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Testimony on
“Protecting Federal Hydropower Investments in the West:
A Stakeholder’s Perspective”
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1 Introduction

Chairman McClintock, Ranking Member Napolitano, and Members of the Subcommittee: thank you for this opportunity to testify today and to share American Rivers’ perspective on U.S. hydropower policy.

American Rivers is the nation’s leading voice for healthy rivers and the communities that depend on them. We believe rivers are vital to our health, safety and quality of life. American Rivers mobilizes an extensive network comprised of tens of thousands of members and activists located in every state across the country. We have been working to protect and restore the health of rivers that have been impacted by hydropower dams since we were founded in 1973. We also serve on the Steering Committee of the Hydropower Reform Coalition, a broad consortium of more than 150 national, regional, and local organizations with a combined membership of more than one million people. In doing so, we represent stakeholders – anglers, canoeists, outdoor enthusiasts, conservation advocates, and lake homeowners – who seek to improve the water quality, fisheries, recreation, and general environmental health of rivers that have been damaged by hydropower dam operations. We are active in many hydropower licensing proceedings currently pending before the Federal Energy Regulatory Commission (FERC), as well as other hydropower-related proceedings involving the Bureau of Reclamation and the Army Corps of Engineers. We have constructively contributed to numerous hydropower-related policy discussions.

2 Towards a balanced Federal hydropower policy that encourages environmentally responsible hydropower development and operation

American Rivers is emphatically *not* anti-hydropower. We seek to improve the nation’s hydropower system by encouraging increased generation while improving environmental performance. Conventional hydropower is one of the oldest and most well-established among a growing number of technologies that provide low-emissions alternatives to fossil-fuel energy. Nationally, hydropower provides about 75,000 megawatts of capacity, and represents nearly 7% of total generation. We expect that hydropower will continue to be a part of our nation’s energy mix for years to come, and accordingly we have signed dozens of agreements supporting the continued, long-term operation of hydroelectric dams that together provide our nation with thousands of megawatts of generating capacity. Reasonable modifications have dramatically improved the performance of these dams, providing fish passage, improving flows, enhancing water quality, protecting riparian lands, and restoring recreational opportunities.

American Rivers supports the development of new hydropower resources that can be brought online while avoiding significant additional harm to local ecosystems. In recent years, we have worked closely with the National Hydropower Association to develop and promote several pieces of legislation that provides incentives for new hydropower generation. We support hydropower that is developed and operated in a responsible manner that avoids harm to America's precious river resources. Given the very real environmental and social impacts of global climate change – especially on vital freshwater systems – we understand the need to develop new sources of energy that can replace America's reliance on fossil fuels. Hydropower is and will continue to be an important part of this mix.

However, we also know that the energy we receive from hydropower comes at an enormous cost to the health of our nation's rivers and communities. Hydropower is unique among renewable resources in the scale at which it can damage the environment. Hydropower's environmental and social impacts are serious and extremely well documented. Hydropower dam operations are responsible for the extinction and near-extinction of a number of species. Hydropower plants often divert water around entire sections of river, leaving them dry or constantly alternating between drought and flood-like conditions. Hydropower dams have flooded forests, destroyed fisheries, diminished recreational opportunities, and caused great harm to the long-term viability of the local – mostly rural – economies that depend on those resources.

The harm caused by most hydropower dams can be avoided if hydropower is sited, constructed, and operated in a responsible manner. A few simple changes can make an enormous difference in the health of a river. Hydropower operators can change the timing of power generation to mimic a river's natural hydrologic conditions, stabilize lake levels and dam releases to protect riverside land from erosion, provide fish ladders and other measures that protect fish and allow them to pass safely upstream and downstream of dams, restore habitat for fish and wildlife, alter the design and operation of plants to maintain appropriate temperature and oxygen levels in rivers, and provide public access and release water back into rivers so that people can fish, boat, and swim. These types of changes have a miniscule impact on the overall generation of the nation's hydropower fleet. In fact, an analysis by FERC found that since Congress passed laws in the 1980s to encourage these types of improvements, overall generating capacity has actually *increased* by 4.1%. The benefits to human and natural communities have been immense.

There are, however, some rare cases – where the environmental, social, and economic impacts of a dam cannot be adequately mitigated. Where those impacts outweigh the benefits of a dam, American Rivers and others sometimes advocate for decommissioning of hydropower dams. We take this extraordinary step with great caution, and only as a last resort: out of 20,441 MW of capacity that has been relicensed by FERC since 1986, American Rivers' advocacy has led to roughly 222 MW of licensed capacity being identified as suitable for decommissioning. Our analysis indicates that this 222 MW is roughly equivalent to the capacity of existing FERC-regulated projects that are in non-compliance and not generating because their owners have failed to maintain them in proper working condition. It represents just 1% of the capacity relicensed by FERC since 1986, and only two-tenths of one percent of the nation's total hydropower capacity. American Rivers has supported policies and projects that have already resulted in much more new hydropower capacity being brought online than capacity that has been removed.

The threat of climate change demands urgent action on two major fronts. First, we must dramatically reduce greenhouse gas emissions. Our current hydropower capacity contributes to decreased dependence on fossil fuels and our recommendations below represent suggestions for how to build additional capacity without causing significant additional harm to healthy rivers and the communities that depend upon them. Ironically, because the forecasts of climate change in the west call for less rain and snow, the fundamental fuel for hydropower is significantly compromised.

Second, even if we bring emissions under control, the carbon already in the atmosphere from historic emissions will cause inevitable changes to the climate. We must therefore also take immediate action to help both human and natural communities prepare for inevitable climate changes. By protecting and restoring healthy watersheds, increasing water efficiency, and improving the quality of our infrastructure we can build resilient communities and ecosystems that stand a better chance of weathering the impacts of global warming.

America is still blessed with many healthy, free-flowing rivers, wetlands, and natural floodplains that protect communities, support local jobs, and provide significant economic value. In fact, in many rural economies, recreation and tourism play a greater role in job creation and economic productivity than any other sector. We must preserve and restore these natural resources and promote them as a vital part of our economy. Now and in the years to come, we need hydropower projects that are sited, built, and operated to produce power while minimizing impacts to the rivers that sustain America's human and natural communities. Federal agencies with a role in U.S. hydropower policy, including the Bureau of Reclamation, the U.S. Army Corps of Engineers, the Department of Energy, and the Federal Energy Regulatory Commission must make the enhancement of environmental quality – at existing and new sites alike – a top priority.

A balanced and responsible hydropower policy must encourage responsible development while continually holding developers and federal operators accountable for their environmental impacts and insisting on the strictest performance standards. It must remove unnecessary obstacles to development while recognizing at the most fundamental level that a high level of environmental performance is a reasonable and necessary cost of doing business. It must encourage new development to take place while also accepting that some sites are simply not appropriate for new or increased hydropower production. Congress must address both sides of this equation equally.

3 Opportunities for new hydropower development

American Rivers supports the development of hydropower projects that are sited, constructed, and operated in a responsible manner so as to avoid harm to America's precious river resources. Hydropower projects that re-use existing water and hydropower infrastructure are the best candidates for responsible development. There is enormous potential from these types of projects. The U.S. Department of Energy has estimated that more than 12,000 MW of new capacity could be added simply by replacing antiquated generating equipment, and more than 12,600 MW more could be added by adding turbines to non-powered dams (only 3% of the nation's dams are currently generating power), many of which are owned and operated by the Federal government. With roughly 75,000 megawatts of installed capacity in the U.S., these types of projects could provide a 30% increase in installed capacity, all without the enormous costs and risks associated with new dam construction. Encouraging such

capacity additions at existing federal facilities would be one of the most cost-effective ways to use scarce taxpayer dollars to protect federal investments in water infrastructure.

American Rivers has long advocated for policies that would encourage or require hydropower operators to upgrade aging turbines and generating equipment with updated, modern equipment. We believe that the public should receive the full benefit of each drop of water that passes through a turbine, and antiquated, inefficient equipment dilutes these benefits. Efficiency improvements are relatively low-cost, use turbines and equipment that is manufactured in the United States, and can often contribute to improved environmental outcomes. These efficiency upgrades are the simplest, most cost-effective, and lowest-impact means of increasing hydropower generation. The potential gains in generation are significant: in many cases, these upgrades can result in a 10-20% increase in generation from the same amount of water. There are substantial environmental benefits to these upgrades as well: modern turbines often feature designs which are less harmful to fish, and can operate efficiently across a different range of release levels, allowing for managed flow regimes which more closely mimic a natural river.

Turbines can also be added to many existing hydropower and non-hydropower dams. While these retrofits are not appropriate in every case, they offer new capacity for minimal additional environmental impacts when done right. In some cases, retrofitting existing dams for hydropower can leverage additional environmental improvements to the affected river reach. For instance, a pending retrofit at the Holtwood project on the Susquehanna River in Pennsylvania will more than double that project's generating capacity while also providing for substantially improved fish passage. Several years ago, American Rivers worked closely with the hydropower industry and Members of Congress to craft legislative language that would encourage such forward-thinking development. This language has since been incorporated into the federal law which provides a Production Tax Credit for Renewables, providing developers with an incentive to develop at existing dams that are currently operated for flood control, navigation, and water supply and that could be developed without harmful changes to river flows.

Finally, an increasing number of developers – especially in the west – are exploring off-stream hydroelectric development. Some developers propose to place turbines in existing water conveyance pipes. Others are adding hydropower capacity to irrigation canals. Still others are placing turbines in municipal water treatment facilities. While there is no official estimate of how much capacity may be available from new conduit projects, we expect that it may be significant, and new technologies are improving the economic viability of these types of projects. Many of these projects have the potential to create substantial environmental benefit. For instance, some irrigation districts are using the revenue from power sales to fund projects that will result in the more efficient use of water, leaving more water in the river to provide ecosystem services. American Rivers is working with conduit developers to find ways to lower the cost and effort associated with developing these types of projects.

3.1 Balanced management of the federal hydropower system

The 171 hydropower plants that make up the federal hydropower system provide more than 37,000 MW of electric capacity, or 50% of total hydropower production in the United States. The federal investment in hydropower production at these facilities is typically seen as secondary to the dams' other

authorized purposes, and generation is very often secondary to flood control operations or water deliveries for agriculture. In western basins where reservoirs are used for multiple purposes, outdated operational guidelines, poor water management and conservation practices, and an alarming lack of coordination among multiple federal and non-federal projects are leaving megawatts on the table. The Bureau of Reclamation and the Army Corps of Engineers should improve their cooperation with FERC and its non-federal licensees to ensure that water control and hydropower systems are being operated efficiently on a basin scale. Additionally, any water that is diverted from storage reservoirs for consumptive use is water that is not available to generate power. Federal operators should, as they examine water delivery contracts, consider the relationship between end-user efficiency and hydropower production, and take steps to ensure that hydropower generation is not threatened by inefficient and wasteful consumptive water use.

American Rivers has worked on dozens of hydropower licensing proceedings before the FERC over the past two decades, and our experience has shown that the comprehensive review of hydropower projects operations with extensive stakeholder involvement results in significant improvements to environmental quality while retaining nearly all of those projects' capacity to generate electricity. While the concept of a periodic review that is open to all interested members of the public is a long-standing one in the realm of non-federal hydropower projects, a similar process is lacking – and needed – for hydropower facilities that are owned and operated by the federal government.

Each Federal project has a plan of operation, but many of these plans have not been revised in decades and are hopelessly out of date, despite laws that permit and/or require Federal operators to review the operational plans for their facilities. We recommend that this Subcommittee direct the Federal operators over which it has jurisdiction to examine changes to the design, configuration, or operation of their existing dams in order to improve upon existing operations, and to periodically repeat this analysis. Federal operators should be directed to consider efficiency upgrades, opportunities to install new physical capacity, and more operational changes that will enhance and maximize the array of beneficial public uses these dams provide, including energy production, environmental protection, water supply, navigation, recreation, and whether facilities are receiving a market return for their services, including energy production.

3.2 Basin-scale coordination of multiple projects

While individual hydropower dams have their own impacts, the cumulative effects of multiple hydropower dams are often much greater than the simple sum of their direct impacts. A single-dam may block fish passage and displace wildlife. A series of dams can harm an entire watershed or cause the extinction of an entire fishery, even if the effect of each of the individual dams seems relatively mild when considered in isolation. The impact of a single dam that kills only 5% of fish in its turbines may seem relatively small, but eight dams along the same river, each of which only kill 5% would reduce the river's fish population by more than a third, placing a cumulative burden on the population that is too great to be sustained over time.

The solution to such cumulative impacts is to address hydropower at a watershed or basin scale instead of at the individual project level. It is often possible to get an increase in generation *and* significant improvements in environmental quality when the operation and management of multiple facilities is

addressed in a coordinated manner. For instance, consider Maine's Penobscot River basin. For decades, a series of dams in this basin blocked access to high-quality habitat and all but wiped out the river's valuable Alewife, Atlantic Salmon, and Shad fisheries. When these projects were relicensed, parties examined the entire basin and came up with a plan that would restore more than 1000 miles of habitat – and millions of fish – by removing two dams, bypassing a third with a nature-like fishway, and installing fishways at others while allowing for a net increase in power generation. This plan also allows the remaining dams to generate more, concentrating environmental restoration measures where they are most needed and power production where it will have the least impact on the basin as a whole.

The Penobscot agreement demonstrates how the coordinated review and planning of hydropower in a basin can result in more power *and* better environmental outcomes. Unfortunately, the circumstances on the Penobscot – where all of the dams were owned by a single entity and subject to the jurisdiction of a single agency – are the exception rather than the rule. Consider, for instance, California's rapidly declining populations of Salmon and Steelhead. A combination of federal and non-federal dams in six watersheds in California (the American, the Feather, the Merced, the Stanislaus, the Tuolumne, and the Yuba) blocks these commercially valuable fish from accessing more than 2,200 miles of their highest-value historic habitat.¹ These dams are managed by a patchwork of federal and non-federal operators. The operators coordinate the management of these watersheds for water supply and power production. But when it comes to mitigating the effects of this environmental catastrophe, each operator points its fingers at the others. There is not one major river in the Central Valley that has even a single fish passage structure. All the major salmon runs are stuck on the valley floor, unable to ascend to the upper reaches of these watersheds where the best quality habitat is located. FERC, its licensees, and the federal operators in these basins have failed to end this avoidance of responsibility by coordinating effectively to find basin-wide solutions to restore fish passage to this valuable historic habitat. As a result, these species are at the brink and downstream users are stuck with a disproportionately higher burden for addressing their protection and restoration.

There is an urgent need for the type of basin-scale planning and coordination of hydropower projects that led to the Penobscot agreement. We recommend that Congress direct the Bureau, the Corps, and FERC to cooperate to address multiple projects in a coordinated fashion to increase power generation and environmental outcomes at the basin – not project – scale. For instance, when FERC is relicensing a project in a basin where the Corps or the Bureau also operate hydropower projects, those agencies should participate as cooperating agencies in FERC's analysis and use that opportunity to review the operations of their own projects in coordination with the FERC-licensed projects.

4 Conclusion

A balanced U.S. energy policy must recognize that hydropower has impacts as well as promise, and it should address both. New hydropower development must be sited, operated, and mitigated responsibly, and it must simultaneously encourage increased generation *and* improved environmental performance

¹ Lindley, S.T. et al, "Historical Population Structure of Central Valley Steelhead and its Alteration by Dams," 2006.

at new and existing projects. American Rivers supports the development of new hydropower resources that can be brought online responsibly, avoiding significant additional harm to local ecosystems. We offer the following recommendations to this Committee as it considers how to protect the federal investment in hydropower:

1. Encourage the development of new capacity using existing water infrastructure, especially capacity and efficiency upgrades and power added to non-powered dams. As a class, these hydropower projects can be brought online for the least cost and with the least additional impact to the environment, and could provide as much as a 30% increase in hydropower generation.
2. Direct Federal hydropower operators to evaluate their facilities and operations as well as the relative values of existing authorized purposes in order to find new opportunities to add power, improve efficiency, and improve environmental quality.
3. Direct Federal hydropower operators to coordinate with each other and with FERC to take a basin-scale approach to hydropower development and reoperation rather than a myopic project-by-project view, and encourage multiple operators within a basin to find shared solutions that will increase generation, use water more efficiency, and restore environmental quality.

Environmental quality is not a luxury good: leaving our children with the burden of an environmental deficit is no less insidious than leaving them with the burden of a financial one. Fortunately, it is possible to protect the environment while protecting our investments in hydropower and other water infrastructure. American Rivers has learned some important lessons in our nearly four decades of experience with hydropower. Disputes over water are complex and contentious, and finding solutions to those problems requires a commitment on the part of each party to see that all other parties interests are respected. A solution that is based on “abundance” as it is defined by one party to a dispute will never be satisfactory to all. We must find solutions that seek abundant water, abundant clean energy, abundant fish and wildlife, and abundant jobs. When traditional foes stop hurling accusations at each other and instead sit down, roll up our sleeves, and work together to meet each others interests, we can and often do find lasting, mutually agreeable solutions.

Thank you again for this opportunity to testify you today. I look forward to answering your questions.