Calibration with E110712A, Elevation adjust NFH, Thousand, and Jones

Allan Wylie IDWR

Calibration with E110712A, A B & C Springs and Return Flow Targets

- Monthly Stress Periods
  - Using
    - MKMOD8.exe
      - Using On-Farm algorithm
    - E110712A
      - Latest and greatest adjustments by IWRRI
    - No steady state targets
    - Aquifer head
      - 1985-2008
    - Seasonal
      - Head difference on selected wells
    - Snake reach gain and loss targets
      - Updated through 2008 to match recharge data
      - 1985-2008
    - Spring discharge
      - Updated through 2008 to match recharge data
      - 1985-2008
    - Returns targets
      - Egin, Liberty, Great Feeder Group, Butte-Market Lake, Aberdeen-Springfield, BID, MID, and NSCCo

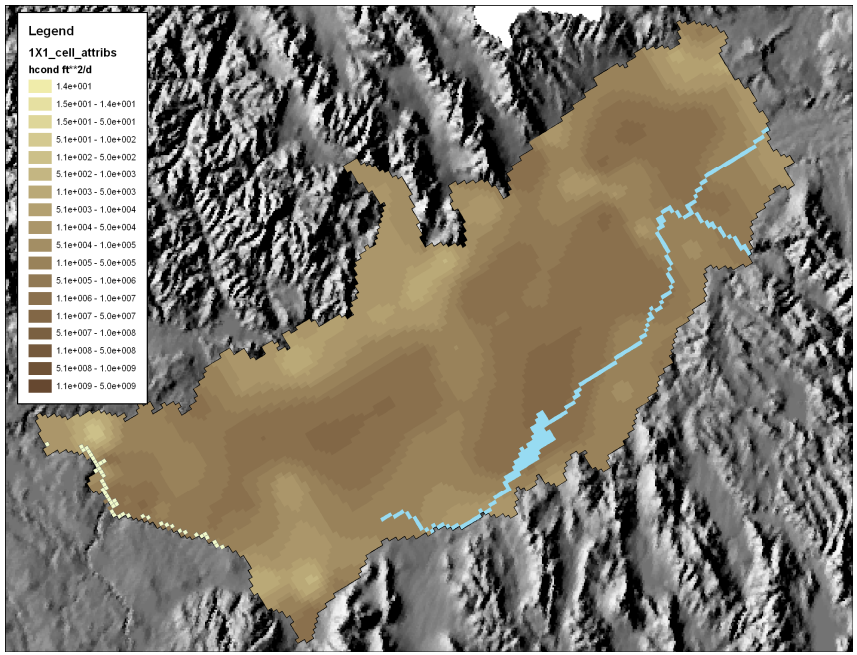
Calibration with E110712A, A B & C Springs and Return Flow Targets

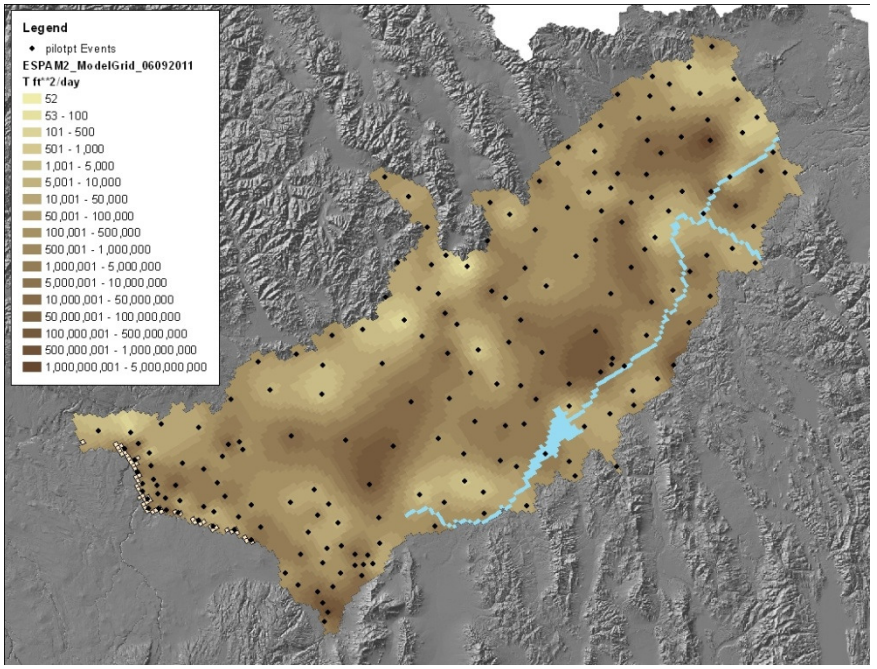
- Adjustable Parameters
  - Transmissivity
    - Pilot Points
      - 1e-10 – 1e+10
  - Specific Yield
    - Pilot Points
      - 0.01 – 0.30
  - Riverbed Conductance
    - By reach
      - 1.0 – 1e+10
  - Drain Conductance
    - By drain cell
      - Up to 2 drain cells per model cell
      - 1e-10 - 3e+8
  - Canal seepage
    - Uniform by entity
      - 1.05 – 0.95
  - Non-irrigated recharge
    - Thin Thick and Lava
    - 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 – 0.5
    - Split Cam/Bev and Hnry Fork
      - 8 – 1e-6

Calibration with E110712A, A B & C Springs and Return Flow Targets

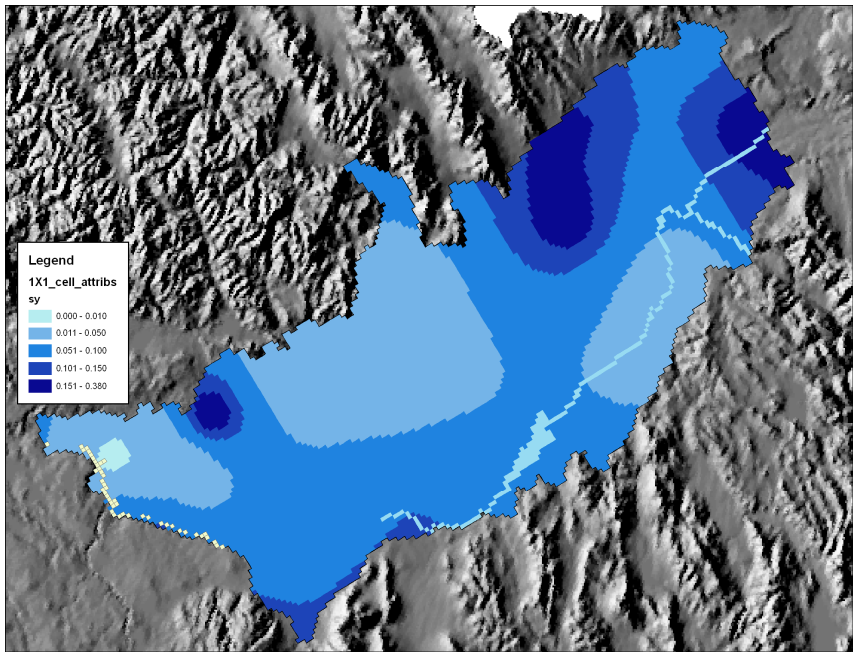
- Adjustable Parameters (cont)
  - On Farm Parameters
    - EffSp
      - Fixed 0.85
    - EffGr
      - Fixed 0.8
    - DPin
      - 0.98 – 0.6
    - DPex
      - 0.98 – 0.6
    - Entities with no returns DPin and DPex fixed at 1.0

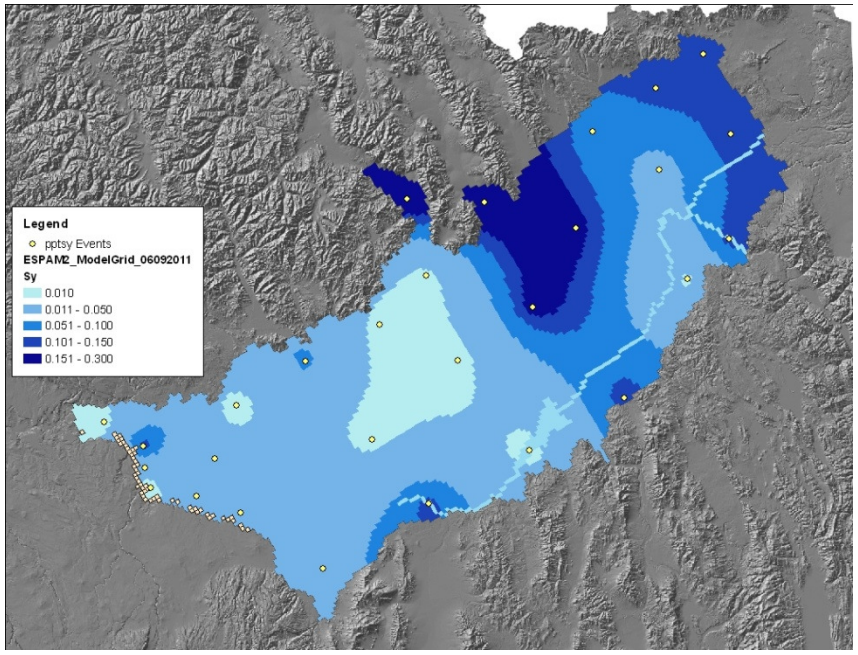
V 1.1


Legend
1X1_cell_attribs
hcond ft**2/d
1.4e+001
1.5e+001 - 1.4e+001
1.5e+001 - 5.0e+001
5.1e+001 - 1.0e+002
1.1e+002 - 5.0e+002
5.1e+002 - 1.0e+003
1.1e+003 - 5.0e+003
5.1e+003 - 1.0e+004
1.1e+004 - 5.0e+004
5.1e+004 - 1.0e+005
1.1e+005 - 5.0e+005
5.1e+005 - 1.0e+006
1.1e+006 - 1.0e+007
1.1e+007 - 5.0e+007
5.1e+007 - 1.0e+008
1.1e+008 - 5.0e+008
5.1e+008 - 1.0e+009
1.1e+009 - 5.0e+009

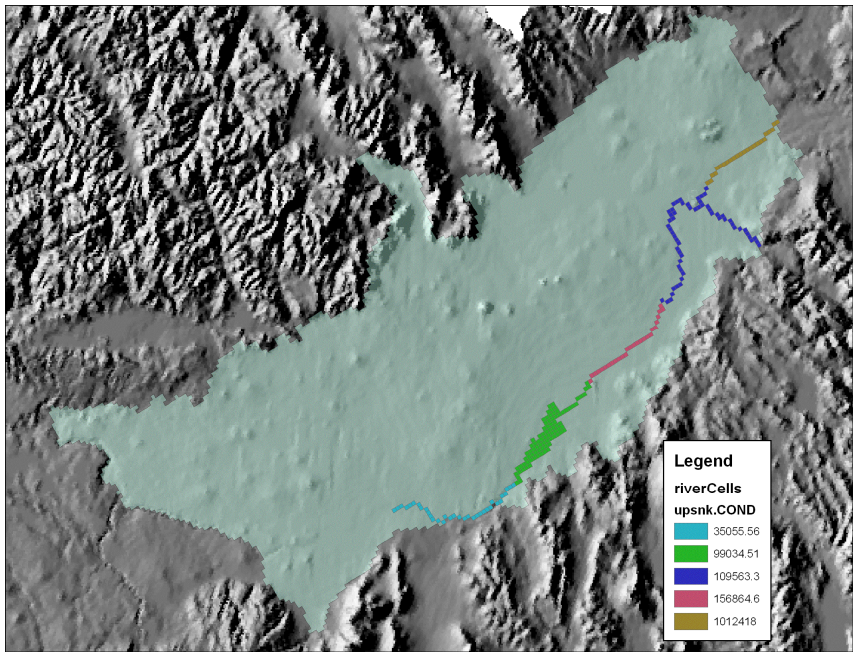

Legend
pilotpt Events
ESPAM2_ModelGrid_06092011
T ft**2/day
52
53 - 100
101 - 500
501 - 1,000
1,001 - 5,000
5,001 - 10,000
10,001 - 50,000
50,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
1,000,001 - 5,000,000
5,000,001 - 10,000,000
10,000,001 - 50,000,000
50,000,001 - 100,000,000
100,000,001 - 500,000,000
500,000,001 - 1,000,000,000
1,000,000,001 - 5,000,000,000

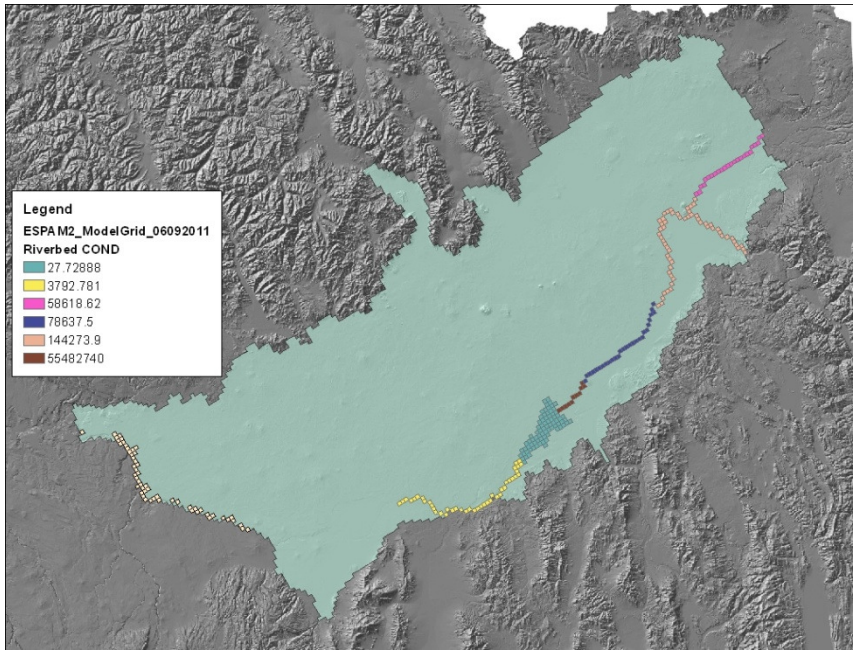
V 1.1


Legend
1X1_cell_attribs
sy
0.000 - 0.010
0.011 - 0.050
0.051 - 0.100
0.101 - 0.150
0.151 - 0.380

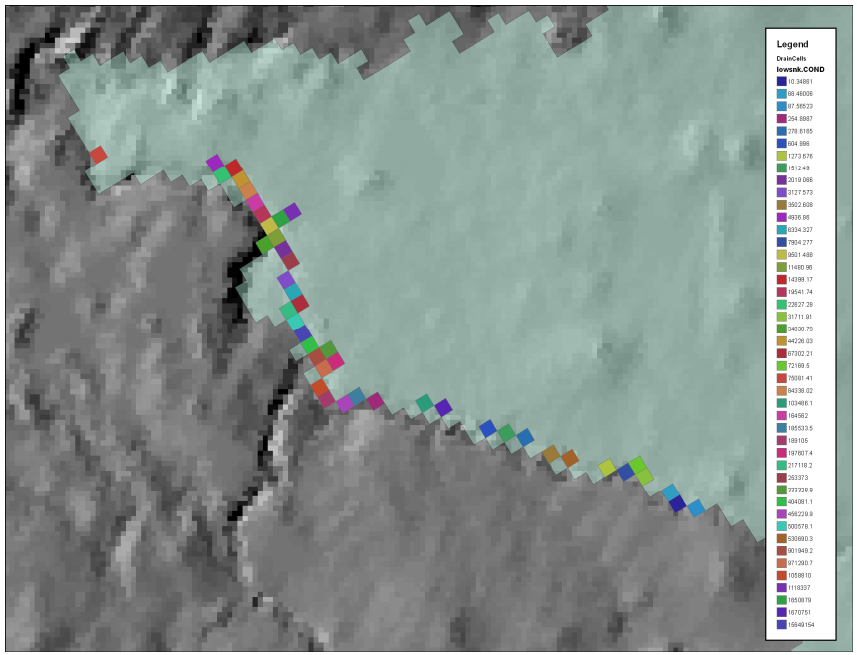

Legend
pptsy Events
ESPAM2_ModelGrid_06092011
Sy
0.010
0.011 - 0.050
0.051 - 0.100
0.101 - 0.150
0.151 - 0.300

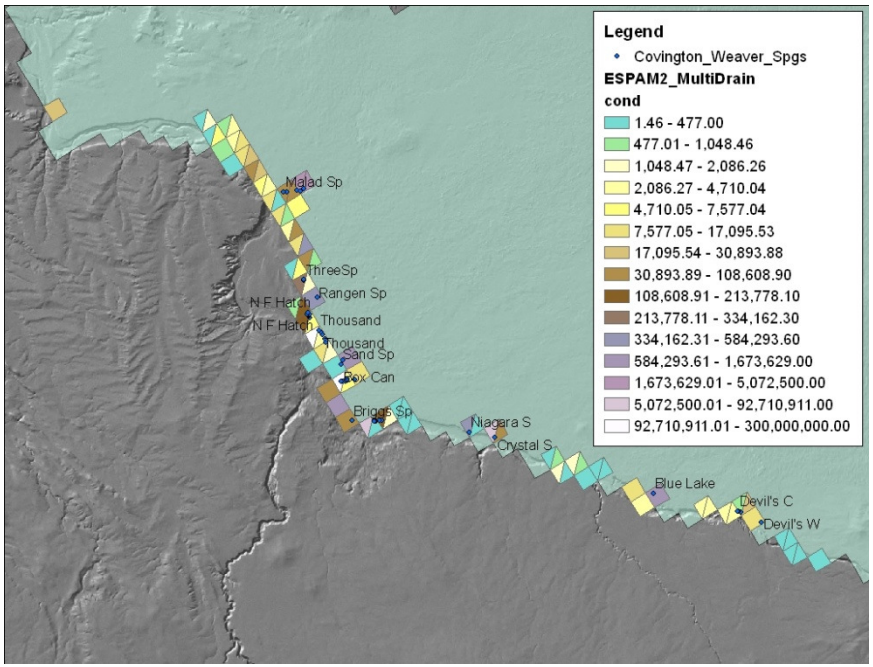
V 1.1


Legend
riverCells
upsnk.COND
35055.56
99034.51
109563.3
156864.6
1012418

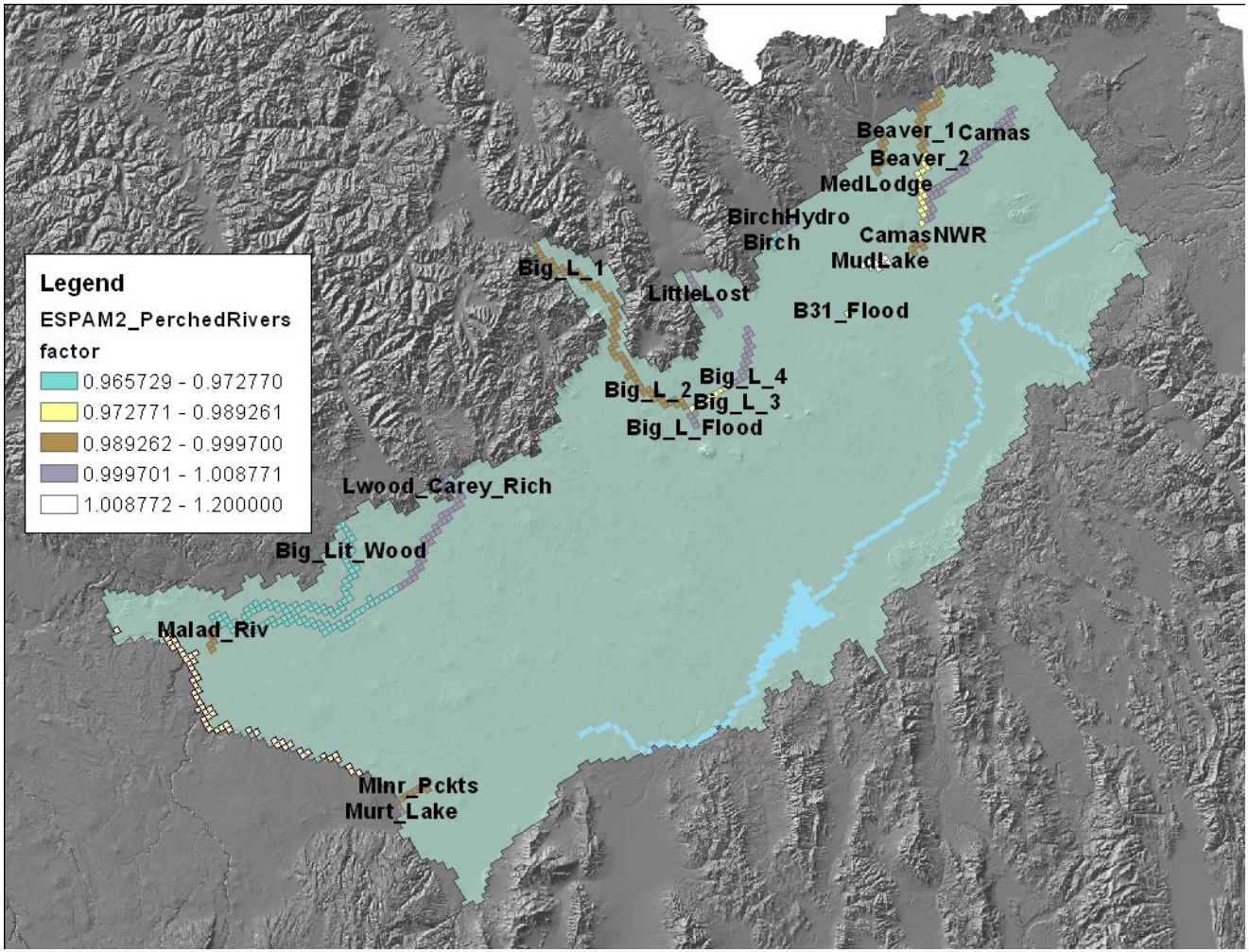

Legend
ESPAM2_ModelGrid_06092011
Riverbed COND
27.72888
3792.781
58618.62
78637.5
144273.9
55482740

V 1.1

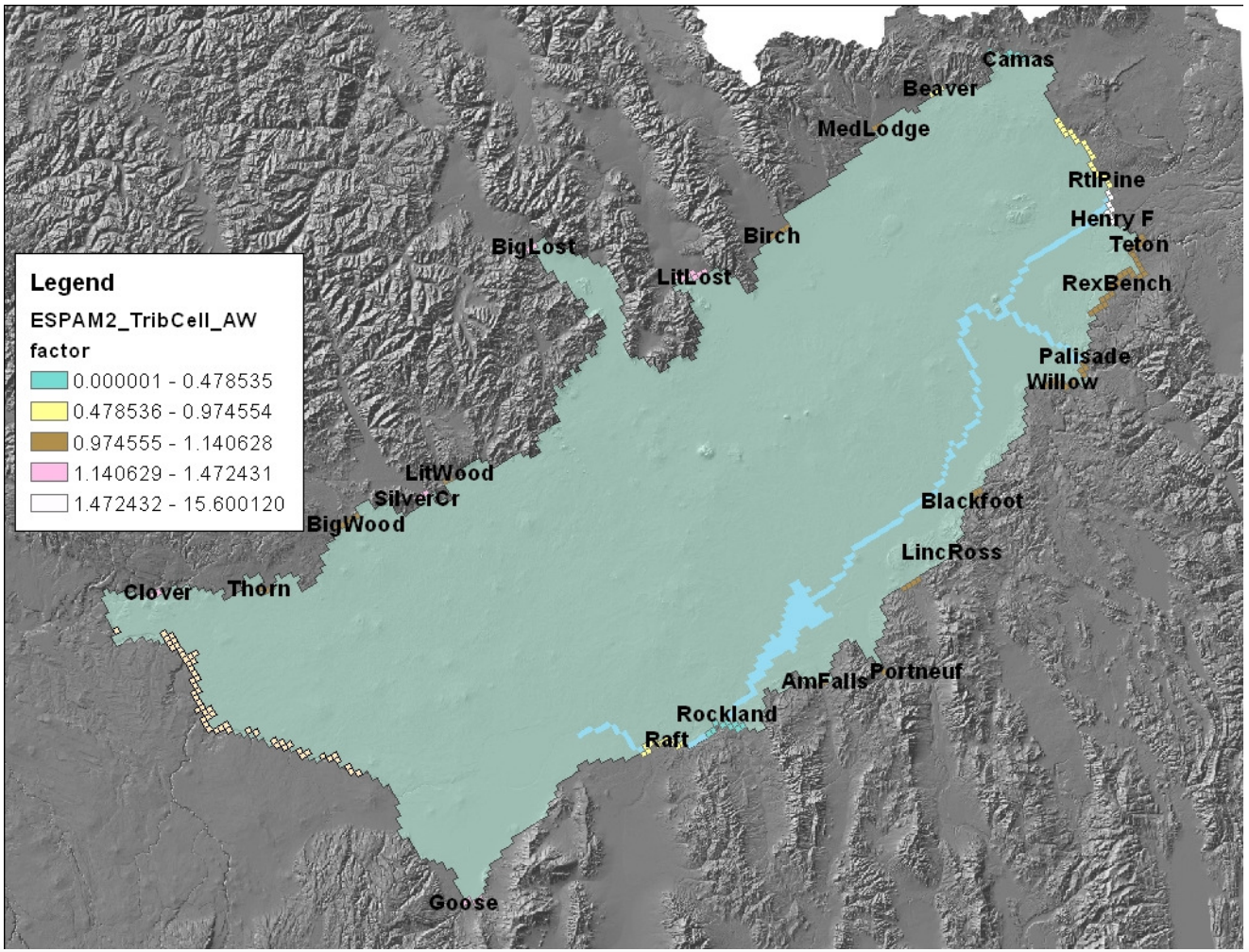

Legend
DrainCells
lowsnk.COND


Legend
Covington_Weaver_Spgs
ESPAM2_MultiDrain
cond
1.46 - 477.00
477.01 - 1,048.46
1,048.47 - 2,086.26
2,086.27 - 4,710.04
4,710.05 - 7,577.04
7,577.05 - 17,095.53
17,095.54 - 30,893.88
30,893.89 - 108,608.90
108,608.91 - 213,778.10
213,778.11 - 334,162.30
334,162.31 - 584,293.60
584,293.61 - 1,673,629.00
1,673,629.01 - 5,072,500.00
5,072,500.01 - 92,710,911.00
92,710,911.01 - 300,000,000.00
Malad Sp
ThreeSp
Rangen Sp
N F Hatch
N F Hatch
Thousand
Thousand
Sand Sp
Box Can
Briggs Sp
Niagara S
Crystal S
Blue Lake
Devil's C
Devil's W

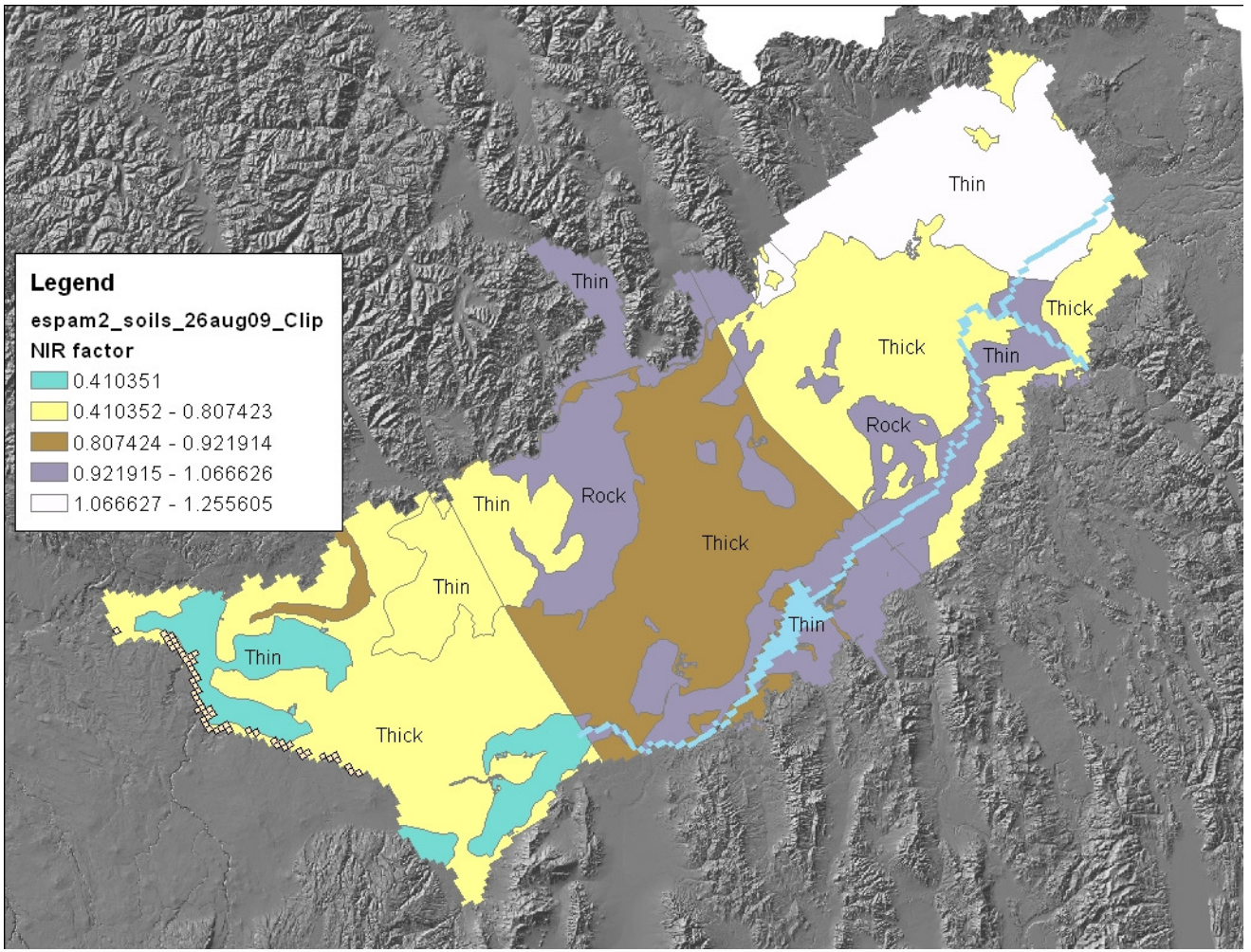
Perched River Seepage



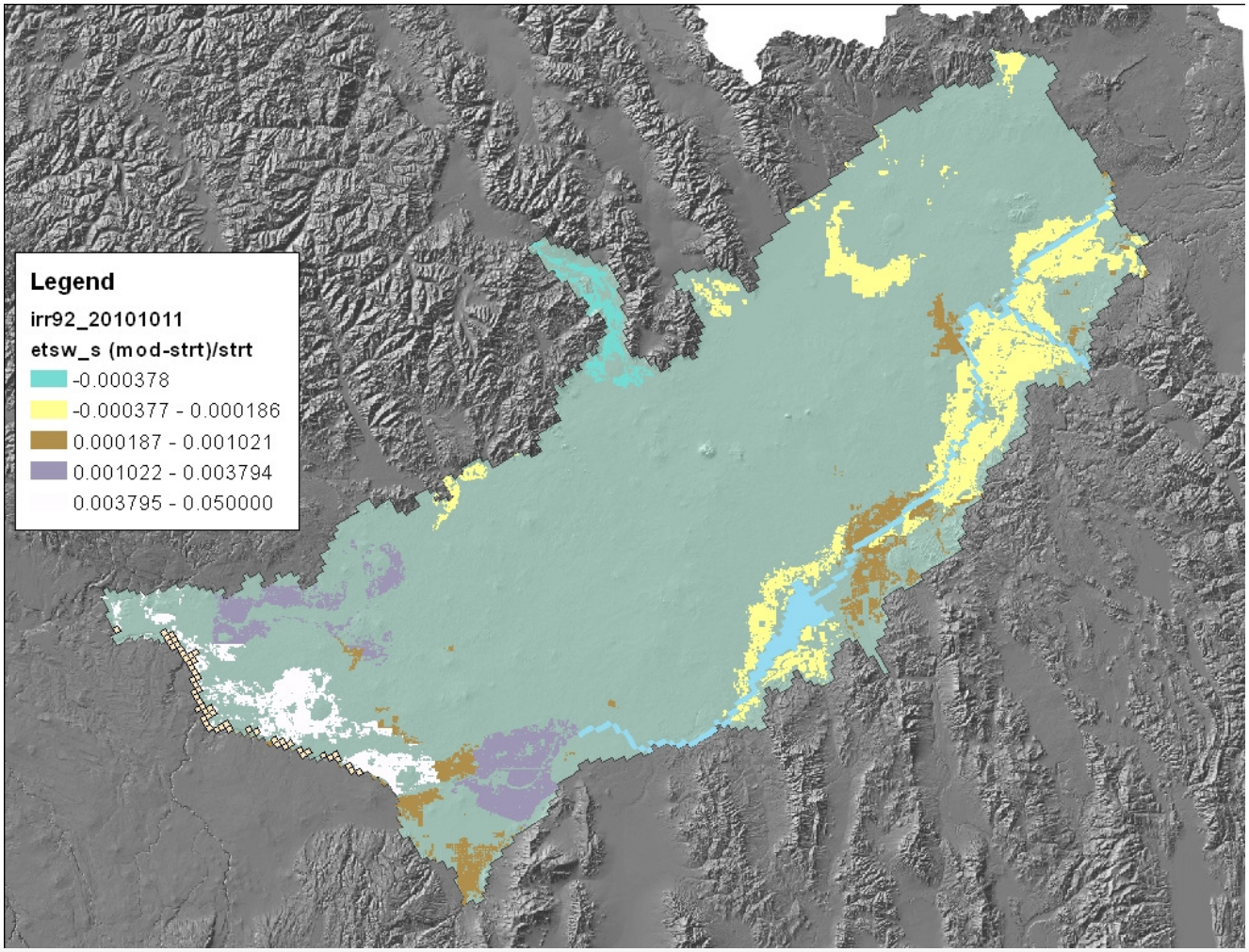
Tributary Underflow



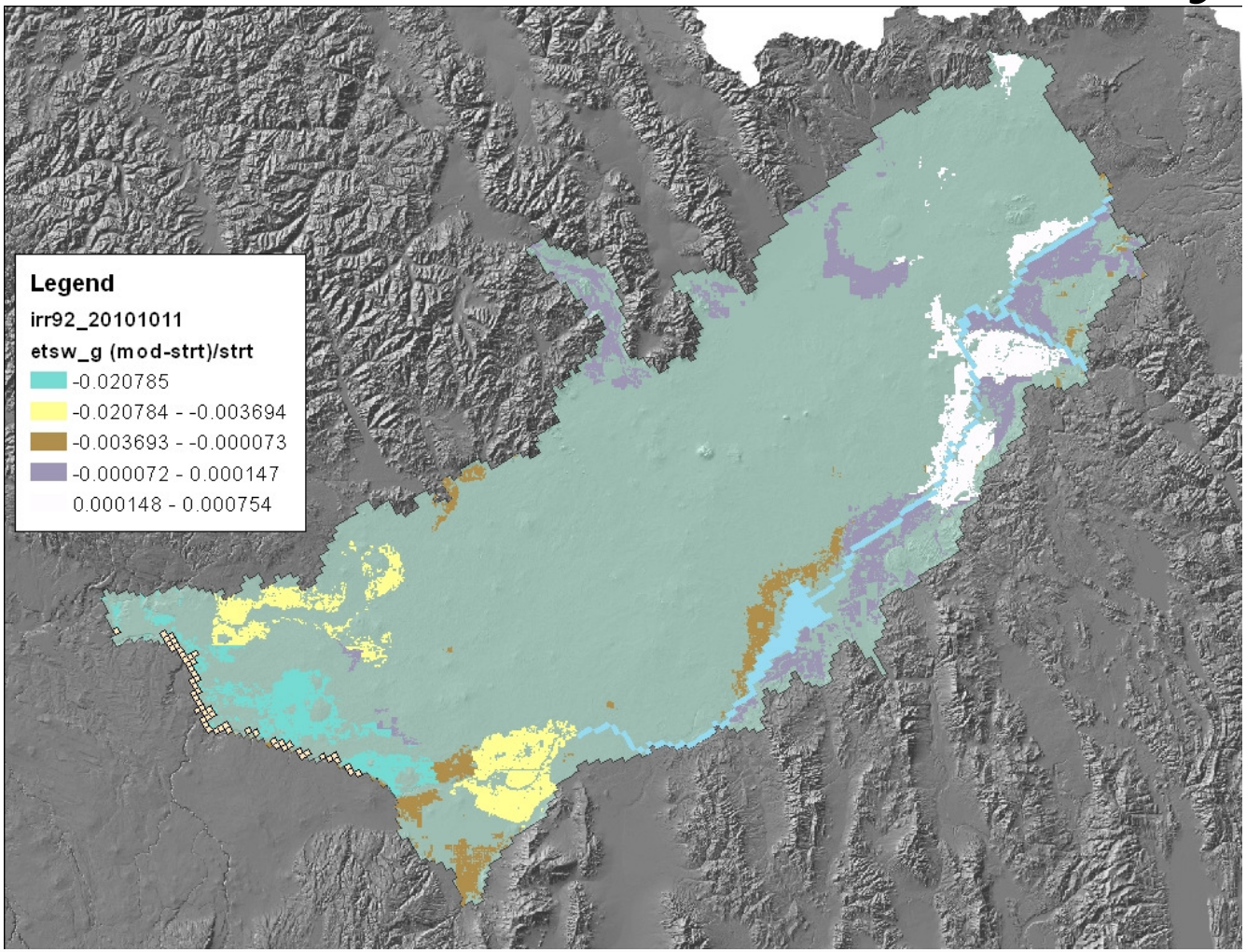
Non-irrigated Recharge



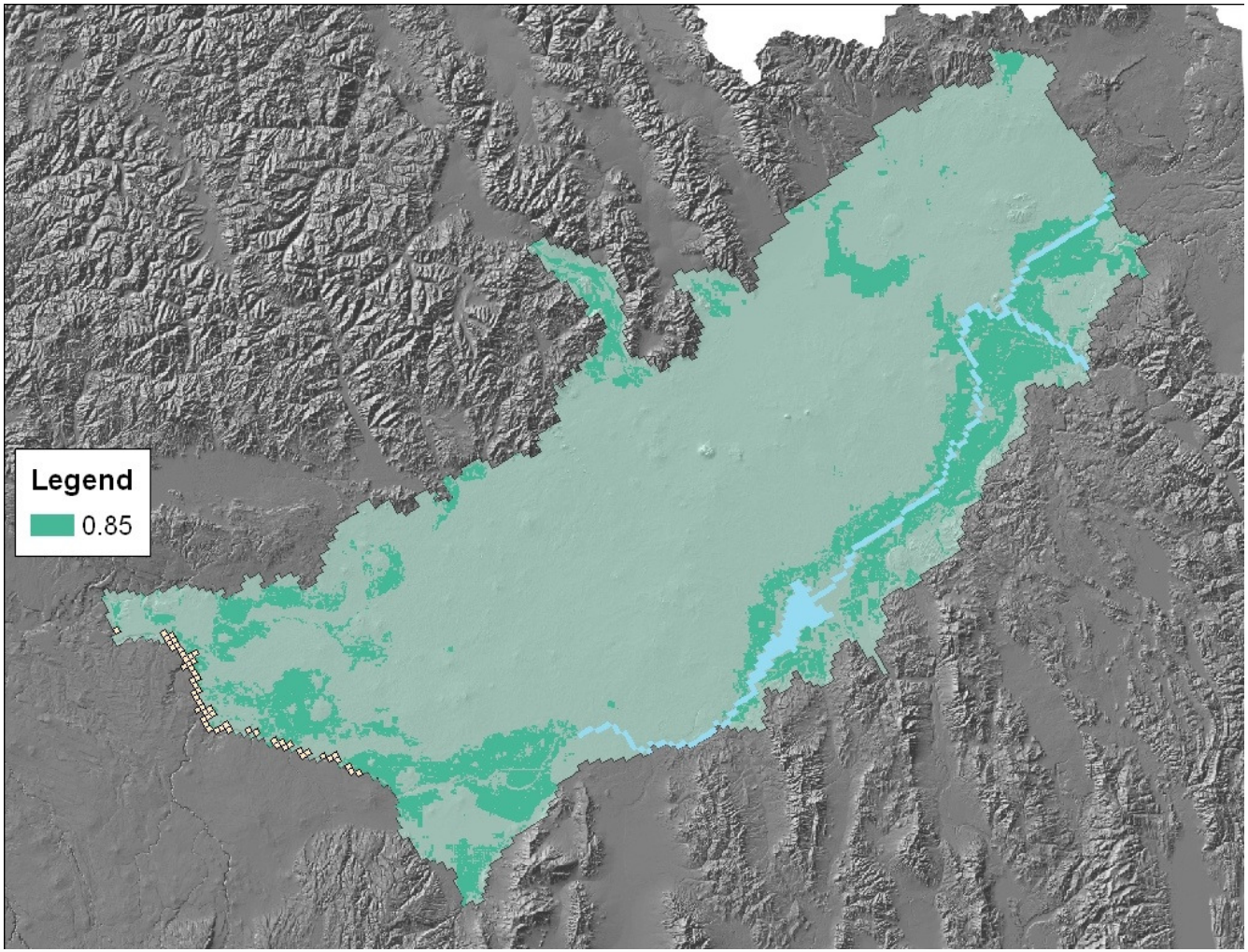
ET Surface Water Sprinkler



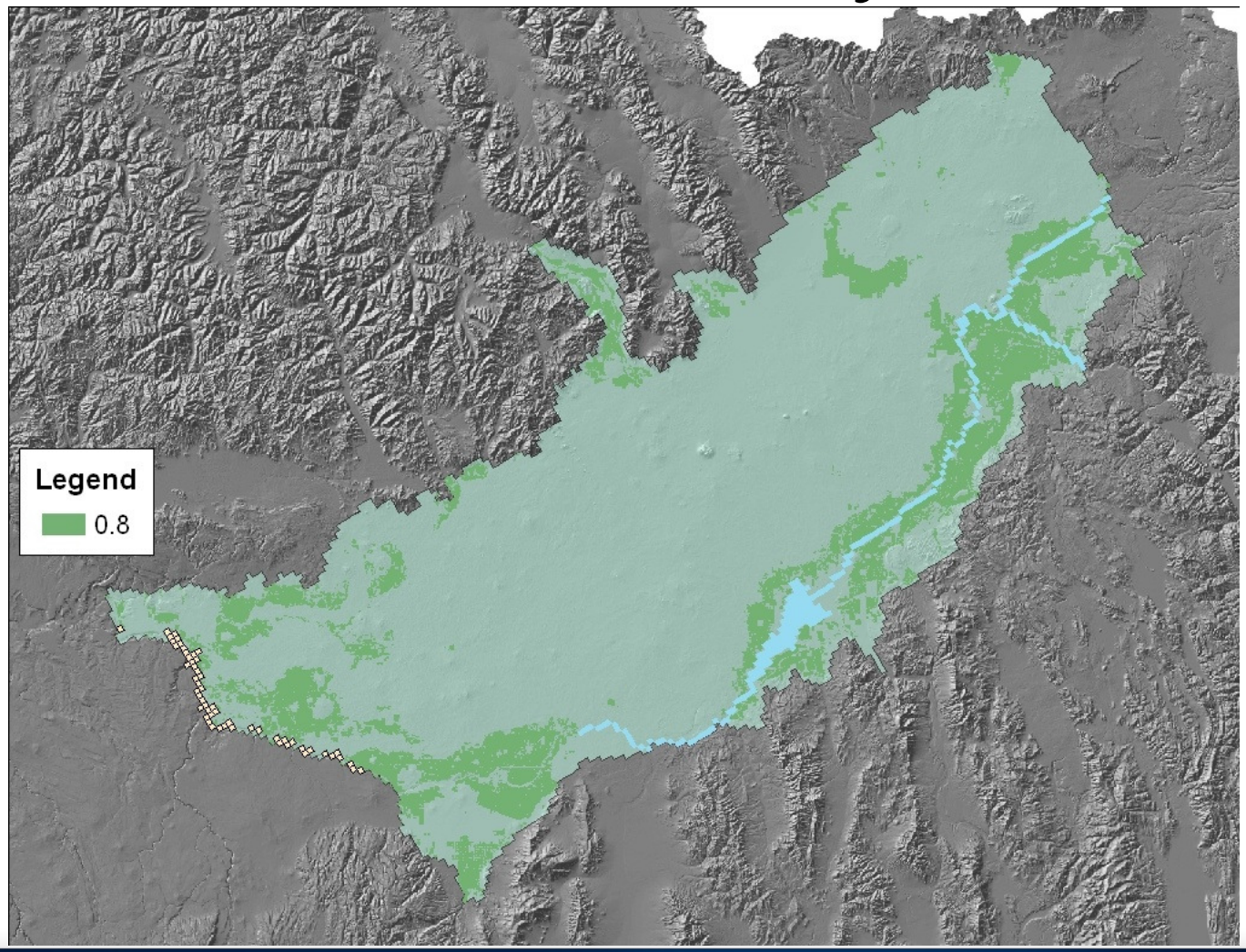
ET Surface Water Gravity

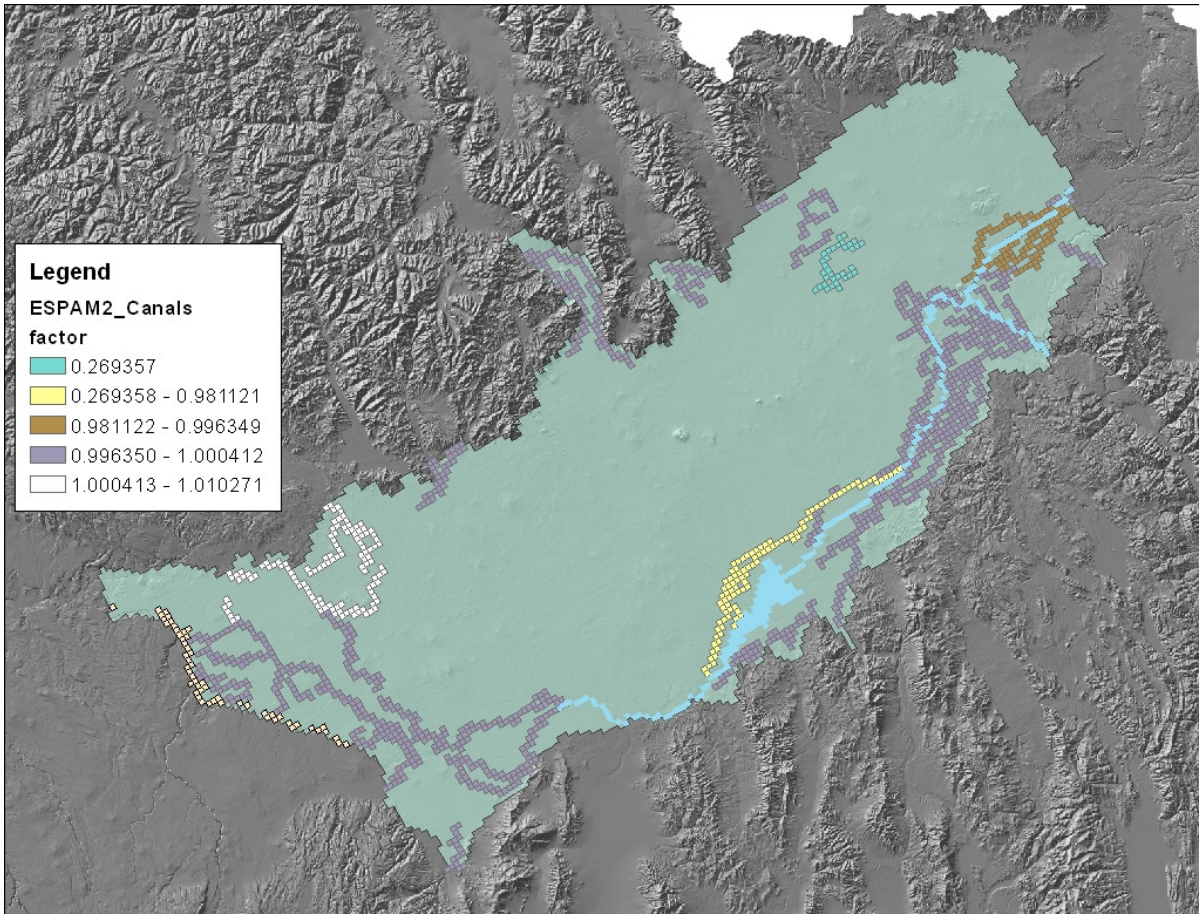


Surface Water Sprinkler Efficiency

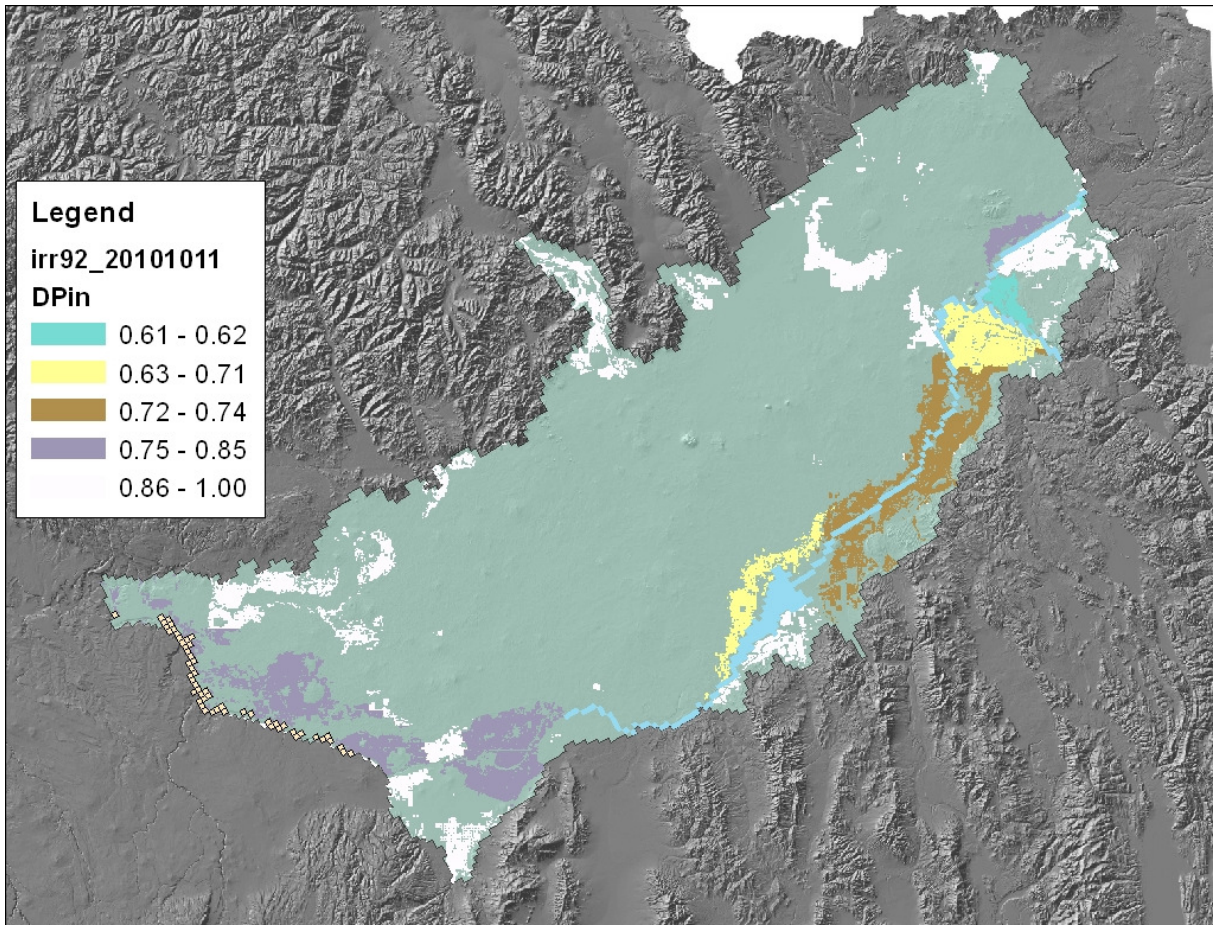


Surface Water Gravity Efficiency

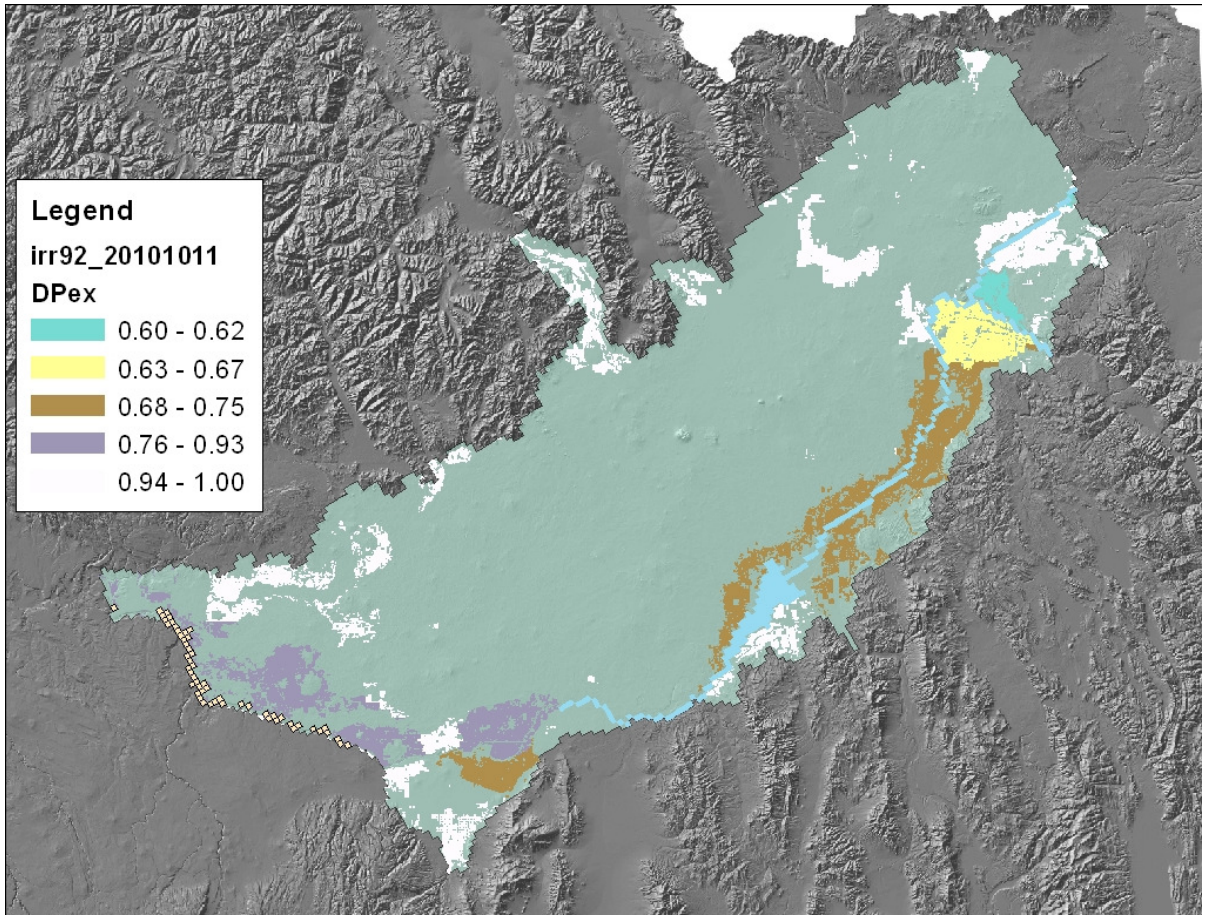




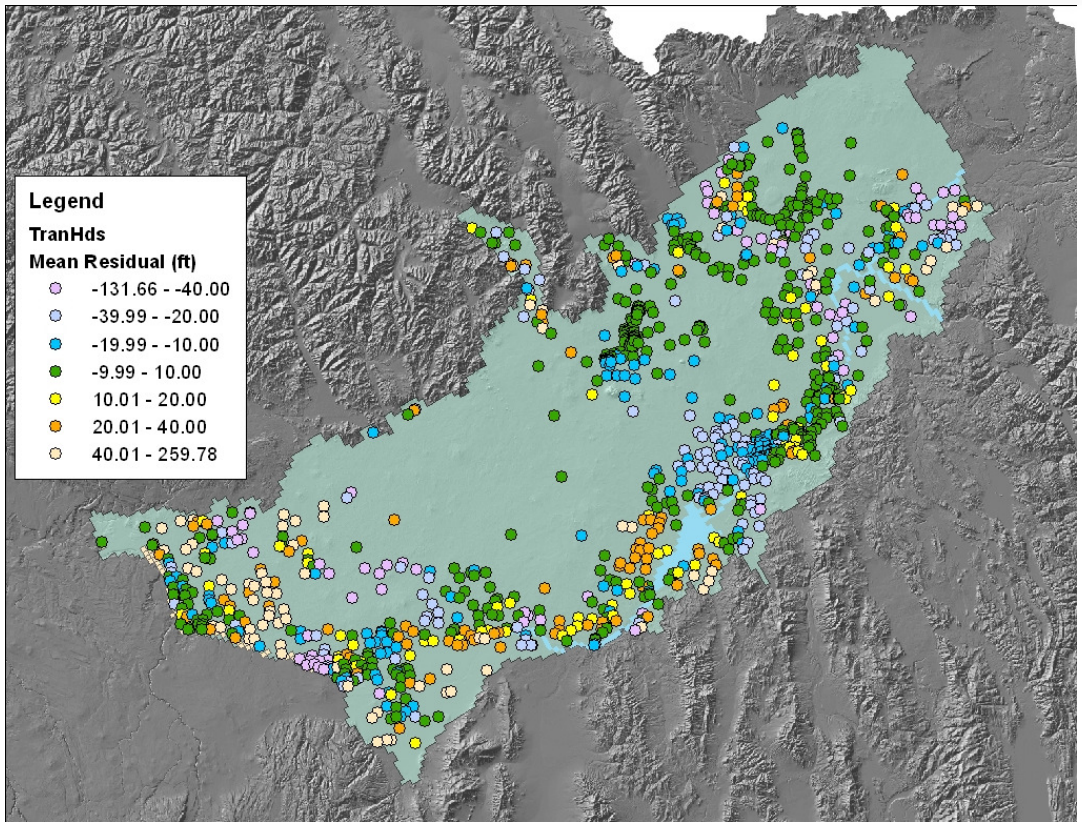
- Canal Seepage
  - CNL fraction * .DIV diversions
  - PEST only allowed to adjust non-coalition entities +/- 5%



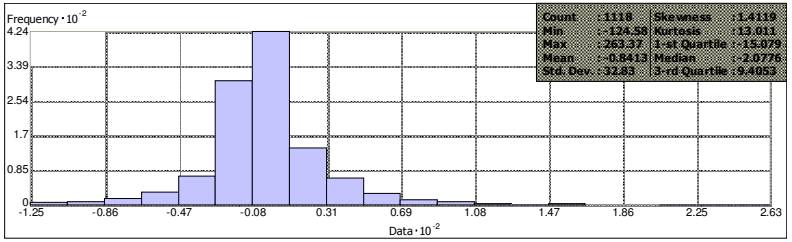
- DPin
  - fraction of the initial irrigation loss (1-eff) that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98



- 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

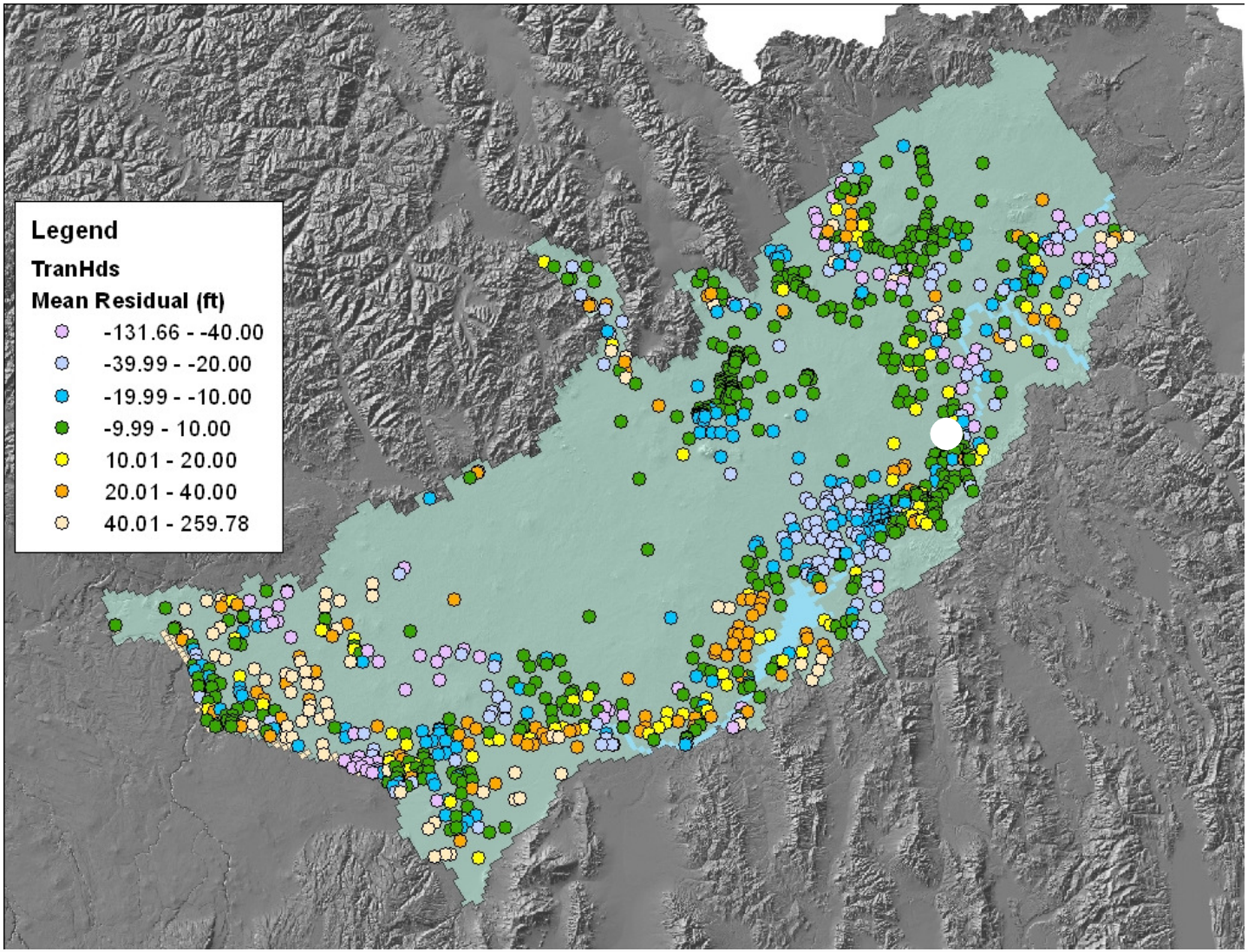


Histogram
Transformation: None

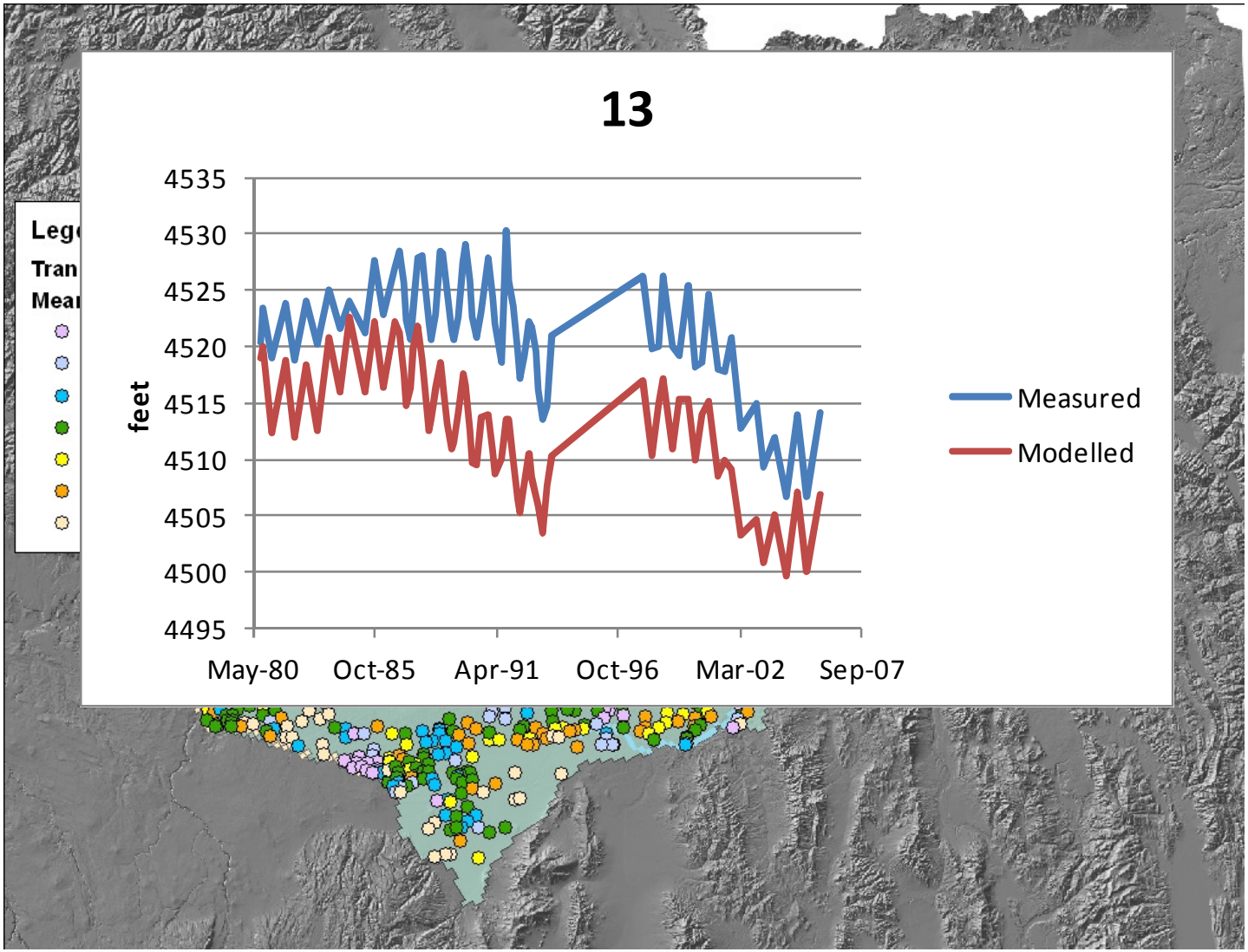


Data Source: TranHds Attribute: Mean

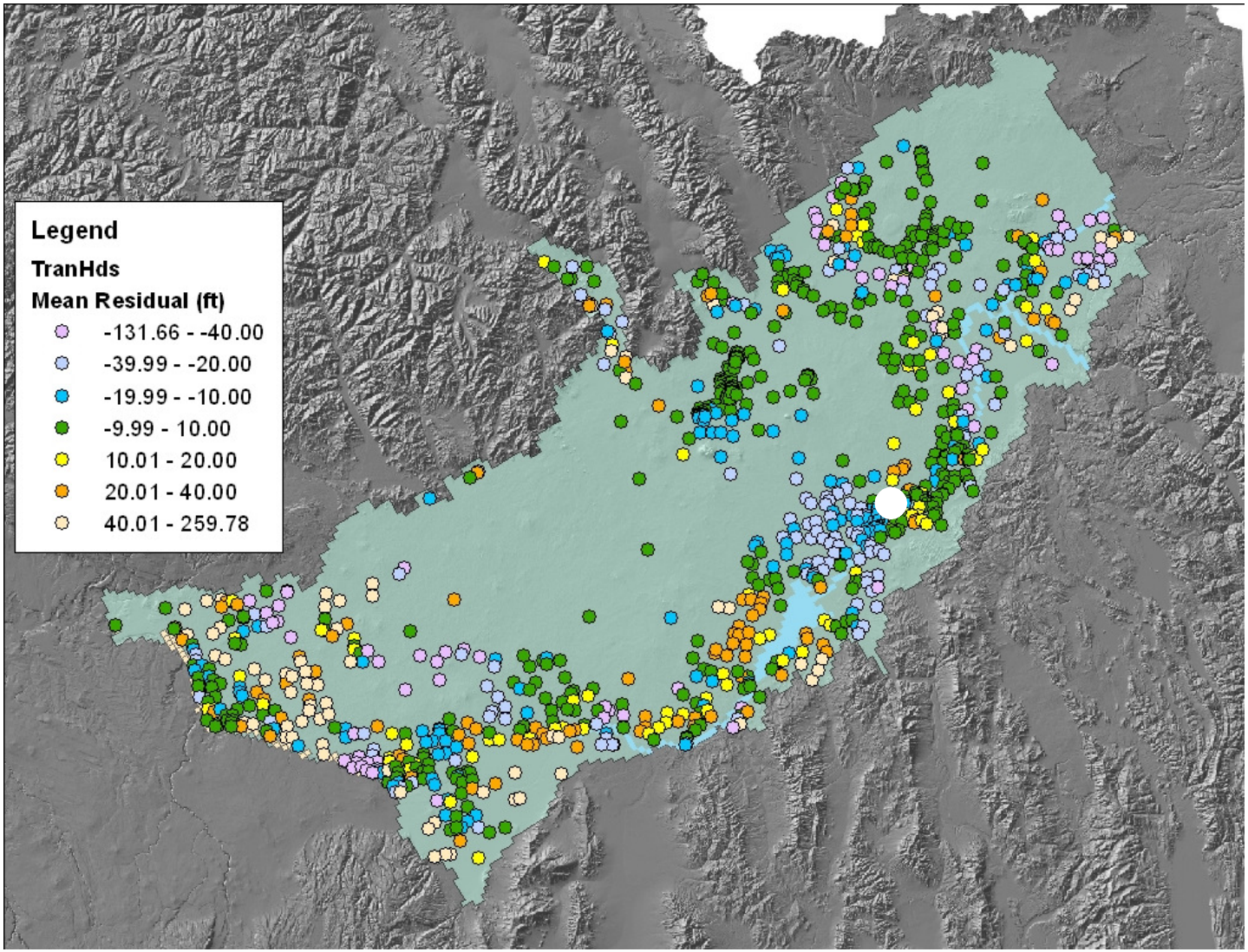
Transient Heads



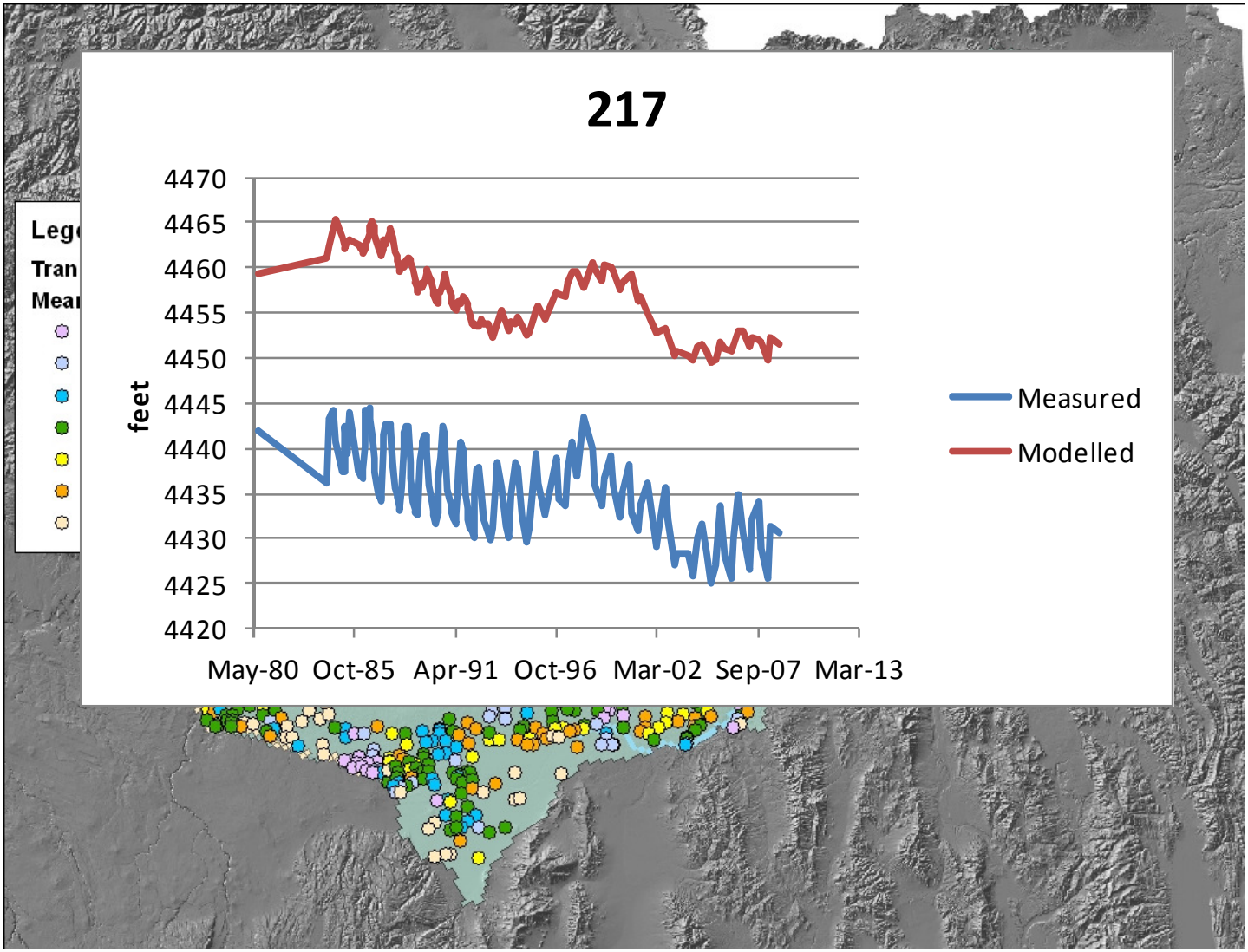
Transient Heads



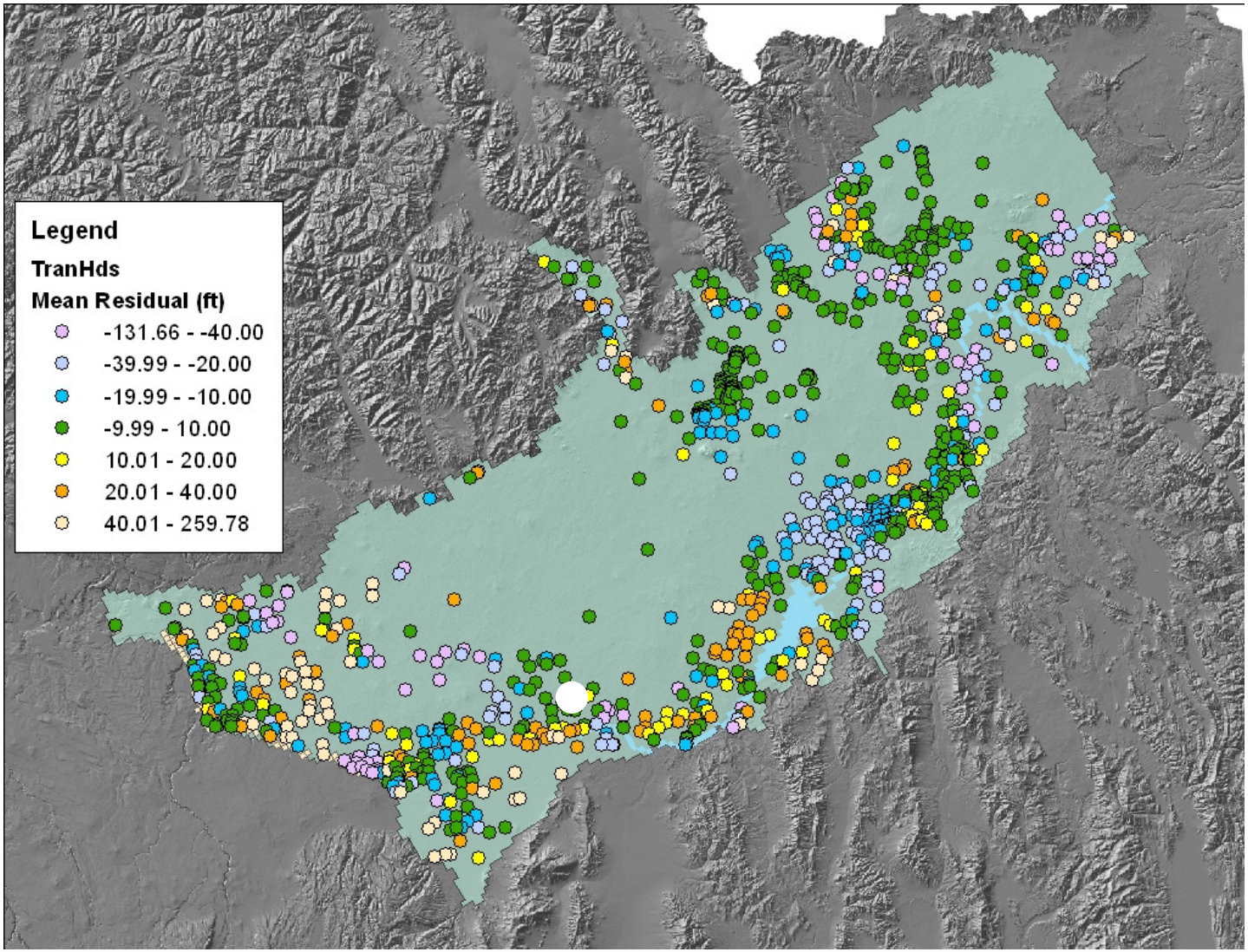
Transient Heads



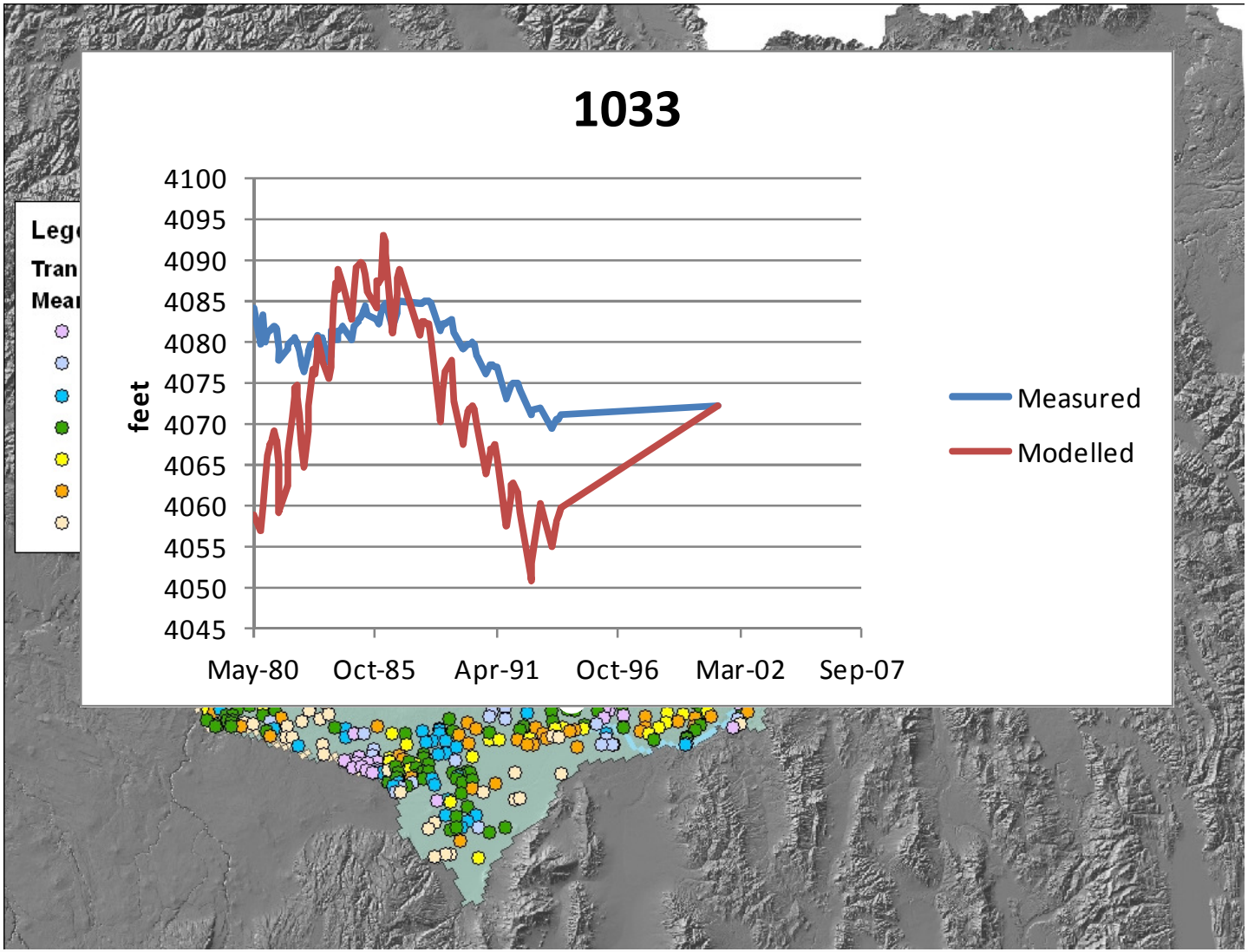
Transient Heads



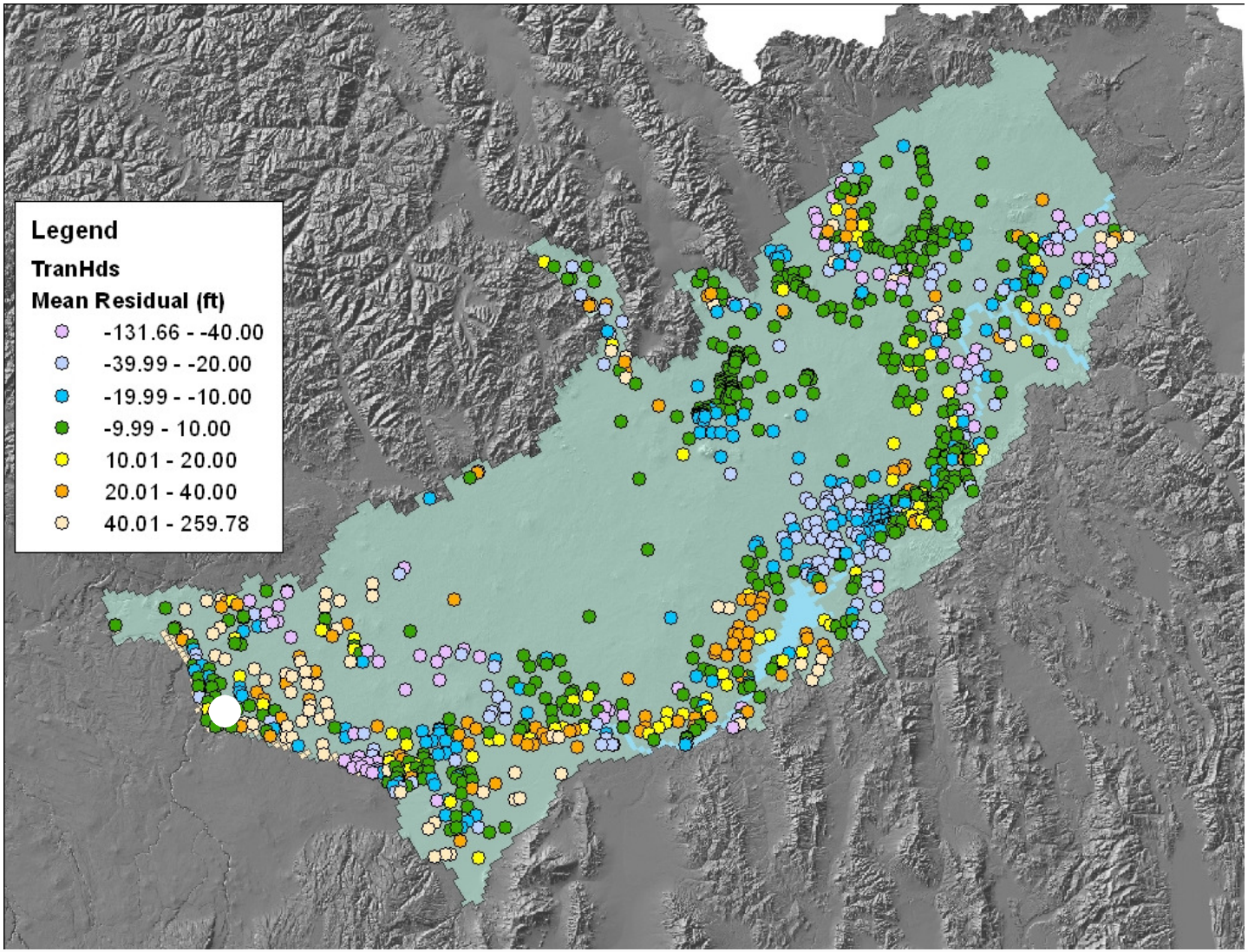
Transient Heads



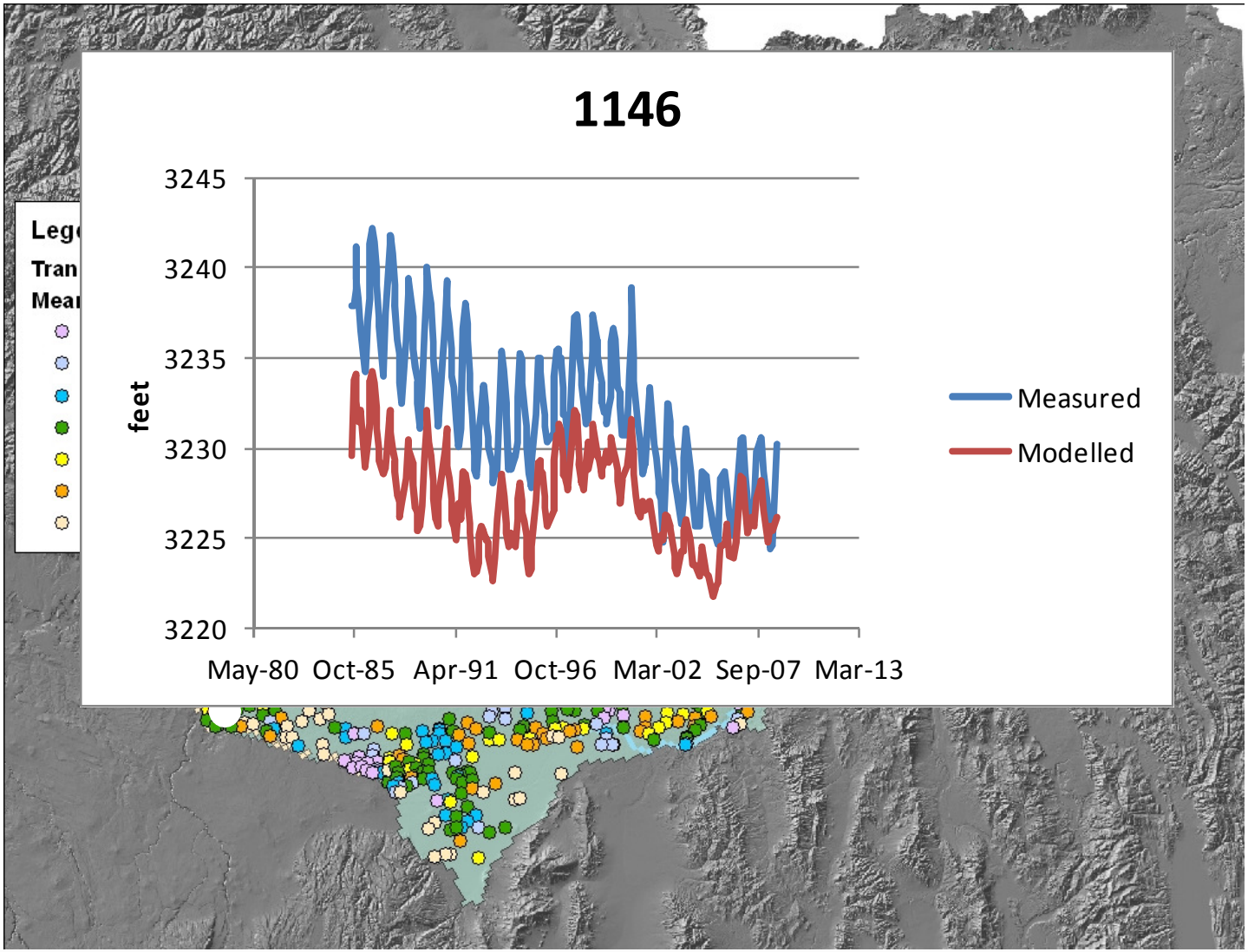
Transient Heads



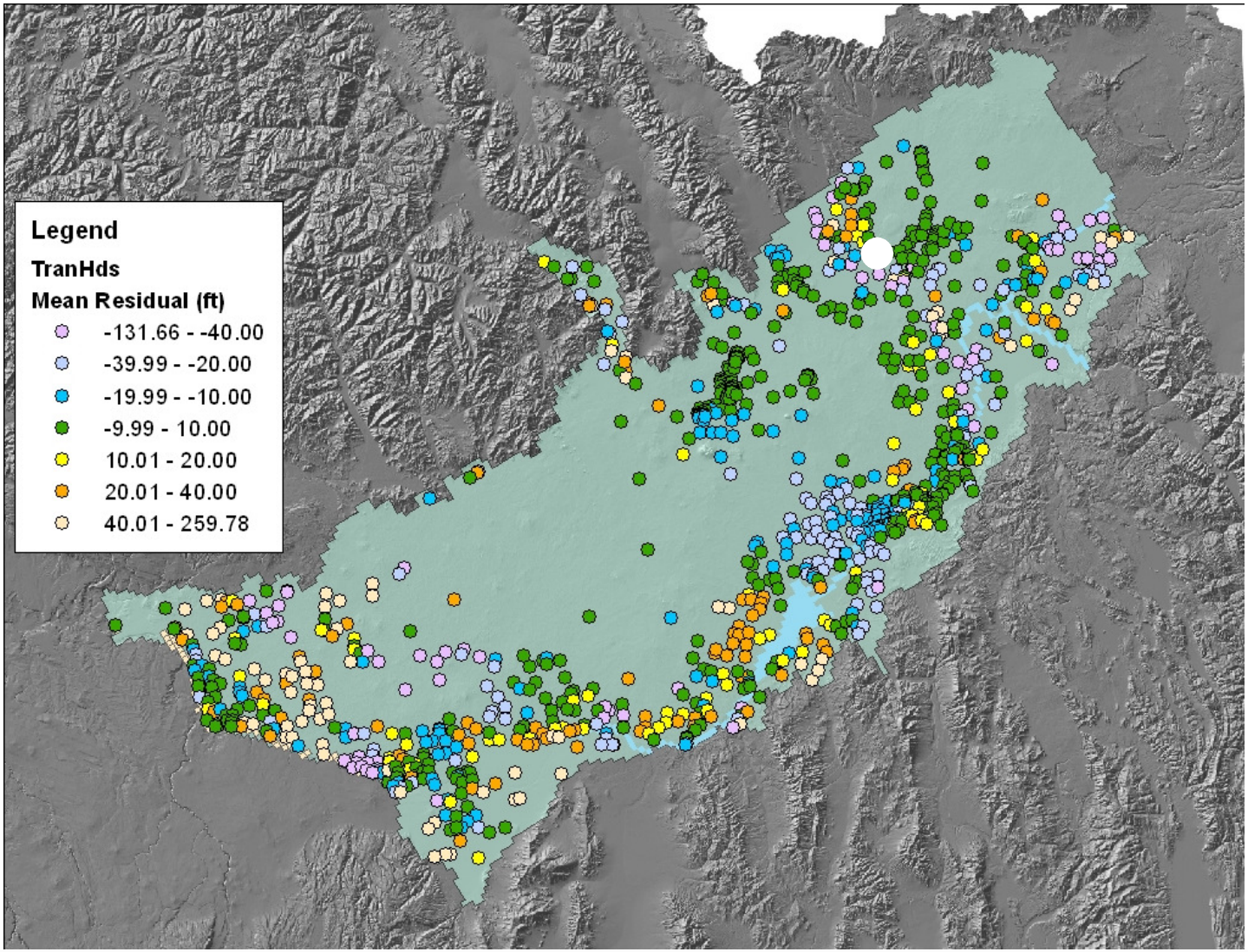
Transient Heads



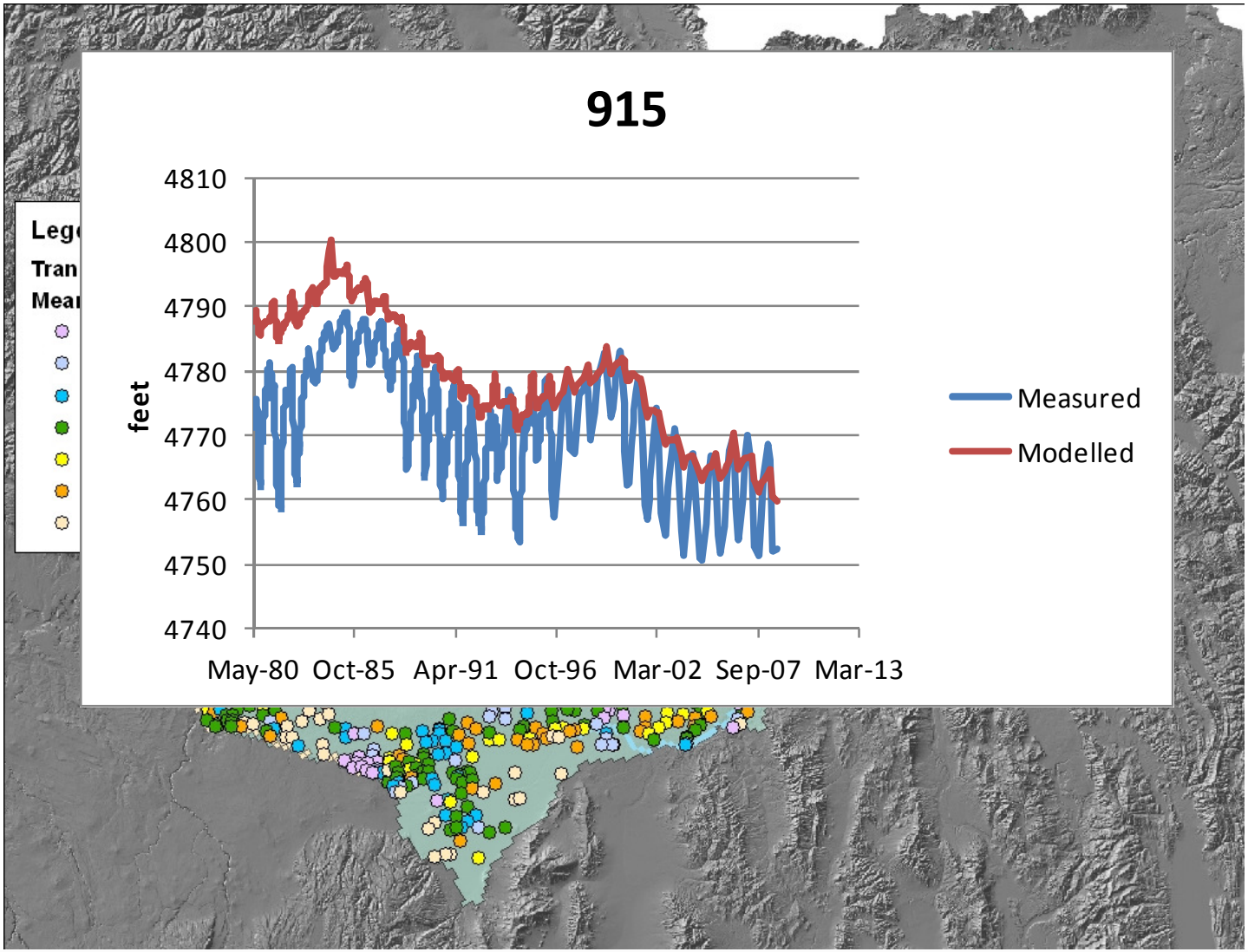
Transient Heads



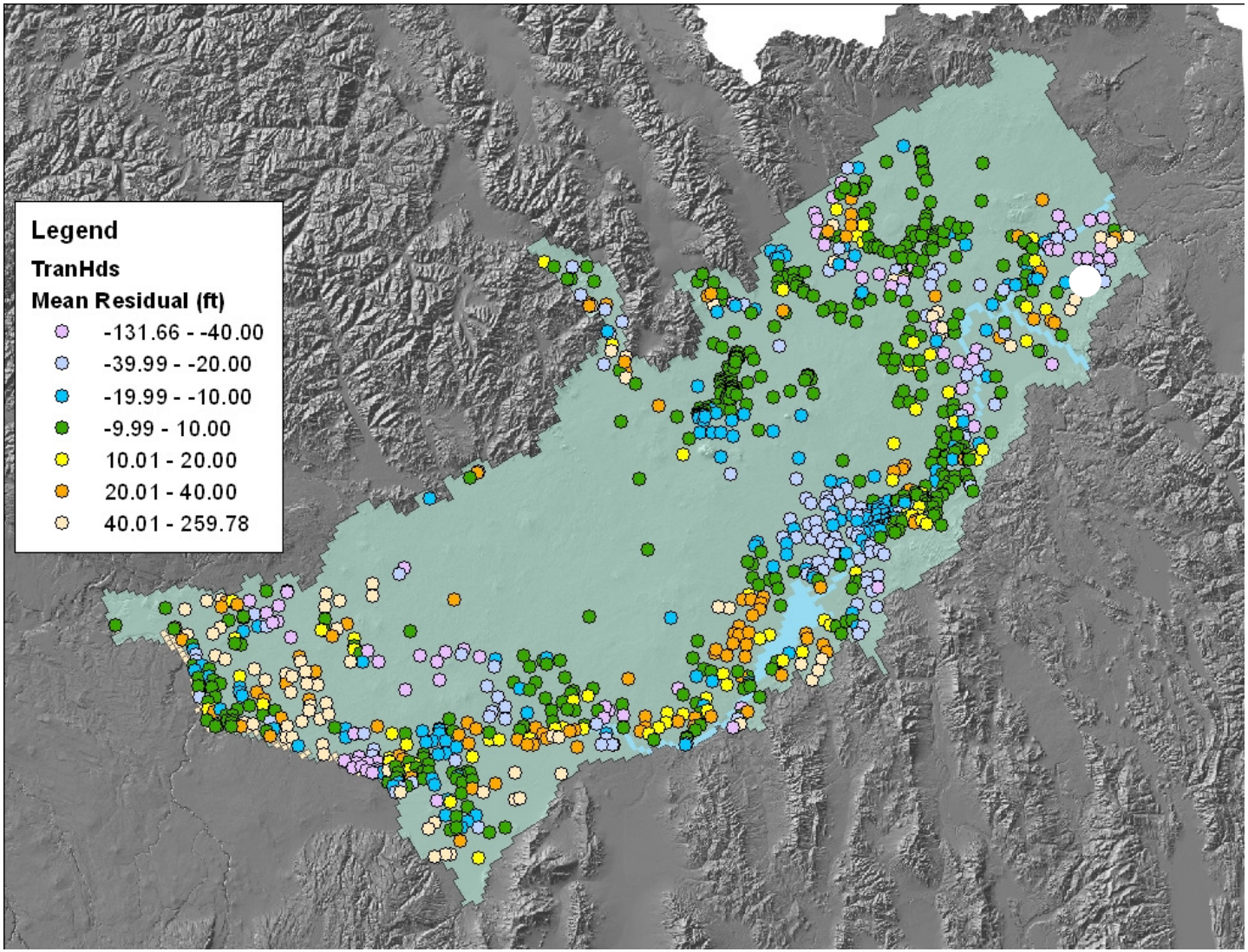
Transient Heads



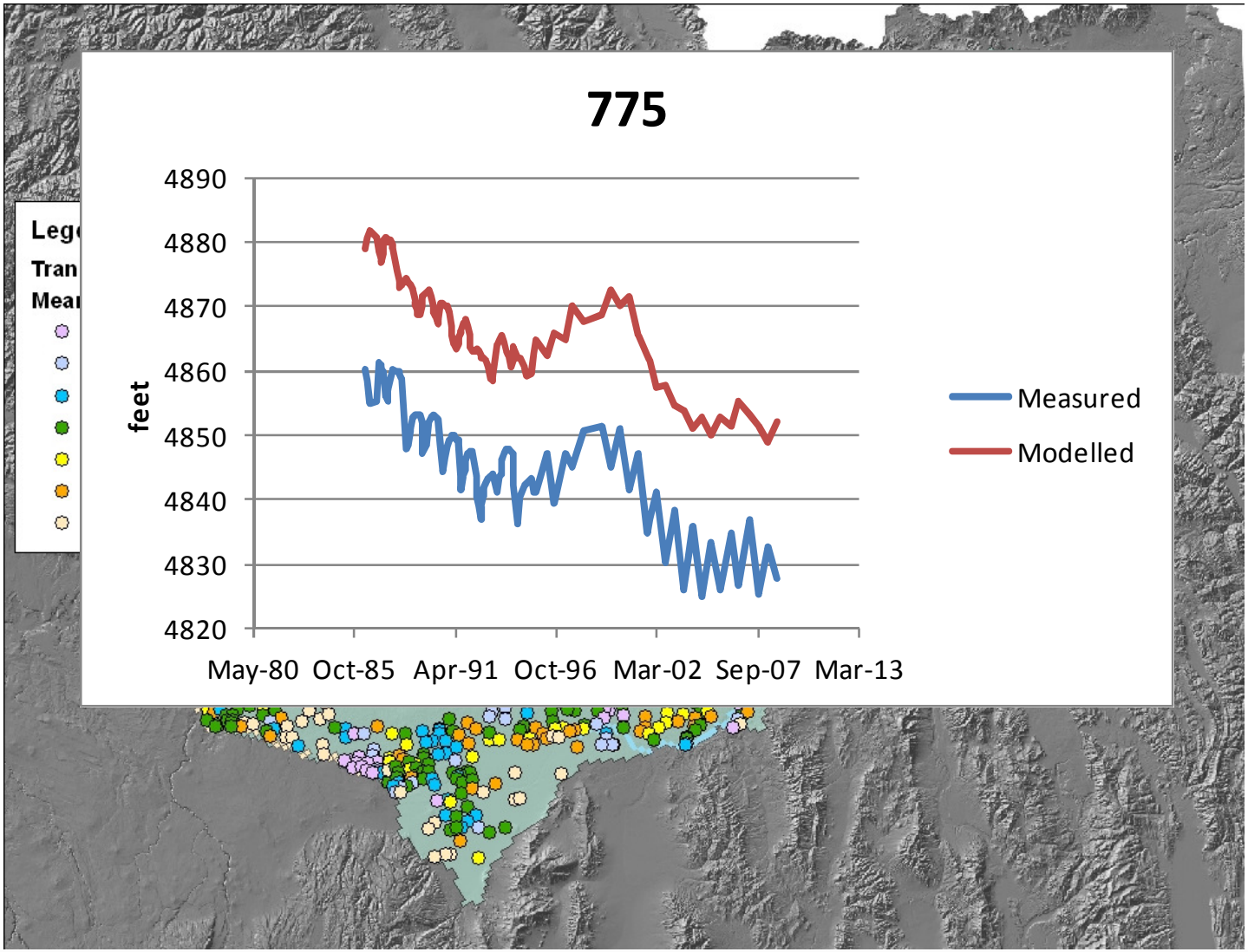
Transient Heads



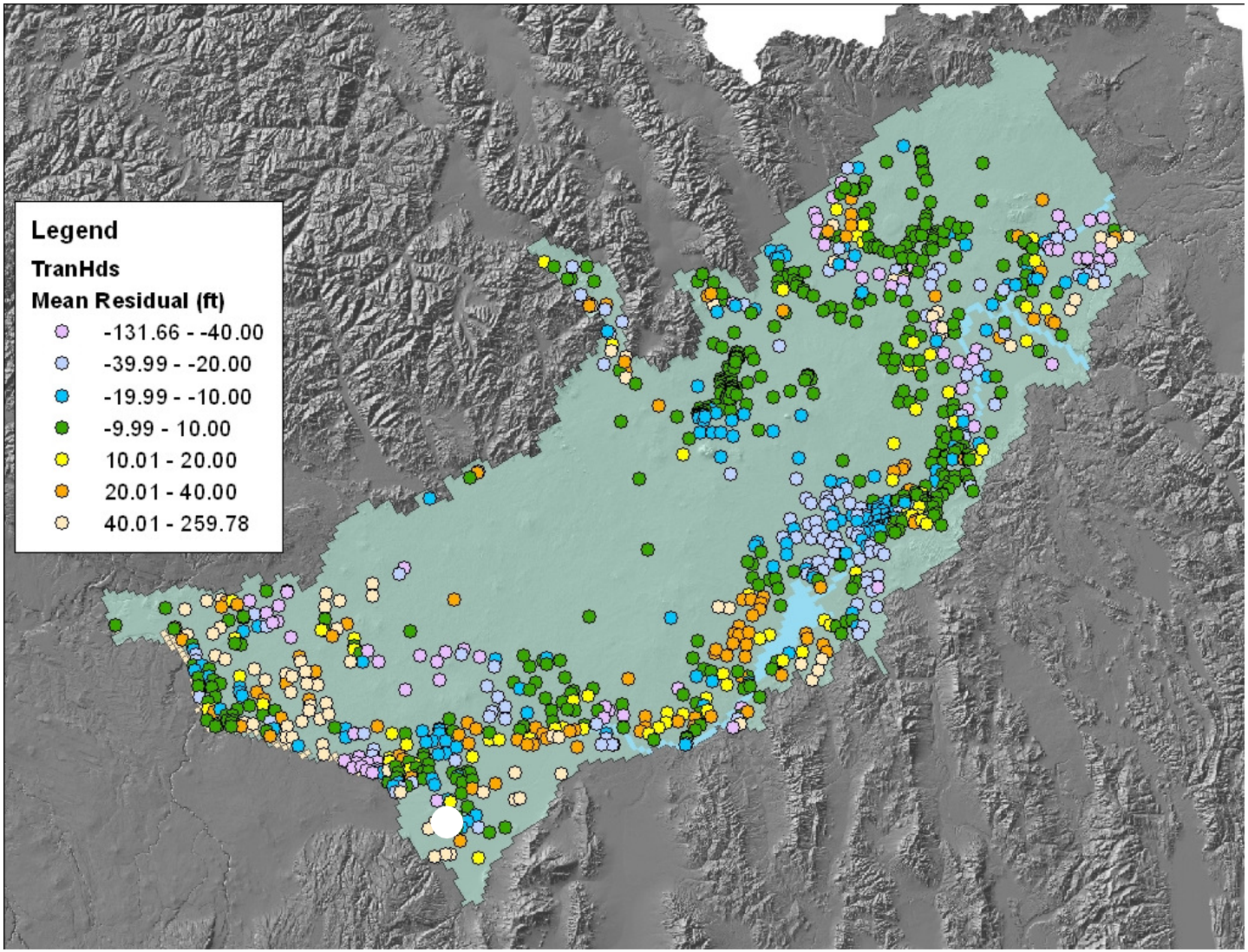
Transient Heads



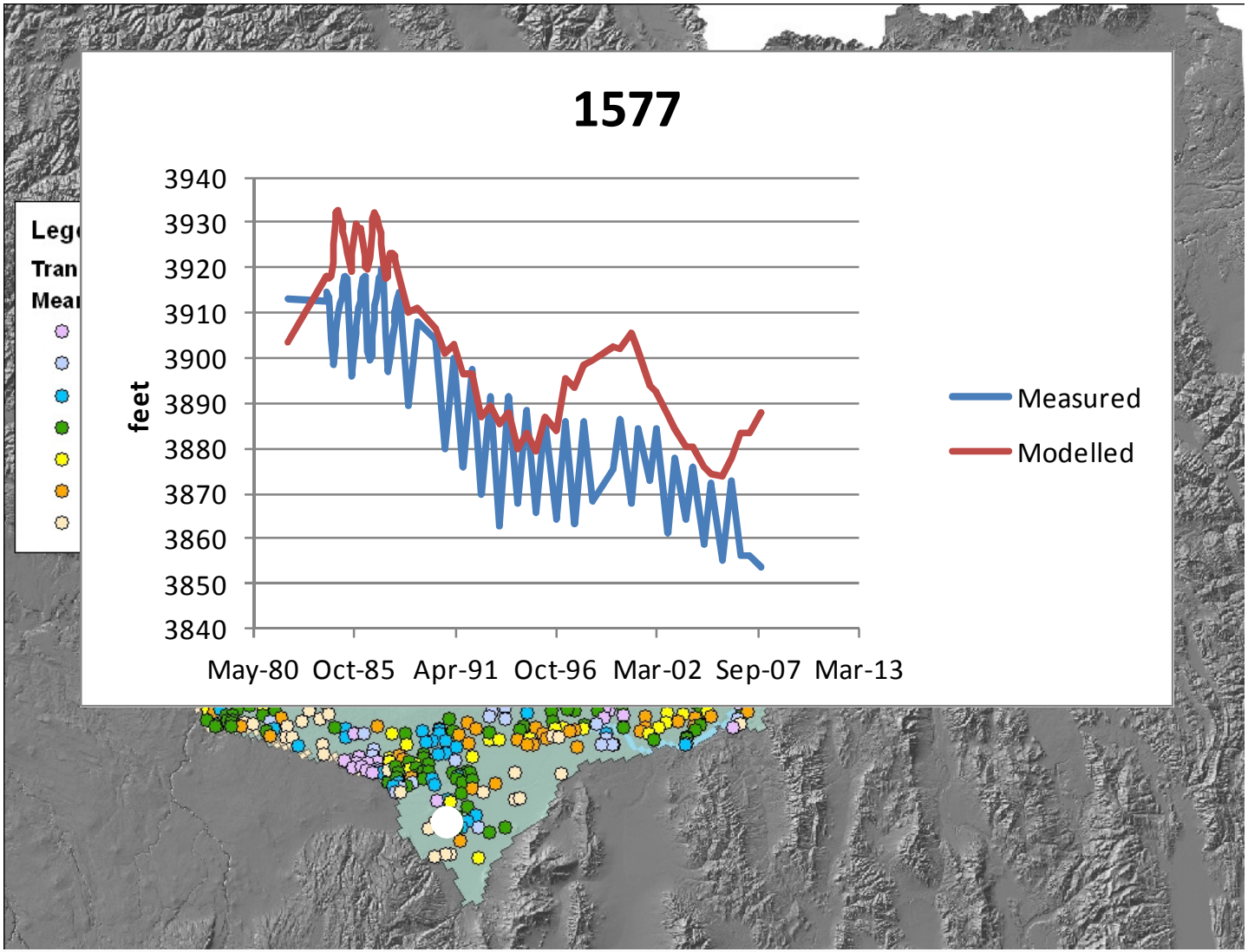
Transient Heads



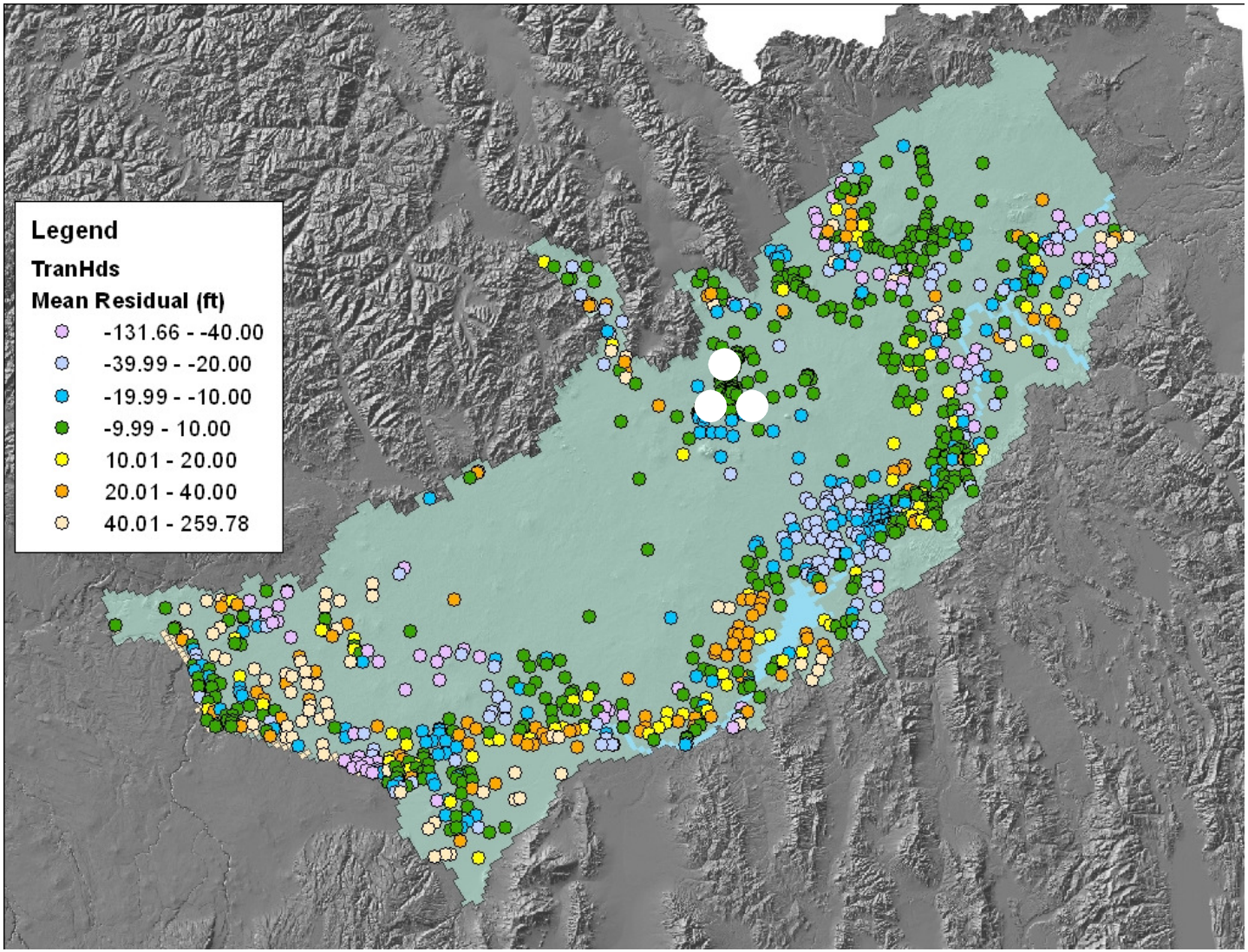
Transient Heads



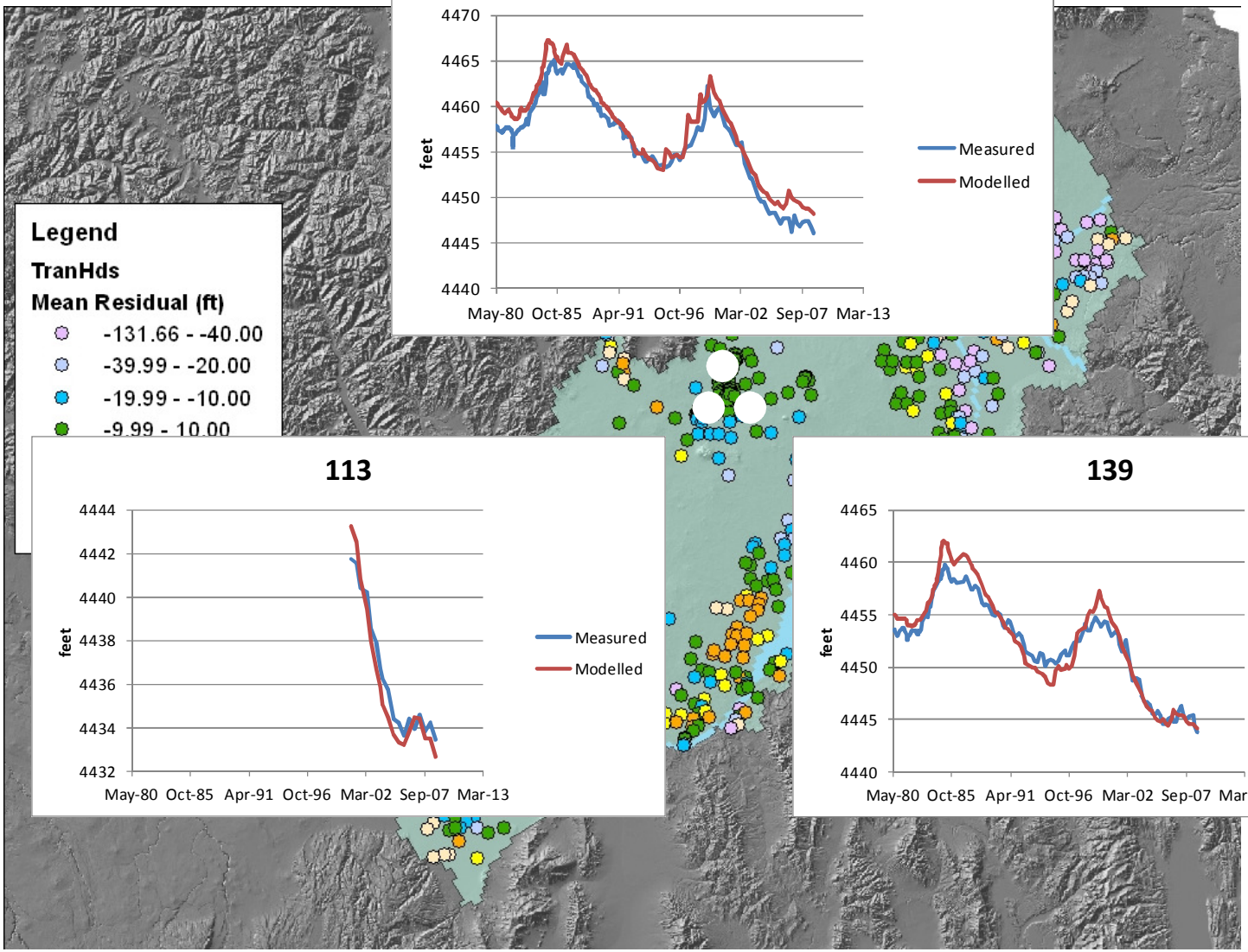
Transient Heads



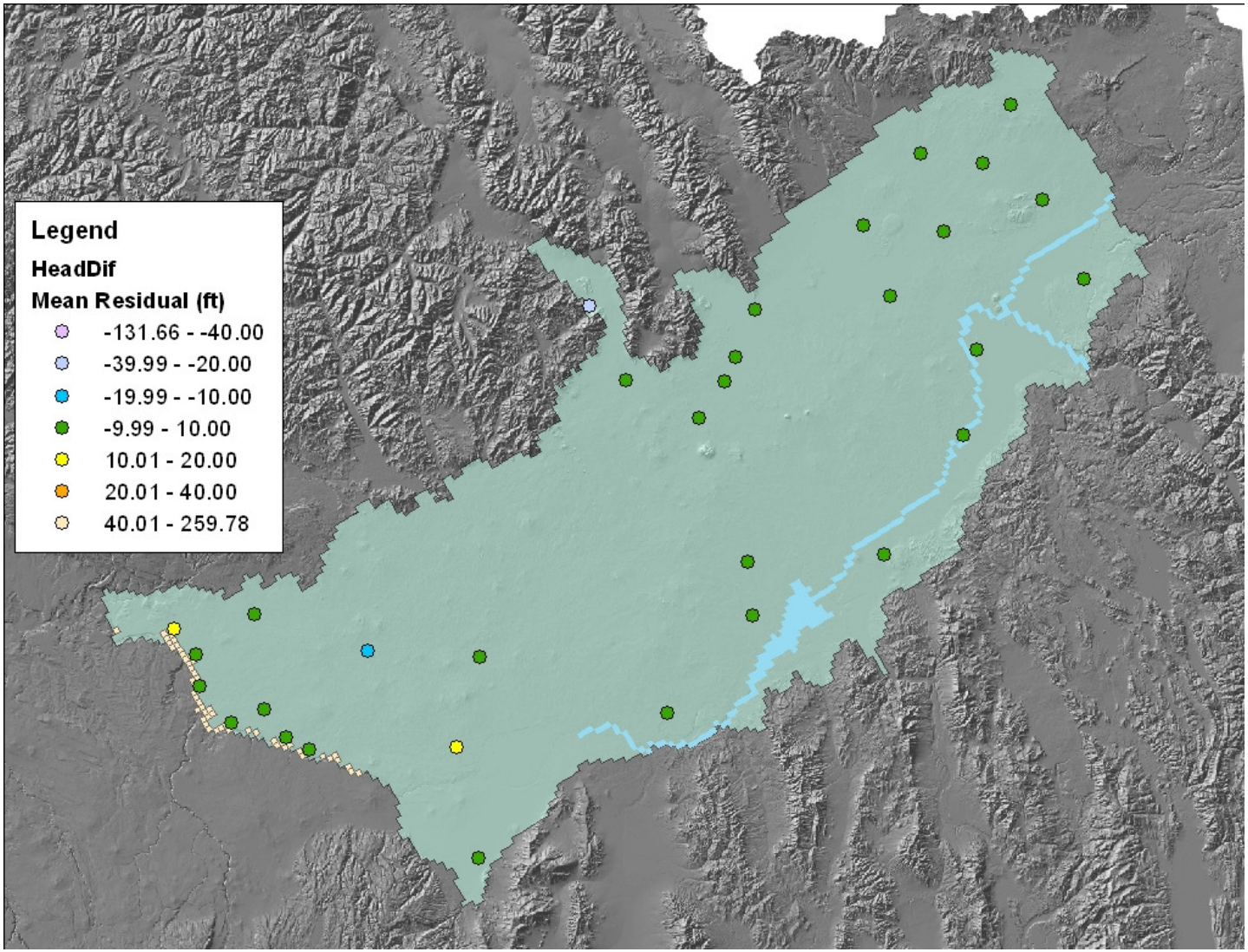
Transient Heads



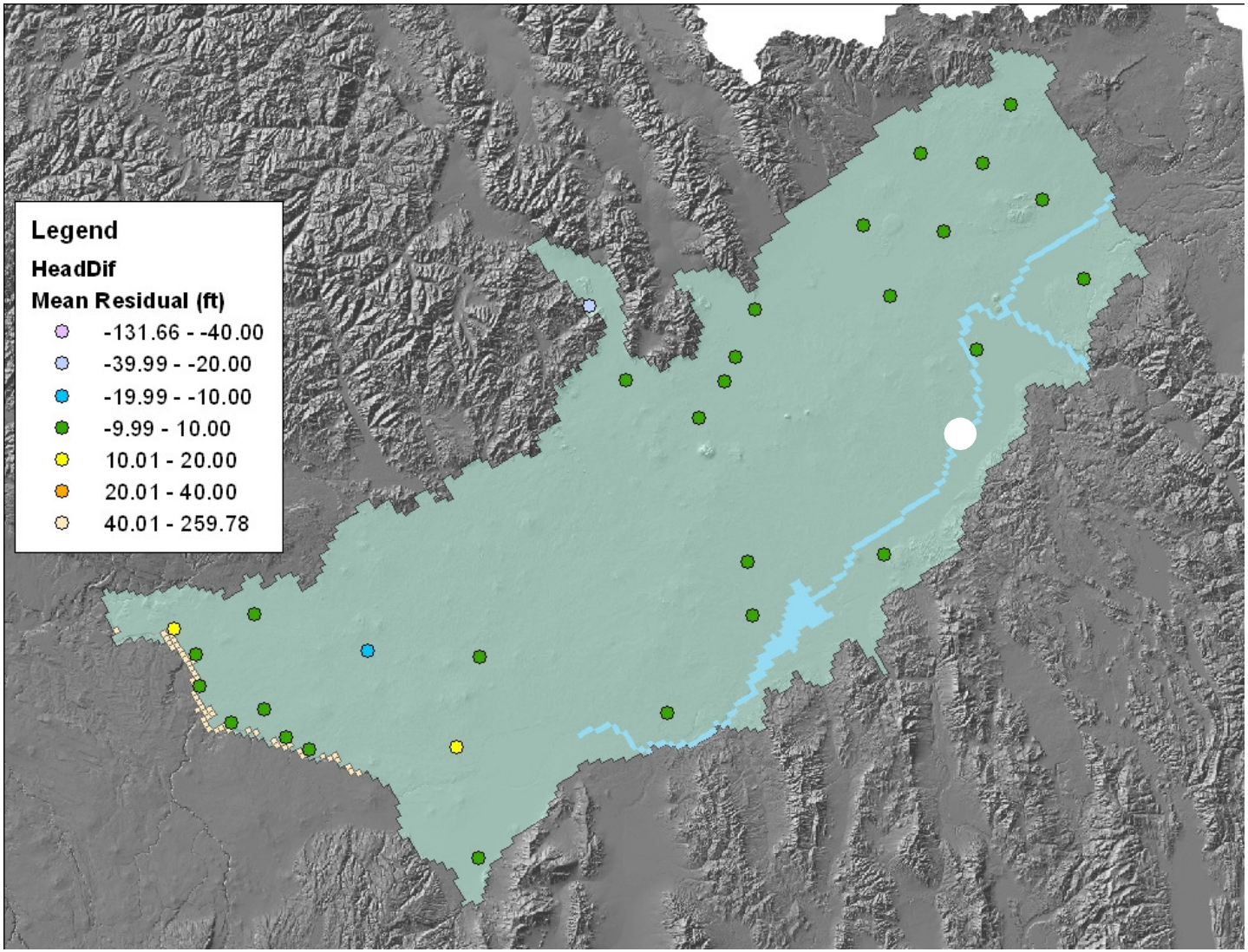
Tra


Legend
TranHds
Mean Residual (ft)
-131.66 - -40.00
-39.99 - -20.00
-19.99 - -10.00
-9.99 - 10.00
293
4470
4465
4460
4455
4450
4445
4440
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled
113
4444
4442
4440
4438
4436
4434
4432
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled
139
4465
4460
4455
4450
4445
4440
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled

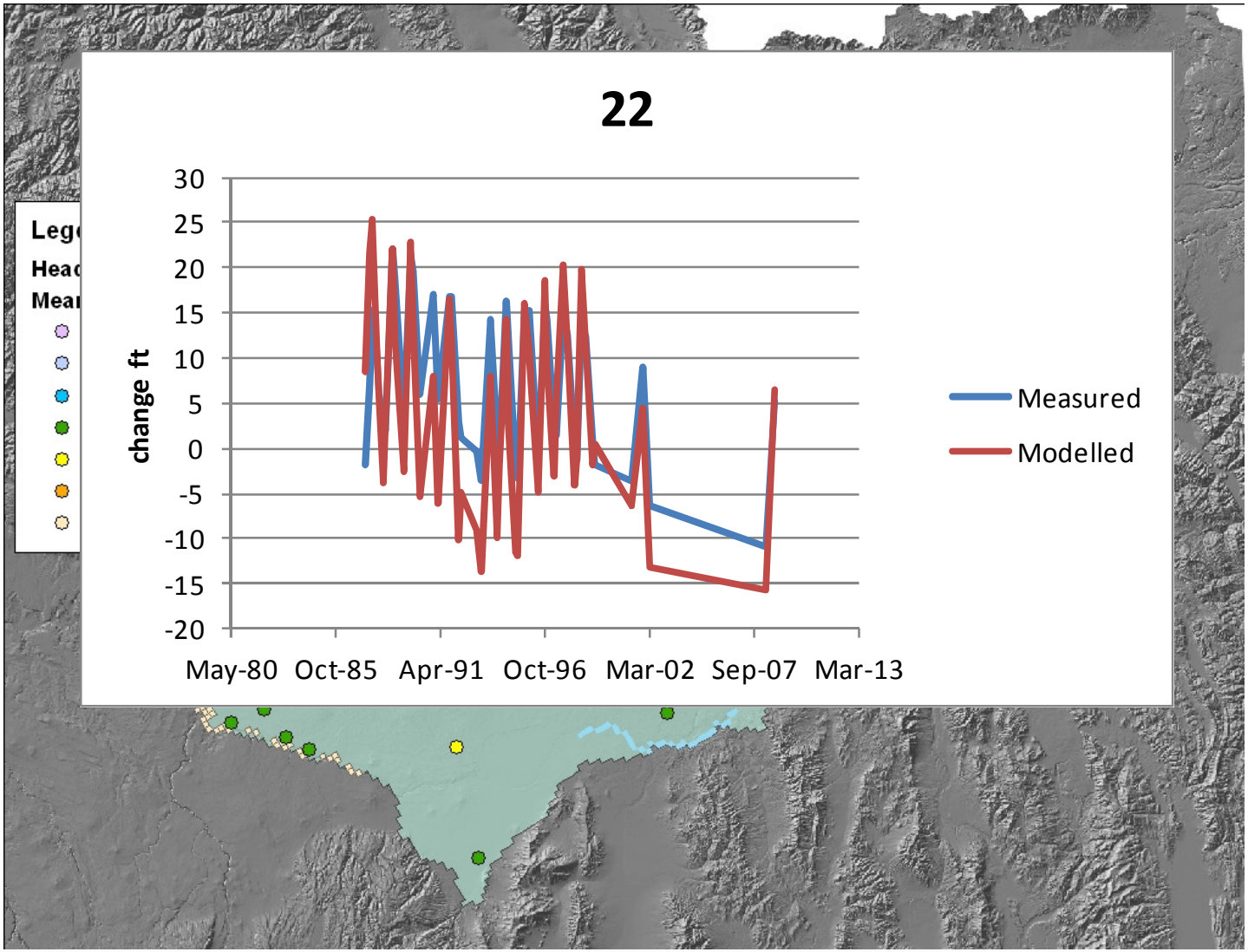
Transient Heads



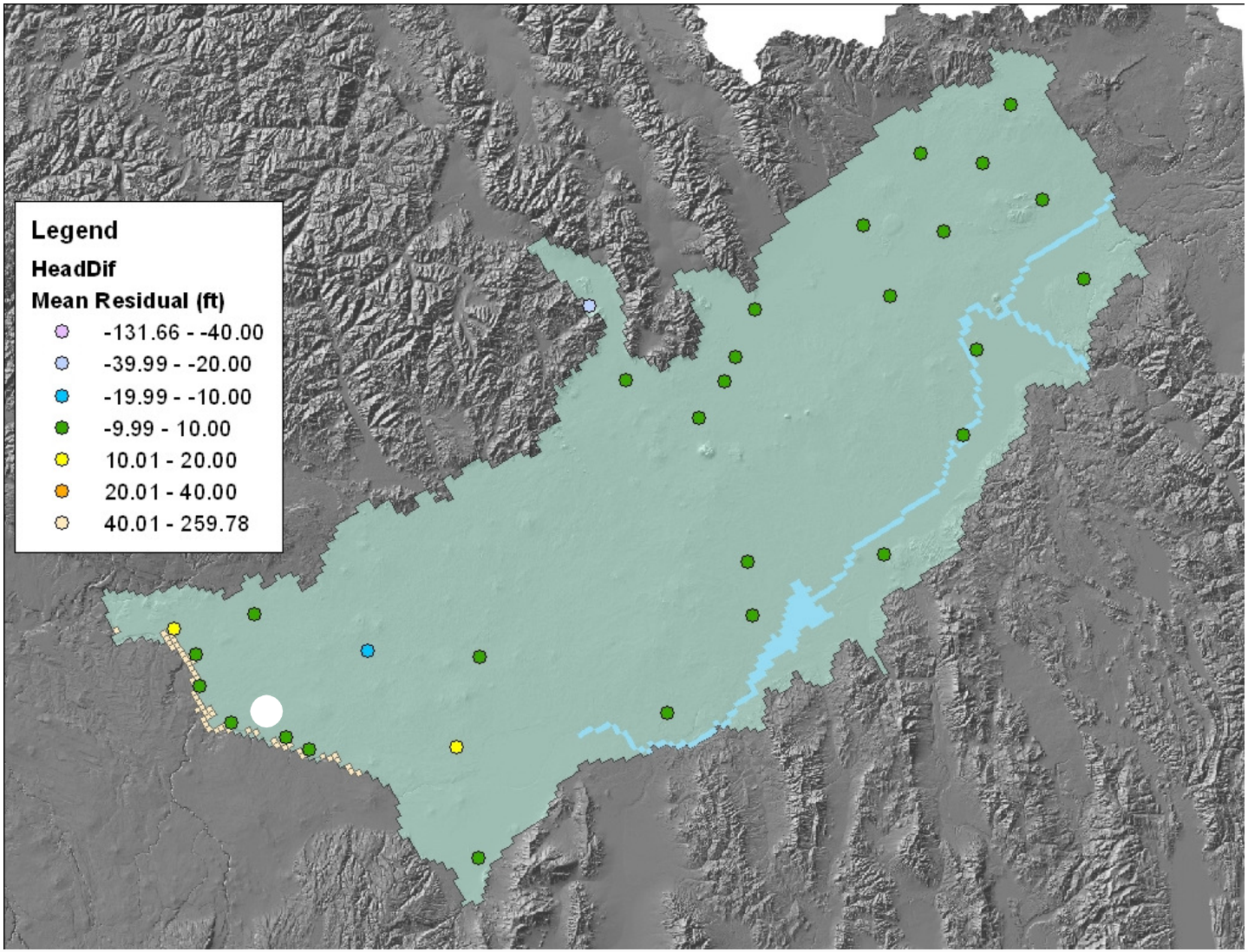
Transient Heads



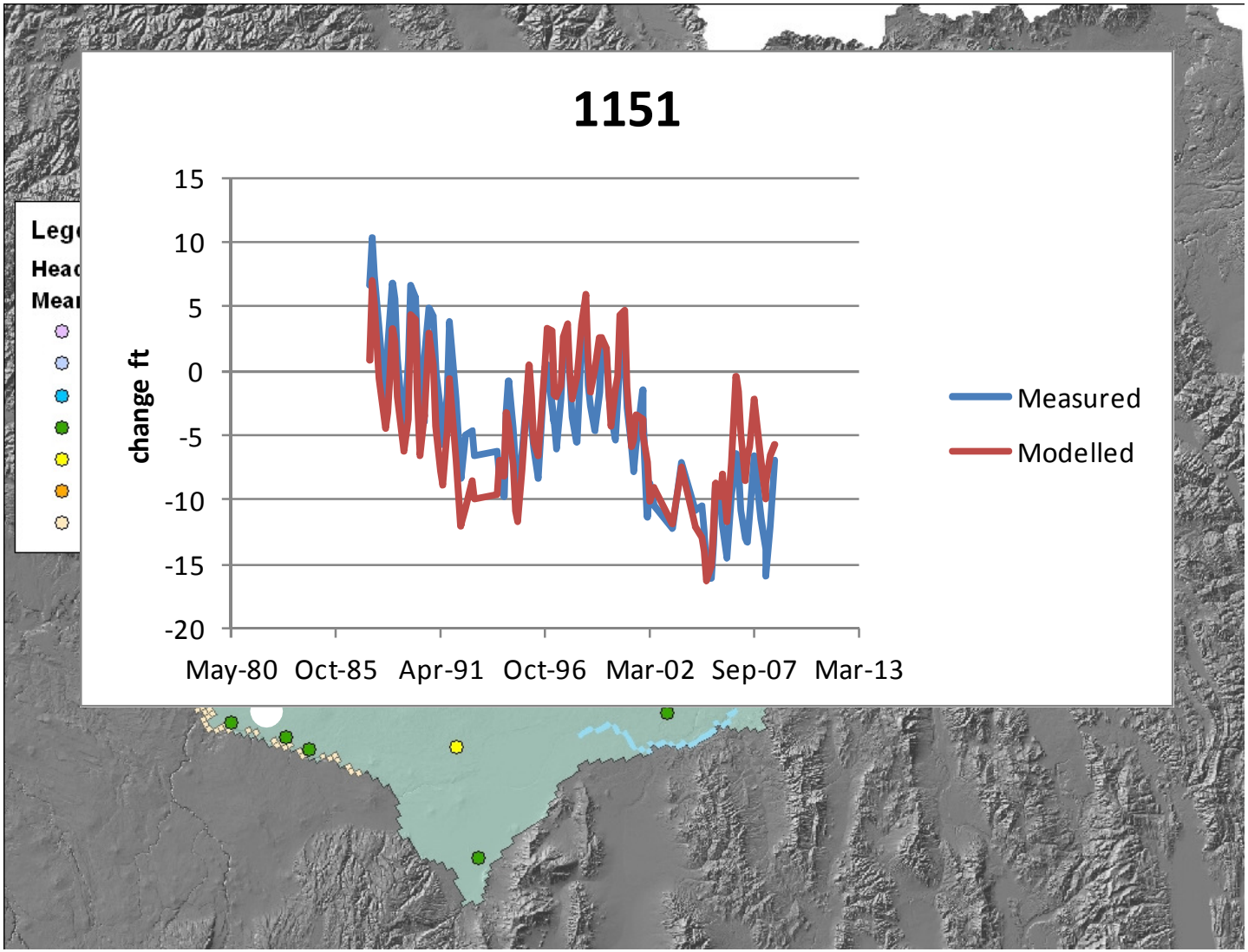
Transient Heads



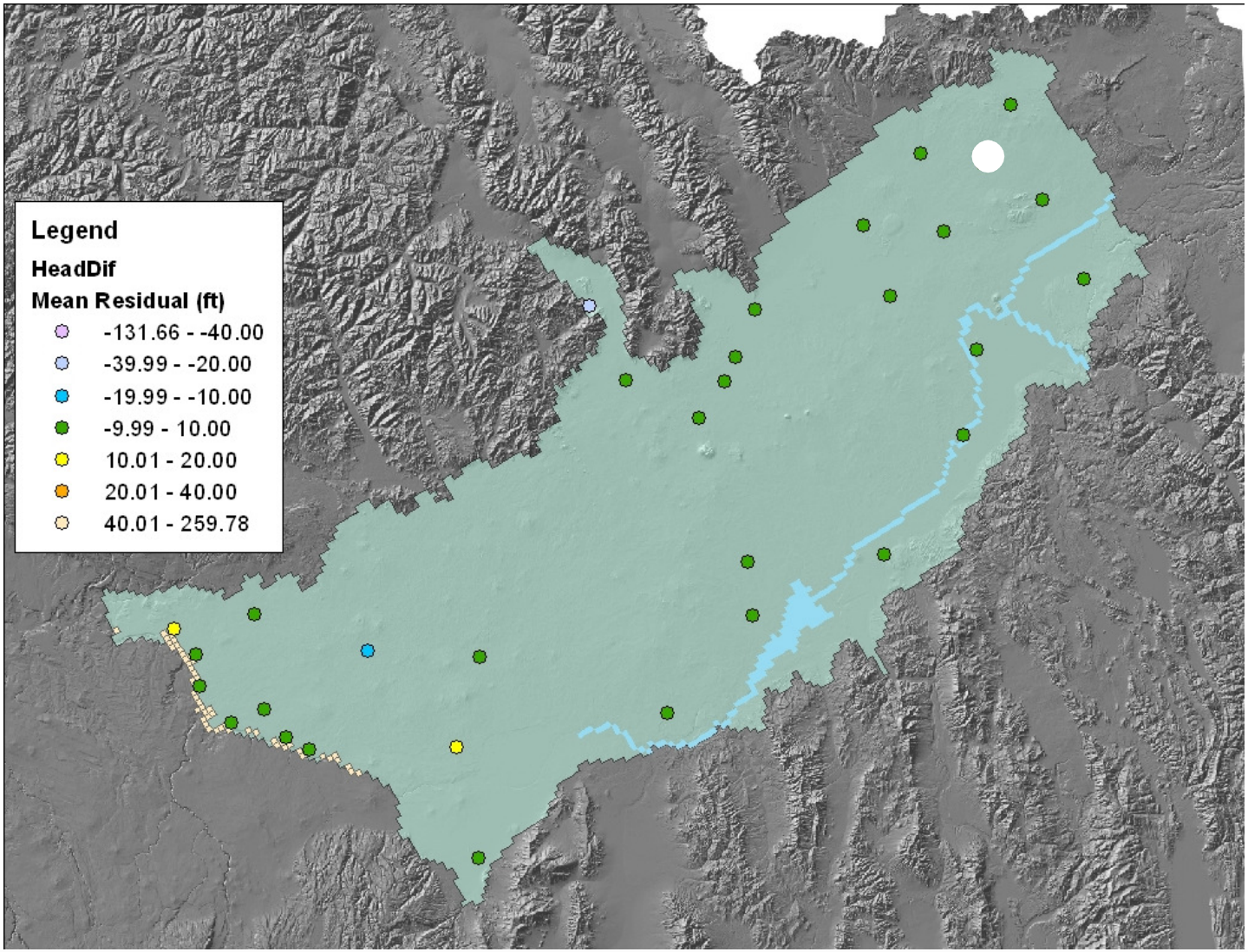
Transient Heads



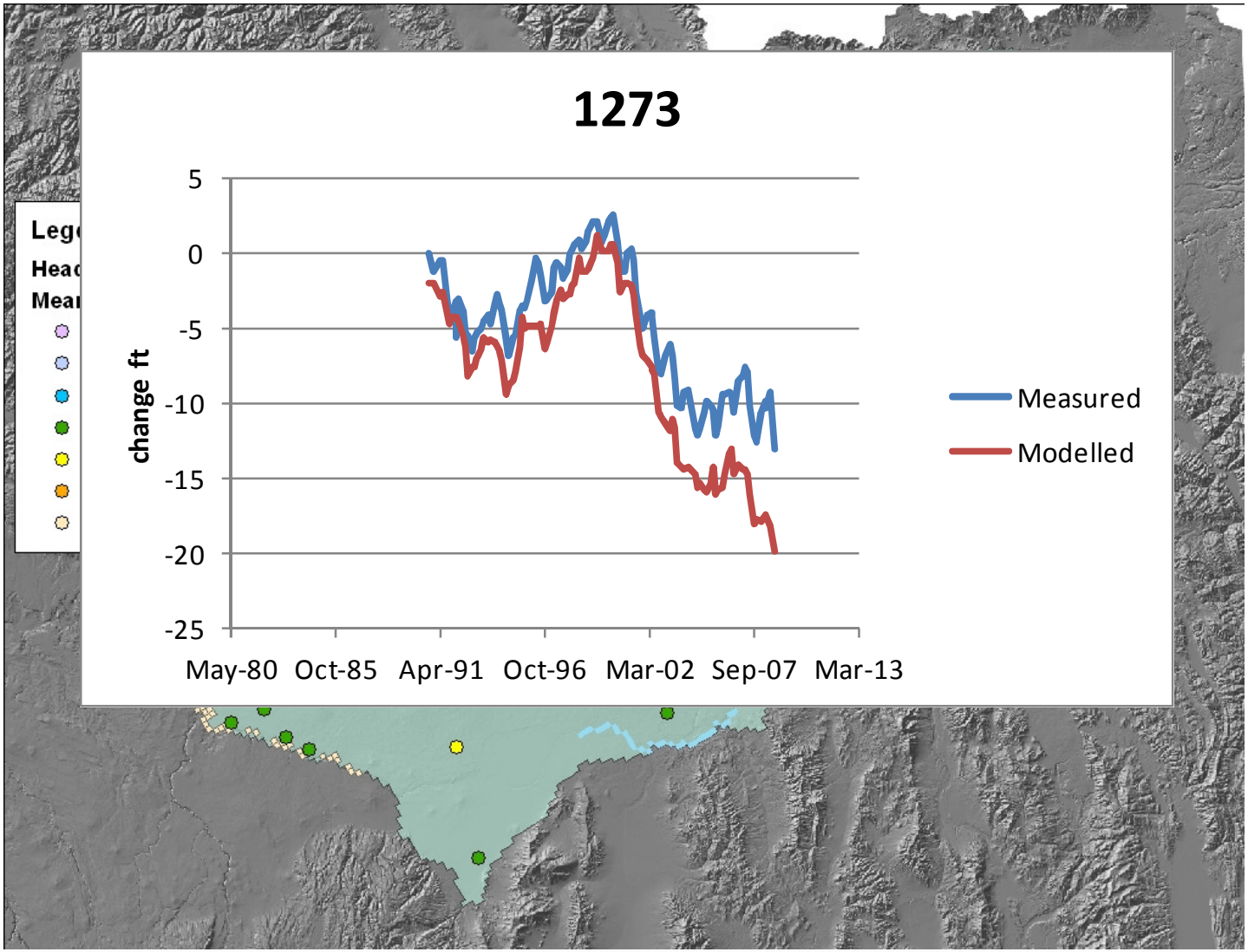
Transient Heads



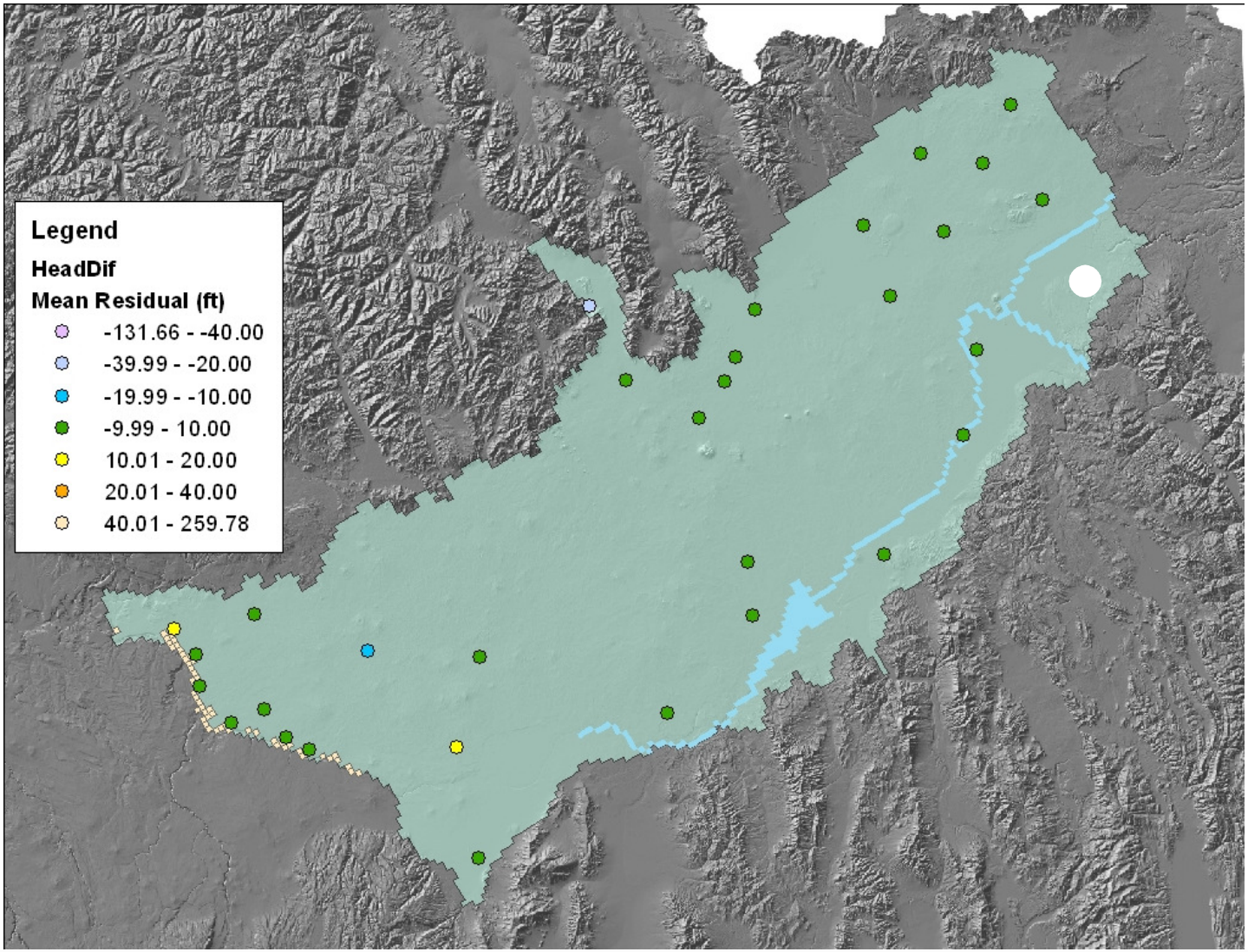
Transient Heads



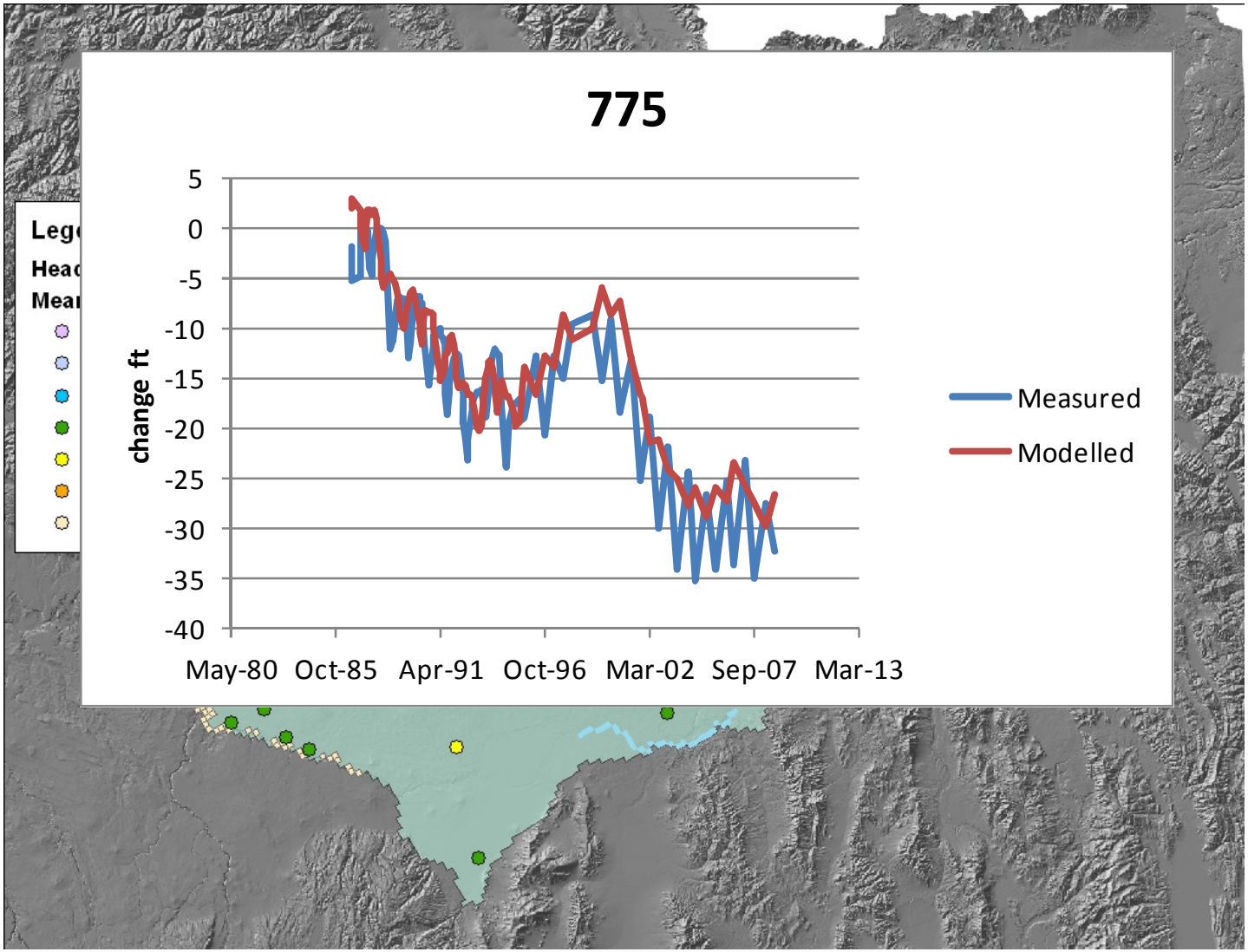
Transient Heads

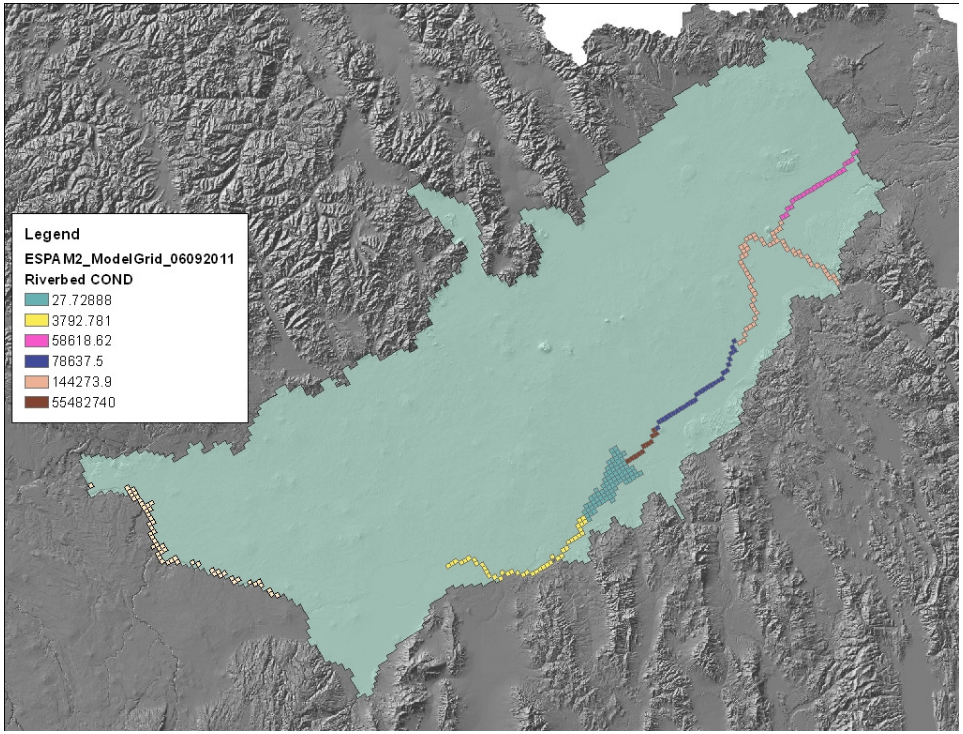


Transient Heads



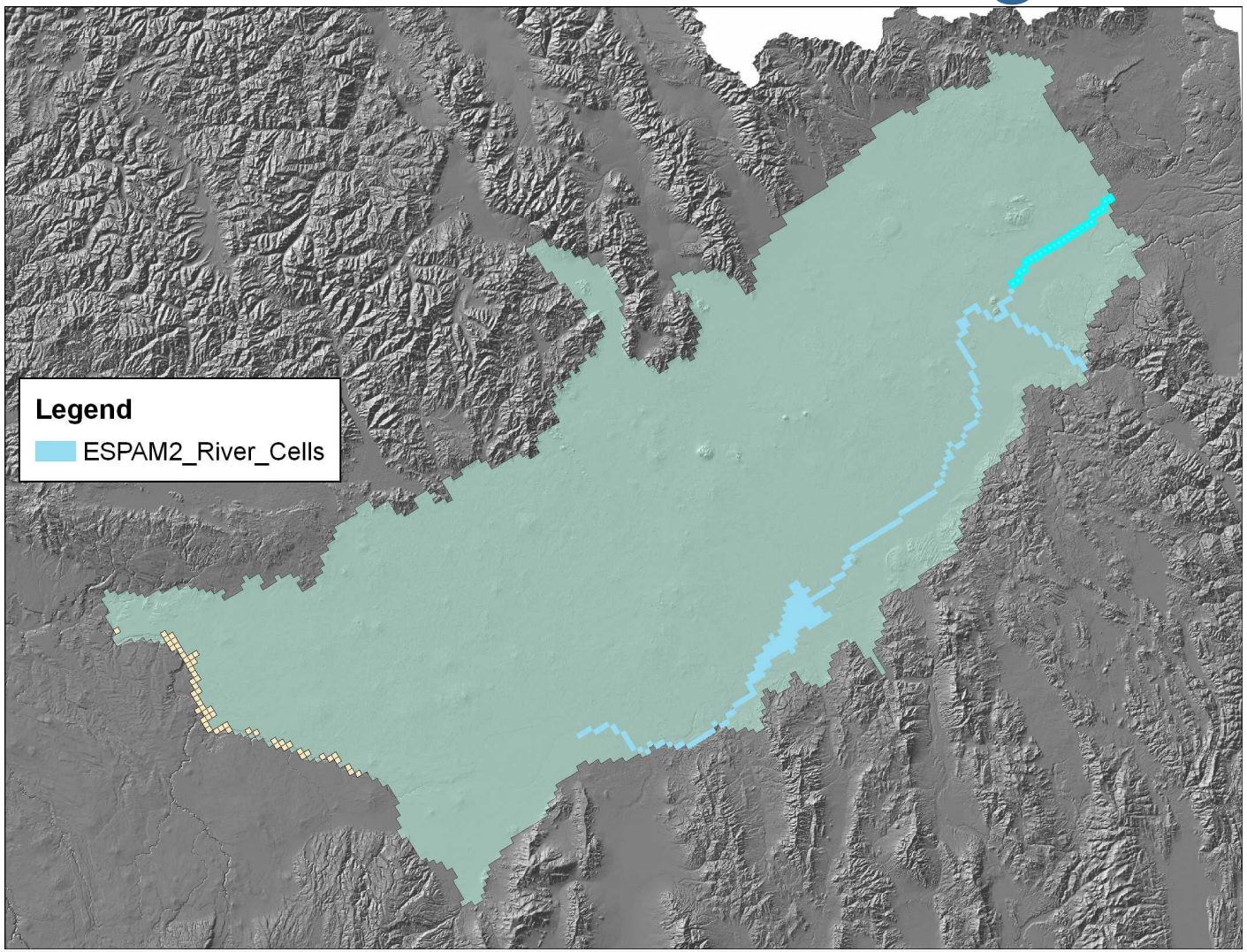
Transient Heads



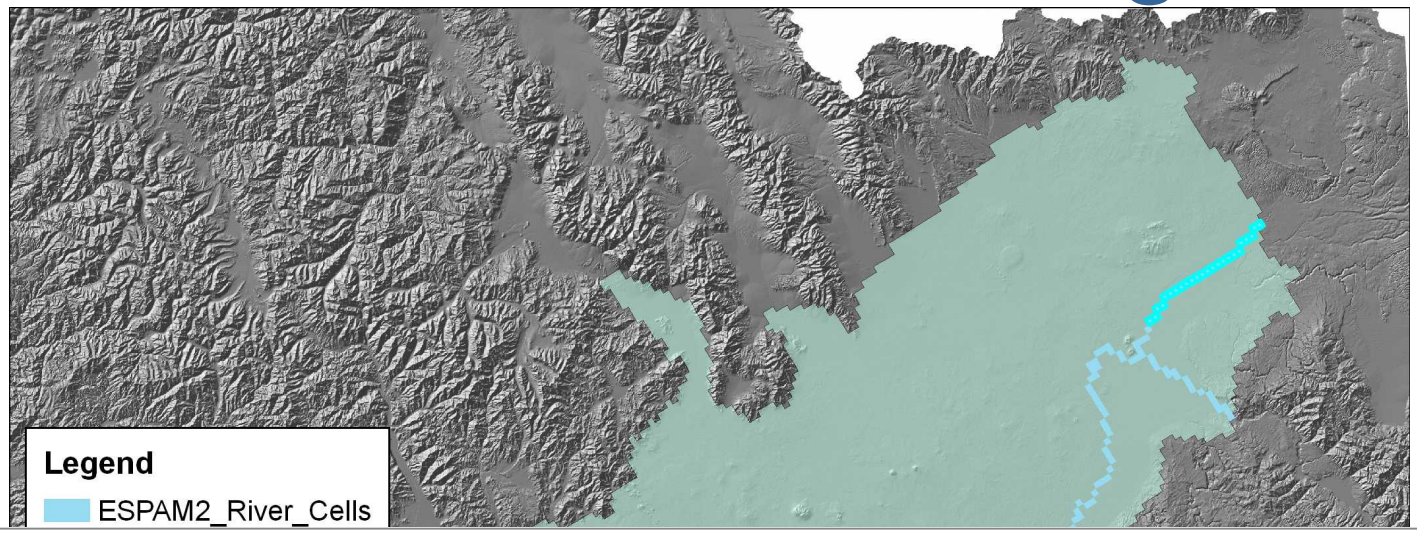


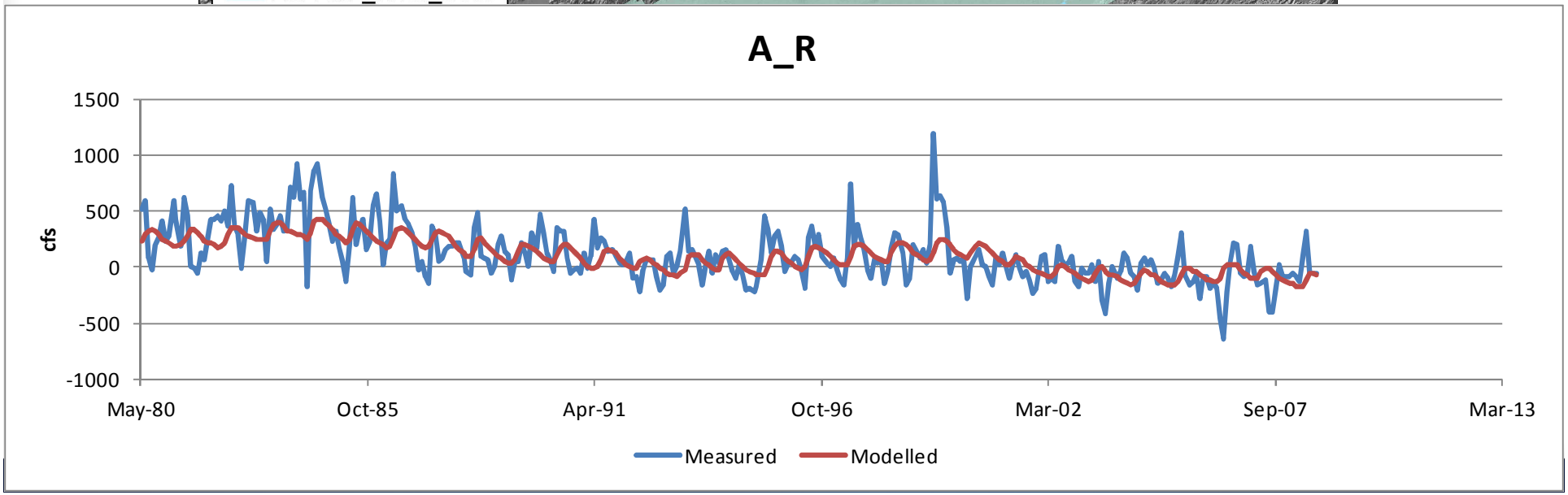
- Snake River reaches

Ashton - Rexburg

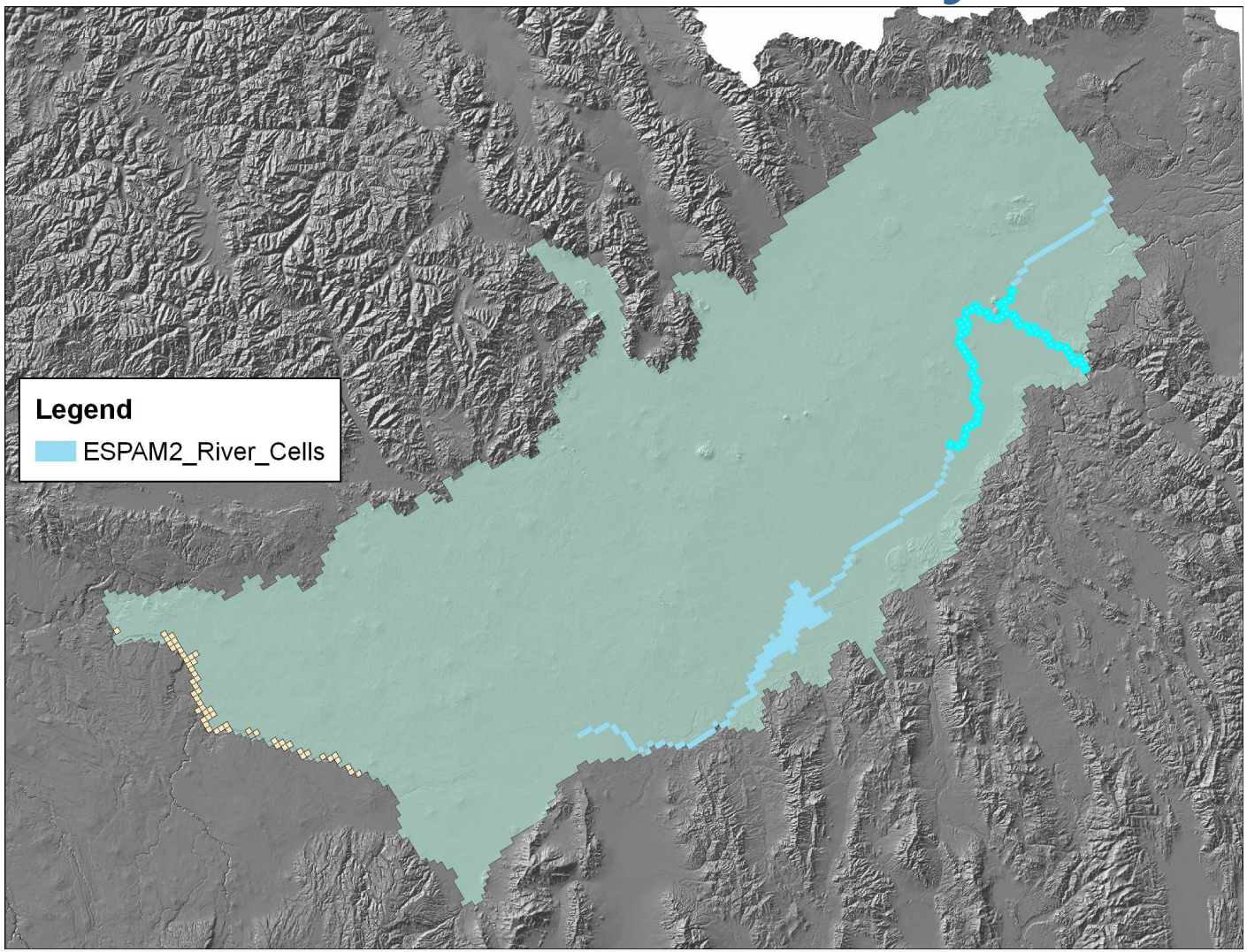


Ashton - Rexburg

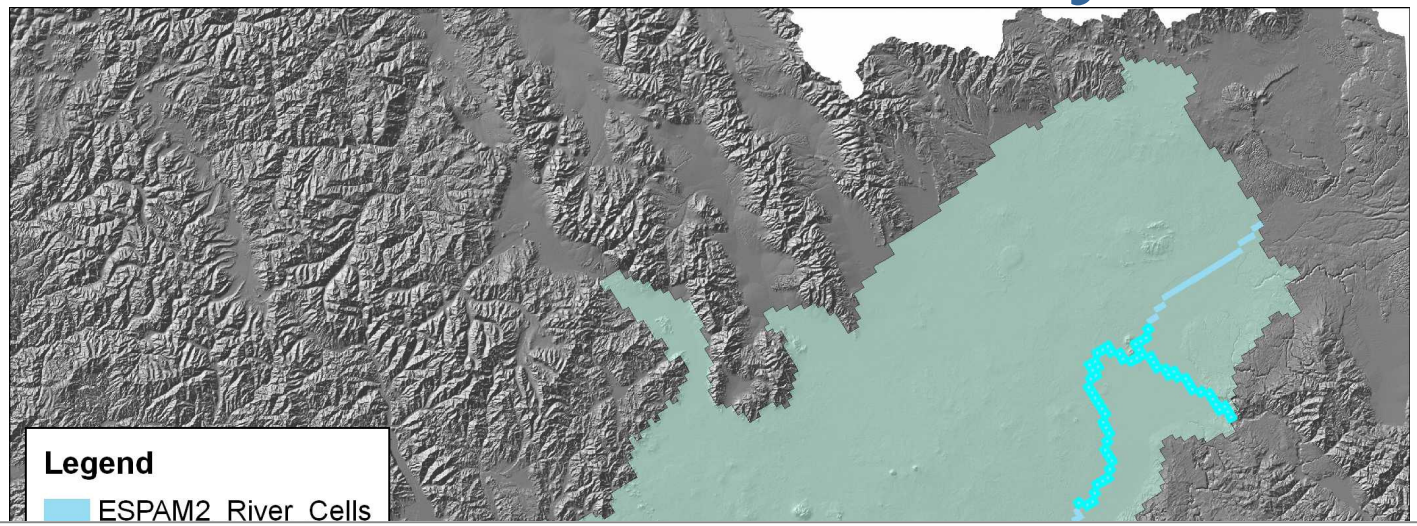


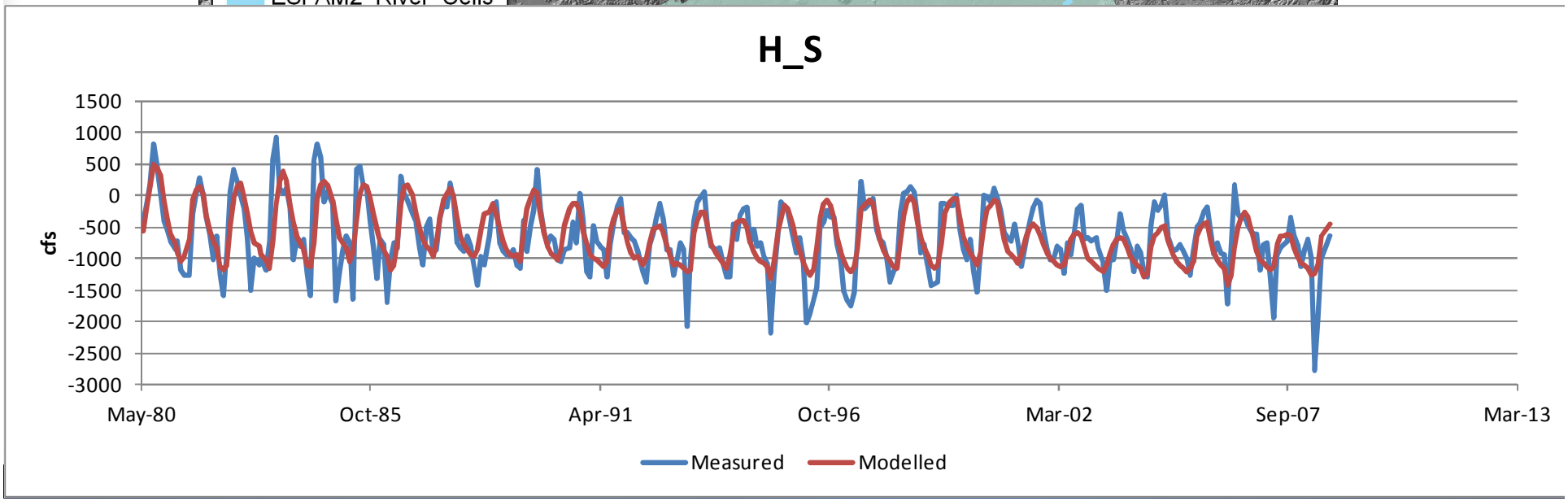


Heise - Shelley

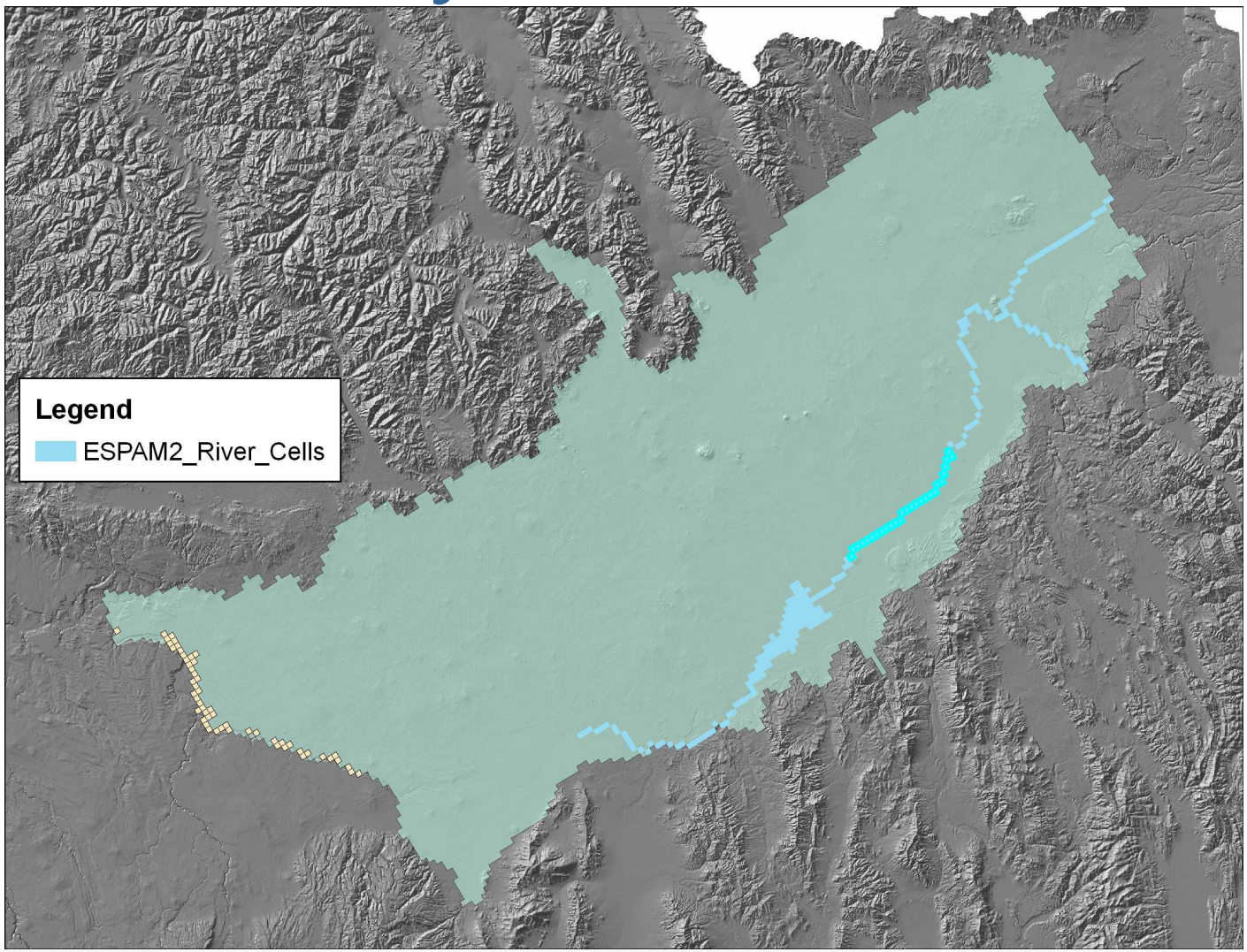


Heise - Shelley

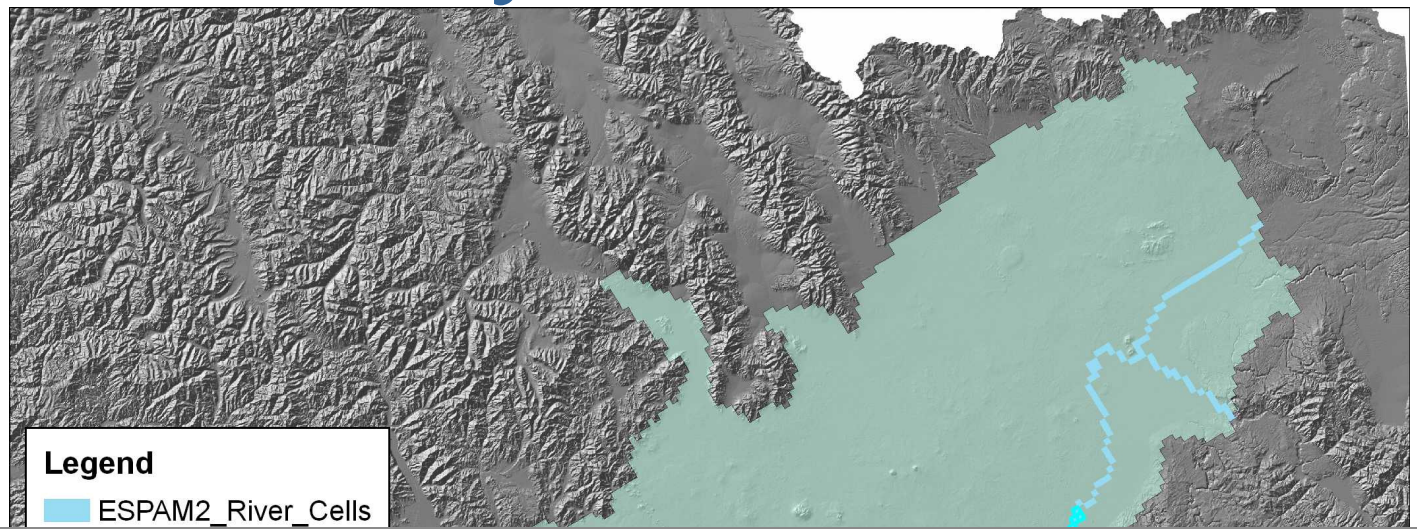


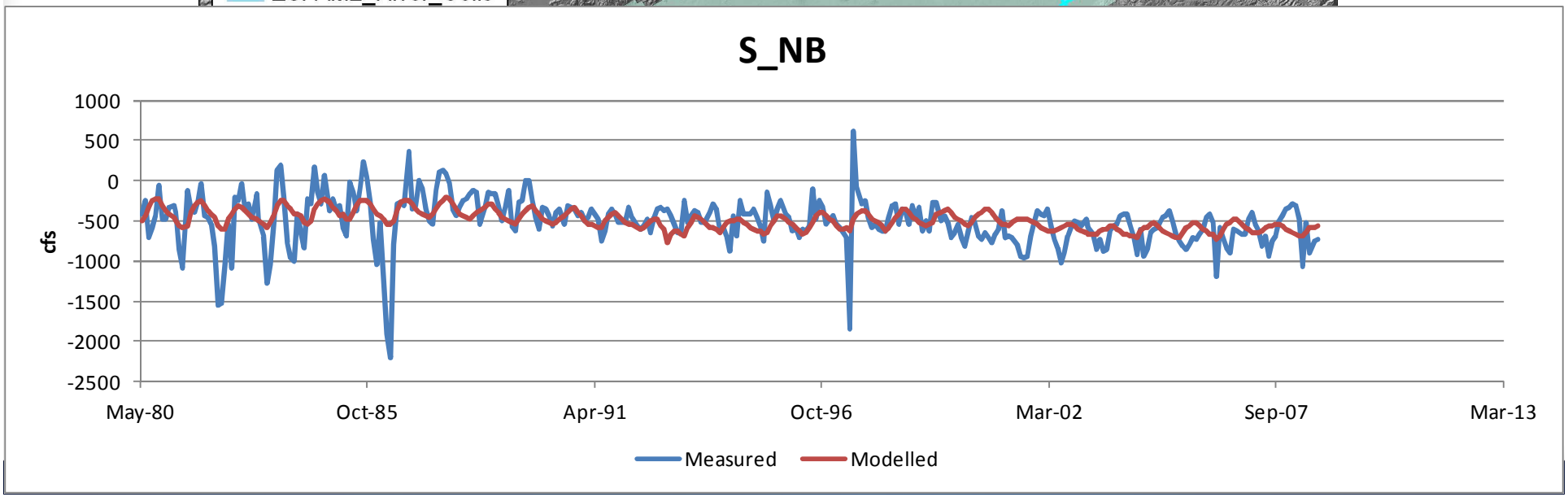


Shelley – nr Blackfoot

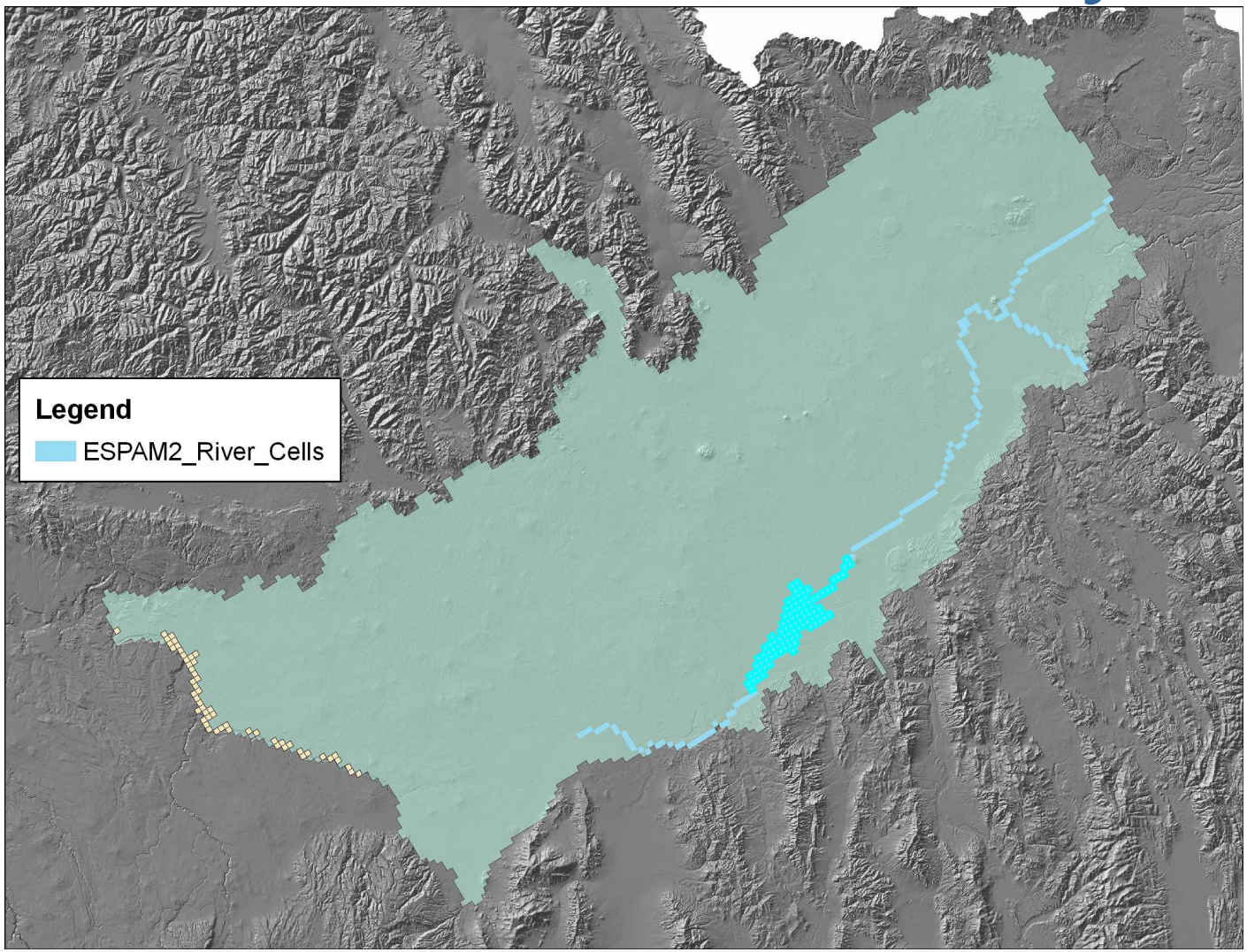


Shelley – nr Blackfoot

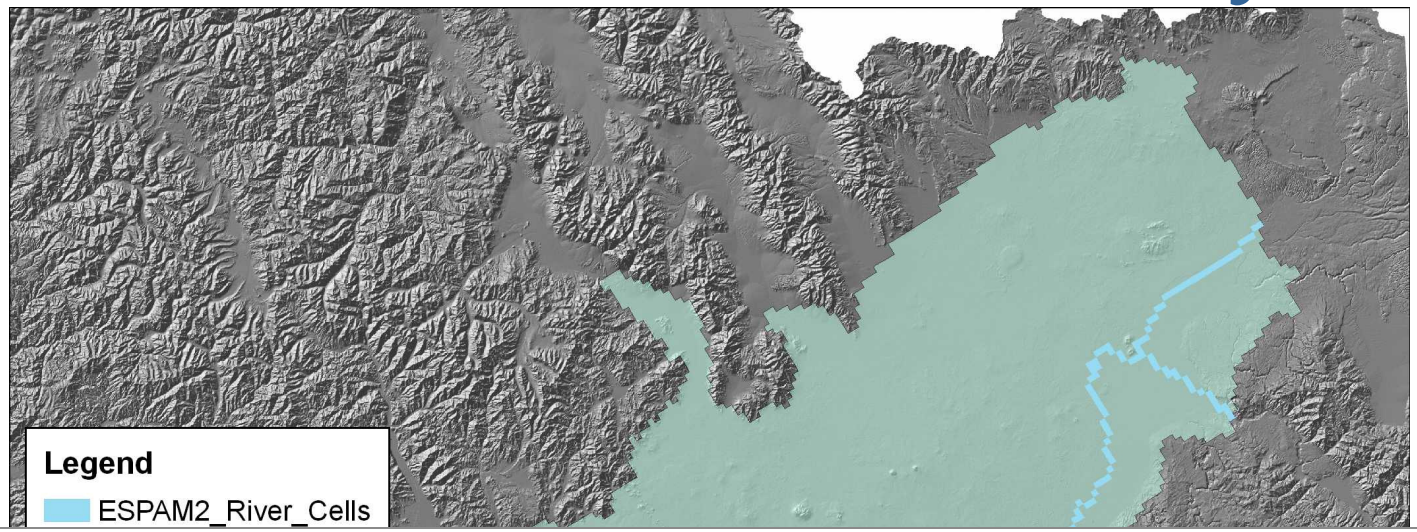


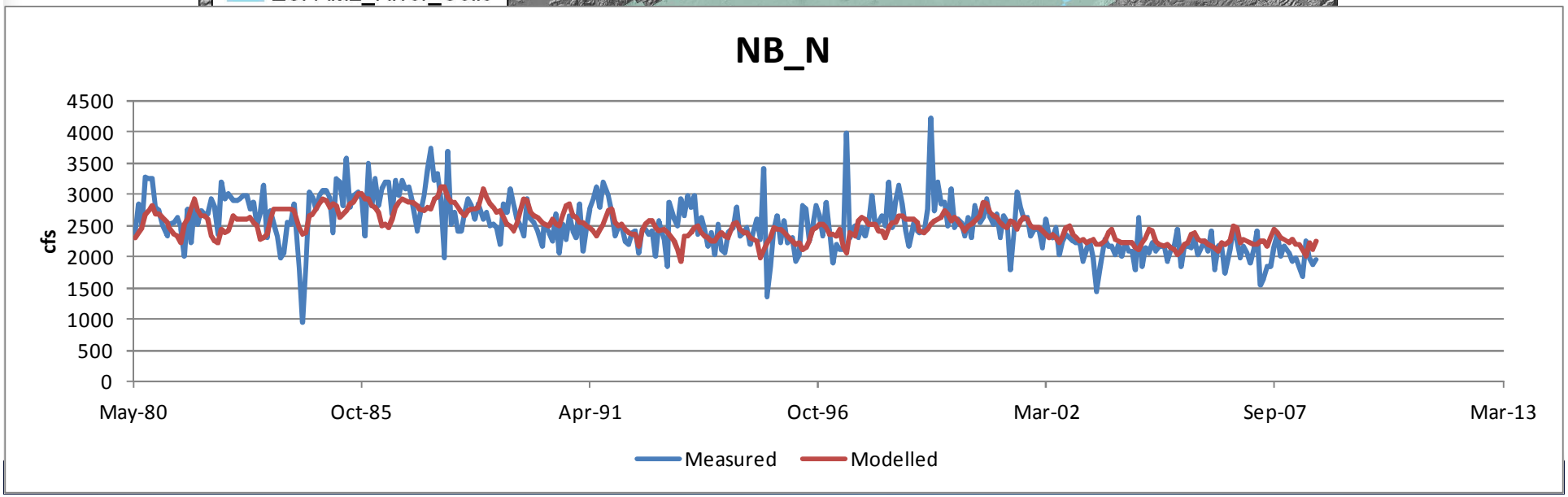


Nr Blackfoot - Neeley

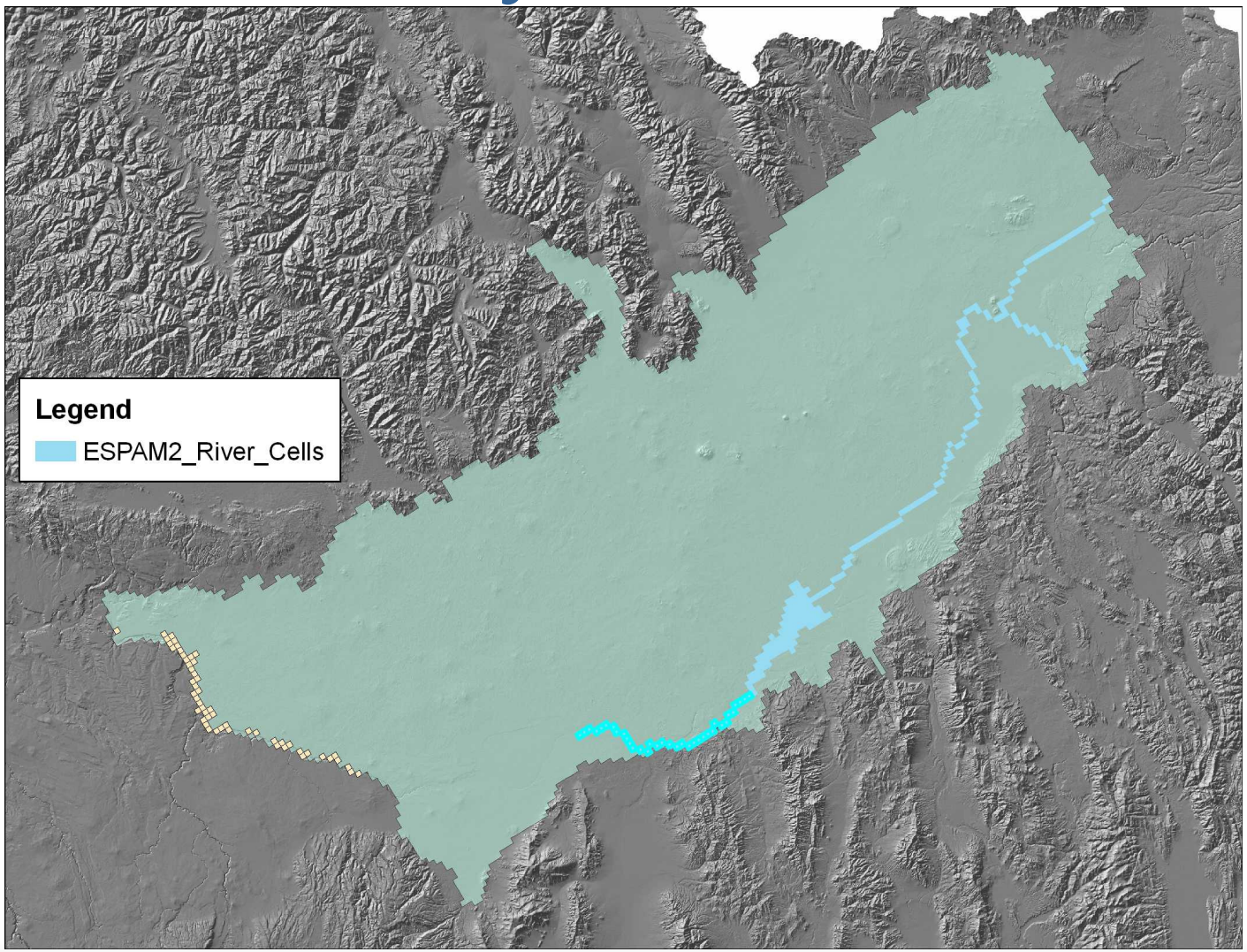


Nr Blackfoot - Neeley

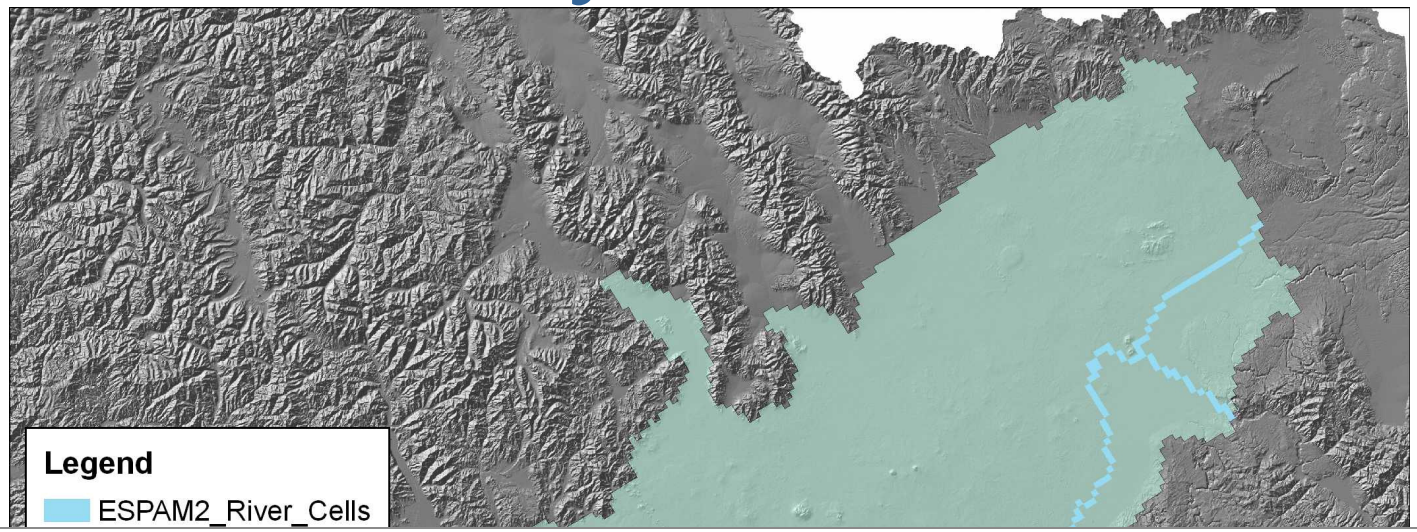


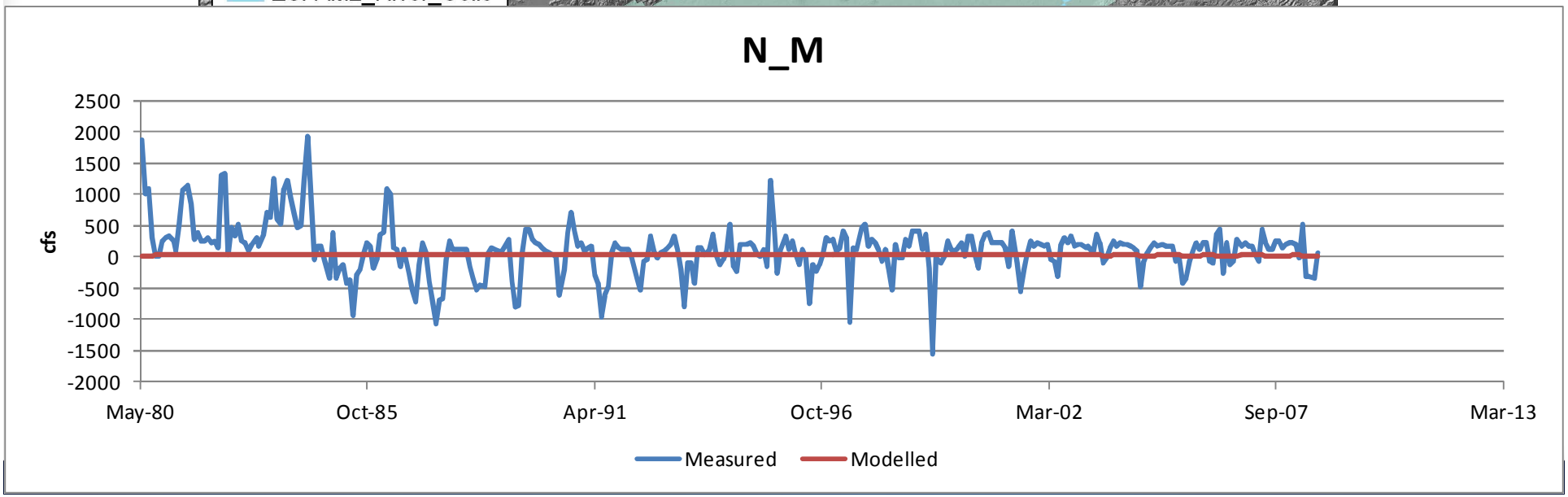


Neeley - Minidoka

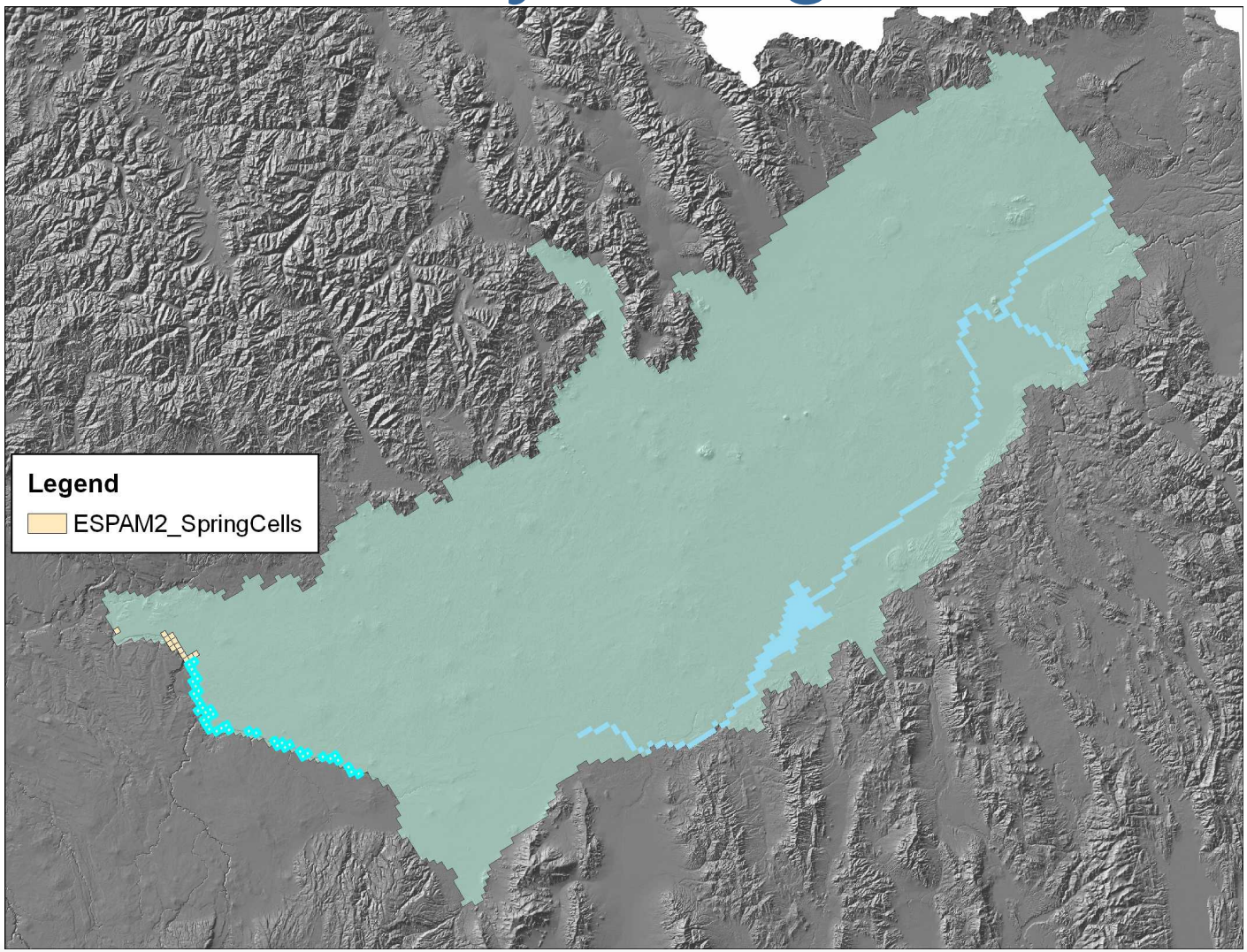


Neeley - Minidoka



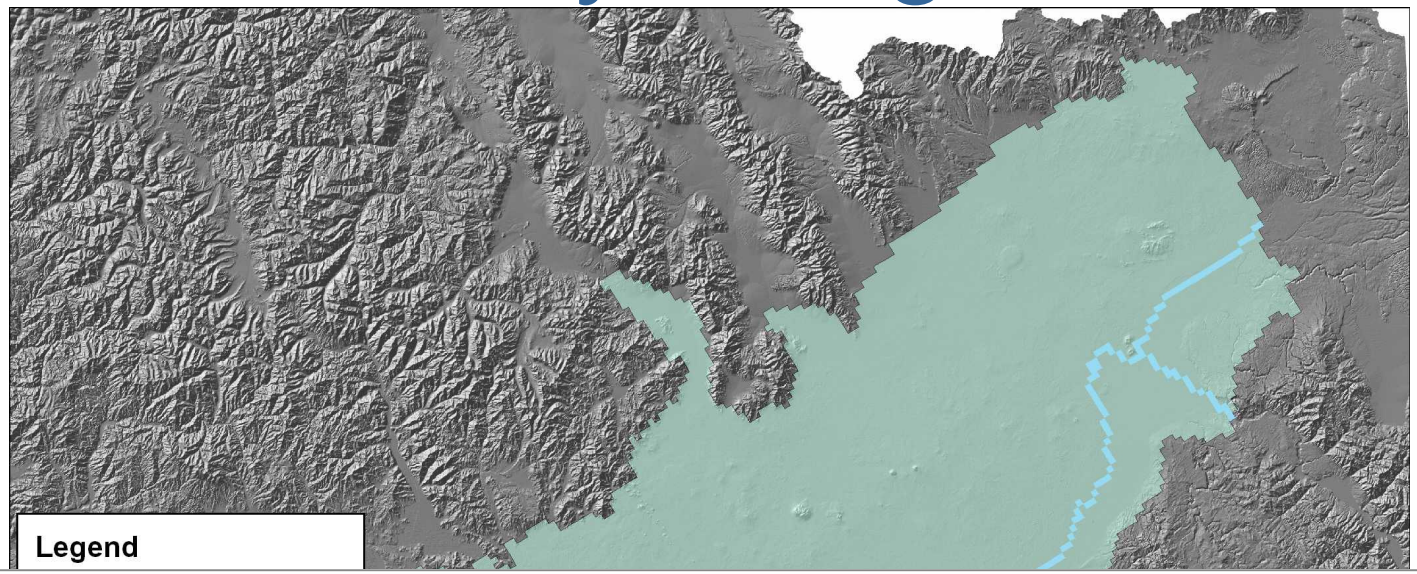


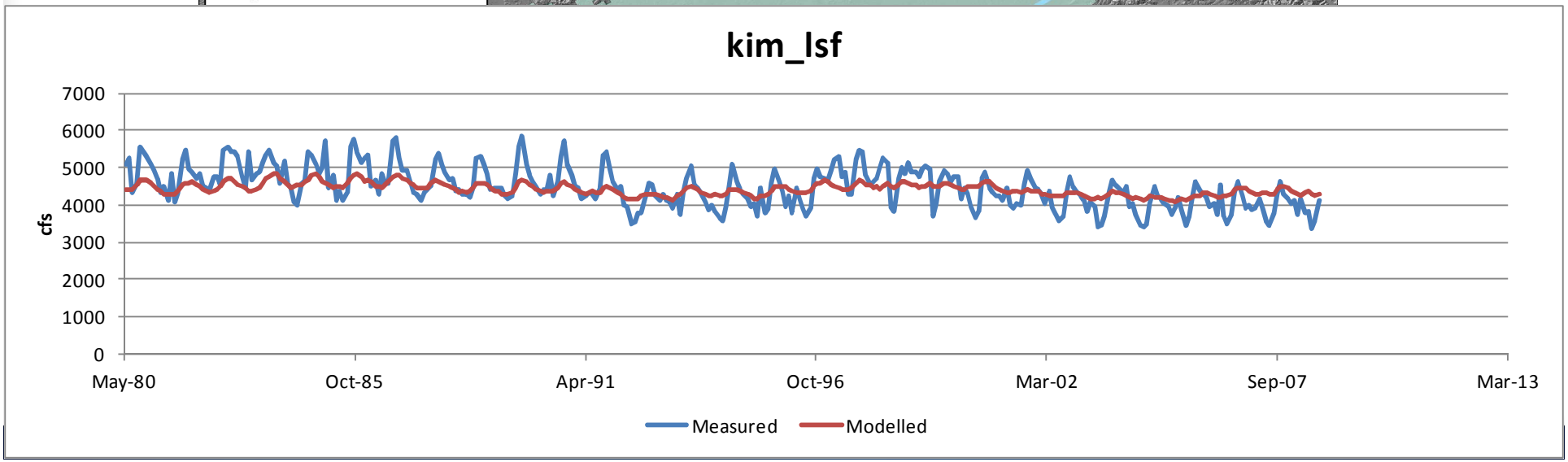
Kimberly - Hagerman



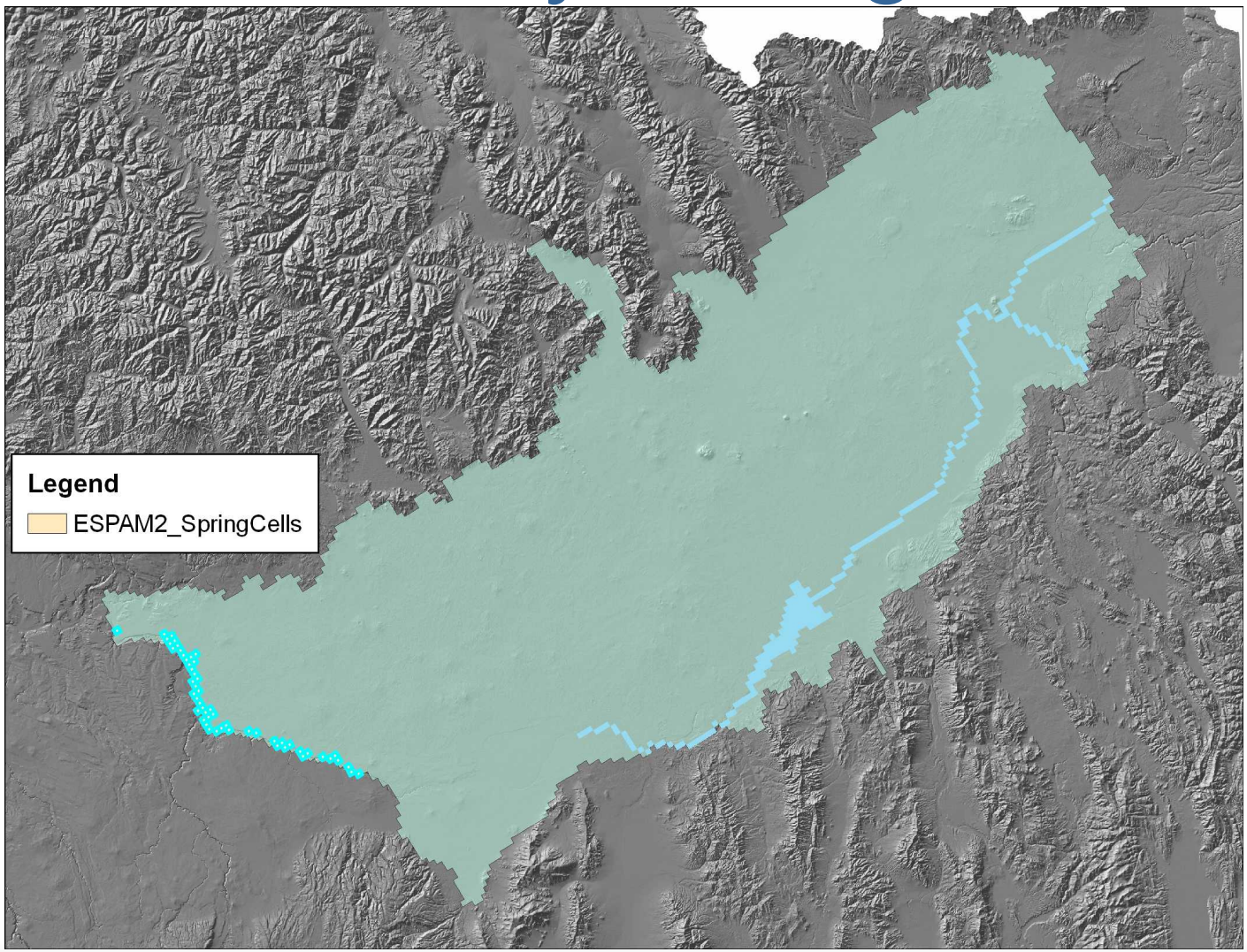
IDAHO Department of Water Resources

Kimberly - Hagerman

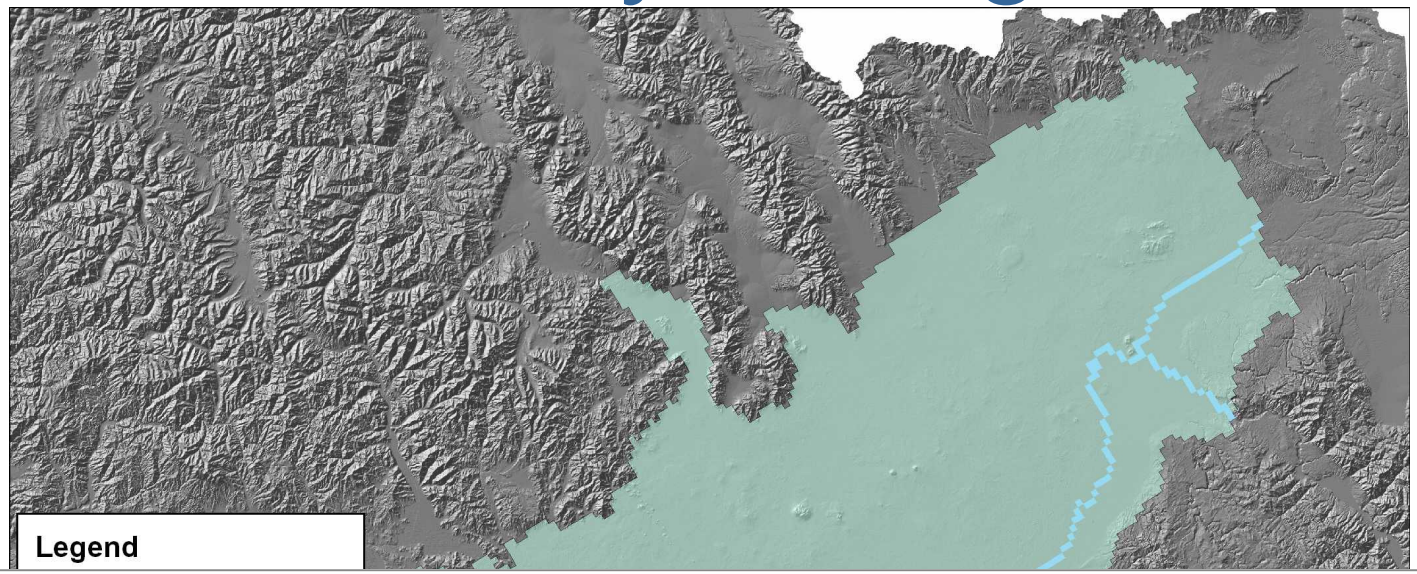


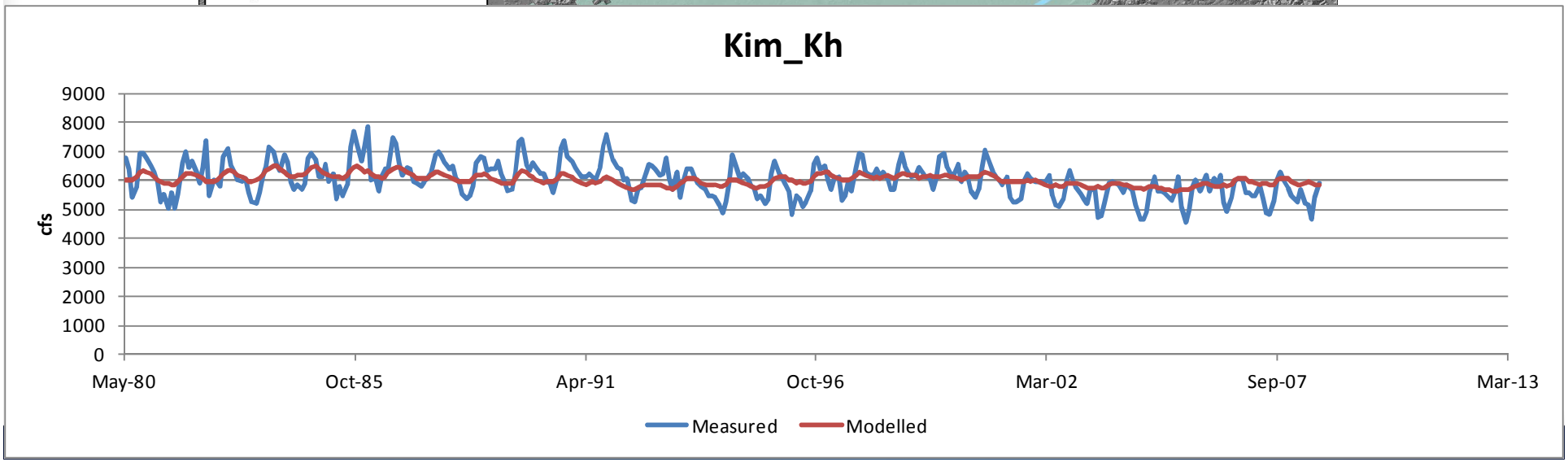


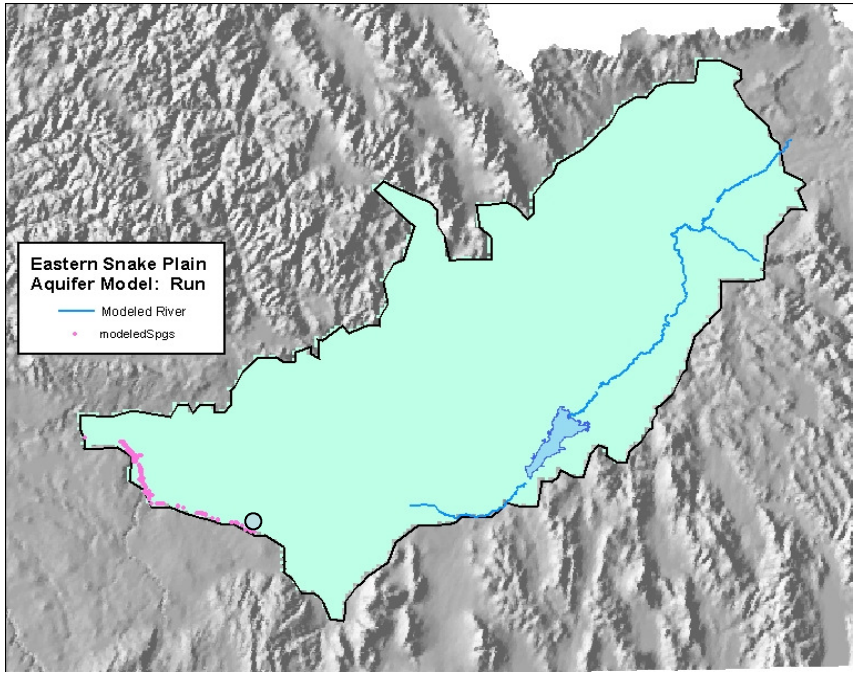
Kimberly – King Hill



Kimberly – King Hill

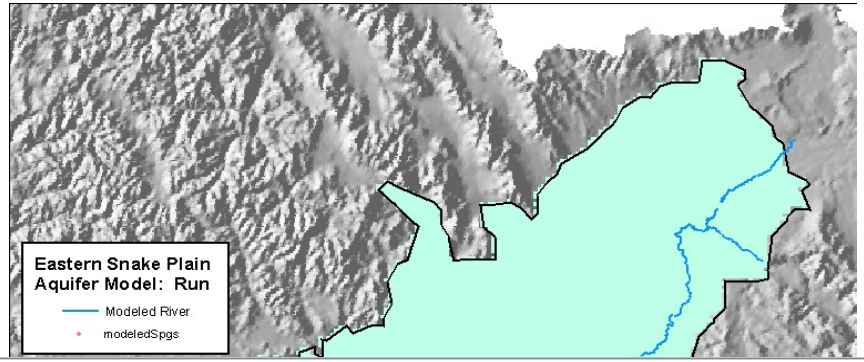


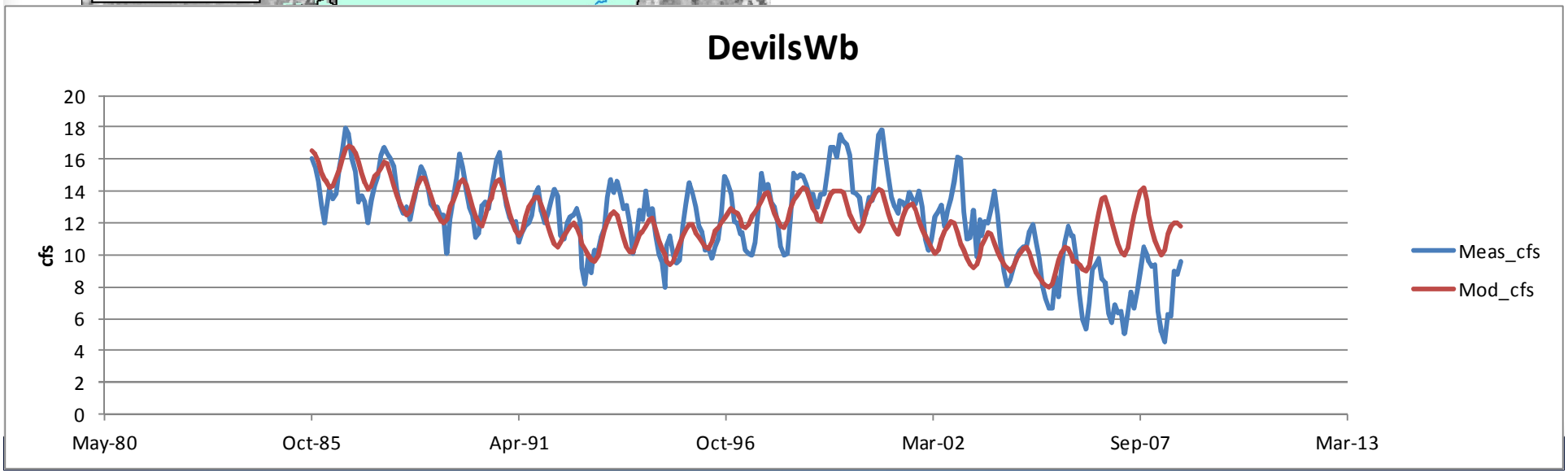


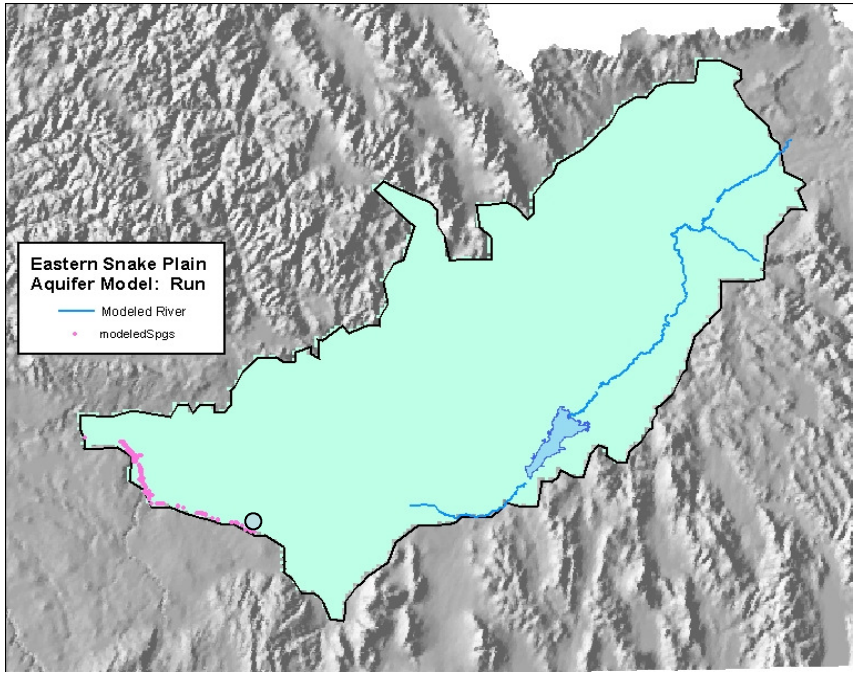


- Devils Washbowl

- Devils Washbowl

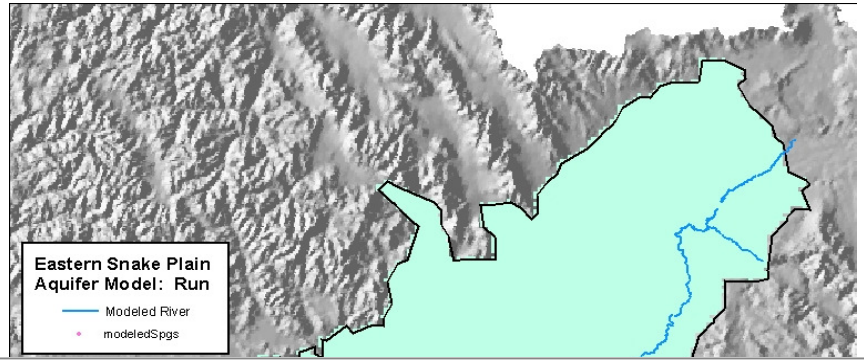


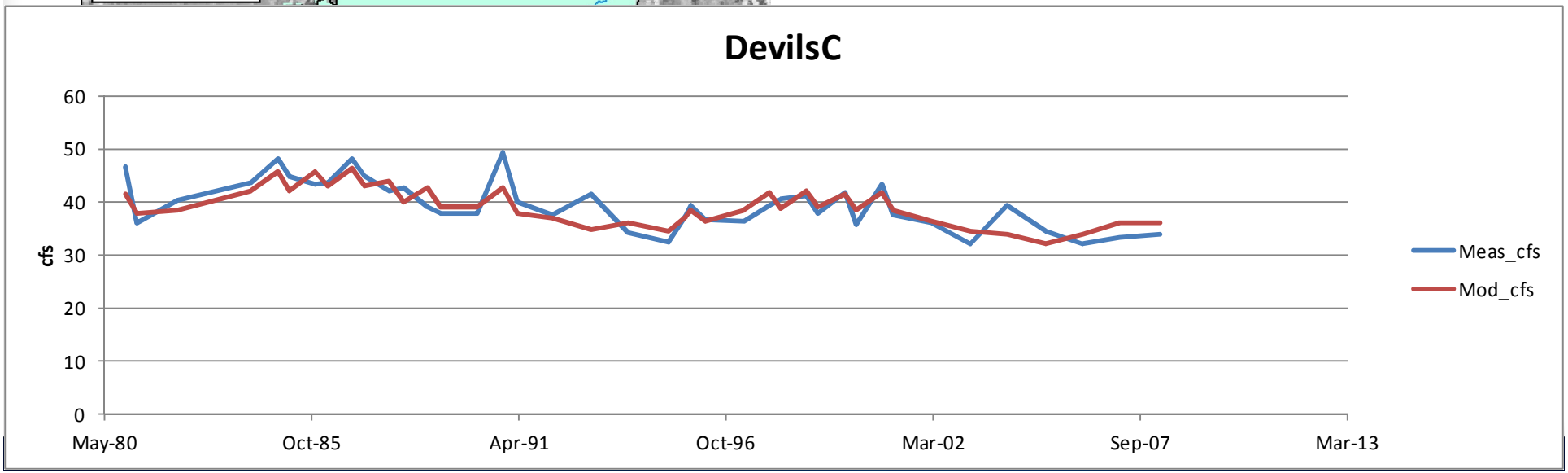


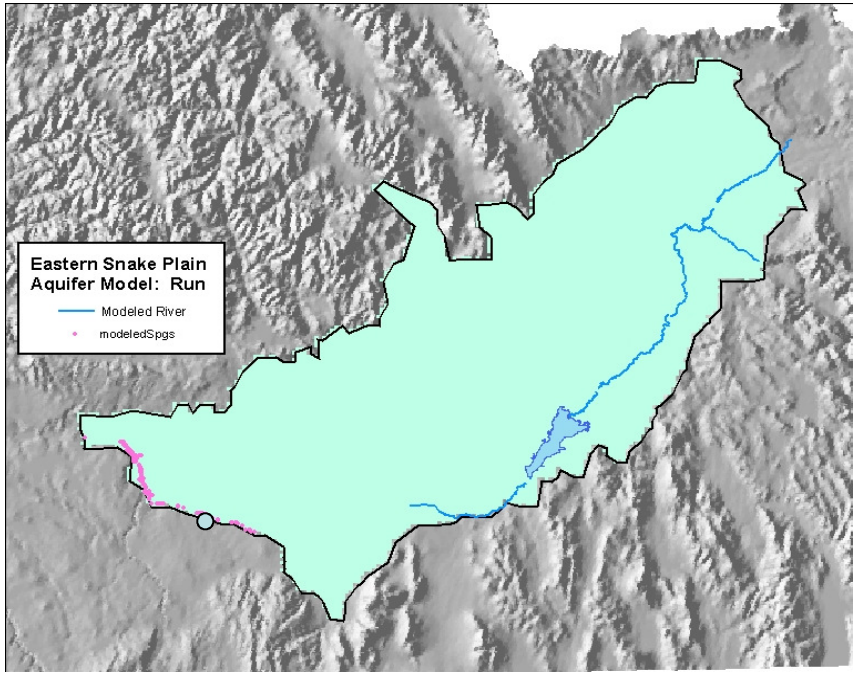


- Devils Corral

- Devils Corral

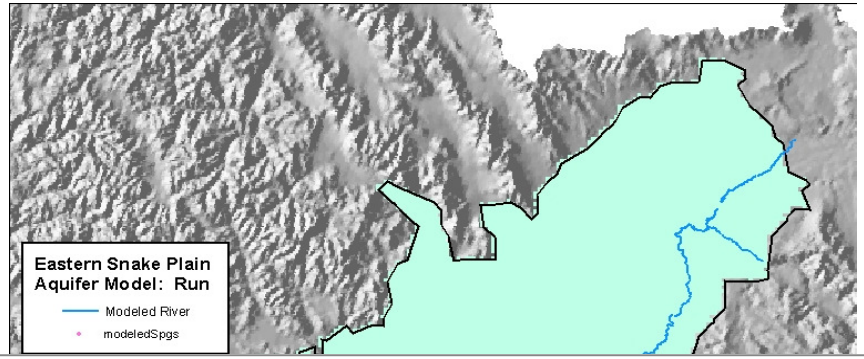


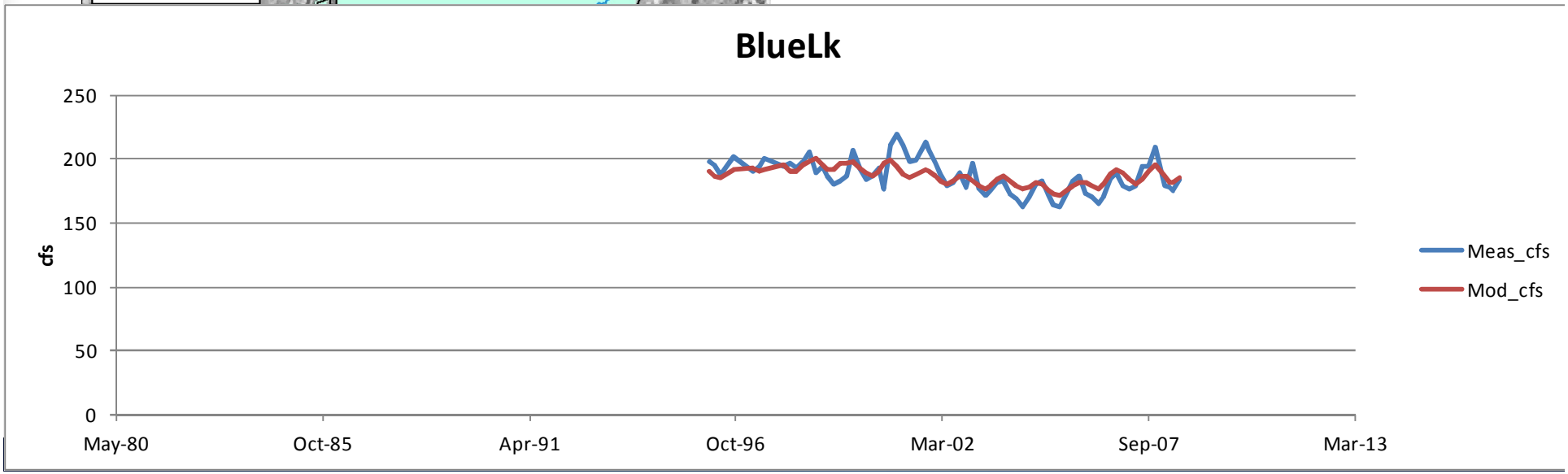


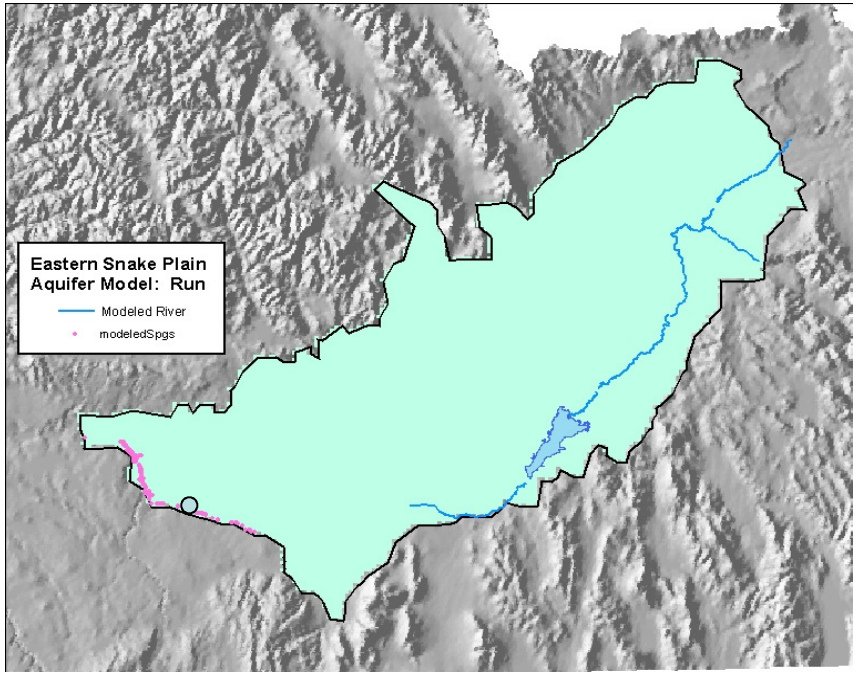

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Blue Lakes

- Blue Lakes

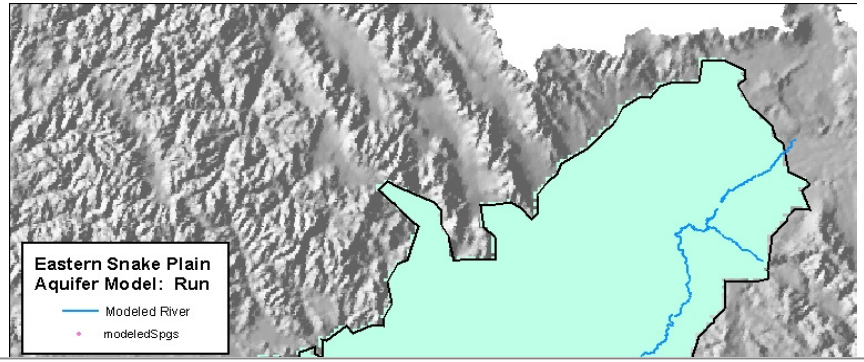

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

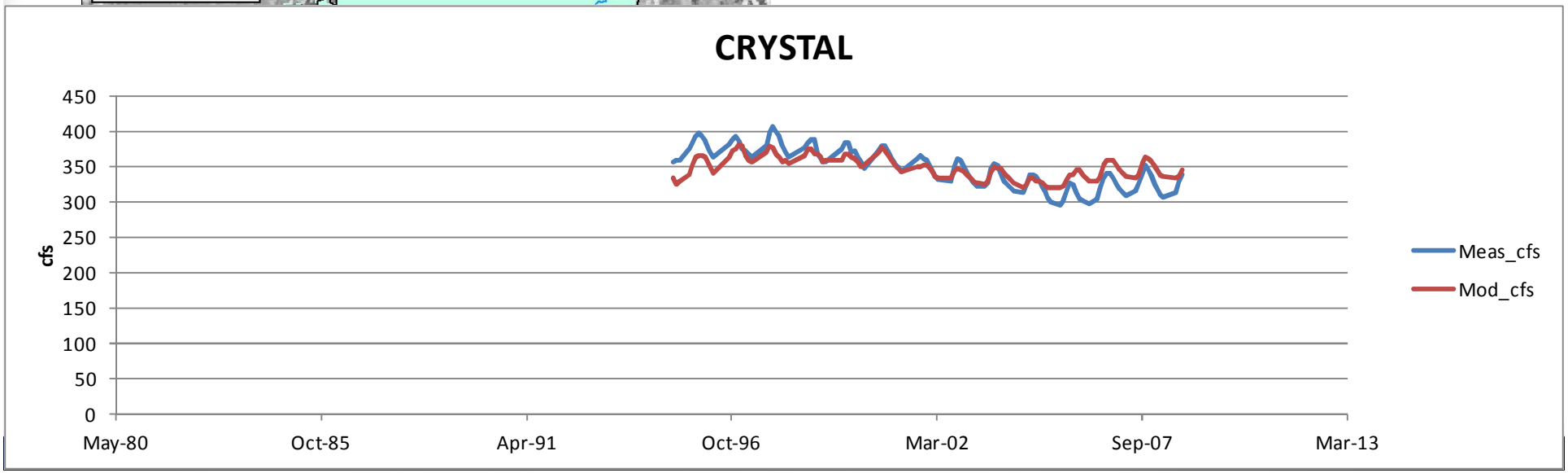

BlueLk
250
200
150
100
50
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Meas_cfs
Mod_cfs

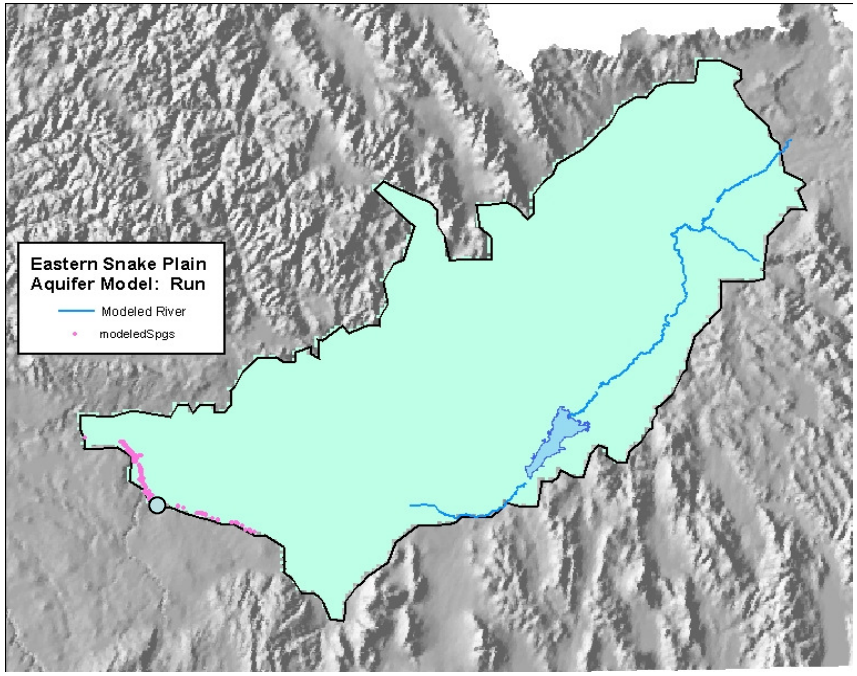


- Crystal Springs

- Crystal Springs

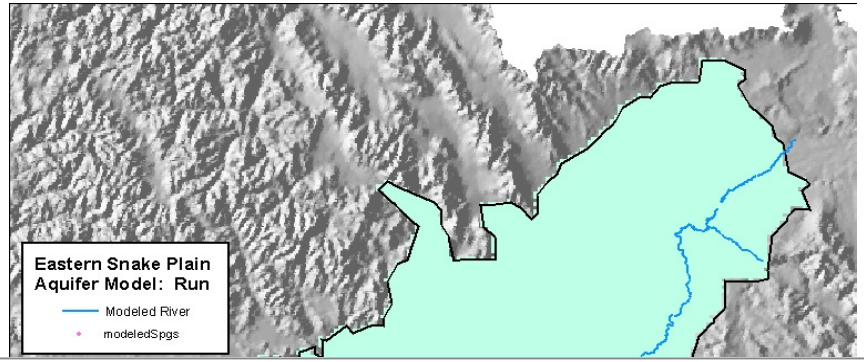


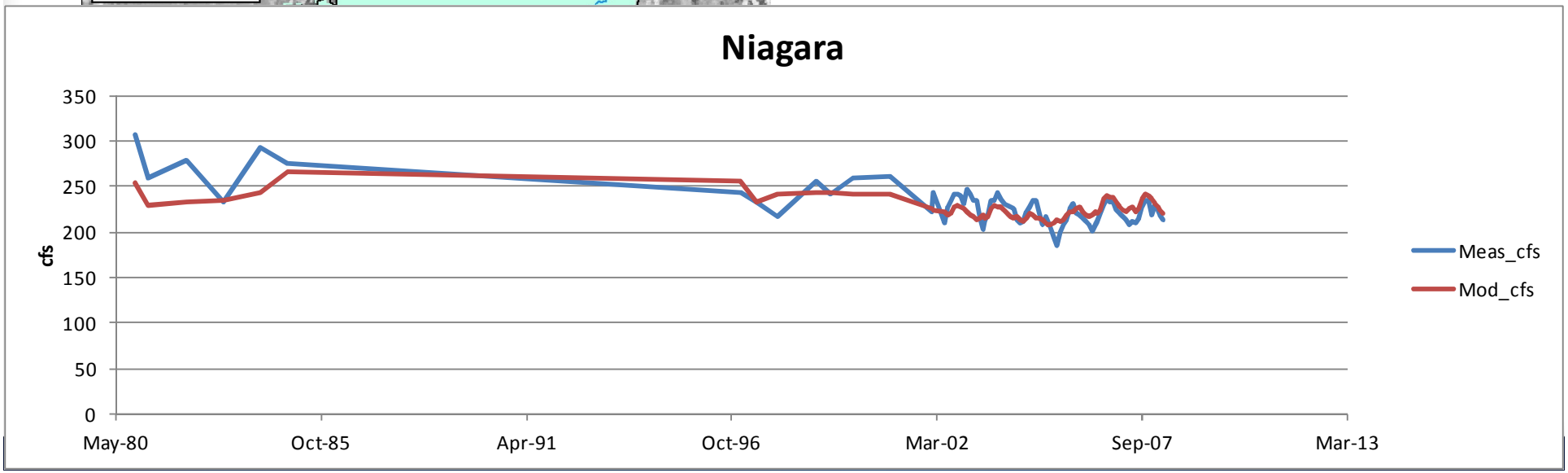


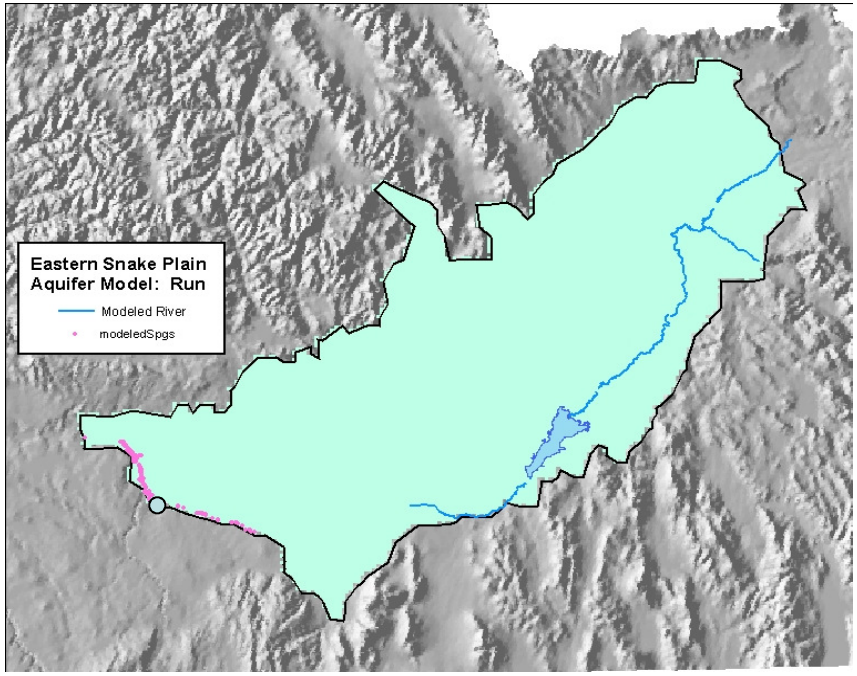

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Niagara

- Niagara

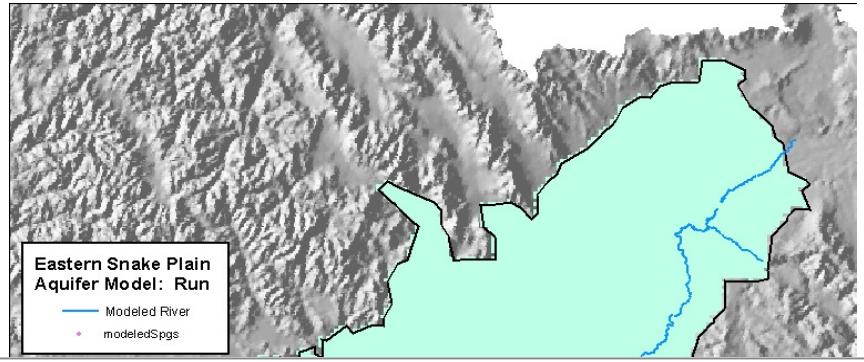

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

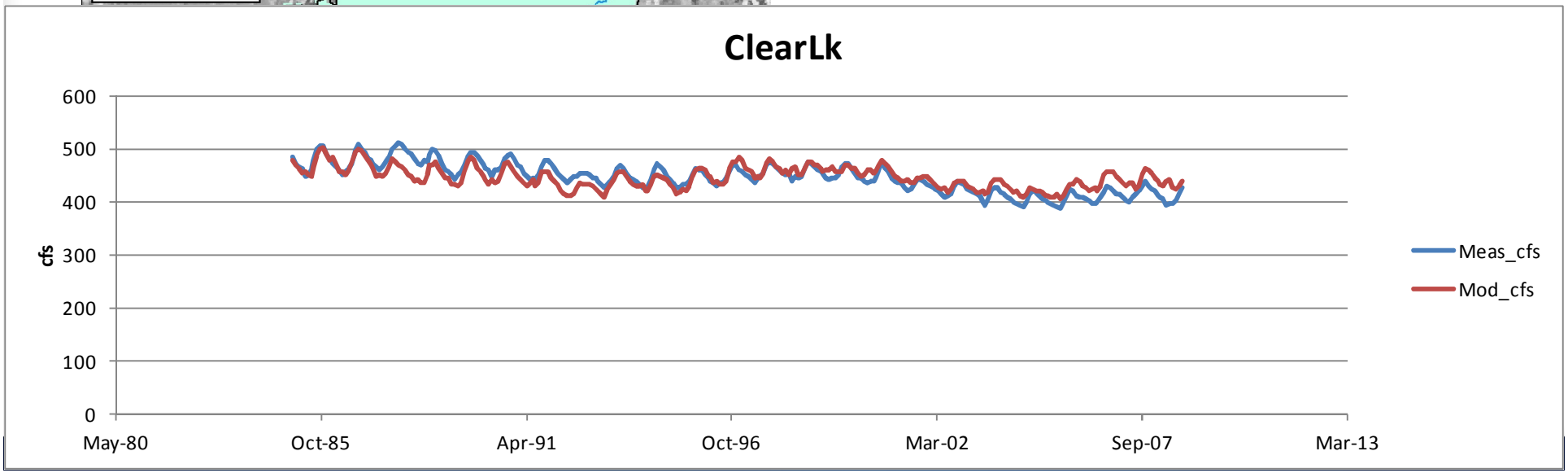

Niagara
350
300
250
200
150
100
50
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Meas_cfs
Mod_cfs

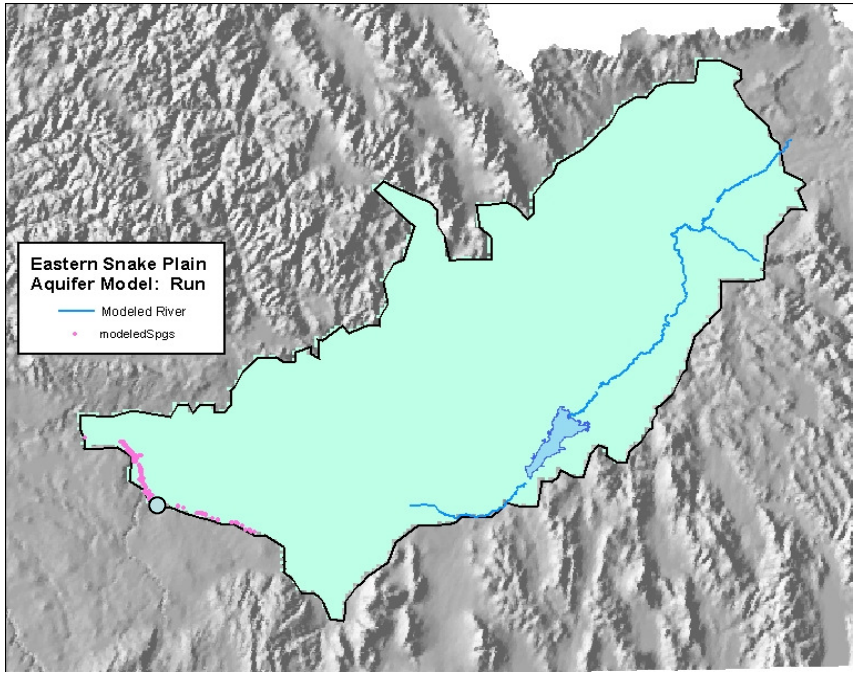

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Clear Lakes

- Clear Lakes

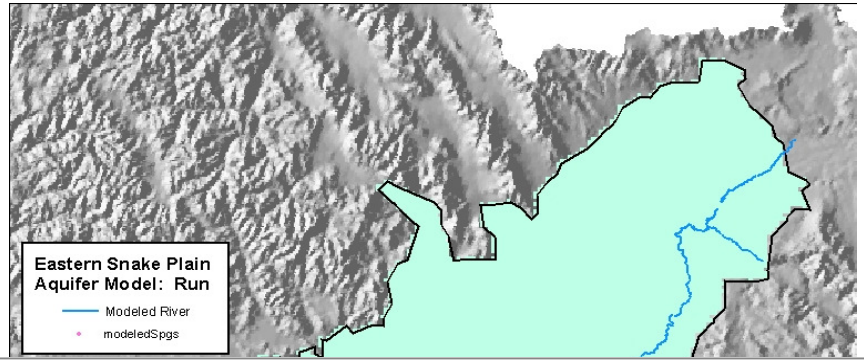

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

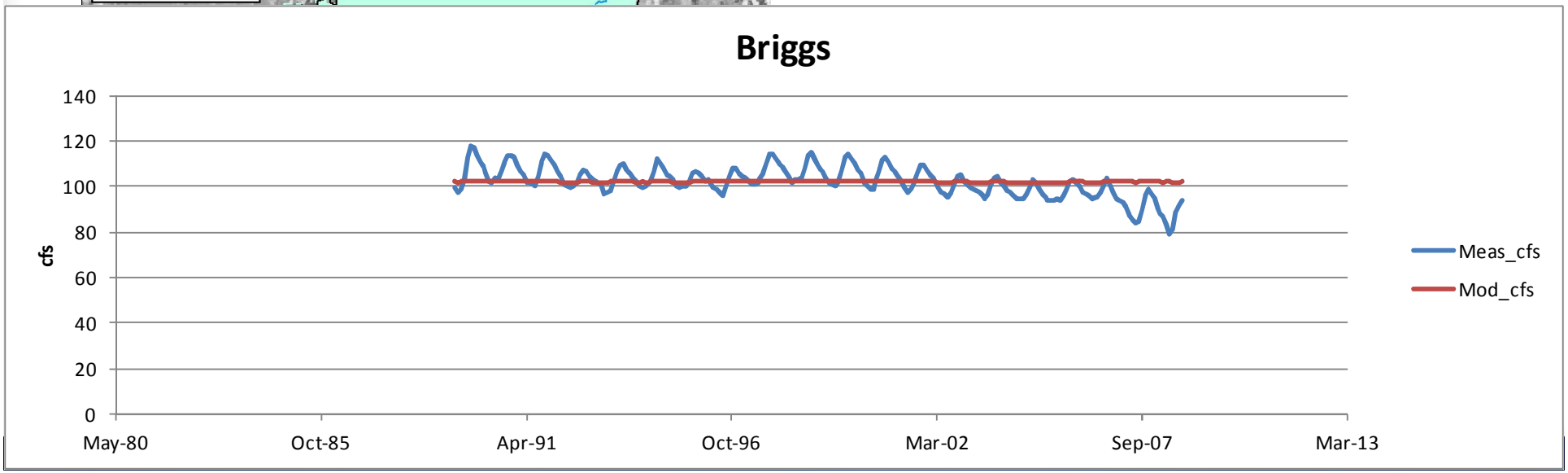

ClearLk
600
500
400
300
200
100
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Meas_cfs
Mod_cfs

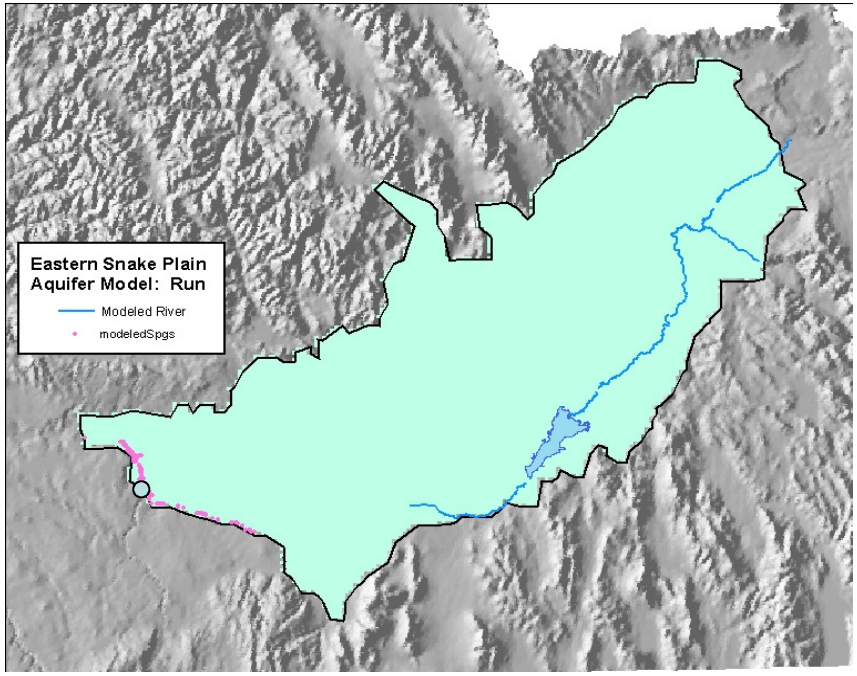


- Briggs Spring

- Briggs Spring

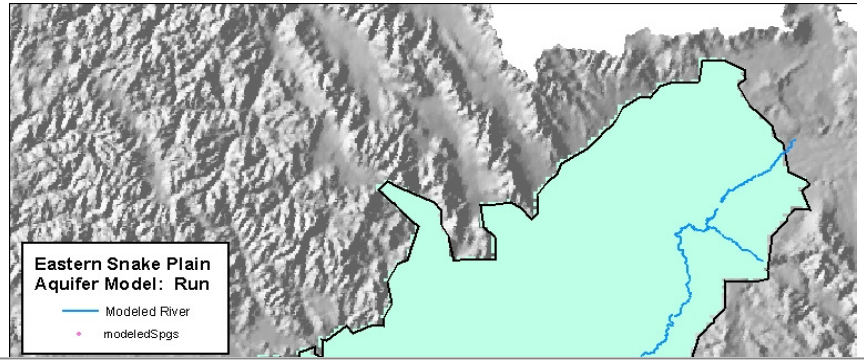


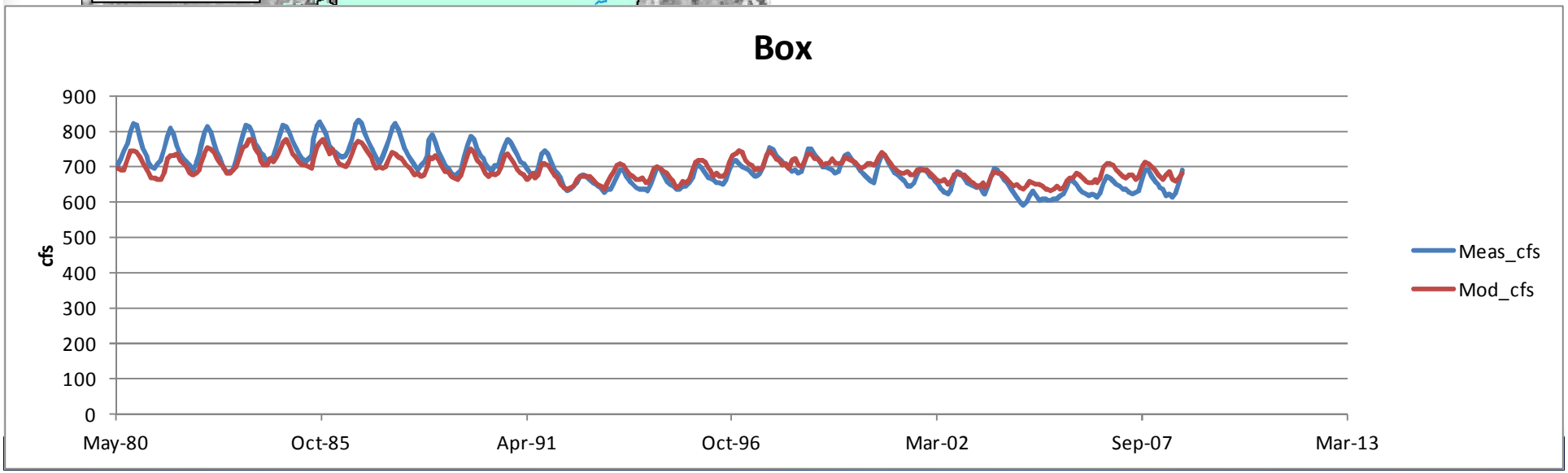


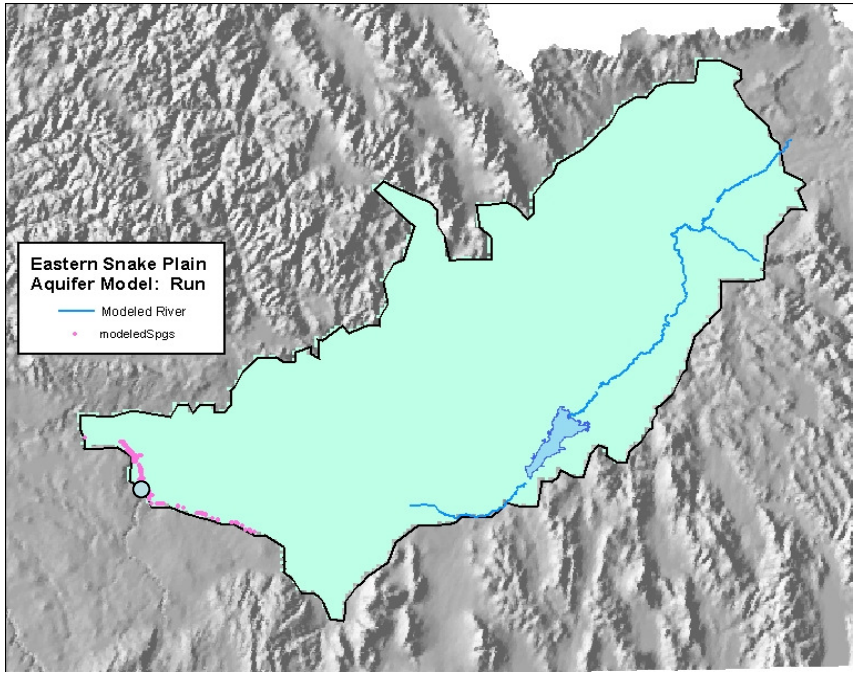


- Box Canyon Spring

- Box Canyon Spring

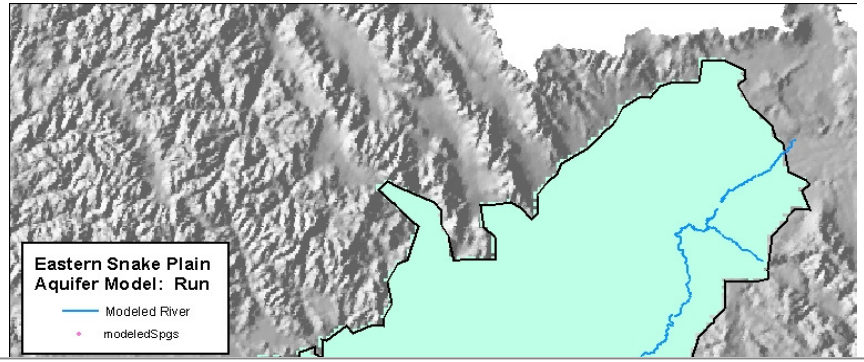


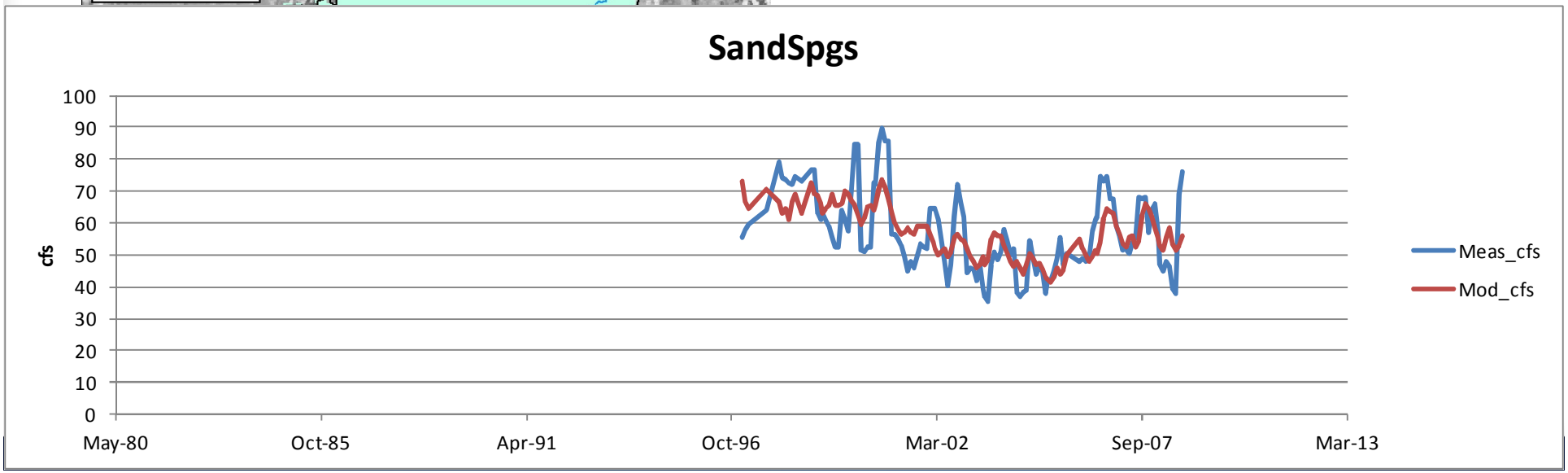


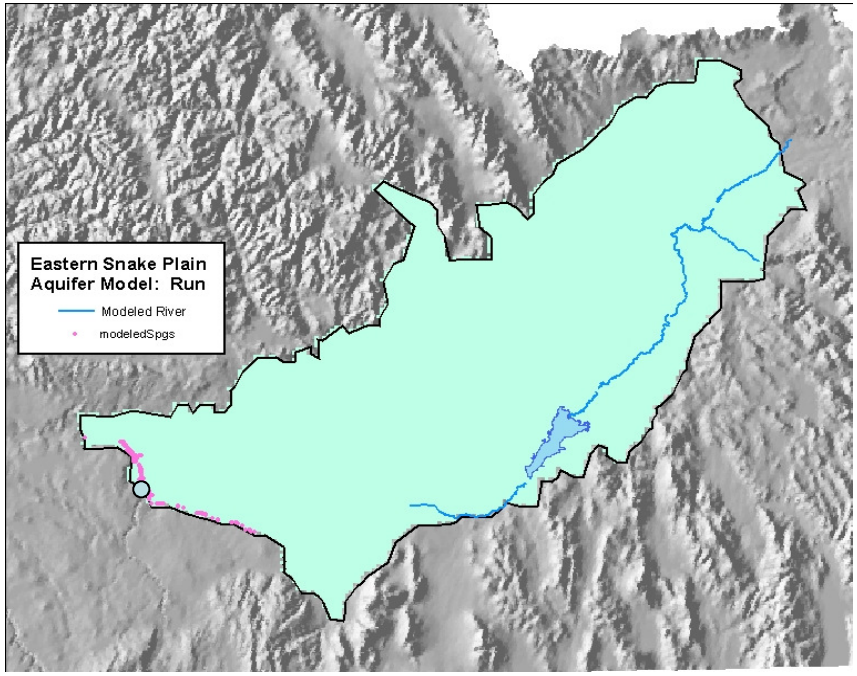


- Sand Springs

- Sand Springs

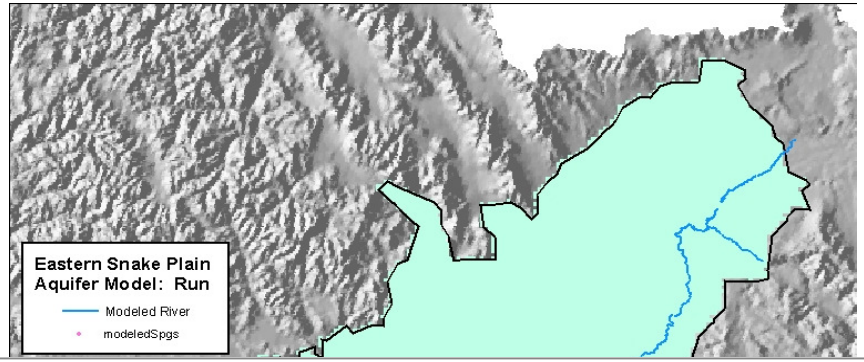


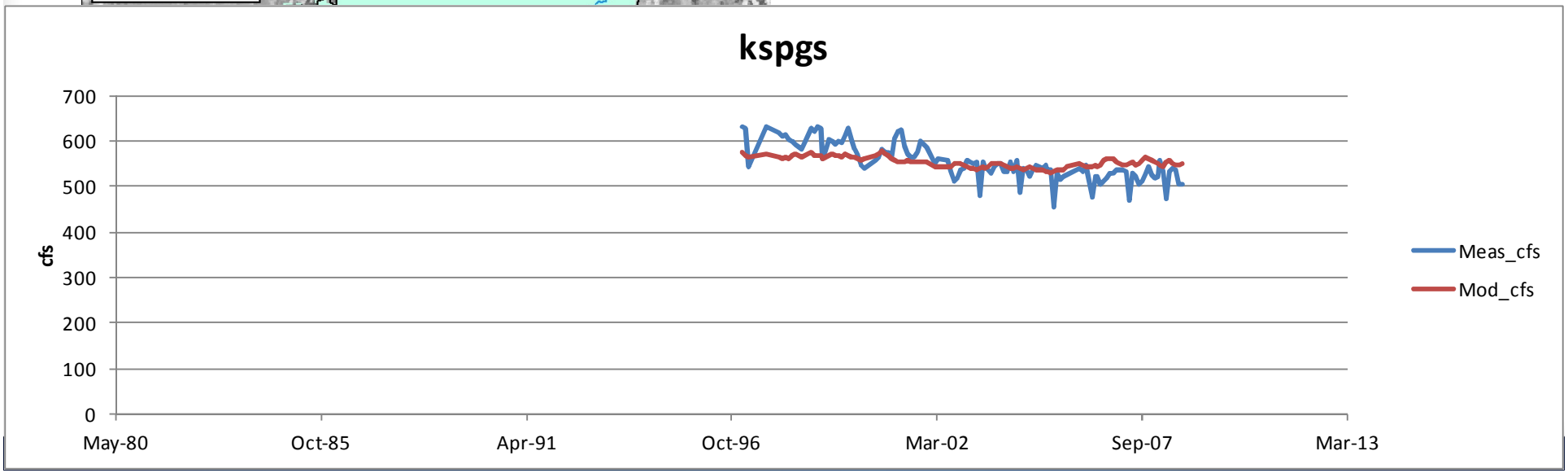


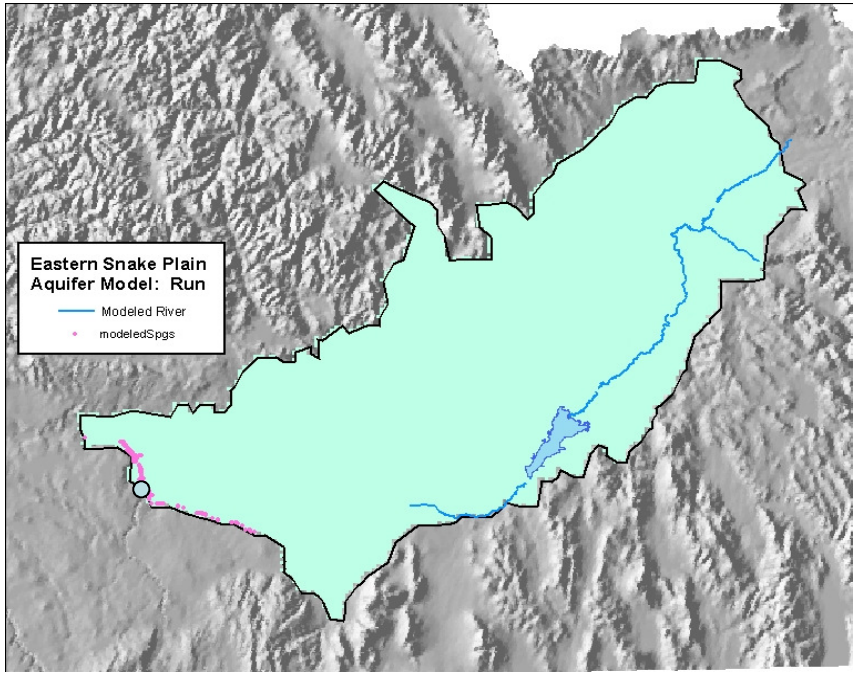


- Thousand Springs

- Thousand Springs

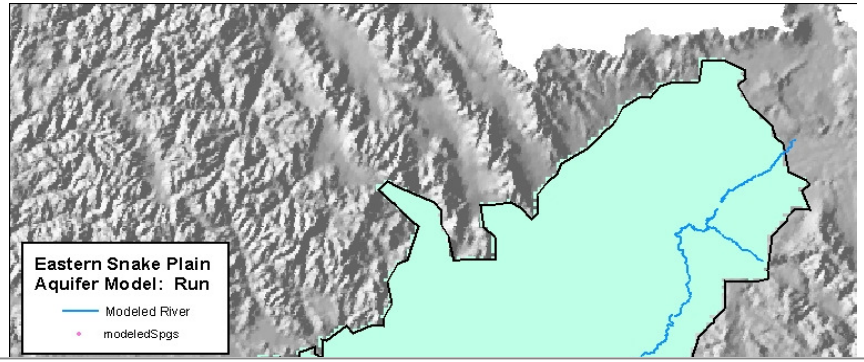


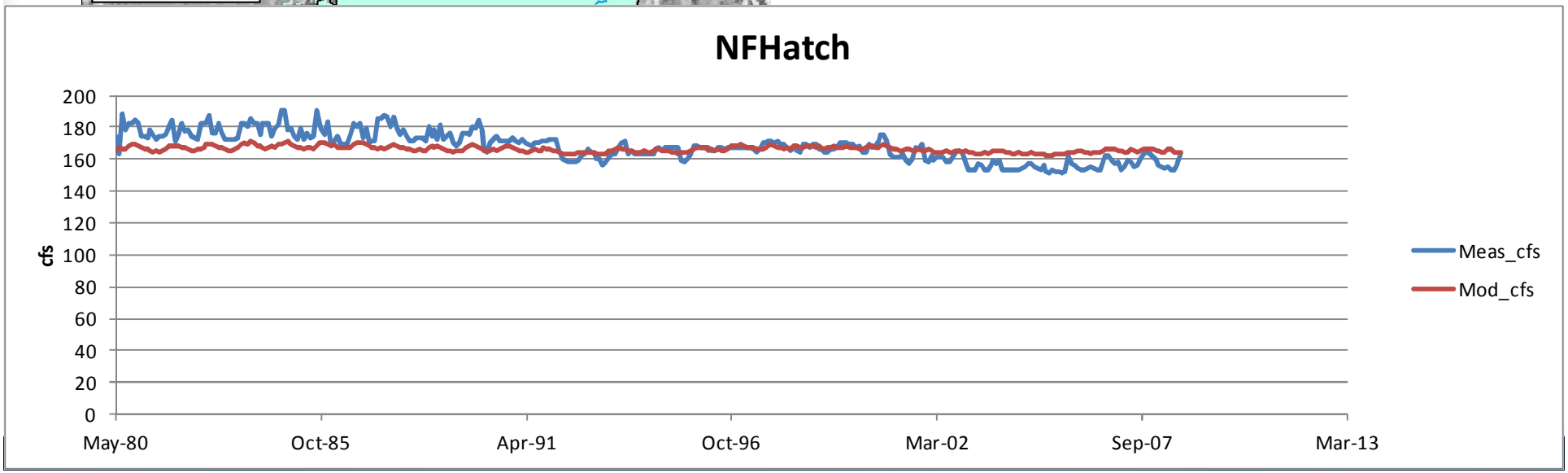


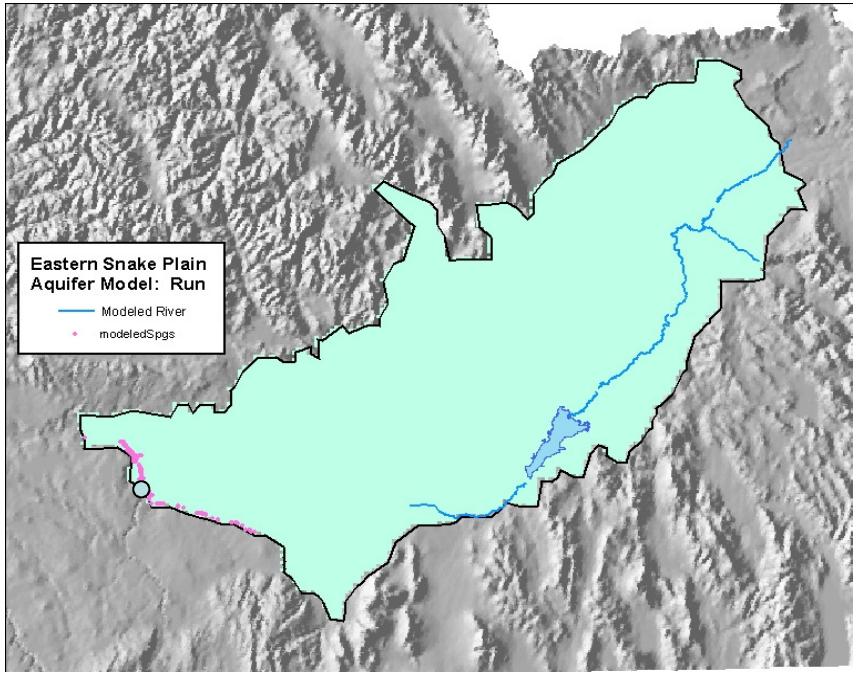


- Ntl Fish Hatchery

- Ntl Fish Hatchery

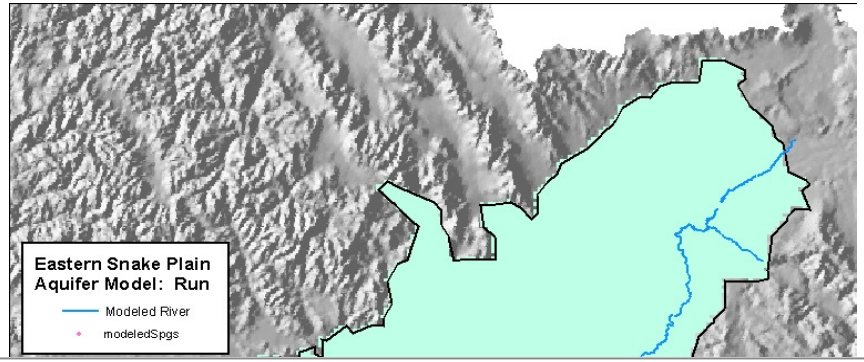


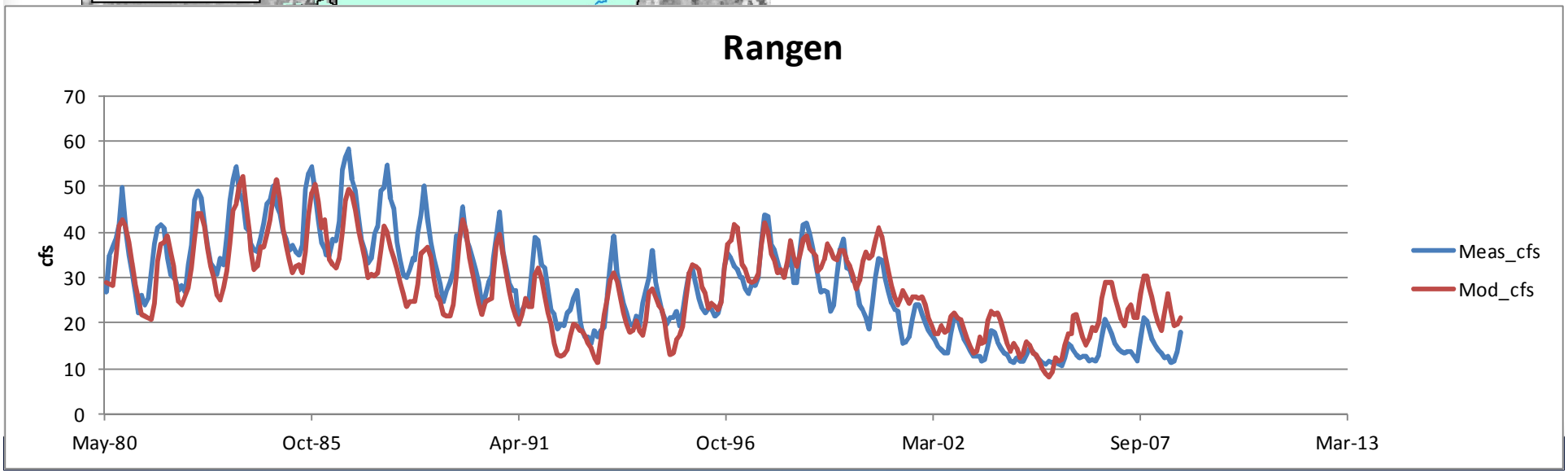


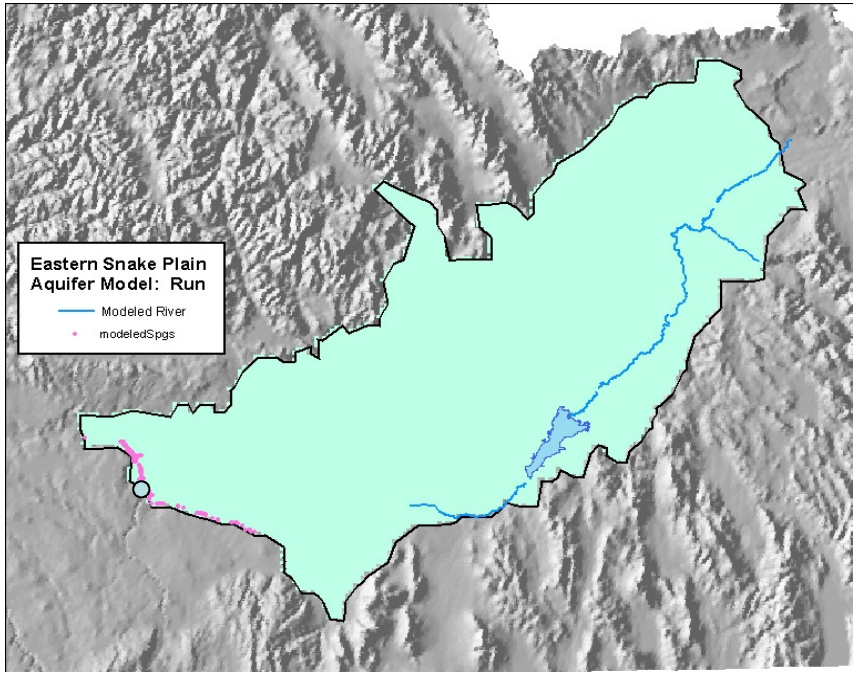


- Rangen Spring

- Rangen Spring

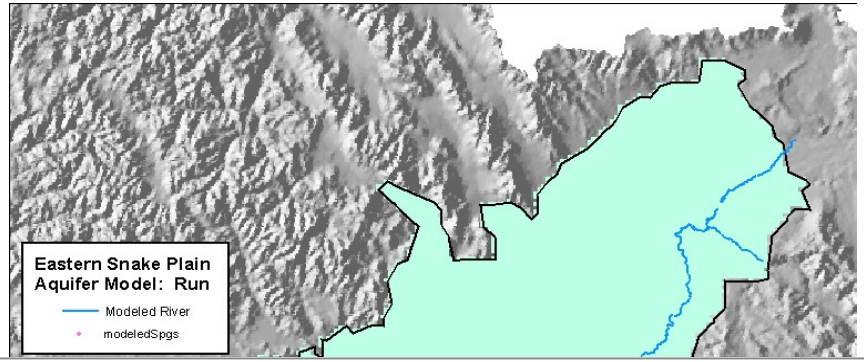


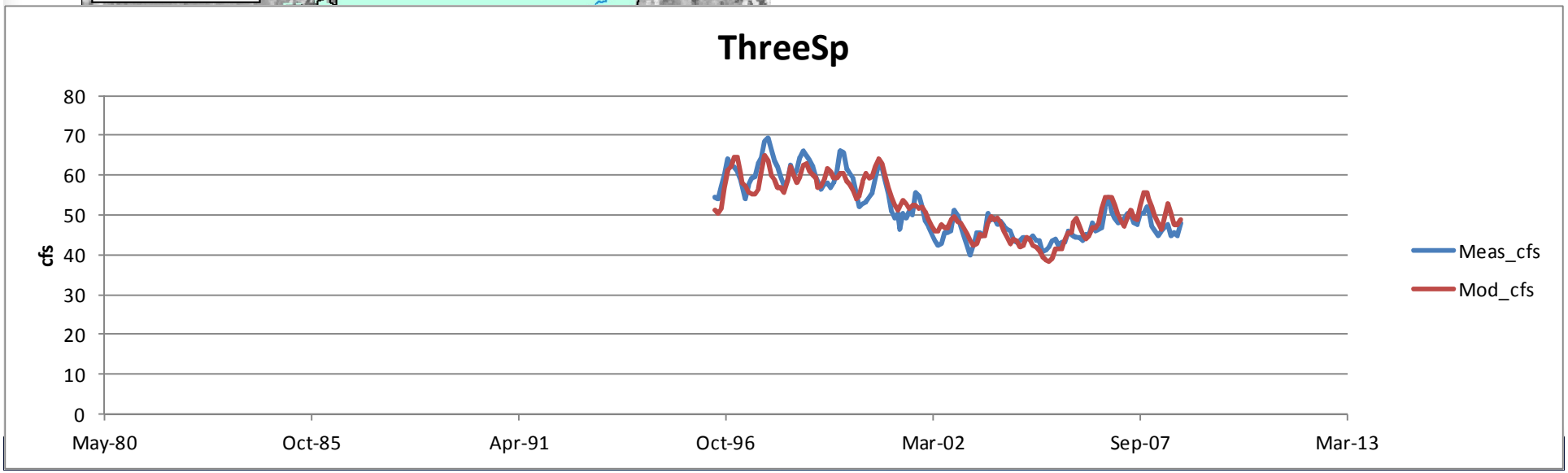


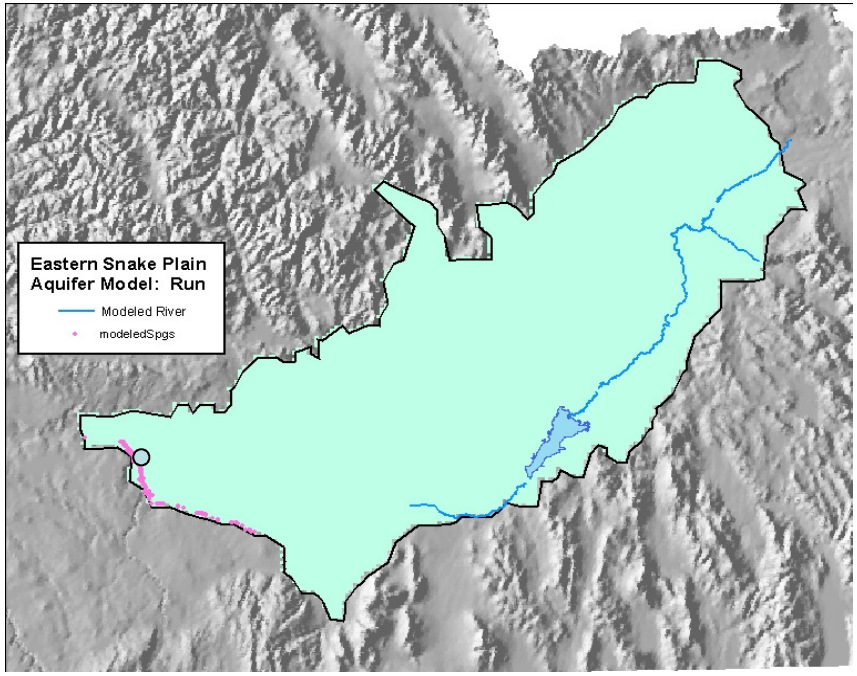


- Three Springs
  - (Jones)

- Three Springs
  - (Jones)

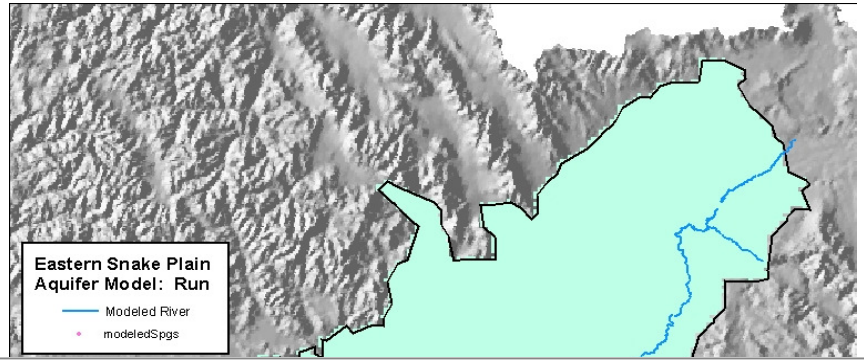


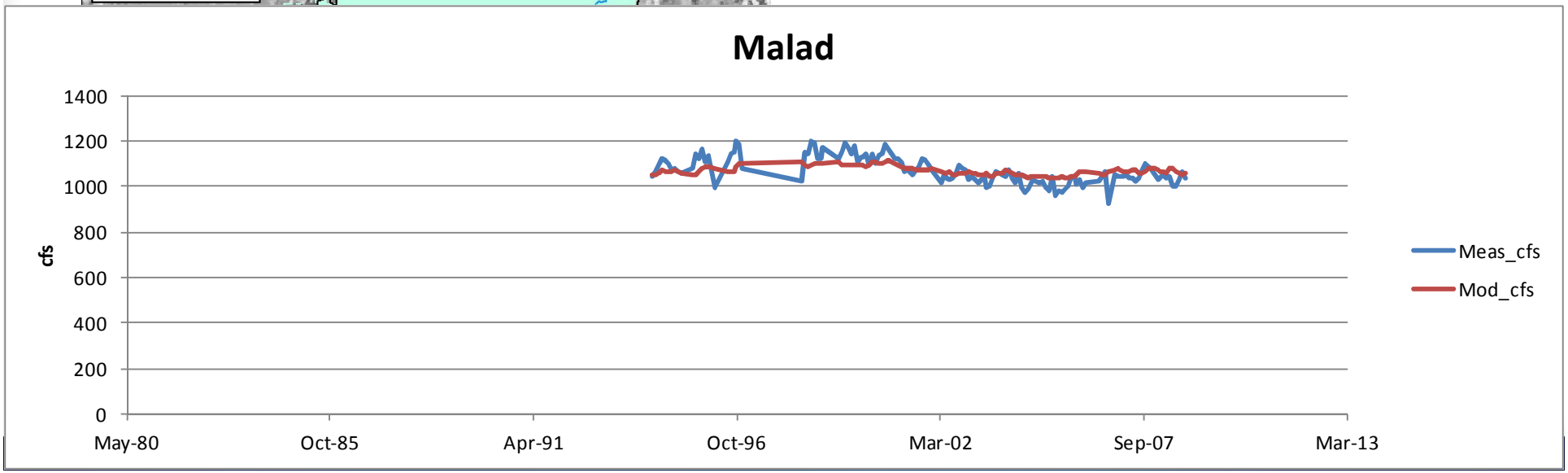


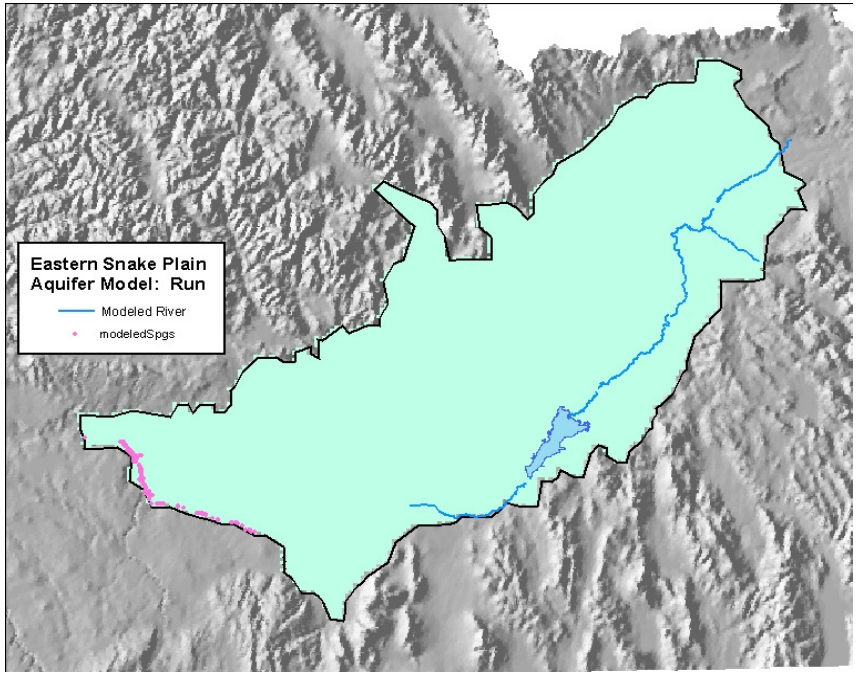

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Malad

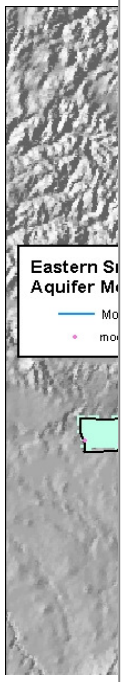
- Malad

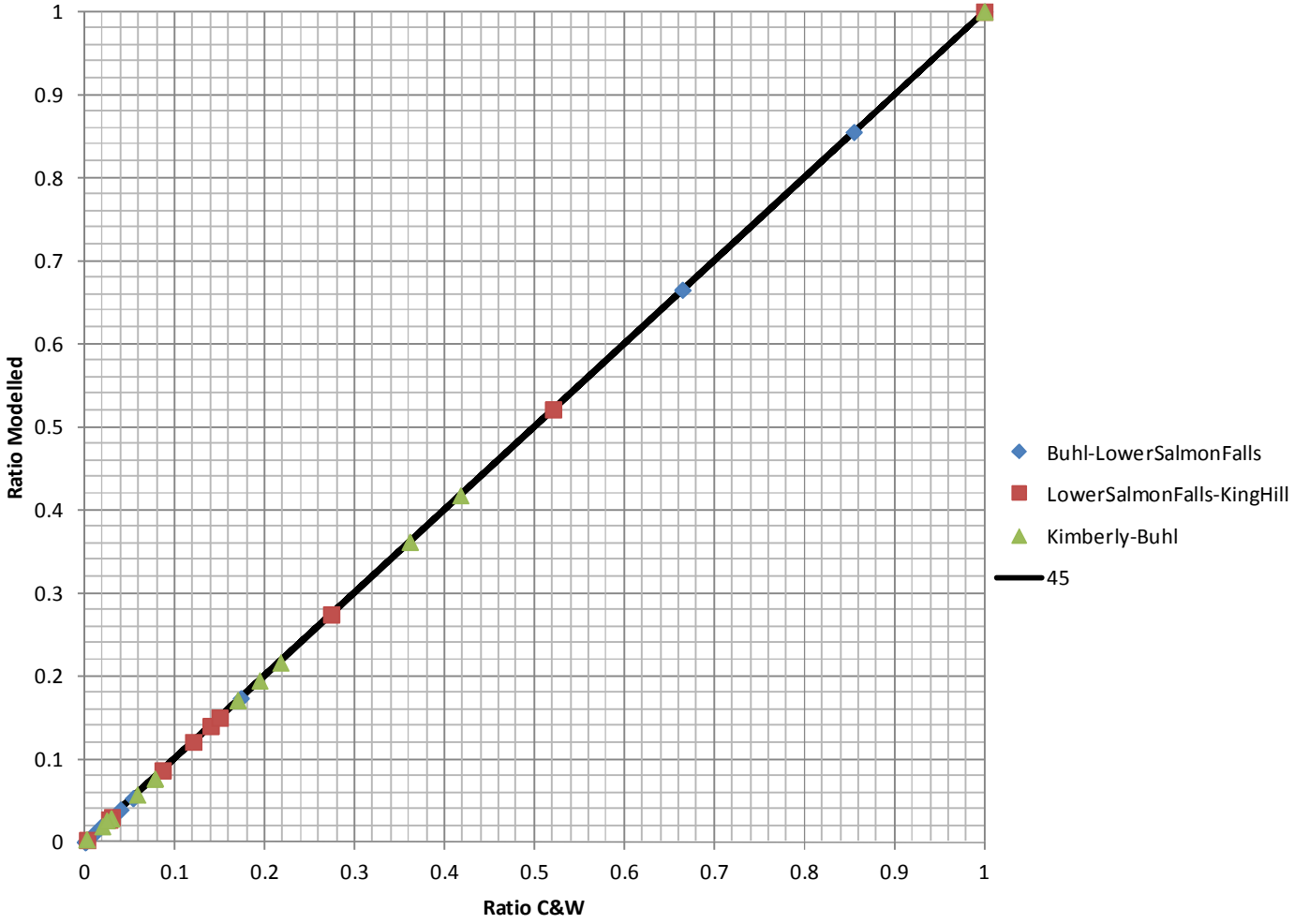

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

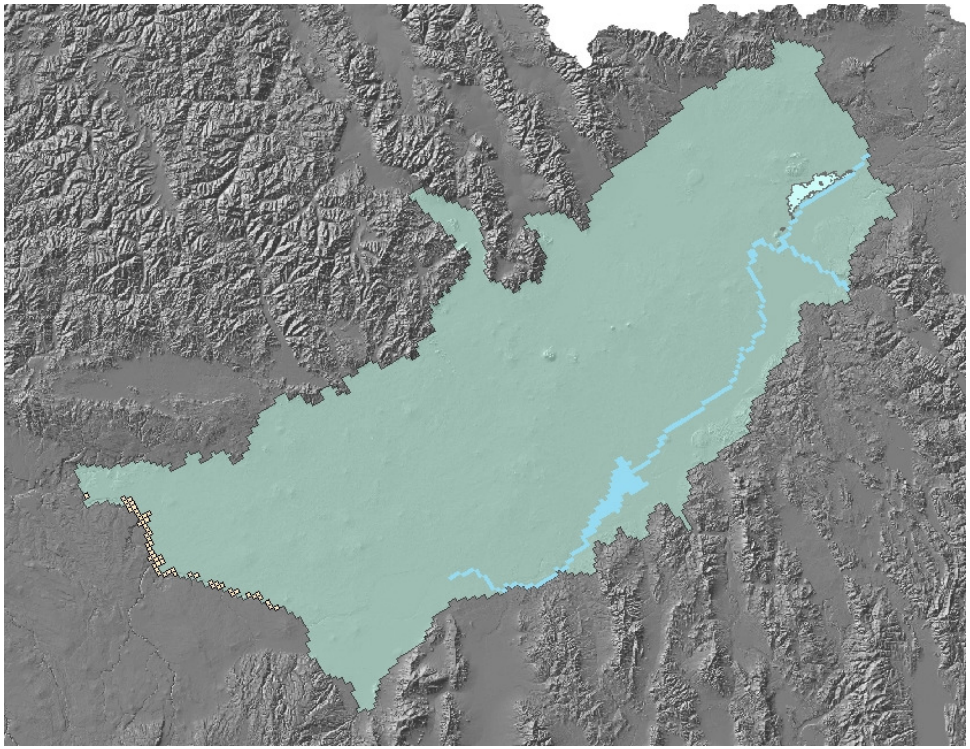

Malad
1400
1200
1000
800
600
400
200
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Meas_cfs
Mod_cfs



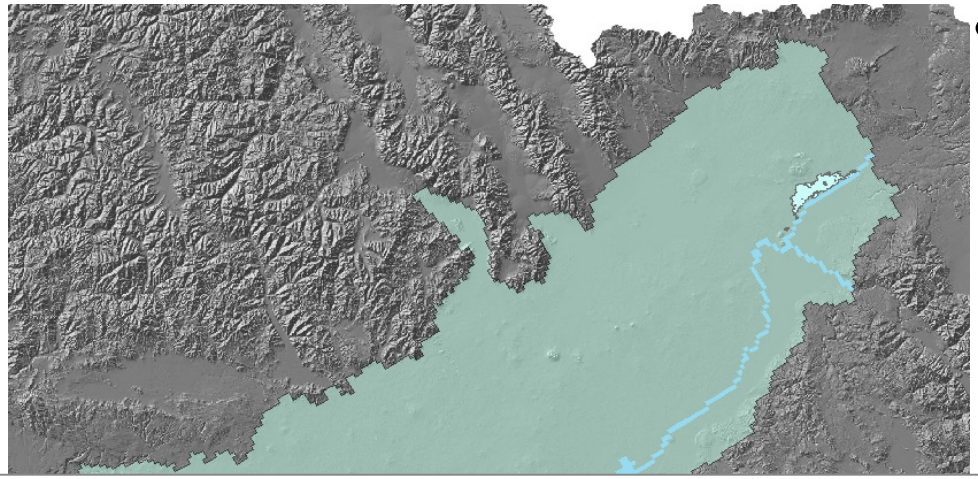
- Group C Springs


Eastern S
Aquifer M

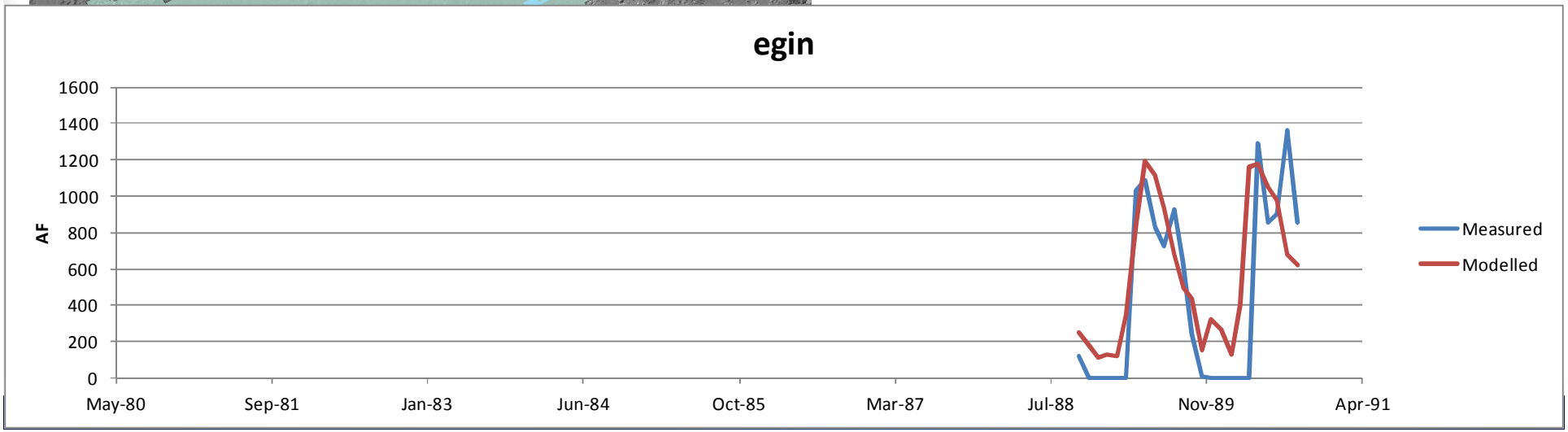

Ratio Modelled
Ratio C&W
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Buhl-LowerSalmonFalls
LowerSalmonFalls-KingHill
Kimberly-Buhl
45

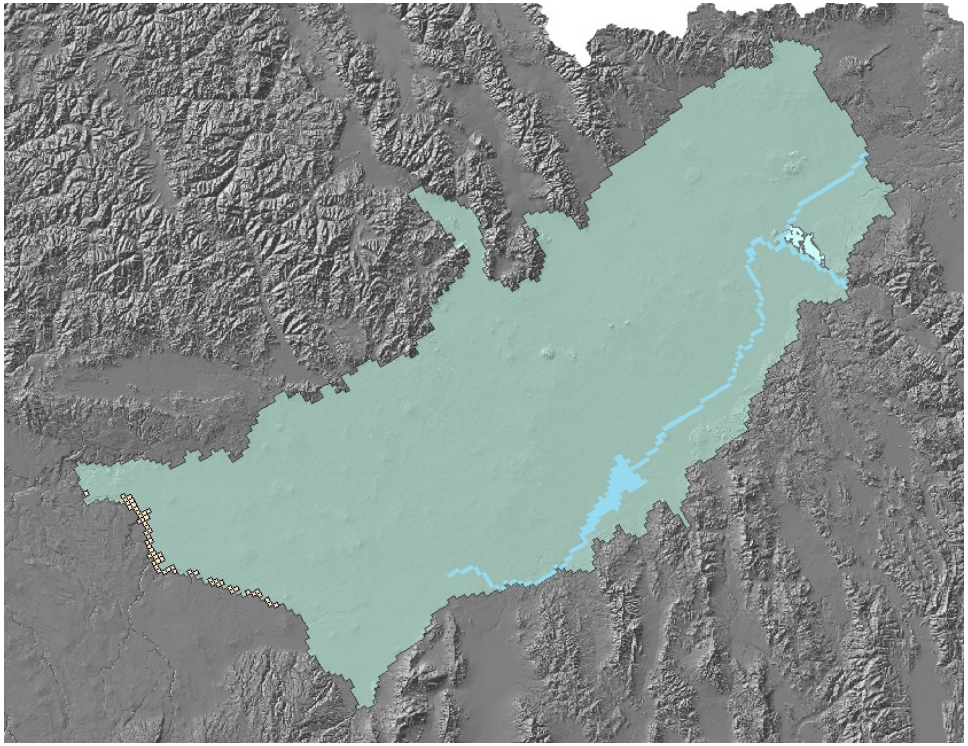


- Egin returns

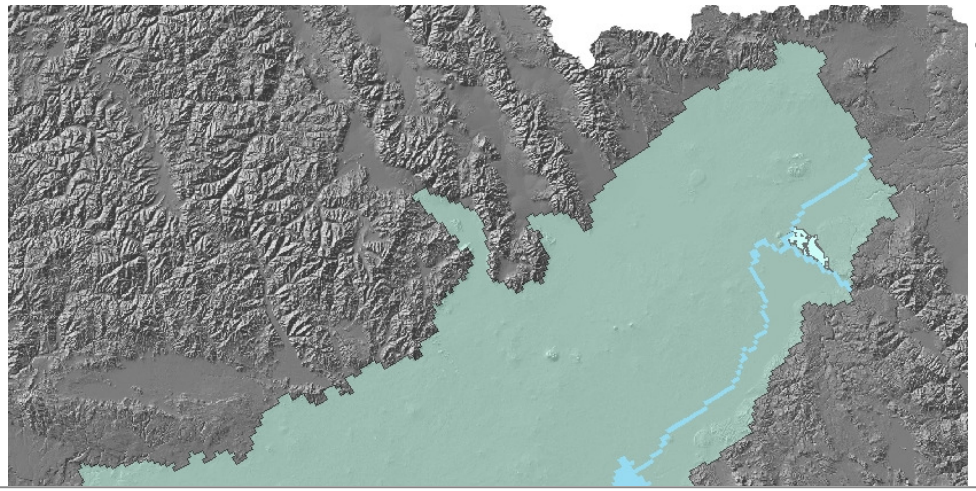


- Egin returns

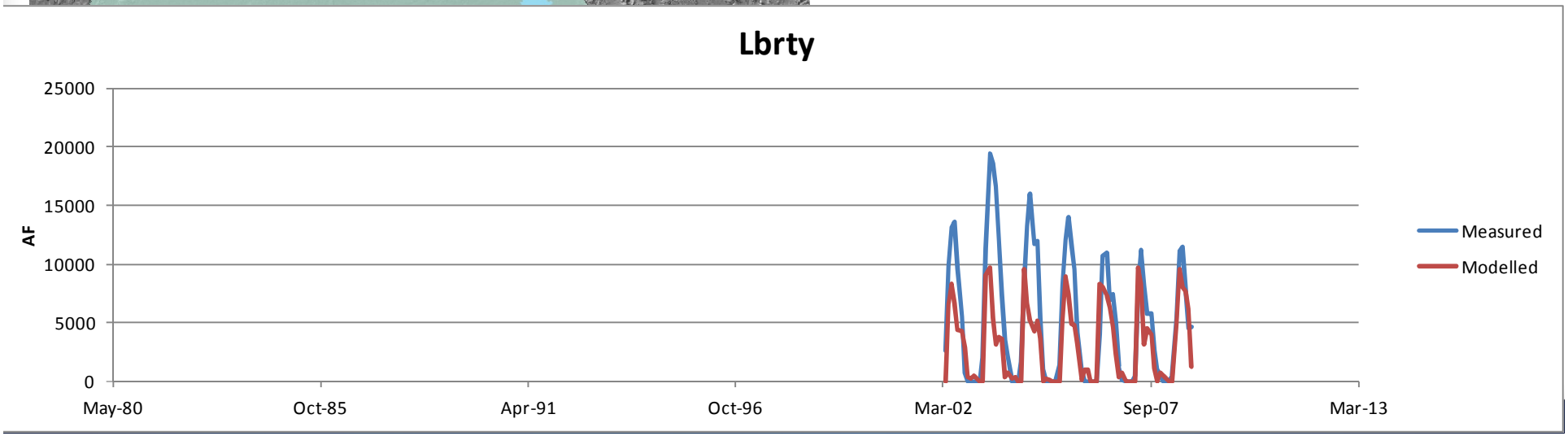


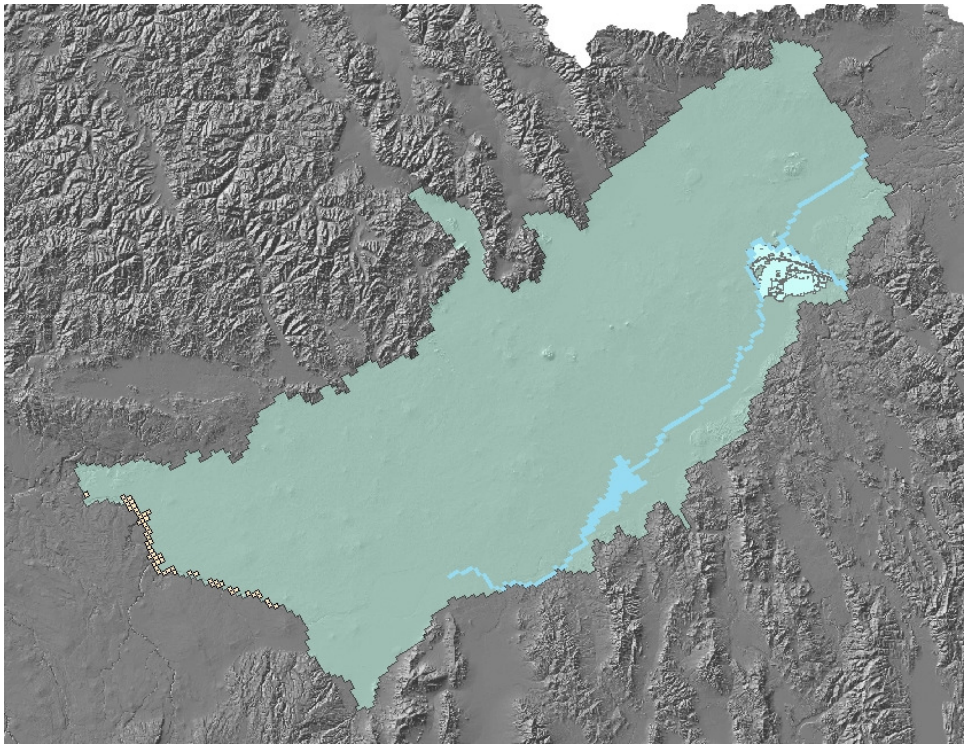


- Liberty returns

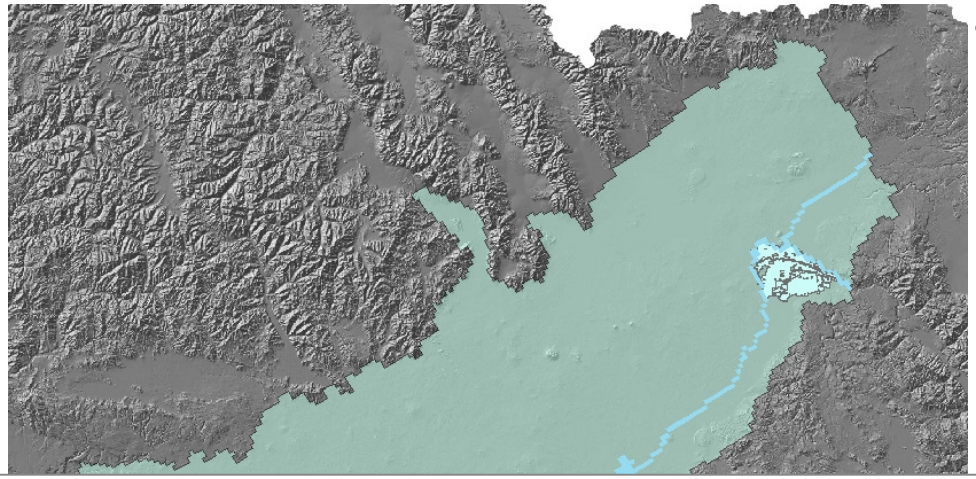


- Liberty returns

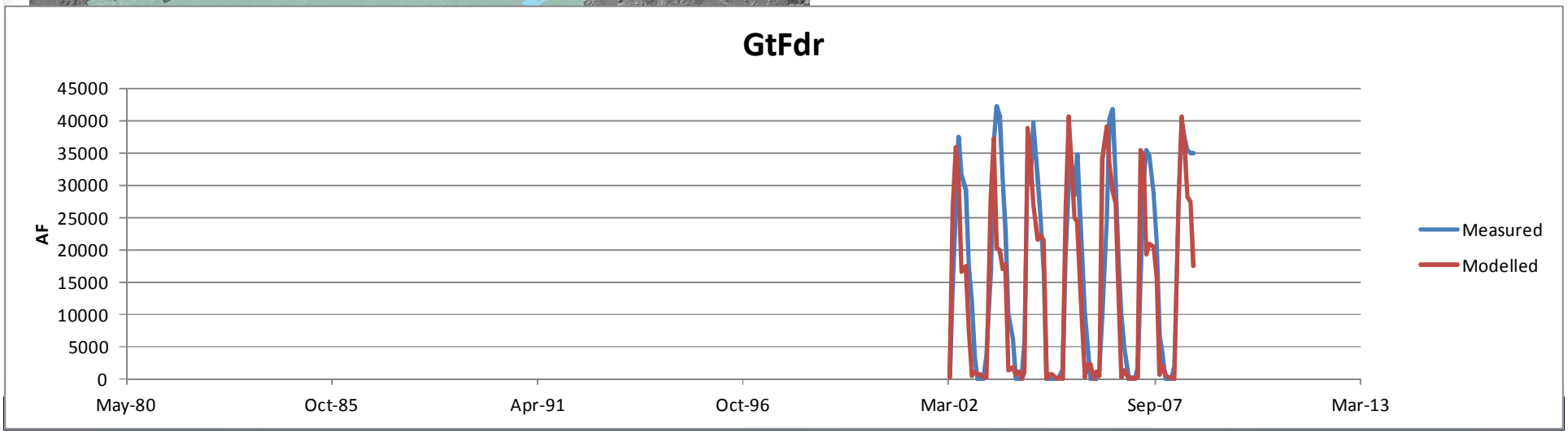


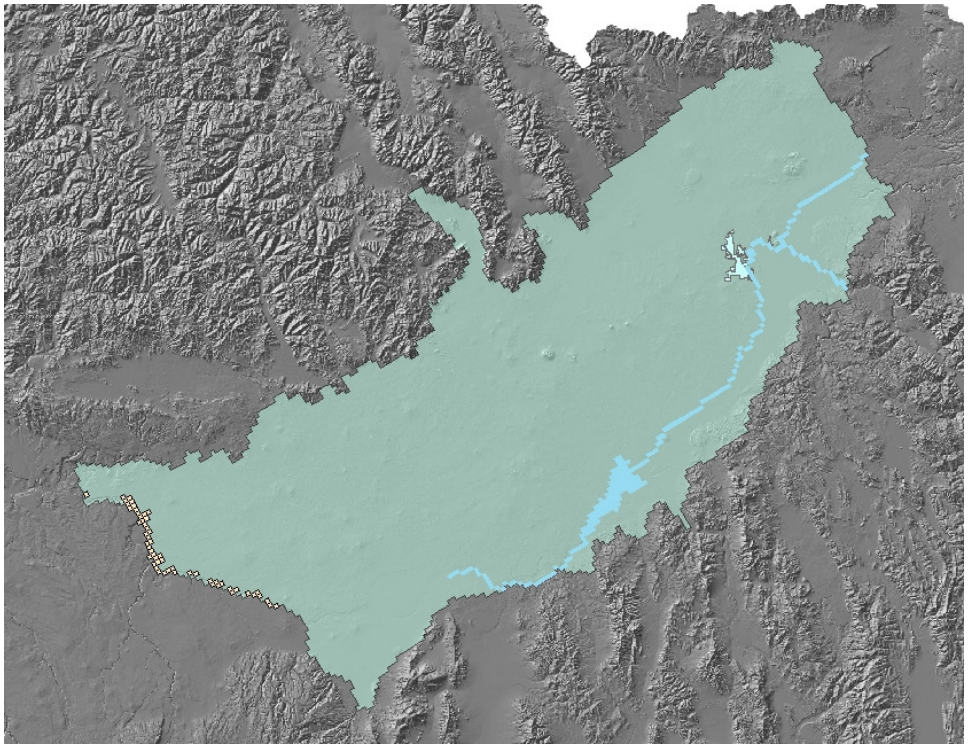


- Great Feeder Group returns

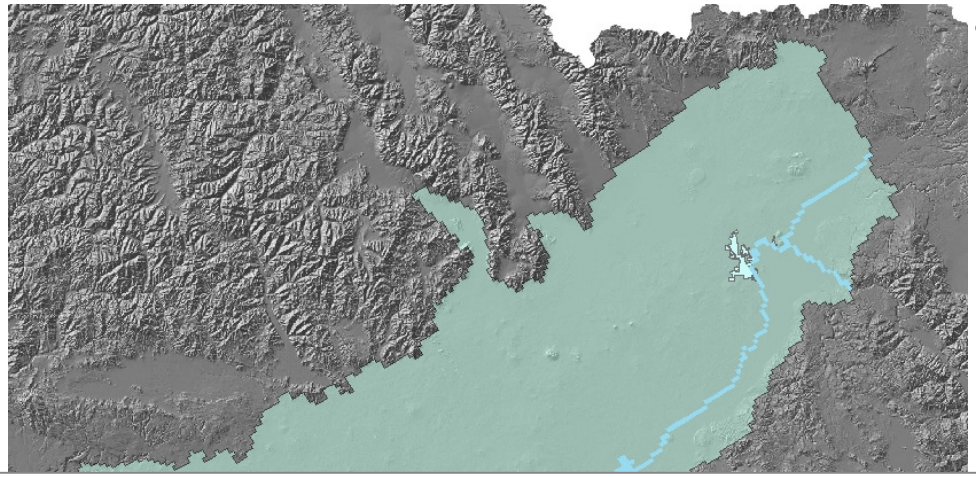


- Great Feeder Group returns

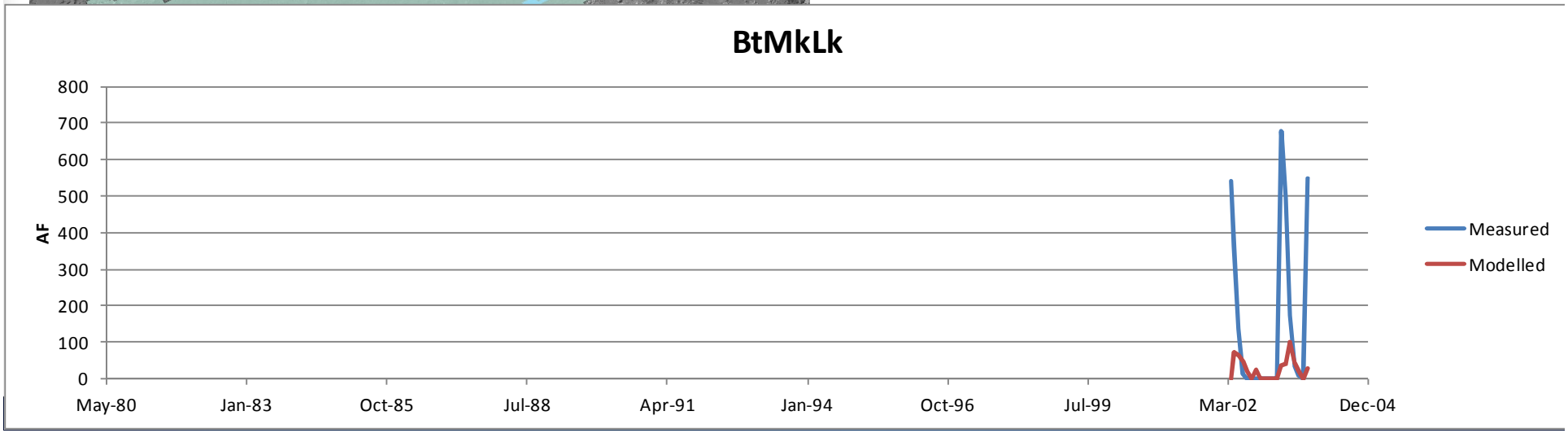


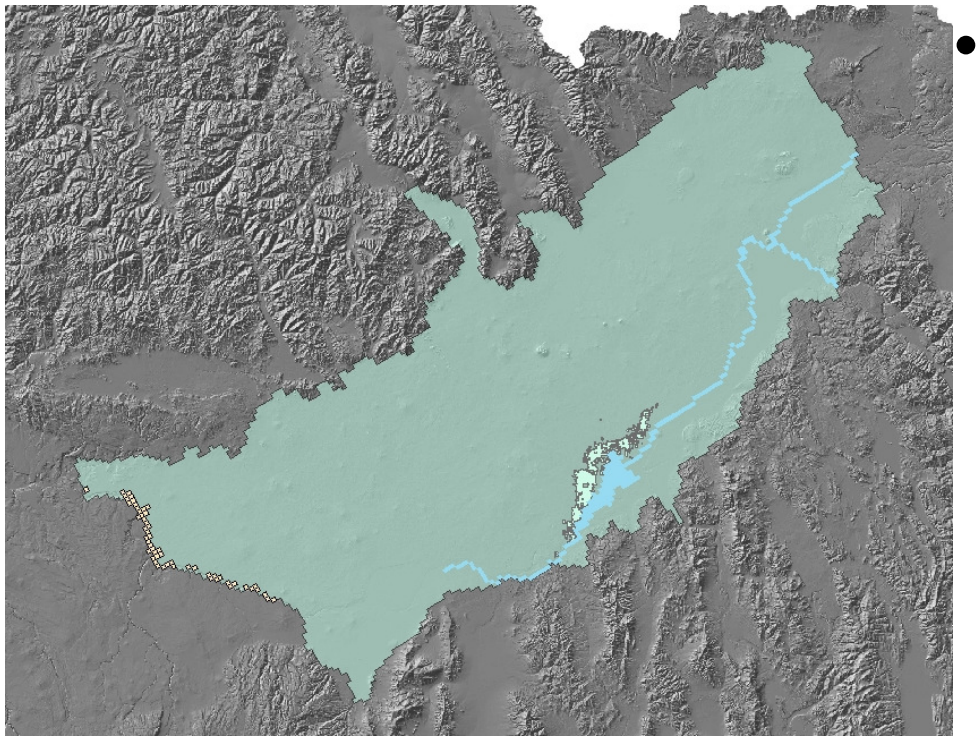


- Butte-Market Lake returns

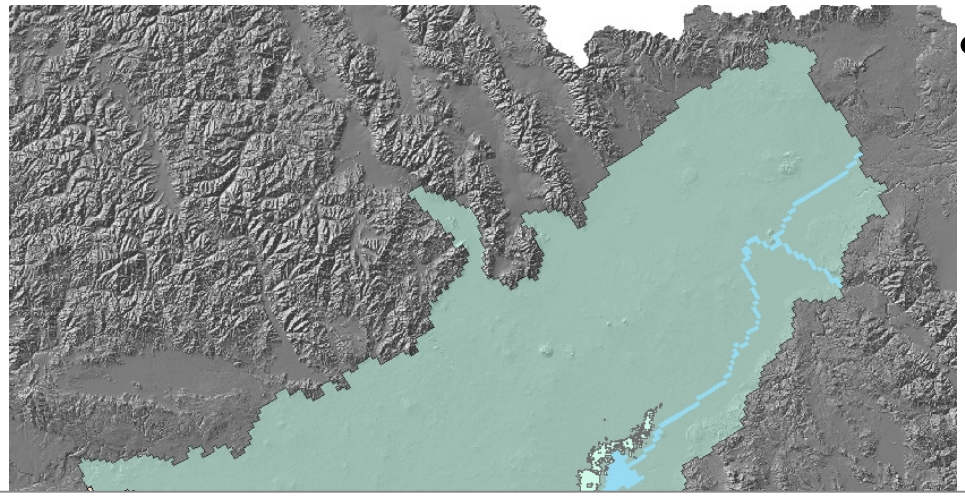


- Butte-Market Lake returns

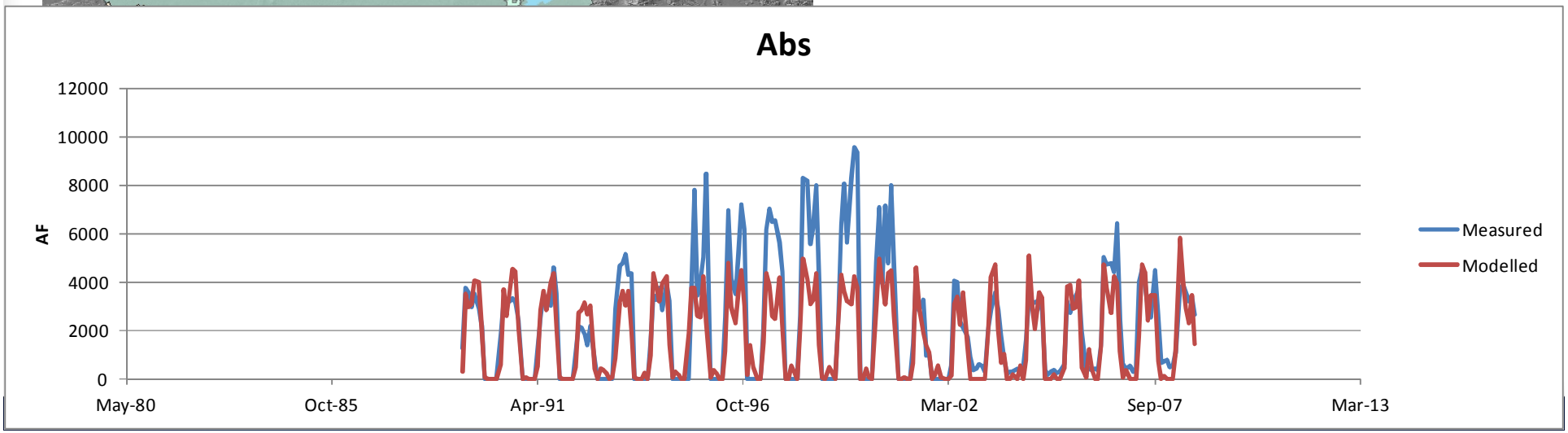


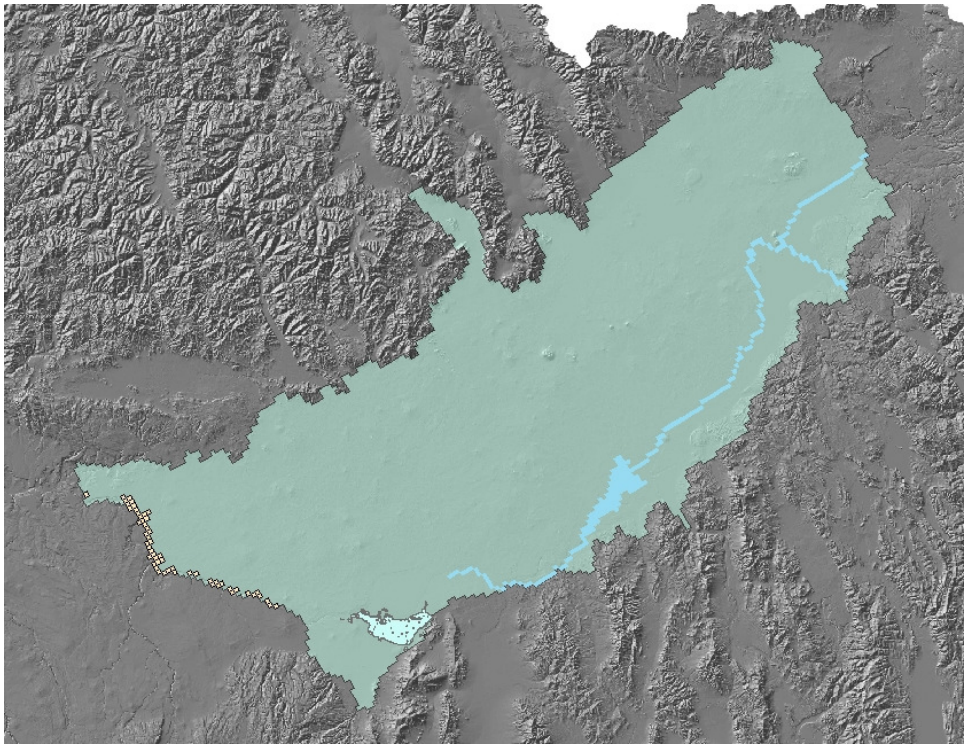


- Aberdeen-Springfield returns

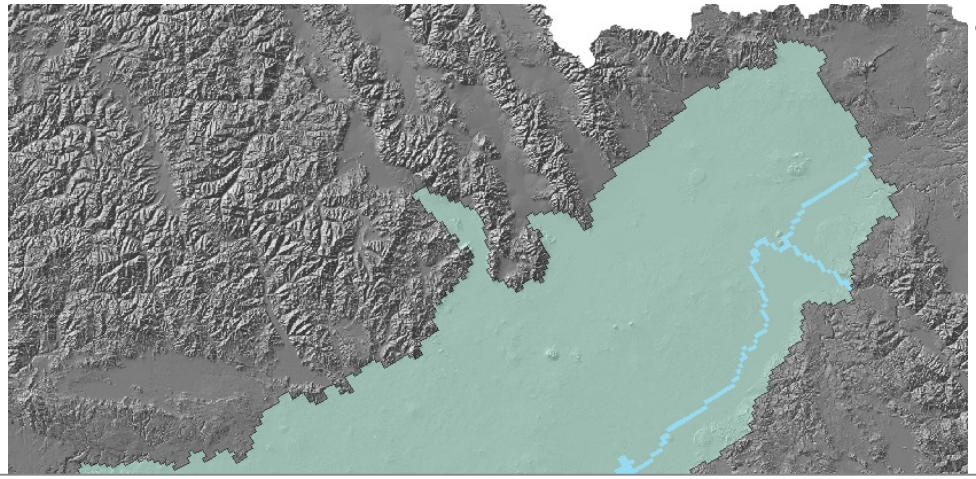


- Aberdeen-Springfield returns

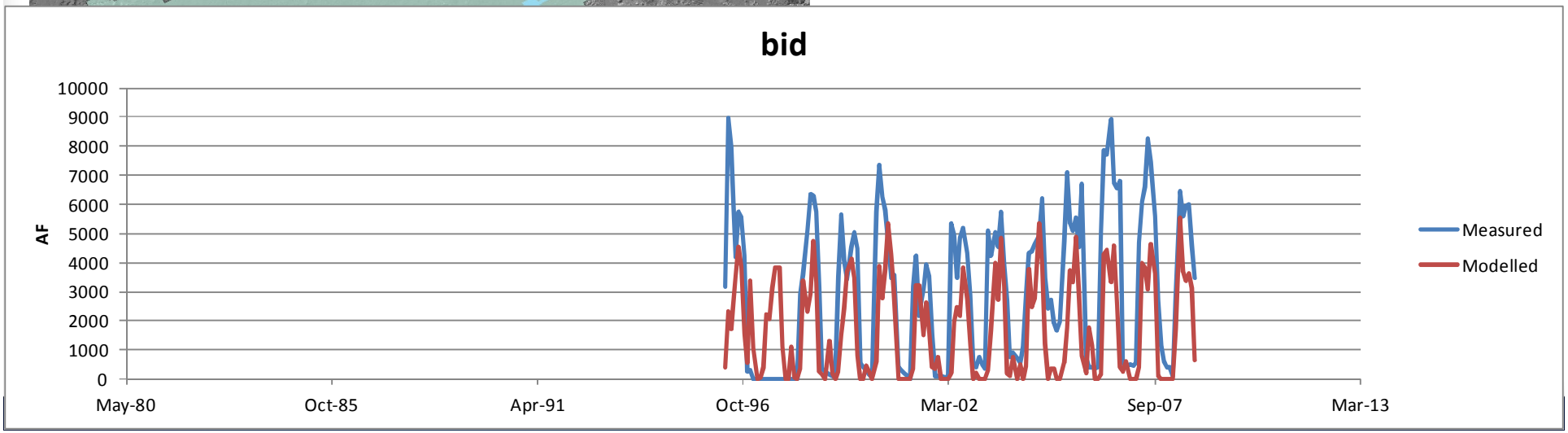


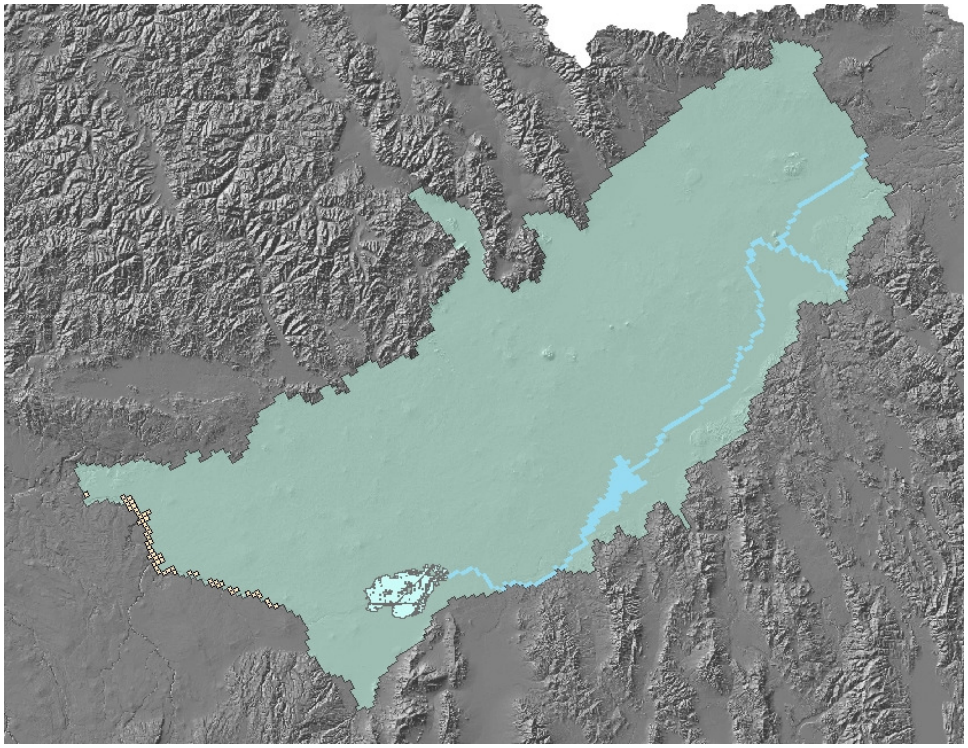


- Burley Irrigation District returns

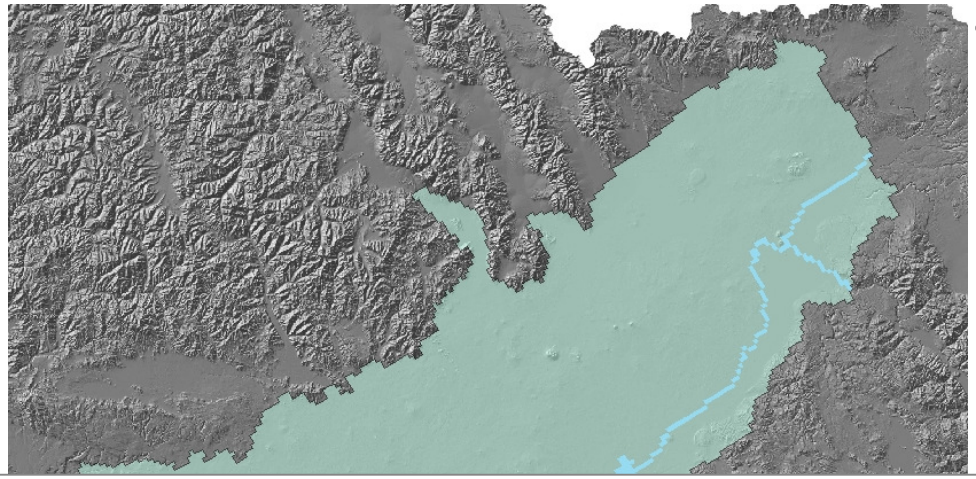


- Burley Irrigation District returns

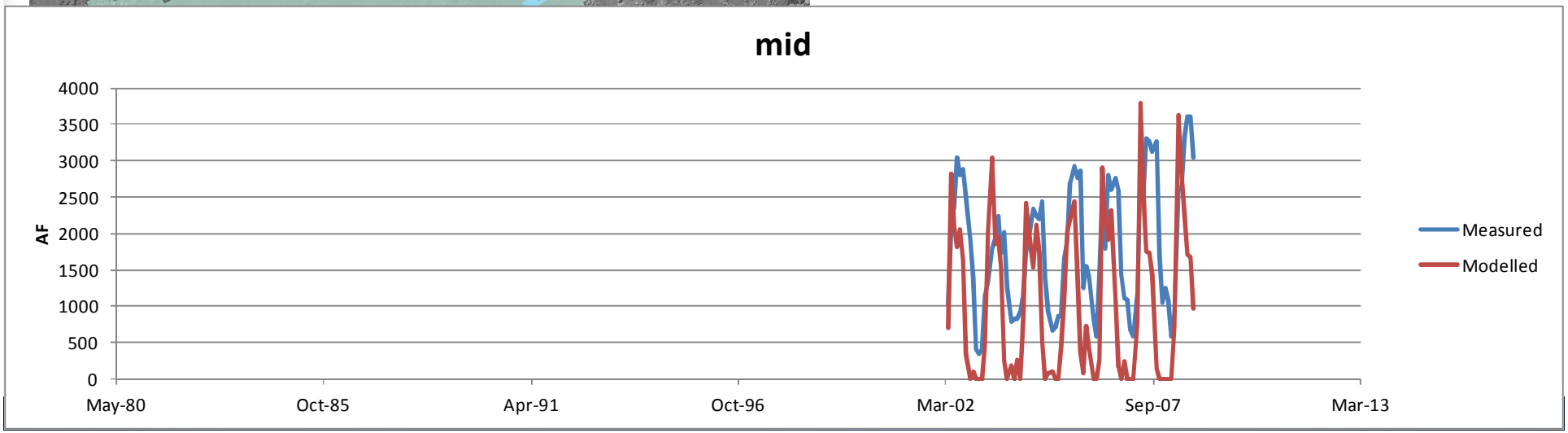


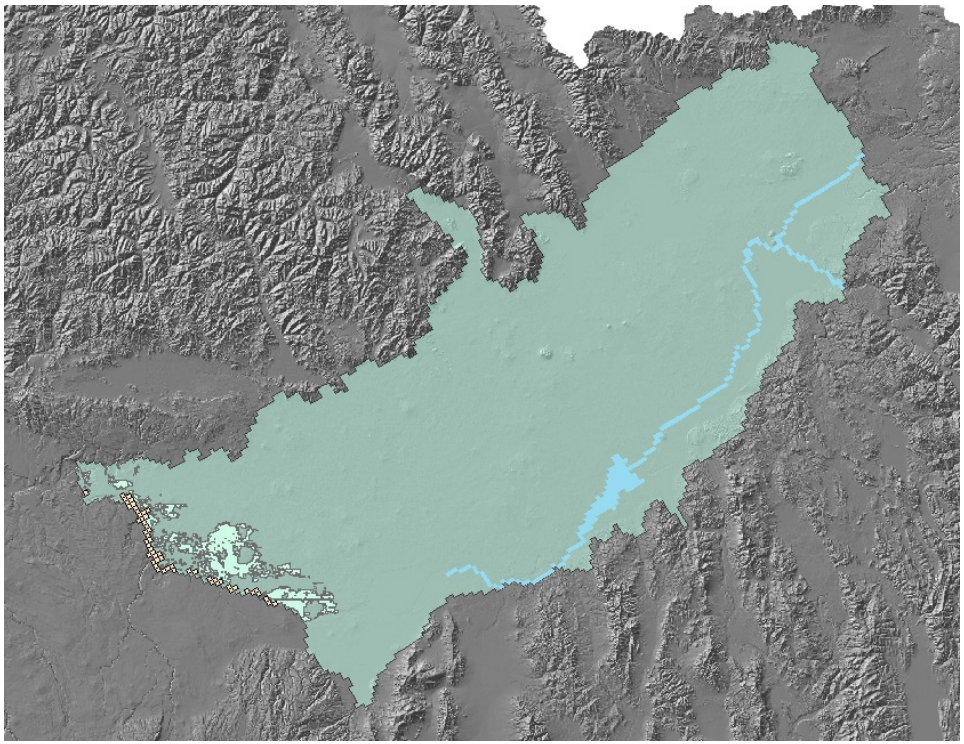


- Minidoka Irrigation District returns

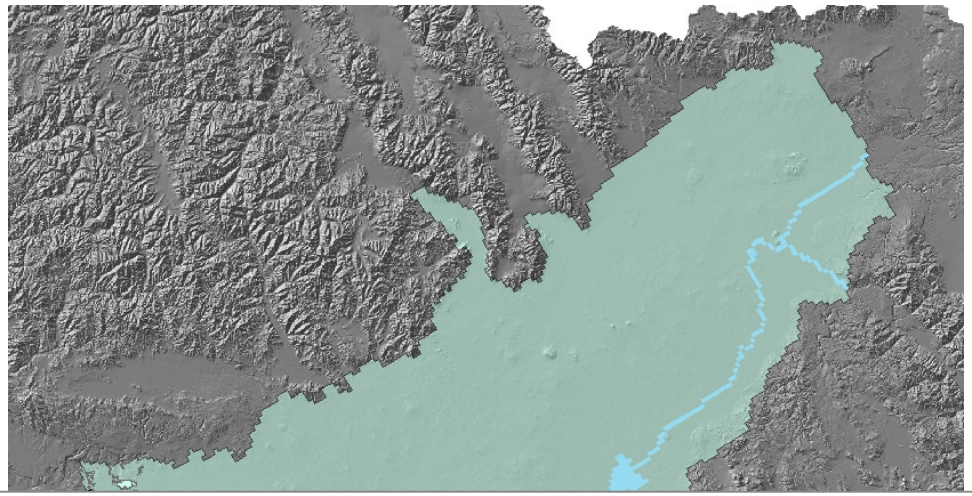


- Minidoka Irrigation District returns

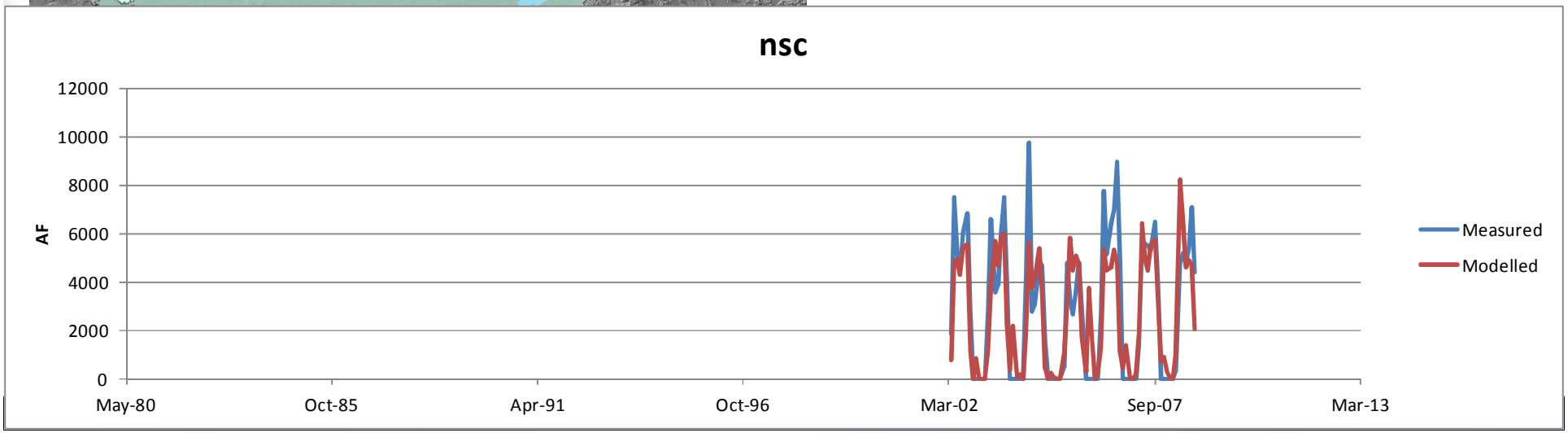


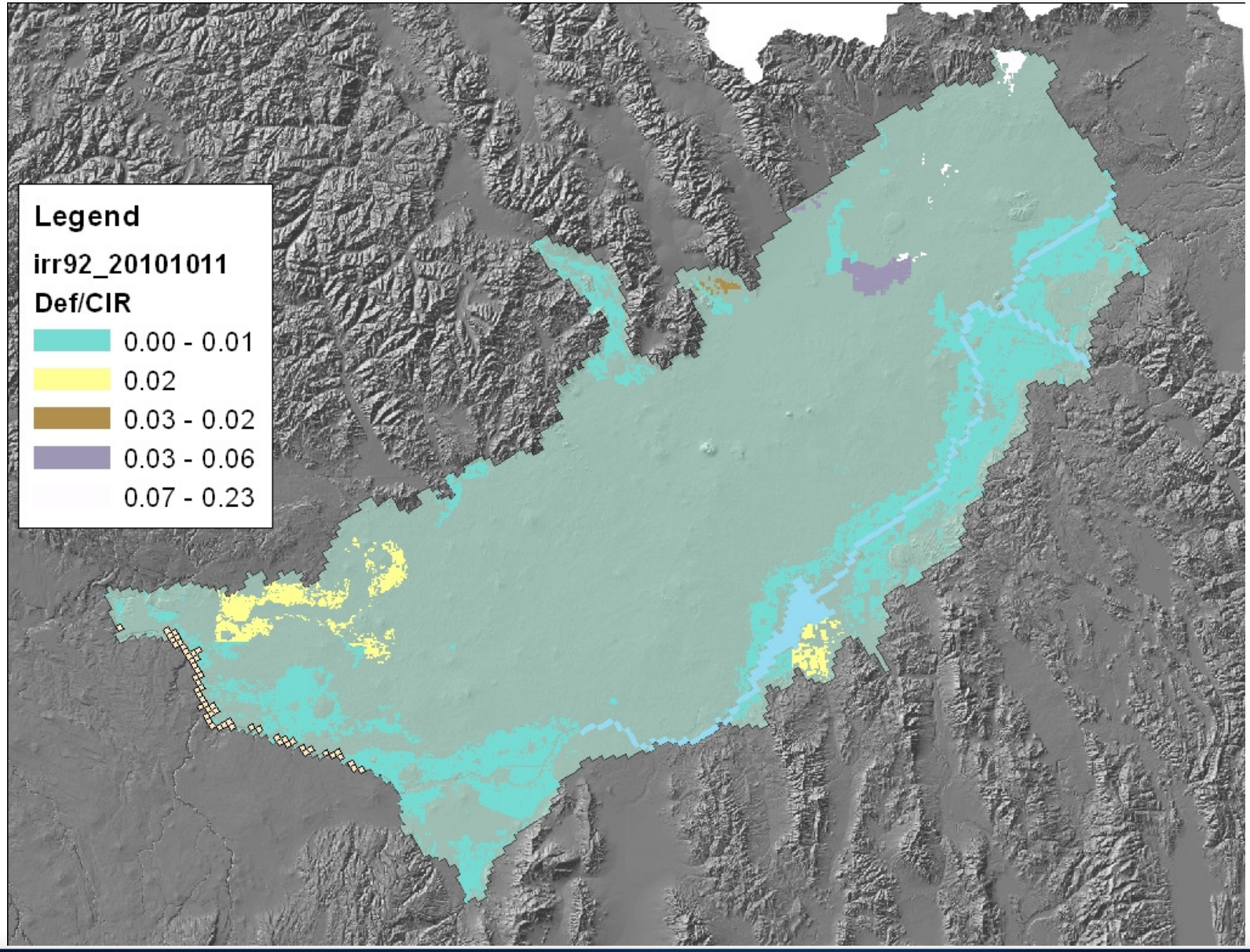


- North Side Canal Co returns

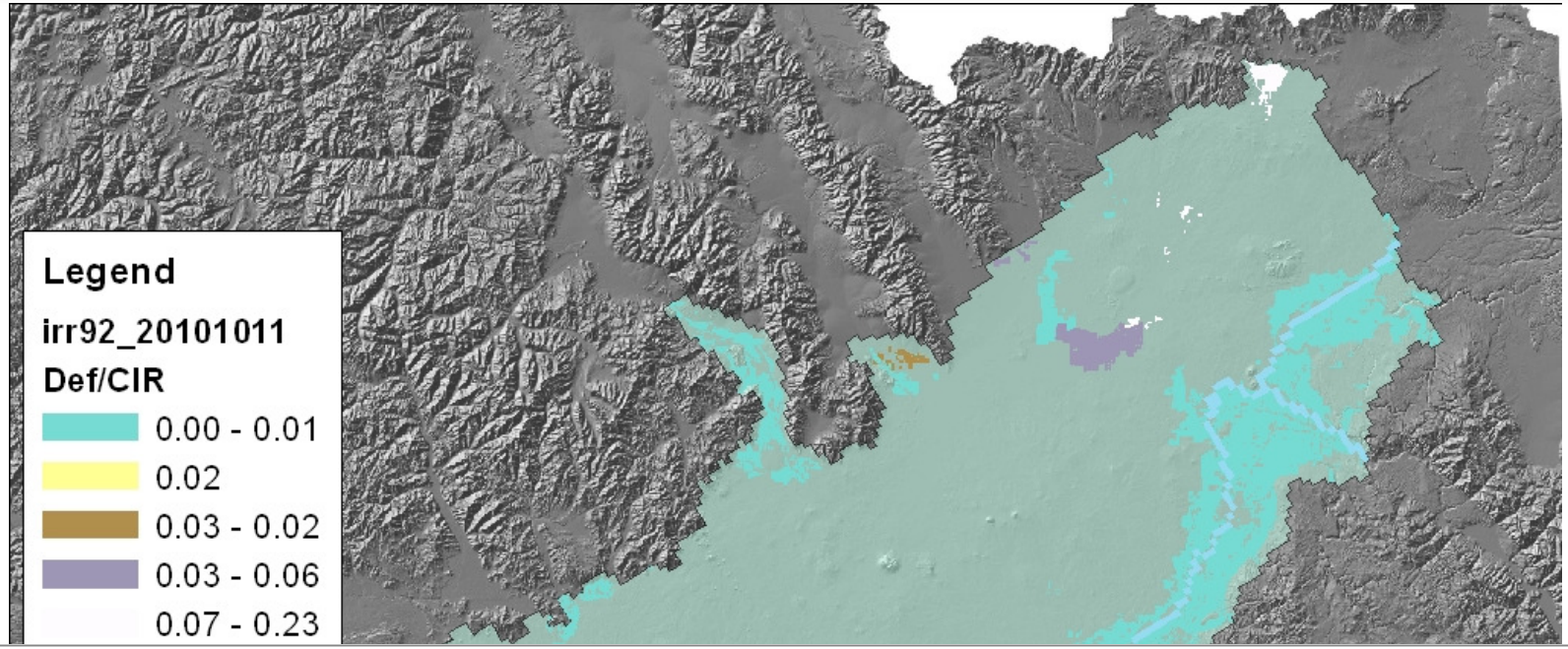


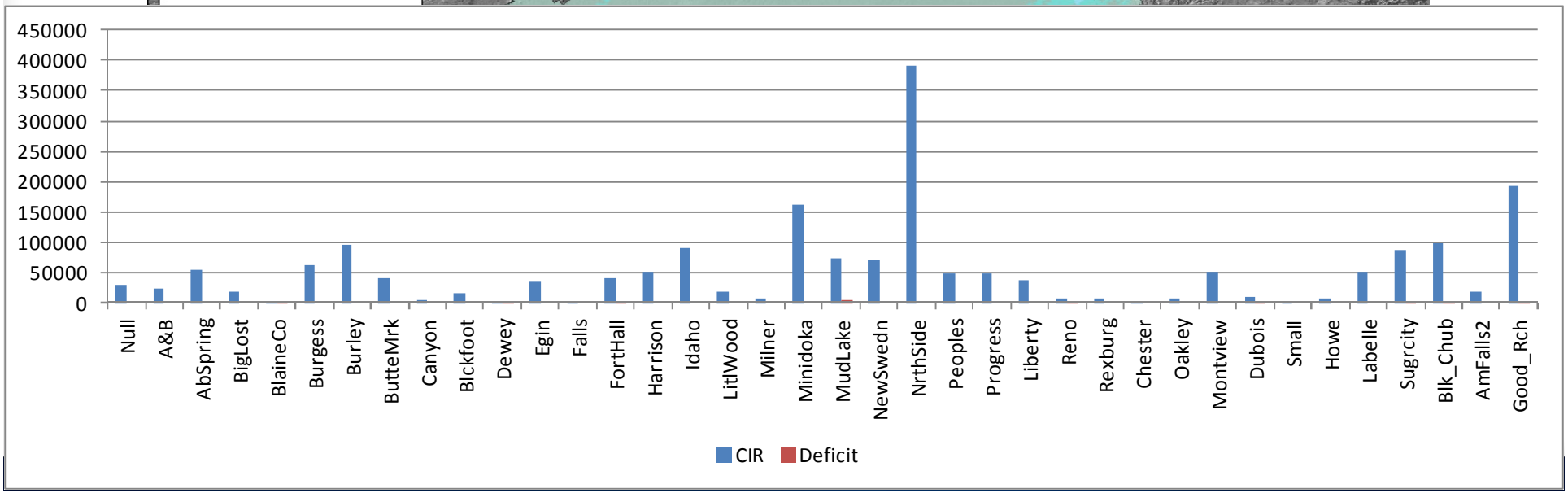
- North Side Canal Co returns



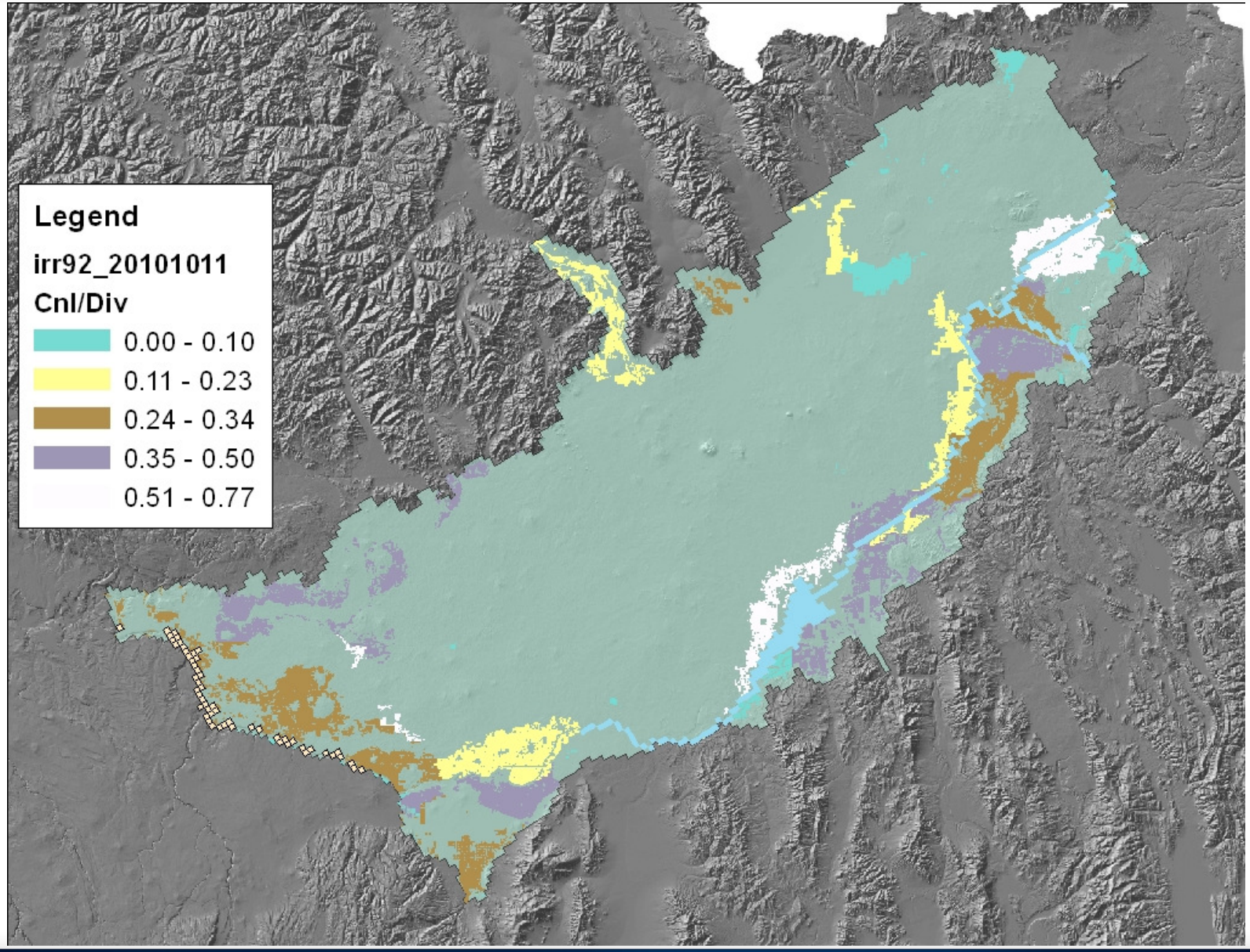

Legend
irr92_20101011
Def/CIR
0.00 - 0.01
0.02
0.03 - 0.02
0.03 - 0.06
0.07 - 0.23

IDAHO Department of Water Resources

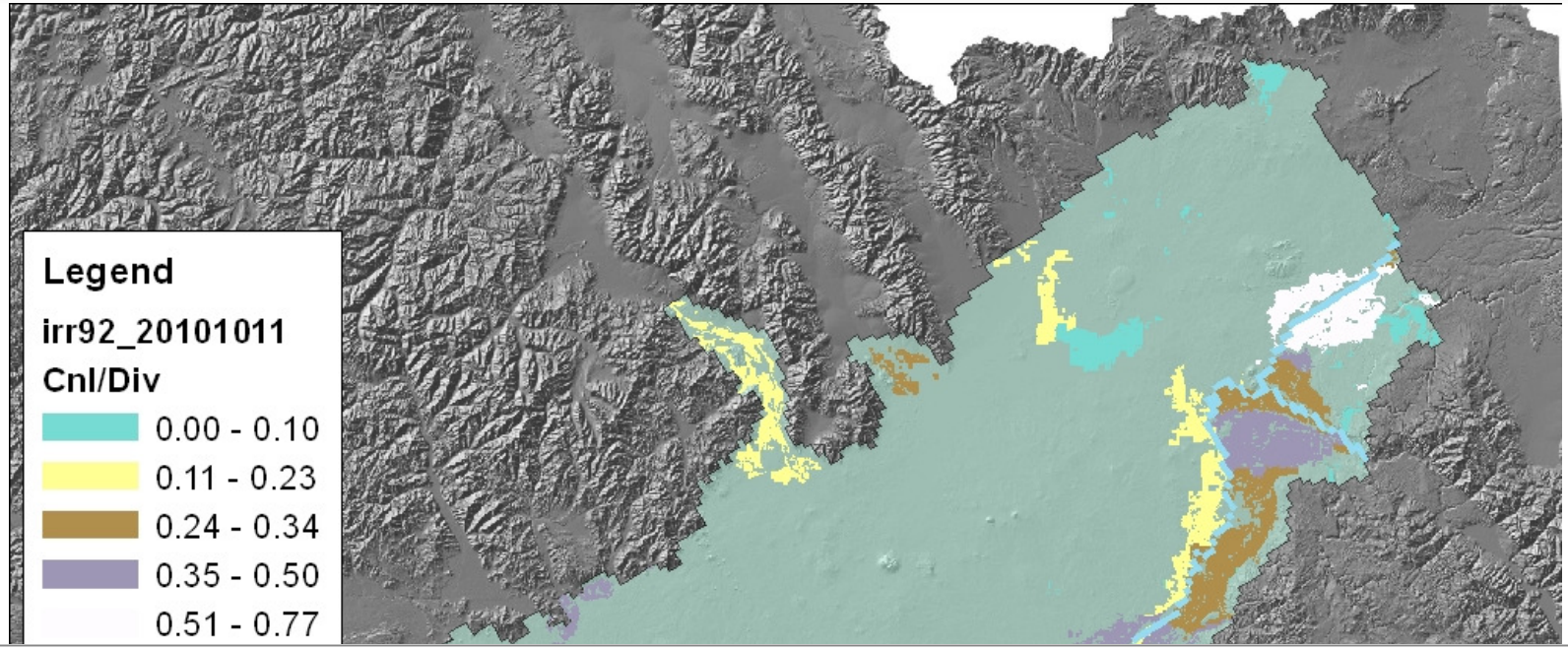


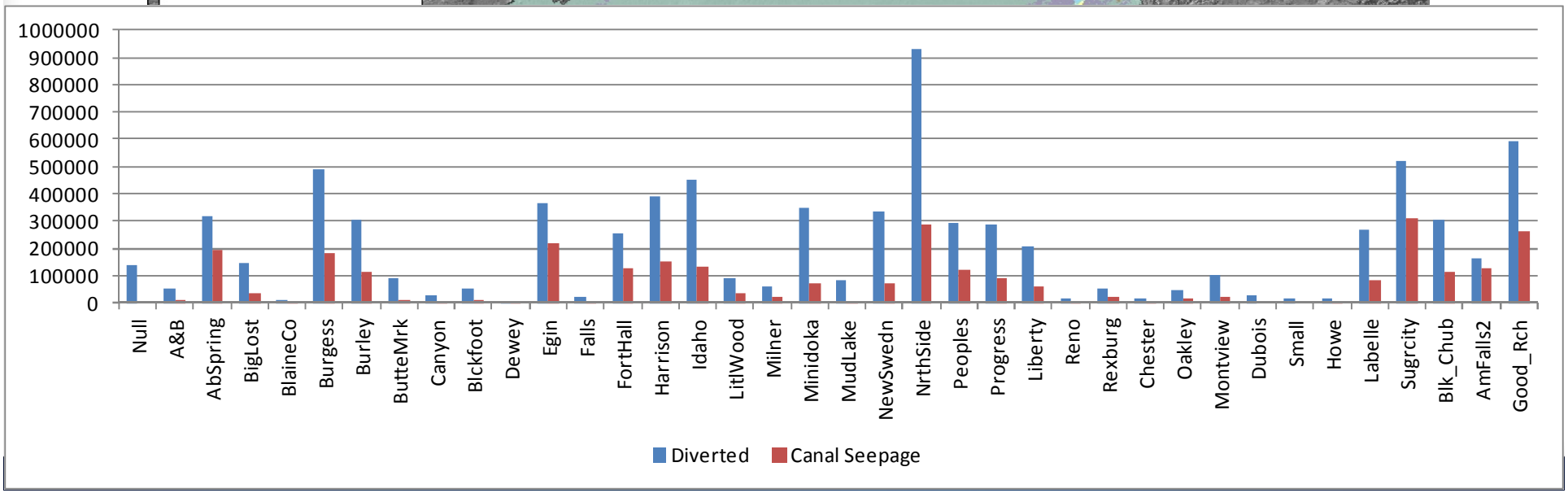


IDAHO Department of Water Resources



IDAHO Department of Water Resources





END