

NATIONAL FOREST MANAGEMENT ACT WATERSHED PROTECTION PLANNING RULE

A Concept Piece by Earthjustice and Pacific Rivers Council
for the US Forest Service Planning Rule Team (July 29, 2010)

SUMMARY

Earthjustice and Pacific Rivers Council commend Secretary Vilsack for the priority he has placed on water and watersheds in his vision for our national forests. We urge the Forest Service to implement the Secretary's vision by recognizing and acknowledging water and watershed integrity as the leading forest output on which its neighbors and the larger landscape surrounding our national forests depend by promulgating National Forest Management Act (NFMA) planning regulations that require land and resource management plans to:

- Establish ecologically defined Riparian Reserves that include minimum default widths of 100 feet, within which all management actions must be restorative of aquatic and riparian values and where special management direction applies.
- Identify Key Watersheds and prioritize the protection and restoration of areas exhibiting the highest aquatic integrity.
- Establish measurable watershed conservation Objectives and Indicators of aquatic ecosystem integrity and desired conditions that are directly linked to management standards and monitoring.
- Describe a Watershed Restoration approach that includes road removal and achievement of road density standards, connectivity within and between healthy watersheds, and re-establishment of stream and watershed ecosystem processes.
- Provide a Monitoring Framework of sufficient comprehensiveness and accuracy to assess trends in aquatic habitat, water quality, and biological integrity for waters across national forests, and to describe the effects of forest management actions, natural disturbance events, and climate change. Require that monitoring results be used in ongoing project planning and future forest plan revisions.
- Establish whole watershed assessments as the primary planning tools that shape and inform future management actions.

Together, these core forest plan requirements will comprise a new, unified national forest watershed conservation strategy that will ensure sound stewardship of the priceless water-based resources entrusted to the care of the Forest Service by the American public.

I. WATERSHED PROTECTION THROUGH NFMA REGULATIONS: THE NEED

Healthy rivers, streams, and wetlands play important roles in both human and natural environments. They moderate periods of drought and flood, provide cool, clean water, and host diverse communities of plants and animals when in good condition. However, the precipitous decline of many aquatic species reveals that the nation's waters are in peril, yet the health of our watersheds is even more important in this time of climate change.

Pacific Coast salmon provide a particularly sobering example of the inadequacy of aquatic conservation efforts. In 1991, 214 distinct stocks of anadromous fish in California, Idaho, Oregon, and Washington were identified as at risk of extinction, and the same report noted over 100 stocks already gone forever. Salmon, however, are only the tip of the iceberg. Almost fifty percent of the native crayfish in the United States and Canada are in need of conservation recognition, and over seventy percent of native freshwater mussels are vulnerable to extinction. Additionally, there was a forty-five percent increase in the number of freshwater fish vulnerable to extinction from 1979 to 1989.

The loss of aquatic diversity is an economic as well as biological disaster. In the Pacific Northwest, Indian fishermen caught only half as many salmon in the 1990s as did their predecessors in the early 1940s, even though their allocation rose from five percent to 50 percent during those 50 years. In the 1990s, ocean trollers reported average landings at half of those in the 1980s, with a loss of hundreds of millions of dollars to local and regional economies.

In addition to producing commercially extractable resources such as trees and fish, healthy watersheds provide a variety of economically valuable ecosystem-based services—such as clean air and water, scenic beauty, recreational opportunity, and wildlife—that have real implications for the vitality of many local economies. A 2010 Forest Service study found that recreation activities on national forest land sustain 223,000 jobs in the rural communities within 50 miles of the National Forests and Grasslands. Visitors spend \$13 billion directly in those communities, which in turn generated an additional \$14.5 billion in economic activity.

Clean water has been recognized widely as a valuable ecosystem service that is vulnerable to watershed degradation and worth a considerable monetary investment to secure.

[W]hile most Americans may live in urban areas, most of us are also dependent upon rural lands, particularly forest lands for clean water and a healthy climate. For these reasons, conserving our forests is not a luxury. It is, in my view, a necessity.

United States Department of Agriculture Secretary Thomas Vilsack (Aug. 14, 2009 speech in Seattle, Washington). A 2008 Forest Service study found that national forests and grasslands contribute 51% of the water used in the 11 Western states. Local municipalities have discovered that the most cost effective water treatment plant is a healthy watershed and -- like the cities of

Portland and New York -- have invested heavily in efforts to permanently protect and restore the integrity of the watershed from which they derive their water.

Watershed protection is even more important with the recognition of the reality of climate change. Several courts have recently held that federal agencies must consider and integrate climate change into their large-scale projects and plans. To date, the Forest Service has generally compartmentalized consideration of climate change by confining it to a separate addendum in any environmental analysis. But climate change has such far-reaching and pervasive effects, it must now be incorporated into any definition of baseline environmental conditions and integrated into all management planning. Only then will all management strategies be informed and driven by the changing environment the land managers face.

In 2009, Secretary Vilsack announced that the Department of Agriculture would be amending the forest planning regulations to integrate climate change and greater watershed protection into forest management, stating that: “[r]estoring forest ecosystems, particularly in fire-adapted forests, will make our forests more resilient to climate-induced stresses and will ensure that our forests will continue to provide ample, abundant clean water. In many of our forests, restoration will also include efforts to improve or decommission roads, to replace and improve culverts, and to rehabilitate streams and wetlands.”

II. WATERSHED PROTECTION THROUGH NFMA REGULATIONS: THE MANDATE

Public concern about excessive clearcutting and insular management led Congress in 1976 to enact the National Forest Management Act as a “fundamental reform.” Congress focused its reform efforts on (1) requiring long-range planning, (2) allowing public participation, and (3) establishing standards and guidelines for managing forests. The Chair of the Senate Subcommittee on the Environment and Land Resources noted that, in enacting NFMA, “the era of full delegation of land management decision-making authority to Federal agencies is over.” Sponsor Senator Humphrey stated: “The days have ended when the forest may be viewed only as trees and trees viewed only as timber. The soil and the water, the grasses and the shrubs, the fish and the wildlife, and the beauty that is the forest must become integral parts of resource managers’ thinking and actions.”

NFMA imposes substantive duties on the United States Department of Agriculture (USDA) by establishing nondiscretionary standards and guidelines for protecting national forest resources and promoting public accountability and long-range planning. *Inland Empire Pub. Lands Council v. U.S. Forest Serv.*, 88 F.3d 754, 757 (9th Cir. 1996) (“NFMA imposes substantive requirements . . . which have been promulgated as regulations”); *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1173 (9th Cir. 2006) (“[S]ubstantive requirements of the NFMA [are] designed to ensure continued diversity of plant and animal communities and the continued viability of wildlife in the forest.”) (citation omitted).

NFMA establishes a three-tiered regulatory approach to forest management, with different requirements existing at the national, regional, and local levels. At the national level,

NFMA requires USDA to promulgate regulations that (1) set out the process for the adoption and revision of forest plans and (2) set forth the standards and guidelines for uses of the forests. *Citizens for Better Forestry v. U.S. Dep't of Agriculture*, 341 F.3d 961, 965 (9th Cir. 2003) (“*Citizens I*”) (citing 16 U.S.C. § 1604(g)). The regulations “set broad guidelines (to be followed in preparing regional and site-specific plans) regarding plant and animal species conservation, timber management, and water management.” *Id.* (citing 16 U.S.C. § 1604(g)(3)). At the regional level, NFMA requires USDA to prepare forest plans, which prescribe the uses allowed in a particular national forest and must comply with the nationwide regulations. 16 U.S.C. § 1604(a). Forest plans set forest-wide standards and guidelines that control site-specific projects for 15 years or more. And at the “site-specific” level, USDA prepares plans for specific actions, such as timber sales, which “must be consistent with both sets of higher-level rules.” *Id.* at 966 (citing 16 U.S.C. § 1604(i)). The provisions of forest plans are enforceable against the Forest Service, as are the requirements of the forest planning rules under NFMA.

With respect to watershed and aquatic ecosystem protection, NFMA at 16 U.S.C. § 1604(g) provides that USDA regulations shall include guidelines for land management plans that:

(A) insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish;

(B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives,...

(E) insure that timber will be harvested from National Forest System lands only where—

(i) soil, slope, or other watershed conditions will not be irreversibly damaged;¹

(iii) protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat;²

The language, legislative history, and judicial interpretations of NFMA’s provisions demonstrate that the Forest Service’s duty to protect forest health is not limited to a narrow obligation to minimize tree mortality, but encompasses conservation of the full range of fish, wildlife, and ecological processes that are integral components of the forest ecosystem.

¹ Note that this requirement applies to all timber activities, including roadbuilding in conjunction with timber harvesting.

² The Senate Agriculture Committee’s discussion of this section stressed that activities affecting “significant fish and wildlife habitat must be very carefully planned and monitored to assure that habitat values are recognized and properly protected.” S. Rep. No. 893, 94th Cong., 2d Sess. 39.

These NFMA mandates overlap and support other management statutes for our national forests that require protection of water flows and watersheds. The Forest Service Organic Act of 1897 required the newly created agency “to improve and protect the forest within the reservation,... securing favorable conditions of water flows....” The Multiple-Use Sustained-Yield Act leaves the Forest Service with substantial discretion to engage in sustainable management that takes into consideration “changing needs and conditions” within the national forests, *see* 16 U.S.C. §§ 529, 531. In the Endangered Species Act, 16 U.S.C. §§ 1531-1544, Congress stated that “[t]he purposes of [the Act] are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered and threatened species....” 16 U.S.C. § 1531(b). Given the increasing number of protected aquatic species on national forests, the Forest Service has specific duties under the Endangered Species Act to affirmatively conserve and ensure that its actions do not jeopardize imperiled species. Finally, in the Clean Water Act, Congress set forth the goal to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” 33 U.S.C. § 1251(a). Particularly through the Act’s water-quality based approach, 33 U.S.C. § 1313, the Forest Service must meet water quality standards and plans to clean up degraded waters (known as “Total Maximum Daily Loads” or “TMDLs”). 33 U.S.C. § 1323.

Given the Forest Service’s legal duties, a unified national approach affords the best opportunity to conserve watershed ecosystems and the ecological processes they undergo. For true sustainability, the underlying causes of habitat degradation must be corrected rather than treating only site-specific symptoms. Protecting intact watersheds is easier, more successful, and less expensive than restoring them.

III. A PROPOSAL FOR WATERSHED PROTECTION

This proposal is based on the six overarching principles set forth below. The proposal purposefully follows the three-step “Assess-Revise-Monitor” frame put forward by the Forest Service on July 12, 2010.

- Protect the best, restore the rest. Conservation biology principles must be followed: first, protect healthy areas, maximize native biodiversity, and stop further degradation; then second, restore watershed function and connectivity.
- Science-based sideboards. While collaboration and stakeholder processes are important and have their place, science must come first to give necessary sideboards to management decisions.
- Structure and function. Protecting water and hydrological processes on the landscape is more important than ever due to climate change, and successful management will require a focus on both structure and function.

- Fulfillment of the watershed stewardship duty. NFMA effectively places watershed protection over timber production, and now is the time for the Forest Service to recognize and fulfill this obligation.
- Adequate plans meet all mandates. NFMA regulations must ensure that the Forest Service complies with other environmental laws, including the Clean Water Act and the Endangered Species Act.
- Measurable, enforceable standards. NFMA regulations should require individual forest plans to adopt key indicators for watershed health, statements of overall desired conditions, and measurable, enforceable standards and guidelines to meet those goals. Wherever possible, standards should be based on the concept of input-oriented management. *See, e.g.,* Montgomery, David R. *Input- and Output-Oriented Approaches to Implementing Ecosystem Management* 19 *Environmental Management* 2: 183-188 (1995) (while outputs approaches are suited to monitoring landscape conditions and assessing when an impact threshold has been crossed, input approaches focus on tailoring management based on landscape, site, or project level information to proactively limit adverse environmental impacts and avoid irreversible or large-scale harm).

A. Step 1: Assess Watershed Health – Where Are We and How Did We Get Here?

While forest plan revision is generally different than writing an entirely new plan, most existing plan provisions for watershed protection (outside of those units covered by the Northwest Forest Plan) are inadequate, and so this process is more like starting anew. Any assessment of watershed health must catalogue what the resources are, and, perhaps more importantly, what the stressors are on the systems. Put another way, it is important to understand what has gone wrong, in order to work backwards to see what principles could have prevented the degradation in the first place.

- **Development of Watershed Assessment Protocols**

Water is the life blood of the landscape, and the Forest Service, as manager of many headwaters, serves hosts of others downstream. Although aquatic ecosystems are most intimately tied to and affected by the health of riparian areas, they are influenced by the condition of the whole watershed. A healthy riparian area is unlikely to retain its integrity and resiliency through time if the surrounding watershed is degraded, for a damaged watershed can overwhelm the capacity of a healthy riparian area to absorb insults. If there is one key word for assessment, it is **connectivity**.

In order to validly revise forest plans, each national forest must recognize the context within which streams and rivers function by focusing on the whole watershed, not just the riparian area or stream channel.

Watershed-scale assessment is needed for informed decision-making at multiple scales, including forest plan revisions. The overall goal of watershed assessment is information

gathering with the purpose of identifying and establishing management standards that ensure the maintenance or restoration of a watershed's ecological integrity and resilience. To be adequate, each watershed-scale assessment must address at least the following questions:

Where are the healthiest, most productive areas of the watershed for both aquatic and terrestrial species?

Is the remaining healthiest habitat secure?

Where are the problem areas within the watershed -- places where actions continue to degrade riparian conditions or increase landslide risk, stream-crossings or drainage culverts that are failing and/or undersized, or failing roads and road system? What are the opportunities for passive and active restoration?

Which areas are below, at, or exceed riparian and aquatic objectives, including but not limited to Clean Water Act water quality standards?

What are the cumulative effects of stressors on each watershed?

What is the likelihood of continued, viable, and productive populations of extant fish and other aquatic species? Where have historically present species been extirpated?

What changes in land management are necessary to secure the healthiest habitats, ensure stream ecosystem maintenance and recovery, and implement needed passive and active restoration?

B. Step 2: Revise Existing Forest Plans – Standards and Guidelines

The Forest Service should adopt regulations that require each national forest plan to include standards and guidelines for watershed protection. While the information generated by regional landscape, forest-level, or watershed assessments will appropriately lead to forest- or area- specific standards and guidelines, there is a strong scientific and adaptive management basis to recommend that the national forest planning regulations require each forest plan to include the following basic components: **riparian reserves, key watersheds, watershed objectives and management standards, and a watershed restoration strategy.**

These are not new concepts for the Forest Service. Fifteen years ago, the Forest Service and BLM adopted the Northwest Forest Plan – a “scientifically sound, ecologically credible, and legally responsible” long-term management strategy for Pacific Northwest national forests. Northwest Forest Plan Record of Decision (ROD) at 3. The 1994 Northwest Forest Plan includes the Aquatic Conservation Strategy (ACS), an unprecedented planning effort developed by a team of leading scientists known as the Forest Ecosystem Management Assessment Team or FEMAT. Because of the dynamic and variable nature of aquatic environments, FEMAT eschewed one-size-fits-all standards. Instead, the ACS establishes a process to tailor prescriptions to fit the needs of each watershed. FEMAT at V-29 to-31.

The ACS has four basic components: (1) a system of key watersheds or refugia comprising watersheds with the best aquatic habitat or the greatest potential for recovering at-risk fish stocks; (2) riparian reserves along streams where aquatic and riparian objectives receive primary emphasis and where certain activities are constrained; (3) watershed analysis to be used to tailor activities to specific watersheds needs; and (4) a comprehensive, long-term watershed restoration program. Northwest Forest Plan ROD at B-12; FEMAT at V-32.

The ACS imposed constraints on habitat-degrading activities in two ways. First, binding standards and guidelines restrict certain activities within riparian reserves and key watersheds. See Northwest Forest Plan ROD at C-7, C-30 to C-38. Second, FEMAT recognized the need to constrain: (1) activities in some upland areas, *e.g.*, non-riparian, stream-associated unstable areas; and (2) the cumulative impacts of activities throughout a watershed. FEMAT at V-29. Instead of imposing explicit constraints on all such activities through specific management standards, the ACS has nine objectives that require aquatic habitat to be maintained and restored to properly functioning conditions. Northwest Forest Plan ROD at B-11; FEMAT at V-30 to-31. The Northwest Forest Plan ROD gave the ACS objectives binding force as *de facto* forest-wide standards and guidelines by explicitly requiring that federal lands shall be managed to attain the ACS objectives. Courts have found that FEMAT embodies the best available scientific information pertaining to the impacts of forestry activities on salmon and their habitat. *PCFFA v. NMFS*, 71 F. Supp.2d 1063, 1069 (W.D. Wash. 1999).

The framework provided by the ACS and its overarching objectives continue to be validated by Forest Service watershed scientists, as reflected by the aquatic conservation guidance developed recently by Region 6. USDA Forest Service Region 6, *Aquatic and Riparian Conservation Strategy* (August 13, 2008) (reflecting major elements of Northwest Forest Plan Aquatic Conservation Strategy and the Pacfish/Infish strategies applicable to the Interior Columbia Basin by calling for 5 elements of an ACS: 1) Riparian Management Areas, 2) Key Watersheds, 3) Mid-scale Watershed Analysis, 4) Watershed Restoration, and 5) Monitoring; also touching on “Desired Conditions” and setting forth model standards and guidelines). The basic elements of this framework are valid for federal forests nationwide.

- **Riparian Areas Require Special Protections.**

Riparian areas are areas along permanent and intermittent streams, wetlands, ponds, lakes, and reservoirs. Their condition is the primary determinant of the ecological integrity of the aquatic ecosystem and largely dictates the resiliency of the aquatic environment to natural and human-induced change. Properly managed, riparian areas will be more resilient to climate change than other areas as a result of their access to water. In a natural setting, riparian areas interact constantly with stream channels through the exchange of flood waters, nutrients, and organic materials. Riparian vegetation is critical to the reduction of bank erosion, the provision of shade and cover for aquatic species, the filtration of nutrients, the interception of fine sediment, the provision of woody debris to the stream systems, and the maintenance of crucial elements of microclimate such as soil moisture, radiation, soil temperature, air temperature, wind speed, and relative humidity. Restoration of aquatic habitats cannot be successful unless riparian processes and communities are also restored.

Each forest plan must include provisions to (a) recognize ecologically-defined riparian reserves on all permanent and intermittent streams, wetlands, ponds, lakes, and reservoirs; and (b) protect them from degradation by excluding all non-restorative management activities.

First, *delineation of riparian reserves must be ecologically based*. This means that site-specific information, gathered as part of an ecological analysis of the watershed, will be necessary to finalize precise boundaries. Default descriptions of riparian reserves must be used unless and until watershed specific information is available.

Stream-side riparian reserve defaults must be at least 100 feet on each side of the stream at bank-full flow, unless the stream has an active, unstable channel, in which case the 100 foot riparian default buffer must start from the edge of the channel migration zone.

Second, *measurable, enforceable standards* for management within riparian reserves must ensure the protection and restoration of riparian and aquatic functions. **These standards must include clear prohibitions on activities in riparian areas that degrade riparian and aquatic values, including but not limited to logging, road-building, grazing, mining, and withdrawal or diversion of surface or ground water. The standards should also establish a presumption against any management in riparian areas unless a showing is made that the riparian and aquatic values will be better protected and restored through that active management.** Riparian objectives should be used to establish standards that include reduction of road density and hydrologic connectivity of the road system to the maximum extent possible

To assist in determining the condition and trend of aquatic ecosystems and to guide management, measurable objectives for ecosystem integrity must be established in forest plans. These objectives should describe hydrologic characteristics, physical structure and form, vegetative characteristics, water quality, and aquatic/riparian biological community characteristics for both biological and physical ecosystem components. While some objectives are appropriately assessed only at the watershed or sub-watershed scales, it is important that some aquatic and riparian objectives also be developed and applied at the site or project levels.

Simply put, riparian reserves work. When the Northwest Forest Plan was adopted in 1994, 70% of streams on lands administered by BLM did not comply with CWA standards. After 10 years of Northwest Forest Plan implementation, 57% of the watersheds across the planning area were in improved condition and only 3% of the watersheds, primarily in areas that experienced large-scale fires, showed declines.

The uncertainties of climate change make the case for riparian reserves more compelling than ever. Healthy riparian areas are naturally most resilient to the effects of climate change, so maximizing the extent of functioning riparian ecosystems on our national forests is a logical and likely effective adaptation strategy.

- **Key Watersheds Serve as Aquatic Strongholds.**

Generally, North America can be viewed as containing islands of relatively healthy aquatic ecosystems in a sea of degradation. Consequently, areas where aquatic ecosystems are considered healthy should be recognized and treated as irreplaceable national treasures.

The Forest Service should require forest plans to identify and protect key watersheds in order to establish a network of watersheds across the landscape that can serve as near-term anchor points for restoration of broadscale processes and recovery of broadly-distributed species. The protection of key watersheds and the values they provide is likely the most important contribution the Forest Service can make to its neighbors in the all-lands approach. The established watershed network must facilitate efforts to protect, expand, and reconnect the remaining healthier aquatic habitats, and it must ensure that all the genetic pieces of each native aquatic species are retained.

The first step in establishing a system of key watersheds is identification of the last best places, or refugia. The second step involves the evaluation of the initial network to ensure it encompasses the important breeding and rearing areas and migratory corridors crucial to the survival of native fish, amphibians, and aquatic-dependent reptiles. If the initial network is skewed in its geographic or taxonomic coverage, watersheds must be added to include further areas that can serve as recovery anchor points. It is crucial that the network of key watersheds be well-distributed across the land and include areas of importance to all aquatic species.

Once the initial network of key watersheds is identified, management standards must be applied that provide rigorous protection against new human-induced ecological harm and appropriate restoration to allow recovery from past damage. A key watershed network can set the stage for restoration of ecosystem connectivity and allow for the recovery and conservation of imperiled native fish and other aquatic-dependent species. Key watersheds should be designated as priority focal areas for active watershed restoration activities, and a forest-level road density objective for key watersheds should be required.

- **Watershed Management Protocols Look Beyond Riparian Areas.**

Watershed health depends not only on riparian area and refuge protection, but also on upslope activities and the cumulative effects of management actions in watersheds across the landscape. Recommendations from several scientific assessments have produced a variety of default standards for management of upslope lands including, among others, prohibitions against timber harvest or road construction in areas prone to landslides, and conservation of existing roadless areas and late-successional old growth forests.

Road density standards could also be an important tool for forest plans. Generally, healthy watersheds will have road densities of less than one mile per square mile, and new roads should not be built in these areas. For watersheds with greater road density, road removal and decommissioning should be priorities. When it comes to maintaining or restoring healthy fish

populations, press disturbances, such as roads, are significantly more important to address than pulse disturbances, such as fire.

- **Watershed Restoration Is Vital to Success.**

Efforts to ensure that remaining healthy aquatic habitats are not degraded must be a top priority. **Conservation must come first.** However, these efforts by themselves are not adequate for the recovery of aquatic ecosystems unless coupled with a carefully prioritized, ecologically-based restoration plan to expand and reconnect the islands of aquatic health.

NFMA regulations should require each forest plan to develop and implement comprehensive, long-term restoration and monitoring programs built upon the understandings developed during the assessment process, for **restoration first requires an analysis of limiting factors.** The focus of watershed restoration must be ecological restoration, not simple rehabilitation. Nature can slowly restore watershed health if the remaining healthier habitats within a watershed are protected; the riparian and upland areas are restored; and the streams are permitted to reconnect with their floodplains. To be most effective, restoration should begin in the headwaters of a watershed and move downstream. Restoration work should also be prioritized to get the most out of restoration expenditures, such as focusing road decommissioning work on areas closest to the desired road density standard or providing connectivity between healthy watersheds.

To be clear, watershed restoration does not mean timber harvest; the goal of watershed restoration must be the reestablishment of stream and watershed ecosystem processes, not the creation of specific habitat types. Self-sustaining biological approaches to restoration are always preferred over engineered solutions. In all cases, ecological restoration efforts also should be undertaken to address the habitat limitation over the long-term.

Based on what is known about the current condition of national forest watersheds, it is appropriate for all forest plans to recognize **road removal in riparian areas and key watersheds as the top watershed restoration priority on our national forests. Where roads are not hydrologically obliterated, they should be remediated so as to minimize hydrologic connectivity and other impacts to stream systems.**

C. Step 3: Monitoring – How Is the Plan Working?

Watershed assessment (Step 1) and watershed monitoring (Step 3) are two sides of the same coin. Watershed assessment provides the basis for monitoring and restoration programs. Watershed assessment sets the stage for monitoring by gathering data at multiple temporal scales (short, intermediate, and long-term) and geographic scales (stream reach, sub-basin, catchment basin, and range-wide) for evaluation of implementation and effectiveness. Both watershed assessment and watershed monitoring should draw from similar data and rely on similar metrics.

Because watershed restoration can take decades, a well-designed monitoring program that will measure the degree and direction of change in ecological integrity is a crucial element

of any planning effort. The Forest Service's framework for the planning rule appropriately underscores the importance of both unit-level and broader landscape scale monitoring. **The planning rule must do more than simply recommend that management units develop and implement a monitoring strategy, it must require a monitoring strategy.**

The forest planning rules should provide a monitoring framework of sufficient comprehensiveness and accuracy to assess trends in aquatic habitat, water quality, and biological integrity of waters across national forests, in the face of forest management actions, natural disturbance events, and climate change. **Every national forest should have both a forest-level monitoring program for aquatic, riparian, and watershed ecosystem and water quality conditions, and a separate, highly focused biological monitoring program for populations of key sensitive aquatic and wetland species.** Biological monitoring of carefully selected species is necessary to ensure that key assumptions about habitat and ecosystem conditions and species population dynamics are correct. Monitoring of physical indicators should include in-stream attributes such as sediment levels and stream temperatures, and chemical monitoring should focus on meeting water quality standards, as well as any changes in stream segments already listed as impaired under Section 303(d) of the Clean Water Act. The utility of this design, and the feasibility of implementing it on a large scale, has already been demonstrated by the Forest Service in its "Aquatic and Riparian Ecosystem Monitoring Program" under the Northwest Forest Plan.

Monitoring results must drive adaptive management for projects throughout the life of the forest plan. However, it is important to recognize that lag times between management actions and physical and biological responses may take many years; many of the crucial effects are only expressed after large floods, drought, windstorms, or wildfire events. In other words, **the most critical question for resource protection and restoration is how forest and watershed management alters the response of watersheds to natural disturbances or stressors.** Forest plan monitoring should be designed to inform ongoing projects and planning decisions that will occur at the next forest plan revision. At no time should watersheds be placed at risk by forest-wide practices that harm aquatic and riparian ecosystems and species.

CONCLUSION

Thanks to the leadership of Secretary Vilsack, the Forest Service has a unique opportunity to fulfill its long-standing obligation to fully protect watersheds and water quality. This duty has existed for over 30 years, and it is more important than ever as we grapple with the impacts of climate change.

All the recommendations outlined above have strong, science-based rationales, and for that reason alone should be considered. The recommendations also align with important public planning concepts identified through Forest Service's citizen outreach: they will be effective; they reflect sound, science-based principles that will remain valid over time; there remains an ample role for stakeholder collaboration in project planning and monitoring; they are consistent with an all-lands approach; and they contain a strong monitoring component.