REVISED AND UPDATED REPORT:

ASSESSMENT OF THE NAVIGABILITY OF THE UPPER SALT RIVER ABOVE GRANITE REEF DAM PRIOR TO AND ON THE DATE OF ARIZONA'S STATEHOOD, FEBRUARY 14, 1912

by

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EXECUTIVE SUMMARY

This is a revised version of a report addressing the navigability (or lack thereof) of the upper Salt River in the decades before or at the time of Arizona's statehood on February 14, 1912. The previous report, dated October 5, 2005, was submitted to the Arizona Navigable Stream Adjudication Commission together with related testimony by the report's author, Douglas R. Littlefield. The 2005 report also addressed a portion of Tonto Creek. The Commission, however, found Tonto Creek to be non-navigable as part of its decision on small and minor watercourses in Gila County dated April 11, 2007. No appeal of that decision was taken. Therefore, this 2014 report is limited to the upper Salt River and does not address Tonto Creek.

This updated study is intended to add further information about the historical characteristics of the upper Salt River, especially now that internet resources have made digital access to historical newspapers and photographs substantially easier than before. This extra insight is necessary to conform with the opinion of the Arizona Court of Appeals decision in *State of Arizona, et al., v. Arizona Navigable Stream Adjudication Commission, et al.* (1 CA-CV 07-0704, April 27, 2010) that a fuller awareness of how human activities and manmade structures on the upper Salt River may have affected that stream's ordinary and natural condition at or before statehood.

This report examines that portion of the upper Salt River lying below the inundation lines of Theodore Roosevelt Lake downstream to Granite Reef Dam on or before February 14, 1912. This report does not deal with portions of the upper Salt River above Theodore Roosevelt Lake. In evaluating the potential navigability or non-navigability of the upper Salt River, a wide array of published and unpublished documents was consulted (discussed in greater detail in the

"Introduction"). This survey of hundreds of primary and secondary sources yielded a wide spectrum of historical views of the upper Salt River, from federal surveys and reports, land settlement and grant records created by the U.S. Government, federal reports, newspaper accounts, photographs, and many other records.

Taken as a whole, these records demonstrate that prior to and at the time of Arizona's statehood, the upper Salt River below the inundation lines of Theodore Roosevelt Lake was considered not navigable by every contemporaneous observer.

INTRODUCTION

As is the case with other bodies of water in Arizona, the question of ownership of the upper Salt River's bed depends on what that stream was like at or before the time of Arizona's statehood on February 14, 1912. In general, if any body of water such as the upper Salt River was commercially navigable at the time of statehood, the ownership of the bed passed to the state when it joined the Union. If any stream was not navigable, ownership of the bed remained in the U.S. Government's hands as part of the public domain until lands adjacent to and under the body of water were patented or otherwise disposed of. At that time, the bed of the stream became the property of the individual landowners next to it.¹

A. Purpose and Methodology

The purpose of this report is to examine what the reach of the Salt River below the flood line of Theodore Roosevelt Lake and above Granite Reef Dam was like before or at about the time of Arizona's statehood and to determine whether the stream prior to or on that date was considered navigable. The chronological time period covered by this report extends from the pre-statehood era to the years shortly after statehood.

A wide variety of published and unpublished sources was utilized in creating this study. The vast majority of these documents are primary sources to obtain the most accurate descriptions of the river at about the time of statehood. To locate all relevant sources, a preliminary list was developed of terms to search many local, state, and national archives as well as published sources. The list was supplemented as research brought to light new topics related to the upper Salt River. Since individual archives have different means of recording their holdings, the list was adapted to

¹ A number of court cases have provided some of the details on what constitutes navigability for title purposes, but the fundamental U.S. Supreme Court case is *The Steamer Daniel Ball v. United States*, 77 U.S. 999 (1871).

accommodate specific locations. A lengthy list of Arizona and U.S. Government agencies' holdings were also searched for records they may have generated regarding the upper Salt River.

Research began at Arizona State University. The university's main library houses the Archives and Manuscript Division, which focuses on Arizona and Southwest history, in addition to the privately funded Arizona Historical Foundation. (Since the time the original research for this report was conducted, the Arizona Historical Foundation has been disbanded and the Foundation's records disbursed to other archives). Both archives contain (or contained) excellent collections of unpublished materials as well as extensive collections of books focusing on the history of Arizona. The first step in research at Arizona State University was to search through the computer on-line manuscript database, which holds file titles from each manuscript collection at the library. Printed finding aids (indices) were also searched. The preliminary results were over ten unpublished manuscript collections of papers of prominent citizens and early settlers of the Phoenix area. The manuscripts in these collections provided eyewitness accounts of the upper Salt River (such as descriptions of floods, the river's channel, and local activities taking place on or near the stream). The manuscript collections also provided useful insights on the development of the Phoenix irrigation system, including its reservoirs, diversion dams, and canals. Numerous photo collections were also searched. Arizona State University was also useful for its collection of Arizona territorial statutes. These laws were searched for legislation relevant to navigability and public land disposal.

Furthermore, Arizona State University's library has an extensive collection of nineteenthand early twentieth-century Arizona newspapers such as the *Arizona Gazette* and the *Arizona*Republican. Strong advocates for settlement of the evolving community of Phoenix, the
newspapers extolled the virtues of life there as well as reported on the use of the Salt River. These
two papers and others were searched for articles that would provide insight to the upper Salt River's

characteristics. In addition, since the 2005 study of that stream was completed, online historical newspaper collections have offered literally millions of key-word-searchable pages, and these sources were investigated to supplement the original newspaper work.

Also useful was the University of California, Berkeley. When the original research for this report was conducted, this university housed the Water Resources Center Archives (now relocated to the University of California, Riverside), and although that facility is located in California, it is one of the premier depositories for both manuscript collections and published government reports relating to water resources in the entire United States, particularly the American West. The Water Resources Center Archives contains manuscript collections of the papers of prominent civil engineers, whose work dealt extensively with irrigation, flood control, and hydroelectric power. The Water Resources Center Archives also holds many published government documents relating to water issues, including a complete set of published U.S. Geological Survey Water Supply Papers and Bulletins (many of which were relevant to the history of the upper Salt River) as well as all of the U.S. Reclamation Service's Annual Reports published around the time of Arizona statehood.

In addition to the Water Resources Center Library, the Bancroft Library, also at Berkeley, is one of the most important depositories for unpublished primary source materials and rare secondary source records on the history of the American West. Collections at the Bancroft relating to the Phoenix area were reviewed as well as published reports of nineteenth-century explorations of the area. Since many of the individuals who visited the region were there specifically to report on the area's potential, their reports are especially useful to ascertaining the historical nature of the upper Salt River.

Following research at the Bancroft Library and the Water Resources Center Archives, reports and studies conducted by U.S. Government agencies were reviewed. Most of these reports

covered topics such as flood control, irrigation, and the utilization of natural resources in the Salt River Valley. These documents provided descriptions of the upper Salt River at different points in time leading up to and shortly after statehood. Some of the reports were specific to the Salt River area, but much of the information that was found was contained in larger studies on Arizona. Furthermore, a computer search was done of files compiled by Congressional Information Services (CIS) to find Congressional documents, hearings, and reports relevant to the Salt River region.

In addition to the sources obtained at Arizona State University and the University of California at Berkeley, documents held by the U.S. Bureau of Land Management in Phoenix were reviewed – records that are some of the most important documents concerning the upper Salt River before and around the time of statehood. The Bureau of Land Management holds the records of nineteenth-century U.S. General Land Office surveys carried out to prepare the public domain for homesteading, and these documents include original surveyors' plats and field notes. Since surveyors were required to "meander" (follow the sinuosities of) all navigable bodies of water and to keep detailed notes of those meanders and other aspects of their work, survey documents are vital to understand what the upper Salt River was like at the time of survey. (See Chapter 1 for a more detailed discussion of how surveys were to be conducted.) The surveys are especially useful to a historical study of the characteristics of the upper Salt River.

The Phoenix office of the U.S. Bureau of Land Management also provided copies of U.S. General Land Office Master Title Plats and Historical Indices. These records were used to determine how the U.S. Government disposed of public domain lands in Arizona through which the upper Salt River flowed. From this material, any U.S. patent that either overlaid or bordered the upper Salt River was obtained. Federal patent records are critical in determining how the U.S. Government viewed the public lands in Arizona. If federal officials had considered the upper Salt

River to be navigable, they would not have deeded out land lying in the channel or bed of that stream. However, there is no indication in the multitude of federal patents overlying the upper Salt River in the study area that the U.S. Government hesitated to grant title to the bed and the banks of that stream to patent applicants. (See Chapter 2 for a more detailed discussion of the significance of federal patents.)

The U.S. National Archives in Washington, D.C., provided the supporting paperwork for federal land patents such as applications and affidavits of witnesses. Federal patents and their files, combined with historical maps obtained from the U.S. Geological Survey and the U.S. Bureau of Reclamation, were used to create patent exhibit maps, which illustrate the location of all federal patents along the upper Salt River. These maps are reproduced in Chapter 2.

Additional research at archives in the Phoenix area was carried out. This included contacting various local archives and the Arizona Historical Society to determine their respective holdings. Furthermore, the Arizona State Archives in Phoenix provided rare state and territorial government documents and manuscript collections.

The Salt River Project Archives in Phoenix was also a critical location for research. The Salt River Project has an extensive archival collection, including many documents copied from the U.S. National Archives' Record Group 75 (U.S. Bureau of Indian Affairs) and Record Group 115 (U.S. Bureau of Reclamation). These documents relate to the Pima-Maricopa Indians and the Salt River Project, respectively. In addition to collecting documents from the U.S. National Archives, the Salt River Project Archives also maintains an excellent collection of historical photographs of the Salt River. This collection was searched thoroughly. Furthermore, the newspaper clipping collection housed by the Salt River Project is extensive. The clippings supplemented newspaper research done at Arizona State University and in online sources.

The material found at the Salt River Project Archives was also useful as a lead-in to research at the U.S. National Archives in Washington, D.C., that went beyond just federal patent files. While at the National Archives, a wide variety of federal agency files, including the U.S. Bureau of Indian Affairs, the U.S. Army Corps of Engineers, the U.S. General Land Office (today, the Bureau of Land Management), the Office of the Secretary of Interior, and the U.S. Geological Survey, were searched. These records contain unpublished paperwork substantiating the conclusions gleaned from published U.S. Government documents.

The Rocky Mountain branch of the National Archives in Denver, Colorado, was also visited to undertake a more thorough search of Record Group 115 (U.S. Bureau of Reclamation). These records are organized into various chronological periods, with the 1902-1919 set containing the materials that were most relevant to this study. While in Denver, the Bureau's Salt River Project histories, historical engineering data, preliminary investigations, and correspondence files were all searched. These records provided a rich source of information from an agency directly involved with management of the river before and around the time of Arizona's statehood.

In addition to archive work, historical water rights cases were searched to determine the nature of the upper Salt River prior to or at Arizona's statehood. These included *M. Wormser, et al. v. Salt River Valley Canal Company* (1892) and *Patrick Hurley v. Charles F. Abbott, et al.* (1910). These two cases were especially important to the development of the Salt River Valley because they focused on dividing the river's resources among many concerned parties, and although the cases' focus was on the portion of the Salt River below the study area, the litigation nonetheless contained commentary about the upper Salt River region.

Finally, supplemental research completed after the 2005 report yielded many more historical photographs of the upper Salt River region. Many of these additional photos have been included here.

B. Organization of Remainder of Report

Based on this extensive research, it became evident that among the most important records were U.S. General Land Office original surveys and patent records. Therefore, the first two chapters of this report deal with the significance of those documents. Other government documents (both published and unpublished) are discussed in Chapter 3 along with miscellaneous historical materials. Chapter 4 examines newspaper accounts and photographs of the upper Salt River. Chapter 5 addresses the types of watercraft used on western rivers around the time of Arizona's statehood. The last section of the report contains a general summary and conclusions.

To facilitate reference throughout the main body of the report, footnotes run continuously rather than starting from number one in each chapter as is common practice in most scholarly writing. Also, the use of terms such as "ibid." has been minimized. The vita of Douglas R. Littlefield is attached at the end of this report.

CHAPTER 1: U.S. GOVERNMENT SURVEYS

Some of the most important records created in relation to the Salt River above Granite Reef Dam prior to and around the time of Arizona's statehood in 1912 are those of the U.S. Government, especially federal surveys done by the General Land Office (today, the Bureau of Land Management). When the United States became the owner of the vast territory acquired from Mexico after the end of the Mexican War in 1848, federal officials were anxious to determine the value of what the U.S. had gained. Moreover, they wanted to prepare the region for orderly occupation by American settlers to solidify control. To ready the new lands for homesteading and to record those lands' characteristics, the United States Government undertook formal surveys by the General Land Office. Because those surveys are highly detailed, the original plats and related field notes of the region encompassing the upper Salt River contain a wealth of information about the nature of that stream in the vicinity of Roosevelt Lake.

A. Surveyors' Manuals

Due to the need for accuracy and consistency in carrying out the federal surveys, the U.S. Government issued a series of manuals to direct surveyors in their work. In many cases, surveyors specifically were instructed by their surveying contracts to use these manuals. It is important to understand the books' provisions and how they changed over time in order to recognize the manuals' significance in relation to the issue of the navigability of the upper Salt River.

1. The 1851 *Manual*

The 1851 *Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations* governed how some of the earliest public land surveys were done in the American

West.² This *Manual* had been adopted by the General Land Office to standardize survey work in California and Oregon, which were the most significant areas of western American settlement in the late 1840s and early 1850s. The 1851 *Manual* was the first formal surveying handbook issued by the U.S. Government to provide guidance for surveyors mapping the vast public domain acquired from Mexico; previously, the U.S. Government had issued directions to surveyors in the field on an individual basis or through surveyors-general assigned to specific territories.

The *Instructions to the Surveyor General of Oregon* provided that public lands were to be divided and subdivided into a series of ever-smaller grids-within-grids to allow the precise location of individual tracts. This system would facilitate the disposal of the public domain in an orderly fashion and at the same time record the characteristics of that land in substantial detail. The largest grids were to be six miles square and were to be created by the surveying of township and range lines. The directions in the *Instructions to the Surveyor General of Oregon* providing for the establishment of these large blocks derived from the same processes that had been used in earlier public land territories and states, procedures that had first been enacted into law in the *Land Ordinance of 1785*.³ The first surveys under this legislation had been undertaken in what is today the state of Ohio. The grid procedure was used in most new territories added to the United States in the years that followed.

² The *Instructions to the Surveyor General of Oregon* is reprinted in C. Albert White's *A History of the Rectangular Survey System* on pages 433-456. White's book was published by the U.S. Government in 1983 as a review of all practices used by federal surveyors on public domain lands since the initial surveys of the Old Northwest (today, Ohio and other parts of the upper Midwest) were undertaken in the late 1700s. In addition to providing a detailed history of those procedures, White's book also reprints many of the original surveying instructions. See C. Albert White, *A History of the Rectangular Survey System* (Washington, D.C.: U.S. Department of the Interior, 1983).

³ For details on the *Land Ordinance of 1785*, see Paul W. Gates, *History of Public Land Law Development* (Washington, D.C.: Zenger Publishing Co., Inc., 1968), pp. 59-74. Gates's seminal study was undertaken by direction of Congress (78 Stat. 982), which in 1964 created the Public Land Law Review Commission. See ibid., pp. ii-iii, 807-814.

To establish township and range lines, a base line and meridian were chosen within the state or territory to be surveyed. In Arizona, the initial base line and meridian intersected at a point on a hill just south of the junction of the Salt and Gila rivers near Phoenix. That location had been chosen in 1865 by John A. Clark, surveyor-general of New Mexico Territory, to begin the Arizona surveys. (Arizona was a part of New Mexico Territory until 1863, but Clark's directions covered both territories.) Clark's beginning marker for the Arizona surveys was a point that originally had been established by the Mexican Boundary Commission in 1851 as a location on the U.S.-Mexico border prior to the Gadsden Purchase of 1853, which created the present boundary between the United States and Mexico. Actual surveys did not begin in Arizona, however, until 1871.

Using the Gila and Salt River Base and Meridian to start, federal surveyors ran township and range lines in Arizona by working their way gradually north and south to create township lines and east and west to establish ranges. Each township and range line was six miles apart from the next. The six-square-mile blocks that resulted were called townships (as distinct from township lines). Surveyors numbered the townships on the basis of how far north or south and east or west of the initial base and meridian they lay. For example, the first township to the north and east of the intersection of the Gila and Salt River Base and Meridian was identified as township 1 north, range 1 east. The township directly north of that was township 2 north, range 1 east, and the township to the east of that point was township 2 north, range 2 east. All townships to the south and west of the initial base and meridian were identified in a similar fashion. In the region of concern to this report – the area along the upper Salt River from the flooded edges of Theodore Roosevelt Lake downstream to Granite Reef Dam – the lands examined lie in townships 2 to 5 north and ranges 6 to

⁴ C. Albert White, *A History of the Rectangular Survey System* (Washington, D.C.: U.S. Department of the Interior, 1983), pp. 137, 147.

14 east. Most of this region can be seen on the U.S. Geological Survey's large-scale 1994 Theodore Roosevelt Lake topographic map of the region, which is shown below.



Figure 1: U.S. Geological Survey's Theodore Roosevelt Lake topographic map, 1994 (scale 1:100,000). Source: U.S. Geological Survey online map web site.

With exterior township and range lines established, U.S. Government surveyors subsequently divided each township into thirty-six sub-blocks called "sections," most of which were 640 acres, or one mile square. (Due to the curvature of the earth and other factors, surveyors sometimes had to adjust slightly the sections of some townships to be more or less than a square mile.) The sections were numbered within each township in an "S" fashion beginning with the northeast square and heading west for sections one through six. Section seven then appeared immediately south of section six, and sections then went east through section twelve. The remaining sections were numbered in the same "S" fashion until section thirty-six was reached in the southeastern most part of the township.

Surveyors laying out the township, range, and section lines were provided with very precise instructions for measuring because accuracy was critical for these lands to be transferred out of the public domain and into private hands in a reliable manner. In addition, for those areas remaining in the public domain, the precise rules for surveying and for noting the characteristics of the land gave the U.S. Government an extremely valuable record of what it owned through the field notes that surveyors were required to make. The field notes were to include any notable features of the land such as streams, rivers, lakes, roads, irrigation ditches, or other prominent landmarks and general topography. Using their field notes, surveyors were then to draw and forward original survey maps to the surveyor-general of the respective state or territory along with the accompanying field notes for final approval.

The 1851 *Instructions to the Surveyor General of Oregon* contained several provisions that are relevant to navigable bodies of water and therefore are important in relation to any consideration of the navigability of the upper Salt River. First, the instructions provided that when surveyors encountered "impassable obstacles, such as ponds, swamps, marshes, lakes, rivers, creeks, &c.," they were to extend the survey line from the opposite side of the obstacle using triangulation or other surveying techniques. In addition, the surveyors were to "state all the particulars in relation thereto in your field book." Moreover, the directions continued with regard to navigable bodies of water,

at the intersection of lines with both margins of impassable obstacles, you will establish a Witness Point, (for the purpose of perpetuating the intersections therewith) by setting a post, and giving in your field book the course and distance therefrom, to two trees on opposite sides of the line, each of which trees you will mark with a blaze and notch facing the post; but on the margins of navigable water courses, or navigable lakes, you will mark the trees with the proper number

of the fractional section, township, and range. [Parenthetical comment is in the original.]⁵

The *Instructions to the Surveyor General of Oregon* also provided that when surveyors encountered navigable bodies of water, special survey markers called "meander corner posts" were to be "planted at all those points where the township or section lines intersect the banks of such rivers, bayous, lakes, or islands, as are by law directed to be meandered." (Congress first passed legislation establishing that navigable waterways remain public right-of-ways in 1796 – a statute that led to the requirement that navigable rivers and lakes be meandered by federal surveyors – but that law did not specify what constituted navigability.) Therefore, where township, range, section, or fractional section lines encountered bodies of water, witness posts were to be established if those watercourses were not navigable, but meander corner posts were to be placed where the lines intersected navigable bodies of water. As the instructions explained, surveyors were to note:

[i]ntersections by line of *water objects*. All rivers, creeks, and smaller streams of water which the [survey] line crosses; the distance on line at the [witness] points of intersection, and their *widths on line*. [Emphases in original.]

Surveying lines that intersected navigable bodies of water were to be conducted as follows:

In cases of *navigable streams*, their width will be ascertained between *meander corners*, as set forth under the proper heading. [Emphases in original.]⁸

⁶ Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations (1851), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 439. On the federal legislation mandating meanders of navigable bodies of water, see White, A History of the Rectangular Survey System, p. 30.

⁵ Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations (1851), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 438.

⁷ An Act Providing for the Sale of the Lands of the United States in the Territory Northwest of the River Ohio, and above the Mouth of Kentucky River, 1 Stat. 464 (1796). The 1796 legislation is now codified at 43 U.S.C. §931.

⁸ Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations (1851), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 444.

Aside from these general directions, surveyors also were given precise instructions for measuring the sinuosities of navigable bodies of water, including rivers, streams, lakes, ponds, or bayous. Between the meander corner posts, the edges of the banks were to be measured going downstream by recording degree bearings. The details of this meander surveying were to be recorded in the surveyor's field book as a separate set of records from the surveys of township, range, and section lines. Finally, as if these instructions were not specific enough, the 1851 *Instructions to the Surveyor General of Oregon* contained detailed examples of surveying notes so that field surveyors would understand virtually any type of circumstance they might encounter. 10

2. The 1855 Manual

Between 1851 and 1864, the U.S. General Land Office published only one revised version of the 1851 work. The 1855 manual (bearing the lengthy title *Instructions to the Surveyors General of Public Lands of the United States, for Those Surveying Districts*Established in and Since the Year 1850; Containing Also, A Manual of Instructions to Regulate the Field Operations of Deputy Surveyors, Illustrated by Diagrams) contained more detail than the 1851 instructions. Nevertheless, it remained virtually identical in substance with regard to recording navigable and non-navigable bodies of water. 11

⁹ Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations (1851), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 442.

¹⁰ C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), passim.

¹¹ For the 1855 discussion of how bodies of water were to be recorded, see *Instructions to the Surveyors General of Public Lands of the United States, for Those Surveying Districts Established in and Since the Year 1850; Containing Also, A Manual of Instructions to Regulate the Field Operations of Deputy Surveyors, Illustrated by Diagrams* (1855), reprinted in C. Albert White, *A History of the Rectangular Survey System* (Washington, D.C.: U.S. Department of the Interior, 1983), pp. 458, 461, 464-465.

3. The 1864 Instructions

Nine years after the 1855 manual had appeared, the U.S. General Land Office began to modify its instructions for how surveyors were to deal with navigable and non-navigable bodies of water. In 1864, the 1855 surveyors' manual was amended by *Instructions to the Surveyors General of the United States, Relating to Their Duties and to the Field Operations of Deputy Surveyors*. Because surveys in Arizona began in 1868, it was this set of directions that governed how bodies of water in Arizona Territory were recorded. The 1864 revision made no changes to the section of the 1855 manual that dealt with "insuperable objects on line." In fact, the 1864 amendments did not discuss these directions at all, presumably leaving this part of the 1855 manual intact. Regarding meanders and navigable streams, the 1864 amendments added some important criteria to which streams would be meandered:

Rivers not embraced in the class denominated "navigable" under the statute, but which *are well-defined natural arteries of internal communication*, and have a uniform width, will be meandered on one bank. [Emphasis added.]

The 1864 Instructions added that for the sake of consistency, one-bank meanders were to be run on the right side (looking downstream) unless obstacles made it necessary to switch to the left bank. If a change to the left were made, it was to be at a point where a survey line crossed the stream and was to be recorded in the field notes. ¹²

4. The 1881 Instructions

On May 3, 1881, the U.S. General Land Office once again updated its directions to federal surveyors by issuing *Instructions of the Commissioner of the General Land Office to the Surveyors General of the United States Relative to the Survey of the Public Lands and Private*

¹² Instructions to the Surveyors General of the United States, Relating to Their Duties and to the Field Operations of Deputy Surveyors (1864), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 504.

Claims. In this manual, much of the directions remained the same as in the 1855 manual as amended in 1864, including, for example, how surveyors were to establish witness posts at intersections with non-navigable "insuperable objects on line." Here, as in 1851 and 1855, the manual told surveyors to use triangulation to establish the distance across non-navigable obstacles on line. Also as in the 1851 and 1855 books, surveyors were to set a witness post on the line on each side of obstacle, and they were to measure to two trees on opposite sides of the line for each post. Each tree was to be marked with a notch and blaze facing the post, and the degree bearings and distance from the trees to their respective witness posts on line were to be noted in the field notes.¹³

For navigable bodies of water, as had been the case in the 1851 and 1855 manuals (as amended in 1864), the surveyors were told that "on the margins of navigable water-courses, or navigable lakes, you will mark the trees with the proper number of the fractional section, township and range." And similar to the 1851 and 1855 instructions, the 1881 directions provided that "[m]eander corners are established at all those points where the lines of the public surveys intersect the banks of such rivers, bayous, lakes, or islands as are by law directed to be meandered." In terms of how meanders were to be carried out, the 1881 instructions repeated the information from the 1855 manual as well as the 1864 addition that rivers that were not navigable "under the statute" but that were "well-defined natural arteries of internal

¹³ Instructions of the Commissioner of the General Land Office to the Surveyors General of the United States Relative to the Survey of the Public Lands and Private Claims (1881), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 516.

¹⁴ Instructions of the Commissioner of the General Land Office to the Surveyors General of the United States Relative to the Survey of the Public Lands and Private Claims (1881), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), pp. 516-517.

communication" were to be meandered on one bank only. The balance of the instructions for meandering was also drawn from either the 1855 instructions or the 1864 amendments. ¹⁵

5. The 1890 Manual

Nine more years elapsed before the U.S. General Land Office revised its surveying instructions. On January 1, 1890, the agency issued its *Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims*. Many of the surveying instructions were identical or nearly indistinguishable from the previous work, including those directions for recording major obstacles. For example, the 1890 instructions about how to chronicle "insuperable objects on line" continued to provide that surveyors were to use triangulation to measure across the obstruction. Surveyors also were still instructed to set a witness post on line at the edge of the non-navigable obstacle and to give the course and direction to two nearby trees on opposite sides of the line, each of which were to be notched and marked with a blaze facing the witness post. And, as had been the case in the 1855, 1864, and 1881 directives, the 1890 directions also stated that for navigable bodies of water, meander posts were to be set where lines intersected these obstacles, and meanders were to be run following the course of the river.¹⁶

A significant change had been made to the instructions for what bodies of water were to be meandered, however. Whereas in 1881 surveyors were to meander navigable streams (both sides) and any non-navigable body of water used for "internal communication" (on one side only), the 1890 manual deleted the instructions to meander non-navigable bodies of water that

¹⁵ Instructions of the Commissioner of the General Land Office to the Surveyors General of the United States Relative to the Survey of the Public Lands and Private Claims (1881), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), pp. 523-524.

¹⁶ Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1890), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 560.

were used for "internal communication." In addition, the 1890 manual no longer told surveyors to meander streams that were considered navigable, as the 1881 instructions had provided "under the statute." Instead, the 1890 manual stated:

Both banks of navigable rivers, as well as of all rivers not embraced in the class denominated as "navigable," the right angle width of which is three chains and upwards, will be meandered on *both* banks by taking the general courses and distances of their sinuosities, and the same are to be entered in the field book. Rivers not classed as navigable will not be meandered above the point where the average right-angle width is less than *three chains*. [Emphases in original.] ¹⁷

In short, there had been two significant changes regarding what bodies of water should be meandered. The first was that meanders were to be done of waterways "as are by law directed to be meandered" (1881) or "embraced in the class denominated as 'navigable'" (1890). The second change as to what was to be meandered involved non-navigable streams. This modification involved bodies of water used for "internal communication" (1881), where one bank was to be meandered, or streams more than three chains wide, where both banks were to be meandered (1890).

6. The 1894 Manual

On June 30, 1894, the U.S. General Land Office issued its 1894 Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims. In relation to directions for meandering, the 1894 manual had major changes in what bodies of water were to be meandered. The new instructions still called for bodies of water "embraced in the class denominated 'navigable'" to be meandered. In addition, as had been the case in the 1890 manual, all non-navigable bodies of water that were more than three chains wide were to be meandered, but here the 1894 manual added another instruction. Both navigable and non-

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¹⁷ Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1890), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 568. In surveying, one chain equals 100 links or 66 feet.

navigable streams (more than three chains wide) were to be meandered "at the ordinary *mean high water mark*" (emphasis in original), and their general courses and sinuosities were to be recorded in the appropriate field notebook. Furthermore, in another significant change, the 1894 manual provided that "[s]hallow streams, without any well-defined channel or permanent banks *will not be meandered*; except tide-water steams, whether more or less than three chains wide, which should be meandered at ordinary high-water mark, as far as tide-water extends." (Emphasis in original.)¹⁸

7. The 1902 Manual

Shortly after the turn of the century, the U.S. General Land Office once again revised its surveying handbook, releasing on January 1, 1902, *Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims*. There were significant differences between the 1902 manual and its 1894 predecessor regarding meandering. First, the 1902 manual observed that the term "meander" had frequently been misapplied in the past by surveyors, which had important implications for lands adjoining the meander lines. The 1902 manual stated:

The running of meander lines has always been authorized in the survey of public lands fronting on large streams and other bodies of water, but does not appear to have been proper in other cases. The mere fact that an irregular or sinuous line must be run, *as in the case of a reservation boundary*, does not entitle it to be called a meander line except where it closely follows a stream or lake shore. The legal riparian rights connected with meandered lines do not apply in case of other irregular lines, as the latter are strict boundaries. [Emphasis added.]¹⁹

¹⁸ 1894 Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1894), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 621.

¹⁹ Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1902), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 717.

What the 1902 manual meant was that the beds of bodies of water that were navigable (and thus meandered) were held by the states whereas the beds and banks of non-navigable bodies of water were held by the adjoining land owners. Therefore, meander lines needed to be clearly identified and had to be distinct from other irregular survey lines, such as those utilized for marking the edges of Indian reservations and other federal land reservations.

Regarding which bodies of water were to be meandered, the 1902 manual had one addition to the 1894 instructions. The new direction provided that streams less than three chains wide were not to be meandered:

except that streams which are less than three chains wide and which are so deep, swift and dangerous as to be impassable through the agricultural season, may be meandered, where good agricultural lands along the shores require their separation into fractional lots for the benefit of settlers. But such meander surveys shall be subject to rejection if proved unnecessary by field inspection.²⁰

The 1902 manual also retained the instruction that shallow streams "without any well-defined channel or permanent banks, will not be meandered; except tide-water streams, whether more or less than three chains wide, which should be meandered at ordinary high-water mark, as far as tide-water extends."²¹

B. Summary and Conclusions regarding Surveyors' Manuals

In short, by the time Arizona entered the Union on February 14, 1912, there had been substantial revisions and alterations to the instructions to federal surveyors concerning how they were to mark and record the intersection of survey lines with non-navigable and navigable bodies of water. Although initially only navigable bodies of water were to be meandered, that direction

²¹ Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1902), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 718.

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²⁰ Manual of Surveying Instructions for the Survey of the Public Lands of the United States and Private Land Claims (1902), reprinted in C. Albert White, A History of the Rectangular Survey System (Washington, D.C.: U.S. Department of the Interior, 1983), p. 718.

had been expanded over the years to include some non-navigable bodies of water. In addition, as the 1902 instructions illustrated, surveyors also used the term "meander" (sometimes incorrectly) to identify irregular survey lines along reservation boundaries.

C. U.S. Surveys along the Upper Salt River

Prior to Arizona's statehood in 1912, areas along the upper Salt River were surveyed, both in relation to exterior township and range lines as well as for interior section and subsection lines. Because surveyors whose work involved marking only exterior lines did not have the responsibility to undertake meanders where necessary, the field notes of those surveys are of limited value to this report and therefore will not be discussed here. Instead, the field notes of interior surveys and resulting plats will be examined in detail for information regarding those surveyors' judgments and descriptions regarding the navigability of the upper Salt River.

Before Arizona's statehood in 1912, the interiors of the townships (or parts of those townships) through which the Salt River flows between the upper limits of Theodore Roosevelt Lake's inundation area and Granite Reef Dam were surveyed by federal surveyors in 1868 (the area around Granite Reef Dam), 1881 (lands later inundated by Theodore Roosevelt Lake), and 1911 (area near the confluence of the Verde and Salt Rivers). In addition, lands along the Salt River between the Verde River and the present location of Stewart Mountain Dam were surveyed after statehood in 1930, 1949, 1968, and 1978. A major reach of the Salt River above these last locations and below Roosevelt Dam was never surveyed by the General Land Office (or its successor, the Bureau of Land Management) because these lands were located in national forests, Indian reservations, or they contained lands withdrawn from the public domain for various purposes such as for the Salt River Project. (See the map below for the locations and dates of federal surveys of townships along the upper Salt River.)

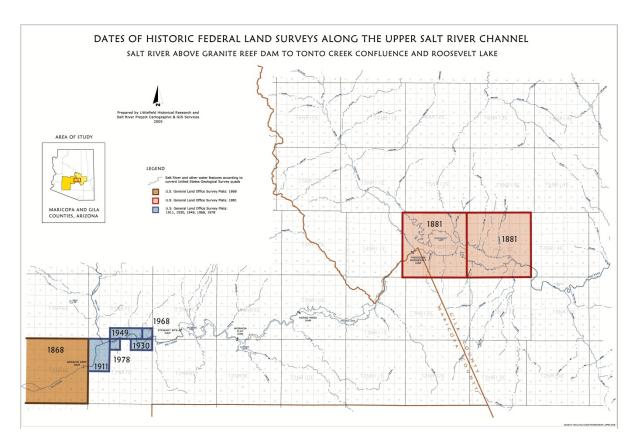


Figure 2: Map Showing Dates of Federal Surveys along the upper Salt River above Granite Reef Dam. Source: Littlefield Historical Research and Salt River Cartographies & GIS Services, 2005.

In the area now covered by Theodore Roosevelt Lake, the pre-statehood surveys were carried out in late April and early May 1881 under the terms of the 1864 surveying instructions (the 1881 surveying manual was issued just a few days after these surveys had been completed). With regard to the 1911 partial survey of the upper Salt River just above Granite Reef Dam near the Salt's confluence with the Verde, that work would have been governed by the 1902 directions. Because of the importance of these initial federal surveys in relation to establishing the nature of the upper Salt River, they will be discussed in detail here. In general, the discussion will be in a down-river manner. Within individual townships, discussion will also be downriver by the location on the survey where it crossed the upper Salt River.

1. 1881 Subdivision Survey of Township 4 North, Range 13 East

The most upstream portion of the upper Salt River in the flooded area of present-day

Theodore Roosevelt Lake lies in township 4 north, range 13 east. The interior subdivision lines
of this township were surveyed in late April and early May 1881 by Deputy Surveyor Theodore
S. White under his contract dated August 27, 1880. The survey and the related plat (see below)
were approved by the surveyor general on December 14, 1881. At each crossing of the upper
Salt River in this township, Deputy Surveyor White noted that he measured across the stream
and set survey posts on both banks. Observing that the upper Salt was between one and three
chains wide (and in some instances divided into channels), at one crossing White wrote that the
water was shallow. In the general description of the township at the end of his survey notes,
White stated that there were several farmers along the stream. With regard to navigability,
however, White set no meander comers in this township, and he did not undertake any meanders
of the stream.²²

²² Theodore S. White, Field Notes of the Survey of the Subdivision Lines of Township 4 North, Range 13 East, Gila and Salt River Base and Meridian, Arizona, approved by the Surveyor General Dec. 14, 1881, pp. 40-41, 69, U.S. Bureau of Land Management, Phoenix, Arizona; White, Plat of Township 4 North, Range 13 East, Gila and Salt River Meridian, approved by the Surveyor General Dec. 14, 1881, ibid.

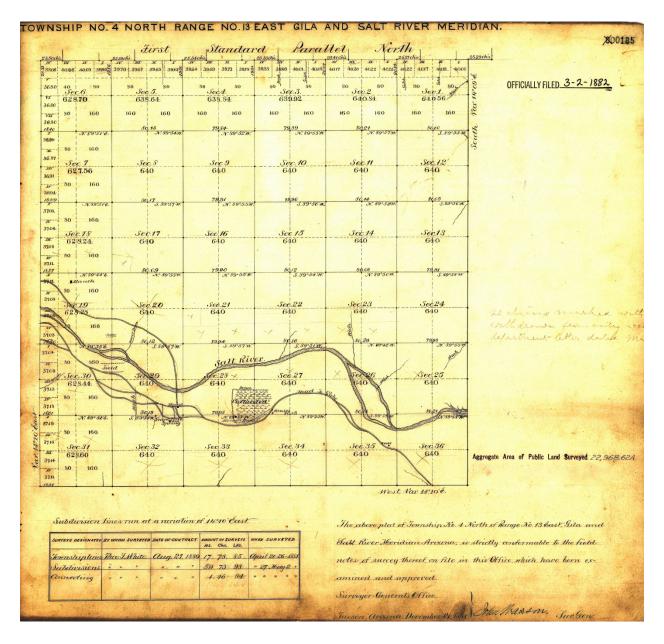


Figure 3: U.S. General Land Office survey plat of township 4 north, range 13 east (1881). Source: U.S. Bureau of Land Management, Phoenix, Arizona.

2. 1881 Subdivision Survey of Township 4 North, Range 12 East

This township, which also was surveyed by Deputy Surveyor Theodore S. White in the spring of 1881, encompasses lands that were flooded by Theodore Roosevelt Lake along the upper Salt River. As he had done in his survey of township 4 north, range 13 east, Deputy Surveyor White set no meander corners and performed no meanders along the banks of the upper

Salt River in this township (see below for the plat of this township). His field notes of the survey of township 4 north, range 12 east, also indicated that like the township next upstream, the upper Salt River in this township was about two chains wide. Moreover, White again observed that the Salt River was "shallow" in several locations where he surveyed across the stream.²³

²³ Theodore S. White, Field Notes of the Survey of the Subdivision Lines of Township 4 North, Range 12 East, Gila and Salt River Base and Meridian, Arizona, approved by the surveyor general Dec. 14, 1881, pp. 39-40, 41-42, 58-63, U.S. Bureau of Land Management, Phoenix, Arizona; White, Plat of Township 4 North, Range 12 East, Gila and Salt River Meridian, approved by the Surveyor General Dec. 14, 1881, ibid.

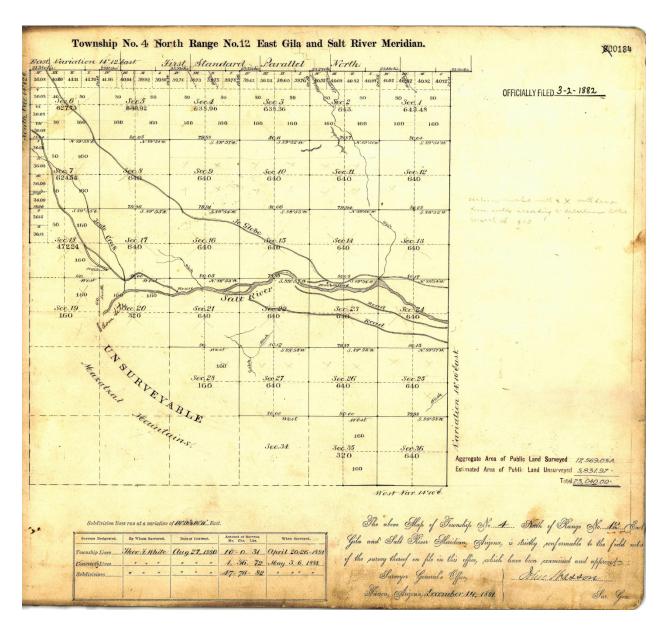


Figure 4: U.S. General Land Office survey plat of township 4 north, range 12 east (1881). Source: U.S. Bureau of Land Management, Phoenix, Arizona.

3. Surveys of Areas Downstream from Township 4 North, Range 11 East

The records of the surveys of the interiors of townships downstream on the upper Salt River between township 4 north, range 11 east, and Granite Reef Dam do not contain subdivision details that are relevant to this report. As noted above in this chapter, some of these regions were not surveyed before Arizona became a state in 1912. Other townships in this reach of the upper

Salt River were never surveyed at all due to their rugged terrain or their inclusion in national forests, Indian reservations, or lands withdrawn for the Salt River Project. It should be noted, however, that meanders were done of the right bank (going downstream) of the upper Salt River in townships 2 and 3 north, range 7 east, as part of those townships' exterior boundary surveys in 1887 and a resurvey in 1911 of the boundaries of township 2 north, range 7 east (which also included the northwest corner of the interior of that township). Those meanders, however, were conducted because the upper Salt River in those townships forms the southern boundary of the Salt River Indian Reservation (and hence, was the northern edge of the public domain in those townships), not because the upper Salt River was navigable.²⁴

Also, although Granite Reef Dam lies in section 13 of township 2 north, range 6 east, near that township's eastern boundary and no interior section lines cross the upper Salt River upstream from that point in that township, it should also be pointed out that meanders of that township were done on the right bank of that stream during the 1911 resurvey due to the presence of the Salt River Indian Reservation. Confirming that those meanders were due to the Salt River Indian Reservation's boundary, the original survey of the interior of that township done by G.P. Ingalls in 1868 contains no meander data.²⁵

²⁴ L.D. Chillson, Plat of Exterior Boundaries of Township 2 North, Range 7 East, Gila and Salt River Meridian, approved by the surveyor general July 11, 1887, U.S. Bureau of Land Management, Phoenix, Arizona; L.D. Chillson, Plat of Exterior Boundaries of Township 3 North, Range 7 East, Gila and Salt River Meridian, approved by the surveyor general July 11, 1887, ibid.; R.A. Farmer, Field Notes of the Survey of the Subdivision of Township 2 North, Range 7 East, Salt River Indian Reservation, Jan. 1911, approved by the surveyor general March 29, 1913, ibid.; R.A. Farmer, Resurvey Plat of Exterior Boundaries of Township 2 North, Range 7 East, Gila and Salt River Meridian, approved by the surveyor general March 29, 1913, ibid. [resurvey was conducted in 1911].

²⁵ G.P. Ingalls, Plat of Township 2 North, Range 6 East, Gila and Salt River Meridian, approved by the surveyor general Dec. 31, 1868, U.S. Bureau of Land Management, Phoenix, Arizona; L.D. Chillson, Plat of Exterior Boundaries of Township 2 North, Range 6 East, Gila and Salt River Meridian, approved by the surveyor general July 11, 1887, ibid.

D. Summary and Conclusions to Chapter 1

U.S. Government surveyors were specifically charged with the task of identifying navigable streams as part of their surveying duties, and the manuals and instructions under which they carried out their work were very precise about how navigable bodies of water were to be distinguished from non-navigable ones. Significantly, surveys undertaken for the upper Salt River above Granite Reef Dam and below the inundation lines of Theodore Roosevelt Lake gave no indication that the federal surveyors in charge of that work believed the upper Salt River to be navigable.

CHAPTER 2: FEDERAL PATENTS

The U.S. Congress passed a variety of homestead statutes in the middle-to-late nineteenth century designed to facilitate the settlement of newly acquired lands in the American West. Those laws resulted in thousands of federal patents (legal titles, or deeds) being issued to settlers determined to establish homes and farms in the West's unfamiliar climate. Before discussing U.S. Government land patents in relation to the upper Salt River and the patents' significance to the issue of navigability, a few words need to be said about the location of the upper Salt River as portrayed on various historical maps because the waterway's position – which are shown on those maps – are significant in relation to patent sites that will be reviewed.

A. U.S. Historical Maps of the Upper Salt River Region

As noted in Chapter 1, the U.S. General Land Office (and its successor, the Bureau of Land Management) conducted original surveys in the upper Salt River area in the late nineteenth and early twentieth centuries to facilitate homesteading and to create accurate legal descriptions of the region. The survey plats covering the study area of this report that date to the years before statehood include plats drawn in 1) 1881 – nearly all the lands now flooded by Theodore Roosevelt Lake, and 2) 1868 and 1911 – lands around Granite Reef Dam. (For details on the dates and locations of these General Land Office surveys, see the survey location map in Chapter 1. The plats themselves are also reproduced in Chapter 1.) These plats were used (together with other maps discussed below) to locate the positions of federal patents near or containing the upper Salt River.

In addition to maps drawn by the General Land Office, the U.S. Geological Survey also became active in mapping the upper Salt area around the early twentieth century in part due to the development of plans for the Salt River Project. That cartographic activity resulted in the Geological Survey's 1904 topographic map covering the area around Granite Reef Dam and the

confluence of the Verde River with the upper Salt River entitled "Ft. McDowell, Ariz." and the 1907 topographic map of the Theodore Roosevelt Lake area, named, appropriately, "Roosevelt, Ariz." (See the following pages for those two maps.)

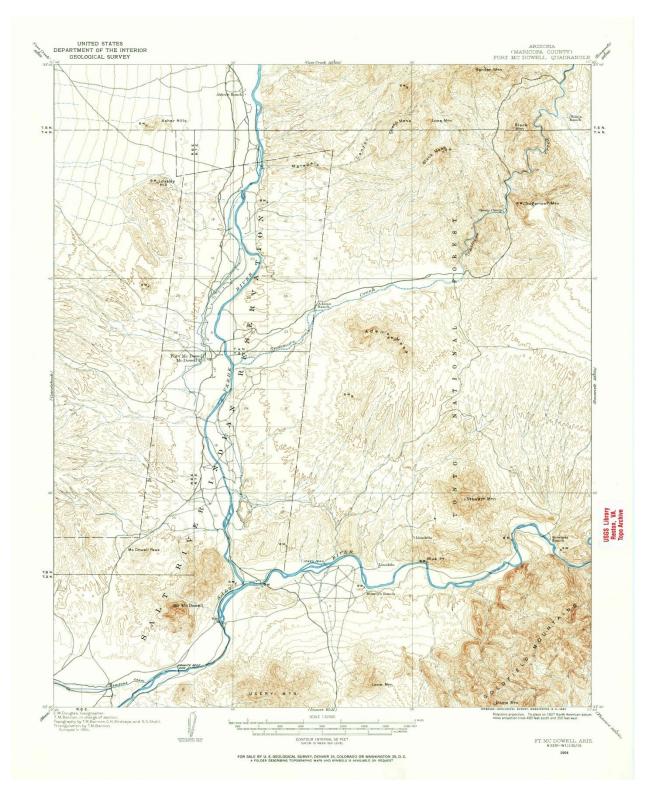


Figure 5: U.S. Geological Survey topo map, Ft. McDowell, Ariz., 1904. Source: U.S. Geological Survey historical topographic map collection.

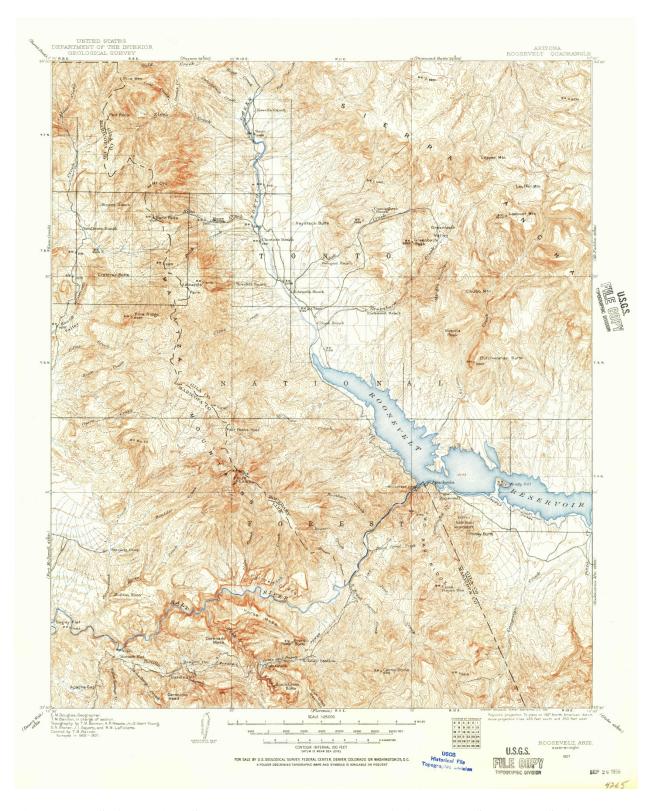


Figure 6: U.S. Geological Survey topo map, Roosevelt, Ariz., 1907. Source: U.S. Geological Survey historical topographic map collection.

In addition, in the early twentieth century, the Geological Survey produced a series of hand-drawn plats of lands in the upper Salt River area (and related tables of data) in preparation for constructing the Salt River Project. These maps, which were drawn in 1903 and 1904, were not based on formal surveys but were sketches intended to help the federal officials determine land ownership and occupancy for payments for areas to be submerged by Theodore Roosevelt Lake. Despite their lack of formal survey data, the maps nonetheless indicate the location of the upper Salt River as it passed through parcels that would later be under the reservoir's water.

There are two Geological Survey sketch maps that cover the lands along the upper Salt River that were subsequently flooded by Theodore Roosevelt Lake. These maps include sketches indicating ownership and occupancy in township 4 north, and ranges 12, and 13 east. On each map (which are reproduced below), parcels that are outlined in red are lands that had been patented at the time the maps were drawn; lands outlined in blue had been entered, but title to the patents had not been perfected. Some of these maps also show the water levels that would have been reached by a reservoir proposed in the 1890s for the same location by the Hudson Reservoir Company. It should be noted here that these maps show ownership or entry as of 1903-1904; some parcels had changed hands since the time of original entries or patents. The Geological Survey's land ownership sketch map series subsequently was combined in 1904 into one map showing all parcel ownerships and indicating minor corrections from the original sketch maps. (This latter map, which is reproduced following the Geological Survey's sketch maps, has been "stretched" for better legibility.)

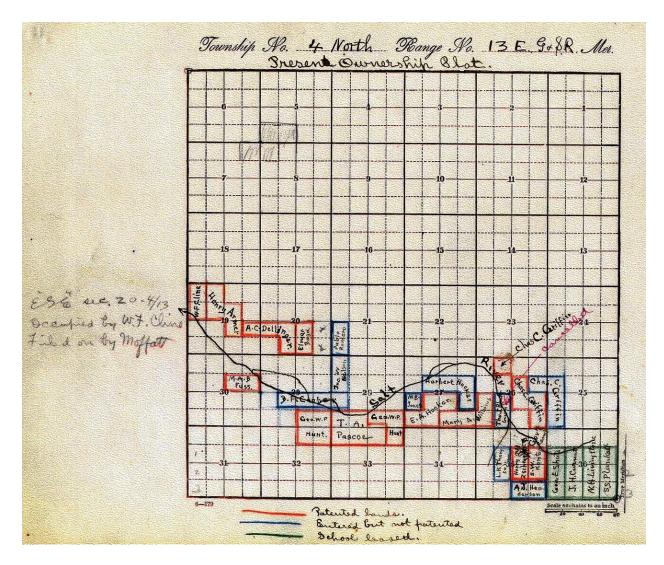


Figure 7: U.S. Geological Survey map, land claims, 1903-04, along upper Salt River, T4N, R13E. Source: Salt River Project Archives, Phoenix, Arizona.

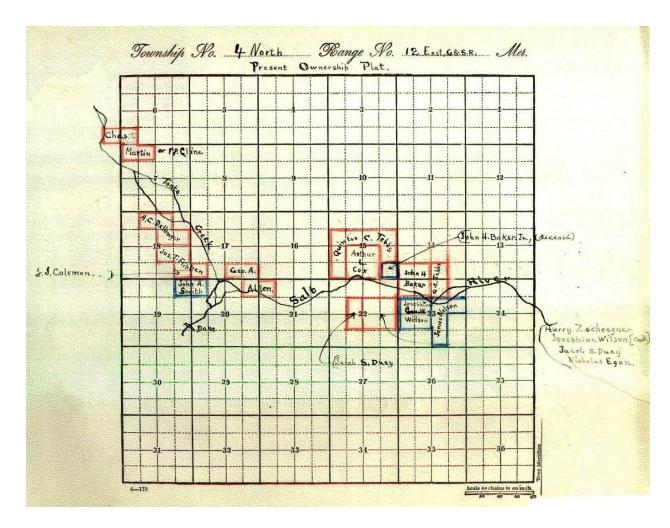


Figure 8: U.S. Geological Survey map, land claims, 1903-04, along upper Salt River, T4N, R12E. Source: Salt River Project Archives, Phoenix, Arizona.

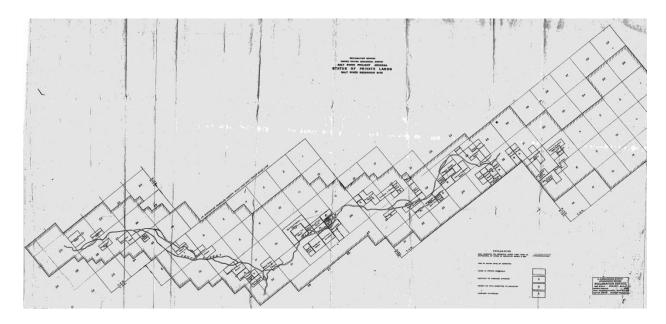


Figure 9: U.S. Geological Survey map, land claims, 1903-04, along upper Salt River. Source: Salt River Project Archives, Phoenix, Arizona.

The three sets of maps discussed above – the original U.S. General Land Office survey plats (reproduced in Chapter 1), the historic U.S. Geological Survey topographic maps (shown above in this chapter), and the Geological Survey land occupancy maps (also shown above) – all have been combined by the Salt River Project's Cartographics Office to illustrate the location of the upper Salt River as close to the time of Arizona's statehood as possible. Using the data from these combined historical maps, Salt River Project Cartographics produced a new map showing the locations of patents granted by the United States in relation to the position of the upper Salt River. This new map is reproduced below. It should be noted that this new map only shows the area flooded by Theodore Roosevelt Lake. Due to public domain withdrawals discussed above, there were only a small number of federal patents in the study area of this report along the upper Salt River below Roosevelt Dam and above Granite Reef Dam. Those patents that were granted between Roosevelt Dam and Granite Reef Dam were awarded following Arizona's statehood in 1912 and therefore are

of little use to this study. The patent map reproduced below may be consulted for easy reference in relation to the discussion of federal patents that follows.

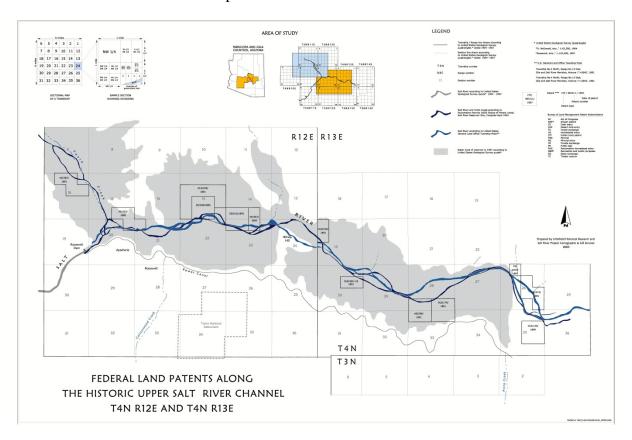


Figure 10: Map of federal land patents along the historical Salt River channel, T4N, R12E, and T4N, R13E. Source: Littlefield Historical Research and Salt River Project Cartographics & GIS Services, 2005.

B. Background on Homesteading and Federal Patents

With U.S. General Land Office surveys having provided an orderly system for the federal government to dispose of the public domain in Arizona Territory in the late nineteenth century, settlers began to acquire parcels of land through homesteading. The various homestead laws passed by the U.S. Congress²⁶ generally required a settler to file an application and make a small payment for a given parcel of land with the nearby federal land office. The application would

²⁶ The most important of these laws was *An Act to Secure Homesteads to Actual Settlers on the Public Domain*, 12 Stat. 392 (1862).

describe the land by township, range, and section, and within each six-hundred-forty-acre section by a fractional identification. For example, a typical one-hundred-sixty-acre parcel might be described as the northeast quarter of section 7, township 1 north, range 5 east, Gila and Salt River Meridian. A forty-acre parcel might be the northwest quarter of the southeast quarter, etc., and a twenty-acre parcel might be the west half of the southwest quarter of the southwest quarter. Further subdividing followed similar descriptions.

Once the application had been filed, the settler was required to live on the land for a number of years and make certain improvements. When the necessary time had elapsed, he or she could return to the land office with witnesses to file affidavits stating that the homesteading requirements had been met. There, the applicant also would complete any remaining paperwork. The affidavits and paperwork created a patent file that contains a great deal of information about the settler and the land he or she wanted to acquire. The affidavits typically describe the parcel in question, the number of acres, the crops farmed, the improvements made, as well as other pertinent information. Depending on the parcel, the type of patent, and whether there was any controversy involved, the patent file might also contain other information such as court documents, correspondence, or other materials. If the land office approved the affidavits, the settler would pay an additional small fee, and he or she would be rewarded with the patent to the parcel.

In relation to the upper Salt River in the region flooded by Theodore Roosevelt Lake, there were twelve patents that were granted in sections overlapping or adjacent to that stream. (There were, of course, other settlers in the area who were either squatters or who had not perfected their patent applications by the time Roosevelt Dam was being built – see the U.S. Geological Survey sketch maps reproduced above – but this chapter focuses on finalized

patents.) The parcels covered by awarded patents can be located on the U.S. Bureau of Land Management's Master Title Plats and Historical Indices, which are cartographic records of how the U.S. Government disposed of (or otherwise compromised) the public domain. Similarly, the legal descriptions of patent locations can also be determined from information on the patents themselves.

C. Significance of Patents to Navigability

Federal patents and their supporting files are important for several reasons in ascertaining the potential navigability of the upper Salt River at or around the time of statehood. First, the patents indicate the total amount of land awarded by the United States. If the upper Salt River had flowed through any particular parcel and that stream had been navigable, federal officials would not have granted the title of the bed of the stream since the Arizona would own it due to the state's sovereignty. As a result, a patent to a quarter section of land through which the stream flowed would have been recorded as somewhat less than one-hundred-sixty acres (a full section being six-hundred-forty acres). Moreover, if the upper Salt River had been considered navigable, an irregularly-shaped parcel next to that waterway would have been identified as a "government lot" instead of an even division of a six-hundred-forty-acre section. In other words, a patent to a small parcel of land lying next to a navigable body of water would have a reference to, hypothetically, "government lot 3, consisting of 27.4 acres." Importantly, none of the federal patents that overlay the upper Salt River (regardless of their respective dates) contain any

²⁷ Copies of patents for this report were obtained from the U.S. Bureau of Land Management in Phoenix. Patent files were obtained from the U.S. National Archives in Washington, D.C.

²⁸ For details on how federal surveyors were to handle creating government lots next to navigable bodies of water, see *Instructions to the Surveyor General of Oregon: Being a Manual for Field Operations* (Washington, D.C.: Gideon and Co., 1851), reprinted in C. Albert White, *A History of the Rectangular Survey System* (Washington, D.C.: U.S. Department of the Interior, 1983), pp. 434, 436-437. For examples of how government lots were established, see *Instructions to Deputy Surveyors of the United States for the District of Illinois and Missouri* (St. Louis: N.p., 1856), reprinted in ibid., pp. 425, 430.

provisions for reserving the bed of those streams to the state of Arizona. There is also no evidence that Arizona, upon statehood, chose lands in lieu of those patented upon the river's bed — which the state would have been entitled to do had either stream been navigable. (In-lieu, or indemnity, selections were public domain lands chosen by a state to compensate for overlapping claims to state ownership elsewhere.) Similarly, there are no government lots listed in patents adjacent to the upper Salt River except parcels lying on the north or west boundaries of individual townships (where acreage was adjusted for the curvature of the earth and other anomalies).

Another reason why patents are important to help determine whether the upper Salt River was navigable at the time of statehood relates to the patents' supporting files. Since a settler had to sign an affidavit regarding improvements and similar documents had to be secured from eyewitnesses, a patent file not only reiterates acreage being assigned, but it also can convey details such as whether the farmer had built an irrigation ditch from the upper Salt River or whether he or she used that stream for other purposes. Again, nothing in the supporting files suggests that the upper Salt River was navigable.

D. Federal Patents in the Study Area

This report will discuss all federal patents to private individuals made in the primary study area (the region now flooded by Theodore Roosevelt Lake). In all cases, patents will be reviewed going downstream. It is important to note that for simplicity sake, not all patents and patent files will be discussed in this section and only representative samples will be reviewed in the text of this report. Nevertheless, in the course of research for this report, all patents and their supporting files were examined; none contradicts the evidence that is presented here.

1. Federal Patents under Roosevelt Lake (Township 4 North, Range 13 East)

The first township going downstream along the upper Salt River inside the flooded area of Roosevelt Lake is township 4 north, range 13 east. One of the most upstream patents in this township was Homestead Entry 273. (Desert Land Entry 133, granted to Edmund Kenton in 1890, is farther upstream than Homestead Entry 273 along the upper Salt River in this township, but Desert Land Entry patents – including several others downstream from Homestead Entry 273 on the upper Salt – will be discussed separately later in this report.) Homestead Entry Patent 273, which was granted to James R. Hazard on January 13, 1891, encompassed acreage in section 26 of this township, and according to the 1881 U.S. General Land Office survey, the Salt River flowed through the tract. When asked about the character of the land in his proof of settlement, Hazard, replied that it was "mostly river bottom land, grazing and ordinary agricultural land."²⁹ Thomas Blackburn and Charles A. Fisk, both of whom vouched for Hazard's homestead application as witnesses, confirmed Hazard's farming activities, adding that Hazard had cultivated ten to twenty acres each season and watered the land with an irrigation ditch.³⁰ Although the upper Salt River ran through the parcel, the General Land Office granted Hazard a full 160 acres, deducting no area due to the presence of the river's bed or banks.³¹

Heading downstream on the upper Salt River from Homestead Entry 273, the United States awarded Cash Entry patent 1072 to Charles C. Griffin in 1895. Griffin's parcel contained forty acres in section 26 of township 4 north, range 13 east. During his time as a resident on the land but before his patent was confirmed, Griffin had cleared the parcel. He also had built two

²⁹ Testimony of Claimant, James R. Hazard, May 15, 1888, Patent File for Homestead Entry 273, Land Entry Files, box 90, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.

³⁰ Testimony of Witness, Thomas J. Blackburn, May 15, 1888, Patent File for Homestead Entry 273, Land Entry Files, box 90, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.; Testimony of Witness, Charles A. Fisk, May 15, 1888, ibid.

³¹ Homestead Entry Patent 273, James R. Hazard, Jan. 13, 1891, U.S. Bureau of Land Management, Phoenix, Arizona.

houses, a corral, and a well.³² A witness to Griffin's settlement, J.H. Baker, described Griffin's parcel as "desert land" despite the fact that the 1881 General Land Office survey of the area indicated that the Salt River coursed through the land. Baker also acknowledged that Griffin had settled on his homestead in 1888 and had farmed about 15 acres.³³

By 1903-1904, Griffin had also acquired the lands encompassed in James R. Hazard's parcel in section 26 (discussed above). As the U.S. Government began assessing which lands would need to be acquired due to flooding by Theodore Roosevelt Lake, federal officials recorded that the Government would have to pay Griffin for a full 160 acres in Hazard's former patent area – lands that Griffin now owned – as well as for complete 40 acres in Griffin's original Cash Entry grant.³⁴

Downstream from Griffin's land in township 4 north, range 13 east, is Homestead Entry Patent 290, 80 acres of which lay in section 28 and 80 acres in an adjacent parcel in section 33 (the latter of which contained the upper Salt River). Awarded in 1891 to James B. Hocker, Patent 290 officially contained 160 acres, with no lands withheld due to the presence of the upper Salt River's bed. Hocker and one of his witnesses confirmed that part of this parcel was "river bottom land" when Hocker submitted his final proof before gaining title to the land. 35

³² Homestead Entry Patent 1072, Charles C. Griffin, June 19, 1895, U.S. Bureau of Land Management, Phoenix, Arizona; Testimony of Claimant, Charles C. Griffin, Sept. 18, 1893, Patent File for Homestead Entry 1072, Charles C. Griffin, Land Entry Files, box 77, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.

³³ Testimony of Witness, J.H. Baker, Sept. 18, 1893, Patent File for Homestead Entry 1072, Land Entry Files, box 77, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C. See also Testimony of Witness, William T. McNelly, Sept. 18, 1893, ibid.

³⁴ U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 15, Salt River Project, Phoenix, Arizona.

³⁵ Homestead Entry Patent 290, James B. Hocker, Jan. 13, 1891, U.S. Bureau of Land Management, Phoenix, Arizona; Testimony of Claimant, James B. Hocker, March 31, 1890, Patent File for Homestead Entry 290, James B. Hocker, Land Entry Files, box 90, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.; Testimony of Witness, George Danforth, March 31, 1890, ibid.

2. Federal Patents under Roosevelt Lake (Township 4 North, Range 12 East)

Moving downstream from Charles C. Griffin's holdings, the next federal patent lying astride the upper Salt River (not including Desert Land Entries) was Homestead Entry 567. This patent, covering 80 acres, lay partly in section 14 and partly in section 23 of township 4 north, range 12 east. Awarded to Quintus C. Tebbs in 1893, the parcel contained 80 acres. Tebbs received title to the full 80-acre lot despite the presence of the upper Salt River's bed and banks.³⁶

By 1903-1904, as the U.S. Government was determining which lands would be flooded by Theodore Roosevelt Lake, Tebbs continued to hold title to his original homestead grant. As a result, in planning for payments to those parties whose land would have to be acquired for the reservoir, the Geological Survey recorded that Tebbs would need to be reimbursed for 80 acres for this parcel of land. The Geological Survey's map and related data book showing lands to be flooded gave no indication that anyone other than Tebbs held title to the full 80 acres even though the upper Salt River ran through the land.³⁷

Over the next five years, the U.S. Government continued to try to obtain title to Tebbs's land, but that objective was clouded because of Tebbs's failure to pay taxes on the parcel and related attempts to sell the land in relation to those overdue taxes. Ultimately, during condemnation proceedings to obtain the land for Theodore Roosevelt Lake, the Fifth Judicial District Court of the Territory of Arizona determined that Tebbs's heir, Charles H. Tebbs, should be paid for the full 80 acres encompassed in Quintus Tebbs's original Homestead Entry. During

³⁶ Homestead Entry Patent567, Quintus C. Tebbs, March 27, 1893, U.S. Bureau of Land Management, Phoenix, Arizona.

³⁷ U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 5, Salt River Project Archives, Phoenix, Arizona.

all the proceedings related to the tax issue and condemnation suit, no question ever was raised over the ownership of lands lying in the upper Salt River flowing through this land.³⁸

Downstream along the upper Salt River from Quintus Tebbs's land was Cash Entry Patent 915. This patent, awarded in 1892 to Charles H. Tebbs, covered 80 acres in section 14 and 80 acres in section 23 of township 4 north, range 12 east. Regardless of the upper Salt River's presence in this parcel, the General Land Office awarded Charles Tebbs the full 160 acres to this patent.³⁹ Similarly, in 1903-1904 when the Geological Survey compiled its list of lands to be submerged by Theodore Roosevelt Lake, the agency recorded that the parcel contained 160 acres (although by this time it was owned by John H. Baker). 40

Cash Entry Patent 248 lay just downstream along the Salt River from Charles Tebbs's parcel and contained 80 acres in section 15 of township 4 north, range 12 east. Awarded to Arthur L. Cox in 1885, Cash Entry 248 included part of the Salt River, which ran from east to west through the southern part of the patent. Nevertheless, no acreage was deducted from Cox's patent due to presence of the Salt River. 41 Cox still owned this land in 1903-1904 when the U.S. Geological Survey was compiling its list of lands that would be inundated by Theodore Roosevelt Lake, but that agency continued to note that the parcel contained a full 160 acres despite the presence of the Salt River. 42

³⁸ See file 2-44, Salt River Project, Purchase of Lands, Q.C. Tebbs, box 843, Entry 3, General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

³⁹ Cash Entry Patent 915, Charles H. Tebbs, Feb. 18, 1892, U.S. Bureau of Land Management, Phoenix,

Arizona.

40 U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 5, Salt River Project Archives, Phoenix, Arizona.

⁴¹ Cash Entry Patent 248, Arthur L. Cox, Oct. 22, 1885, U.S. Bureau of Land Management, Phoenix,

⁴² U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 6, Salt River Project Archives, Phoenix, Arizona.

Near the confluence of the upper Salt River and Tonto Creek and downstream from Arthur Cox's patent was Homestead Entry Patent 223. George A. Allen received this patent on July 3, 1890, and it encompassed 160 acres, including lands through which the upper Salt River flowed. Allen still owned this land in 1903-1904 when the Geological Survey was determining which lands would be needed for Theodore Roosevelt Lake, and the agency confirmed at that time that Allen's parcel consisted of a full 160 acres even though the Salt River ran through those lands.

E. The Desert Land Act of 1877

Aside from the federal Homestead and Cash Entry patents discussed above, other homesteads on the public domain in Arizona in the Roosevelt Lake area were acquired by settlers under the terms of the *Desert Land Act*. Intending to provide further opportunity to settle western lands, the *Desert Land Act* was signed into law on March 3, 1877. This statute, unlike other U.S. homestead legislation, allowed a settler to file an application for up to 640 acres, by far the largest tract of land allowed for a single person under any of the U.S. homestead laws. The act required that the settler reclaim and cultivate a piece of desert land through irrigation before a final patent would be awarded. The law also specified that the water to be used for irrigation was to come from a non-navigable stream. The language in the *Desert Land Act* stated:

Provided however that the right to the use of water by the person so conducting the same, on or to any tract of desert land of six hundred and forty acres shall depend upon bona fide prior appropriation: and such right shall not exceed the amount of water actually appropriated, and necessarily used for the purpose of irrigation and reclamation: and all surplus water over and above such actual

⁴³ Homestead Entry Patent 223, George A. Allen, July 3, 1890, U.S. Bureau of Land Management,

⁴⁴ U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 7, Salt River Project Archives, Phoenix, Arizona.

appropriation and use, together with the water of all, lakes, rivers and other sources of water supply upon the public lands *and not navigable*, shall remain and be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes subject to existing rights. [Emphasis added.]⁴⁵

In short, the *Desert Land Act* stated that land patented under this statute had to be reclaimed through water obtained by prior appropriation from a non-navigable stream. Subsequent court interpretations have confirmed that waters used to "prove up" Desert Land entries had to come from non-navigable streams. For example, in 1935 the U.S. Supreme Court held that any state's right to regulate waters within its borders was subject to the U.S. Government's power "to secure the uninterrupted navigability of all navigable streams within the limits of the United States." The meaning of this statement in relation to the *Desert Land Act* was simply that to deplete waterways by using water for irrigation purposes, those streams had to be non-navigable. Therefore, the requirements of the *Desert Land Act* shed light on the potential navigability of the upper Salt River.

In the townships along the upper Salt River in the area from the inundation lines of Theodore Roosevelt Lake to Roosevelt Dam (there were no perfected Desert Land entries on the upper Salt River between Roosevelt Dam and Granite Reef Dam), there were five perfected entries under the *Desert Land Act*. Four of these were in township 4 north, range 13 east, and one in township 4 north, range 12 east. All of the Desert Land entry applicants along the upper Salt River intended to obtain water from that stream. When considered in relation to the requirements of the *Desert Land Act*, the logical conclusion from these applications is that the upper Salt River (as the source for reclamation water for these lands) must have been considered non-navigable by the applicants as well as by the administrators of the U.S. General Land Office.

California v. United States, 438 U.S. 645 (1978) at 663.

⁴⁵ An Act to Provide for the Sale of Desert Lands in Certain States and Territories, 19 Stat. 377 (1877). ⁴⁶ California Oregon Power Co. v. Beaver Portland Cement Co., 295 U.S.142 (1935) at 159. See also

The history of the study area's *Desert Land Act* patents supports the conclusions reached from the representative Homestead and Cash Entry patents discussed above. Similar to those patents, no mention was made in the *Desert Land Act* applications of reserving the bed of the upper Salt River due to the sovereign rights of the Arizona. Likewise, the use of the upper Salt River as the source of irrigation water to satisfy the terms of the *Desert Land Act* also indicated that the stream was considered non-navigable.

1. Desert Land Patents under Roosevelt Lake (Township 4 North, Ranges 12 and 13 East)

The most upstream Desert Land entry in the study area of this report was Desert Land
Patent 133 in section 35 of township 4 north, range 13 east. This patent, covering the south half
of the northeast quarter and the north half of the southeast quarter of section 35, included 160
acres and was awarded to Edmund Kenton on August 20, 1890. In an affidavit supporting his
application, Kenton testified that he had conducted water on the land for irrigation purposes and
reclaimed the land. He also stated that "the river was so low last season [that I] could not irrigate
the entire tract" and that he had considerably enlarged and improved his ditch to allow possible
irrigation of the entire 160 acres. Moreover, Kenton asserted that his source of water came from
"digging the ditch and appropriating the water from the Salt River." One of Kenton's
witnesses, Nathan H. Livingston, confirmed Kenton's use of Salt River water for irrigation.
When asked if Kenton had the right to water sufficient to irrigate his tract, Livingston replied
"Yes."

⁴⁷ Desert Land Entry Patent 133, Edmund Kenton, Aug. 20, 1890, U.S. Bureau of Land Management, Phoenix, Arizona.

⁴⁸ Deposition of Applicant, Edmund Kenton, April 27, 1888, Patent File for Desert Land Entry 133, Edmund Kenton, box 136, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.

⁴⁹ Deposition of Witness, Nathan H. Livingston, April 27, 1888, Patent File for Desert Land Entry 133, Edmund Kenton, box 136, Records of the U.S. Bureau of land Management, Record Group 49, U.S. National

By 1903-1904, when the U.S. Geological Survey was determining which lands were to be flooded by Theodore Roosevelt Lake, Edmund Kenton's holdings had been transferred to two other parties, S.W. Kenton and Harry Zschoeg. Nevertheless, the Geological Survey's records indicated that the two combined parcels totaled 160 acres – the same acreage awarded to Edmund Kenton – even though the Salt River flowed through the eastern part of S.W. Kenton's 80-acre parcel. ⁵⁰

Downstream from Edmund Kenton's Desert Land Entry was Desert Land Entry 174, awarded to Peter C. Robertson in 1891. Robertson's 160-acre parcel lay in the south half of the southeast quarter of section 28 and the north half of the northeast quarter of section 33 in township 4 north, range 13 east. In his affidavit for final proof, Robertson stated that his land was on the south side of and near the Salt River in Gila County, Arizona. He further asserted that he had a clear right to the use of water sufficient to irrigate his parcel and for keeping the land permanently irrigated. When asked to state the source of water and how it was acquired, Robertson responded, "Water is obtained from [the] Salt River by means of a ditch which will carry some 1200 inches of water acquired partly by purchase and partly by labor." E.E. Kennedy, a witness for Robertson, confirmed that Robertson had conveyed water upon his land by means of two ditches, several cross ditches, and one main ditch running nearly around the tract. Kennedy further said that "the water is taken from the Salt River."

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Archives, Washington, D.C. Witness W.H. Middleton also confirmed Kenton's use of the upper Salt River for irrigation purposes. See Deposition of Witness, W.H. Middleton, April 27, 1888, ibid.

⁵⁰ U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 21, Salt River Project Archives, Phoenix, Arizona.

⁵¹ Desert Land Entry Patent 174, Peter C. Robertson, April 30, 1891, U.S. Bureau of land Management, Phoenix, Arizona.

⁵² Deposition of Applicant, Peter C. Robertson, May 4, I 888, Patent File for Desert Land Entry 174, Peter C. Robertson, box 137, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives, Washington, D.C.

Archives, Washington, D.C.

Straightful Deposition of Witness, E.E. Kennedy, May 4, 1888, Patent File for Desert Land Entry 174, Peter C.

Robertson, box 137, Records of the U.S. Bureau of Land Management, Record Group 49, U.S. National Archives,

Downstream from Robertson's Desert Land Entry was a Desert Land Entry awarded to William H. Duryea. Duryea's Desert Land Entry 260 1/2 (the parcel was, indeed, identified as Entry 260 and one-half) covered 80 acres in the south half of the northeast quarter of section 30 of township 4 north, range 13 east.⁵⁴ This parcel, which was recorded by the Geological Survey in 1903-1904 as being owned by M.A.B. Fuss, contained the Salt River. Yet Duryea was granted Desert Land Patent 260 1/2 containing a full 80 acres, and the Geological Survey recorded the parcel in 1903-1904 as being 80 acres in size.⁵⁵

The final two Desert Land Entries along the Salt River in the area inundated by Theodore Roosevelt Lake were both granted in 1891. These were Desert Land Patent 232 in section 19 of township 4 north, range 13 east, granted to Henry Armer⁵⁶ and Desert Land Patent 229 containing acreage in section 15 of township 4 north, range 12 east, and granted to Quintus C. Tebbs.⁵⁷ Armer's parcel was listed in his patent as having slightly less than 80 acres, but this was due to surveying corrections made at the edge of the township not due to the presence of the upper Salt River, which ran through the lot. Tebbs was awarded the full 280 acres in his claim. Although the patent files for these two final Desert Land entries were not available from the National Archives, it is reasonable to assume that the source of water for these lands was the upper Salt River, particularly for Desert Land Entry 232 which contained that stream.

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Washington, D.C. See Deposition of Witness, B. W. Curtis, May 4, 1888, ibid. See also testimony of George Danforth and J.B. Hocker, Oct. 9, 1888, ibid.

⁵⁴ Desert Land Entry Patent 260, William H. Duryea, Oct. 8, 1891, U.S. Bureau of Land Management, Phoenix, Arizona.

⁵⁵ U.S. Geological Survey, "Township Plat and Abstract of Entries" [1903-1904], p. 19, Salt River Project Archives, Phoenix, Arizona.

⁵⁶ Desert Land Entry Patent 232, Henry Armer, March 4, 1891, U.S. Bureau of Land Management, Phoenix. Arizona.

⁵⁷ Desert Land Entry Patent 229, Henry Quintus C. Tebbs, March 4, 1891, U.S. Bureau of Land Management, Phoenix, Arizona.

F. Federal Land Grants to Arizona

Arizona, like other public domain states, obtained land by Congressional grants to support public interest objectives prior to and following statehood. Historically, such grants to new states had started with Ohio's admission to the Union in 1802, although over the years the types and sizes of the grants varied from state to state. So Grants to Arizona covered a variety of purposes. For example, prior to statehood, Congress reserved in 1850 for Arizona and other western territories all the acreage in sections 16 and 36 in each township for the purpose of supporting public schools. In addition, in 1881 Congress granted seventy-two sections (46,080 acres) to be chosen by Arizona in support of universities. Further public domain lands went to Arizona in 1910 under the provisions of the *Enabling Act* for Arizona and New Mexico, which reserved to each territory sections 2 and 32 (also for schools). Finally, in 1929, Congress provided to Arizona another 50,000 acres from the public domain to fund miners' hospitals.

Aside from Arizona's sovereign lands (which were determined by navigability and not by an act of Congress) and the state's acreage in sections 2, 16, 32, and 36, Arizona was allowed considerable leeway in selecting the other federally granted lands. In addition, Arizona had significant flexibility in choosing "in-lieu" (also known as "indemnity") acreage if mineral lands (which Congress specifically forbade Arizona from choosing from the public domain) or Indian

 ⁵⁸ A detailed discussion of lands granted to various states can be found in Jon A. Souder and Sally K.
 Fairfax, State Trust Lands: History, Management, & Sustainable Use (Lawrence: University of Kansas Press, 1996).
 59 An Act Proposing to the State of Texas the Establishment of Her Northern and Western Boundaries, the Relinquishment by the Said State of All Territory Claimed by Her Exterior to Said Boundaries, and of All Her Claims upon the United States, and To Establish a Territorial Government for New Mexico, 9 Stat. 446 (1850).
 This law is most commonly known as the Compromise of 1850 due to its attempt to resolve the slavery issue in the United States in the years before the Civil War.

⁶⁰ An Act to Grant Lands to Dakota, Montana, Arizona, Idaho, and Wyoming for University Purposes, 21 Stat. 326 (1881).

⁶¹ Section 6, An Act to Enable the People of New Mexico to Form a Constitution and State Government and Be Admitted into the Union on an Equal Footing with the Original States; and To Enable the People of Arizona to Form a Constitution and State Government and Be Admitted to the Union on an Equal Footing with the Original States, 36 Stat. 557 (1910).

⁶² An Act Making an Additional Grant of Lands for Miners' Hospitals for Disabled Miners in the States of Utah and Arizona, and for Other Purposes, 45 Stat. 1252 (1929).

reservations overlay any section 2, 16, 32, or 36. Likewise, the United States retained public domain lands suitable for the development of hydroelectric power, and the Government could withdraw from the public domain (and, hence, lands available for Arizona's selection) any lands necessary for reclamation projects, national forests, or other purposes useful for federal reasons. Nevertheless, Arizona could select in-lieu lands elsewhere in the state for any acreage not otherwise available under the terms of various Congressional grants. In addition, if a navigable body of water overlay any of the four specifically granted sections, the state could take lands equal in size to the total area of the bed of the body of water elsewhere. Significantly, Arizona made no in-lieu selections to compensate for the area covered by the upper Salt River's bed in sections 2, 16, 32, and 36 or in other federal lands granted to the state where they overlay the upper Salt River. Indeed, for those sections 2, 16, 32, and 36, where the upper Salt River lay, Arizona only asked for and received in-lieu selections for the acreage directly involved in those sections and not for any acreage related to the presence of the upper Salt River.

G. Summary and Conclusions Regarding Chapter 2

In conclusion, the federal government granted to individual parties twelve separate patents that touched or overlay the upper Salt River. In not one case did any of these patents or the supporting patent files indicate that acreage was being withheld due to possible ownership of the bed of the upper Salt River by the state of Arizona. In each case where patents were applied for, several parties expressed implicit opinions on the non-navigability of the upper Salt River through the request for, and award of, lands through which these streams flowed. These individuals included the patentee, his witnesses, and officials of the U.S. General Land Office. It is significant that cumulatively, these opinions were spread chronologically over many years,

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⁶³ See "Clear Lists" for Indemnity Selections, U.S. Bureau of Land Management, Phoenix, Arizona.

throughout different seasons, and over a large geographic area. Collectively, therefore, the history of federal patents and Congressional grants to the state of Arizona strongly suggest that both federal and state officials did not perceive the upper Salt River to be navigable.

CHAPTER 3: U.S. AND MISCELLANEOUS DOCUMENTS

Although U.S. Government survey records and documents relating to federal patents and land grants to Arizona are crucial to understanding perceptions of the upper Salt River prior to and in 1912, other U.S. Government records – both published and unpublished – provide a wealth of supplemental information concerning that stream. Two of the most important federal agencies concerned with the region were the U.S. Geological Survey and the U.S. Reclamation Service (after 1923, the Bureau of Reclamation). Both of these agencies were heavily involved in the development of water resources in the American West in the late nineteenth and early twentieth centuries, and their records paint vivid pictures of the upper Salt River before and at the time of Arizona statehood. In addition, another federal agency whose records reveal the nature of the upper Salt River is the Office of Experiment Stations in the U.S. Department of Agriculture. This agency established field locations to advance agriculture and irrigation, and in carrying out its work, its officials collected useful data on the upper Salt River. All of these federal agency records support the evidence provided in Government surveys and homestead files that the upper Salt River was not navigable prior to or in 1912.

In addition to U.S. Government records, a wide variety of other sources also indicate the contemporaneous view that the upper Salt River was not navigable. These records include engineering documents, various records of floods, legislative action and litigation, and more recent historical studies. These materials, ranging chronologically from the late nineteenth century until well into the twentieth century, support the findings in other parts of this report.

A. Records of the U.S. Geological Survey

The U.S. Geological Survey became involved in examining water resources in the West as early as 1888 when the agency's director, John Wesley Powell, began what became known as the

"Powell Irrigation Survey." Essentially a study of arid lands in the West that might be reclaimed by storing and diverting water from the region's streams, Powell's work started what was to become increasingly frequent commentary in the Geological Survey's records regarding water resources throughout the western part of the United States.

1. U.S. Geological Survey Annual Reports

The yearly reports drafted by the Geological Survey contain detailed information on many streams in the West, including the upper Salt River. For example, the *Eleventh Annual Report of the U.S. Geological Survey* (1891), which focused specifically on irrigation, generally described streams draining the Gila Basin (which includes the upper Salt River). Stating that all rivers in this basin were highly erratic, John Wesley Powell, who authored this *Annual Report*, wrote:

In this basin are found rivers most difficult and dangerous to examine and control, differing in character and habit from those of the North as widely as in geographic position. In place of the regularly recurring annual floods of spring and early summer, so strongly marked on the discharge diagrams of other basins, these rivers show conditions almost the reverse, being at that season at their very lowest stages – even dry – and rising in sudden floods at the beginning of and during the winter. These floods are of the most destructive and violent character; the rate at which the water rises and increases in amount is astonishingly rapid, although the volume is not always very great. . . . From this it will be recognized that the onset of such a flood is terrific. Coming without warning, it catches up logs and bowlders [sic] in the bed, undermines the banks, and, tearing out trees and cutting sand-bars, is loaded with this mass of sand, gravel, and driftwood-most formidable weapons for destruction. ⁶⁴

Streams such as those described by Powell, with such violent fluctuations in flow and carrying such destructive debris, would have been impossible to navigate on a regular basis. In addition, the impact of the flood flows would have made maintaining a stable channel for navigation difficult.

⁶⁴ Eleventh Annual Report of the United States Geological Survey to the Secretary of the Interior, 1889-1890, Part II-Irrigation (Washington D.C.: U.S. Government Printing Office, 1891), p. 58.

The Twelfth Annual Report of the U.S. Geological Survey (1891) contains similar descriptions of Arizona's streams, including the Salt River. Noting that many of Arizona's waterways (including the tributaries of the Gila) fluctuated greatly, the author of the Report wrote that those rivers "at times [are] subject to sudden floods, especially during summer rains, when they often sweep out bridges, dams, and canal head works, while at other times they may diminish until the water almost disappears." Specifically with regard to the Salt River, the Report observed it was subject to:

short, sudden floods carrying considerable volume of water for a few hours, and at longer intervals, perhaps of three or five years, there are enormous floods, whose violence and duration is phenomenal. These latter, however, are rather to be feared than to be depended upon as beneficial.⁶⁵

The *Report* added further details about the nature of these floods along the Salt River.

The *Report*'s author (who was unidentified) discussed interviews with local citizens. Although the author's discussion focused on the Salt River near Phoenix, his comments were equally applicable to the upper Salt River above Granite Reef Dam. In fact, given that the stream there is narrower than in the Phoenix area, the characteristics of the flood described by the *Report*'s author would have been enhanced above Granite Reef Dam. The *Report*'s author stated that the

irregular character and extraordinary fluctuations of the stream are clearly brought out. The most notable feature is the great flood of February 21, 1890, when, according to Mr. Davidson's [engineer of the Arizona Canal Company, an irrigation canal near Phoenix] computations, the discharge increased suddenly from 1,000 second-feet to over 143,000 second-feet. This, however, is eclipsed by the flood of February 18 to 25, 1891. . . . On February 17 the mean discharge was 835 second-feet, increasing the next day to 154,000 second-feet, and on the 20th only 69,100, and on the 22d 14,890. This was followed by a second swell greater than the first, the flood increasing until on the 24th a maximum of 300,000 second-feet was reached. This subsided almost as rapidly as it came, so that by the second day after the river was carrying less than 15,000 second-feet. . . . The Arizona Canal Company's weir across the Salt River was damaged, a portion of

⁶⁵ Twelfth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1890-91, Part II-Irrigation (Washington D.C.: U.S. Government Printing Office, 1891), pp. 298, 312-313.

the canal washed out, and the channel of the stream so altered that computations of daily discharge could no longer be made without new data. 66

These vivid descriptions of flooding and channel changes depict the Salt as a river whose flow and course were entirely unreliable for regular navigation.

The *Thirteenth Annual Report of the U.S. Geological Survey*, published in 1893, discussed, among other things, western rivers having periodic (or regular) oscillations in flows. The only such stream in Arizona, according to the *Report*, was the Colorado River. Regarding rivers with irregular flows (which presumably applied to all the other rivers in Arizona) the *Report* noted:

The nonperiodic oscillations give rise to the greatest concern on the part of the engineer and the irrigator, for while he can be reasonably certain regarding the character of the periodic variation, he must at all times be on the watch for extraordinary occurrences for which there are no analogies. The rivers and lakes may for a time increase in volume or may apparently shrink so greatly as to cause serious alarm as to their permanence. . . . The river is subject to some of the greatest floods which have occurred in the west, due to cloudbursts falling over certain portions of the basin. In the early spring of 1890 an extraordinary flood occurred in the Salt River, increasing its discharge for a short period of time to 141,000 second-feet.⁶⁷

As the *Report* indicated, these frequent and violent floods demonstrate the upper Salt River's unreliable character and show that navigation on a regular basis would not have been possible.

2. U.S. Geological Survey Water Supply Papers

In addition to *Annual Reports*, the U.S. Geological Survey also published a series of research treatises known as "Water Supply Papers." While these studies dealt with specific topics and geographic areas, some examined subjects which shed light on the nature of the upper Salt River and Tonto Creek. For instance, Arthur P. Davis, author of Water Supply Paper No. 2,

⁶⁷ Thirteenth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1891-92, Part III-Irrigation (Washington D.C.: U.S. Government Printing Office, 1893), pp. 18, 95-96, 175-176.

⁶⁶ Twelfth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1890-91, Part II-Irrigation (Washington D.C.: U.S. Government Printing Office, 1891), pp. 298, 312-313.

Irrigation Near Phoenix, Arizona (1897), characterized the "streams of this country" (Arizona) as "extremely irregular in character, fluctuating at times with great rapidity, floods coming down without warning, and disappearing in the course of a few hours."

Six years after the Geological Survey issued *Irrigation Near Phoenix, Arizona*, the agency published Water Supply Paper No. 73, *Water Storage on Salt River, Arizona* (1903). This study (also written by Arthur P. Davis) focused principally on the proposed construction of what eventually became known as Roosevelt Dam on the upper Salt River, and Water Supply Paper No. 73 once again noted that the Salt River was "more or less torrential in character, the combined flow [of the Salt and Verde rivers] dwindling at times to about 100 cubic feet per second, and at other times reaching a volume more than one hundred times as great." ⁶⁹

3. Unpublished Records of the U.S. Geological Survey

Aside from the *Annual Reports* and Water Supply Papers created by the Geological Survey, the agency also generated other documents shedding light on the nature of the upper Salt River prior to and at the time of Arizona's statehood. For example, in an unpublished report prepared for the U.S. Geological Survey, E.C. Murphy discussed potential hydroelectric power sites within Arizona just three years after statehood. Murphy's report was done to conform to provisions of the 1910 *Enabling Act* permitting Arizona to organize a state government and join the Union – a law that prevented Arizona from selecting parcels valuable as hydroelectric power sites as part of acreage granted to the new state by Congress. Murphy's report was the result of an investigation to locate those lands so the United States could retain them.

⁶⁸ Arthur P. Davis, *Irrigation Near Phoenix*, *Arizona*, U.S. Geological Survey Water Supply Paper No. 2 (Washington D.C.: U.S. Government Printing Office, I 897), pp. 9, 11, 50-51.

⁶⁹ Arthur P. Davis, *Water Storage On Salt River, Arizona*, U.S. Geological Survey Water Supply Paper No. 73 (Washington D.C.: U.S. Government Printing Office, 1903), p. 9.

⁷⁰ See Section 28 of An Act to Enable the People of New Mexico to Form a Constitution and State Government and Be Admitted to the Union on an Equal Footing with the Original States; and to Enable the People

Part 3 of Murphy's report covered the Salt River.⁷¹ Murphy wrote that over a twenty-six-year period, the annual runoff of the Salt River had ranged from 153,400 acre-feet to 3,226,000 acre-feet, indicating a highly variable stream. He also observed that while the mean flow was 770,500 acre-feet, the fluctuation was so great that in some years the flow had been as little as one-fifth the mean. In others, the flow was more than four times the mean.⁷²

B. Records of the U.S. Reclamation Service

Much like the Geological Survey, the U.S. Reclamation Service created records describing the upper Salt River before and around the time of statehood. Following Congress's enactment of the *Reclamation Act* in 1902, many of the water resource duties formerly carried out by the hydrographic branch of the U.S. Geological Survey were transferred to the young Reclamation Service. Under the terms of the 1902 law, the Reclamation Service also was charged with the responsibility of selecting reservoir locations throughout the American West and constructing dams and irrigation canals at those sites. It was under this latter mandate that the agency planned the Salt River Project. The Salt River Project called for the construction of Roosevelt Dam, the principal storage facility for the Project, and Granite Reef Dam, the main diverting feature along the Salt River. In addition, the Reclamation Service also purchased and renovated some of the existing irrigation canals in the Phoenix area as well as built new ones. Since much of this work took place between 1904 (when construction work began) and 1911 (when Roosevelt Dam was completed), the Reclamation Service's records are extremely useful for determining the nature of the upper Salt River around the time of Arizona's statehood.

of Arizona to Form a Constitution and State Government and Be Admitted into the Union on an Equal Footing with the Original States (also known as the Enabling Act), 36 Stat. 557 (1910).

⁷¹ Each main part to Murphy's report was re-paginated beginning with page one. Therefore, all citations to his report include the section as well as page number. See E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Introduction, pp. 4-5, Salt River Project Archives, Phoenix, Arizona.

⁷² E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part 3, pp. 2, 8, Salt River Project Archives, Phoenix, Arizona.

1. U.S. Reclamation Service Annual Reports

Like the Geological Survey, the Reclamation Service also issued *Annual Reports*. These described the Reclamation Service's activities, and they contain valuable descriptions of the Salt River both above and below Granite Reef Dam. The *First Annual Report of the Reclamation Service* (1903) commented that:

[t]he sources from which water may be obtained for reclamation of the arid lands in Arizona are, taken as a whole, the most erratic or irregular in the entire country. There are comparatively few rivers which flow throughout the year. Most of the tributaries of Gila River, beginning in the mountains as perennial streams, lose their waters in the broad, open valleys.

Because of these characteristics, the *First Annual Report of the Reclamation Service* indicated that the Reclamation Service was planning the Salt River Project to store the Salt River's irregular flows behind Roosevelt Dam at the confluence of the Salt River and Tonto Creek.⁷³ While the *Report*'s description of the variable flows of the Salt helped explain why storage of the stream's supplies was necessary, it gave no indication that navigation interests would be adversely affected by the Salt River Project's storage reservoir, its diversion dam, or the removal from the stream of large quantities of water for irrigation.

By the time the *Third Annual Report of the Reclamation Service* (1905) was published, work on the Salt River Project was well underway, and progress was detailed in the *Report*. In reviewing problems, the *Report* indicated that studies were being undertaken to determine the sources of salt in the stream and to lessen the impact of that substance on irrigation. The isolated location of Roosevelt Dam – which lay outside Phoenix above a long canyon – also had caused difficulties in getting supplies to the construction site. In the *Report*, Reclamation Service Supervising Engineer Louis C. Hill observed that "[f]ew reservoirs have been constructed in

⁷³ First Annual Report of the Reclamation Service, from June 17 to December 1, 1902 (Washington D.C.: U.S. Government Printing Office, 1903), pp. 75-76.

locations where the natural conditions are so extremely favorable and transportation facilities so meager." Hill added that the construction of a road from Phoenix to the dam site had reduced rates for hauling supplies and that "[i]ndirectly, it has opened up a country hitherto absolutely inaccessible."⁷⁴

While issues such as the river's salt content and the difficulties of carrying supplies to the Roosevelt Dam site were thoroughly addressed in the *Third Annual Report of the Reclamation*Service, this synopsis of operations gave no indication that any problems existed due to the Salt River Project's impact on the upper Salt River's navigability. Indeed, the building of the road from Phoenix to Roosevelt underscored the inability of the river to carry supplies or people.

The *Fifth Annual Report of the Reclamation Service* (1906) carried a discussion of the beginning of construction on Granite Reef Dam, noting that the "dam will ultimately divert all the water used on both sides of the river and will save the heavy maintenance charges of the six temporary structures now used." There was no suggestion that Granite Reef Dam or any of the diversion dams it would replace might cause any difficulty for navigation interests on the Salt River.⁷⁵

2. Unpublished Records of the U.S. Reclamation Service

Like the *Annual Reports* of the U.S. Reclamation Service, the agency's unpublished documents further depict the upper Salt River as highly erratic and not capable of being used for commercial navigation. While the Reclamation Service's files contain thousands of documents describing the Salt River and the construction of the Salt River Project (none of which indicate that the river was a reliable means of navigation), representative examples are provided here.

⁷⁵ Fifth Annual Report of the Reclamation Service, 1906 (Washington D.C.: U.S. Government Printing Office, 1906), p. 90.

⁷⁴ Third Annual Report of the Reclamation Service, 1903-4 (Washington D.C.: U.S. Government Printing Office, 1905), pp. 140-141.

On September 4, 1902, Judge Joseph H. Kibbey (who had written in 1892 the earliest water rights adjudication decision involving the Salt River – *M. Wormser, et al., v. The Salt River Valley Canal Company* – to be discussed later in this chapter) submitted to a committee of concerned Phoenix-area citizens a report entitled "Suggestions of Judge Jos. H. Kibbey for Plan to Secure Government Aid for Construction of Tonto [Roosevelt] Reservoir." Drafted only three months after Congress had approved the *Reclamation Act*, Kibbey's report examined the major problems associated with obtaining U.S. Government assistance under the terms of the new law for building Roosevelt Dam. Among the points Kibbey discussed were how to resolve questions of water rights, how irrigators should organize themselves to deal with the Reclamation Service, who would own and operate the canal systems, how repayments for construction would be handled, and a multitude of other concerns. Despite the report's comprehensive nature, Judge Kibbey – whose expertise in Salt River matters was clear by his ruling in the *Wormser* case – gave no indication that addressing the needs of commercial navigation interests would be necessary if the dam and other related structures were built.⁷⁶

The efforts by Kibbey and other concerned Phoenix citizens paid off, and shortly after Kibbey had submitted his paper, the Reclamation Service approved the construction of what eventually became known as the Salt River Project. On May 4, 1903, as initial planning for Roosevelt Dam and other project features went forward, Reclamation Service Consulting Engineer George F. Wisner wrote to Chief Engineer Frederick H. Newell regarding problems that would have to be addressed. Wisner observed that one difficulty was that the reservoir would gradually fill with silt. Seeing that one solution was to raise the dam, Wisner cautioned

⁷⁶ Joseph H. Kibbey, "Suggestions of Judge Jos. H. Kibbey for Plan to Secure Government Aid for Construction of Tonto Reservoir Submitted September 4, 1902, to Conference Committee at Phoenix, Arizona," file 27, General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

against building it too tall because of insufficient water to fill the reservoir every year. Wisner also noted that another issue the Government might face in building the dam was liability for damages during the construction phase. Nevertheless, Wisner made no mention of any problems that might arise by interfering with the navigability of the upper Salt River.⁷⁷

Also indicating that the Salt River was not used for commercial navigation was a September 3, 1905, letter written by Reclamation Service Engineer Louis Hill to Arthur P. Davis, then an assistant to Reclamation Service Chief Engineer Frederick Newell. Describing progress on the construction of Roosevelt Dam, Hill stated that freighting operations along the road from Phoenix to Roosevelt (a portion of which was below Granite Reef Dam) were already taking place:

It may interest you to know something of the traffic passing over the Roosevelt Road even now, before the contractor has fairly begun hauling in his material and before the oil outfit has begun to deliver even one-half the amount which is demanded from them when we are running at full blast. The amount of freight hauled daily and delivered to the United States, . . . to the people living in Roosevelt, those up the Salt River Valley to the Tonto Valley and further on toward Holbrook demands a daily payment to the freighters of at least \$750. A low estimate of the value of this freight is \$250,000 a month. It hardly seems possible that that much material and provision is used in the district tributary to the road. ⁷⁸

With so much freight being hauled from Phoenix to the dam location by wagon, Government engineers surely would have taken advantage of the lower cost of water transportation had the Salt River been navigable.

Another unpublished Reclamation Service document revealing the nature of the Salt River around the time Roosevelt Dam was being built is a 1905 report by Gerard H. Matthes.

⁷⁷ George F. Wisner to F.H. Newell, May 4, 1903, in "Salt River Project, Consulting Engineers' Reports, January 1, 1913 - December 31, 1913," General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado

Colorado.

⁷⁸ Louis C. Hill to A.P. Davis, Sept. 3, 1905, in "Salt River Project, Consulting Engineers' Reports, January 1, 1913 - December 31, 1913," General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

Entitled "Recent Conditions in Salt River Valley, Arizona," the report described the "unusual meteorological conditions which have prevailed throughout the United States during the early part of the present year." In particular, Matthes reviewed how that weather had affected the Salt River Valley. Matthes noted that there had been unusually high precipitation in the winter and spring months of 1903, and while the rain had been an advantage to cattle ranchers on high ground, it had caused serious flooding throughout Arizona, especially in the Salt River Valley. Matthes wrote that:

in the populated districts of Arizona, and in the Salt River Valley more in particular, the excessive precipitation has been the cause of washouts along the railroads, wagon roads, canals, ditches, telegraph and telephone lines, to an extent unparalleled in the history of the valley.

Matthes further observed that the flooding had repeatedly destroyed railroad lines and bridges into and out of Phoenix, and for a time there had been no available bridge spanning the Salt River "for many hundred miles either up or down the river[.]" Matthes also pointed out that there had been considerable damage to the irrigation systems in the Salt Valley and that the Salt River bed had shifted due to the flooding. Despite offering detailed descriptions of the damages wrought by the flooding and the difficulties local residents faced in rebuilding diversion dams, bridges, buildings, and other structures, Matthes made no mention of any impact on navigation on the Salt, either by the rebuilding of irrigation works or by the flooding and massive channel changes.⁷⁹

Yet another example of the Reclamation Service expressing concern over issues that might affect the construction of the Salt River Project can be seen in the agency's interest in *Patrick T. Hurley v. Charles F. Abbott, et al.*, a lawsuit commenced in 1905 to adjudicate the

⁷⁹ Gerard H. Matthes, "Recent Conditions in Salt River Valley, Arizona," Dec. 1905, in "Salt River Project, Consulting Engineers' Reports, January 1, 1913 - December 31, 1913," General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

water rights of all irrigators in the Salt River Valley. As the litigation moved forward, U.S. Government officials were quite anxious about the lawsuit's conclusion because the outcome could have considerable impact on water to be stored at Roosevelt Reservoir on the upper Salt River at that stream's confluence with Tonto Creek. Demonstrating the U.S. Government's worries, on February 28, 1907, Morris Bien, Acting Chief Engineer of the U.S. Reclamation Service and an attorney for that agency, wrote Benjamin A. Fowler, president of the Salt River Valley Water Users' Association. Bien told Fowler that the "importance of this matter [Hurley v. Abbott] is manifest and is undoubtedly appreciated by the water users association and many of the people in the valley." Bien asked Fowler for the status of the litigation, and he added that the "matter is of extreme importance to the Reclamation Service as the progress in this case must guide its future policy." Observing that the "Government must be protected against any claims to the use of water stored in the Roosevelt Reservoir[,]" Bien opined that it might be necessary to keep the gates of Roosevelt Dam open and not store water until the court case was resolved. While Bien was clearly worried about claims for water that might be stored at Roosevelt, he gave no indication that any of those claims might be to keep the Salt River navigable.⁸⁰

Additional evidence of the Reclamation Service's concern with the potential outcome of *Hurley v. Abbott* can be seen in a June 11, 1907, letter from Louis Hill to the director of the agency. Hill noted that ever since the suit had been filed, there had been considerable discussion around the Salt River Valley as to whether the court would have full authority to decide the rights of all concerned parties in relation to the Salt River's supplies. Hill explained that many water users believed that the litigation only would decide the rights of the plaintiff, Patrick Hurley, in relation to those of the named defendants, and therefore many of the water users were

⁸⁰ Morris Bien to B.A. Fowler, Feb. 28, 1907, file 118, General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

not bothering to appear in court or participate in any way. Hill reported that the presiding judge in the case, Edward Kent, viewed this situation with regret because it might result in some irrigators losing their water supplies by default. While Judge Kent had expressed his concern that all parties' interests in the Salt River needed to be resolved, he gave no indication (nor did the Reclamation Service) that any of those concerned parties were commercial navigation interests.⁸¹

The issue of developing hydroelectric power at Roosevelt Dam and elsewhere also demonstrated a lack of navigability of the Salt River. In 1911 as construction on Roosevelt Dam and the Salt River Project neared completion, controversy arose over whether hydroelectric power should be developed at the dam and at drops in the canals, and if so, how much. Evidently, proponents of a permanent source of hydroelectric power believed the income from this energy could be used to offset the costs of the dam and project. Nevertheless, the principal electrical engineer for the Reclamation Service at the Salt River Project, O.H. Ensign, urged restraint in the creation of more power than just the amount necessary for pumping purposes. Ensign told Reclamation Service Director Frederick Newell that generating constant hydroelectric power through continuous releases of water might not be possible if sufficient water for irrigation purposes late in the summer months were to be kept at the reservoir. Ensign, however, gave no indication that navigational interests might support steadier flows of water in the Salt River. 82

⁸¹ Louis C. Hill to the Director, U.S. Reclamation Service, June 11, 1907, file 118, General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

⁸² O.H. Ensign to the Director, U.S. Reclamation Service, Feb. 7, 1911, in "Salt River Project, Consulting Engineers' Reports, January 1, 1907 - December 31, 1912," General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

One final example of Reclamation Service unpublished documents illustrating that the agency did not consider the Salt River to be navigable is the 1916 report, "Final History, Salt River Project, Arizona." This synopsis covered virtually all aspects of the history of the Salt River Project from its inception to 1916, and it included descriptions of private Salt River Valley canals in existence prior to the construction of the federal project as well as roads to Roosevelt Reservoir and Granite Reef Dam. Under the section of this report dealing with roads, the report noted that the "inaccessibility of the Roosevelt Reservoir" had forced the construction of roads to carry freight and lumber to the dam construction site. One of these, the Mesa-Roosevelt (Apache Trail or Tonto) road, had been constructed beginning in 1903, and it had reduced freight expenses considerably by making it possible not to haul everything via Globe, Arizona, and then to the reservoir site. The report noted that building the road had been exceptionally difficult due to the steep mountainous terrain, and in some cases workers had to use lifelines to carry on work. (Photographs of this road appear later in this report.) Moreover, once the road had been completed in 1905, it had washed out frequently, especially in the canyon just below Roosevelt Dam. Nevertheless, despite these extreme difficulties in hauling materials from Phoenix to the dam locale, the report made no indication that the river might have been used as an alternative means of transportation.⁸³

The report also discussed Granite Reef Dam, noting that it took the place of an older timber crib dam that had diverted the Salt River's waters into the Arizona Canal. Granite Reef Dam was built about two and a quarter miles below the older structure beginning in 1905, and it was completed in 1908. The report stated that:

⁸³ "Salt River Project, Final History (to 1916)," Engineering and Research Center Project Histories, 1911-1991, box 142, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

[a]ll material and supplies came by way of Mesa, the nearest railroad connection, and were hauled by wagon from that point to the dam. . . . A daily stage from Mesa carried mail and passengers. 84

Again, as had been the case with carrying supplies to Roosevelt, the Reclamation Service apparently never considered using the river to transport goods or people to Granite Reef Dam.

C. Records of the U.S. Department of Agriculture

Long before Congress passed the *Reclamation Act* in 1902, the U.S. Government had been assisting farmers in the West through the Department of Agriculture. That agency's Division of Soils and the Office of Experiment Stations generated a variety of published and unpublished records characterizing the nature of the Salt River, a few typical examples of which will be discussed here. These records further substantiate those generated by other federal agencies indicating that the upper Salt River was not navigable prior to or at the time of Arizona's statehood in 1912.

1. Published Records of the U.S. Department of Agriculture

Details about the nature of the Salt River can be found in Department of Agriculture materials in Alfred J. McClatchie's *Utilizing Our Water Supply*, published by the Department of Agriculture's Office of Experiment Stations in 1902. Although covering water supplies throughout Arizona, the report chiefly dealt with the Salt River. Describing that stream, McClatchie wrote:

The Salt River, like all streams having a watershed with many steep slopes, is subject to great variations in its flow . . . [and] conditions combine to make a great difference between the winter and the summer flow. After heavy rains in the mountains, especially during the winter, the Salt River is sometimes unfordable for weeks, while during the hot, dry weather of summer it is sometimes reduced to

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⁸⁴ "Salt River Project, Final History (to 1916)," Engineering and Research Center Project Histories, 1911-1991, box 142, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

a mere brook, the flow during the winter months of some years being ten to twenty times what it is during some months of the following summer. 85

2. Unpublished Records of the U.S. Department of Agriculture

Within a year of publishing *Utilizing Our Water Supply*, McClatchie reiterated many of the points he had made in that document in a letter to Charles D. Walcott, director of the U.S. Geological Survey. Writing on March 30, 1903, McClatchie urged the U.S. Government to help irrigate the Salt River Valley more fully. As one of the active local proponents of having the U.S. Reclamation Service build Roosevelt Dam, McClatchie restated in his letter many of the points made in *Utilizing Our Water Supply*. In addition, he noted that:

[t]his desirable condition of our valley that I feel would be secured by water storage I desire to see effected by such means and upon such terms as are conducive to the best interests of the farmers, as are in accordance with justice to all concerned, and as are in harmony with the policy and welfare of our government.⁸⁶

While McClatchie sought "justice to all concerned," he gave no indication that the construction of the large dam might pose a problem by interfering with commercial navigation on the Salt.

McClatchie further noted that in order to provide sufficient supplies to lands already under ditches, the nature of the Salt River had to be taken into account. As he explained,

[t]he great fluctuation of our present water-supply must be understood and taken into consideration, in planning for water storage. As shown in the bulletin before referred to [Utilizing Our Water Supply], the flow during the winter months of some years is ten to twenty times what it is during part of the following summer; and the flow during any one month may be five to fifteen times as great one year as another. The amount diverted and used varies somewhat less than this, the relation of the greatest amount diverted during any one month of the past eight years to the smallest amount diverted being approximately as ten to one, and the greatest difference in the amount diverted during any two months of one calendar year being as five to one. However, the difference in the amounts diverted during

⁸⁵ Alfred J. McClatchie, *Utilizing Our Water Supply* (Washington D.C.: U.S. Government Printing Office, 1902), pp. 62-63.

Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

two different weeks of the same year may be as great as twenty-five to one. That is, during some summer week a farmer may receive but one twenty-fifth as much water as he had during a week of the previous winter.⁸⁷

McClatchie made no suggestion that navigation interests might be adversely affected by the river's erratic flow or even the potential construction of a new, massive storage reservoir by the U.S. Government.

D. Legislative Action and Litigation

Officials in Arizona, representing the courts as well as the lawmakers, agreed with the engineers that the Salt River was useless for the purposes of navigation. The perception that the Salt River was not navigable was held unanimously by such state or territorial authorities.

1. The Arizona Territorial Legislature's "Memorial" to Congress

For example, the Arizona Territorial Legislature, meeting in its second session, passed on December 28, 1865, a "Memorial Asking Congress for an Appropriation to Improve the Navigation of the Colorado River." Seeking \$150,000 to remove obstacles such as sand bars, snags, boulders, and other obstructions in the Colorado's bed, the memorial declared that "the Colorado River is the only navigable water in this Territory[.]" (Emphasis added.) The "Memorial" also noted that if the requested funds permitted the improvements to be carried out, the Colorado River would be navigable as far as Callville, Nevada (under present-day Lake Mead), where a wagon road would connect the Colorado River to Salt Lake City. 88

⁸⁸ "Memorial Asking Congress for an Appropriation to Improve the Navigation of the Colorado River," Acts, Resolutions, and Memorials of the Territorial Legislature of Arizona, 1865, (N.p., n.d), copy at Arizona Historical Foundation, Arizona State University, Tempe, Arizona.

⁸⁷ Alfred J. McClatchie to Charles D. Walcott, March 30, 1903, file 27, General Administrative and Project Records, 1902-1919, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

2. M. Wormser, et al., v. The Salt River Valley Canal Company, et al.

Less than thirty years after the Arizona Territorial Legislature had declared the Colorado River to be the only navigable stream in the territory, the courts in the territory also began to look at the Salt River Valley's resources. On March 31, 1892, Joseph H. Kibbey, judge of Arizona's Second Judicial District, handed down his opinion in *M. Wormser, et al., v. The Salt River Valley Canal Company, et al.* The decision adjudicated the water rights of various irrigators on the Salt River. Before turning to a discussion of relevant law and findings of fact in the case, Judge Kibbey first discussed the history of water use in the Salt River Valley that led to the litigation. Kibbey wrote that the soil in the Salt River Valley was very fertile when supplied with water, but the climate's aridity made irrigation necessary. The watershed of the Salt River, he observed, was:

extensive, and the river is consequently subjected to very great variations in the volume of water which it carries. During the winter months of December, January, February, and until the middle of May there is a large volume flowing in the river, more than adequate for the irrigation of all the lands in the valley.

Kibbey then discussed the history of the various canals established in the valley, and he confirmed the plaintiffs' statement that the Salt River was:

a natural *unnavigable stream* rising in the mountains in the eastern part of the territory and running thence in a westerly direction to its junction with the Gila river in Maricopa county. [Emphasis added.]⁸⁹

The plaintiffs asked Kibbey to force the defendants to remove their dam and not interfere with the flow of the Salt River. The complaint was later amended to change some of the plaintiffs to defendants and to modify some of the complaints. The case went to trial in March 1890 and final arguments took place in February 1891. The trial resulted in 6,000 pages of

⁸⁹ M. Wormser, et al., v. The Salt Valley Canal Co., et al., March 31, 1892, No. 708, Maricopa County District Court, Phoenix, Arizona. Quotes at pp. 1, 5, 9.

evidence. Following a discussion of the relevant law, Kibbey presented his findings of fact regarding the relative rights of various appropriators. ⁹⁰

The significance of this lawsuit is fourfold. First, Judge Kibbey acknowledged the widely varying flows of the Salt River. Second, the plaintiffs complained that the Arizona Canal had begun diverting all of the water in the river during dry seasons, leaving none for downstream canals. Third, the construction of the Arizona Dam across the river had not resulted in any objections from navigation interests, nor were any such entities named as parties in the suit. And fourth, the plaintiffs' declaration that the Salt River was non-navigable remained uncontested. All of these points suggest that the larger Salt River Valley community did not consider the Salt to be navigable. 91

3. The "Kent Decree"

Approximately twenty years later, another critical court decision was handed down in the territory of Arizona which supported the same conclusion regarding the nature of the Salt River as the *Wormser* decision. On March 1, 1910, Judge Edward Kent of the Third Judicial District Court of the Territory of Arizona issued what became known as the Kent Decree in *Patrick T*. *Hurley v. Charles F. Abbott, et al.* In his decree, Kent reviewed the principles of prior appropriation in Arizona, observing that those principles applied to non-navigable streams and that they therefore were relevant to the Salt River litigation. ⁹²

⁹⁰ M. Wormser, et al., v. The Salt Valley Canal Co., et al., March 31, 1892, No. 708, Maricopa County District Court, Phoenix, Arizona.

⁹¹ M. Wormser, et al., v. The Salt Valley Canal Co., et al., March 31, 1892, No. 708, Maricopa County District Court, Phoenix, Arizona.

⁹² Patrick T. Hurley v. Charles F. Abbott, et al., March I, 1903, No. 4564, Third Judicial District Court of the Territory of Arizona, in and for the County of Maricopa. In a much more recent lawsuit, filed on July 17, 1972, in U.S. District Court, another judge confirmed the *Wormser* and *Hurley* opinions on non-navigability of the Salt. In this case, the Salt River Pima-Maricopa Indian Community had sued the Arizona Sand and Rock Company and several others seeking recognition that the bed of the Salt River (in which the defendants were mining sand and gravel) was actually owned by the Indians. The plaintiffs sought damages and removal of the defendants, claiming that under the executive order which had created the Indians' reservation (June 14, 1879), the bed of the river to the

The significance of the decree rendered in *Hurley v. Abbott* is similar to Judge Kibbey's decision in the *Wormser* case – Kent had declared the Salt River to be non-navigable. Furthermore, Kent wrote about the wide fluctuations in flow, claiming the stream was "unpredictable." Additionally, Kent discussed the then-recent construction of Granite Reef Dam across the river, but he never opined this type of structure would be an impediment to navigation. Similarly, there are no indications that navigational interests played any role in this lawsuit. ⁹³

E. Other Miscellaneous Documents

Speeches given by two prominent Arizona personalities shortly after the beginning of the twentieth century support other evidence that the Salt River was not navigable. Joseph H. Kibbey, judge in the *Wormser* case, spoke in 1907 to the Fifteenth National Irrigation Congress in Sacramento, California. In his speech, Kibbey focused mainly on the implementation of the *Reclamation Act* and the disputes that were arising as a result of that law. Predictably, Kibbey used the situation in the Salt River Valley as an example. In discussing the fight over the waters of the Salt River, Kibbey stated:

[i]t is the blindest sort of folly to treat the fluctuations of the river, which could be foreseen by the most casual observer [sic], and which had forced themselves upon the attention of every water user in the valley, as an unusual condition. . . .

As Kibbey noted, the erratic nature of the Salt River was known to all residents of the valley, including even the "casual observer." ⁹⁴

middle of the channel was considered part of their land. As part of the order consolidating the suits, Judge W.D. Murray declared: "*The Salt River is not now and never has been a navigable river*." (Emphasis added.) See p. 1068 in "In the Matter of the Navigability of the Salt River [From Granite Reef Dam to the Gila River Confluence], Admin. Docket No. 94-1, Before the Arizona Navigable Streambed Adjudication Commission."

⁹³ Patrick T. Hurley v. Charles F. Abbott, et al., March 1, 1903, No. 4564, Third Judicial District Court of the Territory of Arizona, in and for the County of Maricopa.

⁹⁴ Joseph H. Kibbey, "Address of Hon. Joseph H. Kibbey Delivered Before 15th National Irrigation Congress at Sacramento, CA.," Sept. 4, 1907, Water Resources Center Archives, University of California, Riverside, California.

Early Phoenix resident Carl Hayden agreed. In his speech in front of the U.S. House of Representatives on February 3, 1916, the subject was flood control on non-navigable streams. House Resolution 122 had been introduced by the speaker of the House, and Hayden interpreted the speaker's intention to be the creation of "a committee having jurisdiction over all bills relating to flood control whether the floods occur on navigable or non-navigable streams." Hayden explained his support of this resolution: "I come from a state where we have dry rivers and no harbors, and I want to see a committee established that will give consideration to the flood problems on non-navigable streams." In commenting on the constitutionality of federal funding for flood control on non-navigable streams, Hayden argued that such expenditures were not only in the local interest, but also in the national interest. He claimed that railroads were often affected by floods, which hurt interstate commerce, and that the U.S. Postal Service was also consistently interrupted by flooding. He also argued that the care of national defense would be assisted by funding for flood control, asserting that "troops cannot be readily moved or supplied when the rivers are in flood." Hayden's remarks in this speech make it clear that in his view all Arizona streams were non-navigable, including the Salt. What Hayden sought, therefore, was money to curb flooding on his state's unpredictable streams, including the nonnavigable Salt River.⁹⁵

F. More Recent Historical Studies

More recent studies confirm historical documents about the nature of the upper Salt River. A Master's thesis from the University of Arizona supports these conclusions about the erratic nature of the Salt River. John Porcello's 1988 thesis studied the area from the confluence of the Salt and the Gila rivers to just above the Salt's confluence with the Verde River to

⁹⁵ Carl Hayden, "Speech of Hon. Carl Hayden, of Arizona, in the House of Representatives, Thursday, February 3, 1916," folder 11, box 653, Carl Hayden Papers, Mss. 001, Arizona State University, Tempe, Arizona.

determine groundwater presence. Although focusing on underground supplies, the study was augmented by important historical data about the Salt River's surface flow. Porcello described the Gila and Salt Rivers as perennial streams "only in reaches upstream of the study area, [and] have been completely diverted by extensive canal systems serving agricultural and municipal water demands since the middle of the 19th century." Adding that "[b]y the 1890s, water use by farms and small towns had resulted in the diversion of the entire flows of both the Salt and Gila Rivers," he noted that "[u]nregulated flows impacting the East Valley were highly seasonal prior to 1910, more than half the annual flow occurring between October and April and the remainder resulting from spring discharges and flash floods during the summer months." ⁹⁶

Karen Smith, another recent historian of the Salt River, reached the same conclusion as other, earlier observers of the stream. In her doctoral dissertation which was later published as *The Magnificent Experiment: Building the Salt River Reclamation Project, 1890-1917* (1986), Smith described the Salt River Valley:

On the face of it, the growth of metropolitan Phoenix from a dusty village located near the Salt River to the ninth-largest city in the United States has been something of an anomaly. There was no major railroad connection to Phoenix until the 1920s, *no harbor or navigable river* to spawn commerce, and no major trail or crossroads to lure tired travelers to stop. [Emphasis added.]⁹⁷

G. Summary and Conclusions to Chapter 3

The records of the three federal agencies whose responsibilities were most closely associated with water resource development in the West (the Reclamation Service, the Geological Survey, and the Department of Agriculture) all consistently illustrate that none of the officials in those agencies considered the upper Salt River to be navigable on a reliable basis.

^{§7} Karen L. Smith, *The Magnificent Experiment: Building the Salt River Reclamation Project, 1890-1917* (Tucson: University of Arizona Press, 1986), p. ix.

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⁹⁶ John Joseph Porcello, "Pre-Development Hydrologic Conditions of the Salt River Indian Reservation, East Salt River Valley, Central Arizona, With an Emphasis on the Ground-Water Flow Regime," (M.S. thesis, University of Arizona, 1988), pp. 14, 21, 30.

Reports by these agencies – both published and unpublished – routinely characterized the Salt River as varying dramatically in flow from mere trickles to wild floods. The accounts also described a river and creek whose channel frequently changed, whose course was blocked by many dams and diversion works, and whose water supplies were fully diverted to supply farming needs. Moreover, the Government documents observed that even when water materialized in the river's or stream's channel, the flows frequently disappeared a short distance downstream. Such a stream could hardly be considered navigable.

CHAPTER 4: NEWSPAPER ACCOUNTS AND PHOTOGRAPHS

Newspaper reports offer some of the most frequent descriptions of the upper Salt River in the years leading up to Arizona's statehood in 1912. The upper Salt River was the focus of considerable newspaper discussion, both below and above Granite Reef Dam. Similarly, the prominence of the upper Salt River and related dams and irrigation works were the subject of a considerable amount of photography around the beginning of the twentieth century. Because the photographic history of the upper Salt corresponds well with newspaper accounts of that stream, this chapter will discuss press accounts of the Salt River in conjunction with photographic illustrations (although the photos are not from the newspaper accounts themselves).

A. Background on Historical Newspapers

To understand the significance of press accounts of the Salt River, it is useful to review some background information on nineteenth and early twentieth century newspapers in the American West. Such newspapers were among their respective communities' biggest boosters, not only due to civic pride, but also to attract settlers to growing towns. Articles in out-of-town papers which provided positive accounts of visits to a particular community were often reprinted verbatim by the latter town's press, and residents who commented on their location's virtues while away received considerable attention by the home-town press if those remarks became known. As enthusiastic promoters of their communities, local papers frequently printed long articles extolling their respective areas' many advantages not only for their own readership, but also for readers in other more distant places, to which copies of the paper would be sent to attract newcomers.

Given the booster nature of the western press, it is not surprising that the Salt River, as the principal source of irrigation water for the Phoenix area, was given substantial newspaper space on many occasions and was touted as one of the region's many blessings, particularly by papers in the

Phoenix area. Although the river was praised as the source of water for the many farms, accounts of reliable commercial navigation on the stream were conspicuously absent from the long list of many benefits the Phoenix area had to offer. This does not mean that there were no accounts of boats on the Salt River – indeed, such stories appeared on a variety of occasions. Nevertheless, the articles that did cover the presence of boating on the Salt River indicate that such uses were rare and often dangerous.

The Phoenix-area press also carried a wide variety of other stories that shed light on the nature of the stream in addition to accounts of infrequent attempts to use boats on the river. These include stories about dams and irrigation and articles about forms of non-water transportation in the Salt River Valley. There were, of course, many stories about flooding, but that topic is addressed elsewhere in this report.

B. Historical Newspaper Accounts and Photographs

Among the earlier stories to appear in the Phoenix press regarding the Salt River above Granite Reef Dam was an article that appeared in the *Arizona Gazette* on June 5, 1885, about an exploration down the upper Salt that had been attempted by boat. The newspaper reported that based on the party's experience, it appeared that logs could be floated to Phoenix. Nevertheless, the following day the *Gazette* offered a more detailed description of the journey making it clear just how dangerous the trip down the Salt had been. Noting that the explorers' craft had been upset once and that the current was so strong that there was no driftwood along the stream, the paper suggested that the trip would have been considered foolhardy had it not been for a "laudable purpose." 98

Regardless of this uncommon account of a boating attempt, even before the turn of the twentieth century, proposals appeared in the press to dam the Salt River near its junction with Tonto

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^{98 [}No title], Arizona Gazette, June 5, 1885; "Valuable Discoveries," ibid., June 6, 1885.

Creek. For instance, the *Arizona Weekly Journal-Miner* reported on August 28, 1889, that Maricopa County Surveyor W.M. Breakenridge had examined the site where Roosevelt Dam was later built. Concluding that it was an ideal locale for a reservoir, Breakenridge nonetheless offered no commentary on how a dam might adversely impact the stream's navigability. ⁹⁹ Breakenridge also reported on the proposal for a dam at the same site three years later, but again he made no mention of a reservoir's effect on navigability. ¹⁰⁰

By the turn of the century, Phoenix-area newspapers began to report on the U.S.

Reclamation Service proposal to construct a dam (initially called Tonto Dam) on the Salt River.

Because Arizona was a territory at the time and the dam was to be funded by a Maricopa County bond issue, proponents of the massive reservoir pressed Congress to pass an act allowing the county to make this monetary commitment. The *Arizona Republican* reported on March 19, 1902, on the debate then taking place on this topic, noting that the size of the bond issue was causing some opposition to the dam's financing. Although opponents of the reservoir scheme fought it on economic grounds, there was no resistance by parties involved in commercial navigation on the upper Salt River. Had boating interests existed along the upper Salt River in the location proposed for the reservoir, they clearly would have had cause to object to such a dam because the narrowness of the canyon at the dam site would not have permitted alternate water routes around that locale.

The following photographs, taken before construction began on Roosevelt Dam, demonstrate not only why boating interests would have objected to blocking the river (had such navigation concerns existed), but the photos also illustrate the scale and difficulty of the proposed undertaking.

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^{99 &}quot;Tonto Basin Reservoir Site," Arizona Weekly Journal-Miner, Aug. 28, 1889.

^{100 &}quot;Our Water Storage," Arizona Republican, May 3, 1892.

¹⁰¹ "South Side Objections," *Arizona Republican*, March 19, 1902. See also articles appearing in the *Republican* over the next few months.



Figure 11: Upper Salt River, circa 1904. Source: Arizona Historical Society, Tempe, Arizona.



Figure 12: Salt River (Roosevelt) dam site, circa 1904. Source: Arizona Historical Society, Tempe, Arizona.

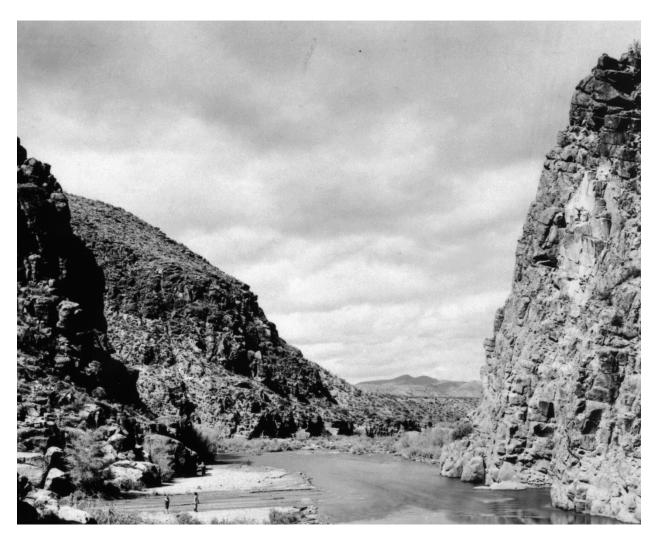


Figure 13: "View of Upper Box Canyon, Tonto Basin, Taken from Point Looking Down River," circa 1904. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 14: "Canyon, showing dam site, Jan. 16, 1904." Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 15: Roosevelt Dam site looking downstream, March 6, 1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

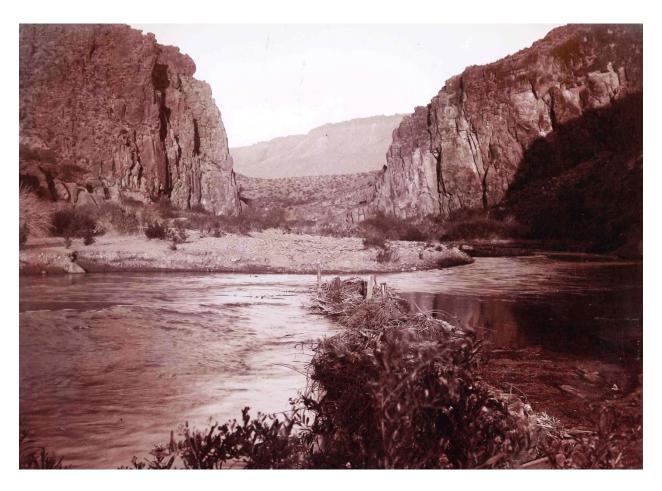


Figure 16: Upper Salt River, circa 1904. Source: Arizona Historical Society, Tempe, Arizona.

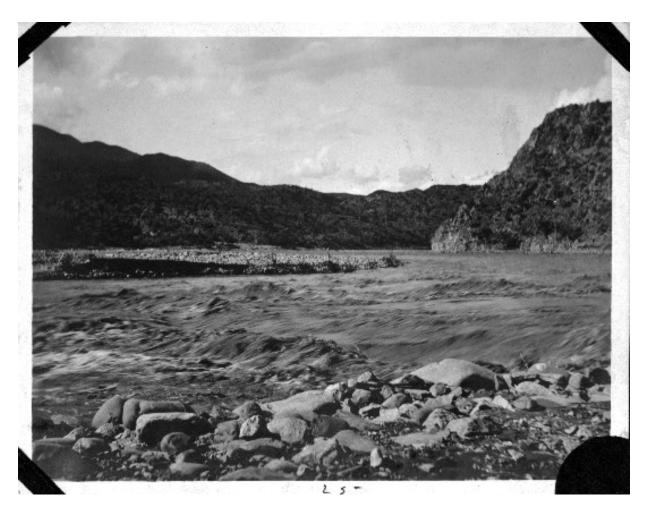


Figure 17: Salt River at Roosevelt Dam site, circa 1908. Source: Phoenix Public Library, Phoenix, Arizona.

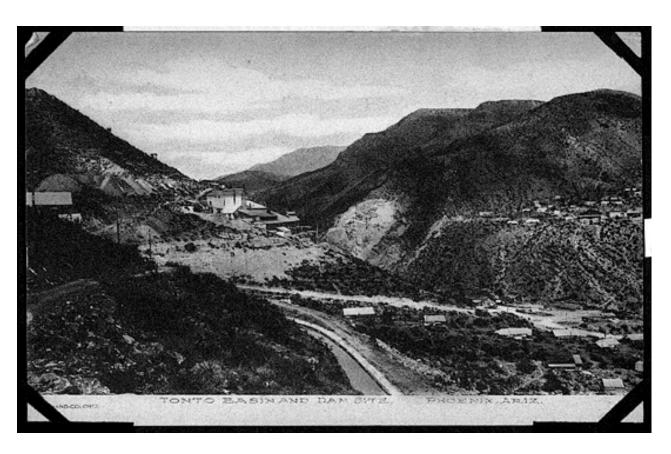


Figure 18: Tonto Basin at Roosevelt Dam site, circa 1908. Source: Phoenix Public Library, Phoenix, Arizona.

When Congress passed the *Reclamation Act* in June 1902, citizens around Phoenix shifted their reservoir efforts to seeking to have that facility built by the U.S. Government under the terms of the new law. The Phoenix press carried a multitude of stories on a near daily basis about the growing effort around Phoenix to have the reservoir at the Tonto Basin built by the Government. While the newspapers also reported that not all parties agreed on the Government's role, the existing resistance was based largely on the unfounded claim that individuals would lose control of their water rights to a federal system. None of the opposition, however, stemmed from commercial navigation interests contending that the dam might interfere with their enterprises. ¹⁰²

¹⁰² "The Reservoir Campaign," *Arizona Republican*, July 20, 1902. See also articles in the *Arizona Gazette*, Aug. 1, 2, 3, 5, 9, 10, 1902.

To support the effort for federal construction of Roosevelt Dam, beginning in August 1902, citizens in Phoenix held a series of mass meetings. According to the local press, the meetings were heavily attended, and eventually a committee representing Phoenix-area canal companies, communities in the Salt Valley, and other interests was organized to work with the U.S. Government. The mass meetings and the meetings of the committee were covered extensively by the Phoenix press, but the newspapers made no mention of any objections to damming the Salt River either at the Roosevelt site or at the Granite Reef Dam locale voiced by commercial boating interests. ¹⁰³

Another action being considered by local residents to back the movement for the massive Salt River reservoir was the possibility of bringing a general adjudication lawsuit to settle all water rights along the Salt and its tributaries. Apparently the belief was that such litigation would simplify the U.S. Government's dealings with water users in establishing repayment contracts and related financial matters. For example, on July 6, 1904, the *Arizona Gazette* reported that the Salt River Valley Water Users' Association had voted to initiate litigation to determine the relative rights of all water users whose supplies came from either the Salt or Verde rivers. The article noted that the suit would ultimately involve several thousand people, but press accounts gave no indication that commercial navigational interests on either stream would play a role. ¹⁰⁴

Two years later, the plan to settle water-related legal issues was still being discussed by area residents. The *Gazette* reported on May 9, 1906, that a conference was being held that day for all the attorneys in Phoenix to determine what the paper termed the "legal side of the water question in this valley." The article pointed out that a committee of sixteen residents had been appointed the previous year when *Hurley v. Abbott* had been filed to draft a proposal to resolve the case, and that

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¹⁰³ See articles in the *Arizona Gazelle*, Aug. 2, 3, 5, 9, 10, 1902.

^{104 &}quot;To Establish Priority Claims," *Arizona Gazette*, July 6, 1904.

plan had been submitted to the court. Nevertheless, the *Gazette* noted, not everyone agreed with the proposal, and the meeting of attorneys was being called to try to resolve the disputes. The article gave no indication that navigation was of any concern. ¹⁰⁵

The Reclamation Service officially took no active position in the *Hurley v. Abbott* suit.

Nonetheless, U.S. Government officials supported the attempt to resolve all rights along the Salt River as a means to facilitate the construction and operation of the Salt River Project. On July 31, 1906, for instance, the *Phoenix Enterprise* reported that the Reclamation Service backed the *Hurley v. Abbott* litigation as a means to clear up water rights in the Salt River Valley. As the paper explained, Reclamation Service officials Morris Bien and Arthur P. Davis, "while they both stated that they have nothing to do with the method, one of the principal agreements between the farmers and the government was that they [the farmers] would settle every legal question before the government could expend money for a storage reservoir." There was no mention in the *Enterprise*'s story, however, that any of the legal problems involved commercial navigation of the Salt River. ¹⁰⁶

Newspaper articles discussing roads and railroads underscored that transportation was conducted overland and not on the Salt River in the years around Arizona's statehood. For instance, on January 19, 1895, the *Phoenix Daily Herald* published a lengthy booster article on the advantages of the Phoenix area. Written in a question-and-answer format, the article contained nearly a hundred detailed questions and answers about the city, particularly about irrigation and farming. The answers were designed to attract settlers and contained considerable information about commerce in the area, and the discussion regarding transportation noted that there were local streetcars as well as two principal railroads. Nevertheless, no mention was made of commerce or

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¹⁰⁵ "Phoenix Attorneys in Conference," Arizona Gazette, May 9, 1906.

^{106 &}quot;Approve of Water Suit," Phoenix Enterprise, July 31, 1906.

people being carried on the Salt River – a topic that certainly would have warranted comment had the stream been used for transportation. ¹⁰⁷

The Salt River's potential use for transportation also was ignored in an *Arizona Republican* article dated June 26, 1902. In that account, the *Republican* reported that the secretary of the interior would probably order the construction of the San Carlos Reservoir on the Gila River (upstream from the confluence with the Salt) under the terms of the newly-enacted *Reclamation Act*. The paper added that "the construction of that will be of advantage to Phoenix, since it will result in the development of a considerable agricultural area in Pinal County, which will be brought into connection with this city by the Phoenix and Eastern Railroad." While floating goods down the Gila and then boating them up the Salt also would have been possible had those streams been navigable, the paper completely disregarded this prospect, discussing only the use of the railroad, and thus illustrating the difficulty in using those rivers for transportation. ¹⁰⁸

As plans for building Roosevelt Dam (then called Tonto Dam) began to take more solid form, the press carried numerous stories about how freight and people would be carried to the construction site. While some of these stories related specifically to areas above Granite Reef Dam, most dealt with the entire distance of the river from Phoenix to Roosevelt. In mid-August 1903, for example, the *Phoenix Enterprise* wrote that entrepreneurs were considering building a trolley to the dam location to avoid the lengthy road via Globe to Roosevelt. The paper added that:

[t]he details of this scheme, however, are not yet worked out, but that there will be a trolley line to the reservoir is almost an assured fact. Much of the cost of this line can be saved in the difference between wagon and [trolley] car freight. 109

Nevertheless, despite the concern with the expense of moving freight, the paper gave no indication that anyone considered using the Salt River itself for transportation.

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^{107 &}quot;The Salt River Valley," *Phoenix Daily Herald*, Jan. 19, 1895.

¹⁰⁸ [No title], Arizona Republican, June 26, 1902.

¹⁰⁹ [No title], *Phoenix Enterprise*, Aug. 14, 1903.

In addition to a trolley line, entrepreneurs also considered construction of a wagon road from Phoenix to the Roosevelt Dam site. An *Arizona Gazette* article pointed out that such a road might be impossible due to its cost, but the article noted that even if the road could not be built, freight to the dam site would not be handled on the Salt River. Instead, it would go via Globe, Arizona:

The proposed wagon road to Phoenix is not seriously talked of for the reason that it is impracticable. It would cost \$150,000, an amount out of all proportion to the benefit that would be derived from it, and the farmers would have to pay for it. Besides, a wagon road from the mouth of Tonto [Creek] to Phoenix available for freighting is impossible. Globe will handle all the freight. 110

While shipping supplies by road through Globe involved going a considerable distance out of the way, the *Gazette* article never suggested that using the river might be an alternative.

Regardless of the *Gazette*'s gloomy assessment that a road from Phoenix to the reservoir location was not possible, five days after the article had appeared, the *Arizona Republican* reported that surveys were already underway for such a road. Demonstrating that the Salt River was not considered a viable route for taking goods and equipment to the reservoir site, the newspaper made it clear that the road was for hauling supplies:

This road of course is designed at present only for the hauling of telephone poles and wire and the supplies for the men engaged in construction work. The telephone line is the most pressing need and is to be rushed to completion as soon as possible. If it shall transpire that the close acquaintance with that route will follow the building of the line proves it to be a better one than any other suggested, or proves that it can with less expenditure of money than on any other be made into a good freight road, it is likely it will be made into a permanent highway and graded for freight handling.¹¹¹

In early September 1903, the *Arizona Gazette* reported on a discussion by the Reclamation Service's Arthur P. Davis on the need for a good road from Phoenix to the Roosevelt Reservoir site. The article pointed out that while freight could go by road via Globe, it

¹¹⁰ [No title], Arizona Gazette, Aug. 25, 1903.

¹¹¹ [No title], Arizona Republican, Aug. 30, 1903.

would be considerably more costly than to take freight directly to the reservoir site if a road could be built from Phoenix. Davis stated that he was not sure the Reclamation fund would pay for the road, but he added:

All things considered we would prefer that the freight came this way. If we could have a road whereby we could make the distance in one day with a buggy and two days with a wagon, it would be a great improvement over the inconvenience we have to endure by going by way of Globe. 112

The cost in hauling freight to the reservoir site was indeed expensive due to the sheer volume. As Davis explained:

Fuel oil will be the greatest amount of freight that will have to be handled, in fact, there will be about twice as much of this as anything else to be hauled. It will take about 15,000,000 pounds of oil, and the cost of hauling from Mesa will be about two cents a pound. Then there will be about 100 tons of steel and 200 tons of other material. 113

The *Gazette*'s report carried no indication that Davis ever contemplated using the Salt River itself to carry these supplies.

By 1904, the Reclamation Service was seeking to have Phoenix-area residents finance the road to Roosevelt on the grounds that they would be the beneficiaries of the water stored there. As part of the effort to secure local funding for the road, on March 8, 1904, the *Phoenix Republican* reprinted a letter from Reclamation Service Chief Engineer Frederick H. Newell to B.A. Fowler, president of the Salt River Valley Water Users' Association. The letter outlined the reasons why voters in the communities in the Salt River Valley should approve bonds to finance a road from the valley to Roosevelt Dam site. Newell pointed out that in building the reservoir, large quantities of supplies had to be shipped to the site via a round-about route:

Under the present conditions all material and men must go to a point on the Southern Pacific Road in the southeastern part of the territory, transfer to a short independent railroad, 125 miles to go to the town of Globe and then travel a road

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¹¹² [No title], Arizona Gazette, Sept. 2, 1903.

^{113 [}No title], Arizona Gazette, Sept. 2, 1903.

of 40 miles or more in length to the site of the dam. From the railroad point at Globe to the dam site is nearly as far as from the Salt River Valley.

Newell added that it was essential to have the road from the valley built to diminish construction and transportation costs. Nevertheless, he made no mention of using the river as a means of commerce between the region around Phoenix and the reservoir site. 114

The volume of shipping necessary to supply the multitude of workers at what became the town of Roosevelt was prodigious and can be appreciated by the following three photographs.

The first two pictures show the temporary town of Roosevelt – which housed workers for Roosevelt Dam – just above the confluence of the upper Salt River and Tonto Creek and slightly upstream from the construction site for the dam. The third photograph provides an idea of the "creature comforts" necessary to house workers at the site for many months at a time – construction on the dam took several years.

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^{114 &}quot;The Tonto Road," *Phoenix Republican*, March 8, 1904.



Figure 19: "Looking up Salt River, Showing Junction of Salt and Tonto Rivers and Location of Camp at Dam Site, Jan. 14, 1904." Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

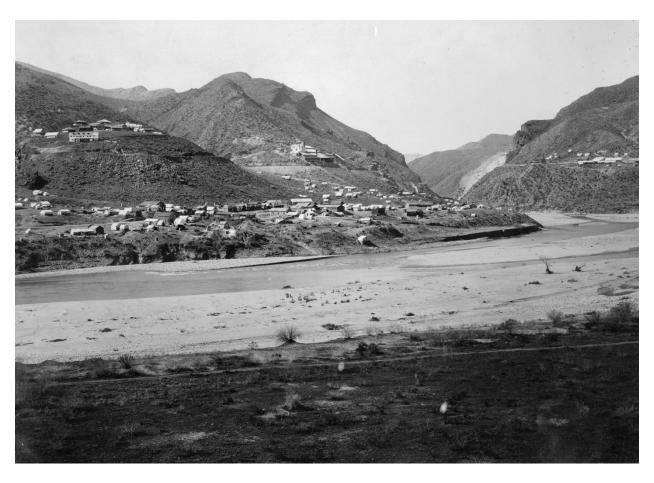


Figure 20: Town of Roosevelt, Arizona, looking downstream toward Roosevelt Dam site, circa 1910. Tonto Creek's confluence with the Salt River is at the right. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 21: Interior of headquarters tent at Camp Roosevelt, January 23, 1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

Aside from supplies for workers, a huge amount of construction equipment and machinery had to be brought to Roosevelt for work on the dam itself. The scale of construction (and, by implication, the quantity of equipment) can be judged from the following photographs taken as work on Roosevelt Dam went forward. The nature of the Salt River's channel also can be seen (and assessed in relation to navigability) in the photographs.



Figure 22: Roosevelt Dam site looking downstream, circa 1905-1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 23: Roosevelt Dam site looking upstream, circa 1905-1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 24: Roosevelt Dam site, March 31, 1908. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

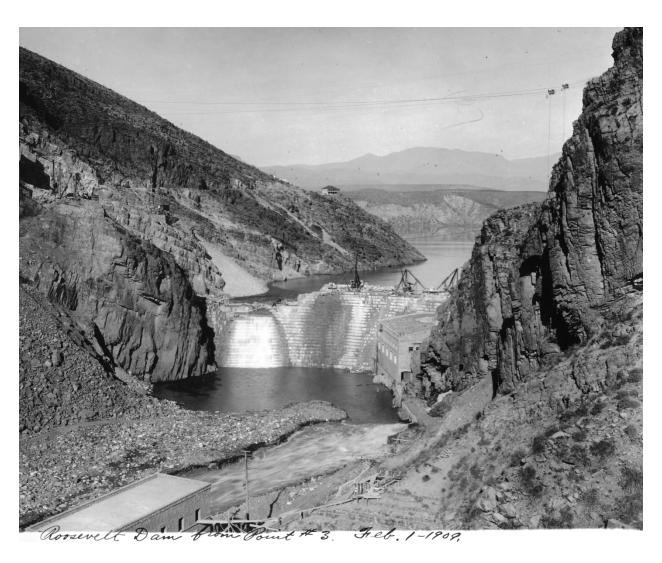


Figure 25: Roosevelt Dam under construction, February 1, 1909. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 26: Roosevelt Dam under construction, July 31, 1909. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

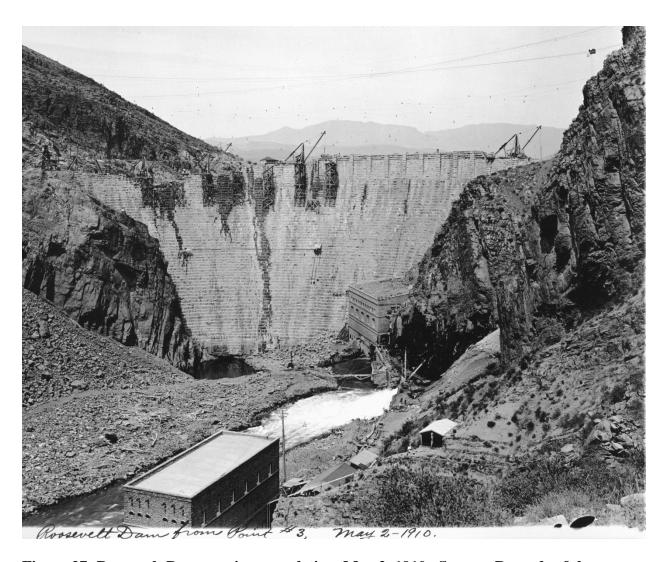


Figure 27: Roosevelt Dam nearing completion, May 2, 1910. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

Ultimately, because of the sheer scale of the undertaking to build Roosevelt Dam (and due to the fact that the upper Salt River was not navigable), the road from Phoenix to Roosevelt was built, and historical photographs document the extremely rugged terrain through which the road ran. The photographs, some of which are reproduced below, clearly demonstrate that had the Salt River been navigable, the Reclamation Service never would have sought reliance on such a difficult overland route as that provided by the Tonto Road (today known as the Apache Trail), preferring instead the easier and more cost-effective transport that water would have

afforded. The first three photographs illustrate the difficulty involved in building the Tonto Road.



Figure 28: Construction of high-line wagon road directly above Roosevelt Dam site, March 29, 1905. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

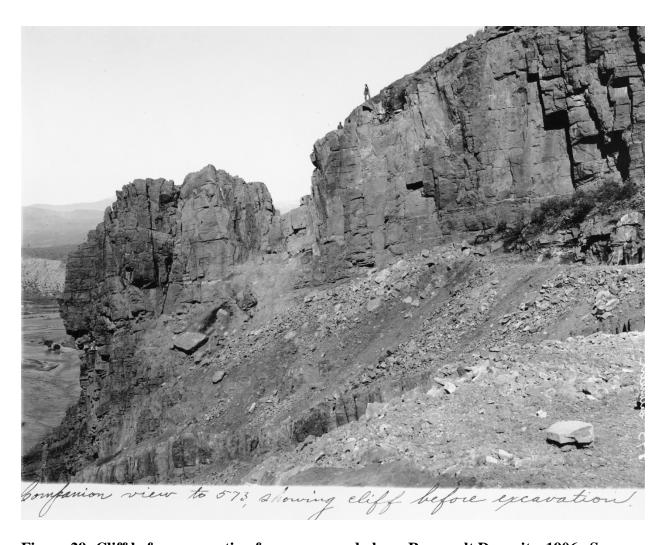


Figure 29: Cliff before excavation for wagon road above Roosevelt Dam site, 1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

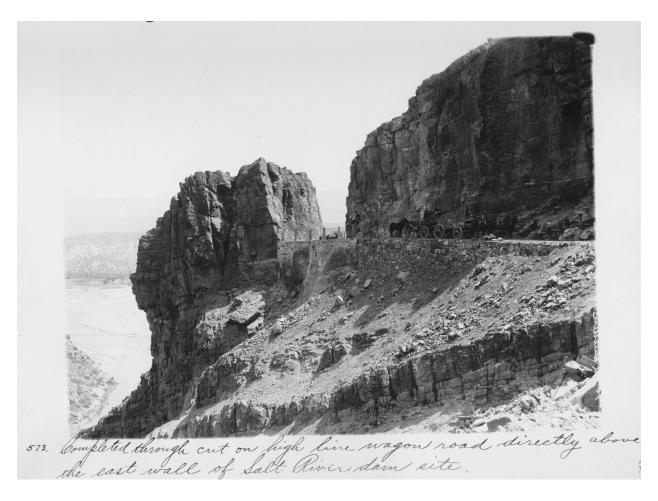


Figure 30: Completed cut for wagon road above Roosevelt Dam site, circa 1906-1907. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

The following photographs illustrate the extreme difficulty of freighting operations and passenger transportation over the Tonto Road to Roosevelt Dam (or, in the case of the last photograph in this set, from Roosevelt back to Granite Reef Dam) in the early twentieth century. Due to the narrowness of the road, in some cases wagons (and later, automobiles) sometimes had to pull over where room permitted to allow other vehicles and horses to pass.

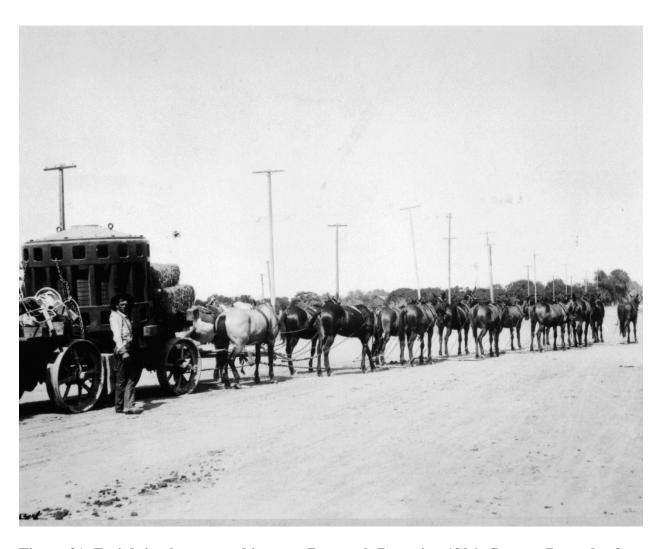


Figure 31: Freighting heavy machinery to Roosevelt Dam site, 1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

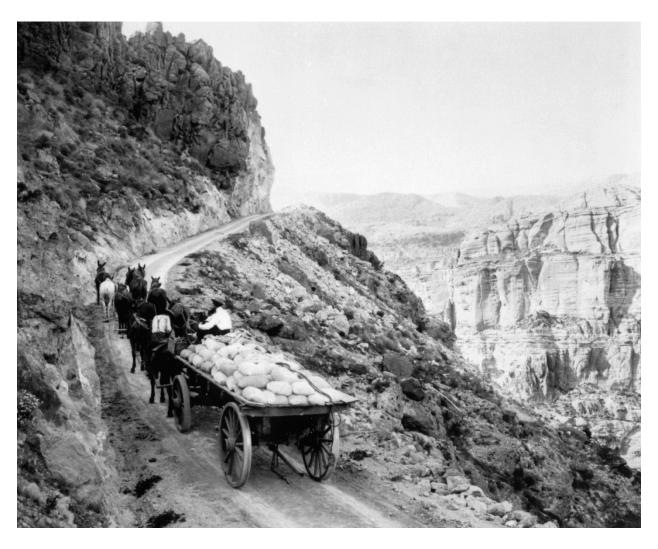


Figure 32: Hauling supplies to Roosevelt Dam site, 1907. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

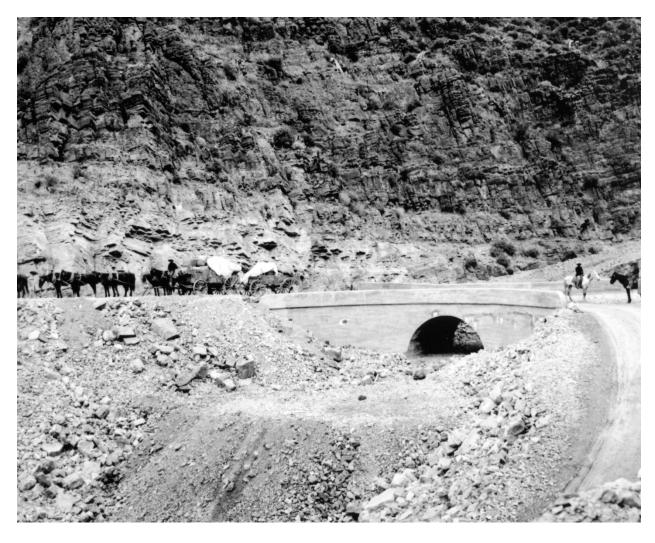


Figure 33: Whitney's Bridge on high line supply road to Roosevelt Dam site, December 1, 1906. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

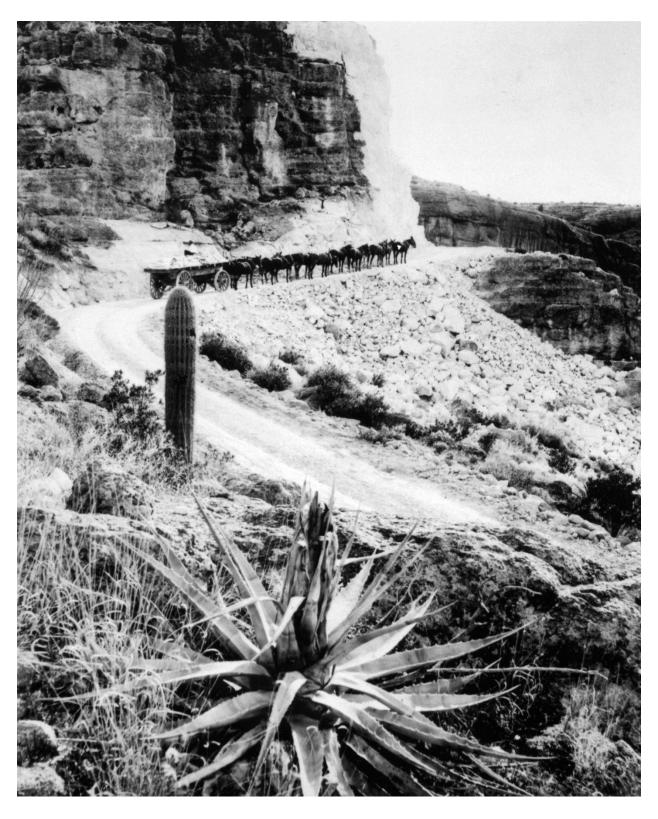


Figure 34: Top of Fish Creek Hill on wagon road to Roosevelt Dam site, March 1907. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

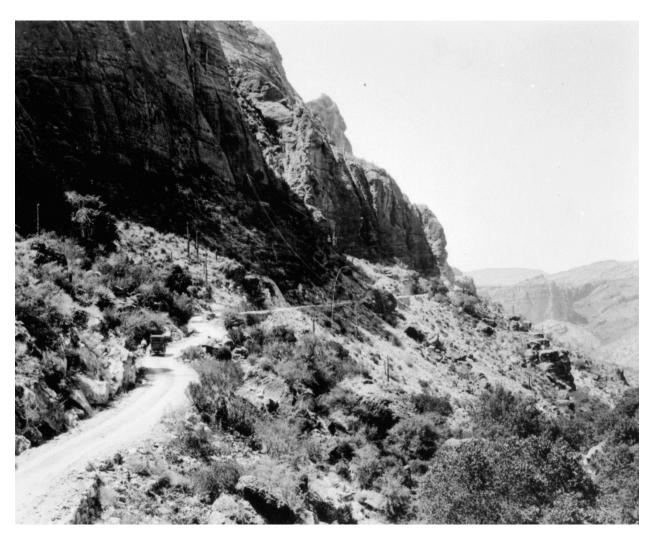


Figure 35: Looking up Fish Creek Hill on wagon road to Roosevelt Dam site, 1914. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.



Figure 36: "Will Sanders Freighting to Roosevelt Dam, 1905." Source: Salt River Project Archives, Phoenix, Arizona.

Once the road to the Roosevelt Dam site had been completed, the Reclamation Service constructed connector roads to carry men and material to work sites along the Salt River. These side roads also were used to convey rock and cement from the Roosevelt site to places where such supplies were necessary, such as at Granite Reef Dam. The local press carried accounts of this supplementary road building, continuing to ignore any possibility that the Salt River itself might be used for ferrying supplies along the stream. For instance, on May 25, 1906, the *Phoenix Republican* reported that the Reclamation Service recently had conducted a new road survey on the south side of the Salt River to connect with the main road to Roosevelt Dam. "This survey," the paper wrote, "of [the] proposed new road is a matter of considerable importance to the people of the valley, for it is another step in the direction of the securing of a

permanent diversion dam." The road, the *Republican* continued, was to be used to carry cement from the plant at Roosevelt to a future diversion dam site, which was to be near Granite Reef. The newspaper added that the road "will touch any desirable point along the river." There was no suggestion that commercial navigation interests objected to the idea of a diversion dam at Granite Reef, and the discussion of the road made it clear that the river was not being used to convey goods along the Salt River by water. ¹¹⁵

The road from Phoenix to Roosevelt had to be maintained after its completion. Press articles about such matters still did not mention the possibility of water transportation along the Salt River above Granite Reef Dam. The *Arizona Gazette* reported on September 25, 1906, that improvements were being made to the Roosevelt Road in preparation for winter flood flows:

In addition to the work that is being carried on at the [diversion dam construction] camp, improvements and fortifications are being made in the Roosevelt road so that the winter rise will not interfere with the transportation of cement from Roosevelt to the dam site. The granite . . . is hauled down this famous road by freighters to a point near Mesa and is taken from there across a new road built especially by the government engineers for the purpose. ¹¹⁶

There were many accounts in the press of travelers who made the difficult journey by stage to the Roosevelt Dam site along the Tonto Road. On January 27, 1908, the *Arizona Gazette* reported on the events of one such stagecoach trip. Noting that the journey required eight hours and covered sixty miles, the article also stated that there was a considerable amount of wagon freighting taking place on the road:

There are many men and teams engaged in hauling stuff to Roosevelt by wagons. On one trip the stage will meet forty wagons. Four to six horses are generally used and the outfits travel in pairs, the owners or drivers camping together. 117

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^{115 &}quot;Prospective Site of Diversion Dam," *Phoenix Republican*, May 25, 1906.

¹¹⁶ [No title], Arizona Gazette, Sept. 25, 1906.

^{117 [}No title], Arizona Gazette, Jan. 27, 1908.

There was no suggestion that any freighting was being done on the Salt River, though the article was quite long and detailed about other activities along the river and at Roosevelt.

Like Roosevelt Dam, Granite Reef Dam also would obstruct potential navigation on the Salt River, but there is no evidence that anyone objected to this diversion facility being built. The following photographs illustrate Granite Reef Dam's locale, its construction (the dam was completed in 1910), and the nature of the Salt River at that location around the time of Arizona's statehood in 1912.



Figure 37: Granite Reef Dam site, October 31, 1907. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

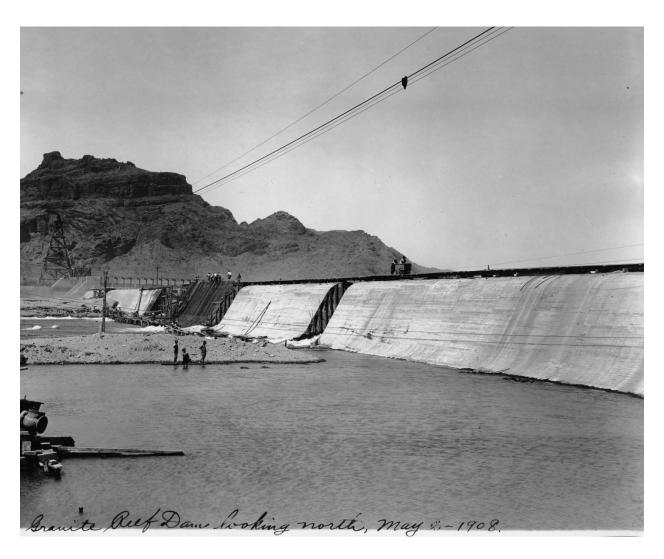


Figure 38: Granite Reef Dam under construction, May 2, 1908. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

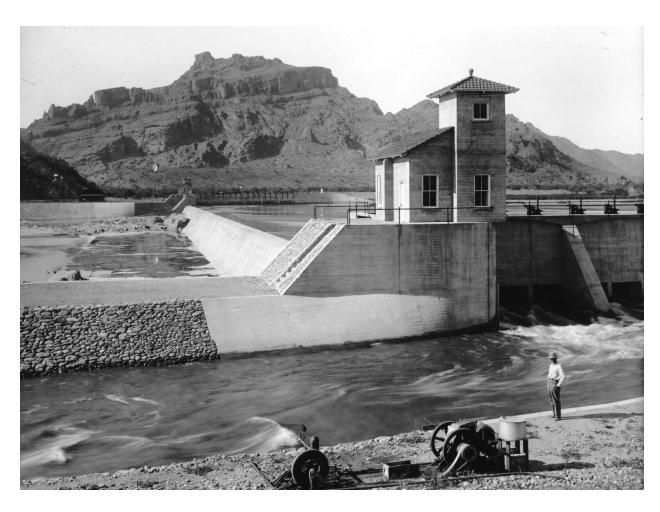


Figure 39: Granite Reef Dam completed, April 29, 1910. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

One final example illustrated the contemporaneous belief in the lack of navigability of the Salt River. On August 30, 1908, the *Arizona Republican* carried an account that a ferry boat to be used on the lake behind Roosevelt Dam had arrived by overland transportation in Mesa and was being freighted by wagon to the reservoir:

A large ferry boat, to be used on the lake at the Roosevelt dam, left Mesa yesterday morning for its destination. W.H. Otterson had a team of twelve horses attached to two large freighting wagons which was used in the transportation of the boat. It has an ample capacity for a team and a wagon, and it is proposed to use this to connect passengers with the Mesa-Roosevelt and Globe stage routes. 118

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^{118 &}quot;Ferry Boat for Roosevelt," Arizona Republican, Aug. 30, 1908.

Had the Salt River been navigable, presumably there would have been no need to haul the ferry to Roosevelt Dam by wagon.

Even the end of construction on Roosevelt Dam in 1911 and the appearance of President Theodore Roosevelt at the dedication ceremonies prompted no objections from navigation interests to the presence of Roosevelt Dam, Granite Reef Dam, or other Salt River Project facilities along the upper Salt River. Instead, the ceremony marking the completion of Roosevelt Dam was a cause of celebration throughout the Salt River Valley. The following photographs illustrate the completion of Roosevelt Dam and the scale of water storage behind that dam serving the Salt River Project.



Figure 40: President Theodore Roosevelt speaks at Roosevelt Dam dedication, March 18, 1911. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

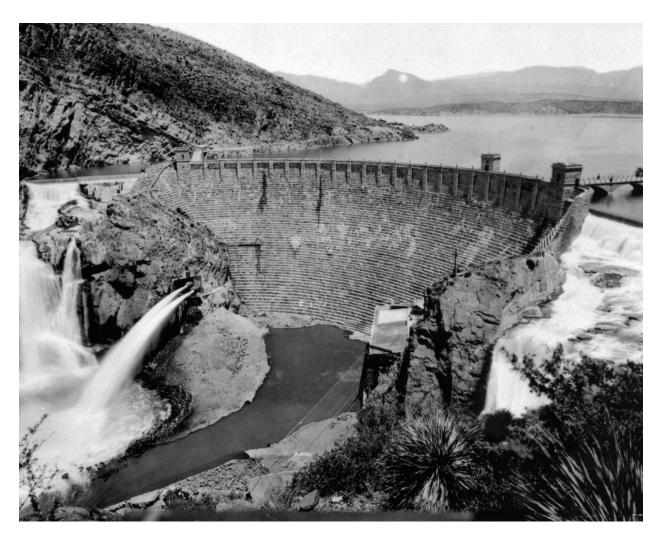


Figure 41: Roosevelt Dam shortly after completion, 1912. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

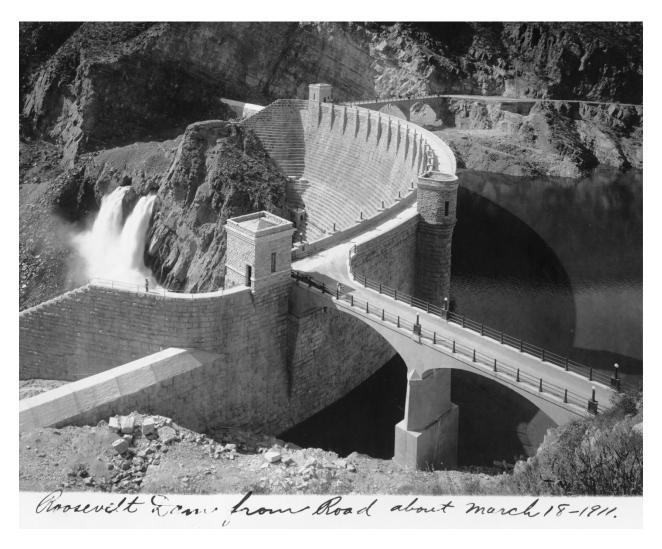


Figure 42: Roosevelt Dam, March 18, 1911. Source: Records of the Bureau of Reclamation, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

C. Summary and Conclusions to Chapter 4

As one of the most dominant features of the topography of the Salt River Valley as well as the source of irrigation water for hundreds of farms in the years leading up to Arizona's statehood, the upper Salt River constantly figured in news accounts by the Phoenix-area press. These newspaper stories illustrated a river that varied enormously in flow, from completely dry to raging torrents. They also emphasized the crucial importance the stream played to the economic well-being of the region. Nonetheless, despite countless articles detailing nearly every aspect of the Salt River, there is no indication in the press reports that the stream was useful for

transportation or that it could have been employed in that manner. Instead, the newspaper articles observed repeatedly that roads and railroads were the principal means of carrying goods and people. In those cases where boats were used on the Salt, the manner in which those stories were written made it clear that such instances were the exception rather than the rule. Historical photographs from the period reinforce these views.

The importance of newspaper accounts *not* showing the Salt River to be navigable is emphasized by the fact that had the stream been useful for transportation on a regular and reliable basis, the booster qualities inherent in late nineteenth and early twentieth century American West newspapers surely would have prompted the Phoenix-area press to bring this attribute of the Salt to the attention of readers far and wide. Likewise, historical photographs surely would have captured images of watercraft being used on the Salt River to carry people or commerce. That the local papers did not deem the river to be navigable and that historical photographs did not illustrate navigation, are both therefore clearly significant.

CHAPTER 5: WESTERN WATERCRAFT

At the turn of the twentieth century, the only river in the Southwest considered by most observers to be navigable was the Colorado, which, as a result, became a testing ground for boats with shallow drafts and lightweight construction. Regularly navigated from its mouth at the Gulf of California past Yuma to approximately present-day Bullhead City, the Colorado River was the subject of many stories in multitudes of newspapers, promotional publications, as well as in published government documents. The significance of such boating on the Colorado River was not lost on prospective businessmen, possible settlers, and military officials, all of whom hoped for easier access to the interior parts of the southwestern United States, not only on the Colorado, but on other rivers as well.

From accounts of expeditions on the Colorado River, therefore, some details about boat technology in relation to southwestern rivers around the time of Arizona statehood can be discerned. This is not to say that river travel was not attempted on other southwestern streams – indeed, it was considered because water travel in the nineteenth century was by far the most economical method of internal communication. Nevertheless, river navigation on other southwestern streams proved to be unreliable and risky, and the Colorado River was the only stream in the region where regular navigation occurred. Therefore, a brief examination of the history of navigation on the Colorado in this chapter can provide useful insight into the nature and technology of watercraft used for transportation on that river and whether similar craft might have plied the upper Salt River.

Aside from accounts of actual expeditions on the Colorado River, additional information about southwestern watercraft operation can be found in reports written to describe general advances in boat construction as well as from historical photographs, both of which are also

discussed in this chapter. This information, when combined with experiences on the Colorado River, can help shed light on the navigability of Arizona's streams such as the upper Salt River.

A. Accounts of Navigation on the Colorado River

Following the acquisition of much of the western part of the United States in the 1840s and 1850s, federal authorities sent many explorers to the West to determine what the new region held. Most often, these parties consisted of military officers who kept journals of their travels, making note of the natural environment, Indians, fort locations, and possibilities for settlement. Some of these expeditions included references to travel on western rivers, notably the Colorado, although not all specified what types of vessels were used.

1. J.C. Ives and the Ship *Explorer*, mid-1850s

One of the first such journeys was led by Lieutenant Joseph Christmas Ives (better known as J.C. Ives). Ives was sent in the mid-1850s to pilot a small steamboat, the *Explorer*, up the Colorado River from the Gulf of California to the Virgin River to assess that stream's utility as a navigable waterway. Following his return to the East, Ives wrote a report about his expedition (which was later published). Completed on March 23, 1858, Ives's written pre-publication account (available at the National Archives branch in College Park, Maryland) discussed the problems associated with navigating the Colorado River. Ives explained that the Colorado River was extremely difficult to navigate because the "channel is exceedingly circuitous and constantly shifting" – characteristics similar to the upper Salt River – and he further noted the repeatedly presence of sand bars and shoals. Ives added:

boats rarely make a trip between tide water and Fort Yuma without grounding many times a day. By working them about in the shifting sand . . . and as a last

resort, by lightening the boat of the cargo, these shoals may always be passed with more or less labor. 119

Ives also offered a recommendation for a type of boat for future use on the Colorado River if the U.S. Government wanted to use it for transportation on a regular basis. Due to the hazardous and difficult conditions, Ives suggested an "iron stern wheel boat, with the hull 100 feet long and the greatest breadth of beam 22 feet built sufficiently [illegible] to ensure a draught when light, not exceeding 12 inches." Ives included in his published report a sketch of the *Explorer*, which is reproduced below together with several drawings of the *Explorer* as it went through the lower Colorado River's gorges. Following those items is a view of a similar craft going up the Colorado River in about 1870. Although Ives believed that five trips a year could be made on the Colorado above Yuma in such watercraft, he repeatedly asserted that it was an extremely troublesome stream to navigate due to the rip and spring tides near its mouth, the constantly shifting channel, the numerous obstacles along the river, and finally, the rapids near the mouth of the Virgin River. 120

¹¹⁹ J.C. Ives, "Report Upon Navigable Portion of Colorado River, March 23, 1858," pp. 1, 2, 7, box 2, Entry 726, Records of the Office of Explorations and Surveys, Miscellaneous Records, Records of the Office of the Secretary of the Interior, Record Group 48, U.S. National Archives II, College Park, Maryland. Ives's report was subsequently published as J.C. Ives, *Report upon the Colorado River of the West, Explored in 1857 and 1858 by Lieutenant Joseph C. Ives, Corps of Topographical Engineers* (Washington, D.C.: U.S. Government Printing Office, 1861).

¹²⁰ J.C. Ives, "Report Upon Navigable Portion of Colorado River, March 23, 1858," pp. 1, 2, 7, box 2, Entry 726, Records of the Office of Explorations and Surveys, Miscellaneous Records, Records of the Office of the Secretary of the Interior, Record Group 48, U.S. National Archives II, College Park, Maryland.

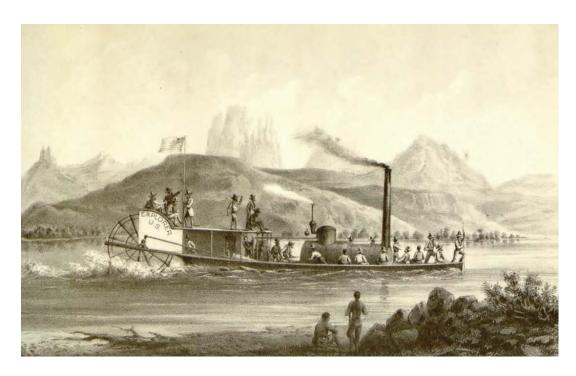


Figure 43: J.C. Ives's sketch of the *Explorer* navigating the Colorado River, ca. mid-1850s. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).



Figure 44: Drawing of Ives's exploration of the Colorado River at West Mohave Canyon, mid-1850s. Note Ives's boat at bottom of sketch. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).

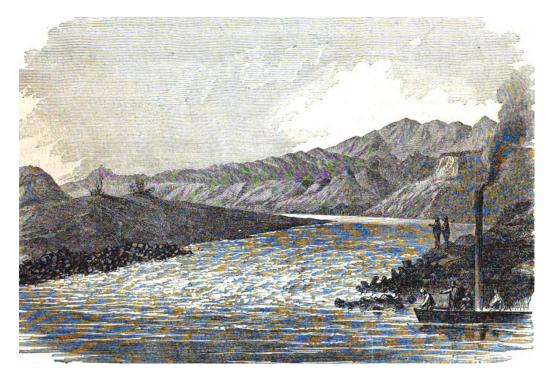


Figure 45: Drawing of Ives's exploration of the Colorado River at Deep Rapid, mid-1850s. Note Ives's boat at right. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).

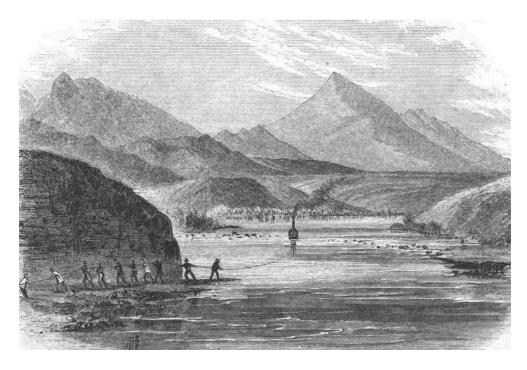


Figure 46: Drawing of Ives's exploration of the Colorado River – lining the boat through rapids, mid-1850s. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).



Figure 47: Photograph of the type of stern wheel steamboat suggested by J.C. Ives for navigating the Colorado River, circa 1870. This photo was taken near present-day Lee's Ferry, Arizona. Source: www.grandcanyonhistory.

2. John Wesley Powell and the Grand Canyon, 1869 and 1871-1872

Ives's expedition up the Colorado River in the mid-1850s may have been one of the earliest attempts to navigate that stream, but probably the most famous expeditions on the Colorado were the two led by explorer John Wesley Powell (see Powell in two photos below). Unlike Ives, who had used a steamboat to go upstream on the Colorado, Powell went downstream in wooden dories through the Grand Canyon (which Ives never reached), first in 1869, and then again in 1871-1872. Powell made it clear after the first trip that while he had survived the experience, the multitude of rapids and other obstacles along this portion of the Colorado River made it hardly practicable as a possible water-based access route to the interior part of North America. Indeed, his experiences and those of his crew on the first trip proved to be so frightening that several crewmembers opted to

climb out of the canyon (where they were subsequently killed by Indians) rather than continue on the river. ¹²¹



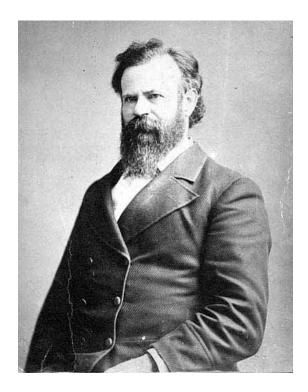


Figure 48: Photographs of John Wesley Powell in 1869 and 1874. Source: U.S. National Park Service online photograph collections.

Powell made a second trip down the Colorado River and through the Grand Canyon in 1871-1872, this time focusing more on gathering scientific information than he had on the first excursion. This expedition – unlike the first – was made during low water, and while the rapids on this trip were not as terrifying as during the first venture, the second journey still faced major difficulties bypassing rocks and rapids. On this second trip, Powell brought a photographer, and some of the resulting photos documented the nature of the dories Powell used on both trips (see below).

¹²¹ See generally Wallace Stegner, *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West* (Boston: Houghton-Mifflin, 1954).

http://3dparks.wr.usgs.gov/3Dcanyons/html/glencanyon.htm (accessed May 9, 2005). For details on Powell's expeditions down the Colorado, see *Exploration of the Colorado River of the West and Its Tributaries Explored in 1869, 1870, 1871 and 1872, under the Direction of the Secretary of the Smithsonian Institution* (Washington, D.C.: U.S. Government Printing Office, 1875).



Figure 49: Photograph of Powell's dories on the Colorado River, 1871-1872. Note the lashed-on armchair on the boat in the foreground; Powell commanded the expedition from the chair. Source: U.S. National Park Service online photo collection.



Figure 50: Photograph of Powell's crew with dories in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photo collection.



Figure 51: Photograph of a closer view of Powell's dories on the Colorado River, 1871-1872. Note the arm chair lashed to the top of the boat in the background. Source: Grand Canyon National Park Collection, Grand Canyon, Arizona.



Figure 52: Another photographic view of Powell's dories on the Colorado River, 1871-1872. Source: Grand Canyon National Park Collection, Grand Canyon, Arizona.



Figure 53: Photograph of Powell's dory tied up in the Grand Canyon with the armchair strapped on top. Note life rings tied to the chair. Source: U.S. National Park Service online photograph collection.

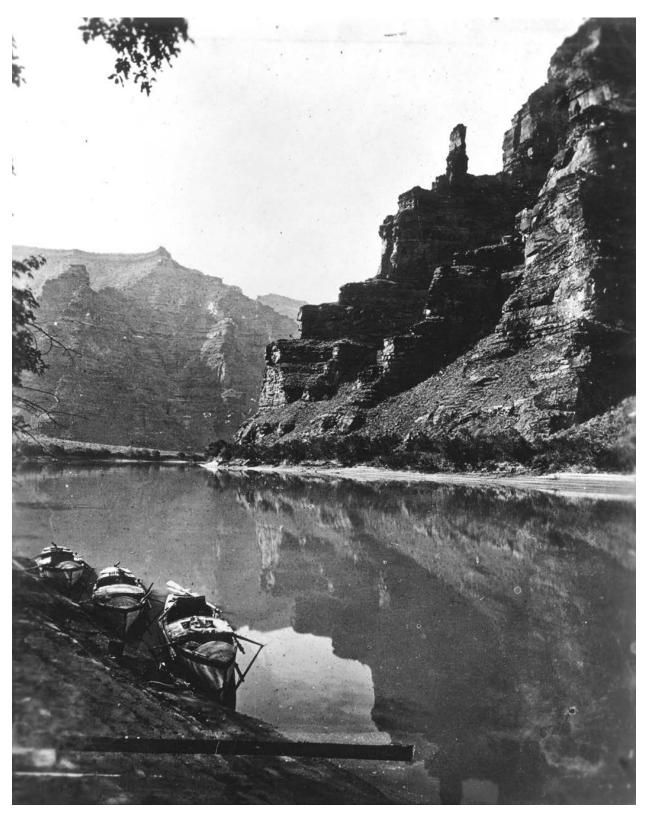


Figure 54: Photograph of Powell's expedition on the Colorado River, 1871-1872, with boats tied up. Source: U.S. National Park Service online photograph collection.



Figure 55: Photograph of John Wesley Powell's second expedition through the Grand Canyon, 1871-1872. Source: U.S. Library of Congress, Washington, D.C.

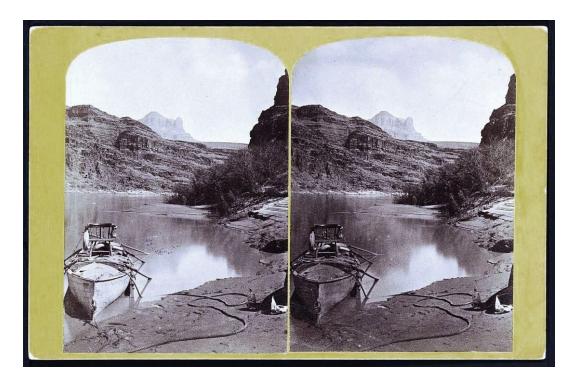


Figure 56: Stereographic photograph of the dory used by John Wesley Powell on the second expedition through the Grand Canyon in 1871-1872. Note that strapped to top of the dory is an arm chair, where Powell sat. Source: U.S. Library of Congress, Washington, D.C.

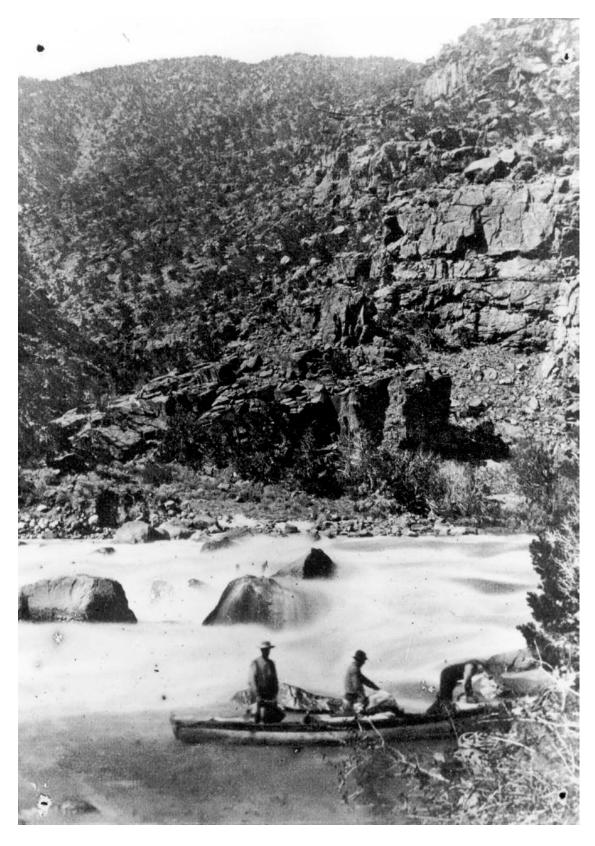


Figure 57: Photograph of one of Powell's boats at rapids in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.



Figure 58: Photograph of Powell's boats tied up near rapids in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

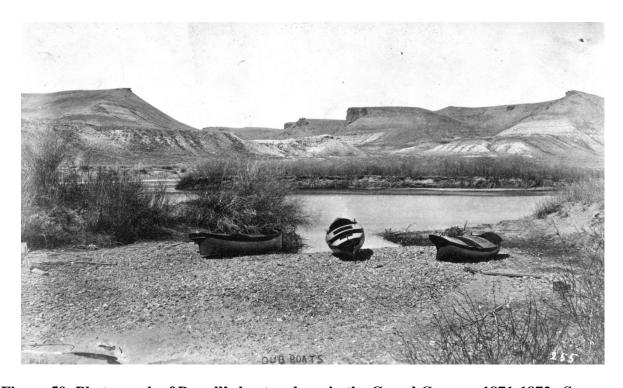


Figure 59: Photograph of Powell's boats ashore in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

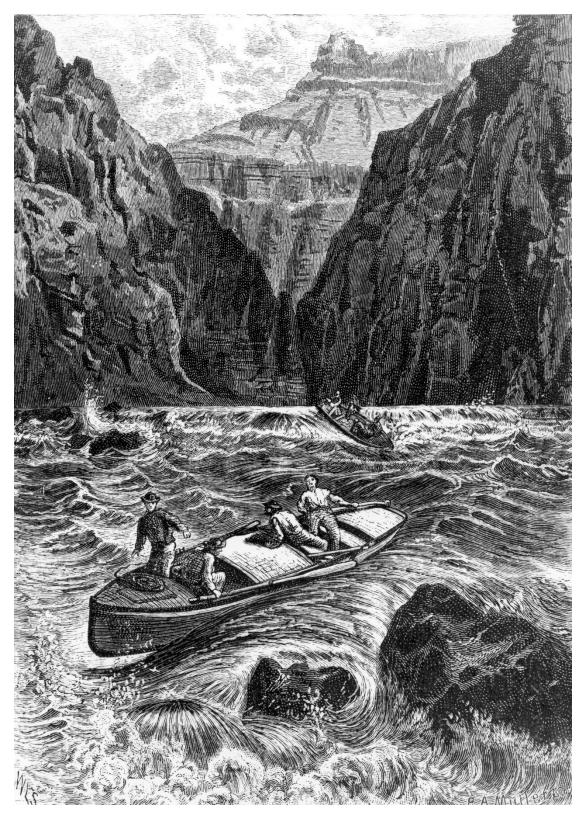


Figure 60: Sketch of the Powell expedition running rapids in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.



Figure 61: "Our First Camp," Powell expedition through the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

3. George M. Wheeler Expedition up the Colorado River, 1871

Another boating expedition – this time up the Colorado River – was made in 1871 just as Powell was journeying through the Grand Canyon the second time. Commanded by Lieutenant George M. Wheeler, the upriver expedition had been directed by Congress to explore the American West and to make topographic maps of that region as well as report on its characteristics. As part of his effort, Wheeler and his party were to locate the head of navigation on the Colorado River. Wheeler's expedition started from Camp Mojave, Arizona Territory, on September 15, 1871, and using small row-boats, the group made it upstream to the mouth of Diamond Creek (often having to portage around rapids). They covered a distance of two hundred sixty miles in thirty-one days. A photograph of Wheeler's departure from Camp

Mohave can be seen below. Following that is a stereographic view of the Wheeler expedition in the Black Canyon on the Colorado River (near where Hoover Dam is located today), and then appears a photograph of the expedition at "Camp Bighorn" on the Colorado.



Figure 62: Photograph of George M. Wheeler's upstream Colorado River expedition leaving Camp Mohave, Arizona Territory, 1871. Source: U.S. Library of Congress, Washington, D.C.



Figure 63: Stereographic photograph of Wheeler expedition up the Colorado River at Black Canyon, 1871. Source: U.S. Library of Congress, Washington, D.C.



Figure 64: Photograph of Wheeler expedition up the Colorado River, 1871, at Camp Big Horn. Note boats on the beach. Source: U.S. Library of Congress, Washington, D.C.

4. Other Accounts about Navigation on the Colorado River

Other reports of attempts to navigate the Colorado River added to the growing belief that the Colorado had some transportation possibilities. An early history of Arizona, entitled *The History of Arizona Territory Showing its Resources and Advantages with Illustrations:*Descriptive of its Scenery, Residences, Farms, Mines, Mills, Hotels, Business, Houses, Schools, Churches, Etc. (1884), for instance, provides excellent descriptions of the rivers of Arizona as well as boats in the late nineteenth century. This publication noted that the steamship Explorer (probably not Ives's boat discussed earlier in this chapter, which had fallen into disrepair) soon was expected to ascend the Colorado River. The Explorer was fifty-four feet long from the bow to the stern wheel. This was about half the length that Ives had recommended for the Colorado River, presumably to make the craft more maneuverable in the shifting channel. Nevertheless, the Explorer's draft was reported to be two and a half feet, considerably more than Ives believed to be feasible on the Colorado River, at least if it was to ascend as far as the Virgin River. 123

While this account of a watercraft capable of navigating upriver on the Colorado River appeared promising, that view, however, should be tempered by the fact that *The History of Arizona Territory* – like many similar regional chronologies of the day – had been paid for by western promoters eager to attract businesses and settlers to the sparsely populated American Southwest.

Joseph Ives's earlier report, therefore, is probably more objective regarding the Colorado's possibilities as an upriver transportation artery, at least below the Grand Canyon. Nevertheless,

¹²³ History of Arizona Territory Showing its Resources and Advantages with Illustrations: Descriptive of its Scenery, Residences, Farms, Mines, Mills, Hotels, Business, Houses, Schools, Churches, Etc. (San Francisco: Wallace W. Elliot & Co., 1884).

other attempts by steamboats confirmed that the Colorado River could, in fact, be used by such craft 124

Other accounts printed in U.S. Government documents further acknowledged the possibilities of using the Colorado River below the Grand Canyon as an artery of commerce and transportation. A January 30, 1907, letter from J.A. Mellon, the captain of the Colorado River steamer *Cochran*, to the Bureau of Corporations, noted that the *Cochran* weighed 237 tons and drew 20 inches of water when light and an additional 1 inch of water for every 10 tons of freight. According to other records of the Bureau of Corporations, another Colorado River steamship (actually, more like a barge), the *Silas J. Lewis*, weighed 100 tons, drawing seven inches of water with no load and one inch more for every eleven tons. ¹²⁵

B. Western Watercraft in General

Regarding western rivers more generally, the 1909 report of the commissioner of corporations provided additional insight on the state of navigation in the Southwest before and around the time of Arizona statehood in 1912. This document contained information about the types of vessels being used for navigation at the time. The report noted that "[o]n the western rivers there soon appeared the well-known flat-bottom, stern-wheel steamboat, adapted to the shallow waters of those streams, the design of which has not greatly changed for half a century." The vessels, the report added, "used in the river trade are still mainly built of wood." When specifically discussing river steamers, the report stated that:

¹²⁴ For details on various steamboats used on the Colorado River, see Kay Muther, "Paddle-wheelers on the Colorado," *Wild West Magazine*, Aug. 2004.

Report of the Commissioner of Corporations on Transportation by Water in the United States, Water-Borne Traffic (Washington D.C.: U.S. Government Printing Office, 1909), pp. 370-371.

¹²⁶ Report of the Commissioner of Corporations on Transportation by Water in the United States, General Conditions of Transportation by Water (Washington D.C.: U.S. Government Printing Office, 1909), pp. 128-129.

[r]equirements on the western rivers are the least possible load draft, economical speed, readiness of handling the vessel, and freight and passenger capacity. In the case of towboats large reserve power is an important item. 127

Although the report conceded that little change had been made in the stern-wheel, light-draft steamers in two decades, it declared that recently "a new type of light-draft steamer has been developed, with screwpropeller built in a tunnel in the after part of the vessel." ¹²⁸

Water Trails West, a more recent compilation of essays regarding various western streams, included one article containing additional information about navigation on the Colorado River as well as other western waterways. This essay, by Donald H. Bufkin and C.L. Sonnichsen, indicates that boats larger than the one proposed by J.C. Ives were used successfully on the Colorado.

According to Bufkin and Sonnichsen, the largest ship to use the Colorado was the Mohave II. With a length of 175 feet (over three times that of the Explorer described in the History of Arizona

Territory and one and three quarters as long as Ives's boat), the Mohave II had a 32-foot beam. This was 10 feet wider than Ives's recommendation. The Mohave II was approximately 190 tons and drew less than two feet of water. (Ives suggested only one foot, while the History of Arizona claimed two and a half). Other boats similar to the Mohave II in use in the West, according to Bufkin and Sonnichsen, were all over 100 feet in length and over 25 feet in width. Further, these vessels were generally stern-wheeled, making them easier to navigate streams filled with sandbars and shallow water. ¹²⁹

¹²⁷ Report of the Commissioner of Corporations on Transportation by Water in the United States, General Conditions of Transportation by Water (Washington D.C.: U.S. Government Printing Office, 1909), p. 138.

¹²⁸ Report of the Commissioner of Corporations on Transportation by Water in the United States, General Conditions of Transportation by Water (Washington D.C.: U.S. Government Printing Office, 1909), p. 139.

¹²⁹ Donald H. Bufkin and C.L. Sonnichsen, "Steamboat Through Hell: River Traffic on the Colorado of the West," in *Water Trails West*, (Garden City, N.J.: Doubleday & Company, 1978), pp. 218-230.

C. Summary and Conclusion to Chapter 5

The state of boating technology around the turn of the century makes it clear that the upper Salt River was not susceptible to navigation before or at the time of Arizona's statehood. The erratic and irregular flow in the upper Salt River was not consistent enough in its ordinary state to support boats used for transporting commerce. A dependable and reliable draft of two feet could not be found in streams that were sometimes only a few inches deep, although at flood stage, they could contain water well over the height of human beings. Then, however, the raging torrents were too dangerous to be navigated. Even the dories used by John Wesley Powell to go down the Colorado River or the rowboats used in the Wheeler expedition would have had a difficult time using the upper Salt River a regular basis. Furthermore, the upper Salt River's shifting nature made its course undependable as well as dangerous. The status of watercraft at the time of Arizona's statehood in 1912 – as described in historical literature and illustrated in photographs – make it clear that no such vessels could have been utilized on a regular and dependable basis on the upper Salt River.

APPENDIX – LITTLEFIELD VITA

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EDUCATION:

- Ph.D. American history. University of California, Los Angeles, 1987. Dissertation: "Interstate Water Conflicts, Compromises, and Compacts: The Rio Grande, 1880-1938." Fields: history of California and the American West, water rights history, legal history, environmental history.
- M.A. American history. University of Maryland, College Park, 1979. Master's thesis: "A History of the Potomac Company and Its Colonial Predecessors." Fields: business history, colonial history, early republic history, trans-Appalachian West history, British history.
- B.A. English literature. Brown University, 1972.

CONSULTING AND EXPERT WITNESS EXPERIENCE:

- 2008-present: Research historian and consultant for McAfee & Taft in Tulsa, Oklahoma (attorney Robert Joyce). Providing historical research, written report, and testimony regarding lead and zinc mining and land use in northeastern Oklahoma for use in *Quapaw Tribe of Oklahoma, et al., v. Blue Tee Corp, et al.*, U.S. District Court for the Northern District of Oklahoma, Civil Action No. 03-CV-486-CVE-PJC.
- 2006-2007: Research historian and consultant for Loeb & Loeb in Los Angeles (attorney Anthony Murray). Provided historical research and deposition testimony regarding the history of natural disasters (mudslides, floods, fires, earthquakes, etc.) in Southern California for use in *Dane W. Alvis, et al.*, v. La Conchita Ranch Company, et al., Ventura County (California), Superior Court Case No. CIV 238700.
- 2005-present: Research historian and consultant for the Stinson Beach County Water District in Marin County, California (counsel: Hanson, Bridgett, Marcus, Vlahos & Rudy of San Francisco). Providing historical research on the history of the water rights of the District.

- 2005: Research historian and consultant for the Lake Arrowhead Community Services District (counsel: Best, Best & Krieger of Riverside, California). Provided historical research and documentation on the history of water rights associated with Lake Arrowhead in southern California. Testified before the California State Water Resources Control Board concerning the District's pre-1914 water rights claims (and post-1914 claims).
- 2004 2006: Research historian and consultant for City of Santa Maria, California (counsel: Best, Best & Krieger of Riverside, California). Provided historical research and documentation on the history of water rights of the U.S. Bureau of Reclamation's Santa Maria Project (California) for use in *Santa Maria Valley Water Conservation District v. City of Santa Maria, Southern California Water Company, City of Guadalupe, et al.*, Santa Clara County (California) Superior Court, Case No. CIV 770214. Deposed and subsequently testified as an expert witness at trial.
- 2004 Present: Research historian and consultant for City of Pocatello, Idaho (counsel: Beeman & Associates of Boise, Idaho, and White & Jankowski of Denver, Colorado). Providing historical research and documentation on the history of Pocatello's water rights for use in Snake River Basin Adjudication (In Re: the General Adjudication of Rights to the Use of Water From the Snake River Drainage Basin Water System, State of Idaho v. United States; State of Idaho; and all unknown claimants to the use of water from the Snake River Drainage Basin Water System, County of Twin Falls (Idaho) District Court, Case No. 39576. Provided affidavit testimony.
- 2003 2004: Research historian and consultant for U.S. Bureau of Reclamation (Mid-Pacific Region). Providing historical research and a report on the history of the water rights of the Friant Unit of the Bureau's Central Valley Project (California).
- 2002: Research historian and consultant for the Alameda County Water District (counsel: Hanson, Bridgett, Marcus, Vlahos & Rudy of San Francisco). Provided historical research on the history of the water rights of the District.
- 2001 2007: Research historian and consultant for Paloma Investment Limited Partnership (counsel: Mesch, Clark & Rothschild of Tucson, Arizona). Provided historical research and deposition regarding whether the Gila River was commercially navigable in 1912 when Arizona became a state for use in *Flood Control District of Maricopa County v. Paloma Investment Limited Partnership* and *Paloma Investment Limited Partnership v. Flood Control District of Maricopa County*, Maricopa County (Arizona) Superior Court, Case No. CV97-07081.
- 2000 2001: Research historian and consultant for Salt River Project, Arizona (counsel: Salmon, Lewis & Weldon of Phoenix, Arizona). Provided historical research and documentation on Zuni Indian water rights and land claims in Arizona and New Mexico for use in *In re the General Adjudication of All Rights to Use of Water in the Little Colorado River System and Source*, Apache County (Arizona) Superior Court, Case No. 6417.

- 2000 2001: Research historian and consultant for the Maryland Attorney General. Provided historical research and affidavit testimony on the 1785 "Mount Vernon" interstate compact between Maryland and Virginia for use in U.S. Supreme Court case of *Virginia v. Maryland*, No. 129 Original.
- 2000: Research historian and consultant for the Salt River Project, Arizona (counsel: Salmon, Lewis & Weldon of Phoenix, Arizona). Provided historical research and documentation on water rights of the Gila River, Arizona, for use in *In Re: The General Adjudication of All Rights to Use Water in the Gila River System and Source*, Maricopa County (Arizona) Superior Court, Case No. W1-203.
- 1998 2000: Research historian and consultant for the Idaho Attorney General. Provided historical research on whether the Salmon River and selected tributaries were commercially navigable in 1890 when Idaho became a state.
- 1998 1999: Research historian and consultant for the Idaho Coalition, a landowners' group (counsel: John K. Simpson of Rosholt, Robertson & Tucker of Boise, Idaho, and Shawn Del Ysura of J.R. Simplot Company of Boise, Idaho). Provided historical research, and affidavit testimony on the impacts of various dams in the Columbia River and Snake River watersheds on anadromous fish for use in Snake River Basin Adjudication (*In Re: the General Adjudication of Rights to the Use of Water From the Snake River Drainage Basin Water System, State of Idaho v. United States; State of Idaho; and all unknown claimants to the use of water from the Snake River Drainage Basin Water System, County of Twin Falls (Idaho) District Court, Case No. 39576.*
- 1998 2000: Research historian and consultant for Sacramento Municipal Utility District of California (counsel: Ronald Aronovsky of Alden, Aronovsky & Sax of San Francisco). Provided research on land site history for use in *Sacramento Municipal Utility District v. California Department of Transportation, Sacramento Housing and Redevelopment Agency, et al.*, Sacramento County (California) Superior Court, Case No. 96AS04149.
- 1997 2005: Research historian and consultant for City of Las Cruces, New Mexico (counsel: Stein & Brockmann of Santa Fe, New Mexico). Provided historical research on the City's water rights for use in *State of New Mexico v. Elephant Butte Irrigation District*, Dona Ana County (New Mexico) District Court, Case No. CV 96-888.
- 1997 2003: Research historian and consultant for Fort Hall Water Users' Association, Idaho (counsel: Richard Simms of Hailey, Idaho). Provided historical research and report the Association's water rights in relation to the Shoshone and Bannock Indian land cessions on the Fort Hall Indian Reservation in Idaho for use in *Fort Hall Water Users'***Association, et al., v. United States of America, U.S. Court of Federal Claims, Case No. 01-445L.
- 1997 2004: Research historian and consultant for Kern Delta Water District (counsel: McMurtrey, Hartsock & Worth of Bakersfield, California). Providing historical research and report on Kern Delta's water rights for use in *North Kern Water Storage District v*.

- *Kern Delta Water District, et al.*, Tulare County (California) Superior Court, Case No. 96-172919. Testified in that case as an expert witness historian for ten days in the initial trial, which was remanded for additional testimony and evidence. Provided additional research and written reports on water rights for the remanded trial.
- 1996 1998: Research historian and consultant for Idaho Attorney General. Provided historical research on water rights in relation to the Deer Flat National Wildlife Refuge for use in Snake River Basin Adjudication (In Re: the General Adjudication of Rights to the Use of Water From the Snake River Drainage Basin Water System, State of Idaho v. United States; State of Idaho; and all unknown claimants to the use of water from the Snake River Drainage Basin Water System, County of Twin Falls (Idaho) District Court, Case No. 39576.
- 1995 1998: Research historian and consultant for U.S. Department of Justice. Provided historical documentation on the history of water rights on the Santa Margarita River at U.S. Marine Corps Base, Camp Pendleton, in southern California.
- 1995 Present: Research historian and consultant for the Salt River Project (counsel: Salmon, Lewis & Weldon of Phoenix, Arizona). Providing historical documentation and reports on whether the Salt, Gila, and Verde rivers were commercially navigable in 1912 when Arizona became a state. Testified between 1997 and 2005 several times before the Arizona Navigable Stream Adjudication Commission regarding the navigability of the Salt, Verde, and Gila rivers. Testified on the same subject in 1998 and 1999 before the Arizona State Legislature.
- 1995 2001: Research historian and consultant for Nebraska Department of Water Resources (counsel: Simms & Stein of Santa Fe, New Mexico). Provided historical documentation and report on water rights and the history of *Nebraska v. Wyoming*, 325 U.S. 589 (1945), for use in U.S. Supreme Court case of *Nebraska v. Wyoming*, Original No. 108, regarding the apportionment of the waters of the North Platte River. Deposed in that case, but the case was settled before trial.
- 1993 1994: Research historian and consultant for Simms and Stein, attorneys specializing in water law in Santa Fe, New Mexico. Provided historical documentation and affidavit testimony on Arapaho and Shoshone land claims and cessions along the Wind River in Wyoming for use in *In Re: the General Adjudication of All Rights to Use Water in the Big Horn River System and All Other Sources, State of Wyoming*.
- 1991 2003: Research historian and consultant for Legal Counsel, Division of Water Resources, Kansas State Board of Agriculture (counsel: Montgomery & Andrews of Santa Fe, New Mexico). Provided historical research on water rights and history of apportionment of the Republican River and its tributaries among Kansas, Nebraska, and Colorado for use in U.S. Supreme Court case of *Kansas v. Nebraska and Colorado*, No. 126 Original, regarding the interstate apportionment of the Republican River. Provided affidavit testimony.

- 1991 1993: Research historian and consultant for Nickel Enterprises (Bakersfield, California; counsel: Anthony Murray of Carlsmith, Ball, Wichman, Murray, Case, Mukai & Ichiki of Long Beach, California. Provided historical documentation and report on the navigability of the Kern River for use in *Nickel Enterprises v. State of California*, Kern County (California) Superior Court, Case No. 199557. Testified as an expert witness historian in this case for eleven days.
- 1989 1990: Research historian for Pacific Enterprises, Los Angeles, California. Directed historical research for and coauthored a corporate history of this southern California holding company entitled *The Spirit of Enterprise: A History of Pacific Enterprises*, 1867-1989 (1990).
- 1988 1989: Research historian and consultant for Water Defense Association, Roswell, New Mexico (counsel: Simms & Stein of Santa Fe, New Mexico). Provided historical documentation of water rights claims along the Bonito, Hondo, and Ruidoso rivers in southeastern New Mexico for use in *State v. Lewis*, Chaves County (New Mexico), Case Nos. 20294 & 22600, Consolidated.
- 1986 1990: Research historian and consultant for Legal Counsel, Division of Water Resources, Kansas State Board of Agriculture (counsel: Simms & Stein of Santa Fe, New Mexico). Provided historical documentation and report on water rights and interstate apportionment of the Arkansas River between Kansas and Colorado for use in U.S. Supreme Court case of *Kansas v. Colorado*, October Term 1985, Original No. 105, regarding the interstate apportionment of the Arkansas River. Deposed and later testified as an expert witness historian for twelve days.
- 1986 1989: Research historian and consultant for Legal Counsel, State Engineer Office, State of New Mexico. Provided historical documentation and report on water rights in the Carlsbad Irrigation District in southeastern New Mexico for use in *State v. Lewis*, Chaves County (New Mexico) Case Nos. 20294 & 22600, Consolidated.
- 1986 1987: Historical consultant for *National Geographic Magazine*. Advised editors on June 1987 article, "George Washington's Patowmack Canal."
- 1984 1986: Research historian and consultant for Legal Counsel, State Engineer Office, State of New Mexico. Provided historical documentation and report on the history of water rights on the Rio Grande and interstate apportionment disputes between New Mexico and Texas for use in *El Paso v. Reynolds*, U.S. District Court, Civ. Case No. 80-730-HB.

AWARDS AND OTHER PROFESSIONAL EXPERIENCE:

- 2008: Winner of the National Council on Public History's Consultant Award.
- July 1, 2007 present: Member, Board of Directors, California Supreme Court Historical Society.

- August 2006: Faculty lecturer for Continuing Legal Education (CLE) International, Arizona Water Law Conference. Taught course on "Historians and Water Rights The Role of Historians in U.S. Supreme Court Interstate Stream Litigation."
- 1999: Gave keynote address at New Mexico Water Resources Institute's 44th Annual New Mexico Water Conference on "The History of the Rio Grande Compact of 1938."
- January 1992 1994: Member of Board of Editors of Western Historical Quarterly.
- 1991 1995: Lecturer, Department of History, California State University, Hayward. Taught a graduate seminar on environmental history and also taught courses on American history and California history.
- 1980 1984: Editorial Assistant, *Pacific Historical Review*. Edited scholarly articles and book reviews.
- 1979 1979: Lecturer, University of Maryland's University College off-campus program. Taught courses on the history of the American West and U.S. History surveys at the Pentagon and at a military base.

PUBLICATIONS:

Books:

Conflict on the Rio Grande: Water and the Law, 1879-1938. University of Oklahoma Press (2009).

The Spirit of Enterprise: A History of Pacific Enterprises, 1867-1989 (coauthor, 1990).

Articles:

- "Jesse W. Carter and California Water Law: Guns, Dynamite, and Farmers: 1918-1939," *California Legal History* (2009).
- "History and the Law: The Forensic Historian in Court," *California Supreme Court Historical Society Newsletter* (2008).
- "The History of the Rio Grande Compact of 1938," in Catherine T. Ortega Klett, ed., 44th

 Annual New Mexico Water Conference Proceedings The Rio Grande Compact: It's

 the Law (Las Cruces: New Mexico Water Resources Research Institute, 2000).
- "The Forensic Historian: Clio in Court," Western Historical Quarterly (1994).

- "The Rio Grande Compact of 1929: A Truce in an Interstate River Apportionment War," *Pacific Historical Review* (1991).
- "Eighteenth Century Plans to Clear the Potomac River: Technology, Expertise, and Labor in a Developing Nation," *Virginia Magazine of History and Biography* (1985).
- "The Potomac Company: A Misadventure in Financing an Early American Internal Improvement Project," *Business History Review* (1984).
- "Water Rights During the California Gold Rush: Conflicts over Economic Points of View," Western Historical Quarterly (1983).
- "Maryland Sectionalism and the Development of the Potomac Route to the West, 1768-1826," *Maryland Historian* (1983).

Book Reviews:

- Sarah S. Elkind, *Bay Cities and Water Politics: The Battle for Resources in Boston and Oakland* (Lawrence: University Press of Kansas, 1998), in *Environmental History* (2000).
- David C. Frederick, Rugged Justice: The Ninth Circuit Court of Appeals and the American West, 1891-1941 (Berkeley: University of California Press, 1994), in Pacific Historical Review (1995).
- Daniel Tyler, *The Last Water Hole in the West: The Colorado Big Thompson Project and the Northern Colorado Water Conservancy District* (Niwot, Colorado: University Press of Colorado, 1992), in *Montana: The Magazine of Western History* (1994).
- Lloyd Burton, *American Indian Water Rights and the Limits of Law* (Lawrence: University Press of Kansas, 1991), in *Journal of the West* (1994).
- Zachary A. Smith, ed., *Water and the Future of the Southwest* (Albuquerque: University of New Mexico Press, 1989), in *Western Historical Quarterly* (1991).
- F. Lee Brown and Helen Ingram, *Water and Poverty in the Southwest* (Tucson: University of Arizona Press, 1987), in *The Public Historian* (1990).
- David J. Eaton and Michael Andersen, *The State of the Rio Grande/Rio Bravo: A Study of Water Resource Issues Along the Texas/Mexico Border* (Tucson: University of Arizona Press, 1987), in *New Mexico Historical Review* (1988).
- Pat Kelley, *River of Lost Dreams: Navigation on the Rio Grande* (Lincoln: University of Nebraska Press, 1986), in *Pacific Historical Review* (1988).
- Marc Reisner, Cadillac Desert: The American West and Its Disappearing Water (New York: Viking Penguin, Inc., 1986), in *Environmental History Review* (1987).

Thomas F. Hahn, *The Chesapeake and Ohio Canal: Pathway to the Nation's Capitol* (Metuchen, N.J.: Scarecrow Press, Inc., 1984), in *Business History Review* (1987).

PROFESSIONAL AFFILIATIONS:

American Historical Association, American Society for Environmental History, California Committee for the Promotion of History, California Historical Society, California Supreme Court Historical Society, National Council on Public History, Ninth Judicial Circuit Court Historical Society, Organization of American Historians, Western History Association, Western Council on Legal History.