

Comparison of PACFISH/INFISH to Draft Forest Plan Direction	
INFISH/PACFISH Goals	Responsive Forest Plan Direction
(1) Maintain or restore water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems.	Riparian Management Area DC-1. Riparian management areas (RMAs) within any given watershed reflect a natural composition of native and desired nonnative plant and animal species and a distribution of physical and vegetative conditions appropriate to natural disturbance regimes affecting the area. Scale: Subwatershed. Riparian Management Area DC-2. Key riparian processes and conditions (including slope stability and associated vegetative root strength, bank stability, wood delivery to streams, and, within the riparian management areas, input of leafy and other organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality) are operating consistent with natural disturbance regimes. Scale: Subwatershed Riparian Management Area DC-3. The recreation opportunity spectrum in MA4 is semi-primitive to primitive. Scale: Subwatershed Riparian Management Area DC-4. The Wetland/Riparian Vegetation Condition indicator from the Watershed Condition Framework assessment from 2011 provides a basis for addressing the function and condition of native riparian vegetation along streams, water bodies, and wetlands. (Watershed Condition Classification technical Guide FS-278, July 2008). Native vegetation is functioning properly throughout the stream corridor or along wetlands and water bodies. Native mid to late seral vegetation appropriate to the site’s potential dominates the plant communities and is vigorous, healthy, and diverse in age, structure, cover, and composition on more than 80 percent of the riparian/wetland areas in the watershed. Sufficient reproduction of native species appropriate to the site is occurring to ensure sustainability. Mesic herbaceous plant communities occupy most of their site potential. Vegetation is in a dynamic equilibrium appropriate to the stream or wetland system. Scale: Subwatershed Riparian Management Area DC-5. The species composition and structural diversity of native plant communities in riparian management areas, including wetlands, provides adequate side channels, pools, undercut banks and unembedded substrates. These conditions result in a variety of depths, gradients, velocities, and structure for seasonal thermal regulation, nutrient filtering, appropriate rates of erosion, and channel migration and supplies amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and stability. Scale: Watershed scale for forestwide planning; subwatershed scale for project planning.

	Riparian Management Area DC-6. Riparian vegetation has the species composition, structural diversity, age class diversity, and extent that is characteristic of the setting in which it occurs and the hydrologic and disturbance regimes in which it developed. The condition and composition of small habitat patches may change over small temporal and spatial scales in response to local disturbances. Plant communities are similar in species composition, age class structure, canopy density, and ground cover to plant associations (Crowe and Clausnitzer 1997) that are representative of a particular setting. Scale: Subwatershed to subbasin. Riparian Management Area DC-7. Riparian shrub communities occupy their historical range and extent. Individual plants are capable of reaching the full potential for a typical individual of a particular species, as defined by plant height, width, and growth form. Individual plants are able to propagate, or reproduce, vegetatively and/or sexually. Plant communities are similar in species composition, age class structure, canopy density, and ground cover to plant associations (Croweand Clausnitzer 1997) that are representative of a particular setting. Scale: Subwatershed. Riparian Management Area DC-8. Riparian areas consist of native assemblages of riparian-dependent plants and animals free of persistent non-native species and provide for dispersal and travel corridors, as well as connectivity, between geographically important areas for both terrestrial and aquatic animals and plant species within the planning area. Scale: Subwatershed. Riparian Management Area DC-9. The potential for large wood recruitment to streams from within forested riparian areas, and from low-order streams to higher order streams, is similar to the potential in reference watersheds with similar forest vegetation types. Scale: Watershed. Riparian Function DC-1. The species composition and structural diversity of native plant communities in riparian management areas, including wetlands, provides adequate side channels, pools, undercut banks, unembedded substrates, submerged and overhanging large wood, log jams, and beaver dams. These conditions result in a variety of depths, gradients, velocities, and structure for seasonal thermal regulation, nutrient filtering, appropriate rates of erosion, and channel migration and supplies amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and stability. Scale: Watershed scale for forestwide planning; subwatershed scale for project planning.
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	Riparian Function DC-2. Management Area 4 Riparian management Areas (RMAs) reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance regimes affecting the area. Scale: Subwatershed. Riparian Function DC-3. Key riparian processes and conditions (including slope stability and associated vegetative root strength, bank stability, wood delivery to streams, and, within the riparian management areas, input of leafy and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality) are operating consistent with local disturbance regimes. Scale: Subwatershed. Riparian Function DC-4. Riparian vegetation has the species composition, structural diversity, age class diversity, and extent that is characteristic of the setting in which it occurs and the hydrologic and disturbance regimes in which it developed. The condition and composition of small habitat patches may change over small temporal and spatial scales but remains relatively constant at larger scales. Scale: Subwatershed to subbasin. Riparian Function DC-5. Riparian shrub communities occupy their historical range and extent. Individual plants are capable of reaching the full potential for a typical individual of a particular species, as defined by plant height, width, and growth form. Individual plants are able to propagate, or reproduce, vegetatively and/or sexually. Plant communities are similar in species composition, age class structure, canopy density, and ground cover to plant associations (Crowe and Clausnitzer 1997) that are representative of a particular setting. Scale: Subwatershed. Riparian Function DC-6. Riparian areas consist of native assemblages of riparian-dependent plants and animals free of persistent nonnative species and provide for dispersal and travel corridors, as well as connectivity, between geographically important areas for both terrestrial and aquatic animals and plant species within the planning area. Scale: Subwatershed. Riparian Function DC-7. The species composition and structural diversity of native plant communities in riparian management areas, including wetlands, provides adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and supplies amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and stability. Scale: Subwatershed to watershed.
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	Riparian Function DC-7. The potential for large wood recruitment to streams from within forested riparian areas, and from low-order streams to higher order streams, is similar to the potential in reference watersheds with similar forest vegetation types. Scale: Watershed. Stream Channel Function DC-1. The physical integrity of the aquatic system, including shorelines, banks, and bottom configurations, are properly functioning and in dynamic equilibrium with the flow and sediment regimes under which aquatic systems have evolved. Scale: Subwatershed to watershed. Stream Channel Function DC-2. Channel morphology, structure, complexity, and diversity are in ranges that are characteristic of the local geology, climate, and geologic processes. Scale: Watershed. Stream Channel Function DC-3. Measures of channel stability and morphology, including width/depth ratio, bank stability, bank angle, pool frequency, pool size, pool depth, and pool volume are within reference ranges and matches the frequency distribution of reference sites for a given channel type and channel size. Scale: Subwatershed to Subbasin. Stream Channel Function DC-4. The sediment regime under which aquatic ecosystems evolved is maintained, including the timing, volume, rate and character of input, storage, and transport. Scale: Watershed. Stream Channel Function DC- 5. Large wood frequency and volume are within the range of variation and potential for streams in individual watersheds. The spatial and temporal distribution of wood in individual streams varies depending on valley, riparian, and channel characteristics and the disturbance processes (fire, flood, debris flow) responsible for transferring material from hillslopes to streams. The frequency distribution of large wood among individual streams is similar to the frequency distribution of reference sites. Scale: Watershed. Stream Channel Function DC-6. In forested watersheds, the distribution and frequency of wood forced channel morphology (forced step pool and forced pool riffle streams), in which the majority of pools are formed by individual pieces or accumulations of large wood, and wood-rich pool riffle streams (Montgomery et al. 1995) is comparable to the distribution in reference watersheds. Scale: Watershed. Stream Channel Function DC-7. Pool frequency, size, depth, and volume are within ranges expected of given channel and valley types. Scale: Subwatershed to watershed.
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	Stream Channel Function DC-8. Channel-floodplain connections are intact. Channel bed and bank erosion rates are within natural ranges and do not result in degraded aquatic or riparian habitats or channel alteration. Scale: Subwatershed to Subbasin. Stream Channel Function DC-9. Bank erosion is within a range that does not degrade aquatic or riparian habitats or that leads to channel alteration. Scale: Subwatershed to subbasin. Stream Channel Function DC-10. The frequency distribution of stream channel and habitat conditions for any given attribute, approaches the frequency distribution of reference conditions for the same attribute in similar channel types. Scale: Watershed to sub-basin. Water Quality DC-1. Water quality (e.g., temperature, turbidity, and dissolved oxygen) of surface and groundwater is sufficient to support healthy riparian, aquatic, and wetland ecosystems. It is within the range that maintains the biological, physical, and chemical integrity of the system and is capable of benefiting the survival, growth, reproduction, and mobility of individuals composing aquatic and riparian communities. Scale: Watershed. Water Quality DC-2. The quality of water within and emanating from the national forests is sufficient to provide for state-designated beneficial uses, including human uses and meets applicable local, state, and tribal water quality criteria. Scale: Subbasin. Water Quality DC-3. Water quality in streams within the national forests is sufficient to meet applicable state, local, and tribal water quality criteria. Scale: Forestwide. Water Use DC-1. Water is available in sufficient quantity and quality to meet downstream human needs as well as the needs of aquatic species considering the range of possible climate change scenarios. Scale: Watershed to Subbasin. Water Use DC-2. Water quality and quantity of groundwater resources, including seeps, springs, fens, and other groundwater-dependent ecosystems, is sufficient to provide for the extent and diversity of species associated with these habitats. Scale: Watershed to Subbasin. Federally Listed Species DC -1. Federally listed species (aquatic and terrestrial) are recovered or delisted. Management activities improve the conservation status of listed species and designated critical habitat. Habitats are managed in accordance with conservation planning documents, recovery plans, best available scientific information, and local knowledge. Critical habitat components (i.e., Primary Constituent Elements and Primary Biological Features) are protected and restored to achieve species recovery.
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Aquatic: For listed aquatic species, on NFS lands spawning, rearing, and migratory habitat is widely available and inhabited. Listed aquatic species have access to historic habitat and appropriate life history strategies (i.e., resident, fluvial, adfluvial and anadromy) are supported. Recovery is promoted through cooperation and coordination with tribes, state agencies, federal agencies, and other interested groups. **Scale:** A variety of spatial scales and hydrologic boundaries (ranging from individual projects to subwatersheds to areas as large as populations). Species recovery plans identify activities necessary for recovery at the project (reach), subwatershed and population scales. Species' recovery plans further describe high-priority restoration actions at these scales that address identified limiting factors and threats to listed species and designated critical habitats.

Objective 1.1 Watershed Function:

- Increase the number of watersheds in condition class 1 (from CC2) and 2 (from CC3) through active restoration. Measure: number of subwatersheds (HUC6) with improved condition class.
- Improve forest vegetative conditions (acres)
- Improve soil hydrologic function in areas of detrimental soil disturbance (acres)
- Reduce road-related sedimentation and reducing hydrologic connectivity of the road system (road miles)
- Restore floodplain connections, channel morphology, channel structure, and flow regime (flood flows and low flows) (stream miles)
- Restore riparian/wetland species composition (riparian acres) by increasing natural seedling establishment, planting, fencing, or modifying riparian management (riparian acres)
- Increase effective stream shade (WQ objective 1) by increasing amount and extent of woody riparian species and increasing age-class structure of terrestrial vegetation in MA 4 (stream miles)
- Increase extent and vegetative species diversity of off-channel and isolated wetlands by restoring hydrologic pathways, modifying existing water diversions, or fencing (number of sites)
- Increase the number and extent of beaver-created wetlands (sites)
- Improve riparian habitat conditions (riparian acres)
- Restore channel morphology to reflect natural conditions (miles)

	• Increase habitat complexity through channel reconstruction, placement of large wood or other structures, habitat enhancement (miles) • Increase aquatic habitat connectivity through culvert replacement (number of culverts)
(2) Maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed.	Aquatic Habitat Function DC-1. Aquatic habitats contribute to ecological conditions capable of supporting self-sustaining populations of native species, and diverse plant, invertebrate, vertebrate aquatic and riparian-dependent species. Aquatic habitats are key for the recovery of threatened and endangered fish species and provide important habitat components for all native aquatic species. Essential Fish Habitat for commercially-fished salmon species, in the Middle Columbia Basin and Snake River Basin, supports sustainable populations of these species, per the Magnuson-Stevens Act of 1996. Scale: Watershed. Aquatic Habitat Function DC-2. The transfer of wood, sediment, nutrients, and other material that occurs following fires, wind storms, floods, and other natural disturbances is capable of creating and maintaining the range and diversity of riparian and aquatic habitat conditions that occurs in reference watersheds. Scale: Watershed. Aquatic Habitat Function DC-3. National forest system lands contribute to the protection of population strongholds for federally listed or proposed threatened and endangered aquatic species and designated critical habitats, as well as for a diversity of other at-risk aquatic species including Forest Service sensitive species, narrow endemics, and commercially fished species of Pacific salmon. These strongholds provide high quality habitat (e.g., spawning/rearing/over-wintering areas, and critical habitats, including migratory corridors), support expansion and recolonization of species to adjacent watersheds, and function in a manner that is resilient to natural disturbance regimes. These areas conserve key demographic processes likely to influence the persistence of populations or metapopulations. Areas adjacent to these high quality habitats are restored (as appropriate) and protected to help ensure adequate connectivity, species distribution, and the maintenance or restoration of fully functioning habitats for all life histories of aquatic species. Scale: Subwatershed to subbasin. Aquatic Habitat Function DC-4. Aquatic habitat elements (e.g., substrate, pools, cover, food, and water quantity and quality) are properly functioning and are sufficiently distributed to ensure egg and embryo survival, fry emergence, and juvenile survival of aquatic species to support self-sustaining populations of native resident and anadromous fish. Spawning and rearing areas contain a

	minimal amount of fine sediment, ranging in size from silt to coarse sand. Scale: Subwatershed to subbasin. Aquatic Habitat Function DC-5. Native fish species have access to historically occupied aquatic habitats and connectivity between habitats allows for the interaction of local populations. Migratory habitats support juvenile and adult mobility and survival between spawning, rearing, overwintering, and foraging habitats that contain areas that: • are free of obstruction and excessive levels of predators of federally listed aquatic species; • have minimal physical, biological, or water quality and quantity impediments (including permanent, partial, intermittent, or seasonal barriers); and • contain natural cover such as large wood, aquatic vegetation, rocks and boulders, side channels, and undercut banks. Scale: Subwatershed to subbasin. Aquatic Habitat Function DC-6. The potential for large wood recruitment to streams from within forested riparian areas, and from low-order streams to higher-order streams, is similar to the potential in reference watersheds containing the same (riparian) forest vegetation types. (This partly restates WF-1, but is more explicit). Scale: Watershed. Aquatic Habitat Function DC-7. Aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths, size and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference watersheds. The distribution of conditions in individual streams vary depending on valley, riparian, and channel characteristics. Scale: Reference conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for Forest planning and watershed or subwatershed for project planning. Aquatic Habitat Function DC-8. Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Scale: Subbasin scale for Forest planning and watershed scale for project planning. Riparian Management Areas DC-1 thru 9 (see above) Stream Channel Function DC-1 thru 10 (see above) Soil Quality DC-1. The productive potential of forest and range soils is maintained at levels that contribute to long-term sustainability of ecosystems considering the range of possible climate change
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	scenarios. Soil physical and chemical properties (texture, porosity, strength, coarse fragment content, and fertility) and organic matter (surface woody debris, humus) are at levels that maintain soil productive potential and hydrologic function (infiltration, percolation, and runoff). Scale: Subwatershed to watershed depending on the severity of the disturbance. Soil Quality DC-2. Surface erosion rates and sediment deposition are within the natural range of variability for each biophysical setting, with an appropriate amount of Effective Ground Cover in the form of live and dead vegetation. Scale: Subwatershed to watershed depending on the severity of the disturbance. Roads and Trails DC-1. Road systems are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal effect on aquatic and terrestrial systems, and are in balance with available funding. Administrative use supports Forest Service management objectives. Conflicts between user groups are minimized, and users take on appropriate challenges and risks. Scale: Forestwide. Water Quality DC-1 thru 3 (see above) Water Use DC-1 and 2 (see above) Federally Listed Species DC -1 (see above) Objective 1.1 Watershed Function (see above)
(3) Maintain or restore instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges.	Hydrologic Function DC-1. Flow regimes, including water yield, timing, frequency, magnitude, and duration of runoff, are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of movement of sediment, nutrients, and wood. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows are within the natural range of variability in which the system developed. Scale: Subwatershed to watershed. Hydrologic Function DC-2. The sediment regime, including the timing, volume, rate, and character of sediment input, storage, and transport, is within the natural range of variability. Scale: Subwatershed to watershed. Hydrologic Function DC-3. The timing, duration, and variability of floodplain inundation and water table elevation in wetlands, seeps, springs, and subsurface water connectivity are within the natural range of variability and support the establishment, maintenance, and succession of riparian plant communities. Scale: Subwatershed to watershed. Riparian Management Areas DC-1 thru 9 (see above) Riparian Function DC 1 thru 7 (see above)

	Water Use DC-1 and 2 (see above) Federally Listed Species DC -1 (see above) Objective 1.1 Watershed Function (see above)
(4) Maintain or restore natural timing and variability of the water table elevation in meadows and wetlands.	Wetland Function and Groundwater-dependent Ecosystem Function DC-1. The extent and diversity of wetland types is maintained or increased. Scale: Subbasin. Wetland Function and Groundwater-dependent Ecosystem Function DC-2. The surface and subsurface flow paths that support wetland habitats are undisturbed. The timing and duration of inundation of wetlands are within natural ranges. Plant species composition in wetlands is characteristic of the biophysical setting in which they occur. Scale: Subwatershed. Wetland Function and Groundwater-dependent Ecosystem Function DC-3. Springs, peatlands and groundwater fed wetlands are maintaining or regaining their ecological structure and function. Scale: Subwatershed. Wetland Function and Groundwater-dependent Ecosystem Function DC-4. The aquifer supplying water to groundwater-dependent ecosystems is not being affected by groundwater withdrawal or loss of recharge. Soils of groundwater dependent ecosystems are intact and functional; erosion and deposition are within the natural range. Runout channels, if present, are functioning naturally and are not entrenched, eroded, or substantially altered. Scale: Subwatershed. Wetland Function and Groundwater-dependent Ecosystem Function DC-5. Vegetation is composed of the anticipated cover of plant species associated with the site environment; hydric species are present and are not replaced by upland species. Livestock herbivory and trampling are not adversely affecting sites. Scale: Subwatershed. Riparian Management Areas DC-1 thru 9 (see above) Federally Listed Species DC -1 (see above) Objective 1.1 Watershed Function (see above)
(5) Maintain or restore diversity and productivity of native and desired non-native plant communities in riparian zones.	Invasive Species DC-1. Healthy, native and desired nonnative animal communities and native plant communities dominate the landscape and are resilient given current and projected climate conditions. Invasive species and other undesirable species (terrestrial and aquatic plants and animals) are absent or occur in small areas and have limited or no impacts on viability of native and desired nonnative species. Existing invasive and undesirable species do not expand their current distributions over the life of the Plan, and their current distributions will be reduced to the extent possible over that period of time. Invasive and undesirable species do not significantly diminish the

	ability of the national forests to provide the goods and services communities expect or the habitat that plant and animal community diversity depends upon. New invasive species resulting from changes in plant and animal habitats due to changes in climate occur only at low levels. Scale: Watershed. Plant Species Composition DC-2. The mix of species in the grass and shrub layer of forests, as well as shrub land and grassland vegetation, contain a diverse array of native species distributed across the landscape reflecting historical conditions. Perennial native bunchgrasses dominate many grasslands and shrublands. Native grasses, grass-like plants (sedges and rushes), forbs and various shrubs characterize the forest understory. Riparian zones consist of meadows with obligate wetland species including native grasses, sedges and rushes, riparian hardwoods and structurally diverse shrublands. Scale: Minimum scale of subwatershed. Scale may be changed to watershed or subbasin level if justified as more appropriate through project analysis. Special Plant Habitats DC-1. Special plant habitats include mountain mahogany, aspen, cottonwood, sagebrush steppe, and whitebark pine. They provide high quality habitat for associated species. The distribution and abundance of structural stages and vegetation density classes within these special plant habitats are consistent with their NRV and create conditions that are ecologically resilient, sustainable, and compatible with maintaining disturbance processes within the desired conditions. Variations in the mix of structural stages and vegetation density combinations across the landscape allow special plant habitats to respond to potential changes in climate. Riparian Management Areas DC-1 thru 9 (see above) Riparian Function DC 1 thru 7 (see above) Federally Listed Species DC -1 (see above) Objective 1.1 Watershed Function (see above)
(6) Maintain or restore riparian vegetation, to: (a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems; (b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones; and	Hydrologic Function DC 1 thru 3 (see above) Riparian Management Areas DC-1 thru 9 (see above) Riparian Function DC 1 thru 7 (see above) Stream Channel Function DC-1 thru 10 (see above) Soil Quality DC-1 and 2 (see above) Water Quality DC-1 thru 3 (see above) Plant Species Composition DC-2 (see above)

(c) help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed.	Special Plant Habitats DC-1 (see above) Riparian Function DC-7 (see above) Riparian Management Area DC-9 (see above) Stream Channel Function DC-5 (see above)
(7) Maintain or restore riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geo-climatic region.	Species Diversity DC-1. The natural range of habitats for native and desired nonnative fish, wildlife, and native plant species, including threatened and endangered species, species identified as regional forester's sensitive species, and surrogate species, is of adequate quality, distribution, and abundance to contribute to maintaining native and desired nonnative species diversity. This includes the ability of species and individuals to interact, disperse, and find security within habitats in the planning area. These habitat conditions are resilient and sustainable considering the range of possible climate change scenarios. Scale: The desired condition for species diversity can be applied at a variety of scales (i.e., forestwide, watershed, and subwatershed). During project analysis and implementation, this desired condition should be used concurrently with information outlined in the strategy and design criteria part of this plan and with consideration of the best available climate change projections. Species Diversity DC-2. Population strongholds for the fish surrogate species provide high quality habitat and support expansion and recolonization of species to adjacent unoccupied habitats. These areas conserve key demographic processes likely to influence the sustainability of aquatic species. Scale: The desired condition for species diversity can be applied at a variety of scales (i.e., forestwide, watershed, and subwatershed). During project analysis and implementation, this desired condition should be used concurrently with information outlined in the strategy and design criteria part of this plan and with consideration of the best available climate change projections. Species Diversity DC-3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish exist. Low levels of occurrence of nonnative predatory, interbreeding, or competing species exist, and if present, they are temporally and spatially isolated from federally listed species. Scale: The desired condition for species diversity can be applied at a variety of scales (i.e., forestwide, watershed, and subwatershed). During project analysis and implementation, this desired condition should be used concurrently with information outlined in the strategy and design criteria part of this plan and with consideration of the best available climate change projections.

	Species Diversity DC-4. Specialized habitat components, such as caves, standing dead trees, seeps, and springs, are found across the landscape in amounts and types commensurate with the natural communities in which they occur. Scale: The desired condition for species diversity can be applied at a variety of scales (i.e., forestwide, watershed, and subwatershed). During project analysis and implementation, this desired condition should be used concurrently with information outlined in the strategy and design criteria part of this plan and with consideration of the best available climate change projections. Species Diversity DC-5. Management activities improve the conservation status of species identified as being surrogate species or of local or regional conservation concern. Habitats and populations are managed in accordance with conservation planning documents, recovery plans, best available scientific information, and local knowledge. Scale: The desired condition for species diversity can be applied at a variety of scales (i.e., forestwide, watershed, and subwatershed). During project analysis and implementation, this desired condition should be used concurrently with information outlined in the strategy and design criteria part of this plan and with consideration of the best available climate change projections. Riparian Management Areas DC-1 thru 9 (see above) Riparian Function DC 1 thru 7 (see above) Stream Channel Function DC-1 thru 10 (see above) Water Quality DC-1 thru 3 (see above) Water Use DC-1 and 2 (see above) Roads and Trails DC-1 see above) Plant Species Composition DC-2 (see above) Federally Listed Species DC -1 (see above) Hydrologic Function DC 1 thru 3 (see above) Soil Quality DC-1 and 2 (see above) Special Plant Habitats DC-1 (see above) Riparian Function DC-7 (see above) Riparian Management Area DC-9 (see above) Stream Channel Function DC-5 (see above) Wetland Function and Groundwater-dependent Ecosystem Function DC-1 thru 5 (see above)
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	Aquatic Habitat Function DC 1 and 8 (see above) Objective 1.1 Watershed Function (see above)
(8) Maintain or restore habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.	Riparian Function DC 1 thru 7 (see above) Aquatic Habitat Function DC 1 and 8 (see above) Federally Listed Species DC -1 (see above) Invasive Species DC 1 (see above) Hydrologic Function DC 1 thru 3 (see above) Plant Species Composition DC-2 (see above) Species Diversity DC 1 thru 5 (see above) Riparian Management Areas DC-1 thru 9 (see above)
<i>INFISH/PACFISH Riparian Management Objectives</i>	<i>Responsive Forest Plan Direction</i>
(1) Pool Frequency by Channel Type	Standard WM-1S. When watershed function ¹ desired conditions are being achieved and watersheds are functioning properly ² , projects shall maintain ³ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore ⁴ or not retard attainment ⁵ of desired conditions. Short-term ⁶ adverse effects from project activities may occur when they support or do not diminish long-term ⁷ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining

¹ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide (USDA Forest Service, 2011b), subsequent versions and/or comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

³ See glossary for definitions of “maintain” and “degrade”.

⁴ See glossary for definitions of “restore”.

⁵ See glossary for definitions of “retard attainment”.

⁶ See glossary for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ⁷ See glossary for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁷ See glossary for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.⁸ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.⁹ Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment 2 (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard.
	GM-3G The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species, provide important contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards. The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and

⁸ Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁹ The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1

	necessary for maintaining or moving towards desired conditions should be applied.¹⁰ Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and desired conditions and the natural potential of the specific geo-climatic, hydrologic and vegetative setting in which they are being applied¹¹. Indicators and indicator values should be adapted over time based on long-term monitoring and evaluation of conditions and trends. Alternative use and disturbance indicators and values, including those in current ESA consultation documents or non-ESA allotment management plans or allotment NEPA decisions, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline. 1. Where desired conditions for water quality, aquatic habitat, and riparian vegetation have been attained¹² and riparian vegetation is in late-seral conditions¹³, protect or maintain those conditions by managing annual livestock grazing use and disturbance as follows ¹⁴: • maintain a minimum of 4-inch residual stubble height ¹⁵ of key herbaceous species on the greenline; • utilize no more than 30-45 percent of deep-rooted herbaceous vegetation in the active floodplain⁷ and, as needed, in other critical portions of the riparian management area; • limit streambank alteration⁸ to no more than 20-25 percent; and
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¹⁰ Not all indicators may apply to a particular site. For example, stubble height is a meaningful indicator for lower gradient streams where herbaceous vegetation plays an important role in stabilizing streambanks. It is generally less useful for steeper channels, where channel morphology is controlled by coarse substrates. Moreover, not all numeric values may apply to a particular site (e.g., sites with short graminoids).

¹¹ Indicator values for specific sites should be determined based on consideration of local conditions including, but not limited to, the degree of departure between existing and desired conditions, the current and desired rate of improvement, site sensitivity to grazing, grazing season, the presence of special status species (e.g., ESA-listed species, Regional Forester’s sensitive species) that are sensitive to grazing, whether or not water quality standards and related requirements (e.g., TMDLs for impaired waters) are being met, and the site’s importance in maintaining or attaining those standards and requirements. Consideration of these conditions is especially important in prescribing specific stubble height values within the 4-inch to 6-inch range and streambank alteration values within the 15-20% range.

¹² Assessment of conditions and trends should be based on best available information at a variety of spatial and temporal scales. Site-specific information is particularly important.

¹³ Late seral conditions means the existing riparian vegetation community is similar to the potential natural community composition (per Winward 2000).

¹⁴ Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.

¹⁵ Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season.

⁷ Active floodplain is defined as the area bordering a stream inundated by flows at a surface elevation that is two times the maximum bankfull depth (measured at the thalweg).

⁸ Streambank alteration criteria apply within 1-2 weeks of removal of livestock from each pasture.

	• limit use of woody species to no more than 30-40 percent of current year’s leaders along streambanks and, as needed, in other critical portions of the riparian management area. 2. Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not yet been attained, but conditions are moving towards those desired conditions³, enable continued recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 4-inch to 6-inch residual stubble height of key herbaceous species on the greenline²; • follow the criteria for utilization of deep-rooted herbaceous vegetation, streambank alteration, and use of woody species described in (1). 3. Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not been attained and conditions are not moving towards those desired conditions³, enable recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 6-inch residual stubble height of key herbaceous species on the greenline; • utilize no more than 30-35 percent of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area; • limit streambank alteration to no more than 15-20 percent²; and • limit use of woody species to no more than 20-30 percent of current year’s leaders along streambanks and, as needed, in other critical portions of the riparian management area. ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Pool Frequency and Quality: Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i> when within the range of ESA listed fish species and their habitat. For Umatilla National Forest use pools per mile values from (McKinney et al. 1996) to characterize <i>Functioning Appropriately</i> conditions. Refer to Watershed Condition Framework Aquatic Habitat Condition indicator and Channel Shape and Function attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification
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	When a MPI or WCF indicator value is not physically or biologically appropriate, given the inherent characteristics (geoclimatic setting) of the area, the value should be modified. Indicator values should be refined to better reflect conditions that are functionally attainable in a specific watershed or stream reach based on local geology, land and channel form, climate, historic and potentially recoverable fish species habitat, and potential vegetation. Modification of default indicator values may be completed through a variety of methods such as watershed and project analysis. It can be done using results of broad-scale and Forest-wide monitoring and collection and evaluation of watershed and/or stream reach specific data. It may be appropriate to evaluate habitat and riparian attributes at scales larger than an individual watershed but it should be recognized that watersheds of any size or scale will contain a finite range of channel, habitat, or riparian attributes and that these attributes may vary between watersheds. Because there are a number of ways to modify the default MPIs, each with strengths and weaknesses, the specific methods and data to be used need to be defined and agreed upon by the Forest Service, NMFS, and FWS in watersheds with ESA listed fish and their critical habitat. Regardless of what methods are used, written documentation of the methods and procedures, quality and source of data, and rationale supporting the modifications should be included in record documentation. In watersheds with ESA listed fish and/or critical habitat, modification of MPIs will be coordinated with NOAA Fisheries and/or FWS through Section 7 consultations.
(2) Water Temperature	Standard WM-1S (same as described above). Standard RMA-1S (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Temperature: <u>Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i></u> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Water Quality Condition indicator and Impaired Waters and Water Quality Problems attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification (same as described above).

(3) Large Woody Debris: greater than 20 pieces per mile; greater than 12 inch diameter; and greater than 35 foot length).	Standard WM-1S (same as described above). (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Large Woody Debris: Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Aquatic Habitat Condition indicator and Large Woody Debris attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification (same as described above).
(4) Bank Stability (greater than 80% stable)	Standard WM-1S (same as described above). Standard RMA-1S (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Streambank Condition: Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Aquatic Habitat Condition indicator and Channel Shape and Function attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification (same as described above).
(5) Lower Bank Angle (greater than 75% of banks with greater than 90% angle).	Standard WM-1S (same as described above). Standard RMA-1S (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Streambank Condition: Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Aquatic Habitat Condition indicator and Channel Shape and Function attribute when outside the range ESA listed fish species and their habitat.

	ARCS Attachment 2 - Indicator Modification (same as described above).
(6) Width/Depth Ratio (less than 10)	Standard WM-1S (same as described above). Standard RMA-1S (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Width/Depth Ratio: <u>Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i></u> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Aquatic Habitat Condition indicator and Channel Shape and Function attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification (same as described above).
(7) Substrate	Standard WM-1S (same as described above). Standard RMA-1S (same as described above). Guideline GM-3G (same as described above). ARCS Attachment 2: Blue Mountains Matrix of Pathways and Watershed Condition Framework Indicators Substrate/Turbidity: <u>Refer to matrix indicators descriptions for <i>Functioning Appropriately</i>, <i>Functioning at Risk</i> and <i>Functioning at Unacceptable Risk</i></u> when within the range of ESA listed fish species and their habitat. Refer to Watershed Condition Framework Water Quality Condition indicator and Impaired Waters and Water Quality Problems attribute when outside the range ESA listed fish species and their habitat. ARCS Attachment 2 - Indicator Modification (same as described above).
1995 March 1 NMFS Biological Opinion 6. Watershed Analysis - Conducted prior to revising RMOs or reducing RHCA widths	ARCS Attachment 2 - Indicator Modification Watershed analysis is not required to modify MPI and/or WCF indicators. A process to modify indicators is outlined in ARCS Attachment 2 and is described above under pool frequency by channel type.

1998 June 22 NMFS Biological Opinion 3 - Use Streamlining & Matrix of Pathways & Indicators - All other ongoing actions that may affect steelhead should be assessed via the Level 1 streamlining teams using the matrix	Standard WM-1S, Standard RMA-1S, and Guideline GM-3G (described above) required use of the matrix of pathways and indicators when ESA listed fish and their critical habitat are present. Matrix indicators serves as diagnostic criteria to assist in evaluating attainment or progress towards attainment of multiple aquatic and riparian desired conditions and compliance with key standards and guidelines. Forest interdisciplinary team aquatic specialists will also continue to use the matrix of pathways and indicators when evaluating projects when ESA listed steelhead and their designated critical habitat may be affected by the proposed action.
<i>INFISH/PACFISH RHCAs</i>	<i>Forest Plan Riparian Management Areas (RMAs)</i>
Interim RHCA widths would apply where watershed analysis has not been completed. Site-specific widths may be increased where necessary to achieve riparian management goals and objectives, or decreased where interim widths are not needed to attain RMOs or avoid adverse effects. Establishment of RHCA's would require completion of watershed analysis to provide the ecological basis for the change. However, interim RHCAs may be modified by amendment in the absence of watershed analysis where stream reach or site-specific data support the change. In all cases, the rationale supporting RHCA widths and their effects would be documented.	Riparian Management Area widths will be based on the direction described below for fish-bearing and permanently flowing non-fish bearing streams, constructed ponds and reservoirs, and wetlands greater than 1 acre, lakes and natural ponds, and seasonally flowing or intermittent streams, wetlands, seeps and springs less than 1 acre, and unstable and potentially unstable areas. Riparian Management Area widths may only be adjusted based on a watershed analysis.
Standard Widths Defining Interim RHCAs: The four categories of stream or water body and the standard widths for each are: (1) Category 1 - Fish-bearing streams: 300 feet	Fish-bearing streams - consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest. In degraded or incised streams, the riparian management area should extend from the edge of the active channel to the outer extent of the former floodplain. It is expected that riparian management area widths along fish-bearing streams will not be less than described here.
(2) Category 2 – Permanently flowing non-fish bearing streams: 150 feet	Permanently flowing non-fish bearing streams - consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both

	sides of the stream channel), whichever is greatest. In degraded or incised streams, the riparian management area should extend from the water's edge to the outer extent of the former floodplain.
(3) Category 3 – Ponds, lakes, reservoirs, and wetlands: 150 feet	Constructed ponds and reservoirs, and wetlands greater than 1 acre –consist of the body of water or wetland and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than 1 acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest. Lakes and natural ponds - consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.
(4) Category 4 – Seasonally flowing intermittent streams, small wetlands, and landslide prone areas: stream channel width, landslide prone area, 100 feet in priority watersheds, and 50 in non-priority watersheds.	Seasonally flowing or intermittent streams, wetlands, seeps and springs less than 1 acre, and unstable and potentially unstable areas - This category applies to features with high Draft Environmental Impact Statement – Volume 3, Glossary and Acronyms Proposed Revised Land Management Plans 44 for the Blue Mountains National Forests variability in size and site-specific characteristics. At a minimum, the riparian management areas should include: • The extent of unstable and potentially unstable areas (including earthflows). • The stream channel and extend to the top of the inner gorge, or in incised streams, to the edge of the former floodplain. • The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation, extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. A site-potential tree height is the average maximum height of the tallest dominant trees for a given site class. • Intermittent streams are defined as any nonpermanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria. Including intermittent streams, springs, and wetlands within riparian management areas is important for full implementation of the ARCS. Accurate identification of these features is critical to the correct implementation of the strategy and protection of the intermittent stream and wetland functions and processes. Identification of these features is difficult at times due to the lack of

	surface water or wet soils during dry periods. Fish-bearing intermittent streams are distinguished from non-fish-bearing intermittent streams by the presence of any species of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the guidelines for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.
1995 March 1 Biological Opinion 6. Watershed Analysis - Conducted prior to revising RMOs or reducing RHCA widths	Watershed analyses shall be conducted or updated prior to proposing any changes to RMA widths.
<i>INFISH/PACFISH Key and Priority Watersheds</i>	<i>Responsive Forest Plan Direction</i>
Key Watersheds (PACFISH) Priority Watersheds (INFISH). Key and Priority Watersheds provide a pattern across the landscape where habitat for anadromous fish and inland native fish would receive special attention and treatment. Priority for these designations is to protect or restore habitat for listed fish stocks, stocks of special interest or concern, or salmonid assemblages of critical value for productivity and diversity. All watersheds that contain designated critical habitat for listed anadromous fish will be treated as Key, but will be refined through broad scale assessments and analyses.	Key Watersheds. Key Watersheds are a network of watersheds that are important to rare species and/or serve as critical sources of high-quality water for those species and/or municipalities. Special management direction applies to these watersheds. They are selected because of their extraordinary resource values. They may serve as strongholds for important aquatic resources or have the potential to do so. They may be areas crucial to Threatened or Endangered fish and other aquatic and riparian species of concern and/or interest. Key Watersheds may also comprise areas that provide high-quality water important for maintenance of downstream aquatic and riparian populations. In addition, they could serve as municipal drinking water sources for communities in the region. Management emphasizes minimizing risk and maximizing restoration or retention of ecological health. Because part of the Key Watershed selection process is based on the habitat requirements of Federally-listed species and species of conservation concern, the network helps address species-level diversity (fine filter) by conserving and/or restoring critical biophysical processes.
1998 June 22 NMFS Biological Opinion 8 - Key Watersheds within the Upper Columbia River Basin ESU and the Snake River Basin ESU should be treated as key watersheds (as directed by PF) and as designated critical habitat.	Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction

	is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds.
A crosswalk of PACFISH Key and INFISH Priority watersheds to the Plan Key and Priority Watersheds is found in a table following this crosswalk.	
<i>INFISH/PACFISH Watershed Analysis</i>	<i>Responsive Forest Plan Direction</i>
Watershed analysis. Watershed analysis emphasizes the importance of determining watershed status, resilience and capabilities, examining ecological relationships, and identifying watershed restoration and monitoring objectives, strategies, and priorities prior to planning actions in the watershed. Watershed analysis ideally should be completed before actions are planned, rather than in response to actions that are already planned. Ideally watershed analysis should be carried out in Priority Watersheds prior to planning and implementing new land management actions that may	Watershed analysis. Watershed analysis is an interdisciplinary evaluation of important geomorphic and ecological processes operating in specific watersheds. These analyses: (1) evaluates the condition and trend of watersheds, riparian zones and aquatic ecosystems, (2) assesses connectivity of the watershed for terrestrial and aquatic flora and fauna species, (3) identifies and evaluates resource conditions and trends, and (4) provides the context for management. These types of analyses provide a basis for development of watershed-scale management and restoration strategies and is a tool for more specifically defining desired conditions, developing management objectives and strategies, and designing monitoring strategies. Watershed analyses should generally be conducted or updated prior to developing and implementing Watershed Restoration Action Plans for Priority Watersheds.

affect listed fish or their habitats. Watershed analysis is required prior to road building in RHCAs, salvage logging in RHCAs of watersheds with designated critical habitat, and new recreation facilities in RHCAs.	In addition, watershed analyses shall be conducted or updated prior to: • proposing changes to RMA widths • timber salvage or construction of facilities in RMAs • construction of permanent system roads in RMAs
<i>INFISH/PACFISH Watershed Restoration</i>	<i>Responsive Forest Plan Direction</i>
Watershed and Habitat Restoration. Prioritize Key and Priority watersheds for restoration. Information from watershed analysis used to determine restoration needs and priorities. Retarget existing funding to establish a watershed restoration management program.	Watershed Restoration. Includes a more formalized and structured process for watershed restoration than the existing strategies. Concepts from the Pacific Northwest Region’s Aquatic Restoration Strategy (USDA Forest Service 2005) and adopts the six-step National Watershed Condition Framework (WCF) process for planning and implementing watershed restoration. Recognizes broad-scale aquatic resource protection/passive restoration during all land management activities as an essential foundation for restoration. The foundation of the passive restoration direction in the plan stems from a suite of robust standards and guidelines which form the basis for design criteria that mitigate the effects to sensitive resources, such as wetlands and riparian areas. Active restoration builds upon this foundation, through targeted, strategically-focused active restoration implemented via the WCF process of watershed assessment, selection of Potential WCF and WCF Priority Watersheds, and development, implementation and monitoring of multi-year, watershed-scale restoration plans. Priority Watersheds identified through the WCF process are expected to generally, but not always, be a subset of the broader Key Watershed network. WCF is a near-term (5-7 years) implementation process for restoration across the broader, long-term Key Watershed network. Includes quantitative, measureable objectives for restoration. Describes the general scope and scale of various restoration treatments (e.g., miles of streams restored, miles of road improved or decommissioned) expected to be implemented during the life of the plan and ultimately, the number of watersheds in which all essential restoration actions are expected to be completed.
<i>INFISH/PACFISH Monitoring</i>	<i>Responsive Forest Plan Direction</i>
Monitoring. Monitoring program required to evaluate project implementation (compliance) and effectiveness of PACFISH as a strategy for protecting and improving aquatic habitat conditions on federal lands. This includes implementation, effectiveness, and validation monitoring.	Monitoring and Evaluation. Includes a consistent, explicit, and structured approach to monitoring and adaptive management (i.e., implementation, effectiveness, and validation monitoring). Both broad-scale and Forest plan level monitoring are included. Specific elements are focused on determining whether restoration objectives are being attained, whether water quality BMPs and other standards and guidelines are being implemented and are effective at the site-scale, determining the status and trend of watershed conditions and aquatic ecosystems, assessing changes in the distribution of ESA-

	listed aquatic species and species of conservation concern, and tracking the status and trend of stream temperatures. Linkages between monitoring and other components of the ARCS are also clearly defined (e.g., watershed analysis).
1998 June 22 NMFS Biological Opinion 7 - Strengthen Monitoring and Commitment to PACFISH to insure the strategy is properly implemented. Implementation has been inconsistent. Strengthened implementation should include increased emphasis on watershed analyses and the development of a schedule for each unit to complete such analysis in a timely manner	Four types of monitoring will address plan and ARCS implementation. First, forest plan implementation monitoring will occur that correlates to the Blues Mountains ARCS and is responsive to the 2012 Planning Rule 219.12.a.5. This includes the: i) status of watershed conditions. ii) status of select ecological conditions iii) status of ecological conditions (see 219.9) related to T&E, candidate, and conservation concern species iv) status of surrogate species (related to 219.9 Diversity) vi) changes due to climate change and other stressors vii) progress toward meeting DCs and Objectives, including multiple use opportunities. Implementation monitoring would measure the effects of various activities such as, watershed restoration, timber harvest, grazing, road building, decommissioning, or fuels treatment. Second, there will be continued to be a commitment to broad-scale effectiveness monitoring through the Pacfish/InFish Biological Opinion Monitoring Program (PIBO) that occurs in the Interior Columbia River Basin. The PIBO monitoring is a long-term monitoring program that is designed to support implementation and effectiveness monitoring in the Interior Columbia Basin. The PIBO program would continue to provide the Blue Mountain Forests with the status and trend of instream habitat and riparian conditions. Third, project-level monitoring will to evaluate implementation and effectiveness of LRMP direction and assess impacts on site-specific resources of concern. One example of this is the use of the National Water Quality Best Management Practices program to evaluate project BMPs that address non-point source pollution and are intended to that protect and restore water quality and aquatic resources. Finally, there will be periodic regional office reviews that will address plan and project implementation issues and concerns.

1995 March 1 Biological Opinion 6.a. - The PACFISH monitoring committee will conduct and report annually on implementation, effectiveness, photo, and validation monitoring.	The Line Manager Certification Report fulfilled the annual reporting requirements of the 1998 and 2003 Biological Opinions on Interim Infish/Pacfish strategies and the Terms and Conditions in the Incidental Take Statements associated with these Biological Opinions. There is currently no plan to continue this annual report submitted to the Deputy team for forests that have left the Infish/Pacfish strategies. However, there will be implementation and effectiveness monitoring (see response to 1998 BiOp above) to address the ARCS.
1995 March 1 Biological Opinion 6.b. - Submit annual report to NMFS on implementation of requirements in this BiOp	See response to 1998 BiOp above
1995 March 1 Biological Opinion 6.c. - Conduct quality control team random spot checks of the implementation of PACFISH and LRMP	No respective plan component.
<i>INFISH/PACFISH Standards and Guidelines</i>	<i>Responsive Forest Plan Direction</i>
Timber Related Direction	
Timber Standard TM-1. Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas (RHCAs), except as described below. Do not include RHCAs in the land base used to determine the Allowable Sale Quantity; however, any volume harvested can contribute to the timber sale program. a. Where catastrophic events such as fire, flooding, volcano, wind, or insects cause damage that results in degraded riparian conditions, allow salvage and fuel cutting in RHCAs only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other riparian Management objectives (RMOs), and where adverse effects can be avoided to aquatic resources. Ecosystem Analysis at the Watershed Scale shall be completed prior to harvest, including salvage and fuel wood cutting, in RHCAs. b. Apply silvicultural practices for RHCAs to acquire desired vegetation characteristics where needed to attain RMOs. Apply silvicultural practices in a manner that does not retard	Standard TM-1S. Silvicultural treatments shall occur in riparian management areas only as necessary to maintain, enhance, or restore desired conditions for aquatic and riparian resources. When conducted, these activities shall avoid or minimize adverse effects to aquatic and riparian resources. Vegetation in riparian management areas shall not be subject to regularly scheduled timber harvest because they are not part of the timber suitability landbase. Standard TM-2S. Fuelwood cutting shall not be authorized in RMAs unless specifically designed to attain aquatic and riparian desired conditions. Guideline TM-3G. Use of existing or construction of new landings, designated skid trails, staging, and decking should not occur in riparian management areas, unless they are associated with projects designed to improve riparian management areas conditions. These features should: • be of minimum size, • be located outside the active floodplain, and • avoid negative effects to large wood, bank integrity, temperature, and sediment levels. Guideline TM-4G. Yarding activities should achieve full suspension over the active channel; unless other alternatives will have less damage to riparian areas and stream channels. Standard TM-5S. Silvicultural practices shall include provisions, as appropriate, to avoid detrimental changes in water temperatures, blockages of water courses; including protection for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water, and deposits of sediment.

attainment of RMOs and that avoids adverse effects to inland native fish.	Standard TM-6S. Silvicultural practices shall include provisions (e.g. BMPs) for the maintenance or restoration of soil resources. Standard TM-7S. Timber harvest on lands not suitable for timber production shall occur only to meet desired conditions for each management area other than timber production. Standard TM-10S. Timber harvest shall only occur when a site specific finding has determined that it will not cause irreversible damage to soil, slope, or other watershed conditions. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.¹⁶ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.¹⁷ Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard. ARCS Attachment 2 (Riparian Management Areas) - RMAs are areas where aquatic and riparian-dependent resources receive primary emphasis and management activities must be designed to benefit those resources. Riparian function and ecological processes descriptions in ARCS Attachment 2 are intended to:
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¹⁶ Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

¹⁷ The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1S.

	1. Ensure interdisciplinary teams consider and understand the appropriate riparian ecological processes when planning silvicultural practices within or affecting RMAs designed to maintain or improve these processes. 2. Provide additional information to help interpret Standard RMA-1S. RMA-1S is intended to maintain riparian areas when at desired conditions and restore/not retard attainment of desired conditions when RMAs are impaired. To fully implement this standard interdisciplinary teams must identify important ecological processes within the analysis area, the status (at desired condition or impaired) of these processes, and evaluate impacts to see how an action maintains, restores, and does not retard attainment of these processes. Descriptions below can help frame the type of processes to consider, the spatial scale they operate, and the important interactions between terrestrial and aquatic ecosystems that need to be considered when defining desired conditions and describing project effects. Guideline RMA-3G. Trees felled for safety shall be retained onsite unless in excess of what is needed to achieve aquatic and riparian desired conditions. If the desired quantity and size distribution of large wood has been met on site, the wood can be transported to other aquatic and riparian restoration projects. Standard WM-1S. When watershed function¹⁸ desired conditions are being achieved and watersheds are functioning properly¹⁹, projects shall maintain²⁰ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore²¹ or not retard attainment²² of desired conditions. Short-term²³ adverse effects from project
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¹⁸ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide (USDA Forest Service, 2011b), subsequent versions and/or comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

²⁰ See glossary for definitions of “maintain” and “degrade”.

²¹ See glossary for definitions of “restore”.

²² See glossary for definitions of “retard attainment”.

²³ See glossary for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ²⁴ See glossary for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	activities may occur when they support or do not diminish long-term²⁴ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard. Suitable uses and activities in Riparian Management Areas- Riparian Management Areas are generally unsuitable for: • New Road or Trail Construction • Salable mineral activities, such as gravel and sand • Energy Development (e.g. wind farms, utility corridors, pipelines, etc. Riparian Management Areas are unsuitable for: • Regularly scheduled timber production (regularly scheduled timber harvest on suitable lands); since they are not part of our timber suitability landbase. • Grazing management that degrades aquatic habitat conditions or impedes attainment of aquatic and riparian-dependent resources Riparian Management Areas are generally suitable for: • Silvicultural treatments necessary to maintain, enhance or restore conditions for aquatic and riparian resources. When conducted, these activities shall avoid or minimize adverse effects to aquatic and riparian resources and not degrade or retard attainment of aquatic and riparian-dependent resources • Timber Harvest and Mechanical fuel treatment may be allowed under certain circumstance to meet Riparian Management Area DCs • Grazing management that does not degrade or retard attainment of aquatic and riparian-dependent resources • Motor Vehicle use consistent with 36 CFR 212 of the Travel Management Rule
1995 March 1 Biological Opinion Timber 5.b.1. Conduct EAWS and site-specific analyses in priority watersheds prior to harvest,	Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management

²⁴ See glossary for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

salvage, or thinning in RHCAs. Demonstrate how the action will not retard/prevent attainment of RMOs or adversely affect salmon and their habitat.	area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.²⁵ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.²⁶ Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard. Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery²⁷ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities. Watershed analysis - will be reviewed, updated or conducted prior to: • proposing changes to RMA widths • timber salvage or construction of facilities in RMAs
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²⁵ Per Watershed Condition Framework Technical Guide (USDA Forest Service, 2011b), subsequent versions and/or comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

²⁶ The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1S.

²⁷ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	• construction of permanent system roads in RMAs
1995 March 1 Biological Opinion Timber 5.b.2. Conduct EAWS in priority watersheds prior to new/proposed timber sales if the existing clearcut area (ECA) exceeds 15% of the potentially forested area.	Watershed analysis (see above)
1995 March 1 Biological Opinion Timber 5.b.3. Conduct EAWS in priority watersheds prior to new/proposed actions reducing RHCA widths.	Watershed analysis (see above)
Roads Related Direction	
Road Standard RF-1. Cooperate with federal, tribal, state, and country agencies and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain RMOs.	No respective plan component.
Road Standard RF-2. For each existing or planned road, meet the RMOs and avoid adverse effects on aquatic resources as described below: a. Ecosystem Analysis at the Watershed Scale shall be completed prior to construction of new roads or landings in RHCAs. b. Road and landing locations in RHCAs shall be minimized. c. Initiate development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, the plan shall address the following items: • Road design criteria, elements, and standards that govern construction and reconstruction. • Road management objectives for each road. • Criteria that govern road operation, maintenance, and management. • Requirements for pre-, during-, and post-storm inspections and maintenance. • Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives.	Watershed Analysis - watershed analyses shall be conducted or updated prior to construction of permanent system roads in RMAs. Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds. Guideline TM-3G. Use of existing or construction of new landings, designated skid trails, staging, and decking should not occur in riparian management areas, unless they are associated with projects designed to improve riparian management areas conditions. These features should: • be of minimum size, • be located outside the active floodplain, and

• Implementation and effectiveness of monitoring plans for road stability, drainage, and erosion control. • Mitigation plans for road failures. d. Avoid sediment delivery to streams from the road surface. • Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. • Route road drainage away from potentially unstable stream channels, fills, and hillslopes. e. Avoid disruption of natural hydrologic flow paths. f. Avoid side casting of soils or snow. Side casting of road material is prohibited on road segments within or abutting RHCAs.	• avoid negative effects to large wood, bank integrity, temperature, and sediment levels. Guideline RF-1G. New roads and trails should not be constructed within riparian management areas unless no other feasible alternative exists. Guideline RF-2G. Temporary roads, including stream crossings, in RMAs should be minimized. Temporary roads, if constructed, should be managed to protect and restore aquatic and riparian desired conditions. Standard RF-3S. Side-casting (placement of unconsolidated earthen waste materials resulting from road construction or maintenance) in riparian management areas shall be avoided. Standard RF-4S. Fill material shall not be placed on organic debris in riparian management areas. Standard RF-5S. Disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow shall be avoided when constructing or reconstructing roads or landings either inside or outside of riparian management areas. Guideline RF-6G. Wetlands and unstable areas should be avoided when reconstructing existing roads or constructing new roads and landings. Minimize impacts where avoidance is not practical. Standard RF-7S. New or replaced permanent stream crossings shall be designed to allow for the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change. Standard RF-8S. Where physically feasible, construction or reconstruction of stream crossings will avoid diversion of streamflow out of the channel and down the road in the event of crossing failure. Standard RF-9S. Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic and riparian-dependent organisms. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows. Guideline RF-11G. Design roads to minimize delivery of water and sediment from roads to streams. Avoid or minimize disruption of hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow when constructing, reconstructing, and maintenance of roads or landing. Guideline RF-12G. Road drainage should be routed away from potentially unstable channels, fills, and hillslopes to the extent practicable. Standard RF-13S. Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat.
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	Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Suitable uses and activities in Riparian Management Areas (see above)
Road Standard RF-3. Determine the influence of each road on the RMOs. Meet RMOs and avoid adverse effects on inland native fish [<i>listed anadromous fish</i>] by: a) Reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of RMOs, or do not protect priority watersheds [<i>designated critical habitat for listed anadromous fish</i>] from increased sedimentation. b) Prioritizing reconstruction based on current and potential damage to inland native fish and their priority watersheds [<i>listed anadromous fish and their designated critical habitat</i>], the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of RHCAs.	Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds. Standard WM-1S. When watershed function²⁸ desired conditions are being achieved and watersheds are functioning properly²⁹, projects shall maintain³⁰ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore³¹ or not retard attainment³² of desired conditions. Short-term³³ adverse effects from project

²⁸ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

³⁰ See glossary in the Plan for definitions of “maintain” and “degrade”.

³¹ See glossary in the Plan for definitions of “restore”.

³² See glossary in the Plan for definitions of “retard attainment”.

³³ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ³⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

Closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to inland native fish in priority watersheds [<i>listed anadromous fish and their designated critical habitat</i>], and the ecological value of the riparian resources affected.	activities may occur when they support or do not diminish long-term³⁴ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery³⁵ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities. Standard RF-8S. Where physically feasible, construction or reconstruction of stream crossings will avoid diversion of streamflow out of the channel and down the road in the event of crossing failure. Guideline RF-12G. Road drainage should be routed away from potentially unstable channels, fills, and hillslopes to the extent practicable. Guideline RF-11G. Design roads to minimize delivery of water and sediment from roads to streams. Avoid or minimize disruption of hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow when constructing, reconstructing, and maintenance of roads or landing. Standard RF-13S. Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat.
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³⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

³⁵ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

Road Standard RF-4. Construct new and improve existing culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those existing structures would or do pose a substantial risk to riparian conditions. Such improvements should include those structures that do not meet design and operation maintenance criteria that have been shown to be less effective than designed for controlling erosion, or that retard attainment of RMOs. Priority for upgrading shall be based on risks and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of stream flow out of the channel and down the road in the event of crossing failures.	Standard RF-7S. New or replaced permanent stream crossings shall be designed to allow for the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change. Standard RF-8S. Where physically feasible, construction or reconstruction of stream crossings will avoid diversion of streamflow out of the channel and down the road in the event of crossing failure. Standard RF-9S. Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic and riparian-dependent organisms. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows. Guideline RF-10G. Fish passage barriers should be retained where they serve to restrict access by undesirable nonnative species and are consistent with restoration of habitat for native species.
Road Standard RF-5. Provide and maintain fish passage at all crossings of existing and potential fish-bearing streams.	Standard RF-7S. New or replaced permanent stream crossings shall be designed to allow for the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change. Standard RF-9S. Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic and riparian-dependent organisms. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows. Guideline RF-10G. Fish passage barriers should be retained where they serve to restrict access by undesirable nonnative species and are consistent with restoration of habitat for native species.
1995 March 1 NMFS Biological Opinion – Roads 5.c.1 For proposed/new roads, where road density is greater than 2 miles/square mile in Priority Watersheds, reduce road mileage and emphasize road closure, obliteration, and revegetation.	Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction

	is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds.
1995 March 1 NMFS Biological Opinion – Roads 5.c.2 Complete and implement road transportation plans as required by PACFISH.	No respective plan component.
Grazing Related Direction	
Grazing Standard GM-1. Modify grazing practices (for example, accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing) that retard or prevent attainment of RMOs or are likely to adversely affect aquatic resources. Suspend grazing if adjusting practices is not effective in meeting RMOs.	Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery³⁶ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions. Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and

³⁶ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard. Standard GM-1S. Manage livestock grazing to attain aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing practices (such as number of livestock, timing, and physical structures). If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures. GM-3G The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species, provide important contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards. The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and necessary for maintaining or moving towards desired conditions should be applied.³⁷ Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and desired conditions and the natural potential of the specific geo-climatic, hydrologic and vegetative setting in which they are being applied³⁸. Indicators and indicator values should be adapted over time based on long-term monitoring and evaluation of conditions and trends. Alternative use and disturbance indicators and values, including those in current ESA consultation documents or non-ESA allotment management plans or allotment NEPA decisions, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline.
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³⁷ Not all indicators may apply to a particular site. For example, stubble height is a meaningful indicator for lower gradient streams where herbaceous vegetation plays an important role in stabilizing streambanks. It is generally less useful for steeper channels, where channel morphology is controlled by coarse substrates. Moreover, not all numeric values may apply to a particular site (e.g., sites with short graminoids).

³⁸ Indicator values for specific sites should be determined based on consideration of local conditions including, but not limited to, the degree of departure between existing and desired conditions, the current and desired rate of improvement, site sensitivity to grazing, grazing season, the presence of special status species (e.g., ESA-listed species, Regional Forester’s sensitive species) that are sensitive to grazing, whether or not water quality standards and related requirements (e.g., TMDLs for impaired waters) are being met, and the site’s importance in maintaining or attaining those standards and requirements. Consideration of these conditions is especially important in prescribing specific stubble height values within the 4-inch to 6-inch range and streambank alteration values within the 15-20% range.

	1. Where desired conditions for water quality, aquatic habitat, and riparian vegetation have been attained³⁹ and riparian vegetation is in late-seral conditions⁴⁰, protect or maintain those conditions by managing annual livestock grazing use and disturbance as follows ⁴¹: • maintain a minimum of 4-inch residual stubble height ⁴² of key herbaceous species on the greenline; • utilize no more than 30-45 percent of deep-rooted herbaceous vegetation in the active floodplain⁷ and, as needed, in other critical portions of the riparian management area; • limit streambank alteration⁸ to no more than 20-25 percent; and • limit use of woody species to no more than 30-40 percent of current year’s leaders along streambanks and, as needed, in other critical portions of the riparian management area. 2. Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not yet been attained, but conditions are moving towards those desired conditions³, enable continued recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 4-inch to 6-inch residual stubble height of key herbaceous species on the greenline²; • follow the criteria for utilization of deep-rooted herbaceous vegetation, streambank alteration, and use of woody species described in (1). 3. Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not been attained and conditions are not moving towards those desired conditions³, enable recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 6-inch residual stubble height of key herbaceous species on the greenline;
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³⁹ Assessment of conditions and trends should be based on best available information at a variety of spatial and temporal scales. Site-specific information is particularly important.

⁴⁰ Late seral conditions means the existing riparian vegetation community is similar to the potential natural community composition (per Winward 2000).

⁴¹ Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.

⁴² Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season.

⁷ Active floodplain is defined as the area bordering a stream inundated by flows at a surface elevation that is two times the maximum bankfull depth (measured at the thalweg).

⁸ Streambank alteration criteria apply within 1-2 weeks of removal of livestock from each pasture.

	- utilize no more than 30-35 percent of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area; - limit streambank alteration to no more than 15-20 percent²; and - limit use of woody species to no more than 20-30 percent of current year's leaders along streambanks and, as needed, in other critical portions of the riparian management area. Suitable uses and activities in Riparian Management Areas (see above)
Grazing Standard GM-2. New livestock handling and/or management facilities shall be located outside of RHCAs. For existing livestock handling facilities inside RHCAs, assure that facilities do not prevent attainment of RMOs. Relocate or close facilities where these objectives cannot be met.	Standard GM-2S. New livestock handling and/or management facilities shall be located outside riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions. Guideline GM-4G. During allotment management planning, existing livestock handling or management facilities that prevent or retard attaining aquatic and riparian desired conditions should be removed, as appropriate.
Grazing Standard GM-3. Limit livestock trailing, bedding, watering, loading, salting, and other handling efforts to those areas and times that would not retard attainment of RMOs or adversely affect aquatic resources.	Standard GM-6S. Livestock grazing shall be managed and implemented to avoid trampling federally listed threatened or endangered fish redds. Guideline GM-5G. Livestock trailing, watering, loading, and other handling in riparian management areas should be avoided or minimized.
Grazing Standard GM-4. Adjust wild horse and burro management to avoid impacts that prevent attainment of RMOs or adversely affect aquatic resources.	Wild Horses DC-1. A viable, free-roaming wild horse herd (consistent with the desire of the herd management plan in effect at the time of project level planning) that is genetically diverse and is in ecological balance with other approved multiple uses is present within the Murderers Creek Wild Horse Territory. In concert, this leads toward stable or improving habitat conditions. Scale: The Murderers Creek Wild Horse Territory/Herd Management Area.
1995 March 1 NMFS Biological Opinion 1. Access to Spawning Habitats and Redds - FS should eliminate or adequately restrict access, including livestock, off-road vehicles, anglers, etc., during spawning and incubation periods to prevent harassment. Effectiveness of effort could be maximized by expanding outreach and education programs in cooperation w/ State agencies to promote awareness.	Standard GM-1S. Manage livestock grazing to attain aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing practices (such as number of livestock, timing, and physical structures). If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures. Standard GM-6S. Livestock grazing shall be managed and implemented to avoid trampling federally listed threatened or endangered fish redds. Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management

	activities shall not retard recovery ⁴³ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities.
Minerals Related Direction	
Minerals Standard MM-1. Avoid adverse impacts to listed species and designated critical habitat from mineral operations. If the Notice of Intent indicates that a mineral operation would be located in an RHCA and could affect attainment of RMOs or could adversely affect listed anadromous fish, then require a reclamation plan, approved Plan of Operations (or other such governing document), and reclamation bond. For effects that cannot be avoided, such plans and bonds must address the following items to attain RMOs and avoid adverse effects on listed anadromous fish: the costs of removing facilities, equipment, and materials; recontouring disturbed areas to approximate pre-mining topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvage and replacement of topsoil; and seedbed preparation and revegetation. Ensure Reclamation Plan contain measurable attainment and bond release criteria for each reclamation activity.	Mineral and Geological Resources DC-1. Exploration, development, and production of mineral and energy resources contribute to the social and economic needs as well as local communities, and are conducted so as to minimize adverse environmental effects on national forest surface resources. Reasonable access is provided to valid existing mineral claims, as well as for exploration and production of leasable and locatable mineral resources. Areas such as congressionally designated wilderness areas, wild and scenic rivers, municipal watersheds, or other areas of high natural or cultural resource value may be withdrawn from future mineral entry. Guideline MM-1G. For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian dependent resources that may be affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this guideline include situations where Forest Service has limited discretionary authorities. In those cases, project effects should be minimized and should not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities. Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. Standard MM-5S. Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations or their designated critical habitat. • All suction dredge mining activities in habitat for aquatic threatened or endangered species/populations or in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or “will likely cause significant disturbance

⁴³ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	of surface resources”. A likelihood that a threatened or endangered species "take" (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics. • If the District Ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the District Ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance. Standard WM-1S. When watershed function⁴⁴ desired conditions are being achieved and watersheds are functioning properly⁴⁵, projects shall maintain⁴⁶ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore⁴⁷ or not retard attainment⁴⁸ of desired conditions. Short-term⁴⁹ adverse effects from project activities may occur when they support or do not diminish long-term⁵⁰ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard.
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⁴⁴ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁴⁶ See glossary in the Plan for definitions of “maintain” and “degrade”.

⁴⁷ See glossary in the Plan for definitions of “restore”.

⁴⁸ See glossary in the Plan for definitions of “retard attainment”.

⁴⁹ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ⁵⁰ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁵⁰ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.⁵¹ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.⁵² Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard. Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery⁵³ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities.
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⁵¹ Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁵² The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1S.

⁵³ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	Suitable uses and activities in Riparian Management Areas (see above)
Minerals Standard MM-2. Locate structures, support facilities, and roads outside RHCAs. Where no alternative to siting facilities in RHCAs exists, locate and construct the facilities in ways that avoid impacts to RHCAs and streams and that avoid adverse effects on aquatic resources. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate, and revegetate roads no longer required for mineral or land management activities.	Mineral and Geological Resources DC-1. Exploration, development, and production of mineral and energy resources contribute to the social and economic needs as well as local communities, and are conducted so as to minimize adverse environmental effects on national forest surface resources. Reasonable access is provided to valid existing mineral claims, as well as for exploration and production of leasable and locatable mineral resources. Areas such as congressionally designated wilderness areas, wild and scenic rivers, municipal watersheds, or other areas of high natural or cultural resource value may be withdrawn from future mineral entry. Guideline MM-2G. To the maximum extent possible, construct new structures, support facilities, and roads outside of riparian management areas. If new structures, support facilities and roads cannot be constructed outside riparian management areas because of site limitations, then construct and manage them to minimize adverse effects to aquatic and riparian dependent resources. Existing roads and facilities should be maintained to minimize damage to aquatic and riparian dependent resources, and should be removed/relocated if roads and facilities are causing unacceptable impacts in riparian management areas. When structures, support facilities, and roads are no longer required for mineral activities, they should be restored or reclaimed to achieve aquatic and riparian desired conditions. Guideline RF-2G. Temporary roads, including stream crossings, in RMAs should be minimized. Temporary roads, if constructed, should be managed to protect and restore aquatic and riparian desired conditions. Standard RF-3S. Side-casting (placement of unconsolidated earthen waste materials resulting from road construction or maintenance) in riparian management areas shall be avoided. Standard RF-4S. Fill material shall not be placed on organic debris in riparian management areas. Standard RF-5S. Disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow shall be avoided when constructing or reconstructing roads or landings either inside or outside of riparian management areas. Guideline RF-6G. Wetlands and unstable areas should be avoided when reconstructing existing roads or constructing new roads and landings. Minimize impacts where avoidance is not practical. Standard RF-7S. New or replaced permanent stream crossings shall be designed to allow for the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change.

	Standard RF-8S. Where physically feasible, construction or reconstruction of stream crossings will avoid diversion of streamflow out of the channel and down the road in the event of crossing failure. Guideline RF-11G. Design roads to minimize delivery of water and sediment from roads to streams. Avoid or minimize disruption of hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow when constructing, reconstructing, and maintenance of roads or landing. Guideline RF-12G. Road drainage should be routed away from potentially unstable channels, fills, and hillslopes to the extent practicable. Standard RF-13S. Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat. Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds. Suitable uses and activities in Riparian Management Areas (see above)
Minerals Standard MM-3. Prohibit solid and sanitary waste facilities in RHCAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RHCAs exists, and if releases can be prevented and stability can be ensured, the: a. Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.	Mineral and Geological Resources DC-1. Exploration, development, and production of mineral and energy resources contribute to the social and economic needs as well as local communities, and are conducted so as to minimize adverse environmental effects on national forest surface resources. Reasonable access is provided to valid existing mineral claims, as well as for exploration and production of leasable and locatable mineral resources. Areas such as congressionally designated wilderness areas, wild and scenic rivers, municipal watersheds, or other areas of high natural or cultural resource value may be withdrawn from future mineral entry.

b. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in RHCAs. c. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to aquatic resources and to attain RMOs. d. Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation, to avoid adverse effects to aquatic resources, and to attain the RMOs. Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.	Guideline MM-1G. For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian dependent resources that may be affected by the operations. Ensure operations do not retard or prevent attaining aquatic and riparian desired conditions. Exceptions to this guideline include situations where Forest Service has limited discretionary authorities. In those cases, project effects should be minimized and should not prevent or retard attaining aquatic and riparian desired conditions to the extent possible within those authorities. Guideline MM-2G. To the maximum extent possible, construct new structures, support facilities, and roads outside of riparian management areas. If new structures, support facilities and roads cannot be constructed outside riparian management areas because of site limitations, then construct and manage them to minimize adverse effects to aquatic and riparian dependent resources. Existing roads and facilities should be maintained to minimize damage to aquatic and riparian dependent resources, and should be removed/relocated if roads and facilities are causing unacceptable impacts in riparian management areas. When structures, support facilities, and roads are no longer required for mineral activities, they should be restored or reclaimed to achieve aquatic and riparian desired conditions. Standard MM-3S. Mine waste with the potential to generate hazardous material (as defined by CERCLA) shall not be authorized within RMAs and/or areas where groundwater contamination is possible. The exception is temporary staging of waste during abandoned mine cleanup. Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects.
Minerals Standard MM-4. For leasable minerals, prohibit surface occupancy within RHCAs for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location and RMOs can be attained and adverse effects to aquatic resources can be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of RMOs and (2) avoid adverse effects to native aquatic species.	Guideline MM-2G. To the maximum extent possible, construct new structures, support facilities, and roads outside of riparian management areas. If new structures, support facilities and roads cannot be constructed outside riparian management areas because of site limitations, then construct and manage them to minimize adverse effects to aquatic and riparian dependent resources. Existing roads and facilities should be maintained to minimize damage to aquatic and riparian dependent resources, and should be removed/relocated if roads and facilities are causing unacceptable impacts in riparian management areas. When structures, support facilities, and roads are no longer required for mineral activities, they should be restored or reclaimed to achieve aquatic and riparian desired conditions.

	Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Suitable uses and activities in Riparian Management Areas (see above)
Minerals Standard MM-5. Permit sand and gravel mining and extraction within RHCAs only if no alternatives exist, if the action(s) will not retard or prevent attainment of RMOs, and if adverse effects to native aquatic species can be avoided.	Mineral and Geological Resources DC-1. Exploration, development, and production of mineral and energy resources contribute to the social and economic needs as well as local communities, and are conducted so as to minimize adverse environmental effects on national forest surface resources. Reasonable access is provided to valid existing mineral claims, as well as for exploration and production of leasable and locatable mineral resources. Areas such as congressionally designated wilderness areas, wild and scenic rivers, municipal watersheds, or other areas of high natural or cultural resource value may be withdrawn from future mineral entry. Guideline MM-1G. For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian dependent resources that may be affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this guideline include situations where Forest Service has limited discretionary authorities. In those cases, project effects should be minimized and should not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities. Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. Standard MM-5S. Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations or their designated critical habitat. • All suction dredge mining activities in habitat for aquatic threatened or endangered species/populations or in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or “will likely cause significant disturbance of surface resources”. A likelihood that a threatened or endangered species “take” (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of

	a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics. • If the District Ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the District Ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance. Suitable uses and activities in Riparian Management Areas (see above)
Minerals Standard MM-6. Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to avoid adverse effects on native aquatic species and to eliminate impacts that prevent attainment of RMOs.	Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. Standard MM-5S. Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations or their designated critical habitat. • All suction dredge mining activities in habitat for aquatic threatened or endangered species/populations or in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or “will likely cause significant disturbance of surface resources”. A likelihood that a threatened or endangered species “take” (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics. • If the District Ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the District Ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance.
1995 March 1 NMFS Biological Opinion Mining 5.a.1 Locate new mines outside RHCAs unless de minimus risk of adverse effects.	Guideline MM-1G. For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian dependent resources that may be affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this guideline include situations where Forest Service has limited discretionary authorities. In those cases, project effects should be minimized and should not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities.

	Guideline MM-2G. To the maximum extent possible, construct new structures, support facilities, and roads outside of riparian management areas. If new structures, support facilities and roads cannot be constructed outside riparian management areas because of site limitations, then construct and manage them to minimize adverse effects to aquatic and riparian dependent resources. Existing roads and facilities should be maintained to minimize damage to aquatic and riparian dependent resources, and should be removed/relocated if roads and facilities are causing unacceptable impacts in riparian management areas. When structures, support facilities, and roads are no longer required for mineral activities, they should be restored or reclaimed to achieve aquatic and riparian desired conditions. Standard MM-3S. Mine waste with the potential to generate hazardous material (as defined by CERCLA) shall not be authorized within RMAs and/or areas where groundwater contamination is possible. The exception is temporary staging of waste during abandoned mine cleanup. Guideline MM-4G. Mineral operations should minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. Suitable uses and activities in Riparian Management Areas (see above)
1995 March 1 NMFS Biological Opinion Mining 5.a.2 Conduct watershed analysis prior to approving Plans of Operations for LAA actions.	No respective plan component.
1995 March 1 NMFS Biological Opinion Mining Management 4 - Work with EPA and States to ensure that draft plans of operation for new mines are conditioned so they do not adversely affect groundwater or surface water quality in a manner that retards attainment of RMOs or adversely affect salmon.	Ground-Water Dependent Ecosystem DC-2. The aquifer supplying water to groundwater-dependent ecosystems is not being affected by groundwater withdrawal or loss of recharge. Soils of groundwater dependent ecosystems are intact and functional; erosion and deposition are within the natural range. Runout channels, if present, are functioning naturally and are not entrenched, eroded, or substantially altered. Vegetation is composed of the anticipated cover of plant species associated with the site environment; hydric species are present and are not replaced by upland species. Livestock herbivory and trampling are not adversely affecting sites. Scale: Subwatershed. Standard MM-3S. Mine waste with the potential to generate hazardous material (as defined by CERCLA) shall not be authorized within RMAs and/or areas where groundwater contamination is possible. The exception is temporary staging of waste during abandoned mine cleanup. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.
Recreation Related Direction	

Recreation Standard RM-1. Design, construct, and operate recreation facilities (including trails) and dispersed sites in a manner that does not retard or prevent attainment of RMOs and avoids effects on aquatic resources. Complete Ecosystem Analysis at the Watershed Scale prior to construction of new recreation facilities in RHCAs. For existing recreation facilities inside RHCAs, assure that facilities or use of facilities will not prevent attainment of RMOs or adversely affect native aquatic species. Relocate or close recreation facilities where RMOs cannot be met or adverse effects on aquatic resources cannot be avoided.	Guideline RM-1G. New facilities or infrastructure should not be placed within expected long-term channel migration zones if it has the potential to impact channel or floodplain function. If some facilities must occur in RMAs (e.g., road stream crossings, boat ramps, docks, and interpretive trails), locate and design them to minimize impacts on floodplains and other riparian dependent resource conditions (e.g., within geologically stable areas, avoiding major spawning sites). Guideline RM-2G. Existing recreation facility components that are causing unacceptable impacts in riparian management areas should be removed or relocated. Site condition should be restored to improve riparian area function. Suitable uses and activities in Riparian Management Areas (see above)
Recreation Standard RM-2. Adjust dispersed and developed recreation practices that retard or prevent attainment of RMOs or adversely affect aquatic resources. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific sites closures are not effective in meeting RMOs and avoiding adverse effects on aquatic resources, eliminate the practice or occupancy.	Guideline RM-2G. Existing recreation facility components that are causing unacceptable impacts in riparian management areas should be removed or relocated. Site condition should be restored to improve riparian area function. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.
Recreation Standard RM-3. Address attainment of RMOs and potential effects on listed anadromous fish (<i>inland native fish</i>) and designated critical habitat in Wild and Scenic Rivers, Wilderness, and other Recreation Management plans.	Standard WM-1S. When watershed function⁵⁴ desired conditions are being achieved and watersheds are functioning properly⁵⁵, projects shall maintain⁵⁶ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall

⁵⁴ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁵⁶ See glossary in the Plan for definitions of “maintain” and “degrade”.

	restore⁵⁷ or not retard attainment⁵⁸ of desired conditions. Short-term⁵⁹ adverse effects from project activities may occur when they support or do not diminish long-term⁶⁰ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions. Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard.

⁵⁷ See glossary in the Plan for definitions of “restore”.

⁵⁸ See glossary in the Plan for definitions of “retard attainment”.

⁵⁹ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ⁶⁰ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁶⁰ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

1995 March 1 NMFS Biological Opinion – Roadless Areas 5.d.2 Ensure actions have a de minimus risk of degrading the functions and values of these areas.	Roadless Areas are identified in the 2001 Roadless Area Conservation Rule which generally prohibits road construction and reconstruction and the cutting, sale or removal of timber in the IRAs identified in that rule. The regulation based RACR management direction cannot be changed through plan revision. For the most part the plan has allocated these areas into Management Area 3A, non-motorized backcountry and MA 3B, motorized backcountry. There are also some IRAs that have been allocated into the MA 1B, recommended wilderness area and some other special area allocations.
1995 March 1 NMFS Biological Opinion – Roadless Areas 5.d.2 Provide maps, pertinent description, road construction plans and analysis of impacts of proposed road system on designated critical habitat to NMFS for roadless areas.	No respective plan component.
1995 March 1 NMFS Biological Opinion 1. Access to Spawning Habitats and Redds - FS should eliminate or adequately restrict access, including livestock, off-road vehicles, anglers, etc., during spawning and incubation periods to prevent harassment. Effectiveness of effort could be maximized by expanding outreach and education programs in cooperation w/ State agencies to promote awareness.	Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery⁶¹ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities.
Fire Related Direction	
Fire Standard FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as to not prevent attainment of RMOs and to minimize disturbances of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function or aquatic resources.	Guideline FM-8G. Minimum impact suppression tactics (MIST) should be utilized in sensitive areas, such as designated wilderness areas, designated wild and scenic river corridors, research natural areas, botanical areas, riparian management areas, cultural and historic sites, developed recreation areas, special use permit areas that have structures, and historic and recreational trails. MIST techniques should also be used for post fire restoration activities. Standard FM-12S. Pumps and charged hoses shall not be back flushed into stream channels, wetlands, or surface water. Standard FM-3S. Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams. When drafting, pumps shall be screened at drafting sites to

⁶¹ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use NMFS-approved screening criteria where listed fish or critical habitat are present. Standard FM-10S. Ensure prescribed burn projects contribute to and do not retard the attainment of the aquatic and riparian desired conditions. Guideline RMA-4G. Water drafting sites should be located and managed to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat. To prevent the spread of invasive species, water should not be discharged into other water bodies. Guideline FM-7G. Pumping directly from a stream channel should be avoided if chemical products are to be injected directly into the system. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian area. Guideline FM-9G. Prescribed burn direct ignition in RMAs should not be used unless site/project scale effects analysis demonstrates that it would not retard attainment of aquatic and riparian desired conditions. Guideline FM-6G. Disturbed areas, such as firelines, drop-points, camps, roads, and trails, should be restored by actions such as scattering slash piles, replacing logs and boulders, scarifying soils, recontouring terrain, and reseeding with native species. Guideline FM-4G. Locate and configure firelines to minimize sedimentation to waterbodies, capture of overland and streamflows, and development of unauthorized roads and trails. Restore firelines following suppression or prescribed fire activities. Standard FM-5S. To minimize soil damage when chipping fuels within riparian management areas, chip bed depths on dry soils shall be limited to 7.5 cm or less (Busse et al. 2006). Guideline FM-11G. Chemicals or retardant should not be used for suppression or mop-up within riparian areas. Guideline FM-2G. Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on
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	avoidance area maps and intermittent streams that are running or holding surface water at the time of retardant use. Guideline FM-1G. Locate temporary firefighting facilities (e.g., incident bases, camps, helibases, staging areas, helispots, and other centers) for incident activities outside RMAs. When no practical alternative exists, all appropriate measures to protect, maintain, restore, or enhance aquatic and riparian dependent resources should be used. If the only suitable location for such activities is within a RMA, use may be granted following review by a resource advisor and discussion with the agency administrator. The resource advisor will work the incident management team to prescribe the location, use conditions, and rehabilitation requirements. Use an interdisciplinary team to predetermine suitable incident base and helibase locations. Standard WM-1S. When watershed function⁶² desired conditions are being achieved and watersheds are functioning properly⁶³, projects shall maintain⁶⁴ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore⁶⁵ or not retard attainment⁶⁶ of desired conditions. Short-term⁶⁷ adverse effects from project activities may occur when they support or do not diminish long-term⁶⁸ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not
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⁶² Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁶⁴ See glossary in the Plan for definitions of “maintain” and “degrade”.

⁶⁵ See glossary in the Plan for definitions of “restore”.

⁶⁶ See glossary in the Plan for definitions of “retard attainment”.

⁶⁷ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition.

⁶⁸ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁶⁸ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard.
Standard FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RHCAs. If the only suitable location for such activities is within the RHCAs, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to aquatic resources a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during pre-suppression planning.	Guideline FM-1G. Locate temporary firefighting facilities (e.g., incident bases, camps, helibases, staging areas, helispots, and other centers) for incident activities outside RMAs. When no practical alternative exists, all appropriate measures to protect, maintain, restore, or enhance aquatic and riparian dependent resources should be used. If the only suitable location for such activities is within a RMA, use may be granted following review by a resource advisor and discussion with the agency administrator. The resource advisor will work the incident management team to prescribe the location, use conditions, and rehabilitation requirements. Use an interdisciplinary team to predetermine suitable incident base and helibase locations.
Standard FM-3. Prohibit delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery biologist, when the action agency determines an escaped fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.	Standard FM-3S. Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use NMFS-approved screening criteria where listed fish or critical habitat are present. Guideline FM-2G. Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams that are running or holding surface water at the time of retardant use. Guideline RMA-4G. Water drafting sites should be located and managed to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat. To prevent the spread of invasive species, water should not be discharged into other water bodies.

	Guideline FM-7G. Pumping directly from a stream channel should be avoided if chemical products are to be injected directly into the system. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian area.
Standard FM-4. Prescribed burn projects and prescriptions should be designed to contribute to the attainment of the RMOs.	Guideline FM-8G. Minimum impact suppression tactics (MIST) should be utilized in sensitive areas, such as designated wilderness areas, designated wild and scenic river corridors, research natural areas, botanical areas, riparian management areas, cultural and historic sites, developed recreation areas, special use permit areas that have structures, and historic and recreational trails. MIST techniques should also be used for post fire restoration activities. Standard RMA-5S. Pumps shall be screened at drafting sites to prevent entrainment of fish and shall have one-way valves to prevent back-flow into streams. Standard FM-3S. Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use NMFS-approved screening criteria where listed fish or critical habitat are present. Guideline RMA-4G. Water drafting sites should be located and managed to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat. To prevent the spread of invasive species, water should not be discharged into other water bodies. Guideline FM-11G. Chemicals or retardant should not be used for suppression or mop-up within riparian areas. Guideline FM-2G. Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams that are running or holding surface water at the time of retardant use.

	Standard FM-5S. To minimize soil damage when chipping fuels within riparian management areas, chip bed depths on dry soils shall be limited to 7.5 cm or less (Busse et al. 2005). Guideline FM-6G. Disturbed areas, such as firelines, drop-points, camps, roads, and trails, should be restored by actions such as scattering slash piles, replacing logs and boulders, scarifying soils, recontouring terrain, and reseeding with native species. Guideline FM-7G. Pumping directly from a stream channel should be avoided if chemical products are to be injected directly into the system. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian area. Guideline FM-1G. Locate temporary firefighting facilities (e.g., incident bases, camps, helibases, staging areas, helispots, and other centers) for incident activities outside RMAs. When no practical alternative exists, all appropriate measures to protect, maintain, restore, or enhance aquatic and riparian dependent resources should be used. If the only suitable location for such activities is within a RMA, use may be granted following review by a resource advisor and discussion with the agency administrator. The resource advisor will work the incident management team to prescribe the location, use conditions, and rehabilitation requirements. Use an interdisciplinary team to predetermine suitable incident base and helibase locations. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.⁶⁹ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.⁷⁰ Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands
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⁶⁹ Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁷⁰ The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1S.

	Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard.
Standard FM-5. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain RMOs and avoid adverse effects on aquatic resources whenever RHCAs are significantly damaged by a wildfire or a prescribed fire is burning out of prescription.	No respective plan component.
1995 March 1 NMFS Biological Opinion – Fire Suppression 5.a Annual briefing for fire overhead teams on ESA requirements for habitat protection.	No respective plan component.
1995 March 1 NMFS Biological Opinion – Fire Suppression 5.b Following a fire affecting RHCAs, evaluate implementation of measures in Fire Situation Analysis, and evaluate effectiveness of rehab efforts. Report to NMFS 15 months after containment.	No respective plan component.
Lands Related Direction	
Standard LH-1. For hydroelectric and other surface water development proposals, require instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage, reproduction, and growth. Coordinate this process with the appropriate state agencies. During relicensing of hydroelectric projects, provide to the Federal Energy Regulatory Commission (FERC) written and timely license conditions that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate state agencies.	Standard KW-2S. In Key Watersheds and subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species, hydroelectric and other surface water development authorizations shall include requirements for in-stream flows and habitat conditions that maintain or restore native fish and other desired aquatic species populations, riparian dependent resources, favorable channel conditions, and aquatic connectivity. Standard LH-1S. Authorizations for all new and existing special uses, including, but not limited to water diversion or transmission facilities (e.g., pipelines and ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals, shall result in the re-establishment, restoration, or mitigation of habitat conditions and ecological processes identified as being essential for the maintenance or improvement of habitat conditions for fish, water and other riparian dependent species and resources. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat.

	Guideline LH-3G. If existing support facilities are located within the riparian management areas, they should be operated and maintained to restore or enhance aquatic and riparian dependent resources. At time of permit re-issuance, consider removing support facilities, where practical. Standard LH-2S. New support facilities shall be located outside of riparian management areas. Support facilities include any facilities or improvements (e.g., workshops, housing, switchyards, staging areas, and transmission lines) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation or enhancement measures. Standard WM-1S. When watershed function⁷¹ desired conditions are being achieved and watersheds are functioning properly⁷², projects shall maintain⁷³ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore⁷⁴ or not retard attainment⁷⁵ of desired conditions. Short-term⁷⁶ adverse effects from project activities may occur when they support or do not diminish long-term⁷⁷ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard. Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management
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⁷¹ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁷³ See glossary in the Plan for definitions of “maintain” and “degrade”.

⁷⁴ See glossary in the Plan for definitions of “restore”.

⁷⁵ See glossary in the Plan for definitions of “retard attainment”.

⁷⁶ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ⁷⁷ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁷⁷ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions. Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard.
Standard LH-2. Locate new hydroelectric ancillary facilities outside RHCAs. For existing ancillary facilities inside the RHCA that are essential to proper management, provide recommendations to FERC to assure that the facilities would not prevent attainment of the RMOs and that adverse effects on aquatic resources are avoided. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in RHCAs to avoid adverse effects on aquatic resources.	Standard LH-2S. New support facilities shall be located outside of riparian management areas. Support facilities include any facilities or improvements (e.g., workshops, housing, switchyards, staging areas, and transmission lines) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation or enhancement measures. Standard KW-2S. In Key Watersheds and subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species, hydroelectric and other surface water development authorizations shall include requirements for in-stream flows and habitat conditions that maintain or restore native fish and other desired aquatic species populations, riparian dependent resources, favorable channel conditions, and aquatic connectivity. Standard KW-3S. In Key Watersheds and in subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species, new hydroelectric facilities and water developments shall not be located in a Key Watershed unless it can be demonstrated that there are minimal risks and/or no adverse effects to the fish and water resources for which the Key Watershed was established. Standard LH-1S. Authorizations for all new and existing special uses, including, but not limited to water diversion or transmission facilities (e.g., pipelines and ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals, shall result in the re-establishment, restoration, or mitigation of habitat conditions and ecological processes identified as being essential for the maintenance or improvement of habitat conditions for fish, water and other riparian

	dependent species and resources. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat. Guideline LH-3G. If existing support facilities are located within the riparian management areas, they should be operated and maintained to restore or enhance aquatic and riparian dependent resources. At time of permit re-issuance, consider removing support facilities, where practical.
Standard LH-3. Issue leases, permits, rights-of-way, and easements to avoid adverse effects on aquatic resources and to avoid effects that would be inconsistent with or prevent attainment of RMOs. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the RMOs or adversely affect aquatic resources. If adjustments are not effective, eliminate the activity. Where the authority to adjust was not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the RMOs or adversely affect aquatic resources. Priority for modifying easements would be based on the current and potential adverse effects on aquatic resources and the ecological value of the riparian resources affected.	Standard LH-1S. Authorizations for all new and existing special uses, including, but not limited to water diversion or transmission facilities (e.g., pipelines and ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals, shall result in the re-establishment, restoration, or mitigation of habitat conditions and ecological processes identified as being essential for the maintenance or improvement of habitat conditions for fish, water and other riparian dependent species and resources. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat. Standard WM-1S. When watershed function⁷⁸ desired conditions are being achieved and watersheds are functioning properly⁷⁹, projects shall maintain⁸⁰ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall restore⁸¹ or not retard attainment⁸² of desired conditions. Short-term⁸³ adverse effects from project activities may occur when they support or do not diminish long-term⁸⁴ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872

⁷⁸ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁸⁰ See glossary in the Plan for definitions of “maintain” and “degrade”.

⁸¹ See glossary in the Plan for definitions of “restore”.

⁸² See glossary in the Plan for definitions of “retard attainment”.

⁸³ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition. ⁸⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁸⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

	Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment B to assist in determining compliance with this standard.
Standard LH-4. Use land acquisition, exchange, and conservation easements to meet RMOs and facilitate restoration of fish stocks and other species at risk of extinction.	Land Ownership DC-2. Landownership adjustment by purchase, exchange, or other authority simplifies and improves management of the Blue Mountains national forests. Priorities for land acquisition include congressionally designated areas and lands that support known populations of threatened, endangered, proposed, or sensitive species. Guideline LH-4G. Land exchanges should avoid the disposition of occupied habitat of threatened, endangered, candidate, proposed, or sensitive species.
1995 March 1 NMFS Biological Opinion – Water Conveyance Management 3. Clarified PACFISH (PF) LH-3, stating that implementation of this standard is expected to assure that 1) water conveyance intakes with the potential to trap or impinge listed salmon would meet NMFS' established intake screening criteria before use is approved, and 2) permits would be authorized or re-authorized only if streamflows are adequate to not retard or prevent attainment of RMOs and not adversely affect listed salmon.	Standard LH-1S. Authorizations for all new and existing special uses, including, but not limited to water diversion or transmission facilities (e.g., pipelines and ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals, shall result in the re-establishment, restoration, or mitigation of habitat conditions and ecological processes identified as being essential for the maintenance or improvement of habitat conditions for fish, water and other riparian dependent species and resources. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat.
1998 June 22 NMFS Biological Opinion 6 - Review floatboating effects to steelhead from commercial and non-commercial recreational boating/floating for adverse effects to steelhead spawning. Where adverse impacts are reducing steelhead productivity, commercial and non-commercial boating/floating should be modified to reduce or eliminate effects. Review all recreational facilities as ongoing federal actions.	Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery ⁸⁵ of listed, and proposed, and candidate species and their designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities.
General Riparian Area Related Direction	

⁸⁵ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

Standard RA-1. Identify and cooperate with Federal, tribal, State, and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.	No respective plan component.
Standard RA-2. Trees may be felled in RHCAs when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.	Standard RMA-3S. Trees felled for safety shall be retained onsite unless in excess of what is needed to achieve aquatic and riparian desired conditions. If the desired quantity and size distribution of large wood has been met on site, the wood can be transported to other aquatic and riparian restoration projects.
Standard RA-3. Apply herbicides, pesticides, and other toxicants and chemicals in a manner that does not retard or prevent attainment of RMOs and that avoids adverse effects on aquatic resources.	Standard RMA-2S. Herbicides, insecticides, pesticides and other toxicants, and other chemicals shall be applied only to maintain, protect, or enhance aquatic and riparian resources or to restore native plant communities in a manner that does not harm aquatic or riparian resources. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.
Standard RA-4. Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs unless there are no other alternatives. Refueling sites within RHCAs shall be approved by the Forest Service or Bureau of Land management and have an approved spill containment plan.	Standard FM-3S. Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use NMFS-approved screening criteria where listed fish or critical habitat are present. Standard MM-3S. Mine waste with the potential to generate hazardous material (as defined by CERCLA) shall not be authorized within RMAs and/or areas where groundwater contamination is possible. The exception is temporary staging of waste during abandoned mine cleanup. Guideline FM-11G. Chemicals or retardant should not be used for suppression or mop-up within riparian areas. Guideline FM-7G. Pumping directly from a stream channel should be avoided if chemical products are to be injected directly into the system. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian area. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.
Standard RA-5. Locate water drafting sites to avoid adverse effects on aquatic resources and instream flow and in a manner that does not retard or prevent attainment of RMOs.	Standard FM-3S. Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Vehicles shall be parked in locations that avoid entry of spilled fuel into streams. When drafting, pumps shall be screened at drafting sites to

	prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use NMFS-approved screening criteria where listed fish or critical habitat are present. Guideline RMA-4G. Water drafting sites should be located and managed to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat. To prevent the spread of invasive species, water should not be discharged into other water bodies. Guideline FM-7G. Pumping directly from a stream channel should be avoided if chemical products are to be injected directly into the system. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian area. Guideline IS-1G. Avoid cross contamination between streams, reservoirs and lakes from pumps, suction and dipping devices or any other equipment. Avoid dumping water directly from one stream or lake into another. Disinfect water storage and conveyance equipment including sampling equipment, water tenders, pumps, engines and aircraft prior to use on Forest.
1995 March 1 NMFS Biological Opinion – Transport of Toxic Chemicals 2. Transport of Toxic Chemicals – FS should minimize risk of toxic fuel spills during transport through RHCAs by using alternative routes where feasible, and taking all other plausible precautions.	No respective plan component.
1995 March 1 NMFS Biological Opinion – Access to Spawning Habitat and Redds 1. FS should eliminate or adequately restrict access, including livestock, off-road vehicles, anglers, etc., during spawning and incubation periods to prevent harassment. Effectiveness of effort could be maximized by expanding outreach and education programs in cooperation w/ State agencies to promote awareness.	Standard GM-1S. Manage livestock grazing to attain aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing practices (such as number of livestock, timing, and physical structures). If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures. Standard GM-6S. Livestock grazing shall be managed and implemented to avoid trampling federally listed threatened or endangered fish redds.
Watershed and Habitat Restoration Related Direction	
Standard WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of RMOs.	Standard RMA-1S. Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When riparian management area desired conditions are functioning properly, projects shall protect or maintain those conditions. When riparian management area desired conditions are not yet achieved or riparian management

	areas have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions.⁸⁶ Short-term adverse effects from project activities may occur when they support long-term recovery of riparian management area desired conditions.⁸⁷ Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects towards attainment of riparian management area desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. Use ARCS Attachment B (e.g. diagnostic indicators and RMA ecological process and function descriptions) to assist in determining compliance with this standard. Standard WM-2S. All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides. Guideline RE-1G. Watershed restoration projects should be designed to utilize or emulate natural ecological processes to the extent practicable, for meeting and maintaining restoration objectives. Guideline RE-2G. Watershed restoration projects should be designed to minimize the need for long-term maintenance. Standard WM-1S. When watershed function⁸⁸ desired conditions are being achieved and watersheds are functioning properly⁸⁹, projects shall maintain⁹⁰ those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk and to the degree that project activities would contribute to those conditions, projects shall
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⁸⁶ Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Class terminology for functioning properly, “functioning-at-risk”, and impaired function are equivalent to “functioning appropriately” or “, “functioning-at-risk” and “functioning at unacceptable risk” functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to “Properly Functioning” or “At Risk” or “Not Properly Functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁸⁷ The definitions and rationale for the terms maintain, restore, degrade, retard attainment, short-term, and long-term are included in Forest Plan standard WM-1S.

⁸⁸ Per Revised Land Management Plan Watershed Function desired conditions (watershed function, hydrologic, riparian, wetland, stream channel, groundwater dependent ecosystem, and aquatic habitat).

² Per Watershed Condition Framework Technical Guide (USDA Forest Service, 2011b), subsequent versions and/or comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF. The Watershed Condition Framework categories of terminology for “functioning properly”, “functioning-at-risk”, and impaired function are equivalent to the “functioning appropriately” “functioning-at-risk” and “functioning at unacceptable risk” categories within the matrix of pathways and indicators (USFWS 1998), and to the respectively equivalent to “properly functioning” or “at risk” or “not properly functioning” categories within the matrix of pathways and indicators used by NMFS (1996).

⁹⁰ See glossary in the Plan for definitions of “maintain” and “degrade”.

	restore ⁹¹ or not retard attainment ⁹² of desired conditions. Short-term ⁹³ adverse effects from project activities may occur when they support or do not diminish long-term ⁹⁴ recovery of watershed function desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (Alaska National Interest Lands Conservation Act {ANILCA}, 1872 Mining law, valid state water right, etc.). In those cases, project effects shall be minimized and not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities. Use ARCS Attachment 2 to assist in determining compliance with this standard.
Standard WR-2. Cooperate with Federal, State, local, and Tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet RMOs.	No respective plan component.
Standard WR-3. Do not use planned restoration as a substitute for preventing habitat degradation (i.e. use planned restoration only to mitigate existing problems, not to mitigate the effects of proposed activities).	Standard RE-3S. Except where Forest Service authorities are limited, mitigation or planned restoration shall not be used as a substitute for preventing long-term watershed or habitat degradation.
1995 March 1 NMFS Biological Opinion – Restoration 5.e.1 Watershed restoration plans should be developed for priority watersheds within the context of broader area plans (subbasin, Forest, etc.) where possible.	Incorporated into the identification of Key and Priority Watersheds. Discussed in ARCS (Watershed Restoration section).
1995 March 1 NMFS Biological Opinion – Restoration 5.e.2 Special emphasis should be provided to implement multi-agency restoration plans in readily restorable habitat.	Incorporated into the identification of Key and Priority Watersheds. Standard RE-5S. Minimize adverse effects to ESA listed, proposed, and candidate species and their designated and proposed critical habitat in accordance with Forest Service authorities. Management activities shall not retard recovery ⁹⁵ of listed, and proposed, and candidate species and their

⁹¹ See glossary in the Plan for definitions of “restore”.

⁹² See glossary in the Plan for definitions of “retard attainment”.

⁹³ See glossary in the Plan for definition of “short-term adverse effects” See the Implementation Plan for application of the definition.

⁹⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁹⁴ See glossary in the Plan for definition of “long-term recovery”. See the Implementation Plan for application of the definition.

⁹⁵ Retard recovery - management action effects that, individually or in combination with other management actions or natural disturbances, measurably slow the natural rate of recovery.

	designated and proposed critical habitat in the long-term in accordance with Forest Service authorities. Federally listed, proposed, and candidate species and their designated and proposed critical habitats shall be managed in accordance with their recovery or other conservation plans, in accordance with Forest Service authorities.
1995 March 1 NMFS Biological Opinion – Restoration 5.e.3 Direct restoration of RHCAs or stream channels, including but not limited to additions of LWD, should be only be undertaken concurrent with a corresponding change to the management regime responsible for the habitat degradation.	No responsive plan component.
1995 March 1 NMFS Biological Opinion – Restoration 5.e.4 Priority should be given to watershed restoration actions that will help improve degraded stream reaches adjacent to or connected to remaining reaches of high quality habitat to help restore connectivity and bolster recolonization.	Incorporated into the identification of Key and Priority Watersheds.
1998 June 22 NMFS Biological Opinion 3 - Use Streamlining & Matrix of Pathways & Indicators - All other ongoing actions that may affect steelhead should be assessed via the Level 1 streamlining teams using the matrix	Standard WM-1S, Standard RMA-1S, and Guideline GM-3G (described above) required use of the matrix of pathways and indicators when ESA listed fish and their critical habitat are present. Matrix indicators serves as diagnostic criteria to assist in evaluating attainment or progress towards attainment of multiple aquatic and riparian desired conditions and compliance with key standards and guidelines. Forest interdisciplinary team aquatic specialists will also continue to use the matrix of pathways and indicators when evaluating projects when ESA listed steelhead and their designated critical habitat may be affected by the proposed action.
1998 June 22 NMFS Biological Opinion 5 Accelerate Steelhead Habitat Restoration - The FS should work cooperatively with BLM, NMFS, State Agencies, and Tribes to develop priorities and adequately fund restoration.	No responsive plan component.
Fisheries and Wildlife Restoration Related Direction	
Standard FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the RMOs.	No responsive standard and guideline direction; however, there are 13 Objectives related to meeting desired conditions for watersheds.
Standard FW-2. Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that	Guideline RM-1G. New facilities or infrastructure should not be placed within expected long-term channel migration zones if it has the potential to impact channel or floodplain function. If some

does not retard or prevent attainment of RMOs or adversely affect aquatic resources. For existing fish and wildlife interpretive and other user-enhanced facilities inside RHCAs, assure that RMOs are met and adverse effects on aquatic resources are avoided. Where RMOs cannot be met or adverse effects on aquatic resources avoided, relocate or close such facilities.	facilities must occur in RMAs (e.g., road stream crossings, boat ramps, docks, and interpretive trails), locate and design them to minimize impacts on floodplains and other riparian dependent resource conditions (e.g., within geologically stable areas, avoiding major spawning sites). Standard KW-1S. In Key Watersheds or subwatersheds with ESA critical habitat for aquatic species or subwatersheds containing listed aquatic species that are functioning properly there shall be no net increase (1 mile of road-related risk reduction for every new mile of road construction), where they are functioning-at-risk, there shall be a net decrease (1.5 miles of road-related risk reduction for every new mile of road construction), and where they are impaired function, there shall be a net decrease (2.0 miles of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. Priority for road-related risk reduction shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction. This standard shall apply to the affected subwatershed when new system road construction is proposed in that subwatershed, and shall not be offset by reductions in open-road densities in other subwatersheds.
Standard FW-3. Cooperate with Federal, tribal, and State wildlife management agencies to identify and eliminate wild ungulate impacts that prevent attainment of the RMOs or adversely affect listed anadromous and inland native fish.	No responsive plan component.
Standard FW-4. Cooperate with Federal, tribal, and State wildlife management agencies to identify and eliminate wild adverse effects on native anadromous and inland fish associated with habitat manipulation, fish stocking, fish harvest, and poaching.	No responsive plan component.

Table 1. Current distribution of key (PACFISH) and priority (INFISH) subwatersheds by subbasin for each national forest in relationship to ARCS key and priority watersheds

National Forest	Subbasin	Subwatersheds Occupied by One or More ESA-listed Species	PACFISH Key Subwatersheds	INFISH Priority Subwatersheds	ARCS Key Watersheds	ARCS Priority Watersheds
Malheur	Middle Fork John Day	29	29	0	0	16
	Upper John Day	47	47	0	16	0
	Upper Malheur	19	0	19	4	10
	Silvies	0	0	20	9	0
	Silver	0	0	14	0	4
	North Fork John Day	4	4	0	0	0
	Harney-Malheur	0	0	4	0	0
	South Fork Crooked River-Beaver Creek	0	0	7	0	0
	Totals	137	80	64	29	30
Umatilla	Middle Fork John Day	1	1	0	0	0
	North Fork John Day	84	84	0	10	11
	Lower John Day	4	4	0	0	0
	Willow-Columbia	2	2	0	0	0
	Umatilla	15	15	0	6	0
	Walla Walla	10	10	0	4	1
	Tucannon	7	7	0	0	3
	Asotin	6	6	0	5	0

National Forest	Subbasin	Subwatersheds Occupied by One or More ESA-listed Species	PACFISH Key Subwatersheds	INFISH Priority Subwatersheds	ARCS Key Watersheds	ARCS Priority Watersheds
	Lower Grande Ronde	25	25	0	12	0
	Upper Grande Ronde	9	9	0	1	0
	Totals	163	163	0	38	15
Wallowa-Whitman	Imnaha	29	29	0	20	3
	Lower Grande Ronde	29	29	0	15	0
	Upper Grande Ronde	50	50	0	12	15
	Lower Snake-Asotin	1	1	0	0	0
	North Fork John Day	7	7	0	3	3
	Hells Canyon, Brownlee, Salmon	32	20	12	3	4
	Powder	30	0	30	7	0
	Burnt	0	0	22	11	0
	Wallowa	22	22	0	16	0
	Totals	172	132	64	87	25