4.2.1.3). Primary concern would be of impacts to the Cosumnes River Preserve. Movement of vehicles through this area could result in adverse effects to riverine and freshwater emergent wetlands by contamination. Removing large woody vegetation from the water's edge in riparian habitats would result in some additional solar heating of the water. Clearing vegetation in the riparian zone would result in erosion and the subsequent increase in sedimentation of the watercourse, which would adversely affect aquatic and semi-aquatic wildlife. Vernal pools have also been identified within the Cosumnes River Preserve in the vicinity of the transmission line (May Consulting Services October 2000).

There is a possibility for indirect long-term impacts from creating new access into the Cosumnes River Preserve through the development of access roads. While the land managers minimize entrance to the Preserve, the presence of new access roads and the movement of heavy equipment increase the likelihood that others may find an entrance to explore the area.

4.2.2.7 Impacts from the No Action Alternative

If the facilities were not developed, routine and emergency maintenance would continue to repair or replace equipment or remove vegetation, which threatens worker and public safety and transmission line reliability. As the existing facilities age, emergency maintenance of the system would probably increase.

Under the No Action Alternative, additional indirect impacts to biological resources would not occur. However, direct impacts associated with routine and emergency maintenance would continue. Activities in the ROW, including the methods used for access and maintenance, would remain.

No additional impacts to special-status species would occur beyond those described in the Programmatic Biological Opinion issued for Western's routine maintenance activities by the USFWS on May 27, 1998.

4.3 CULTURAL RESOURCES

4.3.1 Affected Environment

Cultural resources are aspects of the physical environment that relate to human culture and society and cultural institutions that hold communities together and link them to their surroundings. Cultural resources include expressions of human culture and history in the physical environment (such as prehistoric and historic sites, buildings, structures, objects, districts, and other places, including natural features) considered important to a culture, subculture, or community. Cultural resources also include traditional lifeways and practices, community values, and institutions.

Cultural resources have an important role in connecting all contemporary societies to their heritage and traditions, thereby providing structure and perspective for contemporary life. Once damaged or destroyed, these resources are essentially nonrenewable, though the tangible evidence of the past sometimes may be restored or reconstructed to some degree.

Western has prepared and distributed a Programmatic Agreement (PA) for this project to meet compliance with Section 106 of the *National Historic Preservation Act* (NHPA). The PA describes procedures to identify cultural resources within the area of potential effects. All identified cultural resources would be evaluated and treated in consultation with the parties participating in the PA.

4.3.1.1 Resource Study Area

The resource study area for assessing impacts on cultural resources was considered the "area of potential effects," as defined by regulations. The area of potential effects is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties" (36 CFR Part 800.16[d]).

The area of potential effects was considered the ROW where ground-disturbing activities could occur. This also includes the ROW for existing or new access roads.

Potential indirect effects include visual and noise intrusions that could diminish the historic values of certain cultural resources. The area of potential indirect effects is defined as extending up to 0.25 mile from any project component.

Methods used to identify the presence of cultural resources and to determine National Register of Historic Places (NRHP) eligibility vary among the cultural resource types. Pedestrian surveys are used to locate prehistoric and historic resources, and sometimes excavations or in-depth architectural recordings are required to evaluate NRHP eligibility. Archival research of written records helps identify historic resources or possible traditional cultural properties (TCPs). Consultations with interested Native American tribes or other culture groups identify TCPs and religious resources. Consultation sometimes includes meetings with traditional religious practitioners, interviews with knowledgeable individuals, and site visits to particular areas of concern.

Western completed archival research to determine if any cultural resources have been identified within the ROW or within one-quarter mile of the ROW of any of the alternatives. The research was conducted at the Califor-

nia Historical Resource Information Centers at Sonoma State University in Rohnert Park and at appropriate California state universities. In addition, Western consulted with the California Native American Heritage Commission (NAHC) on appropriate Native American contacts for the study area. In consultation with the NAHC, Western consulted with three Federally recognized tribes: the Shingle Springs Band of Miwok Indians, the Ione Band of the Miwok Indians, and the United Auburn Indian Community of the Auburn Rancheria. Contacts also included groups that have petitioned for Federal recognition status. These include the Muwekma Indian Tribe, the Miwok Indian Community of the Wilton Rancheria, and the Indian Canyon Mutsun Band of Costanoan. Consultations would determine their interest in becoming signatories to the PA and providing traditional use information. Additional information on tribal consultation for the SVS EIS is located in Appendix D.

4.3.1.2 Issues of Environmental Concern

The following laws, regulations, and Executive Orders (EOs) mandate specific cultural resource requirements or restraints that could affect the alternatives that are analyzed in the Draft EIS:

- NHPA of 1966, as amended (16 United States Code (U.S.C.) §470) and implementing regulations (36 CFR Part 800)
- *National American Graves Protection and Repatriation Act* (NAGPRA) of 1990 (25 U.S.C. §3001) and implementing regulations (43 CFR Part 10)
- *American Indian Religious Freedom Act* (AIRFA) of 1978 (42 U.S.C. §1996)
- *Archaeological Resources Protection Act* (ARPA) of 1979 (16 U.S.C. §470aa *et seq.* as amended P.L. 100-555; P.L. 100-588 and implementing regulations at 43 CFR Part 7)
- EO 13007, Indian Sacred Sites, May 24, 1996

For this Draft EIS, cultural resource information has been organized into the categories of prehistoric cultural resources, historic cultural resources, and TCPs. A cultural resource can fall into more than one category due to use through a long period or for multiple functions.

Prehistoric Cultural Resources

Prehistoric resources refer to any material remains, structures, and items used or modified by people before the establishment of a European presence in the Sacramento Valley in the early 19th century. Examples of prehistoric resources in the study area include village sites, rock shelters, rock art, water-control features, game drives or traps, aboriginal trails, campsites, and scatters of prehistoric artifacts.

Historic Cultural Resources

Historic resources include material remains and landscape alterations since the arrival of Europeans in the area. Examples in the study area include homestead, ranching, and agricultural features; water control features; mining features; historic trails, roads, and railroad features; buildings and structures in cities; Native American resources; and scatters of historic artifacts.

Traditional Cultural Properties

TCPs are places associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history or are important in maintaining cultural identity. The study area has been occupied or used for at least 4,500 years by Native American, Spanish, Mexican, and American cultures. The relationships between these cultures and their surroundings are as varied as the cultures themselves. These relationships may have resulted in the attachment of traditional, spiritual, or religious aspects to various natural and cultural features. Religious resources, such as sacred areas or places, are needed for the practice of a religion. These resources have attained a position in the religious or spiritual history and activities of the community and are a part of that particular culture's spiritual survival. Very often religious resources are also considered TCPs.

4.3.1.3 Characterization

A Class I records search was conducted at the California Historical Resources Information System at the California State University at Stanislaus, Chico, Sacramento, and Rohnert Park. Much of the study area was surveyed by Far Western Anthropological Group, Inc. (Far Western 2002) for a Western project unrelated to the Draft EIS but overlapping a large portion of this study area. Some portions of the Draft EIS segments were not surveyed due to the presence of rice fields. The following descriptions use existing data from this records search and the Far Western (2002) survey. Western contacted the California NAHC, and there are no known TCPs or sacred sites in the study area. Tribal consultations are ongoing, but no TCPs have been identified. Due to the sensitive nature of cultural resources, maps showing site-specific locations are not provided in this document. Figures 3-1 through 3-8 detail the line segments and MPs.

No prehistoric cultural resources were recorded for Segment A. Historic resources included three levees, one road, and three railroads. No TCPs were identified. The O'Banion to Elverta double-circuit transmission line

was constructed in 1962 and was not recorded as a site due to its recent date of construction. While Segment A_1 was not surveyed near the Pleasant Grove Cemetery, the proximity to Segment A would suggest similar results.

No prehistoric or historic cultural resources or TCPs were recorded for Segment B. The O'Banion to Elverta double-circuit transmission line was constructed in 1962 and was not recorded as a site due to its recent date of construction. The Cottonwood to Roseville single-circuit transmission line was constructed in 1947 as part of the CVP by the Bureau. It was recorded for the Far Western project previously described.

The inventory at Segment C identified prehistoric and historic sites. One prehistoric site is a low mound with an apparent midden (prehistoric village site). No transmission structures are within the site boundary. The second prehistoric site was previously identified as a mound, but was not found during the Far Western (2002) inventory. The five historic sites include a city dump, two roads, three levees, and four railroads. No TCPs were identified. The Elverta to Tracy transmission line was built in 1961 and was not recorded as a site due to its recent date of construction.

No prehistoric cultural resources were recorded for Segment D. Four historic cultural resources were recorded, including one levee and three railroads. No TCPs were identified. The Elverta Substation to Tracy Substation transmission line was constructed in 1961 and was not recorded as a site due to its recent date of construction.

One previously recorded prehistoric mound village site of Segment E was recorded in the area in 1937, but was not relocated during the Far Western (2002) inventory. No other cultural resources or TCPs were located. South to the Sacramento/San Joaquin county line, the records search indicated that the transmission line crosses three railroads. A prehistoric midden site is also located along the ROW, which may have transmission line structures within the site boundary. The records search also indicated numerous historic buildings in the area, but these are not close to the existing transmission line, and are outside the area of potential effects. The Elverta Substation to Tracy Substation transmission line was constructed in 1961 and was not recorded as a site due to its recent date of construction.

Segment E_1 has not been surveyed. The records search indicated, however, that south of the Sacramento/San Joaquin county line the transmission line crosses three railroads. The records search also indicated numerous historic buildings in the area, but these structures are not close to the transmission line, and are outside the area of potential effects.

No prehistoric or historic cultural resources or TCPs were identified at Segment F. The Cottonwood–Roseville transmission line was constructed in 1947 as part of the CVP for the Bureau. It was recorded for this EIS.

Segment G has not had an archaeological survey. The records search indicated a cemetery in the study area. No other cultural resources or TCPs were identified.

No prehistoric or historic cultural resources or TCPs were identified at Segment H. The Cottonwood–Roseville transmission line was constructed in 1947 as part of the CVP for the Bureau. It was recorded for this EIS.

4.3.2 Environmental Consequences

Under the Proposed Action and alternatives, significant adverse impacts to cultural resources could occur. Potential impacts as a result of constructing, reconductoring and maintaining the Proposed Action and alternatives would be similar in nature. Alternatives that include constructing new transmission lines would be more likely to have an impact than those involving reconductoring. Alternatives requiring the construction of new access roads would have the highest potential for impacts to archaeological resources. Augering new holes for transmission line structures would have the next largest impact. Where at all possible, transmission line structures and access roads would be sited to avoid known cultural resources. Pulling locations, splice points, and staging areas can be selected to avoid cultural resources. Reconductoring a transmission line that is NRHP-eligible could be an adverse effect, depending on the values making the transmission line eligible to the NRHP. Removing an existing transmission line would have potential impacts to archaeological resources from pulling or digging out transmission line structures. Therefore, structures identified for removal will be cut off at ground level rather than below ground surface. Erosion control methods can include recontouring, reseeding, and other minor surface disturbance.

Avoiding cultural resources is Western's standard practice. Other EPMs, discussed below, address many of these impacts. Other project-related impacts would be addressed through the PA.

4.3.2.1 Standards of Significance

The laws, ordinances, and regulations discussed above deal with impacts to cultural resources. In nearly every case, cultural resources must meet some set of criteria for significance before agencies direct efforts to preserve the values these resources represent. Under the NHPA and the regulations at 36 CFR Part 800, only historical or prehistoric sites, objects, or features, or architectural

resources determined "significant" by a Federal agency, need to be considered for potential impacts. Significance of any cultural resources is determined following the criteria for eligibility for nomination to the NRHP, as defined in 36 CFR Part 60.4. The NRHP criteria states:

> *"The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, building(s), structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and*
>
> *(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) That are associated with the lives of persons significant in our past; or*
>
> *(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) That have yielded, or may be likely to yield, information important to history or prehistory."*

If resources are determined to be eligible for listing on the NRHP, and the State Historic Preservation Officer (SHPO) agrees with the agency's determination, these resources are then considered significant, and the agency must avoid or lessen the impacts to them by the Proposed Action or alternatives. Indian tribes, state and local agencies, the public, and the Advisory Council on Historic Preservation are given opportunities to influence how those resources are treated. Sites within California eligible for the NRHP are eligible for the California Register of Historical Resources. Project-related impacts to an eligible cultural resource site that would adversely affect the values of the resource making it eligible for inclusion in the NRHP would be considered significant.

4.3.2.2 Environmental Protection Measures

Programmatic Agreement

Cultural resources would be considered during post-EIS phases of project implementation in accordance with the PA being developed in conjunction with the Draft EIS. Detailed inventories would occur once the Final EIS has been distributed and a ROD issued. Cultural resource identification would only be conducted for the selected alternative. Specific measures would be developed and implemented to avoid and minimize identified adverse impacts. These measures, or stipulations of the PA, could include project modifications to avoid adverse impacts, monitoring of construction activities, procedures for handling the discovery of cultural resources during construction, and data recovery studies. Under the PA, any unknown cultural resources or human remains discovered during the course of construction would be protected, evaluated, and treated in accordance with the PA. Western would instruct construction crews that cultural resources might be present in the study area. They would be trained to stop work near any discovery, and notify Western's regional environmental manager, who would confirm that the resource is evaluated and recorded by a professional archaeologist, as per the PA. This PA would be signed by Western, other project proponents, involved land-managing and utility oversight agencies, the California SHPO, and appropriate and interested tribes.

EPMs for cultural resources from Table 3-4 include the following:

- Before construction, all supervisory construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address Federal, state, and tribal laws regarding antiquities, fossils, plants, and wildlife, including collection and removal, and the importance of these resources and the purpose and necessity of protecting them. Western would instruct that cultural resources might be present in the study area. Contractors would be trained to stop work near any discovery and notify Western's regional environmental manager, who would confirm that the resource is evaluated and avoided. Known cultural resources would be fenced and a minimum distance maintained for work disturbances.
- Cultural resources would be considered during post-EIS phases of project implementation in accordance with the programmatic agreement being developed in conjunction with the EIS. Surveys to inventory and evaluate cultural resources would be conducted.
- Where ground-disturbing activities are identified, cultural resource evaluations would be done to determine the need for field inventory. Construction activities would avoid all historic properties, or a special use permit or mitigation plan would be developed in consultation with SHPO.
- Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be avoided to the extent practicable in the siting of new structures and access roads.

4.3.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

For the Proposed Action, the O'Banion Substation to Elverta Substation (Segment A_1 near Pleasant Grove Cemetery) has not been inventoried for cultural resources. The parallel nearby ROW for the existing transmission line was surveyed for cultural resources during the completion of a vegetation management project (Far Western 2002). Cultural resources in the study area are expected to be similar. Historic resources on the parallel ROW include: the Feather River Bypass Levee, the Feather River Levee, the Cross Canal Levee, the Sacramento Northern Railroad, the Western Pacific Railroad, Sacramento Northern Railroad, and Sorrento Road. Part of the realignment segment of the Cottonwood–Roseville line was surveyed during the Far Western (2002) inventory, and no prehistoric cultural resources were located. Historic resources include the Southern Pacific Railroad, the Union Pacific Railroad Mainline and the Cottonwood–Roseville transmission line. A cultural resources field inventory would be necessary for the O'Banion Substation to Elverta Substation ROW (Segment A_1) and Segment H. The Elverta Substation to Tracy Substation transmission line was surveyed to 34 miles north of Tracy Substation (Far Western 2002). This inventory recorded one prehistoric site, a midden village mound. One prehistoric mound village and one prehistoric mound site were not relocated during the field inventory of 2002. Historic sites included five levees identified during previous surveys, the Western Pacific Railroad, the Sacramento North Railroad, the Union Pacific Railroad, the Sacramento Valley Railroad, the California Central Traction Company Railroad, the Southern Pacific Railroad, Northgate Boulevard, and Del Paso Boulevard. In the unsurveyed southern segment, one prehistoric midden site is in the ROW. The disturbance of an eligible cultural resource would be significant; however, such disturbance is not expected once the standard practices and associated PA commitments are implemented.

Once a cultural resource inventory of this Proposed Action, including associated access roads, has been completed for the unsurveyed segment, Western would conduct a detailed evaluation of any effects to cultural resources, in accordance with the PA, which was developed for the Proposed Action and alternatives in compliance with Section 106 of the NHPA. The two recorded prehistoric sites would need to be evaluated for NRHP eligibility, and if eligible, an assessment of possible adverse project-related impacts and effects would be conducted. Through the PA, Western would negotiate a method to ensure avoidance or mitigate adverse effects.

The Proposed Action would not impact historic resources. All historic resources are in use and would be avoided by any ground-disturbing activities. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected, and mitigation is not appropriate.

4.3.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Except for the southernmost 34 miles in Alternative 1, the entire transmission line corridor has been inventoried for cultural resources. One recorded prehistoric site can be avoided through design. Another prehistoric midden site in the southern, unsurveyed segment would need to be evaluated for impacts and effects. At least six historic sites are in the area. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or reduce cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would be the same as the Proposed Action from O'Banion Substation to Elverta Substation, but would not entail any work south of Elverta Substation.

The segment from O'Banion Substation to Elverta Substation (Segment A_1 near Pleasant Grove Cemetery) has not been inventoried for cultural resources. The parallel nearby ROW for the existing transmission line was surveyed, and cultural resources are expected to be similar. Historic resources on the parallel ROW include the Feather River Bypass Levee, the Feather River Levee, the Cross Canal Levee, the Sacramento Northern Railroad, the Western Pacific Railroad, Sacramento Northern Railroad, and Sorrento Road. The existing Cottonwood–Roseville transmission line was surveyed, and there are no cultural resources. The realignment of the Cottonwood–Roseville transmission line (Segment H) has not been surveyed. The Class I survey indicates the Pleasant Grove Cemetery nearby, which would be avoided through design. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or reduce cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

The ROW for Alternative 3 has not been surveyed for cultural resources. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of associated commitments, are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.7 Impacts from the No Action Alternative

There would be no new impacts under this alternative. Impacts would be restricted to transmission line and access road maintenance. This includes periodic air and ground patrols. Repair to the transmission lines or structures could involve localized ground disturbance from heavy equipment. Vegetation removal by hand or mechanical equipment may be necessary to improve access roads or access to individual transmission line structures. The EPMs summarized in Section 4.3.2.2 are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected.

4.4 ELECTRIC AND MAGNETIC FIELDS

4.4.1 Affected Environment

Both voltage and current are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge measured in amperes, is the source of a magnetic field. The voltage represents the potential for an electrical charge to do work and is measured in volts (V) or kilovolts (kV). The voltage is the source of an electric field.

The possibility of adverse health effects from electric and magnetic fields (EMFs) exposure has increased public concern in recent years about living near high-voltage transmission lines. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. The available evidence has not established that such fields pose a significant health hazard to exposed humans. However, the same evidence does not prove there is no hazard. Therefore, in light of present uncertainty, the issues are discussed below, and Western's policy is to reduce such fields to some degree, where feasible, until the issue is better understood.

4.4.1.1 Resource Study Area

Approximately 108 miles of linear features make up the Proposed Action and alternatives study area. The study area is the transmission line ROW and any structures (buildings, other transmission lines, etc.) within 200 feet of this ROW. All transmission lines for all alternatives would be operated at 230 kV.

4.4.1.2 Issues of Environmental Concern

All transmission lines generate electric and magnetic fields. The present lines, the Proposed Action, and the alternatives would generate similar electric and magnetic fields. The effects of concern relating to EMFs follow:

The electrical effects of a transmission line can be characterized as "corona effects" and "field effects." Corona is the electrical breakdown of air into charged particles. It is caused by the electrical field at the surface of conductors. Field effects are induced currents and voltages, as well as related effects that might occur as a result of EMFs at ground level.

Corona Effects

Corona can occur on the conductors, insulators, and hardware of an energized high-voltage transmission line. Corona on conductors occurs at locations where the field has been enhanced by protrusions, such as nicks, insects, dust, or drops of water. During fair weather, the number of these sources is small, and the corona effect is insignificant. However, during wet weather, the number of these sources increases, and corona effects are much greater. Effects of corona are audible noise, radio and television interference, visible light, and photochemical reactions.

- ***Audible Noise***—Corona-generated audible noise from transmission lines is generally characterized as a crackling/hissing noise. The noise is most noticeable during wet-weather conditions. Audible noise from transmission lines is often lost in the background noise at locations beyond the edge of the ROW.
- ***Radio and Television Interference***—Corona-generated radio interference is most likely to affect the amplitude modulation (AM) broadcast band (535 to 1,705 kilohertz); frequency modulation (FM) radio is rarely affected. Only AM receivers located very near to transmission lines have the potential to be affected by radio interference. Television interference from corona effects occurs during bad weather, and is generally of concern for transmission lines with a voltage of 345 kV or more and only for receivers within about 600 feet of the line.
- ***Visible Light***—Corona is visible as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors would be observable only under the darkest conditions with the aid of binoculars.