

SOUTH FORK WAGES CREEK THP EFFECTIVENESS MONITORING PROJECT

PRELIMINARY WY2004 PRESENTATION

Prepared for:

Campbell Timberland Management

Prepared by:

***GMA* -- Graham Matthews & Associates**

Objective 1: Characterize stream flow, turbidity and suspended sediment transport regimes for SF Wages Creek and tributary streams.

Purpose – quantify existing watershed conditions, provide regional context

Parameters – continuous stream flow and turbidity, periodic suspended sediment

Scale – watershed (~1,000ac), tributary (<200 acres)

Methods – standard USGS (stream flow) and RSL (TTS) protocols at 5 continuous sites

Hypothesis – Stream flow, turbidity and suspended sediment regimes are similar to other coastal Mendocino watersheds of comparable size.

Objective 2: Identify primary sediment sources and their relative volumetric contributions to the sediment budget.

Purpose – develop a detailed sediment source analysis that compares natural, legacy, and current management practices.

Parameters – Geomorphic Mapping/Watershed Inventory

Scale – Watershed (1000ac)

Hypothesis – Current management practices contribute less than 20 percent of the post-treatment sediment budget.

Objective 3: Determine changes in turbidity regimes following timber operations relative to pre-treatment conditions.

Purpose – Determine if there is a detectable change in the turbidity regime associated with implementation of timber operations in SF Wages Creek.

Parameters – Turbidity

Scale - watershed (~1,000ac) and tributary (<200 acres)

Analysis – Magnitude and duration

Hypothesis – **Changes in the magnitude and duration of turbidity following treatment will not be detectable.**

Objective 4: Determine the effect of stream crossing reconstruction on chronic turbidity above and below treatment sites.

Purpose – Evaluate effect of reconstruction on chronic turbidity

Parameters – Turbidity

Scale – Site

Methods – Above and below periodic grab samples taken during storm events

Hypothesis – Initial increases in chronic turbidity from reconstruction will be followed by recovery to levels less than pre-treatment within three years.

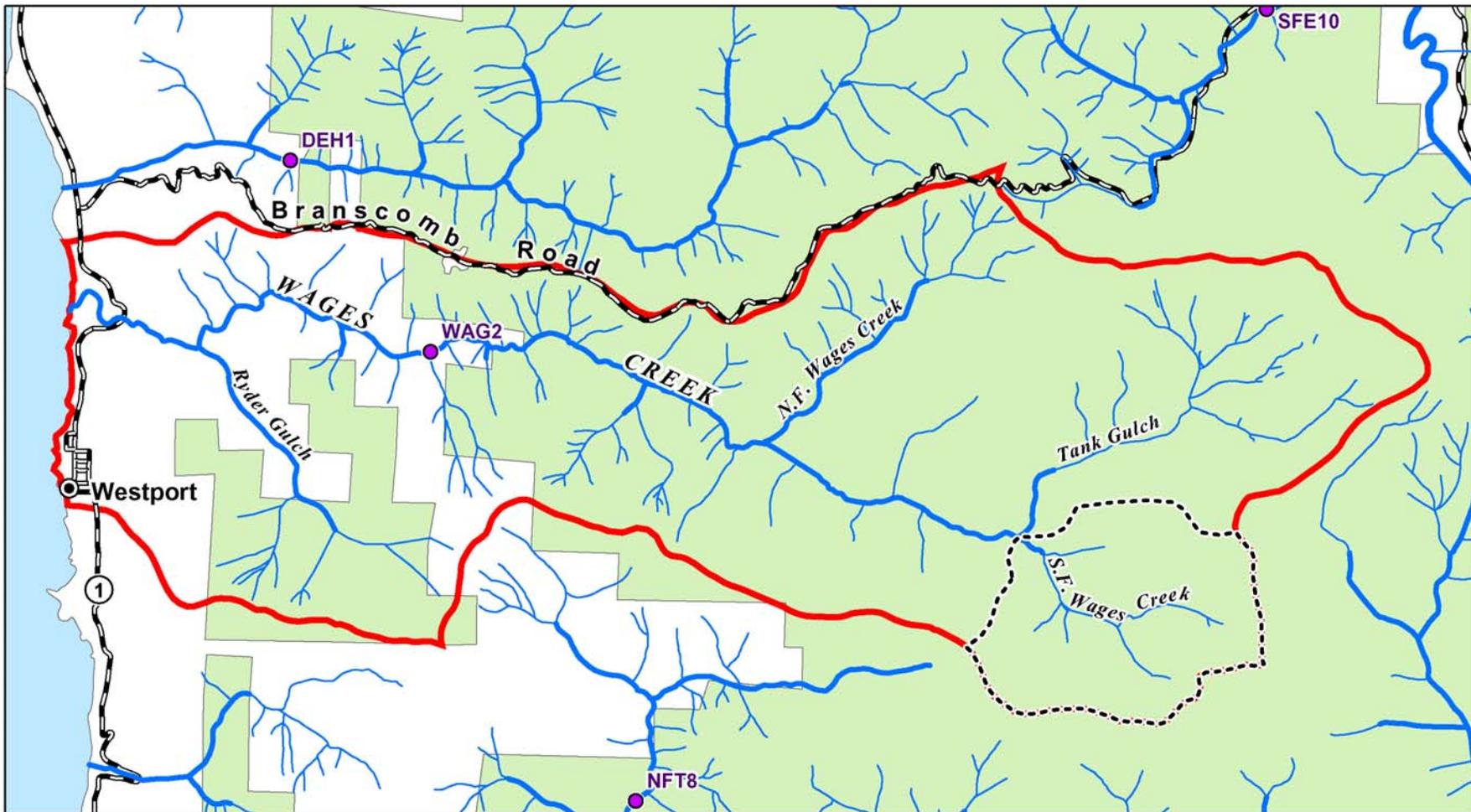


Figure 2. Local Vicinity Map - S.F. Wages Creek Effectiveness Monitoring Project

-  **Wages Creek Watershed**
(Total Acres = 8,583)
-  **Hawthorne Timberlands**
(Total Acres in Wages Creek Watershed = 6,657)
-  **Effectiveness Monitoring Project**
(Total Acres in S.F. Wages Creek Watershed = 907)

- Road Surface**
-  Paved
- Watercourses**
-  Class I
-  Class II

-  Index Monitoring
- Reach Location

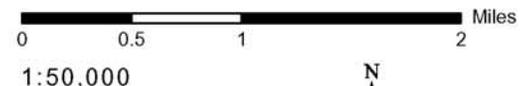
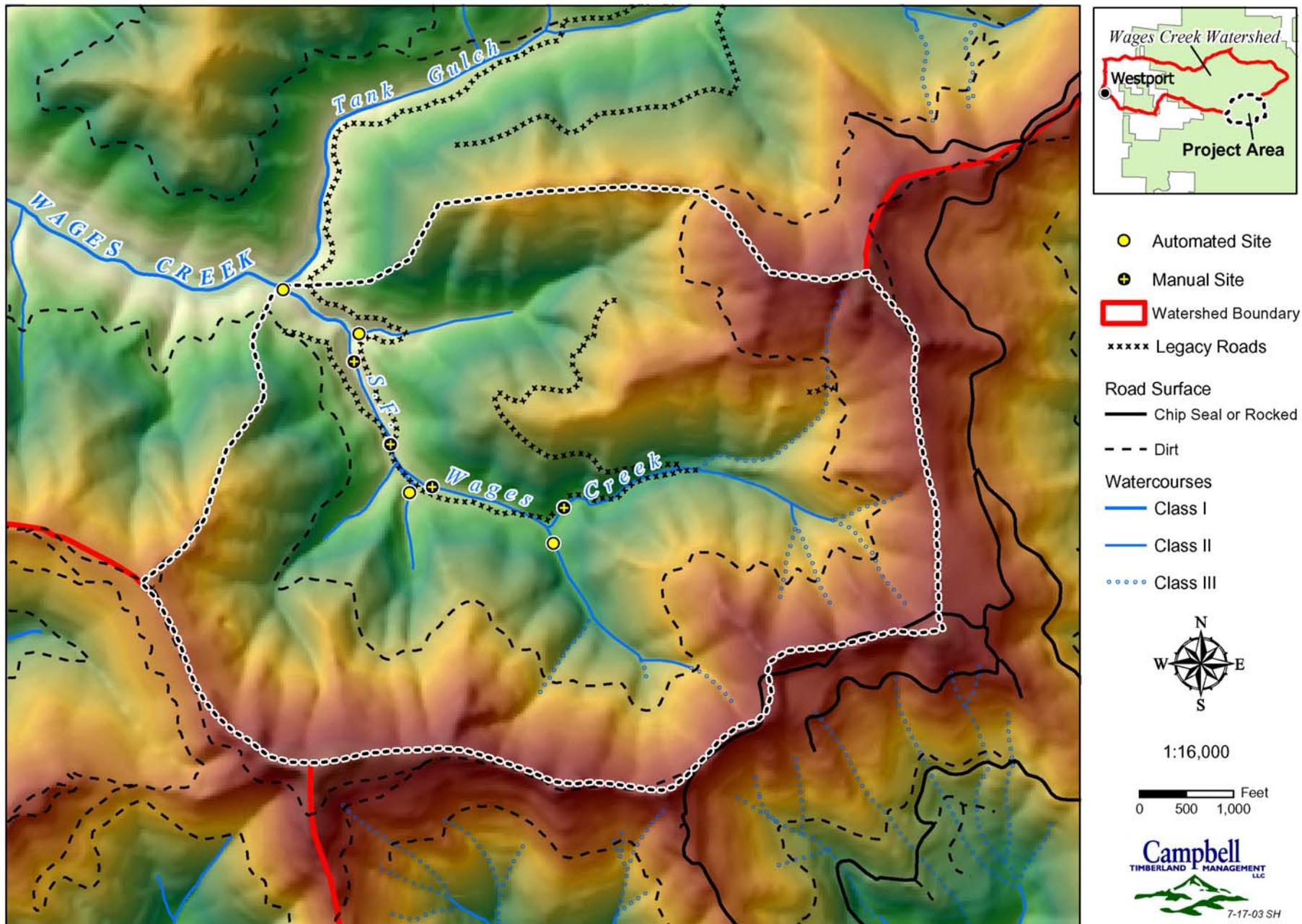


Figure 6. S.F. Wages Creek Watershed - Instream Sampling Locations

(Portion of Cal Water v2.2# - 113.120202)



STREAMFLOW DATA

a. Gaging Equipment and Installation

- i. Dataloggers at Continuous Stations
- ii. Crest Stage Gages at Periodic Stations
- iii. Rain Gages

b. Gage Operation and Maintenance

- i. Gage Height Hydrographs to Date
- ii. Discharge Measurements
- iii. Rating Curves to Date
- iv. Discharge Computations and Hydrographs to Date

TABLE 1
SOUTH FORK TENMILE WATERSHED
 General Site Description WY2004

SITE NAME	ACRONYM	WSA (mi ²)	Continuous Station
SF Wages below Center Gulch	SFWBC	1.40	no
Center Gulch above SF Wages	CASFW	0.29	yes
SF Wages above Center Gulch	SFWAC	1.10	yes
Grey Gulch above SF Wages	GASFW	0.17	no
Wood Creek above SF Wages	WASFW	0.10	yes
SF Wages above Wood Creek	SFWAW	0.73	no
Rock Creek above SF Wages	RASFW	0.24	yes
SF Wages above Rock Creek*	SFWAR	0.39	yes

*Continuous Site does not contain ISCO pump sampler

TABLE 2
SOUTH FORK WAGES CREEK WATERSHED
 Streamflow Measurement Summary WY2004

SITE NAME	ACRONYM	# of Streamflow Measurements collected in WY 2004
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SF Wages below Center Gulch	SFWBC	0
Center Gulch above SF Wages	CASFW	4
SF Wages above Center Gulch	SFWAC	5
Grey Gulch above SF Wages	GASFW	4
Wood Creek above SF Wages	WASFW	5
SF Wages above Wood Creek	SFWAW	0
Rock Creek above SF Wages	RASFW	5
SF Wages above Rock Creek	SFWAR	4

SOUTH FORK WAGES CREEK above CENTER GULCH

Discharge Rating Curve -- Begin Date 12/10/03

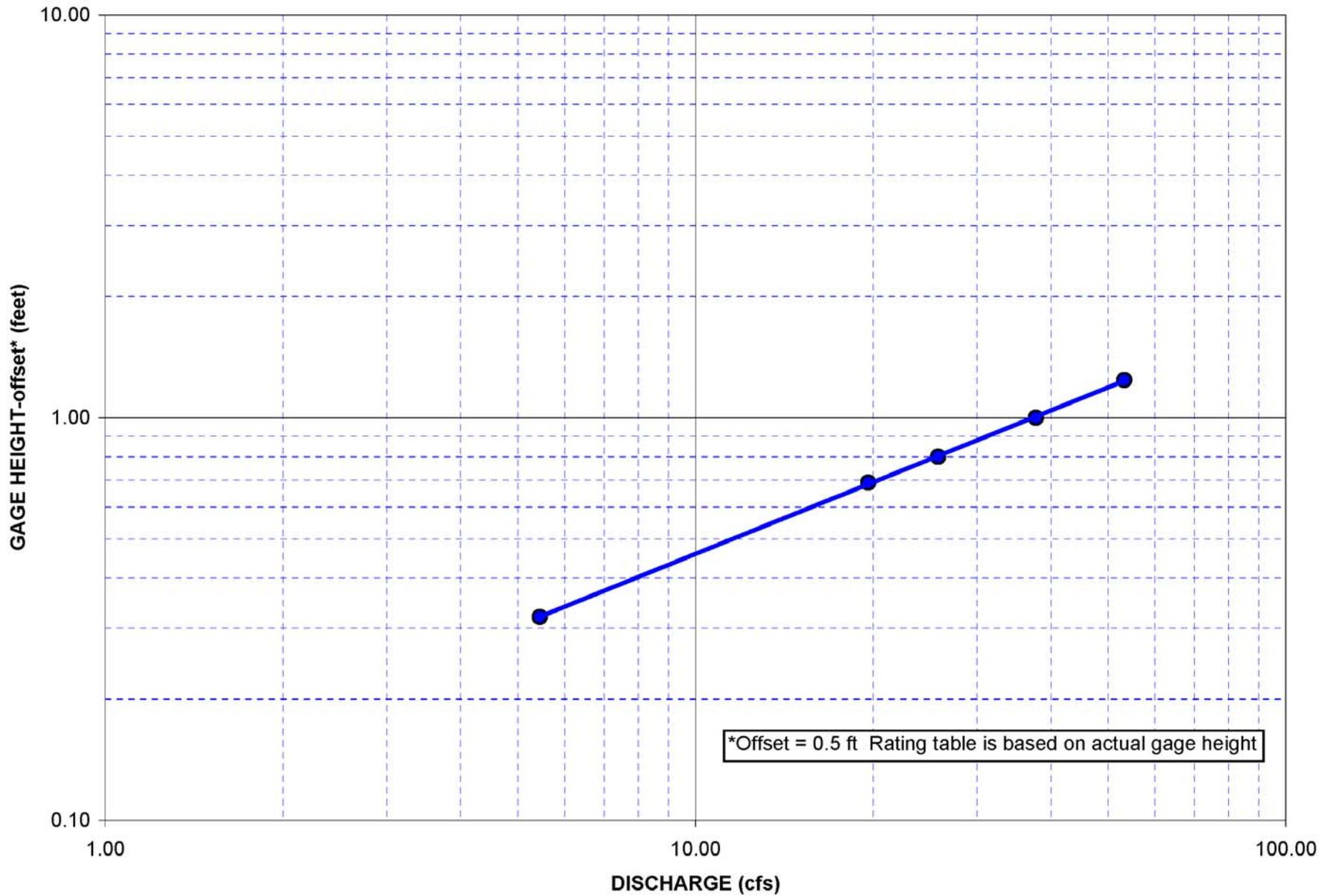


TABLE 3
SOUTH FORK WAGES CREEK WATERSHED
Summary of Peak Discharge WY2004

Site	Date	Discharge (cfs)	Note
SFWBC	2/17/2004	70	Obtained From Synthetic Hydrograph
CASFW	2/17/2004	16	
SFWAC	2/17/2004	55	
GASFW	2/17/2004	9.0	Obtained From Synthetic Hydrograph
WASFW	2/17/2004	5.3	
SFWAW	2/17/2004	37	Obtained From Synthetic Hydrograph
RASFW	2/17/2004	14	
SFWAR	2/17/2004	20	

SOUTH FORK WAGES CREEK above CENTER GULCH

Discharge Hydrograph, WY 2004

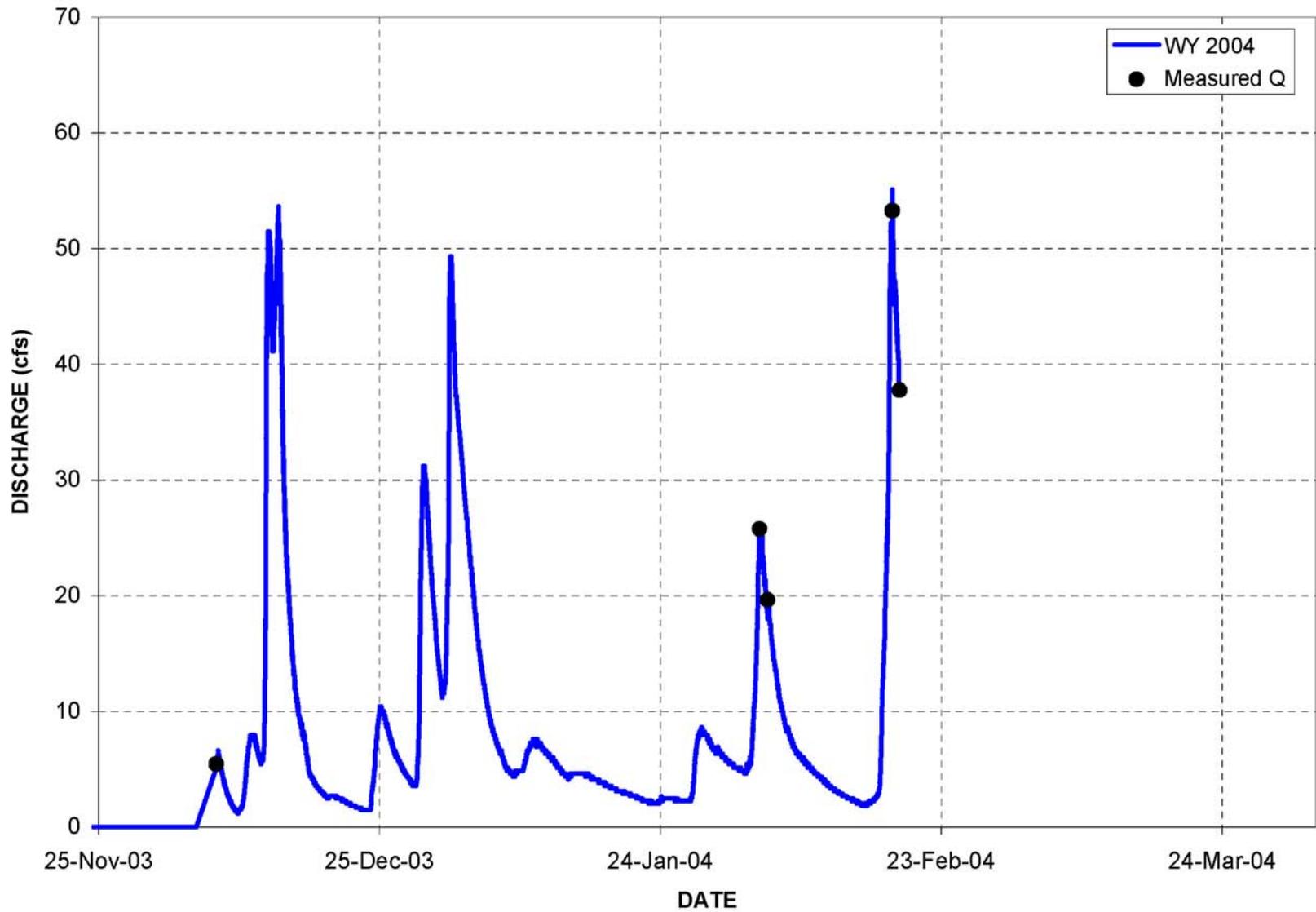


TABLE 4
SOUTH FORK WAGES WATERSHED
 Comparison of Peak Discharges and Unit Peak Discharges WY 2004

SITE NAME	WSA
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WY2004 HIGHEST MEASURED DISCHARGE (cfs)	WY2004 Peak DISCHARGE (cfs)	RATIO PREDICTED PEAK TO HIGHEST MEASURED FLOW	WY2004 UNIT PEAK DISCHARGE (cfs/mi ²)
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SFWBC	1.40
CASFW	0.29
SFWAC	1.10
GASFW	0.17
WASFW	0.10
SFWAW	0.73
RASFW	0.24
SFWAR	0.39

-	70.0	NA	50
13.8	15.5	1.1	54
53.3	55.1	1.0	50
7.9	9.0	1.1	54
4.7	5.3	1.1	51
-	36.6	NA	50
11.3	14.2	1.3	60
17.4	19.6	1.1	50

TABLE 6
WY2004 Regression Equations and r² Values by Site

Location of Sampling Site	SSC vs. T		T vs. Q		SSC vs. Q		SSL vs. Q	
	Equation	(r ²)						
SFWBC	$y = 2.5527x - 9.4572$	0.91	$y = 0.3928x^{0.9274}$	0.82	$y = 0.2156x^{1.228}$	0.69	$y = 0.0006x^{2.2282}$	0.88
CASFW	$y = 2.0745x - 7.3265$	0.92	$y = 3.0999x^{0.6515}$	0.82	$y = 1.0567x^{1.274}$	0.65	$y = 0.0028x^{2.274}$	0.86
SFWAC	$y = 2.6501x - 12.225$	0.88	$y = 0.9228x^{0.762}$	0.85	$y = 0.1611x^{1.3816}$	0.84	$y = 0.0004x^{2.38}$	0.94
GASFW	$y = 0.8293x + 0.5912$	0.74	$y = 5.3586x^{0.385}$	0.89	$y = 5.2556x^{0.27}$	0.46	$y = 0.0142x^{1.27}$	0.95
WASFW	$y = 1.2736x - 8.187$	0.78	$y = 8.197x^{0.113}$	0.69	$y = 0.9475x^{0.957}$	0.47	$y = 0.0051x^{1.3281}$	0.84
SFWAW	$y = 2.0112x - 3.3695$	0.88	$y = 0.7259x^{0.963}$	0.97	$y = 1.0472x^{0.995}$	0.83	$y = 0.0028x^{1.995}$	0.80
RASFW	$y = 2.17x - 12.022$	0.89	$y = 4.0834x^{0.4659}$	0.93	$y = 2.4257x^{0.615}$	0.63	$y = 0.0065x^{1.615}$	0.92
SFWAR	$y = 1.3893x - 3.48$	0.76	$y = 1.2397x^{0.9670}$	0.99	$y = 1.4073x^{0.864}$	0.62	$y = 0.0038x^{1.865}$	0.88

Notes: SSC = suspended sediment concentration (mg/l), T = turbidity (NTU), Q = discharge (cfs), SSL = suspended sediment load (tons/day)



**Wood Creek above SF Wages on 10/29/03
with a discharge of 0 cfs.**



**Wood Creek above SF Wages on 2/17/04 with a discharge of 4.7
cfs. In this photo, turbidity probe readings are being affected by
turbulence. Boom has since been moved towards the right bank
and out of the turbulence.**



**SF Wages above Center Gulch on 10/29/03
with a discharge of <1 cfs.**



**SF Wages above Center Gulch on 2/17/04 with a discharge of 55
cfs. In this photo turbidity probe readings are being affected by
turbulence. Boom has since been moved towards the right bank
and out of the turbulence.**



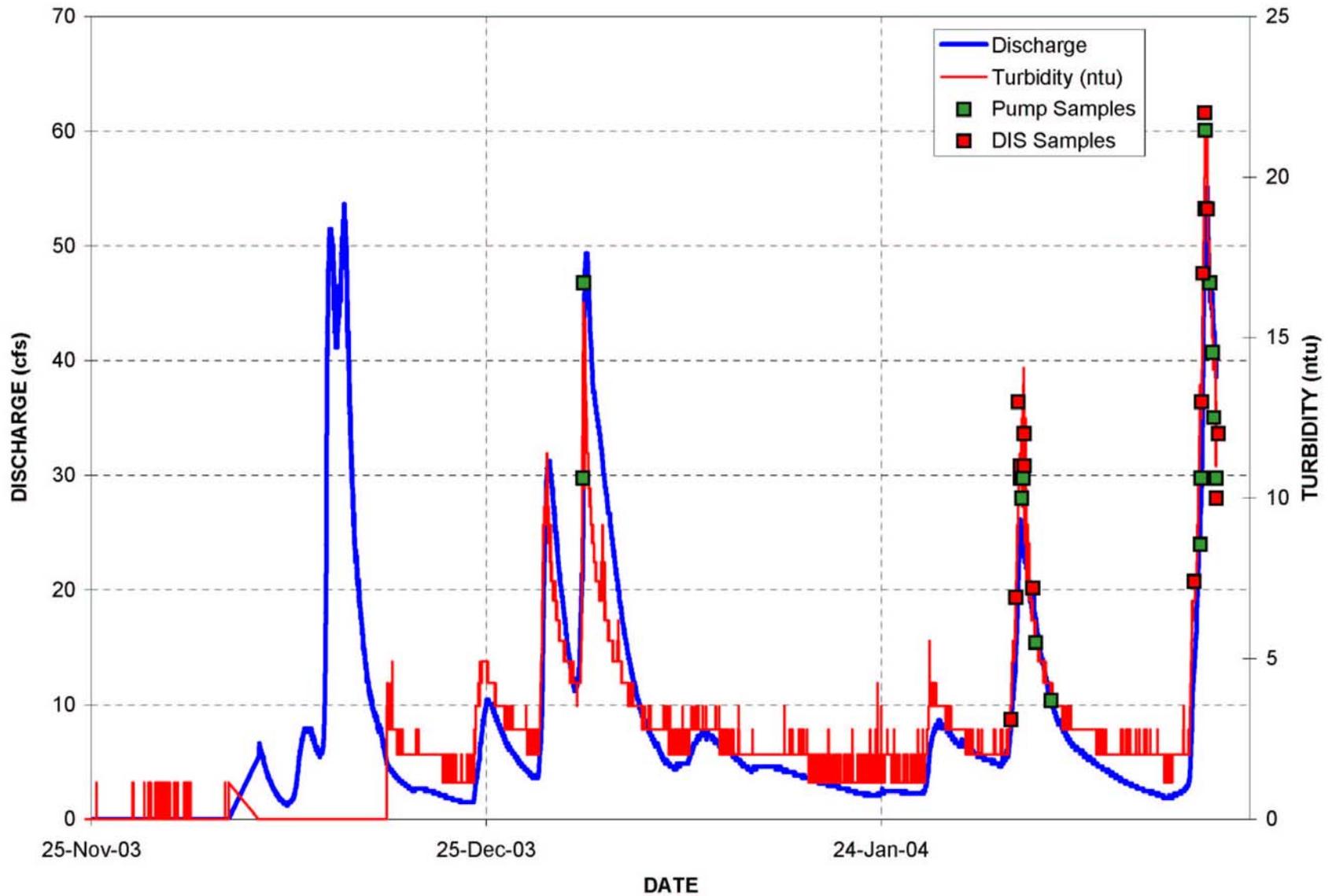
SF Wages above Rock Creek on 1/07/04 with a discharge of 2.5 cfs. Photo taken before large boulders were added to channel.



SF Wages Creek above Rock Creek on 2/18/04 with a discharge of 17 cfs. Note that large boulders placed in channel are working well at backwatering the turbidity probe.

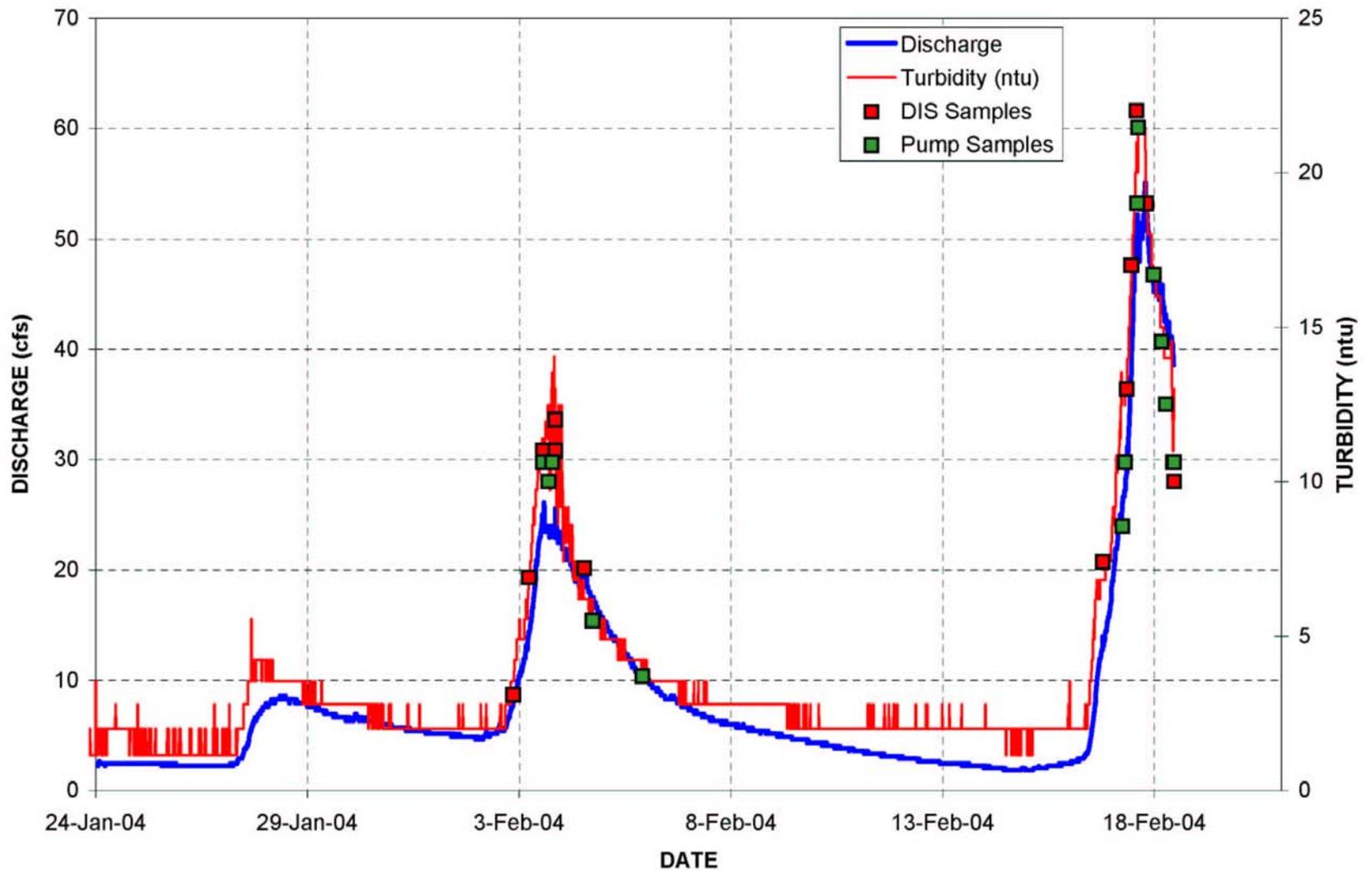
SOUTH FORK WAGES CREEK above CENTER GULCH

Continuous Turbidity vs Discharge, WY 2004

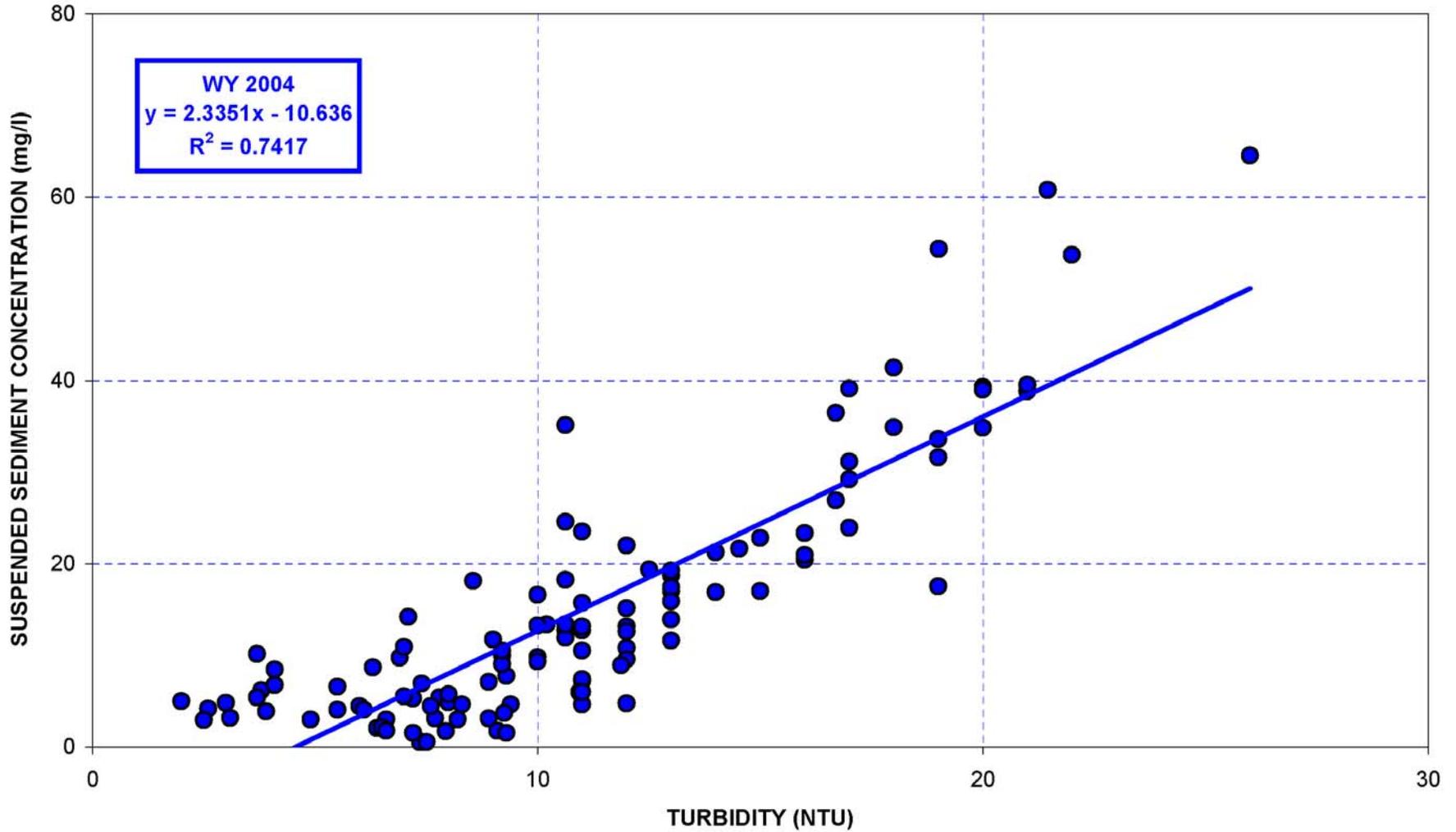


SOUTH FORK WAGES CREEK above CENTER GULCH

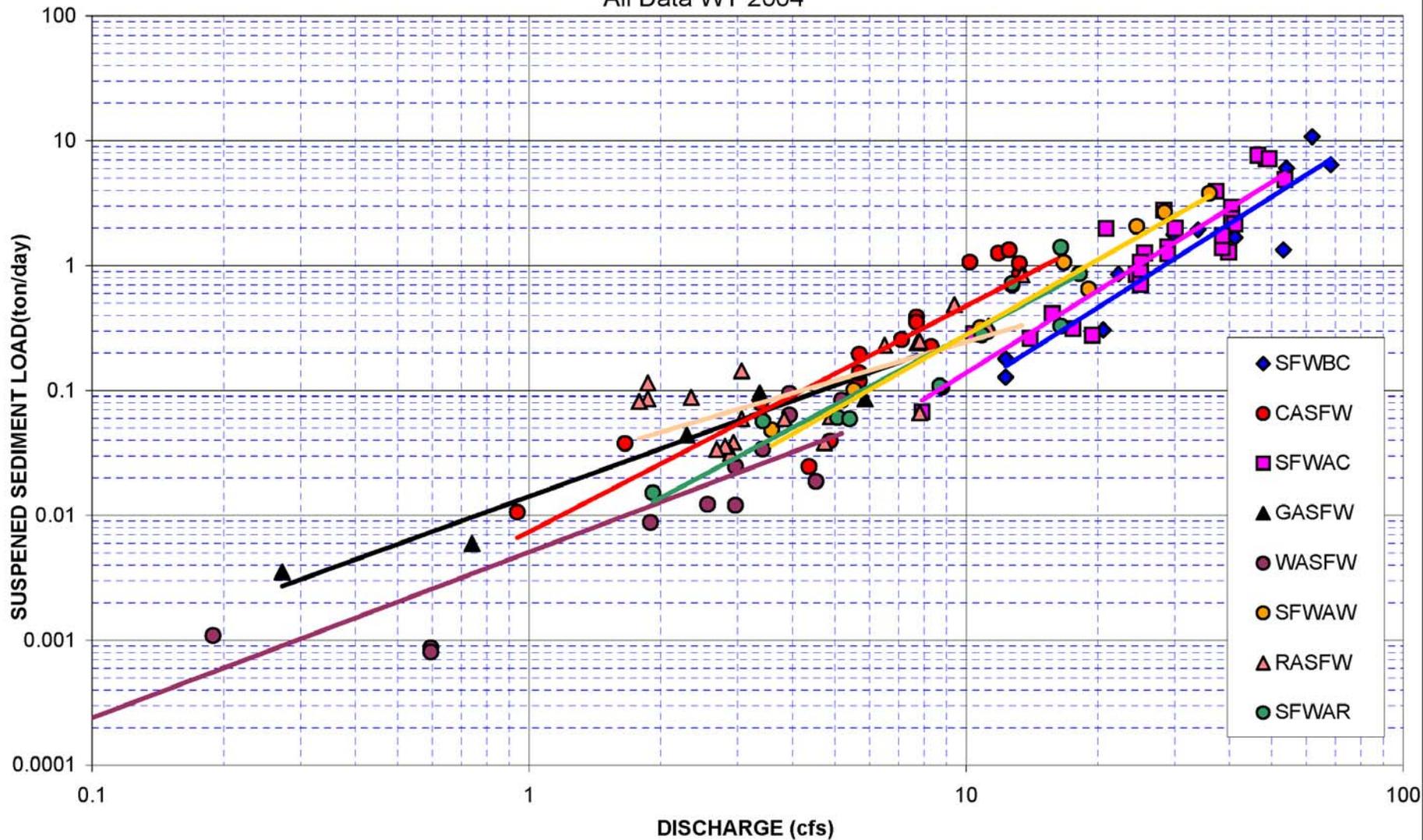
Continuous Turbidity vs Discharge, WY 2004



SOUTH FORK WAGES CREEK WATERSHED
Suspended Sediment Concentration Vs. Turbidity Rating Curve
All Data WY 2004

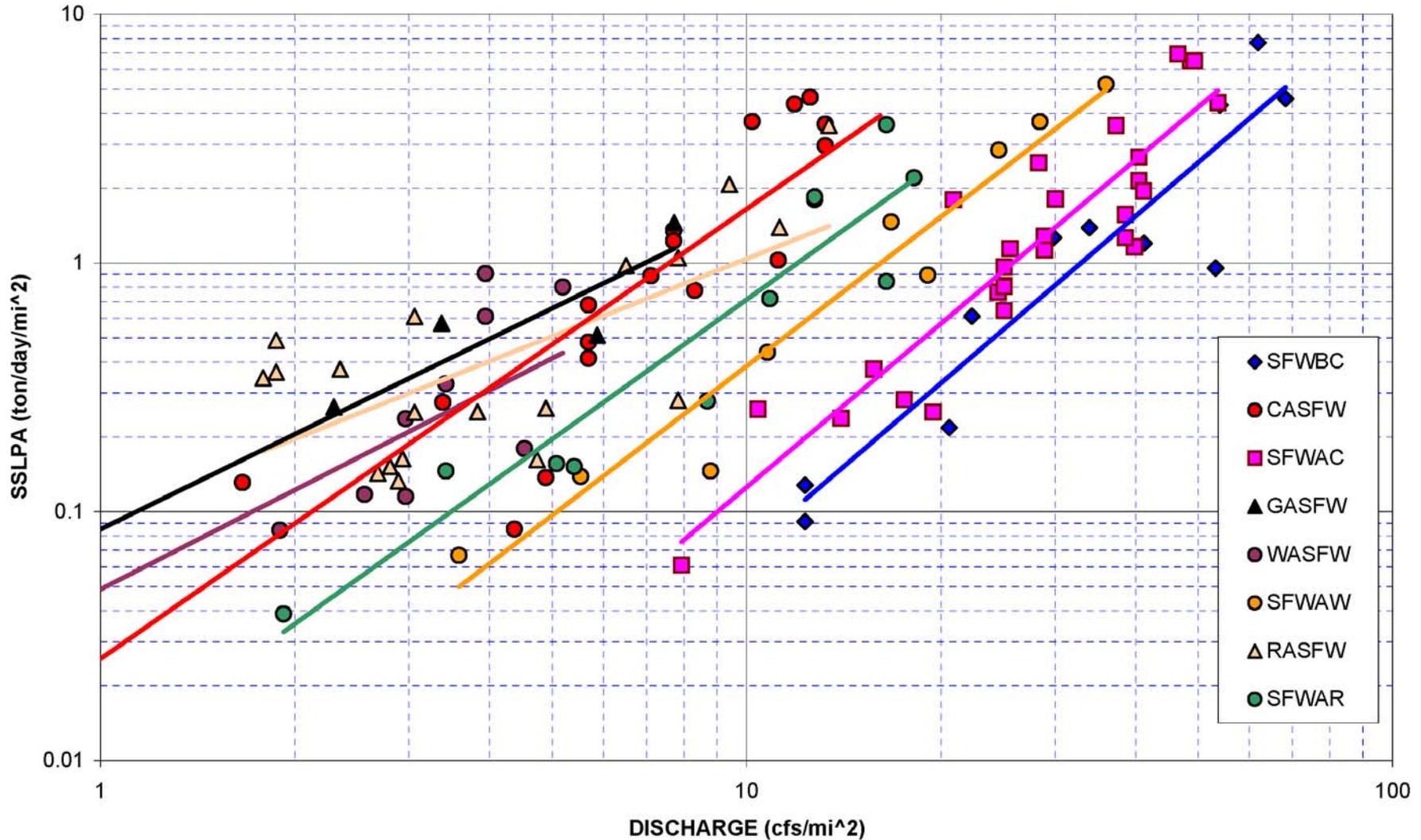


SOUTH FORK WAGES CREEK WATERSHED
Suspended Sediment Load Vs. Discharge Curve
All Data WY 2004



SOUTH FORK WAGES CREEK WATERSHED

Suspended Sediment Load Per Watershed Area Vs. Discharge Per Watershed Area Curve,
All Data WY 2004



SOUTH FORK WAGES CREEK above CENTER GULCH

SUSPENDED SEDIMENT CONCENTRATION Vs. TURBIDITY CURVE #1 -- Begin Date: 1/1/04

