A Functions-Based Stream Assessment Method

To Support Compensatory Mitigation Decisions in Oregon

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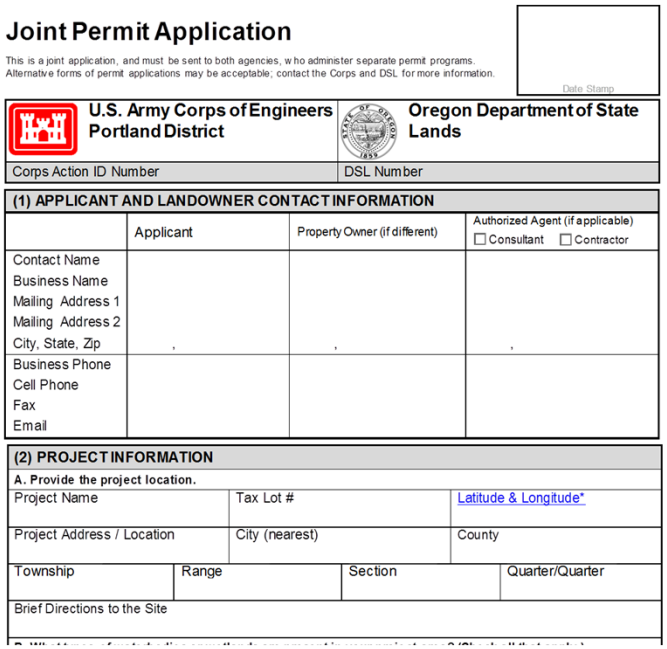
EPA United States Environmental Protection Agency

How is aquatic resource mitigation currently handled in Oregon?

- USACE and Oregon Department of State Lands collaboratively, but independently, administer a permit process to protect, conserve & provide for the best use of Oregon's aquatic resources. EPA co-administers the CWA 404 program with USACE.
- Mitigation is currently acreage-based; not relying on function assessments, not consistently mitigating for stream impacts, and not taking a watershed approach
- EPA, Corps, DSL have shared goals for improving the regulatory programs & mitigation outcomes



Joint Permit Application

This is a joint application, and must be sent to both agencies, who administer separate permit programs. Alternative forms of permit applications may be acceptable; contact the Corps and DSL for more information.

Date Stamp

U.S. Army Corps of Engineers Portland District	Oregon Department of State Lands
Corps Action ID Number	DSL Number

(1) APPLICANT AND LANDOWNER CONTACT INFORMATION

	Applicant	Property Owner (if different)	Authorized Agent (if applicable) ☐ Consultant ☐ Contractor
Contact Name Business Name Mailing Address 1 Mailing Address 2 City, State, Zip	,	,	,
Business Phone Cell Phone Fax Email			

(2) PROJECT INFORMATION

A. Provide the project location.

Project Name	Tax Lot #	Latitude & Longitude*	
Project Address / Location	City (nearest)	County	
Township	Range	Section	Quarter/Quarter
Brief Directions to the Site			

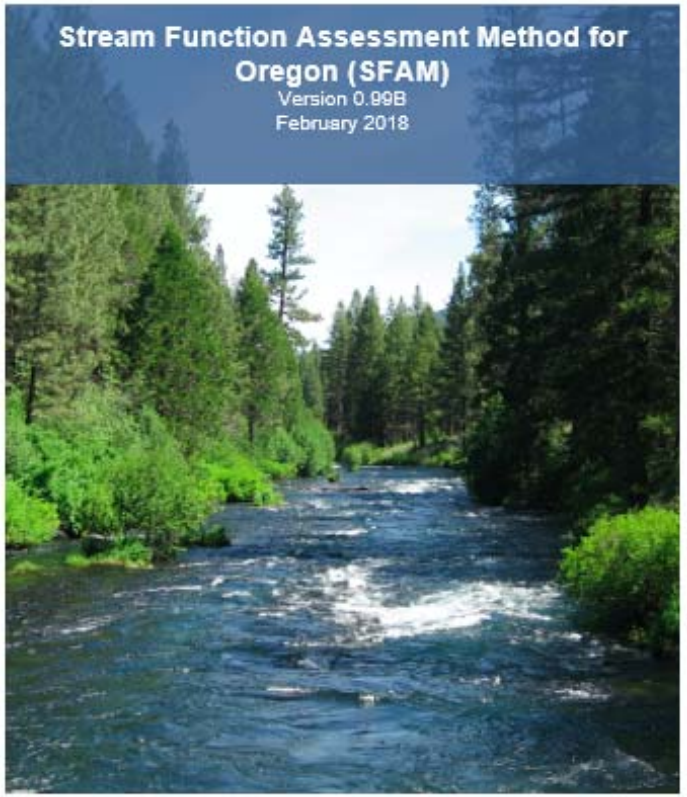
How will a stream function assessment method improve the mitigation process?

- Assist in determining ecological match for impacts
- Encourage applicants to strive for high degree of avoidance and minimization of impacts, and function/value replacement at mitigation sites
- Increase consistency in project evaluation
- Inform mitigation (restoration) designs
- Improve mitigation performance standards and outcomes
- Improve tracking of function/value gains and losses

What are the SFAM development objectives?

✓*science-based* ✓*rapid* ✓*applicable statewide*
✓*function-based* ✓*repeatable*

- Designed and field tested to:
  - quantify <u>functions</u> and <u>values</u>
  - reflect landscape and watershed processes
- Applicable for non-regulatory purposes: assessment, restoration planning, project monitoring



SFAM development history

2010-2013

- concept development
- stream classification system development
- initial method produced

2013-2014

- initial field testing

2014-2015

- revisions

2015-2016

- external review
- statistical analysis

2016-2017

- revisions (models & measures)
- statistical analysis
- standard performance index development

2018

-pilot testing and final review

Defining stream functions & values

Function = *the processes that create and support a stream ecosystem*

Value = *the ecological and societal benefits that riverine systems provide*

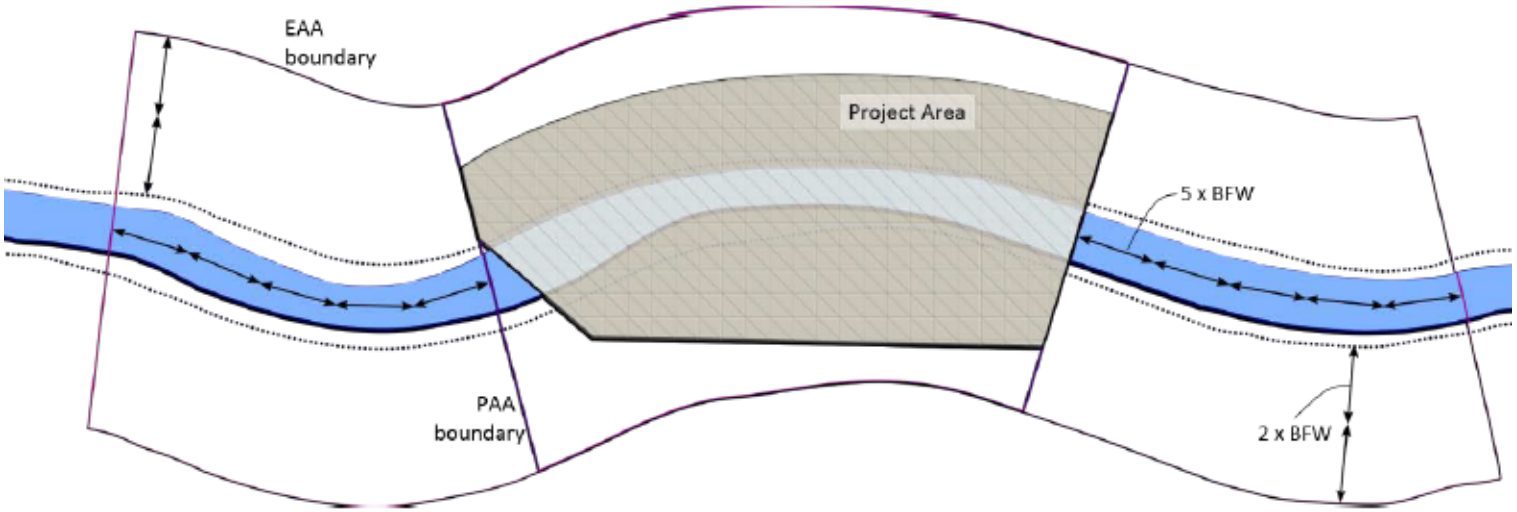
- 11 functions were selected to represent the majority of stream and riparian processes necessary to sustain healthy stream ecosystems
- Each function has an associated value
- Functions are categorized within 4 functional groups

Function Group	Specific Functions/Values
Hydrologic	Surface Water Storage Sub/Surface Transfer Flow Variation
Geomorphic	Sediment Continuity Substrate Mobility
Biologic	Maintain Biodiversity Create and Maintain Habitat Sustain Trophic Structure
Water Quality	Nutrient Cycling Chemical Regulation Thermal Regulation

Measuring stream functions & values

- Functions are difficult to directly measure within regulatory parameters, must be quantified using measures
- 16 measures evaluate specific features characteristic of, or inherent to, the function and may indicate the extent to which a particular function is active
- 16 value measures determine the opportunity to provide a particular function and the local significance of that function

What is the assessment scale for SFAM?



Assessment Area Delineations:

Project Area (PA): Spatial extent of direct project impacts.

Proximal Assessment Area (PAA): Assessment area for functions likely to be directly affected by action in the PA. Includes the entire channel, both streambanks, riparian area, and upland adjacent to the PA.

Extended Assessment Area (EAA): Assessment area for functions that may be expressed at a reach scale.

Ecological function

Surface water storage

(regulate discharge, replenish soil moisture, create low velocity habitat & refugia)

Function measures

- ✓ Quantifiable
- ✓ Rapid
- ✓ Repeatable
- ✓ Sensitive

side channels present?

variable channel bed?

incised channel?

wood in stream?

. . .

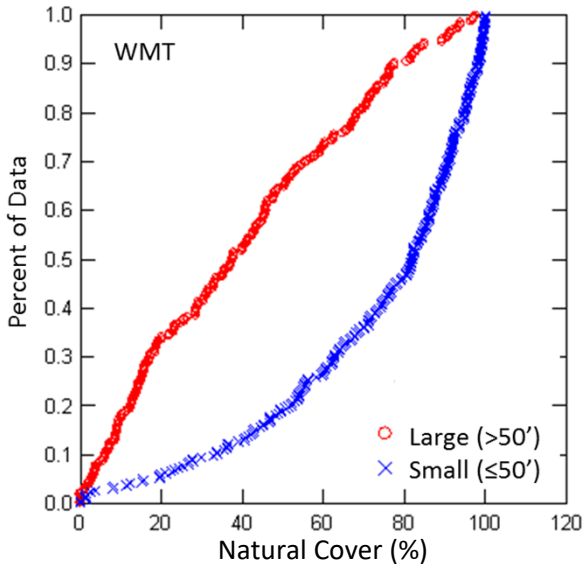
Developing performance indices

Performance indices were developed to translate measures' metrics (percentages, absolute values, ratios, etc.) into meaningful index values (scale of 0.0 – 1.0)

STEP 1: Identify factors upon which a measure may need to be stratified. The purpose of **stratification** is to account for context and adjust performance expectations accordingly.

Example: Natural Cover →

A comparison of natural cover data from both small and large streams presents evidence to support stratification of performance expectations based on stream size



Developing performance indices

Performance indices were developed to translate measures' metrics (percentages, absolute values, ratios, etc.) into meaningful index values (scale of 0.0 – 1.0)

STEP 2: Review literature and evaluate available data to **create meaningful scoring indices**. Development methods varied based on the quantity and type of information available:

METHOD 1	METHOD 2	METHOD 3
Substantial literature exists linking metrics to ecological functioning. Indices are based on trends and thresholds expressed in the literature.	In the absence of substantial literature, looked for an **abundance of raw data** (e.g. EPA NARS dataset) that could be used to set expectations.	In the absence of substantial literature or an abundance of raw data, relied on **current scientific understanding** of how metrics relate to functioning.

Example: Natural Cover

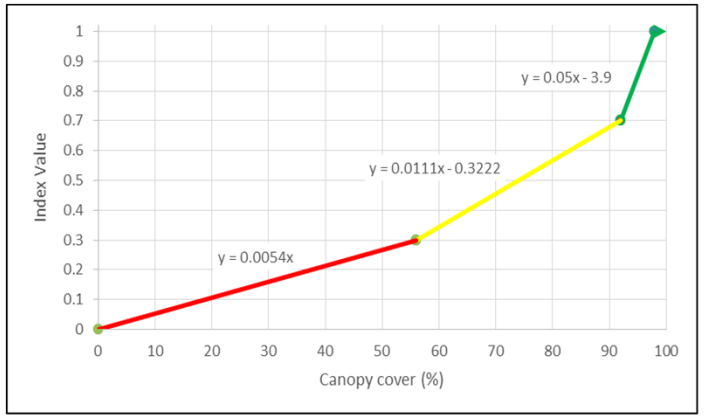
Development method 2 (abundance of raw data)

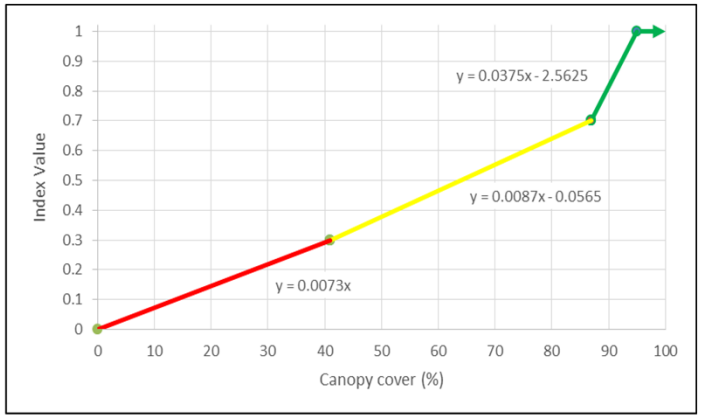
Measure: What is the percent of vegetated cover above the stream within the Proximal Assessment Area (PAA)?

Western Mountain Ecoregion

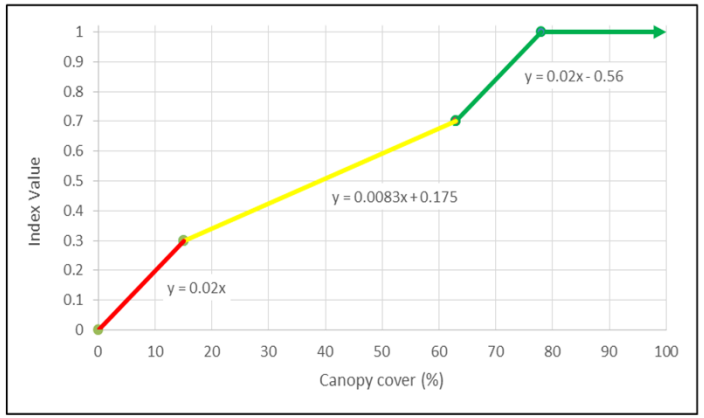
Xeric Ecoregion

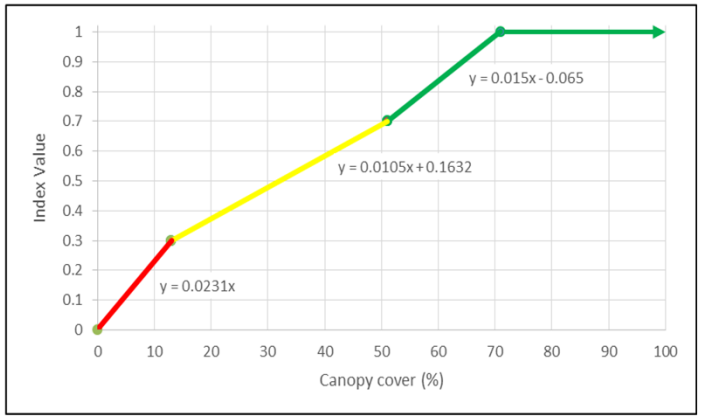
Small (≤50’ wide)





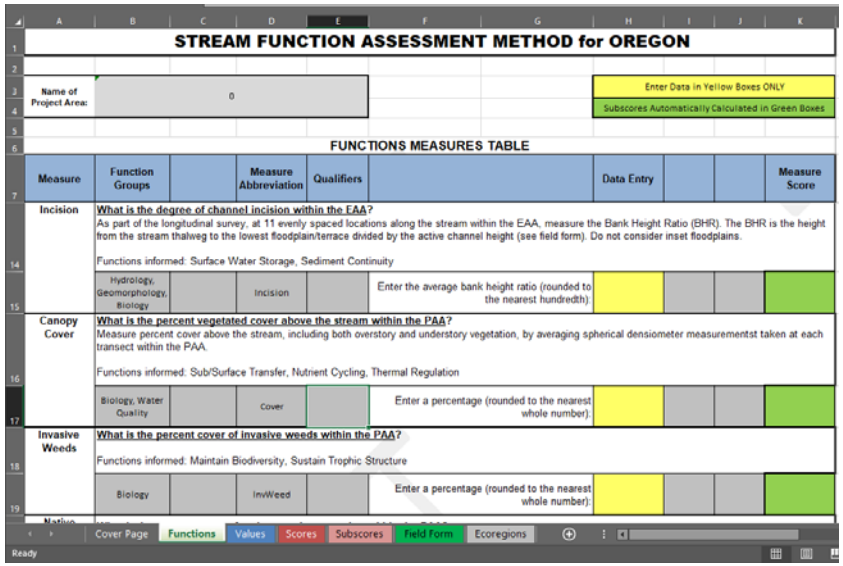
Large (>50’ wide)

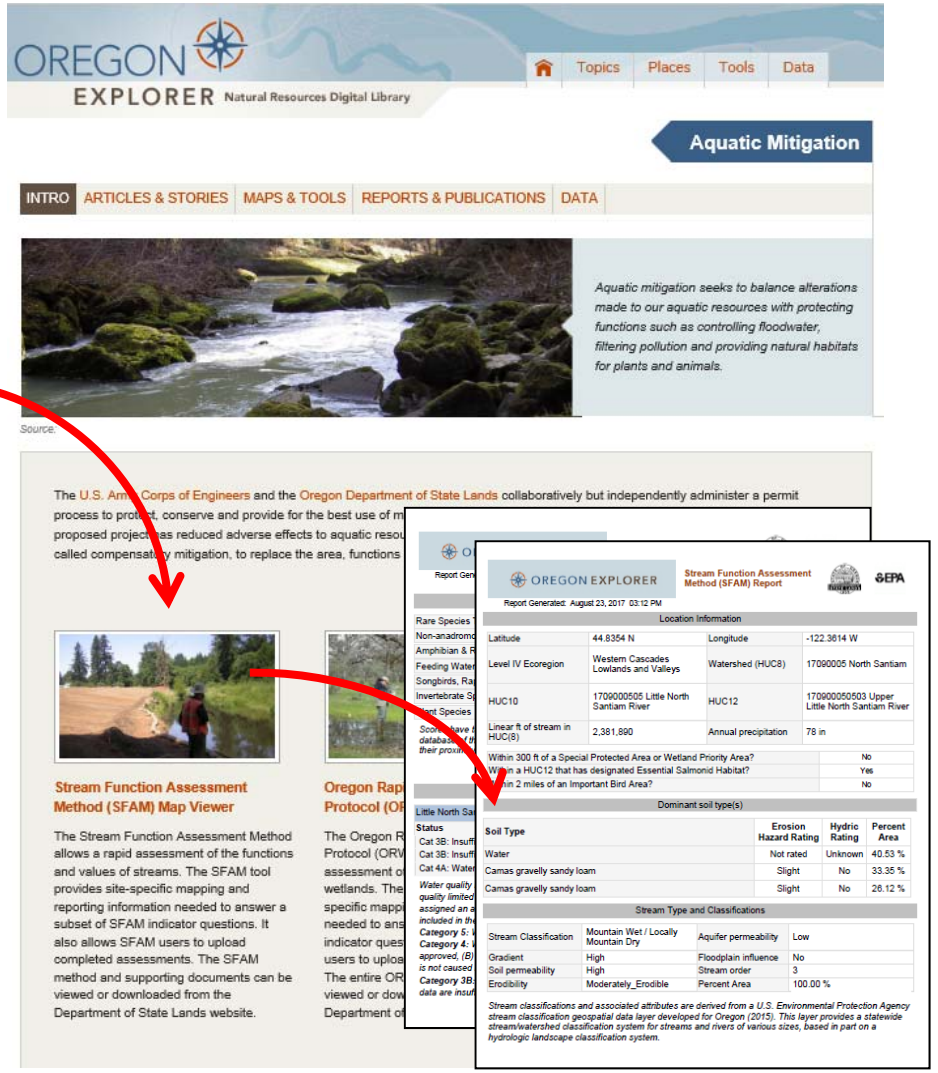




What are the components of SFAM?

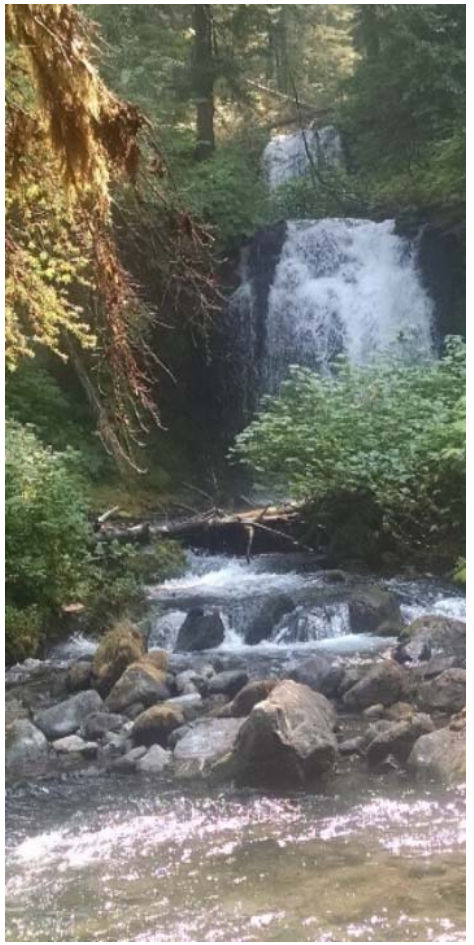
- Excel Workbook
- User Manual
- Scientific Rationale
- SFAM Map Viewer





Timeline for SFAM Completion & Implementation

- ODOT pilot application: Jan–Apr 2018
- Internal (agency) and targeted external reviews: Feb-May 2018
- Internal (agency) training: Spring 2018
- Revisions to beta: May-June 2018
- Public release & external training: June 2018
- Aquatic Resources Mitigation Framework will be implemented through ODSL rulemaking, February 2019



Additional SFAM Development Team Members

- ODSL: *Dana Hicks, Charlotte Trowbridge*
- Willamette Partnership: *Nicole Maness*
- CSS-Dynamac: *Rob Coulombe*
- ESA; Wolf Water Resources: *Nicole Czarnomski*

Additional SFAM Map Viewer Development Team Members

- Institute for Natural Resources/OSU: *Myrica McCune, Marc Rempel, Jimmy Kagan*
- ODSL: *Charlotte Trowbridge, Dana Hicks*

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http://www.oregon.gov/dsl/WW/Pages/Aquatic-Resources-Mitigation-Framework.aspx

EPA United States Environmental Protection Agency