Preliminary Calibration Run

Allan Wylie IDWR

Reach Gain and Spring Discharge Targets

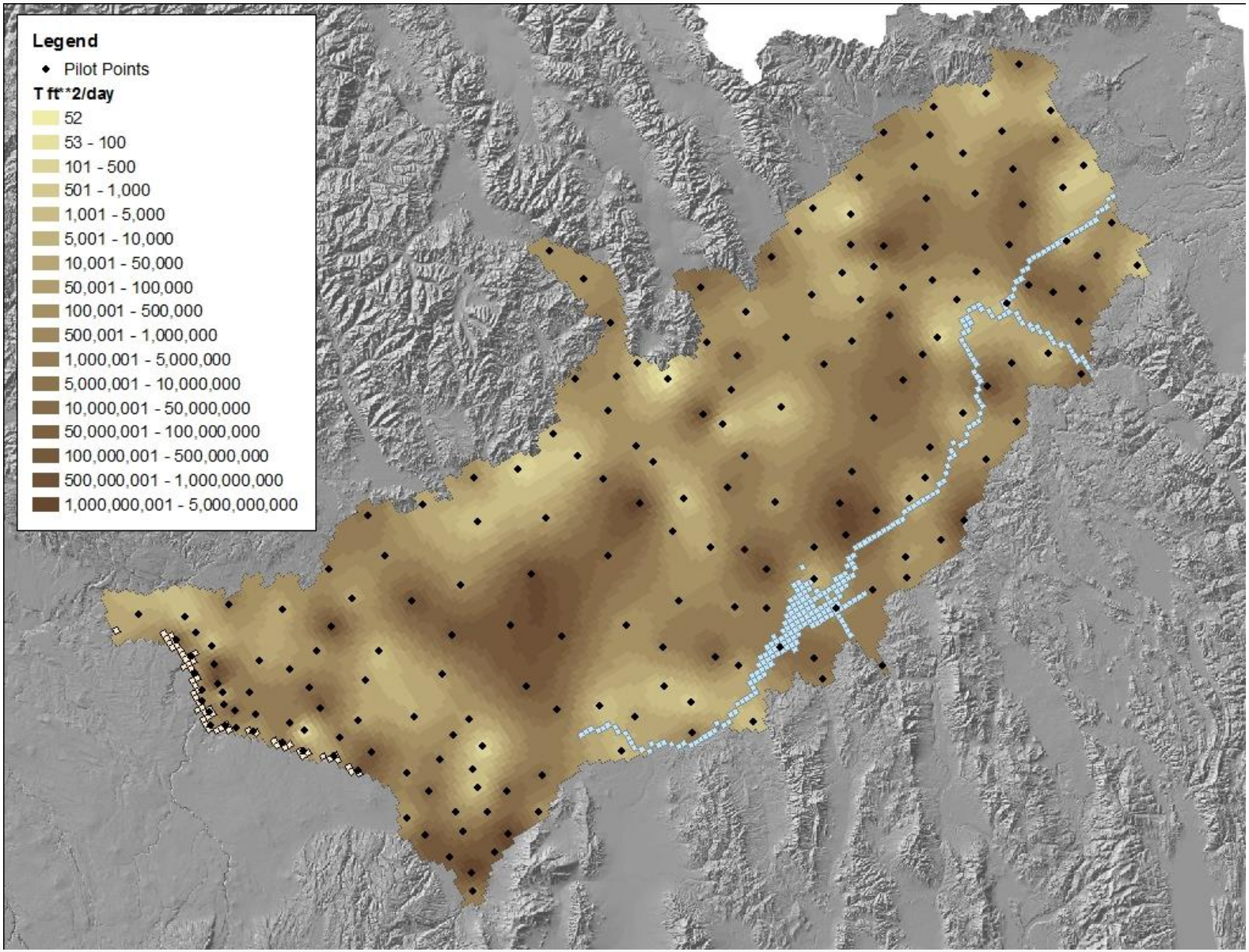
- Monthly Stress Periods
  - Using
    - MKMOD81.exe
      - Using On-Farm algorithm
    - **MFUSG**
    - WoodTest
      - **AFRD2/Big Wood, Ritchfield and Dietrich separate entities**
    - No steady state targets
    - Aquifer head
      - **New set of wells to incorporate sentinel wells**
    - Snake reach gain and loss targets
      - **Include Heise-Menan and Menan-Shelley**
      - **Filtered and unfiltered**
    - Spring discharge
      - Two drains in every spring cell
      - **Adjusted elevation of Briggs**
      - **Using USGS gage at Blue Lk**
        - » Difference between gage and total diversions not significant
    - Return flow targets
      - Egin, Liberty, Great Feeder Group, Butte-Market Lake, Aberdeen-Springfield, BID, MID, and NSCCo

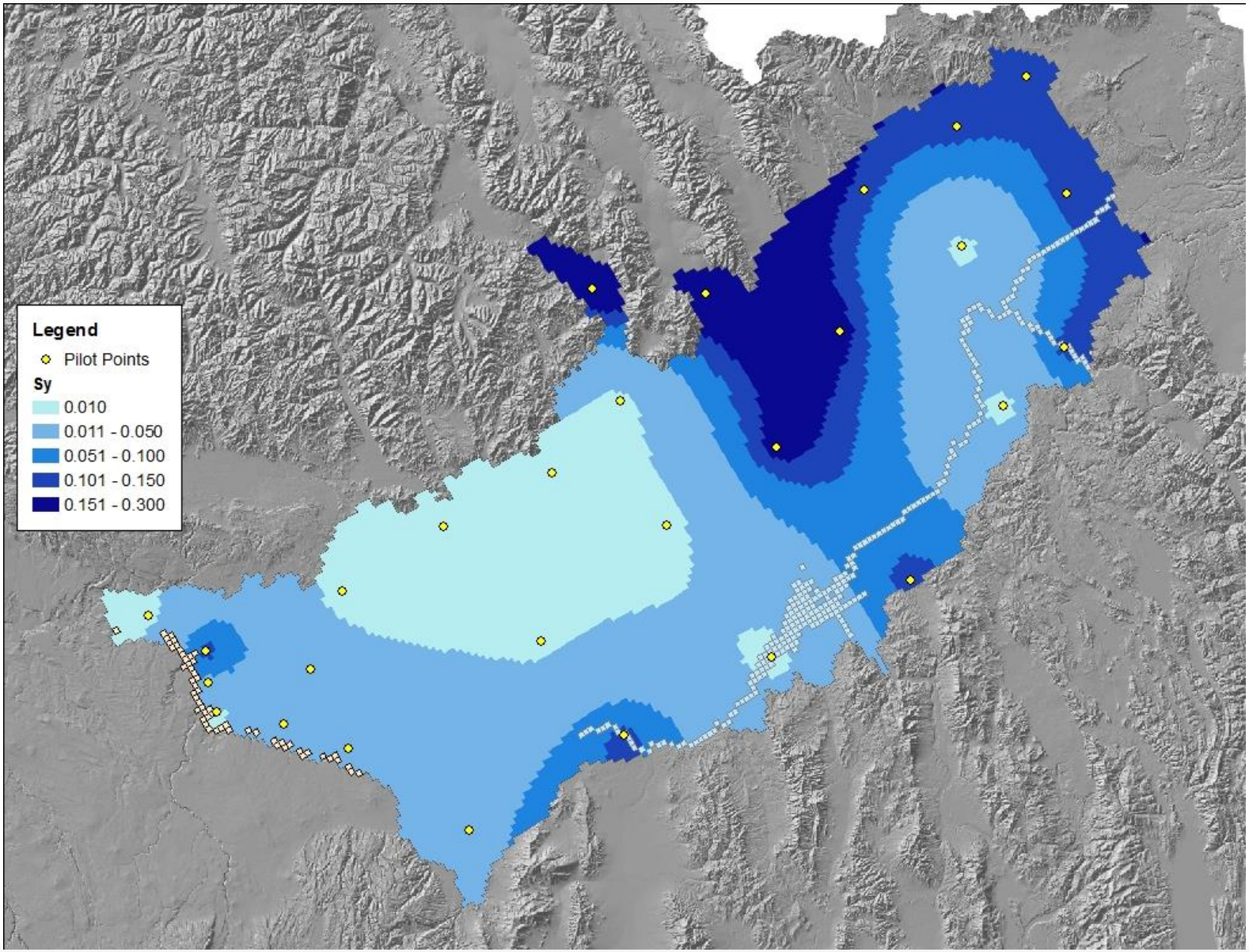
Adjustable Parameters

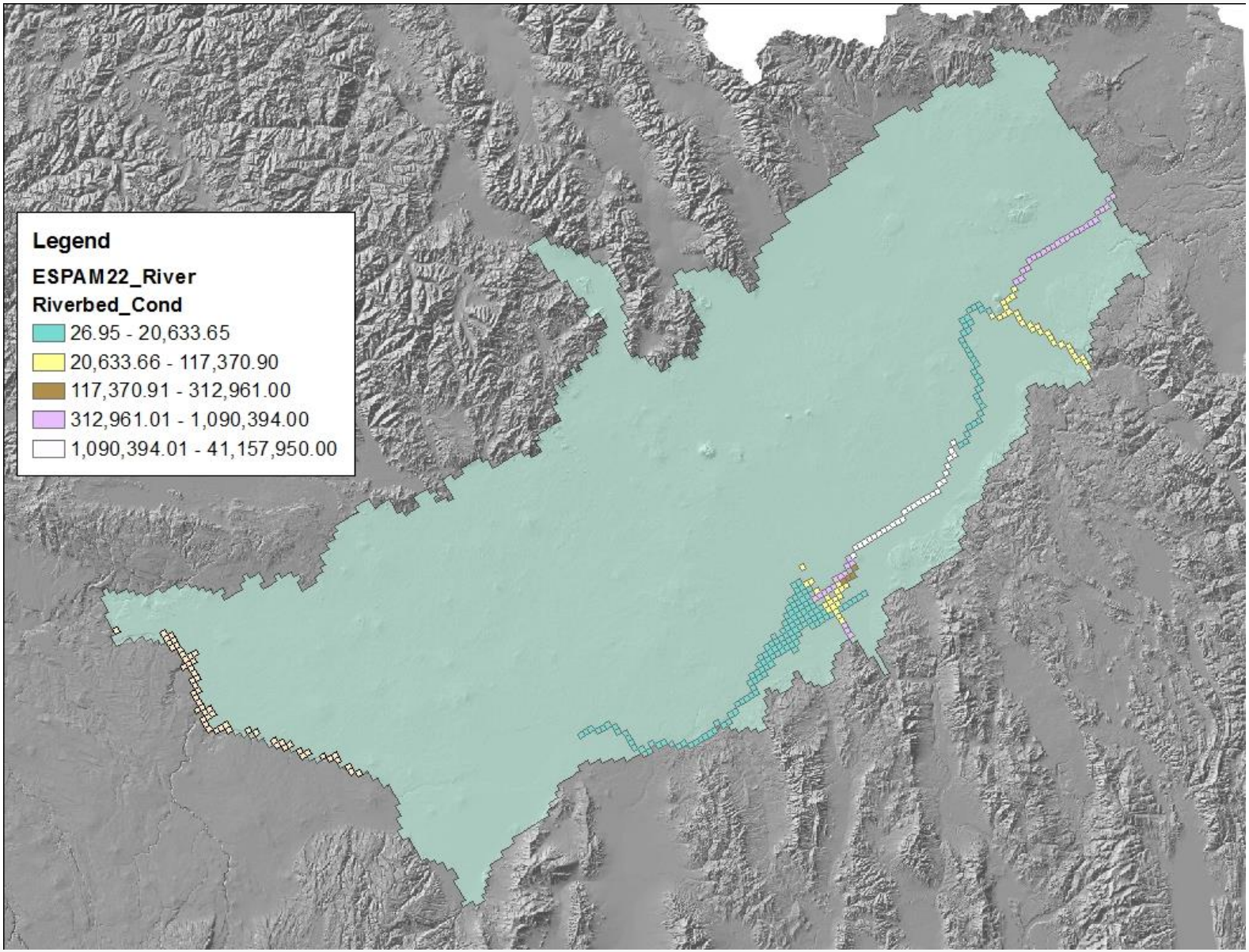
- Adjustable Parameters
  - Transmissivity
    - Pilot Points
      - 1e-10 – 1e+10
  - Specific Yield
    - Pilot Points
      - 0.05 – 0.30
  - Riverbed Conductance
    - Added Portneuff and others
    - By reach
      - 1.0 – 1e+10
  - Drain Conductance
    - By drain
      - 2 drains per model cell
      - 1e-10 - 3e+8
  - Canal seepage
    - Uniform by entity
      - 1.05 – 0.95
  - Non-irrigated recharge
    - Thin Thick and Basalt
    - 2.0 – 1.0e-6
  - ET
    - Surface Water Entity
      - Sprinkler and Gravity
      - +/-5%
    - Groundwater Entity
      - Sprinkler and Gravity
      - +/-5%
  - Perched River Seepage
    - River reach
    - +/-20%
  - Tributary Underflow
    - 2 – 1e-6
    - Split Cam/Bev and Hnry Fork
      - 8 – 1e-6

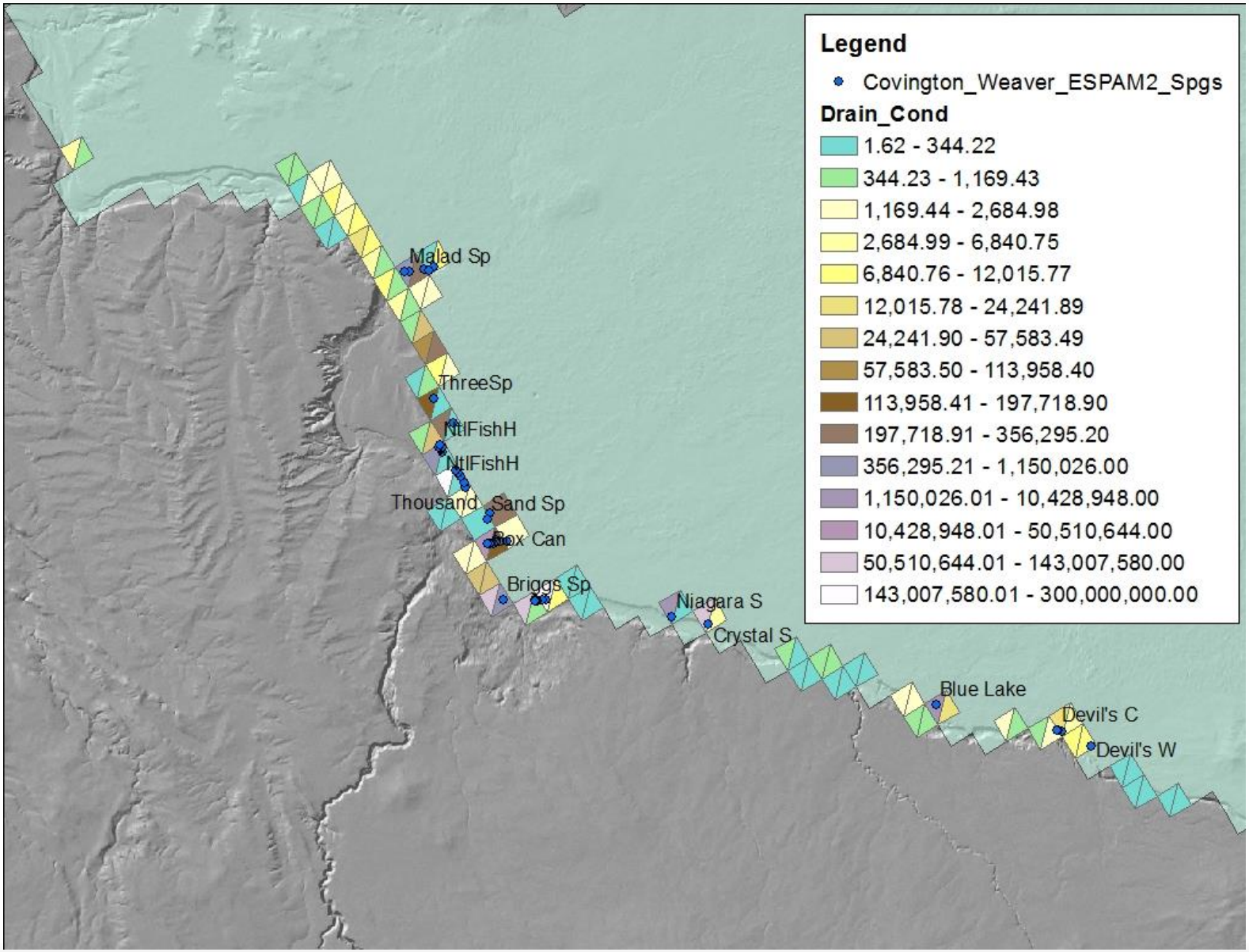
Adjustable Parameters

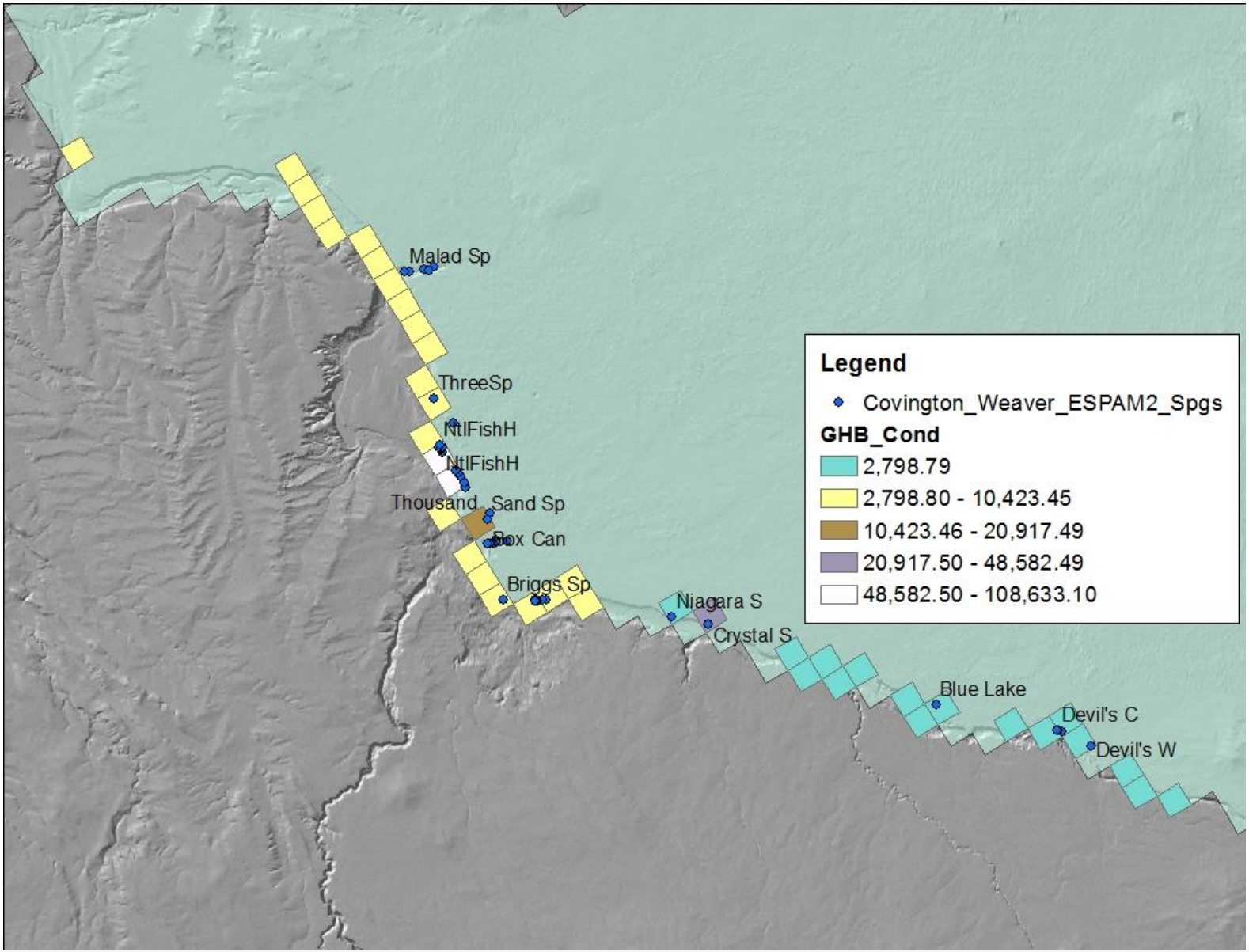
- Adjustable Parameters (cont)
  - On Farm Parameters
    - Efficiency of Sprinkler irrigation
      - Maximum fixed 0.85
    - Efficiency of Gravity irrigation
      - Maximum fixed 0.8
    - DPin
      - 0.98 – 0.6
    - DPex
      - 0.98 – 0.6
    - Entities with no returns DPin and DPex fixed at 1.0

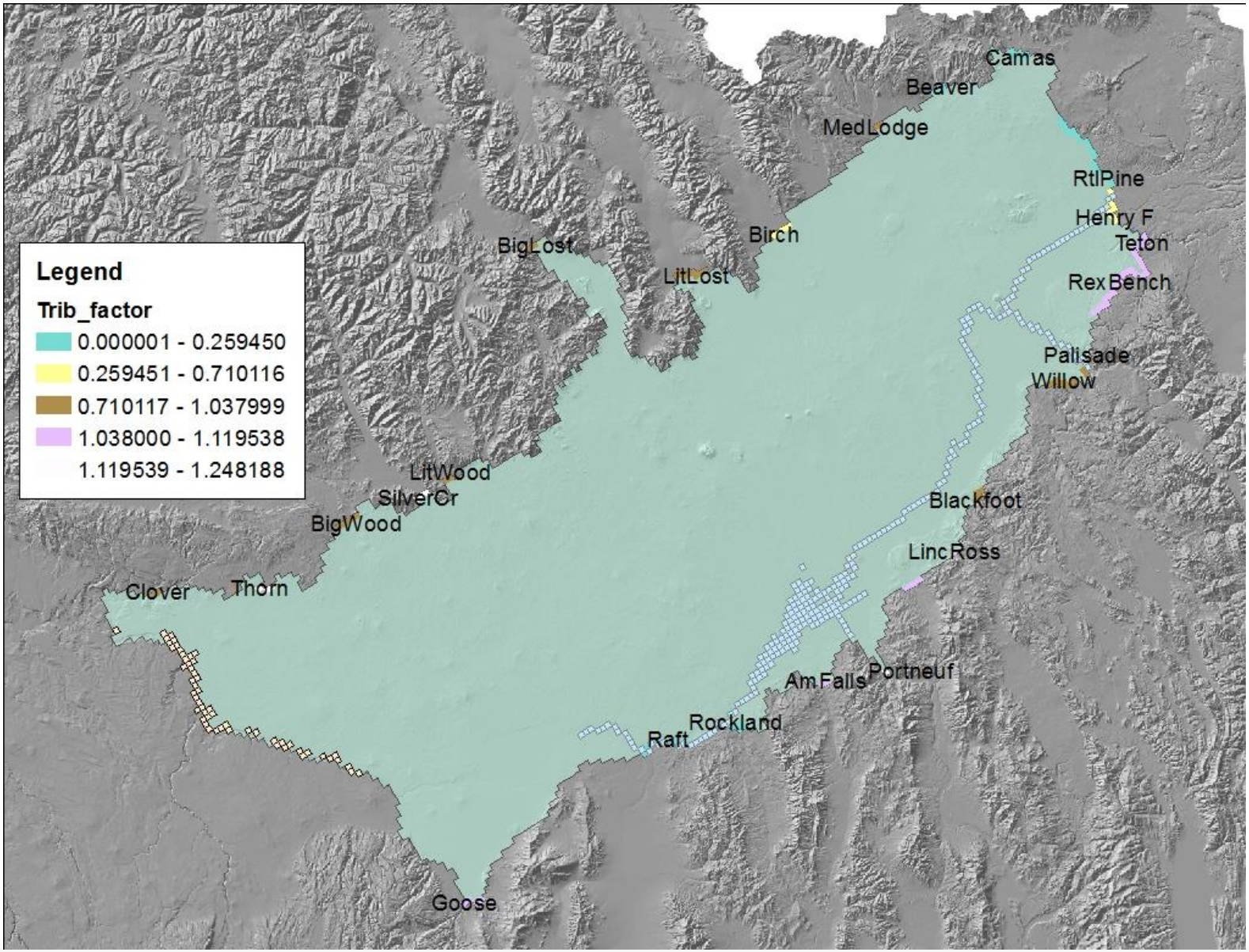

Legend
Pilot Points
T ft**2/day
52
53 - 100
101 - 500
501 - 1,000
1,001 - 5,000
5,001 - 10,000
10,001 - 50,000
50,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
1,000,001 - 5,000,000
5,000,001 - 10,000,000
10,000,001 - 50,000,000
50,000,001 - 100,000,000
100,000,001 - 500,000,000
500,000,001 - 1,000,000,000
1,000,000,001 - 5,000,000,000

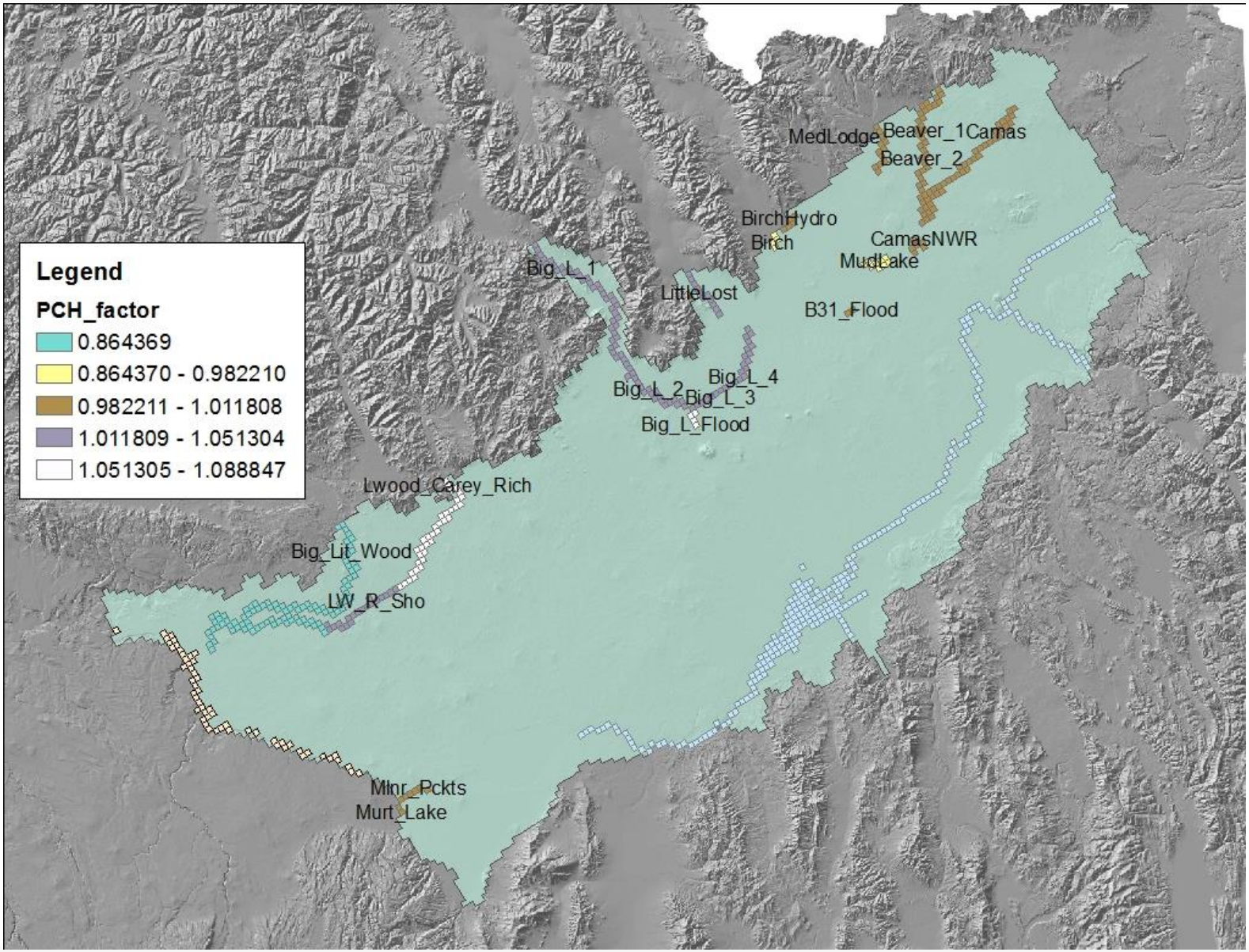

Legend
Pilot Points
Sy
0.010
0.011 - 0.050
0.051 - 0.100
0.101 - 0.150
0.151 - 0.300

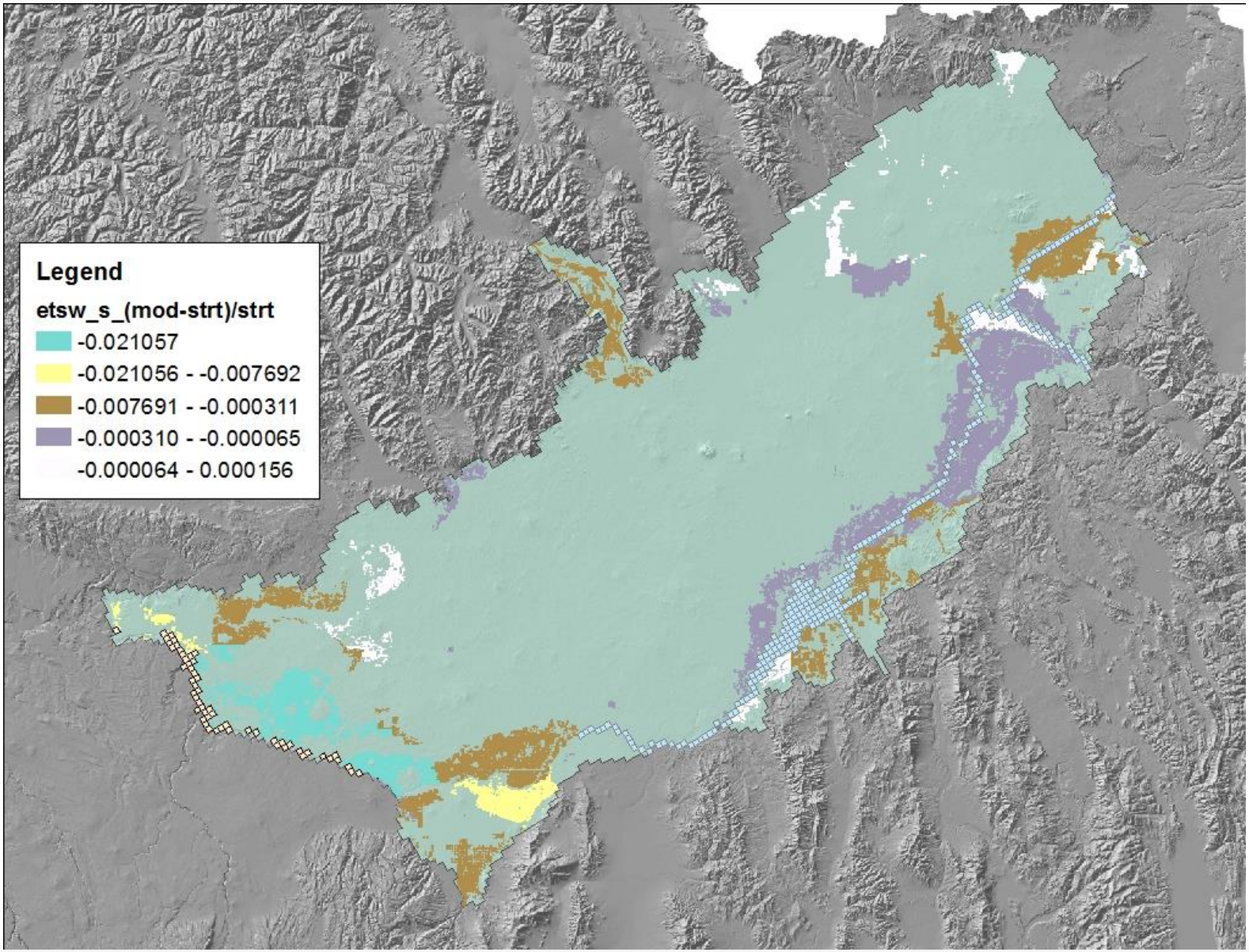

Legend
ESPAM22_River
Riverbed_Cond
26.95 - 20,633.65
20,633.66 - 117,370.90
117,370.91 - 312,961.00
312,961.01 - 1,090,394.00
1,090,394.01 - 41,157,950.00

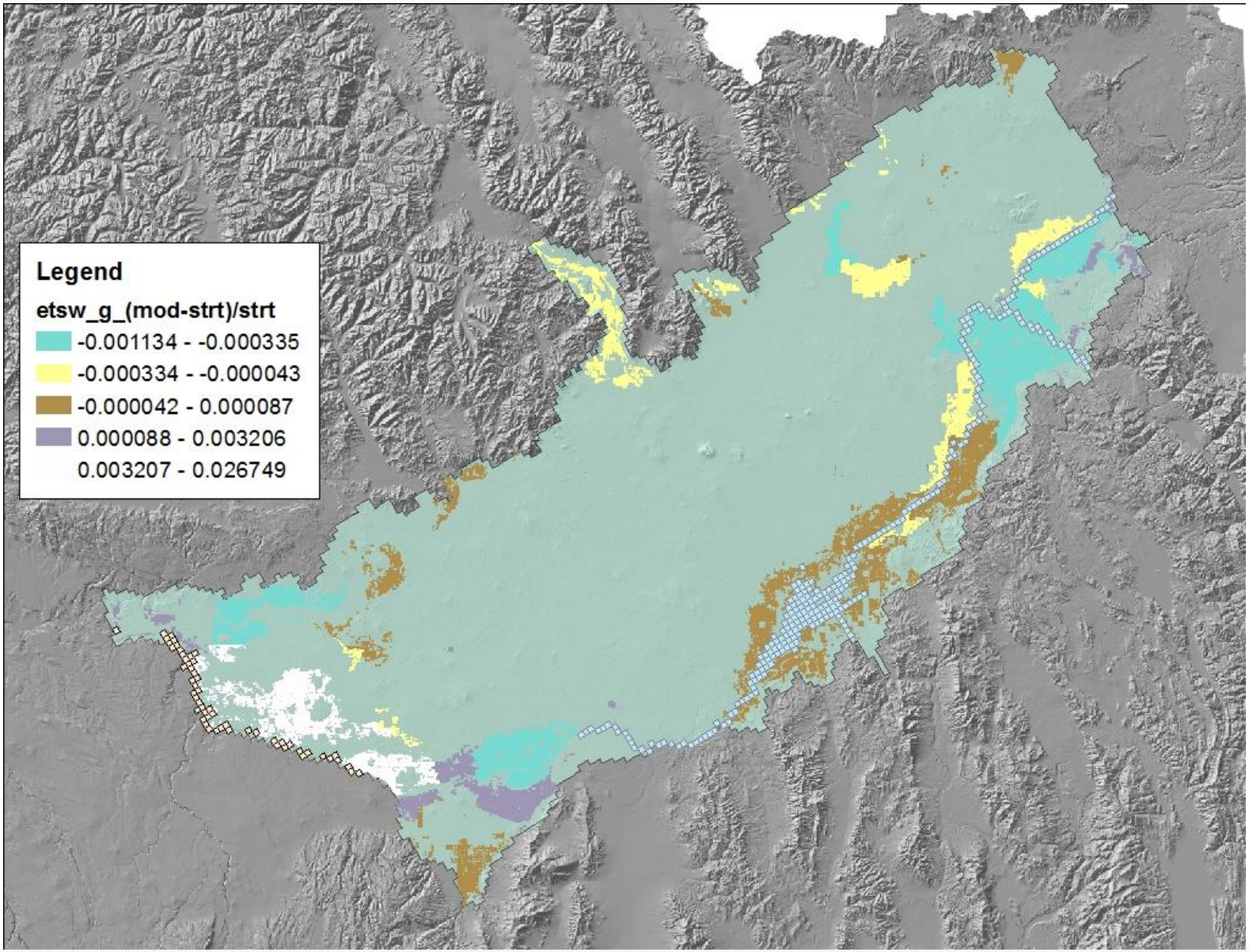

Legend
Covington_Weaver_ESPAM2_Spgs
Drain_Cond
1.62 - 344.22
344.23 - 1,169.43
1,169.44 - 2,684.98
2,684.99 - 6,840.75
6,840.76 - 12,015.77
12,015.78 - 24,241.89
24,241.90 - 57,583.49
57,583.50 - 113,958.40
113,958.41 - 197,718.90
197,718.91 - 356,295.20
356,295.21 - 1,150,026.00
1,150,026.01 - 10,428,948.00
10,428,948.01 - 50,510,644.00
50,510,644.01 - 143,007,580.00
143,007,580.01 - 300,000,000.00
Malad Sp
ThreeSp
NtlFishH
NtlFishH
Thousand Sand Sp
Box Can
Briggs Sp
Niagara S
Crystal S
Blue Lake
Devil's C
Devil's W

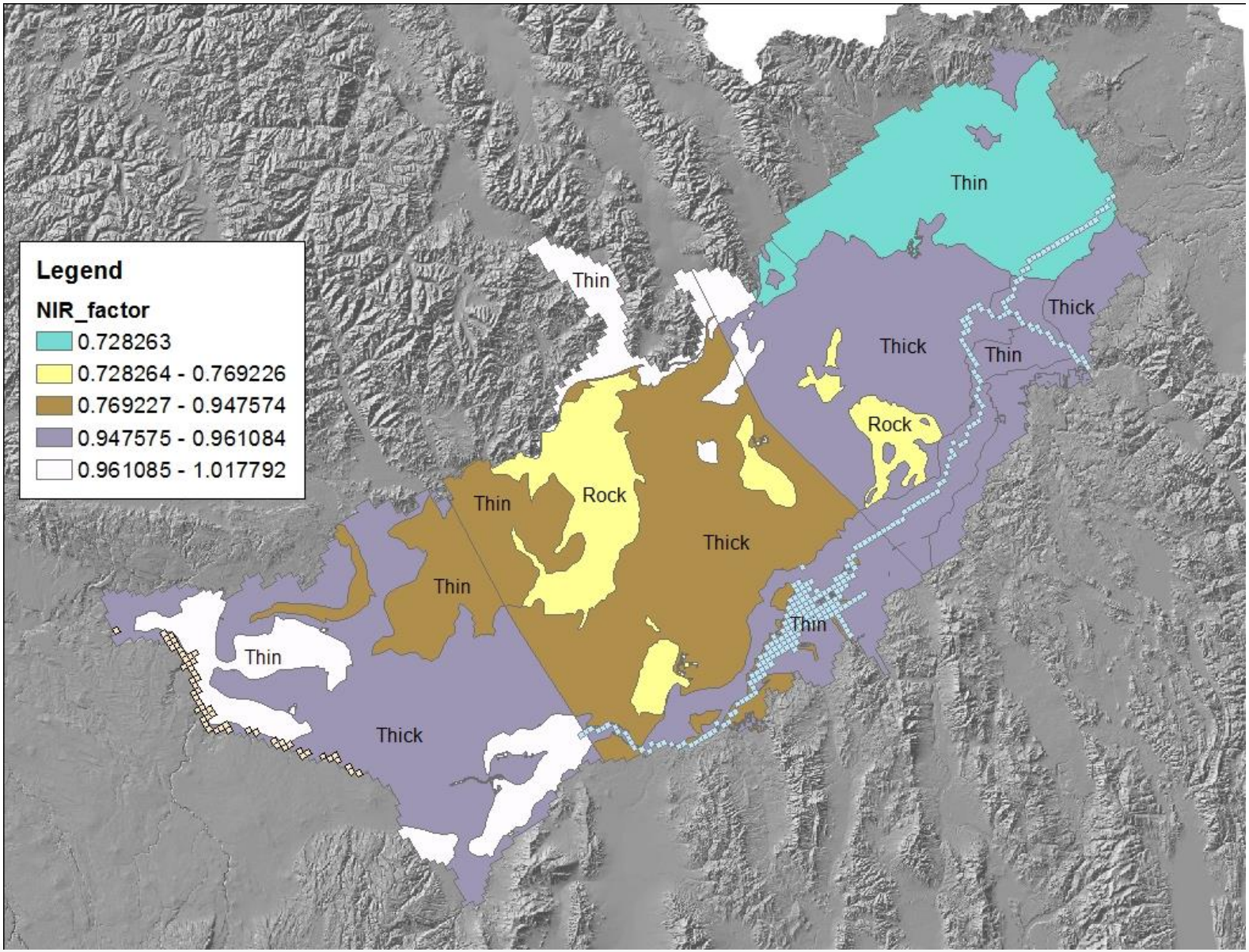

Malad Sp
ThreeSp
NtlFishH
NtlFishH
Thousand Sand Sp
Box Can
Briggs Sp
Niagara S
Crystal S
Blue Lake
Devil's C
Devil's W
Legend
Covington_Weaver_ESPAM2_Spgs
GHB_Cond
2,798.79
2,798.80 - 10,423.45
10,423.46 - 20,917.49
20,917.50 - 48,582.49
48,582.50 - 108,633.10

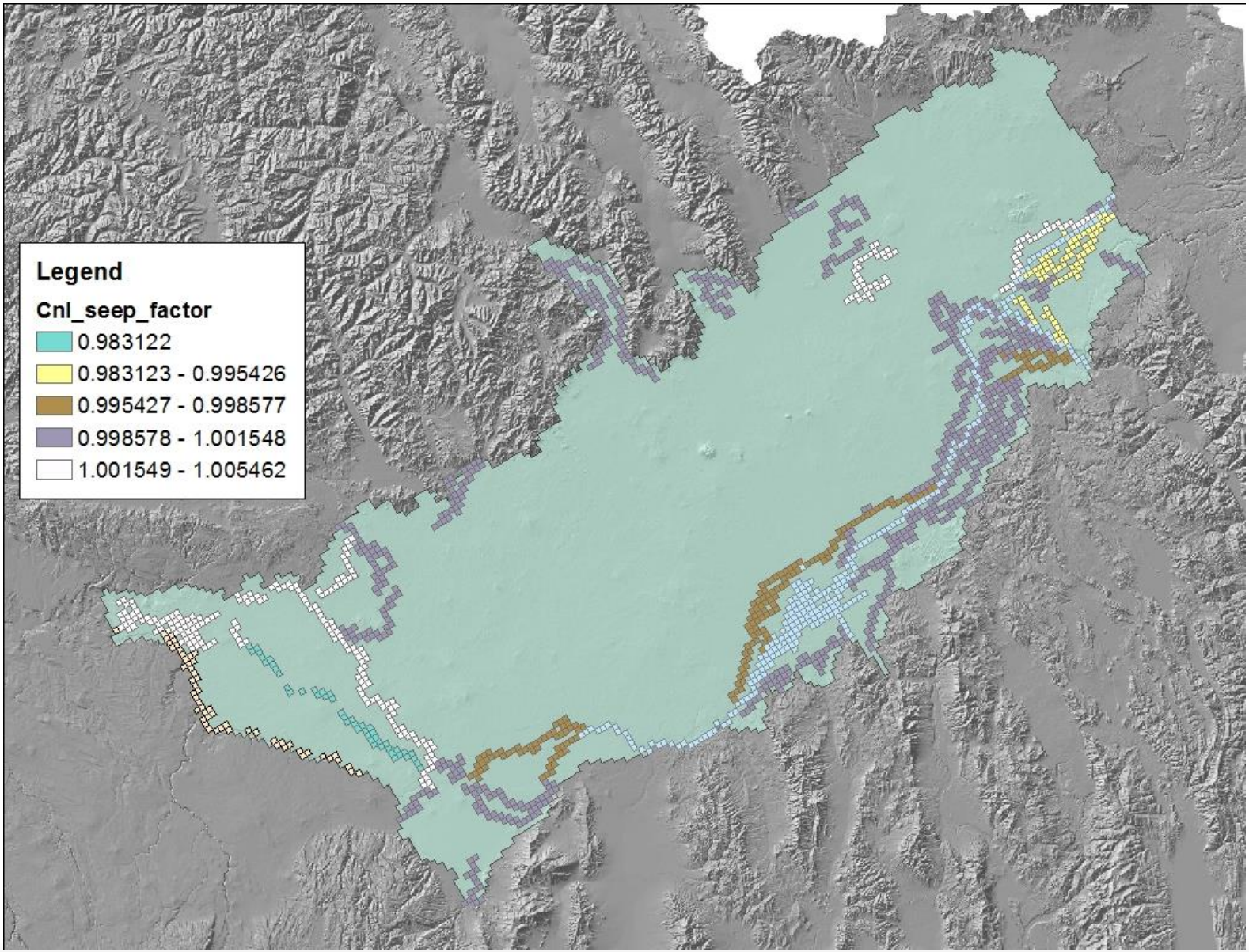

Legend
Trib_factor
0.000001 - 0.259450
0.259451 - 0.710116
0.710117 - 1.037999
1.038000 - 1.119538
1.119539 - 1.248188
Camas
Beaver
MedLodge
RtlPine
Henry F
Teton
Birch
BigLost
LitLost
RexBench
Palisade
Willow
LitWood
SilverCr
BigWood
Blackfoot
LincRoss
Clover
Thorn
AmFalls
Portneuf
Rockland
Raft
Goose

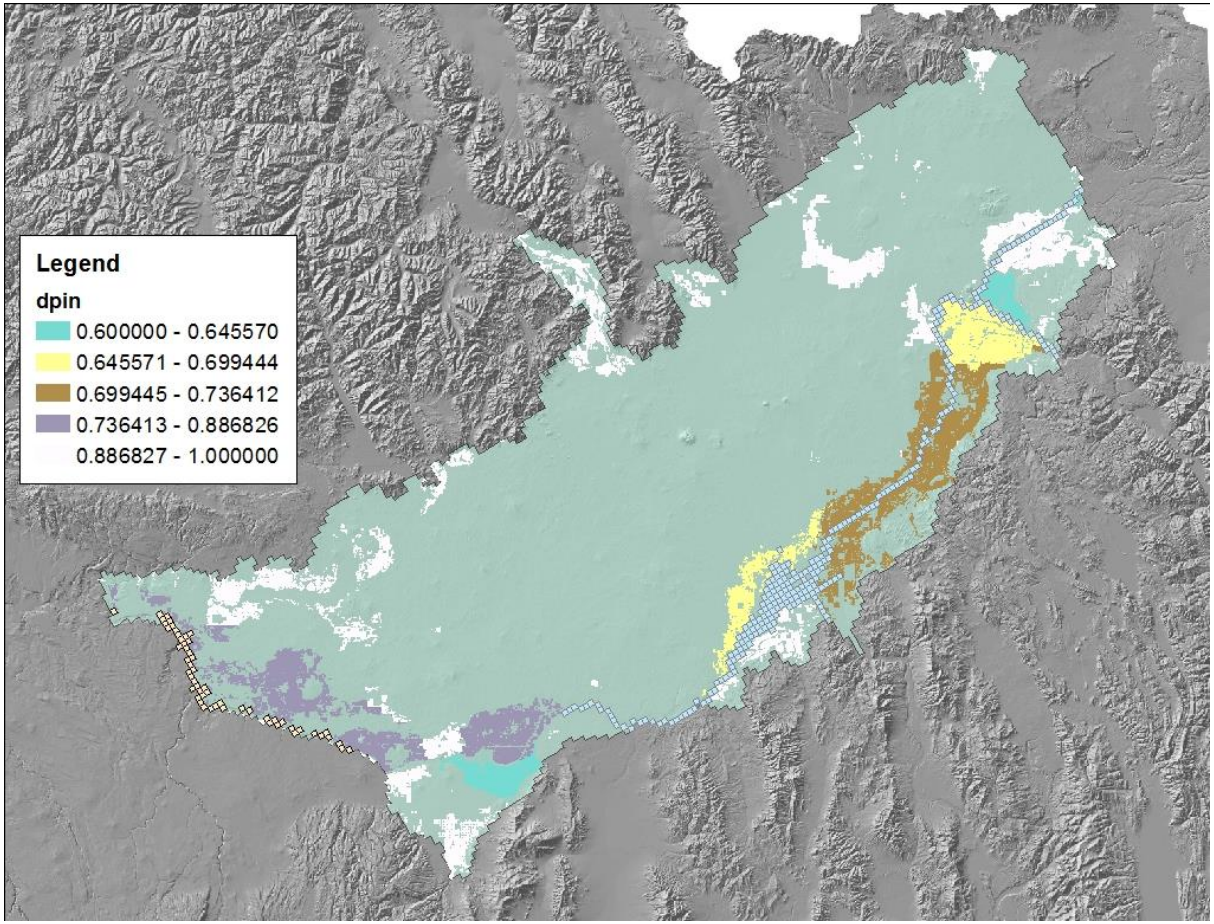

Legend
PCH_factor
0.864369
0.864370 - 0.982210
0.982211 - 1.011808
1.011809 - 1.051304
1.051305 - 1.088847
MedLodge
Beaver_1
Camas
Beaver_2
BirchHydro
Birch
CamasNWR
MudLake
Big_L_1
LittleLost
B31_Flood
Big_L_4
Big_L_2
Big_L_3
Big_L_Flood
Lwood_Carey_Rich
Big_Lit_Wood
LW_R_Sho
Minr_Pckts
Murt_Lake


Legend
etsw_s_(mod-strt)/strt
-0.021057
-0.021056 - -0.007692
-0.007691 - -0.000311
-0.000310 - -0.000065
-0.000064 - 0.000156

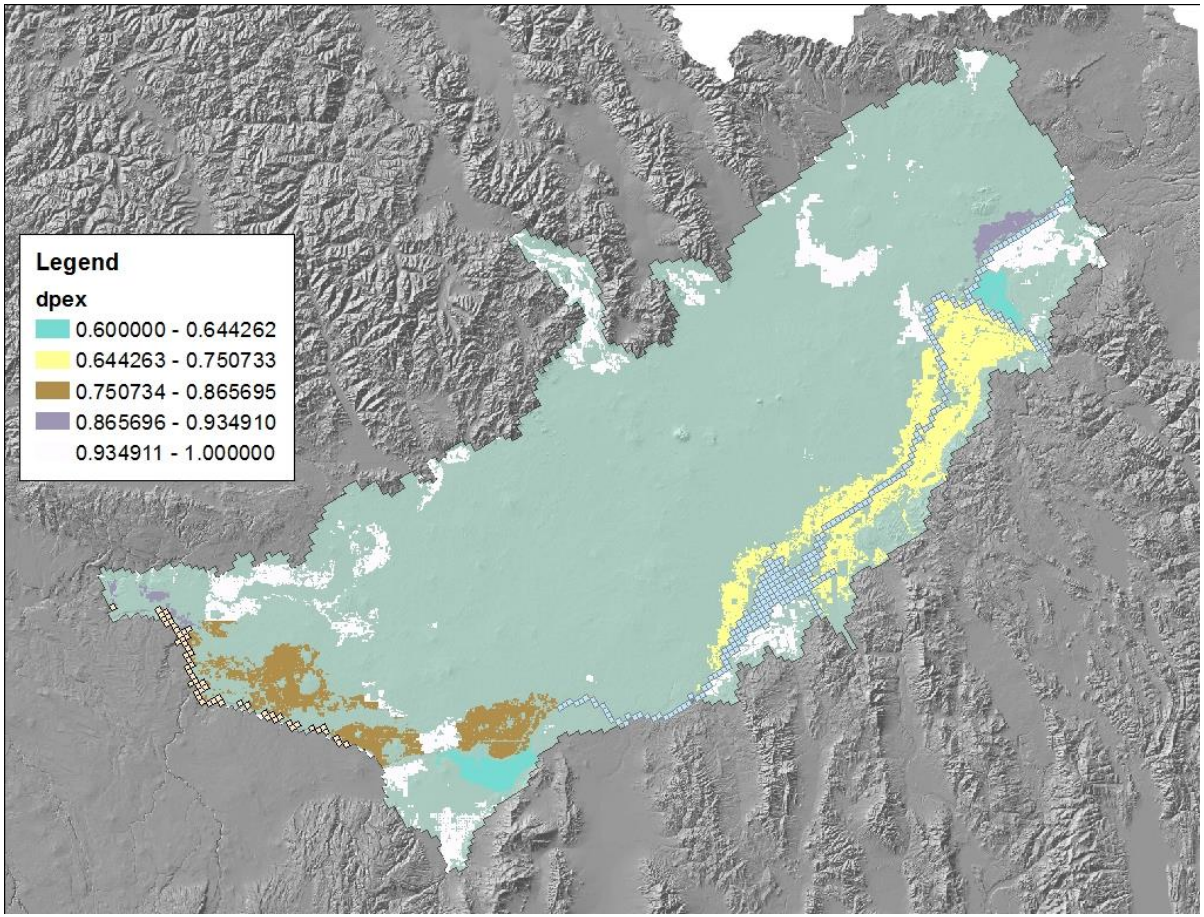

Legend
etsw_g_(mod-strt)/strt
-0.001134 - -0.000335
-0.000334 - -0.000043
-0.000042 - 0.000087
0.000088 - 0.003206
0.003207 - 0.026749


Legend
NIR_factor
0.728263
0.728264 - 0.769226
0.769227 - 0.947574
0.947575 - 0.961084
0.961085 - 1.017792
Thin
Thin
Thick
Thick
Thin
Rock
Thin
Rock
Thick
Thin
Thin
Thin
Thick


Legend
Cnl_seep_factor
0.983122
0.983123 - 0.995426
0.995427 - 0.998577
0.998578 - 1.001548
1.001549 - 1.005462

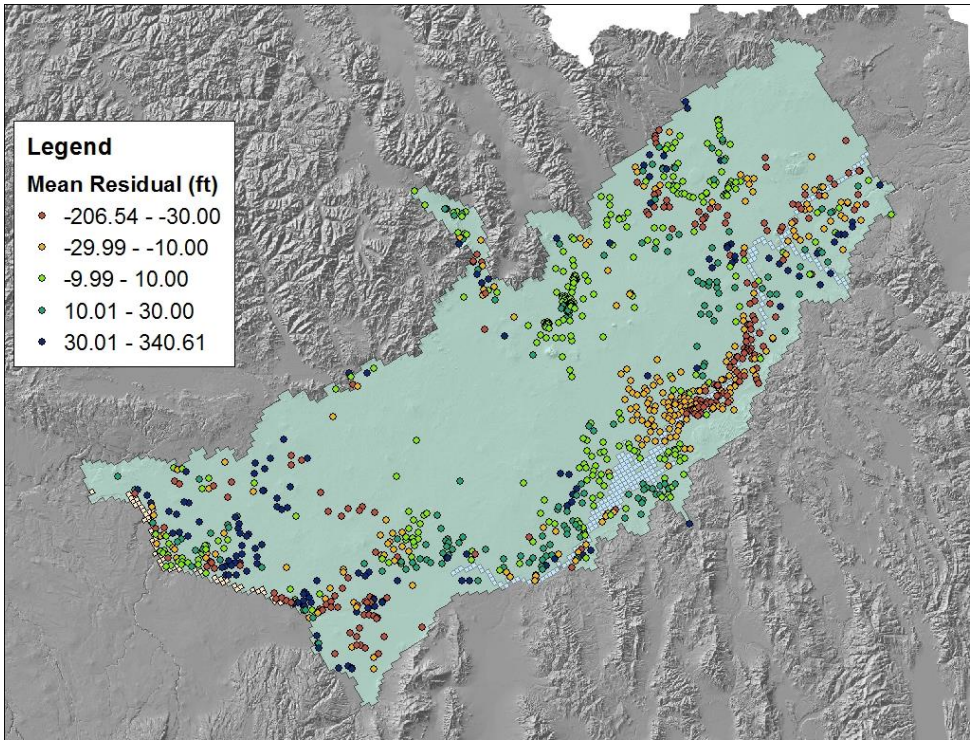


- DPin
  - fraction of the initial irrigation loss (1-eff) that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98

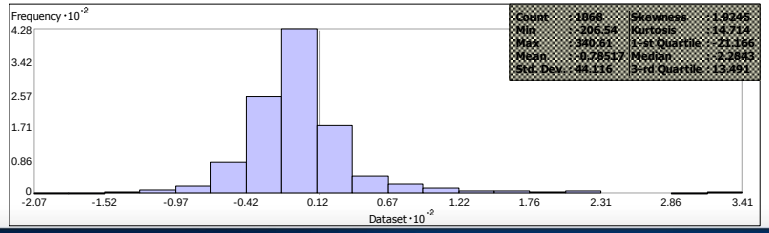


- DPex
  - fraction of delivery exceeding CIR that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98

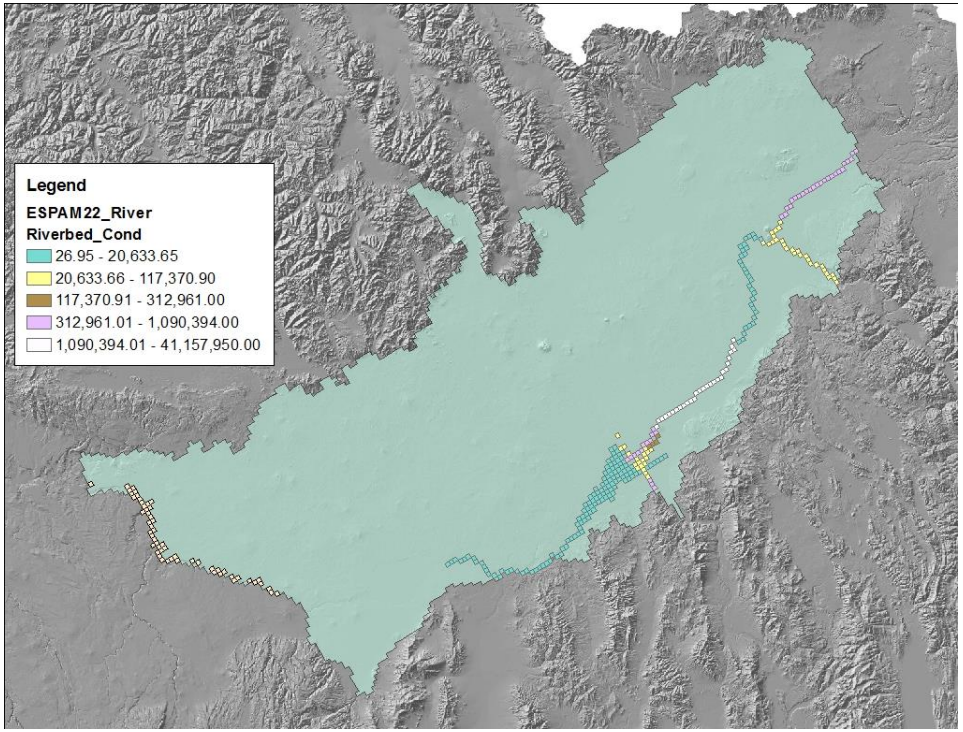
Transient Heads



Histogram
Transformation: None

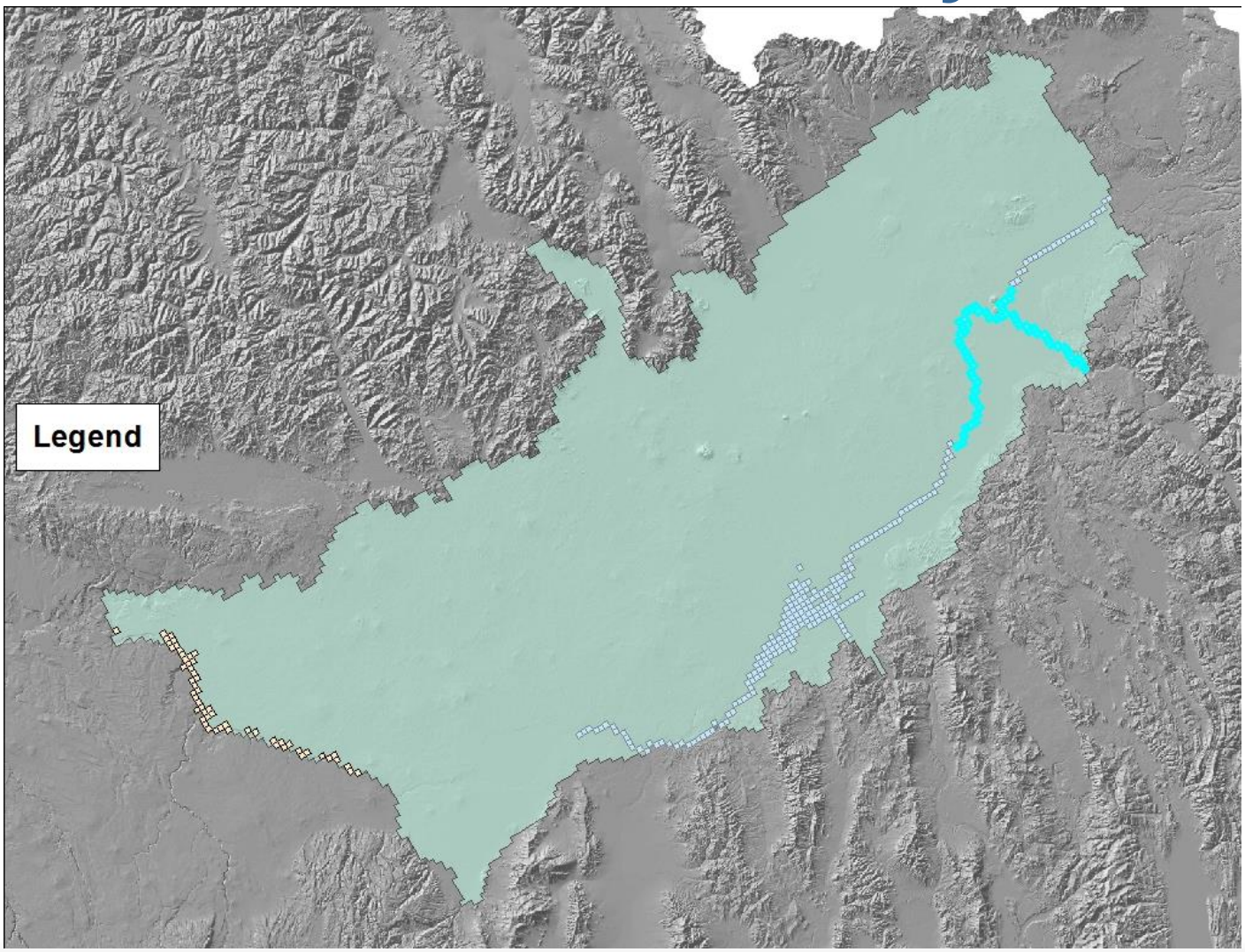


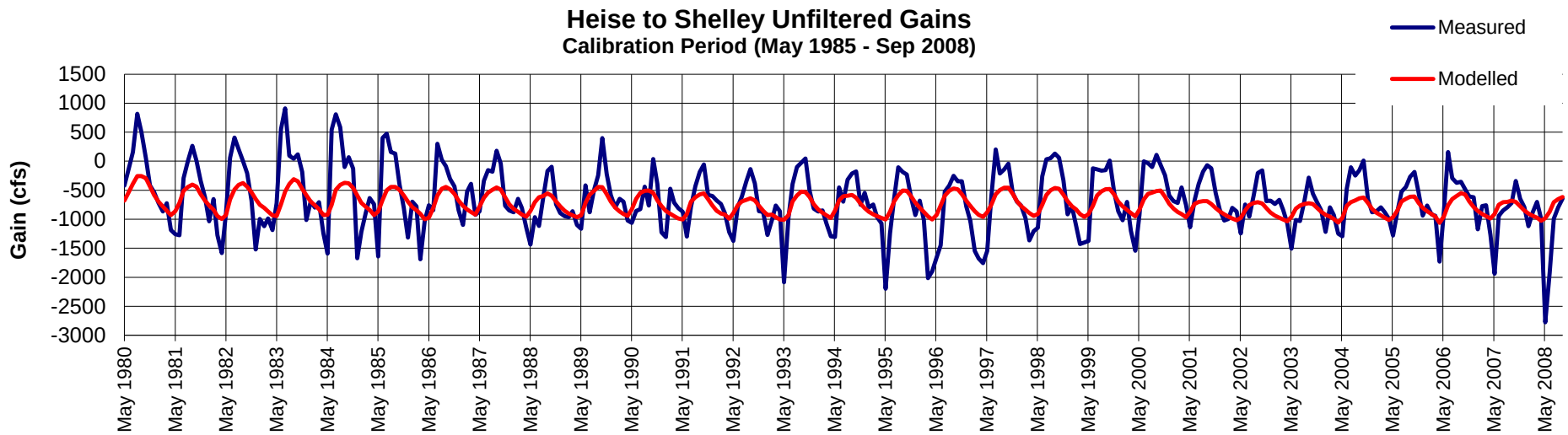
Dataset : tranhds.txt Events Attribute: Mean

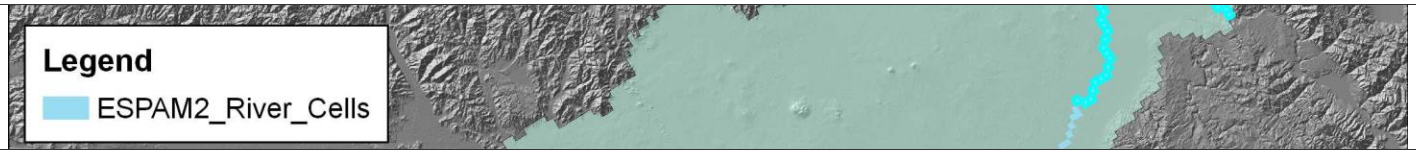


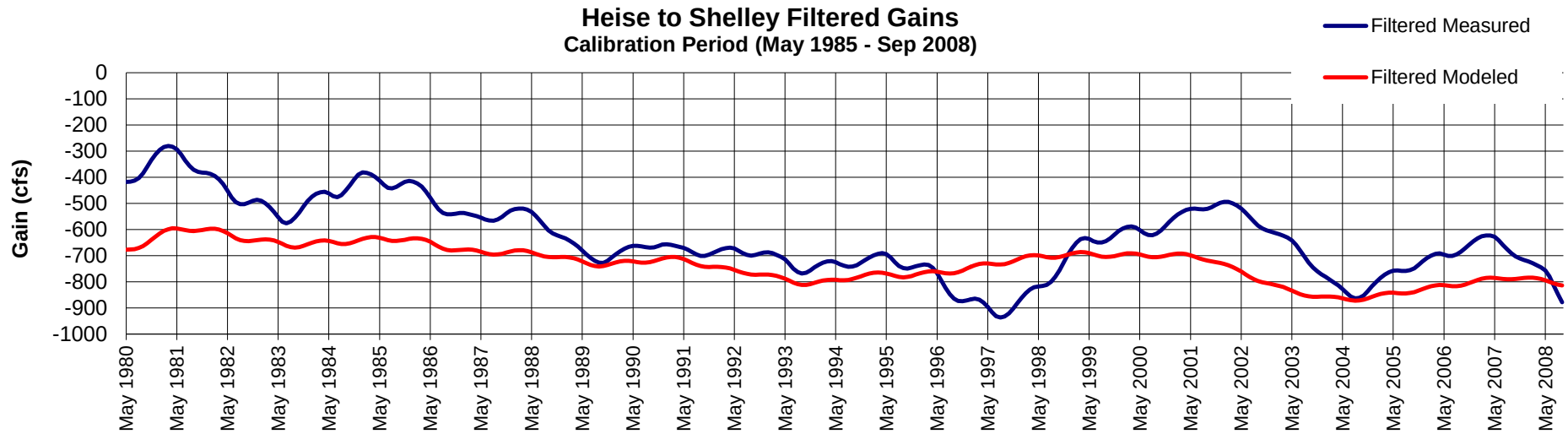
- Snake River reaches

Heise - Shelley

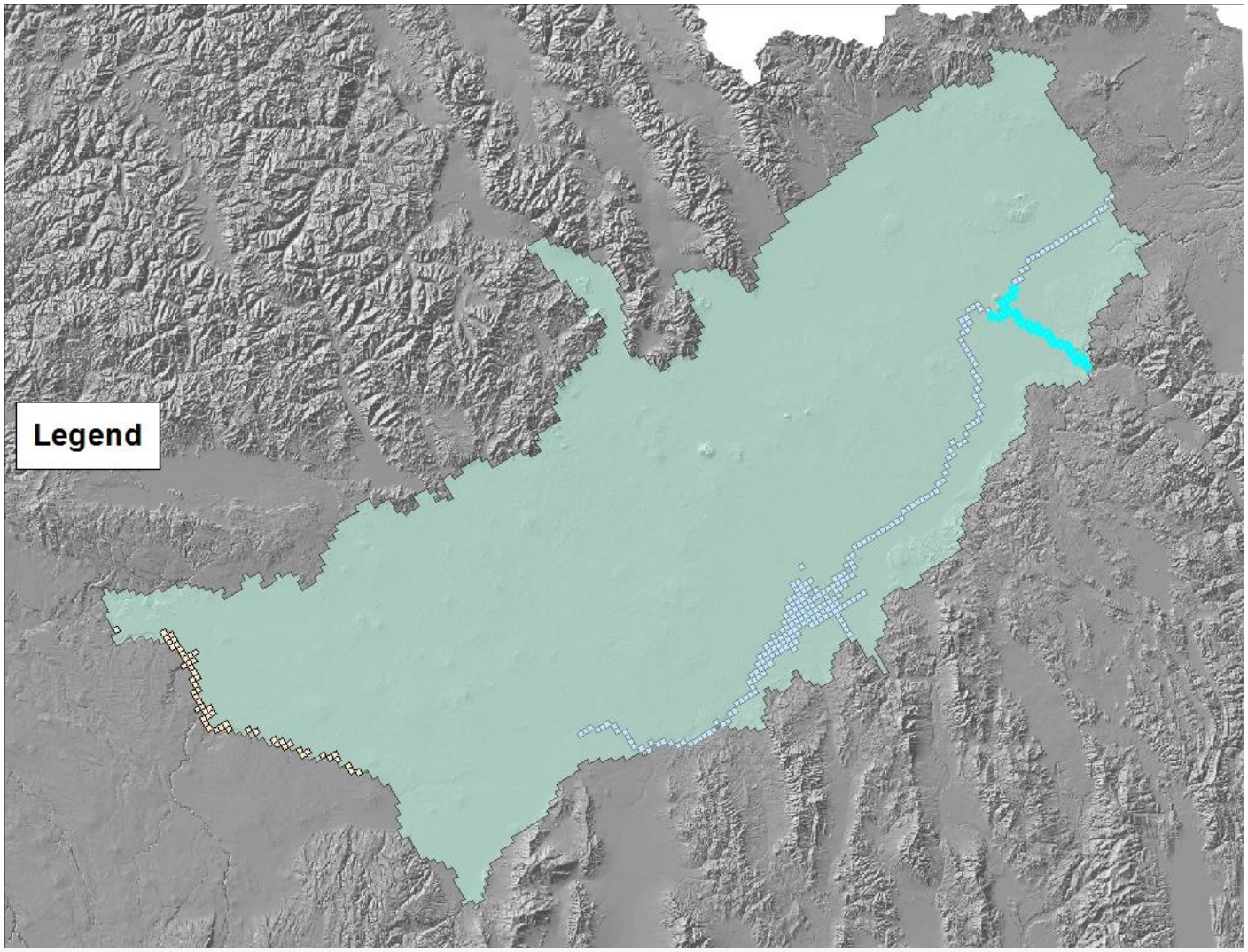



Heise to Shelley Unfiltered Gains
Calibration Period (May 1985 - Sep 2008)
Measured
Modelled
Gain (cfs)
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
May 1980
May 1981
May 1982
May 1983
May 1984
May 1985
May 1986
May 1987
May 1988
May 1989
May 1990
May 1991
May 1992
May 1993
May 1994
May 1995
May 1996
May 1997
May 1998
May 1999
May 2000
May 2001
May 2002
May 2003
May 2004
May 2005
May 2006
May 2007
May 2008

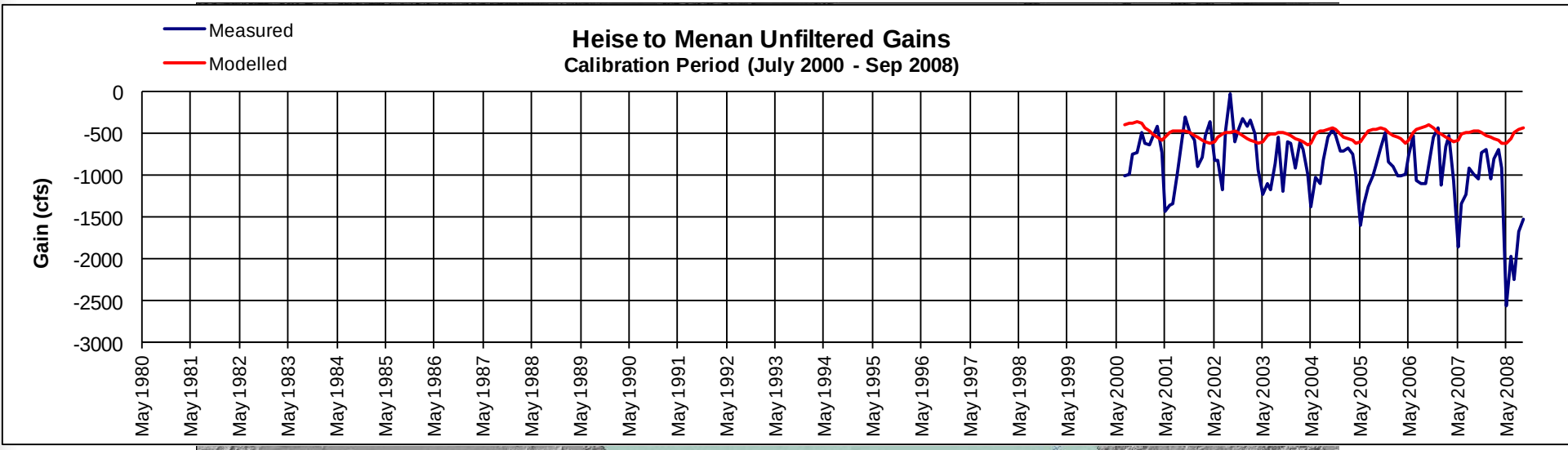

Legend
ESPAM2_River_Cells


Heise to Shelley Filtered Gains
Calibration Period (May 1985 - Sep 2008)
Filtered Measured
Filtered Modeled
Gain (cfs)
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1000
May 1980
May 1981
May 1982
May 1983
May 1984
May 1985
May 1986
May 1987
May 1988
May 1989
May 1990
May 1991
May 1992
May 1993
May 1994
May 1995
May 1996
May 1997
May 1998
May 1999
May 2000
May 2001
May 2002
May 2003
May 2004
May 2005
May 2006
May 2007
May 2008

Heise - Menan



Heise - Menan


Measured
Modelled
Heise to Menan Unfiltered Gains
Calibration Period (July 2000 - Sep 2008)
Gain (cfs)
0
-500
-1000
-1500
-2000
-2500
-3000
May 1980
May 1981
May 1982
May 1983
May 1984
May 1985
May 1986
May 1987
May 1988
May 1989
May 1990
May 1991
May 1992
May 1993
May 1994
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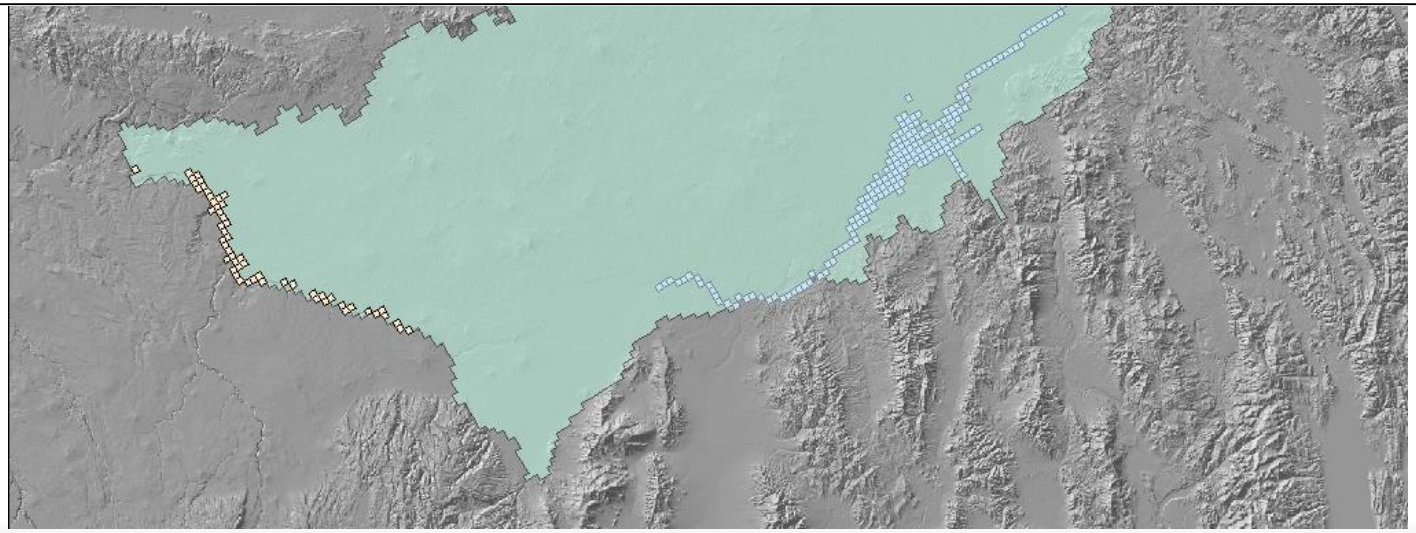
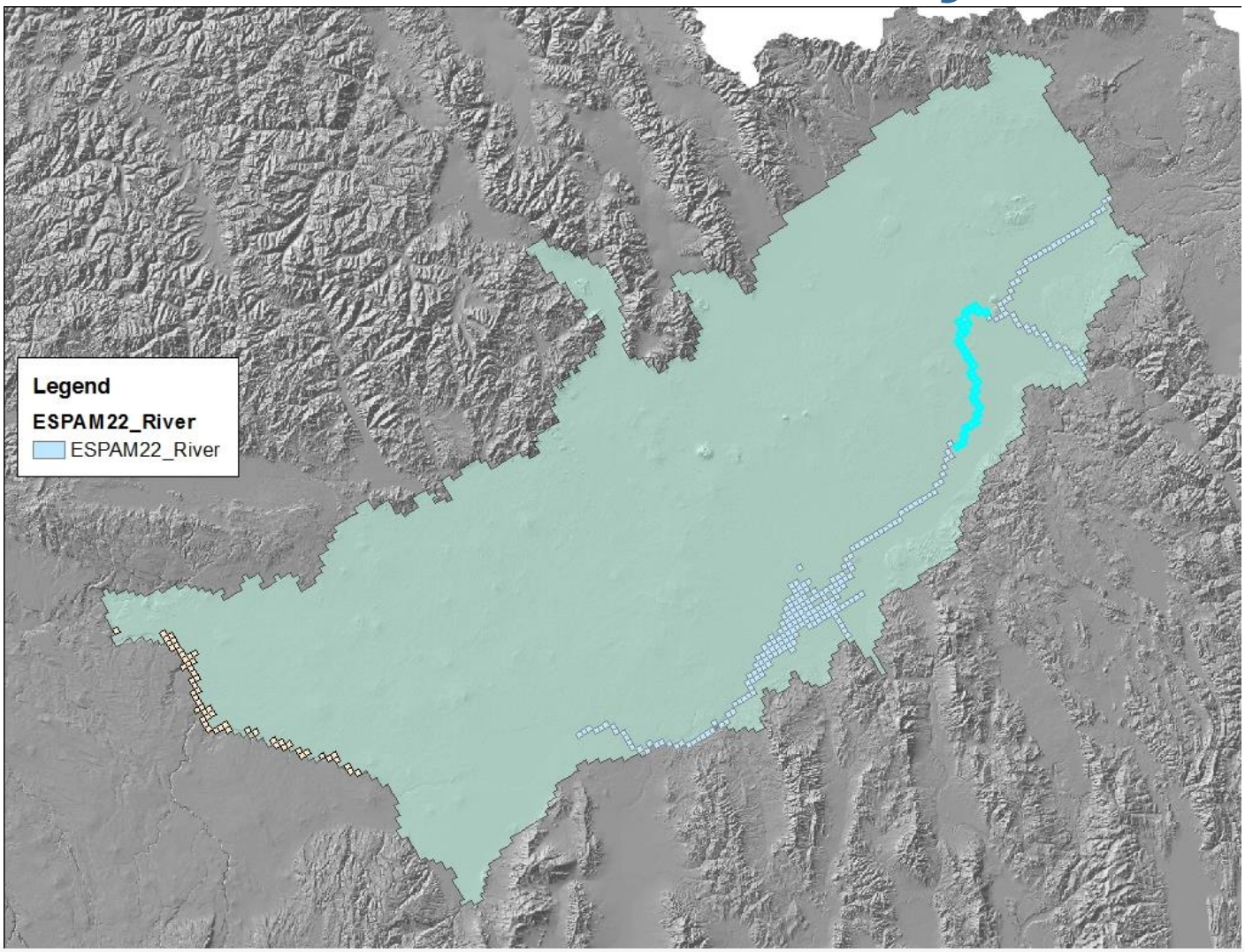
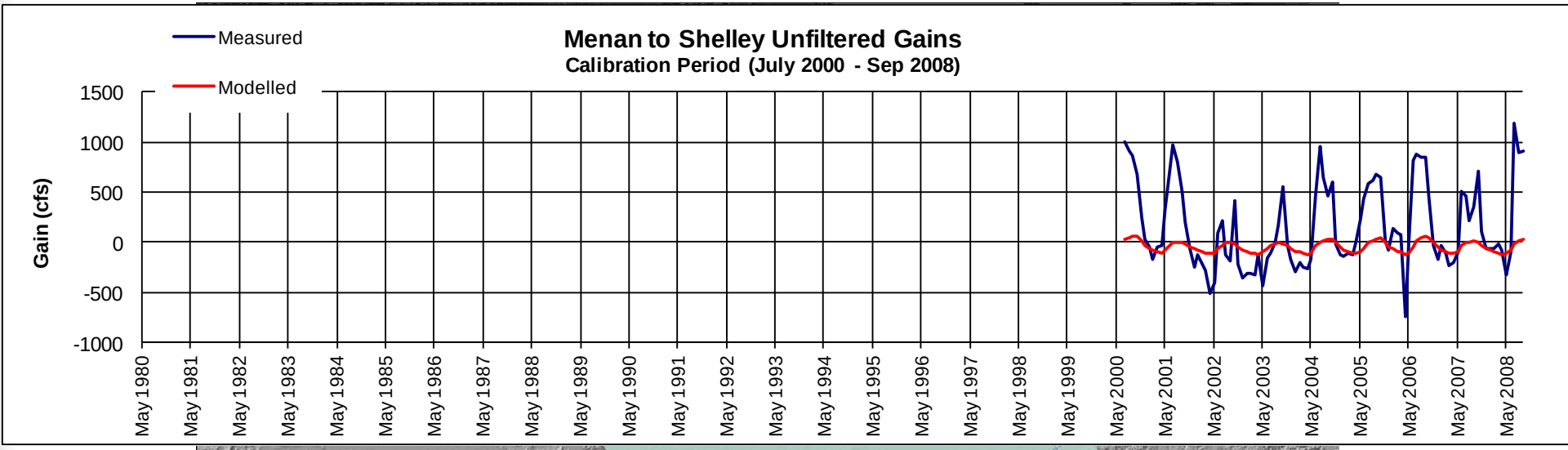
May 2004
May 2005
May 2006
May 2007
May 2008

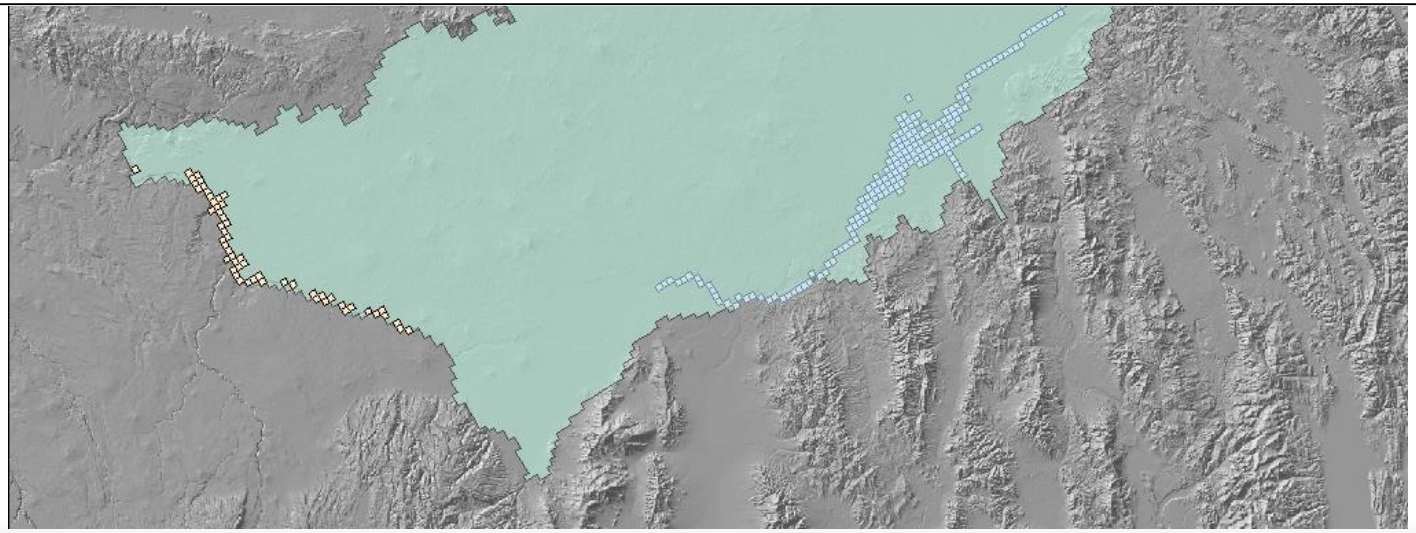


Menan-Shelley

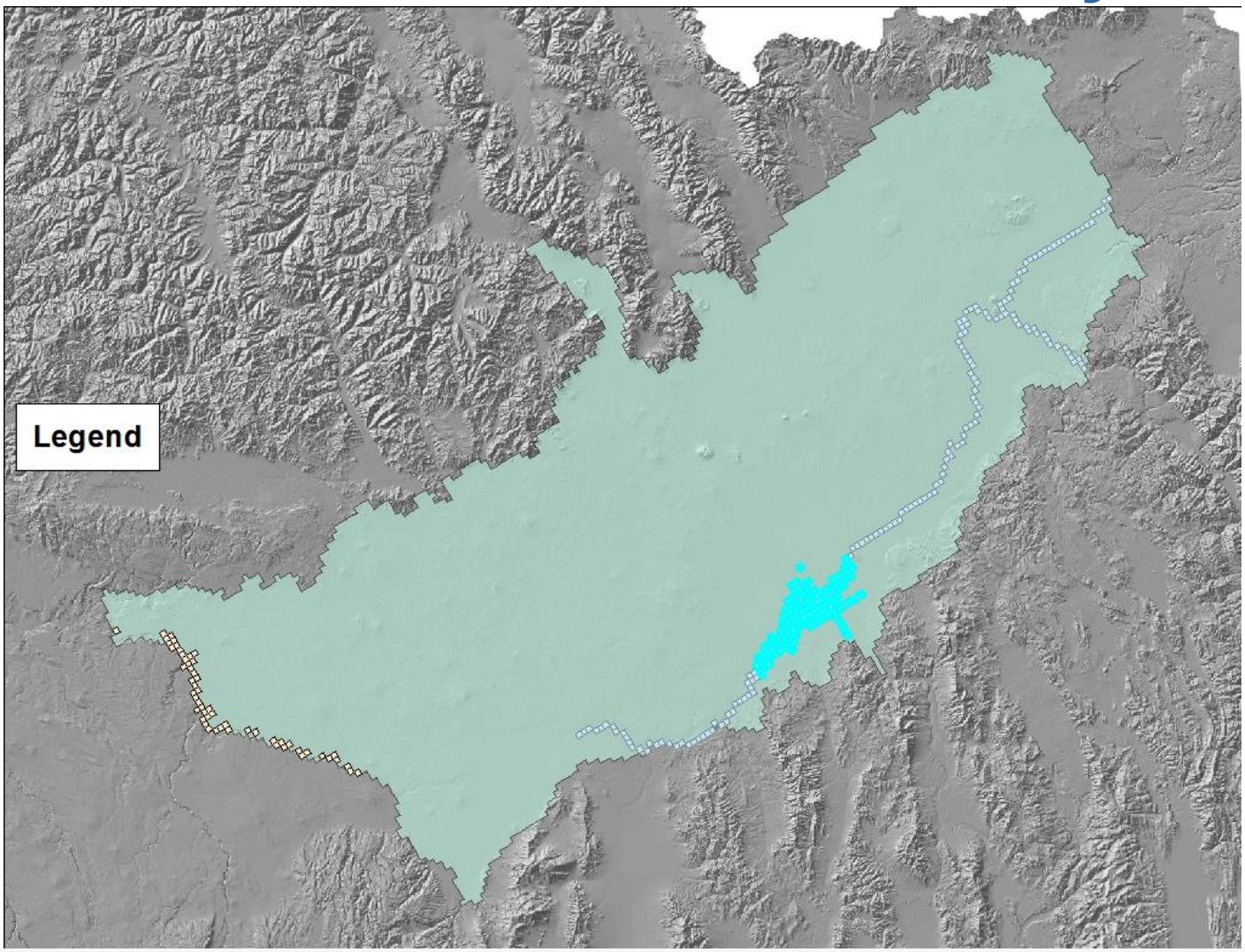


Menan-Shelley

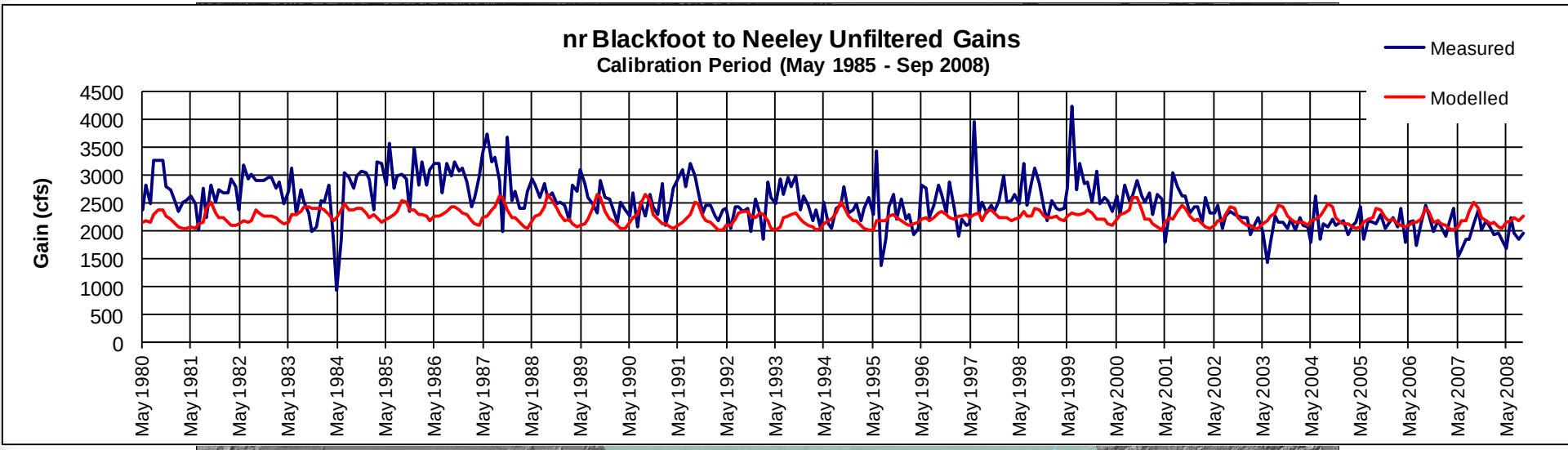


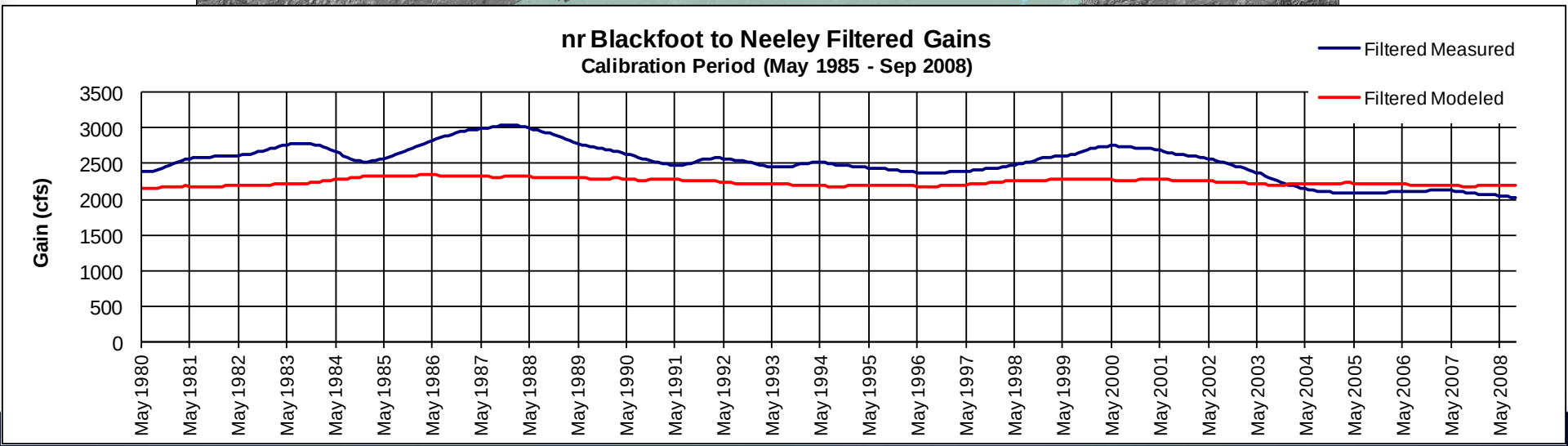


Nr Blackfoot - Neeley

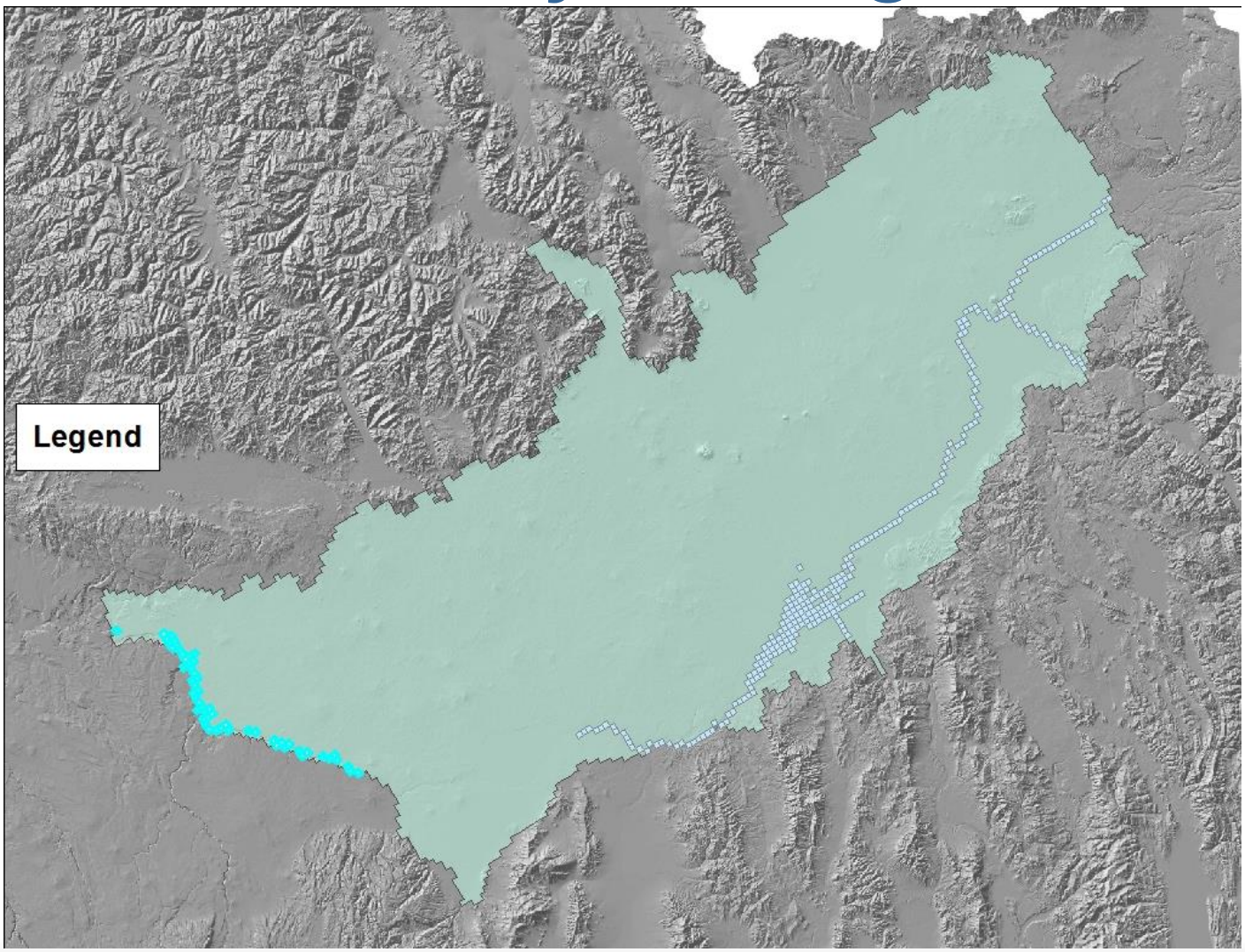


Nr Blackfoot - Neeley

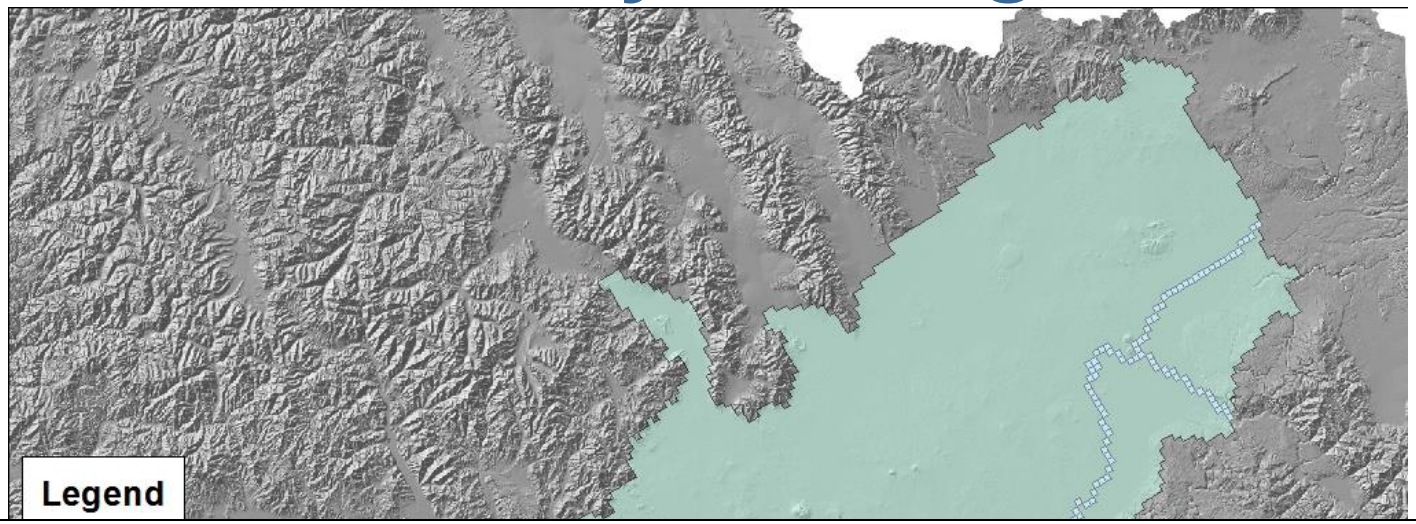


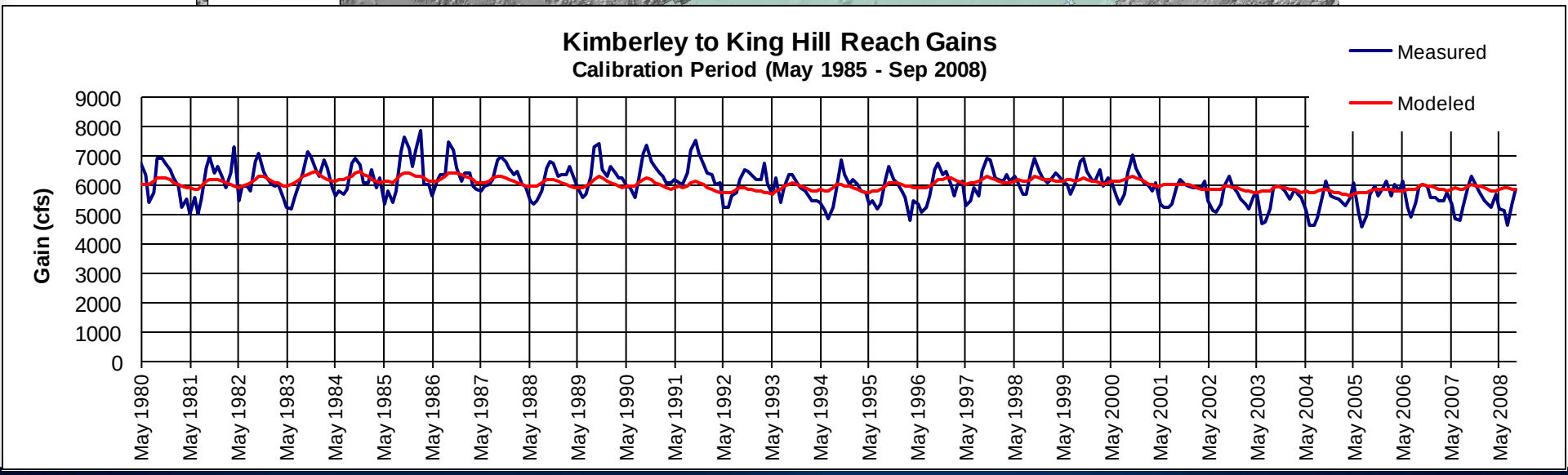


Kimberly – King Hill

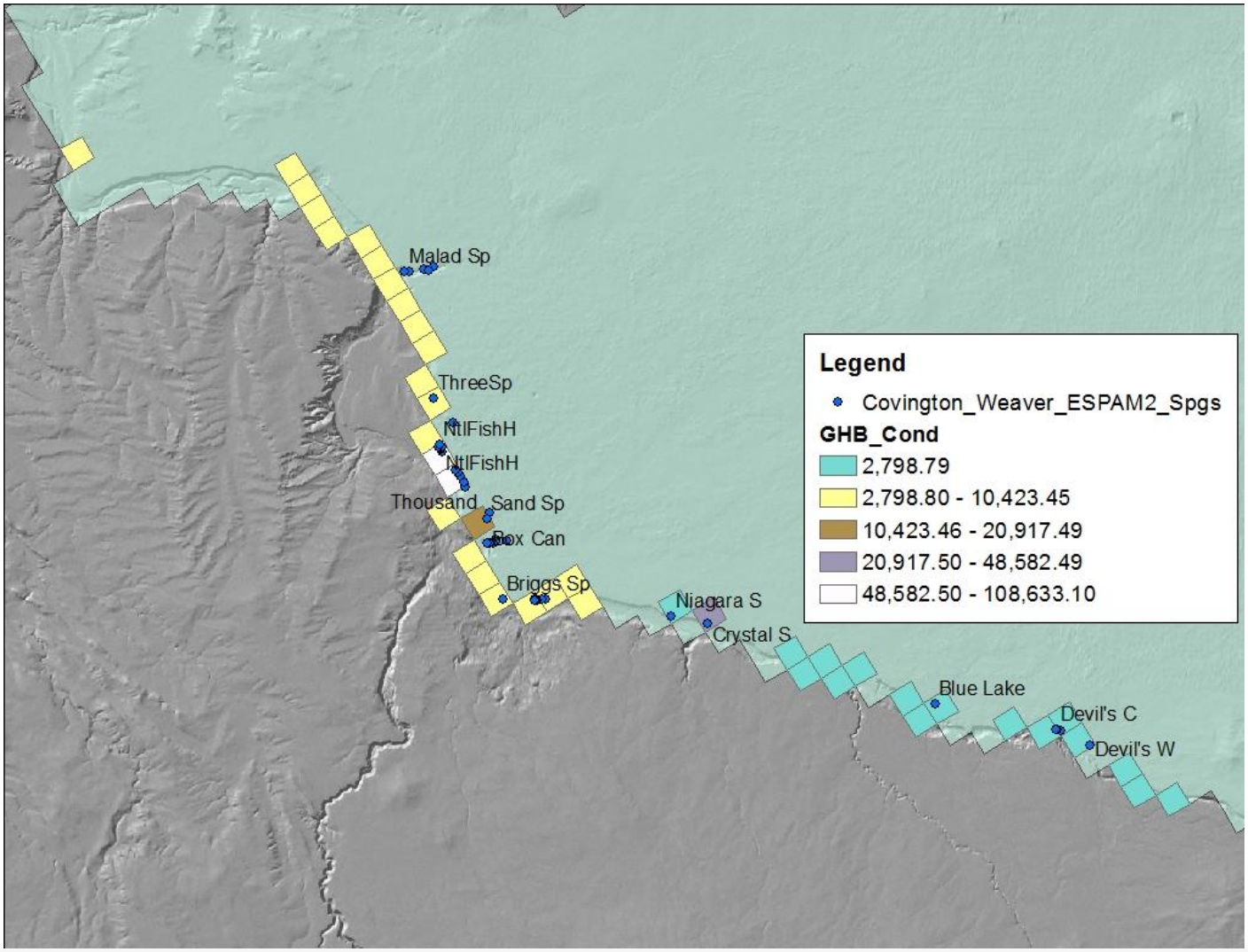


Kimberly – King Hill

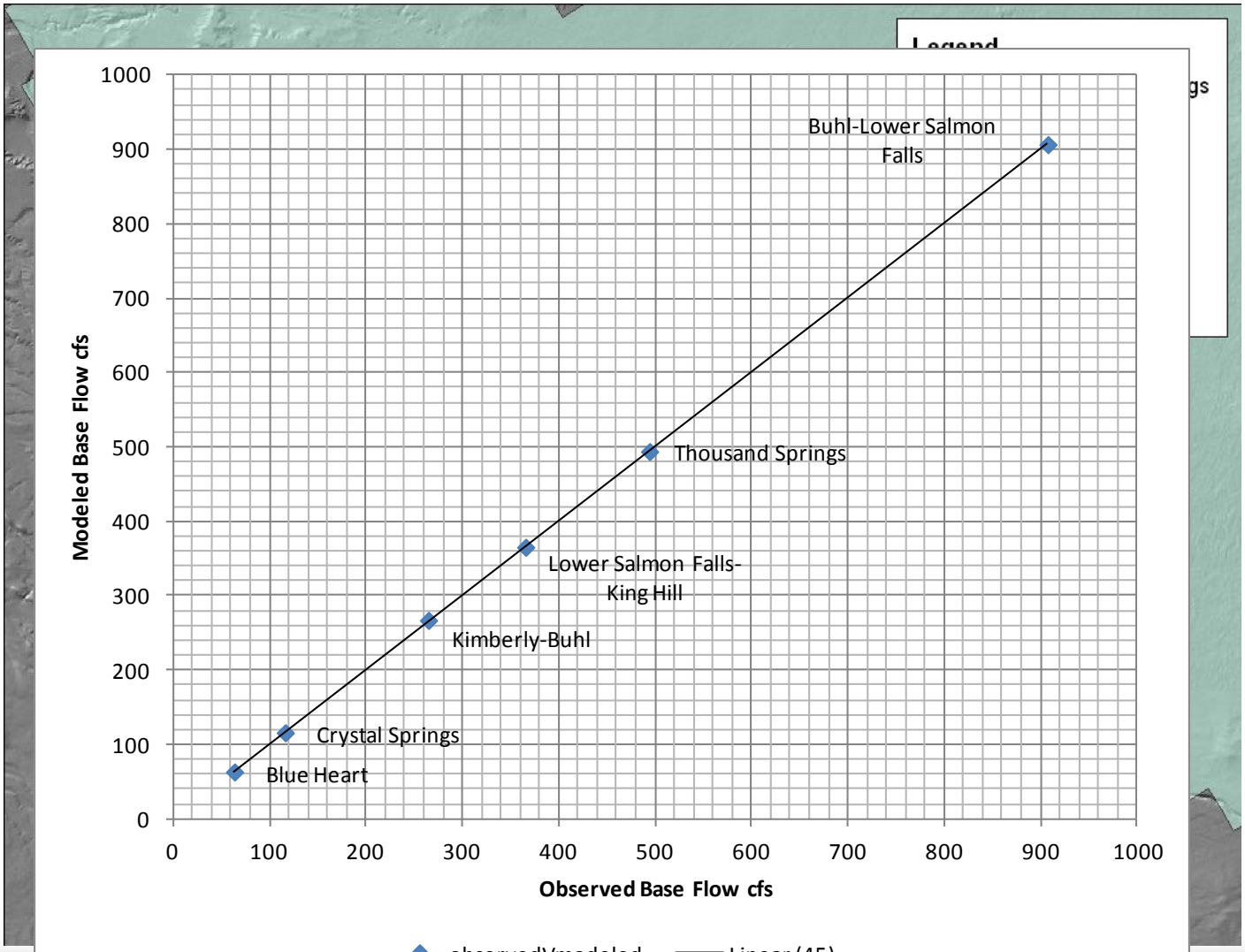


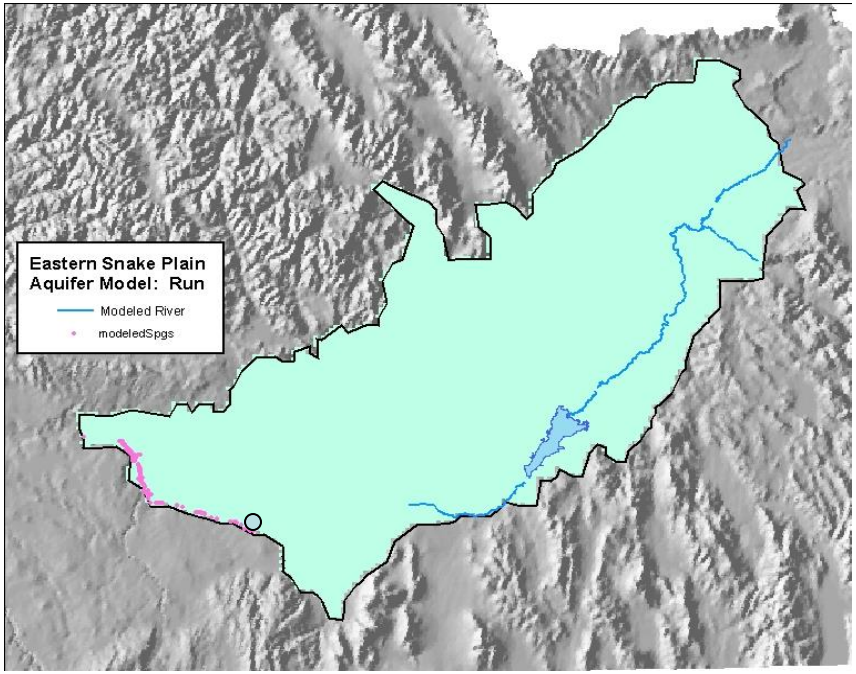


Base Flow


Malad Sp
ThreeSp
NtlFishH
NtlFishH
Thousand Sand Sp
Box Can
Briggs Sp
Niagara S
Crystal S
Blue Lake
Devil's C
Devil's W
Legend
Covington_Weaver_ESPAM2_Spgs
GHB_Cond
2,798.79
2,798.80 - 10,423.45
10,423.46 - 20,917.49
20,917.50 - 48,582.49
48,582.50 - 108,633.10

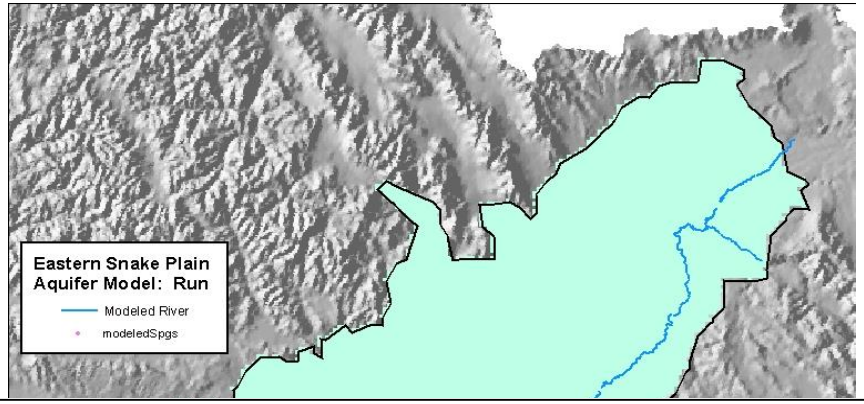
Base Flow

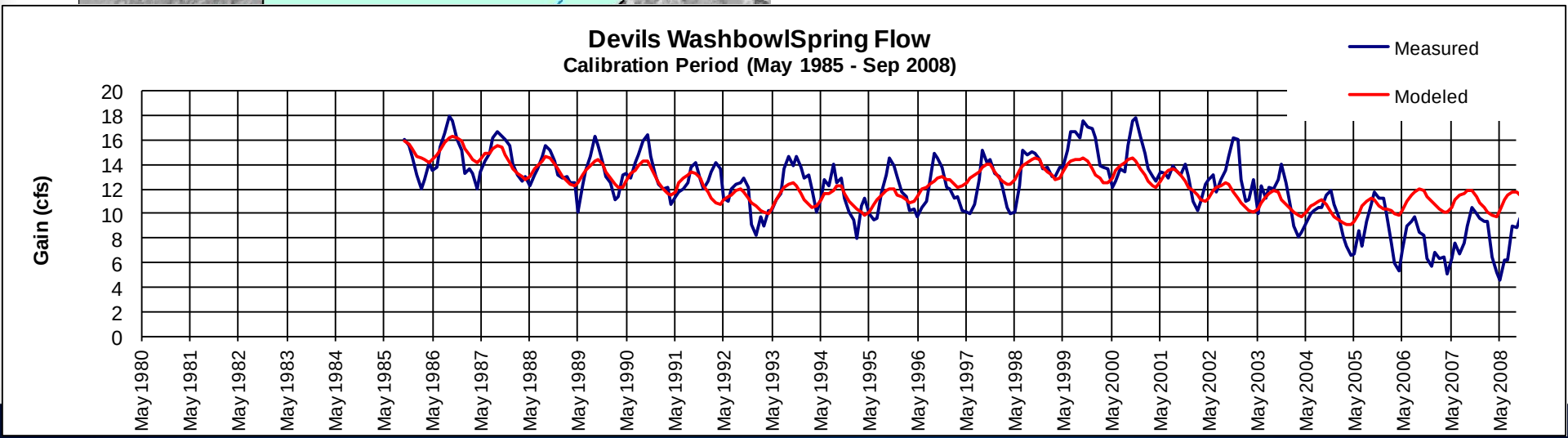

Modeled Base Flow cfs
Observed Base Flow cfs
0
100
200
300
400
500
600
700
800
900
1000
Buhl-Lower Salmon Falls
Thousand Springs
Lower Salmon Falls-King Hill
Kimberly-Buhl
Crystal Springs
Blue Heart
observedVmodeled
Linear (45)

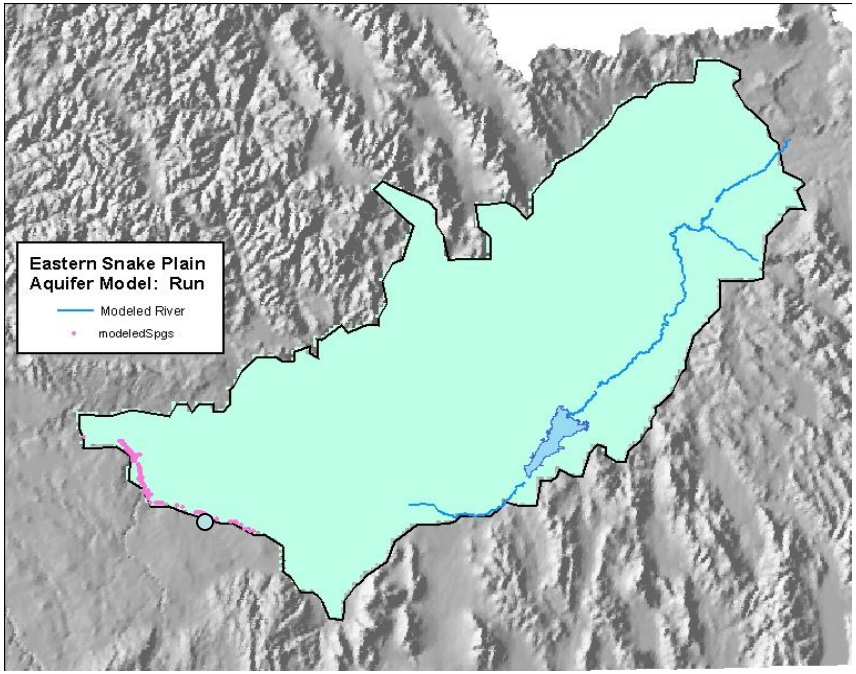


- Devils Washbowl

- Devils Washbowl

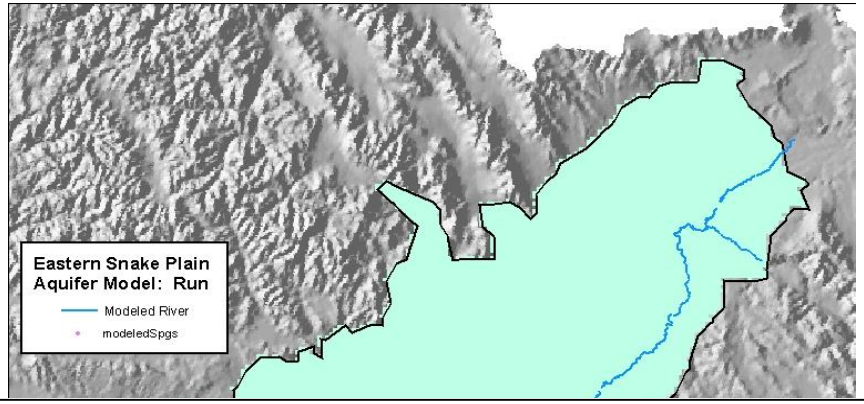


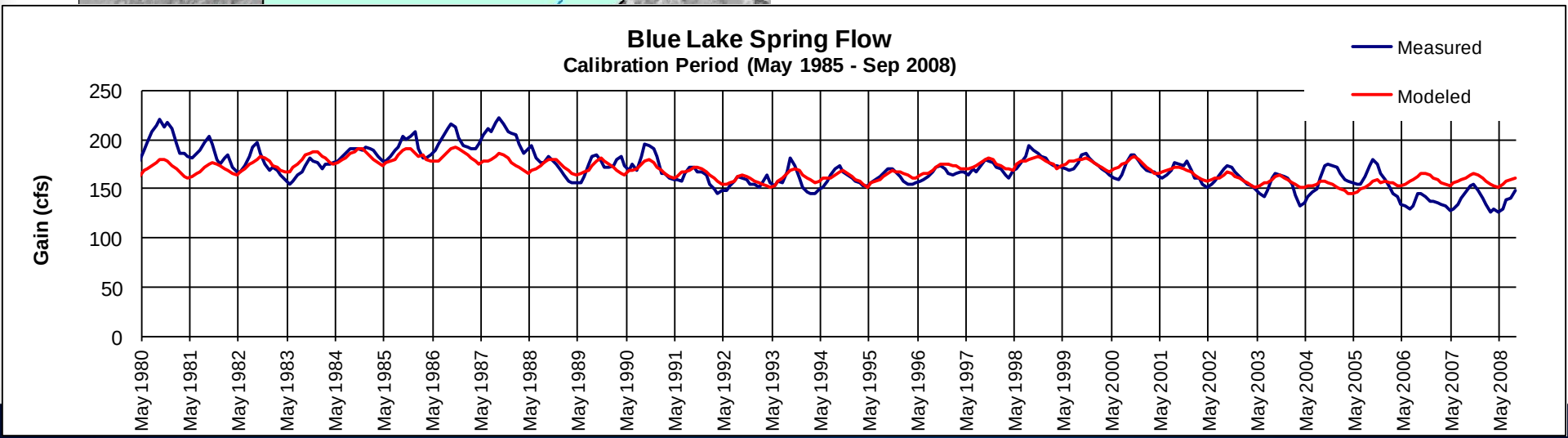



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Blue Lakes

- Blue Lakes


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


Blue Lake Spring Flow
Calibration Period (May 1985 - Sep 2008)
Measured
Modeled
Gain (cfs)
250
200
150
100
50
0
May 1980
May 1981
May 1982
May 1983
May 1984
May 1985
May 1986
May 1987
May 1988
May 1989
May 1990
May 1991
May 1992
May 1993
May 1994
May 1995
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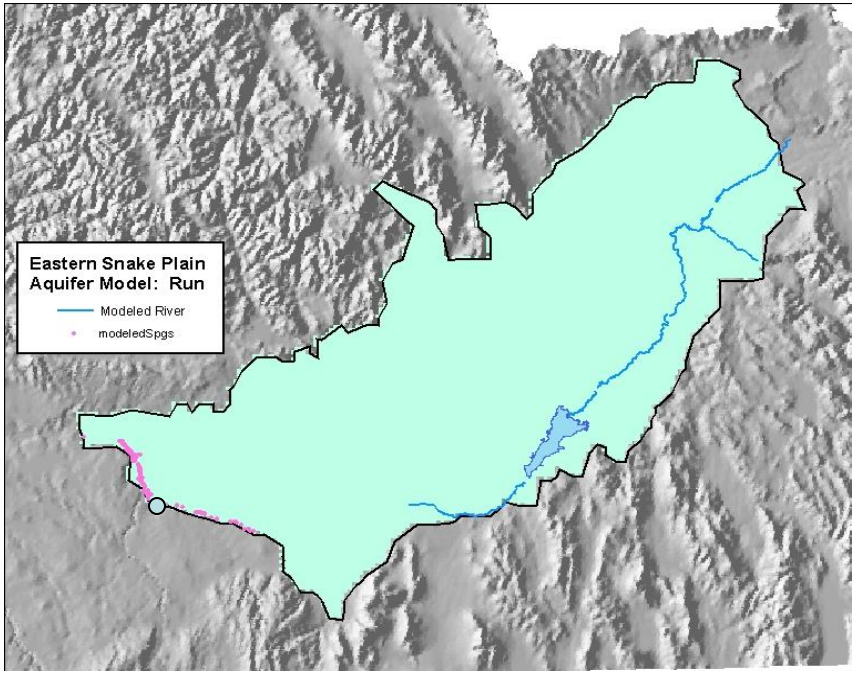
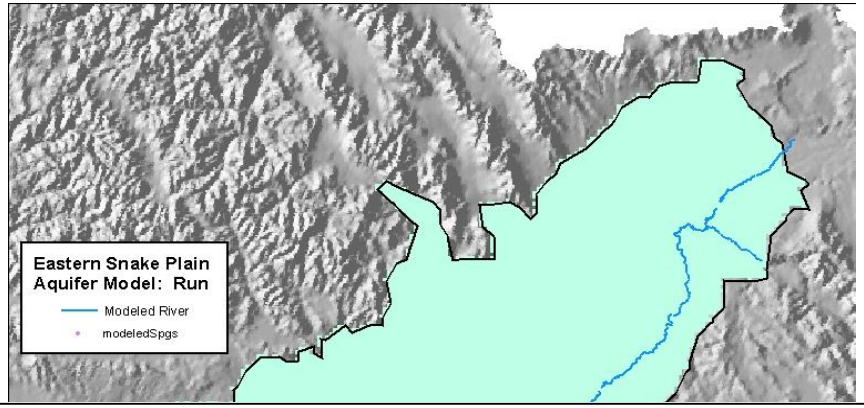
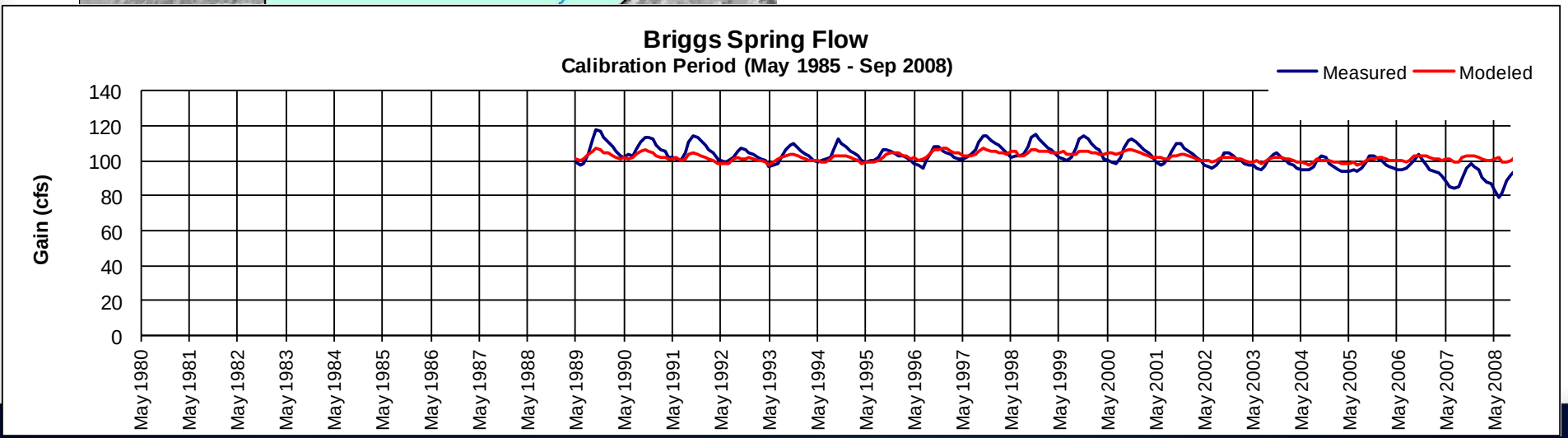
May 2004
May 2005
May 2006
May 2007
May 2008

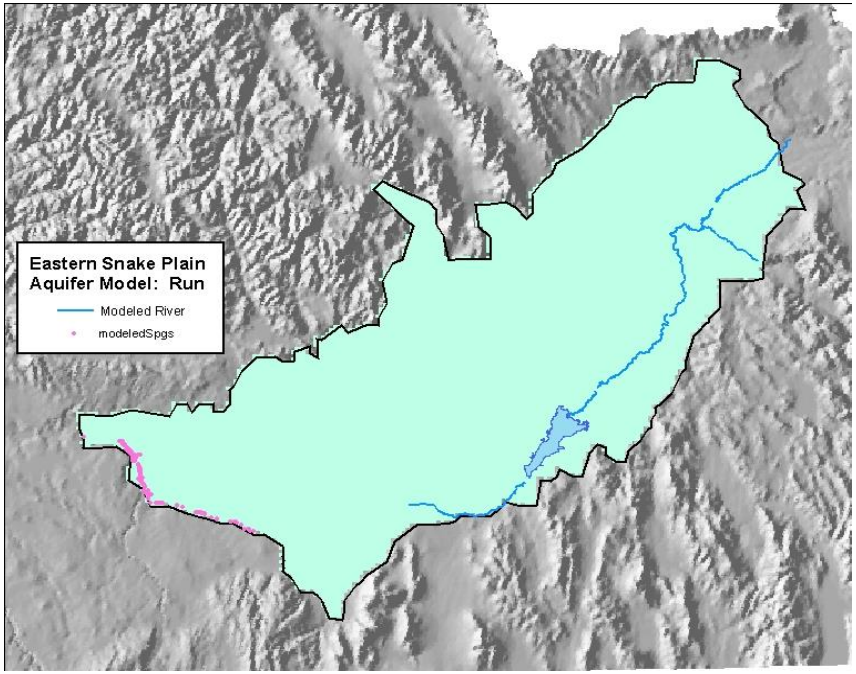


- Briggs Spring

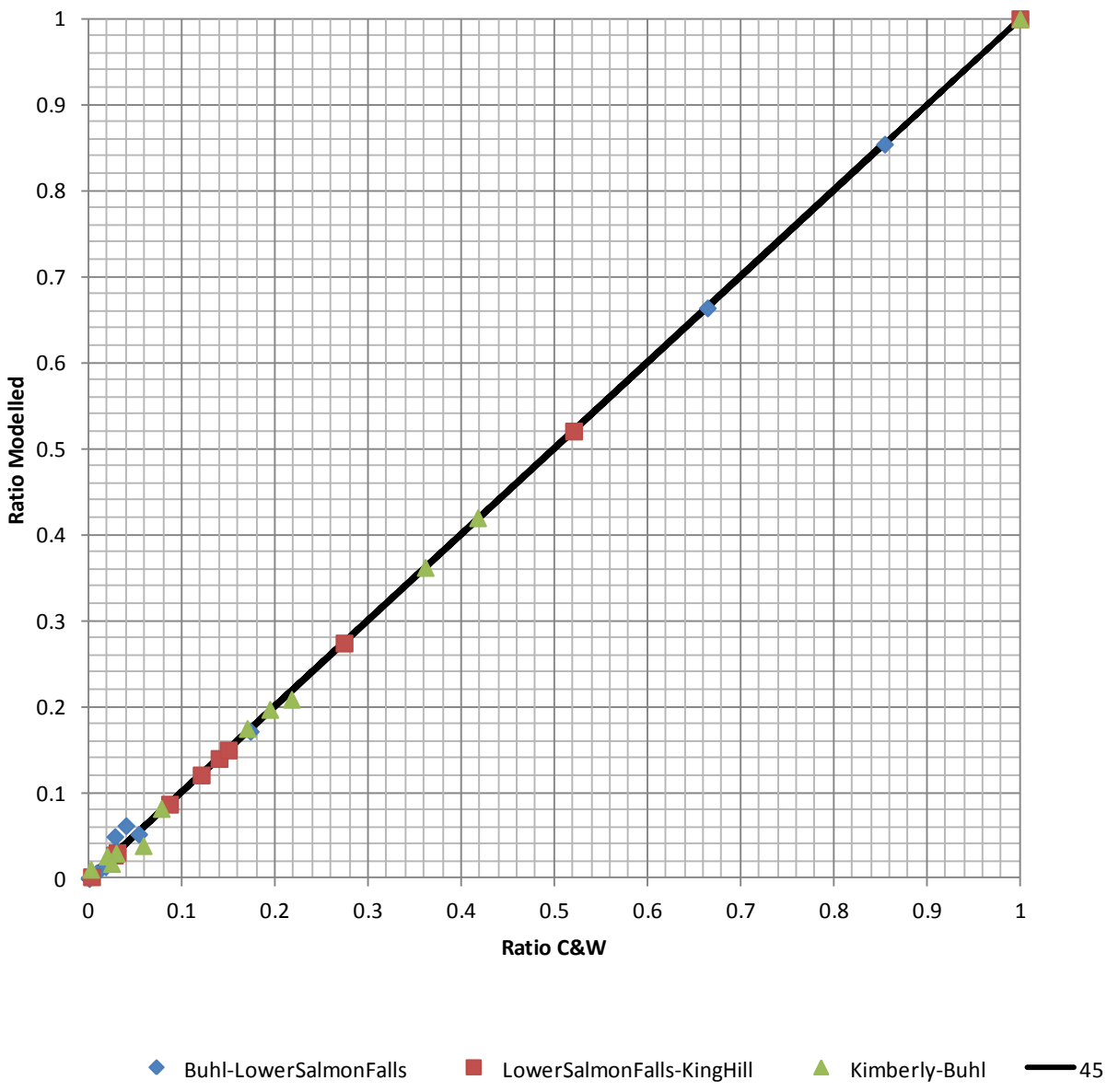
- Briggs Spring

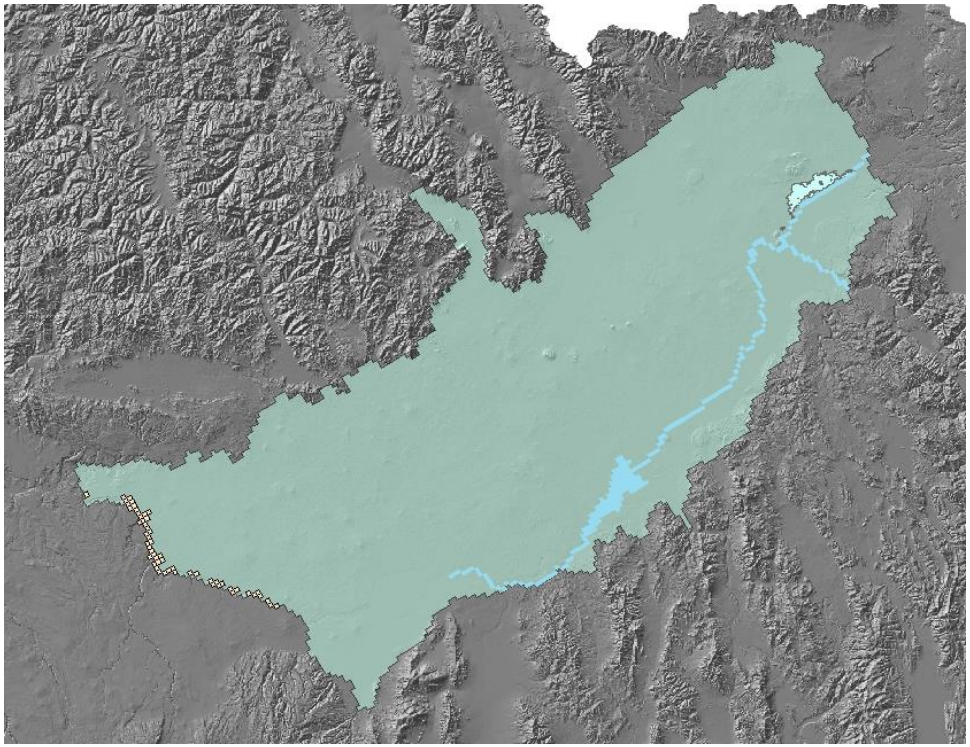




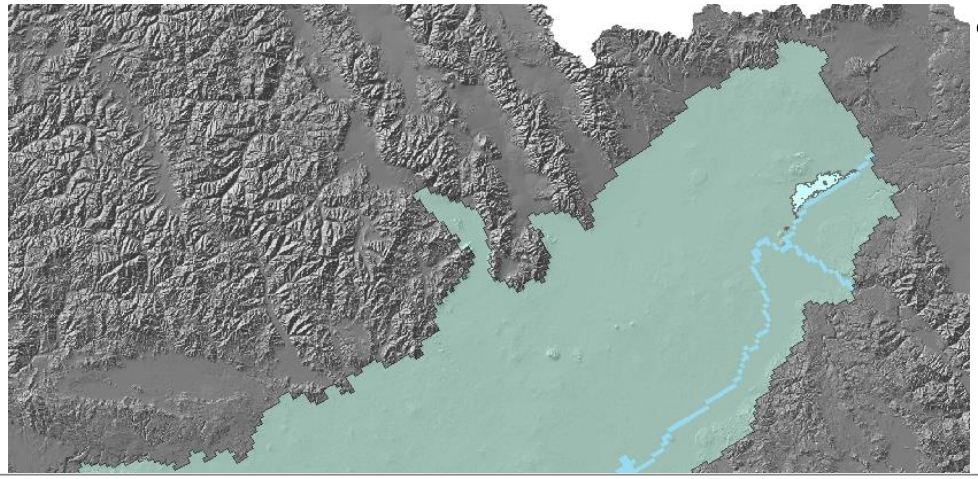


- Group C Springs

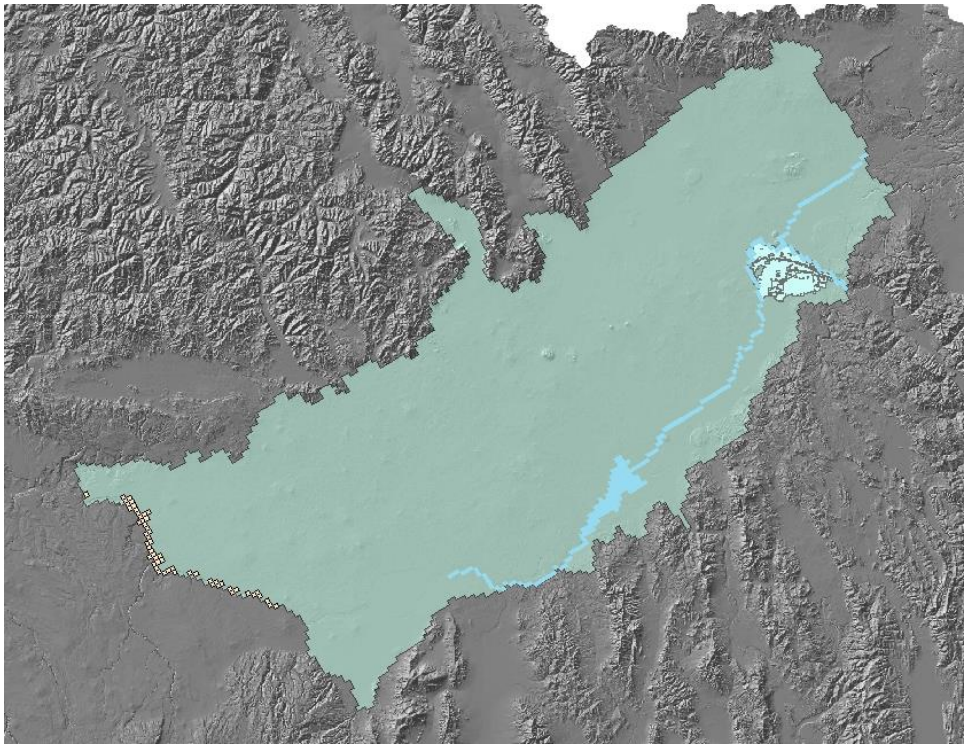

Ratio Modelled
Ratio C&W
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Buhl-LowerSalmonFalls
LowerSalmonFalls-KingHill
Kimberly-Buhl
45



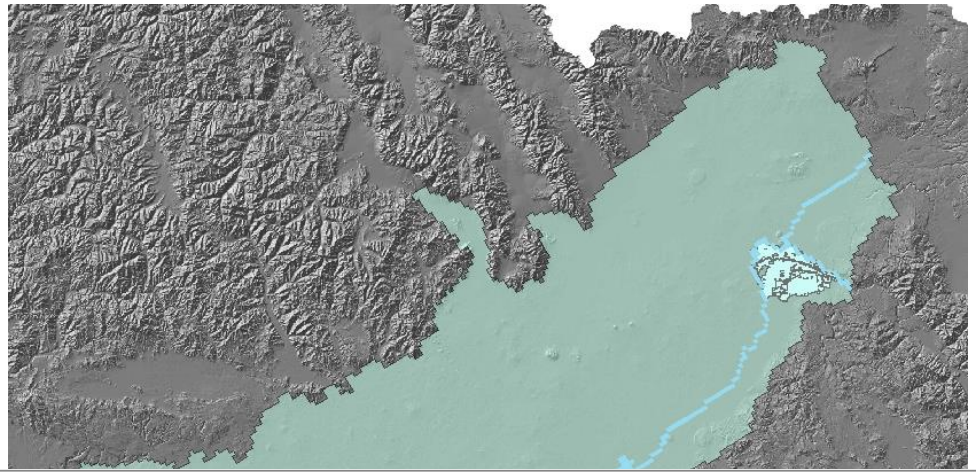
- Egin returns



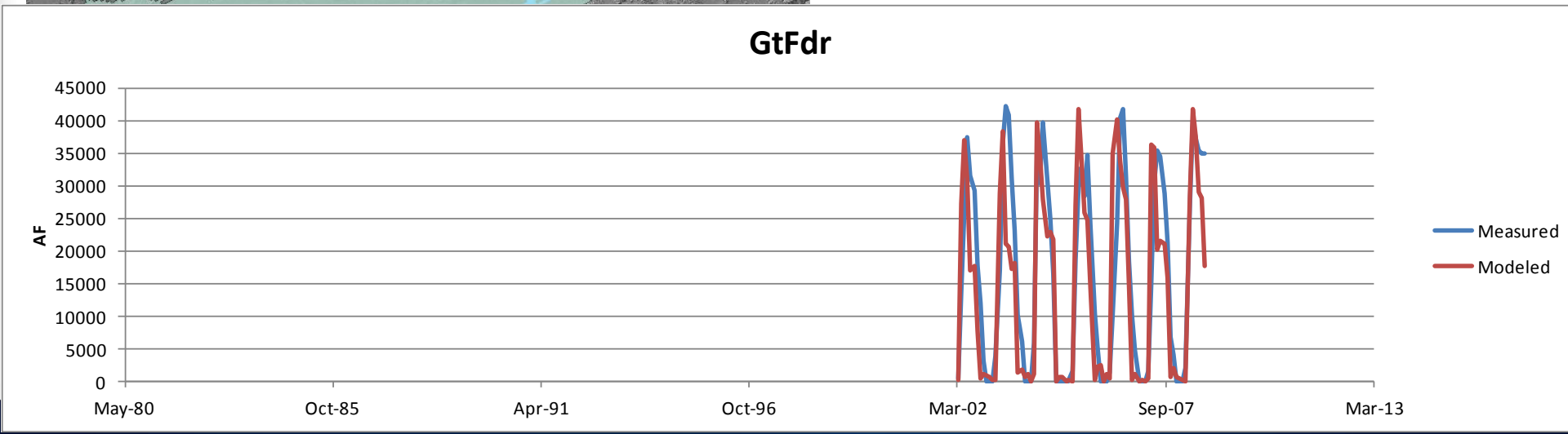
- Egin returns

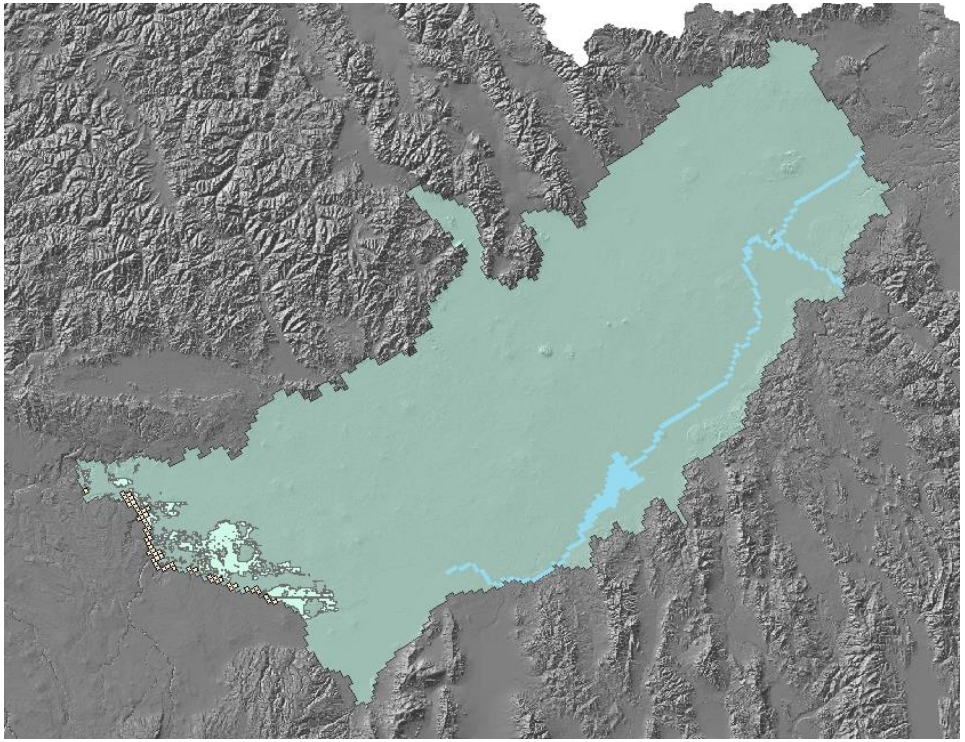


- Great Feeder Group returns

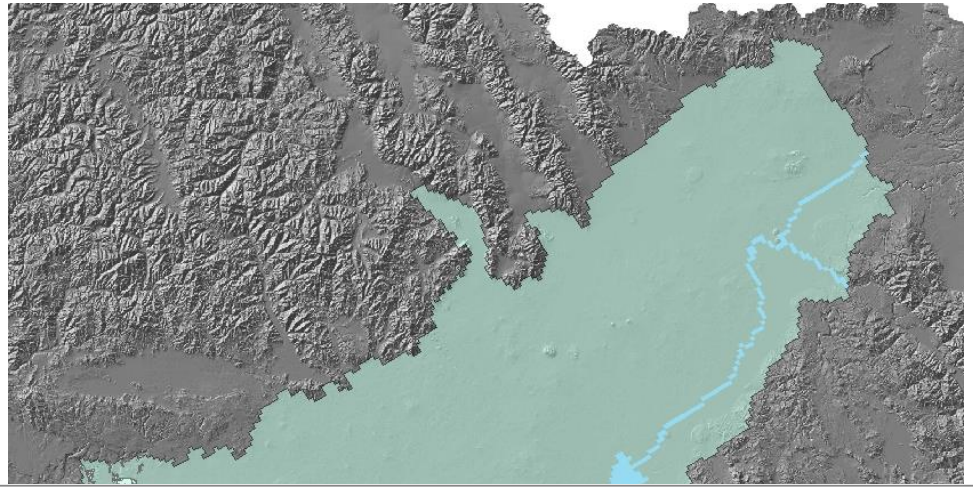


- Great Feeder Group returns

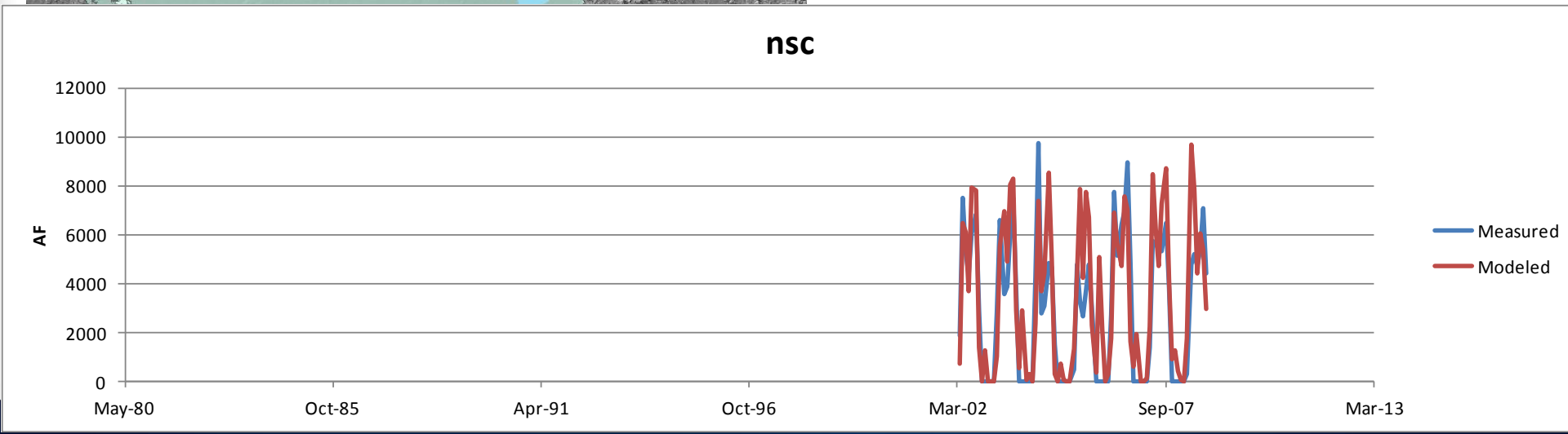


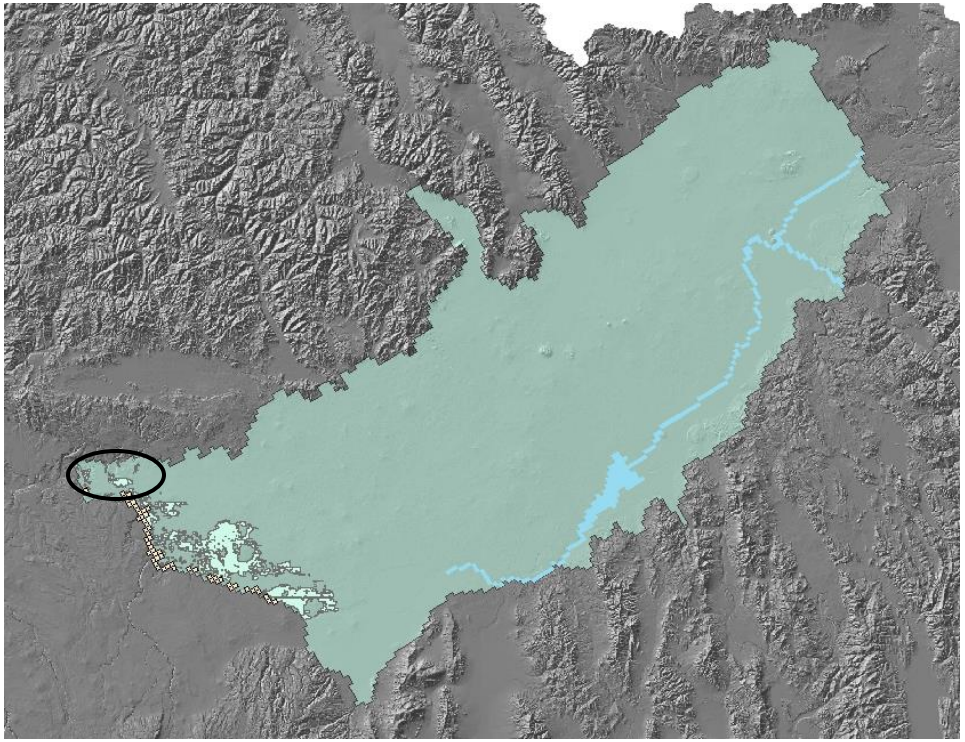


- North Side Canal Co returns

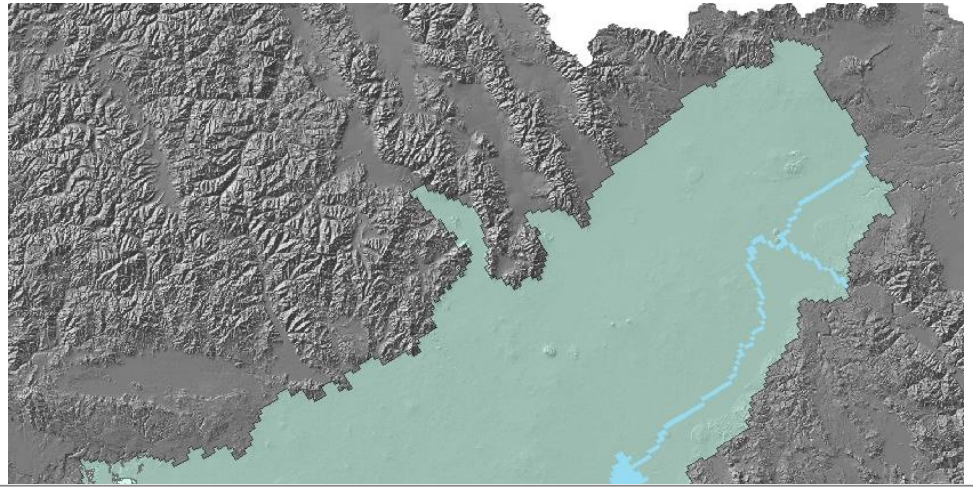


- North Side Canal Co returns

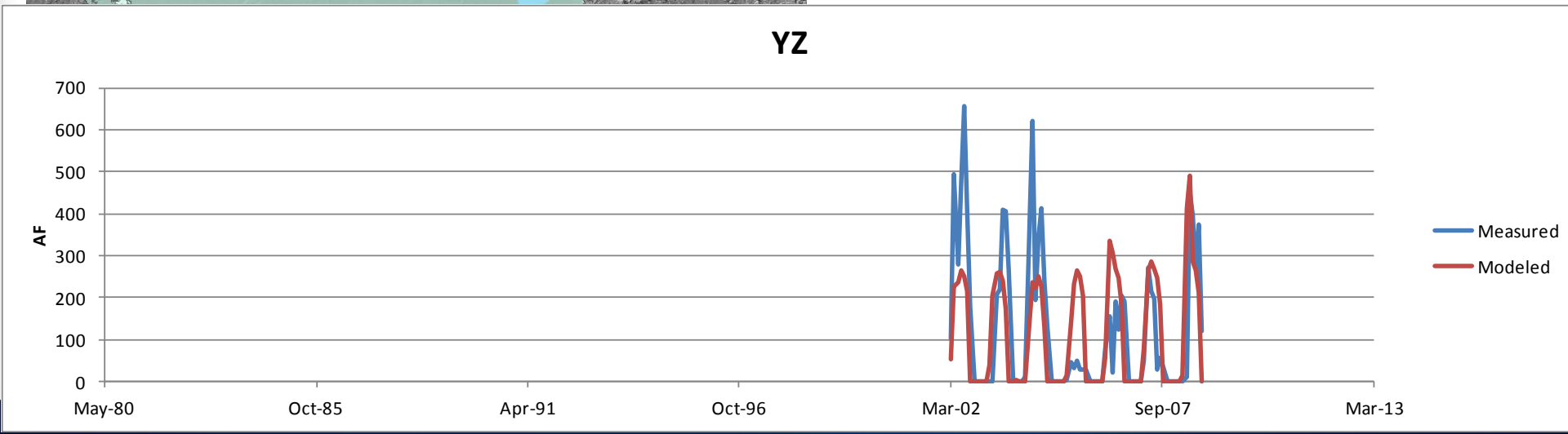


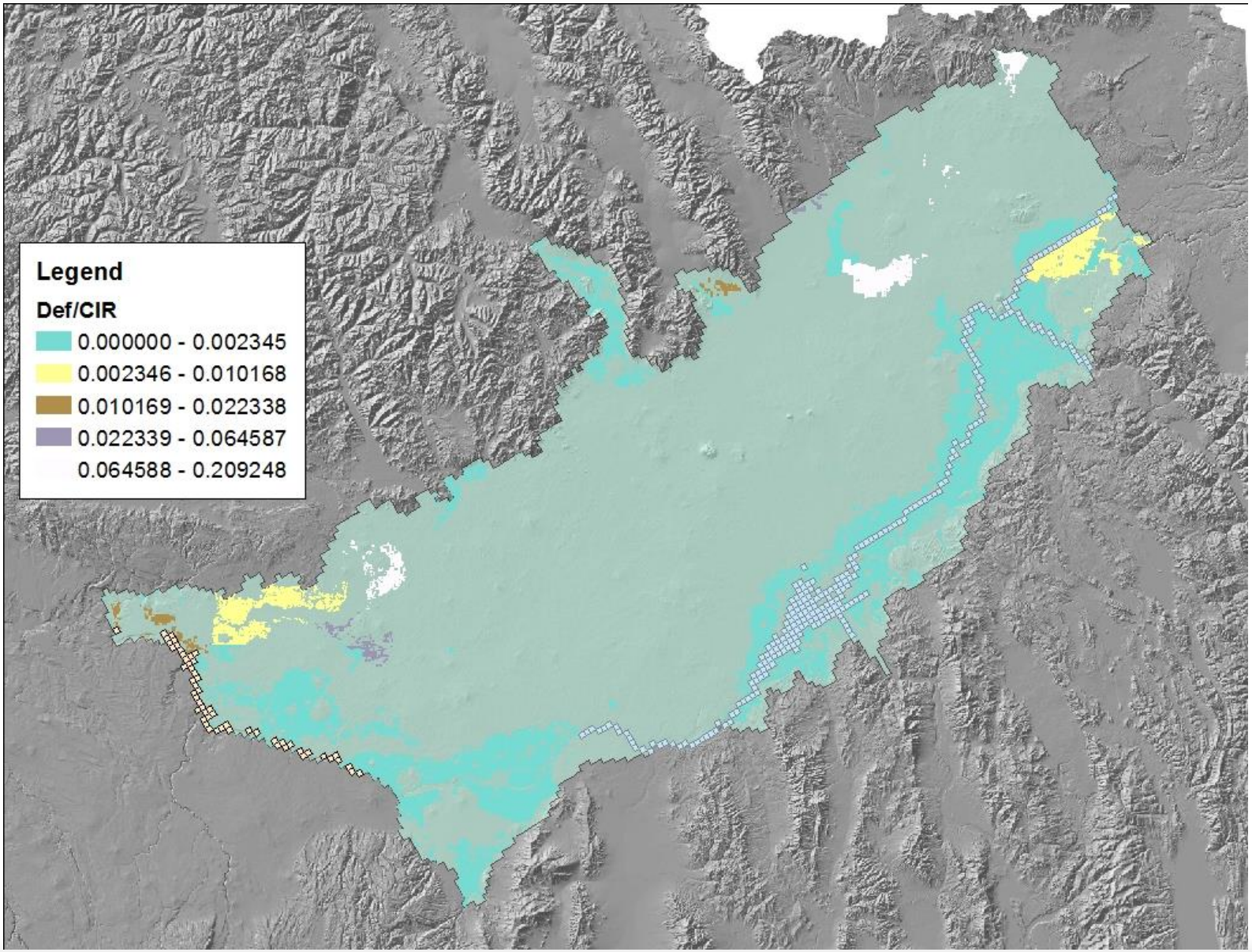


- North Side Canal Co YZ returns



- North Side Canal Co YZ returns




Legend
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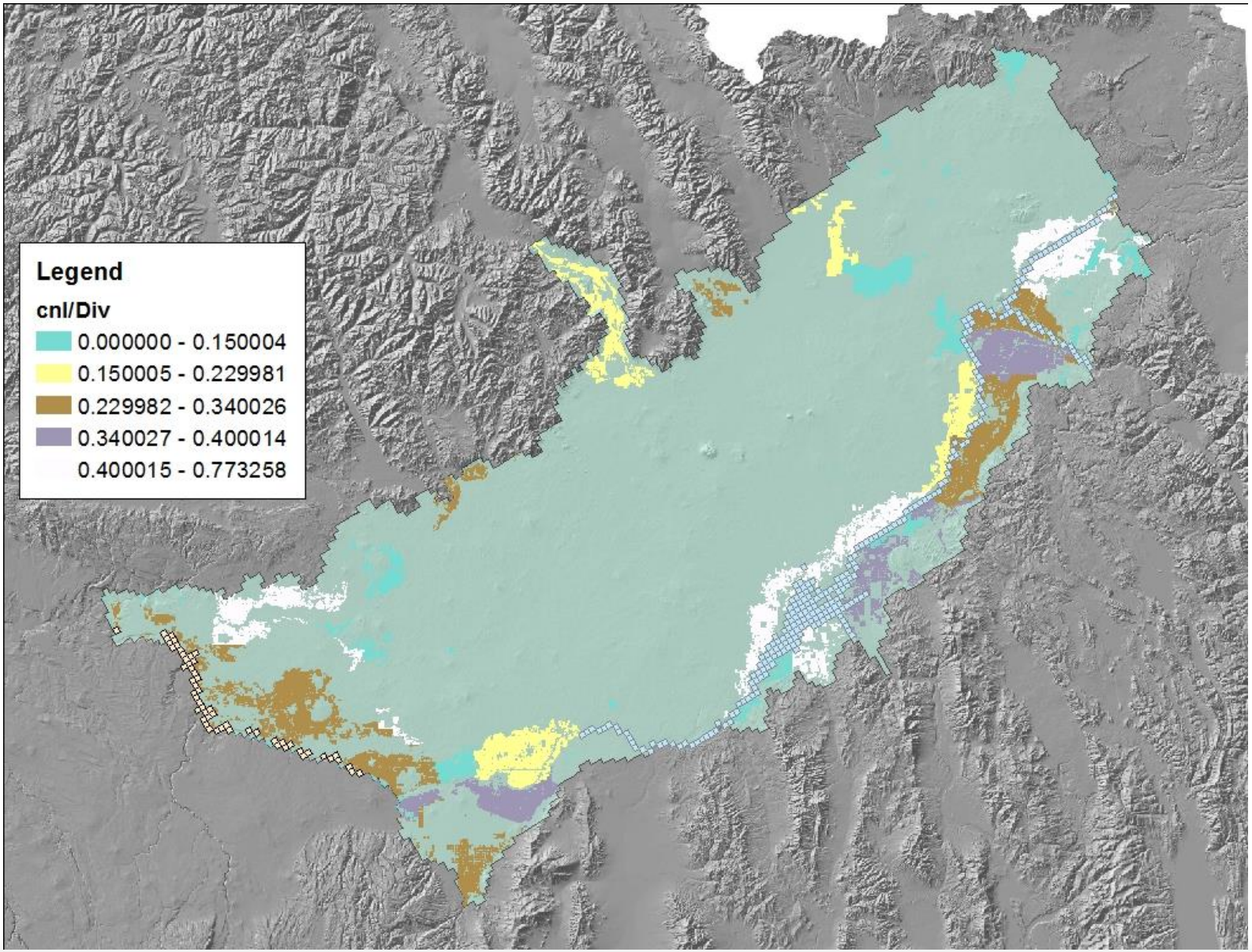
0.002346 - 0.010168
0.010169 - 0.022338
0.022339 - 0.064587
0.064588 - 0.209248


Legend
cnl/Div
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0.340027 - 0.400014
0.400015 - 0.773258

END