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This study addresses three questions related to the effects of timber harvest along non-fishbearing (Type N) streams in eastern Washington:

1. What is the magnitude of change in water temperature, canopy closure, and stream cover of Type N channels in the first two years after harvest?

2. What is the magnitude of change in stream flow and suspended sediment export from the Type N basins in the first two years after harvest?

3. What is the relationship between observed changes in resource condition and forest management activity?

This study will use BAS to address the question of whether riparian processes and functions provided by Type Np buffers are maintained at levels that meet FPHCP resource objectives. The FPHCP resource objectives listed in Schedule L-1 which are relevant to this study are listed in Table 1

Condition or process	**Functional objective**	**Performance Target**
Stream temperature	Provide cool water by maintaining shade, groundwater temperature, flow, and other watershed processes controlling stream temperature.[1]	Water quality standards (— current and anticipated in next triennial review)
Shade	Same as above.	Eastside high elevation: Shade available within 50 feet for 50% of stream length
LWD	Develop riparian conditions that provide complex habitats for recruiting large woody debris and litter.[2]	
Litterfall	Same as above.	Eastside Type N: at least 70% of recruitment available from within 50'.
Sediment	Provide clean water and substrate and maintain channel forming processes by minimizing to the maximum extent practicable, the delivery of management induced coarse	

1 Stream temperature is affected by the interaction of a complex set of factors, including shade, air temperature, pool depth and frequency, flow, and groundwater influences. These factors are addressed in resource objectives for other conditions or processes (e.g., hydrology, sediment, LWD) in addition to the targets selected for stream temperature.

2 Litter is defined to include leaves, needles, twigs, branches, and other organic debris that is recruited to aquatic systems and riparian forest floor.

	and fine sediment to streams by protecting stream bank integrity, providing vegetative filtering, protecting unstable slopes, and preventing the routing of sediment to streams.	
Hydrology	Maintain surface and groundwater hydrologic regimes (magnitude, frequency, timing, and routing of stream flows) by disconnecting road drainage from the stream network, preventing increases in peak flows causing scour, and maintaining the hydrologic continuity of wetlands.	

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Critical Questions

1. What is the magnitude of change in water temperature, canopy closure, and stream cover of Type Np channels in the first two years after harvest?
2. What is the magnitude of change in stream flow and suspended sediment export from the Type Np basin in the first two years after harvest?
3. What is the relationship between observed changes in resource condition and forest management activity?

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Research Questions

1. **How does basin harvest affect the magnitude and timing of surface water discharge from the Type Np basin, and the amount and timing of dry reaches (if applicable)?**
2. **How does harvest of Type Np stream basins affect the number, size, total volume, and distribution of woody debris within study reaches?**
3. **Is there a relationship between the frequency and magnitude of sediment delivery pathways from forest units to streams and suspended sediment export (SSE), and how do pathways differ between treatment and reference basins before and after treatment?**

4. **How does water temperature change within the Type Np basin, and can we relate temperature change to change in shade?**

5. **How does harvest affect water temperature at the basin outlet and in downstream fish bearing waters?**

6. **How do canopy closure, effective shade, stream cover, hydrologic condition, periphyton (both as chlorophyll-a and ash-free dry mass), and detritus standing crops change in response to the different buffer treatments?**

7. **How do benthic invertebrate assemblages and amphibians respond to the different buffer treatments?**