

# Kern River No. 1 Sediment Management Practices



February 2009

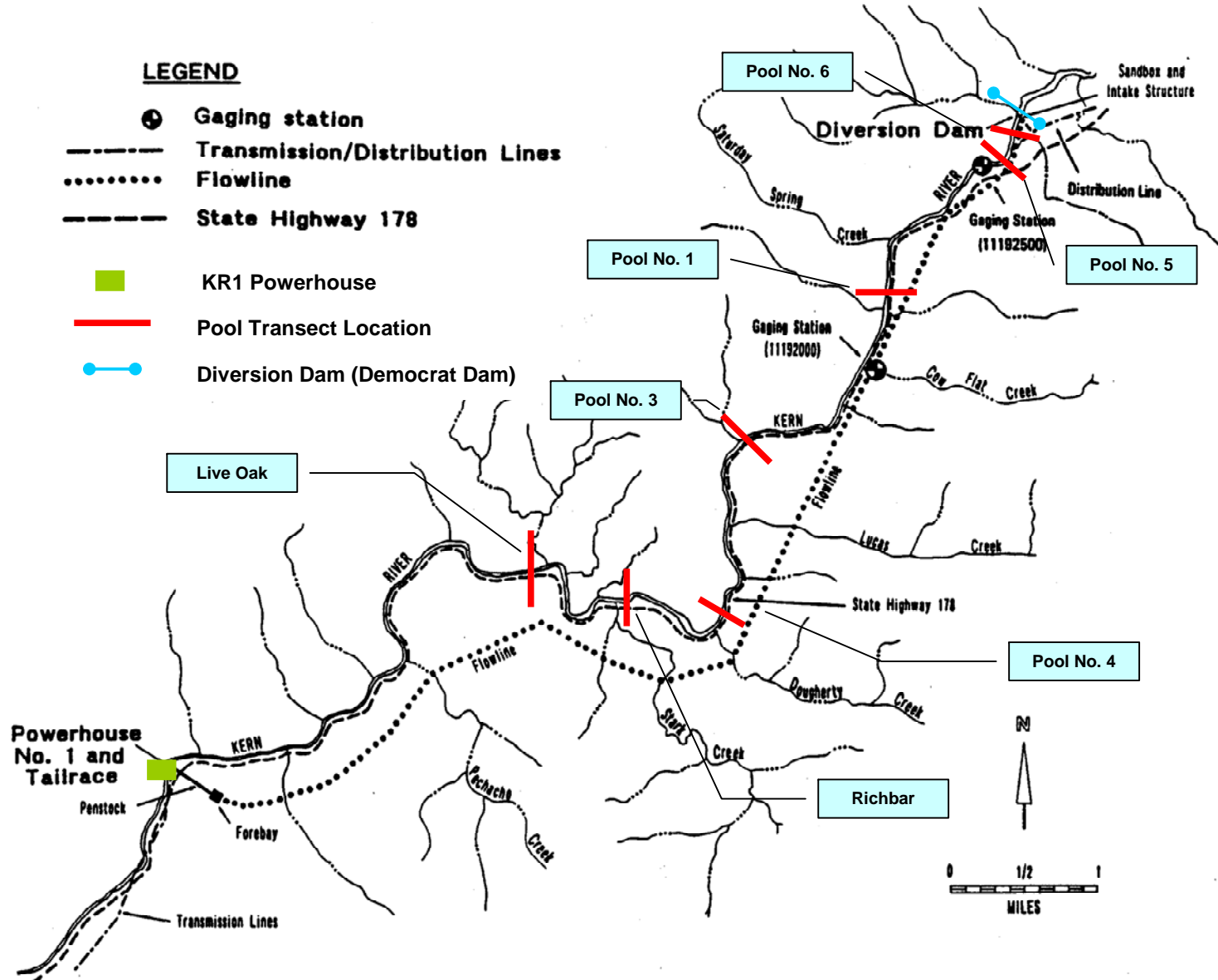
# Meeting Objectives

- 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<sup>ed</sup> 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



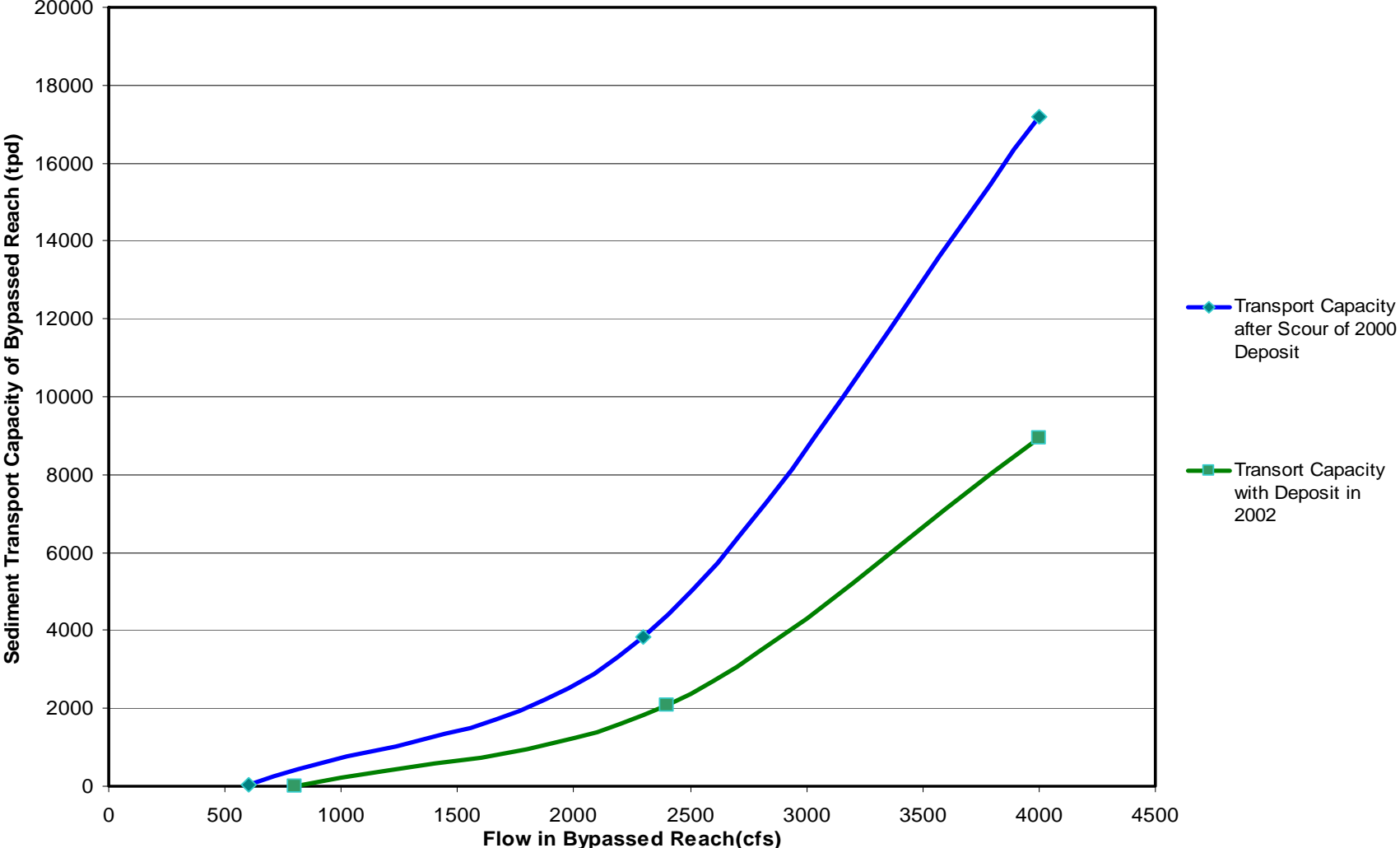
# 2007 Full Pond Drain

- 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

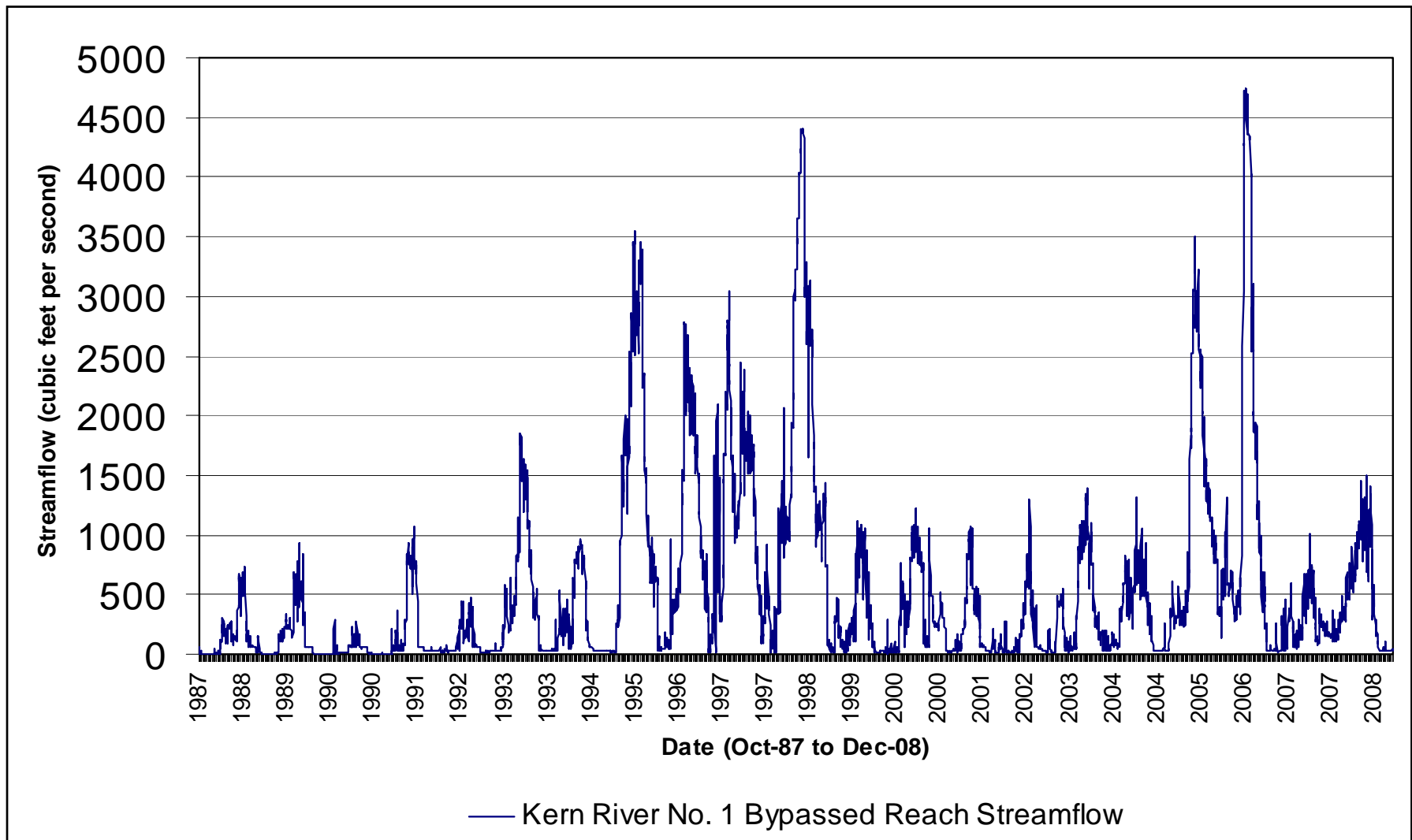
# Current Status of KR1 Bypassed Reach and Democrat Impoundment

- 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)

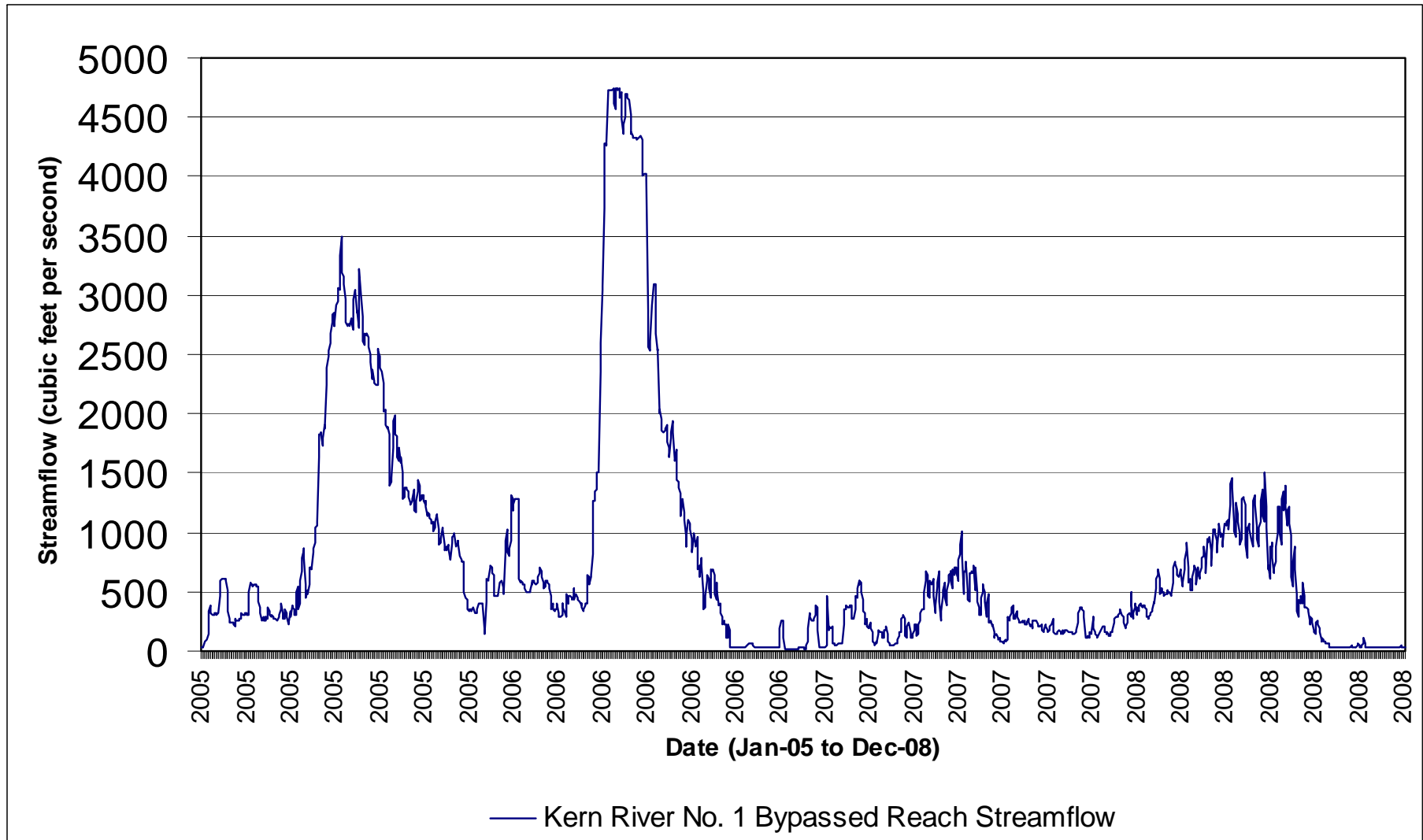
# KR1 Sediment Transport Capacity



# KR1 Bypassed Reach Hydrograph (1988-2008)



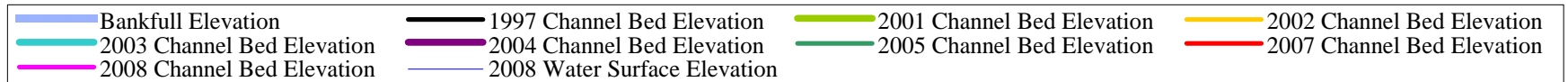
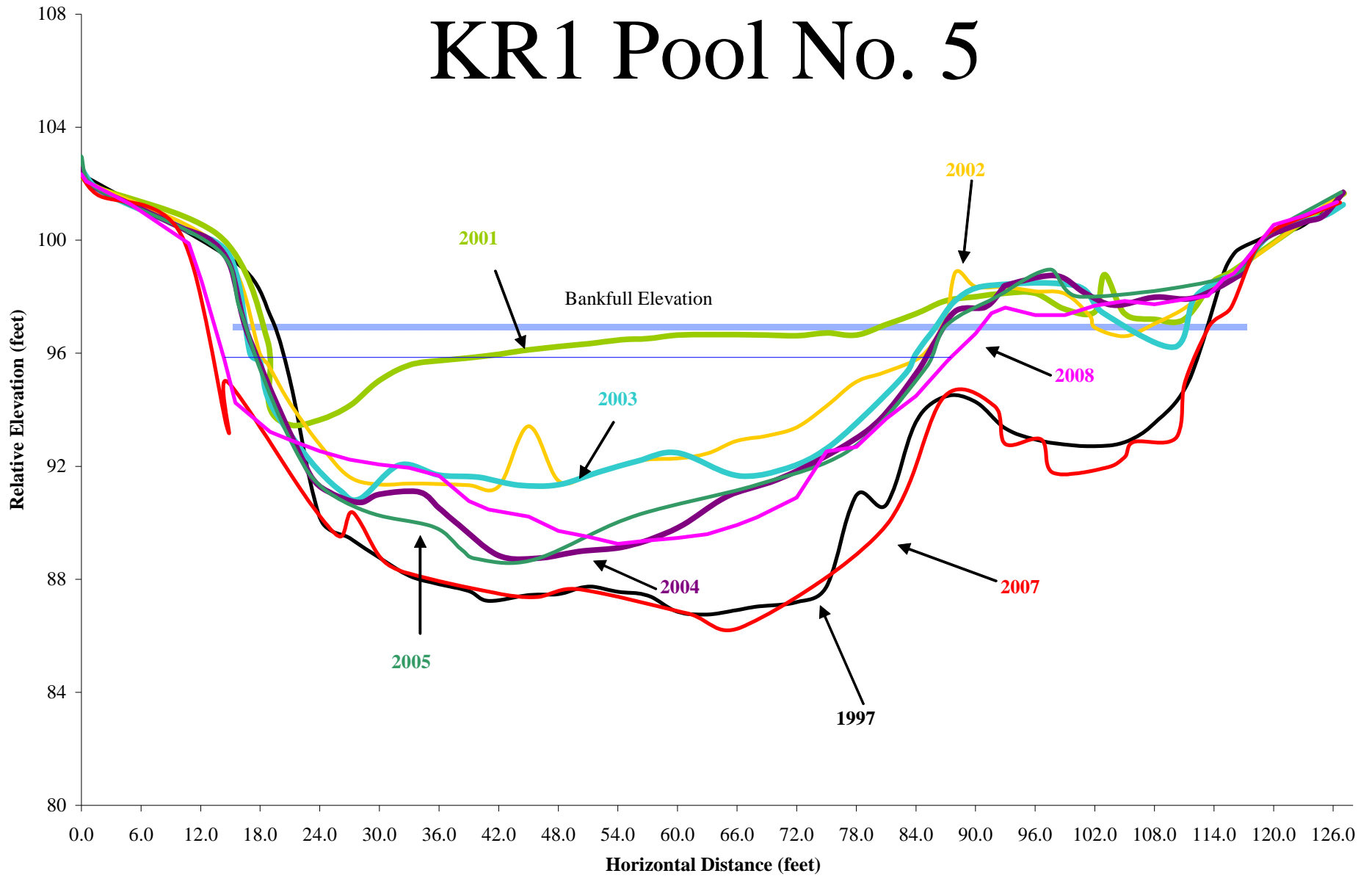
# KR1 Bypassed Reach Hydrograph (2005-2008)



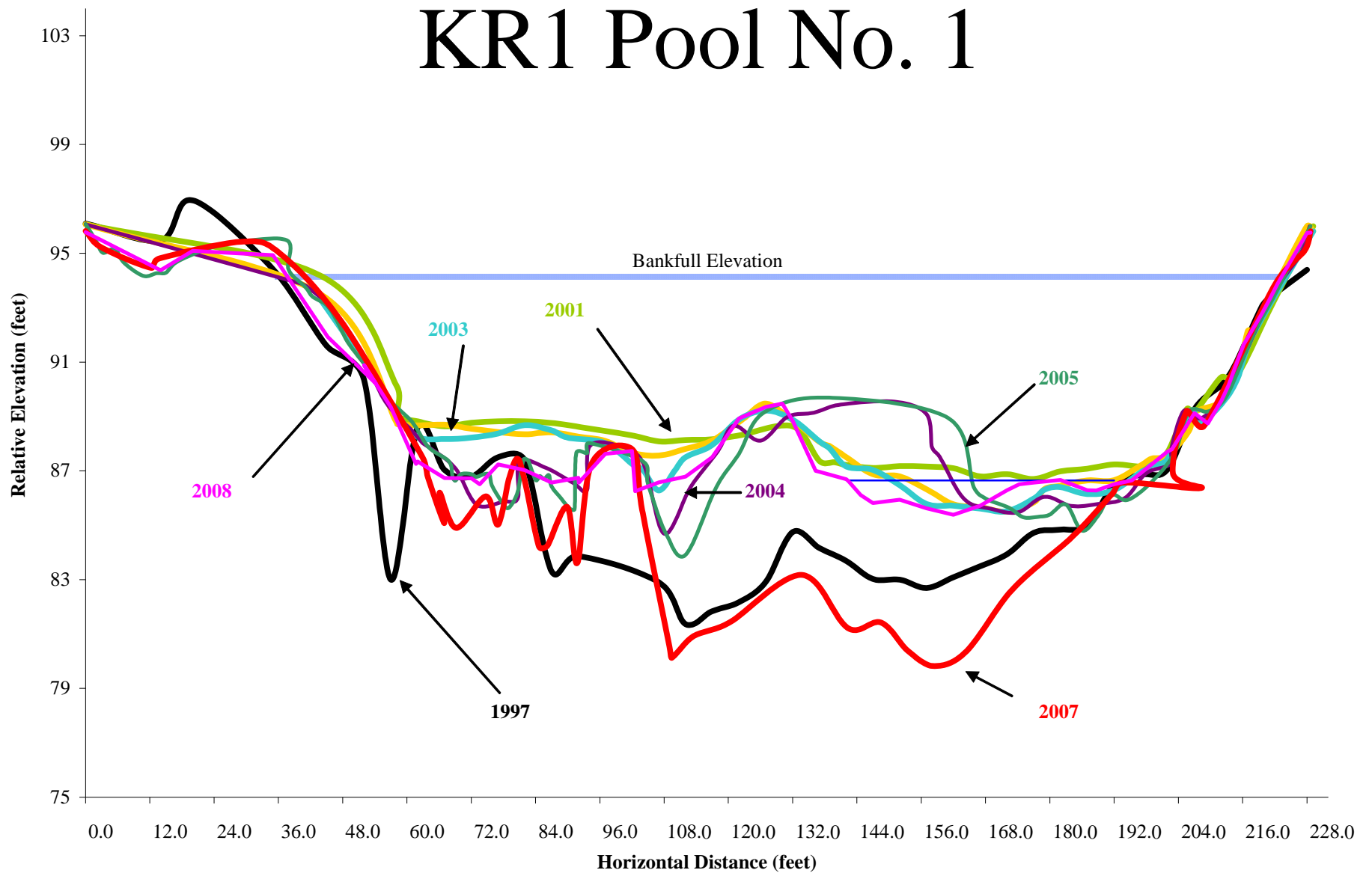
# Summary of Transects and Visual Monitoring

- 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

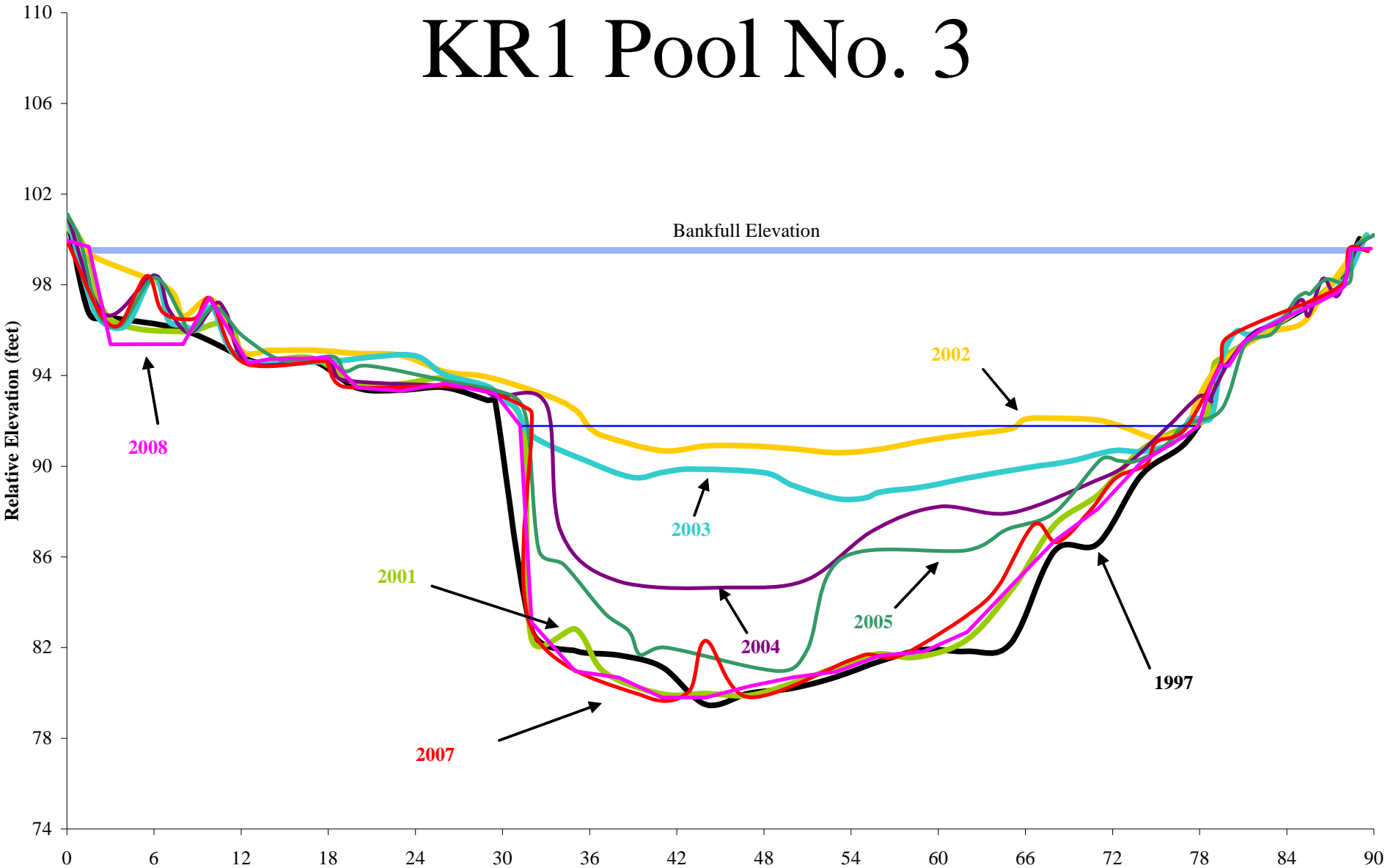


# KR1 Pool No. 1

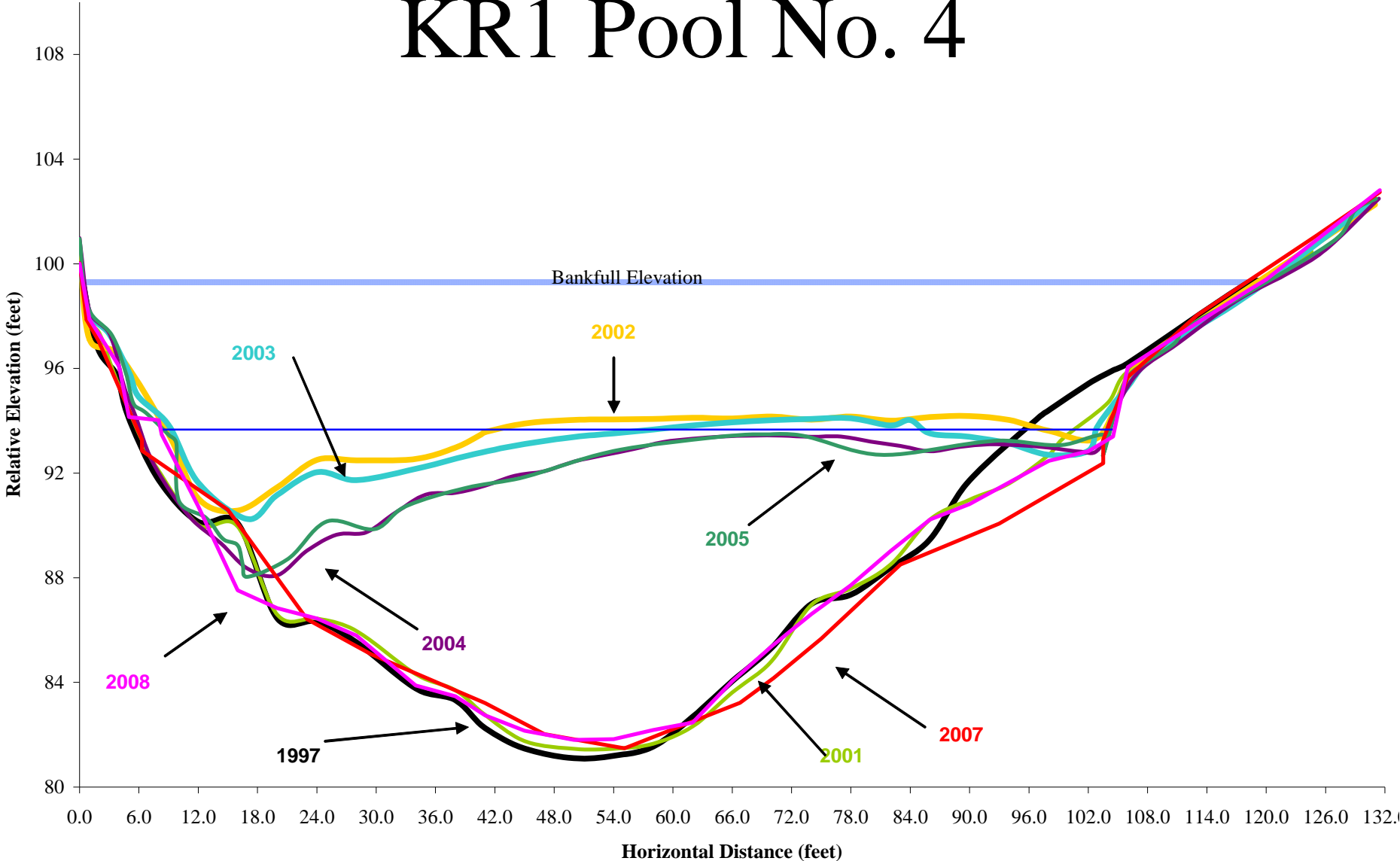


|                              |                            |                            |                            |
|------------------------------|----------------------------|----------------------------|----------------------------|
| Bankfull Elevation           | 1997 Channel Bed Elevation | 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 |                            |                            |

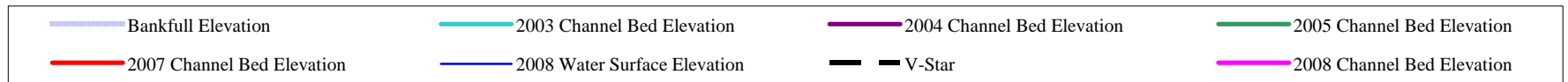
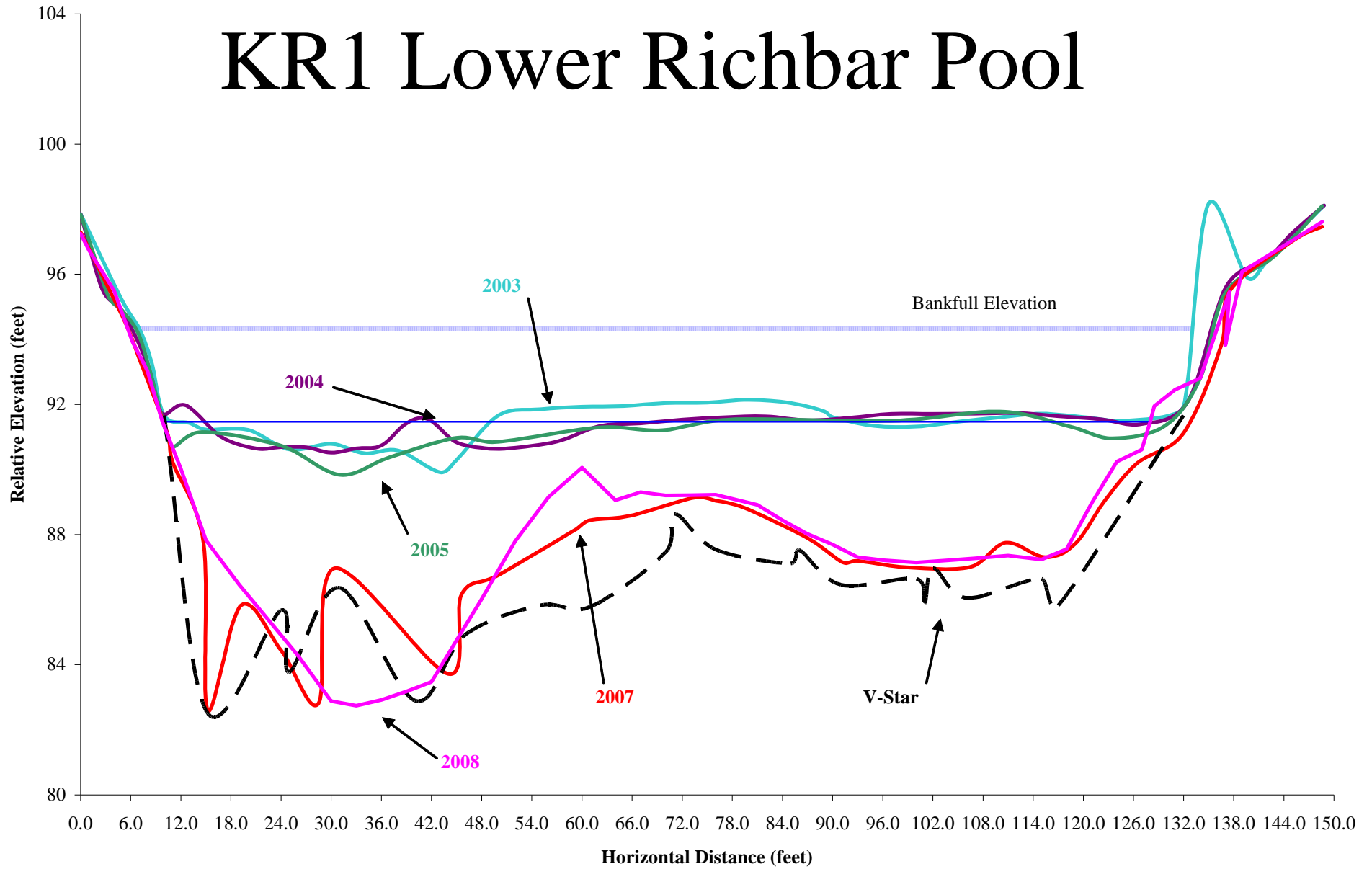
# KR1 Pool No. 3



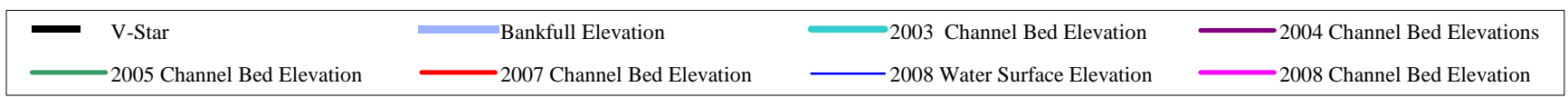
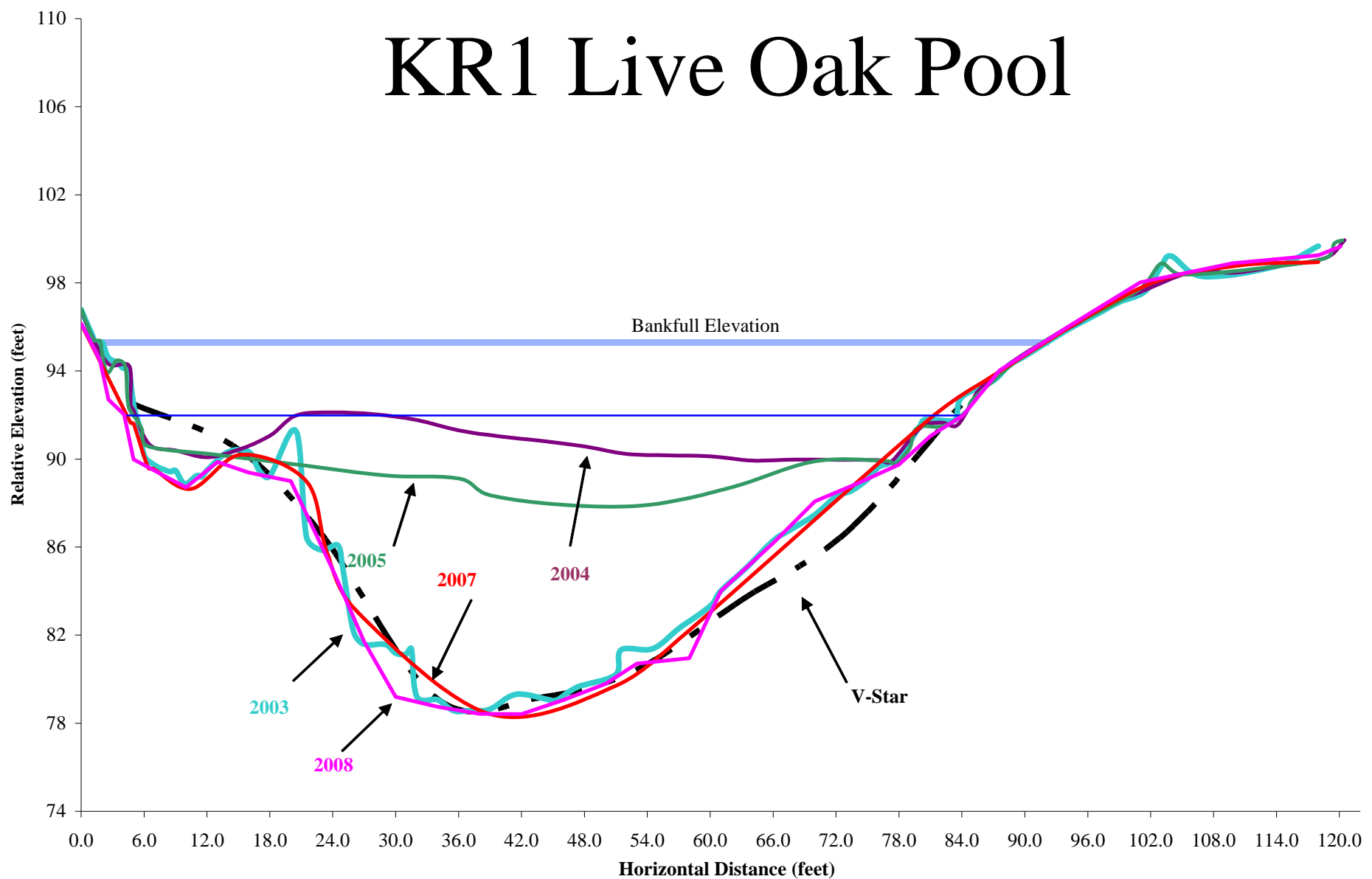
# KR1 Pool No. 4



# KR1 Lower Richbar Pool



# KR1 Live Oak Pool



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



**1996**



**2002**

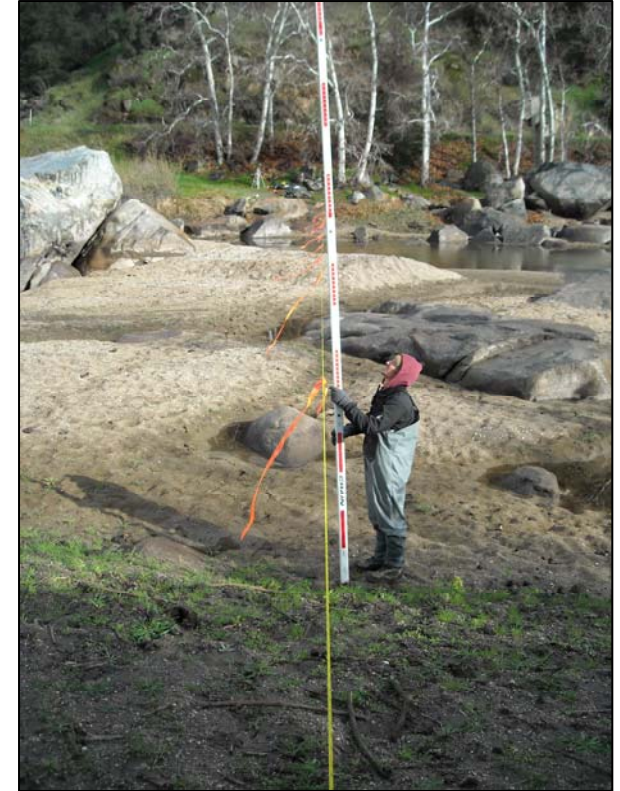
Photo Comparison - KR1 Pool No. 1,  
Transect 1  
View across channel from left bank



**2004**

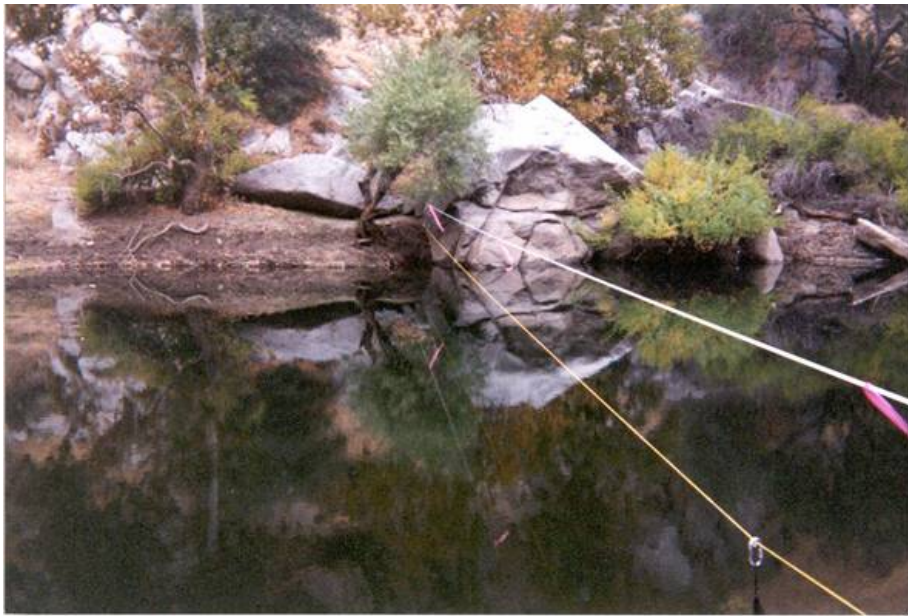


**2006**



**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

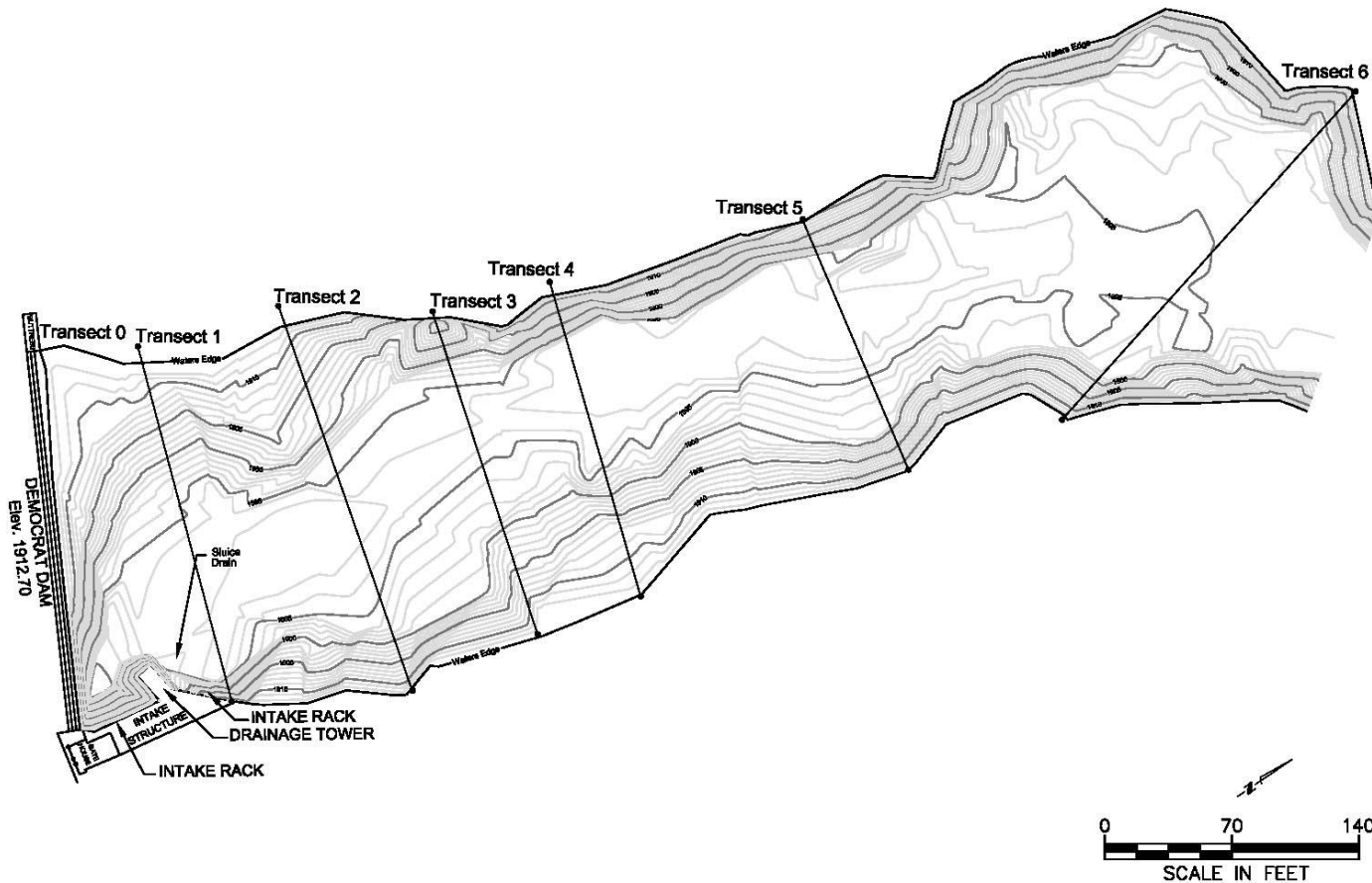
View across channel from right bank



**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)