Towards a New Classification of Rivers based upon Generic Stage-Discharge Rating Curves BENJAMIN PARSONS, JEREMIAH RUNDALL, MICHAEL JORGENSEN, STEVEN EMERMAN, Utah Valley University — The practice in hydrology is to deduce stream discharge from stream stage by creating a rating curve for each stream site from simultaneous measurements of stage and discharge. If a river could be assigned a generic rating curve with a small number of parameters, the cost of developing rating curves could be reduced. The first step has been to classify rivers according to whether there is a unique relationship between stage and discharge. The USGS National Water Information System database of about 3.8 million simultaneous measurements of stage and discharge at 15,345 active and historic stream gaging sites was imported into a Python-driven data manipulation script. Linear relationships between z-scores of the logarithms of stage and discharge were developed for each site. A frequency spectrum of the slopes of the linear relationships was created by summing the normal distributions for each site with mean equal to slope and standard deviation equal to uncertainty in slope. There were no stream gaging sites at which discharge changed without a change in stage. At about 70% of stream gaging sites, over 90% of the variation in stage corresponded to a variation in discharge. At the remaining sites, significant variation in stage occurred without a variation in discharge. Current research involves identifying the characteristics of stream sites that lack a unique stage-discharge relationship and creating classes of generic rating curves by considering more complex functional fits.

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