

Interactive comment on “Road and stream network connectivity and potential: northeastern Puerto Rico, an exploratory analysis” by K. R. Sherrill et al.

K. R. Sherrill et al.

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Response to Anonymous Referee #2:

Comment # 1: The reviewer criticizes that many of the observed relationships between the response variables (species richness and geomorphology measures) and the GIS-based measures of R/S connectivity may be spurious and products of geographic patterns, and the scale of analysis. Likewise the reviewer notes that the hypothesized effects of roads on the response variables may be confounding in that a variable may for example produce increased fine sediment as well as coarse bed load, thus simple correlations maybe misleading and inappropriate.

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Response:

These statements are true, the relationships observed in this observational study might have other explanations, however further isolation and verification of many potential cause and effect relationships are beyond the scope of this study.

Criticism # 1: Excessive reliance on mapped vs. field-checked features, how accurate was the road and stream layers?

Response:

The road and stream layers were overlaid on high resolution digital ortho quarter quads (DOQQs) as well as google earth and were found to be very accurate, thus we are confident we have accurately identified our 25 river road crossing study sites and the subsequently related scales of study.

Criticism # 2: The definitions of road-stream connectivity and the potential for connectivity were a little hard to follow, esp. Figure 1; what are the mechanisms that could make a road that is more distant from a stream have more of an effect than one close to the stream?

Response:

Many mechanisms can work in conjunction to make a road that is more distant from a stream have more of an effect (increased R/S connectivity) than a road which is closer. In the paper we give one such example, with the exception being that the two compared roads are the same distance from the stream. The example on lines 19-26 on page 1736, in section 1.1 Road and stream network connectivity states: A situation that would be considered to have reduced RSNCP is shown in Figure 1c. The road is distant from the stream network and is located in a natural setting that is resistant to R/S connectivity because the road is on gently sloping terrain, with a densely forested riparian buffer between the road and stream network. Conversely, a situation where the environmental conditions are more conducive for R/S connectivity

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is shown in Figure 1d. The same road is distant from the stream network but is located on highly sloped terrain with a sparsely vegetated riparian buffer between the road and stream network.

Criticism # 3: Descriptions of particular road configurations and the stream data from these locations would have helped make the manuscript more understandable.

Response:

We can easily add a descriptive summary of the number and types of river road crossings used as study sites with in the text and as a table. Much of this information such as the number of sites by road and stream size combination could be added to Table 1.

Criticism # 4: Hypotheses could have been presented more clearly in the introduction, rather than mentioned only in the results.

Response:

We state our hypothesis in the introduction on lines 3-5 on page 1735.

Criticism # 5: Tables of statistical results are difficult to interpret, in part because variable names are abbreviated and because the criteria for significance of particular variables in not clear.

Response:

Variable names can be spelled out in tables 5- 7 to make the models more interpretable. After performing the variable reduction process which is explained in section 2.3 variable reduction, best models were derived using Efronymson Stepwise Regression and Leaps and Bounds selection procedures as explained in lines 13 & 14 on page 1742. Selected variables within the developed models were denoted as being ns = not significant at $\alpha=0.5$, to * $p\leq 0.05$, ** $p\leq 0.01$, and *** at $p\leq 0.001$.

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In table headings for tables 6 and 7 we can note that models were selected using Efroymson Stepwise Regression and Leaps and Bounds selection procedures to make clearer.

Criticism # 6: Not clear what was learned from models fitted both with and without X, Y coordinates;

Response:

Point noted, modeling results with the x and y variables included simply show that when the strong north-south topographic gradient within the study area is incorporated in the models it results in increased model fit.

Criticism # 7: It would have been helpful to more clearly tie the findings back to long-term work on stream ecology from Puerto Rico to assess whether roads appear or don't appear, to be affecting stream variables;

Response: Agreed, including a synthesis of how our research results fit within the context of other stream ecology and road affects studies which have been performed in Puerto Rico would be beneficial.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1731, 2008.

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