Physical Road and Stream Network Connectivity North Eastern Puerto Rico

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Abstract. Physical connectivity between the road and stream network was measured using a local bridge scour survey and from an assessment of road crossing influence on fish movement for 24 sites in the Rio Espiritu and Rio Mameyes watersheds in Northeastern Puerto Rico (NE PR). Adopting a survey technique developed by Johnson et al., 1999, eleven stability indicators were measured to derive an overall scour rating at each river road crossing study site. This scour rating measured the amount or potential for alteration to sediment and stream flow processes in the immediate vicinity of the river road crossing. Scour ratings were ranked stable, moderate, poor, and unstable.

Analysis of scour ratings relative to geographic information system (GIS) derived environmental variables (landcover, underlying geology, mean elevation, and average unit stream power) was performed at two scales of study: 250 meter circular buffer and upstream contributing area. Scour ratings were also compared to road characteristic variables which include road size, stream size, crossing type, and percent stream constriction.

Using the environmental and road characteristic variables as explanatory variables, linear regression modeling of bridge scour scores was performed. Assessment of road structures acting as fish barriers was evaluated using slope analysis, field data noting potential barriers, and fish species richness data at pools and riffles upstream and downstream of crossings.

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