

Preliminary Evaluation of Historic Documents

Pertaining to

Yellowstone River Riparian Vegetation

Agreement No. YRCDC-014

**Custer County Conservation District
Miles City, MT**

By

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Introduction

In May 2006, Custer County Conservation District contracted with Joan L. Brownell to conduct a preliminary evaluation of historic records that describe the Yellowstone River valley to determine their information potential on the extent and/or composition of vegetation in the riparian area. This evaluation was to be based on the 2003 report of Confluence Consulting, Inc. (Confluence) entitled *Yellowstone River Historical Retrospective Completion Report*.¹

Methodology

In 2003, Confluence, under a contract with the Montana Department of Environmental Quality (DEQ), conducted an investigation of historic conditions along the Yellowstone River from the northern boundary of Yellowstone National Park to the confluence of the Yellowstone with the Missouri River. The focus of the investigation was the main stem of the Yellowstone River prior to 1900. Confluence utilized various sources of information for this report and assembled an annotated bibliography of historic primary sources pertinent to the investigation. The Confluence report includes three appendices that contain historic materials collected: Appendix B for photography, Appendix C for cartography and Appendix D for textual materials.

Ms. Brownell reviewed the Confluence report and investigated those documents referred to and/or collected by Confluence that appeared to hold the greatest potential to provide relevant information pertaining to riparian vegetation along the Yellowstone River. Ms. Brownell first approached Confluence to obtain access to the materials contained in the appendices of the 2003 report. Unfortunately, Confluence did not retain copies of the appendices. Ms. Brownell then contacted Rosie Sada at DEQ who generously gave access to any materials located in her office. At DEQ, Ms. Brownell viewed the photographs contained in Appendix B and the maps and related documentation in Appendix C. Unfortunately, Appendix D (textual materials) could not be located in the DEQ office.

Since Appendix D was not available and time was limited for this preliminary evaluation, Ms. Brownell judged which documents (listed as contained in Appendix D) appeared most likely to provide relevant information pertaining to the extent and/or composition of vegetation in the Yellowstone riparian area. To view these historic materials, Ms. Brownell visited three repositories in Montana: the Montana Historical Society in Helena; the Merrill G. Burlingame Special Collections at Montana State University-Bozeman and Special Collections at Montana State University-Billings.

¹ Confluence Consulting, Inc., *Yellowstone River Historical Retrospective Completion Report*, for Montana Department of Environmental Quality, Helena, MT by Confluence Consulting, Inc., Bozeman, MT, November 2003.

Preliminary Evaluation

This section discusses and evaluates the vegetation information potential of historic documents that are listed in the three appendices of the Confluence report. A numerical scale from 1 to 5 classifies the relevance of the document towards providing pertinent data on the extent and/or composition of vegetation and whether it is considered worthy of a detailed study. A rating of one has the least potential and five the highest potential. Exhibits are provided to illustrate the documents discussed and are taken primarily from the appendices of the Confluence report.

Appendix B: Collected photographs

Scale: 1-2 with exceptions

Appendix B of the Confluence report contains photocopies of 76 historic photographs located at the Montana Historical Society in Helena, MT, the Minnesota Historical Society in Minneapolis, MN and the National Archives II at College Park, MD. Confluence states in their report that the historic photographs show “physical features more clearly than any journal or report could describe them, especially in the extent of vegetation and woody debris along the river.”²

Comparative photography is an effective tool for evaluating the changing landscape and the technique of rephotography is a possible approach for a Yellowstone River vegetative study but would be time-consuming and costly. The majority of the photographs contained in Appendix B are not site specific and therefore locational information is difficult and attempts to make site determinations very difficult. Even with site determinations, the vegetative information potential depends on how the individual photographic image captures riparian vegetation. The scale rating therefore is low (1-2) for the majority of historic photographs.

Exceptions for the utilization of historic photographs for describing vegetation along the Yellowstone River can be made for historic photographs that display known geologic formations along the Yellowstone or manmade features as bridges or ferry crossings. Locations for these photographs are more easily identifiable through the historic record. While the vegetative information potential still varies with each image, such photographs could effectively illustrate historic vegetation at a precise location along the Yellowstone.

Exhibit A is a set of four photographs of unidentified reaches of the Yellowstone River taken during the 1873 Yellowstone Expedition. These photographs are not labeled to location and it would be difficult or impossible to reidentify the image locations.

Exhibit B is an 1881 photograph by L. A. Huffman of Miles City, MT of an identifiable geologic feature called Eagle Butte along the Yellowstone River. Such a geological formation is readily identifiable and the image reveals dense riparian vegetation.

² Confluence Consulting, Inc., “*Yellowstone River Historical Retrospective*, 2.

Appendix C: Collected Cartographic Documents

The cartographic materials collected by Confluence hold the greatest potential to provide relevant information pertaining to historic riparian vegetation along the Yellowstone River. Most of the cartographic materials are generally accompanied by a narrative document. Each cartographic document reviewed is presented as listed in Appendix C of the Confluence report.

1. General Land Office (GLO) Survey Plats

Scale: 5

Confluence collected all pre-1900 GLO survey plats for the Yellowstone River from the Yellowstone National Park north boundary to the confluence of the Yellowstone with the Missouri River. Confluence states that “plats contain detailed information on river locations and conditions.”³ It appears that Confluence did not investigate the corresponding survey field notes to the GLO survey plats. In order to fully investigate the potential of GLO maps for vegetative data, Ms. Brownell conducted a limited sampling of GLO field notes with their corresponding survey maps.⁴

GLO survey maps are generally considered one of the best historic documentation available for vegetation.⁵ A review of the GLO maps along the Yellowstone River contained in Appendix C indicates that prior to 1880, the majority of surveyors did not identify vegetation along the Yellowstone. After 1880, vegetation is shown along the Yellowstone generally by a universal symbol, distinguishing between sparse and denser vegetation by the proximity of the symbols to one another. The corresponding survey field notes further clarify the type and quantity of vegetation shown on the map and describe sloughs, islands and other features within the river corridor.

However, use of GLO maps for vegetative studies presents several data limitations. The primary concern is that the field notes describe the vegetation encountered along the section line being surveyed and the extent of vegetation to either side of the section line is therefore in question. This leads to questions regarding the competency of the surveyor and the variability of the quality of the survey from one surveyor to the next.

The above-mentioned limitations need to be considered before embarking on a GLO vegetative study. Work conducted by Iowa State University emphasizes that usage of GLO records is often “better for studies of regional vegetative patterns than in detailed site-level studies.”⁶ Regardless of its inconsistencies, this author believes GLO survey maps and field notes are one of the best available sources of information delineating

³ Ibid, 31.

⁴ GLO survey maps and notes are available on microfilm at the Records Room, Bureau of Land Management State Office, Billings, MT.

⁵ The University of Iowa has done extensive studies utilizing GLO documents. For further information, please refer to their web site at www.glo.gis.iastate.edu.

⁶ Ibid.

vegetation within the riparian area of the Yellowstone River. GLO documents are rated the highest (5) on the rating scale.

Exhibit C is the GLO survey map for T1S R18E, surveyed in 1883 and approved in 1884.

Exhibit D contains excerpts from the GLO surveyor's field notes for T1S R18E. The survey field notes are available on microfilm at the Bureau of Land Management State Office, Billings, MT.

Exhibit E is a GLO survey map for T2S R9E, surveyed and approved in 1888.

Exhibit F contains excerpts from the surveyor's field notes for T2S R9E. The field survey notes are available on microfilm at the Bureau of Land Management State Office, Billings, MT.

2. Northern Pacific Railroad Surveys Field Book Excerpts

Scale: 4

Confluence examined Northern Pacific Railroad Surveyor Field Books at the Minnesota Historical Society and collected copies of Land Examinations records for several sections in T14N R54E and 55E. These surveyed individual sections recorded specific data on land surface, soils, vegetation and water availability. Timbered areas are identified as to the number of cords available. These survey sections provide precise information on the riparian vegetation within the Yellowstone River corridor.⁷

The Northern Pacific survey records are limited to only odd numbered sections so the availability of these maps depends on the location of the river with odd-numbered sections along the length of the Yellowstone. The Northern Pacific Railroad Company received these odd-numbered sections in the land grant received from Congress in 1864. The rating for the Northern Pacific survey records is four (4) only because the maps are limited in area covered.

Exhibit G is an 1882 Land Examination surveyed section for Section 27, T14N R54E.

Confluence also collected copies of surveyor field books that provided descriptions and plats of several river reaches showing depot grounds for the railroad.⁸ These maps show riparian vegetation along the Yellowstone River but again are limited in scope and given a rating of four (4). According to railroad historian Dale Martin, it

⁷ A phone conversation with an archivist at the Minnesota Historical Society indicated that the land examination records are for lands owned by the Northern Pacific and are arranged by Range. An index of the sections was not available.

⁸ It is unclear from the report if these were the only plats available for the Yellowstone.

would be possible to determine these historic locations using the station numbers from the historic map with early 20th century maps.⁹

Exhibit H is identified as Plat “B” showing the location and extent of Depot grounds, with accompanying narrative.

3. Maguire, Edward.

Scale: 4

Map: The Yellowstone River from Benson’s Landing, MT to Fort Buford, DT. Compiled from surveys made under the direction of the Chief Engineers of the Department in the years 1873 to 1876. National Archives II, RG77, Q329#35. Seven Maps.

Confluence felt that the Maguire map appeared to be relatively accurate, as they locally correlate extremely well with modern river locations.”¹⁰ The map caption states that the map is compiled from surveys made under the direction of the Chief Engineers of the Department in the years 1873 to 1876. Army Corp of Engineers survey reports and related documentation needs to be located to fully comprehend the usefulness of this map for information potential of the riparian vegetation along the Yellowstone. The Maguire map classifies as a four (4) on the rating scale, due to its small scale.

Exhibit I contains the seven maps that compose Edward Maguire’s map of the Yellowstone River.

Appendix D: Collected Textual Documents

Scale: 1-2

The following list includes the historic documents selected from Appendix D for evaluation as to their potential to yield relevant data pertaining to vegetation along the Yellowstone River.¹¹ Taken as a whole, one comes away from reviewing these historic reports with a better understanding of the river dynamics in the nineteenth century. Information contained within most of these historic reports consists of general descriptions of vegetation, often in the reaches between major confluences. These narratives do not impart any specific information but consist of generalizations on the extent and/or composition of the vegetation. The classification of the textual materials is therefore variable but low (1-2), providing limited pertinent information.

2. Atwater, Elizabeth Joan Rodgers. Letters of Montgomery Meigs, written while engaged in the Survey of the Northern Pacific Railroad, 1872-1873. Masters thesis. Bozeman: State University of Montana, 1937.

⁹ Dale Martin to Joan L. Brownell, Bozeman, MT, June 6, 2006.

¹⁰ Confluence Consulting, Inc.,”*Yellowstone River Historical Retrospective*, 32.

¹¹ The numbers shown are the same as in the Confluence Report.

16. Forsyth, J. W. and F. D. Grant. *Report of an Expedition up the Yellowstone River made in 1875*. United States War Department. Washington: Government Print Office, 1875.

This report includes some interesting detailed sketches of the major confluences of the Yellowstone.

17. Frost, Lawrence A., editor. *Some Observations on the Yellowstone Expedition of 1873, Stanley and Grant*. Glendale, CA: A.H. Clark Company, 1981.

32. Moulton, Gary E., Editor. *The Journals of the Lewis & Clark Expedition: June 10-September 26, 1806*, Lincoln and London: University of Nebraska Press. Vol. 9, 1983. [the correct volume number is Vol. 8].

Confluence felt that the journals of the Lewis and Clark Expedition were the “best expedition journal source” for the Yellowstone.¹² Expansive studies conducted for the Lewis and Clark Expedition Centennial may have identified specific camp locations that would augment further study of William Clark’s trip down the Yellowstone in 1806. The available Lewis and Clark maps must be read with the corresponding narrative [see Volume 1 of *The Journals of the Lewis and Clark Expedition* by Moulton].

35. *Report on the Exploration of the Yellowstone River*. (Communicated by the Secretary of War, in compliance with a resolution of Senate, 40th Cong., 2nd Sess. [1866], Ex. Doc. No. 77 and Preliminary report of the same expedition.

37. Sheridan, General P.H. and W.T. Sherman. *Reports of Inspection Made in The Summer of 1877* by Generals P.H. Sheridan and W.T. Sherman of Country North of the Union Pacific Railroad.

44. *The Climate, Soil, and Resources of the Yellowstone Valley, with accurate maps of the Yellowstone Country, the transcontinental route and connections of the Northern Pacific Railroad and a Plat and Description of the Town of Glendive, at the junction of this railroad, with the steamboat navigations of the Yellowstone and Upper Missouri Rivers* (St. Paul: The Pioneer Press Company), 1882.

Although this document sounds pertinent, it is generalized in both the narrative and maps.

¹² Confluence Consulting, *Yellowstone River Historical Retrospective*, 2.

Summary

At the present time, there is no known nineteenth century historic document that provides precise extent and composition of riparian vegetation along the Yellowstone River corridor. It is the opinion of this author that there are two primary avenues of further study that present the best options for a vegetative study of the Yellowstone River during the nineteenth century. The GLO survey maps and field notes, however inconsistent, are the best available source of information on vegetation for the riparian area of the Yellowstone River. The Northern Pacific Railroad Company survey records available at the Minnesota Historical Society are a wealth of information pertaining to surveys and investigations throughout the Yellowstone River Valley and whose maps and notes reflect the vegetation within the riparian corridor of the Yellowstone. A third option is to also investigate the development of the Maguire map of the Yellowstone and locate the original report and accompanying field notes and/or maps.

Cost estimates

Under this contract, it was requested that cost estimates be provided for a detailed study of historic documents that appear to contain relevant information pertaining to vegetation within the riparian area of the Yellowstone River.¹³ This preliminary evaluation has determined that both the GLO Records and the Northern Pacific Railroad Company Records are worthy of further study. It is also suggested that records relative to the Maguire Map be investigated.

NRCS is planning to conduct a present-day analysis of vegetation in the riparian corridor of the Yellowstone River.¹⁴ If the NRCS study selects a systematic sample of locations, the historic study could concentrate on these locations, rather than the entire length of the river. The investigation, interpretation and analysis of relevant historic documents would then correspond with the present-day survey. The historian and NRCS researcher could then work hand and hand to draw comparisons between historic and present-day vegetation.

A feasibility study should be conducted and methodology established prior to beginning the study of historic documents for the historic vegetative study of the riparian corridor of the Yellowstone River. A base cost for the preparation of the study would include three research trips plus initial research within Montana. For the GLO maps, travel would include a trip to the GLO research department at Iowa State University and to Washington, DC to the National Archives. For the Northern Pacific Railroad records, a trip to the Minnesota Historical Society in Minneapolis is necessary. Army Corps of Engineers records at the National Archives in Washington, DC also will be included in the trip to Washington, DC.

¹³ The cost estimates provided here are general estimates only and are not to be construed in any way as final.

¹⁴ Warren Kellogg to Joan L. Brownell, Billings, MT, June 7, 2006.

It is estimated that the base cost for the above time and expenses will be approximately \$15,000. After the base cost, a cost estimate per township utilizing historic GLO data and Northern Pacific Railroad records will be approximately \$3000 per township. This cost is variable due to numerous factors and would be less or more dependent on the township chosen and the extent of the Yellowstone River within each particular township. This unit cost would then be multiplied by the sample selected for the NRCS riparian vegetation study.