Flows and Aesthetics

A guide to concepts and methods

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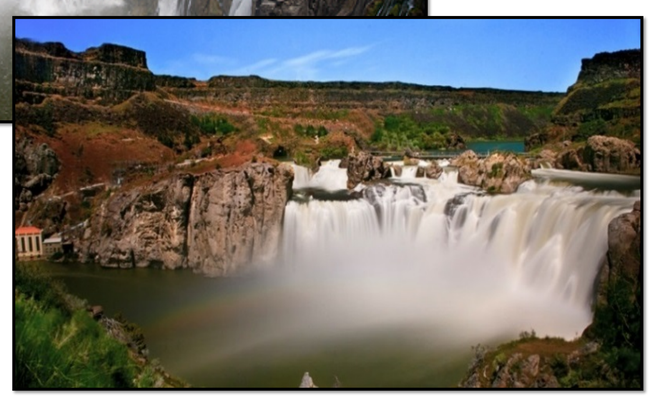
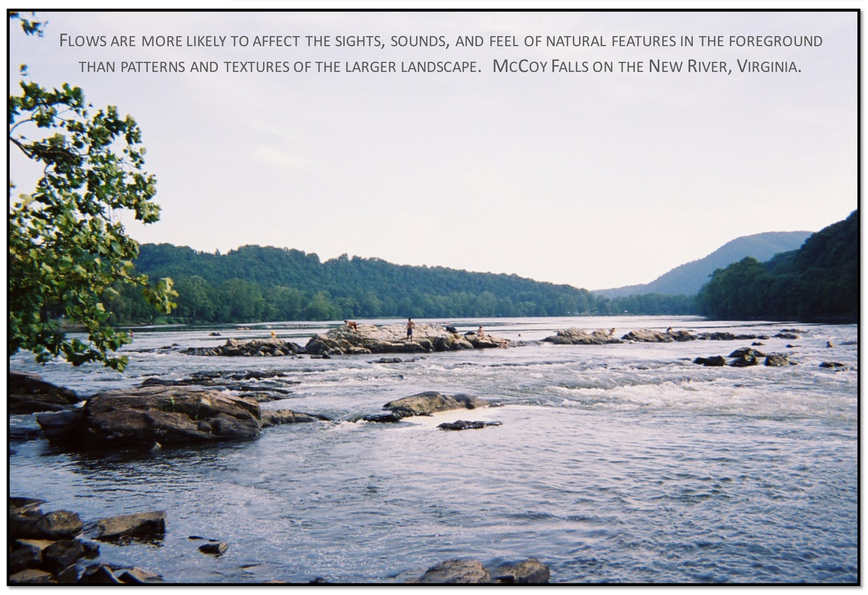
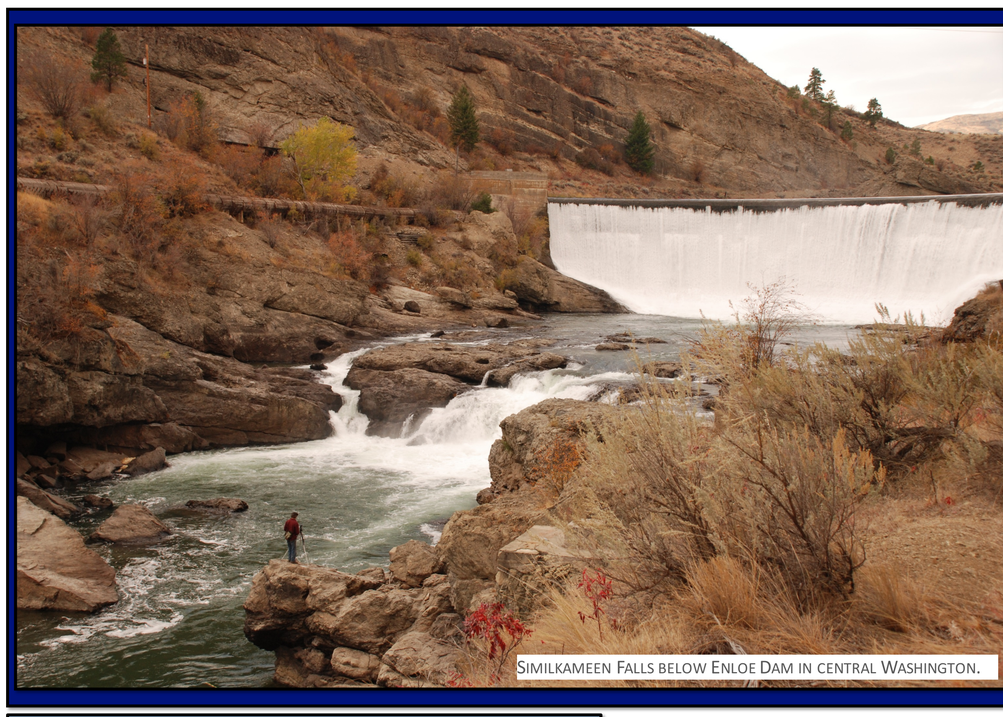
76-page guide available (free!) as a PDF at https://www.hydroreform.org/



Shoshone Falls on the Snake River in Idaho, where flows affect waterfall types and attributes. Lower flows (left) produce four distinct waterfall segments, while higher flows (below) produce a block falls and more mist



Flows are more likely to affect the sights, sounds, and feel of natural features in the foreground than patterns and textures of the larger landscape. McCoy Falls on the New River, Virginia.



Similkameen Falls below Enloe Dam in central Washington.

What's inside the guide?

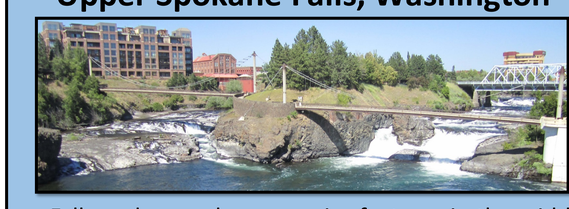
- A conceptual framework
- Reviews of flow-aesthetics decision settings
- Descriptions of study methods, including:
  - Historical photos
  - Systematic photography thru a flow range
  - Physical characteristics in cross-sections
  - Simulating unobservable flows
  - Expert evaluations
  - Panels and survey-based evaluations
  - Hydrologic modeling and desktop methods
- 15 example flow-aesthetic studies and projects
- Sidebars on related topics, including:
  - Distinguishing recreation vs. aesthetics
  - Descriptive vs. evaluative information
  - The philosophic roots of aesthetics
  - Visual Resource Management approaches
  - Types of waterfalls
  - Subjective waterfall evaluation systems

Conclusions: Six Flow-Aesthetics Principles

1. Aesthetics improve most at low end of the flow range.
2. "Filling the bottom of the channel" produces acceptable aesthetics.
3. Flows for optimum aesthetics are less clear.
4. Flows change the shape, type, or other characteristics of waterfalls, with substantial effects on aesthetics.
5. Very high flows may be rated lower, but may produce novelty, raw power, awe-inspiring events.
6. Diverse flows produce multiple aesthetic benefits.

Highlights from an example study in the Guide:

Upper Spokane Falls, Washington



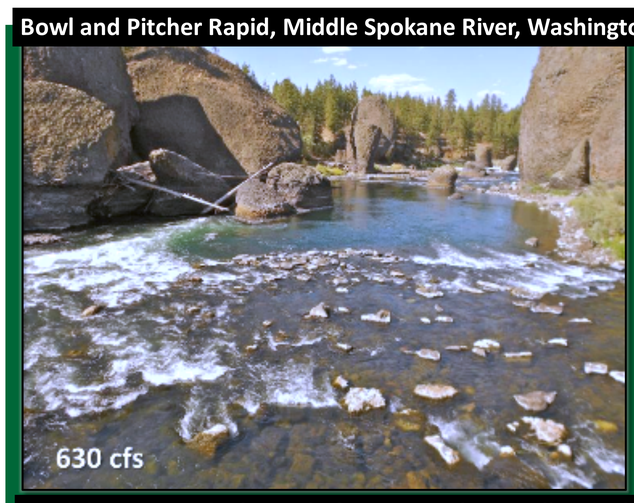
- Falls and cascades are major features in the middle of downtown Spokane.
- Falls were showpieces of the 1974 World's Fair site, which was turned into a riverside park that attracts 2.5 million visitors each year.
- Hydroelectric projects remove up to 2,500 cfs from the river, leaving 30 cfs 'leakage' in summer/fall.
- FERC licensing led to a flow-aesthetic study and higher (200 cfs) minimum flows.
- Subsequent litigation and settlement led to a second study to assess flows and possible channel modifications. ***Could 300 cfs with modifications look as good as 500 cfs without?***
- The drum gate was used to provide study flows, while sand-bag weirs were used to spread water across the entire channel and keep it out of "ditches" cut for historic mills.
- A focus group of 24 diverse stakeholders evaluated flows through two river channels from ten different viewpoints.
- Ratings showed 300 cfs with channel modifications was similar to 500 cfs without modifications.
- Permanent modifications were made in 2012, matching the channel's natural basalt texture and color.
- ***Improved minimum flows combined with channel modifications produce better year-round aesthetics.***

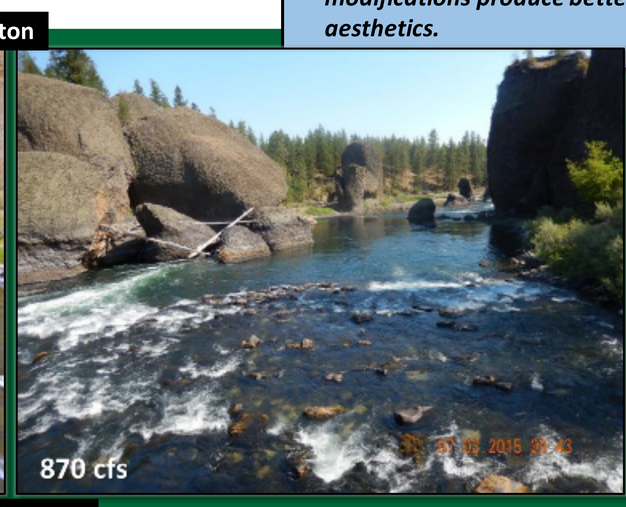
Snoqualmie Falls shown at 1,200 cfs (left) and 11,000 cfs (right). Native people litigated for minimum flows of 1,000 cfs for greater spray and mist.

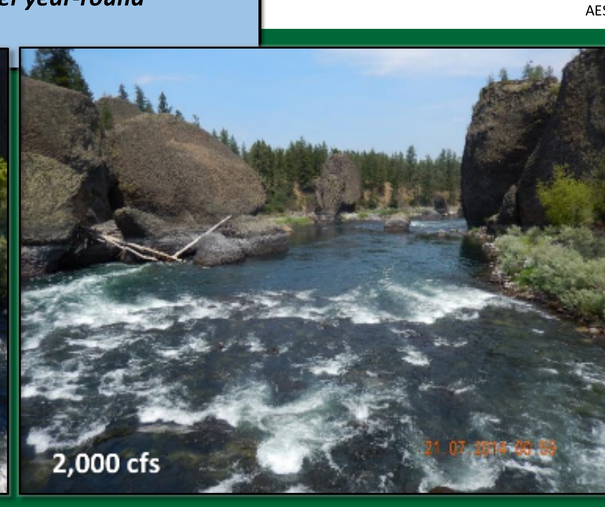
Study participants rate 300 cfs with channel modifications in the north channel.

Washington state regulations protect flows for aesthetics, but most minimum flows have been based on fishery values. Critics argue these may not protect aesthetics on the Middle Spokane River (shown at rare low flows about 700 cfs).

Bowl and Pitcher Rapid, Middle Spokane River, Washington







Final drop in south channel of Upper Spokane Falls, Washington

Which flow do you prefer?

1. Review both sets of photos.
2. In each set, place a sticky dot on the photo with the best aesthetics.

Hydropower Reform Coalition — Putting water, wildlife, and people back in rivers.

Confluence Research and Consulting

Oregon State University

National Park Service

River Management Society