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## Assess physical functioning of riparian systems with an eye toward management

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**Key words :** Interdisciplinary , hydrology , geomorphology , biology , objectives

**Introduction** Riparian systems , where aquatic ecosystems transition to terrestrial uplands , focus land uses and hydrologic processes into compact areas . To avoid problems of floods downstream and low flows in dry times , water must be kept on the land longer with riparian proper functioning condition ( PFC ) ( e g . , Prichard et al . , 1998 ) . PFC occurs when adequate vegetation , landform , and coarse woody debris is present to : dissipate stream ( or wave ) energy from high flows ( winds ) reducing erosion and improving water quality ; filter sediment , capture bedload , and aid floodplain development ; improve floodwater retention and ground-water recharge ; develop root masses that stabilize banks against cutting action ; and develop diverse physical habitats for fish , wildlife , and biodiversity . PFC enables restoration to later seral stages if desired . For each unique area , it is based on the local potential , the highest ecological status that an area can attain , or the capability , the highest it can attain given political , social , or economic constraints . Grazing is not a constraint because livestock or wildlife can be managed to encourage PFC .

**Methods** PFC assessment uses an interdisciplinary team that understands local watershed hydrology , especially the range and frequency of flows ; soils and fluvial geomorphology in relation to deposition and saturation ; and biology about habitats needed for local riparian plants , fish , and wildlife . The team discusses potential and/or capability for the lotic stream reach or lentic wetland and then uses a 17 ( 20 ) -attribute checklist about hydrology , vegetation , and erosion/deposition to assess the physical functionality of the system . They record notes about at least all improper attributes to develop an understanding of PFC issues . Using the definition , they rate it as PFC , functional-at-risk ( trend up , down , or not apparent ) , nonfunctional , or unknown . Unacceptable conditions outside the control of management are noted , but emphasis on the seventeen ( 20 ) attributes often points directly to possible objectives for management . " Creeks and Communities " is collaboration among all watershed ( catchment ) landowners , users , managers , and advocates .

**Results and discussion** Because all disciplines and agencies work together using the PFC process , an interdisciplinary understanding helps people communicate well . The user-friendly approach helps connect professionals with lay citizens and focuses discussion on important at-risk areas . There , specific attributes can be addressed through management of land and water uses such as grazing or water storage for irrigation , and on catchment features such as vegetation , roads , trails , and floodplains . With some training , ranchers and environmentalists can agree about what they see and designate attributes to be monitored as objectives .

**Conclusions** The value of PFC is an upward spiral that leads to better conditions for downstream flood prevention and base flows after aquifer recharge . With water and soil for forage , fish , wildlife , and riparian-dependent biodiversity , communities become more beautiful , sustainable , and productive . Putting the focus on physical functionality helps people work together to make the riparian system produce what they all value . This avoids the sense that riparian area management is for " other " people . Once riparian areas function properly , they continue to improve . Much resiliency comes from soaking up the water to grow plants that slow the water of future floods and hold soils while retaining nutrients . PFC assures the proper relationship among soil , water , and nutrients thus providing more and better habitats for fish , wildlife , livestock , and people . Proper functioning riparian areas provide a foundation for restoration or other resource objectives .

### References

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