrived thereafter. 031, pp 2-5 to 2-6 (ASLD Report); Tr. 2/24/15, p. 2326 (August); X055-1, ¶ 24 (Randall Affidavit).<sup>6</sup>

101. The Anglo settlement period of the late 1800s to early 1900s initiated new water diversions throughout the Verde Valley and Perkinsville [Segments 2 and 1] for agriculture in the same areas as Paleo-Indians had irrigated. X011-58, p. 33 (*Pictorial Perspective*).

102. When the Anglo settlers arrived, they started taking water from the River right away. Tr. 2/20/15, p. 1839 (Randall).

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<sup>6</sup>For more information on indigenous populations, see § IV(A).

103. The River would probably have been in its natural condition close to when the earliest irrigation canals were taken out – roughly in the 1860s or 1870s. 2/19/15, p. 1665 (Littlefield).

104. The River's natural condition was predevelopment. Tr. 2/23/15, p. 1943 (Mussetter).

105. The River was in its ordinary and natural condition in about 1866-1870. Tr. 2/25/15, p. 2429 (August).

106. A 19<sup>th</sup> Century writer noted that the River carried almost as much water as the Gila and that it formed several small but exceedingly rich and beautiful valleys, many of them under a high state of cultivation: “The waters of the Verde are clear and limpid; its banks are shaped by a fine growth of cottonwood, ash, box-elder, maple and many other varieties; it is well stocked with fish and is one of the most beautiful streams in the Territory.” X035-143, p. 49 (*Resources of Arizona*, 1884).

107. Many irrigation ditches had been built by the late 19<sup>th</sup> century. Settlers provided grain for the military forts, and troops raised many crops. By 1880 most of the arable land was under cultivation. 031, pp. 3-15 – 3-16 (ASLD Report).

108. In 1884, a dam was built on Miller Creek (to store water for Prescott) and in 1899, a dam was built on Granite Creek [Miller Creek connects to Granite Creek which connects with the River in Segment 0]. X011-58, p. 34 (*Pictorial Perspective*).

109. After a period of exceptional flooding in 1891, which caused erosion of many feet of surface soil, ancient canals were exposed “in perfect state of preservation.” 031, p. 3-14 (ASLD Report).

110. By 1901, there were 79 diversions on the River and its tributaries from the headwaters to Fossil Creek [Segments 0 through 3]. X001-26, opposite p. 76 (*Agricultural Practice*).

111. Several ranches operated along the Upper Verde and around Cottonwood [Segments 1 and 2]; one rancher ran 10,000 head of cattle. 031, pp. 3-16 (ASLD Report).

112. By 1904, the River's channel had been changed by overgrazing:

The Verde River thirty years ago [in the 1870s] had a well-defined channel. Today it is so badly silted that irrigation is rendered expensive and difficult. To an unprejudiced mind the cause is easily discovered. Goats, sheep and cattle have closely browsed the brush.



032, pp. 130-31 (Littlefield 2005 Report, citing S.J. Holsinger, *Report on the Proposed Verde River Forest Reserve*, 3/19/04).

113. The Apache had specific crossing places on the River, and in the old days when the River was flowing, they would have to carry children under age ten across. Tr. 2/20/15, pp. 1786 (Randall).

114. Water from Fossil Springs was harnessed a hydro-electric plant at Childs [in Segment 4] in 1909. The water ultimately returned to the River. Arizona Power Company built a second plant in 1915, this one on Fossil Creek, as part of that system. In the 1920s, this hydro-electric operation provided electricity for local towns, and 70% of the electricity used in Phoenix. 031, pp. 3-10, 3-17 (ASLD Report); X002-25, p. 45 (*Log of the Verde*).<sup>7</sup>

115. In the early 20<sup>th</sup> century, United Verde Exploration built a smelter in Cottonwood, and Phelps Dodge built a smelter in Clarkdale. Before the Clarkdale smelter began operation, the River had a very lush riparian corridor, like a jungle; afterwards all the cottonwoods and willows were gone. Tr. 2/20/15, pp. 1804-07(Randall).

116. Human stresses on the River's hydrologic system and from outside the Verde Valley [Segment 2] since 1910 are estimated to have decreased the River's base flow. X001-31, pp. 28-29 (*Human Effects*).

117. Wells, climate change, drought, and overgrazing, have had an impact on the River: without grass the water runs off bare ground into the River instead of going into the earth to replenish the water table. Tr. 2/20/15, p. 1833 (Randall).

118. By 1911, the Verde River country had been overgrazed for many years; consequently floods were more sudden and wasteful of water, the minimum flow was less, and more prolonged and great amounts of sediments were carried by the aggregate runoff from comparatively bare land surfaces. X001-26, p. 38 (*Agricultural Practice*).

119. In the late 19th Century, cattle grazing materially changed the River: streamside vegetation was diminished, allowing erosion at spring runoff. X100-28, pp. 190-91 (13th Annual Report, Bureau of Ethnology, 1891-92).

120. Nevertheless, in 1911 the River had constant flow. X001-26 [see map opposite p. 27] (*Agricultural Practice*).

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<sup>7</sup>These plants were decommissioned in 2010. X055-1, Affidavit of Vincent Randall, p. 2, ¶ 7.

121. By 1914, 25 diversions diverted more than 121 cfs for more than 5,000 acres of farm land between Perkinsville and the Salt River, most of them in the Verde Valley [Segment 2]. 031, pp. 7-22 - 7-23, Table 7-16 (ASLD Report). This does not include divisions in the Upper Verde at the headwaters.

122. There was more flow in the River when it was in its ordinary and natural condition because the water is now being used for storage, drinking, irrigation, and some of it evaporates, but there is still sufficient water left to float boats. Tr. 12/15/14, p. 45 (Fuller); X035-167, PPT 35.

123. The River in Segments 1, 3, and 4, is now in a substantively similar condition except for diminished flows and the dams. Tr. 12/15/14, p 229 (Fuller). The types of changes that have taken place in Segments 2 and 5 make the River less navigable than it was when it was in its ordinary and natural condition. Tr. 12/15/14, pp. 229-30 (Fuller).

124. In general, the River's natural condition has been altered by irrigation diversions, groundwater pumping, post-statehood dams, and some physical alteration of the channel.<sup>8</sup> Tr. 12/15/14, pp 43-44 (Fuller); X035-167, PPT 33-34.

125. Sullivan Dam [in Segment 0-A] and Bartlett Dam [in Segment 5] were closed in 1939; Horseshoe Dam [on the border of Segments 4 and 5] was closed in 1948. 031, p. 3-10 (ASLD Report); X011-58, p. 34 (*Pictorial Perspective*).

126. The River, in its ordinary and natural condition, met all of the elements of the federal test for navigability. Tr. 12/15/14, pp. 254-56 (Fuller); X035-167, PPT 220-21.

127. An 1871 newspaper article stated that “the river afford[s] abundant water [for irrigation] at all seasons.” Tr. 3/30/15 (Burtell), p. 2742, discussing Arizona Weekly Miner article, 9/23/1871 (X037-8). [The context of the testimony is irrigation near the headwaters but the article doesn't say where on the river it's addressing.]

#### **IV. General Information**

##### **A. Prehistory**

128. Settlement patterns, architectural, and artifactual traits, and site structure demonstrate that the River has been a communication and trade link for various cultures since prehistoric times. 031, p. 2-11 (ASLD Report).

129. The River has provided accessible, permanent water since the time of its first

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<sup>8</sup>For a full list of irrigation ditches and diversions, see 031 p. 7-23, Table 7-16 (ASLD Report).

inhabitants. It provided water for irrigation for at least 1,000 years. The irrigation systems supplanted floodwater farming and resulted in greater control and stability of agricultural production, including surpluses, and supported a greater population. 031, pp. 2-9, 2-11 (ASLD Report).

130. Paleo-Indians occupied the open valleys of the River [Segments 2 and 5]. Their agricultural activities, including farming, exploitation of fish and wildlife for domestic use, probably affected riparian conditions. X011-58, pp. 31-32 (*Pictorial Perspective*).

131. On the upper Verde [Segments 1 and 2], archaeologists found evidence of ancient human habitation with sites of up to one hundred houses and evidence of Hohokam irrigation canals. The Hohokam abandoned the area around 1425 A.D., and Yavapai people arrived thereafter. 031, pp. 2-5 – 2-6 (ASLD Report).

132. On the Middle Verde [Segments 2 and 3], where the floodplain is generally broader with landforms as diverse as mesas, ridges, and canyons, archaeological evidence shows that various peoples raised crops beginning in 1 A.D. Irrigation canals were built and crops were raised such as corn, beans, squash, and cotton. 031, pp. 2-6 – 2-7 (ASLD Report).

133. In the Lower Verde [Segments 4 and 5], the floodplain broadens and the topography decreases from mountainous terrain to gently sloping bajadas. People practiced irrigation here also, and there is evidence of water conservation features consistent with dryland farming, apparently to maximize diversity in agricultural strategies. 031, pp. 2-7 – 2-8 (ASLD Report).

134. The Hohokam entered the Lower Verde Valley [Segments 4 and 5] in about 700 A.D. At least 26 settlement sites have been found near present-day Bartlett and Horseshoe Dams. Some sites include aqueducts, ball courts, canals, and multilevel compounds. The Hohokam irrigated from the River, raising corn, tobacco, cotton, agave, and squash; they gathered mesquite beans and cactus fruit.

135. The Yavapai, semi-nomadic hunter-gatherers, arrived in about 1300 A.D. and came to dominate the whole Verde area. X067-1, pp. 4-5 (August Declaration); Tr. 2/24/15, pp. 2327-28 (August).

136. The Apache were also in the area; for “millennia,” the Yavapai and Apache peoples relied on the River and surrounding springs, seeps, and creeks, to provide for all the elements of life. X055-1, ¶ 24 (Randall Affidavit).

137. The Apache traded with the Navajo, but their biggest trading partners were the Hopi, who were located near present day Winslow, not connected by a water route, whom they reached by overland travel. Tr. 2/24/15, p. 2329 (August); 2/20/15, pp. 1792-94 (Randall).

138. Some Indians were still irrigating from the River when the Spanish came through. Tr. 2/25/15, pp. 2509-20 (August).

#### **B. Spanish Exploration**

139. The first Spanish to visit the area were Antonio Espejo in 1583 and Marcos de Farfan in 1598 or 1599. They traveled by horse, seeking a northwest passage and following up on rumors of gold and minerals. Both expeditions kept records. Tr. 2/24/15, pp. 2329-31; 2336 (August); X067-1, p. 5 (August Declaration).

140. Espejo and his party descended Beaver Creek from the east [Beaver Creek joins the River in Segment 2] in May 1583 and ascended the River, probably the first non-Indians to do so. They encountered rancheria-dwelling, forager-farmer groups of Indians, peaceful rustic people who also worked mines near present-day Jerome [Segment 2]. X017-120, p. 283 (*Vanishing River*); 031 pp. 3-2, 3-8 (ASLD Report).

141. Espejo, while visiting the mines at Jerome, noted “great groves of walnut trees” along the banks of the River, most likely at the confluence of either Sycamore Creek [at Segment 1/2] or Oak Creek [in Segment 2]. He also visited the Camp Verde area [Segment 2]. X011-58, pp. 27, 32 (*Pictorial Perspective*).

142. In 1598, Don Juan de Onate sent Farfan to check on the mines at Jerome. X011-58, p. 32 (*Pictorial Perspective*).

143. Ornate crossed the River between present-day Camp Verde and Clarkdale [in Segment 2] in 1604, en route to the Colorado River and the Pacific Ocean. X011-58, p. 32 (*Pictorial Perspective*); X017-120, p. 283 (*Vanishing River*); Tr. 2/24/15, pp. 2336-37; 2339; Tr. 2/25/15, p. 2460 (August). He traveled by horse, with a military and religious escort. Tr. 2/24/15, p. 2340 (August).

144. Father Eusebio Kino, a Jesuit priest, traveled in the Lower Verde area from 1687 to 1711, but he did not go up the River. He brought 20 cattle that ultimately became a herd of 70,000, and he mapped 200-225 square miles of Northern Sonora and Southern Arizona. Juan Mateo Manje, a military man, rode with Father Kino and acted as his diarist.

Tr. 2/24/15, pp. 2341-45 (August).

145. Manje claimed that Father Kino named the River the Verde. X067-1, pp. 6-7 (August Declaration); Tr. 2/25/25, pp. 2356-57 (August).

146. Padre Luis Velarde's 1716 description of Pimeria Alta mentions two rivers – the Salado [Salt] and Verde – in addition to the two major rivers – the Gila and the Colorado. 031, p. 3-8 (ASLD Report). Traveling by horseback, Velarde noted that the River was called the Verde “perhaps because it runs along greenish slopes of rocks.” X067-1, p. 7 (August Declaration).

147. Father Juan Bautista Nentvig published the first map that uses the name “Verde,” in 1764. Nentvig compiled much information to consolidate knowledge of the region. X067-1, p. 7 (August Declaration); Tr. 2/25/15, pp. 2361-63.

148. In the early days of exploration, the River was variously referred to as “El Rio de Los Reyes” (by Espejo in 1583); “El Rio Sacramento” (by Farfan and by 17<sup>th</sup> and 18<sup>th</sup> century Spanish map-makers); and as the “San Francisco River” and “Granite Creek” (by 19<sup>th</sup> century Anglo-American pioneers). X011-58, p. 21 (*Pictorial Perspective*); X067-1, p. 5 (August Declaration).

149. During Spanish and Mexican control of what is now Arizona, there was little to attract attention to the Verde Valley [Segment 2], which lapsed into obscurity after its initial lure of gold and silver had faded into myth. X017-120, p. 285 (*Vanishing River*).

150. None of the Spanish explorers researched by Dr. August left specific descriptions of the Verde River, nor did they spend significant time in its vicinity. Tr. 02/25/15, p. 2468 (August).

### C. Trappers

151. St. Louis was the principal mart and outfitting point for the fur trade – 1,000-2,000 miles from the best hunting grounds. The Santa Fe trade was carried on principally with wagons. X056-193, p. 32 (American Fur Trade).

152. Generally, beaver trapping was carried out in winter months when beaver fur was thickest. X011-52 (*Beaver Trapping*). However, Arizona streams were ideal for finding beaver; trapping could occur year-round except in summer when pelts were thin. Quaking aspens, cottonwood, and willows lined the River's banks (before the giant irrigation projects, tree-cutting and overgrazing). X011-57, p. 31 (*Mountain Man*).

153. Beaver pelts, “hairy banknotes,” were shipped east to American hatters or to European fur auctions, until silk hats came into vogue in the early 1800s. X011-57, p. 31 (*Mountain Man*); see X035-148 (*Fur Trade Illustration Project*, third page: drawings of various canoes, rafts, and hats).

154. Even before the Treaty of Guadalupe Hidalgo [1848], beaver trappers and mountain men came to central Arizona while it was still part of the Republic of Mexico. Mexicans were not eager to see increasing numbers of Americans setting up business in Taos and Santa Fe, so they placed heavy restrictions on American fur trappers. X011-66, p. 34 (*In Old Arizona*). The restrictions – licensing provisions and tariffs – remained in place after the Revolution [in 1821]. The risks of transporting furs from the mountains were great: if traveling by boat the boat could capsize, spoiling the furs; Indian attacks and thefts of horses and furs; large bears. X017-94, pp. 3-8 (*Fur Trading*); X017-120, pp. 285 (*Vanishing River*).

155. Early trappers did not use boats on the River, because they had their horses with them, delivery centers were not on the River, and there were no population centers in Arizona where they could take their furs. Tr. 12/15/14, p. 121 (Fuller).

156. Trappers could not simply abandon their horses because they were needed to transport furs back to Santa Fe (Tr. 02/25/15, p. 2470 [August]), and horses were not easily obtained in early Arizona. Tr. 02/25/15, p. 2453 (August).

157. However, some trappers in Arizona used elk or horse-hides to make boats over a framework of willows. X035-152, p. 21 (Tellman, “A Brief History of Boating in Arizona”).

158. James Ohio Pattie and his party built a dugout canoe on the Gila River and again on the Colorado in the 1820s. X035-149, pp. 136/65, 141/68 (*Personal Narrative*).

159. After 1821, Mexicans were interested in trade for European and American goods, and the Santa Fe Trail trade began between Missouri (Independence and St. Louis) and Santa Fe. Arizona became a pass-through area for people to get to California. Mountain men crossed Arizona at about where I-40 is now, first in 1829. Tr. 3/30/15 (August), pp. 2543-45.

160. Ewing Young became a central figure in American trapping. He and other trappers, including James Pattie, trapped up the Salt and Verde then back down the Verde, Salt and Gila to Yuma in 1826 or 1827, evading the Mexican authorities and Mexican law. Young left no written descriptions. 031, pp. 3-2, 3-8 (ASLD Report); X011-57, pp. 28, 30-31

(*Mountain Man*); X011-72, pp. 142-43 (*Taos Trappers*); X017-94, pp. 17-18 (*Fur Trading*); X067-1, p. 10 (August Declaration); X017-120 , pp. 285-86 (*Vanishing River*).

161. In about 1829, Kit Carson joined Ewing Young in Santa Fe; Carson noted that licenses to trap in Mexico were not granted in those days to United States citizens. X011-56, p. 18 (*The Road West*). Among American trappers were the Patties (Sylvester and his son James Ohio), Young, and Bill Williams. X011-70, pp. 217-18 (*Beaver Management*).

162. Trapping generally continued along the Verde until the 1830s, but forty-eight [American] trappers passed through the lower Verde Valley [Segments 2 and 3] in 1844. 031, p. 3-2 (ASLD Report).

#### D. United States Acquisition

163. The Mexican War broke out in April 1846. Col. Stephen Watts Kearney, of the Army of the West, entered Santa Fe in August 1846. Kearney led 300 dragoons west to map the region between the Rio Grande and the Pacific Ocean. A unit of topographical engineers, headed by William H. Emory, accompanied him. Kit Carson, a seasoned mountain man and explorer joined them. X035-139, pp. 25-26 (*Man and Wildlife*).

164. In 1848, the United States annexed all of the previously Mexican territory north of the Gila River. Treaty of Guadalupe Hidalgo, 9 Stat. 922 (1850).

165. In the summer of 1848, a final detachment of Army troops crossed Arizona to carry out duties imposed by the Mexican War. X035-139, p. 38 (*Man and Wildlife*).

166. Although the first American map showing the River as the Verde was published by Zebulon Pike in 1810, Lt. Amiel Whipple, conducting military surveys along the 35<sup>th</sup> parallel in 1849-50, and Joseph Ives, surveying in 1857-58, referred to the River as the “San Francisco,” believing that its headwaters were at the base of San Francisco Peak. X067-1, pp. 8, 11 (August Declaration). As late as 1875, a newspaper referred to the River as “the San Francisco or Verde.” Tr. 2/19/15, pp. 1537-38 (Littlefield); X024, PPT 41 (Weekly Journal-Miner, 9/24/1875).<sup>9</sup>

167. The Gadsden Purchase of 1853 secured for the United States the land south of the Gila River to the current U.S.-Mexican border. 10 Stat. 1031 (1953).

168. After signing the Gadsden Purchase agreement in 1853, the U.S. proceeded to

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<sup>9</sup>Newspapers are useful sources of historical information, and more are available now than formerly through the internet. Tr. 2/18/15, pp. 1447-48 (Littlefield).

survey the 32<sup>nd</sup> parallel for the proposed railroad route. The surveying party was led by Lt. John G. Parke; George Stoneman commanded the military escort of 28 dragoons. X035-139, p. 106 (*Man and Wildlife*).

169. Arizona became a Territory in 1863. Act, Feb. 24, 1863, Ch. 56, 12 Stat. 664.

170. The first Arizona Territorial Legislature adopted the Howell Code, which continued Mexico's practice of appropriation as the means of acquiring water rights. Howell's Ariz. Code, ch. 55 (1864).

171. The 1864 Arizona Bill of Rights provided that all waters within the State, whether capable of being used for navigation or irrigation, are public. Howell's Ariz. Code, Art. 22 (1865).

172. The first fairly accurate map of the area was made in 1880; and the first really accurate map was made in 1889 by Rand McNally. X067-1, p. 12 (August Declaration); Tr. 2/25/15, p. 2516-17 (August).

173. In 1902, Congress passed the Reclamation Act. 32 Stat. 388.

174. Arizona became a State on February 14, 1912.

#### **E. Surveys and Withdrawals**

175. Following the Treaty of Guadalupe Hidalgo, both nations conducted surveys of the new international boundary. The Arizona portion began in 1851 under Andrew Gray, U.S. surveyor, and Lt. Amiel Whipple, astronomer and surveyor, pursuant to the 1785 Ordinance, the Treaty, and surveyors' manuals. They arrived at the Salt-Gila confluence in late September/early October where they set a monument. X035-141, pp. 246-48 (*Journal of Arizona History*).

176. In 1867, William Pierce, leader of the surveying party, began the first rectangular survey of public lands in Arizona, starting at the monument at the Salt/Gila confluence, perhaps with a military escort of soldiers from Fort McDowell. They began surveying northwards from the monument but an Indian uprising stopped them after 24 miles. By 1868, the clamor of mining interests and settlers prompted more surveys. X035-141, pp. 248-53 (*Journal of Arizona History*).

177. In March 1868, Deputy W.F. Ingalls started subdividing the townships around Phoenix. X035-146, p. 2 (*Fort McDowell in the 1880s*).

178. The purpose of the federal government's formal surveys of its recently-acquired



lands was to assess their value, to prepare the region for orderly occupation by American settlers, and to record the characteristics of the public domain. Tr. 2/18/15, pp. 1457-58 (Littlefield).

179. The government was also interested in establishing avenues of communication with the interior; in 1872, the U.S. Army sent George M. Wheeler to assess the region's resources, climate, and other qualities affecting settlement, military expeditions, mining, and other concerns regarding Arizona and Nevada. X002, pp. 80-81 (Littlefield Revised Report).

180. Surveys on the River began in the 1870s. However, less than one-half of the River was surveyed, either because of sparse settlement or because the land was withdrawn for national forests, Indian reservations, or under the Reclamation Act for the Salt River Project. 032, p. 13 (Littlefield 2005 Report).

181. Seven surveyors' manuals, issued between 1851 and 1902, contained meandering instructions for government surveyors regarding navigable bodies of water and for other reasons. Tr. 2/18/15, pp. 1458-60 (Littlefield).

182. Certain of the instructions required meandering on both sides to indicate either a navigable waterway or a waterway that was at least three chains (198 feet) wide or that formed the boundaries of federal reservations.<sup>10</sup> Tr. 2/18/15, p. 1460 (Littlefield).

183. Surveyors did not always meander navigable rivers even though the instructions told them to do so. Tr. 2/19/15, p. 1574 (Littlefield).

184. Neither the applicable federal statute (43 U.S.C. § 931) nor the manuals define “navigable;” the definition was left to each surveyor's judgment. Tr. 2/19/15, p. 1520 (Littlefield).

185. When a section line intersected a major stream or lake, a corner monument was established on the section line at the bank of the water body. Once all section lines were completed, meandering began, beginning at the meander corner (“MC”), by selecting points, visually, along the bank until the next MC (at the section line) was reached. No monuments were set at these points. X017-111, p. 14 (*River and Lake Boundaries*).

186. Where a river bank was not suitable for setting a permanent monument, a witness corner to the meander corner (“WCMC”) was set. X017-111, p. 14 (*River and Lake*

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<sup>10</sup>A surveyor's chain is a unit of length equal to 66 feet. See Kissam, P., *Surveying Practice*, McGraw Hill Pub., New York, p. 126. Three chains would therefore measure 198 feet.

*Boundaries*).

187. From 1804, surveyors were directed to meander navigable rivers so that settlers wouldn't have to pay for riverbed land. Monuments were set only where waterway banks intersected with section lines. X017-112, p. 15, ¶ 1.51 (*River and Lake Boundaries*).

188. Instructions to surveyors regarding the meandering process were “pretty sketchy” - perhaps to be assumed as part of surveyors' skills. X017-112, p. 15, ¶ 1-52 (*River and Lake Boundaries*).

189. 1831 Instructions: “The courses and distances of the meanders of navigable streams are to be truly delineated . . .” X017-112, p. 16 (*River and Lake Boundaries*).

190. Early manuals provided no specific directions on how to pick the point to place meander corners or angle points on the bank. Early manuals required non-navigable rivers to be meandered on only one bank. X017-112, p. 16 (*River and Lake Boundaries*).

191. Any resulting confusion was cleared up in the 1890 manual which required surveyors to meander both banks of non-navigable streams of more than three chains in average width in addition to navigable rivers. X017-112, p. 16 (*River and Lake Boundaries*).

192. In fact, there were wide variations between different surveyors' actual treatment of meanders in the 1800s. X017-112, p. 18 (*River and Lake Boundaries*).

193. Meander corners were often not on the river's bank but at the top of a slope leading down to the water's edge – sometimes hundreds of feet above the river. X017-112, p. 18 (*River and Lake Boundaries*).

194. Because surveyors were required to segregate navigable rivers from public lands, the presence of meander lines on the land plats has been wrongly taken to be conclusive of navigability. X017-113, p. 48 (*River and Lake Boundaries*).

195. In the 1800s, surveyors often bid on a township to survey, without having seen the land; a surveyor might not even know there was a river there. As soon as he broke through the brush on the river bank, he had to decide navigability because he had to set a meander corner on the bank and meander the bank if the river was navigable. “We will probably never know what conditions influenced the surveyor's decision to meander or not meander where the instructions were silent.” X-17-113, pp. 48-49 (*River and Lake Boundaries*).

196. Surveyors are not “clothed with the power to settle the questions of

navigability,” citing one of the “Red River cases.” X017,113, p. 49 (*River and Lake Boundaries*).

197. Desert land entries are made by declaring that the claimant intends to reclaim desert land by conducting water onto the land, and he must acquire water rights necessary to permanently irrigate the land. He must also file a map showing how he proposes to conduct water on the land and the manner in which he intends to irrigate it. X017-101, pp. 19-20 (U.S. Government, *Free Lands and Dry Farming in the Southwest*, c. 1908).

198. The claimant must show specifically the source and volume of the water supply, how it was acquired and maintained, the number, length, and carrying capacity of all ditches, and that he has a right to sufficient water to successfully irrigate all the irrigable land of the entry. X017-101, p. 24 (U.S. Government, *Free Lands and Dry Farming in the Southwest*, c. 1908).

199. Irrigable water for Desert Land Entries in Apache County comes from reservoirs [no source given], surface [no source given], and artesian wells; in Maricopa County, water comes from a government irrigation project now under construction; in Yavapai County, cultivation is accomplished by storage well and ditches [no source given]. X017-101, pp. 37-38 (U.S. Government, *Free Lands and Dry Farming in the Southwest*, c. 1908).

#### F. **Anglo Settlement**

200. Reliable flow in the perennial River was a major factor in historical development of the Verde River Valley [Section 2]. 031, p. 3-22 (ASLD Report).

201. From 1846 or 1848 to 1863, Arizona was crossed by only two major routes: (1) In 1846, Captain Phillip Cooke and the Mormon Brigade crossed on a wagon road between Santa Fe and San Diego (the Gila Trail), a route later used by the '49ers; and (2) the northern route which followed Lt. Beale's survey along the 35<sup>th</sup> parallel (wagon road) in 1857 and 1859 (Beale's Road), used by hunters, trappers, and the military. X100-19, § E(3), pp. 8-9 (*Historic Bridge Inventory*).

202. Various American explorers and surveyors crisscrossed the State in the 1850s. X011-65 (*Historical Atlas*). However, Central Arizona – including the Agua Fria, Verde, and Salt Rivers – was unexplored and uncrossed, sandwiched between the Gila Trail through the Pima Villages and the northern routes of Lt. Amiel Whipple (charged in 1853 with finding a

railroad route along the 35<sup>th</sup> parallel) and others. X017-120, p. 287 (*Vanishing River*).

203. Early transportation in the middle Verde Valley [Segment 2] was typically conducted on horseback, mule train, wagon, and stage. 031, p. 3-10 (ASLD Report).

204. The first Anglo settlers arrived around Flagstaff in about the 1850s looking for gold, and they came to the Verde Valley [in Segment 2] in about 1860. Tr. 2/20/15, pp. 1768-69 (Randall).

205. Various stage lines ran through and within the territory from 1857 to the early 1880s when the two major railroads were completed across the territory. X011-61 (*Historical Atlas*).

206. By the 1860s, the upper Verde [Segments 1 and 2] was reputed to be an unexplored area likely to be rich in gold and silver. Several mining camps were founded on the East Verde River [near Segment 4] in those years. X017-120, p. 288 (*Vanishing River*).

207. The federal government established cavalry outposts, but most were abandoned at the outbreak of the Civil War [1861]. X017-120, p. 291 (*Vanishing River*).

208. With the coming of the Civil War [in 1861], Apache-white relations deteriorated almost overnight. By the time federal officials reached Fort Whipple, Apache warfare had been extended into Central Arizona with such force that the whites were in grave danger of being driven out. X017-100, p. 438 (*Far Southwest*).

209. Congress enacted the Homestead Act in 1862. Ch. 75, 23 Stat. 392.

210. In 1863, Indians outnumbered whites by at least six to one. X017-100, p. 437 (*Far Southwest*).

211. Gold was discovered on the Hassayampa River and near the Verde River in 1863; miners rushed in, and Fort Whipple was established in Chino Valley to protect the miners. 031, p. 3-9 (ASLD Report); X067-1, p. 12 (August Declaration).

212. Arizona became a Territory in 1863. Act, Feb. 24, 1863, Ch. 56, 12 Stat. 664.

213. After 1863, the Arizona Territorial legislature authorized private companies to build and administer toll roads; most of the first such roads extended from Prescott. (Some pre-existing roads were designated free.) X100-19, § E(3), p. 10 (*Historic Bridge Inventory*).

214. The new Territorial legislature, convened in Prescott in 1864, incorporated six toll roads, five of which would connect Prescott to the other regions of Arizona, and the sixth would run from Tucson to Libertad, Sonora, Mexico. X017-100, pp. 440-41 (*Far Southwest*).

215. Territorial legislators often had financial interests in railroad and toll road companies. Cite *Far Southwest*.

216. As opportunities for mining in the newly established Territory were promoted, settlement escalated rapidly, leading to increased conflict with the Indians. X017-120, p. 290 (*Vanishing River*).

217. Military garrisons were soon established near the River: Fort Whipple in 1863 in Chino Valley [near Segment 1], which was moved to Prescott in 1864, along with the Territorial capital; Camp Lincoln in 1865 [in Segment 2], which was renamed Camp Verde in 1864; and Camp McDowell in 1865 [Segment 5]. 031, p. 3-9 (ASLD Report).

218. The forts were to provide military protection to the increasing civilian population. X011-50, pp. 146-48 (*Journal of Arizona History*); X067-1, pp. 12-13 (August Declaration); Tr. 2/25/15, p. 2486 (August).

219. Civilian settlement followed, with settlers raising and selling crops to the military establishments and mining camps. 031, pp. 3-9, 3-22 (ASLD Report).

220. There was trouble with the Indians in 1864: Lt. Col. King Woolsey lead a party against the Apache, and the local newspaper reported several skirmishes. X017-132, -133 (*Arizona Miner*, 4/6/1864).

221. By 1865, farming people (Mormons) were beginning to settle near the Virgin River (now in Nevada), and they moved south in the following years, establishing towns. X017-100, p. 456 (*Far Southwest*).

222. Anglo settlers came after Prescott was established as a territorial capital in 1865. The River became important to farmers for its fertile land, permanent water, a long frost-free growing season; in addition, they had a ready market for their produce in Prescott and the Lynx Creek mines. X017-124, p. 25 (*Territorial Verde Valley*).

223. In 1866, responsibility for roads devolved to the counties, resulting in a patchwork of roads. X100-19, § E(3), pp. 11, 14 (Historic Bridge Inventory).

224. In the winter of 1867-68, troops from Fort McDowell [in Segment 5] built a wagon road from the Fort to Camp Reno on Tonto Creek. 031, p. 3-18 (ASLD Report).

225. Stoneman Road, from Fort Whipple to Fort McDowell, was built in 1870, and Stoneman Grade – from Fort McDowell to Picketpost in Superior – was started in 1870. Tr. 2/25/15, p. 2488 (August).

226. Trouble with the Indians continued: Indians attacked some whites near Camp Verde [in Segment 2] and made off with four tons of corn and some oxen. X017-128 (*Arizona Miner*, 5/8/1869). Apache-Yuma and Apache-Mohaves were hostile to the whites until 1873 when they were taken to a reservation; Apache-Tontos joined them. Many were sick. X017-129 (Corbusier).

227. By 1870, the Stoneman Road connected Fort Whipple near Prescott and Fort McDowell, using established Yavapai and Apache trails. X067-1, p. 16 (August Declaration).

228. Indian reservations were established and Crook's war against the Apaches occurred in the early 1870s. X017-120, p. 293 (*Vanishing River*).

229. A new Camp Verde was built on the other side of the River in 1871, and later became an Indian reservation. X011-50, pp. 151-52 (*Cavalryman*).

230. General Crook hunted the Apache for eleven years until 1871, when the Apache surrendered at Camp Verde. Tr. 2/20/15, p. 1770 (Randall).

231. There was fighting between Anglos and Indians and among the tribes: Pimas killed six Apaches on the River above Fort McDowell [in Segment 5] in October 1872. X017-131 (*Arizona Weekly Miner*, 10/5/1872).

232. In 1875, Yavapai County included Coconino County. Tr. 3/30/15 (Burtell), p. 2614.

233. Mines in Jerome were established (in modern times) in 1876 and prompted the construction of wagon roads and railroads into the general area. 031, pp. 3-17 (ASLD Report); X011-58, p. 39 (*Pictorial Perspective*).

234. Wagon roads and mail trails were built in the 1870s. 031, p. 3-18 (ASLD Report).

235. Railroads came into the Territory once the Indian difficulties were under control and new mining discoveries in eastern and southern Arizona in the 1860s and 1870s made the Territory more attractive. X017-100, p. 462 (*Far Southwest*).

236. The expansion of mining depended on the railroads, and the railroads were driven by mining operations; the mines needed to ship ore inexpensively to smelters. X017-120, p. 289 (*Vanishing River*).

237. The railroads, such as A.T.S.F., courted homesteaders; increased settlement meant increased business along transportation lines. X017-105, p. 8, ¶ 7 (*Homesteading*).

238. As of the 1870s, approximately 7,000 acres of land were being cultivated and irrigated, not necessarily all in the same year, along the headwater streams. Tr. 2/18/15, pp. 1267-68 (Hjalmarson).

239. By the late 1800s, several trails crossed Arizona, such as Crook's Trail (from Fort Apache to Fort Verde [in Segment 2]), which was built in 1874. X011-62 (*Historical Atlas*).

240. Many smaller lines crossed the Territory, mainly to serve the mining industry. X011-64 (*Historical Atlas*).

241. By 1876, the Star Line Transportation Company had established a stage route from Prescott to Santa Fe, stopping at Camp Verde, carrying mail and passengers. 031, p. 3-18 (ASLD Report).

242. In 1877, the Southern Pacific Railway reached Yuma. X011-64 (*Historical Atlas*); X017-100, p. 463 (*Far Southwest*).

243. The Desert Land Act [of 1877], regarding the right of entry for the purposes of reclaiming desert land by conducting legally appropriated water onto the land, provides that the right to use the water shall not exceed the amount of the actual water appropriated and necessarily used for irrigation and reclamation:

“All surplus water over and above such actual appropriation and use, together with the water of all lakes, rivers, and other sources of water supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining, and manufacturing purposes. . . .”

43 U.S.C. § 321. The Act does not define “non-navigable” or “navigable.”

244. Stage service between Prescott and Ash Fork was established in 1878. 031, p. 3-10 (ASLD Report).

245. The first successful homestead claim in Arizona was completed in 1878 when a settler received his patent to 160 acres in SE ¼ of Section 18, T1N, R5E [in the Mesa area]. X017-105, p. 8, ¶ 2 (*Homesteading*).

246. According to the 1880 census, the Arizona population was 41,580, including 4,545 Indians (excluding those on reservations or in pueblos). X035-142, p. 107-08 (*Resources of Arizona*).

247. As of 1881, the government had a telegraph line connecting all the principal military posts throughout the country. Western Union had lines along the Southern Pacific

track, a branch of which ran to Prescott, Phoenix, and to other towns. X035-142, pp. 96 (*Resources of Arizona*, 1881).

248. Stage lines delivered mail to all the leading towns and mining camps distant from the Southern Pacific railroad. X035-142, p. 96 (*Resources of Arizona*, 1881).

249. The coming of the railroads to Arizona led to many towns and mining camps springing up; an army of prospectors, traders and speculators filled the southern counties. Within two years [from 1881], all the leading towns “will be linked to the outside world with iron bands.” The railroads provided cheap freight and rapid transit. X035-142, pp. 94, 96 (*Resources of Arizona*, 1881).

250. In 1882, railroads imported coal from New Mexico, providing coke to the mines and exporting ore. X011-58, p. 39 (*Pictorial Perspective*).

251. Mining in the Verde Valley [Segment 2] was greatly facilitated by the introduction of railroads into the territory in 1882. X011-58, p. 38 (*Pictorial Perspective*).

252. The A&P rail line reached the Colorado in 1883. X011-64 (*Historical Atlas*).

253. The United Verde Copper Co., founded in 1883, began the industrialization of the area [Segment 2] and by 1900, Jerome had become the fifth largest city in Arizona. X011-58, p. 39 (*Pictorial Perspective*); see X017-108, -110 (photos of mule train/ore wagons at Jerome mine).

254. After 1884, the twenty-six-mile United Verde & Pacific railway connected Jerome and Jerome Junction. X035-150, p. 13 (*Pioneer Stories*, “Early History of Jerome”).

255. Once the Apache were pacified and confined, cattle ranching exploded. By 1882, the wilderness was transformed into a gigantic cattle ranch in less than 20 years. The impact on the range was disastrous, exacerbated by severe droughts in 1891-93, resulting in a great decline in herds. X017-120, pp. 296-97 (*Vanishing River*).

256. Railroad service reached northwestern Arizona in 1882, Prescott in 1886, and Jerome in 1895. 031, p. 3-10 (ASLD Report).

257. In 1886, the military headquarters for the Territory was moved from Prescott to Tucson. X035-146, p. 1 (*Fort McDowell in the 1880s*).

258. By 1890, the Territory had 1,000 miles of railroads and 700 miles of canals. Salt River Valley fruits were being shipped out over the railways to the world. X017-100, p. 475 (*Far Southwest*).



259. Communities engaged in boosterism to entice people to move and invest there. The Arizona Republican of July 26, 1893, contains such an article claiming that Tempe was situated in a “region unexcelled in fertility or variety of indigenous semi-tropical productions. Nestled at the foot of Tempe Buttes, from whose altitudinous heights a view of the valley that equals in wealth and excels in extent the historical tract given by the great Lawgiver” and so on. Tr. 4/03/15 (Fuller), pp. 3476-77; X083-201, p. 15-16.

260. The United Verde and Pacific Railway originated in 1894 when United Verde Copper C. constructed a narrow-gage railroad from Jerome [in Segment 2] to Jerome Junction (now Chino Valley) [Segment 1]. X011-58, p. 39 (*Pictorial Perspective*).

261. Other rail lines were established across the Territory by 1895. X017-100, pp. 463-65 (*Far Southwest*).

262. With the coming of the railroads and a new boom in silver and copper mining, new towns sprang up near the mines. X017-100, p. 465 (*Far Southwest*).

263. The presence of thousands of miners created huge demands. Local ranchers, who got their start supplying the military and Indian reserves, expanded to supply beef for mineral towns, the lumber industry started up, and farmers raised more foodstuffs. X017-100, p. 467 (*Far Southwest*).

264. Sand and gravel mining began in the 1880s consistent with settlement activities such as construction of towns and businesses near Jerome [in Segment 2] when mining operations expanded there in the late 1800s. X011-58, p. 33 (*Pictorial Perspective*).

265. The population of Arizona in 1887 was 90,000. X017-100, p. 475 (*Far Southwest*).

266. The capital was moved from Prescott to Phoenix in 1889. X017-100, p. 474 (*Far Southwest*).

267. By 1890, the civilian population of the Verde Valley [Segment 2] was 700, and the protection that Fort Verde had provided was no longer needed; the Fort was therefore abandoned. X017-124, p. 32 (*Territorial Verde Valley*). Settlers moved into the Fort grounds (and turned away Indians who tried to return to their land). X017-120, p. 313 (*Vanishing River*).

268. In 1896, settlement in the lower reaches of the River [Segments 4 and 5] was sparse due to poor soils, lack of irrigable land and rough country. Overgrazing had caused

substantial damage to the landscape, and mineral resources were generally scarce. X017-120, p. 302 (*Vanishing River*).

269. In 1900, Arizona's population was 122,931; in Yavapai County it was 13,799. X017-93 (Census); X017-100, p. 484 (*Far Southwest*).

270. In the early 20<sup>th</sup> century, the Territorial Assembly authorized several territorial highways in the State. X100-19, § E(3), p. 14 (*Historic Bridge Inventory*).

271. The mining boom of the early 1900s created the need for electricity to power equipment and for new settlements. By 1909, electricity from the Fossil Creek Power Plant [Segments 3/4 border] powered mining operations at the United Verde Mine in Clarkdale [Segment 2]. X011-58, p. 39 (*Pictorial Perspective*); Tr. 12/18/14, pp. 967-68 (Hjalmarson); X036-001, PPT 27 (photo of Childs power plant).

272. Congress passed the Forest Homestead Act (for inholdings) on June 11, 1906 (16 U.S.C. § 507) and the Enlarged Homestead Act (Dry Farming Homestead Act) in 1909 (43 U.S.C. § 224). Congress also passed the Stock Raising Homestead Act (43 U.S.C. § 292) in 1916 to further promote the occupation of remnant lands not settled by the other Acts. X017-105, p. 3 (*Homesteading*).

273. The delegates to Arizona's Constitutional Convention [of 1910] modified traditional common law rules to fit the needs of a state dependent upon irrigation. X017-100, p. 503 (*Far Southwest*).

274. The Verde Valley Railroad constructed a line from Drake to Clarkdale in 1911-12. 031, p. 3-10 (ASLD Report). Other lines were constructed in the area in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. 031, pp. 3-19 – 3-20 (ASLD Report).

275. When Arizona became a State in 1912, it had 1,678 miles of railroad track. X011-64 (*Historical Atlas*); X017-90 and -91 (1912 Arizona railroad map).

276. Between 21,000 and 22,000 homestead entries were successful in Arizona; more than 4,748,000 acres passed from public to private ownership through homesteading, peaking in the 1910s. X017-105, p. 8, ¶¶ 4-6 (*Homesteading*).

277. Homesteading occurred in every county and nearly every township in the State. X017-105, p. 9 (*Homesteading*).

278. Early politicians like Governor Safford had an economic stake in railroads and used their political powers to bring railroads to Arizona. X012-71, pp. 458-63; 476 (*Far*

*Southwest*).

279. In 1906-07, evidence was found of land frauds that implicated the territorial secretary, the Attorney General, and the representative of a Pennsylvania land company. X017-100, pp. 487-88 (*Far Southwest*); Tr. 2/19/15, p. 1574 (Littlefield).

## V. Boats

280. Various boating events occurred pre-statehood (described below); in general, historical boating was successful; all but three of the reported seventeen trips on the River were completed. Tr. 12/15/14, pp. 173-78; X035-167, PPT 141-44.

281. Boaters traveled downstream or across the River; no instances of up-River travel were found. 031, p. 8-3 (ASLD Report). See X-017-73, -81, and -82, for photographs of canoes on the River.

282. Generally, river depths were insufficient to haul vast quantities of ore, but the use of flatboats by the military, ferries, trapping, hunting, exploration and travel during normal flows was successful; there are a few rapids and depleted flows from irrigation diversion dams, otherwise nothing prevents downstream boating in small boats. Tr. 12/15/14, pp. 180-82 (Fuller); X035-167, PPT 145, 147.

### A. Boats and Boating on the Colorado

283. By 1909, 1911, and 1920 there were many boats on the Colorado. See X001-34 (photographs of Nathaniel Galloway; man sitting in small canvas boat; Ellsworth Kolb posing with his camera on a rock at the River's edge with a small boat tied up below, men with fish by a collapsible boat, Emery Kolb holding a 125-lb canvas boat, and the Kolbs by a boat with a hole in it); X001-3 (photographs of four men in a canvas canoe and one man standing in the water); X011-60 (*Historical Atlas*) (map showing Colorado River ports).

284. Nathaniel Galloway developed a boat for use on the Colorado River. See X001-9 and -10 for plans of the Edith, Glen and Stone.

285. Joseph Puliot of Detroit had four "cataract boats" built for a trip down the Colorado in 1909; Galloway supervised the construction of these row boats. The boats were 16 ½ feet long, with four-foot beam, 18 inches deep, and the bottom was covered with a thin iron sheet. X001-12 (the Stone).

286. In the summer of 1897, Bishop Kendrick floated down the Colorado from Needles in a "frail canoe" in order to visit the mission at the Parker Indian reservation. X056-

195 (*Los Angeles Times*, 1/18/1898).

287. Mr. Dimock works for a rafting company out of Flagstaff; that runs rafts on the Colorado. He also runs commercially on the San Juan, Green, Yampa, and the upper Colorado. Tr. 3/31/15, p. 2879 (Dimock).

288. Mr. Dimock has boated the upper Colorado, Green, and San Juan Rivers in Utah; no boat used there needs three feet of water. Tr. 3/31/15, p. 2825 (Dimock).

289. Mr. Dimock ran the River a lot in the 1970s in canoes, kayaks, and small rafts: he ran the rapids above Perkinsville in a kayak (and could have done it in a canoe); from Cottonwood to Camp Verde; and Beasley Flat to Childs. He portaged Verde Falls because he was in a big canoe; he had no problem. He also boated the River once in the 1990s in a plastic kayak. Tr. 3/31/15, pp. 2818-19; 2929; 2961-62 (Dimock); X009-1, Fig. 5.

290. Classes I and II rapids are no problem; Class IIIs might be a problem. Tr. 3/31/15, p. 2867 (Dimock).

291. Mr. Dimock could use [his replica] Edith on the River (or on any other river that is boated by thousands of canoeists), but he would line the boat at Verde Falls. Hitting rocks would be no problem because wood is resilient and the bottom is thick. He could boat from Perkinsville and, assuming there were no dams, all the way to the Salt. Tr. 3/31/15, pp. 2834; 2873-75; 2935-36; 2958.

292. Mr. Dimock runs commercial dories through the Grand Canyon; a commercial dory fully loaded with four passengers, a ton of gear, and himself, draws about 10-11 inches. Tr. 3/31/15, pp. 2825-26 (Dimock).

293. Mr. Dimock has built a replica of the Edith (16' 8" x 4'), one of the Kolb brothers' boats. He has run it through the Canyon and Cataract Canyon. Tr. 3/31/15, pp. 2827-28; 2833; 2873 (Dimock).

294. The Edith could carry a ton and had two cargo compartments. The Kolb brothers got the design from Galloway, and Stone, and built the Edith and the Defiance in 1910 and 1911. Tr. 3/31/15, pp. 3827-30 (Dimock).

295. The Kolb brothers carried heavy photographic equipment, ropes, blocks and tackles for lining the Edith around rapids. The Edith was designed to haul cargo because Galloway was a trapper. T. 3/31/15 p. 2955 (Dimock).

296. When the Kolb brothers crashed [the original] Edith while on the Colorado, they

repaired the holes and continued their trip. Tr. 3/31/15, pp. 2830-32 (Dimock) [X035-166, PPT 115].

#### **B. Types of Boats Available Before or Around Statehood**

297. A review of historical records gives the general impression that there was no shortage of boats in the Salt River Valley; the presence of boats in arid regions like Phoenix, Tempe, and the Verde Valley argues for use of boats on the rivers. 031, p. 8-3 (ASLD Report).

298. Trappers, trapping in swampy marshy areas along streams, constructed canoes of bull and buffalo skins, when visiting their traps. X102-217, pp. 1/2, 2/2 (Trapping Techniques of Mountain Men).

299. Bullboats, made of buffalo skins sewn together and stretched over a frame of willow and cottonwood poles, had the least draft of any river craft. They could carry 2½ tons of weight causing a draft of only four inches. These boats in one form or another saw extensive service on Western rivers. X056-193 (American Fur Trade).

300. 1884 photo of eight men in a rowboat on the San Francisco River at Clifton, rescuing people in a flood. X102-208.

301. Photo of man sitting in a small boat on the shore of the Hassayampa River in about 1900. X102-209.

302. Colorized photo of three men in a rowboat on the Salt, 1910. X102-207.

303. The types of boats used on the River included canvas canoes, skiffs, and flat-bottomed boats. Flat-bottomed boats (wood or canvas) could float in four inches of water, and round-bottomed boats (wood or canvas) could float in six inches of water. 031, p. 8-3, Table 8-3 (ASLD Report).

304. Small boats in Arizona were commonly homemade from lumber or driftwood. Tr. 3/31/15, 2837 (Dimock); X035-152, 30-31.

305. Boats available at statehood included collapsible kayaks (Kleppers), collapsible canoes; freight canoes; many home-made rowboats; commercially-made steel boats. Kleppers are still made but with somewhat better skin (Hypelon). It was common then for a person to build a boat for trapping; such boats were built to carry cargo. Tr. 3/31/15, pp. 2835-39 (Dimock).

306. All such boats could have been used on the River and on braided rivers. Tr.

3/31/15, pp. 2839-40 (Dimock).

307. Canvas canoes were in use in Arizona at the turn of the [20<sup>th</sup>] century. Tr. 3/31/15, p. 2851 (Dimock).

308. Klepper boats were the same in 1970 as they were in 1910 except that the 1910 boats had rubberized canvas; now they are made of Hypalon, a type of rubber. But they have the same shape and the same system. They take a lot of cargo and are the boat of choice for braided sandy rivers. Tr. 3/31/15, pp. 2860-61; 2919 (Dimock).

309. Gasoline powered boats were introduced in 1891 and were in use on the Colorado. X054-47 (Lingenfelter Affidavit).

310. The boats that the Kolb brothers used on the Colorado: canoes, folding canoes, many homemade craft, and dugout canoes, were all available at or before statehood. Tr. 2/19/15, pp. 1650-51 (Littlefield).

311. Paddle-wheel steamers on the Colorado, flatboats, home-built boats, mail-order boats from Sears, canvas canoes, dugout canoes, were all available at or around statehood; such boats would be available for commercial purposes. Tr. 2/25/15, pp. 2437-38, 2495 (August).

312. Boats were used for recreational purposes, such as hunting, before statehood. 031, p. 8-3 (ASLD Report).

313. Various types of low-draft boats were widely available by 1912. *See, e.g.,* the many types of boats featured in *Country Life in America*, 1908 (X001-48); and the following:

a. Rowboats: X001-44 and -46 (*Country Life in America*, 1910; X001-13 (Sears Catalog No. 124).

b. Canoes: X001-22 (Kennebec canoes produced in the early 1900s); X001-6 (advertisements in *Hunter-Trader-Trapper*, July 1012; X001-48 (*Country Life in America*, 1908); X001-3 (canvas canoe).

c. Portable folding boats: X001-32 (*Manufacturer & Builder*, 1874); X001-11 (King Folding Boat Co., 1880s); X001-4 (“Life Saving Folding Canvas Boat,” *Hunter-Trader-Trapper*, 1908); X001-42 (“Outing With a Portable Equipment,” *American Homes and Gardens*, 1911); X001-39 (“A Back-Yard Wilderness,” 1915).

d. Inflatable rubber boats: X001-5 (The History of Rubber Boats and How they Saved Rivers).

e. Build-it-yourself boats: X001-41 (*Manufacturer and Builder*, August 1875); X001-33 (“How to Build a Cheap Boat,” 1905); X001-35 (“Just a Boat,” *Country Life*, 1909); X001-7 (advertisement in *Hunter-Trader-Trapper*, 1912); X001-8 (directions for building a canoe based on traditional Algonquian design); X001-36 (“A Floating Camp at a Dollar Day,” *Country Life*, June 1901).

f. Mail-Order Boats: X001-1 (canvas boats, 1895 Montgomery Ward and 1897 Sears Roebuck catalogs); X001-6 (advertisement in *Hunter-Trader-Trapper* 1908); X001-4 (motor boat and flat-bottomed steel fishing boat, *Hunter-Trader-Trapper*, March 1909); X001-13 (flat-bottomed fishing boat, Sears Roebuck catalog)

g. Ducking Boats: X001-47 (pneumatic “boats” with leg casings were available for duck-hunting, 1895); X001-40 (ducking boats were generally 14 to 16 feet long, wide and low with extremely shallow draft; lake and river boats have deeper draft and narrower beams, 1901).

h. Iron Boats: X056-190 (various models with air-tight compartments to minimize weight; each boat weighs from 70 – 170 lbs.)

### C. **Historical Boats vs. Modern Boats**

314. There is no evidence of prehistoric boating on the River. 031, p. 2-14 (ASLD Report); Tr. 1/18/06, p. 10 (Fuller). However, traditionally, Native Americans used various types of watercraft: the Sioux of the Mid-West used tub-boats or bull-boats; the Hupa of Northern California and Louisiana Indians used dugout canoes; the Haida of Alaska used curved canoes; the Kodiak of Alaska used skin boats, and the Utes of Nevada used reed (“balsa”) boats. X001-43 (*Small Water Craft*).

315. The Tohono O'dham creation story has Coyote telling Montezuma to build a canoe, which he did; he and Coyote survived a great flood. X035-152, p. 19 (Tellman, “A Brief History of Boating in Arizona”).

316. Frank Cushing reportedly found the remains of a Hohokam canoe in the Salt River Valley. X035-152, p. 20 (Tellman, “A Brief History of Boating in Arizona”).

317. Birch-bark canoes were used in North American for thousands of years. X001-14 (*Wood and Canvas*); X001-15 (*Ambrose Canoes*); X035-148 (*Fur Trade Illustration Project*) (drawings of various canoes and rafts).

318. The modern durable wood and canvas canoe is based on the traditional birch-

bark canoe. X001-14 (*Wood and Canvas*); X001-15 (*Ambrose Canoes*).

319. Bark canoes were so strong and flexible that Indians used them not only in heavy rapids but also on the ocean. X011-71, p. 12 (*Bark Canoe*).

320. Henri Vaillancourt made bark canoes which were strong, resinous, and waterproof; they could take a blow. The ribs and planking (split, not cut) were flexible. X001-71, pp. 10-11 (*Bark Canoe*).

321. The canoes that the Indians made were as good as or better than what could be done with modern tools and materials X001-71, p. 11 (*Bark Canoe*).

322. The types of boats (criterion craft) that were used historically on the River were low-draft boats, including a wide variety of canoes, and flatboats like the Edith. Such boats could be used on the whole River except for on Segment 0. Tr. 4/03/15 (Fuller), pp. 3495-96.

323. Bark canoes glance off rocks, leaving no trace, whereas aluminum boats get dented and leave heavy streaks of paint or aluminum on rocks. X001-71, pp. 11, 32, 99 (*Bark Canoe*).

324. The criteria for canoes available as of the time of statehood are not substantially different from criteria for canoes available today. 031, p. 8-3 (ASLD Report).

325. Good old-style wood-and-canvas canoes had brass bang plates; many modern canoes have Kevlar bang plates. The inward slope on canoes was developed long ago by Indians building birchbark canoes. X056-192, p. 10 (*Complete Book of Canoeing*).

326. All wood canoes are made much the same way as they have been for generations. X056-192, p. 14 (*Complete Book of Canoeing*).

327. Canoe shapes vary, but overall modern canoes are very similar to historical canoes. Tr. 3/31/15, p. 2844 (Dimock).

328. Modern finishing methods do not make wooden boats more durable than they were 100 years ago. Tr. 3/31/15, p. 2835 (Dimock).

329. Modern kayaks and canoes are meaningfully similar to kayaks and canoes in use in 1912 with respect to their draw, handling, weight, durability, and cargo capacity. Such boats were available for sale in the U.S. and were used to carry cargo. Hard boats, such as modern duck boats, dories, rowboats, and flatboats, are similar to those in use in 1912, but inflatable boats are different. Tr. 3/31/15, p. 2850-51 (Dimock).

330. Mr. Dimock makes some dories out of wood but modern wood which has many



knots is not as tough as wood from old-growth trees. Tr. 3/31/15, p. 2864-65 (Dimock).

331. Wood and canvas kayaks were tougher than fiberglass ones, but fiberglass is lighter. Tr. 3/31/15, p. 2888 (Dimock).

332. Fiberglass emerged as a canoe material after WWII; other materials, such as ABS, polyethylene, and Kevlar, are used to make modern boats. X056-192, pp. 15-17 (*Complete Book of Canoeing*).

333. Fiberglass can shatter, whereas big plank boats will take tremendous hits. Tr. 3/31/15, pp. 2960-61 (Dimock).

334. Canvas boats were built for shallow water and were flexible for going around rocks. Patching a boat with a patch kit was then, as now, an expected part of the ride. Wooden boats could also be patched. Tr. 12/15/14, pp. 75-76; (Fuller). Modern rafts are more durable, but historically people didn't expect their wood boats to last more than one or two trips; cargo capacity was similar. Tr. 3/31/15, pp. 2841-43 (Dimock).

335. Richard Lynch, a commercial boater in Segment 2, routinely carries a patch kit and an emergency kit. Tr. 12/16/14, pp. 297, 343 (Lynch); Tr. 12/16/14, p. 388 (Farmer).

336. If you got a hole in a Klepper canoe in 1912, you would patch it. Tr. 3/31/15, p. 2862 (Dimock).

337. A boater would expect to have to repair wood boats occasionally; not so with most modern boats. However, expectations are different: historical boaters had to be ready for any eventuality, whereas modern boaters assume safety. Tr. 3/31/15, pp. 2910-12 (Dimock).

338. Aluminum boats are easy to repair with epoxy and duct tape. Canvas boats are also easy to repair, by stitching in more canvas and using waterproofing materials or duct tape. Wood boats are repairable with the right tools. Tr. 12/16/14, pp. 489-90 (Farmer).

339. Some friends of Don Farmer each built a wooden canoe about 14-15 feet long and canoed on the River without trouble. Tr. 12/16/14, pp. 386-87 (Farmer).

340. Modern boats are substantively similar to historical boats: a wooden or canvas canoe from 1912 is similar in purpose, weight, draw, and design; however plastic boats are more durable and can be faster. It was normal for historical boats to need fixing after a trip; this is less true today. Tr. 12/15/14, pp. 226-28; 250 (Fuller); X035-167, PPT 211; Tr. 12/16/14, pp. 387-88 (Farmer).

341. Technology that has evolved since 1912 makes it easier to boat the River now, but the new technology is not necessary. Tr. 3/31/15, p. 2956 (Dimock).

342. Mr. Dimock is an experienced river-runner, mainly on the Colorado, in kayaks, canoes, and small rafts; boat builder; and river historian. He uses newspapers for his historical research, but not all boating accounts make the newspapers. Tr. 3/31/15, p. 2817; 2823-24; 2929 (Dimock).

#### **D. Modern Boating**

343. People have recreated on the River and its tributaries for more than one hundred years. X057-2 (DWR 2000 Verde River Watershed Study). The River is the most frequently boated river in Arizona. 031, 8-4 (ASLD Report).

344. Over the past twenty years, Mr. Fuller has canoed, kayaked, and rafted, most of the River from its headwaters near Morgan Ranch to the confluence with the Salt; he has taken these trips in all seasons, and most trips were at lower water than the River's ordinary and natural condition. Tr. 12/15/14, pp 13-14 (Fuller); X035-167, PPT 6, 7.

345. Modern recreational boating takes place in all Segments, and commercial (guided and unguided) in Segments 2 through 5. Tr. 12/15/14, pp. 230-31 (Fuller); X035-167, PPT 193.

346. Jim Slingluff, an experienced boater and guide on the River, has paddled a canoe the entire perennial portion of the Verde, in all seasons and at a wide variety of water flow. 009 (Slingluff, *Verde River Recreational Guide*).

347. Commercial outfits run trips on the River on an as-needed basis; the outfitters obtain permits from the USFS for a fee. 031, p. 8-4 (ASLD Report); Tr. 1/18/06, pp. 39-40 (Fuller). The USFS also issues hunting and fishing permits. Tr. 12/15/14, p. 232-33 (Fuller); X035-167, PPT 196.

348. Shuttle services that bring people to the River improve the local economy. Tr. 12/15/14, p. 232-33 (Fuller);

349. Southwest Paddler offers many trips on the River. X001-27 (*Southwest Paddler*).

350. The Central Arizona Paddlers Club ("CAPD") has reported that all of the River downstream of Perkinsville [in Segment 1] has been boated in recent years. 031, p. 8-4 (ASLD Report).

351. Cimmaron River Co. ran commercial river trips on the River, using canoes, inflatable kayaks, and rafts. Tr. 1/18/06, pp. 55-56 (John Colby for Cimmaron).

352. Mr. Farmer uses the River as primary transportation for activities such as fishing, hunting, exploring, looking for and panning for gold. Tr. 12/17/14, p. 555 (Farmer).

353. USFS personnel canoe with heavy equipment through all Segments, and a Forest Service employee does cleanup on the River. Tr. 12/15/14, pp. 232-34 (Fuller); X035-167, PPT 196.

354. Mr. Dimock learned to build boats by fixing his own boats when they broke and, lately, by training. Tr. 3/31/15, pp. 2826-27 (Dimock).

355. There are several published guides for boating on the River: *Verde River Paddle Trail – Tuzigoot Bridge to 89A Bridge*, by Arizona State Parks (X001-28); *A Boater's Guide to the Verde River*, by the Forest Service (X001-29); *Verde River Paddle Trail – 89A Bridge to Beasley Flat*, by the Verde Valley Land Preservation (X001-30); *Arizona Rivers and Stream Guide*, by Arizona State Parks (X035-163); Jim Slingsluff's *Verde River Recreation Guide* (009); Bob Williams's *A Floater's Guide to the Verde River* (X035-155); and *Verde Valley Recreation Opportunity Guide* 1993 (018).

## **VI. Obstacles and Obstructions**

356. Whether something is an obstacle or an obstruction depends on the type of boat used, the boater's expertise, and on the River's flow rate. Tr. 12/15/14, p. 39 (Fuller); X035-167, PPT 28; X035-166, PPT 78 (Fuller Boating).

357. Unlike the rivers described in *PPL Montana*, the Verde River has no significant obstacles or obstructions that would require portaging (except for the minor, occasional lining of Verde Falls), rendering the River non-navigable. X035-166, PPT 79 (Fuller Boating); *see PPL Montana*, 132 S.Ct. at 1224, 1231 (17-mile Great Falls reach of Missouri River has distinct drops including five waterfalls with continuous rapids in between; always requires portaging).

358. Rapids are normal and are not obstacles. They are classified on an international scale of I to VI. Classes I through V are boatable; VI is not. The River has 60 named rapids, 55 of which are Class IIs that make up only 2.6 % of the River. There are four Class IIIs, one of which is man-made. The only Class IV is Verde Falls. The remainder of the River consists of pools and Class Is. Tr. 12/15/14, pp. 40, 63-65 (Fuller); X035-167, PPT 28, 48; X035-166,

PPT 80 (Fuller Boating).

359. The international scale of rapid classification is as follows:

Class I (Pre-Novice) fast moving water; riffles which are easily navigated with little training;

Class II (Novice) straightforward rapids; wide, clear channels, easy with training;

Class III (Intermediate) boat maneuvering required, moderate waves, tight channels, powerful currents;

Class IV (Advanced) powerful intense predictable rapids; moderate to high risk if capsized;

Class V (Expert) complex, violent, demanding; high risk, difficult rescue;

Class VI (Extreme) obstacles – unrunnable for most boaters.

X035-166; PPT 84-91.

360. A waterfall could be an obstacle. Verde Falls is not a waterfall: at high water it is a rapid; at low water the drop is about four feet. Tr. 12/15/14, pp. 40-41 (Fuller); X035-167, PPT 30 (includes photos of Verde Falls and actual waterfalls). Lining around Verde Falls is about 20 feet, with an easy takeout and drop back in. Tr. 12/15/14, p. 150-51 (Fuller); X035-167, PPT 122. Portaging Verde Falls can take about ten minutes. Tr. 12/16/14, p. 391-92 (Farmer). The Falls could be an obstacle, but it does not create a major barrier across the River, as the Forest Service states in its *Analysis of the Criteria for Navigability* (006, 1993). Tr. 12/17/14, pp. 633-34 (Fuller).

361. Some rapids go away and others show up; rapids form in particular locations for geologic and hydraulic reasons. Verde Falls is in a bedrock-controlled rapid. Tr. 12/18/14, pp. 878-79 (Fuller).

362. A riffle can occur when the water is five to ten feet deep. Riffles are shallower than pool portions of a river. Tr. 2/23/15, pp. 2012-13 (Mussetter).

363. Boulders are not obstructions for small boats. Tr. 2/18/15, p. 1328 (Hjalmarson).

364. There are some beaver dams from Verde Ranch to Perkinsville. Tr. 12/16/14, p. 390 (Farmer). Beaver live in the banks, but they retain water in deep pools. Tr. 12/16/14, p. 295 (Lynch).

365. Beaver dams are not obstructions because they are easily crossed in a canoe or portaged around. Tr. 12/15/14, pp. 40, 183-84 (Fuller); X035-167, PPT 149-50 Tr. 12/16/14,

p. 295 (Lynch).

366. Some boaters just go over beaver dams. Tr. 2/18/15, p. 1332 (Hjalmarson).

367. Strainers and sweepers (overhanging bank vegetation and fallen trees) are not obstructions but can be hazardous to the unprepared; they are obstacles that can be boated around or removed. X035-166, PPT 103 (Fuller Boating).

368. A ford is a shallow part of a river where a car or people can move across; it implies that other parts of a river are deeper. Tr. 12/15/14, pp. 42-43 (Fuller); X035-167, PPT 31.

369. Point bars are deposits of sediment that develop on the inside of a channel bend; they are exposed at low water and inundated at high water; a sand bar is typically in the boating channel underneath the water. Tr. 12/18/14, pp. 908-09 (Fuller).

370. Examples of potential obstructions to small boats are Class IV rapids and some waterfalls. X035-166, PPT 78-79 (Fuller Boating).

371. A sandbar is not an obstruction because the boater merely goes around it, unless the sandbar is river-wide in which case it could be an obstacle. There are few sandbars on the River; some gravel bars but not in the thalweg where boating occurs. Tr. 12/15/14, pp. 39-41 (Fuller); X035-167, PPT 28.

372. The biggest obstructions on the River are diversion dams, such as the one just above Tuzigoot Bridge which is a ribbon dam of steel; it stops the River. Tr. 12/16/14, p. 402 (Farmer).

373. Marshes can be obstructions to small boats if there is no channel through them or if they are shallow. X035-166, PPT 79 (Fuller Boating). However, the marshes that people historically talked about on the River were adjacent to the River's main channel on the floodplain. It is scientifically and physically impossible for there not to be a channel through the marshes in Segment 2. Tr. 12/18/14, p. 901 (Fuller).

374. According to Jim Byrkit, who did a study on the marshes and with whom Hjalmarson discussed the subject, the marshes/cienegas were thick but there was a channel through them. Tr. 12/18/14, p. 992 (Hjalmarson). The marshes were outside of the main channel. Tr. 12/18/14, p. 1100 (Hjalmarson).

375. Land surveys of the 1870s did not describe marshy land adjacent to the River, as mentioned in some historical accounts nor did they document any areas where the low-flow

channel was ill-defined. 031, 5-15 (ASLD Report).

## VII. Wildlife

### A. Native Fish

376. Paleo remains of Gila sucker, Sonora sucker, roundtail chub, humpback sucker, squawfish, and perhaps spike dace, have been found at Perkinsville [in Segment 1]. X011-58, p. 40 (*Pictorial Perspective*)

377. Although archaeological evidence indicates that the same species found in Arizona rivers in prehistoric times were also present around the time of statehood, three of these species - the Gila sucker, Sonora sucker, and roundtail chub - still lived in the River in 1968 but the humpback sucker and squawfish were no longer present in the Perkinsville area [Segment 1], and older residents of Camp Verde [in Segment 2] attested to the occurrence of squawfish, “salmon,” in the River in the early 1900s. 031, p. 8-4 (ASLD Report, citing James, 1992); X001-20, pp. 94-95 (*Fish Remains*).

378. Squawfish, razorback sucker, and flannelmouth suckers, could grow to over three feet long. 031, p. 8-4 (ASLD Report); X001-20, pp. 93-96 (*Fish Remains*); the Colorado pikeminnow (“salmon”), razorback sucker (“buffalo fish”), and several other suckers (found in the Gila River as well as the Verde) could reach five to 100 pounds and ranged from 12 inches to six feet long. Archaeological evidence shows that Native Americans ate these fish. Tr. 1/18/06, pp. 210-11, 218 (David Weedman, Arizona Department of Fish & Game<sup>11</sup>); X001-20, p. 92 (*Fish Remains*).

379. After traveling down the River and having reached the Salt River, Judge Joseph Pratt Allyn of Fort Whipple noted in 1864 that there had been plenty of fish in the Verde. X009, Attachment C, Letter 7 (April 1864), p. 101.

380. In 1879, the U.S. Surgeon General noted that the River contained an abundance of fish. 031, p. 3-12 (ASLD Report).

381. Frederick Morton Chamberlain, of the U.S. Fish Commission, conducted a fish survey in Arizona in 1904; he observed generally failing springs, declining water tables, and floodplain incision, and he attributed the general causes of fish extinction in the region to

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<sup>11</sup>Mr. Weedman's testimony was taken on November 16, 2005, at the ANSAC hearing on the Gila River, when Mr. Weedman also testified regarding the Verde River. A transcript of his testimony is attached to the 1/18/06 transcript of the Verde hearing.

destruction of riparian vegetation (leading to increased floods and erosion), irrigation, and mining operations. X035-138, pp. 96-97; 121-25 (*Arizona Wildlife*).

382. Mr. Chamberlain also expressed concern that close pasturing of the ranges above had subjected Fossil Creek (which enters the River at the boundary of Segments 3 and 4), and others, to an unusual wash of mud that probably made it more or less unfit for fish life; however, he saw plenty of small chub, Sonora sucker, and speckled dace in the East Verde River (which enters the River in Segment 4). X035-138, pp. 117-18.

## **B. Beaver**

383. Beaver are present on the Upper Verde [Segment 0 and 1]. A recent survey team found seven dams (one consisting of many smaller dams, stretching for 351 feet), and at least seventeen active dens/lodges. Beaver dams promote the growth of bulrushes and cattails, both of which slow flood waters. X035-165 (*Beaver Presence Survey of Upper Verde*, 2009).

384. Dr. Elliott Coues, an Army surgeon, historian and ornithologist, noted an abundance of beaver in Arizona in 1867. X011-70, p. 218 (*Beaver Management*).

385. Edgar Mearns, an Army surgeon and field naturalist who was assigned to Fort Verde [in Segment 2] from 1883 to 1888, noted numerous beaver in the River's box canyon and in the River's tributaries. X011-70, p. 219 (*Beaver Management*).

386. Some beaver were taken from the River during the winter of 1884-85. Beaver (one weighing 73 lbs.) were still being taken from the Gila and Verde during the winter of 1886-87. X011-67, pp. 351, 354 (*Mammals*).

387. Beaver were abundant at Fort Verde [in Segment 2] (and in irrigation ditches) in the summer of 1884. Beaver cut down cottonwood trees of 21 to 89 inches circumference at Fort Verde [Segment 2]. X011-67, pp. 354-55, 357 (*Mammals*).

388. Currently, there are no beaver dams downstream of Perkinsville. Tr. 12/15/14, p. 183 (Fuller); X035-167, PPT 149.

389. For the current presence of beaver activity [in Segments 0, 1, 2], see map "Location of Beaver Sign". X102-203 ("Beaver Presence Survey of the Upper Verde River").

390. Beaver rebounded in the Upper Verde River [Segments 0, 1, 2] after livestock were restricted near the River in the early 1990s. X084-202 ("When Verde Means Gold").

391. There are beavers in Segment 2, but beavers are generally bank-dwelling, and

the River is too big for consistent mid-stream beaver dams. Tr. 12/15/14, pp. 184-87 (Fuller).

## VIII. Segments

### A. **Segment 0 (from Sullivan Lake to FR 638 – 7.1 RM)**

392. This Segment becomes perennial below its confluence with Granite Creek. Above the Creek it has a pool drop pattern; below the Creek it is classic pool and riffle. Some of this stretch is in a relatively narrow bedrock canyon. Groundwater pumping in the upper watershed has depleted the flow below Granite Creek.<sup>12</sup> There are minor human impacts such as cattle damage and the presence of some structures. Land ownership is mostly public. There are some beaver dams. Although Mr. Fuller has boated in this Segment, boating is infrequent, and the Segment is not navigable under the federal test. Tr. 12/15/14, pp. 48-61 (Fuller); X035-167, PPT 40-45; 174.

a. Segment 0-A (from Sullivan Lake to Granite Creek) is a bouldery, steep, and ephemeral part of the River, with a long paddleable pool, one to two feet deep, upstream of the Creek, flowing mostly during floods. It is probably close to its ordinary and natural condition, but its flows have been depleted since statehood. Tr. 12/15/14, pp. 50, 54; 214-15 (Fuller); X035-167, PPT 175-76.

b. Segment 0-B (downstream of Granite Creek to FR 638) is perennial but has little flow, shallow riffles, and many obstructions; trees fall over the small stream. It has bankside vegetation and much beaver activity. The River here is about 20 feet wide and the flow picks up. Although this Segment is boatable by canoes about 90% of the time and by flatboats 10% of the time, its many obstructions and the lack of historical boating incidents render it not navigable. Tr. 12/15/14, pp. 52, 55, 57, 216-18 (Fuller); X035-167, PPT 216-18.

### B. **Segment 1 (from FR 638 to Sycamore Creek – about 30 RM)**

#### 1. *Hydrology and Geomorphology*

a. Segment 1 is perennial, about 20-30 feet wide, has a pool and riffle pattern and is inside a shallow, moderately deep, bedrock canyon. Its flow is diminished by upstream withdrawals, a small diversion at Perkinsville, and pumping out of the River. It has two Class II rapids comprising less than 1% of the Segment's length, and one Class III (perhaps man-made) comprising less than 0.2% of the length. The surrounding land is

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<sup>12</sup>Groundwater pumping takes place in Chino Valley above Sullivan Lake and coming down Granite Creek. Tr. 12/15/14, p. 220 (Fuller).



mostly forest with some in-holdings. Cattle grazing has led to a lack of riparian vegetation. This Segment is fairly commonly boated, mainly from Perkinsville, where the River has a steady base flow of 20 – 50 cfs Tr. 12/15/14, pp. 61-70 (Fuller), X035-167, PPT 46-50.

b. According to USGS gages this Segment's non-natural median flow rate is 26 cfs, and 90% of the time the flow is more than 22 cfs. Tr. 12/15/14, pp. 196-97 (Fuller); X053-174, PPT 159. Mr. Fuller has boated this Segment at 24 cfs. Typically, this Segment has three- to four-foot deep pools 30–50' wide, but sometimes the River narrows to two boat-widths. Tr. 12/15/14, pp. 61-74 (Fuller); X035-167, PPT 46-48. The flow rate is relatively constant with a small wintertime boost to 120 cfs. It is boatable by canoes and kayaks 99% of the time (360 days a year) and 30% of the time (110 days) by flatboats. Tr. 12/15/14, pp. 220-21; X035-167, PPT 178-80.

## 2. *Historical Descriptions and Events*

393. Yavapai peoples irrigated their crops on the River's floodplain in the 1890s around Perkinsville. X001-20, p. 95 (Fish Remains).

394. By 1882, James Baker's 76 Ranch in Perkinsville, the largest ranch in northern Arizona, had 10,000 head of cattle. X011-58, p. 35 (Pictorial Perspective).

395. The River's floodplain near Perkinsville was stable in the 1890s according to Mrs. Perkins [in 1968], whose family settled the area. X001-20, p. 95 (Fish Remains).

396. Mrs. Perkins related that livestock driven to a large island in the River in the 1890s refused to leave it because the water was so deep; by 1968, the water was about a foot deep at Perkinsville. X001-20, p. 95 (Fish Remains).

397. James Girand, conducting a government survey in 1902, noted that the River's water in Segment 1 (at T18N, R2E) was “clear and pure” and that the southwest portion of the township was well watered. 032 pp. 55-56 (Littlefield 2005 Report).

398. Jesse B. Wright, surveying sections in Segments 1 and 2 (T17N, R3E) in 1907 and 1908, opined that the surveyed sections could be irrigated “from the ample supply of water in the Verde river.” 032, p. 58 (Littlefield 2005 Report).

## 3. *Historical Boating*

399. In 1891, a “frail” raft was built of railroad ties in an attempt to repair a railroad track; it fell apart when the men tried to cross the River. Tr. 12/15/14, pp. 157-58 (Fuller, citing Littlefield); X035-167, PPT 131; X035-154 (Weekly Journal Miner, 3/4/1891).

However, it is not clear that this incident actually occurred on the Verde. Tr. 12/15/14, p. 157 (Fuller).

400. Boats or rafts were used to transport rock for the building of a rock dam near Perkinsville in June 1899. 031, p. 8-3 (ASLD Report); Tr. 12/15/14, p. 162 (Fuller); X035-167, PPT 134.

401. Although reaches boated historically extended from Perkinsville to the Salt River confluence [in Segment 5], historical boating accounts are generally concentrated in river reaches with settlements, particularly the lower Verde near Fort McDowell [Segment 5] and the Verde Valley near Camp Verde [Segment 2] beginning in the 1860s. 031, p. 8-3 (ASLD Report).

#### 4. *Modern Boating*

402. The Arizona State Parks Department lists the River from Perkinsville to the Salt River [Segments 1 through 5] as a boatable stream. 031, p. 8-5 (ASLD Report).

403. Mr. Fuller has boated past the rapid named Guv Drop, a weak Class II, and he canoed in a 15' 8" Rendezvous in October 2014 when the River was at 22 cfs at Paulden. He was accompanied on this trip by Dave Weedman of Arizona Game and Fish. Game and Fish personnel often boat this reach, carrying a lot of equipment. Tr. 12/15/14, pp. 65-67; 77-78 (Fuller); X035-167, PPT 52; X017-73 (Photos).

404. Don Farmer, an experienced boater, has boated on the Verde since the early 1970s with a 99% success rate. He has boated from Verde Ranch to the Salt confluence three to six times a year in inflatable kayaks, canoes, and rafts, but mostly in canoes which are well suited for travel up or down the River. Tr. 12/16/14, pp. 381-82 (Farmer). He has moved mining equipment - shovels, gold pan, snuffer bottle – on the River in connection with panning for gold. Tr. 12/16/14, pp. 465, 531 (Farmer).

405. One June, Mr. Farmer took a three-day trip with two women from the Audubon Society and a 400-lb load, at 26 cfs and a depth of from six inches to four to five feet in Segment 1. Based on the heavy load and low flow, he had to get out of the boat because of a beaver dam, and for other reasons about once a mile. The River's flow here is depleted by upstream groundwater extraction. Tr. 12/16/14, pp. 399-401 (Farmer).

406. There are no rapids worth listing in this Segment. Tr. 12/16/14, p. 420-21 (Farmer).

407. The USGS conduct studies in this Segment and in Segment 2. Tr. 12/18/14, pp. 974-75 (Hjalmarson); X036-1, PPT 39 (photograph of a canoe, fully-loaded with scientific instruments for a USGS study from Perkinsville to Clarkdale).

408. Southwest Paddlers offer the following trips: Sullivan Lake to Perkinsville [Segment 1] (46 miles), Classes I and II; and from Perkinsville to Beasley Flat [Segments 1, 2] (55 miles), Classes I and II. X001-27, *Southwest Paddler*.

409. Arizona Rivers and Streams Guide describes the following trip: Perkinsville to Clarkdale (23 miles), best in spring and late summer, for low-water boating. X001-2.

**C. Segment 2 (Sycamore Creek to Beasley Flat [49 RM])**

*1. Hydrology and Geomorphology*

410. This Segment is in an alluvial valley; it is perennial with a pool and riffle pattern. It has Class I rapids, which are well suited for beginner boaters, as well as two Class II rapids (one of which is man-made), over .3% of its length and no Class IIIs or Class IVs; it is predominantly a single channel. Land ownership is mainly private. Large tributaries are Sycamore Canyon, Oak Creek, Beaver Creek, Wet Beaver Creek, West Clear Creek. Tr. 12/15/14, pp. 79-81 (Fuller); X035-167, PPT 53-54.

411. Most of the irrigation on the River takes place in this Segment. 031, 7-23, Table 7-16. In its ordinary and natural condition, the River would have had deeper flow with similar channel conditions. Tr. 12/15/14, p. 222 (Fuller).

412. Low flow is in May and June due to irrigation diversions; high flow tends to be from the last week in January/first three weeks in February to mid-April. Tr. 12/16/14, pp. 290, 320 (Lynch).

413. In the upper stretch of this Segment, the deeper pools are from two to four feet, and in the lower stretch pool depths are from four to six feet. Tr. 12/16/14, p. 299 (Lynch).

414. In its ordinary and natural condition, the River would have had deeper flow but similar channel conditions except where the channel has been physically changed by man. Tr. 12/15/14, p. 222 (Fuller); X035-167, PPT 183.

415. In the marsh areas, there was a channel through them with flowing water, except at Tuzigoot. Tr. 2/20/15, p. 1832 (Randall).

416. In modern times, the River has experienced diminished flow and significant human impacts in this Segment because of diversions, bridges, erosion protection, farms,

dams, fences, encroachment, sand and gravel mining, roads, all of which have changed the morphology and decreased boatability. Tr. 12/15/14, pp. 80, 221-22, 920-21 (Fuller); X035-167, PPT 182.

417. Irrigation withdrawals lower the River by six inches to one foot during much of the commercial season. Tr. 12/16/14 at 290, 300 (Lynch).

418. At the Clarkdale gage, the boating channel depth at natural low flow (Q90, 111 cfs) was calculated as three feet at the section control for the gage and 3.2 feet at the cableway. Tr. 12/18/14, pp. 972-73 (Hjalmarson); X036-1, PPT 36, 37, 38.

419. Modern USGS non-natural gage data show a median flow rate of 86 cfs and that 90% of the time the flow is more than 70 cfs. Tr. 12/15/14, p.197 (Fuller); X053-174, PPT 159.

420. There is frequent boating in this Segment, mainly in the summer. It is boatable by canoe 99% of the time (360 days) and by flatboats 85% of the time (310 days). Tr. 12/15/14, p. 222 (Fuller); X035-167, PPT 183.

## 2. *Historical Descriptions and Events*

421. In the late 1500s, early Spanish explorers Espejo and Farfan described the River as “large and copious” and as “a large river, carrying a great volume of water;” they speculated that the River's water was easily sufficient to run water wheels. 031, p. 3-11 (ASLD Report); X011-58, p. 27 (*Pictorial Perspective*). Their exact routes are unknown but the explorers were in the general vicinity of the mines at Jerome. 031, p. 3-11 (ASLD Report). Mr. Randall, an Apache elder, states that Espejo arrived just below where the Verde Ditch is now. Tr. 2/20/15, p. 1766 (Randall).

422. Antoine Leroux, a trapper, described the River in the Verde Valley as “a fine large stream; in some cases rapid and deep, in others spreading out into wide lagoons . . . . The river banks were covered with ruins of stone houses and regular fortifications; which . . . appeared to have been the work of civilized men, but had not been occupied for centuries. They were built upon the most fertile tracts of the valley, where there were signs of acequias and of cultivation.” Quoted by Lt. Amiel Whipple and others. X011-58, pp. 27-28 (*Pictorial Perspective*); X009, Attachment C, *Report Upon The Indian Tribes* by Lieut. Whipple, et al. Washington, D.C. 1855, p. 14.

423. Leroux's Journal contains many phrases such as “splendid water,” “water

plenty,” “wood, water, and grass in abundance,” “grass and water in abundance,” “plenty of wood and water” “wood in abundance as well as water” as he camped along the River (which he referred to as the “San Francisco”) in the Verde Valley in May 1854. X009, Attachment C, Report, pp. 14-15 (Leroux journal entries).

424. Camp Lincoln was established in 1861 as an outpost of Fort Whipple, and was occupied by regular troops in 1866. In 1871, it was moved south one mile because of malaria to about half a mile south of the confluence with Beaver Creek. X079, p. 316 (“Handbook to Arizona,” 1878).

425. Judge Joseph Pratt Allyn described the general characteristics of the valley “where one stream comes in from Bill Williams and the other from the San Francisco mountains” [probably Oak Creek just below present-day Bridgeport] as “similar to those of the Rio Grande and there is nearly as much water in the river as there was in that stream when I first struck it coming from Santa Fe. With irrigation it would yield as the Rio Grande does.” X009, Attachment C, Letter 5 (March 1864), p. 90, n. 14.

426. Camp Verde was established to deal with the Apache unrest. Tr. 4/1/15 (Burtell), p. 3081.

427. The area around Clarkdale and Camp Verde was unsafe for settlers; the Apache would have shot them on the river and elsewhere. Tr., 2/20/15 (Randall), pp. 1826-27.

428. K.S. Woolsey, Lt. Col. of Commanding Volunteers from the Weaver and Walker mines, said in 1864 that the Verde River was once called the San Francisco River. The River at Camp Verde was then only fifty feet wide and two feet deep, whereas [presumably in 1933] it had a wide bed which carried large floods every spring. X035-150, p. (5) (*Pioneer Stories of the Verde Valley* “History of Camp Verde,” pub. 1933).

429. Hay cutters began using the middle Verde Valley in 1863 or 1864. 031, p. 3-15 (ASLD Report).

430. The first white settlers came to the Verde Valley area on or before 1864; that's when irrigation started. Tr. 4/1/15 (Burtell), p. 3081.

431. Settlers hauled hay by wagon to Camp Verde, sometimes by ox team; the mail was carried on horseback. 031, p. 3-18 (ASLD Report).

432. Some “hardy pioneers” set out on foot from Prescott to settle the banks of the River in 1865. Reaching the River after three days, they waded across it, camped on the other

side, and settled at the Verde/Clear Creek confluence. They provisioned in Prescott, returning in six oxen-drawn wagons, dug a ditch, made a dam, and planted barley, wheat, corn, potatoes, beans, melon, and “garden stuff.” They sold some grain to Fort Whipple [in Prescott]. They also brought cattle, but the Indians stole their supplies and ran off the cattle. The settlers had problems with the Indians for the next ten years. Camp Lincoln [later Camp Verde] was established to protect the settlers. X035-150, pp. (5)-7 (*Pioneer Stories of the Verde Valley* “History of Camp Verde”); X017-130 (*Yavapai Magazine*).

433. The first [Euro-American] permanent settlers arrived in the Verde Valley near the mouth of Clear Creek [Segment 2] in January 1865 and began cattle ranching to meet local needs - of the Army and of the settlers. X001-25, p. 44 (*Log of the Verde*); X011-58, p. 34 (*Pictorial Perspective*).

434. At Camp Verde, irrigation began in the mid-1860s. Tr. 12/19/14, p. 1184 (Hjalmarson).

435. The origin of Anglo settlement in central Arizona dates from 1867. X100-19, § E(3), p. 9 (Historic Bridge Inventory).

436. General Crook built Camp Verde in 1870-71 on the [west] side of the River. A temporary reservation for Indians was established near Camp Verde in 1871. X035-150, p. 8 (*Pioneer Stories of the Verde Valley* “History of Camp Verde”).

437. By 1870, there were three or four small ranches farmed by German and American settlers in the Verde Valley. X035-153, p. 469 (*Report on Barracks and Hospitals*).

438. The Verde Valley, where Camp Verde is located, is about seven miles wide with a rich alluvial bottom which has been farmed by settlers. The bottom was very fertile when irrigated, corn being the main crop. Three quarters of a mile below the post where Beaver Creek comes in is a tongue of land which appeared to be the chief source of malaria affecting the soldiers. There was rich grazing, timber, and game in abundance near the camp. The post garden was six miles below the post – where Clear Creek joins the River. X035-153, pp. 468-69. ([1870] *Report on Barracks and Hospitals*).

439. Modern Jerome's history began in 1873 when a party of prospectors arrived in the Verde Valley and located several mines. X035, 150, p. (12) (*Pioneer Stories*, “Early History of Jerome”).

440. Government surveyor C. Burton Foster, who conducting a survey in T13N, R5E

in December 1873, noted that the River was about one chain wide and had a gentle current and sandy bottom. He described the River as “a stream with banks about 3 feet high and of uniform width. The amount of water flowing with gentle current through its channel at an average depth of about 3 feet varies but little during the different seasons of the year and seldom overflows its banks.” X002, p. 34-35 (Littlefield Revised Report).

441. Mr. Foster, surveying in T15N, R4E in 1877, noted that the River was 66 feet wide in one place and 79 feet wide in another. X036, p. 5 (Hjalmarson, Supplement 2).

442. Generally, the land surveys of the 1870s did not describe marshy land adjacent to the River as mentioned in some historical accounts, nor did they document any areas where the low-flow channel was ill-defined. 031, p. 5-15 (ASLD Report). Mr. Foster did not note any marshy area in his notes. Tr. 2/19/15, p. 1596 (Littlefield).

443. During 1875, cattle were driven to Camp Verde from Texas. Gradually the surrounding hills were stocked, and over-stocking resulted. X035-150, p. 9. (*Pioneer Stories of the Verde Valley* “History of Camp Verde”).

444. Hiram Hodge wrote of the River in 1877: “It becomes a fine river eighty feet in width about 50 miles northeast of Prescott.” 031, p. 3-13 (ASLD Report); X001-25, p. 40 (*Log of the Verde*); X056-191, p. 39 (*Arizona As It Is*).

445. C. Burton Foster, surveying in T16N, R3E [near Clarkdale], wrote in May 1877: “The Verde River, a beautiful stream of clear pure water, with an average width of 100 links [66 feet], and an average depth of 3 feet flows in a South Easterly direction through the township.” X036, p. 3 (Hjalmarson, Supplement 2).

446. In 1879, when Jessie Belle Shelley was six years old, she and her family moved to the Verde Valley; at that time the River flowed in a definite course with grass covered banks. 031, p. 3-14 (ASLD Report); X035-150, pp. 186-87 (*Pioneer Stories*, “Jessie Belle Shelley”).

447. Farms dotted the River's edge. Gardening and fruit growing were profitable. Irrigation was good after Wood's Ditch was constructed. X035-150, p. 9; photos opposite p. 9: wagon, plough pulled by horse, typical Verde Valley home (*Pioneer Stories*, “History of Camp Verde”).

448. By 1880, most of the arable land in the Verde Valley was under cultivation. 031, p. 3-9 (ASLD Report).

449. A salutary effect of seasonal flooding was a decrease in incidents of malaria. A settler wrote that: “[W]hen the runoff got bigger and the river was cleaned out occasionally with floods, the malaria disappeared.” 031, p. 3-13 (ASLD Report).

450. Around 1884, a member of Wallace W. Elliott & Co., described the River as one of the largest northern branches of the Salt and one that became “a fine river of eighty feet in width about fifty miles northeast from Prescott. Its whole course is about 150 miles. It receives the waters from the San Francisco Mountains and other timbered slopes.” 031, p. 3-3, Table 3-1 (ASLD Report); Tr. 12/15/14, pp. 129-30 (Fuller); X035-167, PPT 89; X035-161, p. 90 (*History of Arizona Territory*, 1884).

451. The soldiers abandoned Camp Verde in 1890. X035-150, p. 9 (*Pioneer Stories of the Verde Valley* “History of Camp Verde”).

452. Daniel Drummond, a government surveyor, working in this Segment in late 1892 to early 1893, made the following note with respect to T13N, R5E:

The Verde River is a fine stream of living water flowing through the [Camp Verde Military] Reservation from north to south and contains ample water for the purposes of irrigation. The high flood of February 1891 has washed several hundred acres of fine bottom land, leaving in its stead stones, rocks, and gravel, forming the present bed of the river. Since the flood banks of the river average a width of nearly 20 chains.

X002, pp. 36-37 (Littlefield Revised Report). Mr. Drummond meandered both banks of the River. Tr. 2/19/15, p. 1597 (Littlefield).

453. Jerome grew into a proper town by 1899. X035-150, p. 13 (*Pioneer Stories*, “Early History of Jerome”).

454. Residents of Camp Verde reported the presence of squawfish (“salmon”) in the River in the early 1900s. X001-20, p. 94.

455. J.K. Day, a professional hunter, experienced mountaineer and trapper, who was appointed fish and game commissioner for Arizona and who knew more about game, especially big game, than anyone else, died on February 26, 1902. X-102-213 (Arizona Republican, 10/15/1898); X102-222 (Lion Hunter Lost, 6/22/1901); X102-212 (Arizona Republican, 2/27/1902).

456. Jesse B. Wright, surveying sections in Segments 1 and 2 (T17N, R3E) in 1907 and 1908, opined that the surveyed sections could be irrigated “from the ample supply of



water in the Verde river.” X002, p. 39 (Littlefield Revised Report).

457. A new smelter was built in Clarkdale in 1915 because the Jerome plants couldn't handle any more ore. The new plant employed 900 men. Clarkdale subsequently grew into a town. X035-150, p. 14; photos opposite p. 14: wagons with ore; couple in car (*Pioneer Stories*, “Early History of Jerome”).

### 3. *Historical Boating*

458. Although reaches boated historically extended from Perkinsville [in Segment 1] to the Salt River confluence [in Segment 5], historical boating accounts are generally concentrated in river reaches with settlements, particularly the lower Verde near Fort McDowell [Segment 5] and the Verde Valley near Camp Verde [Segment 2] beginning in the 1860s. 031, p. 8-3 (ASLD Report).

459. Boats were used in the Verde Valley beginning near the time Fort Verde was established in the 1860s. 031, p. 8-3 (ASLD Report).

460. Troops at Fort Verde and civilians used boats as ferries around 1878 during periods of high flow. 031, p. 8-3 (ASLD Report). There is no mention of any problems. Tr. 12/15/14, p. 153 (Fuller); X035-167, PPT 127.

461. Betty Tome, historian for the Camp Verde Historical Society, related that soldiers at Fort Verde used a boat for fishing. 031, App. D-4 (ASLD Report); X035-167, PPT 140.

462. A photograph (the original of which is in the Library of Congress), probably taken about ten miles downstream of Camp Verde, shows two men, one wearing an Army uniform, in a boat on the River in 1885 or 1887. Bob Munson of the Fort Verde State Historical Peak, explained that the boat was a “collapsible U.S Army issue boat” and that the Fort used it to take couriers across the Verde during periods of high water and for fishing. 031, pp. 3-20, 4-2 (ASLD Report); X017-124 (*Territorial Verde Valley*). No problems were reported. Tr. 12/15/14, p. 155 (Fuller); X035-167, PPT 129; Tr. 2/19/15, p. 1545 (Littlefield); X024, PPT 51.

463. J.K. Day and his brother George left Camp Verde on September 1, 1891, in a small boat on a trapping expedition to take their beaver and otter furs to market in Yuma, where they arrived six months later. It was J.K. Day's fifth such trip; he and his brother planned to do the trip again the following year. X001-18 (*Arizona Sentinel*, 4/2/1892); Tr.

12/15/14, pp. 158-60 (Fuller); X035-167, PPT 132.

464. In early 1903, Dr. Palmer and Joe Crain boated about sixteen miles on the River in a borrowed steel boat, duck-hunting all the way. The boat had been hauled upriver on a two-wheeled axle drawn by a horse; the horse had apparently done this so many times that it could be relied upon to return the empty axle to the corral. 031, p. 3-21 (ASLD Report); Tr. 12/15/14, pp. 162-63 (Fuller); X035-167, PPT 135; X017-97, p. 29 (*Doctor on Horseback*).

465. Miller, Hooker, Cox, and Smith postponed their planned trip down the River from Jerome [Clarkdale] to Phoenix in 1905 because their iron boats, which had been shipped to them, had apparently been lost in transit. However, a correspondent in Jerome reported that Miller and Cox started down the Verde on May 21, 1905, in sailboats (iron with canvas seats). Armstrong joined them in his own boat at Camp Verde. The boats were “shooting boats,” carrying fishing tackle, guns, and ammunition. “Three other members” of the party (presumably Miller, Cox, and Armstrong) who had started for Phoenix returned because at Camp Verde the water had become too low. X017-126 (*Weekly Journal Miner News*, 5/24/1905); X001-19 (*Bisbee Daily Review*, 5/26/1905); X017-127 (*Weekly Journal Miner News*, 5/28/1905).

466. Four hunters in a boat loaded with guns and supplies started from the Verde Valley at about RM 75 on their way to Mesa in 1910. They successfully navigated through this Segment and Segment 3, but wrecked on a rock at about Red Creek (at about RM 130) or at the East Verde River [both in Segment 4]. X035-164 (*Bisbee Daily Review*, 8/12/1910); Tr. 12/15/14, pp. 166-69 (Fuller); X035-167, PPT 137.

467. A photograph shows Fred Stevens and his wife, Jessie, in a wooden rowboat on the Verde during spring runoff in 1917. They boated successfully through this Segment, but did not make it beyond Brown Springs Falls/Verde Falls in Segment 3. The photograph was probably taken at Beasley Flat. X017-121 (*Verde Independent News*, 2/27/1980); Tr. 12/15/14, pp. 169-70 (Fuller); X035-167, PPT 138.

468. Fred Fogal and Karl Gireaux launched a flat-bottomed boat at Clarkdale in 1931, intending to trap their way down to Granite Reef Dam [on the Salt River]; they noted that the River became easier to navigate the farther south they went. They exited the River eighteen miles north of old Fort McDowell after five successful weeks on the River. 031, p. 3-21 (ASLD Report); X017-125 (*Verde Copper News*, 2/6/1931, 2/20/1931). Tr. 12/15/14,

pp. 170-71 (Fuller); X035-167, PPT 139.

469. Jim Byrkit, Environmental Professor, NAU, recalled that in or around 1958 logs were floated down the River for use in building the Verde House Spring Lodge. 031, App. D-8 (ASLD Report).

#### 4. *Modern Boating*

470. The Arizona State Parks Department lists the River from Perkinsville to the Salt River [Segments 1 through 5] as a boatable stream. 031, p. 8-5 (ASLD Report).

471. There are two boat ramps in this Segment and many boating access points: at the SR 260 bridge and at Beasley Flat. Tr. 12/15/14, pp. 87, 89 (Fuller).

472. Mr. Fuller has paddled through this Segment many times, sometimes when the River was as low as 59 cfs, and he knows others who have done it at 35 cfs. Tr. 12/15/14, pp. 83, 89-90 (Fuller).

473. Mr. Hjalmarson built a marine plywood boat when he was in high school, and he and his brothers fished from the boat. Tr. 2/28/15, p. 1403 (Hjalmarson).

474. Mr. Farmer has boated from Verde Ranch to the Salt confluence three to six times a year in inflatable kayaks, canoes, and rafts, but mostly in canoes which are very suited for travel up or down the River. Tr. 12/16/14, pp. 381-82 (Farmer).

475. The biggest obstacles in this Segment are diversion dams; a steel ribbon dam just above Tuzigoot Bridge stops the River. Strainers can cause problems for boaters and could require getting out of the boat and going around them. There are no rapids worth listing in this Segment. Tr. 12/16/14, p. 402, 404, 421 (Farmer).

476. Photograph of a canoe fully loaded with scientific instruments for a USGS study from Perkinsville to Clarkdale. Tr. 12/18/14, pp. 974-75 (Hjalmarson); X036-1, PPT 39.

477. There are annual boat races on the River, many sponsored by Camp Verde, and the River is internationally known. Tr. 1/18/06, p. 36 (Fuller).

478. Harry King operated a commercial pleasure boat on the River at Camp Verde (a two-mile stretch) on a boat drawing two feet of water; King also had a second, smaller boat. X001-17 (*Arizona Republic*, 6/14/1989).

479. An annual ten-mile Verde River canoe challenge runs from Route 160 (White Bridge) to Beasley Flats [at the border of Segments 2/3] which takes place on one day a year at the end of March or beginning of April. X001-23 (*Canoe Races*); Tr. 12/15/14, pp. 234-35

(Fuller); X035-167, PPT 197.

480. Richard Lynch, an experienced boater and commercial guide, has owned and operated Verde River Adventures in Clarkdale since 2007; his company offers mostly guided trips in inflatable kayaks (“duckies”) on a three-mile stretch from Clarkdale to Tuzigoot; from Cottonwood to the confluence with Oak Creek; and from Camp Verde to Beasley Flats. Tr. 12/16/14, pp. 283-87, 294, 315 (Lynch); X001-24 (*Adventure Tours*). During the summer Verde River Adventures employs between 18 and 25 people. Tr. 12/16/14, p. 329 (Lynch).

481. Verde River Adventures offers boating services, guided tubing and kayaking, boat rentals and general boating advice to 5,000 to 6,000 customers annually for \$65-\$87 per person. Tr. 12/16/14, pp. 285-87 (Lynch).

482. Thousands of people, including commercial operators, boat this reach throughout the year in many different kinds of boats. Tr. 12/15/14, 92-97 (Fuller); X035-167, PPT 60-61, 64.

483. Verde River Adventures, permitted by the Town of Clarkdale and Arizona State Parks, had 6,548 commercial customers in 2014. X056-189, p. 4 (Town of Clarkdale Meeting).

484. A fully-loaded canoe for an overnight trip could weigh 100-150 lbs. plus the boaters' weights. Tr. 12/16/14, p. 371 (Lynch).

485. Mr. Lynch has seen flatboats 14-15 feet long and 5-6 feet wide on the River around Camp Verde with duck hunters aboard. Tr. 12/16/14, p. 374 (Lynch).

486. Boating in canoes and kayaks currently takes place from Tuzigoot Bridge to Highway 89A Bridge (6.5 miles) (Arizona State Parks Verde River Paddle Trail) and from Highway 89A Bridge to Beasley Flat (31 miles). X001-28 (*Paddle Trail*); X001-30 (*Paddle Trail*).

487. To boost tourism in the area, the community offers various events such as Verde River Fest, Verde River Days, and Verde River Runoff. Tr. 12/15/14, p 237 (Fuller); X035-167, PPT 200.

488. Southwest Paddlers offer the following trips: from Perkinsville to Beasley Flat [Segments 1, 2] (55 miles). X001-27, (*Southwest Paddler*)

489. Various commercial outfits offer trips on the River, mostly in this Segment. Several printed boating guides describe the River and its rapid classifications. Tr. 12/15/14,

pp. 238-41; X035-167, PPT 201, 204-07.

490. Arizona Rivers and Streams Guide describes the following trips: Camp Verde to Beasley Flats (9 miles), low-water boating almost year-round; from Perkinsville to Clarkdale [Segments 1, 2] (23 miles), best in spring and late summer, for low-waterboating; Clarkdale to Camp Verde (24 miles). X001-2.

491. The Town of Clarkdale has recommended a maximum of 9,200 commercial customers for its Verde River @ Clarkdale three-mile stretch for the summer of 2015. X056-189, p. 14 (Town of Clarkdale Meeting).

**D. Segment 3 (Beasley Flat to Childs [16.5 RM])**

*1. Hydrology and Geomorphology*

492. This is a “whitewater reach,” but its rapids are mostly Classes I and II (10% of the Segment), a couple of IIIs (1%), and one IV (Verde Falls) (0.2%), depending on the River's flow. This reach is perennial, predominantly pool (85 %) and riffle, and lies in a bedrock canyon. Base flow is depleted from pre-statehood conditions; there were no major pre-statehood diversions within the Segment. Tr. 12/15/14, pp. 92-99 (Fuller); X035-167, PPT 85.

493. Verde Falls is 4-6 feet tall; at high flows it becomes a hydraulic and not really a falls. Tr. 4/03/15 (Fuller), p. 3514.

494. Under the 1968 National Wild and Scenic Rivers System, 16 U.S.C. § 1271, Congress designated the River in this Segment as a Scenic River in 1984. X056-189, p. 6 (Staff Report, 1/13/15, Town of Clarkdale); X001-29 (Boaters' Guide).

495. Land ownership is mostly public. Thousands of people boat this Segment. Mr. Fuller has paddled this Segment many times, portaging Verde Falls. This Segment is boated throughout the year in different kinds of boats. Tr. 12/15/14, pp. 92-99 (Fuller); X035-167, PPT 59-64.

496. Modern USGS non-natural gage data indicate that the Segment's median flow rate is 188 cfs, and that 90% of the time the flow is 82 cfs. Tr. 12/15/14, p. 197-98; X053-174, PPT 159.) This Segment remains fairly pristine physically but has some reduction in normal flows. It is boatable by canoes 99% of the time (360 days) and by flatboats 80% (290 days). Tr. 12/15/14, pp. 222-23 (Fuller); X035-167, PPT 184-86.

*2. Historical Descriptions and Events*

497. Having descended either Gap Creek or Chasm Creek Canyon, Judge Allyn described the River as “a fine rushing stream, some fifty yards wide, and not fordable; it is dammed just below with drift wood.” X009, Attachment C, Letter 5 (March 1864), p. 87.

498. In late December 1902, Dr. Ralph Palmer waded across the River on his way back to Camp Verde from conducting an autopsy at Bloody Basin (about 45 miles south of Camp Verde); he described the River there as about fifty feet wide and “not over waist deep.” X017-97, p. 26 (*Doctor on Horseback*).

499. An unverified statement said that boats used in the Verde Valley from 1910 to 1920 needed to be emptied of cargo to pass the rapids downstream of Camp Verde, probably around The Falls. 031, p. 8-3 (ASLD Report); Tr. 12/15/14, pp. 171-72 (Fuller); X035-167, PPT 139.

### 3. *Historical Boating*

500. The Day brothers, having left Camp Verde on September 1, 1891, passed through this Segment, successfully trapping in their small boat on their way to Yuma to sell their skins. X001-18 (*Arizona Sentinel*, 4/2/1892); Tr. 12/15/14, p. 158; X035-167, PPT 132. They had made this trip four times prior and planned to do it again.

501. The four hunters in a boat loaded with guns and supplies who had started from the Verde Valley at about RM 75 on their way to Mesa in 1910 successfully navigated through this Segment. X035-164 (*Bisbee Daily Review*, 8/12/1910); Tr. 12/15/14, pp. 166-69 (Fuller); X035-167, PPT 137.

502. Mr. and Mrs. Stevens, having boated through Segment 2 in their wooden rowboat during spring runoff in 1917, ended their trip before Brown Springs Falls/Verde Falls. X017-121 (*Verde Independent News*, 2/27/1980); Tr. 12/15/14, pp. 169-70 (Fuller); X035-167, PPT 138. *See also* photograph of Verde Falls, 1920 (proposed dam site); and photo of man in the River near Childs next to a horse-drawn car, perhaps from the turn of the last century. Tr. 12/15/14, p. 150 (Fuller); X035-167, PPT 122-23.

503. Fred Fogal and Karl Gireaux, having launched their flat-bottomed boat at Clarkdale in 1931 to trap commercially, passed through this Segment on their way down the River finding it easier than in the prior Segment. 031, p. 3-21 (ASLD Report); Tr. 12/15/14, pp. 170-71 (Fuller); X035-167, PPT 139; X017-125 (*Verde Copper News*, 2/6/1931, 2/20/1931).

#### 4. *Modern Boating*

504. The Arizona State Parks Department lists the River from Perkinsville to the Salt River [Segments 1 through 5] as a boatable stream. 031, p. 8-5 (ASLD Report).

505. Mr. Fuller has paddled from Beasley Flat to Childs at below 300 cfs mostly; he has done this many times. Tr. 12/15/14, pp. 95-96 (Fuller).

506. Mr. Farmer, has boated from Verde Ranch to the Salt confluence three to six times a year in inflatable kayaks, canoes, and rafts, but mostly in canoes which are very suited for travel up or down the River. Tr. 12/16/14, pp. 381-82 (Farmer).

507. At times, Mr. Farmer has boated this Segment with 400 lbs. of gear in a canoe, at 60 cfs (in June) and as high as 6,000 cfs in early February. At as low as 60 cfs, the depth is one foot but holes could be 20 feet deep. Tr. 12/16/14, pp. 404-07 (Farmer).

508. Verde Falls is sometimes a Class IV+ rapid under the American Whitewater Association classification of rapids (ASLD X044-169). Mr. Farmer sometimes runs the Falls and sometimes lines it, which takes about ten minutes. An experienced boater has no problem with rapids here. Tr. 12/16/14, pp. 391-92, 397, 408 (Farmer). Mr. Fuller has lined the Falls but has never run them. Tr. 12/15/14, pp. 96-97 (Fuller).

509. Boating takes place on the River in canoes and kayaks: from Beasley Flat to Sheep Bridge, Classes I to IV. X001-29 (*Boater's Guide*).

510. At the volunteer sign-in station, the USFS recorded 863 boaters in 728 boats (canoes, inflatable kayaks, rafts, catarafts, kayaks) from Beasley Flat to Horseshoe Dam from January 2001 to March 2005. This Segment is boatable every month of the year; its lowest discharge is 44 cfs. Tr. 12/15/14, pp. 248-49 (Fuller); X035-167, PPT 208.

511. Southwest Paddlers offer the following trips: from Beasley Flat to Childs (18 miles), Classes I – IV, (V); Childs to Horseshoe Reservoir [Segments 3, 4] (42.5 miles), Classes I – III. X001-27 (*Southwest Paddler*)

512. Arizona Rivers and Streams Guide describes the following trips: Beasley Flats to Childs (18 miles), white-water run, October to April, plastic canoes and small inflatable boats extend the season; Childs to Horseshoe Reservoir [Segments 3, 4] (35 miles) (federally designated Wild River area), for short big-water season in the spring; low-water almost year round. X001-2.

E. **Segment 4 (Childs to Needle Rock [70 RM])**

1. *Hydrology and Geomorphology*

513. Segment 4 is perennial, with a pool and riffle pattern; some of the Segment is within bedrock canyon. It has 29 Class II rapids (4% of the Segment), and perhaps some Class IIIs. Land ownership is mainly National Forest. Its major tributaries are Fossil Creek, East Verde River, and some small streams. There were no major diversions at the time of statehood, but Horseshoe and Bartlett dams were built post-statehood in this Segment, so flow rates are now controlled. Small boats, canoes, kayaks, inflatables, and a few rafts boat this Segment recreationally and commercially in winter and spring. Tr. 12/15/14, pp. 97-109 (Fuller); X035-167, PPT 65-70. Flow upstream of the dams is now diminished by irrigation diversions, drinking, storing, and by evaporation. See Tr. 12/15/14, pp. 45, 200-01 (Fuller); X035-167, PPT 35, 161-63.

514. This is primarily an undisturbed segment. Upstream of Horseshoe Dam the channel is similar to the River's ordinary and natural condition; downstream of the Dam there has been encroachment by vegetation following smaller floods and by the altered flow. Tr. 12/15/14 at 224-25 (Fuller); X035-167, PPT 188.

515. Under the 1968 National Wild and Scenic Rivers System, 16 U.S.C. § 1271, Congress in 1984, designated the stretch from Childs to the Mazatzal boundary as a Scenic River (18.8 miles, together with the stretch in Segment 3); and from the Mazatzal boundary to the River's confluence with Red Creek (22.2 miles) as a Wild River. X056-189, p. 6 (Staff Report, 1/13/15, Town of Clarkdale).

516. Access to the River is difficult. The River has reliable flows. Upstream from Horseshoe Dam, the channel is similar to its ordinary and natural condition; downstream of the Dam, there has been encroachment by vegetation from smaller floods and the altered flow. Tr. 12/15/14, pp. 223-25 (Fuller); X035-167, PPT 187-89.

517. Modern USGS non-natural gage data show a median flow rate above the reservoirs of 240 cfs and 90% of the time it is greater than 123 cfs. Tr. 12/15/14, p. 198 (Fuller); X053-174, PPT 159. The flow ranges from 942 cfs in winter to 80 cfs in June. This Segment is boatable by canoes 99% of the time (360 days), and by flatboats 90% (330 days). Tr. 12/15/14, pp. 223-24 (Fuller); X035-167, X035-167, PPT 187, 189. Boating is mainly recreational, but there is some commercial guiding and rafting. Tr. 12/15/14, p. 224 (Fuller);



X035-167, PPT 188.

## 2. *Historical Descriptions and Events*

518. The military established Camp Ilges, a temporary overflow campsite on the Verde River<sup>13</sup>, at what is now the Horseshoe Dam site in 1867. Tr. 12/15/14, p. 123 (Fuller); X035-167, PPT 81.

519. A hydro-electric plant at Childs began operation in 1909 with water from Fossil Springs. Arizona Power Company took over the station and built a second plant in 1915 [on Fossil Creek]. In the 1920s, the power plants provided electricity for many cities, including 70% of power for Phoenix. 031, pp. 3-10, 3-17 (ASLD Report); X002-25, p. 45 (*Log of the Verde*).

## 3. *Historical Boating*

520. The Day brothers, having left Camp Verde on September 1, 1891, continued in their small boat, trapping their way to Yuma. X001-18 (*Arizona Sentinel*, 4/2/1892); Tr. 12/15/14, p. 158; X035-167, PPT 132.

521. The four hunters who had loaded their boat with guns and supplies and started from the Verde Valley at about RM 75 on their way to Mesa in 1910, wrecked on a rock at about Red Creek (RM 130) or at the East Verde River. X035-164 (*Bisbee Daily Review*, 8/12/1910); Tr. 12/15/14, pp. 166-69 (Fuller); X035-167, PPT 137.

522. Fred Fogal and Karl Gireaux, continuing on their commercial trapping boat trip down the River, passed through this Segment, finding it easier the farther south they traveled. 031, p. 3-21 (ASLD Report); Tr. 12/15/14, pp. 170-71 (Fuller); X035-167, PPT 139; X017-125 (*Verde Copper News*, 2/6/1931, 2/20/1931).

## 4. *Modern Boating*

523. The Arizona State Parks Department lists the River from Perkinsville to the Salt River [Segments 1 through 5] as a boatable stream. 031, p. 8-5 (ASLD Report).

524. Personnel from the Arizona Game and Fish Department carried out aquatic habitat research in this Segment from 2001 to 2005 at 60 through 360 cfs. X011-51, with attached photographs; -53, -54, -55 (photographs of G&F personnel in canoes and standing in the River).

525. Field photographs show Game and Fish boats loaded up and carrying expensive

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<sup>13</sup>See American Forts West, Arizona, at [www.northamericanforts.com/West/az.html](http://www.northamericanforts.com/West/az.html)

equipment. Tr. 12/15/14, p. 110 (Fuller); X035-167; PPT 70; X017-73 (Photos).

526. Families with boats full of people and equipment boat in this Segment. Tr. 12/15/14 at 105-07 (Fuller); Tr. 12/16/14 at 413 (Fuller).

527. Mr. Farmer has boated the upper part of this Segment many times with a canoe loaded with equipment. Base flow in June is 125 cfs, but the flow can increase to 6,000 – 12,000 cfs. The depth can vary from greater than 20 feet to one foot in the boating channel. Tr. 12/16/14, pp. 410-12 (Farmer).

528. At a volunteer sign-in station, the USFS recorded 863 boaters in 728 boats (canoes, inflatable kayaks, rafts, catarafts, kayaks) from Beasley Flat to Horseshoe Dam from January 2001 to March 2005. This Segment is boatable every month of the year; its lowest discharge is 44 cfs. Tr. 12/15/14, pp. 248-49 (Fuller); X035-167, PPT 208.

529. The Cimmaron River Company ran commercial river trips from Childs to Horseshoe Reservoir and from Bartlett to the Salt confluence. Trips were single-day or were seven days, at water levels ranging from 32 cfs. up to about 3,500 cfs. Multi-person trips were generally from late March through mid-May and in October and November, using canoes, inflatable kayaks, or rafts. The company transported the guests to and from the River. Tr. 1/18/06, pp. 55-63 ((John Colby, representing Cimmaron).

530. Inflatable kayaks, catarafts, and canoes, hold a maximum of two persons; rafts can take six passengers and a guide. On a multi-day trip, they took everything they needed: kitchen facilities, toilet systems, fireplace equipment, rescue gears, etc., which was distributed among the various boats. Tr. 1/18/06, pp. 58-61 (Colby).

531. Arizona Rivers and Streams Guide describes the following trips in this Segment: Childs to Horseshoe Reservoir (35 miles) (federally designated Wild River area), for short big-water season in the spring; low-water almost year round. X001-2.

532. Boating currently takes place in this Segment in canoes and kayaks: Southwest Paddlers offers a trip from Childs to Horseshoe Reservoir (42.5 miles) for short big-water season in the spring and low-water almost year round, Class I – III. X001-27 (*Southwest Paddler*); X001-2 (*Arizona Rivers and Streams Guide*).

533. The River would be more boatable without the dams because [the flow] would clean out a lot of strainers and would create a more natural channel, as is the case upstream of the dams. Tr. 4/03/15 (Fuller), pp 3493-94.

F. **Segment 5 (from Needle Rock to the Salt River confluence [19.7 RM])**

1. *Hydrology and Geomorphology*

534. Segment 5 is in an alluvial valley; it is perennial, with a pool and riffle pattern and has one Class II rapid. Its channel is compound, with a defined low-flow channel where boating occurs. Land ownership is mostly National Forest and Indian Reservations. Its major tributaries are Camp Creek and Sycamore Creek. There are some irrigation diversions and some aggregate mining. This Segment is boatable throughout the year, depending on dam releases, by small boats, canoes, kayaks, inflatables, and rafts. Boating is mainly recreational, but there has been some commercial boating. Tr. 12/15/14, pp. 111-16; 225 (Fuller); X035-167, PPT 72-76; 193.

535. Federal land surveyors from the 1800s showed an average depth of four feet for the channel at 250 feet wide south of Fort McDowell to the mouth. Tr. 12/18/14, pp. 1031-32 (Hjalmarson); X036-001, PPT 103 (map showing T3N, R7E).

536. Robert Farmer, surveying in T3N, R7E in February 1911, recorded the depths of the River's main channel as from two to four feet, and he remarked that it was "impractical to [survey] up the channel on account of high water." X054-38 (Burtell's Summary of Field Notes). The following month, he recorded the River's main channel as mostly three feet deep in T4N, R7E. X054-39 (Burtell's Summary of Field Notes).

537. There are some strainers in this Segment primarily due to dams regulating the flow. Tr. 12/18/14, p. 900 (Fuller).

538. A gage (not a USGS gage) records an average annual flow rate of 781 cfs. Tr. 12/15/14, pp. 198-99 (Fuller); X053-174, PPT 159. Ninety percent of the flow rate is between 123 and 942 cfs. Tr. 12/15/14, p. 225 (Fuller); X035-167, PPT 190.

539. There are some diversions and other human impacts on the floodplain, such as agricultural encroachments and grazing. The dams have altered the seasonal hydrograph. This Segment is boatable by canoes 99% of the time (360 days) and by flatboats 90% (330 days). Tr. 12/15/14, pp. 225-26 (Fuller); X035-167, PPT 190, 192.

2. *Historical Descriptions and Events*

540. Camp McDowell was established in 1865 to address the Indian issue. It was built on the site of an "Aztec" structure, and there were large acequias which must have irrigated many miles. The troops established a farm with a four-mile acequia in 1866; they

grew corn, sorghum, beans, tomatoes, beets, radishes, melons, but potatoes and onions did not thrive. X035-153, p. 459-60 (*Report on Barracks and Hospitals*); X035-146, p. 1 (*Fort McDowell in the '80s*); Tr. 2/25/15, p. 2382 (August).

541. The local people protested that the soldiers should be out fighting Indians and not growing crops, so crop-raising was parceled out to the private sector. Tr. 2/25/15, pp. 2405, 2492 (August).

542. Other ditches brought water from the River to the Fort. Diversion dams would get washed out in floods. X017-120, p. 310 (*Vanishing River*). Others took water from the River at Fort McDowell in the 1870s and 1880s. X017,120, p. 313 (*Vanishing River*).

543. Jack Swilling came to Arizona in 1865 with the military; after leaving the military, he began a hay farm, diverting water from the Salt River. He made a road to Fort McDowell where he delivered the hay. Tr. 2/25/15, pp. 2404-06 (August).

544. The U.S. Surgeon General remarked in 1870 that the “river is thus well confined and its bottom lands free from marshes. The strip of easily irrigated bottom land is very narrow, yet much good soil could be reclaimed by irrigation from large acquias.” Tr. 12/15/14, pp. 130-31; X035-167, PPT 90.

545. Martha Summerhayes, wife of an army officer stationed at Fort McDowell, described in 1877 how she and others at the Fort swam in the River daily in the summer heat. Thick clumps of mesquite trees provided their dressing room. 031, p. 3-13 (ASLD Report); X017-99, pp. 207-08 (*Vanished Arizona*).

546. Camp McDowell was upgraded to Fort McDowell in 1879. X100-18, p. 5 (“Initial Survey of Historical Resources”).

547. Dan Huntington, upon arrival at Fort McDowell in 1885, found :

“...that the river was full of beaver dams with plenty of fish behind dams where the water was deep. Game was so plentiful we did not bother with it. We noticed that most of the officers' wives were out shooting quail, doves and rabbits. The Cavalrymen would take their horses to have a swim. They certainly enjoyed it as they came out of the deep water and rolled around on the sand and kicked up as playful as a kitten.”

X035-146, p. 7 (*Fort McDowell in the 1880s*); X053-174, PPT 96.

548. When Fort McDowell was abandoned in 1890, either settlers moved onto the Fort grounds (X017-120, p. 313 [*Vanishing River*]) or the Fort became an Indian reservation

where Indians farmed and raised stock (X035-146, p. 9 [*Fort McDowell in the 1880s*]).

549. Government surveyor Philip Contzen noted in 1902 that the land in T3N, R7E “is well watered by the Verde River, which carries an abundance of water, making irrigation successful . . . . There are quite a number of settlers in the Verde Valley who have made substantial improvements and have land under cultivation.” X002, p. 29 (Littlefield Revised Report).

550. Robert Farmer, resurveying the same area (the former Fort McDowell) in 1911, found it impracticable to run certain survey lines “on account of high water.” In his general description of the township, he observed that the amount of water in the River varied and that at “the time of the survey, [the River] was very low, being from 2 ½ feet to 4 feet deep.” 032, pp. 66-69 (Littlefield 2005 Report). X002, p. 27-29 (Littlefield Revised Report). Farmer’s 1911 surveys in T3N R7E showed that the channel widths varied from 198 to 462 feet and the River’s depths varied from 2 to 4 feet. X059 at 29, 39-49 (Hjalmarson’s Second Addendum); 054-38 (Burtell’s summary of channel conditions).

551. Mr. Farmer meandered both banks in T2N R7E in 1911. X002, p. 27 (Littlefield Revised Report). This survey shows a channel depth of 5 feet. X059 at 29, 51-60 (Hjalmarson’s Second Addendum).

552. Surveying in T4N, R7E in 1911, Mr. Farmer noted that the River’s channel showed channel depths of three, four and five feet deep. X036-2, p. 12 (Hjalmarson Addendum), X059 at 29 (Hjalmarson Second Addendum).

### 3. *Historical Boating*

553. Soldiers at the Fort rafted across the River in 1868; the first raft capsized but the others apparently made it. Tr. 12/15/14, p. 153 (Fuller); X035-167, PPT 127.

554. North Willcox and Dr. G.E. Andrews, both of Fort McDowell, boated down the Verde from the Fort in February 1883 to the Salt River Valley Canal in a canvas skiff and had a pleasant trip except for some rain while they were camping. 031, p. 3-20 (ASLD Report); X017-122 (*Arizona Gazette*, 2/14/1883); Tr. 12/15/14, p 154; X035-167, PPT 128.

555. A ferry boat was upset at McDowell but no lives were lost. X017-134 (*Weekly Phoenix Herald*, 1/1/1885).

556. In December 1888, Major Spaulding and Captain Hatfield canoed from Fort McDowell, [duck] shooting as they traveled to Phoenix. Unfortunately, the Major

accidentally shot himself dead while lifting the boat over the Mesa Dam [on the Salt River]. 031, pp. 3-20 - 3-21 (ASLD Report); X017-123 (*Phoenix Daily Herald*, 12/12/1888). The accident was a question of gun safety, not boating. This trip was a boating success. Tr. 12/15/14, pp. 156-57 (Fuller); X035-167, PPT 130.

557. Wood from the abandoned Fort McDowell was to be floated down the Verde and Salt to Mesa but about 300 cords had been unloaded in the Verde; the plan was subsequently abandoned because of the threatened danger to the downstream Arizona Dam. X035-151 (*Salt Lake Herald*, 5/3/1894); Tr. 12/15/14, pp. 160-61 (Fuller); X035-167, PPT 133.

558. The Day brothers continued on their fifth commercial trapping trip from Camp Verde, which they had left on September 1, 1891, and successfully passed through this Segment on their way to Yuma. X001-18 (*Arizona Sentinel*, 4/2/1892); Tr. 12/15/14, p. 158; X035-167, 132.

559. Fred Fogal and Karl Gireaux successfully passed through this Segment on their way from Clarkdale to Granite Reef Dam [on the Salt River] in 1931. They exited the River eighteen miles north of old Fort McDowell after five weeks on the River trapping commercially. 031, p. 3-21 (ASLD Report); Tr. 12/15/14, pp. 170-71 (Fuller); X035-167, PPT 139; X017-125 (*Verde Copper News*, 2/6/1931, 2/20/1931).

#### 4. *Modern Boating*

560. The Arizona State Parks Department lists the River from Perkinsville to the Salt River [Segments 1 through 5] as a boatable stream. 031, p. 8-5 (ASLD Report).

561. Significant boating occurs throughout the year below Bartlett Dam and through the Fort McDowell Nation land when the tribe permits. Tr. 12/15/14, 112-15 (Fuller).

562. Mr. Farmer has canoed in this Segment at 300-400 cfs. There is a little braiding, influenced by the upstream dams, but he has had no trouble finding the channel. Base flows are highly predictable, and high flows are expectedly changeable. Tr. 12/16/14, pp. 414-18 (Farmer).

563. In this Segment there may be sandbars. At 120-150 cfs, the depth would be two feet. Tr. 12/16/14, p. 537 (Farmer).

564. The Cimmaron River Company ran commercial river trips from Bartlett to the Salt confluence. Trips were single-day or were seven days, at water levels ranging from 32

cfs. up to about 3,500 cfs. Multi-person trips were generally from late March through mid-May and in October and November, using canoes, inflatable kayaks, or rafts. The company transported the guests to and from the River. Tr. 1/18/06, pp. 55-63 (John Colby, representing Cimmaron).

565. Inflatable kayaks, catarafts, and canoes, hold a maximum of two persons; rafts can take six passengers and a guide. Tr. 1/18/06, p. 58 (Colby). On a multi-day trip, they took everything they needed: kitchen facilities, toilet systems, fireplace equipment, rescue gears, etc., which was distributed among the various boats. Tr. 1/18/06, pp. 58-61 (Colby).

566. Southwest Paddlers offer the following trips: from Horseshoe Reservoir to Bartlett Reservoir [Segments 4, 5] (19 miles), Class I, II; and Bartlett Reservoir to Salt River confluence (19 miles), Class I, II. X001-27, *Southwest Paddler*.

567. Arizona Rivers and Streams Guide describes the following trips: from Horseshoe Reservoir to Bartlett Lake (20 miles), flows depend on dam releases, and from Bartlett Dam to Salt (24 miles); flow regulated by Bartlett Dam; popular with boaters. X001-2.

## CONCLUSIONS OF LAW

### IX. The Public Trust and Equal Footing Doctrines

568. In 1985, the State of Arizona began asserting ownership claims to the beds of navigable Arizona watercourses based on the “public trust doctrine.” *See Arizona Center for Law in the Public Interest v. Hassell*, 172 Ariz. 356, 359, 837 P.2d 158, 161 (App. 1991) (“*Hassell*”).

569. Under the public trust doctrine, States in their capacities as sovereigns hold title to the beds under navigable waters, as a “high prerogative trust . . . a public trust for the benefit of the whole community.” *Hassell*, 172 Ariz. at 359, 837 P.2d at 161; *see also PPL Montana, LLC v. Montana*, 132 S.Ct. 1215, 1226 (2012) (“*PPL Montana*”). *Hassell* described the doctrine in general terms:

A state’s title to lands under navigable waters “is a title different in character from that which the State holds in lands intended for sale . . . . It is a title held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties.”

172 Ariz. at 364, 837 P.2d at 166, quoting *Illinois Cent. R.R. v. Illinois*, 146 U.S. 387, 452 (1892).

570. The public trust doctrine originated under English common law, where the Crown held title to the riverbed and soil of tidal waters and the public retained the right of passage and the right to fish in the stream. *PPL Montana*, 132 S.Ct. at 1226-27. With respect to non-tidal inland waters, riparian landowners retained title to the center of the stream and the exclusive right to fish, but the public retained the right of water passage. *Id.*

571. After the American Revolution, courts deemed the tidal rule of navigability previously adopted from England ill-suited to the United States because of its vast number of inland rivers upon which navigation could be sustained. The public trust doctrine was extended to navigable inland watercourses as well. *Hassell*, 172 Ariz. at 359, 837 P.2d at 161.

572. Under the Equal Footing Doctrine, the United States Supreme Court held that the principles of the public trust doctrine followed by the original 13 states applied to states later admitted to the Union because all states are coequal sovereigns under the U.S. Constitution. *PPL Montana*, 132 S.Ct. at 1227-28. On the day in which individual states enter the Union, title to the lands under territorial navigable watercourses is transferred from the



federal government to the newly-established state government. *Id.*

573. “A key justification for sovereign ownership of navigable riverbeds is that a contrary rule would allow private riverbed owners to erect improvements on the riverbeds that could interfere with the public's right to use the waters as a highway for commerce.” *PPL Montana*, 132 S.Ct. at 1230.

574. Because the U.S. Constitution itself is the basis for granting a state title to these lands, any questions of navigability for title are governed by federal law. *PPL Montana*, 132 S.Ct. at 1227; *Defenders of Wildlife v. Hull*, 199 Ariz. 411, 420, 18 P.3d 722, 731 (App. 2001) (“*Defenders*” or “*Hull*”).

575. Thus, when Arizona achieved the Constitutional status of a state on February 14, 1912, it acquired title to the lands below high-water mark in all navigable watercourses within its boundaries. *Hassell*, 172 Ariz. at 360, 837 P.2d at 162.

#### **X. The Daniel Ball Test**

576. The basic formulation of the federal law test used for title navigability is set forth in *The Daniel Ball*, 77 U.S. 557, 563 (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.

This test has been further defined in many subsequent federal and state cases.

577. *The Daniel Ball* test has been used to assess both navigability for title under the Equal Footing Doctrine – the issue in this Verde River matter – and navigability for other federal regulatory authority issues such as federal interstate navigability. *PPL Montana*, 132 S.Ct. at 1228-29. The test is not applied in the same manner for all purposes. For example, for title purposes the test is applied based on the ordinary and natural condition of the waterway at the time of statehood. *Id.* In contrast, for federal regulatory authority over interstate waters, the test may be applied based on the potential for navigability if improvements are made. *Id.*

578. When considering the precedential value of cases, the context in which a navigability determination is made must be considered, but “a case applying the *Daniel Ball* test provides guidance.” *State of Alaska v. United States*, 754 F.2d 851, 854 (9th Cir. 1985);

compare *PPL Montana*, 132 S.Ct. at 1233 (citing the commerce clause navigability case *United States v. Appalachian Elec. Power Co.*, 311 U.S. 377, 416 (1940) to explain how evidence of recreational use bears upon susceptibility in a title navigability case), with *PPL Montana*, 132 S.Ct. at 1231-32 (stating that using the Court’s decision in *The Montello* regarding portages is not controlling because *The Montello* was deciding whether a river was a navigable water of the United States and portages are treated differently when the issue is navigability for title purposes).

## **XI. Prior Proceedings on Navigability**

579. Until 1985, Arizona had only asserted a public trust ownership claim under the Equal Footing Doctrine to the bed of the Colorado. *Land Dep’t v. O’Toole*, 154 Ariz. 43, 46, 739 P.2d 1360, 1363 (App. 1987) (“*O’Toole*”).

580. In 1985, the State of Arizona proposed asserting a public trust ownership claim under the Equal Footing Doctrine to the beds of all navigable Arizona watercourses other than the Colorado River. *O’Toole*, 154 Ariz. at 44, 739 P.2d at 1361. This proposal prompted a declaratory judgment claim which was dismissed by the Arizona Court of Appeals in *O’Toole* as inappropriate because the State had not yet asserted ownership of the beds of navigable watercourses. *Id.* at 47, 739 P.2d at 1365.

581. In response to the State’s ownership claim, the Legislature enacted House Bill 2017 in 1987. 1987 Ariz. Sess. Laws, ch. 127 (“1987 Act”). The 1987 Act was a blanket quitclaim of any public trust land interests the State may have to the beds of all watercourses other than the Colorado, Gila, Salt, and Verde Rivers. *Id.* In addition, the 1987 Act set forth a process for which record title holders who had land in the beds of the Gila, Salt, and Verde Rivers could obtain quitclaim deeds with the payment of a small fee in order to “compensate this state for relinquishing the claim in those areas where the state’s claim may be more viable.” *Id.*; see *Hassell*, 172 Ariz. at 360, 837 P.2d at 162.

582. The Arizona Center for Law in the Public Interest (“ACLPI”) challenged the constitutionality of multiple parts of the 1987 Act, including the \$25 per acre quitclaim fee for which any record titleholder of lands in or near the beds of the Gila, Salt, or Verde Rivers could obtain a quitclaim deed and relinquish the State’s equal footing interest in such lands, as well as the part in the 1987 Act that provided that every State land patent issued henceforth will convey the State’s equal footing interest in the patented land. *Hassell*, 172 Ariz. at 360-

61, 837 P.2d at 162-63.

583. The Arizona Court of Appeals in *Hassell* reversed the trial court's ruling and found the 1987 Act violated the Public Trust Doctrine and the gift clause of the Arizona Constitution, article IX, § 7. *Hassell*, 172 Ariz. at 371, 837 P.2d at 173.

584. The public trust and gift clause analysis was reached because the court found that “appellants submitted substantial evidence from which a factfinder might conclude that portions of rivers and streams other than the Colorado met the applicable standard of navigability at the time that Arizona became a state.” *Hassell*, 172 Ariz. at 363, 837 P.2d at 165; *see Hull*, 199 Ariz. at 416, 18 P.3d at 727.

585. In reaching its decision, the court stated it must give public trust dispensations “a close look” and that “there is no unfairness or immorality in a state's pursuit of ownership claims based on the Equal Footing Doctrine, even claims that have lain dormant for decades.” *Hassell*, 172 Ariz. at 369, 837 P.2d at 171. Because the State has fiduciary obligations to maintain the public trust, the State must have a “systematic investigation and evaluation of each of the state's claims” before disclaiming its interest in any of Arizona's watercourse bedlands. *Id.* at 370, 837 P.2d at 172.

586. Responding to *Hassell*, the Legislature established the Arizona Navigable Stream Adjudication Commission (“Commission”) in 1992. 1992 Ariz. Sess. Laws, ch. 297 (“1992 Act”). The five-member Commission was to be appointed by the Governor, and was to gather information from the investigative efforts of the State Land Department, as well as hold its own public hearings. The Commission would then issue a final administrative determination of navigability or non-navigability for each watercourse. This administrative adjudication would be subject to judicial review. *See* A.R.S. §§ 37-1121 to -1129 (1993).

587. After the Commission began taking evidence, in 1994 the Legislature made significant changes to the statutes governing the Commission (“1994 Act”). The changes made the Commission a fact-finding, legislative advisory committee rather than an adjudicatory body. In addition, the Commission was restricted to using specifically enumerated evidence, and certain presumptions of non-navigability were established. *See* 1994 Ariz. Sess. Laws, ch. 278. The 1994 Act made it almost impossible for an Arizona watercourse to be determined navigable, instead of supporting Arizona's right to these lands as public trust holdings. *Hull*, 199 Ariz. at 426, 18 P.3d at 737.

588. In 1998, legislation was passed declaring that many of Arizona's watercourses were non-navigable and disclaiming all rights and title of the state to those waterways. *See* Ariz. Sess. Laws 1998, Ch. 43, § 2.

589. The Arizona Court of Appeals in *Hull* struck down the legislation stating that the 1994 Act was inconsistent with *The Daniel Ball* standard for determining navigability. *Hull*, 199 Ariz. at 426, 18 P.3d at 737. The court stated:

We find that the particularized assessment necessitated by *Hassell* was neither performed in accordance with the applicable federal law nor done in a manner consistent with the public trust doctrine. When this assessment is so abrogated, public trust land may be forfeited. Potential forfeiture of the watercourse bedlands in S.B. 1126, by being functionally identical to the outright disclaimer of H.B. 2017 in *Hassell*, is a violation of the public trust doctrine and the Arizona Constitution's gift clause.

*Id.* at 427-28, 18 P.3d at 738-39.

590. In response to the *Hull* decision, in 2001, the Legislature revised the statutes by reinstating the Commission as the adjudicatory body and eliminating the additional statutory requirements deemed invalid. *See* 2001 Ariz. Sess. Laws, ch. 166, § 1. The 2001 legislation, A.R.S. §§ 37-1101 through 37-1156, now governs the Commission in making its findings with respect to the Verde River.

591. On March 24, 2008, the Commission issued its report finding that the Verde River was non-navigable. *See* Report, Findings and Determination Regarding the Navigability of the Verde River From Its Headwaters to the Confluence with the Salt River.

592. The State Land Commissioner filed a judicial appeal of the Commission's 2008 decision, *State v. Arizona Navigable Stream Adjudication Comm'n*, Maricopa Superior Court Case No. LC2008-000860 ("Verde River Appeal Proceedings"). The parties agreed to stay the proceedings of that case until the resolution of the appeal of the Commission's Lower Salt River non-navigable determination in the case, *State of Arizona, acting by and through Mark Winkleman, State Land Commissioner, and the Arizona State Land Department v. Arizona Navigable Stream Adjudication Comm'n, Maricopa County Superior Court Case No. LC2006-000413-001DT*.

593. The Arizona Court of Appeals issued its opinion on the Lower Salt River non-navigability determination in 2010. *State ex rel. Winkleman v. Arizona Navigable Stream Adjudication Comm'n*, 224 Ariz. 230, 229 P.3d 242 (App. 2010) ("*Winkleman*"). The court of

appeals vacated the superior court's judgment that upheld ANSAC's administrative determination that the Lower Salt River was non-navigable, and the case was remanded for further proceedings consistent with the decision. *Id.* at 245, 229 P.3d at 257.

594. In reaching its decision in *Winkelman*, the court of appeals determined that the Commission did not apply the proper legal standard because it did not sufficiently consider “both the River’s ordinary condition *and* its natural condition in determining its navigability.” *Id.* at 242, 229 P.3d at 254. (Emphasis in original). In addition, although the court did not substitute its judgment for that of the Commission, it did agree with the *Hassell* court that “substantial evidence exists from which a factfinder might conclude that [the River] met the applicable standard of navigability at the time that Arizona became a state . . . .” *Winkelman*, 224 Ariz. at 242, 229 P.3d at 254.

595. Based upon the *Winkleman* decision, all parties agreed that the stayed appeals for all of the Commission’s other determinations, specifically the Upper Salt, Gila, Verde, Santa Cruz, and San Pedro, should be remanded to the Commission as well, for reconsideration consistent with the *Winkleman* decision.

596. The Commission heard additional testimony and received additional evidence on the Verde River’s navigability starting in December, 2014, through April, 2015, as a result of the remand.

## **XII. Overview of Commission’s Role**

597. The Commission is charged with determining whether a particular watercourse was navigable at statehood, and for any watercourse deemed navigable, to identify the public trust values of that watercourse. A.R.S. § 37-1128.

598. Commission members must be unbiased and must not have interests affected by the Commission’s determination. A.R.S. § 37–1121(B). The Commission may not begin its determination with any presumptions *against* navigability. *Winkleman*, 244 Ariz. at 239, 229 P.3d at 251 (emphasis in original).

599. The Commissioner’s “approach and analysis must be wholly impartial and objections, while utilizing the proper legal test.” *Winkleman*, 244 Ariz. at 239, 229 P.3d at 251.

600. In making its determination of navigability or non-navigability, “the Commission shall receive, review and consider all relevant historical and other evidence

presented to the commission by the state land department and by other persons . . . .” A.R.S. § 37-1123.

601. The Commission’s navigability determination of the Verde River must stand on its own facts. *United States v. State of Utah*, 283 U.S. 64, 87, 51 S.Ct. 438, 445 (1931). Comparisons of the Verde to other rivers are not determinative of navigability or non-navigability. *Id.*

602. “If the preponderance of the evidence establishes that the watercourse was navigable, the commission shall issue its determination confirming that the watercourse was navigable.” A.R.S. § 37-1128.

603. If the Commission finds a watercourse navigable, it shall, in a subsequent proceeding, determine the public trust values associated with that watercourse, A.R.S. § 37-1128(B), those “public trust values” being defined as commerce, navigation and fishing, A.R.S. § 37-1101(9).

604. A navigable watercourse is defined in A.R.S. § 37-1101(5), which is a codification of *The Daniel Ball* test as:

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

605. Arizona Revised Statutes § 37-1101(3) defines “highway of commerce” as:  
[A] corridor or conduit within which the exchange of goods, commodities or property or the transportation of persons may be conducted.

### **XIII. Burden of Proof**

606. Arizona Revised Statutes § 37-1128(A) states “[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.” (Emphasis added). This burden of proof standard is consistent with the holdings of Arizona navigability case law. *See O’Toole*, 154 Ariz. at 46 n.2, 739 P.2d at 1363 n.2; *Hassell*, 172 Ariz. at 363 n.10, 837 P.2d at 165 n.10; *Hull*, 199 Ariz. at 420, 18 P.2d at 731; *Winkleman*, 244 Ariz. at 238-39, 229 P.3d at 250-51.

607. The burden of proof lies with the proponents of navigability, who must prove navigability by a preponderance of the evidence. *Winkleman*, 224 Ariz. at 239, 229 P.3d at

251.

608. “The preponderance of the evidence standard requires that the fact-finder determine whether a fact sought to be proved is more probable than not.” *Kent K. v. Bobby M.*, 210 Ariz. 279, 284, 110 P.3d 1013, 1018 (2005) (cited by *Winkleman*, 224 Ariz. at 239, 229 P.3d at 251). The risk of error is shared equally between the parties involved, meaning that while the burden is on one party, no presumption is made for either party and thus error is shared. *Id.*

609. In sharp contrast is the clear and convincing evidence standard that requires “the thing to be proved is highly probable or reasonably certain.” *Kent K.* 210 Ariz. at 284-285, 110 P.3d at 1018-1019 (quoting Black’s Law Dictionary at 577). The clear and convincing standard reflects a heightened standard of proof by placing a heavier burden upon one party to prove its case to a reasonable certainty, and there is a larger margin for error for the unburdened party. *Id.* The two standards can lead to quite different results. *Id.* at 285, 110 P.3d at 1019.

610. In perhaps the most easily understood language, the Arizona Supreme Court defined the preponderance of the evidence standard in *Hewett v. Indus. Comm’n* as the following:

Preponderance of the evidence means such evidence as when weighed with that opposed to it has more convincing force, and from which it results that a greater probability is in favor of the party upon whom the burden rests. It does not necessarily depend upon the number of witnesses; it merely means that the testimony which points to one conclusion appears to the trier of facts to be more credible than the testimony which points to the opposite one. *The capacity of the submitted testimony to enforce belief on the arbiter to whom it is submitted it (sic) the touchstone of preponderance as applied to the testimony of witnesses.*

72 Ariz. 203, 209, 232 P.2d 850, 854 (1951) (emphasis in original).

611. As stated herein in the *Overview of the Commission’s Role*, while the burden is on the navigability proponents to meet the preponderance of the evidence standard, the court of appeals in *Winkleman* underscored that ANSAC may not begin its determination with any presumptions against navigability. 244 Ariz. at 239, 229 P.3d at 251. See A.R.S. § 37-1121(B) (Commissioners must be unbiased and not have interests affected by the Commission's determination).

#### **XIV. Segmentation**

612. “To determine title to a riverbed under the equal-footing doctrine, this Court considers the river on a segment-by-segment basis to assess whether the segment of the river, under which the riverbed in dispute lies, is navigable or not.” *PPL Montana*, 132 S.Ct. at 1229. *See also United States v. Utah*, 283 U.S. at 77 (Court is “concerned with long reaches with particular characteristics of navigability or non-navigability . . .”).

613. “[S]hifts in physical conditions provide a means to determinate appropriate start points and end points for the segment in question. Topographical and geographical indicators may assist.” *PPL Montana*, 132 S. Ct. at 1230.

614. The U.S. Supreme Court has *not* held that because a river has natural segment indicators that some of those segments must be non-navigable. *Id.* at 1229-30.

615. The non-navigable segment at issue in *PPL Montana* had obvious and substantial obstacles to navigation. *See PPL Montana*, 132 S.Ct. at 1223 (finding 17-mile segment of the Missouri river called the “Great Falls reach” non-navigable because of five waterfalls with heights of 87, 19, 48, 7, and 26 feet and continuous rapids in between); *United States v. Utah*, 283 U.S. at 80, 89-90 (finding 36-mile segment of the Colorado River non-navigable where it has “a long series of high and dangerous rapids”).

616. The Commission finds the segmentation submitted by the State is consistent with the U.S. Supreme Court’s holding that rivers may be naturally segmented and should be examined as such. The Commission also finds each and every Verde River segment is navigable for the reasons contained herein.

#### **XV. Rivers Must Be Examined In Their Ordinary and Natural Conditions**

617. In *Winkleman*, the Arizona Court of Appeals held that the test for navigability requires the Commission to assess navigability based on “what the 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) conditions.” 224 Ariz. at 241, 229 P.3d at 253.

618. The court of appeals instructed that both words “ordinary” and “natural” have specific and distinct meanings. *Id.* at 241, 229 P.3d at 253. The ordinary condition of a river is when the river is not in a drought condition and not in an exceptional condition in times of temporary high water, but rather the ordinary condition is the normal, usual condition of the



river. *Id.* at 241, 229 P.3d at 253. The natural condition of a river would be a river untouched by civilization, without purposeful interference, wild. *Id.* at 241, 229 P.3d at 253.

619. In *Winkleman*, the court of appeals stated that the natural condition of the Lower Salt River is “before the Hohokam people arrived many centuries ago and developed canals and other diversions that actively diverted the River.” *Id.* at 242, 229 P.3d at 254. The Court acknowledged, however, that “little if any historical data exists from that period” and that Hohokam diversions “disappeared through non-use over the centuries” so that “by the 1800s, the River had largely reverted to its natural state.” *Id.* The Court found, therefore, that “the River could be considered to be in its natural condition after many of the Hohokam’s diversions had ceased to affect the River, but before the commencement of modern-era settlement and farming in the Salt River Valley . . . .” This corresponds to a date range for the natural condition of the Salt River from the beginning of the 1800’s to the first major diversion on the Salt River, roughly the mid-1860s.

620. The Ninth Circuit has held that it is appropriate to use a date range for evidence that corresponds to a period when a river is in its ordinary, unimproved condition. *Oregon v. Riverfront Prot. Ass’n*, 672 F.2d 792, 795 (9th Cir. 1982) (Parties stipulated that evidence from late 1800’s and early 1900’s was river’s natural condition at statehood in 1859).

621. All parties agreed that the court of appeals decision in the Lower Salt proceedings could assist the parties in the Verde proceedings since many of the same legal issues were involved. Verde River Appeal Proceedings, *supra*.

622. The court of appeals would likely find that the natural condition of the Verde also corresponds to a date range of the beginning of the 1800’s to the first major diversion on the Salt River, roughly the mid-1860s.

## **XVI. Time Period of Considered Evidence**

623. Arizona Revised Statutes § 37-1123(A) directs the Commission to review all available evidence, and the court of appeals has stated that “all evidence should be examined during navigability determinations and no relevant facts should be excluded.” *Winkleman*, 224 Ariz. at 243, 229 P.3d at 255 (citing *Defenders*, 199 Ariz. at 425, 18 P.3d at 736).

624. Although all evidence should be considered, “[e]vidence from that early period should be considered by ANSAC as the best evidence of the River’s natural condition.” *Winkleman*, 224 Ariz. at 242, 229 P.3d at 254. As stated above, a court would likely find that

the “early period” for the Verde was from the early 1800’s to the mid-1860s, and thus the best evidence of the condition of the Verde falls within that date range. “[E]vidence of the River’s condition after obstructions caused a reduction in its flow is likely of less significance than evidence of the River in its more natural condition, and may in fact have ‘minimal probative value,’ . . . .” *Winkleman*, 224 Ariz. at 243, 229 P.3d at 255.

625. While the condition of a river is best assessed with evidence from the river’s ordinary and natural condition, evidence received and considered after statehood is relevant upon the issue of the susceptibility of the rivers to use as highways of commerce at the time of statehood. *United States v. State of Utah*, 283 U.S. at 82; *see also PPL Montana*, 132 S.Ct. at 1233. *See Winkleman*, 224 Ariz. at 243, 29 P.3d at 255.

626. Generally, when the Commission believes evidence has any reliability, the Commission is charged with determining the “relevance and weight to be afforded the evidence . . . .” *Winkleman*, 242 Ariz. at 243, 229 P.3d at 255.

## **XVII. The Test for Navigability Is A Disjunctive Test Met With Actual Or Susceptible Use**

627. The test for navigability is a disjunctive test where *either* actual use or susceptibility to use for travel and trade at the time of statehood can be shown to meet the test:

Those rivers . . . are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water.

*The Daniel Ball*, 77 U.S. 557, 563 (emphasis added); *see United States v. Utah*, 283 U.S. at 82 (“question of that susceptibility in the ordinary condition of the rivers, rather than of the mere manner or extent of actual use, is the crucial question.”)

628. In *United States v. Utah*, the Court explained why it used a disjunctive test that includes the susceptibility standard instead of solely relying on actual use. 283 U.S. at 83:

[A]s the title of a state depends upon the issue, the possibilities of growth and future profitable use are not to be ignored. Utah, with its equality of right as a state of the Union, is not to be denied title to the beds of such of its rivers as were navigable in fact at the time of the admission of the state either because the location of the rivers and the circumstances of the exploration and settlement of the country through which they flowed had made recourse to navigation a late adventure or because commercial utilization on a large scale awaits future demands. The question remains one of fact as to the capacity of the rivers in their ordinary condition to meet the needs of commerce as these may arise in connection with the growth of the population, the multiplication of activities, and

the development of natural resources. And this capacity may be shown by physical characteristics and experimentation as well as by the uses to which the streams have been put.

*See also PPL v. Montana*, 132 S.Ct at 1233 (“True, river segments are navigable not only if they were used but also if they were susceptible of being used . . . .”) (internal quotations omitted).

### **XVIII. Actual Use of The River**

629. What constitutes actual use was first articulated in *The Daniel Ball*, where the U.S. Supreme Court stated that rivers are actually used when they are “highways for commerce, over which trade and travel are...conducted in the customary modes of trade and travel on water.” 77 U.S. at 563.

630. In *The Montello*, the U.S. Supreme Court expounded on their previous decision and made it clear that the actual use test is broad and inclusive of many uses:

[T]he true test of navigability of a stream does not depend upon the mode by which commerce is, or may be, conducted, nor the difficulties attending navigation. . . . It would be a narrow rule to hold that in this country, unless a river was capable of being navigated by steam or sail vessels, it could not be treated as a public highway.

20 Wall. 430 (1874), *quoted with approval in United States v. Utah*, 283 U.S. at 76; *see also United States v. Holt State Bank*, 270 U.S. 49, 56 (1926).

631. Controlling courts consistently use the standard for actual use, set forth as precedent in *The Montello*, when reviewing evidence for navigability. *See Utah v. United States*, 403 U.S. 9, 12 (1971) (finding sufficient actual use on lake where use was characterized as “sporadic and their careers were short” because that “does not detract from the basic finding that the lake served as a highway and it is that feature that distinguishes between navigability and non-navigability”); *see also Appalachian Elec. Power Co.*, 311 U.S. at 404 (stating that there is no “formula which fits every type of stream under all circumstances and at all times”); *State of Alaska v. United States*, 754 F.2d 851, 854 (“We recognize that navigability is a flexible concept and ‘[e]ach application of [the *Daniel Ball* test] . . . is apt to uncover variations and refinements which require further elaboration.’ For this reason, we have liberally construed the phrase ‘customary modes of trade and travel on water,’ taking into account transportation methods in use at the time of statehood.”)

632. *The Daniel Ball* test requires that the mode of transport be available at the time of statehood and used to conduct trade and travel on the river, and that the river be used as a

highway for commerce. *See United States v. Utah*, 283 U.S. at 76; *see also PPL Montana*, 132 S.Ct. at 1233. No court has ever held that a river is navigable only if it sustains upstream travel. *See Defenders*, 199 Ariz. at 422, 18 P.3d at 733.

#### A. Mode of Transport

633. Qualifying actual use is not limited to large scale vessels because both the U.S. Supreme Court and the Ninth Circuit Court of Appeals have recognized the importance of small boats like canoes as valuable transports of people and goods. *See The Montello*, 20 Wall. at 441-442 (finding fur trade which utilized canoes evidence of a navigation on a channel for useful commerce; “[i]t would be a narrow rule to hold that in this country, unless a river was capable of being navigated by steam or sail vessels, it could not be treated as a public highway.” *Econ. Light & Power Co. v. United States*, 256 U.S. 113, 117 (1921) (finding actual use where Desplaines River was used by the kinds of craft common to early fur-trading days, including canoes); *Alaska v. Ahtna, Inc.*, 891 F.2d 1401, 1403 (9th Cir. 1989) (finding lower Gulkana navigable where actual use at statehood was by hunters and fishermen using 16 to 24 ft boats); *see also Nw. Steelheaders Ass'n, Inc. v. Simantel*, 112 P.3d 383, 389-90, 392 Or. App. (2005) (finding John Day river navigable and stating “qualifying travel and trade is not limited to large-scale commercial or multiple passenger vessels of the sort typically engaged in modern commerce” because “courts have recognized the relevance of the historic role of small boats to transport goods in volumes that might seem insignificant by modern standards.”).

634. It is also not necessary that the actual use be for the purpose of making money. *Utah v. United States*, 403 U.S. 9 (1971) (finding the Great Salt Lake navigable where boats were used from time to time to haul cattle and sheep from the mainland to one of the islands, not by a carrier for the purpose of making money).

635. Where actual historic use has not been deemed sufficient for proving navigability, boats were dragged instead of floated, *PPL Montana*, 132 S.Ct. at 1233 (*citing United States v. State of Oregon*, 295 U.S. 1, 20-21, (1935)), and further small craft could be used only at exceptionally high water, *The Montello*, 87 U.S. at 442.

### **XIX. Highway of Commerce**

636. The river is used as a highway of commerce if it is “a corridor or conduit within which the exchange of goods, commodities or property or the transportation of persons may

be conducted.” A.R.S. § 37-1101(3). The statutory definition does not require the transport of goods; the transportation of persons alone is sufficient to establish a “highway for commerce.”

637. The U.S. Supreme Court has held that the “gist of the federal test” is whether a watercourse was or can be used as a highway for commerce. *Utah v. United States*, 403 U.S. at 11. The details of the operation such as if it was profitable or extensive are largely irrelevant as long as the basic finding is that the watercourse can serve as a highway. *Id.* In *Utah v. United States*, evidence that some owners hauled their livestock across the Great Salt Lake was sufficient to meet the highway for commerce requirement. *Id.*

638. The Ninth Circuit in *State of Alaska v. United States*, 754 F.2d at 854, attempted to further clarify the highway of commerce element of *The Daniel Ball* test stating “the central theme remains the movement of people or goods from point to point on the water.” In *Alaska*, the court found no showing of the use of a river as a highway of commerce because floatplanes did not fall within the meaning of using a river as a highway or channel. 754 F.2d at 855.

639. The Ninth Circuit found that guided fishing and sightseeing trips were relevant evidence of commercial use of the Gulkana River. *Alaska v. Ahtna, 891 F.2d at 1405; Defenders*, 199 Ariz. at 424, 18 P.3d at 735 (“guided fishing and sightseeing trips, although merely recreational, are ‘transportation for profit’ and can be considered commercial activity.”)

640. The Arizona Court of Appeals has interpreted “highway for commerce” under the federal test to “neither require both trade and travel together nor that the travel or trade be commercial.” *Defenders*, 199 Ariz. at 421, 18 P.3d at 733 (citing *Utah v. U.S.*, 403 U.S. at 11. Additionally, the Arizona Court of Appeals has stated “nothing in *The Daniel Ball* test necessitates that the trade or travel sufficient to support a navigability finding need be from a ‘profitable commercial enterprise.’” *Id.* at 422, 18 P.3d at 733. Lastly, the Arizona Court of Appeals struck down the non-navigability presumption that required sustained trade and travel both upstream and downstream. *Defenders*, 199 Ariz. at 422, 18 P.3d at 733.

641. “It is not the size of the articles transported in commerce that establishes the navigable character of a waterway. Navigability depends upon the stream’s usefulness as a transportation mechanism for commerce.” *Puget Sound Power & Light Co. v. Fed. Energy*

*Regulatory Comm'n*, 644 F.2d 785, 789 (9<sup>th</sup> Cir. 1981).

## **XX. Susceptibility to Navigation**

642. While actual use of the Verde as a highway for commerce is well documented and is sufficient for a navigability determination, the Commission also finds the Verde navigable based on its susceptibility to navigation.

643. The U.S. Supreme Court has consistently held that for title navigability determinations “[t]he question of that susceptibility in the ordinary condition of the rivers, rather than of the mere manner or extent of actual use, is the crucial question.” *United States v. Utah*, 283 U.S. at 81-82, also quoted with approval in *PPL Montana*, 132 S.Ct. at 1233. It is the susceptibility of rivers to use as a highway of commerce that is the “true criterion of the navigability of a river, rather than the extent and manner of that use” because the susceptibility is the fact that affords the public right of control over navigation on the river. *United States v. Utah*, 283 U.S. at 83 (internal citations omitted). “The extent of existing commerce is not the test.” *Id.* at 82.

644. The U.S. Supreme Court has recognized that susceptibility is the appropriate test when rivers are located in areas of the country “where conditions of exploration and settlement explain the infrequency or limited nature of such use . . . .” *United States v. Utah*, 283 U.S. at 82. “[A state] is not to be denied title to the beds of such of its rivers as were navigable in fact at the time of the admission of the state either because the location of the rivers and the circumstances of the exploration and settlement of the country through which they flowed had made recourse to navigation a late adventure or because commercial utilization on a large scale awaits future demands.” *Id.* at 83, cited with approval in *Winkleman*, 224 Ariz. at 243, 229 P.3d at 255.

645. A lack of commercial traffic is not a bar to a conclusion of navigability “where personal or private use by boats demonstrates the availability of the stream for the simpler types of commercial navigation.” *Appalachian Elec. Power Co.*, 311 U.S. at 416; see *PPL Montana*, 132 S.Ct. at 1233. “Evidence of recreational use, depending on its nature, may bear upon susceptibility of commercial use at the time of statehood.” *PPL Montana*, 132 S.Ct. at 1233.

#### A. Physical Characteristics

646. “The capacity of the rivers in their ordinary condition to meet the needs of commerce . . . may be shown by physical characteristics and experimentation as well as by the uses to which the streams have been put.” *United States v. Utah*, 283 U.S. at 83; *see also FPL Energy Maine Hydro LLC v. F.E.R.C.*, 287 F.3d 1151, 1156 (D.C. Cir. 2002) (finding Messalonskee a navigable water of the United States based solely on three non-commercial, non-recreational test canoe trips and the physical characteristics of the Messalonskee).

#### XXI. Modern Use

647. “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.” *PPL Montana*, 132 S. Ct. at 1233.

648. Present-day use includes recreational use. *Id.* Present-day, recreational use may be used if it “shows the river could sustain the kinds of commercial use that, as a realistic matter, might have occurred at the time of statehood.” *Id.*

649. In order for present-day use to be considered, it must also meet two specific criteria: “(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 poststatehood condition is not materially different from its physical condition at statehood.” *Id.*

650. Modern watercraft must not “permit navigability where historical watercraft would not, or if the river has changed in ways that substantially improve its navigability, then the evidence of present-day use has little or no bearing on navigability at statehood.” *Id.*

651. “Modern recreational fishing boats, including inflatable rafts and lightweight canoes or kayaks, may be able to navigate waters much more shallow or with rockier beds than the boats customarily used for trade and travel at statehood.” *Id.* at 1234.

652. The Commission finds that boating with meaningfully similar boats on a depleted, altered river is evidence that boating could also occur on the Verde River in its ordinary and natural condition at statehood.

#### XXII. Obstacles

653. The U.S. Supreme Court has consistently held that occasional obstructions and small portages do not defeat navigability.

654. In *Econ. Light & Power Co.*, the Court stated that “[n]avigability, in the sense of

the law, is not destroyed because the water course is interrupted by occasional natural obstructions or portages; nor need the navigation be open at all seasons of the year, or at all stages of the water.” 256 U.S. at 122. The Court found that the Desplaines River had “a rapid, and in places shallow water with boulders and obstructions, yet these things do not affect its navigable capacity. . . .” *Id.* at 118.

655. In *United States v. Utah*, the Court stated that a river may still be navigable in fact “although its navigation may be encompassed with difficulties by reason of natural barriers, such as rapids and sand-bars.” 283 U.S. at 86-87. The Court found that the presence of sandbars causing impediments to navigation does not make a river non-navigable. *Id.* at 86. The Court also found that evidence of navigability is valid if not confined to “exceptional conditions or short periods of temporary high water. . . .” *Id.* at 87; *see also United States v. Holt State Bank*, 270 U.S. at 56 (occasional difficulties do not render a river otherwise as non-navigable).

656. Finally, in *PPL Montana*, navigability of the Great Falls reach of the Missouri River was at issue, that consisted of a 17-mile segment with five waterfalls with heights of 87, 19, 48, 7, and 26 feet and continuous rapids in between. 132 S.Ct. at 1223. The segment required Lewis and Clark to portage their boats and supplies around the reach over the course of at least 11 days. *Id.* at 1231. The Court ultimately, held that the Great Falls reach was non-navigable. *Id.* at 1232. While the Court’s determination of navigability was limited to the record before it, the Court did opine that “the law might find some non-navigable segments so minimal that they merit treatment as part of a longer, navigable reach . . . .” *Id.* at 1230. In addition, the Court appeared to establish that a day-long portage is the minimum threshold length for a non-navigability determination based on a portage. *Id.* at 1231.

657. The Ninth Circuit has held that occasional obstacles do not defeat navigability. *Oregon v. Riverfront Prot. Ass’n*, 672 F.2d at 795. A river “need not be without difficulty, extensive, or long and continuous.” *Id.* The court found the McKenzie river navigable where log drives were difficult due to uncontrollable flooding, too little rain that caused gravel bars, boulders, and shoals, and conditions that might create obstacles that take a log moving crew three or four days to overcome. *Id.*

### **XXIII. Determination of Navigability**

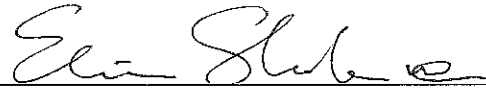
658. Based upon the evidence submitted, the controlling federal and state law, and



the guiding law, the Commission finds that the Verde River was both used and susceptible to use for navigation in its ordinary and natural condition on or before February 14, 1912. The Verde River is "navigable" as defined by the Arizona Revised Statutes and case law.

DATED: November 9, 2015.

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ORIGINAL AND SEVEN COPIES of the foregoing hand-delivered for filing this 9th day of November, 2015, to:

Arizona Navigable Stream Adjudication Commission  
1700 W. Washington  
Suite B-54  
Phoenix, AZ 85007

A COPY in pdf format of the foregoing e-mailed with delivery receipt this 9th day of November, 2015, to each party listed on the ANSAC website, <http://www.ansac.az.gov/parties.asp>, with "SERVICE OF ANSAC DOCUMENT, No. 04-009-NAV (Verde)" written in the subject line.

  
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Paula Brewer  
4424923