

## DECLARATION OF MATT ROSENER, MS, PE

I, Matt Rosener, hereby declare as follows:

- (1) My name is Matt Rosener, and I live in Port Angeles, Washington part of the time and in Hanalei, Hawaii the other part of the time. Since 2014, I have operated my business, North Shore Hydrological Services in both locations. I have extensive experience as a hydrologist, including for USDA Natural Resources Conservation Service and US Geological Survey. I am a registered professional engineer in both Washington and Hawaii. My current CV is attached to this declaration.
- (2) I am personally familiar with the Elwha River and Watershed, I have attended several conferences and symposia on the Elwha River Restoration Project, and I have assisted the US Geological Survey for Elwha River channel surveys associated with this project.
- (3) My declaration is based on my professional experience as a hydrologist, my personal knowledge, and my review and analysis of relevant scientific literature, in particular: a science synthesis produced by the US Forest Service Pacific Northwest Research Station called “Effects of Forest Practices on Peak Flows and Consequent Channel Response: A State-of-Science Report for Western Oregon and Washington” by Gordon E. Grant et al.; a scientific paper called “Long-term effects of forest harvesting on summer low flow deficits in the Coast Range of Oregon”; by Catalina Segura et al. (*Journal of Hydrology* 585 (2020) 124749); a scientific paper called “Summer streamflow deficits from regenerating Douglas-fir forests in the Pacific Northwest, USA”, by Timothy D. Perry and Julia A. Jones, (*Ecohydrology* 2016:1-13, DOI 10.1002/eco.1790). The studies I

reviewed contain information applicable to industrial logging practices and the health of the Elwha River Watershed, in particular in-stream flows.

- (4) I have also reviewed the SEPA checklists for timber sales “Tree Well”, “Parched”, and “Alley Cat”. The areas proposed for the “Alley Cat” timber sale are entirely within the Elwha River Watershed. Almost all of the areas in the “Parched” sale are within the watershed aside from a small eastern unit. The “Tree Well” sale has a unit adjacent to Little River, with sections of it inside and outside the Elwha watershed boundary. Risks to the Watershed associated with industrial logging include increases in peak flows and diminished summer streamflow.
- (5) The US Forest Service Pacific Northwest Research Station synthesis surveys over 100 peer-reviewed scientific studies spanning the last five decades and identifies a direct correlation between industrial logging and increases in peak flows. Peak flows—a term to describe the maximum rate of water discharge in rivers and streams during rain storms and snowmelt runoff—are associated with landslides, mass wasting, channelization, streambed scour, and other forms of erosion and sediment deposition that detrimentally affect fish. By causing water to move faster through the hydrologic system, industrial logging practices not only can contribute to the degradation of salmonid habitat, but also can endanger communities downstream by elevating the risks of floods and landslides. Mass wasting and landslides can cause significant adverse impacts on nearby streams and their aquatic habitat. While state forest practices regulations require some protection for streams and wetlands, these minimal buffers may not adequately mitigate mass wasting or turbidity impacts to the watershed.

- (6) In the paper called “Long-term effects of forest harvesting on summer low flow deficits in the Coast Range of Oregon”, researchers at Oregon State University published a study that drew conclusions about the role forest management plays in streamflow levels in summer months. Dr. Catalina Segura and her colleagues analyzed 60 years of data collected on paired stream basins in the Alsea Watershed in Oregon’s Coast Range. Some basins were logged according to the rules laid out by Oregon’s current forestry regulations, while others were left standing and allowed to mature to over 100 years of age. The researchers found that streams in logged basins produced 50% less water during summer months than streams in unlogged basins. These streamflow deficits persisted for more than half of the year, being most pronounced in late summer. The researchers suggest that the high evapotranspiration rate of young Douglas-fir plantations is the primary cause of this deficit.
- (7) In the paper called “Summer streamflow deficits from regenerating Douglas-fir forests in the Pacific Northwest, USA”, Dr. Julia Jones and Timothy Perry studied data collected in eight paired basins over a six-decade period to inquire into the streamflow consequences of industrial forest practices. The researchers studied forestlands that were set aside over 70 years ago for the purpose of research located within the H.J. Andrews Experimental Forest (east of Eugene, Oregon) and the South Umpqua Experimental Forest (east of Roseburg, Oregon). Half of the basins studied were clearcut according to current legal standards, while the others were left standing. The research concluded that young Douglas-fir plantations diminish summer streamflow by 50% when compared to mature forest reference sites. These streamflow deficits caused by industrial logging practices lasted for long periods of time. According to the six decades of data, low flows in

clearcut-and-replanted basins persisted and intensified for over a half century after the initial harvest of the basin. The results of this study indicate that clearcutting today will produce diminished water levels well into the late-21st century.

- (8) In general, scientists predict that climate change will dramatically alter hydrologic systems and lead to a water shortage crisis in the Pacific Northwest during the latter half of this century. See *State of Knowledge: Climate Change in Puget Sound*, by Climate Impacts Group, University of Washington 2015. This is especially relevant to the Elwha River Watershed where glacial meltwater and seasonal snowmelt substantially contribute to summer streamflow in the Elwha River and its tributaries. Glacial retreat and disappearance have been well-documented in the Olympic Mountain range ([Fountain, et al](#); “*Glaciers of the Olympic Mountains, Washington—The Past and Future 100 Years*” March 8, 2022). With the glacial melt component of the water budget decreasing and predicted to further decrease, summer low flows in the Elwha River Watershed are expected to decline in the future. The timing of seasonal snowmelt runoff is being accelerated due to climate change as well, and this will also contribute to reduced summer low flows ([Glacier status and contribution to streamflow in the Olympic Mountains, Washington](#); Riedel et al.; November 18, 2014 ); (Lower Elwha Klallam Tribe Climate Change [Vulnerability Assessment](#); February 2022).
- (9) The results of the above studies and the predicted impacts of climate change have implications for management of logging in the Elwha River Watershed. It is likely that the effects of altered hydrologic regimes due to climate change will compound the impacts of industrial logging operations on summer low flow availability in this area.

- (10) The planned timber harvests known as “Tree Well”, “Parched”, and “Alley Cat” are primarily within the Elwha River Watershed, as well as other streams and wetlands.
- (11) Based on my professional experience and as is standard in advising local governments or other entities about the impacts of certain activities on watershed health, it is best practices to avoid or defer activities that may have a measurable impact on in-stream flows until there is an acceptable degree of certainty that such activities will not have an unacceptable impact. This is particularly important as climate change introduces greater uncertainty as to our ability to predict the severity of impacts, and availability and reliability of fresh water sources are expected to be greatly compromised.
- (12) It is important to consider the cumulative effects of past, present, and future planned logging, both on public and private land, in the Elwha River Watershed.
- (13) It is also important to consider the recent dramatic changes to the Elwha River that have occurred as a result of dam removal, including the effects such changes have had on the river channel, sedimentation, high flow events, and slope stability of the river bluffs.
- (14) Based on my professional experience and review of the above cited studies, it is my opinion that industrial logging poses a threat to the health of the Elwha River Watershed, and, in particular, will reduce in-stream summer flows to at least some degree and in a potentially significant amount. Logging also presents other hazards to the River such as landslides and erosion.

I declare that the foregoing is true and correct.

Dated: October 15, 2024, Port Angeles, Washington.

A handwritten signature in black ink that reads "Matt Rosener" with a horizontal line extending to the right.

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Matt Rosener, MS, PE