

**Appendix D2**  
**Draft Paleontological Resources Survey Plan**

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## Acronyms and Abbreviations

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BLM	Bureau of Land Management
DOI	Department of Interior
EIS	Environmental Impact Statement
ORS	Oregon Revised Statutes
POD	Plan of Development
Project	Boardman to Hemingway Transmission Line Project
PYFC	Potential Fossil Yield Classification
U.S.C.	United States Code
USFS	United States Forest Service

# APPENDIX D2 – DRAFT PALEONTOLOGICAL RESOURCES SURVEY PLAN

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## D2.1 Introduction

Paleontological resources (i.e., fossils) are the remains or traces of ancient life. Fossil remains may include bones, teeth, shells, leaves, and wood found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also signs of paleofaunal activities (such as footprints, swimming marks and nests), and the collecting localities and the geological deposits that contain the fossils (DOI 2000).

## D2.2 Regulatory Framework

The purpose of this draft survey plan is to define the paleontological resources survey requirements and methodologies for the Boardman to Hemingway Transmission Line Project (Project), document those details in the Project Plan of Development (POD), and communicate the survey requirements among Idaho Power Company, the coordinating agencies, and Project environmental and engineering staff. The plan addresses surveys that must be completed to inform the design of the transmission line and associated facilities, support the implementation of the geotechnical investigation, and prepare the POD for construction of the transmission line. This survey plan does not contain detailed work plans, strategies or schedules for completion, or detailed maps of survey areas. These details will be documented in separate Project-specific survey implementation plans to be developed prior to conducting detailed paleontological resources surveys. In addition to development of the survey implementation plans, pre-field activities would include analysis of aerial imagery to refine areas for detailed survey, in-field reconnaissance to further refine areas for detailed survey, and coordination with the relevant agencies to concur with the areas for detailed survey.

This survey plan does not address paleontological monitoring that could be required as a component of environmental and transmission line construction, or special circumstances that may warrant collection of additional paleontological resources data. Requirements for environmental and construction monitoring will be informed by the findings of surveys described in this document and will be documented in the POD.

In accordance with the Federal Land Policy and Management Act, National Environmental Protection Act, Bureau of Land Management (BLM) Policy 8270, state codes of Oregon; and requirements for the Plan of Development for the Project, a Paleontological Resources Treatment Plan has been drafted (Appendix B6 – Paleontological Resources Treatment Plan). A stipulation of the Paleontological Resources Treatment Plan is to conduct a survey of the areas along the route selected for construction of the transmission line (identified as the Agency Preferred Alternative in the Environmental Impact Statement [EIS]) identified as having a very high, high, or moderate/undetermined potential in advance of ground-disturbing activities associated with construction of the proposed Project. The purpose of the survey is to (1) meet the requirements of federal and state agencies for preservation of fossils; (2) identify any paleontological resources present that should be collected, curated, and preserved for the scientific record; and (3) refine areas of paleontological sensitivity that would need to be monitored during construction activities.

Federal Land Policy and Management Act (43 United States Code [U.S.C.] 1701-1784) recognizes significant paleontological resources as scientific resources and requires federal agencies to manage public lands in a manner that protects the quality of scientific resources and, where appropriate, preserves and protects certain public in their natural conditions. The National Environmental Protection Act (42

U.S.C. 4321) directs federal agencies to use all practicable means to “preserve important historic, cultural, and natural aspects of our natural heritage....”

The basis and guidance for addressing potential paleontological resources on land BLM administers includes the following documents: (1) Paleontological Resource Management (H-8270-1); (2) General Guidance for Paleontological Resource Management (H-8270-1); (3) Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (Washington Office Instruction Memorandum 2008-009); and (4) Assessment and Mitigation of Potential Impacts to Paleontological Resources (Washington Office Instruction Memorandum 2009-011).

In addition to BLM policies, the Paleontological Resources Preservation Act requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise (16 U.S.C. 470aaa et seq.). The Paleontological Resources Preservation Act includes specific provisions addressing management of these resources by the BLM and the U.S. Forest Service. This includes collection of scientifically significant fossils by qualified researchers who have obtained a permit.

Oregon Revised Statutes (ORS 358.920) prohibits a person excavating, injuring, destroying or altering an archaeological site or object. It also prohibits moving an archaeological object that is located on public or private lands in Oregon unless a permit (ORS 390.235) has been issued by the State Parks and Recreation Department. A person may not sell, purchase, trade, barter or exchange or offer to do any of these things with any archaeological object obtained from public or private lands without the permission of the landowner and if a certificate of origin is not furnished.

This survey plan describes the tasks to prepare for and conduct the paleontological survey, curate fossil specimens discovered during the survey, and prepare a survey report. Monitoring of construction activities is not addressed in this survey plan, but rather, in the Paleontological Resources Treatment Plan.

## D2.3 Background

Geological formations, compiled for the geological inventory for preparation of the EIS, and known fossil localities, from several institutions, were used to identify the potential paleontological sensitivity of areas within 1 mile on either side of the reference centerline of each alternative route study corridor.

Paleontological sensitivity levels were assigned to each geological formation using the PFYC system that was adopted by the BLM in 2007 for assessing paleontological sensitivity on federal land and based on discussions with paleontologists familiar with the areas crossed by the study corridors, meetings with resource agency personnel, reviews of pertinent regional literature, and comments received from the public and special interest groups.

The PFYC system classifies geological units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential (BLM 2008). The five-part PFYC system, as defined by the BLM (2008), is explained below.

**Class 1 – Very low potential:** Geological units not likely to contain recognizable fossil remains such as:

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.
- Units that are Precambrian in age and older.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is nonexistent or extremely rare.

**Class 2 – Low potential:** Sedimentary geological units not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils such as:

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent Aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alternation).

The probability for a project to impact vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities will be managed on a case-by-case basis and assessment or mitigation maybe unnecessary except in rare or isolated circumstances.

**Class 3 – Moderate or unknown potential:** Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential such as:

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate and plant fossils known to occur intermittently and are predictably known to be low.
- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3, 4, and 5 units are divided into subclasses, as described below.

- Class 3a – Moderate potential: Units are known to contain vertebrate fossils or scientifically significant invertebrate or plant fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but the potential is somewhat higher for common fossils.
- Class 3b – Unknown potential: Units exhibit geological features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant fossils. The units in this class may eventually be placed in another class when sufficient surveying and research is performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management plans. This classification includes a broad range of paleontological potential. It includes geological units of unknown potential, as well as units of moderate or infrequent occurrence of fossil resources. Management considerations cover a broad range of options and could include pre-disturbance surveys, monitoring, or avoidance. Ground-disturbing activities will require sufficient assessment to determine where significant paleontological resources occur in the area of the proposed action and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and lower concern of affecting significant paleontological resources.

**Class 4 – High potential:** Geological units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Ground-disturbing activities may adversely affect paleontological resources in many cases.

- Class 4a – High potential: Units exposed with little or no soil or vegetative cover. Outcrop areas are extensive, with exposed bedrock areas often larger than two acres. Paleontological resources

may be susceptible to adverse impacts from ground-disturbing actions. Illegal collection activities may impact some areas.

- **Class 4b – High potential:** These are areas underlain by geological units with high potential, but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity. Class 4b includes areas exhibiting:
  - Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
  - Areas of exposed outcrop smaller than two contiguous acres.
  - Outcrops forming cliffs of sufficient height and slope that impacts are minimized by topographic conditions.
- Other characteristics present that lower the vulnerability of both known and unidentified paleontological resources.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, which may include removal or penetration of the protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the ground-disturbing action usually will be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered. Class 4 and 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geological mapping at the appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

**Class 5 – Very high potential:** Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils and are at risk of human-cause adverse impacts or natural degradation.

- **Class 5a – Very high potential:** Units are exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from ground-disturbing activities. Unit is frequently the focus of illegal collection activities.
- **Class 5b – Very high potential:** These are areas underlain by geological units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from ground-disturbing activity. These include areas exhibiting:
  - Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
  - Areas of exposed outcrop are smaller than two contiguous acres.
  - Outcrops forming cliffs of sufficient height and slope that impacts are minimized by topographic conditions.
- Other characteristics present that lower the vulnerability of both known and unidentified paleontological resources.

The probability of impacting significant fossils is high to very high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can be reasonably expected to occur in the impact area. On-the-ground surveys prior to authorizing any ground disturbing activities or land-use adjustments will usually be necessary. On-site monitoring may be necessary during construction activities. Mitigation will often be necessary before and/or during construction. Official designation of areas of avoidance, special interest, and concern may be appropriate.

The results of the paleontological resources study and analysis are documented in the EIS. A summary of the results will be included in the final POD.

## **D2.4 Paleontological Resources Surveys**

### **D2.4.1 Preparation for the Paleontological Resources Survey**

Based on the data and information mapped for the preparation of the EIS and use of aerial photographs, a map will be created showing PFYC levels, and overlaying proposed Project facilities (i.e., geotechnical investigation boreholes, transmission line centerline, preliminary access roads, and other areas of temporary and permanent disturbance). A series of maps will be prepared showing the areas to be surveyed along the proposed transmission line and PFYC classifications.

### **D2.4.2 Conduct Paleontological Resources Survey**

The survey will be conducted by qualified paleontologists under BLM permits and Oregon State Permit. The survey will examine existing rocks and sediments exposed, as well as any recorded localities, access roads that might be affected by any construction-related activities, and structure work areas. Known localities identified during the record search, and in the survey corridor along the proposed transmission line route, will be examined for fossils. New localities identified during the survey will be recorded. The survey will confirm and augment geologic mapping, locate and collect any significant nonrenewable paleontological resources exposed at the surface, and assess paleontological sensitivity with more precision.

The areas to be surveyed will be determined by BLM and United States Forest Service (USFS). In addition, any ancillary facilities, including roads (e.g., new roads, existing roads needing improvement, and overland routes), and borehole locations for geotechnical studies associated with the Project will require survey if they are in areas of PFYC 4 or 5, or in the portions of PFYC 3 requiring survey as determined by the land-management agencies. As of the date of this draft survey plan, these facilities have not yet been located. Once the locations of these facilities have been determined, survey of these areas will be conducted in accordance with the procedures set forth in this survey plan.

Prior to commencing survey, the applicable land-management agency will be contacted to discuss the survey and inform them of the dates and locations the surveys. For privately owned land, Idaho Power Company's right-of-way specialists will be contacted to ensure rights-of-entry have been acquired. The duration of the survey is unknown at this time. In addition, prior to commencing survey, procedures will be established by the BLM and USFS as to how handle fossil localities discovered during the survey.

### **D2.4.3 Curation and Deposition of Fossil Specimens**

A curation plan will be followed for any fossil specimens (vertebrate, invertebrate, trace fossils, and/or plant) collected during the preconstruction survey. The curation plan will include the preparation of collected specimens to a point of identification and permanent preservation, preparation of large vertebrate fossils collected in plaster jackets, long-term stabilization of all collected significant fossils, and analysis. A discussion with the designated approved institution(s) regarding their curation policies will be conducted. If no fossil specimens are found during surveys, no curation will be necessary. Prior to

commencing survey, procedures will be established by the BLM and USFS as to how fossil specimens found during the preconstruction survey or monitoring will be handled.

#### **D2.4.4 Survey Report**

A report of the methods and results of the survey will be prepared and submitted for agency review following the completion of the survey. The BLM and USFS will determine report requirements.

### **D2.5 Literature Cited**

- BLM (Bureau of Land Management). 2008. Potential Fossil Yield Classification (PFYC) System. Instruction Memorandum No. 2008-009. Available online at:  
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