

STREAM FUNCTION INDEX SUMMARY

Addendum to the Salt Lake Countywide
Water Quality Stewardship Plan





Comments? Let us know!

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What is the SFI?

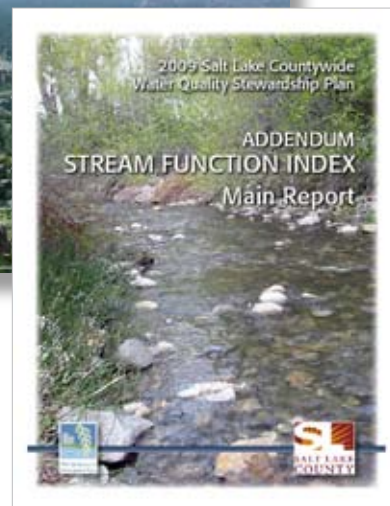
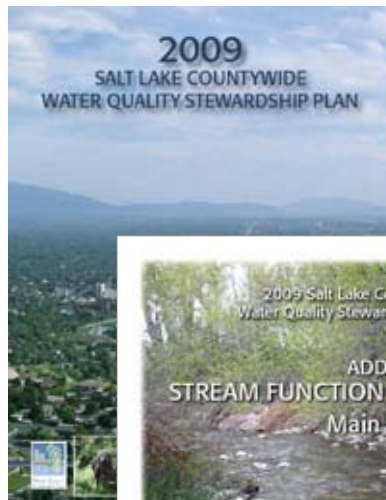
The Stream Function Index (SFI) is a rapid assessment tool used to monitor stream conditions. It was developed to help watershed managers achieve the goals of the Salt Lake Countywide Water Quality Stewardship Plan (WaQSP).

How the SFI and WaQSP work together

The WaQSP—undertaken in 2006 and completed in 2009—provides a framework of goals and policies to ensure water quality stewardship that is consistent with the Clean Water Act *and* the representative needs of local residents.

Streams are the visible evidence of their watershed and are indicators of overall watershed health and stream stewardship. By monitoring stream conditions, the SFI measures the effectiveness of watershed management as well as the general health of the waterways of Salt Lake County.

The 2009 SFI evaluated the condition of 26 streams and the Jordan River. The results highlight areas where current water quality conditions are good and need to be protected, as well as where management policies and practices are needed to improve conditions.



Final products

- SFI Main Report summarizes the study and its results
- SFI Reports for individual Cities in Salt Lake County focus on streams within each city's boundaries to address specific issues and recommendations

The SFI reports, along with the WaQSP and its Technical Appendices, are an important resource for Salt Lake County, local municipalities, and agencies who manage or have jurisdiction over the waterways in the County. All of these documents can be found on www.waterresources.slco.org.

How is the information being used?

The results of the SFI are being used to:

- Identify water quality stressors
- Conduct detailed studies where needed
- Identify and prioritize improvements
- Secure partnerships and funding
- Implement projects and programs
- Re-evaluate streams using 2009 data as the baseline to monitor improvement

Timeline

1978

Salt Lake County designated Area-wide Water Quality Planning Authority, and completes the Area-Wide Water Management Plan in accordance with section 208 of the Clean Water Act

2005

South Valley Sewer District requests amendment of the Area-Wide Water Quality Management Plan

2006

County Council allocates money to redevelop the plan as the WaQSP

2007

SFI data collection begins

2008

WaQSP/SFI data collection completed

2009

Begin WaQSP implementation

2012

Planned to begin WaQSP and SFI 6-year update process

2014

Planned completion of WaQSP and SFI 6-year updates

Collecting the Data

The Stream Function Index examined selected physical, biological and chemical parameters of the river and stream corridors. The SFI also includes the social aspects of aesthetics and recreation along the stream corridors, which was used as an indicator of the degree of success that the watershed is used as an amenity for the county's population. In total, 27 parameters, called **metrics**, were examined (turn the page to see the table of metrics).

The SFI gives an indication of how well streams are functioning based on the desired condition, or **target**, for each metric. The results can be used to quickly identify areas that are reaching targets and areas that are in need of detailed evaluation. The complete SFI Methodology can be found in the appendices of both the SFI Main Report and the WaQSP.

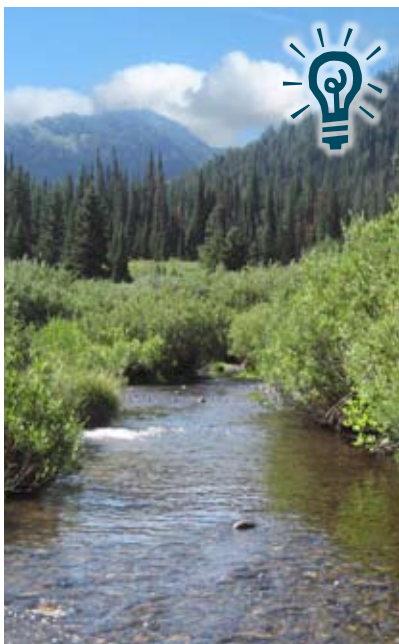
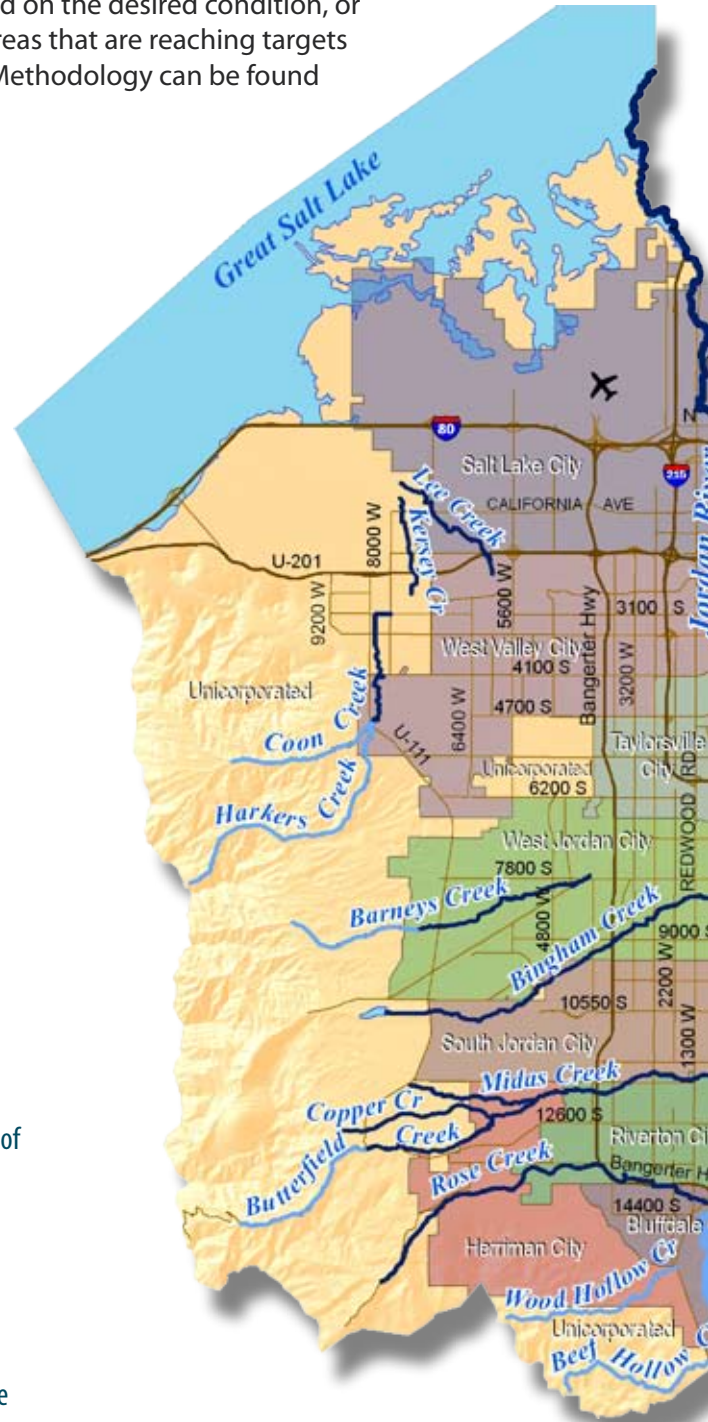
The SFI evaluated

- 26 streams and the Jordan River
- A total of 270 stream miles
- Of those, 223 miles were walked and evaluated
- 15 miles were inaccessible to observers but were evaluated remotely where possible with aerial photography

The waterways were divided into upper and lower segments to take into consideration the sometimes dramatically different stream type and conditions between the urbanized valley and the less developed mountains.

What wasn't evaluated

- 29 miles of culverts
- 3 miles of reservoirs



did you know?

The County's waterways provide a variety of beneficial uses and functions, including:

- culinary water
- irrigation water
- water critical for aquatic and riparian habitat ecosystems
- stormwater and floodwater conveyance
- recreation
- scenic beauty

Protecting the condition of our waterways is critical to being able to continue these uses.



Waterways of Salt Lake County

Legend

- Lower Stream/River Segment
- Upper Stream/River Segment
- Middle River Segment



Map prepared by Salt Lake County Flood Control & Water Quality Division



Using the rapid assessment data collection methods developed for the SFI, County staff conducted field evaluations in over 223 miles of rivers and streams in Salt Lake County.

Crunching the Numbers

The Stream Function Index contains two sets of data: the first is the Ecosystem Health Index (EHI) that summarizes the physical, chemical and biological parameters of river and stream corridors, through Habitat, Hydraulics and Water Quality metrics; the second is the Social parameter which includes Aesthetics and Recreation metrics. The flowchart and notes to the right explain how scores are calculated.

Details of all the scores for the 2009 SFI Main Report and the individual City Reports can be found online at www.waterresources.slco.org.

Functional Group Results

Scores for the four Functional Groups—Habitat, Hydraulics, Water Quality, and Social—are examined here in detail, as they provide the clearest picture for comparison between the different stream segments. The first three make up the Ecosystem Health Index (EHI) which evaluates the chemical, physical and biological health of the waterway. The fourth, Social Function, evaluates the aesthetics and recreation factors that influence water quality and quality of life in Salt Lake County.

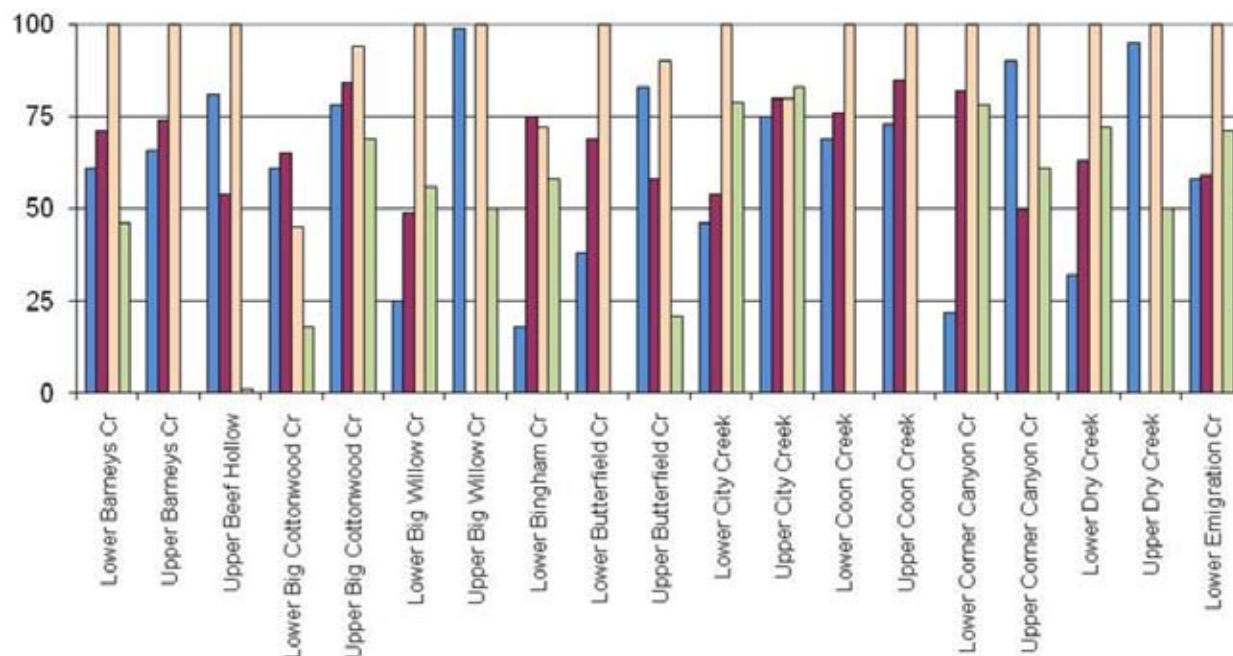
- Twenty-three stream segments scored above 50 for Habitat, Hydraulics and Water Quality Functions
- Of those, five stream segments scored above 75, including Upper Big Cottonwood Creek, Upper City Creek, Upper Mill Creek and Mountain Dell Creek
- Only ten stream segments scored higher than 50 on all four of the Functional Groups, and only two, Upper City Creek and Upper Mill Creek, scored above 75 for all four



Scores for the Four Functional Groups

Poor (0) to Excellent (100)

- Habitat
- Hydraulics
- Water Quality
- Social



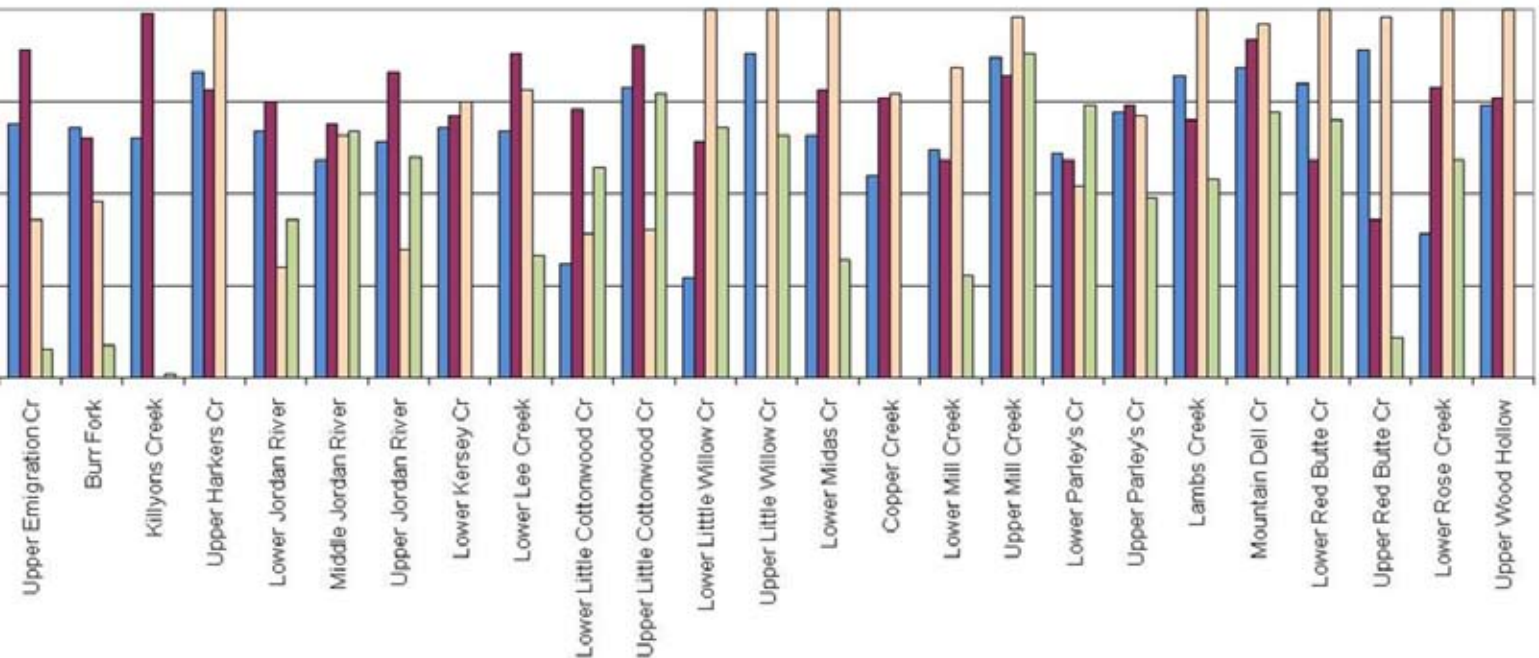
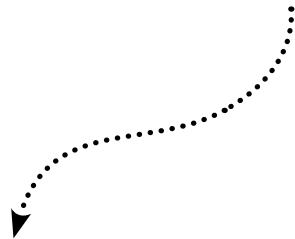
SFI Flowchart

This table identifies all the components used to calculate scores. The Metric column on the left represents what was measured. The columns continuing to the right show how they were combined to calculate the final scores.

Example:

- Bank Stability and Hydraulic Alteration are averaged to obtain the Stream Stability Sub-Group score
- Flood Conveyance and Stream Stability Sub-Group scores are averaged to find the Hydraulics Functional Group score
- Habitat, Hydraulics, and Water Quality Functional Group scores are averaged to determine the EHI score
- Finally, the EHI and Social Functional Group scores are averaged to determine the Stream Function Index Score

Metric	Sub-Group	Functional Group	Ecosystem Health Index	Stream Function Index
Pool/Riffle ratio	Stream Channel	Habitat	EHI	SFI
Water Depth				
Fish Passage				
Habitat Structures				
Flow Diversion				
Riparian Width	Riparian Corridor			
Riparian Density				
Floodplain Development	Flood Conveyance	Hydraulics		
Floodplain Connectivity				
Bank Stability	Stream Stability			
Hydraulic Alteration				
303(d) list	Regulatory	Water Quality		
Macroinvertebrate	Aquatic			
Total P	Monitoring			
Temperature				
TDS				
DO				
<i>E. coli</i>				
Management	Aesthetics	Social		
Visual Aesthetics				
Location	Amenities (Nodes)			
Accessibility (ADA Approved)				
Restrooms				
Resource Compatibility (Nodes)	Amenities (Trails)			
Trail Corridor				
Connectivity				
Resource Compatibility (Trails)				



What's Next?

Improving the SFI

Both the SFI and the WaQSP identified the need for a greater body of water quality data in order to more completely and accurately assess the condition of County waterways.

In particular, the following were identified as necessary to improving the reliability of the SFI results:

- Stream flow data
- Water quality sampling data
 - » *E. coli*
 - » Macroinvertebrates
 - » Physical habitat
 - » Water chemistry

To address these needs, an expanded water quality data collection program was undertaken by Salt Lake County in 2009:

- An additional 10 stream flow gage stations with water quality sampling capabilities are being installed in the valley
- A long-term macroinvertebrate sampling program was initiated using the Utah Division of Water Quality and U.S. Environmental Protection Agency (EPA) protocol so that data can be shared
- A two-year *E. coli* sampling study was initiated in cooperation with the Utah Division of Water Quality

All County data will be entered into EPA's STORET database
www.waterquality.utah.gov/Monitoring

Published April 2010

Begun in 2009, expanded collection of water quality data will help to improve the reliability of the SFI for future updates.

*Photos from top to bottom: new stream gage station on Bingham Creek; kicknet used to collect macroinvertebrates; water sample for *E. coli* testing; water chemistry data collection on City Creek.*

