



Clarno Unit Ranger Station Environmental Assessment

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John Day Fossil Beds National Monument
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Chapter 1: Purpose of and Need for Management Action

A. Park Purpose and Significance

John Day Fossil Beds National Monument in Oregon was authorized by an Act of Congress on October 26, 1974 (Public Law 94-486). The purpose of the monument is to preserve, and provide for the scientific and public understanding of the geological and paleontological resources of the John Day region (NPS 2015d).

New significance statements (NPS 2015d):

1. The John Day region contains one of the longest and most continuous Cenozoic records of evolutionary change and biotic relationships in the world; this outstanding fossil record heightens scientific and public understanding of earth history. John Day Fossil Beds National Monument contains a concentration of localities that are a major part of that record.
2. The John Day region is one of the few areas on the planet with numerous well-preserved and ecologically diverse fossil biotas that are entombed in sedimentary layers and are found in close proximity with datable volcanic rocks; these biotas span intervals of dramatic worldwide paleoclimatic change.

The John Day region contains one of the longest and most continuous records of evolutionary change and biotic relationships in the world, spanning nearly 50 million years of time from the Cenozoic Era. John Day Fossil Beds National Monument contains a concentration of fossil sites that are a major part of that record. The monument also has well-preserved and ecologically diverse fossil biotas entombed in sedimentary rock layers that are found in close proximity to datable volcanic rocks; these biotas span intervals of dramatic worldwide paleo-climatic change (NPS 2009:7, NPS 2015d).



Figure 1: John Day Fossil Beds National Monument, Oregon, showing Clarno Unit in relation to other units.

B. Clarno Unit Significance and Setting

The proposed project area is within the Clarno Unit of the monument, which is located 18 miles southwest of the town of Fossil, the Wheeler County seat, on Oregon State Highway 218 (Figure 1).

Wheeler County is the least populated county in Oregon, with an estimated population of 1,375 in 2014 (U.S. Census Bureau 2015). This relatively remote area is a two hour drive to the Sheep Rock Unit, where park headquarters is located, and a one hour thirty-minute drive to the Painted Hills Unit. The Clarno Unit encompasses 1,969 acres, including frontcountry and backcountry trails, a picnic area, restrooms, potable water, parking, wayside exhibits, and some fully accessible visitor use areas. The most prominent natural feature is the Clarno Palisades, which are a series of sharp cliffs up to 150 feet high that formed from prehistoric volcanic mud flows. The unit is also home to the world famous Clarno Nut Beds and Hancock Mammal Quarry. Based on data from 2004-2014, the average annual visitation for the Clarno Unit is estimated at 23,523 visitors annually (NPS 2015a).

A portion of the Clarno Unit was originally an Oregon State Park. According to the administrative history: When a portion of what would become the Clarno Unit was first established as a state park in the 1960s, the park's focus was on the dramatic Palisades rock formation above the mouth of Indian Canyon, and not on the significant fossil resources in the Clarno area. As early as 1962, the state began planning for a picnic area in the park, and by 1973 they had developed a two acre parcel with parking, picnic tables, pit toilets and several signs at the mouth of Indian Canyon with a view towards the Palisades. After the National Monument was established in 1975, the NPS expanded Clarno Unit boundaries, realizing the need to protect resources on adjacent lands, such as the Nut Beds, the Mammal Quarry, and several archaeological sites. The visitor trails from the Indian Canyon picnic area were subsequently developed in 1980 (Mark 1996).

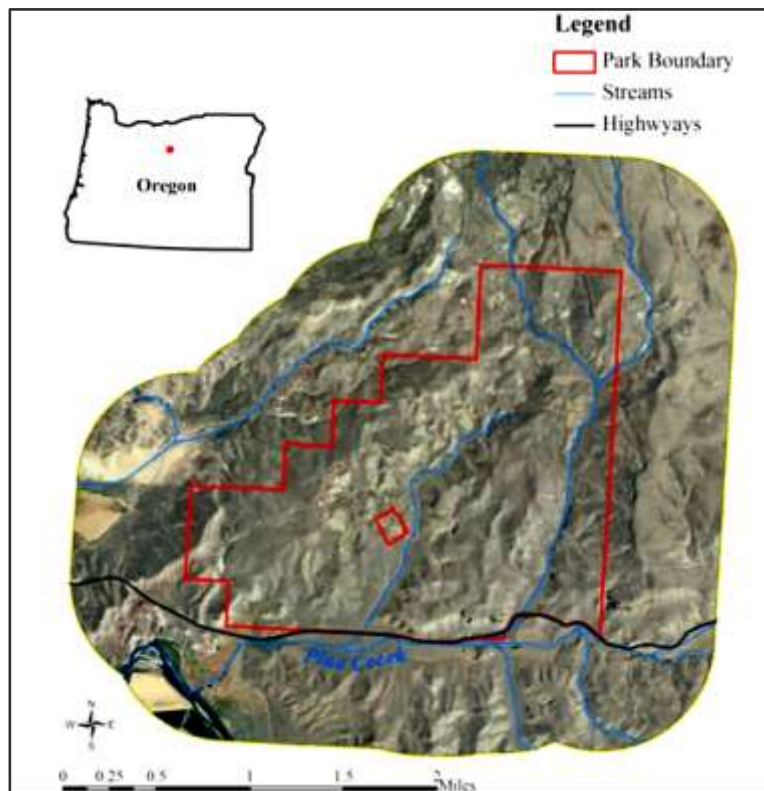


Figure 2: Clarno Unit boundary in red. Small red square is private Hancock Field Station.

The Hancock Field Station (Camp Hancock), owned and operated by the Oregon Museum of Science and Industry, is located on 10 acres of private land within (surrounded by) the Clarno Unit (Figure 2). Camp Hancock consists of 30 structures, including cabins, restrooms, a dining hall, and laboratories/classrooms

(NPS 2008:16). From 2004-2014, the camp averaged 13,078 visits per year (NPS 2015a). Students take classes on a variety of subjects, such as paleontology, geology, botany, archeology, and astronomy.

The Pine Creek Conservation Area (35,000 acres) is directly southeast of the Clarno Unit and (Nielsen et al. 2013:4). The conservation area was acquired in 1999-2001 by the Confederated Tribes of the Warm Springs Reservation with assistance from the Bonneville Power Administration. The purpose of the area is to restore habitat and wildlife lost as a result of constructing the Bonneville, Dalles and John Day Dams along the Columbia River (Nielsen et al. 2013:4). Holistic restoration monitoring efforts include adjacent public lands, including the Clarno Unit, as well as the Spring Basin Wilderness managed by the Bureau of Land Management.

C. Proposed Action

The proposed action is to construct a small ranger station/garage at the Clarno Unit to improve visitor and resource protection by relocating these functions now housed in the Unit's water treatment building.

D. Purpose and Need

1. Purpose

The National Park Service proposes to construct a new ranger office/visitor contact station (ranger station) in the Clarno Unit of John Day Fossil Beds National Monument to replace some of the functions in the existing small (76 square foot) shed used as a well/pump house and water treatment facility and *de facto* ranger station. The current building, which also contains a small office, is located south of State Highway 218 (Shaniko-Fossil Highway), approximately 0.5 miles west of the Palisades Picnic Area, and 0.5 miles east of Hancock Canyon Road.



Figure 3: Water Treatment Building

The new ranger station would accomplish the following objectives for the monument and Clarno Unit:

- Improve operational efficiency for interdisciplinary staff
- Enhance resource protection
- Meet or exceed health and safety standards, and building codes
- Enhance visitor experience and safety
- Provide visitors with an onsite emergency point of contact

2. Need

A new ranger station is needed because of the current substandard condition of the water treatment building as a ranger office and vehicle storage area, including the lack of site security and safety features, and the inadequate size of the building to serve needed functions for visitor needs and resource protection efforts (Figure 3). The existing building was intended, and would continue to be used, as a water treatment facility. Water is pumped across State Highway 218 in both directions, to serve the monument's picnic area and the Oregon Museum of Science and Industry's (OMSI) Camp Hancock facilities.

Constructing a new ranger station in the Clarno Unit would modify **the monument's** General Management Plan (GMP) selected alternative. The Final GMP described ranger functions as continuing

to operate from the water treatment building adjacent to State Highway 218 (NPS 2009:53). Although a new ranger station was considered as an alternative in the draft GMP (NPS 2008:92), for reasons related to the then management of the monument, it was not the selected alternative in the Finding of No Significant Impact (FONSI) decision document (NPS 2009:67). Subsequent evaluation of the structure identified the following inadequacies not fully described or analyzed in the GMP.

- **Substandard Conditions for Use as an Office/Visitor Contact Station**

The existing water treatment building does not meet federal design standards for an employee office or visitor use space (NPS Design Standards 2015b). The building is also substandard because it does not meet design standards for employee or visitor use. These standards include, but are not limited to: accessibility, civil, environmental, electrical, lighting, safety, fire protection, structural, and universal design features (NPS Design Standards 2015b). A formal evaluation by monument management revealed the existing building does not meet building codes for electrical, fire, or accessibility standards, has poor lighting, inadequate space to work, and is rodent infested (NPS 2014a). There is no or minimal insulation and no heating or cooling system. As a result, providing an appropriate, temperature regulated workspace is difficult. Working within the building is also hampered by frequent failure of the phone and computer when the inside temperature is too high. In addition, the building exterior currently lacks NPS identification. There are also no sanitary or potable water facilities.

The existing building primarily functions as housing for the Clarno Unit's water treatment system. The well is in the same building. Water is pumped across State Highway 218 in both directions, to serve the Palisades Picnic Area and the Camp Hancock facilities. Because of its current use as office space for the Clarno Unit ranger, the water treatment building also functions as a *de facto* "ranger station."

- **Lack of Security and Safety Features**

Due to inadequate building security and its easy access from State Highway 218, the facility has experienced vandalism several times and monument staff is reluctant to store office or work tools in the building overnight. There is no alarm system or other security features within or outside the building. The closest secure facility for equipment storage is at the Sheep Rock Unit approximately 80 miles (a two-hour drive) away. The unsafe and substandard conditions associated with the structure preclude providing a year round onsite ranger presence. Without a suitable building for staff to work out of, the Clarno Unit lacks an onsite year round ranger presence, which increases the risk of vandalism, including loss of significant paleontological and archeological resources. The lack of secure overnight parking for government vehicles at the facility means staff must drive to/from the Sheep Rock Unit to access a government vehicle, tools and other equipment to perform their job. These current conditions compromise human safety, and resource protection.

- **Inadequate Size and Configuration**

The size and configuration of the water treatment building is inadequate to serve visitor needs and resource protection staff and equipment needs. Currently, Clarno Unit operations are conducted from the 76-square foot water treatment building. Three to six staff may work from this space that accommodates only one desk. The current space is also inadequate to help direct visitors to recreational opportunities in the area, provide interpretive materials and services, provide basic first aid and emergency contact, and to store resource management, maintenance, and interpretive materials and equipment.

The nearest emergency response is 18 miles away in Fossil, Oregon. Although one of the desired conditions in the GMP states that "**interpretive programs will be implemented at locations such as the mammal quarry, and the public will have better access to important research areas that may currently be difficult to access or are unpublicized**" (NPS 2008:79), this goal is currently unrealized. With the current structure, future needs from the opening of the mammal quarry would not be accommodated.

Not having a ranger station and the above described deficiencies inhibits monument staff from effectively accomplishing their work. Taking no action or delaying action would compound this and the other existing problems.

E. Public Scoping and Issues

Scoping is to be an early and open process for determining the scope of issues and for identifying the significant issues to be analyzed in depth related to a proposed action (40 CFR 1500-1508). An “issue” often describes concerns, obstacles, or problems related to achieving a park goal (NPS 2001). Public involvement helps identify these issues and is a key part of the planning process. Internal scoping among NPS staff began in 2012 with the preparation of a project description to obtain funding. The monument issued a press release on September 15, 2015 to the public, federal, state and local agencies, affiliated Native American Tribes, and interested organizations as part of the scoping process. Ten correspondence letters were received during scoping. A detailed discussion on public involvement is in Chapter 5: Consultation and Coordination. Public scoping comments are found on the NPS Planning Environment and Public Comment (PEPC) website (<http://parkplanning.nps.gov/documentsList.cfm?parkID=308&projectID=56470>.)

Internal and public scoping helped identify relevant issues, determine appropriate analysis procedures, and identify alternatives to the proposed action. Specific impact topics were developed to address potential natural, cultural, recreational and social impacts that might result from the proposed alternatives as identified by the public, NPS, and other agencies, and to address federal laws, regulations and executive orders, and NPS policy (see Appendix 1).

1. Relevant Issues/Impact Topics

An “issue” often describes concerns, obstacles, or problems related to achieving a park goal (NPS 2001). Impact topics are the resources likely to be affected by the proposal. Public involvement helps to identify these and is a key part of the planning process.

Soils: According to Management Policies: The Guide to Managing the National Park System, it is important to “understand and preserve the soil resources of park units and to prevent, to the greatest extent possible, the unnatural erosion, physical removal, or its contamination” (NPS 2006:56). The construction of a new facility in the Clarno Unit would result in soil removal, disturbance, and potential erosion. Activities associated with construction and use, such as heavy equipment movements, staging areas, landscaping, pathway construction, and visitor use of the area would contribute to soil impacts, therefore this issue requires further analysis.

Paleontological Resources: John Day Fossil Beds National Monument preserves a world class fossil record of plants and animals that span nearly 50 million years. The protection of paleontological resources is the monument’s main purpose as outlined in its enabling legislation. Many of these resources are below the soil surface and it is difficult to determine their presence and/or significance without surveys. Consequently, analysis of potential impacts on paleontological resources, including surveys, are needed and are important to analyze.

Archeological and Historic Resources: Soil disturbance and removal also have the potential to impact archeological or historic resources resulting from the action alternatives. National Parks are directed to preserve archeological resources and take proactive measures to protect them. The National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.); The Archaeological Resources Protection Act of 1979; and other laws and policies require the consideration of impacts on archeological and cultural resources. The monument is rich in archeological resources related to precontact use, mining, and ranching. Archeological surveys of the project areas for Alternatives 2 and 3 in Indian and Hancock canyons were important to determine if potential effects on archeological resources would occur. The Hancock Canyon project area includes historic archeological resources related to unsuccessful drilling for oil, while the Palisades area has nearby sites, but none within the project area.

Vegetation: Impacts such as trampling and vegetation loss because of construction activities would be expected. In addition, compaction of soils, soil displacement and disturbance may promote the establishment and spread of noxious weeds in the area. Impacts on vegetation as a result of construction activities are expected to be confined to the footprint of the building and associated access road and pathways. Although many noxious weeds already exist in the project area, analysis of additional impacts to native vegetation from new construction is needed.

Water Resources (Water Quantity and Floodplains): The proposed ranger station would include the additional use of water to support administrative operations, including for restrooms and maintenance. As a result, additional analysis is needed. In addition, Executive Order 11988: “**Floodplain Management**” and Executive Order 13690: “**Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input**,” require federal agencies to take action to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.

The nearest surface water to the proposed project area is Pine Creek, which is outside the monument and south of Highway 218, but adjacent to the existing water treatment building. There is no evidence to suggest that this area has experienced flash flooding. There is, however, anecdotal evidence to suggest that Camp Hancock occasionally experiences flash flooding, which has affected the OMSI facilities. In addition, Indian Canyon has experienced occasional flooding. In 1979 the U.S. Geological Survey studied **flood hazards in the monument and found that a potential exist for “cloudburst” flooding at the mouth of Indian Canyon (USGS 1979:24)**. This same study suggested that the camp facilities then being considered could be constructed on higher ground to alleviate anticipated problems: “**Construction of camp facilities and an access road on the higher ground near the east side of the draw would alleviate the flood hazard (USGS 1979:24).**” Nonetheless, the frequency, extent, and severity of flash flooding at Clarno are not well documented. Although the flood hazards in the project area are rare, the potential for flash flooding necessitates further evaluation.

Visitor Experience: Management Policies direct the NPS to provide enjoyment opportunities that are uniquely suited and appropriate to the purpose for which the park was established, and can be sustained without causing unacceptable impacts (NPS 2006:99). During construction, adverse impacts to visitor use and experience within the project area would be readily apparent, including noise, traffic delays, reduced parking, and visual intrusions. A range of benefits to the visitor experience, such as improved informational and interpretive materials, and an onsite ranger, are also anticipated. Therefore, effects on visitor use and experience are analyzed relative to existing and future conditions.

Human Health and Safety: Beneficial effects on improving health and safety are expected to outweigh the short-term adverse impact from construction. These include a range of beneficial effects on health and safety from facility improvements to correct building code deficiencies and to comply with NPS Design Standards. Therefore these impacts are considered.

Park Operations: This project proposal would bring the first official ranger station to the Clarno Unit, a relatively remote and undeveloped part of the monument. Improvements in operational efficiency would be expected for the entire range of park staff, including for interpretive, resource management, maintenance, and protection. The effects of constructing a ranger station related to future planned actions in the Clarno Unit compared to existing conditions are evaluated.

2. Issues and Impact Topics Considered but Dismissed (Not Relevant to this Proposal)

As identified by the CEO, analysis in an EA should focus on significant issues [meaning pivotal issues, or issues of critical importance] and only briefly discuss insignificant issues (40 CFR 1502.2(b)). Scoping helps focus environmental impact analysis on those issues relevant to the project proposal and

alternatives considered. Issues that are not significant (relevant), or which have been covered by prior environmental review are described below as issues considered, but dismissed (40 CFR 1501.7(a)(3)).

Impact topics considered but dismissed during project development included geology, geologic hazards, air quality, soundscapes, lightscares, wetlands, water quality, wildlife, special status species, prime and unique farmlands, ethnographic resources, sacred sites, historic buildings and structures, cultural landscapes, and Indian Trust Resources. As required by the CEQ, analysis of Indian Sacred Sites and Environmental Justice were also considered but dismissed for the reasons stated below.

1. Issues and Impact Topics Considered but Dismissed

Lightscares (Night Sky Intrusion): The Clarno Unit of the monument is relatively remote and is therefore free of most artificial light. This characteristic is important to maintain. As a result, Management Policies states that:

“To prevent the loss of dark conditions and of natural night skies, the Service will minimize light that emanates from park facilities, and also seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks” (NPS 2006:57).

The addition of a ranger station to the Clarno Unit will necessarily include lighting for monument operations and visitor/employee safety. Other Clarno Unit lighting impacts Camp Hancock and the Palisades Picnic Area. Because lighting would be designed to be directed inward and downward and would meet guidelines for its provision, the additional light emanating intermittently from one ranger station and vehicle storage area would not alter night sky conditions. Therefore this impact topic was dismissed from further consideration.

Wildlife and Special Status Species and Communities: The National Marine Fisheries Service listed the Middle Columbia River Steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS) as threatened on January 5, 2006 (71 FR 834). According to the U.S. Fish and Wildlife Service, this DPS of steelhead is the only listed species in the vicinity of the proposed project areas (USFWS 2015). This DPS includes naturally spawned steelhead originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream of the Wind and Hood Rivers (exclusive) to and including the Yakima River and excludes such fish originating from the Snake River basin, however it does not include fish from artificial reintroduction programs (USFWS 2015).

The existing contact station is directly north of Pine Creek, a tributary of the John Day River and part of the Middle Columbia River Steelhead Recovery Plan for the listed steelhead trout DPS. Pine Creek is also within the Pine Creek Conservation Area, managed by the Confederated Tribes of the Warm Springs Reservation of Oregon in partnership with the Bureau of Reclamation and other agencies. Proposed project areas in Alternatives 2 and 3 are located approximately 0.5 miles from Pine Creek, a tributary to the John Day River, which itself is located approximately 1.2 miles from the Palisades Picnic Area. As a result, construction grading impacts in the vicinity of either site would be unlikely to affect either Pine Creek or the John Day River. As a result, there would be no direct or indirect effects on steelhead. Although existing operations at the water treatment building, which is close to (within 100 feet of) Pine Creek may contribute to erosion. With heavy precipitation, soils in this area could erode and contribute a small amount of sediment to Pine Creek, similar to existing natural conditions in the vicinity from other areas of bare soil, however this would not affect fish or fish habitat in Pine Creek. Therefore this impact topic was dismissed from further consideration.

Soundscapes: Management Policies and NPS **Director’s Order 47: Soundscape Preservation and Noise Management** recognize that natural soundscapes are a park resource and call for the NPS to preserve, to the greatest extent possible, the natural soundscapes of parks. Furthermore, the NPS is directed to restore degraded soundscapes to their natural condition whenever possible, and protect natural soundscapes from degradation due to noise (undesirable human-caused sound).

Natural sounds/soundscapes were digitally monitored continuously for one month at all three units of the monument in 2014. In addition, four one-hour onsite listening sessions were conducted by individuals collecting information on the type, timing, and duration of sound (Pipkin 2015:8). This monitoring was conducted to assess the general acoustical environment and provide a baseline of natural ambient sound levels for the monument (Pipkin 2015:26). The acoustical monitor was located away from developed areas in the far western part of the Clarno Unit. As a result, the report concluded:

Natural sounds (insects – 99.9%, birds- 92.1%, and wind- 70%) were the most prevalent audible sound during the listening sessions. Anthropogenic sounds came from vehicles (16.6%), jets (11.8%), and heavy equipment (8.9%) (Pipkin 2015:10). During a 24 hour period, people contributed 0% time audible noise (Pipkin 2015:v).

The continuously recorded monitors showed that the median natural ambient sound level at all the sites ranged between 23.6 dBA and 36.9 dBA [normal conversation is 60dB]. Both existing and natural ambient values were higher during the nighttime than daytime at all locations, likely due to increased insect activity during the night – between 7p.m. and 7a.m. (Pipkin 2015:26).

Because the proposed project areas in Alternatives 2 and 3 are within or close to developed areas, the proposal to construct a ranger station would not adversely affect the natural soundscape. Although construction impacts would occur, these would be temporary, lasting only for the duration of construction activities. Construction sounds would be localized to nearby visitor use areas. Later, use of the ranger station would occur during the day, when the areas are also regularly used. Therefore, this issue was dismissed from further analysis.

Water Quality: Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge of dredged or fill material or excavation within U.S. waters. No actions are being proposed in the alternatives that would be expected to increase water pollution or alter water quality within the project area. Because NPS policies and guidelines for the provision of water would continue to be followed, no additional impact analysis is needed.

Ethnographic Resources: Ethnographic resources are defined by the NPS as any “...site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system or group traditionally associated with it” (NPS Director’s Order 28).

Indigenous peoples have been in Oregon for over 14,000 years based on evidence from human coprolites and pre-Clovis artifacts found in Paisley Caves (Gilbert et al. 2008, Jenkins et al. 2012) The Columbia Plateau peoples and Great Basin peoples both used the area for traditional subsistence activities such as hunting, fishing, and gathering (NPS 2008:141). The tribes regarded as traditionally affiliated with the monument are the Burns Paiute Tribe (Burns, Oregon); the Confederated Tribes of the Umatilla Indian Reservation (Pendleton, Oregon); and the Confederated Tribes of the Warm Springs Reservation Tribal Council (Warm Springs, Oregon) (NPS 2008:141). There are no known ethnographic resources in the proposed project areas. As a result, this topic has been dismissed from additional consideration.

Sacred Sites: Sacred sites, a type of ethnographic resource, are defined as any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site (Executive Order 13007 1996). Because there are no known sacred sites in the vicinity of the project area, this impact topic was dismissed from further analysis.

Environmental Justice: Environmental justice analyses determine whether a proposed action would have “disproportionately high and adverse human health or environmental effects...on minority populations and low-income populations.” The NPS and other federal agencies have determined that a disproportionately high and adverse effect on minority and low-income populations means an adverse

effect that would result in either of the following two scenarios: (1) The effect is predominately borne by a minority population and/or a low-income population; and (2) The effect will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population. No aspect of this proposed project would result in disproportionately high and adverse human health or environmental effects on minority or low income populations; therefore, this impact topic has been dismissed from further analysis.

Climate Change: The very small potential for greenhouse gas emissions, from a proposed Clarno Unit Ranger Station in the action alternatives, was considered during the building design phase by adhering to NPS guidance that the building be designed to a LEED level of silver or better, consistent with Management Policies (NPS 2006). Similarly, impacts from a changing climate on building design have also been considered. The small degree of greenhouse gas emissions from potential construction of a small ranger station would not measurably contribute to the conditions responsible for global climate change. Because climate change predictions (see Floodplains Statement of Findings in Appendix 2) show a potential increase in the low level, infrequent flooding that has occurred at the site to date, this potential was also taken into consideration during the design phase in identifying the type and elevation of the structure and its location. The proposed building design and set back in the action alternatives would minimize the potential for these impacts to occur. Differences in the location of the building in the action alternatives would not measurably affect emissions. As a result, potential impacts from climate change or to climate change are not discussed further.

F. Legislative, Policy, and Planning Context

A variety of laws, executive orders, NPS management policies and park planning documents guided the development of this environmental assessment (Appendix 1 contains a summary of the most relevant ones).

G. Decision to be Made

This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA), and regulations of the Council on Environmental Quality (40 CFR 1508.9); **NPS Director's Order-12**: Conservation Planning, Environmental Impact Analysis, and Decision-making (DO-12) (2004, 2015); Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended); and implementing regulations 36 CFR Part 800.

This EA will be used to help the NPS (Pacific West Regional Director) determine whether a new ranger station should be constructed at the Clarno Unit of John Day Fossil Beds.

Chapter 2: Alternatives

This chapter describes the differences among the three alternatives being considered by the National Park Service for a ranger station in the Clarno Unit of John Day Fossil Beds National Monument (Figure 4). This chapter is intended to present a range of reasonable alternatives that meet the purpose and need and address the relevant issues described in Chapter 1: Purpose and Need. The description and comparison of alternatives provide clear choices for the decision-maker and the public. Included is a discussion of how the alternatives were developed, a description and map of each alternative, and design features common to the action alternatives (2-3).



Figure 4: Juxtaposition of Alternative Building Locations

Elements Common to All Action Alternatives

Construct a small (870+ square foot) building with attached insulated heated garage (for vehicle and materials storage) and fenced yard (outdoor work space). The proposed building design would accommodate:

- Accessible office space for up to three employees at one time;
- Kitchenette (hot sink, microwave, mini refrigerator) / break space;
- Indoor restroom with flush toilet; and an
- Entry information counter/display space for handouts and cooperating association sales materials.

Because the building would be located in an outlying rural area of the monument, security and septic systems are needed. The septic system would be designed to accommodate projected use at the ranger station. Combined the ranger station and septic system would encompass less than half an acre. The planned security system would include an alarm system with offsite notification, and could also include motion-activated lighting.

The building would be used for the following functions, among others:

- Employee office/work space for up to three employees
- Indoor ranger vehicle storage
- Accessible visitor contact station (providing information and handouts to visitors to the Clarno Unit)

- Secure storage location for tools and equipment, first aid supplies, cleaning and office supplies, interpretive and education materials (approximately 104 square feet).

Under the current proposed design, the building would have a gable roof (18-inches) and small front porch and would be consistent with architecture near the site and within the monument. Proposed utility systems include a small heating, ventilation and cooling (HVAC) ductless heat pump, potable water, and electricity. Telecommunications equipment would also be installed, including bringing the fiber optic cable from near the intersection with the Camp Hancock Road and Highway 218 to the proposed site.

Because the building would serve as both a public and office space, and include an attached garage, it would need a firewall between the office and garage.

Under NPS standards (Management Policies: The Guide to Managing the National Park System, the building would be designed to meet Leadership in Energy and Environmental Design (LEED) silver or better standards (NPS 2006), however, the NPS would self-certify instead of seeking formal LEED certification.

Alternative 1: No Action (Continue Current Management: Retain Existing Functions at Water Treatment/Well Building)

This alternative would continue existing operations and management at the Clarno Unit, including continued use of the water treatment shed as both a maintenance facility and a *de facto* ranger office/visitor contact station. This alternative is intended to serve as a comparison of existing conditions to evaluate the action alternatives (Alternatives 2 and 3).

Under Alternative 1, there would be no changes in the current location, size, or configuration of the water treatment building. The multipurpose use of this facility would continue. There would also be no change in park operations, storage conditions for government property, conditions for providing visitor services, or safety for employees and visitors. Although this alternative constitutes the existing conditions and is viable, it would not meet the purpose and need because it is deficient in several areas, including for operations, health and safety, maintenance and resource protection.

The water treatment building would continue to provide minimal (76 square feet) operations space, of which approximately half is dedicated to the water treatment/well functions and half to an office with inadequate insulation, heating and cooling systems, security, lighting, space and other features required of government offices. There is no space indoors within which to greet visitors or to provide information. Because it would continue to be occupied as office space and used occasionally to provide the public information, the water treatment building would continue to not meet county and other building codes for fire, structural engineering or electricity. The building also does not contain a restroom or potable water source. These facilities are located approximately one half mile away at the Palisades Picnic Area.

Other existing problems with the building and site would also remain, including the lack of rodent-proofing, minimal parking (for approximately three vehicles), and the noisy, unsuitable location on a curve adjacent to Oregon State Highway 218, the Shaniko-Fossil Highway. The Palisades Picnic Area would continue to provide the nearest restroom and potable water facilities for park staff as well as a variety of other visitor services (such as restrooms, parking, picnicking, interpretation, and trail access).

Because the use of the water treatment building as a visitor contact station has developed over time and is incidental to its other uses, the building also would continue to not have any NPS signs identifying it as a place to obtain information. Although there is an interpretive trail and turnout across Highway 218, there would continue to be no obvious access route for visitors from that trail and turnout to the water treatment building, both because of the unsafe highway crossing and because the facility is not suitable for serving visitors.

Alternative 2: Construct New Ranger Station adjacent to Palisades Picnic Area (Preferred) (Proposed Action)

Under this alternative a new 870-square foot Clarno Unit Ranger Station, including an attached garage would be constructed adjacent to the Palisades Picnic Area (Figure 5, Figure 6). The new ranger station would replace the space within the water treatment building that is currently being used as a ranger office and the *de facto* contact station functions.

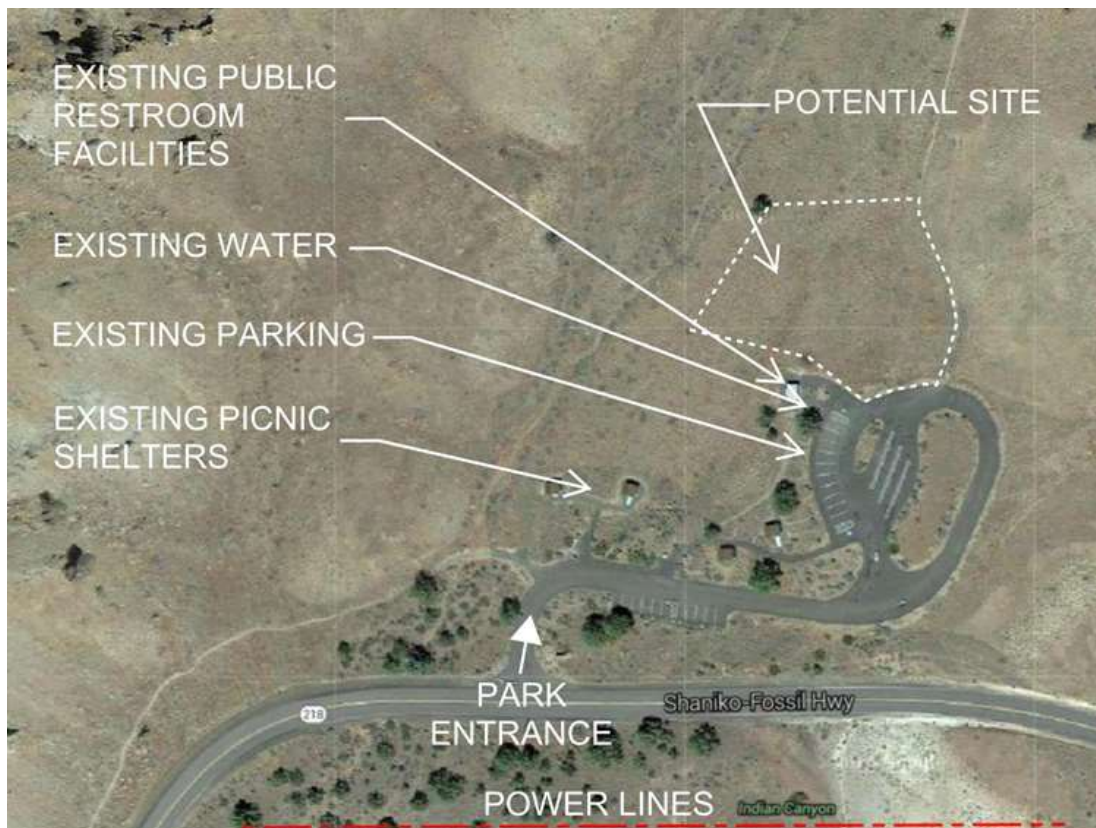


Figure 5: Alternative 2 Site Plan (Holladay 2015).

The building would accommodate the following:

- an entry visitor contact sales area with counter and brochure/display area (approximately 90 square feet);
- accessible employee office (approximately 90 square feet), including kitchenette (counter and sink);
- insulated/heated garage (approximately 338 square feet) that could accommodate one full-size government vehicle;
- secure storage for monument interpretation, law enforcement, maintenance and resource management equipment and supplies (approximately 104 square feet);

- accessible staff restroom (approximately 80 square feet); and a
- porch (approximately 88 square feet).

The building would also be equipped with proper lighting, heating and cooling systems, and telephone, computer and internet capabilities.



Figure 6: View of Proposed Alternative 2 Ranger Station Location (to right in photo) (Holladay 2015)

Because the nearest fiber optic cable is along Highway 218, the project would also require trenching and installing communications cable to the site from the highway. Proposed trenches would be approximately 400 feet long by three feet wide (1,200 square feet). Similarly, electricity would have to be provided from across Highway 218. Because an overhead extension would be provided, trenching would be minimal (400 linear feet). Water lines would be extended from the adjacent picnic area to the ranger station, requiring an additional 200 linear feet of trenching.

Modifications to the area would also include construction of a:

- driveway (approximately 40 feet long by 12 feet wide) to access the garage;
- employee parking area of approximately 40 feet by 50 feet (200 square feet);
- walkway to the building (approximately 40 feet by 12 feet);
- fenced yard behind the ranger station (approximately 800 square feet); and a
- septic system for the restroom/sink. The septic system would comprise approximately 4,860 square feet (0.11 acres) and would be constructed in an area having suitable soil drainage.

Because there is an existing roadway and visitor parking area at this site, no additional parking or roadways would need to be constructed to provide for administrative or visitor use.

Alternative 3: Construct Ranger Station South of Camp Hancock

Under this alternative a new ranger station would be constructed south of the entrance to Camp Hancock, along the access road off of Highway 218. The location for the new ranger station would be about 0.4 mile from State Highway 218 west of the road leading to Camp Hancock and south of the Camp Hancock facilities themselves. The construction and components of the ranger station would be the same as in Alternative 2.

In this location, the building would be oriented in a north-south direction with a gravel road (50 feet by 12 feet or 600 square feet) along its east side and connected to an employee parking area of approximately 600 square feet (Figure 7 and Figure 8).

Because fiber optic cables are located under the gravel road, this connection would have to be brought only a short distance (80 linear feet) further to the proposed ranger station. Similarly, an underground water line (now owned by OMSI under an NPS right-of-way permit) is located west of the adjacent road and would be extended 80 linear feet. Because the trenches would be three feet wide, excavation would affect 240 and 240 square feet respectively. Both lines also service OMSI's Camp Hancock. Overhead power lines currently cross the site, with one power pole located adjacent to the proposed site, providing ready access to electricity. Abandoned oil wells capped on the northeast end of the site would be avoided, as would a foot path from OMSI's Camp Hancock toward Highway 218.

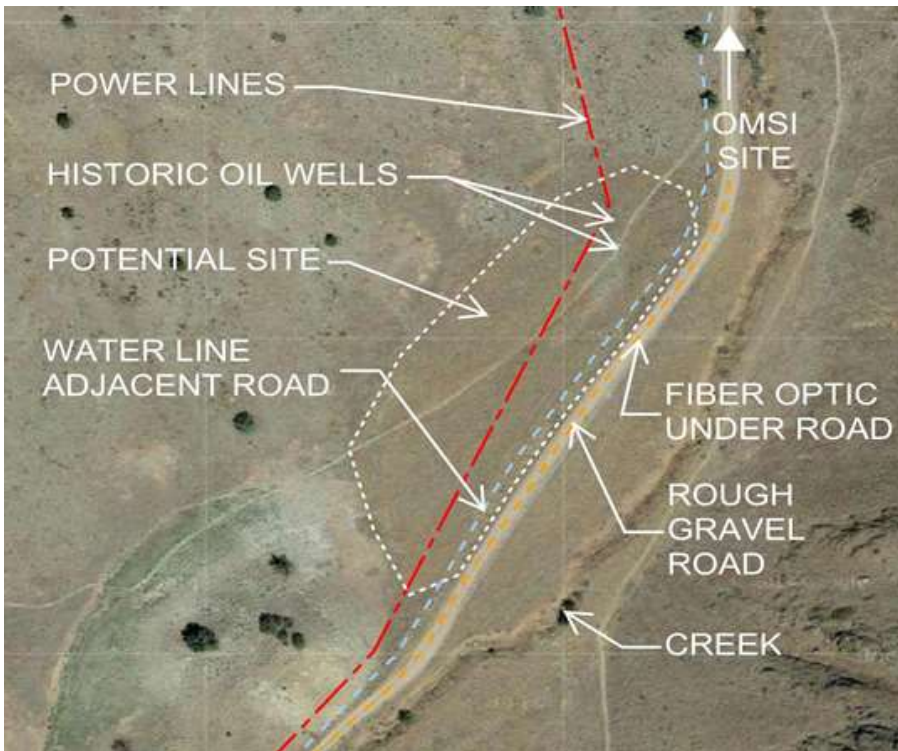


Figure 7: Alternative 3 Site Plan (Holladay 2015).



Figure 8: View of Proposed Alternative 3 Ranger Station Site (Holladay 2015)

Alternatives Considered but Dismissed

Construction of the new ranger station in the vicinity of the existing water treatment building was considered during initial planning and site visits, but was dismissed because it would have greater impacts than the other alternatives considered. Impacts that would not be present in the other alternatives include:

- Potential effects from septic system and construction close to Pine Creek, which is habitat for steelhead trout, a species listed as threatened by the U.S. Fish and Wildlife Service.
- Shape of property is difficult to work with (long triangle between road and creek). The parcel owned by the NPS is approximately three acres.
- Potential effects on safety from locating a building on a curve adjacent to Highway 218 (with poor sight distance for entrance and exits).
- Potential risks on visitor safety from visitors that may cross Highway 218 from the contact station to access the Fossil Discovery Trail (or vice versa).
- Location of powerlines limiting buildable area.
- Additional cost of constructing a 0.25 mile long access road.

Table 1: Alternative Comparison Chart

Element	Alternative 1: Existing Location	Alternative 2: Palisades Site	Alternative 3: Below OMSI site
Location	Existing 76 square foot water treatment building	New approximately 870 square foot ranger station adjacent to Palisades Picnic Area	New approximately 870 square foot ranger station southwest of Oregon Museum of Science and Industry's Camp Hancock
Access	From adjacent U.S. Highway 218	From Palisades Picnic Area adjacent to U.S. Highway 218 and existing public parking area	From U.S. Highway 218 to Camp Hancock Road, then access driveway/road to parking and building.
Building Access	Driveway available	Construct driveway (approximately 480 square feet)	Improve Access Road (future) Construct driveway similar to Alternative 2
Parking	2 vehicles	Construct employee parking area (approximately 200 square feet)	Construct to accommodate eight vehicles and two buses/motorhomes (600 square feet)
Restroom	Not available	Public restroom available Construct employee restroom	Not available at site, available at picnic area. Construct employee restroom
Water	Available	Available Extend waterline approximately 200 feet	Available Extend waterline approximately 80 feet
Wastewater	Not available	Construct onsite septic system	Construct onsite septic system
Fiber Optic	Not available (across Highway 218)	Not available, near Camp Hancock Road. Extend approximately 400 feet	Available under access road
Electricity	Available	Across Highway 218 Extend approximately 400 feet across Highway and under parking area	Overhead powerlines on site.
Amenities	None	High visibility location Excellent access for visitors Opportunity to provide accessibility Concentration of facilities for wildland fire protection. Opportunity for secure fenced area	Excellent access for OMSI staff and participants Opportunity to provide accessibility Some concentration of facilities for wildland fire protection. Opportunity for secure fenced area
Resource Concerns	Too small, does not meet standards for accessibility, office space or as public building Pine Creek contains listed distinct population segment of steelhead trout Location of creek and small size of parcel makes it difficult to add restroom	Potential cloudburst flood hazard that can be mitigated by building construction and location	Rough, unimproved access road. Flash flood hazard on both sides of canyon (adjacent but not within proposed site). Flooding has inundated OMSI camp area and washed out access road. Not visible from Highway 218 Historic archeological resources (capped oil wells) would need to be avoided. Subsurface archeological survey needed. Approximately 0.5 miles from other visitor facilities.

Chapter 3: Affected Environment

Introduction

This section describes the setting and existing conditions in the Clarno Unit of John Day Fossil Beds National Monument. Current resource condition descriptions within the project area provide a baseline for understanding a comparison of the environmental consequences of each alternative. Only those resources that could potentially be affected by the alternatives if they were implemented are described. Resource impact topics included are: soils, paleontology, water resources (floodplains and water quantity), vegetation, archeological resources, visitor experience, human health and safety, and park operations.

A. Physical Resources

Soils

A soil survey for John Day Fossil Beds National Monument was completed by the Natural Resources Conservation Service in 2000 (NRCS 2002). Soils in all three units were mapped.

In the Clarno Unit, four dominant soil map units are present on the hillsides (Figure 15). These range in slope from 15 to 50 percent. These soils generally are moderately to very deep, well drained, and predominately clay-like in texture. Another soil map unit is found on alluvial fans in the Clarno Unit. These soils are also well-drained, very deep, clay soils, and have a high potential for shrink-swell characteristics (NPS 2008:133).

In 2009, an ecological condition assessment for the monument included three main landscape attributes: soil stability, hydrologic function, and biotic integrity. The Clarno Unit data was based on six plots (#19-24) surveyed for the assessment.

The Clarno plots all had an attribute rating of Zero - 2.5% soil stability departure and a hydrologic

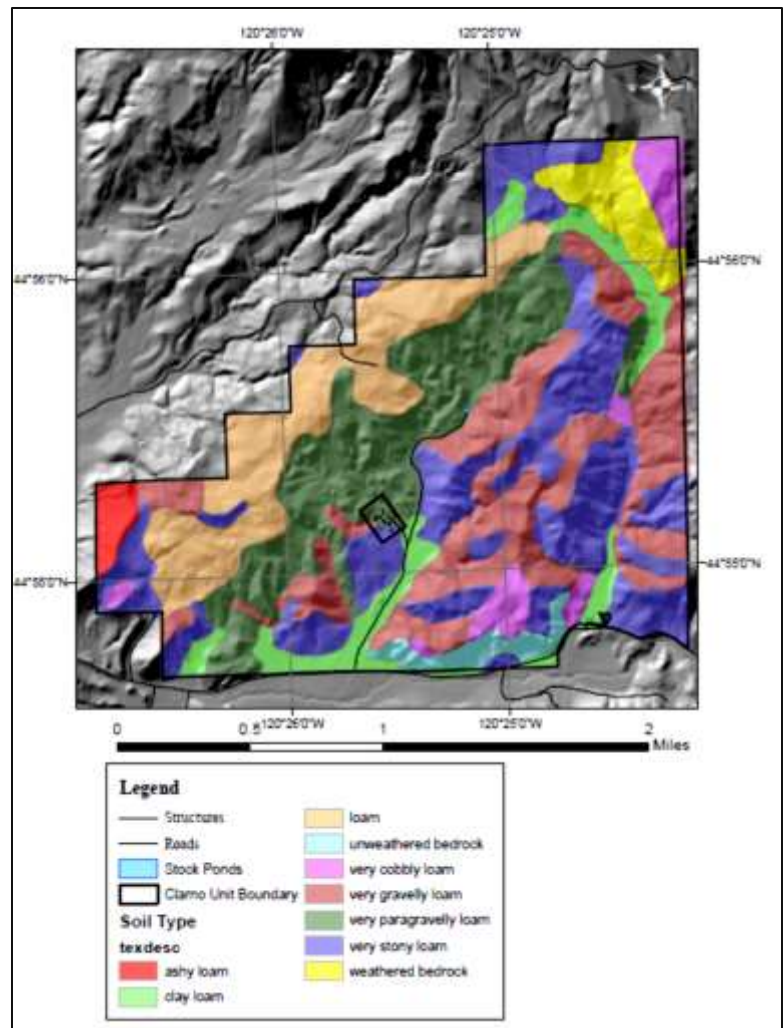


Figure 9: Clarno Unit Soils

function rating of Zero - 12.5% departure from reference condition (Bell 2010:69). These attribute ratings indicate the monument lands are in good condition and functioning properly, and are not contributing to soil erosion and water quality degradation (Bell 2010:68). Plots 20 and 22 were located near the current contact station and the Palisades Picnic Area respectively, which are in a Sorefoot soil formed on alluvial fans from clayey alluvium material weathered from tuffaceous sediments in the John Day and Clarno

formations (Bell 2010:64). Plot 21 is near the Hancock Camp entrance and is dominated by soils developed from clay colluvium formed from tuffaceous sediments.

The soils are loams over clay dominated subsurface. Soil depth varies up to a depth of 60” and is considered well-drained (Bell 2010:66).

Monument soils often have clay-pans that limit the soil permeability. Some soils also have low water-holding capacity and high shrink-swell potential (NPS 2008:133). The numerous social trails in the Clarno Unit have the potential to contribute to soil erosion. As a result, the GMP calls for eliminating social trails.

The barren slopes near the proposed project area in Alternative 2 are largely comprised of weathered Eocene age paleosols and conglomerates (Bestland et al. 1999, Dobbins et al. 2015). **During the archeological survey 24 test holes were dug and found “alternating layers of clay loam, sandy clay loam, and gravels of varying size, shape and density” that the survey team determined represented “numerous episodic flood events that have carried and mixed with colluvial sediments and rocks” (Cheung and Gleason 2015:15).**

Paleontology

John Day Fossil Beds National Monument was set aside in 1974 as a unit of the national park system for the protection of the significant paleontological resources found in the area. A noted paleo-botanist, Ralph Chaney, stated: **“No region in the world shows more complete sequences of Tertiary land populations, both plant and animal, than the John Day formations (Fremd et al. 1997).”**

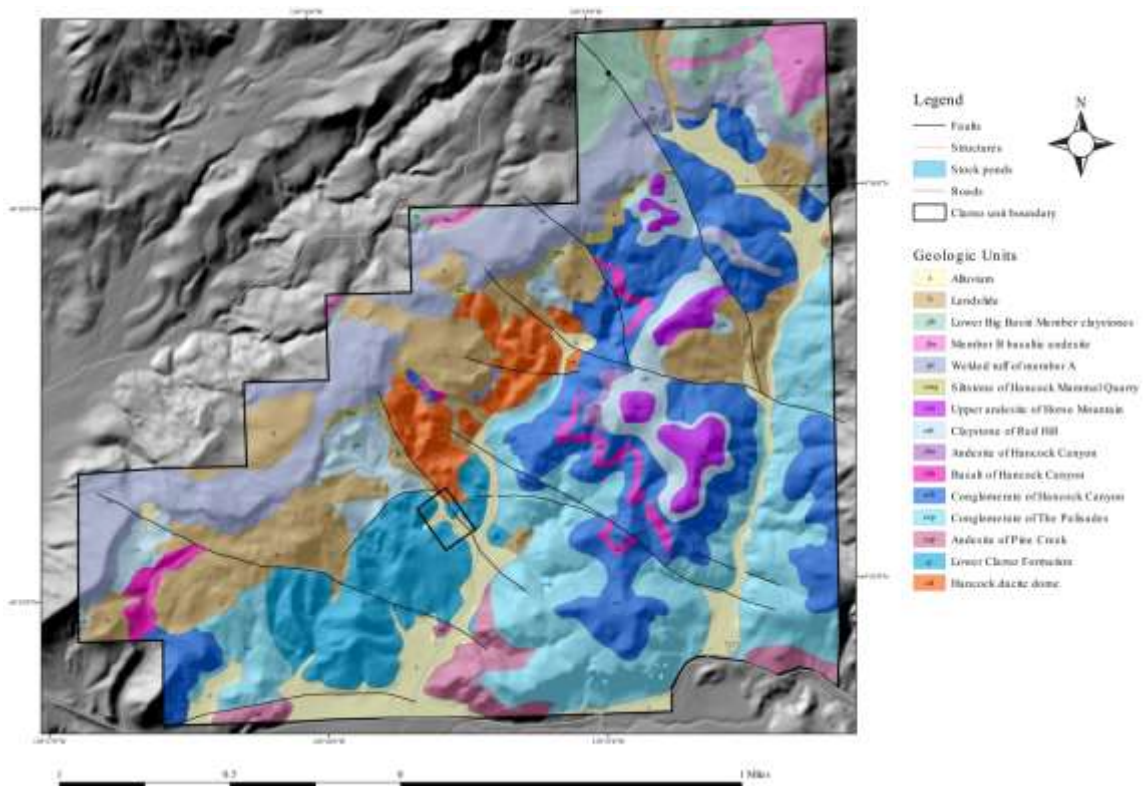


Figure 10: Geologic map of the Clarno Unit showing potential sites for proposed Ranger Station: Area, #1: Palisades Picnic Area, #2: Camp Hancock, #3: Existing Site (Bestland et al. 1999)

The monument is within the John Day River Basin, where thousands of feet of sediment were deposited from approximately 54 million years ago to about 6 million years ago (Samuels 2015a). The exploration and study of the John Day fossil beds began with Thomas Condon in the 1860s. Investigation has continued over the years by various university and research institutions, and today the monument manages research activities and a collection of over 40,000 specimens (NPS 2008:129). Although there are other areas in North America that protect fossils, what makes John Day Fossil Beds unique is the diversity of fossils found and the almost continuous record of rocks over a long period of time (Samuels 2015a:1).

For more than 25 years, the paleontological resources in the John Day region have been managed through the cooperative efforts of the NPS, Bureau of Land Management (BLM), and U.S. Forest Service. This cooperative arrangement has helped facilitate staff training, complete scientific research projects, and improve education and outreach. Fossils collected from all federal lands in the John Day Basin are currently housed in the monument paleontology center (Graham 2014:42). Although the monument encompasses 14,000 acres, this represents only three percent of the land in the region with possible paleontological resources (Samuels 2015a). Sixteen additional parcels of BLM lands have been identified for inclusion into Cooperative Areas for the Management of Paleontology (Samuels 2015a).

The Clarno Formation is approximately 54-39 million years old (early-to middle Eocene period) and dominates the Clarno Unit. The formation is approximately 5,900 feet thick, laterally discontinuous, and contains a heterogeneous sequence of volcanic rocks and sedimentary rock layers that include the Clarno Nut Beds, Hancock Mammal Quarry, and Fern Quarry (Retallack et al. 1996 in Graham 2014:9) (Figure 15).



Figure 11: Hancock Tree
http://www.ucmp.berkeley.edu/science/parks/images/jd_tree600.jpg

The cliffs of the Palisades form the most prominent landform in the Clarno Unit. The volcanic mudflows that formed the Palisades preserve a wide variety of plant fossils, including leaves and petrified wood. Plant fossils in boulders below the Palisades can be seen along the 0.25-mile Trail of the Fossils (Graham 2014:37).

The Clarno Nut Beds, found within the Clarno Unit, include more species of petrified wood than any other locality, of any age, in the world (Scott and Wheeler 1982, Wheeler and Manchester 2002). Over 145 genera and 173 species have been identified from fossil fruits, seeds, leaves, and wood (Fremd et al. 1994). The nut beds are important because the plant remains include permineralized (tissue replaced by silicates) seeds and nuts. Most other fossil floras yield only or mainly impressions of leaves (NPS 2008:130). The significance of this site is also found in that it was one of the first areas where radiometric ages were determined for terrestrial fossils (NPS 2008:130).

The Hancock Mammal Quarry, also in the Clarno Unit, is about 40 million years old and contains the most complete vertebrate remains that have been found to date in the Clarno Formation, and is an important middle Eocene vertebrate fauna in North America (Fremd 2010). The most common mammal in the quarry is an early rhino, *Teletaceras* (Hanson 1989 in Samuels 2015a). Within the conglomerate deposits in Hancock Canyon are lahar (volcanic mudflow) deposits three to four meters thick, which preserve a variety of petrified trees, including the Hancock Tree (Samuels 2015a) (Figure 16). Research has shown that this area preserves fossils of trees, ferns, horsetails, and other plant species in their growth position that indicate a possible in situ forest that was buried by a lahar (Wheeler and Manchester 2014 in Samuels 2015a).

The Clarno Fern Quarry preserves leaf impressions in siltstone, including both ferns and flowering plants, which are types of species that are found in tropical environments (Dillhoff et al. 2009 *in* Samuels 2015).

The Clarno Palisades, Nut Beds, Mammal Quarry, Hancock Tree, and Fern Quarry are not within the potential construction footprints, but are within the 1,969-acre Clarno Unit. Within the unit, formal and informal trails lead to these and other paleontological and geological resources.

Paleontological surveys have been conducted in all three areas evaluated in this EA. No items that **fit collection criteria for the monument were found (Samuels 2015b), who noted that** “according to the current geologic map of the unit, from Bestland et al. 1999, all three of these sites are in areas mapped as alluvium (loose, eroded sediments). . .” **As a result, no exposed rock layers are present and direct effects on fossils in place would not be anticipated.**

Depending on the thickness of the alluvium, “however, work could expose fossil bearing rock layers . . . plant fossils are [also] known to be common in the conglomerates of the Palisades, a unit that is located near each of the proposed sites. Eroded fragments of lahar from the Palisades are rather resilient and are known to potentially migrate long distances through the process of erosion” (Samuels 2015).

Although some material of importance was found at the Hancock Canyon site, there were no concerns with it regarding use as a potential site for development of the ranger station because it was identified as having eroded from the hills to the east.

Water Resources, including Floodplains

As described in the archeological resources survey:

The Clarno Unit is located 1.2 miles (2 km) east of the John Day River, on the southern flank of Iron Mountain. The 1,969-acre unit is bounded by Pine Creek on the south, the edge of the Cove Creek canyon to the east, and an unnamed spring-fed creek to the north and west. The northern part of the unit is characterized by hills and rolling prairies near the upper reaches of numerous intermittent streams. These stream-cut canyons and smaller erosional valleys are separated by north-south trending ridges, all draining into **the Pine Creek basin” (Cheung and Gleason 2015: 3).**

The Palisades Picnic area site (Alternative 2) is described as

situated at a wide portion of the canyon, near its mouth, and extending to the upstream end of an alluvial fan, where episodic floods have transported and deposited sandy clay loam sediments and cobble to boulder-sized rock (Cheung and Gleason 2015: 11).

According to the geologic report for the area, the mouth of this draw drains an area of approximately three square miles (Frank and Oster 1979: 24). This same report notes that **“experience at other sites in central and eastern Oregon shows that cloudburst storms can yield peak discharges ranging from a few hundred to several thousand cubic feet per second per square mile from small drainage areas. . . Although such storms occur infrequently, they are most likely in spring and summer. It was not possible to determine the percent change of occurrence for such a storm” (Frank and Oster 1979:24). However, according to this same report, “Construction of camp facilities and an access road on the higher ground near the east side of the draw would alleviate the flood hazard” (Frank and Oster 1979:24) (Figure 17).**

The primary drainage channel is located west of the proposed site in Alternative 2, while a shallower side channel of Indian Creek is somewhat closer. In some of the archeological survey pits, **the study authors noted that the strata (“alternating layers of clay loam, sandy clay loam and**

gravels of varying size, shape and density”) “represent numerous episodic flood events that have carried and mixed with colluvial sediments and rocks” (Cheung and Gleason 2015:15).

Although surficial and anecdotal evidence indicate episodic flooding, this flooding is generally of low intensity and energy and has resulted in mostly small (fine grained) material being carried in the site as shown in the 24 samples taken in the vicinity of the project area for the archeological survey (Cheung and Gleason 2015:19).

In Hancock Canyon, occasional flash flooding has inundated OMSI’s Camp Hancock facilities and coursed down the access road. This flooding has not been observed in the proposed project area. Near the proposed project area in Alternative 3, water flow is concentrated along the base of the hills outside of the project area, as well as on the adjacent roadway. The NPS and OMSI completed a limited scale road rehabilitation project in response to flooding that occurred on the roadway in 2012.

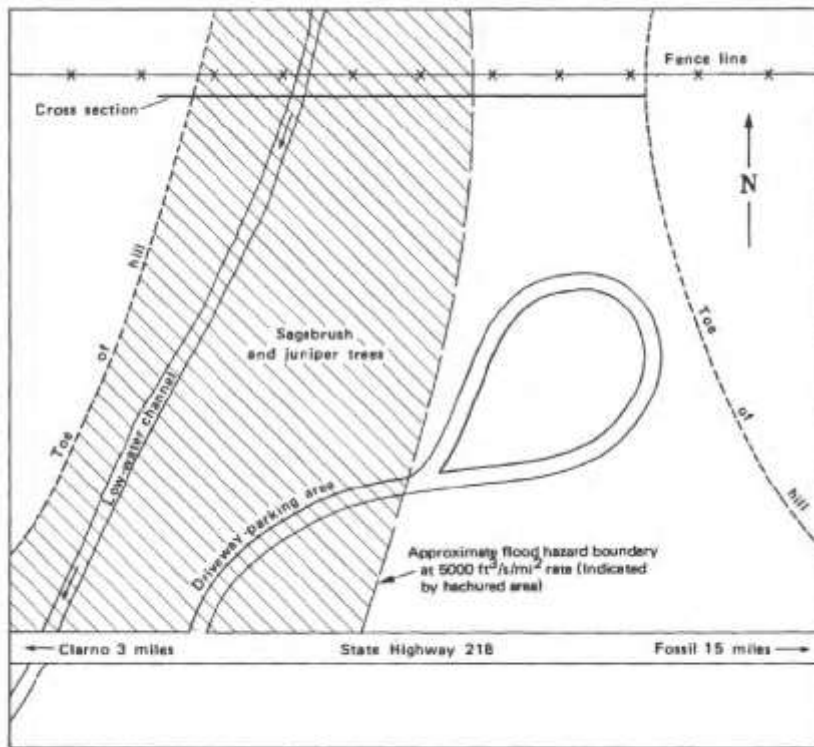


Figure 11.—Sketch map of Indian Canyon campground. (Not to scale.)

Figure 12: Figure 11 from Frank and Oster 1979, page 25 showing approximate flood hazard area at Clarno Picnic Area

B. Biological Resources

Vegetation and Climate Overview

John Day Fossil Beds National Monument is comprised of three geographically separated units with similar plant communities; however, there are some individual species variations among

them. The ground cover in the Clarno Unit is dominated by big sagebrush (*Artemisia tridentata*), scattered western junipers (*Juniperus occidentalis*) and grasses (Bell 2010:4). The vegetation environment is influenced by the climatic conditions produced by the rain shadow effect from the Cascade and Ochoco mountains to the west. Climate data for the past 30 years from the weather station at Fossil, Oregon (approximately 20 miles north of the Clarno Unit), indicates annual mean precipitation of 14.42 inches and an annual mean temperature of 62.3°F (ranging from an average minimum of 24.3°F in January to an average maximum of 85.2°F in July) (Bell 2010:21).

Native Vegetation

The 2009 natural resources condition assessment included three main landscape attributes: soil stability, hydrologic function, and biotic integrity. The vegetation results for the Clarno Unit included six survey plots (#19-26). Plots 20, 21 and 22 correspond to the general locations of the proposed alternative sites for the new Ranger Station. Plot 20 was located in the south central portion of the Clarno Unit just north of Oregon Highway 218 and near the current water treatment facility and corresponds to Alternative 1 (No Action/Continue Current Management). Plot 21 was located near the south central portion of the unit, near the entrance to the OMSI's Camp Hancock (which corresponds to Alternative 3), and Plot 22 was located in the southeast portion of the unit near the current Palisades Picnic Area (which corresponds to Alternative 2).

Plots 20 and 22 are in the JD [John Day] Droughty Fan Ecological Site and have a historic climax plant community of big sagebrush/Thurber needlegrass (*Stipa thurberiana*)-basin wildrye (*Elymus cinereus*). Plot 20 [existing site] was in poor condition with moderate departure for biotic integrity (40.0%) due to invasive weeds, with native Thurber needlegrass and Sandberg bluegrass (*Poa Sandbergii*) making up a minor component (2-10%) of the community. Plot 22 [Alternative 2] was in better condition than plot 20 with a biotic integrity departure of 17.1% with Thurber needlegrass and bluebunch wheatgrass (*Agropyron spicatum*) the dominant species (>40%). Basin big sagebrush and antelope bitterbrush (*Purshia tridentata*) were also a moderate component (10-40%) of plot 22, but were not present in plot 20. Western junipers occurred in trace amounts (<2%) in both plots (Bell 2010:64).

Plot 21 [Alternative 3] is in the JD Droughty North Ecological Site, with a historic climax plant community of bluebunch wheatgrass-Idaho fescue (*Festuca idahoensis*) and a minor overstory of basin big sagebrush (<2%). This plot was in very good condition with none-slight departure for biotic integrity (2.9%) and was dominated by Idaho fescue and bluebunch wheatgrass. The only shrub was a trace amount (<2%) of horsebrush (*Tetradymia canescens*). Live western juniper did not occur, but some burned remnants were found in plot 21 (Bell 2010:66) [bracketed information added].

The archeological survey found native juniper, sagebrush, bitterbrush, wild rose, broom snakeweed, bunchgrass, buckwheat, yarrow and nonnative medusahead rye, tumble mustard, Russian thistle, and cheatgrass in the vicinity of the Palisades Picnic Area (Cheung and Gleason 2015:11).

Nonnative Vegetation

Beginning in the late 1800s, much of the monument, predominantly the lowlands, was subjected to prolonged periods of grazing by livestock, including sheep, cattle, and horses (Youtie and Winward 1977 in NPS 2008:137). Sheep and cattle grazing resulted in the loss of native species and encouraged the spread of invasive nonnative species such as cheatgrass. Livestock grazing was discontinued once the monument was established, but the effects persist today. Dryland and irrigated farming also occurred along the John Day River Valley which also promoted nonnative

invasive and noxious weeds. A remnant irrigated hay field exists today at the James Cant Ranch Historic District at the Sheep Rock Unit [monument headquarters] (NPS 2008:137).

Thirteen nonnative species are of particular concern in the monument: cheatgrass (*Bromus tectorum*), Dalmation toadflax (*Linaria dalmatica*), Russian knapweed (*Acroptilon repens*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea maculosa*), whitetop (*Cardaria draba*), medusahead rye (*Taeniatherum caputmedusa*), musk thistle (*Carduus nutans*), poison hemlock (*Conium maculatum*), yellow star thistle (*Centaurea solstitialis*), scotch thistle (*Onopordum acanthium*), perennial pepperweed (*Lepidum latifolium*), and Russian olive (*Eleagnus angustifolia*) (NPS 2005a in NPS 2008:135). These nonnative invasive species are of high concern because of their adverse effects on native plant and animal communities, and their high potential to spread. Many of these species are also among the most established and difficult to control, including cheatgrass, which can displace native grasses if not kept under control (NPS 2008:135).

Of the species described above, three were found in the Clarno Unit during the 2009 natural resource condition assessment. As highlighted in the report, plots 20 and 22 were burned by a wildfire in 1995 and 1994, respectively. Cheat grass is known throughout the west to invade burned areas after a fire if left untreated. Plot 20 was dominated by medusahead and cheat grass. Plot 22 also contained cheat grass, but in smaller amounts (10-40%). Medusahead and Russian knapweed were the only noxious weeds identified and both were in plot 20 (Bell 2010:64).

Plot 21 was burned by a wildfire in 1994. Cheat grass and medusahead made up a trace amount (<2%) of the plant community in this plot. Disturbed vegetation types will see an increase in western juniper, broom snakeweed (*Gutierrezia sarothrae*), cheatgrass, and medusahead (Bell 2010:66).

Table 2: Summary of Vegetation Condition Assessment for Select Sites in Clarno Unit (Bell 2010)

Plot # and Location	Ecological Site	Biotic Integrity %Departure	Existing Native Vegetation	Invasive Weeds
#20: near Highway 218 and existing Contact Station	John Day Droughty Fan	Poor condition 40% departure	Thurber needlegrass Sandberg bluegrass (2-10%). Western juniper (<2%).	*Medusahead and cheatgrass (dominant species in plot) *Russian knapweed
#21: near Camp Hancock entrance	John Day Droughty North	Very good condition 2.9% departure	Idaho fescue and bluebunch wheatgrass (dominant species). horsebrush (<2%).	*Medusahead and cheatgrass (<2%)
#22: near Palisades Picnic Area	John Day Droughty Fan	Better condition 17.1% departure	Thurber needlegrass and bluebunch wheatgrass (>40%). Basin big sagebrush and antelope bitterbrush (10-40%). Western juniper (<2%).	cheatgrass (10-40%).

*Noxious weeds

The monument has an Integrated Pest Management Plan that identifies the thresholds that must be reached prior to the use of mechanical, chemical, or biological control methods on weed species. The NPS Exotic Plant Management Team operating out of North Cascades National Park has assisted the monument in implementing this plan. Chemical control efforts in 2008

concentrated on 157 acres of high priority areas, such as parking areas, floodplains, riparian areas, and backcountry sites, and targeted nine species of noxious weeds (Bell 2010:108).

Vegetation resource impacts in the Clarno Unit include social (unofficial) trails. A survey of social trails in the Clarno Unit was conducted in 2006. Approximately 75,676 linear feet of social trails were inventoried and mapped. Vegetation along these social trails has been denuded, trampled, and crushed to varying degrees (NPS 2008:137).

C. Cultural Resources

Archeological Resources

More than 100 known archeological sites have been found within the three units of the national monument (NPS 2008:142). The sites range in time from approximately 550 BCE into the historic period, representing both American Indian and European American subsistence, habitation, and settlement patterns and activities (NPS 2008:142). The Clarno Unit contains pictographs that are estimated to be 2,000 years old, lithic scatters, isolated finds of projectile points, rock shelter, and stacked rock cairns (NPS 2008: 141-2)

No archeological sites are known from near the existing water treatment building or the proposed site adjacent to the Palisades Picnic Area. An archeological subsurface survey was conducted in the vicinity of the proposed project area in Alternative 2 (near the Palisades Picnic Area) in 2015. Besides the 2015 survey, two other surveys covered the immediate project vicinity near the picnic area (Cheung and Gleason 2015:10). Portions of the Clarno Unit have also been surveyed in six other efforts since 1993 (1193, 1994, 2005, 2006, 2012, and 2014). During these surveys 57 archeological sites and 12 isolates have been found. These include historic archeological and precontact sites (Cheung and Gleason 2015:7). Approximately 59 percent of the unit (1,152 acres) has been surveyed (Cheung and Gleason 2015:7). The 2014 archeological survey included the proposed project area in Alternative 3.

The Clarno Unit contains a high diversity of sites, including food processing and probably over-winter occupation localities with radiocarbon dates and projectile point analysis showing human presences from 11,000 to 300 years ago (Endzweig 1994a, Cheung and Gleason 2015:8). Precontact sites in the vicinity of the project area include a rock art/rockshelter, lithic scatters, isolated biface and cut stone debris (Cheung and Gleason 2015:10).



Figure 13: Oil Exploration Remains

Historic Resources

Remnants of a shepherders cabin (early 1900s), and scattered remains of the 1920s-1930s Clarno Basin Oil Company exploration operations are found with the Clarno Unit (NPS 2008:141-2) (Figure 13). The Clarno Basin Oil Company exploration sites are located adjacent to the proposed site below OMSI's Camp Hancock. There are currently no sites listed on the National Register

within the Clarno Unit, however, an eligibility analysis for the oil exploration sites has not yet occurred.

D. Visitor Experience

Access and Transportation

Access: Visitor access to the Clarno Unit is by car from Oregon State Highway 218, 18 miles southwest of Fossil, and approximately 37 miles east of Shaniko, Oregon. There is no public transportation to or through the three units of the monument. The units are widely separated by rural roads.

Visitors are welcomed to the Clarno Unit at the Palisades Picnic Area, where a sign indicates the main monument entrance (Figure 14). From the highway, a large parking area is evident and includes the picnic area, parking and a turnaround for standard and oversized vehicles, vault toilets and a seasonal drinking fountain/water spigot. The site also includes a trailhead with an informative bulletin board. Approximately 0.25 miles west of the picnic area is a turnout across from the water treatment building, where additional trailhead information is present. A short distance (approximately 0.4 miles) further west is a gravel road that leads into Hancock Canyon, **including the Oregon Museum of Science and Industry's (OMSI) Hancock Field Station.** According to the GMP, this area is intended for future development, including a trailhead and improved roadway. The Hancock Field Station (Camp Hancock) is located on private property owned and operated by OMSI within the monument boundary.

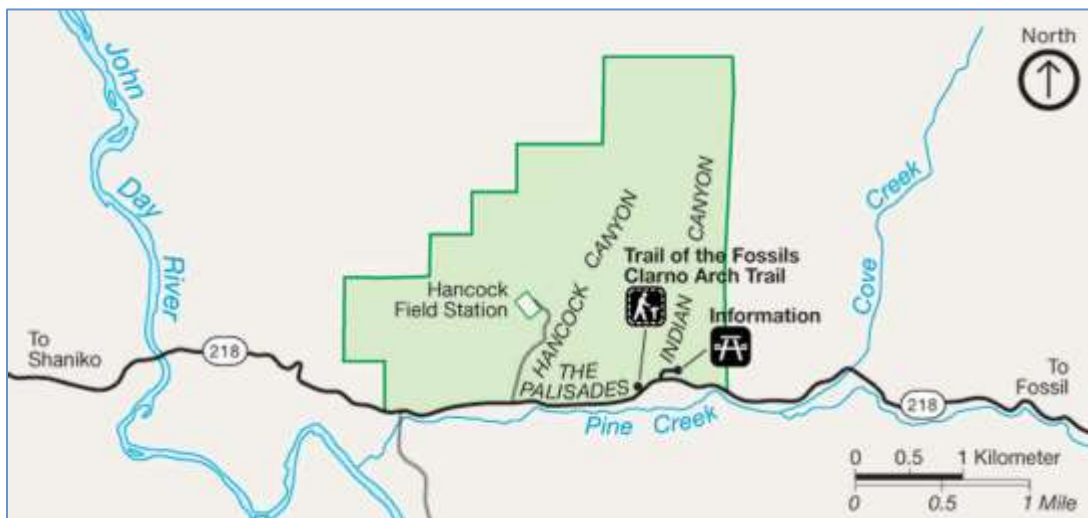


Figure 14: Clarno Unit Public Access Map (does not show existing water treatment building location)

Existing trails in this area are currently being used by students from Camp Hancock, as well as other visitors.

Visitation: In 2014, visitor use for the entire monument was approximately 183,420 recreation visits. Almost 25,000 of these visits came from the Clarno Unit and an additional 11,471 visits came from Camp Hancock. As shown in Figure 15, the Clarno Unit had 235,232 total visits for the 10 year period (2005-2014), with an average 23,523 visits per year. March through October is the main visitor use period, with June, July and August bringing 45-50 percent of the monument's overall visitation. The average monthly use from 2005-2014 has been between 1,200 – 2,300 visits, with a sharp spike of 12,127 visits in June 2013 because of a special event in Fossil, resulting in a similar spike of 36,744 total visits for 2013.

Camp Hancock, established in 1951, has long played an important role in visitation to the Clarno Unit. It is operated by the Oregon Museum of Science and Industry (OMSI) as an outdoor science school. The camp is open to 1st-12th grade students for 3-5 days of intense teaching sessions on topics ranging from archeology and history, to arid land studies, mapping techniques, riparian ecology, and paleontological investigations (OMSI 2015). In addition to serving as an educational facility, the buildings at the camp are open to scientists to conduct research.

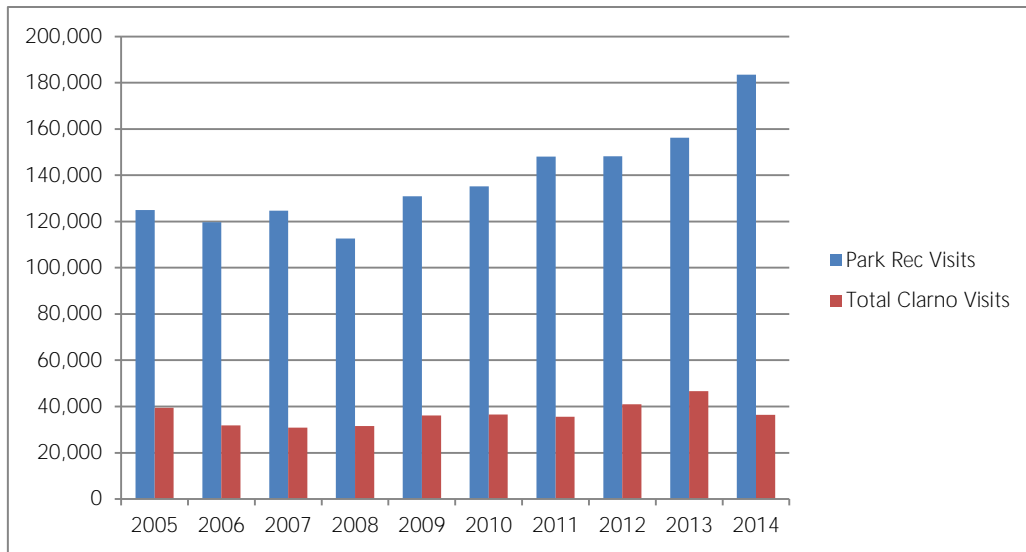


Figure 15: Total Clarno Visits for 10 years (Clarno, including Camp Hancock averaged 26% of **the park's visitation**) (NPS Visitor Use Statistics 2015).

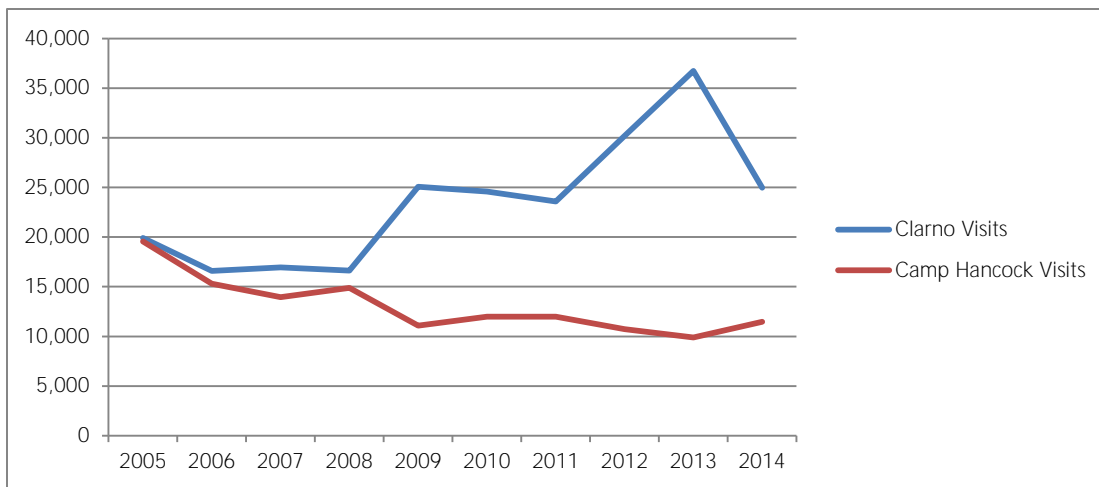


Figure 16: Clarno Unit Visitation. From 2005-2014 Camp Hancock visitation averaged 40 percent of Clarno Unit visitor use.

Camp Hancock visitation averages 13,078 visits per year, with a total of 130,780 visits over the past 10 years (Figure 16). **March thru October is the camp's peak season, with more visits in April and May.** Although June is included in the monument's **peak season**, it is generally a month of low use at the camp. February and November receive some use, with certain years getting no use. The Camp is typically closed December and January. This visitor use pattern corresponds with many school calendars.



Figure 17: Clarno Unit Trails Map

Visitor Use Opportunities

Visitors to the monument may find themselves exploring for an hour or a day at any one of the three geographically separated units (Sheep Rock, Painted Hills, and Clarno units). The Sheep Rock Unit serves as the monument's headquarters and the location of the only visitor center, the Thomas Condon Paleontology Center. The visitor center provides a location where visitors can **obtain comprehensive information about the monument's natural and cultural resources, learn** about things to do and places to see, as well as view fossils and see paleontologists at work.

The Sheep Rock Unit is located approximately two hours driving time from the Clarno Unit. Because of the driving time between the two units, visitors to Clarno may or may not know in advance of their visit about the recreational opportunities available in each location, including how to prepare for their visit to the John Day Region, a relatively remote part of Oregon. Visitors who are driving through on Highway 218 also have limited options upon arrival at the site, with information provided on area bulletin boards and a small information sign at the trailhead.

Consequently, the internet and the monument's **website are** currently the best resources for visitors to plan ahead and prepare for their trip to the Clarno Unit. Information about the John Day region is widely available, including options for other nearby outdoor recreational experiences. Without this type of planning, area visitors may have a limited number of options and expectations for their experience.

According to a 2004 visitor use survey, 33 percent of **visitor groups' primary reason for visiting** this part of eastern Oregon was to visit John Day Fossil Beds National Monument (NPS 2005a). Most visitor groups (76%) indicated that this was their first time to the monument. Their most common reason for the visit was: to view the scenery (41 percent), see fossils (21 percent), and visit the Thomas Condon Paleontology Center (14 percent) (NPS 2005a).

Visitors go to the Clarno Unit to see the Palisade cliffs, petrified trees, and other exposed fossils. Typical recreational opportunities in the Clarno Unit consist of hiking, bird watching, photography, picnicking, and sight-seeing. The three short interconnected trails at the Clarno Unit (Arch Trail, Trail of Fossils, and Geologic Time Trail) offer these opportunities. These three trails were first developed in 1980, and they continue to serve visitors today (NPS 1996:255). These existing trails are not accessible to wheelchairs, but the Palisades Picnic Area has restrooms, a water fountain, picnic tables, and wayside exhibits that are fully accessible.

The Palisades Picnic Area (Figure 17) offers parking for standard cars and oversized vehicles, one restroom, a seasonal drinking fountain, four picnic table shelters (five tables), a small number of interpretive signs, including a brochure box and bulletin boards.

The Trail of the Fossils is a 1/4-mile hike and is the only trail in the monument where visitors can easily see fossils in the rocks, many of which are pointed out by interpretive signs.

The Clarno Arch Trail is a 1/4-mile hike. A moderate climb brings hikers to the base of the Palisades cliff directly under a natural arch cut out by erosion. Petrified logs are visible in the cliff face.

The Geologic Time Trail is a 1/4-mile one way hike. This trail connects the picnic area and pullout trailhead area, leading hikers below the Palisades cliff. The trail symbolizes a timeline with each foot representing 37,000 years. Signs along the way note prehistoric events of the last 50 million years.

Although there are no camping facilities within the monument, there are numerous camping opportunities in the communities surrounding the three units and on adjacent public lands, including U.S. Forest Service and Bureau of Land Management developed campgrounds and dispersed camping.

E. Human Health and Safety

Use of the current water treatment building as an employee office and as a *de facto* visitor contact station does not meet public health and safety guidelines for government office space or for public space. As noted in the need section (Chapter 1), the current building does not meet building codes for electrical, fire, structural engineering, or accessibility. The building has been vandalized in the past and lacks security and safety features (no signing, no alarm system, no lockable storage, no appropriate heating/cooling or lighting for human use, and no secure storage for NPS equipment, including computers and vehicles). Over time, the building has become permeable to rodents and this poses a potential health hazard to employees and visitors. Because the nearest restroom is approximately 0.5 mile away at the Palisades Picnic Area, it is difficult to use as an office. In addition to no onsite sanitary facility, there is also no potable water available. Both of these also result in inconvenient operations for employees.

In addition to concerns with the continued use of the water treatment building for employees and visitors, a separate safety hazard exists for visitors trying to cross Highway 218 on a curve from the turnout/trailhead access across the road to the water treatment building/*de facto* contact station because they have heard that they might be able to obtain information there or because they notice monument staff in the area. Because of the lack of an official ranger station, visitors may stop at homes along Highway 218 to inquire about the monument,

F. Park Operations

The Clarno Unit of the monument is managed under direction from staff located at monument headquarters at the Sheep Rock Unit, approximately two hours away by car. Park operations are divided into administrative, interpretive, maintenance, and resource management (including paleontological resources) operations. Limited staff are duty stationed at Clarno full time, therefore interpretive and law enforcement rangers, and maintenance staff visit the Clarno Unit periodically to regularly. Routine operations include trail maintenance, water treatment testing, cleaning restrooms, monitoring facilities, such as picnic tables, and interacting with visitors. Intermittent needs include assisting with programming at Camp Hancock, treating nonnative invasive plants, snow removal and other activities.

Since its establishment as part of the monument, the Clarno Unit has relied on non-personal services interpretation (trail brochures, bulletin boards, and wayside exhibits) (NPS 1996:258). During the formative years of the monument, the ranger stationed at Painted Hills also served the Clarno Unit. Later, the Clarno Unit ranger was a generalist, performing interpretive and

maintenance operations. The idea to develop recreational opportunities and enhance the visitor experience through development of a contact station and a ranger presence began in 1978 (NPS 1996:275). It was also considered in the General Management Plan (GMP), however it was not part of the alternative selected for implementation in the decision document because it was believed at the time that the current well house/shed was adequate office space for the unit. However, evolving staffing, operational and visitor needs highlight the need for an increased presence in a building adequate to accommodate these changing needs now and into the future.

Currently, the Clarno Unit does not have an official visitor contact station or visitor center. The Painted Hills Unit, however, has a small visitor contact station/office which includes a small sales area. For many years, the existing unmarked water treatment building (shed) has served as a *de facto* visitor contact station because of the tiny ranger office located there. Because of the nondescript and unsigned nature of the building, however, visitors are unaware of this use because the building is separate from the main visitor use areas. **This existing “contact station”** is approximately ½ mile away from the picnic visitor use facilities. It is also not identified online or in visitor handouts as a place for visitors to go, nor are there any signs off Highway 218 to direct visitors to the building.

Chapter 4: Environmental Consequences

Introduction

This chapter analyzes impacts to affected resources for each of the alternatives (1-3). The analysis predicts impacts, based on scientific studies, knowledge of resources, and input from subject matter experts, that can reasonably be anticipated if the actions in the alternatives are implemented (NPS 2015c). For this project, the proposed federal action to construct a new ranger station is the same in both action alternatives; however, there are two different locations evaluated, including the proposed location. The overall area of analysis is the Clarno Unit, with site-specific resource analysis for each location. Background information regarding the affected environment for the project is found in Appendix 2.

A. Methodology

Direct and Indirect Impacts: Impacts were quantified or described qualitatively through site inspections, surveys, and past scientific analysis where possible as direct impacts (which occur as a result of the proposed action, at the same time and place of implementation) and indirect impacts (which occur as a result of the proposed action, but later in time or farther in distance from the action) (40 CFR 1508.8).

Beneficial and Adverse Impacts: Both beneficial and adverse impacts were evaluated and described if applicable. Impact analysis was discussed in relation to the context (setting, situation, or circumstances related to a particular resource) and impact intensity (40 CFR 1508.27(a)).

Intensity of Impacts: Intensity is the severity or magnitude of an impact (40 CFR 1508.27(b)).

Context of Impacts: The context is the setting within which impacts are analyzed – such as the project area or region, or for cultural resources – the area of potential effects (APE). Context provides a backdrop against which the intensity of impact can be applied to understand the importance of the impacts (NPS 2015c).

Area of Impacts: The area of impacts may be localized (detectable in the vicinity of the action) or widespread (detectable in a much larger area).

Duration of Impacts: The duration of impacts may be short-term (often quickly reversible and associated with a specific event, lasting no longer than five years) or long-term (reversible over a much longer period, occurring continuously, or for more than five years).

Conclusions drawn for impacts to cultural resources adhere to the following definitions:

- No effect: There are no historic properties in the Area of Potential Effect (APE); or, there are historic properties in the APE, but the undertaking will have no impact on them.
- No adverse effect: There will be an effect on the historic property by the undertaking, but the effect does not meet the criteria in 36 CFR Part 800.5(a)(1) and will not alter characteristics that make it eligible for listing on the National Register. The undertaking is modified or conditions are imposed to avoid or minimize adverse effects. This category of effects is encumbered with effects that may be considered beneficial under NEPA, such as restoration, stabilization, rehabilitation, and preservation projects. Under the terms of the 2008 PA, data recovery can mitigate affect to archaeological properties that are eligible for listing on the NR under criterion D. However, some archaeological sites are eligible as traditional cultural places under criterion A, and such mitigation may not be sufficient or appropriate.

- Adverse effect: The undertaking will alter, directly or indirectly, the characteristics of the property making it eligible for listing on the National Register. An adverse effect may be resolved in accordance with the Stipulation VIII of the 2008 Programmatic Agreement, or by developing a memorandum or program agreement in consultation with the SHPO, ACHP, American Indian tribes, other consulting parties, and the public to avoid, minimize, or mitigate the adverse effects (36 CFR Part 800.6(a)).
- Significant Impact: An impact to a National Register historic property would be considered significant when an adverse effect cannot be resolved by agreement among SHPO, ACHP, American Indian tribes, other consulting and interested parties, and the public. The impact will diminish the integrity of location, design, setting, materials, workmanship, feeling or association characteristics that make the historic property eligible for inclusion in the National Register Historic Places. The resolution must be documented in a memorandum or programmatic agreement or the FONSI.

B. Cumulative Impacts

Cumulative impacts are the effects on the environment that would result from the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions. The Council on Environmental Quality (CEQ) describes a cumulative impact as follows (Regulation 40 CFR 1508.7):

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative actions are evaluated in conjunction with the impacts of an alternative (including existing conditions) to determine if they have any additive effects on a particular resource. Because most of the cumulative projects are in the early planning stages, the evaluation of cumulative impacts was based on a general description of the project. It is important to note that if there were no resource impacts from the proposed action or alternatives, there would be no cumulative effects on that resource either (NPS 2015c).

Projects Included in the Cumulative Effects Analysis for the Ranger Station

The following projects were identified for the purpose of conducting the cumulative effects analysis.

Past Projects

- *Formal Agreement between Camp Hancock and the National Park Service*

General Agreement (G9325070006) between the Oregon Museum of Science and Industry (Camp Hancock) and the National Park Service was executed on May 5, 2007 and renewed in 2012. The agreement authorizes certain Camp Hancock activities on monument lands within the Clarno Unit, provides for access to the Camp across monument lands, and addresses the provision of potable water to the field station by the National Park Service. The agreement also includes a Permit of Right-of-Way (RW9325-91-001A1) that allows the museum to maintain existing water lines across monument lands. This permit was originally issued on June 12, 1991, and renewed ten years later. The agreement is in the process of being revised and renewed.

Current Planning Projects

The park is currently undergoing planning for replacing wayside exhibits on area trails. OMSI has also proposed to upgrade their water system in 2016.

Proposed Implementation of Monument Management Plans

- *Hancock Mammal Quarry Plan (NPS 2009:44, 53)*

An implementation plan is needed for opening the mammal quarry to research and interpretation. The site was briefly opened to researchers in the late 1950s and again in the 1960s and 1980s. Opening the quarry would require additional funds and staff for monitoring and to prevent vandalism and theft of fossils. Soil and/or rocks covering the site to a depth of less than one foot would need to be removed to gain access to the fossils. The focus of the plan would be a seasonal operation that provides opportunities to advance research goals combined with public viewing and interpretation.

- *Geo-Loop, Mimulus and Stegamonster Trails Plan (NPS 2009:53, 56)*

GMP recommendations include: construction of a new gravel parking area to accommodate approximately eight cars and two RVs, and construction of a trailhead near the entrance to the Hancock Field Station to serve all three trails. The Geo-loop trail would be approximately four miles in length and would access the Hancock Tree, the Clarno Nut Beds, and the Mammal Quarry, including an accessible section. As defined in the GMP, the intent would be to design the trail for high visitor use and managed as part of the Pedestrian Management Zone. The Mimulus and Stegamonster trails, each approximately 2 miles long, would be designed for low to moderate visitor use, which would be in character with the intended Backcountry Management Zone description.

Future Planning Projects

The park has proposed upgrading the Camp Hancock Road. As mentioned elsewhere, the proposed roadway is in poor condition and has regularly washed out during high precipitation events. As described above, the GMP calls for constructing trailhead parking off the Camp Hancock Road. This proposed parking has been incorporated into the project proposal for the road improvements. Constructing the parking without improving the road is not considered advisable.

C. Mitigation Measures Common to All Action Alternatives

Where potential impacts to a resource were identified, analysis was used to determine if mitigation measures would be effective in avoiding or reducing the intensity and/or duration of the potential impact or the impact itself. If implementation of one of the alternatives is selected then mitigation measures would be implemented by the National Park Service and its contractors to avoid, minimize or mitigate potential impacts of constructing the ranger station, and associated features, such as the septic system, parking and walkways. These mitigation measures are identified under each impact topic as appropriate; they have been proven as effective measures by the NPS on similar projects. The following additional mitigation measures from the GMP related to other topics would also be applied to all action alternatives.

General

- Whenever possible, new facilities would be built in previously disturbed areas or in carefully selected sites with as small a construction footprint as possible.
- During design and construction periods, NPS resource staff will identify areas to be avoided.
- Fencing or other means would be used to protect sensitive resources adjacent to construction areas.
- Construction activities would be monitored by resource specialists as needed.
- Construction materials would be kept in work areas (NPS 2009:70).

Air Quality

- A dust abatement program would be implemented. Standard dust abatement measures could include watering or otherwise stabilizing soils, covering haul trucks, employing speed limits on unpaved roads, minimizing vegetation clearing, and revegetating after construction.

Noise Abatement

- Standard noise abatement measures would be followed during construction periods. These could include the following elements:
 - a schedule that minimizes impacts on adjacent noise-sensitive resources
 - the use of the best available noise control techniques wherever feasible
 - the use of hydraulically or electrically powered impact tools when feasible and
 - the location of stationary noise sources as far from sensitive resources as possible (NPS 2009:73).

Scenic Resources

- Facilities would be designed, sited, and constructed to avoid or minimize visual intrusion into the natural environment or landscape (NPS 2009:73).

Wildlife and Wildlife Habitat

- To the extent possible, new or rehabilitated facilities would be sited to avoid sensitive wildlife habitats, including stream channels and water quality values, spawning areas, riparian and other sensitive habitats.

D. Description of Environmental Consequences

1. Impacts to Soils and Vegetation

Alternative 1: (No Action) Continue Current Management

There would be no additional impacts under this alternative because there would be no new construction. Existing impacts attributable to normal use of the Clarno Unit would continue. For example, impacts associated with social trails would continue to include soil erosion, compaction and vegetation trampling, leading to broken plant parts, stunted or dead plants. Other ongoing impacts that would affect soils and vegetation include: natural and prescribed fires and fire management activities, removal of nonnative invasive plants, routine cyclic prospecting/digging for paleontological resources and natural soil erosion from wind and water. Because there is little use of the proposed project areas, except for existing trails, roadways and parking areas, overall impacts would remain small.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

Direct effects on soils from constructing a new ranger station would include soil removal, profile mixing, and compaction from excavation and grading. Soil disturbance would also result in vegetation loss. These impacts would affect the following areas:

- Approximately 530 square feet (6,860 cubic feet) for the ranger station, with attached garage (338 square feet) and porch (88 square feet),
- Approximately 3 x 60 foot (180 square feet) for a gravel or paved walkway from the parking area to the ranger station,
- Approximately 6 x 10 foot (640 cubic feet) for the septic tank
- Approximately 4,800 square feet (9,600 cubic feet) for drain field
- new septic system (tank and drain field approximately 4,860 square feet, 14,400 cubic feet), new gravel road (Figure 11).

- Approximately 40 x 12-foot gravel or paved driveway to access garage and yard
- Approximately 800 square feet for fenced yard
- Approximately 64 cubic feet of excavation for the approximately eight fence posts spaced approximately every 10 feet around the fenced yard (65 linear feet)

No additional disturbance would be needed to provide for visitor parking because it is already present at the site. Excavation would occur to construct the ranger station/garage foundation, and to bring utility lines for water from the existing line at the picnic area, approximately 200 linear feet to the proposed site for the ranger station. Utility trenches would be approximately three-feet wide and would include lines for electrical power, fiber optic cables, water, and phone lines. For the most part, these lines would follow the existing edge of pavement adjacent to the parking area before being directed toward the proposed building site.



Figure 18: View of Proposed Project Area in Alternative 2

During excavation and grading, soils would be mixed, moved and backfilled with native material and imported fill and compacted. Disturbance of soils would cause long-term localized changes in soil profiles, temporary (for the utility lines and septic system) and long-term (for the building, compound and walkways) loss of vegetation, and decreased soil productivity, especially where surfaces were hardened or compacted. Permanent soil loss would occur at the building site and walkway. Indirect soil impacts, such as from erosion and compaction on established and social trails would likely increase with increased visitation to the area with the opening of the ranger station.

Vegetation in the area consists of prairies dominated by bunchgrasses and sagebrush and dotted with juniper parklands in wetter areas. Construction of the visitor contact station and associated facilities would affect the following native species, which are sparse in the project area: sagebrush, bitterbrush, wild rose, broom snakeweed, bunchgrasses, and yarrow. Nonnative species, such as tumble mustard, Russian thistle, cheat grass, and medusahead grass would also be affected. Although there are also scattered junipers in the area, these would not be affected.

Covering and compacting soil would decrease permeability, soil moisture, and water storage capability. This could result in slower rates of subsurface water transmission and increased runoff, increasing soil erosion where soils were exposed by construction. Prolonged trampling gradually decreases vegetation cover and exposes bare ground to the direct erosive impact of rainfall. Depending on the extent, increases in erosion may expose plant root systems and lead to decreased vigor or death of plants. These impacts would be expected to occur locally in the

vicinity of the ranger station from the building and associated components, and on and adjacent to paved walkways and on other pathways that may develop in the vicinity.

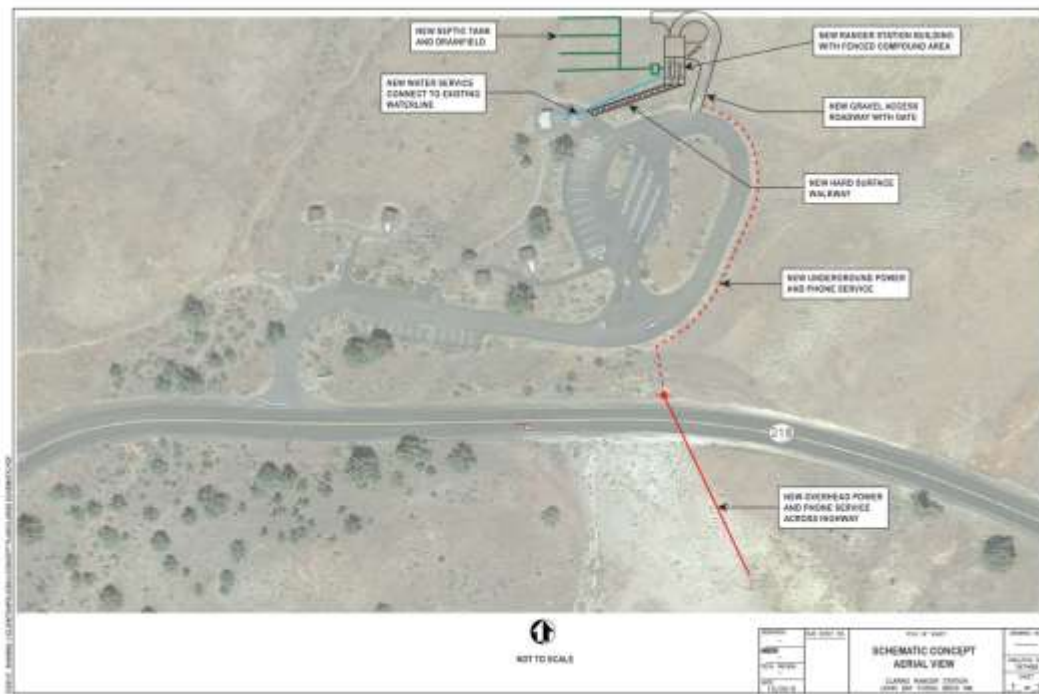


Figure 19: Proposed Configuration of Alternative 2



Figure 20: View of Proposed Project Area in Alternative 3

Alternative 3: Construct Ranger Station South of Camp Hancock
Soils and vegetation impacts would be similar to Alternative 2. In addition, there would be additional soils and vegetation disturbance to construct a small visitor and employee parking area (approximately 400 square feet) and access driveway (approximately 600 square feet). There would also be slightly less disturbance because existing fiber optic and water lines on the access

road adjacent to the site would have to be extended approximately 80 linear feet, a shorter distance to reach the ranger station.

Additional impacts on soils and vegetation may also occur as a result of seasonal flash flooding on the access road. There have been several instances of episodic flooding that has damaged the access road or the surrounding area. Adding a new paved or gravel parking area, impermeable walkways and a building could exacerbate erosion of the roadway, which also accesses Camp Hancock.

Table 3: Estimated Areal Impacts to Soils and Vegetation

Action Item	Alternative 2 Approximate Area of Impact	Alternative 3 Approximate Area of Impact
New Ranger Station and Attached Garage	Approximately 870 square feet (ranger station and garage) permanent covering of area with impermeable materials	Same as Alternative 2
Foundation for Station and Garage	Approximately 6,860 cubic feet of soil removal for foundation and crawl space	Same as Alternative 2
New Septic Tank and Drain Field	Approximately 60 square feet for the tank, and 0.1 acre drain field) – permanent soil loss for tank and permanent soil modification from drain.	Same as Alternative 2
Access Road/with Gate	Ground disturbance for gate and driveway (approximately 480 square feet)	Approximately 600 square feet for new access road/driveway and gate.
New Employee Outside Parking Area	N/A	Approximately 400 square feet – vegetation removal and soil modification into a gravel surface
New Hard Surface Accessible Walkway	Approximately 180 square feet of vegetation removal and permanent soil loss	Same as Alternative 2
New Underground Power and Phone Service	Approximately 1,200 square feet temporary vegetation and soil disturbance, permanent soil loss where lines are placed	Same as Alternative 2, however existing trenches would be used.
New Water Line and Connection to Existing Source	Approximately 600 square feet temporary vegetation and soil disturbance, permanent soil loss where water line is placed.	No new line, but extension of existing water line.

Cumulative Impacts

The Clarno Unit has little development aside from the existing picnic area, trails and short roadways accessing features within the area. Long-term low level adverse effects have been contributed from the concentrated picnic area facilities, including the tables/shelters, vault toilets, trails and parking. These impacts date from prior to acquisition by the NPS, when the area was managed by Oregon State Parks.

When past, present and reasonably foreseeable future actions are added to the actions in Alternative 1, there would continue to be a small degree of adverse effects on soils and vegetation

from the existing uses at the water treatment building and near the other sites. Proposed future actions, including opening the mammal quarry and developing the Geoloop, Stegamonster, and Mimulus trails and an associated trailhead would result in a small degree of additional soil and vegetation disturbance and loss in the vicinity of Alternatives 2 and 3. Past soil impacts, such as grazing, prior to acquisition by the monument have ceased. Future elimination of social trails and development/designation of official trails to reduce soil erosion, vegetation trampling and loss, as called for by the GMP would also have localized cumulative beneficial effects on soils and vegetation. Therefore, when the actions in Alternatives 2 and 3 are combined with impacts from cumulative effects, there would continue to be a small range of adverse and beneficial effects.

Conclusion

There would continue to be small dispersed impacts to soils under Alternative 1. Under Alternatives 2 and 3, there would be long-term localized adverse effects from construction activities in the vicinity of the proposed project areas from soil and vegetation disturbance, loss and covering with impermeable surfaces. There would also be short-term adverse effects during staging and from construction of utility lines and the septic system from vegetation loss, which would recover over time. Additional limited long-term adverse effects would occur from a potential increase in visitor use in the vicinity of the new building and from the likelihood that social trails would develop in the area. Long-term impacts would be greater in Alternative 3 from the need to construct accessible parking for employees and visitors, because the site is away from existing visitor use facilities, and because of future anticipated effects from low-grade flooding on the access road. Combined, there would be approximately 0.3 acres of disturbance in Alternative 2 and slightly more than that due to the need for additional parking and access in Alternative 3.

Measures to Avoid, Minimize or Mitigate Soils and Vegetation Impacts

Because prevention is the most cost effective management option to minimize impacts to soils and vegetation, without revegetation, actions involving ground disturbance/soil grading and clearing may increase the presence of nonnative invasive species. Most noxious and invasive weed species are those that initially become established in disturbed areas. The following impact avoidance, minimization or mitigation measures would be used to reduce impacts on soils and vegetation from implementation of the action alternatives:

- Construction limits would be clearly marked and delineated using fencing or other means.
- New facilities would be built on soils suitable for development (NPS 2009:70).
- Soil erosion would be minimized by limiting the time soil is left exposed and by applying other erosion control measures such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies (NPS 2009:70).
- Once work is completed, construction areas would be revegetated with native plants in a timely period (NPS 2009:70).
- Staging areas would be located where they would minimize new disturbance of area soils (such as in parking areas).
- Excavated soils would be reused to the extent possible.
- Stormwater management measures would be implemented to reduce nonpoint source pollution discharge from parking lots and other impervious surfaces using swales and revegetation of road and parking edges.
- Vegetable oil in place of hydraulic fluid would be used in heavy equipment used in construction.
- Revegetation plans would be developed for disturbed areas.
- Only plants native to the project area or the region would be used in restoration efforts.
- Restoration activities would commence immediately following construction.

- Monitoring would occur to ensure that revegetation was successful, plantings were maintained, and unsuccessful plant materials were replaced (NPS 2009:71-72).
- Areas of concern for noxious weeds would be identified prior to construction.
- Construction equipment would be cleaned of mud and seed-bearing material prior to use in the monument.
- Weed-free certification or inspection of restoration materials would occur.
- Noxious weeds in the project area or borrow materials used in the project would be treated prior to construction use.
- Vegetation would be salvaged where appropriate and disturbed areas would be seeded and/or planted.

2. Impacts to Paleontological Resources

Alternative 1: (No Action) Continue Current Management

There would be no new impacts on paleontological resources because there would be no new construction, and because surveys have revealed no indication of fossil materials at the site (Samuels 2015b).

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

There would be no impacts on paleontological resources from the proposed construction of a ranger station adjacent to the Palisades Picnic area. The area was surveyed in July 2015 and no material meeting monument significance or collection guidelines was found (Samuels 2015).

A single block of lahar was discovered as surface float in the northwest portion of the surveyed area, along the creek bed flowing north to south through the mouth of Indian Canyon. That block of lahar . . . included several fragments of petrified wood, ranging from ~1 to 10 cm in diameter. Those fragments are not particularly well preserved, and do not meet the criteria for collection used at JODA. Additionally, the composition of the block is similar to the conglomerates of the Palisades; the location of the specimen suggests it eroded out of one of the exposures along Indian Canyon and was transported, well over 100 meters, to the site where it was discovered. Given the poor preservation and great distance from the source material, that block was not collected (Samuels 2015).

Alternative 3: Construct Ranger Station South of Camp Hancock

A potential for indirect impacts to paleontological resources from visitors would exist because of **the site's** proximity to Camp Hancock and because of the trail used by Camp Hancock participants that is adjacent to the proposed site (Samuels 2015b). In situ plant fossils were recently discovered near this construction site, and the presence of a ranger station would bring more people to the area, increasing the likelihood of indirect damage to or potential loss of fossil specimens from visitor use (Samuels 2015). At this site, the paleontological survey found:

Though in situ fossil bearing rocks are not present at the site, four large blocks of debris-flow conglomerate (lahar) were discovered on the surface approximately 10 meters to the north of a small knoll at the south end of the surveyed area. Those were collected with the field number JDNPS14-89. . . Composed of fine grained orange sediments, those blocks of lahar were lithologically distinct from the reddish silt that formed the predominant material amongst the alluvium. A similar fine grained orange conglomerate unit caps the knoll to the South, these blocks most likely eroded from that hill and settled on the flat in this area.

Because these blocks eroded out of the east and settled on the flat, there were no additional concerns with potential impacts on paleontological resources from development of the flat area for the ranger station.

Measures to Avoid, Minimize or Mitigate Paleontological Resource Impacts

As part of the nationwide NPS paleontological monitoring program, five methods and vital signs have been identified that could be used to monitor in situ paleontological resources: (1) erosion (geologic factors), (2) erosion (climatic factors), (3) catastrophic geohazards, (4) hydrology /bathymetry, and (5) human access/public use (Santucci et al. 2009). Santucci et al. also identified three categories of illegal fossil collecting on NPS lands: (1) inadvertent casual collecting, (2) intentional casual collecting, and (3) illegal collecting for commercial purposes. Any research collecting done without a permit is also prohibited. Illegal fossil collecting at the monument usually falls under the first two categories, and in the Clarno Unit visitors can see plant fossils in the large boulders strewn below the Palisades along the Trail of Fossils (Graham 2014:42).

Although there is currently no monitoring program in the Clarno Unit, the following impact avoidance, minimization and mitigation measures would be used for construction of the proposed ranger station under either Alternative 2 or 3.

- Site-specific surveys have been undertaken in areas within the proposed project areas believed likely to contain fossils.
- If important paleontological resources are later identified, the NPS would avoid, relocate, or otherwise mitigate impacts from the actions being taken. If any specimens are found and collected during construction activities they would be managed according to NPS paleontological resources management (NPS RM #77) and museum collection policies (NPS 2009:71).
- Any inadvertent discovery of specimens during construction activities would be managed **by the monument's paleontologist** according to NPS museum collection policies and the **monument's scope of collections statement**.
- Efforts would be undertaken (information signs during construction and interpretive/educational materials at ranger station after construction complete) to **inform and educate visitors, students, teachers, and the public about the monument's** paleontological resources, the reasons for protecting these resources, and the laws regarding the collection of fossils from NPS lands.
- Construction activities would be monitored by resource specialists as needed.

Cumulative Impacts

There has likely been a range of adverse impacts on monument paleontological resources over time, particularly prior to monument establishment from collecting and other actions that have damaged resources. Since monument establishment, cumulative beneficial effects have resulted from the collection, curation and interpretation of paleontological resources. Proposed future actions in the monument and at the Clarno Unit would continue to benefit knowledge about paleontological resources, but could also result in some potential for cumulative adverse effects on resources considered common or insignificant. Proposed future actions to open the mammal quarry and develop the Geoloop, Stegamonster, and Mimulus trails and an associated trailhead would affect soils and vegetation and would have the potential to affect paleontological resources from direct and indirect impacts, such as through erosion. However, similar to the current proposal, these areas would be surveyed prior to use and actions taken if needed to avoid or minimize effects.

Ongoing indirect impacts to paleontological resources in the monument are thought to be low because they are so abundant or durable, or difficult to access for the general public (NPS 2008:132). The lack of an adequate monitoring program makes it difficult to determine threats or losses of fossil resources; however, the most likely cause is from natural erosion. Erosion weathers away the hard rock that has encased and protected the fossils, exposing them to water, freezing and thawing. This can result in fossil damage and loss (NPS 2008:132). Other ongoing indirect impacts come from visitors that may cause unintentional fossil damage and destruction when they walk over fossil-bearing rocks may also lead to the rocks being crushed and consequent exposure of fossils to weathering. Visitors walking off trail also may also affect fossils from trampling

vegetation and exposing soils to erosion, especially on sloped landforms. Ongoing cyclical prospecting for fossils would continue to occur at the monument according to established protocols and would result in loss of *in situ* fossils, but their subsequent preservation for study.

When the actions in Alternatives 1 or 2 are added to the impacts from past, present or reasonably foreseeable future actions, there would continue to be no effect on paleontological resources eligible for curation. Similarly, with mitigation, minimal cumulative adverse effects on paleontological resources would be anticipated in Alternative 3.

Conclusion

All three potential construction sites for the ranger station are in areas without exposed *in situ* rock layers, but are on deposited alluvium (loose, eroded sediments). Because of the thickness of the alluvium at these sites, grading of a surface prior to construction is unlikely to impact *in situ* paleontological resources and analysis of those on the surface has not revealed any additional material of importance.

3. Impacts to Water Resources

Alternative 1: (No Action) Continue Current Management

Water Quantity: There would be no new impacts on water resources. Existing impacts would continue. These include the continued withdrawal of water for uses at the monument and for **provision of water to OMSI's Camp Hancock facilities**. Although the NPS and OMSI have a general agreement that includes a right of way for a waterline to access water and cross NPS lands, the well is on NPS land and NPS reserves the right to first use (NPS 1996:208).

Floodplains: Although the bank of Pine Creek is well vegetated, it is also possible that the gravel parking areas adjacent to the water treatment building result in some runoff during storm events that drains toward the creek. Sediment is likely captured during all but the largest events by the undulating nature of the ground surface and by the vegetation between the building and parking areas and the creek. Although no flooding is known from this site, its proximity to Pine Creek may portend long-term risk.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

Water Quantity: As in Alternative 1, water use would continue to be monitored. Although NPS goals emphasize conserving water in all monument operations, constructing a new ranger station would use more water than is currently being used. Through implementation of NPS Design Guidelines for the new facility, water would be conserved by installing low-flow fixtures and other conservation measures, resulting in minimal new use and effects on water quantity.

Impacts on water resources would occur from additional use of water for the flush toilet and sinks at the ranger station. Approximately 300 gallons per day of water are likely to be used. There would also be impacts from constructing additional impermeable surfaces associated with the ranger station that may result in faster runoff, including toward Indian Creek. Because there would be a large area of separation between the ranger station and the creek, these impacts are unlikely to reach the creek. Temporary impacts from excavation of the septic system and drain field however could result in an additional potential for impacts, depending on the effectiveness of mitigation measures employed and whether heavy precipitation occurs during construction.

Floodplains: The area also has a history of short, episodic (extreme) flooding that results from unusually heavy precipitation in the canyon. In the past, this has resulted in overflow onto the parking area and blockage of a culvert carrying water underneath the parking area. As noted under Impact Topics Considered, in 1979 the U.S. Geological Survey studied flood hazards in the monument and found that a potential existed for **"cloudburst" flooding at the mouth of Indian Canyon** (Frank and Oster 1979:24). This same study suggested **"construction of camp facilities**

and an access road on the higher ground near the east side of the draw would alleviate the flood hazard” (Frank and Oster 1979:24). What was then being contemplated was a campground. The higher ground referred to is where the proposed ranger station would be constructed under Alternative 2. The proposed ranger station has also been designed to sit slightly higher (by approximately 2-3 feet) on the ground surface, to avoid any potential impacts that may result from water at ground level. Based on the experience of Clarno Unit staff, the type of flow that has been experienced in the past is related to storms that drop an estimated four inches of rain in a short period of time (Laing pers. comm. 2015). Recent improvements made to install an oversized culvert at the lower end of the Geologic Time Trail, resulted in improvements that made previously observed impacts in the vicinity diminish. The parking area now drains well, with little debris residue left to clean up during flash flooding events (Laing pers. comm. 2015).

A draft floodplains statement of findings has been prepared to summarize the potential for flooding at this site and the acceptance of the NPS to potential consequences from constructing the ranger station in this location if this alternative is selected for implementation (see Appendix 2). Because of the nature of the flooding (low level and accompanied by heavy precipitation), mitigation measures include warning signs, evacuation planning and staff readiness.

Alternative 3: Construct Ranger Station South of Camp Hancock
Similar to the Indian Canyon location in Alternative 2, the Hancock Canyon location in Alternative 3 is known to experience occasional flash flooding in extreme storm events that drop a great deal of moisture. The flooding has affected the Camp Hancock facilities approximately 0.75 mile north and east of the proposed location for the visitor contact station. Water is also known to have coursed down the access road to the site, requiring occasional repair. For instance, in 2014 the park and OMSI repaired flood damage. Because the facility would be constructed east of the area that is known to experience flooding in extreme episodic events, impacts from flooding would not affect it. As with the location in Indian Canyon, however, as a preventive measure, the building would be raised 2-3 feet if constructed in this location to ensure that waters pass unimpeded down the canyon.

Measures to Avoid, Minimize or Mitigate Water Resources Impacts

- To prevent water pollution (sedimentation) during construction, erosion control measures, such as silt fencing, would be used to prevent discharges to nearby creeks and any potential for long-term impacts on water quality, wetlands and/or aquatic species (NPS 2009:71).
- Construction equipment would be inspected regularly for leaks of petroleum and other chemicals (NPS 2009:71).
- Measures would be taken to keep fill material from escaping work areas, especially near streams, springs, natural drainages, and wetlands (NPS 2009:71).
- For new facilities, stormwater management measures would be implemented to reduce nonpoint source pollution discharge from parking lots and other impervious surfaces. Such actions could include use of oil/sediment separators, street sweeping, infiltration beds, permeable surfaces, and vegetated or natural filters to trap or filter stormwater runoff (NPS 2009:71).
- **The monument’s spill prevention** and pollution control program for hazardous materials would be followed and updated on a regular basis. Standard measures could include procedures for hazardous materials storage and handling, spill containment, cleanup, and reporting; and limitation of refueling and other hazardous activities in upland / nonsensitive sites (NPS 2009:71).
- Because of the potential for impacts from flash flooding, there would be no overnight use of the ranger station. An evacuation plan would also be developed for employees and visitors.

Cumulative Impacts

Because of the minimal development of monument facilities, use of water is low and dispersed. The most intensive use is at monument headquarters in the Sheep Rock Unit, where the visitor center (Thomas Condon Paleontology Center) and administrative headquarters/Cant Ranch are located, with facilities, including break rooms, a kitchen and flush toilets in both areas. At the Cant Ranch, over 70 acres of historic fields as well as an historic orchard and lawns are also watered. The Painted Hills Unit contains a small office (no water) and has adjacent public vault-type restrooms. Water use at Painted Hills includes watering of lawns in the adjacent picnic area and a seasonal water fountain/spigot as well as residential use for one park house located at the site. At the Clarno Unit, there is a seasonal water fountain and spigot in the picnic area and the well services the seasonal fountain **and OMSI's Camp Hancock facilities**. Because the area is a relatively dry high desert, there are few wetlands; however, the John Day River is adjacent to or within the park in many areas and Blue Basin and other areas include perennial and/or intermittent streams. Much of the area is also subject to occasional flash flooding down otherwise dry washes, including both Hancock and Indian canyons in the Clarno Unit.

Because there are no additional proposed projects that would expand the use of water within the monument, when the actions in Alternative 1 are added to the impacts from past, present and reasonably foreseeable future actions, there would continue to be small overall impacts on water resources. Similarly, Alternatives 2 and 3 would result in overall small impacts on water resources, but would expand existing uses at the Clarno Unit through the addition of water use associated with the ranger station facilities (employee restroom, sink, and outdoor spigots). Alternatives 2 and 3 would also result in placing facilities close to, but not within areas affected by extreme flooding (flash floods).

Conclusion

Analysis of data related to flash flooding has indicated that none occurs in the vicinity of the existing site in Alternative 1, nor has it adversely affected the proposed sites in Alternatives 2 or 3. Although there would be some additional use of water associated with the new facilities in Alternatives 2 or 3, this use would be minimal and would not require a new well or other testing facilities.

4. Impacts to Archeological Resources

Alternative 1: (No Action) Continue Current Management

There would be no impacts to archeological resources. Although archeological resources have been found near the existing site, none are known from within it.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

As described in the archeological resources section, a variety of archeological sites have been identified in the Clarno Unit. However, none were found in the area of potential effects identified for the ranger station (Figure 12). As stated in the archeological survey report, **“the subsurface survey within the project area failed to locate any significant cultural material or deposits”** (Cheung and Gleason 2015: 19). According to the report,

Given the absence of cultural remains in previous surface surveys, the absence of these remains in the present subsurface survey, and the history of high energy alluvial depositional events within most of the project area, the likelihood of finding intact buried cultural deposits at this location appears to be minimal (Cheung and Gleason 2015:19).

As a result, although archeological monitoring was found not warranted, the study noted that care should be taken during ground disturbing activities to watch for such materials. The contractor and project manager, as well as any park staff observing construction operations would be apprised of this.



Figure 21: Area of Potential Effects (APE) for Alternative 2

Alternative 3: Construct Ranger Station South of Camp Hancock

A surface archeological survey was conducted by Jacqueline Y. Cheung and Eric B. Gleason in October 2014. They noted that most of the area for the proposed visitor contact station is located within a historic archeological site and that development in this area may affect site integrity if key features are not avoided. To avoid oil exploration features, construction would be focused toward the southwestern portion of the site. In addition, there would be monitoring of excavation to minimize the potential to affect buried features. Although resources are present, they would be avoided by the design of the building and its location on the site.

Measures to Avoid, Minimize or Mitigate Archeological Resources Impacts

The following measures would be used to avoid, minimize or mitigate impacts from the action alternatives:

- As recommended by Cheung and Gleason (2015), and the potential effects to undetermined or unknown archeological resources to occur, archeological survey, monitoring (and/or testing as determined necessary) would be conducted prior to construction.
- Should unknown archeological resources be uncovered during construction, work would be halted in the discovery area, an NPS archeologist contacted, the site secured, and the park would consult according to 36 CFR part 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In compliance with NAGPRA, the National Park Service would also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary, and sacred objects should these be discovered during the course of the project.
- If necessary or possible, relocation of work to a non-sensitive area would occur to enable site testing and documentation. Long-term actions could include reinitiating the project in the same area (upon effective data collection) or relocating the action (if possible). There would be an emphasis on taking actions that would avoid further disturbance to the site(s).

Cumulative Impacts: It is likely that there have been inadvertent and occasional intentional localized long-term adverse effects on archeological resources from the discovery of these during recreational activities and from development projects prior to the advent of archeological resources protection laws. Since establishment of the monument, there have been long-term beneficial effects on archeological resources from the effort to inventory and analyze

archeological resources, particularly when development projects have been proposed. It is a key step in the process of project analysis to determine whether archeological resources are present before undertaking actions because it is required by law and policy. This has resulted in both the preservation of those sites that have been found and avoidance of areas with sensitive resources. It has also resulted in finding sites considered eligible for the National Register of Historic Places and some of these have been listed.

When the impacts from past, present and reasonably foreseeable future actions are considered, there would continue to be a small degree of long-term adverse effects on archeological resources, combined with a larger degree of beneficial effects on archeological resources under Alternative 1 from the continued investigations that would occur prior to ground disturbance in the park and on other federally managed lands in the vicinity of the park. Similarly, Alternatives 2 and 3 would contribute a small degree of adverse effects and a substantial degree of beneficial effects from ongoing surveys of park lands for archeological resources and from monitoring of development.

Conclusion: There would be no ground disturbance affecting areas where archeological resources that are potentially eligible for the National Register have been found. Other potential impacts to archaeological resources would be avoided by avoiding sites that have been found through surveys and by monitoring ground disturbance associated with areas that have additional potential for uncovering archeological resources. There would be no adverse effect on precontact or historic archeological resources.

5. Impacts to Visitor Experience

Alternative 1: (No Action) Continue Current Management

There would be no new impacts. Existing impacts, including the current low level of visitor services would continue. Visitor experience and enjoyment would continue to be diminished for some people because of the small number of visitor services provided at the Clarno Unit.

Visitor Access

Visitors would continue to access the Clarno Unit from two locations via Oregon State Highway 218. The Palisades Picnic Area (Indian Canyon) and Hancock Canyon would continue to offer access to the area, however visitor use of unvegetated areas in the two prominent fossil areas in the unit (Clarno Nut Beds and Hancock Mammal Quarry) would continue to be prohibited, based on the compendium, to prevent degradation.

To obtain information for their visit, visitors would likely continue to use the internet, main park visitor center, or stop in at the picnic area from casual observation of informational signs along the highway. Some visitors stopping at the picnic area would continue to take advantage of the three trails that emanate from it to absorb more information about the site. Others driving by the picnic area would notice the vault toilets and stop in to use those and perhaps to obtain additional information and explore area trails. Those visitors who knew about additional resources in Hancock Canyon may also continue to access the park via the road to Camp Hancock.

At the same time, visitors driving by the water treatment building on Highway 218 would likely continue to be confused as to its purpose or ownership since it does not have any identifying signage. Unless directed to it by others or by observation of staff outside the building, most visitors would be unlikely to encounter park staff that might be working there. Because there would continue to be no staffed park facility, it would continue to be difficult to contact area staff, including the resource specialist or seasonal maintenance worker for information or assistance in case of an emergency.

Visitor Use Opportunities and Interpretation and Education

A small range of visitor services would continue to be provided at the Palisades Picnic Area, including parking, picnicking/shelter, seasonal water source, restrooms, trails, and information signage. Although the access road to the Camp Hancock facilities is approximately a half mile from the picnic area, it is likely that most visitors would continue to concentrate their visit in the Palisades Picnic Area vicinity because there are fewer public facilities in that area.

Because of the inadequacy of the *de facto* contact station, its lack of identifying signage (including no visitor information or interpretation), and the need for interpretive rangers to commute two hours each way to the site to provide for visitor services, overall interpretive and educational services at the Clarno Unit would continue to be small. Cooperative educational efforts between the monument and OMSI's Camp Hancock would also continue to be intermittent (usually upon request). Minimal formal public interpretive and educational opportunities would be provided for park visitors (school groups, guided trips, researchers, agencies, tribes, nonprofit organizations, federal and nonfederal partners, and individuals). Casual visitor contacts with monument staff in the Clarno Unit would remain at the current low level because of the intermittent presence of monument staff and inadequate work space.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

Visitor Access

Existing means of visitor access described in Alternative 1 would continue. In addition, signs would be added to indicate the availability of the visitor contact station at the site and the new building would be clearly visible from the highway, giving people driving by an additional reason to stop in at the picnic area. When it was staffed, those stopping at the contact station would be able to obtain information about the Clarno Unit, other parts of the monument and other visitor use opportunities in the area. With an onsite presence, the monument would be able to provide a visible emergency point of contact for visitors to the area.

Visitor Use Opportunities and Interpretation and Education

Visitor use opportunities would include the same options as in Alternative 1. In this alternative, visitor services would be centralized at the picnic area. It would also directly and indirectly increase the range of visitor services available at the Clarno Unit. Because the ranger station would be the duty station for the integrated resource specialist and a seasonal maintenance worker, the existing commute time from headquarters would not need to be included in the work day, thus increasing opportunities for employees to be present and encountered at the site. This would potentially also increase opportunities to offer more interpretive programs in the area. The building would provide a place for visitors to obtain information and offer the park a sales area. Personal and non-personal interpretive, educational, and informational services would be provided in the form of ranger presence, and opportunities for talks and walks, displays, maps, brochures, and handouts. Park staff could also work more closely **with OMSI's Camp Hancock**, improving opportunities for monument staff to engage with students and the science programs offered at Camp Hancock and offering students and other participants another opportunity to learn more about the monument.

Alternative 3: Construct Ranger Station South of Camp Hancock

Visitor Access

Existing means of visitor access described in Alternative 1 would continue. In addition, signs would be added to indicate the availability of the visitor contact station access road approximately 0.5 miles west of the Palisades Picnic Area. Because the visitor contact station would be approximately 0.9 miles from the picnic area, visitors could also choose to walk to the facility using the existing informal trail used by Camp Hancock participants, perhaps formalizing the access trail now used by Camp Hancock participants. Because of the dispersed nature of visitor facilities, people could stop at one or both facilities, depending on what direction they were traveling from on Highway 218 and other needs (such as for potable water, restrooms, and

picnicking). Depending on the sequence, the ranger and information at the contact station could introduce or supplement park visits. As in Alternative 2, when it was staffed, those stopping at the contact station would be able to obtain information about the Clarno Unit, other parts of the monument and other visitor use opportunities in the area. With an onsite presence, the monument would also be able to provide an emergency point of contact for visitors to the area.

Visitor Use Opportunities and Interpretation and Education

Although visitor use opportunities would be similar to Alternative 2, slight differences would exist because of the dispersed location of visitor services (with visitor information in one area and restrooms, seasonal water, picnicking/shelter, and available trails in another). Accessible parking and parking for oversize vehicles, however, would be available in both locations. As in Alternative 2, providing a space for the ranger based out of the Clarno Unit to work from would allow for a more consistent working relationship with Camp Hancock and improve opportunities for public programming. Unlike Alternative 2, the proximity of the ranger station to Camp Hancock in Alternative 3 would make it more convenient for Camp Hancock staff and participants to access it.

Measures to Avoid, Minimize or Mitigate Impacts on the Visitor Experience

- Measures to reduce adverse effects of construction on visitor safety and experience would be implemented, including project scheduling and the use of best management practices (BMPs).
- Visitors would be informed of the construction at the Clarno Unit via local newspapers, **public service announcements, the monument's website and other applicable media sources.**
- To the degree possible, staging of construction equipment, building materials, soil, or other related items in the picnic area parking lot would occur off-season (Alternative 2) with construction fencing delineating safe areas outside of the storage area for visitors.
- Visitor safety concerns would be integrated into interpretive and educational programs (NPS 2009:75).

Cumulative Impacts

Visitor use of the Clarno Unit has increased steadily over the past 10 years as people have become more aware of the monument and its resources, including from the opening of the Thomas Condon Paleontology Center in the Sheep Rock Unit. Although there are future proposed additions to the Clarno Unit that would increase its visibility, including the proposed construction of trails in Hancock Canyon and the opening of the mammal quarry to researchers and the public as proposed in the GMP, it is likely that visitation would continue to increase gradually until these new facilities are constructed. Opening the mammal quarry would likely inspire additional visitation. Combined, adding approximately eight miles of new trails and opening the mammal quarry would bring more visitors and researchers to Clarno, increasing needs for interpretation and paleontological and archeological resources protection, which could be facilitated by the construction of a ranger station in Alternatives 2 or 3.

When the impacts of past, present and reasonably foreseeable future actions such as these, are added to Alternative 1, there would continue to be no visitor contact station or place to stage operations. The existing building does not have storage space for fossils and lacks appropriate heating/cooling controls for temporary storage of artifacts that would be needed when the mammal quarry is opened. As a result, this could initially put resources at risk or result in the need to construct new facilities to accommodate these actions. Under Alternatives 2 and 3, there could be cumulative beneficial effects from the presence of the visitor contact station as a secure place to stage mammal quarry opening activities and trail construction materials. Under the current design, the building would provide a temporary temperature controlled environment for artifact storage. The increased need for onsite resource protection and trail maintenance due to the

future planned actions could be met by the multidisciplinary staff efficiently using the new facility as an operations base.

Conclusion

Existing conditions under Alternative 1 would continue to have long-term direct and indirect adverse effects on visitor experience from not providing some visitor services at the Clarno Unit. Alternatives 2 and 3 would have long-term beneficial effects on visitor experience, including on access, visitor use opportunities and interpretation and education from routine onsite ranger presence and opportunities to increase information and interpretation for visitors.

6. Impacts to Human Health and Safety

Alternative 1: (No Action) Continue Current Management

Current health and safety deficiencies for use of the existing building by employees or the public would continue, including codes not being met for electrical, fire, structural engineering and accessibility standards. The building has been vandalized in the past and lacks security and safety features (no signing, no alarm system, no lockable storage, no appropriate heating/cooling for human use, and no secure place to store an NPS vehicle overnight). Because the building is permeable to mice, it also poses a potential health hazard to employees and visitors during occupancy. There is no onsite sanitary facility or potable water, posing a health and safety problem, as well as an operational issue for employees from the need to drive a half mile down the road to use a restroom or to obtain water.

In Alternative 1, a safety hazard would continue to exist for visitors trying to cross Highway 218 on a curve to access the *de facto* contact station from a small turnout with parking and a trailhead. This facility is across the highway from other monument facilities in the Clarno Unit (picnic area, parking, trailheads and trails, wayside exhibits). In addition, because of the lack of an official ranger station and/or obvious nearby source of information, visitors have been known to stop at homes along Highway 218 to inquire about the monument, posing a potential safety issue to adjacent landowners, monument neighbors and the visitors.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

Long-term beneficial effects would result from eliminating health and safety deficiencies by constructing a modern, code-compliant building. Accessibility improvements, rodent-proofing and a suitable working environment would improve employee safety and working conditions. Unlike the existing building the new ranger station would include a potable water supply and restrooms as well as secure storage for supplies and materials and a work vehicle. Other safety features, such as a security system could also be included. A fenced compound would also provide outdoor work space when needed.

Because the ranger station would be constructed adjacent to an existing visitor use parking area, this alternative would eliminate safety hazards associated with visitors crossing the state highway to access the contact station. It would also be close to public facilities, including parking, sheltered picnicking, trails, and restrooms.

Although most effects on employee and visitor health and safety would be beneficial and long-term, there would also be a potential for short-term adverse effects during construction from the use of heavy equipment near a visitor use area and from the range of other hazards associated with construction activity.

In addition, because of the location of the facility in this alternative at the mouth of a canyon, there is a potential for impacts from flash flooding known to occur occasionally with heavy rainfall in the area. To minimize potential effects, the building would be constructed toward the

east side of the mouth and would be raised slightly. The building would also be designed with fire retardant coverings because of its isolated location and the frequency of fire in the area. Some beneficial effects would be likely because of the **building's location in an area already identified** for protection from wildfire because of existing facilities

Alternative 3: Construct Ranger Station South of Camp Hancock

Impacts would be similar to Alternative 2. Because the building would not be visible from the highway, however, the building could be less evident in emergencies since it is often visibility that alerts the public that rangers are nearby to assist. The building may also be more or less subject to vandalism, which has been a concern with storage of government equipment at the existing site. This effect may or may not be present, however, because of the frequency of use of the Camp Hancock facilities along the same access road and because of the close proximity to those facilities, thus resulting in additional visibility even if not from the highway.

Similar to the Palisades Picnic Area site, the general area below Camp Hancock has a history of flash flooding. Although the flooding is known to inundate Camp Hancock facilities, it primarily is present on the east and west sides of the canyon at the base of the hills (outside of the proposed project area) and also has been known to have affected the gravel access road. Depending on flooding, effects on the access road could be minimal or severe resulting in potential adverse effects on visitor and employee safety from difficulties with access. The existing rough gravel surface is difficult during even good conditions for some vehicles.

Unlike the proposed Alternative 2 location, this facility would be in an area where there are no park developed facilities and would thus result in an additional area needing protection during wildfires, potentially spreading firefighting resources more thinly across the unit.

Measures to Avoid, Minimize or Mitigate Impacts on Human Health and Safety

- The picnic area is at the mouth of Indian Canyon, which has a potential to experience flash flooding. A 1979 USGS survey of the area suggested sighting new developments on higher ground and east of the draw for visitor and employee safety (Frank and Oster 1979:25). Evacuation procedures would be developed for staff and visitor in case of a flash flood.
- The construction area would be signed and temporary fencing would be used to keep visitors safely away from equipment, areas of construction, and to eliminate potential safety hazards.
- The building would be elevated to withstand the low level of flash flooding that typically occurs nearby.
- An evacuation plan for staff and visitors would be developed to minimize potential effects during flash flooding.
- Constructing the exterior of the ranger station with materials that resist combustion would occur.
- Appropriate personal protective equipment (PPE) would be worn by construction workers and park staff while on the roadway and would match the type of work being done (daytime, nighttime, supervising, operating heavy equipment, etc.)

Cumulative Impacts

The action alternatives would contribute a variety of mostly short-term adverse and long-term beneficial effects on human health and safety. Alternative 1 would be more likely to contribute cumulative adverse impacts if conditions remain unimproved for park staff office space accommodations and if visitors, therefore, continue to seek information at the existing water treatment building location. Facility improvements under the action alternatives (2-3) would contribute beneficial effects. None of the alternatives would measurably add to cumulative effects

because, in general, safety issues are not cumulative in nature. Impacts would remain in Alternative 1 and that would result in continued exposure to risks.

Conclusion

There would be no additional adverse effects under Alternative 1, however, a small range of existing adverse effects would continue and could be exacerbated without minor improvements to the existing water treatment building to improve office space, such as from rodent-proofing and installation of better lighting. Alternatives 2 and 3 would result in short-term adverse effects, coupled with long-term beneficial effects from improved human health and safety from constructing new facilities to serve park staff and visitors. There would be slight beneficial effects from concentrating facilities in one location (Alternative 2) compared to constructing the new facilities in a separate location (Alternative 3) because the building would be more visible to the public, because people (staff and visitors) would not have to travel between the two sites to obtain needed information and facilities, and because facilities would be consolidated, for protection from wildfires.

7. Impacts to Park Operations

Alternative 1: (No Action) Continue Current Management

The existing water treatment building would continue to provide minimal office space (72 square feet), inadequate insulation, lighting, communications, and storage space (both for equipment and vehicles). Although approximately half of the building is dedicated to office space, it is needed for up to six employees to work from and interact with visitors during the peak visitor use season (May-September). Park staff would continue having difficulty in basing operations from the unit for trail maintenance and restoration of social trails, maintenance of existing visitor use facilities, natural and cultural resource inventories and monitoring, exotic plant management, and patrolling the area for potential damage and threats to fossils and archeological sites. These factors combined with a two hour commute on each end of the work day (traveling time from headquarters) to obtain and return NPS tools and vehicles would continue to reduce employee efficiency, waste energy (time and fuel), increase wear and tear on government vehicles, reduce actual onsite work, and maintain a higher carbon footprint for the operations.

Alternative 2: (Preferred) Construct Ranger Station at Picnic Area

Short-term adverse effects would occur from the need to oversee construction of the building, while long-term adverse effects would include maintaining the building. Initial costs would be moderate from providing a small utilitarian facility for staff with adequate office, storage and garage space within a secure structure while maintaining a constrained budget. Maintaining the new building, yard and septic system would, for many years, be easy to accomplish. Afterwards, it is likely that components would begin to deteriorate and need repair or replacement, requiring minimal inputs of staff time and resources, including money and materials. To the degree possible, the building would incorporate sustainable design and use features, including high insulation and windows with thermal design features, low flow toilets, hot water on demand, and low volatile organic compound (VOC) paints and finishes. These features would reduce the lifecycle cost of the structure, including reliance on traditional sources of energy.

A wide range of benefits on park operations would also occur. Resource protection, interpretation and maintenance would be improved by constructing a new ranger station adjacent to the existing visitor use area for the Clarno Unit. The new facility would reduce work-related **travel time to the site as part of an employee's work day, depending on their individual commutes**, and would make operations more efficient, thus improving the ability to maintain facilities, such as trails, and protect natural and cultural resources. The water treatment building would be retained to serve that function, while other functions would move to the new ranger station, where adequate heating and cooling systems would be present, along with a source of water and

restrooms. Staff operating out of the facility would be able to direct more of their attention toward accomplishing the needs in the unit from a building in good condition, with benefits associated with additional support features, such as the secure storage and fenced compound.

Locating the facility in conjunction with other visitor facilities at the picnic area would result in some operational benefits, including providing a single place for visitors to recreate as well as to obtain information. Unlike Alternative 3, it would not increase the number of locations needing to be protected during wildfires and would not result in the need to construct additional parking.

Alternative 3: Construct Ranger Station South of Camp Hancock

Impacts would be similar to Alternative 2, with low grade adverse effects during construction and use and greatly improved operations from a new building at the Clarno Unit. Differences relate to the location of the building, which, in this alternative, would be not as conveniently located for some visitors but would be **more conveniently located for OMSI's Camp Hancock facilities**. Because the building would be constructed in a new area, additional parking (approximately 600 square feet) and a longer access driveway (approximately 600 square feet) would need to be constructed. The building would also create a new developed area for the park to maintain, including for fire protection. There would be some additional long-term adverse effects from the location of the building compared to Alternative 2, with the additional need to maintain a gravel road that frequently washes out and needs a higher level of maintenance than the paved parking areas at the picnic area.

Although the location would not be as conveniently located in the short-term for visitors, over time, if the mammal quarry is developed as called for in the GMP, the location could become more convenient, since access to it is via Hancock Canyon rather than Indian Canyon. It is also from this area that additional trails and trailhead parking would be developed.

Measures to Avoid, Minimize or Mitigate Impacts on Park Operations

- Monitoring construction activities to ensure adherence to mitigation measures and to provide recommendations to minimize impacts on park resources.
- Coordinating work with park staff to reduce disruption to normal activities.
- Informing construction workers about the special sensitivity of park resources and values and regulations, including by providing an orientation to park resources for the contractor(s).
- Encouraging park resource specialists to be involved in inspections and monitoring and providing recommendations during the road rehabilitation work.

Cumulative Impacts

Ongoing park operations are constrained by limited staff currently duty stationed at Clarno. Because the park does not store equipment and materials in this unsecure location, this results in an array of cascading indirect adverse effects on operations in the Clarno Unit related to the distance of this area from park headquarters, where employees are duty-stationed. As a result, there would continue to be cumulative adverse effects on day-to-day operations to maintain this and the picnic area facilities, as well as indirect adverse effects on other operations from not having employees close to the site. This would continue to result in cumulative adverse effects on resource interpretation for visitors and likely on protection of park natural and cultural resources as well as on employees. In contrast, when the impacts of Alternatives 2-3, are added to the array of past, present and reasonably foreseeable future actions, there would be a small contribution to cumulative adverse effects from ongoing management of the deteriorated water treatment building combined with additional cumulative adverse impacts initially from maintaining the new ranger station and accompanying facilities in good condition, combined with a wide range of beneficial effects from improvements in park operations in the Clarno Unit from having a safe and functional place for employees to work from.

Additional cumulative adverse effects would occur in Alternative 3 from maintaining the additional facilities in an area separated from where most visitors to the unit now arrive as well as from adding another area of snow removal, firefighting operations and grounds maintenance.

Conclusion

There would be both beneficial and adverse effects on park operations from Alternatives 1-3. Although it would be less costly and time consuming to maintain existing operations in Alternative 1, long-term beneficial effects on other areas of park operations (including protection of natural and cultural resources and interpretation) would be gained from additional costs and operations in Alternatives 2-3.

Table 4: Impact Comparison Chart

Impact Category	Alternative 1: (No Action) Continue Current Management	Alternative 2: (Proposed Action) Construct Ranger Station at Picnic Area	Alternative 3: Construct Ranger Station South of Camp Hancock
Soils and Vegetation	No new impacts. Ongoing impacts from unconfined parking and access.	Short- and long-term adverse impacts from construction of building, utility lines, access, parking, and workyard.	Same as Alternative 2, with slightly more impacts from access and parking.
Paleontological Resources	No effect	Same as Alternative 1.	No direct effects, however potential for indirect effects from proximity to known sites.
Water Resources, including Floodplains	No new impacts. Close to Pine Creek. Unknown history of flooding.	Near Indian Canyon flash flood area. Building would be constructed outside of the area indicated as affected in a 1979 USGS report (Oster and Frank 1979) and raised to minimize potential for effects. A draft floodplains statement of findings has been prepared to evaluate this proposed action/preferred alternative.	Near Hancock Canyon flash flood area. Building would be constructed outside of this area and raised to minimize potential for effects but access road would remain subject to flood damage.
Archeological Resources	No effect	No effect. Subsurface survey did not detect sites or artifacts.	No adverse effect. Close to historic resources related to oil drilling in vicinity.
Visitor Experience	No new impacts. Ongoing adverse impacts from public use of non-public building in poor condition that does not meet standards for public use. Limited opportunities to obtain visitor information.	Long-term beneficial effects from more visible onsite ranger presences, easily obtainable visitor information, accessible facilities, and improved opportunities to collaborate with OMSI's Camp Hancock.	Same as Alternative 2, however slightly less visible facility due to location more distant from highway. Slightly improved opportunity for collaboration with OMSI from proximity to OMSI facilities.
Human Health and Safety	No new impacts. Ongoing risks from unmet building codes, design, and deterioration.	Health and safety deficiencies would be corrected with modern, code-compliant building. Slight adverse potential for flooding impacts would be mitigated by site location, building design, and operational requirements.	Similar to Alternative 2, however, adjacent access road would remain prone to washouts. (There is a proposal to upgrade this road which accesses existing OMSI facilities.)
Park Operations	No new impacts. Ongoing adverse impacts from use of a building in poor condition that does not meet standards for employee office space.	Long-term beneficial effects from modern, sustainably built ranger station with updated, code-compliant and accessible office space, including secure storage for operations and park vehicle.	Same as Alternative 2.

Chapter 5: Consultation and Coordination

A. Internal Scoping

Initial scoping began with the development of a project statement to secure funding in fall 2012. With funding secured for the proposal to design a ranger station for the Clarno Unit, the NPS continued with internal scoping, including monument and regional office staff in 2014, to define the purpose and need for the project and the proposed objectives. This process continued with identifying potential actions to address the need, and determining what monument resources could potentially be affected by the proposal. The project manager met onsite in 2014 with monument staff to discuss potential alternatives for the proposal to construct a new ranger station at the Clarno Unit. This was followed by a site visit with the project manager, architectural and engineering firms, monument and regional office staff in May 2015 and subsequent development of this environmental assessment.

B. Public Involvement

Public scoping for the project began September 15, 2015 with the issuance of a press release to interested individuals and organizations and to news media. Comments were accepted through October 8, 2015. The monument received 10 correspondence letters via email (6), letter (2), the web (1), and phone (1), resulting in 21 different comments. Response letters included correspondence from federal agencies (U.S. Fish and Wildlife Service), one county government (Wheeler County, Planning Department), and one tribal organization (Confederated Tribes of the Warm Springs Reservation of Oregon). Two letters were from nonprofit organizations, the Oregon Paleo Lands Institute and the Oregon Museum of Science and Industry (OMSI). The remaining five correspondences were from unaffiliated individuals. Commenters identified the importance of a regional point of contact for visitors to the Clarno area. Eight commenters supported the proposal for a new ranger office/visitor contact station. (Two other comment letters [from USFWS and the tribes] did not address this issue.) **Reasons for support included “a real visitor center is long overdue,” and opportunities for the new ranger station to improve cooperative efforts between the monument and OMSI.** Another comment highlighted the importance of a regional point of contact for visitors to the Clarno area. The tribes emphasized the need to protect cultural resources throughout the planning and construction process and the importance of the adjoining Pine Creek Conservation Area for tribal uses. The USFWS noted the potential presence of a listed species (Middle Columbia River steelhead, *Oncorhynchus mykiss*) near the project area in Pine Creek.

Internal scoping and public scoping comments helped to identify significant issues, potential impacts, data needs and permitting requirements, determine appropriate analysis procedures, and identify alternative locations for the proposed action to construct a new ranger station. Some comments were beyond the scope of this project or did not address the purpose and need for the project; others were already addressed in the monument’s GMP, **were beyond the geographical influence of this project, or** did not pertain to this specific proposal. Comments and concerns that fell into these categories were not considered relevant to this project-specific assessment, and were dismissed from additional consideration. These included suggestions for two buildings distant from the area that might be available.

C. Agency Consultation

U.S. Fish and Wildlife Service

In accordance with the Endangered Species Act, the National Park Service contacted the U.S. Fish and Wildlife Service to determine which federally listed special status species should be included in the analysis.

The two species that might show up on your species list are steelhead and Canada lynx. For Canada lynx, the nearest potential habitat is over 50 miles from your proposed project sites. However, steelhead are likely found in Pine Creek. Conservation measures should be developed that limits or removes the potential for sediment entering Pine Creek during ground disturbing

activities....particularly for site option 1. . . I also reviewed the project with respect to the Bald and Golden Eagle Protection Act (BGEPA). The nearest eagle territory (Pine Creek/John Day River - golden eagle) is approximately 2 miles from the nearest building site. Due to distance, no seasonal restrictions will necessary to protect this territory.

Based on analysis of the project area and its potential effects, the monument determined that there would be no effect on listed species, including the Middle Columbia River steelhead. Mitigation measures, as suggested, would be in place for all ground disturbance and if the project is implemented in Alternatives 2 or 3, there are no transport mechanisms to dislodge this sediment into Pine Creek because it would not reach onsite tributaries. Although the existing water treatment building is near Pine Creek, which is habitat for the threatened trout, no additional ground disturbance would occur at this site and there are no day-to-day operations at the site that would affect this species. Other areas proposed for action are further from Pine Creek and its tributaries and would result in no effect on this population.

Oregon State Department of Archaeology and Historic Preservation

In accordance with Section 106 of the National Historic Preservation Act, the National Park Service provided the State Historic Preservation Officer (SHPO) of the Oregon State Department of Archaeology and Historic Preservation an opportunity to comment on the effects of this project proposal. There are no resources in the proposed project areas currently listed on the National Register of Historic Places, however the eligibility of the historic oil exploration area in the vicinity of the proposed project area in Alternative 3 have not been determined. If Alternative 3 was selected as the preferred plan for implementation, additional consultation with SHPO would occur.

Native American Indian Consultation

Native American Indian tribes, including the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) were included in public scoping notices. The CTWS submitted comments and emphasized the importance of the area for abundant archeology, traditional foods and cultural sites in the vicinity and the need to protect these cultural resources throughout the development of a new ranger station.

Potential County and State Permits Needed

Depending on the alternative selected in the decision document, the Finding of No Significant Impact (FONSI) for this proposal, the following permits may be needed:

- Building permits from the County to ensure compliance with State of Oregon structural, plumbing, mechanical and electrical codes. Reference: <http://mccog.com/building-codes/faqs/effective-codes/>
- Oregon Department of Transportation utility permit for installation of power line crossing the highway to serve ranger station operations. Reference: <http://www.oregon.gov/odot/hwy/oom/pages/permits.aspx>
- State of Oregon Department of Environmental Quality permit for a new septic system. A permit would be required if a septic system is projected to have a sewage flow less than 2,500 gallons per day. The following link outlines procedures and requirements for installing a new septic system: <http://www.deq.state.or.us/wq/pubs/factsheets/onsite/newsysinstprocs.pdf>.

D. List of Preparers, Persons and Agencies Consulted

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Appendix 1: Selected Laws and Park Planning Documents Applicable to Proposed Action

Laws

Omnibus Public Land Management Act - Paleontological Resources Preservation: Public Law 111-011, 2009.

This act outlines management authority and requirements for the protection of paleontological resources, proper permitting, curation of resources, confidentiality of resources and their location, and outlines criminal penalties for the illegal collection of such resources or any other prohibited actions. This act also **directs agencies to “establish a program to increase public awareness about the significance of paleontological resources.”**

Plans

John Day Fossil Beds National Monument General Management Plan (GMP) (NPS 2009)
Protecting natural and cultural resources and increasing visitor recreation opportunities with new trails and limited new facilities is the focus of the GMP (NPS 2009: iv).

Clarno Unit Management Zones: Most of the Clarno Unit is zoned for Backcountry Management, including the proposed Stegamonster and Mimulus Trails (Figure 22). The rest of the Unit is zoned as follows: (1) the Mammal Quarry and Picnic Area are zoned Frontcountry because of future anticipated and current concentrated visitor use of these areas; (2) the future Geo-loop, current Trail of the Fossils and Clarno Arch Trail are zoned for Pedestrian high use; (3) the paved and dirt roads to the picnic area and Camp Hancock are zoned as Transportation Corridors; and (4) the existing pump house is zoned for Park Operations (NPS 2009:56).

The **Park Operations Zone** description, “...facilities necessary for the management of the monument,” is the only area that would explicitly allow for construction of a new ranger station (NPS 2009:52). The Frontcountry Management Zone, where the current visitor use facilities are located, does not specifically preclude the construction of a ranger station, but neither does it include this type of facility in its description.

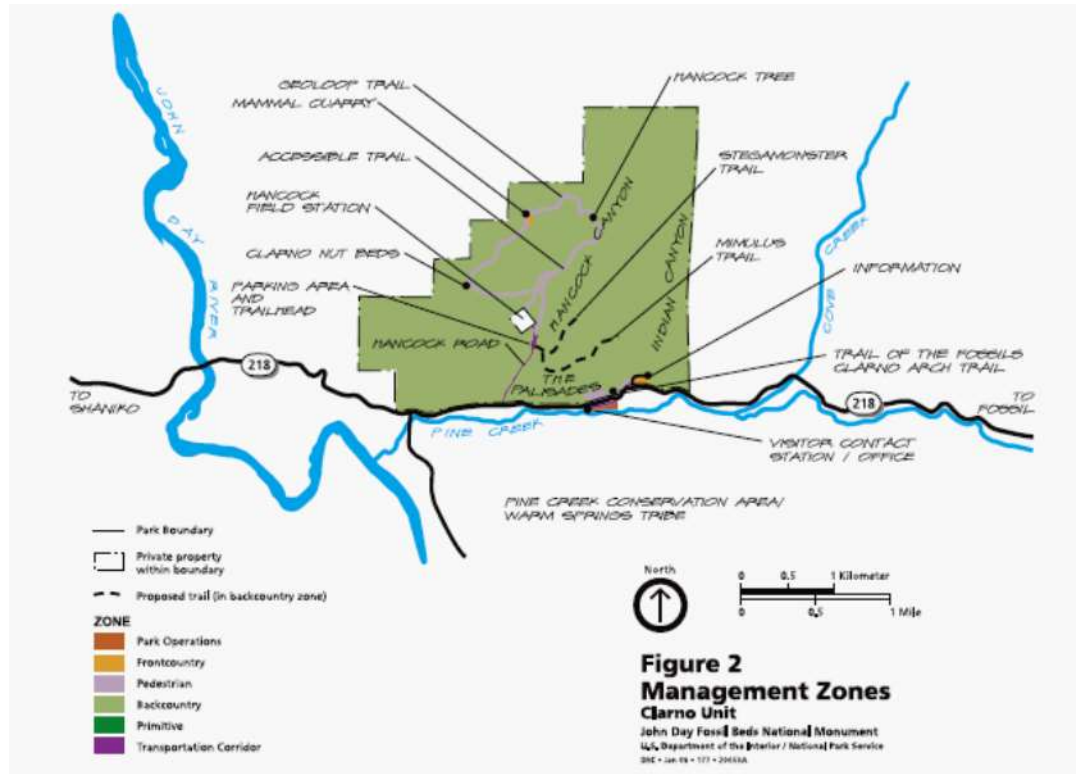


Figure 22: Management Zones with Existing and Proposed Facilities from Final GMP (NPS 2009:56)

The following considerations for new facilities are among those addressed in the GMP:

Paleontological Resource Preservation and Protection: All areas with potential paleontological resources in the monument would be surveyed prior to construction of new facilities. Paleontological resources would be evaluated for their significance, and a determination would be made as to whether data recording, stabilization, or specimen collection is necessary. Hancock staff also may assist the NPS staff in monitoring the area for potential impacts. Combining a resource protection and stewardship message with resource monitoring would help limit potential adverse impacts to paleontological resources (NPS 2009:17-18).

Archeological Resource Protection: Archeological resources are to be protected in an undisturbed condition unless it is determined through formal consultation processes that disturbance or natural deterioration is unavoidable. In such cases, the site would be professionally recovered, excavated, documented, curated, and conserved as appropriate (NPS 2009:29).

Lightscape Management: NPS staff would seek to minimize the intrusion of artificial light into the night scene. In natural areas, artificial outdoor lighting would be limited to meet basic safety requirements and would be shielded when possible (NPS 2009:28).

Sustainable Design/Development: Administrative and visitor facilities should be harmonious with monument resources, compatible with natural processes, aesthetically pleasing, functional, as accessible as possible to all segments of the population, energy efficient, and cost-effective. All decisions regarding operations, facilities management, and development in the monument—from the initial concept through design and construction—reflect principles of resource preservation and sustainability (NPS 2009:36).

Visitor Use and Experience: Visitor opportunities would be expanded through improvements in existing facilities, establishment of new trails, and increased interpretive efforts. Although new

visitor opportunities would be offered, the National Park Service would continue to maintain and protect natural and cultural resources in the monument and not permit new developments that would be inappropriate for the monument (NPS 2009: 47).

Park Operations and Facilities: Construction of new monument facilities would be limited and **would focus on improving visitor opportunities...** Where possible, new facilities would be constructed in already disturbed areas (NPS 2009: 47).

The GMP also addresses the partnership with OMSI's Camp Hancock:

The NPS desires to maintain the working partnership with Camp Hancock to achieve the field station's **education mission while preserving and protecting the monument's resources and values**. The field station plays an important role in achieving conservation goals in the monument, and provides valuable assistance to monument staff through educational programs, resource restoration, and scientific research (NPS 2009:15-16).

Long Range Interpretive Plan (NPS 2010)

This plan calls for upgrades to the current interpretive and educational services offered at Clarno, including, but not limited to: improving basic directional signing so visitors know what to expect onsite, providing more staff onsite to present educational and interpretive programs, updating brochures and exhibits, and using modern technology such as podcasts (NPS 2010:43, 53-56, 70-73).

Appendix 2: Draft Floodplains Statement of Findings

Draft Floodplains Statement of Findings for Clarno Ranger Station Environmental Assessment Preferred Alternative/Proposed Action

for
Executive Order 11988: Floodplain Management
and

Executive Order 13690: Establishing a Federal Flood Risk Management Standard
and a Process for Further Soliciting and Considering Stakeholder Input

Recommended: _____
Superintendent
John Day Fossil Beds National Monument
Date

Concurred: _____
Chief, Water Resources Division
National Park Service
Date

Concurred: _____
Regional Safety Officer
Pacific West Region
Date

Approved: _____
Director, Pacific West Region
National Park Service
Date

Introduction

Executive Order 11988: *Floodplain Management* and the newly issued Executive Order 13690: *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* require the National Park Service (NPS) and other federal agencies to evaluate the potential impacts of their actions on floodplains. The evaluation is intended to reduce the risk of flood damage to park resources, preserve floodplain values, and minimize the impact of floods on human safety, health and welfare. This Statement of Findings (SOF) has been prepared according to NPS **Floodplain Director's** Order 77-2 and Procedural Manual 77-2 to comply with Executive Order 11988 and Executive Order 13690.

It is NPS policy to preserve floodplain values and to minimize potentially hazardous conditions associated with flooding. In the John Day Region, floods can result from heavy precipitation (including rain-on-snow rapid melt events), unseasonably warm weather patterns, mudflows or debris flows.

The NPS at John Day Fossil Beds National Monument is proposing to construct a Ranger Station for the monument. This Floodplains Statement of Findings (SOF) supplements information provided in the Clarno Unit Ranger Station Environmental Assessment.

If a proposed action is found to be in the applicable regulatory floodplain and relocating the action to a non-floodplain site is not a viable alternative, then flood conditions and associated hazards must be quantified as a basis for management decision-making and appropriate prescribed actions must be taken. If there is no other practicable alternative than for NPS facilities to occupy a regulatory floodplain, NPS policy permits the activity when a statement of findings is prepared to explain the rationale for the decision to use the floodplain. This SOF also discloses the risk from flooding and discusses how mitigation of the risk will be achieved.

This SOF applies to the proposed action to construct a ranger station, as well as to other currently existing Clarno Unit facilities. In compliance with the Floodplain Management Guideline, where existing facilities are not in compliance, the planning document must identify those areas known or potentially known to be out of compliance and define short and long-term solutions that would be taken to reduce the flood risk to lower levels. In this case, a SOF has not previously been prepared for the Clarno picnic or parking areas.

Project Description and Regulatory Floodplain

The proposed action is to construct a ranger station for the Clarno Unit. During analysis for the development of a new ranger station, it was discovered that all of the viable sites in the Clarno Unit, including existing facilities, were potentially located in regulatory floodplains. The site associated with the preferred alternative appears to be subject to the least risk, however although there has been some preliminary analysis of floodplains in the Clarno Unit (Frank and Oster 1979), this analysis did not identify regulatory floodplains.

According to DO 77-2, the proposed action is a Class I Action therefore, the *Regulatory Floodplain* is that expected to be inundated by the 100-year flood. Because the possibility of flash flood conditions is great enough, human presence also constitutes a Class III action¹ and requires protection of human life up to

¹ According to the Guideline, NPS proposed actions are classified under one of three action classes. Depending on the action class, one of three *regulatory floodplains* applies (100-year, 500-year, and Extreme). For Class I actions, the base floodplain (100-year) applies, for Class II actions, the 500-year return floodplain applies and for Class III actions, the Extreme floodplain is the regulatory floodplain.

In general, Class I actions consist of most NPS developments (including administrative, residential, warehouse and maintenance buildings, parking areas, etc.) in non-high hazard settings. Class II actions are critical actions requiring a higher degree of protection, including schools, museums, hazardous materials and fuel storage areas and emergency services functions. Class III actions are Class I or Class II actions located in high hazard areas – where dangerous flooding can occur without warning.

the level of an *extreme flood*. Lastly, EO 13690 requires federally funded projects to comply with a Federal Flood Risk Management Standard in addition to the 100-year flood standard.

Description of the Flood Risk

The Clarno Unit is bounded by Pine Creek on the south, the edge of the Cove Creek canyon to the east, and an unnamed spring-fed creek to the north and west. Additionally, there are numerous intermittent



Figure A: Existing Conditions, including Proposed Location of Ranger Station

streams separated by north-south trending ridges, all draining into the Pine Creek basin” (Cheung and Gleason 2015: 3). Based on subsequent analysis the ranger station is proposed to be constructed toward the east edge of the “potential site” identified in Figure A. The drainage channel evident near the center of the photo emanates from Indian Canyon.

The location of the proposed ranger station is not located within any determined floodplain; however, given its location and flooding history, it is likely within the 100-year floodplain. Because of the surrounding topography and flashy nature of flooding in area drainages, the area (including the picnic site) are prone to flash flooding (Figure B). Therefore the mouth of the canyon is considered a high hazard area.

It is certain that sometime in the future there will be another cloudburst flood event at the Clarno Unit in Indian Canyon. It is not possible to predict when such an event may occur. The event may be minor and cause limited impacts, such as typically occur at the site (most recently in 2009, where minor flooding caused overflow of soil and gravel onto the picnic area parking lot), or it may be major and could be devastating to human life and property, causing widespread impacts within and/or outside the monument, such as onto State Route 218 adjacent to the Clarno Unit.

Over the last century (from 1901-2012), annual mean temperature of the Pacific Northwest has increased by 0.6 to 0.8°C and seasonality of precipitation has changed, with increased spring precipitation and decreased summer and autumn precipitation (Abatzoglou et al. 2014). In the future, regional climate is predicted to include warmer and wetter winters in the future, with a likely increase in temperature of 1.8°C and 1-2% increase in precipitation by 2040 (Mote and

Salathé 2010). Additional precipitation is primarily expected to be in the form of winter rain (up to 17% increase by 2040) and snow pack is expected to be lower in the future. This may result in more frequent freezing and thawing of rocks and fossils, and overall accelerated erosion (pers. comm. Samuels 2016)

Justification for Use of the Floodplain

Because of the location of the Clarno Unit developed areas close to Oregon Highway 218, there are no available construction sites not subject to some potential for flooding without inducing substantially **greater impacts to the Unit's significant resources**. The other alternatives evaluated in the environmental assessment included the existing site of the water treatment building, which was considered but dismissed as a potential building site due to the proximity of Pine Creek and because of visitor and employee safety hazards; and constructing the ranger station off of the Camp Hancock Road in Hancock Canyon, an area subject to a higher degree of flooding than Indian Canyon, which could also affect historic resources.

Under the preferred alternative in the Clarno Unit Ranger Station Environmental Assessment, a ranger station would be built close to a hillside identified as not being in the unidentified floodplain in the Frank and Oster 1979 report within John Day Fossil Beds National Monument (Figure B). This justification also includes retention of picnic facilities in the area identified as a floodplain in the 1979 report, however because no changes are proposed to the area, that action is not considered in the EA. Upon transfer of the Clarno Unit from Oregon State Parks to John Day Fossil Beds National Monument, after investigation of flood hazards at the site, a decision was made by the NPS to close what was then an existing campground and to convert the campground to a day use picnic area to diminish potential effects on visitors and facilities from flooding. This action is consistent with minimizing the risk to human life from flood hazards.

The proposed action/preferred alternative for the ranger station was chosen after careful consideration of other natural and cultural resources impacts, as articulated in the Clarno Unit Ranger Station Environmental Assessment.

Actions to Minimize Risk to Human Life and Property

Human life will be protected by warnings and planned evacuations and building occupancy would be day use only: Human presence in a flash flood area is a Class II Action, so, to mitigate against loss of human life during extreme flooding conditions, the following will occur: flood hazards will be developed and posted at the picnic area, trailhead and visitor contact station. Contingent upon occupancy of the building, the NPS would develop an evacuation plan with posted signs to warn NPS staff, volunteer emergency staff and others who may use the facilities of the potential danger of flood events that could occur without warning. Upon official notification of heavy precipitation, such as from the National Weather Service, the NPS will take prudent measures to remove necessary communications systems and emergency vehicles from the site. The building occupants will naturally maintain a higher degree of alert than other NPS staff, however, they will also practice planned evacuations more frequently.

Although specific hours for the ranger station have not yet been identified, as noted above, the building would not be used at night. The day use only nature of the building will therefore further limit potential risk.

Although it is possible that such an Extreme flood event will occur, the day-to-day probability is very low. Nevertheless, following DO 77-2, the monument has taken prudent steps, consistent with public input to minimize the risk to staff and visitors prior to such an event actually occurring.

Infrastructure investment is minimal, periodic loss is accepted as mitigation: Due to the relatively low capital investment of the development, the NPS accepts the risk associated with the placement of the ranger station within the likely 100-year floodplain. Although the building has been designed to be slightly elevated (approximately two feet) and to withstand the low level, more frequent flooding anticipated adjacent to the site, the NPS accepts the possibility that a rare event could result in the loss of this

structure and will include within its contingency plan that possibility and its consequences on monument emergency operations. Under climate change risk scenarios, area flooding is expected to increase in the future, decreasing /exacerbating flood risk.

Natural and beneficial floodplain values will be preserved through the type of development: Natural floodplain values would not be compromised by the construction of the building close to the eastern edge of the canyon mouth. The small size and footprint of the ranger station and minimal paving would not affect flood storage, infiltration, or flood elevations. Because the building is set slightly higher than, and on the edge of the mouth, it would not impede flow or affect flood hydraulics.

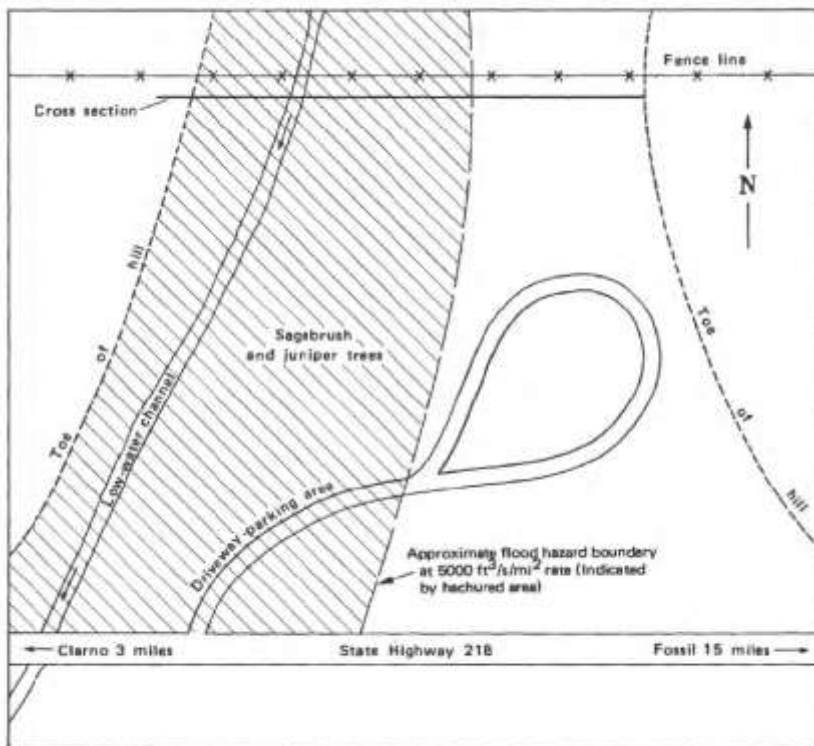


Figure 11.--Sketch map of Indian Canyon campground. (Not to scale.)

Figure B: Drawing of Potential Flood Hazard Area from Frank and Oster (1979)

Conclusion

Although the proposed ranger station would be constructed on the edge of the mouth of flash-flood prone Indian Canyon in John Day Fossil Beds National Monument, an area likely within the 100- year and extreme floodplain, the extent and type of inundation at this site has been documented based on the type of materials found in the subsurface archeological survey to be associated with low flood velocities (Cheung and Gleason 2015).

Other sites evaluated for the structure have similar or higher flood risk. In use of the facility, the monument will take all prudent steps to further minimize the risk to human life and accepts that flooding in the area could result in damage to, or loss of, the structure if an event of much greater magnitude occurs.

The proposed actions would not have appreciable effects which would increase the risk of flooding or hazards to human life or property. There would be no significant effect on natural or beneficial floodplain functions. The project would not increase the risk associated with flooding for the 100-year or extreme event. Therefore, the National Park Service has determined the proposed actions would be consistent with Executive Order 11988 and 13690.

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