



Technical White Paper

Conservation Watershed Networks

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Summary

Conservation watershed networks can be a powerful planning tool for promoting conservation and connectivity through Forest Service land management planning. They are a system of watersheds or subwatersheds that form a connected network of high-quality habitats important for ensuring the long-term persistence of native aquatic species. These can have specific management requirements for watershed restoration and conservation, such as aquatic passage barrier removals and road decommissioning.

What Are Conservation Watershed Networks?

A conservation watershed network (also called “conservation watersheds” or “key watersheds”) is a collection of watersheds or subwatersheds designated for conservation-oriented management in a land management plan. Management direction within the network emphasizes habitat conservation and restoration to support native aquatic species persistence and recovery over the duration of the plan. The term “conservation watershed” has not been established in regulation or policy, and the designation of conservation watersheds is not required under the 2012 Planning Rule or Forest Service Handbook 1909.12.

To date, conservation watersheds have been incorporated into land management plans in forests within the Northern Rockies, intermountain and Pacific regions, but there is wide variation in the number of watersheds designated and the management direction for these areas. Figure 1 shows an example of a conservation watershed network included in the Nez Perce-Clearwater National Forest plan. These watersheds form a network of existing or historic population strongholds and habitats with high potential for productivity and fish abundance. The goal of the network is to sustain the integrity of key aquatic habitats to maintain long-term persistence of native aquatic species and help make habitat conditions more resilient to climate change.

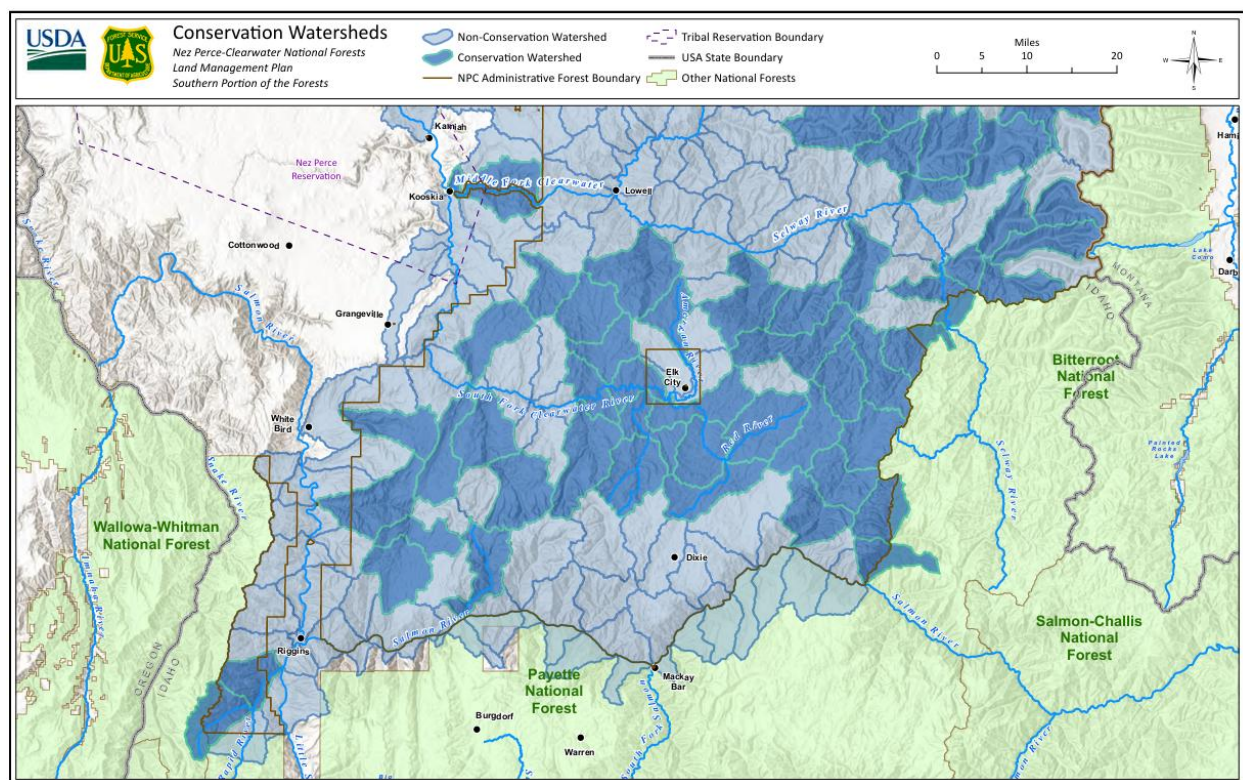


Figure 1 Part of the conservation watershed network (dark blue) on the Nez Perce-Clearwater National Forest.

What Is the Policy Framework for Conservation Watershed Networks?

Conservation watersheds are a mechanism to meet Forest Service management obligations established in laws, regulations and policies (Figure 2). The concept of conservation watersheds was originally introduced by the Scientific Panel on Late-Successional Forest Ecosystem in 1991.¹ This report formed the blueprint that would later develop into the Pacific Anadromous Fish Strategy (PACFISH),² Inland Native Fish Strategy (INFISH)³ and the Northwest Forest Plan's Aquatic Conservation Strategy (ACS). The Northwest Forest Plan first implemented a conservation watershed network, identifying "key watersheds" as a core component of its ACS.⁴

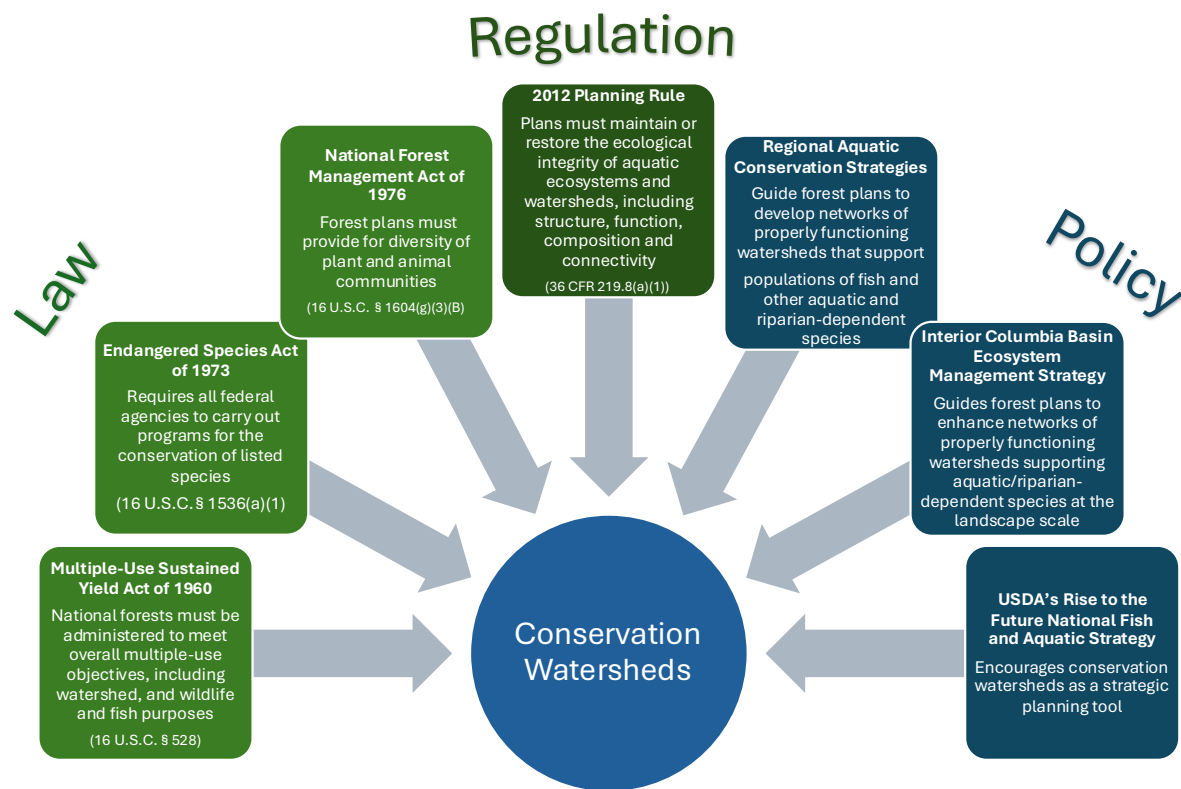


Figure 2 Governing framework for the designation of conservation watersheds.

PACFISH/INFISH were originally envisioned as “stop-gap” conservation strategies to halt the immediate declines of salmonids while a long-term, landscape-scale strategy was developed. The Interior Columbia Basin Ecosystem Management Project (ICBEMP) was intended to provide that more comprehensive strategy; however, it never resulted in a final, signed Record of Decision. In 2003, the Forest Service, Forest Service Research, Bureau of Land Management, U.S. Fish and Wildlife Service, National Marine Fisheries Service and Environmental Protection Agency instead signed a Memorandum of Understanding⁵ completing the project and agreeing to cooperatively implement *The Interior Columbia Basin Strategy* (“Strategy”).⁶ The agencies subsequently developed an Aquatic/Riparian Habitat Framework to clarify, interpret and enhance the principles found in the Strategy. Together, the Strategy and Framework provide direction on how to incorporate the science developed by the ICBEMP into land management plans, including the designation of a conservation watershed network.⁷

Some regions within the Forest Service have also developed their own ACSs to help provide a consistent management framework for aquatic and riparian resources in revised forest plans. Some of these regional ACSs reinforce the value of conservation watershed designation for recovery of ESA-listed species, maintaining multi-scale connectivity and ensuring ecosystem components needed to sustain long-term persistence of species.⁸

The United States Department of Agriculture’s *Rise to the Future National Fish and Aquatic Strategy*⁹ also recommends the identification of conservation watersheds as a strategic, long-term approach to improve aquatic conditions on forest system lands.

How Do Conservation Watersheds Differ from Priority Watersheds?

Conservation watershed networks are a distinct designation from priority watersheds (Table 1), although the two may overlap spatially. Priority watersheds are identified through the Watershed Condition Framework¹⁰ process and are tactical designations to guide the implementation of restoration priorities in the near-term (three to five years). Usually, each forest or grassland has between two to five priority watersheds. Priority watersheds are managed through a watershed restoration action plan (WRAP). The WRAP identifies specific projects necessary to achieve the watershed condition improvement or maintenance goals. By design, priority watersheds are not intended to be permanent designations. When all work in the WRAP is completed, a new priority watershed is identified. Priority watersheds are required to be included in all plans revised under the 2012 Planning Rule,¹¹ but can subsequently be administratively changed at any time.

Table 1 Comparison of Conservation Watersheds versus Priority Watersheds.

	Conservation Watersheds	Priority Watersheds
Objective	Long-term conservation of high-value aquatic ecosystems.	Short-term restoration of watershed condition.
Identification process	Through land management plan revision using locally relevant data sources and professional judgement.	Through Watershed Condition Framework process using 12 core national indicators.
Identification criteria	High genetic integrity; habitat connectivity; genetic or phenotypic diversity, spatial distribution, and abundance/productivity for the population or species as a whole; and restoration and population expansion potential into adjoining watersheds. ¹²	Watershed resource values; alignment with other strategic objectives and priorities of agencies/partners; and estimated costs and capacity. ¹³
Duration	Long-term designation that lasts for the duration of the land management plan. Watersheds with ongoing agency commitments (e.g., Wild and Scenic Rivers, Inventoried Roadless Areas) may be a good fit.	Short-term designation for approximately three to five years of active restoration.
Spatial Scale	Watershed (HUC level 5) or subwatershed (HUC level 6)	Subwatershed (HUC level 6)
Ecological values	High-quality habitat and resource values that warrant conservation management emphasis to prevent future degradation.	Can vary depending on watershed selected but generally have already degraded conditions that warrant active restoration.

How Are Conservation Watershed Networks Selected?

There is relatively little direction for selecting conservation watersheds, and the limited direction that exists differs between the *Interior Columbia Basin Strategy* and the *Rise to the Future Strategy*. The *Interior Columbia Basin Strategy* describes the intent of conservation watersheds as follows:

“Plans should identify watersheds...to be managed to emphasize protection of populations of listed and proposed aquatic species and narrow endemics. The intent is to identify habitat networks of existing strongholds with robust populations and high-quality habitat that will support expansion and recolonization to adjacent watersheds.”¹⁴

In contrast, the *Rise to the Future Strategy* identifies that social and economic values should be considered when selecting conservation watersheds, not just ecological values (Figure 3). In 2022, a subcommittee of the *Rise to the Future Strategy* developed national guidelines for identification of conservation watersheds. This national guidance includes a list of recommended data sources, such as recreational use/valuation data and USDA Forest Service National Forests to Faucets data on municipal watersheds. These types of socioeconomic criteria do not factor into the selection process under the *Interior Columbia Basin Strategy*. The number of conservation watersheds also vary dramatically across processes — forests in the Interior Columbia Basin often have dozens, while the *Rise to the Future Strategy* envisions only one or two per forest or grassland.

Conservation Watersheds



Figure 3 This diagram illustrates the overlap and differences between conservation watersheds as they are conceived in the Interior Columbia Basin Strategy (2014) versus the USDA Rise to the Future Strategy (2017).

In 2016, the Washington office sent a memo to regional foresters providing clarification on conservation watersheds in land management plans. This memo noted, “The term ‘Conservation Watersheds’ has not been established in regulation or policy and will be defined in an update to the FSH 1909.12 at the earliest opportunity.” FSH 1909.12 has not yet been updated to provide clarification on conservation watersheds. Goal 5 in the *Rise to the Future Strategy* is to “Develop criteria for identifying conservation watersheds for fish and aquatic species on national forests and grasslands. Select conservation watershed by 2020.” These designations have not yet been made by most units due to capacity constraints.

Considerations For Future Management

River systems are naturally dynamic and driven by episodic disturbances like wildfires and landslides. To help species persist within this natural dynamism, a conservation watershed network protects entire river systems in addition to more narrow, riparian buffer zones. This landscape-scale connectivity provides resilience — for example, when a fire impacts a specific watershed, an interconnected network of quality habitat allows fish and other species to move and repopulate.¹⁵

Because of the current lack of direction to direct designation of conservation watersheds, their value in a land management plan can range from minimally useful to highly protective

(Figure 4). From an advocacy perspective, they offer the opportunity to establish a network of high-value habitats, managed in a protective and restorative manner that affords multi-species benefits.

Examples of Conservation Watersheds in Forest Plans



Plan component	Custer-Gallatin National Forest Plan (2022)
Desired condition	The conservation watershed network contains functionally intact watersheds that are capable of responding to disturbance. At any point in time, some watersheds in the network will have high quality water and habitat and provide source populations of native fish, and other native organisms, to recolonize recovering habitat elsewhere in the network.
Objective	Reduce sediment production on five to eight miles of National Forest System roads, per year, within the conservation watershed network by enhancing the roadway drainage erosion control mechanisms.
Guideline	To reduce the likelihood of sediment input to streams and retain or improve high quality habitat in the conservation watershed network, net increases (measured from beginning to end of each project) in number of stream crossings and road lengths should be avoided in riparian management zones, unless the net increase would improve ecological function in aquatic ecosystems.

Plan component	Nez Perce-Clearwater National Forest Plan (2025)
Goal	The Nez Perce-Clearwater works with the Nez Perce Tribe, State of Idaho, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and other governmental organizations to plan and implement projects that contribute to recovery goals for aquatic species listed under the Endangered Species Act and their designated critical habitat, such that protective measures under the Act are no longer necessary.
Goal	The Nez Perce-Clearwater partners with federal agencies, including Section 7 consultation, as required; state agencies; tribes; counties; interested groups; and interested private landowners to recover threatened and endangered species.
Desired condition	Conservation Watershed Networks have functionally intact ecosystems that provide high -quality water and contribute to and enhance the conservation of aquatic species of conservation concern and recovery of threatened or endangered fish species.
Desired condition	Streams within the Conservation Watershed Network provide habitat that supports robust native fish populations, which can expand to and recolonize adjacent unoccupied habitats. These areas conserve key demographic processes likely to influence the sustainability of aquatic species.
Desired condition	Roads in the Conservation Watershed Network present minimal risk to aquatic resources.
Objective	Conservation Watershed Networks are the highest priority for restoration actions for native fish and other aquatic species. Assess 500 miles of roads every 5 years to identify those roads, regardless of maintenance level, that may negatively impact streams, such as contributing excessive sediment or altering riparian areas or floodplains.
Objective	Stormproof 15 percent of roads in Conservation Watershed Network prioritized for restoration every 5 years as funding allows to benefit threatened and endangered aquatic species. Emphasize roads with greatest risk of erosion and road prism failure, including maintenance level 1 and 2 roads.
Standard	In Conservation Network watersheds not meeting aquatic and riparian desired conditions, activities shall be designed and implemented in a manner that supports and contributes towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them when evaluated at the HUC12 subwatershed scale. Short-term adverse effects from project activities may occur when they support the long -term recovery of aquatic and riparian desired conditions and federally listed species.

Figure 4 Examples of plan components for conservation watershed networks in recent land management plans, showing the varied levels of protectiveness across plans.

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¹ Johnson, K.N.; Franklin, J.F.; Thomas, J.W.; Gordon, J. (1991). *Alternatives for management of late-successional forests of the Pacific Northwest*. A report to the Agriculture Committee and the Merchant Marine and Fisheries Committee of the U.S. House of Representatives. Scientific Panel on Late-Successional Forest Ecosystems (U.S.). 59 p. at pg. 5.

² U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management [USDA and USDI]. 1994. *Environmental assessment for the implementation of interim strategies (PACFISH) for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California*. Washington, DC. PACFISH, 1995. Decision Notice/Decision Record, FONSI, EA. *Appendices for the interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California*. USDA FS/USDI BLM, Washington, DC

³ INFISH, 1995. *Environmental assessment: decision notice and finding of no significant impact. Interim Strategies for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana and Portions of Nevada*. USDA FS, Intermountain, Northern, and Pacific Northwest Regions.

⁴ USDA Forest Service & USDI Bureau of Land Management. (1994). *Appendix B6, Aquatic Conservation Strategy*. In *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. Volume II at pgs. B-81 to B-128. Available from:

<https://www.fs.usda.gov/r6/reo/library/downloads/documents/NWFP-FSEIS-1994-II.pdf>

⁵ <https://www.fs.usda.gov/r6/icbemp/html/mou.pdf>

⁶ Interior Columbia Basin Interagency Executive Team. *The Interior Columbia Basin Strategy* (Developed 2003, Revised April 2014) *A Strategy for Applying the Knowledge Gained by the Interior Columbia Basin Ecosystem Management Project to the Revision of Land Use Plans and Project Implementation*. Available from:

https://www.fs.usda.gov/r6/icbemp/html/ICBEMP_Frameworkmemorandum-and-strategy_2014.pdf

⁷ Interior Columbia Basin Interagency Executive Team. *The Interior Columbia Basin Strategy* (Developed 2003, Revised April 2014) *A Strategy for Applying the Knowledge Gained by the Interior Columbia Basin Ecosystem Management Project to the Revision of Land Use Plans and Project Implementation*. Appendix 1 at pg. 12.

Available from: https://www.fs.usda.gov/r6/icbemp/html/ICBEMP_Frameworkmemorandum-and-strategy_2014.pdf

⁸ U.S. Forest Service (2022). *Northern region aquatic and riparian conservation strategy (ARCS)*. 62 p.; U.S. Forest Service (2018) *Pacific Northwest and Pacific Southwest Regions Aquatic and Riparian Conservation Strategy (ARCS)*.

⁹ Interagency Memorandum of Understanding, Feb. 15, 2003, FS Agreement No. 03- RMU-11046000-007. Available from:

¹⁰ Potyondy, J. P., & Geier, T. W. (2011). *Watershed condition classification technical guide*. United States Department of Agriculture, Forest Service. Available from:

https://www.fs.usda.gov/biology/resources/pubs/watershed/maps/watershed_classification_guide2011FS978.pdf

¹¹ 36 CFR 219.7(3)(f)(i)

¹² Interior Columbia Basin Interagency Executive Team. *The Interior Columbia Basin Strategy* (Developed 2003, Revised April 2014) *A Strategy for Applying the Knowledge Gained by the Interior Columbia Basin Ecosystem Management Project to the Revision of Land Use Plans and Project Implementation*. Appendix 1 at pg. 12. Available from: https://www.fs.usda.gov/r6/icbemp/html/ICBEMP_Frameworkmemorandum-and-strategy_2014.pdf

¹³ U.S. Forest Service (2016, Sept. 30). *Joint memorandum on Conservation Watersheds in Land Management Plans*. Attachment B, Questions and Answers Related to Land Management Planning WCF Priority Watersheds and Conservation Watersheds at pg. 1.

¹⁴ Interior Columbia Basin Interagency Executive Team. *The Interior Columbia Basin Strategy* (Developed 2003, Revised April 2014) *A Strategy for Applying the Knowledge Gained by the Interior Columbia Basin Ecosystem Management Project to the Revision of Land Use Plans and Project Implementation*. Appendix 1 at pg. 12. Available from: https://www.fs.usda.gov/r6/icbemp/html/ICBEMP_Frameworkmemorandum-and-strategy_2014.pdf

¹⁵ Reeves, G. H., Benda, L. E., Burnett, K. M., Bisson, P. A., & Sedell, J. R. (1995). A disturbance-based ecosystem approach to maintaining and restoring freshwater habitats of evolutionarily significant units of anadromous salmonids in the Pacific Northwest. In *American Fisheries Society Symposium*. 17: 334-349.