APPENDIX P
FRAMEWORK PALEONTOLOGICAL RESOURCES MANAGEMENT AND MITIGATION PLAN

TABLE OF CONTENTS

ACRONYMS

Applicant	TransWest Express LLC, also TransWest
BLM	Bureau of Land Management
BMP	Best Management Practice
CRS	Colorado Revised Statute
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
GIS	geographic information system
NEPA	National Environmental Policy Act of 1969
NTP	Notice to Proceed
PFYC	Potential Fossil Yield Classification
Plan	Paleontological Resources Management and Mitigation Plan, also PRMMP
POD	Plan of Development
PRMMP	Paleontological Resources Management and Mitigation Plan, also Plan
Project	TransWest Express Transmission Project, also TWE Project
PRPA	Paleontological Resource Preservation Act
TransWest	TransWest Express LLC, also Applicant
TWE Project	TransWest Express Transmission Project, also Project

P1.0 INTRODUCTION

This framework Paleontological Resources Management and Mitigation Plan (PRMMP or Plan) identifies the process that will be followed by TransWest Express LLC (TransWest or Applicant) and its Construction Contractor(s) to identify sensitive paleontological resources, develop measures to mitigate impacts to those sensitive resources, and implementation and reporting of those measures for the TransWest Express Transmission Project (TWE Project or Project).

Paleontological resources are the remains or traces of once-living organisms preserved in rocks or sediment. These fossils include bones, teeth, soft tissue, shells, leaves, wood, footprints, burrows, and microscopic remains found in geological deposits within which they were originally buried. The fossil record is the only direct evidence that life on Earth has existed for more than 3.6 billion years. Fossils are important scientific and educational resources because they are used to: (1) study evolutionary relationships, (2) understand fossil preservation, (3) interpret ancient environments and changes in climate, (4) determine the relative geologic age of rocks, (5) study the past geographic distribution of organisms, and (6) study the patterns and processes of evolution, extinction, and speciation. Fossils are considered non-renewable resources because the organisms they represent no longer exist. Information concerning the type of paleontological resources found in the TWE Project area and the potential for the Project to affect these resources can be found in the Environmental Impact Statement (EIS).

P2.0 PLAN PURPOSE

The purpose of the framework Plan is to assist TransWest and its Construction Contractor(s) and those regulatory agencies with the responsibility for protecting paleontological resources in the planning, design, and construction of the Project. The PRMMP identifies the process that will be followed to identify sensitive resources, develop measures to mitigate impacts to those sensitive resources, implementation of those measures, and reporting. Prior to issuance of any Notices to Proceed (NTP) with construction, the steps outlined for the identification of sensitive resources and mitigation measures will need to be completed and the PRMMP updated.

P3.0 PLAN UPDATES

Based on detailed final engineering and design and appropriate pre-construction surveys for the selected Agency Preferred Alternative, an updated Plan will be completed with the NTP Plan of Development (POD). The Construction Contractor will be responsible for preparing and implementing the final Plan in compliance with local, state, and federal regulations pertaining to paleontological resources.

P4.0 REGULATORY FRAMEWORK

Federal and state legislation, regulatory compliance, and professional standards applicable to paleontological resources in the Project area include:

- National Environmental Policy Act (NEPA)
- Federal Land Policy and Management Act (FLPMA)
- Paleontological Resources Preservation Act (PRPA)
- Colorado Revised Statute (CRS) 24-80-401-411

- Utah State Code 63-73-11 through 63-73-19
- Nevada Revised Statutes 381.195 – 381.227

P5.0 POTENTIAL FOSSIL YIELD CLASSIFICATION

The Potential Fossil Yield Classification (PFYC) system is a measure of the likelihood of impacting fossil resources in a given area based on the occurrence of fossil-bearing geological units. This system predicts the probability of finding paleontological resources in a given area using geological maps of sufficient scale and detail. The numerical nature of the PFYC system also allows for ease of importation into a geographic information system (GIS), further facilitating the planning and management decision-making process. The five-part PFYC system, as defined by the Bureau of Land Management (BLM) (2008), is explained below.

Class 1 – Very low potential: Geological units not likely to contain recognizable fossil remains. Units that are igneous or metamorphic, excluding reworked volcanic-ash units. Units that are Precambrian in age. 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. Vertebrate or significant invertebrate or plant fossils not present or very rare. Units that are generally younger than 10,000 years before present. Recent eolian deposits. Deposits that exhibit significant physical and chemical changes (i.e., diagenetic alteration). The probability for impacting 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 may be 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. Commonly marine in origin with sporadic known occurrences of vertebrate fossils. Vertebrate fossils and scientifically significant invertebrate and plant fossils known to occur intermittently and predictably known to be low. Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

***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 as well and could include pre-construction 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-collecting areas due to the higher occurrence of common fossils and lower concern about 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 collecting 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. Areas of exposed outcrop are smaller than two contiguous acres. Outcrops form cliffs of sufficient height and slope so impacts are minimized by topographic conditions. Other characteristics are 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 will usually 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-caused 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 commonly larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from ground-disturbing activities. Unit is frequently the focus of illegal collecting 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 activity. Outcrops form cliffs of sufficient height and slope so impacts are minimized by topographic conditions. Other characteristics are 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 these actions. Official designation of areas of avoidance, special interest, and concern may be appropriate.

P6.0 PALEONTOLOGICAL TREATMENT

TransWest has committed to the following Design Features and Best Management Practices (BMPs) as identified in the Draft EIS (DEIS):

TWE-38: If paleontological resources are known to be present in the Project area, or if areas with a high potential to contain paleontological material has been identified through the NEPA process and Draft and Final EIS (FEIS), the Applicant will prepare a Paleontological Monitoring and Mitigation Plan as part of the NTP POD.

TWE-39: Paleontological mitigation may be required in areas of greatest disturbance and areas likely to have significant fossils. Preconstruction surveys of such areas may be conducted as agreed upon by the land managing and lead federal agency.

The following steps indicate how the above design features will be implemented for the treatment of paleontological resources:

1. Conduct paleontological pre-construction field survey and report.

2. Develop a PRMMP.

3. Undertake resource data recovery (if required) and monitoring as prescribed in the PRMMP.

4. Prepare report documenting the results of the monitoring and additional investigations that were required.

The pre-construction field survey shall be undertaken by a qualified paleontologist(s) within those PFYC Class 4 or Class 5 areas identified in the FEIS. The survey will examine existing rocks and sediment exposures. The survey will confirm and augment geological mapping, locate and collect any significant paleontological resources exposed at the surface, and assess paleontological potential with more precision. The results of the pre-construction survey will be presented in a report that will be provided to the appropriate regulatory agencies.

Based on the results of the pre-construction field survey, a final PRMMP will be developed. This Plan will specifically identify any specimens that require data recovery prior to construction, identify those portions of the Project area where monitoring for paleontological resources should be conducted

during construction, and describe the procedures to be followed in the event of an unanticipated discovery. The PRMMP will also outline a working training program, curation requirements, and reporting.

P7.0 REFERENCES

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