American Falls Experiment

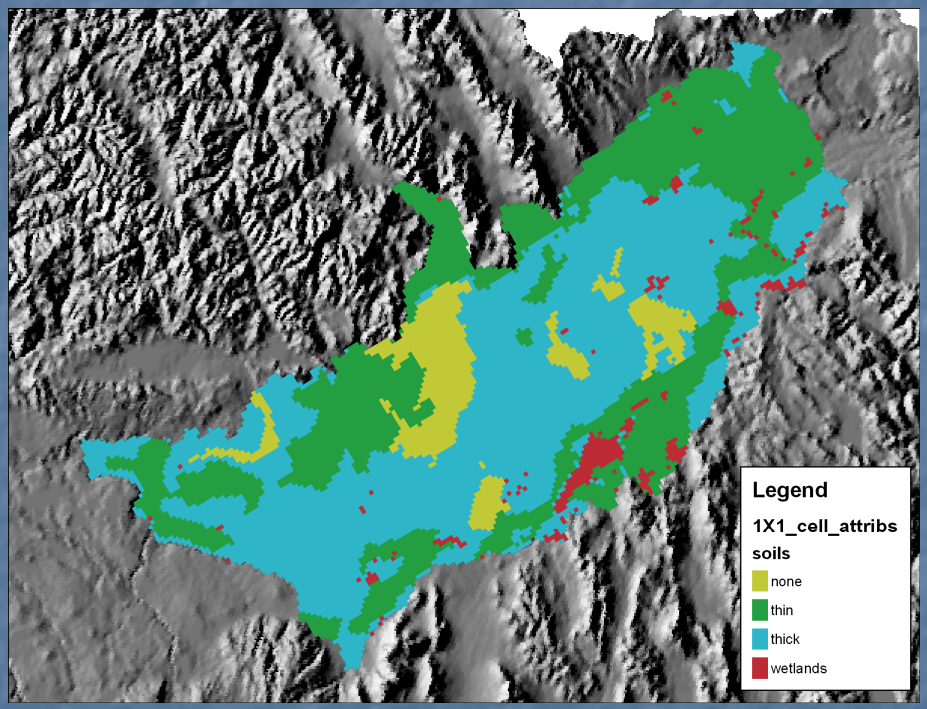
Allan Wylie

May 6, 2008

Outline

- Physical properties
- Steady state match
  - Head
  - Gain and loss
- Transient match
  - Head
  - Gain and loss match

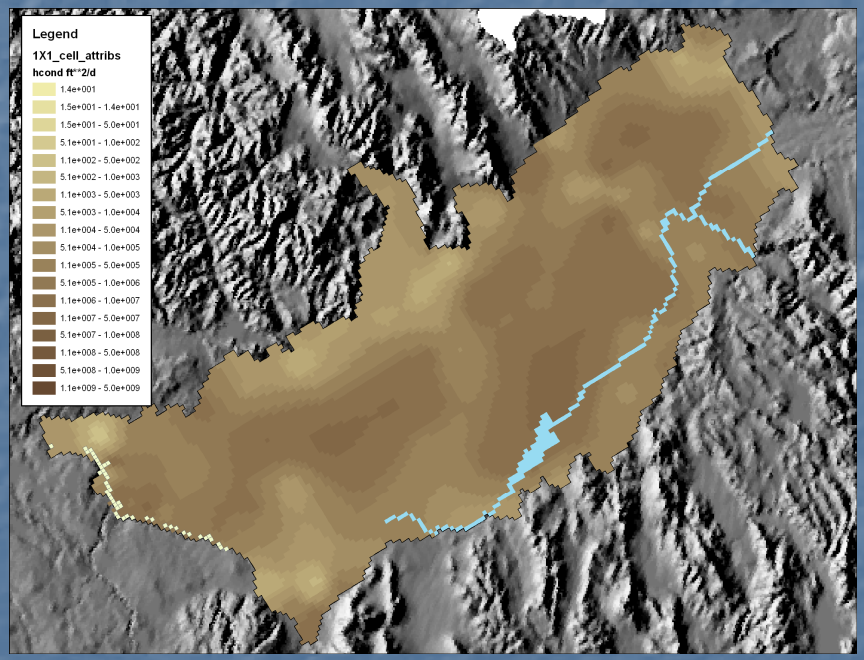
Changes to non-irrigated recharge



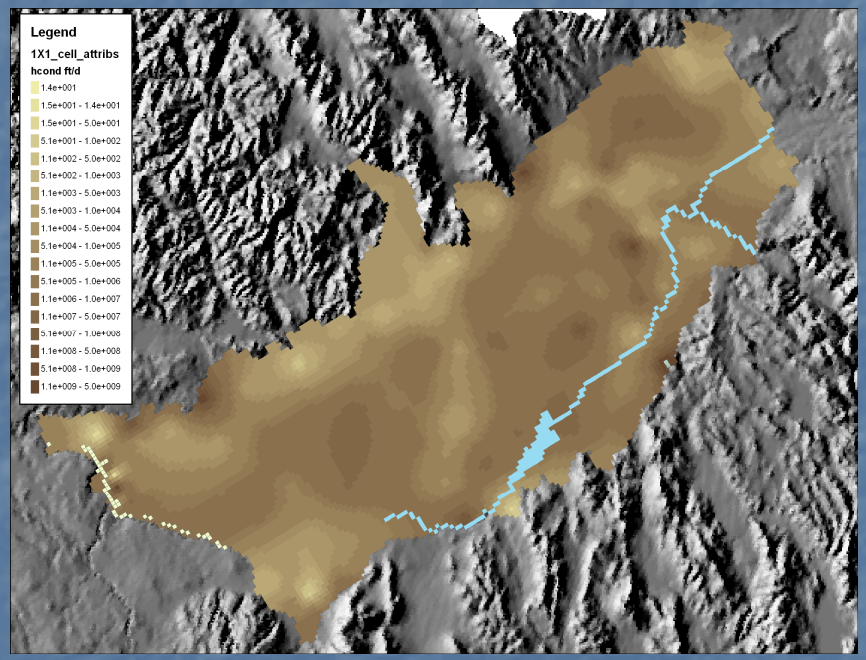
- None (basalt) – 0.81
- Thin soil – 1.2
- Thick soil – 1e-10
- Other – not adjusted

Transmissivity

ESPAM 1.1

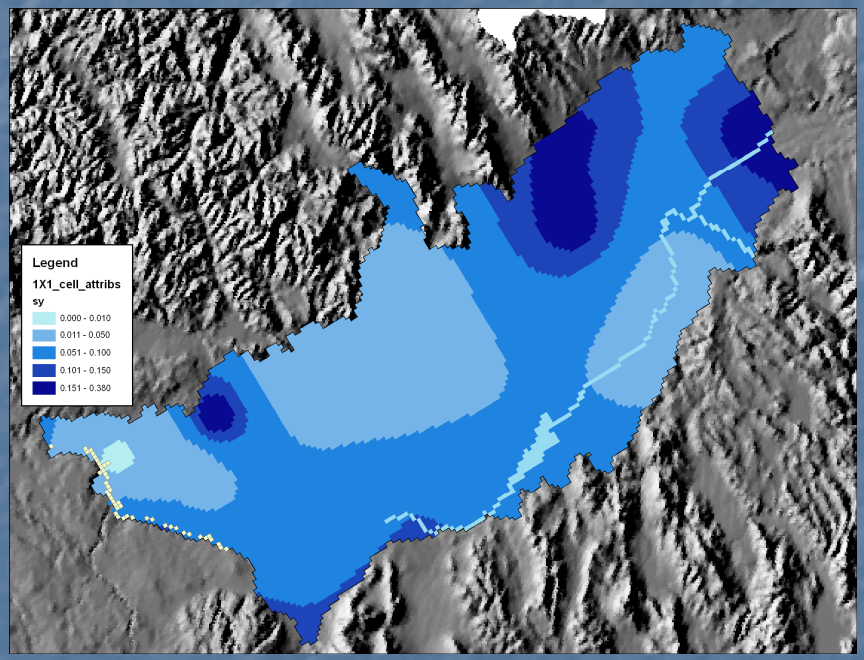


American Falls

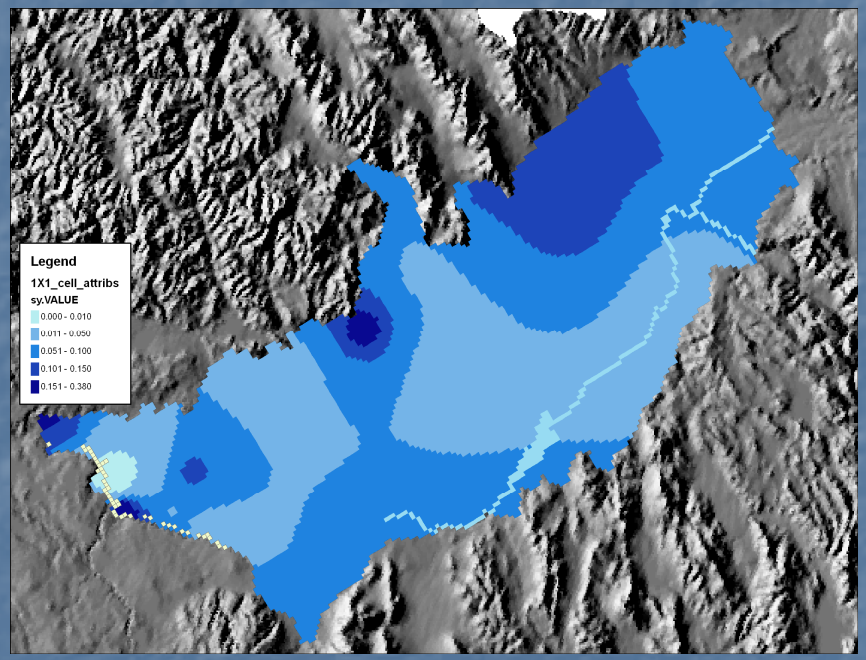


Storage

ESPAM 1.1



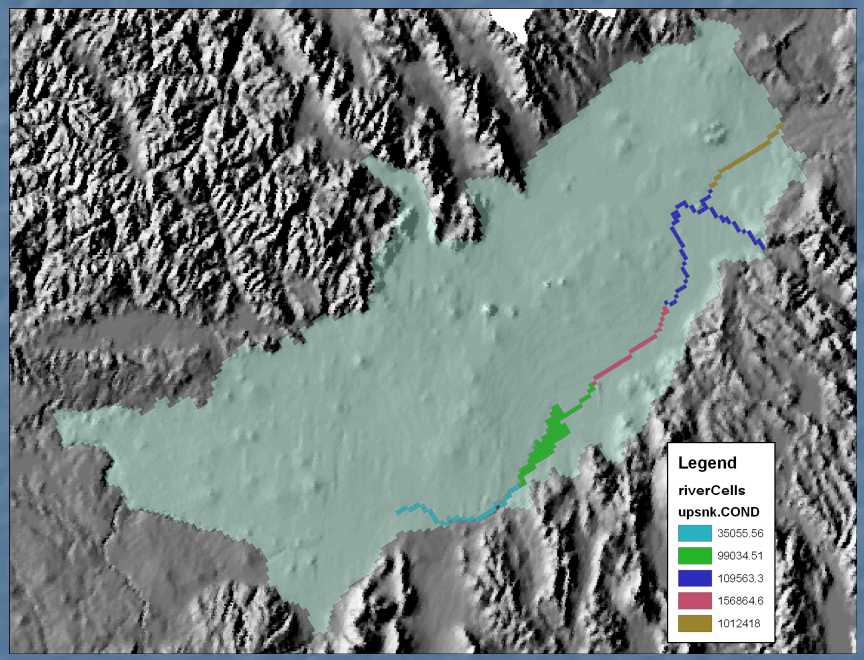
American Falls

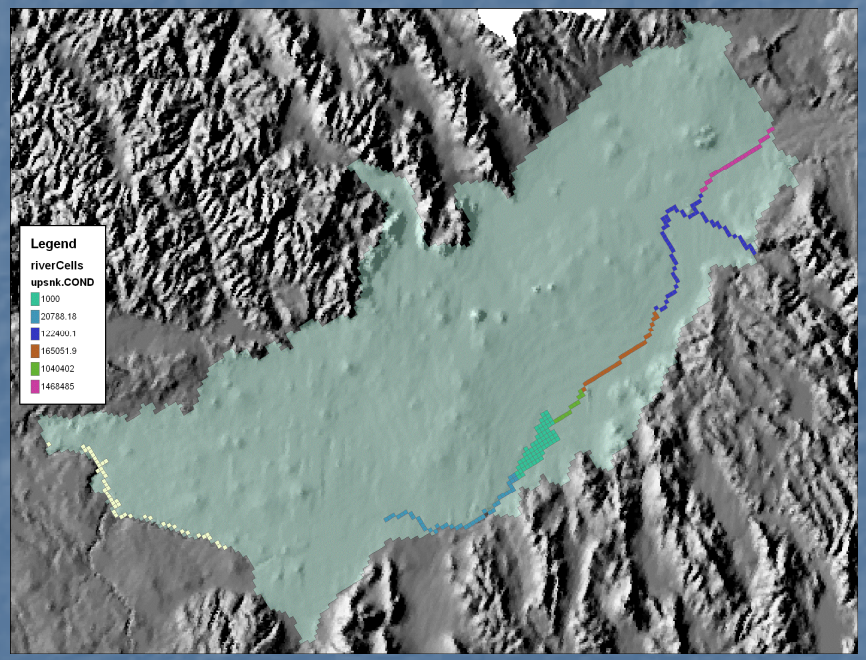


Riverbed conductance

ESPAM 1.1

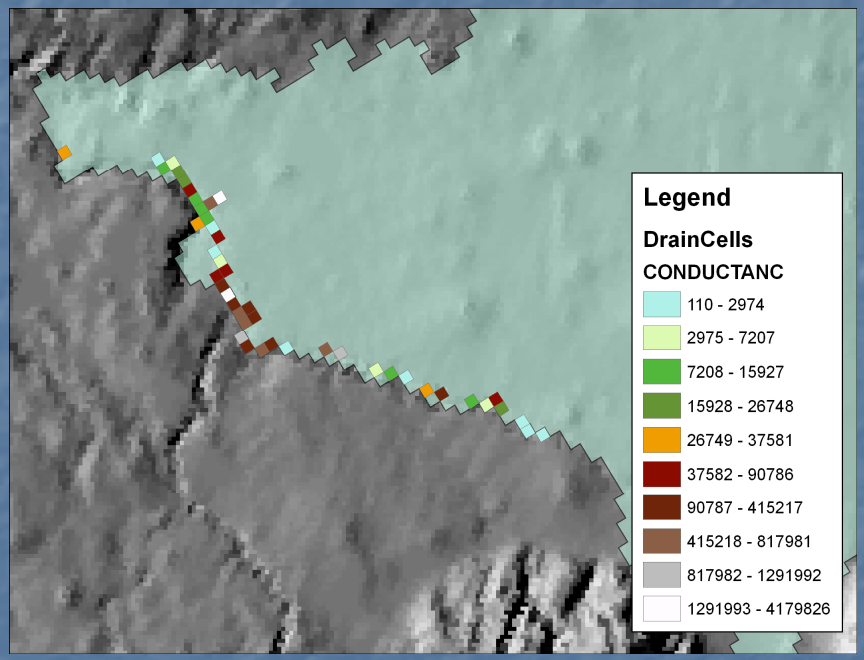
American Falls



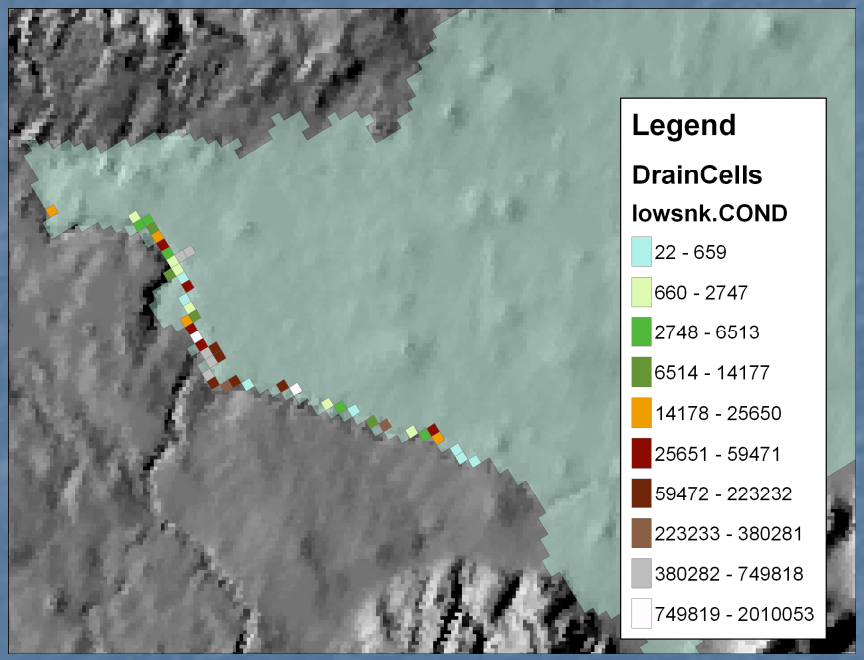


Drain Conductance

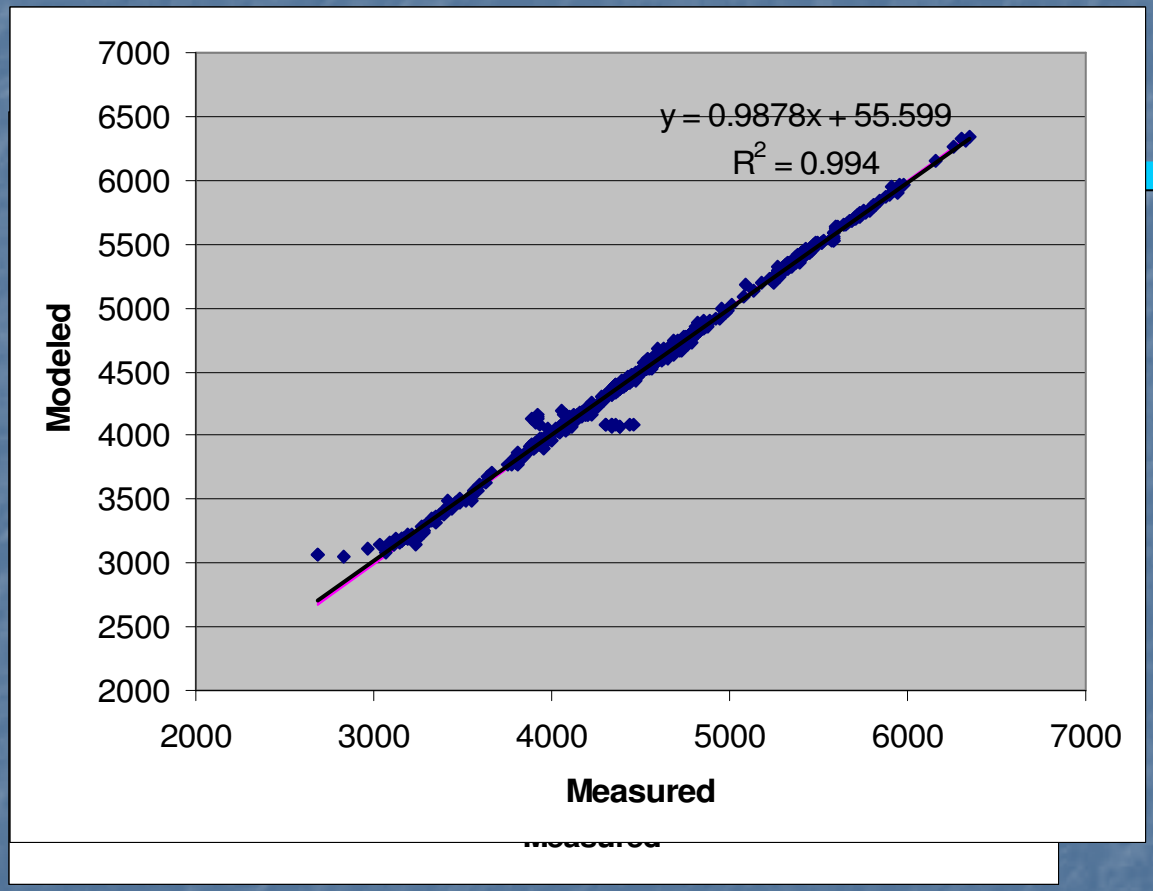
ESPAM 1.1



American Falls

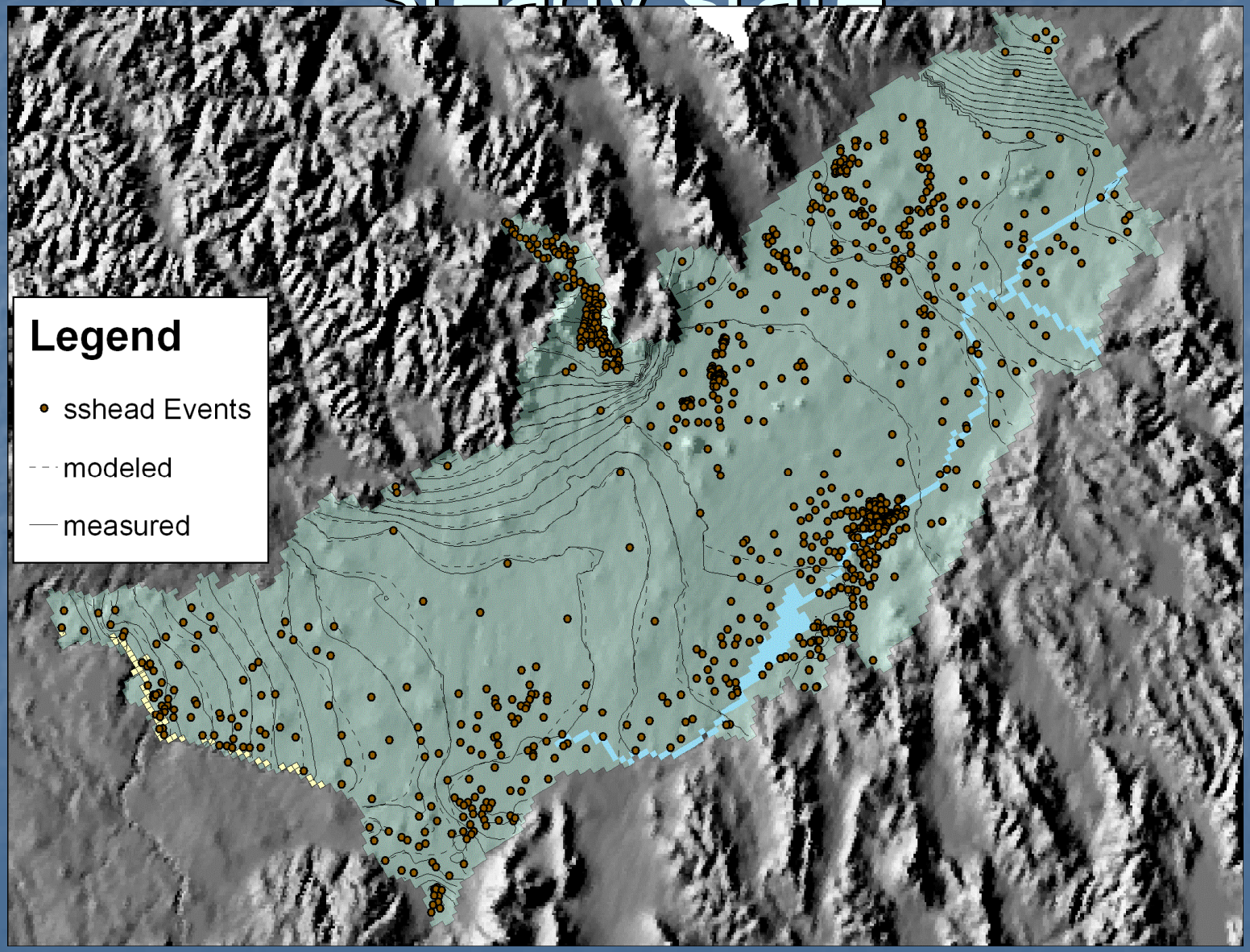


Steady state

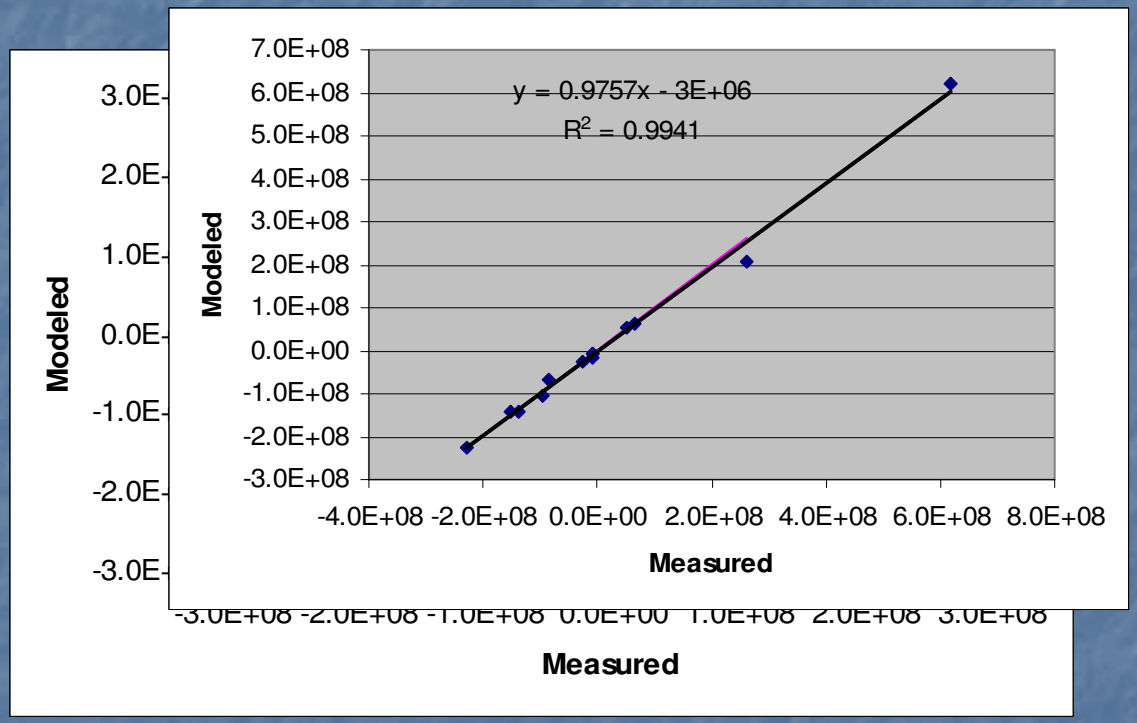


- Head
  - Pink line is 45°
  - If this were a perfect match
    - Y=1x + 0
    - R^2 = 1

Steady state

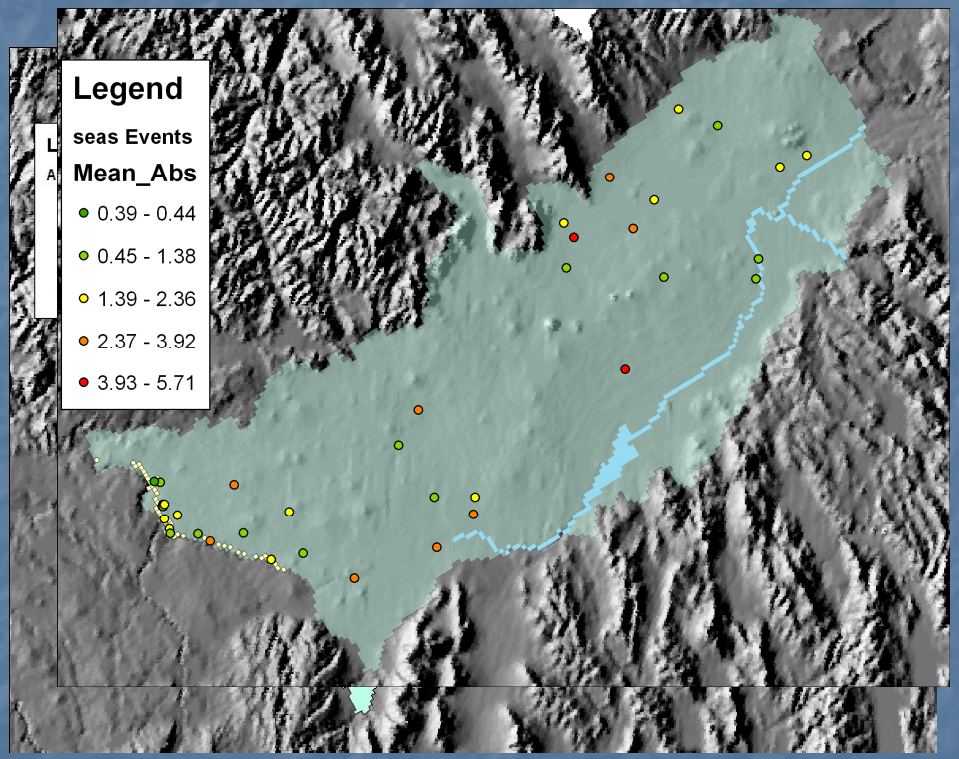


Steady state



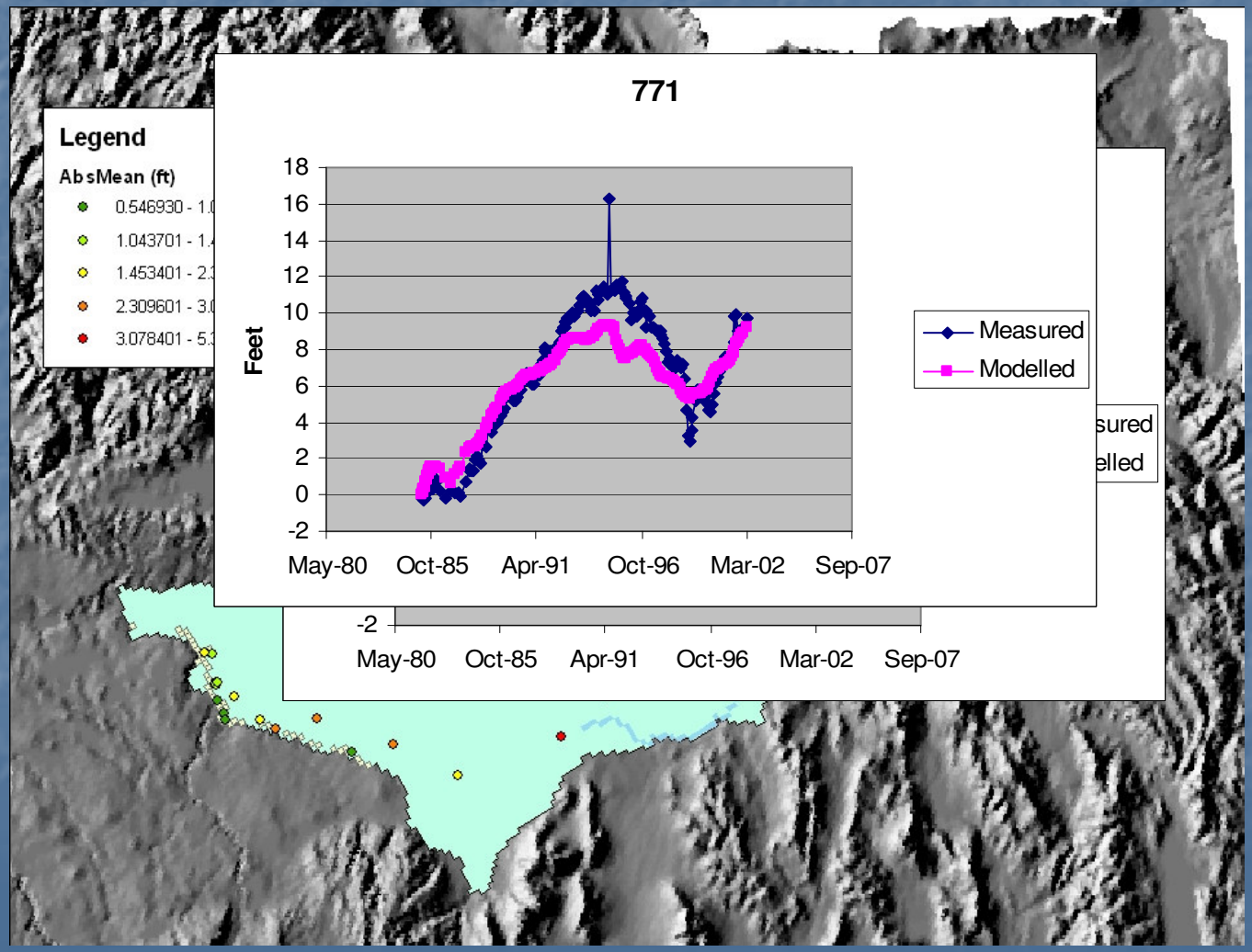
- Gain and loss match
  - Pink line is 45°
  - If this were a perfect match
    - Y=1x + 0
    - R^2 = 1

Seasonal data set

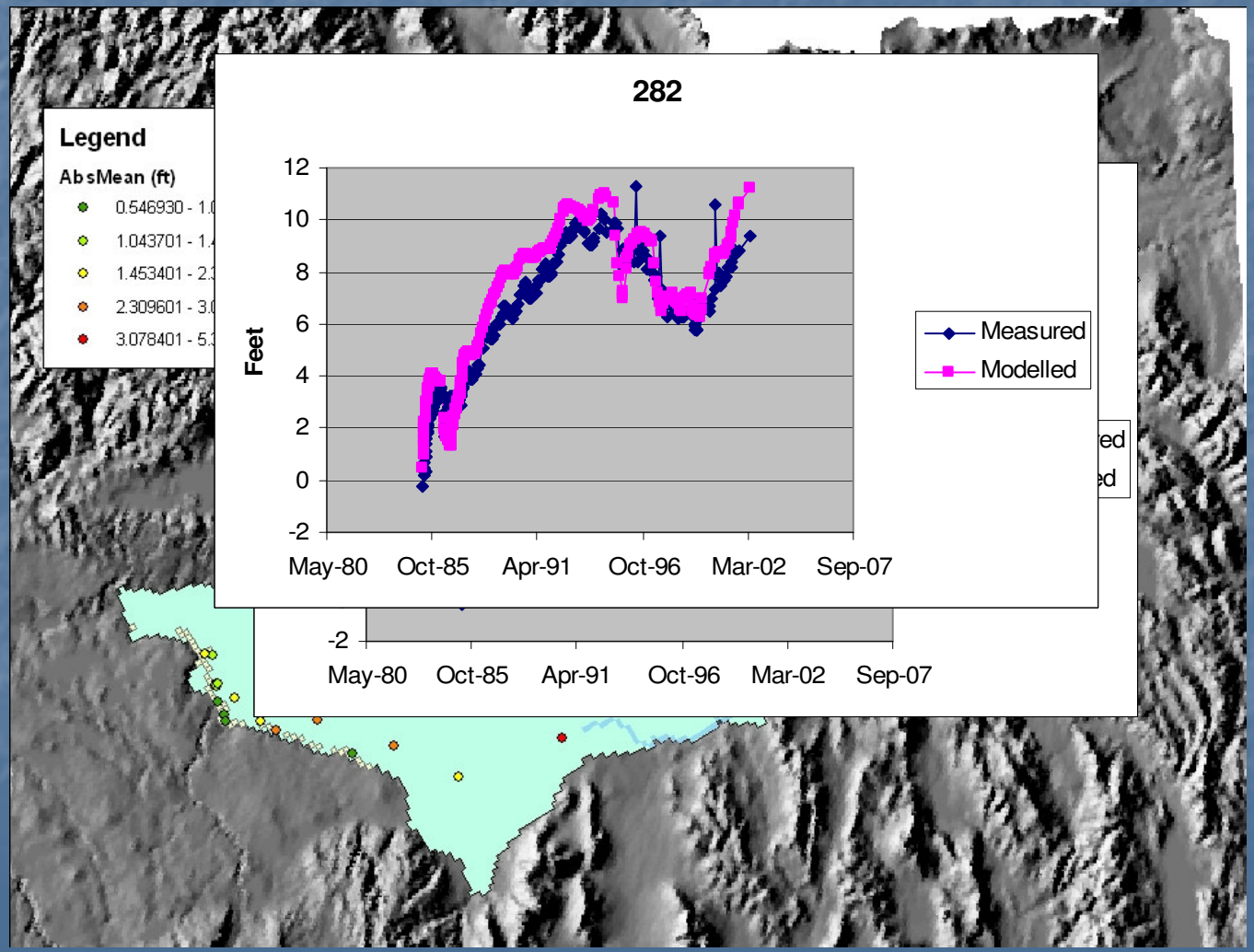


- Hundreds to thousands of observations
  - Lots of data
  - Limited spatial coverage

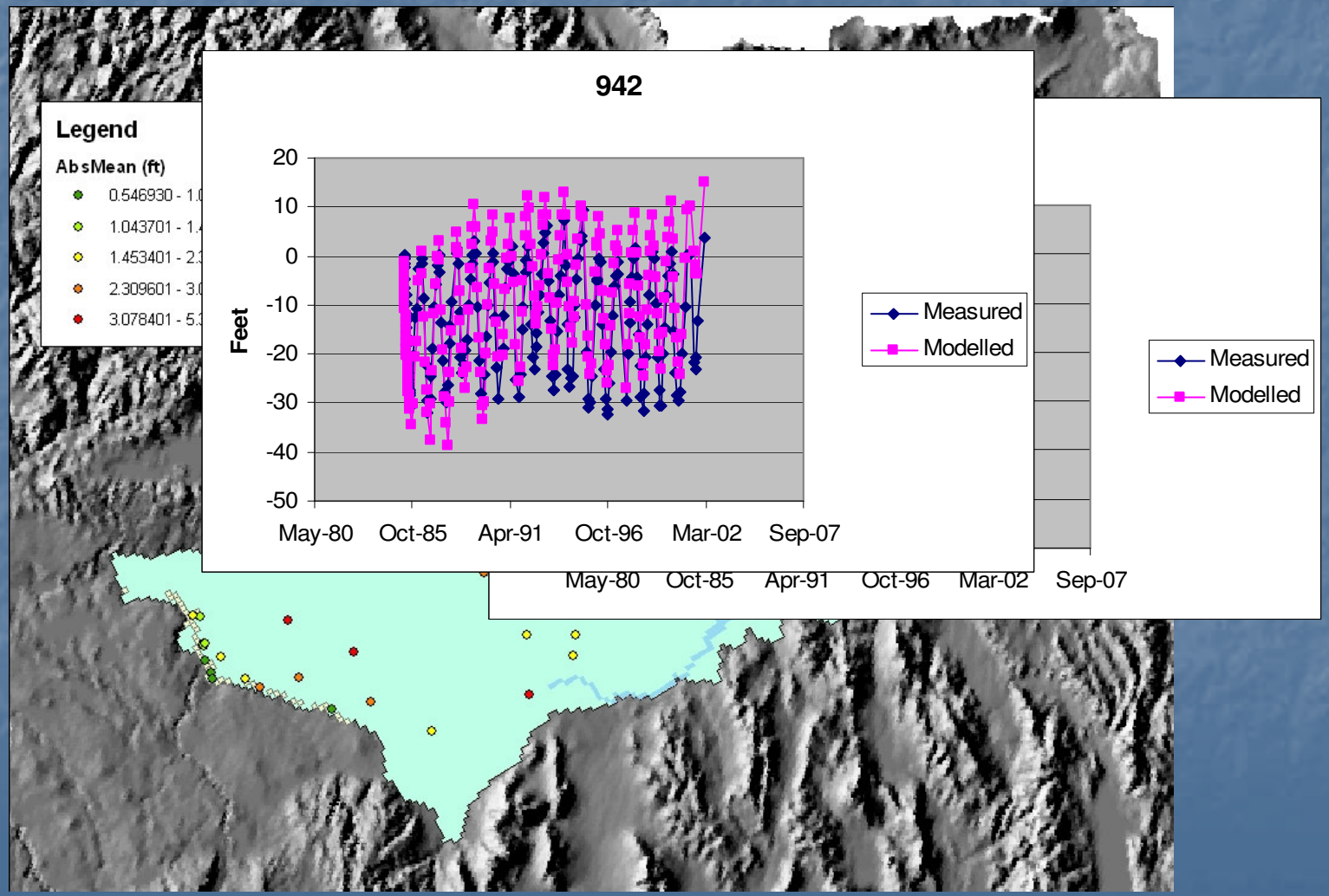
Seasonal data set



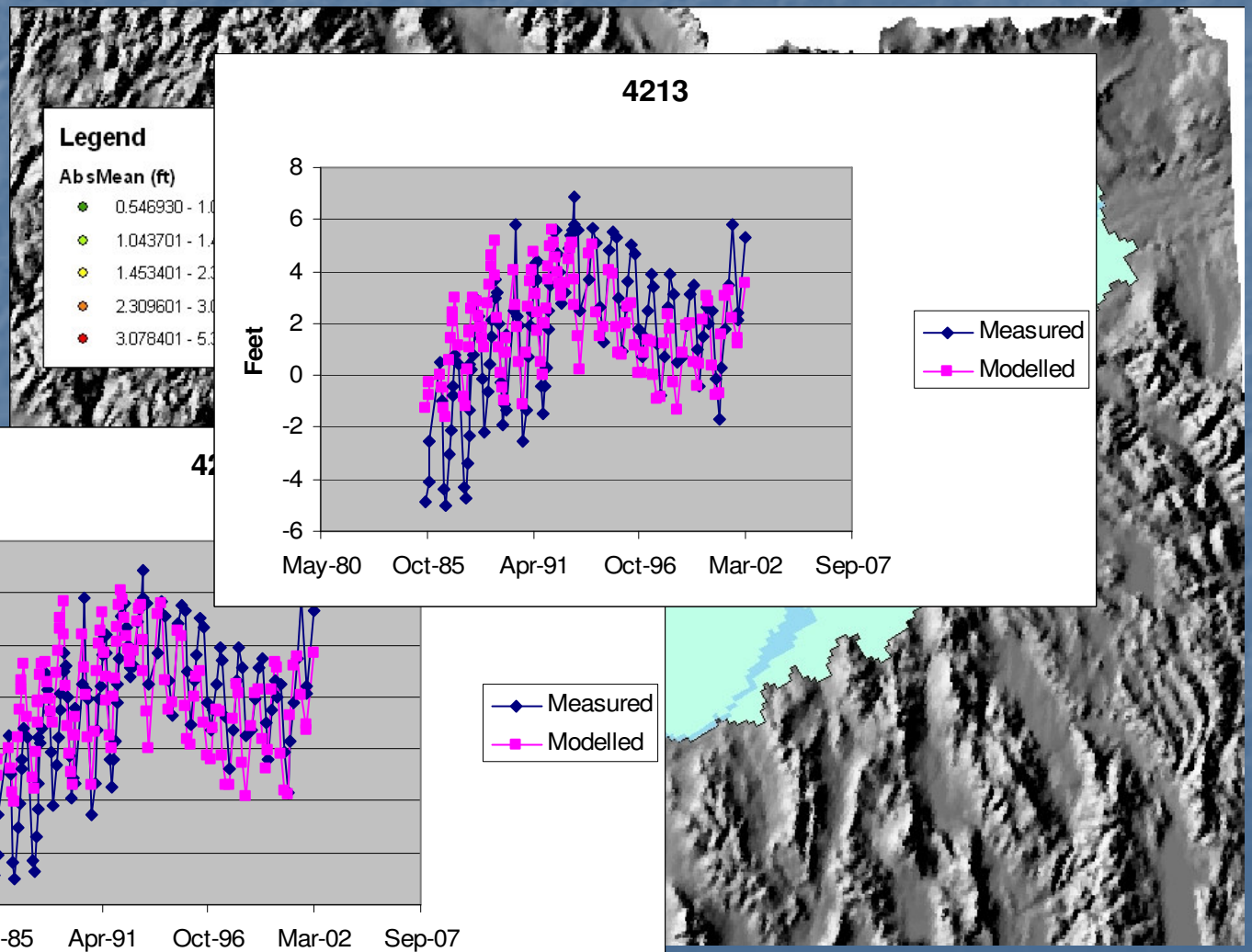
Seasonal data set

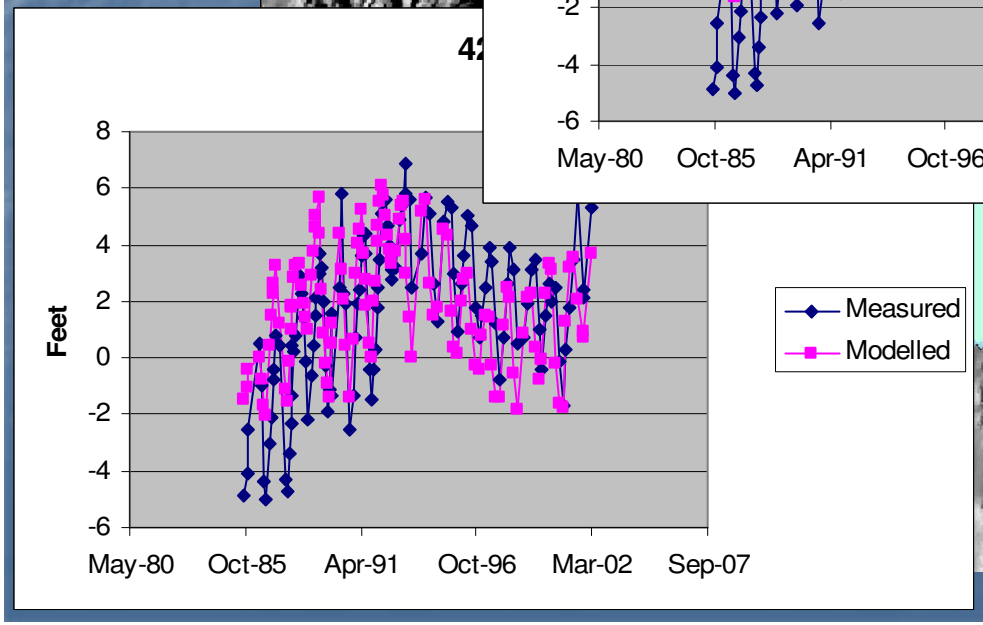


Seasonal data set

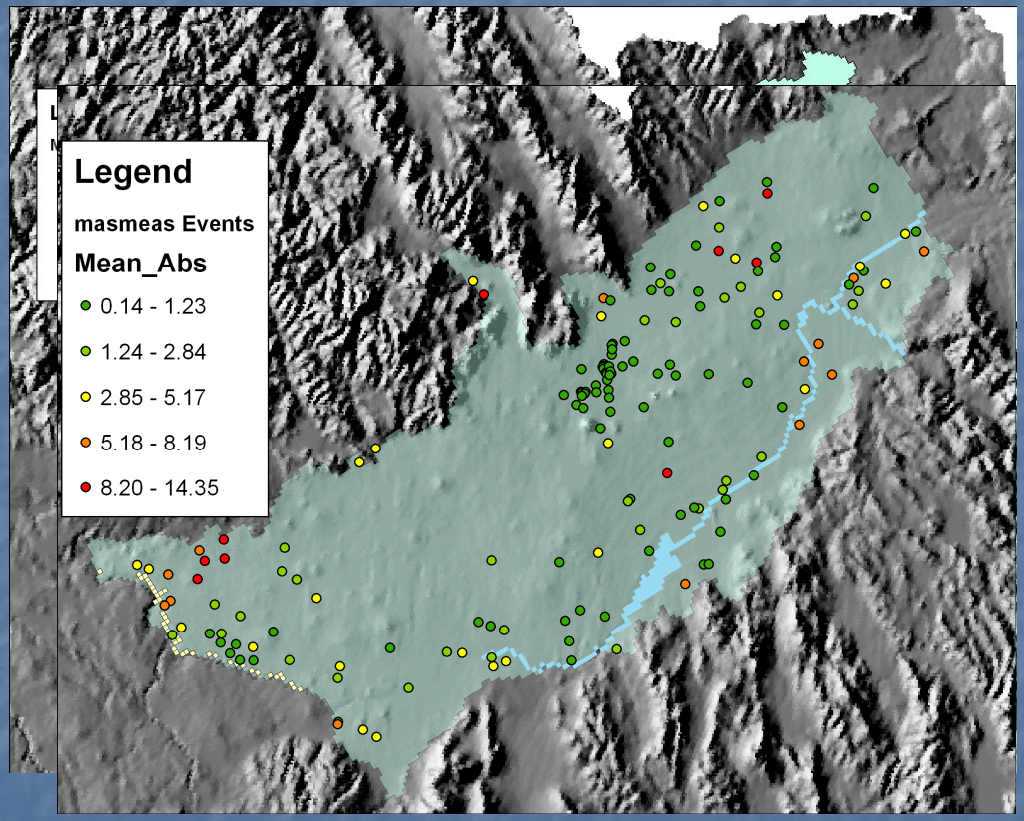


Seasonal data set



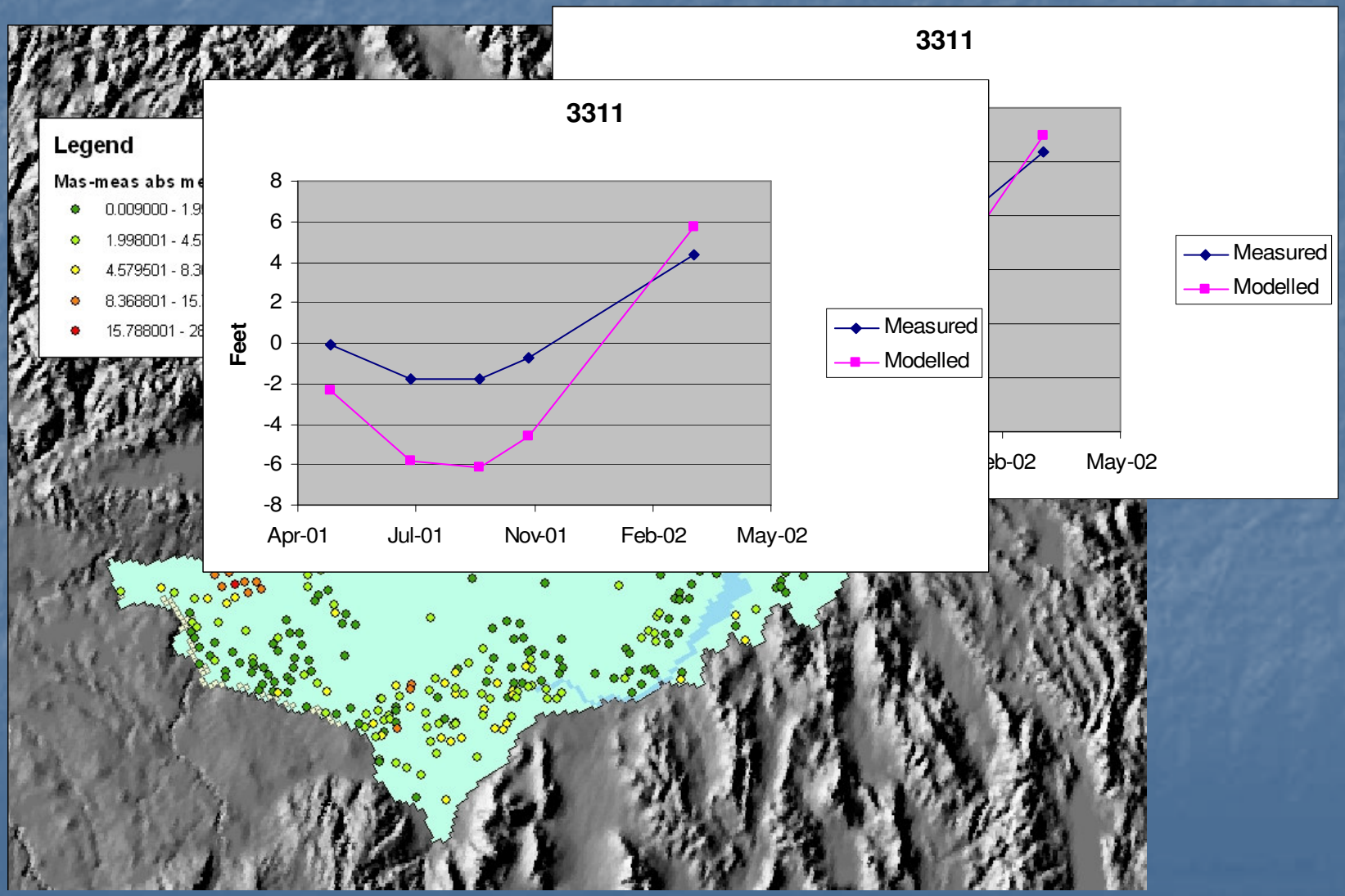


Mass measurement

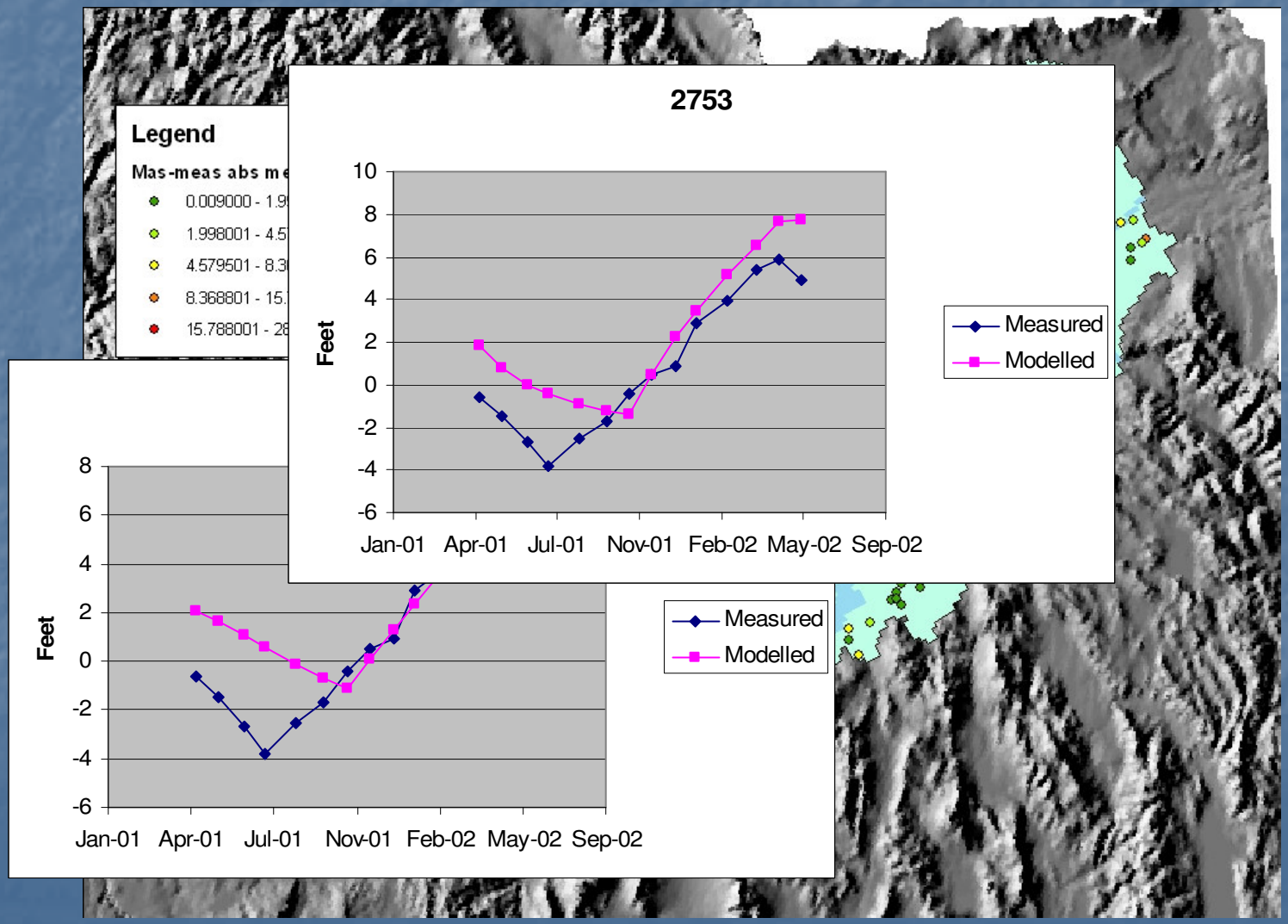


- Observations collected on behalf of this modeling effort
  - 3/1/2001 –5/8/2002

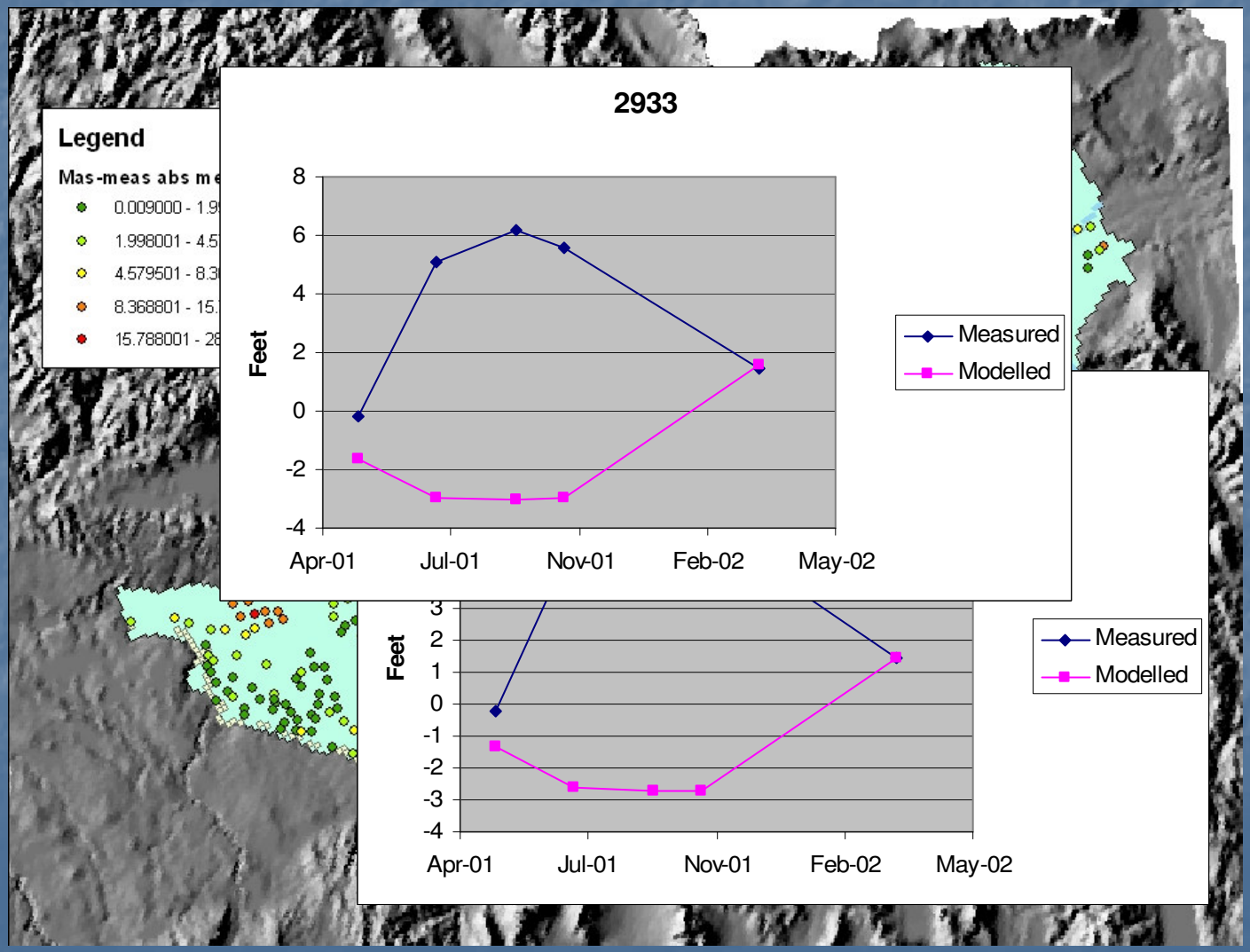
Mass measurement



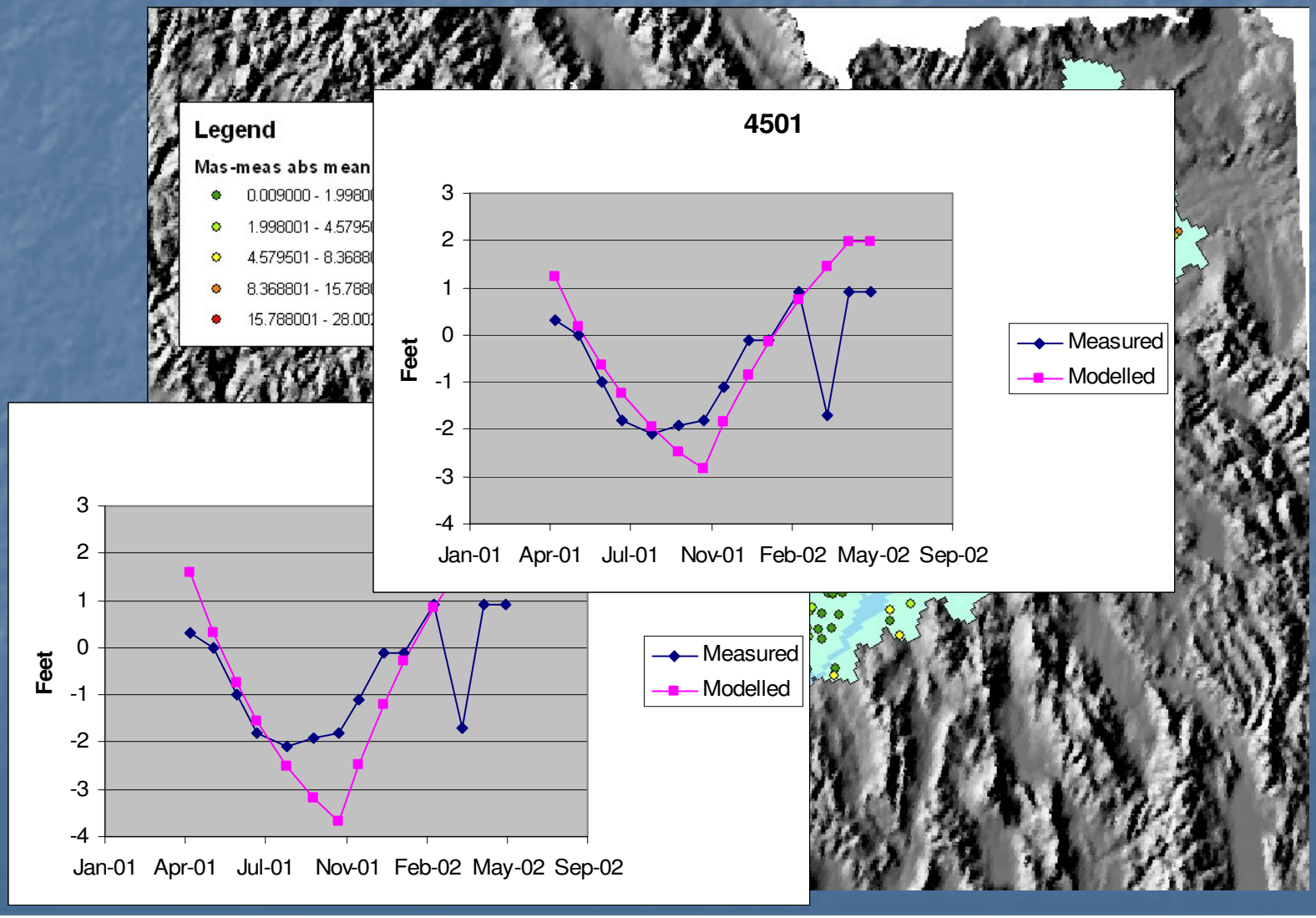
Mass measurement



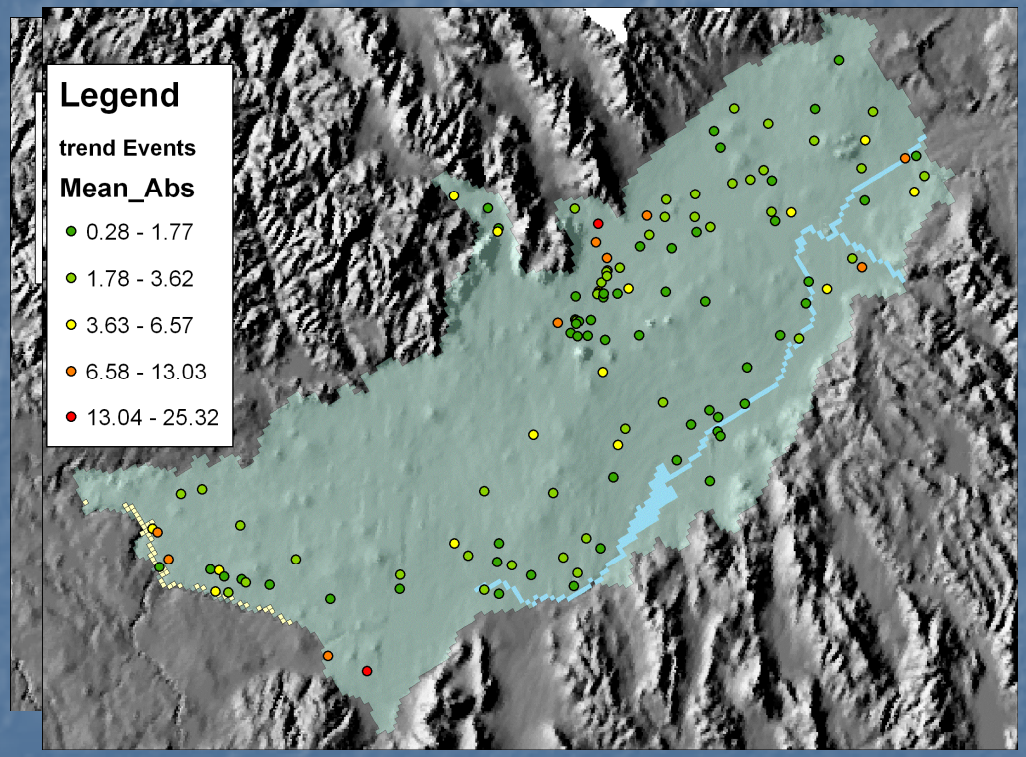
Mass measurement



Mass measurement

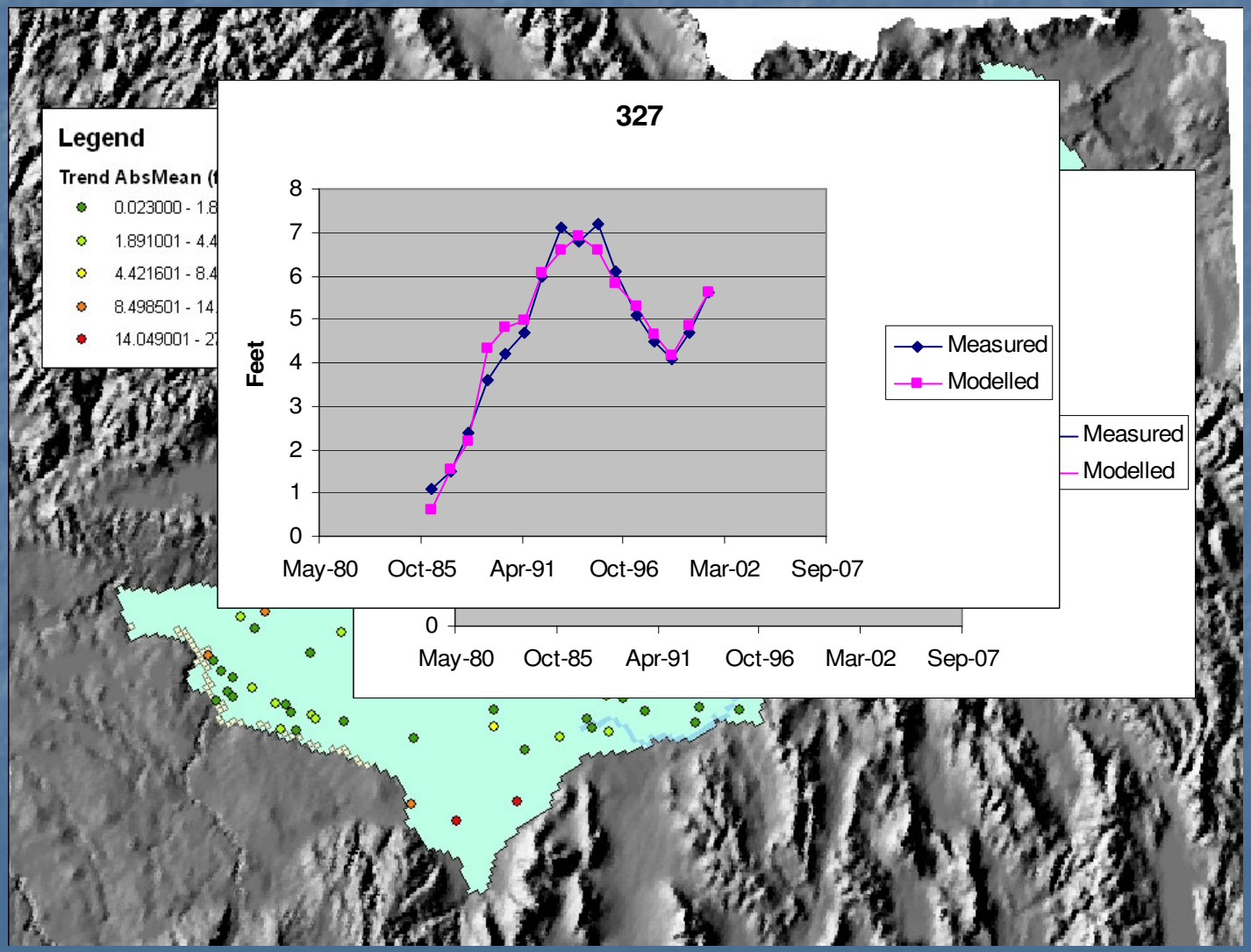


Trend

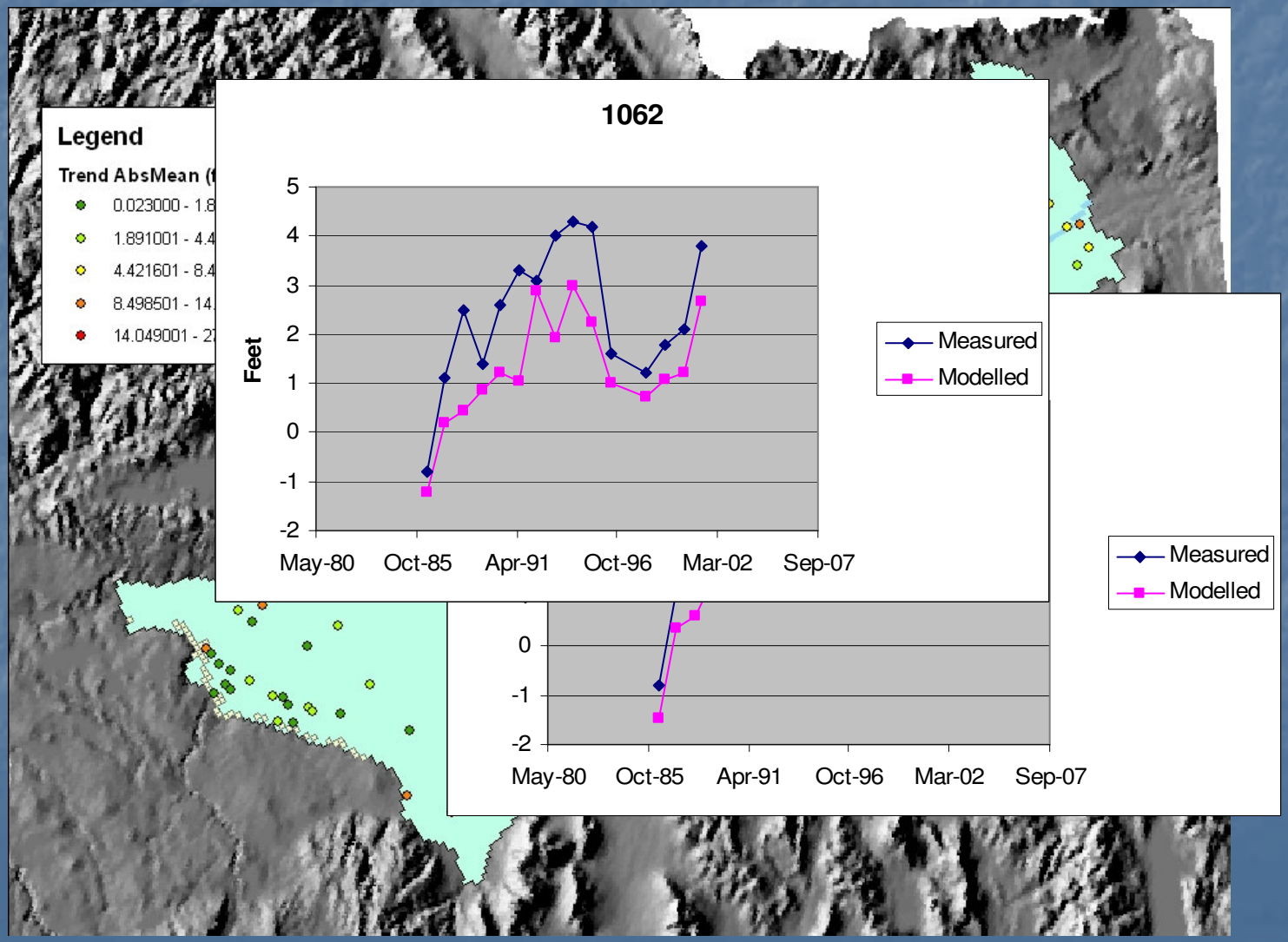


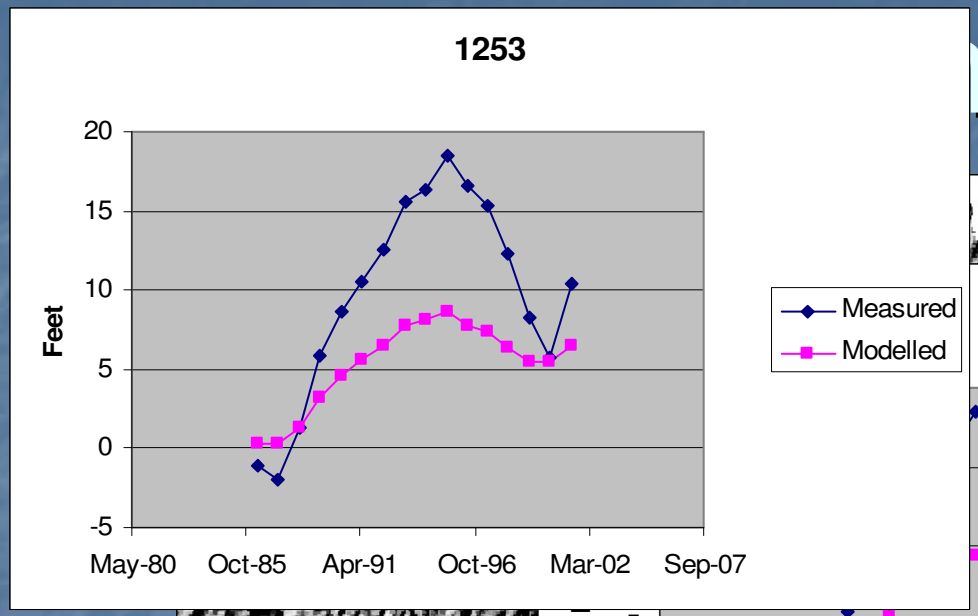
Annual observations in wells

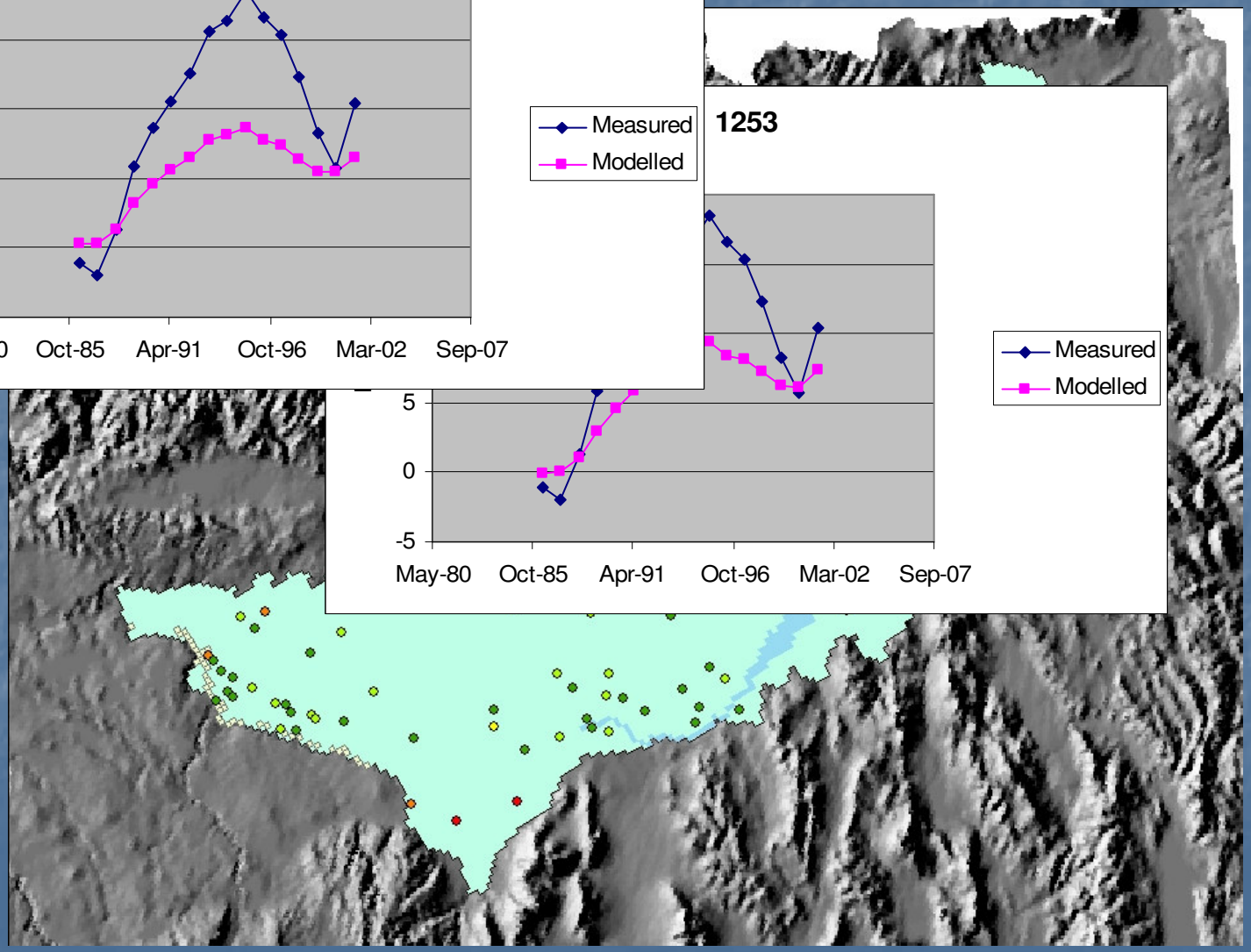
Trend


Legend
Trend AbsMean (f
0.023000 - 1.8
1.891001 - 4.4
4.421601 - 8.4
8.498501 - 14.
14.049001 - 2
327
Feet
8
7
6
5
4
3
2
1
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled
Measured
Modelled
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07

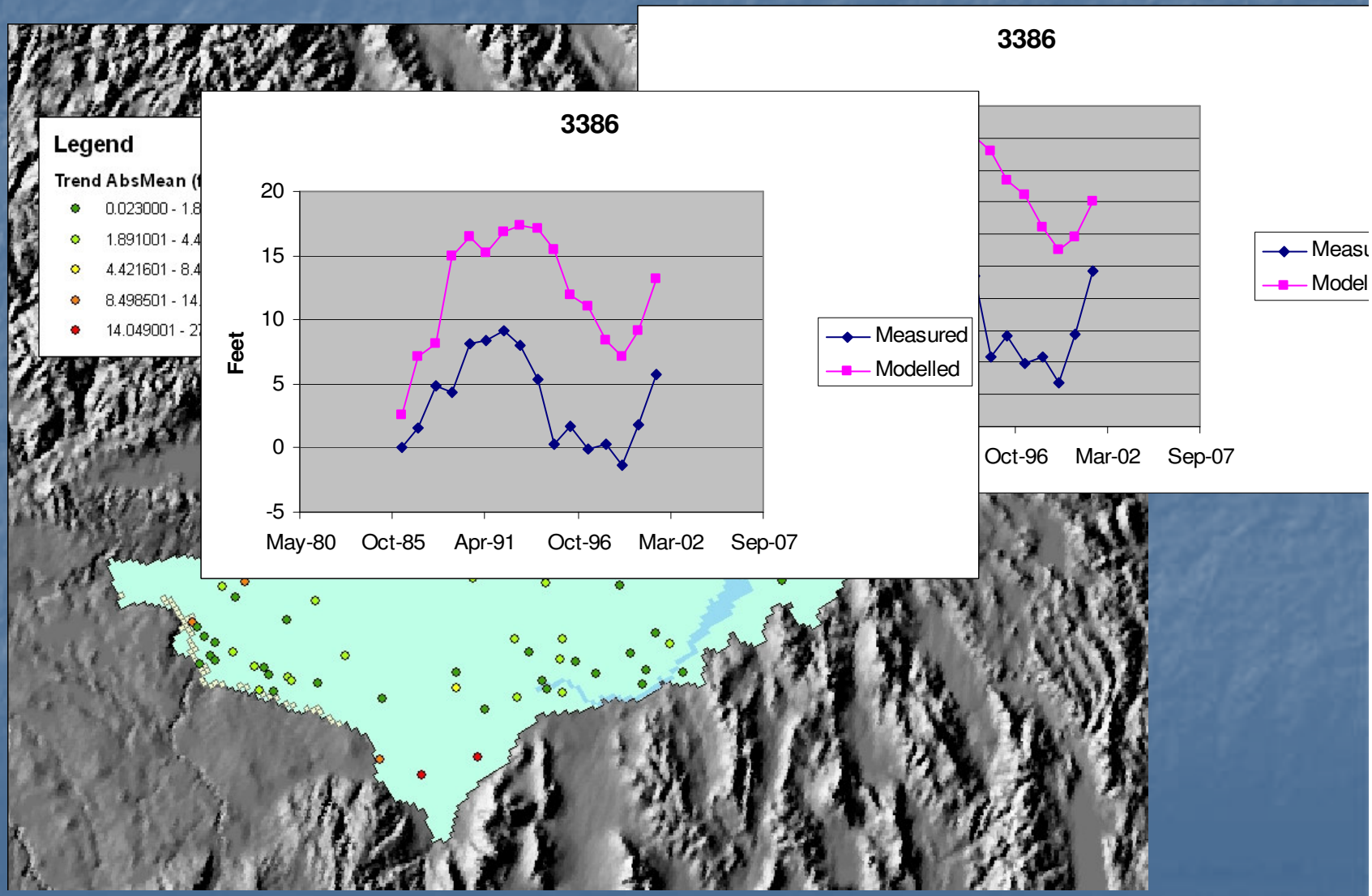
Trend


Legend
Trend AbsMean (f
0.023000 - 1.8
1.891001 - 4.4
4.421601 - 8.4
8.498501 - 14.
14.049001 - 2
1062
Feet
5
4
3
2
1
0
-1
-2
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled
0
-1
-2
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled

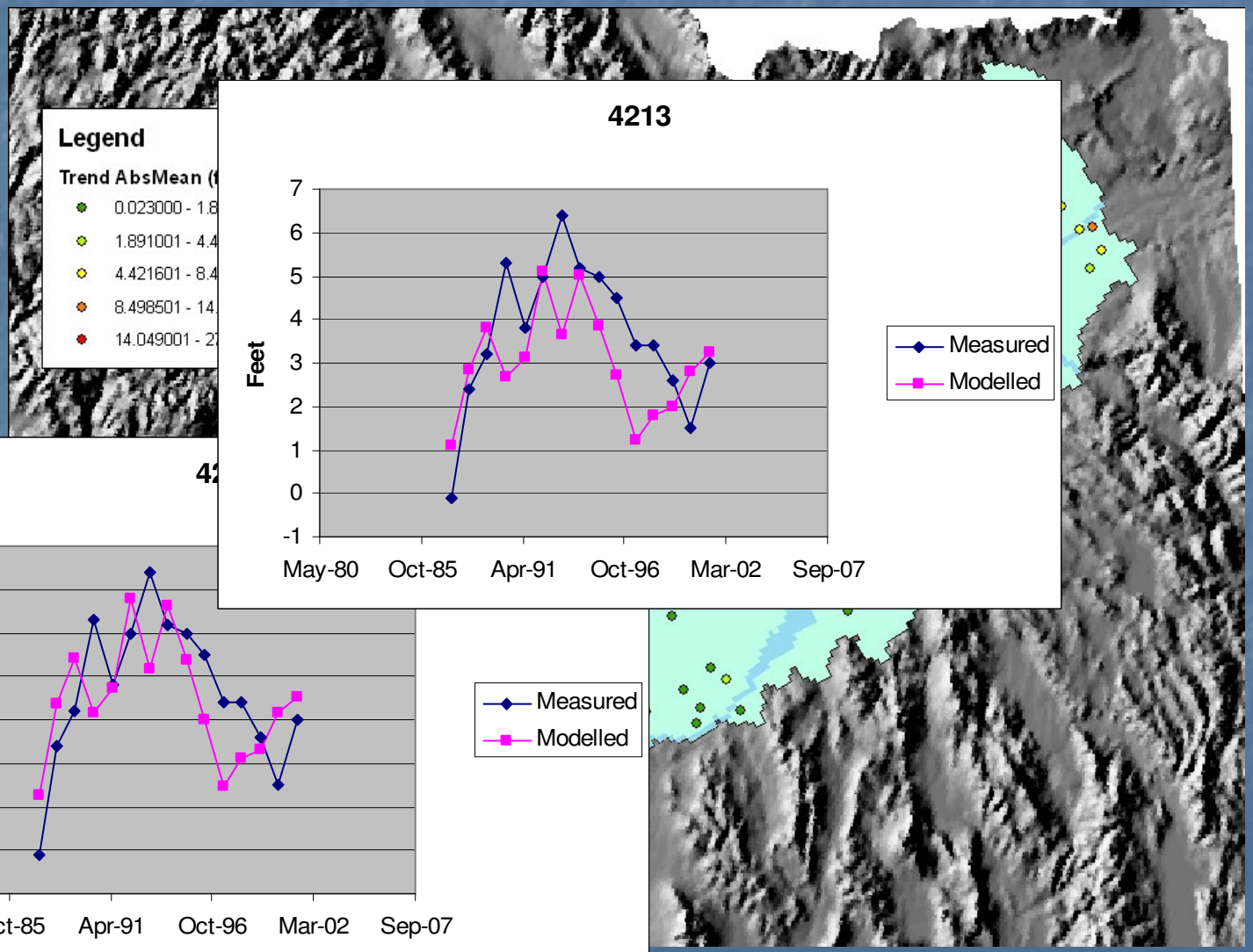

1253
Feet
20
15
10
5
0
-5
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled

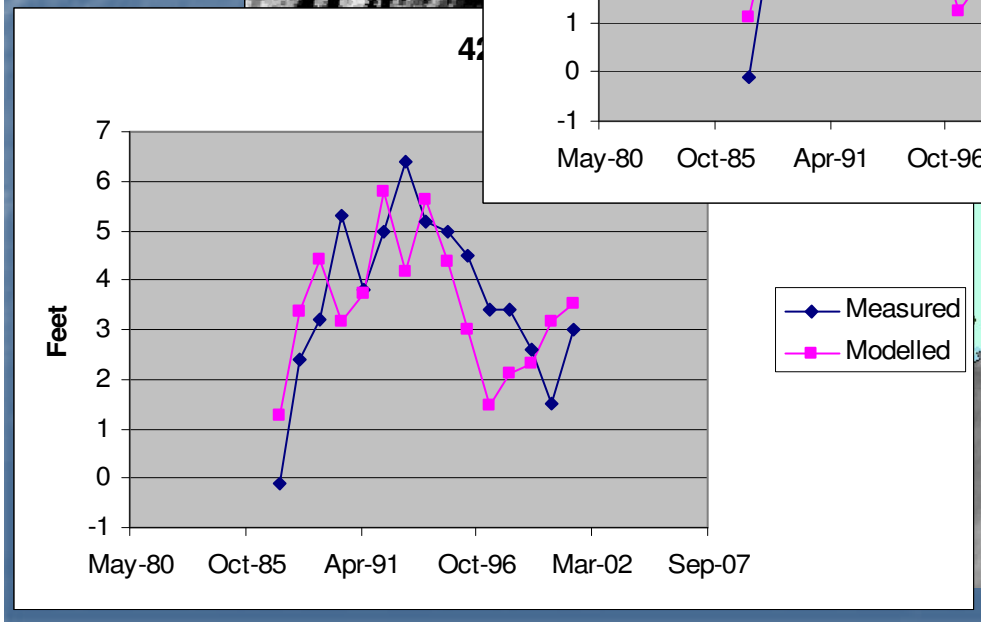

1253
5
0
-5
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled

Trend

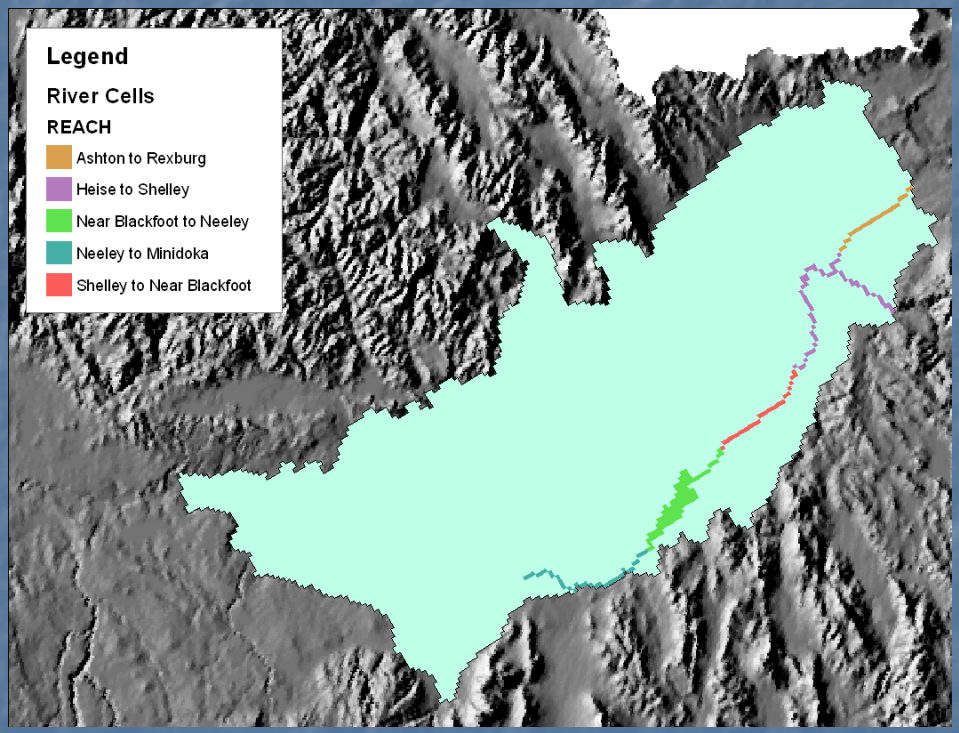

Legend
Trend AbsMean (f
0.023000 - 1.8
1.891001 - 4.4
4.421601 - 8.4
8.498501 - 14.
14.049001 - 2
3386
Feet
20
15
10
5
0
-5
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled
3386
Oct-96
Mar-02
Sep-07
Measu
Model

Trend

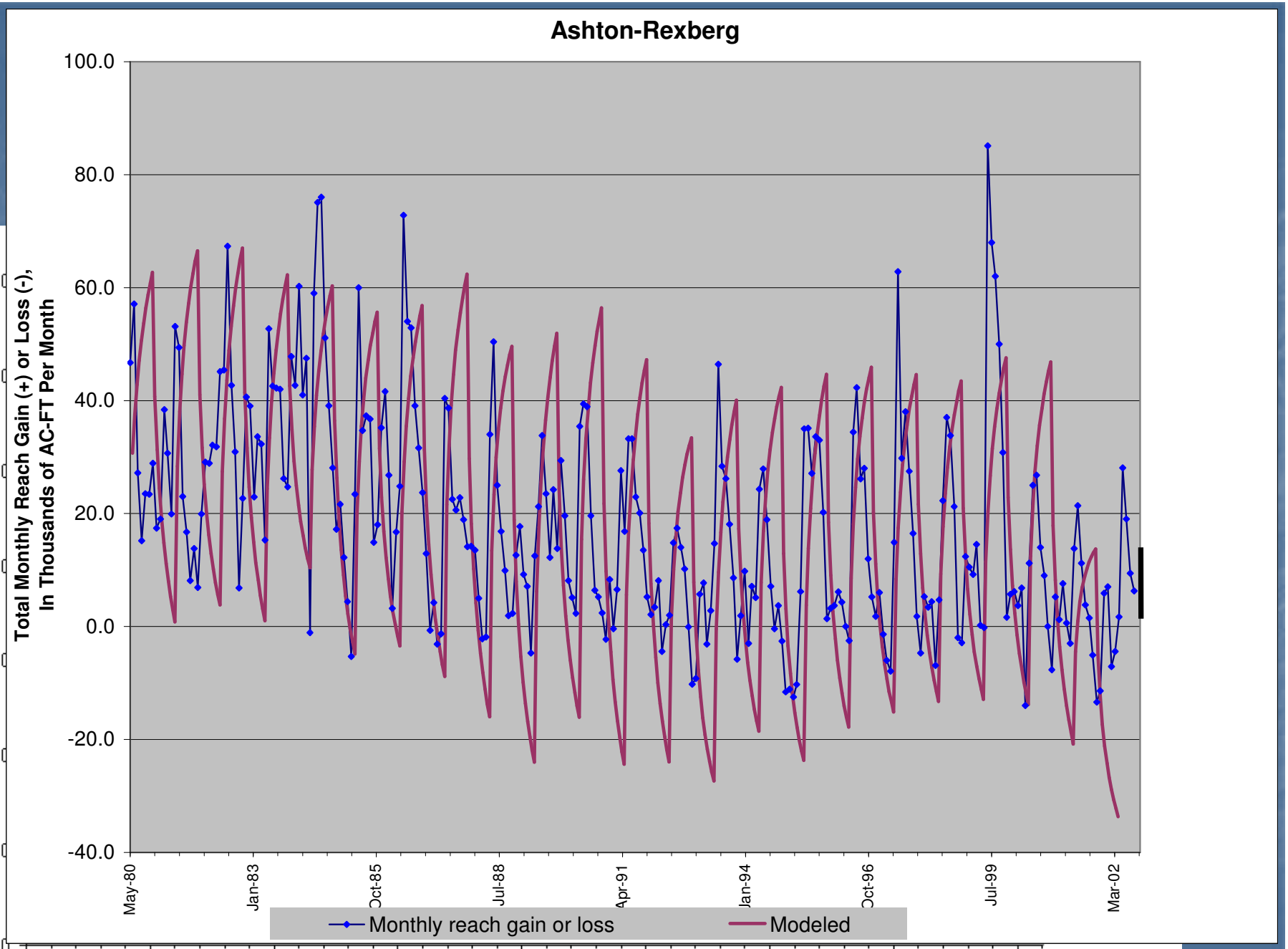

Legend
Trend AbsMean (f
0.023000 - 1.8
1.891001 - 4.4
4.421601 - 8.4
8.498501 - 14.
14.049001 - 2
4213
Feet
7
6
5
4
3
2
1
0
-1
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled


Feet
7
6
5
4
3
2
1
0
-1
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled

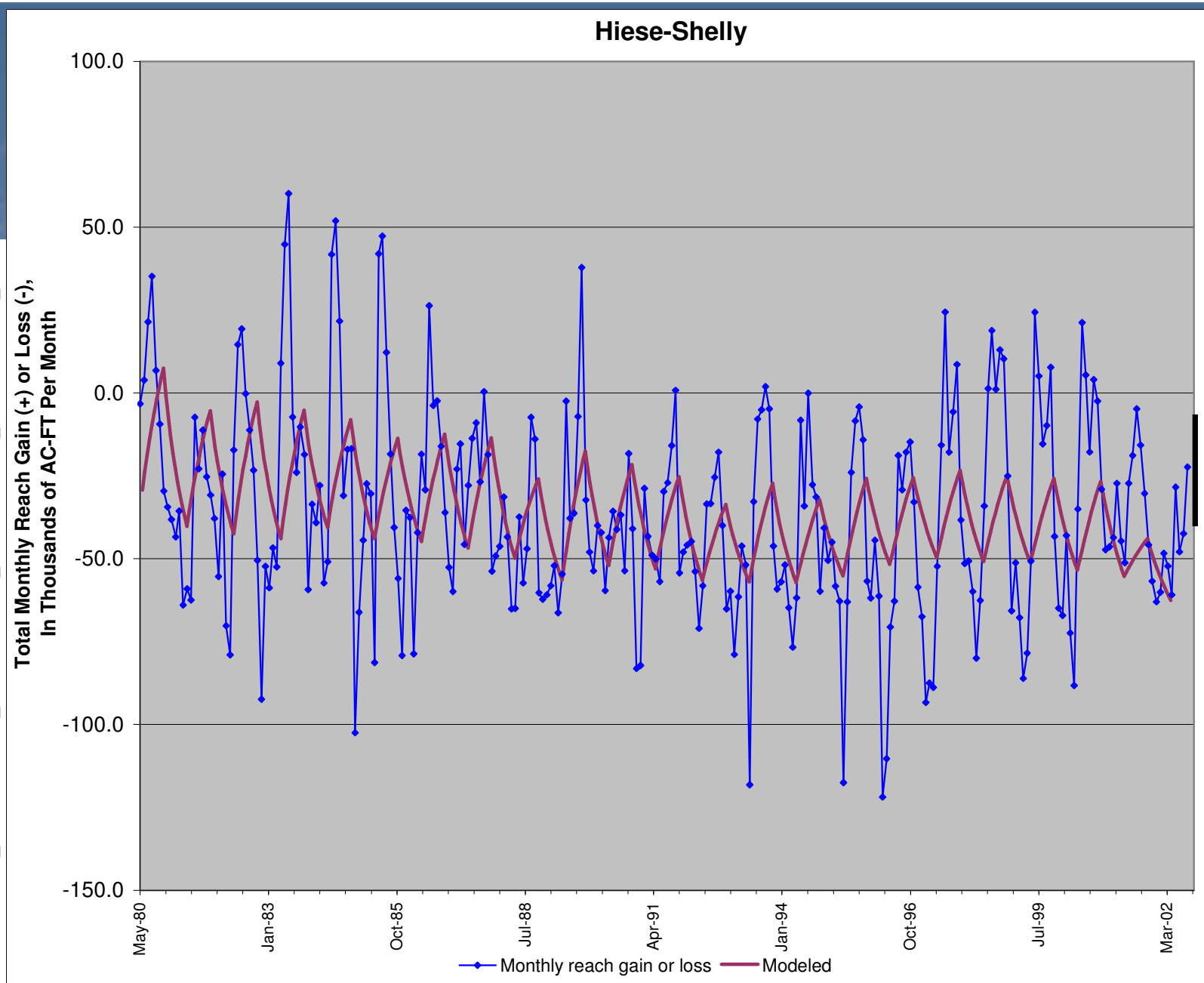
Snake River



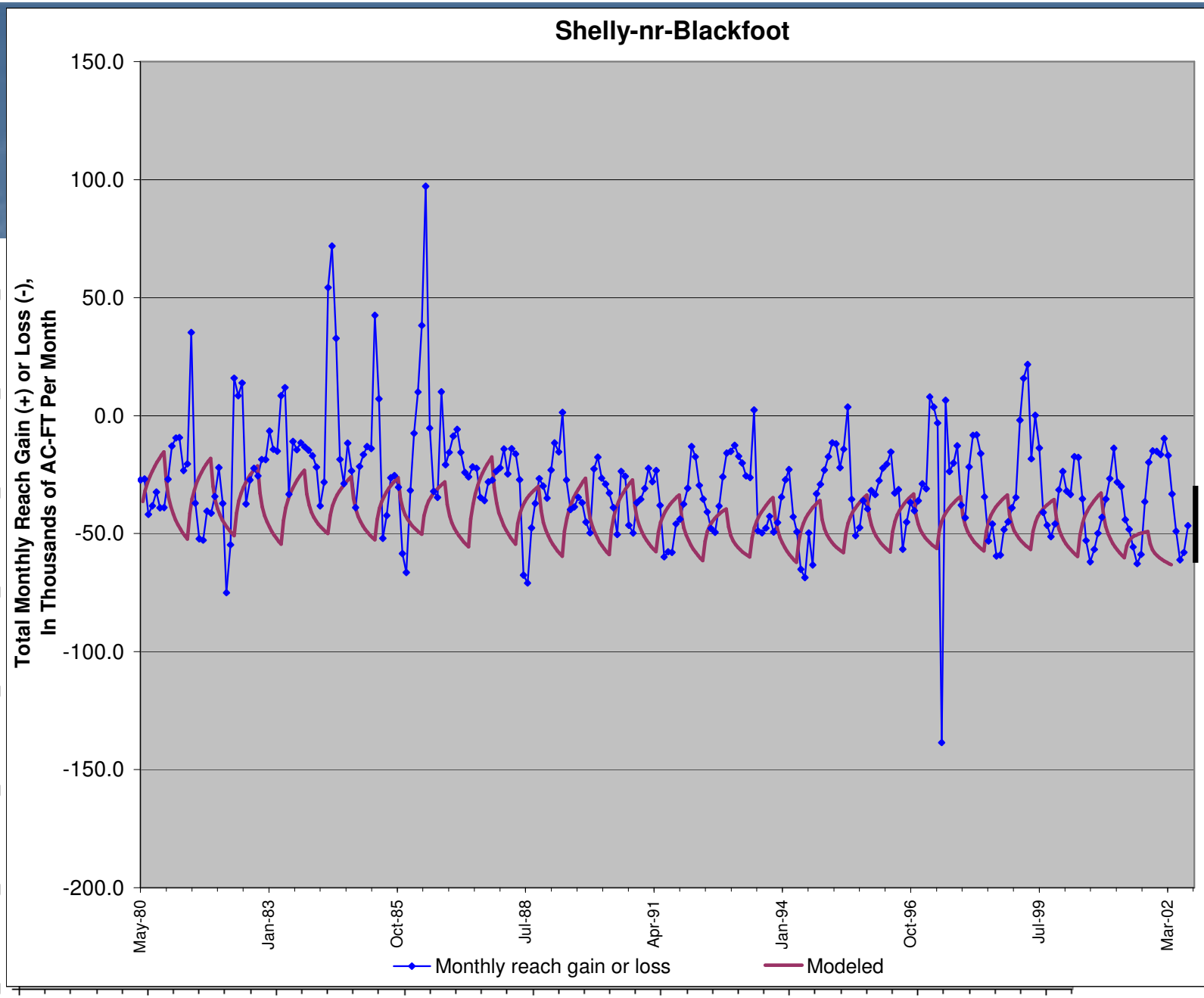
- Snake River reaches



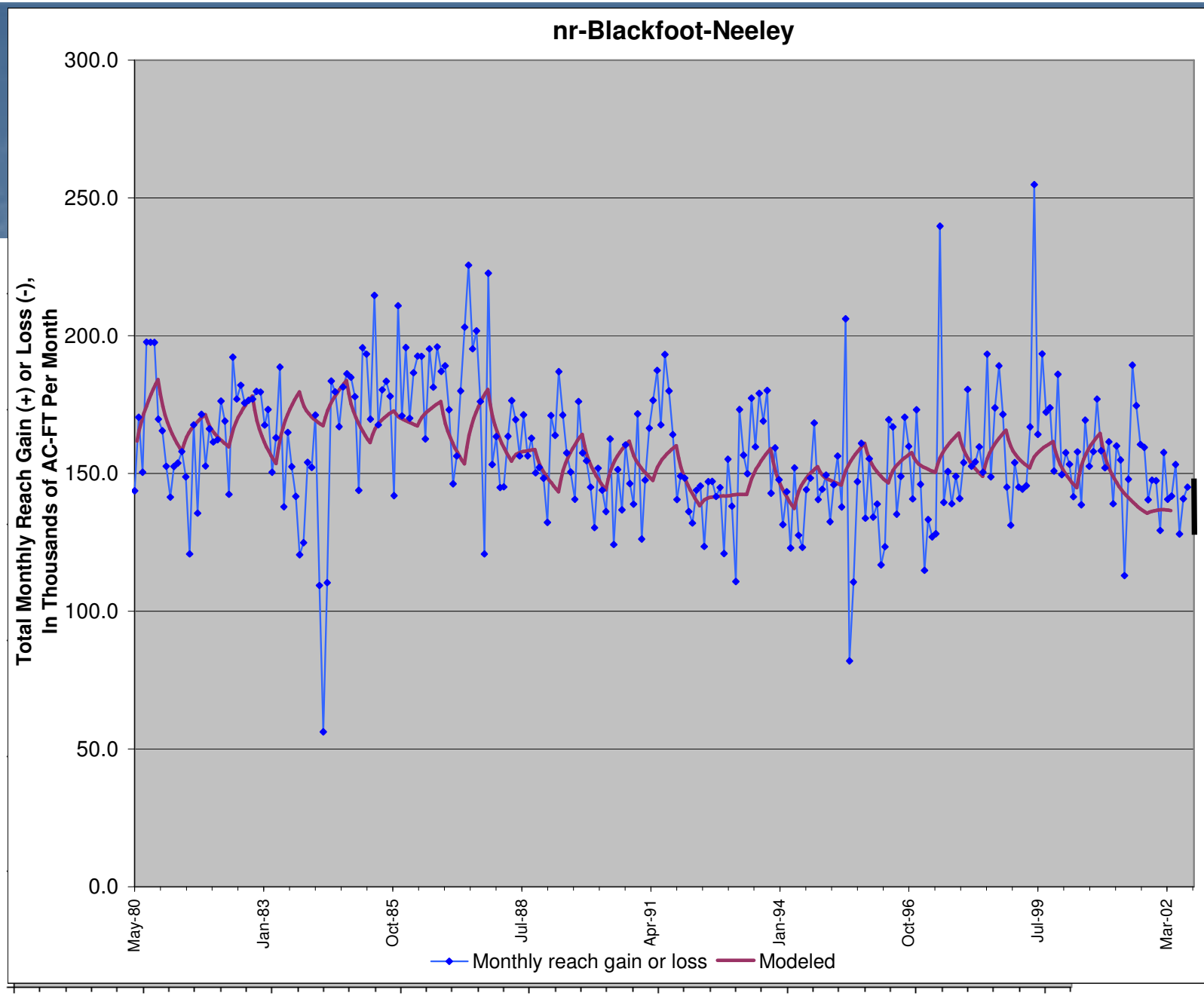
Total Monthly Reach Gain (+) or Loss (-), In Thousands of AC-FT Per Month
Monthly reach gain or loss
Modeled



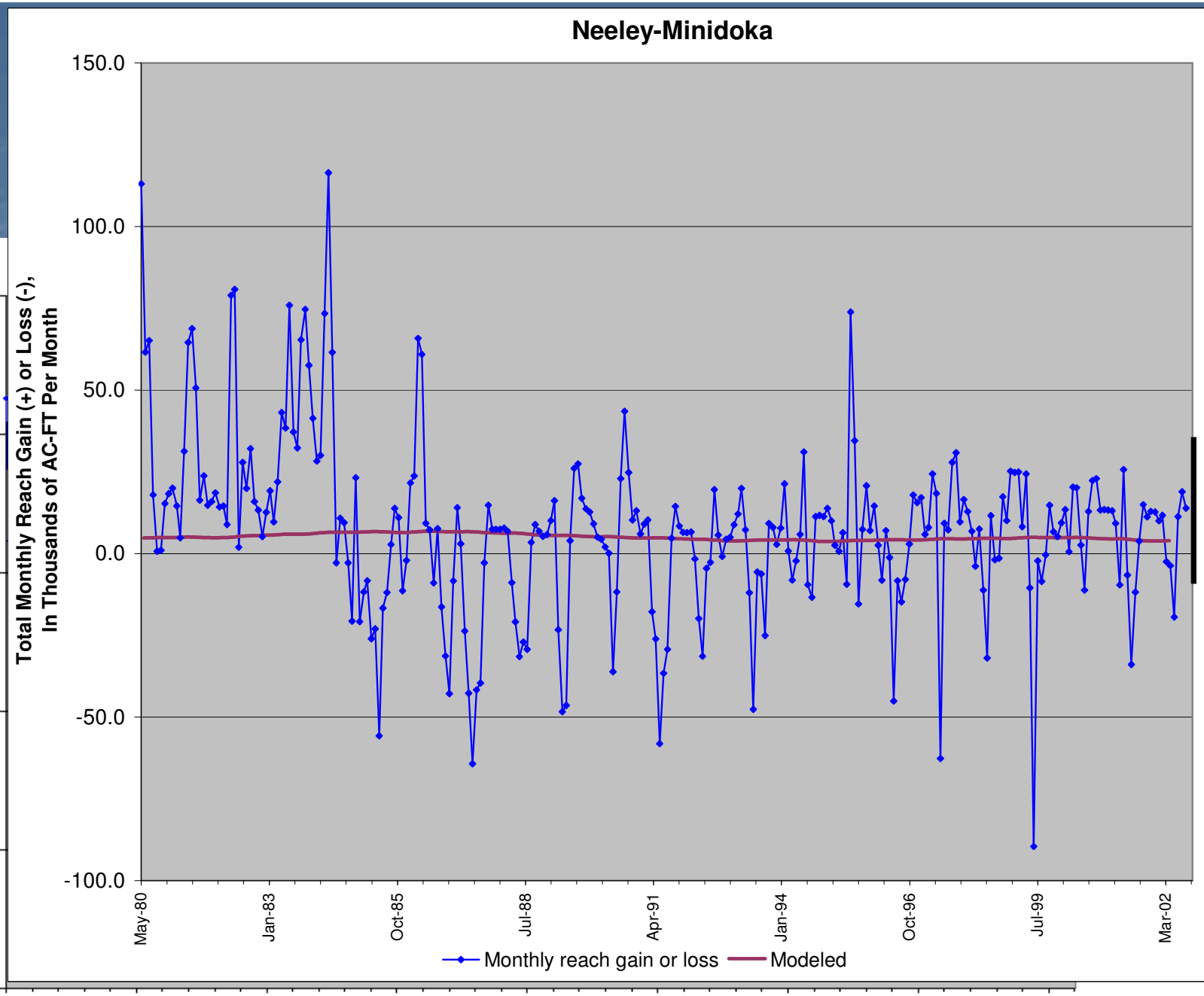
Total Monthly Reach Gain (+) or Loss (-) In Thousands of AC-FT Per Month
100.0
50.0
0.0
-50.0
-100.0
-150.0
May-80
Jan-83
Oct-85
Jul-88
Apr-91
Jan-94
Oct-96
Jul-99
Mar-02
Monthly reach gain or loss
Modeled



Total Monthly Reach Gain (+) or Loss (-) In Thousands of AC-FT Per Month
150.0
100.0
50.0
0.0
-50.0
-100.0
-150.0
-200.0
May-80
Jan-83
Oct-85
Jul-88
Apr-91
Jan-94
Oct-96
Jul-99
Mar-02
Monthly reach gain or loss
Modeled

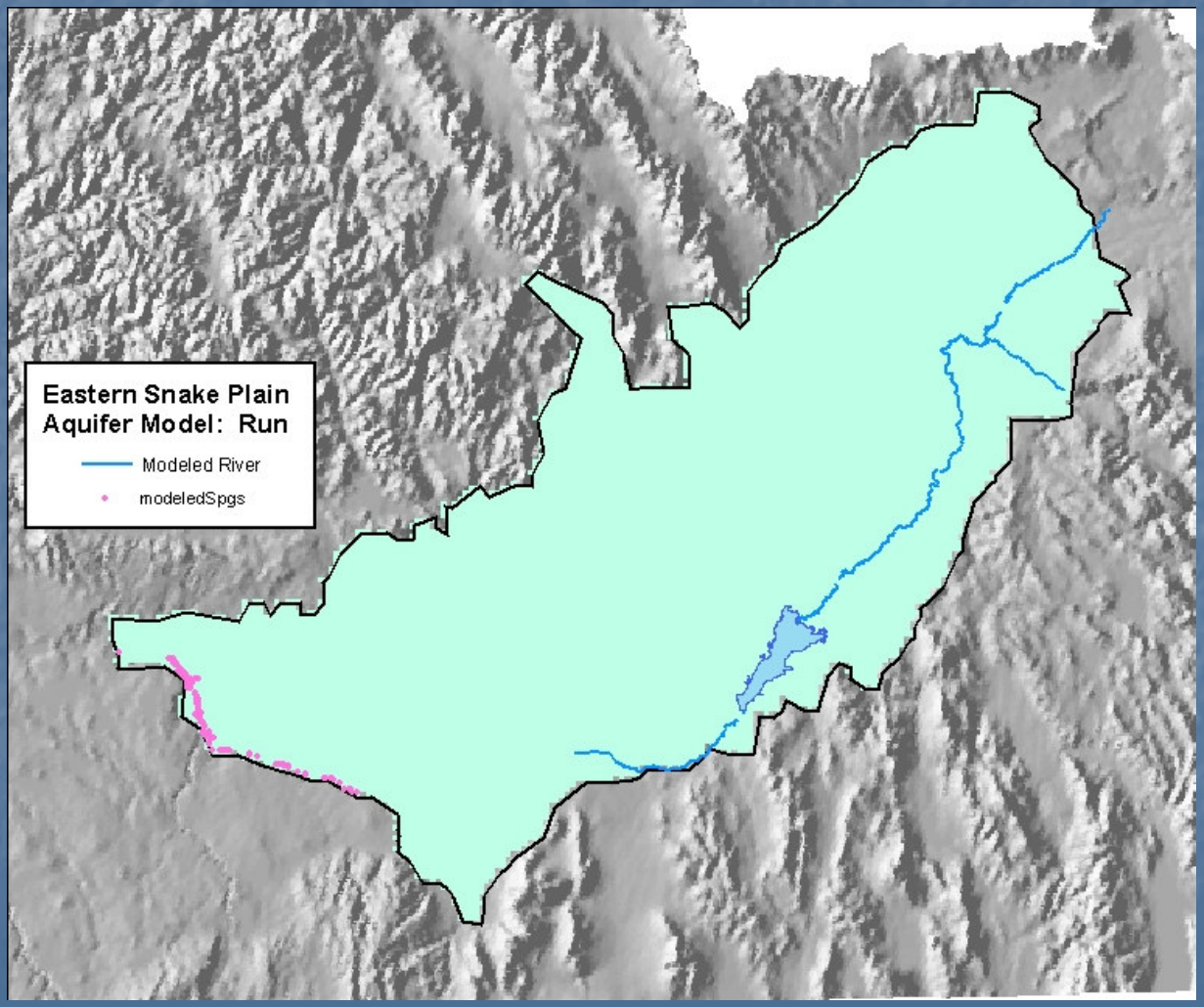


Total Monthly Reach Gain (+) or Loss (-, In Thousands of AC-FT Per Month
300.0
250.0
200.0
150.0
100.0
50.0
0.0
May-80
Jan-83
Oct-85
Jul-88
Apr-91
Jan-94
Oct-96
Jul-99
Mar-02
Monthly reach gain or loss
Modeled



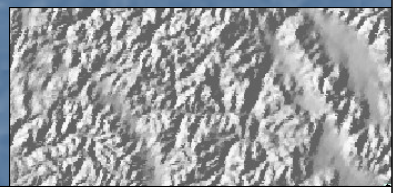
Total Monthly Reach Gain (+) or Loss (-), In Thousands of AC-FT Per Month
150.0
100.0
50.0
0.0
-50.0
-100.0
May-80
Jan-83
Oct-85
Jul-88
Jan-94
Oct-96
Jul-99
Mar-02
Monthly reach gain or loss
Modeled

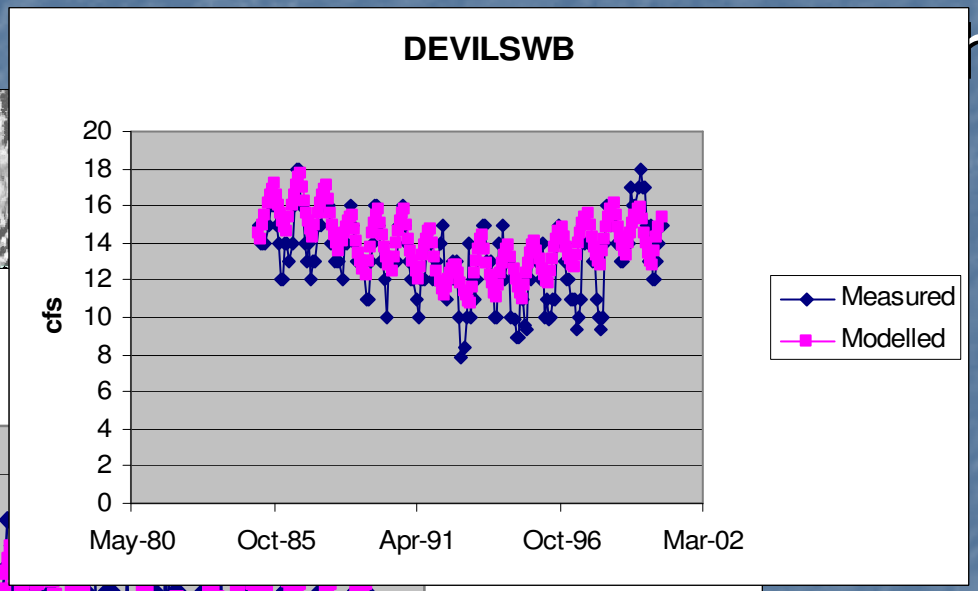
Springs

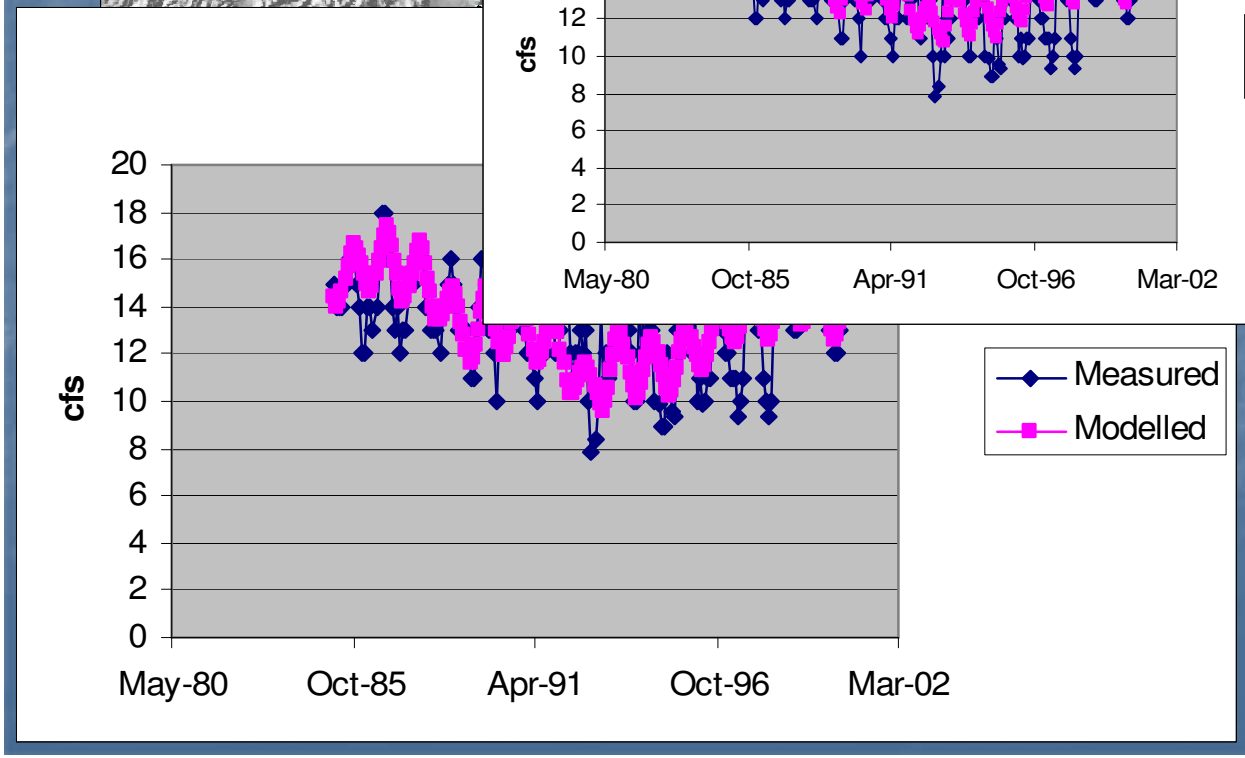

Eastern Snake Plain
Aquifer Model: Run
Modeled River
modeledSpgs

Springs

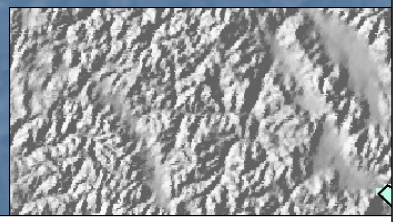
nbowl

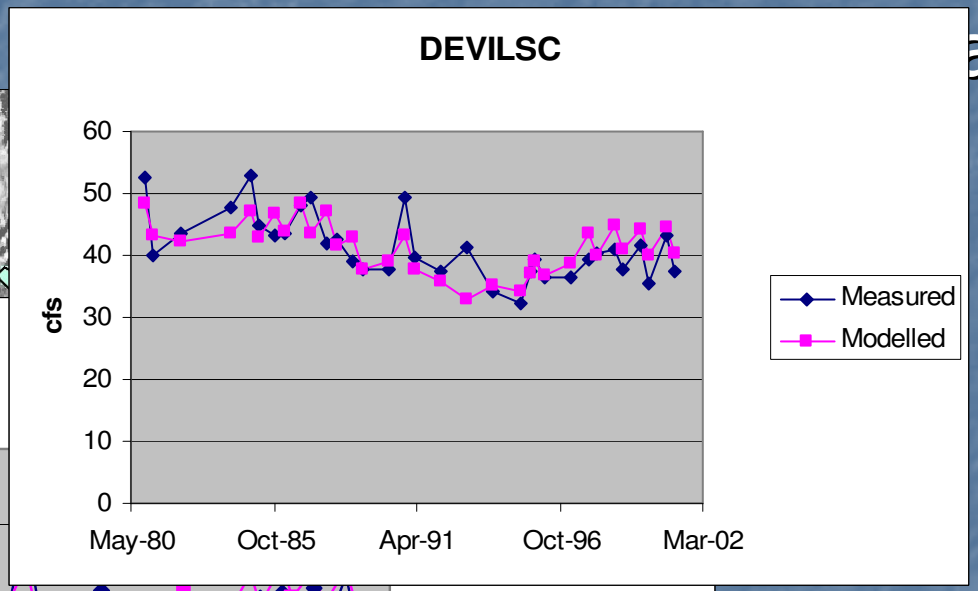


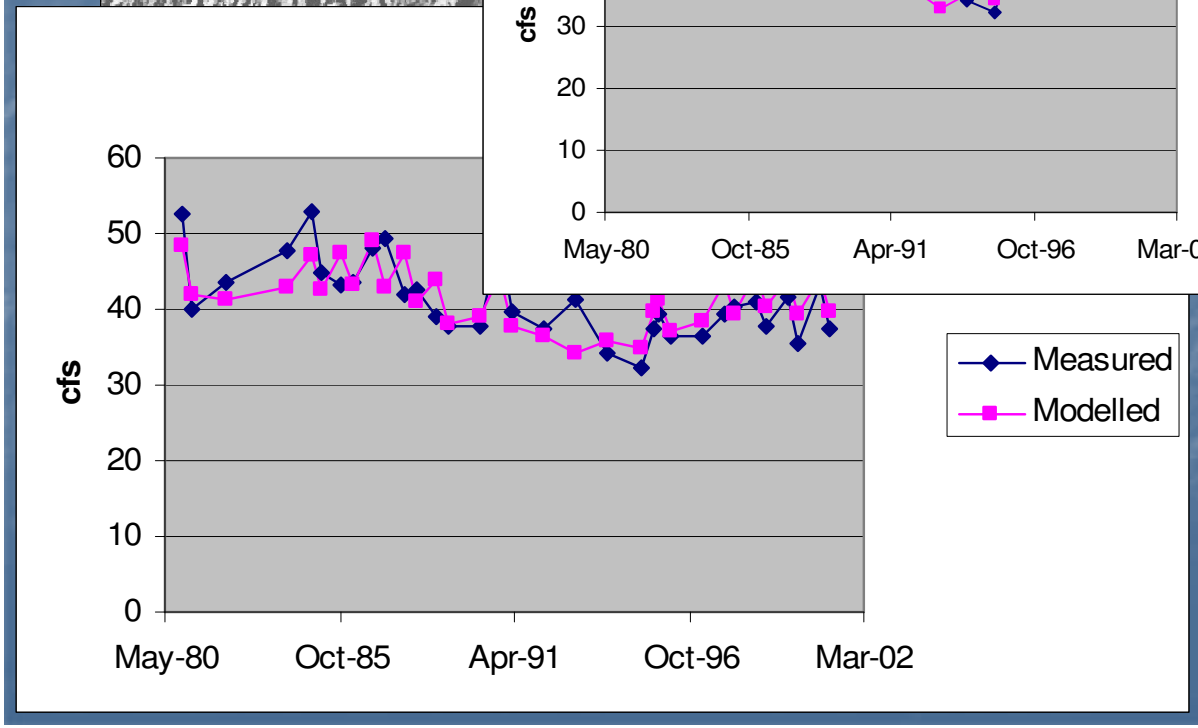




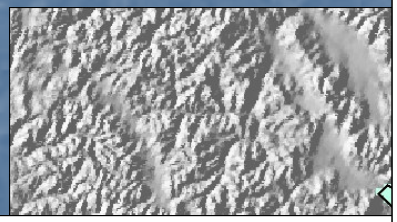
Springs

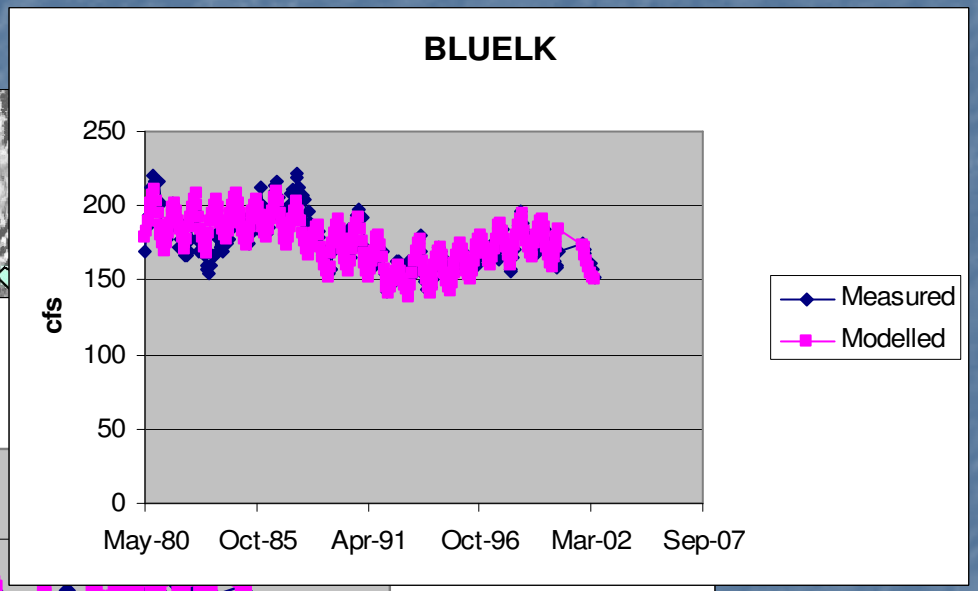


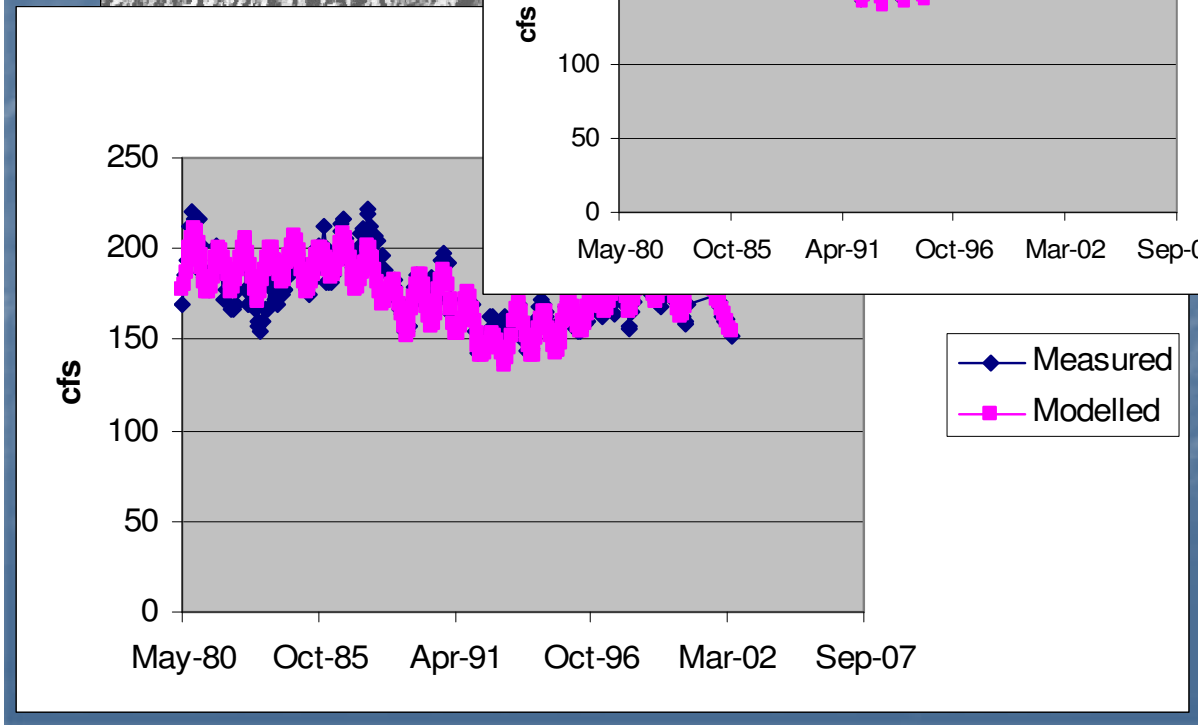

DEVILSC
cfs
60
50
40
30
20
10
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Measured
Modelled


cfs
60
50
40
30
20
10
0
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Measured
Modelled

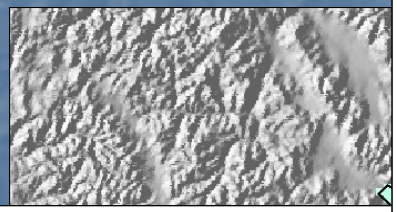
Springs

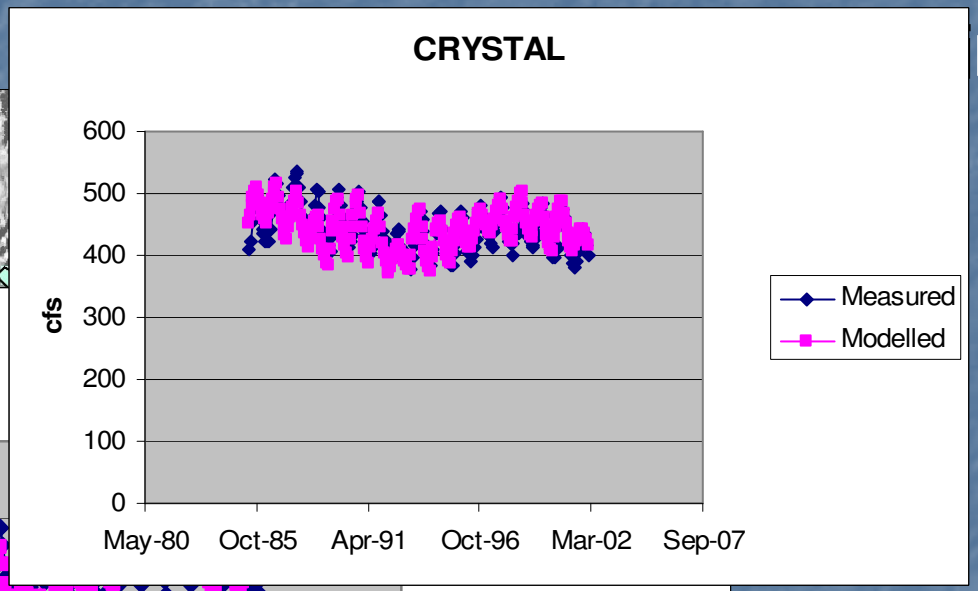



BLUELK
250
200
150
100
50
0
cfs
May-80
Oct-85
Apr-91
Oct-96
Mar-02
Sep-07
Measured
Modelled


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

Springs

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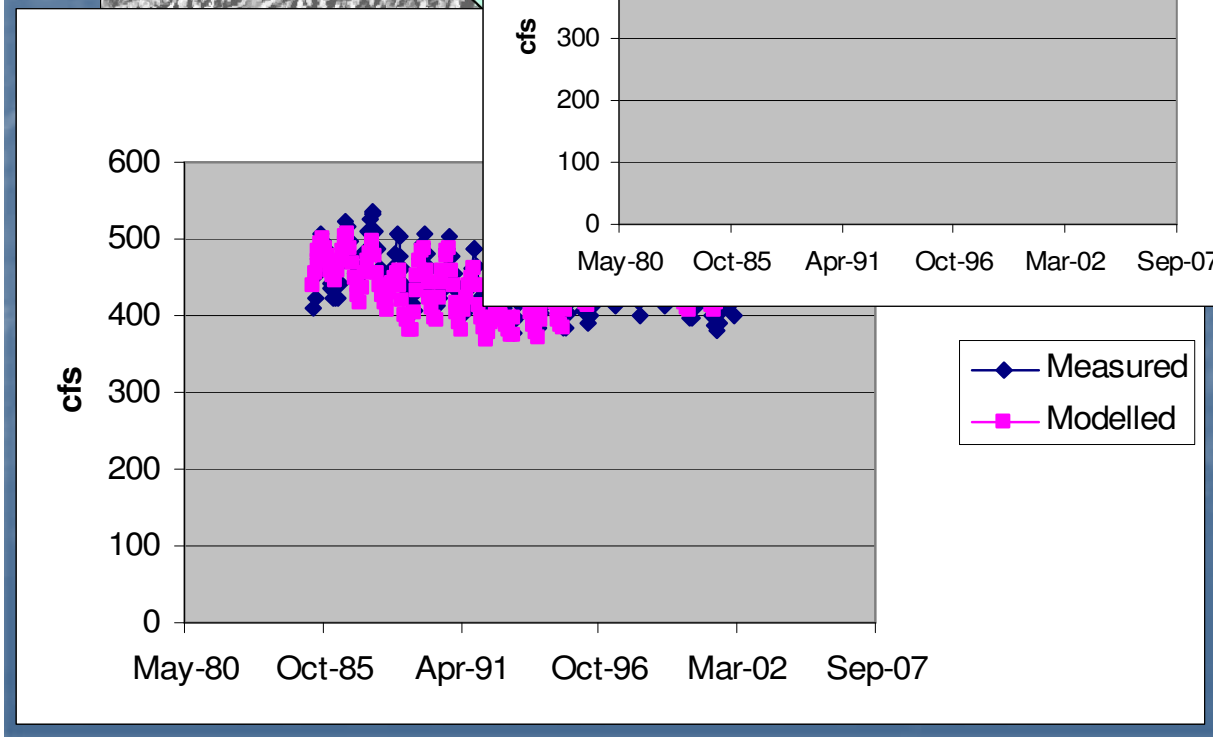
Measured
Modelled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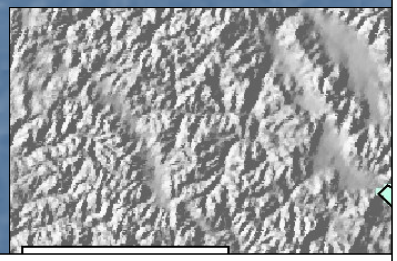
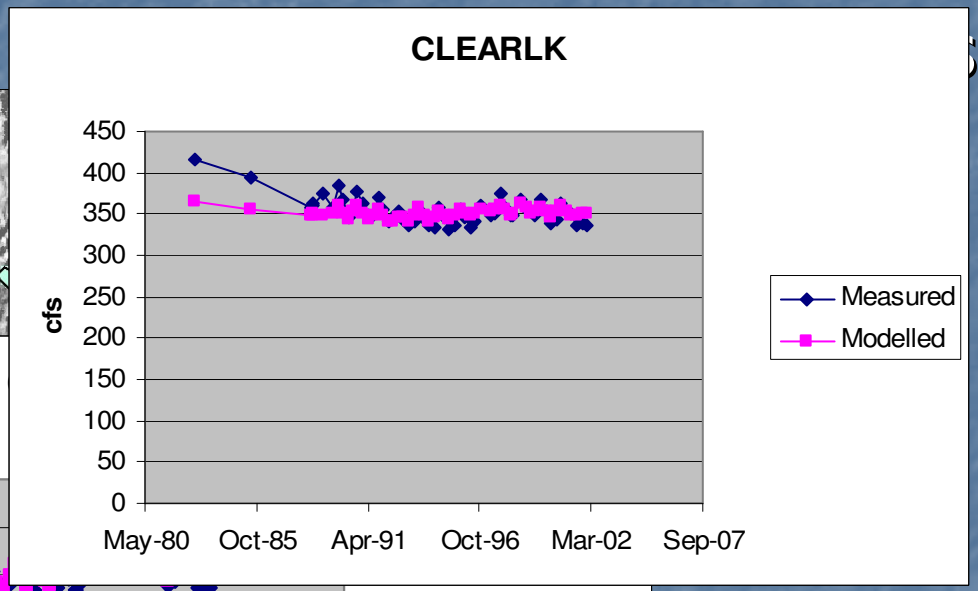
Measured
Modelled

Springs

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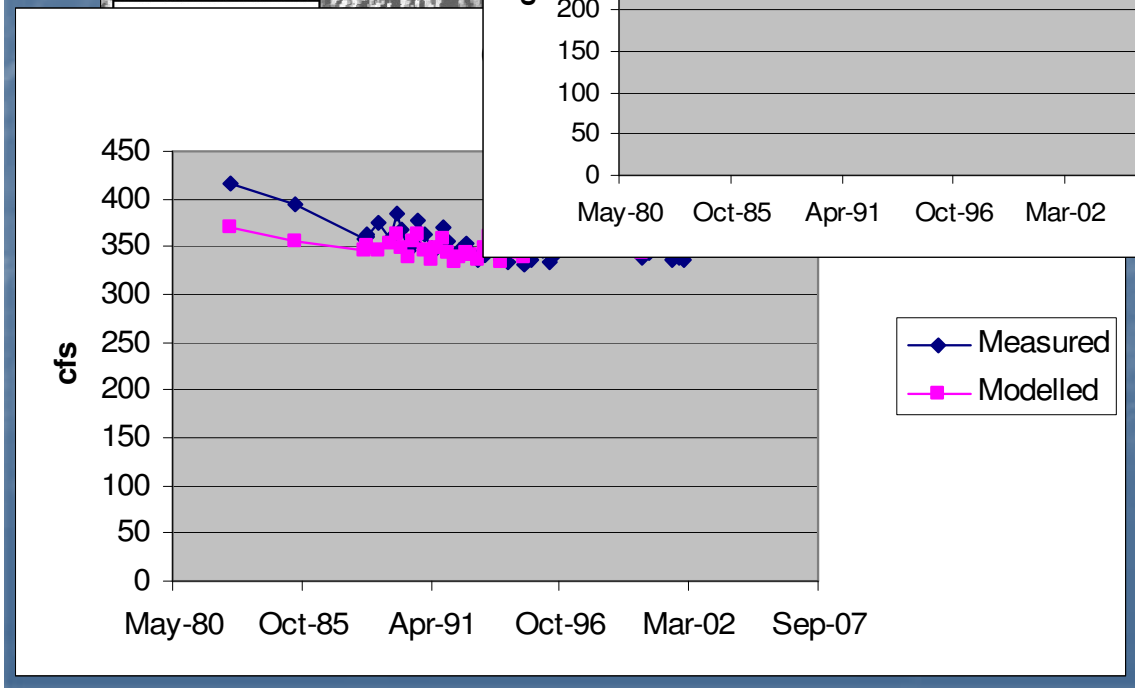
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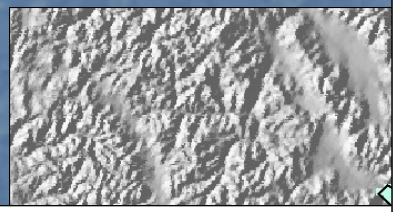
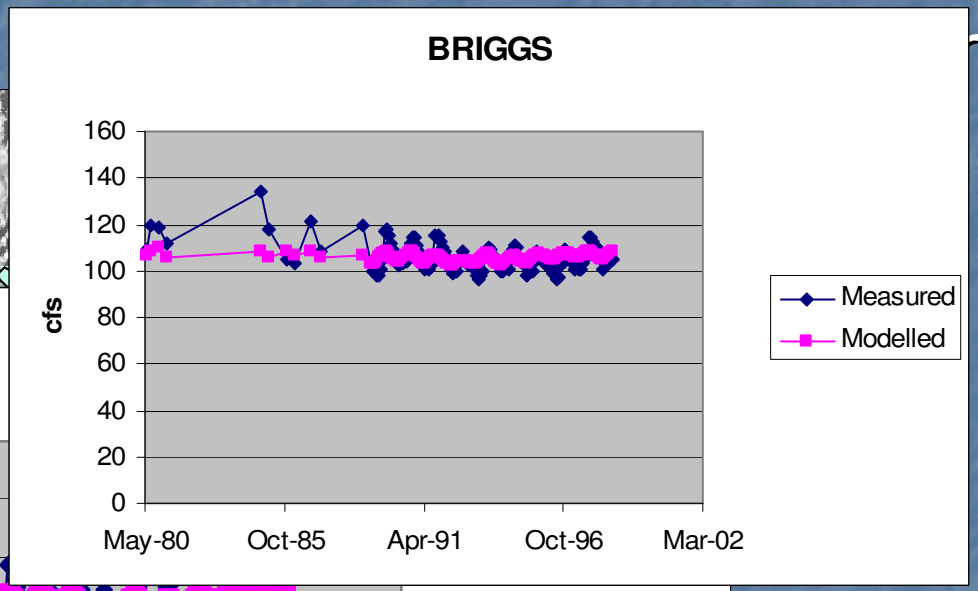
Modelled

Springs

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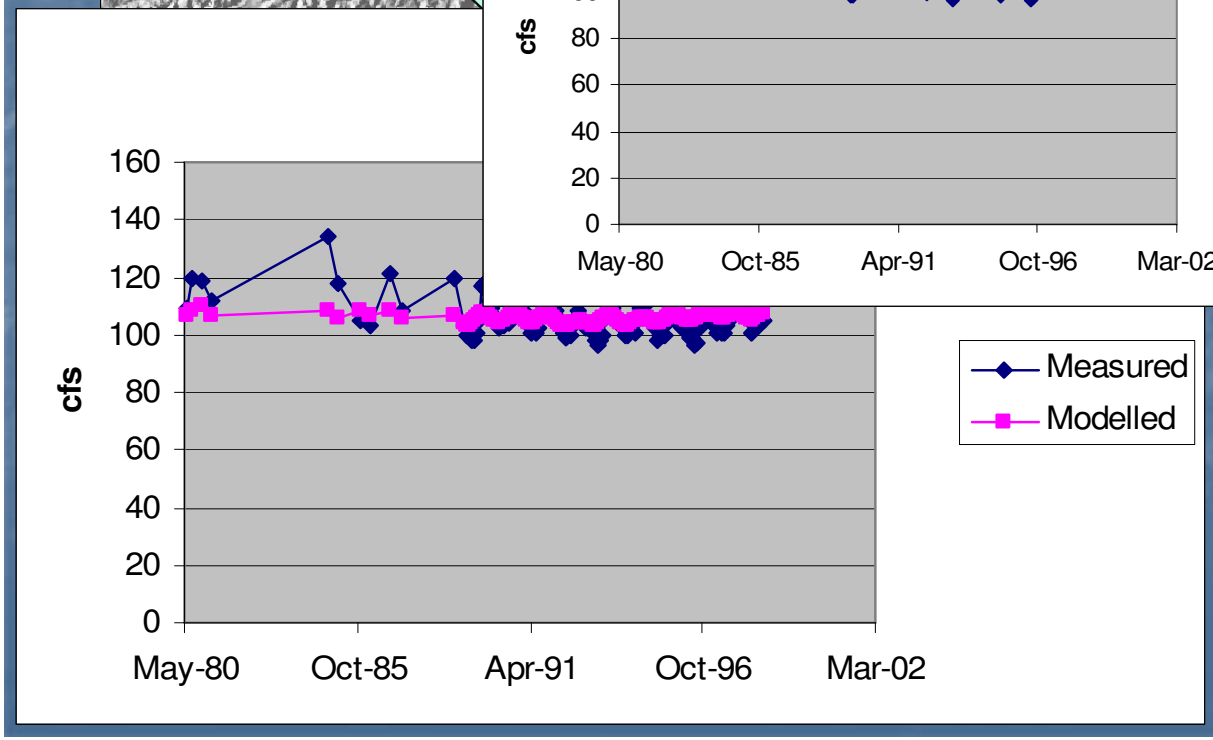
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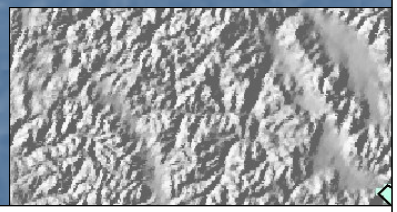
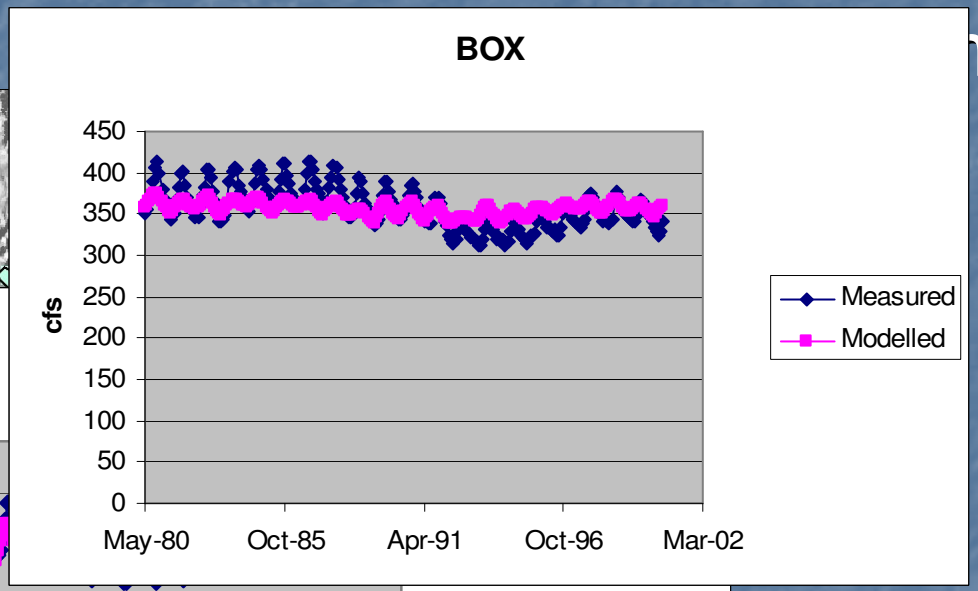
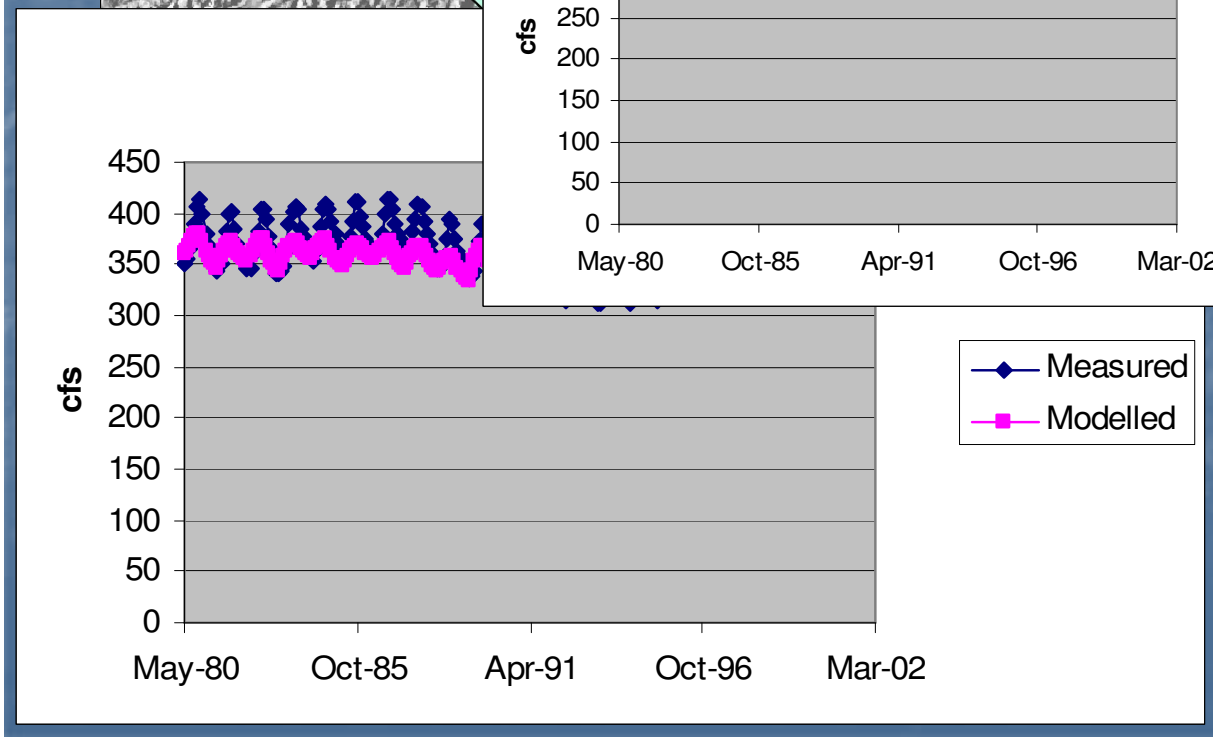
Springs







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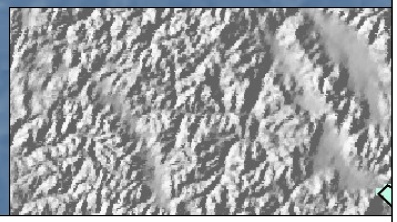
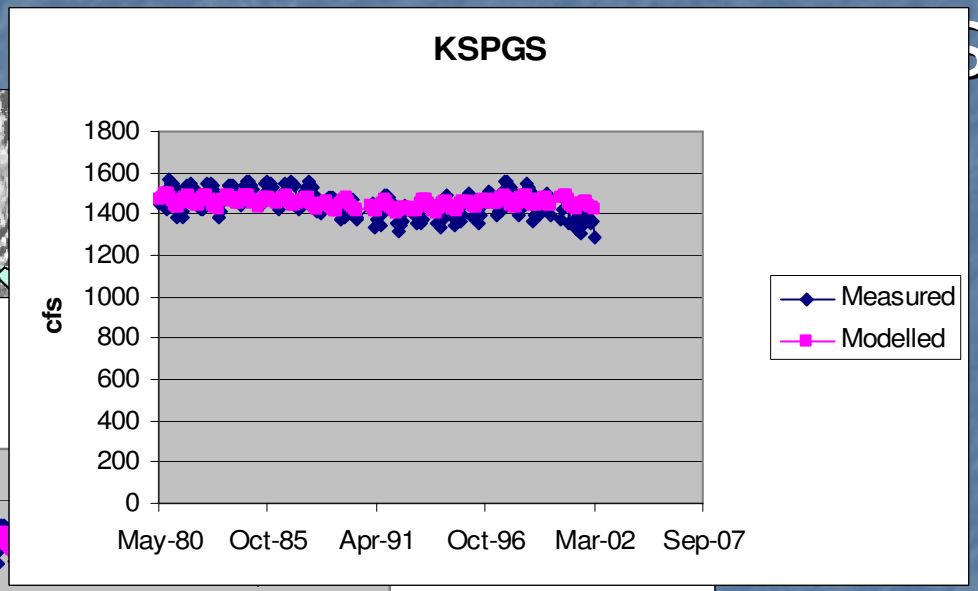
Springs

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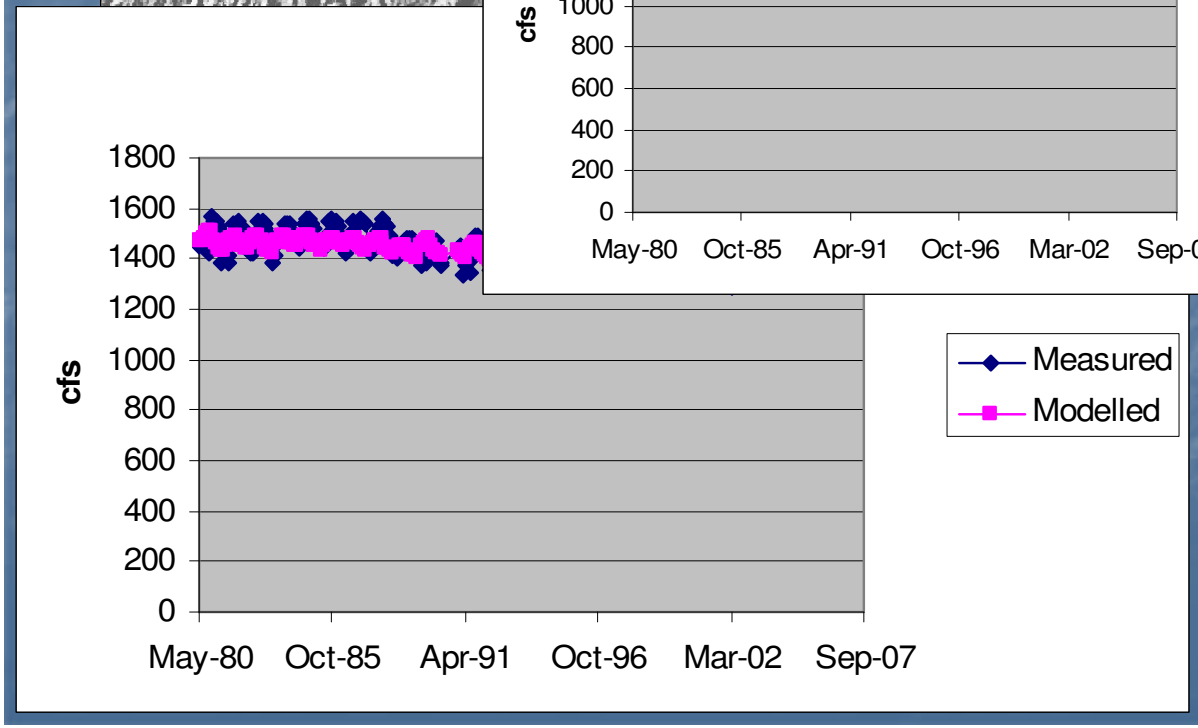
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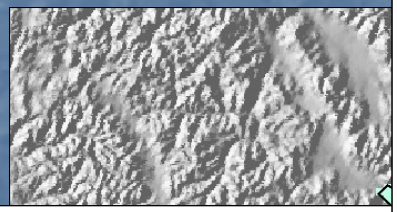
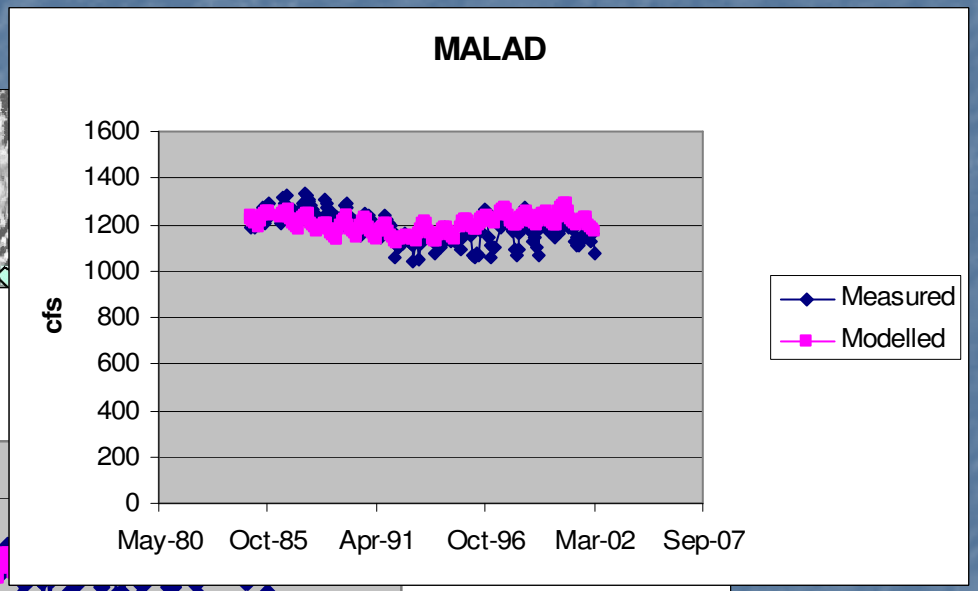
Springs

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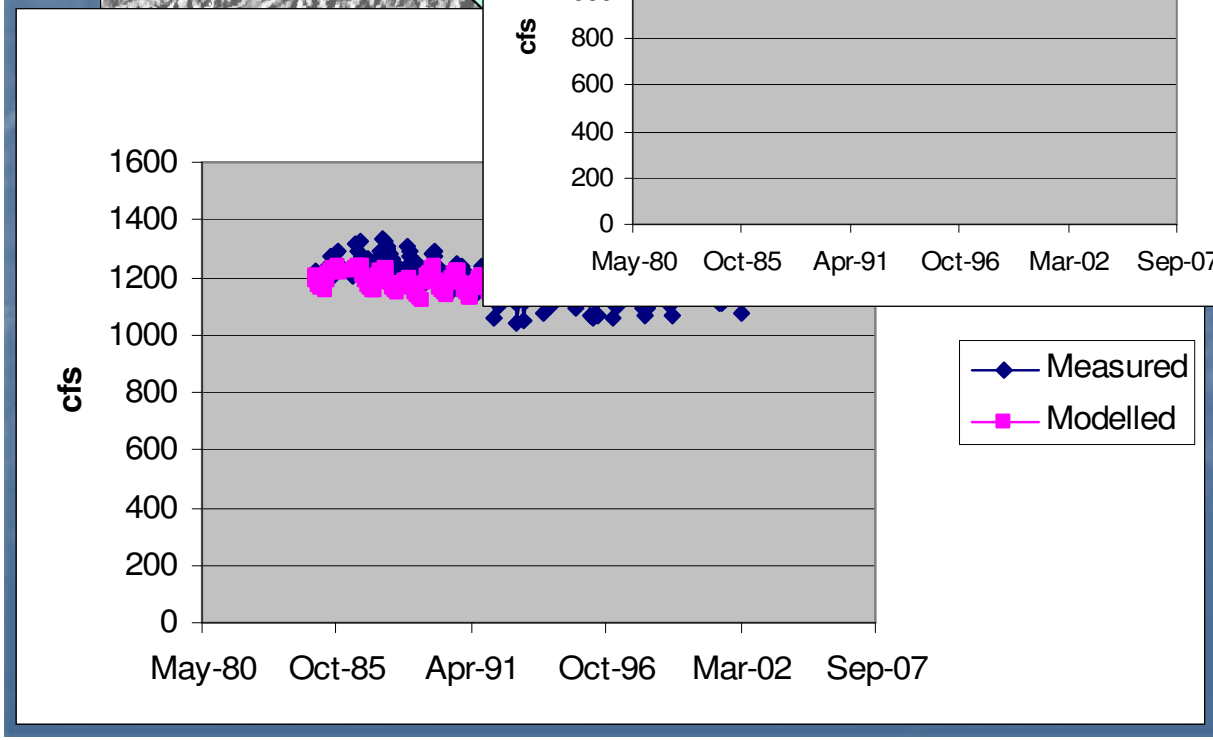
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Sep-07
Measured
Modelled

End