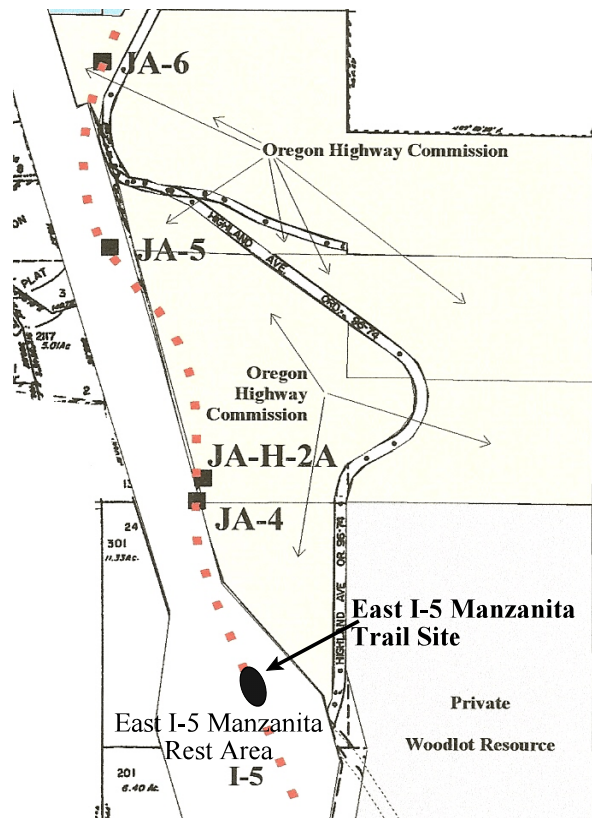


# APPENDICES

## NON-SURVEYED APPLGATE TRAIL SITE: EAST I-5 MANZANITA REST AREA MET VERIFIED



**Mike Walker, Member**

Hugo Emigrant Trails Committee (HETC)  
Hugo Neighborhood Association & Historical Society (HNA&HS)

**June 5, 2015**

**NON-SURVEYED APPLGATE TRAIL SITE:  
EAST I-5 MANZANITA REST AREA MET VERIFIED**

**APPENDICES**

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## **Appendix A. Hugo Neighborhood Association & Historical Society (HuNAHS) Standards for All Emigrant Trail Inventories and Decisions**

The Hugo Emigrant Trails Committee (HETC), HuNAHS (*Hugo Neighborhood*), has been working on researching, mapping, and documenting the 1846 - 1883 *Trail* in northern Josephine County, Oregon for over one and one-half decades. The HETC was formally organized by the HuNAHS Board in 2005 (HETC. May 14, 2005. *Mapping Action Plan For Applegate Trail Program*. Hugo, OR). Per the 2005 policy of the *Hugo Neighborhood* the standards for all emigrant trail inventories and decisions would be documented using the standards of OCTA's *Mapping Emigrant Trails (MET) Manual*. This policy was continued March 2012 when the Hugo Applegate Trail Marking & Mapping Project Agreement was finalized and signed by its partners: Northwest Chapter, Oregon-California Trails Association (NWOCTA); *Hugo Neighborhood*; and the Josephine County Historical Society (JCHS). Over the years, the work of the HETC's two sub-committees has been just outstanding researching and installing wooden *Trail* survey markers, and later OCTA carsonite markers. Both the Diaries, Journals, and Reminiscences Sub-Committee, and the GLO Field Review SubCommittee (GLO SubCommittee) are to be commended, with their work complementing each other.

## **Appendix B. HuNAHS' Policy for Document Verification & Reliability of Evidence**

The HETC, Hugo Neighborhood Association & Historical Society, believes that historical trail inventories must be systematically and comprehensively documented for verification and reliability of evidence. This approach will foster credibility and lead to public trust and acceptance, and just as important it will result in more accurate inventories.

For the HETC, verifiability means other researchers and the public reading its educational brochures or other inventory documents can check where the information comes from and make their own determination if the references or sources are reliable. The HETC's goal is not to try impose "the truth" on its readers, and does not ask that they trust something just because they read it in an HETC document. It does not ask for their trust. Its goal is to empower other researchers and the public through educational materials that can be checked in order for them to find their own truth.

HETC's articles are intended as intelligent summaries and reflections of current published information, as well as an overview and analysis of the relevant literature. Verifiability is related to another core content concept, neutral point of view, which holds that the HETC include all significant views on a subject. Citing reliable sources for any material challenged or likely to be challenged gives readers the chance to check for themselves that the most appropriate sources have been used, and used as well as the applicable evidence available.

That the HETC has guidelines for the inclusion of material does not mean HETC has no respect for truth and accuracy, just as a court's reliance on rules of evidence does not mean the court does not respect truth. HETC values accuracy, but it *requires* verifiability.

Toward those transparent inventory goals, the HETC combines ideas from HNA&HS's and OCTA's missions; the MET Manual (i.e, general principles governing trail location and verification, and ranking the reliability of evidence used to verify trail location); OCTA Mapping, Marking, and Monitoring (MMM) program; and its own ideas about adequate information.

The HETC believes transparent inventories has to do with disclosure, discussion and documentation (DDD). At the first level transparency is providing information about an issue, event, project, policy, program, etc. and then providing a way for other researchers and the public to find and review that information.

At the second level the definition of transparency is defined as DDD in the sense of credibility and accountability. After all, these issues, projects, and programs all have to do with the public's interest, and potentially using public money, or perhaps others' private money. For example, all trail inventories usually lead to a trail classification category and a recommended management regime that costs money. The HETC's and OCTA's classification categories for trails are designed to assess the condition of trails at the time of mapping and establish a basis on which to recommend levels of preservation and use for trails on public lands. The HETC encourages private landowners to consider the recommended levels of preservation and use for trails.

The HETC believes inventory information becomes more valuable as it is shared, and less valuable as it is hoarded, or simply not documented. Adequate information is a goal the HETC strives for all its published materials. It believes that any inventory opinion for purposes other than therapeutic subjective venting, should meet standards of adequacy to have any credibility. Any opinion purported to be based on analysis must meet standards of adequacy for an inventory decision to be credible. Any significant controversial inventory issue must meet stringent standards of adequacy for the final inventory decision to be credible and, therefore, its best opportunity to be accepted and supported by other researchers and the public.

An adequate trail inventory analysis has several elements, along with published documentation.

- Information Is Understood Or Not
- Supporting Arguments Are Made Or Not
- Standard(s) of Review Have Been Identified Or Not
- Applicable Evidence/Facts Are Available Or Not
- References and Sources of Information Were Identified Or Not
- Compliance With Adequacy Information Analysis Elements Or Not

Walker, Mike. July 4, 2012. *Historical Trail Inventories Must Document Verification And Reliability Of Evidence* - Draft Proposal to Hugo Emigrant Trails Committee. Walker is the Education Chair, Hugo Neighborhood Association & Historical Society. Hugo, Oregon. Not web published.

In summary, the document verification and reliability of evidence guidelines should be met for all HETC emigrant trail analysis and documentation.

## **Appendix C. HETC's Standards: Emigrant Trail Inventories and Decisions**

The 2013 Co-Project Leaders, HETC, support OCTA's goal to produce the definitive analysis, documentation, and mapping of the overland emigrant trails based on the research methods, field verification techniques, and classification system advanced in the MET Manual (Section I.C).

MET Manual Conclusion. Parts of our priceless national heritage are being threatened or lost every year simply because of the lack of authoritative knowledge about trail locations. Consequently, it is important that OCTA map the trails as quickly as possible, consistent with historical accuracy, and make this information available to public agencies and private landowners for purposes of trail preservation. Therefore, the sooner the MET program is completed, the sooner our overland-trails heritage will be protected and preserved.

A foundation principal of the HETC, HNA&HS, carrying out its mission in the winter-wet, mountainous terrain of Southwestern Oregon is to research and map emigrant trails through the use of the methods and procedures identified in the OCTA MET Manual.

The accuracy and reliability of the MET program rests on the quality of research; it is therefore important to emphasize the methods used to locate and verify emigrant wagon trails.

Documentary evidence (trail literature of all types) is the main historical resource available to the trail researcher, therefore, MET participants must have a basic familiarity with the literature of the trails. Emigrant diaries and journals, and GLO/DLC surveys in western Oregon are eyewitness accounts of trails, and usually provide the most reliable documentary evidence for trail research and field verification.

For the location of an emigrant trail segment to be considered as verified, it must conform to the MET's Cardinal Rules: 1. Coherence Rule: Linear Uniformity, 2. Corroborative Rule: Confirming [Written] Evidence, 3. Collateral Rule: [Written Confirming] Physical/Topo Evidence, and 4. Correlation Rule: Overall Agreement.

In the best of all situations, the trail researcher examines all the relevant written, cartographic, physical, and artifact evidence, and finds them mutually supporting. A ranking of relative reliability of different types of evidence is identified when the evidence is not mutually supporting.

Guidelines for locating wagon trails focus on the most common surface characteristics and configurations, as well as other indicators, that can be used to locate and identify emigrant wagon trails.

Five classification categories for overland emigrant trails are designed to assess the condition of trails at the time of mapping and establish a basis on which to recommend levels of preservation and use for trails on public lands.

Finally, the HETC recognizes as OCTA does that no system is perfect and it applauds OCTA's ongoing efforts to revised the MET Manual as needed.

## Appendix E. General Principles Governing Trail Location & Verification (2002 MET, p. 4)

- Trail Mapping Committee. October 1, 2014, 5<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.
- Trail Mapping Committee. July 2002, 4<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.

**1. Probability** All too often the exact location of an emigrant trail segment cannot be verified with absolute certainty. In most situations, however, the trail researcher can strive for a higher degree of probability by utilizing all the available evidence and following correct procedures. Verifying the extent to which a trail is an authentic emigrant trail may pose a problem. What appears as an emigrant trail may have originated as a later period of freighting, mining, military, or stage road. In such cases, the researcher must determine the degree of probability that the trail in question did in fact originate as an emigrant trail.

**2. Analogy** The trail historian can only measure the unknown by what is known through analogy. The location of a possible trail segment can be authenticated only by comparing and contrasting it with what is already known about other verified emigrant trails. These analogous relationships include all types of documentary and physical evidence. Thus, to authenticate newly - located trail segments, the trail researcher must apply the accumulated knowledge gained from previously verified trail segments to similar conditions found on the “newly - discovered” segments.

## Appendix F. Cardinal Rules of Trail Verification (2002 MET page 5)

- Trail Mapping Committee. October 1, 2014, 5<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.
- Trail Mapping Committee. July 2002, 4<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.

For the location of an emigrant trail segment to be considered as verified, it must conform to the following “Four Cardinal Rules.” Where conditions exist such that any of these four rules do not apply, the probability level is reduced accordingly. Essentially, these “Four Cardinal Rules” becomes a standard for assessing the degree of probability that the researcher/mapper has accurately located an emigrant trail segment.

**a) Coherence Rule: Linear Uniformity** (page 5, MET) There must be linear uniformity so that the trail segments form a continuous sequence; i.e., the trail segment under investigation has to link coherently with the trail segments that precede and follow it.

**b) Corroborative Rule: Confirming [Written] Evidence** (page 5, MET) There must be confirming documentary evidence of the trail; i.e., the trail segment under investigation has to have valid written or cartographic evidence to support its authenticity (Appendix G: Ranking the Reliability of Different Types of Evidence Use to Verify Tail Location.)

**c) Collateral Rule: [Confirming] Physical/Topo Evidence** (page 5, MET) There must be accompanying physical and/or topographic evidence of a trail; i.e., the trail segment under investigation has to have some geomorphic or artifact evidence to support it as an authentic emigrant trail. (See “Guidelines for Locating Wagon Trails,” page 8.)

**d) Correlation Rule: Overall Agreement** (page 5, MET) There must be overall agreement between all types of evidence; i.e., the evidence resulting from the first three cardinal rules have to be mutually supporting (not contradicting one another) in order to verify the location of a trail segment.

No set of standards, however well thought out, can cover all cases with equal uniformity. In most instances the “Four Cardinal Rules” will work well. Inevitably, however, situations will arise when the level of authenticity required of a trail segment may be much higher than a strict application of the four rules would warrant. In such cases, the researcher-mapper will have to rely on balanced judgment, acquired through experience, to arrive at a final determination. Ultimately, the trail mapper bears the responsibility of reaching a decision on where the trail is located; the rules can not do that.



## Appendix G. Ranking the Reliability of Evidence Used to Verify Trial Location

MET Manual. Trail Mapping Committee. July 2002, 4<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Pages 5 - 8. Independence, MO.

As nearly as possible, the following ranking reflects the relative reliability of available evidence.

1. Written eyewitness descriptions that locate the trail with reasonable accuracy or exactness, such as detailed diaries, journals, letters, newspaper accounts, and reports of the Army Topographical Engineers describing newly-opened trails.
2. Written eyewitness descriptions that locate the trail in a general way or direction, such as less detailed diaries, journals, letters, emigrant guides or logs, and the more detailed recollections/reminiscences.
3. Remaining physical, vegetation, or artifact evidence of wagon trails that correspond to either diary or plat evidence, such as traces, ruts, swales, wagon parts, differential vegetation, etc.
  - Archaeological reports and surveys either by universities, state, or federal agencies can assist in locating physical remains of emigrant trails.
  - Remote-sensing technology that detects subsurface ground anomalies, using computer-assisted image interpretation, show great potential for locating physical and artifact remains.
4. General Land Office (GLO) cadastral survey plats.
  - The earliest GLO surveys in the west were conducted only along township boundaries.
  - Later GLO surveys were conducted along section lines within each township.
5. Topographic features that serve to confine wagon travel can aid interpretation of sketchy diary accounts and GLO plats. However, emigrant trails often defy modern reasoning on the route these trails should have taken. Be cautious, therefore, of second guessing emigrant reasoning and practices.
6. Reports that describe the location of emigrant trails, such as federal, state, county, territorial, military, and railroad surveys undertaken in the 1850s and later. State highway/transportation department surveys at the beginning of the motor vehicle period, sometimes conducted along or across earlier emigrant trail routes, may prove useful.
7. Maps that show the location of either emigrant trails or possible emigrant trails.
  - The earliest mapping usually was the most general in that the maps covered large regions. Maps of this type include early surveys commissioned by state agencies and legislatures, maps of the Army Topographical Engineers and maps of the Pacific Wagon Road Office of the Department of the Interior.
  - An exception is T. H. Jefferson's large scale 1846 *Map of the Emigrant Road from Independence, Mo., to St. Francisco, California* which has proved very useful in determining the early emigrant route to California.
  - Late 19<sup>th</sup> century maps that may reveal emigrant routes, such as early USGS. topographic quadrangles and early county maps often located in county records or recorders offices..
8. Recent evidence and documentation (not necessarily in order of reliability).
  - Published trail descriptions and maps by historians and government agencies. Also trail studies/reports produced by consultants for government agency use.
  - Trail-location knowledge of trail buffs, local residents, ranchers, foresters, and government agency personnel.
  - USGS. Orthophoto Quadrangles (7.5 minute) may reveal the location of trail segments not readily visible on the ground.
  - Aerial photographs. (Refer to Fact Sheets on aerial photography and two pages on availability and use of aerial photography at the end of Appendix G.)

## Appendix H. Emigrant Trail Classification Categories (pages 13 - 14, MET)

The following five classification categories for overland emigrant trails are designed to assess the condition of trails at the time of mapping and establish a basis on which to recommend levels of preservation and use for trails on public lands. The five categories are OCTA's standard classifications for all emigrant trail mapping (MET Manual, pages 13 - 15).

- Trail Mapping Committee. July 2002, 4<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.

### CLASSIFICATION CATEGORIES

#### **Class 1: Unaltered Trail**

Symbol: ①

Description: The trail retains the essence of its original character and shows no evidence of having been either impacted by motor vehicles or altered by modern road improvements. There is visible evidence of the original trail in the form of depressions, ruts, swales, tracks, or other scars, including vegetation differences and hand-placed rock alignments along the trail side.

Preservation: Should be preserved and kept free from all human-made development and intrusions, with a protective corridor adequate to maintain the integrity of location, design, setting, materials, workmanship, feeling, and association.

Use: Restricted to hiking and possibly horseback riding, as long as the physical integrity of the trail is not altered.

#### **Class 2: Used Trail**

Symbol: ②

Description: The trail retains elements of its original character, but shows use by motor vehicles, typically as a two-track road overlaying the original wagon trail. There is little evidence of having been altered permanently by modern road improvements, such as widening, blading, grading, crowning, or graveling. In forested areas the trail may have been used for logging but still retains elements of its original character.

Preservation: Should be preserved from further human-made alterations and intrusions, including road improvements and use as a pipe/utility corridor. The trail should have a protective corridor adequate to maintain the integrity of location, setting, feeling, and association.

Use: Restricted to hiking, horseback riding, and motor vehicles as long as the physical integrity of the trail is not permanently altered. Where the Used Trail has been abandoned and is badly eroded and/or overgrown with vegetation, it may be desirable to restrict use to hiking and horseback riding.

**Class 3: Verified Trail**

Symbol: ③

Description: The main route is accurately located and verified from written, cartographic, artifact, topographical, and/or wagon wheel impact evidence (as rust, grooved or polished rocks). But due to subsequent weathering, erosion, vegetative succession, or logging, trail traces will be nonexistent or insignificant. What does remain is a verified trail corridor with no intrusive modern development. Typically this includes trails that once passed through forest and meadows, across excessively hard surfaces or bedrock (such as ridges), over alkali flats and sandy soils, and through ravines or washes.

Preservation: Should be preserved from any further human-made alterations and intrusions, with a protective corridor adequate to maintain the integrity of location, design, setting, materials, feeling, and association.

Use: Restricted to hiking and horseback riding, consistent with preserving the setting of the trail corridor.

**Class 4: Altered Trail**

Symbol: ④

Description: The trail location is verified but elements of its original condition have been permanently altered, primarily by road construction, such as widening, blading, grading, crowning, graveling, or paving. In some cases, the original trail has been permanently altered by underground cables and pipelines.

Preservation: Although an altered trail no longer contributes to the integrity of design, setting, materials, workmanship, feeling, or association, a protective corridor may be desirable in some area as a way to retain the trail integrity of adjacent or connected Class 1, 2, or 3 segments.

Use: Generally unrestricted. However, in protected corridors, use should be consistent with maintaining the integrity of adjacent or connected Class 1, 2, or 3 segments.

**Class 5: Approximate Trail**

Symbol: ⑤

Description: The trail is either so obliterated or unverifiable that its location is known only approximately. In some cases, the trail has been destroyed entirely by development, such as highways, structures, agricultural or utility corridors. In others, it has been inundated beneath reservoirs. In some, there is not enough historical or topographic evidence by which to locate the trail accurately. Thus, only the approximate route is known.

Preservation: None recommended.

Use: Unrestricted.

## Appendix I. GLO Surveyors Lake & Hyde

This Appendix I is Appendix E of the document, *Indian Trail Over Grave Creek Hills: 1855*. It is repeated verbatim.

Hugo Native American Team, August 12, 2012; Updated April 12, 2014. *Appendices For Indian Trail Over Grave Creek Hills: 1855*. Hugo Neighborhood Association & Historical Society. Hugo, OR.

Walker, Mike, Member Hugo Native American Team. August 12, 2012; Updated April 12, 2014. *Indian Trail Over Grave Creek Hills: 1855* Edited by Liz & Mike Butowitsch & Janet McKy, Members, HNAHS. Hugo, Oregon

The documentation of the professionalism of the GLO United States Deputy Surveyors (U.S.D.S.) Hyde and Lake for the Hugo region has been documented (Section I.B.). Even so it is worth providing an example of a written January 1996 speech by a long-time, experienced, BLM surveyor for the Rogue River Valley, Terry Nickerson, to the Rogue River Chapter (Josephine and Jackson counties) of the Professional Land Surveyors of Oregon. Nickerson was the lead BLM Medford District Office (MDO) surveyor. He was specific on sharing his personal experience of the on the ground performance for earlier surveyor's who did surveys for the government. He rated the work of Ives, Hyde, and Lake as excellent to very excellent. He was not as happy with the work of some others. The range of work performance of the surveyors he had personally checked ranged from very excellent, excellent, very accurate, fairly good, fair to a little sloppy, very poor, very disappointing, terrible, to barely adequate. In summary, he thought the earlier U.S.D.S.s generally did a better job, and that of these earliest surveyors that Ives and Hyde were number 1, Hyde and Lake were number 2, and Truax was number 3 in being the best surveyors of the 13 he had knowledge. The following information from Nickerson is in the order provided.

**INTRODUCTION** I would like to talk a little about my personal experience of the on the ground performance of earlier surveyor's who did surveys for the government. It think it is important to know a little about this because surveyors in retracing old lines are obligated to follow in the footsteps of the original surveyor; therefore it is essential that they know about what to expect from a certain surveyor. The property surveyor cannot ignore the past. His problems go back as far as land ownership itself. These are my opinions, based on working on numerous cadastral surveys through the [BLM] D.O. [Medford District Office]. . . . I have tried to be as fair as I can and as non- judgmental as possible, keeping in mind that doctors bury their mistakes, but surveyors monument them. I would like to briefly mention that the first Manual of Surveying Instructions was written for Surveys conducted in Oregon and California, it was officially issued March 3, 1851. Previous to this manual, survey instructions were issued to the various surveyors by the Survey Generals for the specific project. The first Surveyor General of Oregon, John B. Preston was issued a supply of the 1851 Manual prior to his departure from Washington D.C. to Oregon [Appendix M3]. Preston arrived in Oregon City in May of 1851, establishing the initial point for the Willamette Meridian late in May, after he had made reconnaissance of the Columbia and Willamette Rivers. So with that I would like to start discussing my opinion of some of these earlier surveyors.

**Butler Ives and George Hyde - U.S. Deputy Surveyors (U.S.D.S)** Under Contract No. 39, dated January 1, 1854 they brought the Willamette Baseline down from the Umpqua River into the Rogue Valley. They had to offset several times from the true baseline. Most of the corners they established when offsetting E. or W. were originally set as section corners on a township line, but due to how the townships were surveyed into these offset corners, these corners now only function as angle points along the boundaries. Ives and Hyde then proceeded to do township subdivisional work, mostly in areas where settlement was occurring, and in areas deemed suitable for cultivation. The quality of their survey work varies from excellent to extremely excellent. Their bearings are usually within 10' - 15' of what their record indicates. Distances tend to be a little longer than record. I tend to think this was on purpose, to assure themselves that all the aliquote parts would be the full 40 acres. The monuments they set were usually wood posts, with well marked bearing trees. Their corner descriptions are very accurate and their corner positions are most often recovered, unless obliterated by fire or man. If you are retracing work by them you are in luck because they did excellent survey work and excellent documentation of the work performed. As a side note, Sewall Truax performed work as a compassman for them.

**Wells Lake and George Hyde - U.S.D.S.** Apparently Hyde was in business with both Butler Ives and Wells Lake. The quality of their work compares favorably with Ives and Hyde, in fact I get mixed up once in a while between the two different names. Their work was in generally tougher terrain, apparently Ives had done some recon of his own and sort of creamed the good stuff. Again the monuments were usually wood posts with well marked trees, the corner descriptions are usually very good and the field notes are quite accurate.

**Nathaniel Ford - U.S.D.S.?** Earliest surveys worked on 1856. Most of his work is North and East of Medford. Most of the time his work is very poor. Unless you are retracing from a remonumented corner to a remonumented corner you are in for a real challenge finding his work.

**Sewall Truax - U.S.D.S.** Earliest surveys worked on 1856. His work seems very accurate. Truax did extensive work on DLCs, again work is excellent. His corner descriptions are excellent as are the rest of his field notes.

**David P. Thompson - U.S.D.S.** Most of Thompson's work was performed in 1857-58. The quality of Thompson's work varies from a little sloppy to fairly good. It appears to me he did run the lines on the ground and tried to do good work.

**Daniel G. Major - Astronomer and Surveyor** (Maybe Astrologer would have been a better title. His contract was 1867 and approved 1870. Majors did a very poor job of surveying the Southern Oregon State boundary.

**William Turner and J. S. Howard - U.S.D.S.** Earliest survey worked on 1872. They did township subdivision work and also completion survey work on townships that had previously been partially surveyed. The quality of their work is fair; they could be erratic.

**Rufus Moore - U.S.D.S.** Trying to find something nice to say about Rufus S. Moore - aka Roughhouse Moore is difficult. Rufus did about the same quality work as Nathaniel Ford, in other words, his work is very poor.

**Peter Applegate - U.S.D.S.** Apparently was living off the reputation of his family name. Very disappointing work. He was erratic. One nickname around our office for him is Peter Applesnake, referring to wild bearings and distances.

**William Byars - U.S.D.S.** 1880's. In a word - terrible. The quality of his work in southern Oregon at least is very poor. In addition his field notes are terrible to try and read. Normally old surveyors field notes are fairly legible and readable.

**Edward Sharp - U.S.D.S.** 1890s. Did fairly good work. His corner descriptions are accurate and his field note record is very detailed. Almost every line he surveyed has at least one line tree, and usually a great deal more than that. His monuments are well marked and as stated his field notes are excellent.

Footnote 21B. Nickerson, Terry. January 1996. *Presentation Given by Terry Nickerson, BLM Medford District Officer Surveyor, To The Local Professional Land Surveyors of Oregon, Rogue River Chapter.* Medford, OR.

## Appendix J. Preservation Training: Official OCTA Training Briefings

Oregon-California Trails Association. April 2015. *Preservation Training: Official OCTA Training Briefings*. Web <http://www.octa-trails.org/preserve/preservation-training>.

This strategy has been developed from the perspective of public partnership organizations who have taken on a stewardship role for an historic trail. It does not reflect the perspectives of the agencies responsible for oversight.

**Mapping Emigrant Trails (MET) Manuals** The Oregon-California Trails Association has several ongoing programs dedicated to researching and preserving emigrant trails. The Fifth Edition of Mapping Emigrant Trails released October 1, 2014 reflects continued upgrading of the guidelines and procedures on locating, verifying, classifying and plotting emigrant trails. A wire-bound copy with protective covers may be purchased from the OCTA bookstore for \$10 by members and \$20 for non-members.

- MET Manual Edition 5 Cover
  - Preface and Introduction
  - Part A Investigative Procedures & Trail Classifications
  - Part B GPS and Mapping Software
  - Part C Planning and Executing a Mapping Project
  - Part D Setting Classifications
  - Part E Photo Documentation of Trails
  - Appendix 1 Documentary Sources for Overland Trails
  - Appendix 2 Examples of the Composite Trail Description Method
  - Appendix 3 Public Land Survey System
  - Appendix 4 Trail Terminology
  - Appendix 5 Plotting on USGS Topographic Maps
  - Appendix 6 NHT Condition Category Definitions
  - Appendix 7 Universal Transverse Mercator (UTM) Grid
  - Appendix 8 Internet Map Sources
  - Appendix 9 OCTA Policies
  - Appendix 10 Artifact Research/Identification Resources
  - Appendix 11 Artifact Recording Forms
  - Appendix 12 Using and Plotting Magnetic Compass Directions
  - Appendix 13 Terrain Navigator Pro Basics
- **Training Briefs** OCTA hereby affirms its commitment to protect the emigrant trails. Furthermore, OCTA is committed to work with government agencies and private interests to seek solutions considering the interests of all involved parties. Where reasonable compromise is not attainable or established procedures are not followed, OCTA may take appropriate legal steps.

• Introduction	• GPS & Mapping Software
• Trail Monitoring	• Trail Marking
• Mapping Emigrant Trails	• Trail Marking Policy
• Trail Classifications	• Preservation Basics

**My Topo** MyTopo, the maker of Terrain Navigator mapping products, is making Terrain Navigator Pro (TNP) available to OCTA members for about \$175 per state. The regular price is \$299. Each state package contains all of the USGS topographic maps in that state for 1:250,000, 1:100,000, and 1:24,000 scales. For an annual subscription fee of \$99 (included in the first year subscription), aerial photographs at 1:12,500 scale are included.

Visit: MyTopo website [External hyperlink](#)

## Appendix K. Using General Land Office Notes And Maps To Relocate Trail Related Features

This Appendix K is Appendix D of the document, *Indian Trail Over Grave Creek Hills: 1855*. It is repeated verbatim.

Hugo Native American Team, August 12, 2012; Updated April 12, 2014. *Appendices For Indian Trail Over Grave Creek Hills: 1855*. Hugo Neighborhood Association & Historical Society. Hugo, OR.

Walker, Mike, Member Hugo Native American Team. August 12, 2012; Updated April 12, 2014. *Indian Trail Over Grave Creek Hills: 1855* Edited by Liz & Mike Butowitsch & Janet McKy, Members, HNAHS. Hugo, Oregon

The earliest reliable topographic information for widespread regions of the Midwest and West was compiled by the General Land Office (GLO) of the United States. This is the agency that sent out teams of surveyors to lay out township and section lines on public land prior to homesteading. Its surveyors imposed a grid system of townships (36 square mile blocks) subdivided into one mile square sections. To accomplish this, the surveyors had to transect the landscape at one mile intervals.

The surveyors kept notebooks in which they recorded features of the landscape that might be of interest to settlers. These included the width, direction of flow, quality of water and nature of the banks and bottoms of streams; the location, species composition and understory of groves of trees; the quality of the soils; items of potential economic interest such as salt springs and stone quarries; and locations of such cultural features as roads, trails, Indian villages and farm fields.

The surveyors also established the boundaries of each section and township with appropriate markers. Where wood was available, these markers were wooden stakes; elsewhere, they tended to be stone posts. When a marker location happened to fall in a forested area, or when trees stood directly on a section line, the surveyors created “witness trees” or “bearing trees” by blazing appropriate marks on their trunks. A section corner might have up to four witness trees, the notes for which included the direction and distance from the corner, the species of tree and the diameter of its trunk.

**The rare [GLO survey] errors had to be corrected by subsequent government surveys. Lack of such later survey is an indication that the original surveys were accurate.**

Because the GLO surveys were the basis for subsequent land ownership records, it was important that they be accurate. The rare errors had to be corrected by subsequent government surveys. Lack of such later survey is an indication that the original surveys were accurate.

The original surveyors’ notes are the primary documents and are generally very accurate *for the portions of the landscape surveyed*. That is, the notes provide accurate descriptions along transects spaced one mile apart. The principal errors are sins of omission; many surveyors, for example, failed to record all the cultural features they encountered.



While the survey notes are usually reliable, the maps generated from them require careful interpretation. Maps of each township were drawn, not in the field, but in a regional office and by someone other than the original surveyor. This person used the survey notes to draw the map, but this involved marking the known points along each section line and then connecting the dots in a reasonable manner. What this means is that the maps are precise only along section lines and that they are less reliable elsewhere. At times, the survey notes make reference to features away from the section lines, and they may locate them with greater or lesser precision. The only way to determine this is to refer to the notes rather than to the maps.

The problems of map interpretation are especially severe in the case of streams. At the crossing of a section line, the location of a stream would be recorded accurately, and its direction of flow would be indicated in a general terms such as “north” or “south-southwest.” Away from the section lines, the map maker, who had probably never seen the area in question, would fill in the intervals between section lines with a wavy line. Larger scale maps, drawn in the same office, simply repeated any errors on the township maps.

To determine whether a stream has meandered since the original survey compare only the points where it crosses section lines. My own work in northeastern Kansas\*\* indicates that only the largest rivers, such as the Missouri and Kansas, have meandered significantly since the GLO surveys.

**Larger scale [GLO] maps, drawn in the same office, simply repeated any errors on the township maps.**

For researchers trying to relocate trails and trail-related features, the survey notes are far superior to maps. Unfortunately, the depositories for the notes and maps vary from state to state. In Kansas, both are curated in the library of the State Historical Society. In Nebraska, all of the maps can be found in the State Engineer’s office, but the notes are located in county clerks’ offices across the state. The notes for the township and sections lines are usually located in a volume separate from the section line notes, and notes for the survey of the widely spaced lines of initial survey called principal or guide meridians and base lines or standard parallels, are also in separate volumes.

Finally, anyone using township maps to locate roads and trails should pay special attention to each township border. The outlines of the townships (called township and range lines) were surveyed first, with the section lines filled in later. More care was taken with these initial surveys, because the accuracy of the section lines depended on them. The surveyors of the township and range lines often were more careful also to note the locations of trails and roads than were the section line surveyors. Therefore, township maps often show roads (as short double lines) or trails (a solid line paralleled by a dotted line) at the borders of the township that were not recorded along the section lines. Occasionally, the reverse is true, and a road marked on the interior of a township will terminate either because the surveyor of the exterior line did not record it or because it was not in existence when the exterior line was surveyed but came into existence before the section lines were laid out.

The legend on the township maps gives the dates and names of the surveyors for each set of surveys along with the date the map was drawn. Very often, the township and range line data refer to one year, the section line data to a later one, while the map date will be later still.

To sum up, the GLO survey notes and maps are important sources of historical and environmental information. The survey notes are the primary documents to which the maps are secondary. Like other secondary sources, the maps are interpretations of the survey notes, and they contain errors not present in the notes. This is especially the case in the way streams are drawn, with meanders or bends that were never observed in the field.

\* Morris M. Thompson, *Maps for America: Cartographic Products of the U.S. Geological Survey and Others* (Reston Va: U.S. Department of the Interior, 1979), p. 11, 80-88.

\*\* Donald J. Blakeslee and Arthur H. Rohn, *Man and Environment in Northeastern Kansas: The Hillsdall Lake Project* (Kansas City, U.S. Army Corps of Engineers, 1987), p. 53-60.

Donald J. Blakeslee

Associate Professor of Anthropology

Wichita State University

{Reprinted from the "Letters" section of the Overland Journal [Vol. 8, No. 3, 1990] pp. 30 - 31}

\*\*\*\*\*

Larry Jones of the Idaho State Historical Society comments on the accuracy of the GLO survey records:

Donald Blakeslee is correct in stating that survey records are a good source of trail information, but some caution is warranted. In some states there were cases of surveyor's fraud. The government sometimes let surveyor contracts without substantiating the credentials of the bidders. This would occasionally result in the surveyors drawing their boundary lines without actually performing any field work, and in such cases it becomes necessary to look at later surveys. A couple of such incidents occurred in Idaho. The cadastral branch of the Bureau of Land Management has been attempting to resurvey a number of such areas during the past few years.

\*\*\*\*\*

In the western states having large areas under the management of the BLM, the GLO survey notes and maps are located in the State Bureau of Land Management Office.

## Appendix L1. Oregon Donation Land Act

Oregon Donation Land Act

The Oregon Encyclopedia

[http://www.oregonencyclopedia.org/articles/oregon\\_donation\\_land\\_act/#.VVhg0\\_IViko](http://www.oregonencyclopedia.org/articles/oregon_donation_land_act/#.VVhg0_IViko)

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When Congress passed the Oregon Donation Land Law in 1850, the legislation set in motion procedures for the disposal of public lands that left a permanent imprint on the Oregon landscape. The grid-square pattern of property ownerships imposed on rural lands in the Willamette, Umpqua, and Rogue valleys is visible to the present day.

Arguably the most generous federal land sale to the public in American history, the law legitimized the 640-acre claims provided in 1843 under the Provisional Government, with the proviso that white male citizens were entitled to 320 acres and their wives were eligible for 320 acres. For citizens arriving after 1850, the acreage limitation was halved, so a married couple could receive a total of 320 acres. To gain legal title to property, claimants had to reside and make improvements on the land for four years.

Section 4 of the Donation Law outlined the requirements for eligibility: “granted to every white settler or occupant of the public lands, American half-breed Indians included, above the age of 18 years, being a citizen of the United States, or having made a declaration according to law of his intention to become a citizen.” In effect, the Oregon Donation Land Law benefited incoming whites and dispossessed Indians.

To meet constitutional requirements, Territorial Delegate Samuel Thurston had told Congress that extinguishing Indian title was the “first prerequisite step” to settling Oregon’s land question. Before lawmakers voted for the Donation Land Law, therefore, they passed legislation authorizing commissioners to negotiate treaties to extinguish Indian title and to remove tribes “and leave the whole of the most desirable portion open to white settlers.”

While the Donation Land Law explicitly excluded African Americans and Hawaiians, the act validated white settler claims in the Willamette Valley and attracted an in-rush of people to the Umpqua and Rogue valleys. In the Willamette Valley, Kalapuya bands had suffered catastrophic losses from seasonal malaria outbreaks in the early 1830s, but Indian bands in the Rogue Valley were still numerous and resisted the incursions of whites, especially miners, in the 1850s. The consequence was something akin to a race war in 1852 and 1853, with white volunteer forces ruthlessly driving Indians from their traditional hunting and gathering grounds. Regular U.S. Army troops eventually removed most of the surviving bands to the newly established coastal reservation.

The Donation Land Law was significant in shaping the course of Oregon history. By the time the law expired in 1855, approximately 30,000 white immigrants had entered Oregon Territory, with some 7,000 individuals making claims to 2.5 million acres of land. The overwhelming majority of the claims were west of the Cascade Mountains. Oregon’s population increased from 11,873 in 1850 to some 60,000 by 1860.

William G. Robbins, Author

### Further Reading

- Johansen, Dorothy O. *Empire of the Columbia: A History of the Pacific Northwest*. 2d ed. New York: HarperCollins, 1967.
- Pomeroy, Earl. *The Pacific Slope: A History*. Reno: University of Nevada, 1965.
- Robbins, William G. *Landscapes of Promise: The Oregon Story, 1800-1940*. Seattle: University of Washington Press, 1997.
- Robbins, William G. *Oregon, This Storied Land*. Portland: Oregon Historical Society, 2005.

## Appendix L2. Donation Land Claim Act

From Wikipedia, the free encyclopedia  
[http://en.wikipedia.org/wiki/Donation\\_Land\\_Claim\\_Act](http://en.wikipedia.org/wiki/Donation_Land_Claim_Act)  
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The Donation Land Claim Act of 1850, sometimes known as the Donation Land Act, was a statute enacted in late 1850 by the United States Congress. It was intended to promote homestead settlements in the Oregon Territory in the Pacific Northwest (comprising the present-day states of Oregon, Washington, Idaho and part of Wyoming).

The law, a forerunner of the later Homestead Act, brought thousands of white settlers into the new territory, swelling the ranks of settlers traveling along the Oregon Trail. 7,437 land patents were issued under the law, which expired in late 1855.

**History** The passage of the law was largely due to the efforts of Samuel R. Thurston, the Oregon territorial delegate to Congress. The act, which became law on September 27, 1850, granted 320 acres (1.3 km<sup>2</sup>) of designated areas free of charge to every unmarried white male citizen eighteen or older—and 640 acres (2.6 km<sup>2</sup>) to every married couple—arriving in the Oregon Territory before December 1, 1850. In the case of a married couple, the husband and wife each owned half of the total grant in their own name. The law was one of the first that allowed married women in the United States to hold property under their own name. Half-blood Native Americans were also eligible for the grant. A provision in the law granted half the amount to those who arrived after the 1850 deadline but before 1854. Claimants were required to live on the land and cultivate it for four years to own it outright.

**Limitations** The provisional government formed at Champoeg had limited the land claims offered in the hope of preventing land speculation. The Organic Act of the Oregon Territory had granted 640 acres (2.6 km<sup>2</sup>) to each married couple. The new law voided the previous statutes but essentially continued the same policy and was worded in such a way as to legitimize existing claims. One such claim legitimized by the act was that of George Abernethy, who had been elected to the governorship in the days of the provisional government. His claim became famous for Abernethy Green, where new emigrants camped at the end of the Oregon Trail while seeking a piece of land for themselves.

**Details** Claims under the law were granted at the federal land office in Oregon City. The most famous patent granted at the Oregon City Land Office was the plat for the city of San Francisco, which had to be sent up the coast from California by ship. The claims of the land were surveyed by the Surveyor General of Oregon, an office created out of the law. As part of the general survey, the Willamette Stone was placed just west of Portland, defining the Willamette Meridian.

**Last Year and Aftermath** After the 1854 cut-off date, the designated land in Oregon was no longer free but was still available, selling at \$1.25 an acre (\$3.09/hectare), with a limit of 320 acres (1.3 km<sup>2</sup>) in any one claim. The law expired on December 1, 1855. In the following years, the price was raised and the maximum size of claims was progressively lowered.

In 1862 Congress passed the first "Homestead Act", which was largely designed to encourage settlement of the Great Plains states, but applied to Oregon as well.

## Appendix M1. Oregon Land Survey, 1851-1855

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In 1850, President Millard Fillmore appointed John B. Preston as Oregon Territory's first surveyor general. Preston arrived in the territory in 1851; and by the time he and the last of his surveyors left in 1855, the western interior valleys of Oregon and Washington lay measured in the townships and sections of the Rectangular Land Survey System.

This effort was part of the federal system established by Congress in the Land Ordinance of May 20, 1785. Until then, Colonial America's rural population had determined land boundaries by the English method of defining a parcel of land—identifying adjacent landowners and describing boundaries as on some apparent line, such as a stream or road. To avoid these often-confused "metes-and-bounds" surveys, the Land Ordinance introduced an orderly system of laying one-mile square parcels on federal lands. In a format used ever since, the Ordinance stipulated that surveyors establish a north-south principal meridian and an east-west base line. Next, they were to calculate parallel lines of longitude and latitude six miles apart, creating townships of thirty-six square miles.

Congress passed the Oregon Donation Land Act in September 1850. Designed to promote new settlement in the territory, the legislation provided for the award of land claims to settlers who met certain requirements. In the spring of 1851, thousands of settlers who had journeyed to Oregon in the 1840s lived on lands described in terms of trees, streams, and hills. The settlers needed their land measured accurately so they could divide and sell it, and they pressed for the surveys and official designation of claims boundaries.

During four years in Oregon, surveyors James Freeman, William Ives, Butler Ives, George Hyde, and Joseph Hunt boosted the territory's population by enabling the legal establishment of donation land claims and helping establish commerce, both precursors to the stability and increased confidence that led to Oregon's statehood in 1859.

On June 4, 1851, Surveyor General Preston and surveyors Ives and Freeman convened about four miles west of Portland at what is now Willamette Stone State Park. Their first task was to lay out the Willamette Meridian (north and south) and Base Line (east and west) as a framework for all surveys to come. Freeman would survey the Willamette Meridian from the Initial Point south, while Ives's contract required him to survey the Meridian north from the Initial Point to Puget Sound, as well to survey the east-west Base Line.

The surveyors moved along the meridian line using two sets of measuring chain for accuracy, comparing measurements at every half-mile and mile station. Flagmen marked the line with cloth strips. The surveyors ran the solar compass, or the transit, and recorded calculations. Axemen marked bearing trees and hewed posts. The chainmen came next, unfolding the heavy wire sections of bundled Gunter's chain. Then, stretching the chain taut for accuracy over uneven ground, they measured the line.

Ives reached Puget Sound and returned to the Initial Point to survey the Base Line, from rugged country in the Coast Range to the foothills of the Cascades, before stopping work in mid-August 1851. Heading south, James Freeman eventually encountered steep, mountainous terrain and ended his survey east of Canyonville in August 1851.

Pressured to begin surveys in the Willamette Valley and later deterred by hostilities between whites and Indians in southwest Oregon, the surveyor general postponed completion of the Willamette Meridian to the California boundary until the summer of 1854.

The federal surveys went on through the ensuing decades, moving east of the Cascades and along the coast. The work of these earliest government surveyors, however, remains outstanding in Oregon's development. Their surveys did far more than make it possible to organize land ownership. In the long term, these men had a hand in the Oregon Territory becoming part of the nation, sustaining the continuum of western expansion, and helping shape the mid-nineteenth-century landscape.

The surveyors' field notes and maps became indispensable to federal, state, and county officials. Present-day surveyors take the old records in hand to locate markers and to resolve boundary disputes. They note the precision with which the early government surveyors executed their contracts [Appx. I]. The value of the older work lies in the early surveyors' honesty and skill.

Today, the early field notes and maps are also used by biologists to document historic vegetation and by historians and anthropologists to search for the locations of long-vanished Indian settlements, trails, and settlers' farmhouses and barns. The surveyors, their maps, and notes give us an opportunity to envision the past, to imagine the way western Oregon and Washington looked over 150 years ago.

Written by: Kay Atwood

Other Works by this Author:

Frank Clark (1872-1957) | Oregon Land Survey, 1851-1855

Further Reading:

Atwood, Kay. *Chaining Oregon, Surveying the Public Lands of the Pacific Northwest, 1851-1855*. Granville, Ohio: McDonald & Woodward Publishing Company, 2008.

**Appendix M2. How Accurate Were the GLO Surveys?**  
**Frequently Asked Questions**  
**General Land Office Research, Department of Landscape Architecture**  
**Iowa State University**  
[http://www.public.iastate.edu/~fridolph/glo/pinfo/info\\_faq.html](http://www.public.iastate.edu/~fridolph/glo/pinfo/info_faq.html)  
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**Data limitations**

**FAQ 21. How accurate were the GLO surveys?**

Modern surveyors describe the GLO survey as one with low accuracy and lack of precision. When the survey began, the Federal government desperately needed money; one way that they could get it was from the sale of public lands. They needed a survey system that was efficient and could get the job done quickly. Euro-American settlers were beginning to populate unsettled areas at a rapid rate, even before these areas could be surveyed and opened for settlement. It became imperative that the Federal government survey those lands to maintain order. Probably the most important reason that the surveys were not as concerned with accuracy as surveys are today is because the price of land was low, often \$1.25 per acre. Low land prices did not warrant any delay in the survey procedure. According to Hildegard Binder Johnson in *Order Upon the Land* (1976, p. 221), "Urgency of performance was the order of the day. Surprisingly enough, a high percentage of accuracy was maintained ; in fact, in the upper Middle West, less than 5 percent of the surveys carried out before the contract system ended in 1910 were proved fraudulent, a remarkable achievement."

According to J.S. Dodds in *Original Instructions Governing Public Land Surveys of Iowa* (1943), deputy surveyors were for the most part upstanding, conscientious employees. There were instances of fraud within the system, but for the most part, the surveyors were honest. In *Public Land Surveys: History, Instructions, Methods*, Lowell O. Stewart (1935, p. 49-50) said that the system of deputizing the surveyors required them to swear an oath to the correctness of their work. This and the threat of taking the required surety bonds were the only factors that helped assure the accuracy of these surveys. "The real factor in determining accuracy of the surveys was the integrity of surveyors and their helpers [see Appx. I for 1850s GLO surveys in Western Oregon]. In case of fraud, the government could...sue the deputy. Moreover, conditions under which the deputies worked were so trying that they frequently pleaded extenuating circumstances. In such a case, in response to a letter from the surveyor general in which certain errors were pointed out, one deputy reported how squatters obliterated or confused line markings on trees, set fire to the prairie and destroyed his camp. Their purpose was to prevent the survey and subsequent opening of the land for sale."

Land surveying was done under a contract system. The deputy surveyor was contracted by the Surveyor General at \$3.25 per mile for township lines and \$2.75 per mile for section lines. They were required to pay for all of the expenses of the party until the contract was completed. The practice, however, began for the Surveyor General to finance deputies, thus taking on all responsibility and risk for their actions. Deputies were in charge of hiring members of their survey parties. The only requirement was that they also swear an oath. Instructions to the deputy surveyors said, "it is enjoined on you not to employ any person whose principles are known or

supposed to be corrupt. . . nor is any one to be employed in the capacity above stated who is not a free white person, and who has not attained years of discretion sufficient to understand the nature and solemnity of an oath."

In *Iowa's Forest Area in 1832: A Reevaluation* (1987, p. 118), George Thomson described sources of error in the GLO surveys: "Field notes are often incomplete and flawed with errors that would either go undetected or would be ignored because the vastness of the surveying project and the low budget allocated to the contract surveyors prohibited correction."

In *A History of the Rectangular Survey System* (Washington, D.C.: Bureau of Land Management), C. Albert White (1983, p. 110) said that during the latter half of the 1840s, more and more examinations in the field were made by deputy surveyors under instructions from the Surveyor General. Those examinations would prove to be largely fiction. Just as a subdividing deputy seldom squealed on a fellow surveyor who did township lines, an examining deputy would seldom squeal on a subdividing deputy because that same person might be hired to examine his own work.

One of the early first GLO surveyors in Iowa was William Burt. In addition to being a deputy surveyor, he was also an assistant district judge, a Michigan Territory legislator, and a Justice of the Peace. In 1836, Burt also invented the solar compass, a replacement for the traditional magnetic compass that was often distracted by iron ore deposits. Burt was known for his reputation for honesty. When working as a survey examiner in Michigan, Burt found evidence of fraud within several surveys. As it turned out, these were surveys that he himself had subcontracted and signed for security. Nevertheless, he reported the fraud and re-surveyed the areas at considerable personal time and expense.

In addition to problems with the magnetic compasses, there were problems with Gunter's Chain. It was not a good design for surveys through rugged territory. Much of the surveyor's time was spent cleaning the muck and the debris out of the chain. They did try to maintain the chain's measuring integrity by comparing the length to that of an unused chain. This checking procedure was supposed to take place at least every other day and any discrepancies were to be noted in the field books. According to the field notes (Volume 4, Book 21), the iron survey chain was 28 links per mile shorter in the winter than in the summer.

The Surveyor General had difficulty in finding qualified surveyors to hire as deputy surveyors. Deputy surveyors did not receive extensive training. Their outdoor skills were probably gained from experiences in farming or the military. Their observations and descriptions were influenced by their cultural and educational backgrounds. Also, many deputy surveyors who worked in Iowa had previously worked in GLO surveys. Some had surveyed in the Northwest Territories to the east. Others had surveyed in the Louisiana Purchase to the south. Their prior experiences undoubtedly influenced how they perceived and described the landscape as they surveyed Iowa.



## Appendix M3. Summary of Objects and Data Required to Be Noted In A GLO Survey

### *Instructions to the Surveyors General of Public Lands of the United States, For Those Surveying Districts Established in and Since the Year 1850: Containing Also A Manual of Instructions to Regulate the Field Operations of Deputy Surveyors*<sup>1</sup>

The 1850 and 1851 manual of instructions from the General Land Office of the U.S. to the Oregon Surveyor General required that the deputy surveyor's field notes be a faithful, distinct and minute record of every thing officially done and observed by the surveyor and his assistants, pursuant to instructions, in relation to running, measuring, and marking lines, establishing boundary corners, and present, as far as possible, a full and complete *topographical description* of the country surveyed, as to every matter of useful information, or likely to gratify public curiosity.

The ordinary field notes taken on line by the deputy surveyor must always be written down on the spot, leaving nothing to be supplied by memory. The deputy will subjoin, at the conclusion of his field notes book, such further description or information touching any matter or thing connected with the township (or other survey) which he may be able to afford, and may deem useful in the *aggregate*, as respects the face of the country, its soil and geological features, timber, minerals, waters.

“The FIELD NOTES afford the elements from which the plats and calculations in relation to the public surveys are made. They are the source wherefrom the description and evidence of locations and boundaries are officially delineated and set forth. **They, therefore must be a faithful, distinct and minute record of every thing officially done and observed by the surveyor and his assistants, pursuant to instructions, in relation to running, measuring, and marking lines, establishing boundary corners, &c.; and present, as far as possible, a full and complete *topographical description* of the country surveyed, as to every matter of useful information, or likely to gratify public curiosity.** [emphasis added] There will be sundry separate and distinct field books of surveys, as follows.

“**20. Besides the ordinary notes taken on line, (and which must always be written down on the spot, leaving nothing to be supplied by memory,)** [emphasis added] the deputy will subjoin, at the conclusion of his book, such further description or information touching any matter or thing connected with the township (or other survey) which he may be able to afford, and may deem useful in the *aggregate*, as respects the face of the country, its soil and geological features, timber, minerals, waters, &c.”

**Summary of Objects and Data Required to Be Noted** The following is a quote from Instructions to the Surveyors General of Public Lands.

1. The precise length of every line run, noting all necessary offsets therefrom, with the reason and mode thereof.
2. The kind and diameter of all “*bearing trees*,” with the course and distance of the same from their respective corners; and the precise relative position of WITNESS CORNERS to the *true corners*.
3. The kind of materials (earth or stone) of which MOUNDS are constructed----the fact of their being conditioned according to instructions---- with the course and distance of the “*pits*,” from the centre of the mound, where necessity exists for deviating from the *general rule*.
4. *Trees on line*. The name, diameter, and distance on line to all trees which it intersects.

5. Intersections by line of *land objects*. The distance at which the line first intersects and then leaves every *settler's claim and improvement*; prairie; river, creek, or other "bottom;" or swamp, marsh, grove, and wind fall, with the course of the same at both points of intersection; also the distances at which you begin to ascend, arrive at the top, begin to descend, and reach the foot of all remarkable hills and ridges, with their courses, and *estimated* height, in feet, above the level land of the surrounding country, or above the bottom lands, ravines, or waters near which they are situated.
6. Intersections by line of *water objects*. All rivers, creeks, and smaller streams of water which the line crosses; the distance on line at the points of intersection, and their *widths on line*. In cases of *navigable* streams, their width will be ascertained between the *meander corners*, as set forth under the proper head.
7. The land's *surface*---whether level, rolling, broken, or hilly.
8. The *soil*---whether first, second, or third rate.
9. *Timber*---the several kinds of timber and undergrowth, in the order in which they predominate.
10. *Bottom lands*---to be described as wet or dry, and if subject to inundation, state to what depth.
11. *Springs of water*---whether fresh, saline, or mineral, with the course of the stream flowing from them.
12. *Lakes and ponds*---describing their banks and giving their height, and also the depth of water, and whether it be pure or stagnant.
13. *Improvements*. Towns and villages; Indian towns and wigwams; houses or cabins' fields, or other improvements; sugar tree groves, sugar camps, mill seats, forges, and factories.
14. *Coal* banks or beds; *peat* or turf grounds; *minerals* and ores; with particular description of the same as to quality and extent, and all *diggings* therefor; also *salt* springs and licks. All reliable information you can obtain respecting these objects, whether they be on your immediate line or not, is to appear in the general description to be given at the end of the notes.
15. *Roads and trails*, with their directions, whence and whither.
16. Rapids, cataracts, cascades, or falls of water, with the height of their fall in feet.
17. Precipices, caves, sink-holes, ravines, stone quarries, ledges of rocks, with the kind of stone they afford.
18. *Natural curiosities*, interesting fossils, petrifications, organic remains, &c.; also all ancient works of art, such as mounds, fortifications, embankments, ditches, or objects of like nature.
19. The *variation* of the needle must be noted at all points or places on the lines where there is found any material *change* of variation, and the position of such points must be perfectly identified in the notes.
- 20. Besides the ordinary notes taken on line, (and which must always be written down on the spot, leaving nothing to be supplied by memory,) [emphasis added] the deputy will subjoin, at the conclusion of his book, such further description or information touching any matter or thing connected with the township (or other survey) which he may be able to afford, and may deem useful in the aggregate, as respects the face of the country, its soil and geological features, timber, minerals, waters, &c.**

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1. Nicholuson, A. O. P., Public Printer. 1855. *Instructions to the Surveyors General of Public Lands of the United States, For Those Surveying Districts Established in and Since the Year 1850: Containing Also A Manual of Instructions to Regulate the Field Operations of Deputy Surveyors*. pages 35. Washington, D.C.

## **Appendix M4. General Land Office in Oregon, ca. 1850-1946**

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[http://www.oregonencyclopedia.org/entry/view/u\\_s\\_general\\_land\\_office\\_in\\_oregon\\_ca\\_1850\\_1946/](http://www.oregonencyclopedia.org/entry/view/u_s_general_land_office_in_oregon_ca_1850_1946/)

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With the acquisition of the Oregon Country in 1846, the United States was faced with an enormous challenge to administer what had become a significant part of the nation's federally owned public domain. American Indian title, preemption settlement, existing land claims, and the great westward migration were urgent matters to be addressed. The responsibility rested with Congress, but a key federal agency, the United States General Land Office (GLO), would be summoned to administer, survey, and initiate disposition of the public domain lands.

The Oregon Territorial Act of 1848 contained no provision to grant or sell lands and was silent regarding preemption settlement, but the Donation Land Act of 1850 came to the rescue to create the Office of Surveyor-General of Oregon, provide for the public land surveys, and make donations of public lands to the settlers. Among its major achievements were the legitimization of land claims made by settlers prior to 1850 and the reward and inducement for additional immigration to Oregon. The act also initiated the GLO's direct involvement in the Oregon Territory.

The United States recognized the need to provide for the orderly settlement and disposal of public domain lands as early as 1785, when the Rectangular Survey System and procedures for maintaining land records and recording land patents were initiated. By 1812, these responsibilities were all placed in the hands of the General Land Office, a newly created agency within the Treasury Department. In 1849, the GLO was moved to the Department of the Interior, where it would remain for ninety-seven years.

The GLO's headquarters was in Washington, D.C., and field offices were established wherever there was a significant requirement to survey lands and accommodate the needs of settlers. On May 5, 1851, the first surveyor-general of Oregon, John B. Preston, opened a GLO survey office in Oregon City and initiated the Willamette Meridian rectangular survey. The first GLO district land office was opened in Oregon City on December 11, 1854, under the management of Dr. Ralph Wilcox as register and James Guthrie as receiver. As Oregon's population increased, additional district land offices were established at Roseburg, The Dalles, and several other locations.

In addition to the Donation Land Act, the GLO administered a number of other public land-disposal authorities, including the Sale-Cash Entry Act of 1820 and the Homestead Act of 1862. Amendments to the original Homestead Act included the Enlarged Homestead Act of 1909 and the Stock Raising Homestead Act of 1916. Although the GLO experienced incidents of land and timber fraud in Oregon, the homestead laws are historically recognized as the most important means by which the public domain was transferred into private ownership. Another significant public land law is the General Mining Act of 1872, which vested the control of mineral lands to the GLO. One of the few nineteenth-century public land laws not yet repealed by Congress, it

contains a mandate to establish an orderly process for locating mining claims and mining various minerals.

To obtain ownership of public domain lands, citizens had to satisfy the requirements of several laws and regulations, including locating available land, filing their claims and applications with the local GLO district land office, paying required fees or purchase money, receiving permission for entry and settlement, and meeting residence and improvement stipulations.

If the lands were surveyed and Indian title was extinguished, then the GLO could issue a final certificate that authorized issuance of a land patent to transfer title. The land patent was and continues to be the primary title document used to convey public domain lands into private ownership. Because of the prerequisite to clear Indian title and survey lands, the first land patent in Oregon was not issued until 1858. The GLO's authority to convey lands by land patent was overshadowed by the exclusive authority of Congress to transfer title directly by means of land grants to aid the State of Oregon and to promote development of the public domain through the construction of railroads and wagon roads.

During the 1860s, the Oregon & California Railroad was granted 3,728,000 acres of public domain lands to aid in the construction of a railroad from Portland to the Oregon-California state line. In 1916, 2,891,000 acres—most of it valuable timberlands—were revested to the United States under administration of the GLO because the railroad company failed to properly dispose of the lands. In 1937, the O&C Administration was established to administer the revested lands.

Beginning in the late nineteenth century, federal public land policy began to shift from disposal to retention of lands in federal ownership. The president, the secretary of the Interior, and Congress all used their authority to withdraw and reserve lands for public and national security purposes and for the protection of natural resources. Some examples include the GLO forest reserves, which were transferred to the U.S. Forest Service and became part of the National Forest System in 1905, and the creation of national parks and monuments. An example of natural resource protection is the Taylor Grazing Act of 1934, which provided for the management of surface resources and the requirement for livestock grazing permits on the western public range lands, including much of eastern Oregon, which had been open to unrestricted use during the turbulent homestead era.

In 1946, the GLO merged with the U.S. Grazing Service and the O&C Administration to create the Bureau of Land Management (BLM). Although the GLO no longer exists, its mission continues under the umbrella of the BLM. Considering the distinctive nature of the Donation Land Act, the revested O&C Railroad grant lands, and incidents of land and timber fraud, Oregon has proven to be one of the most challenging of the nation's thirty public domain states. As it nears its bicentennial in 2012, the U.S. General Land Office has left a permanent footprint on Oregon.

Written by: Champ Clark Vaughan

Other Works by this Author:

U.S. General Land Office in Oregon, ca. 1850-1946 | Willamette Stone and Willamette Meridian

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Further Reading:

"Land Office History." U.S. Department of the Interior, Bureau of Land Management, Oregon/Washington. [www.blm.gov/or/pubroom/lohistory.php](http://www.blm.gov/or/pubroom/lohistory.php).

Atwood, Kay. *Chaining Oregon, Surveying the Public Lands of the Pacific Northwest, 1851-1855*. Granville, Ohio: McDonald & Woodward Publishing Company, 2008.

O'Callaghan, Jerry A. *The Disposition of the Public Domain in Oregon: Memorandum of the Chairman to the Committee on Interior and Insular Affairs, United States Senate, transmitting a dissertation submitted to the Department of History and the Committee on Graduate Study of Stanford University*. Washington, D.C.: U.S. Government Printing Office, Nov. 1960.

**Appendix N. Use of the Multiple Hypotheses Method**  
Mapping Emigrant Trails Manual Part A Investigative Procedures & Trail Classifications  
Mapping Emigrant Trails MET Manual  
Office of National Trails Preservation & OCTA  
<http://www.octa-trails.org/preserve/preservation-training>

- Mapping and Marking Committee, OCTA. June 2014. *Mapping Emigrant Trails Manual Part A Investigative Procedures & Trail Classifications*. Part A is one of nine parts of the 2014 *Mapping Emigrant Trails MET Manual*. Independence, MO.
- Trail Mapping Committee. October 1, 2014, 5<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.
- Trail Mapping Committee. July 2002, 4<sup>th</sup> edition. *Mapping Emigrant Trails MET Manual*. Office of National Trails Preservation & Oregon-California Trails Association. Independence, MO.

The following is the entire section on the *Use of the Multiple Hypotheses Method* in the 2014 MET, Part A).

**“USE OF THE MULTIPLE HYPOTHESES METHOD”** (2014 MET, Part A, p. A-6)

“Another method that can be applied to determine an unknown or unverified trail route is creating *multiple hypotheses* and then rigorously testing each one. Hypotheses are designed to be “destructively tested.” The biggest danger for the mapper analyst is to embrace a favored hypothesis rather than remain skeptical and rigorously test its validity. A hypothesis that remains durable under testing has a higher probability of being accurate. Look for a “fatal flaw” that would render a hypothesis highly unlikely to fit normal emigrant travel patterns. The testing process includes applying diary descriptions, General Land Office (GLO) plat information, and terrain surface characteristics in the field.”

“Armed with this type of evidence, head out into the field and try to put yourself into emigrant boots walking alongside a wagon to see whether or not a hypothetical trail route makes trail sense. For example, a route too sideling for wagons to traverse would be that fatal flaw negating a hypothesis. Any significant obstacle that would require time and energy to overcome—and is not accounted for in a diary description—might be a fatal flaw for a given hypothesis. For example, a challenging cliff barrier encountered on the ground would suggest that if emigrants had directly ascended the cliff the incident would have elicited diary comments. Absence of those comments would suggest that the travel route deviated in some fashion to avoid the obstacle. Likewise, the absence of an obstacle in the way of direct travel would negate a hypothesis that had emigrants taking a circuitous route.”

From the author’s point of view, the 2014 MET, Part A Section on the “Use of the Multiple Hypotheses Method,” is another outstanding step in the evolution of the MET process nudging the researcher closer to a sound systematic (MET, p. 3) repeatable system of emigrant trail research, analysis, classification, mapping, and documentation (i.e., scientific method).

- Walker, Mike, Co-Project Leader, HETC; Education Chair, HNAHS. Draft July 4, 2012. *Historical Trail Inventories Must Document Verification And Reliability of Evidence*. Hugo, OR.
- Rose, Karen and Walker, Mike, Co-Project Leaders, Hugo Emigrant Trails Committee. December 8, 2013. *Emigrant Trail Inventories and Decisions*. Hugo Neighborhood Association & Historical Society. Hugo, OR.
- Walker, Mike, Member, HETC; Education Chair, HNAHS. Draft July 4, 2012; Updated Draft May 3, 2015. *Scientific & MET Manual Methods*. Hugo, OR.

However, it like MET CS 4 (Section I.B.1) has process application questions (Section I.C.5 of *Non-surveyed Applegate Trail Site: East I-5 Manzanita Rest Area MET Verified*).

- MET CS 4. Rank Reliability of Different Types of Evidence Used to Verify Trail Location (Part of the Corroborative Rule, Appendix F; 2002 MET, pps. 5 - 8).
- Walker, Mike, Member, HETC. June 5, 2015. *Non-surveyed Applegate Trail Site: East I-5 Manzanita Rest Area MET Verified*. Hugo, OR.

The biggest question is to replace, where possible, judgement of the individual researcher, with specific standards and criteria for verification analysis process decision-making. For example, the following phrases are from “Use of the Multiple Hypotheses Method.”

1a Quote “. . . creating *multiple hypotheses* and then rigorously testing each one.”

1b Question What are the standards for “rigorously testing”?

2a Quote “Hypotheses are designed to be “destructively tested.”

2b Question What are the standards for “destructively tested”?

3a Quote “. . . embrace a favored hypothesis rather than remain skeptical and rigorously test its validity.”

3b Question What are the standards for “rigorously test its validity”?

4a Quote “Look for a “fatal flaw” that would render a hypothesis highly unlikely to fit normal emigrant travel patterns.”

4b Question What is a fatal flaw? This question has a qualitative explanation in the MET which satisfies the author when a quantitative standard is not available.

“Any significant obstacle that would require time and energy to overcome—and is not accounted for in a diary description—might be a fatal flaw for a given hypothesis. For example, a challenging cliff barrier encountered on the ground would suggest that if emigrants had directly ascended the cliff the incident would have elicited diary comments. Absence of those comments would suggest that the travel route deviated in some fashion to avoid the obstacle. Likewise, the absence of an obstacle in the way of direct travel would negate a hypothesis that had emigrants taking a circuitous route.”

- 5a Quote “... a route too sideling for wagons to traverse would be that fatal flaw negating a hypothesis.”
- 5b Question What is the standard or criteria for “too sideling” in support of an interpretive opinion to negate a hypothesis (i.e., verification analysis proves emigrant wagon trail site was not at the hypothesized location)? We know the actual emigrants could easily recognize it, or feel it, on the trail. However the author has spent considerable energy addressing the issue without a satisfactory answer.

Malcolm Drake, Member HETC; Walker, Mike, Co-Project Leader, HETC, HNAHS.  
Very Draft June 6, 2012. *Bad Roads (Rough, Hilly and Sidling) at Oxbow of Applegate Trail And/or Grave Creek Hills*. For the HETC, HNAHS. Hugo, OR.

For example, the following quotes, in relevant part, are from the diaries of 1846 emigrant Virgil Pringle, and 1847 emigrant Lester G. Hulin, along the Applegate Trail over Grave Creek Hills in northern Josephine County, Oregon.

*Sunday, October 18 – Have some bad road that takes till after dark to go 6 miles. 6 miles (Pringle).*

*W 19<sup>th</sup>. Upon leaving camp soon came to a fine creek [Jump Off Joe Creek], then bad roads entered (rough, hilly and sidling), but by night we were in a valley with good camping ground at hand [On Grave Creek in Sunny Valley]; distance 8 miles (Hulin).*

To date, members of the HETC have interpretive opinions in conflict of the location for where the “rough, hilly and sidling” occurred traveling over the Grave Creek Hills (i.e., today’s Mt. Sexton Pass area), but no definition of “too sideling,” or more importantly, in that verification analysis, of what was “*bad roads entered (rough, hilly and sidling)*,” but not the threshold of significance where the sidling was too much for wagon travel.