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**Forest Service Handbook 1909.12 – Land Management Planning Handbook
Zero Code**

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Digest: Following is an explanation of the changes throughout the directive by section.

05: Change the term 'Native knowledge' to 'Indigenous knowledge' and update the definition of that term to align with 36 CFR 219.19, as revised.

07.13: Clarify that 'Indigenous knowledge' and data and information from Tribal and Indigenous participation are appropriate sources of Best Available Scientific Information. Remove the unnecessary qualifier 'other' and eliminate redundant uses of the term 'scientific information.'

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This Handbook provides procedural guidance for implementing land management planning direction for the 2012 Planning Rule (77 FR 21165, April 9, 2012). The primary use is for interdisciplinary team members and Line Officers responsible for planning.

01 – Authority

The Forest and Rangeland Renewable Resources Planning Act, as amended by the National Forest Management Act (NFMA) requires the Forest Service to develop land management plans for units of the National Forest System (NFS). The Act also requires the adoption of implementing regulations to establish a process for developing and revising those plans and to carry out the NFMA's substantive requirements for them (16 USC 1604(a) and (g)). The NFMA implementing regulations are found in Title 36, Code of Federal Regulations, part 219. The regulations establish requirements for planning: assessment; developing, revising, and amending plans and monitoring. The regulations also establish a pre-decisional objection process for plans, revised plans, and amendments. Further planning direction is set forth in FSM 1920. The full text of the 2012 Planning Rule is included as an exhibit in section 08 of this chapter.

03 – Policy

Compliance with the Paperwork Reduction Act (PRA) is required for the collection of information of ten or more persons, whether such collection of information is mandatory, voluntary, or required to obtain or retain a benefit. The term information is defined in section 05 of this chapter. The Responsible Official shall review the PRA (5 CFR 1320) requirements to ensure that methods for obtaining information to meet the requirements of 36 CFR 219.6 and this Handbook are consistent with the Act (see, in particular, 5 CFR 1320.3(h)).

The Responsible Official shall not use any method of obtaining information that is prohibited (absent approval) by the Act. The Office of Management and Budget has approved a generic clearance to collect feedback related to land management planning and the assigned control number is #0596-0234.

04 – Responsibility

The Forest Supervisor is responsible for developing, amending, or revising plans, except when the Regional Forester; the Chief; the Under Secretary, Natural Resources and Environment; or the Secretary acts as the Responsible Official under Title 36, Code of Federal Regulations, section 219.2(b)(3) (36 CFR 219.2(b)(3)). See FSM 1920 for a broad description of Line Officer responsibilities.

05 – Definitions

Adaptation. Adjustment in natural or human systems to a new or changing environment. Adaptation includes, but is not limited to, maintaining primary productivity and basic ecological functions such as energy flow; nutrient cycling and retention; soil development and retention;

predation and herbivory; and natural disturbances. Adaptation occurs primarily by organisms altering their interactions with the physical environment and other organisms.

Adaptive capacity. The ability of ecosystems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations. As applied to ecological systems, adaptive capacity is determined by:

1. Genetic diversity within species in ecosystems, allowing for selection of individuals with traits adapted to changing environmental conditions.
2. Biodiversity within the ecosystem, both in terms of species richness and relative abundance, which contributes to functional redundancies.
3. The heterogeneity and integrity of ecosystems occurring as mosaics within broader-scaled landscapes or biomes, making it more likely that some areas will escape disturbance and serve as source areas for re-colonization.

Adaptive Management. Adaptive management is the general framework encompassing the three phases of planning: assessment, plan development, and monitoring (36 CFR 219.5). This framework supports decision-making that meets management objectives while simultaneously accruing information to improve future management by adjusting the plan or plan implementation. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

Address. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, an individual's or entity's current address used for U.S. Postal Service or other delivery services; an email address does not meet this definition.

Airshed. A geographic area that, because of topography, meteorology, and / or climate is frequently affected by the same air mass.

Alaska Native Corporation. One of the regional, urban, and village native corporations formed under the Alaska Native Claims Settlement Act of 1971 (36 CFR 219.19).

Area of influence. An area influenced by the management of the plan area that is used during the land management planning process to evaluate social, cultural, and economic conditions. The area is usually a grouping of counties.

Assessment. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, an assessment is the identification and evaluation of existing information to support land management planning. Assessments are not decision-making documents, but provide current information on select topics relevant to the plan area, in the context of the broader landscape (36 CFR 219.19).

At-risk species. A term used in land management planning and this Handbook to refer to, collectively, the federally recognized threatened, endangered, proposed, and candidate species and species of conservation concern within a plan area.

Best management practices for water quality (BMPs). Methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

Broader Landscape. For land management planning pursuant to 36 CFR part 219 and this Handbook, the plan area and the lands surrounding the plan area. The spatial scale of the broader landscape varies depending upon the social, economic, and ecological issues under consideration.

Candidate species (36 CFR 219.19).

1. For species under the purview of the U.S. Fish and Wildlife Service (USFWS), a species for which the USFWS possesses sufficient information on vulnerability and threats to support a proposal to list as endangered or threatened, but for which no proposed rule has yet been published by the USFWS.
2. For species under the purview of the National Marine Fisheries Service (NMFS), a species that is:
 - a. The subject of a petition to list as a threatened or endangered species and for which the (NMFS) has determined that listing may be warranted, pursuant to section 4(b)(3)(A) of the Endangered Species Act (16 U.S.C. 1533(b)(3)(A)), or
 - b. Not the subject of a petition but for which the (NMFS) has announced in the Federal Register the initiation of a status review.

Carbon pool. Any natural region or zone, or any artificial holding area, containing an accumulation of carbon or carbon-bearing compounds or having the potential to accumulate such substances. Carbon pools may include live and dead above ground carbon, soil carbon including coarse roots, and harvested wood products.

Carbon stocks. The amount or quantity of carbon contained in a carbon pool. For purposes of carbon stock assessment for National Forest System (NFS) land management planning, carbon pools do not include carbon in fossil fuel resources, lakes or rivers, emissions from agency operations, or public use of NFS lands (such as emissions from vehicles and facilities).

Climate change adaptation. Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. This adaption includes initiatives and measures to reduce the vulnerability of

natural and human systems against actual or expected climate change effects. Adaptation strategies include the following:

1. Building resistance to climate-related stressors.
2. Increasing ecosystem resilience by minimizing the severity of climate change impacts, reducing the vulnerability, and/or increasing the adaptive capacity of ecosystem elements.
3. Facilitating ecological transitions in response to changing environmental conditions.

Collaboration or collaborative process. A structured manner in which a collection of people with diverse interests share knowledge, ideas, and resources, while working together in an inclusive and cooperative manner toward a common purpose. Collaboration, in the context of the land management planning regulation at 36 CFR part 219 and this Handbook, falls within the full spectrum of public engagement described in the Council on Environmental Quality's publication of October 2007: Collaboration in NEPA— A Handbook for NEPA Practitioners (36 CFR 219.19).

Connectivity. Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change (36 CFR 219.19).

Conservation. The protection, preservation, management, or restoration of natural environments, ecological communities, and species (36 CFR 219.19).

Conserve. For the purpose of meeting the requirements of 36 CFR 219.9 and this Handbook, to protect, preserve, manage, or restore natural environments and ecological communities to potentially avoid federally listing of proposed and candidate species (36 CFR 219.19).

Consultation (in relation to the Endangered Species Act). See Formal Consultation and Informal Consultation.

Critical habitat. For a threatened or endangered species, (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act (ESA) (16 USC 1533), on which are found those physical or biological features (a) essential to the conservation of the species, and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the ESA (16 USC 1533), upon a determination by the Secretary that such areas are essential for the conservation of the species. ESA, sec. 3 (5)(A), (16 USC 1532 (3)(5)(A)). Critical habitat is designated through rulemaking by the Secretary of the Interior or Commerce. ESA, sec. 4 (a)(3) and (b)(2) (16 USC 1533 (a)(3) and (b)(2)).

Critical load. The concentration of air pollution or total deposition of pollutants above which specific deleterious effects may occur.

Designated area. An area or feature identified and managed to maintain its unique special character or purpose. Some categories of designated areas may be designated only by statute and some categories may be established administratively in the land management planning process or by other administrative processes of the Federal executive branch. Examples of statutorily designated areas are national heritage areas, national recreational areas, national scenic trails, wild and scenic rivers, wilderness areas, and wilderness study areas. Examples of administratively designated areas are experimental forests, research natural areas, scenic byways, botanical areas, and significant caves (36 CFR 219.19).

Decision document. A record of decision, decision notice, or decision memo (36 CFR 220.3).

Decision memo. A concise written record of the Responsible Official's decision to implement an action that is categorically excluded from further analysis and documentation in an environmental impact statement (EIS) or environmental assessment (EA), where the action is one of a category of actions which do not individually or cumulatively have a significant effect on the human environment, and does not give rise to extraordinary circumstances in which a normally excluded action may have a significant environmental effect (36 CFR 219.62).

Decision Notice. A concise written record of the Responsible Official's decision when an EA and finding of no significant impact (FONSI) have been prepared (36 CFR 220.3).

Desired conditions. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, a description of specific social, economic, and/or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined, but do not include completion dates (36 CFR 219.7(e)(1)(1)). Desired conditions are achievable, and may reflect social, economic, or ecological attributes, including ecosystem processes and functions.

Disturbance. Any relatively discrete event in time that disrupts ecosystem, watershed, community, or species population structure and / or function and changes resources, substrate availability, or the physical environment (36 CFR 219.19).

Disturbance regime. A description of the characteristic types of disturbance on a given landscape; the frequency, severity, and size distribution of these characteristic disturbance types; and their interactions (36 CFR 219.19).

Ecological conditions. The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment. Examples of ecological conditions include the abundance and distribution of

aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species (36 CFR 219.19).

Ecological integrity. The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence (36 CFR 219.19).

Ecological sustainability. See sustainability.

Ecological system. See ecosystem.

Economic sustainability. See sustainability.

Ecosystem. (36 CFR 219.19) A spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its:

1. **Composition.** The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.
2. **Structure.** The organization and physical arrangement of biological elements such as, snags and down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.
3. **Function.** Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances such as wind, fire, and floods.
4. **Connectivity.** See connectivity above.

Ecosystem diversity. The variety and relative extent of ecosystems (36 CFR 219.19).

Ecosystem integrity. See ecological integrity.

Ecosystem services. Benefits people obtain from ecosystems, including:

1. Provisioning services, such as clean air and fresh water, energy, food, fuel, forage, wood products or fiber, and minerals;
2. Regulating services, such as long-term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood and drought control; and disease regulation;

3. Supporting services, such as pollination, seed dispersal, soil formation, and nutrient cycling; and
4. Cultural services, such as educational, aesthetic, spiritual, and cultural heritage values, recreational experiences, and tourism opportunities.

Endangered Species. Any species that the Secretary of the Interior or the Secretary of Commerce has determined is in danger of extinction throughout all or a significant portion of its range. Endangered species are listed at 50 CFR sections 17.11, 17.12, and 224.101.

Environmental assessment (EA). A public document that provides sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact, aids an agency's compliance with the NEPA when no EIS is necessary, and facilitates preparation of a statement when one is necessary (40 CFR 1508.9; FSH 1909.15, Ch. 40) (36 CFR 219.62).

Environmental document. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook: an environmental assessment, environmental impact statement, finding of no significant impact, categorical exclusion, and notice of intent to prepare an environmental impact statement (36 CFR 219.19).

Environmental impact statement (EIS). A detailed written statement as required by section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969 (40 CFR 1508.11; 36 CFR 220) (36 CFR 219.62).

Ephemeral stream. A stream that flows only in direct response to precipitation in the immediate locality (watershed or catchment basin), and whose channel is at all other times above the zone of saturation.

Essential Fish Habitat (EFH). Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity for species managed in Fishery Management Plans under the Magnuson-Stevens Fishery Conservation and Management Act. In this definition, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding growth to maturity" covers a species' full life cycle.

Even-aged stand. A stand of trees composed of a single age class (36 CFR 219.19).

Federally recognized Indian Tribe. An Indian Tribe or Alaska Native Corporation, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian Tribe under the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. 479a (36 CFR 219.19).

Focal species. A small subset of species whose status permits inference to the integrity of the larger ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area. Focal species would be commonly selected on the basis of their functional role in ecosystems (36 CFR 219.19).

Forest land. Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for non-forest uses. Lands developed for non-forest use include areas for crops, improved pasture, residential or administrative areas, improved roads of any width and adjoining road clearing, and power line clearings of any width (36 CFR 219.19).

Formal comments. See substantive formal comments (36 CFR 219.62).

Formal Consultation. A process between the USFWS and / or NMFS and a Federal agency proposing an action that 1) determines whether the proposed Federal action is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat; 2) begins with a Federal agency's written request and submittal of a complete initiation package; and 3) concludes with the issuance of a biological opinion by USFWS and/or NMFS, that may include an incidental take statement by the USFWS or NMFS. If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required, except when the USFWS or NMFS concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat (50 CFR sections 402.02 and 402.14).

Geographic area. A spatially contiguous land area identified within the planning area. A geographic area may overlap with a management area (36 CFR 219.19).

Goals. An optional plan component that are broad statements of intent, other than desired conditions, usually related to process or interaction with the public. Goals are expressed in broad, general terms, but do not include completion dates (36 CFR part 219.7(e)(2)).

Groundwater-dependent ecosystem. Community of plants, animals, and other organisms whose extent and life processes depend on groundwater. Examples include many wetlands, groundwater-fed lakes and streams, cave and karst systems, aquifer systems, springs, and seeps.

Guideline. A constraint on project and activity decision-making that allows for departure from its terms, so long as the purpose of the guideline is met (36 CFR section 219.15(d)(3)). Guidelines are established to help achieve or maintain a desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Habitat type. A land or aquatic unit, consisting of an aggregation of habitats having equivalent structure, function, and responses to disturbance.

Indigenous Knowledge. A body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes and Indigenous Peoples through interaction and experience with the environment. It is applied to phenomena across biological, physical, social, cultural, and spiritual systems. Indigenous Knowledge can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation. Indigenous Knowledge is developed by Indigenous Peoples including, but not limited to, Tribal Nations, Native Americans, Alaska Natives, and Native Hawaiians. Each Tribe or Indigenous community has its own place-based body of knowledge that may overlap with that of other Tribes. Indigenous Knowledge is based in ethical foundations often grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. Indigenous Knowledge is inherently heterogeneous due to the cultural, geographic, and socioeconomic differences from which it is derived, and is shaped by the Indigenous Peoples' understanding of their history and the surrounding environment. Indigenous Knowledge is unique to each group of Indigenous Peoples and each may elect to utilize different terminology or express it in different ways. Indigenous Knowledge is deeply connected to the Indigenous Peoples holding that knowledge. (36 CFR 219.19).

Indigenous Ecological Knowledge. See Indigenous Knowledge

Informal Consultation. An optional consultation process that includes all discussions, correspondence, and so forth between the FWS/NMFS and a Federal action agency or designated non-Federal representative prior to formal consultation, if required (50 CFR sections 402.02 and 402.14).

Information. For information collection from the public pursuant to 5 CFR part 1320, any statement or estimate of fact or opinion, regardless of form or format, whether in numerical, graphic, or narrative form, and whether oral or maintained on paper, electronic or other media. "Information" does not generally include items in the following categories; however, OMB may determine that any specific item constitutes "information"

- (1) Affidavits, oaths, affirmations, certifications, receipts, changes of address, consents, or acknowledgments; provided that they entail no burden other than that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument (by contrast, a certification would likely involve the collection of "information" if an agency conducted or sponsored it as a substitute for a collection of information to collect evidence of, or to monitor, compliance with regulatory standards, because such a certification would generally entail burden in addition to that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument);
- (2) Samples of products or of any other physical objects;

- (3) Facts or opinions obtained through direct observation by an employee or agent of the sponsoring agency or through non standardized oral communication in connection with such direct observations;
- (4) Facts or opinions submitted in response to general solicitations of comments from the public, published in the Federal Register or other publications, regardless of the form or format thereof, provided that no person is required to supply specific information pertaining to the commenter, other than that necessary for self-identification, as a condition of the agency's full consideration of the comment;
- (5) Facts or opinions obtained initially or in follow-on requests, from individuals (including individuals in control groups) under treatment or clinical examination in connection with research on or prophylaxis to prevent a clinical disorder, direct treatment of that disorder, or the interpretation of biological analyses of body fluids, tissues, or other specimens, or the identification or classification of such specimens;
- (6) A request for facts or opinions addressed to a single person;
- (7) Examinations designed to test the aptitude, abilities, or knowledge of the persons tested and the collection of information for identification or classification in connection with such examinations;
- (8) Facts or opinions obtained or solicited at or in connection with public hearings or meetings;
- (9) Facts or opinions obtained or solicited through non-standardized follow-up questions designed to clarify responses to approved collections of information; and
- (10) Like items so designated by OMB (5 CFR 1320.3(h)).

Inherent capability of the plan area. The ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances (36 CFR 219.19).

Integrated resource management. Multiple use management that recognizes the interdependence of ecological resources and is based on the need for integrated consideration of ecological, social, and economic factors (36 CFR 219.19).

Intermittent stream. A stream or reach of stream channel that flows, in its natural condition, only during certain times of the year or in several years, and is characterized by interspersed, permanent surface water areas containing aquatic flora and fauna adapted to the relatively harsh environmental conditions found in these types of environments. Intermittent streams are identified as dashed blue lines on USGS 7 1/2-inch quadrangle maps.

Invasive Species. An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. A species that causes, or is likely to cause, harm and that is exotic to the ecosystem it has infested. Invasive species infest both aquatic and terrestrial areas and can be identified within any of the following four taxonomic categories: Plants, Vertebrates, Invertebrates, and Pathogens (Executive Order 13112).

Key ecosystem services. Ecosystem services provided by the plan area that are important in the broader landscape outside the plan area and are likely to be influenced by the land management plan.

Landscape. A defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area (36 CFR 219.19).

Lead objector. For an objection submitted with multiple individuals, multiple entities, or combination of individuals and entities listed, the individual or entity identified to represent all other objectors for the purposes of communication, written or otherwise, regarding the objection (36 CFR 219.62).

Line Officer. A Forest Service official who serves in a direct line of command from the Chief (36 CFR 219.62).

Maintain. In reference to an ecological condition: To keep in existence or continuance of the desired ecological condition in terms of its desired composition, structure, and processes. Depending upon the circumstance, ecological conditions may be maintained by active or passive management or both (36 CFR 219.19).

Management area. A land area identified within the planning area that has the same set of applicable plan components. A management area does not have to be spatially contiguous (36 CFR 219.19).

Management system. For the purposes of the land management planning regulation at 36 CFR Part 219 and this Handbook, a timber management system including even aged management and uneven-aged management (36 CFR 219.19).

Mitigate. To avoid, minimize, rectify, reduce, or compensate the adverse environmental impacts associated with an action.

Monitoring. A systematic process of collecting information to evaluate effects of actions or changes in conditions or relationships (36 CFR 219.19).

Multiple use. The management of all the various renewable surface resources of the NFS so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to

conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output, consistent with the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531) (36 CFR 219.19).

Name. The first and last name of an individual or the name of an entity. An electronic username is insufficient for identification of an individual or entity (36 CFR 219.62).

National Forest System. Includes National Forests, National Grasslands, and the National Tallgrass Prairie (36 CFR 219.62).

Native species. An organism that was historically or is present in a particular ecosystem as a result of natural migratory or evolutionary processes and not as a result of an accidental or deliberate introduction into that ecosystem. An organism's presence and evolution (adaptation) in an area are determined by climate, soil, and other biotic and abiotic factors (36 CFR 219.19).

Natural range of variation (NRV). The variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application. In contrast to the generality of historical ecology, the NRV concept focuses on a distilled subset of past ecological knowledge developed for use by resource managers; it represents an explicit effort to incorporate a past perspective into management and conservation decisions (adapted from Weins, J.A. et al., 2012). The pre-European influenced reference period considered should be sufficiently long, often several centuries, to include the full range of variation produced by dominant natural disturbance regimes such as fire and flooding and should also include short-term variation and cycles in climate. The NRV is a tool for assessing the ecological integrity and does not necessarily constitute a management target or desired condition. The NRV can help identify key structural, functional, compositional, and connectivity characteristics, for which plan components may be important for either maintenance or restoration of such ecological conditions.

Newspaper(s) of record. The newspaper(s) of record is (are) the principal newspaper(s) of general circulation annually identified and published in the Federal Register by each Regional Forester to be used for publishing notices as required by 36 CFR 215.5. The newspaper(s) of record for projects in a plan area is (are) the newspaper(s) of record for notices related to planning (36 CFR 219.62).

Objection. The written document filed with a Reviewing Officer by an individual or entity seeking pre-decisional administrative review of a plan, plan amendment, or plan revision (36 CFR 219.62).

Objection period. The allotted filing period following publication of a public notice in the applicable newspaper of record (or the Federal Register, if the Responsible Official is the Chief) of the availability of the appropriate environmental documents and draft decision document,

including a plan, plan amendment, or plan revision during which an objection may be filed with the reviewing officer (36 CFR 219.62).

Objection process. Those procedures established for pre-decisional administrative review of a plan, plan amendment, or plan revision (36 CFR 219.62).

Objective. A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets.

Objector. An individual or entity who meets the requirements of section 219.53, and files an objection that meets the requirements of sections 219.54 and 219.56 (36 CFR 219.62).

Online. Refers to the appropriate Forest Service website or future electronic equivalent (36 CFR 219.62).

Participation. Activities that include a wide range of public involvement tools and processes, such as collaboration, public meetings, open houses, workshops, and comment periods (36 CFR 219.19).

Perennial stream. A stream or reach of a channel that flows continuously or nearly so throughout the year and whose upper surface is generally lower than the top of the zone of saturation in areas adjacent to the stream. These streams are identified as solid blue on the USGS 7 1/2-inch quadrangle maps.

Persistence. Continued existence (36 CFR 219.19).

Plan or land management plan. A document or set of documents that provide management direction for an administrative unit of the NFS developed under the requirements of the land management planning regulation at 36 CFR part 219 or a prior planning rule (36 CFR 219.19).

Plan area. The NFS lands covered by a plan (36 CFR 219.19).

Plan components. The parts of a land management plan that guide future project and activity decision-making. Specific plan components may apply to the entire plan area, to specific management areas or geographic areas, or to other areas as identified in the plan. Every plan must include the following plan components: Desired conditions; Objectives; Standards; Guidelines; Suitability of Lands. A plan may also include Goals as an optional component.

Plan monitoring program. An essential part of the land management plan that sets out the plan monitoring questions and associated indicators, based on plan components. The plan monitoring program informs management of resources on the plan area and enables the Responsible Official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed.

Planning record. The documents and materials considered in the making of a forest plan, plan revision, or plan amendment.

Plant and animal community. A naturally occurring assemblage of plant and animal species living within a defined area or habitat (36 CFR 219.19).

Productivity. The capacity of NFS lands and their ecological systems to provide the various renewable resources in certain amounts in perpetuity. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, productivity is an ecological term, not an economic term (36 CFR 219.19).

Project. An organized effort to achieve an outcome on NFS lands identified by location, tasks, outputs, effects, times, and responsibilities for execution (36 CFR 219.19).

Proposed Species. Any species of fish, wildlife, or plant that is proposed by the U. S. Fish and Wildlife Service or the National Marine Fisheries Service in the Federal Register to be listed under Section 4 of the Endangered Species Act. (36 CFR 219.19)

Public and governmental participation. Phrase used in this Handbook as shorthand for participation by all Tribes and Alaska Native Corporations, other Federal agencies, State and local governments, public and private organizations, and interested individuals. This can include people and government and non-governmental entities in other countries, for example, where plan areas are adjacent or proximate to international borders.

Recovery. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook and with respect to threatened or endangered species: The improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate (36 CFR 219.19).

Recreation opportunity. An opportunity to participate in a specific recreation activity in a particular recreation setting to enjoy desired recreation experiences and other benefits that accrue. Recreation opportunities include non-motorized, motorized, developed, and dispersed recreation on land, water, and in the air (36 CFR 219.19).

Recreation setting. The social, managerial, and physical attributes of a place that, when combined, provides a distinct set of recreation opportunities. The Forest Service uses the recreation opportunity spectrum to define recreation settings and categorize them into six distinct classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban (36 CFR 219.19).

Redundancy. The presence of multiple occurrences of ecological conditions such that not all occurrences may be eliminated by a catastrophic event.

Representativeness. The presence of a full array of ecosystem types and successional states, based on the physical environment and characteristic disturbance processes.

Resilience. The ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape.

Responsible Official. The official with the authority and responsibility to oversee the planning process and to approve a plan, plan amendment, and plan revision (36 CFR 219.62).

Restoration, ecological. The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions (36 CFR 219.19).

Restoration, functional. Restoration of abiotic and biotic processes in degraded ecosystems. Functional restoration focuses on the underlying processes that may be degraded, regardless of the structural condition of the ecosystem. Functionally restored ecosystem may have a different structure and composition than the historical reference condition. As contrasted with ecological restoration that tends to seek historical reference condition, the functional restoration focuses on the dynamic processes that drive structural and compositional patterns. Functional restoration is the manipulation of interactions among process, structure, and composition in a degraded ecosystem to improve its operations. Functional restoration aims to restore functions and improve structures with a long-term goal of restoring interactions between function and structure. It may be, however, that a functionally restored system will look quite different than the reference condition in terms of structure and composition and these disparities cannot be easily corrected because some threshold of degradation has been crossed or the environmental drivers, such as climate, that influenced structural and (especially) compositional development have changed.

Restore. To renew by the process of restoration. See restoration (36 CFR 219.19).

Reviewing Officer. The USDA or Forest Service official having the delegated authority and responsibility to review an objection filed under the planning rule at 36 CFR part 219, subpart B. (36 CFR 219.62).

Riparian Areas. Three-dimensional ecotones [the transition zone between two adjoining communities] of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths (36 CFR 219.19).

Riparian management zone. Portions of a watershed where riparian-dependent resources receive primary emphasis, and for which plans include plan components to maintain or restore riparian functions and ecological functions (36 CFR 219.19).

Risk. A combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences (36 CFR 219.19).

Scenic character. A combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity (36 CFR 219.19).

Social sustainability. See sustainability.

Sole source aquifer. Underground water supply designated by the Environmental Protection Agency (EPA) as the “sole or principle” source of drinking water for an area as established under section 1424(e) of the Safe Drinking Water Act (42 U.S.C. 300h–3(e)) (36 CFR 219.19).

Source water protection areas. The area delineated by a State or Tribe for a public water system (PWS) or including numerous PWSs, whether the source is ground water or surface water or both, as part of a State or tribal source water assessment and protection program (SWAP) approved by the Environmental Protection Agency under section 1453 of the Safe Drinking Water Act (42 U.S.C. 300h–3(e)) (36 CFR 219.19).

Species of conservation concern. A species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the Regional Forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9(c)).

Standard. A mandatory constraint on project and activity decision-making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

Stressors. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook, factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological process in a manner that may impair its ecological integrity, such as an invasive species, loss of connectivity, or the disruption of a natural disturbance regime (36 CFR 219.19).

Substantive formal comments. Written comments submitted to, or oral comments recorded by, the Responsible Official or designee during an opportunity for public participation provided during the planning process (sections 219.4 and 219.16), and attributed to the individual or entity providing them. Comments are considered substantive when they are within the scope of the proposal, are specific to the proposal, have a direct relationship to the proposal, and include supporting reasons for the Responsible Official to consider (36 CFR 219.62).

Suitability of lands. A determination that specific lands within a plan area may be used, or not, for various multiple uses or activities, based on the desired conditions applicable to those lands.

The suitability of lands determinations need not be made for every use or activity, but every plan must identify those lands that are not suitable for timber production.

Sustainability. The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For the purposes of the land management planning regulation at 36 CFR part 219 and this Handbook “ecological sustainability” refers to the capability of ecosystems to maintain ecological integrity; “economic sustainability” refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and “social sustainability” refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities (36 CFR 219.19).

Sustainable recreation. The set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations (36 CFR 219.19).

Timber harvest. The removal of trees for wood fiber use and other multiple use purposes (36 CFR 219.19).

Threatened Species. Any species that the Secretary of the Interior or the Secretary of Commerce has determined is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are listed at 50 CFR sections 17.11, 17.12, and 223.102.

Timber production. The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use (36 CFR 219.19).

Traditional Ecological Knowledge. See Native Knowledge.

Tribal consultation. A formal government-to-government process that enables Indian Tribes and Alaska Native Corporations to provide meaningful timely input and, as appropriate, exchange views, information, and recommendations on Forest Service proposed policies or actions that may affect their rights or interests prior to a decision. Consultation is a unique form of communication characterized by trust and respect (FSM 1509.05).

Viable population. A population of a species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments (36 CFR 219.19).

Watershed. A region or land area drained by a single stream, river, or drainage network; a drainage basin (36 CFR 219.19).

Watershed condition. The state of a watershed based on physical and biogeochemical characteristics and processes (36 CFR 219.19).

Wild and Scenic River. A river designated by Congress as part of the National Wild and Scenic Rivers System that was established in the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 (note), 1271–1287) (36 CFR 219.19).

Wilderness. Any area of land designated by Congress as part of the National Wilderness Preservation System that was established in the Wilderness Act of 1964 (16 U.S.C. 1131–1136) (36 CFR 219.19).

05.1 – Degree of Compliance or Restriction in this Handbook

Based on FSM 1110.8, the following exhibit 01 explains the degree of compliance as conveyed by the helping verbs, imperative mood, and introductory phrases used in this Handbook.

05.1 - Exhibit 01

Degree of Compliance or Restriction in this Handbook

Helping Verbs	Degree of Compliance or Restriction
must, shall	Action is mandatory and full compliance is required, unless specifically waived in accordance with FSM 1103.
should, ought	Action is mandatory unless a justifiable reason exists for not taking action. Employees must fully consider, but may depart from based on a written finding as applied to specific circumstances that the deviation will enhance program management efficiency or better achieve desired results or other objectives.
may not	Action is prohibited.
may only	Action is permitted only in the circumstance(s) described.
may	Action is optional.
will	This verb does not convey a degree of restriction or mandate action.
can or could	This verb is not directive; it expresses inherent capability.

Mood of Verb	Degree of Compliance or Restriction
imperative	Direction written with a verb in the imperative mood is also mandatory. For example: “Ensure cost-efficient delivery of services.” In this sentence, the missing subject is understood to be “you” and the direction (“ensure cost-efficient delivery of services”) is a direct command meaning “you shall ensure.” The verb “ensure” is in the imperative mood.

05.1 - Exhibit 01 - Continued

Degree of Compliance or Restriction in this Handbook

Introductory phases to lists of items in this handbook	Degree of Compliance or Restriction
The task should include:	The following listed items must be done unless a written finding supports another way that enhances efficiency or better achieves desired objectives.
Should consider—	Thinking about a list of considerations is mandatory unless a justifiable reason exists for not taking action.
<p>When doing task A, you may consider—</p> <p>This task A may include information such as—</p> <p>Doing task A, you may consider conditions such as—</p>	Task A is mandatory. You may think about the list, or you may consider other items, information, or conditions when doing task A. You may use part of the list, or none of the list.
When there is available information, the responsible official should—	If you have the information, the direction is mandatory unless deviation based on a written finding will enhance efficiency or better achieve desired objectives. If there is no existing information, no action is required.
You should do task A, such as—	Mandatory task, unless deviation based on a written finding will enhance efficiency or better achieve desired objectives. The listed items are optional ways of doing the task. You may select one of the ways or you may do it another way.
Should identify and evaluate relevant information about resource A, such as—	Mandatory to identify and evaluate information about resource, unless deviation based on a written finding will enhance efficiency or better achieve desired objectives. The list provides only examples. You may evaluate other information.

06 – Adaptive Management

The three phases of planning (assessment, planning, and monitoring) in Title 36, Code of Federal Regulations, part 219 (36 CFR 219) are a framework for adaptive management that will facilitate learning and continuous improvement in plans and Agency decision-making. Adaptive management is a structured, cyclical process for planning and decision-making in the face of uncertainty and changing conditions with feedback from monitoring, which includes using the planning process to actively test assumptions, track relevant conditions over time, and measure management effectiveness.

This approach supports decision-making that meets resource management objectives while simultaneously accruing information to improve future management.

06.1 – Features of Adaptive Management

Features of adaptive management include:

1. Explicitly characterizing uncertainty and assumptions.
2. Testing assumptions and collecting data using data collection protocols at appropriate temporal and spatial scales.
3. Analyzing new information obtained through monitoring and project experience.
4. Learning from feedback from monitoring results and new information.
5. Adapting assumptions and strategies to design better plans and management direction.
6. Adjusting actions and making decisions on the basis of what has been learned.
7. Creating an open and transparent process that shares learning internally and with the public.

06.2 – Adaptive Management Questions

The intent of adaptive management in land management planning is to structure the assessment, plan components, and monitoring program in a way that will provide feedback to inform decision-making. Over time, this feedback can provide information about questions such as:

1. Are assumptions being validated, or is there new information that may suggest a need to change assumptions?
2. Are areas of uncertainty being reduced?
3. Are basic conditions that influence the outcome staying the same, or are they changing?

4. Are the actions being taken having the desired effect? Are conditions moving in the desired direction? Is there progress towards achieving desired conditions?
5. How can management be improved so that it is more effective? How can the information be used to change or improve the plan?
6. Does the information indicate other questions or sources of data that could provide further feedback to support improved decision-making?
7. Is the monitoring design effective and are the correct variables being measured at the appropriate spatial and temporal scales?

06.3 – Adaptive Management in the Phases of Planning

Responsible Officials should focus on the purpose of adaptive management during each of the three phases:

1. **Assessment phase.** Gather and evaluate existing information to form a base of information and context for plan decision-making, and identify important assumptions, areas of uncertainty, and risks.
2. **Planning phase.** Be responsive to information that is already available, and structure plan components in a way that will allow for monitoring to test the effectiveness of those plan components. Design a monitoring program in the plan to test assumptions, evaluate risks, reduce uncertainties, and measure management effectiveness.
3. **Monitoring phase.** After the plan has been developed or revised:
 - a. Design management activities in a way that will yield specific information and support learning.
 - b. Analyze monitoring results in the biennial monitoring report to evaluate progress toward achieving desired conditions and objectives of the plan and to validate the assumptions used in developing the plan. Well-designed monitoring programs using scientific methods and protocols for collecting information contribute to better scientific analysis of these results.
 - c. Learn from the results of the evaluation and share with land managers and the public how the results either confirm or modify the existing assumptions or provide feedback on management effectiveness.
 - d. Use the biennial monitoring report to determine what changes may be needed to the plan, management activities, or to the monitoring program. Adapt planning and management activities based on learning from the evaluation. Adaptation may include modifying assumptions, models, data, and understanding of the system. This

knowledge is then used to inform the planning process that leads to adjusting plans and projects.

Based on learning in the monitoring phase, determine if an assessment and / or plan amendment or revision is warranted. A new assessment restarts the basic adaptive management cycle.

07 – Use of Best Available Scientific Information to Inform the Land Management Planning Process

07.1 – Use of Best Available Scientific Information

The responsible official shall use the best available scientific information to inform the planning process required by this subpart. (36 CFR 219.3)

The Responsible Official shall identify and use the best available scientific information (BASI) to inform the planning process and document how BASI was determined to be accurate, reliable, and relevant to issues being considered. The BASI includes relevant ecological, social, and economic scientific information. Use of BASI must be documented for the assessment, the plan decision, and the monitoring program.

While the BASI informs the planning process, plan components, and other plan content, it does not dictate what the decisions must be. There may be competing scientific perspectives and uncertainty in the available science. Plan decisions also reflect other relevant factors such as budget, legal authorities, traditional ecological knowledge, agency policies, public input, and the experience of land managers.

The rule does not require that planning develop additional scientific information, but that planning should be based on scientific information that is already available. New studies or the development of new information is not required for planning unless required by other laws or regulation. In the context of the BASI, “available” means that the information currently exists in a form useful for the planning process without further data collection, modification, or validation. Analysis or interpretation of the BASI may be needed to place it in the appropriate context for planning.

When evaluating the information, the Responsible Official shall be guided by the Forest Service’s policies for implementation of the Data Quality Act (Public Law 106-554).

The Responsible Official may choose to subject certain issues to reviews by the scientific community to confirm that the BASI appropriately informed the planning process.

07.11 – Integration of the BASI in the Planning Process

Best available scientific information (BASI) is integrated differently in each phase in the planning process. Sections 07.11a through 07.11c discuss the role of BASI in each phase.

07.11a – Assessment Phase

The assessment phase identifies and evaluates information relevant to the issues that will be considered later in the development of plan components and other plan content. During the assessment, the Responsible Official shall identify and evaluate information, including the conditions and trends about the 15 assessment topics listed in 36 CFR 219.6(b) and the sustainability of social, economic, and ecological systems (36 CFR 219.5(a)(1)). For the assessment, the issues under consideration are those related to the 15 topics and sustainability that form a basis for plan decision-making. This identification and evaluation uses information determined to be the BASI (sec. 07.12 of this Handbook) as well as other information.

Early in the assessment phase the Responsible Official shall provide opportunities for public and governmental participation, inviting submission of information, including scientific information that may be relevant to the planning process. The Responsible Official also provides opportunity for public and governmental participation to develop a shared understanding of the BASI and to make clear how the BASI was identified for the assessment process.

07.11b – Planning Phase

The planning phase begins by making a preliminary identification of the need to change the plan as informed by the assessment. The issues for consideration in the planning phase are identified in the NEPA scoping process and the BASI for these issues is used to inform the development of the plan components and other plan content.

The Responsible Official continues to engage governments and the public on the determination and use of the BASI, as part of the public and governmental participation opportunities provided in the early stages of the planning process. Governments and the public may submit any additional or new scientific information for consideration in the planning process, and the Responsible Official shall determine whether any such information is the BASI.

BASI informs the development of plan components and the evaluation of environmental effects in National Environmental Policy Act (NEPA) documentation. Information identified in BASI, such as uncertainties, risks, opportunities, strategies, or methodologies should be recognized in the planning process to develop management approaches and plan components. The BASI may lead the Responsible Official to consider specific plan components, or a range of potential plan components in the development of the plan.

07.11c – Monitoring

Best available scientific information must be used to inform the development of the monitoring program. The Responsible Official must design the monitoring program to test assumptions used in developing plan components and to evaluate relevant changes and management effectiveness of the plan components.

The issues being considered in the monitoring program are those related to the selection of monitoring questions and indicators in the monitoring program. Typically, monitoring questions seek additional information to increase knowledge and understanding of changing conditions, uncertainties, and risks identified in the BASI as part of an adaptive management framework. BASI can identify indicators that address associated monitoring questions. The BASI is also important in the further development of the monitoring program as it may help identify protocols and specific methods for the collection and evaluation of monitoring information.

07.12 – Determining Best Available Scientific Information

. . . , the responsible official shall determine what information is the most accurate, reliable, and relevant to the issues being considered. . .
(36 CFR 219.3)

The Preamble of the planning rule makes clear that there is range of information that can be considered to be the best available scientific information (BASI):

“In some circumstances, the BASI would be that which is developed using the scientific method, which includes clearly stated questions, well-designed investigations and logically analyzed results, documented clearly and subjected to peer review. However, in other circumstances the BASI for the matter under consideration may be information from analyses of data obtained from a local area, or studies to address a specific question in one area. In other circumstances, the BASI also could be the result of expert opinion, panel consensus, or observations, as long as the responsible official has a reasonable basis for relying on that scientific information as the best available.”

(77 FR 21192 (April 9, 2012))

However, not all information used in the planning process should be considered to be scientific information. Of the scientific information there is a subset that is the BASI. The Responsible Official shall determine the BASI based on the following three criteria:

1. **Accurate.** To be accurate, the scientific information must estimate, identify, or describe the true condition of its subject matter. This description of the true conditions may be a measurement of specific conditions, a description of operating behaviors (physical, biological, social, or economic), or an estimation of trends. Statistically accurate information is near to the true value of its subject, quantitatively unbiased, and free of error in its methods.

The extent to which scientific information is accurate depends on the relationship of the scientific findings to supportable evidence that identifies the relative accuracy or uncertainty of those findings. The accuracy of scientific information can be more easily evaluated if reliable statistical or other scientific methods have been used to establish the accuracy or uncertainty of any findings relevant to the planning process.

2. **Reliable.** Reliability reflects how appropriately the scientific methods have been applied and how consistent the resulting information is with established scientific principles. The scientific information is more reliable if it was resulted from an appropriate study design and well-developed scientific methods that are clearly described. The assumptions, analytical techniques, and conclusions are well referenced with citations to relevant, credible literature, and other pertinent existing information. The conclusions presented are based on reasonable assumptions supported by other studies and consistent with the general theory underlying those assumptions or are logically and reasonably derived from the data presented. Any gaps in information and inconsistencies with other pertinent scientific information are adequately explained.

Scientific information that describes statistical or other scientific methods used to determine both its accuracy and uncertainty can be considered to be more reliable. The use of quantitative analysis that has known (and quantifiable) rates of errors and results improves this reliability. An accuracy assessment of the data supports the reliability of the quantitative analysis.

The application of quality control to the scientific information also improves the reliability of the information. One form of quality control is peer review when scientific information has been critically reviewed by qualified scientific experts in that discipline and the criticism provided by the experts has been addressed by the proponents of the information. Publication in a refereed scientific journal usually indicates that the information has been appropriately peer reviewed.

3. **Relevant.** The information must pertain to the issues under consideration at spatial and temporal scales appropriate to the plan area and to a land management plan. Relevance in the assessment phase is scientific information that is relevant to providing information, including conditions and trends, about the 15 topics in 36 CFR 219(b) or to the sustainability of social, economic, or ecological systems (36 CFR 36 219.5(a)(1)). Relevance in the planning phase is scientific information pertinent to the plan area or issues being considered for the development of plan components or other plan content.

For any particular scientific subject relevant to the planning process, the Responsible Official shall evaluate the scientific information based on the three criteria described. To the extent that a scientific consensus exists, it may be easy to identify the BASI. In other cases, the Responsible Official may recognize multiple sources and possibly conflicting scientific information as BASI where a clear scientific consensus does not exist. The Responsible Official

does not have to identify a single source of scientific information that is “best” as BASI for a specific subject.

07.13 – Sources of Scientific Information

Scientific information that may be considered BASI includes:

1. Peer reviewed articles.
2. Scientific assessments.
3. Indigenous Knowledge.
4. Expert opinion, panel consensus, inventories, or observational data.
5. Data prepared and managed by the Forest Service or other Federal agencies. This information may include monitoring results, information in spatially referenced databases, data about the lands and resources of the planning unit, and various types of statistical or observational data.
6. Data prepared and managed by universities, national research networks, and other reputable scientific organizations.
7. Data or information from public, governmental, Tribal and Indigenous participation.

07.14 – Data Quality

The U. S. Department of Agriculture (USDA) and the Forest Service have data quality standards that apply to the use and dissemination of information in the planning process. The USDA information quality guidelines) ([USDA - Departmental Directives](#)) require USDA agencies to strive to ensure and maximize the quality, objectivity, and integrity of information disseminated to the public. This also includes transparency and documentation to ensure that information used to influence policy meets a basic standard of quality in terms of objectivity, utility, and integrity.

If the scientific information used in the planning process is considered “influential,” the Responsible Official shall decide if the material should be, or should have been, peer reviewed. OMB guidelines define “influential” information as information that the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or important private sector decisions. Guidance for determining whether information is “influential” can be found at [USDA - Departmental Directives](#). To determine if there is a need for peer review, the Responsible Official should consider the breadth and intensity of the potential impact, or whether the information affects a broad range of parties and may have a costly or crucial impact. The Forest Service provides guidance for the peer review process at: [USDA - Forest Service - Quality of Information](#).

07.15 – Documenting Best Available Scientific Information in the Planning Process

The responsible official shall document how the best available scientific information was used to inform the assessment, the plan decision and the monitoring program as required in 219.6(a)(3) and 219.14(a)(4). Such documentation must: Identify what information was determined to be the best available scientific information, explain the basis for that determination, and explain how the information was applied to the issues considered. (36 CFR 219.3)

(3) Document in the [assessment] report how the best available scientific information was used to inform the assessment (§219.3) (36 CFR 219.6(a))

(a) *Decision document.* The responsible official shall record approval of a new plan, plan amendment, or revision in a decision document prepared according to Forest Service NEPA procedures (36 CFR 220). The decision document must include

(4) The documentation of how the best available scientific information was used to inform planning, the plan components, and other plan content including the plan monitoring program (§219.3). . . (36 CFR 219.14)

The Responsible Official shall document how the best available scientific information (BASI) informed the assessment, the plan decision, and the monitoring program as required by the planning rule. The documentation in the assessment report and the decision document should summarize how the BASI information was applied to the issues considered. The assessment report and the decision documents are not intended to be research papers, or a comprehensive survey of the science used in the planning process. Instead, these documents are intended to provide a summary sufficient to provide the reader with an understanding of what was determined to be the BASI, how it was determined to be the BASI, and how it was used to inform the assessment, planning process, plan components, and other plan content including the monitoring program. Documentation of the BASI should occur throughout the planning process in the planning record.

The amount of detail to include in the summary depends upon a number of factors, such as the controversy over the issue or the amount of controversy about the scientific information itself (how much disagreement there is by scientists and/or others as to whether the information is the BASI). For some topics, the discussion of BASI could be very brief but in others it would be a more detailed documentation.

Documents associated with the planning process should use standard citations to link findings or information to the BASI. The use of such citation in the documents should provide evidence of how the BASI was used to inform consideration of the issues. The assessment report,

environmental documents, and the decision document should use citations as one of the principal methods to show how the BASI was applied to the issues being considered and provide additional explanation if needed.

07.15a – Documentation of Best Available Scientific Information in the Assessment Report

Documentation of BASI is used to inform the assessment should focus on how the BASI informed the evaluation of conditions and trends for the 15 topics of the assessment (36 CFR 219.6(b)), the sustainability of social, economic, and ecological systems (36 CFR 219.5(a)(1)), and any other topic identified by the responsible official for the assessment. In doing so, the Responsible Official shall:

1. Identify the scientific information determined to be the BASI based on what is most accurate, reliable, and relevant to the issues of the assessment. This may be done through reference to a list of the BASI or other methodology as determined by the Responsible Official. Explain the basis for this determination.
2. Describe how the BASI was used to inform the assessment for the issues being considered. This can be done through a brief explanation and citation of the BASI. Contradictory BASI should also be briefly described.

07.15b – Documenting Best Available Scientific Information in the Plan Decision Document

Documentation of the BASI in the decision document should focus on how it was used to inform the development of plan components and other plan content, including the plan monitoring program. In doing so, the Responsible Official shall:

1. Identify the information determined to be the BASI, based on the determination of what is most accurate, reliable, and relevant for the issues being considered (sec. 07.12 of this Handbook). This may be done through reference to a list of the BASI or other methodology as determined by the Responsible Official. Explain the basis for this determination.
2. Describe how the BASI was used to inform the development of plan components, or sets of plan components, and other plan content, including the plan monitoring program. This can be done through a brief explanation and citation of the BASI. Contradictory BASI should also be briefly described.

The Responsible Official should also summarize the general process of how the BASI was identified, evaluated, and used throughout the planning process. This summary should describe outreach to gather scientific information, the evaluation process, models and methods used, evaluation of risks, uncertainties or assumptions, and any science reviews conducted (sec. 07.2 of this Handbook).

07.2 – Optional Science Reviews in the Land Management Planning Process

The Responsible Official, Project Manager, or Interdisciplinary Team Leader may choose to initiate a science review of the identification and use of BASI to inform the assessment or planning process. Science reviews may cover one or more specific scientific questions or the overall use of scientific information in the assessment or planning process. Science reviews can occur on a continuum from less formal reviews to validate how specific BASI is identified and used to inform the planning process to a more formal review of the use of BASI in plan documents (sec. 07.21 of this Handbook). Science reviews are discretionary.

The purpose of science reviews is to support the quality and credibility of planning and to review whether the BASI adequately informed the planning process. The review may focus on a specific aspect of the scientific information under consideration or evaluate how scientific information was used throughout the planning process. Reviews should be conducted in a timely and expeditious manner to provide useful feedback that is within the defined scope of the planning process.

1. A science review may be considered when:
 - a. There is substantial controversy regarding a specific science issue.
 - b. There is perceived to be substantial risk to important resources in the plan area or the broader landscape.
 - c. There is a lack of scientific consensus or a high degree of uncertainty around a science question.
 - d. The Responsible Official or interdisciplinary Team Leader wants broader confirmation that the scientific information considered is credible or that its interpretation is correct.
2. A science review may address central questions, including:
 - a. Has applicable and available scientific information been considered and interpreted appropriately?
 - b. Has the Responsible Official appropriately determined the BASI?
 - c. Have the uncertainties, risks, and assumptions associated with the scientific information been accurately acknowledged and documented?

07.21 – Levels of Science Reviews

Each science review is unique, but the range of science reviews can be represented with different levels varying in intensity from less formal to more formal. For less formal or lower-level review, the Interdisciplinary Team Leader may initiate or manage the review. Only the

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Responsible Official may initiate a more formal or higher-level review. Exhibit 01 displays factors to consider when determining what level of review is appropriate.

07.21 - Exhibit 01**Level of Review Factors**

Factors	Lower Level of Review	Higher Level of Review
State of the Knowledge	Well-developed routine analysis. Professionally recognized science findings.	Emerging science and technology. Inconsistent findings and interpretations.
Data Availability	Well-developed data. Well-accepted techniques.	Data gaps. Highly insufficient data or collection techniques.
Controversy	Generally accepted.	Highly disputed.
Risk	Risk to elements of sustainability is low.	Risk to elements of sustainability is high.

A lower-level review focuses on basic consideration and evaluation of specific scientific information and how to use such information in the planning process. These reviews would normally occur early in the process as a review of work in progress before publication of documents. Such a review can be a check that the scientific information is being correctly interpreted and applied. Lower-level reviews may be informal and use reviewers who primarily work for the Forest Service. Some draft material may also be reviewed for feedback that the scientific information is being correctly interpreted and applied. The interdisciplinary team may adjust the work in progress as a result of these reviews.

The purpose of higher-level review is a more comprehensive check on the interpretation and application of the scientific information in draft documents such as the draft assessment or draft environmental document. Such review would not be used to evaluate the merit of plan components. Higher-level review normally occurs later in the process when draft documents have been developed. Higher-level review may involve reviewers outside the Forest Service who submit written comments. Higher-level reviews need careful focus in forming questions for the review and overall management to ensure response is timely in the planning process. Response by the Responsible Official may lead to adjustments in the documents reviewed.

08 – References

This section displays major statutes, regulations, and guidelines needed to carry out the procedures in this Handbook.

08.1 – Planning

1. Text of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of October 22, 1976 (collectively referred to as NFMA) (16 USC at 1600-1614) available at: [Forest and Rangeland Renewable Resources Planning Act of 1974](#).
2. Text of 36 CFR 219 governing land and resource management planning as amended through April 19, 2013, available at: [Govinfo.gov - Text of 36 CFR 219](#).
3. Text of 2000 planning rule (36 CFR 219 (2011)) (available at: [Govinfo.gov - Text of 2000 planning rule \(36 CFR 219 \(2011\)\)](#)).
4. Text of the 1982 planning rule procedures (36 CFR 219 (2000)), available at: [1982 Rule - National Forest System Land and Resource Management Planning](#).
5. Text of the Wilderness Act of September 3, 1964 (16 USC 1131-1136) is available at: [Govinfo.gov - Title 16 - Conservation](#).
6. Text of the Eastern Wilderness Act of January 3, 1975 (Public Law 93- 622; 16 USC 1132 (note)) is available at: [Eastern WILDERNESS ACT.PDF \(whywilderness.org\)](#)
7. Selected text of the Wild and Scenic Rivers Act of October 2, 1968 (Public Law 90-572; 16 USC 1271-1287), as amended, is available at: [Rivers.gov - Wild and Scenic Rivers Act](#).
8. Text of the Departments of the Interior and Agriculture Guidelines for Eligibility, Classification, and Management of River Areas (47 FR 39454, September 7, 1982) is available at: [Rivers.gov - Guidelines](#).