Pool Depth Changes

TRINITY RIVER RESTORATION PROGRAM
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Technical Report: TR-TRRP-2013-1

Assessment of Pool Depth Changes in the Trinity River between Lewiston Dam and the North Fork Trinity River

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Repeat Sonar Surveys
Collected in 2009, 2010, and 2011
139 locations between Lewiston and NF Trinity River

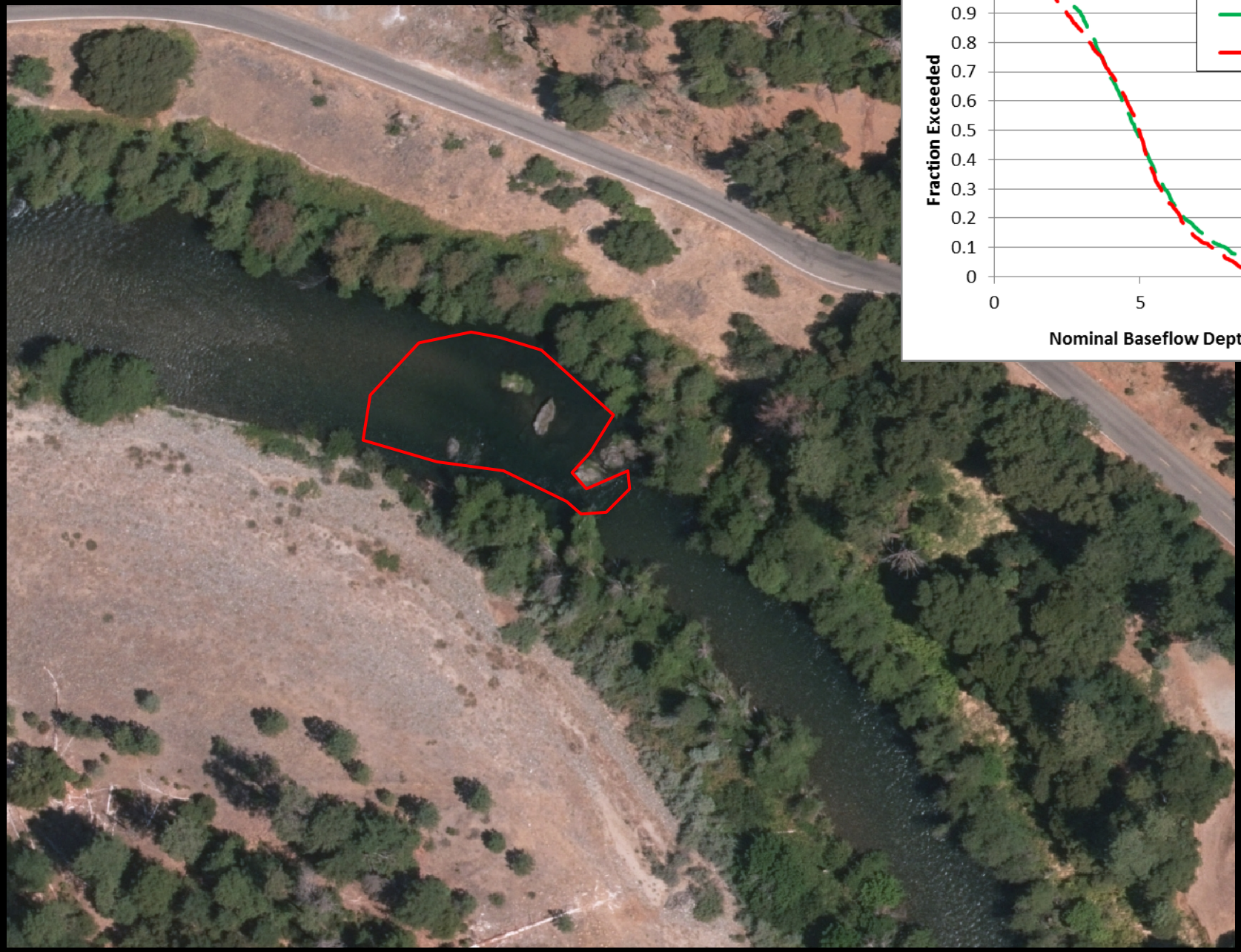
2009: Single sonar transducer

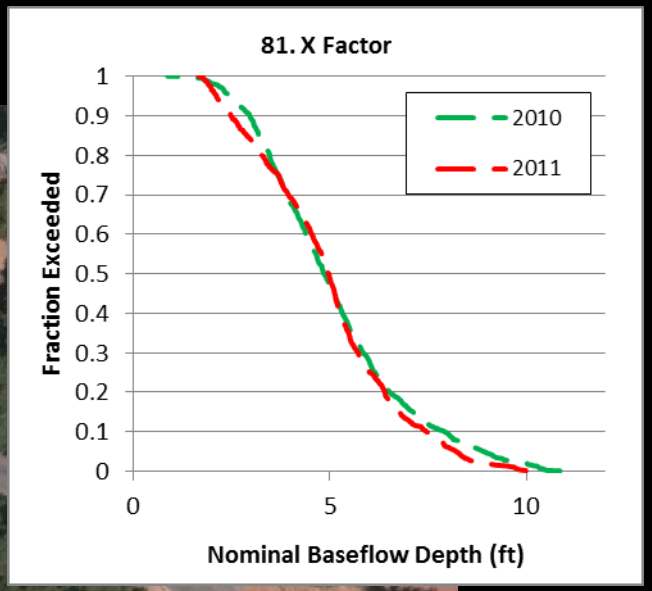
2010: Dual transducers

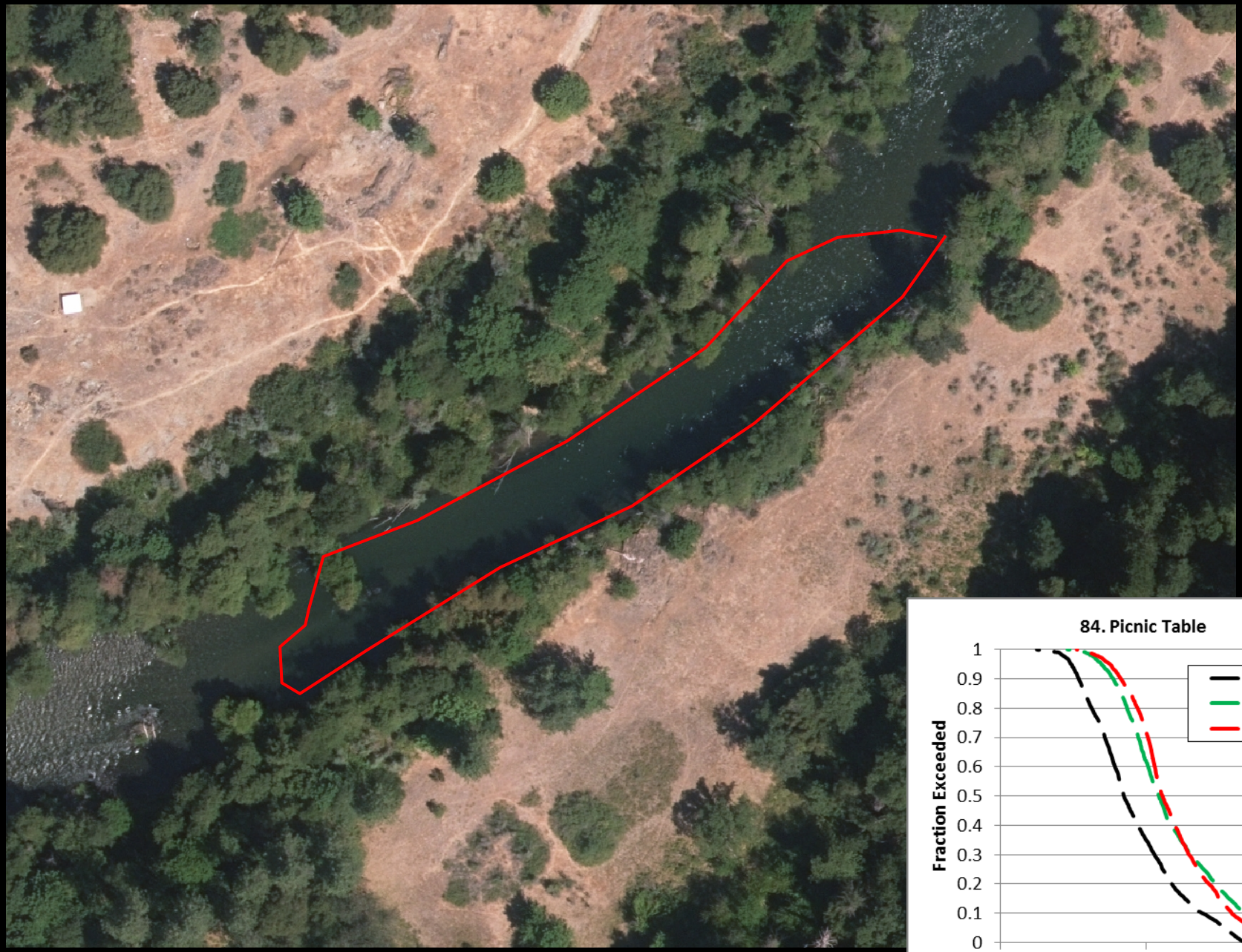
2011: Sweep System (up to 7 transducers)

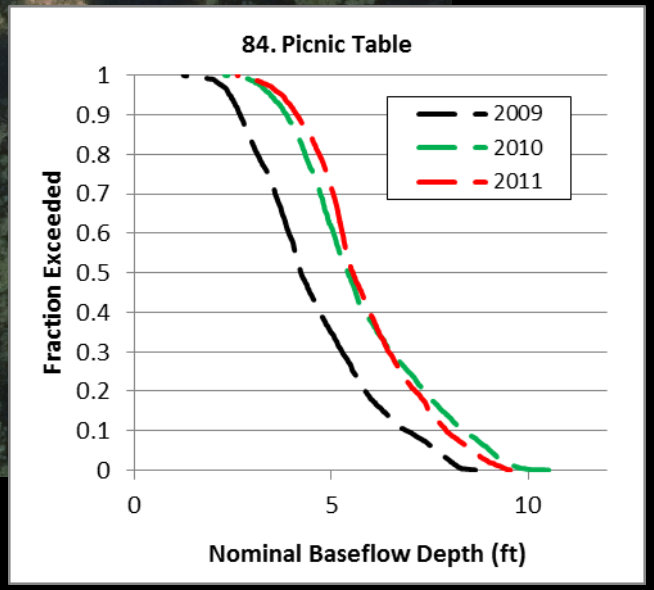
Sonar elevations in overlap areas gridded at 3' resolution (ArcMap), and converted to depth below a nominal WSEL. Cumulative frequency curves and quantile statistics computed.

X Factor

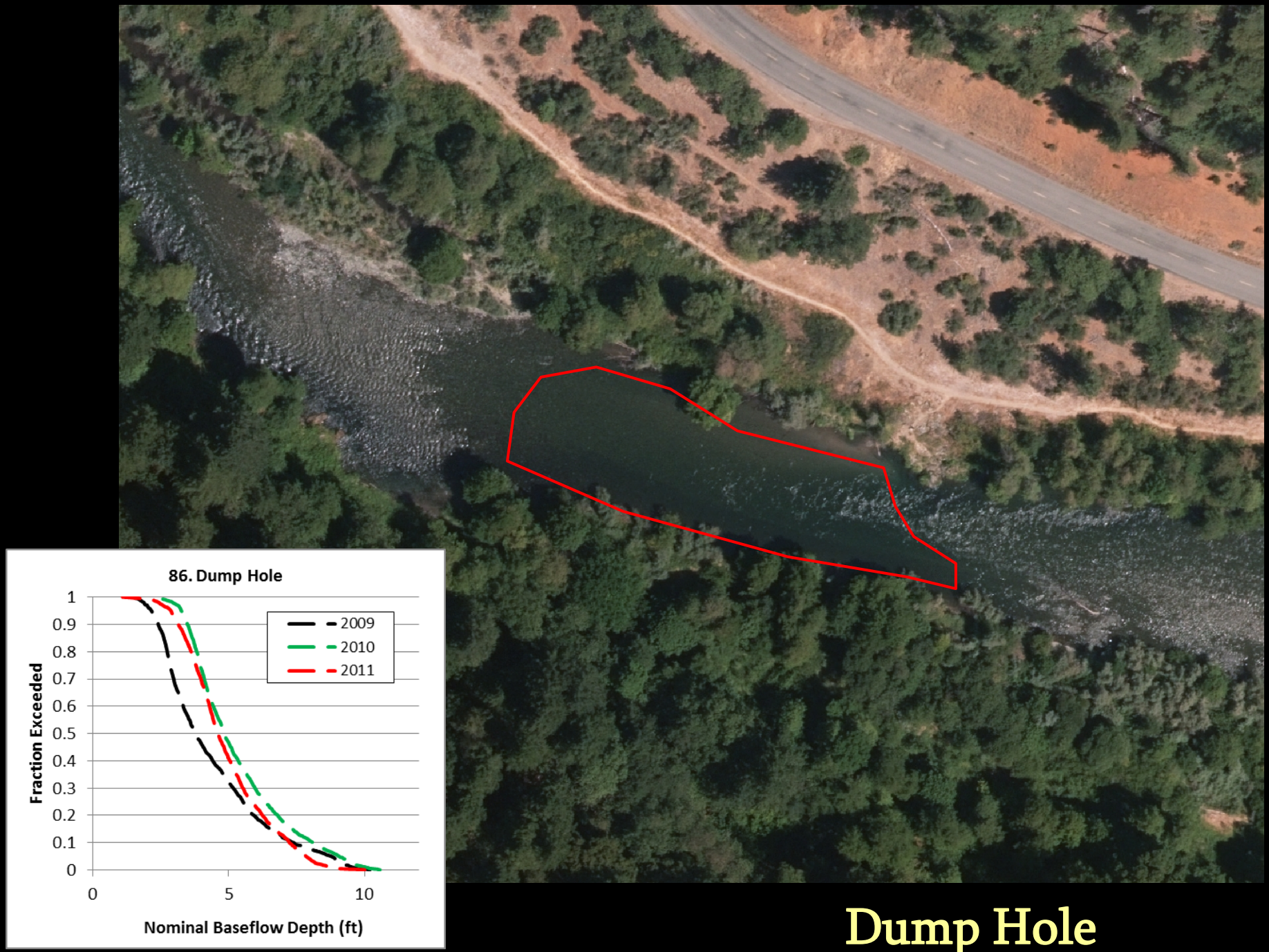



81. X Factor
Fraction Exceeded
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
Nominal Baseflow Depth (ft)
2010
2011

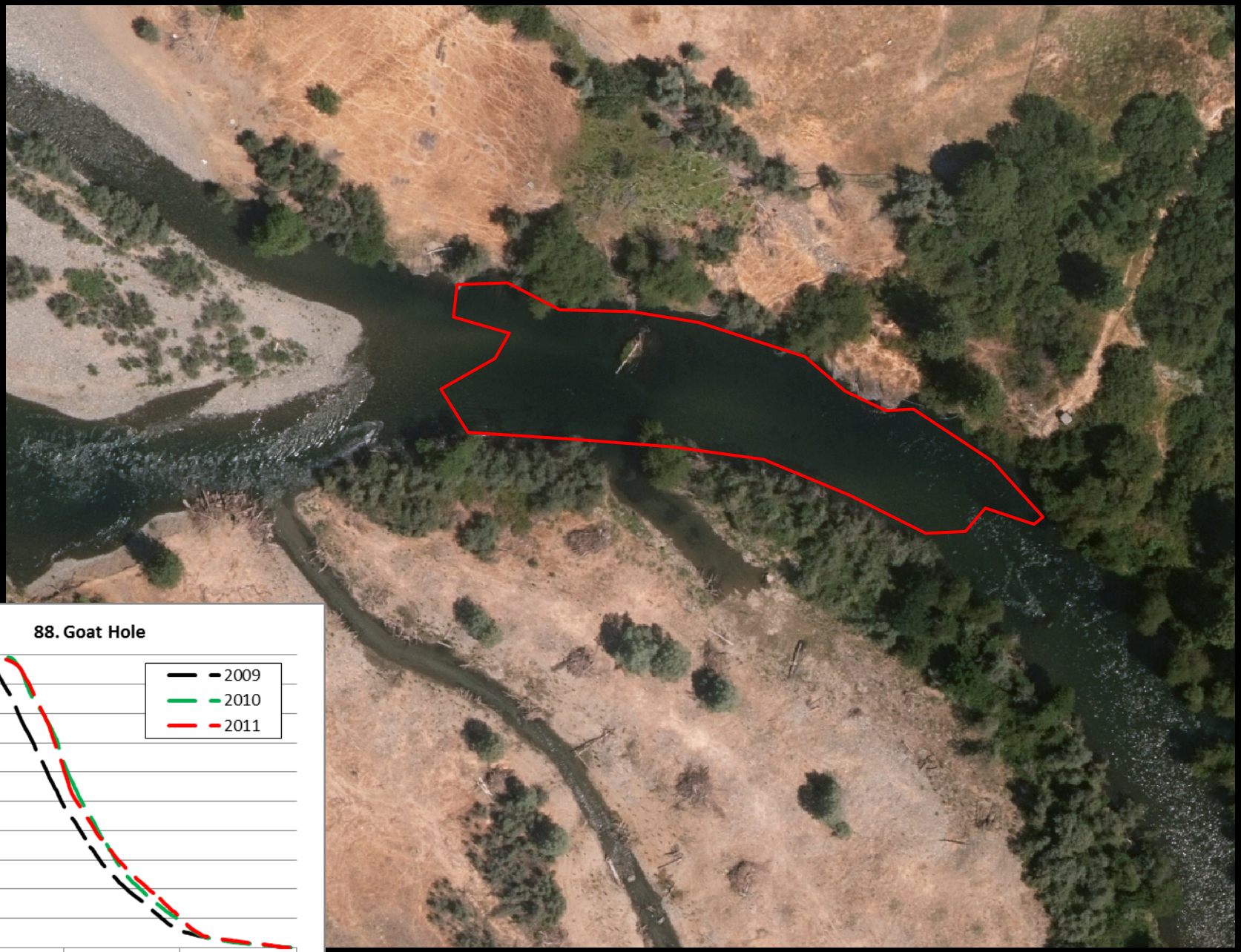


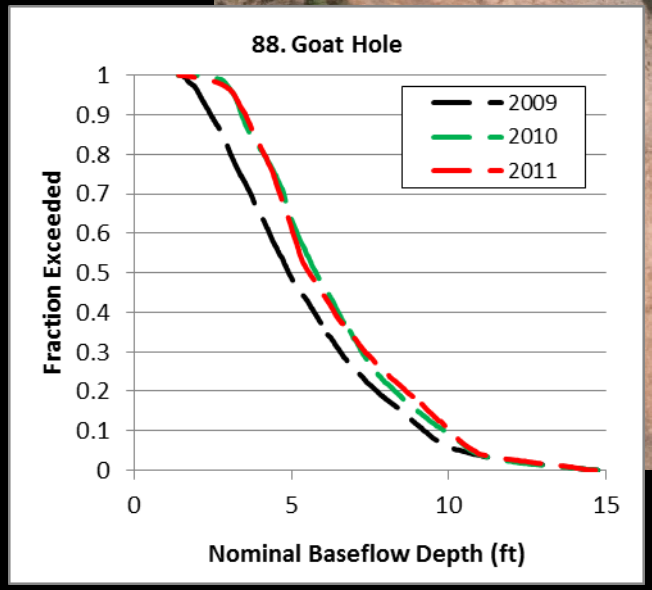


Picnic Table

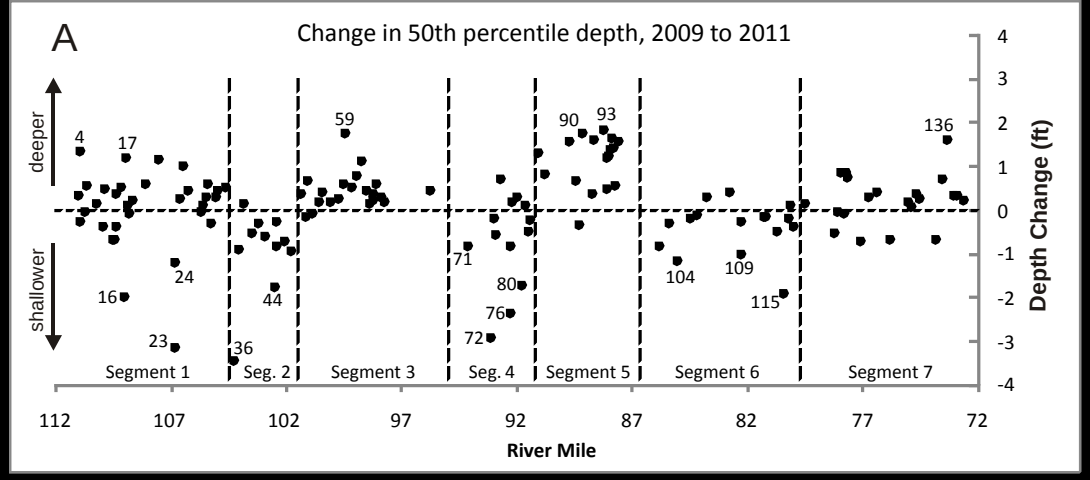

86. Dump Hole
Fraction Exceeded
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
Nominal Baseflow Depth (ft)
2009
2010
2011

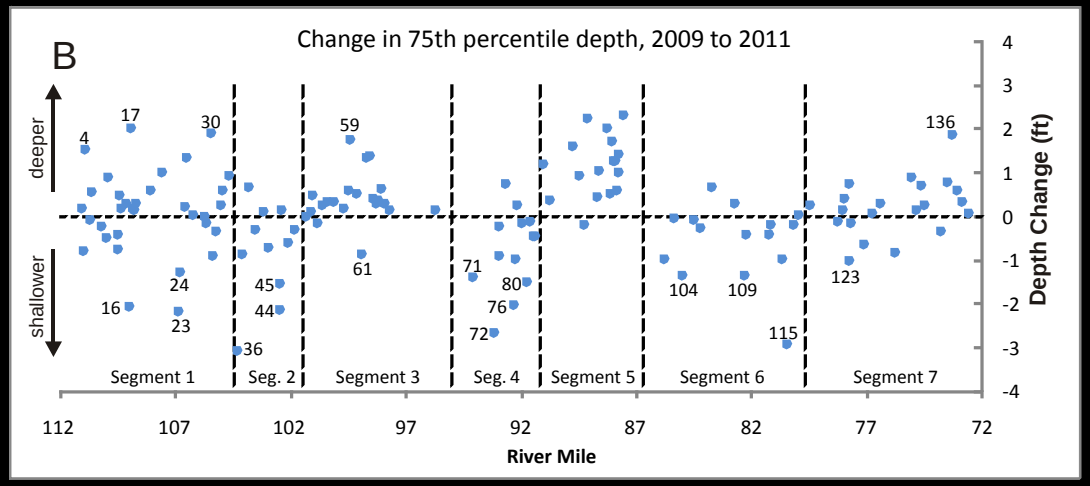
Dump Hole

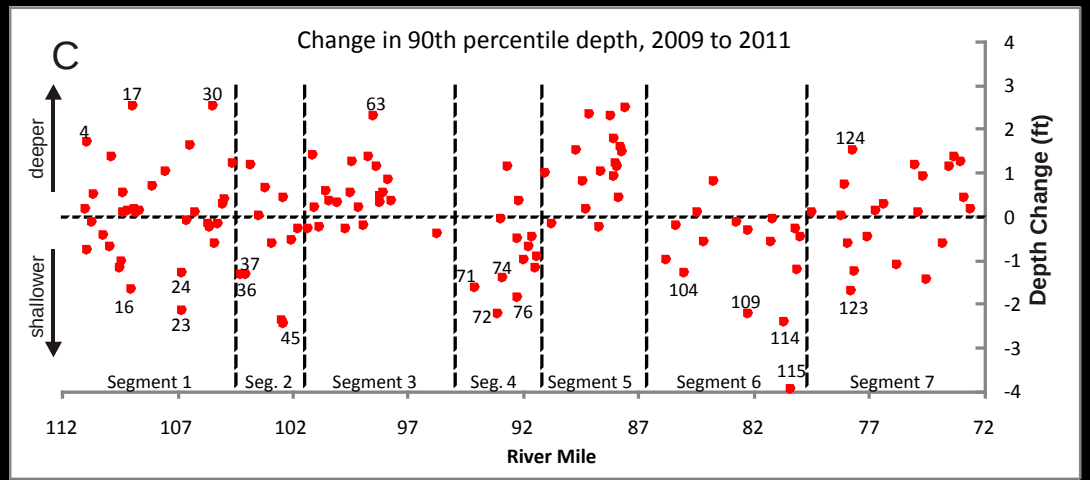



88. Goat Hole
Fraction Exceeded
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
Nominal Baseflow Depth (ft)
2009
2010
2011

Goat Hole







1 = Dam through Lowden Ranch

2 = Trinity House Gulch to Society Pool in the Poker Bar subdivision

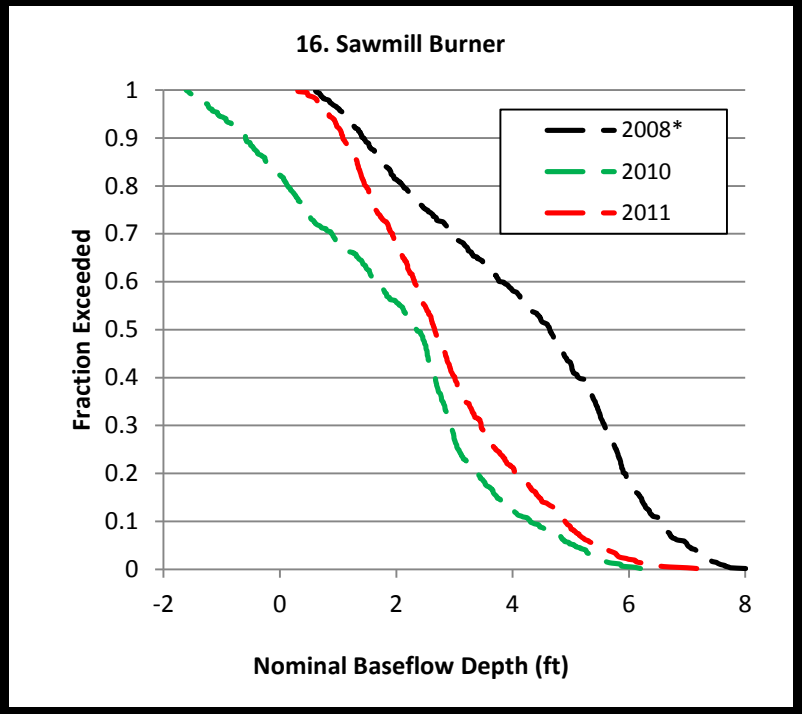
3 = Society Pool to Indian Creek

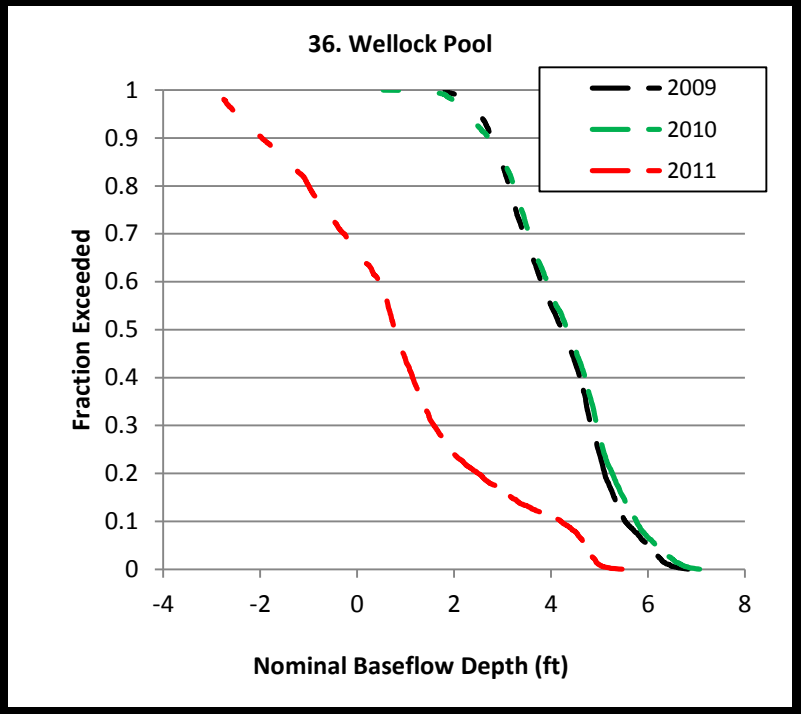
4 = Weaver Creek past Douglas City Campground

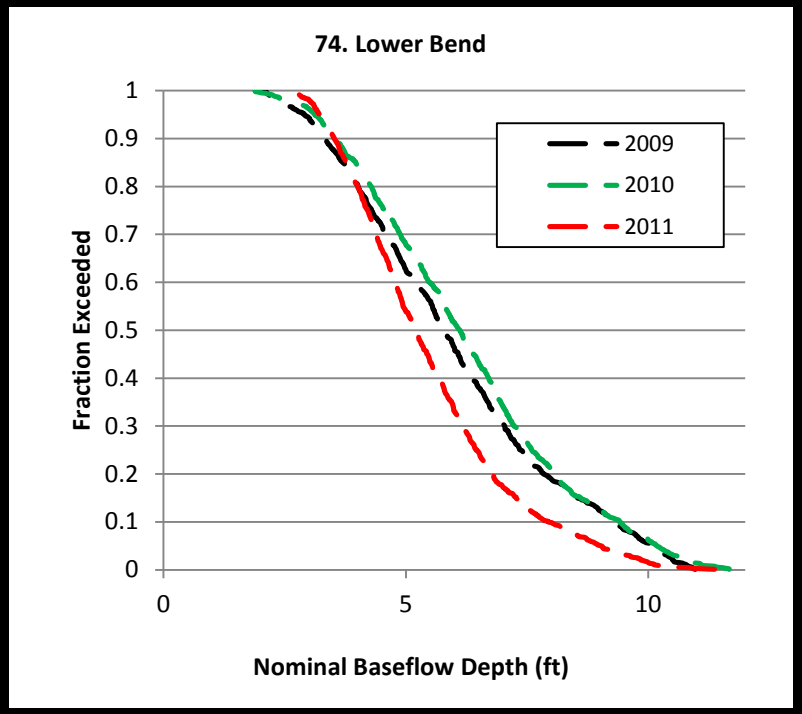
5 = Steiner Flat Road area to beyond Browns Creek

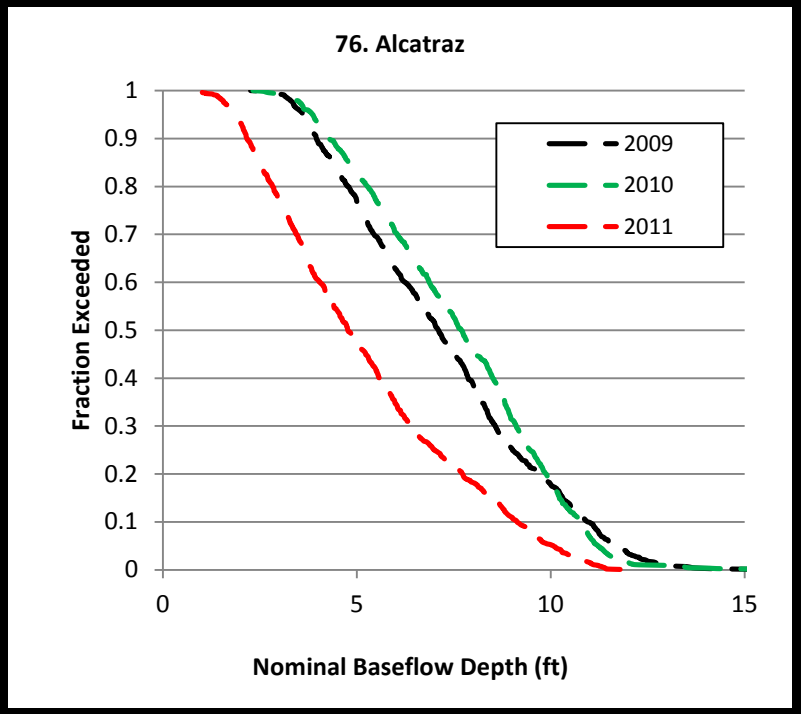
6 = Sky Ranch Road area

7 = Junction City to the North Fork


16. Sawmill Burner
Fraction Exceeded
Nominal Baseflow Depth (ft)
2008*
2010
2011
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-2
0
2
4
6
8

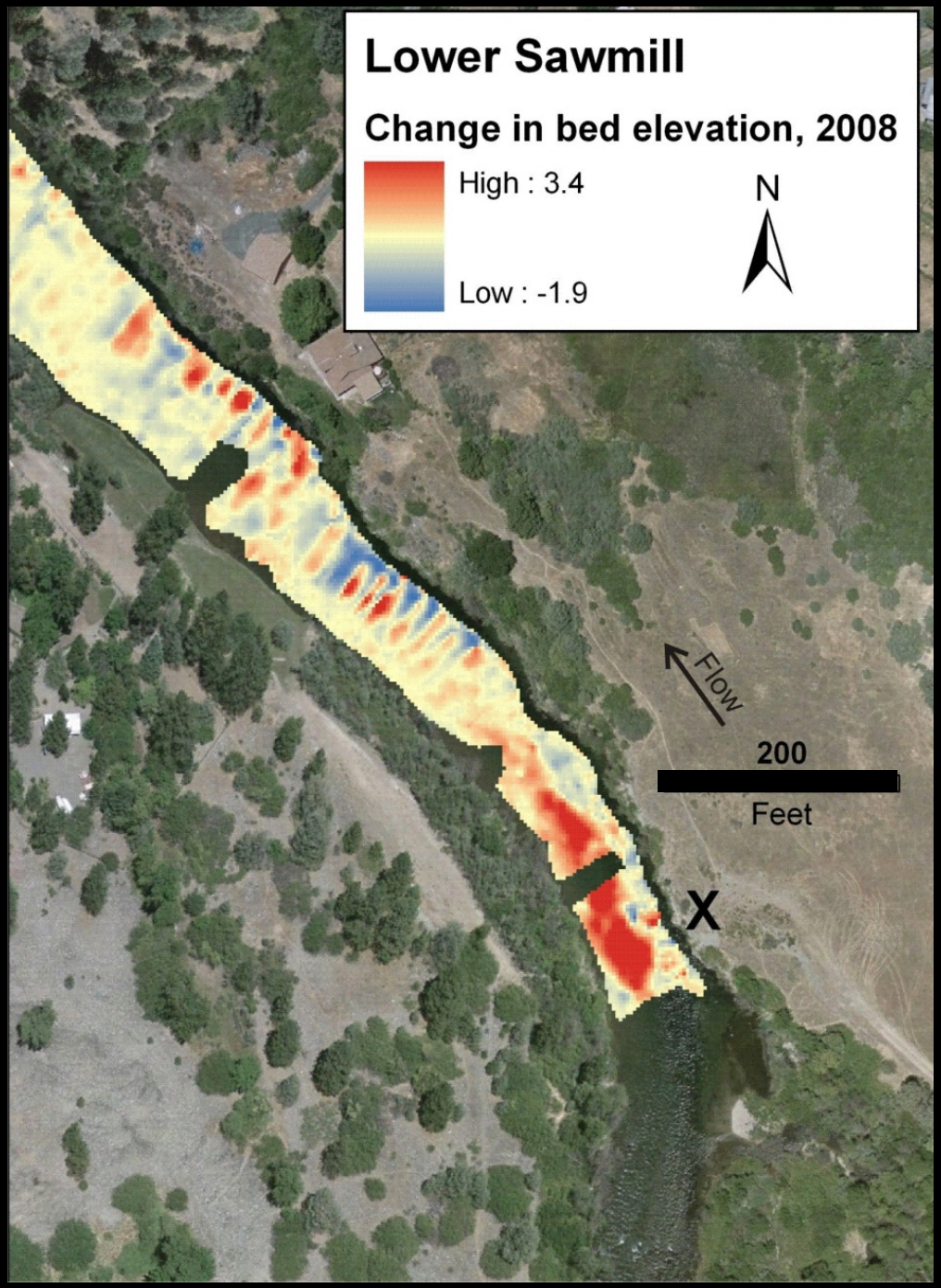

36. Wellock Pool
Fraction Exceeded
Nominal Baseflow Depth (ft)
2009
2010
2011
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-2
0
2
4
6
8


74. Lower Bend
Fraction Exceeded
Nominal Baseflow Depth (ft)
2009
2010
2011
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10


76. Alcatraz
Fraction Exceeded
Nominal Baseflow Depth (ft)
2009
2010
2011
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15

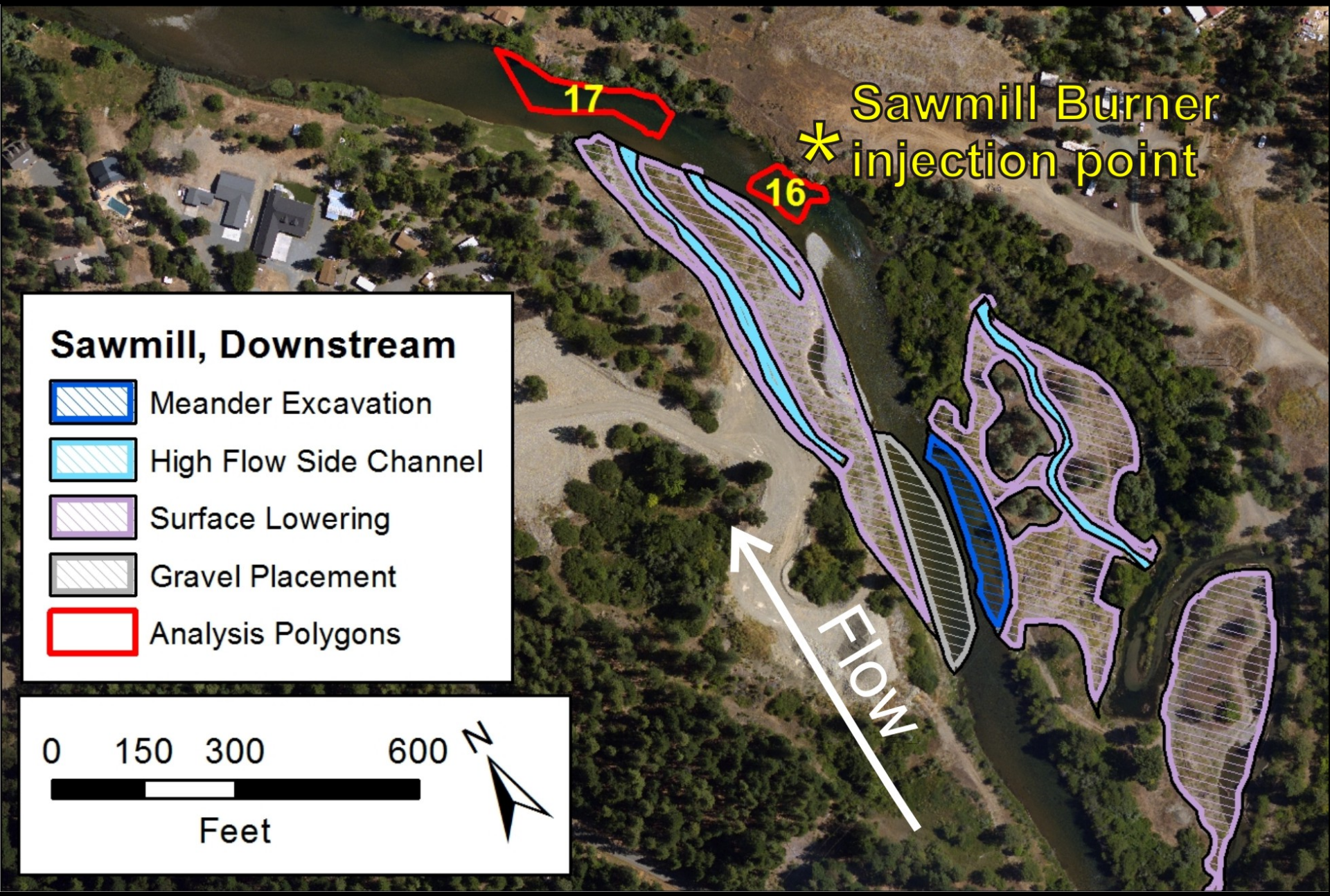
Sawmill Burner Hole
2008 and 2009

During 2009 high-flow release

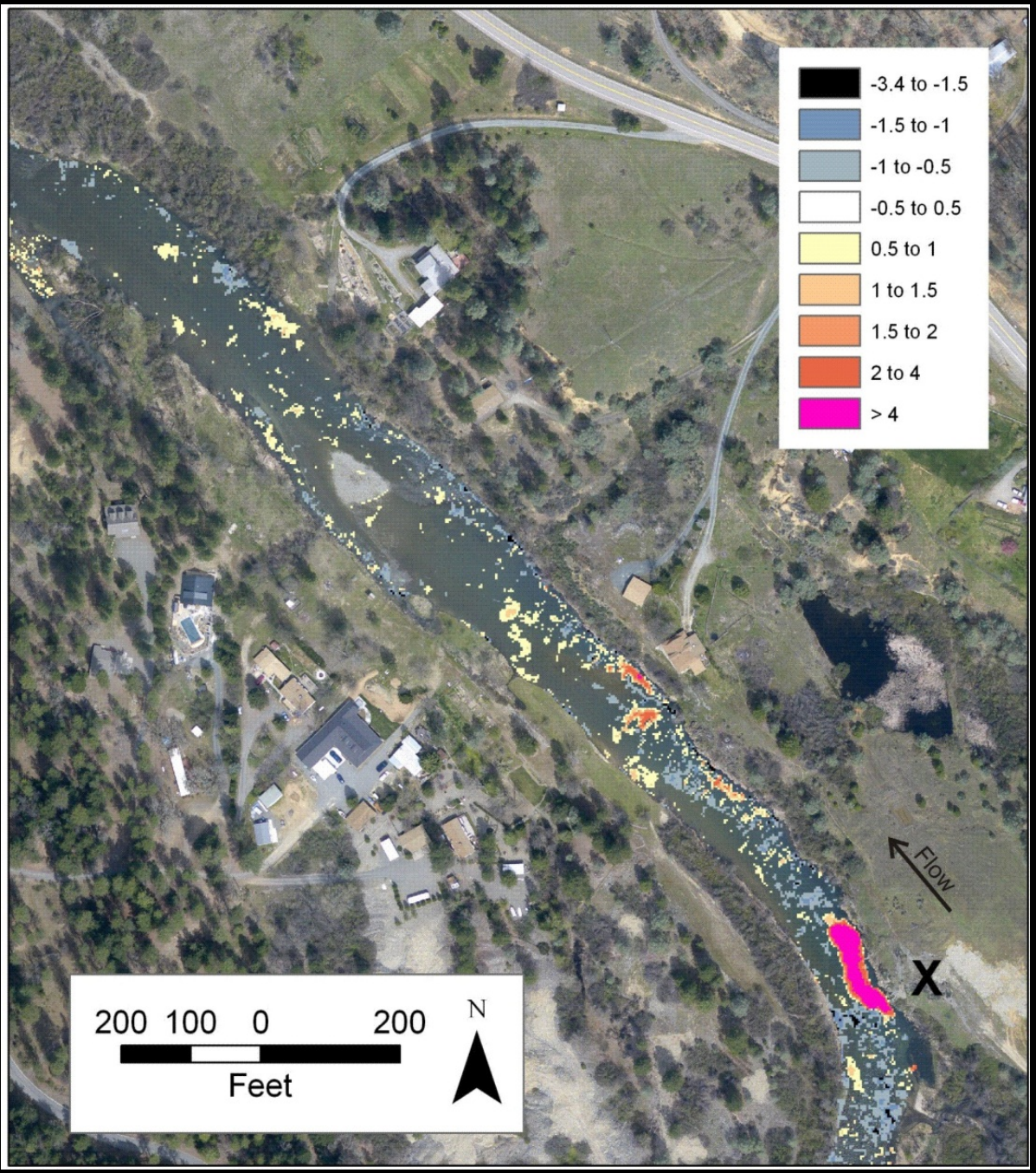


Burner Hole Different Behavior Before and After 2009 Channel Rehabilitation Project

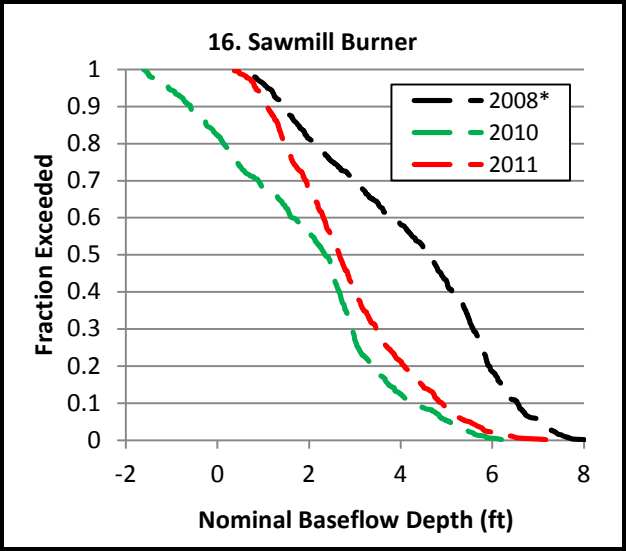
Elevation changes, before and after 2008 release


17
16
Sawmill Burner
injection point
Flow
Sawmill, Downstream
Meander Excavation
High Flow Side Channel
Surface Lowering
Gravel Placement
Analysis Polygons
0
150
300
600
Feet
N

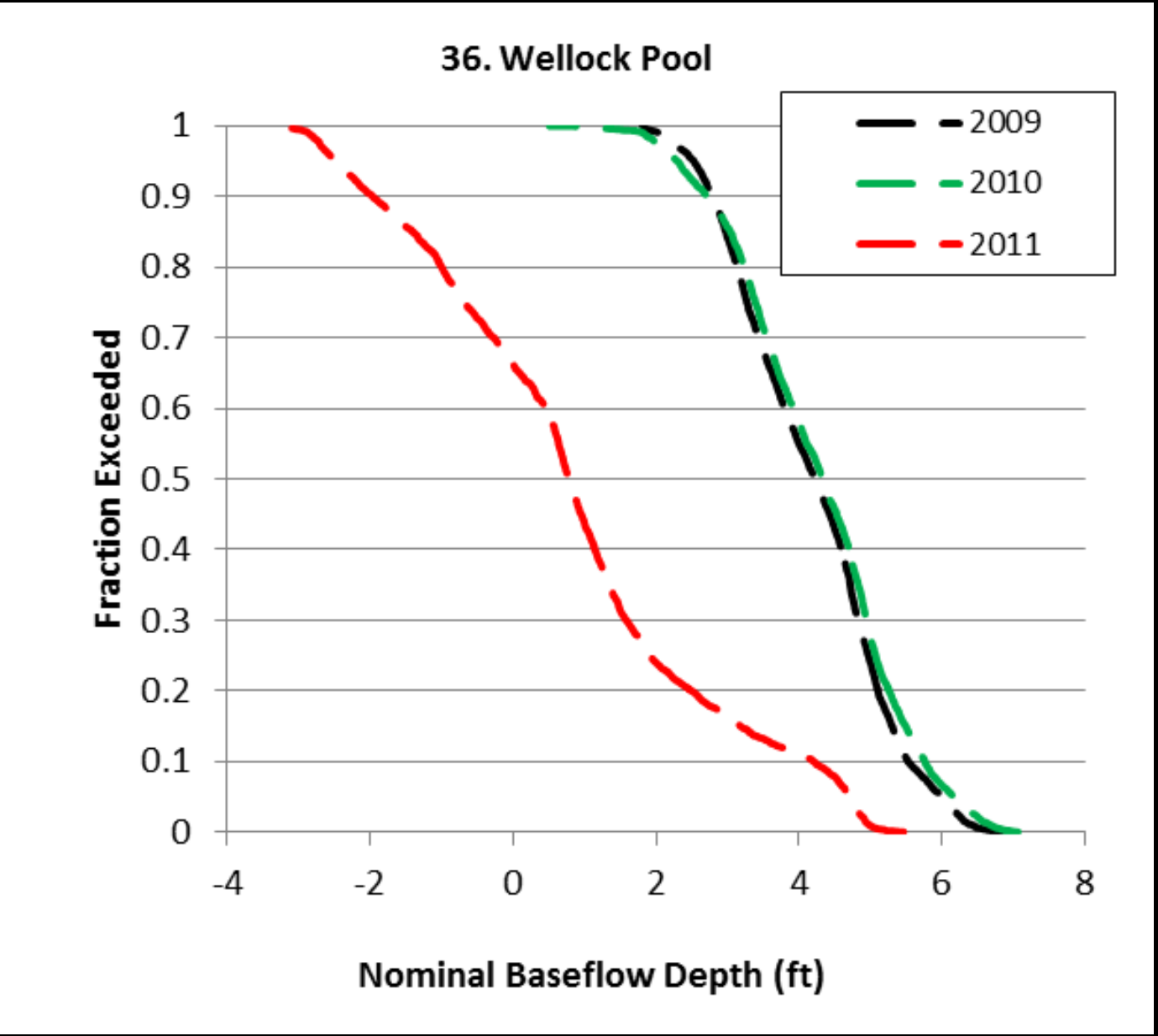
Burner Hole Different Behavior Before and After 2009 Channel Rehabilitation Project



Elevation changes, before 2009 release and after 2010 release



Wellock Pool



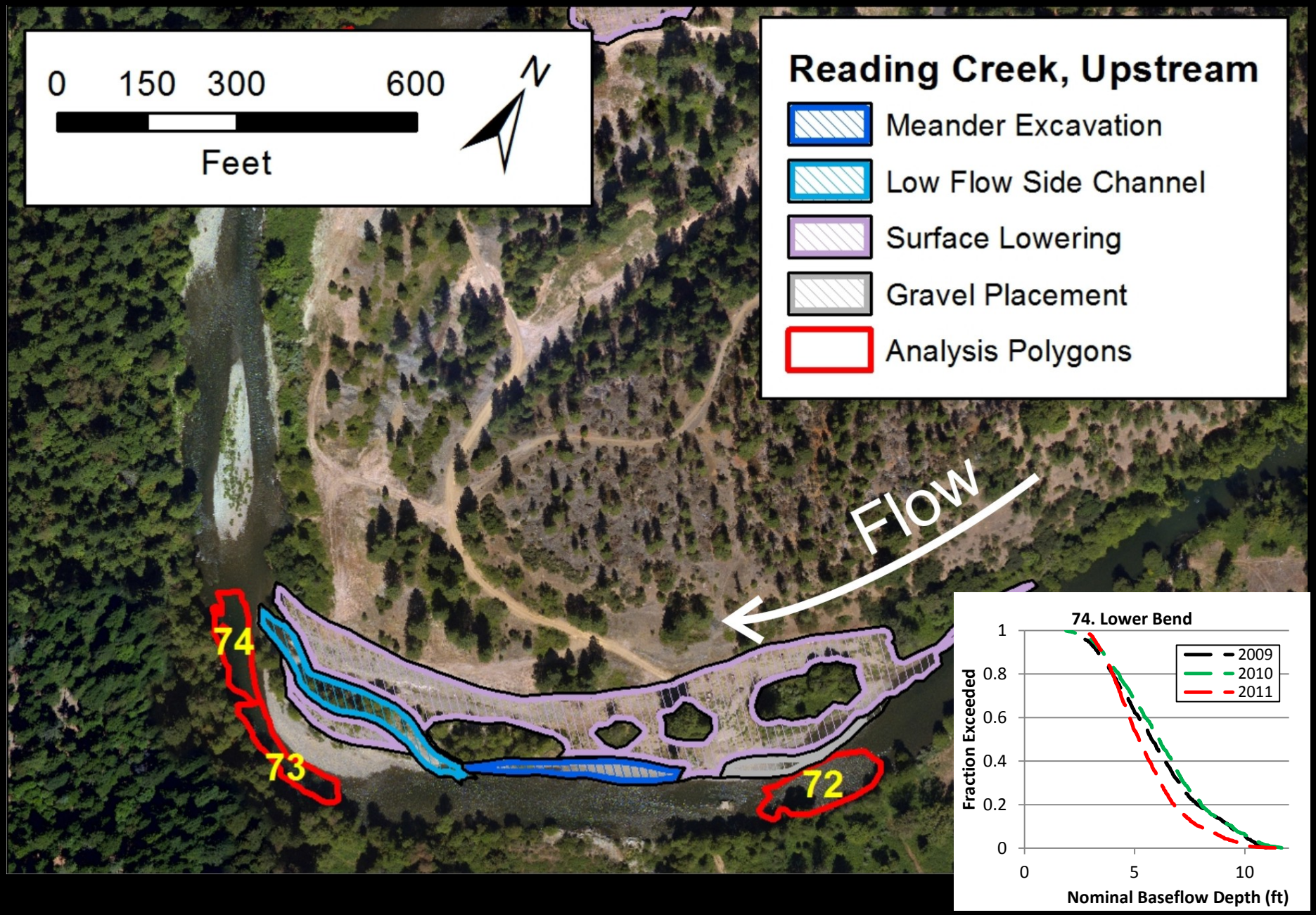
Wellock Pool

Wellock 'Pool' in 1980 – no pool present. It has not yet been dredged.

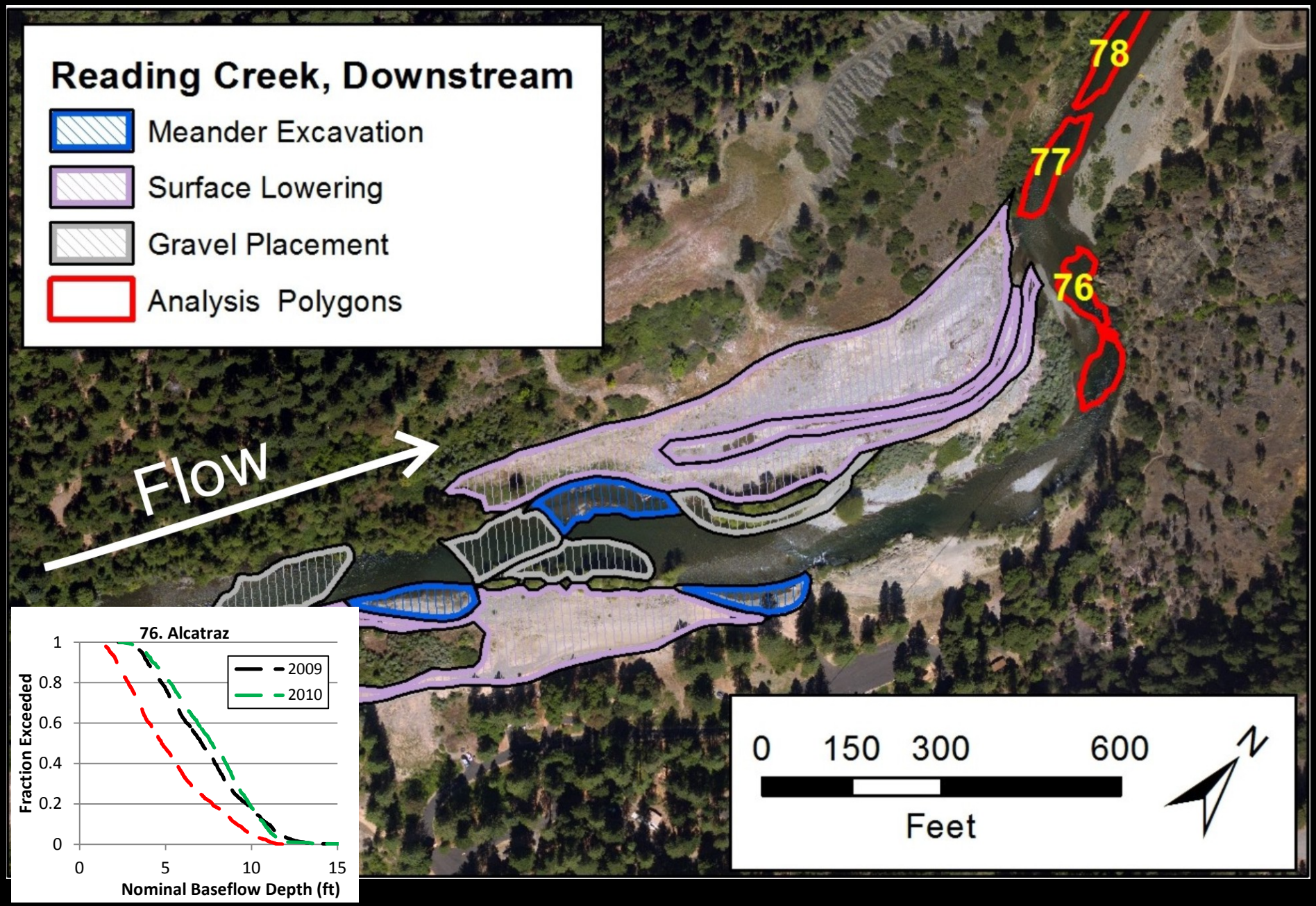
Wellock Pool prior to the 2011 flow release – right river bank has migrated to the north since 1980. Slackwater pool on river left.

Wellock Pool after the 2011 flow release – similar to pre-dredge (1980) configuration but located farther to the north.

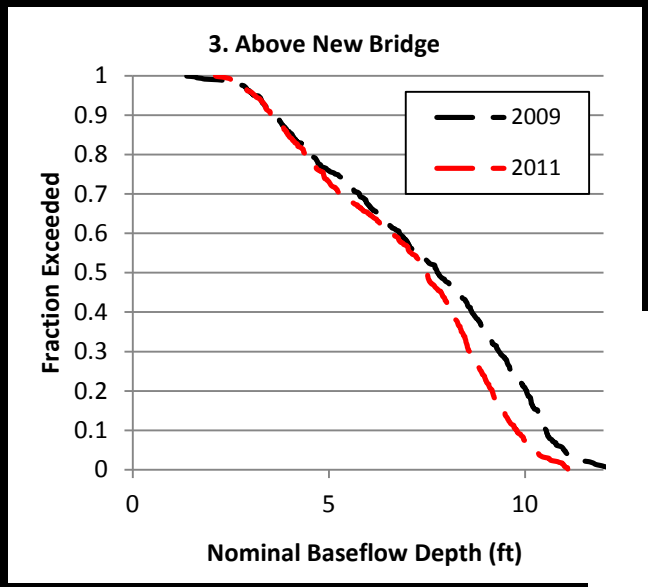
Lower Bend

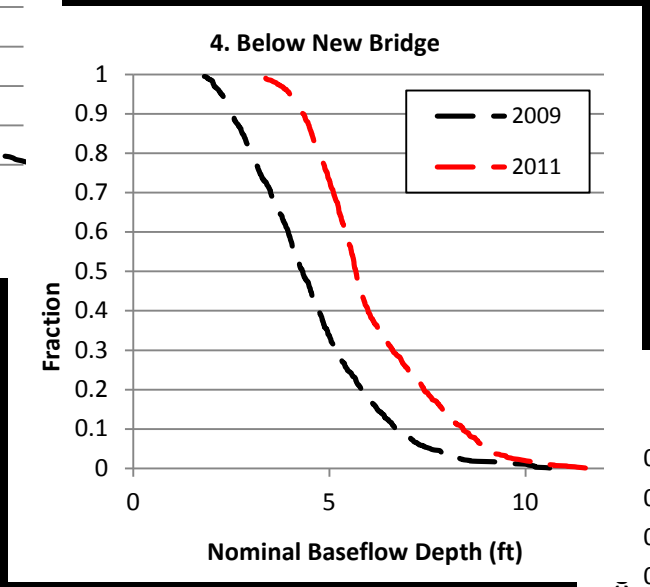

0 150 300 600
Feet
N
Reading Creek, Upstream
Meander Excavation
Low Flow Side Channel
Surface Lowering
Gravel Placement
Analysis Polygons
Flow
74
73
72
74. Lower Bend
2009
2010
2011
Fraction Exceeded
1
0.8
0.6
0.4
0.2
0
0
5
10
Nominal Baseflow Depth (ft)

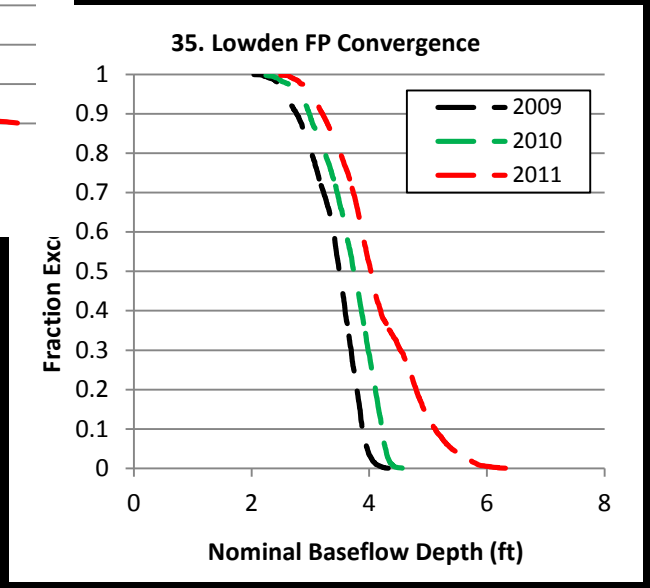
Alcatraz


Reading Creek, Downstream
Meander Excavation
Surface Lowering
Gravel Placement
Analysis Polygons
78
77
76
Flow
0 150 300 600
Feet
N
76. Alcatraz
2009
2010
Fraction Exceeded
Nominal Baseflow Depth (ft)
0
0.2
0.4
0.6
0.8
1
0
5
10
15

Depth Increases Downstream from Gravel Augmentations



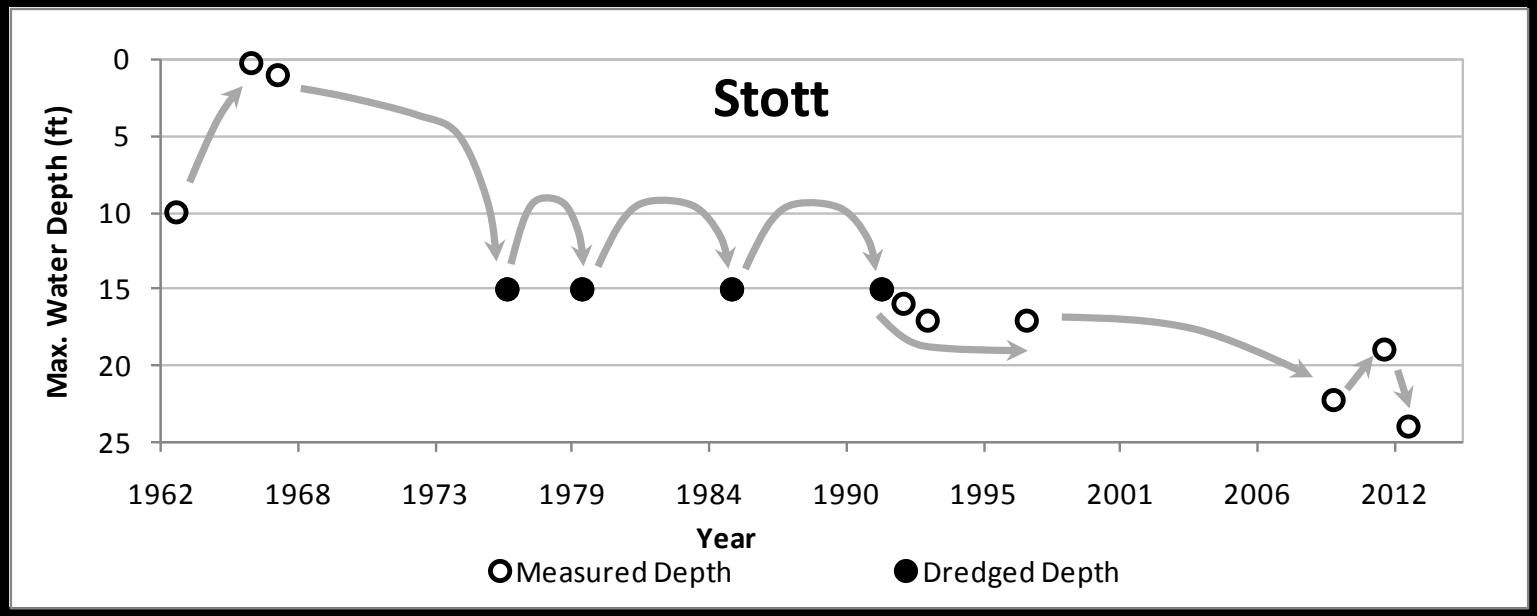




Longer-term Depth Changes

'Hole' at Old Lewiston Bridge in 1999

Stott 'Hole' in 1977



Maximum depths at Stott Hole before, during, and after dredge operations

Lessons Learned

Popular Assumption:

Pools are filling with gravel throughout the Trinity River, and this is the result of gravel augmentation.

Findings:

Only a few pools have filled significantly and many pools have deepened. Where substantial fill has occurred, it is often related to terrace lowering rather than gravel augmentation.

Management Implications:

Modify rehabilitation designs to maintain mainstem confinement in the vicinity of valuable holding habitats.