

Assessing the effects of alternative flow scenarios on rivers using the REFDSS Web Tool

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Overview

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- Managed rivers face competing flow demands for both human and natural needs.
- These include a myriad of factors with complex relationships including physical habitat, hydrologic frequency, physical hydraulic changes, and other factors.
- The REFDSS (Talbert and Maloney, 2014). web tool combines these data sources for a complete assessment of habitat impacts under multiple management scenarios for not only aquatic species but riparian vegetation and invertebrate species as well.

Hydraulic Input

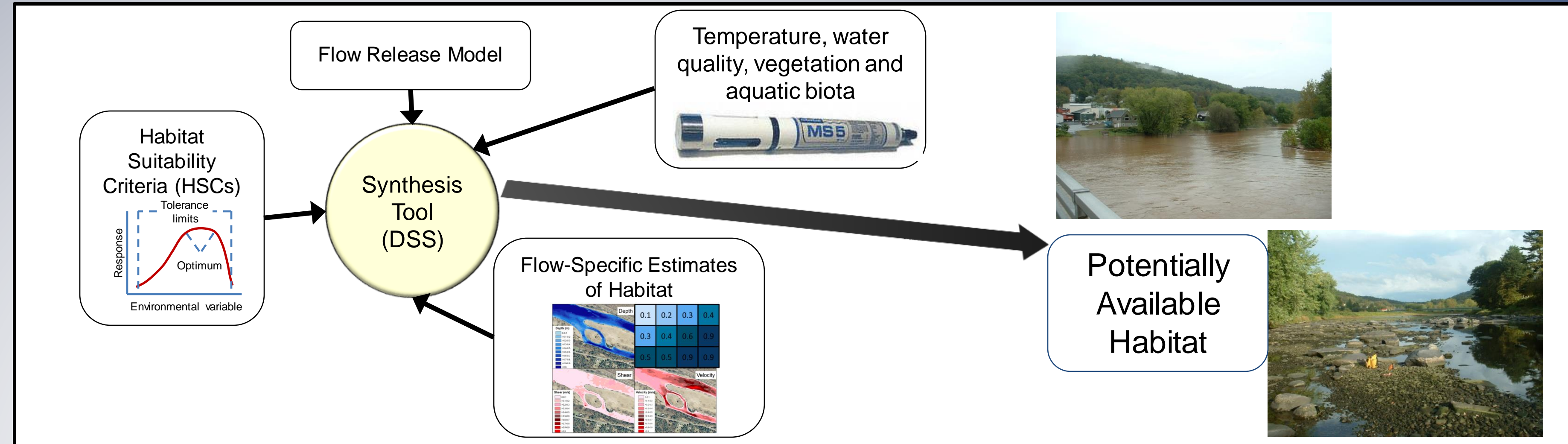
- Expanding on the design of REFDSS (Maloney et al., 2015) the new dashboard will expand habitat assessment from 2D hydraulic data to include HEC-RAS 1D hydraulic data and single cross-section hydraulic data

Hydrologic Input

- Selection of hydrograph data can be by map-based selection of USGS stream gage records or upload of user-specific data.

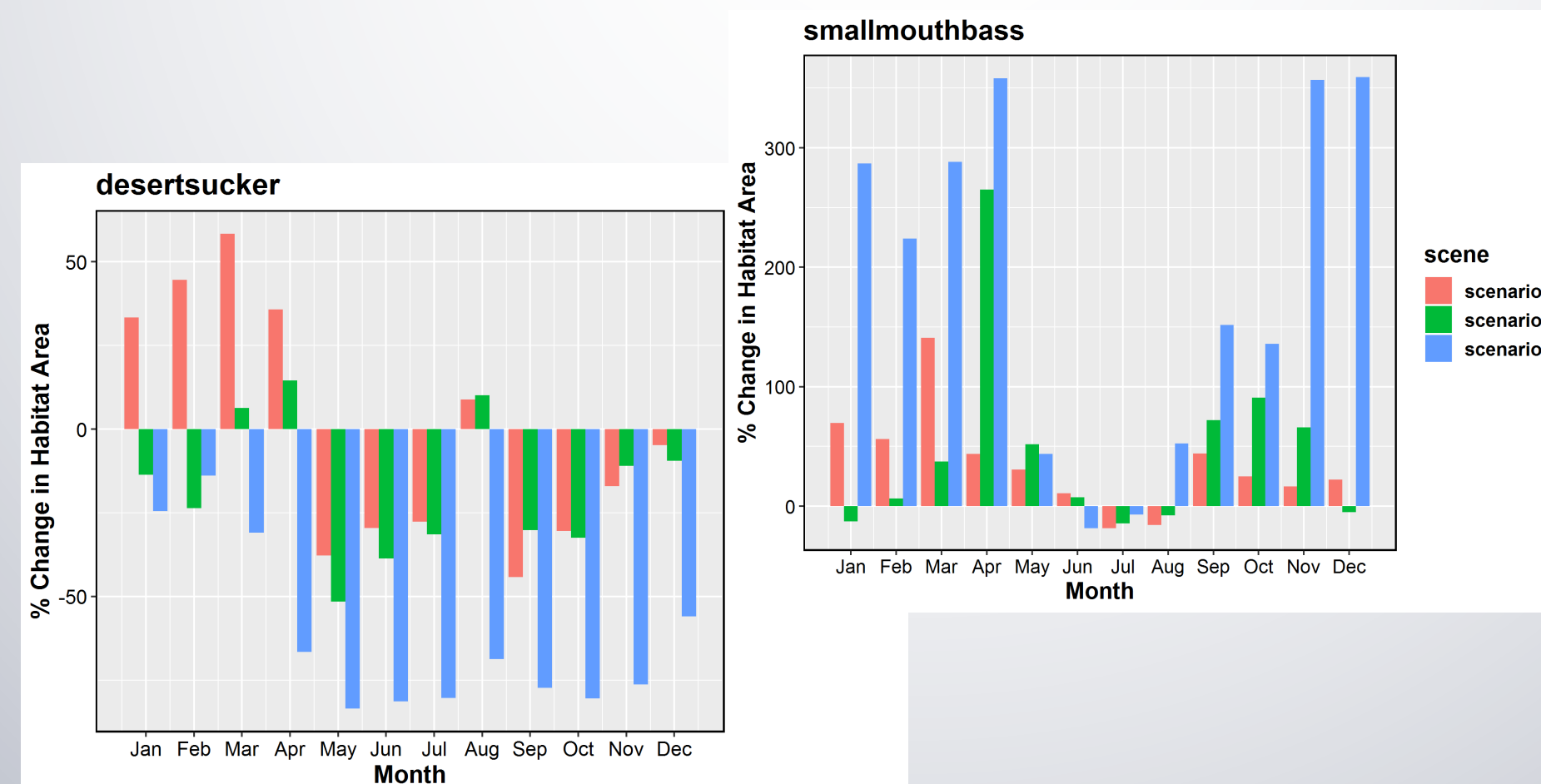
Digital Inundation Maps

- The pre-processing of 2D hydraulic data now exports the digital inundation map for external assessment of impacts of flow. This is in addition to internally using the maps for habitat suitability assessment.



Habitat Suitability

Custom habitat suitability curves for **aquatic, riparian and invertebrate species** can be specified and assess under different management scenarios.



Citations

- Holmquist-Johnson, C., Hanson, L., Daniels, J., Talbert, C., and Haegle, J. 2016. Development of a decision support tool for water resource management using biotic, abiotic, and hydrological assessments of Topick Marsh, Arizona. USGS Open-File Report 2016-1065. doi: 10.3133/ofr20161065.
- Maloney, K., Talbert, C., Galbraith, H., Blakeslee, C., Hanson, L., and Holmquist-Johnson, C. 2015. An integrated Riverine Environmental Flow Decision Support System (REFDSS) to evaluate the ecological effects of alternative flow scenarios on river ecosystems. International Associate of Theoretical and Applied Limnology. v186.1-2. doi: 10.1127/fal/2015/0611.
- Talbert, C. and Maloney, K. 2014. User's manual for the upper Delaware River riverine environmental flow decisions support system (REFDSS), Version 1.1.2. USGS Report 2014-1183. doi:10.3133/ofr20141183.
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Scenario Assessment

- Multiple flow and inundation scenario selection allows for comparison of impacts due to management actions across a wide variety of river systems (Holmquist-Johnson et al., 2016).
- Species specific output by life-stage allows for customization of management to species specific problem/solutions.

Conclusions

- The new web dashboard builds on the existing habitat assessment framework and generalizes it's application to streams nationwide allowing for more complete assessment of management impacts on stream flow and associated habitat.
- More information at: www.onewatersolutions.com