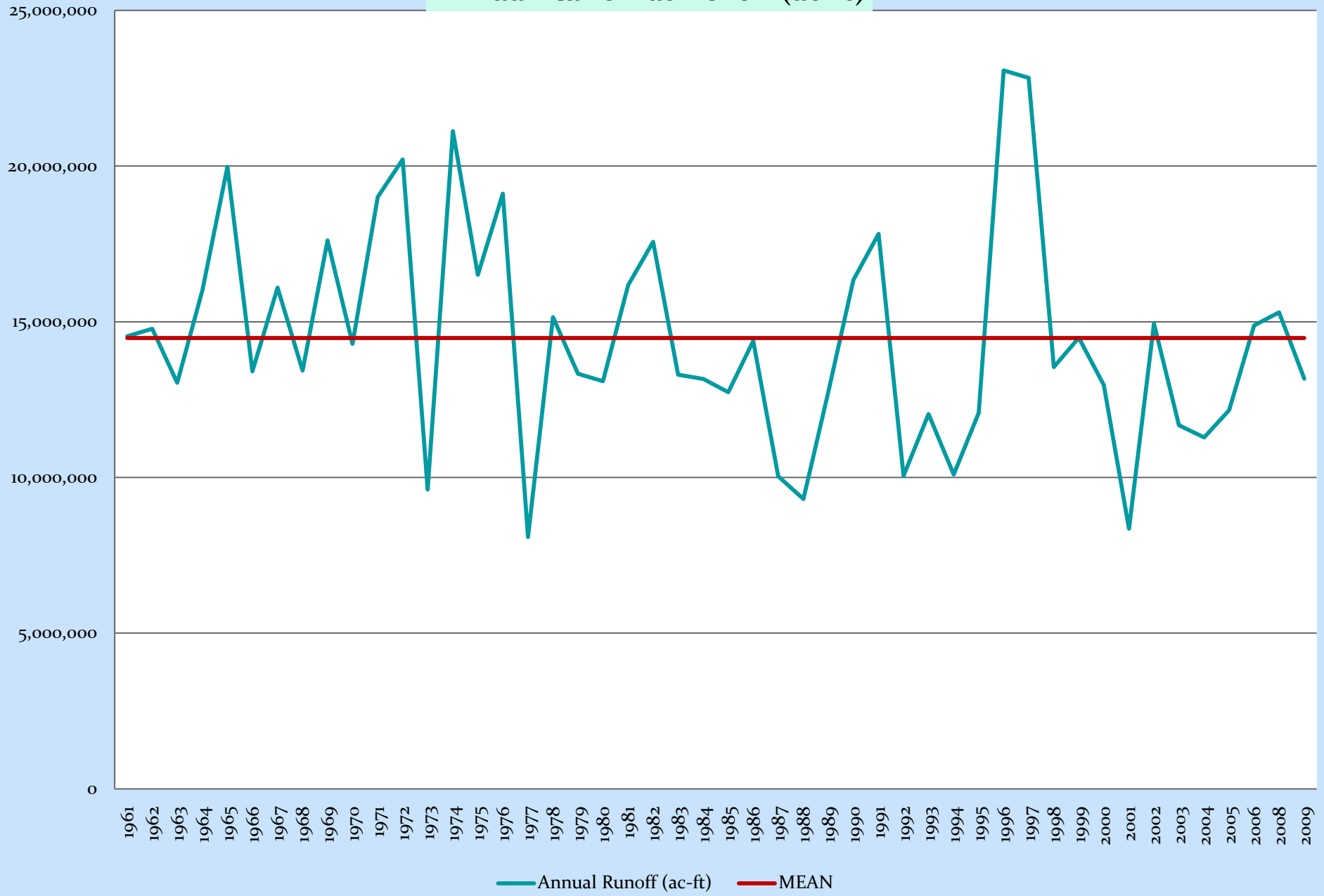
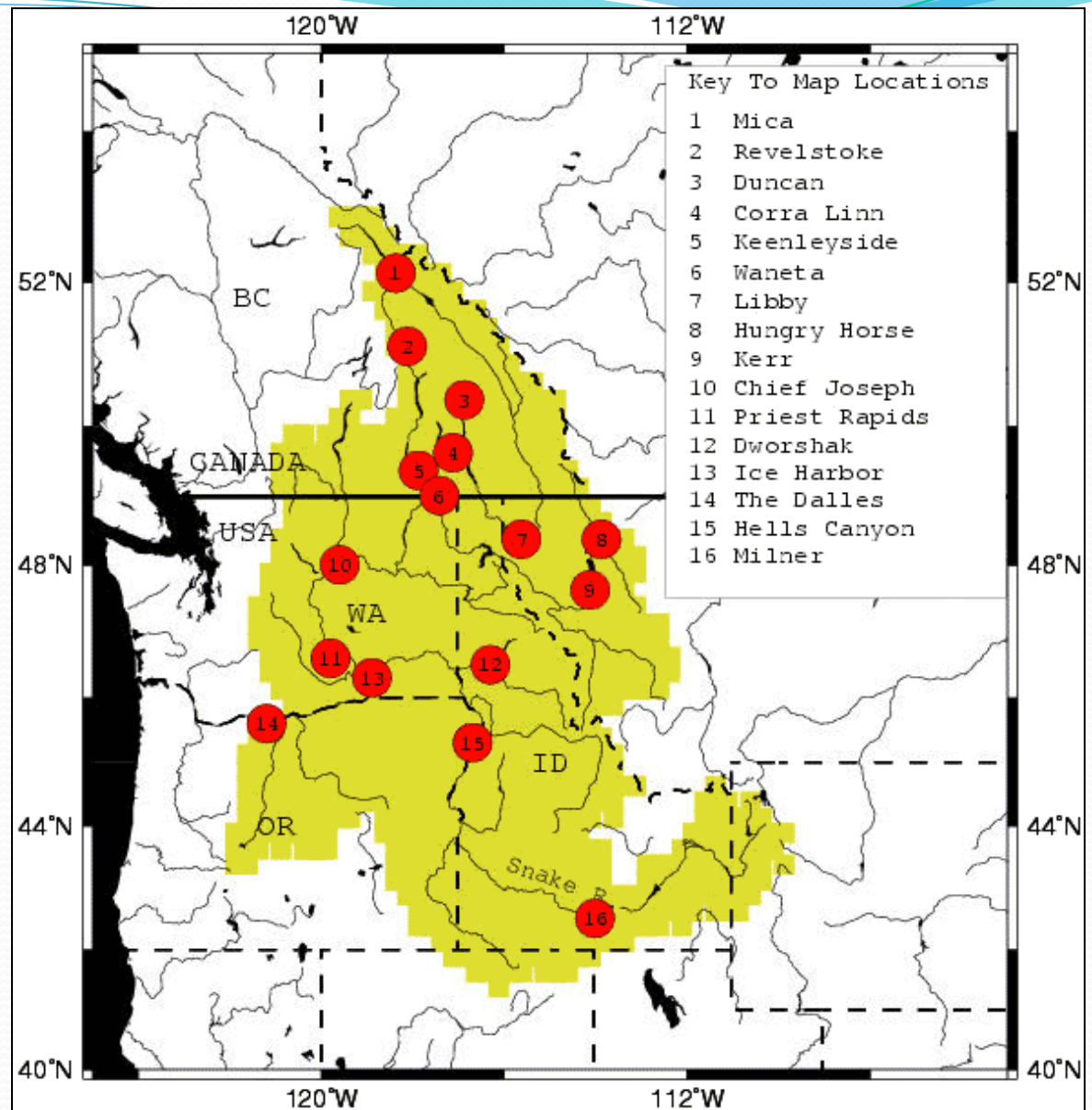


Clark Fork River Annual Runoff at Noxon (ac-ft)



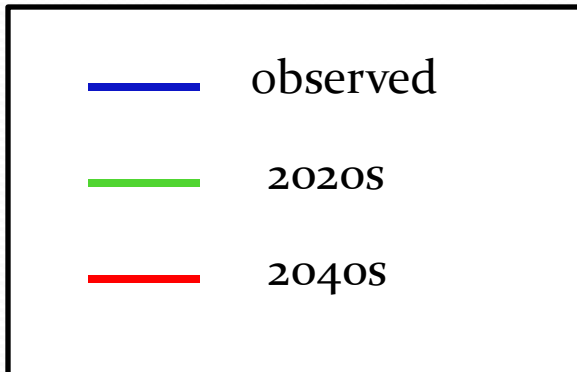
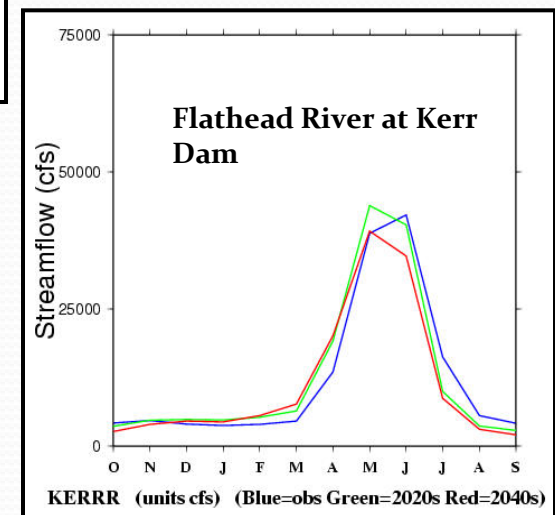
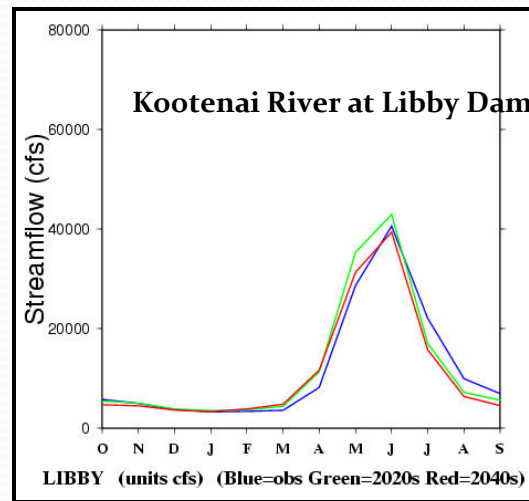
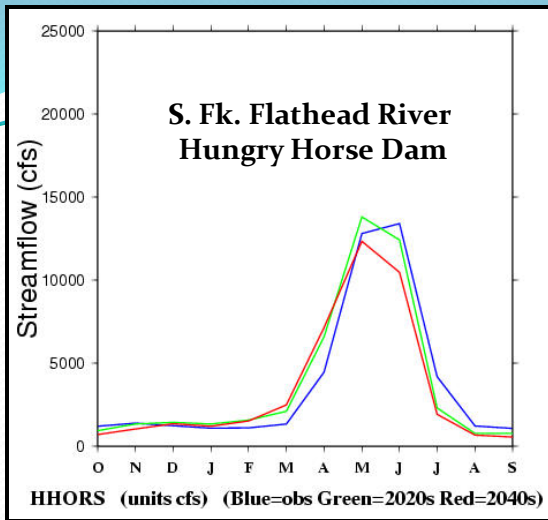
**U of WA
Climate Impacts
Group**

Long-term
streamflow forecast
locations in
Columbia and Snake
River Basins



Long-term Streamflow Forecasts for Upper Columbia in Montana:

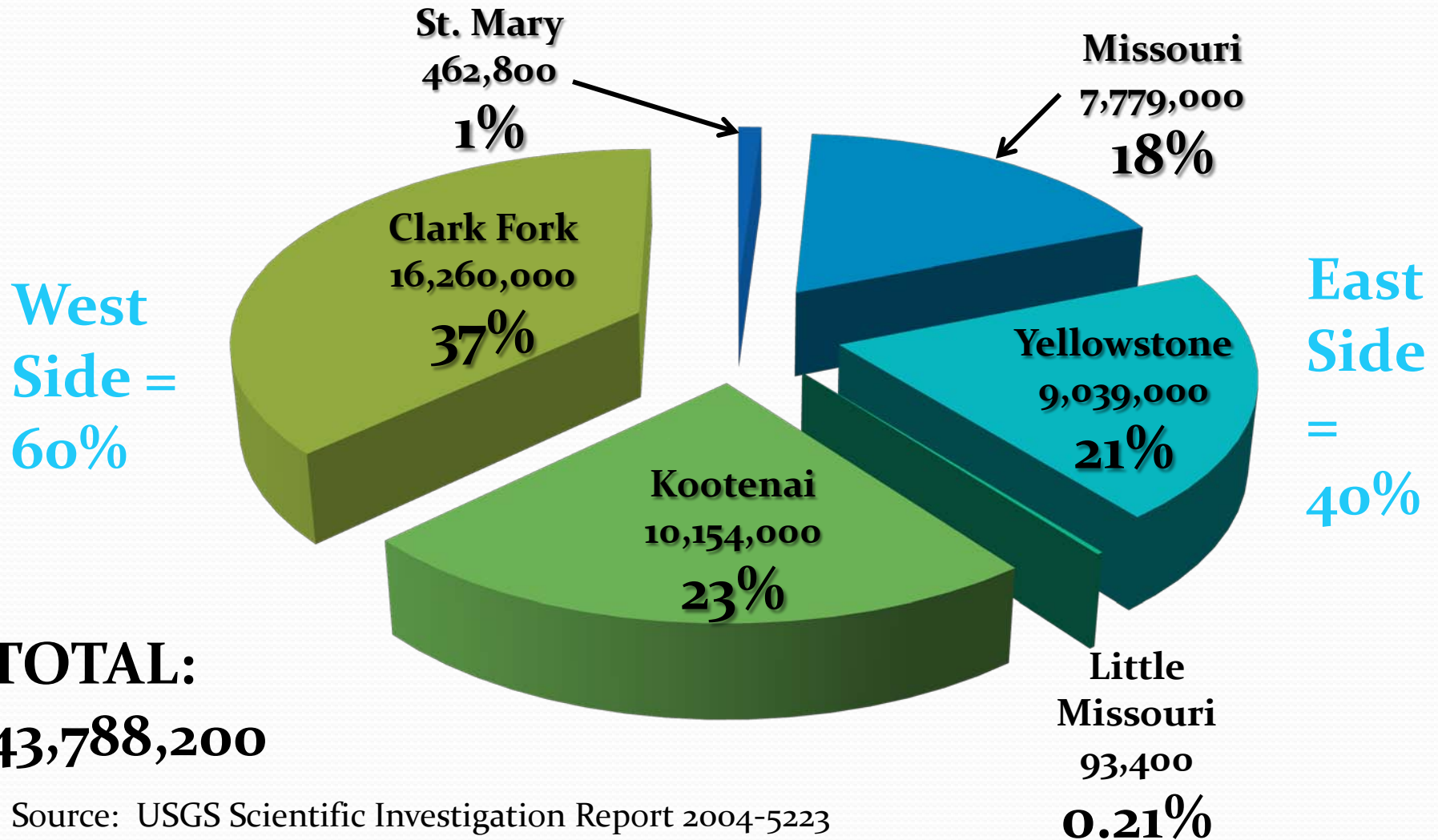
- less water in general
- earlier peak flows (April/May vs. June/July)
- steeper rising limb of hydrograph
- less steep falling limb



Source: University of Washington – Climate Impacts Group

Water in Montana's Rivers

1971-2000 Average Annual Runoff (ac-ft)



Montana State Water Plan – Implementation Strategy

Fundamental Relationship
between primary elements :

$$\begin{array}{c} \text{Water Supply} \\ \text{minus} \\ \hline \text{Water Use} \\ \hline \text{Water Availability} \end{array}$$

Montana State Water Plan – Implementation Strategy

❑ Water Supply:

- StreamStats – Interactive Web Map Application (RRGL)
- USGS Cooperative Stream Gage Program

❑ Water Use:

- Irrigated Lands Mapping (RRGL)
- Geospatial Enabling of the Water Rights Database
 - POD to NHD
 - POD to POU
- Update of National Hydrography Dataset (NHD)
- Update “Estimated Water Use in Montana in 2000” (USGS SIR 2004-5223)
- MBMG GW Investigations and Integration of GWIC well database

❑ Water Availability:

- Climate Variability
- Drought Planning
- Irrigation Efficiency Improvements
- Storage Possibilities
- etcetera...

StreamStats –

- Interactive, Web-based map application for providing streamflow statistics, such as the 100-year flood and the 7-day, 10-year low flow.
- Streamflow statistics are needed for:
 - water supply planning and management
 - water rights adjudication
 - water quality regulation
 - biological habitat assessment
 - floodplain delineation
 - infrastructure design
- Goal: statewide hydrological data delivery tool



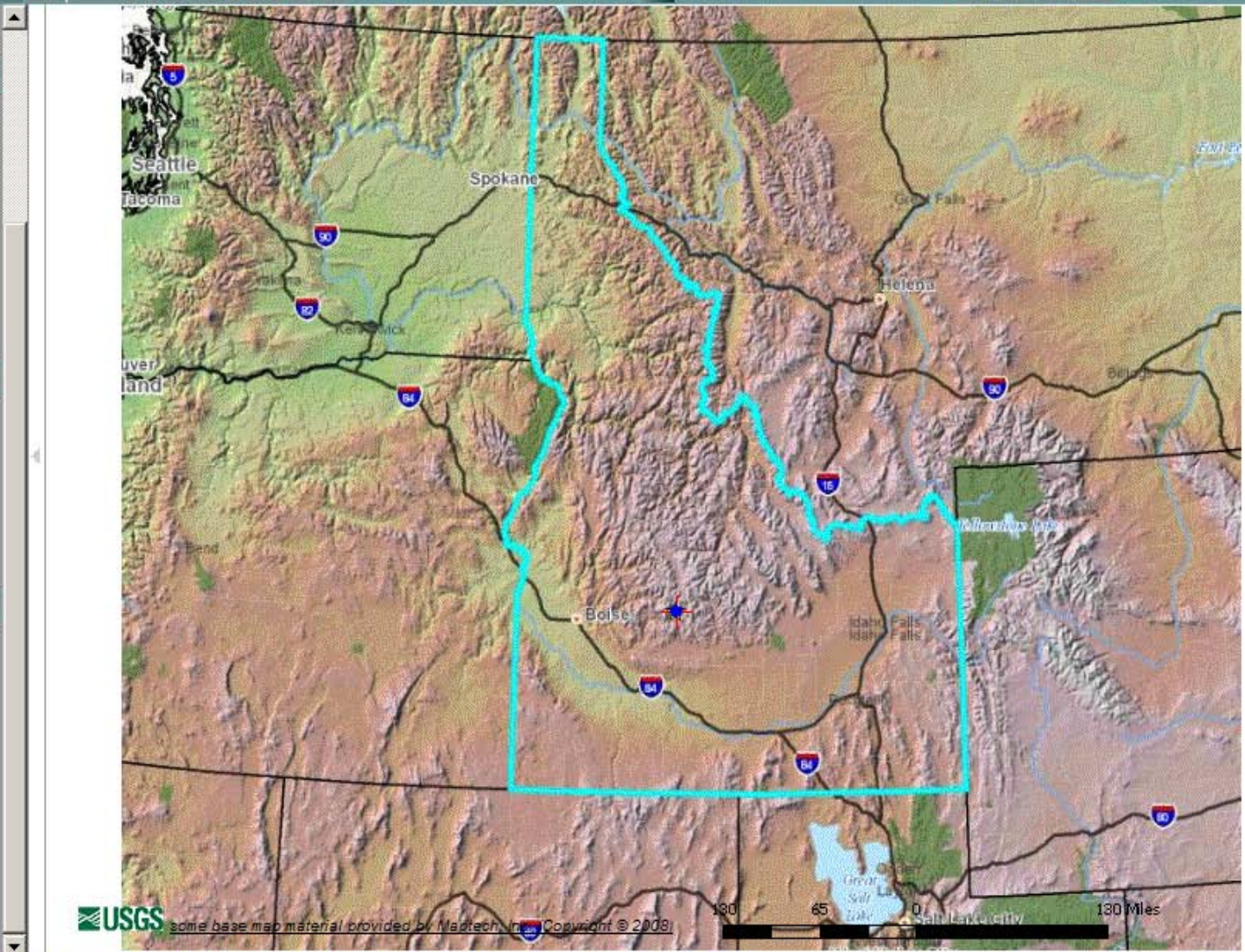
Zoom To: 1:6,345,501

Map Contents

- ID@id_ss
 - Slp1085Point
 - GlobalWatershedPoint
 - Stream Gages
 - NHDPlusGages
 - NHDPlusFlowline
 - LongestFlowPath3D

Navigation

Overview



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Map navigation toolbar with icons for zoom, pan, and other functions. Zoom To: 1:5,000,000

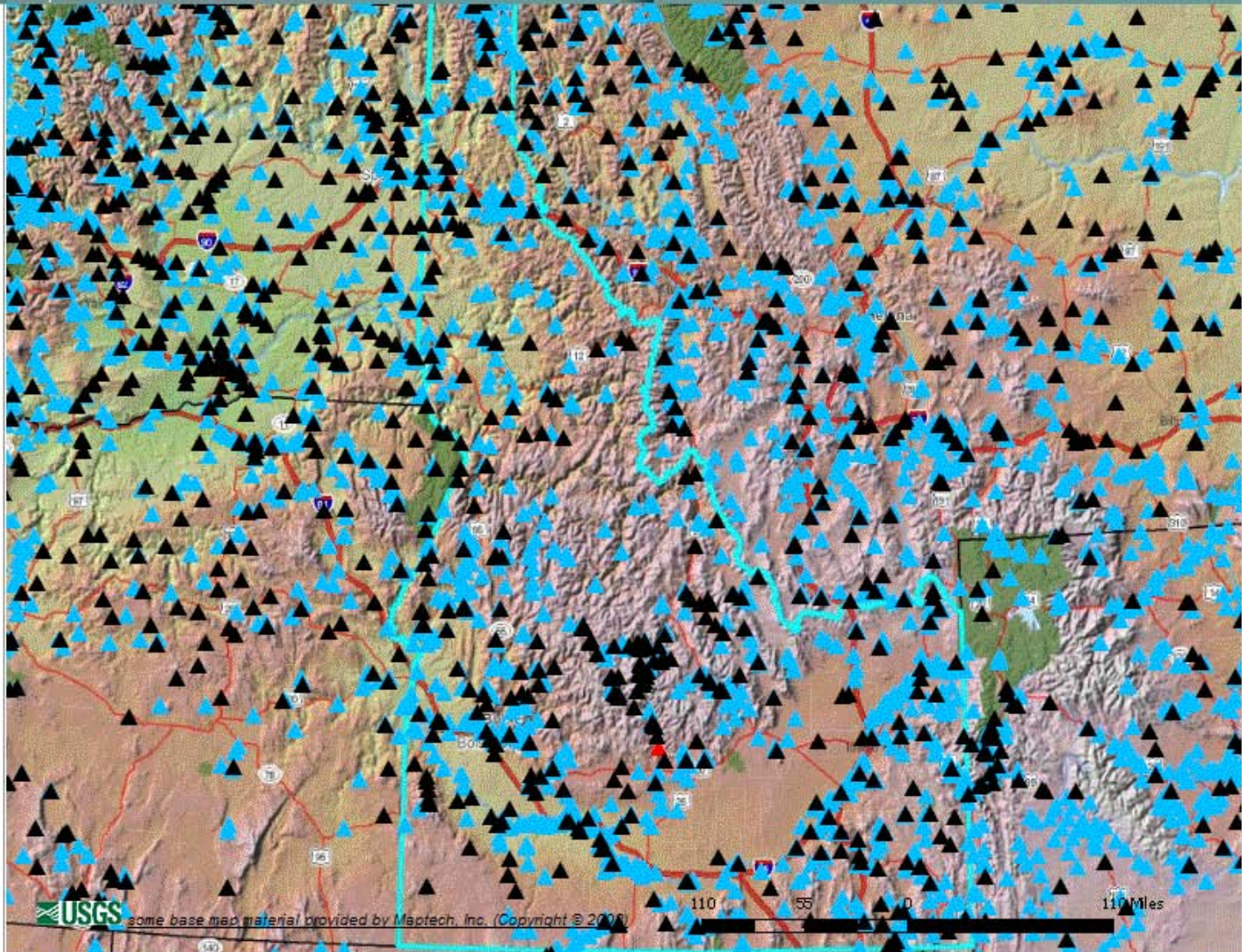
Results

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Navigation

Overview



USGS some base map material provided by Maptech, Inc. (Copyright © 2006) 110 55 0 110 Miles



Zoom To: 1:500,000

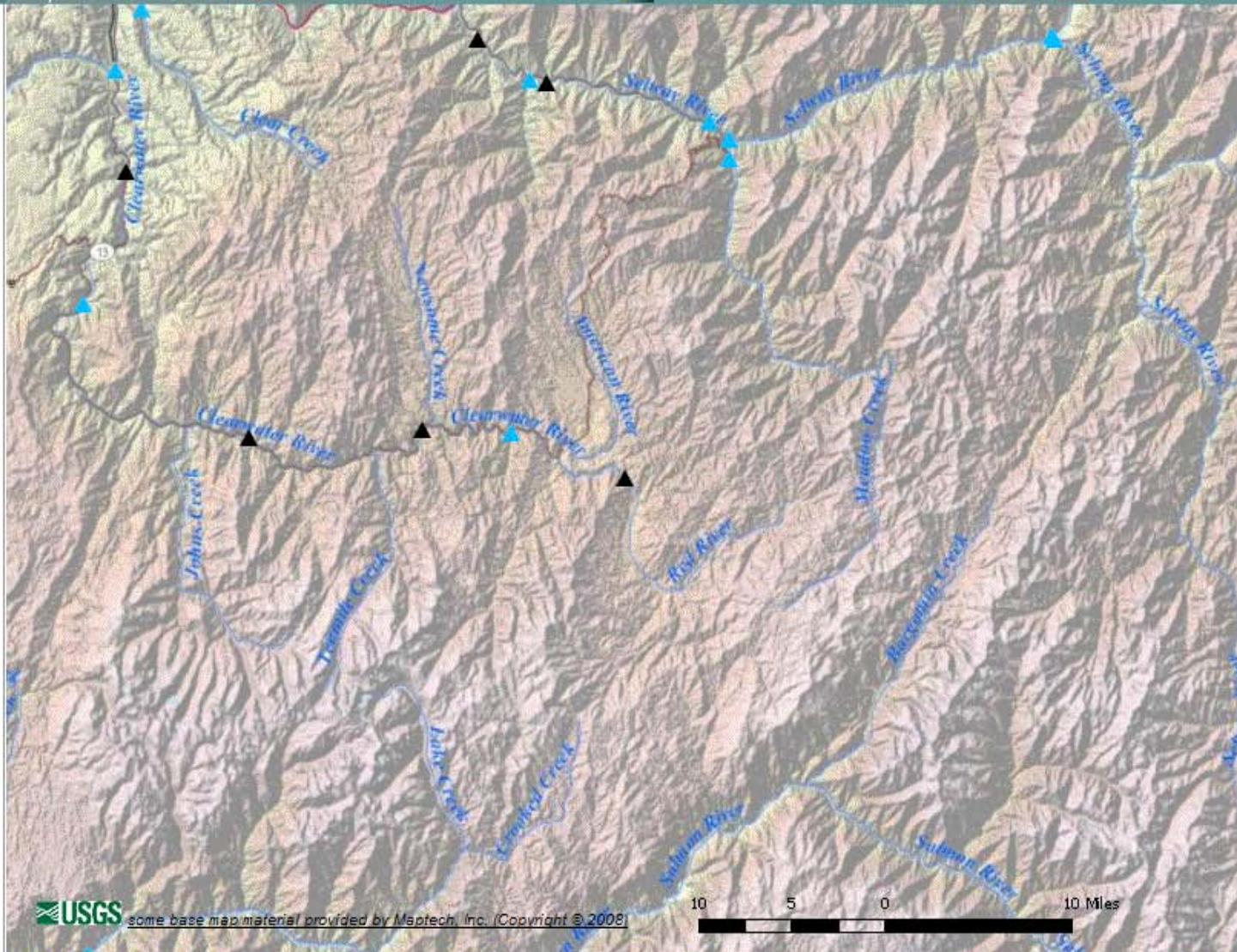
Results >>

Map Contents >>

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Navigation >>

Overview >>



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StreamStats Data-Collection Station Report

USGS Station Number 13337500
Station Name SF CLEARWATER RIVER NR ELK CITY ID

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type Gaging Station, continuous record
Regulated? False
Period of Record 1945-74
Remarks
Latitude (degrees NAD83) 45.82527778
Longitude (degrees NAD83) -115.52722222
Hydrologic unit code 17060305
Local Basin -
County 049-Idaho
MCD -
Directions to station

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
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Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Contributing_Drainage_Area	261.000	square miles	31
Drainage_Area	261	square miles	39
Latitude_of_Basin_Centroid	45.780	decimal degrees	31
Longitude_of_Basin_Centroid	115.380	decimal degrees	31
Main_Channel_Length	30.000	miles	31
Mean_Basin_Elevation	5095	feet	39
Percent_Forest	91.7	percent	39
Percent_Lakes_and_Ponds	0.0000	percent	31
Percent_Storage	0.0000	percent	31
Relief	3584	feet	38
Soil_Infiltration	6.3000	inches	31
Stream_Slope_10_and_85_Method	36.05	feet per mi	38
N_Facing_Slopes_gt_30pct_from_30m_DEM	10.1	percent	39
Slopes_gt_30pct_from_30m_DEM	28.8	percent	39
Elevation_in_Thousands	5.095068	thousand feet	00
Percent_Forest_add_1_ID_ROI_Parm	92.70432	dimensionless	00
Pct_South_Facing_Slopes_add_1_ID_ROI	29.79888	dimensionless	00
Mean_Basin_Slope_from_30m_DEM	24.1	percent	39

Streamflow Statistics

Statistic Name	Value	Units	Citation Number
----------------	-------	-------	-----------------

Peak-Flow Statistics

Streamflow Statistics

Statistic Name	Value	Units	Citation Number
Peak-Flow Statistics			
1_5_Year_Peak_Flood	1660	cubic feet per second	40
10_Year_Peak_Flood	3060	cubic feet per second	39
100_Year_Peak_Flood	4560	cubic feet per second	39
2_33_Year_Peak_Flood	2050	cubic feet per second	40
2_Year_Peak_Flood	1930	cubic feet per second	39
200_Year_Peak_Flood	5030	cubic feet per second	39
25_Year_Peak_Flood	3650	cubic feet per second	39
5_Year_Peak_Flood	2600	cubic feet per second	39
50_Year_Peak_Flood	4100	cubic feet per second	39
500_Year_Peak_Flood	5680	cubic feet per second	39
Log_Mean_of_Annual_Peaks	3.2800	Log base 10	31
Log_Skew_of_Annual_Peaks	-0.1830	Log base 10	31
Log_STD_of_Annual_Peaks	0.15245	Log base 10	00
Mean_Annual_Flood	1450.00	cubic feet per second	31
Systematic_peak_years	30	years	39
WRC_Mean	3.2880	Log base 10	31
WRC_Skew	-0.2000	Log base 10	31
WRC_STD	0.1530	Log base 10	31
Flood-Volume Statistics			
7_Day_10_Year_Maximum	2210.00	cubic feet per second	31
7_Day_2_Year_Maximum	1400.00	cubic feet per second	31
7_Day_25_Year_Maximum	2680.00	cubic feet per second	31
Low-Flow Statistics			
7_Day_10_Year_Low_Flow	21.000	cubic feet per second	31
7_Day_2_Year_Low_Flow	30.100	cubic feet per second	31
7_Day_20_Year_Low_Flow	19.000	cubic feet per second	31
Flow-Duration Statistics			



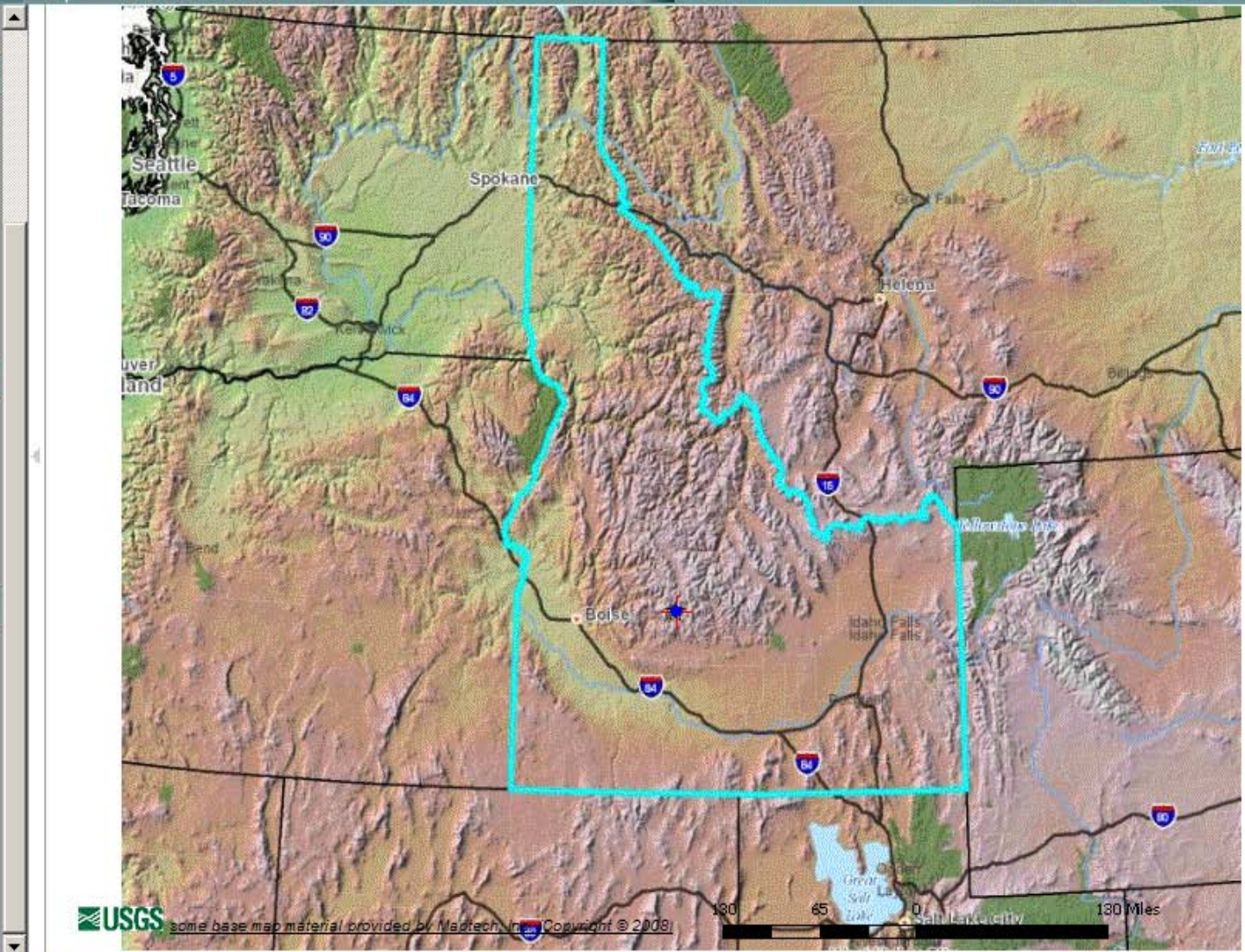
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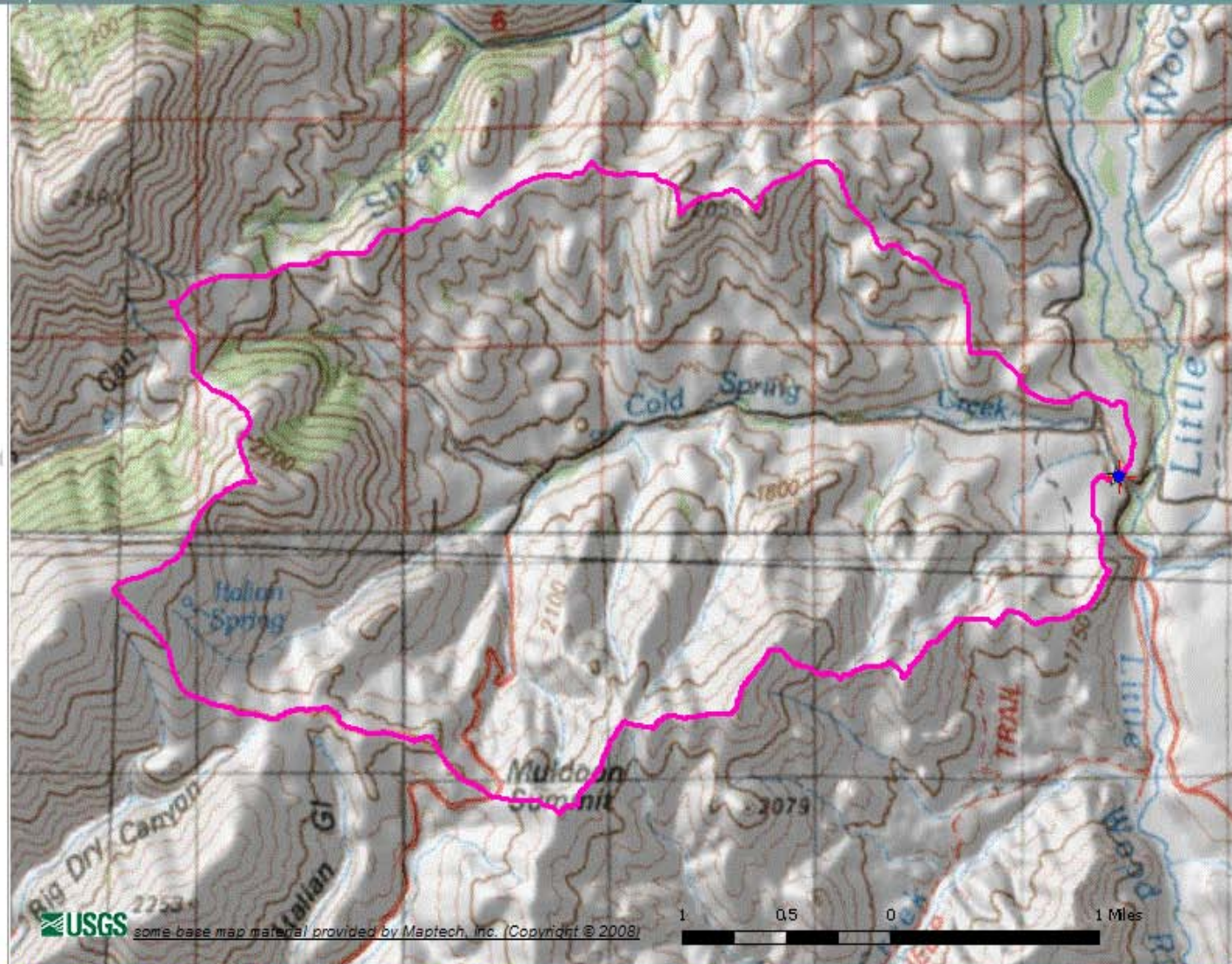


Zoom To: 1:45,412



- Map Contents
- LongestFlowPath3D
 - GlobalWatershed
 - Areas of limited function
 - Perennial Streams Model
 - Stream Grid
 - Hydrologic Units--WBD
 - Agricultural Land (NLCDS)

Results



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Idaho StreamStats

Streamstats Ungaged Site Report

Date: Fri Jun 4 2010 14:51:05 Mountain Daylight Time

Site Location: Idaho

NAD27 Latitude: 43.5040 (43 30 15)

NAD27 Longitude: -114.0597 (-114 03 35)

NAD83 Latitude: 43.5039 (43 30 14)

NAD83 Longitude: -114.0606 (-114 03 38)

Drainage Area: 9.23 mi²

Percent Urban: 0 %

Percent Impervious: 0.1 %

Peak-Flow Basin Characteristics

100% Peak Flow Region 7B (9.23 mi²)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	9.23	2.1	431.4

Low-Flow Basin Characteristics

100% Low Flow Region 7 (9.23 mi²)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	9.23	7.4	535.3
Stream Slope 10 and 85 Method (feet per mi)	214	18.4	372.8
Percent Forest (percent)	3	0	38.9
Mean Basin Elevation (feet)	6160	2984.4	7603
Slopes gt 30pct from 30m DEM (percent)	40.8	0	55.2
Mean Basin Slope from 30m DEM (percent)	27.5	1.7	35.3
Mean Annual Precipitation (inches)	17.8	8.2	29.1
Slopes Greater Than 50 Percent (percent)	5.52	0.189	28.5

Monthly and Annual Basin Characteristics

100% Low Flow Region 7 (9.23 mi²)

Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	9.23	7.4	535.3
Stream Slope 10 and 85 Method (feet per mi)	214	18.4	372.8
Percent Forest (percent)	3	0	38.9
Mean Basin Elevation (feet)	6160	2984.4	7603
Slopes gt 30pct from 30m DEM (percent)	40.8	0	55.2
Mean Basin Slope from 30m DEM (percent)	27.5	1.7	35.3
Mean Annual Precipitation (inches)	17.8	8.2	29.1
Slopes Greater Than 50 Percent (percent)	5.52	0.189	28.5

Peak-Flow Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK1_5	30.1	130		5.55	163
PK2	39.7	110		8.51	185
PK2_33	44.5	100		10.2	195
PK5	68.4	81		19.8	236
PK10	91.5	69		30.7	272
PK25	125	60		47.6	329
PK50	152	56		61.1	380
PK100	181	54		73.9	444
PK200	211	55		85.4	524
PK500	255	58		97.7	665

Low-Flow Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Estimation Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
M1D10Y	0.34	160			
M7D10Y	0.4	140			
M7D2Y	0.66	140			
M30D5Y	0.57	140			

Monthly and Annual Streamflow Statistics

Statistic	Flow (ft ³ /s)	Estimation Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
QA	2.37	80			
JAND20	4.67	68			
JAND50	2.21	68			
JAND80	1.52	69			
FEBD20	8.22	91			
FEBD50	3.79	75			
FEBD80	1.99	68			
MARD20	3.83	95			
MARD50	1.8	99			
MARD80	1.04	94			
APRD20	22.3	110			
APRD50	10.9	99			
APRD80	5.45	82			
MAYD20	15.7	110			
MAYD50	7.08	120			
MAYD80	3.36	110			
JUND20	6.97	120			
JUND50	3.64	110			
JUND80	2.07	100			
JULD20	2.4	99			
JULD50	1.65	110			
JULD80	1.09	130			
AUGD20	1.4	110			

Hydrologists talk about several different types of stream flow: observed, naturalized, modified and regulated flows.

- **Naturalized flows represent the flow pattern that would be present in the absence of any human modification (e.g., dams/reservoirs) of the river system.**
- **Modified flows are naturalized flows minus consumptive losses for irrigation, municipal and industrial use.**
- **In a managed river system, regulated flows are the flows that are observed.**