



**HYDROPOWER  
REFORM  
COALITION**

*Putting water, wildlife,  
and people back in rivers.*

Washington Department of Ecology  
Attn: Climate Comments  
PO Box 47600  
Olympia, WA 98504

January 22, 2008

Email Submittal to [climatecomments@ecv.wa.gov](mailto:climatecomments@ecv.wa.gov)

RE: Comments on Draft Recommendations for meeting the Washington Climate Change Challenge

Dear Climate Advisory Team Members and Co-Chairs:

The Hydropower Reform Coalition would like to thank the Washington Departments of Ecology (Ecology) and Community, Trade, and Economic Development (CTED) for addressing climate change and setting goals for reducing greenhouse-gas emissions, increasing the number of clean energy jobs, and moving towards greater energy independence. Each of these goals is important and supported by our membership.

Like climate change, the future of America's rivers tops the list of our members' critical future environmental concerns. The impacts of climate change are particularly evident when it comes to water – especially water supply, flood control and recreation. It is imperative that the state amend its water-resource policies and water-management practices to minimize and mitigate the effects of climate change as best it can.

The purpose of our comments is to assist the state as it develops solutions to reduce GHG emissions that avoid trading clean water for clean air and that do not inadvertently sacrifice the river resources that are crucial to ecosystem functioning and to the quality of life in Washington.

**HYDROPOWER REFORM COALITION**

The Coalition is a consortium of more than 140 outdoor recreation and conservation organizations nationwide that have effectively reduced the footprint of hydropower dams on rivers. Collectively we engage and support more than one million fishermen, paddlers, birding enthusiasts, and environmental interests who are concerned with, and inspired by, rivers. Coalition members around the nation advocate for river protection and for environmental restoration from the effects of hydropower projects through the Federal Energy Regulatory Commission (FERC) licensing process and negotiated settlements. The Coalition has benefited from an especially strong membership in Washington State.

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**Steering Committee:**

*Alabama Rivers Alliance • American Rivers • American Whitewater • Appalachian Mountain Club • California HRC  
Coastal Conservation League • Friends of the River • Idaho Rivers United • Michigan HRC • Natural Heritage Institute  
New England FLOW • New York Rivers United • River Alliance of Wisconsin • Trout Unlimited*

The coalition, along with many of its members, maintains a good working relationship with both Ecology and CTED on issues related to Washington's rivers, hydropower development, and energy independence. Most recently, we worked to pass SB 5881 which improved the Department of Ecology's Section 401 water quality certification program. Last year, our members were also involved with CTED in supporting the hydropower provisions of the Energy Independence Act (Initiative No. 937). We agreed with the Initiative's proponents that any hydropower included as part of a renewable portfolio standard would result in improved performance at existing dams, and reward increased power generation with no additional impact.

## **OVERVIEW OF COALITION COMMENTS ON DRAFT RECOMMENDATIONS**

We are concerned with the role that conventional hydropower plays in the draft recommendations for abating greenhouse gas emissions. We agree that hydropower has a role in mitigating disruptive climate change impacts because it generates power not dependent on burning fossil fuels, but we contend that conventional hydropower dams will provide minimal value in offsetting climate change due to:

- The effect of climate change on hydroelectric generation.
- Conventional hydropower's limited potential for producing new energy.
- Conventional hydropower's proven harmful impacts on the function and resiliency of natural systems.

In its final recommendations, we request that Ecology and CTED:

- Tightly define and clarify the role of hydropower with any recommended actions the state should take to prepare and adapt to climate change.
- Be consistent in their treatment of hydropower in terms of its role as a renewable energy.
- Ensure that final recommendations improve the efficiency of existing dams, while retaining natural systems by keeping water in our rivers, improving water quality, protecting species, and allowing fish to migrate to their spawning grounds.

In addition to our support for existing hydropower that is and appropriately sited, operated, and mitigated, the Coalition sees great value in increasing efficiency at existing hydropower plants, and the potential to increase electricity generation at some existing non-power dams. While we have concerns with the overall lack of clarity the draft report provides on conventional hydropower, we support the specific strategies recommended by the Technical Working Group for Water Resources and Quality. We would add the following to the Working Group's recommendations:

- New hydropower – not new dams (efficiency and increased capacity at existing non-power dams).
- Operate and equip existing hydropower projects to protect rivers.
- Encourage non-conventional hydropower with care.
- Coordinate the management of multiple projects on a river.

## **A WATERSHED MOMENT FOR WASHINGTON STATE**

As the state's report stresses, we cannot focus only on mitigating climate change impacts through energy efficiency improvements and producing more carbon-free energy. We must also adapt to the changes in physical processes and ecosystems that are inevitable as a result of climate disruption caused by emissions of the past. In the long term, Washington needs a strategy to provide clean air and clean water, and to maintain healthy human communities and watersheds. In part, such a strategy depends upon restoring rivers impacted by existing hydropower projects, diversions, levees, and other structures, and protecting habitat from further degradation.

Hydropower is an important source of low-emissions energy. At the same time, it is essential to operate hydropower projects to mitigate impacts to fish and wildlife from a changed hydrology and other physical and biological changes. Healthy rivers are resilient -- they are more likely to cope successfully with climate disruption. On the other hand, rivers with impaired water quality, diminished flows and fish-passage barriers are less likely to retain important species and ecosystems as warming continues.

The Coalition supports hydropower when it is appropriately sited, operated, and mitigated. Coalition members participate in FERC licensing and in settlement negotiations to restore resiliency to natural rivers impaired by hydropower dams. After more than a century of exploiting the hydropower potential of Washington's rivers, we do not believe that there are many remaining sites where new construction can be justified on environmental or economic grounds. Thus, we recommend here, as we did with respect to the Energy Independence Act, that the state focus on new hydropower and not on new dams.

## **HOW CLIMATE CHANGE WILL AFFECT HYDROPOWER PRODUCTION AT DAMS**

Hydropower and healthy river ecosystems both depend on water flowing down rivers. It is now beyond dispute that climate change will have physical effects on water availability that will result in important changes to the timing, quantity and quality of river flows (no longer following the natural hydrograph).<sup>1</sup> Some of these changes are already taking place. As the effects of global warming intensify, river hydrology will change, causing impacts to both water uses and river ecosystems. In terms of hydropower generation, the most significant effects promise to be:

- **Quantity of Power Produced Due to River Flow** -- River flow are the "fuel" for hydropower. If the annual flow on a river increases or decreases, the potential for generating power does, too.
- **Shifts in Seasonal Generation** -- In areas with low-to mid-elevation snow-dominated precipitation patterns, hydropower production shifts with flow, to more winter and early

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<sup>1</sup> The Prevention and Adaptation Working Group (PAWG) recognize changes to hydropower under the Water Resources and Quality section, listing both direct and indirect effects associated with temperature and changes in the seasonality and annual amount of hydropower related to changes in streamflow timing or annual volume. [Preparing for the Impacts of Climate Change in Washington](#), page 89.

spring generation, and less summer generation. This is a serious issue in the West, where the time mismatch between spring peak river flows, and summer peak electricity demand is anticipated to increase.

- **Flood Control and Spills** -- Hydropower projects with storage avoid spilling water through floodways rather than through the turbines – no revenue is generated from spills. Multiple-use projects also provide flood control by storing some or all floodwaters for controlled release. Both of these procedures keep some reservoir space empty to accommodate floods. But the most power per gallon is generated from a full reservoir when pressure on the turbines is greatest. With less predictable hydrology, projects will have to risk more spilled water, or reserve more space for flood control; both result in less generation.
- **Conflicts with Other Water Uses** -- In areas where water availability declines, conflicts between hydropower and other uses may intensify. This is especially critical for the Columbia River basin, where the upper portions lie in British Columbia,<sup>2</sup> Idaho and Nevada, and where Washington and Oregon share the river and its tributaries with the Province and other states.

On the energy demand side of the equation, climate disruption has a variety of effects, with hydropower affected indirectly. In the U.S., warmer temperatures will reduce winter heating demands, but increase summer air conditioning and cooling demands significantly. For hydropower in Washington, where snow pack storage is important, this shift in demand for energy is exactly the opposite of the effect of the shift in available hydropower generation.

### **HYDROPOWER’S LIMITED POTENTIAL FOR PRODUCING NEW ENERGY**

Conventional hydropower has been around Washington since the 1930’s, and 73% of the state’s electric power comes from hydropower.<sup>3</sup> As mentioned above, most of the sites that are environmentally and economically acceptable (well sited, operated and mitigated) have been developed and the cumulative greenhouse gas emission reduction benefit due to the few new hydropower dams that might be built would not be worth the net increase in environmental degradation to our watersheds.

- **Economics, Clean Economy, Subsidies & Timing**

The Coalition supports the Climate Advisory Team’s (CAT) efforts to “seize the economic benefits that will accompany the innovation, investment, and job creation that this endeavor (creating a Clean Economy) will require and create.” We support “effective and efficient deployment of investment capital, stimulating technology development, performance-based not prescribed choices, and support for entrepreneurs to seek innovative solutions” in the areas of

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<sup>2</sup> This draft report barely addresses the many “trans-border” issues affecting rivers such as the Columbia, Pend Oreille, Spokane, and Similkameen.

<sup>3</sup> Washington State Business and Project Development, [http://www.choosewashington.com/state\\_data/Energy.asp](http://www.choosewashington.com/state_data/Energy.asp)

emerging technologies such as wind, solar, hydrokinetics, and other potential renewables. As mentioned above, our members support efficiency improvements at existing renewable and non-renewable power plants, and adding generation capacity at existing non-power dams as appropriate. We strongly oppose environmental and regulatory subsidies (i.e. reducing developers' costs by loosening standards for environmental protection) for any technology with a history of well-documented adverse impacts. This would include legislative authority and rulemaking that would support or create such subsidies at either the state or federal levels.

In a green economy, economic value must be assigned to the value and functions that natural environments provide free of charge, and these values and functions must be considered in decisions that will affect the future of rivers and watersheds. This analysis should include river recreation, natural watersheds for sustainable futures (a critical issue in this draft report), aesthetics, and other quality of life issues. Final recommendations should provide greater support for the economic values of the natural environment, including solid natural value data that can aid in balancing power production with natural ecosystem processes.

As noted in the draft report, the need to address climate change is immediate. Given the length of time needed to site, apply, approve, build and mitigate new dams, new dam construction (even if these were in the conceptual or early application stage) would be hard pressed to be on-line to achieve the emissions reductions impacts needed by 2020. We would prefer to see Washington invest resources into new emerging technologies, new science, and energy efficiency -- to invest in tomorrow rather than the technology and economy of the past.

As a mature technology, conventional hydropower represents the old economy. For decades, this old resource-extractive economy produced energy, mostly from fossil fuels, that has resulted in the combination of carbon-emissions, deforestation, watershed degradation, and species extinction now associated with climate change.

- **Small Scale Hydro**

The Coalition is particularly concerned with the draft report's definition of the Clean, Low-Carbon Economy (page 16) where "this sector consists of ten subindustries: renewables, fuel cells, PV/solar, geothermal, **small-scale hydro**, wind, biomass, efficiency, smart, and unidentified industry categories."(Emphasis added) While small hydro emits less carbon and other green-house gases, it does not promote environmental protection, economic prosperity, high quality jobs, social equity, or a better future quality of life.

When you remove the few remaining sites for new dams that would make environmental and economic sense, you are left almost exclusively with small scale hydro. Small scale hydro however, has no intrinsic value that makes it cause less environmental damage than large-scale hydropower, the size of a hydropower project is not an accurate predictor of its impact. Small hydro trades huge cost for small gains by causing most if not all of the impacts of a large dam to a river or watershed, while providing only a fraction of the economic or power production values. When looking at an issue as critical as climate change, the miniscule power potential of small hydro pales in significance to the environmental costs to Washington's watersheds.

- **Hydrokinetic Development**

Development of the new emerging technology of hydrokinetics (wave, ocean, and tidal) has potential if the state can establish strong resource protection for these areas. Coalition members have worked along with agencies, tribes and developers to promote this technology while determining the baseline information needed for financial and environmental security. Our members have been involved with the FERC pilot-project program, and continue to push FERC for appropriate timelines that would allow for clean water and coastal zone permitting, mandatory conditioning, agency oversight, and meaningful public participation.

Due to the amount of stress already present in Washington's river systems, we are concerned over the potential to increase cumulative impacts with hydrokinetic projects that are sited on river channels. While no developer has applied for a preliminary permit for an in-channel project in Washington, projects in other states propose placing hundreds or thousands of turbines in river channels, potentially affecting many miles of river.<sup>4</sup>

While there are still many unanswered questions regarding this new technology, the Coalition has generally been in support of the development of new, damless technologies provided that any proposed project:

- Identifies appropriately-sited renewable energy facilities.
- Recognizes and protects sensitive species.
- Distinguishes and avoids potential impacts to recreation and commercial fishing.
- Addresses cumulative impacts.
- Completes state, regional and national planning.
- Guarantees effective and coordinated public and agency involvement.
- Assesses impacts to Washington rivers and streams.
- Includes a requirement for project decommissioning and removal in cases where the operation or installation results in significant adverse impacts to public aquatic resources.

### **HYDROPOWER'S PROVEN IMPACTS ON THE FUNCTION AND RESILIENCY OF NATURAL SYSTEMS.**

We now understand that no known energy source is purely clean and renewable. All sources of energy generation, including hydropower, have environmental, economic, and societal impacts.

As identified in the draft report, "Washington's natural systems, however, have been degraded by past practices and will continue to be significantly disrupted by global warming." Hydropower dams are one of these past practices: they have proven to destroy resiliency by

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<sup>4</sup> A preliminary permit application for the Ste. Genevieve Bend Project (No. 12917-000), located on or adjacent to the Mississippi River, plans to install up to 3,850 generating units within 7.7 miles of river. This project is one of 14 proposed projects along Missouri's border, which together would impact 74 miles of river.

disturbing habitats and altering the hydrological<sup>5</sup> and fluvial regimes within a watershed, resulting in watershed degradation, reduced wetland capacity, and species decline. The alteration of chemical, biological, and physical processes by dams has resulted in negative effects on water quality, fish and other aquatic species, plants, terrestrial wildlife, recreation, aesthetics, and cultural resources. These alterations to the natural environment must be weighed against the value of reduced carbon emissions.

In the draft report, the Technical Working Group for Water Resources and Quality recommends four strategies for protecting the function and resiliency of natural systems that the Coalition supports. These include strategies for:

- Water resource management.
- Water conservation and efficiency.
- Emergency preparedness and drought management.
- Water resources planning and information.

The Coalition supports these strategies, but each must be coordinated with the others so that they manage and mitigate for the impacts of dams on the natural system. This is a critical part of the solution for maintaining and improving function and resiliency. We also support Recommendation 1.3: Restore and Protect Natural Watershed Functions which says: “Ecology, Fisheries and Wildlife, Natural Resources, and Community, Trade, and Economic Development and the Recreation and Conservation Office use the tools they have available for planning and for habitat restoration and protection to restore natural watershed functions that decrease peak flows and increase base flows.”

In the last decade, river advocates have called for decommissioning and removal of a very small number of hydropower dams. We will continue to do so in a warmer world in cases where dams cannot be made less damaging to an increasingly fragile environment, or where age or other issues raise safety concerns. Whenever dams are uneconomic, unwanted, or have unacceptable impacts, removal should be considered.

## **Conclusion**

The Coalition agrees with the draft report that the “effects of global warming on Washington are local and unique, including our dependence on snowpack for fresh water, our reliance on hydropower for energy, and our significant amount of shoreline.” To the extent possible,

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<sup>5</sup> The hydrologic regime directly affects the physical and biological attributes of a river system, including sediment transport, large woody debris, water temperature, and aquatic habitat. Hydroelectric projects often substantially alter the hydrologic regime by storing water; altering the magnitude, timing, and duration of peak flow downstream of reservoirs; and creating diversions that reduce natural flow in bypass reaches or augment natural flow through inter-basin transfers. <http://www.hydroreform.org/hydroguide/science/scientific-approaches-for-evaluating-hydroelectric-project-effects>

Washington should improve the performance of existing hydroelectric projects by increasing efficiencies, and adapting operations to increase the resilience of the watershed to adapt to climate change. Beyond that, Washington should seek opportunities to increase hydropower at non-power dams, and support new hydrokinetic technologies where appropriate.

In general, we oppose building new dams, especially small dams, whose impacts are in lockstep with the growing impacts of a warming climate – reduced resiliency of natural systems, reduced flows, increased water temperature, migration and corridor impediments, and species extinction. These issues, regardless of whether they come about through hydropower dams or climate change, or both, will adversely impact on Washington’s entire wonderful and interconnected heritage of great rivers, estuaries, beaches and coastal areas.

Once again, thanks to Washington Departments of Ecology and Community, Trade, and Economic Development for providing this opportunity to address climate change and to set goals for reducing greenhouse-gas emissions, increase clean energy jobs, and move towards greater energy independence.

Sincerely,

A handwritten signature in black ink, appearing to read "R. J. Bowers". The signature is fluid and cursive, with a large loop at the end.

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