



Integrated Monitoring of Riparian Ecosystems

Importance

Riparian vegetation is the most important functional component of riparian ecosystems. Near-stream vegetation contributes to stream-bank stabilization and provides habitat, organic matter, and nutrients essential to terrestrial and aquatic organisms. Riparian plant communities are sensitive to hydrologic change, and vary depending on local geomorphology (see diagram). Human activities and periodic natural disturbances, including flooding and fire, can affect riparian ecosystems. Integrated monitoring of vegetation, hydrology, and geomorphology can detect impacts and disturbances to these systems. Long-term monitoring of integrated riparian ecosystems will complement aquatic macroinvertebrate and water-quality assessment methods, thus providing a more complete evaluation of overall stream health.



NPS/R. WEISSINGER

Mancos River, Mesa Verde NP.

Long-term Monitoring

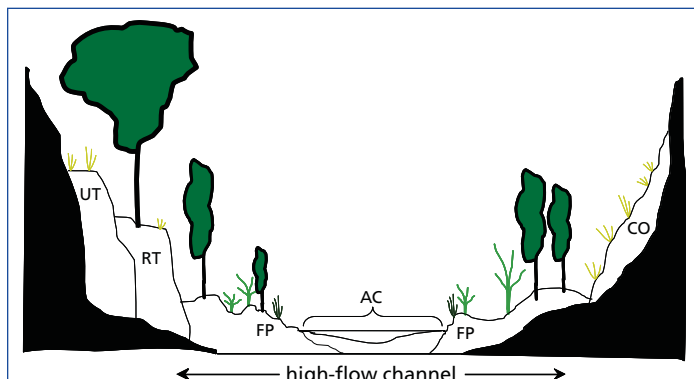
Riparian monitoring occurs along 1–3 reaches of selected streams in 11 SCPN parks. Vegetation monitoring includes frequency and abundance of shrub and herbaceous species, and forest-structure attributes. In addition, surface and groundwater dynamics, and stream channel morphology are monitored. Basic water quality measurements and physical habitat characteristics (e.g., water depth and velocity, canopy closure, and substrate size) are also collected within each stream reach. Monitoring began in 2007, with monitoring reaches established at Chaco Culture NHP, Hubbell Trading Post NM, and Salinas Pueblo Missions NM. Over the next few years, additional riparian reaches will be established in the other eight SCPN park units where riparian monitoring is planned.

Management Applications

Reduction or depletion of stream flow may result from diversion

or retention of surface water, groundwater extraction, climatic drought, or a combination of anthropogenic activities and natural processes. Significant depletions of surface and groundwater can lead to dewatering of channels and floodplains, resulting in a variety of structural and functional changes, including the mortality of riparian vegetation and aquatic biota, destabilization of channel banks, and the encroachment of upland vegetation and non-native weeds into the riparian zone.

The first few years of monitoring data will be used to document current conditions of selected riparian ecosystems in SCPN streams. Over the long term, integrated riparian data will be used to (1) examine the response of riparian vegetation to changing water availability or physical conditions, (2) follow the recovery of integrated riparian ecosystems after major disturbance events, such as floods or catastrophic fires, and (3) document riparian ecosystem response to climate change.



Geomorphic surfaces in riparian areas. CO = colluvium; UT = upland terrace; RT = riparian terrace; FP = flood plain; AC = active channel.

Contact

Steve Monroe, Stephen_Monroe@nps.gov

Network park units where riparian systems are monitored

Bandelier NM	Mesa Verde NP
Canyon de Chelly NM	Petrified Forest NP
Chaco Culture NHP	Salinas Pueblo Missions NM
Glen Canyon NRA	Walnut Canyon NM
Hubbell Trading Post NHS	

Channel morphology is monitored at Petroglyph NM and Wupatki NM.

NP = National Park; NM = National Monument; NHP = National Historical Park; NHS = National Historic Site; NRA = National Recreation Area