Draft

Programmatic Environmental Assessment

U.S. Regional Climate Reference Network

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EXECUTIVE SUMMARY

A United States (U.S.) Regional Climate Reference Network (USRCRN) is proposed for implementation, operation and management by the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) in collaboration with the National Climatic Data Center. With other climate monitoring efforts deployed at differing scales and density, the proposed USRCRN would provide a greater density of reliable, high-quality climate data for analysis and use in operational climate-monitoring activities and for placing current climate anomalies into both a regional and historical perspective. Beginning with a pilot deployment and operation project in the Southwest region, USRCRN stations would be deployed over multiple years in nine NOAA climate regions throughout the Continental U.S. (CONUS) at an approximately 80.8-mile spatial resolution. Upon full deployment, about 538 locations in the CONUS will have either a USRCRN or U.S. Climate Reference Network (USCRN) station.

Climate data acquisition would include sensors for air temperature and precipitation. Each USRCRN site is approximately 24 feet by 24 feet, and is typically located away from tall objects and existing or anticipated future development, yet accessible via existing unpaved roads or driveways for ease of installation and periodic maintenance. Commercial power or telecommunications infrastructure is not required. Low-voltage power requirements would be met using solar panels and rechargeable batteries. Data telemetry is conducted hourly via the GOES (Geostationary Operational Environmental Satellites) Data Collection System and would be immediately distributed by the NWS to its operational sites. Temperature sensors, data telemetry and other hardware components would be mounted on a free-standing, 10-foot tall steel-lattice tower. The USRCRN Program would conduct annual equipment calibration and maintenance, and as-needed preventive site maintenance to control fast-growing vegetation or snow accumulation or to conduct necessary repairs.

While nominal sites located at the center of a theoretical network have been identified at approximately 80.8-mile spacing, other operational, technical and environmental factors are considered during site selection. Key among the operational considerations is the placement of USRCRN sites on public lands not expected to undergo development for the foreseeable future (50 to 100 years). Preferred sites meeting these criteria are often on federal lands, and would occur in cooperation with land managers typically associated with the National Park Service, Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service, the Bureau of Reclamation, NOAA and other federal agencies and bureaus. Other dedicated or encumbered undeveloped properties meeting these criteria are present on state-owned lands such as at parks, airports or State University Reserves. The site survey and selection processes are summarized in the USRCRN Siting Criteria and other more detailed Program documents.

This Programmatic Environmental Assessment (PEA) is prepared by NOAA to identify the effect of the proposed USRCRN Program as a whole on the human environment. The PEA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 U.S. Code 4321-4347), the President's Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–-1508), and NOAA Administrative Order (NAO) 216-6 *Environmental Review Procedures for Implementing the National Environmental Policy Act*. NOAA has determined that the Preferred Alternative is the only feasible action that would meet the USRCRN Program's purpose and need. Consistent with CEQ guidance and NAO 216-6, the NOAA has discretion to limit the number of alternatives for consideration in an Environmental Assessment (EA). NOAA has analyzed two alternatives in this PEA, the Preferred Alternative and the No-Action Alternative.

This PEA analyzes each alternative within the context of its regulatory and environmental setting for a range of resource topics, and has identified associated environmental impacts, tiered NEPA documentation and, where necessary and feasible, mitigation measures to reduce potential impacts to less-than-significant levels. These impacts and mitigation measures are summarized in the table below.

Table ES-1: Summary of Impacts and Mitigation Measures for the Preferred Alternative

Resource	Impacts	Mitigation Measures
Preferred Alternative		
Land Use	Less than significant impacts.	No mitigation measures required.
Geological Resources	Less than significant impacts.	The USRCRN program would consult with federal and state site host to evaluate the potential for paleontological resources to be present and whether a preconstruction surface assessment is appropriate. Areas with potential paleontological resources must be evaluated and avoided, or excavation activities monitored during construction.
Water Resources and Hydrological Processes	Less than significant impacts.	Avoid areas with highly erodible soils, as defined by the NRCS. Apply erosion prevention measures and periodic maintenance at sites where steep slopes and highly erodible soils cannot be avoided. Use equipment and vehicles that are in proper working condition during construction, and handle fuels and contaminants in accordance with commonly accepted practices to reduce the potential for spills and releases.
Air Quality	Less than significant impacts.	No mitigation measures required.
Recreational and Wilderness Resources	Less than significant impacts.	No mitigation measures required.
Environmental Justice and Socioeconomic Resources	Less than significant impacts. The USRCRN program would contribute to the understanding of climate change trends at a regional level and throughout the	No mitigation measures required.

Resource	Impacts	Mitigation Measures
	CONUS.	
Cultural Resources	Less than significant impacts.	Conduct Section 106 NHPA consultations with each affected SHPO for individual sites or though multi-site federal host agency Programmatic Agreements. Consultation includes coordination with the Advisory Council on Historic Preservation, federal host agency federal Preservation Officers and affected Tribal Historic Preservation Officers.
Flora and Fauna	Less than significant impacts.	Conduct Section 7 ESA consultations regarding potential effects to protected species and impact avoidance with each affected USFWS regional office. Avoid or evaluate the presence of critical habitat using on-line database and mapping products and though informal or formal consultations with USFWS, and if necessary, State wildlife resource management agencies. Avoid habitat for nesting birds, or install USRCRN stations outside of the regional breeding season. Monitor for nesting birds if construction must occur within nesting habitat during the nesting season.
Wetlands	Less than significant impacts.	In rare cases in which avoidance of wetlands is not possible, prepare a wetlands delineation, minimize the affected volume of wetlands affected, and obtain a USACE Nationwide permit under Section 404 of the CWA, including adherence to any standard or specific permit conditions.
Floodplains	Less than significant impacts.	Should no practicable alternative exist to locating a USRCRN station within a 100-year floodplain, conformance with the FEMA eight-step process or the DOC EMM process would be required.
Coastal Zone Management	Less than significant impacts.	Consult with each affected Coastal Management Program and prepare a Consistency Determination (or Negative Determination) as required.
Farmlands	Less than significant impacts.	Consult with the NRCS and review databases to identify whether If prime, or locally important or unique, farmland. If these resources cannot be avoided, a USDA Farmland Conversion Impact Rating form will be completed and a determination made as to whether the proposed conversion is consistent with the FPPA or if modifications to USRCRN siting criteria are necessary.
Noise	Less than significant impacts.	No mitigation measures are required.
Transportation	Less than significant impacts.	No mitigation measures are required.
Utilities and Solid Waste	Less than significant impacts.	No mitigation measures are required.
Aesthetic and Visual Resources	Less than significant impacts.	When visual resources are present, coordination with the land owner/responsible agency to ensure selected sites meet that agency's requirements regarding visual resource management and avoid highly visually sensitive areas.
Hazardous Materials	Less than significant impacts.	No mitigation measures are required.
Cumulative Impacts	Less than significant impacts.	No mitigation measures are required.
No-Action Alternative		
All Resources Evaluated	Less than significant impacts.	No mitigation measures required.

Based on an analysis of anticipated short- and long-term effects to the human environmental due to the Proposed Action's Preferred Alternative to install a USRCRN system within the CONUS, no direct, indirect or cumulatively significant impacts were identified for the resources topics considered. This assessment assumes the judicious application by NOAA and the USRCRN Program of the USRCRN site-selection criteria, the site-specific application of the USRCRN Standard Operating Procedure (SOP) 15, *NEPA Documentation*, and the implementation of mitigation measures identified in this PEA, where appropriate. In addition, the No-Action Alternative would not result in a significant environmental effect.

A FONSI is warranted for the Preferred Alternative or the No-Action Alternative.

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LIST OF ACRONYMS

ACHP	Advisory Council on Historic Preservation
AGL	above ground level
APE	Area of Potential Effect
AST	Aboveground Storage Tank
ATDD	Atmospheric Turbulence and Diffusion Division
BLM	Bureau of Land Management
CAA	Clean Air Act
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMP	Coastal Management Plan
CO	carbon monoxide
CONUS	Continental United States
COOP	Cooperative Observer Network
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DA	Double Alter
dBA	decibels (adjusted to the A-scale)
DOC	U.S. Department of Commerce
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMM	Environmental Management Manual
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GCOS	Global Climate Observing System
GOES	Geostationary Operational Environmental Satellite(s)
GPS	Global Positioning System
km	kilometer(s)
MBTA	Migratory Bird Treaty Act
m	meter(s)
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NAO	NOAA Administrative Order

NCDC	National Climatic Data Center
NEPA	National Environmental Protection Act
NFMA	National Forest Management Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
NWS	National Weather Service
OAR	Office of Oceanic and Atmospheric Research
PA	Programmatic Agreement
PEA	Programmatic Environmental Assessment
PM_{10}	particulates with diameter less than 10 microns
$PM_{2.5}$	particulates with diameter less than 2.5 microns
PSD	Prevention of Significant Deterioration
RCC	Regional Climate Center
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLA	site land agreement
SOP	Standard Operating Procedure
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCRN	United States Climate Reference Network
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USHCN-M	United States Historical Climatology Network–Modernization
USRCRN	United States Regional Climate Reference Network
VRM	Visual Resource Management
WFO	Weather Forecast Office
WMO	World Meteorological Organization
WOUS	Waters of the United States
WRCC	Western Regional Climate Center

1 INTRODUCTION

A United States (U.S.) Regional Climate Reference Network (USRCRN), formerly the U.S. Historical Climatology Network–Modernization (USHCN-M) program, is proposed for implementation, operation and management by the National Weather Service (NWS) in collaboration with the National Climatic Data Center (NCDC). The responsible NWS program office is headquartered in Silver Spring, Maryland, and the NCDC is based in Asheville, North Carolina. Each agency is administratively within the National Oceanic and Atmospheric Administration (NOAA), a branch of the U.S. Department of Commerce (DOC). Other NOAA programs supporting the proposed USRCRN program include the Atmospheric Turbulence and Diffusion Division (ATDD) within the NOAA Office of Oceanic and Atmospheric Research (OAR) based in Oak Ridge, Tennessee, and the NWS Office of Science and Technology also in Silver Spring, Maryland.

The USRCRN, in conjunction with other climate monitoring efforts at differing scales and density, represent a long-term commitment on the part of the DOC and the NOAA. In 2001, a U.S. Climate Reference Network (USCRN) was initiated to provide broadly distributed, high-quality information at the national level both on and off the continental U.S. (CONUS). However, changes and variability in climate are not geographically uniform, and often changes in one region are offset by changes in another region. The proposed deployment of a more densely populated set of USRCRN sites would provide confidence that regional temperature and precipitation trends are being detected.

The proposed USRCRN would introduce additional, strategically sited and well-calibrated stations within nine climate regions within the CONUS to yield similar quality information for regional use. The program's goal is to attain greater continuity of climate applications with as long a period of homogeneous record as possible. Since these data will be available in near-real time, climate applications and significance of climate events can be established and then provided to users in a timely fashion. This network will provide a continuity of observation using detailed metadata documentation for the station locations and measurements, similar to those standards used by the USCRN and other systems applied internationally.

The proposed USRCRN stations would provide high-quality climate data for analysis and use in operational climate-monitoring activities and for placing current climate anomalies into historical perspective. Research based on these data will directly support near- and long-term policy and decision-making by senior government and business leaders. The measure of performance will be related to the improved confidence in detecting regional trends and variability for temperature and precipitation.

These data would be transmitted hourly via the GOES (Geostationary Operational Environmental Satellites) Data Collection System and would be immediately distributed by the NWS to its operational sites. These observations would also be available on-line and accessible via the Worldwide Web. USRCRN deployment and operation will be guided by the ten Climate Monitoring Principles recognized by the National Research Council (NRC) and members of the World Meteorological Organization, and would meet the requirements of the Global Climate Observing System (GCOS) (NOAA, April 2010). A complete list of the GCOS Climate Monitoring Principles is provided in Appendix A-1.

Beginning with a pilot deployment and operation project in the Southwest region, USRCRN stations would eventually be deployed in nine NOAA climate regions throughout the CONUS, at an approximately 80.8mile (130 kilometers [km]) spatial resolution. As with the USCRN, USRCRN stations have triple redundancy and are placed in pristine environments. About 538 locations in the CONUS will have either a USRCRN or USCRN station upon full system deployment of this proposed project.

This Programmatic Environmental Assessment (PEA) is prepared by NOAA to identify the effect of the proposed USRCRN Program as a whole on the human environment. The PEA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 U.S. Code 4321-4347), the President's Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts1500–1508), and NOAA Administrative Order (NAO) 216-6 *Environmental Review Procedures for Implementing the National Environmental Policy Act*. Federal funding would be provided to implement the proposed USRCRN, which is a major federal action. The USRCRN program includes Standard Operating Procedure (SOP) 15, *NEPA Documentation*, involving further site-specific screening of environmental resources as part of the Preferred Alternative. A final PEA would be prepared following a 30-day public comment period. NOAA would then make a decision based on public comment, its final PEA, and the anticipated preparation of tiered NEPA documentation as to whether a Finding of No Significant Impact (FONSI) is warranted or an Environmental Impact Statement (EIS) should be prepared.

1.1 PROGRAM BACKGROUND

The U.S. has thousands of weather observing stations, but many are not in the locations needed for producing the quality of data required to describe climate change. The USCRN program initially installed two experimental USCRN stations in Asheville, North Carolina, in August, 2001. NCDC developed critical standards and procedures for station equipment and siting to assess climate parameters at a national scale. Unlike previous climate related data-acquisition stations or networks typically established at existing weather monitoring stations located in

altered environments, observations made in pristine locations with highly accurate, well maintained instruments were found to require fewer stations to accurately detect climate trends.

Since fiscal year 2008, the USRCRN program has partnered with the NWS and NOAA's ATDD to establish a regional climate monitoring network built on the same design principles as USCRN. What was initially known as the USHCN-M and Regional U.S. Historical Climatology Network is now designated as the USRCRN. Within NOAA, the NWS has programmatic and lead agency responsibility for USRCRN, and has delegated development, deployment, and day-to-day operations to the NCDC and ATDD.

While the primary mission of the USCRN is to determine national climate trends, the complementary USRCRN mission is to deploy a regional scale observing network to better characterize regional trends for temperature and precipitation. The prototype for USRCRN was designed by the USCRN program as part of a 2006 pilot study in Alabama and involved the deployment of 17 stations using the same technology as USCRN but equipped with only modified temperature and precipitation instruments. Analysis based on a newly developed dataset of monthly temperature and precipitation values at approximately 470,000 gridded data points determined that a network of 538 uniformly distributed stations is sufficient for identifying trends in all U.S. regions. It was also determined that non-regular grid solutions did not increase efficiency over a uniform grid.

1.2 PROPOSED ACTION

The Proposed Action is for NOAA to develop, acquire, deploy and operate a premier environmental climate-monitoring network for the United States and its climate regions. The USRCRN will contribute to stable surface temperature and precipitation observations to accurately represent environmental conditions critical to climate research. Site location is particularly important as environmental conditions must not be affected by encroachment of urban expansion or other conditions that create a changing environment.

As the premier reference network, environmental monitoring locations must remain stable for a period of 50 to 100 years and, where possible, be co-located with or near existing meteorological observation sites such as the National Weather Service's Cooperative Observer (COOP) network. The program would develop data transfer functions relating observations from these networks to the USRCRN and thereby leverage primary and specialized climate observations over broader coverage areas. As mentioned above, the Proposed Action would follow accepted GCOS Climate Monitoring Principles (see Appendix A-1).

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2 PURPOSE AND NEED

Climate is widely recognized as one of the most fundamental drivers of ecological conditions. The physical characteristics of temperature and precipitation in a region or ecosystem provide a foundation that defines fundamental parameters of that ecosystem. Changes in the physical environment, caused either by climate change or normal physical processes, can have significant impacts on the entire ecosystem. In order to properly monitor an ecosystem, the changes in the physical environment must be properly monitored and documented.

In general, the U.S. has a sparse dispersion of climate monitoring sites. Confidence has eroded in our ability to deliver credible information about trends of temperature and precipitation. Historically there has been little adherence to basic climate monitoring principles in the design and operation of networks relied upon for assessments of climate variability and change. The inadequacies in existing observing networks have forced scientists to apply complex methods to reduce the error in the flawed observations.

Although observations using existing systems have been a vital part of climate change study, the failure to design and operate observing networks that more strictly adhere to basic climate monitoring principles has led to public criticism. Confidence in the results of climate change studies has declined, both from a scientific and a public perception standpoint. Issues regarding the quality of U.S. climate data and public response to these issues threaten broader efforts to understand the rate of climate change and to establish effective policies necessary for responding to the impacts of climate change.

Current regional climate monitoring relies on networks that do not meet basic requirements for climate quality data. Many reports have identified the critical need for NOAA to improve its climate observing systems. NRC reports (1998 and 1999), “Future of the NWS Cooperative Observer Network” and “Adequacy of Climate Observing Systems,” along with national media reports underscore the need for a network of progressively equipped stations to record and report an accurate regional climate signal.

In addition to the public, the atmospheric research community, government agencies, and private enterprise have identified significant shortcomings in examining and understanding long-term climate trends and change within the U.S. and its sub-regions. Beyond the lack of data acquisition locations, some of these shortcomings are due to poor documentation of operations and changes associated with existing and earlier observing networks, the observing sites, and the instrumentation over the life of the network. These include inadequate overlap among observations and using inconsistently maintained and calibrated instruments of inferior quality. These factors increase the level of data uncertainty when government and business decision-makers are considering long-range strategic policies and plans. Never before have people been so

aware of the impact of the environment and of climate variability and change on the quality of life and the economic health of a nation, its citizens, and the population of the world.

The nation requires increased confidence in climate observations to reduce the uncertainty surrounding long-term climate trends. It also needs a calibrated reference to other U.S. surface observation networks in order to improve confidence in the measurements and support enhanced climate decision-making. This improved ability can only be accomplished with the establishment of a climate-quality surface network throughout the U.S. The proposed USRCRN program would provide a continuity of observation by applying detailed metadata documentation for the station locations and the process for taking measurements, that is similar to those standards used by the more broadly distributed USCRN.

Given that changes and variability in climate are not uniform (often changes in one region are offset by changes in another region), the purpose of the USRCRN is to establish high-quality information at the regional level across CONUS. The USRCRN would result in additional, strategically sited and well-calibrated stations to yield quality temperature and precipitation information. Very high quality observations of the climate on a regional basis will be critical for near real-time monitoring for drought (including determining areas for emergency drought declarations); seasonal climate prediction; and water resources allocation (including critical river flow predictions). Furthermore, these high-quality climate data will be critical for additional climate applications such as dynamic norms, and extending and examining climate variability and change issues on a regional basis. All of these climate factors have direct impacts on the economy and society at large; increased data reliability would provide a benefit to the American public.

The USRCRN Program underscores the Secretary of Commerce and NOAA Administrator's commitment to helping the public understand and effectively respond to both climate change and extreme weather events by providing accurate and reliable observations of temperature and precipitation at the regional scale. Hence, NOAA's USRCRN Program is proposing to install and operate a regional network of 538 automated climate-observing stations across the nine NOAA Climate Regions.

3 ALTERNATIVES CONSIDERED AND ANALYZED

To warrant evaluation under NEPA, an alternative must be reasonable and meet the lead agency's purpose and need. Under NAO 216-6 section 5.03b it states: "An Environmental Assessment [EA] must consider all reasonable alternatives, including the preferred action and the no action alternative." NOAA applied the following screening criteria to determine whether an alternative means of achieving the Preferred Alternative is reasonable:

- The action must not violate any federal statute or regulation.
- The action must be consistent with reasonably foreseeable funding levels.
- The action must be consistent with long-term conservation commitments and goals to meet the NEPA requirements.

NOAA has determined that the Preferred Alternative is the only feasible action that would meet these criteria. Consistent with CEQ guidance and NAO 216-6, the NOAA has discretion to limit the number of alternatives for consideration in an EA. NOAA has analyzed two alternatives, the Preferred Alternative and the No-Action Alternative. These alternatives are described below.

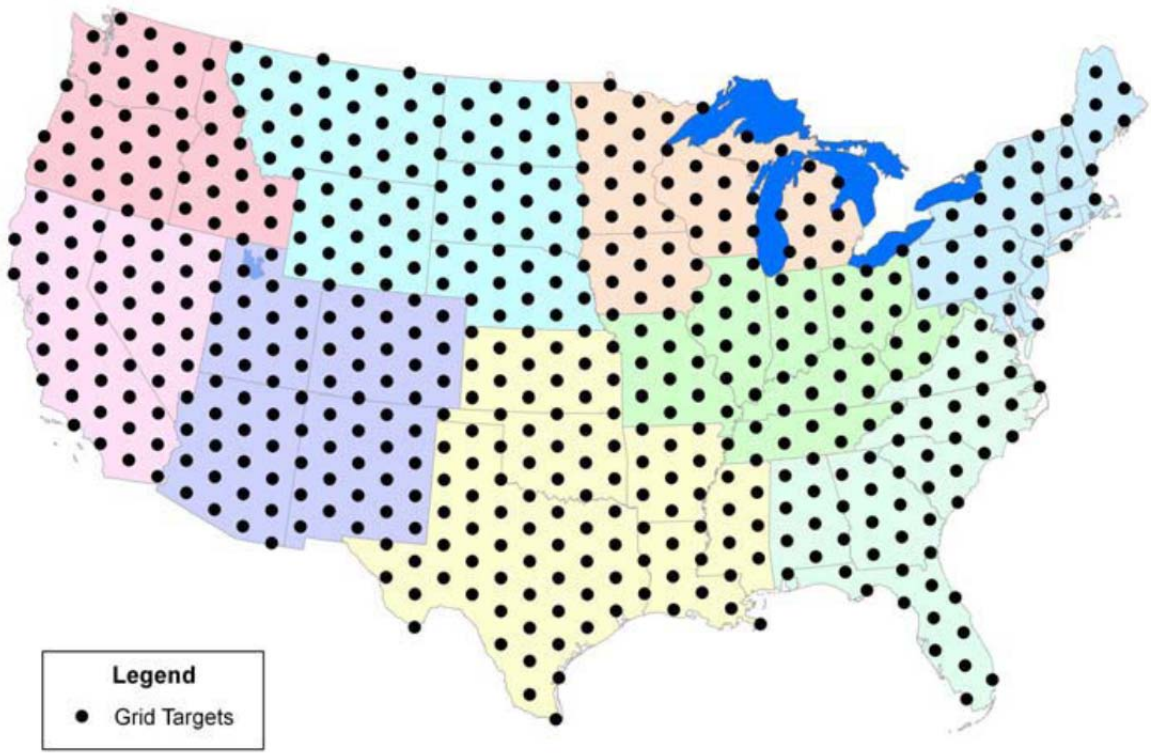
3.1 PREFERRED ALTERNATIVE – USRCRN IMPLEMENTATION

The Preferred Alternative is to implement the proposed USRCRN system through site selection, station installation, and operation and maintenance of 538 USRCRN stations. To achieve its objective for long-term, high-quality climate data acquisition, stations would be on publicly owned lands spaced roughly equidistant away from each other throughout nine NCDC-defined climate regions within the CONUS (see **Figure 1**). Based on an analysis of monthly temperature and precipitation values at approximately 470,000 gridded data points, NOAA determined that a network of 538 uniformly distributed USRCRN stations is sufficient for identifying trends in all nine U.S. regions.

Implementation of the Preferred Alternative includes: establishing network siting criteria; conducting field investigations, surveys and site-selections; negotiating and executing site license agreements; coordinating instrument installation and calibration; managing operations and maintenance personnel; monitoring network performance; and achieving data archive, dissemination, and climate trend analysis. No other new facilities are proposed, such as database or maintenance centers, to implement the USRCRN Program.

USRCRN regional and spatial representation is needed at a multi-state scale, typically resulting in widely spaced adjacent USRCRN sites, nominally 80.8 miles (130 km) apart. There may be cases in which redundancy with similar measurement systems is desired, such that existing or proposed sites may be within 1,500 feet (457 meters [m]) of one another.

Figure 1: Site Density of 538 USRCRN Stations Within Nine NOAA Climate Regions



Source: NOAA, no date.

3.1.1 USRCRN Siting Criteria

While **Figure 1**, above, represents a nominal site located at the center of a theoretical network, other operational, technical and environmental factors are considered. Key among the operational considerations is the use of largely undisturbed properties on public lands. Preferred sites are on lands not expected to undergo development for the foreseeable future (50 to 100 years). These are often found on federal lands, particularly those managed by the National Park Service (NPS), Bureau of Land Management (BLM), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), the Bureau of Reclamation, NOAA and other federal agencies and bureaus. Other dedicated or encumbered properties may be present on state-owned lands such as at parks, airports or State University Reserves. These public agencies may be invited to act as cooperating agencies during the site-selection process and to support tiered NEPA documentation on a site-specific basis.

The USRCRN Siting Criteria in Appendix A-2 sets out required constraints and preferred conditions for individual USRCRN station sites. Preferred sites would not be located on private

property and would be at least 100 feet (30.5 m) from human influences such as structures, farmland, concrete surfaces or asphalt roadways that may produce artificial heat or wind effects, glare/heating, dust, or air emissions. In addition, tall objects or obstructions such as buildings, cliffs and trees that would block data telemetry, block sunlight, reflect light or act as an artificial heating source would be no closer than 330 feet (100 m) from the USRCRN sensors.

Sites having nearly level ground surfaces are preferred. Potential sites must also be at least 330 feet (100 m) away from large water bodies such as large ponds, lakes and oceans. The site-selection criteria include avoiding areas prone to flooding, orographically-induced (topographically influenced) winds, prolong periods of extreme snow depth (tens of feet high), above average tornado frequency, or topography that promotes trapped air resulting in fog or pooling of cold air. While the siting criteria states that efforts would be made to "avoid known habitat for endangered species and sensitive historic resources," the precise nature of the efforts in the context of regulatory compliance at a site-specific level, including the need for cooperating agency status, are included in the USRCRN SOP 15 (see Appendix B).

3.1.2 USRCRN Site Selection Process

Under the Preferred Alternative, the site survey and selection processes summarized in the USRCRN Siting Criteria, and other more detailed Program documents, would be followed. Program staff associated with NCDC Regional Climate Centers (RCCs) would coordinate with NOAA Weather Forecast Offices (WFOs), State Climatologists, and other partner organizations, and conduct desk-top studies to identify priority search areas on public lands within each of the 80.8 miles (130 km) diameter site-search rings. This includes utilizing geographic information systems to review and analyze land use and environmental conditions within priority search areas. When a desk survey results in a favorable review of a priority area, the landowner (local, state or federal agency) is contacted and a physical site survey scheduled.

Checklists, photographs, interviews and firsthand evaluation and scoring are prepared during the site survey process to identify physical, operational and environmental conditions applicable to the site-selection criteria. A site survey package is submitted to the NOAA Program office where staff would consult with interdisciplinary peer reviewers and other technical experts to rank the about half-dozen surveyed site locations. These experts come from NOAA's NCDC, regional NWS WFOs, OAR, Air Resources Laboratory, ATDD and RCCs. NOAA also solicits information from the state and federal host agencies, and other regulatory bodies, during the site screening process. A final site selection is documented based on the above investigations and review from the NOAA Site Selection Panel, which include members of the USRCRN Program office management team from NCDC, ATDD, NWS and other selected technical experts.

Because the stations are often sited at remote locations, they represent data for areas that are currently under-observed by local NWS Weather Service Offices or WFOs. For this reason, the

USRCRN program would engage local NWS participation in the site-selection process and provide the NWS highly useful information for local forecasting. The USRCRN program would also endeavor to co-locate stations with existing environmental research programs, including the Long-term Ecological Research Network and the National Ecological Observatory Network.

The process of down-selecting to a preferred site is based on technical, operational and environmental considerations and would be well documented. For preferred sites, Site Land Agreements (SLAs) between NOAA and the host organization would be drafted. The entire process for any one location can take from a few months to as much as two years to complete. The SLAs are written to preserve the long-term integrity of data-acquisition process by limiting anthropogenic land use nearby, including regular or seasonal irrigation or tilling of land within 330 feet (100 m).

3.1.3 USRCRN Implementation Schedule

A portion of the proposed USRCRN program had been initiated in the NCDC's Southwest climate region. Seventy-four USRCRN sites were installed in that region during 2010 and 2011. To date, these sites were processed under NEPA using either a NOAA categorical exclusion at individual sites or, in a few cases, with host federal agencies taking the lead in preparing site-specific EAs. The USRCRN Program Office proposes to initiate the remaining system within the CONUS, and would start with the West (California, Nevada) and Northwest (Oregon, Washington, Idaho) regions. NEPA documentation tiered from this PEA would be prepared by NOAA, as the USRCRN Program's Lead Agency, in each case.

The estimated schedule for the evaluation and installation of remaining USRCRN stations within the CONUS is provided in **Table 1**. Typically, the construction of one monitoring station would take approximately a week. Construction of USRCRN monitoring stations would be performed within each climate region over approximately a one year period, with overlapping installation efforts among adjacent regions. Ultimately all USRCRN stations would be installed within five years of initiating work.

3.1.4 Station Installation

Climate data acquisition would require sensors for air temperature and precipitation. Each USRCRN site is approximately 24 feet by 24 feet (7.3 m by 7.3 m), and is typically located near unpaved roads or driveways to provide access for installation and periodic maintenance. Commercial power or telecommunications infrastructure is not required. Low-voltage power requirements would be met using solar panels and rechargeable batteries. Data telemetry is conducted hourly through satellite uplink. Diagrams illustrating site layout and station components are shown in **Figures 2 and 3**. In some cases a perimeter fence is warranted to limit

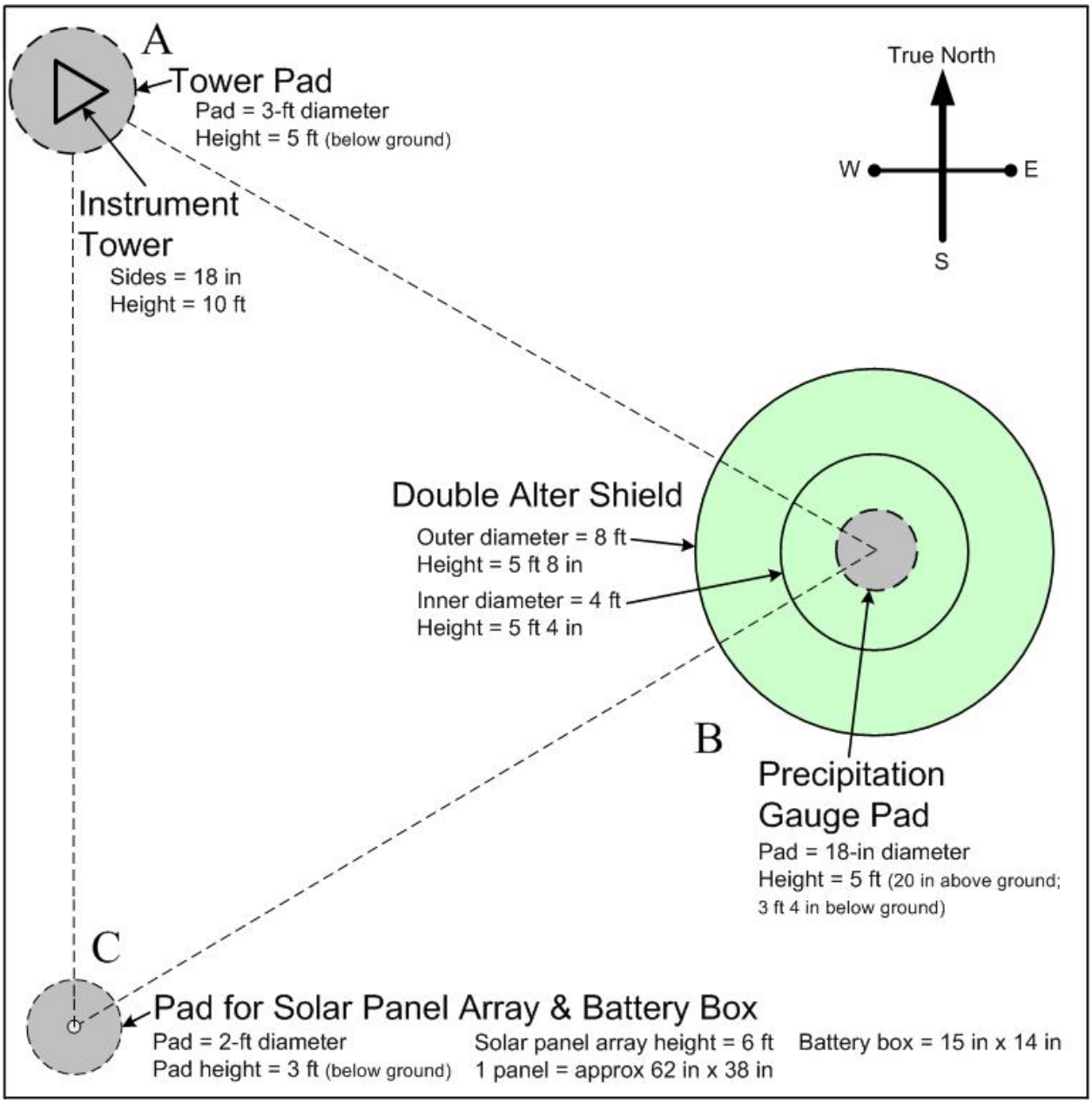
Table 1: Estimated USRCRN Implementation Schedule

ACTIVITIES BY CLIMATIC REGION	Initiate	Year 1	Year 2	Year 3	Year 4	Year 5
Site Surveys & Selection						
West and Northwest Regions	Begin	End	End			
South and Southeast Regions		Begin	End			
East North-Central and West North-Central Regions			Begin	End		
Northeast and Central Regions				Begin	End	
Installations						
West and Northwest Regions		Begin	End			
South and Southeast Regions			Begin	End		
East North-Central and West North-Central Regions				Begin	End	
Northeast and Central Regions					Begin	End
Operation and Maintenance						
All Climate Regions				Ongoing		

intrusion by livestock or discourage trespassing. In these cases, the site size would be 30 feet by 30 feet (9.1 m by 9.1 m).

Station construction includes the installation of three equally spaced concrete pads or foundation pedestals totaling approximately five cubic yards in volume (see **Figure 2**). Connecting the instrument and equipment mounted on these pedestals is a 12-inch (0.3 m) wide, 18-inch (0.45 m) deep trench about 53 feet (16.2 m) long for conduit to extend electrical power and digital instrument data. One concrete pad would support an aluminum 10-foot (3 m) tall, 14-inch (0.36 m) wide steel lattice, three-sided, free-standing Climatronics Corporation instrument tower. The tower would support a lightning grounding rod and static dissipater, a shield-aspirated temperature sensor, GOES and GPS antennas; and a Campbell Scientific Incorporated enclosure for a CR3000 datalogger, GOES transmitter, and other hardware. The second foundation consists of a two-foot by two-foot (0.6 m by 0.6 m) square by 2.5-foot (0.76 m) deep concrete pad to support a two- to five-foot (0.6 m to 1.5 m) diameter precipitation gauge rising approximately 5 feet, 4 inches (1.6 m) above ground level (AGL), and up to 12 feet (3.7 m) AGL in areas with snow accumulation. Surrounding the precipitation gauge is a Double Alter wind shield consisting of hanging aluminum slats arranged in two concentric circles, an inner one four feet in diameter and an outer one eight feet in diameter. Twelve vertical support poles up to five feet-eight-inch tall support the hanging shields. A third concrete pad, 2 feet (0.6 m) in diameter and 3 feet (0.9 m) below the ground surface, would support a pole-mounted 62-inch by 38-inch (1.6 m by 0.9 m) solar panel and battery box, having a total height of 6 feet (1.8 m) AGL. The battery box includes two, 100 amp-hour (AH) batteries and a Morningstar solar controller.

Figure 2: Concrete Pad Layout Orientation (plan view prior to instrument installation)



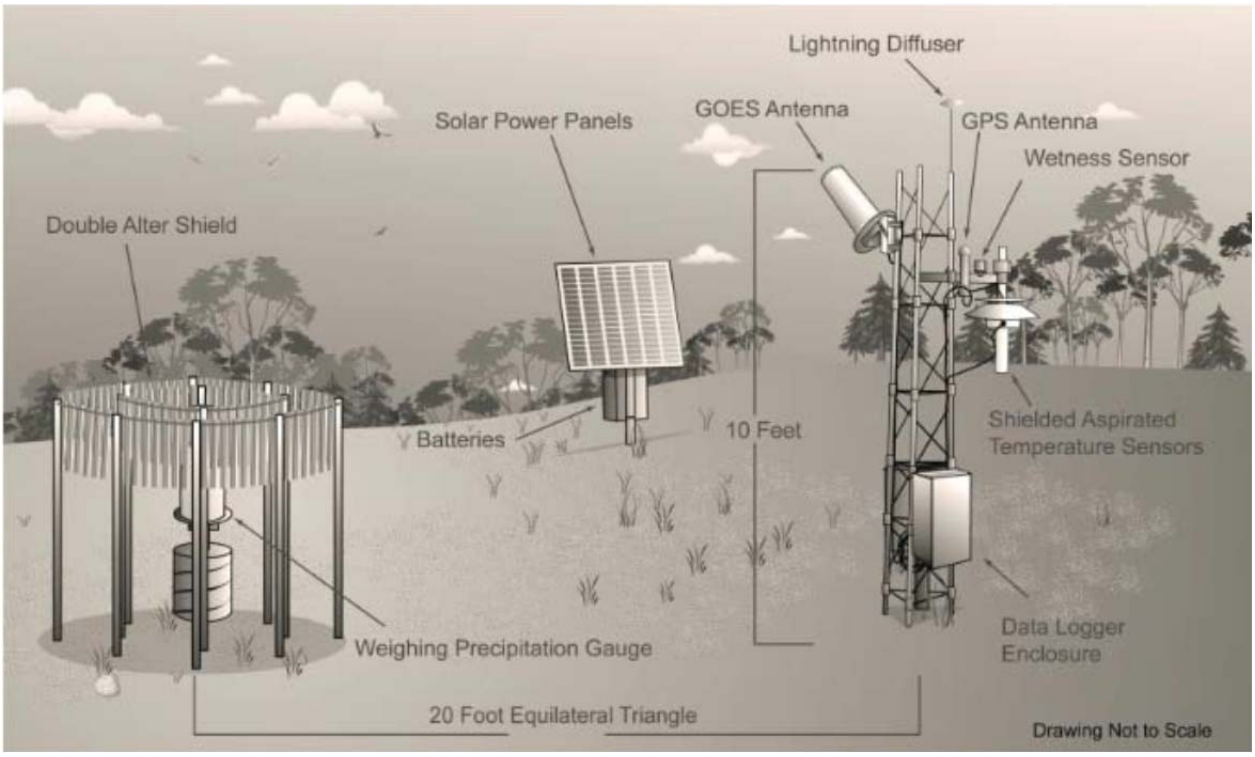
Source: NOAA, 2010b.

Construction access is required over a one-week period for light-duty construction equipment, such as a utility truck with trailer, backhoe, and cement truck; and for maintenance vehicles and equipment.

In some cases, a short, four-foot (1.2-m) tall exclusion fence is used to discourage entry near the tower by unauthorized personnel or some animals. Post holes would be required for aluminum wind shield supports around the rain gauge and, where proposed, to support fence posts for an

exclusion fence. Removal of vegetation, accumulated snow along the fence may require more frequent visits. Annual site maintenance may include cutting vegetation, cleaning or servicing sensors and equipment, emptying rain gauges (and use of anti-freeze at some cold-weather sites). Approximately a pint of light-weight oil and a pint of anti-freeze are used in the rain gauge to reduce rain water evaporation and prevent freezing, respectively. The oil and anti-freeze is replaced annually. The three-sided steel-lattice tower is 10 feet (3 m) in height and supports temperature sensors, a GOES satellite data transmission antenna, a global positioning system (GPS) antenna, a lightning rod and a data logger box.

Figure 3: Schematic Diagram of a Typical USRCRN Station



The capability for cost-efficient capture of three independent, high-quality measurements of surface air temperature and precipitation is required using solar power and sufficient battery backup for 10 days. The temperature measurement is configured with three platinum resistance thermometers within one radiation shield serviced by two fans, a primary and a back-up, to maintain aspiration even if a fan fails. Precipitation would be measured using a Geonor gauge surrounded by a Double Alter wind shield.

A typical USRCRN station is shown in **Figure 4**.

Figure 4: Typical USRCRN Station

Source: NOAA, no date.

3.1.5 Station Operation and Maintenance

Stations are visited annually for site maintenance. The frequency of preventive or periodic maintenance is based on equipment manufacturer recommendations and experience with similar automated surface measurement systems. Although some equipment vendors recommend specific periodic maintenance (e.g., annually), most recommendations cite an as-needed basis (NOAA, 2010b).

The USRCRN Program would adopt an annual maintenance requirement for routine and preventive on-site maintenance, field calibrations, major component swap-out, and other duties. Removal of vegetation growth or snow accumulation may require more frequent maintenance visits at some locations. Annual site maintenance typically includes cutting fast-growing vegetation, cleaning or servicing sensors and equipment, emptying rain gauges (including small amounts of light-weight oil and anti-freeze at some sites). An approximate pint of light-weight oil and a pint of anti-freeze is used and annually replaced in the rain gauge to reduce evaporation and prevent freezing, respectively. In addition, site metadata would be updated during each visit by quantifying and photographing site changes. Training of site host technicians is needed, if they are to perform more frequent preventive maintenance.

3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, NOAA would not implement its Preferred Alternative and a high-density distribution of regional climate monitoring stations would not be installed. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

3.3 NEPA APPROACH

This PEA represents the first tier of environmental review under NEPA. Subsequent tiering is accomplished through the completion of SOP 15 *NEPA Documentation* provided in Appendix B at a site-specific or second-tier level. If, in conjunction with the findings of the PEA, a tiered analysis under SOP 15 confirms that site-selection goals and PEA mitigation measures have been achieved, and any required federal permits will be obtained (or are not necessary), no significant direct or indirect effects would result and a FONSI is applicable for the subject site. NOAA may invite an agency to be a cooperating agency for the purposes of completing its tiered NEPA documentation. In general, Program staff would identify site locations intended to avoid or eliminate adverse effects.

If substantial adverse effects are unavoidable and/or federal permits cannot be obtained without additional studies or investigation, a site-specific EA for the preferred and alternative locations would be prepared. The site-specific EA would focus on the resource areas that require additional analysis. In the case of compliance with the federal Endangered Species Act (ESA), informal Section 7 consultation may be required for a determination of ”No-effect” or “May affect, but not likely to adversely affect” protected species or critical habitat. Similarly, under the National Historic Preservation Act (NHPA), coordination with the State Historic Preservation Officer (SHPO) would be required under Section 106 and a Phase I archaeological survey report may need to be prepared for SHPO review and NOAA compliance under the NHPA.

If those adverse effects can be mitigated, and the land management agency at the candidate (host) site agrees to do so, the SLA is modified. If the adverse effects cannot be mitigated, then the Program staff would identify an alternative site and the NEPA process would be repeated. If moderate adverse effects are identified, and NOAA staff cannot come to agreement on mitigation measures then an alternative site would be selected and the NEPA evaluation process would continue with alternative site locations. If significant adverse effects are unavoidable through either relocation or mitigation, an EIS may be prepared.

Regulatory permits may be required that will be determined by NOAA in coordination with the host agency (e.g., NPS, BLM). Required permits are identified prior to site selection. Permits are applied for by NOAA as the applicant. In some cases these may be coordinated with the regulatory agency by the station host organization to gain expedited review and approval.

3.4 SIGNIFICANCE THRESHOLDS

Environmental impacts may occur directly, indirectly or cumulatively with other actions. These effects can be either beneficial or adverse. NEPA requires consideration of these categories of impacts be analyzed for each feasible alternative for a proposed action. NOAA has identified its Preferred Alternative for implementing its proposed action. In addition, a No-Action Alternative is considered.

Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in time or removed in distance, but are still reasonably foreseeable. Cumulative impacts result when the effects of an action are added to or interact with other past, current or reasonably foreseeable effects in a particular place and within a particular time. In evaluating the cumulative impacts of an action, an agency considers the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource, no matter what entity (federal, non-federal, or private) is taking an action. Cumulative impacts involve the combined, incremental effects of human activity.

Significance of Impacts

At CEQ regulations 40 CFR 1508.27, significance under NEPA requires consideration of both context and intensity. Section 4 of this PEA evaluates the context and intensity of anticipated effects and whether these effects have the potential to be significant.

Context – The significance of an impact is partially analyzed by evaluating the context of the effect, such as whether the effect is associated with society as a whole (human, national), an affected region, resource or set of stakeholders, or for a defined locality. Both short- and long-term effects are relevant. The USRCRN Program is a widely dispersed network that is national in scale and therefore has the potential to impact a wide range of conditions and resources within the human environment throughout the CONUS. Context may consider the potential presence of unique characteristics of a geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers or vistas, or ecologically critical areas.

Because of the wide variety and variability of resources that may be affected by the program, it is not the goal of this PEA to provide a detailed comprehensive description of resource impacts at individual sites. However, the potential for significant effects from a prospective USRCRN station would need to be avoided either through the site-selection process and/or tiered site-specific analysis and impact mitigation. For purposes of evaluating the impacts of the USRCRN program as a whole in this PEA, the relevant context is national or regional in scope.

This document primarily characterizes resource effects of a USRCRN program as a whole on the human environment. It also identifies those resource topics that may require additional site-

specific analysis of impacts. NOAA anticipates that additional NEPA analysis at the site-specific level may be needed to ensure that potentially significant effects are avoided or mitigated at the site-specific level through execution of the USRCRN's SOP 15 *NEPA Documentation* process. This process would result, in some cases, in informal and formal coordination with responsible regulatory agencies.

Intensity – Intensity refers to the severity of an impact and is typically considered by evaluating:

- Impacts that may be beneficial or adverse (significant effects, including *beneficial* effects, trigger an EIS).
- The degree to which the proposed action affects public health or safety.
- The degree to which the effects are likely to be highly controversial.
- The degree to which the possible effects are highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect resources eligible for listing in the National Register of Historic Places (NRHP) under the NHPA of 1966.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA of 1973.
- Whether the action threatens a violation of federal, state, or local laws or requirements imposed for the protection of the environment.

Since the CEQ regulations do not provide definitions of the thresholds of impact, this PEA uses impact threshold definitions that take into consideration the physical characteristics and site-selection criteria associated with the USRCRN program.

The *intensity* of direct and indirect effects on a resource, as well as cumulative impacts is characterized as one of four levels:

Negligible – The impact is barely perceptible or measurable and remains localized and confined. For example, excavation required for construction would cause surficial ground disturbance, which would impact soils. However, because the typical footprint of disturbance is small, adverse impacts to soils would be barely perceptible and confined to the footprint of the tower and compound.

Minor – The impact is slight but perceptible and measurable and remains localized and confined. For example, construction in or near a wetland may cause a perceptible change in the wetland's size, integrity, or continuity. However, the change would be slight and the wetland's ability to perform vital functions, such as filtering pollutants or providing habitat for wildlife, would not be affected.

Moderate – The impact is readily apparent and sufficient to cause a change in the character defining features of a resource. It generally does not affect the resource's viability. For example, clearing one acre (0.4 hectare) of trees would cause a clearly detectable change in a forest community and may have an appreciable impact on that community. This could include changes in the abundance, distribution, or composition of vegetation communities, but would not include changes that would affect the viability of plant populations in the forest.

Major – The impact results in a substantial and highly noticeable change in character-defining features or involves an individually important feature of a resource. A major impact may, but does not necessarily, affect the resource's viability. For example, an impact that results in the deaths of large numbers of individual wildlife would be highly noticeable and constitute a major impact.

Significance Determination **–** Once the relevant context has been identified and an impact has been determined to be negligible, minor, moderate, or major, a determination of the impact's significance must be made, based on the requirements in 40 CFR 1508.27. The three levels of impact are:

No Impact – No impact is anticipated.

Less-than-Significant Impact – An impact is anticipated, but the impact does not meet the intensity/context significance criteria for the specified resource.

Significant Impact – An impact is anticipated that meets the intensity/context significance criteria for the specified resource.

The levels of these impacts and their specific definitions vary based on the resource that is being evaluated. For example, what constitutes a significant impact may be different for wetlands when compared to visual resources, both in terms of the relevant context and the intensity of effects.

Negligible, minor, and moderate intensities are generally not significant. Negligible and minor intensities are not significant because they are only barely or slightly perceptible within a localized and confined context. Moderate intensity are usually not significant because they are not highly noticeable and do not involve individually important features. However, a moderate intensity may be significant if its importance is magnified by the context in which it occurs.

Major intensity is often significant, but are not necessarily so when considered in context. For instance, a major impact would be significant if it threatens the viability of a population so that the population may not recover. For example, the deaths of many individual members of a wildlife population, while a major impact, may not constitute a significant impact in the context of a much larger total population that is subject to far greater forces.

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4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section evaluates a range of resource topics and conditions each with the following subheadings: Regulatory Setting (applicable federal and/or state regulations); Environmental Setting (anticipated existing conditions or the Affected Environment); Environmental Effects (context and intensity are considered for both the Preferred Alternative and No-Action Alternative); Mitigation Measures (actions required to conform to applicable regulations or ensure a less-than-significant effect is achieved for the Preferred Alternative and the No-Action Alternative).

4.1 LAND USE

4.1.1 Regulatory Setting

Public Buildings Amendments of 1988

The Public Buildings Amendments of 1988 (40 United States Code [USC] 601), Public Law 100-678, requires a federal agency to comply with a nationally recognized model building code and other applicable nationally recognized codes, such as electrical, life safety, and plumbing codes. Federal agencies shall consider state or local zoning and similar laws and consult with appropriate officials and make plans available upon request. State and local government may make recommendations and the federal agency should give due consideration to those recommendations and local conditions. No action, fine or penalty may be brought against the federal government for failure to meet the requirements of this Public Law, or for failure to carry out any State or local government recommendation.

Executive Order 12372—Intergovernmental Review of Federal Programs

Executive Order (EO) 12372 directs federal agencies to "make efforts to accommodate State and local elected officials' concerns with proposed…direct Federal development" and to provide State and local officials the opportunity to comment on actions that could affect their jurisdictions. It also encourages the use of state clearinghouses to facilitate the consultation process, when available. Several States have elected to eliminate this process; however, efforts to coordinate with local planning and development reviewing agencies should be made at the earliest possible time.

NPS Organic Act of 1916 and the NPS General Authorities Act of 1970

Because many USRCRN stations would potentially be located on NPS lands, the NPS Organic Act is considered. A key statutory directive for the NPS is provided by interrelated provisions of

the NPS Organic Act of 1916, and the NPS General Authorities Act of 1970, including amendments to the latter law enacted in 1978. Key management-related provisions are:

> *[The National Park Service] shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (16 U.S.C. 1)*

Federal Land Policy and Management Act of 1976 (as amended) (Public Law 94-579)

The Federal Land Policy and Management Act (FLPMA) of 1976 (as amended) declared as policy that remaining public domain lands would be retained in federal ownership unless disposal of a particular parcel served the national interest. FLPMA is known as the BLM Organic Act because it consolidated and articulated BLM's management responsibilities and proclaimed multiple use, sustained yield, and environmental protection as the guiding principles. As such, BLM lands are utilized in a way that will best meet the present and future needs of the American people for renewable and non-renewable natural resources. FLPMA specifies that:

> *"… the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use…"*

Organic Administration Act of 1897

The USFS principal authorities associated with land use within USFS managed lands include the Organic Administration Act of 1897, as amended (16 USC 473 et seq.), which seeks to:

> *"…to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States…"*

National Forest Management Act (NFMA) of 1976

Proposed actions in USFS-managed lands would need to conform to the NFMA of 1976, and each national forest's comprehensive land management plan. These plans guide future management and provide for multiple use and sustained yield mandates for forest resources

inclusive of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness values.

4.1.2 Environmental Setting

Land use is the way in which, and the purposes for which, people use the land and its resources. Land use planning varies depending on land ownership and jurisdictional boundaries. Land use is generally guided by local comprehensive plans that specify the allowable types and locations of present and future land use.

Natural land uses and land uses that occur as a result of human modification are considered affected resources. Land-use designations are typically made by the state or federal land management agency or by the local jurisdiction through management plans, policies, ordinances, and regulations. Natural land uses may include forest, rangeland, desert, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, institutional, transportation corridors, communications and utilities rights-of-way, agriculture, and other activities. Other land-based resources such as recreation, wild and scenic rivers, visual resources, farmlands and coastal zones are addressed separately in this PEA.

Land use classifications in the areas considered for reference station sites would vary depending on location. The USRCRN stations will be located in a variety of local environments. Based upon the siting criteria, preferred locations include public lands, often state and federal lands, at least 1,640 feet (500 m) from private property or man-made development except for unpaved roadways. Federal- and state-designated areas would exclude areas of private development or commercial activity. However, these settings may include undeveloped portions of airport property, parklands closed to public access, and public universities with properties set aside for research or resource preservation purposes. Federally-designated Wilderness areas are defined as roadless areas and would not be chosen as a setting for USRCRN. As such, urban, private rural and active agricultural land use classifications are not expected to be associated with the potentially affected environmental setting.

4.1.3 Environmental Effects

Preferred Alternative

The USRCRN program would comply with the Public Buildings Amendments of 1988. In addition, federally managed lands typically have management plans that limit or prescribe certain activities or uses, and provide guidance on what classes of land uses are appropriate given certain land management objectives. During the identification of USRCRN station alternatives, coordination with host land management entities would occur that results in proposed USRCRN locations that do not conflict with stated management objectives. It is anticipated that this would be achieved for the USRCRN program as a whole throughout the nine climatic regions.

The Preferred Alternative would result in either no land use impacts or less than significant impacts if it were consistent with the management objectives for the area and did not conflict with or disrupt existing land use as or adjacent to a preferred site. The Preferred Alternative would require that prospective USRCRN stations be at locations that would be highly unlikely to require man-made development for decades. In some cases this may prevent future planning that may change from a relatively pristine condition to a developed condition or one that includes elements incompatible with the site-selection criteria (i.e., tall trees or active agriculture within 100 m (330 yards). This potential impact is difficult to predict, but is not expected to exceed a moderate level of effect. In extremely rare cases in which effects could be greater than moderate, those effects could potentially be mitigated through relocation of the USRCRN.

Overall, areas with land uses or management objectives that are incompatible with a USRCRN monitoring station should be avoided during site-selection and coordination with the land management agency associated with a preferred site. When evaluated for the USRCRN program as a whole, the Preferred Alternative would not have the potential to result in significant impacts.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to land use would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.1.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.2 GEOLOGICAL RESOURCES

4.2.1 Regulatory Setting

Federal Cave Resources Protection Act of 1988

Various federal agencies have policies to protect unique geological features and sensitive soils. For USRCRN stations on NPS lands, the USRCRN program would follow policies to protect geologic features from the adverse effects of human activity, while allowing natural processes to continue. “Significant” caves will be identified using the criteria established in the 43 CFR Part 37 regulations for the Federal Cave Resources Protection Act of 1988. The NPS would control use, when such actions are required for the protection of cave resources or for human safety.

No laws specifically address paleontological resources; some protection is offered, however, through the Antiquities Act of 1906 to specimens of significant scientific value. Two other federal acts, the Archaeological Resources Protection Act of 1979 and the Federal Cave Resources Protection Act of 1988, protect fossils found in primary context and from significant caves, respectively. Fossils on federal lands (e.g., BLM-administered lands) are further protected by laws penalizing the theft or degradation of property of the U.S. government (Theft of Government Property [62 Stat. 764, 18U.S.C. 1361] and FLPMA [Public Law (P.L.) 94–579; 90 Stat. 2743; 43U.S.C. 1701]).

4.2.2 Environmental Setting

The large number of productive fossil-bearing geological landforms found on federal land in the American West has encouraged the BLM to provide guidance on protecting this resource. Guidance on the treatment of paleontological resources is given in the 2000 Report by the Secretary of the Interior on Fossils on Federal Land (U.S. Department of the Interior [DOI] 2000). Further guidance is provided in the BLM Manual titled 8270 Paleontological Resource Management (US DOI 1998a). Procedures for managing this resource are identified in an attachment to BLM Manual 8270, the Paleontological Resources Handbook 8270-1 (US DOI 1998b). The goal of the BLM program is to locate, evaluate, manage, and protect paleontological resources on public lands.

The term “geologic features” describes the products and physical components of geologic processes. Examples of geologic features include rocks, soils, and minerals; geysers and hot springs in geothermal systems; cave and karst systems; canyons and arches in erosional landscapes; sand dunes, moraines, and terraces in depositional landscapes; dramatic or unusual rock outcrops and formations; and paleontological and paleoecological resources such as fossilized plants or animals, or their traces. USRCRN stations would typically be proposed on nearly level terrain away from cliffs, bluffs, pinnacles or other tall geologic formations.

The USRCRN site investigation would identify the following types of geologic hazards that could potentially occur at the project sites:

- Seismic ground shaking.
- Ground rupture.
- Liquefaction.

Public lands may include areas undergoing mineral development, particularly the development of oil and gas resources. Hard rock mineral development, leasable mineral development, and the development of common variety minerals, such as sand and gravel, also occur on public lands and would be avoided during site selection. USRCRN station installation would be incompatible with most mineral development activities and would preclude such activities in adjacent areas

once climate stations are constructed. An exception to this could occur if oil and gas or geothermal resources could be accessed underneath a climate station via offset drilling technologies. Existing valid mining claims, oil and gas leases, or other types of mineral leases that would preclude or affect climate station installation would be identified during site selection.

Paleontological resources are the fossilized remains of plants and animals. Some fossil remains have major scientific value. Greater attention is often given to vertebrate fossils than to invertebrate fossils because of their rarity; however, some invertebrate fossils are also rare. The rarity of such specimens and the unique information that can be gleaned from these items emphasizes the need for their protection.

To date, no comprehensive inventory of fossils and no systematic inventory of fossil-bearing areas have been conducted. Most assessments and inventories of paleontological resources are conducted on a project-specific basis. BLM field offices maintain records of the paleontological finds made on the lands they manage. Often this information is held by the primary State repository for fossil finds in that area. Site-specific information regarding paleontological resources would need to be collected to define the affected environment for an individual project.

4.2.3 Environmental Effects

Preferred Alternative

Common impacts on soil resources encompass a range of impacts that would be expected to occur mainly as a result of ground-disturbing activities, especially during the construction phase of the project. Given the limited area of disturbance and lack of human use or occupation of the proposed facilities, the effects of the proposed project located in a geological hazard zone or area subject to soil erosion would be less than significant.

During USRCRN operation, direct adverse impacts of operations are expected to be small, because project activities (e.g., monitoring controls and inspecting equipment, maintenance) would not involve extensive ground disturbances beyond that which has already occurred during construction. Minor soil erosion may still occur during the operations phase, because soil surfaces exposed by vegetation clearing, grading, and excavation during the site preparation and construction phase may continue to be exposed throughout the life of the project. The risk of erosion would be greatest when exposed soils are subjected to high wind conditions or intense rainfall and surface runoff along roads is channeled into natural drainages.

Soil compaction could also occur but would not be significant because most routine vehicle traffic would be limited to paved or graveled roads. Soil contamination could result from the release of contaminants related to the use of trucks and mechanical equipment or improper storage and handling; however, through implementation of standard construction-industry

practices and applicable mitigation measures, the level of adverse impacts associated with these activities would be less than significant.

NPS and other federal lands with potential paleontological resources may need to be preceded by a preconstruction surface assessment prior to disturbance. For any occurrences noted, or when the site may yield paleontological resources, the site will be avoided, or the resources will, if necessary, be collected and properly cared for prior to the initiation of the construction disturbance. Areas with potential paleontological resources must also be monitored during construction projects.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to geological resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.2.4 Mitigation Measures

Preferred Alternative

Proposed USRCRN station sites may be located in areas with potential geologic hazards; however, because the proposed facilities do not contain occupied structures or involve the storage of hazardous materials, no mitigation measures are required in these instances.

The USRCRN program would consult with the federal or state site host to evaluate the potential for paleontological resources to be present and whether a preconstruction surface assessment is appropriate. Should a prospective USRCRN site investigation identify the presence of paleontological resources, these would be avoided, or the resources would, if necessary, be collected and properly cared for prior to the initiation of the construction disturbance. Areas with potential paleontological resources must also be monitored during construction projects.

No-Action Alternative

No mitigation measures are required.

4.3 WATER RESOURCES AND HYDROLOGICAL PROCESSES

4.3.1 Regulatory Setting

Clean Water Act of 1972

The Clean Water Act (CWA) of 1972 (as amended) is the primary law regulating water pollution and gives the U.S. Environmental Protection Agency (EPA) the authority to set water quality standards for contaminants in surface waters. The CWA regulates water quality of all discharges

into Waters of the United States (WOUS). The term WOUS applies to surface waters – including streams, lakes, estuaries, coastal waters, wetlands, and their tributaries – used for commerce, recreation, industry, fishing, and other purposes such as floodwater storage or groundwater recharge. Water quality standards have three primary components: designated uses, criteria to protect those uses, and an antidegradation policy. The CWA also establishes State water quality certification requirements under Section 401; dredged or fill material permit requirements under Section 404; establishment of total maximum daily loadings in pollutant-impaired waters under Section 303(d); and the National Pollutant Discharge Elimination System (NPDES) under Section 402. The NPDES Permit Program regulates wastewater discharges from point sources including municipal stormwater systems, industrial facilities, and construction sites.

Safe Drinking Water Act of 1974

The EPA, through the Safe Drinking Water Act (SDWA) of 1974 (42 USC § 300f et seq.), regulates primary drinking water supplies and its sources (i.e., rivers, lakes, reservoirs, springs, and groundwater wells). The SDWA was established to ensure safe drinking water for the public and to prescribe requirements for states to implement the public water supply supervision program and underground injection control program under the authority of the SDWA. The 1996 amendments mandated that states perform a source water assessment to identify potential sources of contamination for each public water system.

4.3.2 Environmental Setting

Water resources encompass surface water and groundwater and their occurrence, availability, and physical, chemical, and biological characteristics, including hydrologic properties and water quality for aquatic plant and animal communities and public water supplies. Water resources include aquifers, springs, streams, rivers, lakes, reservoirs, estuaries, wetlands, and near shore and offshore marine waters. Water use classifications generally include public water supply, recreation, propagation of fish and other aquatic life, agricultural use, and industrial use.

Water resources are inherently site-specific resources, and this document can only characterize them in general terms. Site-specific conditions would be considered during the site-selection process and subsequent documentation associated with site-specific NEPA or regulatory permits, where required.

Water resources such as lakes, rivers, streams, canals, and drainage ditches make up the surface hydrology of a given topographical watershed. Groundwater resources consist of subsurface hydrology in which one or more aquifers may be present. Aquifers may be large, spanning more than one surface watershed. Aquifers perched near the ground surface may significantly influence local surface water levels, flow rates, and chemistry.

Hydrology – Surface waters are naturally replenished by precipitation, overland flow, and groundwater discharge. Losses occur through natural processes such as discharge to oceans, evaporation/evapotranspiration, and subsurface seepage. The total quantity and flow rate (if applicable) of water in any surface water system is dependent on precipitation in its watershed, storage capacity, soil permeability, runoff characteristics of land in the watershed, timing of the precipitation, and evaporation/evapotranspiration rates.

Groundwater resources are naturally replenished and lost by seepage from and to the surface or from and to other aquifers. The rate of replenishment or loss is dependent on precipitation and climate in the overlying watershed as mitigated by soil and bedrock permeability and transmissivity. Some aquifers are virtually isolated from surface conditions by underground restrictive layers. Others, such as perched groundwater resources, respond rapidly to precipitation events and interact readily with surface water resources.

Water Quality – The chemical composition of water is a function of atmospheric inputs (gases, aerosols, precipitation), weathering and erosion of bedrock and soil, biological processes, and anthropogenic effects. Typical chemical parameters used to describe water quality and which may be of concern during environmental review include: total suspended solids and turbidity, salinity, pH, dissolved oxygen, temperature, nutrients (i.e., nitrogen and phosphorus), pathogens, heavy metals (i.e., copper, lead, nickel), petroleum aromatic hydrocarbons, pesticides and other organic compounds, and radioactivity.

Data on the location and condition of regional watershed resources is available from both the EPA and USGS water programs and resource maps. The USGS publishes the National Water Summary for water resources nationwide, and their National Water Quality Assessment Program provides water quality information for specific "study units." The EPA STORET environmental data system, which provides additional water quality and other descriptive information, is available via the Internet. Finally, the USGS Groundwater Atlas of the United States is another source of water resource information. Sources of data at the state and local level typically include state and county departments of water resources, environmental conservation, and environmental protection. Other independent sources include municipal water treatment data and independent sampling by private health, scientific and environmental organizations.

4.3.3 Environmental Effects

Preferred Alternative

During USRCRN station construction within the CONUS, water resources may be affected by the proposed USRCRN stations because of soil erosion promoted by land clearing and grading during construction, and subsequent entrainment and transport of sediments to surface waters. Construction would remove existing vegetation and organic soil horizons that normally absorb

rainfall and limit soil erosion. Although the USRCRN sites are too small (less than one acre) to require conformance under the NPDES construction permit program under the CWA, State regulations may apply that require control of erosion and sedimentation. The potential for erosion can be estimated by the volume of cut and fill, the topography (steep slopes are more likely to erode than level terrain) and soil type. Prospective USRCRN stations would be located on nearly level terrain and require the excavation of a relatively small volume of soil or rock (less than five cubic yards total). These conditions suggest the potential for substantial erosion off-site would be less than significant. The Natural Resources Conservation Service (NRCS) publishes soil surveys for each county and classifies soils by several criteria, including their potential for severe erosion. Erosive soils and sloping areas will be avoided during site selection, or, if avoidance is not possible, measures will be taken to prevent erosion and transport of soil to nearby surface waters. No significant impacts upon local water quality would result.

Also during construction there exists the potential for spills and leaks of fuels, hydraulic fluid, and other vehicle and construction compounds. Improper storage and handling of these potential pollutants may also result in release to the environment and contamination of water resources. Because the USRCRN sites would be located on terrestrial landscapes away from major water bodies, the risk that a spill or leak would impact water resources is small. In addition, the magnitude of construction at each site is small in terms of duration (days) and equipment and staffing (two or three workers using light-duty trucks or small backhoe) needs; therefore, there are few opportunities for spills and leaks to occur. Given the shallow excavation, lack of site disturbance during operation and lack of water consumption for the Preferred Alternative, no adverse effects to surface and subsurface drinking water resources would result.

When operational, USRCRN sites would be periodically visited at least once each year by NOAA personnel for maintenance activities, which would include data processing checks, cleaning and repair of the equipment and, where necessary, control of vegetation. Replacement of rain gauge water requires the use of small amounts of antifreeze to prevent freezing, and light-weight oil to limit surface evaporation. There is a potential for small spills and leaks of replacement or spent fuels, detergents, antifreeze, and other vehicle and cleaning compounds. Improper storage and handling of these potential pollutants may result in release to the environment and contamination of water resources. Vegetation would be controlled by mechanical means to avoid the use of herbicides.

The three foundation pedestals or concrete pads upon which monitoring equipment would be mounted, and in some cases fence post foundations, are the only new impervious surfaces that would be installed for the USRCRN stations. They account for only a small percent of overall site area and would not be directly connected to each other or any other impervious surface.

Precipitation that falls on these structures would run off to adjacent pervious surfaces where it is likely to infiltrate into the ground. No significant impacts to local hydrology will result.

The site-selection criteria would be applied such that placement would not occur in or immediately adjacent to WOUS or jurisdictional wetlands. The stations are small in size and hydrologically distant from each other. Based on the application of the standard USRCRN station configuration and established site-selection criteria, the proposed 538 USRCRN program as a whole, and nominally for each prospective station, would not result in significant impacts to water quality or hydrology. Program-wide adverse effects to water quality and hydrology are anticipated to occur. For sites that cannot avoid placement on 25-percent slopes or greater in areas containing highly erosive soils, the potential for moderate impacts to off-site water resources may occur, such as nearby seeps or drainages.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to water or hydrological resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.3.4 Mitigation Measures

Preferred Alternative

Avoid areas with highly erodible soils, as defined by the NRCS. Apply erosion prevention measures and periodic maintenance at sites where steep slopes and highly erodible soils cannot be avoided.

Use equipment and vehicles that are in proper working condition during construction, and handle fuels and contaminants in accordance with commonly accepted practices to reduce the potential for spills and releases.

No-Action Alternative

No mitigation required.

4.4 AIR QUALITY

4.4.1 Regulatory Setting

Clean Air Act of 1970 (40 CFR Part 50)

The Clean Air Act (CAA) of 1970, with the associated Clean Air Act Amendments of 1990, is the comprehensive federal law that regulates air emission from stationary and mobile sources. Among others, this law authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and welfare with an adequate margin of safety. Pollutants for

which NAAQS have been set are often referred to as “criteria” air pollutants. There are primary and secondary standards for six criteria pollutants. These criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter—which consist of two classifications, particulates with diameter less than 10 and 2.5 microns (PM_{10} and $PM_{2.5}$, respectively).

Primary standards have been established to protect human health, and secondary standards have been designed to protect property and natural ecosystems from the effects of air pollution. Key factors affecting air quality conditions for a location or region are pollutant emission rates, emission parameters, topographic features, chemical reactions, cumulative effects from other emission sources, and meteorological conditions. If criteria pollutant standards are met and not exceeded, the basin is designated as being in attainment. If criteria pollutant standards are exceeded more than once per year within an air basin, that basin is designated as being in nonattainment.

The EPA has identified areas of the country where air pollution levels persistently exceed the national ambient air quality standards. The areas where levels exceed the NAAQS are designated “nonattainment.” The EPA identifies which counties are in nonattainment for all criteria pollutants. For nonattainment areas, each state submits a State Implementation Plan (SIP) for approval by the EPA that would bring the affected air basin into attainment with the NAAQS. Each state has identified within their SIP those pollutant emissions that are in nonattainment. The SIP identifies regulations to reduce pollutants in the area to attainment status and meet the NAAQS criteria. Depending on the criteria pollutant, appropriate measures are enacted to reduce levels. For areas designated as nonattainment, state and local regulatory agencies have established common practices to reduce emissions of nonattainment criteria pollutants. Once nonattainment areas meet the standards, the EPA will designate the area to attainment as a “maintenance area.”

Areas with very clean air, such as federally designated wilderness areas, are required to adhere to Prevention of Significant Deterioration (PSD) requirements concerning major new emission sources. The purpose of PSD is not to prevent sources from increasing emissions, but to protect public health and welfare, preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value, insure that economic growth will occur in a manner consistent with the preservation of existing clean air resources; and assure that any decision to permit increased air pollution in any area is made only after careful evaluation of all the consequences of such a decision and after adequate procedural opportunities are provided for informed public participation in the decision making process. New and modified sources in attainment areas, where air quality standards have been met, and in unclassifiable

areas, are required to follow PSD rules. PSD rules require a pre-construction permit, proof that the construction will not cause violations of certain air quality standards, and show that operations are in continuous compliance with the best available control technology requirements. Section 112 of the CAA addresses emission of hazardous air pollutants.

4.4.2 Environmental Setting

Proposed USRCRN stations would occur in the nine climate regions within the CONUS, each containing established air basins. There are five CONUS states that are in attainment for all criteria pollutants: Mississippi, North Dakota, South Dakota, Nebraska, and Oklahoma (EPA 2012). Four states are in attainment, maintenance, or have revoked NAAQS status for all criteria pollutants. Arkansas is in maintenance status for Ozone eight-hour average pollutant levels, Louisiana is in maintenance status or revoked NAAQS for ozone eight-hour and ozone one-hour average pollutant levels, Maine is in maintenance or revoked NAAQS for Ozone (eight-hour average), ozone (one-hour average), SO_2 and PM_{10} criteria pollutants, and Nebraska is in maintenance for lead. The remaining states are currently in nonattainment for one or more criteria pollutants.

4.4.3 Environmental Effects

Preferred Alternative

Short-term air emissions for the USRCRN would be associated with the use of construction equipment and development-related emissions during station construction within the CONUS and would be repeated over the roughly six-year system implementation period. Short-term activities include construction of concrete foundation pedestals, trenching for conduit, and fencing. Other infrequent but potential construction activities include preparation of an access driveway. Construction equipment would include light-duty equipment such as utility truck, backhoe, and equipment delivery truck. In addition, construction worker trips to and from the monitoring station location would contribute to potential air pollution. Construction of one monitoring station would take approximately a week. Construction of USRCRN monitoring stations would be performed within each climate region over approximately a one year period, with overlapping installation efforts among adjacent regions. Ultimately all USRCRN stations would be installed within five years of initiating work.

Construction activities may include the use of a small backhoe to assist in digging a trench in areas where there is direct roadway access to the selected site. Installation of the concrete foundation pedestals for the instrument tower and other equipment and fence support posts would not require large construction equipment. Emissions of some criteria pollutants due to use of construction equipment at a typical individual site would occur; however, even when considering these emissions collectively across the proposed USRCRN program, the intensity of

this impact would not have measureable impact. The limited duration and intensity of activities and their associated air emissions from all USRCRN sources would be *de minimus*. No measureable change in air quality nationally or locally from these sources, including fugitive dust emissions, would occur. Even if a prospective USRCRN station is proposed within an air basin in a nonattainment area for criteria pollutants, emissions from construction operations would not exceed established thresholds. Thus, construction impacts for the system as a whole, and for typical individual stations nationwide, are anticipated to be less than significant.

Long-term air emissions would be associated with operation of the proposed 538 USRCRN stations located equidistant within nine specific climate regions in the CONUS. Long-term operational activities include annual maintenance of each monitoring station's equipment and periodic upkeep assistance from a local host representative or NOAA contractor. Regular maintenance activities would typically involve use of a single, light-duty truck driven to the monitoring station for removal of tall seasonal vegetation or accumulated snow and annual cleaning and calibration of monitoring equipment and solar panels. Operation and routine maintenance of the monitoring station would generate negligible amounts of criteria pollutant emissions. Taken individually or cumulatively, the USRCRN program would not generate emissions sufficient to be categorized under air quality regulations as a major emission source.

There would be no substantive air emissions and therefore no measureable direct or indirect air quality impacts due to the installation, operation and maintenance of individual USRCRN stations, or cumulatively for the program nationally. Any emissions of criteria pollutants would be *de minimus* in quantity, having a less than significant effect on overall air quality within a regulated county or air basin. Similarly, the proposed USRCRN program would not degrade existing air quality within areas subject to PSD.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to air quality would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.4.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.5 RECREATIONAL AND WILDERNESS RESOURCES

4.5.1 Regulatory Setting

Wilderness Act of 1964

The Wilderness Act of 1964 (Public Law 88-577, 16 U.S.C. §§ 1131–1136, 78 Stat. 890) established the National Wilderness Preservation System. The Wilderness Act defines wilderness as follows:

> *"A Wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this section an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."*

Section 4(c) of the Wilderness Act defines prohibited uses as:

> *"Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."*

Wild and Scenic Rivers Act of 1968 (16 U.S.C. § 1271 et seq.)

The Wild and Scenic Rivers Act of 1968 preserves selected rivers in a free-flowing condition and protects their local environments.

4.5.2 Environmental Setting

The National Park System covers more than 84 million acres that include historical parks or sites, monuments, national parks, battlefields or military parks, preserves, and recreation areas (NPS 2012). Typical characteristics associated with lands owned by NPS include sites of

national or local significance, part of larger natural or biotic area, or offers superlative opportunities for recreation for public use and enjoyment. Similarly, BLM administers America's public lands, totaling approximately 253 million acres. The BLM regulates activities in hunting, fishing, camping, hiking, boating, hang gliding, shooting, off-highway vehicle driving, mountain biking, birding, and visiting natural and cultural heritage sites.

For federally-designated wilderness areas, there is a requirement for making all management and use decisions, including administrative practices, proposed special uses, scientific activities, and equipment use (including weather stations). That requirement presumes that the potential disruption of wilderness character and the physical resource be given more weight than economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable. The process considers whether:

- The proposed management action is needed, necessary for the purpose of wilderness, and does not pose a threat to wilderness resources and character.
- The techniques and type of equipment needed to ensure that impact to wilderness resources and values is minimized.

Designated Wild and Scenic areas and their resources would be avoided during site-identification activities. For other federal- and state-managed lands, USRCRN stations may be located in areas designated for recreational use; however, preferred sites would be identified in coordination with host entities to avoid conflicts with public use of those recreational resources. For example, portions of a National Recreation Area or Monument would be identified that are not currently or planned to be open to public access, or access is limited or restricted by permit or permission.

4.5.3 Environmental Effects

Preferred Alternative

For USRCRN stations proposed at federal or state parks, trails, recreation areas, or open space districts, sites would be selected away from readily accessible public locations or those associated with active or high-density use. Furthermore, it is anticipated that physical elements of a typical USRCRN would not be visually discerned from surrounding landscapes beyond a distance of approximately 500 feet (152 m). Particularly sensitive recreational resources beyond this distance would not have a direct or indirect effect, including visual conspicuity at a recreational resource. Given the low visual profile and lack of infrastructure required to support USRCRN stations, it is expected that the Preferred Alternative would not have a detrimental effect on the preponderance of recreational experiences. Site hosts and their resource managers would contribute to the NOAA site-selection process and determine whether a sensitive recreational resource has been adequately avoided to reduce or eliminate adverse effects, if any.

Wilderness values in remote areas throughout the U.S. would not be adversely affected since the site-selection criteria excludes the placement of USRCRN stations within federal designated or eligible wilderness areas.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to recreational or wilderness resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.5.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.6 ENVIRONMENTAL JUSTICE AND SOCIOECONOMIC RESOURCES

4.6.1 Regulatory Setting

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

EO 12898 requires federal agencies to address the potential for disproportionately high adverse human health and environmental impacts to occur on minority and low-income populations due to their programs, policies, and activities. Federal agencies, programs, and policies should not exclude people and populations of people based on race, color, or nationality from federal activities or benefits of such activities. Minority communities and low income communities must also have access to public information on matters related to human health and the environment (President, 1994).

4.6.2 Environmental Setting

Prospective USRCRN station locations would not be on private lands, and selected sites are those not expected to undergo development for 50 to 100 years. Federal- or state-managed lands, and other public lands involving dedicated or encumbered properties, such as University Reserves, would not include properties directly associated with low-income or minority populations. Preferred USRCRN sites managed by these and other federal agencies would typically be located on undeveloped land that are low-priority revenue-producing areas. From a

private sector perspective, the potential USRCRN stations would be away from the populated areas or areas with a high concentration of commerce and residential development.

While prospective sites for USRCRN stations are unknown, a digital national atlas was used to consider National Demographic Characteristics by identifying average population density and, in turn, minority population at and adjacent to large federal land holdings. The average population density in majority of federal land holdings is less than 50 people per square mile, and at least 75 percent of the population is white. The most current data available on this interface was for the year 2000 for population density.

In terms of a socioeconomic setting, uses with aesthetic or revenue-income value on host sites on public lands would be present. The site-selection criteria and coordination with prospective hosts would tend to separate preferred sites from conditions that represent important long-term socioeconomic value or growth.

4.6.3 Environmental Effects

Preferred Alternative

Construction would require a very small number of workers evaluating and installing sites in a serial fashion within each climate region over roughly a one year period, hence no direct or indirect effects to local commerce, housing, community services or population would result. Implementation of the project at a national level would not have a direct or indirect effect on national employment rates.

Operation and maintenance of the USRCRN stations would not be on private lands or areas physically influenced by human activity. Preferred sites on federal and state lands would tend to be sparsely populated, on the order of 50 people per square mile or less. And site-selection would consider limits to future population growth patterns when selecting candidate USRCRN station sites. The site-selection criteria includes locating sites away from man-made conditions and private property, and public lands are generally less populated, such that individual USRCRN sites would not have a direct or indirect effect on human populations, inclusion of those populations considered under EO 12898. As a national program, the selection criteria to be applied is not expected to result in an adverse effect to minority or low-income populations within the CONUS.

Displacement of existing homes, businesses, farms, or transportation corridors would not result. The proposed project operation would not rely on national, regional or local resources for public services, utilities, or commerce. As such, physical operation of USRCRN stations would not individually or cumulatively impact minority or low-income communities, or directly influence the local economic activity.

From a socioeconomic perspective, the 538 USRCRN stations collectively would not have a measureable effect on present uses, aesthetic or monetary values, or the revenue income potential of host sites. For prospective use of federal land, the varying land management agency would provide guidance during site selection to avoid resources valuable to their land management goals. Hence, for prospective sites within the 84-million-acre National Park System, areas valued by revenue producing visitation, or intrinsic values overall, within historical parks or sites, monuments, national parks, battlefields or military parks, preserves, and recreation areas would be avoided.

Similarly, existing conditions potentially affected include those associated with the BLM and its resource management of recreation, cultural, energy use and grazing lands. Most of revenue generated by BLM comes from energy production. Income producing activities or resource values associated with these land management activities would be avoided during site selection, and are unlikely to be adversely affected given the low intensity of human activity associated with prospective USRCRN stations.

The USFS administers the nation's 155 national forests and 20 national grasslands, which encompass 193 million acres. Revenues generated by the USFS are derived from activities such as mineral extraction, conservation, timber harvesting, third-party leases, and recreation fee. Similarly, income producing activities or resource values associated with these land management activities would be avoided during site selection, and are unlikely to be adversely affected given the low intensity of human activity associated with prospective USRCRN stations.

This site-selection strategy would tend to eliminate, or reduce to a less-than-significant level, potential adverse effects to socioeconomic conditions locally and cumulatively for the USRCRN program.

The USRCRN program would contribute to the understanding of climate change trends at a regional level and throughout the CONUS. It would directly contribute to the formation or adaptation of national or regional public policies and economic priorities, and potentially influence regional planning and business priorities at many levels. Some of the projected and observed effects of climate change are direct and measureable, such as sea level rise, frequent storms, droughts, and increases in extreme temperatures, impacting regional and national economic activities. The Preferred Alternative to install the USRCRN within the CONUS to observe climate conditions and change across climate regions has the potential to predict long-term decreases in precipitation levels in the South and Southwest U.S., and temperature changes in the mid-Atlantic States (University of Maryland, 2007).

More accurate and reliable data on changing climatic conditions would help agencies and industry to advance more effective policies to minimize adverse socioeconomic impacts. Agriculture is directly dependent on climate and largely affected by the changes in it. Although,

farmers have adapted to changed climatic conditions, the challenge now is to adapt within very short periods of time to potentially extreme impacts. Technical climate change information can also be incorporated in long-term water resource planning. Access to local climate data would also aid in framing public health policies more suitable to local geography and demographics.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to environmental justice or socioeconomic resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.6.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.7 CULTURAL RESOURCES

4.7.1 Regulatory Setting

National Historic Preservation Act of 1966

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and seeks to accommodate historic preservation interests with the needs of federal undertakings (36 CFR Part 800.1). The Section 106 consultation process includes identifying historic properties that an action may affect, determining if the effect is adverse, and evaluating resolution of adverse effects (36 CFR 800.3 et seq.). NRHP property types include buildings, structures, objects, sites and districts, of which specialized properties such as cultural landscapes and Traditional Cultural Properties (TCPs) are a part.

In accordance with Section 110 of the NHPA (amended in 1980), federal agencies are responsible for identifying and protecting historic properties, including avoiding unnecessary damage to historic properties. The 1992 additions to Section 110 also set out some specific benchmarks for federal agency preservation programs, including:

(a) Federal agency historic properties are to be managed and maintained in a way that considers the preservation of their historical, archaeological, architectural, and cultural values;

(b) Historic properties not under agency jurisdiction or control but potentially affected by agency actions are to be fully considered in agency planning;

(c) Federal agency preservation-related activities are to be carried out in consultation with other federal, state, and local agencies, Indian tribes, Native Hawaiian organizations, and the private sector;

(d) Federal agency procedures for compliance with Section 106 of the Act are to be consistent with regulations issued by the Advisory Council on Historic Preservation (ACHP); and

(e) Federal agencies may not grant assistance or a license or permit to an applicant who damages or destroys historic property with the intent of avoiding the requirements of Section 106, unless specific circumstances warrant such assistance.

For all actions, including this Preferred Alternative, NOAA is responsible for complying with Section 106 of the NHPA. For each undertaking, NOAA would identify an Area of Potential Effect (APE) and consult with the appropriate SHPO, federally recognized Indian Tribes and other Native American groups. In consultation with SHPO, the host entity, NOAA would determine the presence or absence of NRHP resources, the effects the Preferred Action would have on NRHP resources, and the appropriate measures to avoid, minimize, or mitigate effects on NRHP resources.

Even for USRCRN sites to be located on federal lands, NOAA as the Lead Federal Agency must meet its section 106 obligations. If a station is proposed on non-federal, land, such as a property or University Reserve, Section 106 consultation by NOAA would still be required using the NHPA regulatory framework.

On federal lands, further coordination under the Archaeological Resource Protection Act and the Native American Graves and Repatriation Act may be appropriate with the land management agency and the SHPO.

4.7.2 Environmental Setting

The NRHP contains over 80,000 properties throughout the country. Almost every county in the U.S. contains properties listed in the NRHP and it is impossible to identify the presence or absence of NRHP listed or eligible properties in the potential project locations. The site selection and screening criteria for preferred sites, as previously discussed, do limit the probability of some NRHP listed or eligible property types to be present.

Properties that are undeveloped and not expected to be developed for the next 50 years would exclude most NRHP above-ground resource types, such as buildings, structures, districts and objects. NRHP listed or eligible properties could potentially be included, however. Installation locations that are at least 1640 feet (500 m) away from private property or other human

influences, including other USRCRN sites, would only potentially have NRHP above-ground properties in the individual undertakings' APE. These potential sites would exclude those that include "well-traveled roadways and productive farmland" and "buildings, cliffs and trees that would block data telemetry, block sun or reflect light or act as an artificial heating source." Under the NRHP property category, a "structure' would also presumably be included in the previous list of "buildings, cliffs and trees." NRHP properties that may be encountered in a USCRN site include TCPs and cultural landscape features, such a windbreaks, farm access roads, historic trail routes, or large-scale conservation plantings, such as those completed by the Civilian Conservation Corps (CCC). An "object" is defined by the NRHP as "small-scale."

USRCRN site locations have the potential to contain subsurface archaeological deposits, based on the undeveloped nature of the potential sites. The preference for "nearly level ground surfaces" that are 330 feet (100 m) or more from "large water bodies including large ponds, lakes and oceans" may somewhat reduce the potential for archaeological resources. Creeks or streams could be located within that distance, which could be considered moderate to high probability sites, depending on the location and topographic context.

4.7.3 Environmental Effects

Preferred Alternative

Under Section 106, the range of potential effects to NRHP listed or eligible resources include the following determination of affect findings: 1) No Historic properties Present or Affected; 2) No Adverse Effect; or 3) Adverse Effect. If an Adverse Effect determination results from a federal undertaking, measures of mitigation need to be developed that directly address the adverse effect(s). Mitigation can include simply re-locating the project to a site that will result in a No Adverse Effect determination.

Undertakings that could potentially result in a No Historic Properties Present or Affected determination would require a reasonable attempt to identify NRHP listed or eligible resources. Based on the site criteria, a predetermined APE for above-ground resources could be agreed upon with the SHPO. It is likely that a separate and potentially smaller APE would be developed for archaeological resources, based on the extent of the potential underground disturbance. SHPO NRHP listings and determinations of eligibility would need to be consulted to verify the presence or absence of any NRHP listed or eligible resources in the project area. Each SHPO would also have inventories of historic above-ground resources and archaeological sites that would be consulted.

Undertakings involving federal lands should consider appropriate agency Cultural Resource Management plans and inventories. Identification of TCPs would involve coordination with the federal agency and the SHPO to identify appropriate Tribal Historic Preservation Offices

(THPO) and provide them with an opportunity to comment. Conditions under which a No Historic Properties Present of Affected determination by NOAA would be submitted to the SHPO for concurrence include:

- No historic or cultural properties that are listed or eligible for NRHP listing
- No properties that appear to be 50 years of age or older
- No properties that could potentially meet NRHP Criterion Consideration G for under 50 years of age and having exceptional significance
- Location on ground at a sufficiently low elevation to avoid potential effects to properties in the undertaking's viewshed.
- Low potential for archaeological resources, as determined by a Secretary of the Interior qualified archaeologist, and
- No comment by affiliated tribal or Native American cultural groups after 30 days notification in writing.

If properties that appear to be at least 50 years of age or older are identified in the APE, State or local level inventory of historic above-ground properties or landmarks would be consulted to obtain any additional information. If the project is located on federal lands, previous cultural resource inventories, such as the NPS's List of Classified Structures or Cultural Landscape Inventory, would be consulted and reviewed. SHPO archaeological inventory records would also be accessed to determine if any prior investigations of the project area had occurred. If the archaeological site location is on federal land, appropriate archaeological reports and inventories would also be consulted.

If the proposed location for an USRCRN had been previously surveyed for potential archaeological and above-ground historic resources and no substantive resources were present, the effect of the project would likely be of negligible intensity and duration. Documentation of this survey would be prepared. It is unlikely that such documentation would exist for the absence of any TCPs, since these sites may be considered sacred and be subject to restricted access. Inventories of these sites are not typically included in a management unit's cultural resource inventory.

Conditions that could potentially result in a No Adverse Effect determination would involve the project location and/or APE (historic above-ground property or archaeological site) containing properties that are listed in or have been determined to be potentially eligible for listing in the NRHP. A determination of potential eligibility would be made by the NOAA as Lead Federal Agency, in concurrence with the land-owning federal agency and the SHPO.

A No Adverse Effect determination for an undertaking involving a NRHP listed or eligible property would depend on the impact to the NRHP property's character-defining features – those

physical attributes that convey the historic association and significance of the property. For historic properties, such as those previously identified, the features are specific to the resource. For example, a stand of trees planted by the CCC would likely contain trees with uniformity of size and spacing. A historic trail route may evidence wagon ruts or at least convey a pathway with wear patterns. For some routes, such as a National Historic Trail, the route itself may be considered significant and the character of the surrounding landscape may convey a sense of the period when the journey or migration occurred. If such a resource was within 1,500 feet (457 m) of the project site, but the project site was not visible from the resource and the resource was not visible from the project site, due to vegetation or a change in topography that masks view, and the undertaking would not change the traffic or use patterns of the resource, the circumstances may warrant a No Adverse Effect determination.

Conditions under which effects of the undertaken would be considered adverse would involve the project changing or altering the character-defining features of a NRHP eligible or listed above-ground historic property or archaeological site. Effects on historic properties may include direct physical effects as well as visual or other indirect effects. For example, if the project would involve clear-cutting a section of a CCC planted stand of trees, or removal of a section of historic trial that retained integrity, these actions would be considered an adverse effect on historic properties. If the project would destroy the site integrity or stratigraphy of an archaeological site, that would be considered an adverse effect. If the project were to introduce a new visual element that significantly changed the visual character or spiritual quality of a TCP, as determined by an affiliated cultural group, then that would be an adverse effect.

The preferred means of eliminating an adverse effect is to relocate the project. If an individual USRCRN could not be relocated without sacrificing the integrity of the regional data, a Memorandum of Agreement (MOA) may need to be executed to mitigate or offset the adverse effect(s). This would involve consultation with the federal land agency, the SHPO, THPO and federally recognized Indian tribes/ Native American organizations, and potentially local governments, individuals and organizations and the public.

The USRCRN program is national in scale and has the potential to impact resources throughout the country. The project may be implemented in geographically diverse areas, but at locations with common characteristics identified above. It is possible to provide a generalized description of resource impacts for individual sites that meet the USRCRN siting criteria. Resources that require additional site-specific analysis would include those areas that no longer meet the criteria and have not already been determined to: have no historic above-ground resources; no potential for archaeological resources; and, are not associated with traditional cultural practices, based on response from the associated cultural group(s). For purposes of evaluating impacts of the

USRCRN program as a whole, the relevant context is national in scope; individually proposed sites will be set in areas in which context may vary widely from location to location.

Impact thresholds previously discussed were used for this analysis and include the following levels of *intensity*: negligible, minor, moderate, and major. A negligible intensity is considered barely perceptible and is localized or confined. For example, if a USRCRN unit were to be installed in an relatively open, un-forested area that did not require the removal of mature tree canopy, was screened from public view by topography or vegetation, did not require new access roads or utility trenching, and was determined to have low archaeological potential by an archaeologist who met the *Secretary of the Interior's Professional Qualification Standards* in this discipline, and is not considered to be associated with traditional cultural practices, the impact would be considered negligible. Should the installation of the USRCRN station require removal of mature tree canopy, but all the other conditions described under negligible impact were present, it would be considered a minor impact. The impact, assuming the size of the federal or institutional land unit was at least an acre, would be considered slight; a 30-foot by 30-foot (9.1 m by 9.1 m) section of tree removal would be considered a minor impact.

Moderate to major impacts on a cultural resource could be those that would change a *secondary* feature. A secondary feature of a cultural resource is one that would not be character defining and it would not contribute to the historic significance and NRHP eligibility. Although the removal or alteration of the feature would change the physical character of the historic resource, the action would not result in de-listing a NRHP resource and would be considered a moderate impact. Under this scenario, the impact would be readily apparent but it may not negate the significance of the historic trail to the point that it was no longer eligible for listing in the NRHP.

The primary character-defining features for a historic trail may include the trail itself and the right-of-way, other built features, such as campsites, related to the historic experience of traveling on the trail, or physical features that determined the routing of the trail, such as a mountain range or body of water, or sites where important events occurred, such as encounters with indigenous people. Impacts to these types of features would be considered major, substantial and highly noticeable. This type of impact may affect the resources viability, as a NRHP resource by diminishing the resource's historic integrity to the point it could not convey its historic significance. This would be considered an adverse effect under Section 106 and require mitigation. These conditions would be evaluated during Section 106 consultation and primary features of a historic resource avoided during site selection.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed.

No effects to cultural resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.7.4 Mitigation Measures

Preferred Alternative

NOAA as the Lead Federal Agency would conduct Section 106 consultation, whether host sites are on federal or non-federal public lands. Two approaches may be used. First, Section 106 would be facilitated by preparation of a Programmatic Agreement (PA) with other host federal agencies for the purpose of streamlining the consultation process when multiple sites are proposed on lands managed by a particular federal agency. This process would include notification of the federal Preservation Officers for each federal land agency and informal consultation with the ACHP regarding the timing, scope, and geographical distribution of the undertaking and methods to meet section 106 responsibilities. The ACHP's comment on further consultation may provide additional streamlining of the consultation process.

Federal agencies tend to have either relatively high rates of participation or very low rates of participation. PAs would be initiated with interested host agencies. Federal agencies known to have high rates of PA participation include the NPS, BLM, and NFS as indicated above. Host sites managed by non-federal agencies or with federal agencies having low PA participation rates would be managed using a second approach involving standard, individual Section 106 consultation submissions. A submittal template would be used to streamline these repetitive efforts as a whole. PAs with federal agencies would accommodate addenda or be general enough to apply agency range of circumstances and site characteristics. NOAA would not likely prepare a PA with state agencies, but would conduct individual Section 106 consultation for each undertaking.

With the completion of the Section 106 coordination process with host agencies, tribal organizations and SHPO, whether individually or using PAs, significant impacts to historic resources would either be avoided or mitigated to a less-than-significant level.

No-Action Alternative

No mitigation measures are required.

4.8 FLORA AND FAUNA

4.8.1 Regulatory Setting

Federal Endangered Species Act (16 U.S.C. 1536)

Pursuant to the federal ESA of 1973, the USFWS holds authority over projects that may affect the continued existence of a species federally listed as Threatened or Endangered. If a project

may affect a federally listed species, consultation under Section 7 of ESA is required. Under ESA, the definition of "take" includes to kill, harm, or harass any federally listed species. The USFWS has interpreted the definition of harm to include significant habitat modification.

If listed species or designated critical habitat are present and could be adversely affected by the proposed project, a biological assessment must be prepared to analyze the potential effects of the project on listed species and critical habitat and make a determination of effect. In response, the USFWS (or the National Marine Fisheries Service if listed fish species are involved) would issue a Biological Opinion regarding the level of effect and, if necessary, to authorize the incidental take of a threatened or endangered species.

Migratory Bird Treaty Act (16 U.S.C. 703-712)

The Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The vast majority of birds are protected under the MBTA. Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered a "take" and is potentially punishable by fines and/or imprisonment. Incidental take permits from the USFWS are not issued under this Act. Any proposed project must take measures to avoid the take of any migratory birds, nests, or eggs.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. Sections 668 to 668d, 54 Statute 250) prohibits the destruction of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) and their occupied and unoccupied nests. "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.

Executive Order 13112, Invasive Species

The intent of EO 13112, Invasive Species, is "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause." Per this EO, determinations of the likelihood of introducing or spreading invasive species and a description of measures being taken to minimize their potential harm should be evaluated and any effects considered.

State/Local Regulations

At each station site there may be other state and local regulations governing impacts to biological resources.

4.8.2 Environmental Setting

A programmatic analysis of potential effects to protected flora and fauna due to the installation, operation, maintenance and decommissioning of the USRCRN system as a whole is provided below. Specific environmental settings are not presented for this level of NEPA analysis. Descriptions of flora and fauna habitat types potentially affected have been identified in order to broadly assess the range of potential effects given the overall size and distribution of proposed facilities.

Flora **–** For the CONUS, there are seven broad vegetation communities that may be encountered. For each vegetation community there are several subtypes and hundreds of species specific to those subtypes. Discussing the subtypes or species-specific associations is beyond the intent of this PEA and would be considered further through tiered analysis during the site-selection process.

- Forests: Tree-dominated communities including all types of non-wetland forests at all topographic elevations.
- Shrubland or scrub: communities dominated by shrubs and understory-sized plants instead of trees.
- Open: communities dominated by forbs and grasses including prairie, grasslands, dunes, serpentine outcrops, meadows, and agriculture.
- Riparian: tree and shrub/scrub dominated communities adjacent to and within the bed and bank of rivers and streams.
- Wetland: communities inundated with standing water for 5 percent of the growing season with characteristic hydrology, hydric soils and hydrophytic vegetation that do not classify as riparian communities including swamps, marshes, bogs, vernal pools, emergent wetlands, seeps, vegetated ditches, and lacustrine wetlands.
- Rocky and talus: communities dominated by rock dwelling species.
- Barren/Urban/Ruderal/Disturbed: areas that lack significant vegetation, are dominated by disturbance-loving weeds and bare ground, or have previously been developed. This community type is preferred if available when sites are selected.

Sensitive communities may occur in each of the broad community types described above. Sensitive vegetation communities are defined as rare or retain special ecological attributes that are protected nationally or regionally. For example, serpentine grasslands are protected because they support rare and endangered plants due to their unique soil characteristics.

Sensitive vegetation communities vary across the country. State run Natural Heritage Programs and state Departments of Fish and Game have resources online that list sensitive communities and descriptive information:

- NatureServe offers links to all State Natural Heritage Programs. Natural Heritage Progams inventory state natural resource data including special status species and communities: http://www.natureserve.org/visitLocal/index.jsp
- NatureServe Explorer is a database of threatened plants, animals, and systems: http://www.natureserve.org/explorer/index.htm
- USFWS state-run agency partners: http://www.fws.gov/offices/statelinks.html

Fauna – Often presence/absence of protected wildlife species can be determined by the presence of suitable habitat. In some cases a vegetation community is enough to indicate habitat, but often other considerations should be made to determine if suitable habitat exists. Wildlife habitat is the place where an organism lives and is the sum of the specific resources and conditions for a species to survive. Resources found in suitable habitat include food, water, cover, and conditions for breeding and raising young.

Many migratory birds protected under the MBTA use tree-dominated vegetation communities such as forests and riparian areas. Fringe habitat, i.e., areas where one vegetation community transitions to another, is often valuable for migratory birds and protected bat species due to the diversity of habitat for shelter and forage. Protected raptors may be found where woodlands transition to grasslands and perching trees are located near rodent populations. Likewise, protected bat species may be found in transitions between forests and ponded areas where insect prey is abundant. Because this project will site stations away from forests (trees, tall objects), wetlands, and water bodies, the impacts to these species that may rely on these transitional habitats is expected to be limited.

Other significant components of wildlife habitat are movement corridors that connect different patches of wildlife populations or different regions. These wildlife corridors are essential to the survival of healthy populations by increasing gene flow/exchange thus reducing genetic load of a species. Movement corridors are most impacted by linear projects that bisect migration routes. Since this project consists of limited, isolated stations, movement corridors are not likely to be part of the environments affected by the Preferred Alternative, either individually or collectively.

Special status species, designated by federal, state or local governments and are generally protected, and their habitats have potential to occur in the vicinity of site locations. The most commonly identified special status species are those protected by the federal government under the ESA. States also have their own state designations. Occurrences of special status species and life history information are recorded and kept in national and state-run databases to help determine range, population health, and occurrence likelihood. Examples of special status designations include: federally endangered, federally threatened, state endangered, state threatened, candidate species, and sensitive species as defined by the state. Habitat that is essential to the conservation of a species is designated as critical habitat.

To determine if special status species could be present in potential site locations a list of species with potential to occur in the area must be created and cross referenced with vegetation communities or habitat types found at the location (or in vegetation mapping applications). The search should include both the USFWS list for all federally listed species and applicable state agency list for state-listed species and those of special concern.

- Informal species lists provided by the USFWS can be obtained here: http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action
- Maps of designated critical habitat can be viewed here: http://criticalhabitat.fws.gov/crithab/
- Maps and descriptions of major bird flyways can be found here: http://www.birdnature.com/flyways.html

State special status lists and life history information can be found on either of the two lists provided below:

- Natural Heritage Programs: http://www.natureserve.org/visitLocal/index.jsp
- USFWS state-run agency partners: http://www.fws.gov/offices/statelinks.html

4.8.3 Environmental Effects

Preferred Alternative

This section describes the potential effects to biological resources during construction and operation of the proposed USRCRN program, including special status species and associated habitat. In many cases, impact to biological resources would be avoided during the site selection process; however, agency consultation or coordination with local partners may be necessary to ensure that specific sites have actually avoided protected or sensitive biological resources.

The USRCRN site-selection criteria, the limited envelope of individual proposed facilities, and short duration for construction and maintenance would result in impacts that are less than significant on a nationwide or programmatic basis, assuming coordination under Section 7 of the ESA is completed for site alternatives. There is a less-than-significant impact on a nationwide and/or programmatic level because combined effects on any one habitat/species would be negligible when Section 7 consultation concludes that no effect or no adverse effect would result at preferred individual sites. USRCRN station sites will be spread across the country, diffusing the impact to a particular species, habitat, or population. When considering all 538 USRCRN stations collectively, impacts would be less than significant.

Migratory Birds

The Preferred Alternative would include installation of 10-foot (3 m) tall instrument support towers, vegetation removal and limited excavation for support pedestals. While the site-selection

criteria includes the avoidance of tall objects, including trees, facility construction and vegetation maintenance has the potential to take nests, eggs, young, or individuals of protected species that breed or nest in shrubs, brush or burrows. For construction taking place during breeding seasons, incidental loss of fertile eggs or nestlings may occur, or lead to the abandonment of nests. Disturbance from construction noise activity, vegetation clearing, permanent habitat removal from the platform, and, under some conditions, the towers themselves have the potential to affect migratory birds.

While towers of all types have the potential to kill some birds, collision risk is known to increase with the height of the tower, with the addition of guy wire supports, and with the amount and type of lighting (Manville 2000). In general guidance provided by the USFWS to limit bird strikes, towers should be less than 200 feet (61 m) tall and be absent of guy wires (Manville 2000). Avoiding tall, hard-to-see elements near critical avian habitat within major flyways can also reduce the potential for bird collisions. The towers proposed for the USRCRN are an order of magnitude shorter than the recommended height. The potential for the USRCRN towers to result in bird collisions is considered negligible and effects to migratory birds would not be significant due to the tower height or type of construction (no hard-to-see elements such as guy wires).

Migratory birds could be impacted during vegetation removal if required during USRCRN station construction or maintenance during the breeding season. Vegetation removal is expected to be infrequent and localized to the immediate project area; existing roads will be used to access prospective USRCRN stations limiting the amount of vegetation clearing necessary. Clearing to provide new access roads or utility (i.e., power) lines will not be required. USRCRN stations would be away from tall structures, such as trees, thus de-limbing will not be necessary.

With the implementation of USRCRN site-selection criteria and, where necessary, other mitigation measures described above, the impact to migratory birds would be less than significant.

Bald and Golden Eagles

This project has a provision that tall objects, which would include trees that could serve as nesting sites, should be no closer than 1640 feet (500 m) from the tower sensors. The siting of the stations is expected to be further than the recommended 660 feet (201 m) from structures that could support active nests. This project is expected to avoid impacts to bald and golden eagles.

To avoid take of bald or golden eagles, the implementation of nest buffers (temporal or spatial buffers) are recommended. USFWS guidelines recommended that no construction activity occur within 660 feet (200 m) of an active eagle nest during nesting season (USFWS 2007). With the implementation of USRCRN site-selection criteria and, where necessary, other mitigation

measures described above for migratory birds, the impact to bald and golden eagles would be less than significant.

Special-Status Species

For any prospective USRCRN location, the potential exists for an endangered species or their habitat to be present. Impacts to these species may be avoided through implementation of the avoidance and minimization measures described below. If impacts cannot be avoided and there is potential for take of the threatened or endangered species informal or formal consultation with agencies would be required and preparation of a Biological Assessment may be necessary.

Special status species could be impacted by the project due to:

- Reduction in habitat acreage
- Being killed during construction (e.g., crushed by construction equipment)
- Disturbance during construction

During the site-selection process, NOAA would consult national databases for special status species and coordinate with local partners to determine if special status species suitable habitat could be present within the proposed construction site. Coordination with regulatory agencies such as USFWS and the state wildlife agency would be conducted as necessary to discuss ways to avoid impacts to special status species. In general, habitat areas likely to support protected species will be avoided, such as wetlands, riparian habitat, diverse native plant communities, and areas with large, contiguous native old-growth forest habitat.

NOAA would work with the local land-owning partners to identify the local and State agencies that may have jurisdiction over the site and consult with these agencies about potential impacts to resources under their jurisdiction. Example state and local agencies that may need to be consulted include the applicable state agency responsible for fish and wildlife resources and the local planning or development agency.

Due to the extremely limited size of the footprint of this project, reduction in habitat acreage and impacts to migratory corridors are considered to be negligible and insignificant. The only exception would be where there are small areas of sensitive habitat (e.g., wetlands, serpentine outcrops) that support specialized or rare species. These special features will be avoided during the siting process through collaboration with local partners and agencies. In addition, the use of existing access roads and power sources will limit the project footprint and potential impacts. With avoidance and minimization measures, impacts to habitat would be less than significant.

There is some potential for construction equipment to kill special status species or disturb these species during construction. Construction will be a temporary, short-duration impact that is not expected to jeopardize the existence of any species over the long-term. If special status species

are known to be in the area, consultation with USFWS will determine avoidance and minimization measures to reduce impacts to the species to less than significant.

Invasive Plant Species

This project will consider actions to avoid the introduction of invasive species through the implementation of recommended avoidance and minimization measures.

Removal and disturbance of vegetation to accommodate site development has the potential to introduce and spread non-native invasive species of vegetation. Construction equipment can introduce non-native seeds, which may colonize disturbed ground more quickly that native species. Additionally, many invasive plant species are opportunistic and respond and thrive in disturbed soil. Due to the size of the footprint of the project, this potential impact in considered minor.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to flora and fauna would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.8.4 Mitigation Measures

Preferred Alternative

In general, NOAA would avoid or minimize adverse impacts to protected flora and fauna during the site-selection process and, as needed, apply mitigation measures that would reduce potential impacts to less than significant. The following strategies to avoid, minimize, mitigate or compensate for adverse effects would be applied to individual USRCRN siting investigations:

Site-Selection Criteria and Mitigation

NOAA would review resource databases and consult with federal and state regulatory agencies to identify and avoid protected flora and fauna and their critical habitat. This coordination and review effort would include:

- Contact with state natural resource agencies, such as state run Natural Heritage Programs, state Departments of Fish and Game. Such agencies can be found for each state using the following sources:
- http://www.fws.gov/offices/statelinks.html
  http://www.natureserve.org/visitLocal/index.jsp

- Use of USFWS, NatureServe and state databases to identify species occurrence at or near the areas of interest and avoid conflicts with those occurrences and associated habitat. Sources include:
- http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action
- http://criticalhabitat.fws.gov/crithab/

Special Status Species

- In accordance with Section 7 of the ESA, NOAA would consult with the USFWS and/or the regulatory state agency (for state-listed species) to confirm resource avoidance or assess whether resources potentially present would be adversely affected. Where adverse effects cannot be avoided, a biological assessment would be prepared and impact mitigation measures identified. In these rare cases, NOAA would seek a Biological Opinion from the USFWS and reach an agreement that would conclude the Section 7 process.

Migratory Birds

- In accordance with the MBTA, if nests are identified within ¼ mile (400 m) of a preferred site location, then perform construction activities outside of the nesting bird season. Nesting seasons are location dependent and construction windows should be determined through coordination with the USFWS.
- If construction must occur during the nesting season and areas with suitable nesting habitat within 400 m cannot be avoided, a biological monitor would be present during construction to assess the site for nesting birds and monitor birds for disturbance.

Invasive Species and Native Habitats

- NOAA would avoid the alteration of native habitats through the inadvertent introduction of seeds of invasive species by cleaning construction equipment prior to the start of construction and after equipment has been used at another site where invasive plants are present.

No-Action Alternative

No mitigation measures are required.

4.9 WETLANDS

4.9.1 Regulatory Setting

Clean Water Act, Section 404

Under Section 404 of the CWA, the U.S. Army Corps of Engineers (USACE) regulates dredge and fill activities within WOUS. These jurisdictional WOUS include intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the U.S. (CFR 33 Part 328).

In areas subject to tidal influence, Section 404 jurisdiction extends to the high-tide line. Certain WOUS are considered "special aquatic sites" because they are generally recognized as having particular ecological value. Such sites include sanctuaries and refuges, mudflats, wetlands, vegetated shallows, coral reefs, and riffle and pool complexes. Special aquatic sites are defined by the EPA and may be afforded additional consideration in the permit process for a project.

Projects that impact jurisdictional wetlands and non-wetland WOUS require a permit from the USACE. A jurisdictional delineation of the wetland and water resources and a permit application would need to be completed and submitted to the USACE for verification. There are two types of permits: individual permits and nationwide permits (NWPs). NWPs are issued by the USACE for specific types of activities that have minimal individual or cumulative adverse environmental impacts. Individual permits are required for more complex projects that exceed the impact threshold for a NWP. By avoiding impacts to jurisdictional wetlands and waters, consultation with USACE can be avoided.

Application of the USRCRN site–selection criteria and SOP 15 *NEPA Documentation* in the vast majority of the CONUS would avoid jurisdictional wetlands and WOUS.

Court Cases Defining Jurisdiction

In the 2001 decision of the U.S. Supreme Court in the *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*, USACE was denied jurisdiction over isolated water bodies. The court defined isolated waters as any body of water that is non-navigable, intrastate, and lacking any significant nexus to navigable bodies of water (Pooley 2002). Isolated seasonal wetlands, i.e., wetlands that are not hydrologically connected with other jurisdictional wetlands or non-wetland WOUS, are generally considered non-jurisdictional.

In the 2006, U.S. Supreme Court, *Rapanos v. United States* (No. 04-1034) and *Carabell v. Army Corps of Engineers* (No. 04-1384), challenged the USACE's interpretation of "waters of the U.S." (USACE and EPA 2007). Subsequently, "waters of the United States," have been defined as navigable waters and their tributaries and wetlands or waters that are adjacent or abutting

these features. The agencies will generally not assert jurisdiction over swales, erosion features or ditches excavated wholly in and draining only uplands and that don't carry a relatively permanent flow of water.

Clean Water Act, Section 401

Section 401 of the CWA, Water Quality Certification, requires that project proponents seeking to obtain a federal permit for any activity that may result in a discharge to navigable waters of the U.S. first obtain a state Water Quality Certification to ensure the proposed action will comply with state water quality standards. For example, a Water Quality Certification is applicable when a project requires a 404 permit from the USACE and other special circumstances. While required under the federal CWA, Section 401 compliance is administered at the state level. Any project requiring a Section 404 permit is assumed to also need a 401 certification from the state where the impact would occur.

Executive Order 11990, Protection of Wetlands

EO 11990 requires each federal agency to take actions to minimize the destruction, loss, or degradation of wetlands. It requires all projects with a federal nexus to avoid construction in wetlands unless there is no alternative or the construction is designed in such a way that it includes all practicable measures to minimize impacts to wetlands. It also requires that federal agencies provide plans for early public review on any construction planned in a wetland.

State/Local Regulations

Other state and local regulations governing actions within wetlands and water resources may be applicable to the USRCRN siting process. Examples of states with agencies that separately regulate state wetlands include New Jersey, Minnesota, Michigan, Florida, Pennsylvania, and Maine, to name only a few.

4.9.2 Environmental Setting

Wetlands are transitional zones between terrestrial and aquatic ecosystems and are likely to be encountered during the project. Typical wetland areas include marshes, swamps, and bogs, but can also occur in ditches and drainages. The wetland delineation method developed by the USACE (Environmental Laboratory 1987) requires that three conditions be met in order for an area to be classified as a jurisdictional wetland: the area must contain hydric soils; it must support hydrophilic vegetation; and it must have appropriate hydrologic indicators.

Soils are considered hydric if classified as hydric by the NRCS soil survey or if field indicators as defined in "Field Indicators of Hydric Soils in the United States, Guide for Identifying and Delineating Hydric Soils" (U.S. Department of Agriculture [USDA] 2003) are present. An area has wetland hydrology if it is inundated or saturated in the upper 12 inches (0.3 m) of the soil for

at least five percent of the growing season in most years (Environmental Laboratory 1987). To be considered as having hydrophytic vegetation, more than 50 percent of the dominant plant species must have an indicator status as facultative, facultative wetland, or obligate wetland vegetation (Reed 1988). Desktop analysis tools for wetland identification are available online. However, these references are only as accurate as the information provided; ground verification is still necessary to determine presence or absence of jurisdictional wetlands in potential locations.

- USFWS Wetland Inventory Map of *known* wetlands resources. http://www.fws.gov/wetlands/
- NRCS soil type: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx and http://soils.usda.gov/survey/printed_surveys/
- NRCS database of hydric soils: http://soils.usda.gov/use/hydric/
- USACE wetland indicators: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/rw_bro.pdf

4.9.3 Environmental Effects

Preferred Alternative

It is expected that through the complete and proper application of the site-selection criteria and final SOP 15 environmental checklist, jurisdiction wetlands will be avoided when identifying prospective sites and in selecting preferred sites for USRCRN reference stations. When prospective sites are being identified at a desk-top level of analysis, various databases and mapping tools should be applied to consider known wetlands locations (i.e., USFWS National Wetland Inventory maps), or locations where wetlands are likely to occur (i.e., soils identified as hydric and or vegetation containing hydrophytic species). During the on-site investigations, field investigators will work with host partners' biological staff or qualified consultants to confirm the absence of jurisdictional wetlands, WOUS, or wetlands resources protected under state regulation. Given the USRCRN program would use existing access roads and not require extension of commercial utilities, the ability to avoid wetlands is greatly enhanced. In cases where wetlands may be present at or adjacent to a prospective site, and avoidance is not possible, a site-specific wetlands delineation survey may be required to define the boundaries of jurisdictional wetlands and the volume of dredge and fill required within the wetlands. In this instance, it is anticipated that either NWP #5 Scientific Measurement Devices and/or NWP #19 Minor Dredging would be applicable. Each requires dredging or discharge to wetlands or WOUS to be less than 25 cubic yards, and is more fully described below:

- NWP #5. *Scientific Measurement Devices.* Devices, whose purpose is to measure and record scientific data, such as staff gages, tide gages, water recording devices, water

quality testing and improvement devices, and similar structures. Small weirs and flumes constructed primarily to record water quantity and velocity are also authorized provided the discharge is limited to 25 cubic yards. (Sections 10 and 404)

- NWP #19. *Minor Dredging*. Dredging of no more than 25 cubic yards below the plane of the ordinary high water mark or the mean high water mark from navigable WOUS (i.e., section 10 waters). This NWP does not authorize the dredging or degradation through siltation of coral reefs, sites that support submerged aquatic vegetation (including sites where submerged aquatic vegetation is documented to exist but may not be present in a given year), anadromous fish spawning areas, or wetlands, or the connection of canals or other artificial waterways to navigable WOUS (see 33 CFR 322.5(g)). (Sections 10 and 404)

For rare instances in which jurisdictional wetlands cannot be avoided during the site-selection process, the maximum volume of dredge and fill into the wetlands resource would be less than five cubic yards. While a wetlands delineation may be required for completion of a NWP application to the USACE under Section 404 of the CWA, it is clear each such instance would qualify for permit approval using either of these two existing NWPs.

In summary, if wetlands and other aquatic sites can be avoided, the Preferred Alternative for individually proposed USRCRN sites would have no effect. In rare cases in which avoidance is not possible, the impact will be rendered to an insignificant level by preparing a wetlands delineation, minimizing the affected volume of wetlands and obtaining a USACE NWP permit under Section 404 of the CWA, including adherence to any standard or specific permit conditions.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to wetlands would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.9.4 Mitigation Measures

Preferred Alternative

In rare cases in which avoidance of jurisdictional wetlands is not possible, the impact will be rendered to an insignificant level by preparing a wetlands delineation according to USACE-accepted protocols, minimizing the volume of affected wetlands, and obtaining a USACE permit (i.e., NWP) under Section 404 of the CWA, including adherence to any standard or specific conditions placed on the action during NWP approval process.

No-Action Alternative

No mitigation measures are required.

4.10 FLOODPLAINS

4.10.1 Regulatory Setting

Executive Order 11988: Floodplain Management

EO 11988 requires that a project constructed, permitted, or funded by a federal agency must avoid incompatible floodplain development, be consistent with the standards and criteria of the National Flood Insurance Program, and restore and preserve natural and beneficial floodplain values. Federal actions are located outside of the 100-year flood plain, if practical. EO 11988 requires federal agencies to minimize occupancy of and modification to floodplains. Specifically, the EO prohibits federal agencies from funding construction in the 100-year floodplain (the 500-year floodplain for critical facilities) unless there are no practicable alternatives. This section provides an overview of EO 11988 and U.S. DOC guidance for applying the EO to proposed actions in the floodplain.

EO 11988 requires federal agencies to:

- Avoid, to the extent possible, the long and short term adverse impacts associated with the occupancy and modification of floodplains; and
- Avoid direct or indirect support of floodplain development whenever there is a practicable alternative.

The DOC Environmental Management Manual (EMM), dated January 15, 2009, describes procedures for complying with EO 11988. In accordance with EO 11988, the EMM:

- Describes actions to which EO 11988 applies, including "acquiring, managing, and disposing of interests in federal lands and facilities, including, but not limited to, purchases, construction, leases, easements, and right-of-ways";
- Defines the floodplain as the area subject to inundation from a flood that has a one-percent chance of being equaled or exceeded in any given year (also referred to as the 100-year flood or base flood); and
- Defines a "critical action" as an action that, if located in a floodplain, poses a greater than normal risk for flood-caused loss of life or property. Examples include storage of flammable or toxic materials, facilities such as schools and hospitals that are occupied by populations that are not sufficiently mobile to avoid loss of life or injury, and critical facilities such as public utilities. The minimum floodplain of concern for critical actions is the 0.2-percent annual chance floodplain (the 0.2-percent annual chance flood is also referred to as the 500-year flood).

Section 2(a) of EO 11988 identifies eight steps in the decision-making process. These steps, and EO 11988 compliance policy prepared by the DOC, are identified below.

FEMA's Eight-Step Process	DOC EMM Chapter 18
1. Determine if the proposed action is located in a floodplain or has the potential to affect or be affected by a floodplain.	7.01. Determine if the proposed action is located in a floodplain or would impact a floodplain.
2. Notify the public of the potential to implement an action that could affect or be affected by a floodplain and involve the public in the decision-making process.	7.02a. Identify and analyze impacts to public health, safety, and welfare and to floodplain values and functions.
3. Identify and evaluate alternatives to the proposed action. FEMA must select a alternative that avoids floodplain impacts if practicable.	7.02b. Avoid impacts identified in 7.02a if practicable. If avoidance is not practicable, minimize impacts.
4. Identify potential impacts (direct and indirect) associated with occupying or modifying a floodplain or potentially supporting floodplain development.	7.05 Notify the public of the proposed action per Subparagraph (a). If the proposed action is a critical action, hold a public hearing per 7.06.
5. Minimize adverse impacts to floodplains identified in Step 4.	7.07 Notify the public of the final determination.
6. Re-evaluate the proposed action to determine if it is still the only practicable alternative in light of results from Steps 4 and 5. FEMA must select an alternative that avoids floodplain impacts if practicable.	7.08 Integrate these EO requirements with NEPA requirements.
7. Notify the public of its decision if action will be taken that impacts a floodplain.	
8. Review the implementation and post-implementation of the action to ensure requirements (above) are followed.	

4.10.2 Environmental Setting

Floodplain protection is important to human safety, property loss prevention, and natural resources management, which it directly affects surface water quality and the value of aquatic habitats. The base flood, sometimes referred to as the "100-year" flood, has a one percent chance of occurring in any given year. The Federal Emergency Management Agency (FEMA) has mapped over 100 million acres of flood hazard areas nationwide and has designated some six million acres of floodways along 40,000 miles of streams and rivers. Floodways are areas that must be preserved in order to allow the discharge of the base flood, and communities are required to prohibit any development within a floodway that would cause an increase in flood heights. Floodways are often the most hazardous areas within a community and generally coincide with environmentally sensitive areas.

Existing conditions for floodplain resources vary tremendously depending on location. The FEMA produces Flood Insurance Rate Maps (FIRMs) depicting the spatial layout of areas that may be potentially affected by flood events. In addition to showing the locations of the one percent and 0.2 percent floodplains, many FIRMs show the base flood elevation.

FIRMs delineate floodplains with other descriptors, the most important of which are the floodway and the 100-year coastal, high hazard floodplain. The floodway is the channel of a river or other watercourse and adjacent land areas that are required to remain free from development to discharge the base flood without cumulatively increasing the water-surface elevation.

The USRCRN stations will be located in a variety of local environments and ecosystems within the CONUS. Properties within the 100-year (one-percent chance) floodplain would be avoided to prevent damage to the monitoring station. Based upon the siting criteria, preferred site locations would be located outside of the boundary for the one-percent chance flood and at least 330 feet (100 m) away from large water bodies such as large ponds, lakes and oceans.

4.10.3 Environmental Effects

Preferred Alternative

Project location siting criteria requires locating the approximately 538 monitoring stations in areas that are not prone to flooding or within the one-percent chance flood zone. Siting monitoring stations within the floodplain is not anticipated as the USRCRN monitoring station network as a whole will avoid floodplains due to the skewed atmospheric monitoring data associated with areas adjacent to bodies of water, and the potential damage even infrequent flooding may have upon the instrumentation. With implementation of the Preferred Alternative and its associated site-section criteria and final SOP 15 environmental checklist, no impact to floodplain resources is anticipated.

However, in the rare circumstance in which no practicable alternative exists to locating a USRCRN station within a 100-year floodplain, conformance with the FEMA eight-step process or the DOC EMM process described above would be required. These EO 11988 requirements are summarized as follows:

> *"(2) If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain."*

Meeting these EO 11988 requirements would reduce individual impacts, and those for the USRCRN program as a whole, to a less-than-significant level.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to floodplain resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.10.4 Mitigation Measures

Preferred Alternative

Should no practicable alternative exists to locating a USRCRN station within a 100-year floodplain, conformance with the FEMA eight-step process or the DOC EMM process described above would be required.

No-Action Alternative

No mitigation measures are required.

4.11 COASTAL ZONE MANAGEMENT

4.11.1 Regulatory Setting

Coastal Zone Management Act of 1972, 16 U.S.C. 1451-1465

The Coastal Zone Management Act (CZMA) of 1972, as amended, authorizes coastal states to develop Coastal Zone Management Plans (CZMPs) for coastal areas, including the Great Lakes. The 1990 amendments required that states develop a Coastal Nonpoint Pollution Control Program subject to review and approval by EPA and NOAA (also see Section 4.3: *Water Quality and Hydrological Processes*. The program must identify land uses that contribute to degradation of threatened or impaired coastal waters and provide for the implementation of management measures to achieve water quality standards. Pursuant to Section 307 of the CZMA, federal agency activities that affect the coastal zone must be consistent with the enforceable policies of each affected state's CZMP. Federal agencies are typically required to provide a consistency determination based on an analysis of the proposed action and applicable policies.

There are three categories of federal actions subject to consistency review. The first is direct federal agency activities, such as the proposed USRCRN program, which are activities and development projects performed by a federal agency or by a contractor for the benefit of a federal agency. The second category of federal actions subject to consistency review are federal license or permit activities, meaning activities not performed by a federal agency, but requiring federal permits, licenses or other forms of federal approval. Examples of such actions are activities requiring USACE Section 404 CWA permits. The third category is state and local

government projects that may impact the coastal zone for which federal financial assistance is provided.

At the heart of Federal Consistency is the "effects test." The CZMA was amended in 1990 to establish a generally applicable rule of law that any federal agency activity, regardless of its location, is subject to the consistency requirement if it will affect any natural resources, land uses, or water uses in the coastal zone. For federal development actions, a Federal Consistency Determination is typically required under each state's approved Coastal Management Program (CMP) and its CZMP. No federal agency activities are categorically exempt from this requirement. Enforceable policies with which such activities must be deemed consistent are policies that are legally binding under state law, such as constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, and by which a state exerts control over private and public coastal uses and resources.

A Federal Consistency Determination includes a statement indicating that the proposed action will be undertaken in a manner that is consistent to the maximum extent practicable with an approved CZMP. The statement must be based upon an evaluation of the relevant enforceable policies of the CZMP, and must be included with the consistency determination. The consistency determination shall also include a detailed description of the activity, its associated facilities, and their coastal effects, and provide comprehensive data and information sufficient to support the Federal agency's consistency statement. The amount of detail in the evaluation depends on the complexity of the project. Federal agencies are strongly encouraged to obtain the assistance of the state's coastal commission, or approved governing body within each state CMP with a CZMP, in preparing a consistency determination.

A federal agency may decide that a consistency determination is not required either because, after a thorough assessment, it determines that there would be no effects upon coastal uses or resources. In such cases, the federal agency should submit a "negative determination" and supporting information to the coastal commission, or approved CMP body within each state with a CZMP, for final approval of the activity. It is recommended that a negative determination be sent 90 days prior to the need for a final approval.

A negative determination contains a brief description of the activity, the activity's location and the basis for the federal agency's determination that the activity will not affect any coastal use or resource. In determining effects, federal agencies shall include an evaluation of the relevant enforceable polices of the CZMP. The level of detail in the federal agency's analysis may vary depending on the scope and complexity of the activity and issues raised by the state agency, but shall be sufficient for the state agency to evaluate whether coastal effects are reasonably foreseeable.

A federal agency may assume the state has concurred with a negative determination if the governing body has not responded to the federal agency with a certain time period, varying from two to six months after receipt of the negative determination, or requested a 15-day extension. A federal agency may continue with a proposed project even though the CMP has objected to the consistency determination; however, Federal agencies must inform the CMP in writing of any such action. The NOAA Office of Ocean and Coastal Resource Management encourages informal discussion between the parties, and is available to mediate in these discussions.

4.11.2 Environmental Setting

The environmental setting for prospective USRCRN station locations within federally approved state coastal zones varies with each state. The inland extend of the coastal zone is measured in some states by elevation above mean sea level (MSL) (e.g., 10 feet [3 m] MSL in Alabama); distances inland (e.g., 1000 feet [305 m] from mean high water, or ridgeline adjacent to an estuary or water body in California and Oregon); the inland extent of coastal counties (e.g., Maryland, North Carolina, Washington, Wisconsin); and in some cases the entire state (e.g., Delaware, Florida, Rhode Island). A description of all coastal zone boundaries in the U.S. (and its territories) is provided in Appendix C-1.

In these coastal zones, coastal resources may vary widely and include natural, ecological, man-made and socioeconomic conditions. These topics of interest are commonly associated with public access; coastal habitat; coastal water quality; coastal hazards; and coastal dependent uses and community development. Each coastal program will have a set of enforceable policies or state laws that describe resources and procedures for compliance under the CZMA. For federal actions these policies and laws are typically not applicable due to the nature of the action, or are analyzed under NEPA, either at a programmatic level or during tiered environmental screening at prospective development locations, and would provide the basis for a consistency determination.

4.11.3 Environmental Effects

Preferred Alternative

These topics of interest under a CZMP are typically avoided due to the application of USRCRN site-selection criteria, or are analyzed under NEPA either within this PEA or during tiered environmental screening for each prospective station. Given the limited size and location away from human development, prospective USRCRN stations would be unlikely to be sited in areas that would inhabit public coastal access. Sensitive coastal habitat and coastal dependent land uses would be avoided during the site selection process, primarily through completion of SOP 15 and collaboration with the public agency site host, or with the state (or local) coastal program directly. Similarly, water quality impacts and coastal hazards are expected to be avoided during

the site-selection process, both through review of coastal program policies, resource maps and databases, and consultation with host public agencies.

The SOP 15 *NEPA Documentation* applied at the site-specific level would include a review of that CZMP's enforceable policies or laws. It is anticipated that a consistency determination would be prepared for each preferred USRCRN station location within a coastal zone using PEA and site-specific SOP 15 NEPA documentation. Provided that a sufficiently detailed consistency determination is prepared by NOAA and reviewed by the CMP's governing body for approval, the proposed project would have a less-than-significant impact to coastal resources. Alternative, the USRCRN program may decide to submit a negative determination based on a similar broad, though less detailed, analysis of effects and seek CMP acceptance well in advance, two to six months, of the desired approval date.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to coastal zone resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.11.4 Mitigation Measures

Preferred Alternative

A consistency determination would be prepared for each preferred USRCRN station location within a coastal zone. This would be accomplished by using programmatic and site-specific SOP 15 NEPA documentation.

No-Action Alternative

No mitigation measures are required.

4.12 FARMLANDS

4.12.1 Regulatory Setting

Farmland Protection Policy Act, 7 U.S.C. 4201-4209

The Preferred Alternative would be subject to the Farmland Protection Policy Act (FPPA) and similar state or local farmland protection goals. The FPPA sets forth federal policies to prevent the unnecessary and irreversible conversion of farmland to nonagricultural uses. Under the FPPA, federal agencies must examine whether potentially adverse effects to prime or unique farmlands or farmlands of state or local importance would occur before approving any action that would irreversibly convert farmland to non-agricultural uses.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of Statewide or local importance. Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. NRCS regulations at 7 CFR Part 658, are designed to implement those policies. Regulations at 7 CFR 658.2(a) exclude land from definition of farmland as those lands already in urban use or committed to urban development or water storage.

For projects that have the potential to convert important farmland to non-farm use, the NRCS or USDA Service Center uses a land evaluation and site assessment system to establish a farmland conversion impact rating score on proposed sites. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. In instances where the conversion of prime farmland is necessary, the USDA has created the Farmland Conversion Impact Rating system. The assessment is completed on form AD-1006, Farmland Conversion Impact Rating.

4.12.2 Environmental Setting

Prime farmland is characterized as land with the best physical and chemical characteristics for the production of food, feed, forage, fiber, and oilseed crops. Prime farmland is either used for food or fiber crops or is available for those crops; it is not urban, built-up land, or water areas. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Unique farmland is defined as land that is used for the production of certain high-value crops, such as citrus, tree nuts, olives, and fruits.

Prime farmlands can occur throughout the U.S., but are more prevalent throughout the Great Plains, Midwest, and Western states. Approximately 326 million acres of land in the U.S. are designated as prime farmland by the USDA (USDA 2009).

4.12.3 Environmental Effects

Preferred Alternative

Construction of the USRCRN would not occur in areas in active cultivation, inclusive of areas containing protected farmland soils. In rare cases, prospective USRCRN station sites may be located on fallow agricultural lands or unproductive farmland, which would result in the conversion of less than one-tenth of one acre to non-agricultural use and limit the future use of agriculture within 500 feet, of a total area of approximately 18 acres. The siting criteria for the

monitoring stations specify that the monitoring station would be at least 1640 feet (500 m) away from productive farmland. Productive farmland has been identified as development that would produce local sources of glare/heating, dust and emissions which would interfere with the data collected by the monitoring station. Therefore, productive farmland, whether prime, locally important or unique, would be avoided. There are no substantial impacts anticipated. Agricultural use of the farmland beyond 1640 feet (500 m) these USRCRN stations would continue.

The USRCRN monitoring stations will be located in a variety of natural or slightly altered physical environments. Based upon the siting criteria, preferred site locations include public lands, including federal and state-managed lands, and at least 1,640 feet (500 m) from private property or other human influences, including productive farmland. Preferred locations do not include developed or urban areas hence a likely absence of farming infrastructure is needed to support prime farmland designations.

The Preferred Alternative includes the installation of 538 monitoring stations located equidistant within nine specific climate regions in the continental U.S. Based on the application of USRCRN site selection criteria, prime farmland designated by both either individual state departments of agriculture and the USDA NRCS would be avoided. However, if prime, or locally important or unique, farmland cannot be avoided, coordination with the local NRCS or agricultural extension/cooperative station would be required and a USDA Farmland Conversion Impact Rating form AD-1006 completed (see Appendix C-2). A determination would be made as to whether the proposed conversion is consistent with the FPPA. Based on the small size of individual monitoring stations, substantial loss of prime farmland values is highly unlikely to occur; however, any substantial impacts can be mitigated by either altering the monitoring station design or reducing the setback distance from productive farming practices. Substantial impacts to farmlands are not anticipated to occur at prospective sites for the approximately 538 stations within the CONUS.

The Preferred Alternative would gather data for use in climate change research. The unpredictable nature of climate change makes impacts using existing climate data on the agricultural sector uncertain. The data collected by the USRCRN program is intended to facilitate improved prediction and advanced planning of regional climate changes affecting agriculture. With the improved prediction and advanced planning, farmers could implement agricultural practices to suit new climatic conditions and be better prepared to deal with events such as flood and drought. Given the use of national and international standards for data acquisition, the compilation of more reliable and representative information for climate research and policy implementation would be a positive effect of uncertain degree on the agricultural industries regionally and nationally.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to protected farmland resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.12.4 Mitigation Measures

Preferred Alternative

If prime, or locally important or unique, farmland cannot be avoided, a USDA Farmland Conversion Impact Rating form will be completed and a determination made as to whether the proposed conversion is consistent with the FPPA or if modifications to USRCRN siting criteria are necessary.

No-Action Alternative

No mitigation measures are required.

4.13 NOISE

4.13.1 Regulatory Setting

Noise Pollution and Abatement Act of 1972

The Noise Pollution and Abatement Act of 1972 is a statute of the U.S. initiating a federal program of regulating noise pollution with the intent of protecting human health and minimizing annoyance of noise to the general public. The Act established mechanisms of setting emission standards for virtually every source of noise, including motor vehicles, aircraft, certain types of heating, ventilation, and air-conditioning equipment and major appliances. It also put local governments on notice as to their responsibilities in land use planning to address noise mitigation. This noise regulation framework comprised a broad data base detailing the extent of noise health effects.

Congress ended funding of the federal noise control program in 1981, which curtailed development of further national regulations. The EPA retains authority to conduct research and publish information on noise and its effects on the public. The initial EPA regulations and programs provided a basis for development of many state and local government noise control laws across the U.S.

Occupational health and safety standards exist for indoor noise exposure is enforced at the federal and state levels; however, these standards would not apply to the deployment and use of prospective USRCRN stations individually or nationally.

4.13.2 Environmental Setting

Noise is unwanted sound and can include any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Responses to noise varies depending on the type and characteristic of the noise, distance between the noise source and receptor, receptor sensitivity, and time of day. Noise can be continuous, steady or impulsive, and may involve a number of sources and frequencies. Human response may vary depending on the source, listener sensitivity and expectations, the time of day, and the distance from the source.

Noise is measured in decibels, usually adjusted to the A-scale (dBA). Affected receptors are specific or area-wide locales in which occasional or persistent sensitivity to noise above ambient levels exists, such as at or near hospitals, amphitheaters, nursing homes, schools, and certain locally designated districts. Sensitive receptors include schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Areas with the greatest sensitive receptors are in urban and suburban areas. Wilderness areas and rural communities possess few sensitive receptors.

The USRCRN monitoring stations will be located in a variety of local environments. Based upon the siting criteria, preferred site locations include federal lands, sites at least 1,640 feet (500 m) away from private property or other human influences. Preferred locations do not include developed land or urban areas as USRCRN observations made in pristine locations are more ideal to accurately detect climate trends. As such, the locations for the monitoring stations would be in areas away from sensitive receptors found within urbanized and developed areas.

4.13.3 Environmental Effects

Preferred Alternative

Potential noise impacts could occur during construction and regular maintenance of the monitoring stations. Construction would be brief and is anticipated to last one week for an individual USRCRN monitoring station. Construction equipment would include light duty equipment such as a utility truck with trailer, backhoe, and cement truck. Construction activities include trenching between the USRCRN solar panel, rain gauge and instrument tower; installation of concrete pads or foundation pedestals; and monitoring instruments. Use of this type of equipment would result in maximum noise levels 50 feet (15.2 m) beyond the site boundary of 80 dBA for a backhoe and 82 dBA for a cement pump, when needed (Federal Transit Administration, 2006).

Operation of the USRCRN stations is not anticipated to generate noise. Maintenance may include cutting and clearing vegetation, cleaning or servicing sensors and equipment, removing

accumulated snow in some areas, and emptying rain gauges. Maintenance activities of the monitoring station are not anticipated to generate substantial noise impacts to the surrounding area and wildlife.

Based upon the project's siting criteria and requirements for preferred locations, the monitoring stations would not be located in areas where there are sensitive noise receptors. Therefore, the construction and operational maintenance activities are expected to result in negligible impacts.

No-Action Alternative

Under the No-Action Alternative, there would be no noise impacts.

4.13.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.14 TRANSPORTION

4.14.1 Regulatory Setting

Wilderness Act of 1964, Public Law 88—577

The Wilderness Act generally prohibits the use of motor vehicles in wilderness. The law contains special provisions for motor vehicles use as required in emergencies or when necessary for administration of the area.

Federal agencies such as the BLM, NPS and USFS set forth plans and policies for managing access to federal lands under their jurisdiction within their planning documents. At the state level, individual state Departments of Transportation are generally responsible for the design, construction, and maintenance of their state highways systems, as well as a portion of the federal highways and interstates within their boundaries. At the local level arterial roads, connector roads, rural roads, and local roads are typically constructed and maintained by county or city governments. Individual jurisdictions generally set the level of service standards for roadways in order to determine if a roadway is operating acceptably.

4.14.2 Environmental Setting

Sites would have year round access and be located on publicly owned lands typically in remote locations. These properties would include land owned by federal, state and local (county/parish and city) government agencies and university properties. Access roads would typically include existing dirt or unpaved gravel roads that may have restricted public access. Site access routes

would avoid known seasonal hindrances, such as heavy snowfall that could impede entry. Designated wilderness areas would be avoided.

4.14.3 Environmental Effects

Preferred Alternative

While the project includes multiple USRCRN sites, these sites would not require a substantial number of vehicular trips between sites. Individual sites would generally not be located in areas with heavy vehicular traffic given that ideal USRCRN sites would be located on land as natural, pristine, and undisturbed as possible per siting criteria. Individual USRCRN sites would use existing roads. During site section, all sites would be carefully evaluated for adequate access including road conditions, seasonal hindrances, and other access obstacles (such as locked gates). New roads would not be constructed for the project.

Potential trip generation would include short-term construction activities and intermittent maintenance. Construction traffic at individual sites would typically include two to three trucks with one carrying a backhoe. Construction activities are anticipated to take less than a week per site. Once constructed, vehicle trips would generally occur by a 4×4 truck for one-day annual maintenance and repair trip(s) as needed. Given that the project would use existing roads, that relatively few trips would be generated at individual sites, and that travel interconnection between sites is not required, the potential impacts to transportation systems would be less than significant.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects associated with project-related transportation or site-access would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.14.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.15 UTILITIES AND SOLID WASTE

4.15.1 Regulatory Setting

There are no directly applicable federal regulations pertaining to effects of federal actions on local utilities and public services (i.e., solid waste disposal). Regulatory constraints related to the existing capacity and distribution of utility services is typically considered through local zoning or land use law. While the federal government is not required to follow local regulations under the Public Building Amendments of 1988 (Public Law 100-678), they strive to assess potential effects of projects and conform to local requirements to the extent practicable. This assessment considers the presence and capacity of existing and future utility services needed to support the USRCRN stations individually and then extrapolated for the CONUS system as a whole. Other laws and policies that indirectly relate to utilities and solid waste for national federal programs like the USRCRN are described below.

EO 12185, Conservation of Petroleum and Natural Gas, 44 FR 75093

EO 12185 encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

Energy Independence and Security Act of 2007, PL 110-140

The Energy Independence and Security Act of 2007, originally named the Clean Energy Act of 2007, is the energy policy of the U.S. and a challenge to reduce gasoline consumption by 20 percent in 10 years. The stated purpose of the act is "to move the U.S. toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the federal Government, and for other purposes." The bill focuses on automobile fuel economy, development of biofuels, and energy efficiency in public buildings and lighting.

4.15.2 Environmental Setting

Prospective USRCRN stations would be located on undisturbed properties on public lands and generally away from human development and related infrastructure, such as overhead utility distribution or transmission line towers or actively used rights-of-way needed to access and maintain buried, surface or overhead utility infrastructure, such as power substations, waterways, storm drainages, canals, water service mains, and cellular towers, among others.

4.15.3 Environmental Effects

Preferred Alternative

The anticipated use or displacement of existing and future utility service capacity and infrastructure due to the Preferred Alternative are evaluated. This includes effects associated with the need to extend or limit the distribution of infrastructure or individual and nationwide use of natural, non-renewable resources capacity to support the Preferred Alternative.

Construction of the USRCRN does not require the use of utility services, such as those from power, water, sewer or commercial telecommunication providers. Construction-related solid waste would consist of small amounts of remnant construction materials that could not be reused. These may consist of scraps of recyclable metals, unusable fence materials, and on rare occasions, excess concrete material. The use of commercial landfills would be minimal, when necessary. Construction at prospective USRCRN stations would be located away from tall objects such as overhead utility towers and away from disturbed areas such as rights-of-way for utility service distribution corridors or substations. Any solid waste or waste water generated during construction would be removed by the contractor in accordance with local regulations and requirements. The volume of such wastes for an individual monitoring station site would be small, and would have less than significant impacts on solid waste or waste water treatment or disposal facilities. No effects to utility services or service capacity would result from USRCRN stations individually or when considered for the nationwide program as a whole.

Operation of the USRCRN stations would require electricity, which would be provided by solar panels with backup low-voltage chargeable batteries with surge suppression. Data communication is via dedicated on-site satellite antenna link; commercial communication services and infrastructure would not be used. Public utilities and commercial water, sewer service, electricity or natural gas services are not required. No solid waste or waste water would be generated during operation of a USRCRN station.

Sites powered by solar panels (and backup batteries) would have no impact on existing utilities. The requirement to be separated from tall objects may inhibit future plans to use nearby areas for overhead or buried infrastructure; however, the site-selection criteria seeks to identify site alternatives that are highly unlikely to be developed, or require such infrastructure, for a relatively long period of time (50 to 100 years).

Based on the lack of dependence and use of public utilities and commercial services for a typical USRCRN station, the combined effect of construction and operation of the USRCRN system would have a less-than-significant effect on these resources.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No effects to public utilities and services would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.15.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.16 AESTHETIC AND VISUAL RESOURCES

4.16.1 Regulatory Setting

Neither NEPA nor any federal regulation or EO provide specific impact criteria or standards for determining the significance of visual/aesthetic resource impacts. However, of the ten issues listed in NEPA as being important to consider, three appear relevant to visual resource impact assessment: the unique character of the affected resource, the potential for controversy, and the potential to violate laws and regulations.

Potential effects to visual resources are addressed in federal management policies for public lands, particularly lands managed by the BLM and the USFS. Specific federal requirements for visual resource assessment include the National Forest Management Act of 1976 (as amended), the Federal Land Policy and Management Act of 1976 (as amended), the Wild and Scenic Rivers Act of 1968, and the resource management policies of the BLM and USFS.

A framework for analysis of visual effects on federal lands was developed by the BLM, within the U.S. Department of the Interior, in 1978. BLM lands are administered by BLM Resource Management Plans or BLM Management Framework Plans. The BLM employs a Visual Resource Management (VRM) Inventory and Contrast Rating System (U.S. DOI 1986), and identifies Visual Resource Management Objectives in their planning documents.

The USFS, within the USDA, developed a similar framework in 1974 (amended in 1995) known as the USFS Scenery Management System (USDA 1995). USFS lands are administered by USFS Forest Plans, which identify Visual Quality Objectives or Scenic Integrity Objectives.

These frameworks are applicable to large federal landholdings and actions evaluated under an environmental impact statement. However, concepts from these methodologies can be applied to

provide a basis for assessing effects within an EA for federal actions on public lands. The concepts include actions to:

- Identify those views potentially affected and for which the public may express concern
- Describe the existing visual conditions and potentially affected critically sensitive views
- Estimate the intensity of possible adverse visual impacts on those views
- Evaluate the significance of the possible impacts
- Mitigate, as needed, using measures to lessen the impact to a level that is less than significant.

Visual analysis considers the visual resources and the condition of potentially affected views. These resources may include landforms, vegetation, water surfaces, and cultural modifications (physical changes caused by human activities) that give the landscape a visually aesthetic quality. This impression is referred to as "visual character," a point of reference to assess whether a given project would appear compatible with the setting or would contrast unfavorably with them. Potentially significant visual impacts are those that:

- Cause a perceptibly substantial reduction of visual quality, including the degree of public sensitivity, the intensity of the impacts, and the duration of the impact.
- Are inconsistent with specific laws, ordinances, regulations or standards pursuant to general planning policies or objectives for the protection of the quality of aesthetics and visual resources.

Potential for a level of impact beyond negligible may occur to important landscapes with moderate or high visual sensitivity. This sensitivity is assumed to exist where landscapes, particular views, or the visual characteristics of certain features are protected through policies, goals, objectives, and design controls in public planning documents or where critical views are subject to sensitive public interest and concern.

While the NPS has no formal policy or framework for visual or scenic resources, it often employs the techniques and concepts of the BLM's VRM system when assessing impacts on visual or scenic resources. Consultation with the NPS may be required for potential impacts on the visual resources in National Parks. Section 6(f) of the Land and Water Conservation Fund Act (16 U.S.C. §460) protects visual resources in some outdoor recreation sites and facilities.

Finally, the National Scenic Byways Program (P.L. 105–178, 23 U.S.C. §162) protects the viewsheds of national scenic byways, and state laws similarly protect state-designated scenic byways.

4.16.2 Environmental Setting

Visual resources comprise the natural and man-made features that give a particular environment its aesthetic qualities. These features form the overall impression that a viewer has of an area or its landscape character. Landforms, water surfaces, vegetation, and man-made features are considered characteristic of an area if they are inherent to the composition and function of the landscape. The landscape character is studied to determine whether a new element would appear compatible with the affected setting or would noticeably contrast in such a way as to diminish its character or aesthetic quality. Four broadly defined landscapes consist of natural, rural, urban, and transitional landscapes.

Methods to assess visual resources based on public values, goals, awareness, and concern have been developed by the BLM (U.S. DOI, 1986). The VRM system helps to define the visual sensitivity of an area and the degree of potential effect on a visual resource. Of particular concern are state and locally designated scenic highways and recognized visual settings governed by local comprehensive plans and ordinances, which are common within coastal, recreation, and open space areas, and historic properties or districts. These are of moderate sensitivity. Areas of national significance, such as national parks, wild and scenic rivers, monuments, and landmarks are areas of potentially high visual sensitivity.

Preferred sites would be on lands not expected to undergo development for the foreseeable future (50 to 100 years) and typically include federal lands managed by the NPS, BLM, USFS, and other dedicated or encumbered properties such as University Reserves. The NPS covers more than 84 million acres that include historical parks or sites, monuments, national parks, battlefields or military parks, preserves, and recreation areas. Typical characteristics associated with lands owned by NPS include sites of national or local significance, part of larger natural or biotic area, or sites which offer superlative opportunities for recreation for public use and enjoyment. Similarly, BLM administers America's public lands, totaling approximately 253 million acres. USFS is an agency of the USDA that administers the nation's 155 national forests and 20 national grasslands, which encompass 193 million acres.

Individual USRCRN monitoring stations would be located in a wide range of visual landscapes, with preferred sites for the Preferred Alternative typically consisting of grasslands or undeveloped land with a relatively flat topography, located in more remote areas. Given the siting criteria, natural landscapes would be the most frequently encountered landscape for the Preferred Alternative.

Natural landscapes are those in which natural-appearing landforms and vegetation predominate, and signs of human activity are not readily apparent. Coastlines, water bodies, mountainous landforms and areas of varied relief are the most striking and tend to be the most conspicuous. More sparsely vegetated mountainous areas in the western U.S. are dominated by their landform,

such as rock outcroppings, ridges, escarpments, and plateaus. Natural areas within the eastern third of the continental U.S. are typically heavily forested. Even where there is substantial relief, the heavily forested landforms are undistinguished and tend to confine a viewer's attention to the immediate foreground.

Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Areas of Critical Environmental Concern, frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

4.16.3 Environmental Effects

Preferred Alternative

The degree to which the Preferred Alternative affects the visual quality of a landscape depends on the visual contrast created between the Preferred Alternative and the existing landscape (the element contrast). The contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the Preferred Alternative.

- A Preferred Alternative would have negligible visual effects if the element contrast is not visible or perceived; or if the element contrast can be seen but does not attract attention in an area of low visual sensitivity or scenic quality.
- A Preferred Alternative has the potential to have minor to moderate visual impacts if the element contrast begins to attract attention and begins to dominate the characteristic landscape, particularly in an area of moderate to high landscape sensitivity.
- A Preferred Alternative has the potential to have significant visual impacts if the element contrast demands attention, cannot be overlooked, and is dominant in the landscape.

Given the preference that monitoring stations be located on federal lands, or lands which are protected from development by some other means, there is potential for some sites to be located within pristine natural areas that are visually sensitive.

On a nationwide scale, the visual impact of 538 climate stations would be less than significant, as each individual climate station is small in dimension (approximately 10 feet [3 m] in tower height and contained within an area approximately 24 by 24 feet (7.3 m × 7.3 m) and the stations will be spaced roughly 80.8 miles (130 km) apart from each other in most cases (in some cases, stations may be placed approximately 5,000 feet (1500 m) apart). In addition, the siting criteria

mean that sites will be remote from highly trafficked roads and urban areas, and will not be located on prominent ridge lines or mountain tops. It is anticipated that physical elements of a typical USRCRN station would not be visually discerned from surrounding landscapes beyond a distance of approximately 500 feet (152 m).

On a site-by-site scale, there is the potential for a range of visual impacts. Not only will the visual character of each site vary from low to high sensitivity, but the degree of contrast between the proposed climate station and the surrounding visual character would influence the degree of effects. The general definition of levels of contrast to be applied is as follows.

- **None** The element contrast is not visible or perceived.
- **Weak** The element contrast can be seen but does not attract attention.
- **Moderate** The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong** The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Where USRCRN sites are co-located with existing climate stations (or similar facilities), no visual impacts would result, as the existing stations already form part of the visual setting in those locations, and the proposed addition through the USRCRN station would not significantly increase the scale or intensity of development at those sites.

Since the predominant majority of USRCRN sites would be established in pristine locations, each would have the potential to cause minor to moderate adverse visual impacts where the visual sensitivity of the site chosen is not considered to be high. Many public lands contain significant visual resources or scenic landmarks, monuments or vistas of potentially high visual sensitivity. The climate monitoring stations may be visible, thus posing an unnatural visual intrusion in pristine or visually sensitive environments. Intrusions could include the actual visibility of the tower itself, or glare reflected off the equipment. In each case, NOAA would work closely with the landowner (NPS, BLM, USFS, etc.) during the site selection process to avoid visually sensitive areas.

Visual impacts during construction might include vegetation removal. The presence of construction equipment may also have temporary visual impacts within pristine areas. However such impacts would be temporary in nature, and would be less than significant if areas of high visual sensitivity are avoided.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed.

No effects to visual and aesthetic resources would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.16.4 Mitigation Measures

Preferred Alternative

When visual resources are present, NOAA would coordinate with the land owner/responsible agency to ensure selected sites meet that agency's requirements regarding visual resource management and avoid highly visually sensitive areas

No-Action Alternative

No mitigation measures are required.

4.17 HAZARDOUS MATERIALS

4.17.1 Regulatory Setting

Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act of 1976 governs the handling, treatment, and disposal of solid wastes, which are defined as garbage, refuse, or sludge from a waste treatment facility and other discarded materials including solids, semi-solids, liquids, and contained gases. In general, land disposal of solid wastes is allowed only at properly permitted facilities which are located, constructed, and operated so as to prevent release of contaminants to the environment. Hazardous wastes are those solid wastes which are hazardous to human health or the environment because of an inherent characteristic of being reactive, ignitable, corrosive, or toxic. Petroleum products are not considered hazardous materials or wastes but their storage, transport, use, and disposal is regulated by several laws, most notably the Oil Pollution Act of 1990.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980

The Comprehensive Environmental Response, Compensation, and Liability Act assigns physical and fiscal responsibility for the removal or neutralization of hazardous waste. In general, the owner and operator of facilities or land at the time at which disposal of hazardous waste occurs is responsible for the cost of remedial actions. In some situations, such as when the prior owner or operator cannot be found or is financially insolvent, landowners who acquire a property with pre-existing contamination may be liable for clean-up costs. Landowners in the latter situation can be relieved of liability if they can show that they diligently conducted studies to ascertain the presence or absence of contamination prior to acquiring the property (i.e., the innocent landowner defense). The most common means for establishing this defense is to conduct an environmental due diligence study meeting recognized standards, such as the American Society of Testing and Materials E-1527-93 or E-1528-93 standards. Compliance with the due diligence

standards requires investigation of past and existing uses of the target property, past and existing uses of nearby properties, search of government and private environmental databases for information on the target property and surrounding lands, physical inspection of the property and surroundings, and interview of individuals who may have knowledge about the target property and its past and present uses.

4.17.2 Environmental Setting

In general, prospective USRCRN station sites would not be expected to contain hazardous or regulated materials. Data on the location and condition of existing contaminated sites, if any, is typically available through local environmental health departments, or nationally registered sites which are under the jurisdiction of the EPA. The EPA "STORET" environmental data system, which provides additional soil and groundwater water quality and other descriptive information, is available via the Internet. Sources of data at the state and local level typically include state and county departments of water resources, environmental conservation, and environmental protection.

4.17.3 Environmental Effects

Preferred Alternative

During construction, operation and maintenance of the stations, hazardous or regulated materials, such as petroleum fuels, antifreeze, and batteries would be used in small quantities. A small quantity of ethyl glycol (antifreeze) would be used to keep the rain gauge water from freezing, and would be brought onsite in one-gallon containers during maintenance. A small quantity of light weight oil (two pints) would be used to reduce surface evaporation from the gauge. The rainwater in the rain gauge is replaced annually with a known starting water quantity, and fresh antifreeze and oil are added.

During installation and maintenance of the USRCRN station sites there is a potential for spills and leaks of fuels, detergents, and anti-freeze. Improper storage and handling of these potential pollutants may result in release to the environment and soil contamination. The amounts of oil and antifreeze used would be minor and would not present a significant risk to the environment. The climate stations would use batteries to provide backup power. Upon removal or replacement, these batteries will likely be considered a hazardous waste and would be sent to a disposal/recycling facility that is licensed to accommodate this type of waste. Due to the proper collection and off-site disposal/recycling of these materials, and the small quantities used at applicable USRCRN sites, these materials will would not have the potential to significantly contaminate the environment.

The proposed USRCRN stations will not result in significant impacts to soil or water quality. The stations are small in size and distant from each other. Negligible program-wide adverse effects to soil or water quality are anticipated to occur.

Because the stations would be located in generally remote areas, the potential for the USRCRN program to incur liability due to the acquisition of contaminated property and the potential for construction or operation of climate stations to cause significant contamination would not present a significant risk. As a result, no significant impacts would result.

No-Action Alternative

Under the No-Action Alternative, the USRCRN program would not implement its Preferred Alternative and a high-density distribution of climate monitoring stations would not be installed. No adverse effects associated with hazardous materials would result. Under this alternative, the ability to acquire high-quality climate data at the regional level would not be fulfilled.

4.17.4 Mitigation Measures

Preferred Alternative

No mitigation measures are required.

No-Action Alternative

No mitigation measures are required.

4.18 CUMULATIVE IMPACTS

The NEPA requires that the Lead Agency consider the cumulative effects of a Proposed Action, in conjunction with other past, current and reasonably foreseeable actions, on the quality of the human environment. At a programmatic level for the Preferred Action, the potential for cumulative effects are considered broadly based on the implementation of USRCRN site-selection criteria and experience with previously installed climate monitoring facilities. Given that prospective USRCRN stations will be located on public lands, the site-selection process and coordination with potential host entities would include a review of existing, current and foreseeable future development. The use of host agency land use policies and management plans, or other planning documents, would be used to indicate whether a prospective USRCRN site would meet the site-selection criteria, in particular the criteria associated with setbacks from development and, to the extent feasible, the potential for development to occur within the setback distance for paved surfaces, tall structures or growth, or elements that produce man-made influences on temperature or wind speed over many years. By applying the site-selection criteria and entering into Site Land Agreements with host agencies for each site, the USRCRN system is

unlikely to produce cumulative effects that would significantly impact the resources analyzed above in this PEA.

5 SUMMARY OF IMPACTS AND MITIGATION MEASURES

5.1 PREFERRED ACTION ALTERNATIVE

Resource	Impacts	Mitigation Measures
Land Use	Less than significant impacts.	No mitigation measures required.
Geological Resources	Less than significant impacts.	The USRCRN program would consult with federal and state site host to evaluate the potential for paleontological resources to be present and whether a preconstruction surface assessment is appropriate. Areas with potential paleontological resources must be evaluated and avoided, or excavation activities monitored during construction.
Water Resources and Hydrological Processes	Less than significant impacts.	Avoid areas with highly erodible soils, as defined by the NRCS. Apply erosion prevention measures and periodic maintenance at sites where steep slopes and highly erodible soils cannot be avoided. Use equipment and vehicles that are in proper working condition during construction, and handle fuels and contaminants in accordance with commonly accepted practices to reduce the potential for spills and releases.
Air Quality	Less than significant impacts.	No mitigation measures required.
Recreational and Wilderness Resources	Less than significant impacts.	No mitigation measures required.
Environmental Justice and Socioeconomic Resources	Less than significant impacts. The USRCRN program would contribute to the understanding of climate change trends at a regional level and throughout the CONUS.	No mitigation measures required.
Cultural Resources	Less than significant impacts.	Conduct Section 106 NHPA consultations with each affected SHPO for individual sites or though multi-site federal host agency Programmatic Agreements. Consultation includes coordination with the Advisory Council on Historic Preservation, federal host agency federal Preservation Officers and affected Tribal Historic Preservation Officers.
Flora and Fauna	Less than significant impacts.	Conduct Section 7 ESA consultations regarding potential effects to protected species and impact avoidance with each affected USFWS regional office. Avoid or evaluate the presence of critical habitat using on-line database and mapping products and though informal or formal consultations with USFWS, and if necessary, state wildlife resource management agencies. Avoid habitat for nesting birds, or install USRCRN stations outside of the regional breeding season.

Resource	Impacts	Mitigation Measures
		Monitor for nesting birds if construction must occur within nesting habitat during the nesting season.
Wetlands	Less than significant impacts.	In rare cases in which avoidance of wetlands is not possible, prepare a wetlands delineation, minimize the affected volume of wetlands affected, and obtain a USACE Nationwide permit under Section 404 of the CWA, including adherence to any standard or specific permit conditions.
Floodplains	Less than significant impacts.	Should no practicable alternative exist to locating a USRCRN station within a 100-year floodplain, conformance with the FEMA eight-step process or the DOC EMM process would be required.
Coastal Zone Management	Less than significant impacts.	Consult with each affected Coastal Management Program and prepare a Consistency Determination (or Negative Determination) as required.
Farmlands	Less than significant impacts.	Consult with the NRCS and review databases to identify whether If prime, or locally important or unique, farmland. If these resources cannot be avoided, a USDA Farmland Conversion Impact Rating form will be completed and a determination made as to whether the proposed conversion is consistent with the FPPA or if modifications to USRCRN siting criteria are necessary.
Noise	Less than significant impacts.	No mitigation measures are required.
Transportation	Less than significant impacts.	No mitigation measures are required.
Utilities and Solid Waste	Less than significant impacts.	No mitigation measures are required.
Aesthetic and Visual Resources	Less than significant impacts.	When visual resources are present, coordination with the land owner/responsible agency to ensure selected sites meet that agency's requirements regarding visual resource management and avoid highly visually sensitive areas.
Hazardous Materials	Less than significant impacts.	No mitigation measures are required.
Cumulative Impacts	Less than significant impacts.	No mitigation measures are required.

5.2 NO-ACTION ALTERNATIVE

Resource	Impacts	Mitigation Measures
All Resources Evaluated	Less than significant impacts.	No mitigation measures required.

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6 CONCLUSION

Based on an analysis of anticipated short- and long-term effects to the human environmental due to the Proposed Action's Preferred Alternative to install a USRCRN system within the CONUS, no direct, indirect or cumulatively significant impacts were identified for the resources topics considered. This assessment assumes the judicious application by NOAA and the USRCRN Program of the USRCRN site-selection criteria, the site-specific application of USRCRN SOP 15, *NEPA Documentation,* and the implementation of mitigation measures identified in this PEA, where appropriate. In addition, the No-Action Alternative would not result in a significant environmental effect.

A FONSI is warranted for the Preferred Alternative or the No-Action Alternative.

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7 PREPARERS

John Chamberlain – Project Manager

Mr. Chamberlain is a senior project manager for environmental impact, land use feasibility and permit acquisition services. He has over 29 years of experience in NEPA analysis, with particular expertise in analyzing nationwide systems of multi-site facilities and infrastructure associated with sensors and new technology deployment. He has prepared both individual and programmatic NEPA documents for NOAA to support projects in virtually every state. Mr. Chamberlain provided project management and planning for this PEA.

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Mr. Reidenauer is the team leader for NEPA/Natural Resources and has over 25 years of experience preparing and managing EISs and EAs, and a variety of natural resource studies. He has managed projects with the NOAA and other federal agencies and has published several papers in peer-reviewed scientific journals. Mr. Reidenauer provided technical advice and quality assurance review for this PEA.

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Mr. Edwards is a senior Architectural Historian with over 34 years of experience in historic and architectural studies and environmental compliance procedures. Mr. Edwards has extensive experience in the design, management and technical execution of architectural history investigations of historic buildings, structures, objects, historic districts, cultural landscapes and Traditional Cultural Properties. He has extensive experience assisting agencies comply with federal, state, and local environmental and historic preservation laws and regulations, including both the NEPA and the NHPA. He has also successfully worked with numerous SHPOs to develop work plans and create Memoranda of Agreement and PAs for cultural resources management.

Katherine Dudney – Resource Analyst

Ms. Dudney is a senior ecologist specializing in ecosystem ecology with specific applications to vegetation surveying, habitat evaluation, mitigation site selection, and restoration design. She has experience combining environmental assessment with restoration planning to help clients identify effects and assess mitigation strategies. Ms. Dudney is experienced in conducting both plant and animal surveys and previously worked for the National Park Service as a biological technician. Ms. Dudney prepared the Flora and Fauna section of this PEA.

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Ms. Dunn has over four years of experience in the field of environmental assessment and planning with experience in CEQA and NEPA documents, environmental constraint and baseline analysis, preliminary analysis, air quality analysis, acoustical analysis, and other planning studies in both the private- and public-sectors. Ms. Dunn has experience in the preparation of noise, air quality and global climate change analysis. She prepared the noise, air quality, recreational and wilderness resources, farmlands and floodplains sections of this PEA.

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Ms. Rawnsley has eight years of experience in the fields of environmental impact analysis and land use planning, including management and preparation of environmental review documentation. Ms. Rawnsley has contributed to NEPA documents for several NOAA projects, analyzing effects to utilities, land use, geology and hazardous waste. Ms. Rawnsley prepared the aesthetic and visual resources, utilities and solid waste, and land use sections of this PEA.

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Ms. Garg has over four years of experience in the field of environmental assessment and planning with experience in CEQA and NEPA documents, land use planning and socioeconomic resource impact analysis in both the private- and public-sectors. Ms. Garg prepared the Environmental Justice and Socioeconomic Resources section of this PEA.

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Ms. Marquardt has 11 years of experience in environmental site investigation and project management for soil and groundwater investigations and environmental compliance projects. She has implemented subsurface investigations and remedial actions under the oversight of various regulatory agencies at federal, state and local levels. Ms. Marquardt prepared the Geological and Soils and Hazardous Materials sections of this PEA.

Bonnie de Berry – Resource Analyst

Ms. De Berry has over 10 years of experience directing watershed investigations and hydrology-related studies, with an emphasis on nonpoint sources of pollution and water quality enhancement. She is experienced with evaluations of complex water-quality issues within the federal and state regulatory framework. Ms. de Berry prepared the Water Resources and Hydrological Processes section of this PEA.

Renee Longman – Resource Analyst

Ms. Longman is an urban and environmental planner with over five years of experience preparing NEPA and CEQA documents, particularly in the areas of transportation, municipal

planning and public works projects. As a planner, she works with public agencies in the identification of existing land use conditions, analyzing a proposed project compatibility with existing land uses, and assessing the consistency of a proposed project with relevant planning policies. Ms. Longman prepared the Transportation section of this PEA.

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APPENDIX A

USRCRN PROGRAM INFORMATION

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APPENDIX A-1: GCOS Climate Monitoring Principles

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GCOS CLIMATE MONITORING PRINCIPLES

Effective monitoring systems for climate should adhere to the following principles:*

1. The impact of new systems or changes to existing systems should be assessed prior to implementation.

2. A suitable period of overlap for new and old observing systems is required.

3. The details and history of local conditions, instruments, operating procedures, data processing algorithms and other factors pertinent to interpreting data (i.e., metadata) should be documented and treated with the same care as the data themselves.

4. The quality and homogeneity of data should be regularly assessed as a part of routine operations.

5. Consideration of the needs for environmental and climate-monitoring products and assessments, such as IPCC assessments, should be integrated into national, regional and global observing priorities.

6. Operation of historically-uninterrupted stations and observing systems should be maintained.

7. High priority for additional observations should be focused on data-poor regions, poorly-observed parameters, regions sensitive to change, and key measurements with inadequate temporal resolution.

8. Long-term requirements, including appropriate sampling frequencies, should be specified to network designers, operators and instrument engineers at the outset of system design and implementation.

9. The conversion of research observing systems to long-term operations in a carefully-planned manner should be promoted.

10. Data management systems that facilitate access, use and interpretation of data and products should be included as essential elements of climate monitoring systems.

Furthermore, operators of satellite systems for monitoring climate need to:

(a) Take steps to make radiance calibration, calibration-monitoring and satellite-to-satellite cross-calibration of the full operational constellation a part of the operational satellite system; and

(b) Take steps to sample the Earth system in such a way that climate-relevant (diurnal, seasonal, and long-term interannual) changes can be resolved.

Thus satellite systems for climate monitoring should adhere to the following specific principles:

11. Constant sampling within the diurnal cycle (minimizing the effects of orbital decay and orbit drift) should be maintained.

12. A suitable period of overlap for new and old satellite systems should be ensured for a period adequate to determine inter-satellite biases and maintain the homogeneity and consistency of time-series observations.

…/2

13. Continuity of satellite measurements (i.e. elimination of gaps in the long-term record) through appropriate launch and orbital strategies should be ensured.

14. Rigorous pre-launch instrument characterization and calibration, including radiance confirmation against an international radiance scale provided by a national metrology institute, should be ensured.

15. On-board calibration adequate for climate system observations should be ensured and associated instrument characteristics monitored.

16. Operational production of priority climate products should be sustained and peer-reviewed new products should be introduced as appropriate.

17. Data systems needed to facilitate user access to climate products, metadata and raw data, including key data for delayed-mode analysis, should be established and maintained.

18. Use of functioning baseline instruments that meet the calibration and stability requirements stated above should be maintained for as long as possible, even when these exist on de-commissioned satellites.

19. Complementary in situ baseline observations for satellite measurements should be maintained through appropriate activities and cooperation.

20. Random errors and time-dependent biases in satellite observations and derived products should be identified.

** The ten basic principles (in paraphrased form) were adopted by the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) through decision 5/CP.5 at COP-5 in November 1999. This complete set of principles was adopted by the Congress of the World Meteorological Organization (WMO) through Resolution 9 (Cg-XIV) in May 2003; agreed by the Committee on Earth Observation Satellites (CEOS) at its 17th Plenary in November 2003; and adopted by COP through decision 11/CP.9 at COP-9 in December 2003.*

APPENDIX A-2: USRCRN Siting Criteria

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USRCRN SITING CRITERIA

Basic Site Distribution, Layout, Footprint and Condition:

- The 538-point grid establishes the number of sites, their approximate locations, and their relatively even distribution across CONUS. It ensures that all significant signals of regional climate variability are captured.
- The most desirable surrounding landscape is a relatively large and flat open area with low vegetation, so that the sky view is unobstructed in all directions except at the lower angles of altitude above the horizon.
- The area occupied by sites is recommended to be about 7.3 meters by 7.3 meters (24 feet by 24 feet).
- To be considered for USRCRN sites, locations should be as natural, pristine and undisturbed as possible.

Geographic Location Factors:

- Ownership of the land on which USRCRN sites are located must be public, not private. Properties of Federal, state and local (county/parish and city) government agencies, and university properties, are eligible. Privately owned lands currently are not eligible.
- Site's general location must be sensitive to measuring long-term climate variability and trends. Although the site is representative of the region's climate, it should not be heavily influenced by unique local topographic and mesoscale/microscale features or factors.
- Ideally, site will be within 8 kilometers of an existing or former observing site having a multi-decades-long record of daily maximum and minimum temperature and precipitation measurements.
- Also highly desirable is site's proximity to other currently operating site(s) with personnel expert in climate-observing systems, in part for the value of having available local technical support (SURFRAD, NADP, etc.).
- Site and surrounding area should remain stable, with physical surroundings continuing for 50 to 100 years in present condition without major changes—in particular, from encroachment of man-made structures and activities (e.g., housing development, airport expansion, parking lot construction). There should be minimal risk that site will close due to sale of land or other factors. Sites on federal, state or local government lands (e.g., parks, forests, airports), or on university land (e.g., agricultural research station), often have higher stability. Part of the overall site evaluation process is to review recent (last 10 years) and possible future population growth patterns in the area. In terms of nearby population, smaller is better.
- Site's year-round accessibility by deployment and maintenance personnel and equipment should be assured. Access road conditions, seasonal hindrances, and other access obstacles (e.g., locked gate) must be assessed.
- Site's security should be evaluated. Is it secure or can it be made secure (e.g., by constructing a fence to keep out large animals)? Presence of site host personnel? Proximity/volume of vehicular/pedestrian traffic? Visibility of site to the public? Known vandalism in the area?
- Site should not be close to man-made or natural heat sources: paved surfaces, railroads, rock faces, heat-producing equipment, etc.
- Site should not be too close to a body of water or watercourse (e.g., ocean, lake, reservoir, marsh, river or stream). An elevation difference between the site and the water may lessen the negative effects.
- Site's proximity to tilled lands/agricultural activities should be assessed. Planting, cultivating, harvesting, etc. may interfere with reliable observations.
- Site's geologic condition should be considered for its effect on station infrastructure installation. (For example, bedrock, extensive boulders, sand, or muck areas may hinder installation.)
- Site's drainage should be good, not in the path of runoff or in an area that collects water.

Local-scale meteorological phenomena to avoid:

- Enclosed locations that may trap air and create frequent fog, cold air advection, etc.;
- Locations affected by seasonal wind patterns, such as Santa Ana and Chinook winds;
- Areas where rough terrain or air drainage are proven to result in non-representative temperature data;
- Locations with persistent periods of extreme snowfall or snowdrift depths (several meters/tens of feet); and

Other locations to avoid:

- Sites affected by nearby obstructions—from tall vegetation to buildings. Sites should be at least 100 feet from any extensive concrete or paved surfaces, and have no stationary obstructions that reflect sunlight or cast shadows on the station sensors.
- Endangered species' habitats;
- Sensitive cultural/historical locations;
- Viewsheds—where the station would detract from the quality of the view of scenic/historic attractions; and
- Designated wilderness areas.

A meteorological measurement evaluation (based on the Michel Leroy classification scheme) must be conducted using the USRCRN *Site Score Sheet* (part of the USRCRN Site Survey Checklist). The resultant scores are essential siting criteria.

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APPENDIX B

USRCRN STANDARD OPERATING PROCEDURES
15 – NEPA DOCUMENTATION

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Standard Operating Procedure 15 – NEPA Documentation (Revised November 2012)

Overview

The U.S. Regional Climate Reference Network (USRCRN) Standard Operating Procedure 15 (revised) provides guidance for the site-specific consideration and tiered NEPA evaluation at each prospective USRCRN site considered as potentially viable and available by the NWS. Typical USRCRN facilities and anticipated environmental conditions were analyzed for the nationwide network in a Programmatic Environmental Assessment (PEA). Individually proposed USRCRN sites that conform to the physical and operational criteria analyzed as the Preferred Alternative in the PEA are expected to support a Finding of No Significant Impact (FONSI) provided that the tiered NEPA documentation generally described below is evaluated by NOAA as the USRCRN lead agency and supports a "no significant impact" determination. For individually proposed USRCRN facilities that do not substantially conform to the physical and operational criteria analyzed under the Preferred Alternative in the PEA, or when tiered NEPA documentation cannot support a "no significant impact" determination, an alternative site location or a site-specific NEPA document would be required by NOAA as the lead agency.

The tiered NEPA Documentation needed to support a "no significant impact" determination at the site-specific level is obtained through a series of research and/or consultation steps taken for each resource topic. The steps generally involve site-specific inquiries with agencies or individuals with demonstrated expertise in the potentially affected resource at a prospective USRCRN site. This may be in the form of:

- studies or other credible data that supports a professional judgment as to the presence or absence of a resource;
- identification of actions that are known to avoid a resource;
- documentation regarding the potential effect of the project and adherence to federal regulations, Acts and Executive Orders, prepared by land managers or cooperating agencies, or if needed, exchanged with affected regulatory agencies.

These steps are used to arrive at an Evaluation Outcome that either supports a FONSI or the need for a site-specific EA. Note that certain Acts are regulated at the state level, such as the National Historic Preservation Act, the Coastal Zone Management Act, and aspects of the Clean Water Act.

In many cases, the public agency managing land at prospective USRCRN sites will have either jurisdiction over acceptable land uses and/or specialized expertise in the resources present or potentially present within a preferred or alternative site. Cooperation of the federal lead agency with these other interested and affected parties is a basic compliance requirement under NEPA. Statute language in Section 101(a) of NEPA directs that federal government policies be developed "in cooperation with other concerned public and private organizations."

Consistent with CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500-1508), specifically at Section 1501, *Cooperating agencies,* NOAA would determine the degree of jurisdiction and applicable resource expertise that would warrant a request

for an agency's participation as a cooperating agency. Conversely, an agency may request that it be designated as a cooperating agency by NOAA, as the lead agency. Federal, state or local agencies or Native American tribes (for prospective sites on lands of tribal interest) may, by agreement with the lead agency, become a cooperating agency. Pursuant to 40 CFR 1506.3, a cooperating agency may adopt the environmental document of a lead agency without recirculation.

A request for participation as a cooperating agency should occur at the earliest possible time in the site-evaluation process. The goal is to use the expertise of cooperating agencies to the maximum extent possible, consistent with NOAA's responsibility as lead agency. Each cooperating agency would fund their participation in the USRCRN site-specific NEPA documentation process. NOAA and candidate cooperating agencies would discuss and document their respective cooperating responsibilities by letter or memorandum. The document would identify when and how the cooperating agencies would be asked to contribute their expertise. Such participation from cooperating agencies does not mean that the lead agency is delegating its decision authority. The lead agency is still responsible for the NEPA process, regulatory compliance and decisions concerning site selection.

Tiered NEPA Documentation Process

Resource Topic	Tiered NEPA Documentation Process	Evaluation Outcome
Land Use	Coordinate with host/cooperating agency to identify land use conflicts with objectives of relevant management plans.	
	Identify and document avoidance of land use conflicts.	
	Obtain host/cooperating agency concurrence with documentation.	
Geology	Coordinate with host/cooperating agency to evaluate the potential for paleontological resources to be present.	
	Identify existing paleontological studies for the affected area, or whether a preconstruction surface assessment is appropriate. For National Park Service lands, these may occur at any of 237 parks (http://www.nature.nps.gov/geology/nationalfossilday/park_list.cfm).	
	Identify and document avoidance of paleontological resources.	
	If avoidance is not possible, collect and properly care for significant resources prior to site disturbance.	
Water	Coordinate with host/cooperating agency to evaluate the potential for surface/subsurface water resources to be present.	
	Identify and avoid highly erodible soils found at the Natural Resources Conservation Service (NRCS) soil survey website: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.	
	Identify 'Area of Interest', then click on Soil Data Explorer tab, and then the 'Suitabilities and Limitations for Use' tab. Expand the 'Land Management' menu and click on 'Erosion Hazard (off-road, off-trail) and then 'view rating'.	
	Avoid soil types that have "severe" or "highly severe" rating.	

Resource Topic	Tiered NEPA Documentation Process	Evaluation Outcome
	If avoidance is not possible, apply erosion prevention measures and periodic maintenance.	
Air Quality	No effect per PEA.	
Recreation and Wilderness	Research federal designated wilderness areas at: http://nationalatlas.gov/mld/wildrnp.html .	
	Coordinate with host/cooperating agency to identify sensitive recreational resources.	
	Avoid designated or eligible wilderness areas, and sensitive recreational resources.	
	Document research and other expertise obtained to demonstrate avoidance of sensitive recreation and wilderness resources.	
Environmental Justice and Socio-Economics	No effect per PEA.	
Cultural	Coordinate with host/cooperating agency/tribal government or state repository to identify sites of known cultural values or archaeological studies prepared at prospective USRCRN sites.	
	Comply with any existing Section 106 Programmatic Agreement stipulations relevant to the particular host/cooperating agency.	
	Identify, evaluate (using criteria in 36 CFR 60.4), and document the level of effects, if any, to historical properties posed by the action within the Area of Potential Effects (APE), as defined in consultation with NOAA and the appropriate SHPO.	
	If historic properties are considered to exist within the APE, first document how avoidance will be implemented and submit findings to appropriate SHPO/THPO requesting concurrence on findings.	
	Prepare Memoranda of Agreement (MOAs), if needed, to delineate measures to resolve adverse effects.	
Flora & Fauna – threatened and endangered species	Coordinate with host/cooperating agency to identify sites of known protected species that may occur at prospective USRCRN sites.	
	Obtain protected species lists for terrestrial species from federal and state regulatory agencies, such as state Natural Heritage Programs, Departments of Fish and Game/Wildlife found at: http://www.fws.gov/offices/statelinks.html http://www.natureserve.org/visitLocal/index.jsp	
	Identify species or habitat occurrence at or near the areas of interest. Sources include: http://ecos.fws.gov/ipac/wizard/chooseLocation!prepare.action http://criticalhabitat.fws.gov/crithab/.	
	Avoid protected flora and fauna and their critical habitat.	
	Consult with the USFWS and/or the regulatory state agency (for State-listed species) to confirm resource avoidance or assess	

Resource Topic	Tiered NEPA Documentation Process	Evaluation Outcome
	whether resources potentially present would be adversely affected.	
	Document Determination from USFWS and state agencies as follows: No adverse effect determination; or where adverse effects cannot be avoided: • Prepare a biological assessment and identify mitigation measures. • Seek a Biological Opinion from the USFWS and agreement to conclude the ESA Section 7 or state review processes.	
Flora & Fauna – Migratory Birds	Coordinate with host/cooperating agency to identify sites of known nest sites that may occur within ¼ mile (400 m) of prospective USRCRN sites.	
	Identify migratory bird nesting bird season for site region through consultation with USFWS.	
	Avoid construction during the nesting bird season, or confirm no nests are present within two weeks of initiating construction.	
	Document efforts to avoid 'taking' as defined under the Migratory Bird Treaty Act.	
Wetlands	Coordinate with host/cooperating agency to identify presence or absence of jurisdictional wetlands at prospective USRCRN sites using U.S. Army Corps of Engineers (USACE) protocols.	
	Avoid known wetlands using on-line mapping resources: • USFWS Wetland Inventory Map of known wetlands resources. http://www.fws.gov/wetlands/ • NRCS soil type: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx and http://soils.usda.gov/survey/printed_surveys/ • NRCS database of hydric soils: http://soils.usda.gov/use/hydric/ • USACE wetland indicators: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/rw_bro.pdf	
	Confirm avoidance of wetlands (and Waters of the U.S.). Not all wetlands are mapped.	
	Document avoidance of jurisdictional wetlands, Waters of the U.S. or State-protected wetlands resources.	
	Document Determination – No jurisdictional wetlands present; Or Where jurisdictional wetlands cannot be avoided: • Prepare a wetlands delineation according to USACE-accepted protocols, • Minimize the volume of affected wetlands • Prepare appropriate permit applications (i.e., NWP)	

Resource Topic	Tiered NEPA Documentation Process	Evaluation Outcome
	under Section 404 of the CWA.	
Floodplains	Coordinate with host/cooperating agency to identify presence or absence of the 1% chance (100-year) floodplain at prospective USRCRN sites.	
	Identify 100-year floodplain boundary using https://hazards.fema.gov/wps/portal/mapviewer.	
	Avoid sites within the 100-year (1% chance) floodplain.	
	Should no practicable alternative to locating a USRCRN station within a 100-year floodplain exist, prepare documentation via conformance with the FEMA eight-step or the DOC EMM process. (See PEA.)	
Coastal Zone Management	Coordinate with host/cooperating agency to determine whether a prospective USRCRN site is within the coastal zone, or refer to: http://coastalmanagement.noaa.gov/mystate/docs/StateCZBoundaries.pdf.	
	Coordinate with host/cooperating agency and the state (or local) coastal program, and review management plans, to identify affected enforceable policies (e.g., avoiding sensitive coastal habitat and coastal dependent land use). Review coastal program policies, resource maps and databases, and consult with host public agencies to avoid water quality impacts and coastal hazards.	
	Avoid sensitive coastal habitat and coastal dependent land uses.	
	Prepare and submit a consistency determination using PEA and site-specific NEPA documentation 2 months prior to desired approval date, or a less detailed "negative determination" analysis at least 2-6 months in advance of desired approval date.	
	Contact the state coastal program for acceptance of consistency/negative determination.	
Farmlands	Coordinate with host/cooperating agency to identify presence or absence of soils that may qualify as prime farmland at prospective USRCRN sites.	
	Research http://www.farmlandinfo.org/states/ for state/regional farmland or soils information to identify prime, locally important or unique farmland boundaries.	
	Avoid prime, locally important or unique farmland.	
	If avoidance is not possible, contact the local NRCS or agricultural extension/cooperative station and complete a U.S. Department of Agriculture (USDA) Farmland Conversion Impact Rating form (Form AD-1006).	
	Document whether the proposed conversion is consistent with the FPPA.	
Noise	No effect per PEA.	

Resource Topic	Tiered NEPA Documentation Process	Evaluation Outcome
Transportation	No effect per PEA.	
Utilities	No effect per PEA.	
Aesthetics and Visual Resources	Coordinate with host/cooperating agency to identify presence or absence of sensitive visual resources at or near prospective USRCRN sites. Adhere to that agency's policies regarding visual resource management.	
	Identify and avoid highly visually sensitive areas.	
	Avoid highly visually sensitive areas.	
Hazardous Materials	Coordinate with host/cooperating agency to identify the presence or absence of hazardous materials at or near prospective USRCRN sites.	
	Identify if sites have known existing contamination. Use the federal Environmental Protection Agency "STORET" and http://www.epa.gov/superfund/sites/index.htm databases, and state/local sources (state and county departments of water resources, environmental health, environmental conservation, and/or environmental protection).	
	Avoid sites with known existing contamination.	
	Prepare environmental due-diligence documentation such as a Phase I Environmental Site Assessment (per NOAA SECO direction).	

Completed by:	Approved by:
Name	Name
Signature	Signature
Date:	Date:

APPENDIX C

DATA LISTS AND FORMS

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APPENDIX C-1: Description of Coastal Zone Boundaries

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STATE COASTAL ZONE BOUNDARIES
February 9, 2012

STATE	DEFINITION OF STATE'S COASTAL ZONE **(The seaward boundary of the Great Lake States is the U.S.-Canada International boundary, and for all other States is the 3 nautical mile territorial sea, except for those States marked with an asterisk (*)**
ALABAMA	Alabama's coastal zone extends inland to the continuous 10-foot elevation contour in Baldwin and Mobile Counties.
ALASKA	As of July 1, 2011, Alaska no longer has a federally approved coastal management program or defined coastal zone and federal consistency does not apply to Alaska. Contact NOAA's Office of Ocean and Coastal Resource Management for additional information.
AMERICAN SAMOA	American Samoa's coastal zone is the entire Territory.
CALIFORNIA & BCDC	California's coastal zone generally extends 1,000 yards inland from the mean high tide line. In significant coastal estuarine habitat and recreational areas it extends inland to the first major ridgeline or 5 miles from the mean high tide line, whichever is less. In developed urban areas, the boundary is generally less than 1,000 yards. The coastal zone for the San Francisco Bay Conservation and Development Commission (BCDC) includes the open water, marshes and mudflats of greater San Francisco Bay, and areas 100 feet inland from the line of highest tidal action. The boundary also includes: the Suisun marsh and buffer zone: managed wetlands diked off from the Bay; and open waters diked off from the Bay and used in salt production.
CONNECTICUT	Connecticut's coastal zone has two tiers incorporated within the 36 coastal townships. The first tier is bounded by a continuous line delineated by a 1,000 foot linear setback measured from the mean high water mark in coastal waters; or a 1,000 foot linear setback measured from the inland boundary of state regulated tidal wetlands; or the continuous interior contour elevation of the one hundred year frequency coastal flood zone; whichever is farthest inland. The second tier is the area between the inland boundary of the 36 coastal communities and the inland boundary of the first tier.
DELAWARE	Delaware's coastal zone includes the whole state.
FLORIDA *	Florida's coastal zone is the entire State, but has two tiers. Local governments eligible to receive coastal management funds are limited to those Gulf and Atlantic coastal cities and counties which include or are contiguous to state water bodies where marine species of vegetation constitute the dominant plant community. Florida's seaward boundary in the Gulf of Mexico is 3 marine leagues (9 nautical miles) and is 3 nautical miles in the Atlantic.
GEORGIA	Georgia's coastal zone includes the 11 counties that border tidally-influenced waters or have economies that are closely tied to coastal resources.
GUAM	Guam's coastal zone is the entire Territory.
HAWAI'I	Hawai'i's coastal zone is the entire state.

ILLINOIS	Illinois' coastal zone has two components. The Lakeshore Boundary is based on the Lake Michigan watershed and is generally parallel to the Lake Michigan shoreline. The Inland Waterway Boundary includes Inland Waterway Corridors, which are select segments of the Chicago River system (North Branch, South Branch, Main Branch and North Shore Channel) and select segments of the Little Calumet and Grand Calumet Rivers. The Inland Waterway Corridors consist of both the waterway and designated land area to either side of the waterway.
INDIANA	Indiana's coastal zone is based on watershed boundaries within coastal townships and the counties of Lake, Porter and LaPorte. To create an inland boundary that is identifiable in practical landmarks, the coastal zone boundary is described based on the U.S. Geological Survey Quadrangle maps and major roads for each county. The coastal zone boundary is located in the northern portions of Lake, Porter, and LaPorte Counties. At its widest extent, the boundary extends away from the shoreline 17 miles to the Crown Point area and at its narrowest point, less than 2 miles, just north of Hudson Lake in LaPorte County. *See* NOAA, *Indiana Lake Michigan Coastal Program and Final Environmental Impact Statement*, Appendix C (April 2002), to determine the precise coastal zone boundary in a particular area of the State.
LOUISIANA	Louisiana's coastal zone varies from 16 to 32 miles inland from the Gulf coast and generally follows the Intracoastal Waterway running from the Texas-Louisiana state line then follows highways through Vermilion, Iberia, and St. Mary parishes, then dipping southward following the natural ridges below Houma, then turning northward to take in Lake Pontchartrain and ending at the Mississippi-Louisiana border.
MAINE	Maine's coastal zone includes the inland line of coastal towns on tidewaters and all islands.
MARYLAND	Maryland's coastal zone extends to the inland boundary of the 16 counties bordering the Atlantic Ocean, the Chesapeake Bay, and the Potomac River (as far as the municipal limits of Washington, D.C), and includes Baltimore City and all local jurisdictions within the counties.
MASSACHUSETTS	Massachusetts' coastal zone extends 100 feet inland of specified major roads, RR tracks, or other visible right of ways which are located within a half mile of coastal waters or salt marshes. The coastal zone includes all islands, transitional and intertidal areas, and coastal wetlands and beaches. In instances where the road boundary excludes significant resource areas, the boundary line may depart from the road to encompass.
MICHIGAN	Michigan's coastal zone, generally, extends a minimum of 1,000 feet from the ordinary high water mark. The boundary extends further inland in some locations to encompass coastal lakes, rivermouths, and bays; floodplains; wetlands; dune areas; urban areas; and public park, recreation, and natural areas.
MINNESOTA	Minnesota's coastal zone is divided into three areas. The first includes the area of the St. Louis River in Carlton County, south of Duluth. The second is the city of Duluth and surrounding areas of urban growth and expansion to the north and west. The third is the region between the Duluth city limits north to the Canadian border, also known as the "North Shore," which includes portions of St. Louis, Lake, and Cook Counties. *See* NOAA, *Minnesota's Lake Superior Coastal Program Final Environmental Impact Statement*, Chapter One, (May 1999), to determine the precise coastal zone boundary in a particular area of the State.

MISSISSIPPI	Mississippi's coastal zone includes the 3 counties adjacent to the coast. The coastal zone includes these counties, as well as all adjacent coastal waters. Included in this definition are the barrier islands of the coast.
NEW HAMPSHIRE	New Hampshire's coastal zone is the 17 coastal municipalities.
NEW JERSEY	New Jersey's coastal zone recognizes four distinct regions of the State and treats them separately. From the New York border to the Raritan Bay, the boundary extends landward from mean high water to the first road or property line. From the Raritan Bay south along the Atlantic shoreline and up to the Delaware Memorial Bridge, the boundary extends from half a mile to 24 miles inland (1,376 square miles of land area). From the Delaware Memorial Bridge northward up the Delaware River to Trenton, the boundary extends landward to the first road inclusive of all wetlands. The fourth boundary serves a 31-mile square area in the northeast corner of the state bordering the Hudson river (New Jersey Meadowlands Commission).
NEW YORK	New York's coastal zone varies from region to region while incorporating the following conditions: The inland boundary is approximately 1,000 feet from the shoreline of the mainland. In urbanized and developed coastal locations the landward boundary is approximately 500 feet from the mainland's shoreline, or less than 500 feet where a roadway or railroad line runs parallel to the shoreline at a distance of under 500 feet and defines the boundary. In locations where major state-owned lands and facilities or electric power generating facilities abut the shoreline, the boundary extends inland to include them. In some areas, such as Long Island Sound and the Hudson River Valley, the boundary may extend inland up to 10,000 feet to encompass significant coastal resources, such as areas of exceptional scenic value, agricultural or recreational lands, and major tributaries and headlands.
NORTH CAROLINA	North Carolina's coastal zone includes the 20 counties that in whole or in part are adjacent to, adjoining, intersected by or bounded by the Atlantic Ocean or any coastal sound(s). Within this boundary, there are two tiers. The first tier is comprised of Areas of Environmental Concern (AEC) and is subject to more thorough regulatory controls. AECs include: coastal wetlands, estuarine waters, public trust areas, estuarine shorelines, ocean beaches, frontal dunes, ocean erosion areas, inlet lands, small surface water supply watersheds, pubic water supply well-fields, and fragile natural resource areas. The second tier includes land uses which have potential to affect coastal waters even though they are not located in AECs.
NORTHERN MARIANA ISLANDS	Northern Mariana Islands' coastal zone is the entire Commonwealth. (Note: a recent federal court decision ruled that the Commonwealth does not own the adjacent territorial sea. A consent decree allows the CNMI to manage the area.)
OHIO	Ohio's coastal zone includes portions of 9 counties bordering Lake Erie and its tributaries and varies depending on biophysical characteristics of various coastal regions– in the western part of the coast the boundary extends inland up to 15 miles along certain low lying wetland and floodplain areas; in most of the eastern part of the State, areas with high bluffs, the boundary extends inland for only about an eighth of a mile, with the exception of the Mentor Marsh area.
OREGON	Oregon's coastal zone extends inland to the crest of the coastal range, except for the following: along the Umpqua River, where it extends upstream to Scottsburg; along the Rogue River, where it extends upstream to Agness; and except in the Columbia River Basin, where it extends upstream to the downstream end of Puget Island.

PENNSYLVANIA	Pennsylvania's coastal zone along Lake Erie varies from 900 feet in urban areas to over 3 miles in more rural areas, and encompasses the floodplains of Lake Erie and tributary streams, bluff hazards recession areas, and coastal wetlands. The coastal zone along the Delaware River Estuary extends inland to 660 feet in urbanized areas, to 3.5 miles in rural areas, and includes floodplains of the Delaware and Schuykill Rivers and their tributaries to the upper limit of tidal influence, and tidal and freshwater wetlands.
PUERTO RICO *	Puerto Rico's coastal zone, generally, extends 1,000 meters inland; however, it extends further inland in certain areas to include important coastal resources. Puerto Rico's seaward boundary is 3 marine leagues (9 nautical miles).
RHODE ISLAND	Rhode Island's coastal zone includes the whole state. However, the inland extent of the regulatory authority of the State's CZMA agency is 200 feet inland from any coastal feature, to watersheds, and to certain activities that occur anywhere within the State that include: power-generating plants; petroleum storage facilities; chemical or petroleum processing; minerals extraction; sewage treatment and disposal plants; solid waste disposal facilities; and, desalination plants.
SOUTH CAROLINA	South Carolina's coastal zone includes all lands and waters in the counties which contain any one or more of the critical areas (coastal waters, tidelands, beaches, and primary oceanfront sand dunes).
TEXAS *	Texas' coastal zone is generally the area seaward of the Texas coastal facility designation line which roughly follows roads that are parallel to coastal waters and wetlands generally within one mile of tidal rivers. The boundary encompasses all or portions of 18 coastal counties. Texas' seaward boundary is 3 marine leagues (9 nautical miles).
VIRGINIA	Virginia's coastal zone includes the 29 counties, 17 cities, and 42 incorporated towns of *Tidewater Virginia*, including the Atlantic Coast watershed and portions of the Chesapeake Bay and Albemarle-Pamlico Sound watersheds.
VIRGIN ISLANDS	Virgin Islands' coastal zone includes the entire territory.
WASHINGTON	Washington's coastal zone is the 15 coastal counties that front saltwater.
WISCONSIN	Wisconsin's coastal zone is the 15 counties that front Lake Superior, Lake Michigan, or Green Bay.

APPENDIX C-2: USDA Farmland Conversion Impact Rating Form AD-1006

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U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request	
Name of Project	Federal Agency Involved	
Proposed Land Use	County and State county and state	
PART II *(To be completed by NRCS)*	Date Request Received By NRCS	Person Completing Form:

Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	0	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	0	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.