

Beatriz Mogollon and Paul Angermeier

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Title: Which riverine floods can we manage?

Abstract (232/250)

Despite huge investments in water-related infrastructure and improvements in flood forecasting, riverine floods and their damage are increasing. Long-duration, intense precipitation events are uncommon, but cause extreme flood damage. For large floods, the influences of flood control measures and land cover become negligible; only small and intermediate floods seem to be manageable. Using recent instantaneous discharge records for 31 small watersheds ($\leq 31 \text{ mi}^2$) in Virginia and North Carolina, we derived three flood regime metrics (magnitude, duration and count) for several flood-recurrence intervals (80% of a 1-, 1.5-, 2-, 5-, 10-, 20-, 50- and 100-year flood). We classified each watershed as urban, rural, semi-forested, or forested based on a hierarchical cluster analysis using 1990, 1992, 2001 and 2006 land cover data. We tested differences among watershed types for each flood-recurrence interval for three flood regime metrics in generalized linear mixed models by deriving the least-squares adjusted means and the Bonferroni-adjusted confidence limits. We found a) no significant differences in duration and count of floods between watershed types although trends showed higher duration and fewer floods for non-urban watersheds up to a 10- and 20-year flood respectively, and b) significant differences in magnitude between non-urban and urban watersheds up to a 2-year flood. Our findings suggest that small and large floods warrant different management approaches. In particular, land use policy may be more effective in curtailing small and intermediate floods than larger floods.