**Github repo readme**

This readme describes (i) the three main steps for running the decision tree used to make flow-based recommendations regarding dam operation rules, (ii) scripts used to produce figures in the manuscript associated with this work:

Hecht, J.S., R.M. Vogel, R.A. McManamay, C.N. Kroll, J.M. Reed. Decision trees for incorporating hypothesis tests of hydrologic alteration into hydropower-ecosystem tradeoffs. *J. Water Resour. Plann. Manage.* In review.

The table below lists the three main steps of the analysis, including the R scripts used to execute them as well as the required inputs and parameters, some of which the user must specify in the code itself.

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| --- | --- | --- | --- |
| **Step** | **Task** | **R script** | **Required User Inputs and Parameters** |
| 1 | Hydropower reservoir simulation | HP\_Res\_Simulation.R | * Daily streamflow time series data (convert to m3/s if needed) * Reservoir design and operation parameters |
| 2 | Run Mann-Whitney test to obtain estimates of type I and II errors | MannWhitney\_AFDC\_quantiles.R | * AFDC Quantiles * Percent deviation thresholds * Sets of alphas and betas to test |
| 3 | Run decision tree | Bayesian\_Decision\_Tree.R | * Prior probabilities of alteration. (We recommend using a noninformative prior probability (P(NA) = P(A) = 0.5) unless there is strong reason to choose another one.) * Costs associated with incorrect under- and over-protection decisions. * Type I and II errors from Step 2 |

**R Code was used to generate the following figures in the text**

|  |  |  |
| --- | --- | --- |
| **Figure** | **Script Name** | **Description** |
| 3 | Fig3\_AFDC Comparison.R | This figure requires one to execute a reservoir simulation first and then compare pre- and post-dam flows. |
| 4 |  |  |
| 5 |  |  |
| 7 |  |  |

Fig3\_AFDC Comparison.R

Fig4\_Test Distribution Comparison.R

Fig5\_Effects of record length and Cv.R\*

Fig7\_DecisionSpace-EffectSize vs CostRatios.R\*

\*Generated figures may vary slightly from versions in manuscripts due to random number generation.

Figure S1 utilizes the reservoir simulation script. Note in code.

Figure S2 utilizes the reservoir simulation script. Note in code.

Figure S3/S4 utilizes a test statistic, separate code.

These functions are sourced by scripts that produce analysis and/or figures

* FDC\_annual.R
* FDC\_overall.R