Calibration with A,B, & C Springs using E101027A with Return Flow Targets

Allan Wylie IDWR

2008 Reach Gain and Spring Discharge Targets

- Monthly Stress Periods
  - Using
    - MKMOD5.exe
      - Using On-Farm algorithm
    - E101027A
      - Assumes that the On-Farm algorithm would be used
    - No steady state targets
    - Aquifer head
      - 1985-2008
    - 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

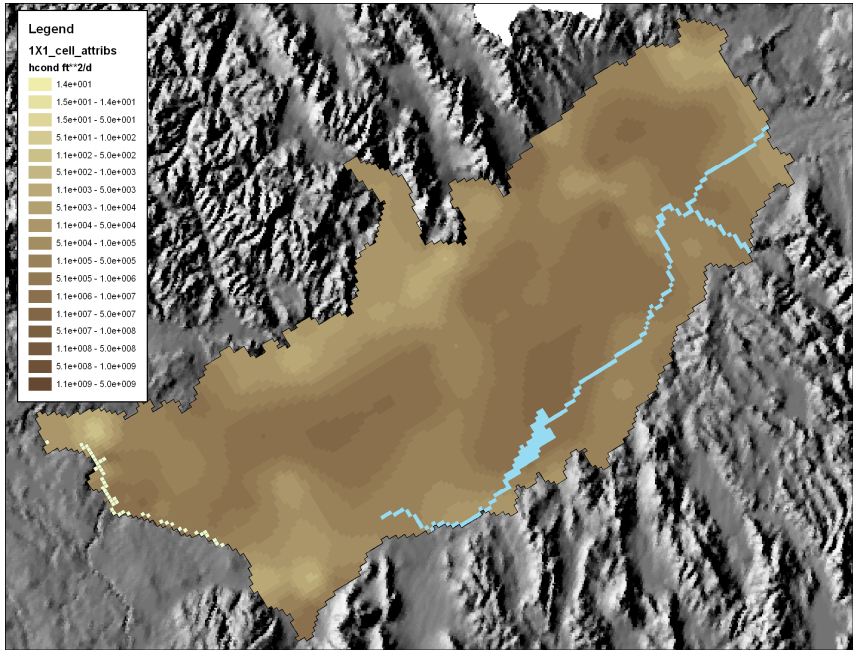
2008 Reach Gain and Spring Discharge Targets

- 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 3 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
    - Tributary Basin
    - 2 – 0.5

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 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
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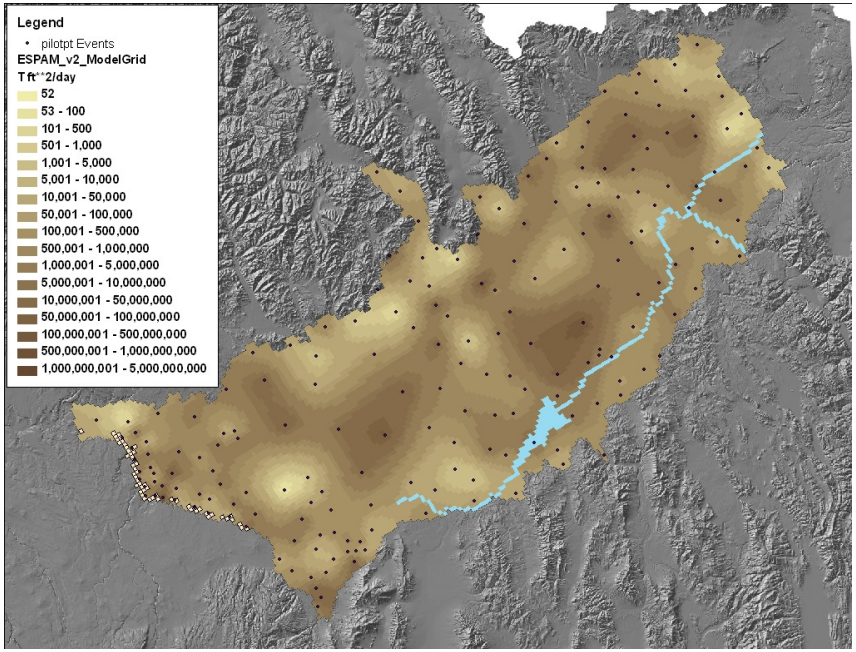
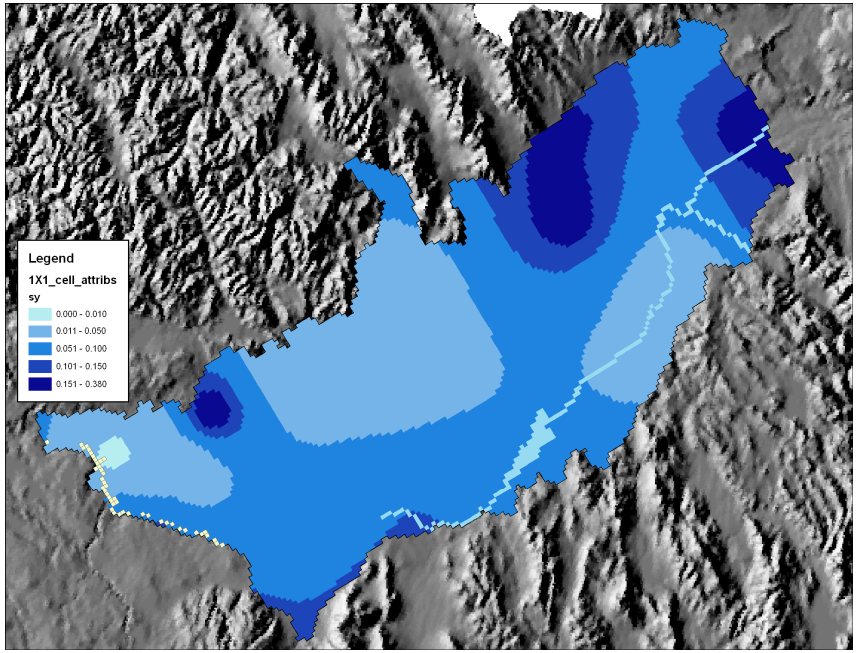
1.1e+009 - 5.0e+009


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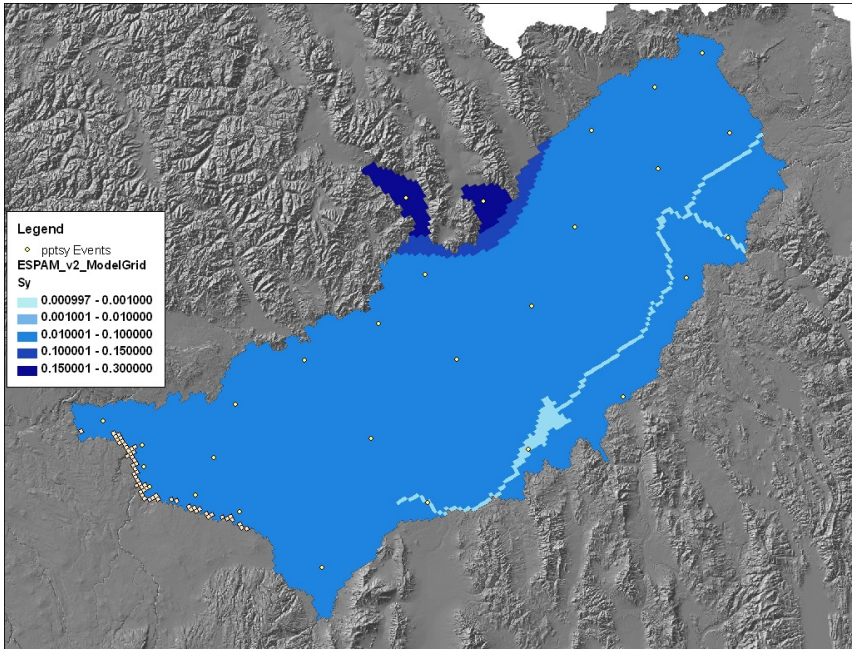
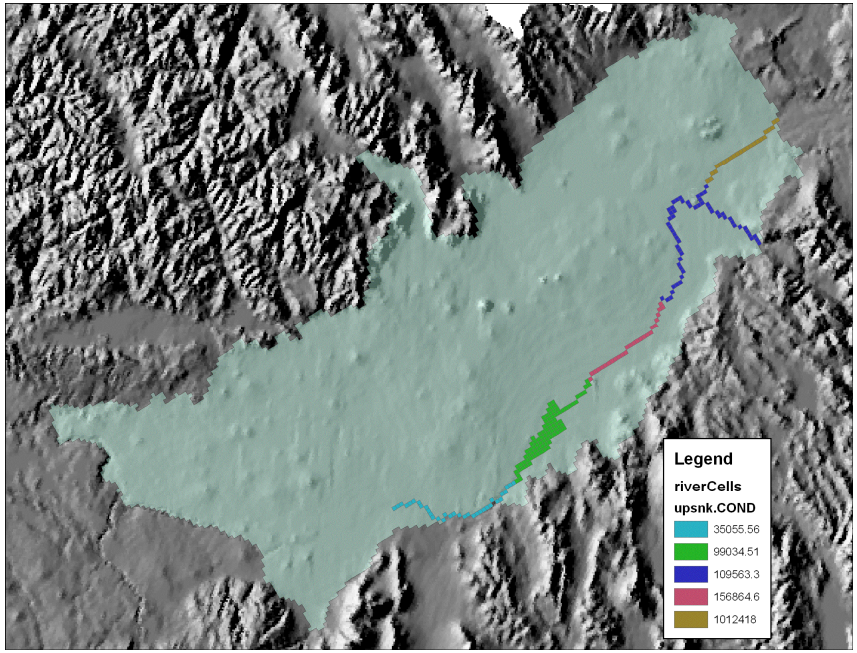
0.011 - 0.050
0.051 - 0.100
0.101 - 0.150
0.151 - 0.380


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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riverCells
upsnk.COND
35055.56
99034.51
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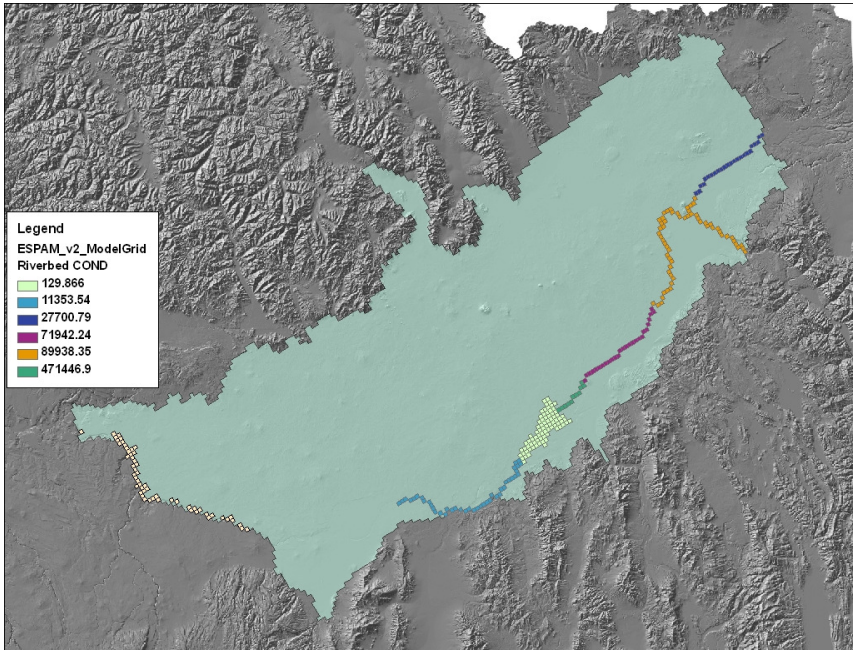
Legend
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Riverbed COND
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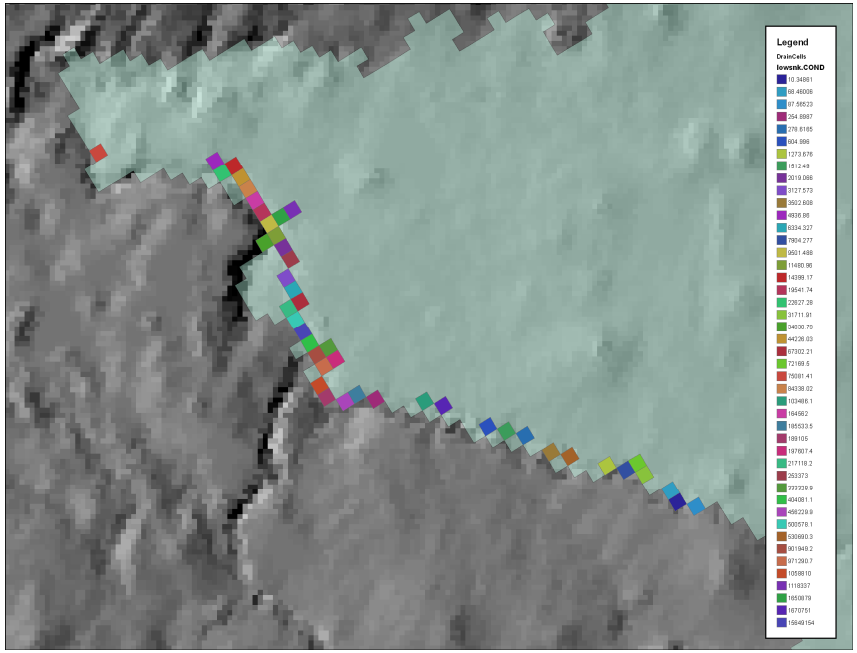
V 1.1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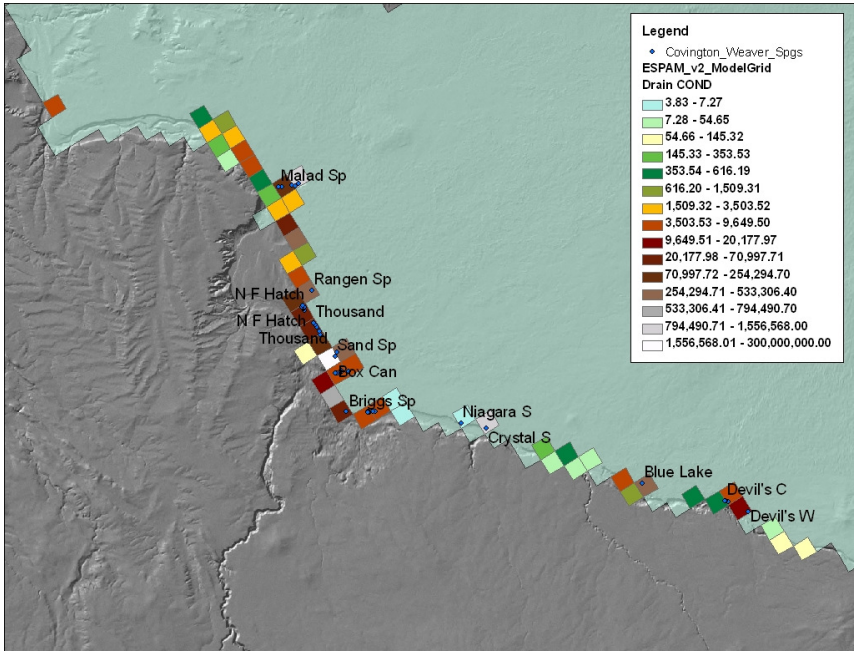
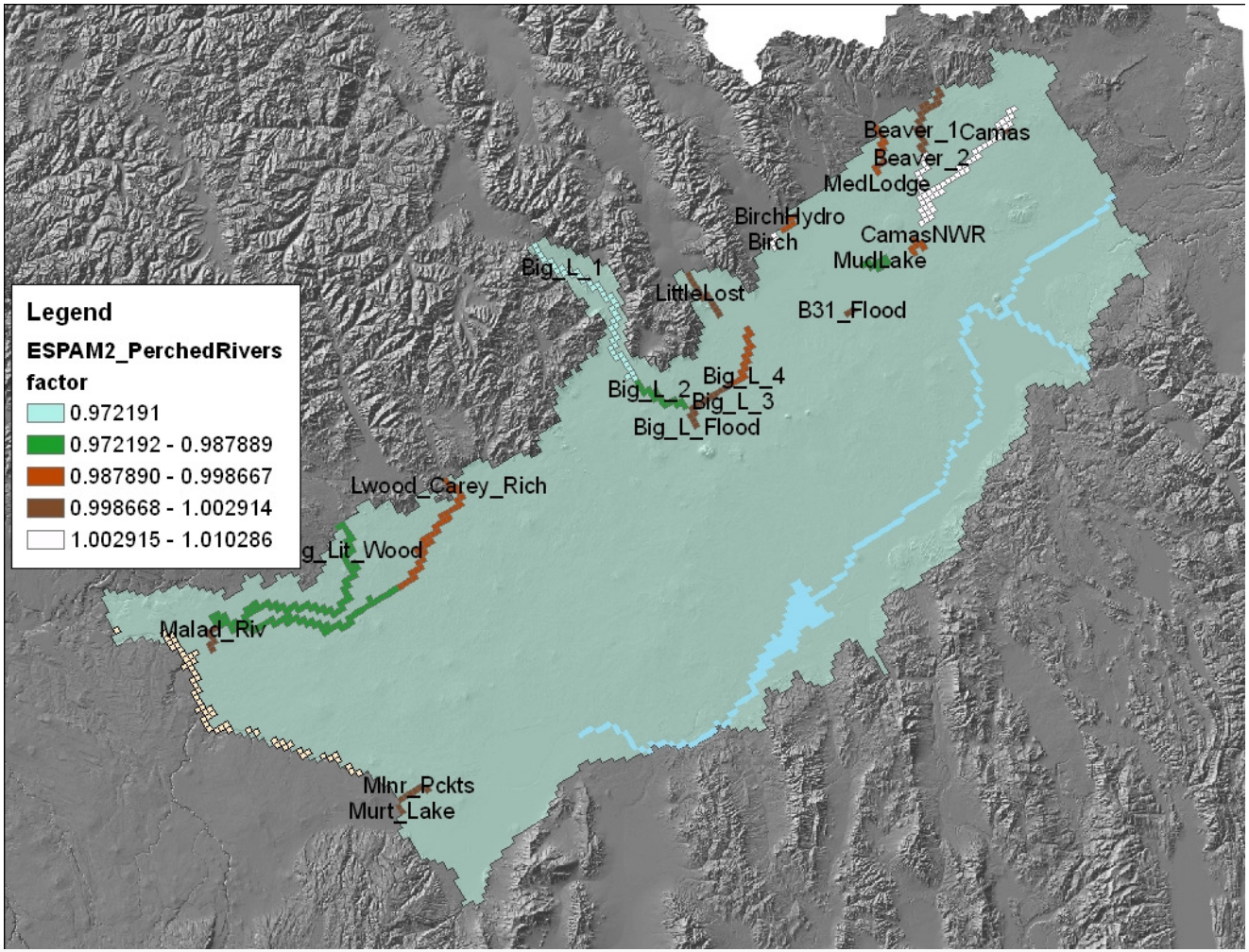
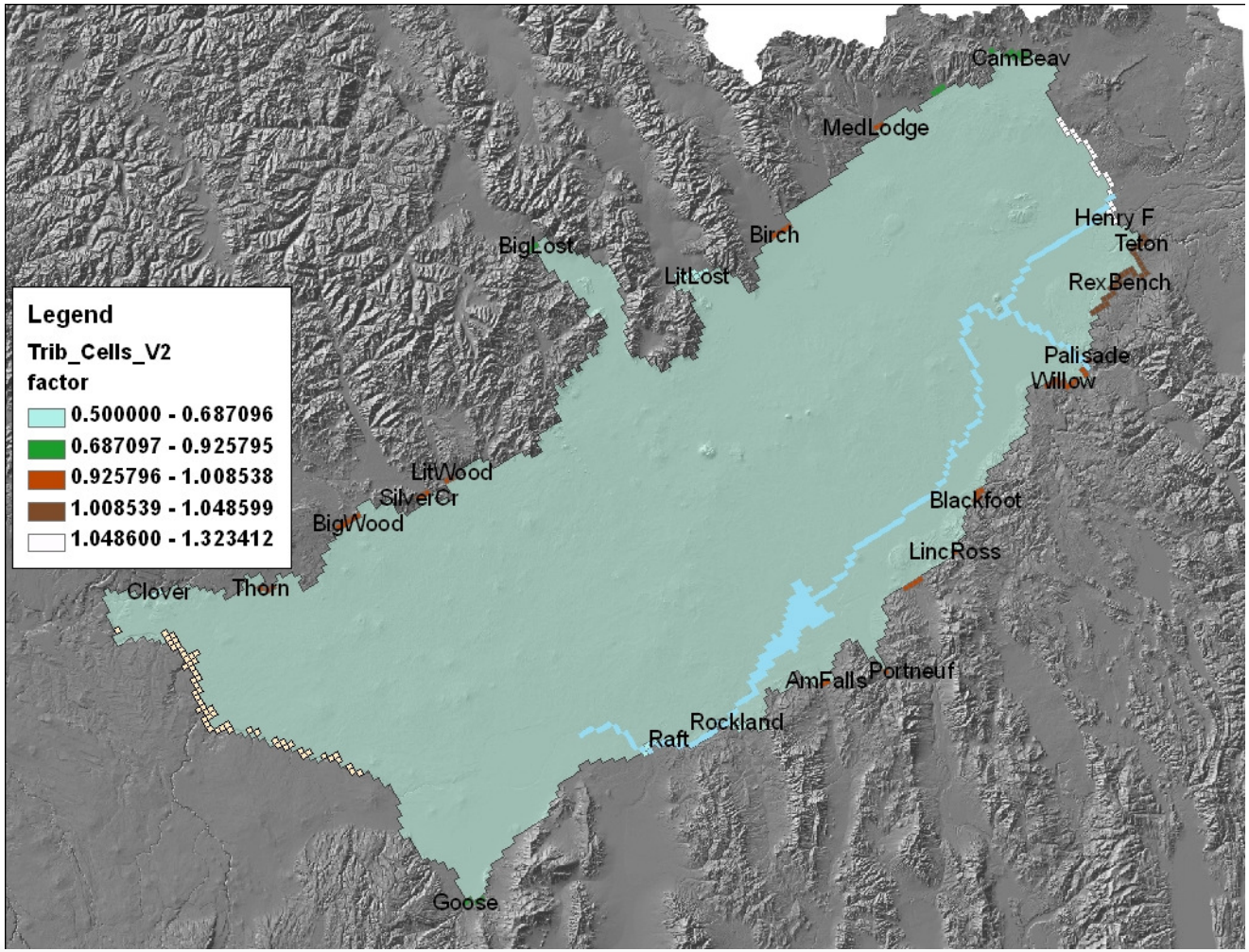
DrainCells
lowsnk.COND


Legend
Covington_Weaver_Spgs
ESPAM_v2_ModelGrid
Drain COND
3.83 - 7.27
7.28 - 54.65
54.66 - 145.32
145.33 - 353.53
353.54 - 616.19
616.20 - 1,509.31
1,509.32 - 3,503.52
3,503.53 - 9,649.50
9,649.51 - 20,177.97
20,177.98 - 70,997.71
70,997.72 - 254,294.70
254,294.71 - 533,306.40
533,306.41 - 794,490.70
794,490.71 - 1,556,568.00
1,556,568.01 - 300,000,000.00
Malad Sp
Rangen Sp
N F Hatch
Thousand
N F Hatch
Thousand
Sand Sp
Box Can
Briggs Sp
Niagara S
Crystal S
Blue Lake
Devil's C
Devil's W

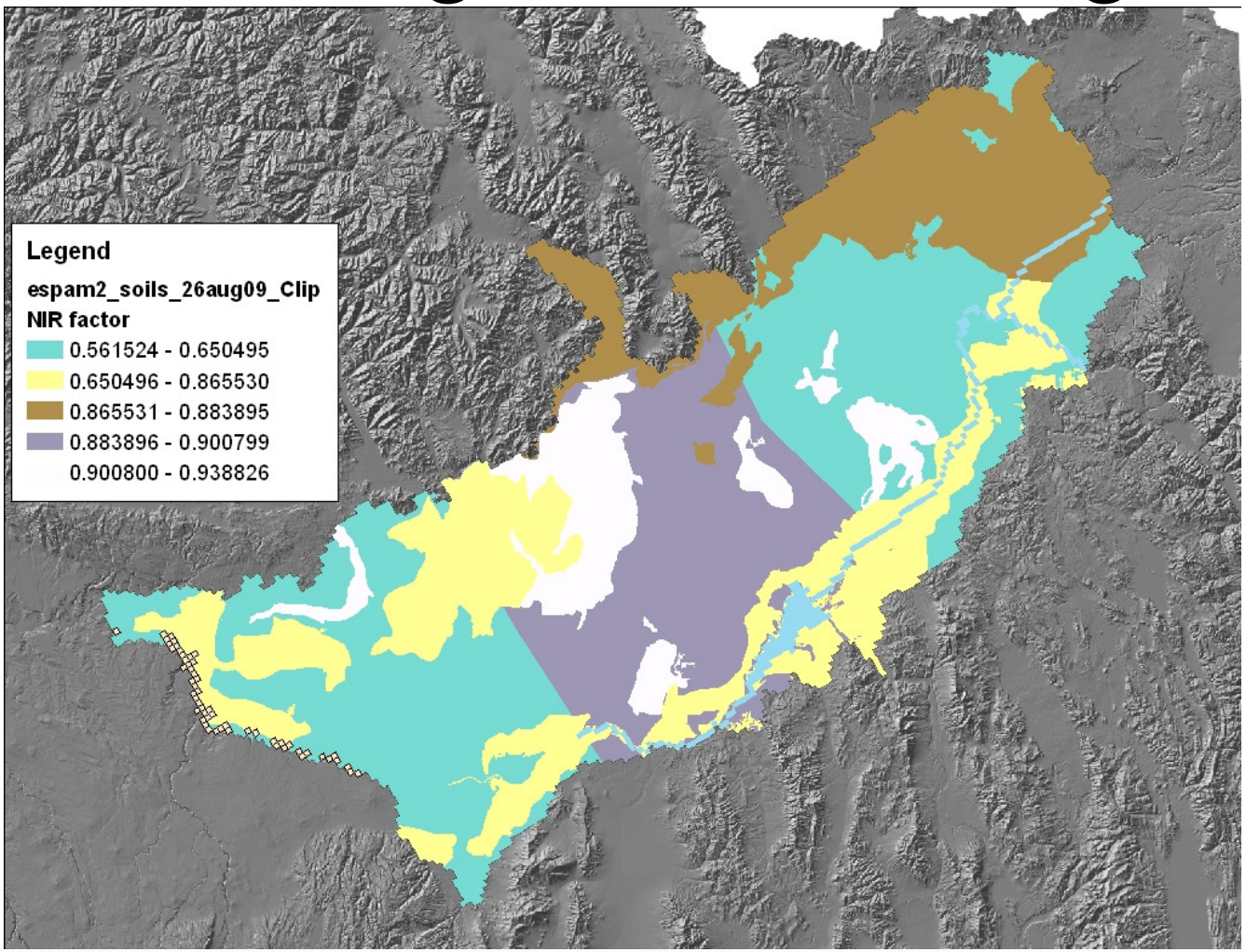
Perched River Seepage



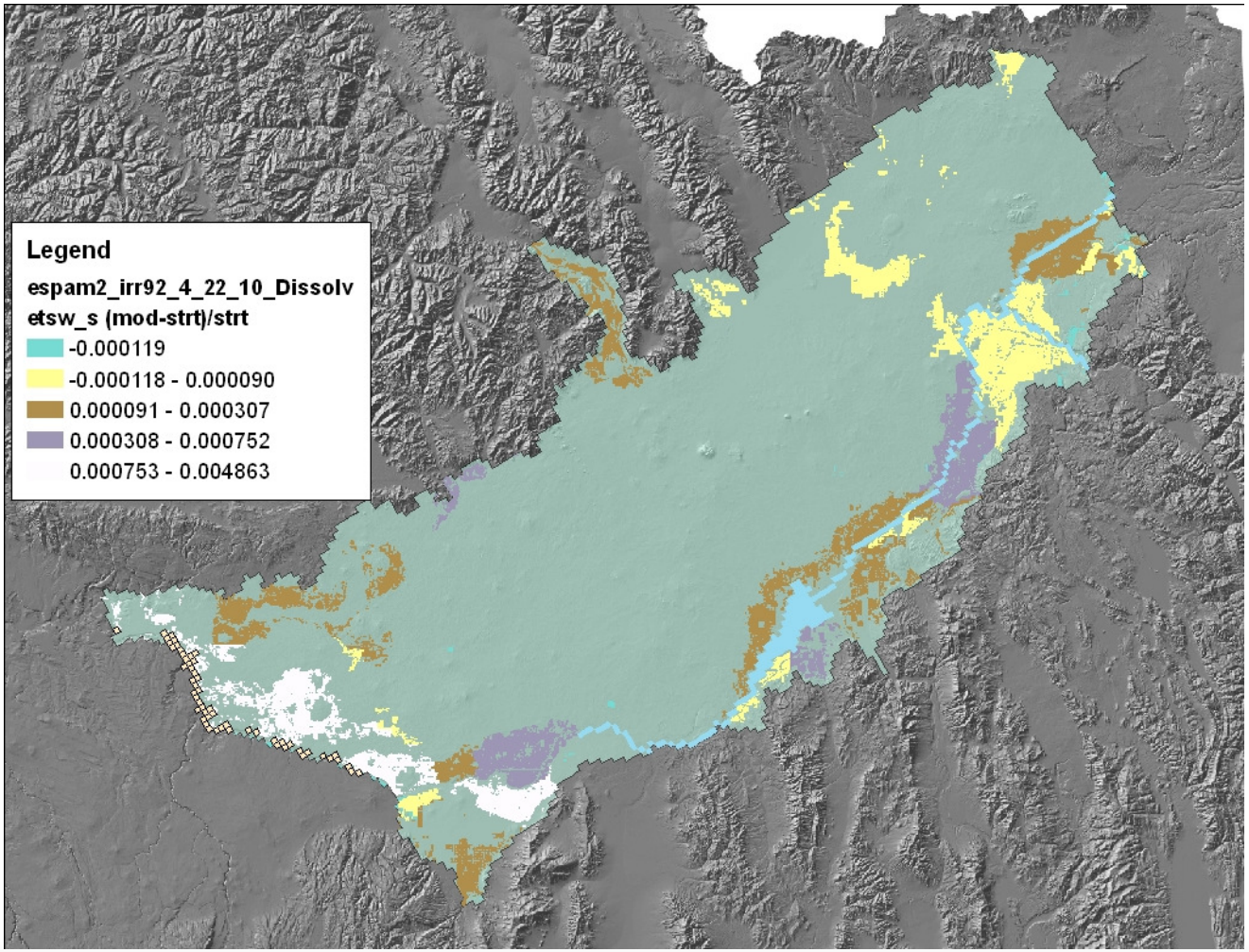
Tributary Underflow



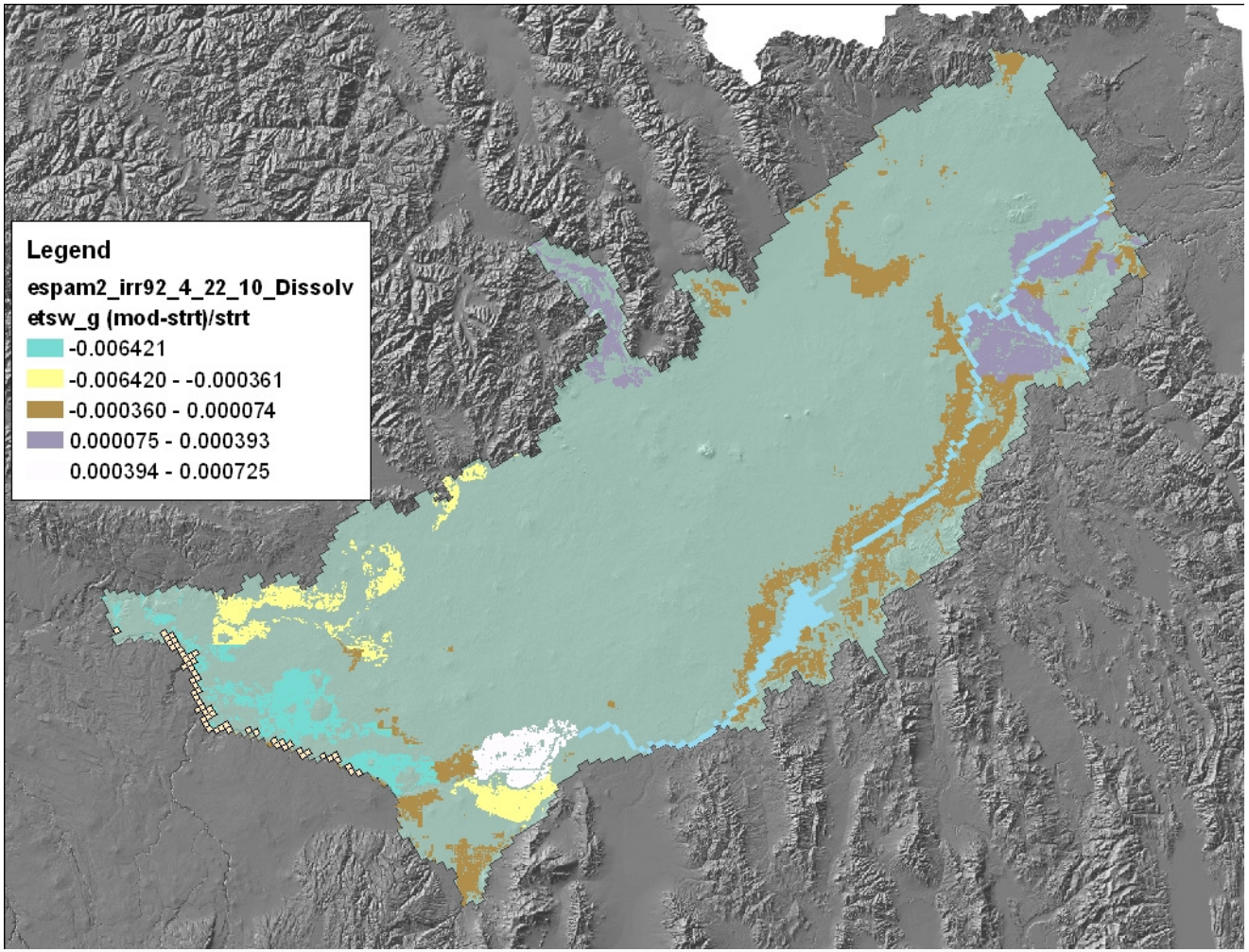
Non-irrigated Recharge



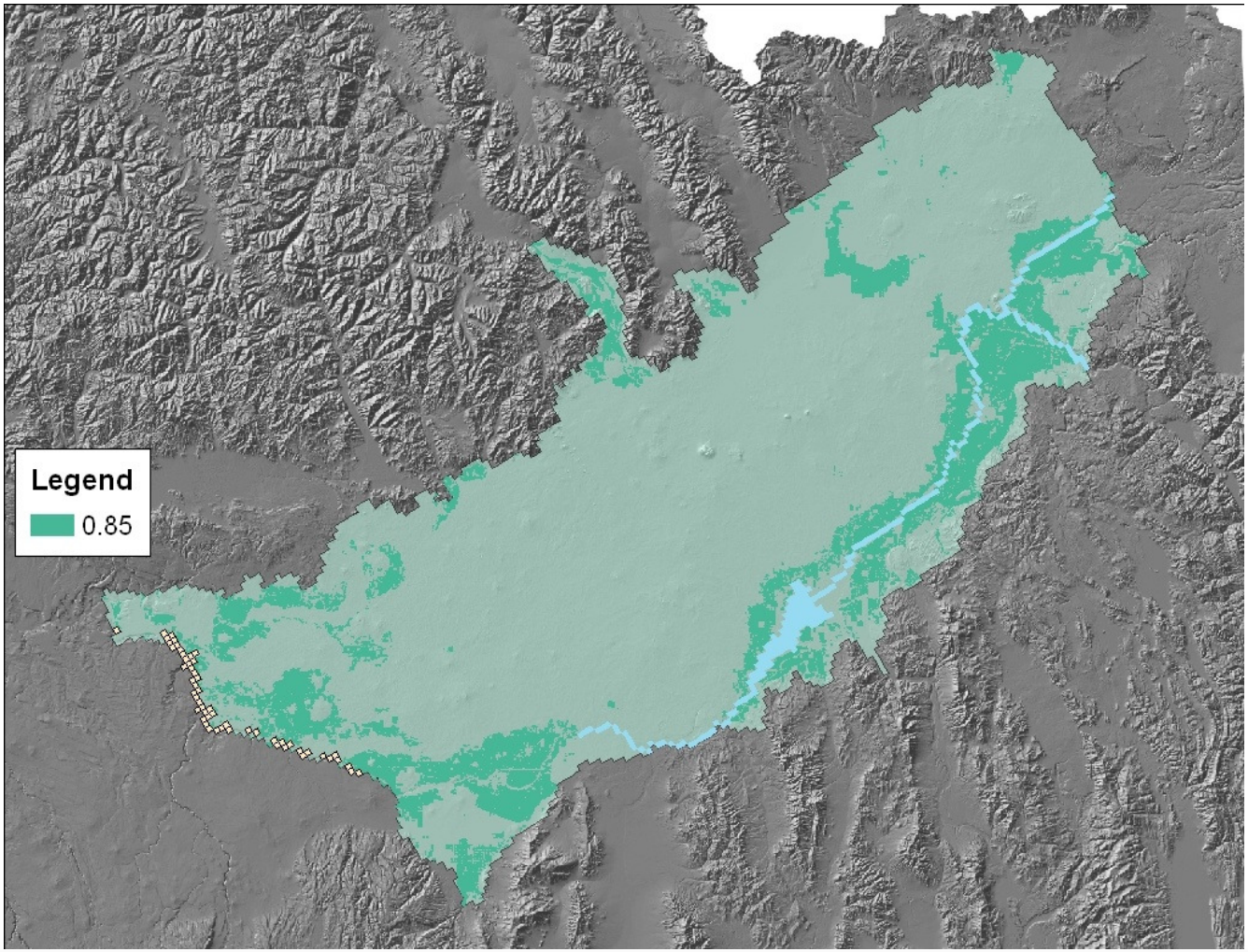
ET Surface Water Sprinkler



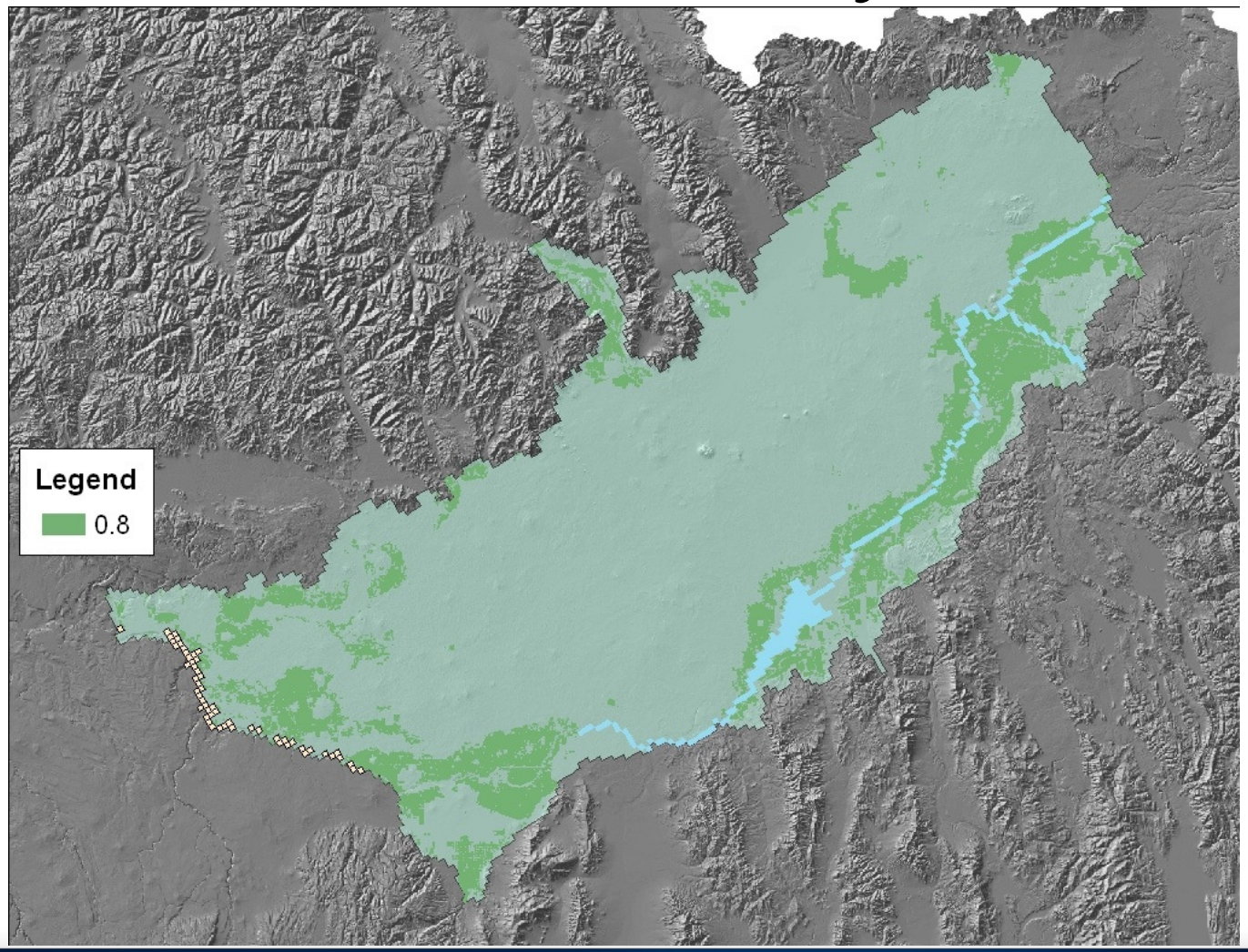
ET Surface Water Gravity

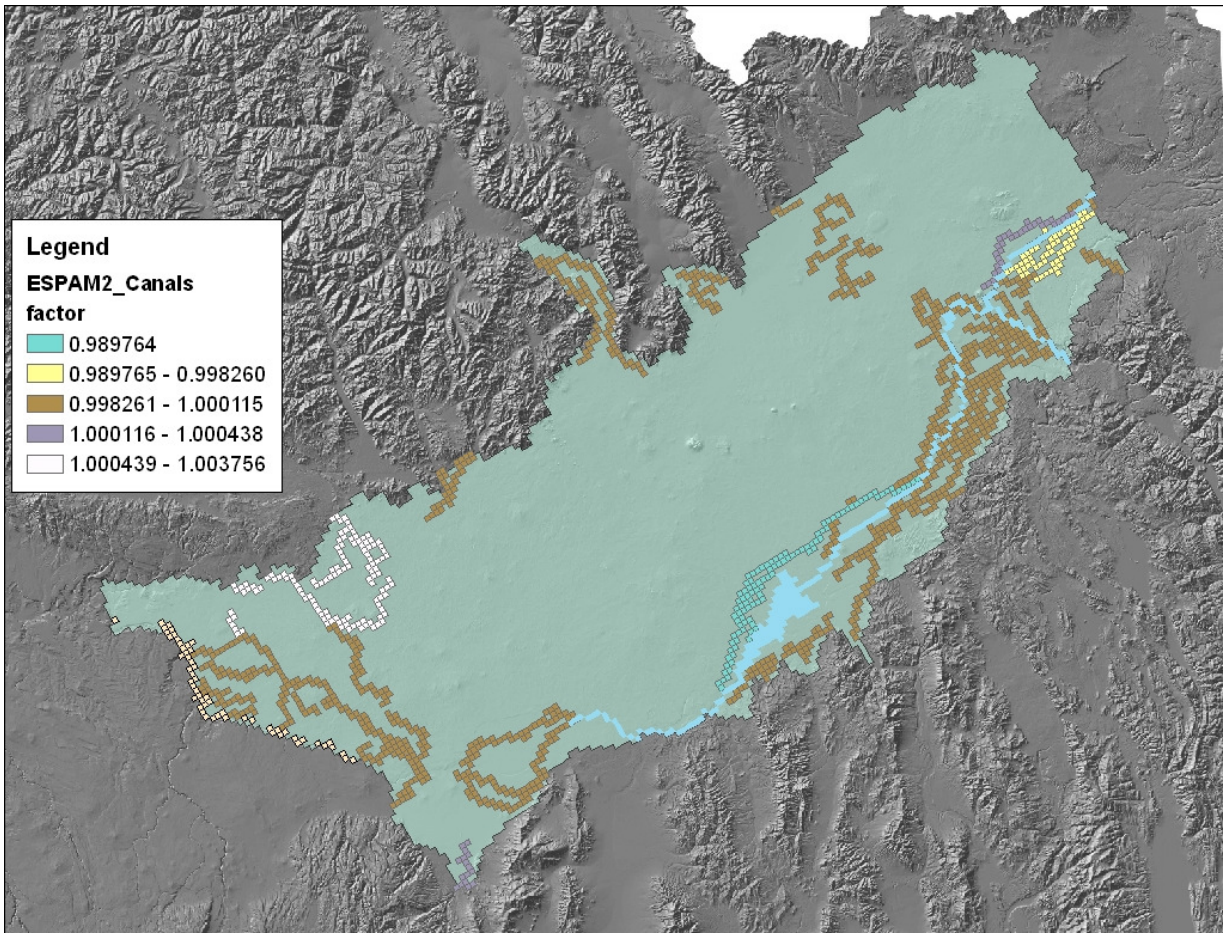


Surface Water Sprinkler Efficiency

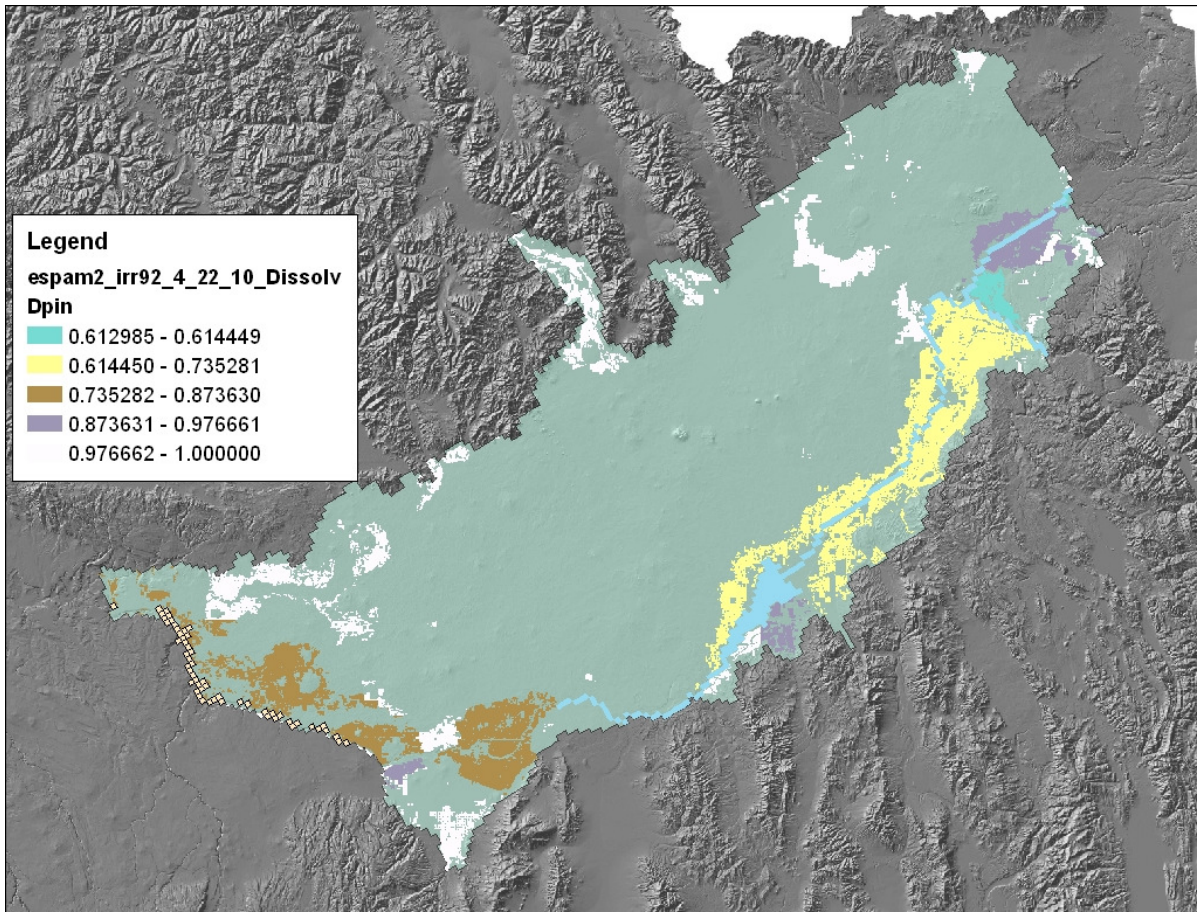


Surface Water Gravity Efficiency

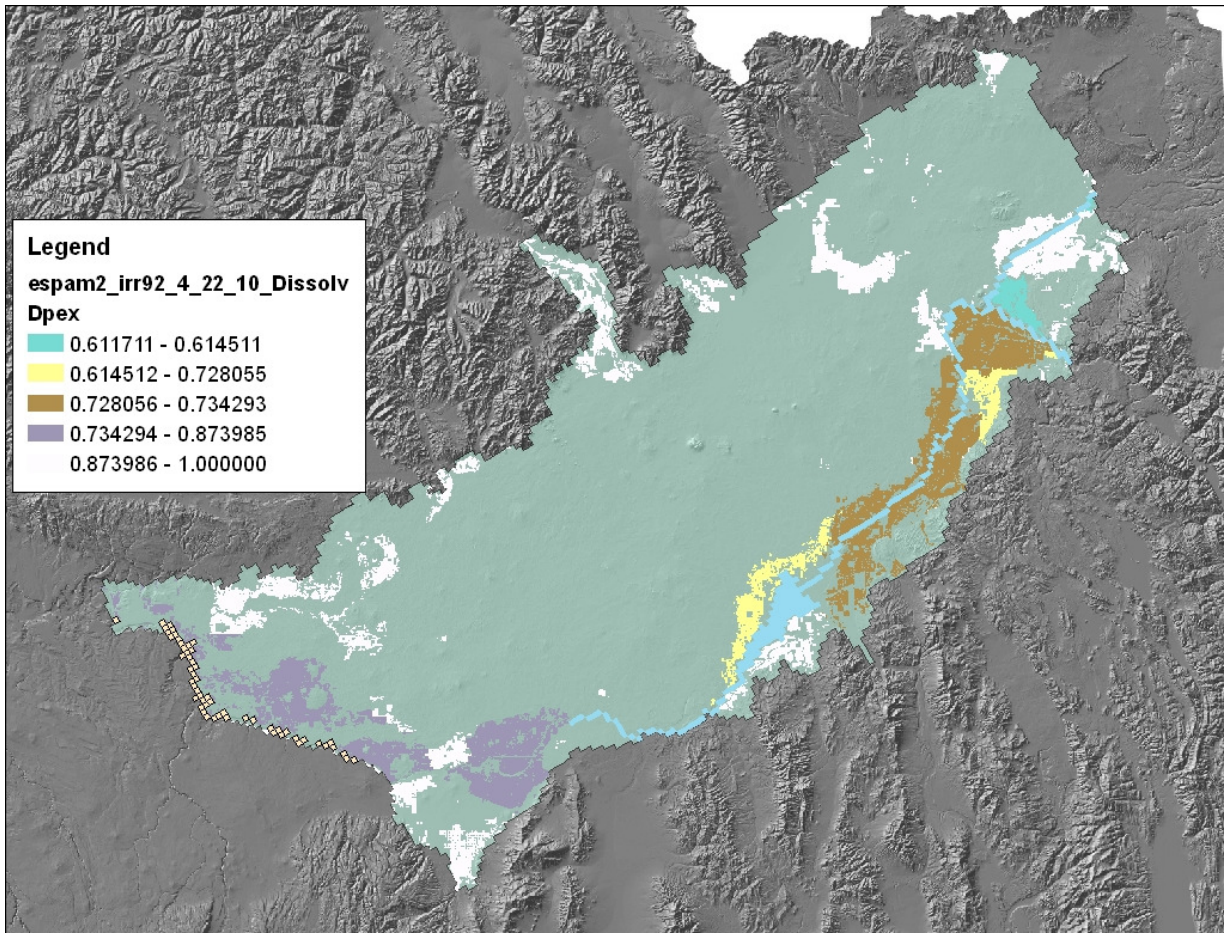




- Canal Seepage
  - CNL fraction * .DIV diversions
  - PEST only allowed to adjust non-coalition entities +/- 5%

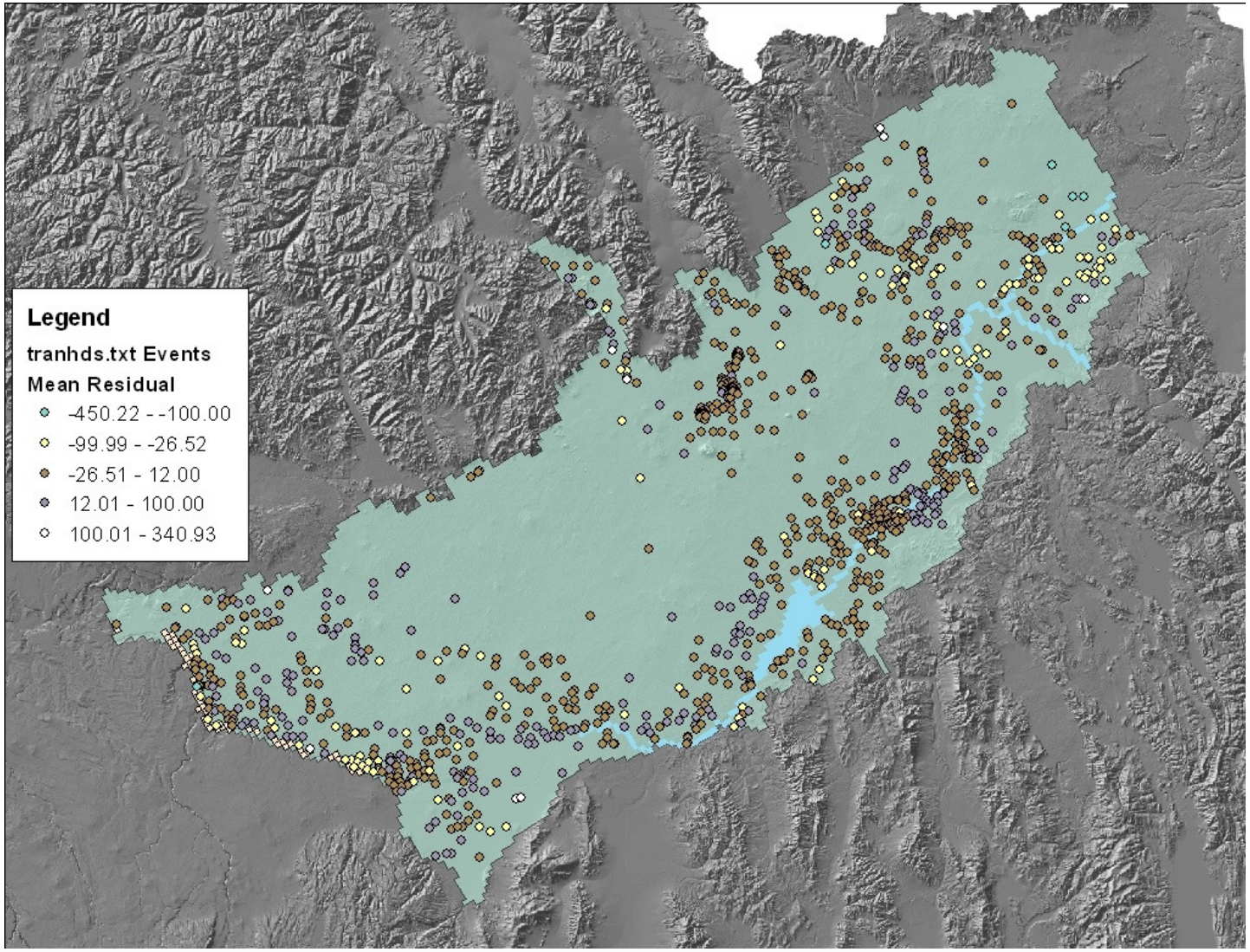


- DPin
  - fraction of the initial irrigation loss (1-eff) that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98



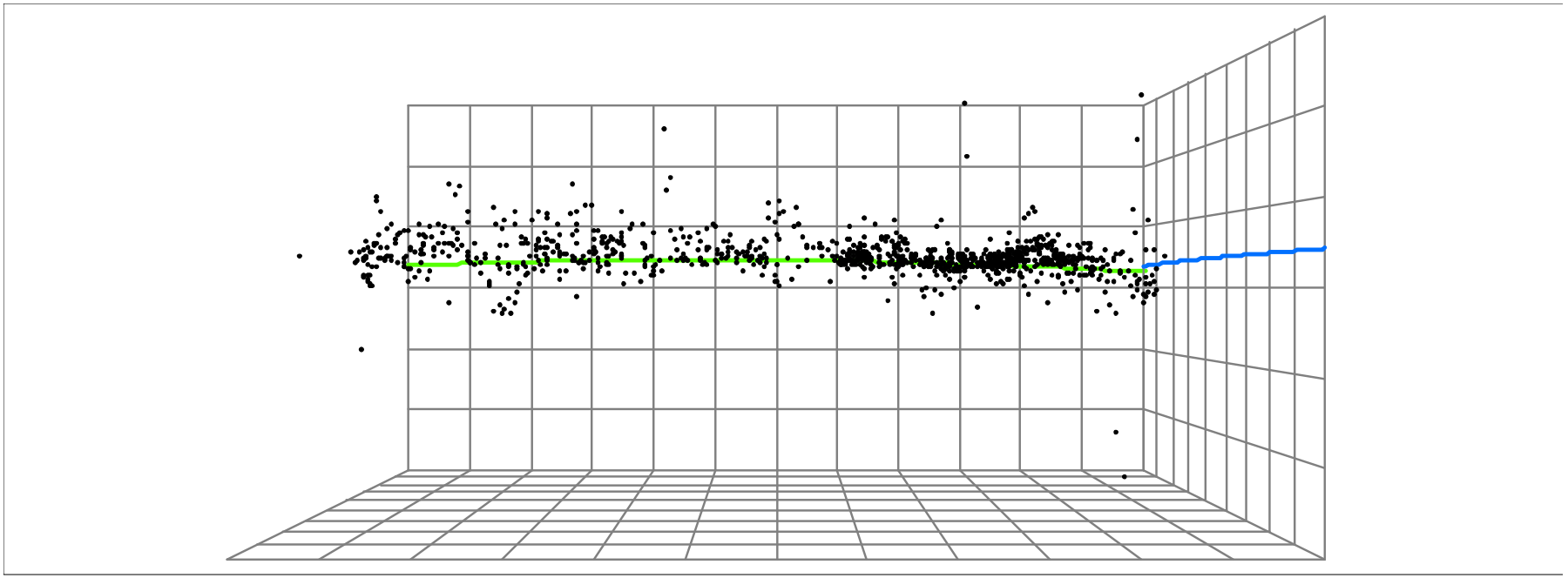
- DPex
  - fraction of delivery exceeding CIR that percolates below the root zone
  - Fixed at 1.0 for non-Snake entities and some others
  - PEST allowed to adjust between 0.6-0.98

Transient Heads



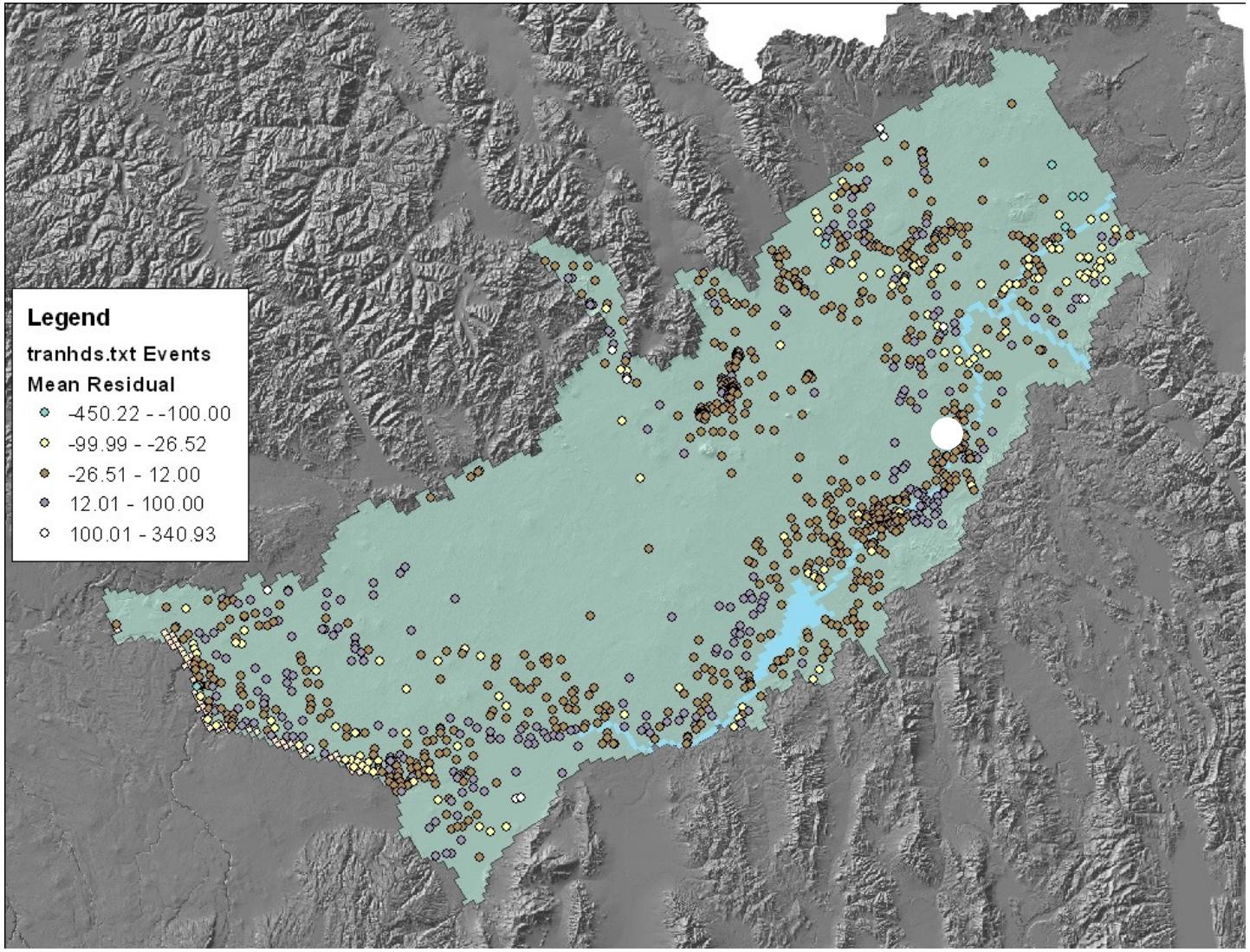
Transient Heads

Trend Analysis



Data Source: tranhds.txt Events Attribute: Mean

Transient Heads



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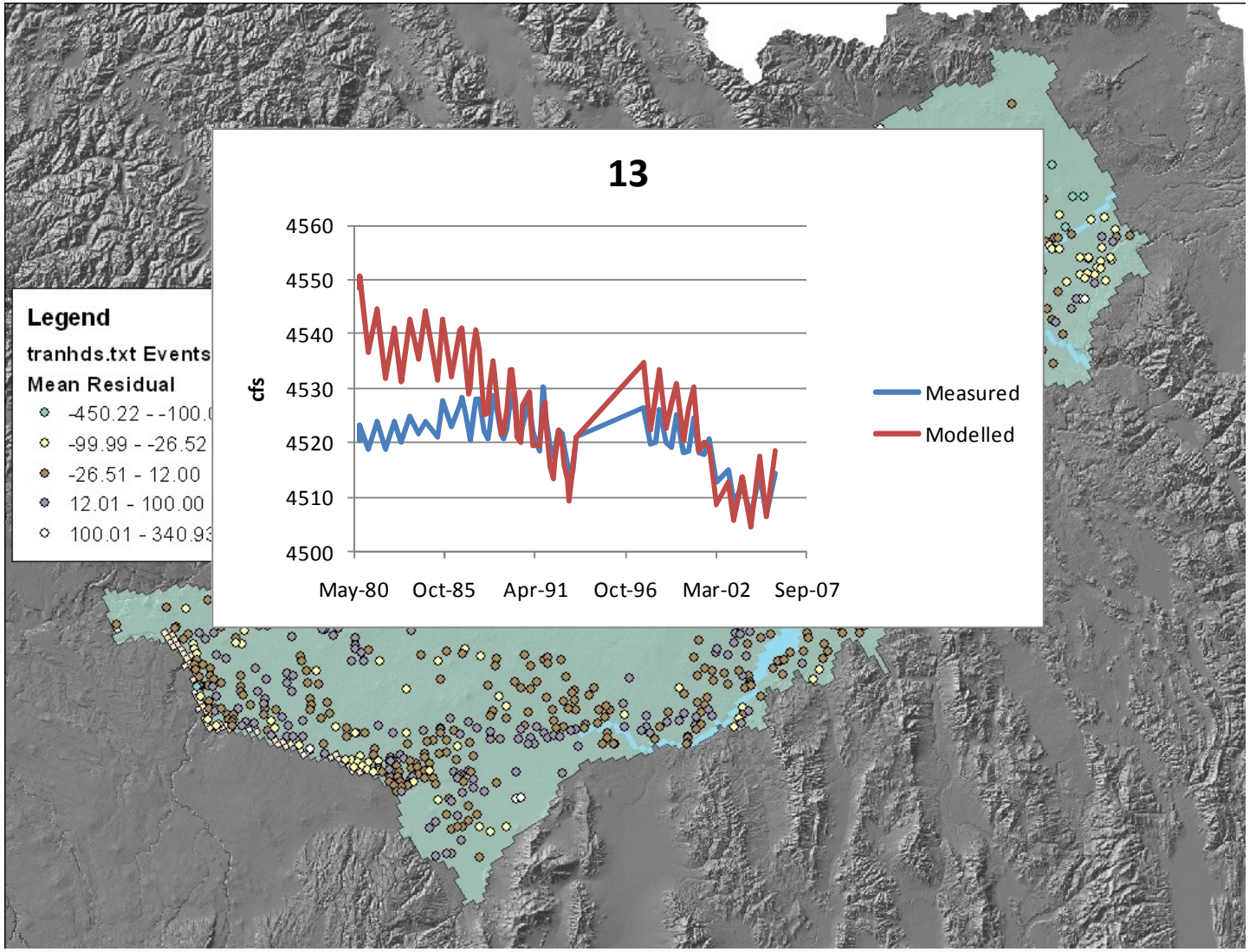

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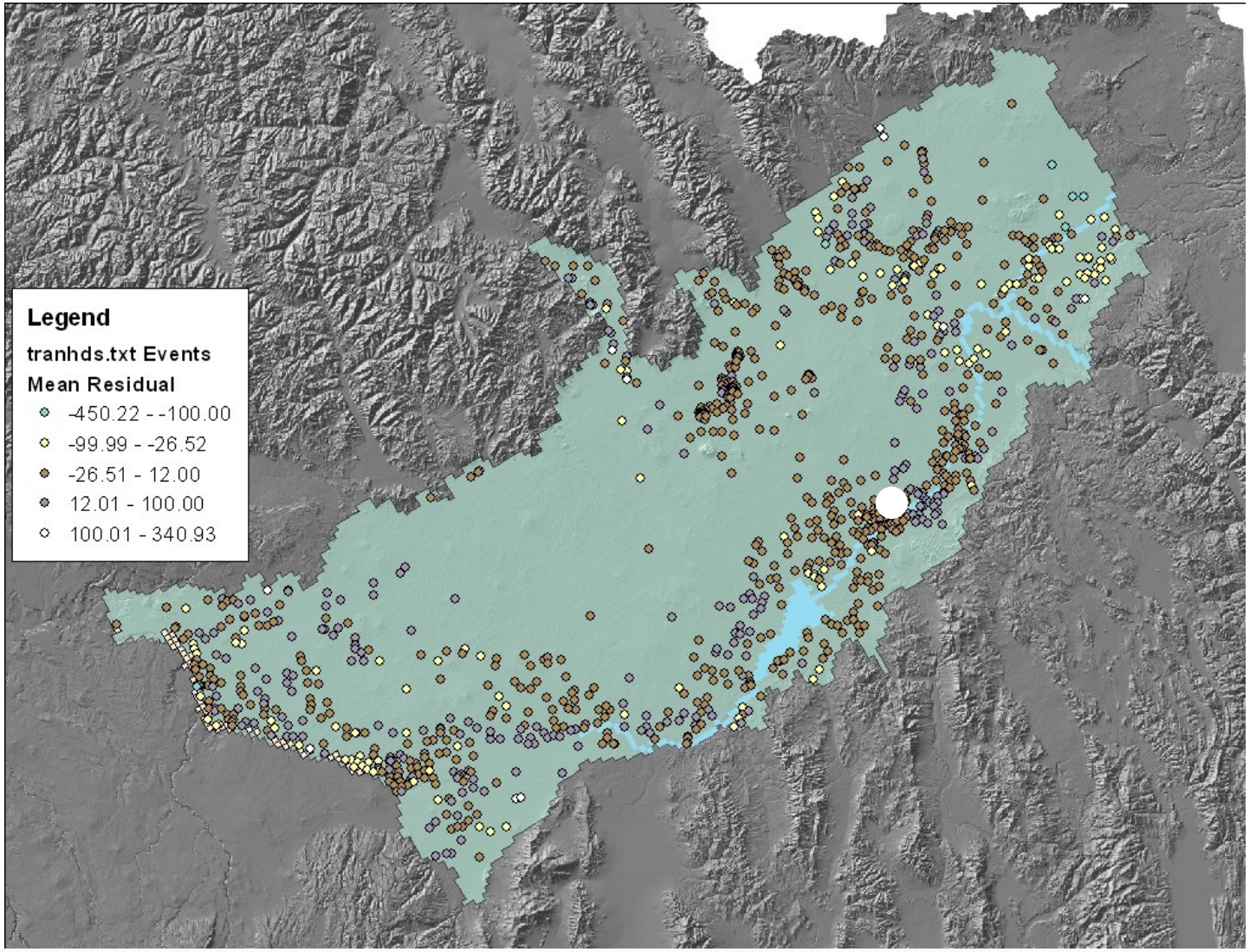

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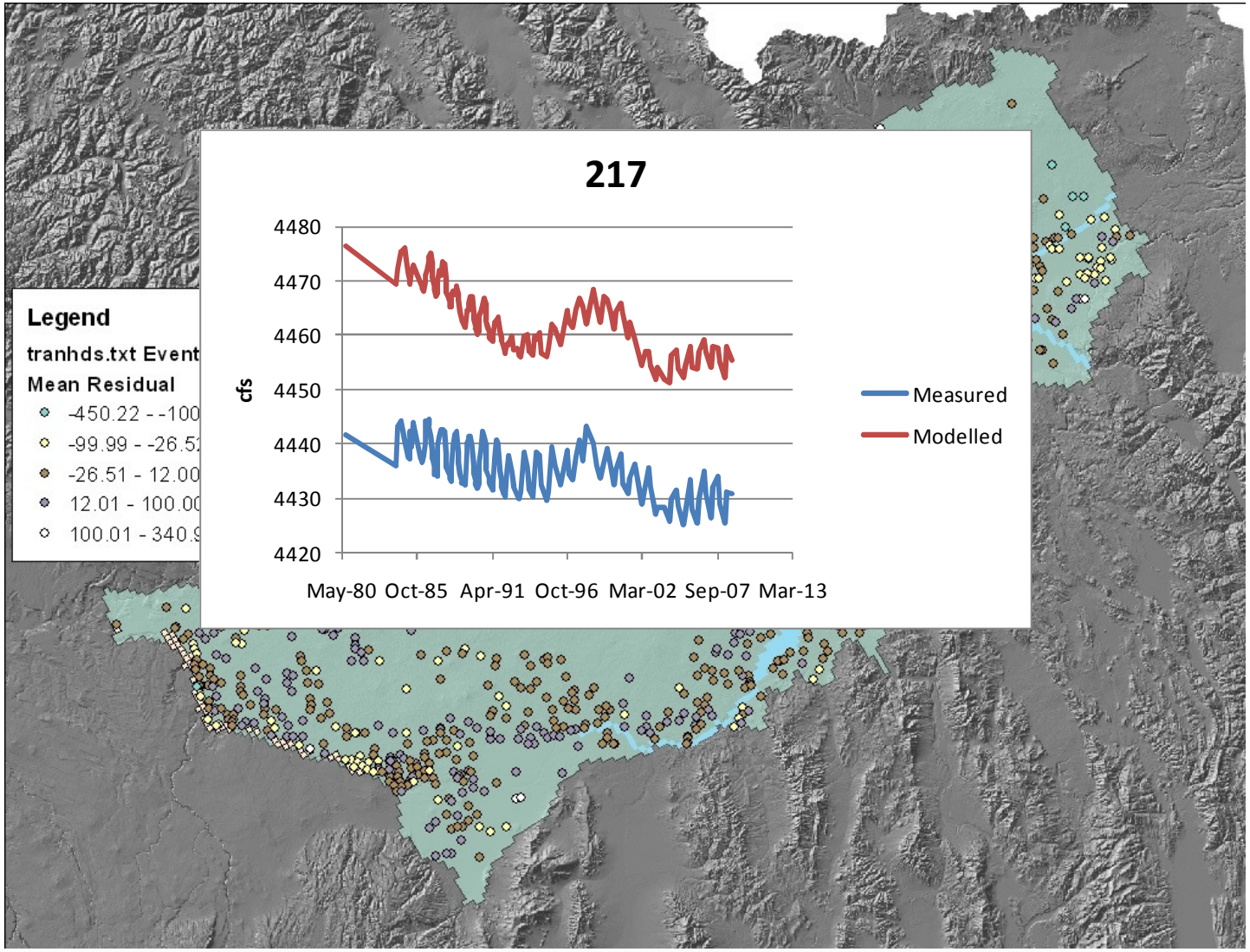

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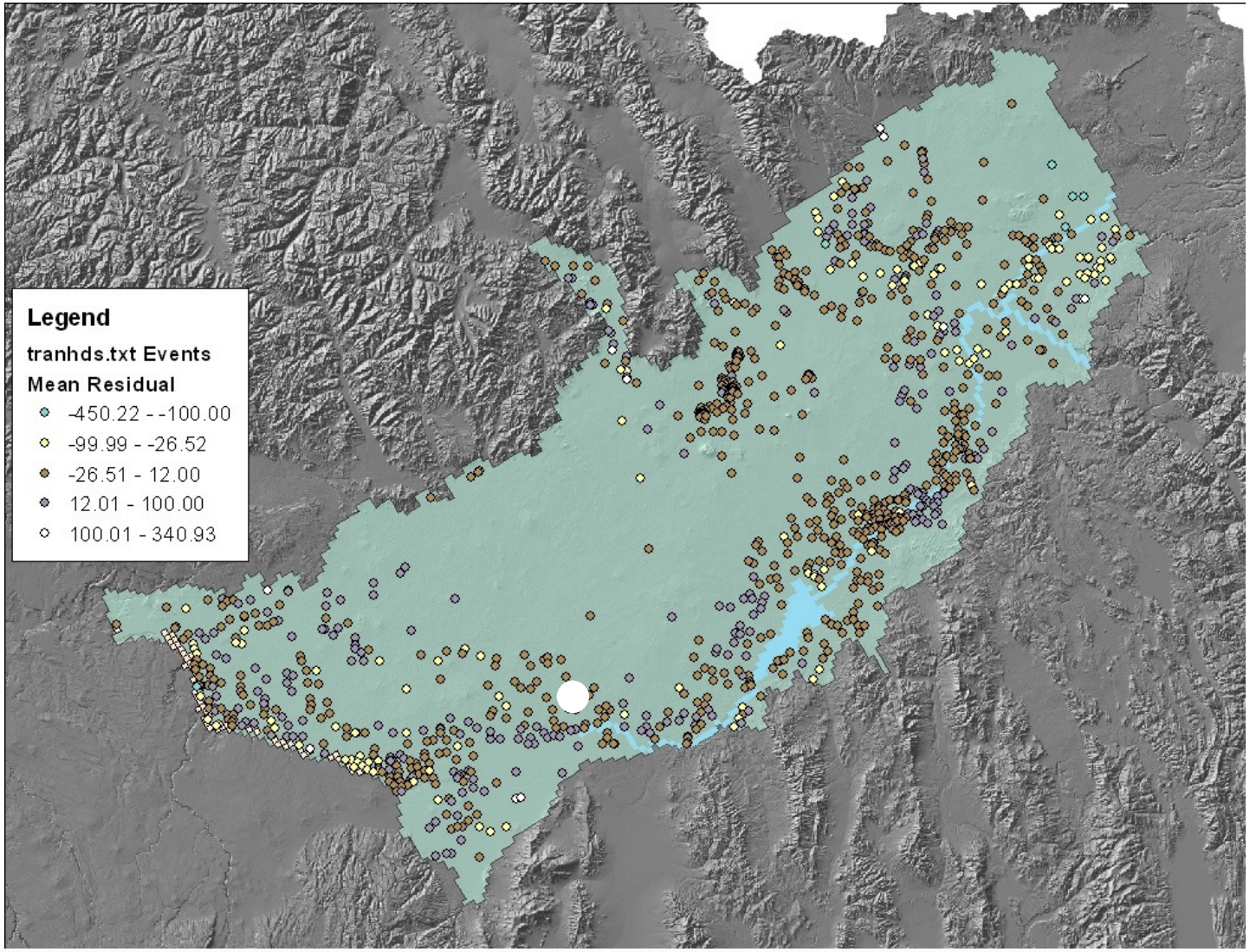

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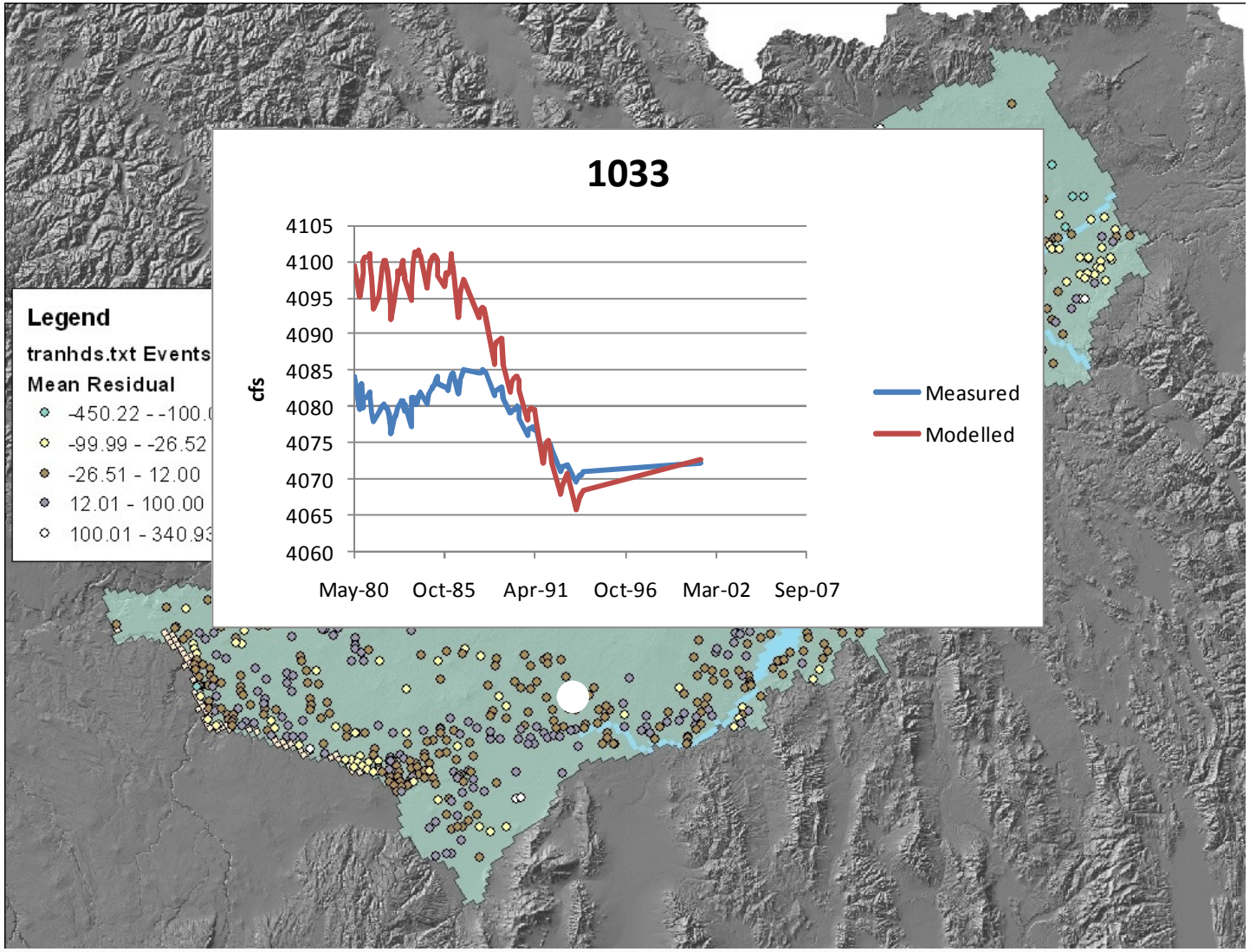

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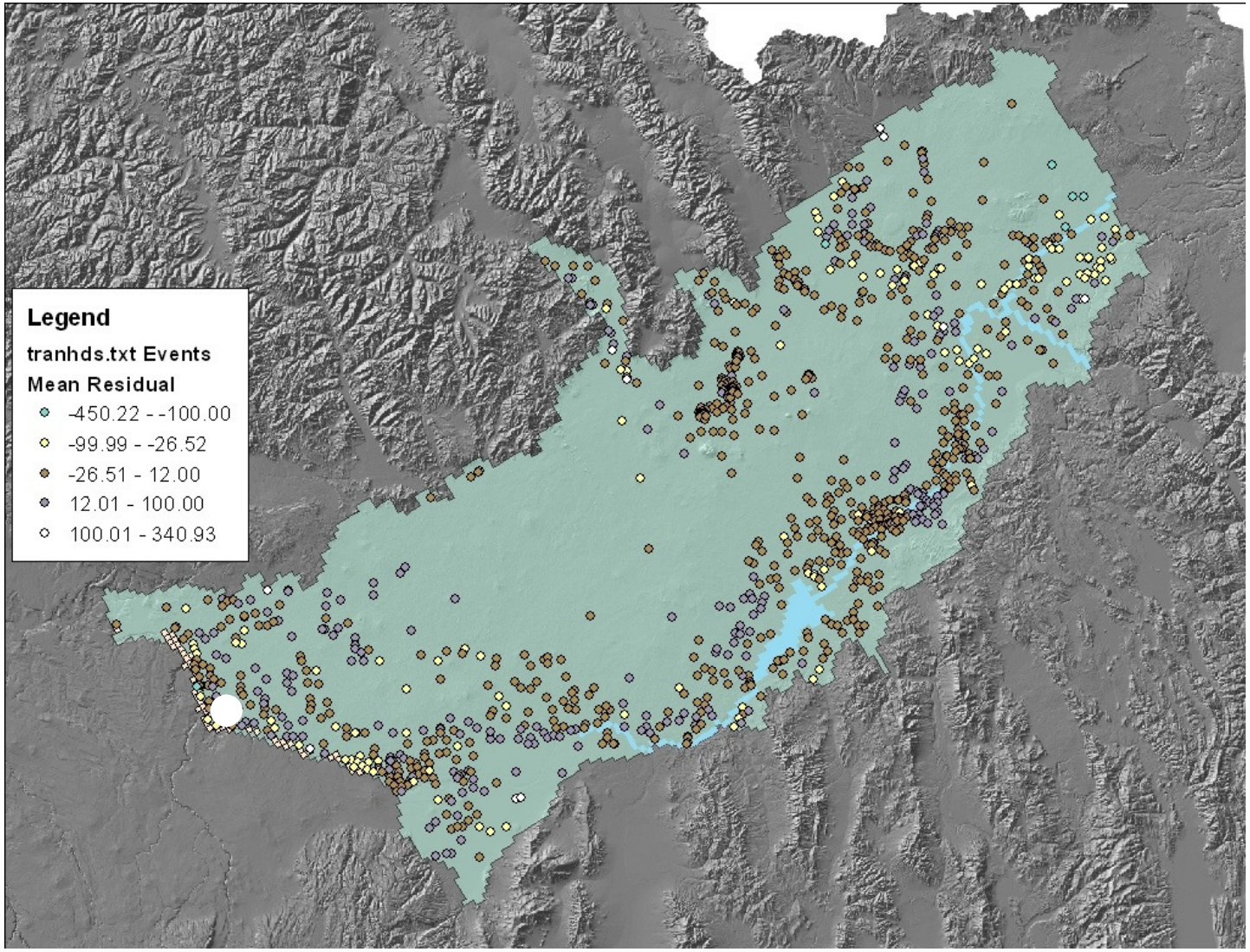

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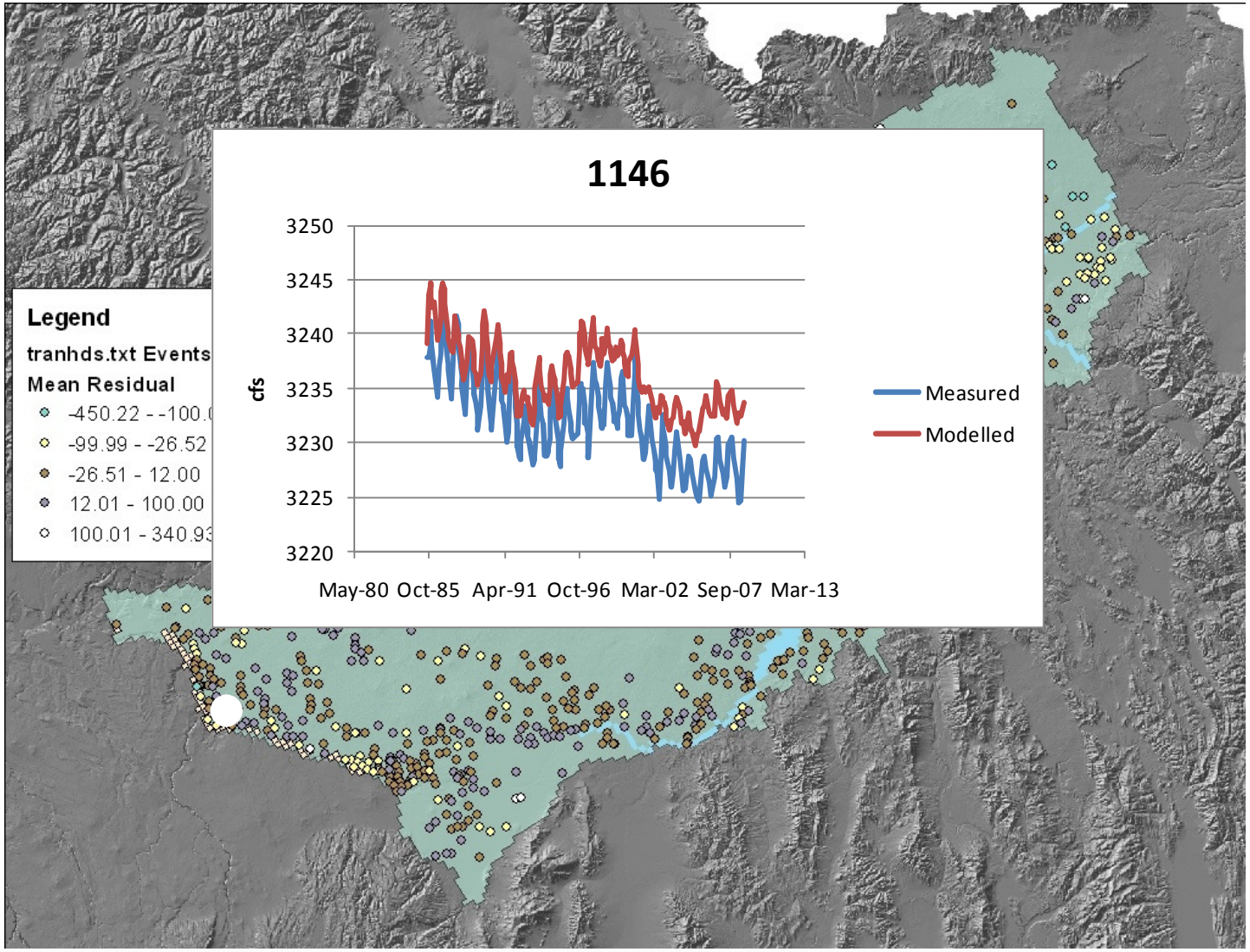

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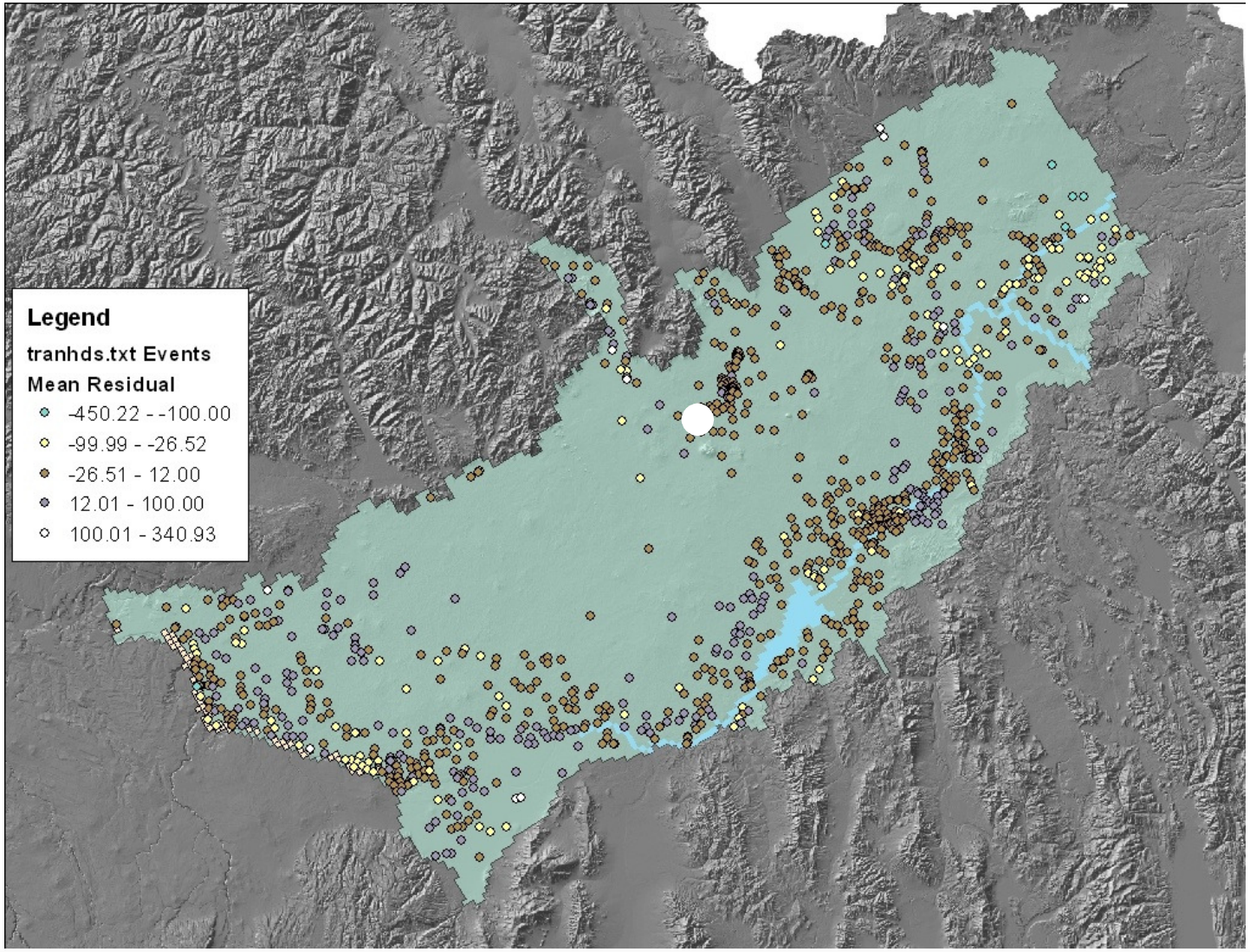

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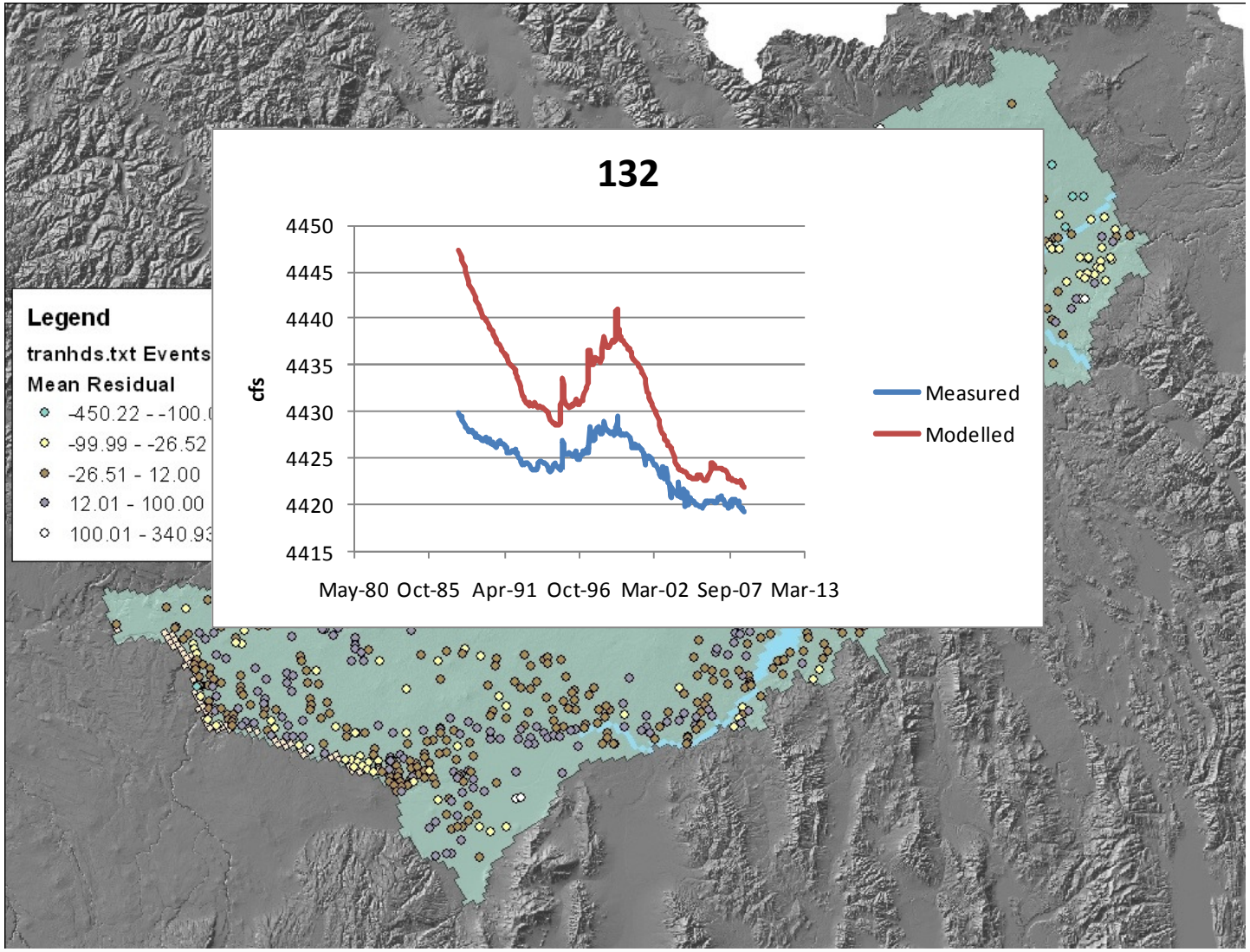

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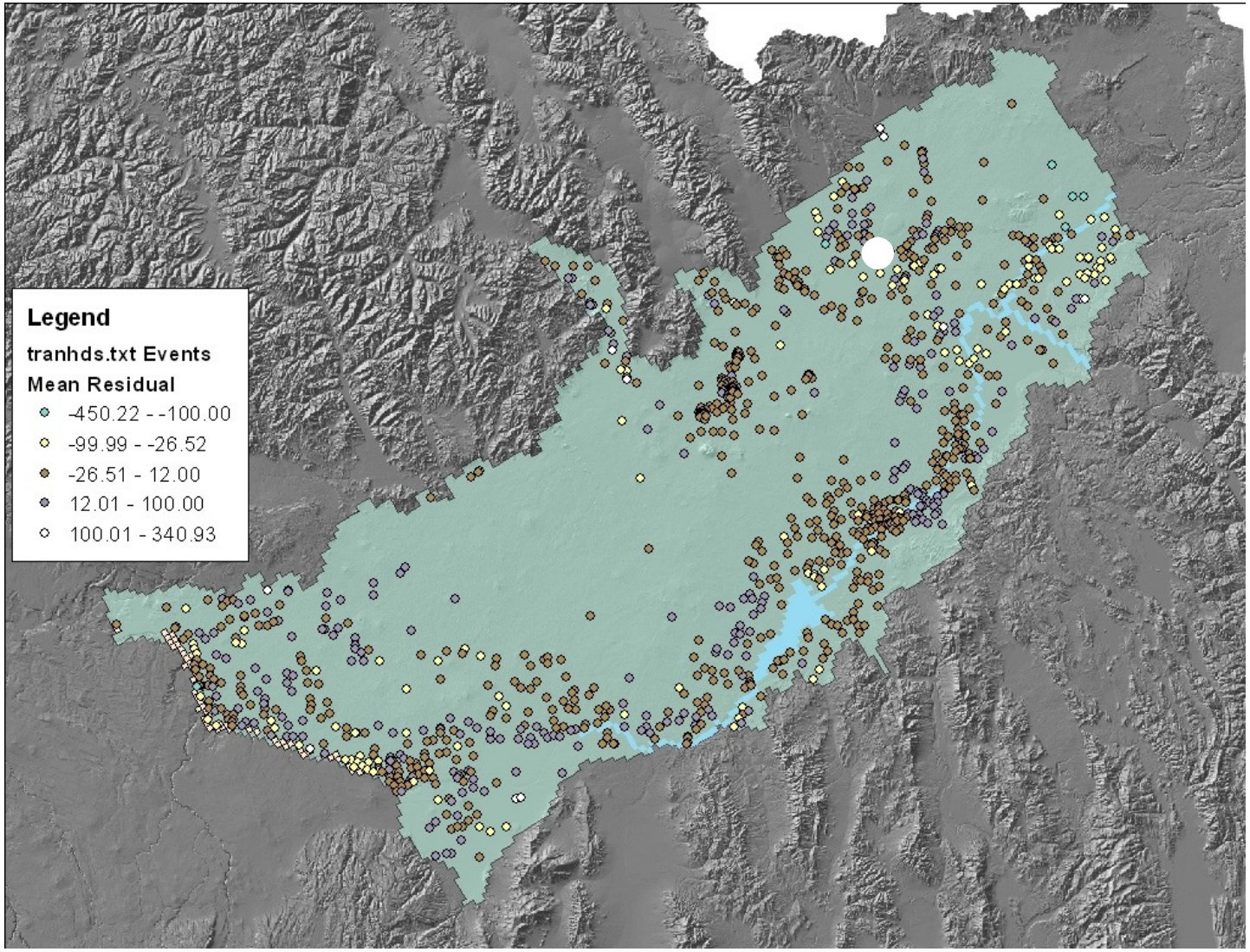

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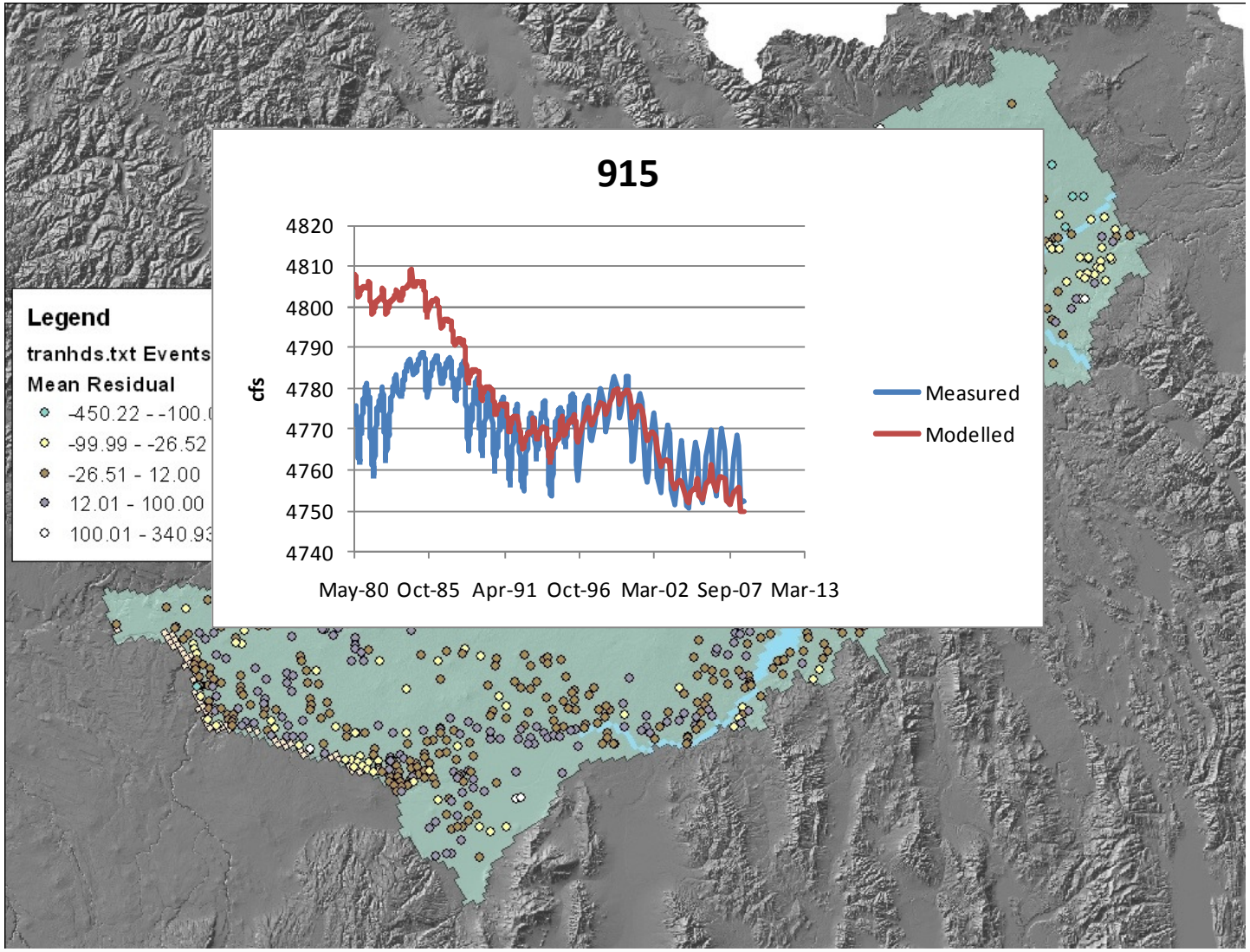

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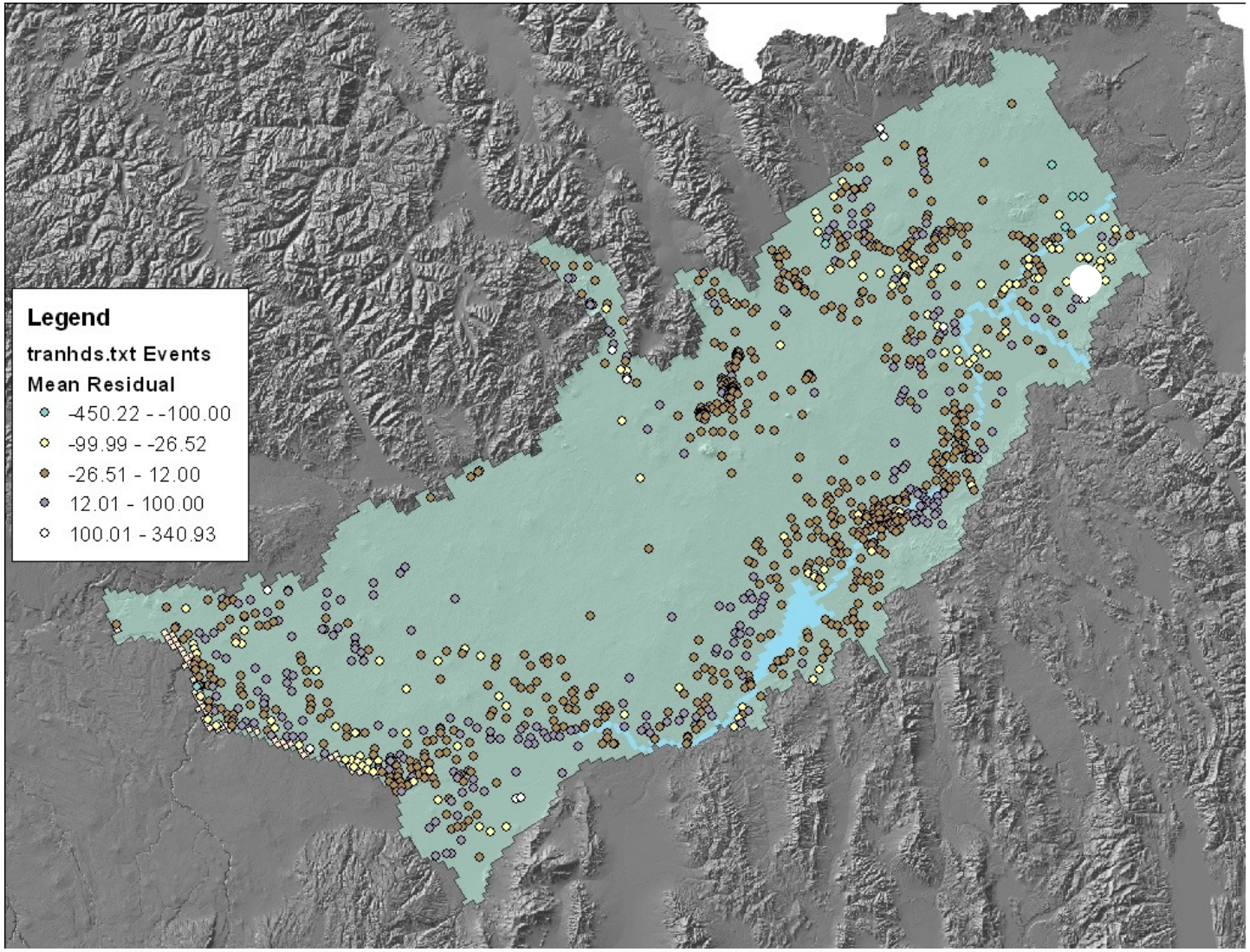

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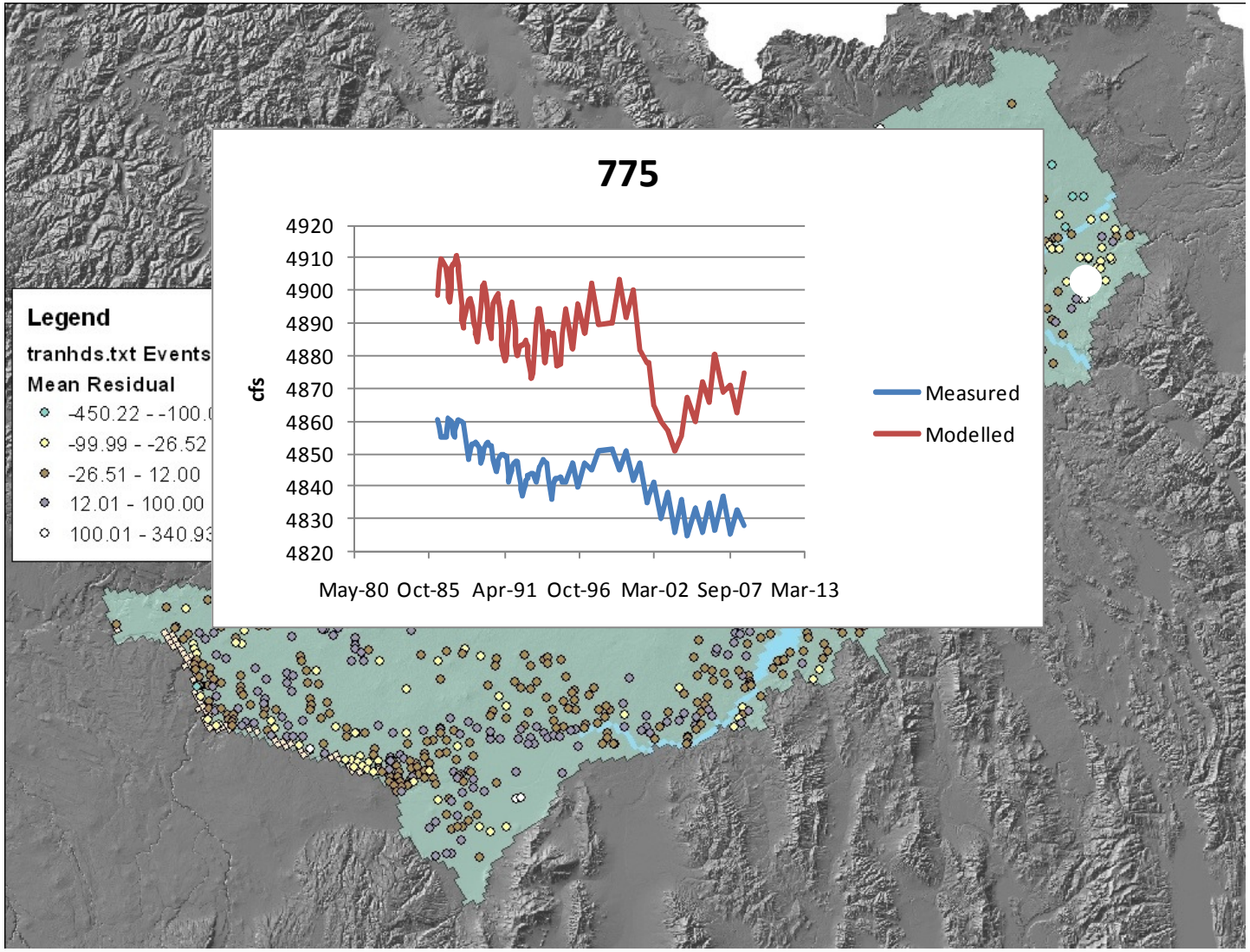

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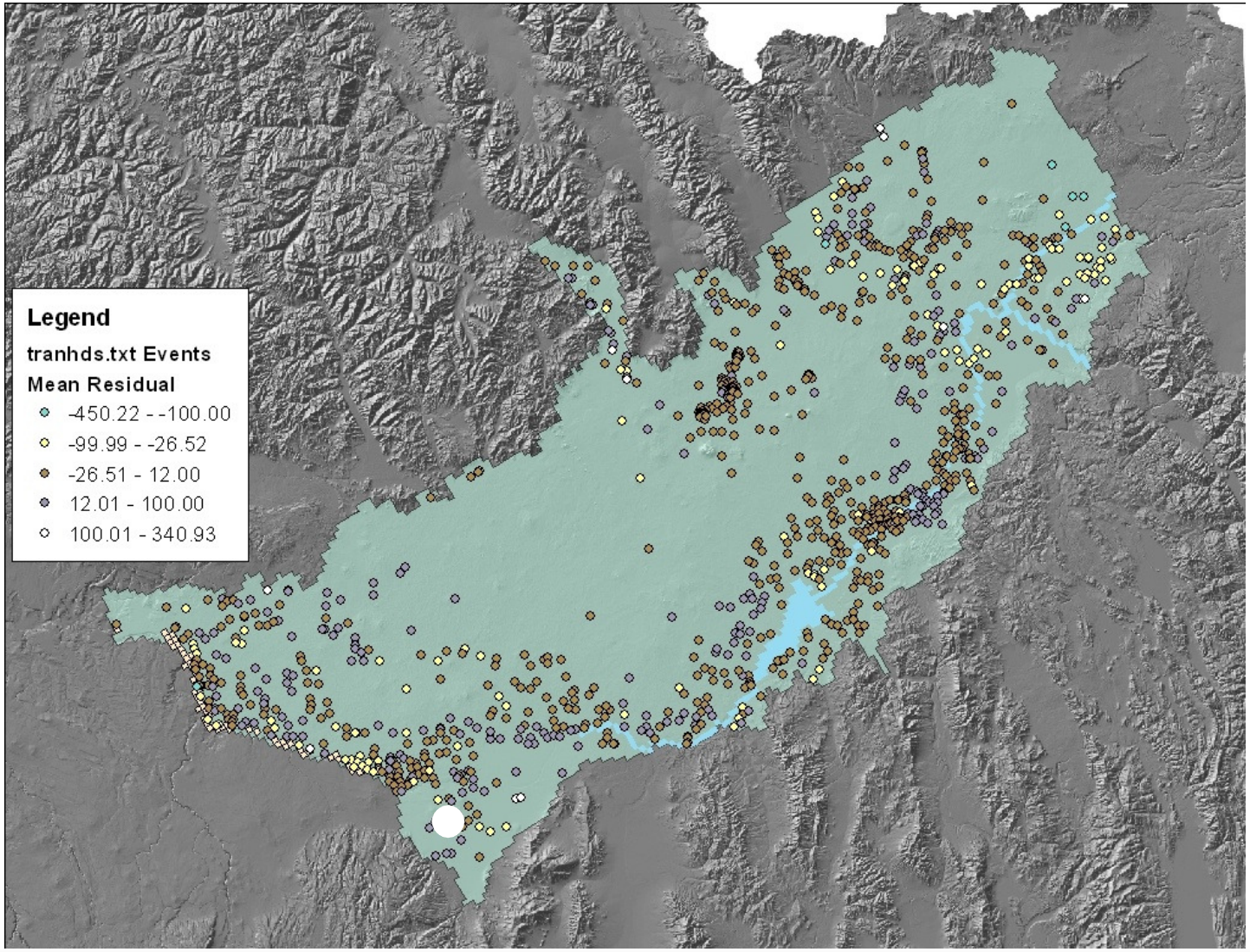

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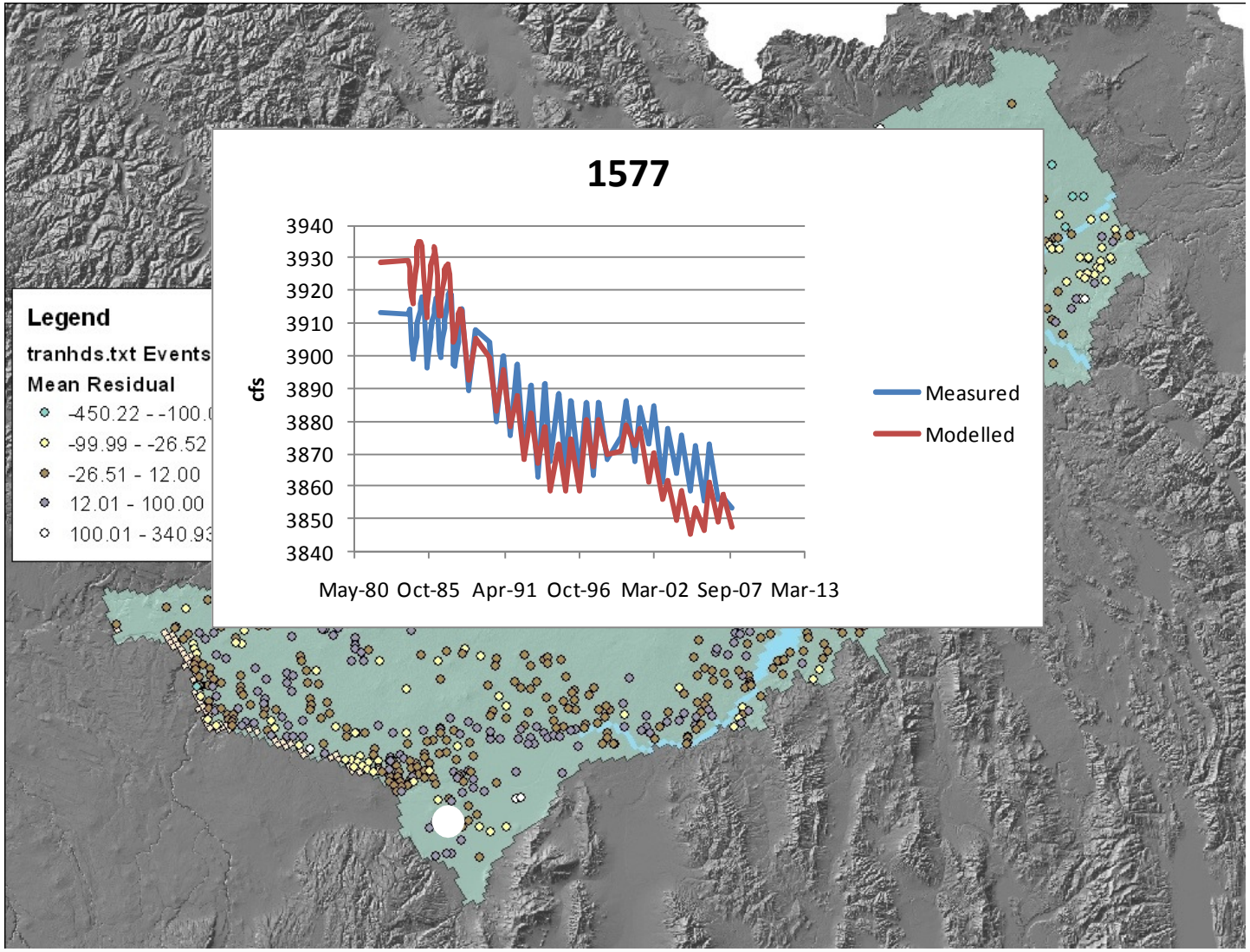
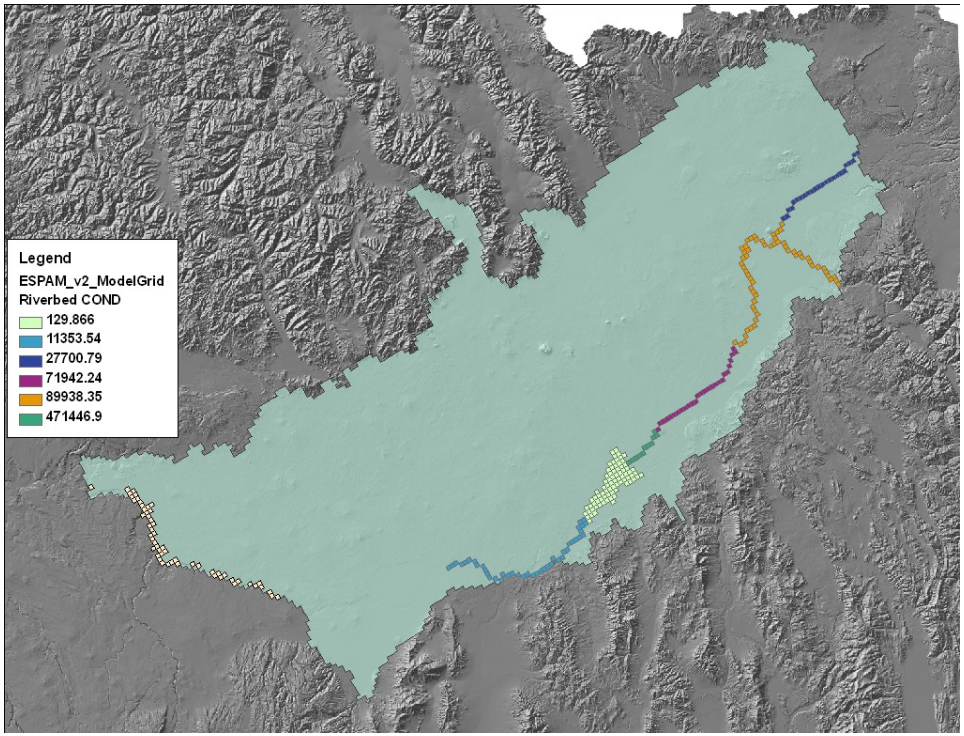
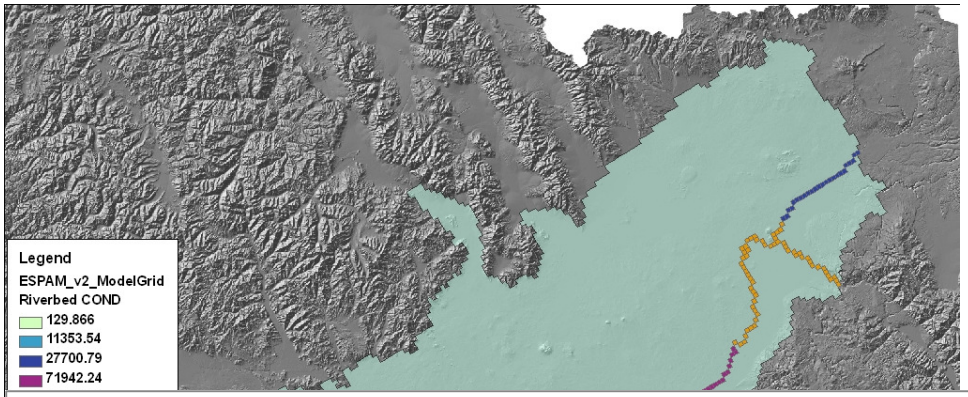
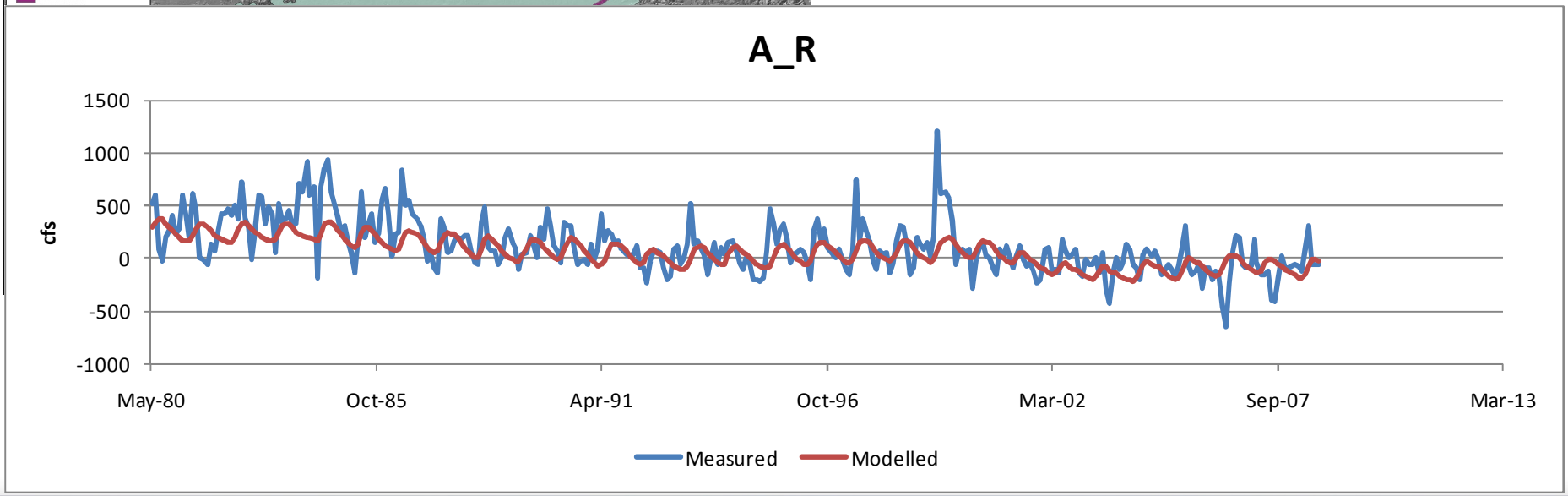


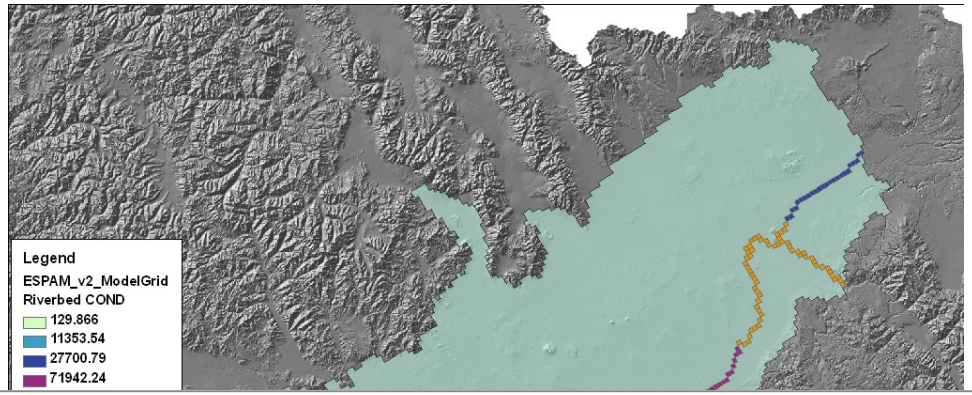


- Snake River reaches

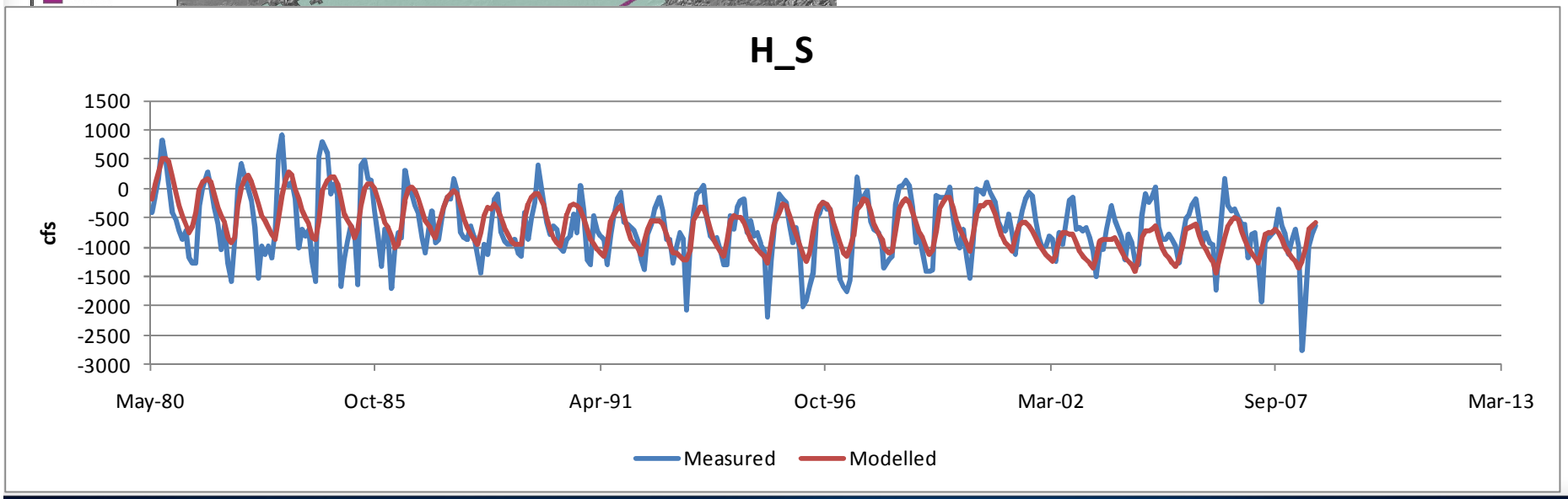


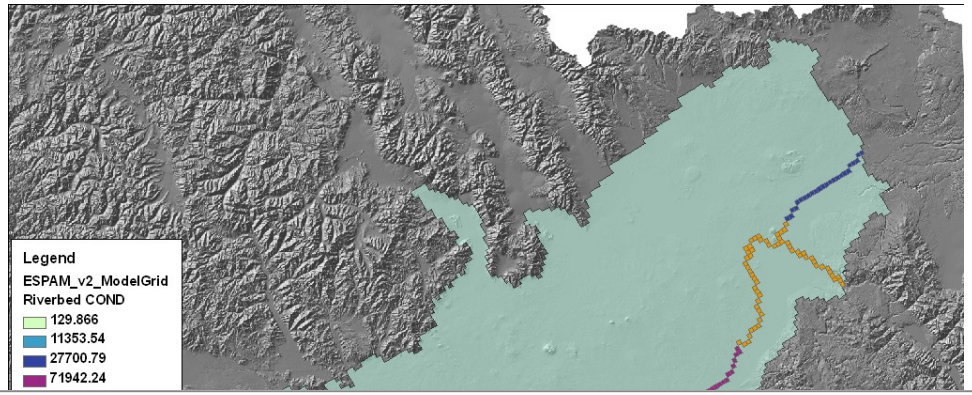
- Snake River reaches
  - Ashton-Rexburg



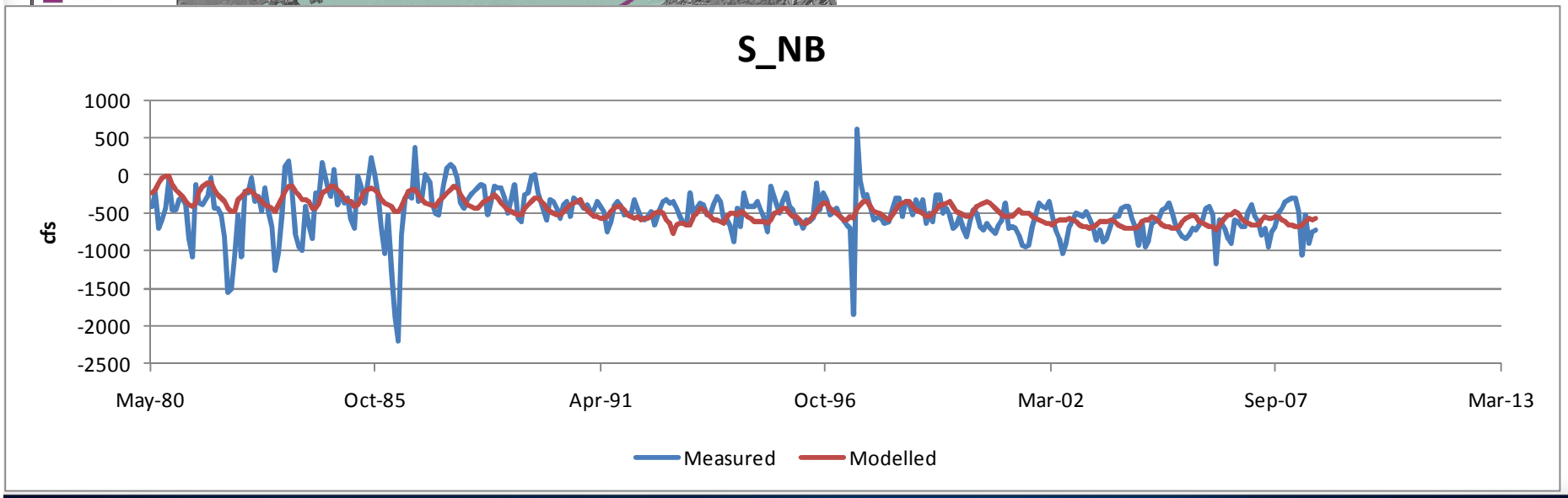


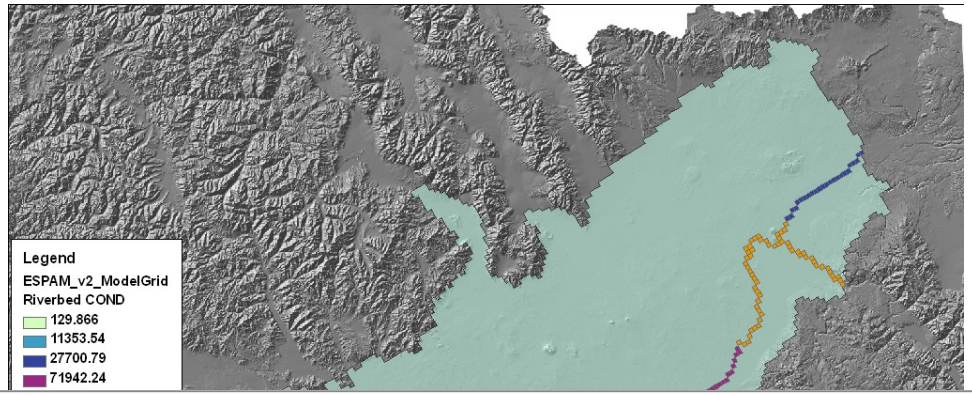
- Snake River reaches
  - Heise-Shelley



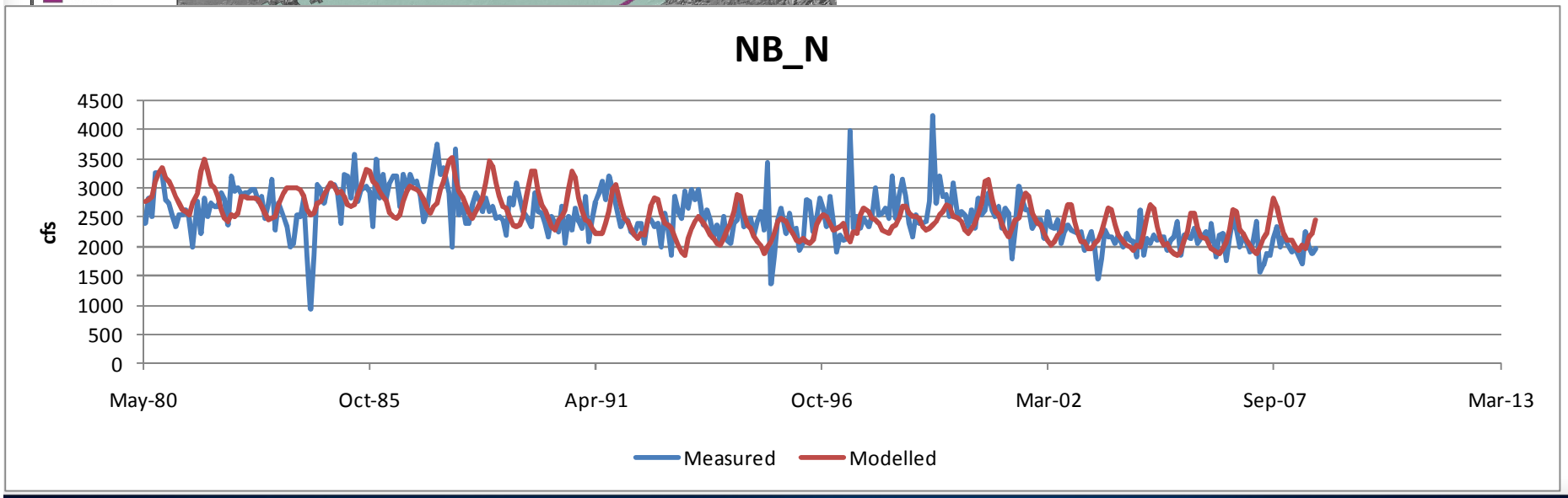


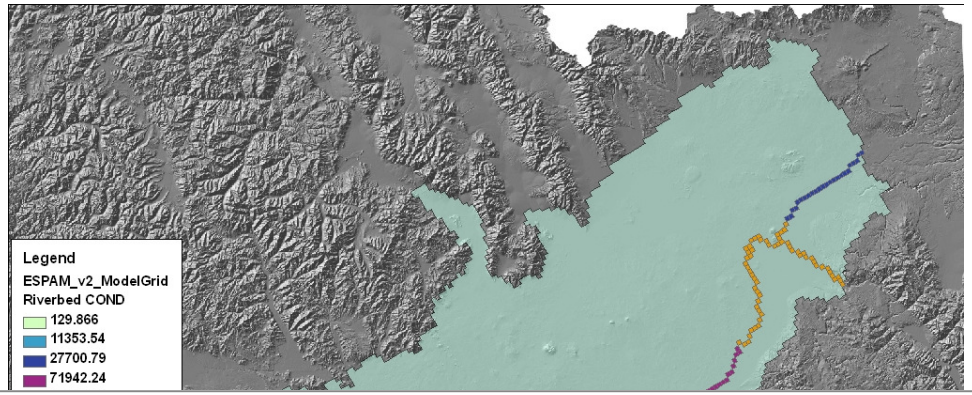
- Snake River reaches
  - Shelley-nr Blackfoot



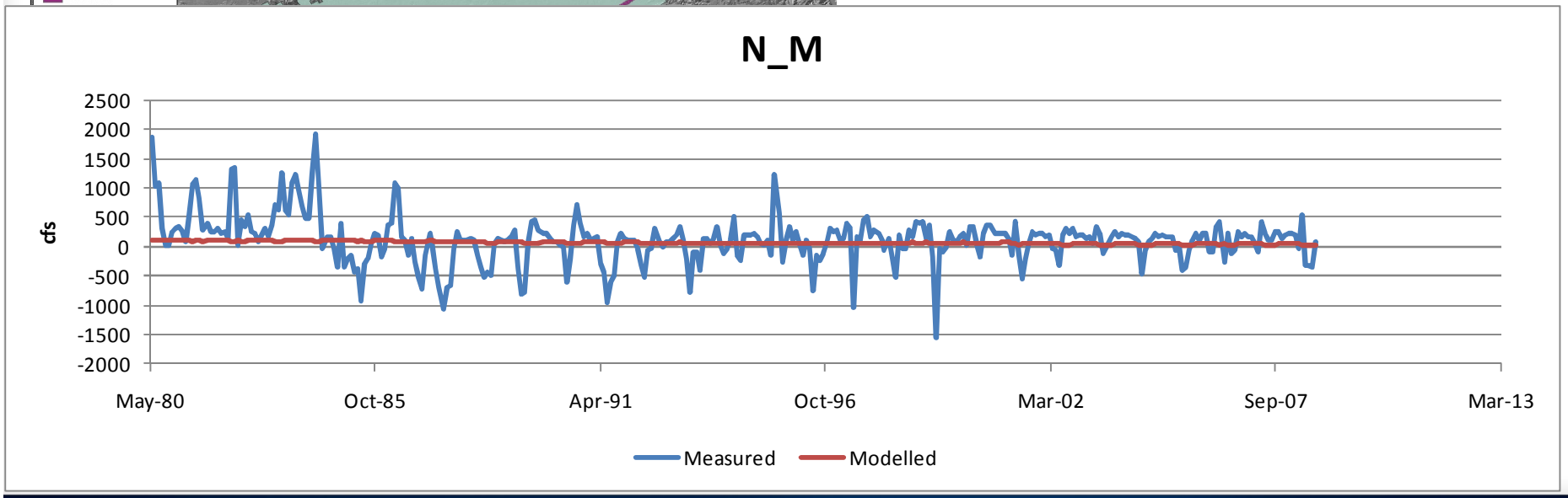


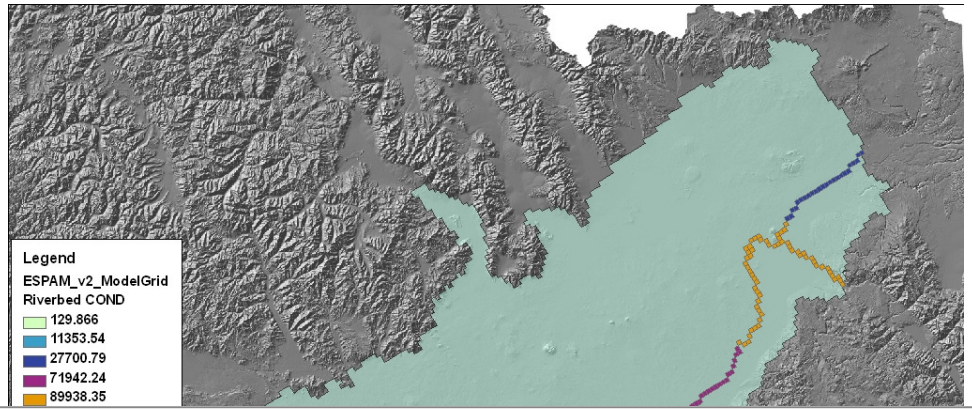
- Snake River reaches
  - Nr Blackfoot-Neeley



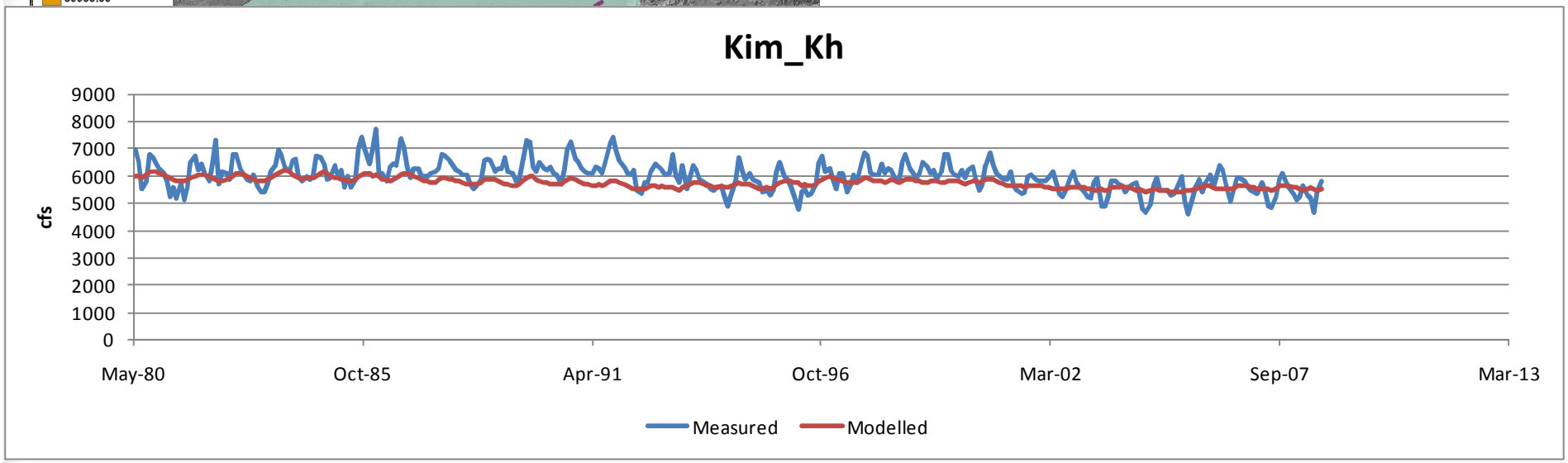


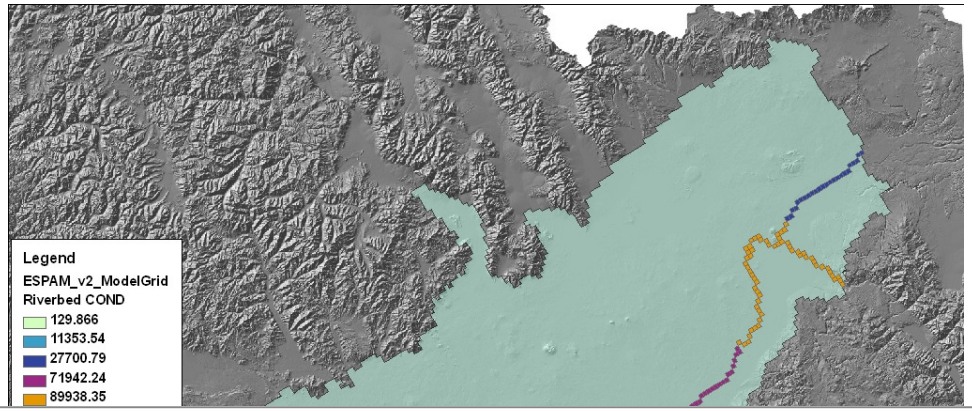
- Snake River reaches
  - Neeley-Minidoka



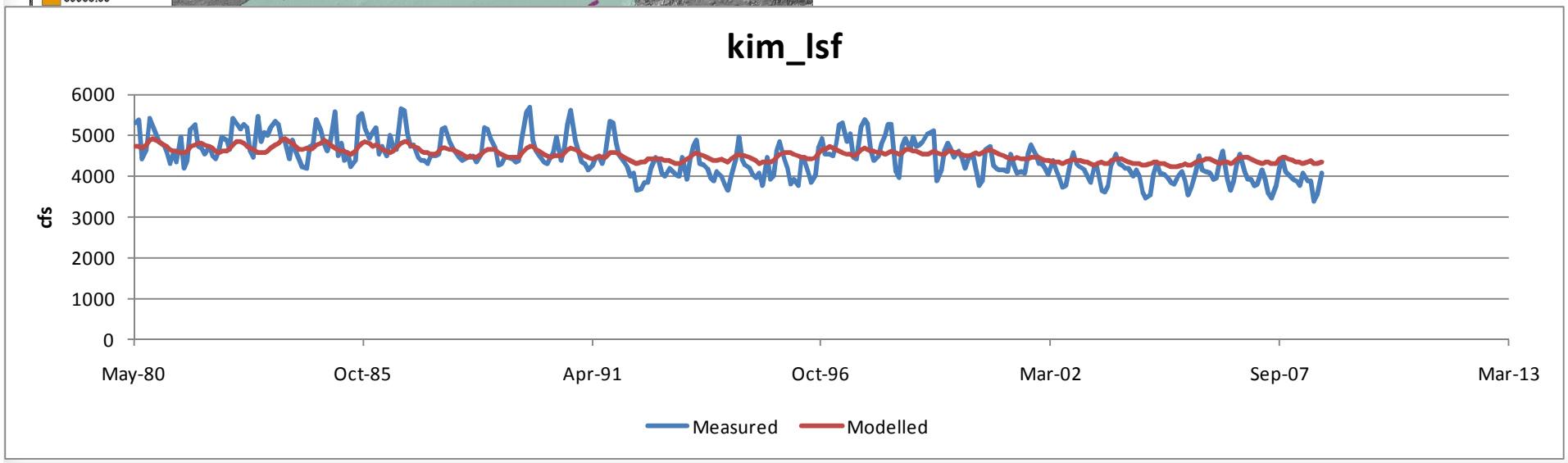


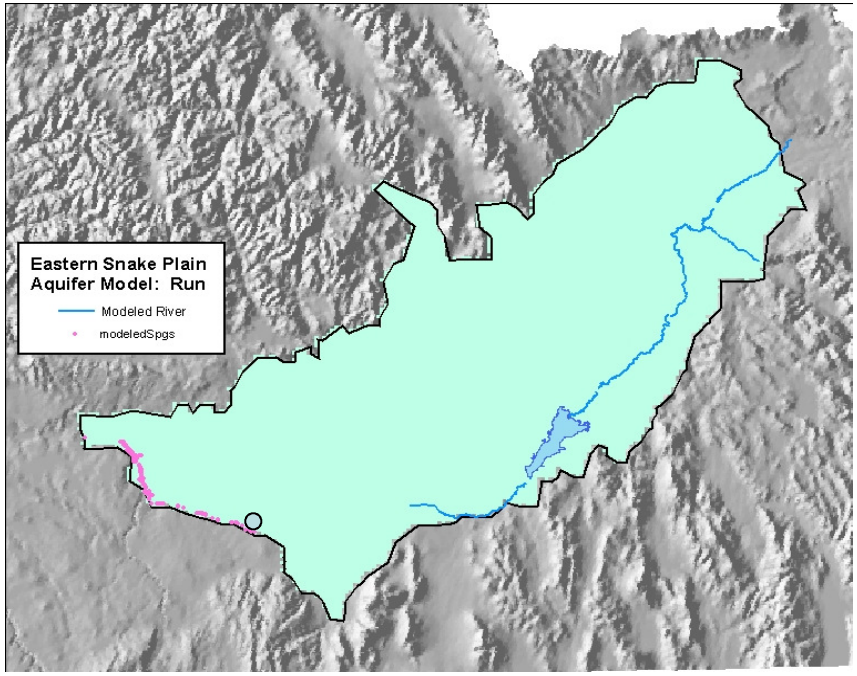
- Snake River reaches
  - Kimberly-King Hill





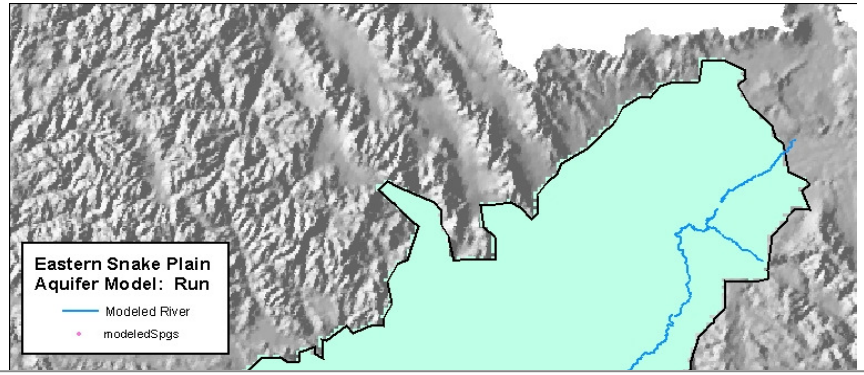
- Snake River reaches
  - Kimberly- Hagerman

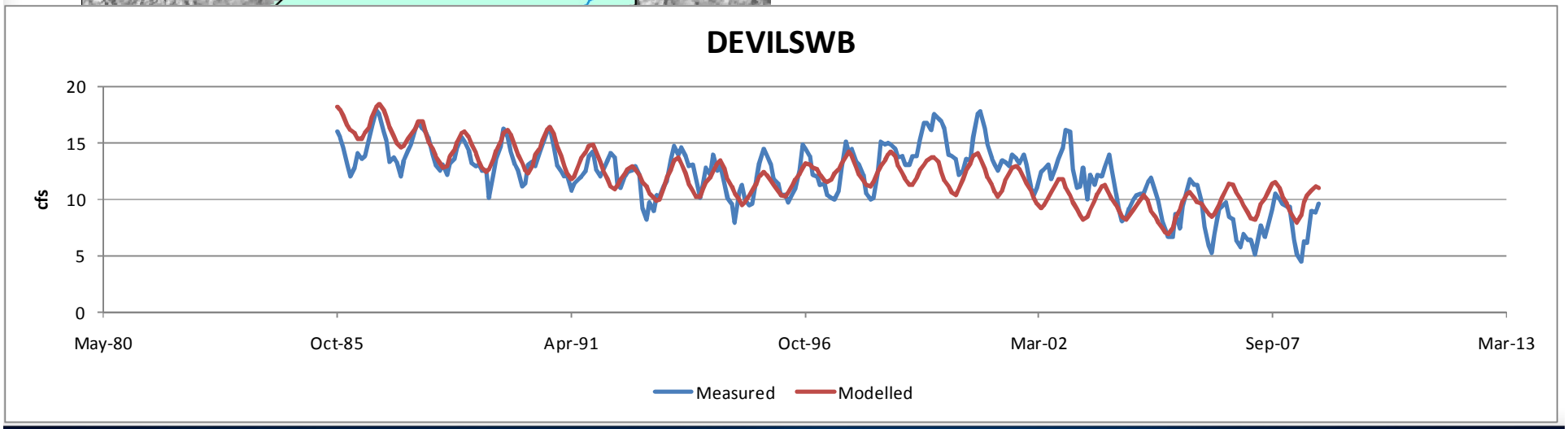


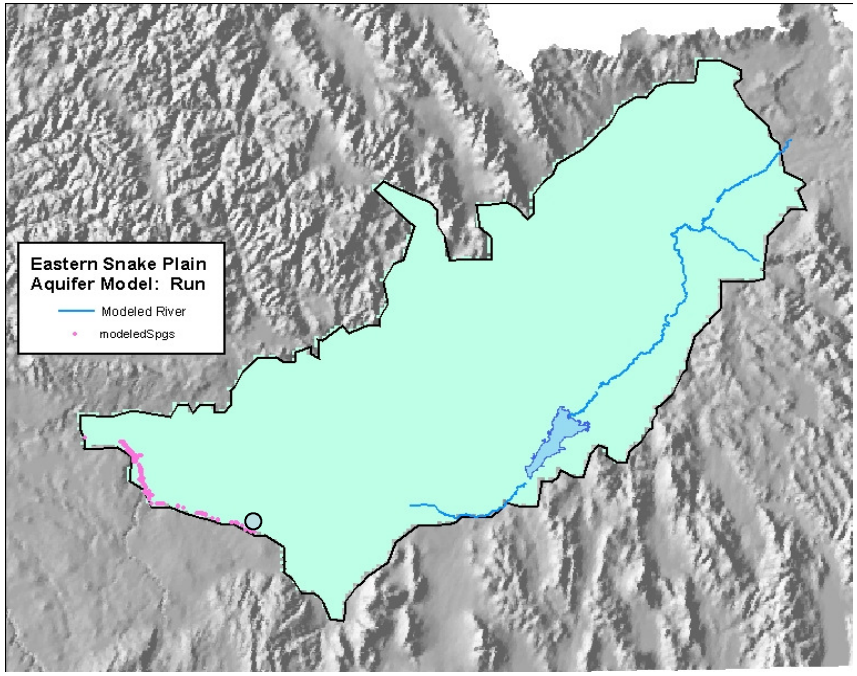


- Devils Washbowl

- Devils Washbowl

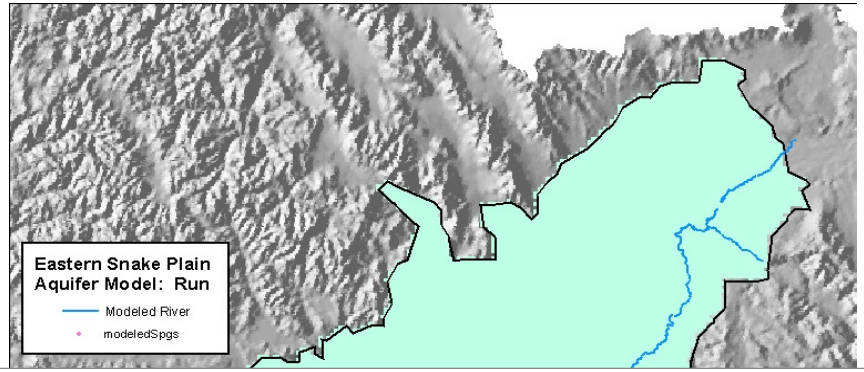


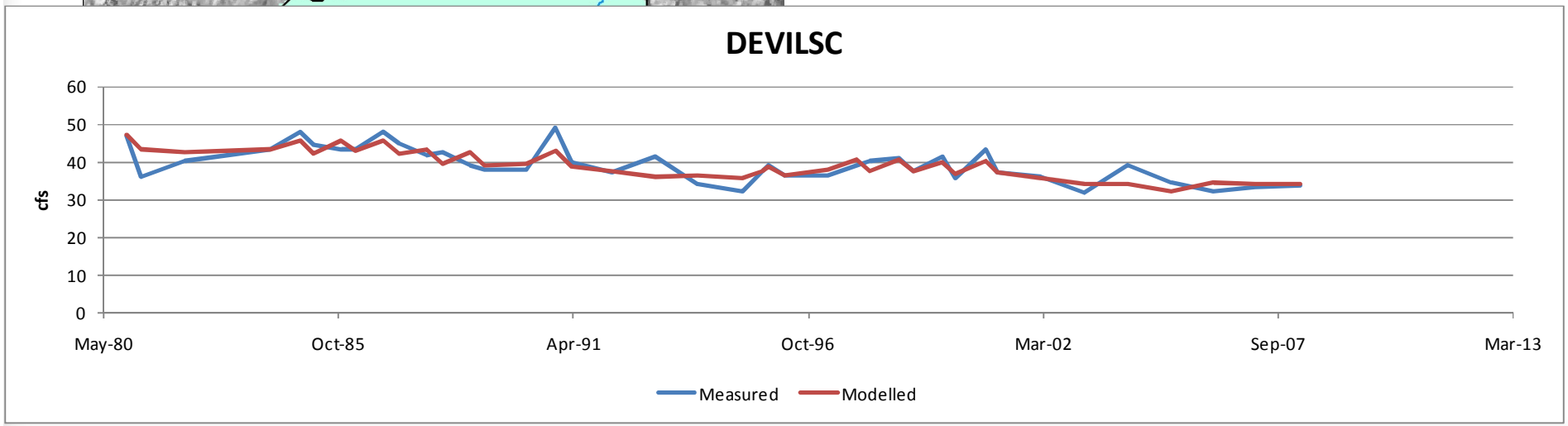


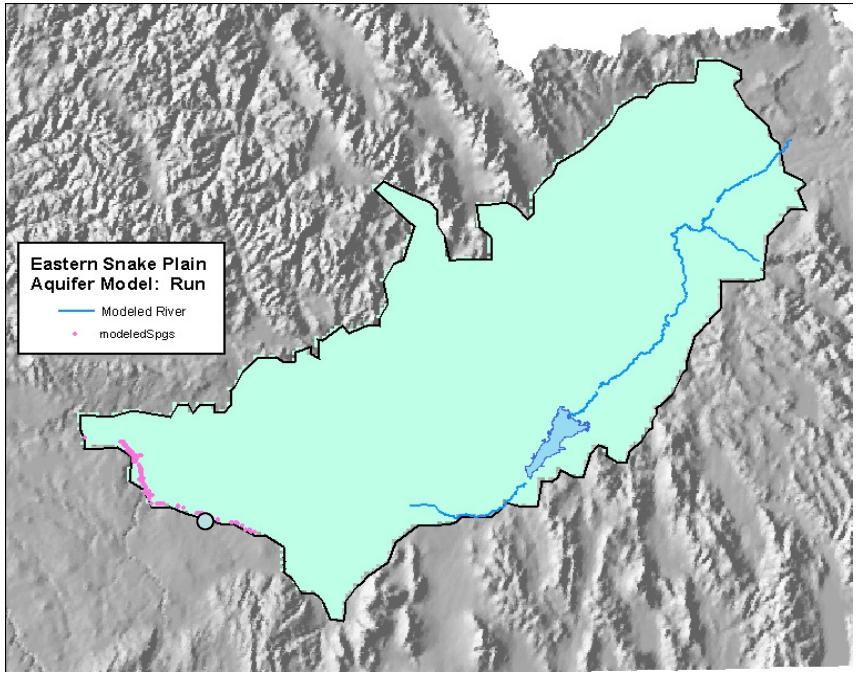


- Devils Corral

- Devils Corral

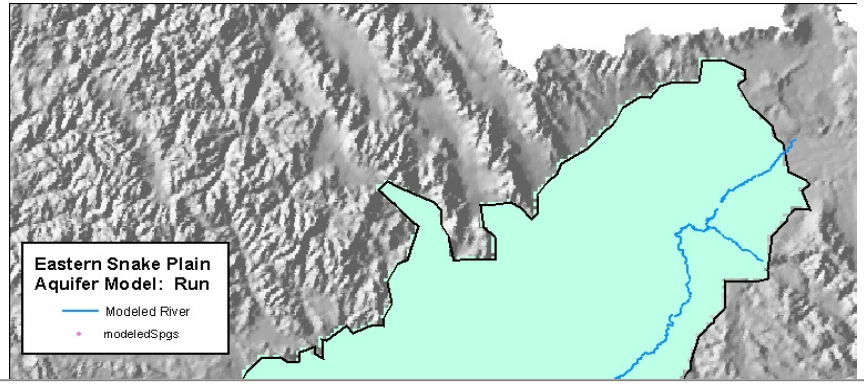


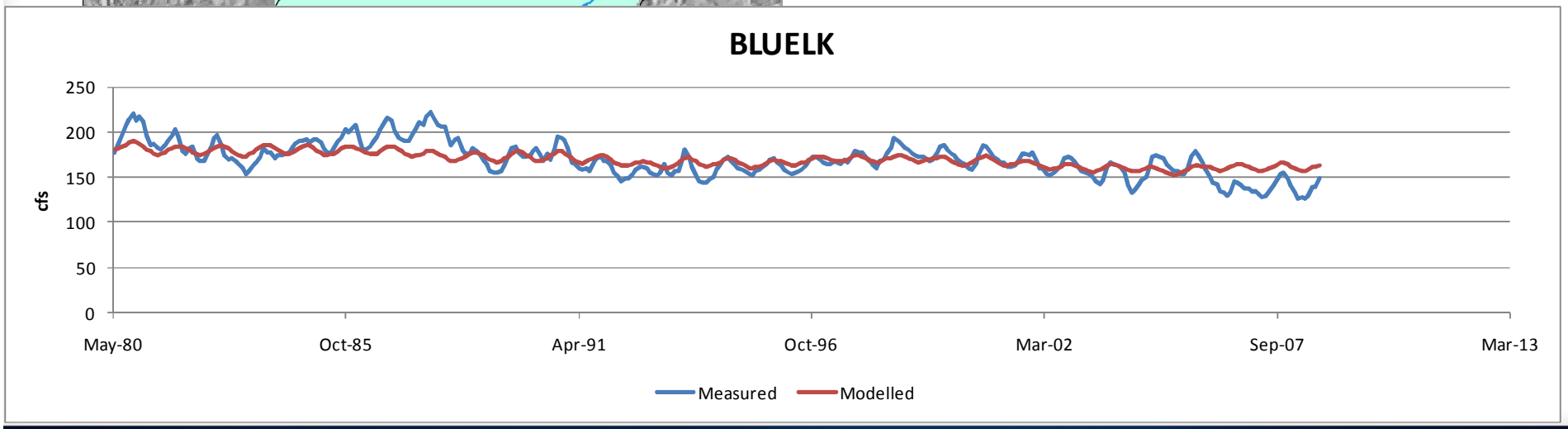



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Blue Lakes

- Blue Lakes


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs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Apr-91
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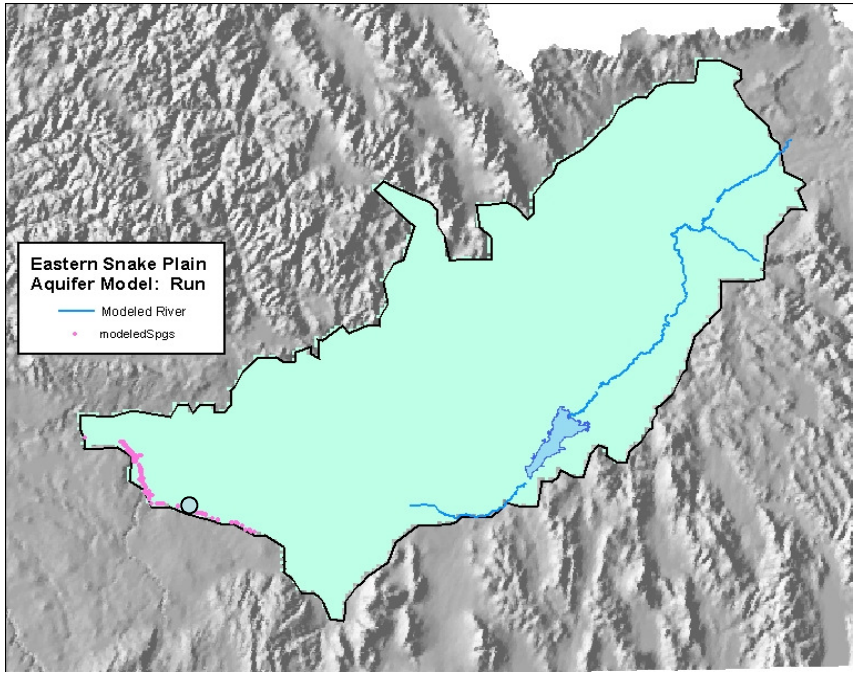
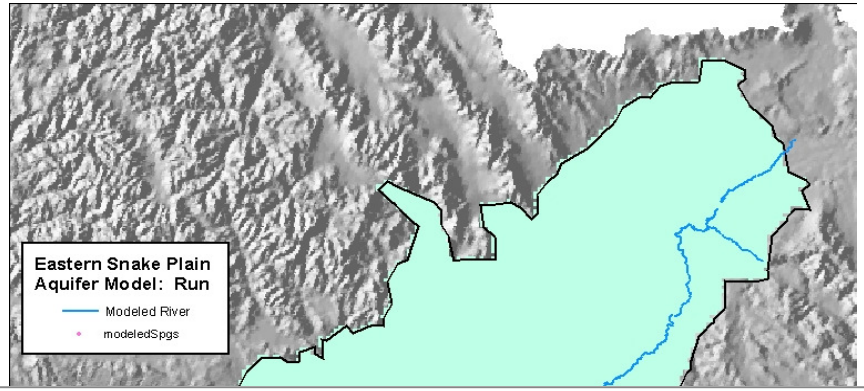
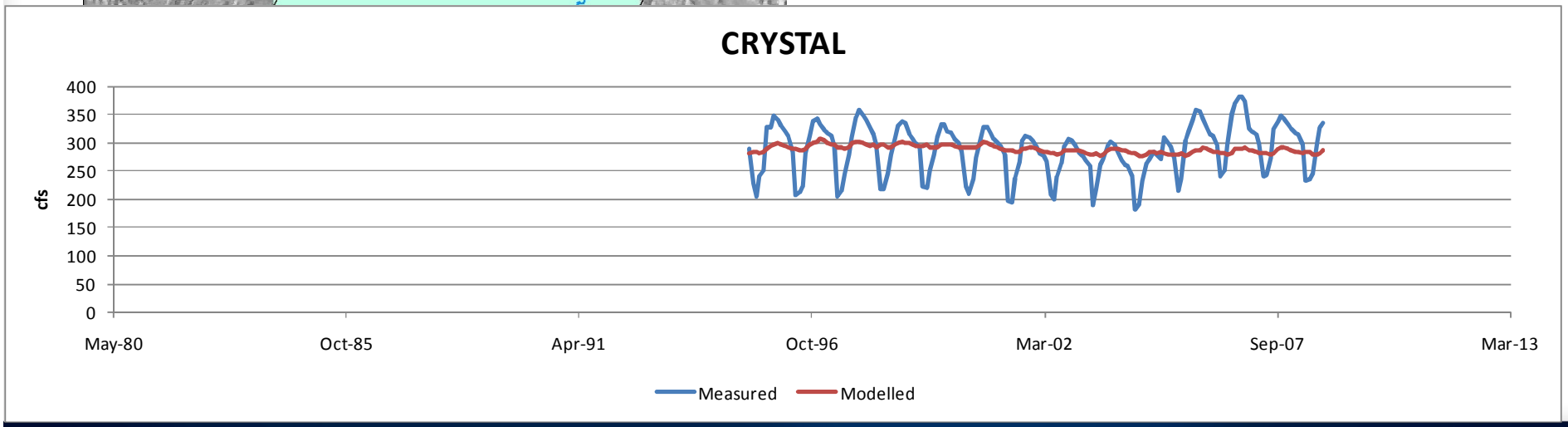
Mar-02
Sep-07
Mar-13
Measured
Modelled

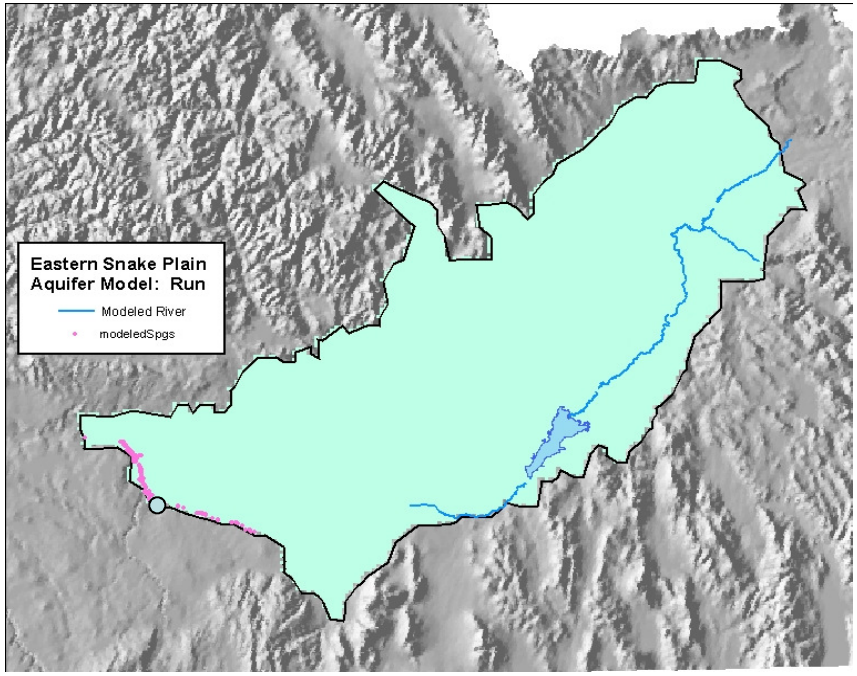


- Crystal Springs

- Crystal Springs

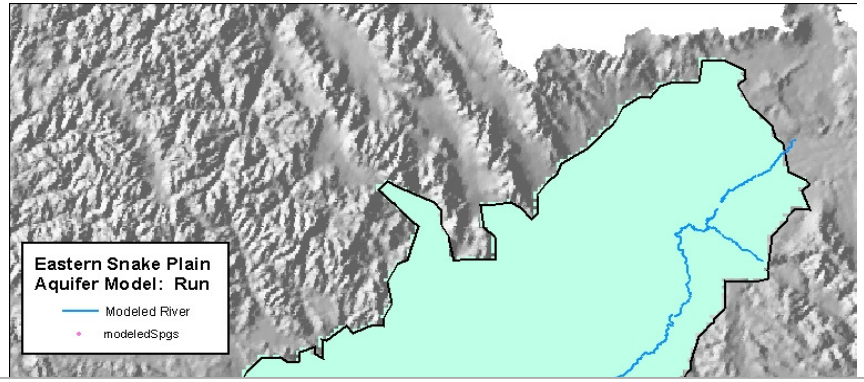


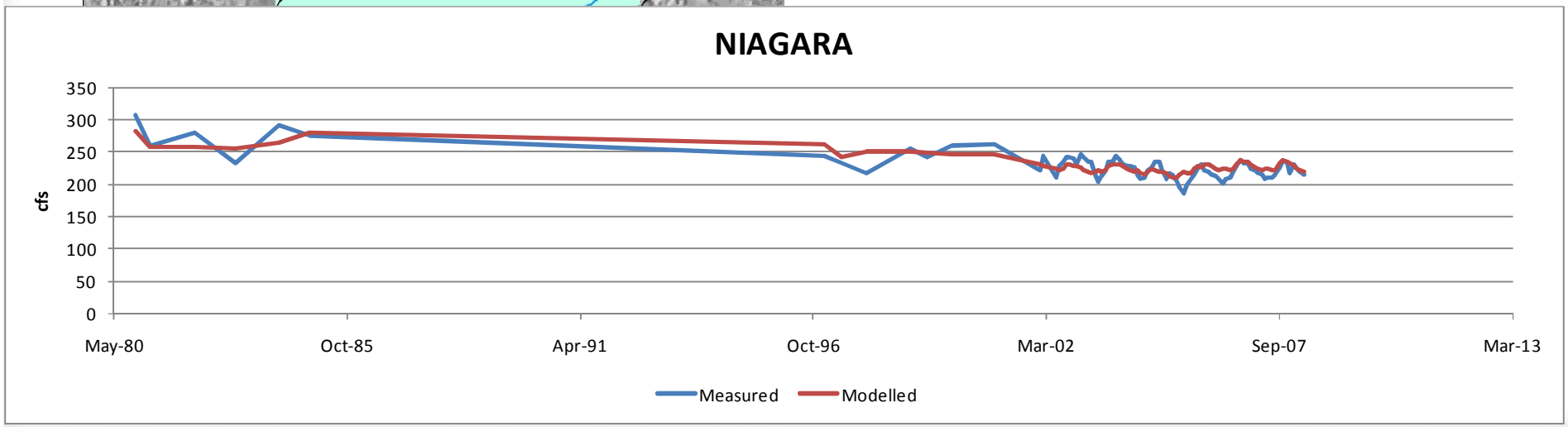



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Niagara

- Niagara


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


NIAGARA
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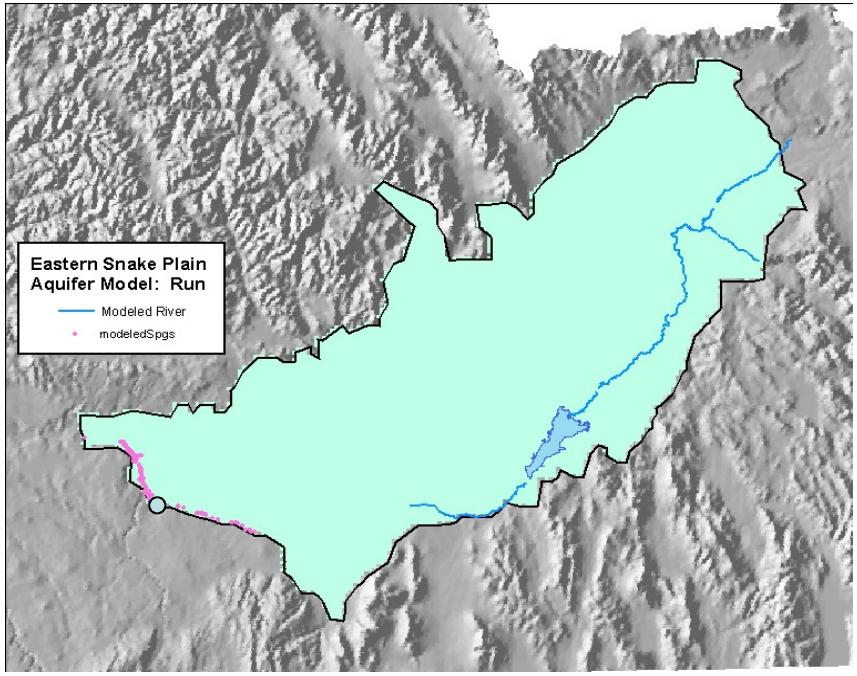
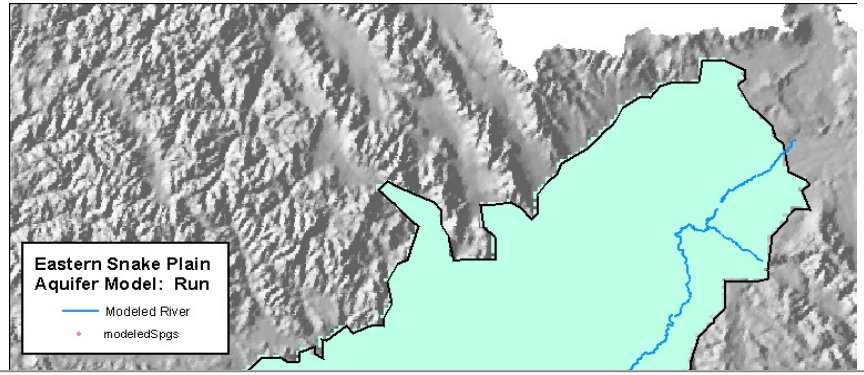
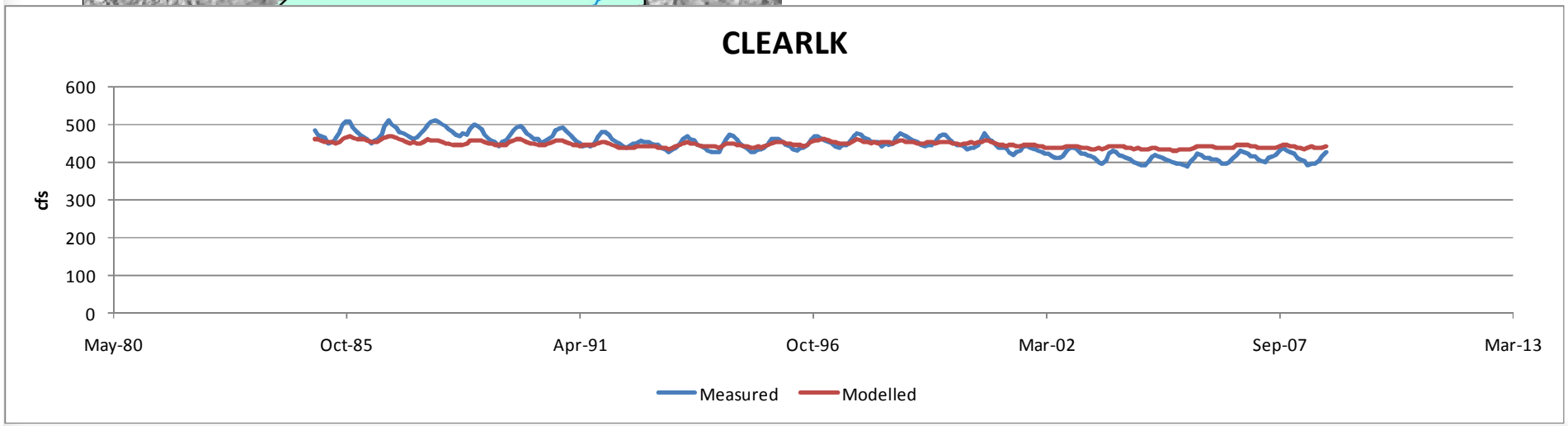
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Mar-13
Measured
Modelled


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Clear Lakes

- Clear Lakes


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs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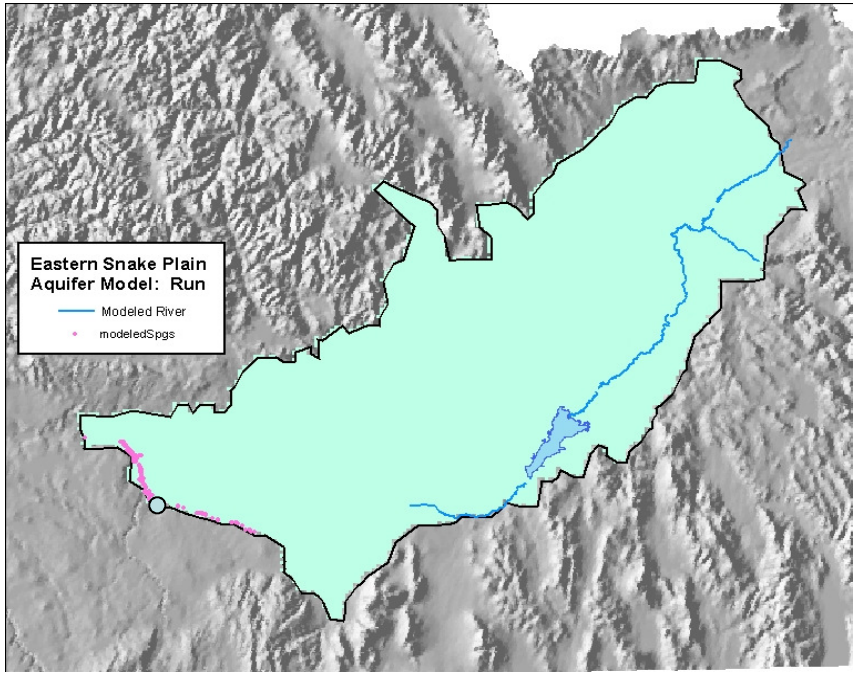
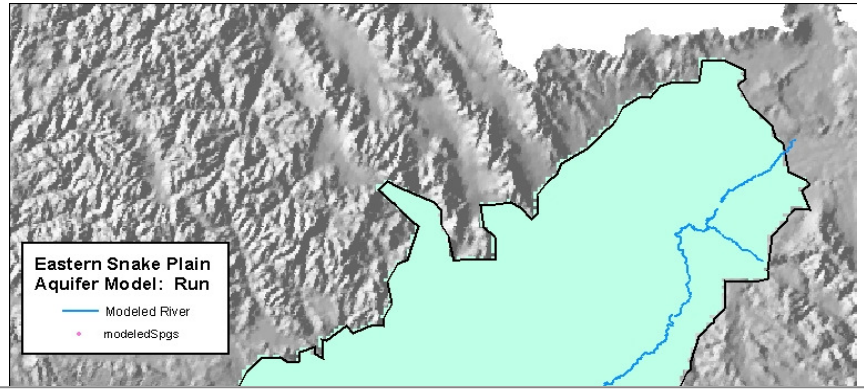
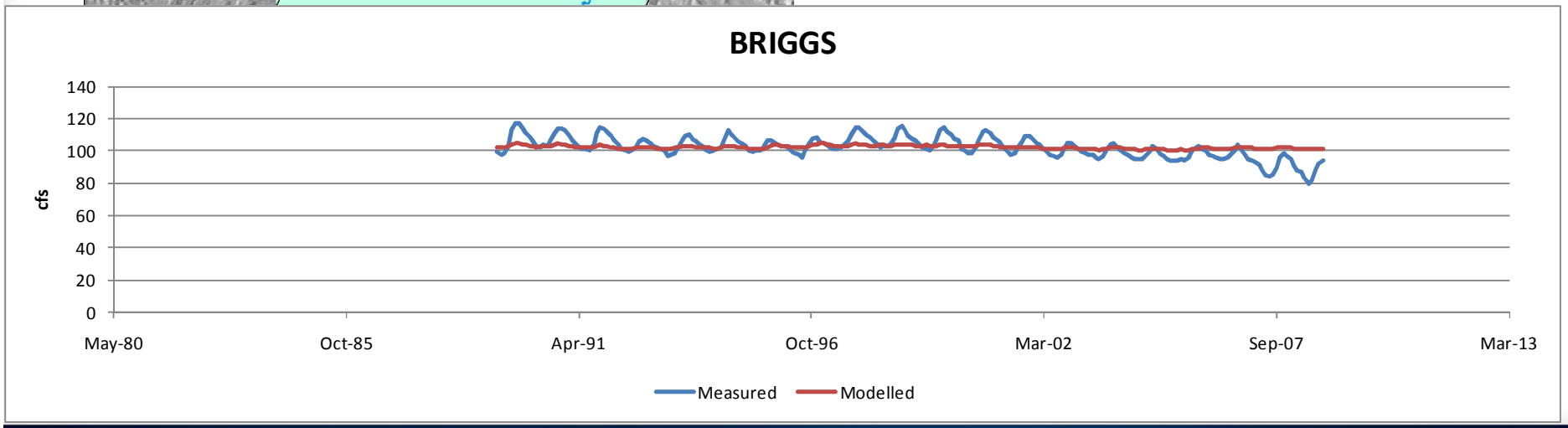
Mar-13
Measured
Modelled

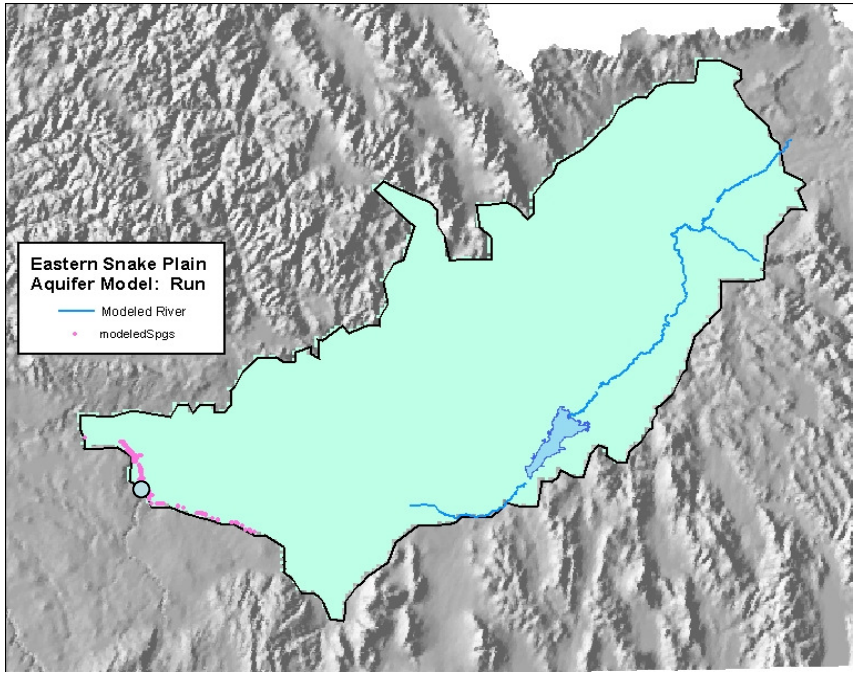


- Briggs Spring

- Briggs Spring

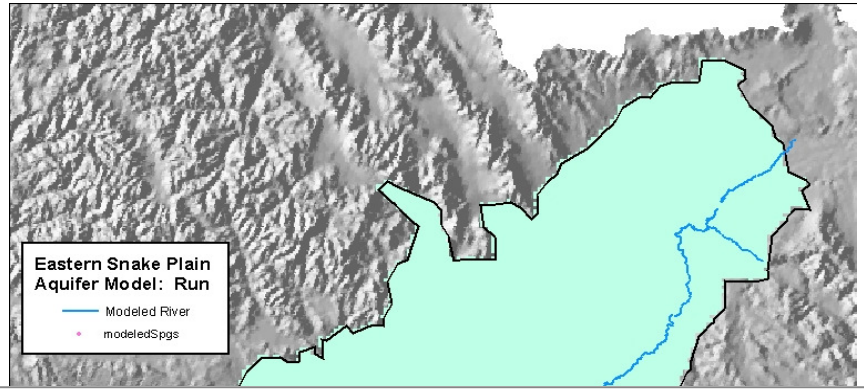


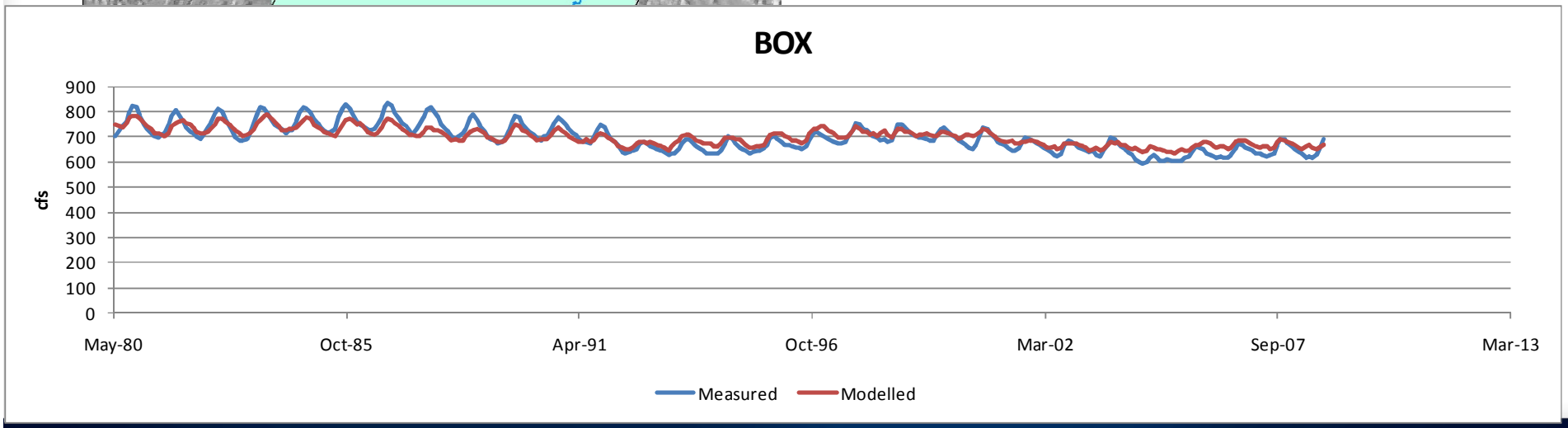


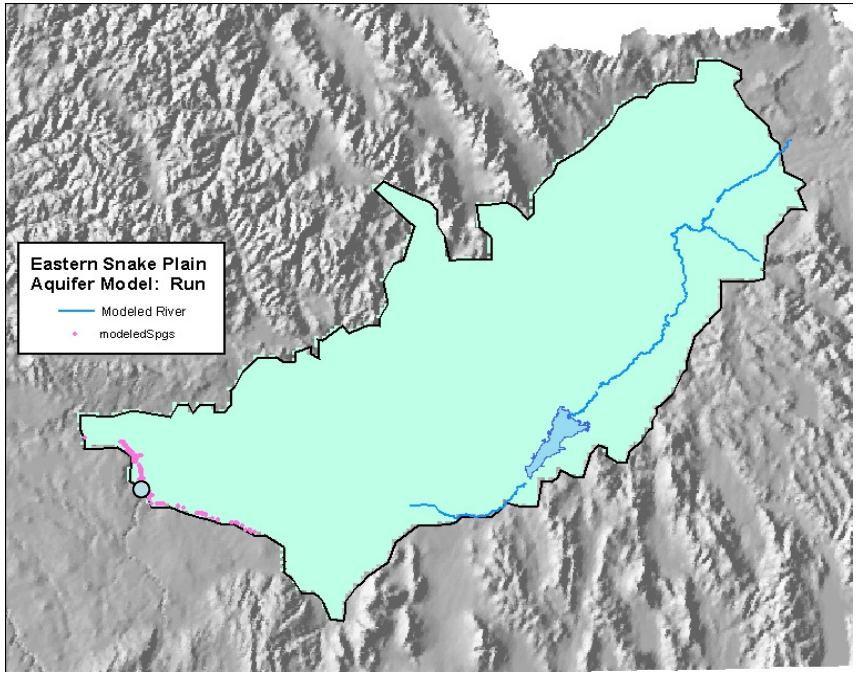


- Box Canyon Spring

- Box Canyon Spring

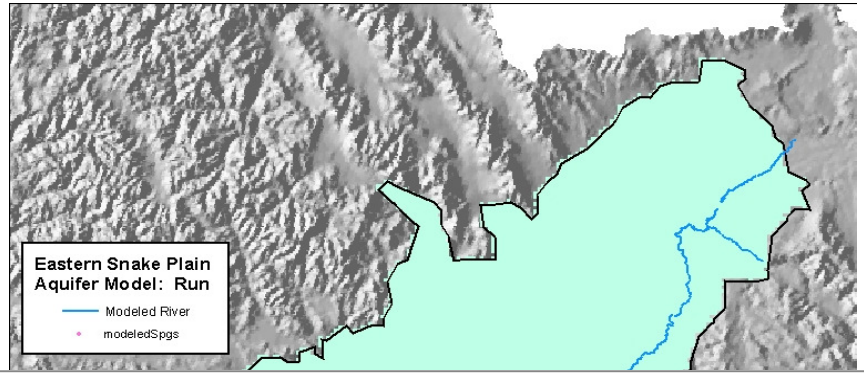


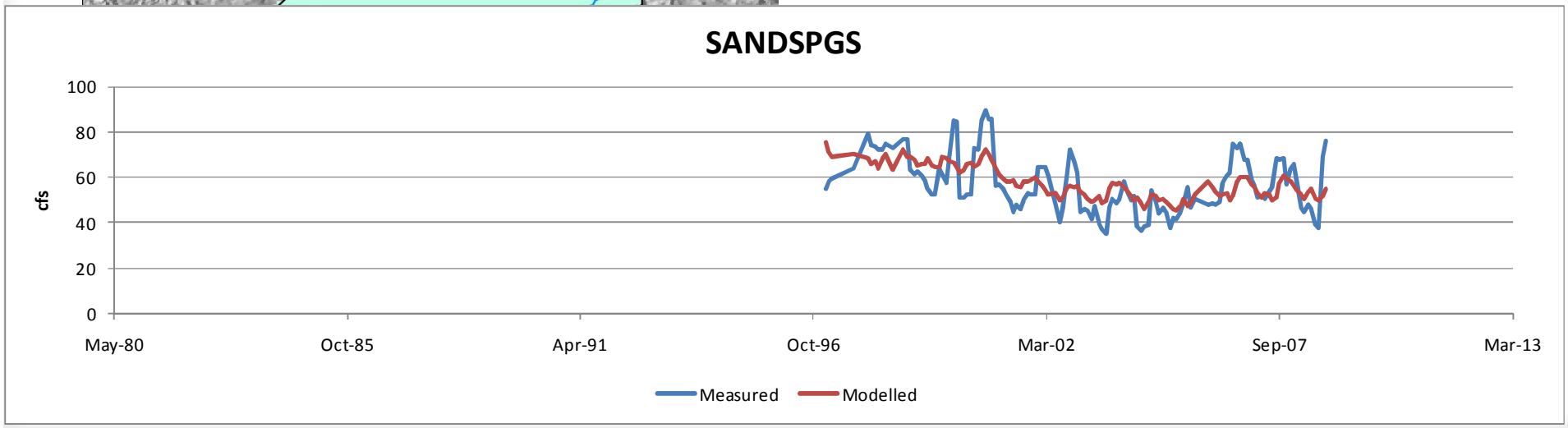


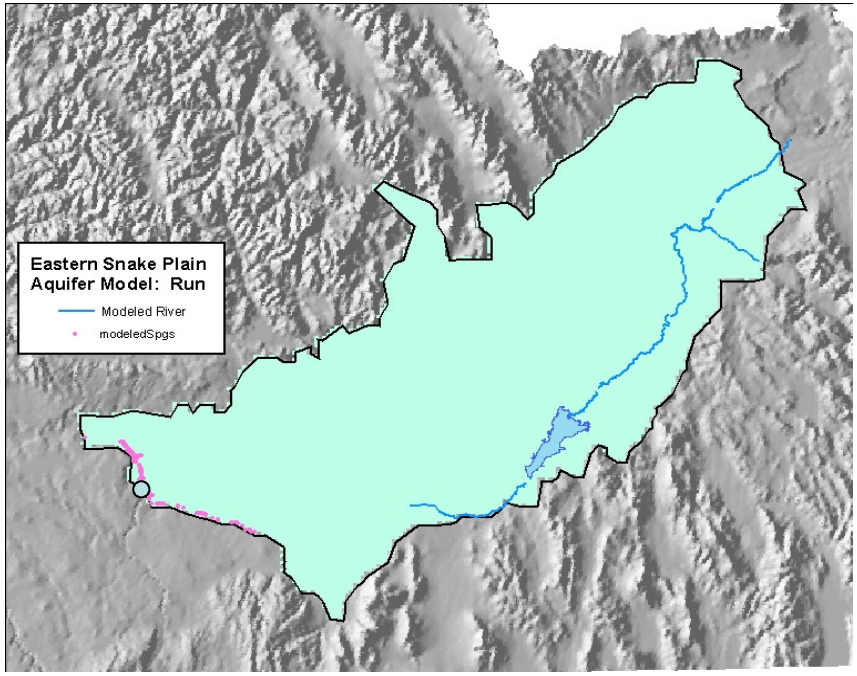


- Sand Springs

- Sand Springs

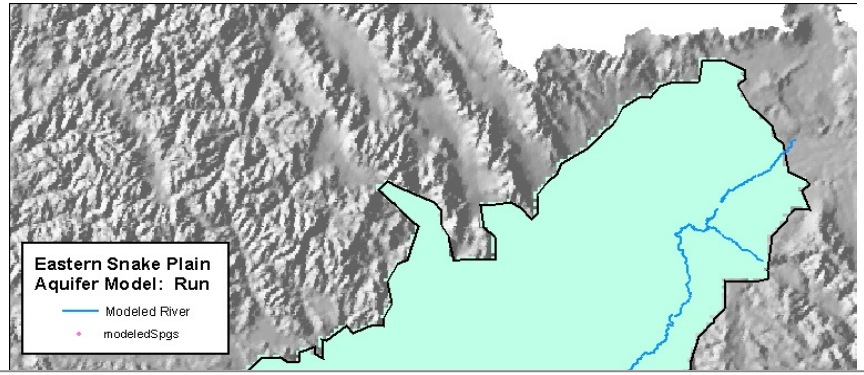


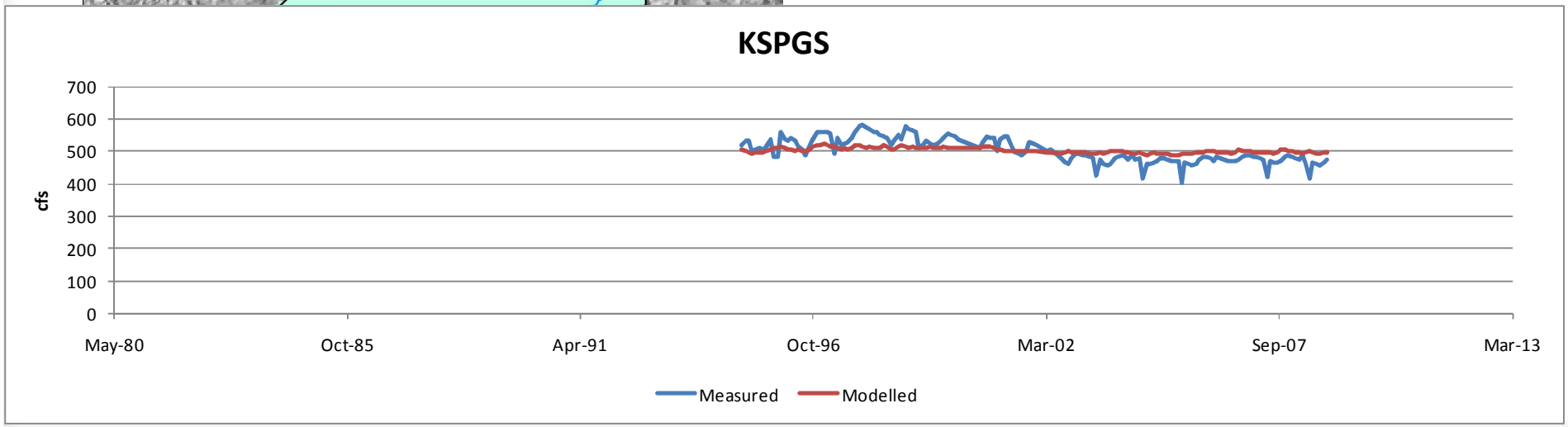


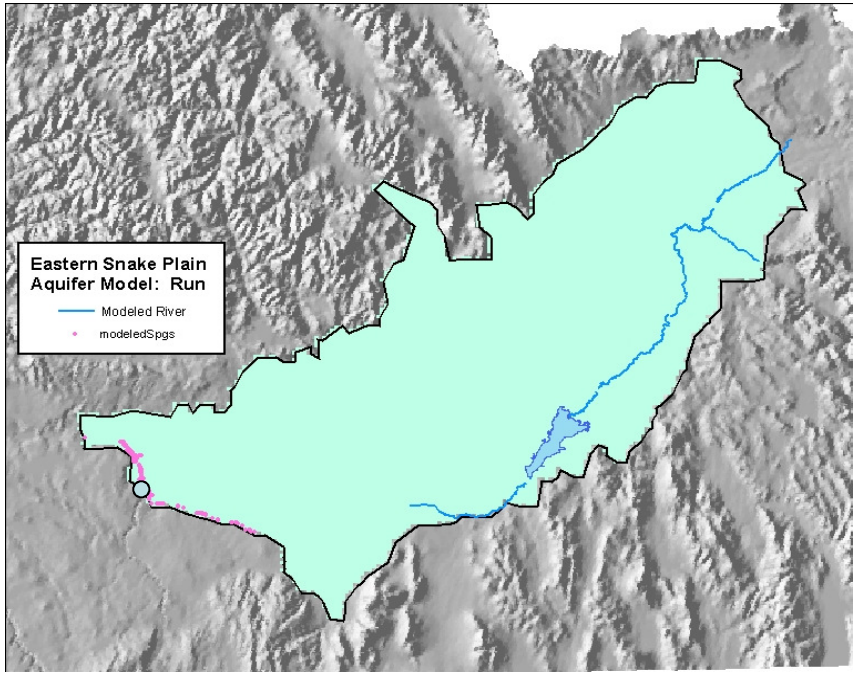


- Thousand Springs

- Thousand Springs

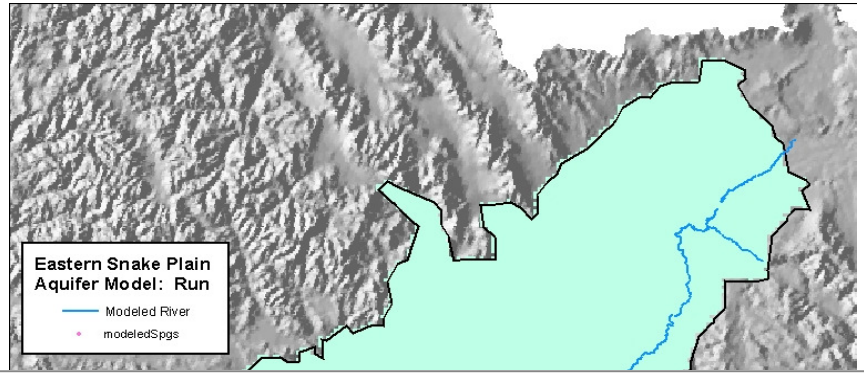


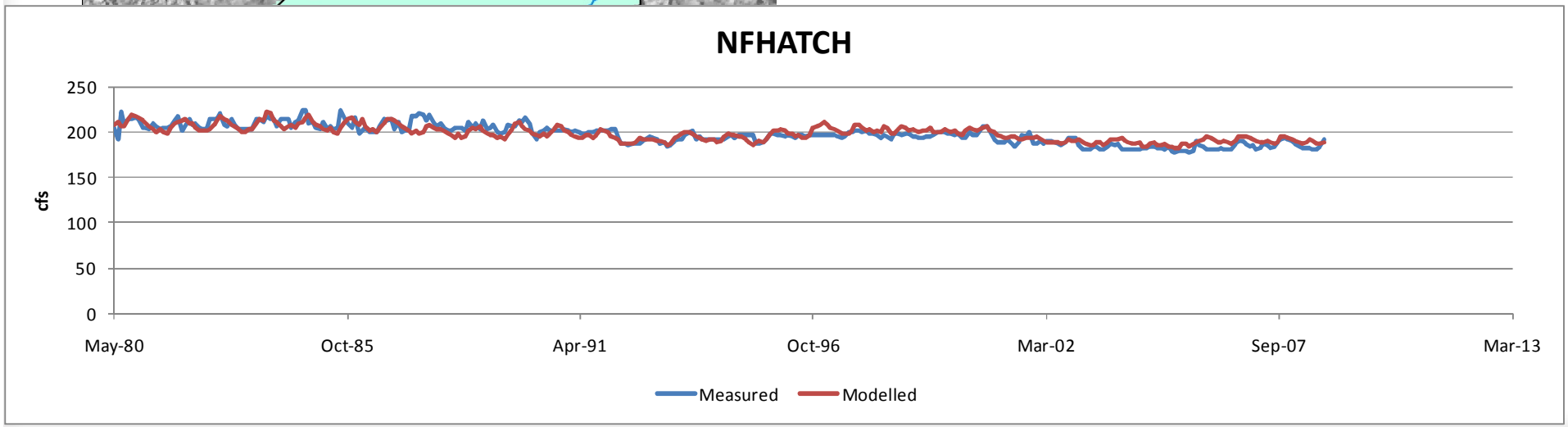


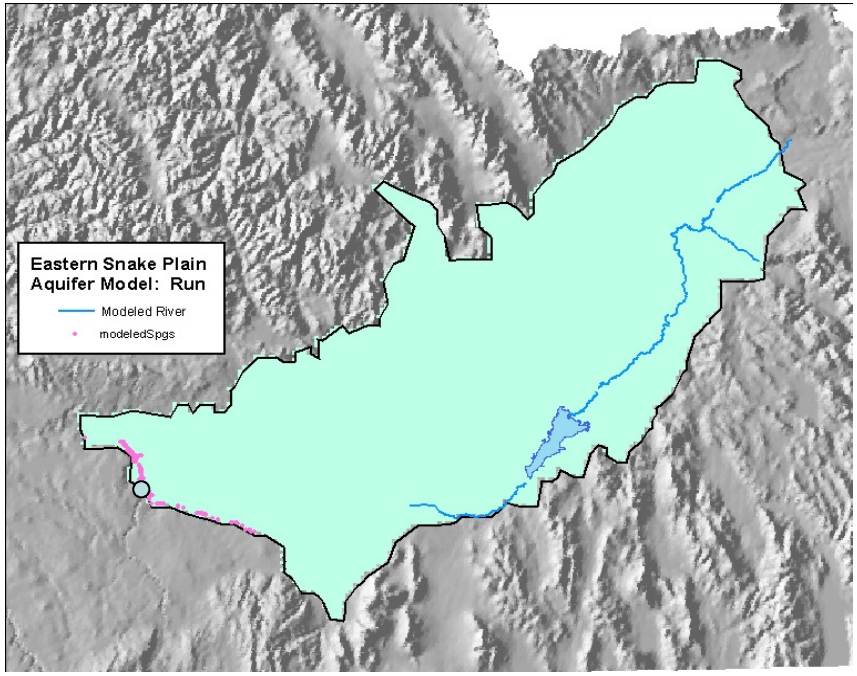


- Ntl Fish Hatchery

- Ntl Fish Hatchery

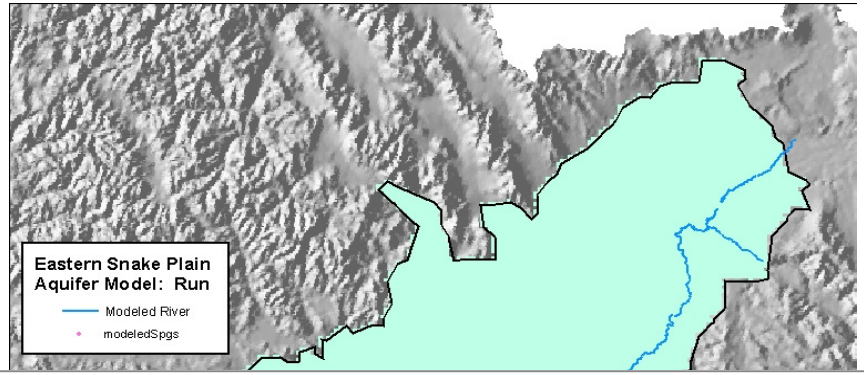


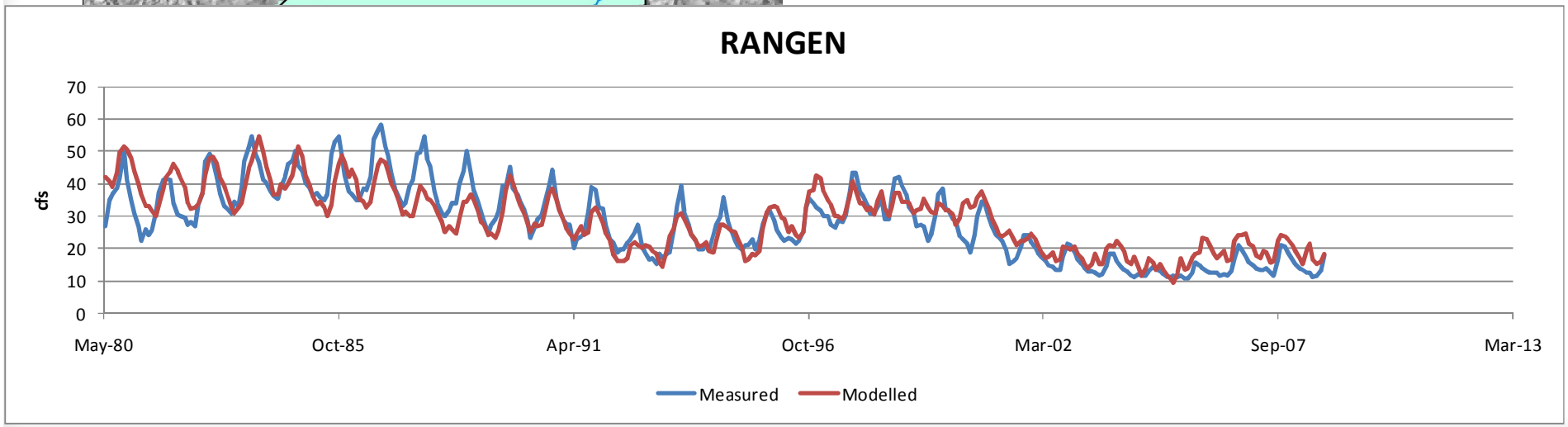


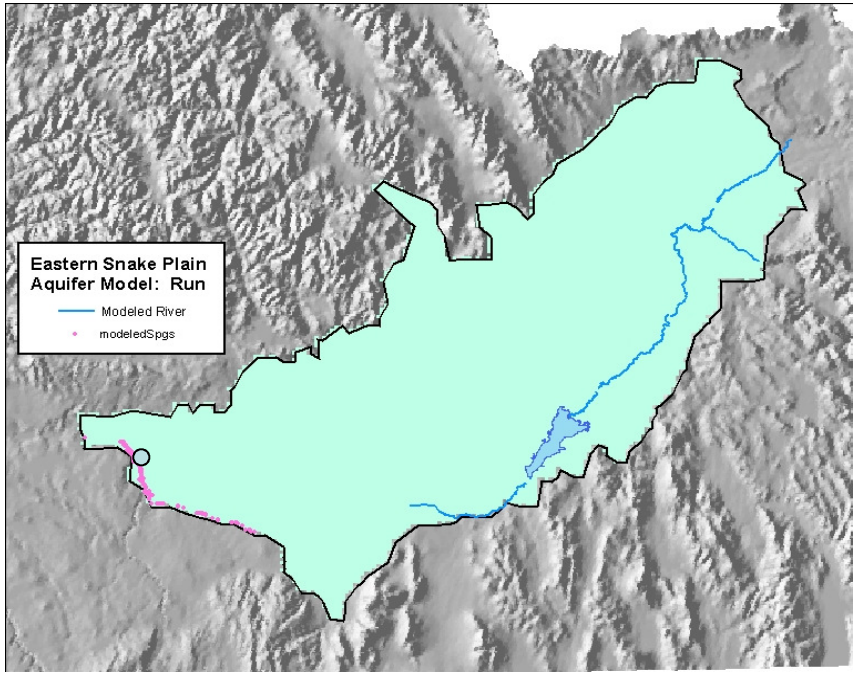


- Rangen Spring

- Rangen Spring

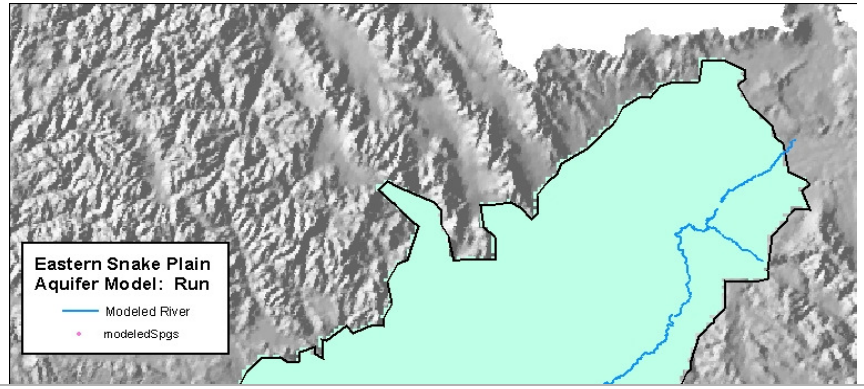


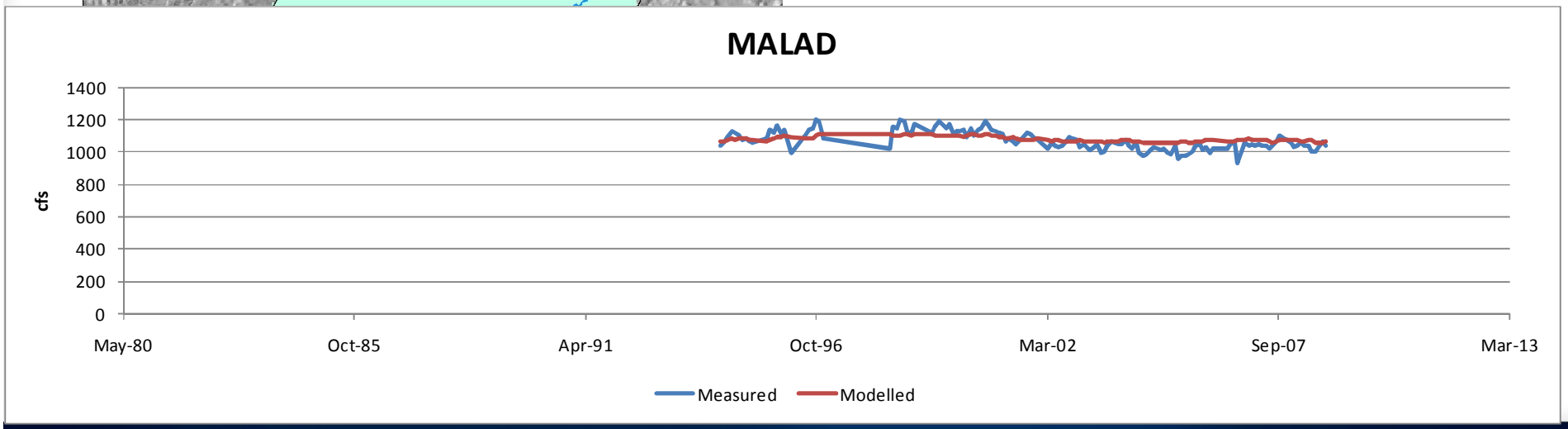



Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

- Malad

- Malad


Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs


MALAD
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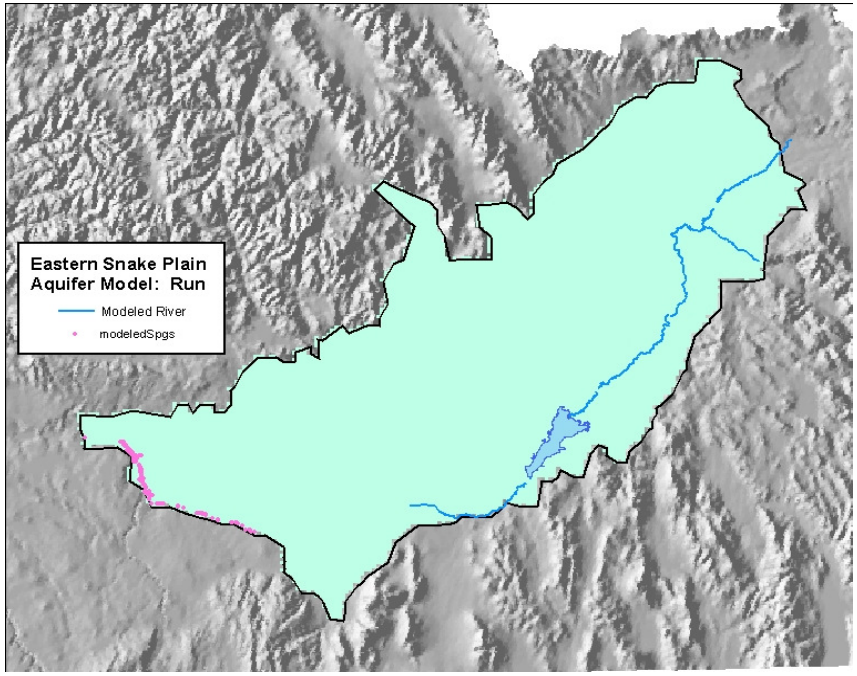
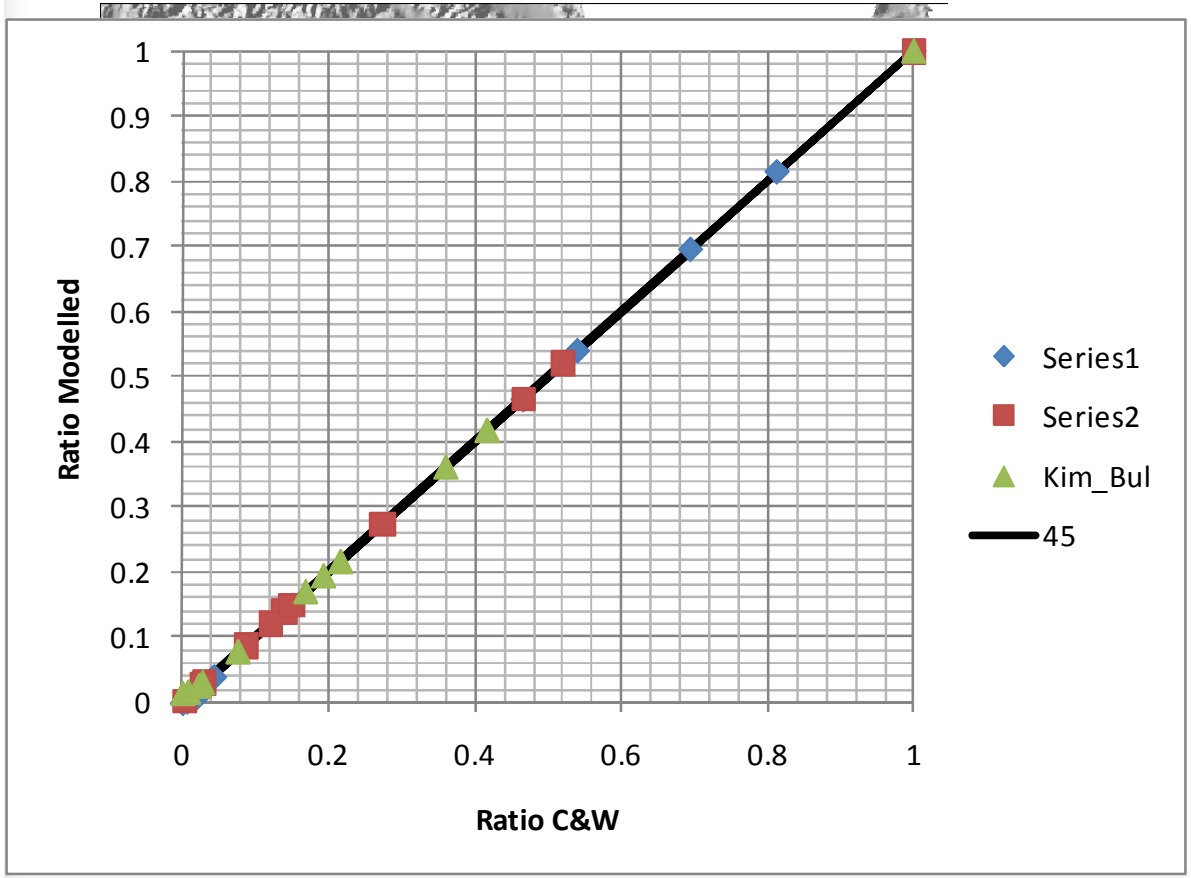
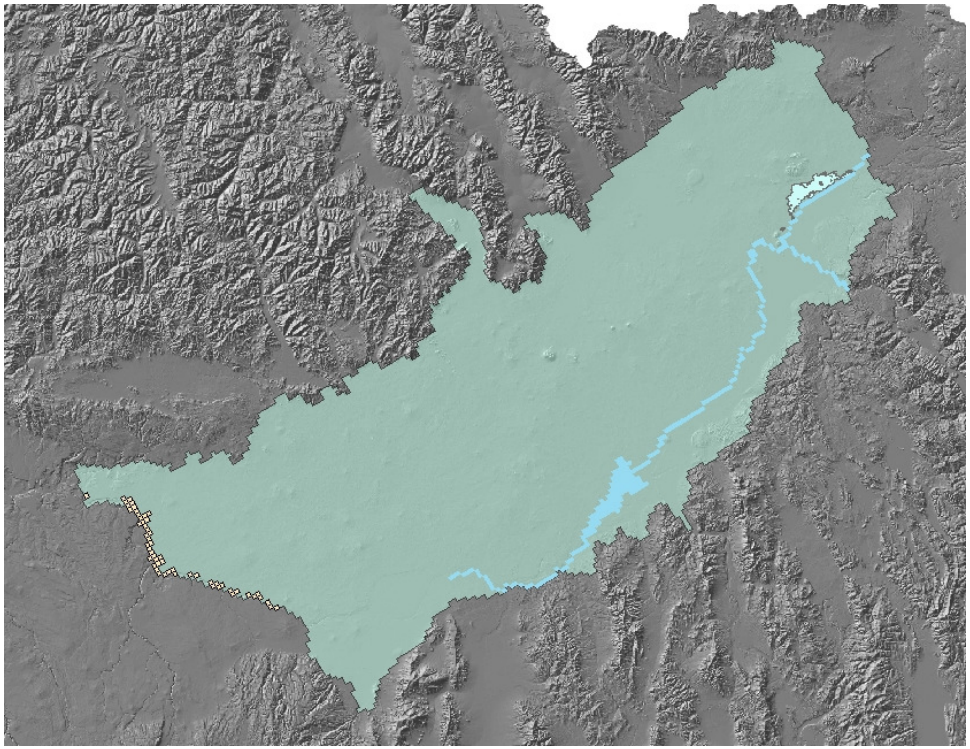
Sep-07
Mar-13
Measured
Modelled



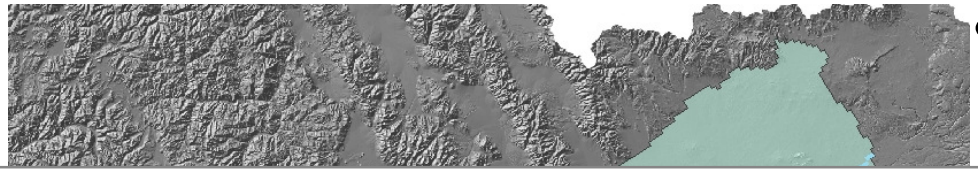
- Group C Springs

- Group C Springs

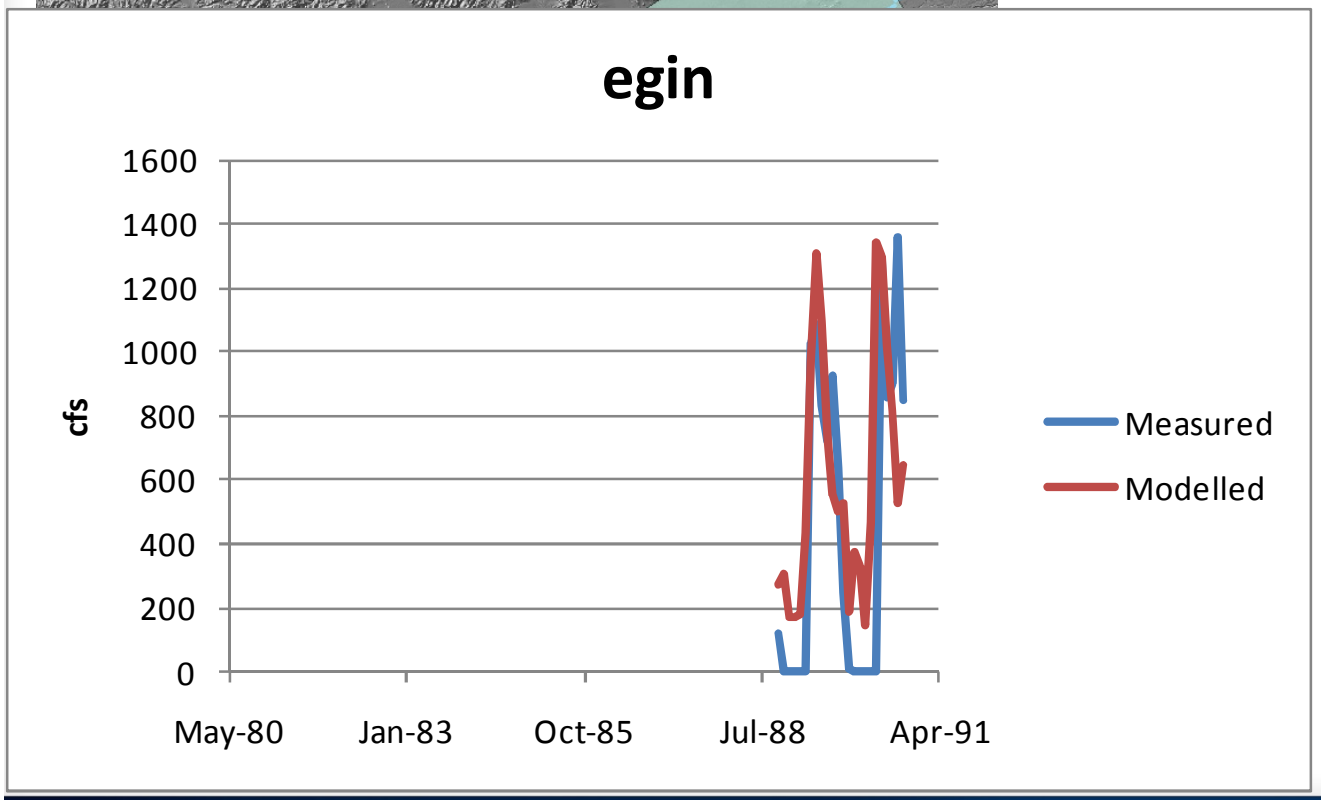


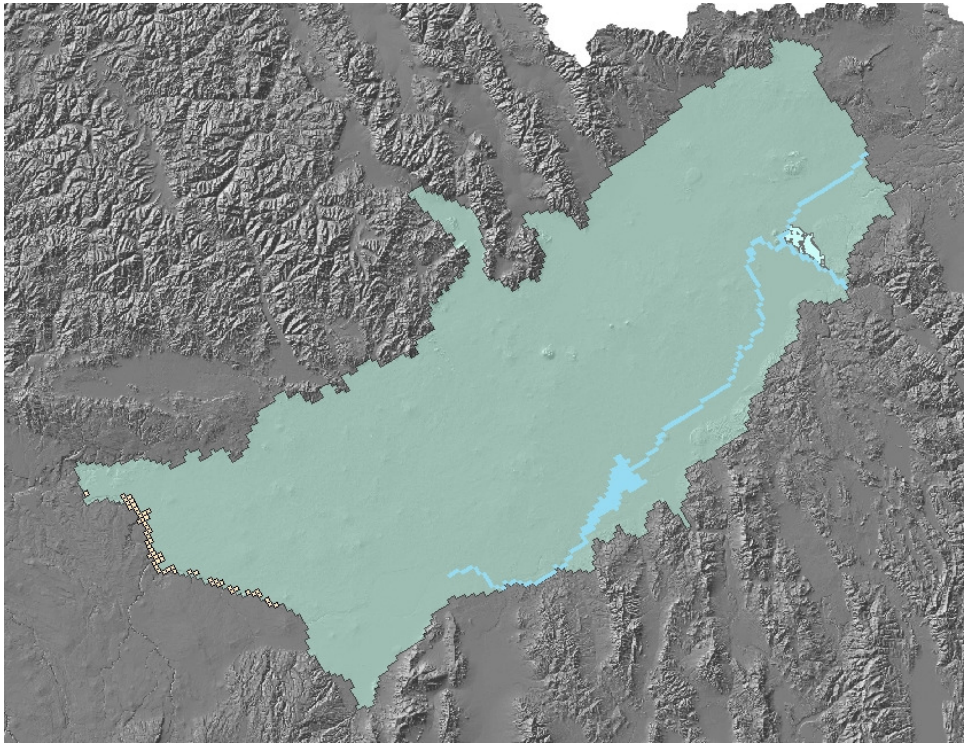


- Egin returns

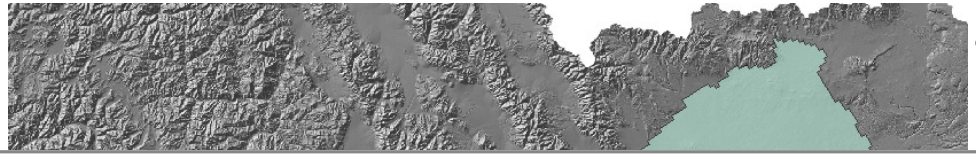


- Egin returns

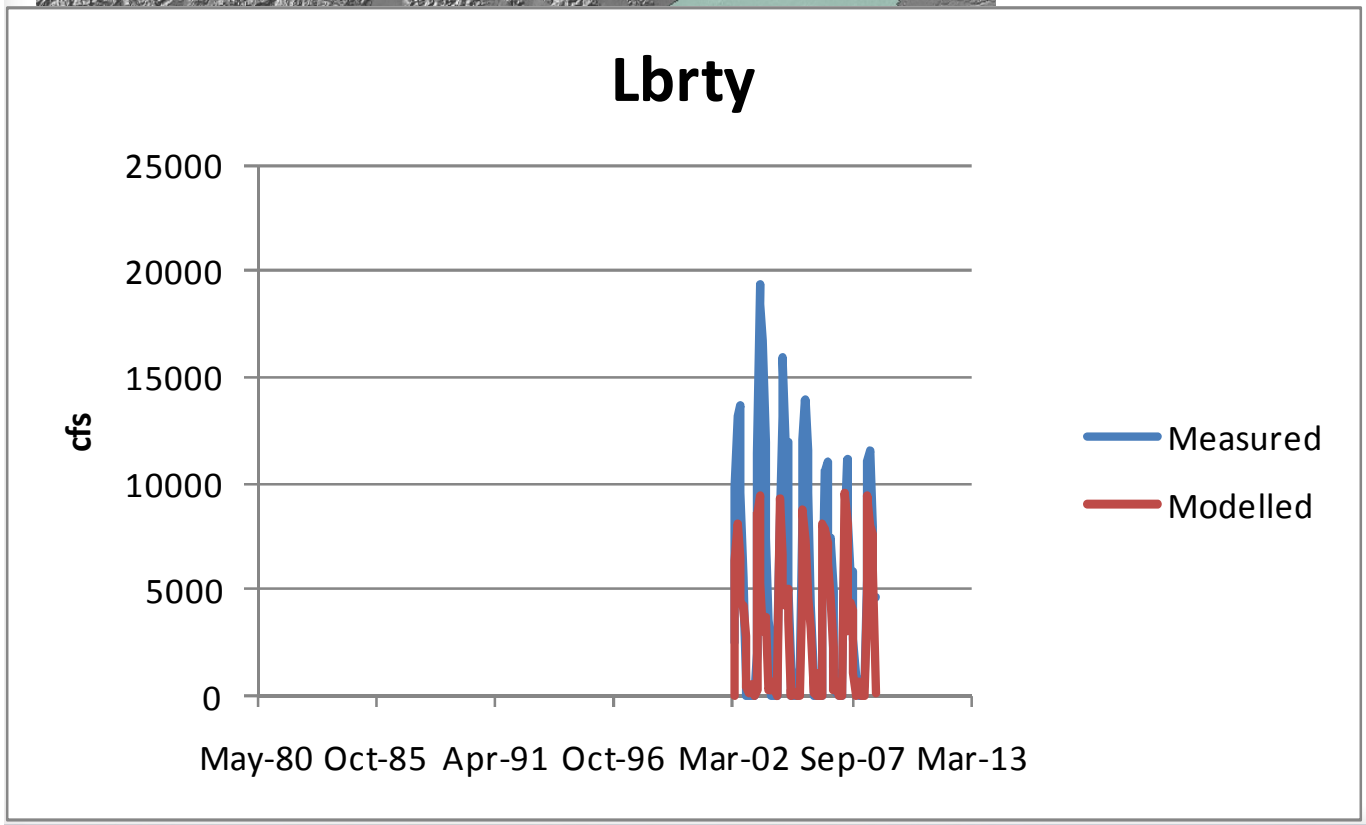


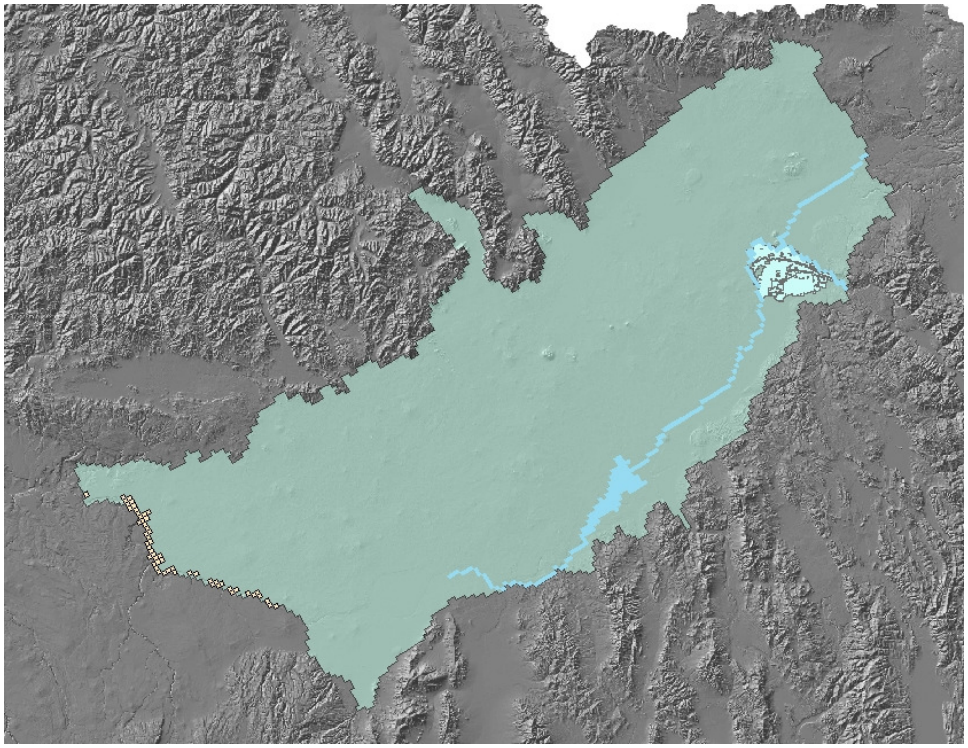


- Liberty returns

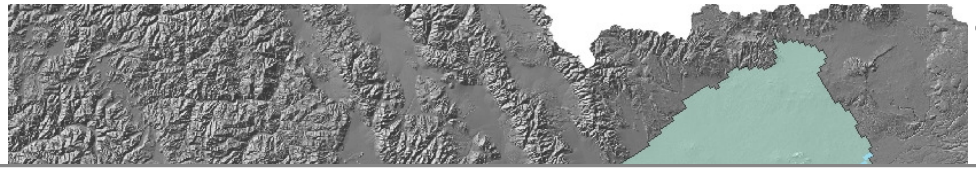


- Liberty returns

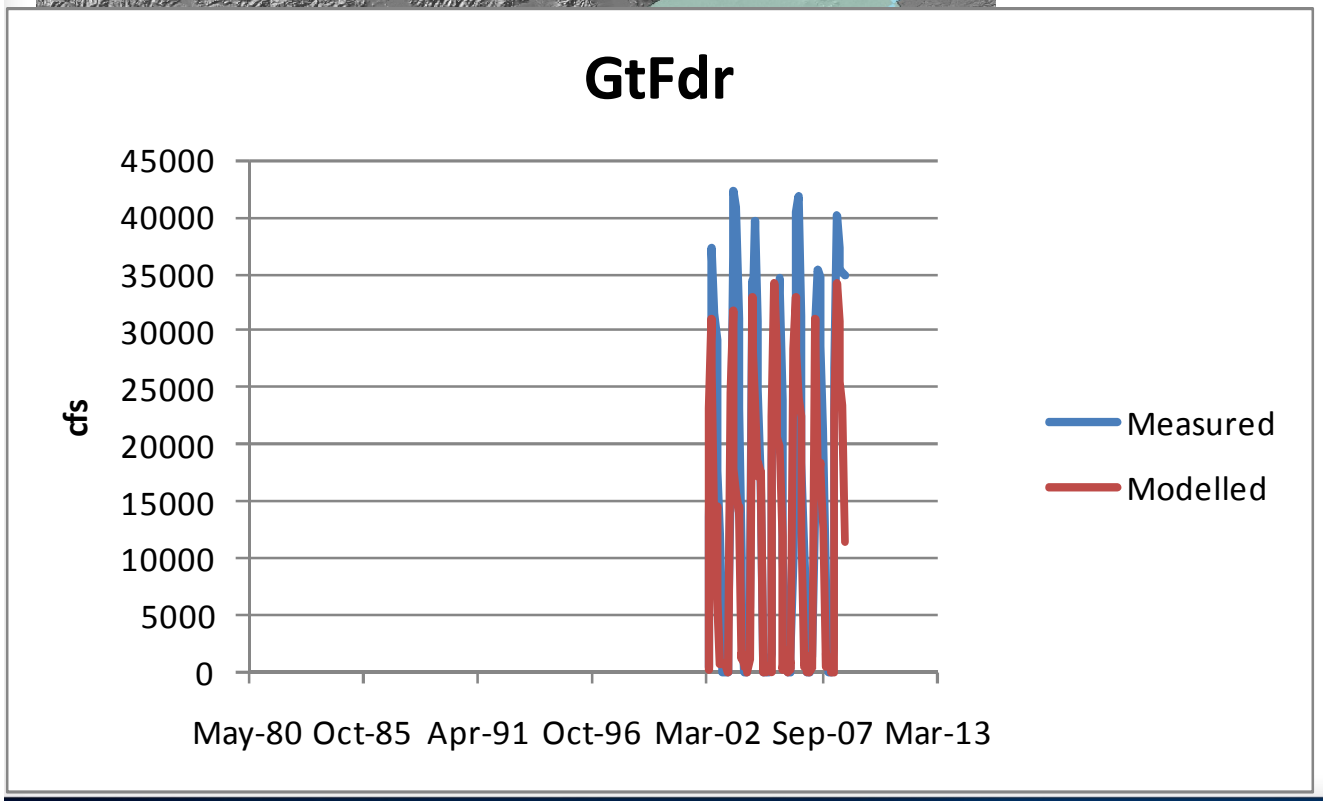


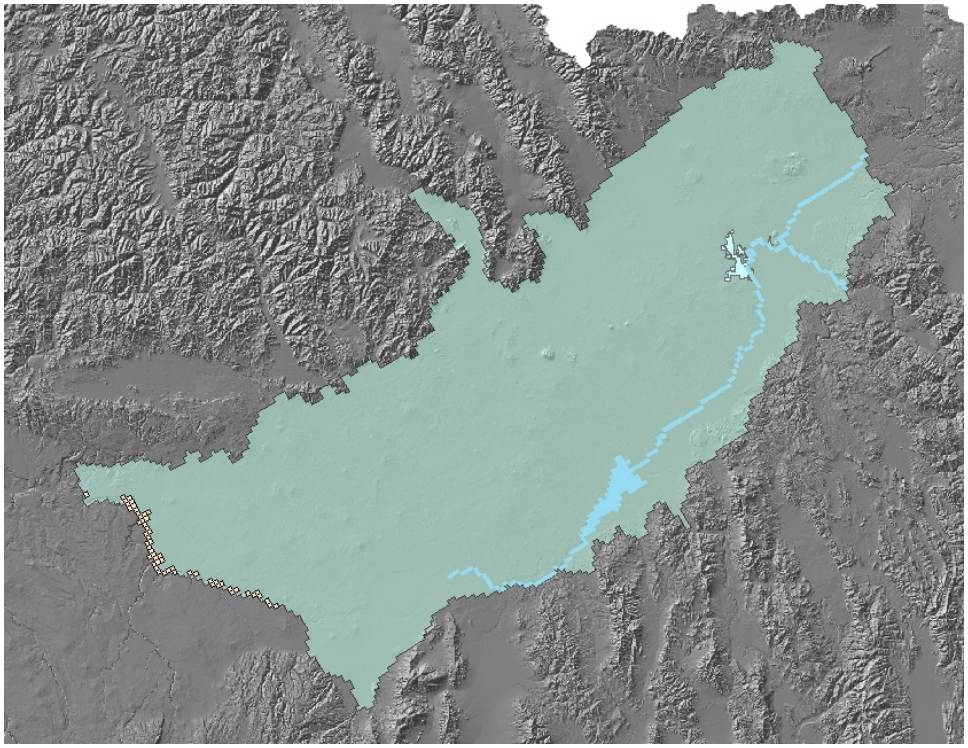


- Great Feeder Group returns

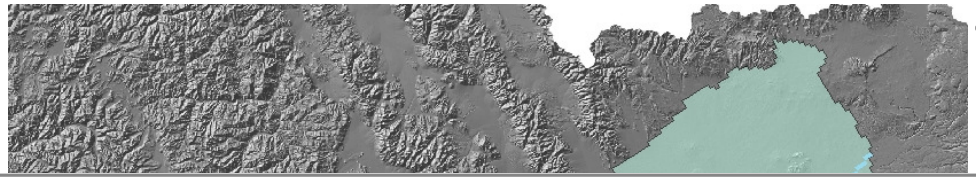


- Great Feeder Group returns

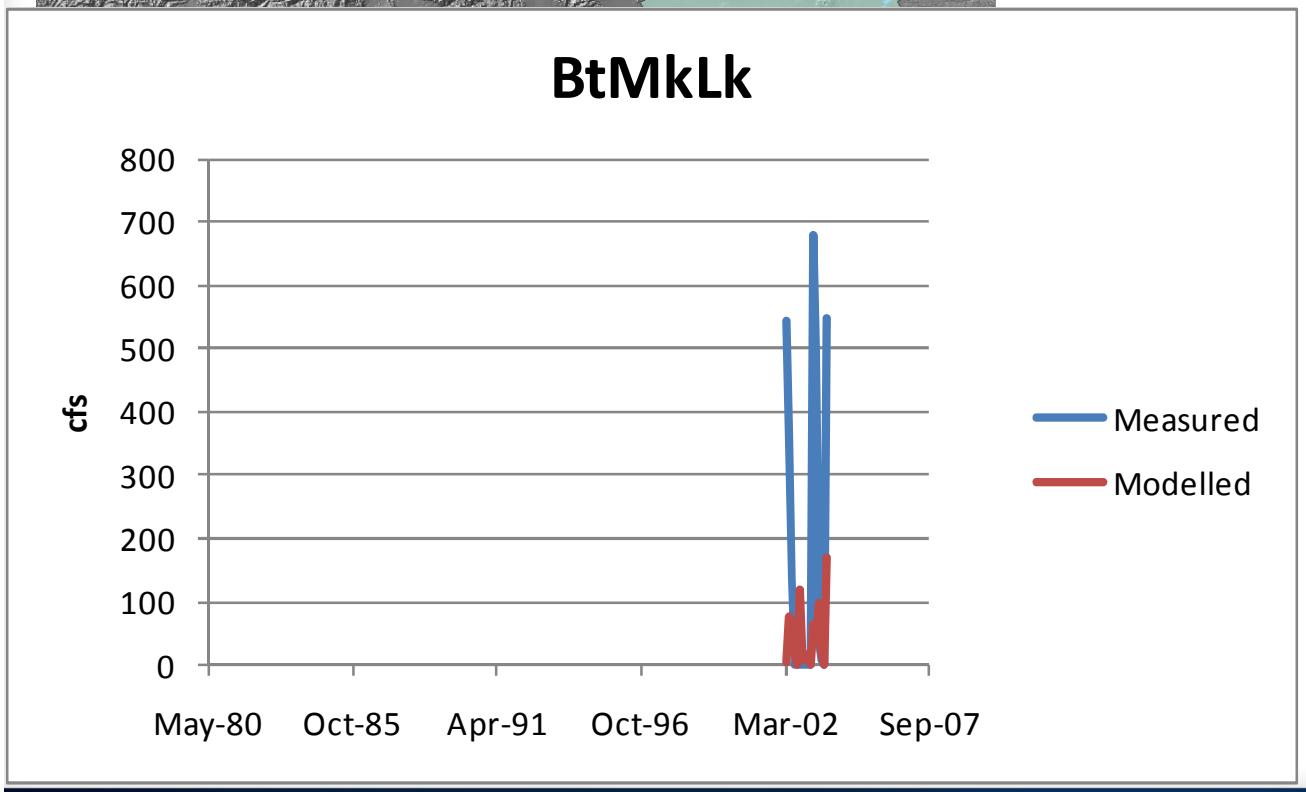


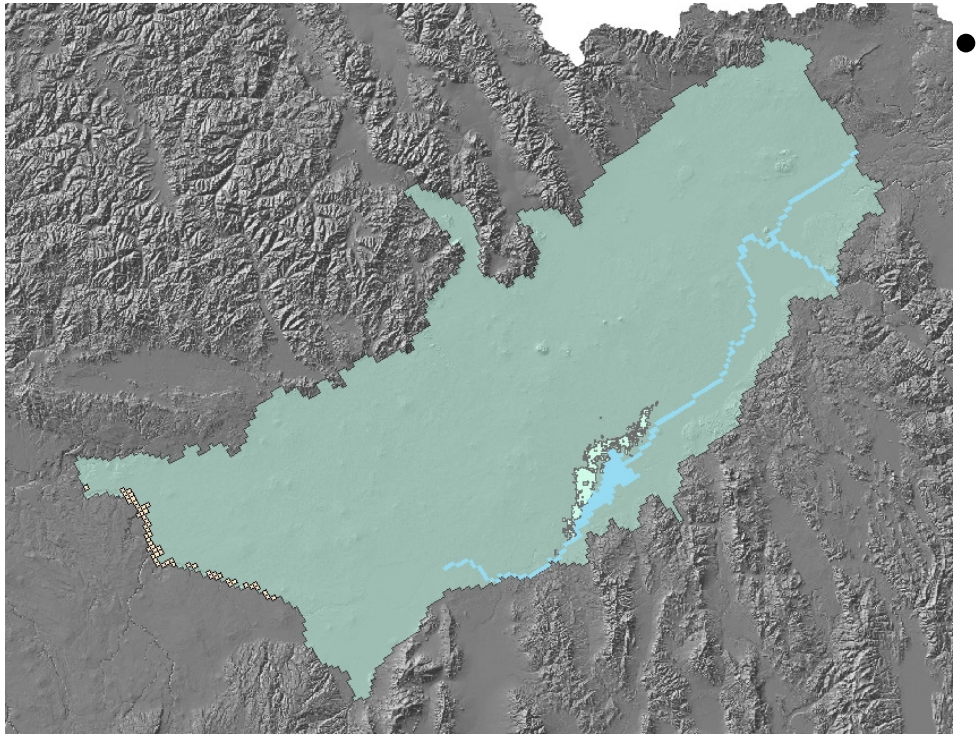


- Butte-Market Lake returns

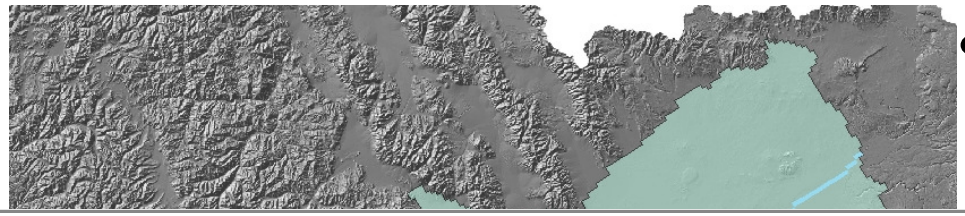


- Butte-Market Lake returns

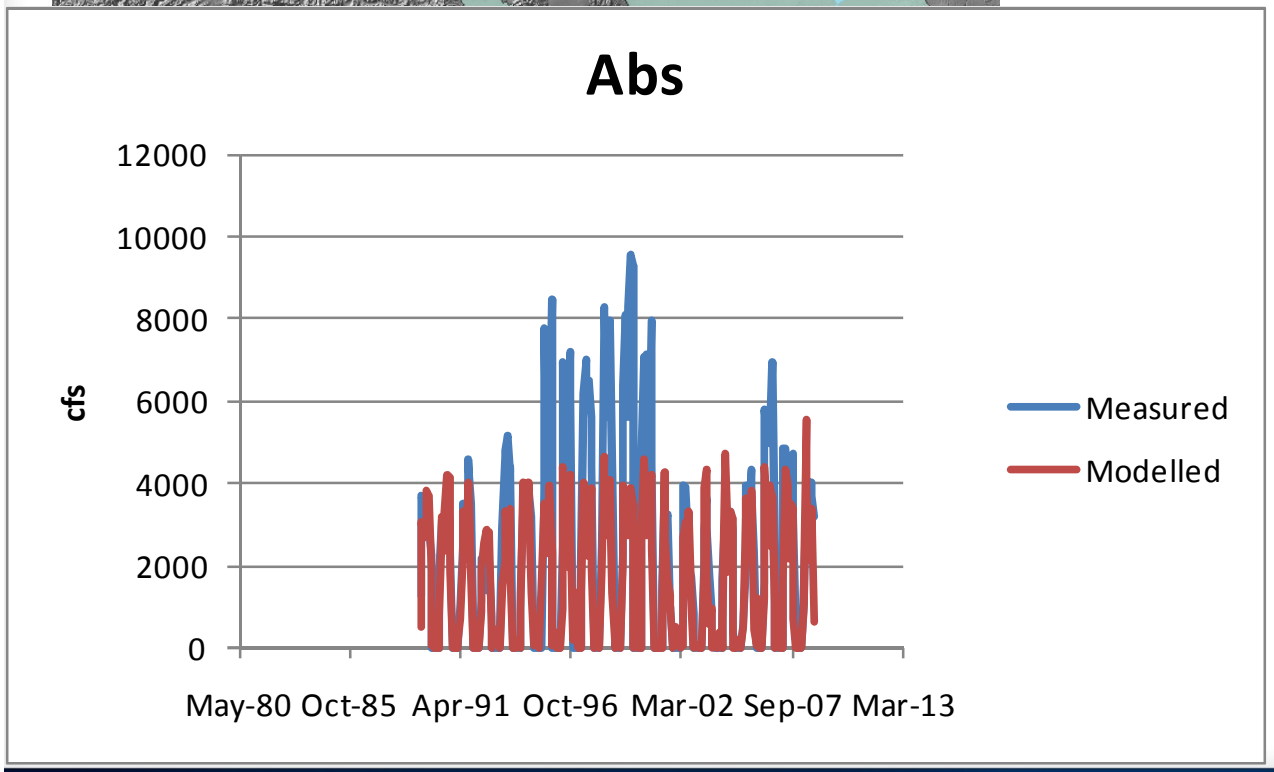


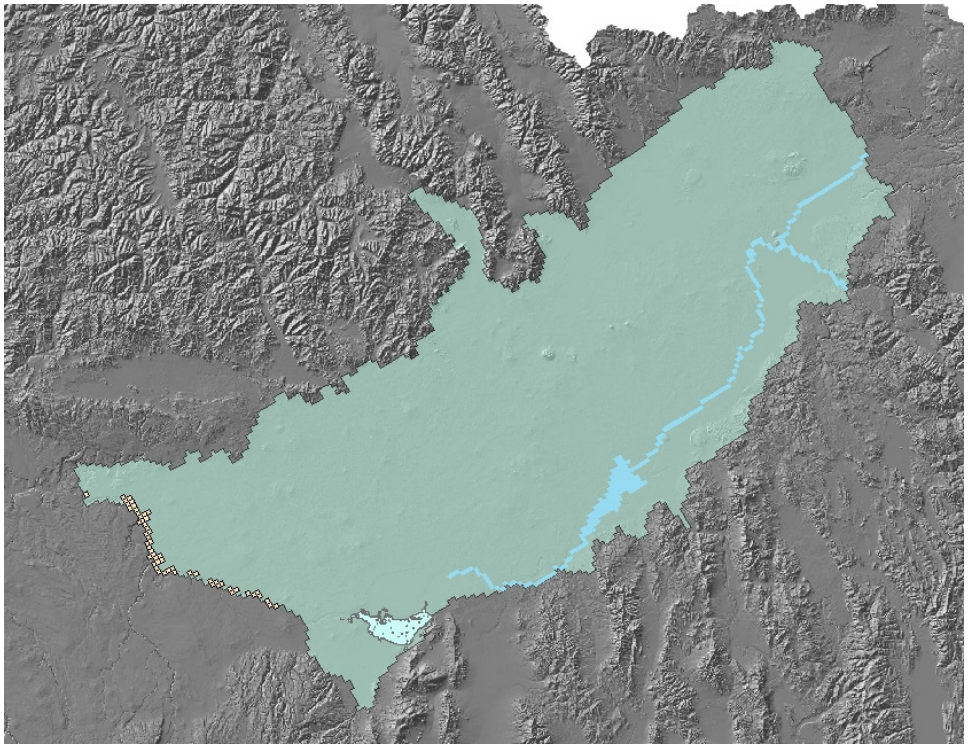


- Aberdeen-Springfield returns

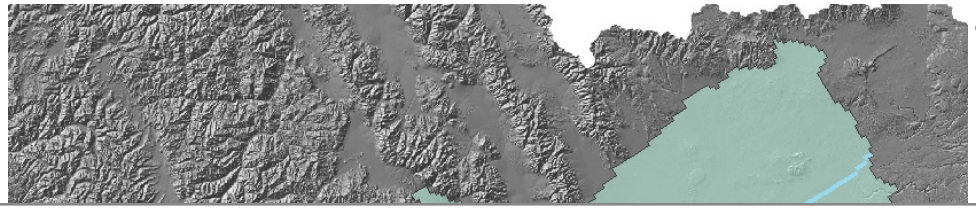


- Aberdeen-Springfield returns

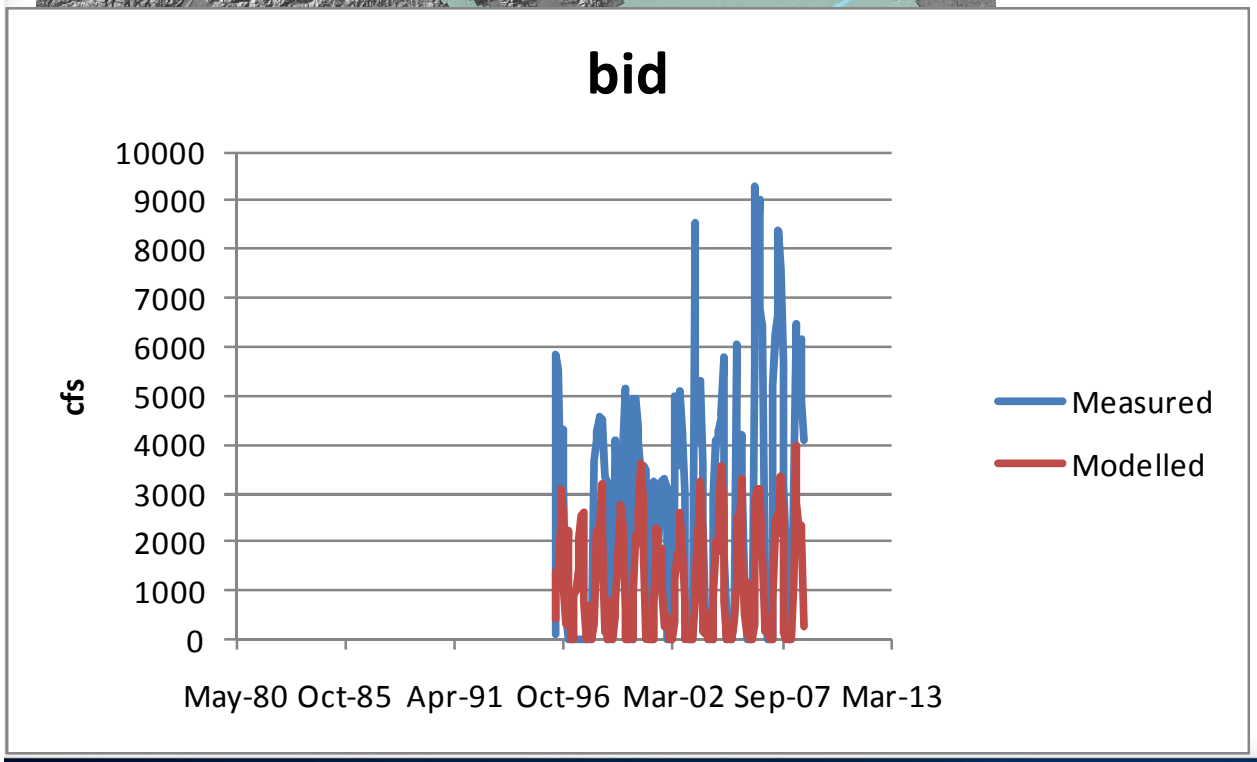


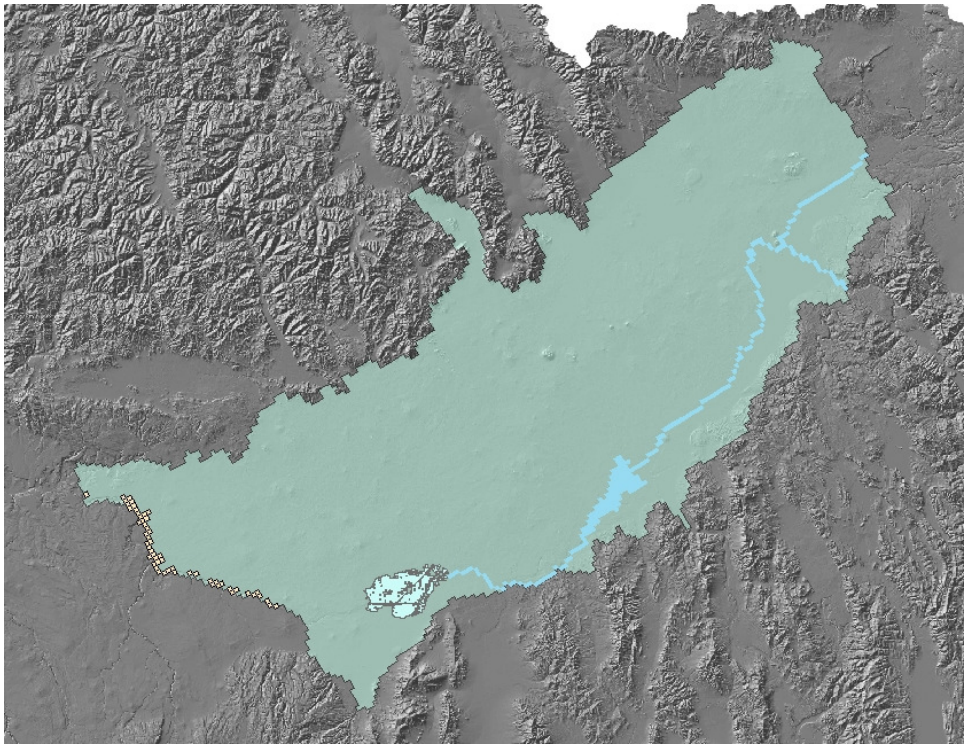


- Burley Irrigation District returns

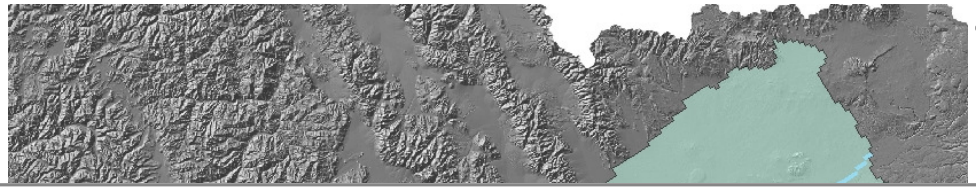


- Burley Irrigation District returns

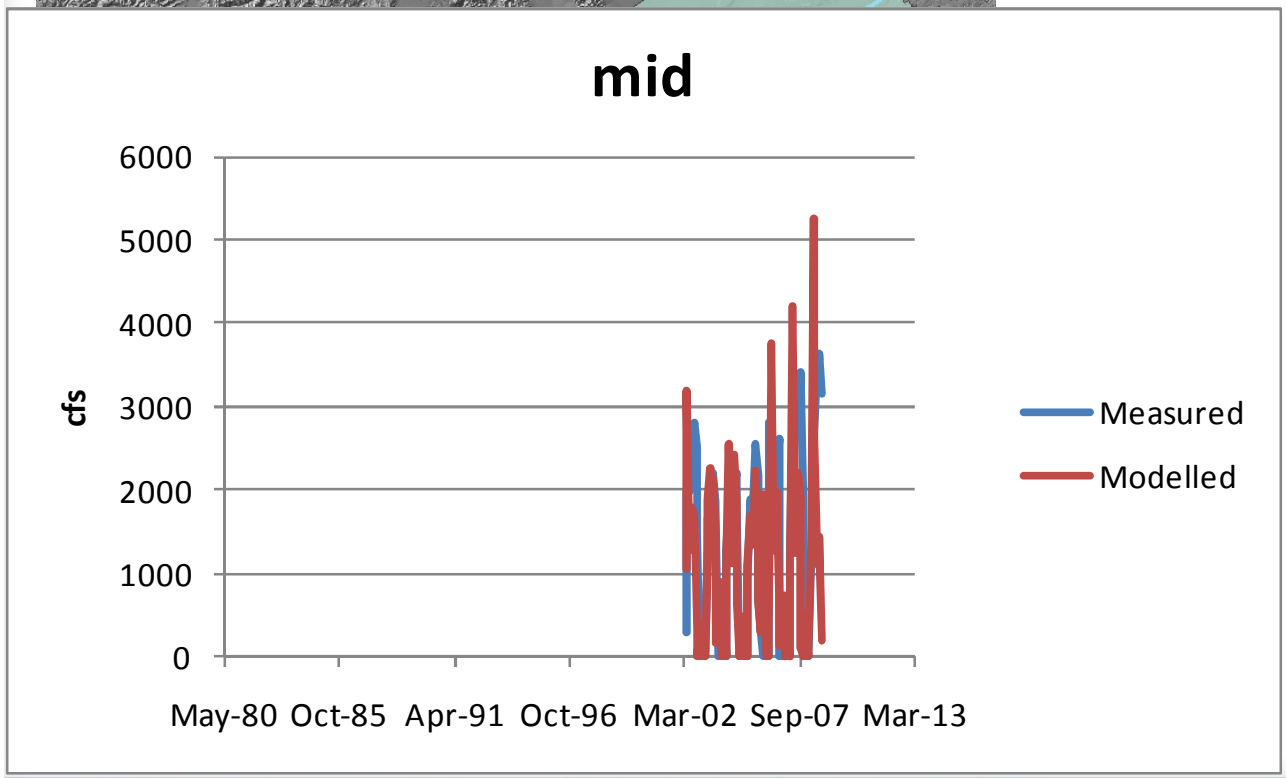


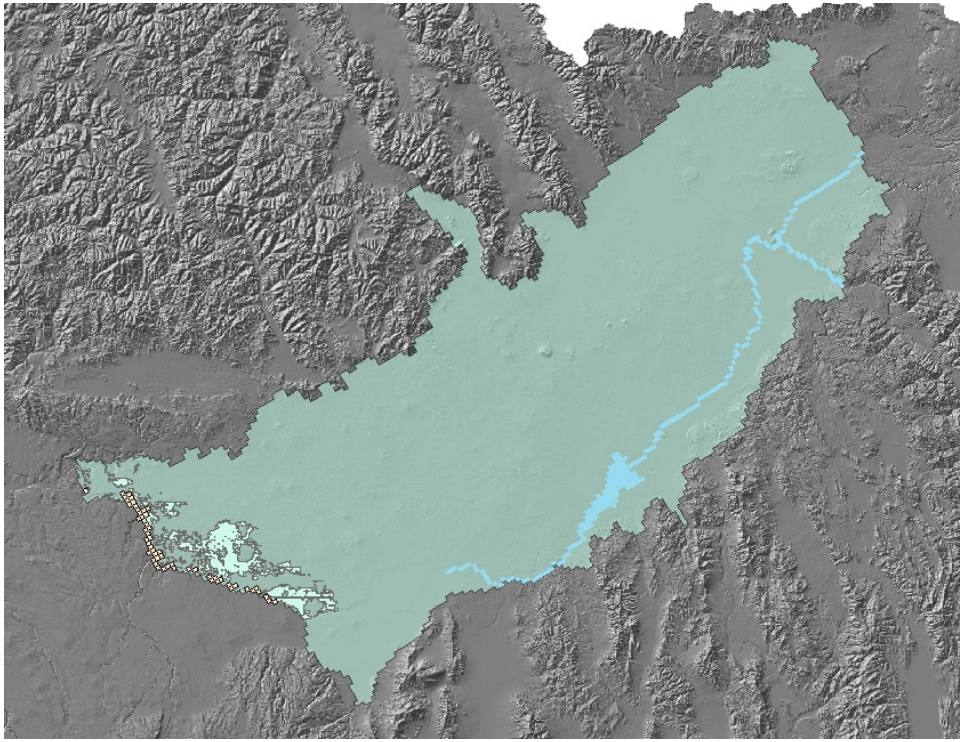


- Minidoka Irrigation District returns

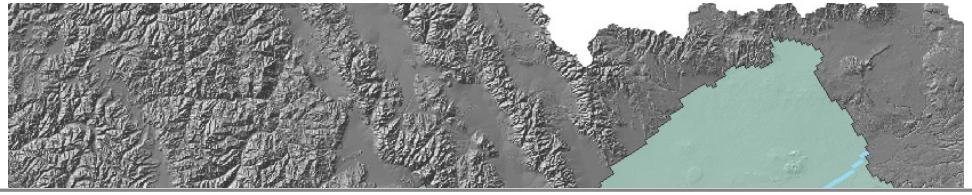


- Minidoka Irrigation District returns

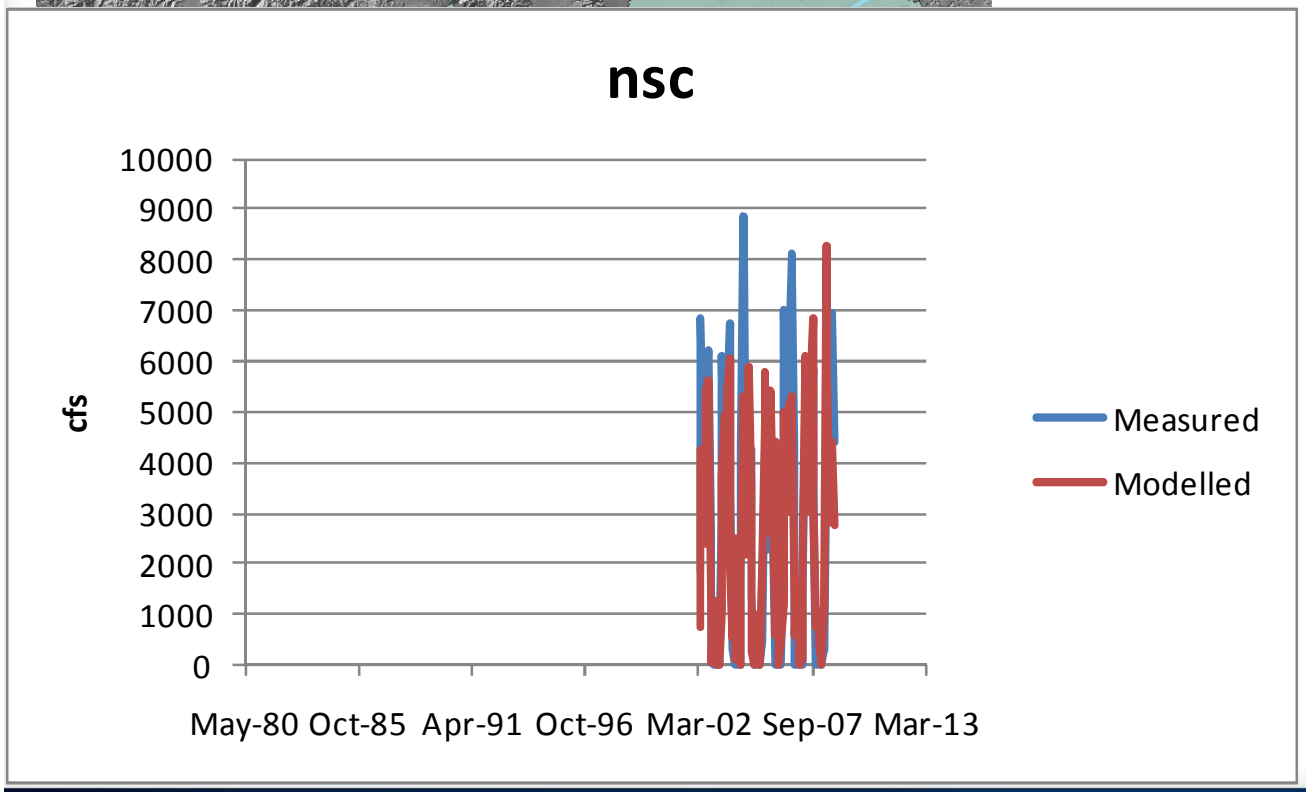


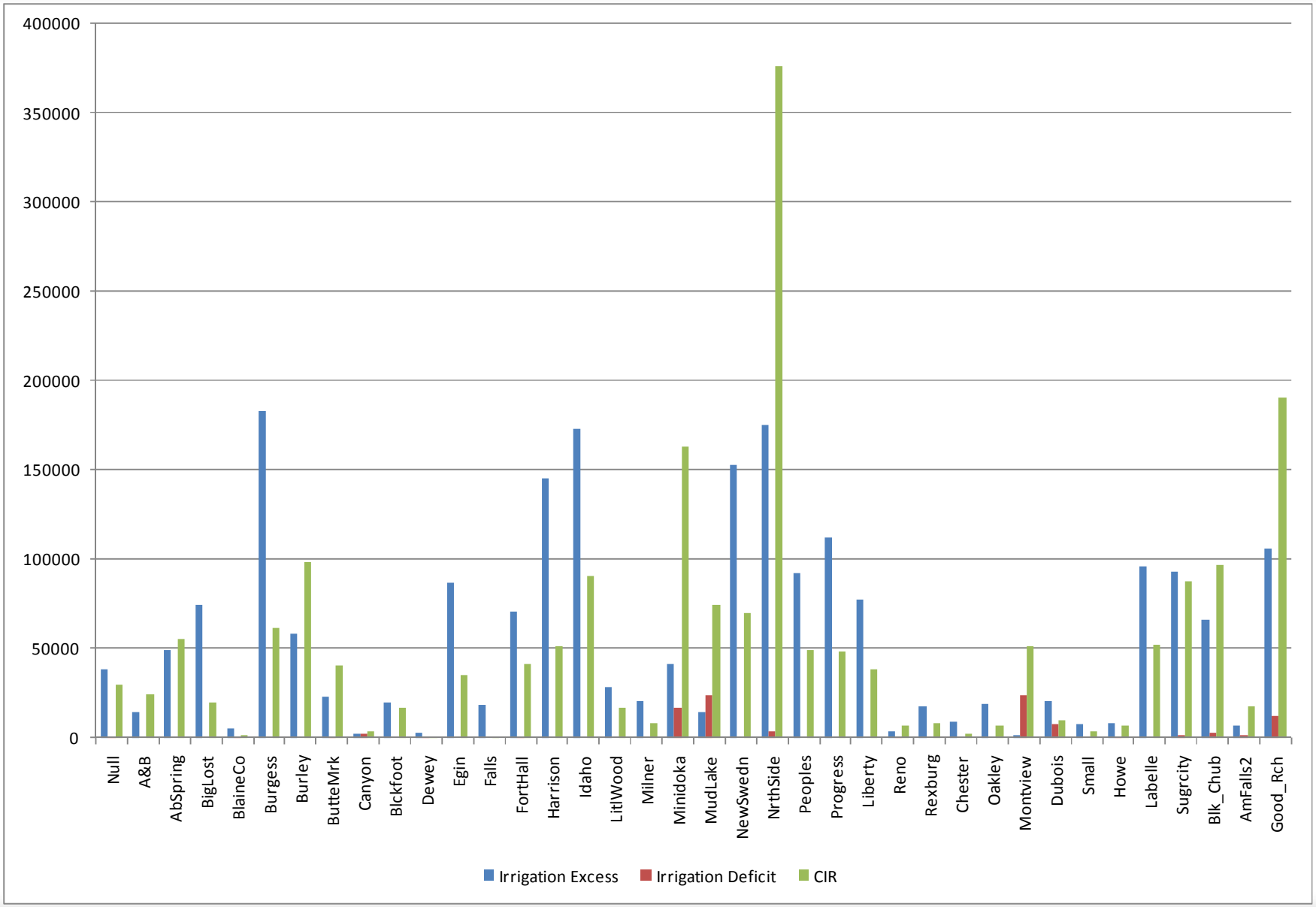


- North Side Canal Co returns



- North Side Canal Co returns

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Blk_Chub
AmFalls2
Good_Rch
Irrigation Excess
Irrigation Deficit
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