

**CONCEPTUALIZING WATERSHED TO CHANNEL SCALE
GROUNDWATER-STREAM EXCHANGE UNDER NATURAL AND
RE-NATURALIZED CONDITIONS^{AFS}**

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Physical and sociological constraints hamper attempts to improve or re-establish stream health. The role of groundwater in stream systems is usually poorly understood or ignored even though it underpins the ecology of stream and floodplain systems. Groundwater exchanges with the stream channel creating gaining, losing, flow-through and parallel-flow reaches. Such transfers of water, nutrients and temperature are critical components of stream-riparian-floodplain function. Groundwater and surface water interaction also creates hyporheic zones, areas in which groundwater and stream water mix at the channel bed scale. These zones also provide critical spawning and rearing areas for several salmonid species. Restoration, re-naturalization and remediation of stream systems should incorporate groundwater-stream exchange as one of its goals.