STEEL BRIDGES OF EASTERN IDAHO

ITD Key #12479/Project #A012(479)

Prepared for

IDAHO TRANSPORTATION DEPARTMENT

By

PRESERVATION SOLUTIONS LLC

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TABLE OF CONTENTS

Acknowledgements 1
Introduction & Certification of Results 2
Project Description 3
Methodology 6
Glossary 9
Survey Findings 11
Historic Contexts 22
Selected Bibliography 58
Appendix A: NRHP Evaluation Criteria 59
Appendix B: Bridge IHSI Forms 60

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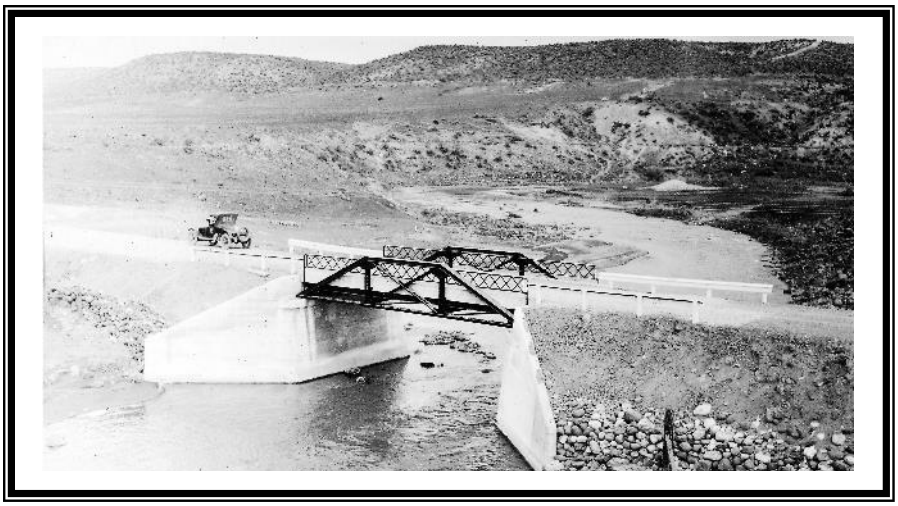
Cover photos top to bottom: 1) Unidentified Bridge Over Big Wood River, no date (courtesy Idaho State Archives, 73.221.547); 2) OSL Railroad Parker Truss Overpass, Spencer (vicinity), June 2017 (PSLLC); and 3) Unidentified Bridge Over the Snake River (courtesy ITD online photo collection *ITD06485_F.A. 84E*).
Next page: Unidentified Bridge over Clover Creek, Elmore County, 1946 (courtesy ITD Online Photo Collection).



INTRODUCTION

An agency can take steps to protect the significant historic resources under its administration only if it knows what is within its jurisdiction. Thus, cultural resource survey and development of associated historic contexts are basic building blocks for any agency's preservation program. Information gathered through such efforts are the foundation for decisions affecting an agency's cultural resources, guiding the planning, maintenance, and investment decisions of officials, staff, and contractors.

The Idaho Transportation Department (ITD) has under its care thousands of bridges statewide. Among the hundreds nearing or past fifty years of age are the increasingly rare steel bridges. In particular, the metal trusses, some of which are more than one hundred years of age. Initially very common, most have been replaced or abandoned over time with only a few dozen remaining, a loss of well over 80 percent.

CERTIFICATION OF RESULTS

I certify that this investigation was conducted and documented according to Secretary of Interior's Standards and guidelines and that the report is complete and accurate to the best of my knowledge.

Signature of Principle Investigator

May 22, 2018
Date

PROJECT DESCRIPTION

PURPOSE

This project was conducted as mitigation for the loss of both the Henry's Fork Snake River Bridge (aka Del Rio Bridge; ITD District 6, Key #12741; IHSI No. 43-5789) and the Topaz Overhead Bridge in Bannock County (ITD District, Key 7749; IHSI No. 05-18253). This project consisted of a cultural resources survey and development of historic contexts related to the construction of steel vehicular bridges in Eastern Idaho.

PROJECT AREA

The study area spanned all of ITD Districts 4, 5, and 6, comprising twenty-four counties; an area encompassing almost 40,000 square miles (about 25.6 million acres). This area, comparable to the size of the State of Kentucky and predominantly rural, is home to about 567,000 Idahoans.

For the purposes of this study, Eastern Idaho comprises the vast area bounded by the state line to the south, east, and north, and east of Owyhee, Elmore, Boise, and Valley counties. Including the Sawtooth Basin, part of the Bitterroot Range, and Salmon River Mountains, as well as the Magic Valley, Caribou Range, and South Hills, Eastern Idaho spans a great variety of terrain. Granite mountains with timbered slopes and meadowed valleys characterize the northern sections of Eastern Idaho, while the more arid sage steppe and lava fields characterize the southern section of the study area.

With such diverse geography, the character of transportation corridors and impediments to travel thereof, varies widely. Roadways carried by bridges in this study run the gamut from unmaintained dirt tracks dozens of miles from the nearest town to multi-lane U.S. highways. Among the obstacles spanned by bridges included in this study were rivers, creeks, canyons, railroad grades, and irrigation canals.

Del Rio Bridge, 2014
Courtesy ITD Inspection Records

RESULTS OVERVIEW

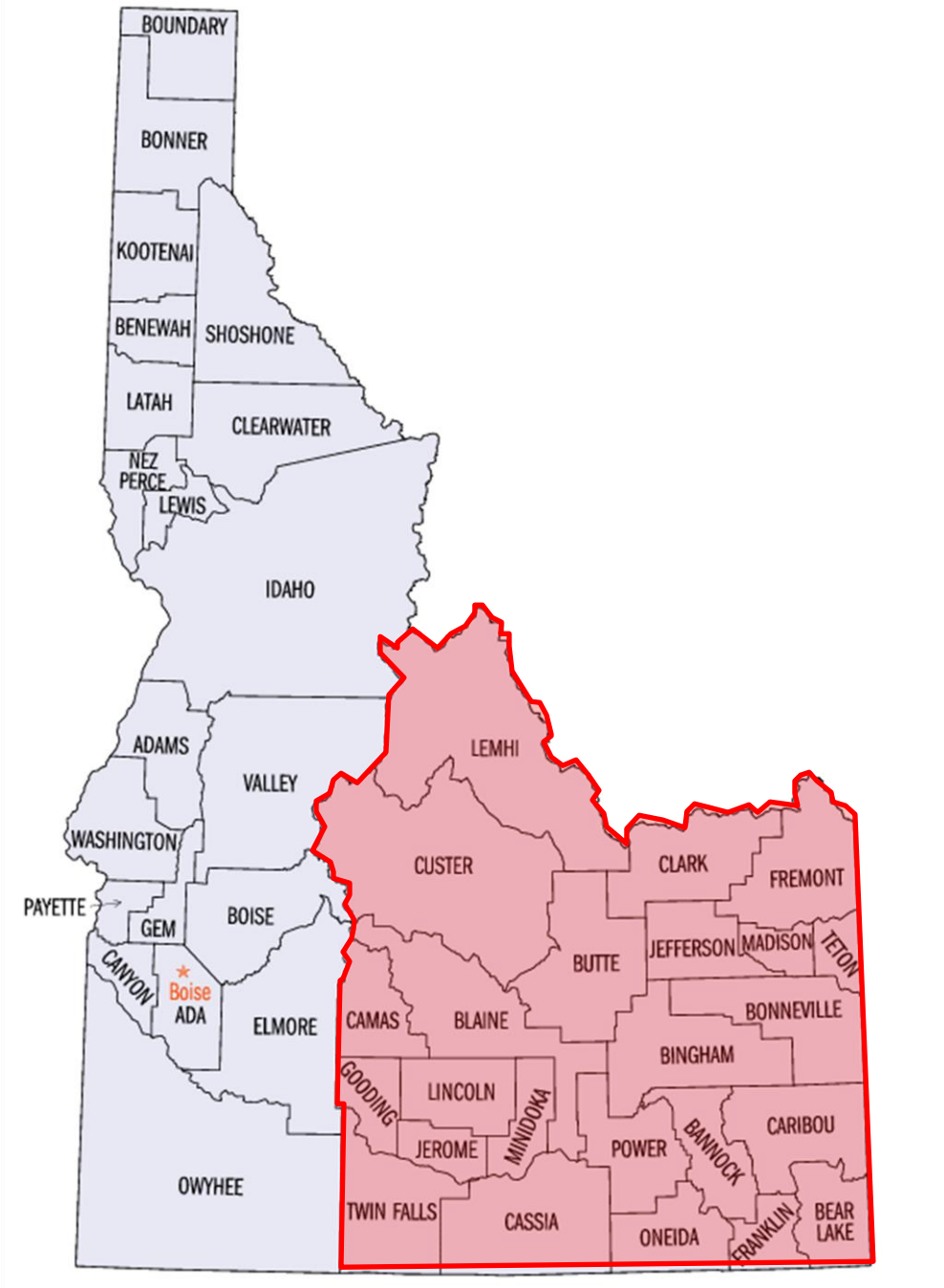
This project identified trends in the manufacture, construction, and legacy of historic steel bridges in Eastern Idaho. At the same time, the project team surveyed twenty-five existing steel bridges in thirteen counties to identify extant historic structures and determine their NRHP eligibility.

By means of compiling all available ITD and Idaho State Historic Preservation Office (SHPO) resource databases, 350+/- steel bridges were identified as potential for field survey. Among those, ten were documented at the reconnaissance level and fifteen documented intensively. (See Methodology section below for an elaborated discussion of the survey selection process.) Of the twenty-five surveyed, only three

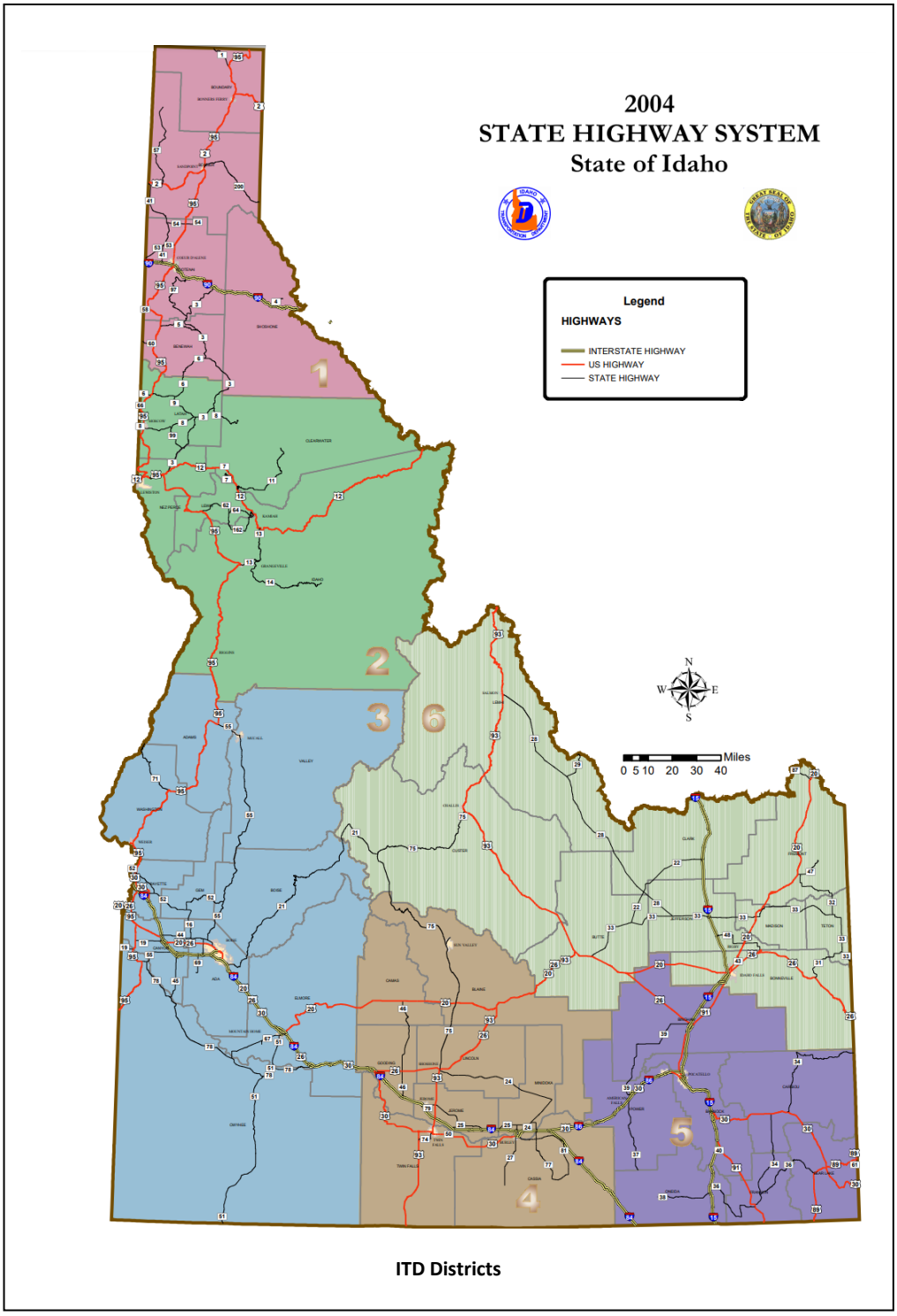
Topaz Overhead Bridge, c.1960
Courtesy ITD Online Photo Collection

had not been previously documented. Though most had been previously documented, the vast majority had not been surveyed since the 1980s.

All twenty-five bridges documented as part of this effort were found to be NHRP-eligible.



Eastern Idaho



ITD Districts

METHODOLOGY

PERSONNEL AND TIMELINE

This project launched in February 2017. Preservation Solutions architectural historian, Kerry Davis, M.S., acted as the project lead and conducted all aspects of project planning and fieldwork. Davis collaborated with architectural historian, Dan Everhart, in the archival research and report preparation. Project manager for ITD, Tracy Schwartz, provided all readily available ITD records and facilitated receipt of SHPO records. Davis completed the necessary pre-field research and reviewed all available records through ITD and Idaho SHPO to identify National Register of Historic Places (NRHP)-eligible or NRHP-listed properties. Davis met with ITD Architectural Historian, Tracy Schwartz, in Spring 2017 for verification of documentation methodology. Budget constraints dictated only fifteen bridges were to be surveyed to the full Idaho SHPO requirements for Intensive-Level Survey. PSLLC completed an additional ten Reconnaissance-Level inventory forms. Draft inventory forms were submitted to ITD from November 2017 through April 2018. Preservation Solutions (PSLLC) submitted the draft report in mid-April 2018, with all final materials delivered on May 22, 2018.

PRE-FIELD RESEARCH

In April 2017, Idaho SHPO provided all available IHSI forms for all steel vehicular bridges previously documented in all twenty-four counties within ITD Districts 4, 5, and 6. Concurrently, ITD provided all available spreadsheets containing steel bridge information, as well as all relevant inspection files, construction records, and architectural plans.

Three steel bridge studies have taken place over the years, but none specific to steel bridges since the 2001 Multiple Property Documentation Form (MPDF) for *Metal Truss Highway Bridges in Idaho,* which was based on a 1982 statewide bridge survey. Summary of previous bridge studies:

Author	Date	Title
Herbst, R.	1982	Idaho Bridge Inventory
Watts, D.	2001	Metal Truss Highway Bridges of Idaho, NRHP MPDF
Grey, D.	2004	Idaho's Historic Bridges

Review of previous ITD records and SHPO files (including both IHSI and ASI databases) indicated the vast majority of steel bridges had been previously documented. However, a handful had not been previously documented as they were either off-system (i.e. not owned by ITD), on private property, and/or were not previously of age sufficient to warrant traditional documentation methodology (i.e. ~50 years of age).

PSLLC merged all available ITD and SHPO spreadsheets containing steel vehicular bridge information and contacted both U.S. Forest Service (USFS) and Bureau of Land Management (BLM) staff for any information regarding potential steel bridges on federal lands within the study area. List compilation resulted in a total finding of 350 extant steel bridge structures in Eastern Idaho. This included the entire gamut of steel bridges, including nonhistoric structures, nonextant structures, and stringer girder structures.

In order to narrow down the list of potential bridges to field document and survey at the intensive level, nonhistoric structures, nonextant structures, railroad bridges, and stringer girder bridges were eliminated.

Stringer girder bridges were eliminated from the list of potential structures to be surveyed due to the 2012 Advisory Council on Historic Preservation's (ACHP) *Program Comment for Common Post-1945 Concrete and Steel Bridges*. The Program Comment "relieves federal agencies from the Section 106 requirements to consider the effects of undertakings" on certain common bridge types identified in Section V of the comment.[1] Exceptions to the Program Comment include: bridges previously determined eligible for or listed in the National Register of Historic Places; truss, arch, suspension, cable-stayed, or covered bridges, and those with moveable spans; and any bridges identified by the state Department of Transportation as being of exceptional significance. ITD, in consultation with the Idaho SHPO, did not identify any exclusions to the exemption.[2]

To further narrow down the list, the following aspects were prioritized:

- ITD-owned bridges
- Bridges not previously documented with IHSI form
- Bridges with previous survey documentation outdated or insufficient

Per ongoing consultation with ITD, a final list of twenty-five bridges was compiled to develop a fieldwork route through each of ITD Districts 4, 5, and 6. Though contracted to document fifteen bridges, PSLLC field verified and completed IHSI forms for all twenty-five structures (see list below).

FIELDWORK

Field survey took place on various dates from May through November 2017. Combined with the applicable research on Eastern Idaho's past development, the fieldwork provided a basis for an accurate analysis of NRHP eligibility. The consultant conducted an on-site structure-by-structure assessment, which included field investigation and documentation of each of bridge resource. The lead field investigator recorded all structure information sufficient to complete the Idaho Historic Sites Inventory (IHSI) Form.

Fieldwork included on-site integrity assessments, location verification, and photographic documentation of all properties. Field analysis led to identification of resource eligibility in accordance with *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation.* Photographic documentation followed Idaho SHPO photography policies.

As mentioned above, due to budget constraints, only fifteen bridges were to be surveyed to the full Idaho SHPO requirements for Intensive Survey. In order to achieve a more thorough assessment of conditions and patterns, PSLLC exceeded the requirements and field verified twenty-five potential bridge sites based on information and maps provided by ITD and SHPO.

COMPILATION AND ANALYSIS OF DATA

Preservation Solutions used the Idaho SHPO Microsoft Access database template to compile survey information based upon information required by the Idaho SHPO Inventory Form. This included data fields for each structure's historic and current function, physical features (e.g., principal materials, plan shape); architect and/or builder, if known; estimated or documented date of construction; source(s) of historic

[1] Advisory Council on Historic Preservation, Program Comment for Common Post-1945 Concrete and Steel Bridges, 77 § 222 (final rule November 16, 2012).
[2] Ibid.

information; and notes about the history of the structure. In addition to these fields, the database includes assessment of eligibility.

Analysis

In order to accurately evaluate the eligibility of each resource and/or group of resources according to the criteria and standards for historic resources established by the Secretary of the Interior and the Idaho SHPO, the consultant analyzed the following four categories of data to identify structures that are potentially eligible for NRHP listing. A detailed description of the four areas of analysis and results appears in the "Survey Findings" section of this report.

- Date of Construction
- Bridge Form
- Integrity
- Truss Type/Bridge Design

EVALUATION

As defined by the National Register of Historic Places (NRHP), "historic integrity is the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic period."[3] All properties eligible for listing in the National Register of Historic Places must retain sufficient historic architectural integrity to convey the period of time in which they are significant.[4] Thus, to be listed in the National Register of Historic Places, a property must not only have historic significance, but it must also retain integrity.[5] The consultant visually inspected the structures to determine the retention of integrity of each resource identified.

The significance of historic bridges lies in their association with transportation in Idaho and their engineered design. Additionally, they reflect local settlement patterns of the community served. While location is an important aspect of integrity, the Multiple Property Documentation Form for Idaho's Metal Truss Highway Bridges acknowledges that for NRHP eligibility, "it should be noted that truss bridges, by their very nature, can be considered moveable structures."[6] As such, bridges that have been moved from their original location, which commonly occurred to accommodate changes in load requirements, are often still eligible under Criterion C for Engineering and their truss type/bridge design.

An elaborated discussion of NRHP eligibility can be found in Appendix A.

[3] National Park Service, *National Register Bulletin: How to Complete the National Register Registration Form* (Washington D.C.: U.S. Department of Interior, 1997), 4.

[4] Historic architectural integrity should not be confused with the physical condition of a building or structure. A structure may be in excellent physical and structural condition but may have lost its historical character-defining elements. Conversely, a building may retain all of its historical architectural features, but may be structurally unsound and, therefore, in poor condition.

[5] National Park Service, *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (Washington D.C.: U.S. Department of Interior, 1997), 44.

[6] Donald Watts, National Register of Historic Places Multiple Property Documentation Form, "Metal Truss Highway Bridges of Idaho," (Boise, Idaho: Idaho State Historic Preservation Office, 2000), F-5.

GLOSSARY

Camelback: While some commonly refer to any arched truss or any bridge with a segmented/polygonal top chord as a 'Camelback' truss, technically the term Camelback only applies to a Parker Truss with a top chord of exactly five slopes. No Camelback truss bridges were identified in this survey effort. For an elaboration on the Parker Truss and others, please see Survey Findings section below.

Cantilevered Bridge: This is a bridge in which each span is constructed from cantilevers built out sideways from piers. Two examples of this type of construction were identified in this survey effort – the Owsley Bridge and the Pleasant Valley Creek Bridge.

Owsley Bridge
(47-005153/ITD Key# 24340)

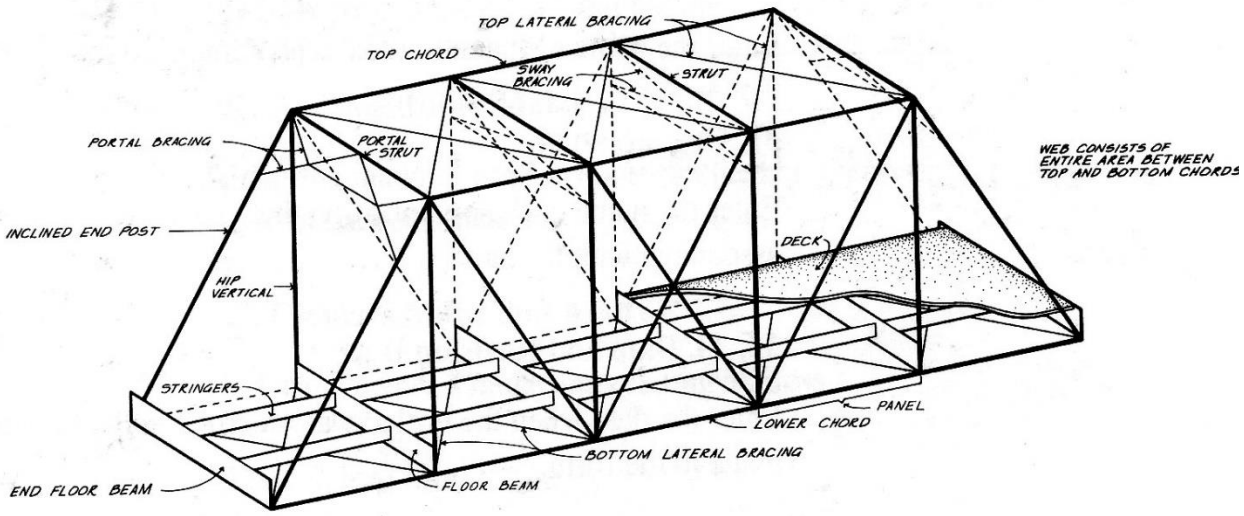
Key #s: ITD assigns a Key Number to all structures, projects, and so forth as a means of tracking the thousands of sites, and their respective projects. Around 1980, this numbering/tracking system started at '10000' after which new numbers were assigned in increments of '5' with little if any semblance of order and often at random. For 'replacement' bridges ITD will often add a '1' to the number, but this is not executed consistently and is a relatively recent trend. Previously, ITD would simply assign a replacement bridge the same key number as the previous structure.

Off-system: Not owned by ITD. Examples include those bridges under the ownership of counties, towns, and/or private individuals.

'Reconstruction' and 'Year Built': ITD uses these words in a manner specific to their needs. The agency's traditional use of these words is as follows:[7]

> **Reconstruction**: This is the year a bridge structure received considerable work (e.g. a new deck or abutments) or was replaced. It should be noted this word does not necessarily mean the previous bridge is nonextant; sometimes it has merely been bypassed and is still in the vicinity or has been relocated and received a new ITD Key # at its new location.
>
> **Year Built**: This is the year when the bridge was installed at its current site. For example, a 1930 steel truss bridge moved to its current location in 1980 would be given a Year Built of 1980.

[7] Email communication via Tracy Schwartz (ITD) with Patty Fish (ITD), Spring 2018.



Bridge Terminology Diagram
Courtesy Historic American Engineering Record

SURVEY FINDINGS

A total of twenty-five bridges were documented, fifteen intensively and ten at reconnaissance level. All were found to be NRHP-eligible, one of which was listed in the NRHP in 1998 (Owsley Bridge). Three had not been previously documented. All bridges newly recorded and pre-recorded include:

Site #	Site/Feature Type	NR Status
05-005178	W. Whitman St. Warren Truss Bridge	Individually Eligible
10FM287	Fall River Pratt Deck Truss Bridge	Individually Eligible
11-005190	W. Bridge Street Bridge	Individually Eligible
25-005156	Camas Creek Truss Leg Bedstead Bridge	Individually Eligible
25-005157	Camas Creek Pratt Truss Bridge	Individually Eligible
33-005776	OSL RR Parker Truss Overpass	Individually Eligible
33-005777	Pleasant Valley Creek Steel Arch Truss Bridge	Individually Eligible
37-004918	Salmon River Pratt Truss Bridge (Lyon Creek)	Individually Eligible
37-005783	Salmon River Parker Truss Bridge	Individually Eligible
37-005784	Salmon River Pratt Truss Bridge at Bayhorse Creek	Individually Eligible
41-005191	Bear River Warren Truss Bridge (Oneida Narrows Road)	Individually Eligible
41-005762	Bear River Warren Truss Bridge (Riverdale Road)	Individually Eligible
43-005790	Henry's Fork Pratt Truss Bridge (aka Fun Farm Bridge)	Individually Eligible
47-005153	Owsley Bridge	NR-Listed
47-005160	Big Wood River Warren Truss Bridge	Individually Eligible
53-004912	Blue Lakes Bridge	Individually Eligible
53-007924	Perrine Bridge	Individually Eligible
59-004920	Salmon River Warren Truss Bridge (Rattlesnake Creek)	Individually Eligible
59-005796	Lemhi River Warren Truss Bridge	Individually Eligible
63-005166	Little Wood River Warren Truss Bridge (N. Birch St.)	Individually Eligible
63-005168	Little Wood River Warren Truss Bridge (E. 3rd St.)	Individually Eligible
83-005171	High Line Canal Warren Truss Bridge	Individually Eligible
ITD-21105	Fall River Steel Strut Frame Bridge	Individually Eligible
ITD-23745	Little Wood River Warren Truss Bridge	Individually Eligible
ITD-24465	Clover Creek Warren Truss Bridge	Individually Eligible

Per NRHP and Idaho SHPO guidelines, PSLLC identified and assessed bridge structures according to construction date, integrity, bridge form, and bridge design, thus recognizing both shared associative (functional), as well as physical (bridge form and bridge design) characteristics.

INTEGRITY

Using NRHP guidelines, as well as the bridge-specific registration requirements outlined in the *Metal Truss Highway Bridges of Idaho* MPDF, the consultant assessed integrity for each structure surveyed. All twenty-five bridges were found to retain sufficient integrity to clearly communicate their historic associations. It should be noted the MPDF specifically outlines integrity of location as carrying less weight, particularly for steel truss bridges which "by their very nature, can be considered moveable structures." Furthermore, the reader is cautioned not to confuse physical condition with integrity; a structure may be in poor physical condition but retain its historic character-defining elements, and thus maintains integrity.

DATES OF CONSTRUCTION

Using the information provided by historic maps, ITD records, local primary resources, newspapers, historic photos, previous survey, and added secondary sources, as well as truss type and bridge form, the consultant determined estimated dates of construction for the twenty-five resources surveyed.

ERA	NUMBER OF BRIDGES
Up to 1909	1
c.1910 – c.1919	10
c.1920 – c.1929	5
c.1930 – c.1940	7
c.1941 – c.1950	0
c.1951 – c.1960	0
c.1961 – c.1970	1
c.1971 – c.1980	1
TOTAL	**25**

BRIDGE FORMS

Bridge form (also referred to as 'roadbed type') classification provides insight into patterns of construction method and design. The survey documented a degree of diversity of bridge forms, the categorization of which follows the classification terminology required and accepted by the National Register of Historic Places program, as well as what is defined in the statewide Multiple Property Documentation Form (MPDF) for *Metal Truss Highway Bridges in Idaho*.

BRIDGE FORMS	NUMBER OF RESOURCES
Pony	13
Through	8
Deck	4
TOTAL	**25**

PONY

A Pony bridge structure has low side 'walls' that rise above the roadbed but have no overhead lateral bracing. Also known as a 'half-through' truss, this bridge form was typically used for short spans.

The survey identified thirteen examples of pony bridges constructed between 1911 and 1931, among which the Highline Canal Warren Truss Bridge, Big Wood River Warren Truss Bridge, and Camas Creek Truss Leg Bedstead Bridge, all seen at right, are classic examples.

Highline Canal Warren Truss Bridge
(83-005171/ITD Key# 25355)

Big Wood River Warren Truss Bridge
(47-005160/ITD Key# 24440)

Camas Creek Truss Leg Bedstead Bridge
(25-005156/ITD Key# 23800)

THROUGH

A Through bridge structure has tall side 'panels' that rise above the roadbed and overhead lateral bracing between the top chords. This bridge form was commonly used for moderate to long spans.

The survey identified eight examples of through bridges constructed between c.1907 and 1936, among which the Salmon River Pratt Truss Bridge at Bayhorse Creek, the OSL Railroad Parker Truss Overpass, and the West Bridge Street Bridge, all seen at right, are classic examples.

Salmon River Pratt Truss Bridge at Bayhorse Creek (37-005784/ITD Key# 31660)

OSL Railroad Parker Truss Overpass
(33-005776/ITD Key# 31565)

West Bridge Street Bridge
(11-005190/ITD Key# 23120)

DECK

A Deck bridge structure features the roadbed atop the truss or frame structure, and the traffic load is level with the top chords. The survey identified four examples of deck bridges – the c.1920 Fall River Pratt Deck Truss Bridge, the 1936 Pleasant Valley Creek Bridge, the 1969 Fall River Steel Rigid Frame Bridge, and the 1976 Perrine Bridge, an example of a very long span Arch Deck Truss design.

Fall River Pratt Deck Truss Bridge
(aka Kirkham Bridge)
(10FM287/Off-System)

Pleasant Valley Creek Bridge
(33-005777/ITD Key# 31610

Perrine Bridge
(53-007924/ITD Key# 17580)

BRIDGE DESIGNS

In addition to bridge form categorization, resource classification of shared physical attributes typically includes bridge design. The bridge designs identified in the survey and discussed below follow the terminology required and accepted by the National Register of Historic Places program. Of the twenty-five structures surveyed, most reflect pre-World War II design, with two outliers dating to 1969 and 1976, respectively.

BRIDGE DESIGNS	NUMBER OF RESOURCES
Pratt Truss	6
Warren Truss	13
Parker Truss	2
Truss Leg Bedstead	1
Arch	2
Steel Rigid Frame	1
TOTAL	**25**

PRATT

Patented in 1844, the Pratt truss incorporates vertical members in compression and diagonal members in tension, a design that reduces the required length of compression members, helping to prevent bending or buckling.[8] The Pratt truss became the most common bridge type of the late nineteenth and early twentieth centuries and spawned numerous variations including Parker, Camelback, Baltimore, Truss Leg Bedstead, Lenticular, and Pennsylvania trusses.[9]

In Idaho, Pratt trusses were constructed into the twentieth century, suggesting the appeal of the design's strength and economical construction costs. A 1982 survey of bridges statewide identified seventy-seven Pratt truss bridges statewide, of which the current survey effort documented six, including the Henry's Fork Pratt Truss Bridge, the Salmon River Pratt Truss Bridge, and Camas Creek Pratt Truss Bridge (seen at right), all classic examples of this truss design.

Henry's Fork Pratt Truss Bridge
(aka Fun Farm Bridge)
(43-005790/ITD Key# 31840)

Salmon River Pratt Truss Bridge at
Bayhorse Creek
(37-005784/ITD Key# 31660)

Camas Creek Pratt Truss Bridge
(25-005157/ITD Key# 23825)

[8] T. Allan Comp and Donald Jackson, *Bridge Truss Types: A Guide to Dating and Identifying.* (Nashville, Tennessee: American Association for State and Local History, Technical Leaflet 95), 8.
[9] Ibid.

WARREN

Patented in 1848, the Warren truss has diagonal members that are alternately placed in either tension or compression, resulting in a visually distinctive system of alternating equilateral or isosceles triangles. Vertical members are often incorporated to further strengthen the truss, as in the Clover Creek Warren Truss Bridge, Little Wood River Warren Truss Bridge, and Salmon River Warren Truss Bridge (at right).

While the straightforward design of the Warren truss was desirable, the lack of counters and sometimes verticals subjected the center pins to extensive wear, making it less durable and therefore less popular than the Pratt truss during the nineteenth century. The later standardization of riveted construction techniques eliminated these issues and the Warren truss gained popularity. In Idaho, Warren trusses were constructed into the middle of the twentieth century, suggesting the appeal of the design's strength, simplicity, and economical construction costs.

A 1982 survey of bridges statewide identified fifty-two Warren truss bridges in existence throughout the state of Idaho at that time. The current survey effort documented thirteen, two of which had not been previously identified – the Clover Creek Warren Truss Bridge and the Little Wood River Warren Truss Bridge (both seen at right).

Clover Creek Warren Truss Bridge
(Temp. No. ITD-24465/ITD Key# 24465)

Little Wood River Warren Truss Bridge
(Temp. No. ITD-23745/ITD Key# 23745)

Salmon River Warren Truss Bridge
(Rattlesnake Creek)
(59-004920/ITD Key# 32750)

PARKER

Patented in 1870, the Parker truss is a variation of the Pratt truss wherein the bottom and top chords are *not* parallel. The top chord of a Parker truss is segmented, with each segment connecting to each respective vertical post, which vary in height. The result is an overall arched shape when viewed in elevation. As with the Pratt truss, the Parker truss incorporates vertical members in compression and diagonal members in tension, a design that reduces the required length of compression members, helping to prevent bending or buckling.[10] The benefit of the Parker truss design is that it used less material than the Pratt truss. However, the drawback was that the Parker truss assembly was more complex. A relatively uncommon bridge type of the late nineteenth and early twentieth centuries, the Parker truss bridge is most commonly executed as a through truss.[11]

In Idaho, Parker trusses were relatively uncommon. A 1982 survey of bridges statewide identified only four Parker truss bridges statewide, two of which were surveyed as part of this effort – the 1936 OSL Parker Truss Overpass near Spencer and 1915 Salmon River Parker Truss Bridge near Clayton.

OSL Parker Truss Overpass
(33-005776/ITD Key# 31565)

Salmon River Parker Truss Bridge
(37-005783; ITD Key# 31650)

[10] Comp and Jackson, 8.
[11] Ibid.

TRUSS LEG BEDSTEAD

The Truss Leg Bedstead is a variation of the Pratt truss. Patented in 1844, the Pratt truss incorporates vertical members in compression and diagonal members in tension, a design that reduces the required length of compression members, helping to prevent bending or buckling.[12] It became the most common bridge type of the late nineteenth and early twentieth centuries and spawned numerous variations including Parker, Camelback, Baltimore, Truss Leg Bedstead, Lenticular, and Pennsylvania trusses.[13]

Camas Creek Truss Leg Bedstead Bridge
(25-005156/ITD Key# 23800)

The Truss Leg Bedstead is a Pratt pony truss with vertical end posts that extend below the end floor beams and are embedded into foundation pads or abutments, thus forming the namesake "legs" of the design. This variation of the standard Pratt truss design was intended for short spans between thirty and one-hundred feet. In Idaho, while Pratt trusses were very popular, the Truss Leg Bedstead subtype was rare. A 1982 survey of bridges statewide identified only two as extant, including the Camas Creek Truss Leg Bedstead Bridge, the only example of this design extant in Eastern Idaho.

STEEL RIGID FRAME

Steel Rigid Frame bridges feature monolithic structural members (legs and horizontal girders), with the rigid inclined legs forming the primary support. Typically used for spans of fifty to two hundred feet, the overall 'splayed-leg' form was economical, aesthetically pleasing, and eliminated the need for intermediate supports or piers.[14]

Fall River Steel Rigid Frame Bridge
(aka Ashton-Flagg Ranch Road Bridge)
(Temp. No. ITD-21105/ITD Key# 21105)

Initially devised in the early twentieth century, steel rigid frame bridges date from the 1920s through the 1960s and developed concurrently with the reinforced concrete rigid frame bridges, though they were much less common, both nationwide and in Idaho. Only two examples are known to exist in Idaho – the 1975 White Bird Bridge (ITD Key# 18365/District 2) and the 1969 Fall River Steel Rigid Frame Bridge that was surveyed as part of this effort and the only extant example in Eastern Idaho.[15]

[12] Comp and Jackson, 8.
[13] Ibid.
[14] Cody Chase, "A Look at Bridges: A Study of Types, Histories, and the Marriage of Engineering and Architecture," (New London, Connecticut: Connecticut College, 2015), Architectural Studies Integrative Projects, Paper 73, 65. Available from http//digitalcommons.conncoll.edu/archstudintproj/73.
[15] Additional survey outside the scope of this project is recommended to confirm no additional Steel Rigid Frame bridges exist in Districts 1, 2, or 3.

ARCH

One of the oldest known structural solutions and initially executed in stone or timber, the arch bridge design transfers weight into a horizontal thrust restrained by its abutments. First executed in steel in the late nineteenth century, steel arch bridges feature strong compressive, tensile, and shear capabilities. Though relatively popular nationwide in the 1920s and 1930s, during the 1960s and 1970s, the steel arch bridge was a popular solution for significant crossings because of its aesthetic appeal and relatively economical erection methods.[16]

A 1982 survey of Idaho bridges statewide identified only two steel arch bridges, both in Eastern Idaho – the 1938 Pine Creek Bridge (19-005764/ITD Key# 13835) and the 1934 Pleasant Valley Creek Bridge, a cantilevered bridge with a central arch. The current survey field verified and documented both the Pleasant Valley Creek Bridge and the 1976 Perrine Bridge (both seen at right).

Pleasant Valley Creek Bridge
(33-005777/ITD Key# 31610)

Perrine Bridge
(53-007924/ITD Key# 17580)

[16] *Utah Historic Bridge Inventory: Volume 1*, Mead & Hunt, Inc., 2011), 100.

HISTORIC CONTEXTS

To fully appreciate the significance of Eastern Idaho's steel bridges, it is important to understand the forces that influenced the evolution of the region in general, as well as the development trends that occurred statewide and nationally. The National Park Service defines historic context as "a broad pattern of historical development in a community or its region that may be represented by historic resources."[17] According to the Secretary of Interior's *Standards for Preservation Planning, Identification, and Evaluation*, proper evaluation of the significance of historic resources can occur only when they are assessed within broad patterns of historical development. Only then may the NRHP criteria for evaluating property eligibility be accurately applied.

Establishing historic contexts is a means of organizing information about resources that share common historic, architectural, engineering, and/or cultural themes. What follows is an overview of the historic contexts identifying themes representing Eastern Idaho's development and settlement patterns, which drove the establishment of bridges. The region's steel bridges, discussed in detail above, relate to these themes. When historic resources are viewed in relationship to the context within which they were built, it is possible to apply the established criteria for evaluating eligibility for designation to the national and local historic registers.

Technological advancement, settlement patterns, geography, and impediments to travel on the land are key drivers in bridge existence, location, design, and construction technique. In Eastern Idaho, rivers, creeks, canyons, railroad grades, and irrigation canals represent the landscape elements in need of crossing. Initially forded, ferried, or avoided by means of an out-of-the way route, bridge construction typically took place at or near existing fords or ferry locations, with canyon crossings balancing between the narrowest span between rims and convenience to existing roadways/route between settlements.

[17] National Park Service, *National Register Bulletin: Guidelines for Local Surveys* http://www.nps.gov/history/nr/publications/bulletins/nrb24/chapter1.htm (accessed June 2, 2013).

PRE-CONTACT AND EURO-AMERICAN EXPLORATION: PRE-1840S

Pre-contact occupation of the upper Snake River Plain began thousands of years ago. Archaeological discoveries confirm occupation across the region dates to at least 10,000 years Before Present.[18] Seasonal migrations by bands of native peoples to hunt, fish, and collect various plants for food, shelter, and trade defined the earliest human exploration and use of what we now know as Eastern Idaho.

Aboriginal interaction with the various waterways of the region was a necessity. Anadromous fish populations were seasonally exploited along the Snake River and its tributaries, providing a major source of food and raw material needed for the manufacture of certain tools. The shade and botanical diversity of rivers and creeks could also provide temporary shelter from the harsh climate of the Idaho desert, resulting in the de facto formation of regionally-known locales for trade and social interaction by disparate tribes.

These same waterways could both define and prevent the migratory routes developed by native peoples to access seasonal hunting and gathering. While rapids and waterfalls could provide natural barriers to fish passage and therefore serve as ideal locations for necessary fishing activities, the steep canyons and cliffs which often accompany such river features could prove difficult if not impossible to traverse. Spring floods could prevent the crossing of swollen rivers and delay needed access to places known for a particular resource.

Trails established along the easiest line of travel by animals and indigenous people formed the earliest "roads" in Idaho. Crossing of creeks and rivers was made at places shallow enough to easily ford and the establishment of well-known fords defined transportation routes both before and after native contact with Euro-American explorers. Though there are no known examples of aboriginal bridges in Eastern Idaho, Native American tribes most assuredly built the first "bridges" over creeks and rivers not amenable to fording.[19]

American Falls on the Snake River, 1845
Illustration from Capt. Fremont's *Report of the Exploring Expedition to the Rocky Mountains in the year 1842, and to Oregon and North California in the years 1843-'44*
Courtesy University of Montana, Mansfield Library, K. Ross Toole Archives

Euro-American exploration of the Intermountain West began with President Jefferson's commission of the Lewis and Clark expedition from 1804 to 1806. Prompted by the American government's acquisition of the vast and uncharted Louisiana Purchase in 1803, the Corps of Discovery was commissioned to explore and map the newly-acquired territory. Lewis and Clark crossed the Continental Divide and entered present-day Idaho at Lemhi Pass in August of 1805.[20] Their interaction with Sacagawea and her Lemhi Shoshone People proved invaluable due to their knowledge of the Salmon River and the impassability of its canyon.

[18] Mark Plew, *The Archaeology of the Snake River Plain* (Boise: Boise State University, 2000).
[19] Parsons Brinckerhoff and Engineering and Industrial Heritage, *A Context for Common Historic Bridge Types*, NCHRP Project 25-25, Task 15 (Washington, D.C.: National Cooperative Highway Research Program, Transportation Research Board, 2005), 2-1.
[20] James H. Hawley, *History of Idaho* (Chicago: S.J. Clarke Publishing Company, 1920).

Wilson Price Hunt and his expedition in 1811 were the first non-natives to thoroughly explore the Snake River.[21] John Jacob Astor commissioned Hunt as the leader of one of two distinct parties that made their way to the mouth of the Columbia River to establish a trading post and American dominance of the North American fur trade. While a second party traveled by ship around the tip of South America, Hunt led a party overland from Missouri to the Pacific. He initially relied on information first gathered by the Corps of Discovery but later deviated from their route. Discovery of the Snake River defined the Hunt expedition. The party abandoned their horses to canoe downstream but after several days encountered rapids which killed one of their members. Hunt then split the party in two with each taking an opposite bank of the river. Their subsequent progress along the Snake River and through its canyons eventually allowed them to successfully reach the Columbia and the newly-established Fort Astor.

Three decades of fur trapping and exploration were built on the successes of these initial expeditions to and through Eastern Idaho. The European and American market for fur provided a lucrative incentive to a particularly hardy sub-set of early Western entrepreneurs. The trapper's motive led him to explore the West and the Snake River with its regional tributaries, which was frequently aided by native peoples who provided knowledge of the land and its resources that would otherwise be inaccessible. Aboriginal migratory routes and river crossings were exploited by the trapper for the quickest and most reliable access to rewarding locations with plentiful prey.

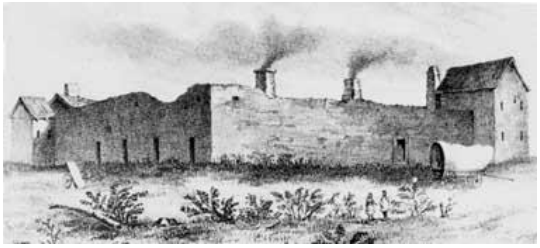
Trappers of French-Canadian origin working for the Hudson's Bay Company and others marked Eastern Idaho with their names and terminology, as did American trappers who left a lasting etymological legacy on the landscape; the Snake River was reportedly named when a native hand sign representing fish was misinterpreted by an early trapper to indicate a snake.[22] More straight-forward, if crude, origins are responsible for the naming of the Teton Range which defines the eastern boundary of Idaho and shelters the headwaters of the Snake. The Portneuf, Boise, and Payette rivers as well as innumerable smaller waterways and geologic features trace their names to French influences, while Americans named Bear Lake and its eponymous river despite their discovery by French-Canadians and the lake later served as the location of a rendezvous by American mountain men including Jedediah Smith and Jim Bridger.[23]

Henry's Fork of the Snake River is named for Andrew Henry of the Missouri Fur Company who discovered the upper Snake River in 1810 or 1811. John C. Fremont and Benjamin Louis Eulalie de Bonneville (an American of French birth) were both U.S. Army officers and explorers after whom Eastern Idaho counties were named.[24] Richard "Beaver Dick" Leigh who took his moniker from the animal he was known to trap was an early settler of what became Madison County and among the last of the region's trappers.[25] Like their native contemporaries, these rugged individuals made use of shallow crossings to ford regional waterways and seldom left permanent improvements.

It was the fur companies and their agents that established the first points of semi-permanent settlement in Eastern Idaho though occasionally without long term success. Andrew Henry founded "Fort Henry" near present-day St. Anthony in 1810 or 1811 but abandoned this

[21] Ibid.
[22] Lalia Boone, *Idaho Place Names: A Geographical Dictionary* (Moscow, Idaho: University of Idaho Press, 1987).
[23] Fred R. Gowens, *Rocky Mountain Rendezvous* (Salt Lake City: Gibbs Smith, 1985).
[24] Boone.
[25] Samuel M. Beal, *The Snake River Fork Country* (Rexburg, Idaho: The Rexburg Journal, 1935).

location within a few months.[26] Of more lasting permanence was Fort Hall. Established in the summer of 1834 on the Snake River near the mouth of the Portneuf, its founder and builder Nathaniel Wyeth named it for one of his primary investors, Henry Hall.[27] Wyeth intended his fur-trading post to compete with the Hudson's Bay Company or similar American enterprises but was forced to sell Fort Hall to the British company in 1837.[28] As the profitability of the fur trade dwindled due to over-trapping and changing fashions, the Hudson's Bay Company maintained its ownership of the outpost.[29] In 1846, the Oregon Treaty resolved the long-standing boundary dispute between Great Britain and the United States and Fort Hall was returned to American control.[30]



Fort Hall, 1849
Courtesy Historyglobe.com

EURO-AMERICAN MIGRATION AND EARLY SETTLEMENT: 1840S TO 1890

As did all previous indigenous people, Idaho's early Euro-American settlers encountered watercourses and ravines obstructing transportation. As transportation networks took form and these routes facilitated more than just the occasional Euro-American explorer or trapper, newly arriving families settled into areas such as Eastern Idaho. Once an area maintained a sufficient population, establishment of bridges predictably followed.

By the time American dominance was reestablished at Fort Hall, the fur trade had ceded its importance at the post to a burgeoning westward expansionism from the Mississippi to the Pacific. In 1843, the missionary Marcus Whitman led a wagon train westward which stopped at Fort Hall.[31] Subsequent cultural and political pressures, and establishment of the Oregon and Washington territories in 1848 and 1853 respectively, spurred a great western migration which would last for more than two decades.

City of Rocks, well-known Idaho landmark on the route of the Oregon and California trails

Fort Hall was the western terminus for the common route of two of the three major emigrant trails. The Oregon and California trails occupied the same route from eastern points of origin to Fort Hall while the Mormon Trail diverged from the other two at Fort Bridger. Not long after leaving the Eastern Idaho post, the Oregon and California trails split to proceed separately to their individual destinations. Nearly 300,000 emigrants reached Fort Hall during their westward journey.[32]

[26] Hawley.
[27] Ibid.
[28] Ibid.
[29] Richard Somerset Mackie, *Trading Beyond the Mountains: The British Fur Trade on the Pacific 1793-1843* (Vancouver: University of British Columbia Press. 1997).
[30] Ibid.
[31] Clifford Merrill Drury, *Marcus and Narcissa Whitman and the Opening of Old Oregon* (Norman, Oklahoma: A.H. Clark Company, 1973).
[32] Merrill J. Mattes, *The Great Platte River Road* (Lincoln, Nebraska: Bison Books, 1987).

Few of those traveling across Eastern Idaho considered permanent settlement in its desolate desert. Oregon and California were the ultimate destinations with the promise of fertile farmland or mining wealth. Idaho was a geographic barrier to cross and its terrain presented significant obstacles. For those continuing to Oregon, the Snake River was the most intimidating impediment to progress through the region.

Bear Lake Valley

Few places along the Snake River's route through Southern Idaho allowed a crossing by wagon, as much of it is boxed in by steep canyon walls and the current too swift where access to the bank is possible. Two of the best fords were located near Fort Hall where travelers might opt to cross the river and take the North Side Alternate, also known as Goodale's Cutoff.[33] Many emigrants chose to cross the Snake River at Three Island Crossing near present-day Glenns Ferry. As the name implies, ferry service was eventually established at this location in 1863.[34] At any crossing, wagon trains were forced to ford the river – a challenging and dangerous task.

Initially, no lasting settlement in Eastern Idaho was spurred by the immigrant trails, and despite the passage of thousands of pioneers across the region, no permanent crossing of the Snake River or its tributaries was established because of their migration. However, in an eccentricity of history, it was the Mormons, whose route to Utah caused them to originally avoid passage through Eastern Idaho, who formed the first enduring Euro-American occupation of the territory.

Mormons

The Church of Jesus Christ of Latter-Day Saints (LDS or Mormon) was founded by Joseph Smith in upstate New York in 1830.[35] A sect of Christianity, but with substantially different doctrines than the more common tenets of the traditional religion and its various denominations, Mormon believers encountered harsh and occasionally violent responses from the majority of non-Mormon Americans with whom they came in contact. These responses resulted in a series of en masse relocations of LDS practitioners seeking the geographic and cultural freedom to establish Zion – Smith's concept of a communalistic society based on the principles of Mormon faith.

The death of Joseph Smith at the hands of an angry mob in western Illinois in 1844 prompted his successor, Brigham Young, to command the largest and lasting westward migration of Mormons beginning in 1846.[36] Young established the permanent capital of Mormon Zion on the eastern shore of the Great Salt Lake. From his offices in Salt Lake City, Young directed the LDS settlement and colonization of the Great Basin and beyond.

Mormon occupation of Eastern Idaho began with the establishment of Fort Lemhi in 1855.[37] The name of the colony along the Salmon River near the present-day city of Salmon was derived from a figure in the Book of Mormon and was itself the origin of the name of both the neighboring

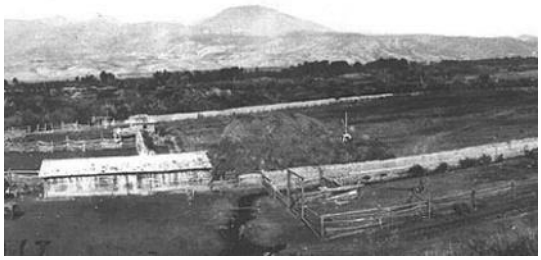
[33] James McGill, *Rediscovered Frontiersman Timothy Goodale* (Independence, Missouri: Oregon-California Trails Association, 2009).
[34] Larry R. Jones, *Idaho State Historical Society Reference Series: Snake River Ferries* (Boise: Idaho State Historical Society, 1982).
[35] Matthew Bowman, *The Mormon People: The Making of an American Faith* (New York: Random House, 2012).
[36] Ibid.
[37] *Centennial History of Lemhi County: Volume 1* (Salmon, Idaho: Lemhi County History Committee, 1992).

mountain range and the native people whose traditional homeland the Mormons settled. When interaction with the Lemhi Shoshone and their native allies turned violent, the LDS abandoned Fort Lemhi in the winter of 1858.[38]

The oldest town in Idaho, Franklin, was founded at the direction of Brigham Young to continue the Mormon colonization of the Cache Valley along the Bear River in the spring of 1860.[39] More deliberate expansion of LDS settlement into Eastern Idaho occurred with their occupation of the Bear Lake Valley. Beginning with the establishment of Paris on the west side of the lake in 1863 and reinforced by the building of Montpelier across the lake in 1864, Mormon pioneers cemented their commercial and religious dominance of the Bear River drainage and beyond.

Soda Springs, known for decades to trappers, explorers, and travelers on the Oregon Trail, was the site of a community of Morrisite dissenters from Mormonism beginning in 1863.[40] In 1870, Brigham Young directed Mormon colonizers to also establish an orthodox LDS community near the springs.[41] A cabin at Soda Springs was constructed for Young himself who took advantage of its shelter on journeys through the northern reaches of the Mormon-occupied Intermountain West.[42]

Mormon development throughout Eastern Idaho reached as far west as present-day central Cassia County where Mormons pioneered the Oakley area beginning in 1877.[43] The growth of LDS influence continued with their settlement of the Upper Snake River region and their founding of Rexburg and Rigby in the early 1880s.[44]



Ruins of Fort Lemhi, c.1900
Courtesy https://imnh.iri.isu.edu/DIGITALATLAS

Eastern Idaho history and culture is indelibly marked by its association with the territorial expansion of Mormonism. The purposeful permanence of LDS communities was dictated by Joseph Smith and his plan of the City of Zion. This prototype for Mormon towns was conceived in 1833 and specified the spatial arrangement, social and architectural hierarchy, and infrastructural dimensions of towns established under church direction.[45] This proscriptive planning was enhanced by a cultural tendency toward permanency and LDS colonies quickly prioritized building materials and commercial enterprise which allowed durability.

Despite these tendencies, like the less-permanent occupants of Eastern Idaho before them, the geographic difficulties of the region initially challenged Mormon pioneers. River crossings were first limited to shallow-water fords until the establishment of more dependable ferry locations. Eventually bridges were built to allow uninterrupted access to the region, but it was a commercial rather than religious incentive that first provided the impetus for their construction.

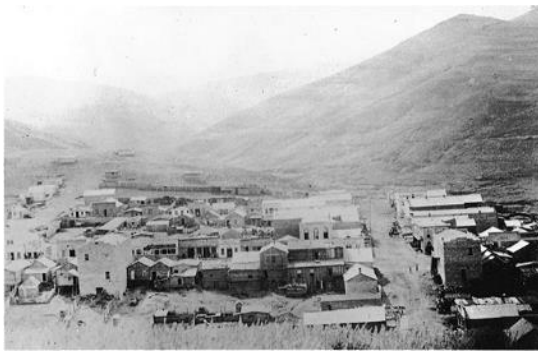
[38] Ibid.
[39] Hawley. The founders of Franklin mistakenly believed themselves to be in Utah Territory.
[40] C. Leroy Anderson, *Joseph Morris and the Saga of the Morrisites* (Logan, Utah: Utah State University Press, 1988).
[41] Ellen Carney, *Historic Soda Springs: Oasis on the Oregon Trail* (Traildust Publishing Company, 1998).
[42] Ibid.
[43] Kathleen Hedberg, *Cassia County, Idaho: The Foundation Years* (Burley, Idaho: Cassia County Commissioners, 2005).
[44] Louis J. Clements and Harold S. Forbush. *Pioneering the Snake River Fork Country* (Rexburg, Idaho: Eastern Idaho Publishing Company, 1972).
[45] Thomas Carter, *Building Zion: The Material World of Mormon Settlement* (Minneapolis, Minnesota: University of Minnesota Press, 2015).

MINING, THE ARRIVAL OF THE RAILROAD, AND IDAHO'S FIRST METAL BRIDGES: 1860S TO 1890

Euro-American exploration and interest in the western reaches of the continent were at first limited to a small, hardy population of trappers, adventurers, missionaries, and military men. Their limited reconnaissance of the American West was spurred into a massive, national migration by the discovery of mineral wealth west of the Rocky Mountains. Even among the thousands of pioneers who saw the fertile Willamette Valley of Oregon as their ultimate destination, it was not uncommon for even those with agricultural intent to be drawn by the lure of the California gold fields. In fact, it was the boom and bust cycles of gold, silver, and copper strikes that prompted so much of the reverse migration from the Pacific Coast that ultimately settled most of the Intermountain West.

The 1848 discovery of gold in California's Sacramento Valley was just the first of many that drew the interest of dreamers, investors, miners, and suppliers westward over the subsequent half-century. The California Gold Rush of 1849 was followed ten years later by the identification of the Comstock Lode in Western Nevada in 1859.[46] The next year, in 1860, gold was discovered near the Clearwater River in the Idaho Panhandle. Subsequent strikes in Southwestern Idaho's Boise Basin in 1862 only increased the region's lure. The discoveries spurred widespread prospecting in the region and by the end of 1861 a major gold rush was underway.[47]

Expansion of the mining activity reached stampede scale and by the end of 1861, the population influx convinced the Washington Territorial Legislature to establish three new counties in the region – Shoshone, Nez Perce, and Idaho.[48] The boundaries set for Idaho County



Virginia City, Montana, c.1865
Courtesy http://virginiacitymt.com/history

were enormous – spanning from Florence in the northwest corner to Franklin at the south boundary and including much of what later became western Wyoming. Bordering Oregon, Nevada, Utah, Nebraska, and Dakota, it comprised approximately the same land area as the present-day state of Idaho.[49]

The 1862 passage of the Homestead Act solidified the region's position as a destination point for prospectors, speculators, and settlers from nationwide and beyond. As a result, the Washington Territorial Legislature carved Boise County out of the south part of Idaho County in January 1863. Just a few months later the mining districts and surrounding vast wilderness and rugged terrain were all incorporated into the new Idaho Territory with its capital at Lewiston in March of 1863.

The discovery of gold elsewhere in Idaho Territory prompted another mining boom which dramatically increased Euro-American presence in Eastern Idaho. Those arriving to the area came by foot or horseback on overland trails, many of which were ancient aboriginal trading routes. From these, miners and freighters improved trails leading directly to mining districts. The influx of prospectors increased demand for necessary

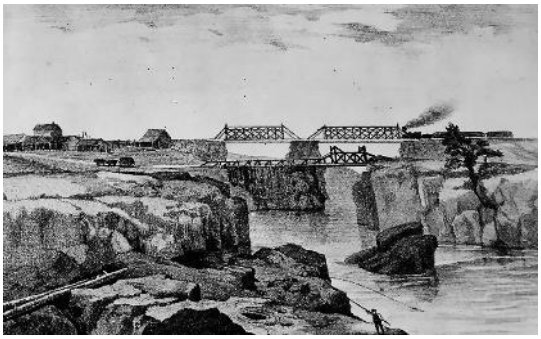
[46] Grant H. Smith, *The History of the Comstock Lode* (Reno: University of Nevada Press, 1998).
[47] *An Illustrated History of North Idaho* (Spokane, Washington: Western Historical Publishing, 1903), 86.
[48] The area encompassing present-day Idaho was part of Washington Territory after the boundaries of the State of Oregon were established in 1859.
[49] "Early Idaho County," *Idaho State Historical Society Reference Series*, No. 324 (Boise, ID: September 1968).

agricultural goods and services, drawing non-miners to the area who established settlements along and at the intersections of these routes to provide services to the passing/area freighters and miners. During the territorial period population boomed, increasing by 117 percent from 1870 to 1880 (to 32,610) and another 171 percent by 1890 (to 88,548).

An 1862-1863 rush to present-day far southwestern Montana necessitated a complicated and lengthy supply route across Eastern Idaho – The Montana Trail.[50] The Montana Trail was a wagon road beginning in Salt Lake City and ending in the Montana gold fields of Bannack, Virginia City, and Helena. The trail traversed much of Eastern Idaho in a generally northerly direction and made use of the Portneuf River valley before crossing the Upper Snake River plain and cresting the Continental Divide at Monida Pass.[51]

It was the Montana Trail and its associated mineral wealth that drove the construction of the first bridge across the Snake River. J.M. "Matt" Taylor – like many other freighters on the trail – delivered supplies from Utah to Bannack. In June 1864, Taylor, W.F. Bartlett, and Edgar M. Morgan incorporated the Oneida Road, Bridge, and Ferry Company and bought the Eagle Rock Ferry which had been established in 1863.[52] In December of 1864 Taylor traveled 700 miles to Idaho's territorial capital at Lewiston to obtain a franchise to operate the ferry and build a bridge across the Black Rock Canyon. According to his franchise records, the bridge was to be operable within two years and the legislature established the toll rates as the same for both the bridge and the ferry. This exclusive right would remain in effect for twenty years and the territorial government retained a percentage of the tolls for educational funding.[53] Between 1863 and 1890, Idaho's Territorial Legislature granted toll franchises for eighty-two facilities including twenty-six ferries, thirteen bridges, and forty-three roads.[54]

Taylor's Bridge was a timber structure built with twelve 45-foot timbers hauled from Beaver Creek eighty miles away. Executed in a modified Queen truss design, the necessary iron bolts and other hardware were salvaged from a wrecked steam boat near Fort Benton on the Missouri River and from old Fort Hall. Stringers for the bridge were put in place when the river was frozen solid in the winter of 1864-1865.[55] This pioneering piece of infrastructure formed the anchor for what later developed as the city of Idaho Falls.



1865 Eagle Rock Bridge, as drawn in 1884
Note railroad bridge in background
Courtesy Idaho State Historical Society #76-37.103

Mineral strikes across Eastern Idaho and beyond continued to prompt the exploration and exploitation of the region and its natural resources. Discoveries at Leesburg in 1866 spurred the settlement of Salmon as a supply

[50] Betty M. Madsen and Brigham D. Madsen, *North to Montana!: Jehus, Bullwhackers, and Mule Skinners on the Montana Trail* (Pocatello, Idaho: Utah State University Press, 1999).
[51] Ibid.
[52] Eagle Rock was renamed Idaho Falls in 1891. Alice Horton, Afton Bitton, and Patti Sherlock, *Beautiful Bonneville: County of Contrasts* (Logan, Utah: Herff Jones, 1989).
[53] Edith Haroldsen Lovell, *Captain Bonneville's County* (Idaho Falls, Idaho: Bonneville County Centennial and Historical Commission, Inc., 1963).
[54] Rebecca Herbst, *Idaho Bridge Inventory,* Volume 1 (Boise, Idaho: Idaho Transportation Department, 1983).
[55] Barzilla Clark, *Bonneville County in the Making* (Idaho Falls, Idaho: Barzilla Clark, 1941).

point for miners in nearby gold fields[56] and the mining of silver and lead near the Wood River Valley in the 1870s and 1880s necessitated the establishment of Ketchum, Hailey, and Bellevue.[57]

Walker's 1870 Constitutional Population Distribution Map, detail
Note: black shading denotes areas with 2 to 6 inhabitants per square mile and no shading is 'Unsettled'
Map courtesy of http://www.census.gov/history/pdf/1870_Population_Density.pdf

Despite the migration to and within Idaho Territory, analysis of population census records from this period conveys the sparseness of settlement in Eastern Idaho. The 1870 census tallied a total of 14,999 Idahoans, but in the area that became Eastern Idaho it documented only a single settlement with a density of at least two to six inhabitants – Eagle Rock.

While not always immediate, bridge construction, to access the remote geography typically home to mines and their resulting settlements, was inevitable. The Salmon River mines at Clayton and Bayhorse were in operation long before the construction of permanent river crossings. Timber structures were the initial choice when bridges were built. Finally, by the second decade of the twentieth century, development of the Sawtooth Park Highway prompted Custer County to have five steel bridges constructed in 1915.[58] All built by James H. Forbes, the "first Idaho-based bridge builder of merit," at least two, and possibly three, of them are still extant.[59]

[56] *Centennial History of Lemhi County*.
[57] Hawley.
[58] Herbst.
[59] Crossing the Salmon River between Clayton and Bayhorse, and of the same era, design, and method of construction, it is likely the Salmon River Pratt Truss Bridge (Lyon Creek) was one of the five built by Forbes in 1915. See IHSI Form 37-004918 for more detail.

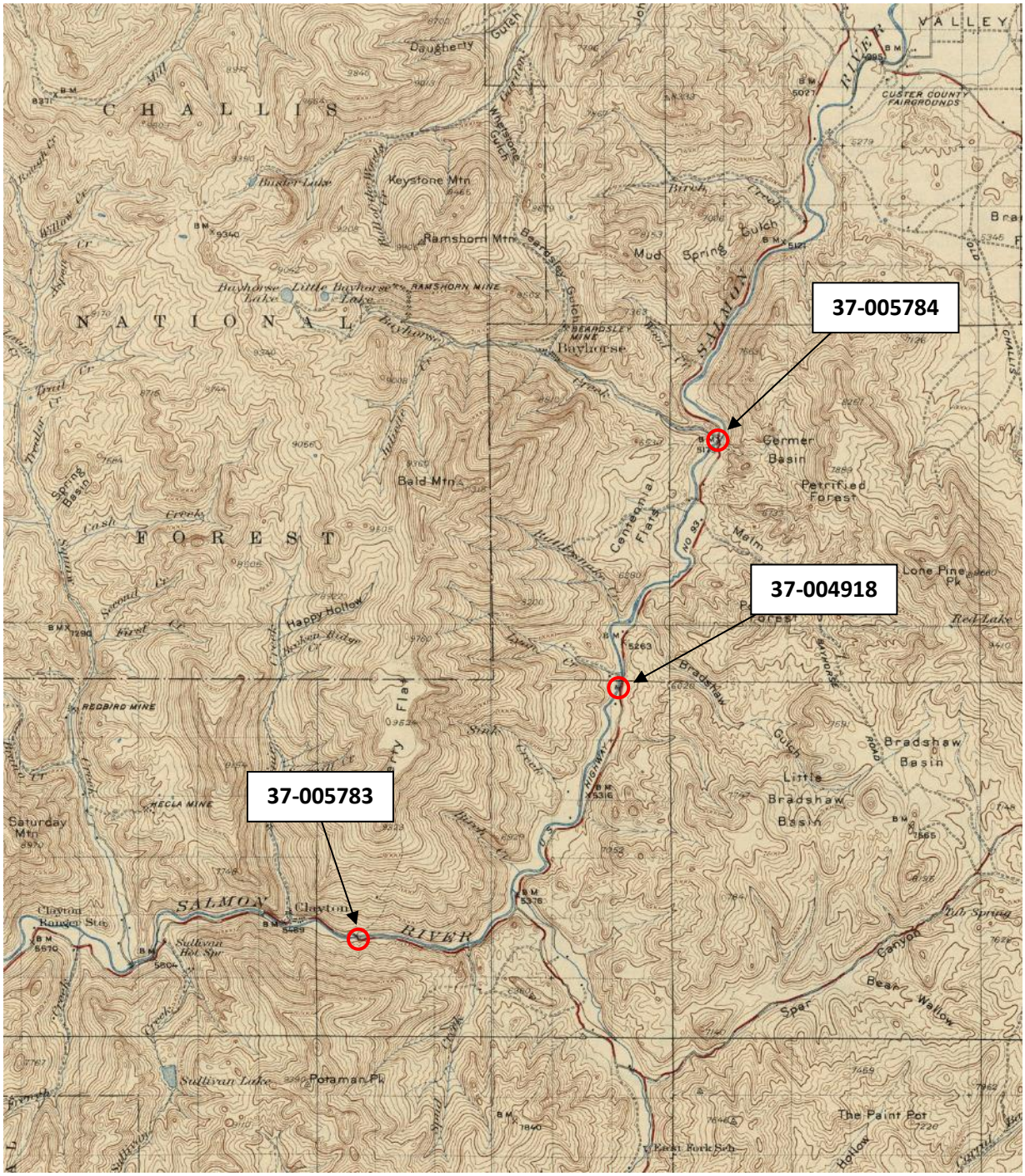
His use of at least two distinct truss types speaks to the dexterity with which he employed his expertise.

The mines near Central Idaho's Salmon River and dozens of similar examples across Eastern Idaho continued to stimulate permanent and temporary settlement well into the twentieth century. As at Eagle Rock, it was often the promise of a lucrative return on the not-insubstantial costs of bridge building that first allowed their construction. The financial incentive of easier access to the mines offered a justification for the cost and effort of bridging any number of the region's waterways but it was the advent of the railroad that frequently made their fabrication possible.

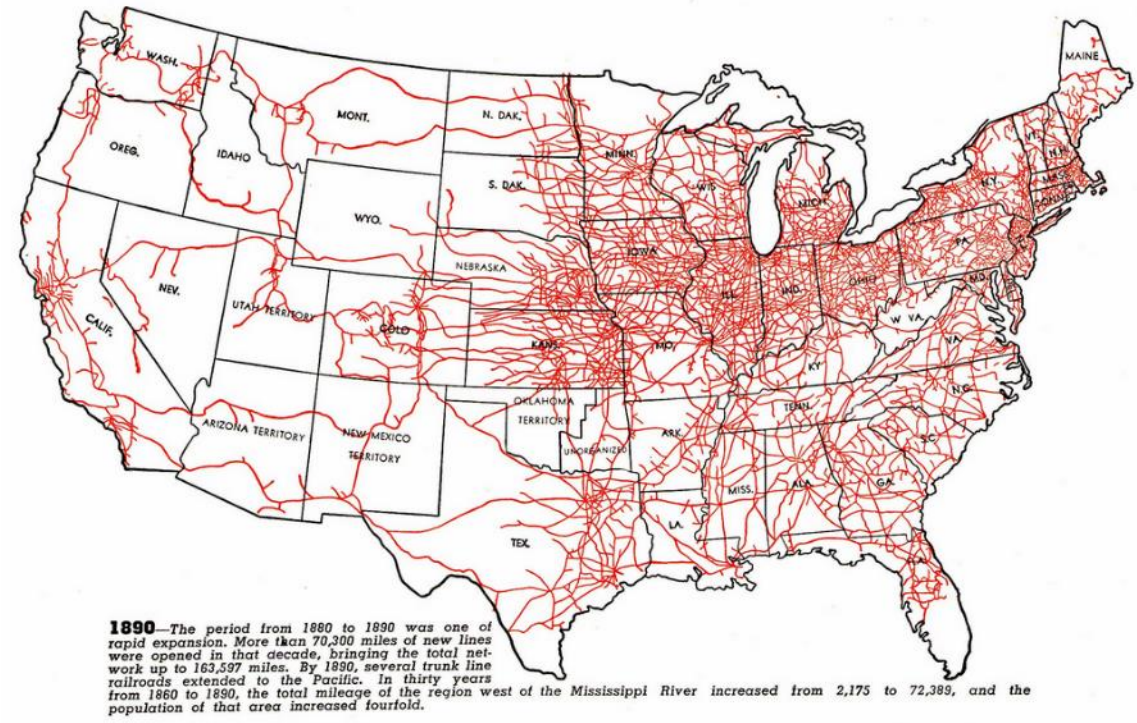
1915 Salmon River Pratt Truss Bridge at Bayhorse Creek Challis (vicinity) (37-005784; ITD Key# 31660)

c.1915 Salmon River Pratt Truss Bridge (Lyon Creek)
Clayton (vicinity) (37-004918; Off-system/No Key#)

1915 Salmon River Parker Truss Bridge, 2017
Clayton (vicinity) (37-005783; ITD Key# 31650)



USGS Bayhorse Quadrangle, 1929
Note the three exant 1915 Salmon River bridges construted by J. Forbes



US Railroad Network, 1890

Map courtesy of http://users.humboldt.edu/ogayle/Hist%20111%20Images/RR1890.jpg

In the late nineteenth century, "railroad mania" swept the nation and railroad expansion revolutionized America by stimulating the growth of trade, settlement, and communication networks. Between 1880 and 1890, more than 70,300 miles of new lines opened, a 75 percent increase in track mileage nationwide.[60] At the same time, Idahoans welcomed two new railroads built across the territory – the Northern Pacific across the panhandle through Sandpoint and the Oregon Short Line across southern Idaho.

The railroad expansion into Eastern Idaho transformed the region by linking previously isolated trade, settlement, and communication networks. The promise of the railroad spurred the establishment of hamlets and towns along the route that became local trading centers providing access to regional and national markets.

The May 1869 meeting of the Union Pacific and Central Pacific railroads at Promontory Point, Utah, marked the completion of the world's first transcontinental railroad. This historic achievement was nationally significant and had specific and profound effects on the history and settlement of Eastern Idaho. The railroad not only eliminated the necessity of the wagon train as a means of western migration, it also facilitated the settlement and supply of mining communities across the Intermountain West. As the web of interdependent railways spread across the region it both necessitated the construction of towns to supply its growth and provided the materials and labor needed to make that development possible. Similarly, both the materials and impetus for the

[60] Humboldt State University, "Industrialization, Urbanization, and Immigration in the Gilded Age," http://users.humboldt.edu/ogayle/hist111/industrial.html (accessed August 13, 2013).

construction of bridges throughout Eastern Idaho were spurred by the arrival of the railroad.

While the capital and demand for railroad service into Idaho Territory required time to mature, the transcontinental railroad immediately prompted infrastructural development. Freighting operations along the Kelton Road between Kelton, Utah, and Boise, Idaho, began by the summer of 1869. Founded in 1863, Boise quickly developed as the civic and commercial hub of Southwestern Idaho and replaced Lewiston as the territorial capital in 1866. The Kelton Road's route across Southern Idaho drove the development of stage stops along its length and soon prompted the establishment of the Glenn's Ferry crossing of the Snake River.[61]

By 1871, the Utah Northern Railroad into Idaho Territory was under construction.[62] Financed largely by Mormon interests, the planned route of the railroad from Ogden, Utah, to Soda Springs was intended to serve LDS settlements along its path.[63] Due to limited funding, the Cache Valley communities sustained by the railroad were primarily responsible for its construction. These volunteer efforts and the railroad itself ended short of their goal, terminating at Franklin in 1874.[64] Eastern investment revived the company in 1878 and the new terminus of the reorganized Utah *and* Northern Railroad was the Montana gold fields.[65] The railroad's route north of Franklin made use of the Portneuf River Valley before crossing the Snake River Plain. Towns with varying permanency sprang up along the railroad's right of way. Among them, Blackfoot was founded in the spring of 1879 and the Snake River was spanned with a new steel bridge at Eagle Rock.[66] In 1881 the Utah and Northern Railway began offering service from Ogden to Butte, Montana.[67]

The Oregon Short Line Railway (OSL) was incorporated in 1881 with the intention of providing the shortest route – or "Short Line" – across Southern Idaho between Wyoming and Eastern Oregon. Construction reached Montpelier, Idaho, in the summer of 1882 and resulted in the founding of Pocatello at the mouth of the Portneuf River Canyon that same year.[68] The OSL bridged the Snake River at American Falls and continued west along the north side of the canyon until it once again crossed the river at Huntington, Oregon, in November 1884.[69] Along the way, completion of the line to the newly-established town of Shoshone allowed the construction of a spur line north to access the booming mines of the Wood River Valley.[70]

1882 Oregon Short Line (OSL) Railroad bridge over the Snake River at American Falls, c.1915 (nonextant)

[61] Ibid.
[62] Merrill D. Beal, *The Utah and Northern Railroad: Narrow Gauge* (Pocatello, Idaho: Idaho State University Press, 1980).
[63] Ibid.
[64] Edith Haroldsen Lovell, *Captain Bonneville's County* (Idaho Falls, Idaho: Bonneville County Centennial and Historical Commission, Inc., 1963).
[65] Beal. *The Utah and Northern Railroad*.
[66] Lovell.
[67] Beal. *The Utah and Northern Railroad*.
[68] Ibid.
[69] Beal. *Intermountain Railroads*.
[70] Hawley.

Rail access to Eastern Idaho and its resources dramatically increased the region's population and its need for uninterrupted transportation corridors. The Utah and Northern Railroad and the Oregon Short Line, which were eventually consolidated under the Union Pacific Railroad, facilitated the construction of additional rail routes. The railroads also spurred construction of wagon roads accessing the new lines and the towns that developed to serve them. The first documented iron highway bridge in Idaho was built across the Snake River at Blackfoot in February of 1881.[71] Operated as a toll bridge for vehicular crossing, completion of the structure was possible only with the access provided to distant materials and professional expertise by the Utah and Northern Railway.

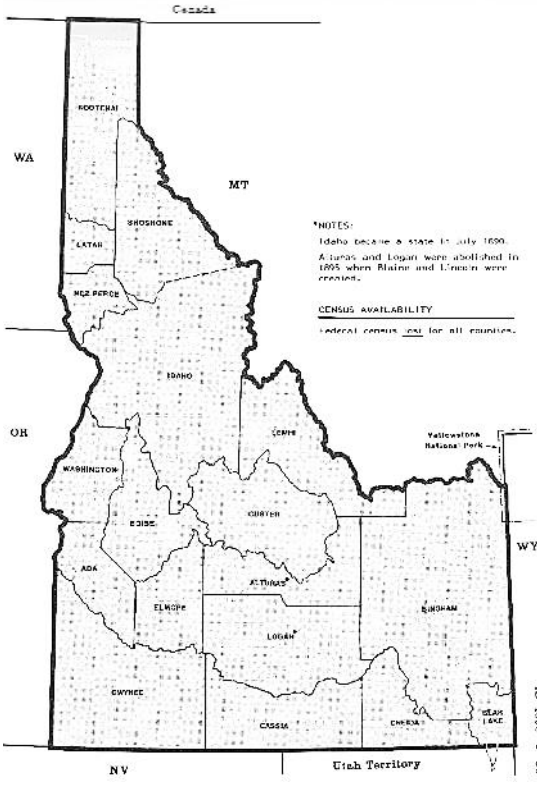
Bridge construction across difficult geographic obstacles was generally impossible until the arrival of railroad lines overcoming the previously limited materials and manpower. The train could deliver timber, steel, expertise, and manpower to allow bridge building throughout the region. Perhaps more importantly, the increase in population brought about by rail access was the impetus for accessible, direct transportation corridors to serve the ever-increasing cultural and commercial needs of a new state.

STATEHOOD AND EARLY TWENTIETH CENTURY DEVELOPMENT: 1890 to 1920s

The progression of the railroad across Idaho, coupled with the cyclical discovery and exploitation of mineral wealth, resulted in an influx of new residents to the territory. The promise of untapped virgin timber and other natural resources combined to warrant governmental recognition. A quick progression of six western states joined the union in 1889 and 1890, with Idaho statehood occurring on July 3, 1890.

Following the flourishing period of the 1880s, the Panic of 1893 led to a serious nationwide economic depression that lasted most of the decade. While some Idahoans suffered as a result of these economic conditions, the Panic put only a slight damper on the previous boom times and the new state of Idaho continued to draw rapid immigration. An additional 73,224 residents arrived between 1890 and 1900, an 83 percent increase.

With Boise as her capital, the Gem State's boundaries encompassed nearly 84,000 square miles from the Canadian border south to Utah and Nevada and stretching between Oregon to Wyoming. When created, the State of Idaho was composed of eighteen counties; eight of those were in the southern and eastern regions of the state. Since 1890, the state legislature has eliminated two counties (Alturas and Logan) and created twenty-eight more for a total of forty-four. The number of Eastern Idaho counties has tripled from eight to twenty-four.



1890 County map of Idaho
Courtesy IdahoGenealogy.org

[71] Herbst.

An explanation for the proliferation of counties across Idaho can be found in the 43rd state's sparse population at the time of admittance. Large expanses of the new state were still unsettled at the time of designation, but the incentive of cheap land, access to minerals, timber, and soon, water, as well as the permanence and visibility the designation afforded would soon entice an influx of new citizens.

With an increase in population came an increased demand for infrastructure to provide access to markets. The ever-expanding network of railroads demanded vehicular road access to deliver goods to shipping points, and increased population demanded roads to allow connections to communities where one could shop, learn, worship, and be entertained. As the expense of bridge construction along these routes was justified with greater numbers of people, those improvements in turn incentivized still more settlement.

As the residents of Eastern Idaho's eight counties grew in number, their rights as citizens spurred the creation of new counties and still more infrastructure. For example, in 1893, residents of what is now Jefferson County asked newly-created Fremont County for assistance in financing a bridge across the Snake River on the Market Lake-Menan Road route to facilitate the transport of local goods to the rail station at Market Lake.[72] A contract was let to B.J. Briggs to construct a bridge with "tubular iron piers at the center and stone abutments" for $8,975.[73] The bridge was opened to the public in the fall of 1894.

Need for public accessibility to/from elected officials demanded division of larger governmental units and the designation of new county seats. County officials promised better roads to their constituents and in return expected funding from the Idaho legislature. As early as 1881, all roads in Idaho Territory had been designated county roads by the Territorial Legislature's County Road Act.[74] As state government matured, responsibility for major cross-state routes and projects with extraordinary cost or importance reverted to legislative responsibility. In Eastern Idaho, an example was the March 1903 passage by the state legislature of a bill providing for construction of a timber and steel wagon bridge across the Snake River at American Falls.[75] The State Engineer supplied the plans and the bridge funded by State Treasury funds.

1903 American Falls Bridge over Snake River, c.1910
Courtesy Idaho State Historical Society 81-35.6

Irrigation

A major infrastructural investment that prompted yet more population growth was facilitated by the federal government and legislation allowing agricultural expansion into what had once been an inhospitable desert.

Despite increases in population, President Harrison's signature created a largely unpopulated 43rd state. Idaho's substantial size and rugged geography proved a disadvantage, particularly in the generally harsh landscape of the southern and eastern reaches of the state.

[72] Willard Adams, *100 Years of Jefferson County* (Rexburg, Idaho: Willard Adams, 1970).
[73] Ibid.
[74] W.P. Eaton, Edward Equals, L.F. Erickson, and Ellis L. Mathis, *Idaho's Highway History: 1863-1975* (Boise, Idaho: Idaho Transportation Department, 1985).
[75] Ibid.

The region's climate discouraged agricultural development which limited the commercial viability and its attractiveness to new settlers. The Snake River Plain in particular proved difficult to populate until legislative intervention.

Notwithstanding the incentive of free federal land to qualifying claimants offered by the 1862 Homestead Act, the arid southern Idaho desert

Typical sagebrush steppe of Eastern Idaho

remained sparsely settled. Even the railroad failed to attract new communities to the region except in specific and select instances. Without mineral wealth or timber, the flat, desolate topography appeared ill-suited to any productive use. Lacking sufficient annual rainfall, the plain's dry, volcanic soil would need to be irrigated if it were to be farmed. However, individual homesteaders could not afford the cost or undertake the effort of constructing the needed network of dams, canals, and ditches.

Congress had attempted to resolve some of the hurdles to the settlement of the semi-arid West by means of the Desert Land Act of 1877. The act essentially amended the Homestead Act by removing the claimant occupancy requirement. Furthermore, by increasing the number of acres claimed from 160 to 640, the Desert Land Act encouraged widespread abuse and fraud and did little to address the fundamental question of funding for irrigation infrastructure.[76]

In 1892 Senator Joseph Carey of Wyoming introduced a bill to Congress which would do much to resolve the matter of desert lands irrigation. When finally passed in 1894, the Carey Act facilitated private, for-profit construction of irrigation infrastructure and provided a mechanism for individual settlers to access the harnessed water.[77] The Act authorized the General Land Office (GLO) to set aside suitable acreage in designated Desert Lands and the respective state was then responsible for selection of private corporations to finance and construct dams, canals, ditches, and so forth. While land distribution and pricing of public water remained under governmental control, the cost of infrastructure development and overall risk fell to private corporations and their investors who were compensated through the sale of public land and water.[78] The individual farmer was free to settle public land and invest his own capital in its improvement with the promise of access to the necessary irrigation that would otherwise be unavailable.

Among the Carey Act-triggered projects in Eastern Idaho, one such privately-funded endeavor that proved critical to the development of the region was the Milner Dam and its reservoir on the Snake River. Promoted by Ira Perrine, an early settler of the Snake River Canyon, he attracted the investment of Stanley Milner, Walter Filer, Frank Buhl, and Peter Kimberly.[79] Together

Milner Dam shortly after completion, c.1905

[76] Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 2000).
[77] Ibid.
[78] Ibid.
[79] "Milner Dam," *Idaho State Historical Society Reference Series* (Boise, Idaho: Idaho State Historical Society, 1985).

they funded the construction of the Milner Dam and the Twin Falls Main Canal between 1902 and 1904.[80] With irrigation provided to 360,000 acres of Snake River desert, the project was a benchmark for privately-funded irrigation investment.[81]

Despite Perrine's success, difficulties in raising private capital for similar projects across the West convinced Congress to pass the Reclamation Act of 1902.[82] This Act essentially conceded the need for investment of federal funds in addition to federal land and water. Unlike the Carey Act, infrastructure developed under the Reclamation Act would be financed directly by the government and managed by the newly-formed United States Reclamation Service (later the United States Bureau of Reclamation).[83] With an initial investment by the federal government, it was intended that newly-irrigated lands would be sold to settlers and those proceeds would be reinvested in further reclamation projects. This conceptual revolving fund for irrigation would profoundly impact southern and eastern Idaho.

Idaho's first Reclamation Service project was the Minidoka Dam. Built upstream from the Milner Dam on the Snake River, the project and its resulting North Side and South Side canals would eventually supply irrigation waters to more than one million acres of Southern and Eastern Idaho. Construction commenced in 1904 and was substantially completed in 1906. In 1909 the dam began to produce hydroelectricity, the first federal project to do so in the Pacific Northwest. The project's success resulted in further federal investment throughout the state and justified the upstream construction of the dam at American Falls in 1927.[84]

The results of the Carey and Reclamation acts in Southern and Eastern Idaho was nothing short of astounding. In the course of two decades the Snake River Plain was transformed from an unpopulated volcanic desert to an irrigated agricultural region with cities and towns to serve the civic and commercial needs of a growing populace. The towns of Rupert, Burley, Jerome, Twin Falls, Buhl, and dozens of others were founded as a direct result of access to irrigation. Advertisements and promotion of the aptly-christened Magic Valley attracted settlers from across the nation seeking the opportunities promised by cheap land and the American dream. The need for transportation infrastructure naturally resulted and rails and roads soon crisscrossed the region. Bridges were a necessary component of this network. Crossings of the new man-made waterways proved essential.

1915 High Line Canal Warren Truss Bridge, 2017

Among them, the High Line Canal Warren Truss Bridge, one of a pair of short-span bridges installed by the Idaho State Highway Commission in 1915 to cross the High Line Canal in the vicinity of Buhl. The High Line Canal is part of the network of irrigation canals forming the large-scale Twin Falls Irrigation Tract constructed between 1905 and 1909, diverting water from the Snake River at Milner Dam. Bridges like the High

[80] Ibid.
[81] Ibid.
[82] Fiege.
[83] Ibid.
[84] "Minidoka Dam," *Idaho State Historical Society Reference Series* (Boise, Idaho: Idaho State Historical Society, 1974).

Line Canal Warren Truss Bridge that provided area farmers with access over new canals and to local markets were critical to the survival of the regional economy, particularly the small towns of arid Eastern Idaho that served as trading and shipping points for the surrounding nascent rural communities.

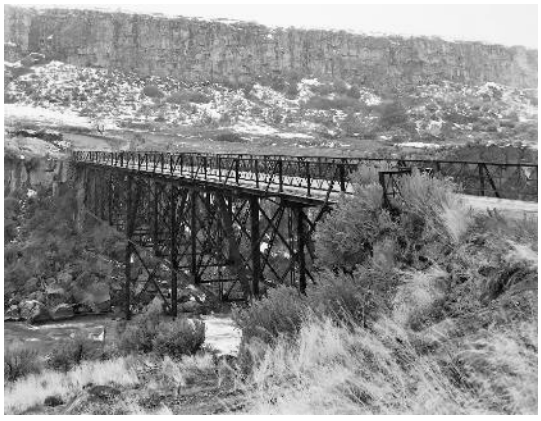
Until the advent of the region's agricultural revolution, ferry crossings had been sufficient to accommodate Southern Idaho's sparse traffic. The transformational increase in population on both sides of the river required more reliable infrastructure and the perennial problem of efficient routes across the Snake River and its canyon were soon debated.

The first generation of bridges across the Snake River required tortuous access roads to allow navigation down into the canyon and back up the other side. An extant example of this condition was the 1911 Blue Lakes Bridge. which was accessed by the steep switchback-laden road up/down both sides of the canyon.[85]

Another early solution to crossing the Snake River was Murtaugh Bridge constructed north of the town of Murtaugh to provide access to the relatively-isolated region irrigated by the Milner Dam north of the river canyon. The Hillsdale Highway District was formed to build the bridge in 1914.[86] C.H. Mull of Twin Falls was awarded the $7,975 bridge contract in December of 1915.[87] The steel structure was the first toll-free bridge in the canyon and remained in place until the mid-1980s.

1911 Blue Lakes Bridge, 1911
Courtesy Idaho State Historical Society

1911 Blue Lakes Bridge, 2017



1916 Murtaugh Bridge, c.1970
Courtesy Idaho State Historical Society 83-5.27/a

[85] This bridge is referred to as the Perrine Bridge in some early primary sources. Reportedly Ira Perrine designed and built it, hence the reference.

[86] Virginia Ricketts, *Then and Now in Southern Idaho* (Jerome, Idaho: Falls City Publishing, 1998).
[87] Ibid.

To eliminate the delay of a detour into and out of the Snake River Canyon, regional residents soon demanded routes that would span both the canyon and the river. The construction cost and difficulty of this concept were substantial and only two such crossings were ever built. The first was a $93,000 steel suspension bridge north of Hansen.[88] Completed in July 1919, public bonds approved by voters on either side of the river financed 80 percent of the structure, with the state legislature appropriating a little over 20 percent of the cost.[89]

1919 Hansen Bridge, c.1920 (nonextant)
Courtesy Idaho State Historical Society 63-132.12

Shortly after completion of the Hansen Bridge, the citizens of Twin Falls began to call for a canyon crossing of their own. In the fall of 1927 a privately-funded, cantilevered steel span opened to traffic. The $750,000 cost of the structure was partially met by its operation as a toll bridge until purchase by the State of Idaho in 1940.[90] Known as the Perrine Bridge in honor of Milner Dam's promoter, the new bridge surpassed the Hansen Bridge as the highest span in America at the time of its completion.

1927 Perrine Bridge under construction (nonextant)
Courtesy Idaho State Historical Society 74-118.6

Federal Lands

Successful construction of the Milner and Minidoka dams and their associated irrigation networks would have proven difficult, if not impossible, without the availability of millions of acres of public land. Like much of the West, federal land ownership dominated Idaho geography from its inception. Nearly 62 percent of the state, or 32,623,376 square acres are owned by the federal government – the third highest percentage nationwide.[91]

Sale or reservation of the nation's public domain was possible only with accurate measurement and mapping. GLO oversaw management of federal lands and their disposal or retention from 1812 until 1946.[92] Placed under the oversight of the Department of the Interior in 1849, the GLO was responsible for the survey, platting, and distribution or sale of public lands. In Idaho, the monumental task of surveying its remote and disparate geography began in Southwestern Idaho at Initial Point south of Meridian in 1867.[93]

Initial Point

[88] Eaton, Equals, Erickson, and Mathis.
[89] Ibid.
[90] Ibid.
[91] Carol Hardy Vincent, Laura A. Hanson, and Carla N. Argueta, *Federal Land Ownership: Overview and Data*. (Washington, D.C.: Library of Congress, Congressional Research Service, 2017).
[92] James R. Skillen, *The Nation's Largest Landlord: The Bureau of Land Management in the American West* (Lawrence, Kansas: University Press of Kansas, 2009).
[93] Hawley.

Once mapped, the land could be managed, and the GLO distributed Idaho's public lands under the enabling legislation of the Homestead Act, Desert Land Act, Carey Act, Reclamation Act, and a myriad of other congressional legislation. Public concern over the disposal of the nation's geographic wealth to private interests coincided with Idaho's admittance to the union. Progressives across the country argued that it was in the public's best interest to retain federal control of government lands to allow for preservation and recreation.

Beginning in 1891, the President was authorized to withdraw timbered lands or forest reserves from private claim.[94] The rapid exploitation of timber resources in the West prompted Roosevelt to establish the U.S. Forest Service in 1905, to which the management of these reserves was transferred under the Department of Agriculture. The agency's acquisition and management of the soon-designated National Forests would result in a particularly controversial public conversation in Idaho where the state's Senator Heyburn vehemently opposed their withdrawal and creation. Despite political protest, Idaho now boasts 20.5 million acres of National Forests, the highest percentage in the U.S.[95]

The retention of federal land for public benefit continued through the first decade of the twentieth century when the GLO began to lease land rather than sell it. The Pickett Act of 1910 gave the President the authority "at any time in his discretion, (to) temporarily withdraw from settlement, location, sale, or entry any of the public lands. . . and reserve the same for public purposes...".[96] Federally owned areas recognized for their scenic and natural beauty were protected when the National Park Service was created in 1916, and the Taylor Grazing Act of 1934, which also created the United States Grazing Service, effectively withdrew the remainder of public lands from private acquisition.[97]

In 1946, the General Land Office was merged with the United States Grazing Service to form the Bureau of Land Management (BLM) under the Department of the Interior.[98] Much of southern and eastern Idaho that had not previously been passed to state or private ownership or withdrawn by the Bureau of Reclamation or the U.S. Forest Service was consolidated for public use under the management of the new bureau. The BLM now manages nearly 12 million acres of Idaho land.[99]

Early oversight of Idaho's federal lands rarely resulted in the construction of infrastructure. The Forest Service made use of roads and bridges already in existence. However, as the agency matured it constructed administrative facilities including ranger stations, guard stations, and lookout sites, and built the roads, bridges, and communication framework needed to access and manage the land. The ready supply of inexpensive labor provided by President Franklin Roosevelt's New Deal facilitated an expansion of the agency's infrastructure.

Typical Forest Service log bridge, Valley County, 1923
Courtesy ITD Online Photo Collection

[94] Harold K. Steen, *The U.S. Forest Service: A Centennial History, Revised Edition* (Seattle: University of Washington Press, 2004).
[95] Vincent, Hanson, and Argueta.
[96] Skillen.
[97] Ibid.
[98] Ibid.
[99] Vincent, Hanson, and Argueta.

GOOD ROADS MOVEMENT AND ARRIVAL OF THE AUTOMOBILE: 1880S AND 1920S

The advent of the automobile was transformative to the nation, and Idaho was no less impacted. In fact, transportation possibilities allowed by automobile travel were arguably more important throughout the West than they were east of the Mississippi. The internal combustion engine permitted a traveler to cover greater distances in a shorter amount of time than a horse drawn conveyance and provided independence from the restrictions of rail. Idaho's varied topography was better suited to the freedom of car travel than regions served by a more expansive railroad network. While a personal car was initially cost prohibitive, the genius of Henry Ford's assembly line soon placed automobile ownership within reach of nearly every family.

American drivers quickly realized that existing infrastructure was unable to meet the growing demands of the autoing public. The "Good Roads" movement petitioned elected leaders to invest in the construction of highways which could accommodate recreation as well as commerce. In Idaho, motorists demanded access to the natural and scenic beauty offered by the state's unpopulated expanse.

Idaho's territorial government first provided for the public construction and maintenance of roads and bridges in the County Road Act of 1881.[100] In addition to declaring all roads to be county roads, the Act proscribed the mechanism for determining routes and obtaining needed funding and labor[101]. As an example, a bridge across the Snake River near the present Lorenzo Bridge was first proposed to Bingham County by regional residents in the fall of 1887.[102] They also asked for a bridge across the Dry Bed – due south of the first location. The county commissioners denied the request due to funding but promised construction when budgets allowed. In

Auto ownership quickly outpaced Idaho's highway infrastructure; here an early Ford and its passengers are forced to use a Snake River Ferry
Courtesy Idaho State Historical Society 66-104.1

September of 1889, the county issued a contract to Mr. R.E. Miller for $13,700 to construct both bridges.[103] This prompt action on the part of the county was an exception, and while the County Road Act provided a framework for road construction, it generally failed to address the systematic flaws which prevented its widespread implementation. Individual acts of the territorial legislature also funded specific road and bridge construction projects, but, with rare exception, those projects were built outside of southern and eastern Idaho.[104]

Soon after statehood, the legislature authorized the creation of a Wagon Road Commission and the issuance of bonds to fund its designated projects. Still, development approved by the commission was restricted to specific, legislature-approved routes. Like its territorial predecessor, the state legislature also continued to fund and approve the construction of specific transportation projects, each overseen by a uniquely-appointed commission.[105] State participation in many of these projects was only justified by either extraordinary cost or need, or the insistent demand of the voting public.

[100] Eaton, Equals, Erickson, and Mathis.
[101] Ibid.
[102] Adams.
[103] Ibid.
[104] Eaton, Equals, Erickson, and Mathis.
[105] Ibid.

Until 1905, when the newly-constructed railroad bridge provided a risky pedestrian crossing, the only way to traverse the Snake River at the burgeoning town of Burley was to use a ferry.[106] In 1906 Edward Verberg built a toll bridge between Heyburn and Burley using lumber salvaged from the construction of the Minidoka Dam.[107] By 1910, Burley boosters began to petition for a toll-free, state-funded bridge at the northern end of Overland Avenue with more direct access to the community of Paul.[108] This was opposed by residents of Heyburn who feared that a free crossing would attract commerce away from their town and the toll bridge. They demanded that the state purchase and repair the Verberg bridge rather than build a new facility. Surprisingly, the 1911 state legislature funded both the construction of a new bridge north of Burley (now State Highway 27) and the acquisition and rehabilitation of the Verberg Bridge.[109] The Paul-Burley bridge was a narrow timber and steel structure with a wider turn-out in the middle to allow vehicles to pass one another. It was built for $20,000, and like the repaired Verberg Bridge, was opened without toll to the public in 1911.[110]

The Wagon Road Commission also occasionally authorized roadway projects, and in 1911, $20,000 was approved to pave approximately five miles of state roadway between Pocatello and Blackfoot. This was the first state project to result in an asphalt road surface.[111] Legislation during this period also permitted the organization of county highway districts to fund and oversee local transportation improvements including both highways and railroads.[112]

1911 Paul-Burley Bridge, c.1915 (nonextant)
Courtesy Idaho State Historical Society 78-94.101

During this period, automobile ownership grew at a rapid pace statewide as a result of improved roads and the increasing affordability of vehicles. With the formation of the State Highway Commission, a spike in Idaho's road building ensued and over 2,000 vehicles were in operation statewide.[113]

In 1913, the State Legislature created a five-member permanent State Highway Commission which would allow Idaho to take advantage of federal transportation funding. The first Federal-Aid project contract in the state was awarded on October 11, 1917 by the State Highway Commission to the Missouri Bridge and Iron Company. The work consisted of constructing three steel bridges and 43 concrete bridges and culverts in Custer and Lemhi counties on what is now U.S. Highway 93.[114]

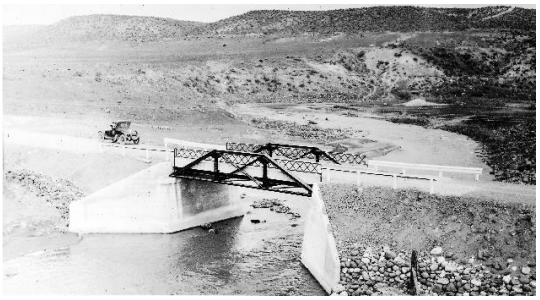
By 1918, Idaho's state highway system boasted 2,255 miles of roads, five of which were paved or oiled. In Eastern Idaho, state highway routes connected such distant communities as Montpelier, Ashton, Salmon, and Bliss to one another and the much larger markets of Boise and Salt Lake City and beyond. Though at the

[106] Kathleen Hedberg, *Cassia County, Idaho: The Foundation Years* (Burley, Idaho: Cassia County Commissioners, 2005).
[107] *A History of Minidoka County and Its People* (Rupert, Idaho: Minidoka County Historical Society, 1985).
[108] Hedberg.
[109] Ibid.
[110] "Historic Bridge Over Snake River to be Dismantled" *The Idaho Daily Statesman* [Boise], October 10, 1927.
[111] Eaton, Equals, Erickson, and Mathis.
[112] Ibid.
[113] 2,083 license plates were issued in 1913. Rebecca Herbst, *Idaho Bridge Inventory,* Volume 1 (Boise, Idaho: Idaho Transportation Department, 1983), 25, and Idaho Transportation Department, "Idaho's Motor Vehicle History," http://itd.idaho.gov/dmv/dmvhistory.htm (accessed August 15, 2013).
[114] Ibid.

time little to none of these routes was paved, about half were at least graded and much was improved with crushed rock. By 1922, the system had expanded greatly, though in Eastern Idaho much of the network was under construction or under not up to state standards.[115] Regardless, such graded, "all weather" crushed rock roads between area commercial centers further stimulated automobile use in Eastern Idaho.

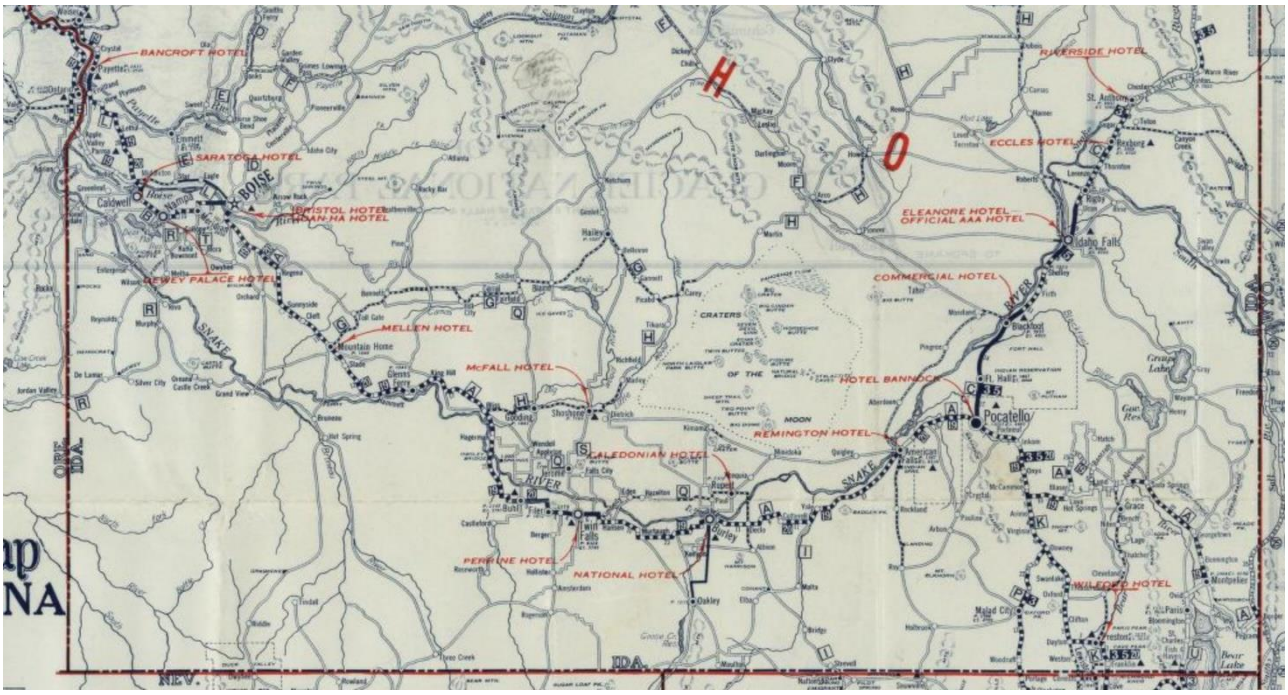
By this time, auto tourists were becoming important travelers across Idaho and the identification of regional and transcontinental auto routes became vital. To provide tourists with a documented network of roads linking states and identifying roadside necessities along the route, town boosters and national automobile clubs planned touring routes and published guidebooks directing "autoists" from state to state.[116] Among the trans-state highways developed in the 1910s, promoters laid out cross-country routes that traversed parts of Eastern Idaho. Among them were: the Utah-Idaho Yellowstone Highway, Banff-Grand Canyon Road, Old Oregon Trail Auto Route, and Evergreen National Highway. Also, no less than 10 separately designated Sampson Trails traversed sections of Eastern Idaho. With the coming of the U.S. Bureau of Roads numbering system in 1926, these auto trails received uniform highway numbers.

In 1919, the bureaucracy of the state's agencies was again reorganized. The result was the abolition of the State Highway Commission in favor of a Bureau of Highways under the Department of Public Works.[117] Creation of the new Bureau coincided with the advent of technological and material developments which would allow concrete construction to supersede the use of steel truss engineering in bridge building. Passage of the Federal Highway Act in 1921 promised federal monies to aid state road and forest highway construction. Due to increased funding, the Bureau of Highways capitalized on these developments in the inter-war era of the 1920s and 1930s and Idahoans enjoyed completion of several long-distance highways. Service stations and other roadside businesses went up along these routes and in communities along the way to serve not only tourists, but the increasing numbers of local automobile owners and commercial users.



Unidentified Bridge over Clover Creek, Elmore Co.
Courtesy ITD Online Photo Collection

[115] Herbst, 52.
[116] Elizabeth Rosin and Dale Nimz, National Register of Historic Places Multiple Property Documentation Form (Draft), "Roadside Kansas," (Kansas City, Missouri; Rosin Preservation, 2009), E-8.
[117] Ibid.



Rand McNally 1925 Auto Trails Map, detail of Southern and Eastern Idaho
Map courtesy of DavidRumsey.com

THE GREAT DEPRESSION AND WORLD WAR II: 1929 TO 1946

Though the onset of the Great Depression is typically defined as the October 1929 collapse of the stock market, a major agricultural recession was already underway throughout Idaho by the beginning of the 1920s. While the 'Roaring Twenties' took place in the general economy, Idaho farmers did not experience these conditions. Federal price supports during World War I caused famers nationwide to expand their production, however these supports were withdrawn at war's end and prices for farm products plummeted. Despite the organizing and political efforts of the Grange, the Farmer's Union, and the national American Farm Bureau Federation, many farmers were forced into bankruptcy. Many Idahoans tied to the agricultural sector left the state during the 1920s and Idaho experienced its lowest population growth to date, with an increase of only 3 percent between 1920 and 1930. The number of farms statewide dropped for the first time in Idaho's history.[118]

With the rest of the nation, Idaho's economy suffered also under the effects of the stock market crash of 1929. While the agricultural endeavors of many Idahoans allowed them to avoid food shortages experienced in urban centers, the prices of crops fell dramatically, crippling the state's rural economy. Despite the strained conditions during the Depression, Idaho saw a jump both in population growth and numbers of farms, indicating a pattern of return to farming and rural areas likely due to job scarcity in urban areas and as Dust Bowl refugees came

[118] University of Virginia, Historical Census Browser. Database online, http://mapserver.lib.virginia.edu/php/county.php (accessed August 11, 2013).

to Idaho in search of more promising agricultural and industrial employment opportunities.[119]

Little private development occurred during the Great Depression and the only significant construction nationwide took place through public building projects. Lower wage and labor costs coupled with high unemployment during the 1930s spurred President Franklin Roosevelt's make-work initiatives, known collectively as the New Deal, which funded the creation of a wide range of new agencies with the interconnected intent to put American's back to work. In Idaho, the Works Progress Administration (WPA), Public Works Administration (PWA), and the Civilian Conservation Corps (CCC) were perhaps the most impactful.

In Idaho, federal work programs spurred "the most active period of highway and bridge construction" to date."[120] Idaho ranked eighth nationwide in receipt of New Deal allocations through the PWA, WPA, and CCC programs that funded more than two hundred public buildings, including schools.[121] By 1940, the Idaho State Highway System had more than doubled its mileage since 1918, and the vast majority of its 4,857 miles of roads were graded with crushed rock, oiled, or paved thanks to New Deal money. Of singular significance in the development of Eastern Idaho infrastructure credited to the Corps was their construction of the Salmon River Road.[122] While ultimately abandoned, the effort to connect Salmon and Riggins with a road through the Salmon River Canyon was indicative of the optimism (or hubris) with which officials and engineers greeted the challenges of Idaho's forbidding terrain.

Federal highway appropriations to the individual states also dramatically increased during the New Deal decade and the Idaho Bureau of Highways took advantage of this opportunity to replace dozens of outdated structures which had been constructed of substandard materials and built to obsolete designs.[123] Additional funds administered by the federal Bureau of Public Roads and its partnering agencies were used to construct projects which would augment or compliment investment priorities of the state Bureau of Highways.

Two projects in particular illustrate the benefit of this cooperative coordination. Designed by the Forest Service and constructed by the Bureau of Public Roads on the Idaho-Montana Highway near Monida in 1934, the Pleasant Valley Creek Bridge is a massive, cantilevered, steel deck truss with concrete piers. Four years later, the Bureau of Public Roads completed the Pine Creek Bridge near Swan Valley on the Victor-Irwin Highway for $153,000.[124] The colossal steel arch employs a Pratt deck truss with concrete piers supporting the approach spans. Both bridges remain the only examples of their particular types in the state.

1934 Pleasant Valley Creek Bridge under construction
Courtesy Idaho State Historical Society MS281_03929

[119] "Dust Bowl Immigrants to Northwest Present Nation's Big Relief Problem," *Spokane Daily Chronicle*, April 8, 1937.
[120] Herbst, 33.
[121] Elizabeth Egleston, "Public School Buildings in Idaho," National Register of Historic Places Multiple Property Documentation Form, (Boise, Idaho: Idaho State Historical Society, 1991), E-2.
[122] Richa Wilson and Dan Everhart, *"Like Palaces to Us": Administrative Facilities of the Salmon-Challis National Forest, 1905-1960* (Ogden, Utah: USDA Forest Service, Intermountain Region, 2011).
[123] Herbst.
[124] Ibid.

1938 Pine Creek Bridge

The broad disruption of private construction resulting from the Great Depression continued after the United States entered World War II. As the nation refitted for wartime production, restrictions on construction materials and fuel led to a general cessation of private and public development. American engagement in World War II precipitated a halt to both state and federal investment in transportation with the exception of projects which would provide access to "war-essential" sites. Infrastructure improvements to reach mining operations critical to the national war effort comprised the majority of Idaho's roadway projects during the first half of the 1940s.[125]

POST-WAR PERIOD AND THE INTERSTATE SYSTEM: 1946-1970S

As the post-war economy stabilized around the country consumer demand increased, fueling production growth and contributing to a period of unprecedented economic prosperity. Wartime legislation, such as the GI Bill of Rights, provided subsidies for education, housing, and business endeavors, shifting the national economy away from its agricultural roots.

By the end of World War II, almost twenty years had passed during which the Great Depression and wartime restrictions had severely constrained construction, maintenance, and new development. Thus, there was a real and psychological need for new, clear symbols of progress. Deferred maintenance of the nation's infrastructure during World War II and improved economic conditions in the decade following the war led to road and building improvements nationwide. The auto industries refitted for automobile manufacturing, which had been ceased during the War, and consumer demand skyrocketed as Americans hit the road and the Baby Boom began. Statewide, Idaho experienced a 13 percent population increase during the 1950s.

Post-war America saw a short-lived recession as the workforce was glutted with returning GIs, but the national economy rebounded by the mid-1950s allowing generous federal funding of the country's highway system. Simultaneously, the decline of the railroad as a means of travel coupled with the rising dominance of American automobile culture led to exponential expansion and improvement of the Gem State's roadways.

After the war, management of the state's roads was revised yet again when the Bureau of Highways was removed from the administrative oversight of the Department of Public Works and reorganized as the State Department of Highways in 1949.[126]

Federal investment in infrastructure was further enhanced with the passage of the Interstate Highway Act in 1956.[127] Massive congressional appropriations under the Act permitted the development of a modern freeway system to allow for Cold War military readiness.

[125] Eaton, Equals, Erickson, and Mathis.
[126] Ibid.
[127] Ibid.

In Eastern Idaho, national expectations for efficiency in travel between the states resulted in the prioritization of routes through the region. The designation and construction of Interstate 15 facilitated travel between Salt Lake City and Helena, Montana while Interstate 84 connected Salt Lake to Portland, Oregon through Boise and across the Snake River Plain. Interstate 86 superseded U.S. Highway 30 and connected I-84 and I-15.

Across the state, Idaho's highway officials concentrated their freeway construction efforts on routes where the existing system was no longer adequate to meet the needs of ever-increasing traffic. Despite unprecedented investment in new construction during this era, roadway mileage managed by the Department of Highways remained relatively stable as older sections of highway replaced by the new interstate were either given to local jurisdictions or abandoned altogether. Substantial completion of the state's federally-funded and designated freeway system coincided with the legislature's abolition of the Department of Highways and creation of the Idaho Transportation Department in 1974.[128]

While advances in bridge engineering accelerated the use of concrete construction in favor of the steel truss, a few post-war projects relied heavily on steel. The replacements of both the Hansen and Perrine bridges across the Snake River Canyon in 1966 and 1976, respectively, employed steel to facilitate erection of structures expected to span the enormous chasm. The Hansen Bridge is a steel girder structure raised 350 feet above the river on telescoping concrete piers which received an Award of Merit from the American Institute of Steel Construction.[129] The main span of the Perrine Bridge's weathered steel truss arch is nearly 1,000 feet long. At 486 feet above the river, it is the eighth highest bridge in the nation.[130]

1966 Hansen Bridge

1976 Perrine Bridge

[128] Ibid.
[129] Ibid.
[130] Ruth Miller, "New Bridge Due to Span Snake Canyon by 1974" *The Twin Falls Times-News*, June 25, 1972, D-4.

MATERIALS AND TECHNOLOGY OVERVIEW

By 1910, most metal trusses were constructed of built-up members composed of mass-produced, standard-shaped channel, plate, and angle stock purchased from one or more of the numerous steel companies nationwide. The bridge companies preassembled trusses in their factories then simply shipped them to the bridge site for installation. Installation involved grading approaches, constructing abutments and piers, erecting preassembled floor and truss members, and placing deck material.

Prior to 1900, generally all panel point connections – the locations at which structural bridge elements intersect – were made with the use of a pin. This technique was so widespread that it became one of the distinctive features of American bridge construction in the nineteenth century. The pin-connected construction of the Salmon River Parker Truss Bridge illustrates the standardization of this technique. However, subsequent advancements in pneumatic riveting techniques greatly improved rivet installation quality, enabling more reliable panel point connections. With the increased portability of this construction technology, the more rigid, riveted technique rapidly surpassed pin-connected bridge construction during the first years of the twentieth century.

In addition, the contemporary development of economical cement production promoted the widespread combination of steel and concrete in bridge construction. By the 1920s, reinforced concrete was the standard material for abutments, piers, and decks of steel truss bridges. It was not uncommon for older metal truss bridges to receive new reinforced concrete decks or poured concrete reinforcements for older stone abutments.

Typical pin connection (bottom node)

Typical riveted connection (bottom node)

After World War II, standardization of materials, engineering, and design became widespread as agencies such as the Bureau of Public Roads (BPR), National Research Council, Highway Research Board, and the American Association of Highway Officials (AASHO) conducted cooperative research projects with the goal of utilizing a scientific approach toward highway and bridge construction.[131] BPR and AASHO published roadway and bridge standards based on traffic loads, speeds, spans, and so forth. In the post-World War II era, these publications, updated regularly to reflect technological advancements and materials testing, emphasized reinforced concrete and steel bridges. Innovations introduced in these specifications were adopted by the bridge construction industry and by the late twentieth century prestressed concrete and steel girder bridges became ubiquitous nationwide.

[131] *Utah Historic Bridge Inventory: Volume 1*, Mead & Hunt, Inc., 2011), 63-68.

BUILDERS, FABRICATORS, AND MANUFACTURERS

Brief biographies of the selected bridge builders, truss fabricators, and steel manufacturers identified as part of the current survey effort are in alphabetical order below.

Dan J. Cavanagh (1883-1971)

A native of Missouri, Dan Cavanagh was a bridge builder, road contractor, sheep rancher, and politician based out of Twin Falls. He also reportedly constructed a number of buildings throughout the Twin Falls region. Cavanagh represented the Twin Falls area in the Idaho legislature from 1933 to 1937, was one of Idaho's delegates to the Democratic National Convention in the 1940s and 1950s, and also served as a presidential elector for a number of years.[132]

Review of ITD records online show Cavanagh's name in relation to bridge and road work bids as early as 1919. Among the works known to have been associated with him include:

1919: Hansen Suspension Bridge

1922: Five bridges on the Idaho Central Hwy between Corral and Fairfield, Camas County

1923: Reinforced concrete bridge on the Yellowstone Park Hwy, north of Kimball, Bingham County

1923: resurfacing of the main canal bridge near Murtaugh, and the Malad Bridge near Hagerman

c.1931: Bear River Warren Truss Bridge (Riverdale Road; Preston Vicinity)

1936: West Bridge Street Bridge (Blackfoot)

1943: Improvements on the Twin Buttes & Shelley-New Sweden Highway, Bonneville County

(no date) re-flooring of the 1927 Perrine Bridge (date unknown)

(no date) "a number of bridges across Rock Creek"[133]

J.H. Forbes and Company

Based in Caldwell, Idaho, the J.H. Forbes bridge-building endeavor was among the earliest, if not the first, Idaho based bridge-building companies. The firm started operations in Emmett and then Caldwell in 1903-1904 and remained in business until at least the 1930s. Among the completed projects were infrastructure improvements in the area, such as Canyon Canal Dam, Emmett electric light plant, and the water works at both Emmett and Parma. As road improvement activity peaked statewide in the 1910s, so did Forbes' bridge construction operation. Primarily based in southern Idaho, he is known to have been associated with about 25 bridges, most of which were of the pin-connected steel truss type.


references. American Laundry Co.

WANTED—Highway bridge foreman at once; long job for right man. J. H. Forbes & Co., Caldwel, Idlaho.

Idaho Statesman, September 24, 1913

Among the Eastern Idaho bridges known to be associated with Forbes are the Salmon River Pratt Truss Bridge (Lyon Creek), Salmon River Parker Truss Bridge (Clayton vicinity), and Salmon River Pratt Truss Bridge at Bayhorse Creek.

[132] "Cavanagh, Dan J.," Index to Politicians, 2015. Available from http://politicalgraveyard.com/geo/ID/farmer.html

[133] *The Times News* (Twin Falls, Idaho), March 29, 1971. The historic record is not consistent as to the timing of his arrival to Twin Falls, with some sources suggesting 1922 and others suggesting much earlier.

Helmer & Mull

Helmer & Mull was a partnership between contractor, Charles H. Helmer, and civil engineer, Charles H. Mull, and based in Twin Falls. The historic record indicates they primarily worked separately but partnered on several projects in the mid-1910s. Individually they worked through southern Idaho during the first half of the twentieth century. Among their shared projects were: highway road work on the Idaho Pacific Highway from Owsley's Ferry to Cassia County (1913); road and bridge work along 50 miles of the "east-west highway" across Twin Falls County (1914); and the twin bridges over the Low Line and High Line canals (Buhl vicinity).

Max J. Kuney Company

Founded in 1930, this firm is still in business today as Kuney Construction and still based out of Spokane, Washington. The company's website states they are "one of the longest tenured General Contractors in the Northwest."[134]

Prior to founding his own business, Max Kuney was in the partnership, Crick & Kuney as early as 1928, at which time they bid on road and bridge projects in northern Idaho, including locations in Bonner, Nez Perce, and Kootenai counties. In July 1928 they were awarded a $54,048 contract for work on 5.8 miles of the North-South highway in Kootenai County.

In 1930, Kuney created his own firm and was involved in transportation and infrastructure projects throughout the Northwest over the next several decades. The company reportedly completed public works projects for the U.S. Army Corps, Navy, and Departments of Transportation in Washington, Oregon, Idaho, Montana, and Alaska. Notable projects included involvement on the 1960s completion of Dworshak Dam near Orofino, Idaho, and Spokane's elevated freeway. Among the company's known road construction projects contracted through the State of Idaho are:

1935: 15.5 miles of road improvement (bitumous paving and rock shoulders) in Lewis and Nez Perce counties

1935: 16.5miles of road improvement in Idaho County

1936: OSL Parker Truss Overpass Bridge (Spencer vicinity)

1948: Road improvement in Benewah and Kootenai counties

1949: Road improvement on Hwy 10 in Shoshone County

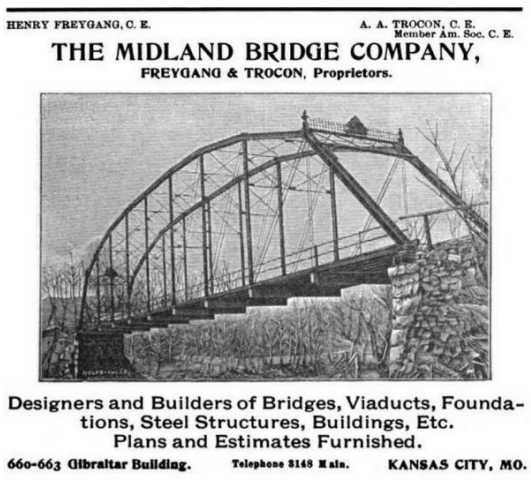
1950: Road construction/improvement along 8+ miles of US Hwy 95 in Latah County

A native of Oregon, Max Kuney (1894-1981) began his career as a surveyor in Portland in the 1910s. By 1917 he was working as an engineer for A.E. Comm in Salem, Oregon. He later worked as a railroad construction engineer in Newport, Oregon, around 1920. In the late 1920s he partnered with James T. Crick on road projects in the region, including Idaho. In 1930, Kuney formed his own company and was listed in the census and city directories for the next several decades as a road/railroad contractor or 'heavy construction' contractor. He passed away in 1981 in Alameda, California, and yet his name is still attached to the successful construction company in Spokane.

[134] "Company History," (Spokane, Washington: Max J. Kuney Company, no date). Available from http://maxkuney.com/about.

Midland Bridge Company

Albert Alexander Trocon (b. 1864), a native of Leavenworth, Kansas, worked his way up through the ranks at Missouri Valley Bridge & Iron Works in the 1880s and 1890s to become their chief engineer. Around 1900 he partnered with Henry Freygang, an 1880 mechanical engineering graduate of Stevens Institute of Technology (Hoboken, New Jersey), to form the Midland Bridge Company.[135] Polk's 1904 Kansas State Gazetteer and Business Directory listed the company as "consulting engineers, Designers and Builders of Bridges, Viaducts, Foundations, Steel Structures, Buildings, Etc."


HENRY FREYGANG, C. E. A. A. TROCON, C. E. Member Am. Soc. C. E.

THE MIDLAND BRIDGE COMPANY,

FREYGANG & TROCON, Proprietors.

Designers and Builders of Bridges, Viaducts, Foundations, Steel Structures, Buildings, Etc.
Plans and Estimates Furnished.

660-663 Gibraltar Building. Telephone 3148 Main. KANSAS CITY, MO.

Courtesy Polk's 1904 Business Gazetteer

The company remained in operation through at least the 1920s, during which time both Trocon and Freygang were members of the American Society of Engineers. The Kansas City, Missouri-based firm completed many notable projects including major river crossings along railroads and newly established highways, and fabrication of ocean ships and barges, as well as countless small projects throughout the West and Midwest.

Among the Eastern Idaho bridges known to be associated with Midland Bridge Company are the Bear River Warren Truss Bridge (Oneida Narrows Road).

Missouri Valley Bridge and Iron Company

The Missouri Valley Bridge and Iron Company, of Leavenworth, Kansas, was a prolific bridge builder from the late nineteenth century through the twentieth century. Formed in 1874 by Edwin I. Farnsworth and D.W. Eaves of Wrought Iron Bridge Company (Canton, Ohio), the Missouri Valley Bridge Company was their endeavor to manufacture and sell bridges locally rather than import them from eastern firms. Among their early contracts was the completion of a number of bridges along the Leavenworth, Topeka & Southwestern Railroad. By 1904, the company incorporated as the Missouri Valley Bridge and Iron Company and built everything from boats to bridges. The company completed bridge construction projects nationwide and in some parts of Mexico, while also manufacturing general iron work for jails and courthouses. Early twentieth century issues of *Engineering News* indicate Missouri Valley Bridge and Iron was a major contractor/fabricator of vehicular bridges in Kansas, Oklahoma, New Mexico, Louisiana, and other states in west, south, and southwest.[136]

Bear River Warren Truss Bridge (Riverdale Road, Preston vicinity), construction plaque, 2017

[135] Sources vary, with some suggesting the firm was in existence by 1895 and other sources indicating it was not formed until closer to 1900.

[136] Larry Jochims, *Metal Truss Bridges in Kansas 1861-1939,* National Register of Historic Places Multiple Property Documentation Form (Topeka: Kansas State Historical Society, 1989), E3.

During World War I and into the 1940s, the company completed significant ship and floating dock projects, as well as deep underwater foundation projects. Among their most notable projects was the completion of the piers for the 1936 San Francisco Bay Bridge.

After World War II, as steel bridges became more obsolete, the company's bridge division was phased out. In the late 1970s, the company was liquidated and reorganized into the more generic Missouri Valley Fabricators.[137].

Known examples of their work in Idaho include the 1911 8th Street Bridge in Boise and the c.1931: Bear River Warren Truss Bridge (Riverdale Road, Preston vicinity).

Omaha Structural Steel Works

Originally founded by John W. Towle and Fred K. Smith in 1906 as Omaha Steel Works, this company (also known as Omaha Structural Steel Bridge Company), fabricated steel stock for bridges, buildings, railroad infrastructure, and automobiles. They produced the steel for the Nebraska State Capitol building and produced artillery shells and landing craft tanks during World War II. The company transitioned into various subsidiaries and changed its name to Omsteel Industries in the 1960s. It is still in operation today as Omaha Steel with headquarters in Wahoo, Nebraska.

Little Wood River Warren Truss Bridge (North Birch Street, Shoshone), construction plaque, 2017

Among the Eastern Idaho bridges known to be associated with Omaha Structural Steel are the Little Wood River Warren Truss Bridge (North Birch Street, Shoshone).

Perham and Harris

Active from around 1905 through around 1920, the partnership of H.W. Perham and A.D. Harris was responsible for the construction of numerous resources in southeastern Idaho and neighboring states during a period of remarkable growth in the region. Based in St. Anthony,[138] the partnership completed various bridges, buildings, and infrastructure projects throughout southeastern Idaho, Montana, and Wyoming during the first decades of the twentieth century. In 1923, both Perham and Harris were still living and working in St. Anthony as bridge builders, but by this time the city directory no longer lists the partnership as extant. By 1930 Harris had left Idaho, while Perham continued bidding on projects in the region, either on his own or with a partner by the surname of Coffin.

Hugh Worth Perham (1862-1951), a native of Oregon, came to St. Anthony between 1900 and 1907 from Butte, Montana, where he had worked as a contractor. Census records from 1910 through 1930 show him living in St. Anthony and working as a bridge and building contractor. ITD minute books from the 1910s through early 1930s show he bid upon and was awarded projects submitted either on his own, or in the partnerships of Perham & Harris or Perham & Coffin. According to the Ashton, Idaho, centennial history, "Hugh Perham built many of the first buildings" and was "possibly" the first builder in town.

[137] "Missouri Valley Bridge and Iron Company Records," Kansas State Historical Society Collections Summary. Available from www.kshs.org/archives/40167. Accessed May 8, 2018.

[138] The MPDF *Metal Truss Highway Bridges of Idaho* states Perham and Harris were of Rexburg but no other source corroborated this information.

Austin D. Harris (1873-1960), a native of Ohio, came to St. Anthony between 1900 and 1907. In 1910 he was living as a lodger in H.W. Perham's house in St. Anthony, at which time his occupation was listed as 'bridge contractor.' He worked in partnership with H.W. Perham, as well as on his own, until the mid-to-late 1920s when he moved back to Munroe Falls, Ohio, where he worked as a general contractor and remained until his death in 1960.

Among the Idaho projects known to have been awarded and/or attributed to Perham and Harris are:

c.1900 Vernon School, Fremont County[139]

1907: Henry's Fork Pratt Truss Bridge (Chester vicinity)

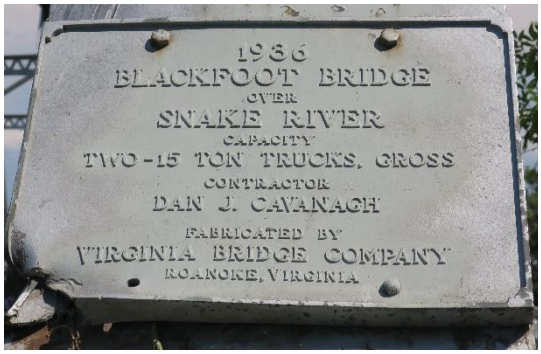
1909: Fremont County Courthouse (designed by Wayland and Fennel; NRHP listed)

1920: Multiple unspecified bridges on the Yellowstone Highway in Jefferson County

1920: A concrete dam at the "source of the outlet to Henry's lake" for irrigation purposes; contract amount $34,000

Virginia Bridge Company

Established in 1888 as American Bridge Works, the company was reorganized as Virginia Bridge and Iron Company in 1895. Manufacturing iron and steel products, as well as fabricating trusses for delivery nationwide, the company grew to become the largest of bridge manufacturer in the South. In addition to bridge components, they produced steel rail cars, tanks, power houses, and stadiums.[140] During the early twentieth century the company expanded to include branch operations in Charlotte, North Carolina, Atlanta, Georgia, and Memphis, Tennessee, New York, New York, and Los Angeles, California.



West Bridge Street Bridge (Blackfoot), construction plaque, 2017

By the early 1930s, the company was the third largest steel fabricating company nationwide. In 1936, the Tennessee Coal, Iron and Railroad Company of Birmingham, Alabama, (a subsidiary of U.S. Steel Corporation), acquired Virginia Bridge and Iron Company and reorganized the Roanoke operations as the Virginia Bridge Company. During World War II, the company shifted to the manufacture of products for the war effort (e.g. ships, barges, dry docks, portable military bridges). Acquisition by American Steel Company and subsequent labor disputes contributed to the company's closing in the mid-twentieth century.

Though the majority of bridges associated with Virginia Bridge Company were constructed east of the Mississippi, the company was also considerably active in the West, with extant examples in California, Oregon, Washington, and Idaho. Known examples of their work in Idaho include the 1926 Oldtown Bridge in Bonner County (nonextant)[141] and the 1936 West Bridge Street Bridge in Blackfoot.

[139] A secondary source states the building was built in 1900 by Perham and Harris, however neither man was living in Idaho yet, so this attribution is unconfirmed. *Ashton, Idaho: The Centennial History, 1906-2006.*

[140] Kirsten Peeler and Kathryn Kuranda, "Fort Belvoir Railroad Bridge (Facility No. 1433)," Historic American Engineering Record, HAER No. VA-141, (R. Christopher Goodwin & Associates, 2012), 16.

[141] The Old Town Bridge was replaced in 1988, at which time it was documented into the HAER. http://bridgehunter.com/id/bonner/oldtown/

STEEL MANUFACTURES

Carnegie Steel Company

Carnegie Steel Marking
(Henry's Fork Pratt Truss Bridge (aka Fun Farm Bridge))

Originally founded in 1874 as the Thompson Steel Works in Braddock, Pennsylvania, Carnegie Steel Company later reorganized as Carnegie Steel in 1892 with headquarters in Pittsburgh. Known for the persistent drive to lower costs, Andrew Carnegie's steel company often undersold the competition, making stock steel affordable to a fast-developing nation. Considered one of, if not the, most productive steel operations in the world, Carnegie Steel became a model in the industry. In 1901, J.P. Morgan bought Carnegie Steel as one of U.S. Steel's subsidiaries after which it kept the Carnegie name until 1936, when it was renamed Carnegie-Illinois Steel Company. Among the Eastern Idaho bridges made from Carnegie stock steel are the Henry's Fork Pratt Truss Bridge (aka Fun Farm Bridge).

Illinois Steel

Illinois Steel formed in 1889 from a consolidation of several existing, smaller steel companies in Illinois and Wisconsin that had been founded in the 1850s through 1870s. With controlling interests in railways, coal mines, iron mines, and limestone mines throughout the Midwest and Mid-Atlantic regions, the company grew to become one of the largest steel manufacturers nationwide. Various mergers at the turn of the twentieth century resulted in its consolidation into the newly formed Federal Steel Company and then U.S. Steel, the process of which included such prominent players as J.P. Morgan and Andrew Carnegie.

Illinois Steel Marking
(Salmon River Warren Truss Bridge (Rattlesnake Creek)

Among the Eastern Idaho bridges known to have Illinois Steel stock parts are the OSL Parker Truss Overpass (Spencer vicinity), West Whitman Street Warren Truss Bridge (Pocatello), Bear River Warren Truss Bridge (Oneida Narrows Road), Owsley Bridge (Hagerman vicinity), and Salmon River Warren Truss Bridge at Rattlesnake Creek (Salmon vicinity).

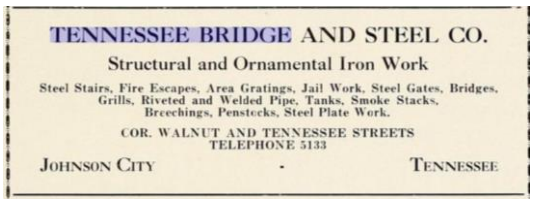
Cambria Iron Works

Cambria Iron Works Marking
(Little Wood River Warren Truss Bridge (E. 3rd St.)

Originally founded in the mid-nineteenth century in Pennsylvania, it became one of the largest steel manufacturers nationwide before it was eventually absorbed by Bethlehem Steel in 1923.

Among the bridges known to have Cambria Iron Works stock steel are the Camas Creek Truss Leg Bedstead (Fairfield vicinity), Salmon River Parker Truss Bridge (Clayton vicinity), Salmon River Pratt Truss Bridge at Bayhorse Creek, and Little Wood River Warren Truss Bridge (East 3rd Street, Shoshone),

Tennessee Bridge & Steel


TENNESSEE BRIDGE AND STEEL CO.
Structural and Ornamental Iron Work
Steel Stairs, Fire Escapes, Area Gratings, Jail Work, Steel Gates, Bridges, Grills, Riveted and Welded Pipe, Tanks, Smoke Stacks, Breechings, Penstocks, Steel Plate Work.
COR. WALNUT AND TENNESSEE STREETS
TELEPHONE 5133
JOHNSON CITY · TENNESSEE

1928 advertisement, *The Buffalo,* Milligan College, TN

Founded in 1926 as the structural steel division of the Johnson City Foundry and Machine works, Tennessee Bridge and Steel operated until at least the mid-1960s.[142] Based in Johnson City, Tennessee, the company was primarily active east of the Mississippi. The company is known to have fabricated the stock steel for at least one Eastern Idaho bridge – the West Bridge Street Bridge (Blackfoot).

Tennessee Steel Marking
(W. Bridge Street Bridge, Blackfoot)

Lackawanna Steel

Lackawanna Steel Marking
(Little Wood River Warren Truss Bridge (Bellevue vicin.)

Founded in 1840 by George and Seldon Scranton, in Scranton, Pennsylvania, the Lackawanna Steel Company grew to become the second largest steel manufacturer in the world. The headquarters moved to an area on the outskirts of Buffalo, New York, in 1902, resulting in the founding of the town of Lackawanna, New York. The company was absorbed into Bethlehem Steel in 1922, after which time steel stock had letters in relief that read, "BSC Lackawanna" or "B.S.Co. Lackawanna."

Among the bridges known to have Lackawanna Steel stock parts are the Camas Creek Pratt Truss Bridge (Fairfield vicinity), Big Wood River Warren Truss Bridge (Gooding vicinity), Blue Lake Bridge (Twin Falls), Little Wood River Warren Truss Bridge (North Birch Street, Shoshone), and Little Wood River Warren Truss Bridge (Bellevue vicinity).

[142] *The Buffalo,* (Elizabethton, Tennessee: Milligan College, 1928,) 132; and "Johnson City Foundry Supplied Steel for Kingsport Industries," *Kingsport Times-News* (Kingsport, Tennessee), September 25, 1949, 60.

Inland Steel

Formed in 1893 from bankrupt and liquidated Chicago Steel Works, Inland Steel operated near Lake Michigan in the Indiana suburbs of Chicago. The company experienced major growth in the first years of the twentieth century, and continued successfully through the Great Depression, with only a single year (1932) showing a loss. Despite a variety of downturns and upswings over the decades, Inland Steel remained strong until the late twentieth century, at which time it was finally absorbed into Ispat International in 1998.

Inland Steel Marking
(Bear River Warren Truss Bridge (Riverdale Road)

Among the bridges known to have Inland Steel stock parts are the Camas Creek Pratt Truss Bridge (Fairfield vicinity), Bear River Warren Truss Bridge (Riverdale Road), and Lemhi River Warren Truss Bridge (Salmon vicinity),

CONCLUSION

Eastern Idaho's historic steel bridges communicate some of the earliest and ongoing patterns of transportation and development in the region. These structures represent effective responses to the need for all-weather crossings of rivers, streams, canyons, and canals that corresponded to the growth of the market economy across Eastern Idaho during the late nineteenth century and through the mid-to-late twentieth century. Bridges providing reliable access to markets could make the difference between growth and stagnation for the region's many small, fledgling communities.

Once very common and now increasingly rare, historic steel bridges illustrate trends in settlement, technological advancements, and solutions to geographic obstacles. Often meeting National Register of Historic Places criteria for significance – typically under Criterion A for Transportation and/or Criterion C for Engineering – historic steel bridge documentation and eligibility assessment is warranted not only to facilitate compliance with federal preservation regulations affecting their management, but also as a means of recording key underlying themes in Eastern Idaho history.

SELECTED BIBLIOGRAPHY

An Illustrated History of North Idaho. Spokane, Washington: Western Historical Publishing, 1903.

Beal, Merrill D. *The Utah and Northern Railroad: Narrow Gauge*. Pocatello, Idaho: Idaho State University Press, 1980.

Beal, Samuel M. *The Snake River Fork Country*. Rexburg, Idaho: The Rexburg Journal, 1935.

Boone, Lalia. *Idaho Place Names: A Geographical Dictionary*. Moscow, Idaho: University of Idaho Press, 1987.

Chase, Cody. "A Look at Bridges: A Study of Types, Histories, and the Marriage of Engineering and Architecture." New London, Connecticut: Connecticut College, 2015.

Clements, Louis J. and Harold S. Forbush. *Pioneering the Snake River Fork Country.* Rexburg, Idaho: Eastern Idaho Publishing Company ,1972.

Comp, T. Allan and Donald Jackson. *Bridge Truss Types: A Guide to Dating and Identifying.* Nashville, Tennessee: American Association for State and Local History, Technical Leaflet 95 (no date.

Eaton, W.P., Edward Equals, L.F. Erickson, and Ellis L. Mathis. *Idaho's Highway History: 1863-1975*. Boise, Idaho: Idaho Transportation Department, 1985.

Fisher, John, et al. "Steel Bridges in the United States: Past, Present, and Future." Transportation Research Circular E-C104, September 2006.

Gowans, Fred R. *Rocky Mountain Rendezvous*. Salt Lake City: Gibbs Smith. 1985.

Hawley, James H. *History of Idaho*. Chicago: S.J. Clarke Publishing Company, 1920.

Herbst, Rebecca. *Idaho Bridge Inventory,* Volume 1. Boise, Idaho: Idaho Transportation Department, 1983.

Jochims, Larry. *Metal Truss Bridges in Kansas 1861-1939.* National Register of Historic Places Multiple Property Documentation Form. Topeka: Kansas State Historical Society, 1989.

Parsons Brinckerhoff and Engineering and Industrial Heritage. A Context for Common Historic Bridge Types, NCHRP Project 25-25, Task 15. Washington, D.C.: National Cooperative Highway Research Program, Transportation Research Board, 2005.

Ricketts, Virginia. *Then and Now in Southern Idaho*. Jerome, Idaho: Falls City Publishing, 1998.

Rosin, Elizabeth and Dale Nimz, National Register of Historic Places Multiple Property Documentation Form (Draft), "Roadside Kansas." Kansas City, Missouri; Rosin Preservation, 2009.

Utah Historic Bridge Inventory: Volume 1. Mead & Hunt, Inc., 2011.

Vincent, Carol Hardy, Laura A. Hanson, and Carla N. Argueta. *Federal Land Ownership: Overview and Data*. Washington, D.C.: Library of Congress, Congressional Research Service, 2017.

Watts, Donald. National Register of Historic Places Multiple Property Documentation Form, "Metal Truss Highway Bridges of Idaho." Boise, Idaho: Idaho State Historic Preservation Office, 2000.

APPENDIX A

NRHP EVALUATION CRITERIA

The physical characteristics and historic significance of a resource provide the basis for evaluating NRHP eligibility. A property or district must be associated with an important historic context and meet a combination of the criteria outlined below. Opinions of potential eligibility should be approved by the Idaho SHPO prior to proceeding with nomination to the National Register of Historic Places.

Age Requirements

To allow sufficient time to gain historical perspective, the National Register of Historic Places uses a minimum age guideline of fifty years before a resource is considered eligible. However, it should be noted that it also allows for the evaluation of resources that have achieved significance in the past fifty (50) years if they are of exceptional importance.

Significance Requirements

In addition to integrity, properties listed in the NRHP must meet certain criteria of historic significance. Historic significance is the importance of a property to the history, architecture, archaeology, engineering, or culture of a community, a state, or the nation. To be listed, properties must have significance in at least one of the following areas:

Criterion A: Association with events, activities, or broad patterns of history.

Criterion B: Association with the lives of persons significant in our past.

Criterion C: Embody distinctive characteristics of construction, or represent the work of a master, or possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: Have yielded, or be likely to yield information important in prehistory or history.

Integrity Requirements

A property's level of integrity — the degree to which it retains its physical and historic character-defining features and is able to communicate its significance — is a key factor in determining whether it may be eligible for NRHP listing. The National Register of Historic Places defines seven physical aspects of integrity against which a property or district must be evaluated:

- Location
- Design
- Setting
- Materials
- Workmanship
- Feeling
- Association

To maintain integrity, a property must possess at least several of these aspects, enough so that the essential physical features that enable it to convey its historic significance remain intact. Determining which aspects are important to integrity requires knowledge of why, when, and where the property is significant. For additional information about the National Register of Historic Places, visit http://www.nps.gov/nr/.