REVISED AND UPDATED REPORT:

ASSESSMENT OF THE NAVIGABILITY OF THE GILA RIVER BETWEEN THE MOUTH OF THE SALT RIVER AND THE CONFLUENCE WITH THE COLORADO RIVER PRIOR TO AND ON THE DATE OF ARIZONA'S STATEHOOD, FEBRUARY 14, 1912

by

Douglas R. Littlefield, Ph.D.
Littlefield Historical Research
6207 Snake Road
Oakland, California 94611
510-339-1017
drl@LittlefieldHistoricalResearch.com
www.LittlefieldHistoricalResearch.com

November 12, 2013

TABLE OF CONTENTS

MAPS AND OTHER ILLUSTRATIONS

EXECUTIVE SUMMARY

This is the second revised version of a report addressing the navigability (or lack thereof) of the Gila River between that stream's confluence with the Salt River (near Phoenix) to the Gila's juncture with the Colorado River (at Yuma) in the decades before or at the time of Arizona's statehood on February 14, 1912. The previous two reports were dated April 24, 1998, and November 3, 2005. Both reports were submitted to the Arizona Navigable Stream Adjudication Commission together with related testimony by the reports' author, Douglas R. Littlefield. This updated study is intended to add further information about the historical characteristics of the Gila 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 Gila River may have affected the stream's ordinary and natural condition before statehood.

To make the evaluation of the Gila River's navigability before and in 1912, a wide array of published and unpublished documents and photographs were consulted (discussed in greater detail in the "Introduction" and listed in the footnotes and appendices). This survey of hundreds of primary and secondary sources yielded a multitude of historical views of the Gila River, from U.S. Government surveys and reports, land settlement records created by authorities of the United States and Arizona, explorers' journals, diaries, early pioneer reminiscences, historical photographs, newspaper accounts, and many other types of records.

Taken as a whole, these records illustrate that many years prior to and at the time of Arizona's statehood in 1912 the Gila River was considered *not* navigable by virtually every

contemporaneous observer. It is significant that cumulatively hundreds of people made judgments concerning the Gila River's navigability – opinions spread over many years, different seasons, and over the large geographic area between roughly Phoenix and Yuma, Arizona. The historical record illustrates that the Gila River was erratic, subject to unpredictable flooding, prone to channel changes, and blocked by natural obstacles such as rock outcroppings and sandbars. In short, the historical record clearly demonstrates that the Gila River was *not* navigable before or on February 14, 1912.

INTRODUCTION

A. Previous Reports

This report is a revised version of a 2005 historical study of the Gila River's navigability at the time of Arizona's statehood in 1912, which, in turn, was a revision of a 1998 report on the same topic. The original two reports were prepared on behalf of the Salt River Project and presented as exhibits, together with related testimony by Douglas R. Littlefield, Ph.D., to the Arizona Navigable Stream Adjudication Commission (ANSAC) during hearings in Yuma in 1998 and in Phoenix in 2005. Some of the current report is similar to the earlier studies, particularly in relation to U.S. General Land Office surveys and federal and state patents, because those historical sources have not changed since the previous reports were done. Yet this report has been expanded, especially in relation to historical newspaper accounts and historical photographs. This additional material has been made possible by the growth of online historical newspaper collections (which permit key-word searching of relevant newspaper articles) as well as by online archival finding aids for pertinent historical photograph collections. By conducting additional historical research in these areas, it has been possible to provide more insight about the nature of the Gila River long before and at the time of Arizona's statehood on February 14, 1912. This extra awareness 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 Gila River may have affected the stream's ordinary and natural condition, particularly in the years before statehood.

B. Purpose of Report

The purpose of this revised report is to examine what the Gila River was like in its ordinary and natural condition well before and at the time of Arizona's statehood on February 14, 1912. As is the case with other bodies of water in Arizona, under the "equal footing doctrine" of the U.S. Constitution, the answer to the question of who holds title to the Gila River's bed depends upon whether that stream was susceptible of, or used for, navigation at or before the time of statehood. In general, the equal footing doctrine holds that if any body of water within any state was navigable at the time of statehood, title to the bed passed to that state when it joined the Union. If the stream was not navigable, ownership of the bed remained in the U.S. Government's hands until lands adjacent to the body of water were patented or otherwise disposed of. At that time, the bed of the stream or lake became the property of individual land owners next to the river.[1]

C. Chronological and Geographical Limits of Report

The chronological time period covered by this report extends from the mid-nineteenth century, when there were only a minimal number of man-made obstructions or diversions on the Gila River, to the years shortly after Arizona's statehood on February 14, 1912. The geographic range covered by this report is from the Gila River's confluence with the Salt River near Phoenix, Arizona, downstream to the Gila's juncture with the Colorado River near Yuma. This report does not address any part of the Gila River above its juncture with the Salt River. Of course, some historical materials overlap these downstream and upstream boundaries, so to the extent they are relevant to the regions in between, those records will also be discussed.

[1] The fundamental U.S. Supreme Court case confirming this doctrine is *The Steamer Daniel Ball v. United States*, 77 U.S. 999 (1871).

D. Historical Research Locations

A wide variety of published and unpublished sources were utilized in creating this study. The vast majority of these are primary sources – documents created close in time and/or geography to events that they describe. These primary sources provide the most accurate descriptions of the Gila River. To locate relevant sources, Littlefield Historical Research developed a preliminary list of terms for searching many local, state, and national archives. We also used the list to search published primary sources such as government reports and newspaper accounts, and the list was supplemented as research brought to light new topics related to the Gila River. Since various archives use different means to list their holdings, we adapted our list to accommodate specific locations, and we utilized many online finding aids (indices of archival holdings) on the internet.

In addition, a lengthy list of Arizona and federal government agencies' names was searched for records they may have generated regarding the Gila River. Agencies (and their predecessors) whose records were reviewed include the Arizona State Land Department, the Arizona Attorney General's Office, the U.S. Congress, the U.S. Geological Survey, the U.S. Bureau of Land Management, the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, the U.S. Department of Agriculture, and the U.S. Bureau of Indian Affairs.

Research began at Arizona State University. The university's main library houses the Archives and Manuscript Division, and, when the original 1998 research was conducted, the main library also contained the privately funded Arizona Historical Foundation (which, since the time of the original research, has been disbanded and its materials distributed to other archives). Both archives contain (or contained) excellent collections of source materials, published and unpublished, as well as an extensive collection 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 comprises file titles from each manuscript collection at the library. Non-digitized printed finding aids were also examined. The preliminary searches yielded eleven unpublished manuscript collections of prominent citizens and early settlers in the Gila River Basin including Phillip A. Bailey, Lloyd C. Henning, and Carl Hayden. The manuscripts in these collections provided eyewitness accounts of the Gila River, such as descriptions of floods, the stream's channel, and local activities taking place on or near the stream.

Numerous photo collections at Arizona State were also searched both for the previous versions of this report as well as for this study, and relevant photos have been reproduced where appropriate here.

Arizona State University was also useful for its collection of Arizona statutes. The statutes (mostly territorial) were investigated for laws relevant to navigability and public land disposal.

Additionally, historical Arizona newspapers – in microfilm for the previous studies and online for this version of the report – were searched to obtain a sense of the activities occurring on the Gila River and for firsthand accounts of any important events. Many newspapers around the turn of the century provided booster-like stories intended to attract settlers to local communities near or along the Gila River. Such reports frequently noted transportation facilities, mild weather, and other conveniences of the region. Navigation on the Gila River, therefore, certainly would have been celebrated in the area press had it occurred regularly and reliably. Newspapers originally examined include the *Arizona Weekly Gazette* (Phoenix, 1909-1914), the *Yuma Examiner* (1909-1913), and the *Arizona Sentinel* (Yuma, 1909-1915). Supplementing this initial work, a considerable amount of additional research in historical newspapers was conducted in online

Arizona newspaper collections, many of which only recently became available for online key-word searching.

Additional and similar research was conducted at the University of Arizona in Tucson and at the Tucson branch of the Arizona Historical Society. At both locations, many historical photographs were reviewed illustrating the nature of the Gila River in the late nineteenth and early twentieth centuries.

Also useful was the Water Resources Center Archives, which at the time of the original research, was located at the University of California, Berkeley, but since then has been moved to the University of California, Riverside. Although located in California, this library is one of the premiere 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 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 U.S. Geological Survey's *Water Supply Papers* and *Bulletins* (many of which were relevant to the history of the Gila River Valley) as well as all of the U.S. Reclamation Service's *Annual Reports* published before and around the time of Arizona's statehood.

Another important archival research location was the Bancroft Library at the University of California, Berkeley. The Bancroft Library 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 Gila River area were reviewed as well as published reports of nineteenth-century explorations. Since many of the individuals who visited the

Gila River region were there specifically to report on its potential, their reports are especially useful to ascertaining the historical nature of the Gila River.

The University of California, Berkeley, was also the site of research on boating around the time of Arizona's statehood. Published reports of the Commissioner of Corporations on Transportation by Water were reviewed to determine the extent of technological development for shallow watercraft in the nineteenth and early twentieth centuries. Also examined were records about boating on the Colorado River. The Colorado River was a catalyst for advances in boating technology because of its swift current, shallow water, and frequently changing channel. Information on watercraft on the Colorado River, therefore, is useful to understand river boating throughout the West in the years before and around the turn of the century.

Following this research, reports and studies conducted by U.S. Government agencies were reviewed. Most of these reports covered such topics as flood control, irrigation, and the utilization of natural resources in the Gila River Valley. These documents provided descriptions of the Gila River at different points in time leading up to and shortly after statehood. Some of the reports are specific to the Gila River, but much information was contained in larger studies on Arizona and the Gila River Valley. In addition, a computer search was done of files compiled by Congressional Information Services (CIS) to find Congressional documents, hearings, and reports relevant to the Gila River.

In addition to the sources obtained at Arizona State University, the University of Arizona, and the Universities of California at Berkeley and Riverside, documents held by the U.S. Bureau of Land Management in Phoenix were reviewed – records that are some of the most important concerning the Gila River before and around the time of statehood. The Bureau of Land Management holds nineteenth-century U.S. General Land Office surveys carried out to prepare the

public domain for homesteading; these records include original surveyors' plats and field notes. Since the U.S. Government required that federal surveyors "meander" all navigable bodies of water (using degree bearings and distances to measure the irregular sinuosities of streams) and to keep detailed notes of these meanders, survey documents are vital to understand what the Gila River was like at the time of survey. While surveys took place for different areas along the Gila River at different times, initial surveys before statehood were done between 1868 (when relatively few man-made obstructions affected the Gila River) and 1911. A few resurveys prior to statehood also were carried out. Thus, the surveys and resurveys are especially useful to an historical study of the Gila River's characteristics, particularly in the years before the completion of major dams altered the Gila River's regimen. (See Chapter 1 for greater detail on these records.)

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 Indexes. These records were used to determine how the federal government disposed of the public lands in Arizona through which the Gila River flows. From this material, any U.S. patent that either overlaid or bordered the Gila River was obtained. Federal patents were critical in determining how the U.S. Government viewed public lands in Arizona. If federal officials had considered the Gila River to be navigable (which partly would have been determined by any meanders conducted by federal surveyors), they would not have deeded out land lying in the channel or bed of the river. However, there is no indication in any federal patents overlying the Gila River that the U.S. Government hesitated to grant title to the bed and the banks to patent applicants.

The U.S. National Archives in Washington, D.C., provided the supporting paperwork for federal land patents such as applications and affidavits of witnesses. (Such affidavits were generally required for "proving up," or finalizing, a patent and obtaining clear title.) The affidavits in

particular are useful to assessing the Gila River's navigability because many homestead patent applicants and their witnesses commented on the Gila River, especially when the patent overlay the Gila River. Federal patents and their files, combined with historical maps obtained from the U.S. Geological Survey and the Bureau of Land Management, were used to create exhibit maps for this report illustrating the location of patents and federal land grants along the Gila River. (The maps and related discussion of patents appear in Chapter 1.)

Additional research at archives in the Phoenix and Tucson areas was carried out. This included contacting various local archives and the Arizona Historical Society at two of its locations, Phoenix and Tucson (the Yuma branch is temporarily closed) to determine their respective holdings. Considerable research was conducted at the Tucson branch of the Arizona Historical Society (which is the oldest branch, and therefore has the largest collections of records). In particular, at the Tucson branch many historical photographs were examined and relevant ones copied for this report.

Furthermore, the Arizona State Archives in Phoenix provided more rare state and territorial government documents and manuscript collections. These materials included the unpublished papers of agencies such as the Arizona State Land Department, the Arizona Water Commissioner, the Arizona State Planning Board, and the Arizona Secretary of State. The papers of the State Land Department were particularly useful for historical information on how the state disposed of the lands along the Gila River that had been granted to the state by the federal government.

After reviewing the historical records of the Arizona State Land Department at the Arizona State Archives, research was also done at the Arizona State Land Department's Phoenix office. Although most of the patent information for land along the Gila River was found at the U.S. Bureau of Land Management in Phoenix and the U.S. National Archives in Washington, D.C., the Arizona State Land Department provided copies of patents issued by Arizona for parcels granted to the state

by the United States. Approximately fifty state patents were eventually reviewed. (See the state patent map in Chapter 2.) The corresponding application files for the state patents were also obtained and reviewed.

The Salt River Project Archives in Tempe was also a critical location for research. The Salt River Project has an extensive historical document 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). Furthermore, the newspaper clipping collection housed by the Salt River Project is also 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. While at the National Archives, a wide variety of federal agency files, including those of the U.S. Bureau of Indian Affairs, the U.S. Army Corps of Engineers, the U.S. General Land Office, 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 government documents.

The Rocky Mountain branch of the National Archives in Denver was also visited to undertake a more thorough search of Record Group 115 (U.S. Bureau of Reclamation). These records are organized into two chronological periods, with the 1902-1919 group containing material most relevant to this study, including reports and other materials dating back into the nineteenth century. These records provided a rich source of information before and around the time of statehood. Moreover, the Bureau of Reclamation's files contain historical data on the nature of the Gila River before major upstream dams were constructed.

Further historical research was conducted at the Sharlot Hall Museum and Research Library in Prescott, Arizona. The Sharlot Hall Research Library holds an extensive historical photograph collection, and all photos related to the Gila River were reviewed. Relevant photos were copied for possible use in this report.

E. Computer Database and Methodology

As noted above, the scope of research undertaken for this project was extensive. Many thousands of pages of records were reviewed on-site at various archives, libraries, and government agencies, and tens of thousands of pages of documents, photographs, and newspaper articles were copied for later in-depth study. To manage this comprehensive research, a computer database was utilized in the research and writing of this report. That process was undertaken in the following manner. Relevant documents located during research were abstracted into a database that could be sorted by subject matter, author, recipient, date, agency, or a wide variety of other possible combinations. When research and abstracting were completed, that database was sorted by subject matter and date, and the results were transferred directly into a word processing program to provide a rough draft of this report. The use of the database not only facilitated correlating information and organizing the rough draft, but transferring the organized material from the database directly to the word processing program also ensured accuracy by avoiding transcription errors. The computer database also was used to record accurately the original sources for all underlying documents used in drafting this report, and the database kept track of the location of copies of those documents in the author's files.

F. Report Organization and Stylistic Notations

One of the principal functions of a historian is to review and summarize in an accurate manner large quantities of historical information to yield a detailed and understandable record of the past so that others may readily understand it without the need to read and analyze all of the underlying data. That concept is a basic goal of this report. It is also the responsibility of a historian to present the past in an objective manner, no matter how unpleasant those events may have been or how unpopular the outcome may be with regard to modern-day concerns. For that reason, the underlying documents in this study were used in such a manner as to allow those documents to tell their own stories. This was done in the following manner. Summaries of documents were sometimes used to condense material into a useable length, yet wherever possible, direct quotations from the underlying documents – especially those of particular importance – were also employed.

It is common practice for professional and scholarly historians to use footnotes, and this report employs that methodology. Footnotes verify accuracy by citing the original sources or, if so desired, provide a means of beginning further research on various points discussed in the text. In this report, footnotes also specifically indicate materials relied upon. There are, however, the following exceptions to the use of footnoting in this report. This overall "Introduction" as well as the final "Summary and Conclusion" sections generally do not contain many footnotes because those sections of the report are synopses of everything contained in the intervening chapters. Documentation supporting the general statements found in this "Introduction" and in the "Summary and Conclusion" section can be found in the detailed paragraphs that appear within the individual chapters to this report. The same caveat applies to the introductory paragraphs and concluding paragraphs to each of the intervening chapters.

Individual footnotes appear at the end of phrases, sentences, or paragraphs indicating sources used for those statements. Where an individual footnote appears following several sentences or paragraphs, the note generally covers all of that material. Direct quotations are always provided with individual footnotes throughout this report. To facilitate ease of reference, the use of "ibid." and other terms denoting repetition of previously-cited sources has been eliminated and complete sources cited except in relation to repeated portions of citations within any given individual footnote. Also for simpler reference, footnote numbers run continuously throughout the entire report rather than using the conventional practice of starting each new chapter with footnote number 1.

G. Organization of Remainder of Report

Based on the wide-ranging research for this report, it became evident that some of the most important records dealing with the Gila River were the U.S. General Land Office original surveys and patent records (both federal and state). Therefore, the first two chapters of this report deal with the significance of those documents. Other U.S. Government documents (both published and unpublished) and miscellaneous materials are discussed in Chapter 3. Chapter 4 examines historical newspaper accounts of the Gila River. Chapter 5 contains a discussion of types of watercraft used on western rivers during the nineteenth and early twentieth centuries. Historical photographs and other illustrations appear throughout this report where appropriate. The last section of the report contains a general summary and conclusions. Following that section is an appendix containing the vita of Douglas R. Littlefield, Ph.D., who oversaw all research, reviewed all materials, and wrote the original two studies and this supplemental report.

CHAPTER 1: U.S. GOVERNMENT SURVEYS

Among the largest and most important groups of records in relation to the Gila River 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 U.S. General Land Office. When the United States became the owner of the vast territory acquired from Mexico after the end of the Mexican-American War in 1848, U.S. officials were anxious to determine the value of the country's new lands. Moreover, they wanted to prepare the region for orderly occupation by American settlers to solidify control. To ready the new areas for homesteading and to record those lands' characteristics, the U.S. Government undertook formal surveys conducted by the General Land Office – the predecessor of today's U.S. Bureau of Land Management. Because those surveys were highly detailed, the original plats of the area near the Gila River and the related survey field notes contain a wealth of information about the nature of that stream.

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' work. To appreciate the significance of these manuals in relation to navigability, it is important to understand the books' provisions and how they changed over time.

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. This manual was adopted by the U.S. General Land Office to standardize survey work in California and Oregon, which were the most important areas of western American settlement in the late 1840s and early 1850s. The *Manual* was the first formal surveying handbook issued by the federal

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.[2]

The *Instructions to the Surveyor General of Oregon* provided that public lands were to be 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 process that had been used in other earlier public land territories and states, and the size of the blocks was based on Thomas Jefferson's original estimate that each block, composed of many small farms, would be the proper size to support a town at its center. Jefferson's ideas were first enacted into law in the *Land Ordinance of 1785*.[3] The first surveys under this legislation were done in what is today the State of Ohio, and the grid procedure was used in most new territories added to the United States in the years that followed.

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. That location had been chosen in 1865 by

[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. Aside from a detailed history of those procedures, White's book 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 of the history of public lands 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.

John A. Clark, surveyor general of New Mexico Territory, to begin the Arizona surveys. The beginning marker originally had been established by the Mexican Boundary Commission in 1851 as a point on the U.S.-Mexico border prior to the Gadsden Purchase of 1853, which created the present boundary between the United States and Mexico.[4]

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. The results were blocks of land that were six miles by six miles in dimension 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 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 Gila River from its confluence with the Salt River downstream to its juncture with the Colorado River near Yuma, Arizona – the lands examined lie between township 1 north, range 1 west, and township 8 south, range 23 west.

With exterior township and range lines established, federal 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 along the edges 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

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

and heading west for sections one through six. Section seven then appeared immediately south of section six, and section numbering then went east through section twelve. The remaining sections were numbered in the same "S" fashion until section thirty-six was reached in the extreme southeastern part of the township.

Surveyors laying out the township, range, and section lines were provided with very precise instructions for measuring these lines because accuracy was critical for these lands to be transferred out of the public domain 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. Using their field notes, surveyors then were 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 *Instructions to the Surveyor General of Oregon* contained several provisions that are relevant to navigable bodies of water and other obstructions and therefore are important in relation to any consideration of the Gila River's navigability or non-navigability. 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 instructions continued, surveyors were given specific instructions to identify 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.[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."[6] Federal legislation directing that navigable bodies of water be set aside for public uses was first passed in 1796, but that law did not directly specify what constituted navigability. Nonetheless, the law provided that all navigable rivers:

> shall be deemed to be, and remain public highways, and that in all cases, where the opposite banks of any stream, not navigable, shall belong to different persons, the stream and the bed thereof shall become common to both.[7]

In other words, surveyors were given the responsibility of identifying navigable bodies of water to determine who held title to the beds and banks of those waterways. 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.]

---

[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.

[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.

[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. 468 (1796).

Surveying lines that intersected navigable rivers, lakes, or other bodies of water were to be done 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]

Aside from these general directions, surveyors were also 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.[9]

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,

---

[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.

[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.

it remained virtually identical in substance with regard to recording navigable and non-navigable bodies of water.[11]

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 dealt 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 Territory began in 1868, it was this set of instructions that governed how bodies of water in Arizona 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 instructions at all, presumably leaving this part of the 1855 *Manual* intact. Yet 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.][12]

The *Instructions* further provided that for the sake of consistency, one-bank meanders were to be done on the right side (looking downstream) unless obstacles made it necessary to switch to

---

[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.

[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. The statute referred to is the original law establishing that navigable streams would be meandered. See *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. 468 (1796).

the left bank. If a change to the left were to be made, it was to be done at a point where a survey line crossed the stream, and the change was to be recorded in the field notes.[13]

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 Claims*. In this manual, much of the instructions 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 1881 *Instructions* told surveyors to use triangulation to establish the distance across non-navigable obstacles on line. Also as in the 1851 and 1855 *Manuals*, 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 bearing and distance from the trees to their respective witness posts on line were to be noted in the field notes.[14]

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

[13] *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.

[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), p. 516.

"[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."[15]

In terms of how meanders were to be carried out, the 1881 directions 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 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.[16]

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 identical to the previous work, including those 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 still were 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 1855, 1864, and 1881, the 1890 directions also stated that for navigable bodies

[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. 516-517.

[16] *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.

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.[17]

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 were used for "internal communication." In addition, the 1890 *Manual* no longer told surveyors to meander streams that were considered navigable, as the 1881 directions had provided "under the statute."[18] Instead, the 1890 instructions 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.][19]

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 affected non-navigable streams. This change involved bodies of water used for "internal communication" (1881), where one bank was to be meandered, or streams more than three chains wide (1890), where both banks were to be meandered.

---

[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. 560.

[18] *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. The statute referred to is: *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. 468 (1796).

[19] *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.

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 relation to which 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-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.)[20]

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

[20] *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.

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.][21]

What the *Manual* meant was that the beds and banks 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 riparian 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 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.[22]

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

[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. 717.

[22] *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.

more or less than three chains wide, which should be meandered at ordinary high-water mark, as far as tide-water extends."[23]

B. Summary Regarding Manuals and Meandering

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 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" (frequently incorrectly) to identify irregular survey lines along reservation boundaries.

C. U.S. Government Surveys in the Gila River Area

Prior to Arizona's statehood in 1912, various areas along the Gila River were surveyed and in some cases resurveyed, 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 generally did not have the responsibility to undertake meanders where necessary (unless their contracts covered both interior and exterior surveys, which was true in many cases), the field notes of the exterior surveys are of limited value to this report. Therefore, exterior surveys 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 Gila River's navigability or non-navigability.

[23] *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.

The interiors of the townships through which the Gila River flows between its confluence with the Salt River downstream to the juncture with the Colorado River were surveyed initially over a wide range of years, most of which were prior to statehood. Those surveys took place in 1868, 1871, 1874, 1877, 1878, 1882, 1883, 1890, 1910, and 1911. A resurvey of a part of one township was also undertaken in 1907. In addition, several townships were not surveyed until after Arizona's statehood on February 14, 1912. Those surveys took place in late 1912, 1915, and 1936. Because of the large number of different survey dates, cumulatively they were done according to the instructions of many of the survey manuals discussed above. Significantly, while there were nine U.S. Government surveyors who mapped the Gila between the Salt and Colorado rivers prior to 1912 and while those surveys were done under the instructions of many different survey manuals, all surveyors indicated in their field notes and plats that they did not consider the Gila River to be navigable.

Because of the importance of these initial federal surveys in relation to establishing the nature of the Gila River, they will be discussed in detail here. In general, the discussion will be in a down-river manner because surveys began near where the Gila River merged with the Salt River near Phoenix. In addition, while the field notes and plats for all townships along the Gila River below the Salt River have been reviewed, most of the examples discussed in this report will be drawn from field notes and plats for areas covered by the detailed sample maps created for this report. Due to the length of the Gila River involved in this study, representative sampling was necessary to keep the discussion to manageable proportions. The location of the sample areas can be seen on the map below, which covers the Gila River from the mouth of the Salt River downstream to the Gila's confluence with the Colorado River. The map shows in yellow the areas covered by this study in greater detail.

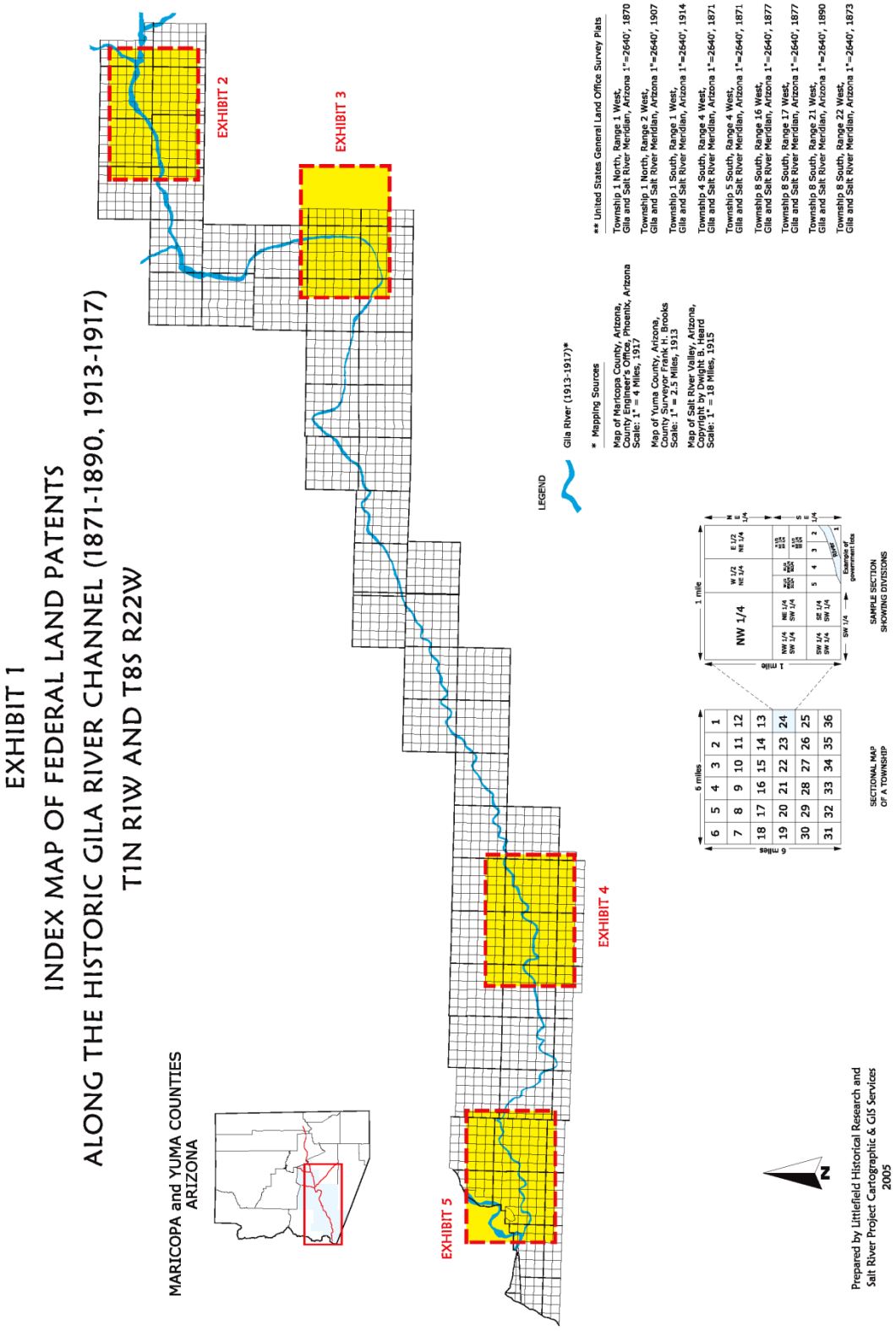


Figure 1: Exhibit 1, Index Map of Federal Land Patents along the Historical Gila River Channel (1871-1890, 1913-1917), between T1N, R1W, and T8S, R22W. Source: Littlefield Historical Research and Salt River Project Cartographics, 2005.

As the above map illustrates, Exhibit 2 is a map that covers the area near where the Salt River meets the Gila. Exhibit 3 shows lands around Gila Bend on the Gila River. Exhibit 4 shows lands along the Gila River in the Mohawk Valley, and Exhibit 5 details the area at the juncture of the Gila and Colorado rivers near present-day Yuma, Arizona.

Generally speaking, the sample areas in Exhibits 2-5 were chosen for this report because they had a relatively high density of original homestead patents – a factor that is important in relation to the discussion in Chapter 2. With regard to the topic of this chapter, although the study areas involve sampling along the river, nothing in the field notes and plats for townships outside the sample areas contradicts findings from plats and notes within the sample areas. Exhibits 2-5 are reproduced below.

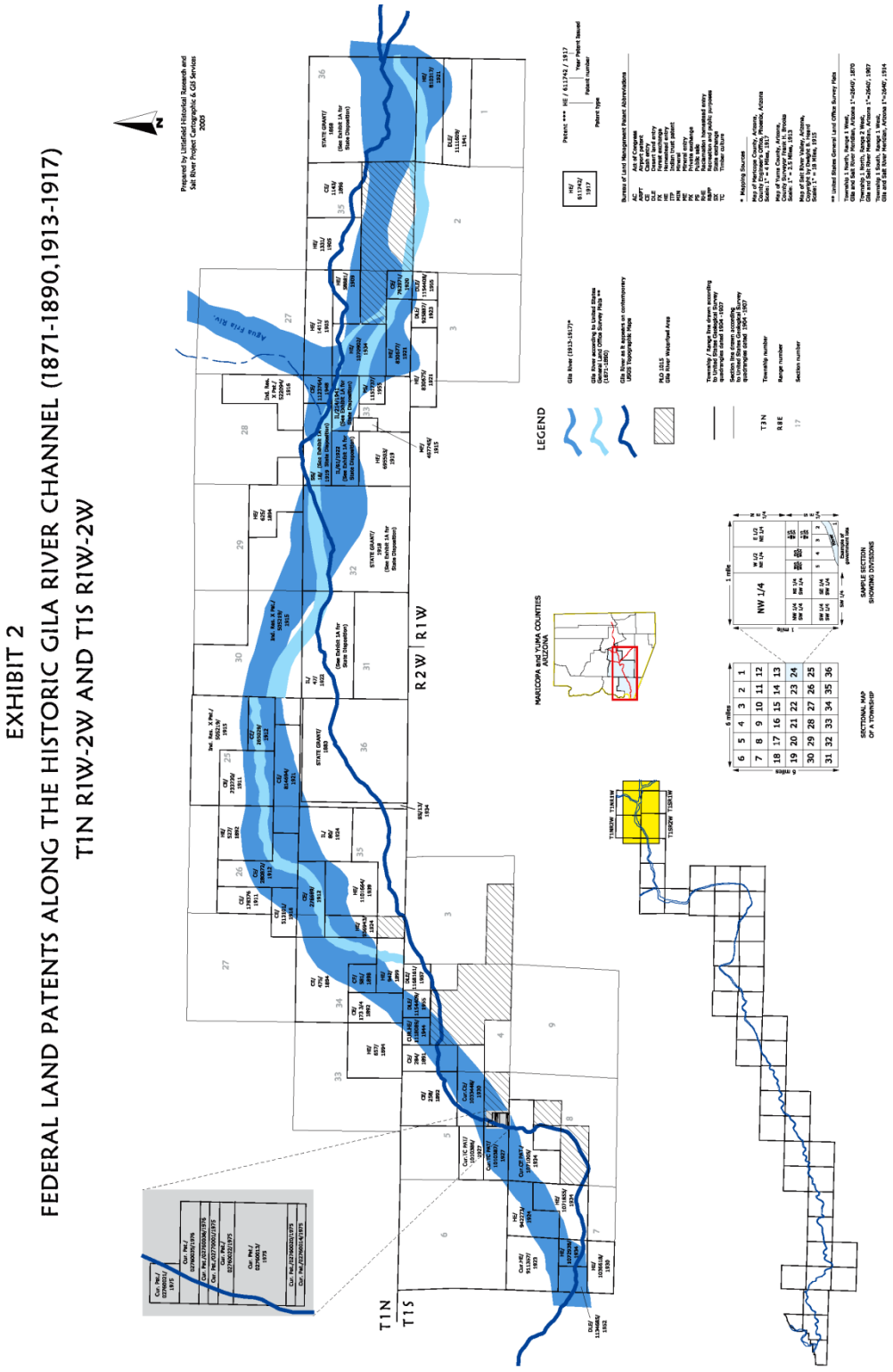


Figure 2: Exhibit 2, Map of Federal Land Patents along the Historical Gila River Channel (1871-1890, 1913-1917), T1N R1-2W and T1S R1-2W. Source: Littlefield Historical Research and Salt River Project Cartographics, 2005.

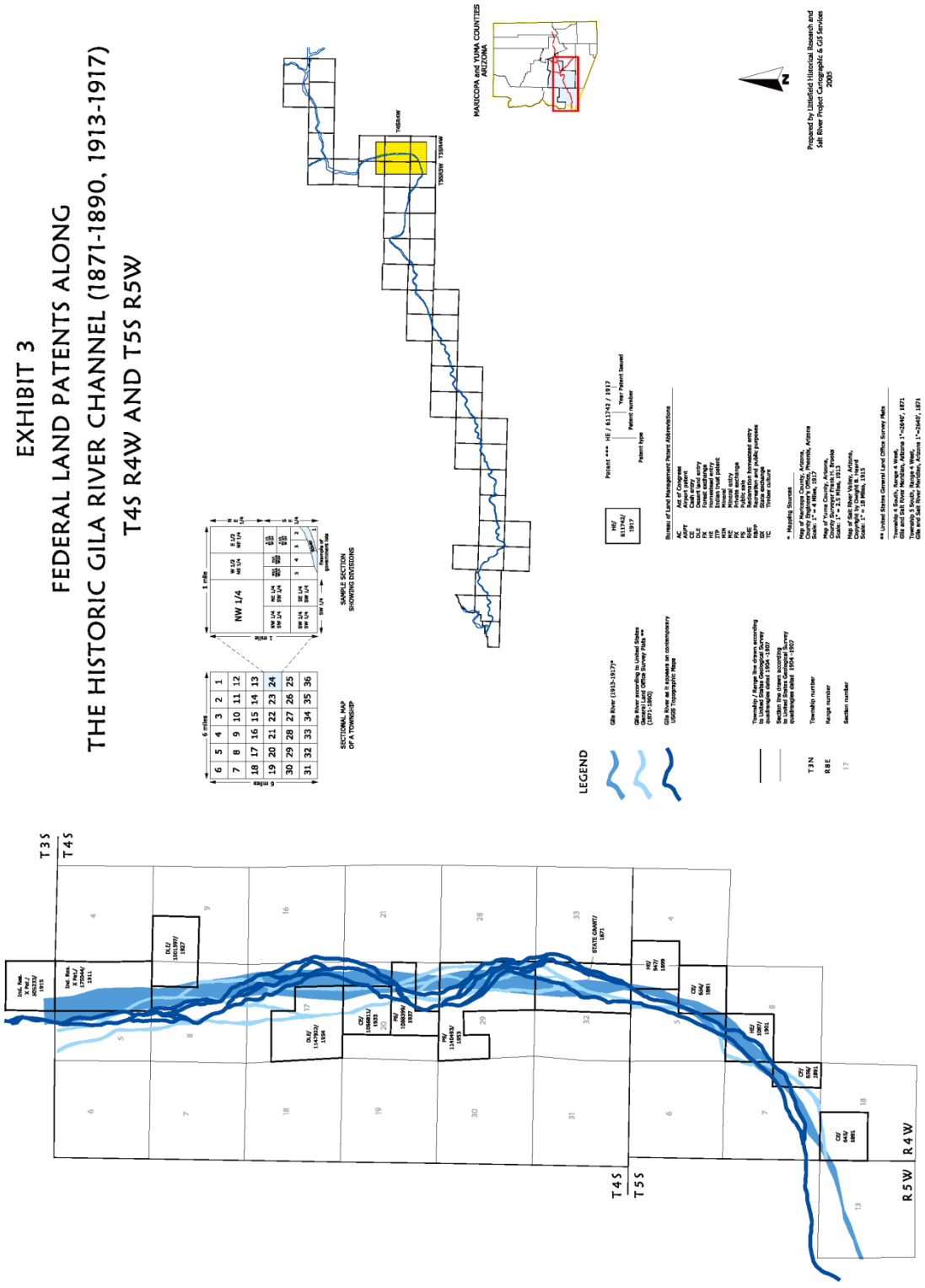


Figure 3: Exhibit 3, Map of Federal Land Patents along the Historical Gila River Channel (1871-1890, 1913-1917), T4S R4W, and T5S R5W. Source: Littlefield Historical Research and Salt River Project Cartographics, 2005.

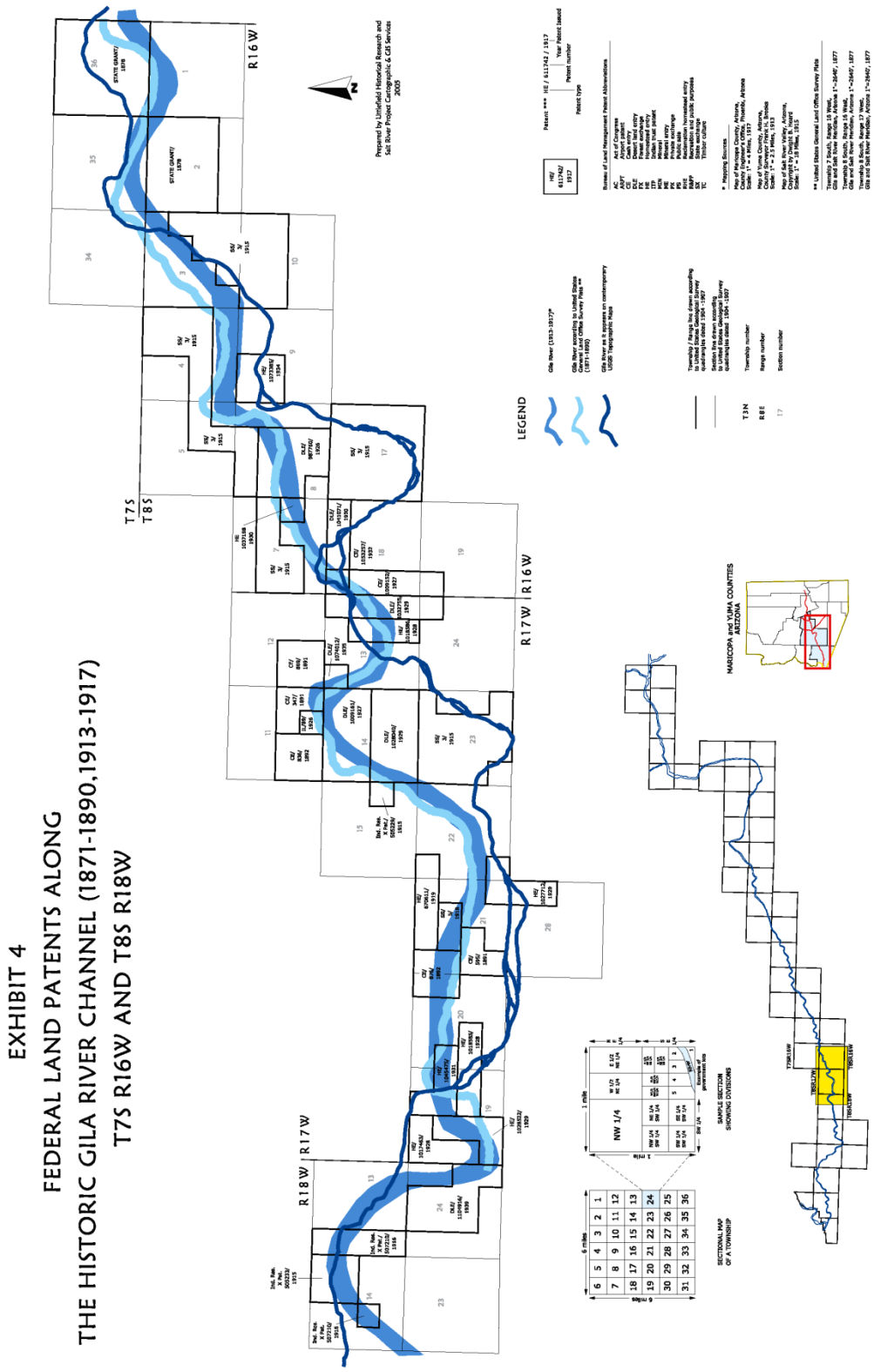


Figure 4: Exhibit 4, Map of Federal Land Patents along the Historical Gila River Channel (1871-1890, 1913-1917), T7S R16W, and T8S R18W. Source: Littlefield Historical Research and Salt River Project Cartographics, 2005.

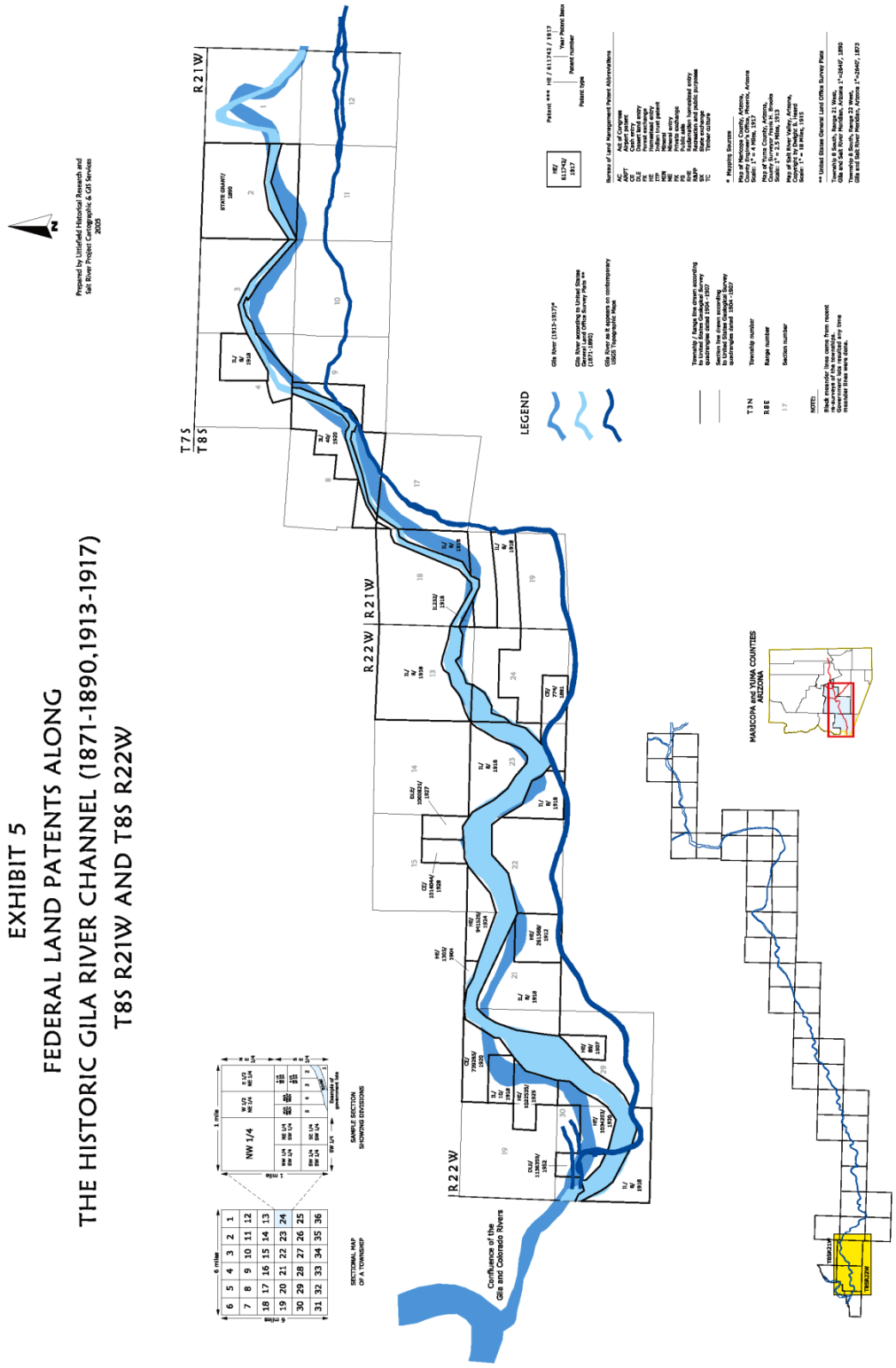


Figure 5: Exhibit 5, Map of Federal Land Patents along the Historical Gila River Channel (1871-1890, 1913-1917), T7S R21W, and T8S R22W. Source: Littlefield Historical Research and Salt River Project Cartographics, 2005.

D. U.S. Surveys along the Gila River (Exhibit 2)

Exhibit 2, the first sample area for discussion in this report with regard to U.S. Government surveys, covers parts of townships 1 north and 1 south, and ranges 1 and 2 west.

1. 1868 Interior Survey of Township 1 North, Range 1 West (Field Notes)

On June 22, 1868, George P. Ingalls surveyed the interior subdivision lines of township 1 north, range 1 west. His field notes indicate that he encountered the Gila River on lines between sections 30 and 31, 31 and 32, 32 and 33, 33 and 34, and 34 and 35. (The places where Ingalls crossed the Gila along these lines can be seen on the plat derived from Ingalls's field notes of the survey, which is reproduced below.) As he crossed the Gila at each of these locations, he set no meander corners, as he would have been required to do under the 1864 surveying instructions had he considered the stream to be navigable. In addition to mentioning that the Gila had a rapid current and sandy bottom, he noted that "[i]t is a fine stream."[23]

2. 1868 Interior Survey of Township 1 North, Range 1 West (Plat)

Ingalls's plat of township 1 north, range 1 west (approved by the surveyor general on December 31, 1868 – see below), further confirms that he did not consider the Gila to be navigable. There are no meander lines on the plat, and in the box at the bottom of the plat identifying which surveyor had conducted various parts of the survey of the township, there is no indication that anyone had undertaken meander surveys. Moreover, there is no survey data recorded in the margin of the plat, as there would have been had meanders been done.[24]

[23] "Field Notes of the Survey of Township 1 North, Range 1 West, Gila and Salt River Meridian," 1868, vol. R1, pp. 375-376, 387, 398, 408-409, 423, U.S. Bureau of Land Management, Phoenix, Arizona.

[24] Survey Plat of Township 1 North, Range 1 West, 1868, Gila and Salt River Meridian, U.S. Bureau of Land Management, Phoenix, Arizona.

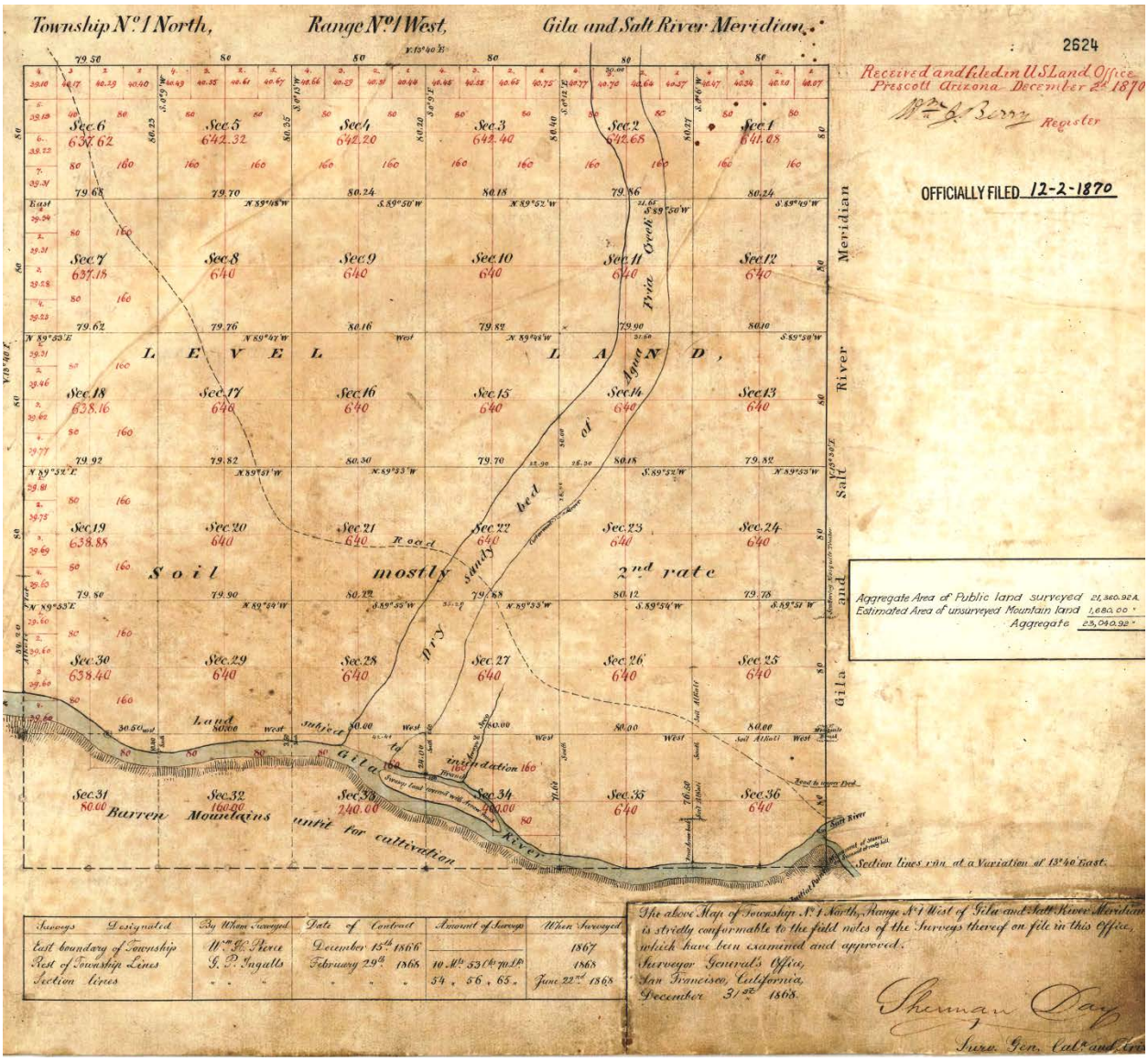


Figure 6: U.S. General Land Office Survey Plat of Township 1 North, Range 1 West, 1868, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

3. 1883 Interior Survey of Township 1 North, Range 2 West (Field Notes)

When R.C. Powers surveyed the interior subdivision lines of township 1 north, range 2 west, in 1883, he gave no indication in the field notes that he considered the Gila River to be navigable. The Gila ran through the southeast corner of this township. When Powers crossed the river on the line between sections 25 and 26, he set no meander corners, but he indicated that the stream was

characterized by "shallow water & rapid current." He made a similar observation about the river on the line between sections 34 and 35, but again set no meander corners. Finally, on the line between sections 26 and 35, he set no meander corners, but offered the description that the stream there had "deep water and low banks." In his general description of the township, Powers wrote: "This township is mostly good land and if the waters of the Gila River would be conducted in a ditch to the land for irrigation (which could be done with some expense) the land could be made very valuable and productive."[25]

4. 1883 Interior Survey of Township 1 North, Range 2 West (Plat)

Like the field notes, the plat of township 1 north, range 2 west (see below), drawn by Powers, gives no suggestion that Powers thought the Gila was navigable. There are no meander lines along the Gila on the plat. No surveyor is identified on the plat as having undertaken meanders, and the box in the right margin labeled "meanders of" contains no entries for meander data. The plat does indicate, however, that roads ran parallel to the stream on both banks, suggesting that commerce was carried on in the valley by land and not by water.[26]

[25] "Survey Field Notes of Township 1 North, Range 2 West, Gila and Salt River Meridian," 1883, vol. R1006, pp. 7, 22-24, 92, U.S. Bureau of Land Management, Phoenix, Arizona.

[26] Survey Plat of Township 1 North, Range 2 West, Gila and Salt River Meridian, 1883, U.S. Bureau of Land Management, Phoenix, Arizona.

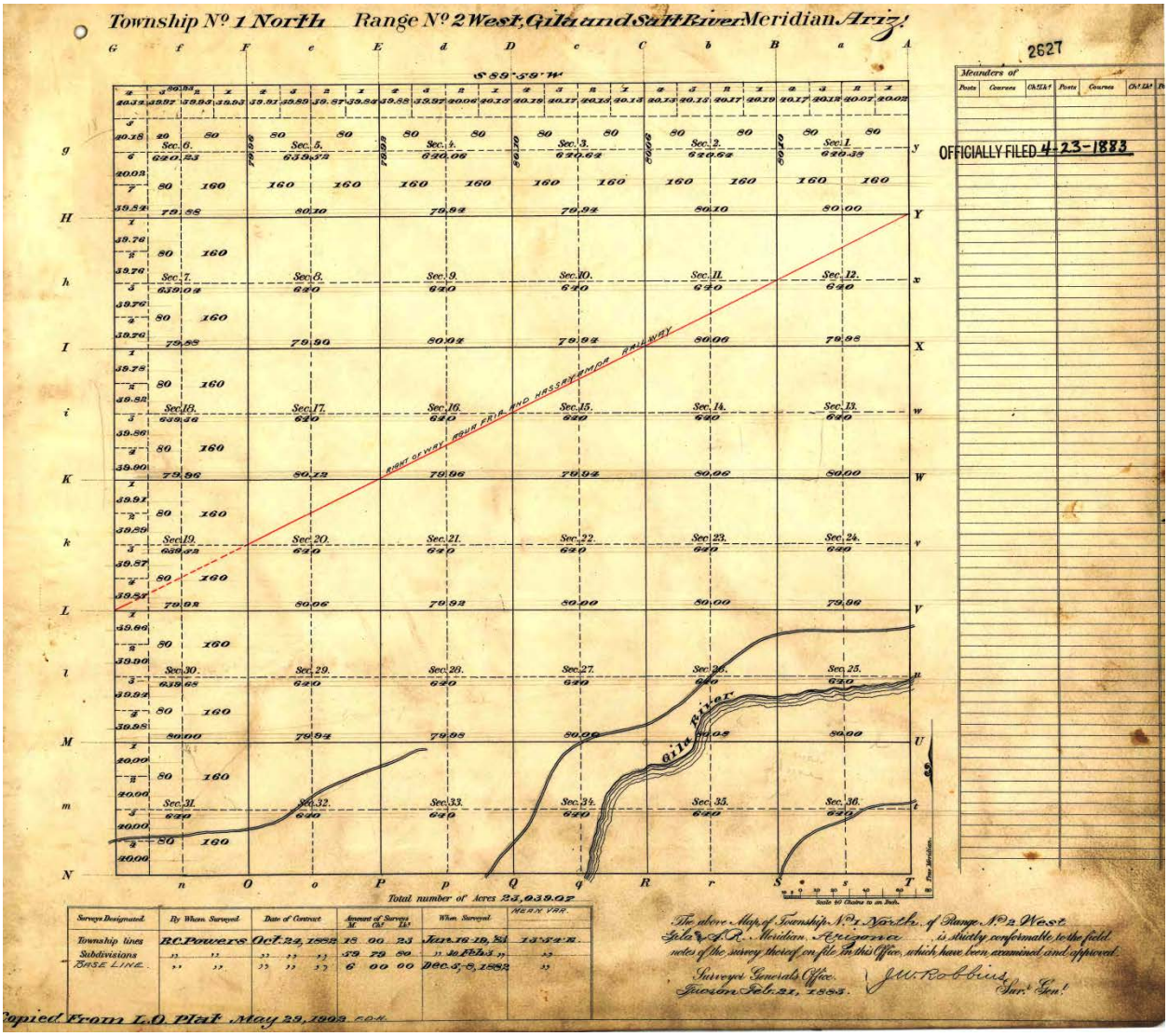


Figure 7: U.S. General Land Office Survey Plat of Township 1 North, Range 2 West, 1883, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

5. 1907 Interior Resurvey of Township 1 North, Range 2 West (Field Notes)

Between May 29 and June 16, 1907, John F. Hesse resurveyed township 1 north, range 2 west. Nowhere in the field notes did he record any meander data. Hesse did, however, indicate that the stream was eighteen inches to two feet deep, and in his general description of the township, he wrote that the soil was generally "1st. rate, and if supplied with water would raise abundant

crops. . . ." He added that "The southwestern cor. of the township is settled and is well watered by the Buckeye Canal which runs through the township."[27]

6. 1907 Interior Resurvey of Township 1 North, Range 2 West (Plat)

On the plat of the 1907 resurvey of this township (see below), Hesse drew no meander lines, and no surveyor is identified on the plat as having undertaken meanders. Moreover, no meander data appear in the margins of the plat. Roads on the plat parallel the river, and several irrigation ditches are shown, including the Buckeye Canal mentioned by Hesse.[28]

[27] "Resurvey Field Notes of Township 1 North, Range 2 West, Gila and Salt River Meridian," 1907, vol. R2055, pp. 105, 109, 133, U.S. Bureau of Land Management, Phoenix, Arizona.

[28] Resurvey Plat of Township 1 North, Range 2 West, Gila and Salt River Meridian, 1907, U.S. Bureau of Land Management, Phoenix, Arizona.

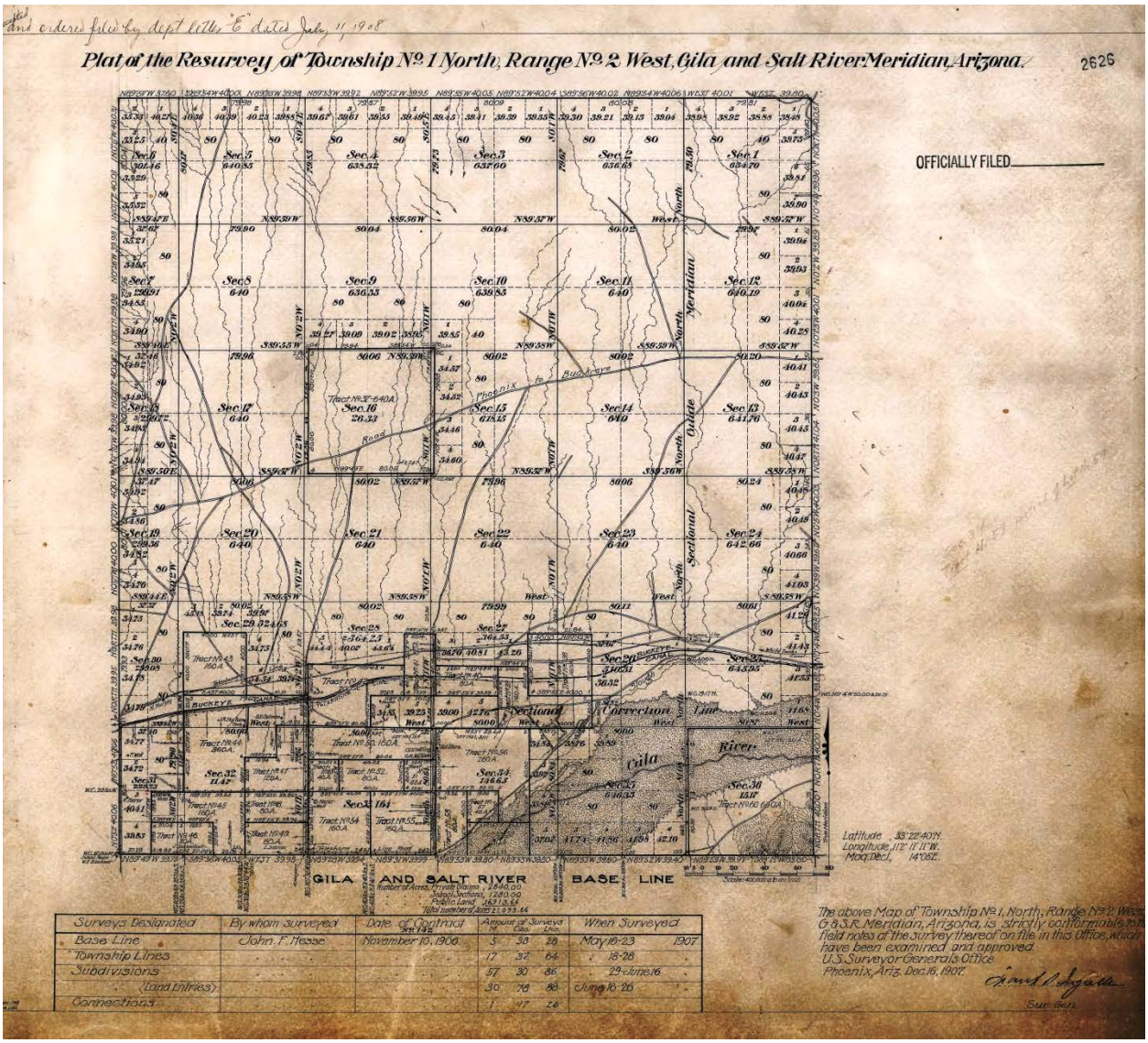


Figure 8: U.S. General Land Office Plat of Resurvey of Township 1 North, Range 2 West, 1907, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

7. 1883 Interior Survey of Township 1 South, Range 2 West (Field Notes)

Moving down the Gila, R.C. Powers undertook the survey of the interior section lines for township 1 south, range 2 west, between January 11 and 15, 1883. In each encounter with the Gila River in this township, Powers treated the stream in his field notes as a non-navigable body of water. He set no meander posts at the edges of the stream where section lines intersected it, and he

ran no meander lines along the stream. His only comment on the river was in the general description of the township at the end of the notes, where he indicated that there was "plenty of water in the Gila River for irrigation."[29]

8. 1883 Interior Survey of Township 1 South, Range 2 West (Plat)

On February 21, 1883, Surveyor General J.W. Robbins approved the survey plat filed with his office of township 1 south, range 2 west (see below). Suggesting that Surveyor R.C. Powers did not consider the Gila to be navigable is the fact that no meander lines appear on the plat. Furthermore, in the right hand margin there is a blank table to record meander bearings of any navigable bodies of water, but no data are filled in. Other indicators on the plat that further suggest that the Gila was not navigable include a dam across the river and the presence of irrigation ditches. Moreover, a road roughly parallels the river on the south side.[30]

[29] "Field Notes of the Survey of Subdivision Lines of Township 1 South, Range 2 West, Gila and Salt River Meridian," 1883, vol. R1166, pp. 50, 65, 67, 89, and 97, with quotation at 97, U.S. Bureau of Land Management, Phoenix, Arizona.

[30] Survey Plat of Township 1 South, Range 2 West, Gila and Salt River Meridian, 1883, U.S. Bureau of Land Management, Phoenix, Arizona.

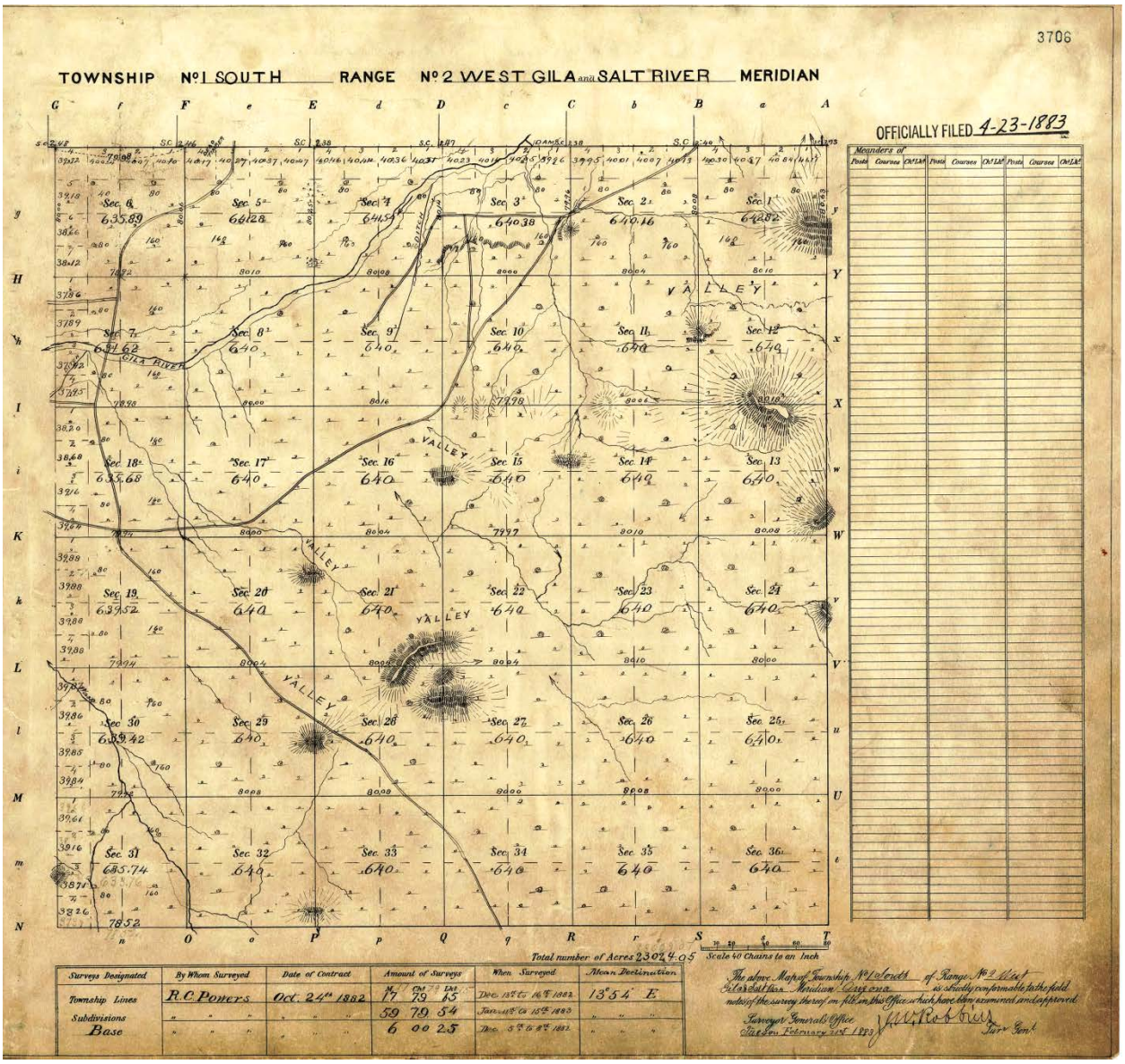


Figure 9: U.S. General Land Office Survey Plat of Township 1 South, Range 2 West, 1883, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

E. U.S. Government Surveys along the Gila River (Exhibit 3)

Moving downstream, the next area of focus for this report is covered in Exhibit 3 and encompasses parts of townships 3, 4, and 5 south, ranges 4 and 5 west.

1. 1871 Interior Survey of Township 4 South, Range 4 West (Notes and Plat)

Solomon W. Foreman surveyed the interior subdivision lines of townships 4 and 5 south, range 4 west, between March 21 and April 15, 1871. In township 4 south, range 4 west, the Gila River flowed in several channels from north to south through sections 5, 8, 17, 20, 29, and 32, and Solomon recorded no meander bearings in the volume of field notes containing the details of this township's survey. Moreover, no meander data appear on the plat of the survey (reproduced below), and in the box on the plat identifying which surveyors accomplished various parts of the township's survey, there is no entry for a meander surveyor.[31]

The lack of meander data for the Gila River in this township is one indication that the Gila River was not navigable. Also, the fact that Foreman noted the presence of a road running parallel to the stream further suggests that the Gila River was not navigable.[32]

[31] Survey Plat of Township 4 South, Range 4 West, Gila and Salt River Meridian, 1871, U.S. Bureau of Land Management, Phoenix, Arizona.

[32] "Field Notes of the Survey of the Sub-division Lines in Township No. 4 South, Range No. 4 West, of Gila and Salt River Meridian," 1871, vol. 1161, pp. 49-52, 61-62, U.S. Bureau of Land Management, Phoenix, Arizona.

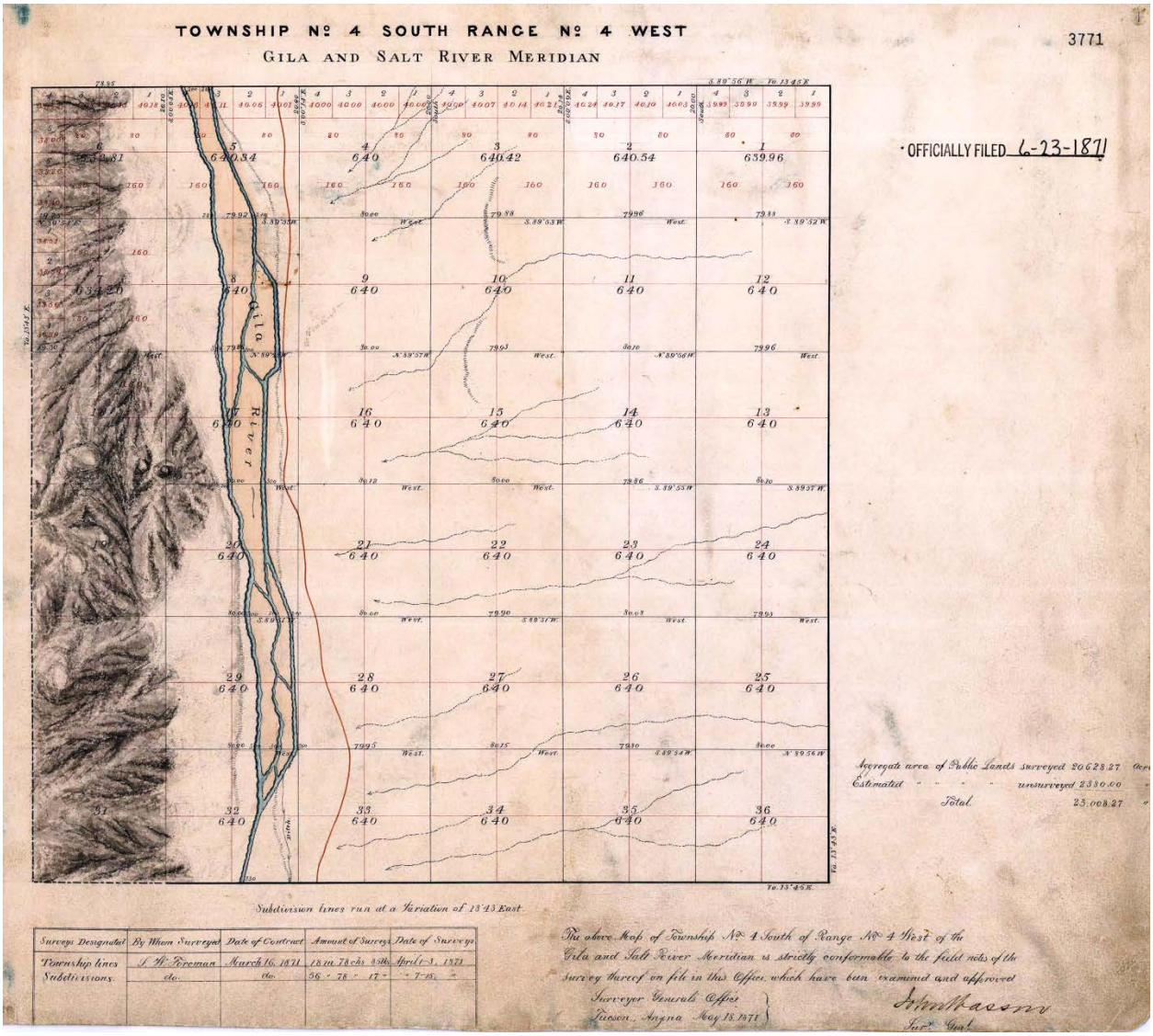


Figure 10: Survey Plat of Township 4 South, Range 4 West, 1871, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

2. 1871 Interior Survey of Township 5 South, Range 4 West (Notes and Plat)

Solomon Foreman also surveyed township 5 south, range 4 west, at about the same time he undertook survey work for the township discussed in the previous two paragraphs. In township 5 south, range 4 west, the Gila coursed through sections 5, 7, 8, and 18, and in this township in each encounter with the Gila River, Foreman *did* set meander markers, but only on the left edges of the

Gila (facing downstream). He also meandered that bank and recorded those meander details in his field notes, but not on the plat (see below for a copy of the plat).[33]

The reason for Foreman's use of meanders along one bank of the Gila can be seen in conjunction with both his surveying instructions and the survey manual in use at the time, the 1864 version. First, with regard to his surveying instructions, Foreman had been directed on February 13, 1871, by John Hasson, U.S. Surveyor General for Arizona Territory, to carry out this survey "in accordance with law and the Manual of printed Instructions by the General Land Office[.]" Hasson also told Foreman to bear "in mind the object of this work you are about to execute, is to accommodate actual settlers" who lived in the vicinity of Gila Bend. For this reason, Hasson added, "If in your judgment the Gila River should be meandered, you are hereby authorized and directed to do it, at the same time advising this office, in writing, the reasons therefor."[34]

Foreman did, in fact, explain his one-bank meanders in his field notes as Hasson had instructed him to do. Even though setting meander corners on the *right banks* of "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" was required under the provisions of the 1864 surveying manual, Foreman explained in the meander section of the field notes for this township that "the reason for selecting the left bank for meanders is that all the lands of value are on the left bank[.]" He added that the lands on the right bank soon "pinched out" due to the proximity

[33] "Field Notes of the Survey of the Subdivision Lines of Township 5 S., Range 4 W., Gila and Salt River Meridian," 1871, pp. 56, 58, 60, 64-65, U.S. Bureau of Land Management, Phoenix, Arizona; Survey Plat of Township 5 South, Range 4 West, Gila and Salt River Meridian, 1871, ibid.

[34] U.S. Surveyor General for Arizona John Hasson to Solomon W. Foreman, Feb. 13, 1871, Letters Received from the Surveyors General of Public Land States, 1826-83, Arizona, 1863-76, box 2, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

of mountains. In other words, the only lands useful for farming were along the left bank, and for that reason, Foreman had meandered that bank as Hasson had instructed him.[35]

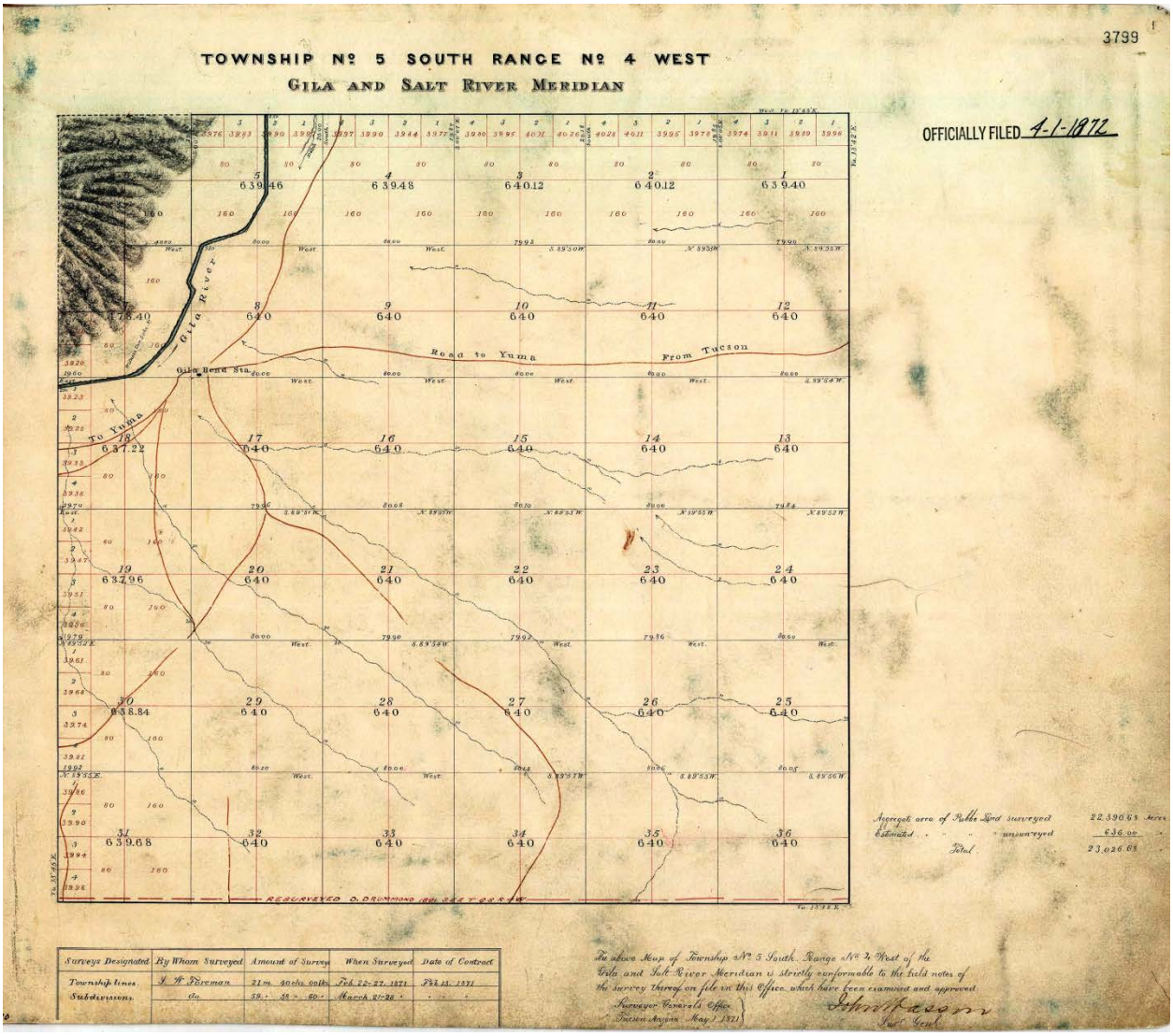


Figure 11: Survey Plat of Township 5 South, Range 4 West, 1871, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

F. U.S. Surveys along the Gila River (Exhibit 4)

The next sample area downstream encompasses parts of townships 7 and 8 south, and parts of ranges 16 to 18 west.

[35] "Field Notes of the Survey of the Subdivision Lines of Township 5 S., Range 4 W., Gila and Salt River Meridian," 1871, pp. 56, 58, 60, 64-65, U.S. Bureau of Land Management, Phoenix, Arizona.

1. 1878 Interior Survey of Township 8 South, Range 16 West (Field Notes)

The interior subdivision lines of townships 7 and 8 south, range 16 west, were surveyed by John L. Harris between January 21 and 31, 1878. Because the Gila River cut through only a small part of township 7 south, range 16 west, that township's survey will not be discussed here. Nevertheless, Harris's treatment of the Gila in both townships was similar and indicated a non-navigable river.

The field notes of Harris's survey of township 8 south, range 16 west, were approved by the surveyor general on April 1, 1878. This survey was done under the terms of the 1864 federal surveying manual. The Gila River cut through parts of sections 1, 2, 3, 4, 5, 7, 8, 9, and 18 in this township, and at each of these places, Harris set no meander posts. Instead, he measured across on line as the directions provided for non-navigable bodies of water. Moreover, Harris wrote no meander data in his field notes, and he also observed the presence of an old bank of the river – suggesting channel changes – along the south side of the stream. Finally, like surveyor Foreman in 1871, Harris also recorded the presence of the road from Yuma to Tucson running roughly parallel to and south of the stream.[36]

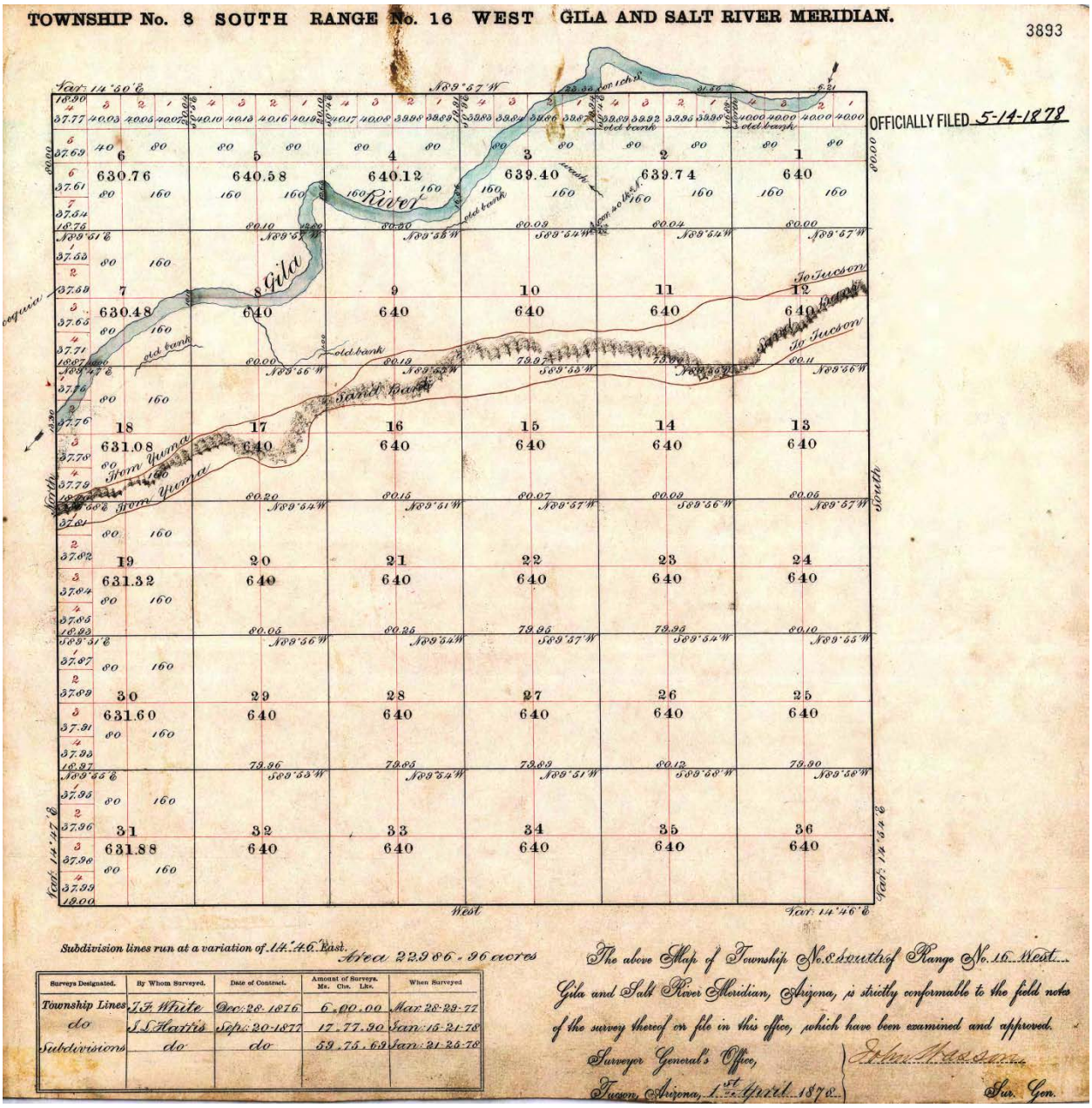
2. 1878 Interior Survey of Township 8 South, Range 16 West (Plat)

Harris's plat (see below) of township 8 south, range 16 west, which was approved by the surveyor general on the same day as his field notes of the township, also indicated for several reasons that Harris did not consider the Gila River to be navigable. First, no meander data appear in the right margin, as it would have had Harris thought the river was navigable. Second, in the box at the bottom of the plat where surveyors and their respective surveys were listed, there are no entries for meander surveys. Third, the plat, like the field notes, clearly indicates that the road from Yuma

[36] "Field Notes of the Subdivision Lines of Township 8 South, Range 16 West, Gila and Salt River Meridian," 1878, vol. 1171, pp. 11, 22, 33, 43, 44, 56-58, 61, U.S. Bureau of Land Management, Phoenix, Arizona.

to Tucson ran roughly parallel to the stream on its south side. Finally, Harris had drawn the "old bank" in at least five places where that feature crossed a section line. The presence of the old bank indicated that the stream had changed channel, suggesting its unreliability for commercial transport.[37]

[37] Survey Plat of Township 8 South, Range 16 West, Gila and Salt River Meridian, 1878, U.S. Bureau of Land Management, Phoenix, Arizona.



Surveys Designated.	By Whom Surveyed.	Date of Contract.	Amount of Surveys. Ms. Chs. Lks.	When Surveyed
Township Lines	J.F. White	Dec. 28. 1876	6.00.00	Mar. 28-29-77
do	J.J. Harris	Sept. 20. 1877	17.77.90	Jan. 15-21-78
Subdivisions	do	do	59.75.69	Jan. 21-25-78

Figure 12: Survey Plat of Township 8 South, Range 16 West, 1878, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

3. 1878 Interior Survey of Township 8 South, Range 17 West (Field Notes)

Harris also surveyed the interior subdivision lines of township 8 south, range 17 west. The field notes of this survey, which was done between February 7 and 11, 1878, were approved by the surveyor general on April 1, 1878. In this township, the Gila River crossed sections 13, 14, 11, 15,

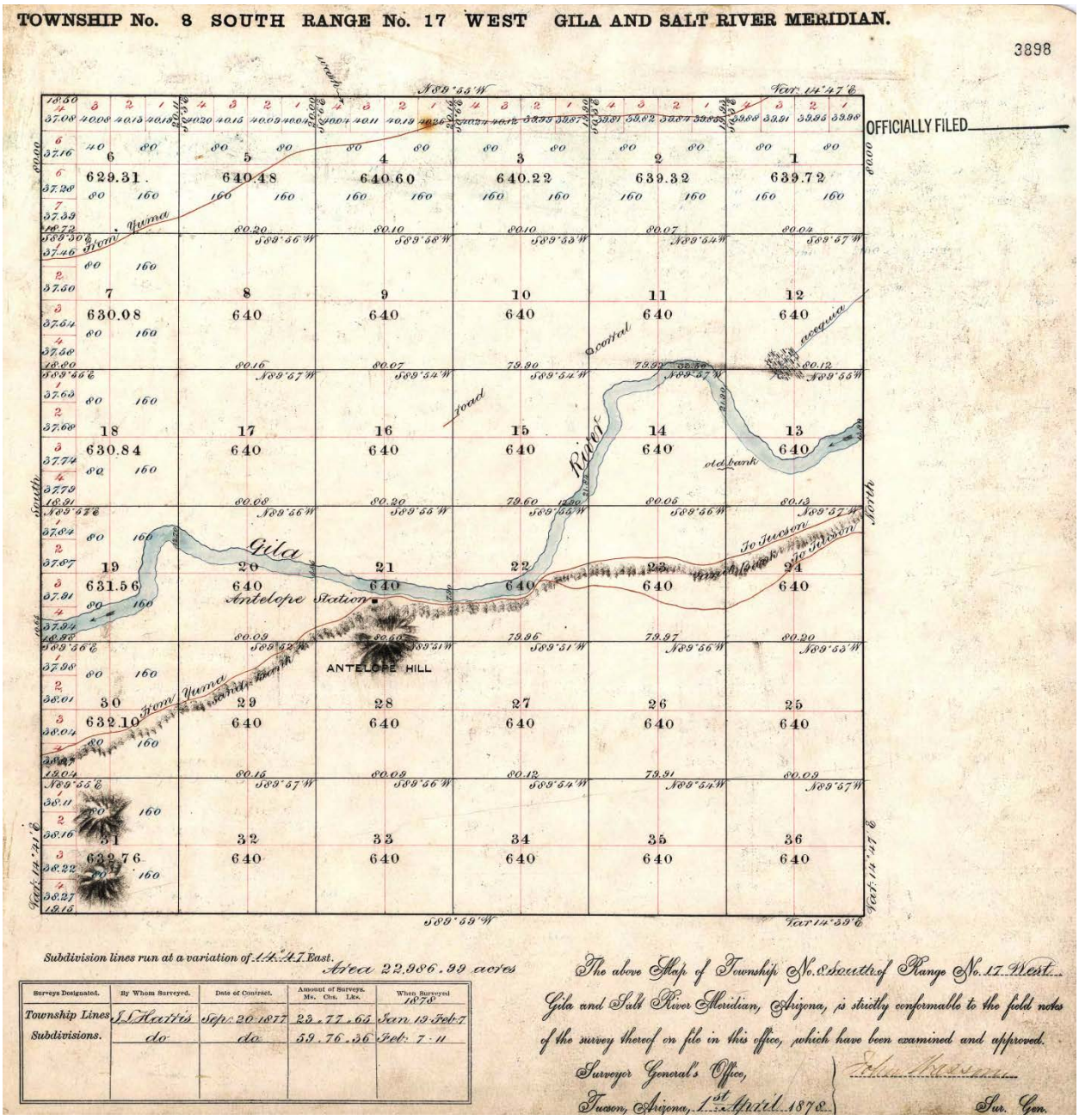
22, 21, 20, and 19. At the lines between each of these sections, Harris set no meander posts. In addition, he wrote in his general description of the township that the Gila River's waters could be useful for irrigation. He gave no similar indication that shipping could be accomplished on the stream: "With the exception of some poor soil immediately along the river, and along a sand bank extending across the township just S. of the river, this entire township presents a surface of very rich soil, while the Gila river flowing through the center of the township contains an abundance of water which can be used for the irrigation of the lands in this township."[38]

4. 1878 Interior Survey of Township 8 South, Range 17 West (Plat)

Like the field notes of township 8 south, range 17 west, several features of the plat of that township (see below) indicate that Harris did not consider the Gila to be navigable. First, there are no meander data in the right margin of the plat as there would have been had he considered the stream to be navigable. Second, there is no entry for any surveyor having done meander lines in the box recording who undertook what portion of the surveys of the township. Finally, the presence of two roads roughly paralleling the river – one to the north and the other to the south – suggested that the river was not used to carry commerce or people.[39]

[38] "Field Notes of the Subdivision Lines of Township 8 South, Range 17 West, Gila and Salt River Meridian," 1878, vol. 1172, pp. 1, 18, 19, 27, 28, 38, 51, and 61 (with quotation at 61), U.S. Bureau of Land Management, Phoenix, Arizona.

[39] Survey Plat of Township 8 South, Range 17 West, Gila and Salt River Meridian, 1878, U.S. Bureau of Land Management, Phoenix, Arizona.



Surveys Designated.	By Whom Surveyed.	Date of Contract.	Amount of Surveys. Ms. Chs. Lks.	When Surveyed 1878
Township Lines	J. L. Kattis	Sept. 20 1877	23 . 77 . 65	Jan. 19-Feb. 7
Subdivisions.	do	do	59 . 76 . 36	Feb. 7-11

Figure 13: Survey Plat of Township 8 South, Range 17 West, 1878, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

G. U.S. Surveys along the Gila River (Exhibit 5)

Exhibit 5 covers parts of township 8 south, ranges 21 and 22 west, and is the most downstream sample area reviewed in this report. This Exhibit covers lands near Yuma, Arizona.

1. 1890 Interior Survey of Township 8 South, Range 21 West (Field Notes)

The next sample area downstream is township 8 south, range 21 west. The initial subdivision survey of this township was done between September 18 and October 4, 1890, by James H. Martineau using the new manual for surveying instructions that had been issued on January 1, 1890. The field notes of the survey were approved on December 19, 1890, by the surveyor general.

The Gila River ran from east to west through parts of sections 1, 2, 3, 4, 9, 8, 17, 18, and 19, and at each place where Martineau encountered the Gila River on lines between these sections, he set meander corners on both banks. He observed that the Gila was in some places well over five chains wide, and in some places it was so deep that he was forced to swim to the other bank to continue running section lines. Despite these statements, Martineau clearly did not consider the Gila River to be navigable because he explained in his field notes that his setting of meander corners on both banks was consistent with the new January 1890 instructions directing surveyors to meander both banks of non-navigable bodies of water if on average they were more than three chains wide. Confirming the lack of navigability of the Gila, Martineau also noted the presence of the road from Yuma to Gila City and the Southern Pacific Railroad, both of which paralleled the stream.[40]

2. 1890 Interior Survey of Township 8 South, Range 21 West (Plat)

The plat of this township (see below), which was approved by the surveyor general on December 18, 1890, clearly indicates that the Gila River had been meandered. Meander notes appear in the right margin of the plat labeled "Meanders of Gila River," and Martineau is identified

[40] "Field Notes of the Subdivision Lines and Meanders of Township 8 South, Range 21 West, Gila and Salt River Meridian," 1890, vol. 1213, pp. 34-35, 38-39, 44-46, 47, 49-54; vol. 1214, pp. 56-59, 62-64, U.S. Bureau of Land Management, Phoenix, Arizona.

as the meander surveyor in the box listing surveyors and the parts of the township survey they had undertaken. Moreover, meander lines are apparent on the plat itself. In addition, immediately below the plat is the notation that water surface area amounted to 368.58 acres (indicating acreage within the meander lines).

Nevertheless, Martineau noted the road from Yuma to Gila City (which he also recorded in the field notes). On the plat, that road ran parallel to the river on its north side, while the Southern Pacific Railroad was shown parallel to the river on the south side.[41] Both the road and railroad suggest that the principal means of transportation in the region was by land, not water.

[41] Survey Plat of Township 8 South, Range 21 West, Gila and Salt River Meridian, 1890, U.S. Bureau of Land Management, Phoenix, Arizona.

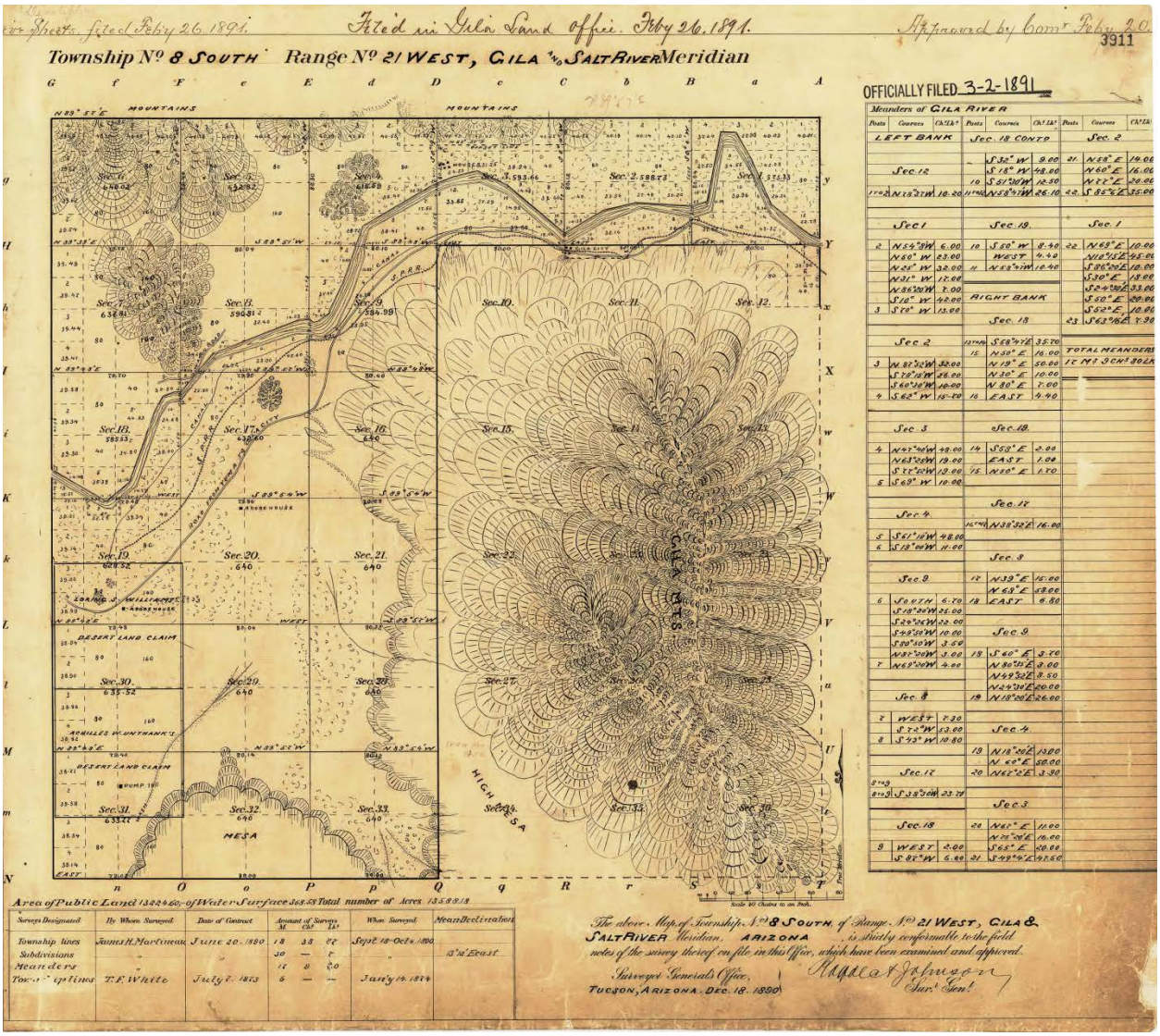


Figure 14: Survey Plat of Township 8 South, Range 21 West, 1890, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

3. 1874 Interior Survey of Township 8 South, Range 22 West (Field Notes)

The field notes of the 1874 survey of the next township downstream (township 8 south, range 22 west) corroborate that Martineau's meanders of the Gila had been done because the stream was non-navigable and over three chains wide. Between February 26 and March 4, 1874, Theodore F. White surveyed the interior subdivision lines in township 8 south, range 22 west, and the field

notes of that survey were approved on May 9, 1874, by the surveyor general. The Gila River ran through the township from east to west, crossing sections 13, 24, 23, 22, 15, 21, 20, 29, and 30.

In addition to running section lines, White meandered the Gila River, but not because he deemed it navigable. White's surveying instructions were those found in the 1864 manual, which called for meandering only one bank of non-navigable streams that served as routes for internal communication. Following those instructions, White had meandered just the right bank in sections 21, 20, 29, and 30, and the left bank in sections 22, 23, 24, and 13. He indicated in his notes that he shifted from one bank to the other as the surveying instructions provided because of the difficulty in finishing the one-bank meander on the right bank.[42]

4. 1874 Interior Survey of Township 8 South, Range 22 West (Plat)

White's plat of township 8 south, range 22 west (see below), was approved on May 10, 1874, by the surveyor general. Several features of this plat are noteworthy in relation to the question of the navigability of the Gila River. First and most obvious is the presence of meander data in the right margin of the plat and identification of White as the surveyor who had done the meanders at the bottom of the plat. The meander data illustrated that only one bank was meandered in each section. The drawing of the river itself showed more rigid angular bends in the river's bank on one side where the meanders were conducted. In addition, a road ran paralleling the Gila River to the south, suggesting that travel was carried out on land and not by water.[43]

[42] "Field Notes of the Survey of the Subdivision Lines of Township 8 South, Range 22 West, Gila and Salt River Meridian," 1874, vol. 1174, pp. 5, 6, 16, 27-28, 38, 48-49, 60-62, U.S. Bureau of Land Management, Phoenix, Arizona.

[43] Survey Plat of Township 8 South, Range 22 West, Gila and Salt River Meridian, 1874, U.S. Bureau of Land Management, Phoenix, Arizona.

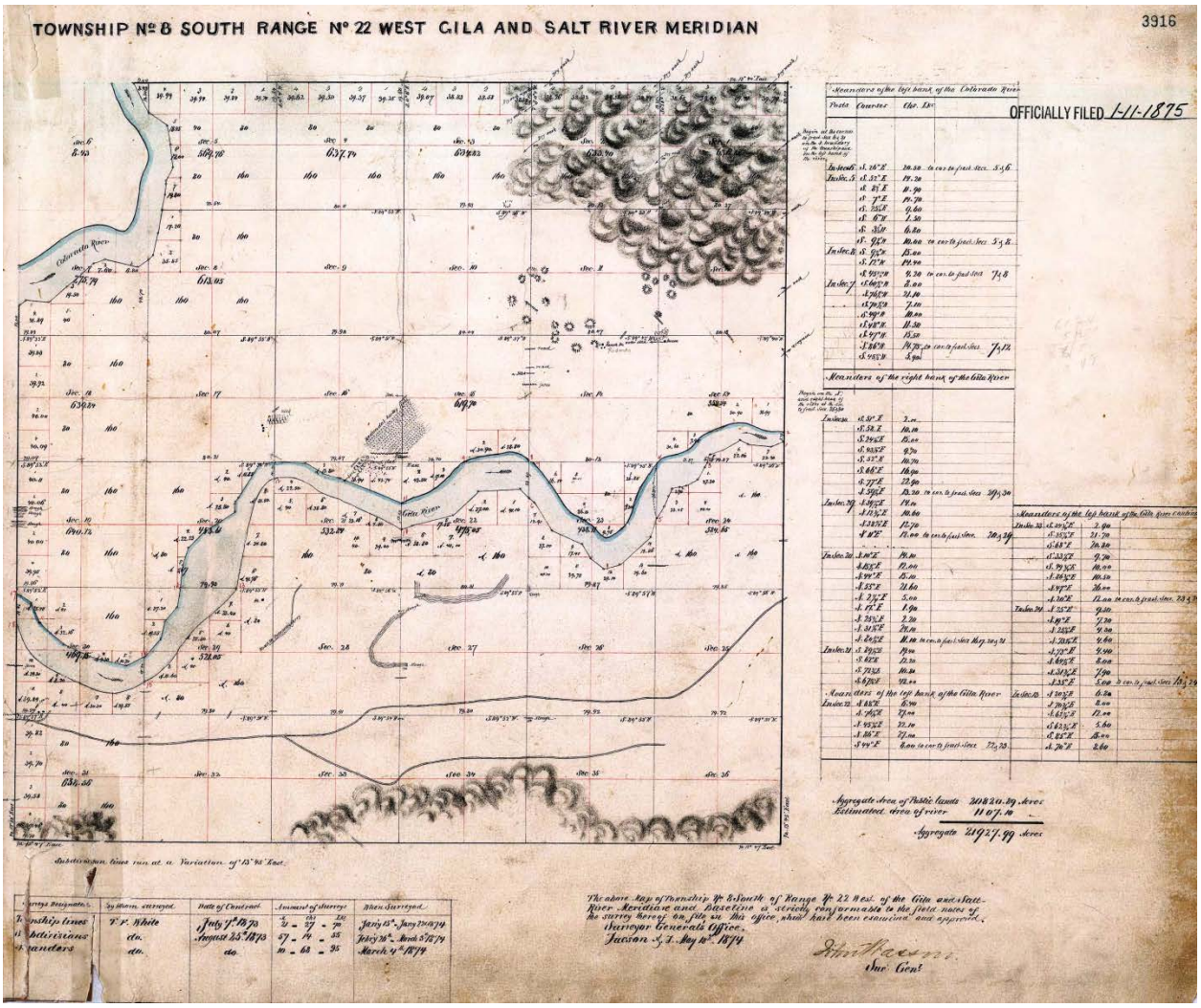


Figure 15: Survey Plat of Township 8 South, Range 22 West, 1874, Gila and Salt River Meridian. Source: U.S. Bureau of Land Management, Phoenix, Arizona.

H. U.S. Surveys Outside of Exhibits 2 to 5

The survey field notes and plats of the sample areas discussed above clearly indicate that multiple surveyors – undertaking their surveys in different years and at disparate times of year – all reached the same conclusion that the Gila River was not navigable. Nothing in survey data from other townships along the Gila River between the Salt and Colorado rivers contradicts these findings. Nevertheless, a few other examples from field notes and plats not on Exhibits 2-5 will underscore the unanimity among federal surveyors, whose work was done over many years and at

differing times of year that the Gila River was not navigable. These will be discussed in a down-river fashion.

1. 1871 Interior Survey of Township 5 South, Range 5 West (Field Notes)

Between March 4 and 11, 1871, Solomon W. Foreman surveyed the interior subdivision lines of township 5 south, range 5 west. The Gila River flowed westward through sections 13, 14, 15, 16, 9, 8, and 7 of this township. As Foreman ran the line north between sections 13 and 14, he first crossed the road to Yuma running parallel to the Gila River. He then encountered the Gila at 67.80 chains, and he set a meander post on the left (south) bank of that stream. In addition, he observed that the "river runs west & has a smooth lively current. Water not too deep to cross on line." Reaching the right bank, Foreman set another corner, noting that the bank was "low on n. side & land subject to overflow."[44] He made similar observations and set posts (sometimes calling them meander posts and sometimes not) while running the lines between sections 14 and 15, 15 and 16, 16 and 9, 9 and 8, and 8 and 7. Foreman subsequently listed the meanders of the Gila in this township.[45]

Following the meander data, Foreman added what he called "explanations and description" for the township. In this part of the field notes, he observed that while he had set meander corners on both banks of the stream throughout the township where section lines crossed the Gila River, he actually only had meandered the left bank. This was consistent with the 1864 surveying manual, which provided that non-navigable bodies of water were to be meandered if they were more than three chains wide and were well-defined routes for internal communication. Foreman explained:

[44] "Field Notes of the Survey of Township 5 South, Range 5 West, Gila and Salt River Base and Meridian," 1871, vol. 1164, p. 7, U.S. Bureau of Land Management, Phoenix, Arizona.

[45] "Field Notes of the Survey of Township 5 South, Range 5 West, Gila and Salt River Base and Meridian," 1871, vol. 1164, pp. 16, 26, 39, 41, 56, 61-63, U.S. Bureau of Land Management, Phoenix, Arizona.

> The lands north of the Gila River being almost worthless, on account of the low bottom land & the near approach of the mountains to the river & the banks on the south side being high & the lands superior quality, I deemed it best to meander the left bank of the river. The Gila is at times subject to very high freshets, and at all times even at a low stage of water as at present runs a volume of water equal to about 100,000 inches. It has a fall of about 20 feet to the mile in this township and flows over a sandy bottom and is fordable at nearly all points except in time of high water, when it becomes almost impassable for boats, which precludes men from owning farms lying on both sides of the river – hence the necessity for meandering the stream. The lands in this township south of the Gila is [*sic*] of very superior quality for agricultural purposes and can mostly be irigated [*sic*] from the river. A company is almost organized to construct an immense canal, beginning 20 miles above here and leading the water down & parallel to the river to a point some 12 miles below this township.[46]

2. 1871 Interior Survey of Township 5 South, Range 6 West (Field Notes)

Foreman also surveyed the subdivision lines of township 5 south, range 6 west, in 1871. The Gila River flowed through parts of sections 1 and 2 of this township, and, as he had in his field notes of township 5 south, range 5 west, Foreman recorded meanders of the left bank of the stream in this township. He offered this explanation for meandering only the left bank: "Note: The left bank of the river is taken by me in preference to the right bank because the lands north of the Gila in this township are worthless."[47]

3. 1910 Interior Survey of Township 5 South, Range 8 West (Field Notes)

On December 14 and 15, 1910, John F. Hesse surveyed part of the interior subdivision lines of township 5 south, range 8 west. This was the first survey of any subdivision lines in this township, and it covered only sections 3 to 6. The Gila River ran through parts of sections 5, 6, and

[46] "Field Notes of the Survey of Township 5 South, Range 5 West, Gila and Salt River Base and Meridian," 1871, vol. 1164, pp. 60-61, U.S. Bureau of Land Management, Phoenix, Arizona. Note: the accuracy of the 100,000 figure for miners' inches in this quotation is open for question. The field notes are handwritten and it is difficult to determine the exact number in those notes.

[47] "Field Notes of the Survey of the Subdivision Lines of Township 5 South, Range 6 West, Gila and Salt River Base and Meridian," 1871, vol. 1156, p. 62, U.S. Bureau of Land Management, Phoenix, Arizona.

through a corner of unsurveyed section 7. The survey field notes were approved by the surveyor general on April 12, 1911.

Hesse's notes indicated that while most of the Gila lowland area was dry, a small stream ran through its bed about seven inches deep. No meander notes appeared in these field notes, and the index diagram page, which showed where notes for various lines were in the volume, had a blank line where a meander note page would be listed. Hesse wrote in his general description of the township: "The Gila River runs through secs. 5 and 6, a small stream of water which sinks in the sand and rises again all along its course through these secs. The water is very brackish and not good for domestic purposes."[48]

I. Summary and Conclusions about U.S. Surveys of the Gila River

Federal 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 waterways. As part of the U.S. Government's surveying efforts, the areas along the Gila River were surveyed and resurveyed many times. Significantly, while those surveys were done at varying times of year, in different years, and by several individuals, all of the descriptions and plats that resulted from this work consistently portrayed the Gila River as being a non-navigable stream.

[48] "Field Notes of the Survey of the Subdivision Lines of Township 5 South, Range 8 West," 1911, vol. 2233, pp. 1-2, 60 (with quotation at 60), U.S. Bureau of Land Management, Phoenix, Arizona.

CHAPTER 2: LAND PATENTS AND STATE GRANTS

The U.S. Congress passed a variety of homestead laws in the mid-to-late nineteenth century designed to facilitate the settlement of newly acquired lands in the American West, and those statutes resulted in thousands of federal patents being issued to newcomers determined to establish homes and farms there. Yet before discussing federal land patents in relation to the Gila River, a few words need to be said about the stream's location as portrayed on various maps because this bears on related patent positions.

A. Maps of the Gila River Region

Several entities created comprehensive maps of the Gila River between the Salt and Colorado rivers that are useful for establishing the historical channel of the Gila prior to or near the time of Arizona's statehood in 1912. One of these map sources, as noted in Chapter 1, was the U.S. General Land Office, which conducted original surveys along the Gila beginning in 1868 to facilitate homesteading and to create accurate legal descriptions of property in the area. That agency's township plats cover large portions of the Gila River involved in this study. Two other detailed historical maps of the Gila River region were those drawn by the Yuma County surveyor in 1913 and by the Maricopa County engineer in 1917. These two maps, together with the General Land Office's survey plats, have been utilized to locate the bed of the historical Gila River for this report and to create the Exhibit maps that appear in Chapter 1. Portions of the 1917 Maricopa County and the 1913 Yuma County maps have been reproduced below. Comparing the General Land Office survey plats' location of the Gila to that of the 1913, 1915, and 1917 maps indicates that a significant amount of channel change occurred over the years – shifts in the Gila's streambed that would almost certainly have hindered navigation.

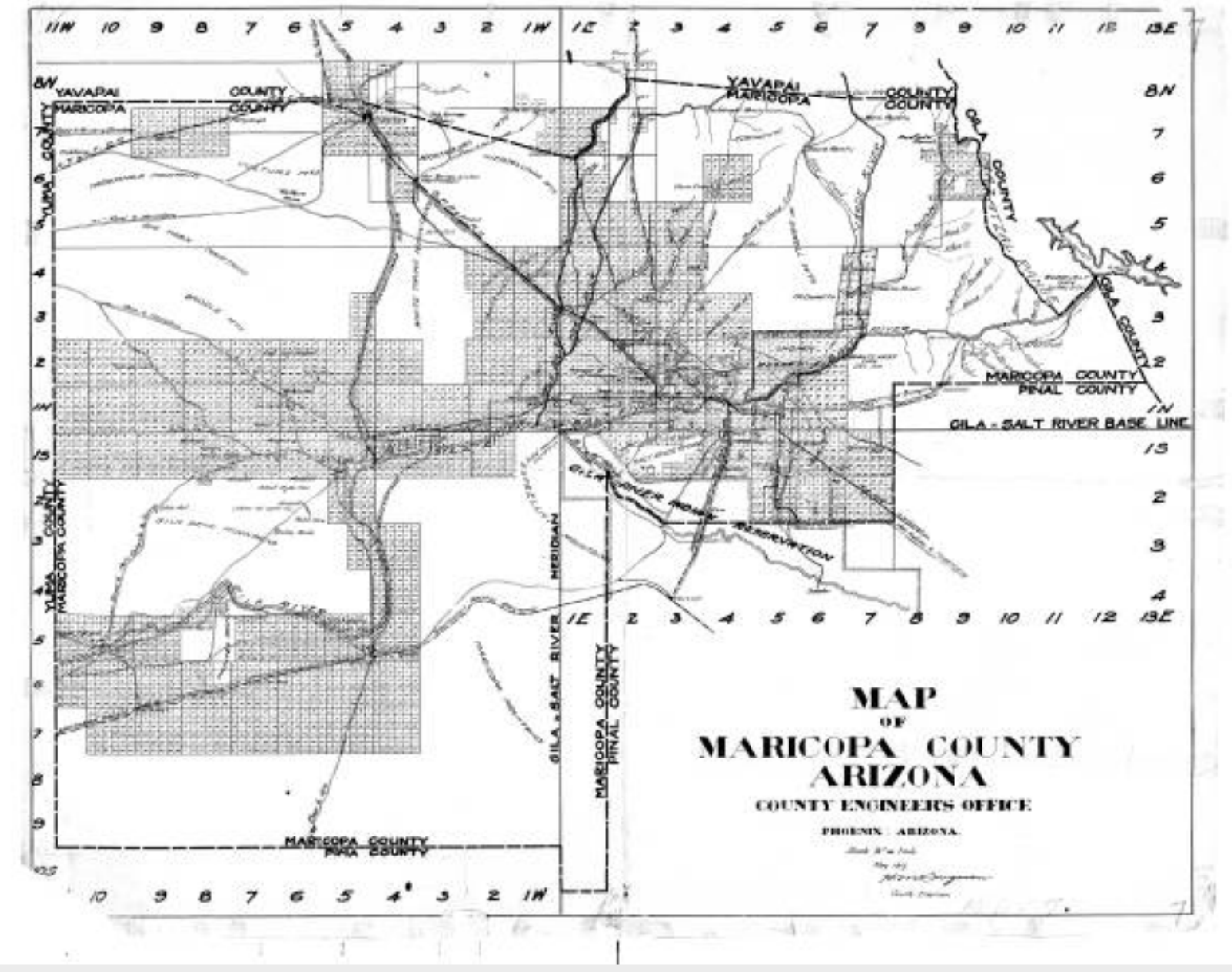


Figure 16: "Map of Maricopa County, Arizona," 1917. Source: Arizona State Library and Archives, Phoenix, Arizona.

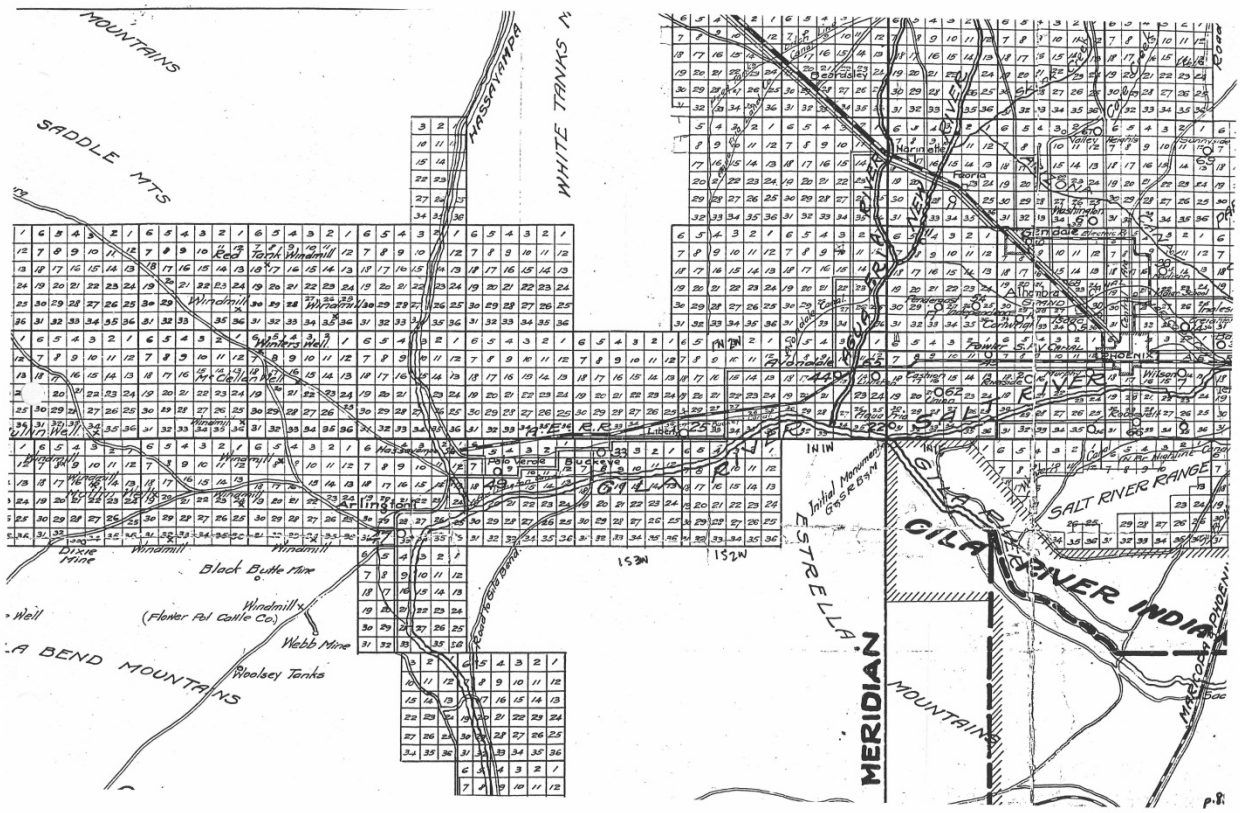


Figure 17: Portion of "Map of Maricopa County, Arizona," 1917, showing the area near the junction of the Gila and Salt rivers just west of Phoenix. Source: Arizona State Library and Archives, Phoenix, Arizona.

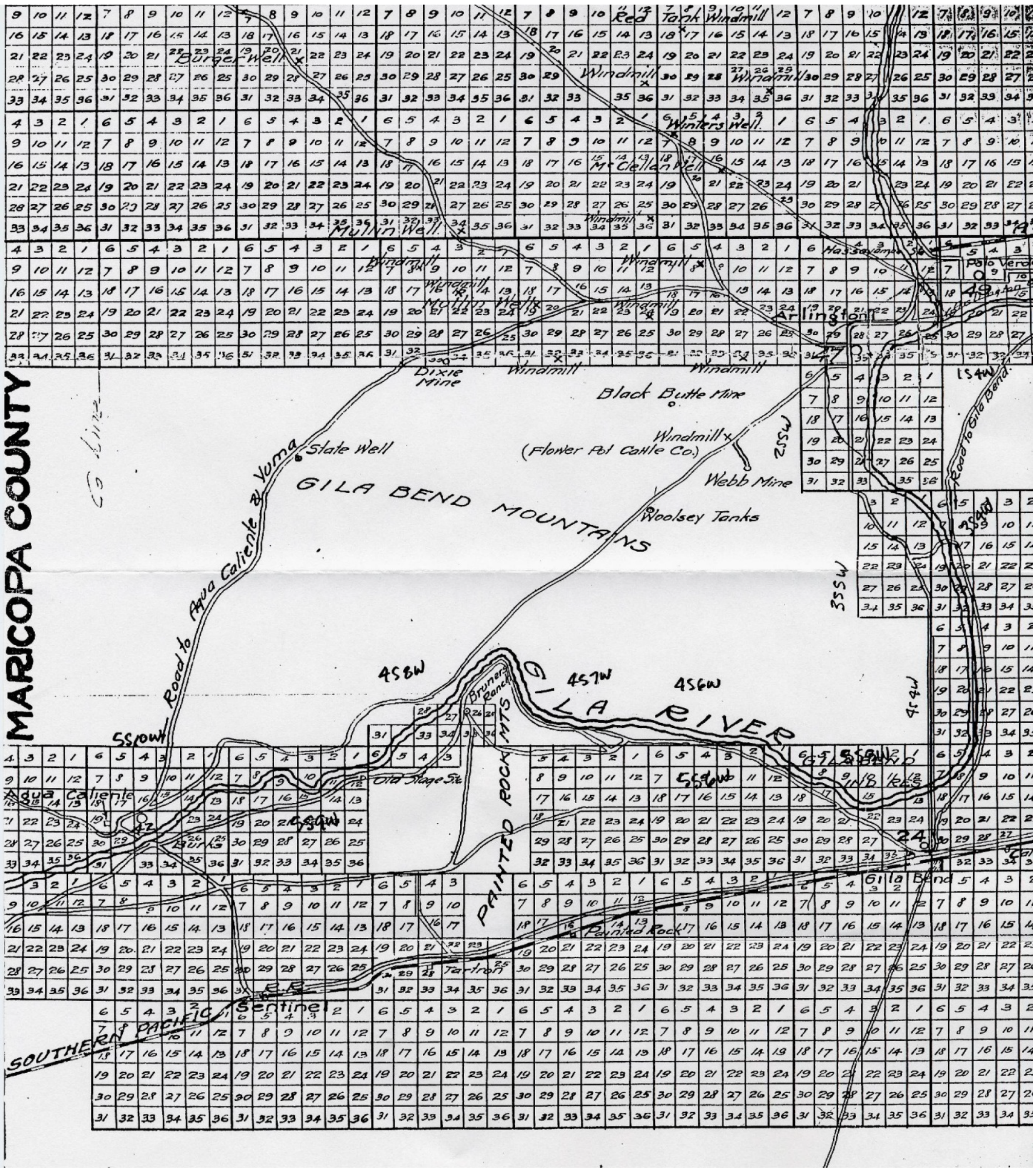


Figure 18: Portion of "Map of Maricopa County, Arizona," 1917, showing the region along the Gila River near Gila Bend. Source: Arizona State Library and Archives, Phoenix, Arizona.

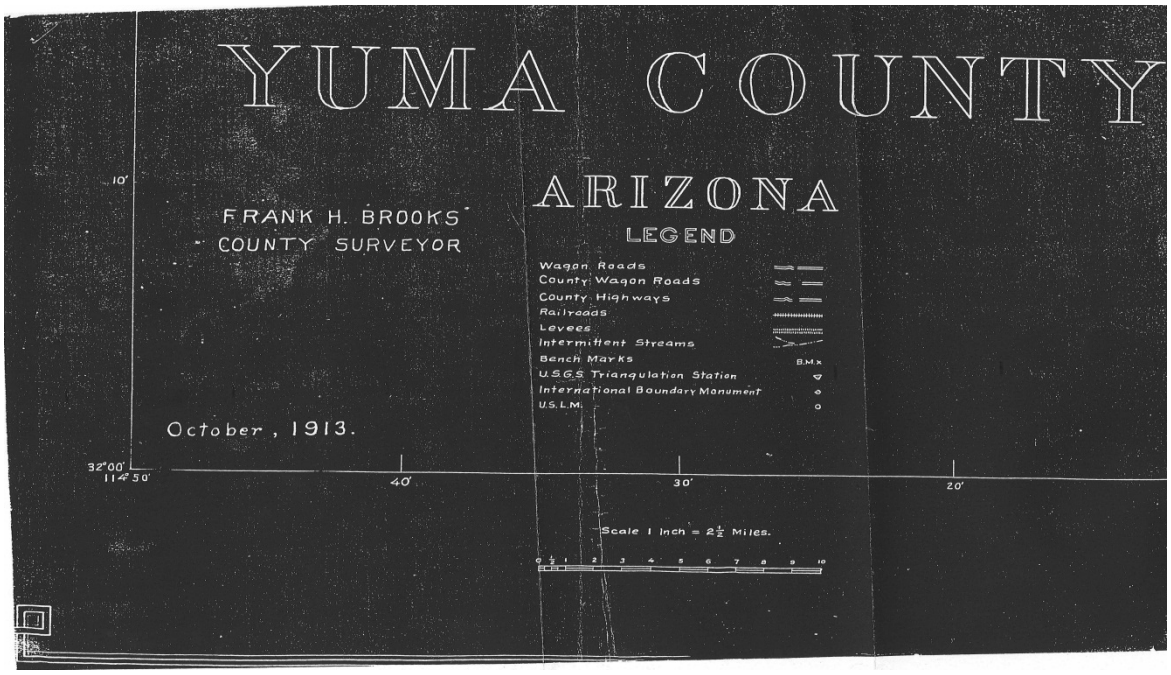


Figure 19: Title to map of "Yuma County, Arizona," Frank H. Brooks, County Surveyor, October 1913. Source: Arizona State Library and Archives, Phoenix, Arizona.

Figure 20: Portion of map of "Yuma County, Arizona" near the confluence with the Colorado River, Frank H. Brooks, County Surveyor, October 1913. Source: Arizona State Library and Archives, Phoenix, Arizona.

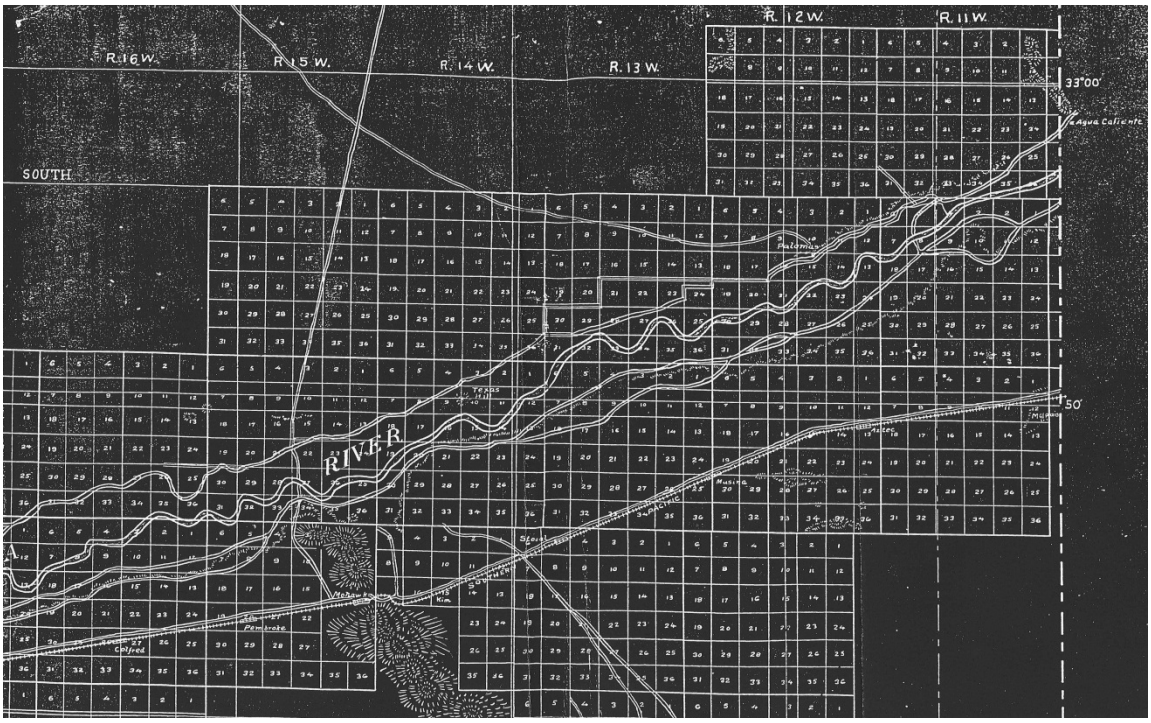


Figure 21: Second portion of map of "Yuma County, Arizona," Frank H. Brooks, County Surveyor, October 1913. Source: Arizona State Library and Archives, Phoenix, Arizona.

The U.S. Bureau of Land Management's Master Title Plats and Historical Indices (see below for examples of these documents) were used to locate homestead patents in relation to the Gila River as that stream appeared on the U.S. General Land Office survey plats and the 1913, 1915, and 1917 maps. The Master Title Plats, which show how the U.S. Government has disposed of (or otherwise encumbered) the public domain, are township-by-township cartographic records of changes to the public domain; the Historical Indices contain the details on these changes.

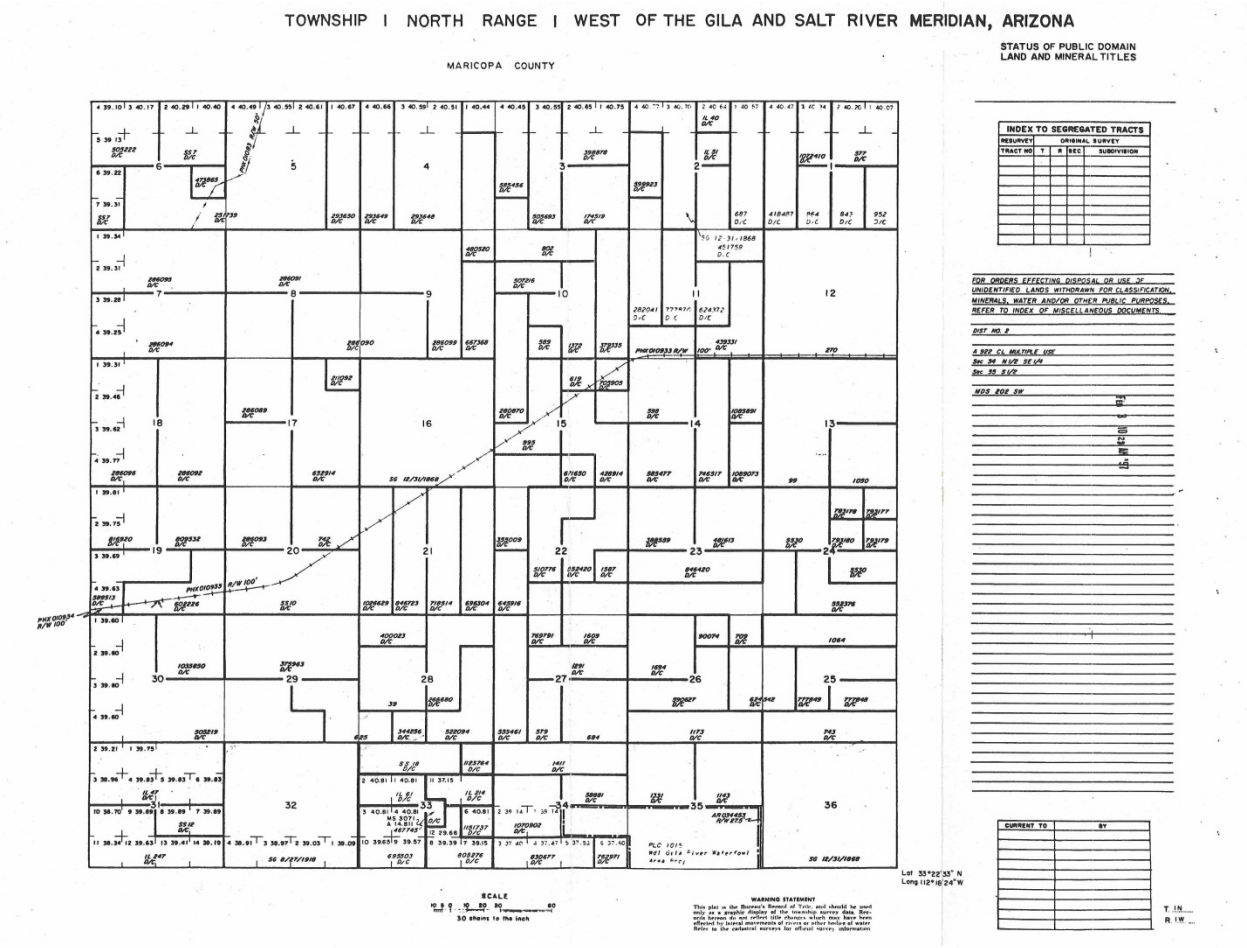
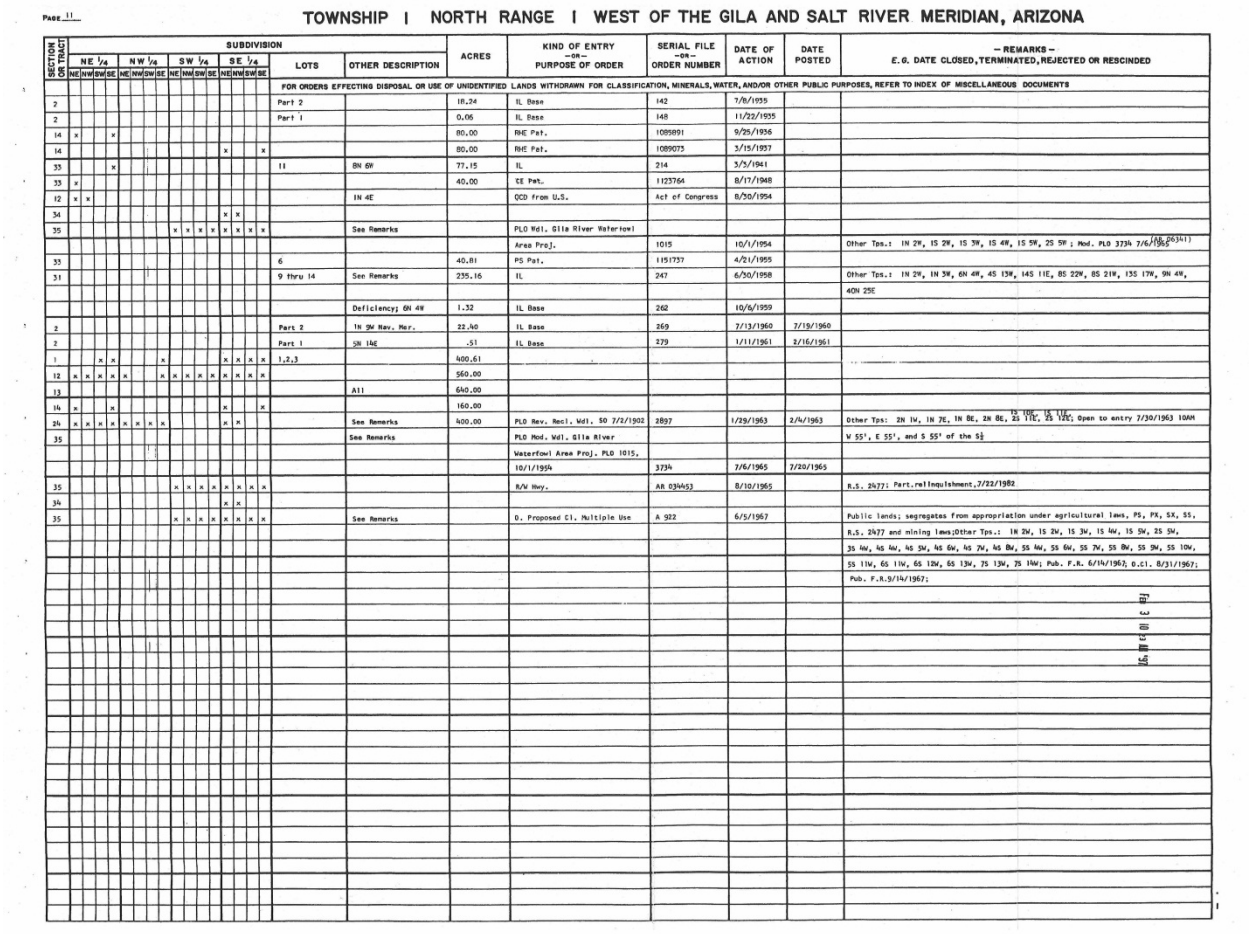


Figure 22: Sample Master Title Plat to lands in the Gila River Area. Source: U.S. Bureau of Land Management, Phoenix, Arizona.



Page 11

TOWNSHIP 1 NORTH RANGE 1 WEST OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA

SECTION OR TRACT	SUBDIVISION: NE ¼ (NE NW SW SE)	NW ¼ (NE NW SW SE)	SW ¼ (NE NW SW SE)	SE ¼ (NE NW SW SE)	LOTS	OTHER DESCRIPTION	ACRES	KIND OF ENTRY —OR— PURPOSE OF ORDER	SERIAL FILE —OR— ORDER NUMBER	DATE OF ACTION	DATE POSTED	— REMARKS — E.G. DATE CLOSED, TERMINATED, REJECTED OR RESCINDED
	FOR ORDERS EFFECTING DISPOSAL OR USE OF UNIDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER, AND/OR OTHER PUBLIC PURPOSES, REFER TO INDEX OF MISCELLANEOUS DOCUMENTS											
2					Part 2		18.24	IL Base	142	7/8/1935		
2					Part 1		0.06	IL Base	148	11/22/1935		
14	x	x					80.00	RHE Pat.	1089891	9/25/1936		
14				x			80.00	RHE Pat.	1089073	3/15/1937		
33		x			11	BN 6W	77.15	IL	214	3/5/1941		
33	x						40.00	CE Pat.	1123764	8/17/1948		
12	x x					IN 4E		QCD from U.S.	Act of Congress	8/30/1954		
34				x x								
35			x x x x	x x x x		See Remarks		PLO Wdl. Gila River Waterfowl Area Proj.	1015	10/1/1954		Other Tps.: 1N 2W, 1S 2W, 1S 3W, 1S 4W, 1S 5W, 2S 5W; Mod. PLO 3734 7/6/1965 (AR 26341)
33					6		40.81	PS Pat.	1151757	4/21/1955		
31					9 thru 14	See Remarks	235.16	IL	247	6/30/1958		Other Tps.: 1N 2W, 1N 3W, 6N 4W, 4S 13W, 14S 11E, 8S 22W, 8S 21W, 13S 17W, 9N 4W, 4ON 25E
						Deficiency; 6N 4W	1.32	IL Base	262	10/6/1959		
2					Part 2	1N 5W Nav. Mer.	22.40	IL Base	269	7/13/1960	7/19/1960	
2					Part 1	SN 14E	.51	IL Base	279	1/11/1961	2/16/1961	
1		x x		x	1,2,3		400.61					
12	x x x x x		x x x x x x x x				560.00					
13						All	640.00					
14	x	x		x			160.00					
24	x x x x x x x x			x x		See Remarks	400.00	PLO Rev. Recl. Wdl. 50 7/2/1902	2897	1/29/1963	2/4/1963	Other Tps: 2N 1W, 1N 7E, 1N 8E, 2N 8E, 2S 11E, 2S 12E; Open to entry 7/30/1963 10AM
35						See Remarks		PLO Mod. Wdl. Gila River Waterfowl Area Proj. PLO 1015, 10/1/1954	3734	7/6/1965	7/20/1965	W 55', E 55', and S 55' of the S½
35			x x x x x x x x					R/W Hwy.	AR 034453	8/10/1965		R.S. 2477: Part. relinquishment, 7/22/1982
34				x x								
35			x x x x x x x x			See Remarks		O. Proposed Cl. Multiple Use	A 922	6/5/1967		Public lands; segregates from appropriation under agricultural laws, PS, PX, SX, SS, R.S. 2477 and mining laws; Other Tps.: 1N 2W, 1S 2W, 1S 3W, 1S 4W, 1S 5W, 2S 3W, 3S 4W, 4S 4W, 4S 5W, 4S 6W, 4S 7W, 4S 8W, 5S 4W, 5S 6W, 5S 7W, 5S 8W, 5S 9W, 5S 10W, 5S 11W, 6S 11W, 6S 12W, 6S 13W, 7S 13W, 7S 14W; Pub. F.R. 6/14/1967; e.c.l. 8/31/1967; Pub. F.R. 9/14/1967;

Figure 23: Sample Historical Index page to lands in the Gila River area, U.S. Bureau of Land Management, Phoenix, Arizona.

The 1913, 1915, and 1917 historical maps, the U.S. General Land Office original survey plats, and the Bureau of Land Management's Master Title Plats were used to create Exhibits 1-5 in Chapter 1. To draw those exhibits, the river as shown on the historical maps was digitized by Salt River Project Cartographics using a GIS computer system. With this product, Littlefield Historical Research consulted the U.S. Bureau of Land Management's Master Title Plats and Historical Indices to place the federal patents upon the newly created maps. (For Exhibit 1A, which shows state patents, the same process was used with state plats created by the Arizona State Land Department – see later in this chapter regarding state acquisition and disposition of federally-

granted lands.) Because of the length of the lower Gila River below the Salt River, Exhibits 2-5 show only portions of the stream. However, the patents which appear on these exhibits are representative of settlement patterns throughout the Gila River Basin below the Salt River.

B. Background Information on Federal Patents

With U.S. General Land Office surveys having provided an orderly system for the U.S. Government to dispose of the public domain in the Territory of Arizona, settlers began to acquire parcels of land through homesteading. The various homestead laws passed by the U.S. Congress in the late nineteenth century 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.[49] The application would 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 21, township 1 north, range 1 west, Gila and Salt River Base and Meridian. A forty-acre parcel might be the northwest quarter of the southeast quarter, and a twenty-acre parcel might be the west half of the southwest quarter of the southwest quarter.

Once the application had been filed, the settler was required to live on the land for a number of years and make improvements such as fencing the land and building a barn or stables. When the necessary time had elapsed, he or she could return to the land office with witnesses to file affidavits stating that homesteading requirements had been met. There, the settler would also complete any remaining paperwork and make final payments. The affidavits and paperwork created a patent file that contained a great deal of information about the settler and the land he or she wanted to acquire.

The patent files are available at the U.S. National Archives in Washington, D.C., and those relating to the Gila River were used in the preparation of this report together with the actual patents

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

themselves (obtained from the U.S. Bureau of Land Management in Phoenix). The applicant and witness affidavits typically described the parcel in question, the number of acres, the crops farmed, the improvements made, as well as other pertinent information (such as, for example, irrigation canals and diversion points). 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 and correspondence.

In relation to the Gila River, there were many patent applications filed for parcels in sections overlapping the stream between the eastern boundary of township 1 north, range 1 west, and the western boundary of township 8 south, range 22 west – the reach of the Gila involved in this study.

1. Significance of Patents to the Gila River and Navigability

Federal patents to private parties and the supporting files are important for several reasons in ascertaining the potential navigability of the Gila River around the time of Arizona's statehood in 1912. First, the patents indicate the total amount of land awarded by the United States. The acreage is significant because if the Gila River had been considered navigable, federal officials presumably would not have granted title to any land through which the river flowed. Instead, Arizona would have owned such land due to the state's sovereignty. As a result, a patent to a quarter section through which the stream ran would have been recorded as somewhat less than one-hundred-sixty acres (a full section is six-hundred-forty acres). In other words, land would have been removed from the total acreage because of the stream's navigability. Moreover, if the river had been considered navigable, an irregularly-shaped parcel next to the river would have been identified as a "government lot" instead of an even division of a six-hundred-forty-acre section. Thus, a hypothetical patent to a small parcel of land lying next to a navigable body of water would have a

reference to "government lot 3, consisting of 27.4 acres."[50] While there are some government lots lying next to meandered portions of the very lowest reaches of the Gila, those lots were not created due to the stream's navigability. Instead, the lots were formed because of surveying instructions pertaining to meanders of non-navigable bodies of water (see Chapter 1 above).

Importantly, none of the federal patents that overlay the Gila River (regardless of their respective dates) contain any provisions for reserving the bed of the river to Arizona. There is also no evidence that Arizona, upon statehood, chose lands in lieu of those previously patented upon the river bed – which the state would have been entitled to do had the river been navigable. (In-lieu, or indemnity, selections were public domain lands chosen by a state or railroad to compensate for overlapping claims to state or railroad ownership elsewhere.)

Another reason why patents are important to help determine whether the Gila River was navigable at the time of statehood relates to their 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 built an irrigation ditch from the Gila River or whether he used the river for other purposes. Again, nothing in the supporting files suggests that the Gila River was navigable or that settlers used the stream for conveying commerce.

C. Federal Patents in Exhibit 2

This report will discuss representative federal patents along the Gila River between township 1 north, range 1 west (the confluence of the Salt River and the Gila), downstream to

[50] 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. See also for examples of how government lots were established, *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.

township 8 south, range 22 west (where the Gila meets the Colorado River), in relation to the Exhibit maps reproduced in Chapter 1. While this section of the report does not include every township or every patent within the Gila River watershed to keep the discussion to manageable proportions, all patents in all townships for the watershed have, in fact, been reviewed. None contradicts the evidence presented here, and most of the Gila River patents considered in the following discussion are displayed on Exhibits 1 through 5 in Chapter 1. For the purposes of this discussion, representative patents and their files will be reviewed going downstream from the original starting point for all Arizona federal surveys near the confluence of the Salt and Gila rivers.

1. Federal Patents on the Gila River in Township 1 North, Range 1 West

This township lies directly west of the confluence of the Gila and Salt rivers, and it is the upstream-most segment of the Gila River covered in this study. The land in the area was quite fertile and therefore attracted many early homesteaders, and among them was Earl A. Watts. Watts applied for a homestead patent on December 17, 1929, for land lying in section 34. A favorable government report written on March 5, 1934, stated that the character of land was "[r]iver bottom alluvial soil seamed and hummocked throughout and covered with a dense growth of brush, and *along the many water courses*, with iron wood." (Emphasis added.) Those water courses included the Gila River. One of Watts' witnesses wrote on his final proof that the land was "[r]olling, *river running through*." (Emphasis added.) Despite the fact that the river flowed through the land, Watts nonetheless received title to the entire tract, suggesting that the Gila River was not considered navigable because none of the land was set aside due to Arizona's sovereignty.[51]

Thomas D. Taylor also applied for a homestead patent in section 34 on December 16, 1918. On his final proof, Taylor wrote that only about thirty acres of the claim were capable of being

[51] Homestead Entry Patent File for 1070902, 1929, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

farmed and that the "[b]alance of the land [is] *in the river*." (Emphasis added.) This information was repeated in the witness's affidavits, leaving no doubt that the claim lay in the river bed. Nonetheless, no acreage was reserved for Arizona because of its sovereign rights.[52]

2. Federal Patents on the Gila River in Township 1 North, Range 2 West

Further downstream, the land along the Gila River became more densely settled. On June 11, 1919, Robert O. Gruwell applied for a homestead patent for land lying in sections 25 and 26 of township 1 north, range 2 west. On his final proof, Gruwell reported that only one hundred acres of the claim was cultivable and that the "balance [is] *river bed*." (Emphasis added.) This information was repeated throughout the patent file, leaving no doubt that part of the parcel was indeed in the river bed. However, no land was reserved for Arizona's sovereign rights to the bed and the banks of navigable streams.[53]

Other patented parcels through which the river flows exist in this township. However, because some of these patents were acquired under the *Desert Land Act* of 1877 and because that law had unique requirements that relate to the issue of navigability, those patents are discussed separately below.

3. Federal Patents on the Gila River in Township 1 South, Range 2 West

In 1931 a substantial dispute over land occurred in section 8 of township 1 south, range 2 west. In this township, Walter R. Ford filed a homestead entry for land claimed by another individual. Though a controversy erupted over title to these lands (through which the Gila flowed), the State of Arizona was never a party to the dispute and never filed any protest over the fact that the U.S. was granting title to land that lay in the riverbed. On July 25, 1931, the chief of the field

[52] Homestead Entry Patent File for 762971, 1918, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[53] Homestead Entry Patent File for 814694, 1919, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

division of the U.S. General Land Office wrote to the commissioner of that agency that "[t]he land involved being located about a mile and one-half south of Liberty, Arisona [*sic*], is situated, with the exception of the SE1/4NE1/4, *in the bed of the Gila River*." (Emphasis added.) He continued that "[t]he tract in dispute, namely – the SW1/4NW1/4 Sec. 8, with the exception of about ten acres thereof, is strictly speaking bottom land situated *in the bed of the Gila River* and does not show any evidence of having been cultivated within recent years." (Emphasis added.)[54]

Not only did the U.S. General Land Office acknowledge the presence of the river in the disputed parcel, but so too did Walter Ford's proof. That document stated that the "surface is practically level except the river bottom. The river bottom is washed . . . 100 acres out of the 160 could be plowed – would be subject, of course, to the overflow of the river when it got up." While the title dispute was eventually settled in favor of Ford, no mention was ever made by the State of Arizona about the lands located in the riverbed. Instead, Ford was granted title to the entire parcel, without any lands removed for the state, suggesting that the river was considered non-navigable.[55]

D. Federal Patents in Exhibit 3

Heading downstream, the next examples of patented land are shown on Exhibit 3, which covers township 4 south, range 4 west, and township 5 south, range 4 west.

1. Federal Patents on the Gila River in Township 4 South, Range 4 West

Nestled against the Painted Rock and Gila Bend mountains to the west, settlers in township 4 south, range 4 west, created one of the few settlements along the lower stretch of this desert river – the farming community of Gila Bend. As part of this community, Miller F. Woods filed a

[54] Homestead Entry Patent File for 1071855, 1926, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[55] Homestead Entry Patent File for 1071855, 1926, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

homestead entry for land lying in section 20 on October 7, 1929. On May 15, 1933, a special agent from the Division of Investigations submitted a report of the land in question. This report is in Woods's patent file. The agent wrote that "[t]he Gila River forms the approximate east boundary of the entry, and practically all the land in this entry, with the exception of a narrow strip of higher land along the west line of the entry is *river bottom land*, fairly well covered with a growth of arrow weed." (Emphasis added.) The remainder of the patent file underscores that the land was located in the river bottom, yet no land was reserved for Arizona.[56]

Ben Harrelson came to Gila Bend much later than Woods. Settling just south of Woods, Harrelson's patent file shows that he did not purchase the land until a public sale around 1952. Furthermore, documentation in the file makes it clear that all parties involved considered the Gila River to be non-navigable. The land classification report filed by Eugene H. Newell for the Bureau of Land Management indicated that of the 160 acres in Harrelson's parcel, "135 acres *lies in the dry Gila River bed* and consists of rocky sand bars which makes the lands totally unsuitable for cultivation." (Emphasis added.) The topography, Newell wrote, was "[f]lat along west boundary, dry river bed covers greater portion," and in response to a question regarding the type and extent of erosion, he stated that "*Gila River Bed occupies greater portion*." (Emphasis added.) Harrelson's own application for the land underscored Newell's report. When asked to describe the character of the parcel, Harrelson said that "small portion on west edge is cultivable – *balance in Gila River channel*." (Emphasis added.) He also wrote that the "*Gila River flows through* east part during rainy seasons." (Emphasis added.) It was undoubtedly clear to officials that the river ran directly through and occupied a large percentage of this tract of land. However, no acreage was withheld

[56] Homestead Entry Patent File for 1066811, 1929, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

due to Arizona's sovereign rights to the bed and banks of navigable rivers, nor were any in lieu selections made by the state for these lands.[57]

E. Federal Patents in Exhibit 4

Exhibit 4 covers the western edge of township 7 south, range 16 west; township 8 south, range 16 west; township 8 south, range 17 west; and the eastern edge of township 8 south, range 18 west.

1. Federal Patents on the Gila River in Township 8 South, Range 16 West

Further downstream, Chesterton Dennis Norton filed for a homestead patent on December 21, 1928, for land lying in section 9 of township 8 south, range 16 west. It is clear that the Gila River ran very close to or through this land because the patent file contains many references to the river's overflow. For instance, the claimant wrote on his final proof that in 1931, he had "[p]lanted and cultivated 60 acres to barley and wheat – crops being washed away by flood in Gila river," and that in 1932, he had "[p]lanted and cultivated 60 acres to barley and wheat – Gila washing it away." Norton described the same circumstances again for 1933. All of his witnesses testified about the same situations. Importantly, none of the land was reserved for Arizona's sovereign rights. Furthermore, the regular flooding of the river, which is noted in this patent file, suggests the river's erratic nature.[58]

There are also Desert Land entries in this township, but they are discussed in the section dealing with the *Desert Land Act* below.

[57] Public Sale Patent File for 1140493, 1952, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[58] Homestead Entry Patent File for 1073385, 1928, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

2. Federal Patents on the Gila River in Township 8 South, Range 17 West

Norton Marshall, an immigrant from Canada, set out to homestead land in township 8 south, range 17 west, near Yuma, Arizona, in 1890. His land was quite close to the Gila, however, and according to documents in his patent file, he had to contend with the fickle nature of that river. Specifically, in 1890, Marshall noted in his affidavit that he was absent from his land upon occasion due to "floods in the valley, and he could not return to the land for several weeks, and when the flood subsided the canal was so damaged water could not be gotten [unreadable] to irrigate." This type of erratic behavior suggests that the river was not susceptible of navigation.[59]

F. Federal Patents in Exhibit 5

Exhibit 5 covers patents located in township 8 south, range 21 west, and township 8 south, range 22 west.

1. Federal Patents on the Gila River in Township 8 South, Range 22 West

In spite of the extremely dry nature of the land, homesteaders settled just east of the Gila River's confluence with the Colorado. On April 9, 1903, Clarence Maddox filed a homestead entry on land in sections 29 and 30, township 8 south, range 22 west. Maddox's patent file makes it clear that the Gila River ran through the tract. In a February 26, 1912, letter from a special agent of the General Land Office to the Commissioner, the unnamed author wrote that "[t]he land is agricultural *bottom land of the Gila river and is subject to annual overflows by that river*, and is covered with a growth of arrow weeds and some cottonwood trees." (Emphasis added.) In another letter, written on June 21, 1909, the special agent said that:

> the only time [the Maddox family members] were absent from said land up until June, 1908, was at such times as it was unsafe to live thereon by reason of the

[59] Cash Entry Patent File for 869, 1891, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

> overflow of the Gila River. . . . Maddox claims that at one time to have had about 40 acres cleared and planted, but that the river washed away all of said cultivation, and that the Gila River has changed its course three or four times during the period he has lived on said land and that at the present time *most of said entry is in the bed of said river*, there being only about 20 acres left; that his other houses were built on the north side of the Gila River, while his present house is on the south side; that the channel of the river has so changed during the past five or six years that while at the time he made his entry all his entry was on the north side of the river that most of it is now on the south side of the river. [Emphasis added.][60]

Another document in Maddox's file, written by his wife, Kate, on February 21, 1912, stated that a major flood had happened about a year after they arrived on the land:

> The Gila River overflowed its natural course and washed over our land. . . . We returned to the land about three months subsequent thereto and again lived in the house, until about a year when the Gila & Colorado Rivers again overflowed and drove us from the land, absolutely destroying the adobe house, pumps and all traces of our residence. About six months thereafter we built a small house, and continuously resided therein until a couple of months afterward when the river again rose, washed away our second house, and driving us from the land. . . . I have exercised the utmost good faith in endeavoring to maintain residence on the land during the above period often-times at the risk of my life, and that of my child, the river oftentimes rising to a depth of seven or eight feet and forming a stream a mile wide in a single night.[61]

When Maddox deserted his wife in July 1909, Kate Maddox became the sole claimant to this parcel, and on her final proof even more information about the land and river became apparent. She wrote that "80 acres of said land practically now *lies in the Gila River Bottom* which at the present time is dry." (Emphasis added.) However, during one of the numerous floods which occurred on this river, she had to be rescued from the land. On a sworn affidavit dated June 24, 1911, Kate Maddox stated that "on one occasion I was held there by the flood and was rescued by Mr. W.E. Lynch, who came in after me with a boat and that the house in which I was then living

[60] Homestead Entry Patent File for 1034203, 1903, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[61] Homestead Entry Patent File for 1034203, 1903, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

and its total contents, furniture, clothing provisions and household supplies were washed away and totally destroyed within twenty four hours after Mr. Lynch rescued me."[62]

Kate Maddox was issued a patent to the entire amount of land requested in her application even though the Gila flowed through it. None was reserved due to the sovereign rights of the Arizona. Furthermore, the vivid descriptions of the violent and erratic river suggest it could not be depended upon for navigation on a regular and reliable basis.[63]

G. THE *DESERT LAND ACT* OF 1877

In addition to patented lands already discussed, other parcels along the Gila River were claimed under the 1877 federal *Desert Land Act*.[64] While the various other homestead acts allowed a maximum of 160 acres per individual, the *Desert Land Act* was intended to allow larger blocks to be settled. Federal lawmakers understood that desert lands were less productive (from an agricultural perspective) than non-arid lands, and therefore, the legislators provided that patents attained under the act could be as large as 640 acres. The relevance of the *Desert Land Act* to the question of the Gila River's navigability lies in the law's requirement that the land be irrigated before the final patent was awarded. Importantly, the water to be used had to be taken from a non-navigable stream. 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 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

[62] Homestead Entry Patent File for 1034203, 1903, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[63] Homestead Entry Patent File for 1034203, 1903, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[64] *An Act to Provide for the Sale of Desert Lands in Certain States and Territories*, 19 Stat. 377 (1877).

> be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes subject to existing rights. [Emphasis added.][65]

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."[66] 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.

The requirements of the *Desert Land Act* shed light on the non-navigability of the Gila River. There were over twenty patents adjacent to the Gila River awarded under the *Desert Land Act*, many of which cited that stream as their source of water. The logical conclusion from these applications is that the Gila River must have been considered non-navigable by the applicants as well as by the administrators of the U.S. General Land Office.

The following discussion is not limited to Desert Land entries located in the sample sections although most are, in fact, located there.

1. Desert Land Entries along the Gila in Township 1 South, Range 2 West

On August 2, 1886, James H. Brown applied for a claim under the *Desert Land Act* of 1877 in section 4 of township 1 south, range 2 west. Malie Jackson, one of Brown's witnesses, gave a deposition in 1889 in which he asserted that the "Gila River crosses the SE corner of the northwest 1/4 of the SE1/4." The deposition of Brown himself confirmed this same testimony. Additionally,

[65] *An Act to Provide for the Sale of Desert Lands in Certain States and Territories*, 19 Stat. 377 (1877).
[66] *California Oregon Power Co. v. Beaver Portland Cement Co*., 295 U.S. 142 (1935) at 159. See also *California v. United States*, 438 U.S. 645 (1978) at 663.

Jackson and Brown both noted that the source for irrigation of the land would be the Gila River through the Buckeye Canal. Brown was awarded patent 1033448.[67]

2. Desert Land Entries along the Gila in Township 1 South, Range 3 West

Just downstream, David R. Hefley applied for land lying in section 7 of township 1 south, ranges 2 and 3 west, declaring his intent to reclaim this tract in 1945. He filed his intention to make final proof on the desert land entry in 1951. According to the patent file, the land was clearly crossed by the Gila River on the north side.

Hefley's patent file contains a report filed by Field Examiner James W. Neal for the Bureau of Land Management. Describing his findings on October 7, 1946, Neal wrote that "[t]he land lies in the bottoms adjacent to the Gila River, on the south side of the river." Although Neal's characterization was somewhat vague, the land classification filed on June 27, 1946, stated specifically that "[t]he land *is crossed by the Gila River*." (Emphasis added.) On another classification report, submitted on June 11, 1946, for the Department of Interior's Grazing Service, Examiner Morris A. Iragstad recorded that the topography of the land was "*[b]ank and bed of Gila River*, round rocks in sand on flat bottom land." (Emphasis added.) In describing the soil, Iragstad wrote that there was "*[s]and and gravel in bed*; rocky near bank and sandy loam on flat." (Emphasis added.) Perhaps most telling about the documentation in Hefley's file is that, according to Examiner Iragstad, an old channel of the river was also present upon the land that Hefley was attempting to patent: "The non-tillable portion *is part of the present river bed* and the old river bed is composed of bare sandy wash with a predominance of salt cedar and arrowweed *on the old*

[67] Desert Land Entry Patent File for 1033448, 1886, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

channel portion." (Emphases added.)[68] All affidavits submitted on behalf of this desert land entry also noted the presence of the river, including that of Hefley himself. Ultimately, no acreage was removed from the final patent – number 1134685 – and no mention was made of Arizona's sovereign right to the bed and banks of the Gila.[69]

The patent file for another settler in this township, Howard William Bourland, also contains documentation which describes in detail the 120 acres of land he wished to patent. The 1953 report that was filed by Appraiser Eugene H. Newell for the Bureau of Land Management clearly stated that "[w]ater for irrigation [for Bourland's land] is obtained from a dug well located under the flood-plain bluff of the *Gila River which traverses the southern half of the entry*. . . . Due to the location of the well in the river bed, shallow and an unlimited supply of irrigation water is available." (Emphasis added.) This was the first indication that Bourland's land lay in the river bed. The other documents in Bourland's file underscore this conclusion. For instance, another report, filed by Field Examiner Paul F. Cutter, stated that "[t]he Gila River (high water) flows westerly through the southeast corner of the land. The East-West flood-plain bluff of the Gila River is situated just north of the center of S1/2 NE1/4 section 11 and then drops off to the southwest in SE1/4 NW1/4." Lastly, each affidavit submitted on behalf of Bourland's desert land entry noted that the Gila River passed through the land. Bourland received patent number 1141999 for all 120 acres, suggesting strongly that contemporaries did not believe the Gila River was navigable.[70]

[68] Desert Land Entry Patent File for 1134685, 1945, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[69] Desert Land Entry Patent File for 1134685, 1945, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[70] Desert Land Entry Patent File for 1141999, 1953, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

3. Desert Land Entries along the Gila in Township 4 South, Range 4 West

Further downstream, other applicants filed desert land entries along the Gila River. On April 24, 1920, U.L. Logan applied for a desert land patent to 240 acres of land lying in sections 8 and 9 of township 4 south, range 4 west. Logan declared that his irrigation supply would be coming from the Gila Water Company, which obtained its supplies from the Gila River. In addition to the source of water, there were many documents in Logan's file which state that a portion of the claim lay in the river bed. For example, an "Affidavit Outlining Proposed Irrigation Project" stated that "[a]bout 2/3 of the west side of the E1/2 NE1/4 Sec. 8 are non-cultivable, nonreclamable [*sic*] because the *Gila River often covers this portion which is mostly river sand*." (Emphasis added.) In May 1924, Logan himself swore that "20 acres of each of two 40 acre tracts in my said claim, *are in the Gila River*, and not irrigable." (Emphasis added.) This information was repeated on the claimant's final proof as well as those of his witnesses. Moreover, an inspector from the Department of the Interior submitted a report stating that "[o]n the west side [of the parcel] floods in the Gila River have cut away and partly destroyed approximately forty acres." These numerous references to the Gila River upon this tract indicate that all parties were aware of its presence. Nonetheless, when patent 1001597 was awarded to Logan, no acreage was reserved due to the State of Arizona's sovereign rights to the bed and banks of navigable streams.[71]

4. Desert Land Entries along the Gila in Township 8 South, Range 16 West

On July 13, 1925, James D. Forest filed for a Desert Land entry patent on land lying in section 8 of township 8 south, range 16 west. As noted in a letter contained in Forest's patent file, "[t]he land in question is situated 16 miles northeast of the town of Welton, Arizona and is located on the north side of the Gila River. *This river passes through the extreme southeast portion of this*

[71] Desert Land Entry Patent File for 1001597, 1920, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

entry in a general northeast and southwest direction." (Emphasis added.) The same information was reiterated on Forest's own Final Proof. In response to a question regarding the "streams, springs, or bodies of water" upon the land, Forest wrote that "Gila river is adjoining this land, the stream being dry the greater potion [*sic*] of the year; stream does not afford natural irrigation." Despite the presence of the Gila, patent 987760 was awarded to Forest without reservation of land for the State of Arizona.[72]

5. Desert Land Entries along the Gila in Township 8 South, Range 17 West

In January 1924, William C. Lacy applied for a Desert Land patent on a parcel lying in section 14 of township 8 south, range 17 west. On Lacy's final proof, he noted that "[t]he *Gila River passes along and cuts off about 30 acres on the east end of this entry*." (Emphasis added.) Lacy's witnesses also testified to this fact. H.S. Price, for instance, wrote to the Commissioner of the General Land Office that "[t]he Gila River is situated about one-eighth of a mile to the east and when the highwaters occur, the entire Sec. 14 is subject to inundation." Importantly, when patent number 1028040 was awarded to Lacy, no land was reserved for Arizona despite the river's obvious presence in the parcel.[73]

Also in section 14 of township 8 south, range 17 west, Allen B. Ming applied for a Desert Land patent in 1924. On May 24, 1927, an inspector from the Department of the Interior submitted a report finding that "[t]his tract is located in the Gila River bottoms, one mile south of Rolls. . . . The *Gila River, dry during the greater part of the year, touches the land* in the southeast corner, but does not naturally irrigate any part." (Emphasis added.) On the claimant's final proof, he repeated

[72] Desert Land Entry Patent File for 987760, 1925, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[73] Desert Land Entry Patent File for 1028040, 1924, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

that "the *Gila River touches the SE corner of said land*, which stream is dry the greater portion of the year." (Emphasis added.) This same information was repeated on the witnesses' final proofs.[74]

The history of *Desert Land Act* entries along the Gila supports the evidence from homestead and cash entry patents that the river was not considered navigable by contemporaneous observers. No mention was made in the *Desert Land Act* applications of reserving the bed and the banks of the Gila for Arizona due to the sovereign rights of the State. Moreover, the fact that over twenty Desert Land patents were awarded indicates that many individuals thought the stream was *not* navigable. In fact, the evidence indicates that all contemporaneous observers considered the Gila to be non-navigable.

H. 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.[75]

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.[76] In addition, in 1881 Congress

[74] Desert Land Entry Patent File for 1009161, 1924, Serial Land Patents, Records of the U.S. General Land Office, Record Group 49, U.S. National Archives, Washington, D.C.

[75] 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).

[76] *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, 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, also contained the provision that states carved out of territories gained from Mexico at the end of the Mexican War would each receive sections 16 and 36 to support public schools. See Section 15 of this statute.

granted seventy-two sections (46,080 acres) to be chosen by Arizona in support of universities.[77] 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).[78] Finally, in 1929, Congress provided to Arizona another 50,000 acres from the public domain to fund miners' hospitals.[79]

Aside from sovereign lands (which were determined by navigability and not by an act of Congress) and lands in sections 2, 16, 32, and 36, Arizona was allowed considerable leeway in selecting the other federally granted lands. In addition, Arizona had flexibility in selecting in-lieu, or indemnity, acreage if mineral lands (which were denied to the State), Indian reservations, or other conflicting claims overlay any section 2, 16, 32, or 36. Likewise, if a navigable body of water overlay any of these four sections, the state could take lands elsewhere equal in size to the total area of the bed of the body of water. Significantly, Arizona made no in-lieu selections to compensate for the area covered by the Gila River's bed in sections 2, 16, 32, and 36 or in other federal lands granted to the state where they overlay the Gila.

I. State Disposition of Federally-Granted Lands

In the years following statehood in 1912, Arizona's officials confronted the daunting task of disposing of the millions of acres given to the state. To do this, the Arizona State Legislature created an initial version of the Public Land Code in a special 1915 session laying out the manner in which the state would dispose of its public land. The basic procedure established was to advertise

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

[78] 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).

[79] *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).

the proposed sale of state land for at least ten consecutive weeks in a newspaper regularly circulated in Phoenix, send an appraiser to the land to make a report and set a minimum price, and then sell the land to the highest bidder. The purchaser would receive a certificate of purchase, indicating his or her promise to pay any balance in addition to state taxes. Once full payment had been received, an Arizona patent was issued.

This section of the report demonstrates that Arizona officials did not consider the Gila River to be navigable when granting title to parcels through which the stream flowed. The discussion centers around the land in township 1 north, range 1 west. (For the location of state patents discussed here, see Exhibit 1A, reproduced below.) Information about state patents is derived from the state patents themselves and related state patent files at the Arizona State Land Department. The location of state patents was determined in part through the use plats generated by Arizona, a sample of which is also reproduced below. Although this report only discusses in detail the state patents in this one township, all state patents overlaying the river were reviewed for the purposes of this report. None contains any information which disputes the conclusions set forth below.

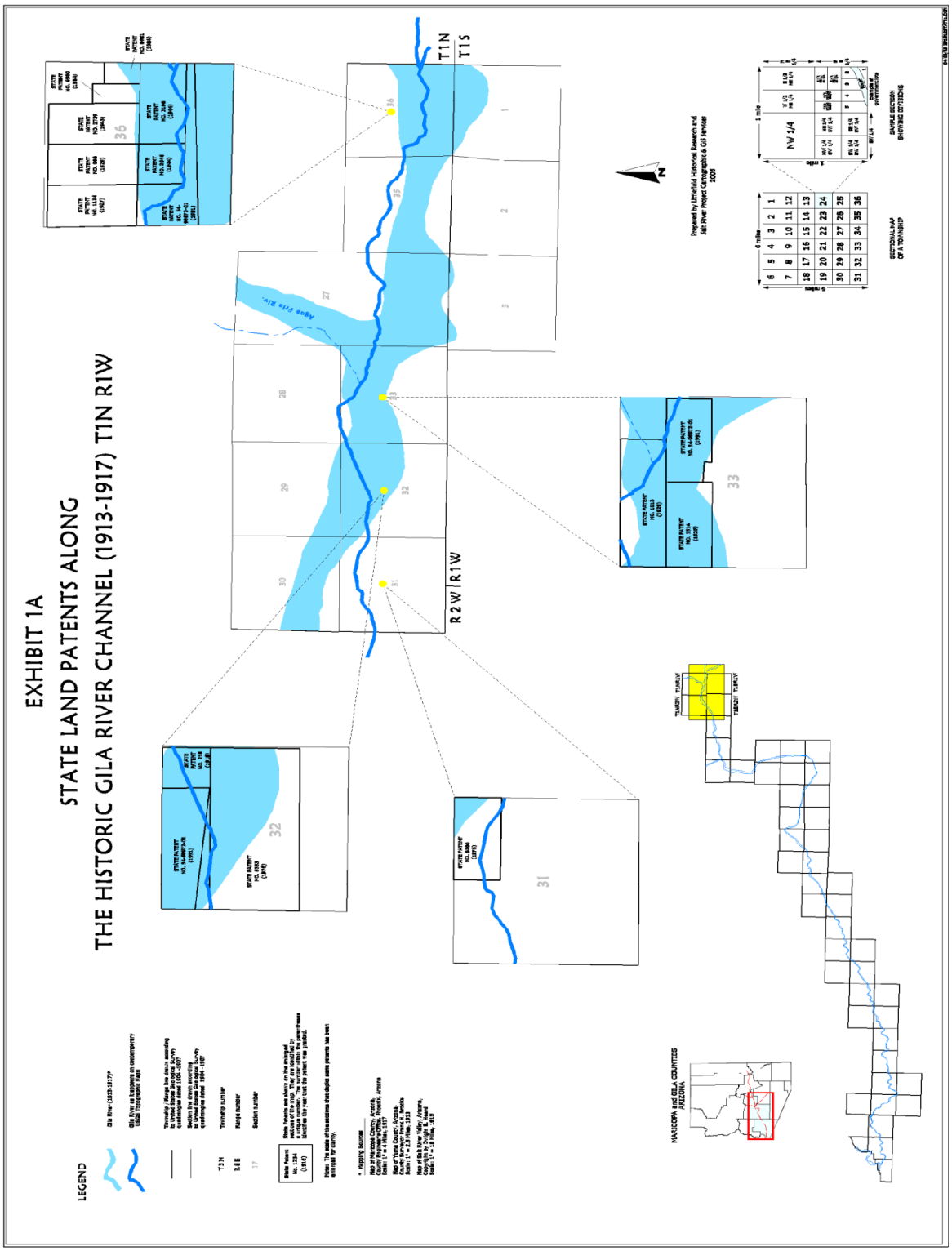


Figure 24: Exhibit 1A, State Patents along the Historical Gila River Channel (1913-1917) T1N R1W. Source: Littlefield Historical Research and Salt River Cartographics & GIS Services, 2005.

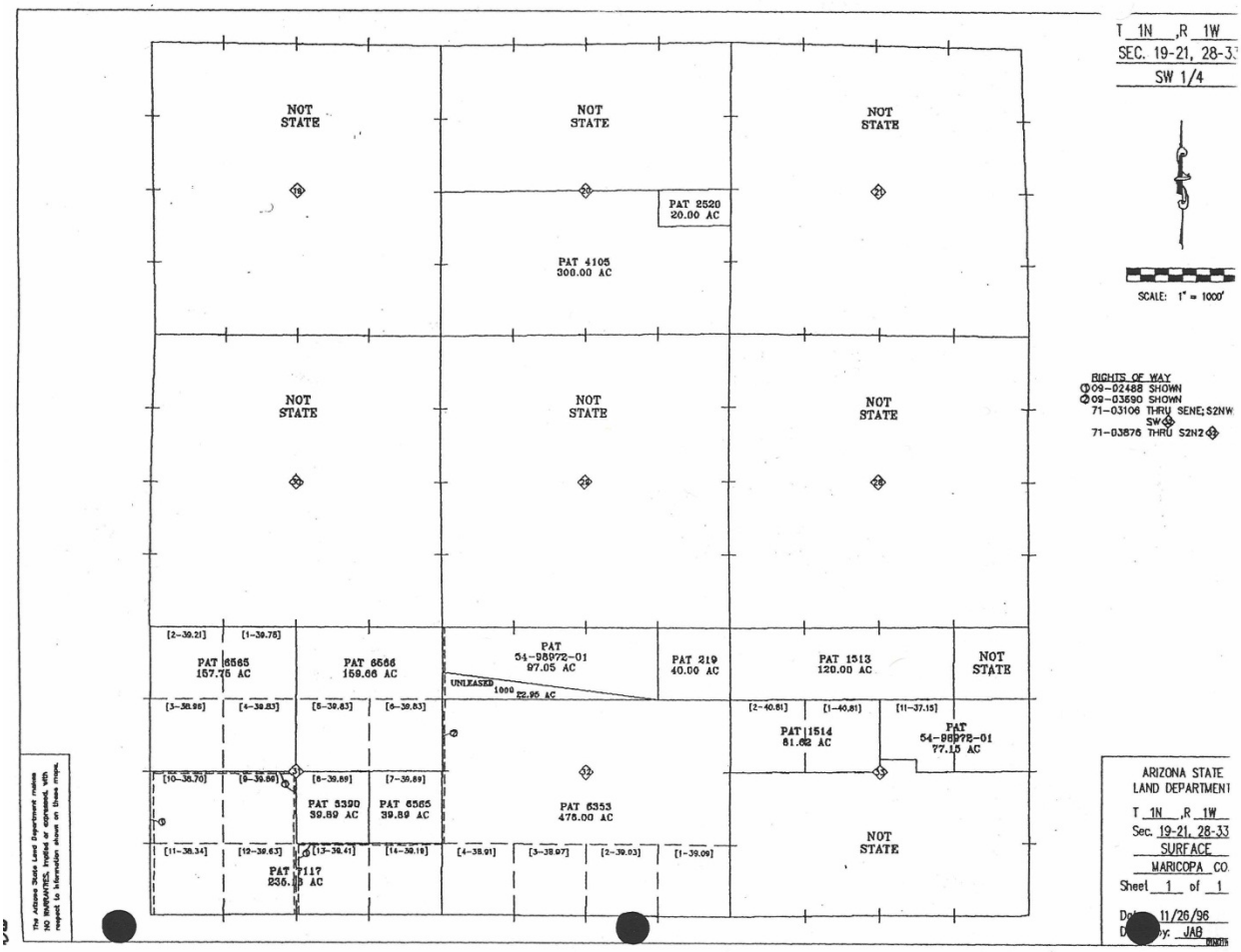


Figure 25: Sample Master Title Plat to Arizona State Lands in the Gila River Area. Source: Arizona State Land Department, Phoenix, Arizona.

1. State Patents in Township 1 North, Range 1 West

The land lying directly west of the confluence of the Gila and Salt rivers drew many settlers. Those unable to homestead on land obtained directly from the federal government had the option of purchasing land from the state of Arizona, which owned at least four sections of land in this township. Importantly, the Gila River ran through two of the four, sections 32 and 36. In addition, Arizona obtained land in sections 31 and 33 of the same township in lieu of lands located elsewhere in the state. The land in all of these sections – 31, 32, 33, and 36 – was eventually sold by the state to individuals.

In section 36, Arizona sold seventy-nine acres of the northwest quarter in the form of patent number 986 to Bruno Ramirez on August 18, 1926. The river bordered the southern edge of Ramirez's land, yet no land was reserved for the state. The acreage directly to the west of Ramirez's land, also in the northwest quarter, was sold to L.J. Holzwarth just one year later, on September 16, 1927. As on Ramirez's land, the Gila River ran along the south edge of this parcel, but no acreage was withheld. The same was true for the land to the east of Ramirez's, patent 2739 lying in the northeast quarter of section 36. Here, the land was patented to L.W. and Irma J. Hudson on May 1, 1943. No mention was made in any of these three patents about the sovereign rights of Arizona to the land overlying navigable streams.[80]

In the south half of the section, Arizona sold forty acres to Elgie L. Burleson on March 11, 1944, without any mention of reserving the river's bed in the interest of the State. The land directly to the east of Burleson's parcel was also patented without mention of the state's rights. Lloyd C. Lakin and George T. Peter, co-partners in the Lakin-Peter Cattle Company, purchased eighty acres of land in the southeast quarter of section 36 on November 30, 1944. Their patent, number 3166, mentioned nothing about the bed of the Gila River. The other two patents in the section, 6980 and 6981, both sold in 1984, also gave no indication of Arizona's interest in the bed of the Gila River.[81]

Downstream in section 33, patent 1514, sold to the Chula Vista Ranch Company on November 20, 1929, had the Gila River coursing directly through it. Yet 81.62 acres were sold without reserving any of the river's bed to Arizona. The same company also patented the land directly to the north on the same day. This patent, number 1513, totaled 120 acres, again with no

[80] State Patent 986, 1926; State Patent 1124, 1927; State Patent 2739, 1943, Arizona State Lands Department, Phoenix, Arizona.

[81] State Patent 2946, 1944; State Patent 3166, 1944; State Patent 6980, 1984; State Patent 6981, 1984, Arizona State Lands Department, Phoenix, Arizona.

reservation for the bed of the river. Patent 54-98972-01, also in section 33, also did not reserve any land for the state.[82]

State patents in section 32 support the conclusion that the Gila River was not considered navigable. Lying in the northeast quarter of the northeast quarter, patent 219 was sold to the Buckeye Irrigation Company on September 24, 1918. The appraisers' report stated that "the intake and sand gates of the Buckeye Irrigation Co's canal lie upon this tract." The application to purchase state lands contained a comment that the "grazing land is in river bottom," and that "*Gila River flows over south part of forty*." (Emphasis added.) These comments make it clear that the Gila River ran through this parcel of land. Nonetheless, the state did not reserve any of the acreage for its sovereign rights, patenting the entire forty-acre tract to the company. Patent 6353, south of the Buckeye Irrigation Company's land, also did not have any of its acreage reserved for the state's sovereign rights.[83]

Lastly, the sole patent overlying the river in section 31 was granted by Arizona to James L. King on March 30, 1978. King received 159.66 acres lying in the north half of the northeast quarter. The Gila River flowed directly through this parcel of land, yet none of its acreage was reserved for the sovereign rights of the state of Arizona.[84]

J. Conclusions Regarding Federal and State Patents

In conclusion, the federal government granted over ninety-five separate patents that touched or overlay the Gila River to private individuals. 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 Gila by the state of Arizona. In each case where patents were applied for, several parties

[82] State Patent 1514, 1929; State Patent 1513, 1929; State Patent 54-98972-01, 1991, Arizona State Lands Department, Phoenix, Arizona.
[83] State Patent 219, 1918; State Patent 6353, 1976, Arizona State Lands Department, Phoenix, Arizona.
[84] State Patent 6566, 1978, Arizona State Lands Department, Phoenix, Arizona.

expressed implicit opinions on the navigability of the Gila through the request for and award of lands through which the river flowed. These included the patentee, his witnesses, and officials of the U.S. General Land Office. It is significant that cumulatively, literally hundreds of people made judgments concerning the Gila River's navigability in this manner – opinions spread chronologically over many years, throughout different seasons, and over a large geographic area.

The patents issued by Arizona to private parties for land through which the river ran provide another perspective. If the state had believed it owned the bed and banks of the river, it presumably would have considered the stream's navigability in disposing of those lands. Yet there are over sixty instances in which the state chose to sell lands which lay in the river bed. Collectively, therefore, federal patents, Congressional grants to Arizona, and state patents all strongly suggest that both federal and state officials did not perceive the Gila River to be navigable prior to statehood, at statehood in 1912, or in the years following statehood.

CHAPTER 3: U.S. AND MISCELLANEOUS RECORDS

Although U.S. Government survey records and documents relating to federal and state patents are crucial to understanding perceptions of the Gila River prior to and in 1912, other U.S. Government records – both published and unpublished – provide a wealth of supplemental information concerning that stream. In addition to information from the U.S. General Land Office (which directed federal surveys and patenting), two of the most important U.S. Government agencies concerned with the Gila River region were the U.S. Geological Survey and the U.S. Reclamation Service (today, the Bureau of Reclamation). Both of these Department of the Interior 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 clear pictures of the Gila River before and at the time of Arizona statehood in 1912.

Moreover, other miscellaneous historical records shed further light on the Gila River. These documents include records of explorers, legislative pronouncements, observations of irrigation enthusiasts, and statements by Gila Valley residents. These documents and photographs are representative of many more illustrating the same conclusions regarding the Gila River, and this material, which ranges chronologically from the eighteenth into the twentieth centuries, supports the findings in other parts of this report that the Gila River was erratic, unreliable, and blocked by obstructions such as sand bars, gravel beds, and boulders. This chapter, therefore, will cover representative examples from thousands of pages of documents – both government and otherwise – that were examined for this report, all of which substantiate that the Gila River was never viewed as a reliable means of navigation prior to or at the time of Arizona statehood in 1912.

A. Miscellaneous Historical Records

1. Spanish Missionaries

There are numerous accounts of the Gila River as it existed prior to Arizona statehood in 1912. Among such historical materials are reports by Spanish missionaries, military explorers, and various other visitors to the region, who provided descriptions of the Gila River long before it was impeded by irrigation diversion dams.

One of the earliest non-Indians to visit the Gila River area was Francisco Garces, a Spanish missionary priest, who traveled through what is now the American Southwest in 1775 and 1776. While in what is today the state of Arizona, on November 29, 1775, Garces described the frequent shifting of the Gila River's channel as part of his commentary on that stream as well as on the Colorado River:

> As the Rio Colorado has such a current, and runs so scattered through the bottomlands, we found no Isla de Trinidad, neither was there now the ford by which passed the expedition on the former occasion, the Indians saying that the river was now very deep at that ford: for these two rivers Colorado and Gila rise every year to such excess, and run through these flat and friable grounds with such lack of restraint, that they appear to shift their channels, forming wash-outs, and dividing into branches, according as the force of the current bears more or less to this side or to that. The result is that at its greatest flood the Gila itself extends more than a league [2.63 miles], and presumably the Colorado much more.[85]

2. American Military Expeditions and the U.S.-Mexican Boundary Survey

Many early explorers of the Gila River region were members of the American military, partly because the Gila River and the Colorado River provided land access routes across the Southwest that were useful during the war between Mexico and the United States (1846-1848). Other military explorers came after the war, both to document the assets of the region after the

[85] Francisco Garces, *On the Trail of a Spanish Pioneer: The Diary and Itinerary of Francisco Garces*, Elliot Coues, trans. (New York: Francis P. Harper, 1900), p. 145. Depending on the time and country, a league varied in distance from about 2.4 to 4.6 statute miles. The Spanish league, which was used in what is today the American West, was 2.63 miles.

United States had acquired it as well as to survey the new border between the United States and Mexico (a part of which was the Gila River until the Gadsden Purchase of 1853). The importance of the Gila River as a route across the Southwest was noted by Odie B. Faulk, a former professor at the University of Arizona and Arizona State University. Faulk's *Destiny Road: The Gila Trail and the Opening of the Southwest* (1973) describes the trail, observing that the Gila River was not useful for transportation:

> That the Gila Trail should be of such importance was incomprehensible to men in the eastern United States during the 1850s, for there rivers had provided the natural highways for pioneering; these in turn had carried canoes, flatboats, keelboats, and steamboats, and along their banks men had planted their farms and built their cities. *In the arid reaches of the American Southwest, however, no such water route was available, and a road, such as the Gila Trail, became the route of exploration, conquest, transportation, and communication*. [Emphasis added.][86]

Despite Faulk's assessment that transportation went by land and not by water in the Gila River region, there were at least a few attempts to use boats on the Gila River during the nineteenth century, particularly during the war between Mexico and the United States. Among the earliest military groups to try using the river for conveyance were members of the so-called Mormon Battalion – volunteers recruited from Mormon emigrants, who were then headed for Utah. In October 1846, Colonel Phillip St. George Cooke led the Mormon Battalion westward from Santa Fe, New Mexico, following the Gila Trail across Arizona. After passing Gila Bend, Cooke wrote in his journal about a failed attempt to travel down the Gila by boat:

> Sixty or seventy miles above the mouth of the Gila, having more wagons than necessary, and scarcely able to get them on, I tried the experiment, with very flattering assurances of success, of boating with two pontoon wagon beds, and a raft for the running gear. I embarked a portion of the rations, some road tools, and corn. The experiment signally failed, owing to the shallowness of the water on the bars; the river was very low. In consequence of the difficulty of approaching the river, orders mistaken &c., the flour only was saved from the

[86] Odie B. Faulk, *Destiny Road: The Gila Trail and the Opening of the Southwest* (New York: Oxford University Press, 1973), p. viii.

> loading, and the pontoons were floated empty to the crossing of the Rio Colorado, where they were used as a ferry boat.[87]

Other members of the Mormon Battalion also recorded their perceptions of the Gila River, including Nathaniel V. Jones, who told of another attempt to use boats on the Gila – this time to transport cattle downstream. In early 1847 after camping near the Gila River, Jones noted that the Battalion "[s]tayed in camp all day; here we left one wagon, and made boats of two wagon beds and put about twelve oxen in each boat and started down the river."[88] Despite this description of using boats on the Gila, there is no indication precisely where these boats were first used on the Gila or how far the group was able to travel with them.

Another observer during the war with Mexico also thought boats might be used on the lower Gila River – or at least he speculated on the possibility. Henry Smith Turner kept a journal of his travels in the Southwest during his service in the military, and on November 19, 1846, at a place approximately eighty miles west of Gila Bend, Turner wrote:

> The Gila is assuming a much more river-like appearance – it has attained the width from 100 to 150 yards – and is in average depth about 4 feet – quite deep enough to float a steamboat – its valleys are wide, and but for the want of moisture would doubtless be covered with grass.[89]

While this description indicates that Turner believed the Gila was capable of floating boats far west of Gila Bend, nevertheless his chosen words also suggest that east of this point on the river, the stream did not have "river-like" characteristics and presumably was not capable of carrying steamboats.

---

[87] Philip St. George Cooke, *Report of Lieutenant Colonel Phillip St. George Cooke of His March from Santa Fe, New Mexico, to San Diego, Upper California*, H. Ex. Doc. 41, 30 Cong., 1 sess. (Washington D.C.: U.S. Government Printing Office, 1848), p. 558.

[88] Nathaniel V. Jones, "The Journal of Nathaniel V. Jones, with the Mormon Battalion," *Utah Historical Quarterly* 4:1 (1931), p. 10.

[89] Henry Smith Turner, *The Original Journal of Henry Smith Turner with Stephen Watts Kearny to New Mexico and California, 1846-47*, H.S. Turner and D.L. Clarke, eds., (Norman: Oklahoma University Press, 1966), p. 115.

Another military observer also thought – at least initially (although he later changed his mind) – that the lower Gila River might be useful for transportation by water. This was true even though his descriptions of the stream suggest that its channel changed frequently and was filled with sandbars. William H. Emory took many notes of his service in the Southwest in 1846-1847, and upon his return to the East, he submitted an extensive report of his journey to Congress. As his party moved west from what is today the Gila River Indian Reservation, they "found the river spread over a greater surface, about 100 yards wide, and flowing gently along over a sandy bottom, the banks fringed with cane, willow, and myrtle."[90] On November 19, 1846, just west of the confluence of the Gila and the Salt rivers, Emory made note of the Gila's shifting channel when he wrote that his party:

> encamped on an island where the valley is contracted by sand buttes in what had been very recently the bed of the river. It was overgrown with willow, cane, Gila grass, flag grass, &c. The pools in the old bed of the river were full of ducks, and all night the swan, brant and geese, were passing. . . .[91]

Despite the shifting channel, Emory believed the river had the potential for use by watercraft – an idea he later abandoned. But at this early point of his views, Emory wrote that the "Gila, at certain stages, might be navigated up to the Pimas village, and possibly with small boats at all stages of water."[92]

Emory might have thought boats could be used on the Gila when he visited it in 1846, but nine years later, he had developed a different opinion. While sitting on the commission charged with surveying the new boundary between the United States and Mexico following the Gadsden Purchase in 1853, Emory wrote in an unpublished memo that the newly acquired United States

---

[90] William H. Emory, *Notes of a Military Reconnaissance from Fort Leavenworth in Missouri to San Diego in California*, S. Ex. Doc. 7, 30 Cong., 1 sess. (Washington D.C.: U.S. Government Printing Office, 1848), p. 92.

[91] William H. Emory, *Notes of a Military Reconnaissance from Fort Leavenworth in Missouri to San Diego in California*, S. Ex. Doc. 7, 30 Cong., 1 sess. (Washington D.C.: U.S. Government Printing Office, 1848), p. 92.

[92] William H. Emory, *Notes of a Military Reconnaissance from Fort Leavenworth in Missouri to San Diego in California*, S. Ex. Doc. 7, 30 Cong., 1 sess. (Washington D.C.: U.S. Government Printing Office, 1848), p. 95.

territory on the "north side [of the new boundary line] is bounded by the *Gila River, which is not navigable*, but is a never failing stream, discharging a large volume of water. . . ." (Emphasis added.)[93]

Not only did Emory's memo indicate that he no longer considered the Gila River to be navigable, but so too did his official report of the boundary commission's work to the U.S. Congress. Emory's *Report on the United States and Mexican Boundary Survey Made under the Direction of the Secretary of the Interior*, published in 1857, included a letter Emory had drafted to the secretary of the interior eight years earlier. The letter commented on the nature of the Gila River (which, at the time, was still the border between the United States and Mexico), and strongly suggested that navigating the river would be difficult due to its shifting bed:

> The Gila does not always run in the same bed; whenever it changes the boundary must change, and no survey nor anything else can keep it from changing. The survey of that river, therefore, as it fixes nothing, determines nothing, is of minor importance.[94]

While Emory is credited as the author of the boundary survey report, Chapter Seven of that account actually had been authored by Lieutenant Nathaniel Michler. Michler's summary supported Emory's conclusion that the Gila was not navigable by indicating that only the Colorado River was useful for boats:

> The Colorado is said to have but few tributaries; the Gila has several, emptying in above and below the Pima's villages. The annual rise in both rivers usually takes place in the months of May and June, sometimes as late as July, and is caused by the melting of the snows in the mountains near their head-waters; the freshets are not of long duration. Frequently the one stream will be up and the other down. *The Gila becomes so low that a sand-bar forms at its mouth during the summer, and at no time does it supply much water. The Colorado on the contrary, is navigable for small steamers*, drawing two and two and a half feet water, as high

[93] "Memorandum," Nov. 20, 1855, Letters Sent by the U.S. Commissioner, 1848-58, Emory, U.S.-Mexican Border, box 2, Entry 399, Records of Boundary and Claims Commissions and Arbitrations, Record Group 76, U.S. National Archives II, College Park, Maryland.

[94] William H. Emory, *Report on the United States and Mexican Boundary Survey* (reprint ed., Austin: Texas State Historical Association, 1987), p. 21.

> up as Fort Yuma. . . . This [navigation] is a great saving, as the cost of transportation of stores by trains across the desert is enormous. The navigation is pretty good, but, like all streams of the same nature, the channel frequently changes, owing to the shifting sands and the instability of its banks. [Emphasis added.][95]

Barely two years after Congress had printed Emory's *Report on the United States and Mexican Boundary Survey Made under the Direction of the Secretary of the Interior*, another military observer confirmed Emory's assessment (as well as that of Lieutenant Michler) that the Gila River was not navigable. In March 1859, Lieutenant Sylvester Mowry gave a speech before the American Geographical and Statistical Society regarding proposals to create the Territory of Arizona out of what was then New Mexico Territory. In commenting on the resources of the region, Mowry stated that the existing territory "embraces within its borders three of the largest rivers on the continent west of the Mississippi, viz: the Rio Grande, the Gila, and the Colorado of the West. *The Colorado is the only navigable stream*. . . ." (Emphasis added.)[96]

B. Arizona Territorial Legislation and Description

Military officials in Arizona were not the only people to believe that the Gila River was not navigable. Barely four years after Mowry had spoken to the American Geographical and Statistical Society, President Abraham Lincoln signed a bill creating Arizona Territory out of the western part of New Mexico Territory. Among the earliest actions taken by the new Territory's legislature involved the issue of navigable streams in Arizona. Meeting in 1865 in its second session, the Arizona Territorial Legislature passed a *Memorial Asking Congress for an Appropriation to Improve the Navigation of the Colorado River*. The memorial sought $150,000 to remove obstacles such as sand bars, snags, boulders, and other obstructions in the Colorado River's bed, and it

[95] William H. Emory, *Report on the United States and Mexican Boundary Survey* (reprint ed., Austin: Texas State Historical Association, 1987), pp. 102-103.

[96] Sylvester Mowry, "The Geography and Resources of Arizona and Sonora," *Journal of the American Geographical and Statistical Society* 1 (March 1, 1859): 66.

declared that "*the Colorado River is the only navigable water in this Territory*[.]" (Emphasis added.)[97]

C. Records of the U.S. Geological Survey

Even as various explorers, various military expeditions, and the Arizona Territorial Legislature were commenting on the Gila River, U.S. Government agencies also began providing other views of the Gila. The U.S. Geological Survey and its predecessor agencies started recording commentary concerning the West's resources as early as the 1870s, and the Geological Survey's records about the Gila contain a wealth of information on the stream.

1. The Wheeler Survey

For example, in 1872 the U.S. Government sent George M. Wheeler to obtain topographical information about Arizona and Nevada and to assess the region's resources, climate, and other qualities that might affect homesteaders. (Although this study of the West was conducted under the direction of the U.S. Army prior to the creation of the U.S. Geological Survey in 1879, Wheeler's records are considered part of the those of the Geological Survey's predecessor agencies.)

Following his exploration of the region, Wheeler submitted a report to Congress containing a daily record of the journey as well as descriptions of various subjects. In the report, Wheeler mentioned several streams in Arizona, including the Gila, the Salt, and the Verde. None of these, however, was described as being navigable, although navigability was certainly a characteristic Wheeler would have discussed given his detailed characterization of the Colorado River. Under a section entitled "Means of Communication," Wheeler noted that boats had gone upstream on the Colorado River as high as Camp Mohave (upstream from Yuma, Arizona, near present-day

[97] *Memorial Asking Congress for an Appropriation to Improve the Navigation of the Colorado River*, in *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.

Bullhead City).[98] Yet Wheeler was pessimistic about reliable river transport anywhere in the West, even on the Colorado River:

> One of the urgent wants felt in the promotion of our mining industry is that of increased and cheapened inland transportation. River transportation upon our western coast is, to a great extent, a failure, as beyond the Columbia and Colorado Rivers, that furnish somewhat irregular avenues of connection with the interior, no streams of considerable magnitude exist; river transportation, even in this very American age, loses its great power when pitted against railroads.[99]

2. U.S. Geological Survey *Annual Reports*

Following the Wheeler Survey, the Geological Survey became more directly involved in examining water resources in the West. In 1888 the agency's director (and famed explorer of the Grand Canyon), John Wesley Powell, began what became known as the "Powell Irrigation Survey." Essentially a study of which arid lands in the West might be reclaimed by storing and diverting water from the region's streams, Powell's work led to increasingly frequent commentary in the Geological Survey's records regarding water resources throughout the western part of the United States. Many of the descriptions of the streams of the West were included in the Geological Survey's *Annual Reports*.

Part II of the Eleventh Annual Report of the U.S. Geological Survey, for example, contained a section devoted solely to the Gila Basin. In describing the basin in general, this 1891 report stated:

> 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

[98] Camp Mohave (also called Camp Colorado and Fort Mohave) was established by the U.S. Army in 1859 at Beale's Crossing on the Colorado River. It was closed in 1935.

[99] George M. Wheeler, *Report on Exploration of the Public Domain in Nevada and Arizona*, H. Ex. Doc. 65, 42nd Cong., 2 sess. (Washington, D.C.: U.S. Government Printing Office, 1872), pp. 17-19, 53.

> 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.[100]

The *Twelfth Annual Report of the U.S. Geological Survey* contained more description of the Gila River. Noting that for farming purposes "water is derived from the Gila River and its tributaries by means of canals and ditches, which distribute it to the fields of each farmer," the report added that "[t]hese streams fluctuate greatly, being at times 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."[101] The *Twelfth Annual Report of the U.S. Geological Survey* also described massive torrents and dramatic changes in flow on the Gila:

> The floods of the Gila are usually short and violent, the highest water occurring during the months of January and February. During a freshet the river rises in some places from 8 to 12 feet, and increases in width from 300 feet to a mile and a half. It is sometimes impassable for weeks, and has the appearance in places of a sea of muddy water. The season of low water occurs during the months of June and July, the river bed being then dry in places.[102]

3. U.S. Geological Survey Water Supply Papers

Aside from its *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 Gila River prior

[100] *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.
[101] *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), p. 292.
[102] *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), p. 295.

to or at the time of Arizona's statehood. The "Water Supply Papers" further confirm the undependable and unpredictable nature of the stream.

For example, *Report of Progress of Stream Measurements for the Calendar Year 1905, Part XI. Colorado River Drainage Above Yuma* (U.S. Geological Survey Water Supply Paper No. 175) noted that:

> [t]he river now (1905) flows in a channel fully 1 mile north of the original channel. . . . At every flood the channel shifts. The valley at its narrowest is half a mile wide and the waters may occupy any part or all of it. . . . [The river contains] an enormous amount of mud and sand. At times the waves of sand traveling along the bed of the stream are so large, the current is so swift, and the stream so shallow, that the water is broken into a uniform succession of waves 2 feet high and over.

A table accompanied this description recording discharge at Gila City (Dome), Arizona, and it further indicated the erratic nature of this river. For instance, on February 8, 1905, the discharge was 82,000 cubic feet of water per second, but just eight days later, on February 16, no discharge was recorded at all.[103]

U.S. Geological Survey Water Supply Paper No. 162, published in 1906, added additional detail about the Gila's characteristics. Entitled *Destructive Floods in the United States in 1905, with a Discussion of Flood Discharge and Frequency and an Index to Flood Literature*, this Water Supply Paper described the devastating floods which occurred in the United States in 1905, including five on the Gila. Observing that the first 1905 Gila inundation was "more characteristic of floods on this stream than any of the others," the Water Supply Paper stated that such torrents were

[103] M.C. Hinderlider and G.L. Swendsen, *Report of Progress of Stream Measurements for the Calendar Year 1905, Part XI. Colorado River Drainage Above Yuma*, U.S. Geological Survey Water Supply Paper No. 175 (Washington D.C.: U.S. Government Printing Office, 1906), p. 164.

"generally of short duration, the rise and fall being very rapid."[104] More telling, however, was the Water Supply Paper's attempt to put the spring floods on the Gila into proper perspective:

> The total run-off for the five months is 2,957,400 acre-feet. To appreciate the magnitude of the run-off on this stream during this period it is necessary to remember that this stream is usually dry at this place about ten months of the year. . . . [The Gila's bed] not only scours out during a flood and fills in after it, but [the] channel changes from one side of the bottom to the other. . . . This continual changing of the river bed has made it exceedingly difficult to secure reliable estimates of the rate of flow, and some of the estimates may be largely in error.[105]

Several photographs shown below illustrate the destructive nature of the Gila River floods.

[104] Edward Charles Murphy, et al., *Destructive Floods in the United States in 1905, with a Discussion of Flood Discharge and Frequency and an Index to Flood Literature*, U.S. Geological Survey Water Supply Paper No. 162 (Washington, D.C.: U.S. Government Printing Office, 1906), p. 47.

[105] Edward Charles Murphy, et al., *Destructive Floods in the United States in 1905, with a Discussion of Flood Discharge and Frequency and an Index to Flood Literature*, U.S. Geological Survey Water Supply Paper No. 162 (Washington, D.C.: U.S. Government Printing Office, 1906), p. 48.

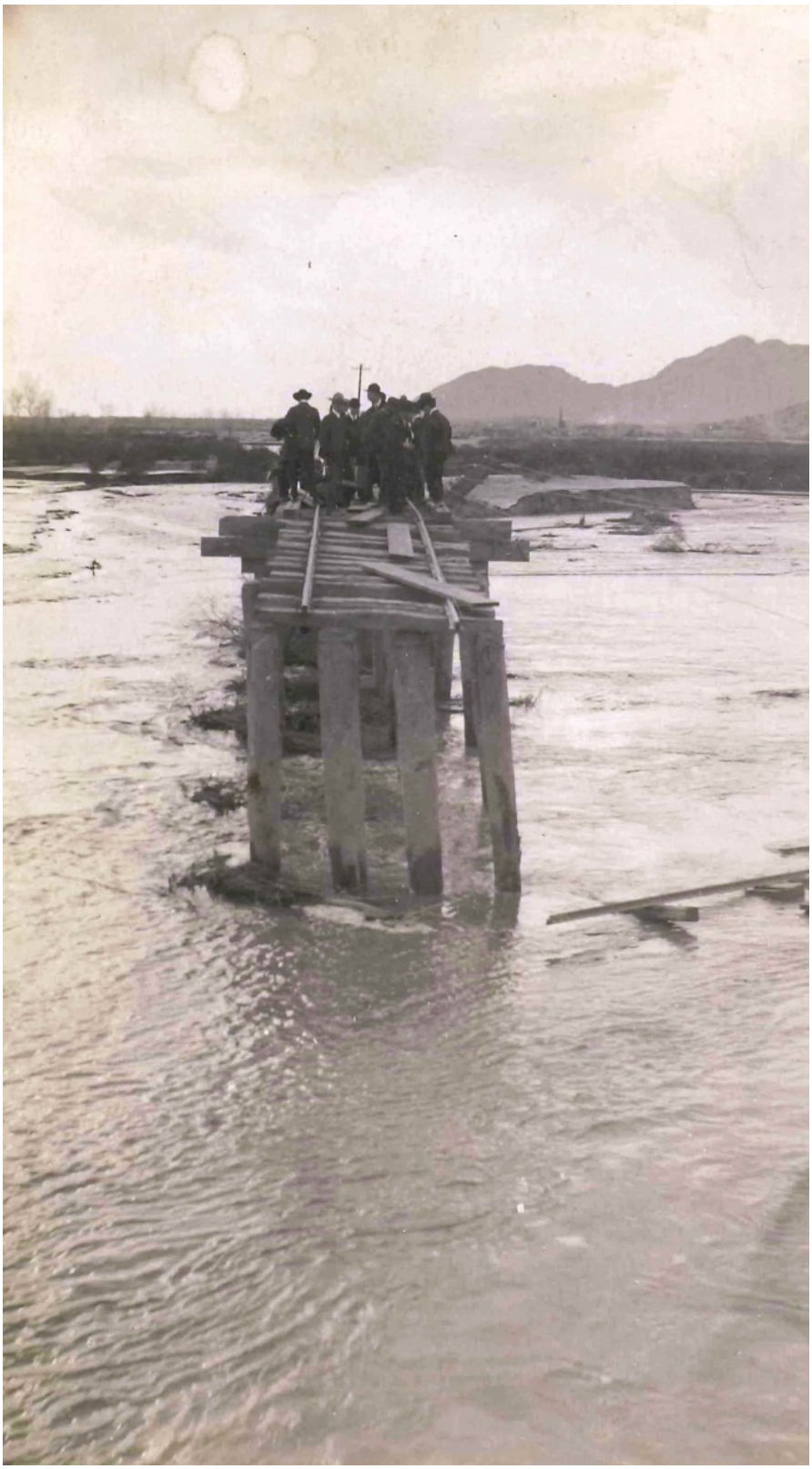


Figure 26: Railroad bridge damaged by 1905 flood on the Gila River. Note the river's broad, sandy streambed. Source: Arizona Historical Society, Tucson, Arizona.

Figure 27: Railroad bridge damaged by 1905 flood on the Gila River. Note the river's broad, sandy streambed. Source: Arizona Historical Society, Tucson, Arizona.

Figure 28: Railroad bridge over the Gila River damaged by 1905 flood. Source: Arizona Historical Society, Tucson.

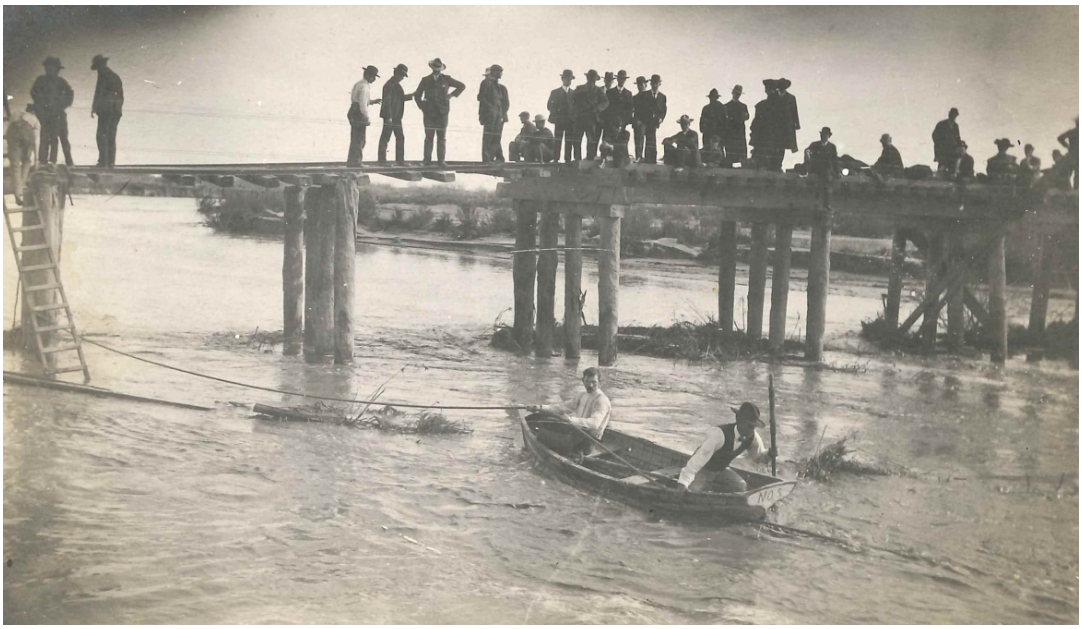


Figure 29: Workers use a small boat to examine the railroad bridge damaged by the 1905 Gila River flood. Source: Arizona Historical Society, Tucson, Arizona.

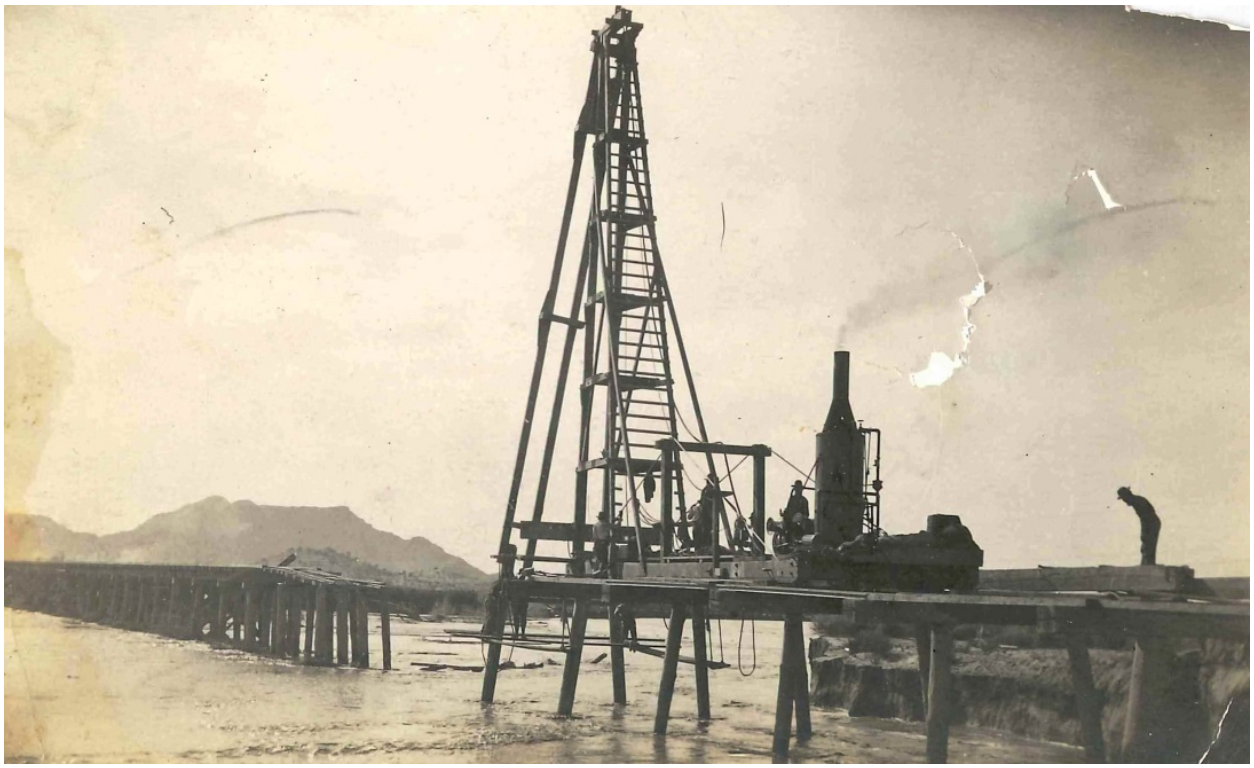


Figure 30: Workers driving pilings to repair the railroad bridge damaged in 1905 by the Gila River flood. Source: Arizona Historical Society, Tucson, Arizona.

Figure 31: Woman walking next to the flooding Gila River near Gila Bend, Arizona, June 1905. Note standing waves on the river. Source: Arizona Historical Society, Tucson, Arizona.

U.S. Geological Water Supply Paper No. 289, written about the surface water supply of the United States in 1910, provided additional useful information on the character of the Gila River. Calling the river "torrential," the report described the Gila as "sometimes impassable for weeks and [it] has the appearance of a sea of muddy water." The Water Supply Paper added that the "season of low water occurs in June and July, the river bed then being dry in places."[106] Another view of the Gila River at about the time Water Supply Paper 289 was written can be seen below.

Figure 32: View of the Gila River near Wilton Crossing, 1910. Source: Phoenix Public Library, Phoenix, Arizona.

[106] W.B. Freeman, et al., *Surface Water Supply of the U.S. - Colorado River Basin*, U.S. Geological Survey Water Supply Paper No. 289 (Washington D.C.: U.S. Government Printing Office, 1912), p. 200.

The Gila River's dramatic fluctuation in flow probably can best be seen in U.S. Geological Survey Water Supply Paper No. 1049, which provided a summary of records of the surface waters of the lower Colorado River Basin between 1888-1938. These included records for the gauging station located near Dome, Arizona (also known as Gila City), close to the mouth of the Gila River. Records at this station were available from 1902 to 1938, and they consistently illustrated that the Gila River discharge ranged from nothing at all to well over 100,000 cubic feet per second in many cases. Moreover, at the mouth of the Gila River, there was no flow at all in February 1912, and none appeared until the following May.[107]

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

Aside from the published reports and "Water Supply Papers" created by the U.S. Geological Survey, the agency also generated other documents shedding light on the nature of the Gila River prior to and about the time of Arizona's statehood.

The unpublished records of George M. Wheeler that led to his published report to Congress in 1872 (discussed earlier in this chapter) provide yet more information about the nature of the Gila River. Wheeler's draft "Progress Report Upon Geographical and Geological Explorations and Surveys West of the 100th Meridian in 1872" observed that there were only three navigable streams in the West – the Columbia, Sacramento, and Colorado:

> [t]here are three streams whose navigability gives them more or less importance as commercial lines, namely: the Columbia, the Sacramento, and the Colorado rivers. [Wheeler had reduced the number of navigable streams to two in his final report to Congress – see earlier in this chapter.] The limit of navigation of these streams for freight carrying vessels, has already been determined and from it, is deduced the conclusive fact that except for their advantages as an assistance to local interior traffic, and as the possible adjunct to trans-continental routes, that the standard for their usefulness has been fixed: which usefulness is governed by

[107] *Summary of Records of Surface Waters at Stations on Tributaries in Lower Colorado River Basin, 1888-1938*, U.S. Geological Survey Water Supply Paper No. 1049 (Washington D.C.: U.S. Government Printing Office, 1947), pp. 230-237.

> the rates of increase of commerce from the ports at their mouths to and from the head of navigation in each case.[108]

Later unpublished records of the U.S. Geological Survey confirmed the inability of the Gila to support commercial navigation. One particularly revealing unpublished report dealt with potential hydroelectric power sites within Arizona. Although written shortly after Arizona became a state, the report was based on data accumulated for many years prior to statehood, and it had been done to conform with provisions of the 1910 *Enabling Act* allowing Arizona to take steps to join the Union and to select federal public domain lands that Congress had awarded the state. That law, however, also prevented the future state from selecting parcels valuable as hydroelectric power sites as part of acreage granted to Arizona by Congress. The resulting report by E.C. Murphy was the result of an investigation to locate those hydroelectric power sites so the United States could retain title to them.[109]

Part 2 of Murphy's report dealt with the Gila River. The introduction to this section described the Gila's general characteristics, noting that it was a tributary of the Colorado River. Adding that the Gila drained about 70,000 square miles in Arizona, New Mexico, and Mexico, Murphy nevertheless observed that the Gila had "a very small run-off at the mouth except during very wet periods."[110] Murphy then described the Gila:

> On account of the erratic character of the precipitation, the use of the water for irrigation, and the depth and porosity of the valley fill, the minimum flow in the valleys along the Gila is very small and uncertain. In all these valleys there is no surface flow at certain places during the low water period of dry years. Though the surface flow may be 0 at one place there may be several second feet at some

---

[108] George M. Wheeler, "Progress Report upon Geographical and Geological Explorations and Surveys West of the 100th Meridian in 1872," p. 256, box 1, Entry 20, Records of the U.S. Geological Survey, Record Group 57, U.S. National Archives II, College Park, Maryland.

[109] Each main part to Murphy's report is re-paginated beginning with page 1. Therefore, all citations to his report will 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.

[110] E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part II, p. 1, Salt River Project Archives, Phoenix, Arizona.

> distance below due to seepage from irrigated lands, or a reduction in cross section of the ground water channel.[111]

Regarding the Gila's water supply, Murphy added further detail about the nature of that stream, explaining that the river was:

> partly an underground stream rising and sinking according to local formations. There is abundant evidence of this fact from Clifton, New Mexico, to Gila Bend, Arizona. In each of the valleys between those places the Gila is dry for a few days nearly every year and at a point a few miles below there is flowing water in the stream. . . . In 1903 there was a flood on the San Francisco [River] that reached a stage of 30 feet above low water at Clifton. By the time this flood reached the mouth of Salt River, 175 miles distant, it had almost entirely disappeared. With the exception of a small part that passed into irrigation ditches and some that passed off in evaporation, this flood went into the ground storage.[112]

Indicating that the Gila was not relied upon for commercial transportation, Murphy stated that one of the major hindrances to reservoirs on the Gila was "a railway running along the river through some of the sites that must be moved to higher location."[113]

In his discussion of hydroelectric power possibilities along the Gila, Murphy said that for the segment of the river from its mouth to Buttes, the stream:

> flows through a broad, flat valley in a broad, sandy, changing channel. It is dry for a month or longer each year at Florence, and below Gila Bend it is dry all the time except during large and long continued floods. There are many ditches diverting water from the Gila in this part, and the area that can be irrigated from them is very large, but the area actually irrigated is comparatively small on account of small and uncertain supply. As previously stated there may be several years in succession of very small run-off. During these years only ground water is available for some of this land. The irrigation ditches and especially the head works are allowed to get out of repair and when a flood comes it damages or destroys the head works and little if any of the flood water is utilized. . . . At some places on the Gila Indian Reservation the underflow comes to the surface and is diverted for irrigation, also below the mouth of Salt River where the Buckeye and Arlington canals are located. The canals and ditches that tap the

[111] E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part II, p. 3, Salt River Project Archives, Phoenix, Arizona.

[112] E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part II, p. 8, Salt River Project Archives, Phoenix, Arizona.

[113] E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part II, p. 8, Salt River Project Archives, Phoenix, Arizona.

underflow have a permanent supply but those that depend on the surface flow for water are not a success.[114]

D. Records of the U.S. Reclamation Service

Following Congress's enactment of the 1902 *Reclamation Act*, many of the water resource duties formerly carried out by the hydrographic branch of the U.S. Geological Survey were transferred to the young U.S. Reclamation Service (after 1923, renamed the Bureau of Reclamation). Under the terms of the *Reclamation Act*, the new agency 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 investigated the Gila River for possible reservoir sites.

1. U.S. Reclamation Service *Annual Reports*

Like the Geological Survey, the Reclamation Service issued *Annual Reports* describing its activities, and these contain valuable accounts of the Gila River. Much of the Reclamation Service's focus was on the San Carlos Reservoir site above the Gila River's confluence with the Salt River, but nevertheless, the agency also dealt with the Gila below the Salt.

The *First Annual Report of the Reclamation Service* commented that irrigation in the drainage basin of the Gila and Salt rivers had already been developed to a point that there was insufficient water for the lands. Nonetheless, the *Report* stated that "[t]he situation in this respect, while not peculiar, is most extreme as regards the entire West, the fluctuations of flow of the rivers being most marked and the effect upon the population most disastrous."[115] In addition, the *Report* added:

---

[114] E.C. Murphy, "Water Power Utilization in Arizona," April 1915, Part II, pp. 9-10, Salt River Project Archives, Phoenix, Arizona.

[115] *First Annual Report of the Reclamation Service, from June 17 to December 1, 1902* (Washington D.C.: U.S. Government Printing Office, 1903), p. 75.

> The 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.[116]

The *Ninth Annual Report of the Reclamation Service* carried information about progress being made on a canal to serve the Gila River Indian Reservation. Yet the *Report* also indicated that the erratic nature of the Gila made that work difficult:

> [T]he construction of the flood-water canal on the Gila River Indian Reservation was begun, 6 miles of canal being excavated, and most of the concrete structures were built. Work was suspended in April, 1910, and will be resumed after the flood season in the Gila River.[117]

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 depicted the Gila River as highly unpredictable and not useful for commercial navigation. While these files contain many documents describing the Gila River and proposals for dams on that stream – none of which indicate that the river was a reliable means of navigation – representative examples are provided here.

One such document is a 1911 letter from L.W. Powell to Secretary of the Interior Walter L. Fisher regarding the possible construction of a dam by the Gila Water Company. In this letter, Powell wrote that "[t]he flow of the Gila varying as it does from almost nothing at times to a tremendous volume during floods, makes necessary very accurate data to enable us to decide upon the type and construction of the dam contemplated." Powell asked that the secretary of the interior

[116] *First Annual Report of the Reclamation Service, from June 17 to December 1, 1902* (Washington D.C.: U.S. Government Printing Office, 1903), p. 76.

[117] *Ninth Annual Report of the Reclamation Service, 1909-1910* (Washington D.C.: U.S. Government Printing Office, 1911), p. 68.

direct the Reclamation Service to undertake a hydrographic study of the Gila to assist the dam construction plan.[118]

Correspondence regarding a proposal for a dam at Gila Bend also provided information on the characteristics of the Gila River. Although the following two letters were written in 1913, they both indicate that the descriptions of the Gila were historical in character. The first letter from Reclamation Service Division Engineer Louis C. Hill to Howard S. Reed (another Reclamation Service employee) expressed Hill's disbelief about what he thought had been Reed's comment to another party that the Gila had a minimum flow of 125 cubic feet per second all year. Hill stated:

> I feel quite sure that he must be entirely mistaken in this, because we both know that there are certain seasons of the year that you certainly cannot get 125 second feet; in fact, the only time that I went down there, which was with you I believe, there wasn't over about 125 inches and all of that was going into a little ditch on the north side of the river.[119]

Reed responded to Hill's letter on June 10, 1913. In reference to the amount of water which could be expected to flow in the Gila between the proposed dam site and Buckeye Dam (shown below in two photographs), Reed wrote:

> I am inclined to think the expression that I used was that, "During my various visits to the Gila Dam site, never have I seen less than 100 second feet surface flow, with the river dry between that site and the Buckeye Dam and that canal full to its capacity." . . . [O]n the 10th of August, 1911, I made a current meter measurement, the original notes which are herewith enclosed, when I found a discharge of 103 cubic feet per second and this with no flow at all below the Buckeye Dam. In fact, one could walk across the river and hardly dampen the shoes.[120]

---

[118] L.W. Powell to Walter L. Fisher, July 19, 1911, 37-A-5 Straights, Preliminary Investigations-Sentinel Project, 37-A-5, General Correspondence File (Straights) #37-A, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

[119] Louis Hill to H.S. Reed, June 3, 1913, 37-A-5 Straights, Preliminary Investigations-Sentinel Project 37-A-5, General Correspondence File (Straights) #37-A, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

[120] Howard S. Reed to Louis C. Hill, June 10, 1913, 37-A-5 Straights, Preliminary Investigations-Sentinel Project 37-A-5, General Correspondence File (Straights) #37-A, Records of the U.S. Bureau of Reclamation, Record Group 115, U.S. National Archives Branch, Rocky Mountain Region, Denver, Colorado.

Figure 33: "A.R. at Buckeye Dam, Dec. 8, 1907." Source: Salt River Project Archives, Phoenix, Arizona.

Figure 34: "Gila River & Buckeye Dam, 12-8-'07." Source: Salt River Project Archives, Phoenix, Arizona.

E. U.S. Department of Agriculture Agricultural Experiment Station

Although the largest amount of information about the Gila River in federal files is contained in the records of the U.S. Geological Survey and the Reclamation Service, one especially useful report on the nature of that stream is contained in U.S. Department of Agriculture records. That report is *Irrigation and Agricultural Practice in Arizona* by R.H. Forbes. Published by the U.S. Government Printing Office in 1911, the report had been the fruit of research undertaken at the University of Arizona's Agricultural Experiment Station, which was overseen by the U.S. Department of Agriculture. The report was a detailed discussion of Arizona's principal industries, transportation, climate, water supply, and farmlands.

In his report, Forbes first discussed the territory's principal industries and then turned his attention to transportation. Because of the significance of what Forbes wrote in relation to the Gila River, this part of his report is quoted here:

> By reason of its isolation, Arizona is dependent upon its transportation facilities to an unusual degree. These consist chiefly of three great railroad systems, which, in order of their construction, are the Southern Pacific, the Santa Fe, and the El Paso & Southwestern. The Santa Fe crosses the northern tier of counties from east to west, and with its branches opens up the mining and lumbering districts of the more elevated half of the Territory. The Southern Pacific runs a roughly parallel course south of the Gila River, and its feeders tap the rich mining districts and the warmer irrigated valleys at lower altitudes. The El Paso & Southwestern road affords an outlet for the copper mines of southeastern Arizona and northern Mexico. A few steamboats of shallow draft ply the Colorado River, and in remote localities freighting with teams is still practiced.[121]

It is noteworthy that Forbes listed only the Colorado River as having regular navigation. Moreover, his statement that the Southern Pacific Railroad ran south of the Gila River additionally indicates that Forbes did not think the Gila was navigable.

[121] R.H. Forbes, *Irrigation and Agricultural Practice in Arizona*, University of Arizona Agricultural Experiment Station (Washington D.C.: U.S. Government Printing Office, 1911), p. 14.

In relation to surface streams and water supply, Forbes initially discussed the Colorado River, and then turned his attention to the Gila. Forbes wrote that the Gila was:

> a comparatively small and irregular stream, due to its arid watershed and uncertain rainfall, although occasionally it carries enormous floods. Since the appropriation of its upstream waters for irrigation its lower courses are often dry for months in succession. . . . The run-off of the Gila is difficult to estimate, differing in this respect from the Salt and Colorado Rivers, which, confined in rocky beds in their upper courses, can be quite definitely and completely measured at established gauging stations. The Gila, flowing in a pervious bed of low gradient, is in varying proportions an underground river, and rising and sinking as it does, according to local formations, cannot be measured definitely by ordinary methods. The amount of surface flow, as estimated from the not very continuous or prolonged measurements available, indicates a limited but comparatively constant stream in the upper Gila near the New Mexico line, but an increasingly variable and inconstant irrigating supply between San Carlos and Yuma. The San Pedro and the Santa Cruz Rivers resemble the Gila and give tribute to it mainly in flood waters. The seepage from the Salt River irrigation appears near its confluence with the Gila and affords a very constant and reliable supply for the irrigation of the lands near Buckeye and Arlington. Below the latter point *the Gila supply is so uncertain* as to preclude satisfactory farming operations. . . . The Gila River is not infrequently dry at Florence, sometimes for several months at a time, as for instance, from March to July, 1899. Without storage, therefore, agriculture at this point is less assured of its necessary irrigating supply than near the New Mexico boundary, where even in driest years, the river has never failed entirely. *At Yuma, the Gila is even more variable than at Florence*, and the discharge has ranged, it is said, from nothing for a period of a year to as high as 3,665,148 acre-feet in 1905. . . . It may be stated summarily that the fluctuations in water supply become more and more extreme from the source to the mouth of the Gila. [Emphases added.][122]

F. Summary and Conclusions to Chapter 3

U.S. Government records – both published and unpublished – clearly indicate that the Gila River between its confluence with the Salt River and its mouth at the Colorado River was not navigable or susceptible of navigation on or before Arizona's statehood on February 14, 1912. The records of the federal agencies whose responsibilities were most closely associated with water resource development in the West (the U.S. Reclamation Service and the U.S.

[122] R.H. Forbes, *Irrigation and Agricultural Practice In Arizona*, University of Arizona Agricultural Experiment Station (Washington D.C.: U.S. Government Printing Office, 1911), pp. 32, 46-48.

Geological Survey) consistently portrayed the Gila River as highly erratic with unpredictable flows and a shifting channel. This assessment was further confirmed by the 1911 report done for the University of Arizona's Agricultural Experiment Station by R.H. Forbes.

CHAPTER 4: HISTORICAL NEWSPAPERS

A. Background about Historical Newspapers

Although the impressions of early explorers, military expeditions, the declaration of the Arizona Territorial Legislature, the opinions of Arizona Territorial officials, and the records of U.S. Government agencies all attest to the lack of navigability of the Gila River, so too do historical newspapers' reports regarding the reach of the Gila from approximately Phoenix downstream to Yuma (as with the other parts of this report, this study only addresses the Gila River from its confluence with the Salt River downstream to where the Gila flows into the Colorado River)

To understand the significance of press accounts about the Gila River some background information on nineteenth and early twentieth century newspapers in the American West is necessary. Local newspapers in the American West were among their respective communities' biggest boosters, not only because of civic pride, but also due to a desire to attract settlers. As enthusiastic promoters of their communities, local papers frequently ran 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.

Arizona's newspapers and journals were no exception in the desire to report all positive aspects of their communities. Such benefits as the fertility of the soil, the long growing season, and assets such as schools, churches, and businesses were all hailed in the papers of Arizona. Importantly, the ability to market crops to distant areas was also a significant item to be reported upon, and in that regard, railroads and wagon roads were championed. Significantly, press reports did not brag about any reliable commercial navigability of the Gila River – something they surely would have noted as a benefit to local residents. The newspapers *did*, however, carry stories about a

few reckless and dangerous attempts to boat down the stream, which further underscored why no one viewed the Gila as a possibility for commercial navigation.

B. Newspaper Accounts of the Gila

One of the earliest newspaper stories describing the Gila River appeared in the *Arizona Miner* (published in Prescott) on June 16, 1866. The account, which was a narrative of a trip through parts of Arizona, described the Gila, observing that the river during some seasons was completely dry – even though in 1866 there were very few irrigation canals diverting the stream's waters:

> The Gila, the principal stream that runs through the interior of the Territory, is at some seasons dry twenty-five miles above its junction with the Colorado [River]. I will add that the number of running streams or springs in Arizona, considering the extent of its territory, are very few; it is rather a dry country. On one occasion, we marched forty-five miles before we came to water. Irrigation in nearly every case is found necessary to produce crops. The country over which we passed in coming from Fort Yuma to this place [the San Pedro River] is unfit for agriculture, except in some places immediately bordering the Gila River. On both sides of the river sterile plains, covered with a scant growth of thorny trees, and barren, broken mountains are seen, but not a drop of water, except what flows in the river itself.[123]

Another early account of the Gila River appeared three months later in the *Weekly Journal Miner* (which, like the *Arizona Miner*, was also published in Prescott). This time noting that the Gila had a considerable amount of water, the paper acknowledged that the flows were mostly due to a major rain storm:

> On Saturday and Sunday, the 15th and 16th instant [this month], there was a rain storm of unusual severity. Granite Creek rose to an extraordinary heighth [*sic*], and was impassable for several days. We hear that the Gila and Salt rivers are higher than they have been for years, and that the Pima delegation to the Legislature may find it impossible to cross them for a week or two to come.[124]

[123] "Pima County," *Arizona Miner*, June 13, 1866.
[124] [No title], *Weekly Journal Miner*, Sept. 26, 1866.

To permit travel on both the Gila and Salt no matter what their water levels were, Samuel Adams (also known as "Steamboat Adams"), a candidate for Arizona Territory's non-voting seat in Congress, advanced a unique idea in the 1860s. According to the *Weekly Journal Miner* (which reported on Adams's plan many years later during a meeting of Arizona Territory's politicians), one of Adams's notions aimed to address the widely fluctuating flows of the Gila and Salt rivers. His idea was:

> the navigation of the Gila and Salt rivers with steamboats with big broad wheels something on the order of our present traction engine wheels, and when there was water, they were to act as water wheels and in places where the river sank, they were to carry the boat over [the] dry [land], and for protection, it was to be provided with a double turret gun, one in front and one behind, [and] in case of Indians it could be turned on the enemy, and in tight pulls either on land or water the firing of the gun at the rear acted as a pusher by the recoil of the charge or a shot from the front or bow would make the vessel back out in case they got stranded[.][125]

Apparently Steamboat Adams's idea for a boat with wheels never was fulfilled (nor was his desire to serve as a territorial delegate to Congress), or at least the Arizona press never reported on Adam's boat-wagon. Richard C. McCormick, however, who *did* serve as Arizona Territory's delegate to Congress between 1869 and 1875, provided more insight about the nature of the Gila River in an article published in the *Arizona Champion* newspaper in 1870. McCormick, who testified before the federal lawmakers on April 1, 1870, about a possible railroad route across Arizona, offered the opinion that the Gila River was not used for navigation:

> For two hundred miles you follow the valley of the Gila River [for the possible railroad route]. For half or two-thirds of the year it is a large river, and the other part a comparatively small one. *It is not navigated.* The valley of the Gila is narrow in many places. [Emphasis added.][126]

---

[125] "Republicans at Camp Verde," *Weekly Journal Miner*, Nov. 7, 1900.

[126] McCormick's testimony to Congress was reprinted in "Southern Pacific Railroad," *Arizona Champion*, Nov. 5, 1870. The original testimony can be found in U.S. Congress, *Memphis, El Paso and Pacific Railroad Company of Texas*, S. Misc. Doc. 121, 41 Cong., 2 sess., 1870, p. 29.

Confirming Richard McCormick's opinion that the Gila River was not navigable was the proposal a few months later to divert a large part of the stream's water for a massive irrigation project that would serve lands downstream from Gila Bend. As the *Arizona Champion* explained in February 1871:

> We have been shown a letter from a gentleman interested, which says that a preliminary organization has been made to construct an immense ditch by which all lands between Gila Bend and Canyon Station may be irrigated from the Gila River. A meeting for permanent organization takes place today at Gila Bend. Ten thousand inches of water is claimed, and the ditch is expected to cost $10,000, and work is expected to commence in earnest by March 1.

Although the *Champion*'s news story made it clear that this was to be a major diversion project, the paper did not report any objections by boating interests to depleting the Gila River's flows or impeding navigation by the related diversion dam.[127]

Like the *Arizona Champion*'s lack of commentary about boating interests being affected by major diversions from the Gila River, the area press also did not carry news stories about the impact of floods on navigation on the Gila. For instance, the *Arizona Sentinel*, published in Yuma, reported on January 31, 1874, that flooding on the Gila had had a serious impact on land transportation and commerce in the Gila Valley. Even though the newspaper carried the story in the same column that reported on steamer boat traffic going up and down the Colorado River, none of the *Sentinel*'s account mentioned anything about navigation being adversely affected on the Gila River due to the flood. The paper, however, did comment on the inundation's effect on railroads:

> The flood of the Salt and Gila rivers has so destroyed the [rail]road between here and Gila Bend that several freight trains ready to move are still here. Wm. B. Hooper & Co. dispatched by Barnett & Block's train on Thursday last about forty thousand pounds, general merchandise for Tucson merchants, which is the only freight movement we hear of the present week.[128]

[127] "Ditch Enterprise," *Arizona Champion*, Feb. 18, 1871.
[128] "Marine and Commercial," *Arizona Sentinel*, Jan. 31, 1874.

Three years after the *Arizona Sentinel* failed to note any impact by flooding on commercial boating interests on the Gila River, the same Yuma newspaper carried a lengthy booster news story on May 5, 1877, about the many virtues of living in the Gila River area. First observing that U.S. General Land Office surveyor Theodore F. White was in the process of platting a large part of the Gila Valley into townships and ranges (see Chapter 1 for White's conclusion that the Gila River was not navigable), the *Sentinel* then described how the land involved was highly desirable for farming purposes and that the Gila River carried significant water supplies that could be diverted for irrigation. In the same article, the paper also described railroads (both prospective as well as existing) and wagon roads that served the area, but the newspaper made no mention of any commercial boating on the Gila River, something the paper surely would have noted if the Gila had been considered navigable:

> While in the field, Mr. [Theodore F.] White and party ran the exterior lines of, and subdivided into sections, fifteen townships, extending along the Gila River in Maricopa and Yuma counties from a point about Oatman Flat station to a point three miles west of Mohawk station; a total distance along the river of nearly fifty miles, which with an average width of twelve miles, gives six hundred square miles, or over 350,000 acres of land surveyed. West of this tract, Mr. White reports a large extent of country that will be surveyed, doubtless, at a comparatively early date, making a compact area of at least 500,000 acres of valuable land in that locality. This immense area lies along both sides of the Gila River, the larger portion being found unexpectedly on the north side, and contains a very large amount of fine, arable land. The Gila bottom here merges imperceptibly into the foothills and has an average breadth of from five to ten miles. Its soil is extremely rich, being composed of rich alluvian [*sic*], and will produce two crops without fail yearly, resembling the Santa Cruz bottom directly in front of Tucson, which has yielded two crops annually for the 100 years it has been under cultivation. The remaining land has a rich soil that will produce abundantly when irrigated. In the Gila there is sufficient water for all purposes that never fails, and irrigation is easily effected. The river has an average width of six hundred feet and a depth of from three to five feet. This volume will be increased if anything during other seasons of the year, as this is the time when no rain falls and no water comes from the mountains to swell the current. The banks of the river are everywhere gentle and low and at almost any point can be taken out for irrigation, while points [that] afford unusual facilities for the construction

> of large and permanent ditches to bring water upon extensive areas back from the bottom are abundant.[129]

The *Arizona Sentinel* then provided details about the climate and the types of crops that could be raised in the Gila Valley before turning to the topic of available and forthcoming transportation facilities. Here, the *Sentinel* reported that the Southern Pacific Railroad, then under construction in California, was already nearing Yuma, and with the likelihood that that rail line would soon cross into Arizona, the paper declared that "this land certainly offers strong inducements to settlers at once." Adding other information about commercial transportation opportunities, the *Sentinel* continued that there were "traveled roads" along the south side of the Gila River. Yet the newspaper offered no information about commercial boat traffic on the Gila, something the paper certainly would have noted given the article's intent to attract settlers.[130]

That the Gila River was not navigable came as no surprise to area residents, but people not familiar with the region frequently assumed the river was being used for commercial boat traffic. It was therefore gleefully reported in July 1877 by the *Arizona Sentinel* – which, being a Yuma newspaper, presumably was familiar with the Gila – that newspapers from places as far-flung as San Francisco and New York were telling their readers that boats on the Gila were carrying supplies from Yuma to many inland areas. As the *Sentinel* wrote:

> The subject of railways and freights to Arizona are just now being handled by the press of San Francisco, New York and other cities in a very humorous if not intelligent way. The editors [of the out-of-town press] write with all the ease and directness which Mark Twain said he could when writing about a subject of which he knew nothing. Here is a sample from the *San Francisco Post* of July 14: "For many years past the Arizona imports have come by railroad and wagon from the East and by water via the Gulf of California and the Gila River from this city [San Francisco]. Both ways were slow and tedious. The steamers of the Colorado Steam Navigation Company left this city only once every twenty-one

[129] "A Good Chance for Homes," *Arizona Sentinel*, May 5, 1877.
[130] "A Good Chance for Homes," *Arizona Sentinel*, May 5, 1877.

> days, and even then, though the freights went direct to Florence and Tucson by water, etc."[131]

The *Sentinel* then added with tongue-in-cheek that overland freight haulers likely would have been amused by the reports of water transport along the Gila. Calling the land-based freight haulers "Captains" and "navigators" to emphasize the attempt at humor, the paper stated:

> Capts. Quinlan, Jenks, Cavaness, Bowley, Fields, Noriega and other noted navigators between Yuma and Tucson will very likely read this with surprise, and admire the intelligence of the geographical sharp of the *Post*; and Capts. Moore, Kerens & Mitchell, Capron, and even our old friend Platt of Kansas City, all of whom now run mail packets on the line, will smile and wonder what on earth they bought so much barley for and why they went off on the plains and fooled away thousands of dollars to dig wells to supply their steam works with water, while their crafts were sailing right along "by water."[132]

A little over a year after the *Arizona Sentinel* reported on out-of-town newspapers' misperceptions of the Gila River, the same paper indicated that low water in the Gila was actually beneficial for commercial transportation along its course, but by road and not by water. Reporting on September 21, 1878, the *Sentinel* commented that the Gila Road was in "excellent condition" after that stream's flows had dropped sufficiently to permit it to be forded:

> The Gila Road is now in excellent condition; the Gila River is again fordable at all crossings; grass is good, and the weather is cool. Freighters can now make up for hardships incurred during the late terribly muddy spell.[133]

Even though the *Sentinel* observed that transportation went by road in the Gila Valley, as had been the case in 1877, there were still parties who believed (incorrectly) that navigation was taking place on the Gila River. Barely a week after the *Sentinel* had commented on the improved road conditions in the Gila Valley, the *Arizona Champion* reported about a map illustrating steam vessels on the Gila River:

---

[131] "Humorous If Not Intelligent," *Arizona Sentinel*, July 28, 1877.
[132] "Humorous If Not Intelligent," *Arizona Sentinel*, July 28, 1877.
[133] "Transportation," *Arizona Sentinel*, Sept. 21, 1878.

> We have heard of a map, made by some of the hardy and honest pioneers of this Territory which shows steam vessels on the Santa Cruz opposite Tucson, and of other maps showing steamers on the Gila. It is but a few years since some newspaper man of the modern type put steamers on the Gila River, at least did so on paper.[134]

The *Arizona Champion* added that perhaps due to such confusion, Commissioner of Indian Affairs Ezra A. Hayt had sent one of his agency's officials to visit the San Carlos Indian Agency (upstream from Phoenix on the Gila), telling the official to travel via the Southern Pacific Railroad to Yuma and "thence up the Gila by steamer to within thirty miles of the agency" where he could travel by stagecoach to his destination. The *Champion* added that upon arriving in Yuma, the official was confused by the instructions to continue by steamer up the Gila River because he could not locate the steamboat ticket office. As a result, the newspaper wrote, he returned to Los Angeles.[135]

Despite the widespread view that the Gila was not navigable, there were, in fact, some attempts to boat the river, and the press duly noted these occasions because of their novelty. Under the heading "Phoenix to Yuma by Water. The Gila River Navigable? – Arrival of a Skiff and Three Bold Navigators," the *Arizona Sentinel* carried a lengthy story in January 1879 about three individuals who floated down the Gila River from Phoenix. The newspaper article also noted that the steamboat Uncle Sam "used to run up [the Gila] for some distance" to obtain loads of wood:

> Whether the Gila River is available for navigation is a question which was never settled in the affirmative; although the steamboat Uncle Sam used to run up for some distance, and bring down loads of wood. Last week the advocates of navigation of the Gila obtained a solid fact from the arrival here of Messrs. Charles Hamilton, R.W. Jordan and E.R. Halesworth, who built a skiff at Phoenix, at an expense of $10, and paddled it down here to Yuma, with all their

[134] "Internal Navigation in Arizona in Connection with the Indian Service," *Arizona Champion*, Sept. 28, 1878.

[135] "Internal Navigation in Arizona in Connection with the Indian Service," *Arizona Champion*, Sept. 28, 1878.

> accoutrements and *impedimenta* (classic for "grub and blankets"). . . . They report the river perfectly practicable for navigation, except at one spot about ten miles above Gila Bend; there the channel was obstructed by rocks, leaving a passage only some eight feet wide. This obstruction, they say, can be easily removed by a few small blasts. The river would then have easily floated down a flat-boat loaded with grain, pumpkins, or other fruits of the "Orchard of Arizona," and drawing two feet of water. The geodetic distance from here to Phoenix is 170 miles, but following the turns of the river, the actual distance paddled by the aforesaid navigators must have been over 300 miles. In no place is the river narrowed down into anything like a box-cañon; though below Oatman Flat its valley is hemmed in by precipitous walls of basaltic lava. So far as known here, to the three gentlemen named belongs the honor of being the first white men to successfully navigate 300 continuous miles of the Gila River. It is now incumbent upon the enterprising citizens of Phoenix to make a pioneer shipment of produce to Yuma by water. From Yuma down the Colorado to tide-water at Port Ysabel, navigation is easy; from there to New York or London, Phoenix has ocean transportation for her products. By demonstrating that she has water communication with the markets of the world, Phoenix can make Prescott turn green and "bust" with envy; by doing this she can oppose a check to the exactions of the "monster monopoly" [railroads]; if her citizens will not stand the extortionate fares (ten cents a mile by rail, twenty by stage), they can navigate the Gila – or walk. [The italics and the parenthetical phrase are in the original.][136]

Although the three individuals had managed to float from Phoenix to Yuma, the "enterprising citizens of Phoenix" apparently did not follow up on the suggestion that they "make a pioneer shipment of produce to Yuma by water," because the Arizona press never reported on such an event. Perhaps the explanation for the successful float trip from Phoenix lay in the fact that only two weeks after the boat made it to Phoenix, the *Arizona Sentinel* observed that the Gila River near Yuma was "considerably swollen this week; mails and stage passengers being ferried across in a skiff. Melting snow in the White Mountains and in southeastern Pima County has been the cause."[137]

The wide variations in the Gila River's flows also may explain why another attempt to navigate the Gila – this time in 1881 – turned out considerably different from the boating

[136] "Phoenix to Yuma by Water. The Gila River Navigable? – Arrival of a Skiff and Three Bold Navigators," *Arizona Sentinel*, Jan. 25, 1879.

[137] "Local Matters," *Arizona Sentinel*, Feb. 15, 1879.

expedition in 1879. This time the attempt either never took place or was significantly delayed. On February 17, 1881, the *Arizona Gazette* reported that two individuals planned to float an eighteen-foot flat-bottomed skiff from Phoenix to Yuma via the Salt and Gila rivers, and the paper stated that the boat appeared "very strong and durable, and able to stand pretty severe buffeting."[138] No immediate follow-up story appeared in the press, although in late November of the same year, the *Gazette* carried another story about a water-borne exploration of the Salt and Gila rivers – perhaps using the boat described the previous February. The *Gazette* wrote that the:

> "'Yuma or Bust' party which left Phoenix recently for the purpose of exploring the Salt and Gila rivers were seen yesterday, only twelve miles from here, all waiding [*sic*] in mud and water up to their knees, pulling the boat, and apparently as happy (?) as mudturtles." [The question mark is in the original.][139]

Four days later, the *Gazette* detailed the final outcome of this boating expedition down the Salt and Gila rivers:

> The officers of the "Yuma or Bust" returned on to-day's stage. They report having arrived safely at Yuma six days out from this port [Phoenix]. We have advice, however, that the boat reached Gila Bend and "busted." . . . [The crew] endured great hardships, being compelled to wade in the water the greater portion of the time and push the craft ahead of them.[140]

The huge fluctuations in the Gila River's flows not only made boat traffic up and down the river impracticable, but it also was the cause of extreme inconvenience for those parties who traveled by land in the Gila region. The *Arizona Sentinel* commented on these circumstances on May 6, 1882:

> It has been remarked by several old-timers that the Colorado and Gila rivers are late in rising this year. This is easily accounted for by the continuance of cold weather in the mountains. It is, therefore, almost certain that when the rivers commence to rise, the volume of water will be very much greater than usual. There is nothing to fear from an overflow of either river, and no inconvenience will be experienced on account of high water in the Colorado. But with the Gila it

[138] [No title], *Arizona Gazette*, Feb. 17, 1881.
[139] [No title], *Arizona Gazette*, Nov. 30, 1881.
[140] [No title], *Arizona Gazette*, Dec. 3, 1881.

> is different. This stream has to be forded at all times, and during high water the traveler has to either swim his horse or cross in boats. The great inconvenience this works is manifest to all, but to none is it more apparent than to those living north of the Gila – at Castle Dome, Silver district, and Ehrenbert. The SENTINEL would like to see a bridge built across the Gila, and recommends to the next Territorial Legislature to make an appropriation for this purpose. The business and overland travel to these places named has now reached a sufficient magnitude to warrant its construction; and with the now assured development of the mining interests of Yuma County and the business and travel that will be promoted thereby, this means of transit will be an absolute necessity. We advise the miners of these districts to make this measure figure in the campaign this fall, and to see to it no one is sent to the legislature who is not pledged to actively support the project.[141]

Not only did the erratic flows of the Gila make travel difficult in the region, but at times the river's floods were catastrophic. The *Arizona Weekly Citizen*, published in Tucson, described one especially large Gila River flood (in a story sent to the Tucson paper from Yuma):

> The Gila River is rising rapidly; it is reported that the Colorado is also rising from rains. The Gila is now six inches higher than in the great flood of 1862. The people here are much alarmed for the safety of property; a force of men is constructing at the levee; a portion of the town will undoubtedly be inundated, and, as it is inhabited by poor people, starvation is staring them in the face; large families will be left destitute, homeless. It is feared that the bridge of the railroad company will be washed away. All settlers in that section have had their homes washed away. One family came near perishing. Adondo station as reported by Supervisor Baker of this county, is threatened with destruction. Mr. Baker rode into this place [Yuma] to warn the people that the Gila River will be at least three feet higher by to-morrow morning; in that case, a large portion of the best part of town will be damaged.[142]

The *Maricopa County Miner* elaborated the next day on the damage caused by the Gila River flood:

> The Gila River is rising rapidly and is six feet higher than during the great flood of 1862. Citizens are constructing a levee, but this will not prevent the lower part of town [from] being swept away if the river continues to rise. The railroad bridge will probably go.[143]

---

[141] [No title], *Arizona Sentinel*, May 6, 1882.
[142] "Telegraph," *Arizona Citizen*, March 15, 1884.
[143] "Local Brevities," *Maricopa County Miner*, March 16, 1884.

In fact, Gila River floods were so frequent and destructive that residents of Yuma finished constructing the levee to keep the water out of town. As the *Arizona Sentinel* reported on May 31, 1884:

> The levees on the Gila and Colorado rivers continue to hold their own, and keep the water out of town [Yuma]. A measurement was made last Tuesday, which showed that the Colorado was nearly on a level with Main Street.[144]

Despite the repeated floods on the Gila (as well as other Arizona rivers), the regional press found considerable reasons to boast about Arizona Territory's advantages. Even as Gila River settlers were recovering from the severe floods of the spring of 1884, the *Arizona Champion*, published in Flagstaff, ran a lengthy article entitled "Our Territory" extolling the many virtues of the area. Observing that "Arizona is well worthy [of] the consideration of Government and people," the newspaper bragged about the two transcontinental railroads that traversed Arizona as well as the multitudes of different types of crops that could be grown in different parts of the territory. Declaring that the "Gila, Salt, Verde, Francisco, White, Black, Little Colorado, San Pedro, Santa Cruz, and East Fork of the Verde are large streams," the *Champion* nonetheless asserted, "The Territory has but one navigable river, the Great Colorado."[145]

Indeed, several years later, the *Arizona Sentinel* confirmed this assessment when it devoted a long article to the many benefits of living in Yuma. Stating that the Colorado River was navigable and discussing the advantages of that river's waterborne trade, the *Sentinel* also described the Gila River but gave no indication that that stream could be utilized for carrying commerce.[146]

---

[144] "Local Matters," *Arizona Sentinel*, May 31, 1884.
[145] "Our Territory," *Arizona Champion*, July 12, 1884.
[146] "Yuma County – Its Geographical Position and Advantages," *Arizona Sentinel*, Feb. 25, 1888.

About a year after the *Arizona Champion* had declared that the only navigable waterway in Arizona Territory was the Colorado River, the *Arizona Weekly Citizen* recounted the historical background to the one of the earliest ferries used to cross the Colorado River. This craft also had been used on one of the rare (and frequently dangerous or unsuccessful) occasions that boats went down the Gila River, and this time the craft was used to float a family down in 1849. Responding to an article that had appeared in the *San Francisco Bulletin* about the Colorado River ferry's history, the *Weekly Citizen* provided a corrected version of that history. The article stated that when local military officials at Fort Yuma had been informed that someone was attempting to float down the Gila, they were so alarmed due to the dangerous nature of that stream that they sent a scouting expedition upriver to rescue the "reckless voyagers":

> In the history of the boat used for that purpose [the ferry across the Colorado River], it is mentioned as having been "constructed from the bed of a wagon in which a family of Howards had ridden from the state of Wisconsin and must have been a curiosity in its way and should have been preserved by the pioneers." The boat referred to has a history not without interest to some now living apart from the tragic incident to which it bore so unfortunate a connection. It was not constructed from a wagon bed as stated by the *Bulletin*'s correspondent, but was built as a boat complete at the beginning, and first launched on the waters of Lake Michigan. In length 16 feet over all; beam 5 feet 6 inches, except the bow, which was decked, and used for the driver's seat; it was provided with an adjustable cover that gave it all the advantages of a coach when mounted on wheels, and the comforts of a stateroom, when used on the water. It was specially designed to meet the exigencies of travel en route to California, and its first service on water was at Fort Benton at the crossing of the Arkansas [River]; the next being the navigation of the Gila River, for which the owner intended it at the start. This he accomplished without serious impediment in the month of September, 1849. Embarking at the Pima villages with his wife and one child, with a physician and Baptist minister as companions of the voyage, he reached Fort Yuma at the mouth of the Gila, a distance by the river's course of 250 miles, in three and one half days. Lieut. Couts at that time was in command of the United States escort to the Mexican Boundary Commission, and had headquarters at Fort Yuma. Being informed by some advance riders of the emigrant party that one of their number with his family was coming down the river by boat, he at once sent a detachment from the post up the river to give such aid to the expedition, as the Lieutenant afterward told the writer, its not only possible but probable outcome might require. But the squad passed without seeing the reckless voyagers and did not

> put in an appearance at the fort until several days after the latter had arrived there. This is believed to be the first navigation of the Gila River, and it may be added, incidentally, that on the passage down a boy was born to the wife of Mr. Howard, who is now living in Lake County, California, and claims to have been the first child born in Arizona.[147]

As the *Arizona Weekly Citizen* recounted, the military officials at Fort Yuma had been so worried by the idea that someone would try to float down the Gila that they had sent an expedition to rescue the group because the military fully understood how unpredictable and treacherous the Gila could be. The *Weekly Journal Miner* commented on one of these characteristics of the Gila when the paper wrote in September 1887, "The Gila River rose ten feet in a single day during the recent storm."[148]

Another example of the Gila River being dangerous for any attempts to boat appeared in the *Tombstone Epitaph Prospector* on April 5, 1890. As the paper explained:

> Deputy Sheriff Frank Burke and George Davis of the Harqua Hala mines, who had $15,000 in gold bullion in charge, were dumped into the Gila River last week by their boat capsizing. As the boat turned over, Davis held onto the bullion and struck the bottom of the river with some force; through the assistance of Mr. Burke, Davis and his bullion were soon on "terra firm," otherwise known as Sentinel station on the railroad [downstream on the Gila River from Gila Bend].[149]

In fact, it was only during a major flood that covered the countryside around Yuma creating a lake fifty miles wide that another account of a boat making a dangerous trip on the river appeared in the press. The *Tombstone Epitaph* reported on March 8, 1891, that the inundation near Yuma had killed many people, had caused the Gila River's channel to change near Phoenix, and had stopped all railroad traffic. It was only by means of a boat – the only possible means of transportation at that time – that made its way downstream from Mohawk that the true extent of the massive flood's destruction became known in Yuma, where, according to

[147] "The First Ferry Boat Used at Yuma," *Arizona Weekly Citizen*, July 18, 1885.
[148] "Our Territory," *Arizona Weekly Journal Miner*, Sept. 21, 1887.
[149] [No title], *Tombstone Epitaph Prospector*, April 5, 1890.

the *Epitaph*, nearly the entire town had been destroyed.[150] Moreover, the flooding even made operating a ferry on the Gila River near Phoenix difficult. Discussing the "horrible" condition of the roads to Phoenix in the Gila Valley, the *Arizona Republican* stated that "ferrying the Gila is not such a pleasant operation." The paper continued:

> owing to the formation of a sand bar in the middle of the river, no weights of over 3,000 pounds can be permitted on the boats so larger amounts must be carried to and taken from the ferry by manual labor. The approaches are difficult as well.[151]

The importance of ferries across the Gila River in conveying land-based transportation can be seen in a March 28, 1891, news report in the *Arizona Sentinel*. That story read:

> R.M. Straus of Aztec, senior partner in the house of Straus, Dallman & Co., made the SENTINEL a call yesterday. They have their new ferry-boat ready and at work crossing the Gila River. It is large enough to carry a loaded 6-horse team in safety.[152]

The type of ferry boat used on the Gila River can be seen below in a photograph taken in 1913. The exact location on the Gila is unknown.

[150] "Suffering Yuma," *Tombstone Epitaph*, March 8, 1891.
[151] "Prospects for Freight," *Arizona Republican*, March 18, 1891.
[152] "Local Notes," *Arizona Sentinel*, March 28, 1891.

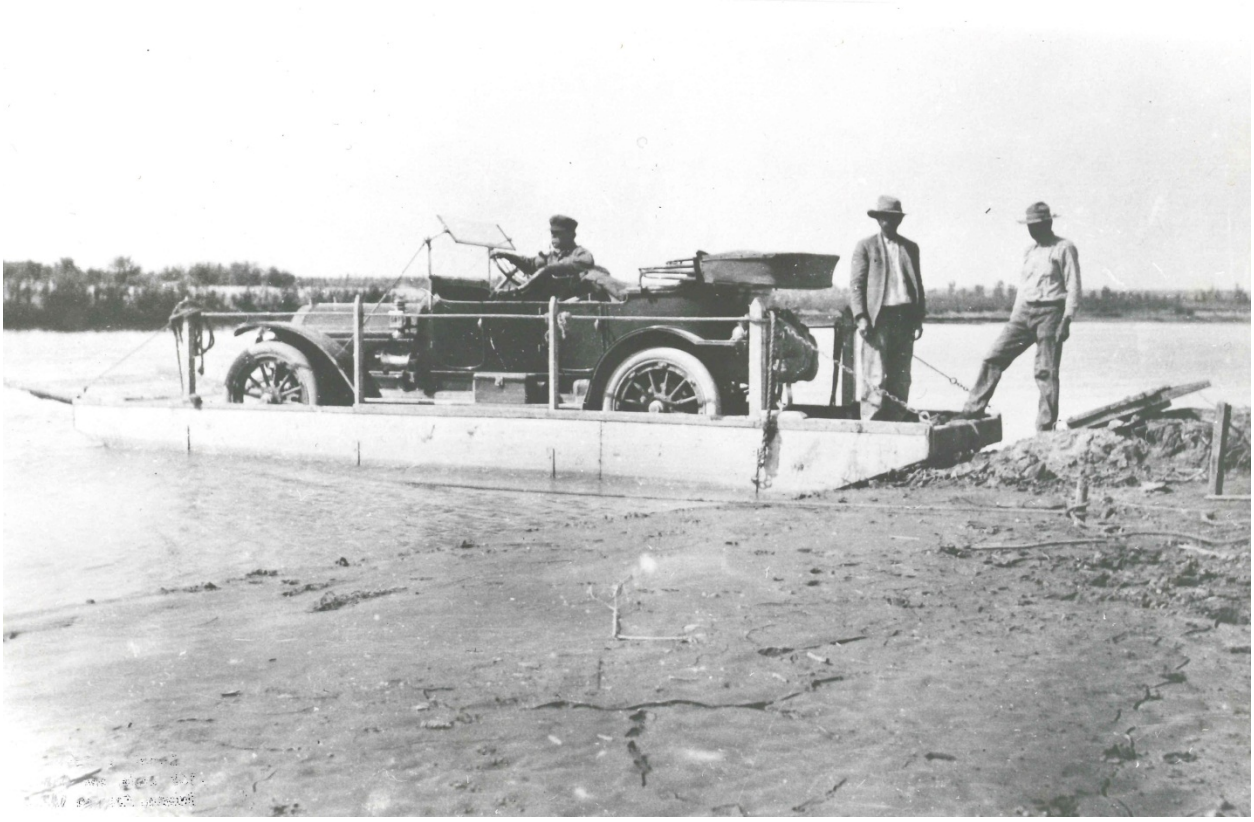


Figure 35: Gila River ferry, 1913. Source: Arizona Historical Society, Tucson, Arizona.

The absence of reliable and regular boat traffic on the Gila River made clear the importance of land transport through the Gila Valley. In an article Stanton P. Allen wrote for *Capitol Magazine* in August 1891 describing his trip from Fort Yuma to Camp McDowell near Phoenix, he noted that transportation within Arizona had long gone overland, and not by boat on the Gila:

> In the ante-railroad days of the territory all freight for the interior was transported in bull trains. From Yuma to Tucson, 260 miles, the merchandise for the stores, and goods of all kinds were shipped in wagons.[153]

The unreliable and dangerous aspects of the Gila River notwithstanding, other parties continued to try to boat the river. On April 18, 1891, the *Arizona Republican* reported that two men had arrived in Yuma after accomplishing "the dangerous feat of navigating the Gila River from source to mouth." Reporting that the men had gone from Los Angeles to Arizona and New

[153] Stanton P. Allen, "After the Indians," *Capitol Magazine* I (Aug. 1, 1891).

Mexico for mining, they subsequently sold their horse and wagon and "started down the Gila in a boat of their own making." The *Republican* continued:

> Their starting point was in the Black range, New Mexico, where the Gila has its source. They say the scenery in the cañons of the Gila is nearly as grand as the Colorado cañons. They met with no special incident until the high water of the February floods began to come down. Their boat was upset and lost, but they built another and started on, in some of the cañons the water rose to enormous heights, owing to the narrow channel in which it was confined. The crookedness of the river makes its total length about 800 miles. The men hunted and trapped on the way, but met with only moderate success. They claim to be the first who ever made the trip in a boat the whole length of the river.[154]

That the Gila River could be dangerous was underscored by another story appearing in the *Arizona Sentinel* in August 1893. Under the title "A Narrow Escape," the *Sentinel* wrote:

> Capt. Hale, his son, A.C. Leffel, and Mr. Cox went bathing near the mouth of the Gila River Saturday evening. The undertow of the whirlpool caught Mr. Leffel, [and] when young Hale went to his assistance, he too was drawn under by the current. Capt. Hale went to the rescue of the two when he as drawn down. Mr. Cox, seeing that the three were about to drown, tore a board from the fence nearby and rushed to their rescue. He succeeded in getting near enough to the Capt. so that he seized the end of the board, and hung to it, while with the other hand he hung on to Leffel, who had young Hale still in his grasp. By the hardest of work, Mr. Cox was enabled to draw the three men from the current into shoal water, where they were safe. It was a very narrow escape. Half a minute's delay, and the three would have found a watery grave.[155]

The whirlpool and undertow described in the *Arizona Sentinel*'s news story about the Gila River pointed to a unique characteristic of the Gila. When considerable flows came down the Colorado, some of that river's waters backed up into the Gila creating sufficient water for boats to go up the Gila. As the *Arizona Weekly Citizen* explained in early June 1894:

> The Gila River is navigable a long distance up from Yuma at present, due to the backing of the waters of the Colorado. In the Colorado, the flow is very large, due to the meltage [*sic*] of the snows in Colorado and Utah. Steamboat excursions up the Gila from Yuma are the rage of late.[156]

---

[154] "Down the Gila in a Boat," *Arizona Republican*, April 18, 1891.
[155] "A Narrow Escape," *Arizona Sentinel*, Aug. 29, 1893.
[156] "Local News," *Arizona Weekly Citizen*, June 2, 1894.

Steamboat excursions up the Gila River may have been the rage when the Colorado River was flooding and backing water up the Gila, but it was more typical for the Gila River to be either dry or raging from its own torrents, and at flood times any type of boating on the Gila was extremely dangerous. The *Tombstone Epitaph* made it clear why boating on the Gila River was difficult at best when it was flooding. Commenting on the status of the Gila at Gila Bend, the *Epitaph* wrote on January 20, 1895:

> The Gila River is raging and is up to the high water mark. At four o'clock yesterday afternoon five hundred feet of the Wolfley Dam was carried away, and it looks as if the remainder will soon go out.[157]

The *Mohave County Miner* carried a similar story in October 1897, when that paper declared: "The Gila River has been on the warpath and farms and stock along its course suffered considerably about ten days ago."[158]

About four years later, the *Arizona Republican* noted that severe flooding on the Gila River had badly damaged a railroad bridge near Phoenix:

> Some time Wednesday night a flood damaged the Gila River bridge so badly that the Maricopa train could not cross it yesterday morning. A special [train] was run down and mail, baggage, and passengers transferred. It will take some time to repair the bridge, and so the evening train to Maricopa will leave Tempe at 5 o'clock to allow for the time taken by the transferring at Gila. It is feared a section of track will be washed out unless the flood abates soon.[159]

The next day, the *Arizona Republican* added more detail about the flood-damaged railroad bridge:

> The Gila River is still high enough to endanger the M. & P. [Maricopa & Phoenix Railroad] bridge. The river seems to have a particular spite at the bridge and is systematically working to destroy it. The current strikes the bridge at the north bank and then turns and runs south along the bridge until it strikes the south bank. Some timbers were taken down last night to be used to make the operation of transferring passengers, baggage, and mail easier. No repairing can be done until

[157] "By Wire," *Tombstone Epitaph*, Jan. 20, 1895.
[158] [No title], *Mohave County Miner*, Oct. 2, 1897.
[159] "Tempe," *Arizona Republican*, Aug. 16, 1901.

> the river falls. About seventy feet of track was torn up yesterday and carried off to prevent its being lost if the bridge gives way.[160]

Part of the problem, at least from the railroad's perspective, was that the Gila River was erratic and frequently changed its channel. On September 19, 1901, the *Phoenix Weekly Republican* explained:

> The Gila River is certainly a remarkable stream and its nerve commands respect. When the [railroad] bridge was built, the stream ran straight east and west, and a long trestle was put up for its accommodation. Gradually, it left the south bank and ate into the north bank above the bridge. This it has done for years, with every high water season, and eventually it left the main part of the bridge over dry land, making occasional washouts on the north bank and making an extension of the trestle work necessary. Its plan is to curve into the bank, and running down, strike the railroad grade, then follow it back into the river bed. Eventually the grade gives way as it did a month ago. This time the operation was repeated, only instead of eating into the grade, it ate clean through it, then, turning back upon itself to some extent, it follows the channel made before. Therefore, parallel with the track, on the west side of it and some distance from it runs the dry land, and there is just a little angular point of dry land on the west side, reaching out to the end of the old bridge, just close enough to allow the transfer of mail and passengers. If the water should stay up long enough to cut off this point the transfer would be as impossible as though the bridge were gone. But little fear of that is entertained, as the reports from there yesterday were that the water was going down.[161]

The Maricopa & Phoenix Railroad had constant struggles with the Gila River's channel changes and debris-filled flood flows. In February 1905, the *Tucson Daily Citizen* explained the situation under the headline "The Uncertain Gila Bridge Perplexes the Managers." Calling the Gila "notoriously treacherous and unconventional," the paper wrote:

> Bicknell, of the Maricopa and Phoenix railroad, said yesterday that it would be at least a week before the company could transfer passengers at the Gila river bridge and ten days at least before trains could be run across the bridge. He said the river was 4,500 feet wide Sunday afternoon at that point, and there was no impediment in his speech when the remark was made. In other words, it was not merely 4,500 feet of swamp and sand, but 4,500 feet of running water. The familiar island in the center of the stream was submerged and there was nothing to distinguish the

[160] "Tempe," *Arizona Republican*, Aug. 17, 1901.

[161] "M. & P. & S.R.V. Washout – Another 140 Feet of Roadbed Destroyed at the Gila Bridge," *Phoenix Weekly Republican*, Sept. 19, 1901.

> river from a large-sized ocean, except that there was more driftwood and debris afloat making the river less navigable than a tropical sea during a simoom [*sic*]. The water fell a little yesterday, enough so the company officials on the banks of the river could estimate the length of the breach in the bridge at 800 feet. This was guess work, of course, for nobody swam across with a tape line, but the matter of a few more yards more or less makes little difference to a bridge across that notoriously treacherous and unconventional stream.[162]

Problems with the Gila River railroad bridge related to that stream's flooding persisted into the following year. According to a January 1906 article in the *Arizona Republican*:

> The Gila bridge is going some this time for sure. There was no halting in the order of its going but when the time came, twelve bents of it just rose up and shook their skirts and floated off gracefully toward the ocean. As mentioned in yesterday's paper, it was just crouching for the spring when the train came over on Thursday afternoon about 4 o'clock. The river was then coming down like a tidal wave and in the early evening the bridge wobbled away with a mocking gurgle and was seen no more. The river was very high all day yesterday and it was expected that the rest of the bridge would follow along piecemeal until there wouldn't be enough left to patch again, but strange to say, no more of it was loosened during the day. Superintendent Bicknell is hoping that it will stand through the flood and thinks it really ought to. A joke is a joke all right, but even the Gila River can carry things too far sometimes. If the M. P. [Maricopa & Phoenix Railroad] company had all the bridges back that the Gila River has carried away for it, it would be in a position to bust the lumber trust. It was reported yesterday that a bigger flood was coming down the Gila yesterday afternoon than any that had ever preceded it, but the story was evidently without foundation. Late in the day, Superintendent Bicknell received a telegram from San Carlos saying that the river gauge there only read six feet and four inches against seven feet and four inches the day before, so he had reason to hope last evening that the worst is past. But it is altogether too early to predict when trains will cross again. It may be a week and it may be several of them. The mails have been detoured as usual and all the regular emergency tactics are being pursued.[163]

Ultimately, the Maricopa & Phoenix Railroad tackled the repeated Gila River floods with what the *Tucson Daily Citizen* labeled "Big Engineering Feat on the Maricopa and Phoenix – Big New Steel Bridge to be Put In." The paper explained:

> Engineering skill and plenty of capital to carry out the plans will battle again next winter with Dame Nature and destroying waters which come down the Gila in huge volume, gathering strength and force for hundreds of miles before it reaches

[162] "The Uncertain Gila Bridge Perplexes the Managers," *Tucson Daily Citizen*, Feb. 25, 1905.
[163] "A Clean Breakaway," *Arizona Republican*, Jan. 19, 1906.

> the Maricopa & Phoenix railway cross of the river. It has just been announced that plans have been drawn for a sturdy steel bridge across the Gila which, with other improvements along the line, will represent a total expenditure of $146,000. Never yet has a bridge been constructed which could withstand the raging Gila when the water is up. Never before, however, has so large and strong a bridge been contemplated. Always in the past the power of the turbulent river has been underestimated. The new bridge will consist of sixty twenty-foot spans, making its total length 1,200 feet. The new bridge will be several feet higher than the present structure, and will be located about 300 feet west of the present bridge. The approach from the north will be very long and will be graded and rip-rapped thoroughly so that it will be able to withstand the river should the treacherous stream suddenly endeavor to change its channel. The approach will cost about $25,000. The south approach will be easy to construct, as the rocky bank on that side is close to the main channel.

The Tucson paper concluded that once the new bridge was in place, delegates to the Territorial Legislature from Tucson would never again be trapped in Phoenix by the high water of the Gila River for weeks, "as they were compelled to do two years ago."[164]

Yet apparently even before the Maricopa & Phoenix Railroad Company could build the new steel bridge, new flooding in December 1906 again destroyed the existing bridge over the Gila River:

> The troublesome Gila is raging. This treacherous stream, after lying peaceful for several months, has suddenly risen and its waters are rushing across Arizona toward the Colorado [River] at terrific speed, carrying much ahead of it and doing considerable damage. . . . Two bents were carried away on the Gila bridge of the Maricopa & Phoenix road. It was reported that the remainder of the bridge, however, withstood the rush of the waters.[165]

The repeated high water on the Gila River not only made keeping the railroad bridge intact difficult, it also made fording the stream extremely dangerous. Yuma's *Arizona Sentinel* reported in September 1907 about the nearly tragic consequences of one attempt to ford the stream:

---

[164] "Treacherous Gila River – Big Engineering Feat on the Maricopa and Phoenix – Big New Steel Bridge to be Put In," *Tucson Daily Citizen*, March 13, 1906.

[165] "Both Bridges Over Gila Suffer," *Tucson Daily Citizen*, Dec. 5, 1906.

> The Gila River was on the rampage several days ago and is not yet at a normal stage. In attempting to ford the swollen stream last Sunday on his way from the De Luce mines to Yuma, E.R. Van Wagenen had a perilous experience. His horse and buggy were swept so far down the stream and were so entirely in control of the current that he hastened to unhitch in mid-stream and allowed his horse to swim out, himself upon the horse's back. He sent an Indian in a boat after the buggy. Crossing the Gila about the same time were J. Porter Moffett, A.B. Ming, Carlos Theobals, and Newton Parks. They did not attempt to bring their wagon but rode horses across and secured an Indian to go for the wagon in a boat. They managed it by taking the wagon to pieces and packing it in a big canoe.[166]

A similar terrifying ordeal was experienced by the mail carrier in February 1908, when he attempted to ford the Gila River at Palomas (roughly half way between Gila Bend and Yuma). The *Arizona Sentinel* provided the details of the frightening ordeal:

> C. Ortiz, the mail carrier between Palomas and Aztec station, had a narrow escape from drowning in the Gila River last week. He was driving a four-horse team and in crossing the river one of his horses fell down. Ortiz had to get down into the water to disentangle the animal, and while doing so, he saw a wall of water coming down upon him. By the time he had cut the harness and freed the horses, the flood was upon him. Fortunately, he was near the north bank of the stream; otherwise he would have surely drowned and lost his teams. His wagon was carried away by the flood, but the horses swam out. He bought a new wagon in Yuma yesterday.[167]

Even well after statehood, the dangerous flooding, channel changes, and erratic behavior of the Gila River continued as the following photographs from the U.S. National Archives branch in Denver, Colorado, illustrate.

[166] "A Perilous Experience," *Arizona Sentinel*, Sept. 4, 1907.
[167] "Narrow Escape from Drowning," *Arizona Sentinel*, Feb. 26, 1908.

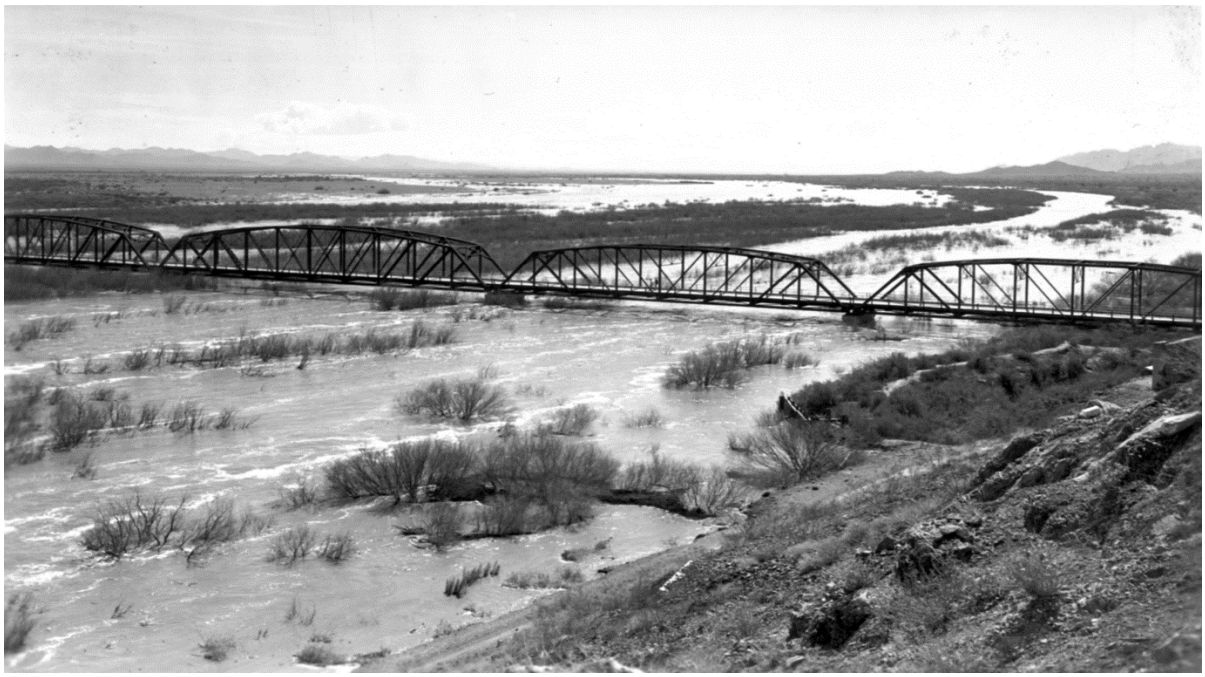


Figure 36: Flooding Gila River looking downstream from Gillespie Dam, March 5, 1938. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

Figure 37: Flooding Gila River 17 miles east of Yuma, Arizona, March 20, 1941. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

Figure 38: Dry Gila River near Antelope Hill, January 16, 1940. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

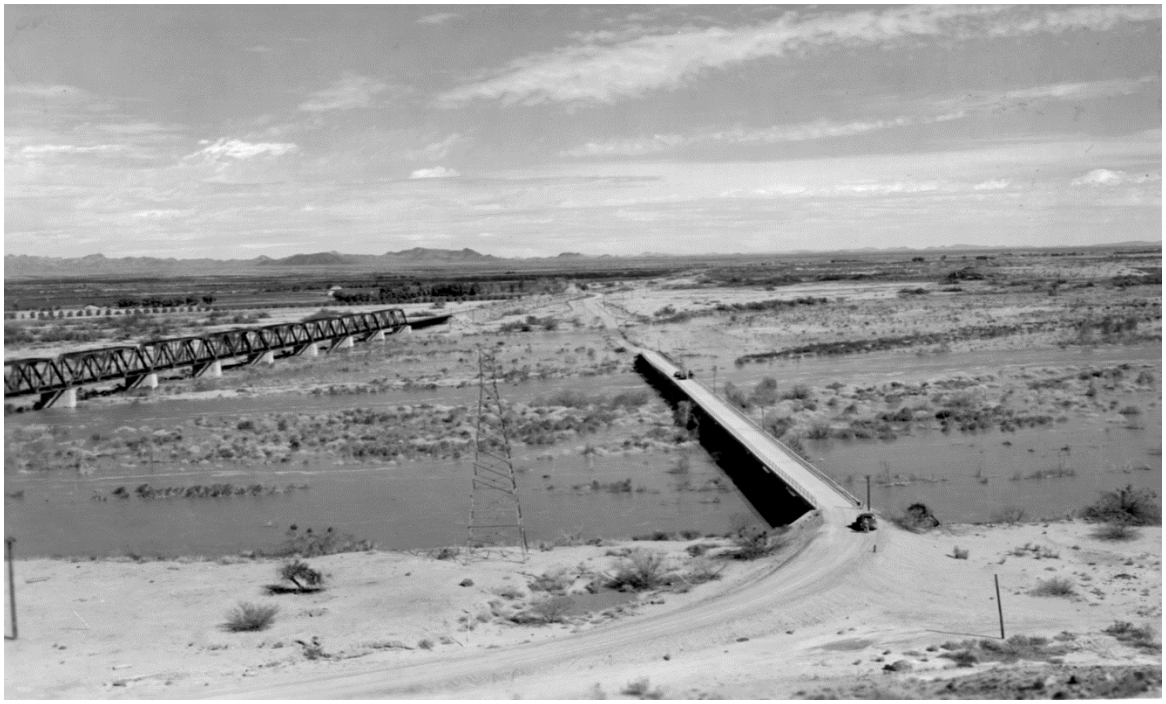


Figure 39: Flooding Gila River near Antelope Hill, March 6, 1938. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

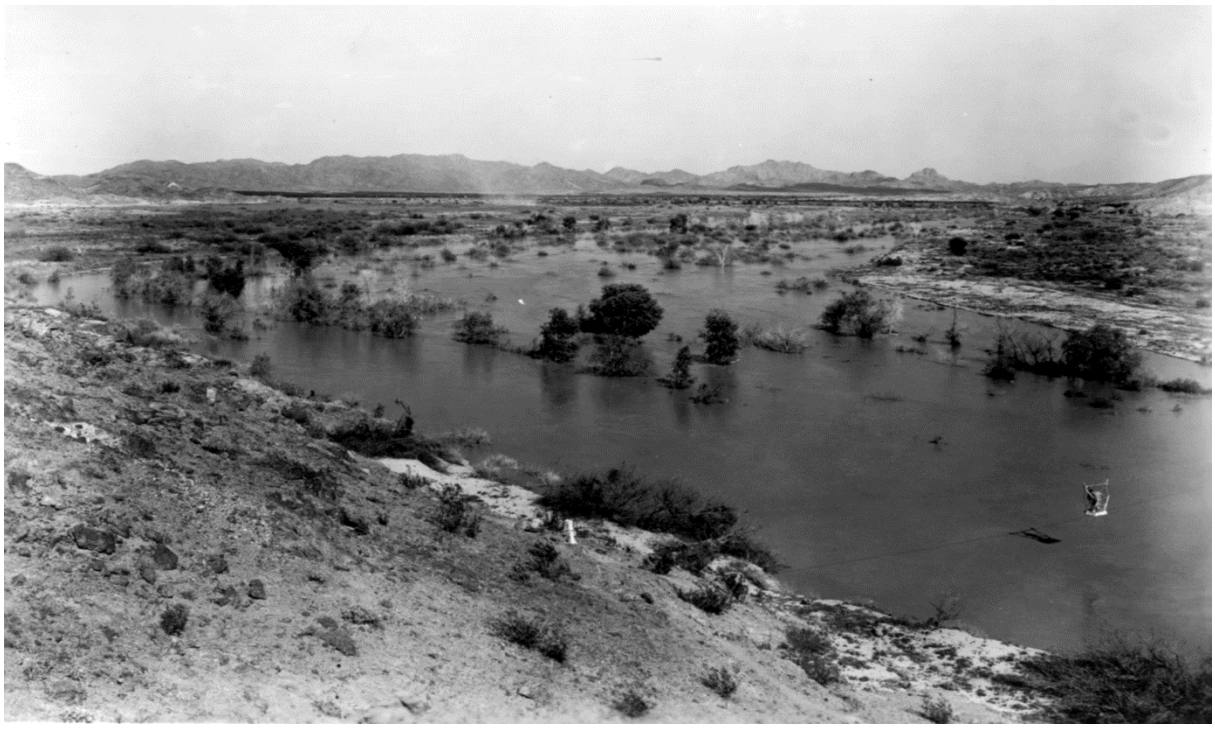


Figure 40: Flooding Gila River 17 miles east of Yuma, Arizona, March 20, 1941. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

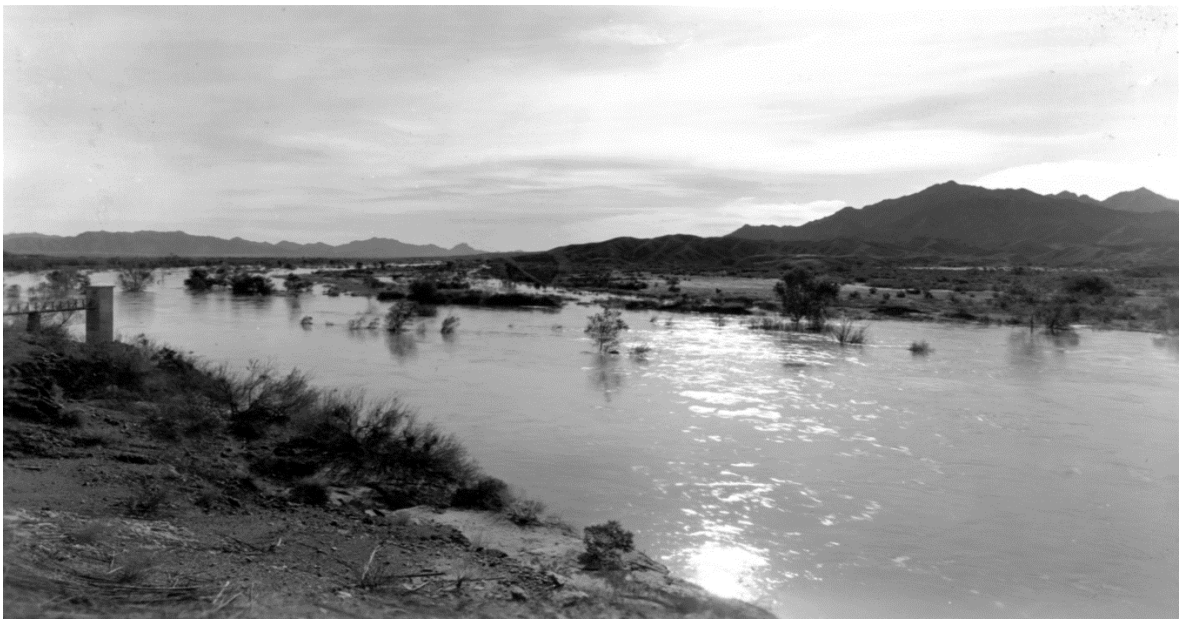


Figure 41: Floodwater in the Gila River at Dome Bridge, March 10, 1938. Source: Records of the U.S. Bureau of Reclamation, U.S. National Archives branch, Denver, Colorado.

C. Summary and Conclusion to Chapter 4

"Raging," "torrents," "perilous," "treacherous," "rampage," "turbulent," "undertow," "whirlpool," "unconventional," are all words that historical newspapers used to describe the Gila River – in addition to "dry" when the river was not flooding. Those words and other similar ones underscore why many individuals whose opinions appeared in the Arizona press declared the Gila River to be non-navigable. Indeed, Arizona newspapers themselves mocked out-of-town papers for claiming the Gila was navigable, and while the papers dutifully carried stories about a handful of attempts to navigate the stream, the newspapers made it clear that those instances – some more successful than others – were the exception rather than the rule. In the years before Arizona's statehood in 1912, the Gila River was an extremely erratic stream. When it carried water, it was violent, prone to channel changes, wild inundations, and dangerous currents, while at other times it was either bone dry or extremely shallow.

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 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 Gila 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 Gila 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 Gila 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.[168]

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 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.[169]

[168] 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).

[169] 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.

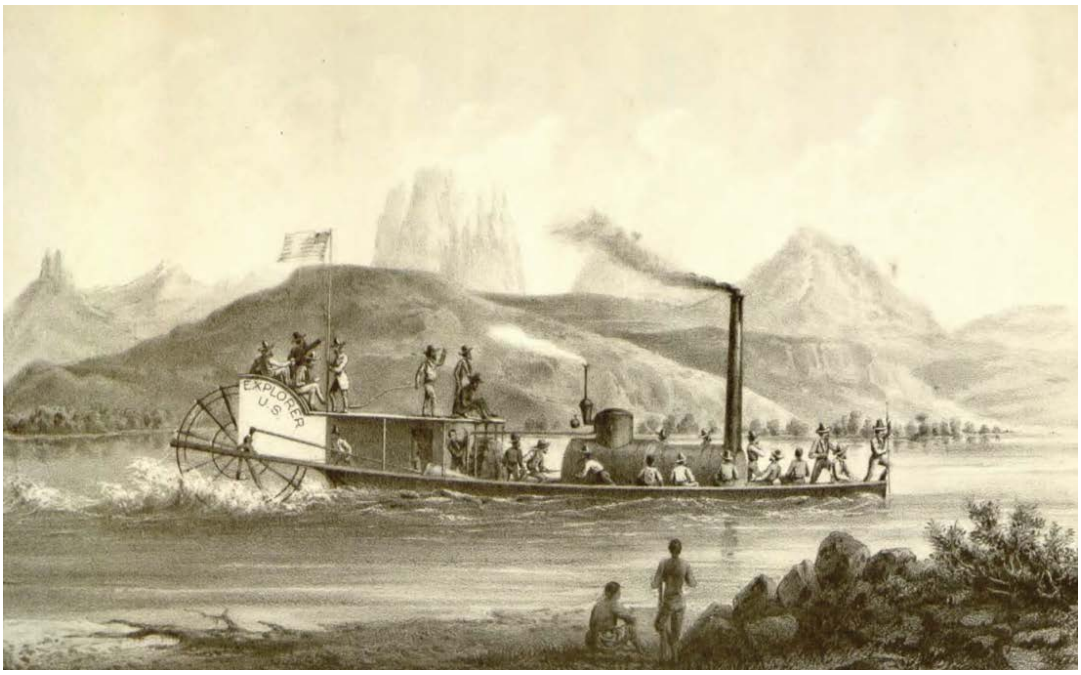


Figure 42: J.C. Ives's sketch of the *Explorer* navigating the Colorado River, ca. mid-1850s. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).

Figure 43: 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 44: 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).

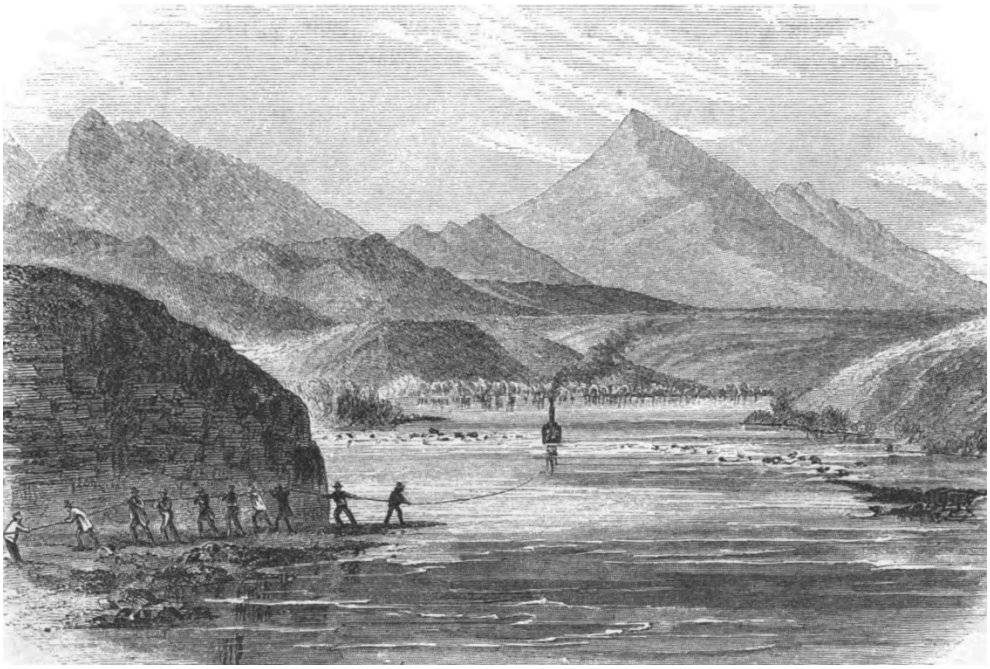


Figure 45: Drawing of Ives's exploration of the Colorado River – lining the boat through rapids, mid-1850s. Source: Joseph C. Ives, *Report upon the Colorado River of the West* (1861).

Figure 46: Photograph of the type of stern wheel steamboat suggested by J.C. Ives for navigating the Colorado River, ca. 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.[170]

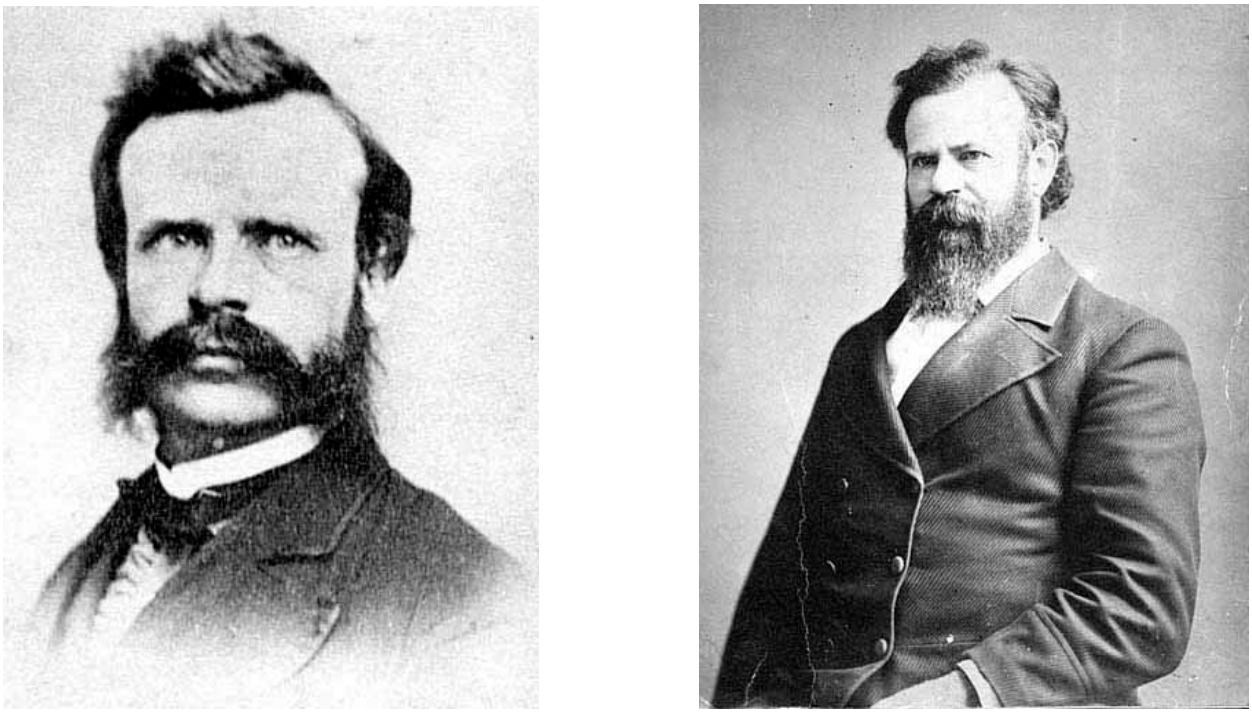


Figure 47: Photographs of John Wesley Powell in 1869 and 1874. Source: U.S. National Park Service online photograph collections.

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.[171] 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).

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

[171] 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 48: 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 49: Photograph of Powell's crew with dories in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photo collection.

Figure 50: 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 51: Another photographic view of Powell's dories on the Colorado River, 1871-1872. Source: Grand Canyon National Park Collection, Grand Canyon, Arizona.

Figure 52: 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 53: 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 54: Photograph of John Wesley Powell's second expedition through the Grand Canyon, 1871-1872. Source: U.S. Library of Congress, Washington, D.C.

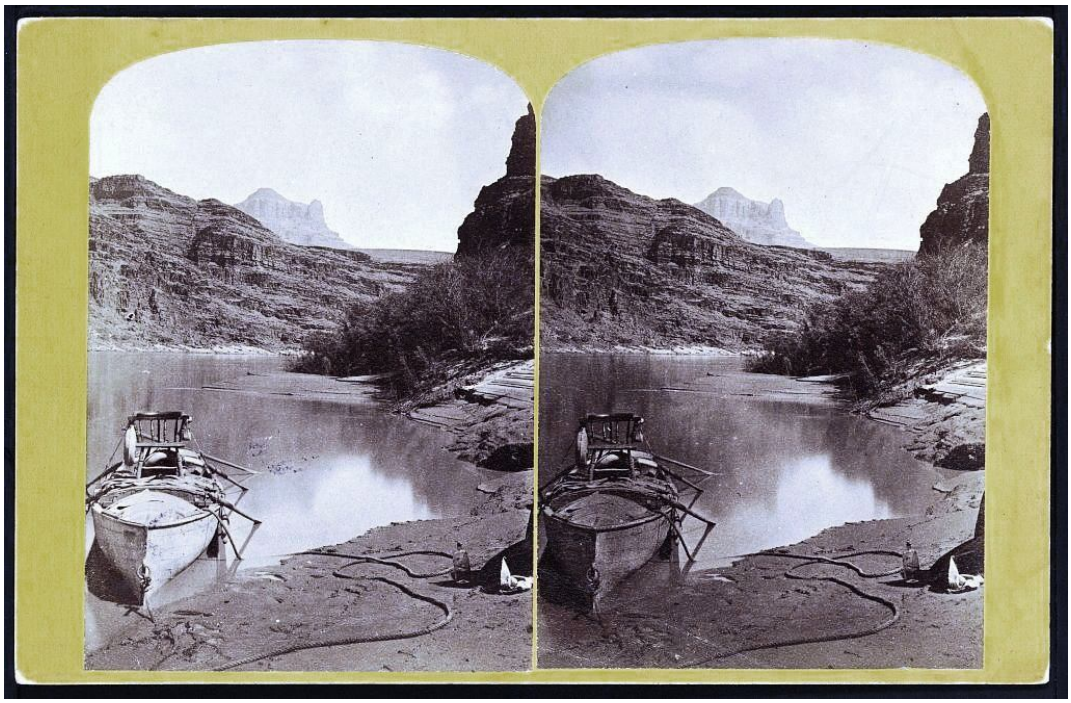


Figure 55: Stereographic photograph of the dory used by John Wesley Powell on the second expedition through the Grand Canyon in 1871-1872. Note that strapped to top of the dory is an arm chair, where Powell sat. Source: U.S. Library of Congress, Washington, D.C.

Figure 56: 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 57: 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 58: Photograph of Powell's boats tied up or ashore in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

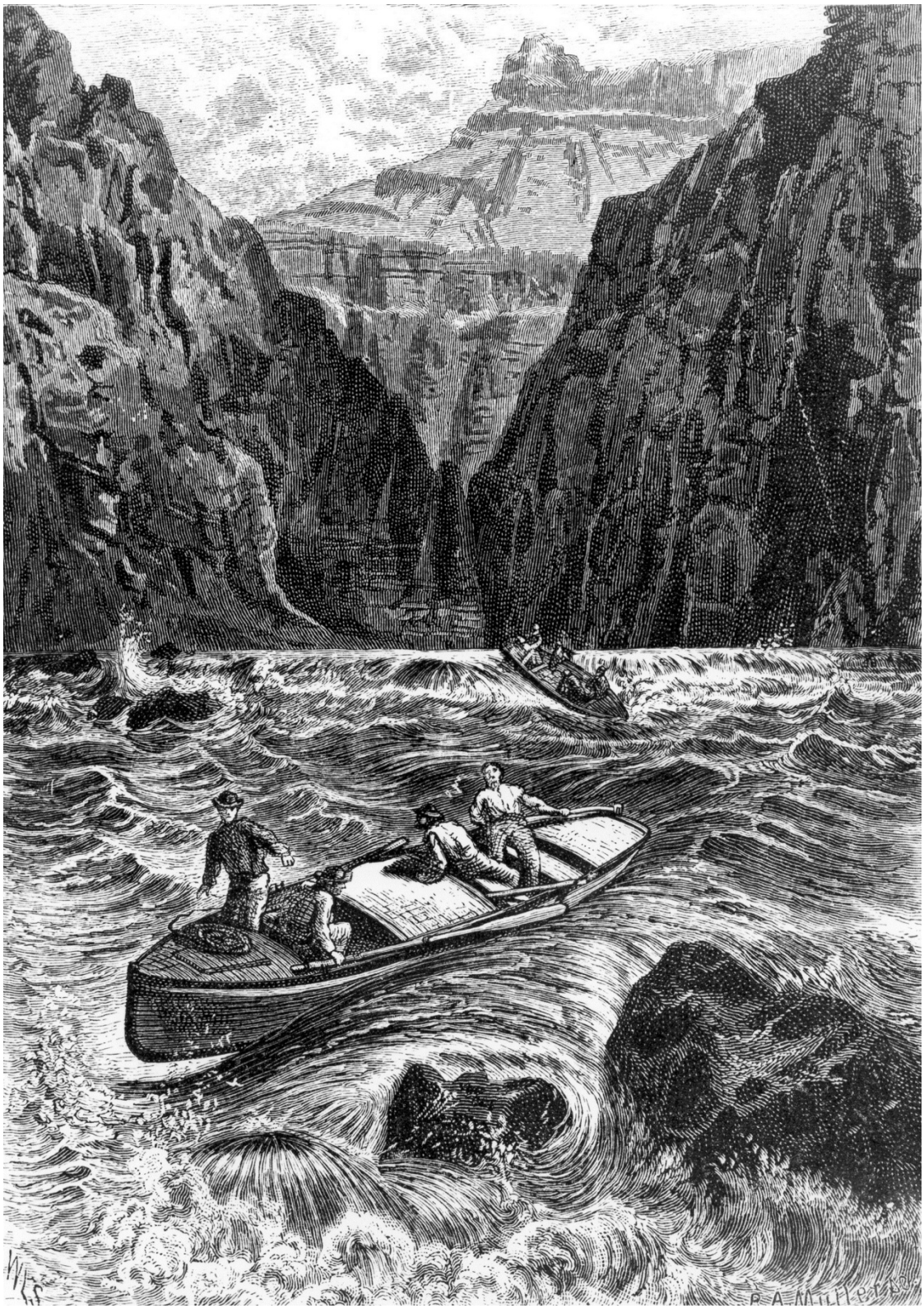


Figure 59: Sketch of the Powell expedition running rapids in the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

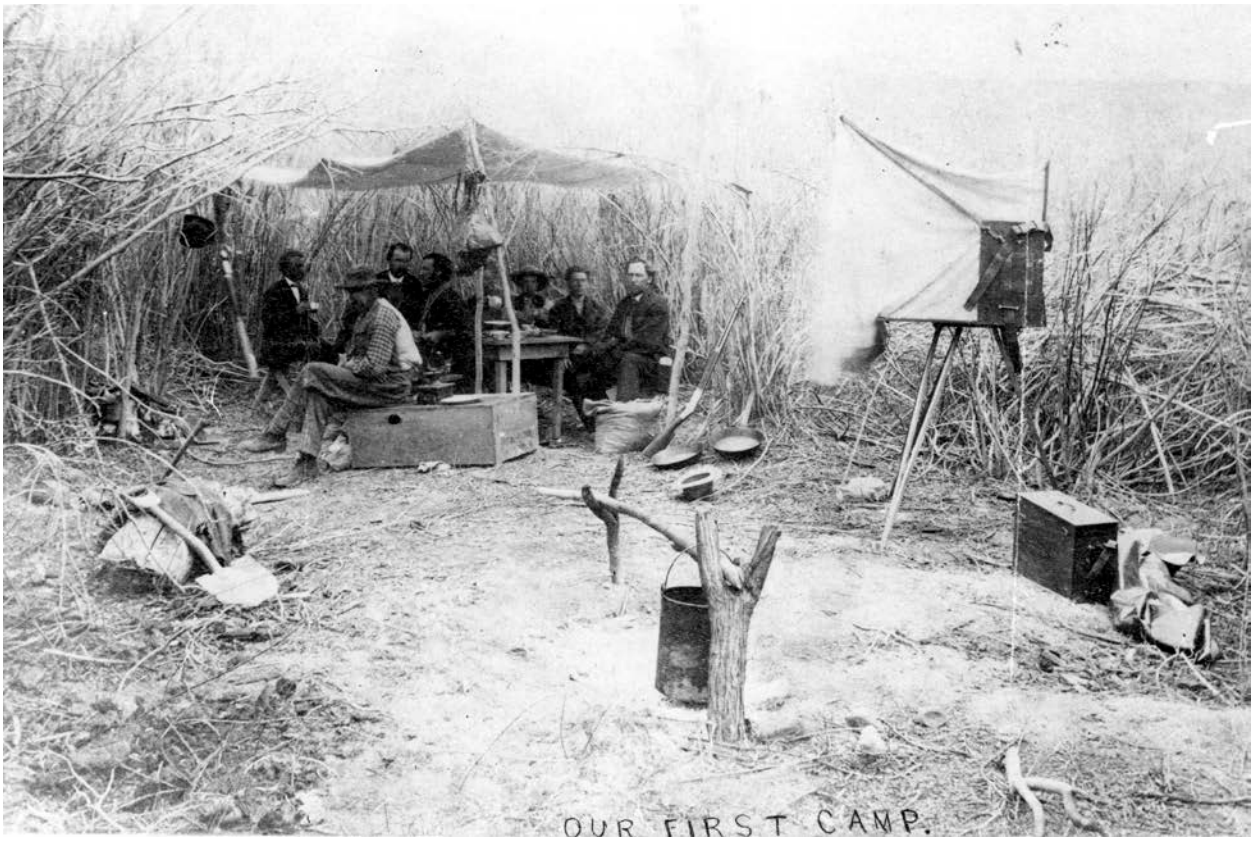


Figure 60: "Our First Camp," Powell expedition through the Grand Canyon, 1871-1872. Source: U.S. National Park Service online photograph collection.

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 61: 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 62: Stereographic photograph of Wheeler expedition up the Colorado River at Black Canyon, 1871. Source: U.S. Library of Congress, Washington, D.C.

Figure 63: 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.[172]

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,

[172] *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.[173]

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.[174]

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 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."[175] When specifically discussing river steamers, the report stated that:

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

[174] *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.

[175] *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.[176]

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."[177]

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.[178]

---

[176] *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.

[177] *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.

[178] 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 Gila River was not susceptible to navigation before or at the time of Arizona's statehood. The erratic and irregular flow in the Gila 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 a river that was sometimes only a few inches deep, although at flood stage, the Gila 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 Gila River on a regular basis – as can be seen in historical newspaper reports in Chapter 4 of this report. Furthermore, the Gila'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 Gila River.

SUMMARY AND CONCLUSIONS

Since modern settlement began in Arizona in the mid-nineteenth century, there have been a multitude of documents created describing the Gila River. These cover a wide spectrum of published and unpublished sources, including U.S. Government and state (and territorial) materials, diaries, journals, reminiscences, other archival records, and photographs.

Some of the most important sources for ascertaining the nature of the Gila River prior to and at the time of Arizona's statehood in 1912 are survey field notes and plats created by U.S. Government surveyors as they carried out their responsibilities mapping Arizona. Directed by manuals conveying precise instructions, surveyors were to make careful note of the region in which they were working, and they were provided with specific instructions about how to record the presence of navigable bodies of water. A substantial part of the area through which the Gila River flowed was surveyed prior to 1912, and in some cases resurveys were done for some sections of the river. Significantly, although these surveys were undertaken by many different parties at different times and under various seasonal conditions, none of the federal surveyors indicated in his field notes or on the related plats that the Gila River was navigable. While some sections of the stream were, in fact, meandered, the surveyors' field notes clearly show that those meanders had been done to conform with surveying instructions not related to navigability. In addition, the field notes and plats illustrated a stream that varied enormously in flow and that had a changing channel in many places. Moreover, the notes and plats contain references to roads and railroads paralleling the Gila, suggesting that transportation was carried out on land and not on the river.

Supporting the U.S. Government surveys' determination that the Gila River was not navigable are federal government homestead patents, U.S. grants to Arizona, and Arizona's disposition of those lands. Many patents were issued by the U.S. Government Land Office to

parcels of land through which the Gila River ran. In every single case when these patents were formalized, the United States made no effort to deny title to the applicants based on a possible claim of ownership due to Arizona's sovereignty. Furthermore, when lands were granted to Arizona through which the Gila River flowed, the state made no effort to obtain in-lieu selections for the acreage covered by the stream's bed – as it would have been entitled to do had the Gila River been navigable at the time of statehood. And, when Arizona subsequently disposed of lands it had acquired from the federal government through which the Gila River ran, the state made no indication that it was withholding the bed of the river due to navigability and the public's interest.

The U.S. and state grant and patenting process is significant in relation to determining the Gila River's navigability because with so many different parcels and transfers of land involved, a large number of parties ultimately reached the same conclusion – that the Gila River was not navigable. Each applicant who requested land through which the river flowed implicitly asserted the river's non-navigability; each federal official approving a homestead application or grant to Arizona reached the same implicit conclusion, as did each state authority who sold Arizona's federally-granted lands. Not only did many individuals all indicate the same finding with regard to the Gila River's non-navigability, but they did so over a lengthy span of time, and their actions covered a large and diverse geographic area.

Further strengthening the finding that the Gila River was not navigable in 1912 are other published and unpublished records of the U.S. Government. Records of the U.S. Geological Survey and the Reclamation Service describe a stream that was extremely erratic in flows, unreliable in relation to channels, subject to severe floods, and dangerous.

Much like the federal agencies' records, explorers' journals, personal reminiscences, other historical documents, and more recent historical studies all reached the same conclusion regarding

the lack of navigability of the Gila River. Indeed, the Arizona Territorial Legislature in 1865 declared that the only stream in Arizona that was navigable was the Colorado as did several territorial officials. In addition, Odie Faulk, in his study of the Gila Trail, noted the lack of navigable waterways in the region.

Finally, historical newspaper accounts and photographs all support other evidence that the Gila River was not navigable before or at the time of Arizona's statehood in 1912.

From this wealth of information, covering a huge array of documentary sources, only one conclusion can be reached: The Gila River was not navigable or susceptible of navigation on or before February 14, 1912.

APPENDIX – LITTLEFIELD VITA

Douglas R. Littlefield, Ph.D.
Littlefield Historical Research
6207 Snake Road
Oakland, California 94611
Telephone: (510) 339-1017
Email: drl@LittlefieldHistoricalResearch.com
www.LittlefieldHistoricalResearch.com

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.