Bear River Stream Flow Reconstruction

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- Simon Wang

http://en.wikipedia.org/wiki/Bear_River_(Utah)

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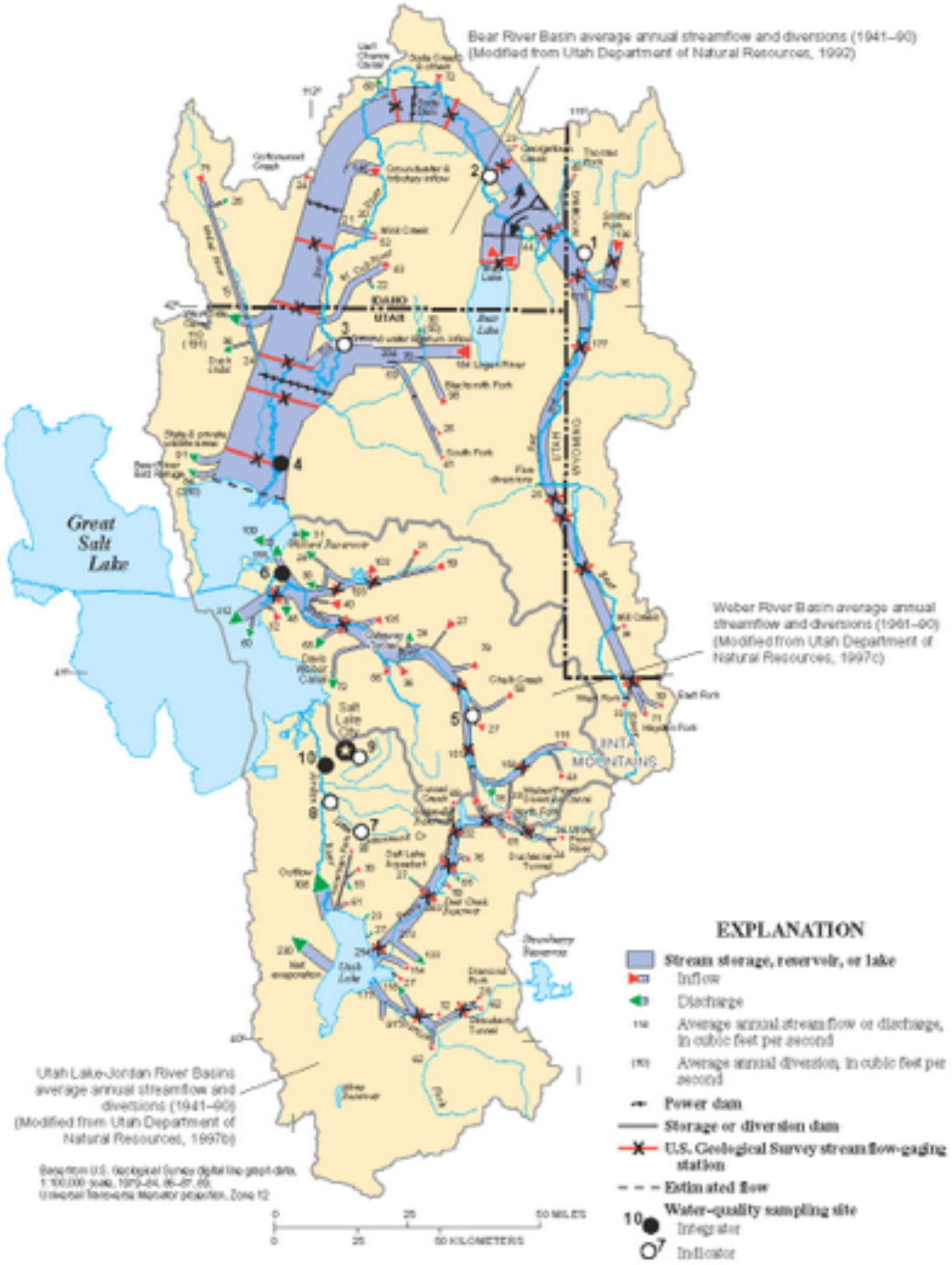
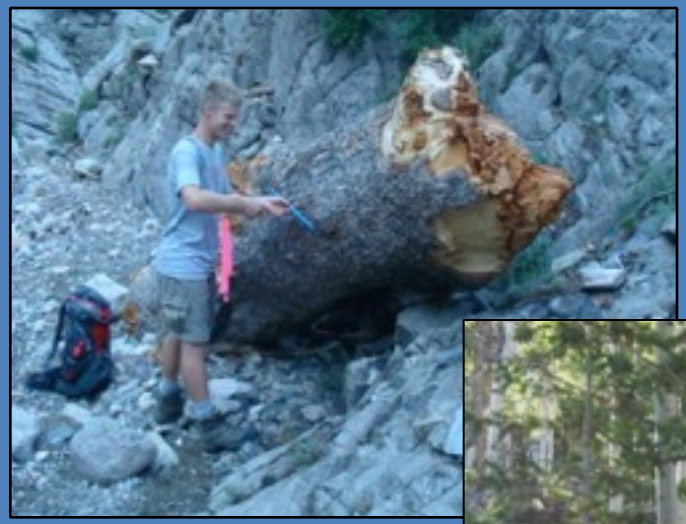
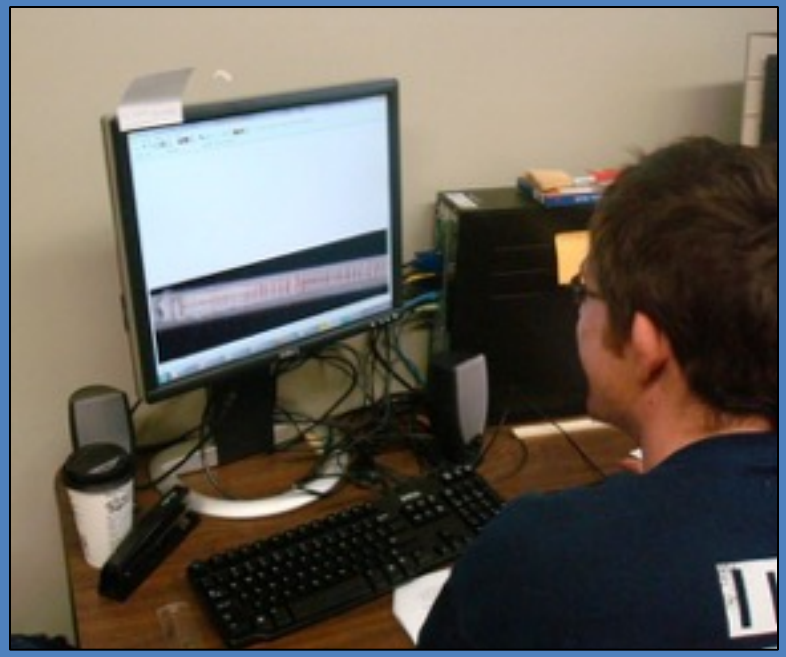
Bear River


Bear River Basin average annual streamflow and diversions (1941–90)
(Modified from Utah Department of Natural Resources, 1992)
Great Salt Lake
IDAHO
UTAH
WYOMING
Weber River Basin average annual streamflow and diversions (1961–90)
(Modified from Utah Department of Natural Resources, 1997c)
UINTA MOUNTAINS
Utah Lake-Jordan River Basins average annual streamflow and diversions (1941–90)
(Modified from Utah Department of Natural Resources, 1997b)
EXPLANATION
Stream storage, reservoir, or lake
Inflow
Discharge
Average annual streamflow or discharge, in cubic feet per second
Average annual diversion, in cubic feet per second
Power dam
Storage or diversion dam
U.S. Geological Survey streamflow-gaging station
Estimated flow
Water-quality sampling site
Integrator
Indicator
50 MILES
50 KILOMETERS





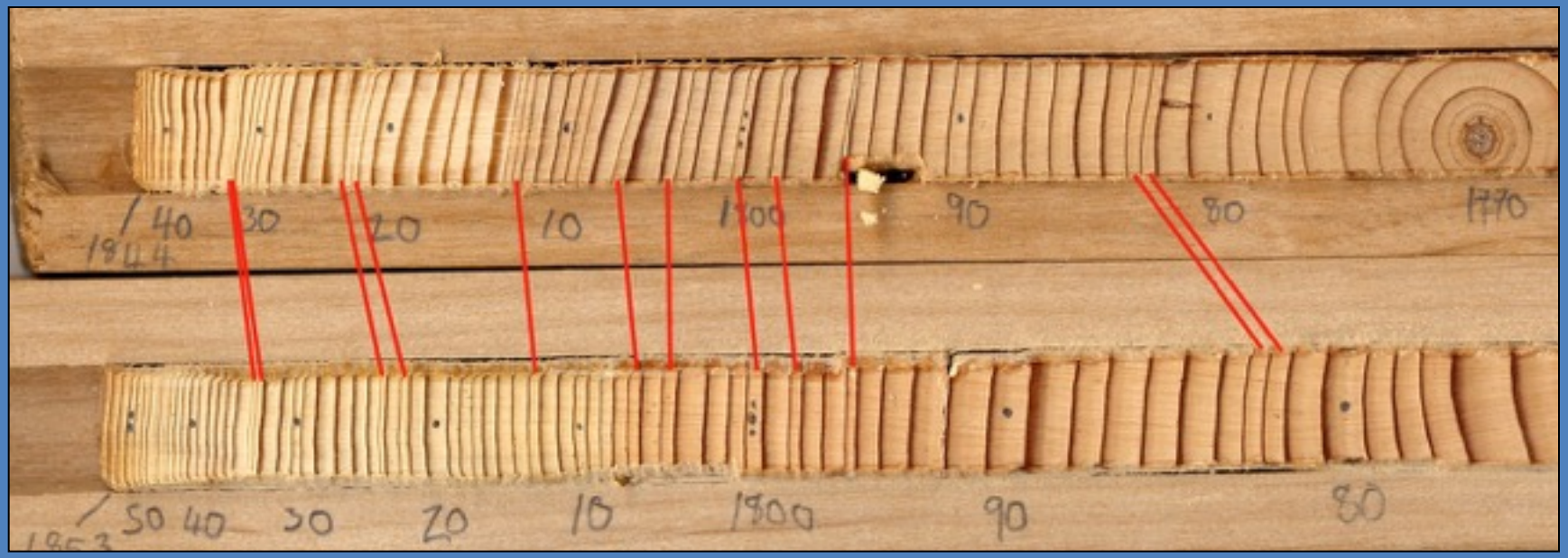
Dendrochronology 101

Site and Species Selection Principle

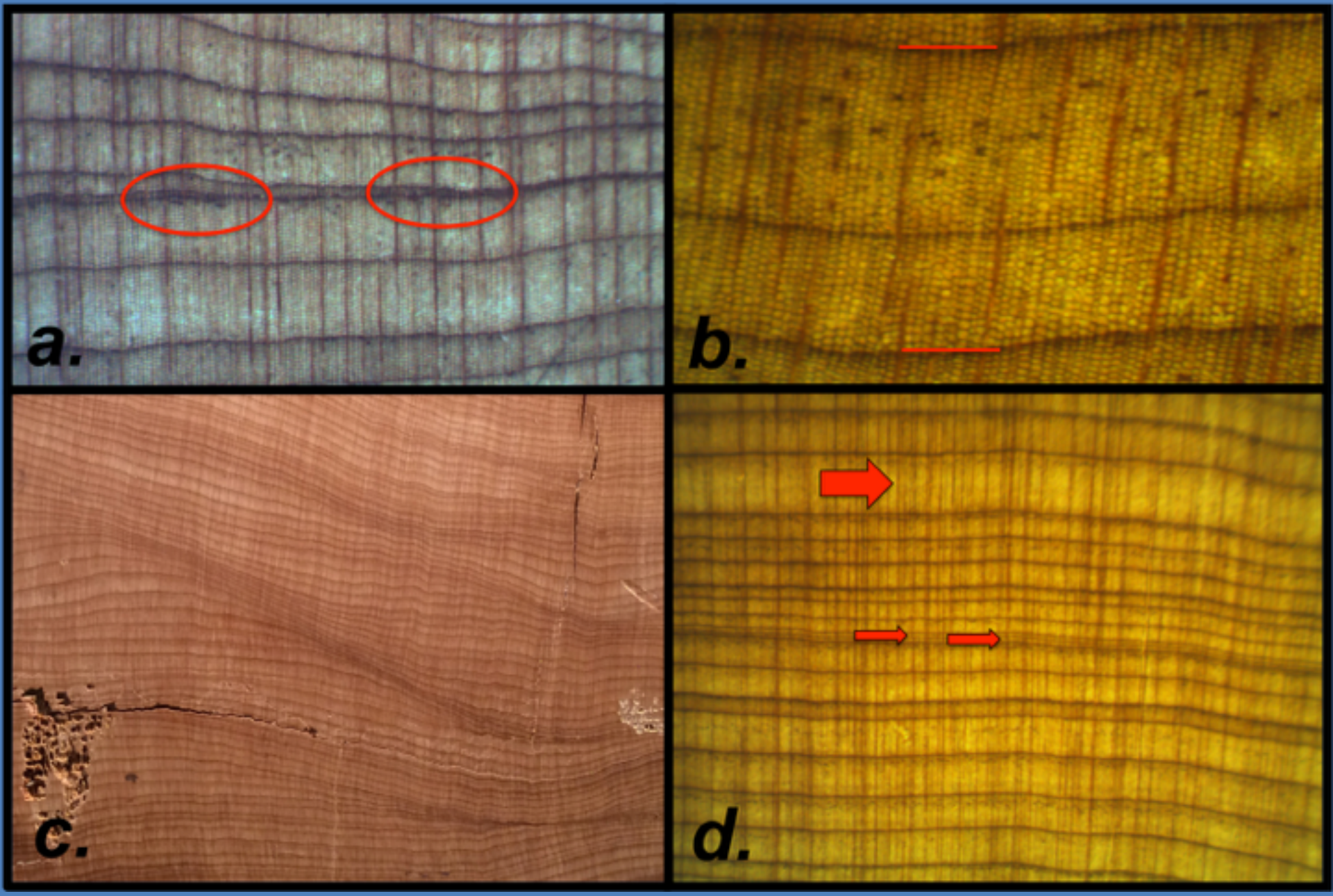
- a **dry** year leads to a *narrow* growth ring
- a **wet** year leads to a *wide* growth ring

Dendrochronology 101

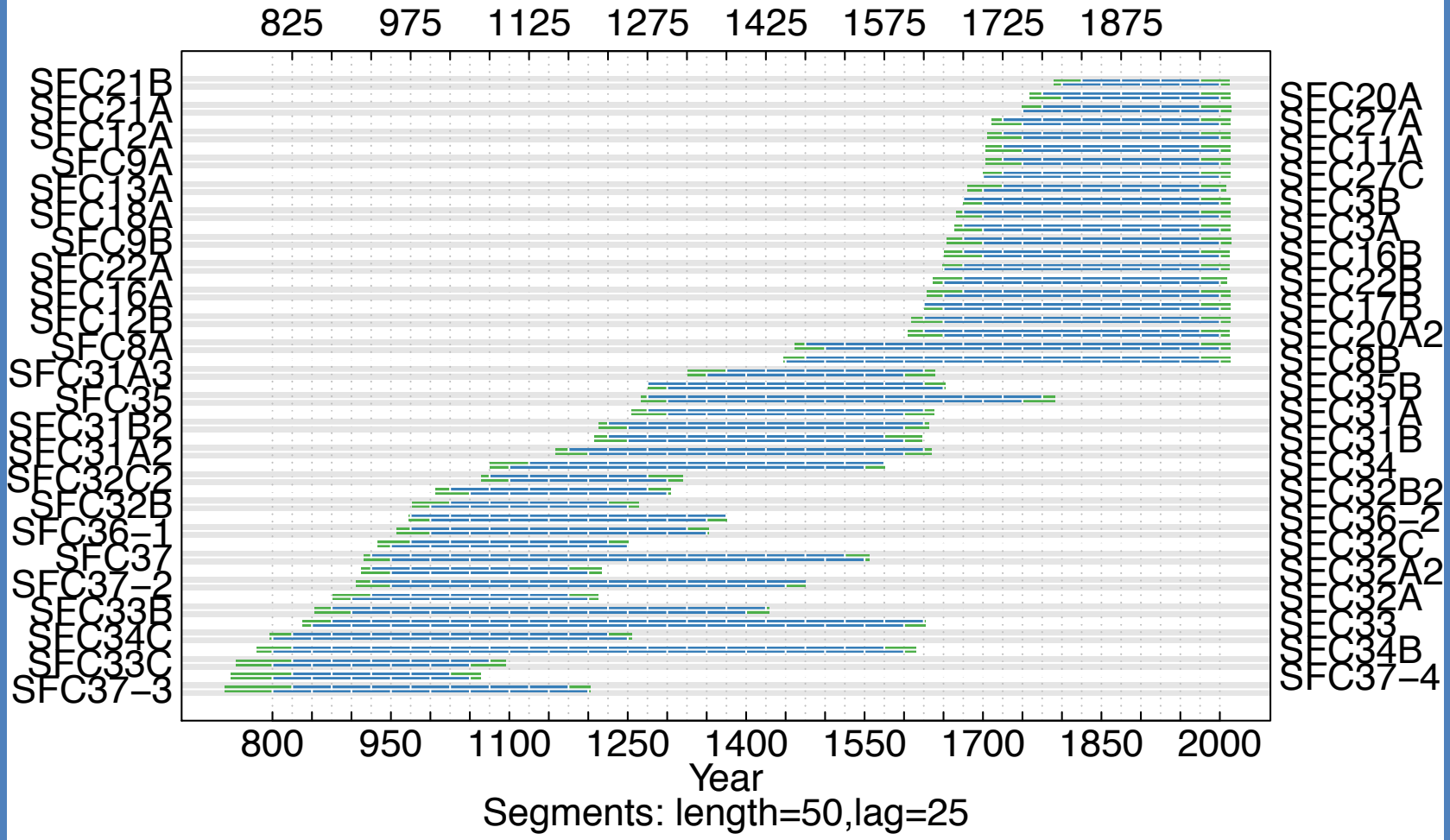
Crossdating Principle



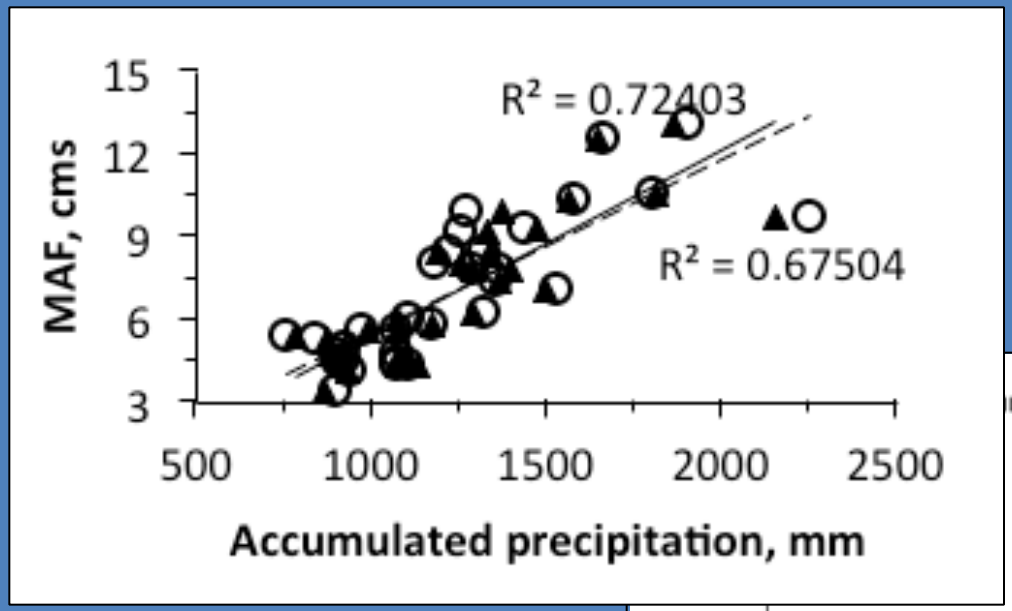
Utah juniper

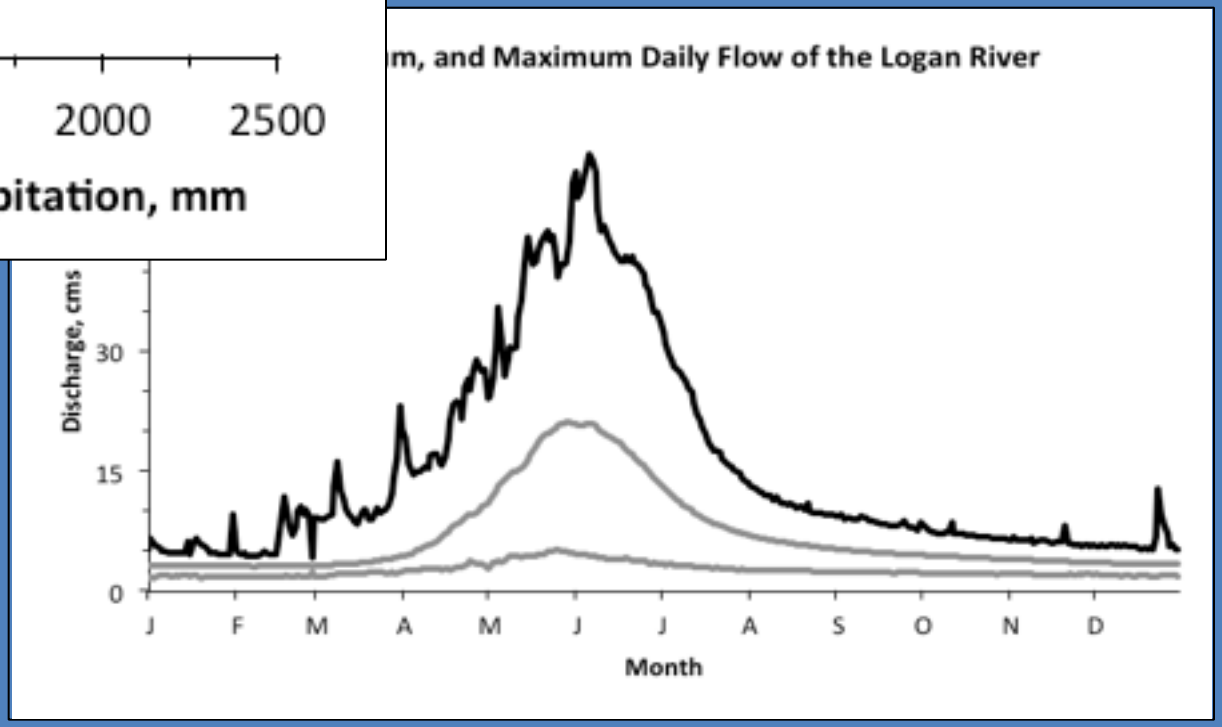


Bear River chronology

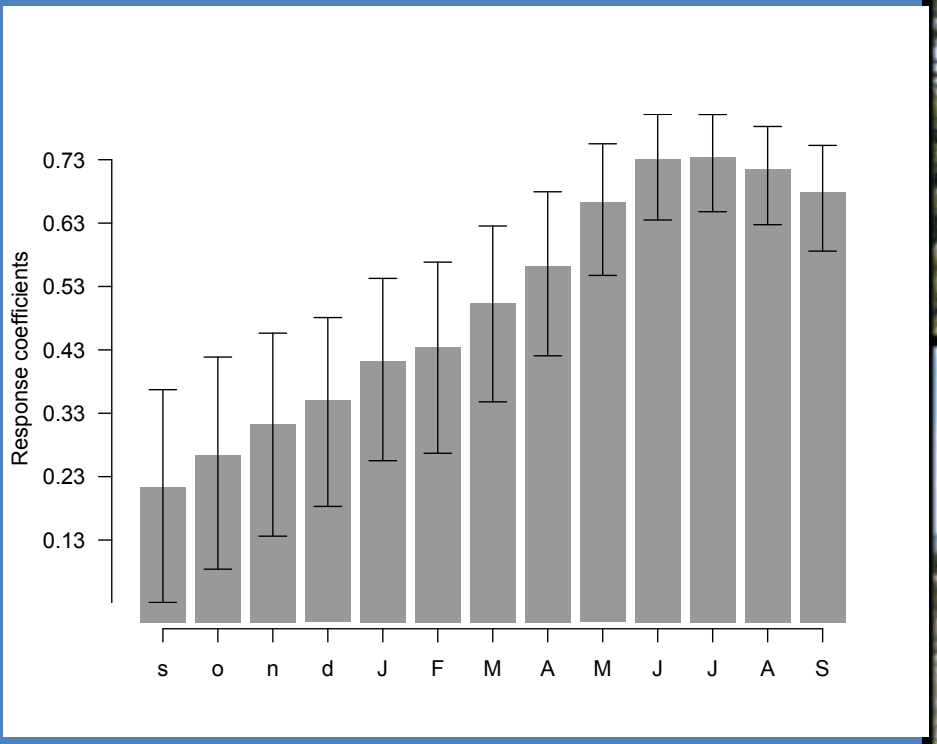


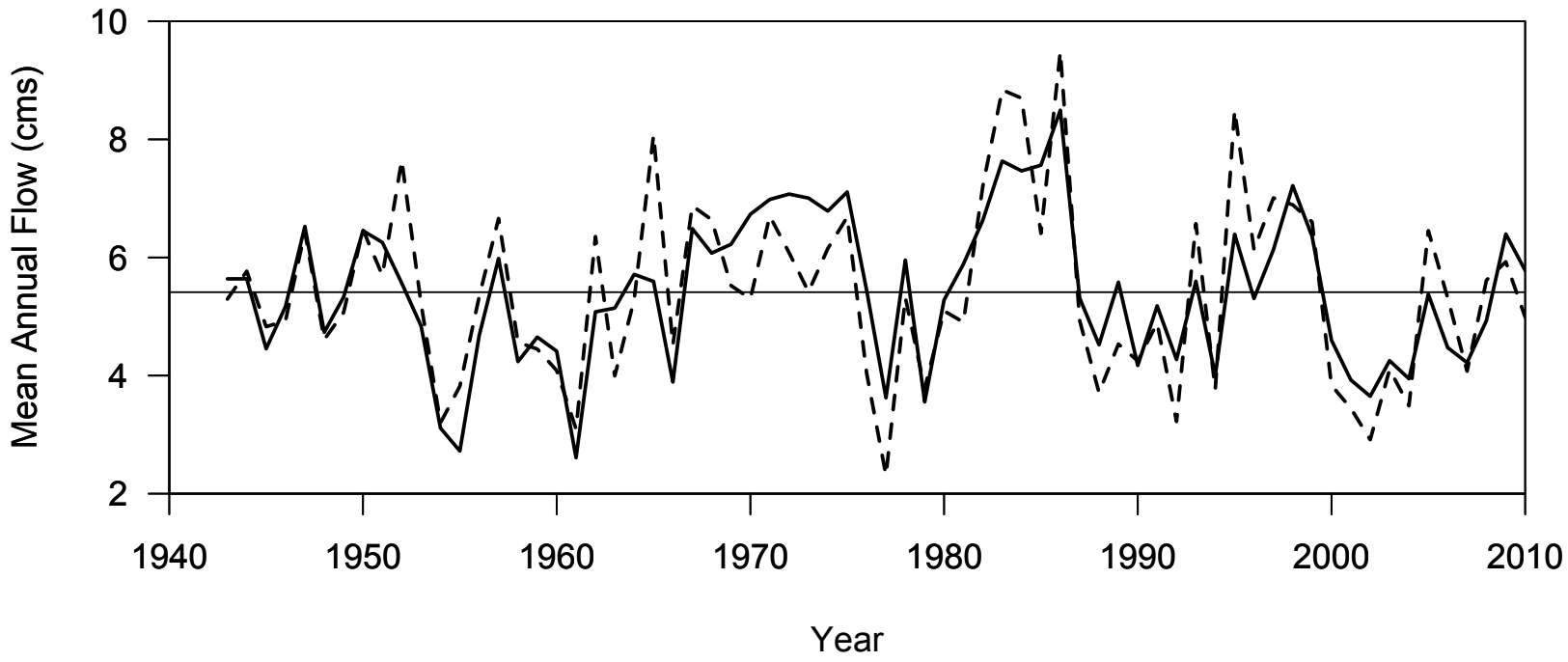
Stream flow reconstruction



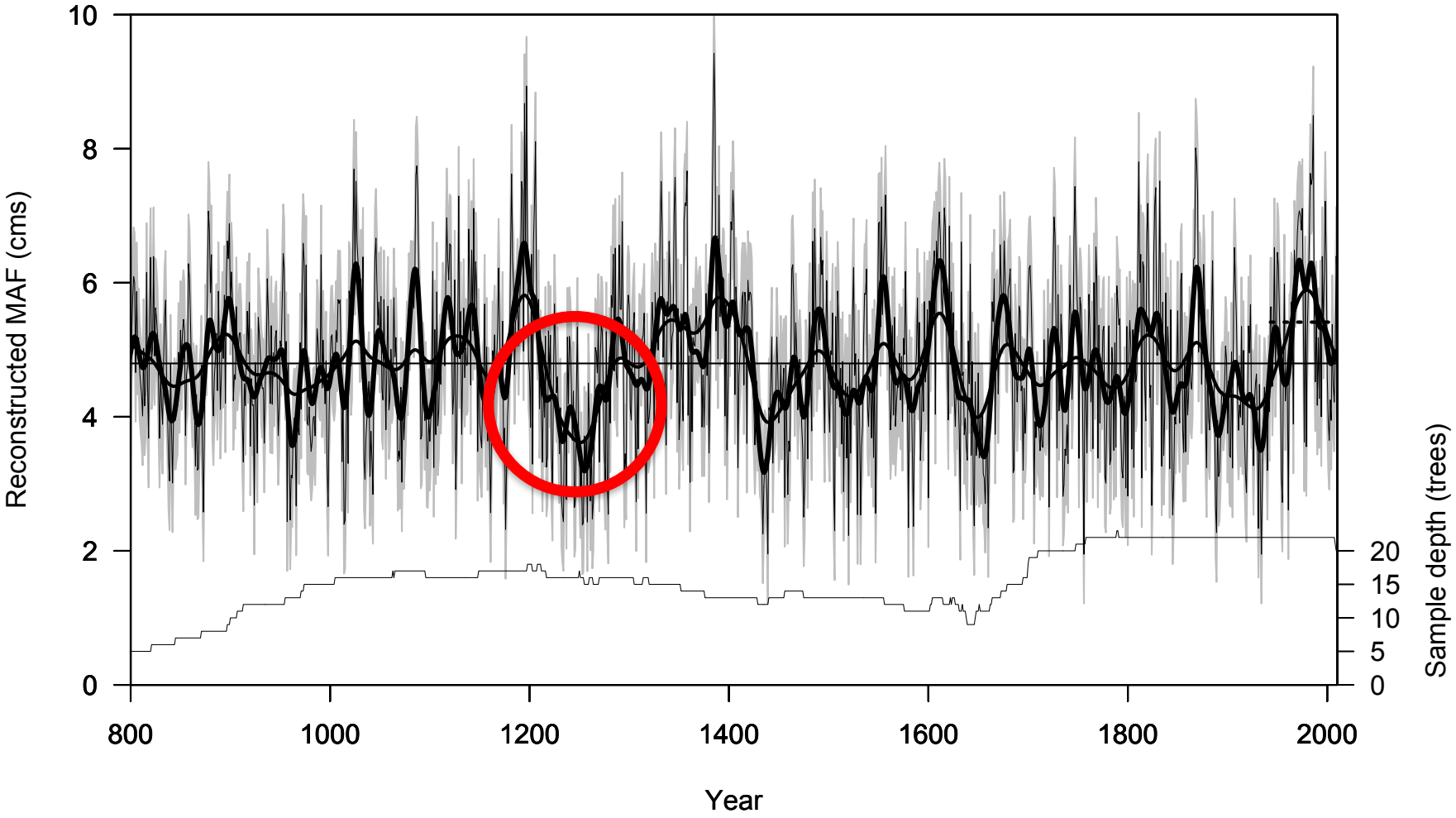


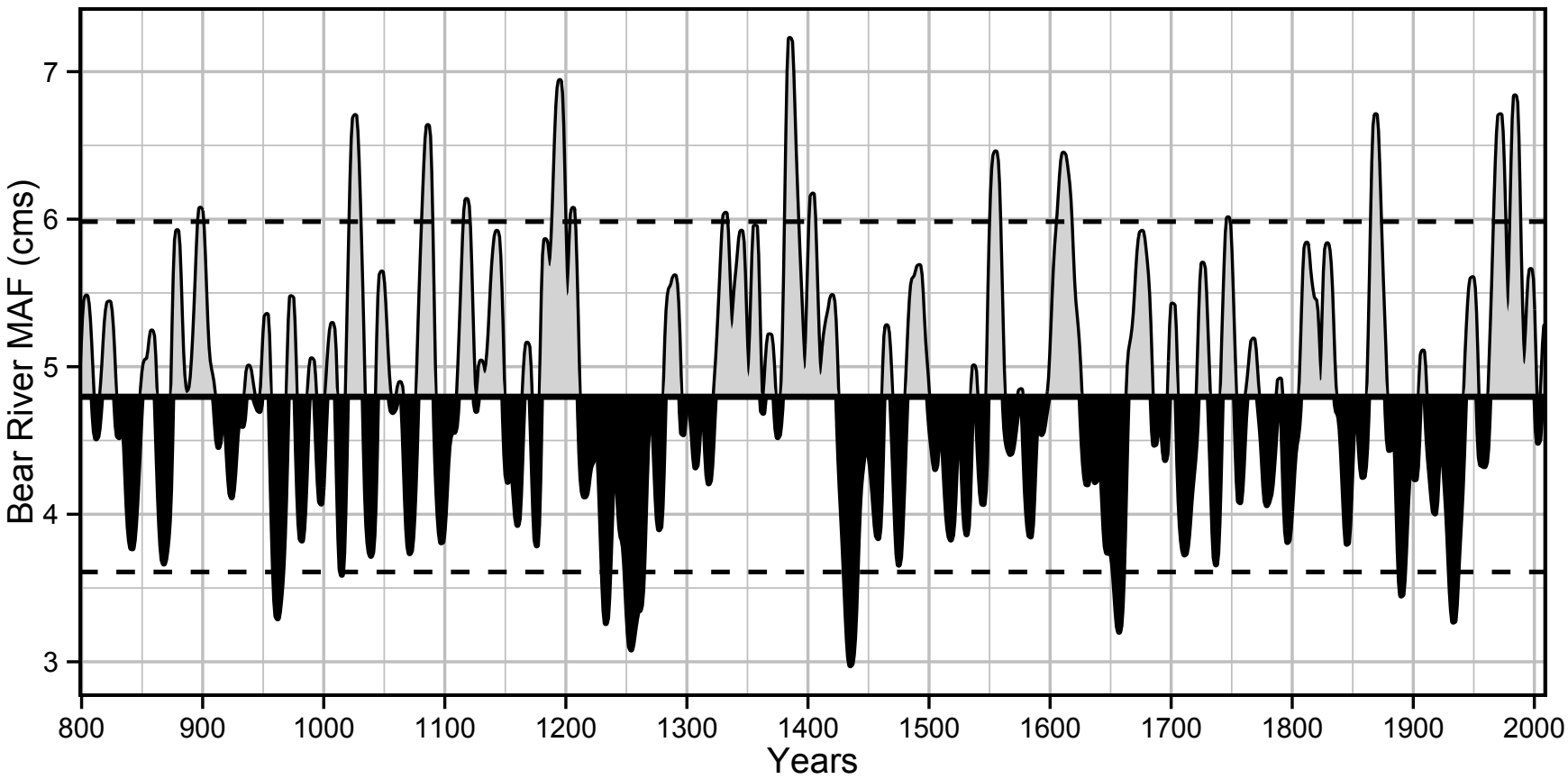
Utah juniper sites

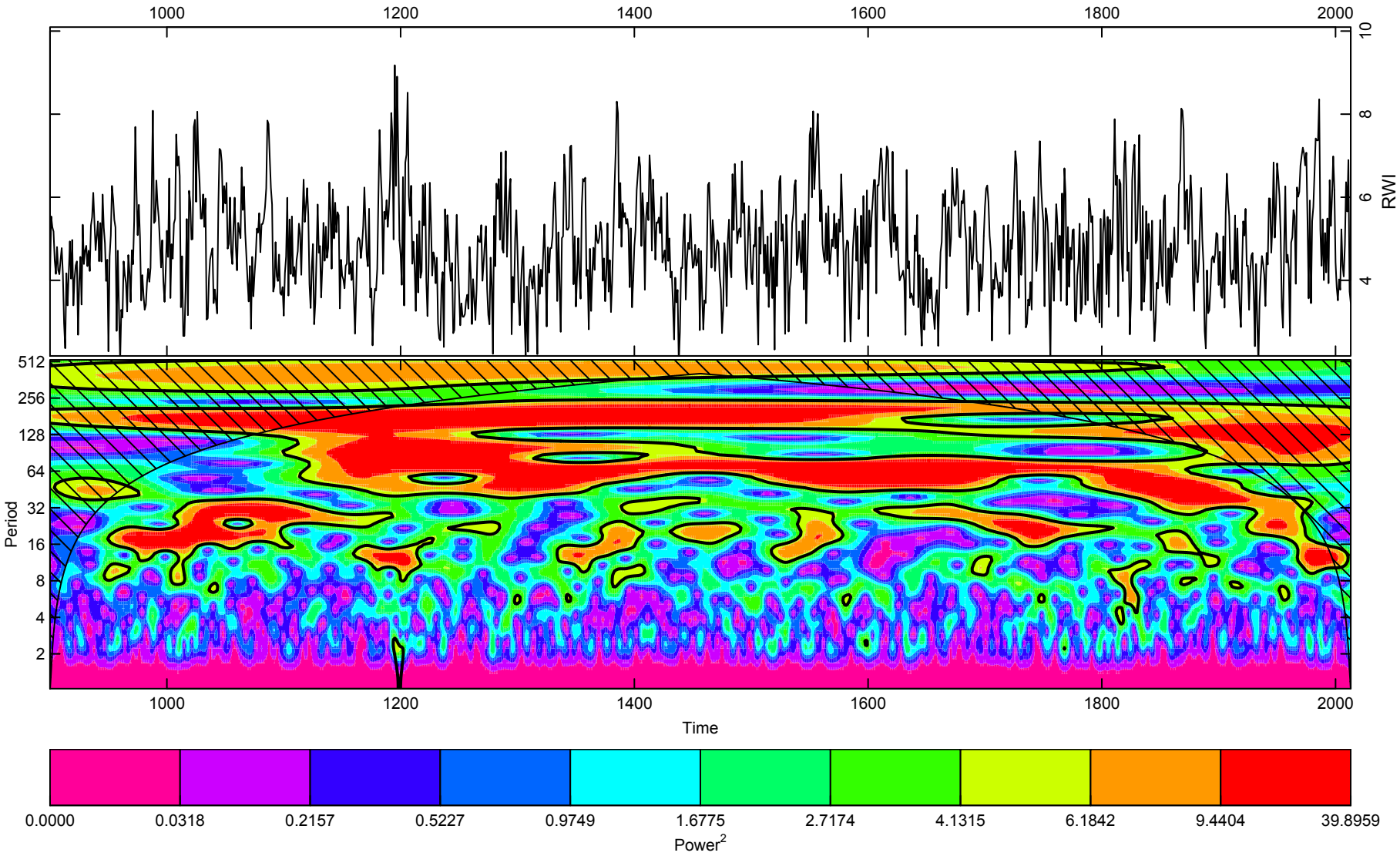


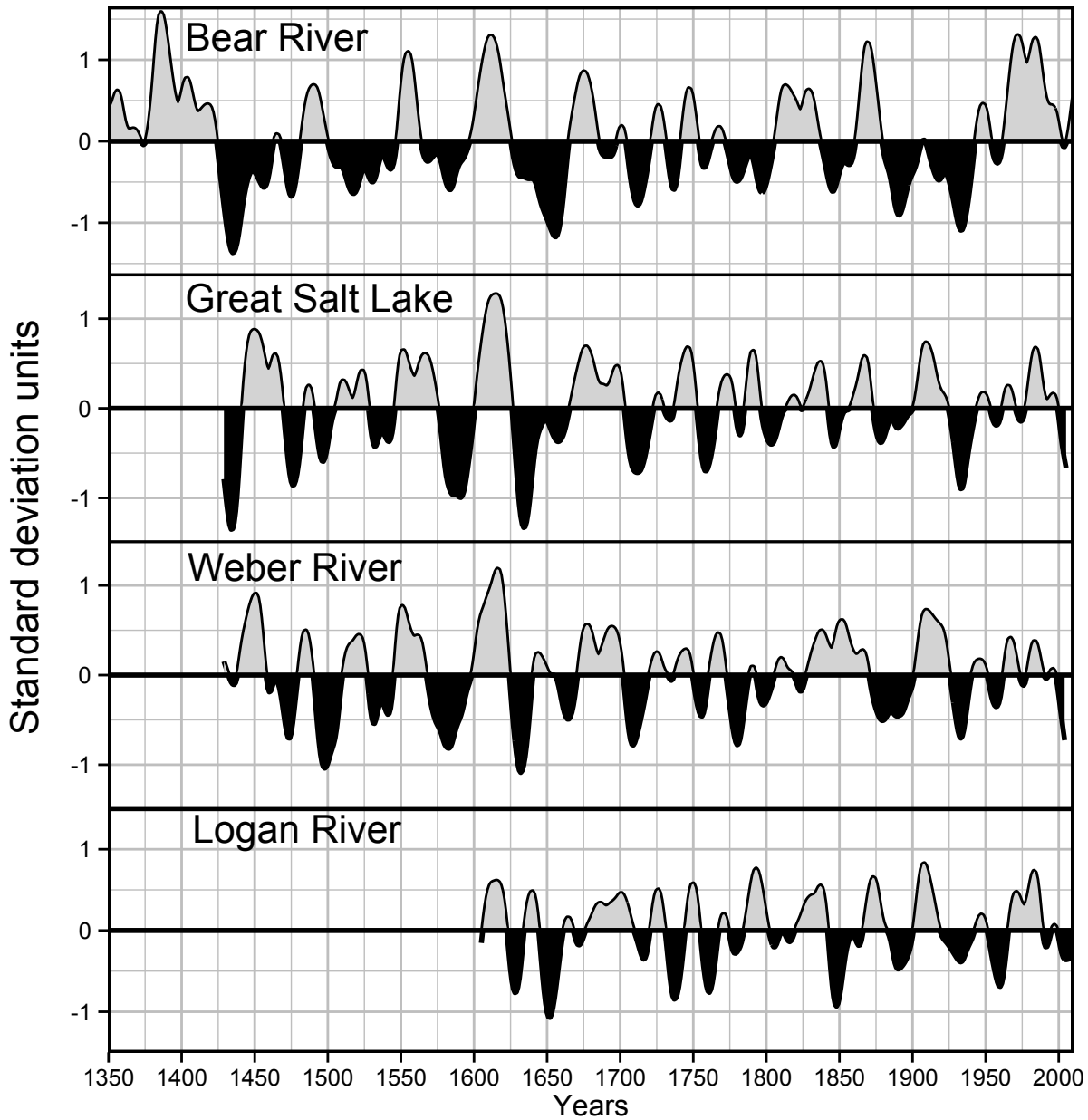

Mean Annual Flow (cms)
10
8
6
4
2
1940
1950
1960
1970
1980
1990
2000
2010
Year

Bear River reconstruction




Bear River MAF (cms)
7
6
5
4
3
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Years


1000
1200
1400
1600
1800
2000
10
8
6
4
RWI
512
256
128
64
32
16
8
4
2
Period
Time
0.0000
0.0318
0.2157
0.5227
0.9749
1.6775
2.7174
4.1315
6.1842
9.4404
39.8959
Power^2

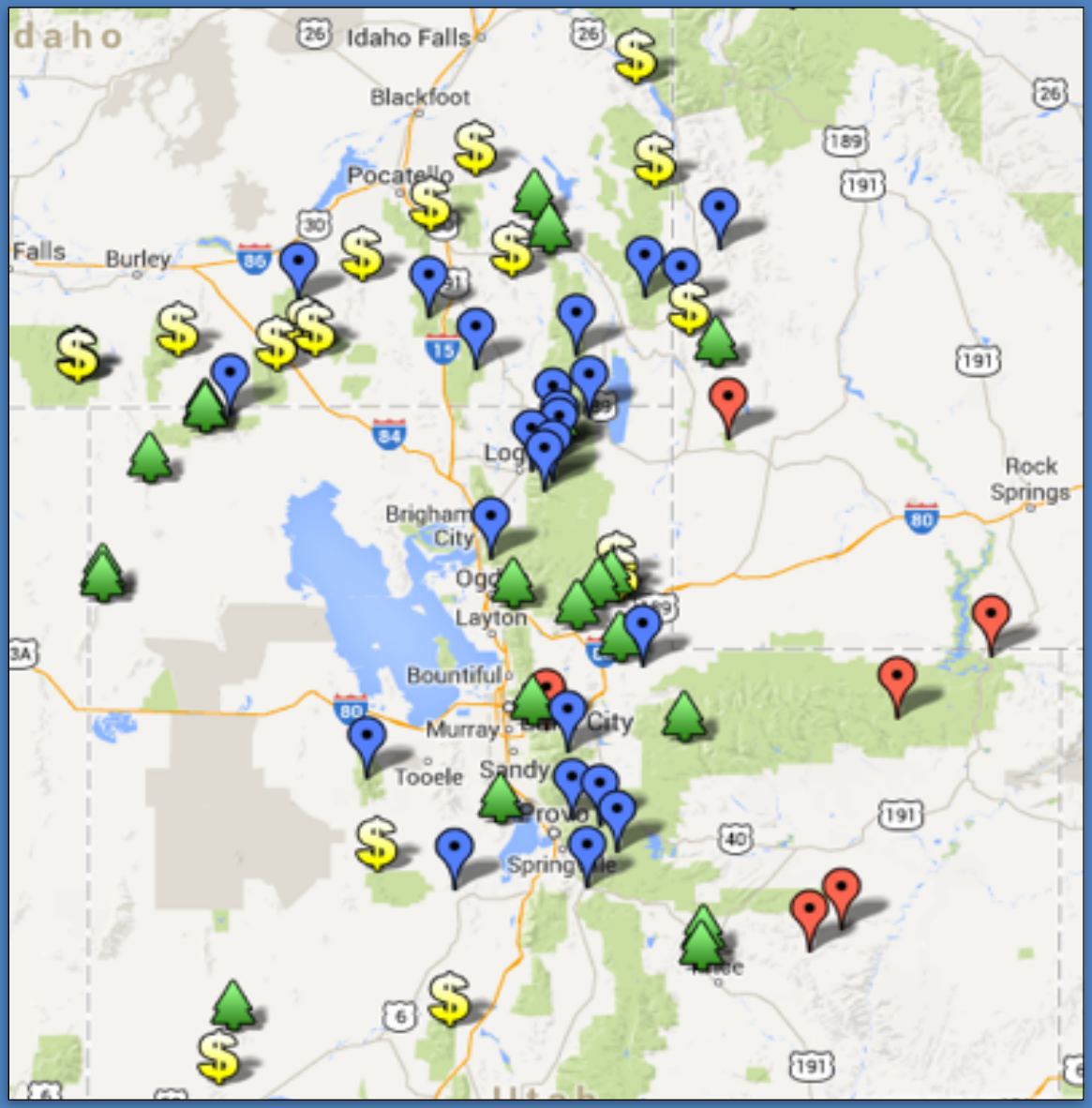

Bear River
Great Salt Lake
Weber River
Logan River
Standard deviation units
1
0
-1
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
Years

Bear River Gages

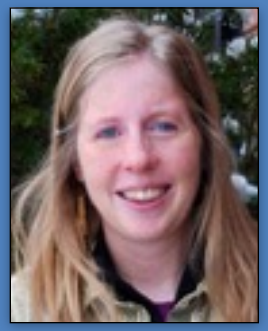
Table 6
Attributes of downstream Bear River gages and immediate tributaries to the Bear, and correlations (r) between Bear River reconstruction (1943–2010) and downstream gages in order of drainage area.

USGS gage name (number)	Location (easting-northing)	Elevation (m asl)	Drainage area (km^{-2})	Period of record	Missing data (# years)	(r)
Smith's Fork (Bear River tributary) (10032000)	42°17′36″N 110°52′18″W	2027	427	1943–2013	0	0.72
Smith's Woodruff, UT (10020100)	41°26′04″N 111°01′01″W	1967	1955	1962–2013	0	0.85
Smith's Cokeville, WY (10038000)	42°07′36″N 110°58′21″W	1871	6338	1955–2013	2	0.81
Border, WY (10039500)	42°12′40″N 111°03′11″W	1845	6423	1938–2013	4	0.79
Pescadero, ID (10068500)	42°24′06″N 111°21′22″W	1814	9596	1923–2013	15	0.67
ID-UT state line (10092700)	42°00′47″N 111°55′14″W	1347	12,650	1971–2013	0	0.79
Corinne, UT (10126000)	41°34′35″N 112°06′00″W	1282	18,205	1950–2013	6	0.75

WADR tree-ring collection effort



CIRES
Cooperative Institute for Research in Environmental Science



WAsatch Dendroclimatology Research (WADR) Group

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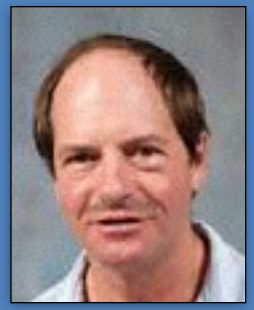

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Thank you !