Calibration with E110712A, Jones as a Transient Target

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

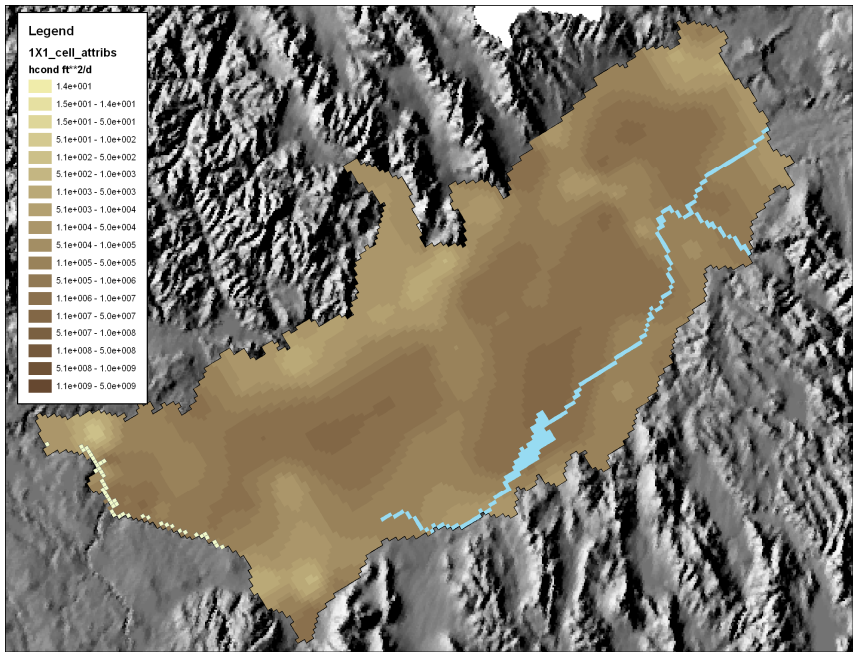
Calibration with E110712A, A B & C Springs and Return Flow Targets

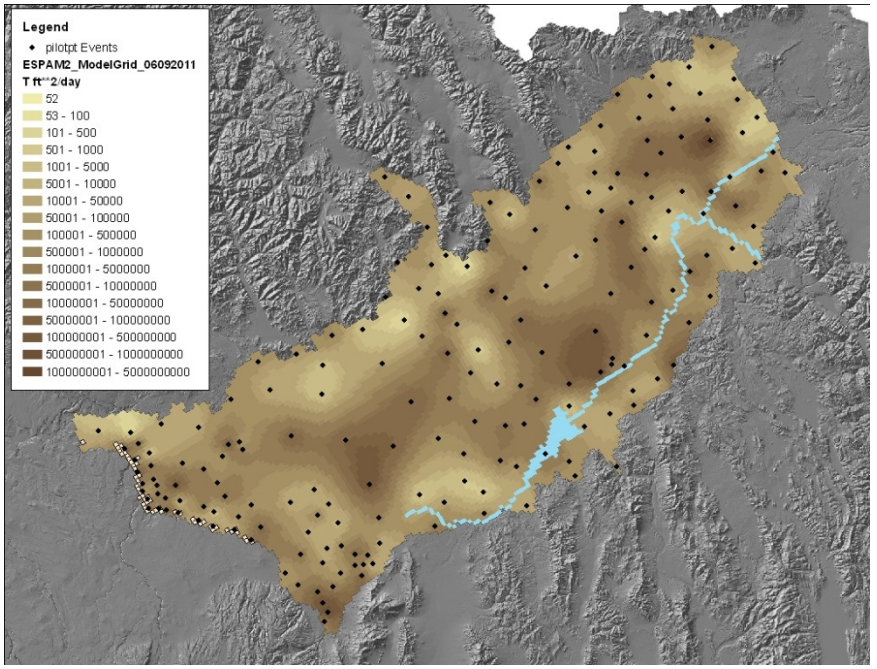
- Adjustable Parameters
  - Transmissivity
    - Pilot Points
      - 1e-10 – 1e+10
  - Specific Yield
    - Pilot Points
      - 0.01 – 0.30
  - Riverbed Conductance
    - By reach
      - 1.0 – 1e+10
  - Drain Conductance
    - By drain cell
      - Up to 2 drain cells per model cell
      - 1e-10 - 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

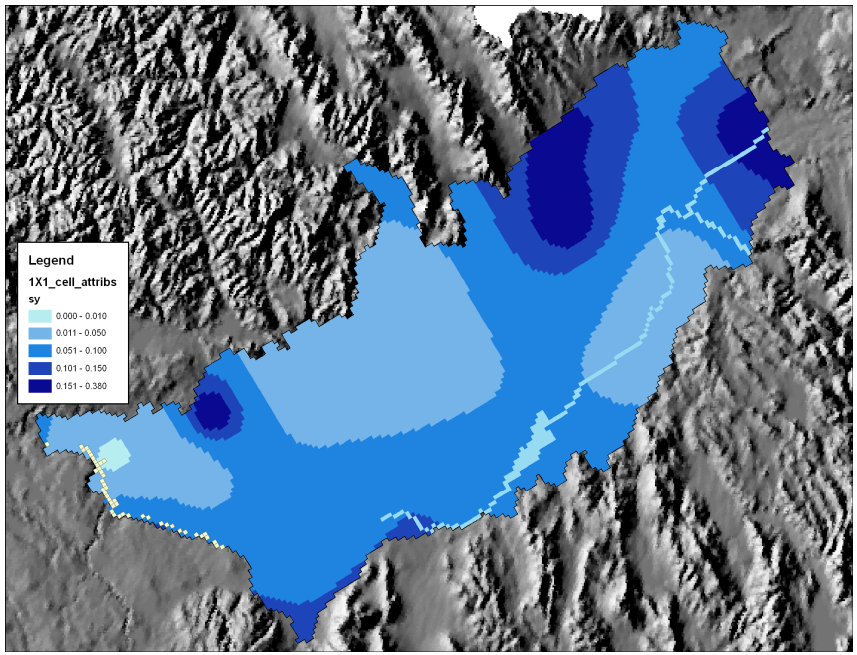
- Adjustable Parameters (cont)
  - On Farm Parameters
    - EffSp
      - Fixed 0.85
    - EffGr
      - Fixed 0.8
    - DPin
      - 0.98 – 0.6
    - DPex
      - 0.98 – 0.6
    - Entities with no returns DPin and DPex fixed at 1.0

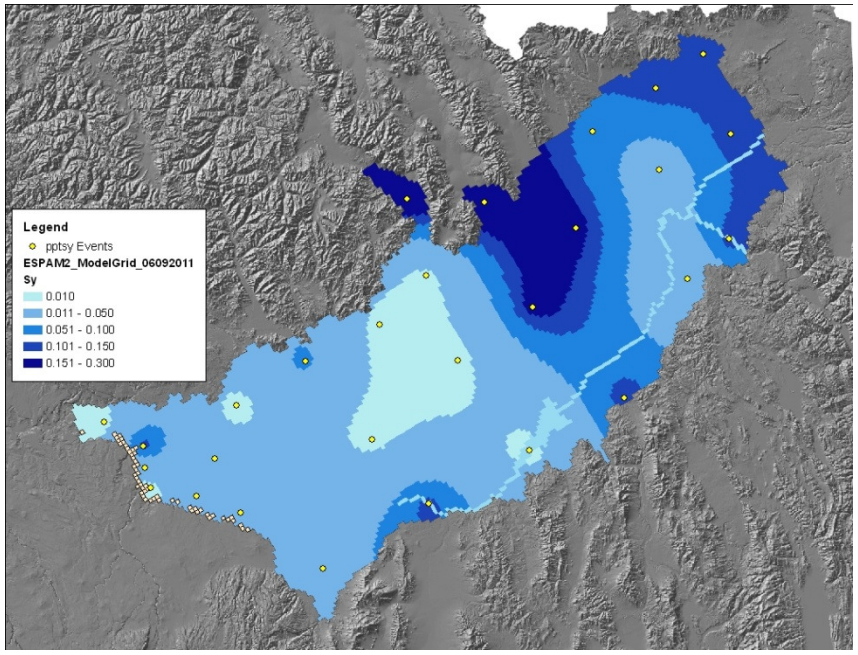
V 1.1


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

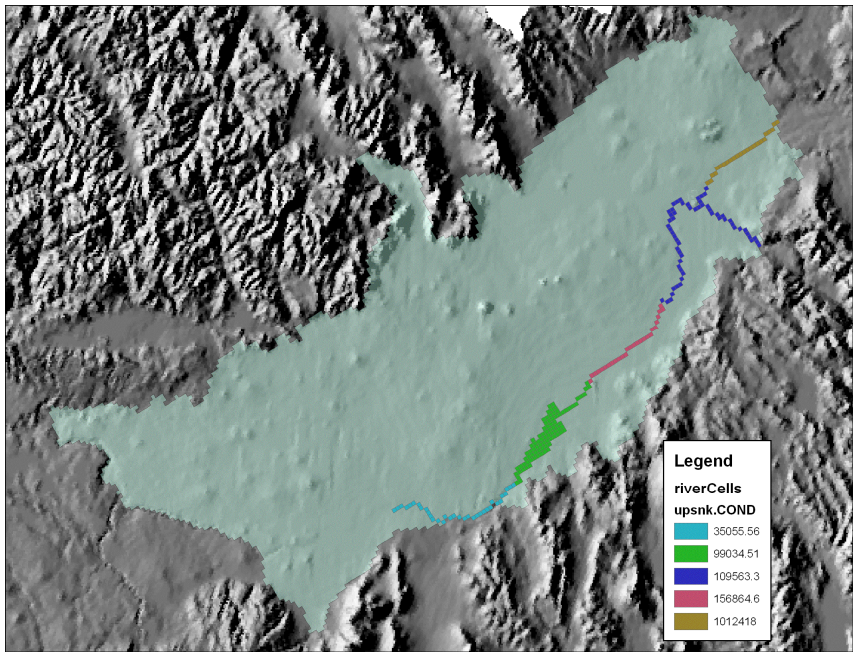

Legend
pilotpt Events
ESPAM2_ModelGrid_06092011
T ft**2/day
52
53 - 100
101 - 500
501 - 1000
1001 - 5000
5001 - 10000
10001 - 50000
50001 - 100000
100001 - 500000
500001 - 1000000
1000001 - 5000000
5000001 - 10000000
10000001 - 50000000
50000001 - 100000000
100000001 - 500000000
500000001 - 1000000000
1000000001 - 5000000000

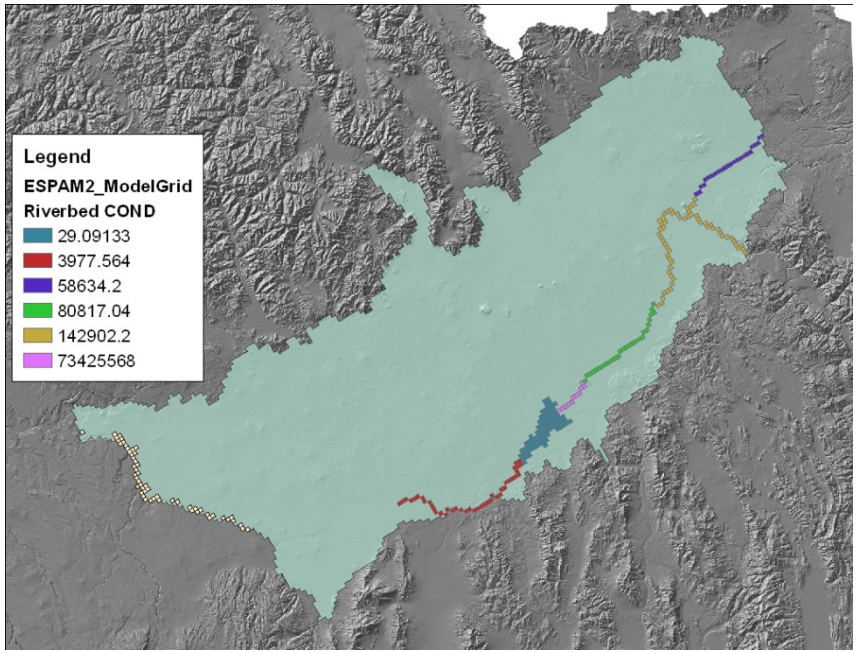
V 1.1


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
Riverbed COND
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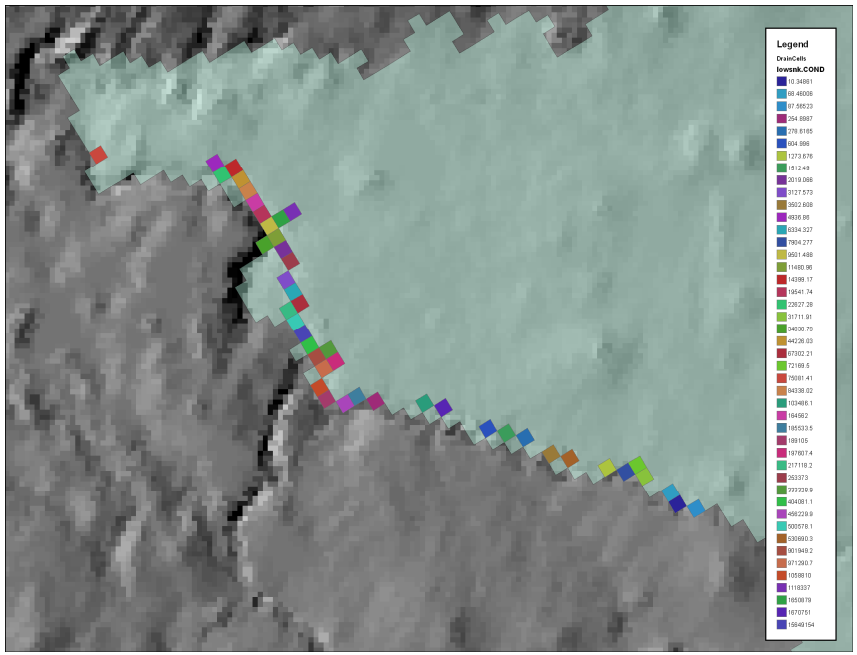
3977.564
58634.2
80817.04
142902.2
73425568

V 1.1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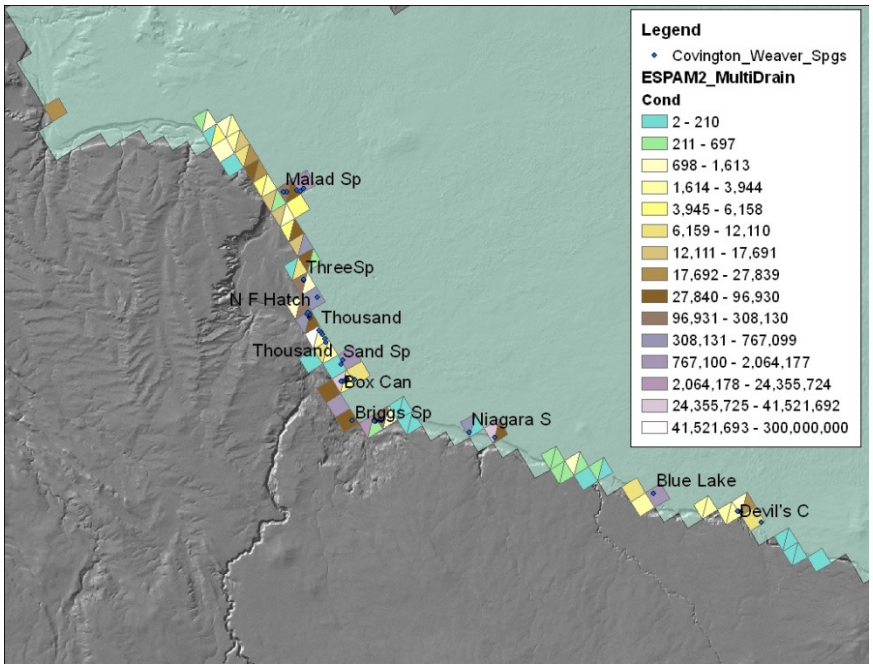
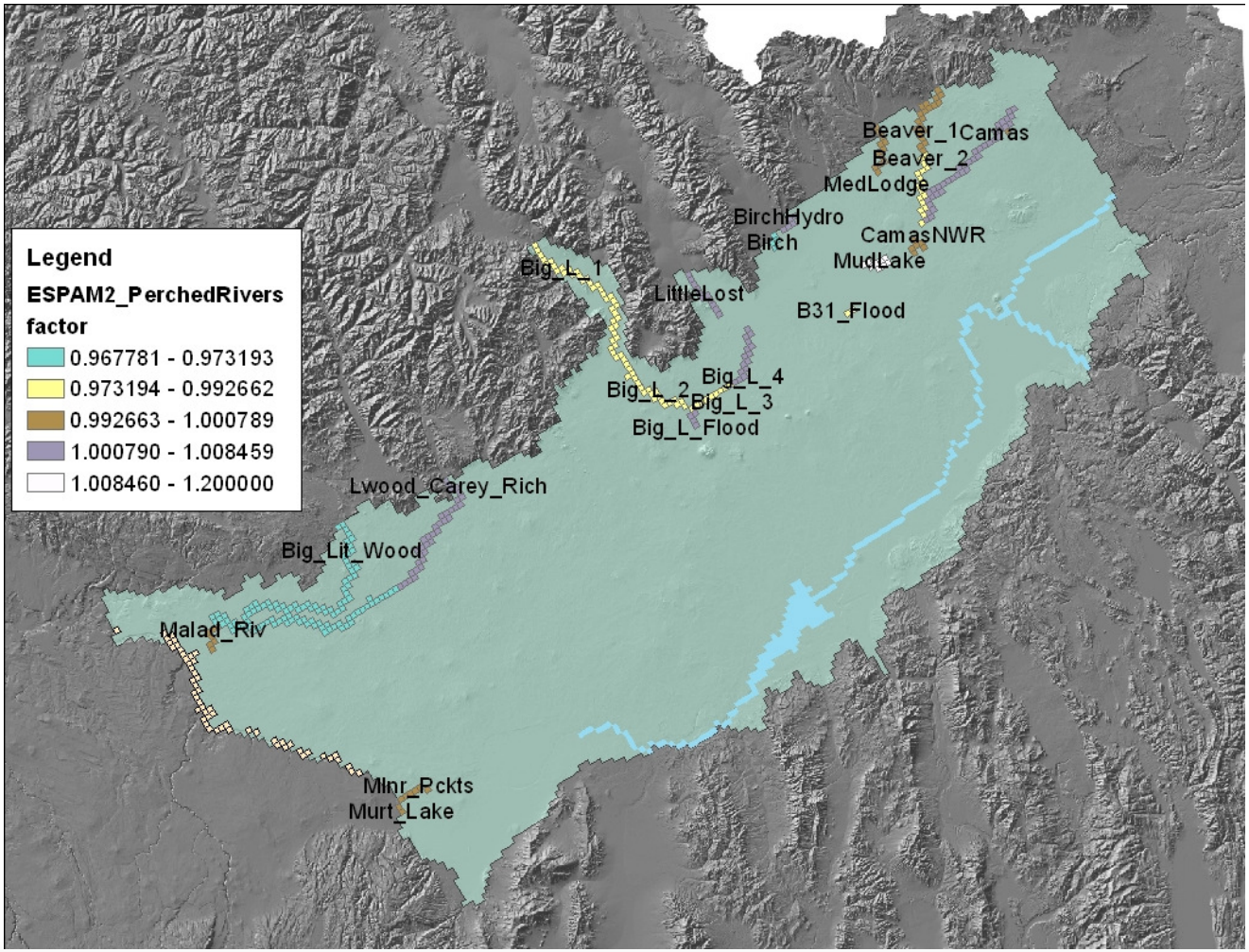
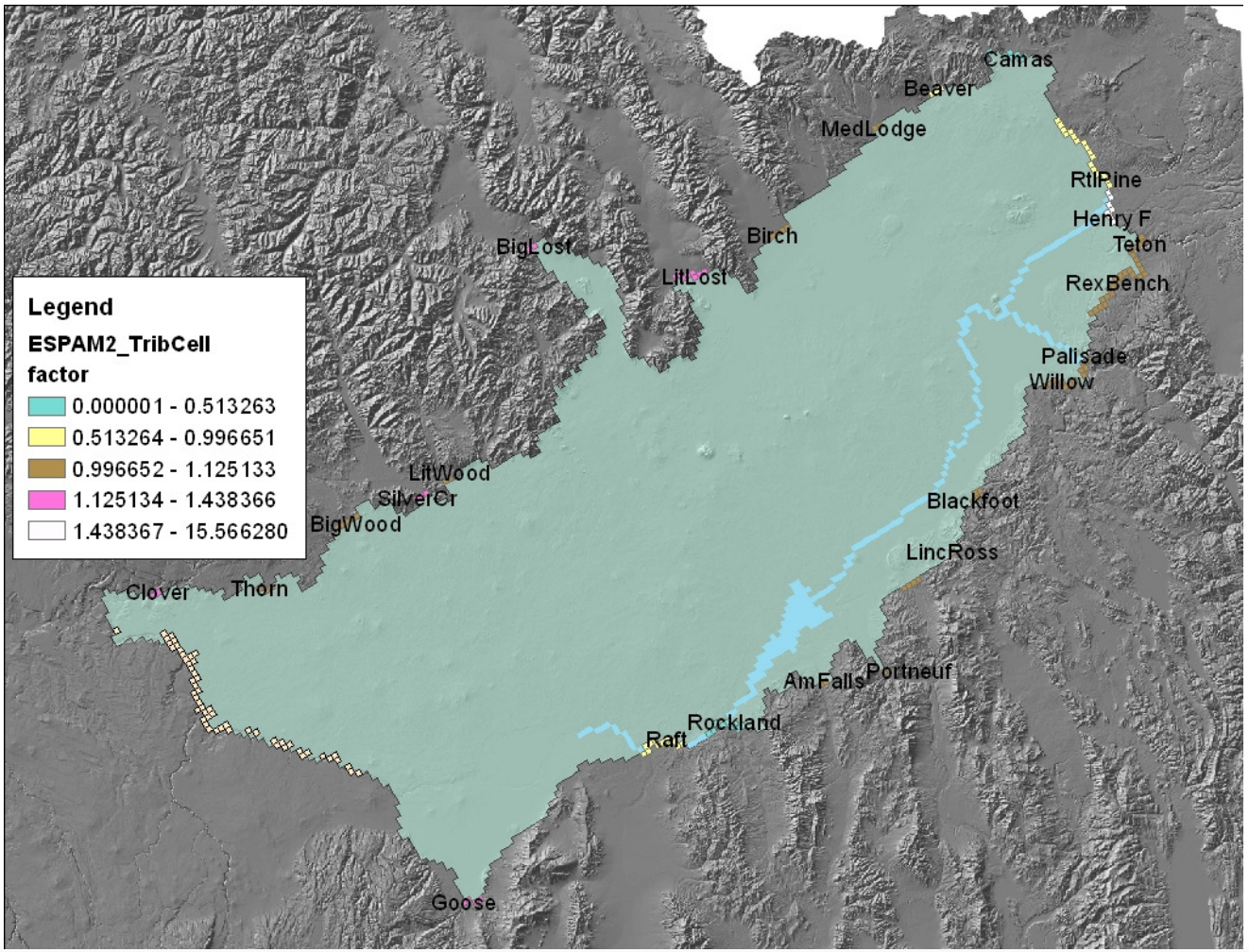
DrainCells
lowsnk.COND


Legend
Covington_Weaver_Spgs
ESPAM2_MultiDrain
Cond
2 - 210
211 - 697
698 - 1,613
1,614 - 3,944
3,945 - 6,158
6,159 - 12,110
12,111 - 17,691
17,692 - 27,839
27,840 - 96,930
96,931 - 308,130
308,131 - 767,099
767,100 - 2,064,177
2,064,178 - 24,355,724
24,355,725 - 41,521,692
41,521,693 - 300,000,000
Malad Sp
ThreeSp
N F Hatch
Thousand
Thousand Sand Sp
Box Can
Briggs Sp
Niagara S
Blue Lake
Devil's C

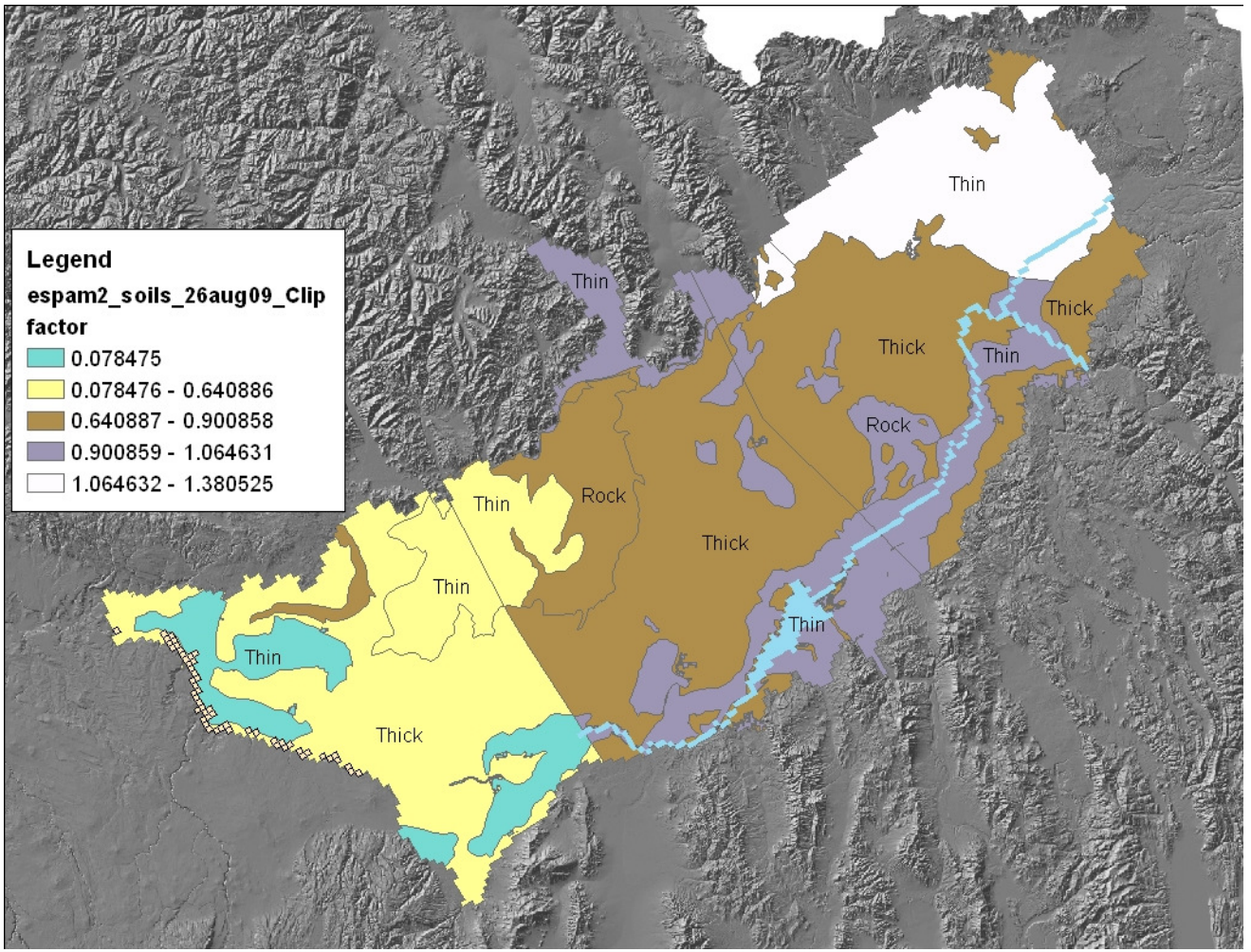
Perched River Seepage



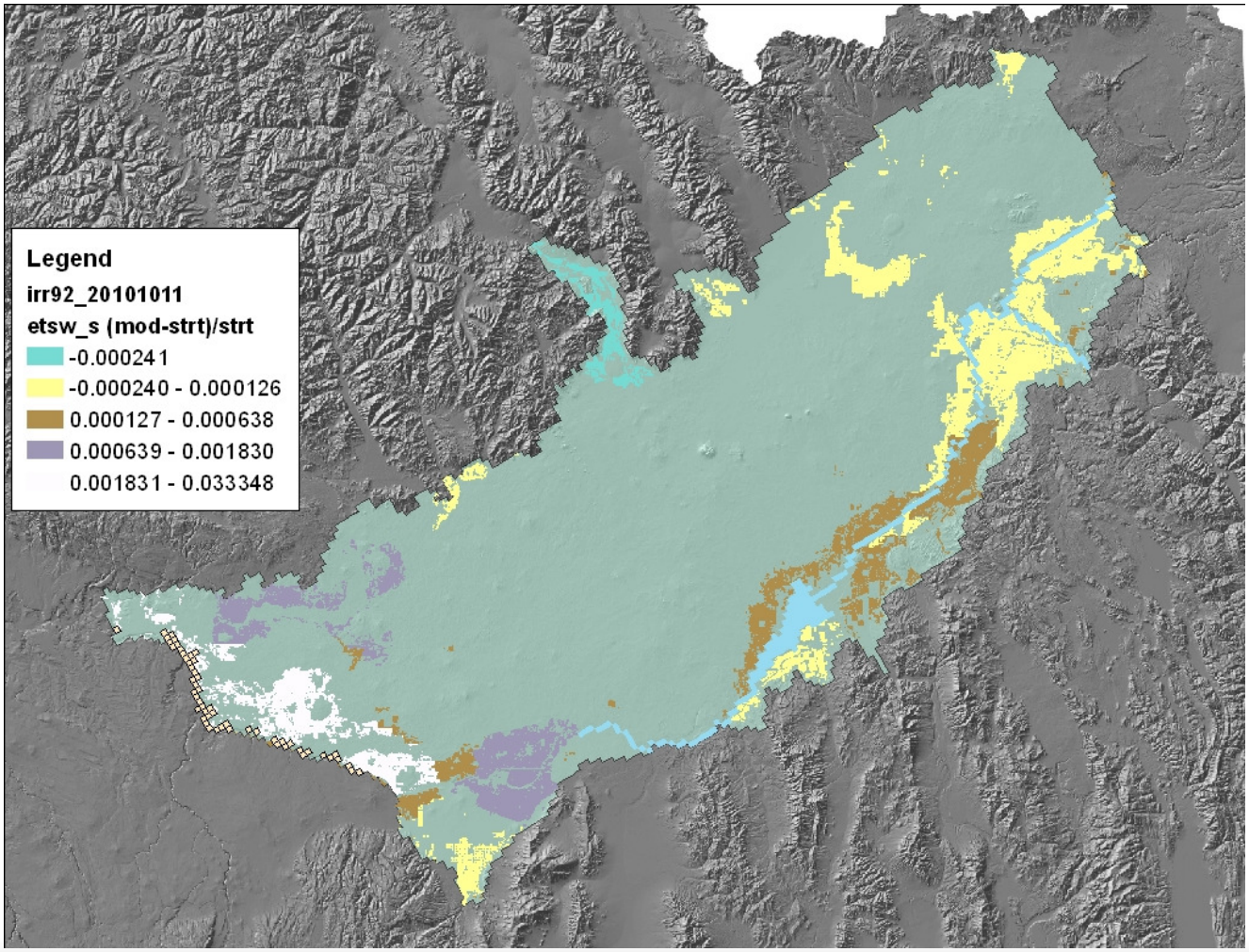
Tributary Underflow



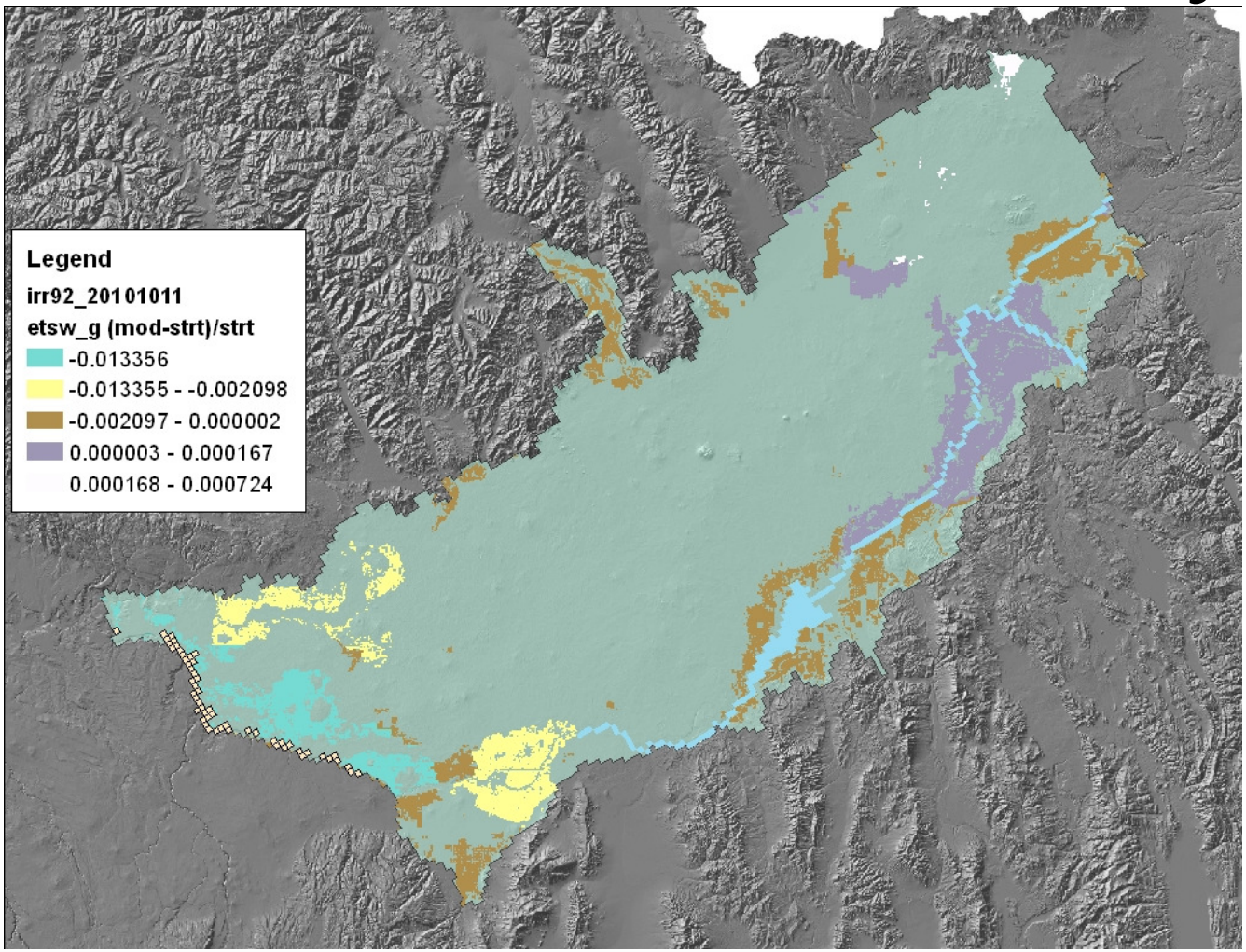
Non-irrigated Recharge



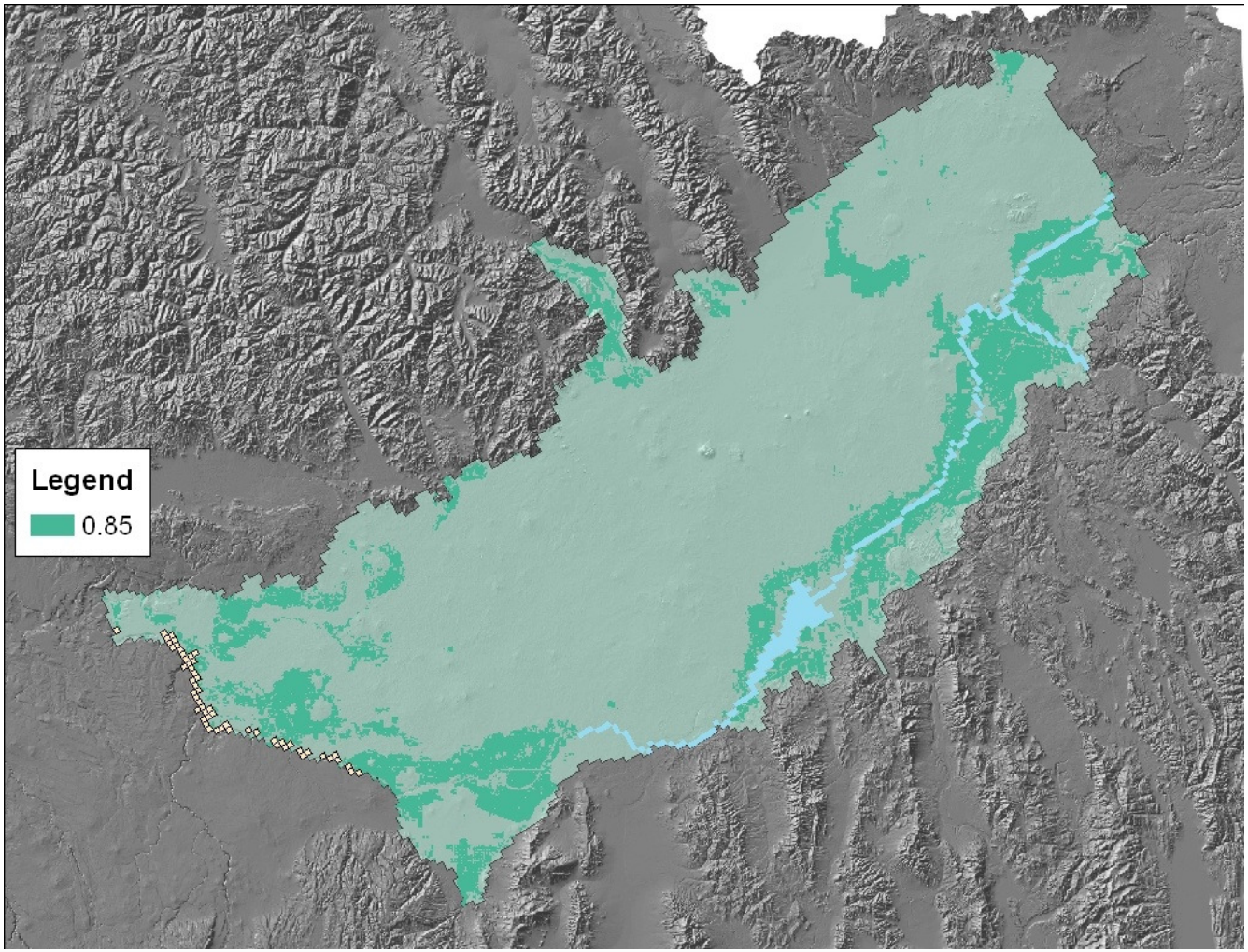
ET Surface Water Sprinkler



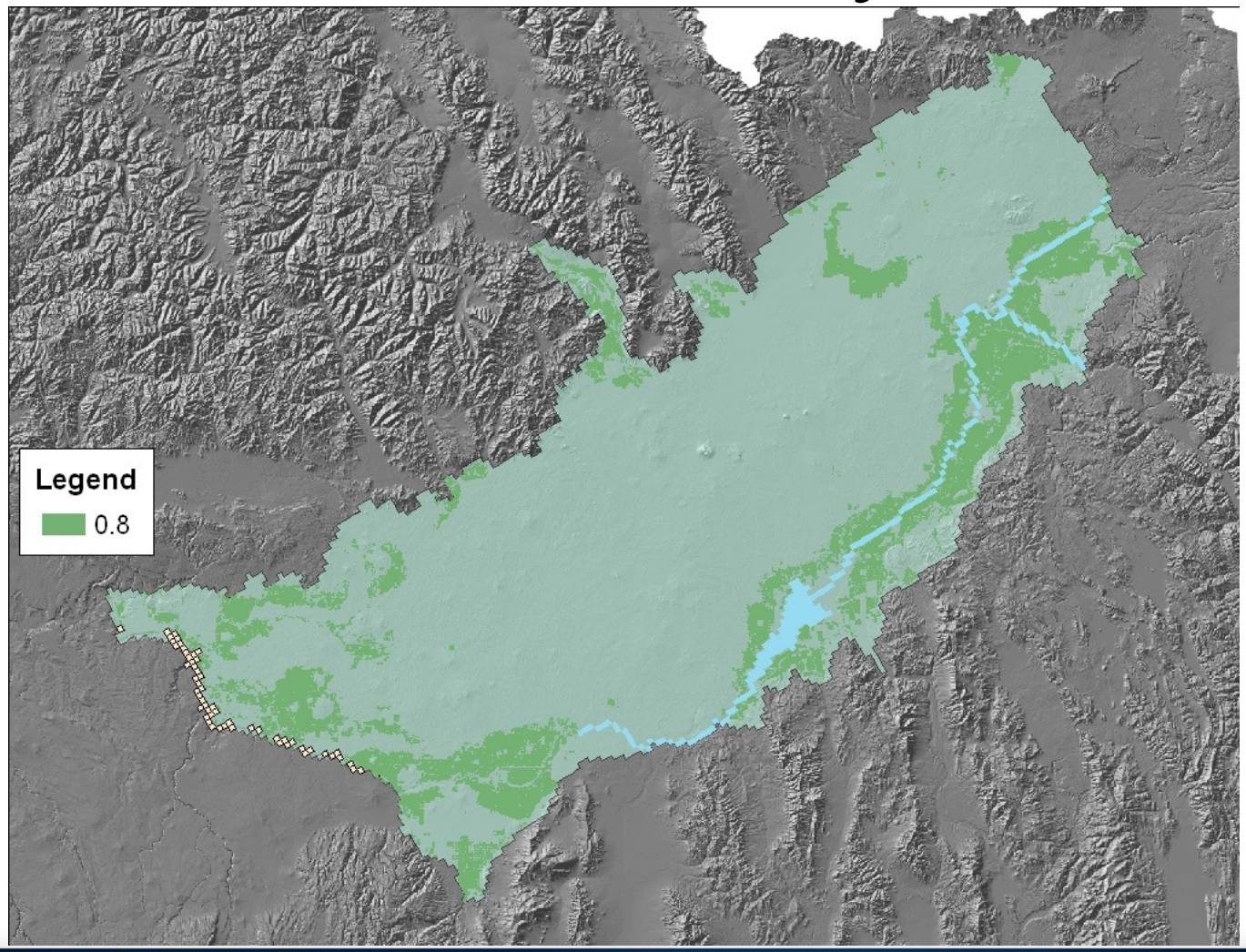
ET Surface Water Gravity

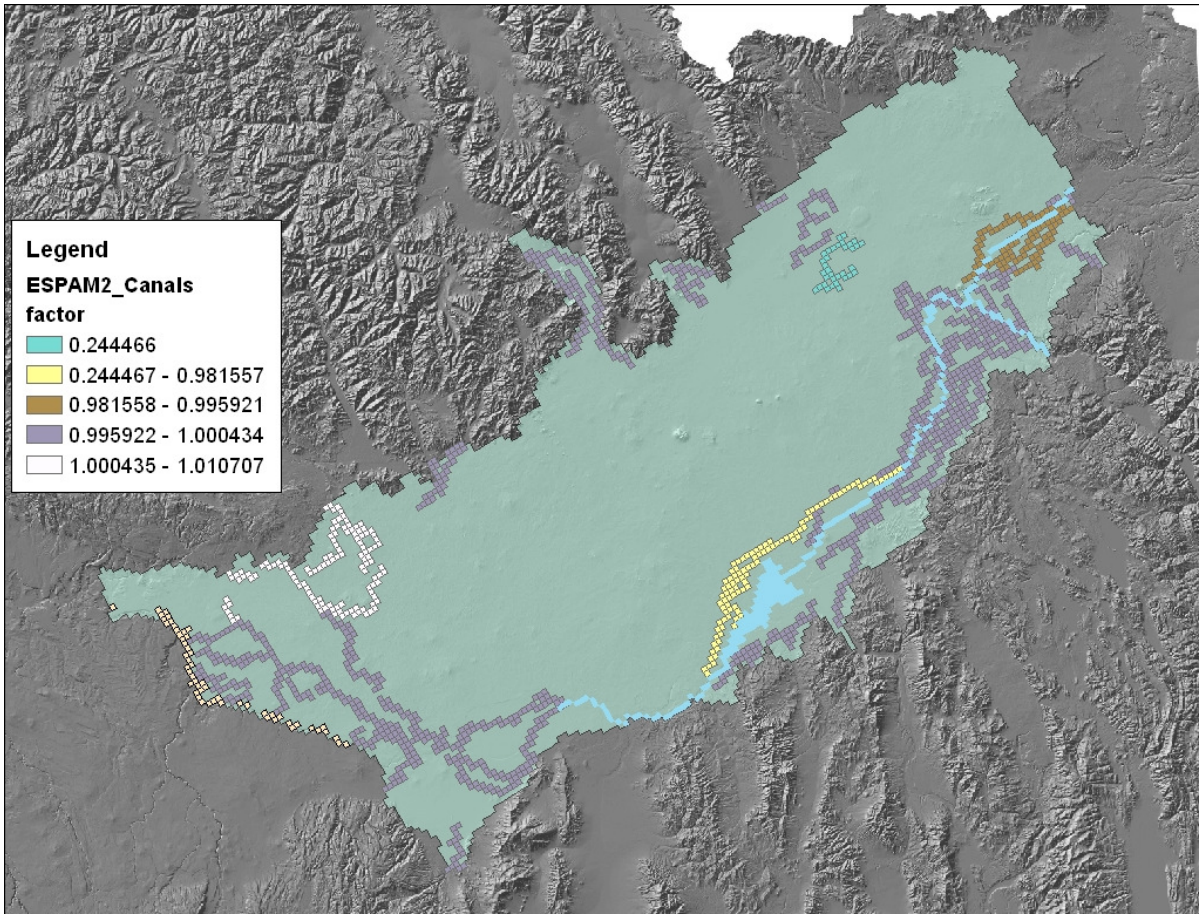


Surface Water Sprinkler Efficiency

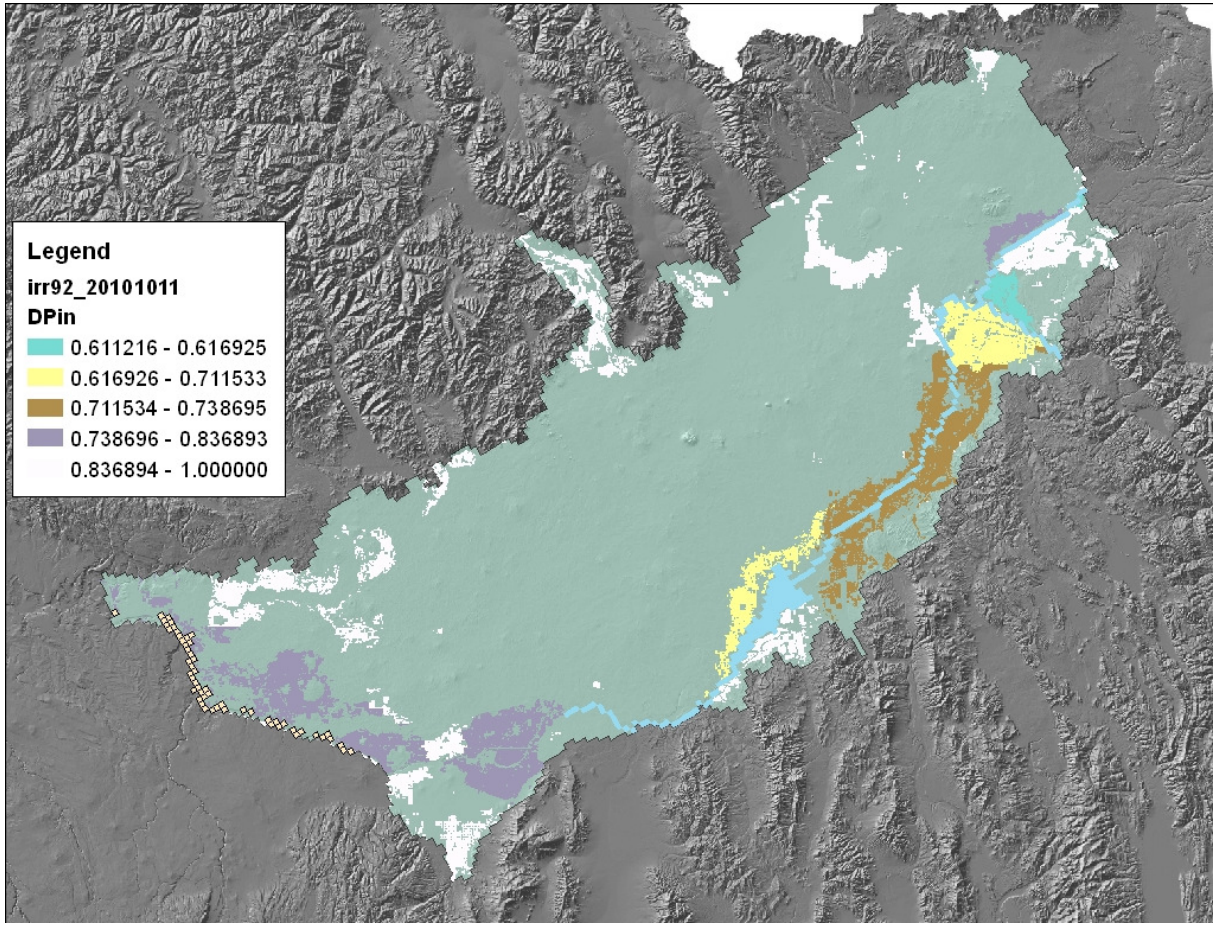


Surface Water Gravity Efficiency

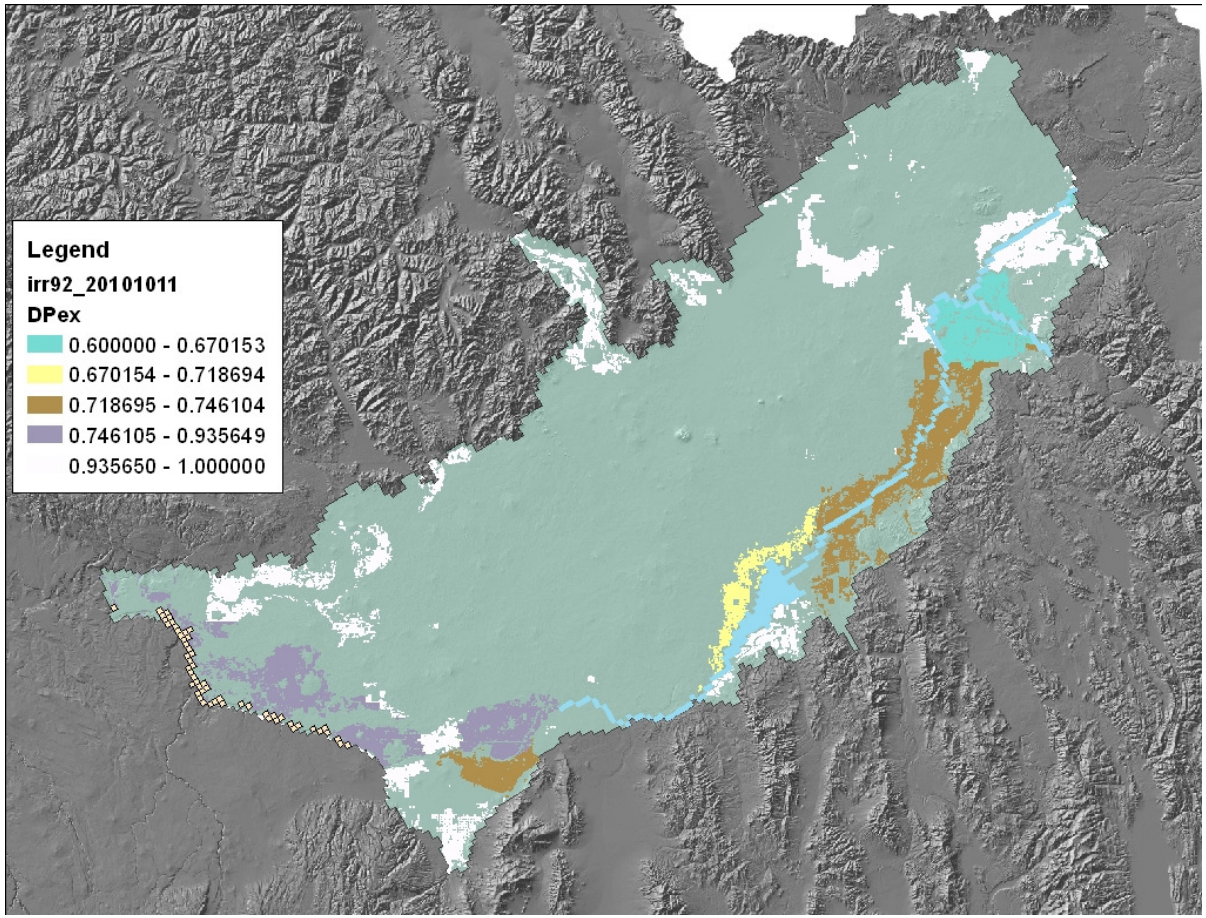




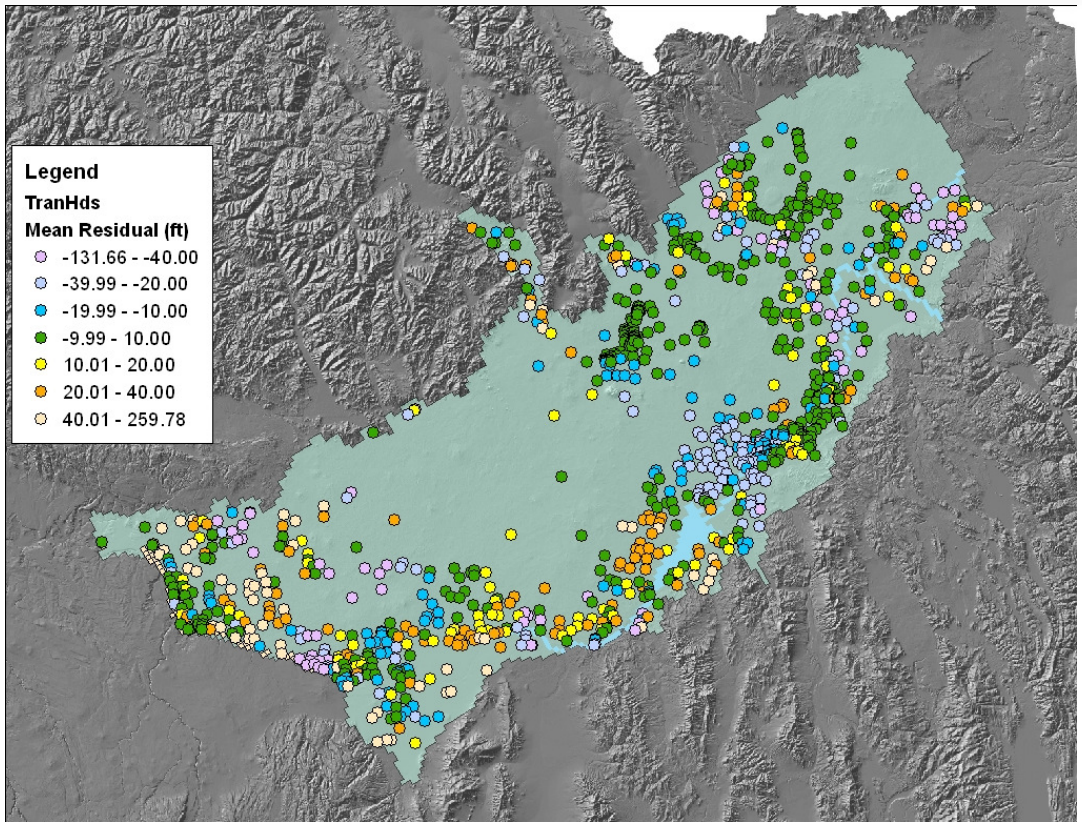
- Canal Seepage
  - CNL fraction * .DIV diversions
  - PEST only allowed to adjust non-coalition entities +/- 5%



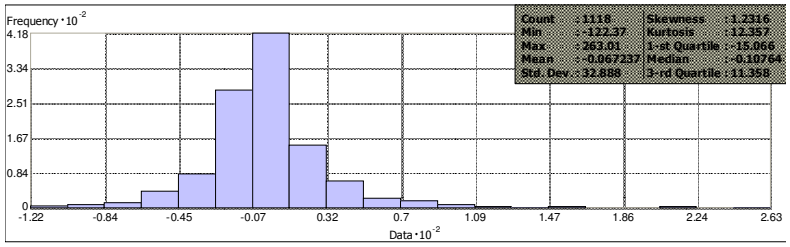
- DPin
  - fraction of the initial irrigation loss (1-eff) that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98



- 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

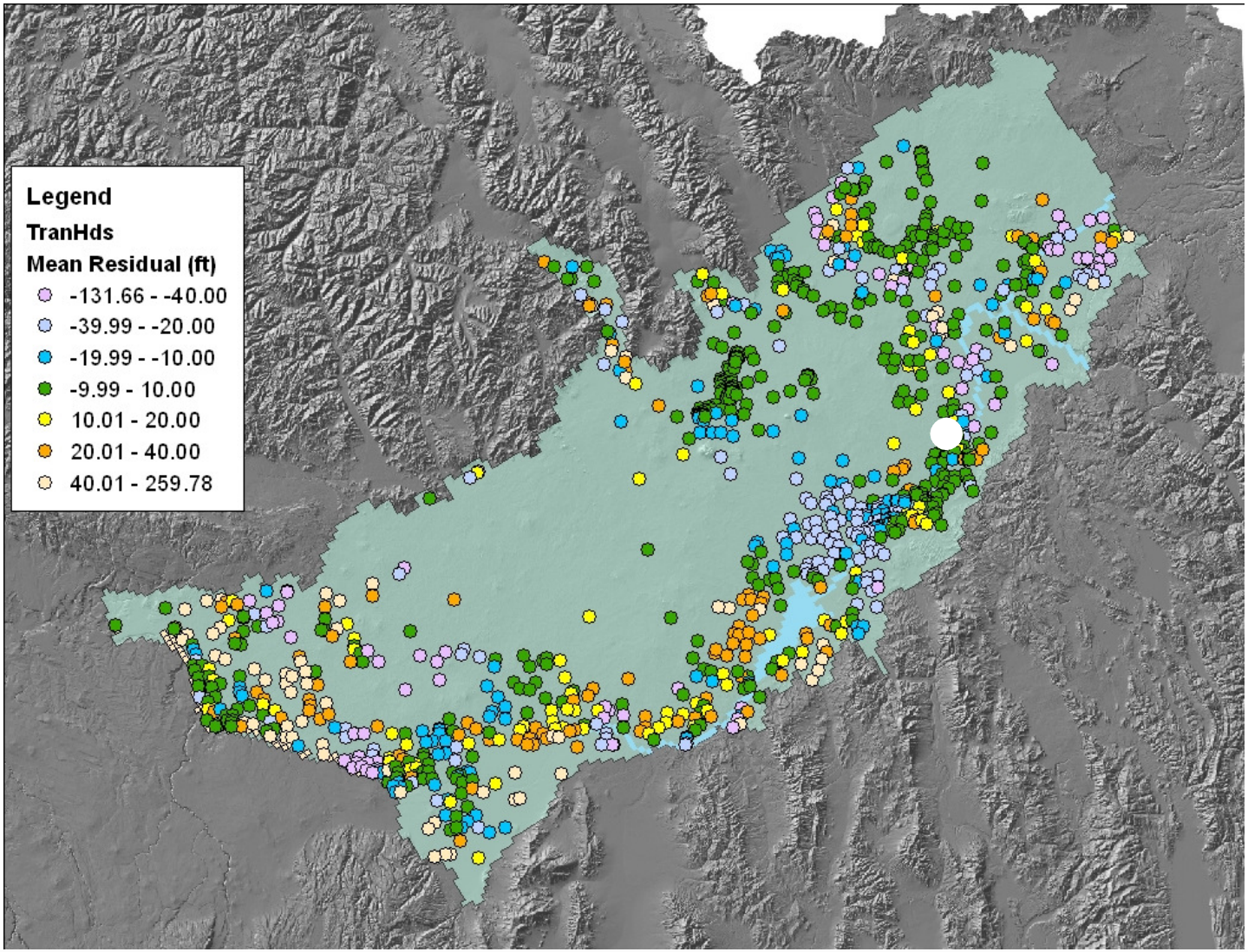


Histogram
Transformation: None

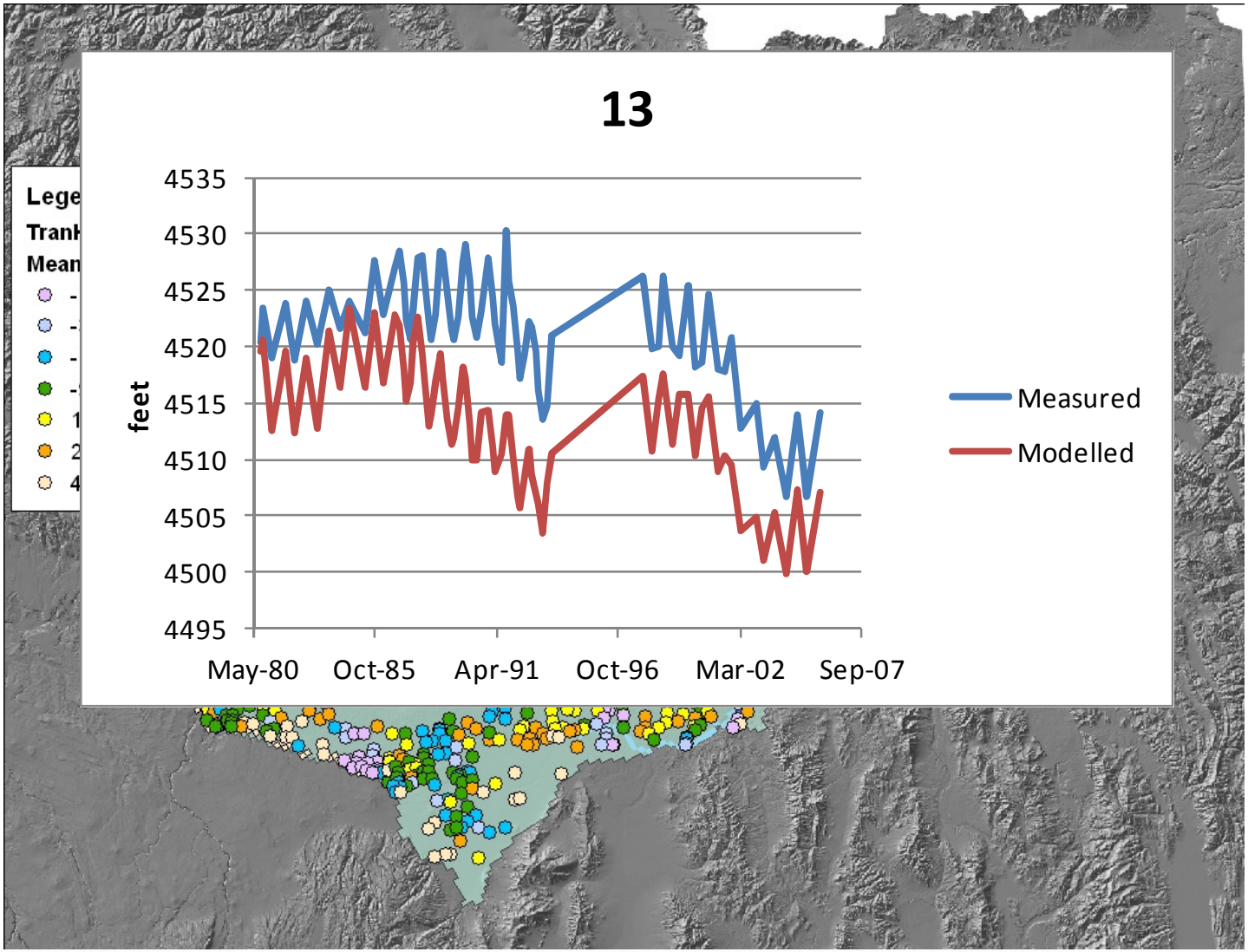


Data Source: TranHds Attribute: Mean

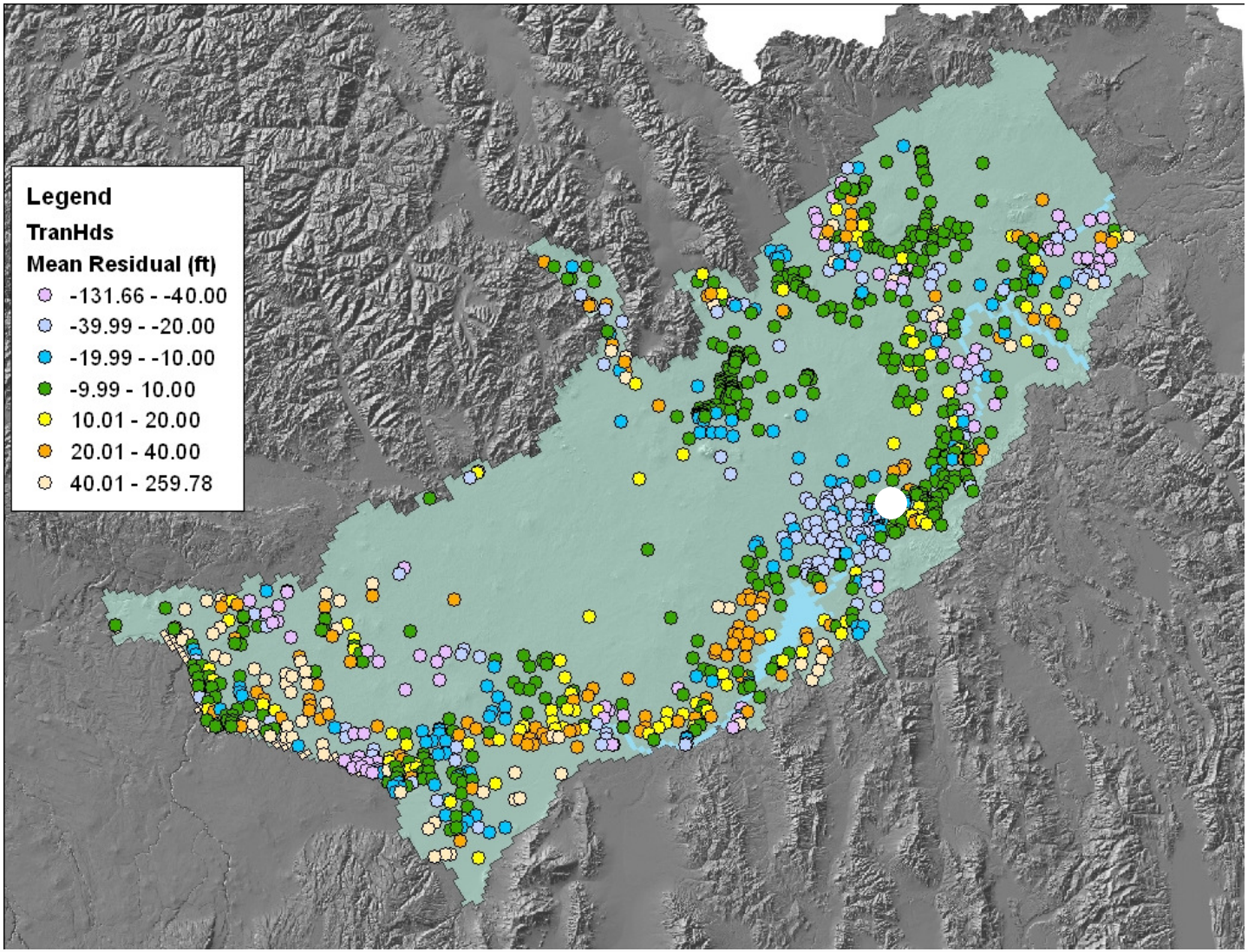
Transient Heads



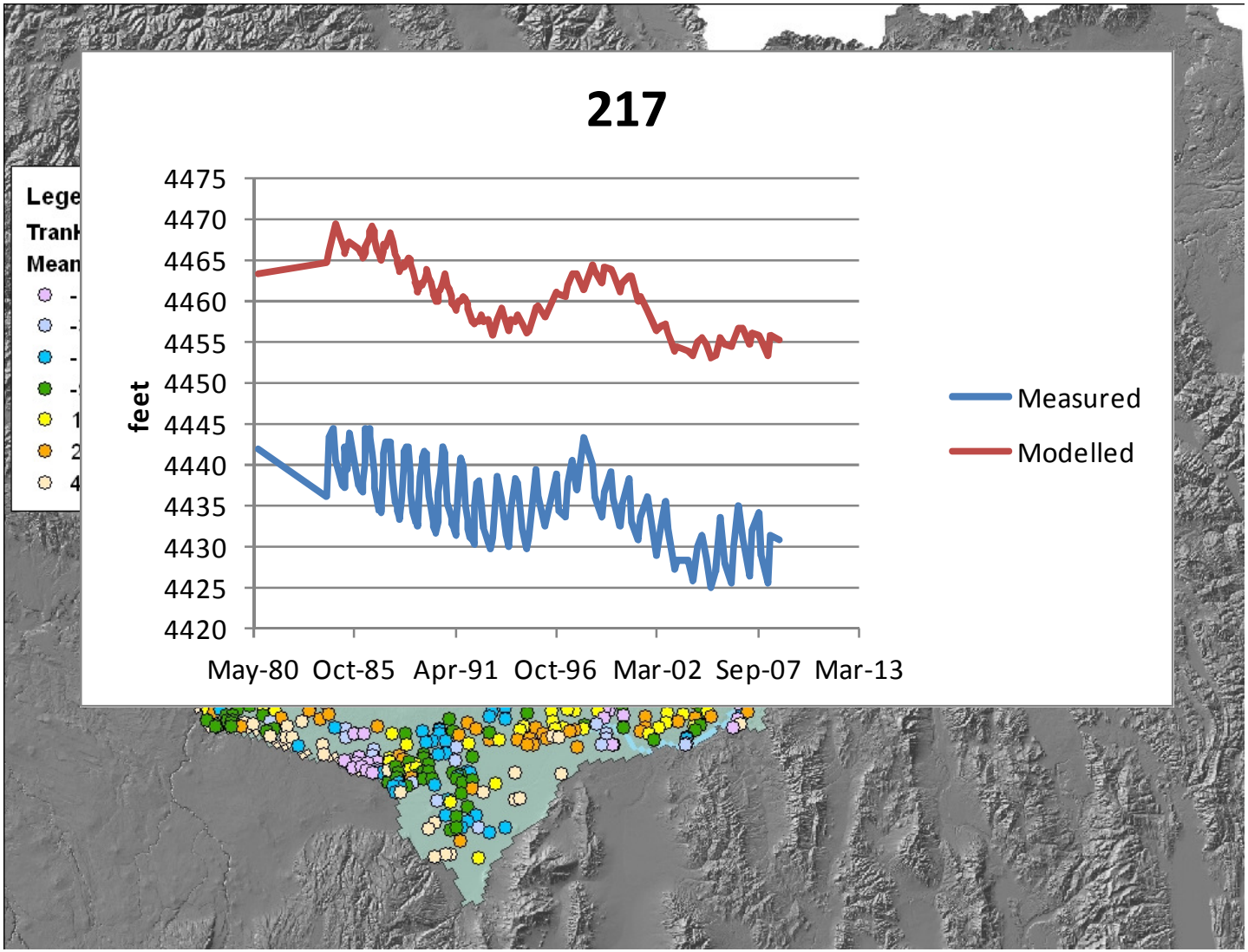
Transient Heads



Transient Heads



Transient Heads



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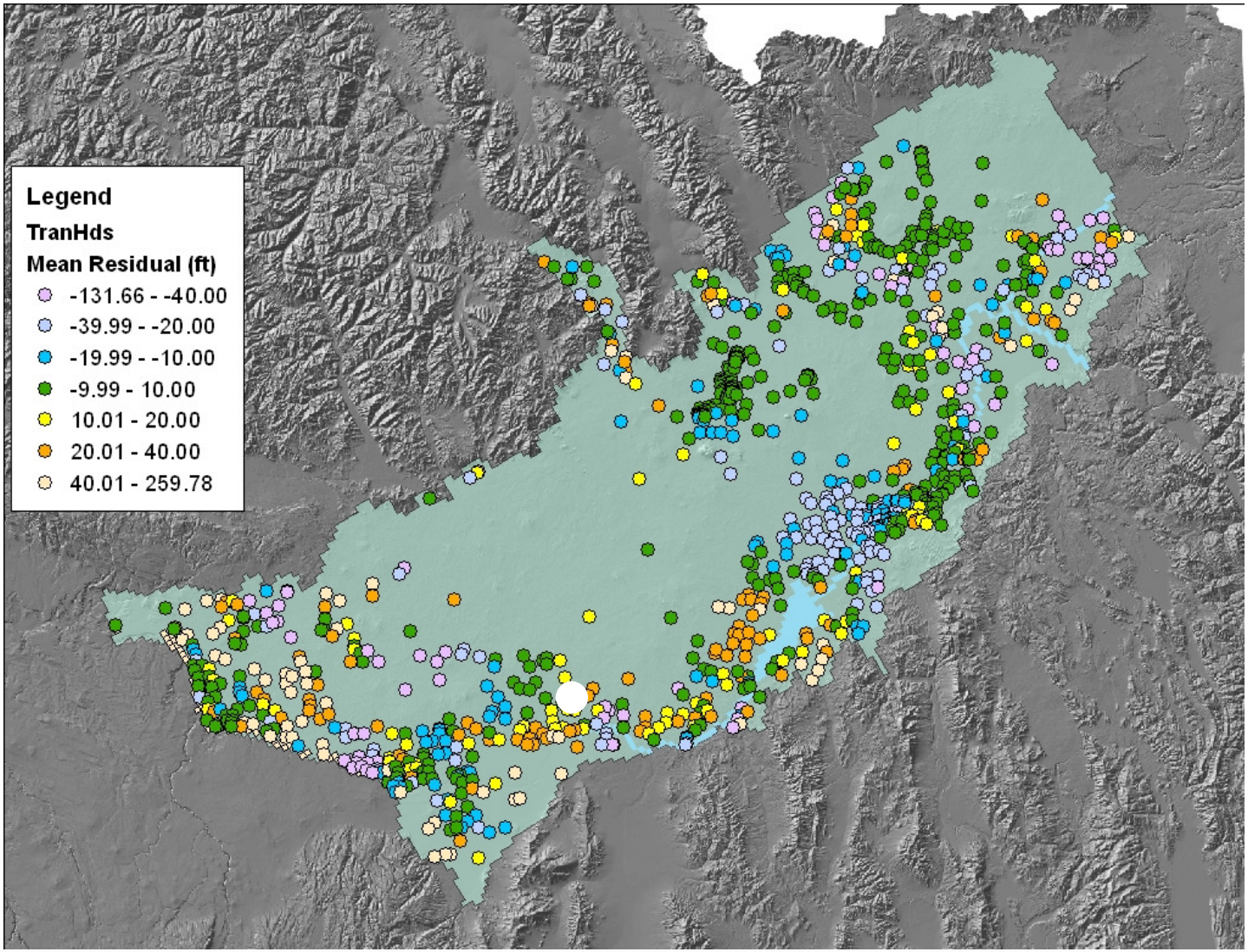

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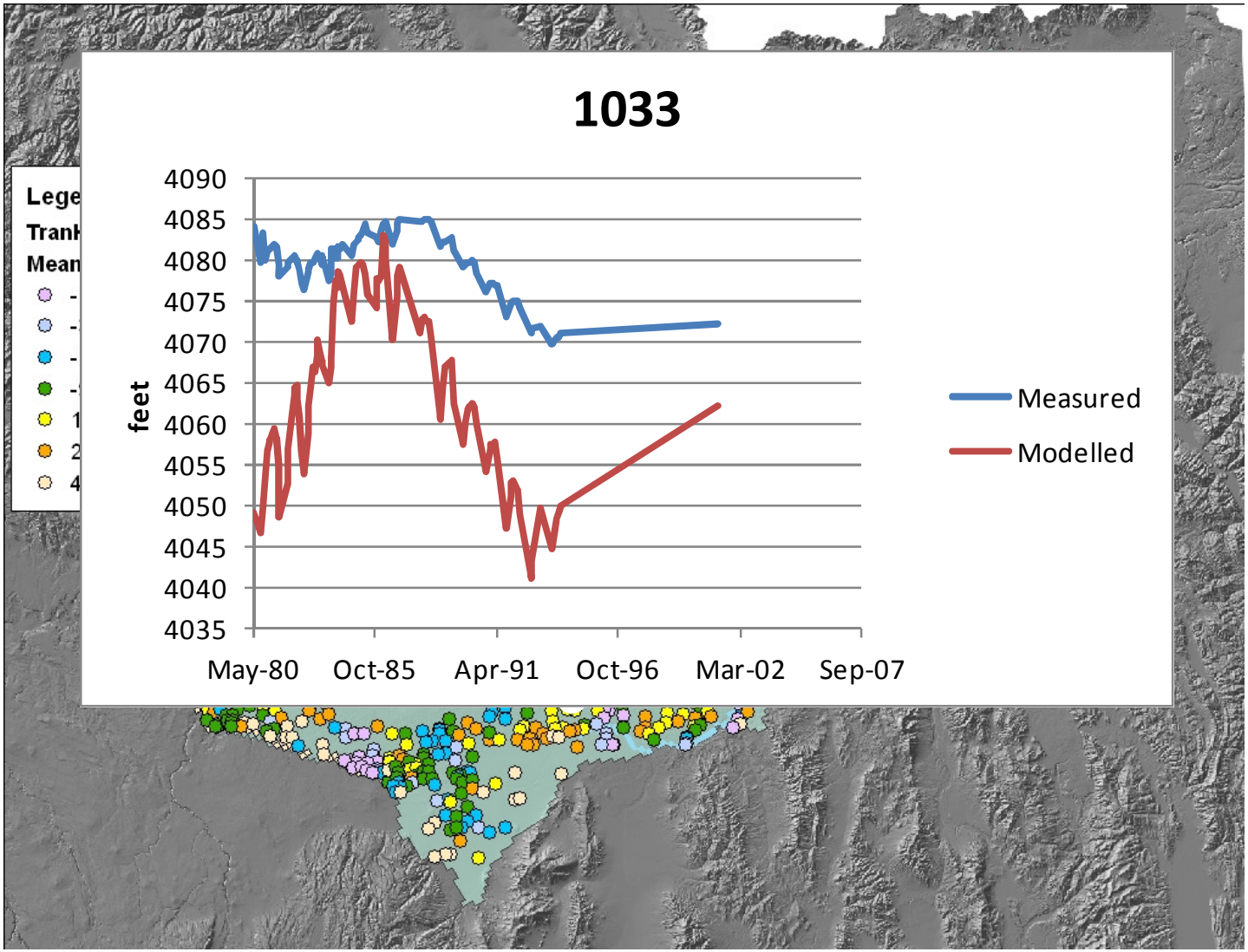
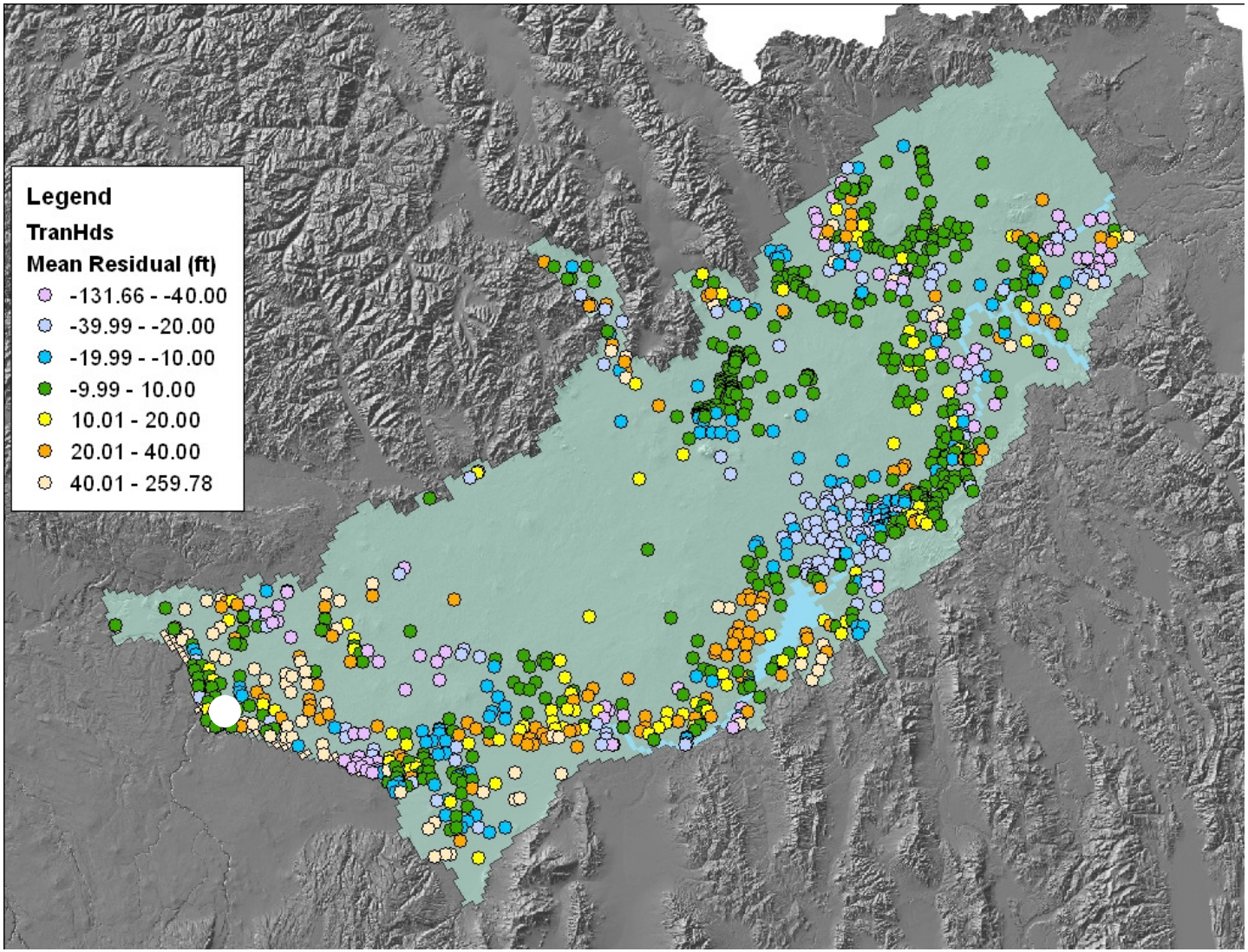
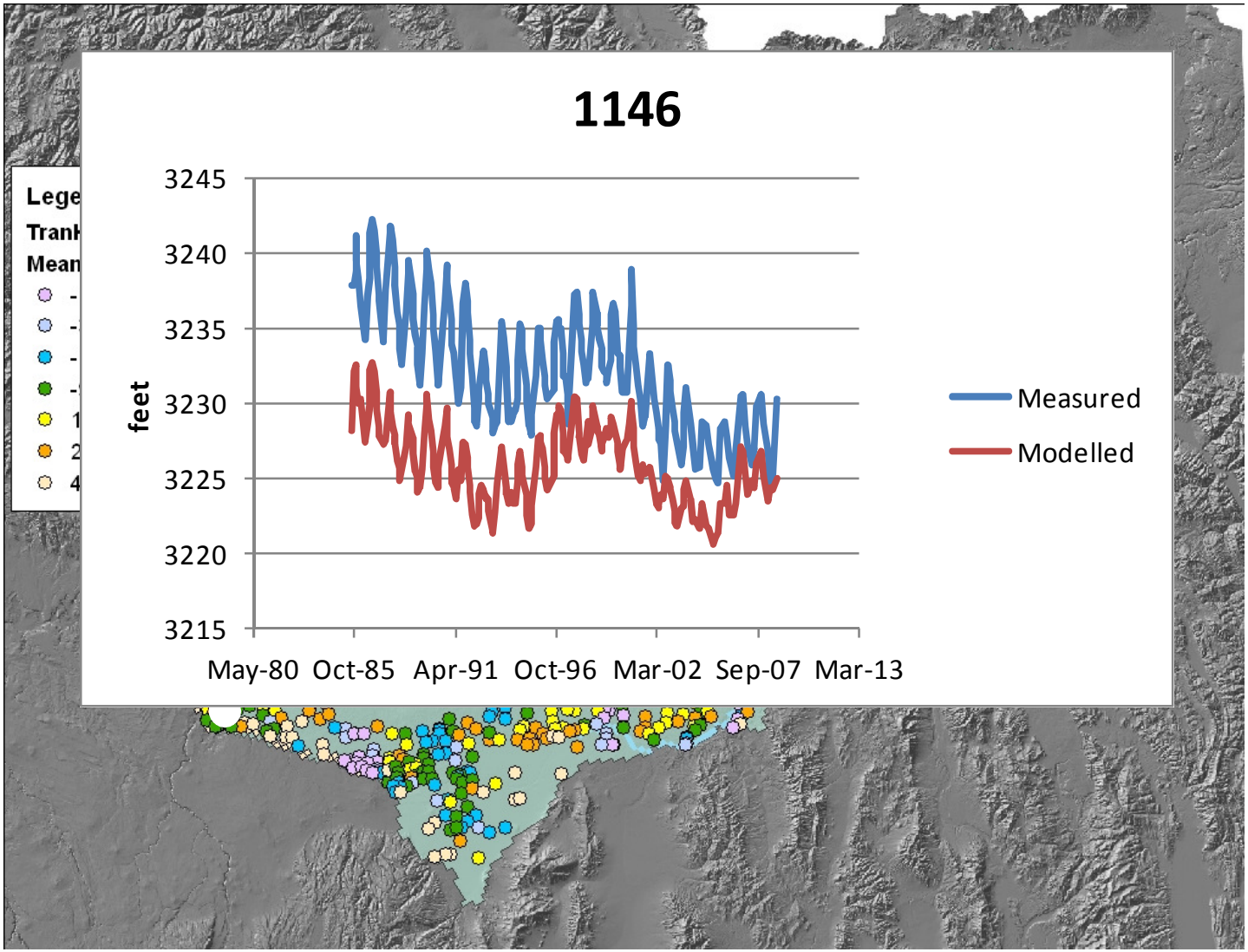


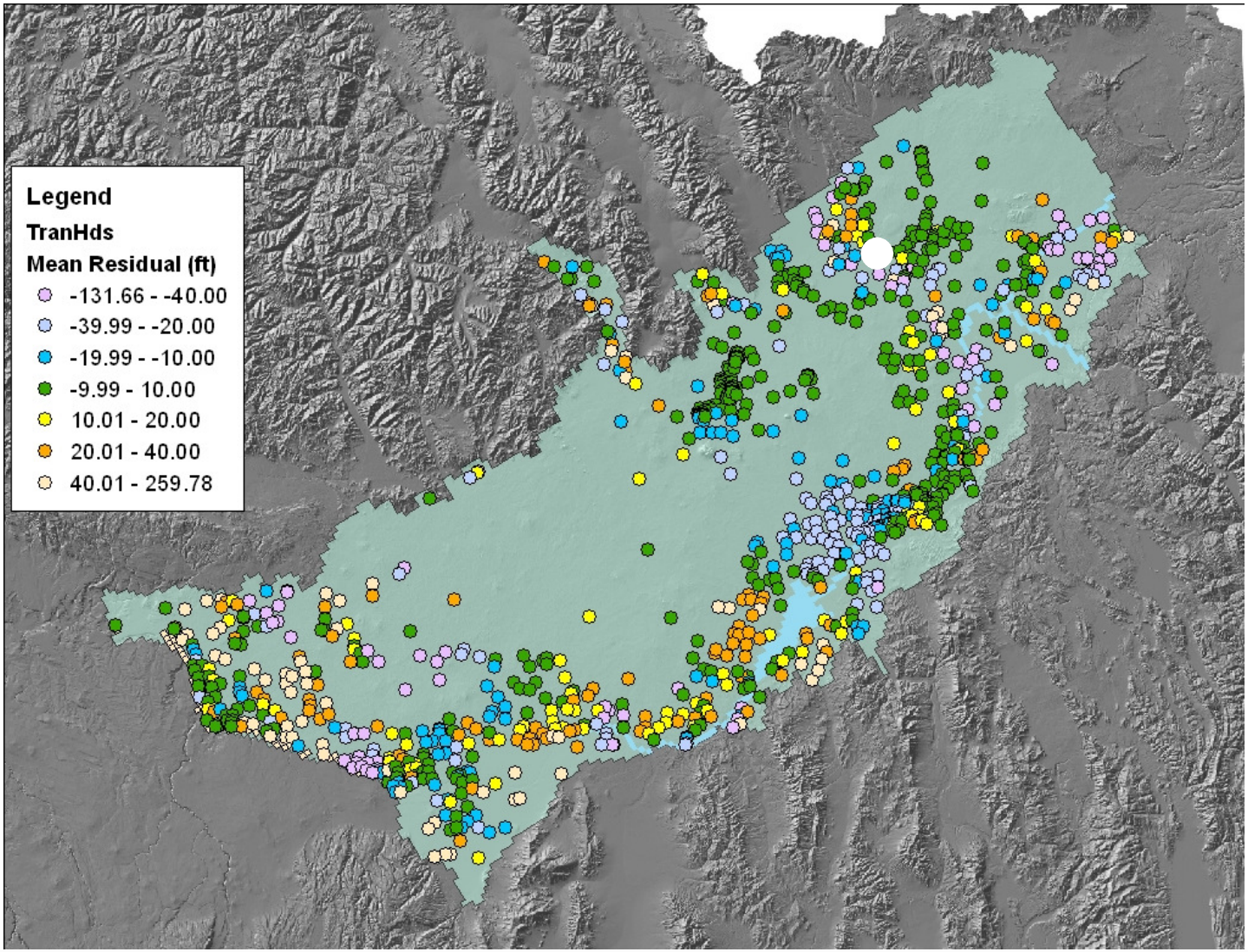
Transient Heads



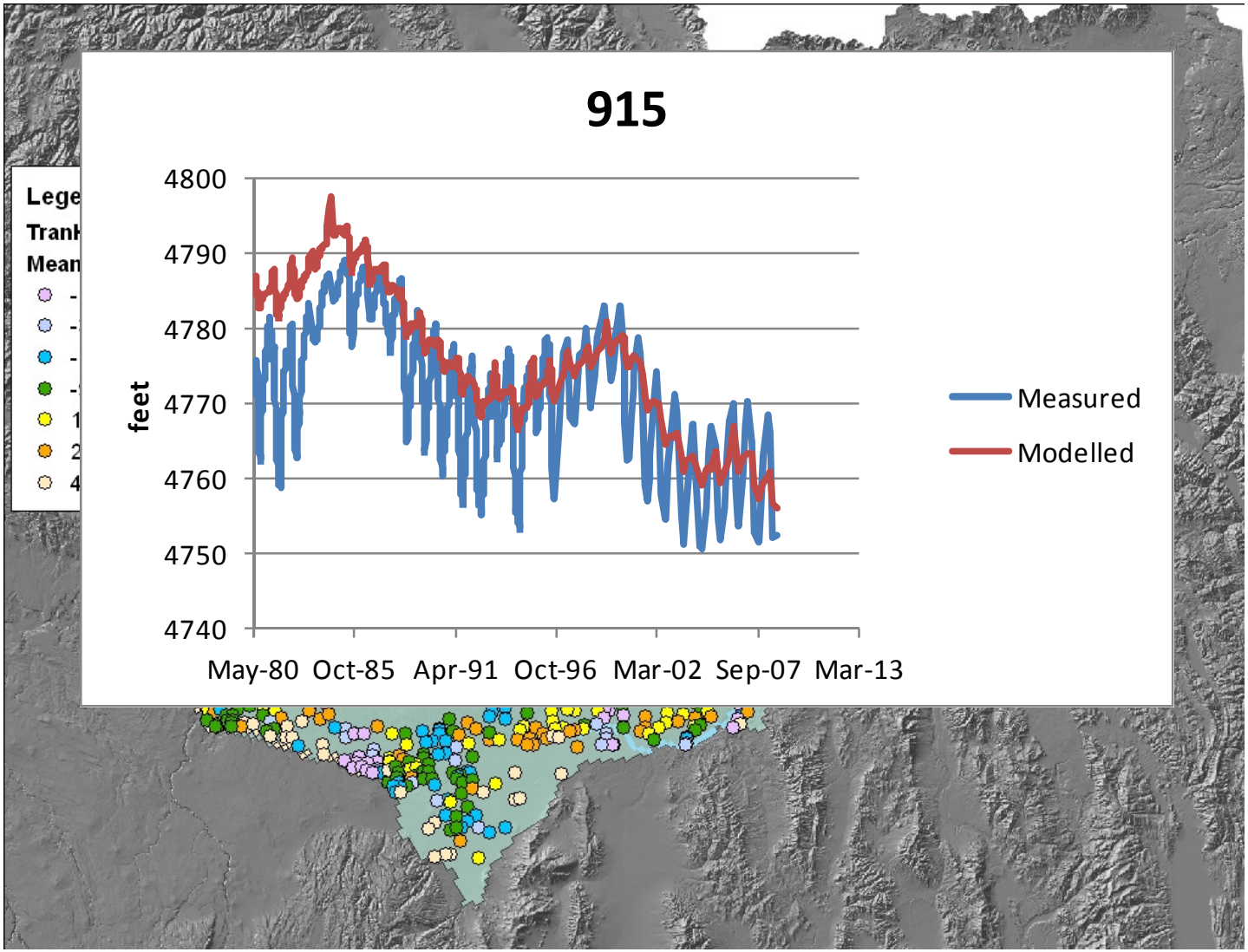
Transient Heads



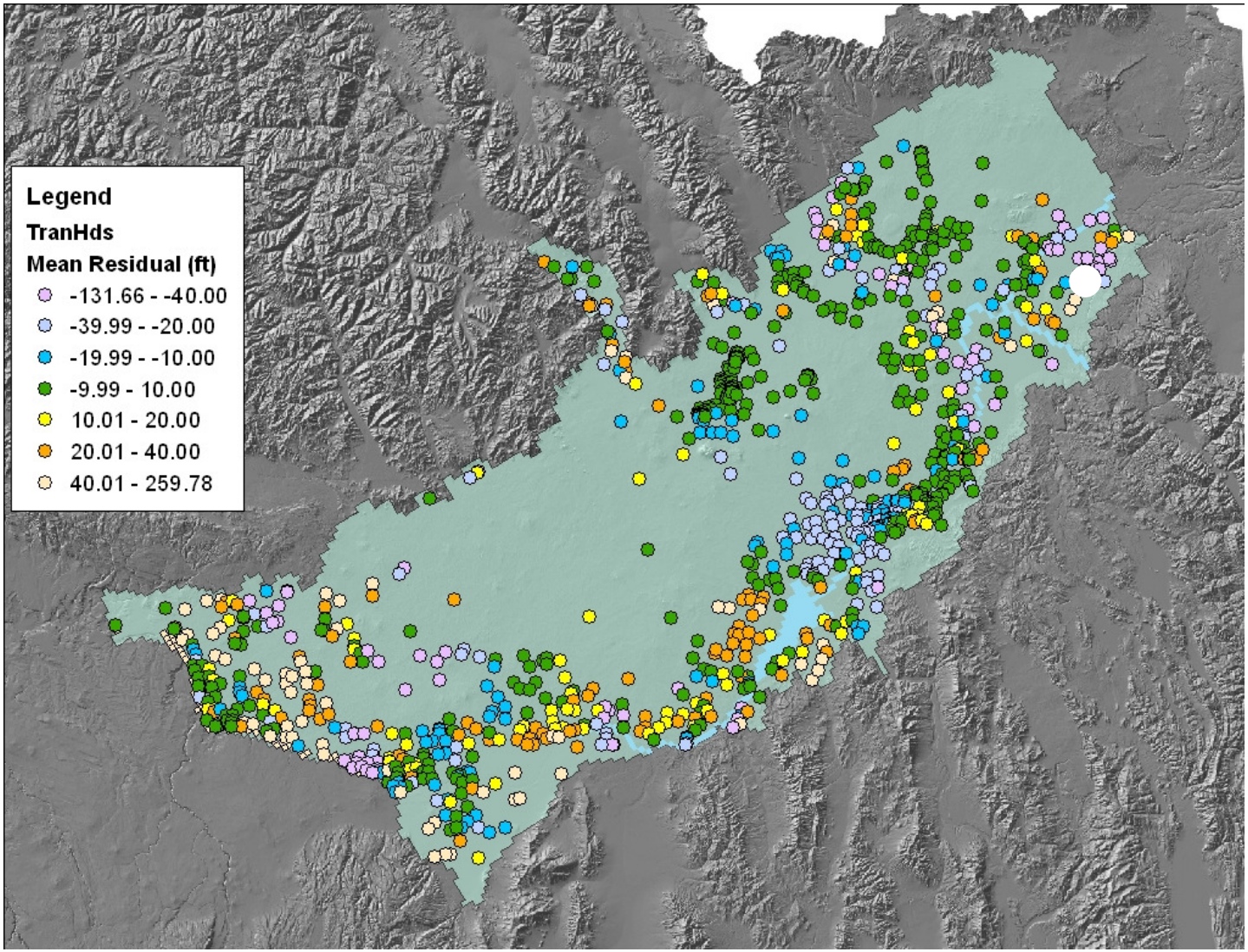
Transient Heads



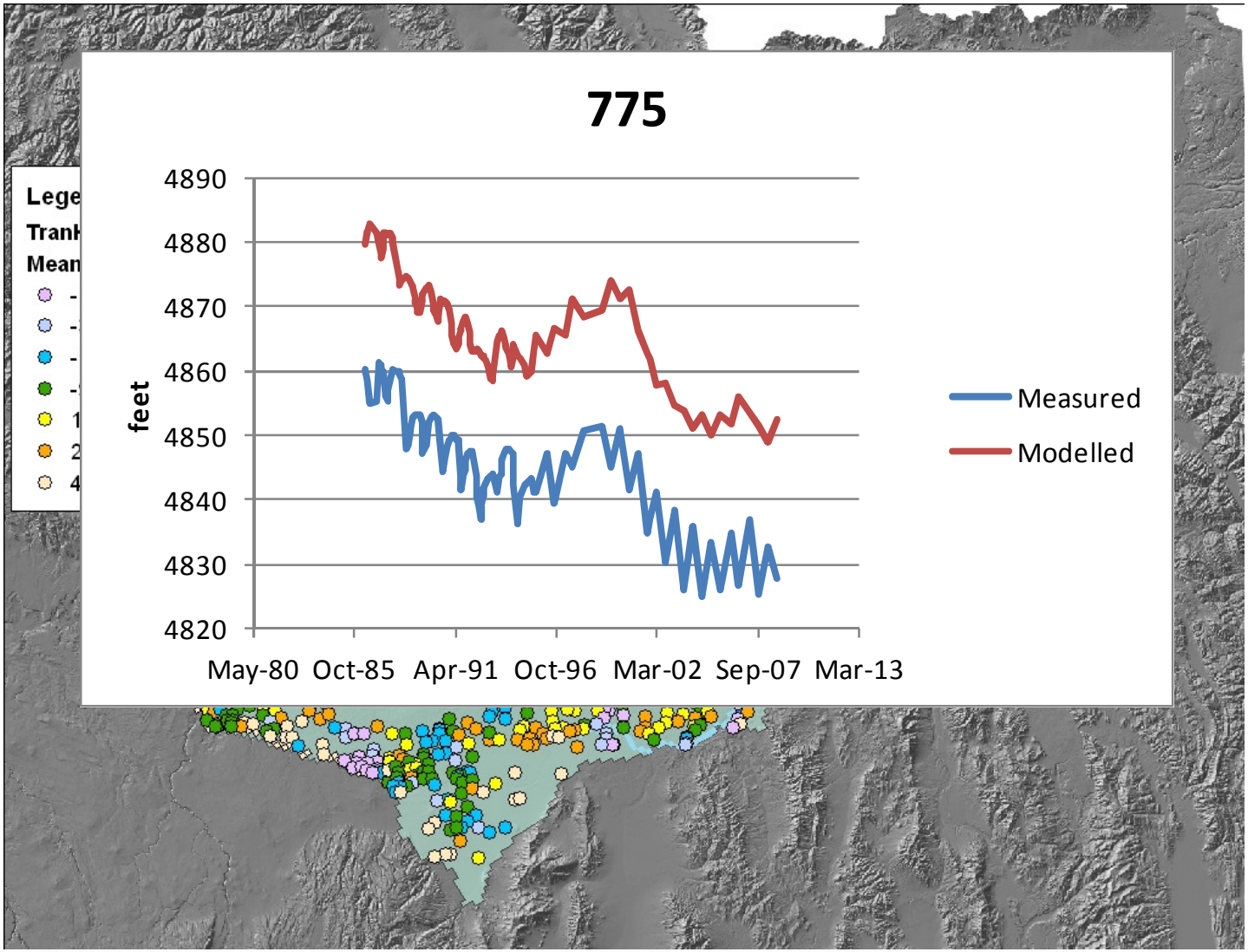
Transient Heads



Transient Heads



Transient Heads



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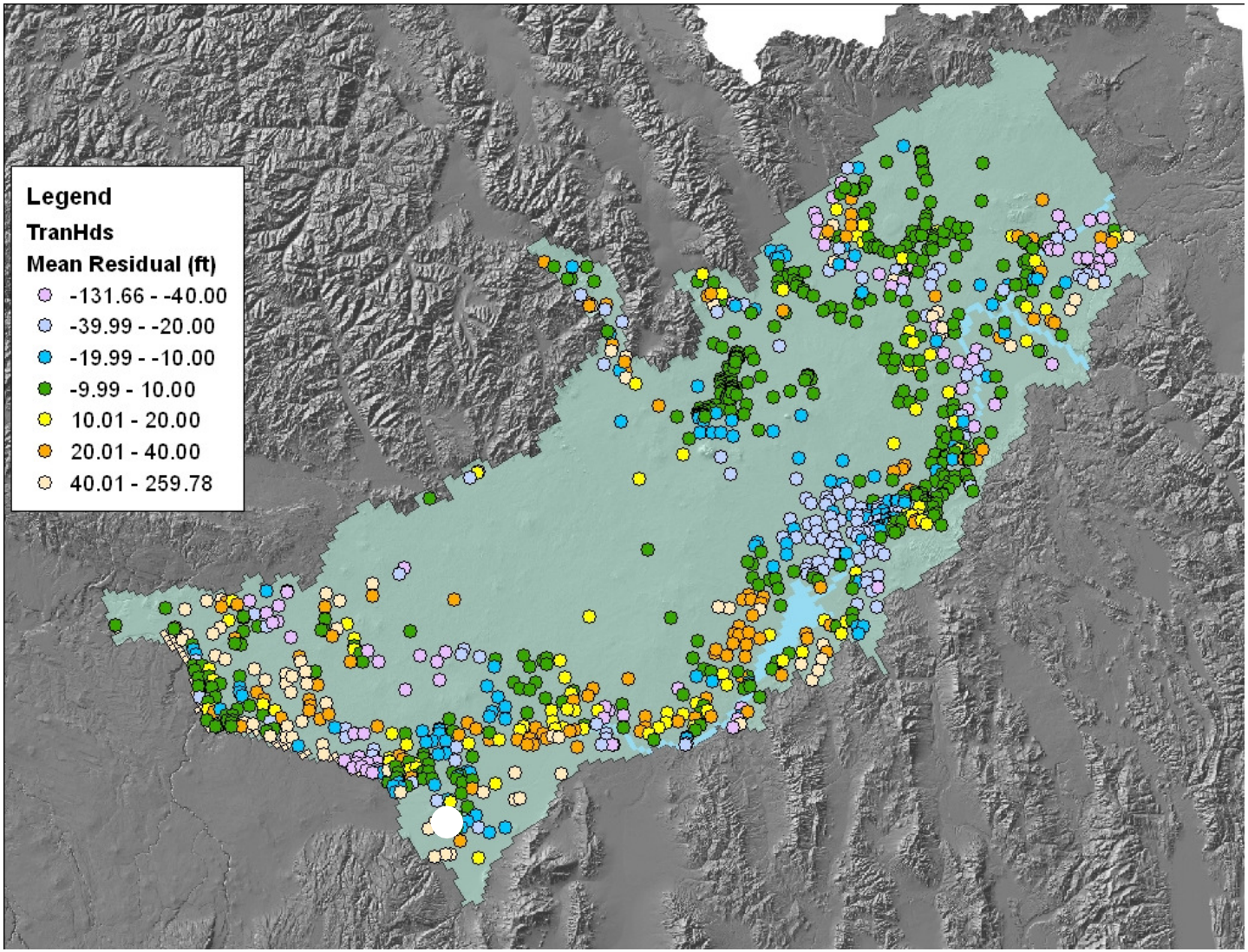
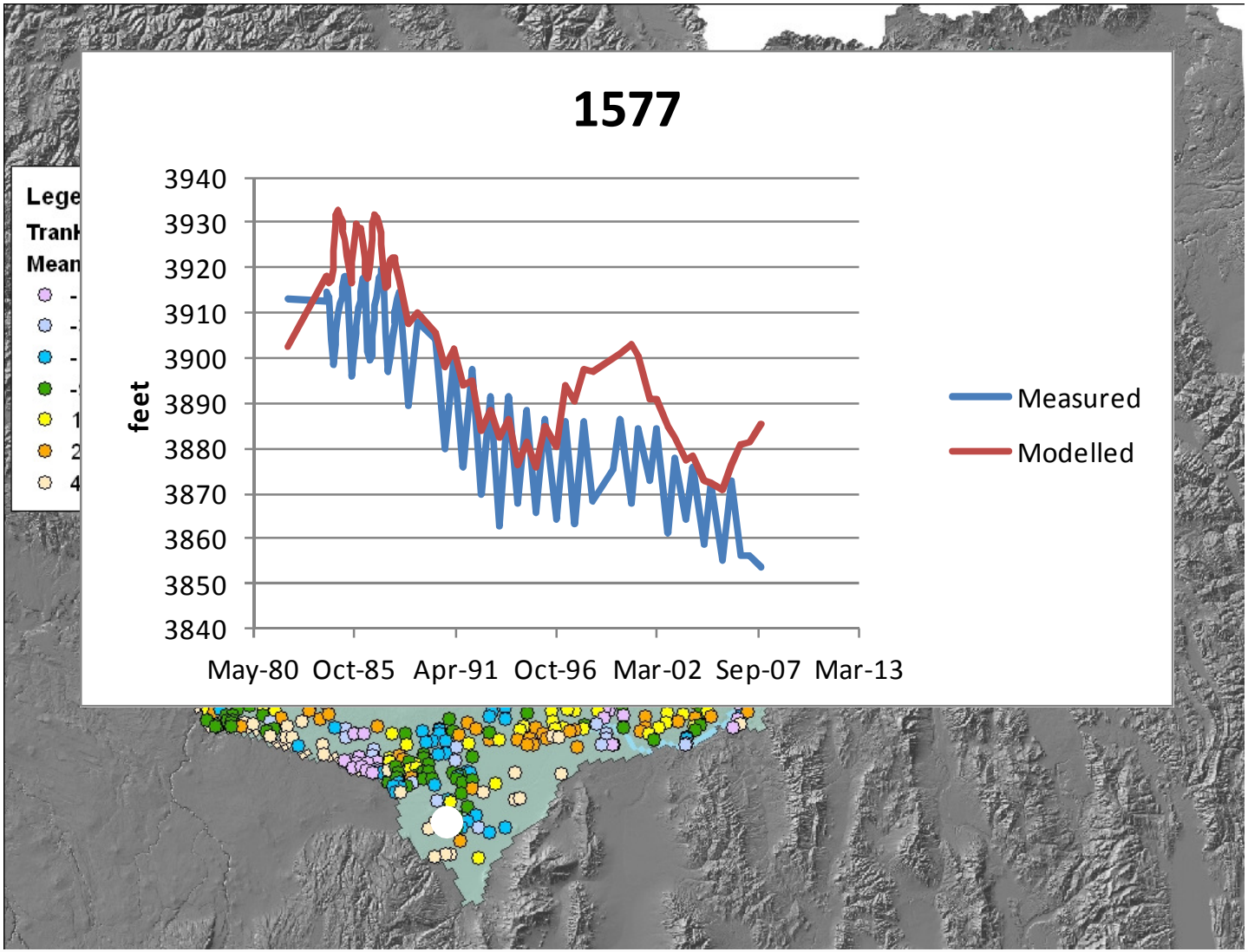
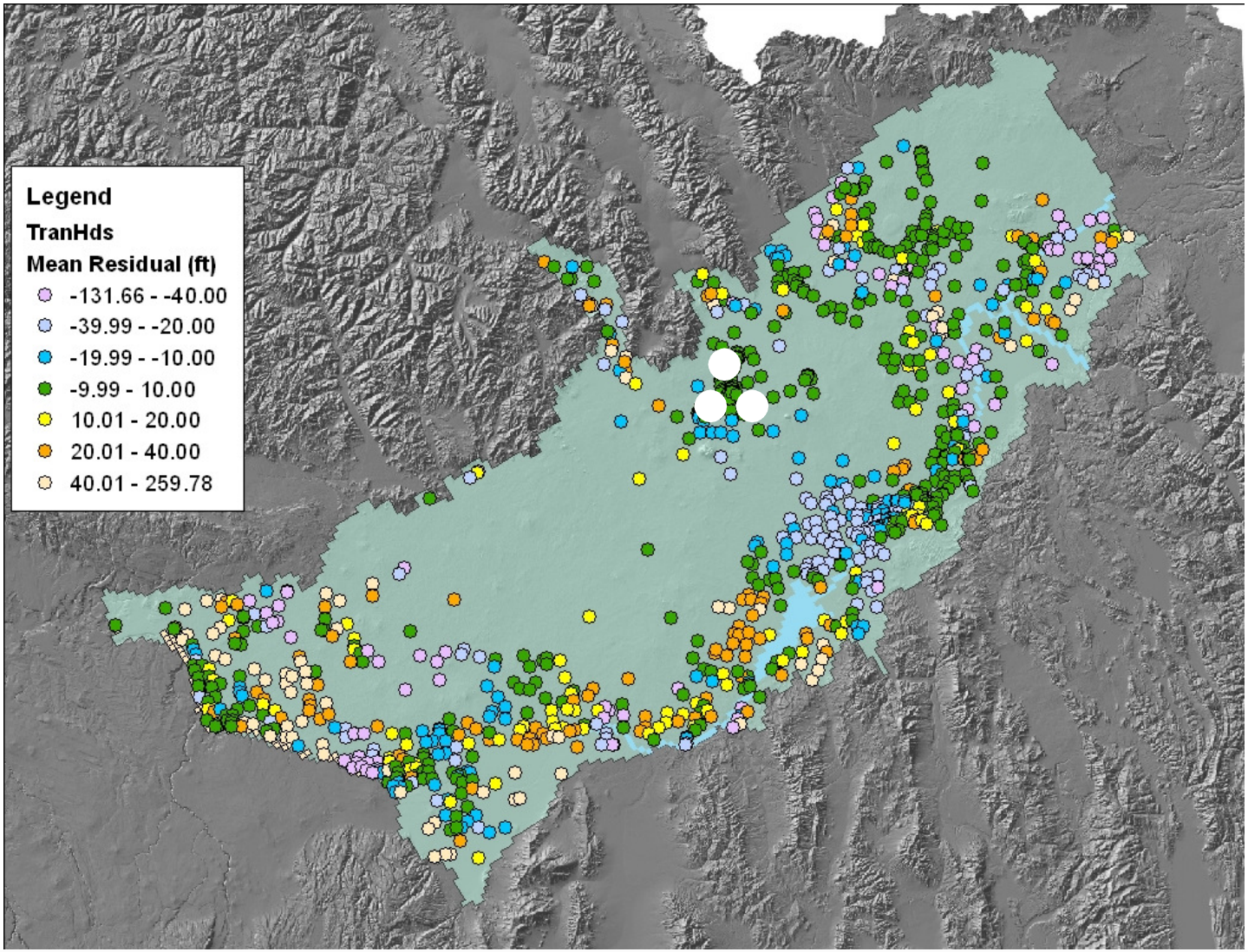


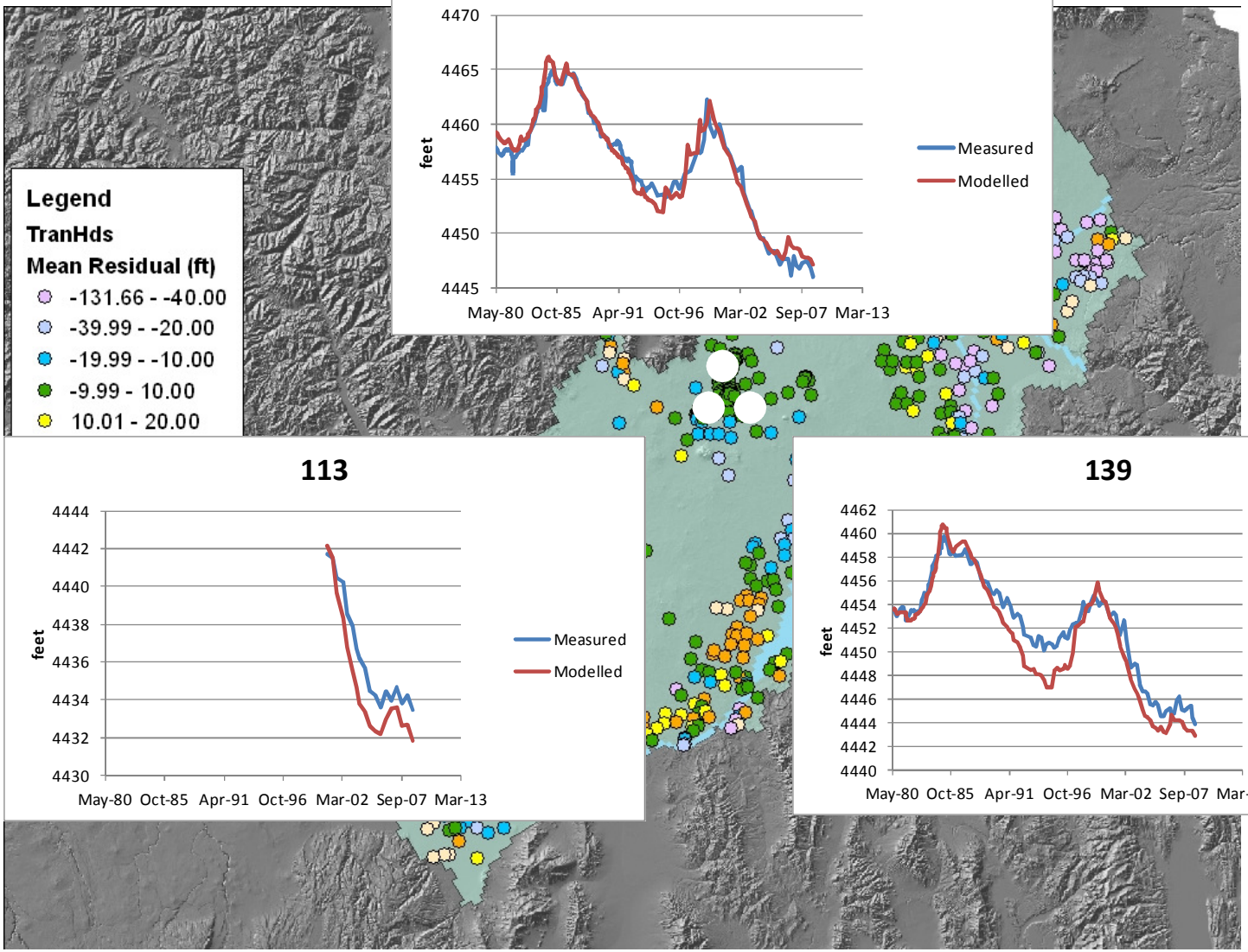
Transient Heads

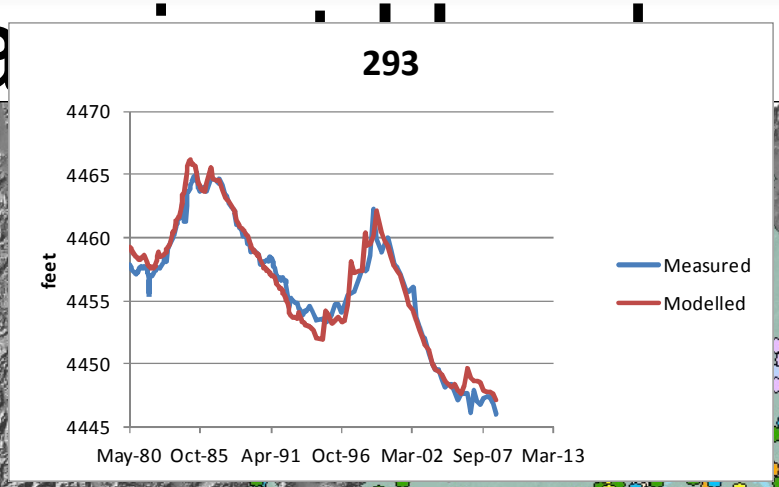


Transient Heads

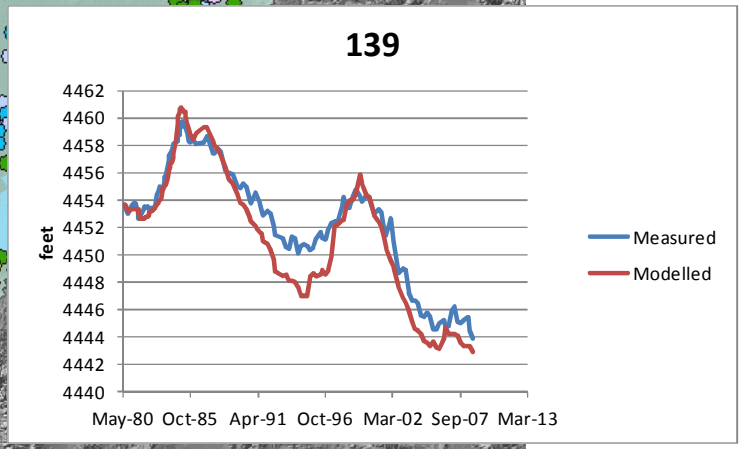


Tra

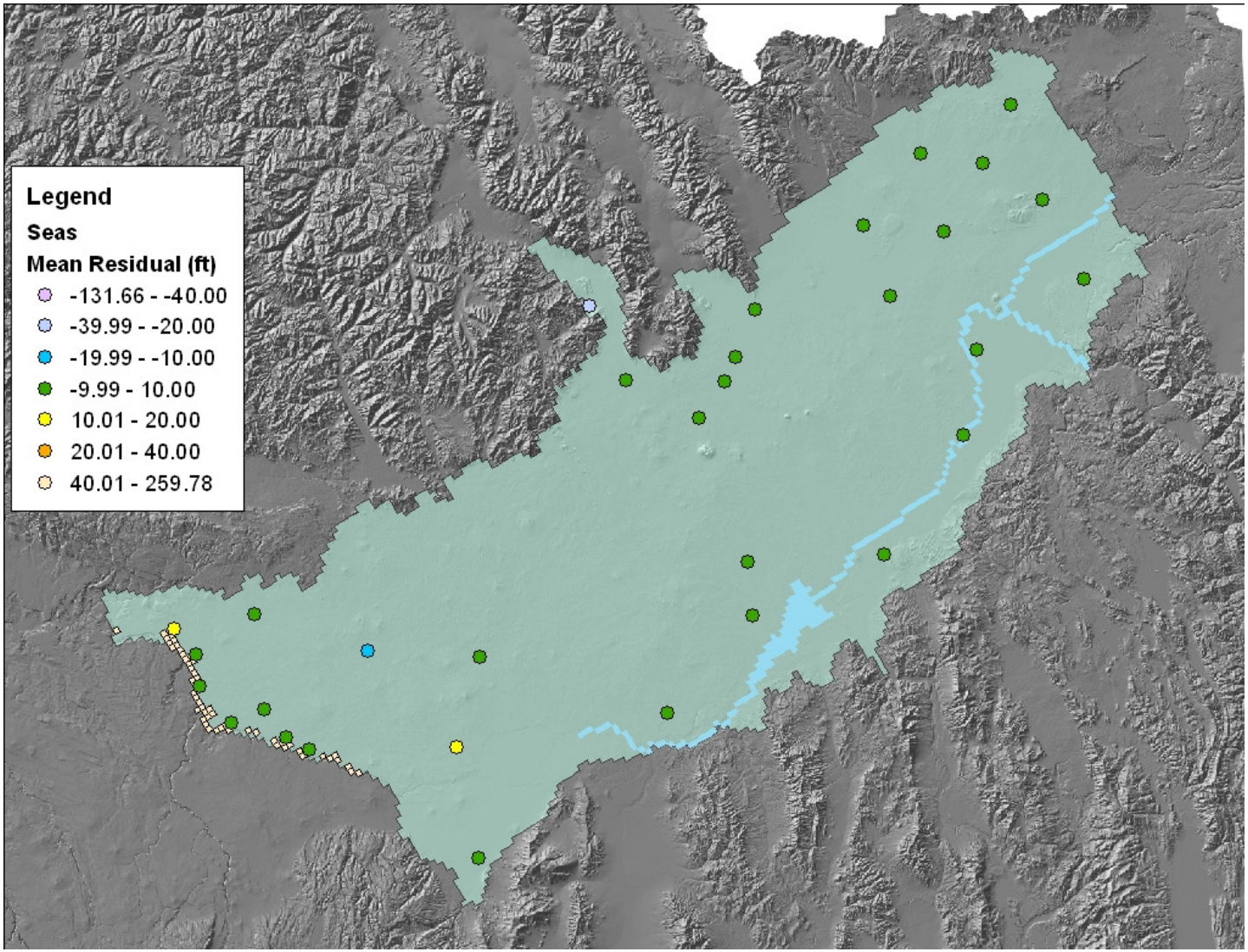

Legend
TranHds
Mean Residual (ft)
-131.66 - -40.00
-39.99 - -20.00
-19.99 - -10.00
-9.99 - 10.00
10.01 - 20.00


293
4470
4465
4460
4455
4450
4445
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled

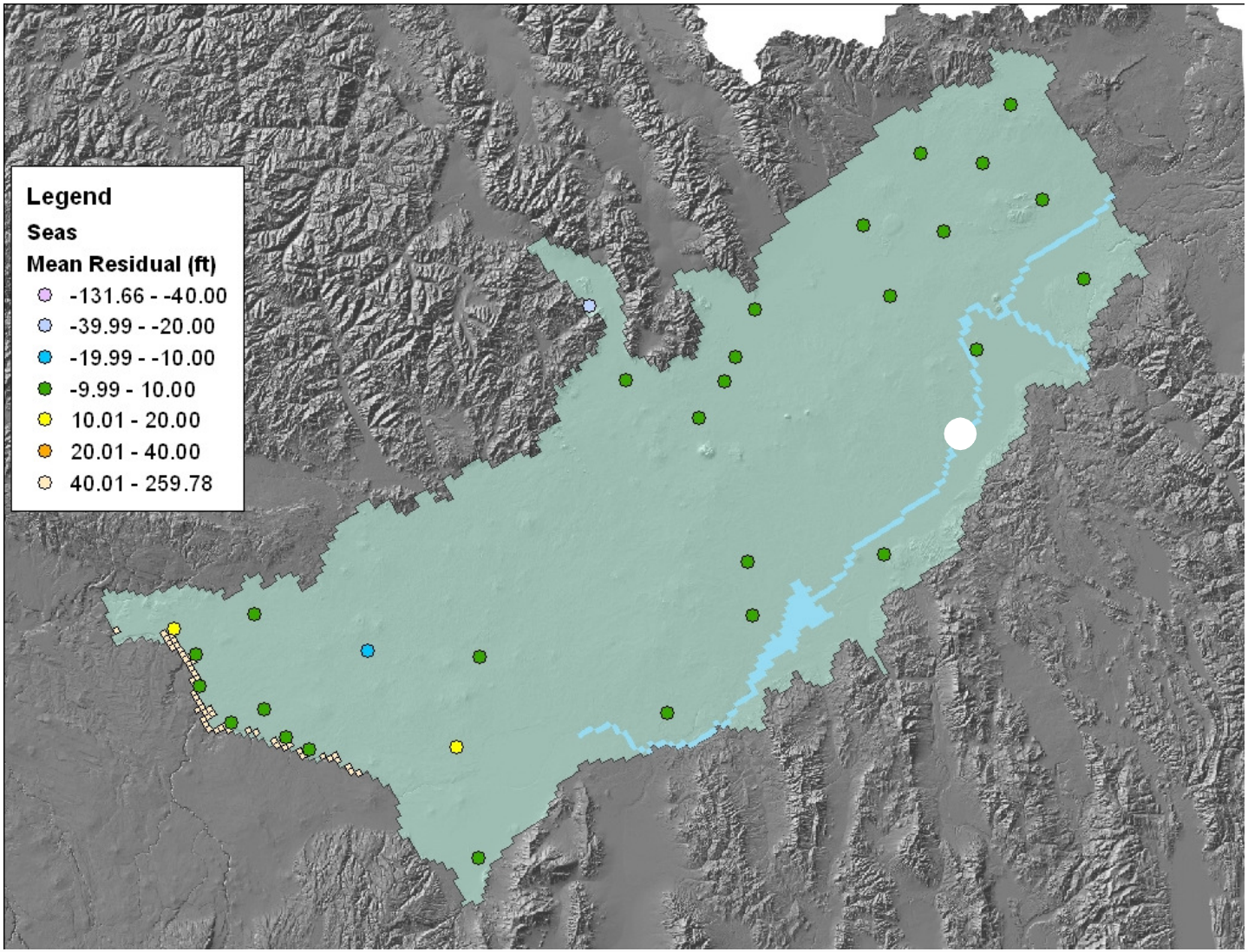
113
4444
4442
4440
4438
4436
4434
4432
4430
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled


139
4462
4460
4458
4456
4454
4452
4450
4448
4446
4444
4442
4440
feet
May-80 Oct-85 Apr-91 Oct-96 Mar-02 Sep-07 Mar-13
Measured
Modelled

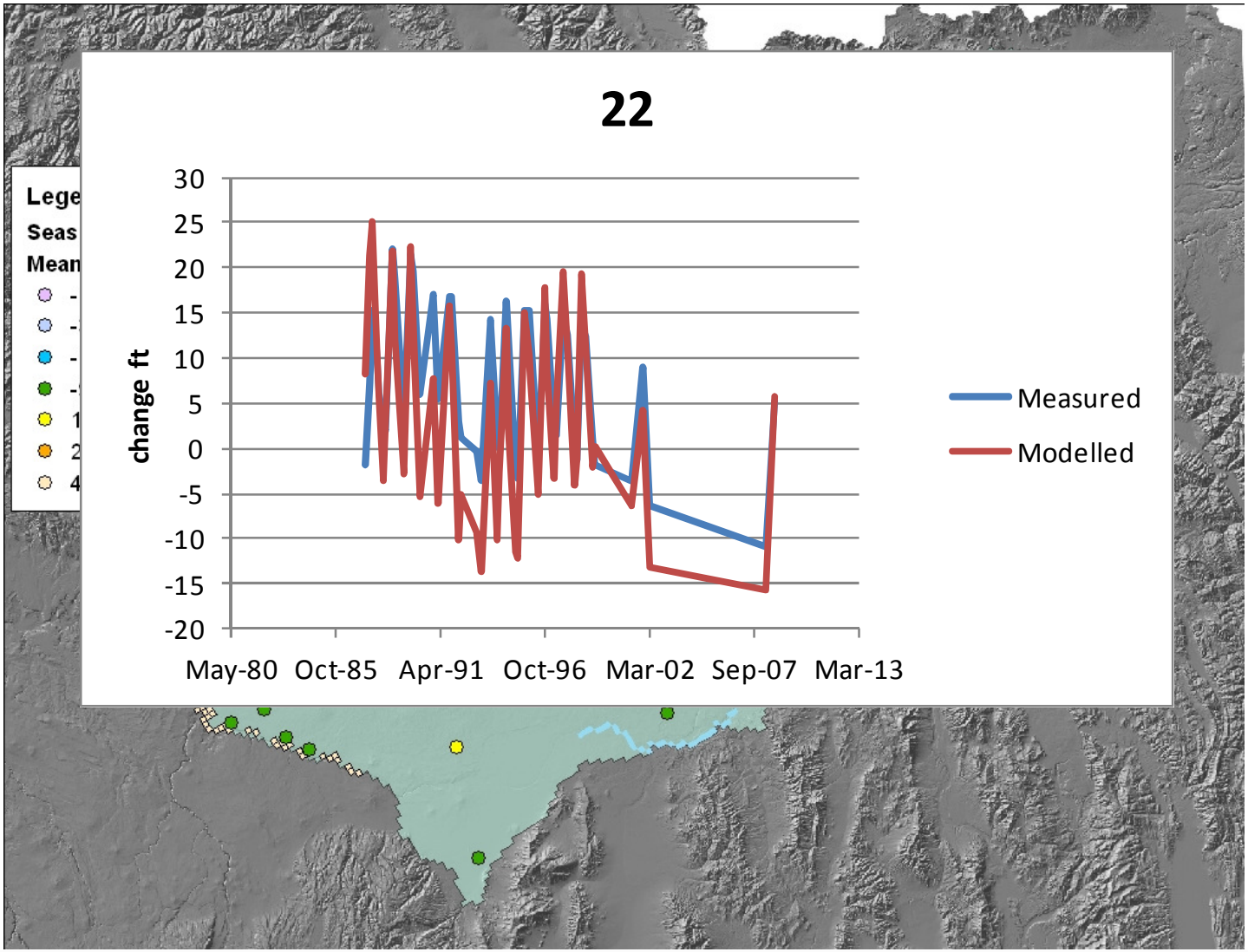
Transient Heads



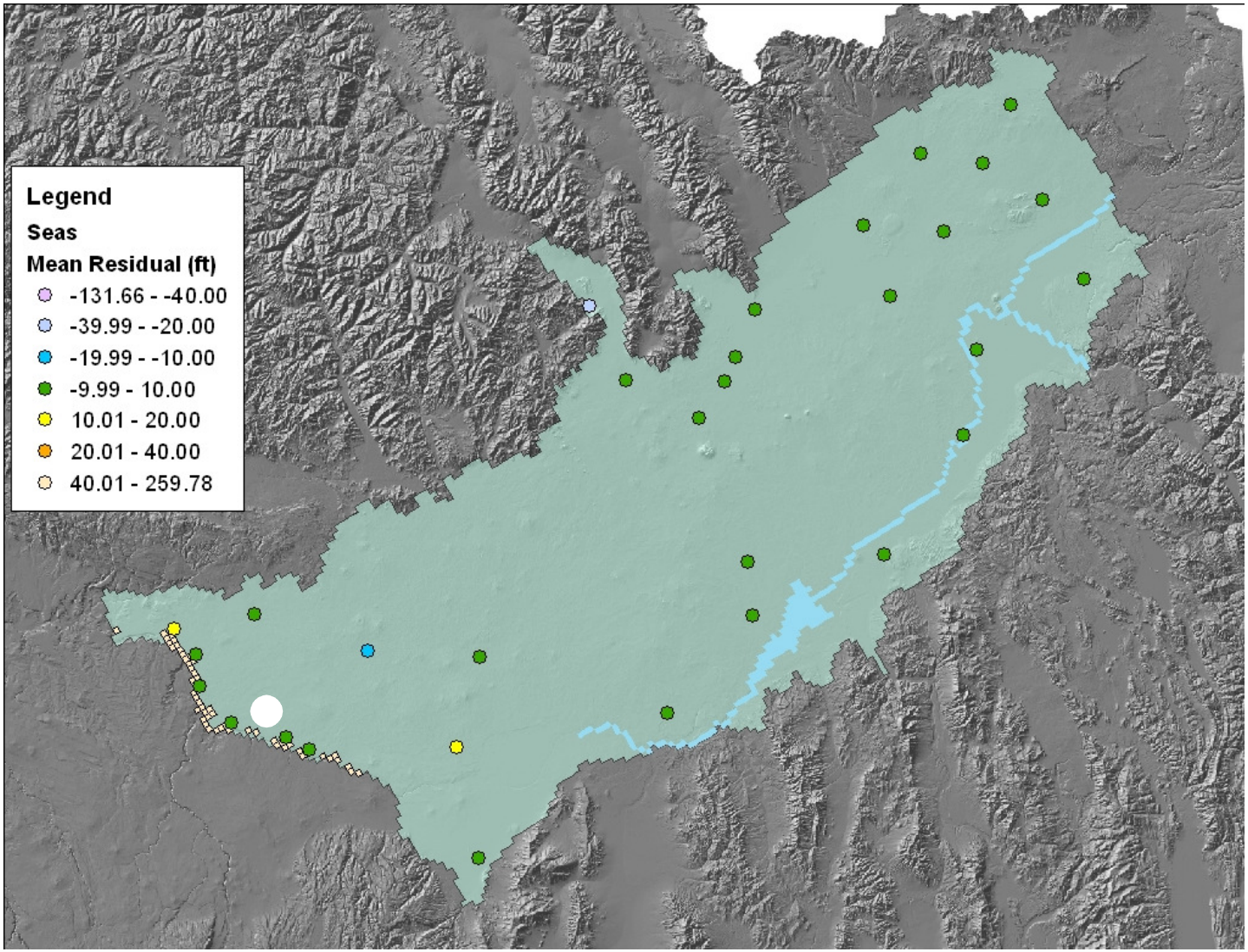
Transient Heads



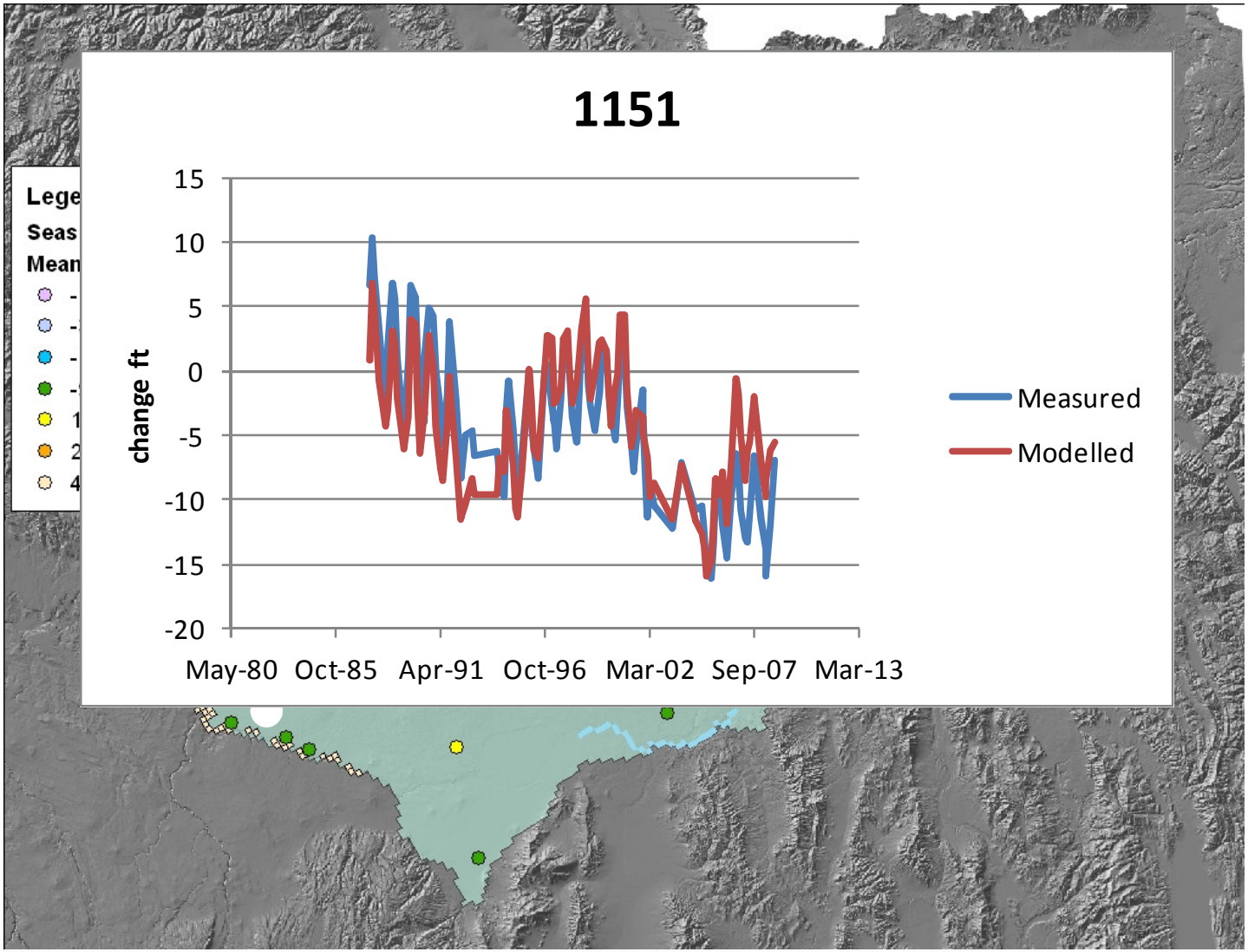
Transient Heads



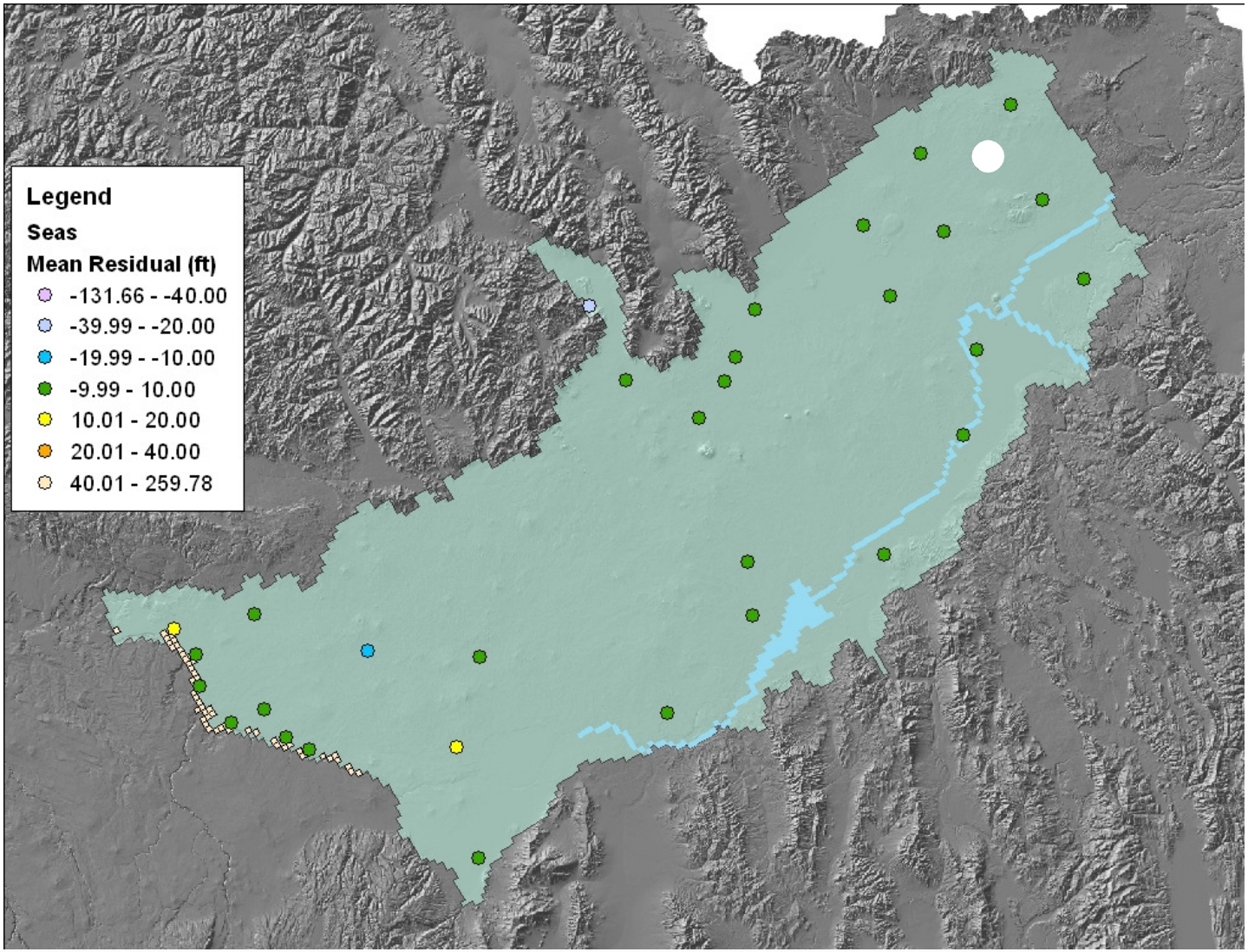
Transient Heads



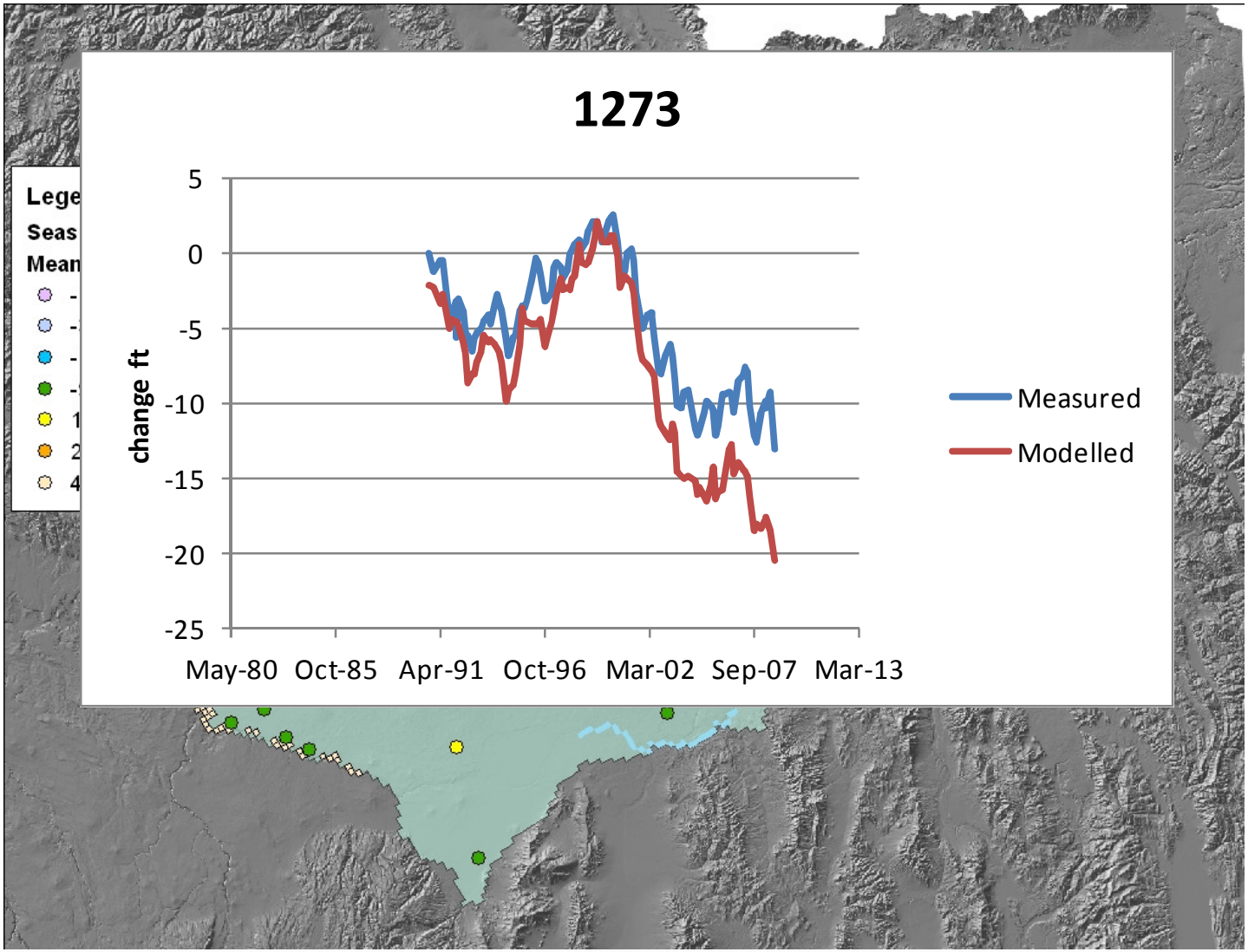
Transient Heads



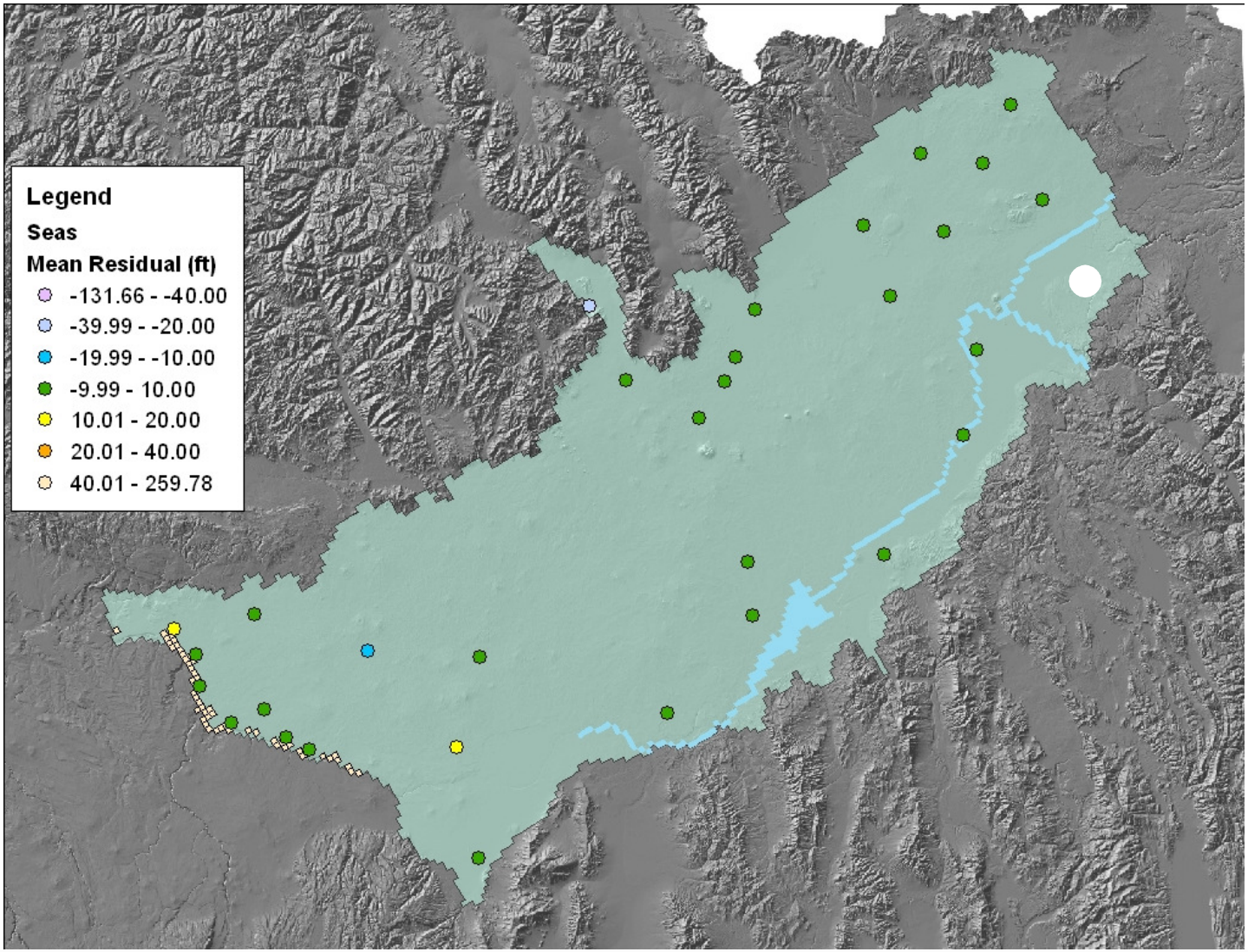
Transient Heads



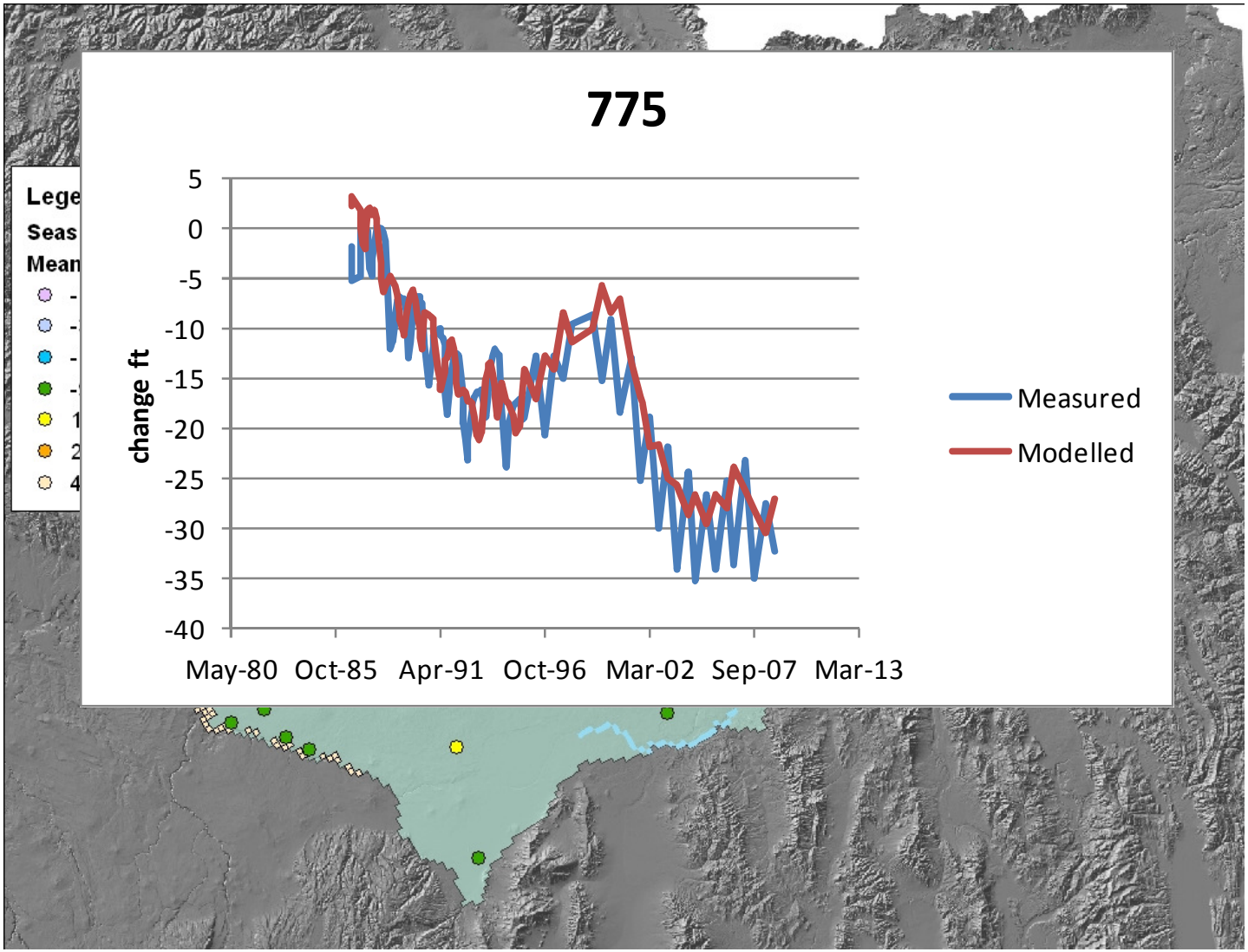
Transient Heads

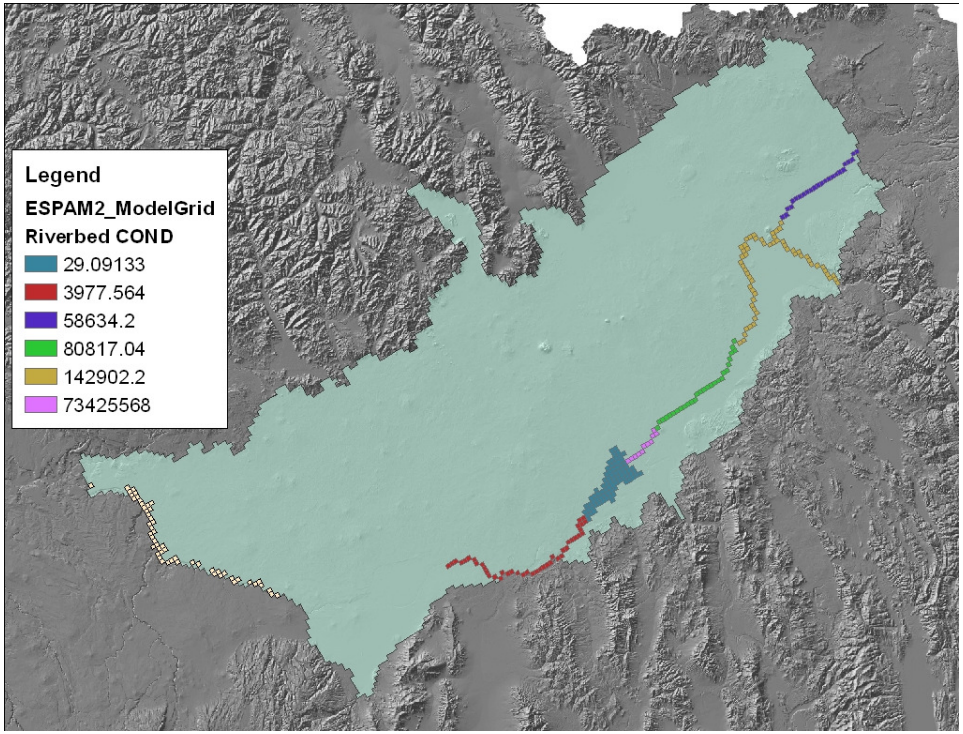


Transient Heads



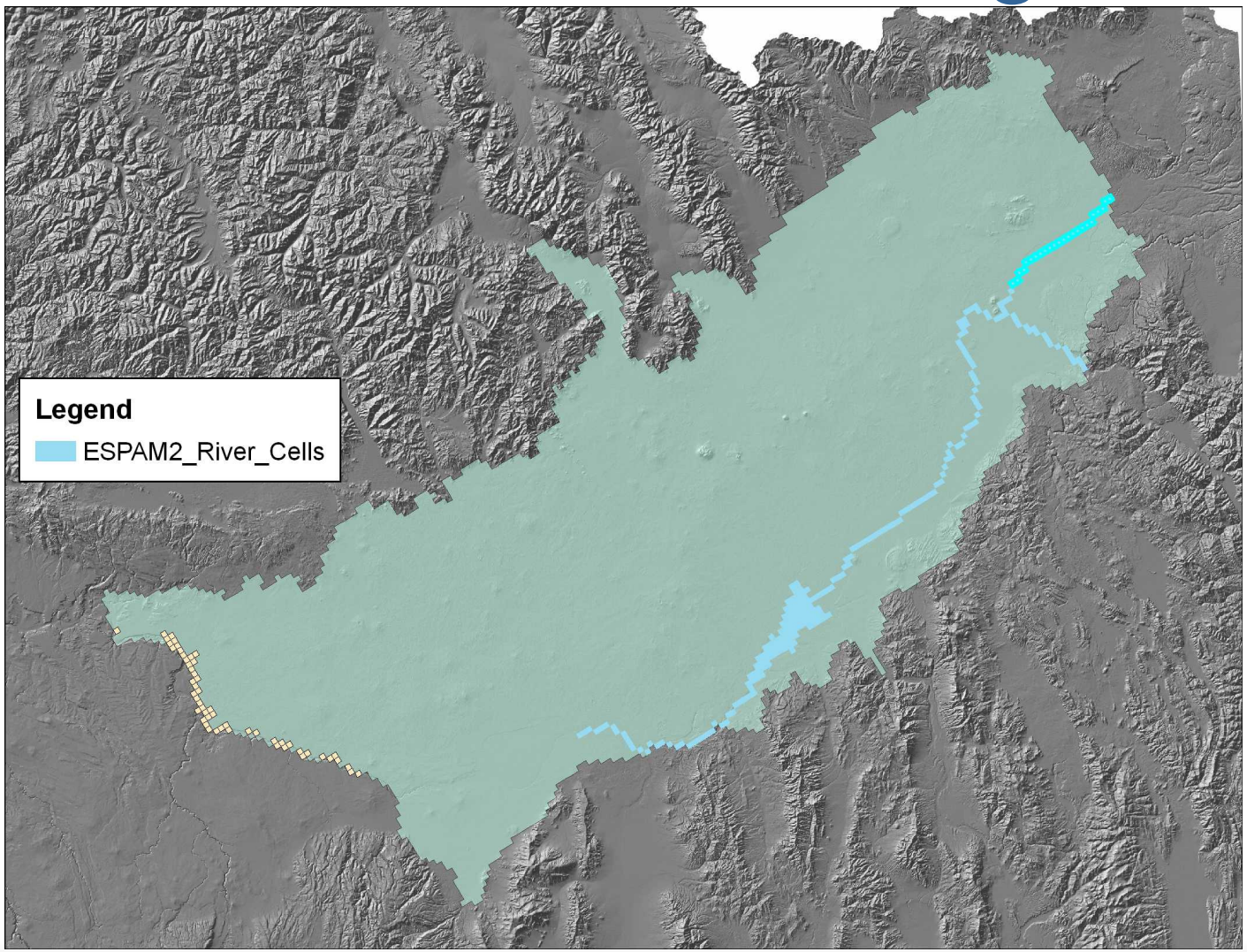
Transient Heads



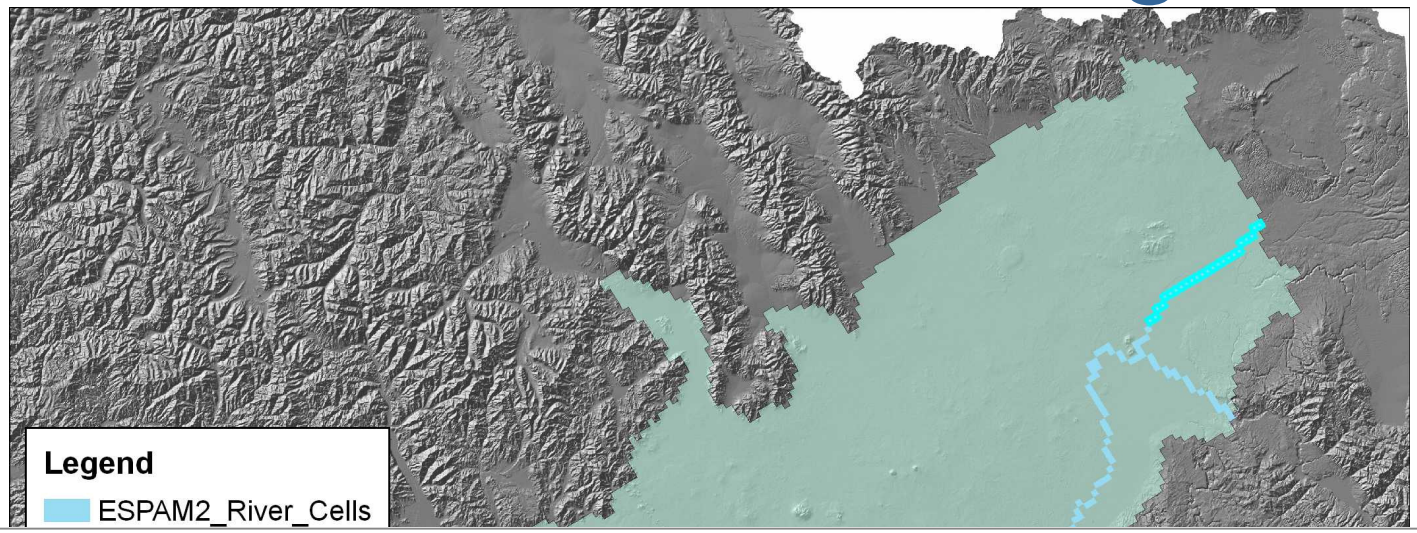


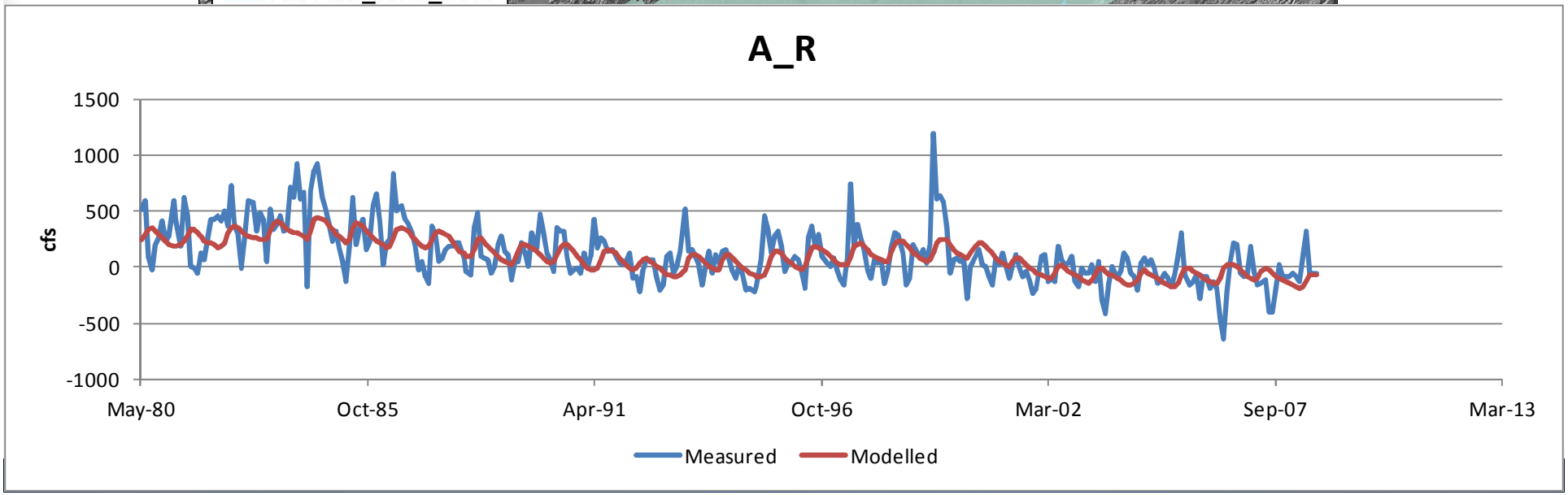
- Snake River reaches

Ashton - Rexburg

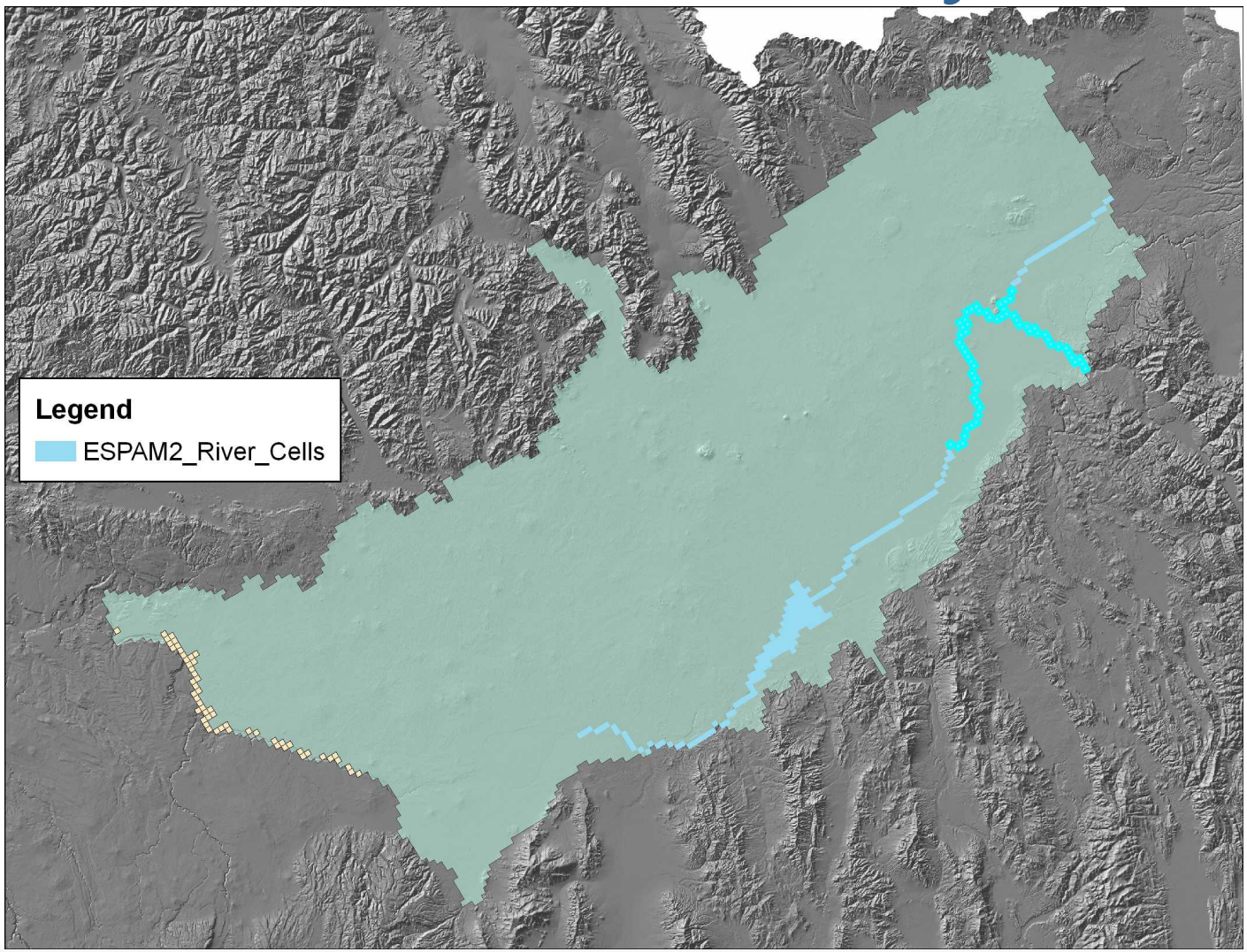


Ashton - Rexburg

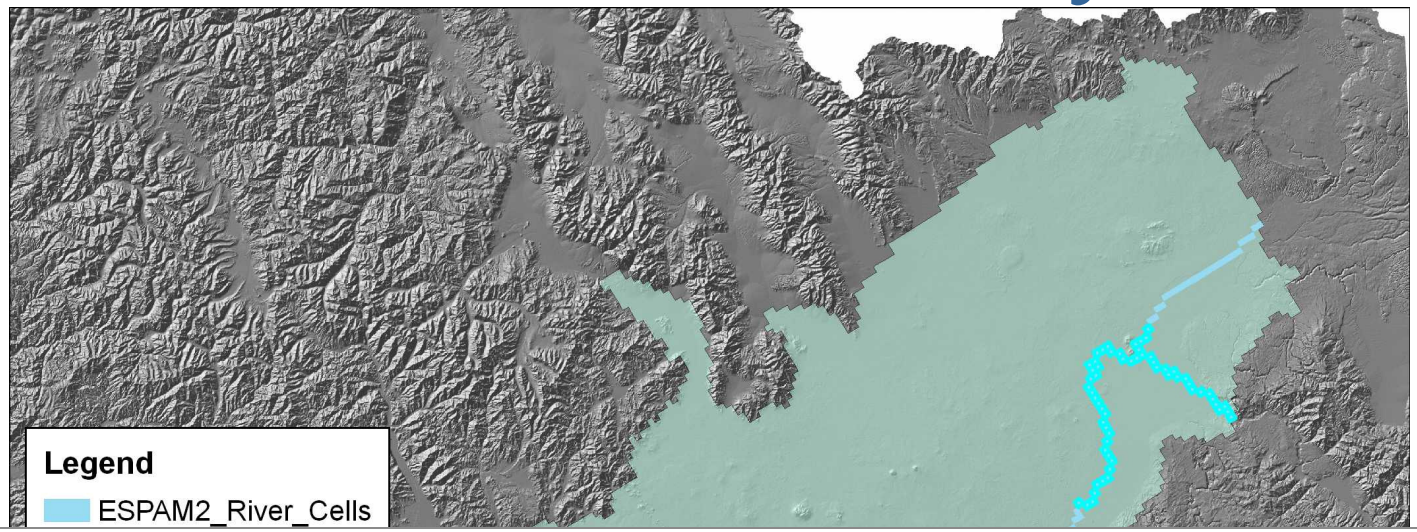


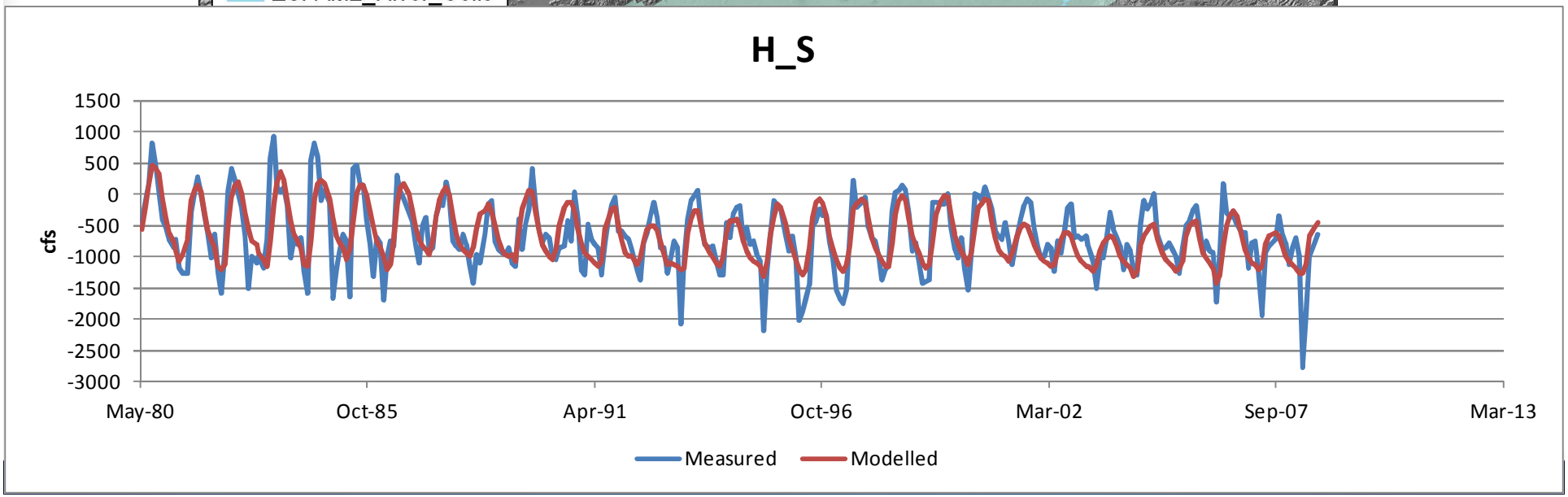


Heise - Shelley



Heise - Shelley





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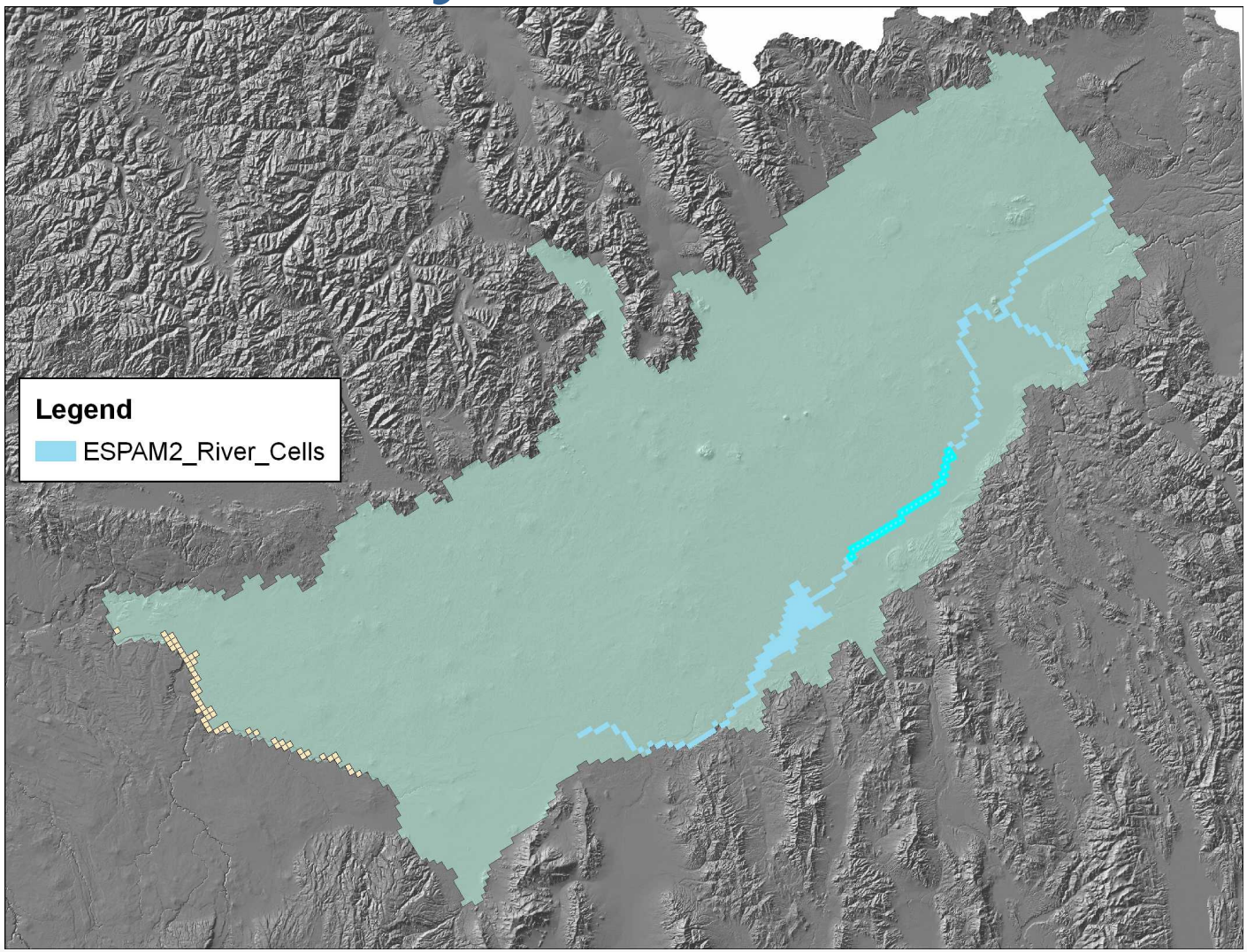

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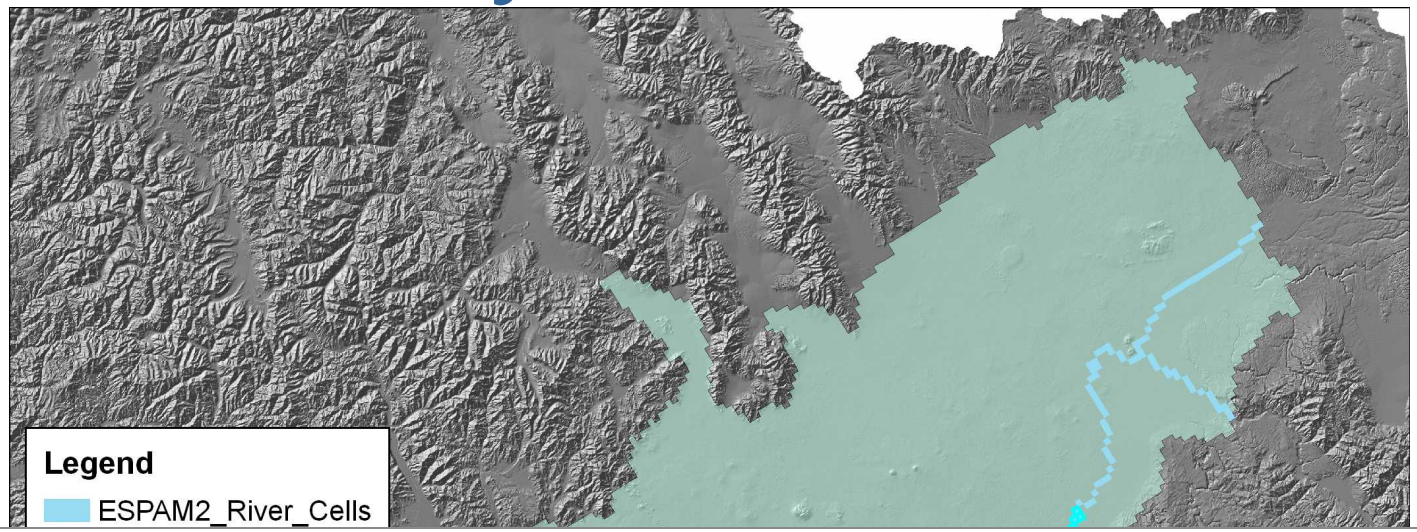

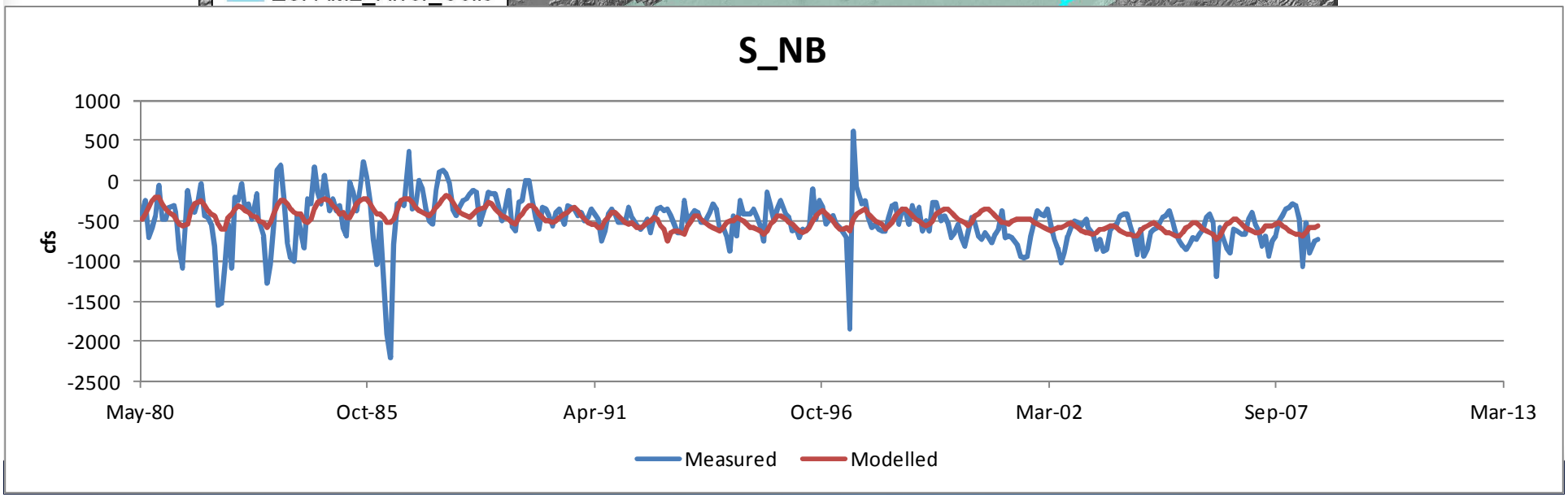

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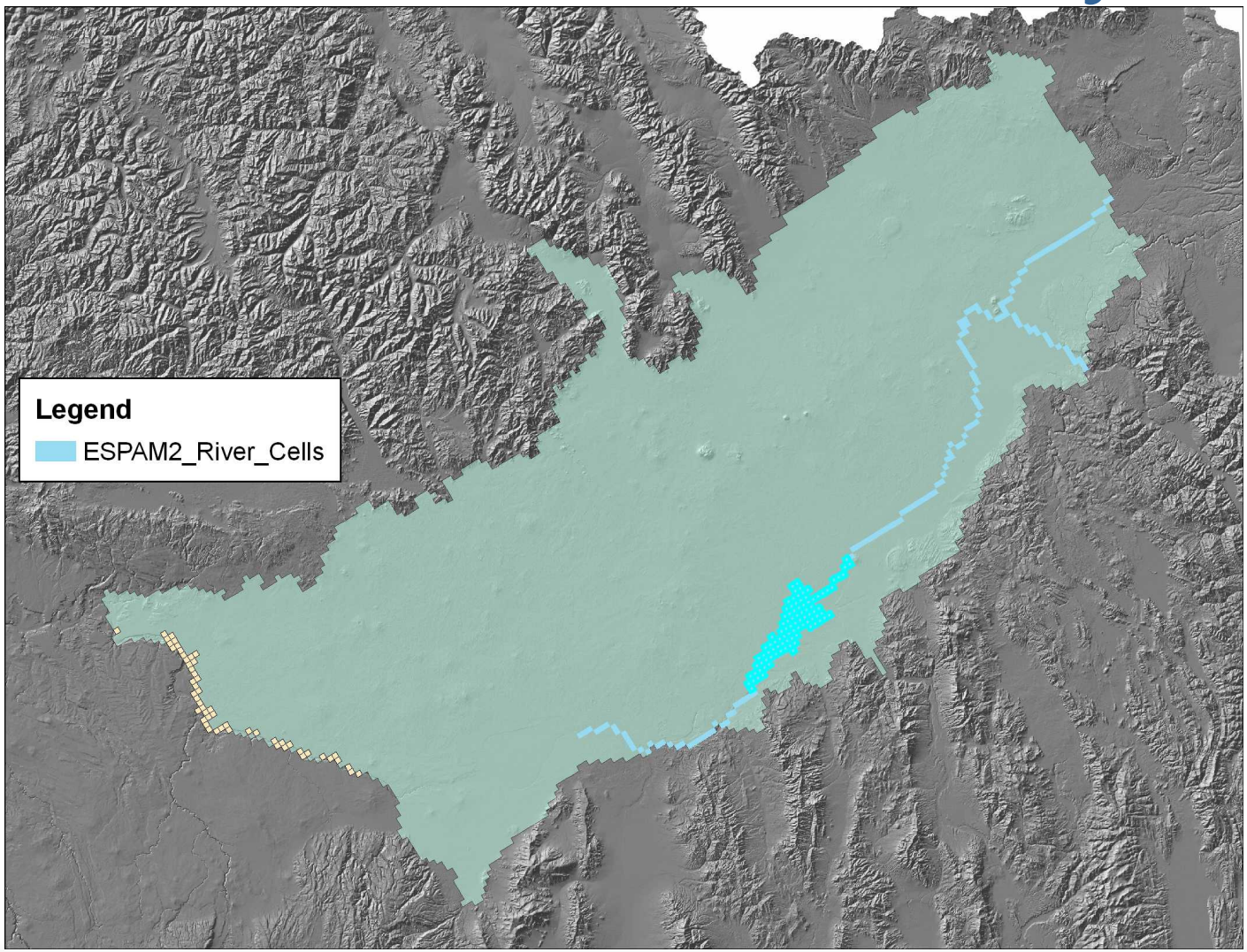
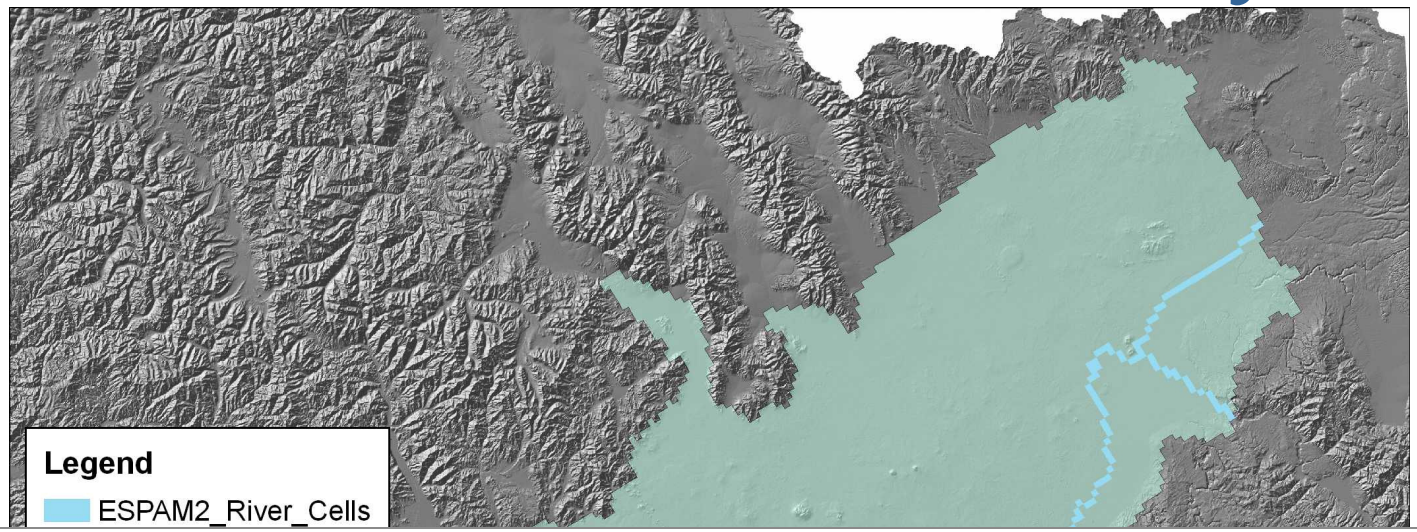
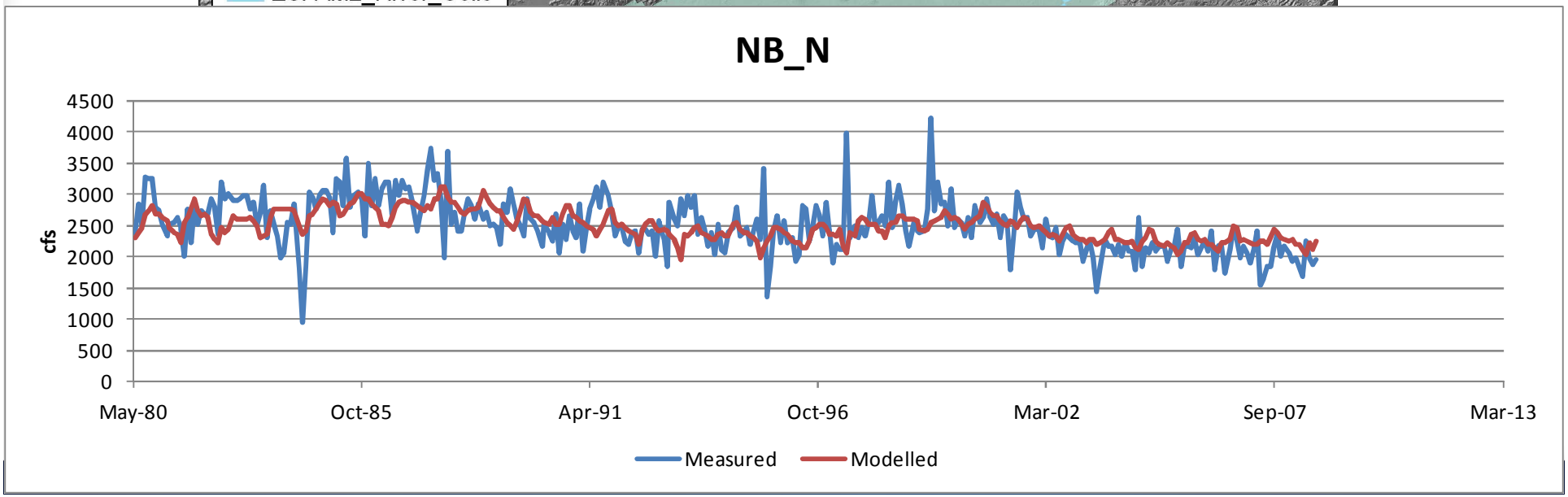
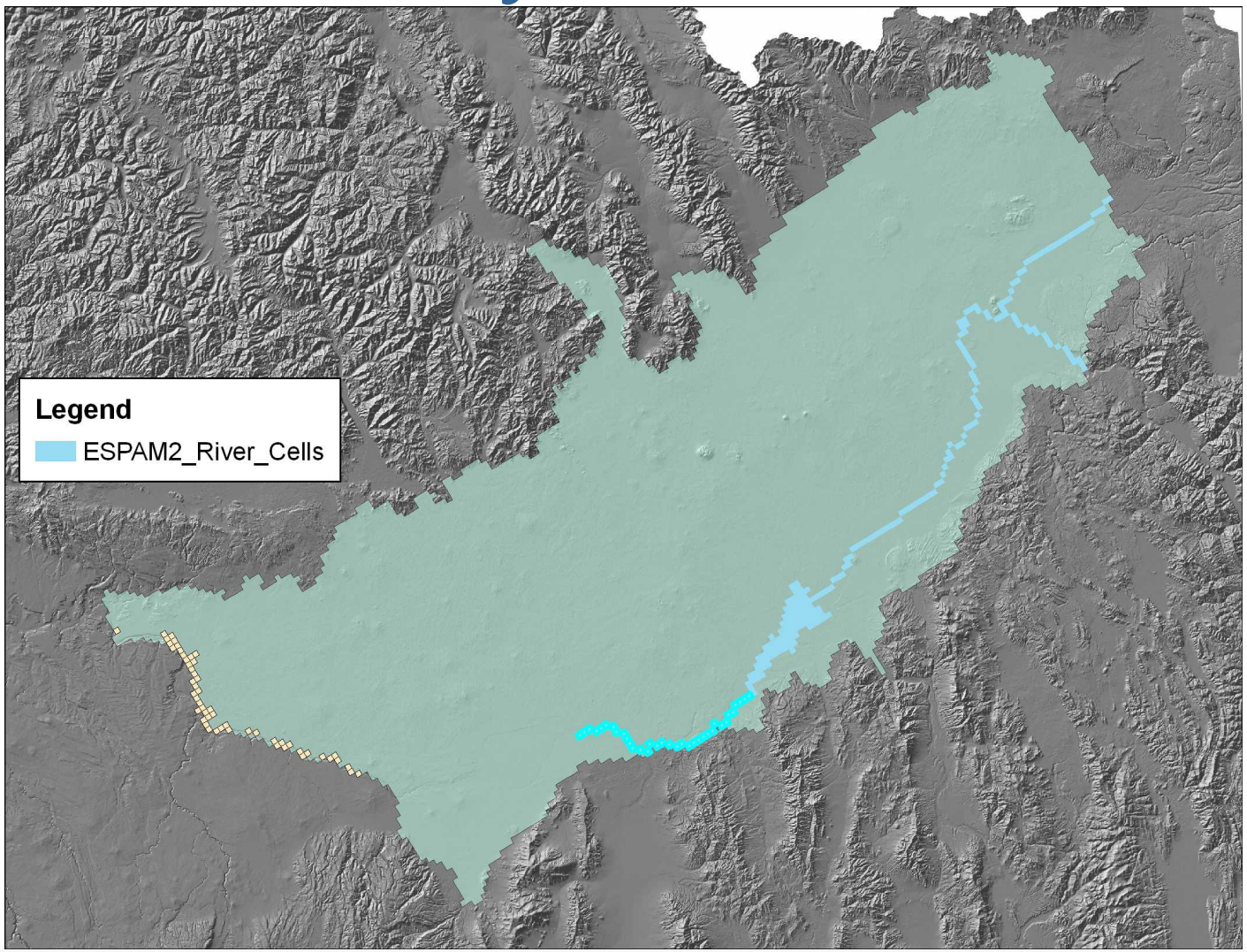


Nr Blackfoot - Neeley





Neeley - Minidoka



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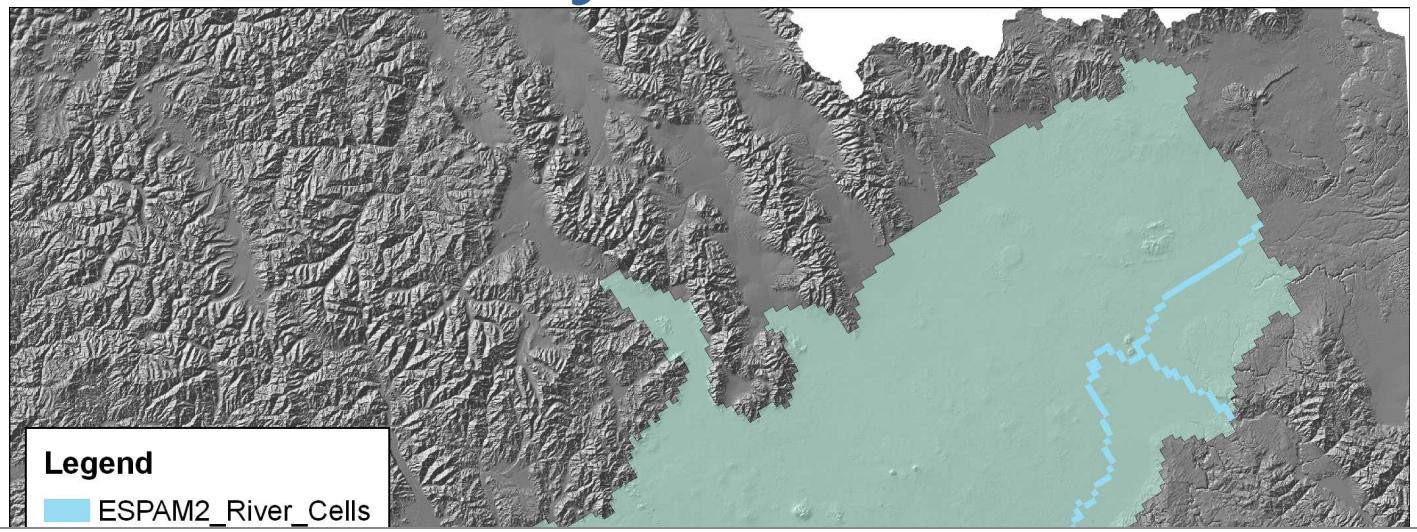
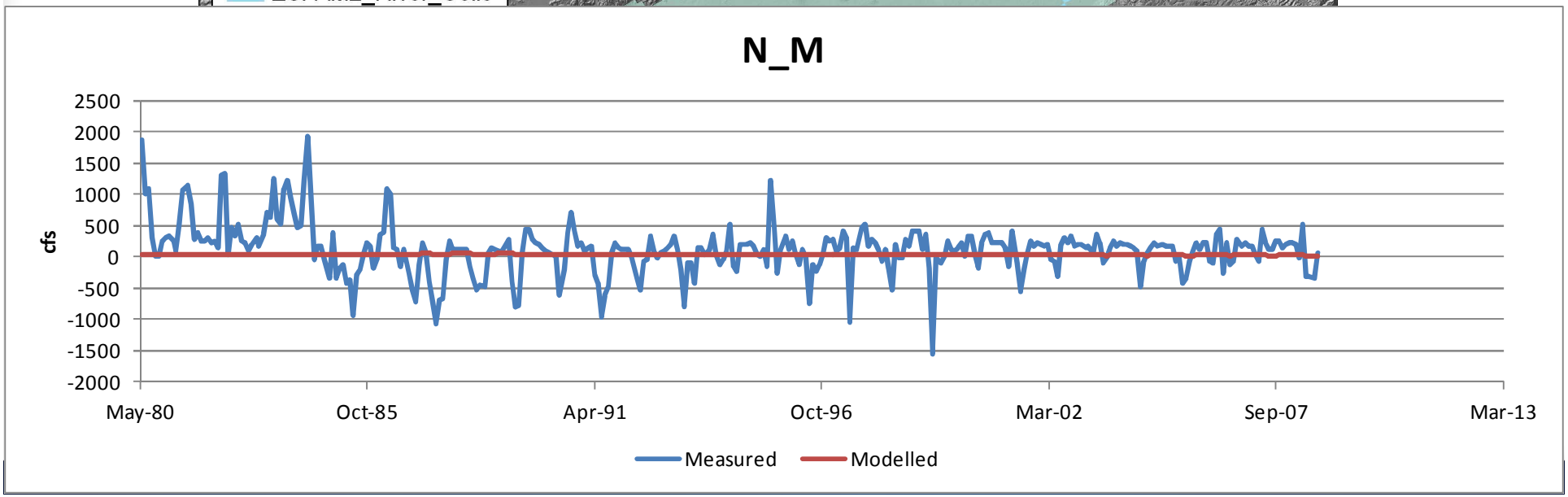
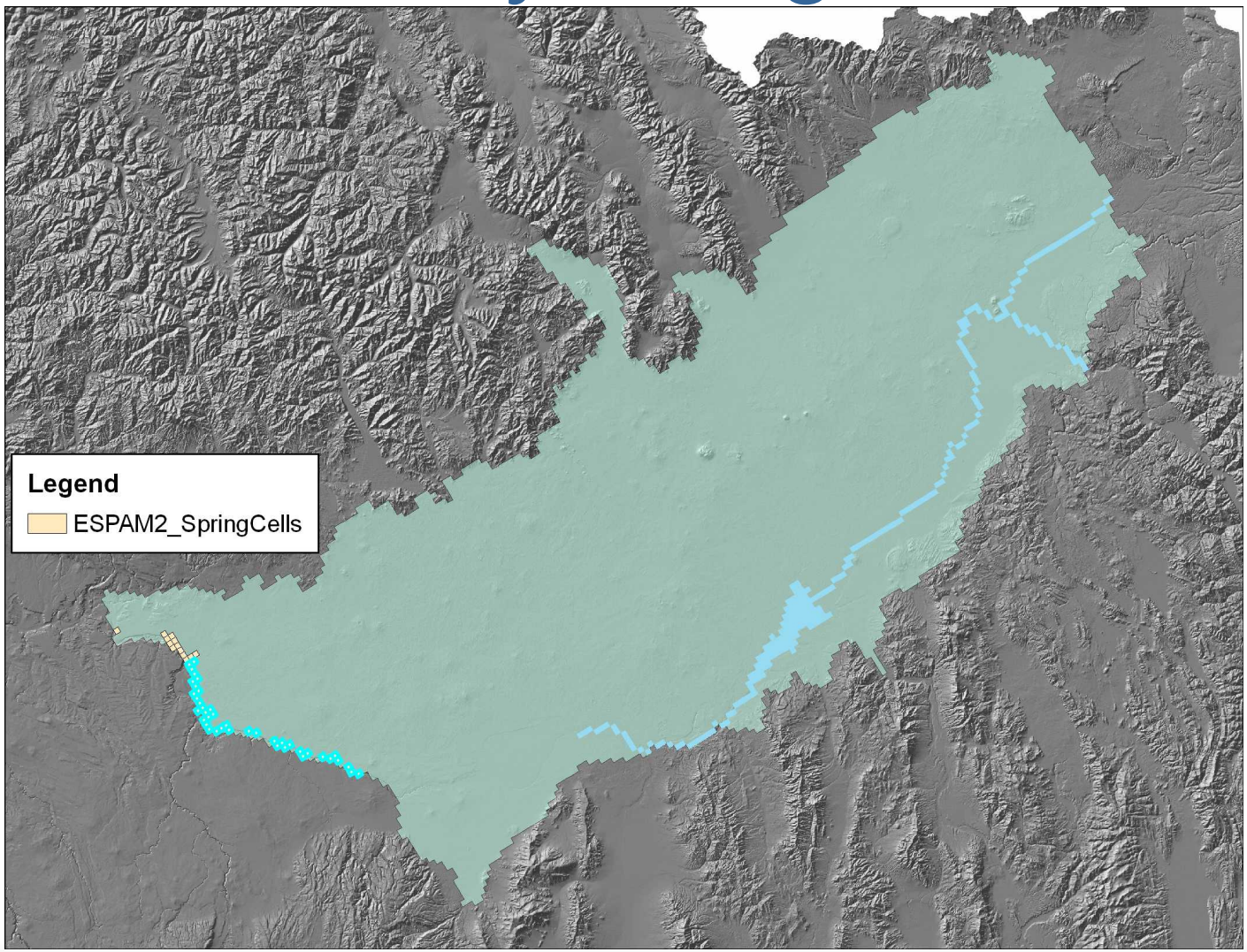


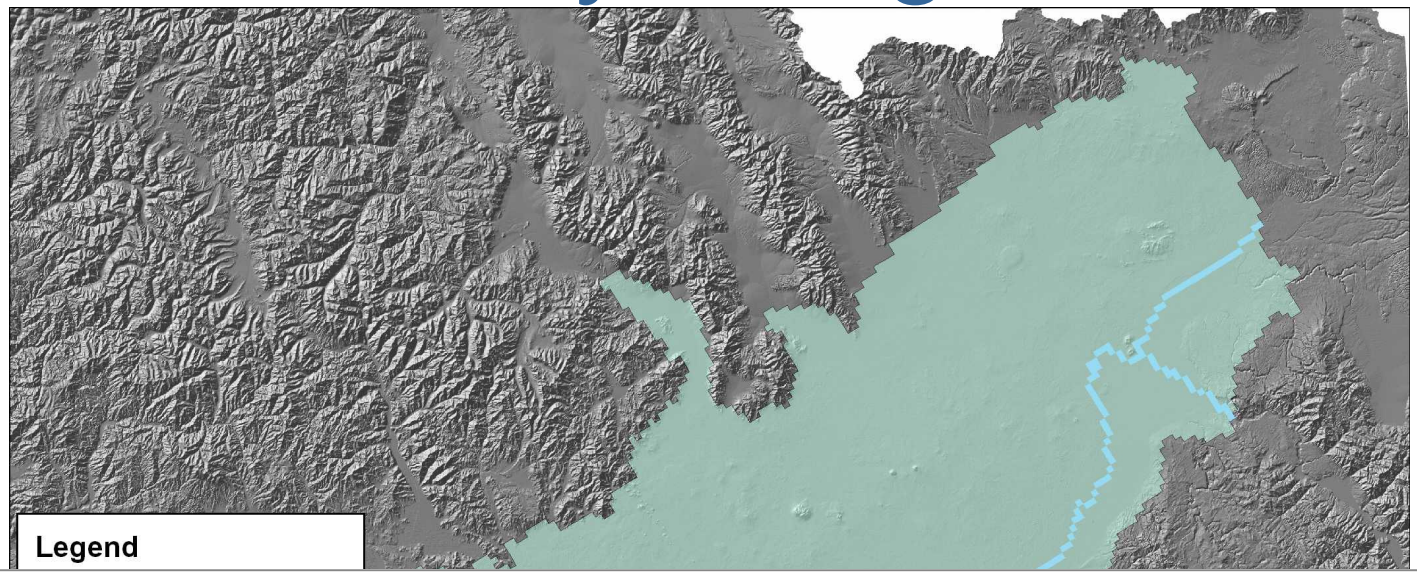


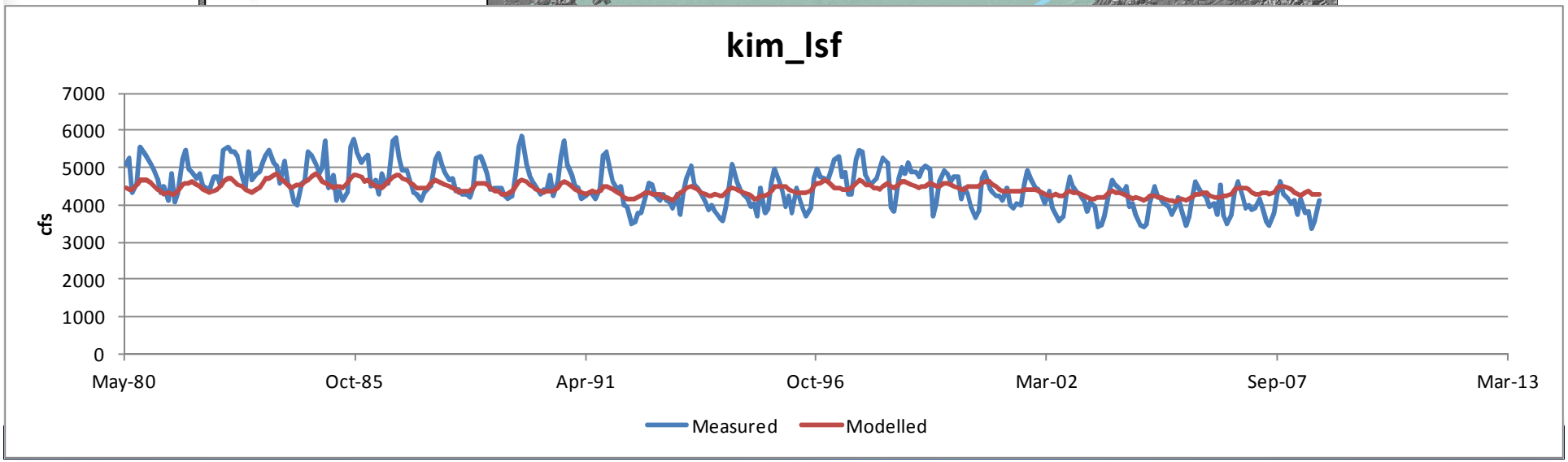
Kimberly - Hagerman



IDAHO Department of Water Resources

Kimberly - Hagerman





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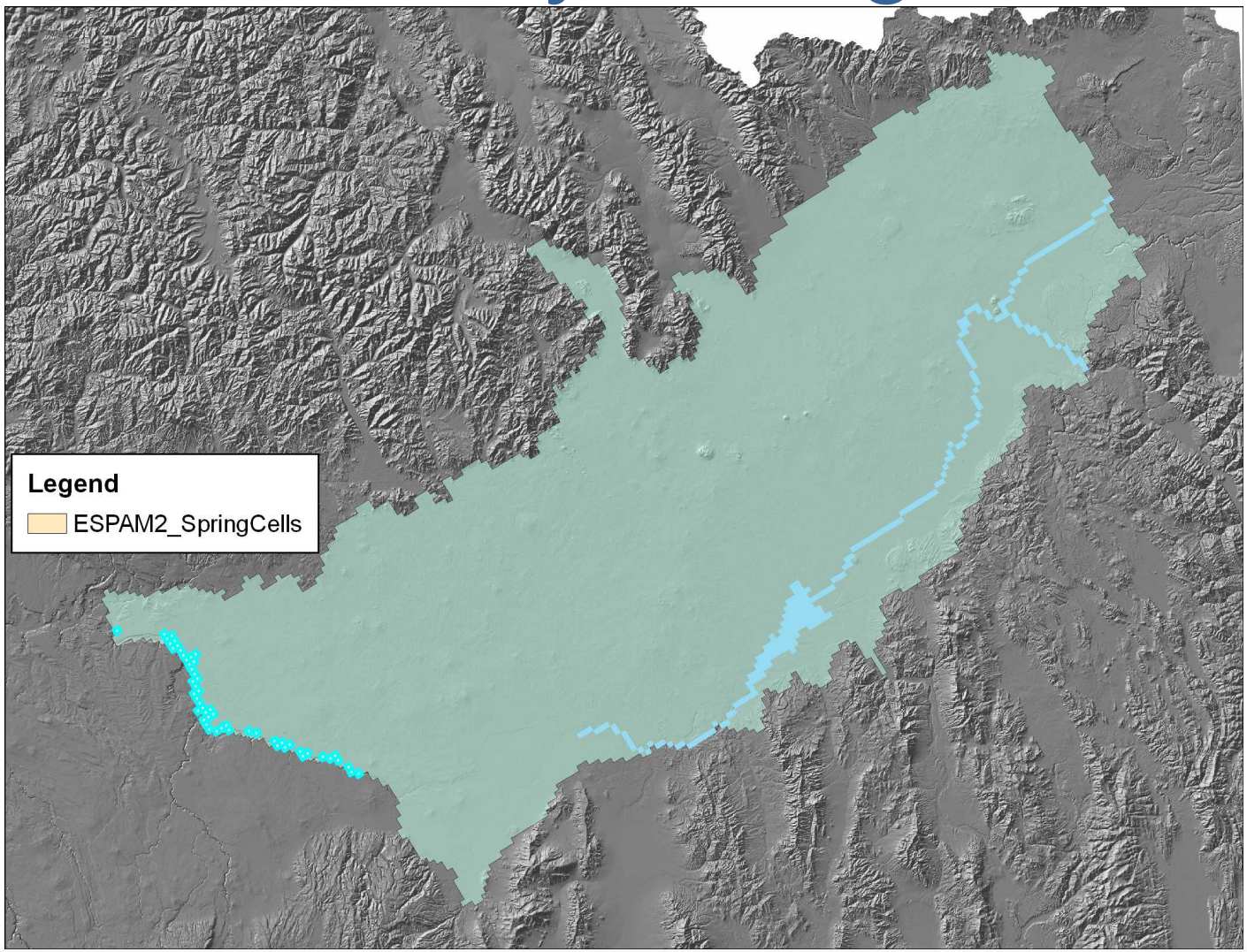
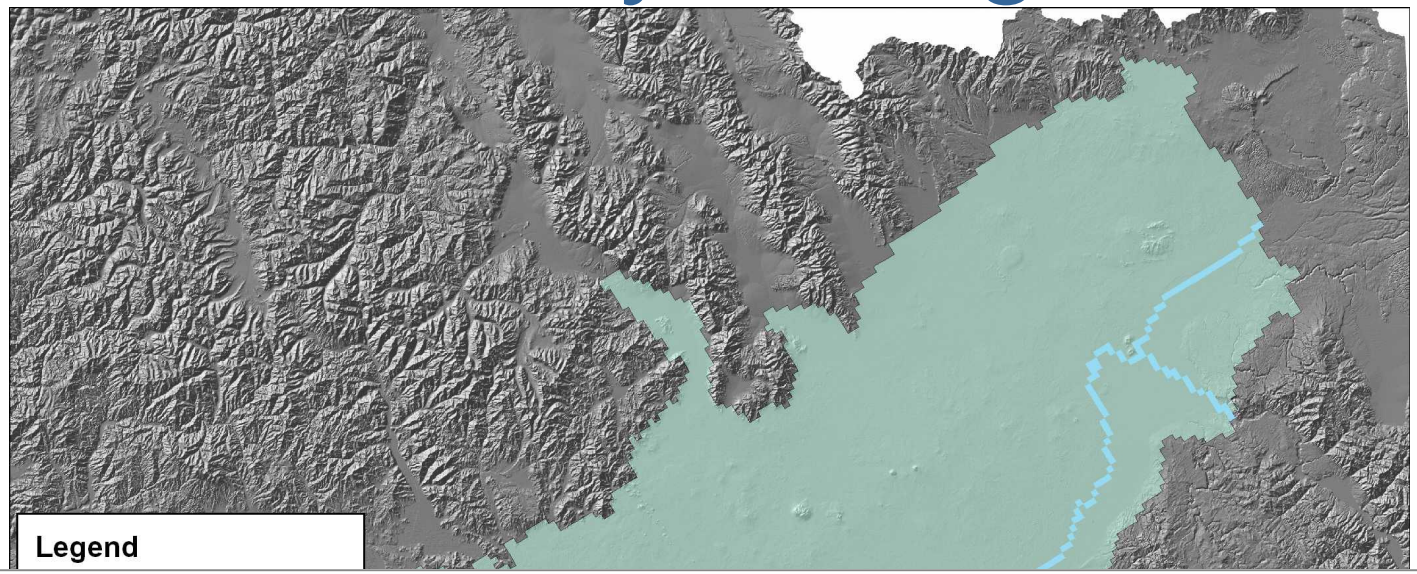
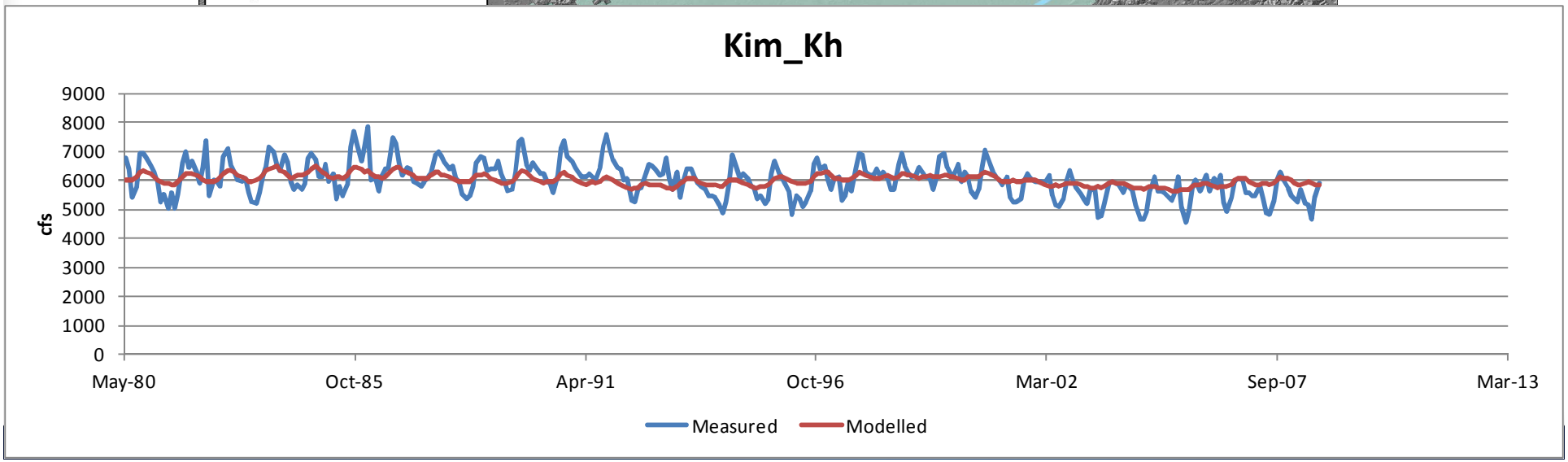
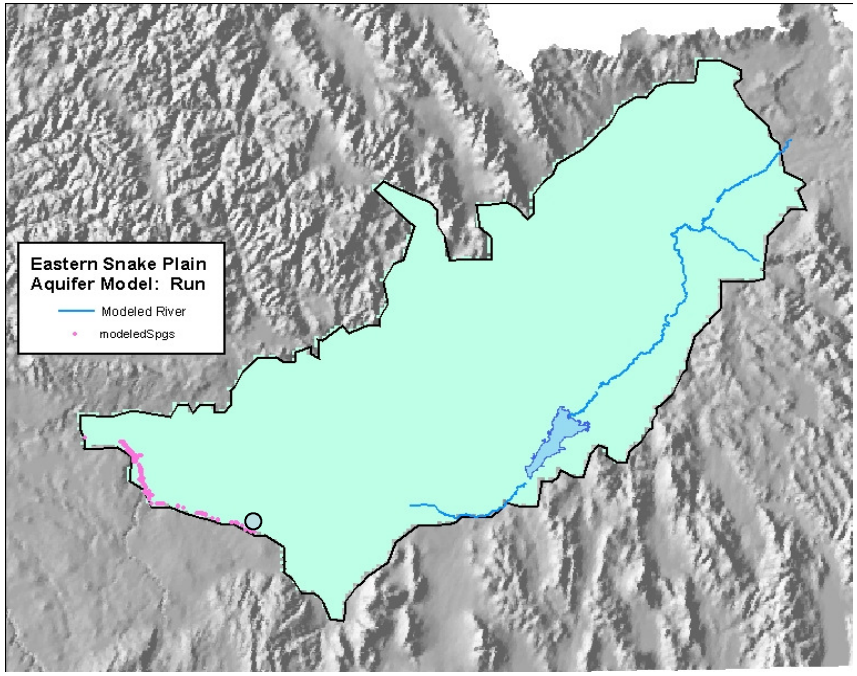


IDAHO Department of Water Resources

Kimberly – King Hill

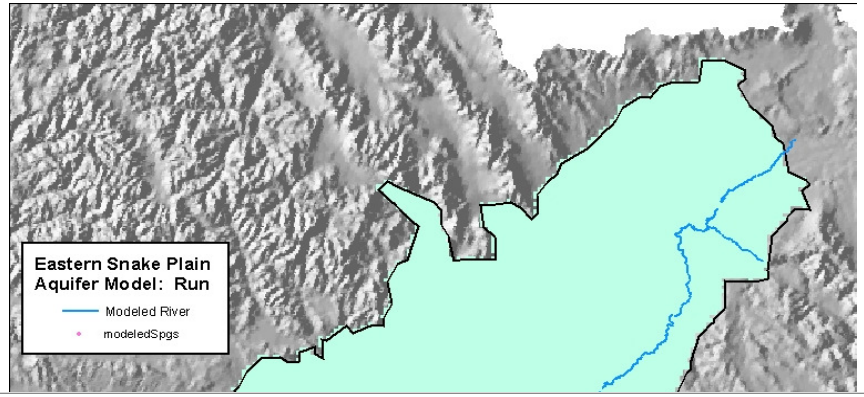


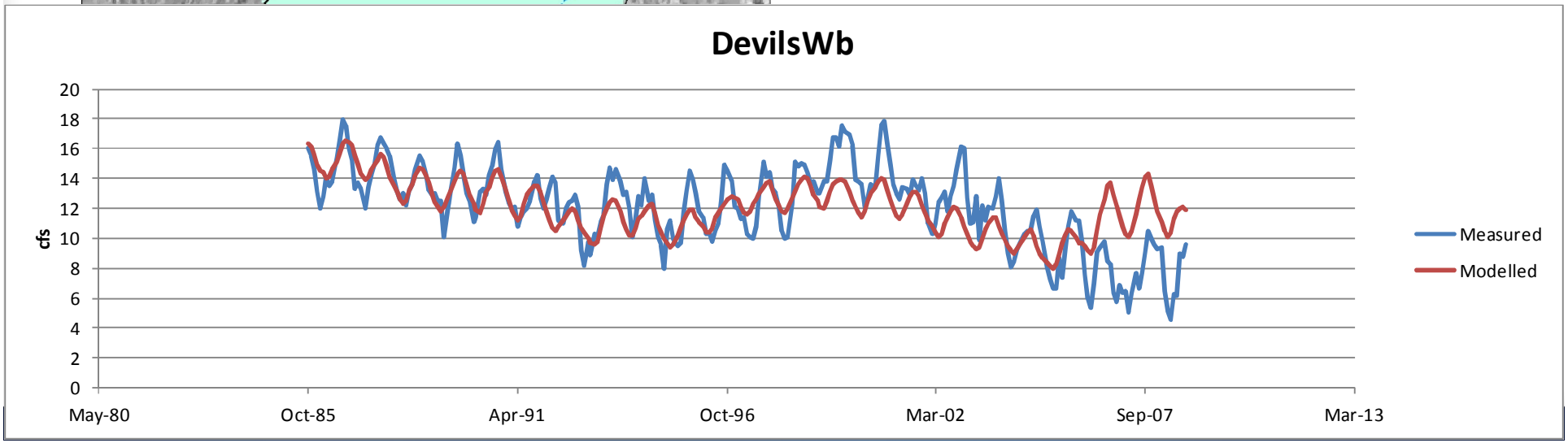


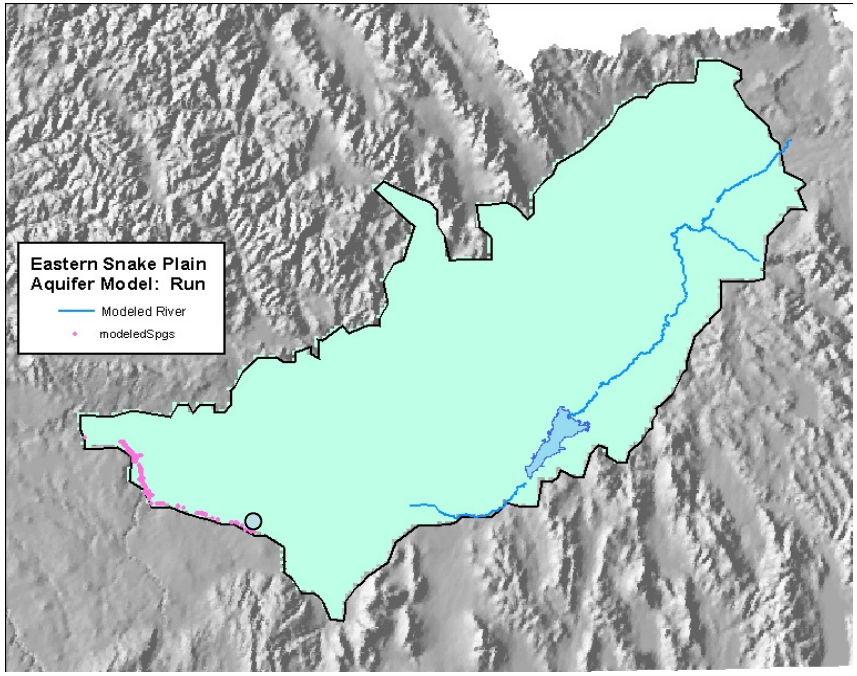


- Devils Washbowl

- Devils Washbowl

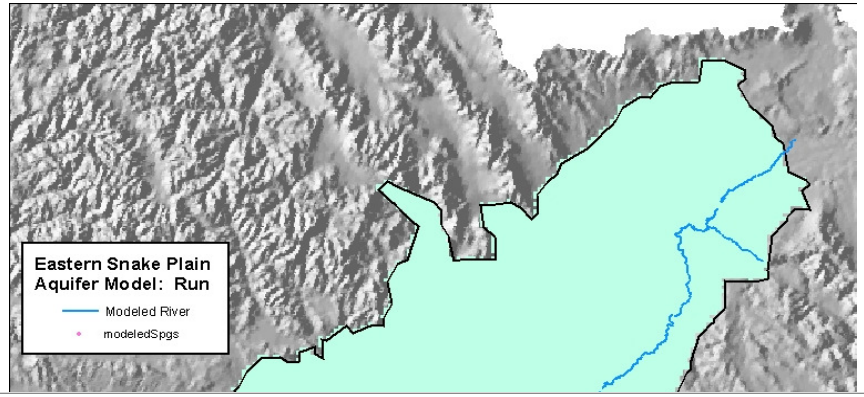


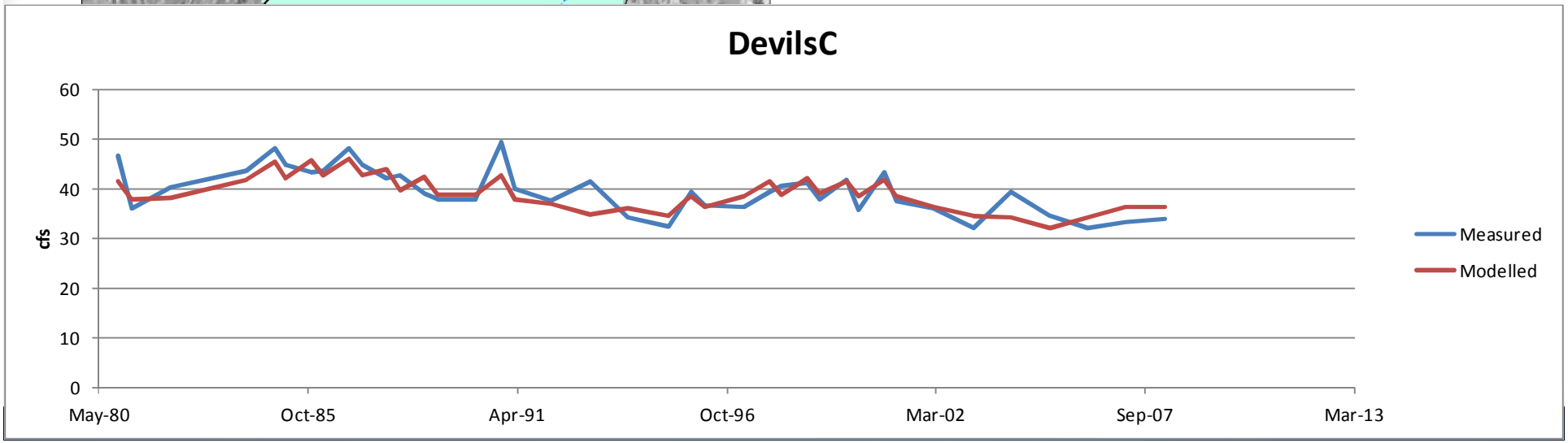


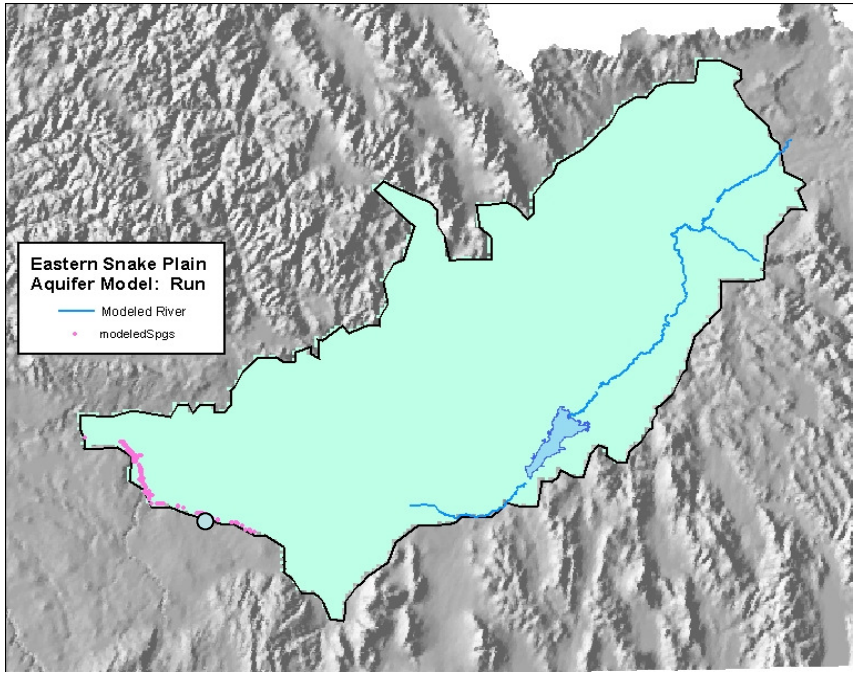


- Devils Corral

- Devils Corral

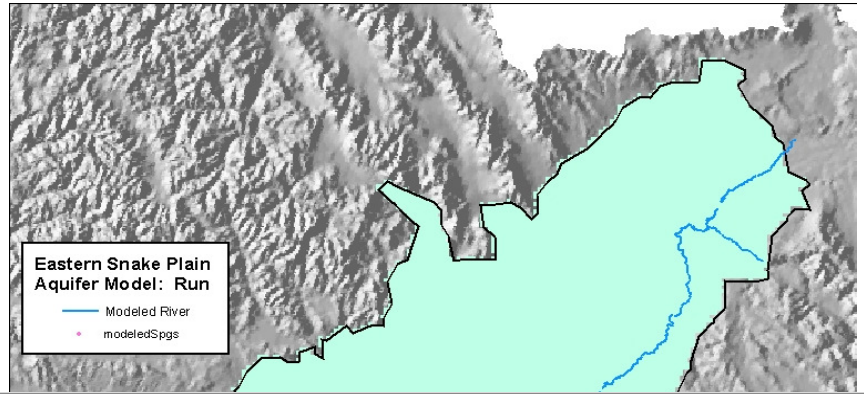


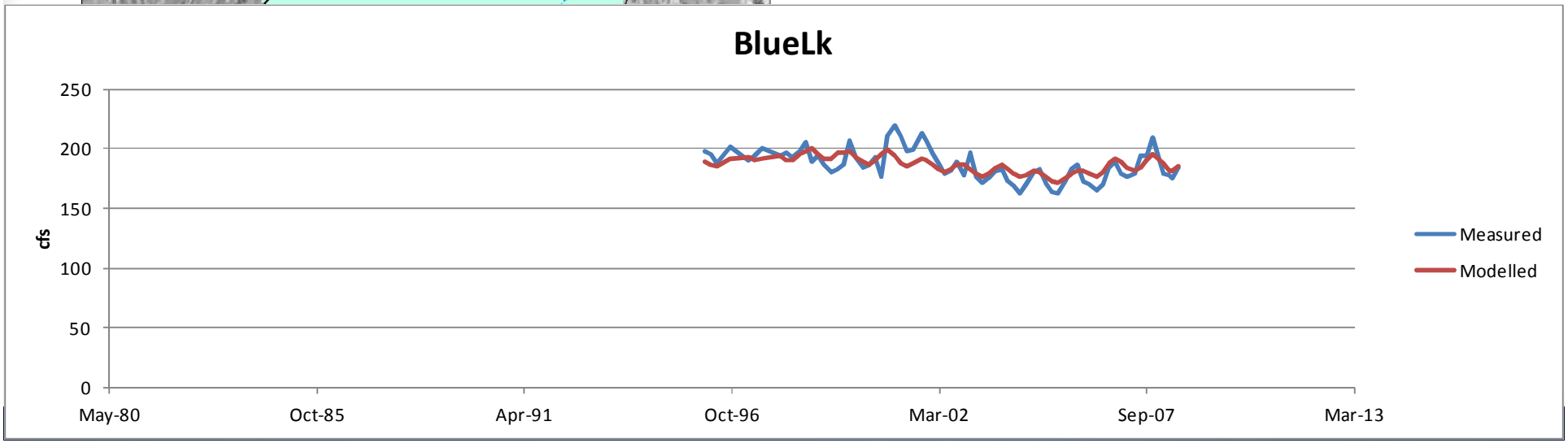


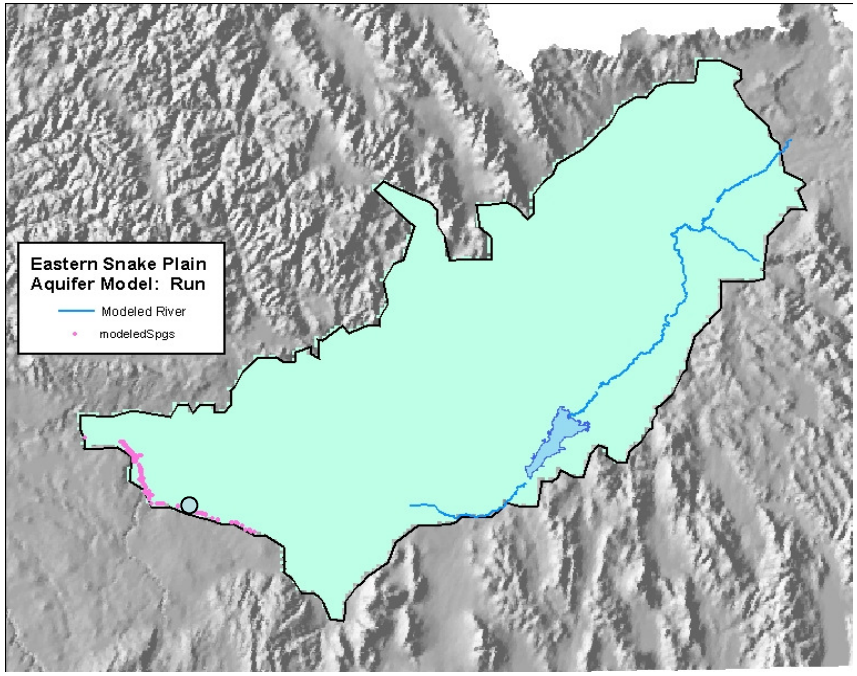

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Blue Lakes

- Blue Lakes

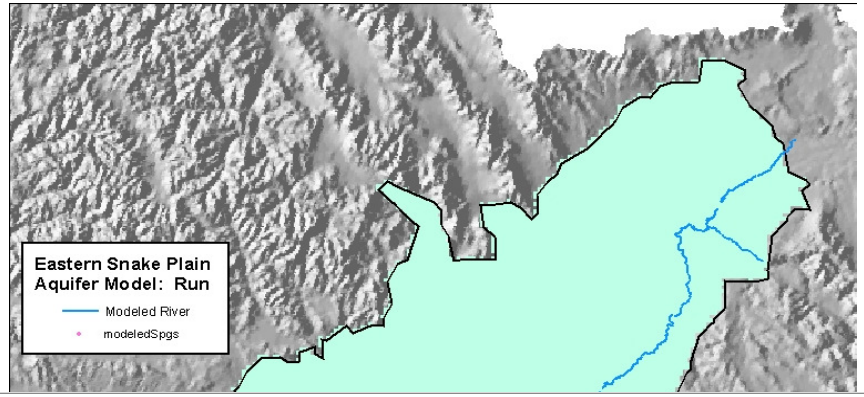

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

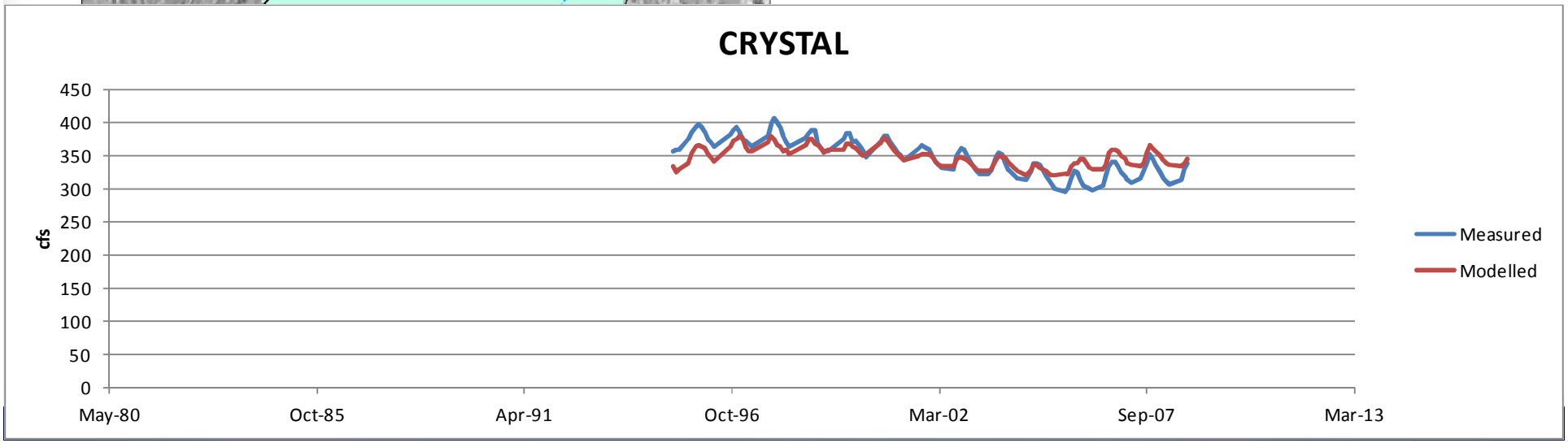

BlueLk
250
200
150
100
50
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled

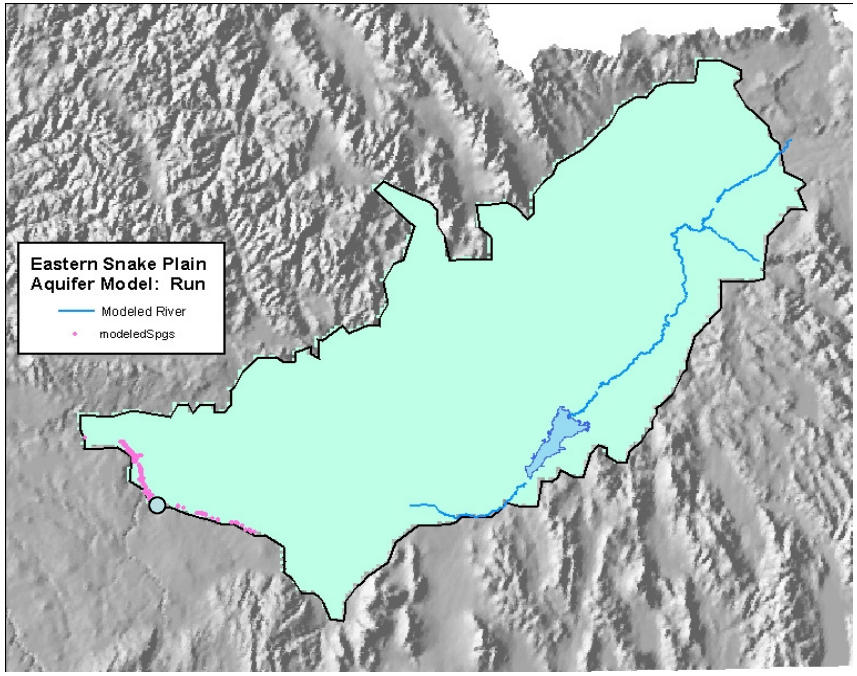


- Crystal Springs

- Crystal Springs

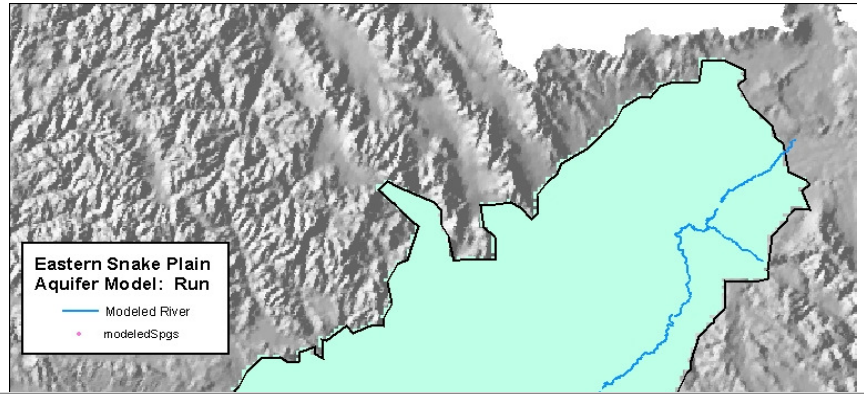


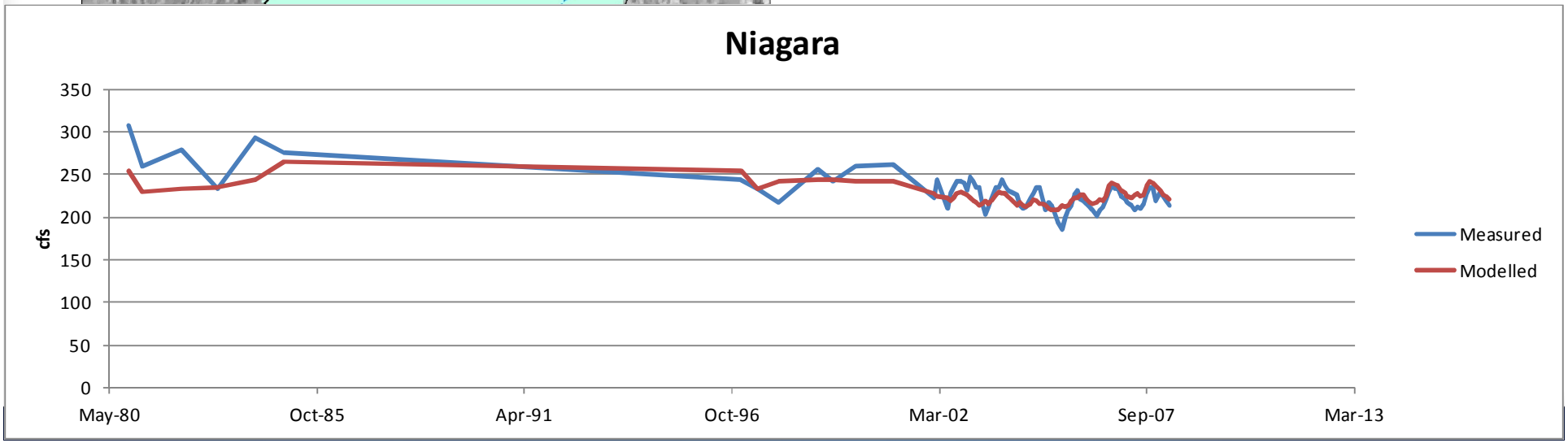



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Niagara

- Niagara


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


Niagara
350
300
250
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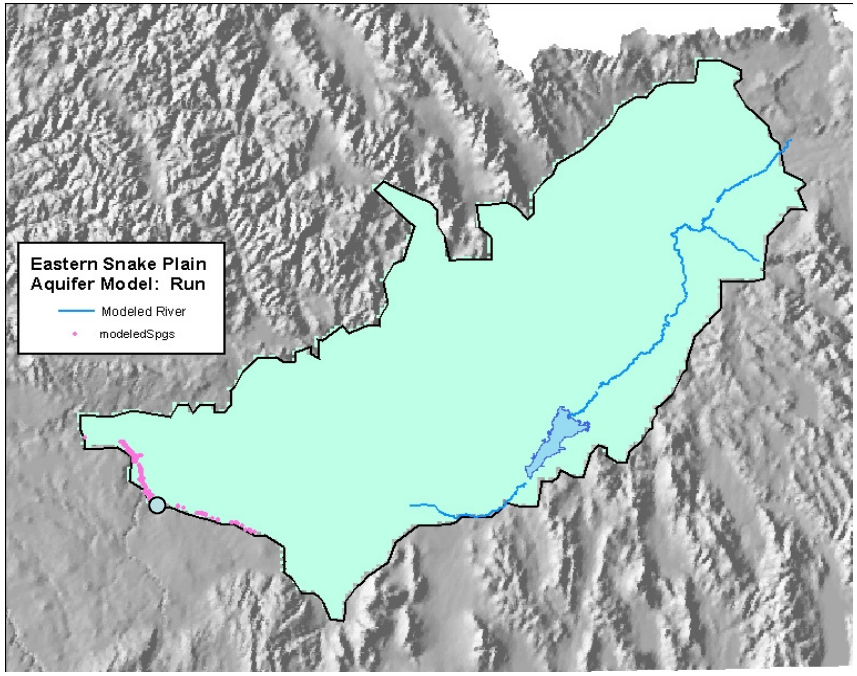
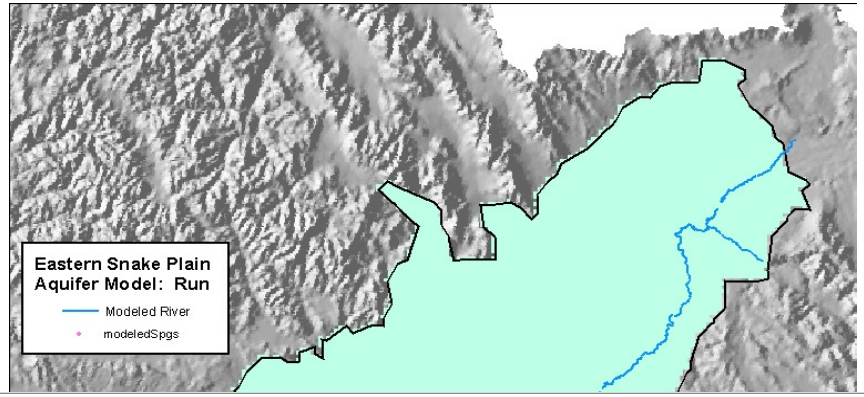
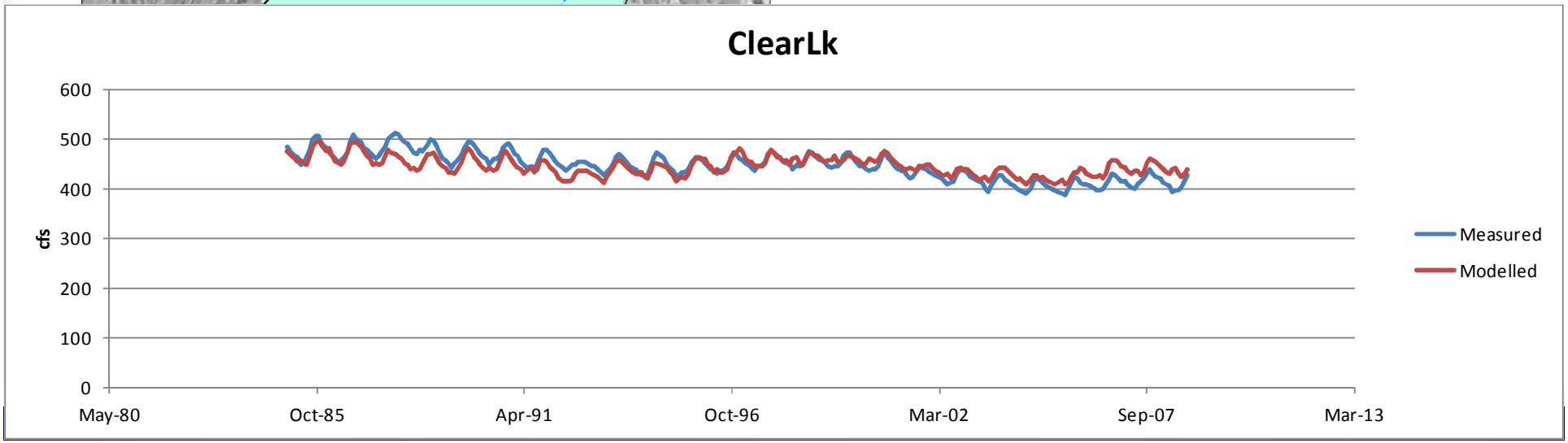
Sep-07
Mar-13
Measured
Modelled


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
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May-80
Oct-85
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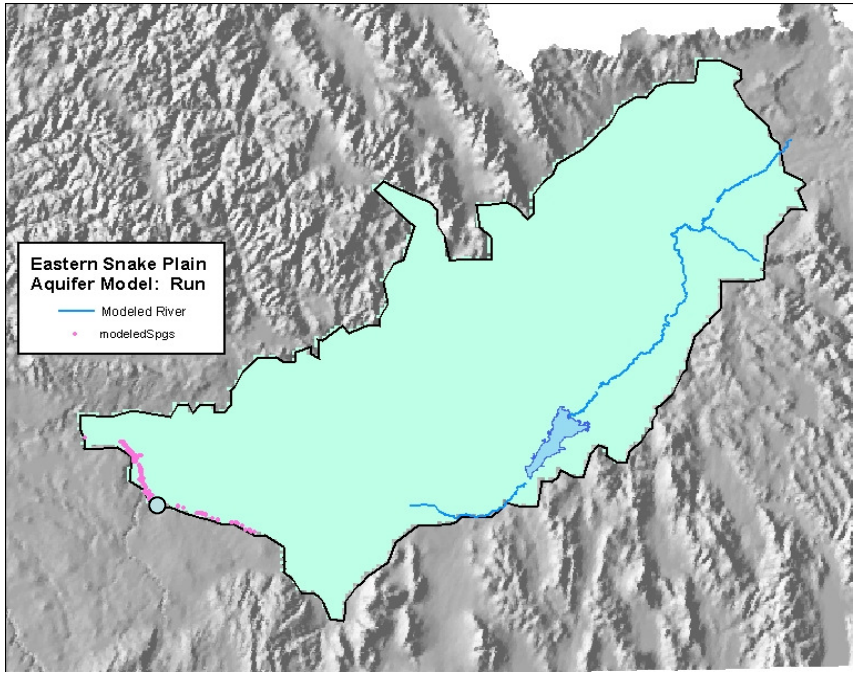
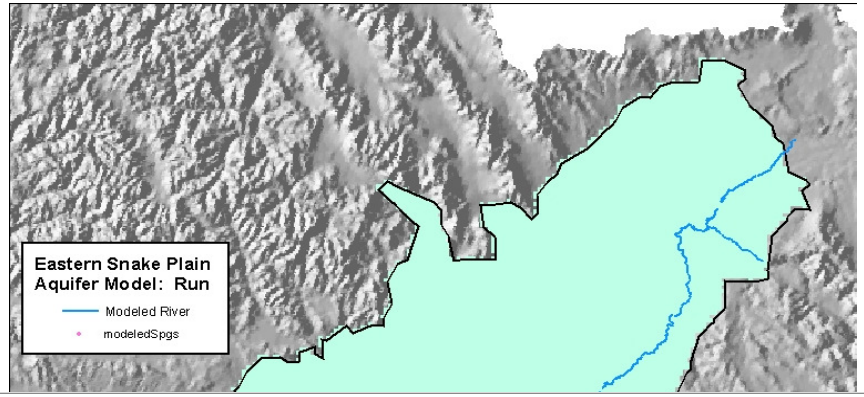
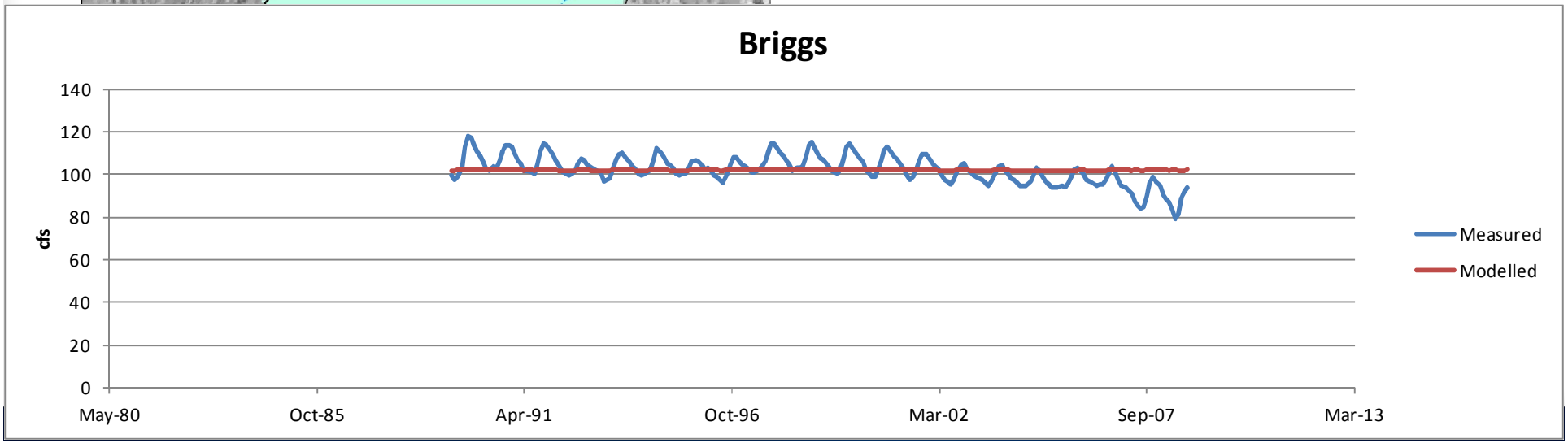
Sep-07
Mar-13
Measured
Modelled

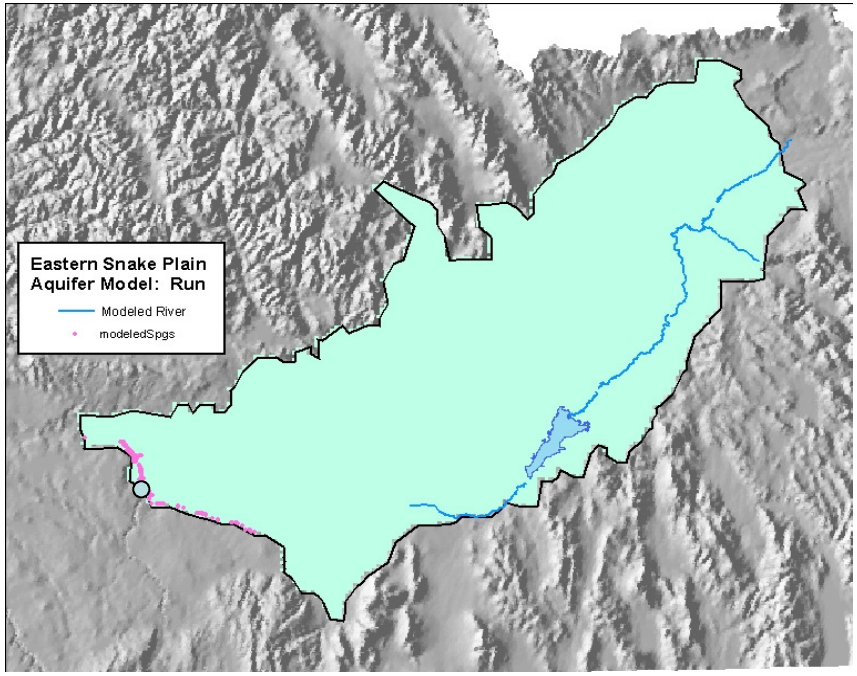


- Briggs Spring

- Briggs Spring

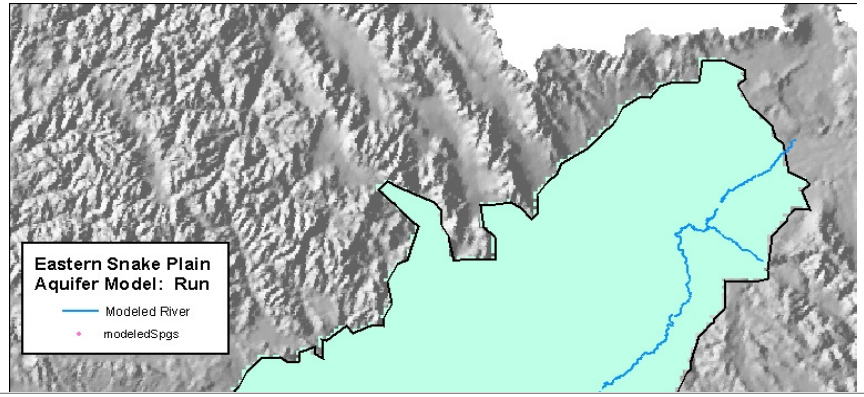


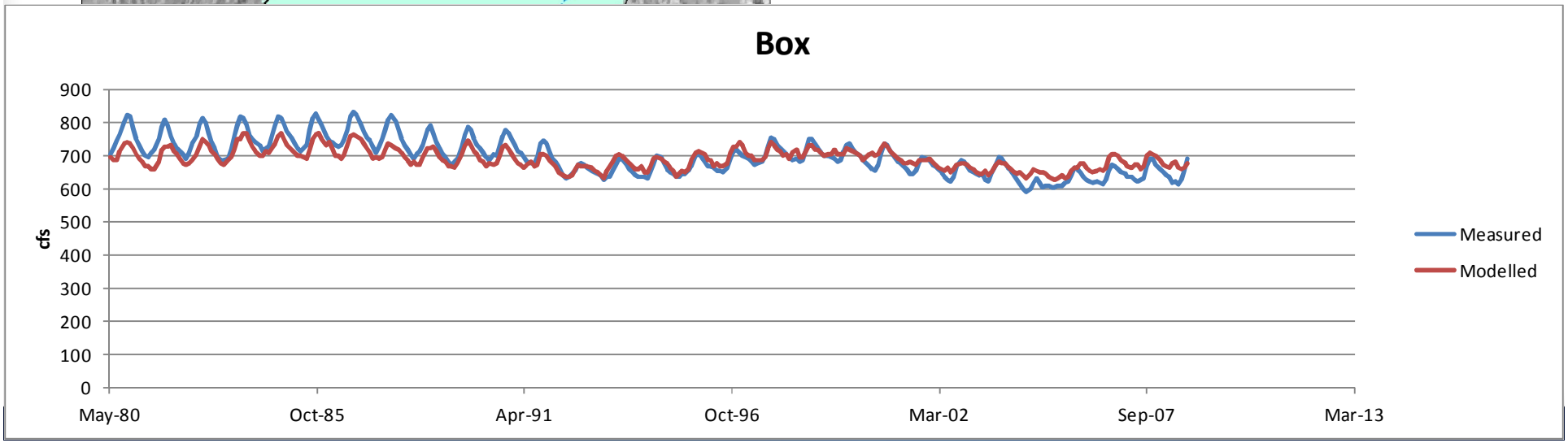


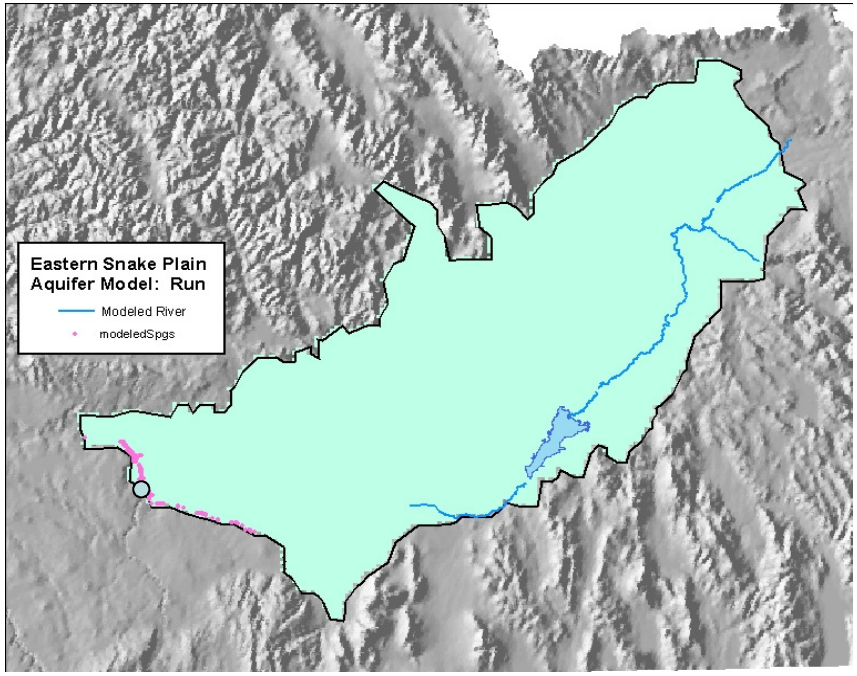


- Box Canyon Spring

- Box Canyon Spring

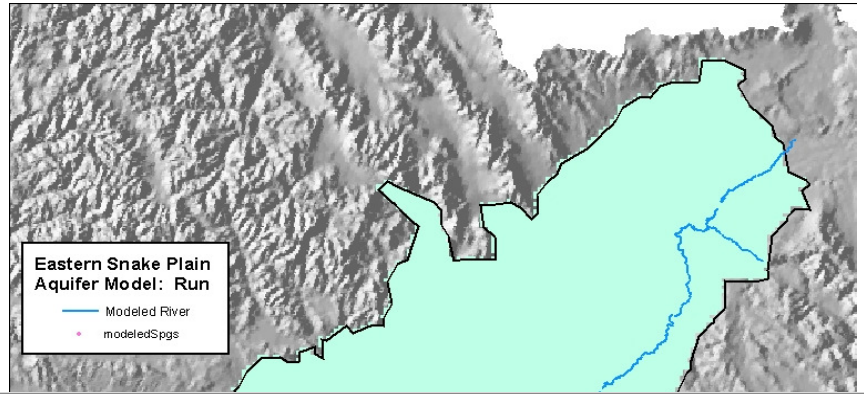


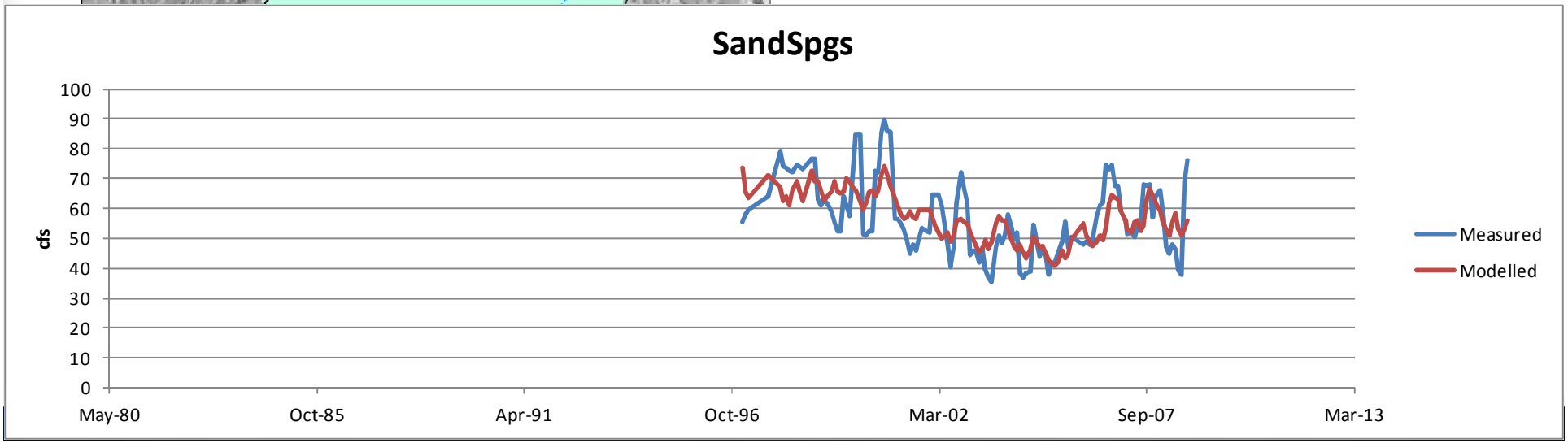


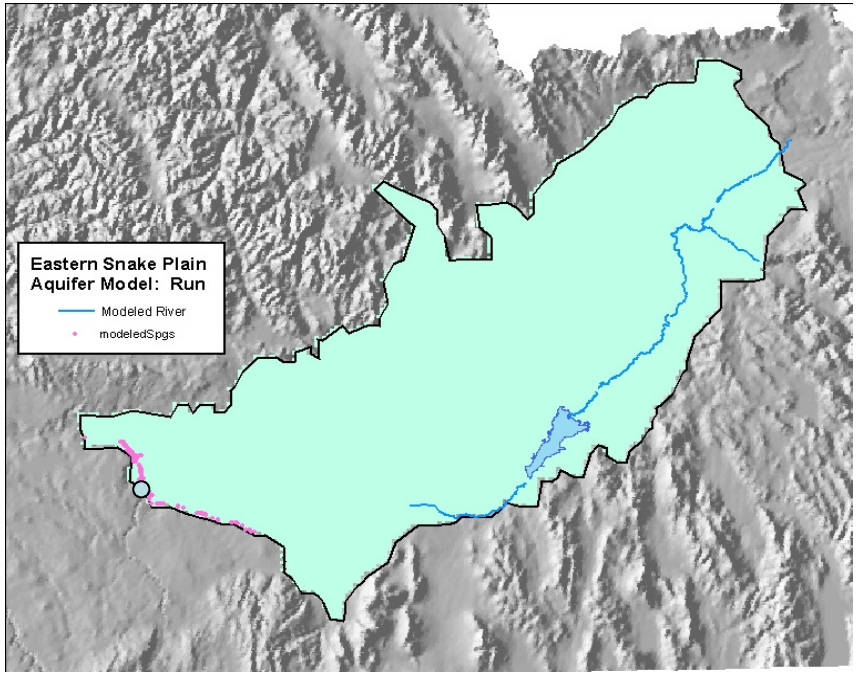


- Sand Springs

- Sand Springs

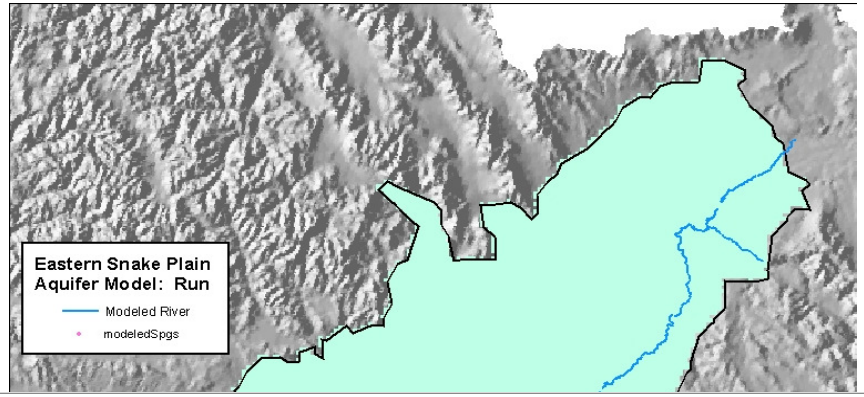


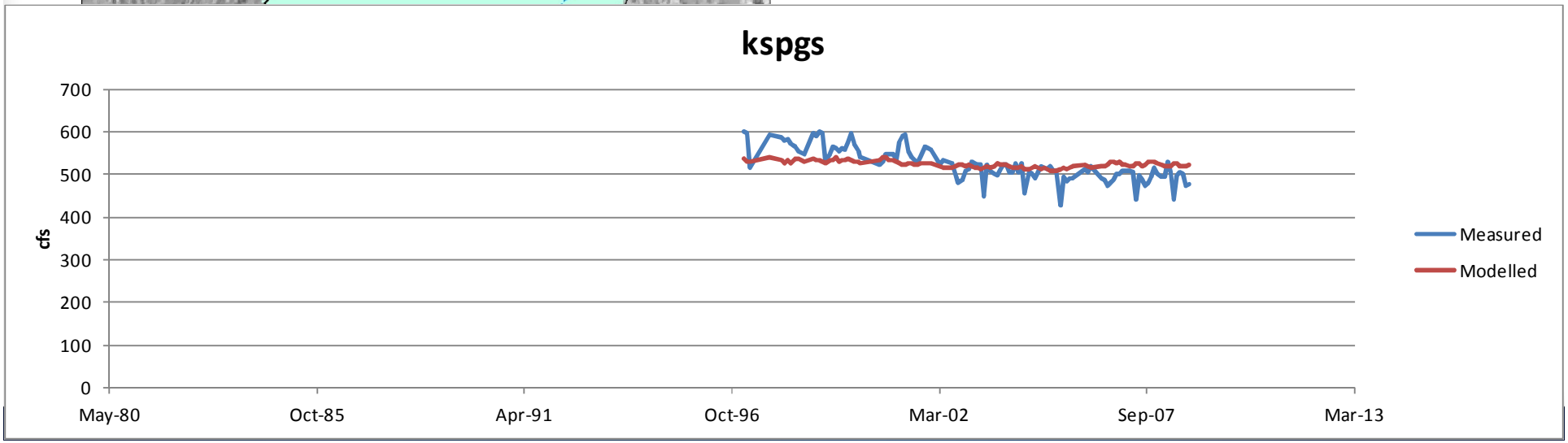


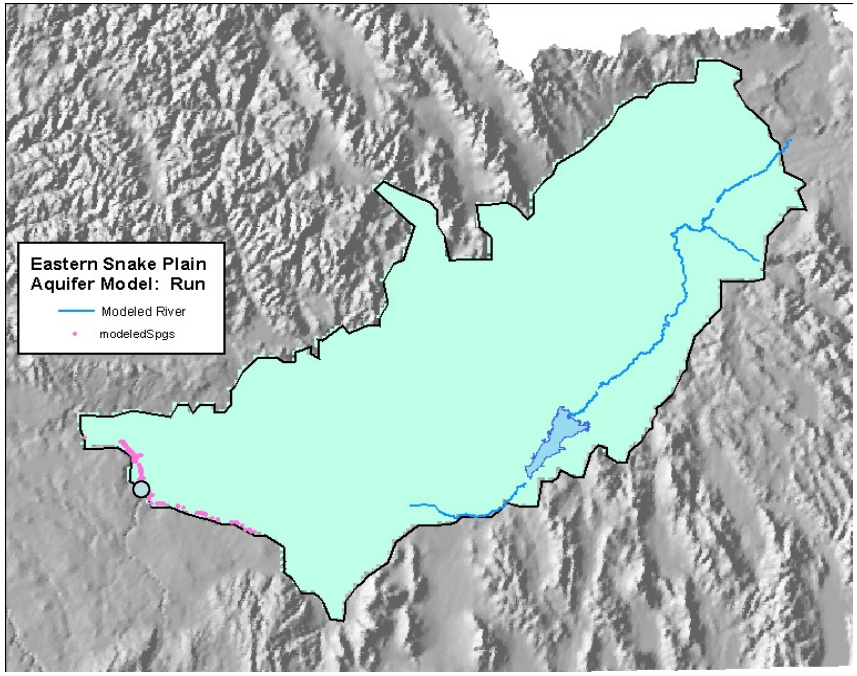


- Thousand Springs

- Thousand Springs

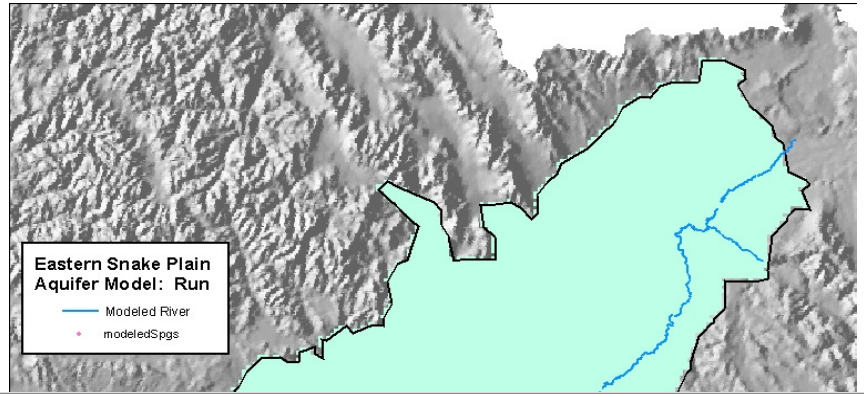


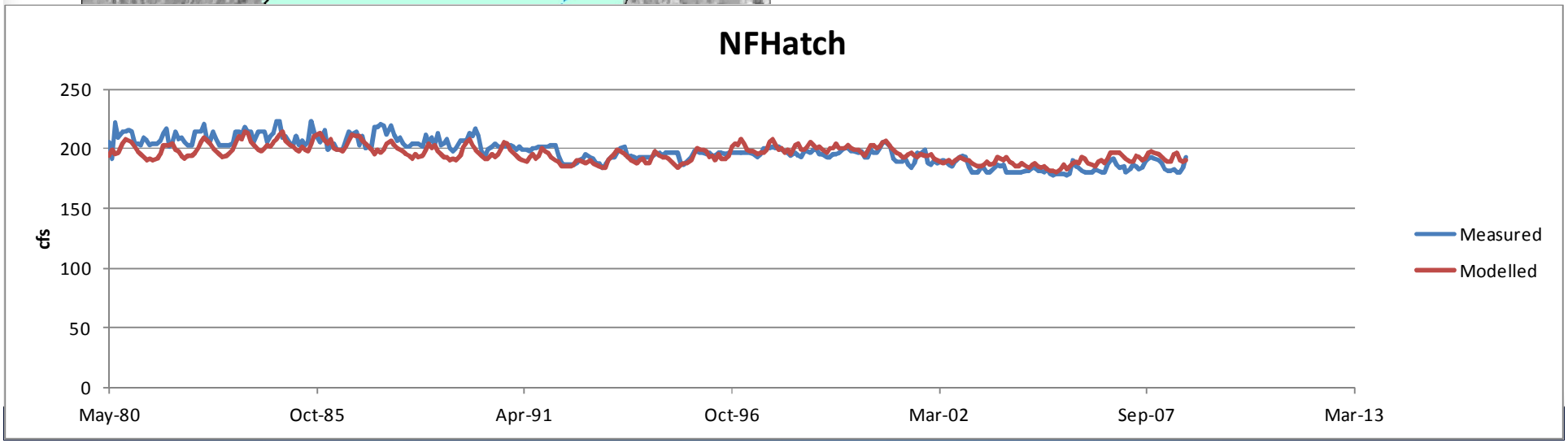


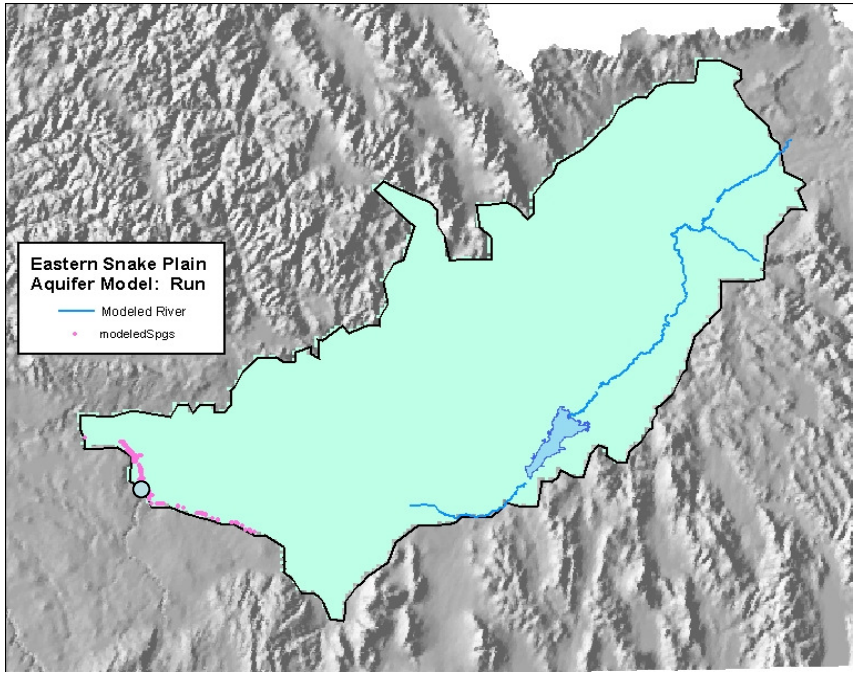


- Ntl Fish Hatchery

- Ntl Fish Hatchery

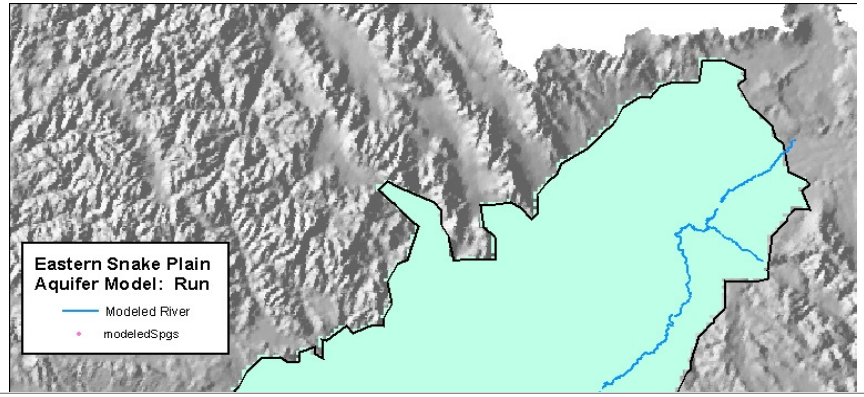


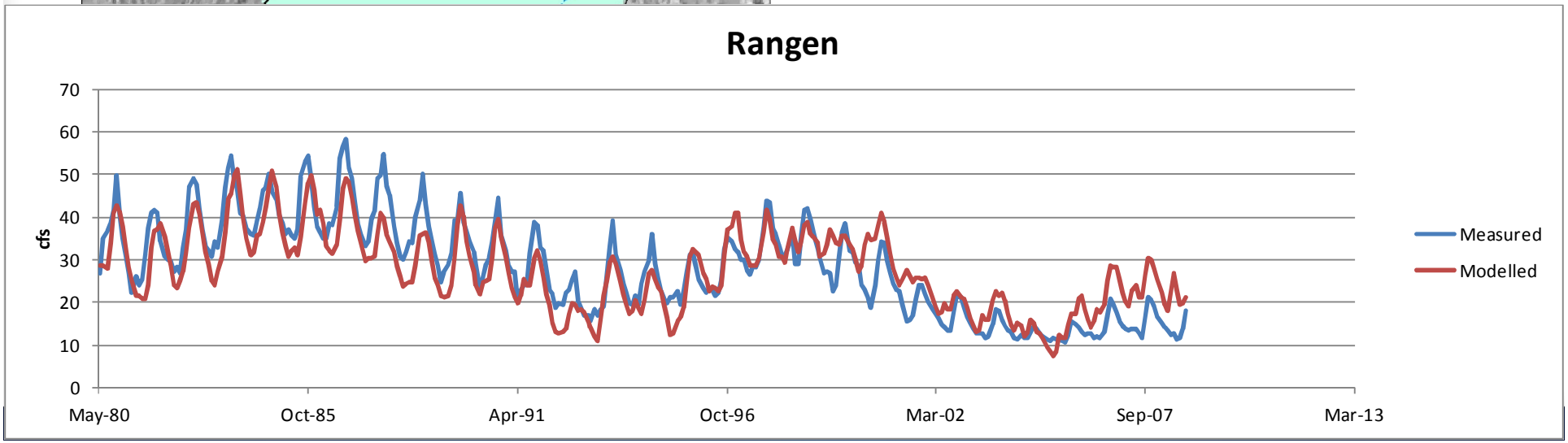


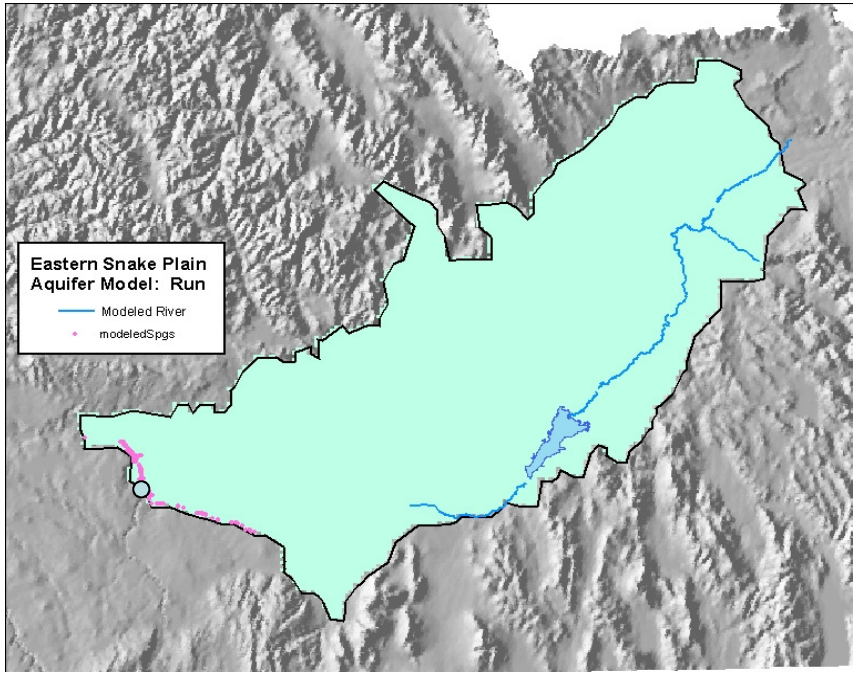


- Rangen Spring

- Rangen Spring

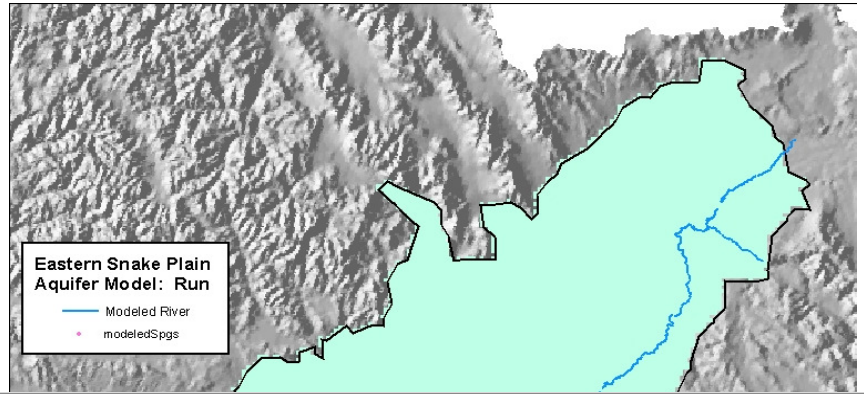


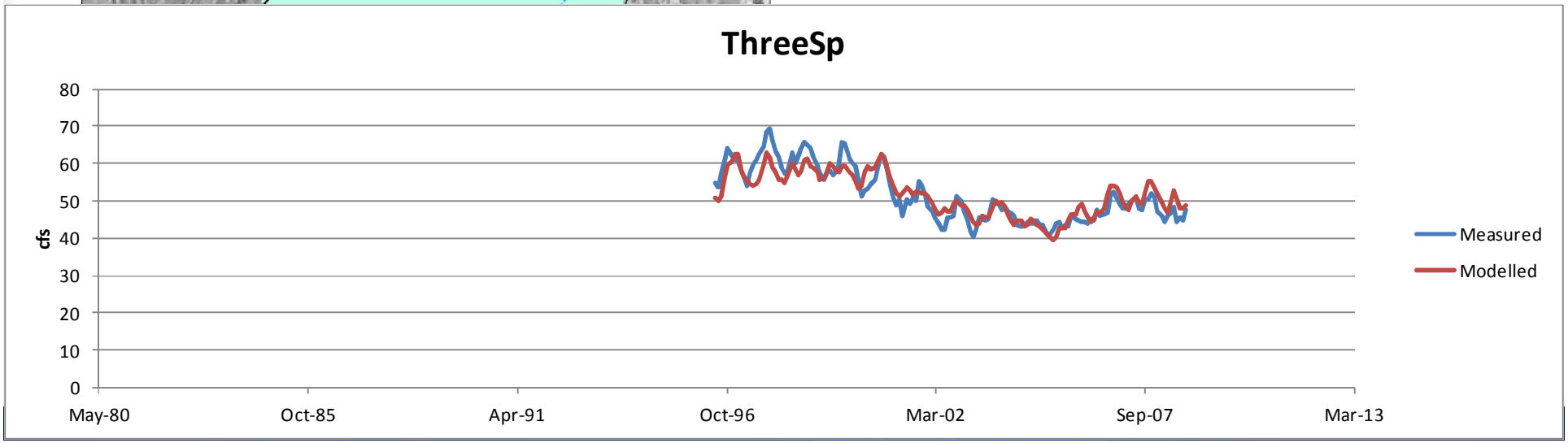


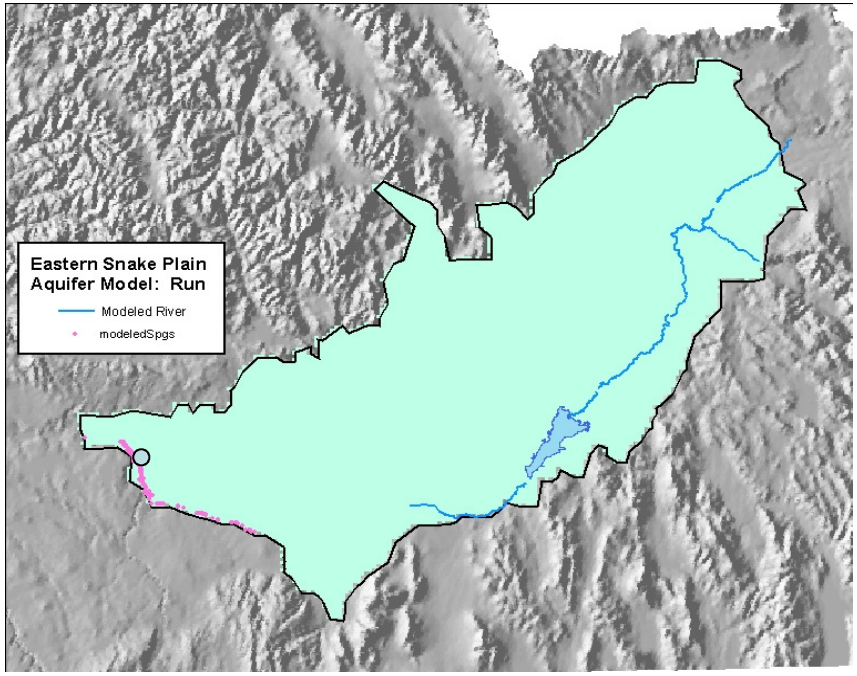


- Three Springs
  - (Jones)

- Three Springs
  - (Jones)

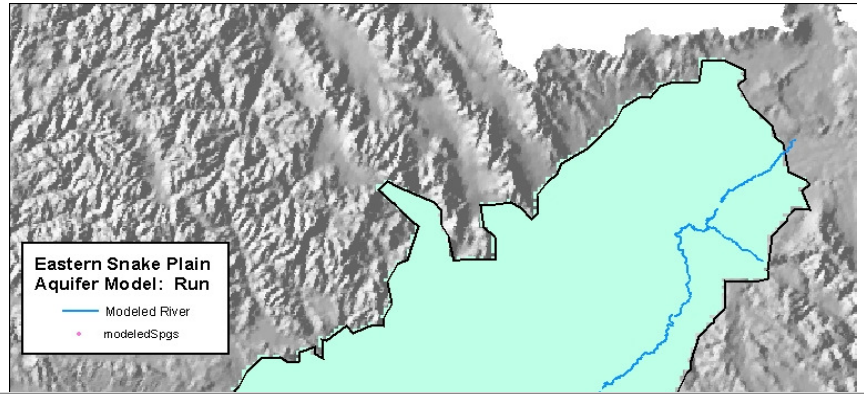


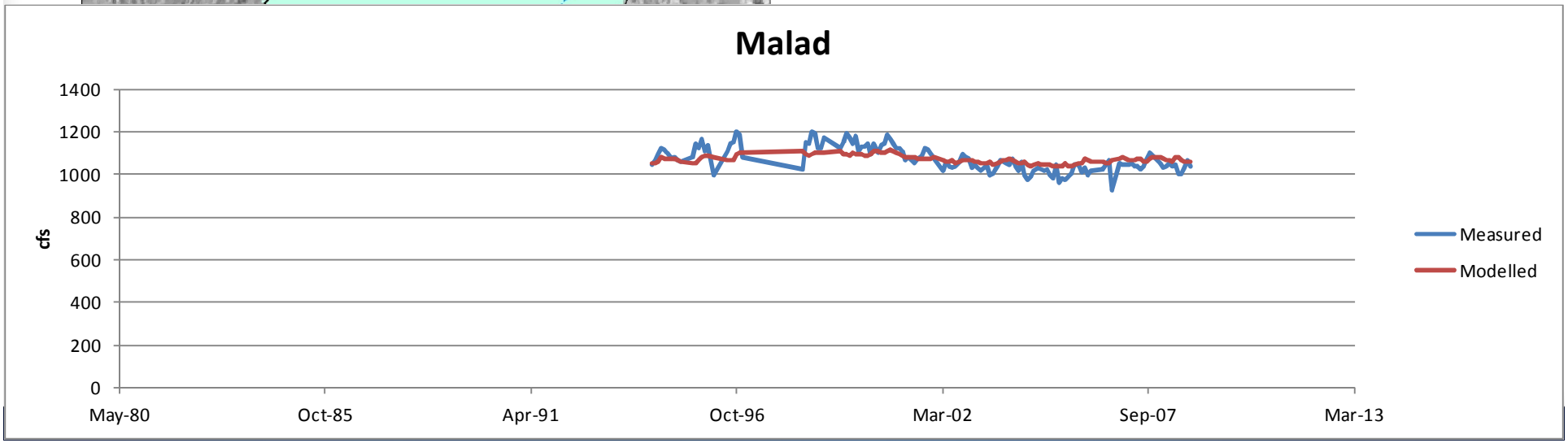



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Malad

- Malad


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


Malad
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Apr-91
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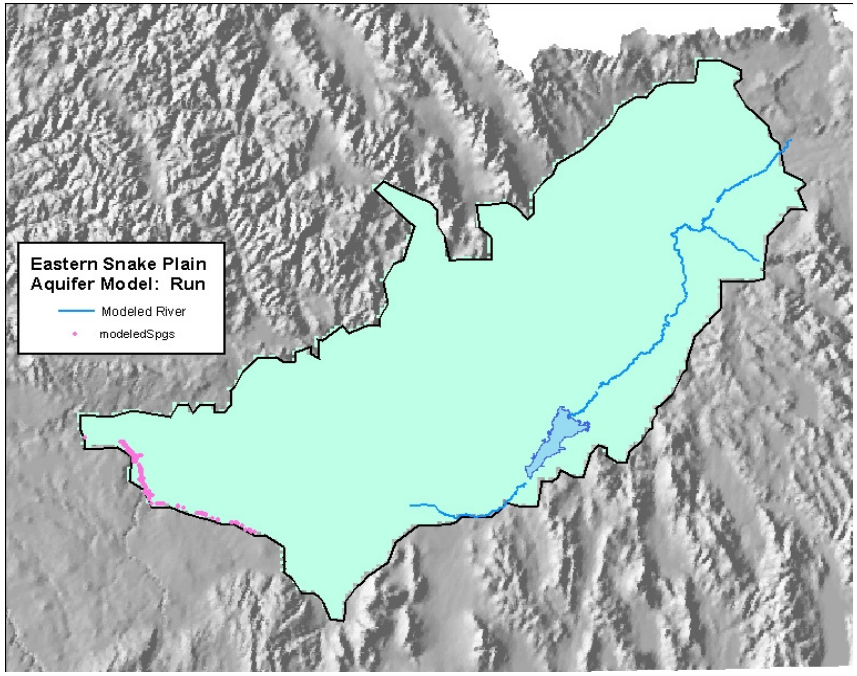
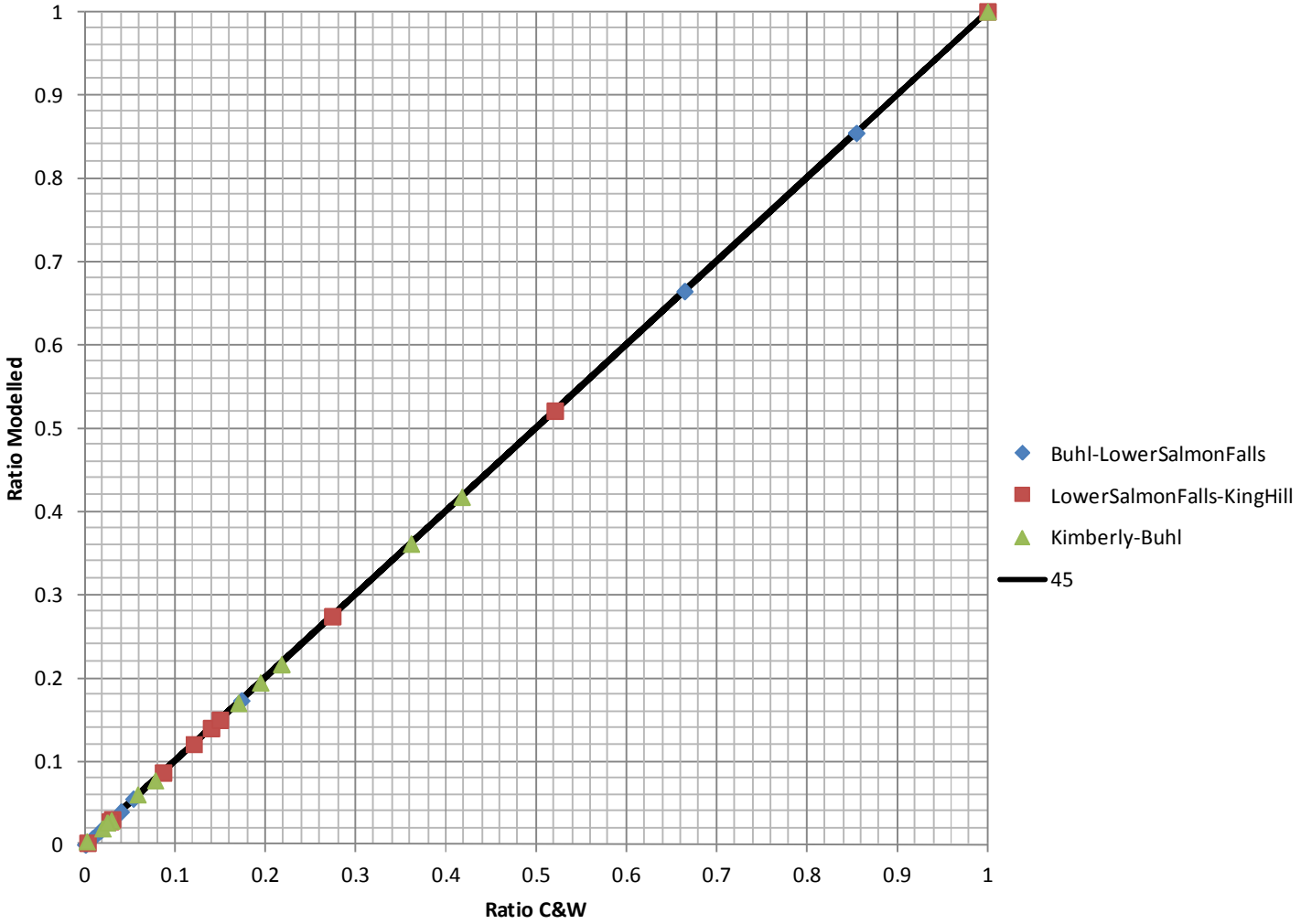
Mar-13
Measured
Modelled



- Group C Springs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LowerSalmonFalls-KingHill
Kimberly-Buhl
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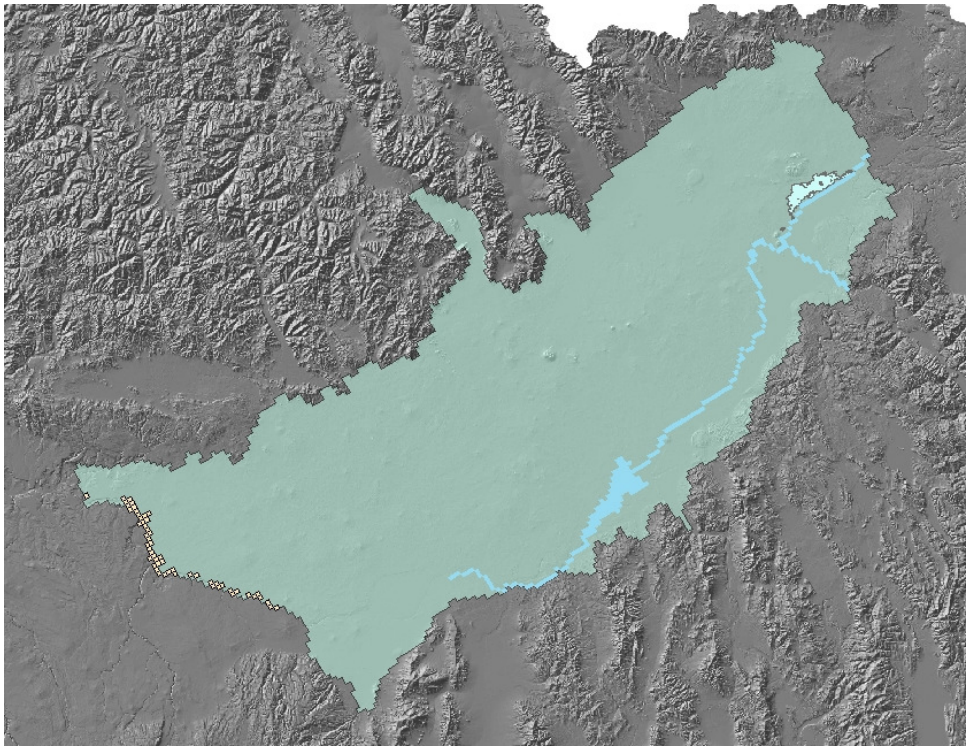
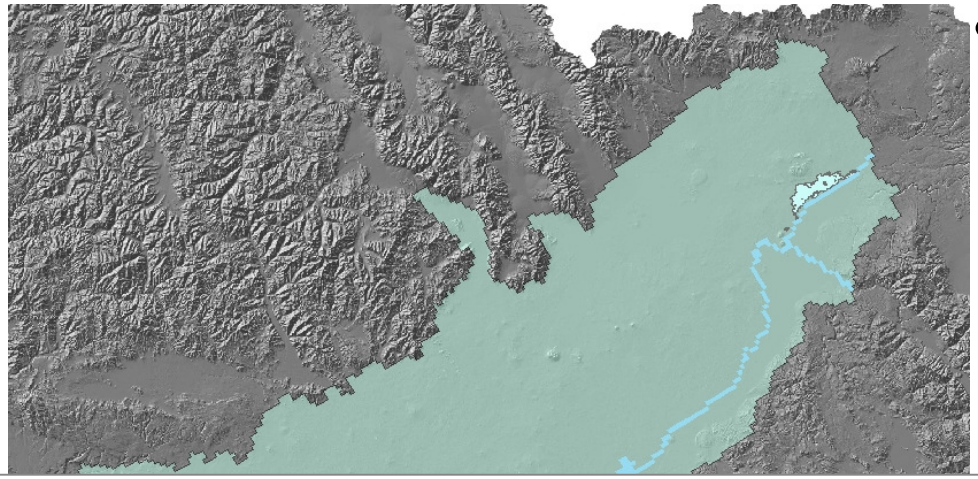
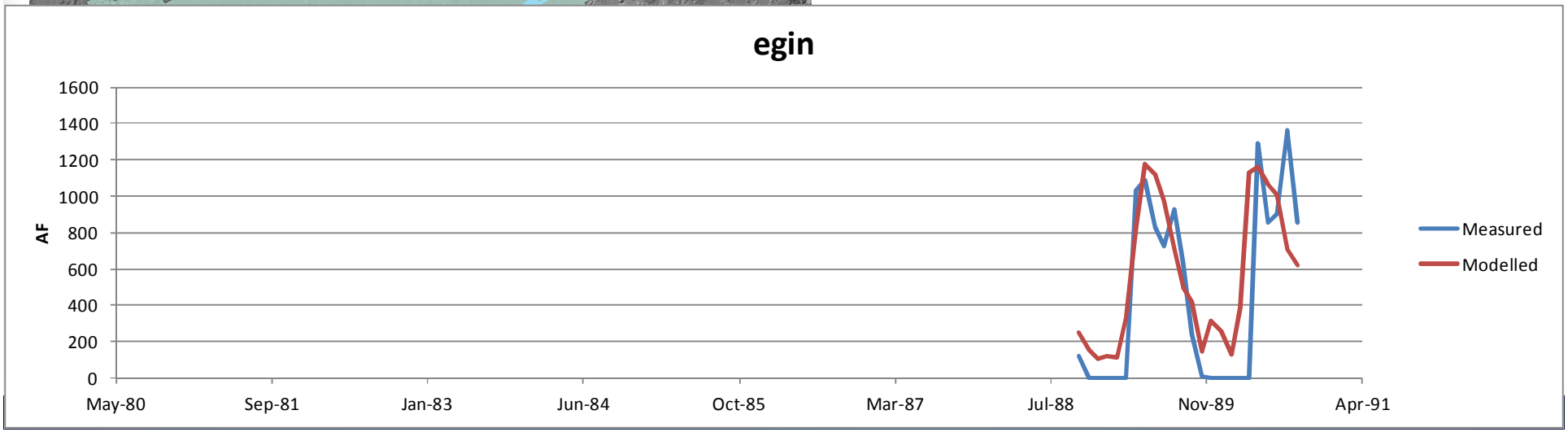
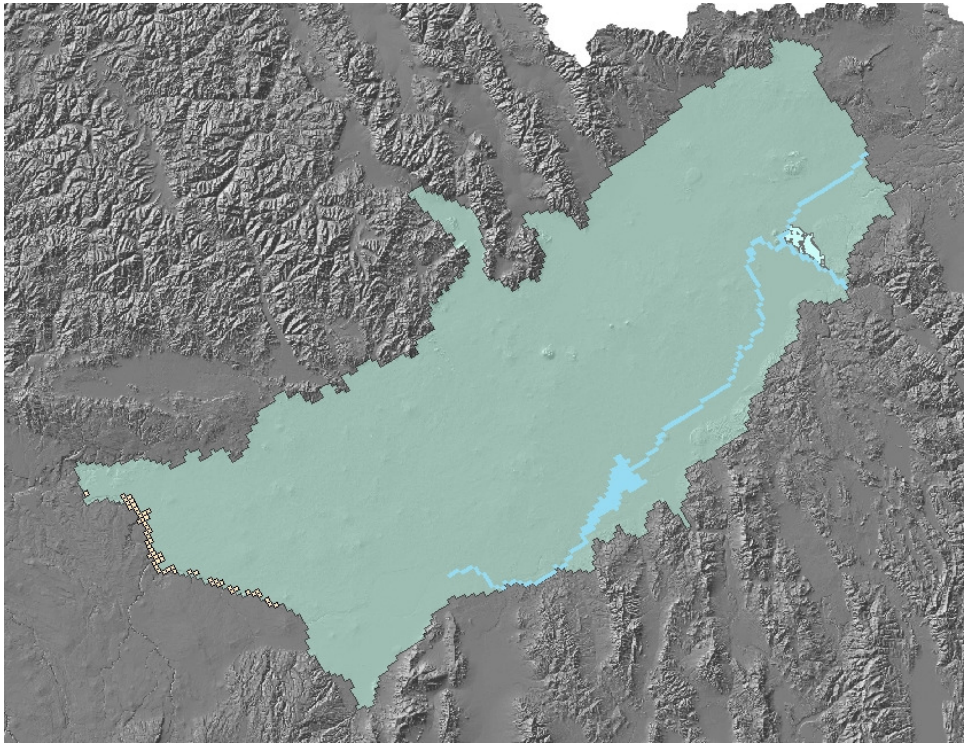


- Egin returns

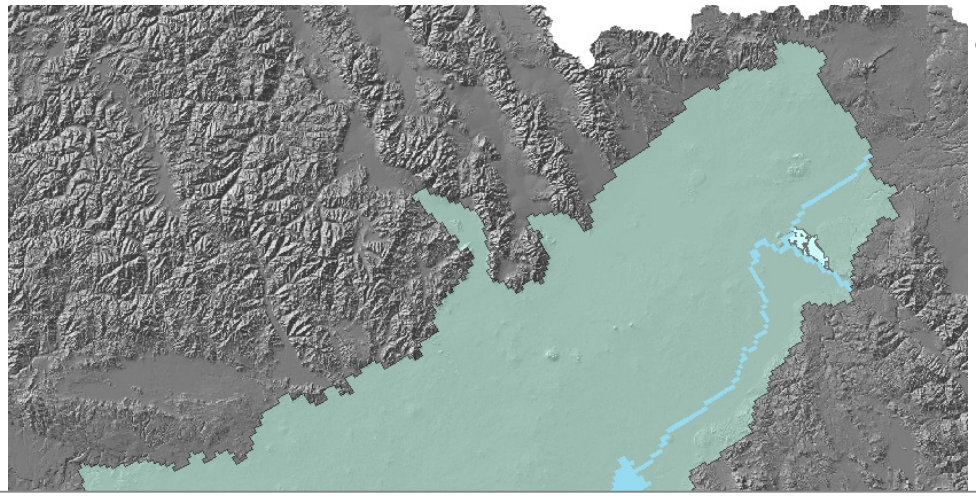


- Egin returns

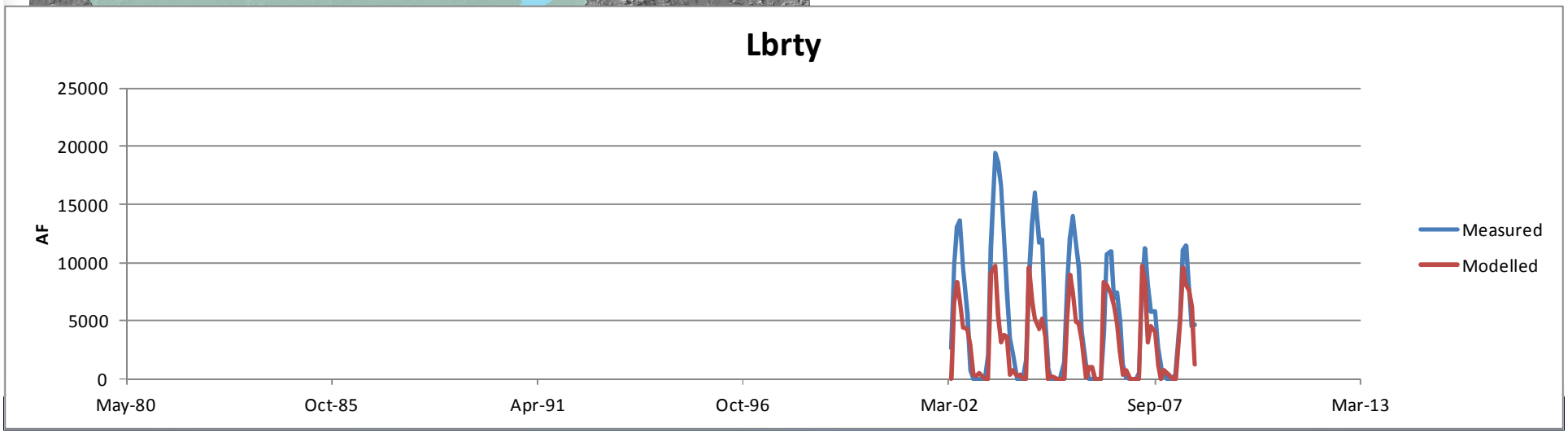


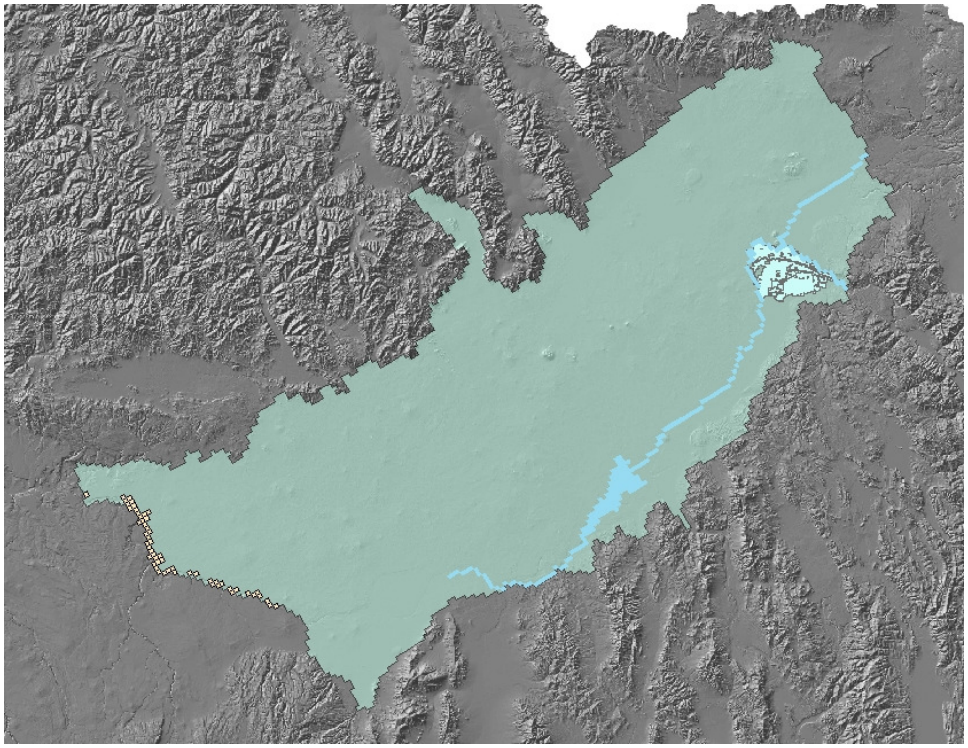


- Liberty returns

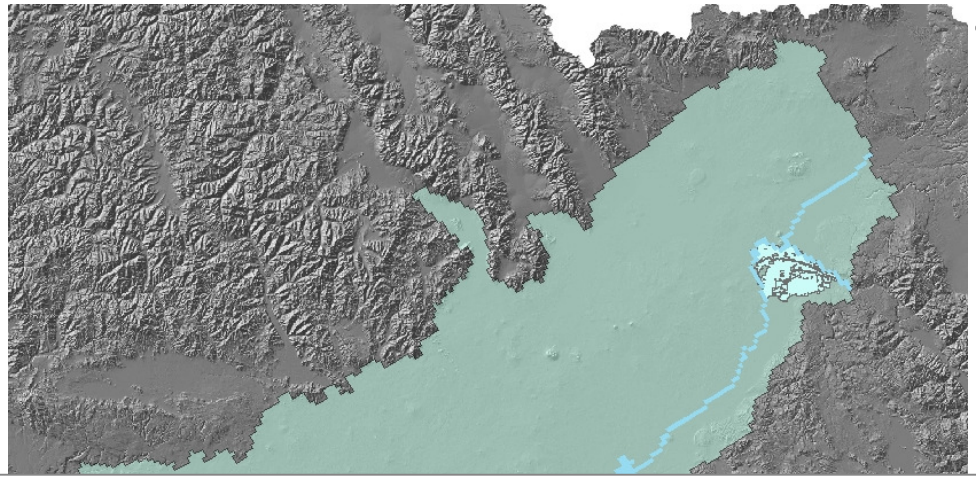


- Liberty returns

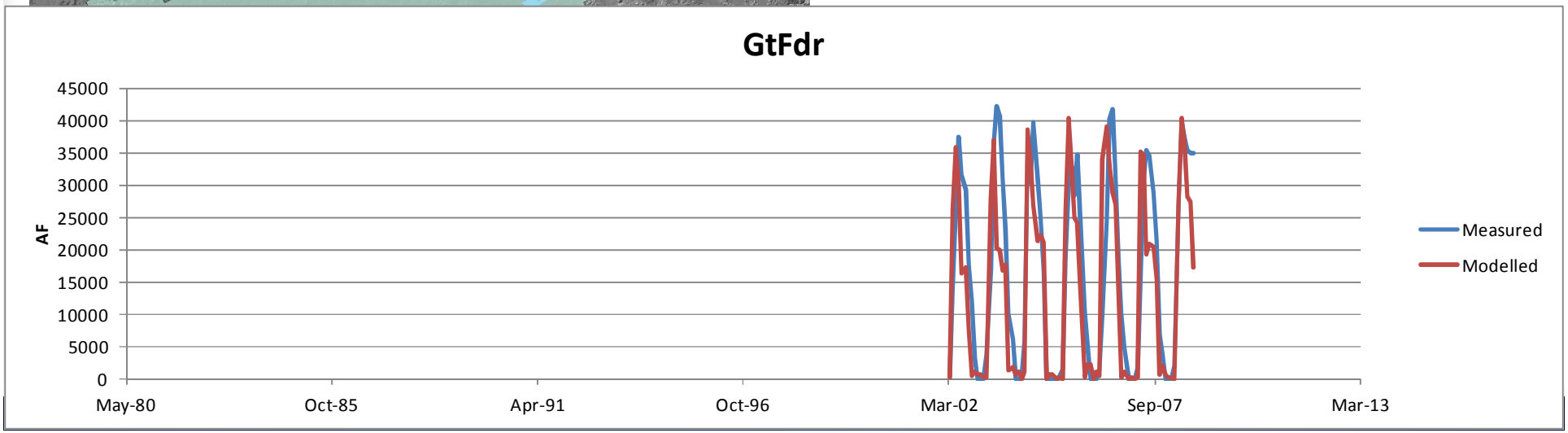


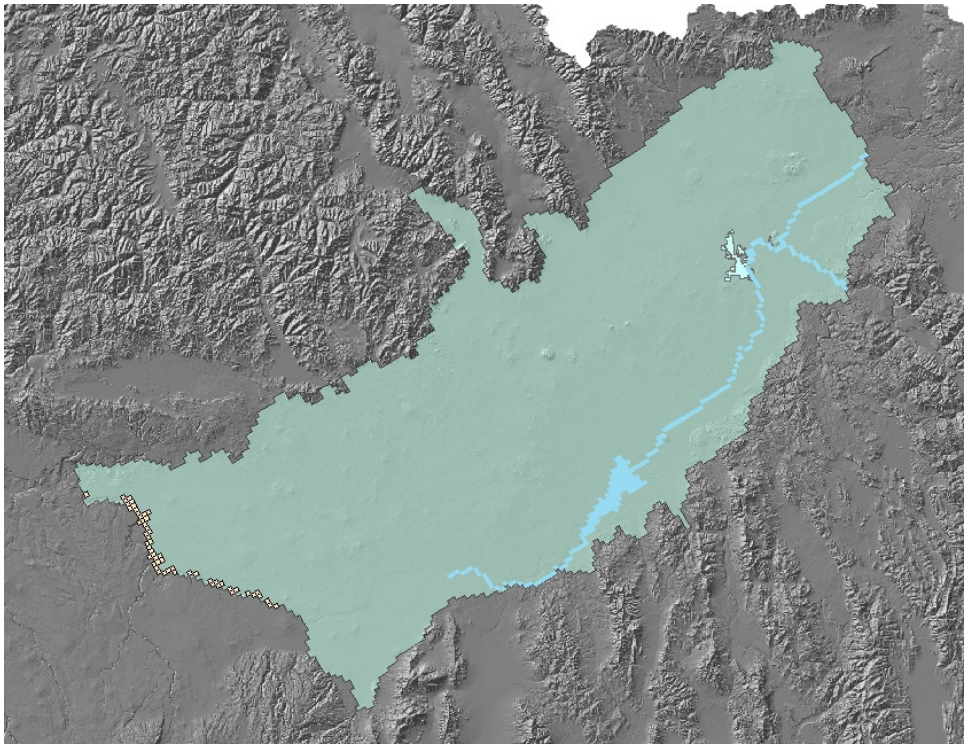


- Great Feeder Group returns

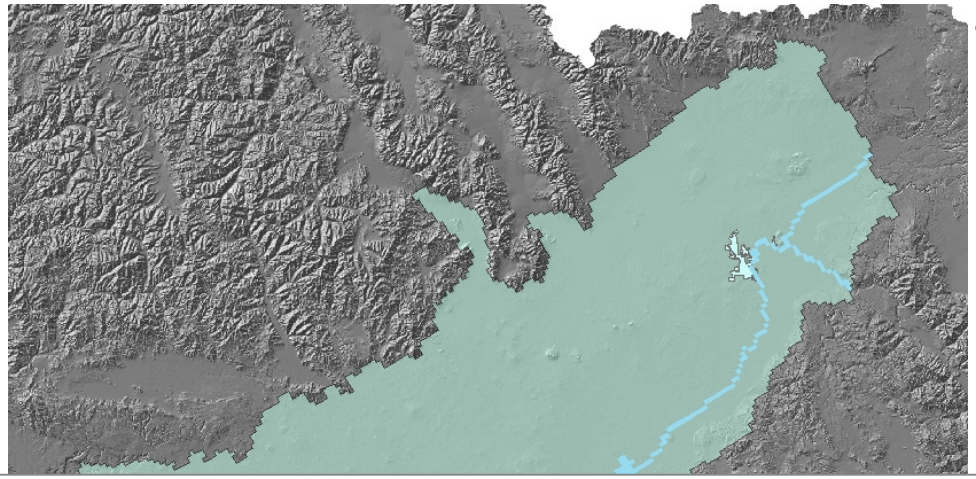


- Great Feeder Group returns

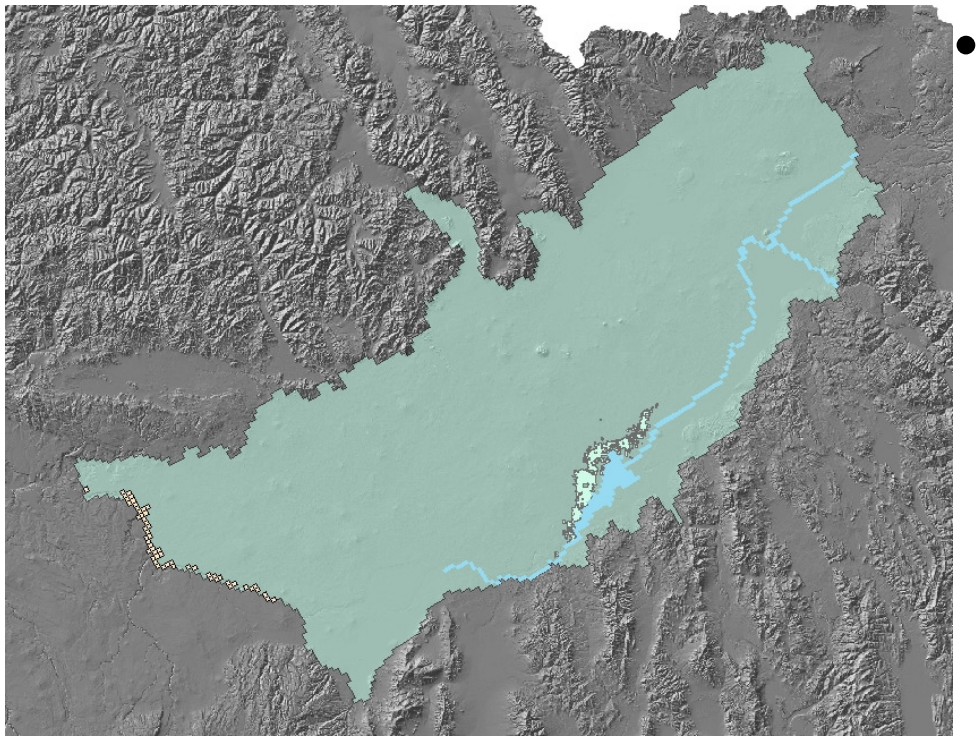




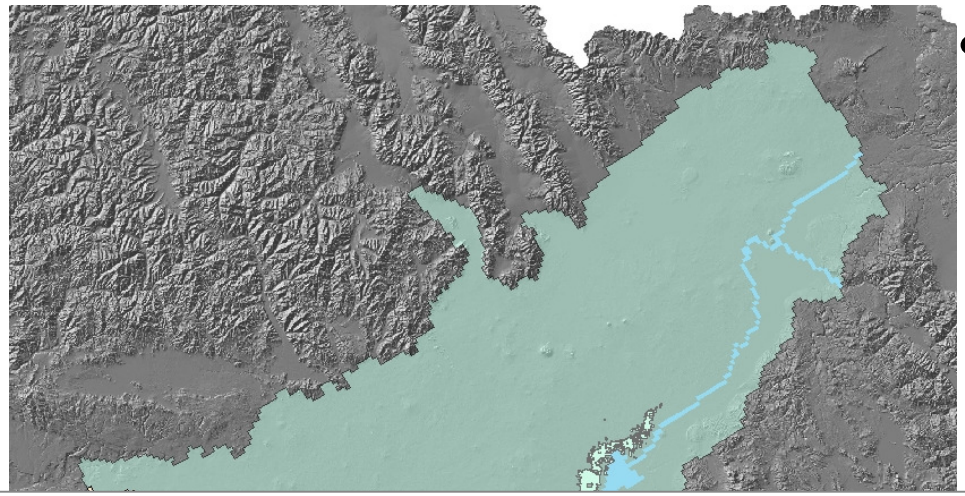
- Butte-Market Lake returns



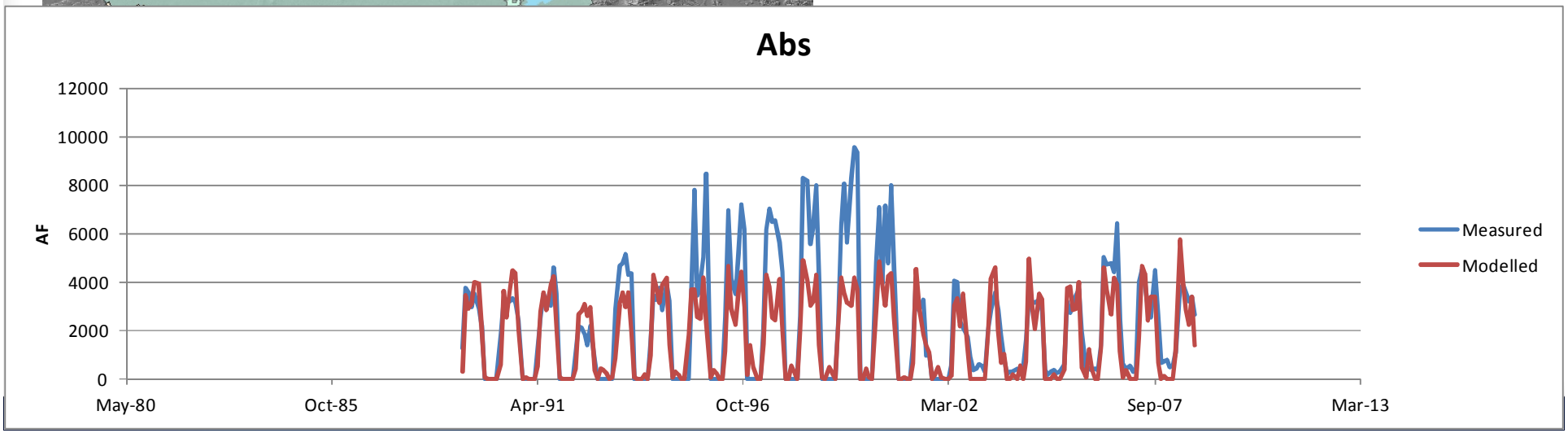
- Butte-Market Lake returns

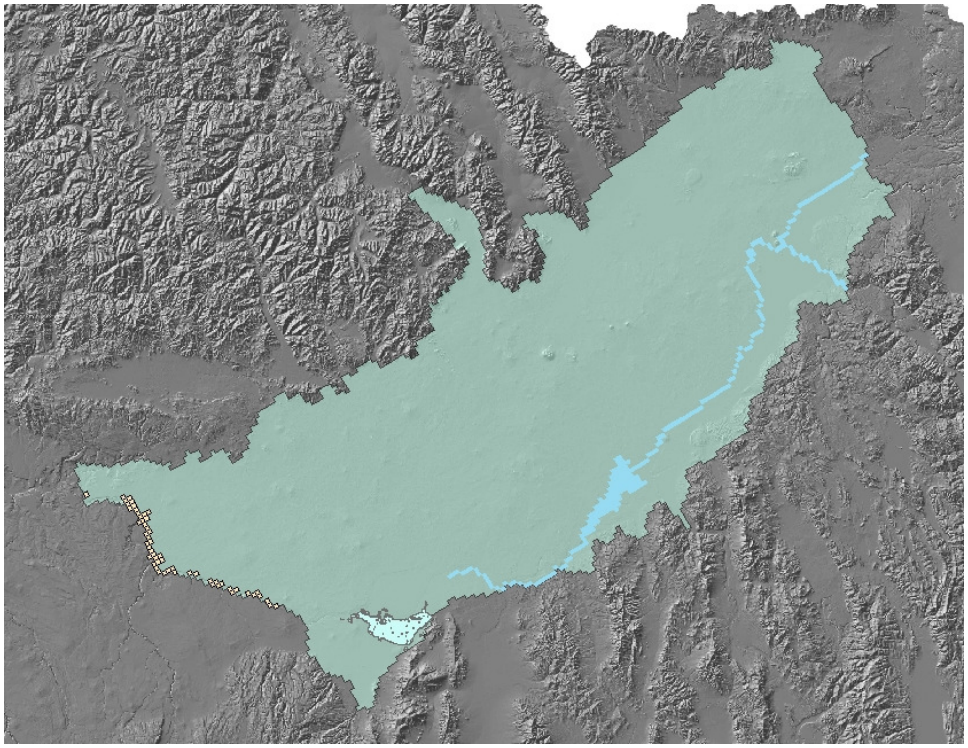


- Aberdeen-Springfield returns

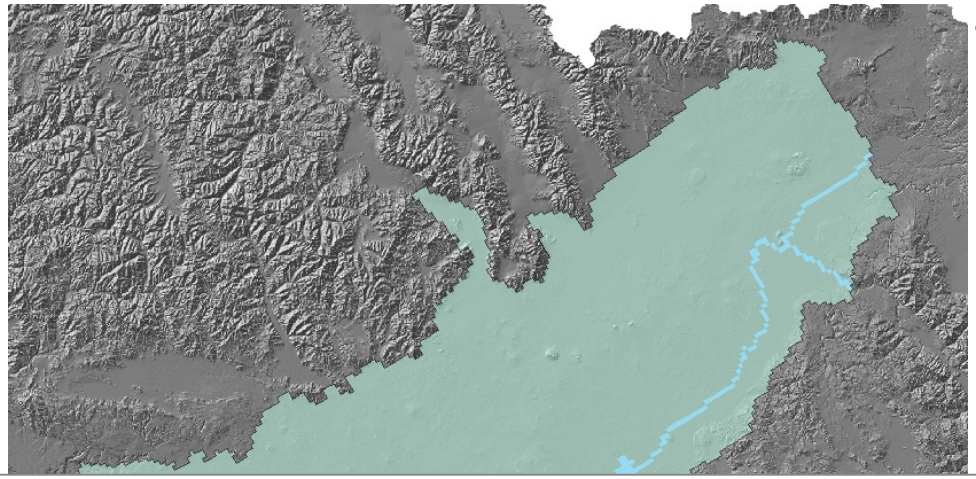


- Aberdeen-Springfield returns

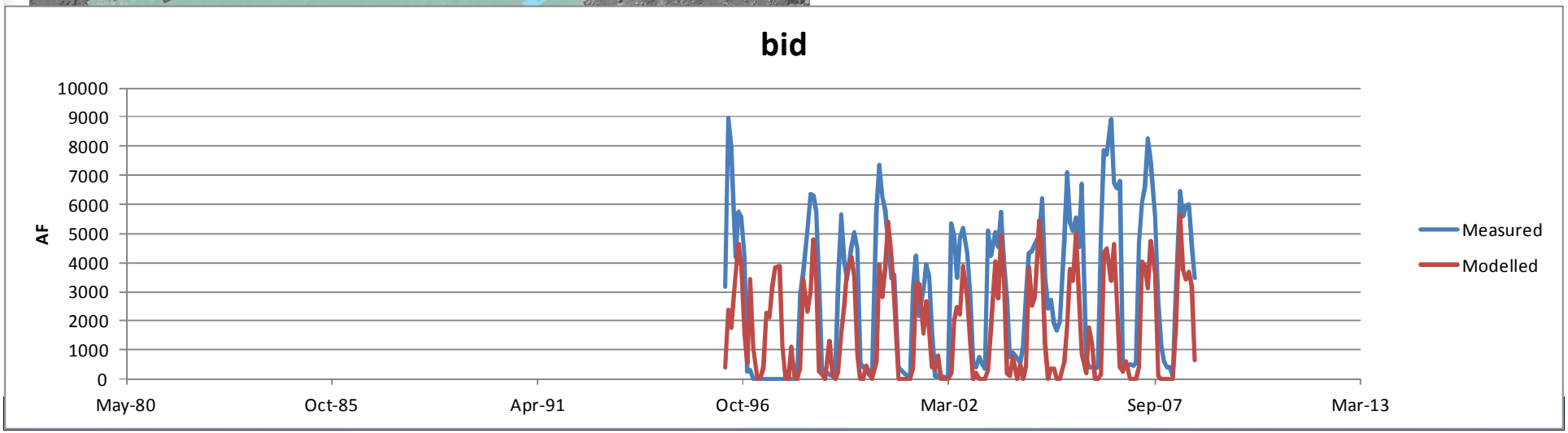


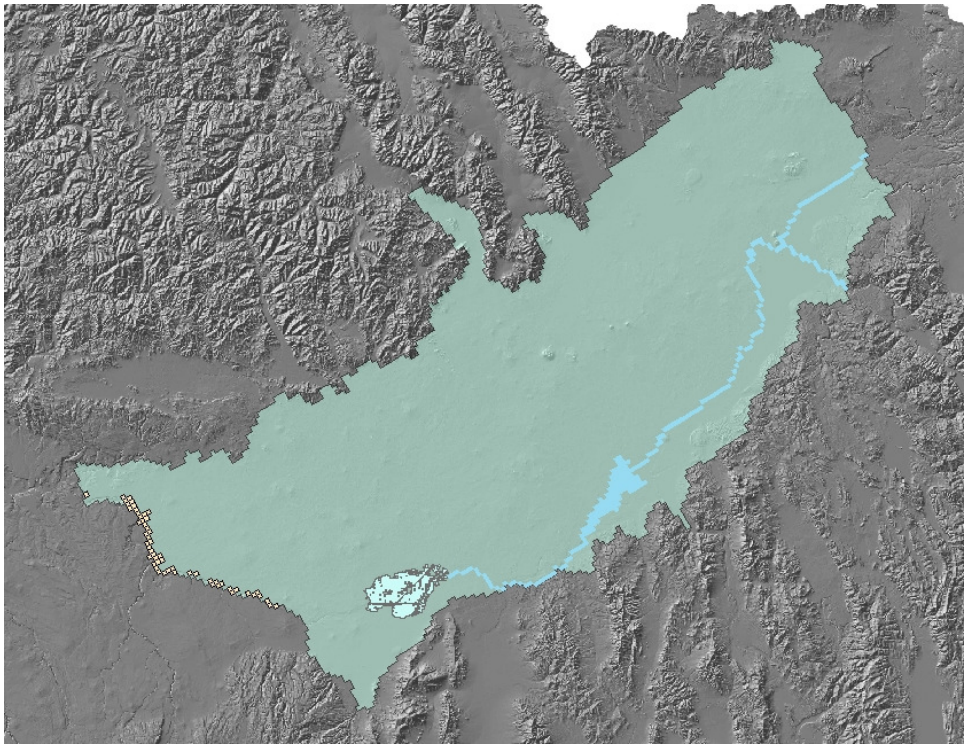


- Burley Irrigation District returns

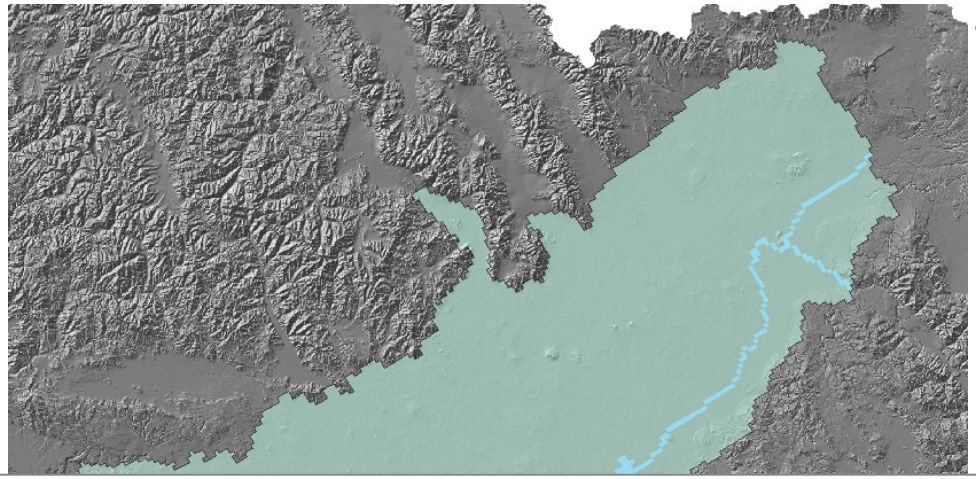


- Burley Irrigation District returns

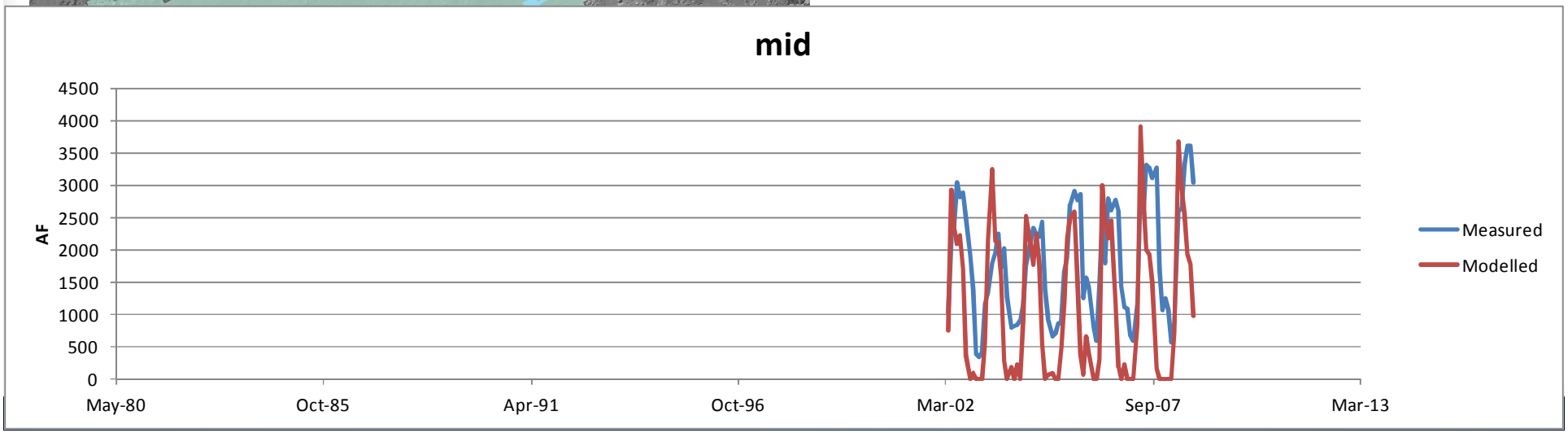


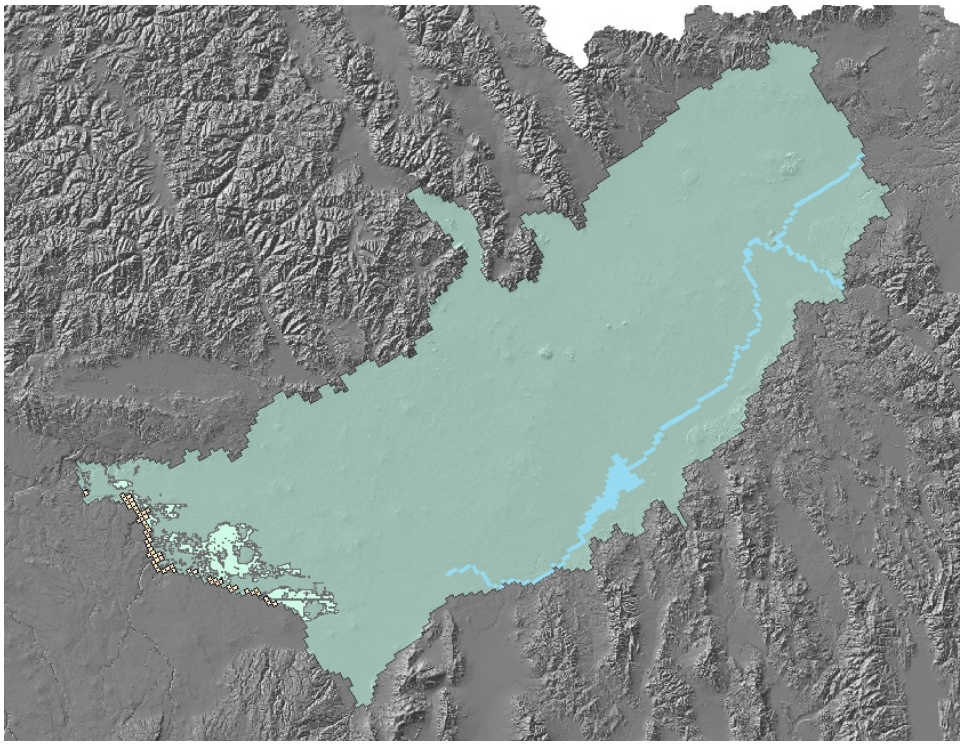


- Minidoka Irrigation District returns

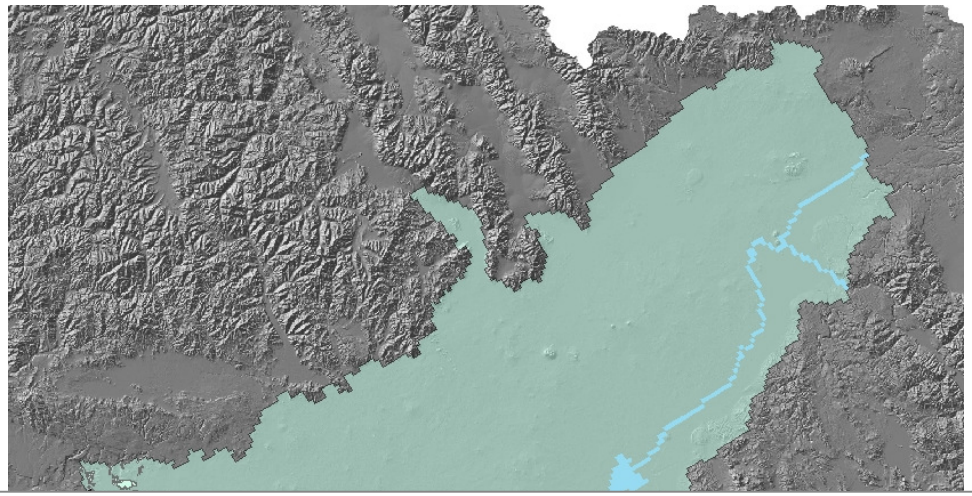


- Minidoka Irrigation District returns

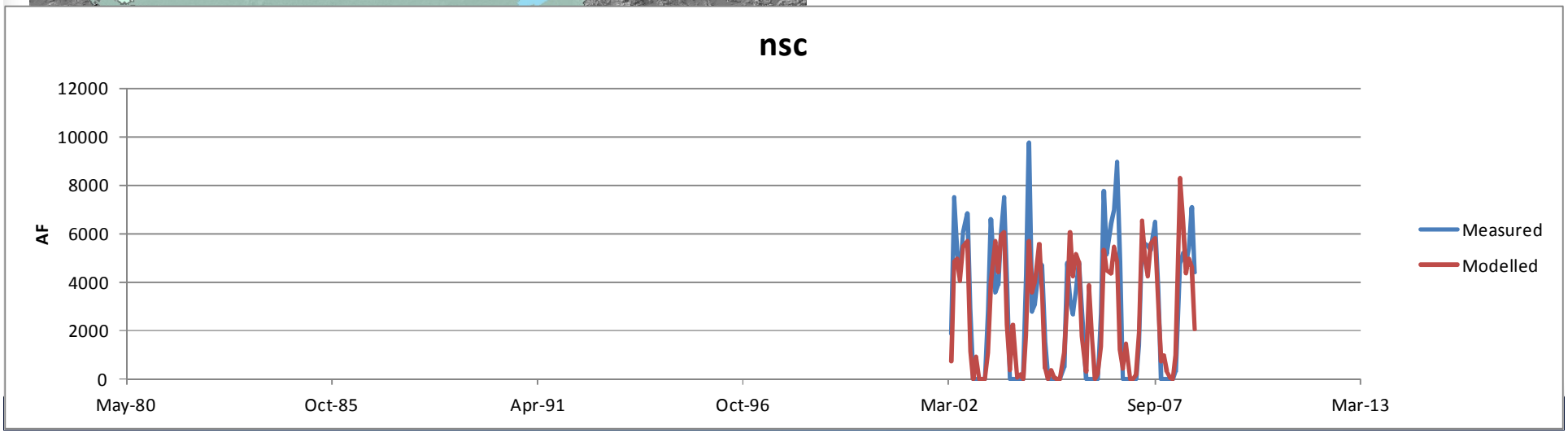




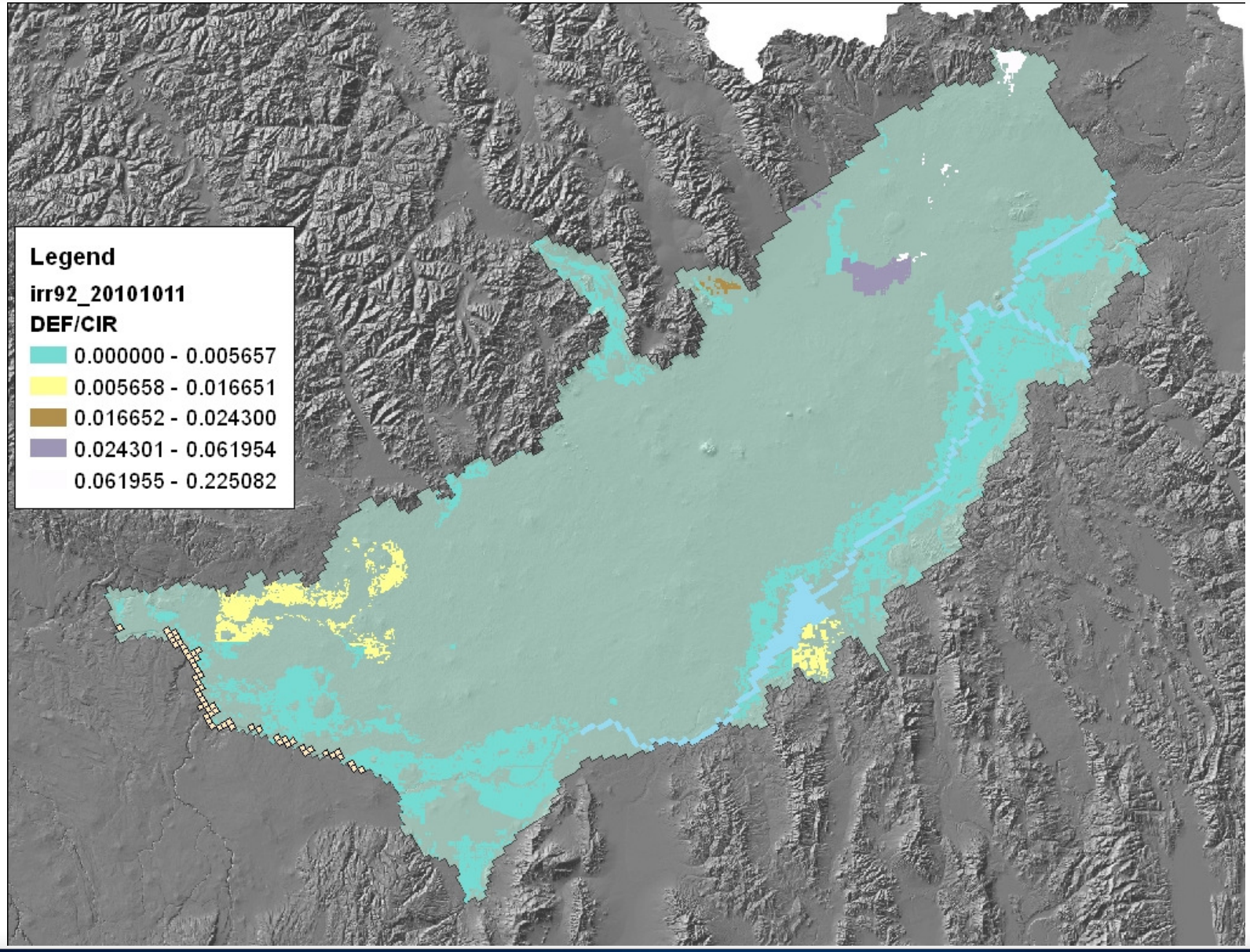
- North Side Canal Co returns



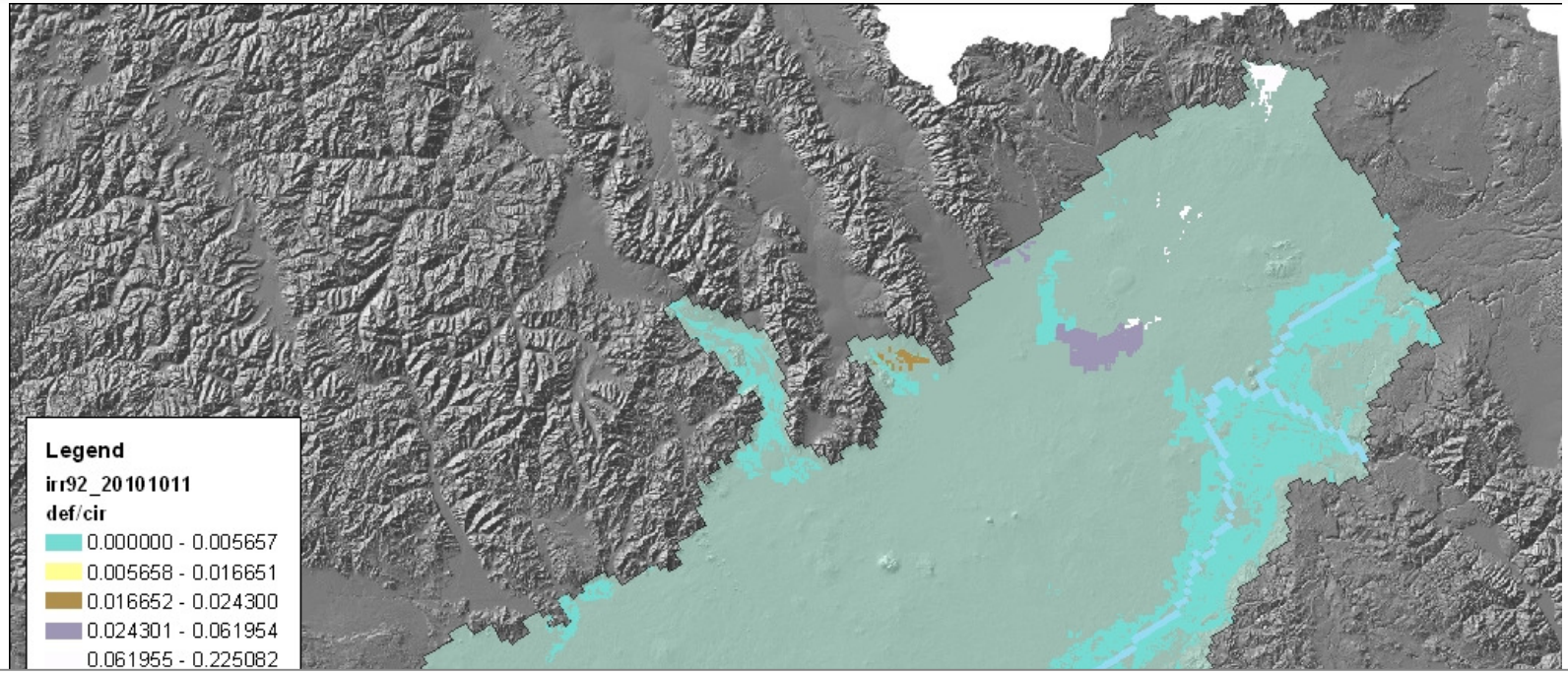
- North Side Canal Co returns

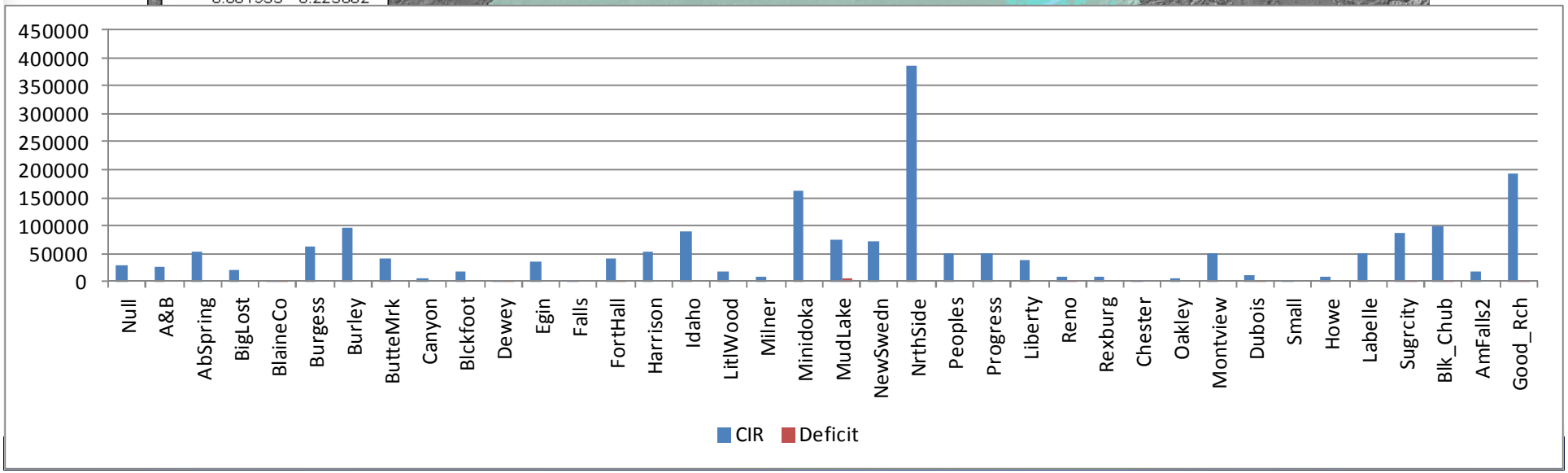


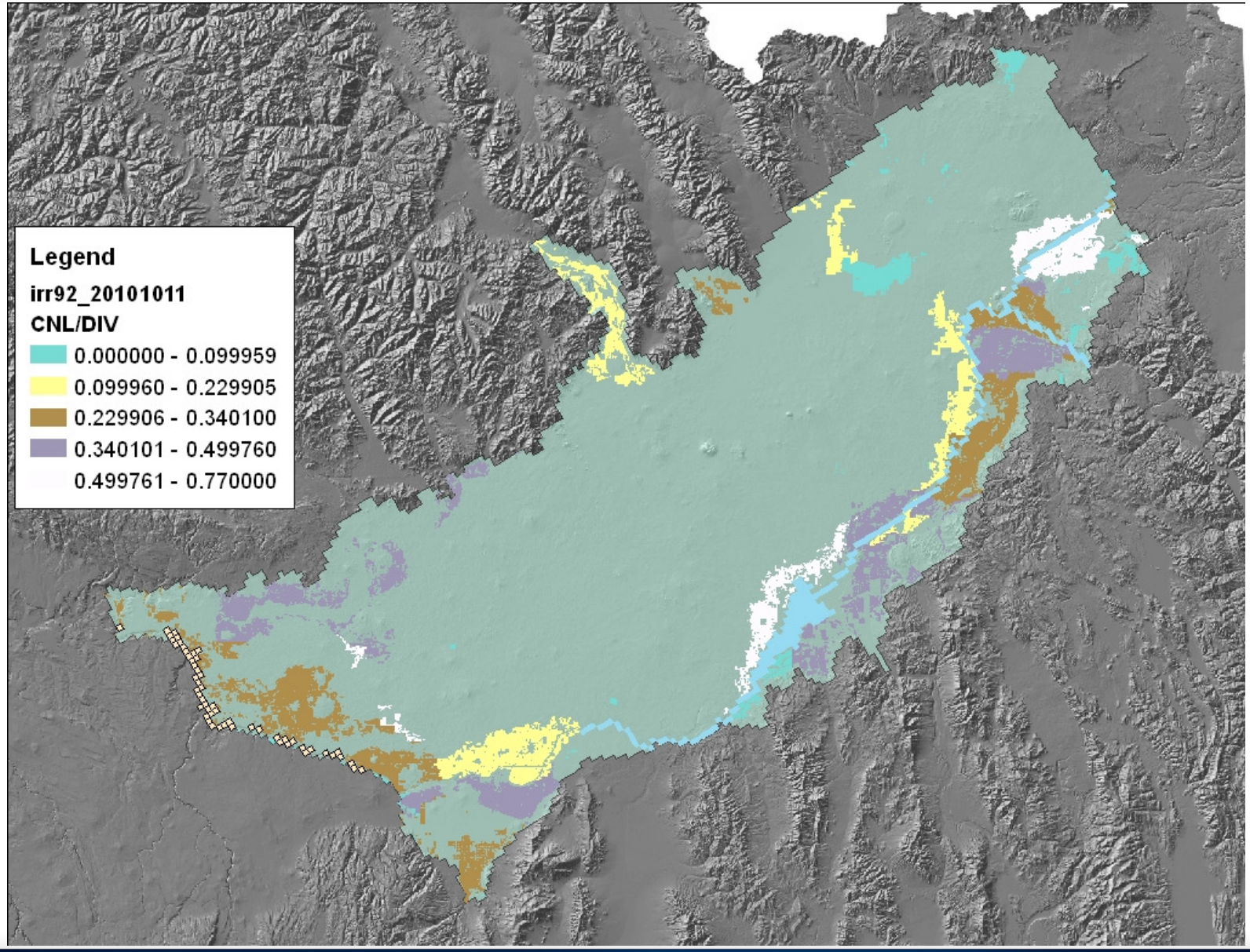
IDAHO Department of Water Resources



IDAHO Department of Water Resources



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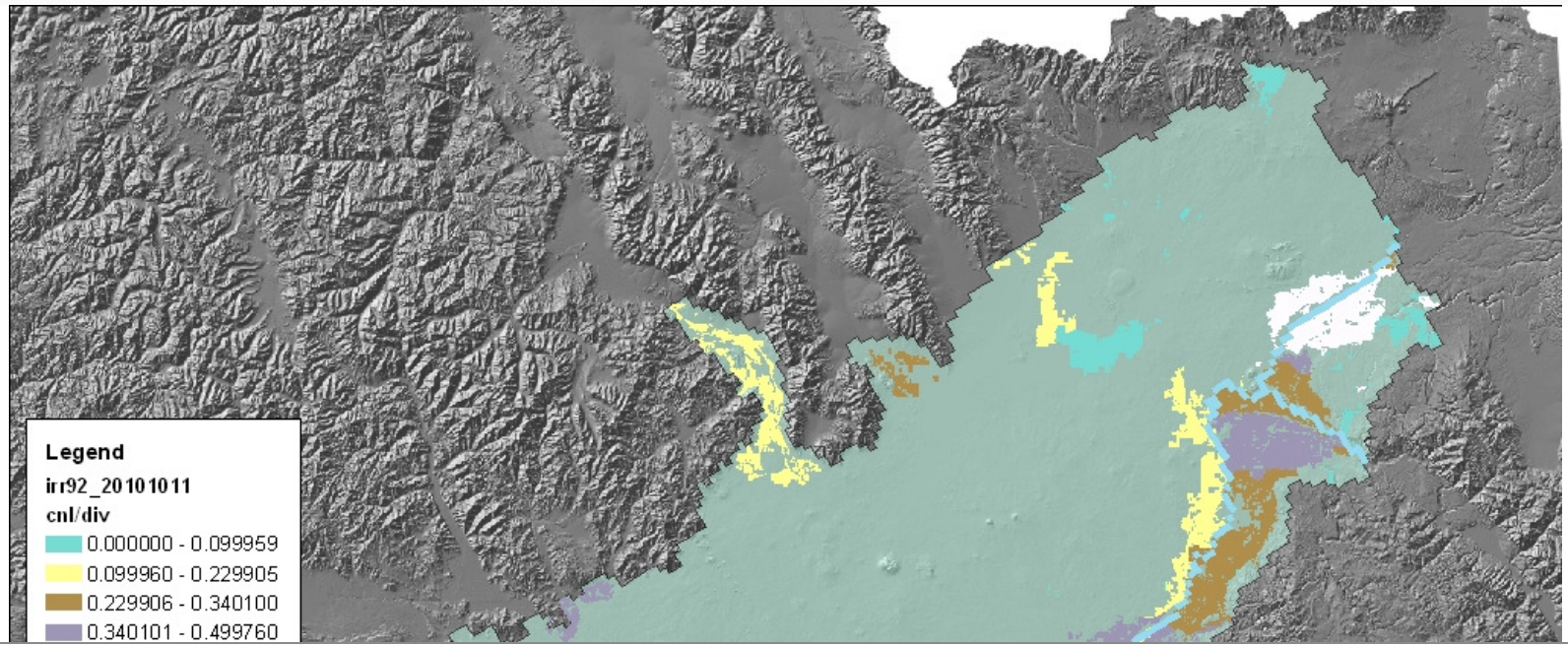
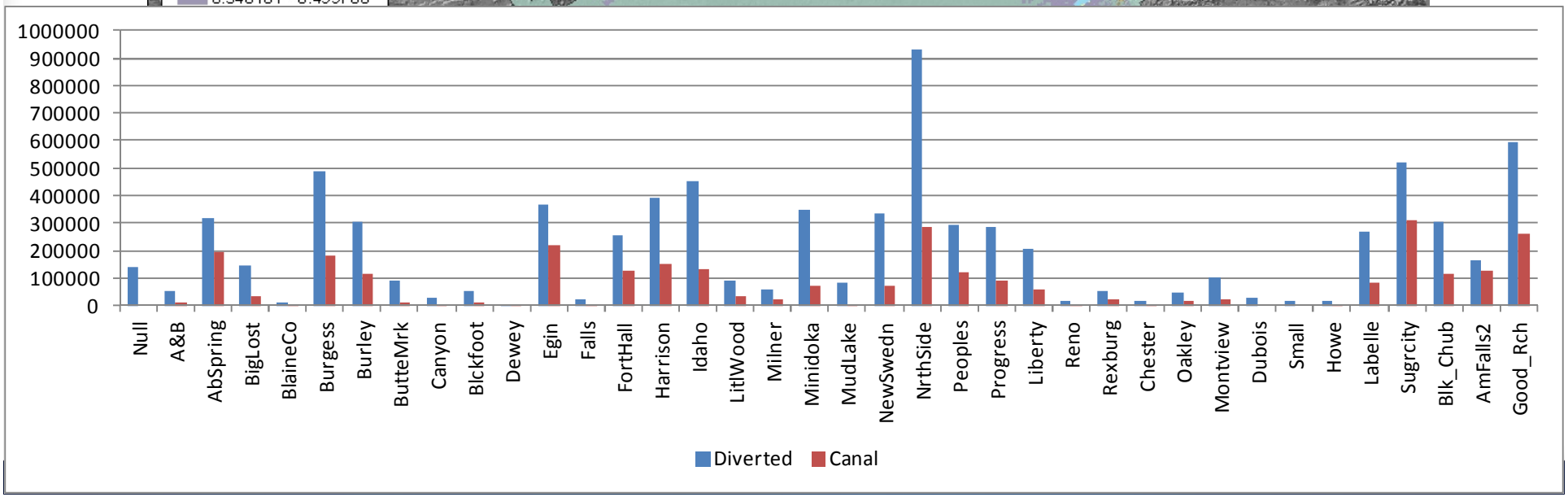
IDAHO Department of Water Resources





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