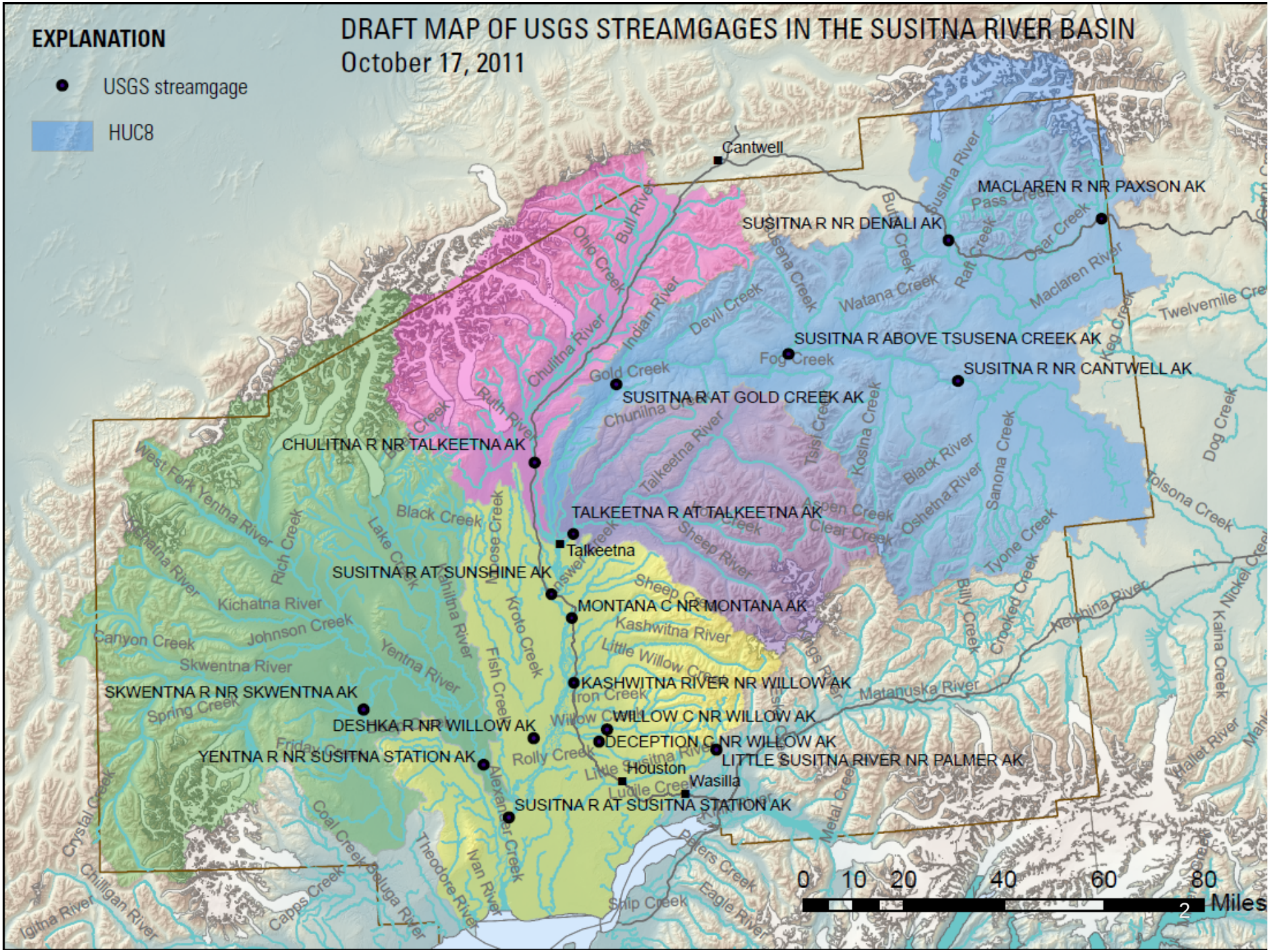
USGS Hydrologic Monitoring in the Susitna Basin

David Meyer
USGS Alaska Science Center

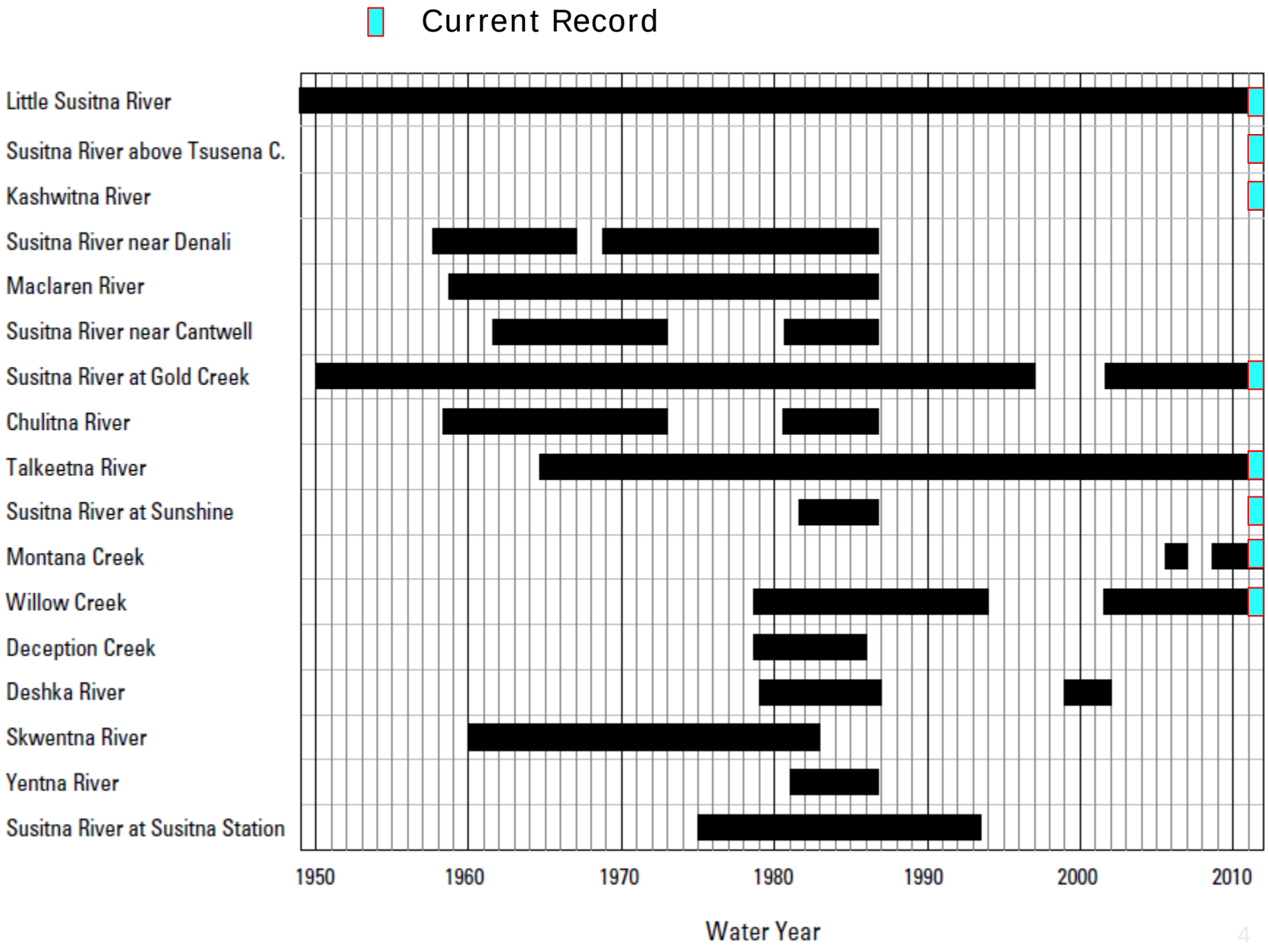
Oct 24, 2011

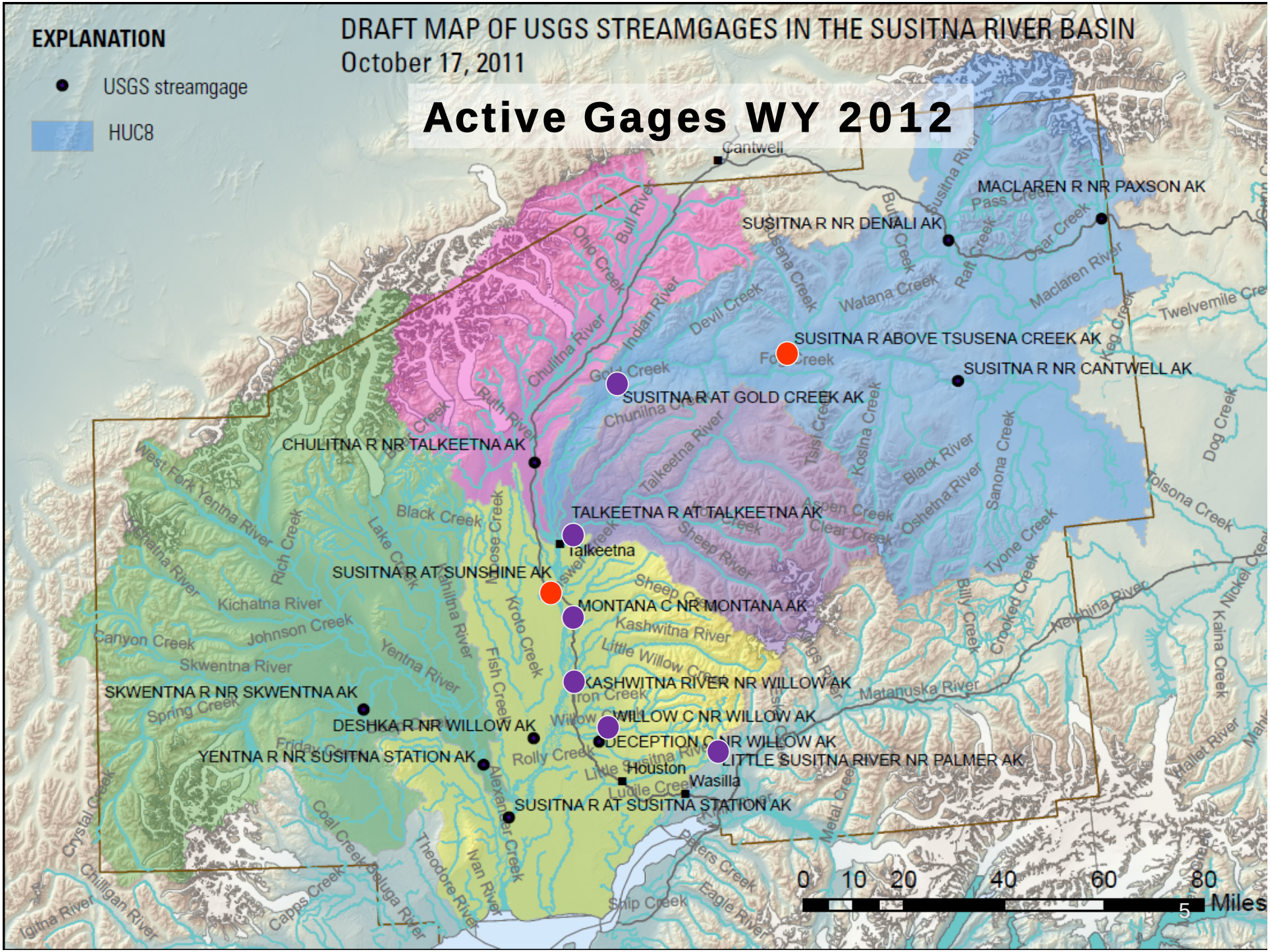

EXPLANATION
USGS streamgage
HUC8
DRAFT MAP OF USGS STREAMGAGES IN THE SUSITNA RIVER BASIN
October 17, 2011
Cantwell
MACLAREN R NR PAXSON AK
SUSITNA R NR DENALI AK
SUSITNA R ABOVE TSUSENA CREEK AK
SUSITNA R NR CANTWELL AK
SUSITNA R AT GOLD CREEK AK
CHULITNA R NR TALKEETNA AK
TALKEETNA R AT TALKEETNA AK
Talkeetna
SUSITNA R AT SUNSHINE AK
MONTANA C NR MONTANA AK
KASHWITNA RIVER NR WILLOW AK
WILLOW C NR WILLOW AK
DECEPTION C NR WILLOW AK
LITTLE SUSITNA RIVER NR PALMER AK
SKWENTNA R NR SKWENTNA AK
DESHKA R NR WILLOW AK
YENTNA R NR SUSITNA STATION AK
SUSITNA R AT SUSITNA STATION AK
Houston
Wasilla
Susitna River
Maclaren River
Twelvemile Cre
Dog Creek
Tolsona Creek
Nickel Cree
Kaina Creek
Hallet River
Matanuska River
Nelchina River
Crooked Creek
Billy Creek
Tyone Creek
Sanona Creek
Oshetna River
Black River
Kosina Creek
Tsisi Creek
Fog Creek
Keg Creek
Osar Creek
Raft Creek
Butt Creek
Pass Creek
Watana Creek
Devil Creek
Tsusena Creek
Indian River
Bull River
Ohio Creek
Chulitna River
Ruth River
Gold Creek
Talkeetna River
Clear Creek
Aspen Creek
Sheep River
Sheep Creek
Kroto Creek
Fish Creek
Lake Creek
Black Creek
Rich Creek
West Fork Yentna River
Kichatna River
Canyon Creek
Johnson Creek
Skwentna River
Yentna River
Spring Creek
Kashwitna River
Little Willow Creek
Iron Creek
Willow Creek
Rolly Creek
Little Susitna River
Ludile Creek
Alexander Creek
Theodore River
Ivan River
Coal Creek
Beluga River
Capps Creek
Chilligan River
Crystal Creek
Igitna River
Peters Creek
Eagle River
Ship Creek
Metal Creek
0 10 20 40 60 80
Miles
2

USGS Streamflow Gages in the Susitna Watershed

Station ID	Station Name	lat	long	period of record (WY)	complete years of record	drainage area (mi2)
15290000	Little Susitna River near Palmer	614237	1491347	7/48-current	62	61.9
15291000	Susitna River near Denali	630614	1473057	1957-66 1968-86	28	950
15291200	Maclaren River near Paxson	630710	1463145	1958-86	28	280
15291500	Susitna River near Cantwell	624155	1473242	1961-72 1980-86	18	4,140
15292000	Susitna River at Gold Creek	624604	1494128	1949-96 2002-current	57	6,160
15292400	Chulitna River near Talkeetna	623331	1501402	1958-72 1980-86	28	2,570
15292700	Talkeetna River near Talkeetna	622049	1500101	6/64-current	47	1,996
15292780	Susitna River at Sunshine	621042	1501030	1981-86	7	11,100
15292800	Montana Creek near Montana	620632	1500312	4/05-current	7	164
15294005	Willow C nr Willow	614603	1500348	1978-93, 2001-current	26	166
15294010	Deception Creek near Willow	614452	1495614	1978-85	9	48
15294100	Deshka River near Willow	614605	1502013	1979-86 1999-current	12	591
15294300	Skwentna River near Skwentna	615223	1512201	1960-82	24	2,250
15294345	Yentna River near Susitna Station	614155	1503902	1981-86	6	6,180
15294350	Susitna River at Susitna Station	613241	1503045	1975-93	18	19,400

Period of record for Susitna River Basin streamgages

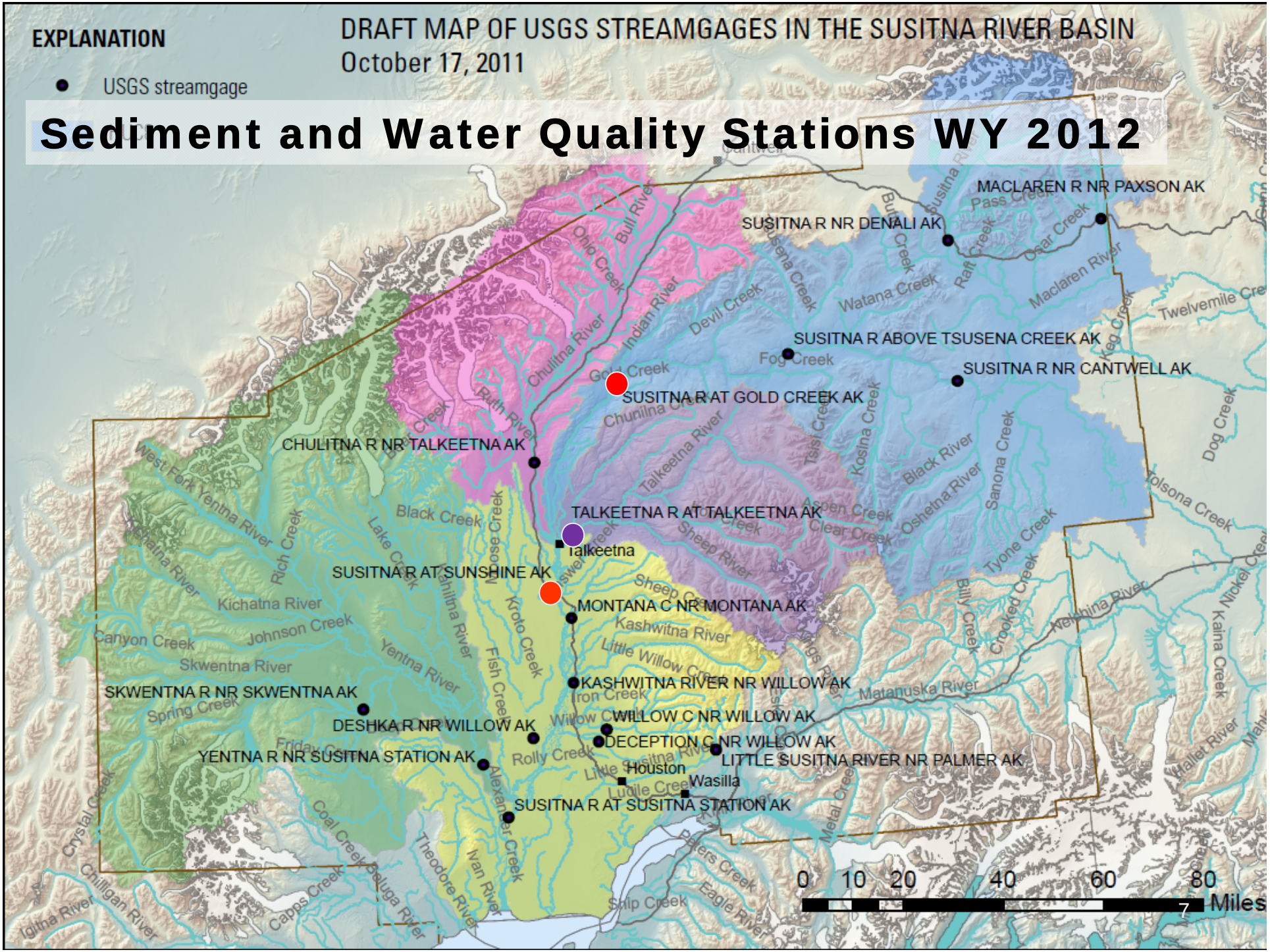



EXPLANATION
USGS streamgage
HUC8
DRAFT MAP OF USGS STREAMGAGES IN THE SUSITNA RIVER BASIN
October 17, 2011
Active Gages WY 2012
Cantwell
MACLAREN R NR PAXSON AK
SUSITNA R NR DENALI AK
SUSITNA R ABOVE TSUSENA CREEK AK
SUSITNA R NR CANTWELL AK
SUSITNA R AT GOLD CREEK AK
CHULITNA R NR TALKEETNA AK
TALKEETNA R AT TALKEETNA AK
Talkeetna
SUSITNA R AT SUNSHINE AK
MONTANA C NR MONTANA AK
KASHWITNA RIVER NR WILLOW AK
WILLOW C NR WILLOW AK
DECEPTION C NR WILLOW AK
LITTLE SUSITNA RIVER NR PALMER AK
SKWENTNA R NR SKWENTNA AK
DESHKA R NR WILLOW AK
YENTNA R NR SUSITNA STATION AK
Houston
Wasilla
SUSITNA R AT SUSITNA STATION AK
Susitna River
Butte Creek
Pass Creek
Oscar Creek
Raft Creek
Maclaren River
Twelvemile Creek
Keg Creek
Susena Creek
Watana Creek
Devil Creek
Indian River
Ohio Creek
Bull River
Chulitna River
Gold Creek
Ruth River
Tsisi Creek
Kosina Creek
Talkeetna River
Black River
Oshetna River
Sanona Creek
Dog Creek
Tolsona Creek
Aspen Creek
Clear Creek
Sheep River
Tyone Creek
Billy Creek
Crooked Creek
Nenana River
Nickel Creek
Kaina Creek
West Fork Yentna River
Rich Creek
Black Creek
Lake Creek
Kichatna River
Canyon Creek
Johnson Creek
Skwentna River
Yentna River
Fish Creek
Kroto Creek
Kashwitna River
Little Willow Creek
Iron Creek
Willow Creek
Rolly Creek
Matanuska River
Spring Creek
Friday Creek
Alexander Creek
Hallet River
Crystal Creek
Chilligan River
Coal Creek
Beluga River
Theodore River
Ivan River
Capps Creek
Peters Creek
Eagle River
Ship Creek
Metal Creek
Igitna River
0 10 20 40 60 80
Miles
5

- At least 5 water quality samples during the year at Susitna River at Gold Creek and Susitna River at Sunshine to be analyzed for nutrients, major ions, dissolved trace metals, dissolved organic carbon, suspended organic carbon, and lab turbidity. Whole trace metals, dissolved and whole mercury will be sampled twice. Additional samples may be collected as needed.

- At least 5 suspended sediment samples at Susitna River at Gold Creek and Susitna River at Sunshine during the year for concentration and size analysis.

- At least 5 bed material samples during the year at Susitna River at Gold Creek and Susitna River at Sunshine for size analysis.


EXPLANATION
USGS streamgage
DRAFT MAP OF USGS STREAMGAGES IN THE SUSITNA RIVER BASIN
October 17, 2011
Sediment and Water Quality Stations WY 2012
MACLAREN R NR PAXSON AK
SUSITNA R NR DENALI AK
SUSITNA R ABOVE TSUSENA CREEK AK
SUSITNA R NR CANTWELL AK
SUSITNA R AT GOLD CREEK AK
CHULITNA R NR TALKEETNA AK
TALKEETNA R AT TALKEETNA AK
SUSITNA R AT SUNSHINE AK
MONTANA C NR MONTANA AK
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SUSITNA R AT SUSITNA STATION AK
SKWENTNA R NR SKWENTNA AK
DESHKA R NR WILLOW AK
YENTNA R NR SUSITNA STATION AK
Talkeetna
Houston
Wasilla
Susitna River
Maclaren River
Chulitna River
Talkeetna River
Yentna River
Skwentna River
Kashwitna River
Matanuska River
Nenana River
Gold Creek
Indian River
Devil Creek
Watana Creek
Tsisi Creek
Kosina Creek
Black River
Oshetna River
Sanona Creek
Tyone Creek
Dog Creek
Tolsona Creek
Kaina Creek
Nickel Creek
Hallet River
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Black Creek
Lake Creek
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Spring Creek
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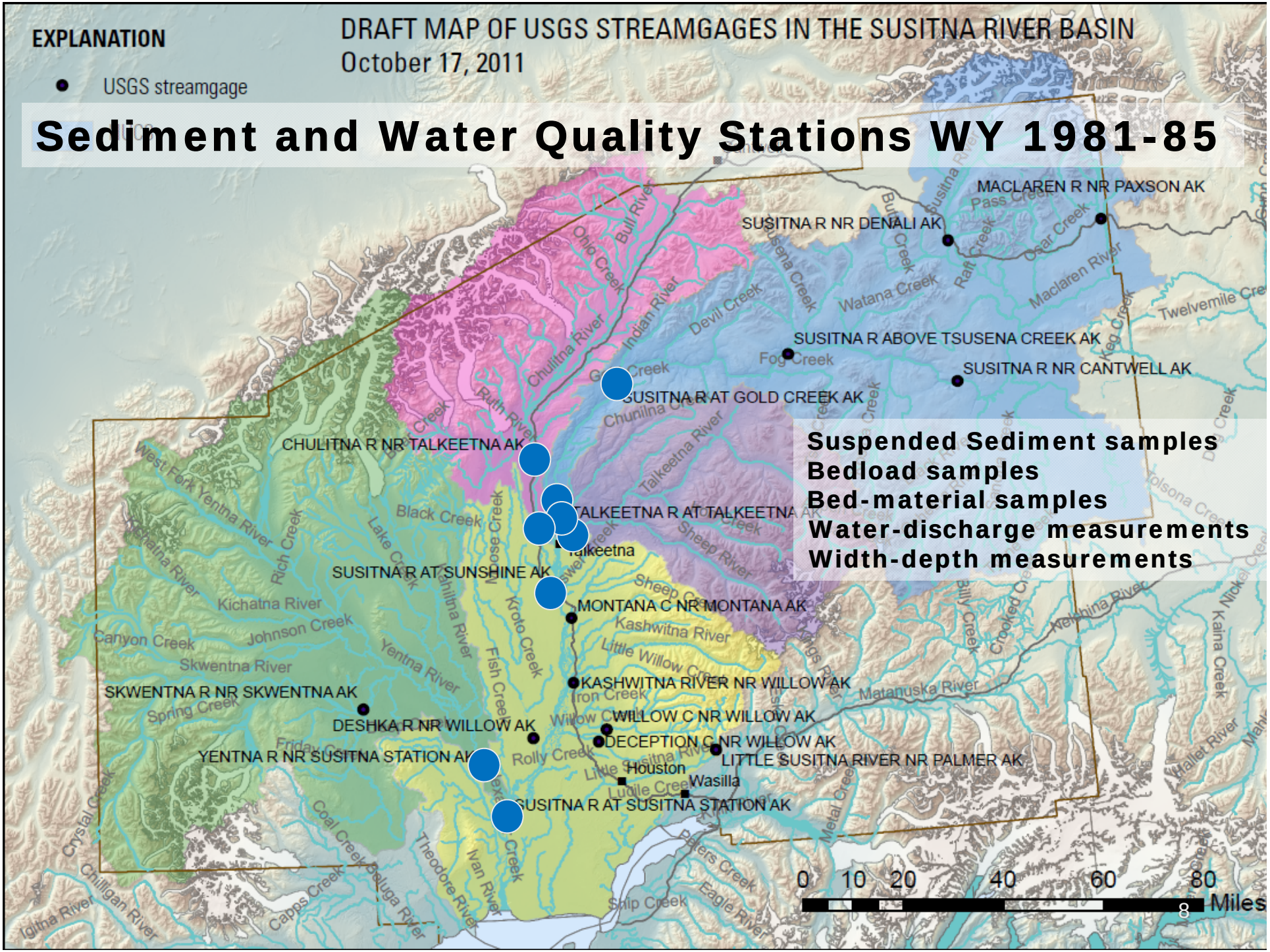
Aspen Creek
Billy Creek
Crooked Creek
Metal Creek
Peters Creek
Eagle River
Ship Creek
Ivan River
Theodore River
Coal Creek
Beluga River
Capps Creek
Chilligan River
Igitna River
Crystal Creek
0 10 20 40 60 80
Miles
7


EXPLANATION
USGS streamgage
DRAFT MAP OF USGS STREAMGAGES IN THE SUSITNA RIVER BASIN
October 17, 2011
Sediment and Water Quality Stations WY 1981-85
MACLAREN R NR PAXSON AK
SUSITNA R NR DENALI AK
SUSITNA R ABOVE TSUSENA CREEK AK
SUSITNA R NR CANTWELL AK
SUSITNA R AT GOLD CREEK AK
CHULITNA R NR TALKEETNA AK
TALKEETNA R AT TALKEETNA AK
Talkeetna
SUSITNA R AT SUNSHINE AK
MONTANA C NR MONTANA AK
KASHWITNA RIVER NR WILLOW AK
WILLOW C NR WILLOW AK
DECEPTION C NR WILLOW AK
LITTLE SUSITNA RIVER NR PALMER AK
SUSITNA R AT SUSITNA STATION AK
YENTNA R NR SUSITNA STATION AK
SKWENTNA R NR SKWENTNA AK
DESHKA R NR WILLOW AK
Houston
Wasilla
Suspended Sediment samples
Bedload samples
Bed-material samples
Water-discharge measurements
Width-depth measurements
0 10 20 40 60 80
Miles
Susitna River
Chulitna River
Talkeetna River
Yentna River
Kashwitna River
Little Willow Creek
Matanuska River
Devil Creek
Watana Creek
Maclaren River
Twelvemile Creek
Fog Creek
Gold Creek
Ruth River
Indian River
Ohio Creek
Bull River
Butte Creek
Raft Creek
Oscar Creek
Pass Creek
Tsusena Creek
Keg Creek
Dutch Creek
Tolsona Creek
Black Creek
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Fish Creek
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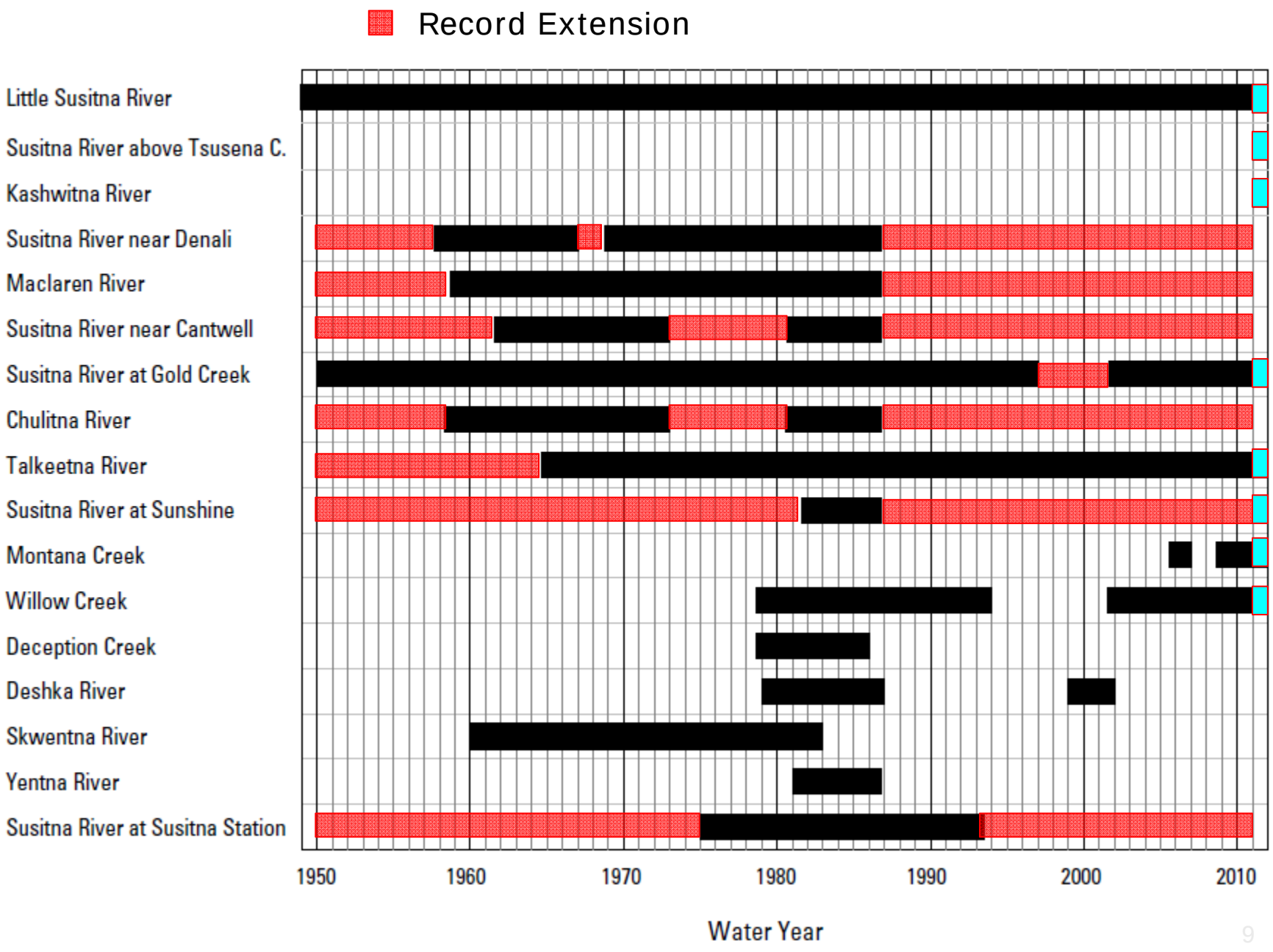
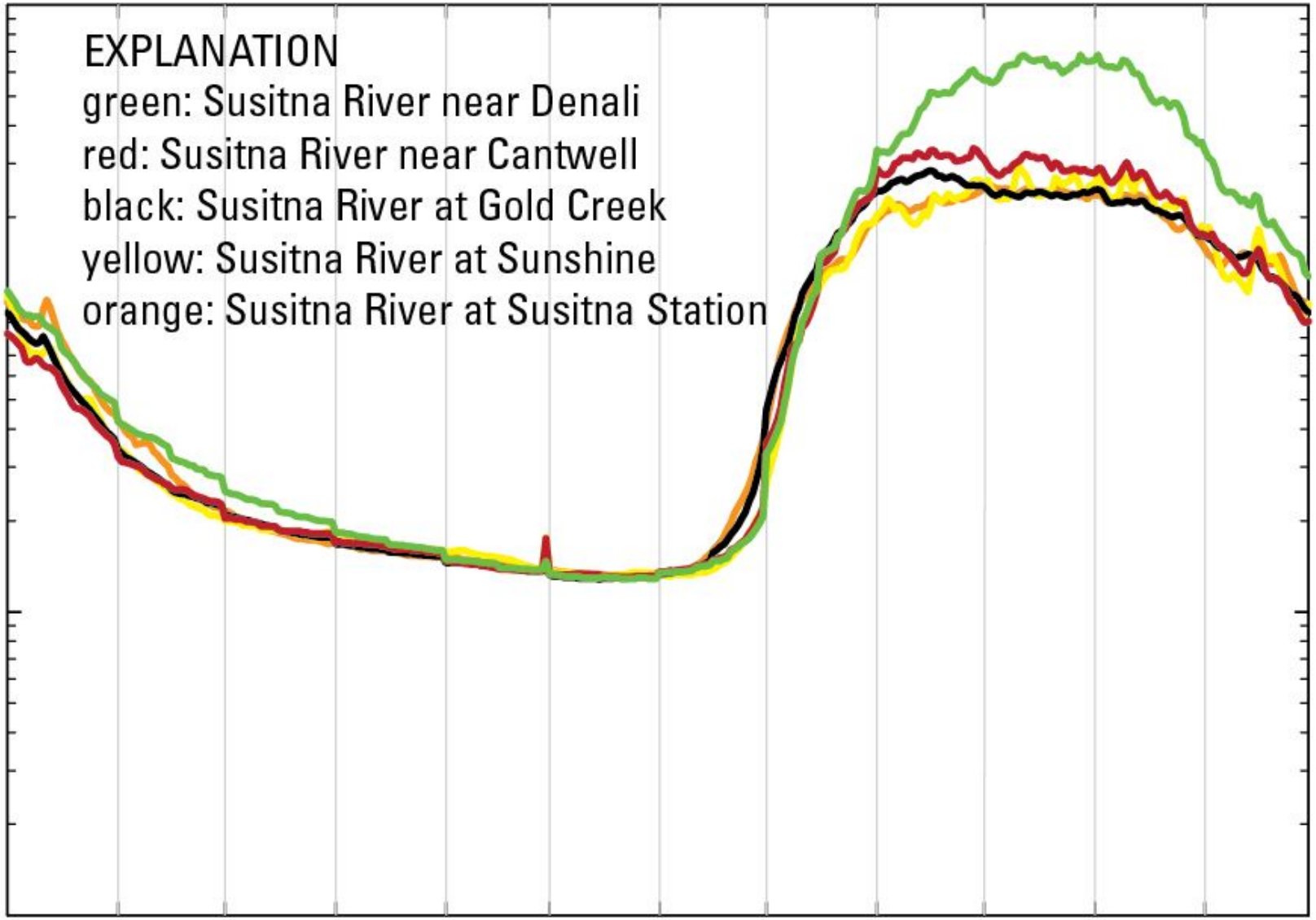
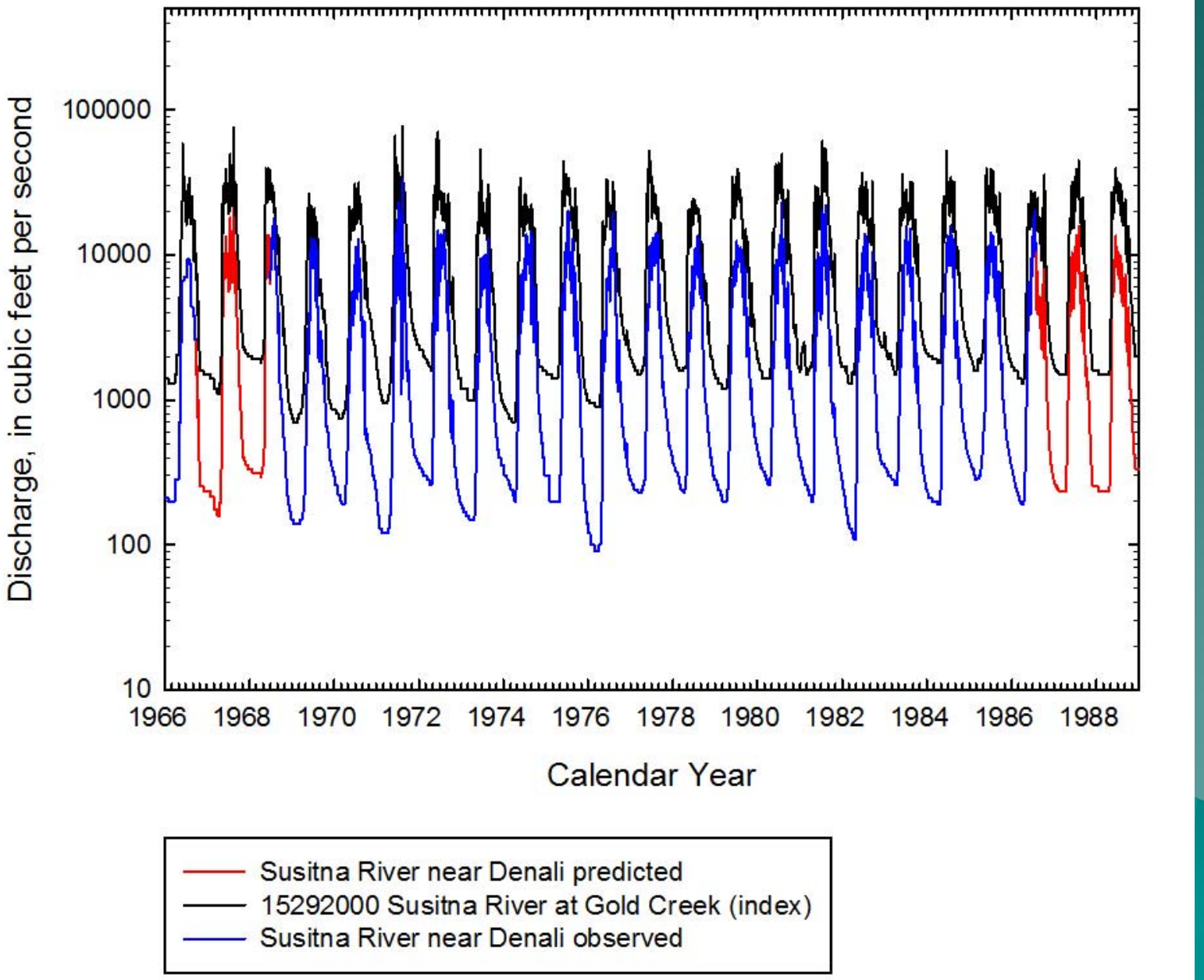
Sheep Creek
Sheep River
Iron Creek
Willow Creek
Rolly Creek
Friday Creek
Little Susitna River
Ludlle Creek
Crooked Creek
Billy Creek
Nelchina River
Kings River
Kaina Creek
Nick
Hallet River
Metal Creek
Peters Creek
Eagle River
Ship Creek
Theodore River
Ivan River
Coal Creek
Beluga River
Capps Creek
Chilligan River
Igitna River
Crystal Creek

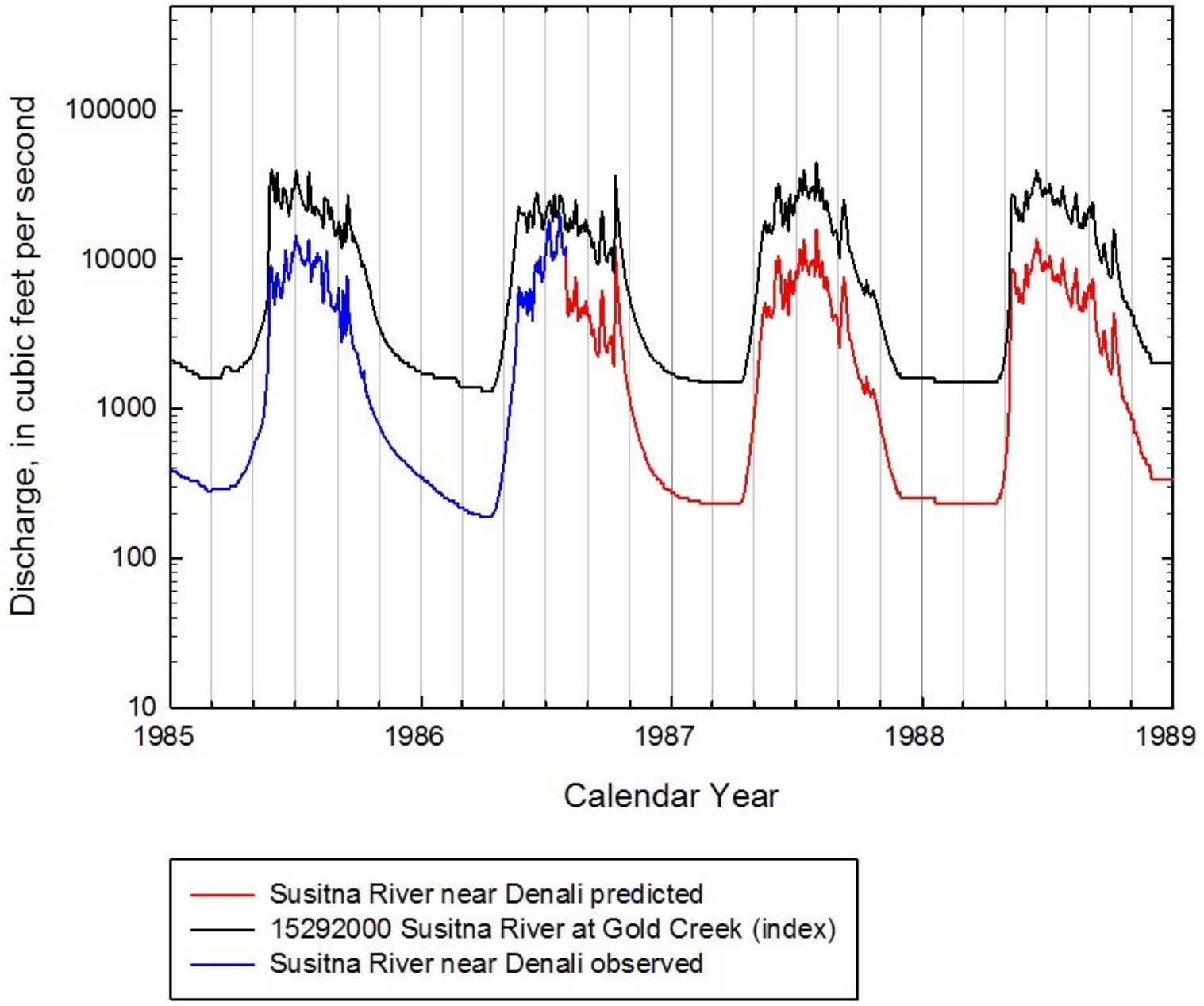
Period of record for Susitna River Basin streamgages

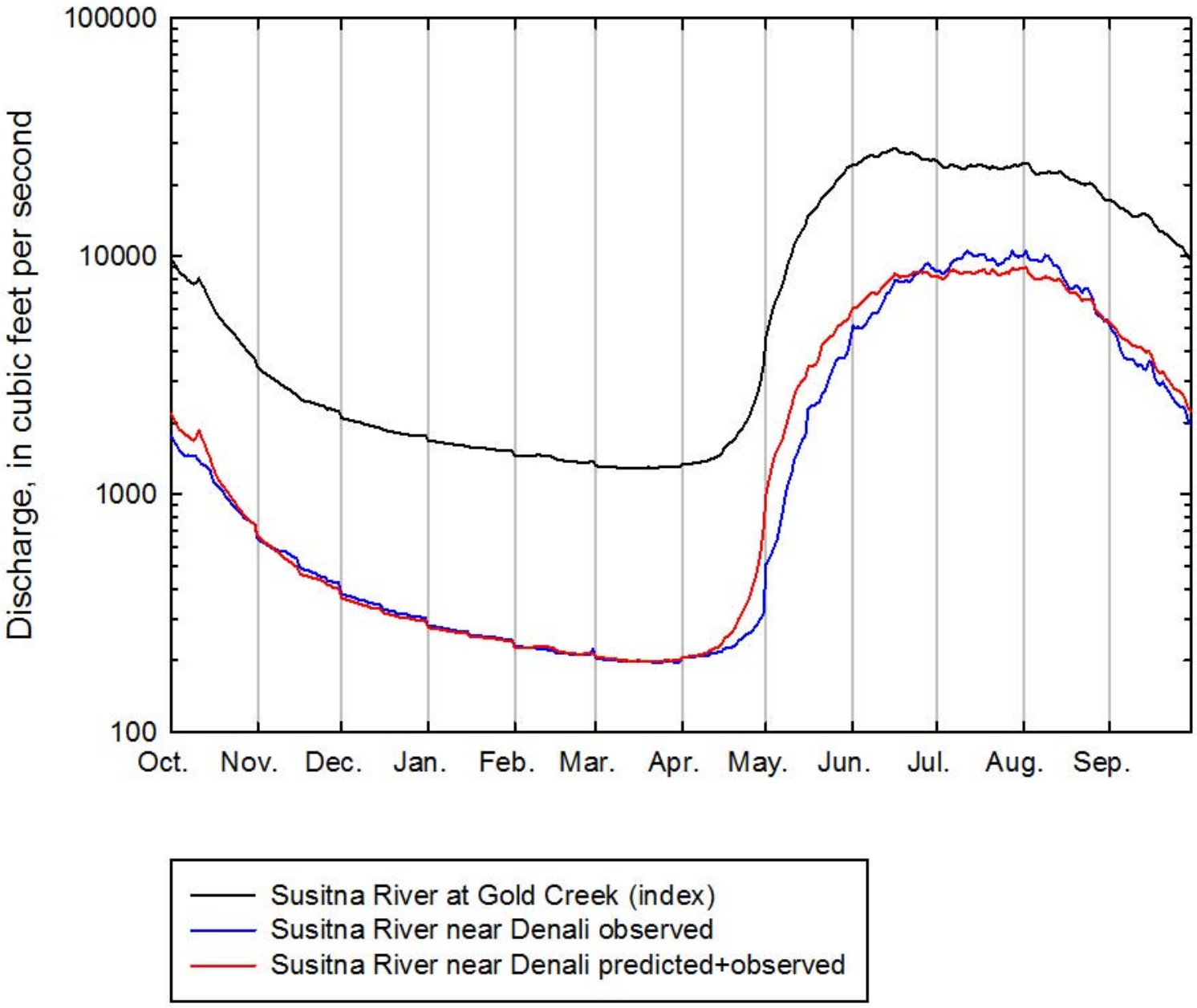


Mean daily mean values for the period of record, plotted on log scale and adjusted to match Susitna River at Gold Creek during March/April low flow




Discharge, in cubic feet per second
100000
10000
1000
100
10
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
Calendar Year
Susitna River near Denali predicted
15292000 Susitna River at Gold Creek (index)
Susitna River near Denali observed


Discharge, in cubic feet per second
100000
10000
1000
100
10
1985
1986
1987
1988
1989
Calendar Year
Susitna River near Denali predicted
15292000 Susitna River at Gold Creek (index)
Susitna River near Denali observed


100000
10000
1000
100
Discharge, in cubic feet per second
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May.
Jun.
Jul.
Aug.
Sep.
Susitna River at Gold Creek (index)
Susitna River near Denali observed
Susitna River near Denali predicted+observed

European Conference on Impacts of Climate Change on Renewable Energy Sources
Reykjavik, Iceland, June 5–9, 2006

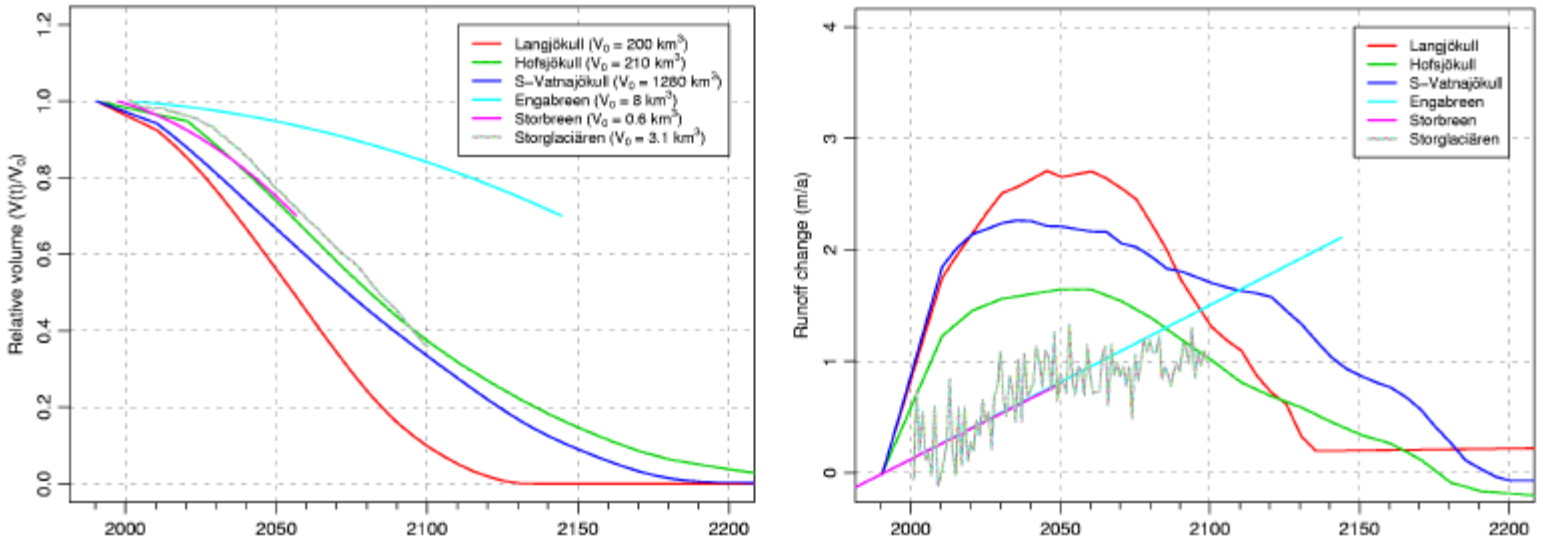
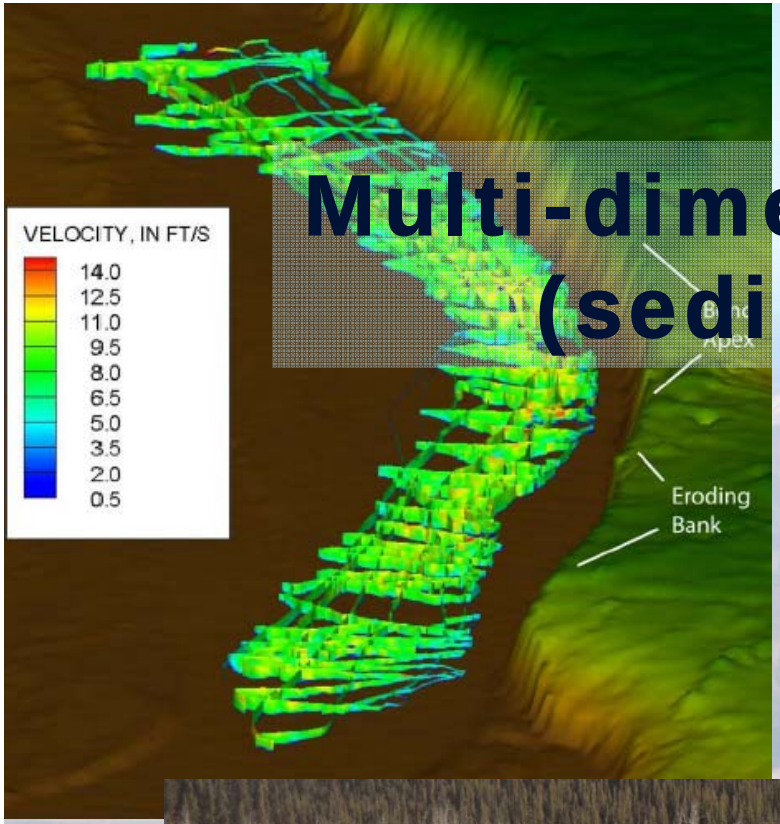


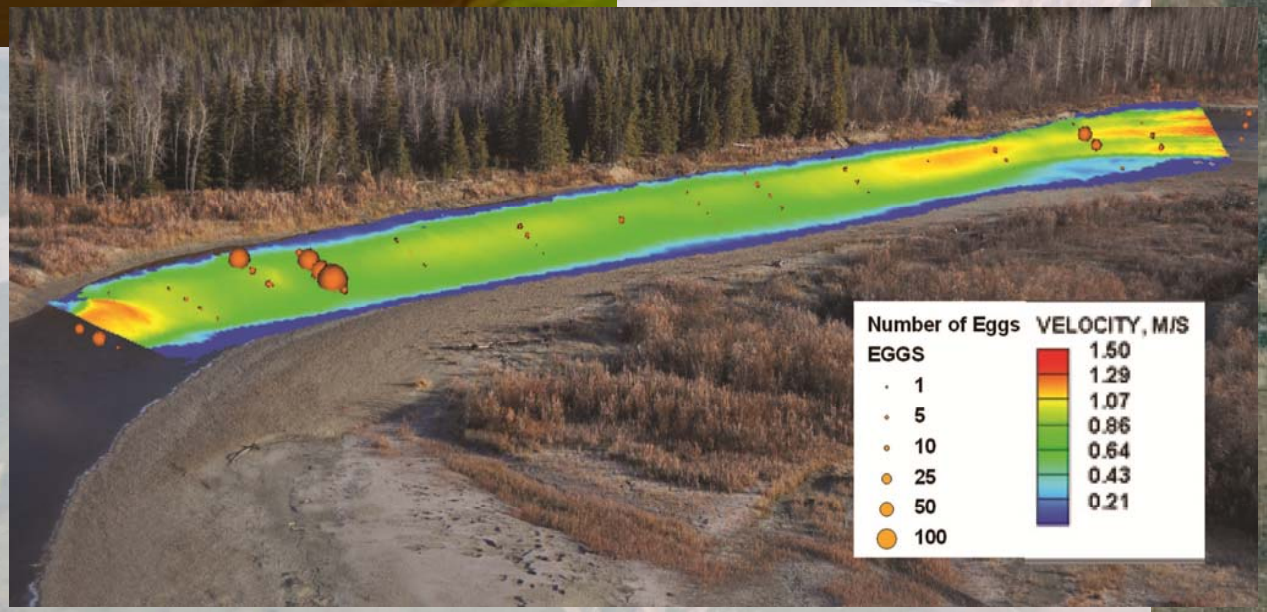
Figure 4. Modeled ice volume and change in runoff from the presently glaciated area for six ice caps and glaciers in Iceland, Norway and Sweden. The legend of the ice volume figure specifies the approximate volume of ice for each glacier at about the year 2000. The initial ice volume in the dynamic model simulations may be slightly different from the specified volume because the modeled glacier may under- or overestimate the volume of ice

Johannesson, et al, 2006

USGS science for a changing world

Multi-dimensional hydraulic (sediment) models



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3
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Image NASA
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