

Kern River No. 1 Sediment Management Practices



February 2009

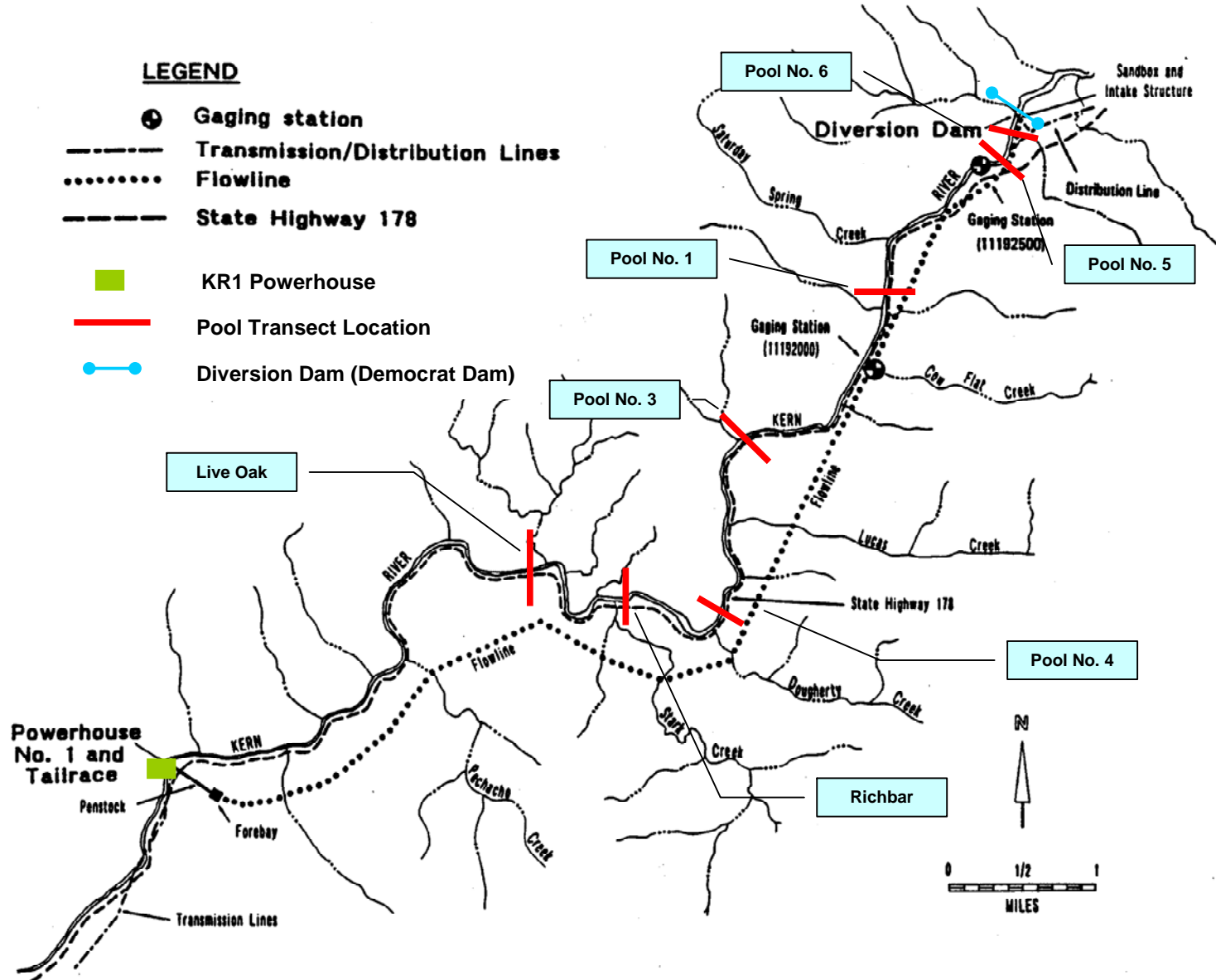
Meeting Objectives

- Update on permit approvals for Kern River No. 1 Sediment Management Practices
- Current status of sediment in Kern River No. 1 bypassed reach and Democrat Dam impoundment
- Sediment management activity projected for 2009

KR1 Permit Approvals

- CDFG Routine Maintenance Agreement
 - Beginning 3^{ed} year of the Mitigation and Monitoring Program
 - Amendment to Agreement for proposed KR1 Intake Work
- ACOE Nationwide Permit
 - NWP 03 pending renewal
- SWRCB Water Quality Certification
 - KR1 WQ Cert. issued in December 2008
 - Monitoring Program initiated this year

Kern River No. 1 Project Reach



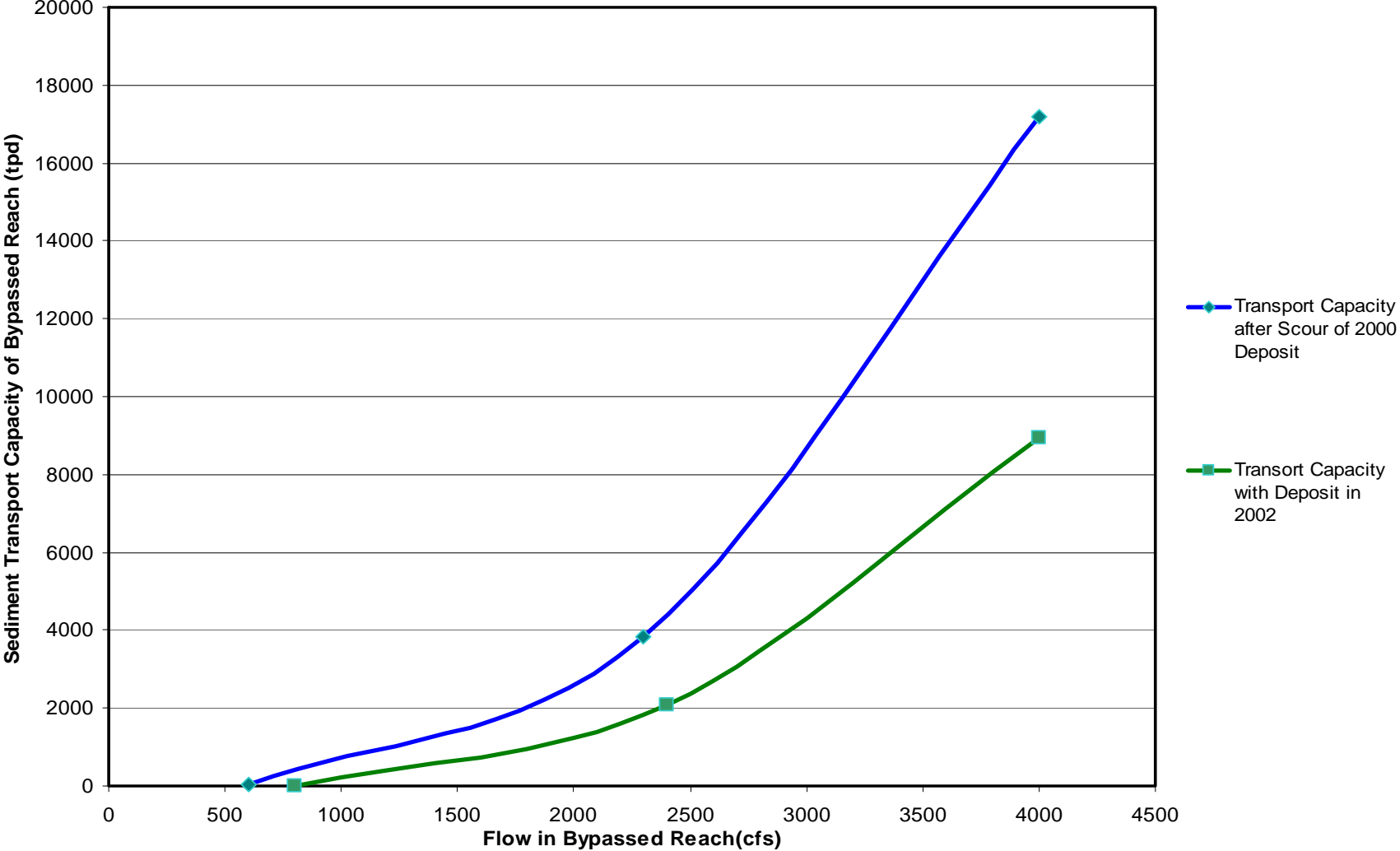
2007 Full Pond Drain

- Full pond drain March 11-15, 2007
- Approximately 20,000 cubic yards released
- Represents about 7% of the 2001 release (272,000 cubic yards)
- Observations made on April 4, 2007

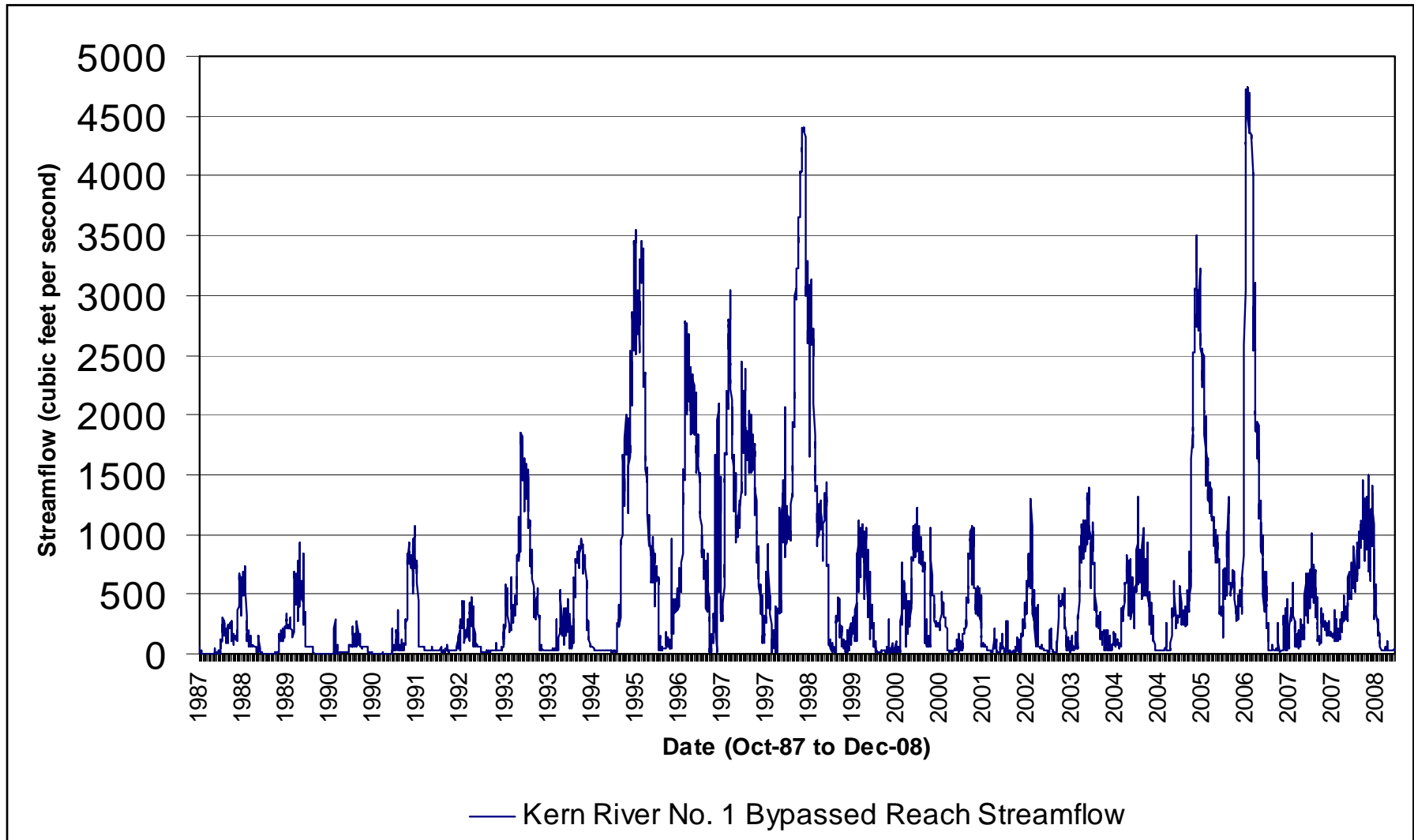
Current Status of KR1 Bypassed Reach and Democrat Impoundment

- Fate of 2001 Sediment Release
 - 2005: Flow exceeded 1,000 cfs in bypassed reach from May 20 to October 15, peak of 3,500 cfs
 - 2006: Flow exceeded 1,000 cfs in bypassed reach from April 20 to August 10, peak of 4,740 cfs
 - Transport model predicted flows in 2005 would scour the deposit, confirmed by visual observations
 - 2006 releases provided further scour
 - Bypass reach channel morphology is in the unimpaired state
- 2007 Full Pond Drain (approx. 20,000 cubic yards)
 - No monitoring performed in 2008 (2007 WY) due to tunnel outages during the low flow season
 - 2009 Monitoring: Temporary sediment storage at Pool 1 (first prominent low gradient area; Richbar areas are next)

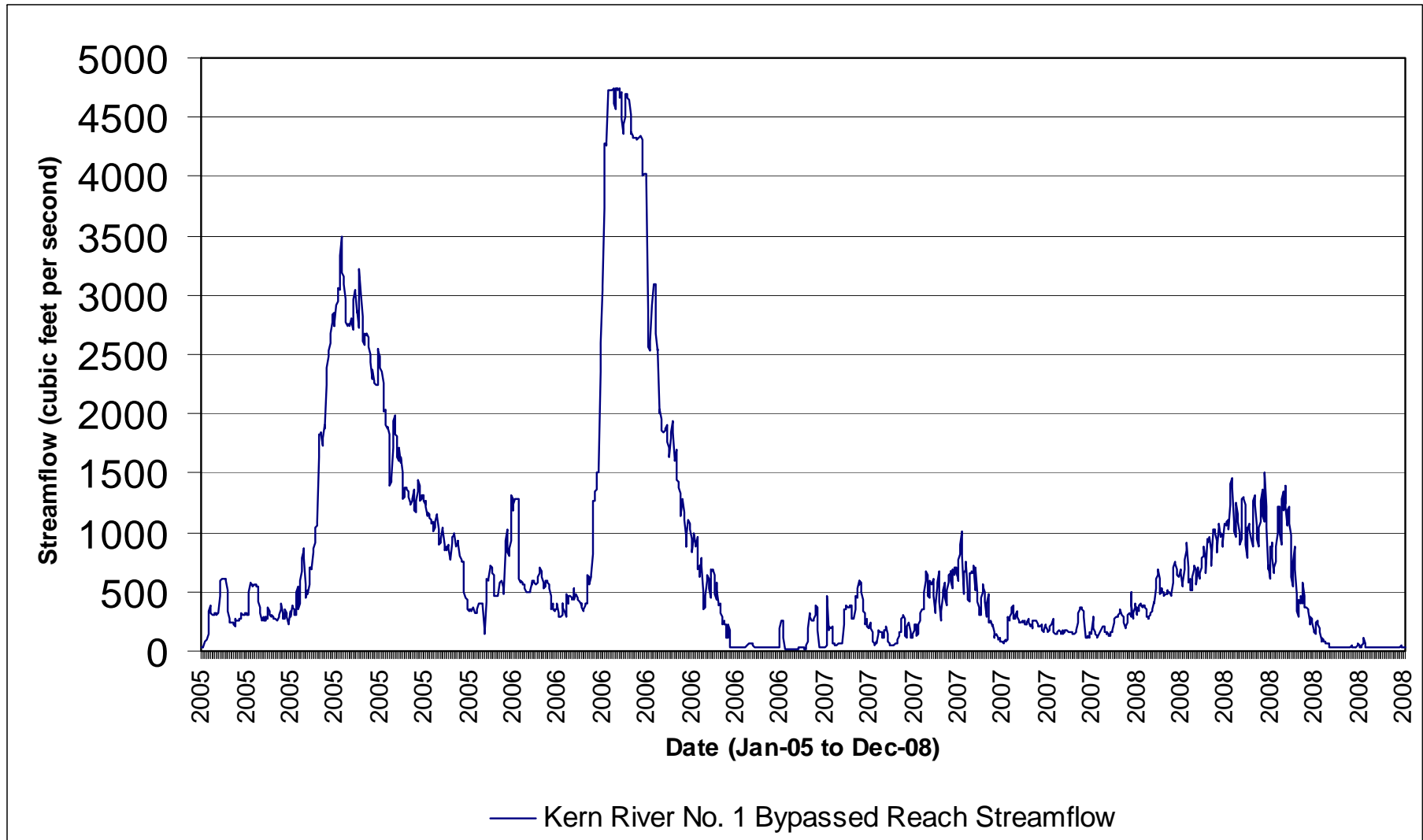
KR1 Sediment Transport Capacity



KR1 Bypassed Reach Hydrograph (1988-2008)



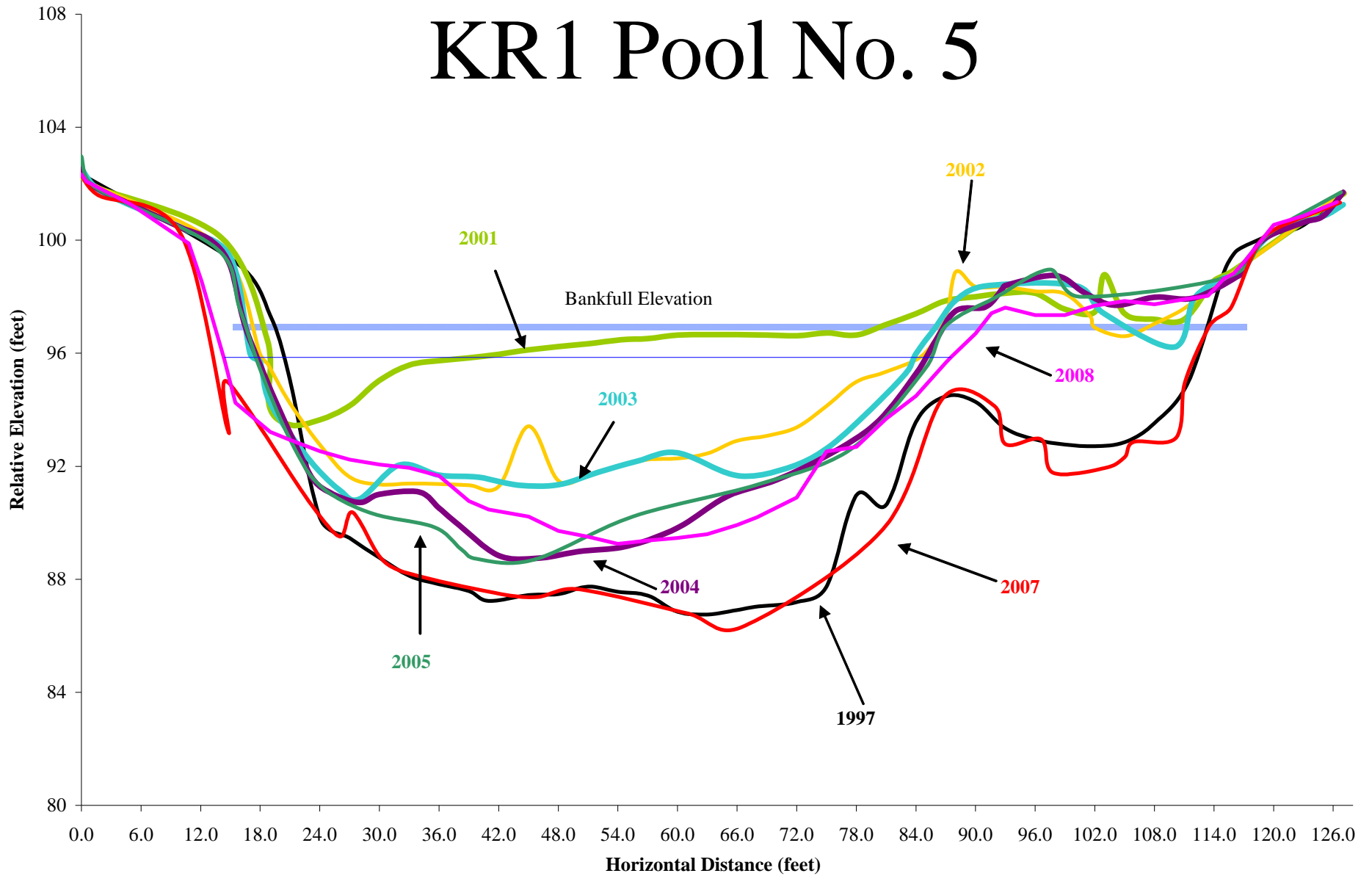
KR1 Bypassed Reach Hydrograph (2005-2008)



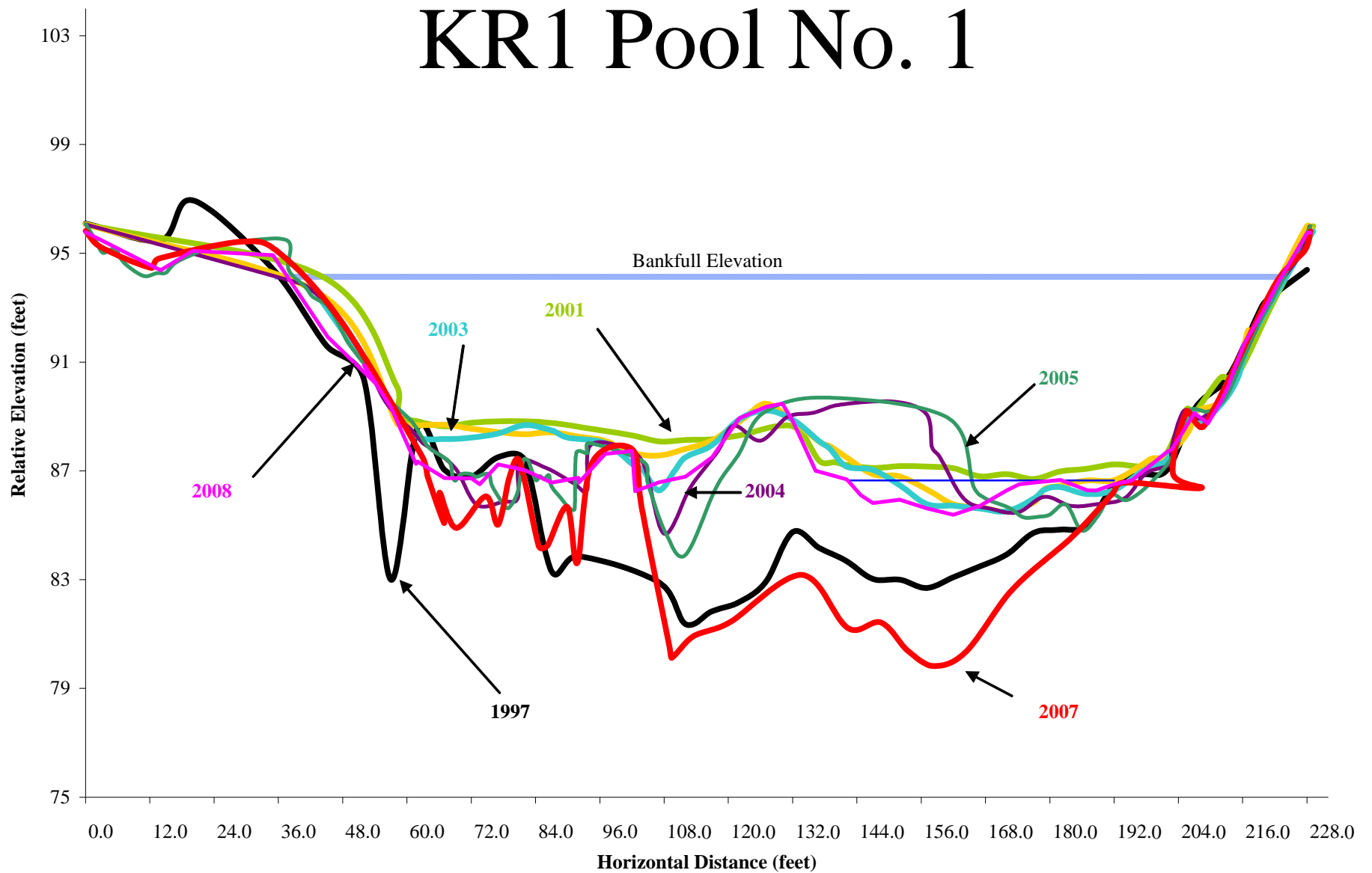
Summary of Transects and Visual Monitoring

- Minor sediment deposition measured at Pool 5
- Sediment deposition measured at Pool 1
- The remaining 6 pools remain relatively scoured throughout the KR1 bypassed reach
- The majority of the bypassed reach continues to operate within the unimpaired transport capacity measured in the late 1990's

KR1 Pool No. 5

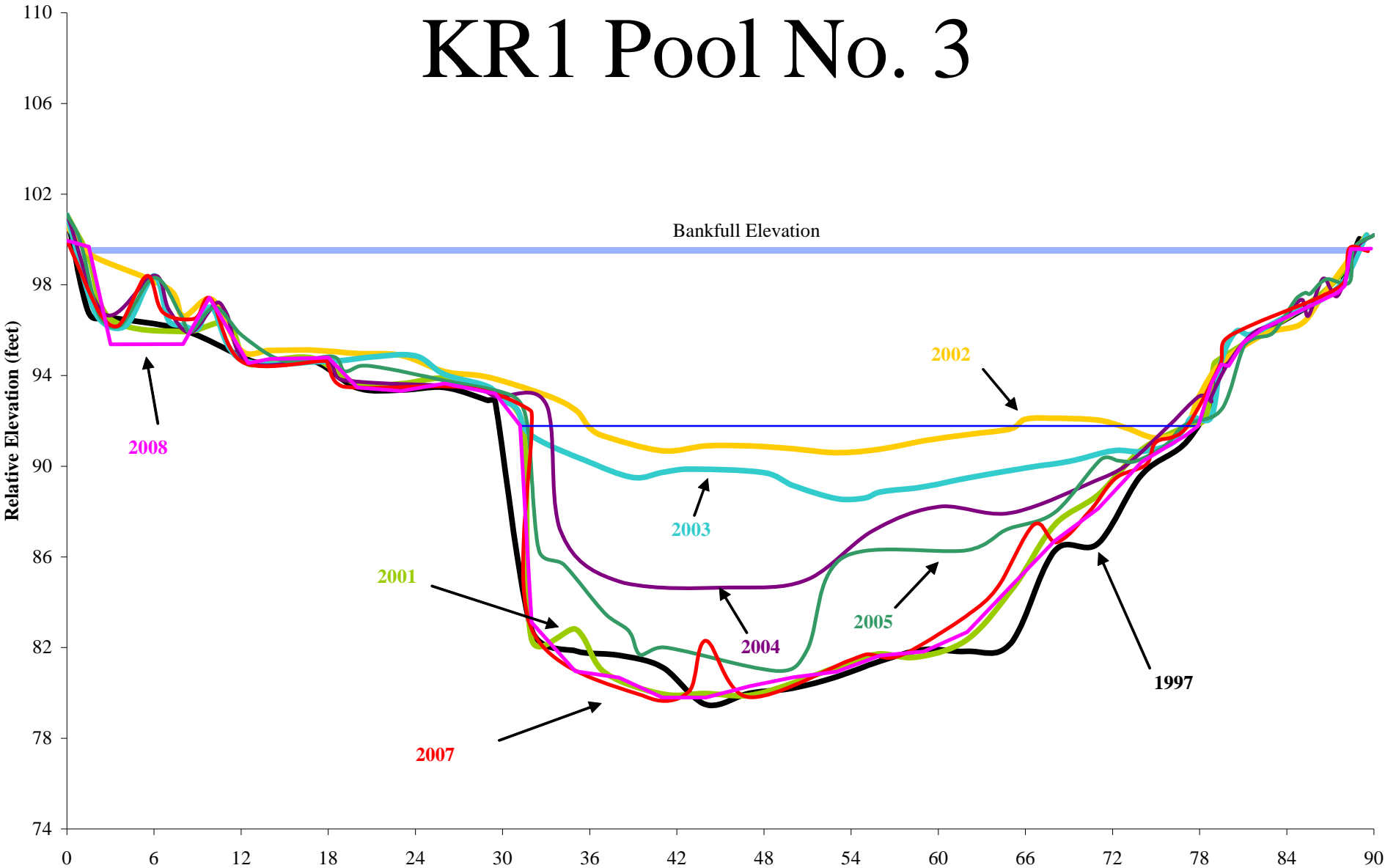


KR1 Pool No. 1

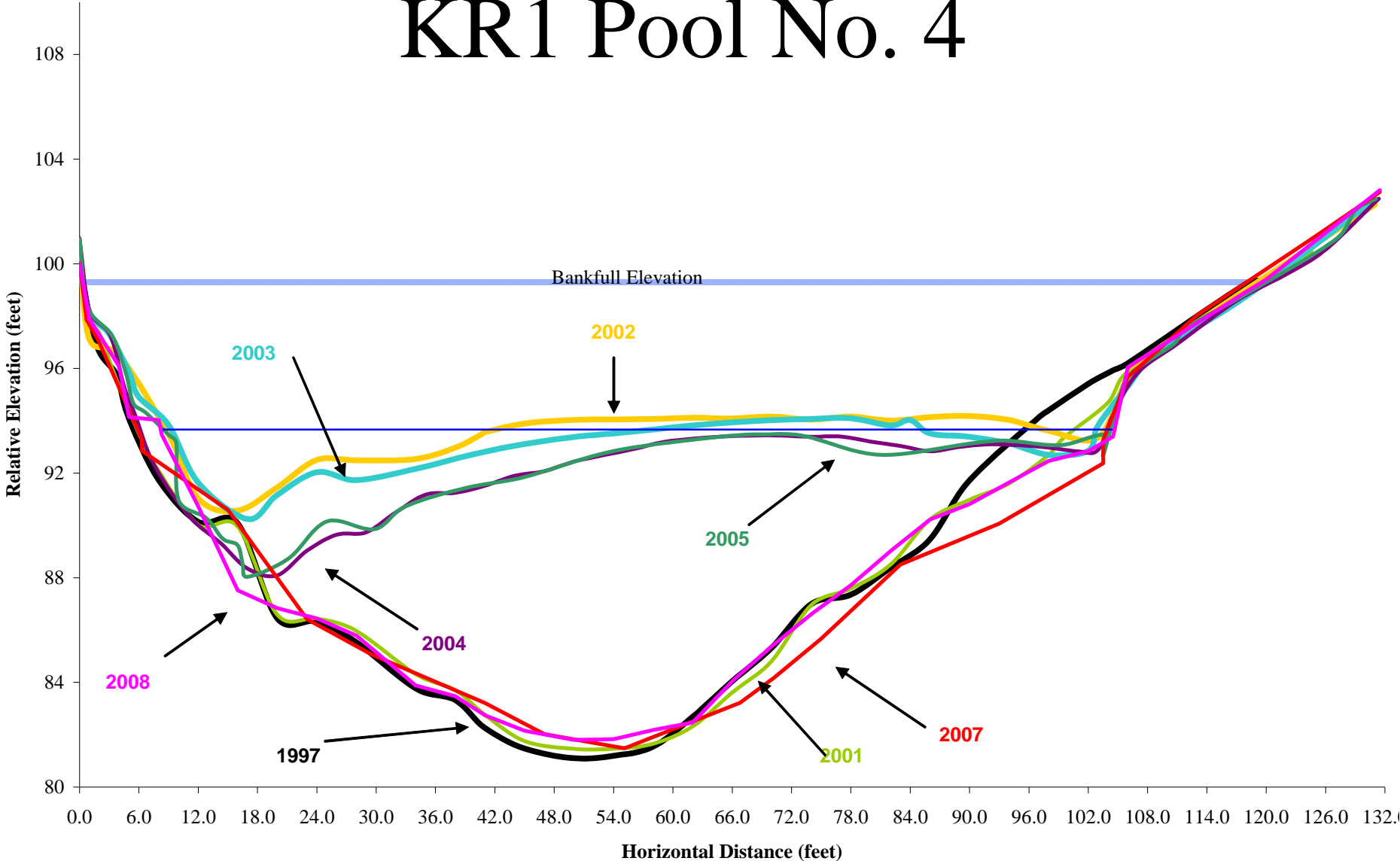


Bankfull Elevation	1997 Channel Bed Elevation	2001 Channel Bed Elevation	2002 Channel Bed Elevation
2003 Channel Bed Elevation	2004 Channel Bed Elevation	2005 Channel Bed Elevation	2007 Channel Bed Elevation
2008 Water Surface Elevation	2008 Channel Bed Elevation		

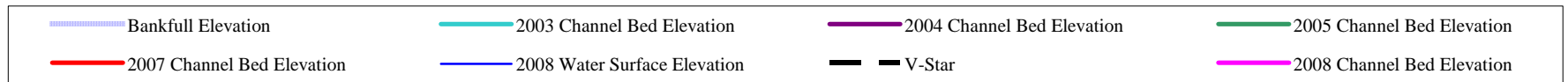
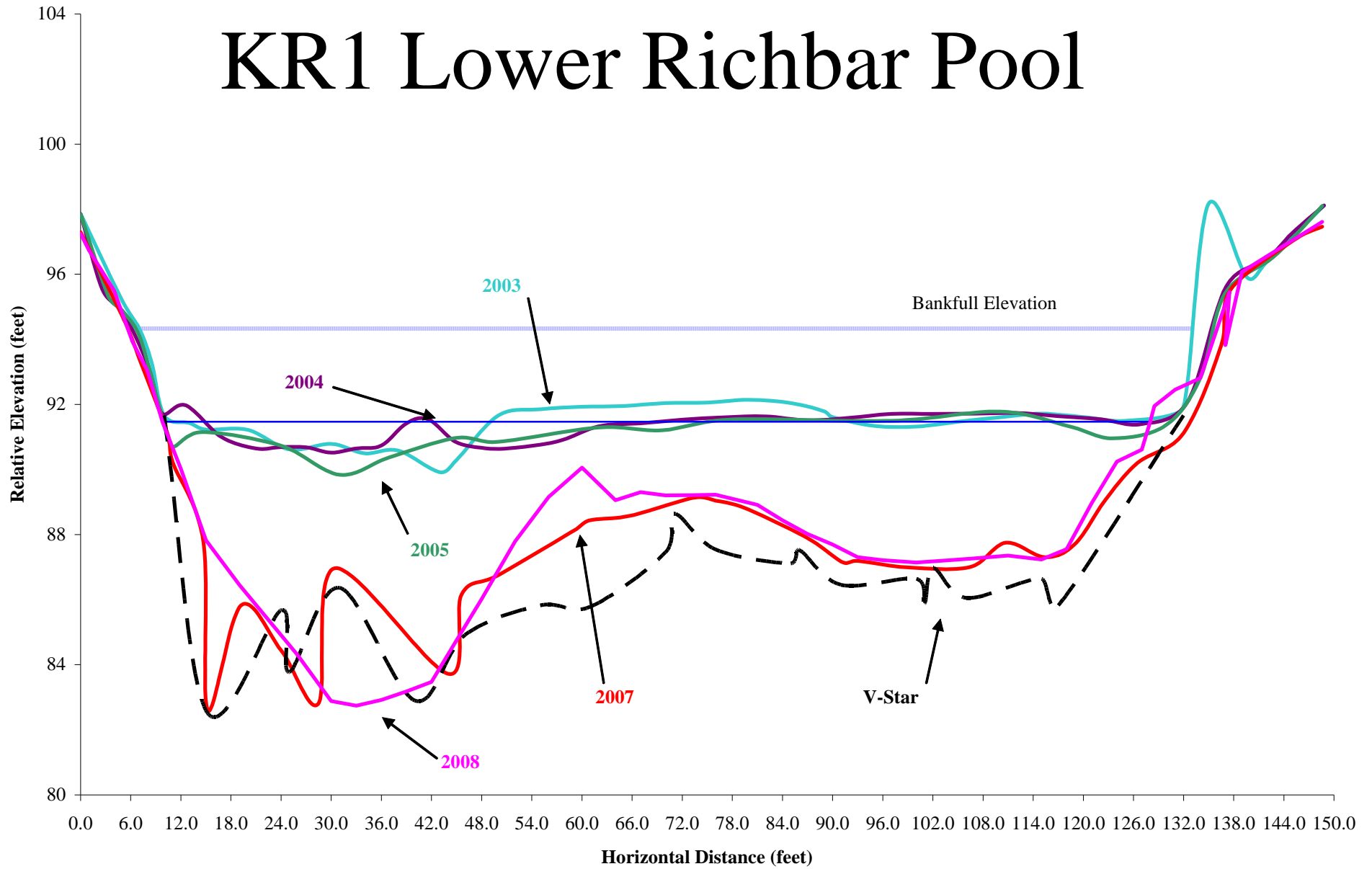
KR1 Pool No. 3



KR1 Pool No. 4



KR1 Lower Richbar Pool



KR1 Live Oak Pool

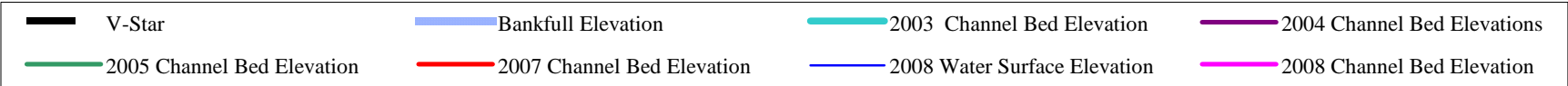
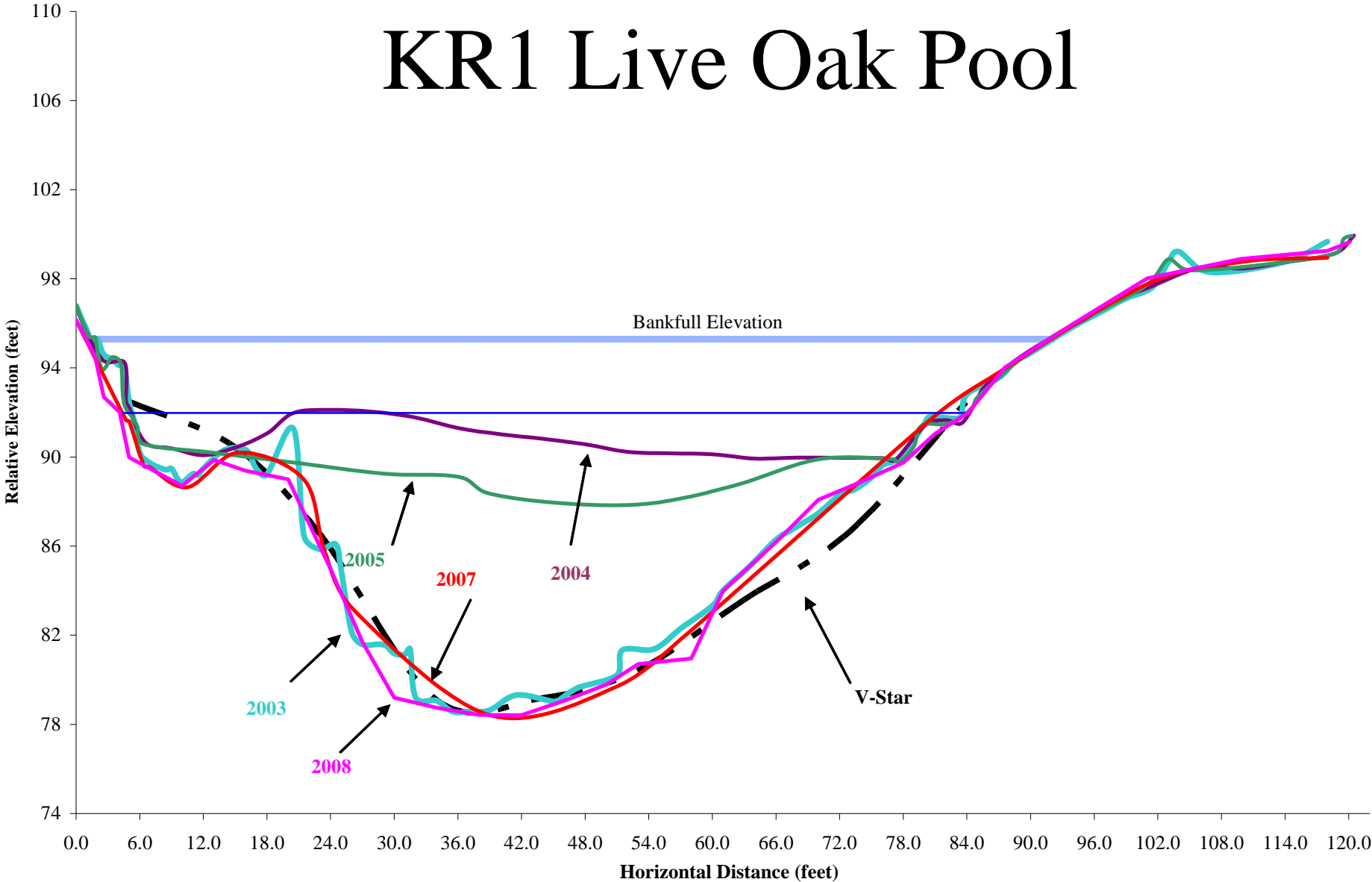


Photo Comparison - KR1 Pool No. 1, Transect 1 View across channel from left bank



1996



2002

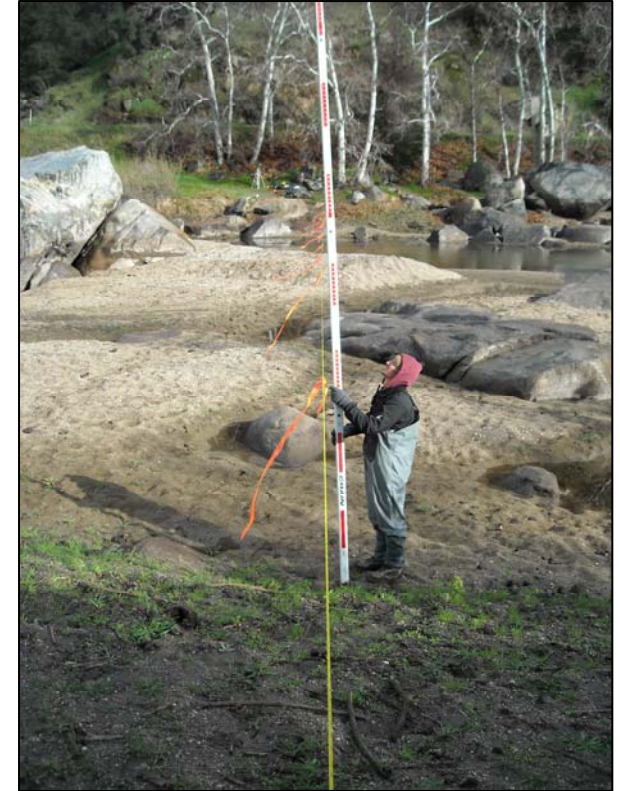
Photo Comparison - KR1 Pool No. 1,
Transect 1
View across channel from left bank



2004

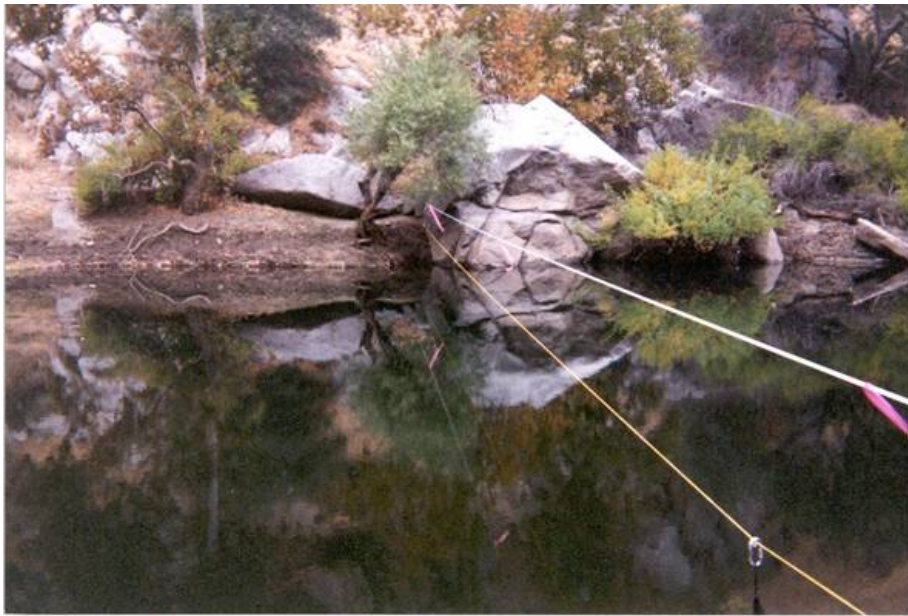


2006



2008

Photo Comparison - KR1 Pool No. 4,
Transect 1
View across channel from right bank



1996



2002

Photo Comparison - KR1 Pool No. 4,
Transect 1
View across channel from right bank



2004



2006

Photo Comparison - KR1 Pool No. 4, Transect 1

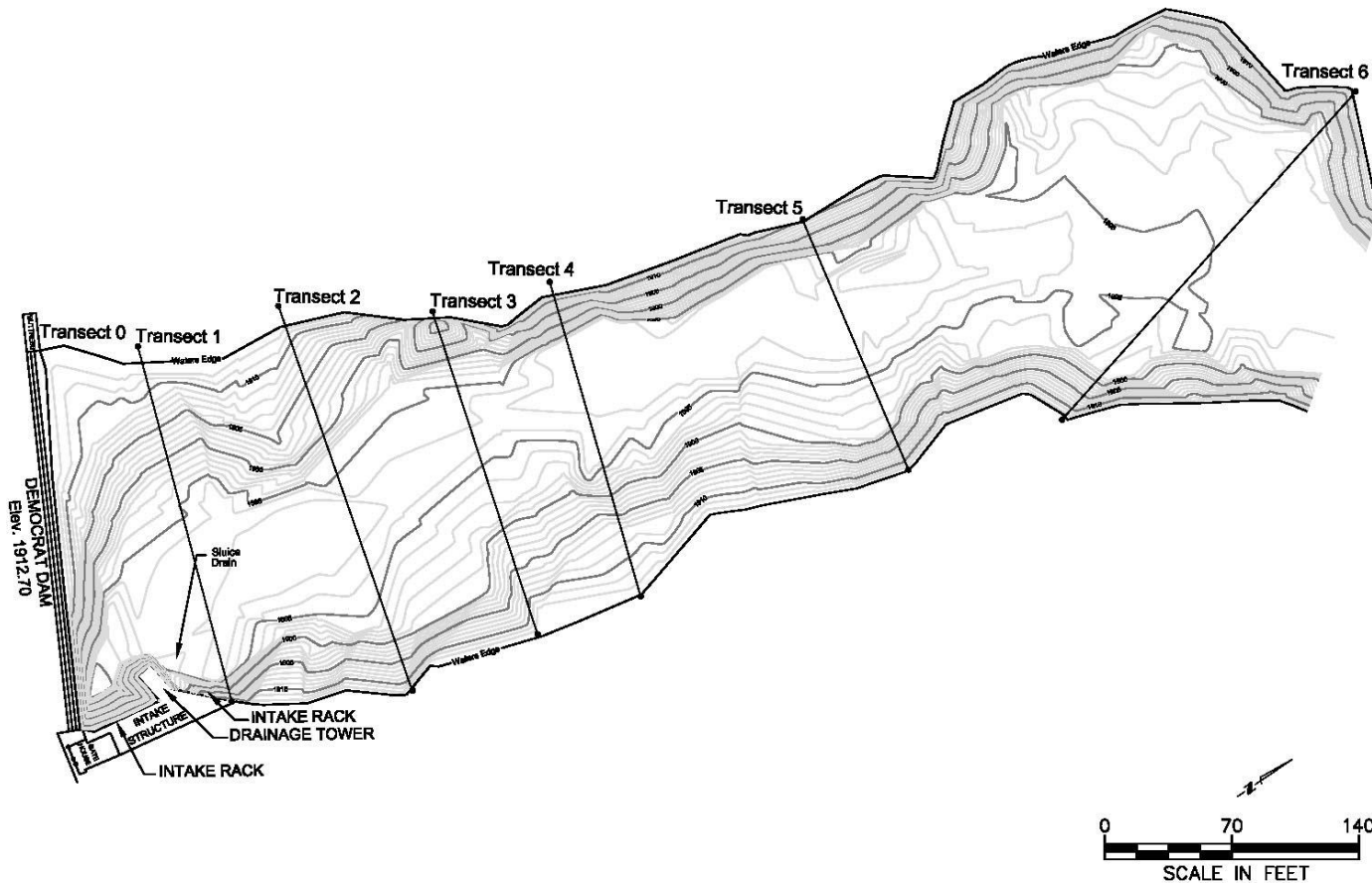
View across channel from right bank



2008

To be measured in February 2009

Democrat Impound Bathymetry



Summary of Bathymetry

- Essentially no volume change between 2003, 2004, 2005 (low inflow, low sediment delivery)
- Measured sediment prior to full pond drain was essentially zero
- Based on 2007 Full Pond drain, approximately 20,000 cubic yards of sediment delivered by 2005 and 2006 inflows
- 20,000 cubic yards is more or less the “detection limit” of the bathymetric measurements
- Low flows since 2007 pond drain, so expect low sediment volume in impoundment

Summary of Watermaster Forecast for Releases

- 2009 Isabella release estimates based on DWR February 1 forecast
- Anticipate dry year release conditions
- Maximum dam release expected to be 1,200 cfs (July median)
- Low sediment storage in impoundment appropriate for dry year release conditions from Lake Isabella

Projected Sediment Releases

- Operational Sluicing (performed as needed)
- Peak Flow Sediment Bypass (if conditions arise)
- Full Pond Drain (February 2009)
- KR1 Intake Modifications to be conducted after the full pond drain (August/September 2009)