

10 GLOSSARY

Active pitch control: Continuous adjustment of the orientation of a turbine blade's airfoil in order to achieve maximum efficiency or maintain the rotation speed within design limits.

Adiabatic change: Change in the volume and pressure of a parcel of gas without an exchange of heat between the parcel of gas and its surroundings.

Adaptive management: A management system that is designed to make changes (i.e., to adapt) in response to new information and changing circumstances.

Aerodynamic noise: Aerodynamic noise is produced by the movement of an object through the air. For wind turbines, it is the noise caused by the rotor blades passing through the air, often described as a "swishing" sound. In general, the higher the rotational speed, the louder the sound.

Aerodynamics: The study of the forces exerted on and the flow around solid objects moving relative to a gas, especially the atmosphere.

Aerodynamic stall: A condition in which the wind's aerodynamic lifting force is approximately equal to its aerodynamic drag, resulting in the lowest wind power capture by the blade.

Aggregate: Mineral materials such as sand, gravel, crushed stone, or quarried rock used for construction purposes.

Air density: The weight of a given volume of air. Air is denser at a lower altitude, lower temperature, and lower humidity.

Air toxics: Substances that have adverse impacts on human health when present in ambient air.

Alluvial: Formed by the action of running water; of or related to river and stream deposits.

Alluvial fan: A gently sloping mass of unconsolidated material (e.g., clay, silt, sand, or gravel) deposited where a stream leaves a narrow canyon and enters a plain or valley floor. Viewed from above, it has the shape of an open fan. An alluvial fan can be thought of as the land counterpart of a delta.

Alternating current (ac): A flow of electrical current that increases to a maximum in one direction, decreases to zero, and then reverses direction and reaches maximum in the other direction. The cycle is repeated continuously. The number of such cycles per second is equal to the frequency, measured in Hertz (Hz). U.S. commercial power is 60 Hz.

American Antiquities Act of 1906: This act prohibits excavating, injuring, or destroying any historic or prehistoric ruin or monument or object of antiquity on federal land without the prior approval of the agency with jurisdiction over the land.

American Indian Religious Freedom Act of 1978: This act requires federal agencies to consult with Tribal officials to ensure protection of religious cultural rights and practices.

Anemometer: An instrument that measures wind speed or wind speed and direction.

Anthropogenic: Human made; produced as a result of human activities.

Aquifer: A permeable underground formation that yields usable amounts of water to a well or spring. The formation could be sand, gravel, limestone, and/or sandstone.

Archaeological and Historical Preservation Act of 1966, as Amended: This act directly addresses impacts to cultural resources resulting from federal activities that would significantly alter the landscape. The focus of the law is the creation of dams and the impacts resulting from flooding, creation of access roads, etc. Its requirements, however, are applicable to any federal action.

Archeological Resources Protection Act of 1979: This act requires a permit for excavation or removal of archeological resources from public or Native American lands.

Archaeological site: Any location where humans have altered the terrain or discarded artifacts during prehistoric or historic times.

Areas of Critical Environmental Concern (ACECs): These areas are managed by the Bureau of Land Management and are defined by the Federal Land Policy and Management Act of 1976 as having significant historical, cultural, and scenic values, habitat for fish and wildlife, and other public land resources, as identified through the Bureau of Land Management's (BLM's) land use planning process.

Array (turbine): The positioning and spatial arrangement of wind turbines relative to each other.

Attainment area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards for a given pollutant. An area may be in attainment for one pollutant and in nonattainment for others.

Attenuation: The reduction in level of sound.

Bald and Golden Eagle Protection Act of 1940: This act makes it unlawful to take, pursue, molest, or disturb bald and golden eagles, their nests, or their eggs. Permits must be obtained from the U.S. Department of the Interior in order to relocate nests that interfere with resource development or recovery.

Best management practices (BMPs): A practice (or combination of practices) that are determined to provide the most effective, environmentally sound, and economically feasible means of managing an activity and mitigating its impacts. Best management practices adopted as part of the proposed Wind Energy Development Program would identify for the BLM, industry,

and stakeholders the best set of practices for developing wind energy and ensuring minimal impact to natural and cultural resources.

Betz limit: The maximum fraction of the power in the wind that can theoretically be extracted by a wind turbine, usually given as $16/27$ (about 59%).

Biological assessment: A document prepared for the Endangered Species Act of 1973 Section 7 process to determine whether a proposed major construction activity under the authority of a federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat.

Biological opinion: A document resulting from formal consultation with the U.S. Fish and Wildlife Service. The document presents the opinion of the U.S. Fish and Wildlife Service as to whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Biomass: Anything that is or has once been alive.

Biota: The living organisms in a given region.

Boiler slag: A noncombustible by-product collected from the bottom of furnaces that burn coal for the generation of steam. When molten boiler slag comes in contact with water it fragments into coarse, black, angular particles having a smooth, glassy appearance. These particles are used for blasting grit and roofing granules.

Borrow pit: A pit or excavation area used for gathering earth materials (borrow) such as sand or gravel.

Broadband noise: Broadband noise is noise that has a continuous spectrum (i.e., energy is present at all frequencies in a given range). This type of noise lacks a discernible pitch and is described as having a “swishing” or “whooshing” sound.

Bureau of Land Management (BLM): An agency of the U.S. Department of the Interior that is responsible for managing public lands.

Candela: The International System of Units standard unit of measurement of light intensity (formerly called the candle). The power of a light source is often expressed in candelas per square meter.

Candidate species: Candidate species are plant and animals for which the U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a listing regulation is precluded by other higher priority listing activities.

Canopy: The upper forest layer of leaves consisting of tops of individual trees whose branches sometimes cross each other.

Capacity factor: The practically available power (usually expressed as a percentage) from a wind turbine. It is defined as the ratio of the annual energy output of a wind turbine to the turbine's rated power times the total number of hours in a year (8,760).

Carbon monoxide (CO): A colorless, odorless gas that is toxic if breathed in high concentrations over an extended period. Carbon monoxide is listed as a criteria air pollutant under Title I of the Clean Air Act.

Carrion: The dead, decomposing flesh of an animal.

Categorical Exclusion (CX): Under the National Environmental Policy Act, these are classes of actions that the U.S. Department of the Interior has determined do not individually or cumulatively have a significant effect on the human environment.

Chaparral: A plant community of shrubs and low trees adapted to annual drought and often extreme summer heat and also highly adapted to fires recurring every 5 to 20 years.

Clean Air Act (CAA): This act establishes national ambient air quality standards and requires facilities to comply with emission limits or reduction limits stipulated in State Implementation Plans. Under this act, construction and operating permits, as well as reviews of new stationary sources and major modifications to existing sources, are required. The act also prohibits the federal government from approving actions that do not conform to SIPs.

Clean Water Act (CWA): This act requires National Pollutant Discharge Elimination System permits for discharges of effluents to surface waters, permits for storm water discharges related to industrial activity, and notification of oil discharges to navigable waters of the United States.

Coal production (on BLM lands): The Mineral Leasing Act of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976 requires competitive leasing of coal. These leases require payment of a royalty rate of 12.5% for surface-mined coal (8% for coal mined by underground methods), diligent development of commercial quantities of coal within 10 years of lease issuance, and stipulations to protect other resources within the lease. The BLM routinely inspects all coal to ensure accurate reporting of coal production and maximum economic recovery of the coal resource.

Code of Federal Regulations (CFR): A compilation of the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the United States. It is divided into 50 titles that represent broad areas subject to federal regulation. Each volume of the CFR is updated once each calendar year and is issued on a quarterly basis.

Conifers: Cone-bearing trees, mostly evergreens, that have needle-shaped or scale-like leaves.

Conterminous United States: The 48 mainland states, excluding Alaska and Hawaii.

Coriolis effect: The deflection sideways of free-moving air or water bodies (e.g., wind, ocean currents, airplanes, and missiles) relative to the solid earth beneath, as a result of the earth's

eastward rotation. The Coriolis effect must be taken into account when projectile trajectories, terrestrial wind systems, and ocean currents are being evaluated.

Corona/corona noise: The electrical breakdown of air into charged particles. The phenomenon appears as a bluish-purple glow on the surface of and adjacent to a conductor when the voltage gradient exceeds a certain critical value, thereby producing light, audible noise (described as crackling or hissing), and ozone.

Council on Environmental Quality (CEQ): Established by the National Environmental Policy Act. Council on Environmental Quality regulations (40 CFR Parts 1500–1508) describe the process for implementing the National Environmental Policy Act, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Criteria air pollutants: Six common air pollutants for which National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency under Title I of the Clean Air Act. They are sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter (PM_{2.5} and PM₁₀), and lead. Standards were developed for these pollutants on the basis of scientific knowledge about their health effects.

Critical habitat: The specific area within the geographical area occupied by the species at the time it is listed as an endangered or threatened species. The area in which physical or biological features essential to the conservation of the species are found. These areas may require special management or protection.

Cryptobiotic organisms: Cryptobiotic organisms are soil-dwelling organisms, including cyanobacteria (blue-green bacteria), microfungi, mosses, lichens, and green algae found in surface soils of the arid and semiarid west. These organisms perform many important functions, including fixing nitrogen and carbon, maintaining soil surface stability, plant growth, and preventing erosion. They bind together with soil particles to create a crust.

Cultural resources: Archaeological sites, architectural structures or features, traditional-use areas, and Native American sacred sites or special-use areas that provide evidence of the prehistory and history of a community.

Culvert: A pipe or covered channel that directs surface water through a raised embankment or under a roadway from one side to the other.

Cumulative impacts: The impacts assessed in an environmental impact statement that could potentially result from incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), private industry, or individual undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cut-in speed: The wind speed below which a wind turbine cannot economically produce electricity. It is unique for each turbine.

Cut-out speed: The wind speed above which a wind turbine cannot economically produce electricity without also potentially suffering damage to its blades or other components.

Decibel (dB): A standard unit for measuring the loudness or intensity of sound. In general, a sound doubles in loudness with every increase of 10 decibels.

Decibel, A-weighted [dB(A)]: A measurement of sound approximating the sensitivity of the human ear and used to characterize the intensity or loudness of a sound.

Decommissioning: All activities necessary to take out of service and dispose of a facility after its useful life.

Demographics: Specific population characteristics such as age, gender, education, and income level.

Desert scrub: The desert scrub community is characterized by plants adapted to seasonally dry climate.

Dewater: To remove or drain water from an area.

Dielectric fluids: Fluids that do not conduct electricity.

Direct current (dc): Electric current that flows in one direction only.

Direct impact: An effect that results solely from the construction or operation of a proposed action without intermediate steps or processes. Examples include habitat destruction, soil disturbance, and water use.

Distributed energy systems: Interconnected wind turbines operating for the express purpose of generating electricity.

Downwind turbine: A turbine whose rotor and blades are oriented to the downwind side of the turbine's support structure. Downwind is the direction toward which the wind is blowing; with the wind.

Ecological refugium: See refugium.

Ecological resources: Fish, wildlife, plants, biota and their habitats, which may include land, air, and/or water.

Ecoregion: A geographically distinct area of land that is characterized by a distinctive climate, ecological features, and plant and animal communities.

Ecosystem: A group of organisms and their physical environment interacting as an ecological unit.

Electric and magnetic fields (EMF): The electric and magnetic fields that surround both big power lines that distribute power and the smaller electric lines in homes and appliances.

Electromagnetic fields: Electromagnetic fields are generated when charged particles (e.g., electrons) are accelerated. Charged particles in motion produce magnetic fields. Electromagnetic fields are typically generated by alternating current in electrical conductors. They are also referred to as EM fields.

Electromagnetic interference: Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electrical equipment. It is caused by the presence of electromagnetic radiation.

Emergency Planning and Community Right-to-Know Act (EPCRA): This act requires emergency release notification, hazardous chemical inventory reporting, and toxic chemical release inventory reporting by facilities, depending on the chemicals stored or used and their amounts.

Emissions: Substances that are discharged into the air from industrial processes, vehicles, and living organisms.

Empirical: Based on experimental data rather than theory.

Endangered species: Any species (plant or animal) that is in danger of extinction throughout all or a significant part of its range. Requirements for declaring a species endangered are found in the Endangered Species Act.

Endangered Species Act of 1973 (ESA): This act requires consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service to determine if endangered or threatened species or their habitats will be impacted by a proposed activity and what, if any, mitigation measures are needed to address the impacts.

Endemic: Unique to a particular region.

Environmental assessment (EA): A concise public document that a federal agency prepares under the National Environmental Policy Act to provide sufficient evidence and analysis to determine whether a proposed action requires preparation of an environmental impact statement or whether a Finding of No Significant Impact can be issued. An environmental assessment must include brief discussions on the need for the proposal, the alternatives, and the environmental impacts of the proposed action and alternatives, and a list of agencies and persons consulted.

Environmental impact statement (EIS): A document required of federal agencies by the National Environmental Policy Act for major proposals or legislation that will or could significantly affect the environment.

Environmental justice: The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Ephemeral: Lasting a very short time.

Exotic species: A plant or animal that is not native to the region where it is found.

Exploration and Mining Activity (on BLM land): Exploration refers to exploring for minerals by way of drilling, trenching, etc. Mining refers to the extraction and processing of minerals. Exploration and mining activities on BLM-managed lands are regulated under 43 CFR Part 3809, which provides for three levels of activity. The first, causal use, requires no contact with the BLM. The second, a notice, is filed for activities that disturb less than 5 acres (2 ha) unreclaimed per calendar year. The third, a plan of operations, is filed for activities that exceed 5 acres (2 ha) unreclaimed per calendar year. Plans of operation require BLM approval and are subject to the National Environmental Policy Act.

Extant: Currently existing.

Extensive Recreation Management Areas: All BLM-administered lands outside Special Recreation Management Areas. These areas may include developed and primitive recreation sites with minimal facilities.

Extremely low frequency (ELF): ELF refers to a band of frequencies from 30 to 300 Hz. Sometimes the band from 0 to 3,000 Hz is considered to be extremely low frequency. The 60 Hz power frequency is in this range.

Federal Cave Resources Protection Act of 1988: This act allows the collection and removal of resources from federal caves only when a permit has been authorized by the Secretary of Agriculture or the Secretary of the Interior.

Federal Land Policy and Management Act of 1976: This act requires the Secretary of the Interior to issue regulations to manage public lands and the property located on those lands for the long term.

Feeder lines: Power lines that travel out from substations to “feed” smaller distribution lines in a certain geographic area.

Fledging success: The average number of offspring fledged (i.e., raised until they leave the nest) per female.

Floater: Nonbreeding adult and subadult birds that move and live within a breeding population.

Floodplain: Mostly level land along rivers and streams that may be submerged by floodwater.

Flora: Plants, especially, those of a specific region, considered as a group.

Fly ash: Small particles of airborne ash produced by burning fossil fuels. Fly ash is expelled as noncombustible airborne emissions or recovered as a by-product for commercial use (e.g., as a replacement for Portland cement used in concrete).

Flyway: A concentrated, predictable flight path of migratory bird species from their breeding ground to their wintering area.

Forbs: Nonwoody plants that are not grasses or grasslike.

Fragmentation of habitat: The breaking up of a single large habitat area such that the remaining habitat patches are smaller and farther apart from each other.

Frost heave: Expansion in soil volume due to the formation of ice. It is generally expressed as an upward movement of the ground surface.

Fugitive dust: The dust released from activities associated with construction, manufacturing, or transportation.

Gallinaceous birds: A term used for birds of the order Galliformes. They are heavy-bodied largely ground-feeding domestic or game birds, including chickens, pheasants, turkeys, grouse, partridges, and quail.

Geologic resources: Material of value to humans that is extracted (or is extractable) from solid earth, including minerals, rocks, and metals; energy resources; soil; and water.

Geology: The science that deals with the study of the materials, processes, environments, and history of the earth, including the rocks and their formation and structure.

Geostrophic wind: Horizontal wind in the upper atmosphere that moves parallel to isobars. It results from a balance between pressure gradient force and Coriolis force.

Geotechnical: Related to the use of scientific methods and engineering principles to analyze and predict the behavior of earth materials. Geotechnical engineers deal with soil and rock mechanics, foundation engineering, ground movement, deep excavation, and related work.

Geothermal energy: Energy that is generated by the heat of the earth's own internal temperature. Sources of geothermal energy include molten rock, hot springs, geysers, steam, and volcanoes.

Geothermal production: Electricity produced from the heat energy of the earth. This energy may be in the form of steam, hot water, or the thermal energy contained in rocks at great depths. The BLM leases geothermal rights to explore for and produce geothermal resources from federal lands or from subsurface mineral rights held by the government.

Grazing permits and leases (on BLM land): A grazing permit authorizing grazing of a specified number and class of livestock within a grazing district on a designated area of land

during specified seasons each year. A grazing lease authorizes the grazing of livestock on public land outside grazing districts during a specified period of time. Grazing privileges are measured in terms of animal unit months.

Gross state product (GSP): The sum of value added in the production of all goods and services in the state in a year. It is a measure of the level of economic activity in the state.

Ground moraine: A deposit of glacial till released beneath the ice sheet as a glacier melts. An unsorted mixture of rocks, boulders, sand, silt, and clay deposited by glacial ice.

Groundwater: The supply of water found beneath the earth's surface, usually in porous rock formations (aquifers), which may supply wells and springs. Generally, it refers to all water contained in the ground.

Grubbing: Removal of stumps, roots, and vegetable matter from the ground surface after clearing and prior to excavation.

Guy wire: Wire or cable used to secure and stabilize wind turbines, meteorological towers, and other vertical objects in wind resource areas.

Habitat: The place, including physical and biotic conditions, where a plant or animal lives.

Hazardous air pollutants (HAPs): See air toxics.

Hazardous material: Any material that poses a threat to human health and/or the environment. Hazardous materials are typically toxic, corrosive, ignitable, explosive, or chemically reactive.

Hazardous material transportation law: The hazardous material transportation law (Title 49, Sections 5101–5127 of the *United States Code*) is the major transportation-related statute affecting transportation of hazardous cargoes. Regulations include The Hazardous Materials Table (49 CFR 172.101), which designates specific materials as hazardous for the purpose of transportation, and Hazardous Materials Transportation Regulations (49 CFR Parts 171–180), which establish packaging, labeling, placarding, documentation, operational, training, and emergency response requirements for the management of shipments of hazardous cargoes by aircraft, vessel, vehicle, or rail.

Hedonic statistical framework: A method of assessing the impact of various structural (number of bedrooms, bathrooms, square footage, age, etc.) and locational attributes (local amenities, fiscal conditions, distance to workplace, etc.) on residential housing prices.

Herbaceous plants: Nonwoody plants.

Hertz (Hz): The unit of measurement of frequency, equivalent to one cycle per second.

Historic properties: Any prehistoric or historic districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the *National Register of Historic Places* maintained by

the Secretary of the Interior. They include artifacts, records, and remains that are related to and located within such properties.

Historic site: The site of a significant event, prehistoric or historic activity, or structure or landscape (existing or vanished), where the site itself possesses historical, cultural, or archeological value apart from the value of any existing structure or landscape.

Hub: The central portion of the rotor to which the blades are attached.

Hydrology: The study of water that covers the occurrence, properties, distribution, circulation, and transport of water, including groundwater, surface water, and rainfall.

Indigenous: Native to an area.

Indirect impact: An effect that is related to but removed from a proposed action by an intermediate step or process. An example would be changes in surface-water quality resulting from soil erosion at construction sites.

Infrasound: Sound waves below the frequency range that can be heard by humans (about 1 to <20 Hz). Infrasound can often be felt, or sensed as a vibration, and can cause motion sickness and other disturbances.

Infrastructure: The basic facilities, services, and utilities needed for the functions of an industrial facility or site. Examples of infrastructure for wind farms are access roads, transmission lines, meteorological towers, etc.

Invasive species: Any species, including noxious and exotic species, that is an aggressive colonizer and can outcompete indigenous species.

Isochronal: Recurring at regular intervals; of equal time.

Lay-down area: An area that has been cleared for the temporary storage of equipment and supplies. To ensure accessibility and safe maneuverability for transport and off-loading of vehicles, lay-down areas are usually covered with rock and/or gravel.

L_{dn}: The day-night average sound level. It is the average A-weighted sound level over a 24-hour period that gives additional weight to noise that occurs during the night (10:00 p.m. to 7:00 a.m.).

Lead: A gray-white metal that is listed as a criteria air pollutant. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Sources include leaded gasoline and metal refineries.

Lek: A traditional site that is used year after year by males of certain bird species for communal display as they compete for female mates.

L_{eq} : For sounds that vary with time, L_{eq} is the steady sound level that would contain the same total sound energy as the time-varying sound over a given time.

Listed species: Any species of fish, wildlife, or plant that has been determined, through the full, formal ESA listing process, to be either threatened or endangered.

Low-frequency sound: Sound waves with a frequency in the range of 20 to 80 Hz. The range of human hearing is approximately 20 to 20,000 Hz.

Marsh: A wetland where the dominant vegetation is nonwoody plants, such as grasses, as compared with a swamp where the dominant vegetation is woody plants, such as trees and shrubs.

Mechanical noise: Noise caused by the vibration or rubbing of mechanical parts. Sources of mechanical noise from wind turbines include the gearbox, the generator, yaw drives, cooling fans, etc.

Meteorological tower: A wind monitoring system that measures meteorological information such as wind speed, wind direction, and temperature at various heights above the ground. These data are used to evaluate the wind resource at a specific location.

Migratory Bird Treaty Act of 1918 (MBTA): This act requires that the USFWS be consulted to determine the effects of a proposed activity on migratory birds and requires that opportunities to minimize the effects be considered.

Mineral materials (salable): For BLM-managed land, these are defined as minerals such as common varieties of sand, gravel, pumice, and clay that are not obtainable under the mining or leasing law, but that can be obtained through purchase or free use permit under the Materials Act of 1947, as amended.

Mitigation: Actions taken to avoid, minimize, rectify, or compensate for any adverse environmental impact.

Mudflat: A flat sheet of mud between the high and low tide marks. Also, the flat bottoms of lakes, rivers, and ponds, largely filled with organic deposits, freshly exposed by a lowering of the water level.

Nacelle: The housing that protects the major components (e.g., generator and gear box) of a wind turbine.

Nameplate rating: The maximum amount of power that can be produced by a wind turbine under ideal conditions. It is usually expressed in watts or megawatts of electrical power.

National Ambient Air Quality Standards (NAAQS): Air quality standards established by the Clean Air Act, as amended. The primary National Ambient Air Quality Standards specify maximum outdoor air concentrations of criteria pollutants that would protect the public health

within an adequate margin of safety. The secondary National Ambient Air Quality Standards specify maximum concentrations that would protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Conservation Areas: Areas designated by Congress to provide for the conservation, use, enjoyment, and enhancement of certain natural, recreational, paleontological, and other resources, including fish and wildlife habitat.

National Environmental Policy Act of 1969 (NEPA): This act requires federal agencies to prepare a detailed statement on the environmental impacts of their proposed major actions significantly affecting the quality of the human environment.

National Historic Preservation Act of 1996, as Amended (NHPA): This act requires federal agencies to take into account the effects of their actions on historical and archaeological resources and consider opportunities to minimize their impacts.

National Historic Trails: These trails are designated by Congress under the National Trails System Act of 1968 and follow, as closely as possible, on federal land, the original trails or routes of travel with national historical significance.

National Landscape Conservation System (NLCS): The National Landscape Conservation System was created by the BLM in June 2000 to increase public awareness of BLM lands with scientific, cultural, educational, ecological, and other values. It consists of National Conservation Areas, National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, and National Historic and Scenic Trails.

National Monument: An area owned by the federal government and administered by the National Park Service, the BLM, and/or U.S. Forest Service for the purpose of preserving and making available to the public a resource of archaeological, scientific, or aesthetic interest. National monuments are designated by the President, under the authority of the American Antiquities Act of 1906, or by Congress through legislation.

National Natural Landmark: An area of national significance, designated by the Secretary of the Interior or the Secretary of Agriculture, that contains outstanding examples of the nation's natural heritage.

National Outstanding Natural Areas: Areas of public land that are either Congressionally or administratively designated on the basis of their exceptional, rare, or unusually natural characteristics.

National Parks: National Parks are public lands set aside by an act of Congress because of their unique physical and/or cultural value to the nation as a whole. They are administered by the National Park Service.

National Pollutant Discharge Elimination System (NPDES): A federal permitting system controlling the discharge of effluents to surface water and regulated through the Clean Water Act, as amended.

National Recreation Area: An area designated by Congress to conserve and enhance certain natural, scenic, historic, and recreational values.

National Recreation Trails: Trails designated by the Secretary of the Interior or the Secretary of Agriculture that are reasonably accessible to urban areas and meet criteria established in the National Trails System Act.

National Scenic Trails: These trails are designated by Congress and offer maximum outdoor recreation potential and provide enjoyment of the various qualities — scenic, historical, natural, and cultural — of the areas through which these trails pass.

National Wild and Scenic River: A river or river section designated by Congress or the Secretary of the Interior, under the authority of the Wild and Scenic Rivers Act of 1968, to protect outstanding scenic, recreational, and other values and to preserve the river or river section in its free-flowing condition.

National Wildlife Refuge: A designation for certain protected areas in the United States managed by the U.S. Fish and Wildlife Service. The National Wildlife Refuge System includes all lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife, and plant resources.

Native American Graves Protection and Repatriation Act: This act established the priority for ownership or control of Native American cultural items excavated or discovered on federal or Tribal land after 1990 and the procedures for repatriation of items in federal possession. The act allows the intentional removal from or excavation of Native American cultural items from federal or Tribal lands only with a permit or upon consultation with the appropriate tribe.

Nitrogen dioxide (NO₂): A toxic reddish brown gas that is a strong oxidizing agent, produced by combustion (as of fossil fuels). It is the most abundant of the oxides of nitrogen in the atmosphere and plays a major role in the formation of ozone.

Nitrogen oxides (NO_x): Nitrogen oxides include various nitrogen compounds, primarily nitrogen dioxide and nitric oxide. They form when fossil fuels are burned at high temperatures and react with volatile organic compounds to form ozone, the main component of urban smog. They are also a precursor pollutant that contributes to the formation of acid rain. Nitrogen oxides are one of the six criteria air pollutants specified under Title I of the Clean Air Act.

Noise Control Act of 1972: This act requires that noise levels of facilities or operations not jeopardize public health and safety. States are authorized to establish their own noise levels.

Nominal (measurement): A design value, based on experience and generally reflecting accepted industry practice. A nominal value (e.g., depth of a tower foundation) may change depending on the conditions at a specific location.

Nonattainment area: The U.S. Environmental Protection Agency's designation for an air quality control region (or portion thereof) in which ambient air concentrations of one or more criteria pollutants exceed National Ambient Air Quality Standards.

Nonenergy leasables: All solid nonenergy mineral that private entities produce under leases issued by the BLM. These entities pay royalties to the federal government based on the value of the mineral they produce. Most of these minerals are used in industry and include sodium, bicarbonate, and potash.

Noxious plants/noxious weeds: Those plants regulated by law or those that are so difficult to control that early detection is important.

Occupational Safety and Health Administration (OSHA): Congress created the Occupational Safety and Health Administration under the Occupational Safety and Health Act on December 29, 1970. Its mission is to prevent work-related injuries, illnesses, and deaths.

Offsets: Reductions in emissions that are caused by an activity not directly related to the source creating the emissions. For example, a company that buys and uses wind-powered electricity has acquired an offset equal to the amount of fossil-fueled energy and carbon dioxide emissions it would have taken to produce the same amount of electricity. Offsets are used to stabilize total emissions in a particular area.

Oil and gas leasing (on BLM land): The BLM leases oil and gas rights to explore for and produce oil and gas resources from federal lands or mineral rights owned by the federal government. Federal oil and gas leases may be obtained and held by any adult citizen of the United States.

Operating range: The range of wind speeds over which a wind turbine is designed to operate and economically produce electricity. It includes all the wind speeds between the cut-in speed and the cut-out speed.

Operator: The party holding the right-of-way grant allowing either monitoring and testing of wind energy resources at a site, or commercial development of a wind energy project.

Outwash plain: A smooth plain covered by deposits from water flowing from glaciers.

Ozone (O₃): A strong-smelling, reactive toxic chemical gas consisting of three oxygen atoms chemically attached to each other. It is formed in the atmosphere by chemical reactions involving nitrogen oxide and volatile organic compounds. The reactions are energized by sunlight. Ozone is a criteria air pollutant under the Clean Air Act and is a major constituent of smog.

Paleontological resources: Any remains, trace, or imprint of a plant or animal that has been preserved in the earth's crust since some past geologic time.

Paleontology: The study of plant and animal life that existed in former geologic times, particularly through the study of fossils.

Particulate matter: Fine solid or liquid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions. The size of the particulates is measured in micrometers (μm). One micrometer is 1 millionth of a meter or 0.000039 inch. Particle size is important because the U.S. Environmental Protection Agency has set standards for $\text{PM}_{2.5}$ and PM_{10} particulates.

Passerines: Perching birds or songbirds.

Permissible exposure limit (PEL): The maximum amount or concentration of a chemical that a worker may be exposed to under Occupational Safety and Health Administration regulations.

Photovoltaic system: A system that converts light into electric current.

Physiography: The physical geography of an area or the description of its physical features.

Pitch: The orientation of a turbine blade relative to the direction of the wind.

Planetary boundary layer: The bottom layer of the atmosphere that is in contact with the surface of the earth. Within this layer, the effects of friction are significant. It is roughly the lowest 1 or 2 kilometers of the atmosphere.

Plateau: A large, flat area of land that is higher than the surrounding land.

Playa/playa lake: Playas form in arid basins where rivers merge but do not drain. They are flat areas that contain seasonal or year-to-year shallow lakes that often evaporate leaving minerals behind.

PM_{10} : Particulate matter with a mean aerodynamic diameter of 10 micrometers (0.0004 in.) or less. Particles less than this diameter are small enough to be deposited in the lungs. PM_{10} is one of the six criteria air pollutants specified under Title I of the Clean Air Act.

$\text{PM}_{2.5}$: Particulate matter with a mean aerodynamic diameter of 2.5 micrometers (0.0001 in.) or less.

Policy: A plan of action adopted by an organization. Policies adopted as part of the proposed Wind Energy Development Program would establish a system for the administration and management of wind energy development on BLM-administered lands.

Pollutant: Any material entering the environment that has undesired effects.

Polychlorinated biphenyls (PCBs): A group of manufactured organic compounds made up of carbon, hydrogen, and chlorine. They were used in the manufacture of plastics and as insulating fluids for electrical equipment. Because they are very stable and fat-soluble, they accumulate in ever-higher concentrations as they move up the food chain. Their use was banned in the United States in 1979.

Population: A group of individuals of the same species occupying a defined locality during a given time that exhibit reproductive continuity from generation to generation.

Potable water: Water that can be used for human consumption.

Power coefficient or rotor power coefficient: The ratio of the rotor power density to the wind power density.

Power density or rotor power density: The mechanical power available at the rotor shaft divided by the swept area of the rotor.

Prevention of Significant Deterioration (PSD) Program: An air pollution-permitting program intended to ensure that air quality does not diminish in attainment areas.

Production Tax Credit (PTC): The Production Tax Credit was a federal policy that promoted the development of renewable energy (including wind energy). It provided qualifying facilities with an annual tax credit based on the amount of electricity that was generated. The Production Tax Credit expired December 31, 2003.

Programmatic Agreement: A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program, complex undertaking, or other situations in accordance with Section 800.14(b), "Programmatic Agreements," of 36 CFR Part 800, "Protection of Historic Properties."

Putrescible waste: Solid waste that contains organic matter that can rot or decompose.

Rain shadow: A region on the leeward (downwind) side of a mountain range where rainfall is noticeably less than the windy (windward) side of a mountain.

Raptor: Bird of prey.

Recharge: The addition of water to an aquifer by natural infiltration (e.g., rainfall that seeps in to the ground) or by artificial injection through wells.

Recreation Opportunity Spectrum (ROS) Class: A tool commonly used by federal land management agencies to determine the level of development, the types of facilities that are appropriate, and the type of recreational opportunities that one will experience. Six recreation opportunity classes have been developed: primitive, semiprimitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. See Section 4.7.5 of the programmatic environmental impact statement for more information.

Refugium: An area where special environmental circumstances have enabled a species or a community of species to survive after extinction in surrounding areas.

Research Natural Areas: Areas designated or set aside by Congress or by a public or private agency to protect natural features or processes for scientific and educational purposes.

Resource Conservation and Recovery Act (RCRA): This act regulates the storage, treatment, and disposal of hazardous and nonhazardous wastes.

Right-of-way (ROW): Public land authorized to be used or occupied pursuant to a right-of-way grant. A right-of-way grant authorizes the use of a right-of-way over, upon, under, or through public lands for construction, operation, maintenance, and termination of a project.

Riparian: Relating to, living in, or located on the bank of a river, lake, or tidewater.

Rotational speed: The rate (in revolutions per minute) at which a turbine blade makes a complete revolution around its axis. Wind turbine speeds can be fixed or variable.

Rotor: The portion of a modern wind turbine that interacts with the wind. It is composed of the blades and the central hub to which the blades are attached.

Rotor diameter: The diameter of the circular area that is swept by the rotating tip of a wind-turbine blade. It is equal to twice the blade length.

Rotor-swept area: The circular area that is swept by the rotating blades. Doubling the length of the blades quadruples the blade-swept area.

Safe Drinking Water Act (SDWA): This act authorizes development of maximum contaminant levels for drinking water applicable to public water systems (i.e., systems that serve at least 25 people or have at least 15 connections).

Savannah: A flat grassland of tropical and subtropical regions usually having distinct periods of dry and wet weather.

Scrubbers: Any of several forms of chemical/physical devices that remove sulfur compounds formed during coal combustion.

Section 7 of the ESA: The section of the Endangered Species Act that requires all federal agencies, in “consultation” with the U.S. Fish and Wildlife Service, to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Sedges: Perennial nonwoody plants that resemble grasses in that they have relatively narrow leaves. They are common to most freshwater wetlands.

Sediment: Materials that sink to the bottom of a body of water, or materials that are deposited by wind, water, or glaciers.

Sedimentary rock: Rock formed at or near the earth's surface from the consolidation of loose sediment that has accumulated in layers through deposition by water, wind, or ice, or deposited by organisms. Examples are sandstone and limestone.

Sedimentation: The removal, transport, and deposition of sediment particles by wind or water.

Seismic: Pertaining to any earth vibration, especially that of an earthquake.

Sensitive species: A plant or animal species listed by the state or federal government as threatened, endangered, or as a species of special concern.

Shadow flicker: The visual effect that occurs when the rotating blades of wind turbines cast shadows that cause a flickering effect.

Shake-down tests: Tests conducted to demonstrate that equipment is operational and meets performance requirements.

Shrub steppe: Habitat composed of various shrubs and grasses.

Silt: Sedimentary material consisting of fine mineral particles intermediate in size between sand and clay.

Siltation: The deposition or accumulation of silt.

Sludge: A dense, slushy, liquid-to-semifluid product that accumulates as an end result of an industrial or technological process designed to purify a substance.

Solid Waste Disposal Act: An act that regulates the treatment, storage, or disposal of solid hazardous and nonhazardous waste.

Sound pressure level: The level, in decibels, of acoustic pressure waves. Very loud sounds have high sound pressure levels; soft sounds have low sound pressure levels. A 3-dB increase in sound doubles the sound pressure level. Zero decibels is the threshold of human hearing. The maximum level of human hearing is around a 120-dB sound pressure level, which is the level where people begin to experience pain because of the high sound pressure levels.

Special areas: Areas of high public interest and containing outstanding natural features or values. BLM special areas include National Wild and Scenic Rivers, National Wildernesses, National Conservation Areas, National Scenic Areas, National Recreation Areas, National Monuments, National Outstanding Natural Areas, National Historic Landmarks, National Register of Historic Places, National Natural Landmarks, National Recreational Trails, National Scenic Trails, National Historic Trails, National Backcountry Byways, Areas of Critical

Environmental Concern, Research Natural Areas, Important Bird Areas, United Nations Biosphere Reserves, and World Heritage Sites.

Special Recreation Management Areas (SRMAs): An area where a commitment has been made to provide specific recreation activity and opportunities for recreational activities and experiences. These areas usually require a high level of recreation investment and/or management. They include recreation sites, but recreation sites alone do not constitute Special Recreation Management Areas.

Special status species: Special status species include both plant and animal species that are proposed for listing, officially listed as threatened or endangered, or are candidates for listing as threatened or endangered under the provisions of the Endangered Species Act; those listed by a state in a category such as threatened or endangered, implying potential endangerment or extinction; and those designated by each BLM State Director as sensitive.

Species of special concern: A species that may have a declining population, limited occurrence, or low numbers for any of a variety of reasons.

State Historic Preservation Officer (SHPO): The State officer charged with the identification and protection of prehistoric and historic resources in accordance with the National Historic Preservation Act.

Stipulation: A restriction that is insisted upon as a condition of agreement. Right-of-way grants issued by the BLM would include project-specific stipulations defining the conditions for wind energy development on BLM-administered lands. The policies and best management practices of the proposed Wind Energy Development Program would provide a baseline set of stipulations; additional stipulations would be developed, as needed, to address site-specific issues and concerns, on the basis of relevant land use plan requirements, other BLM mitigation guidance, and mitigation measures identified and discussed in Chapter 5 of this programmatic environmental impact statement.

Stratigraphy, subsurface: The arrangement (in layers) of different types of geologic materials located below the surface of an area.

Subalpine: The growing or living conditions in mountainous regions just below the timberline.

Substation: A substation consists of one or more transformers and their associated switchgear. It is used to switch generators, equipment, and circuits or lines in and out of a system. It is also used to change ac voltages from one level to another.

Sulfur dioxide (SO₂): A gas formed from burning fossil fuels. Sulfur dioxide is one of the six criteria air pollutants specified under Title I of the Clean Air Act.

Surface water: Water on the earth's surface that is directly exposed to the atmosphere, as distinguished from water in the ground (groundwater).

Switchgear: A group of switches, relays, circuit breakers, etc. Used to control distribution of power to other distribution equipment and large loads.

Terrace: A step-like surface, bordering a valley floor or shoreline, that represents the former position of a floodplain, lake, or sea shore.

Threatened species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Requirements for declaring a species threatened are contained in the Endangered Species Act.

Tip speed or rotor tip speed: The speed of the tip of a rotor blade as it travels along the circumference of the rotor-swept area.

Tip speed ratio: The ratio of the speed of the tip of a rotating blade to the speed of the wind.

Topography: The shape of the earth's surface; the relative position and elevations of natural and human-made features of an area.

Toxic Substances Control Act (TSCA): An act authorizing the U.S. Environmental Protection Agency to secure information on all new and existing chemical substances and to control any of these substances determined to cause an unreasonable risk to public health or the environment.

Transformer: A device for transferring electric power from one circuit to another in an alternating current system. Transformers are also used to change voltage from one level to another.

Transponder: A device that transmits and responds to radio waves.

Turbidity: A measure of the cloudiness or opaqueness of water. Typically, the higher the concentration of suspended material, the greater the turbidity.

Turbine: A device in which a stream of water or gas turns a bladed wheel, converting the kinetic energy of the fluid flow into mechanical energy available from the turbine shaft. Turbines are considered the most economical means of turning large electrical generators. They are typically driven by steam, fuel vapor, water, or wind.

Turbine spacing: The distance between wind turbines in a string. This distance is generally proportional to the rotor diameter.

Upwind turbine: A turbine whose rotor and blades are oriented to the upwind (the direction from which the wind is blowing) side of the turbine's support structure.

U.S. Environmental Protection Agency (EPA): The independent federal agency, established in 1970, that regulates federal environmental matters and oversees the implementation of federal environmental laws.

Viewshed: The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.

Visitor days: One visitor day equals 12 visitor hours at a site or area.

Visual Resource Management (VRM): The planning, design, and implementation of management objectives for maintaining scenic values and visual quality.

Visual resources: The composite of basic terrain, geologic features, hydrologic features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal that the unit may have.

Volatile organic compounds (VOCs): A broad range of organic compounds that readily evaporate at normal temperatures and pressures. Sources include certain solvents, degreasers (benzene), and fuels. Volatile organic compounds react with other substances (primarily nitrogen oxides) to form ozone. They contribute significantly to photochemical smog production and certain health problems.

Voltage flicker: A noticeable dimming of a light source for a fraction of a second (flicker) caused by a sudden dip in voltage. Some people can detect dips as low as a third of a volt.

Watershed: An area from which water drains to a particular body of water. Watersheds range in size from a few acres to large areas of the country.

Wetlands: Areas that are soaked or flooded by surface or groundwater frequently enough or long enough to support plants, birds, animals, and aquatic life. Wetlands generally include swamps, marshes, bogs, estuaries, and other inland and coastal areas and are federally protected.

Wild horses and burros: These are unbranded and unclaimed horses or burros roaming free on public lands in the western United States and protected by the Wild Free-roaming Horse and Burro Act of 1971. They are descendants of animals turned loose by, or escaped from, ranchers, prospectors, Indian Tribes, and the U.S. cavalry from the late 1800s through the 1930s.

Wilderness Areas: Areas designated by Congress and defined by the Wilderness Act of 1964 as places “where the earth and its community are untrammeled by man, where man himself is a visitor who does not remain.” Designation is aimed at ensuring that these lands are preserved and protected in their natural condition.

Wilderness Study Areas (WSAs): Areas designated by a federal land management agency as having wilderness characteristics, thus making them worthy of consideration by Congress for wilderness designation.

Wind farm: One or more wind turbines operating within a contiguous area for the purpose of generating electricity.

Wind resource areas (WRAs): Areas where wind energy is available for use based on historical wind data, topographic features, and other parameters.

Wind shear: The change, sometimes severe, in wind direction caused primarily by geographic features and obstructions near the land surface.

Wind shadow: The area behind an obstacle where air movement is not capable of moving material.

Windward slopes: Those slopes facing into the wind.

Xeric: Low in moisture.

Yaw: Side-to-side movement. For wind turbines, it refers to the angle between the axis of the rotor shaft and the wind direction. As this angle increases, the turbine's ability to capture the wind's energy decreases.

