Calibration with Average of 1985-1988 for Starting Stress Period

Allan Wylie IDWR

Reach Gain and Spring Discharge Targets

- Monthly Stress Periods
  - Using
    - MKMOD6.exe
      - Using On-Farm algorithm
    - E110304A
      - Minidoka and Montview fixed, Mud Lake adjustments
    - 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

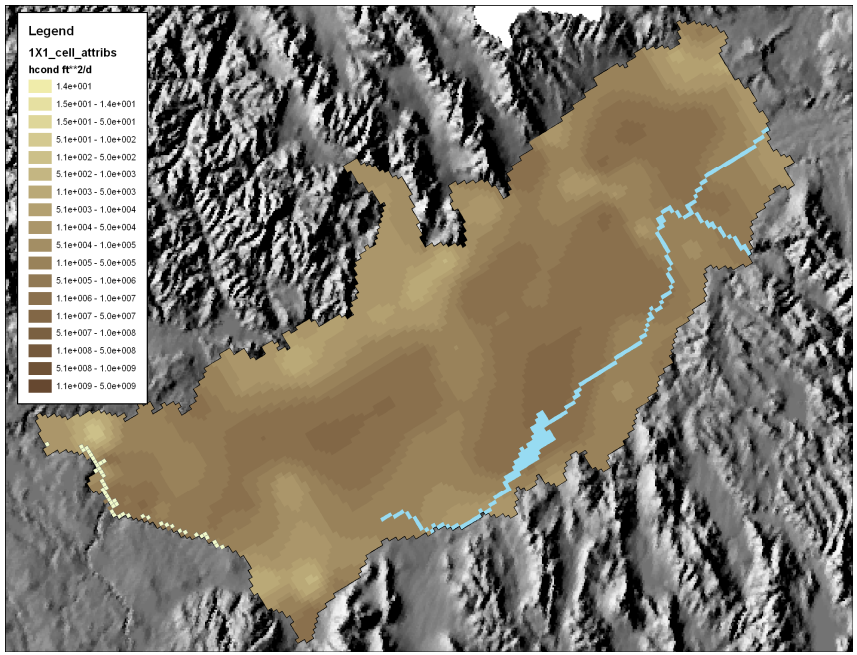
Reach Gain and Spring Discharge Targets

- Adjustable Parameters
  - Transmissivity
    - Pilot Points
      - 1e-10 – 1e+10
  - Specific Yield
    - Pilot Points
      - 0.001 – 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

2008 Reach Gain and Spring Discharge 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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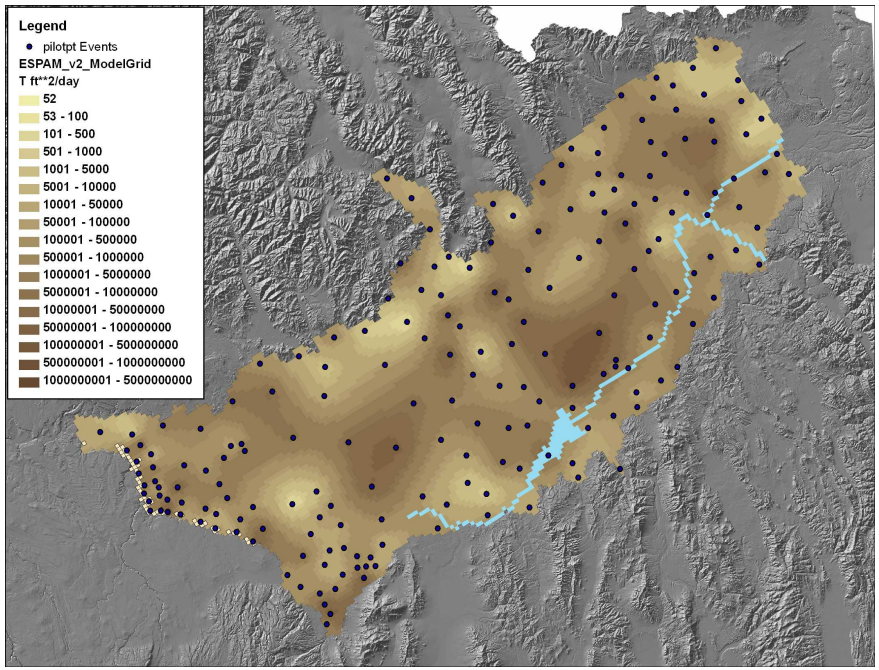
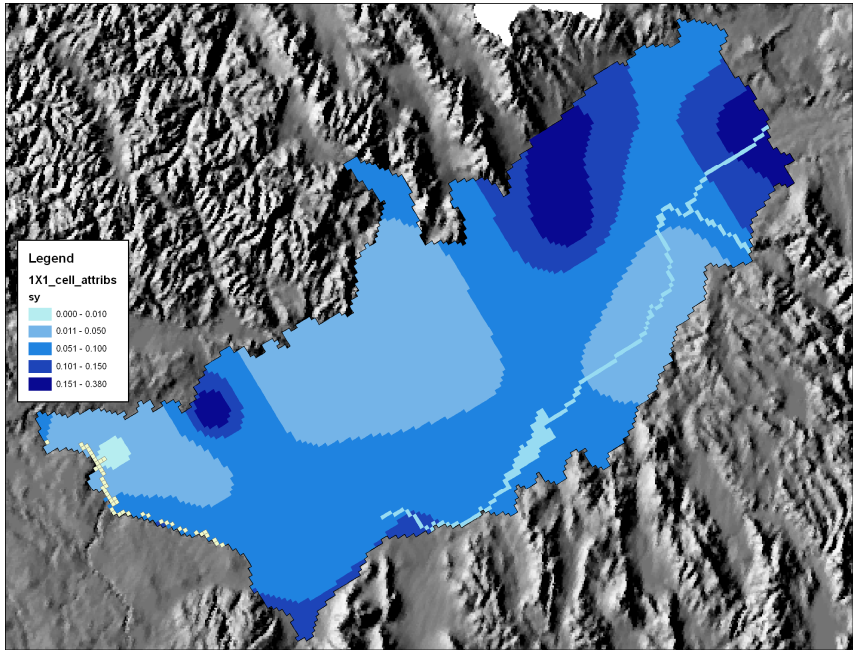
1X1_cell_attribs
hcond ft**2/d
1.4e+001
1.5e+001 - 1.4e+001
1.5e+001 - 5.0e+001
5.1e+001 - 1.0e+002
1.1e+002 - 5.0e+002
5.1e+002 - 1.0e+003
1.1e+003 - 5.0e+003
5.1e+003 - 1.0e+004
1.1e+004 - 5.0e+004
5.1e+004 - 1.0e+005
1.1e+005 - 5.0e+005
5.1e+005 - 1.0e+006
1.1e+006 - 1.0e+007
1.1e+007 - 5.0e+007
5.1e+007 - 1.0e+008
1.1e+008 - 5.0e+008
5.1e+008 - 1.0e+009
1.1e+009 - 5.0e+009


Legend
pilotpt Events
ESPAM_v2_ModelGrid
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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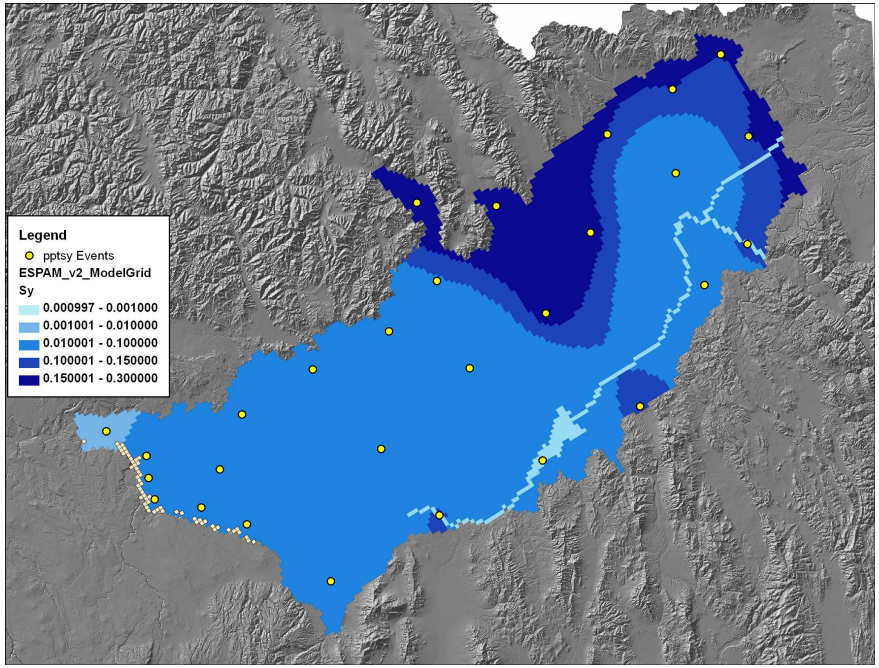
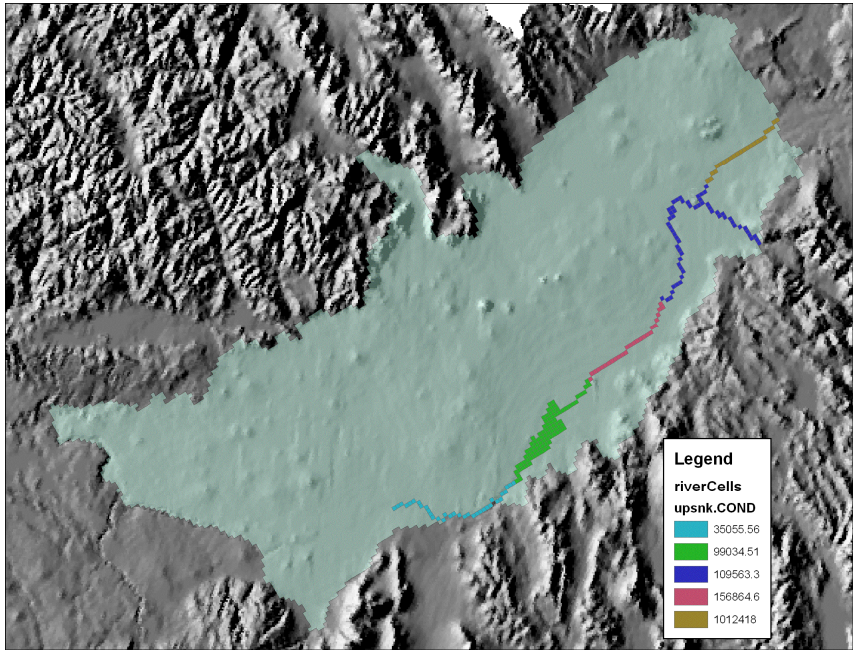
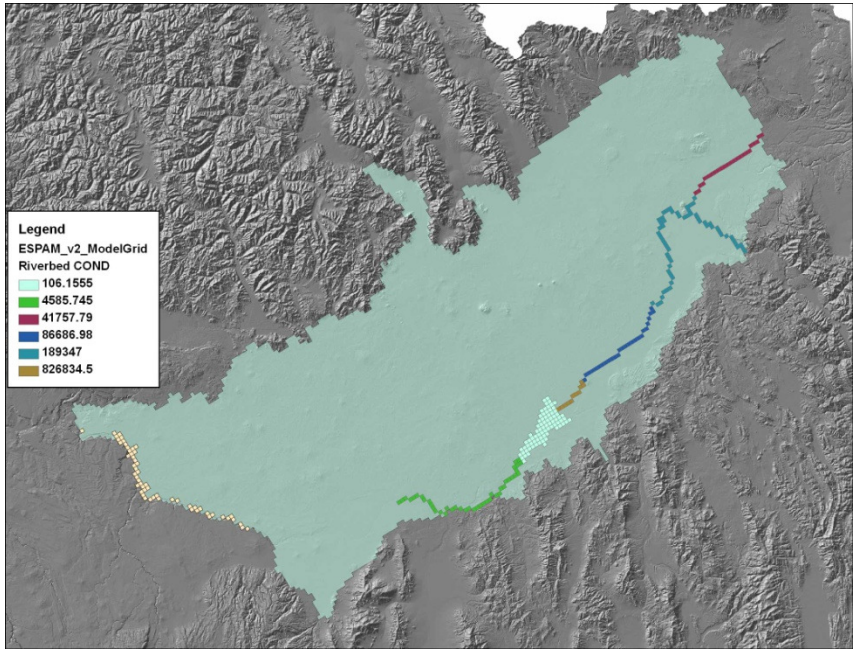
1X1_cell_attribs
sy
0.000 - 0.010
0.011 - 0.050
0.051 - 0.100
0.101 - 0.150
0.151 - 0.380


Legend
pptsy Events
ESPAM_v2_ModelGrid
Sy
0.000997 - 0.001000
0.001001 - 0.010000
0.010001 - 0.100000
0.100001 - 0.150000
0.150001 - 0.300000

V 1.1


Legend
riverCells
upsnk.COND
35055.56
99034.51
109563.3
156864.6
1012418


Legend
ESPAM_v2_ModelGrid
Riverbed COND
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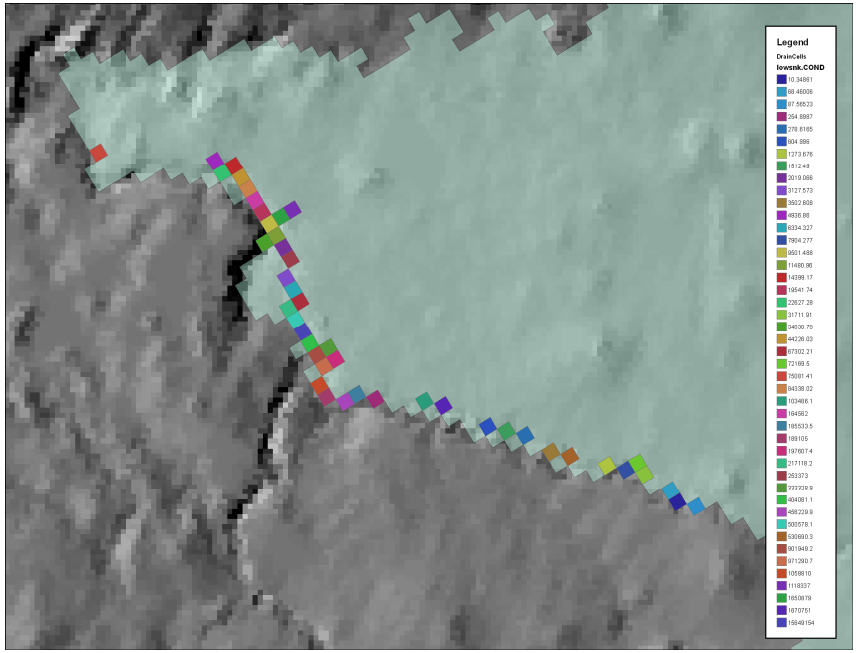
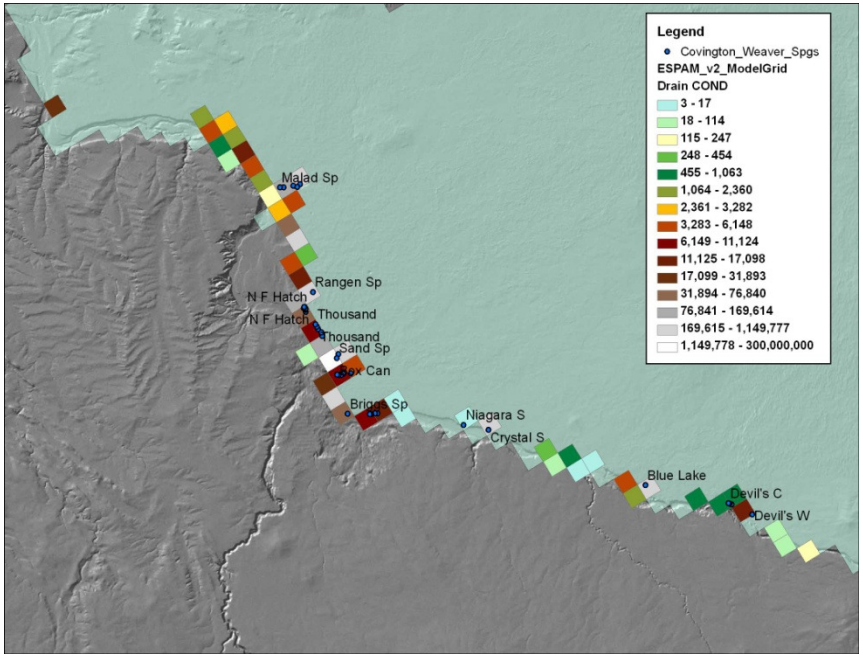
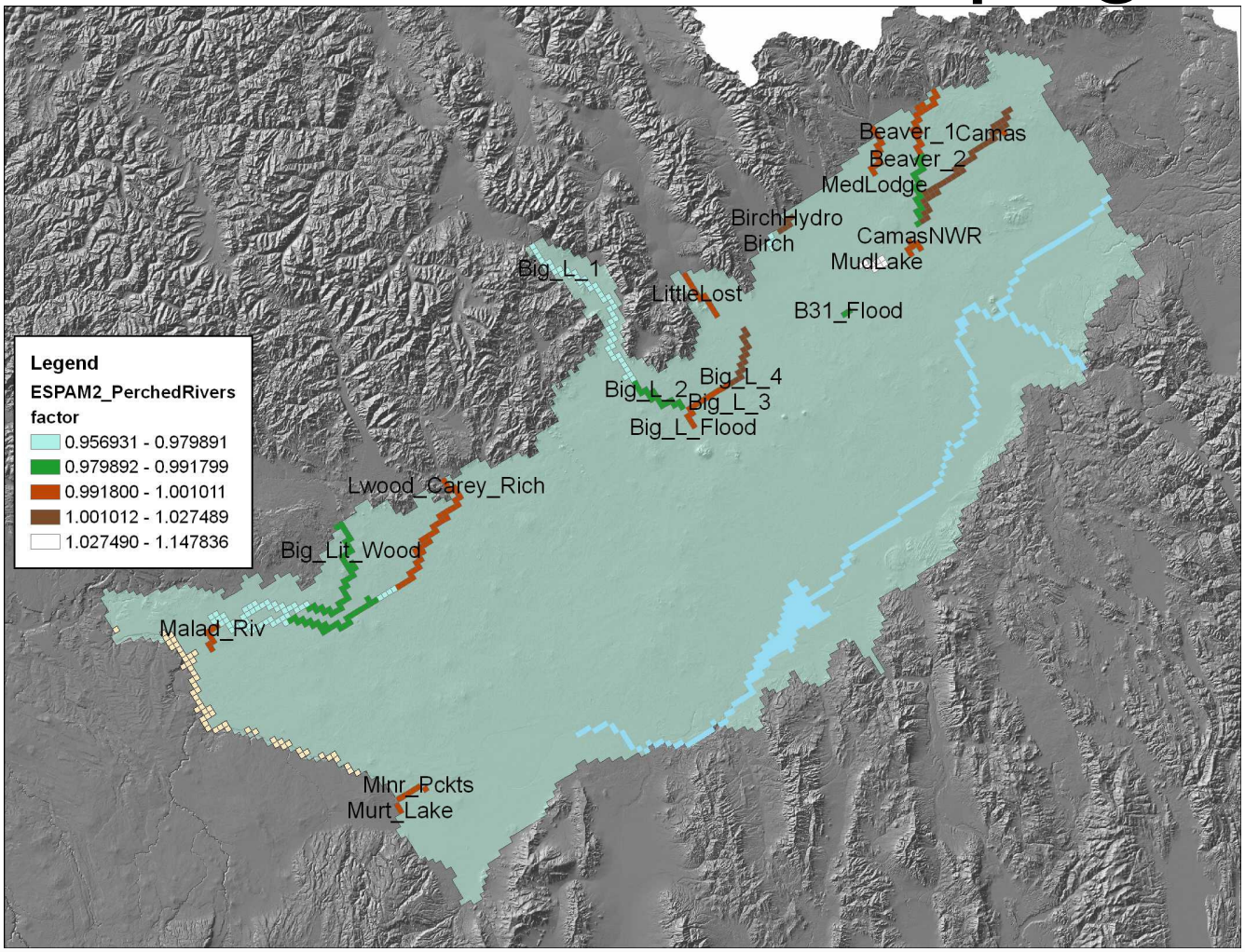
189347
826834.5

V 1.1

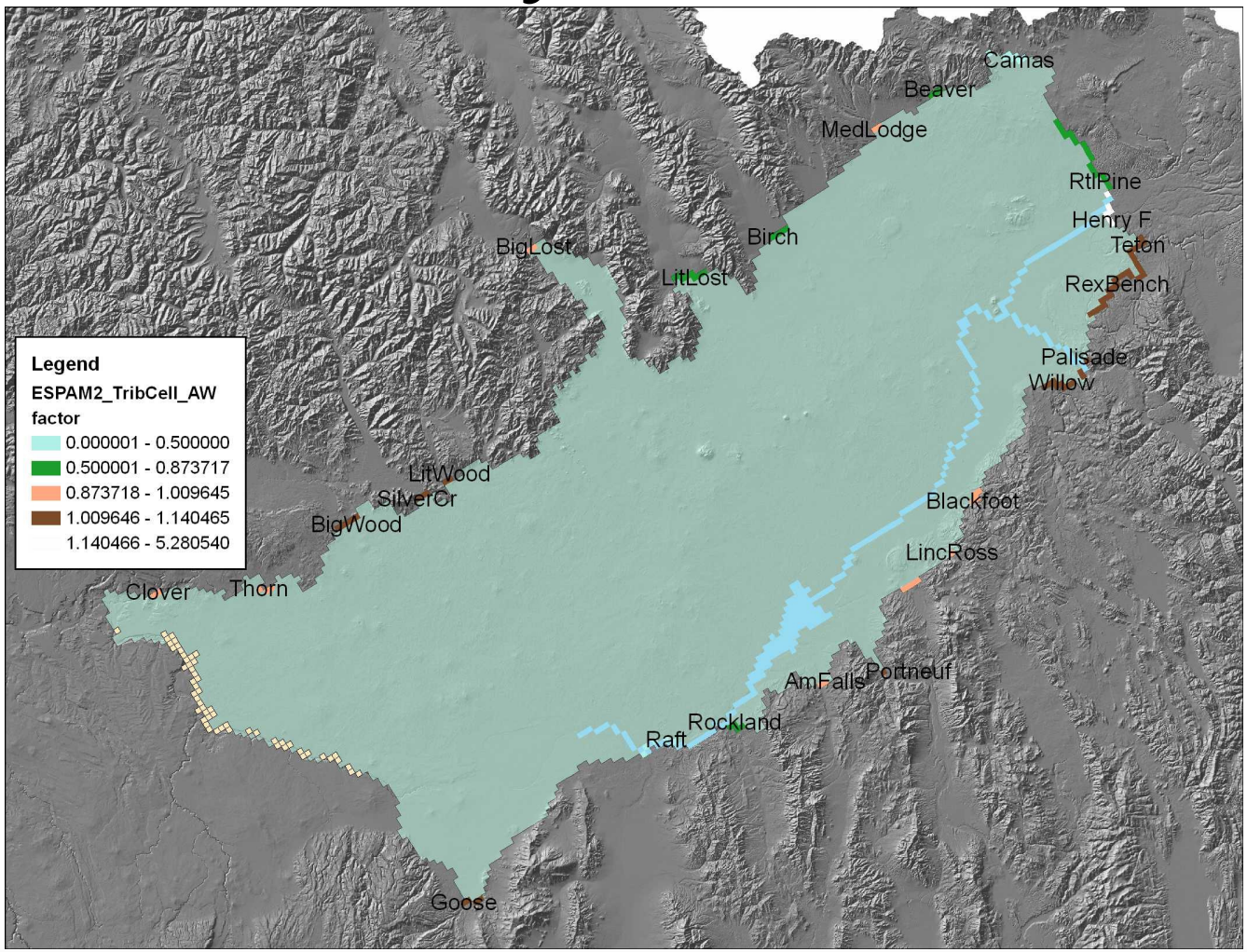

Legend
DrainCells
lowsnk.COND


Legend
Covington_Weaver_Spgs
ESPAM_v2_ModelGrid
Drain COND
3 - 17
18 - 114
115 - 247
248 - 454
455 - 1,063
1,064 - 2,360
2,361 - 3,282
3,283 - 6,148
6,149 - 11,124
11,125 - 17,098
17,099 - 31,893
31,894 - 76,840
76,841 - 169,614
169,615 - 1,149,777
1,149,778 - 300,000,000
Malad Sp
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

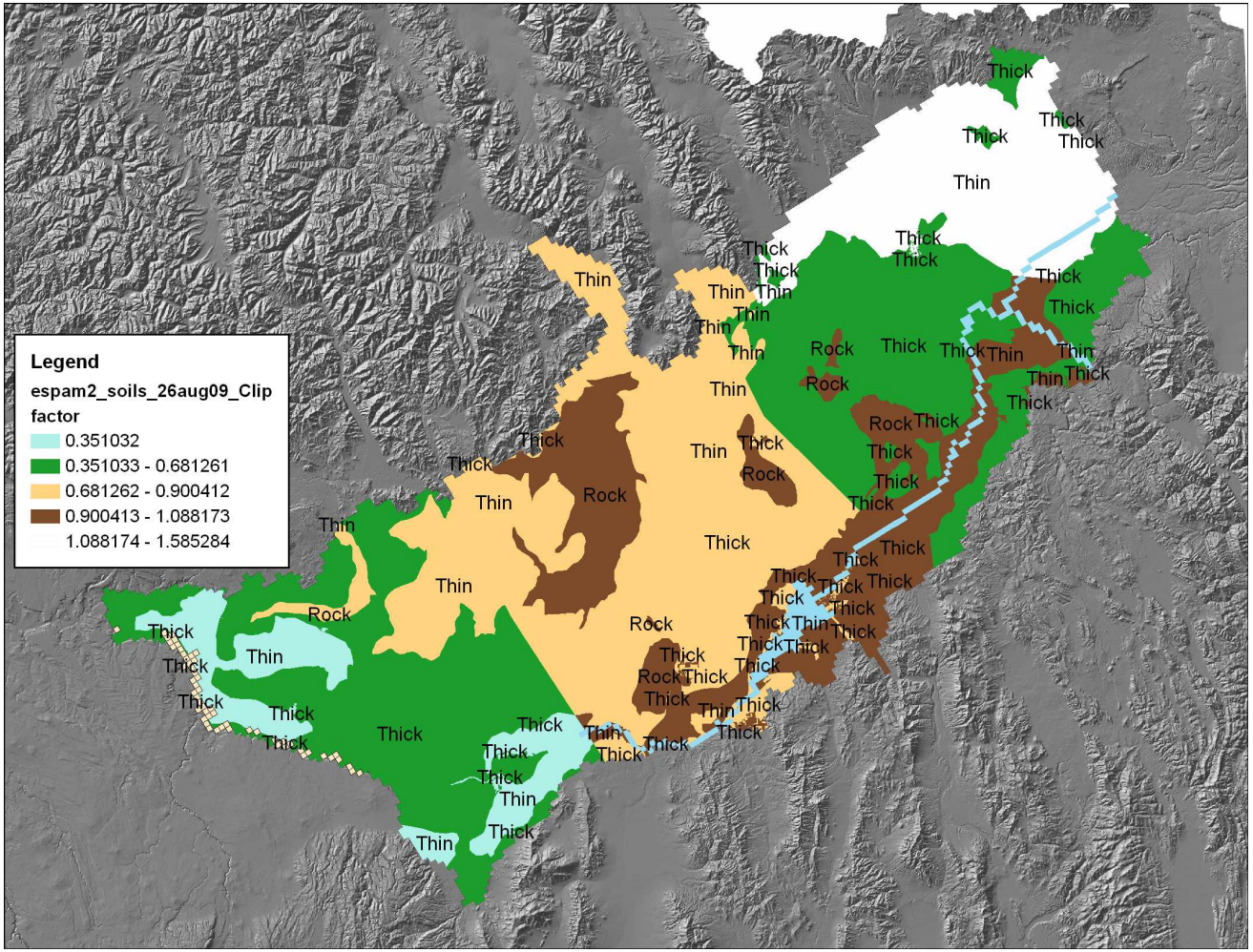
Perched River Seepage



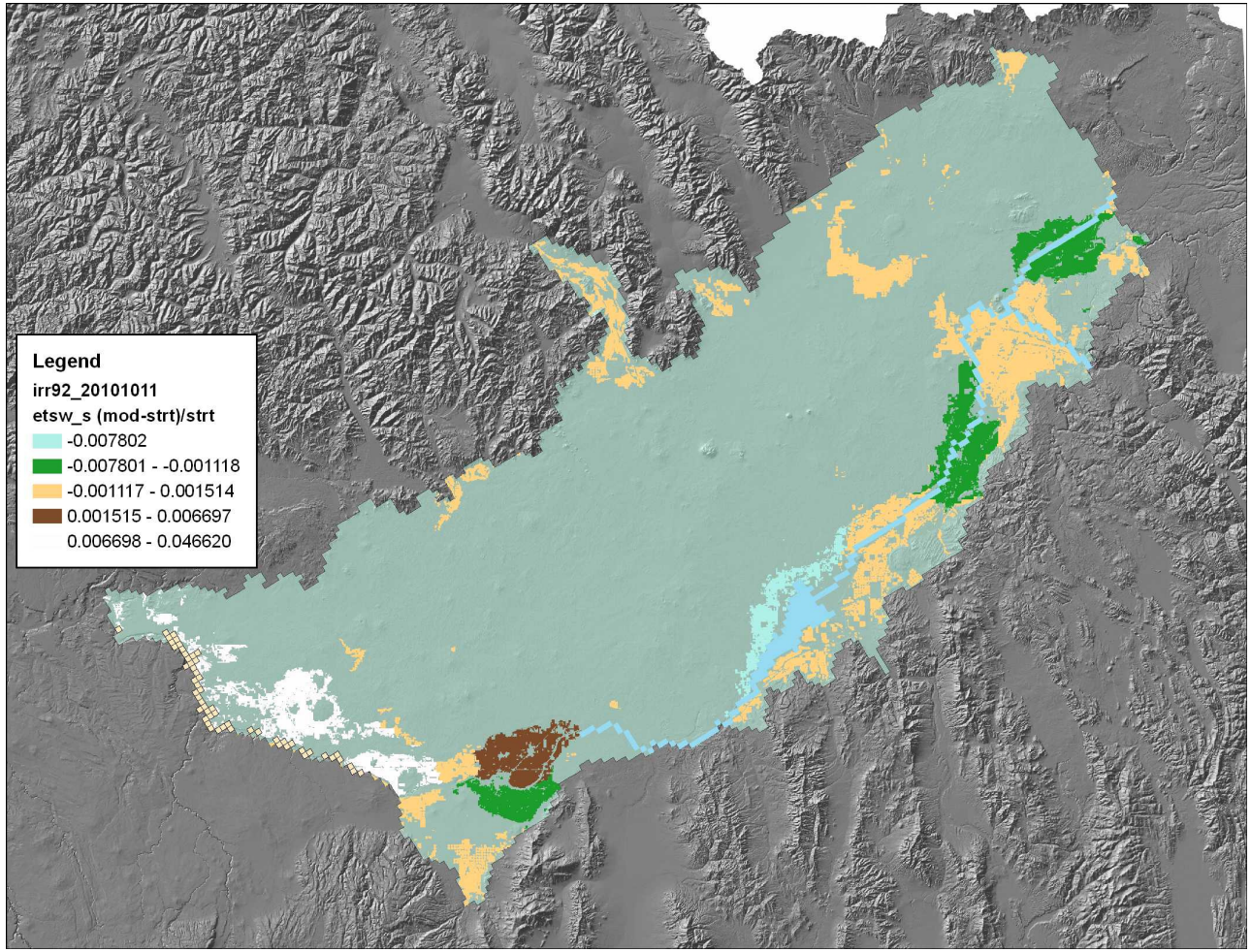
Tributary Underflow



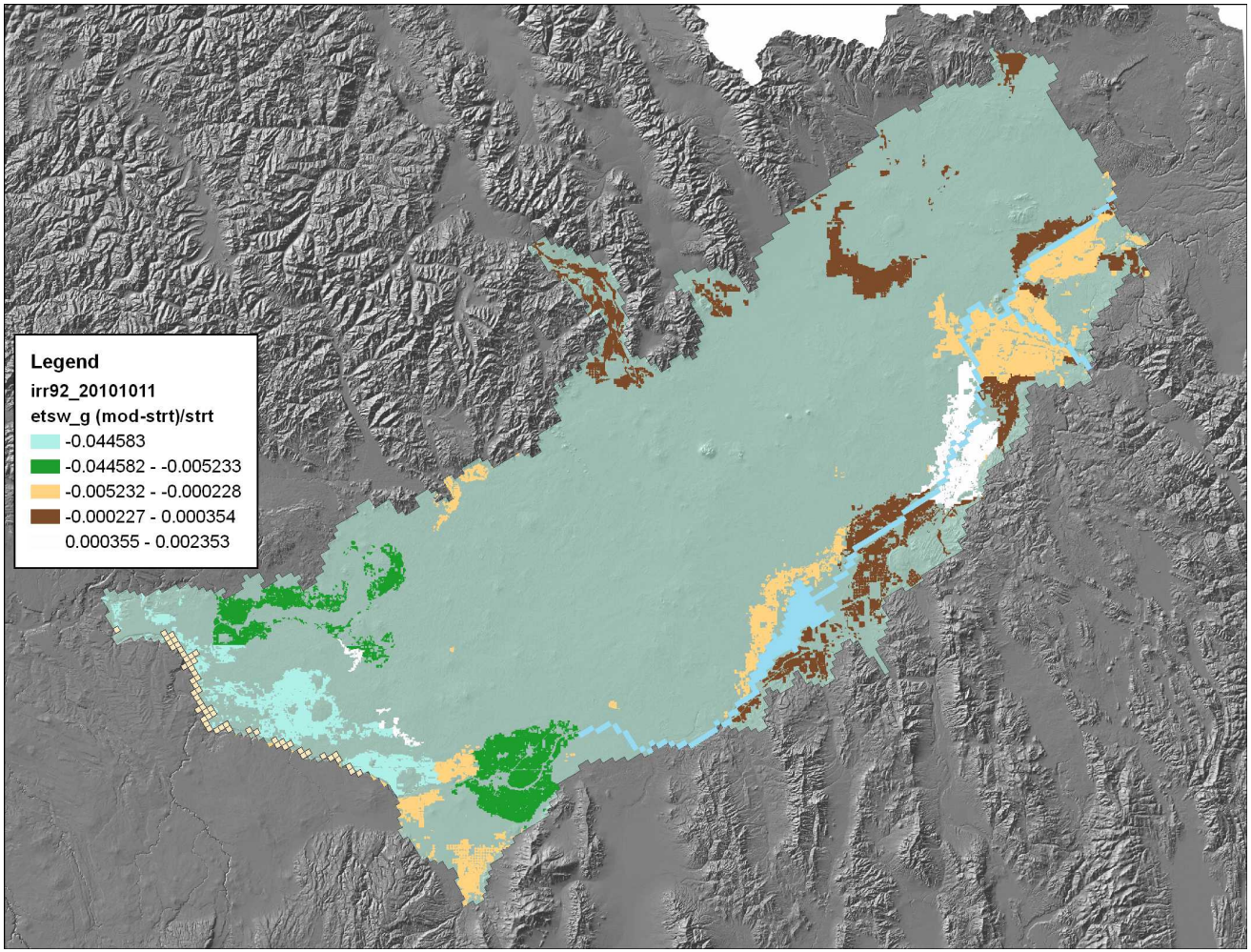
Non-irrigated Recharge



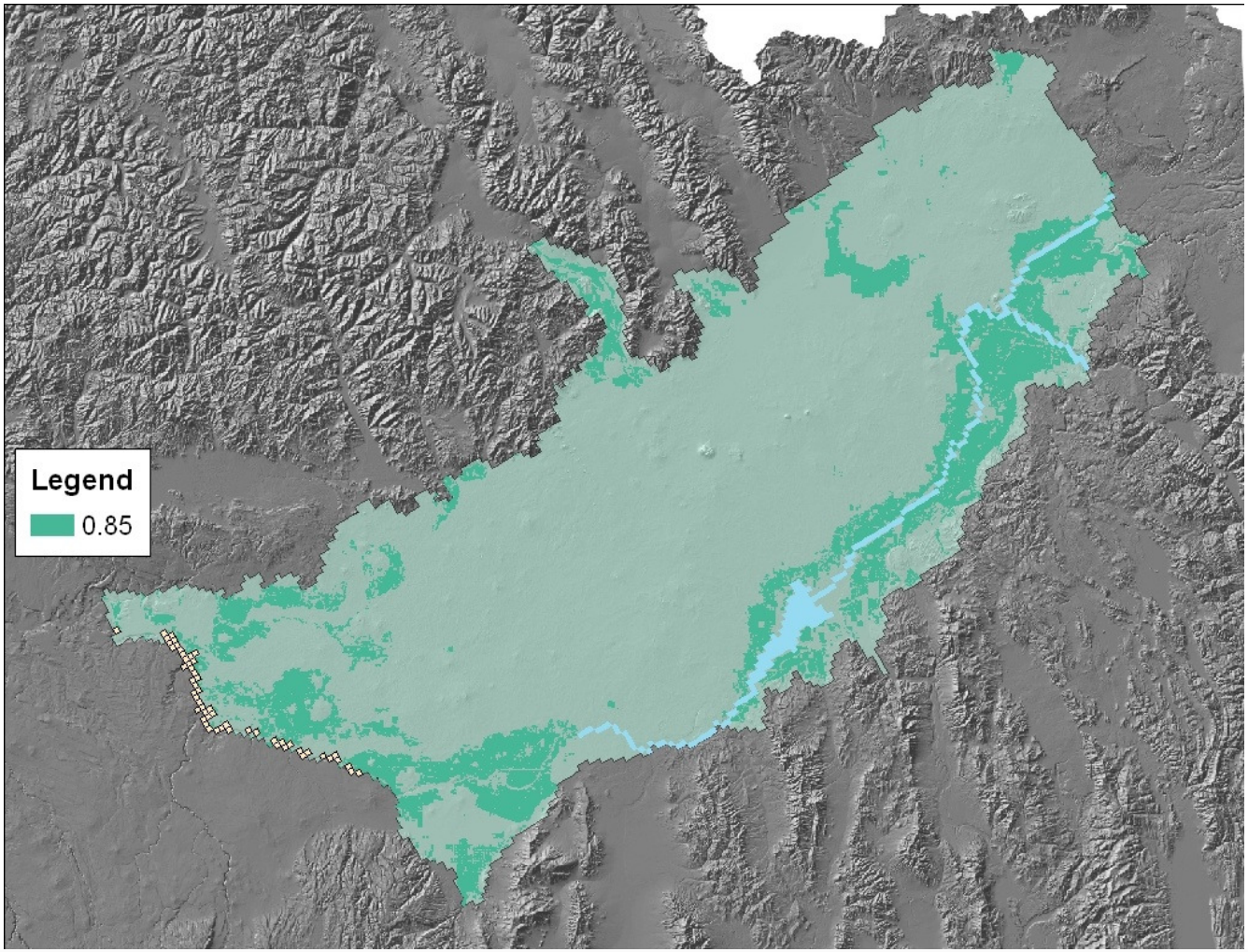
ET Surface Water Sprinkler



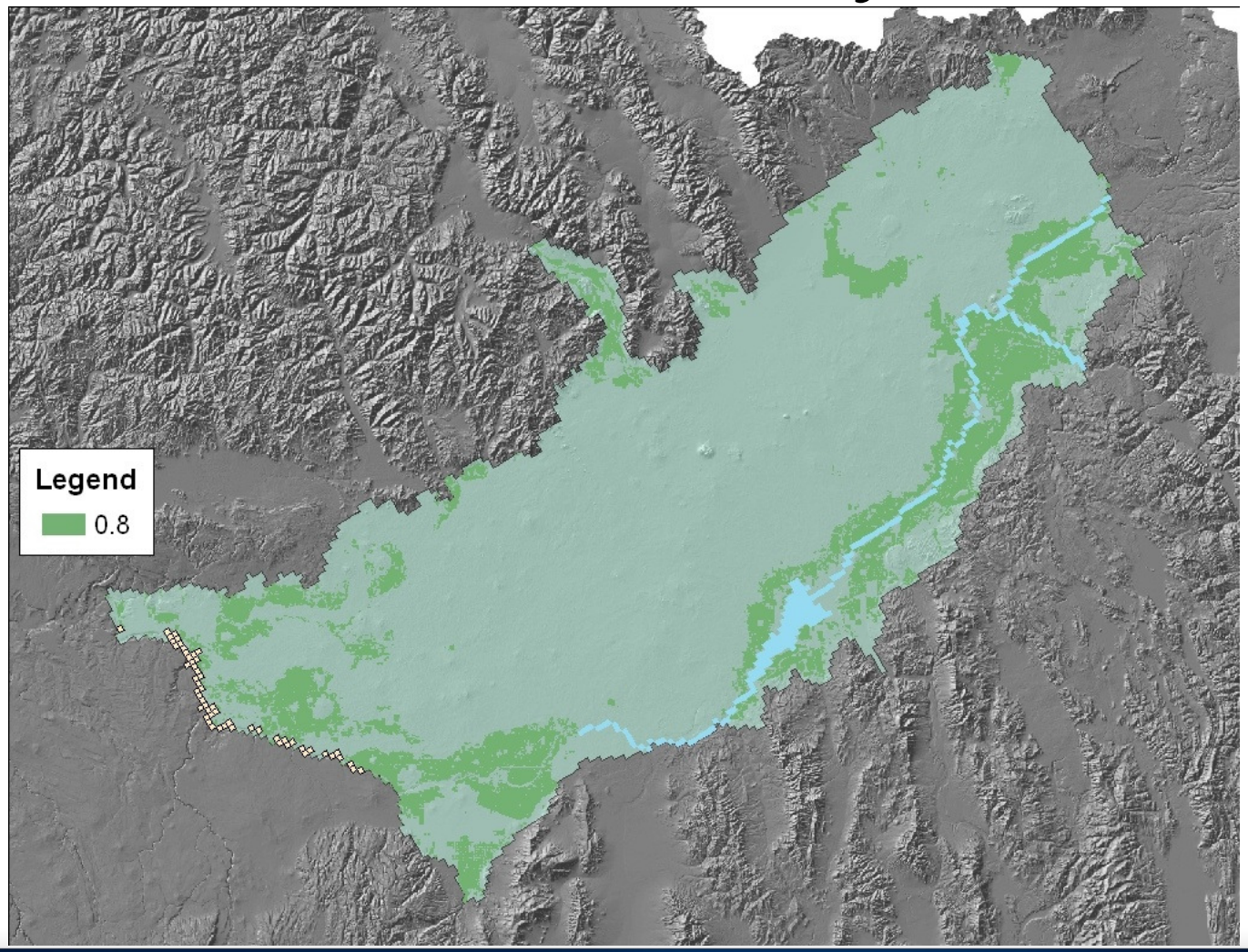
ET Surface Water Gravity

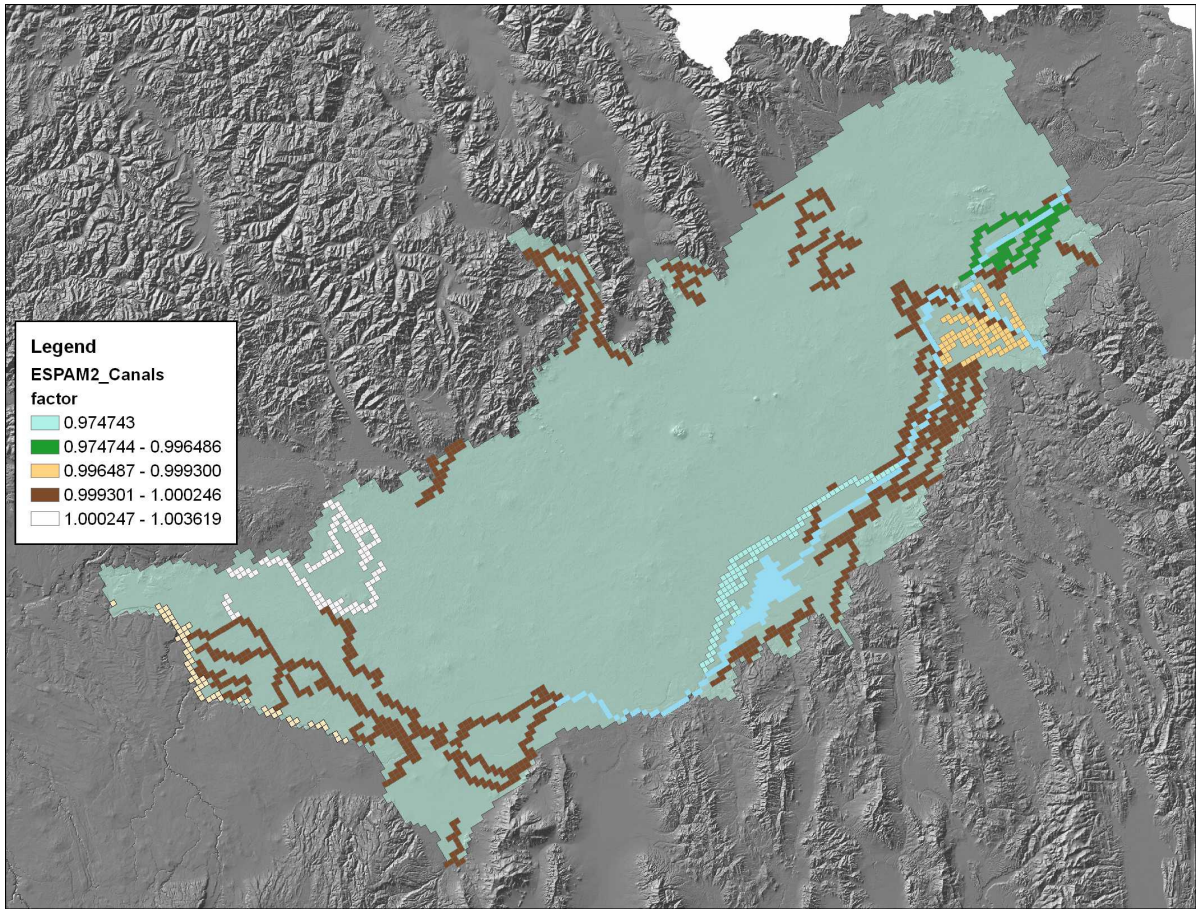


Surface Water Sprinkler Efficiency

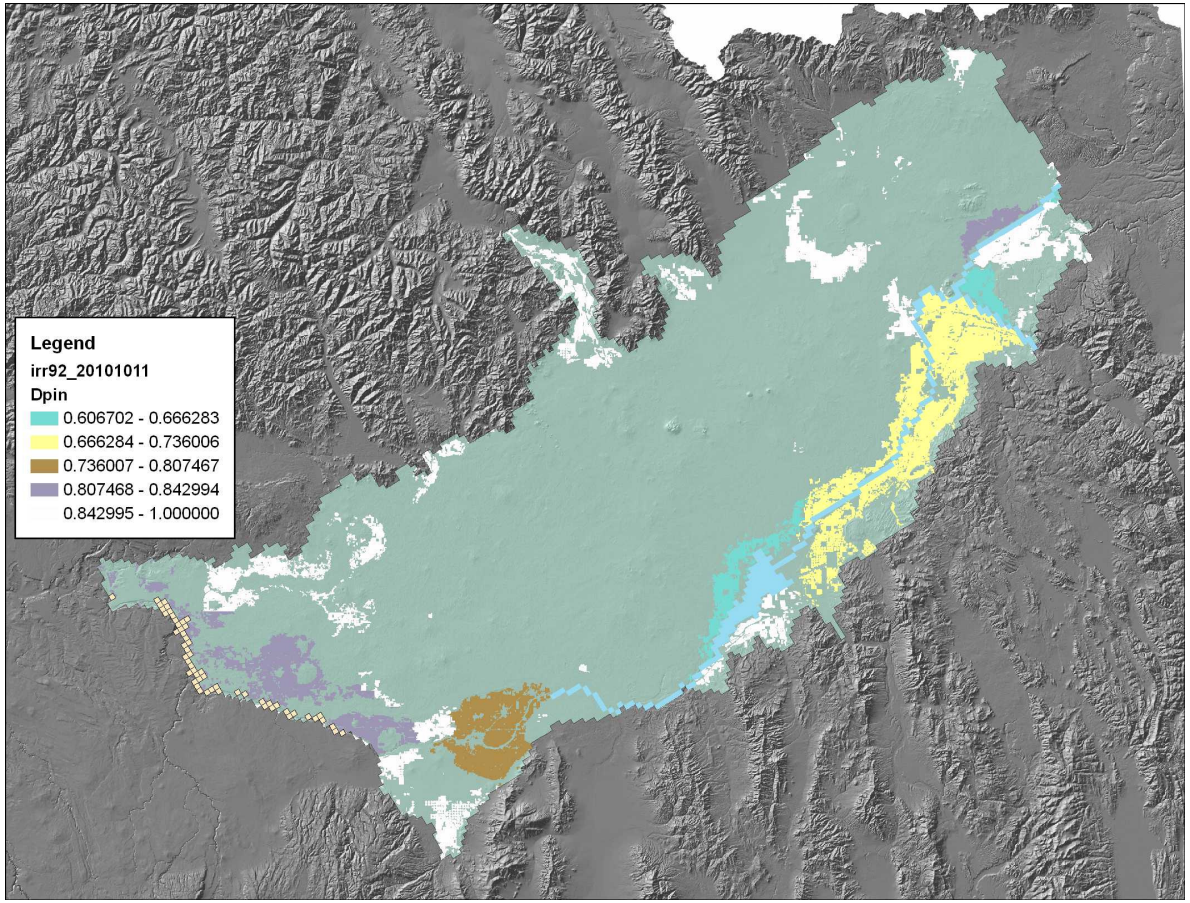


Surface Water Gravity Efficiency

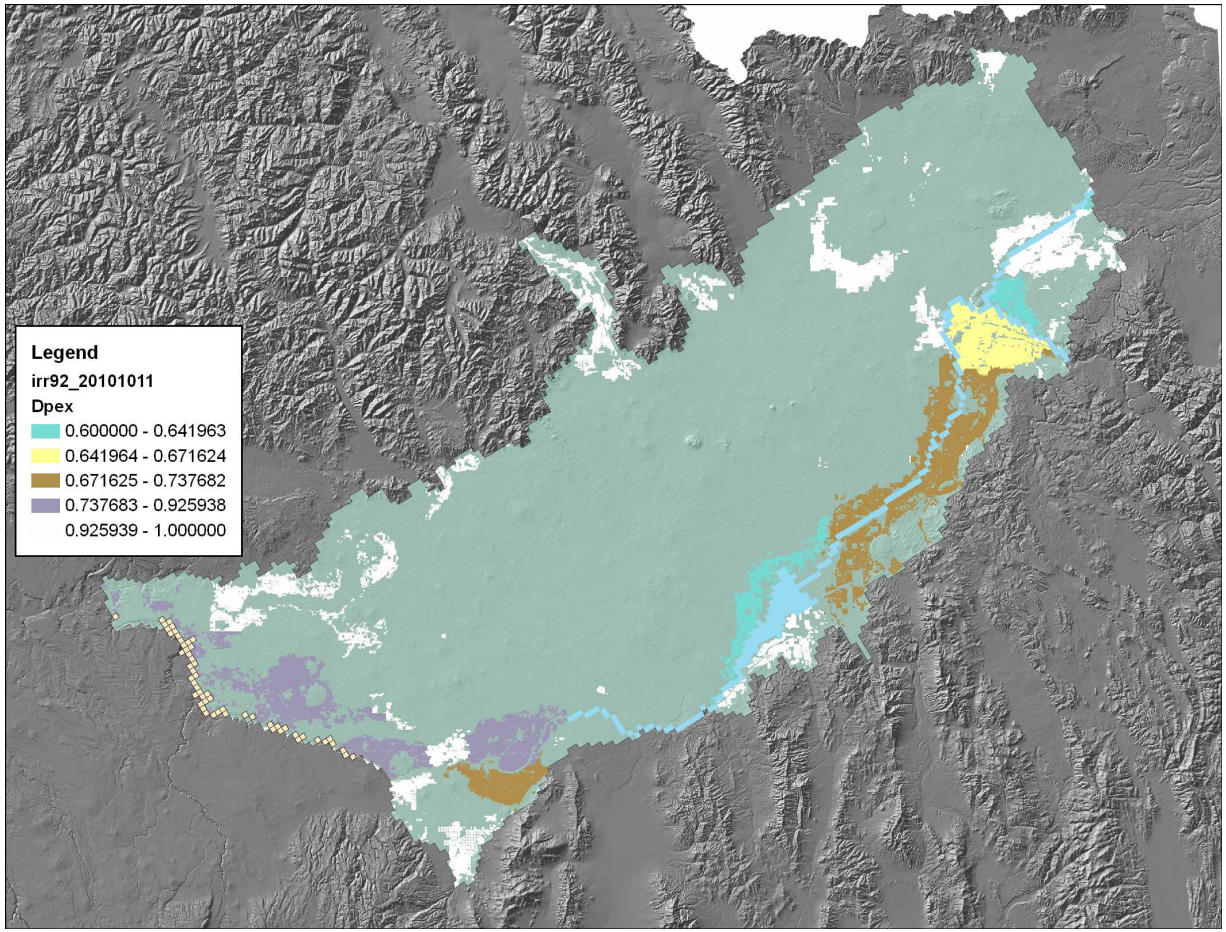




- Canal Seepage
  - CNL fraction * .DIV diversions
  - PEST only allowed to adjust non-coalition entities +/- 5%

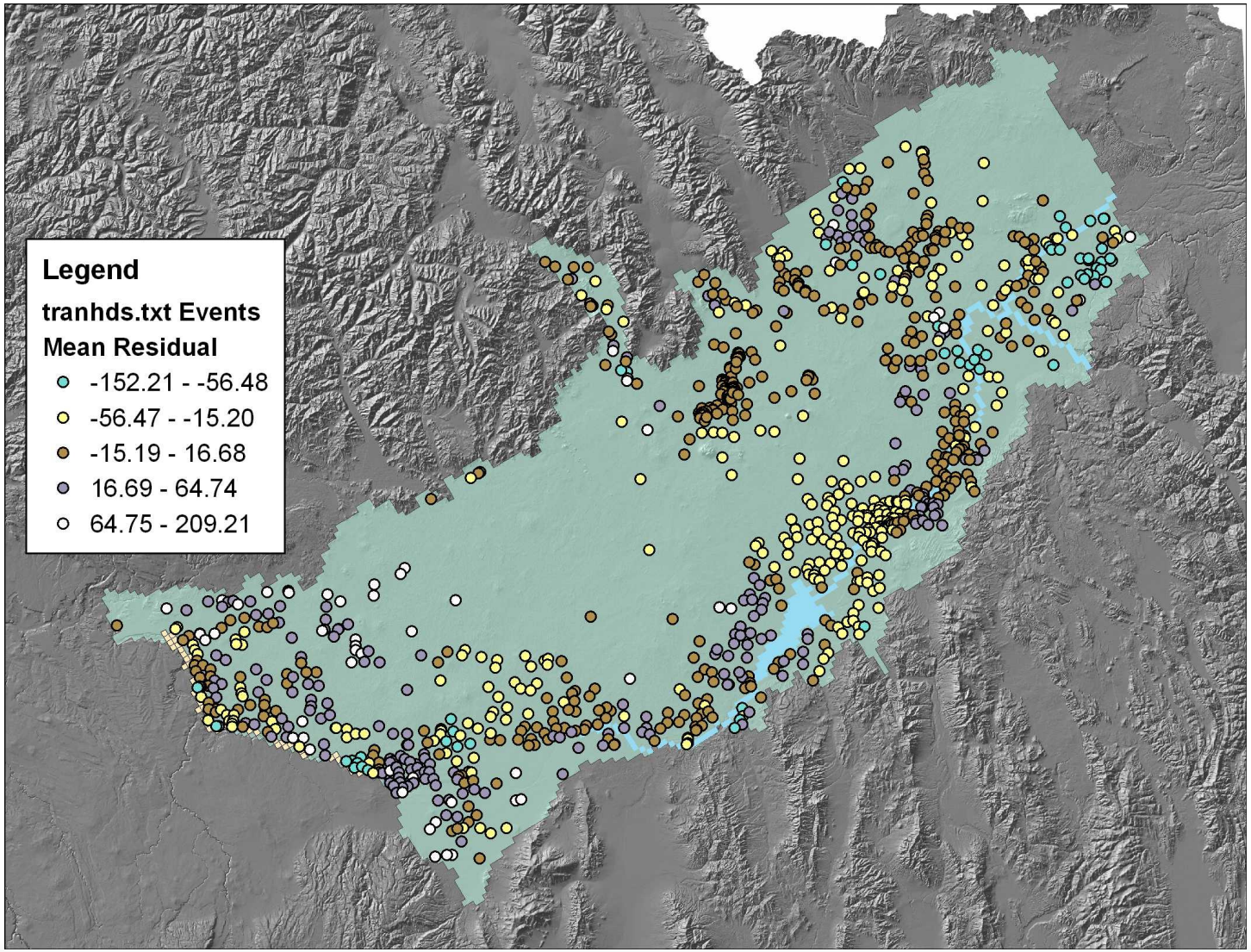


- DPin
  - fraction of the initial irrigation loss (1-eff) that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98

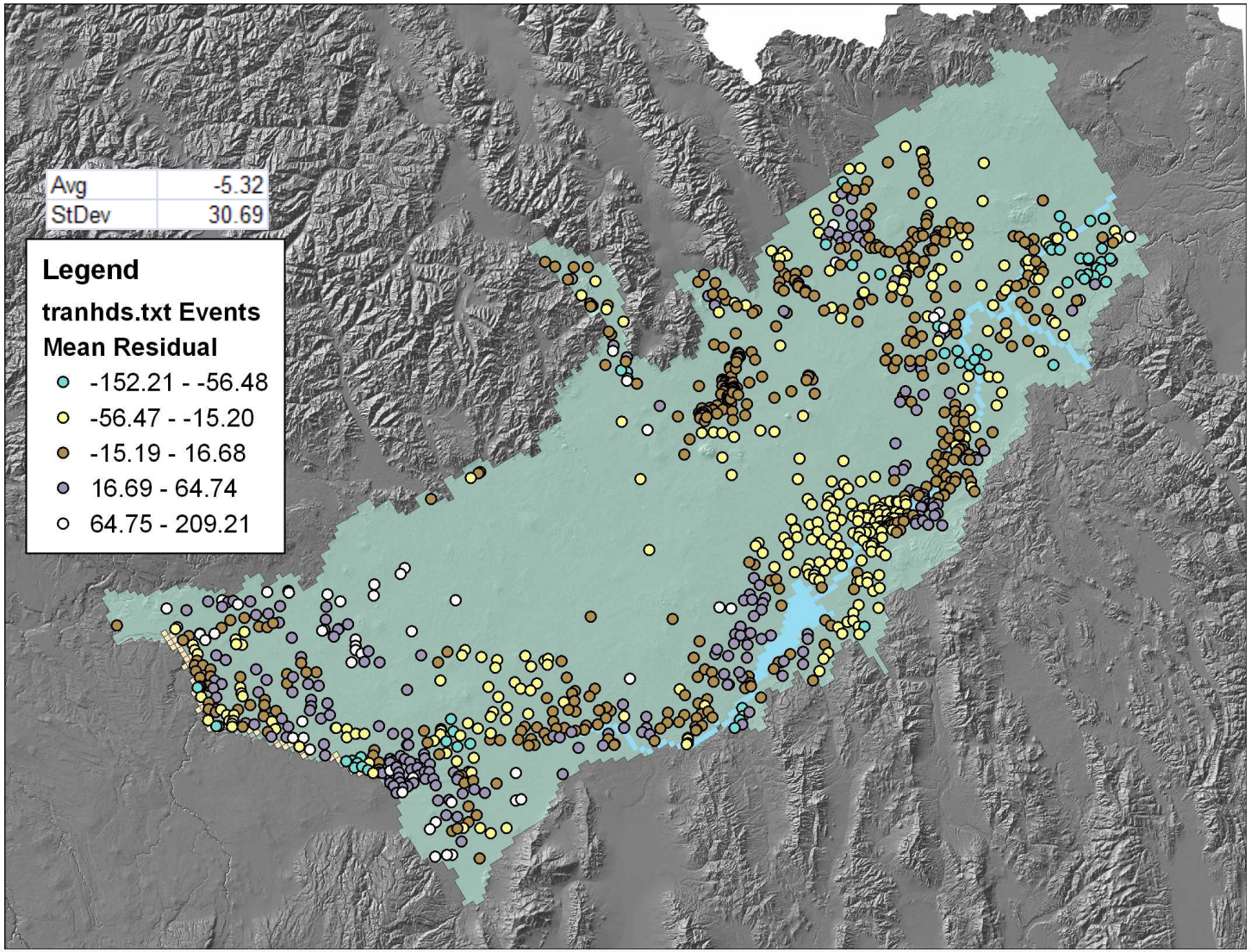


- DPex
  - fraction of delivery exceeding CIR that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98

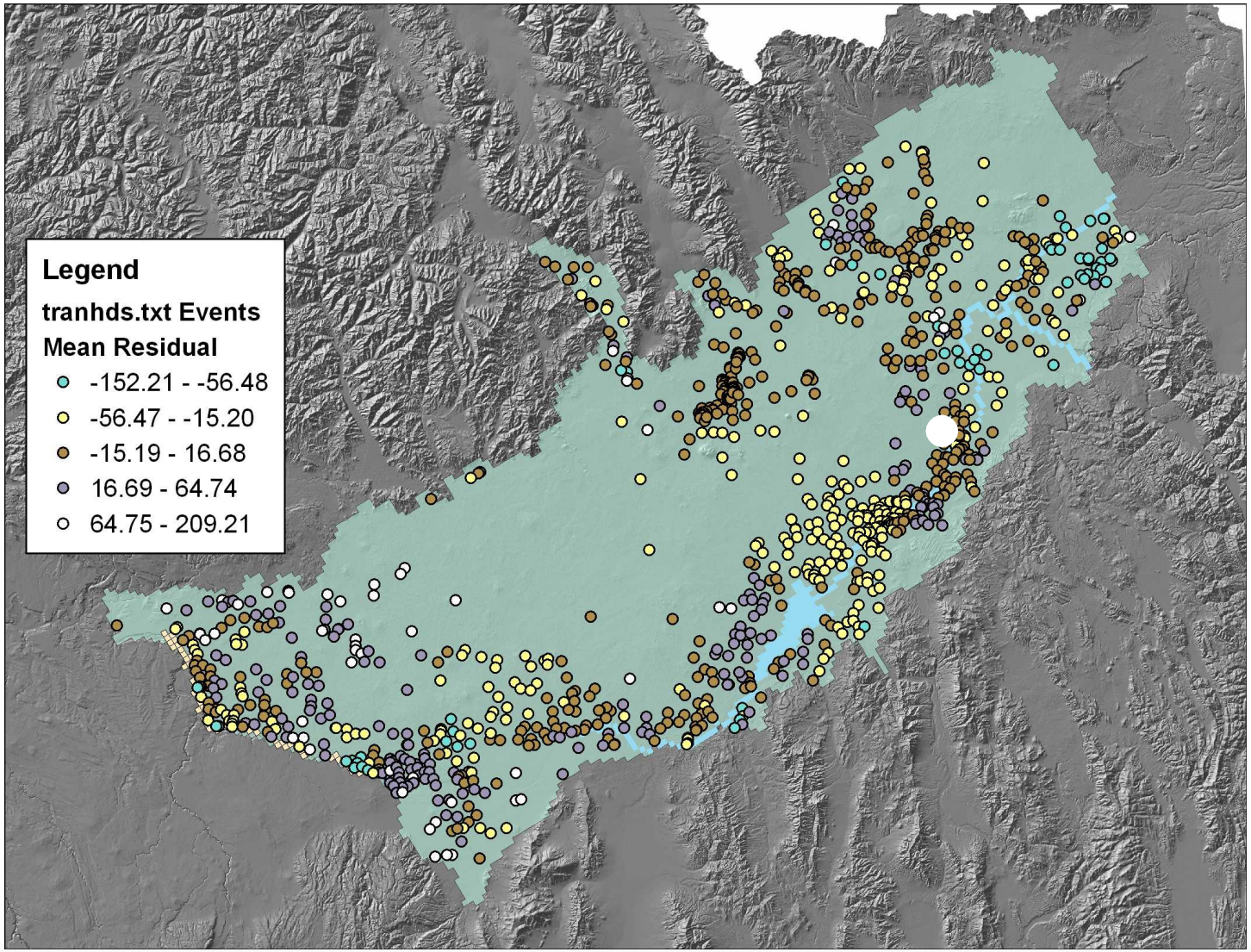
Transient Heads



Transient Heads



Transient Heads



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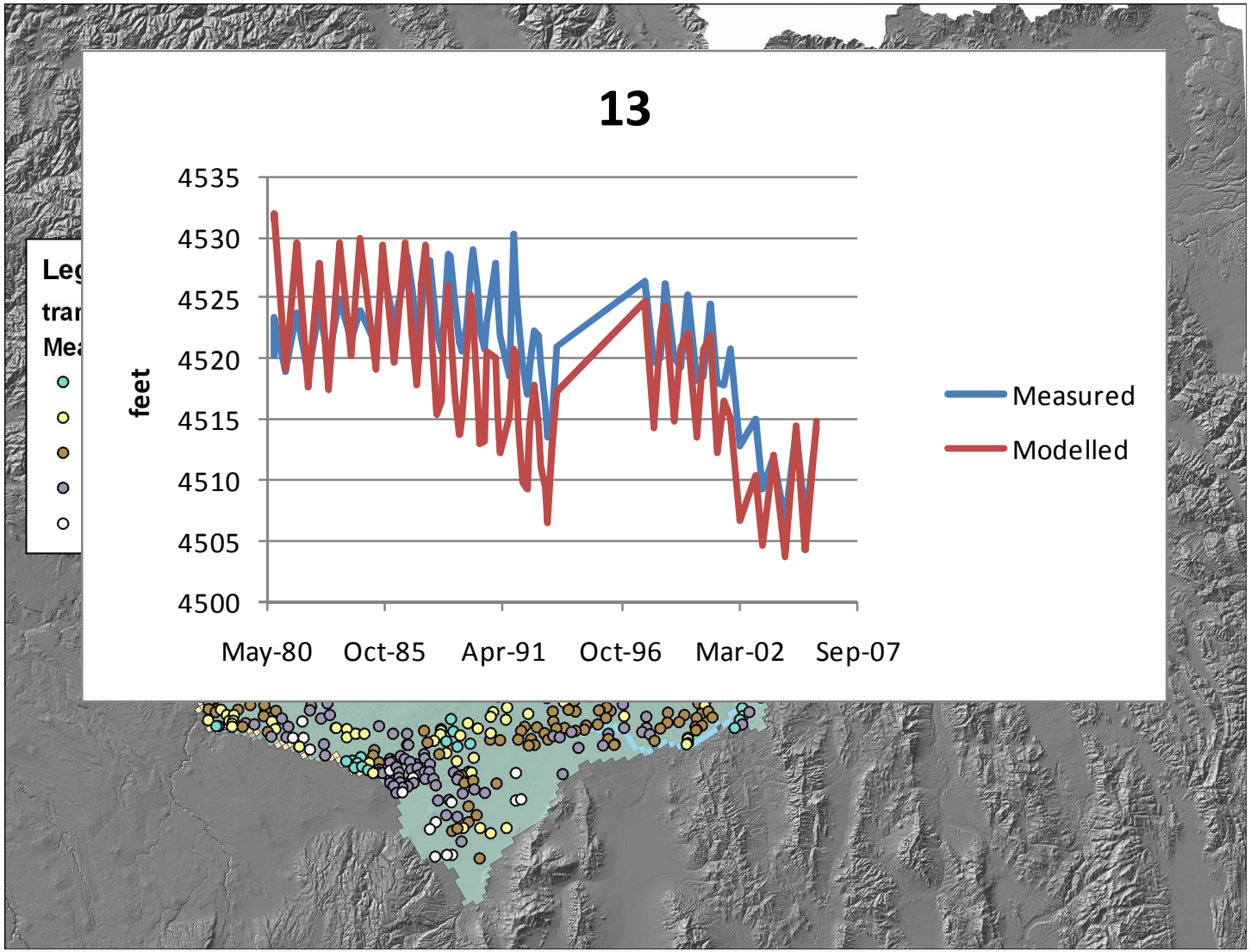

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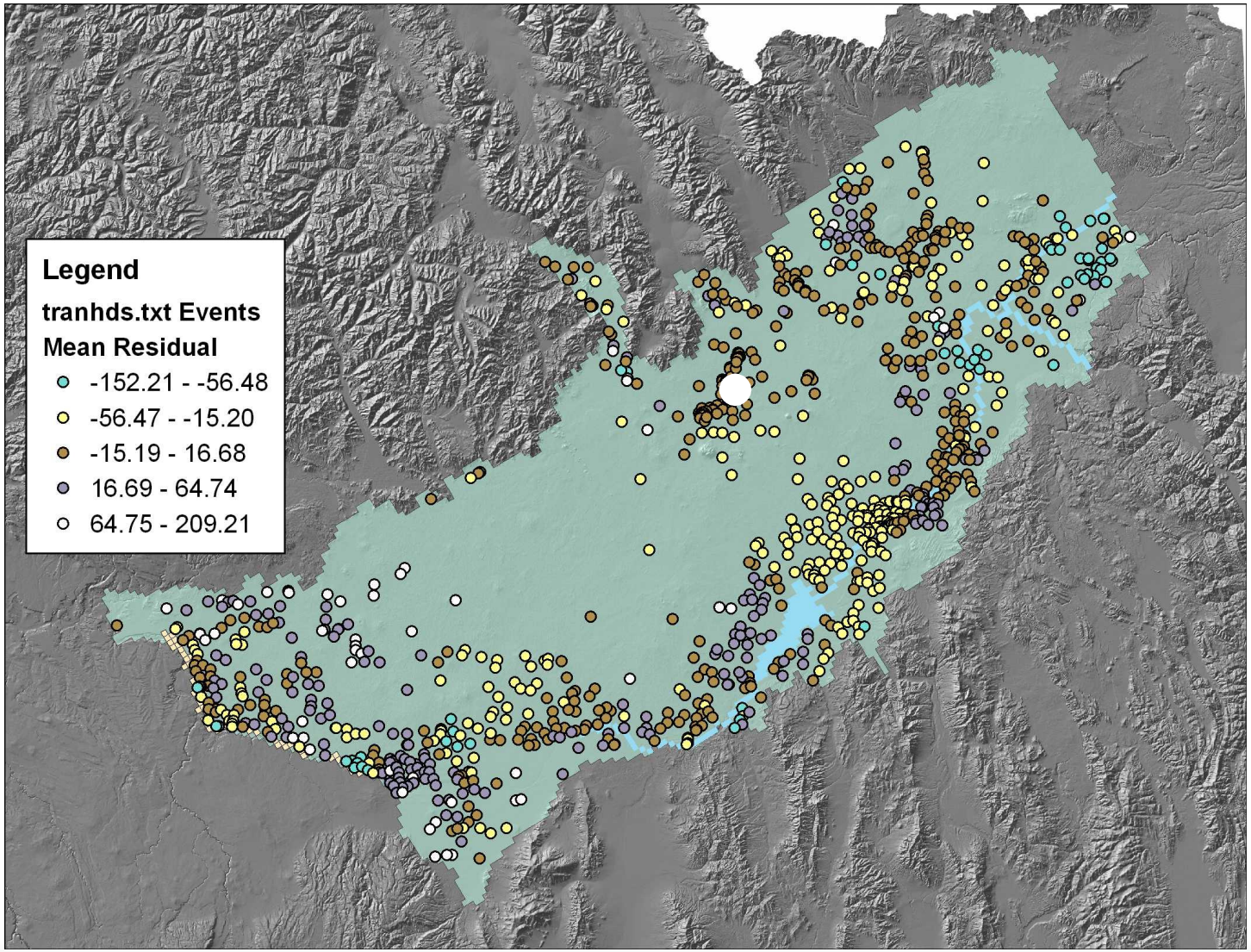
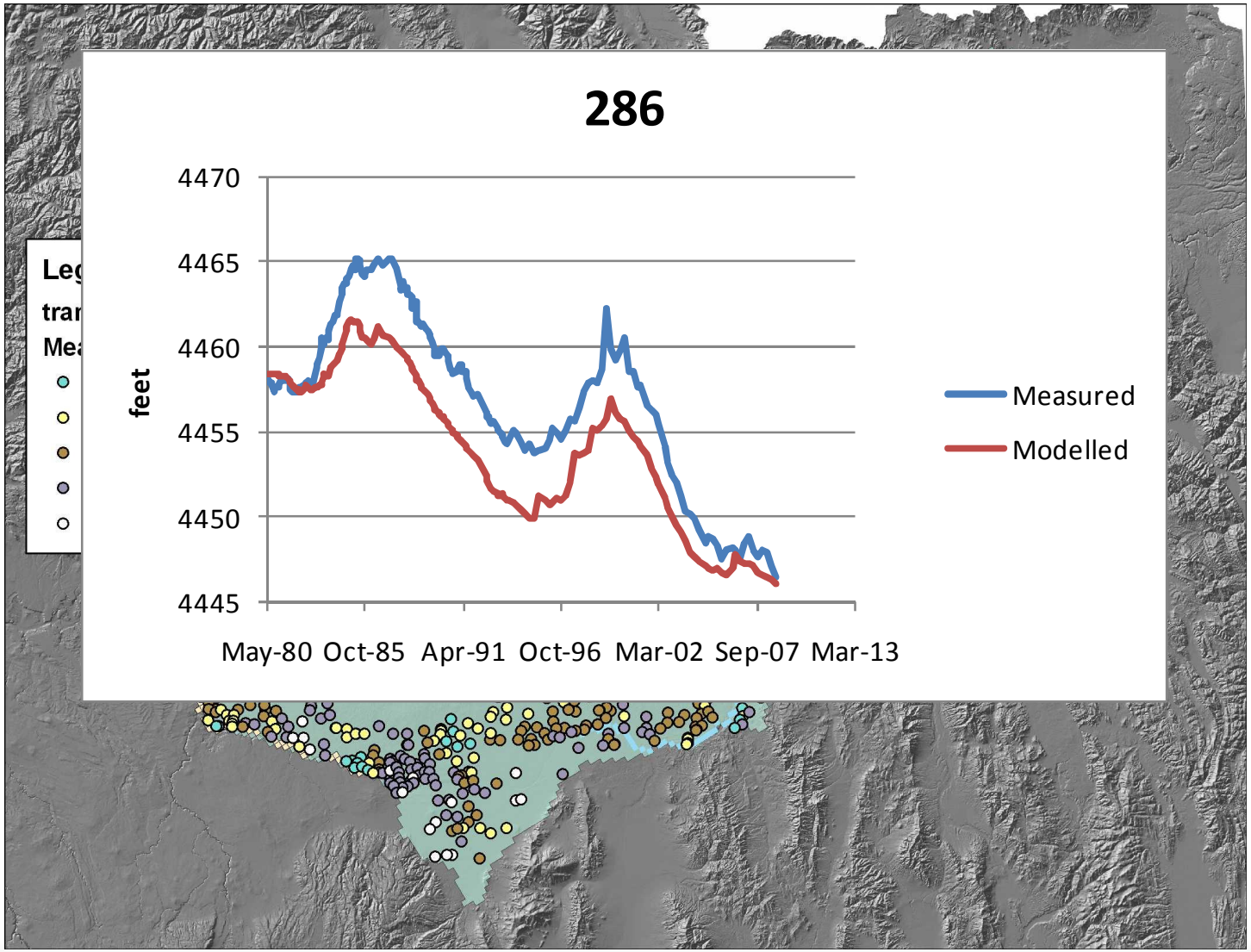


Transient Heads



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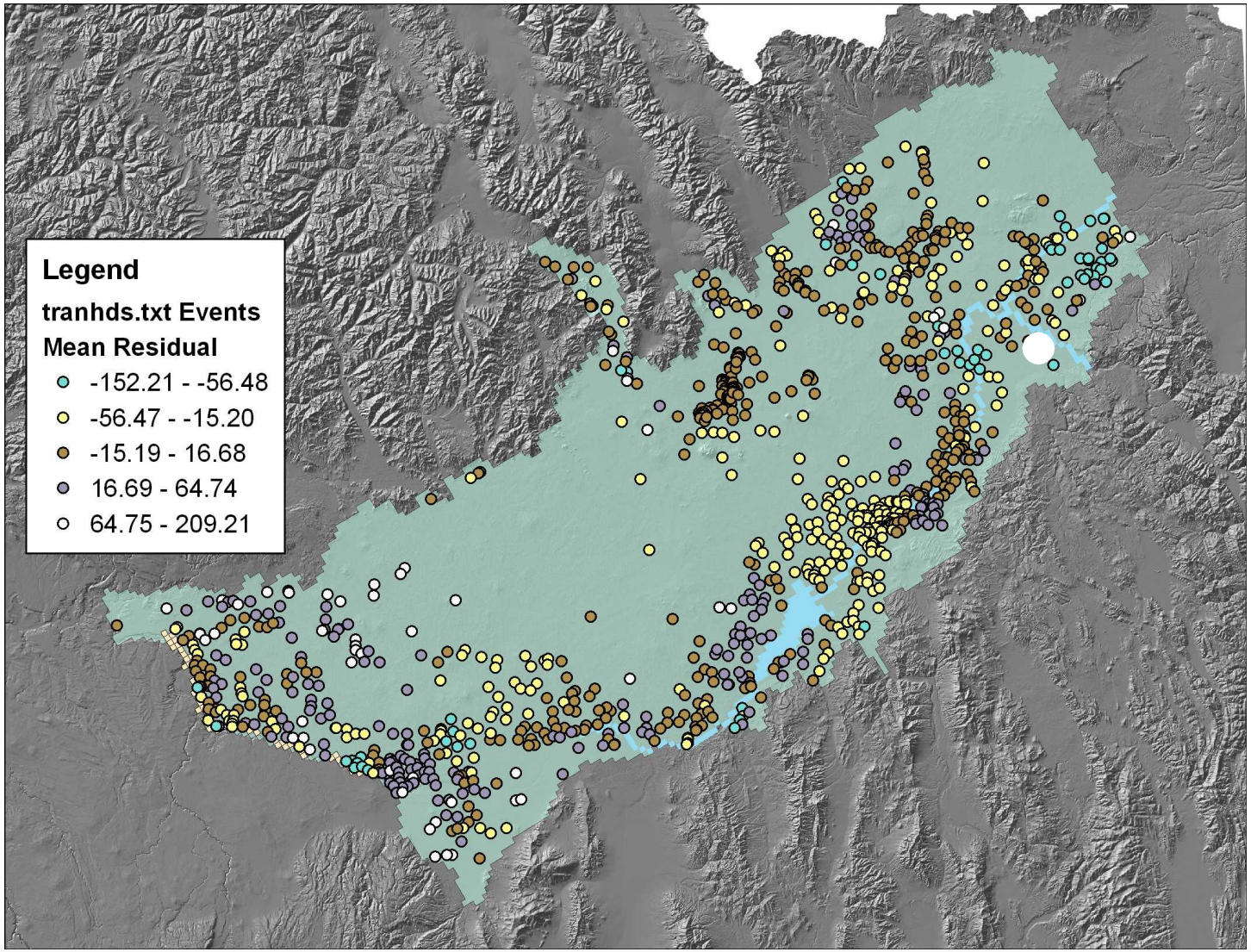

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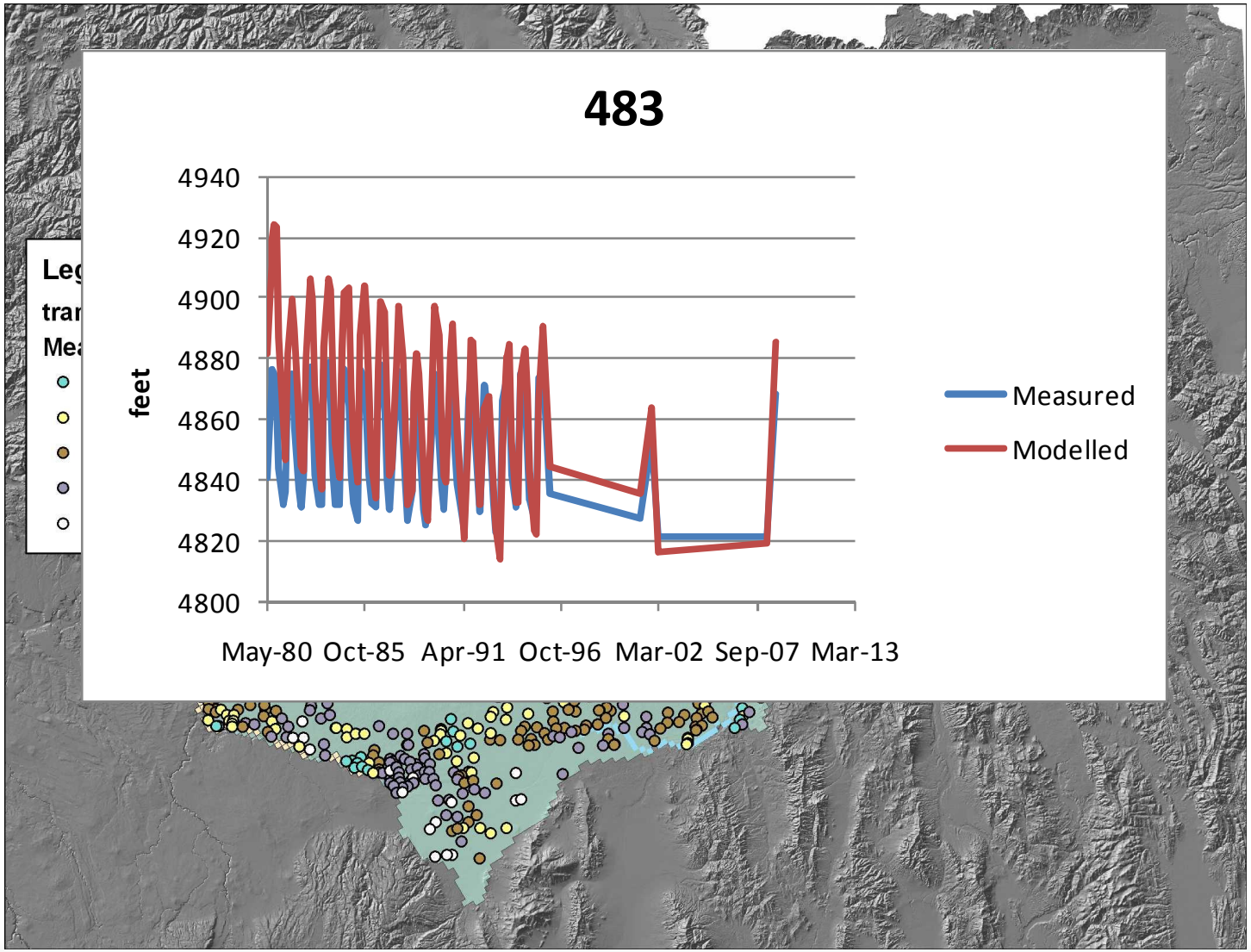
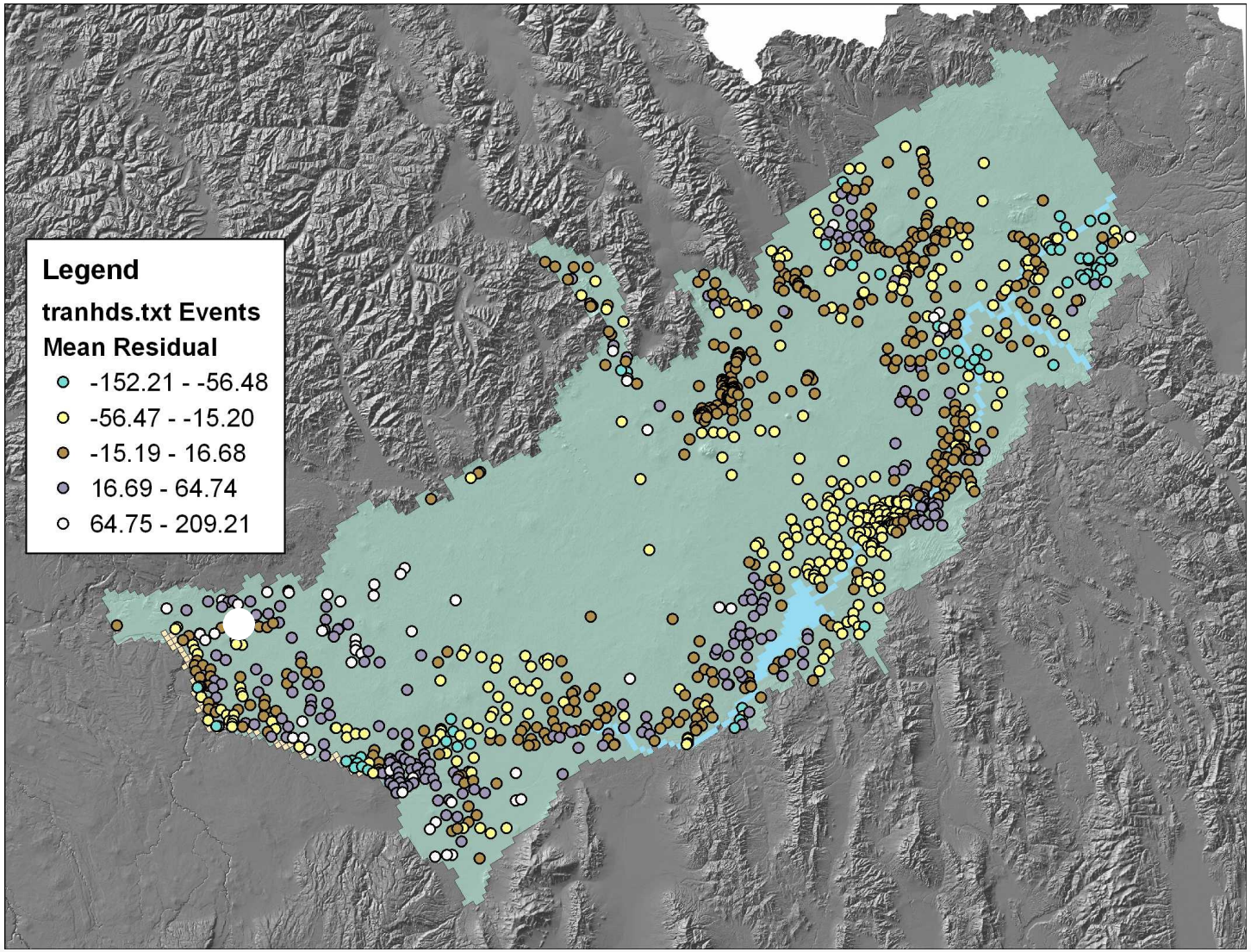


Transient Heads



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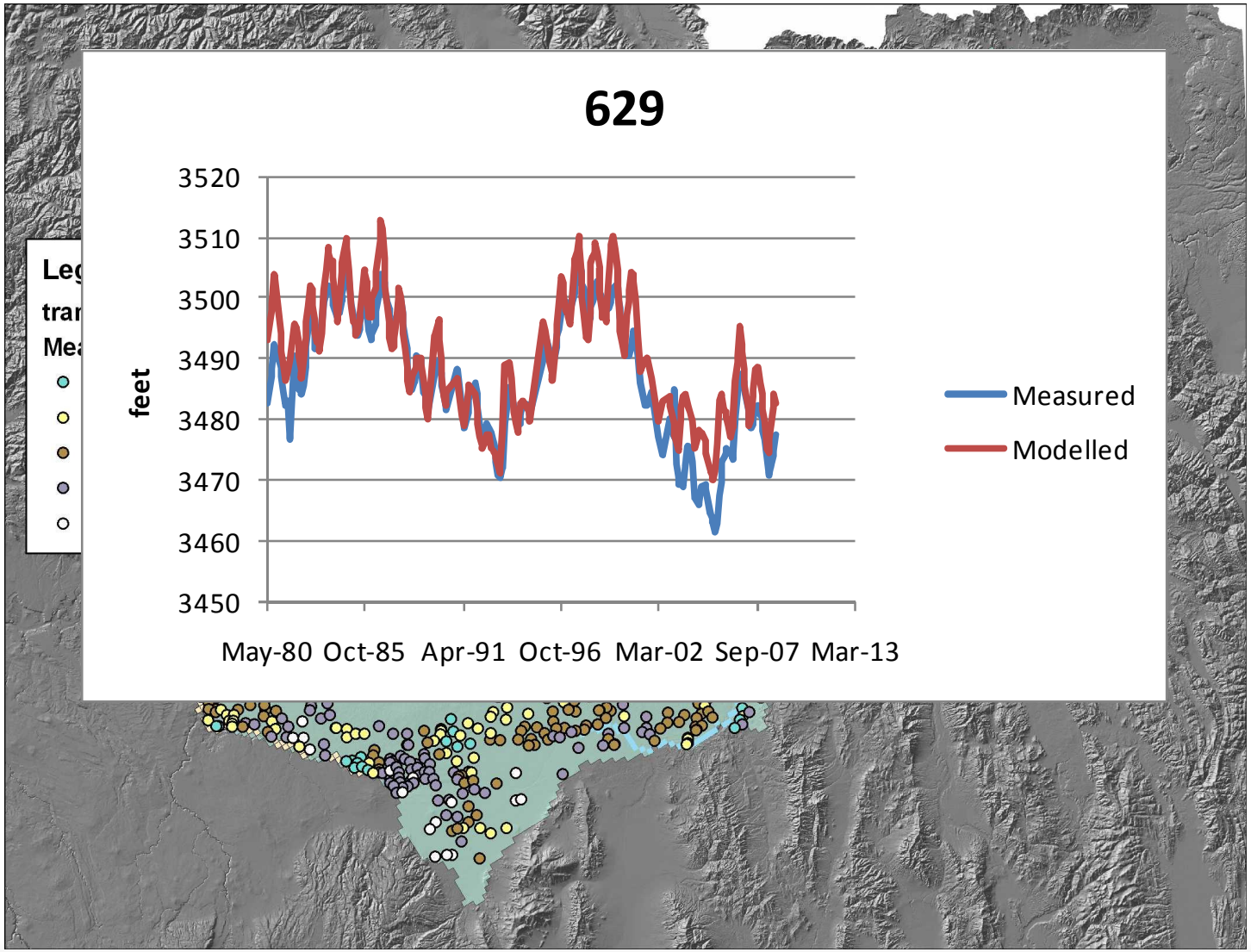

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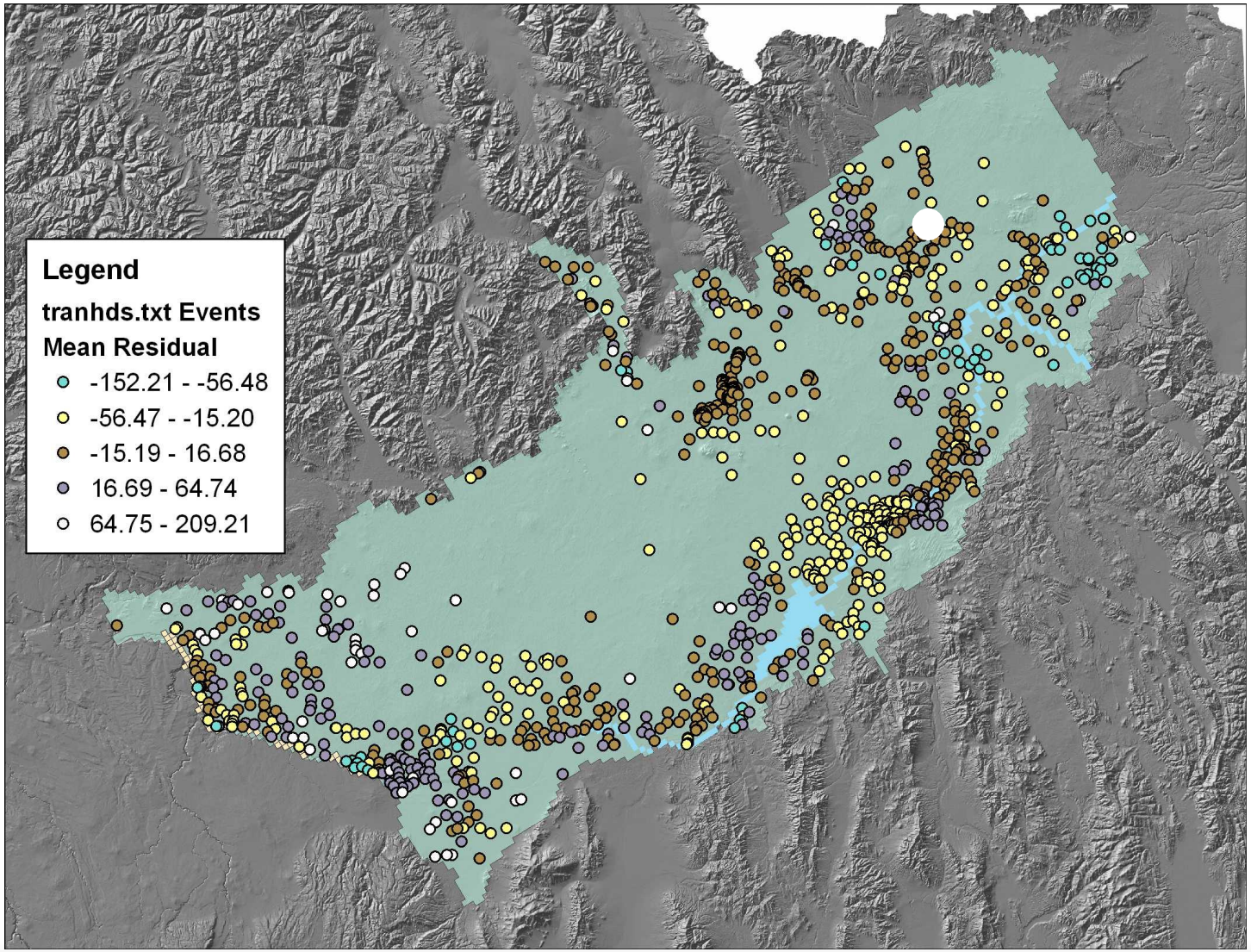
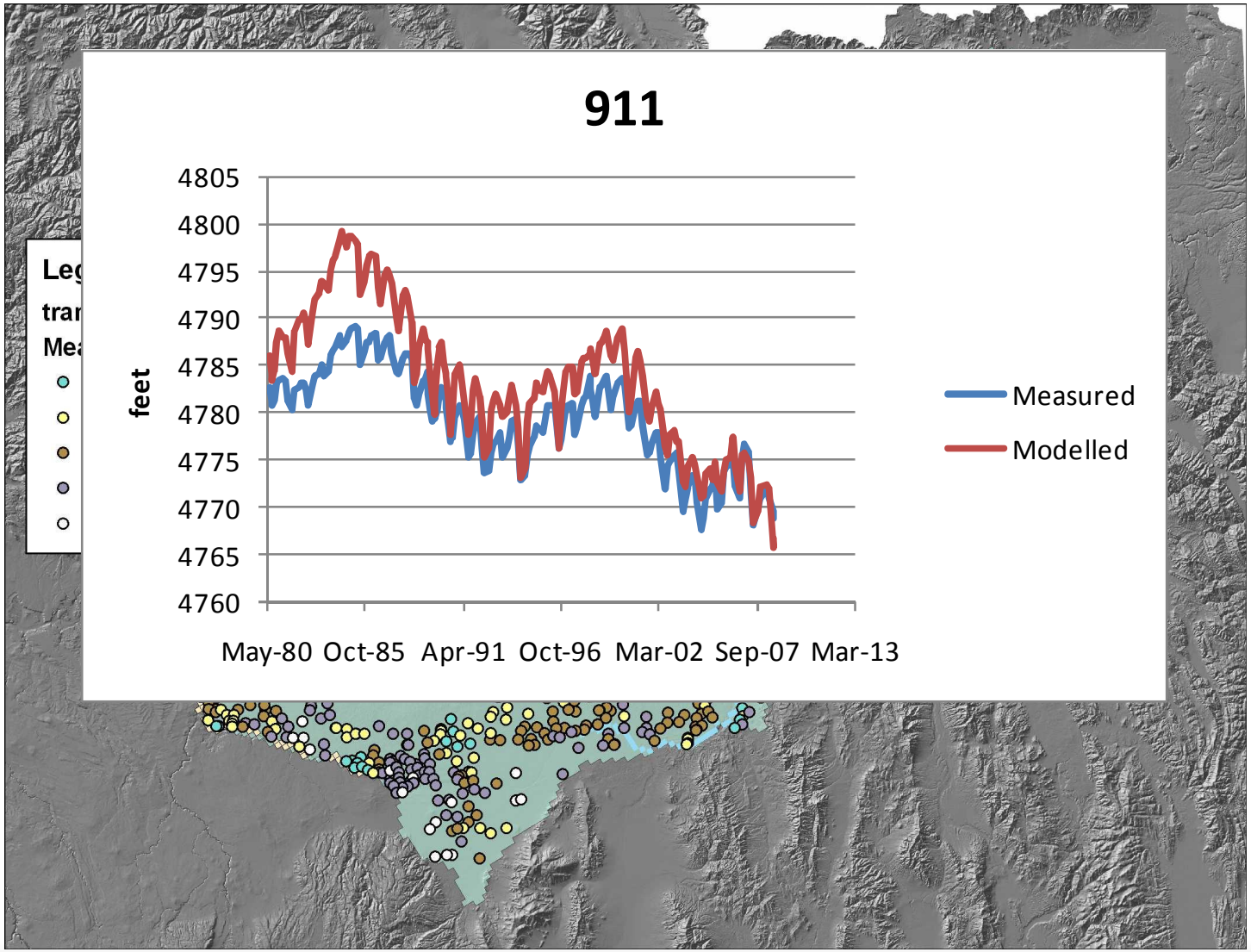


Transient Heads



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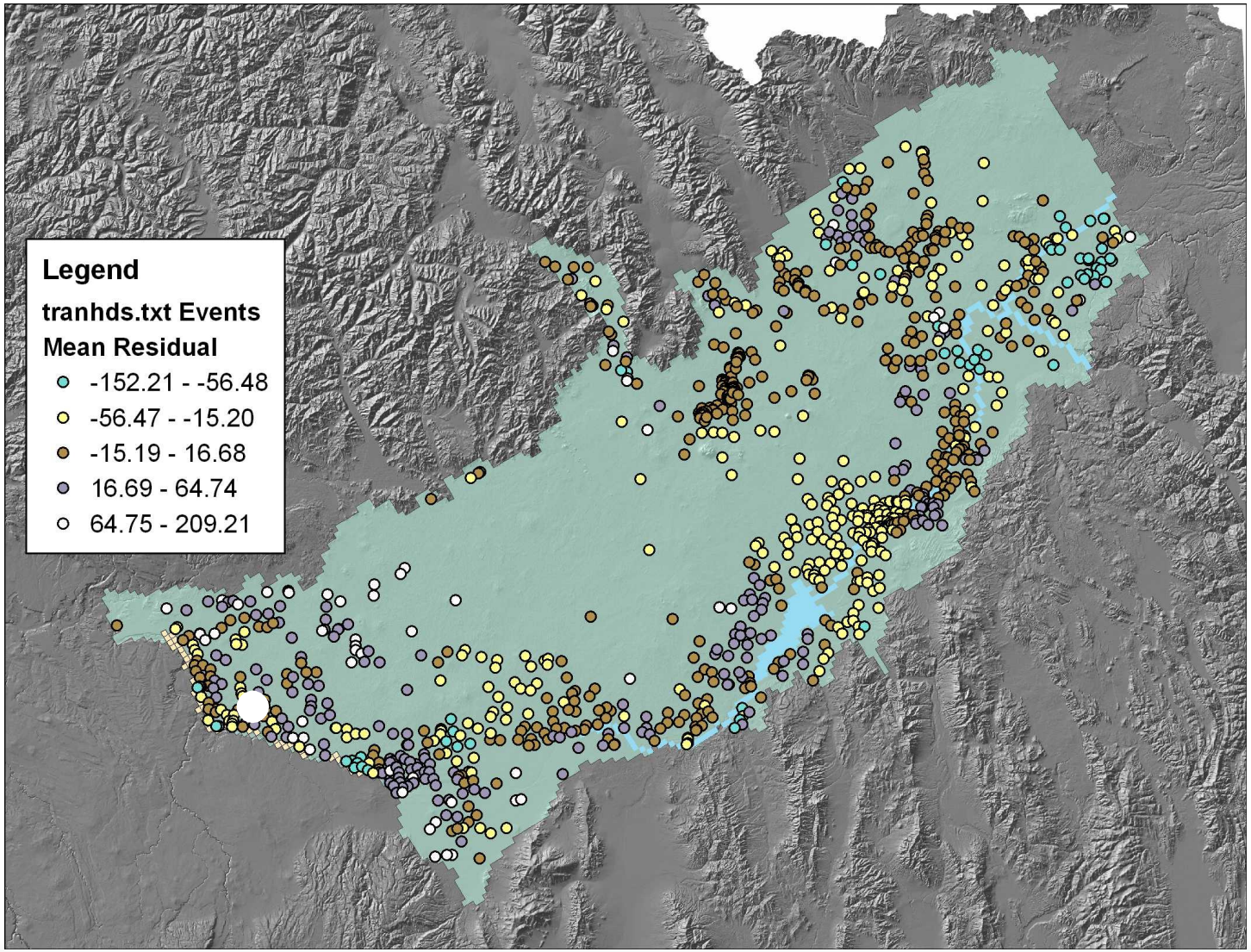

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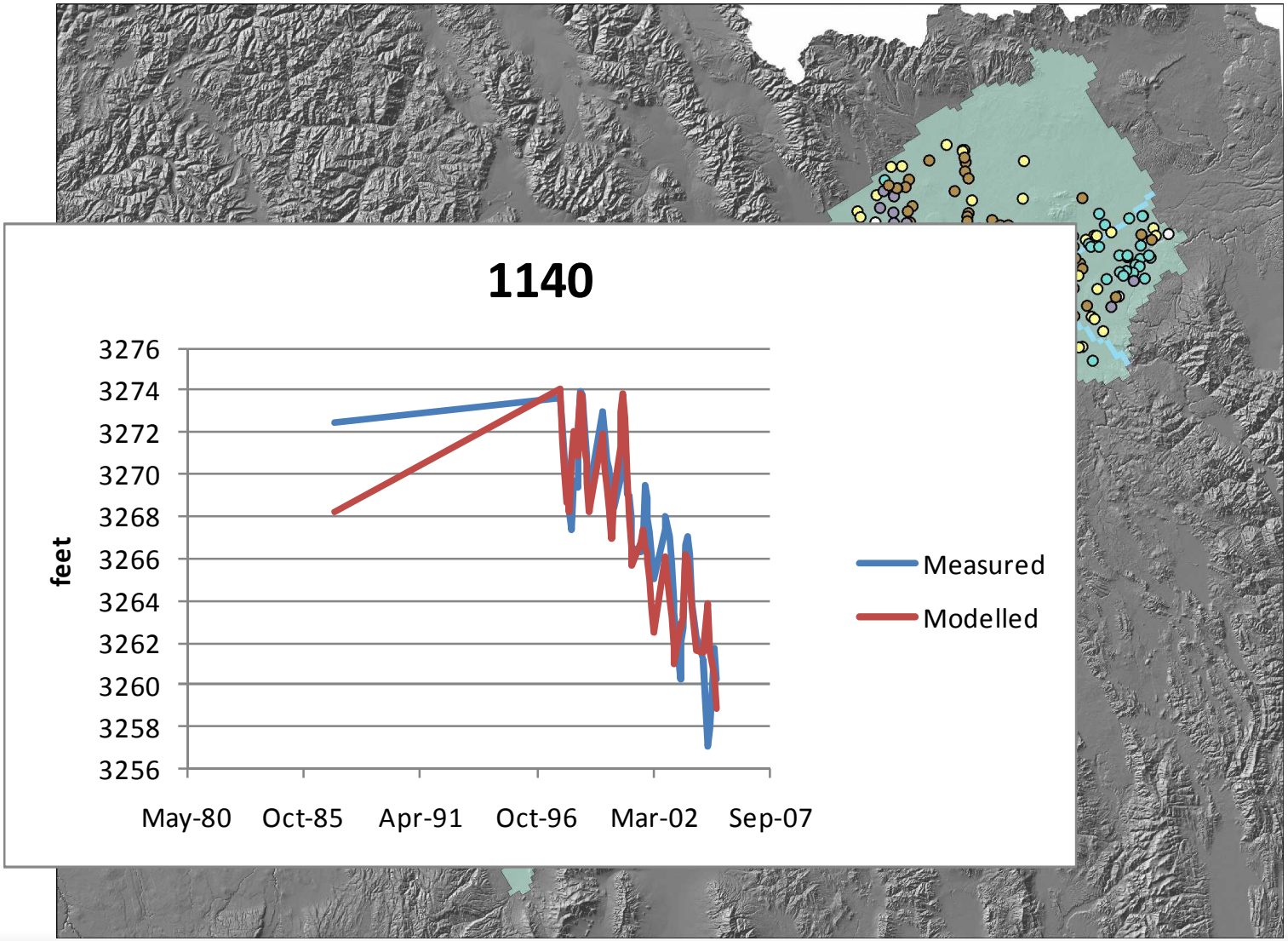

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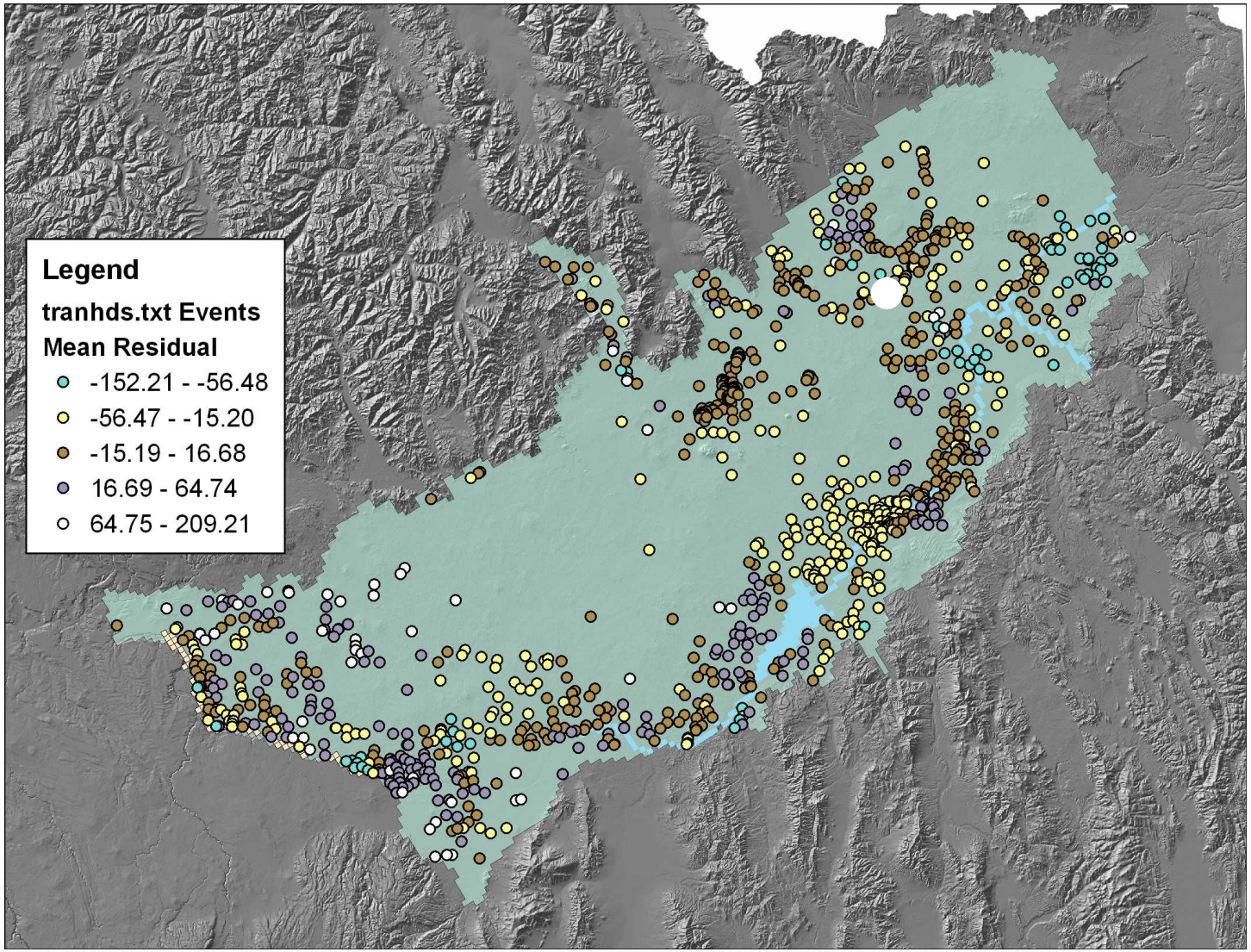

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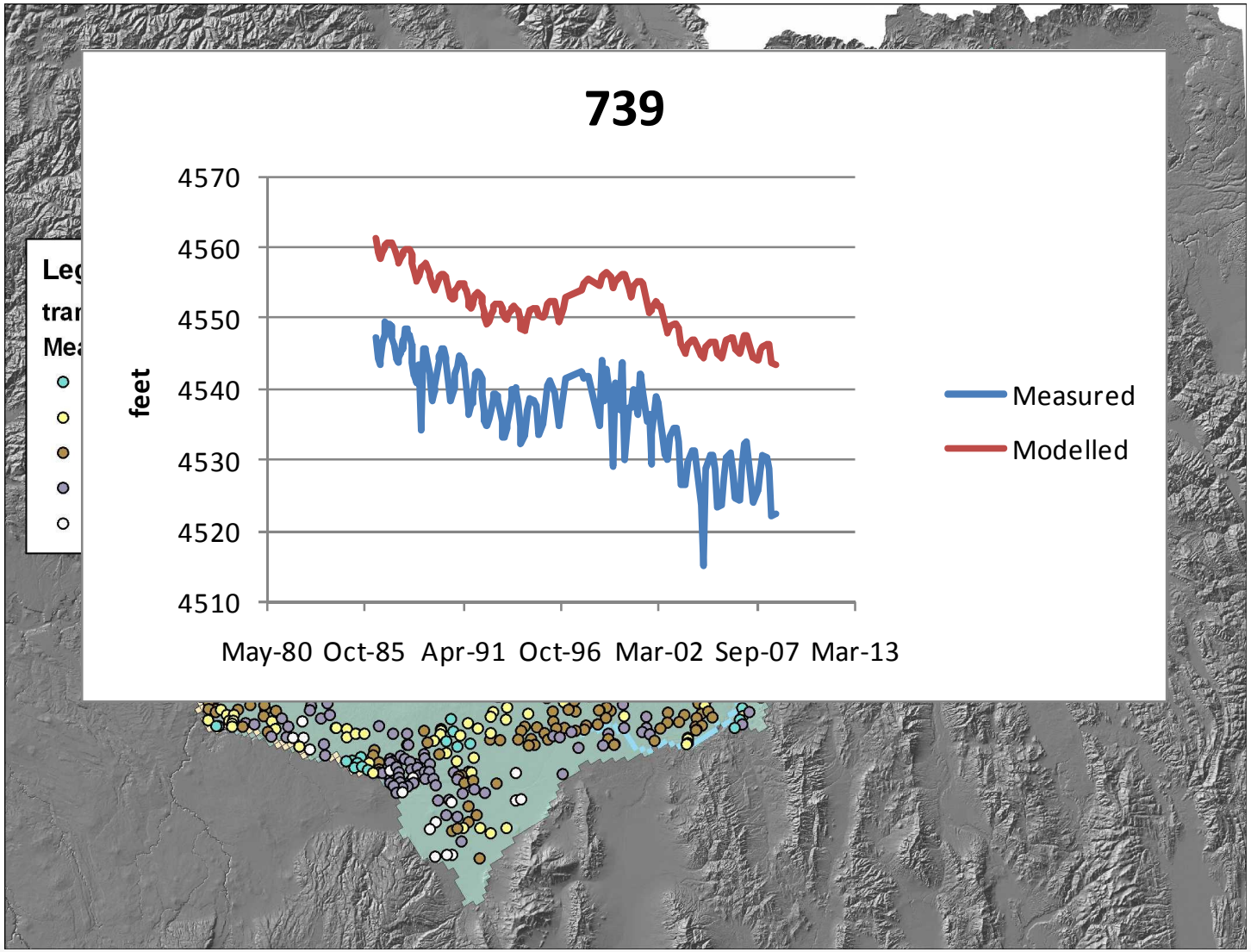
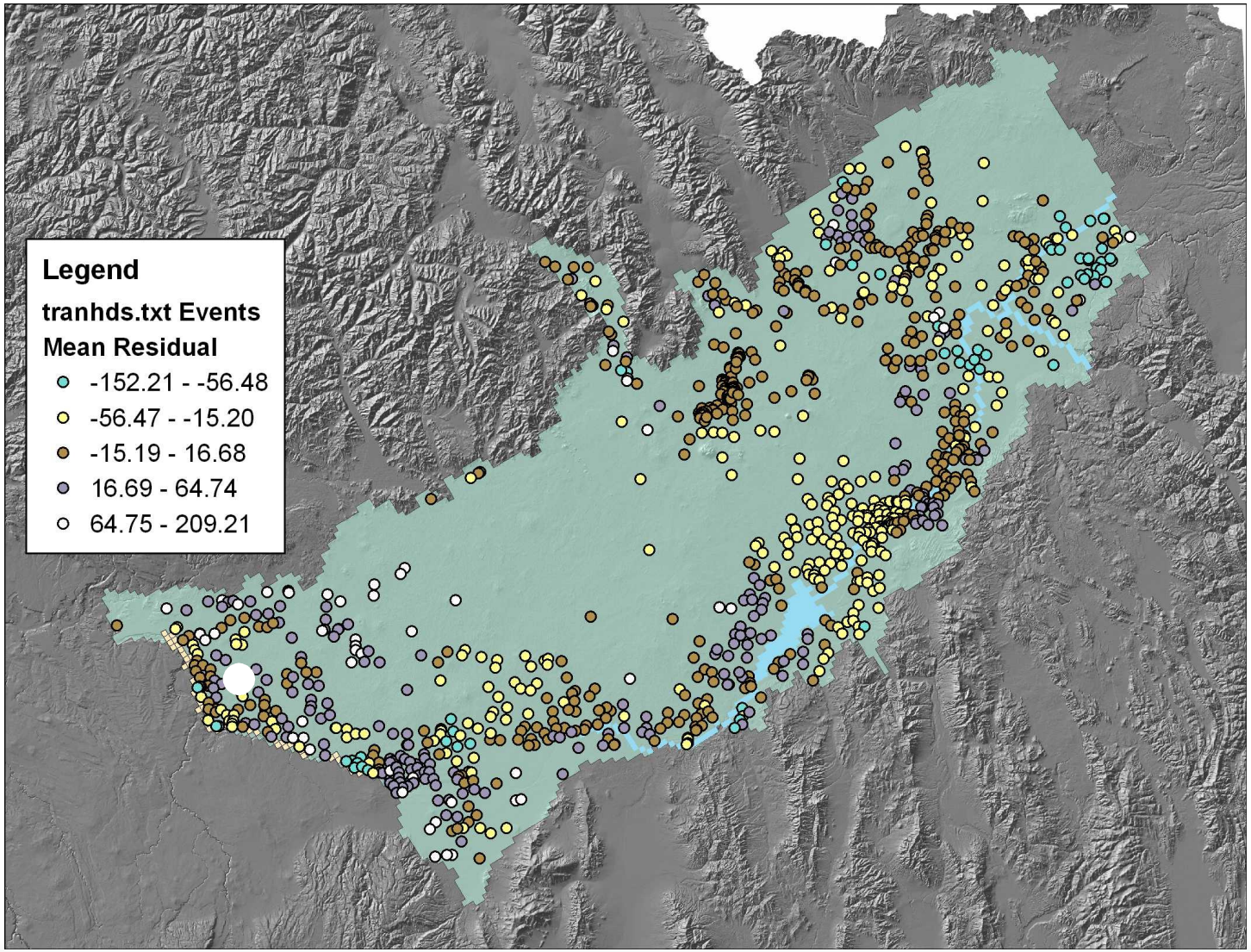
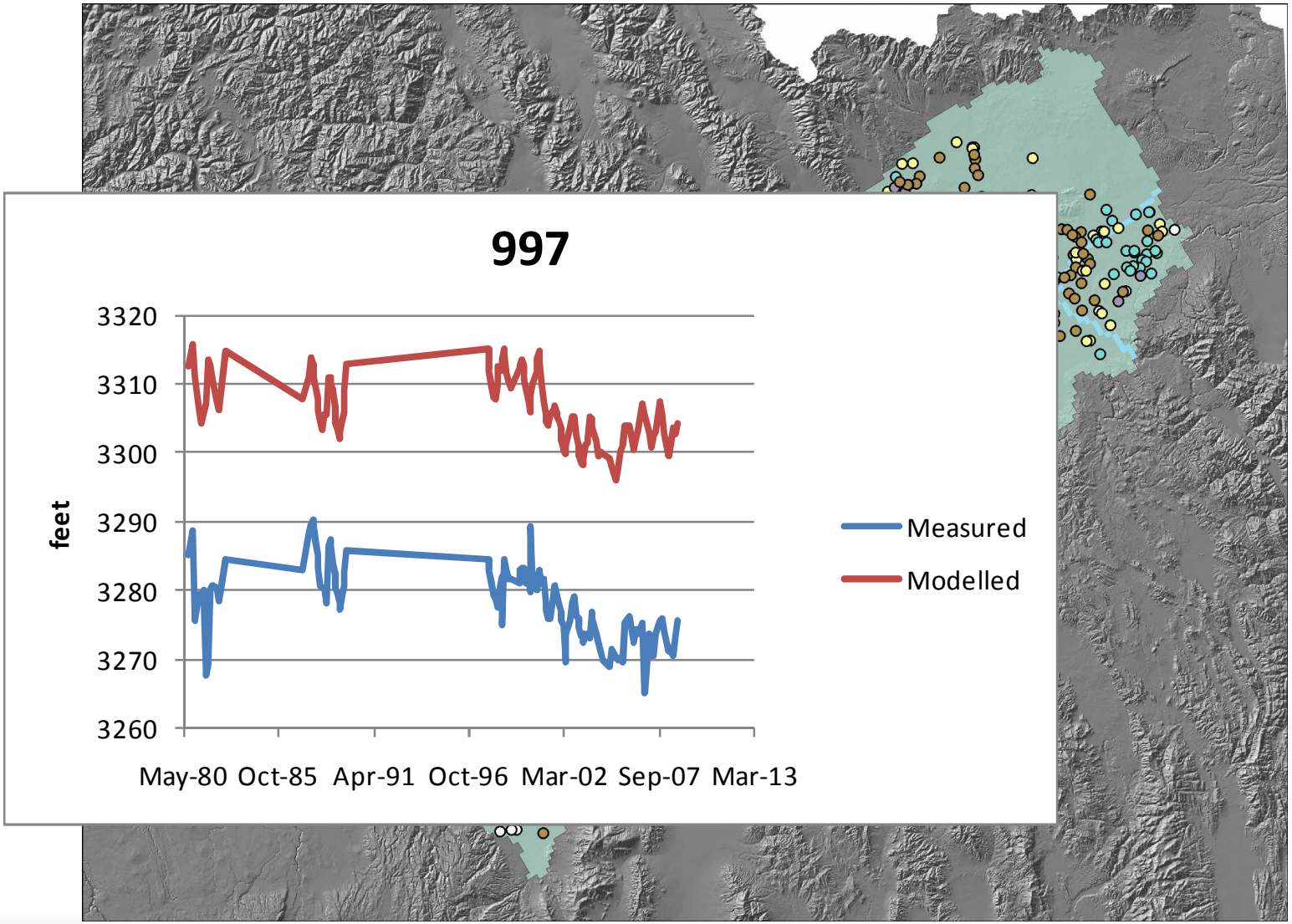


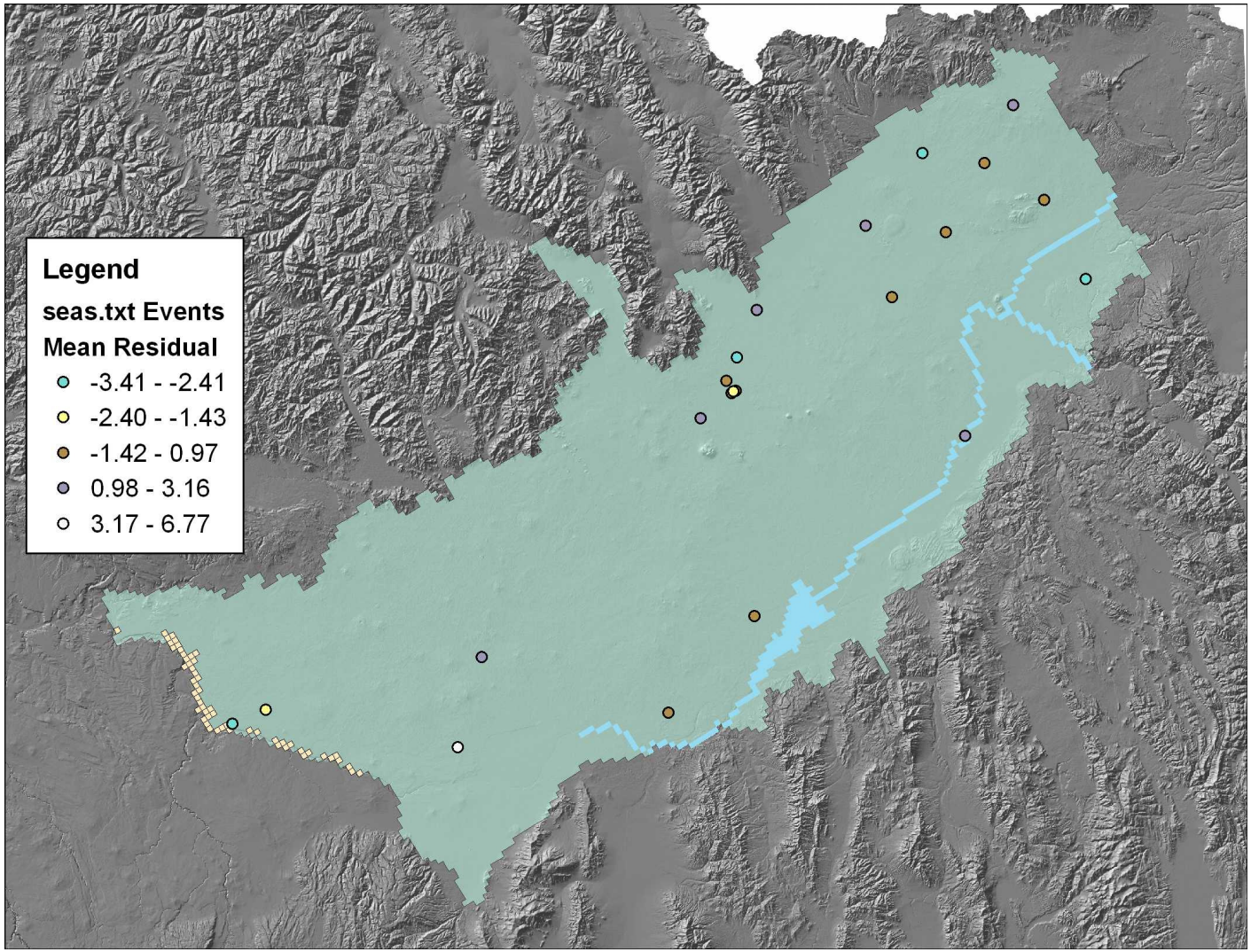
Transient Heads



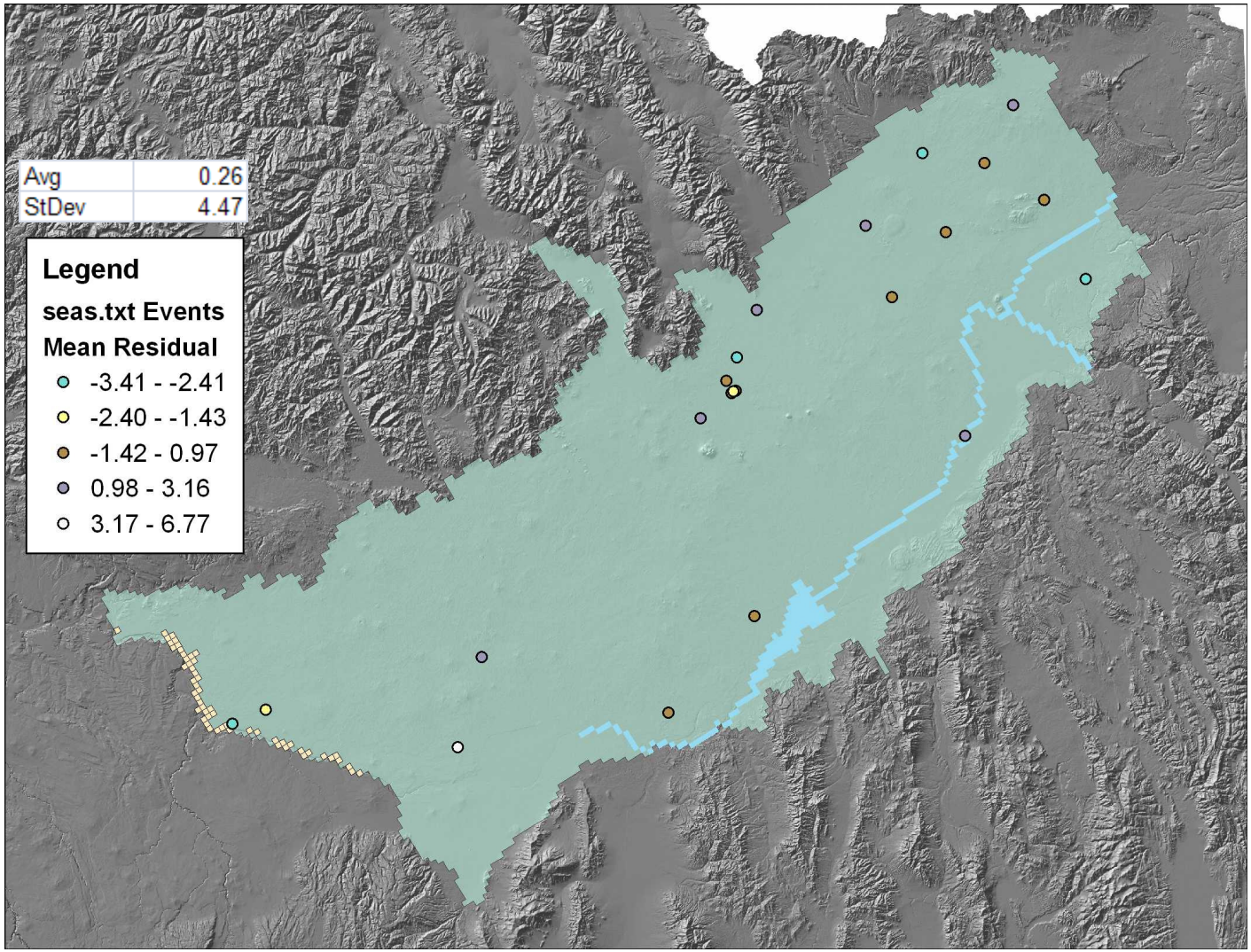
Transient Heads



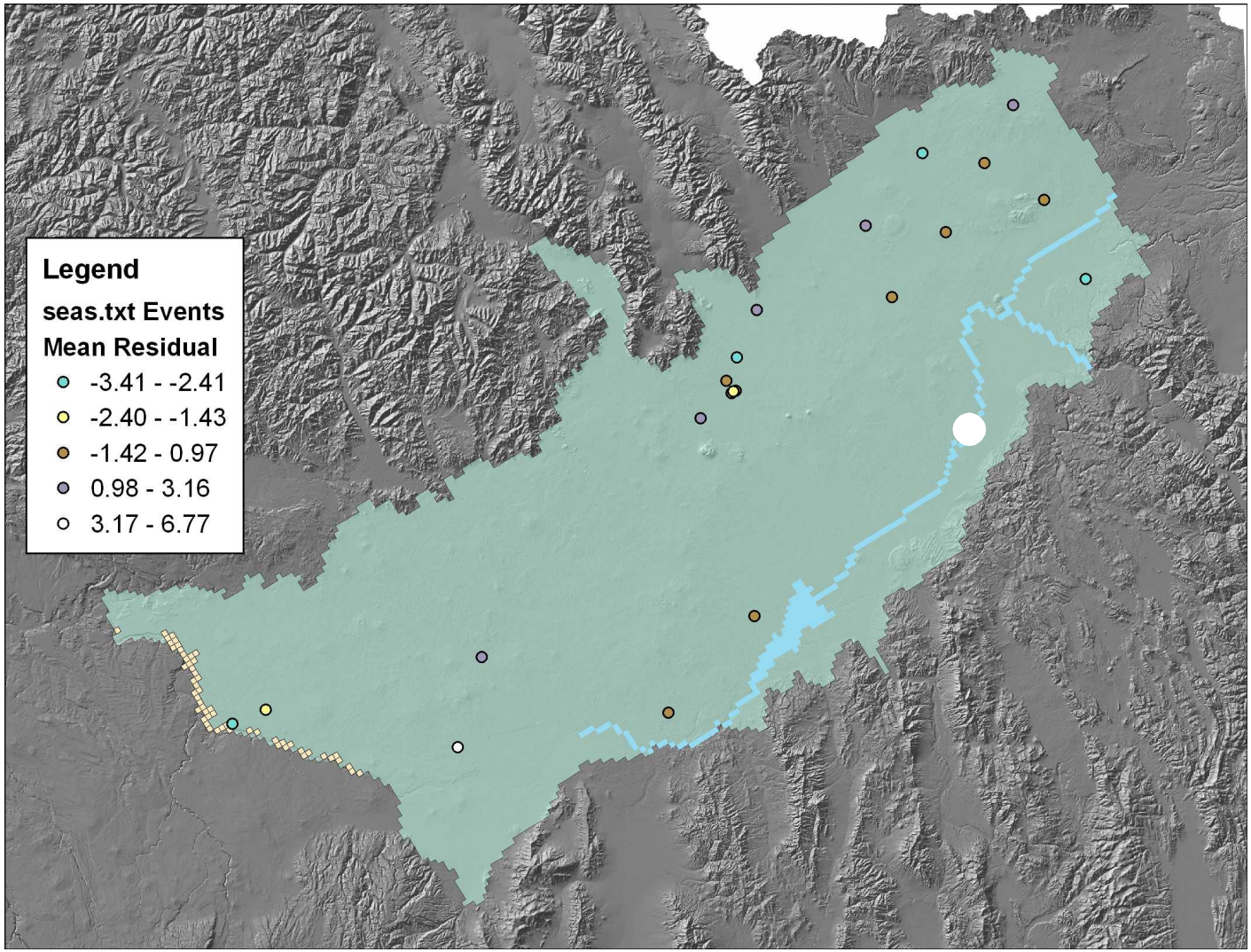
Seasonal


Legend
seas.txt Events
Mean Residual
-3.41 - -2.41
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

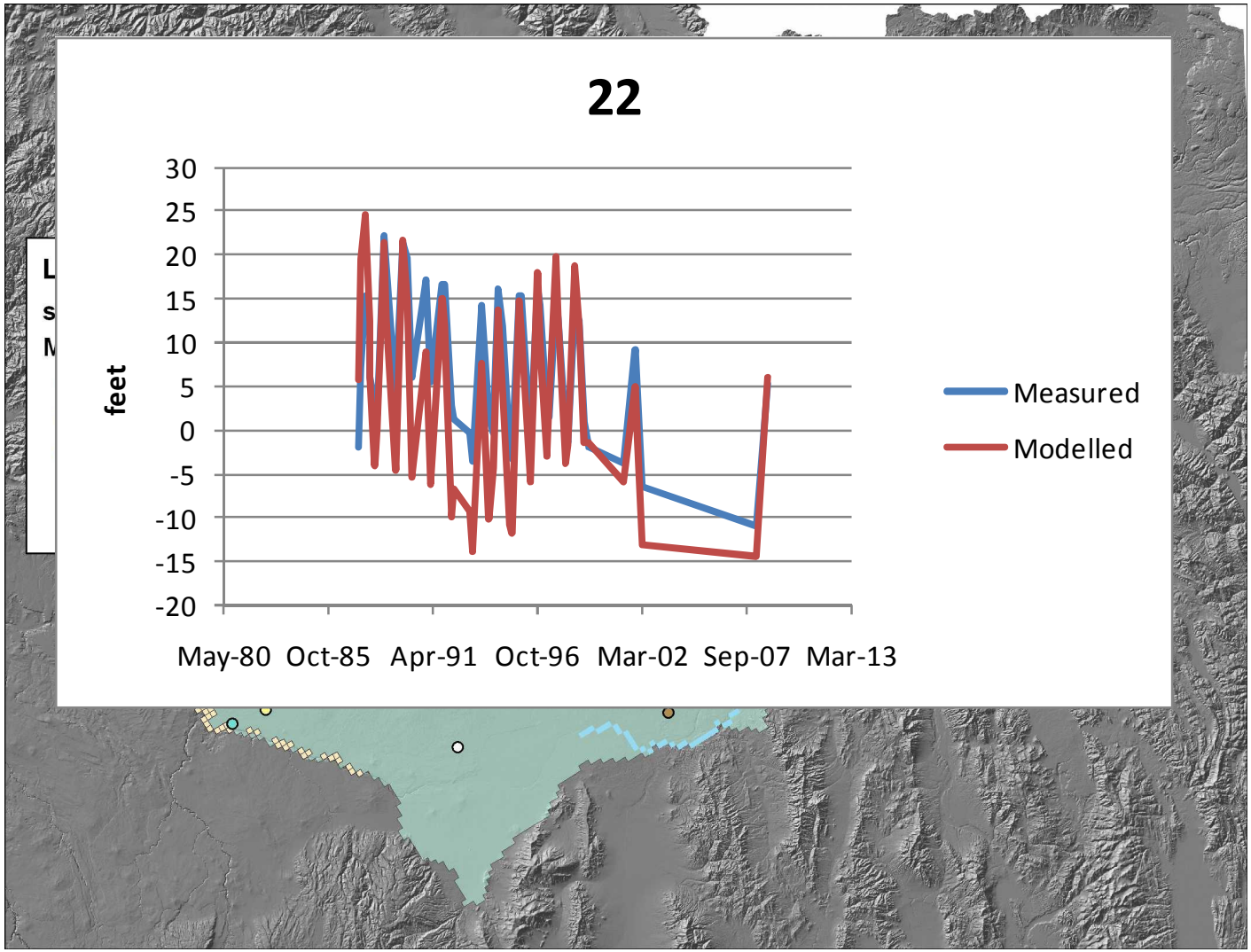
Seasonal


Avg 0.26
StDev 4.47
Legend
seas.txt Events
Mean Residual
-3.41 - -2.41
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

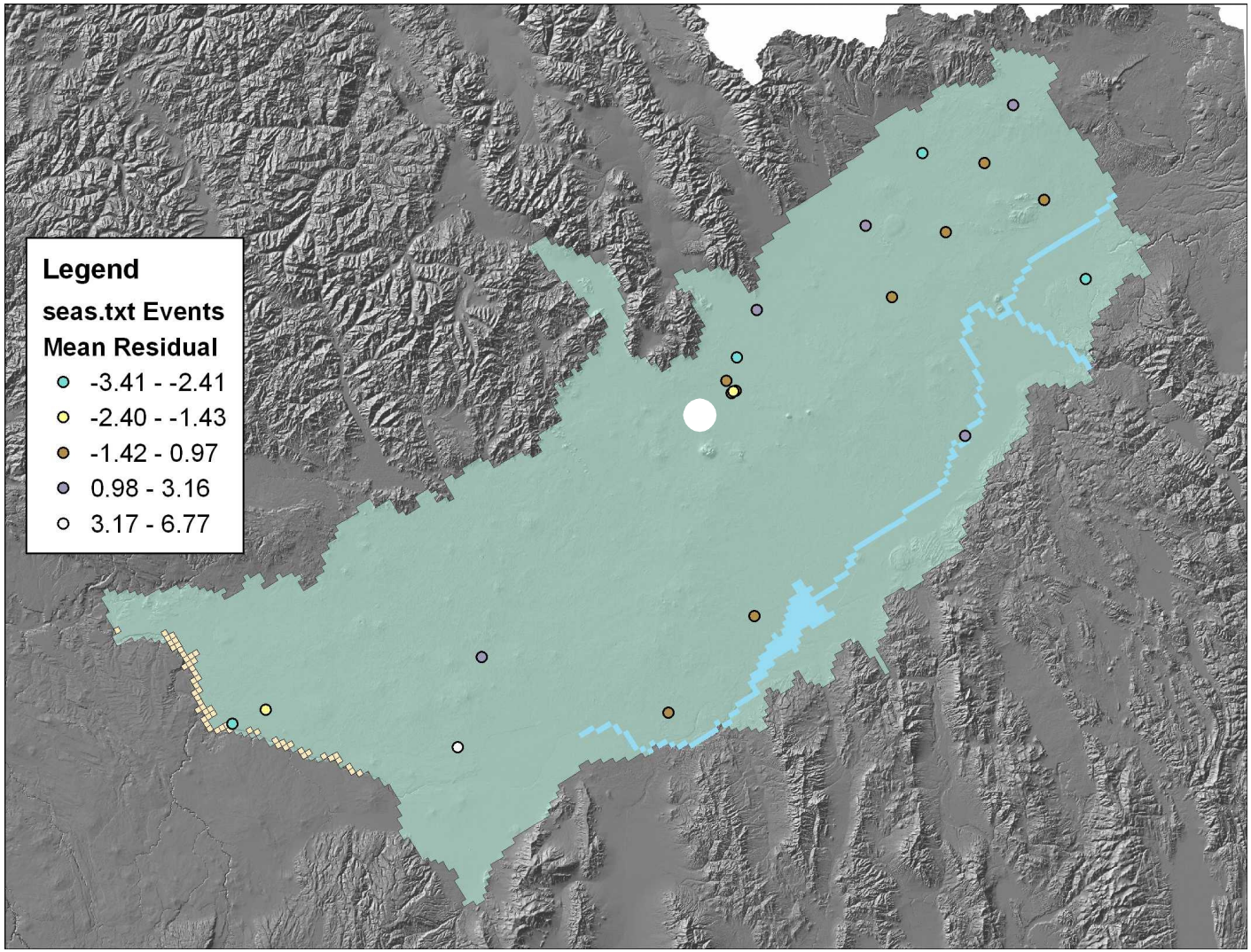
Seasonal


Legend
seas.txt Events
Mean Residual
-3.41 - -2.41
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

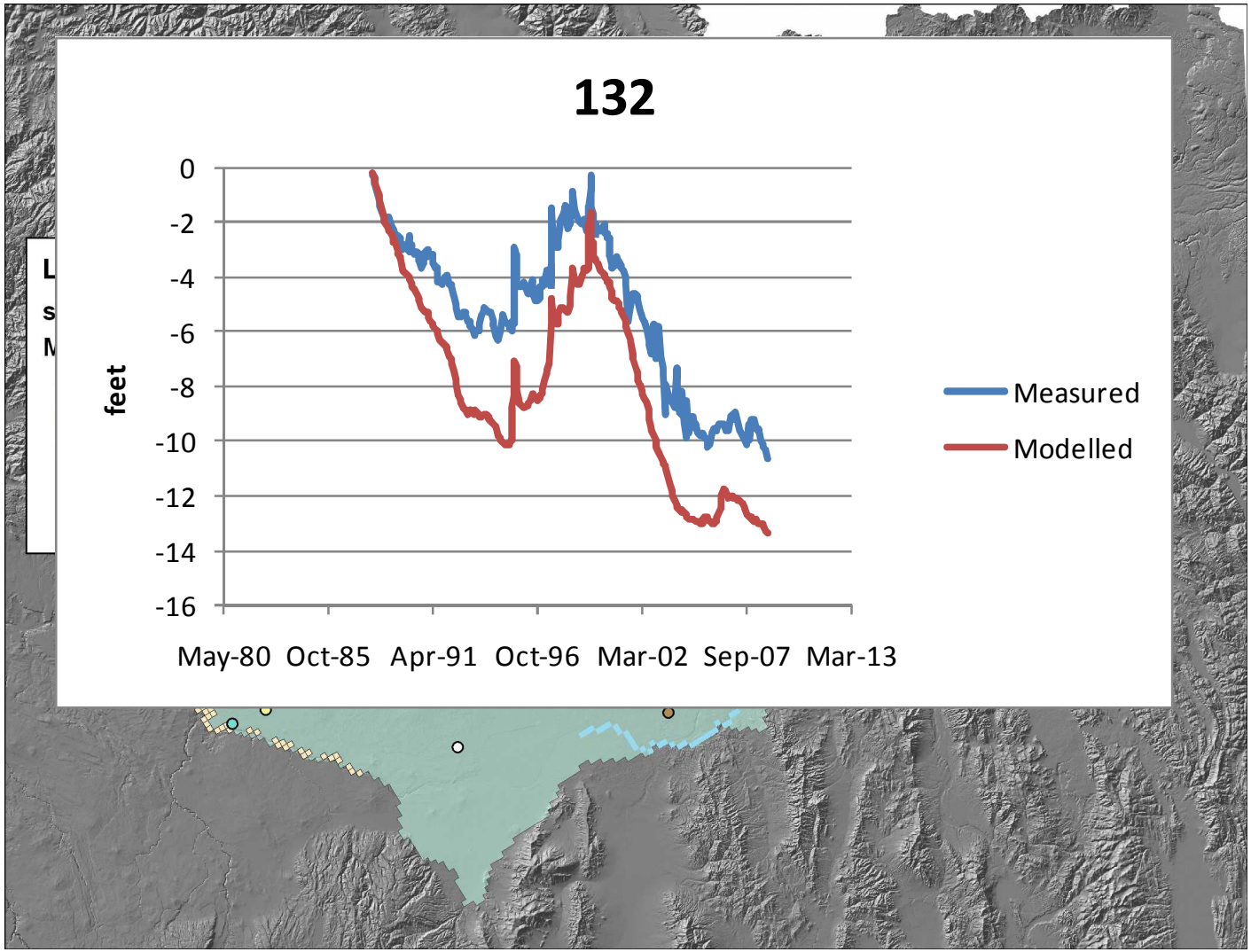
Seasonal


22
30
25
20
15
10
5
0
-5
-10
-15
-20
feet
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled

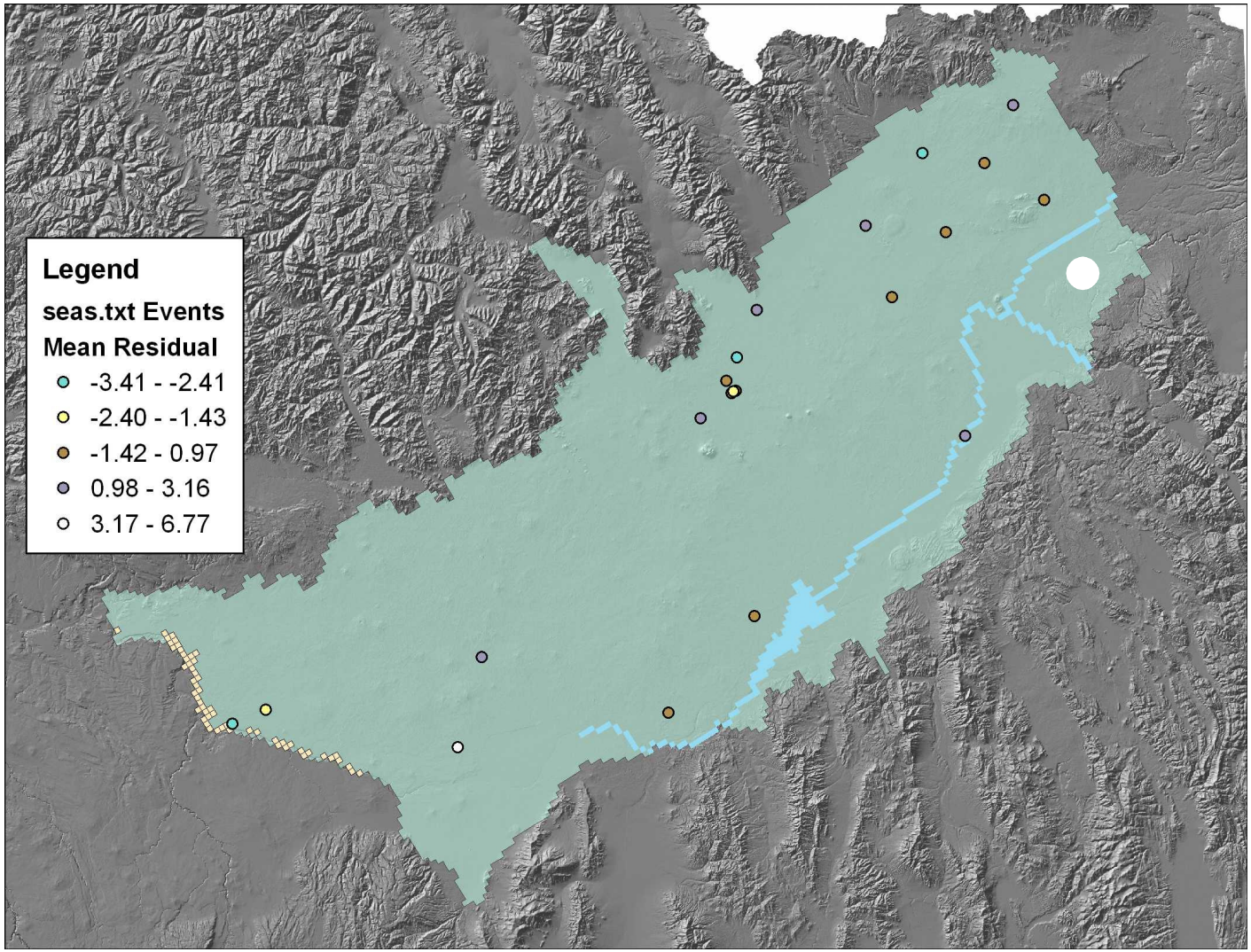
Seasonal


Legend
seas.txt Events
Mean Residual
-3.41 - -2.41
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

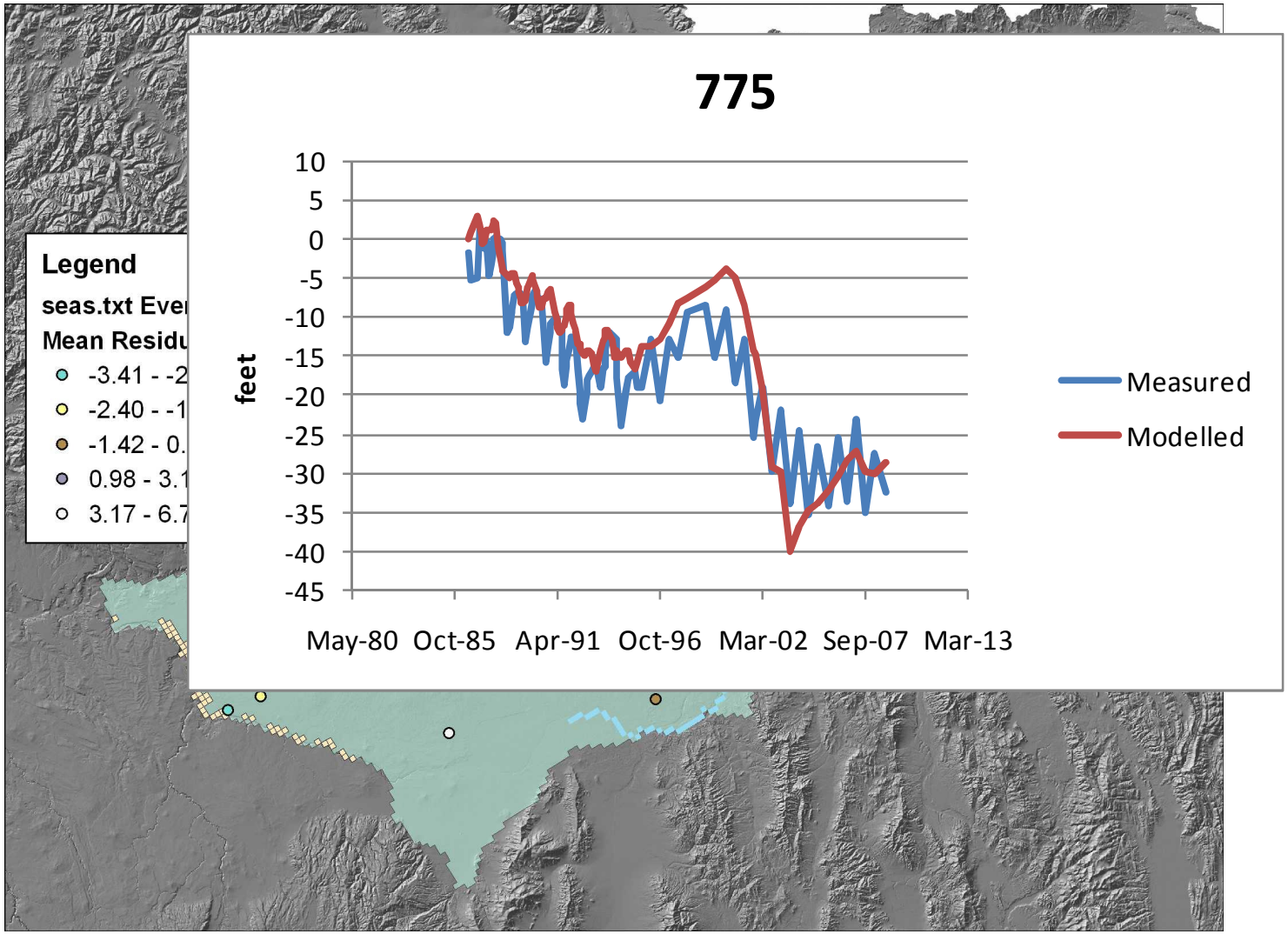
Seasonal


132
feet
0
-2
-4
-6
-8
-10
-12
-14
-16
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled

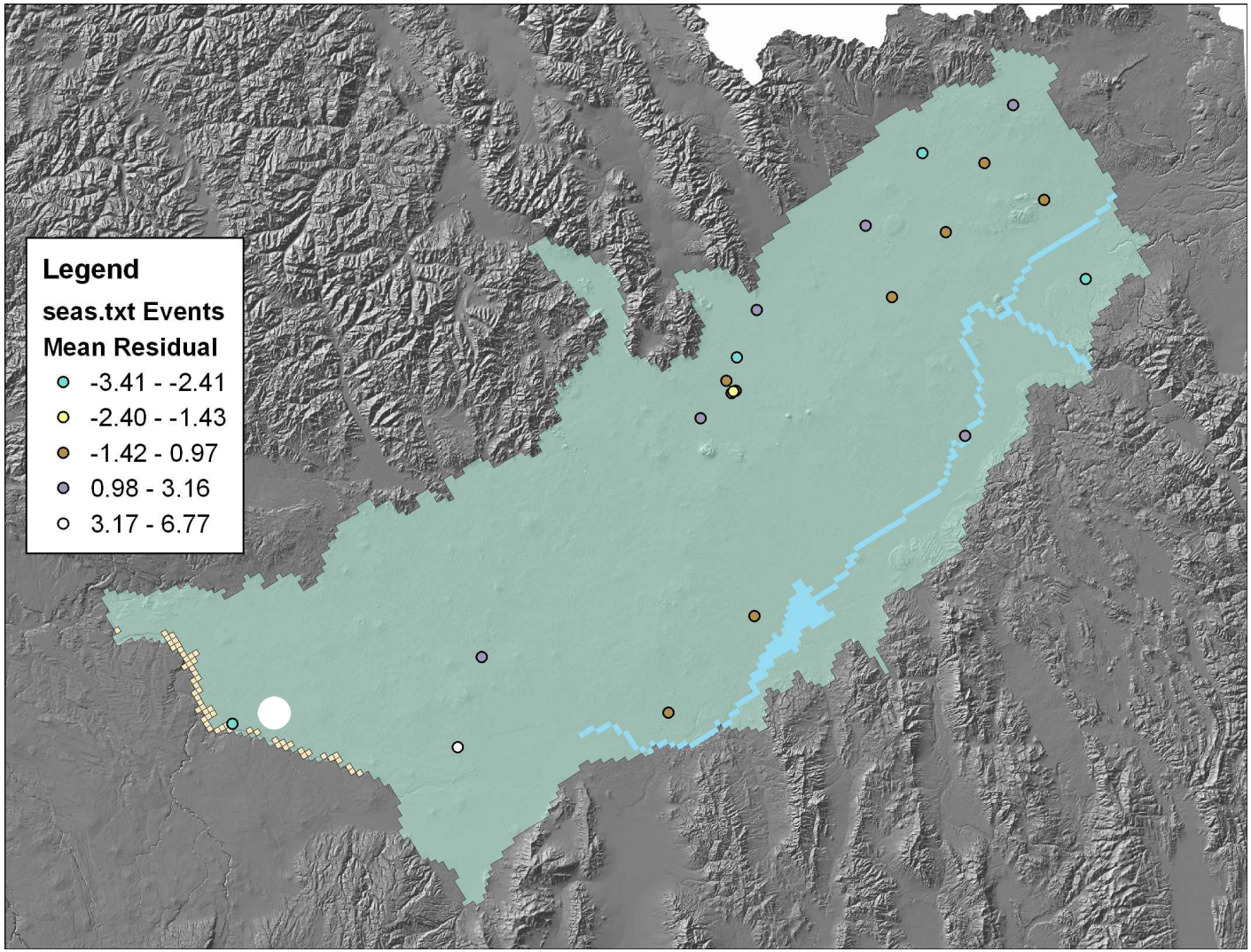
Seasonal


Legend
seas.txt Events
Mean Residual
-3.41 - -2.41
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

Seasonal


Legend
seas.txt Ever
Mean Residu
-3.41 - -2
-2.40 - -1
-1.42 - 0.
0.98 - 3.1
3.17 - 6.7
775
feet
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled

Seasonal


Legend
seas.txt Events
Mean Residual
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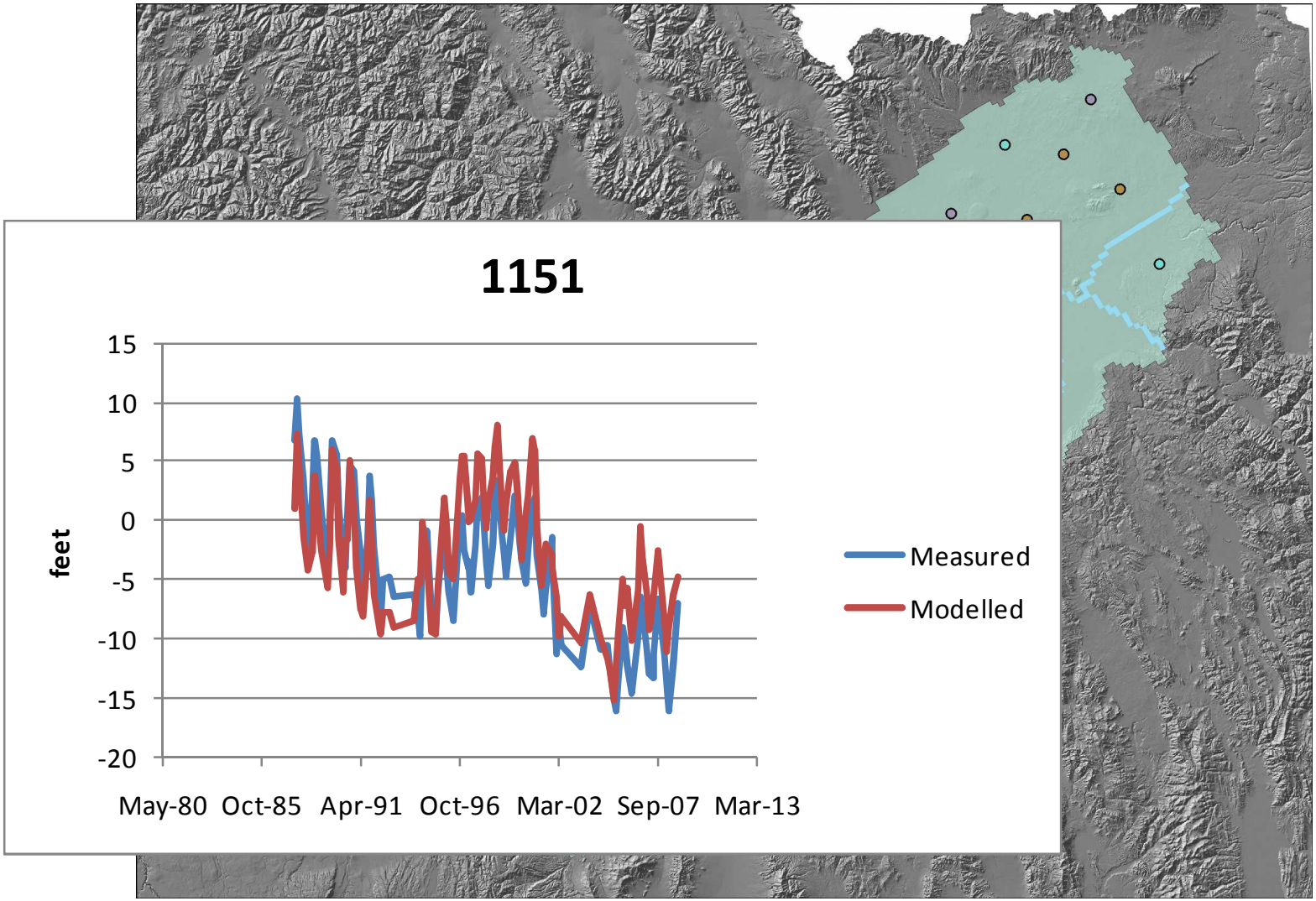
-2.40 - -1.43
-1.42 - 0.97
0.98 - 3.16
3.17 - 6.77

Seasonal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10
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-5
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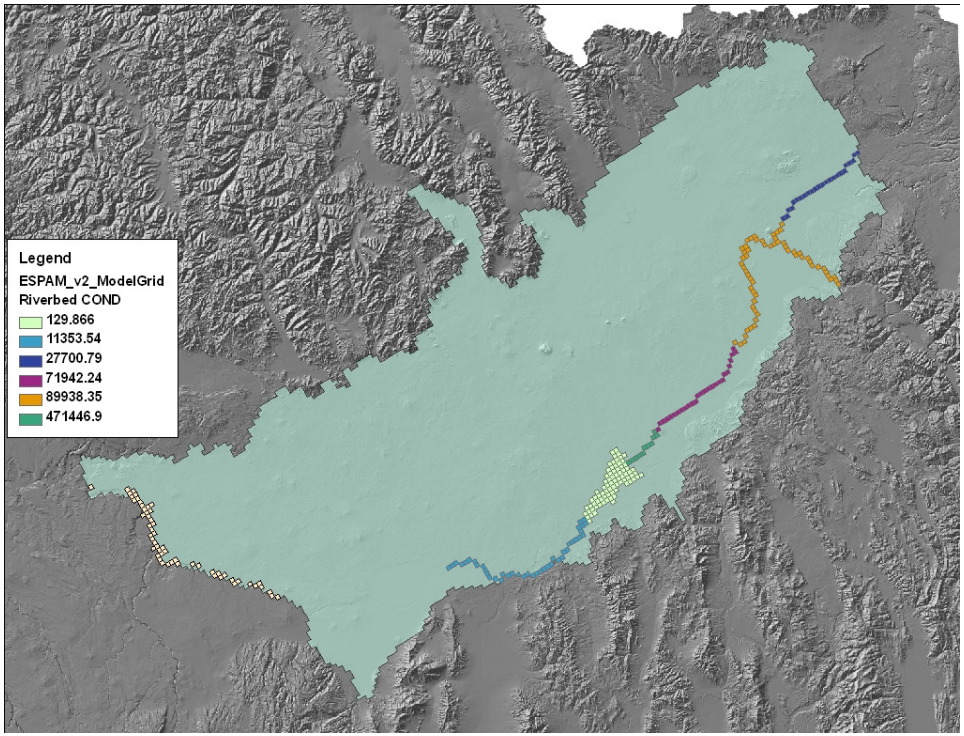
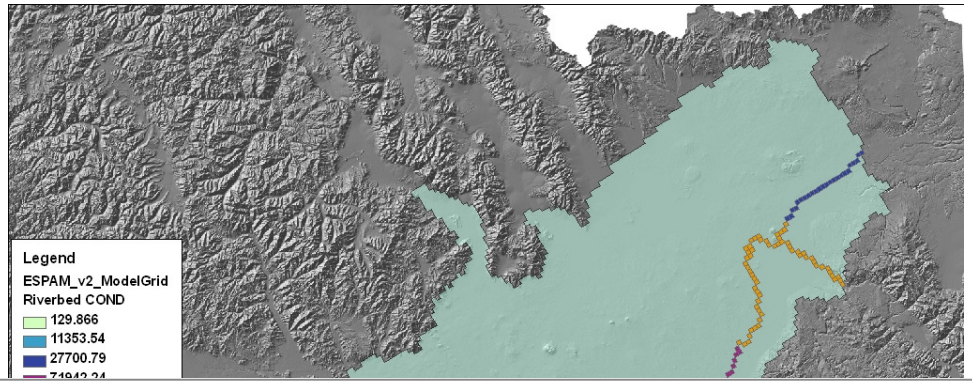
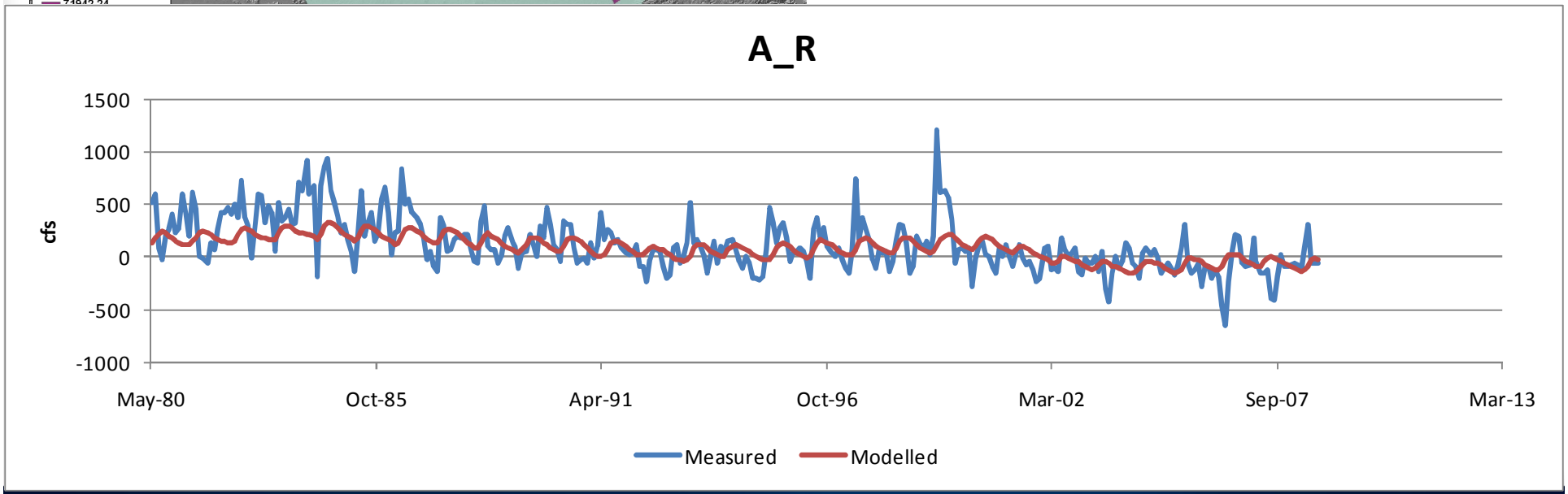
Mar-02
Sep-07
Mar-13
Measured
Modelled

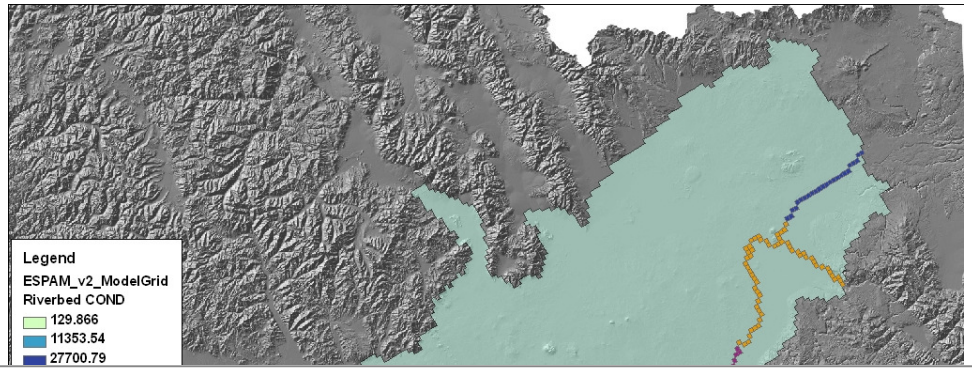


- Snake River reaches

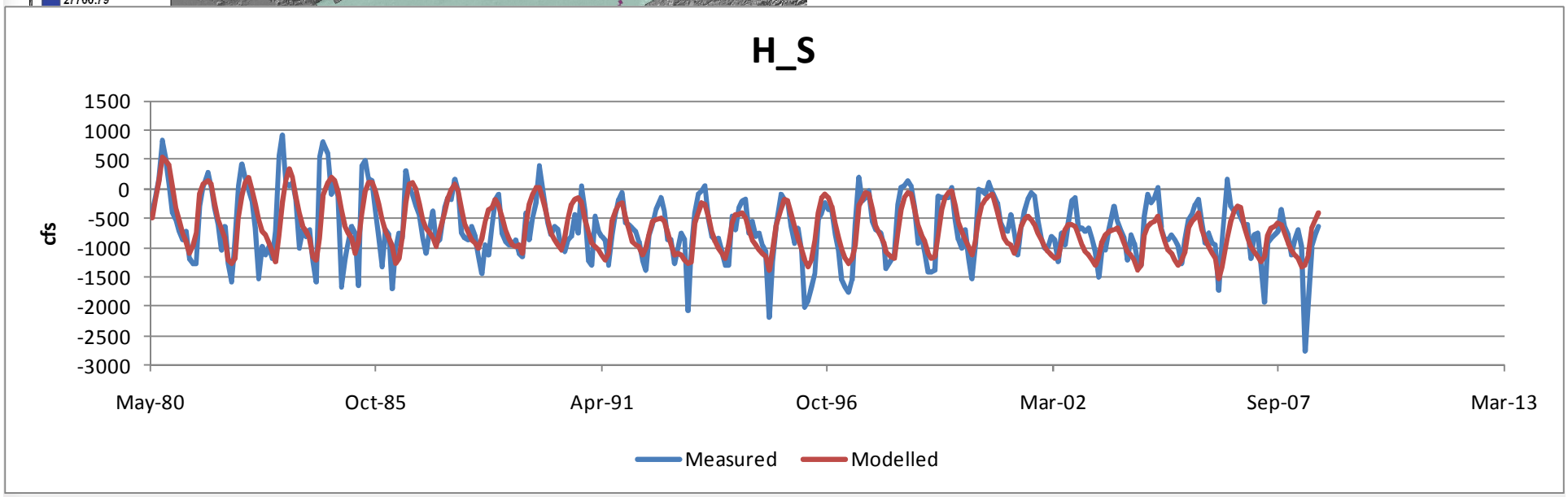


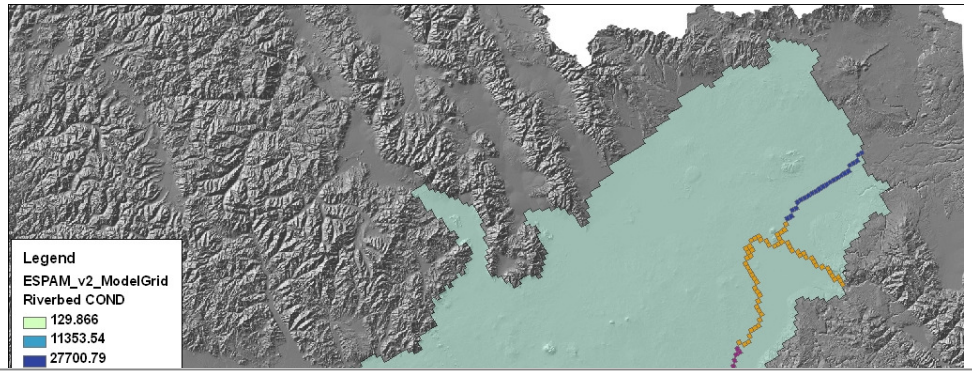
- Snake River reaches
  - Ashton-Rexburg



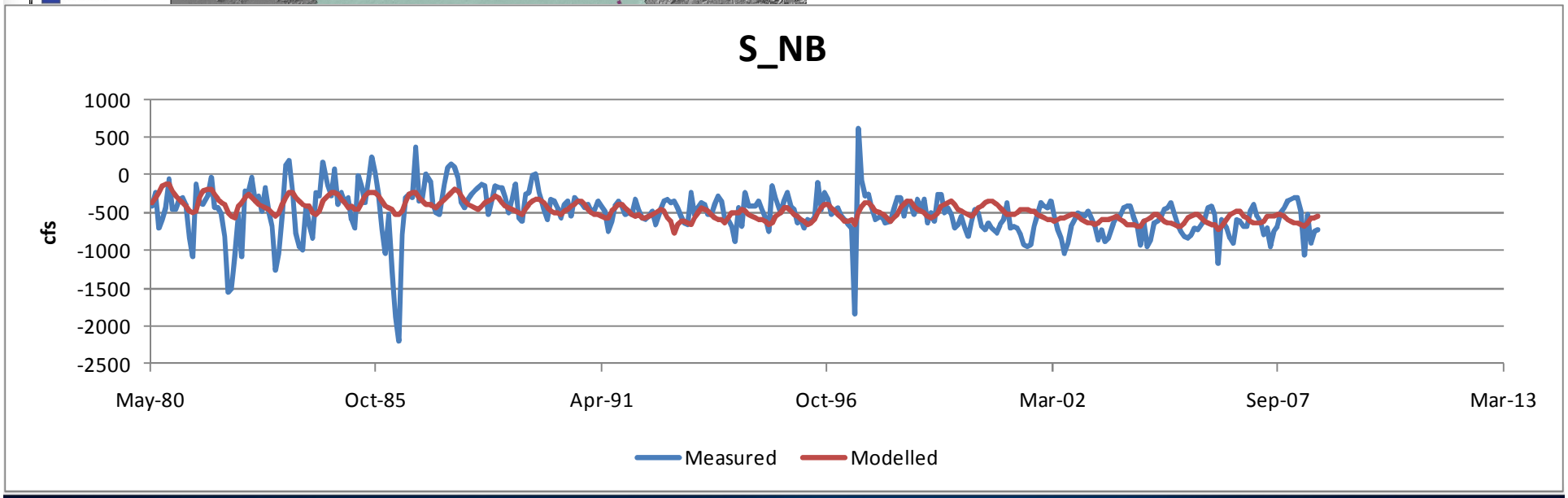


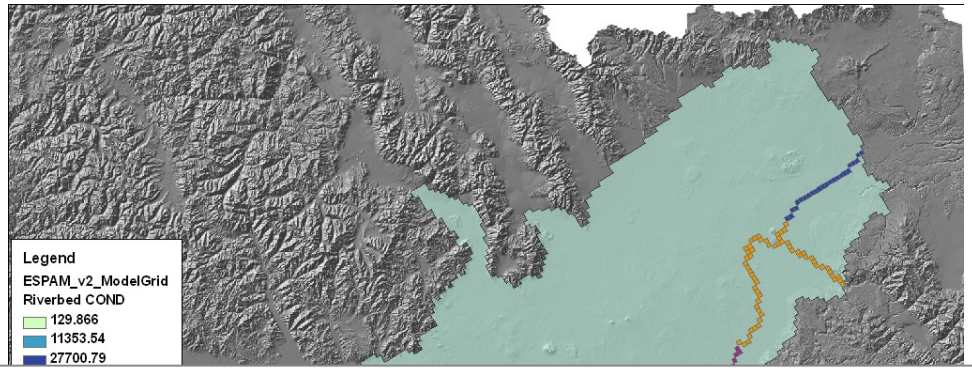
- Snake River reaches
  - Heise-Shelley



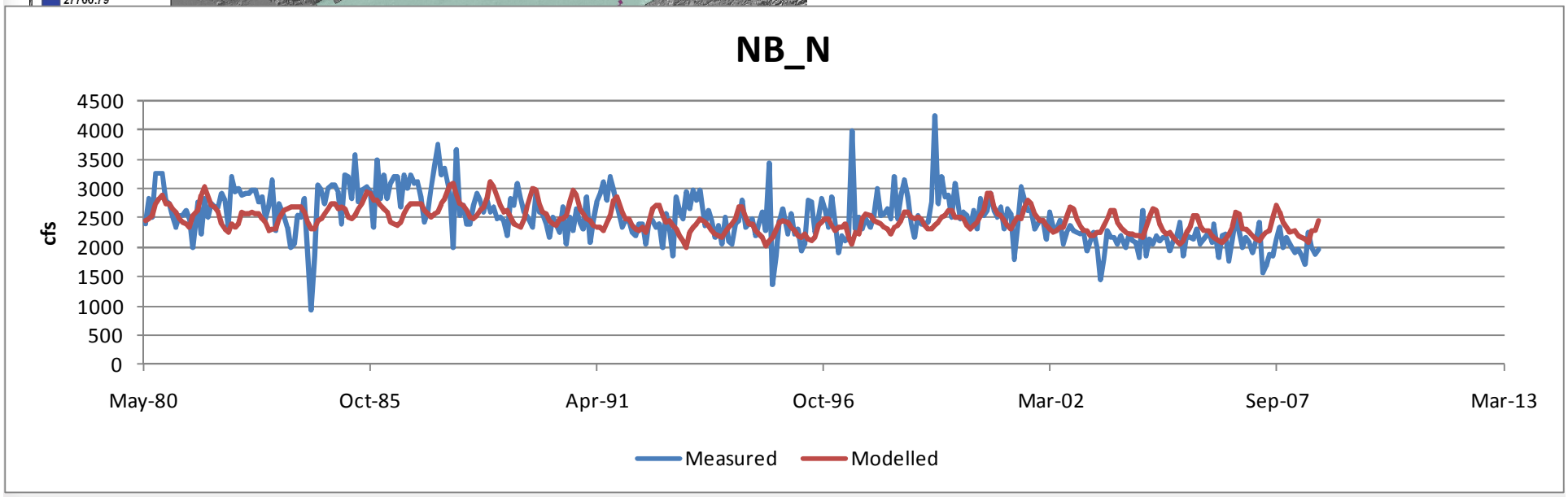


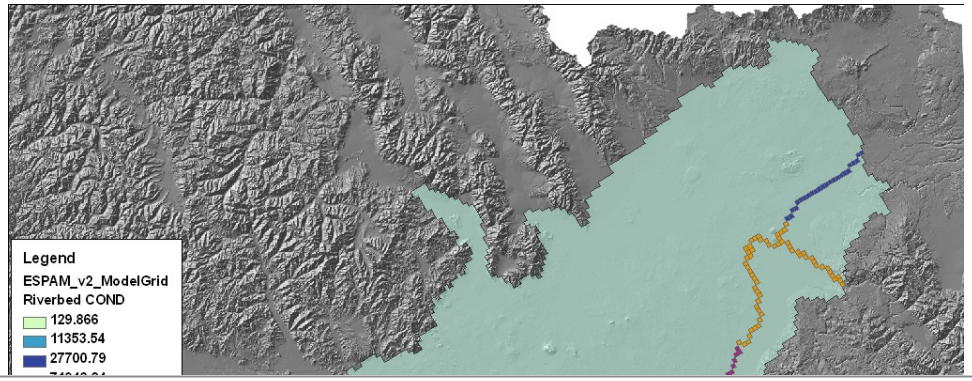
- Snake River reaches
  - Shelley-nr Blackfoot



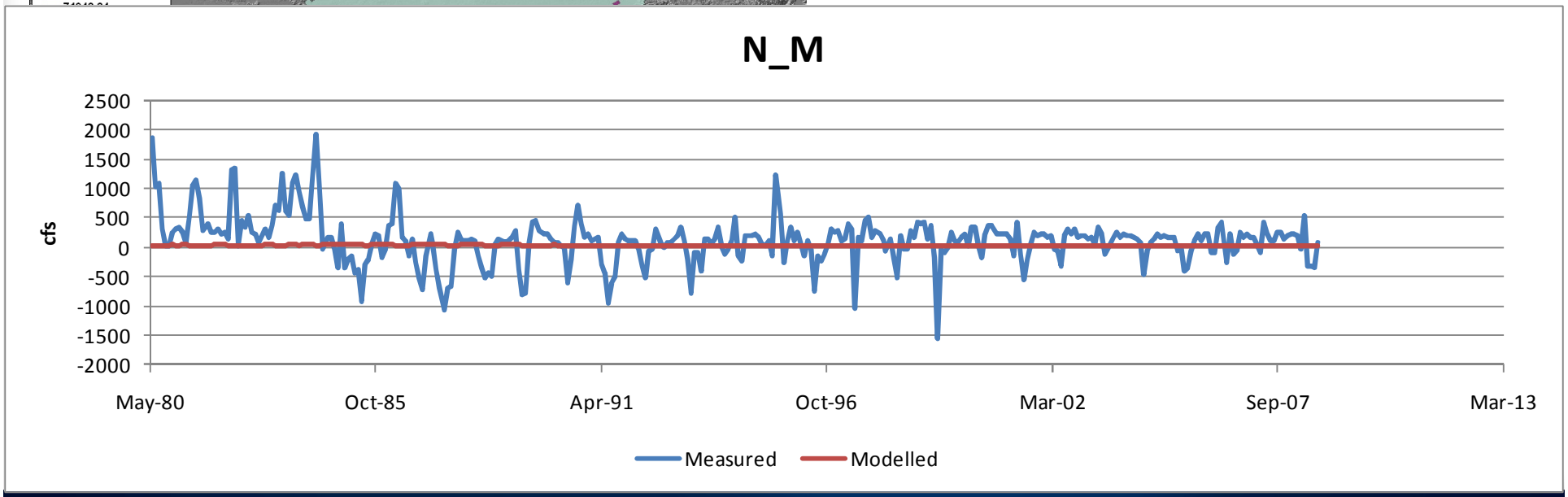


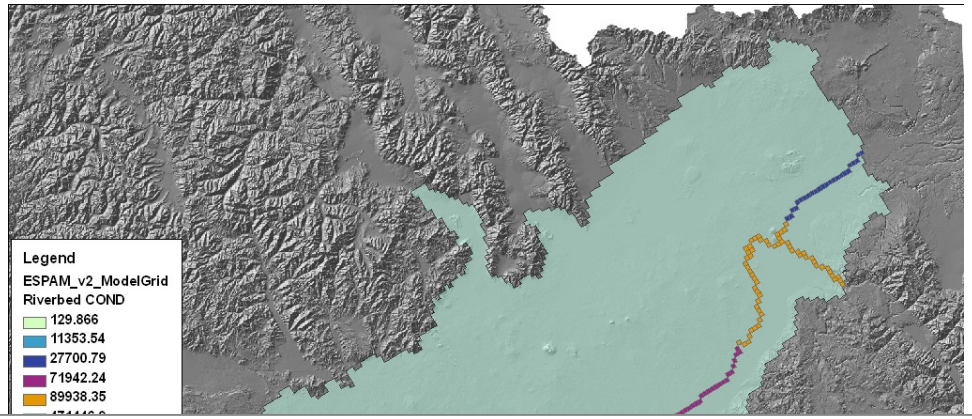
- Snake River reaches
  - Nr Blackfoot-Neeley



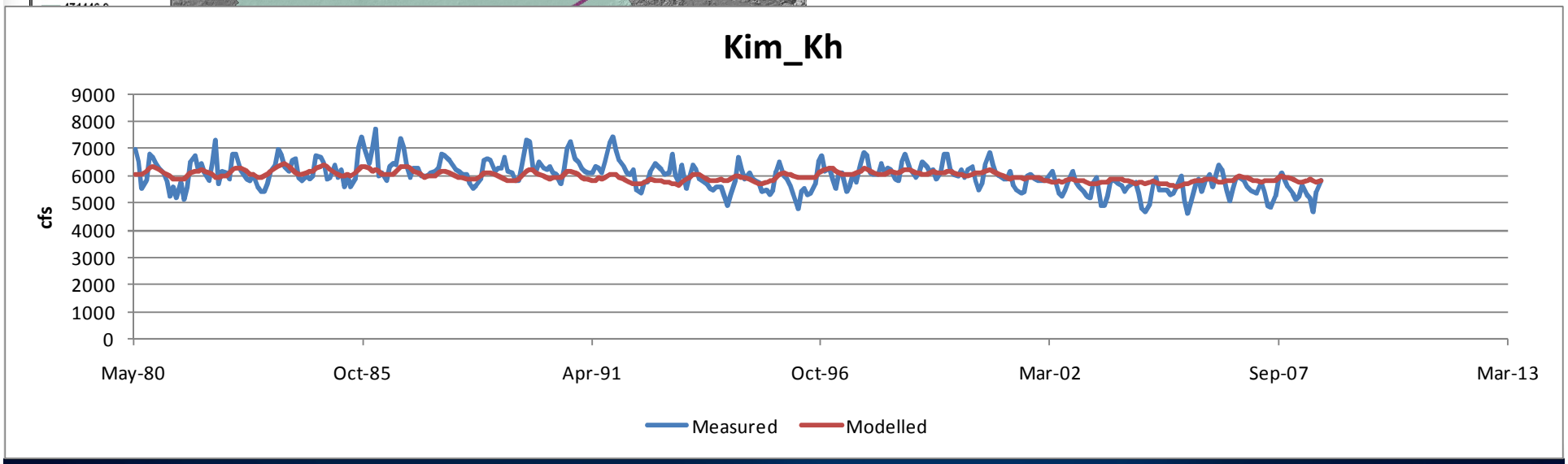


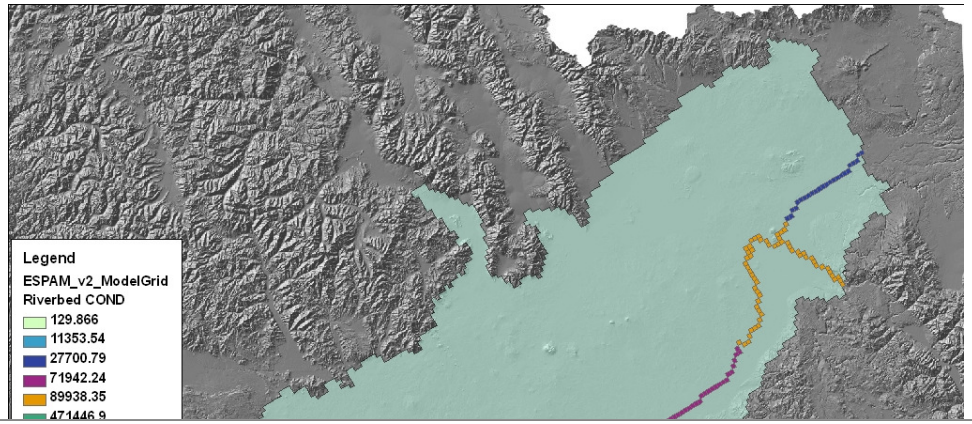
- Snake River reaches
  - Neeley-Minidoka



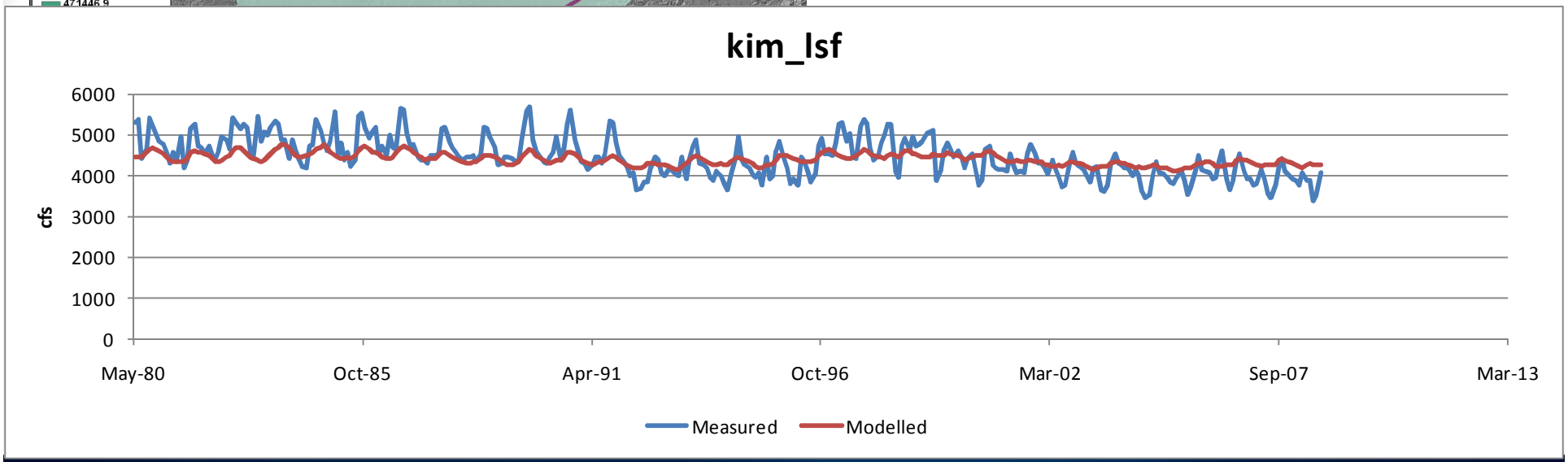


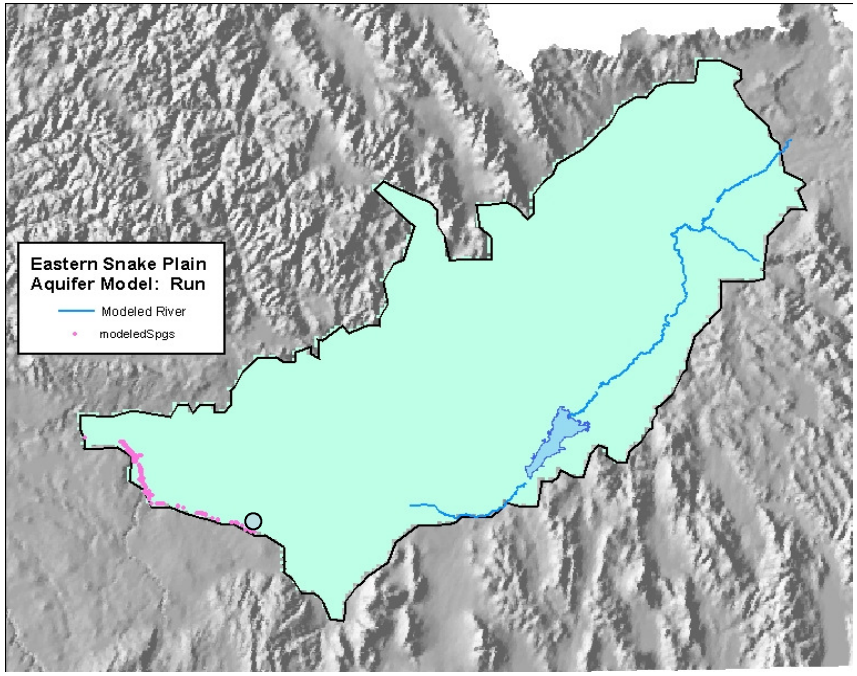
- Snake River reaches
  - Kimberly-King Hill





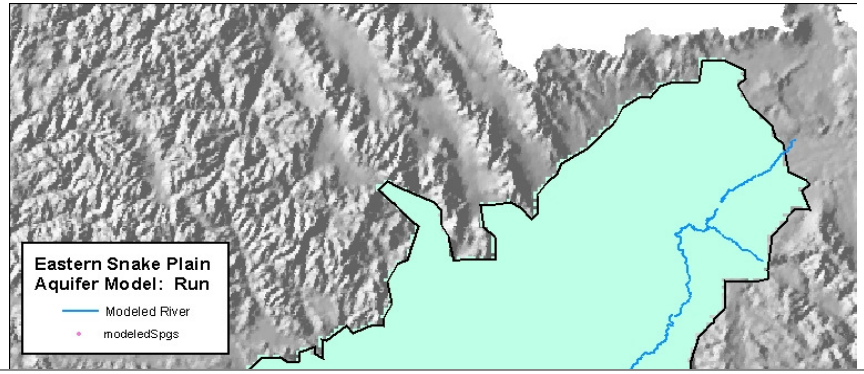
- Snake River reaches
  - Kimberly- Hagerman

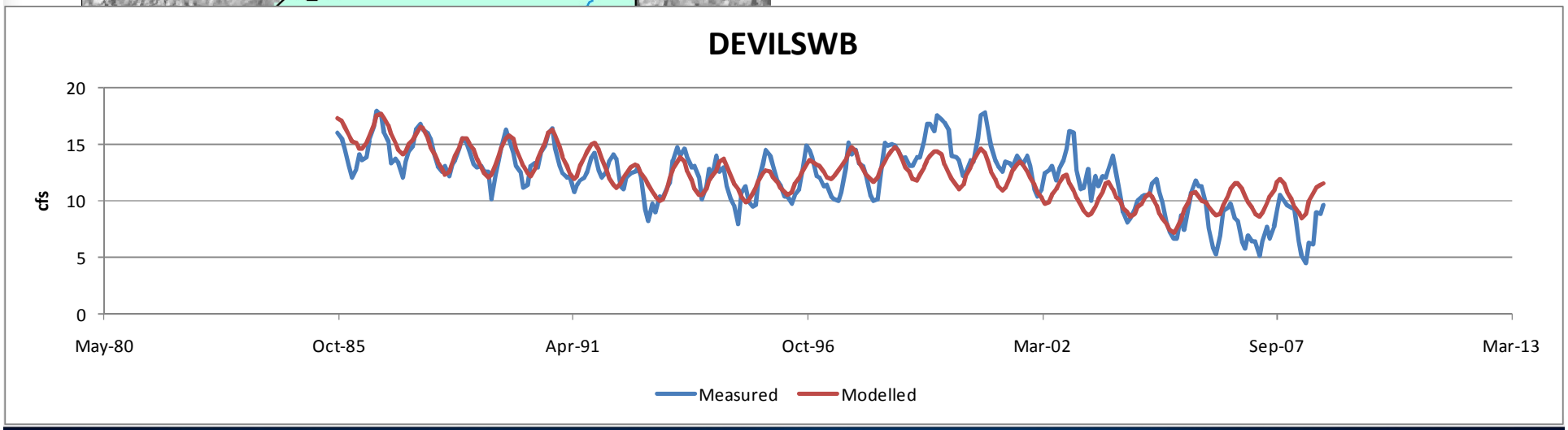


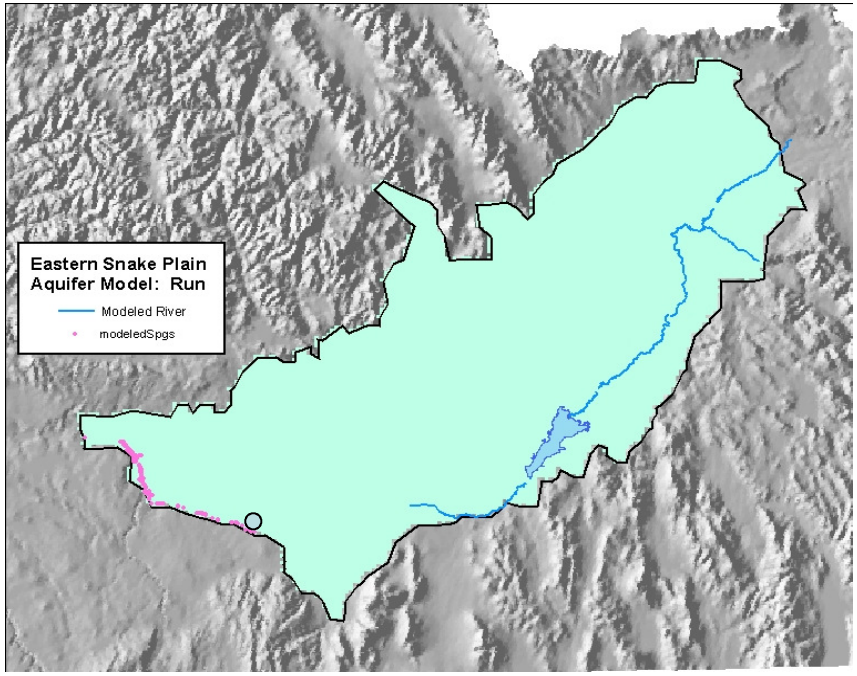


- Devils Washbowl

- Devils Washbowl

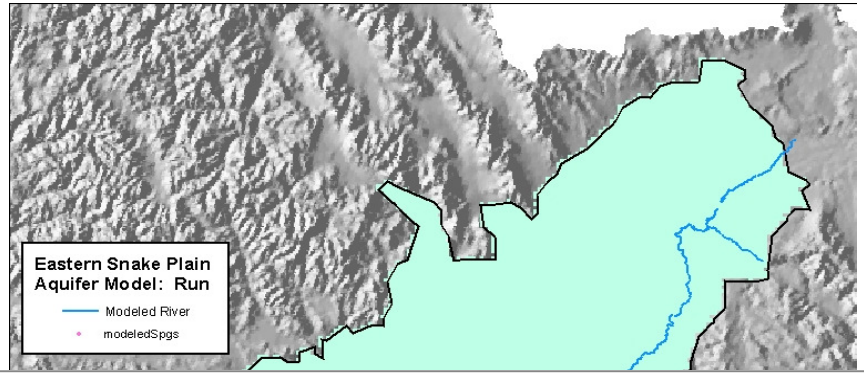


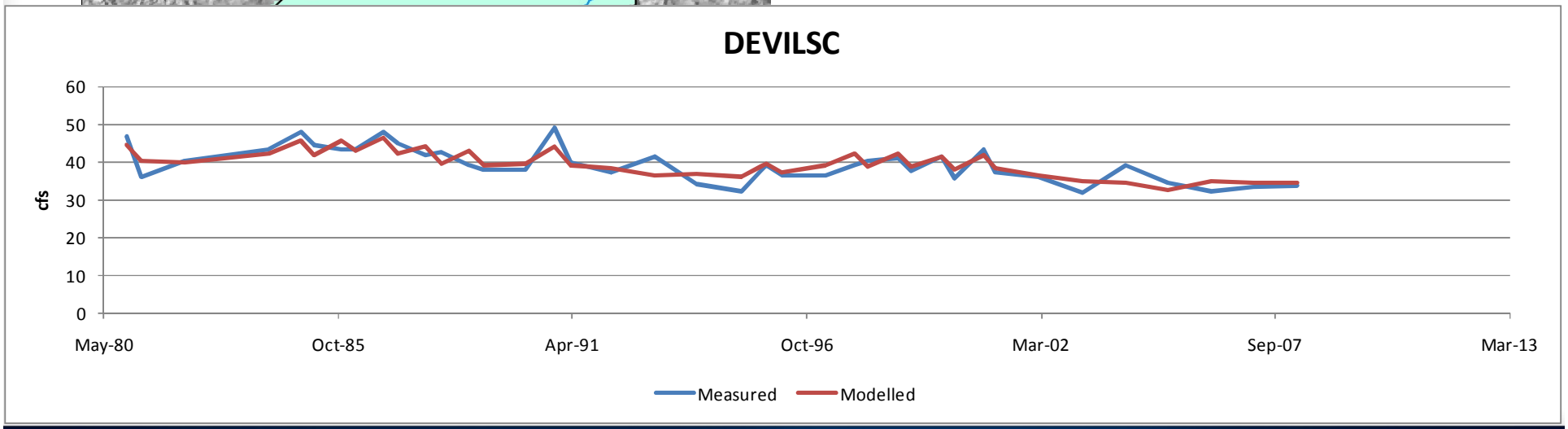


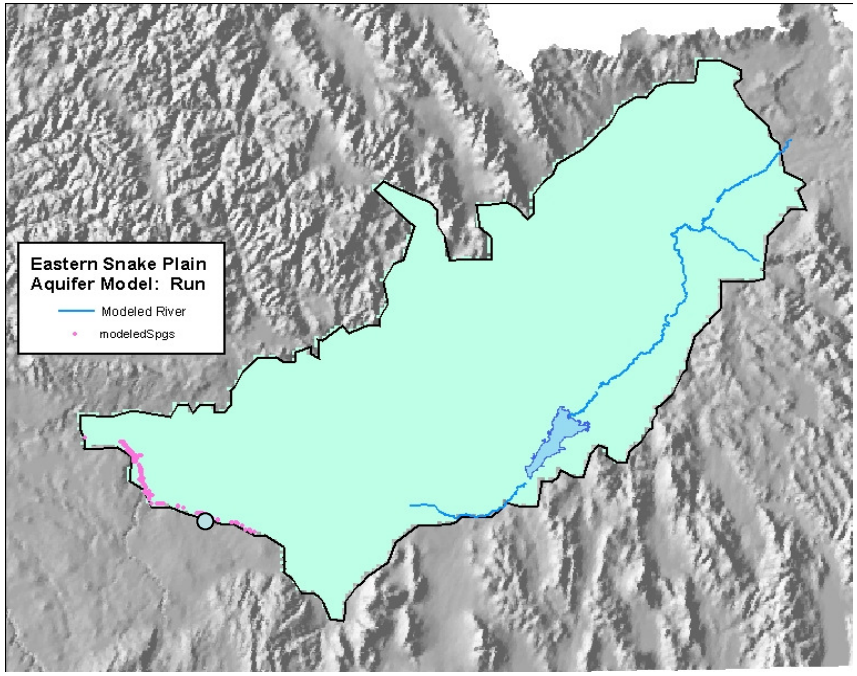


- Devils Corral

- Devils Corral

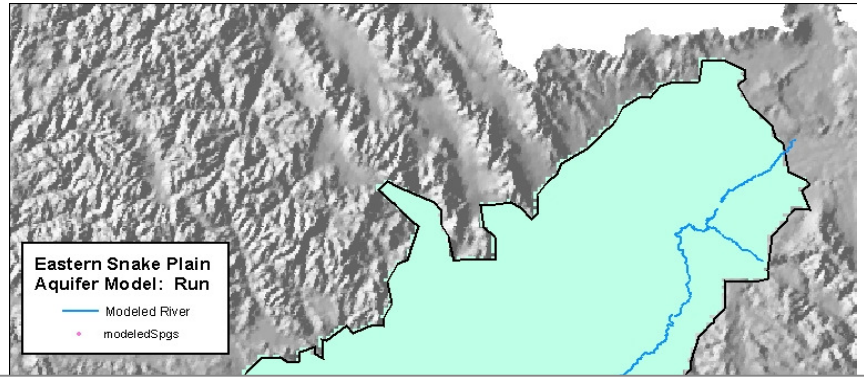


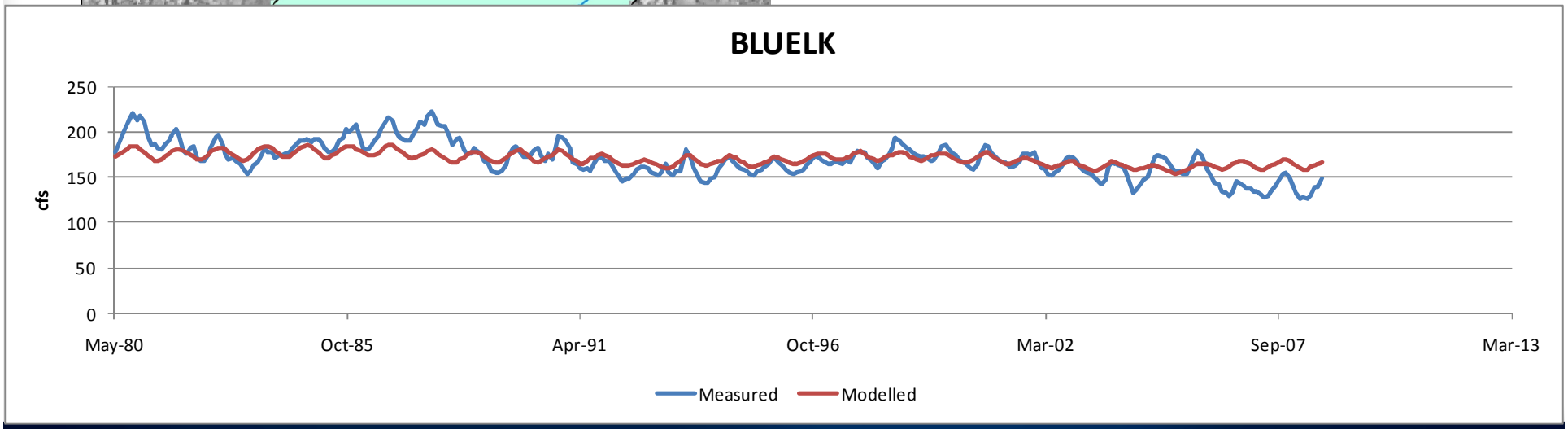


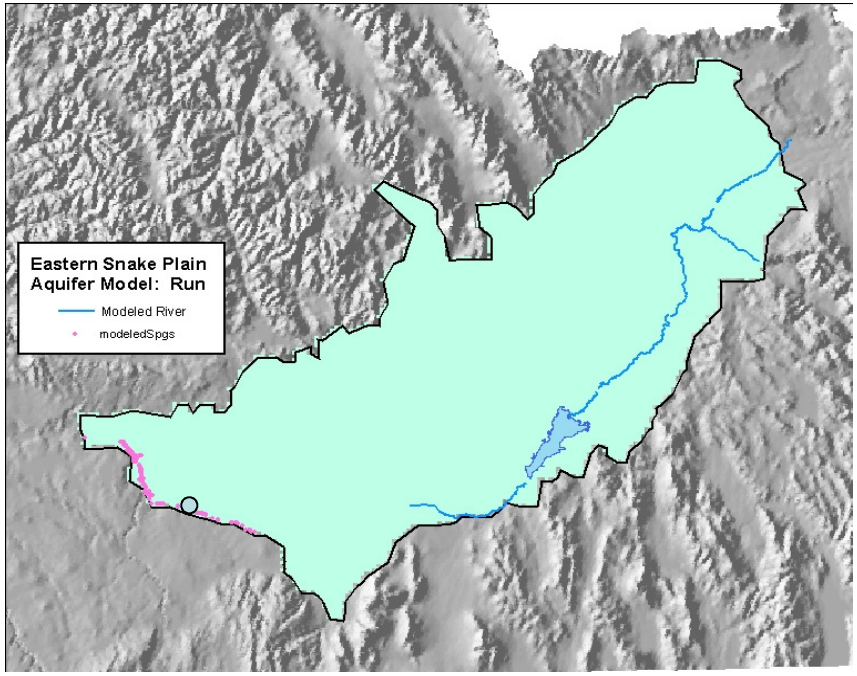

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Blue Lakes

- Blue Lakes

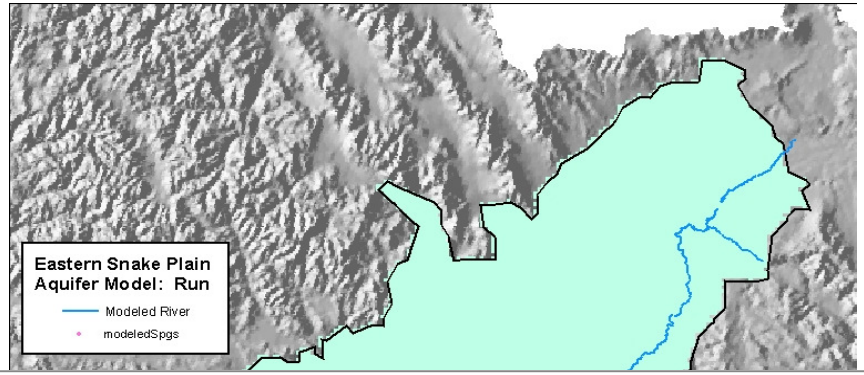

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

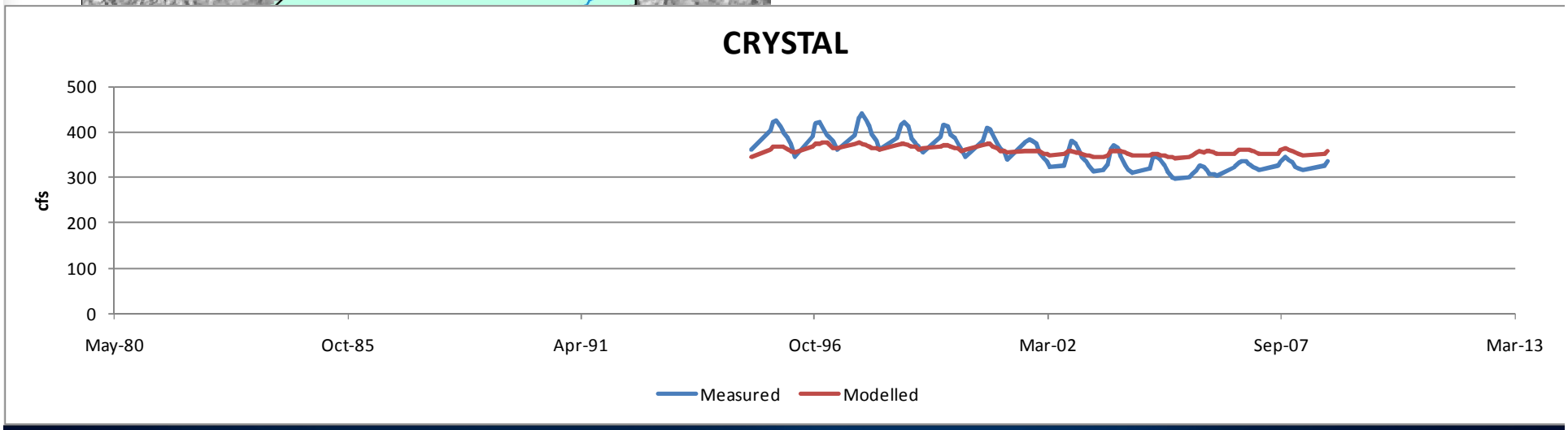

BLUELK
cfs
250
200
150
100
50
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled

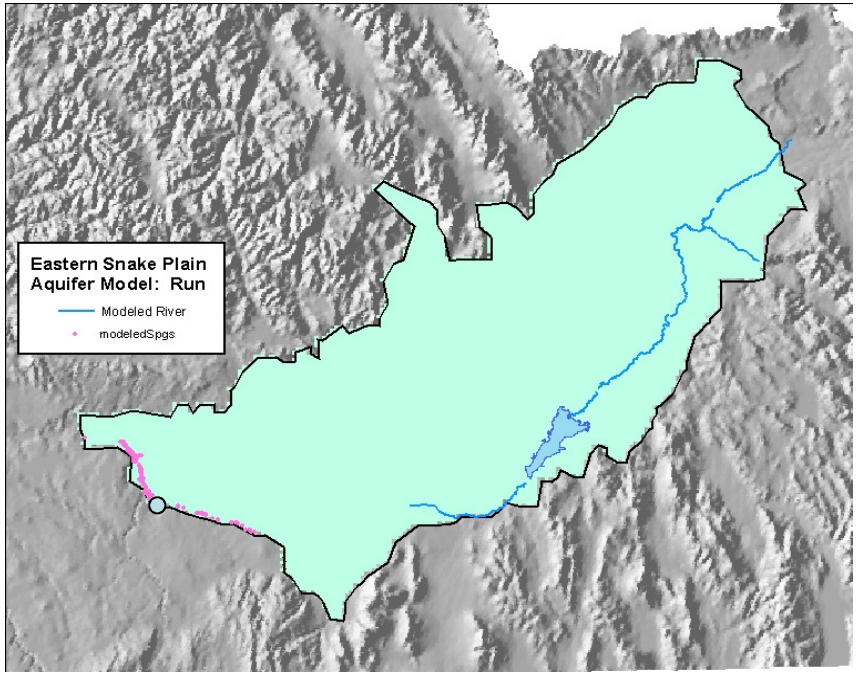


- Crystal Springs

- Crystal Springs

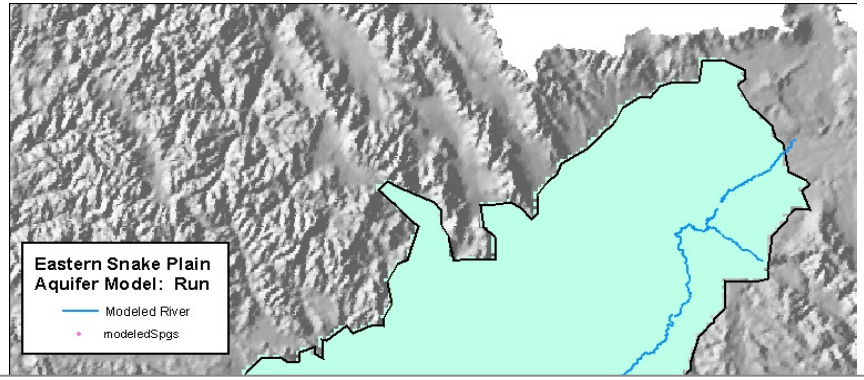


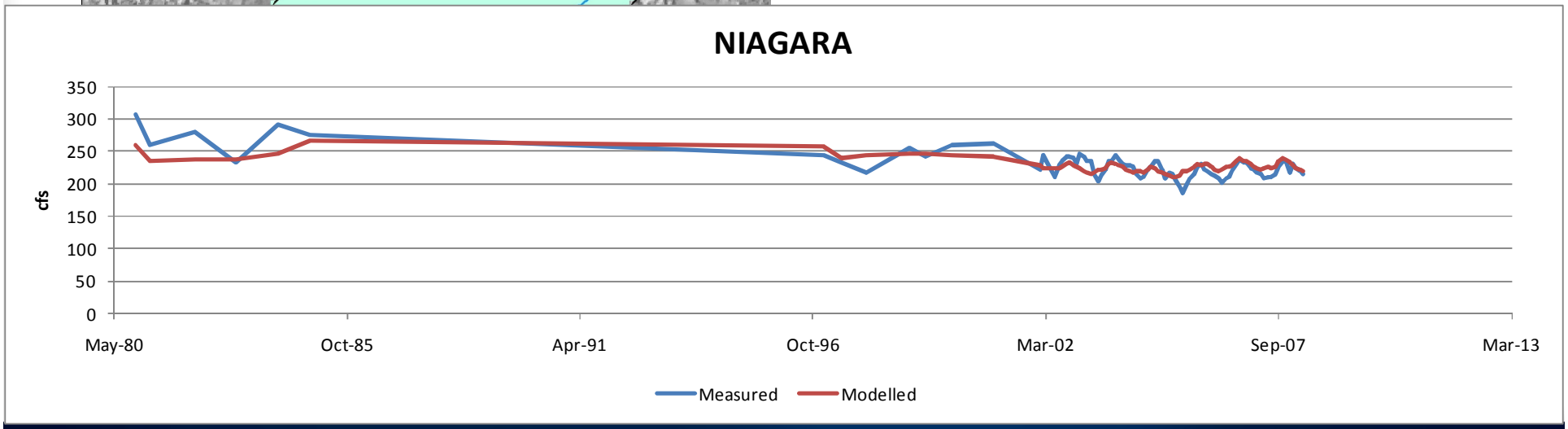


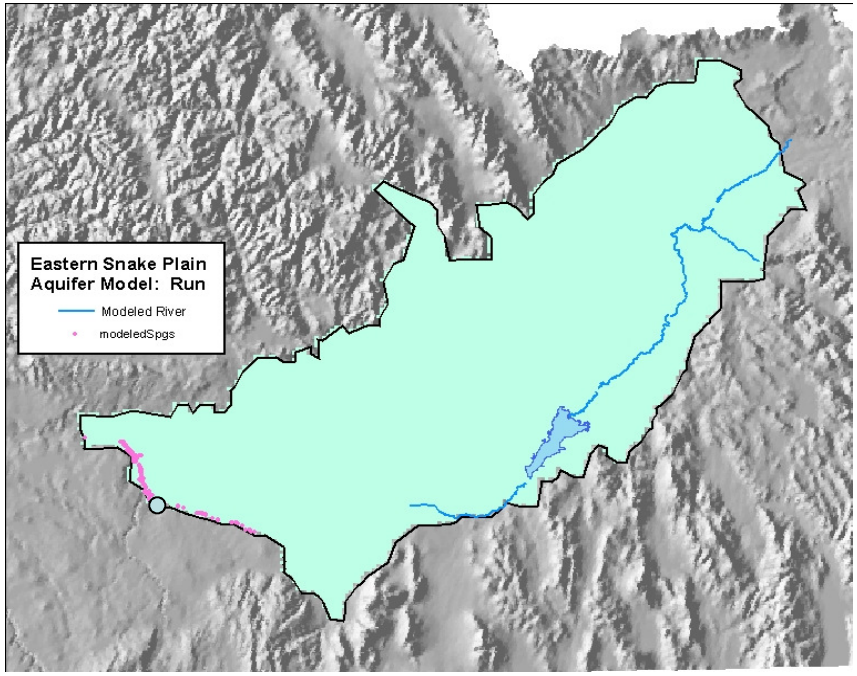

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Niagara

- Niagara

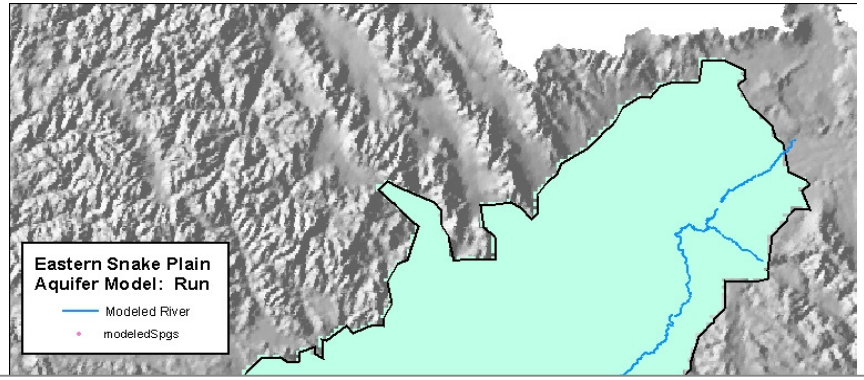

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

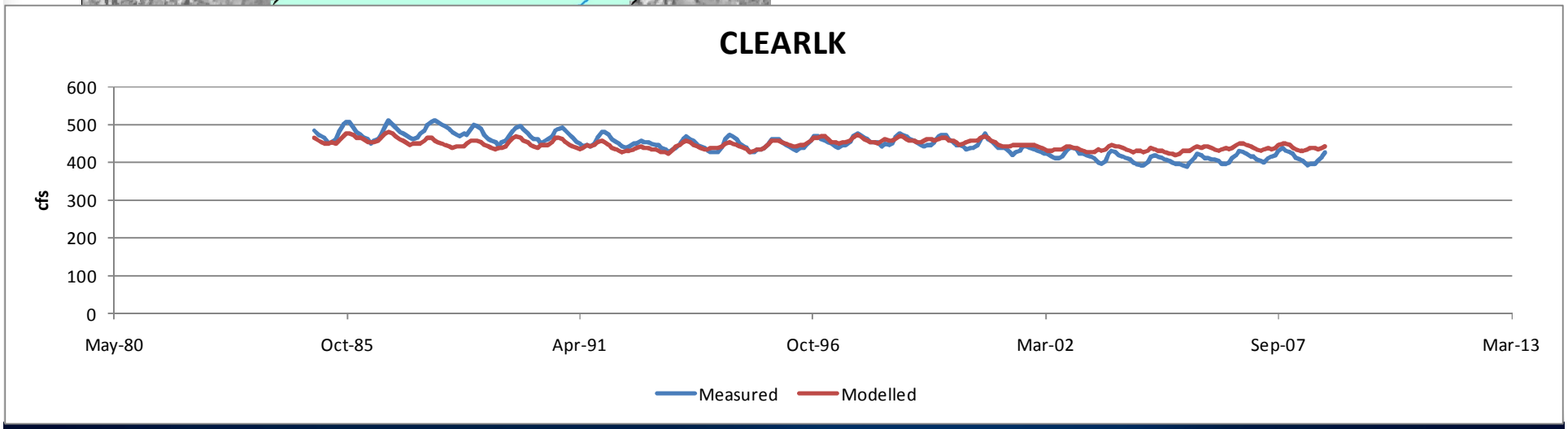

NIAGARA
cfs
350
300
250
200
150
100
50
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Clear Lakes

- Clear Lakes


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


CLEARLK
cfs
600
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May-80
Oct-85
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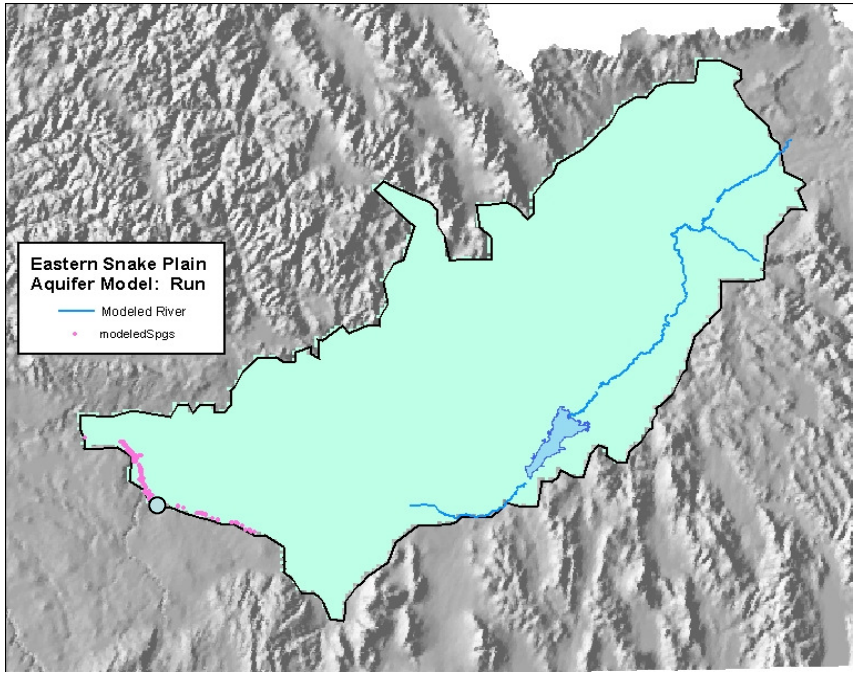
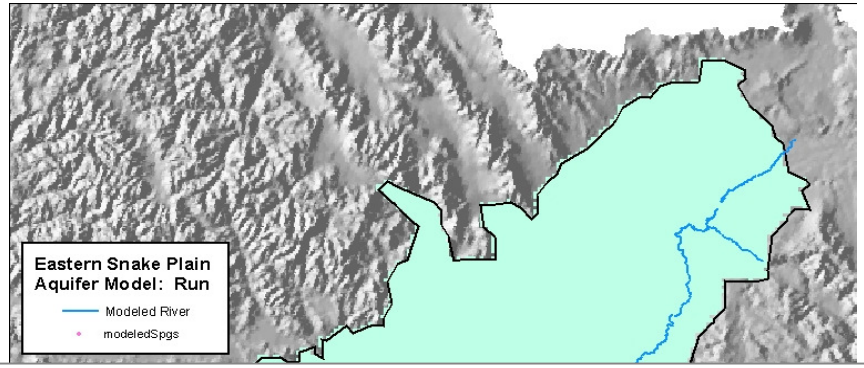
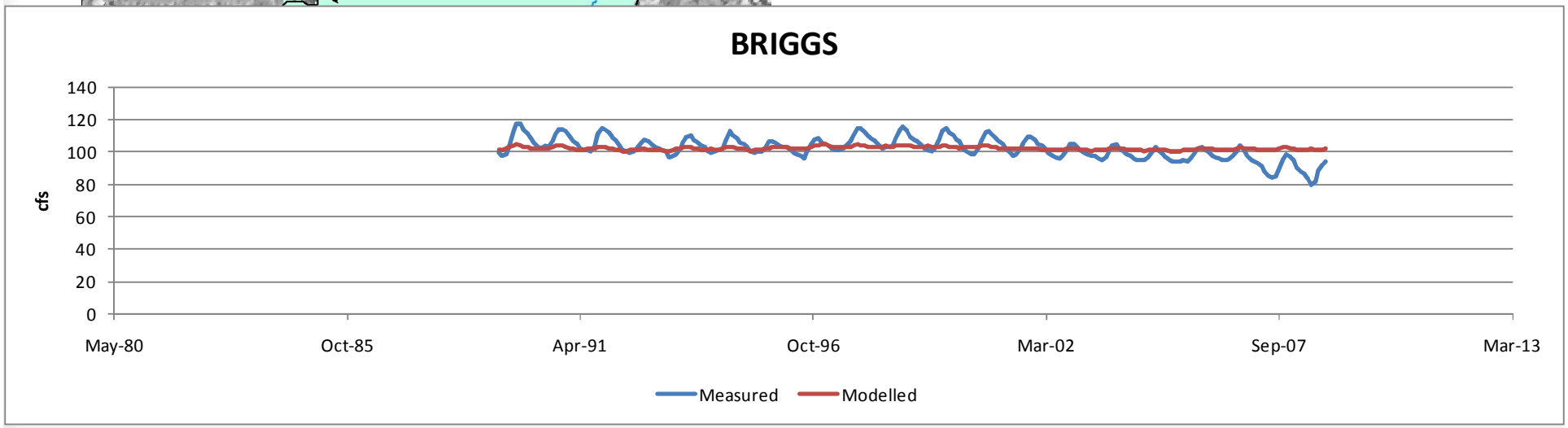
Mar-02
Sep-07
Mar-13
Measured
Modelled

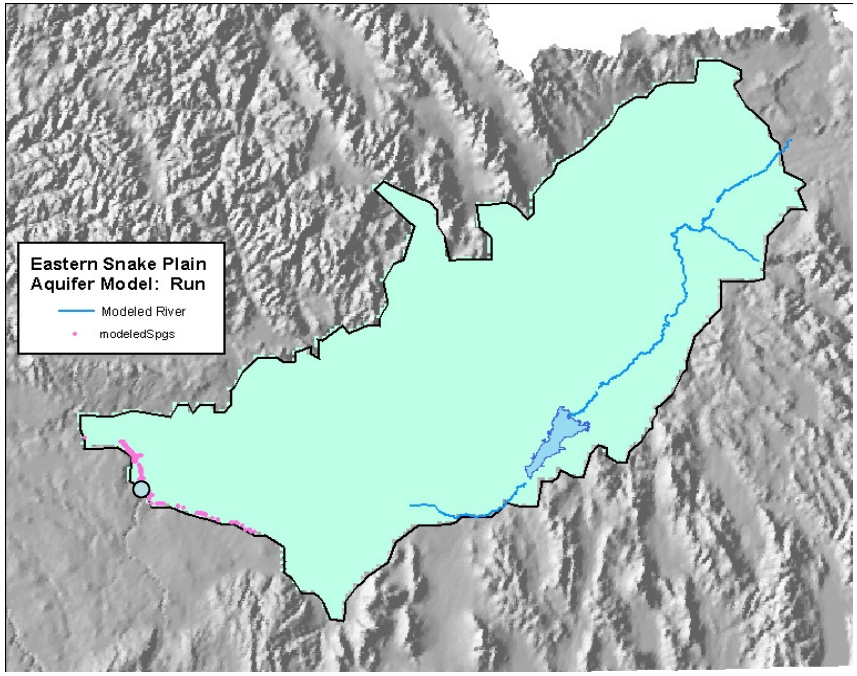


- Briggs Spring

- Briggs Spring

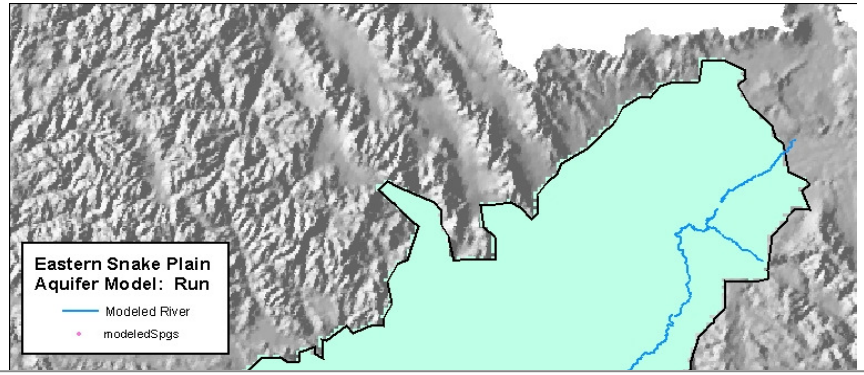


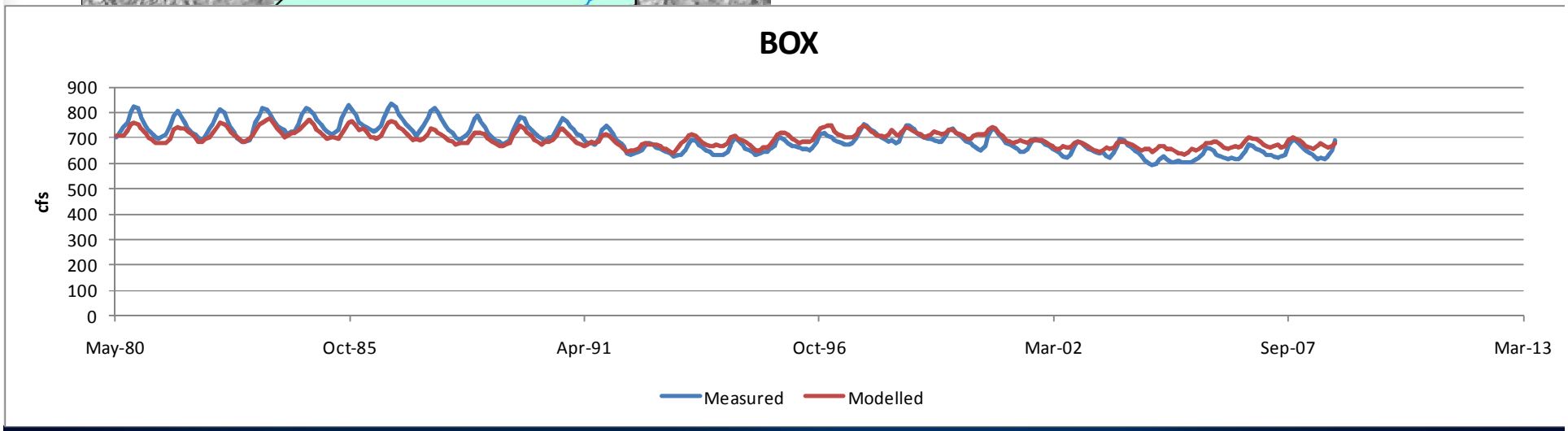


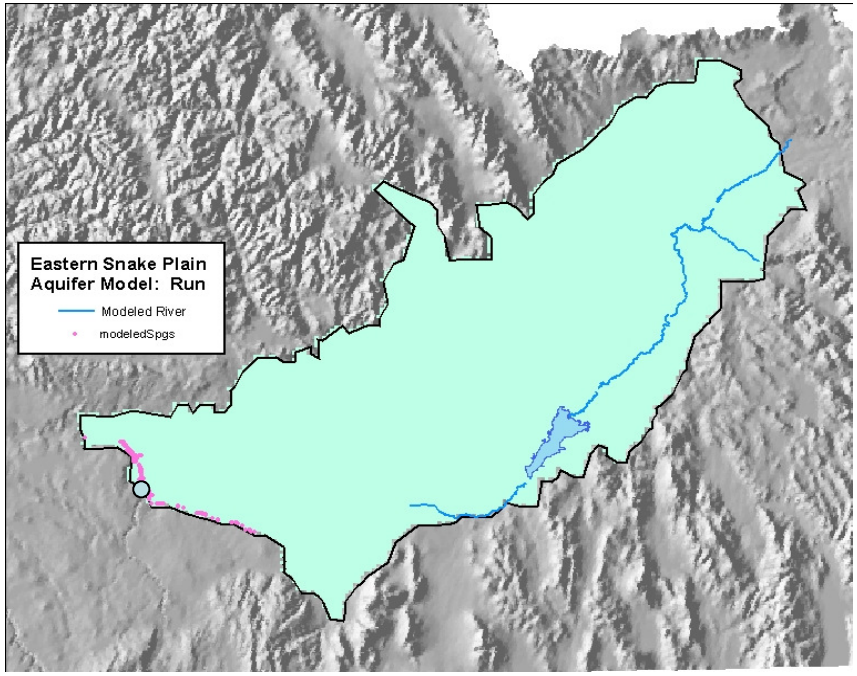


- Box Canyon Spring

- Box Canyon Spring

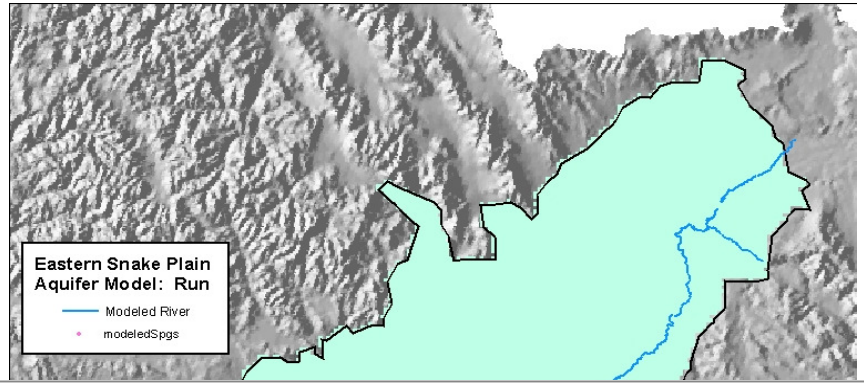


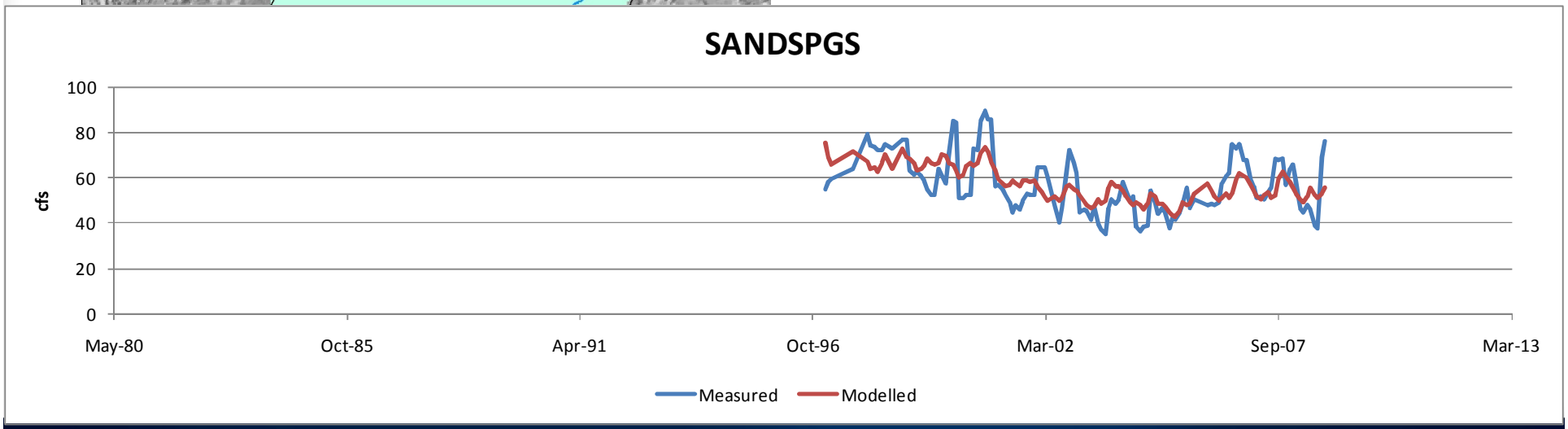


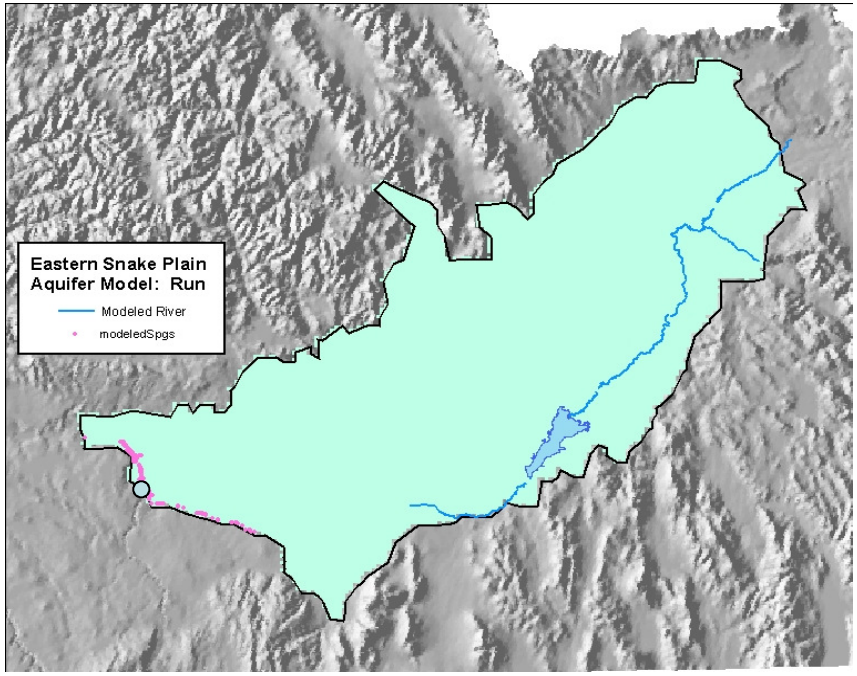


- Sand Springs

- Sand Springs

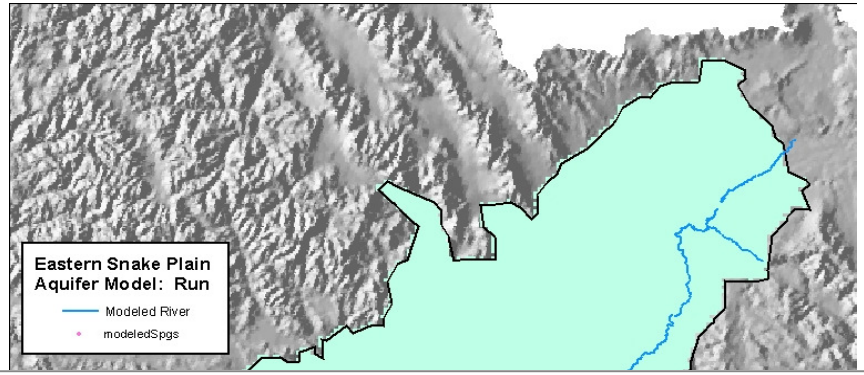


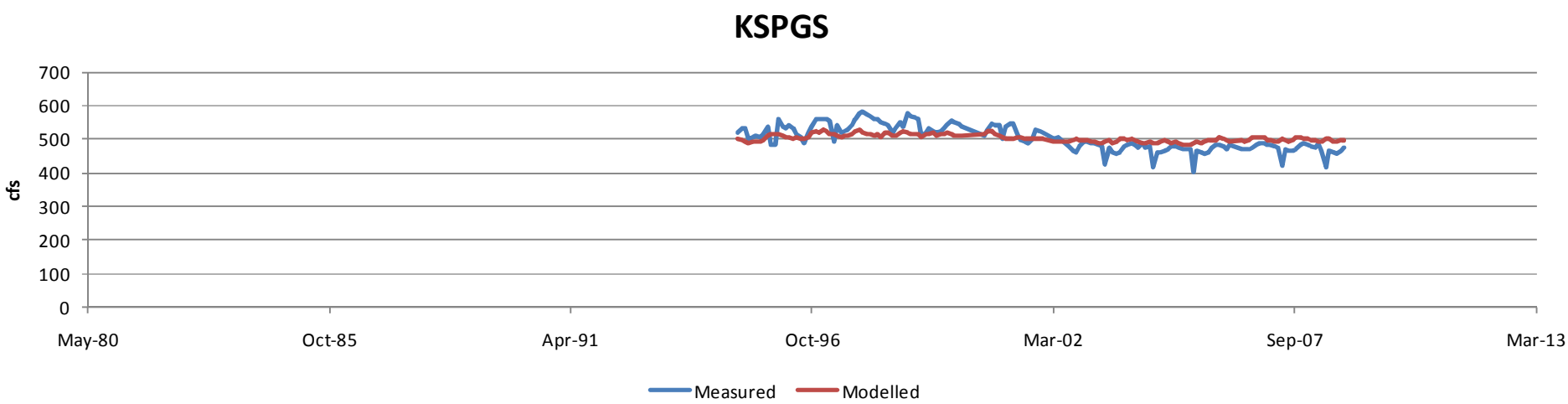


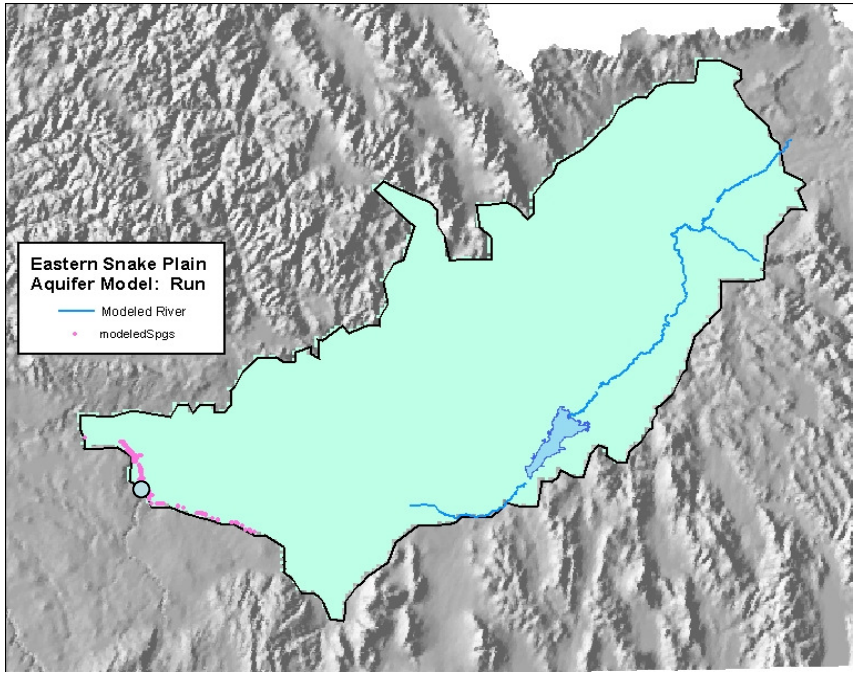


- Thousand Springs

- Thousand Springs

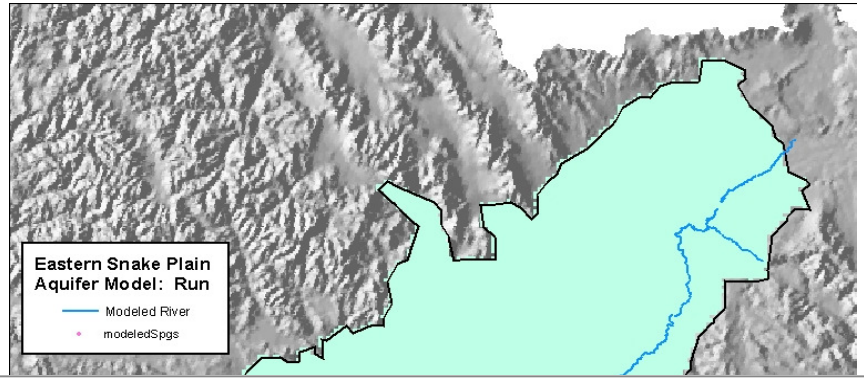


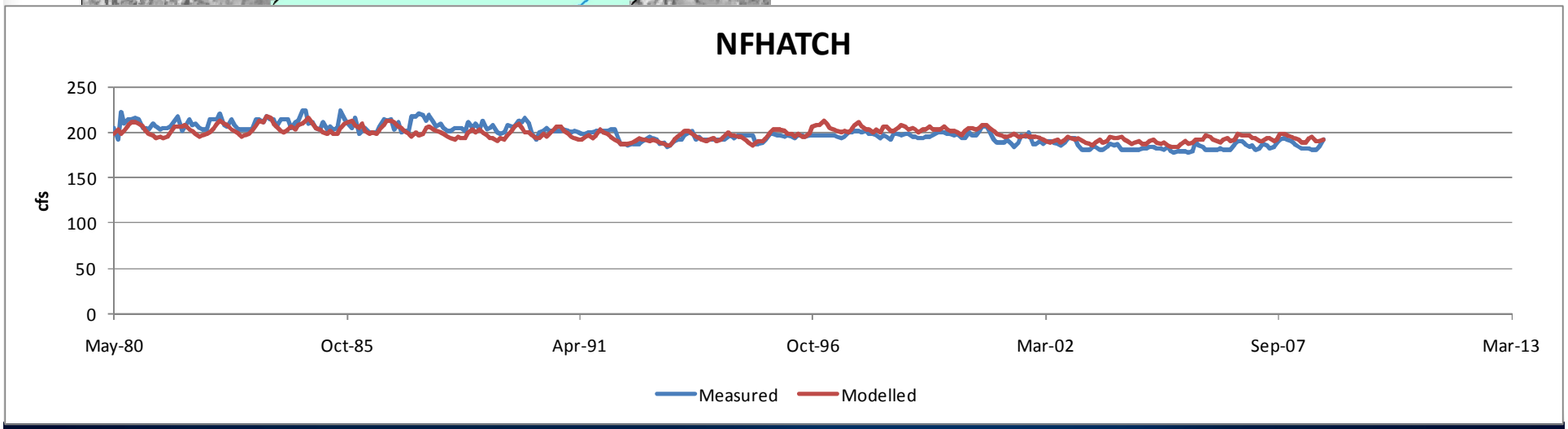


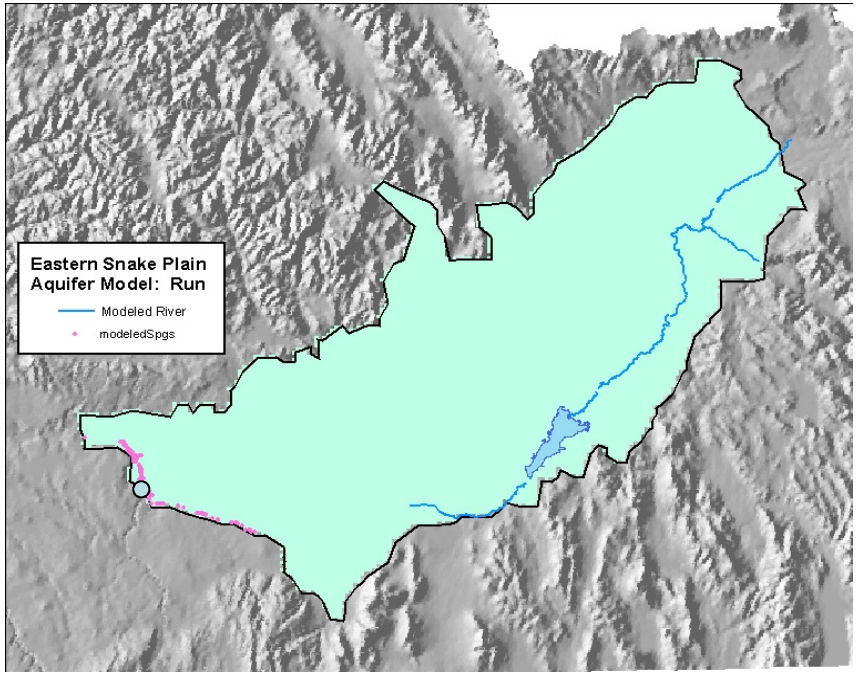


- Ntl Fish Hatchery

- Ntl Fish Hatchery

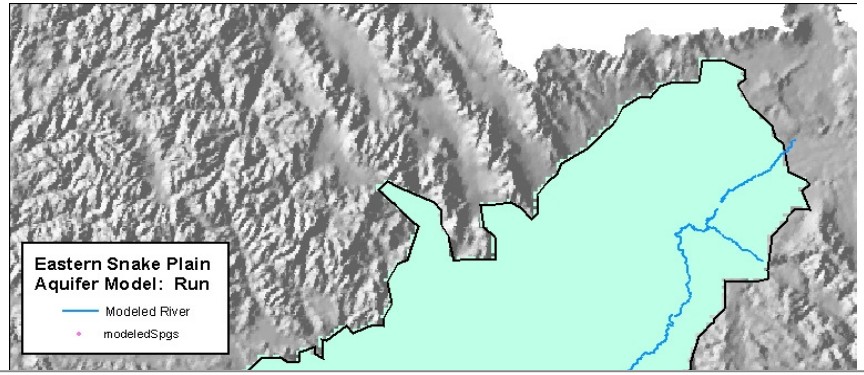


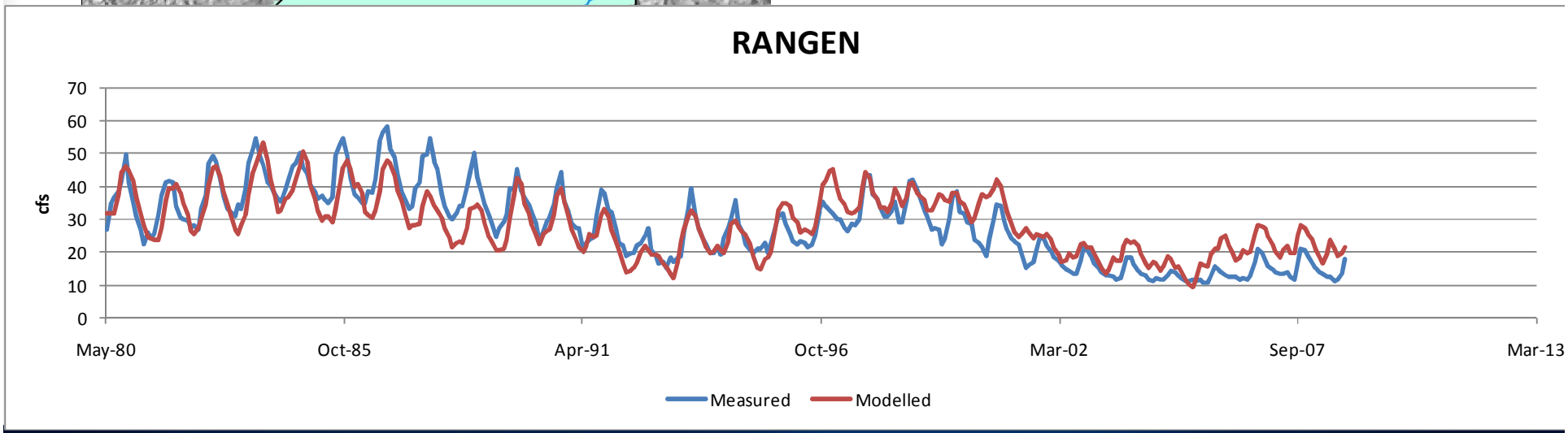


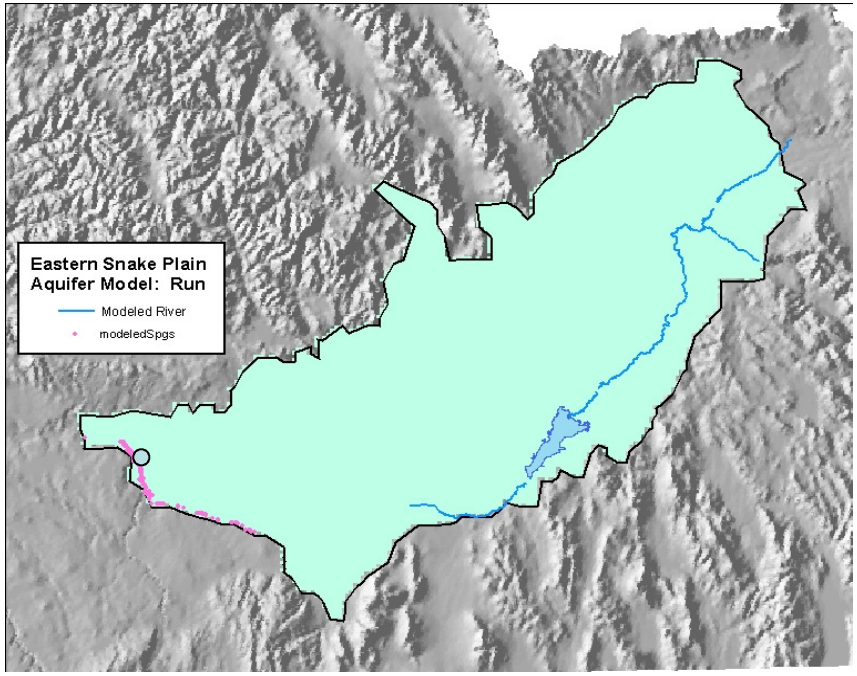


- Rangen Spring

- Rangen Spring

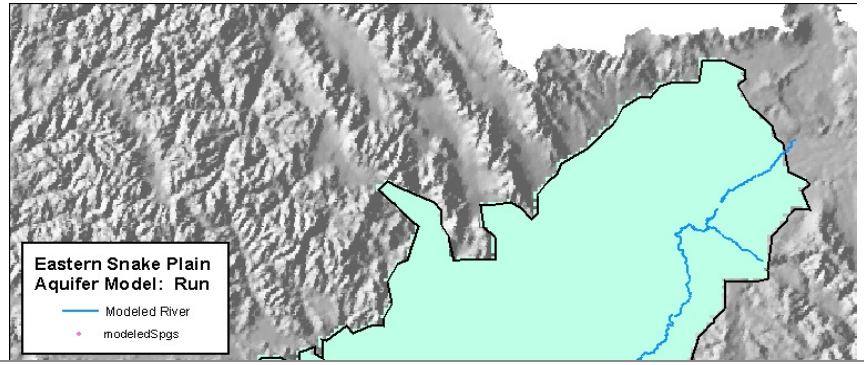


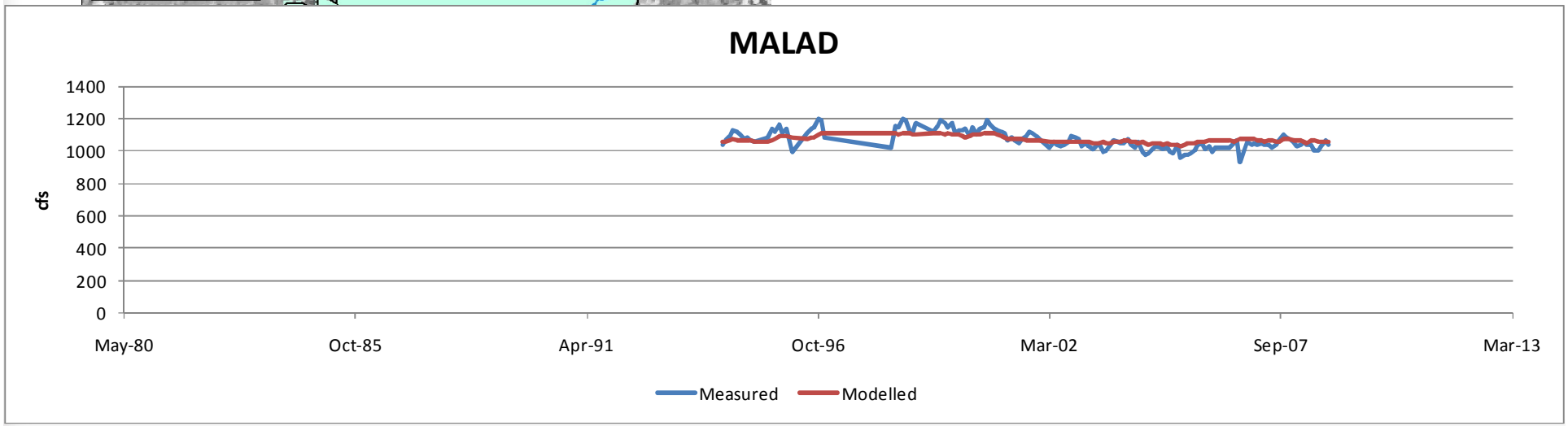



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Malad

- Malad


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


MALAD
cfs
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1200
1000
800
600
400
200
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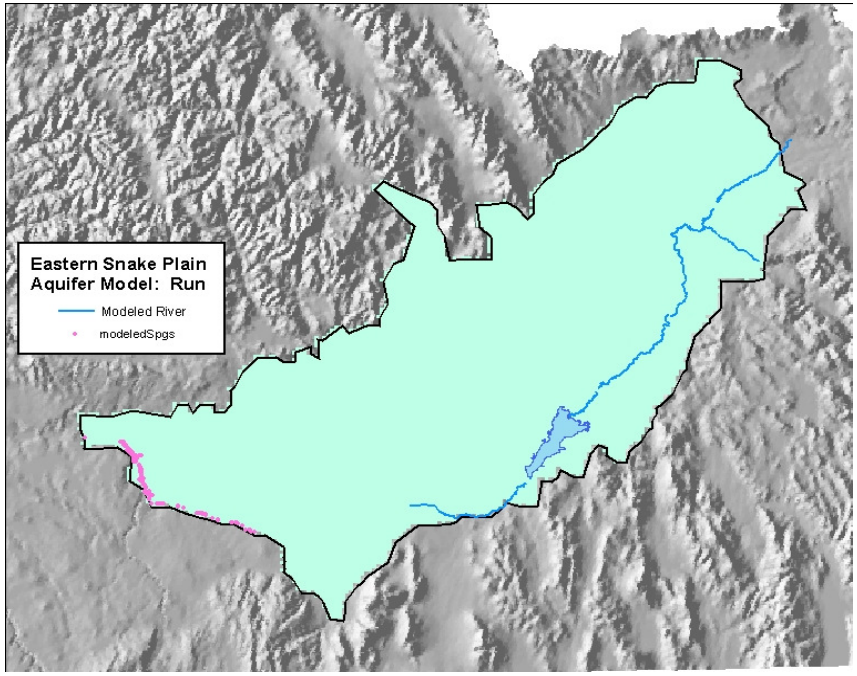
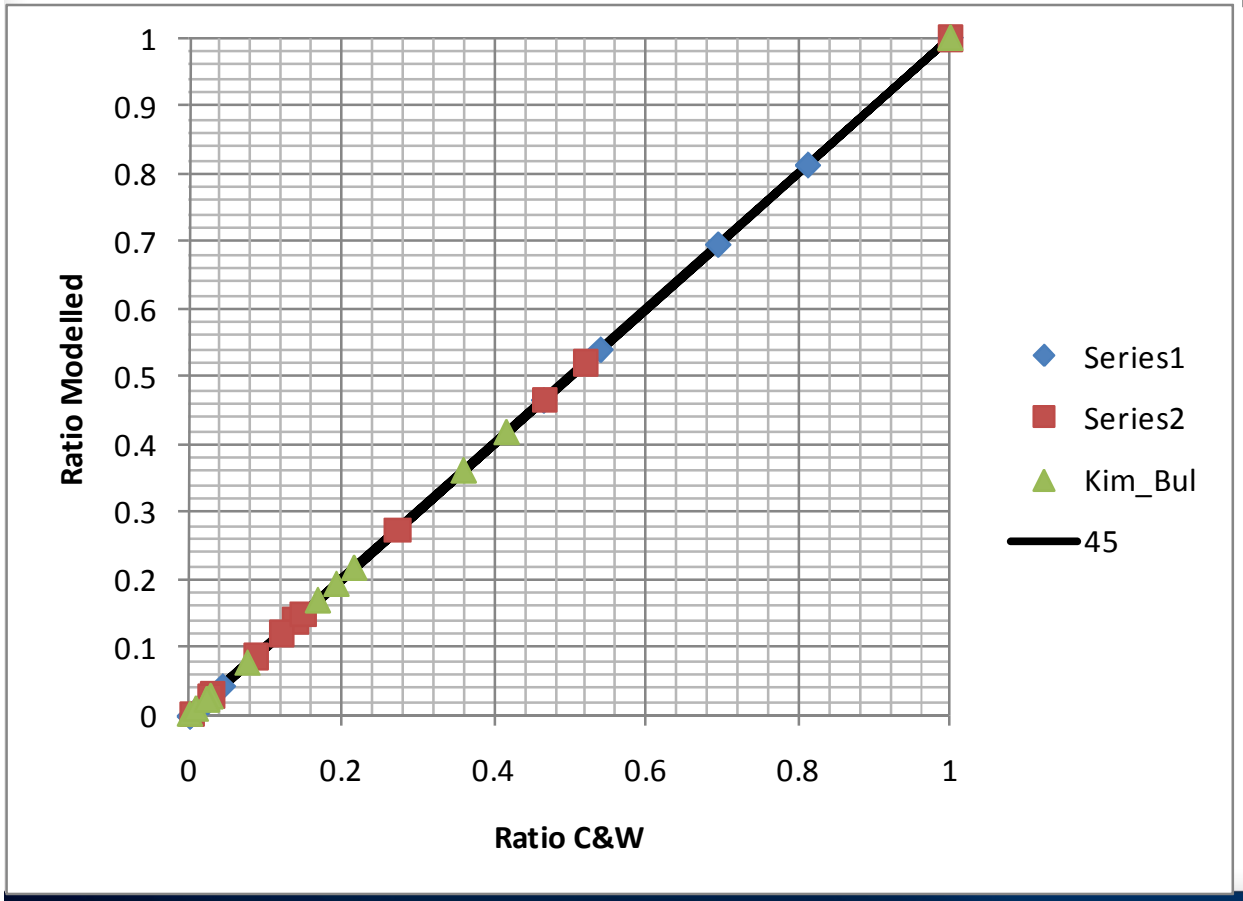
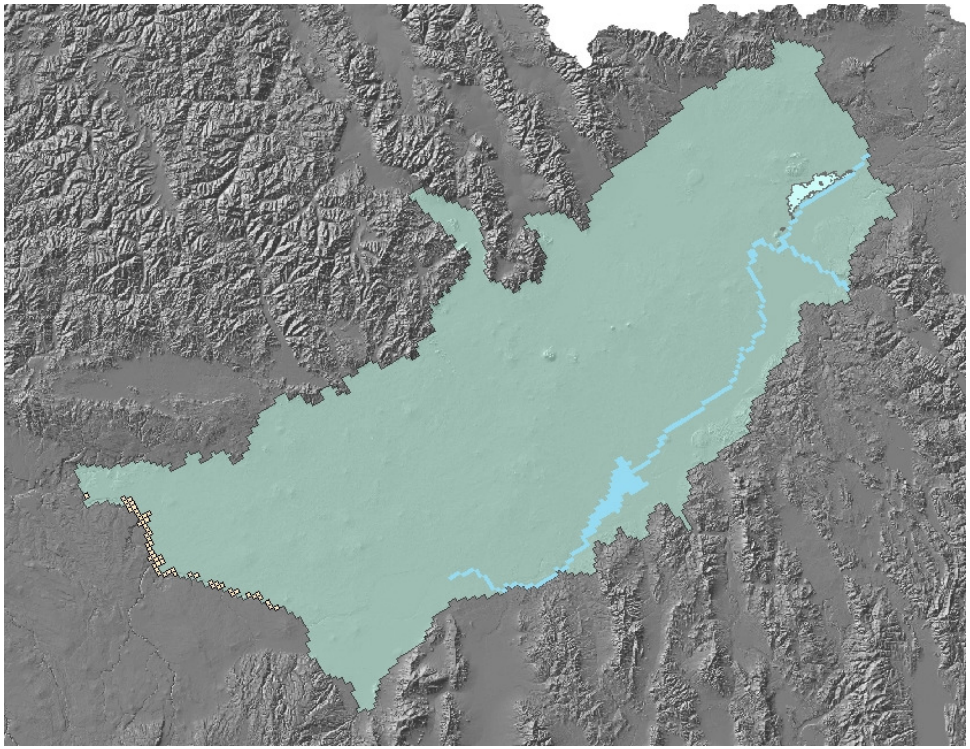
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled



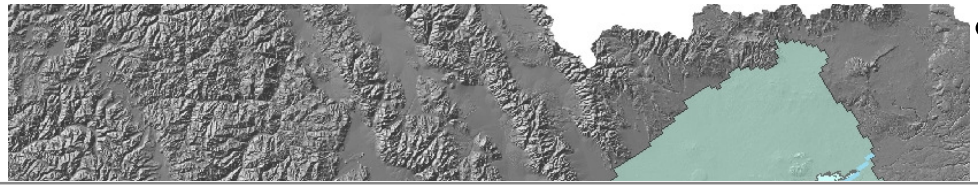
- Group C Springs

- Group C Springs





- Egin returns



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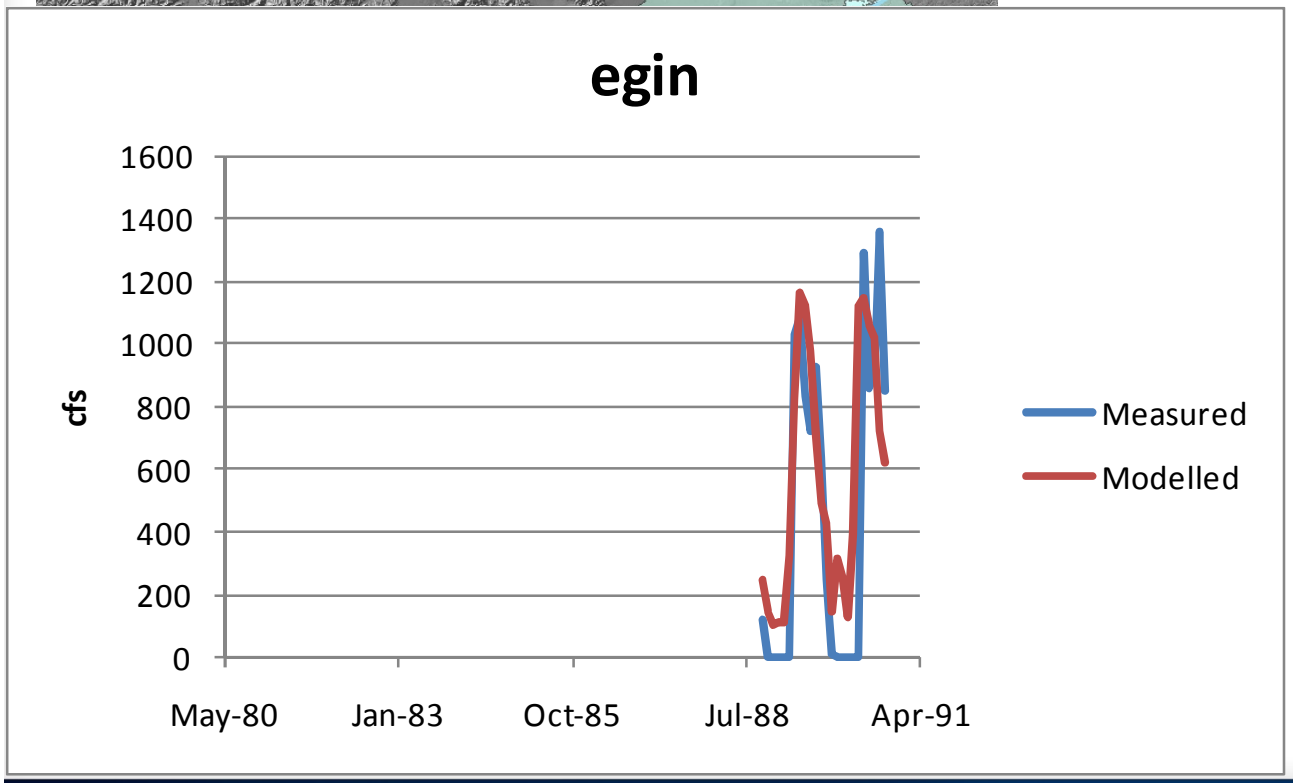
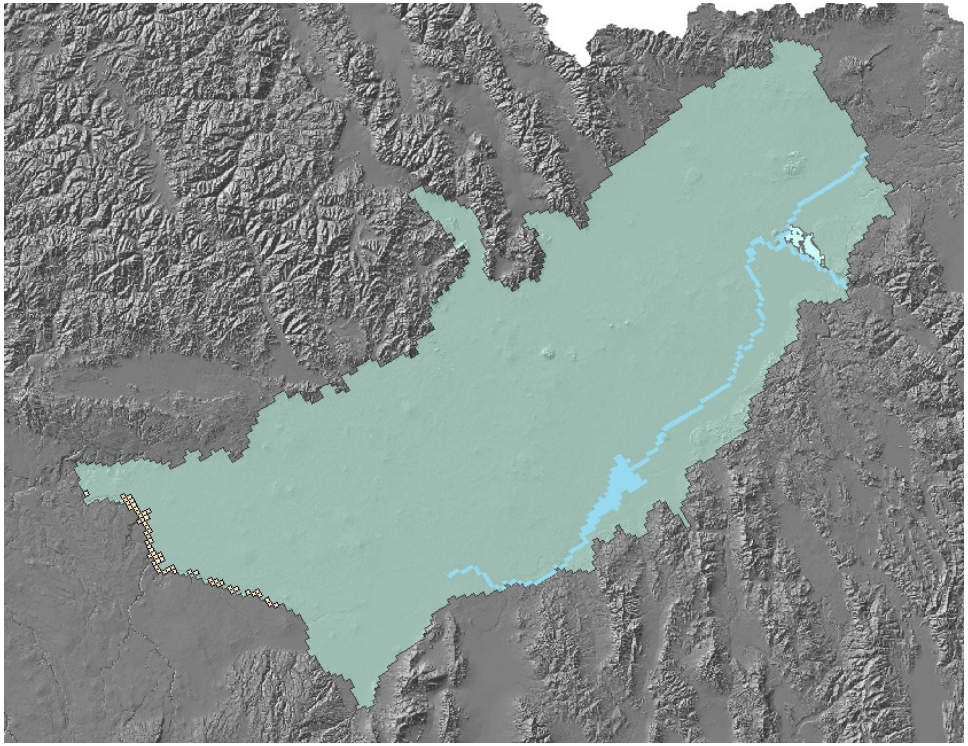
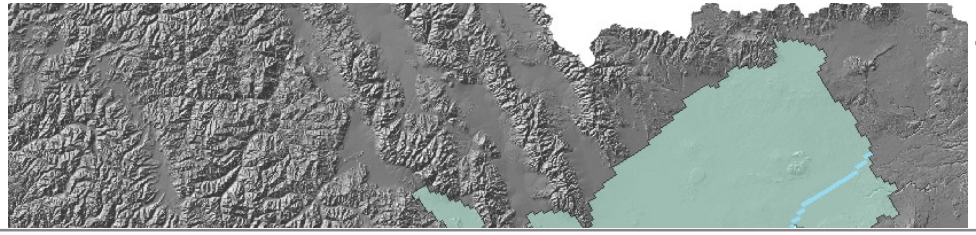
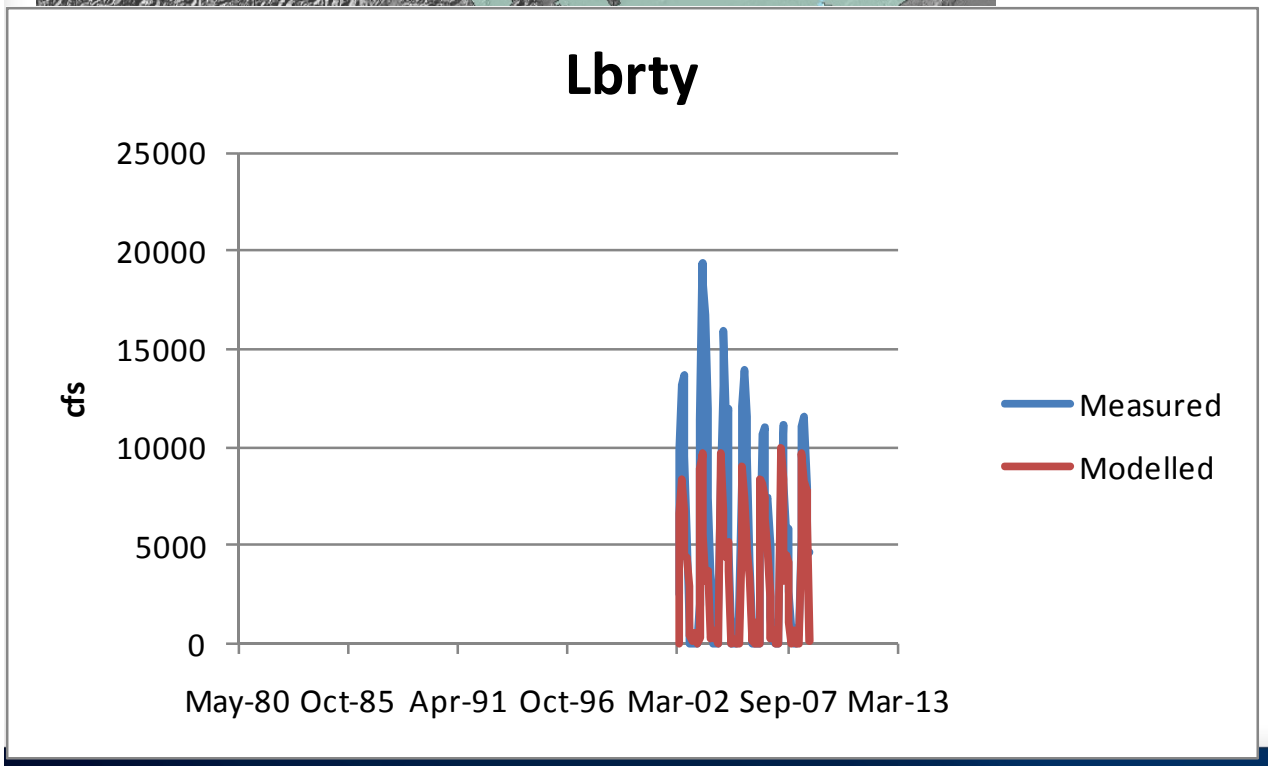


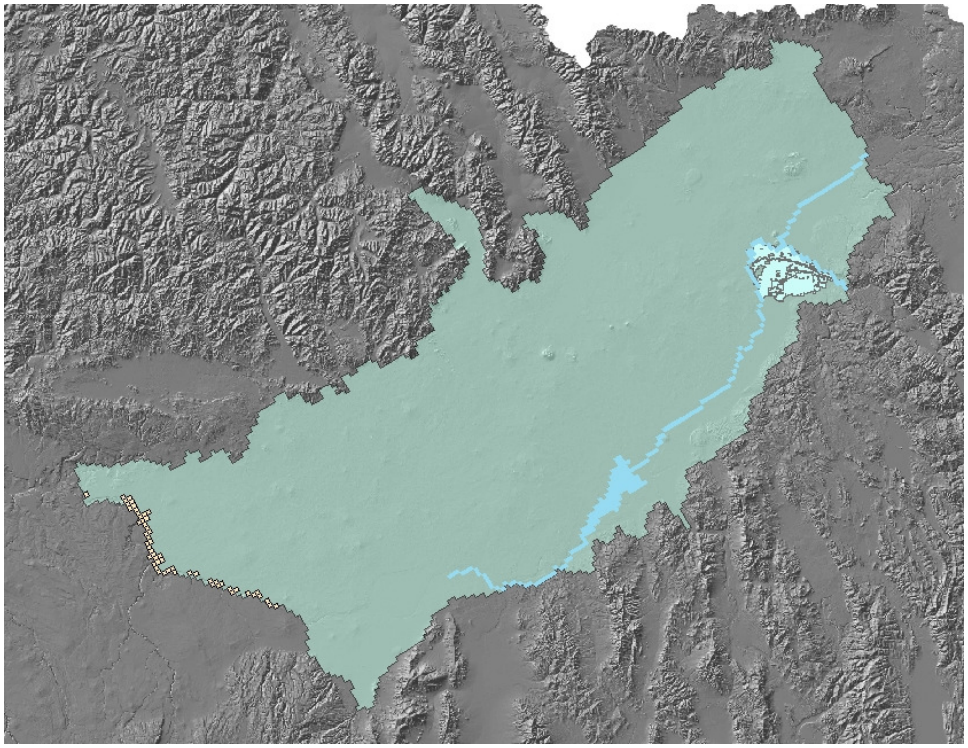


- Liberty returns

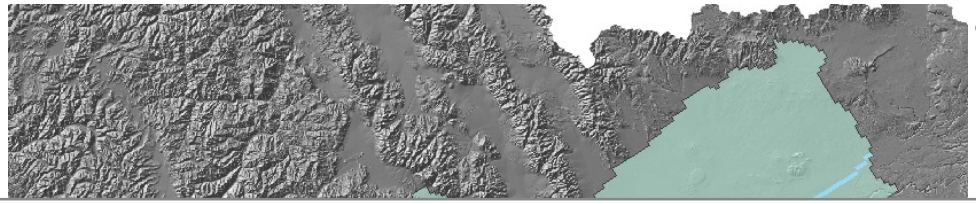


- Liberty returns

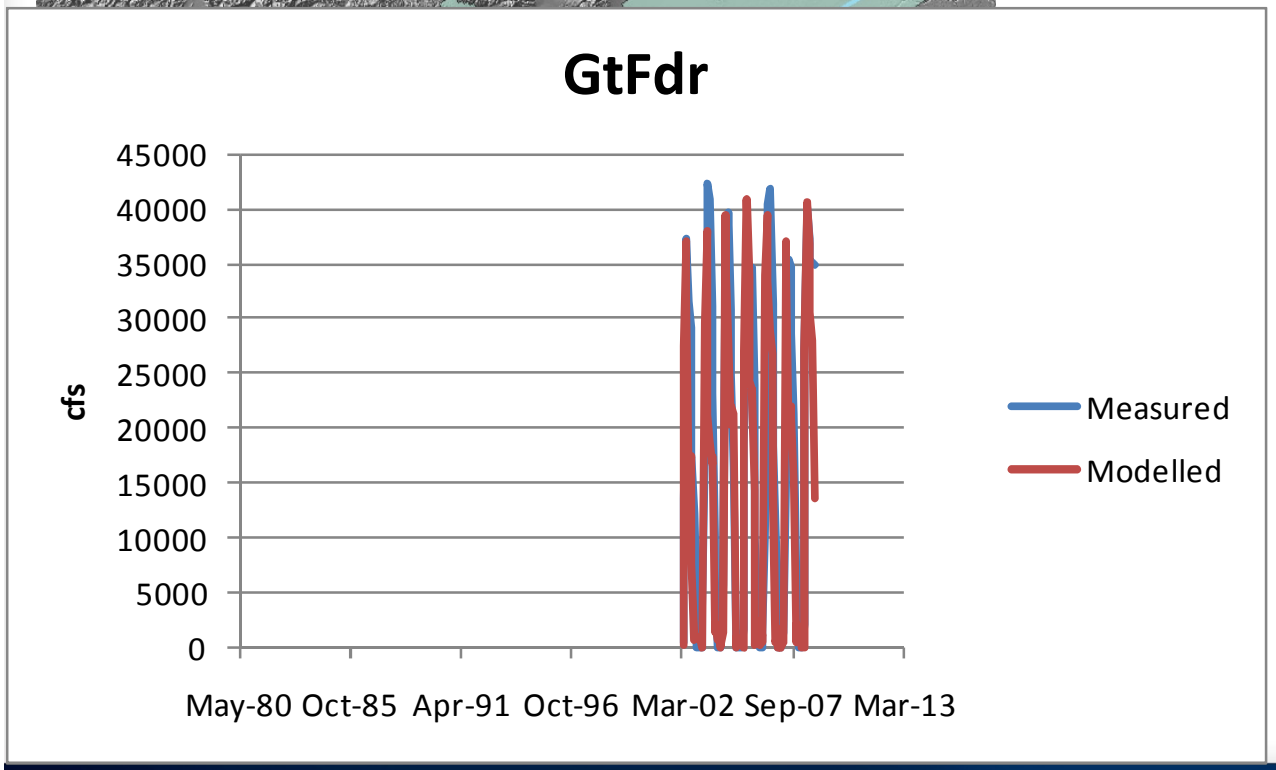


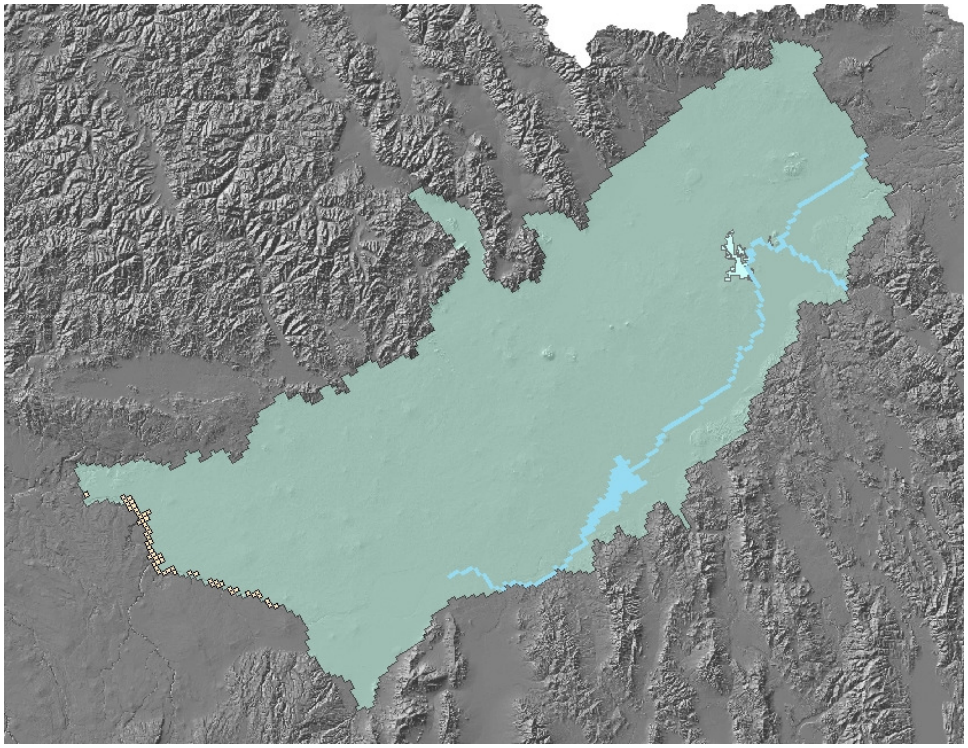


- Great Feeder Group returns

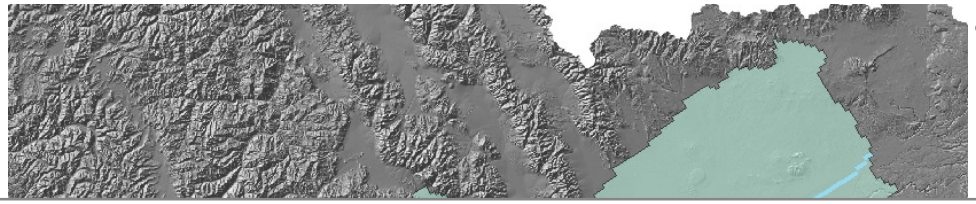


- Great Feeder Group returns

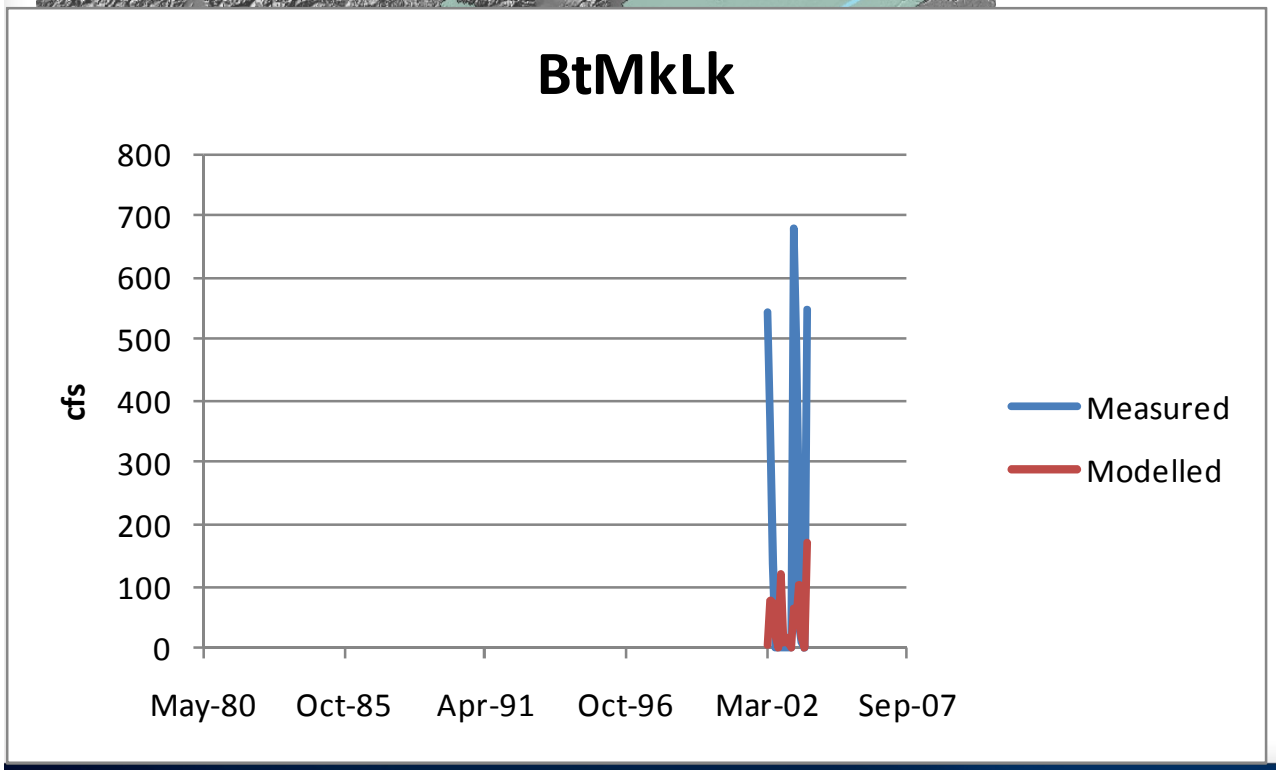


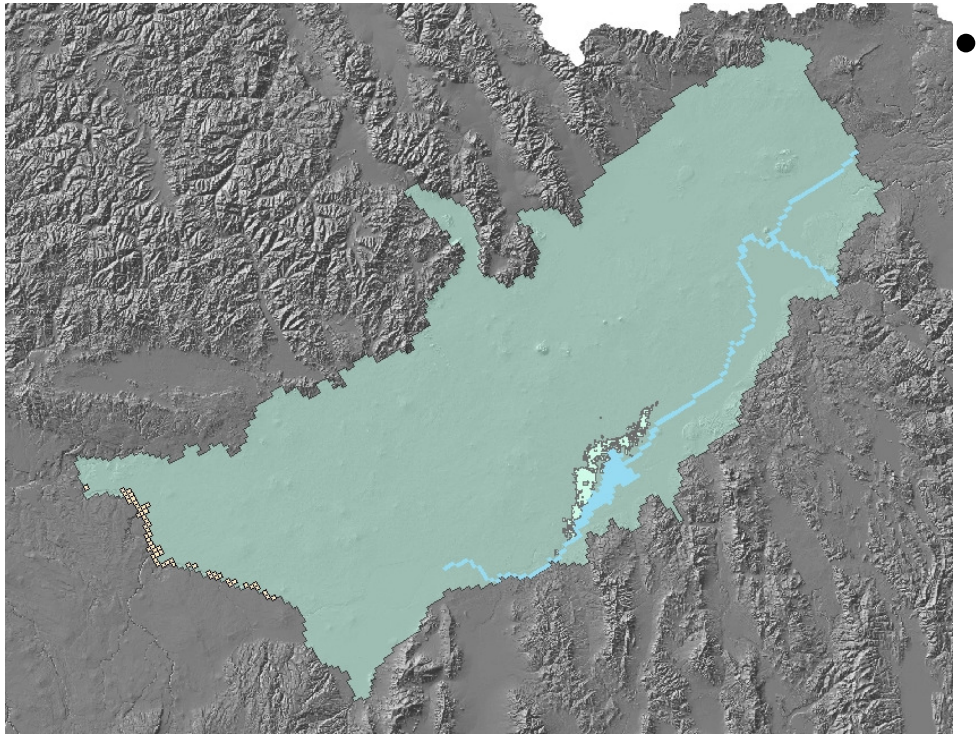


- Butte-Market Lake returns

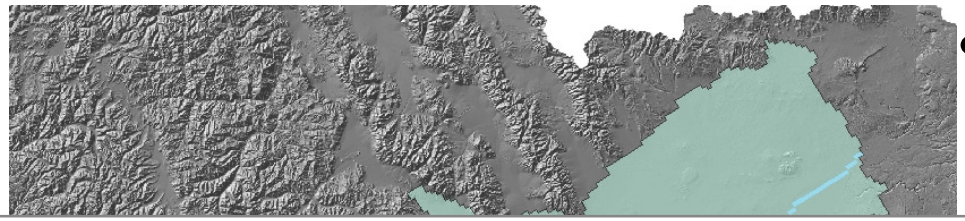


- Butte-Market Lake returns

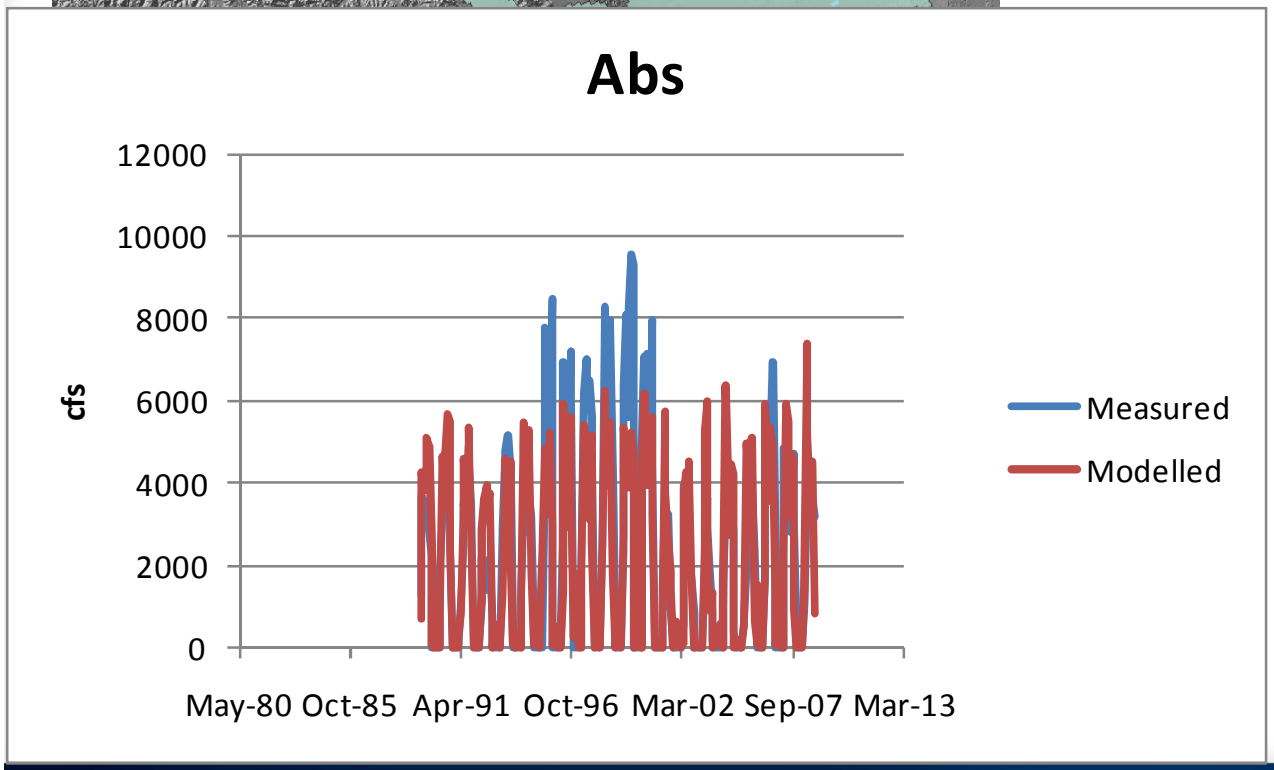


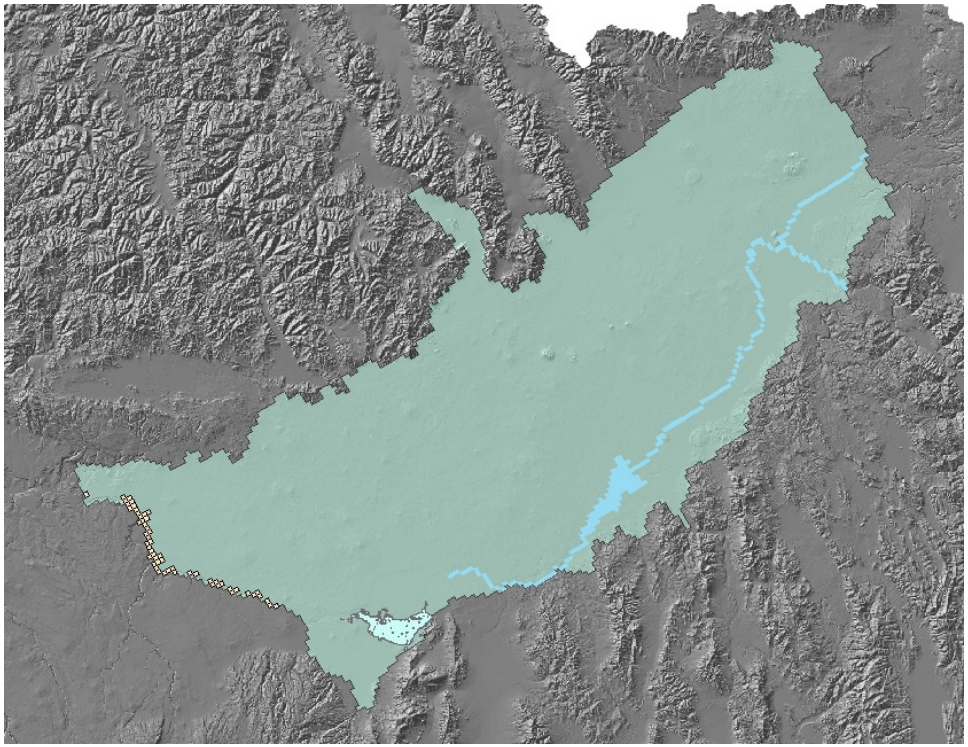


- Aberdeen-Springfield returns

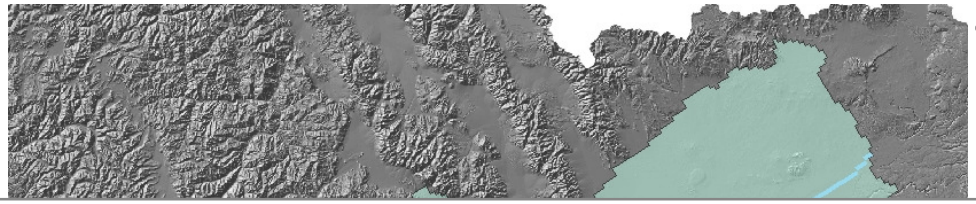


- Aberdeen-Springfield returns

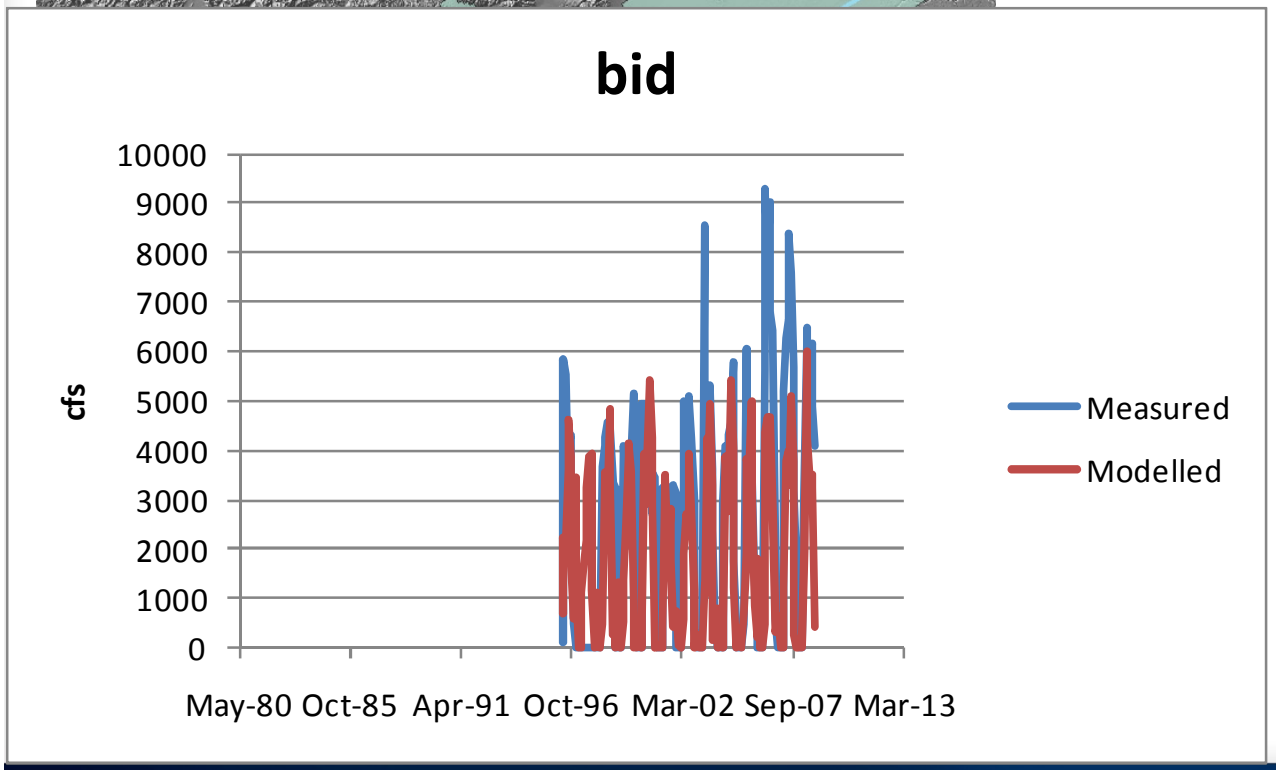


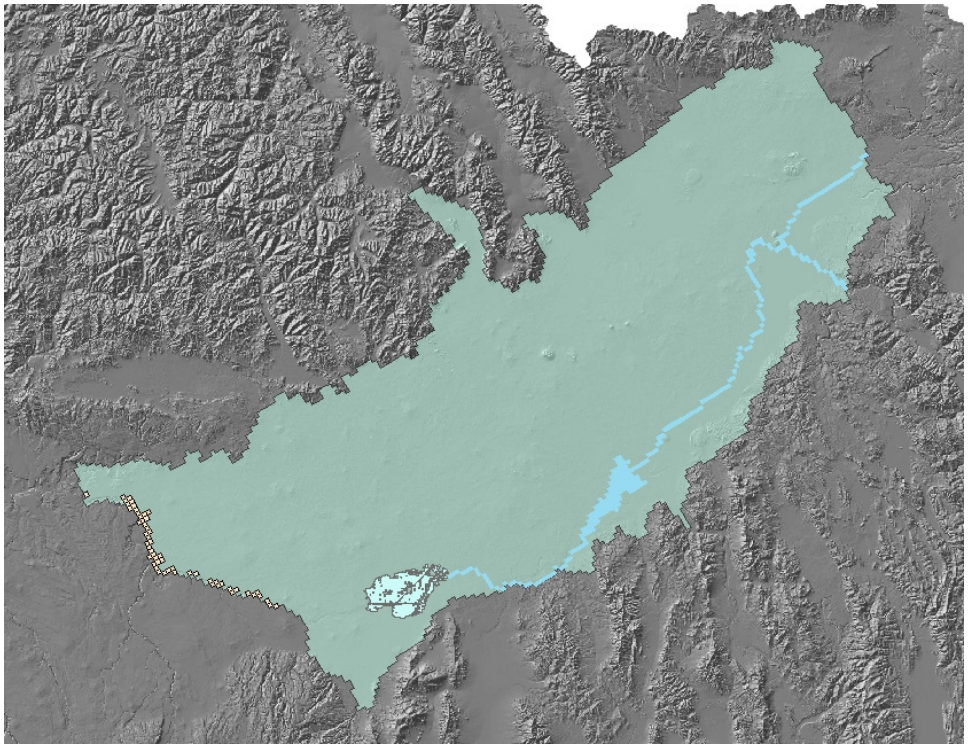


- Burley Irrigation District returns

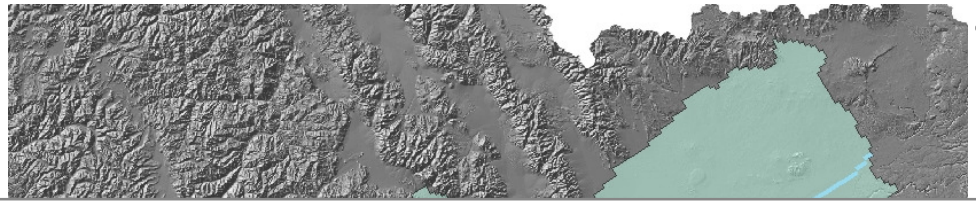


- Burley Irrigation District returns

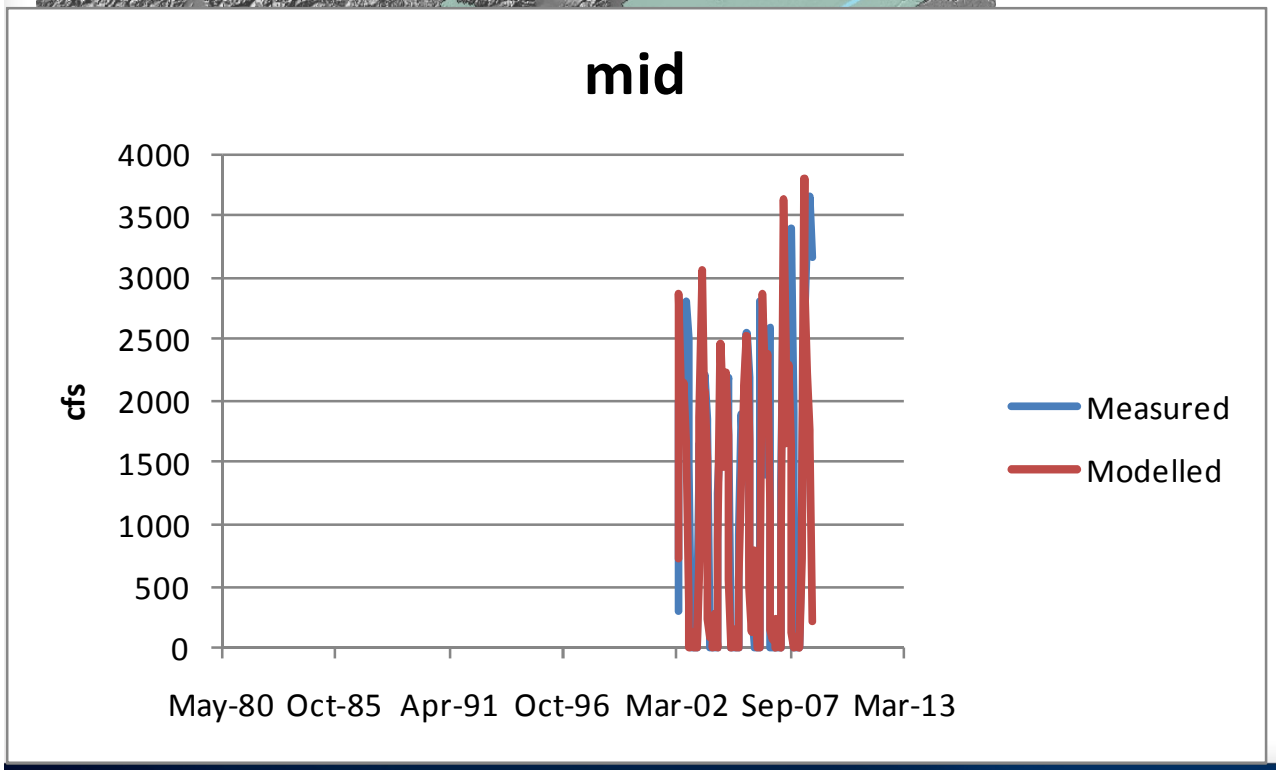


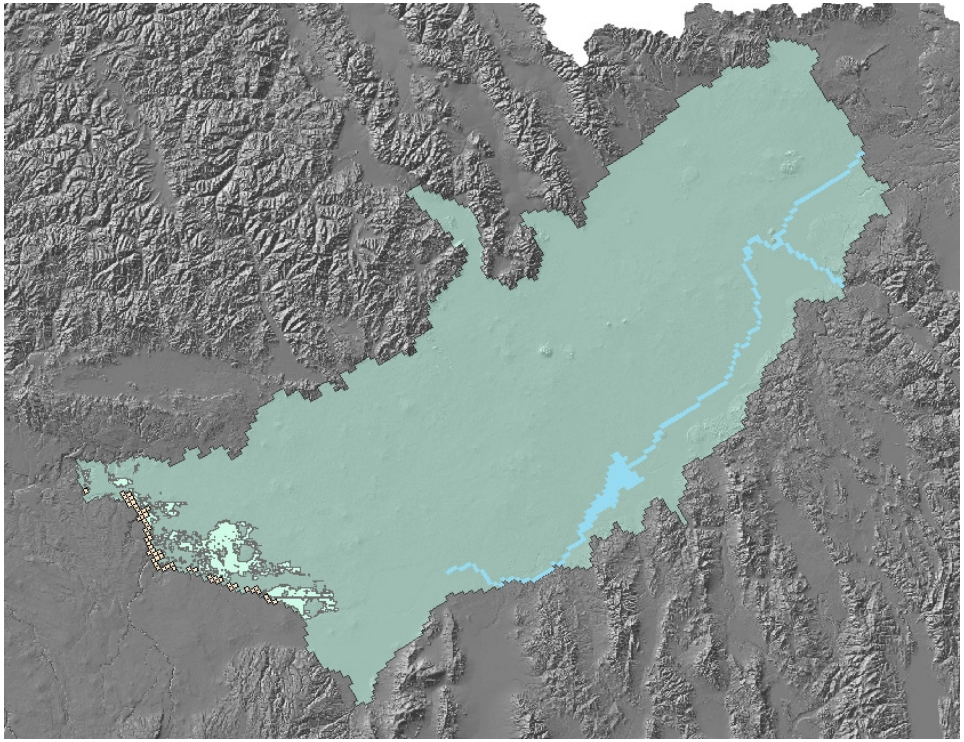


- Minidoka Irrigation District returns

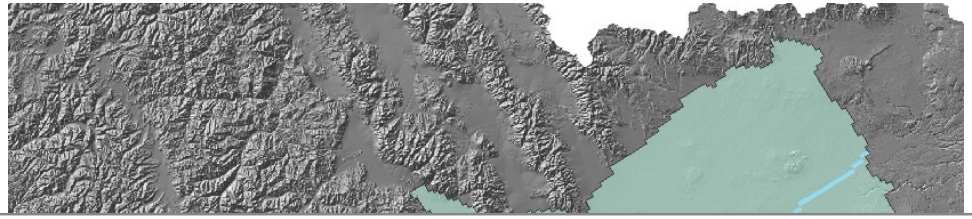


- Minidoka Irrigation District returns

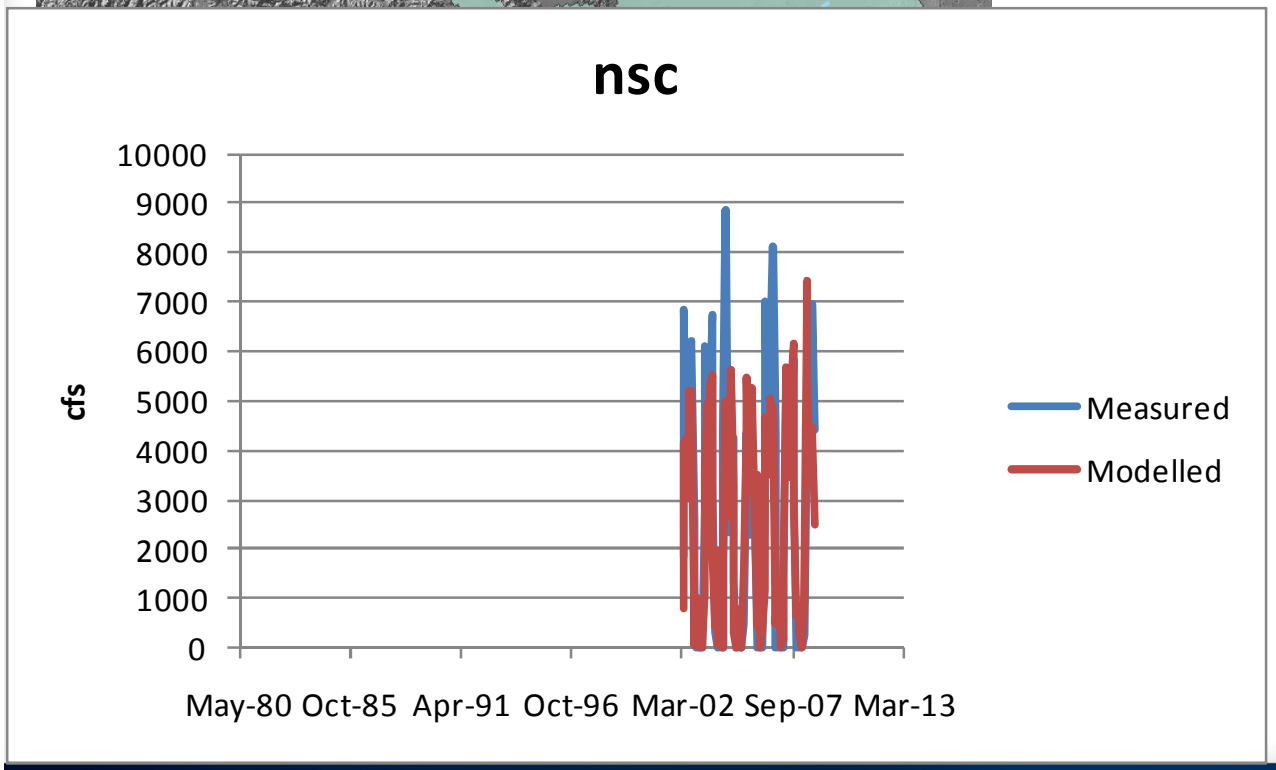


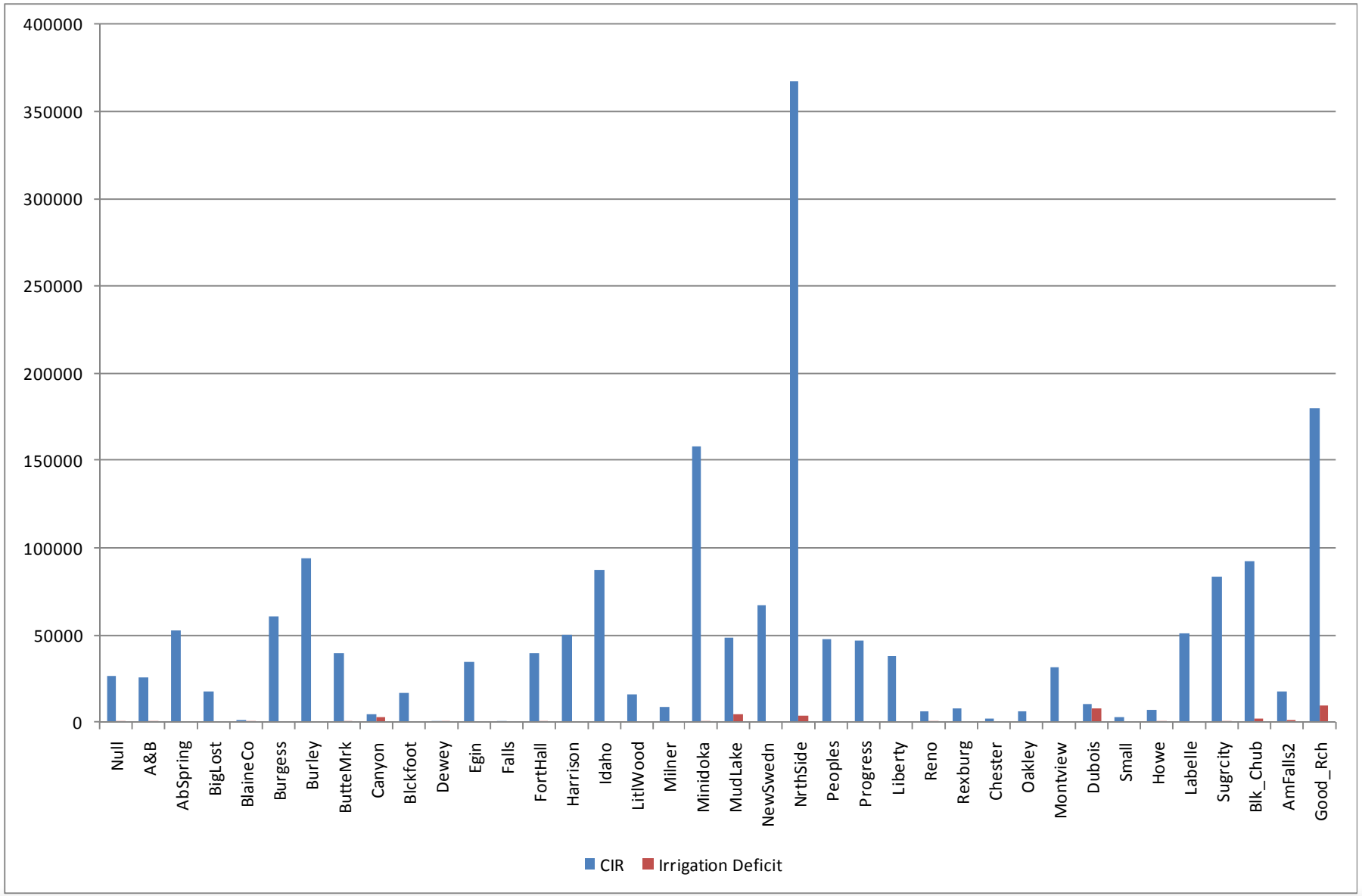


- North Side Canal Co returns



- North Side Canal Co returns

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Progress
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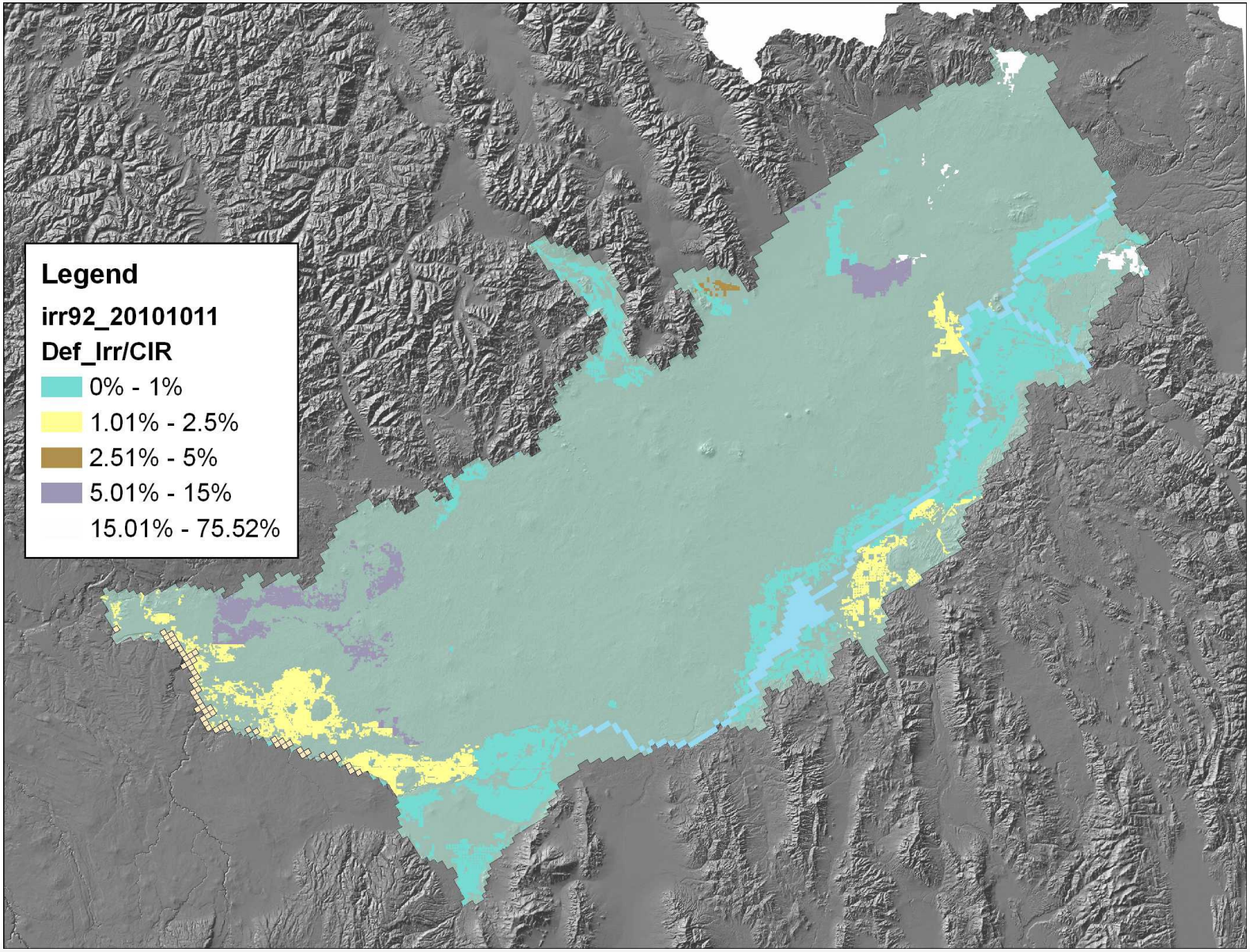
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