Manuscript No.: esp-2016-5

Manuscript Title: Delineating incised stream sources within a San Francisco Bay tributary basin.

Overview: The authors use geospatial analysis to identify "hotspots" of erosion and sediment delivery in an incised channel network within a tributary to the San Francisco Bay in California, USA. Channel adjacent sediment sources are identified and quantified based on a combination of DEM-derived slope gradient and morphology, as well as the density and size of riparian vegetation. Rates of sediment delivery are constrained by measured sediment yield data for the watershed. Rates are summarized at the 30-m reach scale and the subbasin scale to demonstrate spatially explicit sediment delivery within the larger watershed.

General Comments: I agree with anonymous referee #2 that this is a relevant and interesting study, which can provide restoration practitioners with some relatively simple tools to help identify and prioritize restoration activities in a cost-effective manner. I also agree that more information is needed on the assumptions and methods used in the analysis. Overall, I recommend this paper to be approved if additional detail is added to the manuscript.

Specify and Discuss Hydraulic Geometry Relationships for Modeled Watershed - The authors cite Dunne and Leopold (1978) for hydraulic geometry relationships related to predicting bankfull width and depth. I suggest that the authors state both equations in the manuscript. Also, given that Dunne and Leopold (1978) only published the regression lines and not the data used to derive the relationships, I wonder how accurate these regional regressions are for predicting bankfull width and depth for the modeled watersheds. This is important, since the channel buffer width (i.e., source areas) is dependent on the bankfull channel width. As such, the authors should briefly describe whether the hydraulic geometry relationships from Dunne and Leopold (1978) predicted reasonable values for bankfull width and bankfull depth for the modeled watershed(s).

More Detail Needed on the Channel Buffering Technique - The manuscript cites Perroy et al. (2010) as the rationale for using the buffer of 6 times the bankfull width. The Perroy paper mentions that their buffering technique scaled with stream order, but did not discuss a specific factor of 6. More information is needed on how the authors came up with the value of 6 times the bankfull width to determine their channel buffer width. Ideally, the width of the buffer should relate to the height of the bank and the geotechnical properties of the bank material, as these properties will largely dictate the extent of the adjacent hillslope subject to failure.

More Detail Needed on How Erosion Reduction Equation was Derived – There needs to be more detail on the how the curve (Figure 2) and the equation (Equation 2) were created.

Erosion Source Areas and Proximity to Channel Knickpoints – This might be beyond the scope of this paper, but it would be interesting to see if the erosion patterns were related to the location of discontinuities in the channel profile. Some recent literature has suggested that inner gorge failure (i.e., bank failure) happens pervasively downstream of channel knickpoints/knickzones (Bennett et al., 2016). This could give restoration practitioners even more insight on where to concentrate their restoration activities.

References:

Bennett, G.L., S.R. Miller, J.J. Roering, and D.A. Schmidt. 2016. Landslides, threshold slopes, and the survival of relict terrain in the wake of the Mendocino Triple Junction. Geology. doi:10.1130/G37530.1.