

**Table 1  
Ecological Processes and Structures Affected by Major Alterations**

		Ecological Processes & Structure																		
		Physical and Biological Functions	Hydrology					Sediment		Water Quality			Habitat							
			Storage	Subsurface Infiltration and flow	Surface flows	Hyporheic Exchange	Groundwater Recharge	Soil Erosion	Deposition/Storage	Nutrient Sources	Temperature/Dissolved Oxygen	Toxins/Pathogen sources	Riparian Vegetation Recruitment	Native grasslands and shrub steppe	Terrestrial Species - Foraging	Terrestrial Species - Breeding/Nesting	Terrestrial Species - Migration	Aquatic Species - Spawning	Aquatic Species - Rearing	Aquatic Species - Migration
<b>Major Alterations</b>	<b>Impairments</b>																			
Columbia Basin Project Storage	Restricts water movement		x		x							x	x					x	x	x
	Restricts sediment movement						x	x	x											
	New lakes and wetlands					x						x	x	x	x	x	x	x	x	x
	More rapid pool elevation fluctuations				x		x					x					x	x	x	x
Columbia Basin Project Diversion/Conveyance	New or relocated channels and wetlands					x						x	x	x	x	x	x	x	x	x
	New recharge areas					x														
	Water velocity increases						x	x			x									
Impervious Surfaces	Run-off rather than infiltration	x	x	x			x			x	x							x	x	
	Stormwater management/infrastructure	x	x			x			x		x									
	Habitat loss											x	x	x	x	x				
Vegetation Alterations	Loss of nutrient and organic inputs, reduced evapotranspiration and bioinfiltration, increased toxin and nutrient loading									x	x	x	x	x						
	Invasive species (terrestrial and aquatic)																	x	x	
	Aquatic species														x	x		x	x	
	Increased soil erosion						x					x		x						
Water Quality Impacts	Fertilizer/Pesticide/Herbicide Inputs											x								
	Effluent Inputs											x								
	Temperature increases											x								
	Bioaccumulation of toxins														x	x				
Structural Effects on Habitat	Habitat fragmentation by roads											x	x	x	x	x				
	Over-water structures alter sediment, organic material pathways and the photic zone			x														x	x	x
	Aquatic fill, reduced water storage																	x		
Shoreline Hardening/Stabilization	Habitat loss, replacement of variable sized material with large homogenous substrate											x			x	x	x	x	x	x
	Increased wave energy at toe of slope and energy transfer downstream/down current of hardening						x	x												
	Sediment and subsurface water cycle disruption				x			x												
	Organic material cycle disruption								x											
Channel Realignment	Water velocity increases			x					x									x	x	x
	Reduced floodplain connection and functions				x															
	Decreased temporary storage of sediment, nutrient-, toxin-, or pathogen-laden water in streams								x	x		x								
Other Alterations	Artificial lighting increases light delivery at unnatural times														x	x	x	x	x	x
	Increased noise														x	x	x			
	Recreation infrastructure increases wave energy at shoreline (boat ramps, wakes)						x	x									x	x	x	x
	Non-native species predation														x	x	x	x	x	x
	Competition for resources from non-native species													x	x	x	x	x	x	x