Rio Salado Oeste Study
Without Project Final
Hydraulic Analysis Report

Contract Number: DACW09-00-D-0021

Prepared for:
U.S. Army Corps of Engineers
Los Angeles District

WEST
CONSULTANTS, INC.

Prepared by:
WEST Consultants, Inc
2151 East Broadway Road, Suite 116
Tempe, AZ 85282
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1. Introduction

1.1. Purpose

This without-project hydraulic and sedimentation analysis was conducted in support of the Rio Salado Oeste Feasibility – F3 Phase Study.

1.2. Scope

This report documents the hydraulic and sedimentation analysis conducted on a reach of approximately 9.5 miles of the Salt River, within the boundaries of the City of Phoenix, Arizona. The focus of the study was the identification of baseline hydraulic and sediment conditions, which will be used with later alternative condition studies to identify the preferred project alternative(s).

A hydraulic model was created based on "existing conditions", and the inundation boundaries associated with different return periods were delineated. Next, a sediment transport model was developed. Using a 50-year synthetic hydrology, the model was used to simulate long term river processes with results analyzed at 10 year intervals.

1.3. Study Area

The study reach extended from the upstream limit of 19th Avenue down to the lower limit of 91st Avenue. The downstream boundary of the study reach was approximately 2.5 miles upstream of the confluence of the Salt and Gila Rivers. Scattered along the reach were several pits, the result of active and inactive sand and gravel mining operations, both within the channel and in the overbank areas.

2. Existing Conditions Hydraulic Analysis

2.1. General

The objectives of the analysis were to identify an existing conditions hydraulic model, delineate flood inundation boundaries for the 5-, 10-, 20-, 50-, 100-, and 500-year events, and provide the initial geometry for the sediment transport analysis.

2.2. Background

An existing Flood Insurance Study (FIS) HEC-RAS model from the confluence with the Gila River (RM 199.82) to about 12th Street (RM 214.14) was provided by the Flood Control District of Maricopa County (FCD). This model will be referred to as the FEMA model. The FCD also provided aerial photographs from 1993 and 1999, an ArcInfo coverage with contours with a 4-ft interval developed for the Salt/Gila River Master Plan (1992), an ArcInfo coverage with the cut lines of 100 of the FEMA model cross sections, and an ArcInfo TIN (Triangular Irregular Network) of the study area including raw data in point files and breakline format also created for the Salt/Gila River Master Plan (1992). The line coverage included cross sections from RM 202.09 to RM 211.12. Cross section 202.09 is located approximately 1100 ft downstream of 91st Avenue, while cross section 211.12 is about 2150 ft downstream of 19th Avenue.

2.3. Existing Conditions Hydraulic Model

A 1-dimensional model of the reach was created using HEC-RAS and the HEC-GeoRAS extension in ArcView 3.2a (Environmental Systems Research Institute, Inc.). The cross section geometry for this model was obtained from the TIN using the same cut lines utilized in the FEMA model.

First the TIN file, aerial photographs, contours coverage and cross sections coverage (containing the cut lines from the FEMA model) were inspected in ArcView. The cross sections coverage was converted into an ArcView shapefile to facilitate editing the cross sections. Seven new cross section lines were added at the downstream end of the reach (ID numbers 1 through 7). These new cross sections were inserted to prevent the downstream boundary condition from affecting the hydraulics in the project area. In addition, two more cut lines were inserted to model the conveyor bridge in the vicinity of the 27th Avenue alignment. These cross sections were located immediately downstream and upstream of the conveyor bridge, and were identified as River Mile 210.43 and 210.44 respectively.

Using the TIN, the contour coverage and the aerial photographs as reference, new shapefiles were created identifying the location of the bank stations, stream centerline, and flow lines in the channel, left overbank and right overbank.

Using the HEC-GeoRAS extension, a HEC-RAS input data file was generated. The data file contained the geo-referenced stream line and cross section lines, and the cross section station/elevation data. In addition, it included flow lengths in the channel, left overbank and right overbank.

The data file was then imported into HEC-RAS and the cross sections IDs were modified to match those from the FEMA model. Next, cross sections 211.21 through 214.14 from the FEMA model were appended at the upstream end of the reach. Although these cross sections were not geo-referenced they provided the geometry in the vicinity of 19th Avenue (the project's upstream end) and add a 2.5 mile segment at the upstream end of the reach. This segment would not have any effect on the hydraulics of the project area since a subcritical flow regime was expected throughout the reach, but were needed to provide an equilibrium inflowing sediment concentration to the study reach in the sediment transport model.

Next, the cross section geometry was reviewed to ensure proper location of channel bank stations. Roughness coefficients in the FEMA model were evaluated and, based on the field visit and the examination of the aerial photographs, deemed to be acceptable for general use. Some of the n coefficients were adjusted based on inspection of the aerial photographs. The appropriateness of these values for the sediment transport model was further evaluated during a subsequent sensitivity analysis. Typical values used in the model are shown in Table 2.1.

Bridge information and modeling procedures from the FEMA model were reviewed and included with some changes into the current HEC-RAS model. There was a new bridge in place at the 51st Avenue crossing. Plans for this bridge were obtained from the City of Phoenix Engineering Department and used to code the bridge geometry. Plans for the bridges at 19th Avenue and 35th Avenue were also obtained to verify their geometry. Plans for the conveyor bridge near the 27th Avenue alignment were obtained from United Metro Materials.

Contraction/expansion loss coefficients were set to 0.3 and 0.5 respectively in the cross sections near the bridges. The bridges in 35th Avenue, 51st Avenue and 27th Avenue were modeled using the "Multiple Opening Analysis" option in HEC-RAS, with the overbanks modeled as conveyance areas. This selection prevented the use of the weir equation to compute flow on the overbanks for the large flood events simulated.

Table 2-1 Manning's *n* values used in the existing conditions hydraulic model.

LAND USE	*n* VALUE
Sand/gravel mine	0.037
Open shrub	0.04 – 0.043
Agricultural	0.025 – 0.037
Urban/industrial	0.043
Disturbed	0.037 – 0.043
Channel open vegetation	0.037
Channel sand/gravel	0.032 – 0.037

Finally, all the cross sections were inspected to identify the location of ineffective flow boundaries. The area occupied by sand and gravel pits was set ineffective for

conveyance calculations or, where this was not possible, the pits were "filled" using blocked obstructions before computing the steady state profiles. This procedure eliminates the excess conveyance in the pit and therefore results in higher water surface elevation, which is a conservative approach for flooding studies. Consideration of in-channel sand and gravel operations is more important in sediment transport studies. Pits can act as sediment traps and induce headcutting in the upstream direction and/or tailcutting downstream.

The discharges used in the hydraulic analysis were obtained from a report by the U.S. Army Corps of Engineers (USACE, 1996), and are shown in Table 2-1. The discharge at Central Avenue was assigned to cross section 214.14, and the discharge at 67th Avenue was assigned to cross section 205.52.

Table 2-2. Discharge frequency values used in the existing conditions model.

LOCATION	RETURN PERIOD					
	5-yr	10-yr	20-yr	50-yr	100-yr	500-yr
Peak Discharges (ft^3/s) in the Salt River at:						
Central Avenue	20,200	53,000	87,000	135,000	166,000	240,000
67th Avenue	20,000	51,000	84,000	132,000	164,000	237,000

The model was run under this configuration and it was observed that several of the cross sections were not able to contain the 500-year flood. In fact, some cross sections could not contain even the 100-year flood. Under these circumstances HEC-RAS extends vertically the end points of the cross section and carries out the flow calculations, but clearly that does not yield the correct water surface elevation.

New elevation data points were needed to extend the terrain model so that the cross sections would be able to contain all floods. The FCD provided additional contour lines (2 ft interval) for the area south of the study reach, between 19th Avenue and 75th Avenue (from Laveen ADMP, 1989). Elevation data for other areas was obtained from the USGS 30m resolution DEM (generated from digitized contours from 1/24,000 USGS topographic maps). The area added through this process is primarily in the far overbank areas of the model where the DEM vertical accuracy is not as critical.

The USGS DEM was converted first from grid format to TIN format to remove points that did not add terrain information. The TIN was then converted into a point shapefile which was then clipped to cover only the area that was not covered by the original TIN or the additional contour map. Finally, a new TIN was generated using the original point and breakline files, the additional contour coverage from the FCD, and the new point shapefile obtained from the 30m DEM.

Using the new TIN as a reference, the cross section cut lines were extended in ArcView and a new HEC-RAS input file was created using HEC-GeoRAS. The input file was imported into HEC-RAS and manipulated in the same manner as before. Cross section plots are shown in Appendix A.

The new model was then executed using the six flood events. The results show that the 100-year flood is now contained in all the cross sections, and the 500-year flood is contained in most of them. The majority of the cross sections that do not contain the largest flow are located near the confluence with the Gila River. It was decided not to extend these cross sections farther to the south because then they would become part of the Gila River floodplain. In any case, the end points of the cross sections that do not contain the 500-year flow are located far from the main channel in ineffective flow areas, and therefore have no effect on the computed water surface elevation.

2.4. Floodplain Delineation

The model was executed for the 5-, 10-, 20-, 50-, 100- and 500-year flood events with the discharges from the Corps report shown in Table 2-1 (for post Roosevelt Dam modifications). Water surface elevation profiles are shown in Figure 2-1. Appendix A shows the 10-, 100- and 500-year water surface elevation in the cross section plots. In addition, Appendix B shows some other variables from the hydraulic model output file.

The model results were exported from HEC-RAS into ArcView to automatically delineate the inundation boundaries using HEC-GeoRAS. The resulting inundation boundaries were then inspected and edited to remove spurious polygons and to ensure that all polygons contained other polygons with smaller return period. Existing conditions floodplain delineations are shown in Appendix C.

The resulting 100-year profile from the Existing Conditions (EC) model was compared to the FEMA model (Figure 2-2). Both profiles are practically identical from the downstream end of the study reach up to river mile 204.25, where the cross sections from the two models show some differences in their geometry. At this location the water surface elevation in the EC model is 0.45 ft higher than in the FEMA model. Upstream of this cross section, between river miles 204.34 and 205.15, the differences between the two models increase, with the FEMA profile 0.6 to 2.54 ft higher than the EC profile. The reason for this divergence is the different location of the ineffective flow limits in the two models. The ineffective flow limits are located closer to the main channel in the FEMA model, constricting the conveyance area resulting in a rise in the water surface elevation. The location of the ineffective flow boundaries differs between the two models because they were developed with different purposes. The FEMA model was developed to define the floodplain only for the 100-year flow. On the other hand, the EC model was created to map flow boundaries for flows with return periods between 5 and 500 years, and then converted into a single sediment transport model driven by measured flows which varied between 20 and 200000 cfs. Therefore, the existing conditions geometry needs to be valid for a wide range of discharges.

From river mile 205.25 to 206.51 the differences between the profiles become small again (0.4 ft or less). The reach between river miles 206.6 and 207.07 has mining pits within the channel. The EC model blocked completely these pits, while the FEMA model raised the bottom of the pits up to a lower elevation than the EC model blockage. As a consequence, the profiles show some differences, with the EC profile being 0.53 to 2.07 ft higher than the FEMA profile.

The cross section in river miles 207.34 shows a difference of 0.78 ft (EC higher than FEMA). The cause is a change in cross section geometry and the election of different locations for the ineffective flow limits. The channel bed is lower for the bridge cross sections (207.48 and 207.49) in the FEMA model, but that did not produce significant difference in the profiles. However, at river mile 207.53 (immediately upstream of the 51st Avenue Bridge) the EC profile is again 0.49 ft higher due once more to the different location of the ineffective flow limits.

The disparity between the profiles is minimal between river miles 207.62 and 208.75. From river mile 208.85 to 209.24 there are again mining pits located within the channel and in the overbank area. The geometry of the blocks used to fill the pits and the location of ineffective flow boundaries are responsible once more for differences in water surface elevation between 0.46 and 2.15 ft. The FEMA model does not block the pits in the channel and blocks the pits in the overbanks to a higher elevation.

The remaining part of the study reach (from river mile 209.42 to 211.54) displays a complete divergence of the two model profiles. The cause for this discrepancy can be found after examination of the cross sections in the vicinity of the 35th Avenue Bridge (209.53 and 209.54). This is a bridge with a very narrow opening. At the same time, the bed slope upstream of the bridge is nearly flat. Therefore, backwater due to the bridge obstruction propagates all the way to the upstream end of the study reach. The bridge cross sections in the FEMA model are much deeper (thalweg elevation $\approx$ 993 ft) than in the EC model (thalweg elevation $\approx$ 1020 ft), increasing the conveyance through the bridge opening and producing a lower water surface upstream of the bridge.

The origin of the 35th Avenue Bridge cross section in the FEMA model is not clear. The cross sections in the EC model were extracted from the TIN using the procedure previously described. In general, all the EC cross sections matched well their FEMA counterparts except those bounding the 35th Avenue Bridge. These cross sections are located in an area of the Salt River with permanent water, where no visual verification was possible. Preliminary runs of the sediment transport model revealed that after 50 years of sediment transport the thalweg under the bridge becomes stable at a depth between 1005 and 1010 ft regardless of the initial conditions,. When the sediment transport model was run with river mile 209.54 from the FEMA model (a deep scour hole under bridge), the cross section experienced deposition, and when it was run using river mile 209.54 from the TIN (representing a shallow depth under bridge), the cross section experienced erosion. It is possible that the TIN elevations represent the water surface under the bridge when the mapping was performed but verification would require an on site survey of the area near the bridge.

The TIN river mile 209.54 geometry was selected because it resulted in a more conservative approach for the existing conditions hydraulic analysis but may be overly conservative for a detailed FEMA study. The FEMA study is likely too optimistic in regards to flow area under the bridge based on the sediment results obtained during this study. The future without-project hydraulic analysis results were similar using both geometries so the more conservative initial conditions were used as the basis for this study.

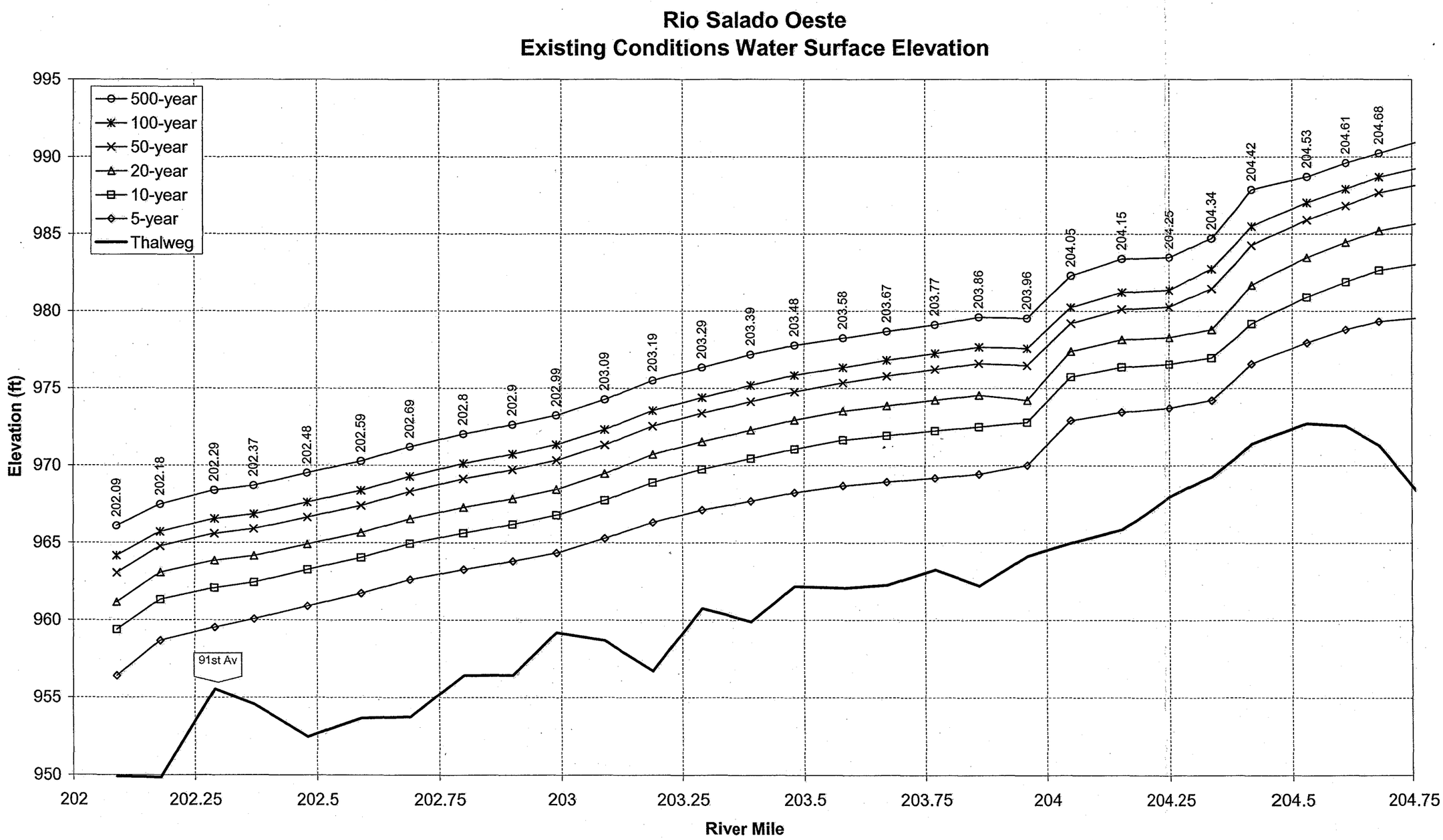


Figure 2-1. Existing conditions water surface elevation profiles.

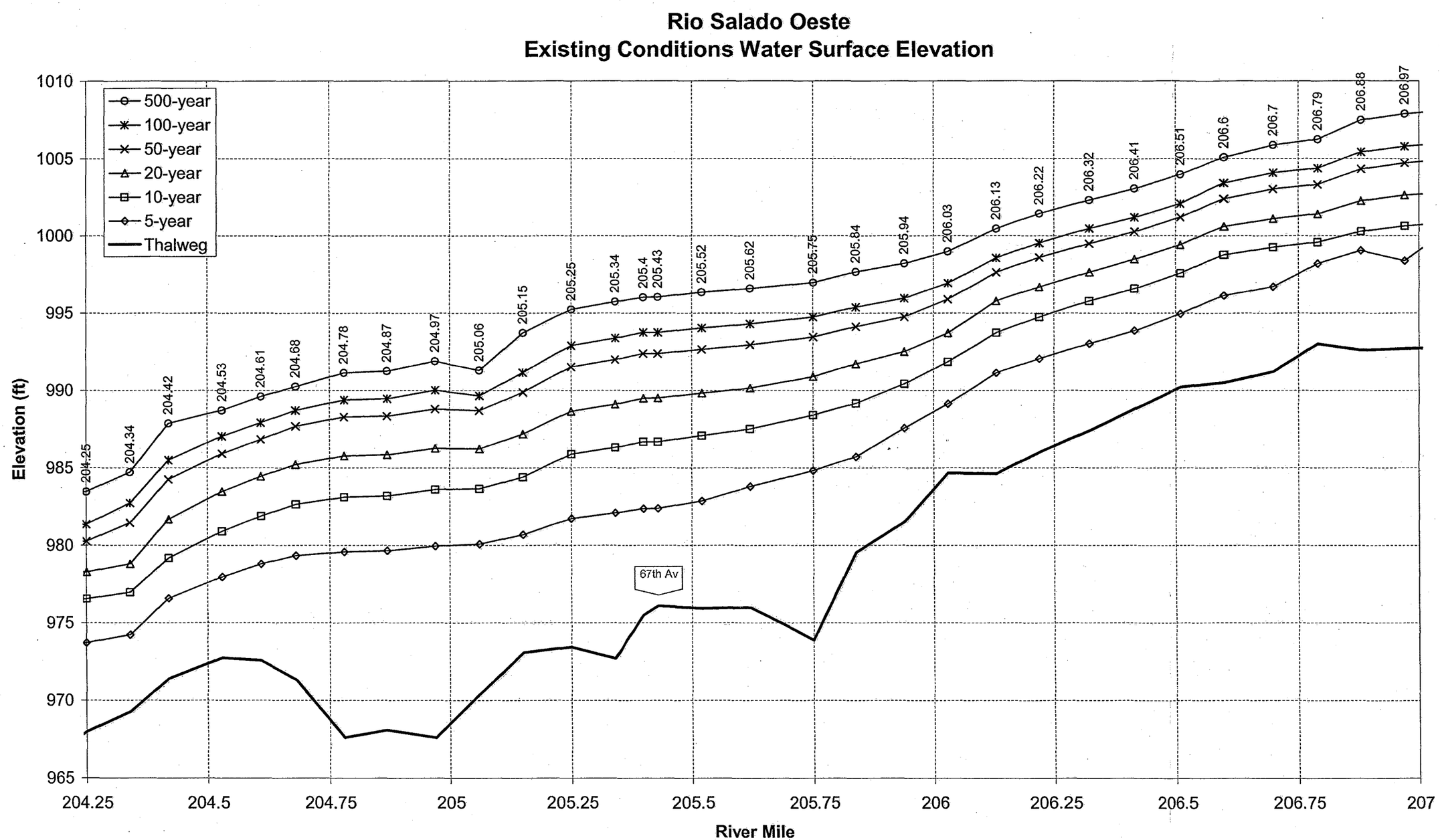


Figure 2-1. ***Continued.***

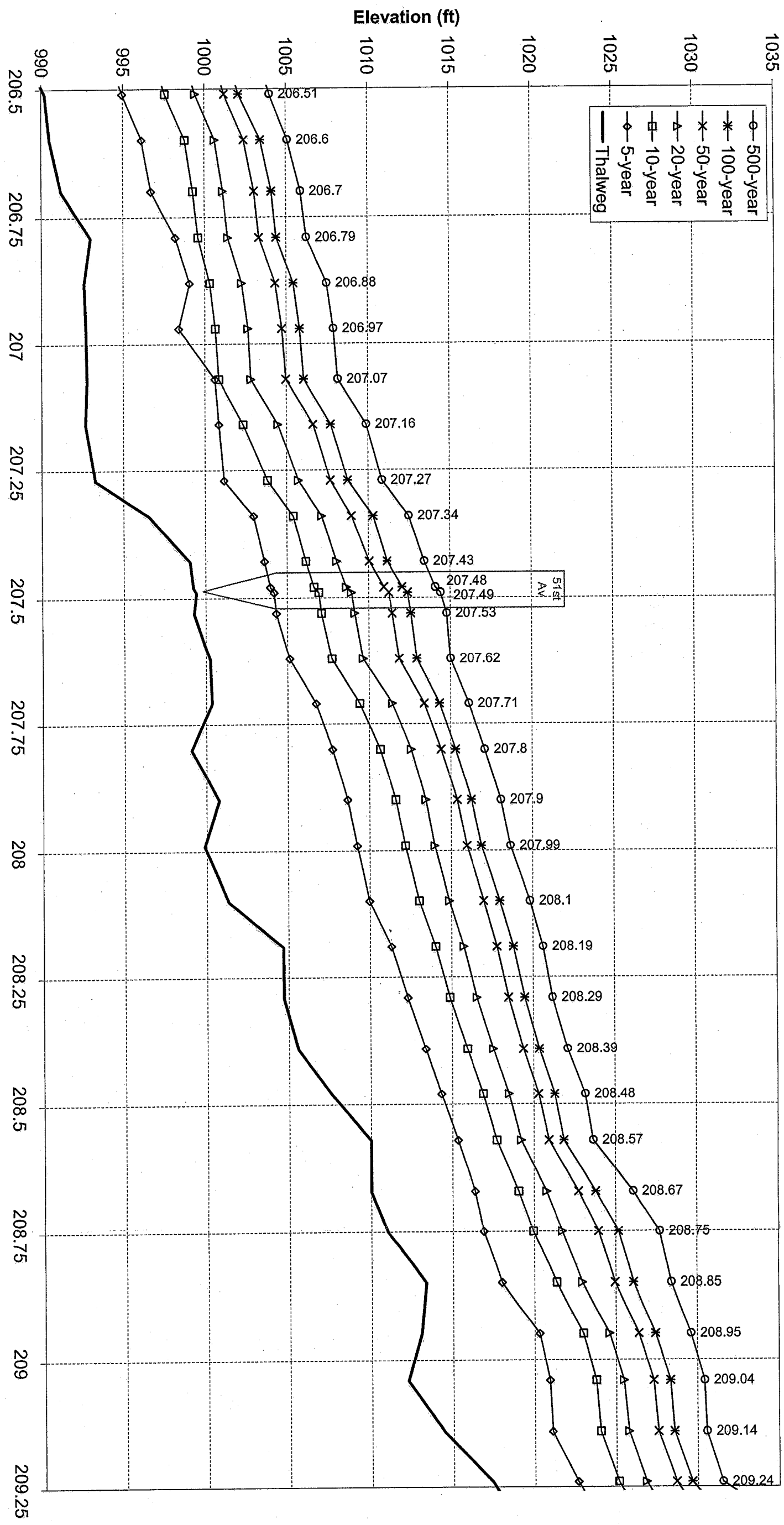


Figure 2-1. *Continued.*

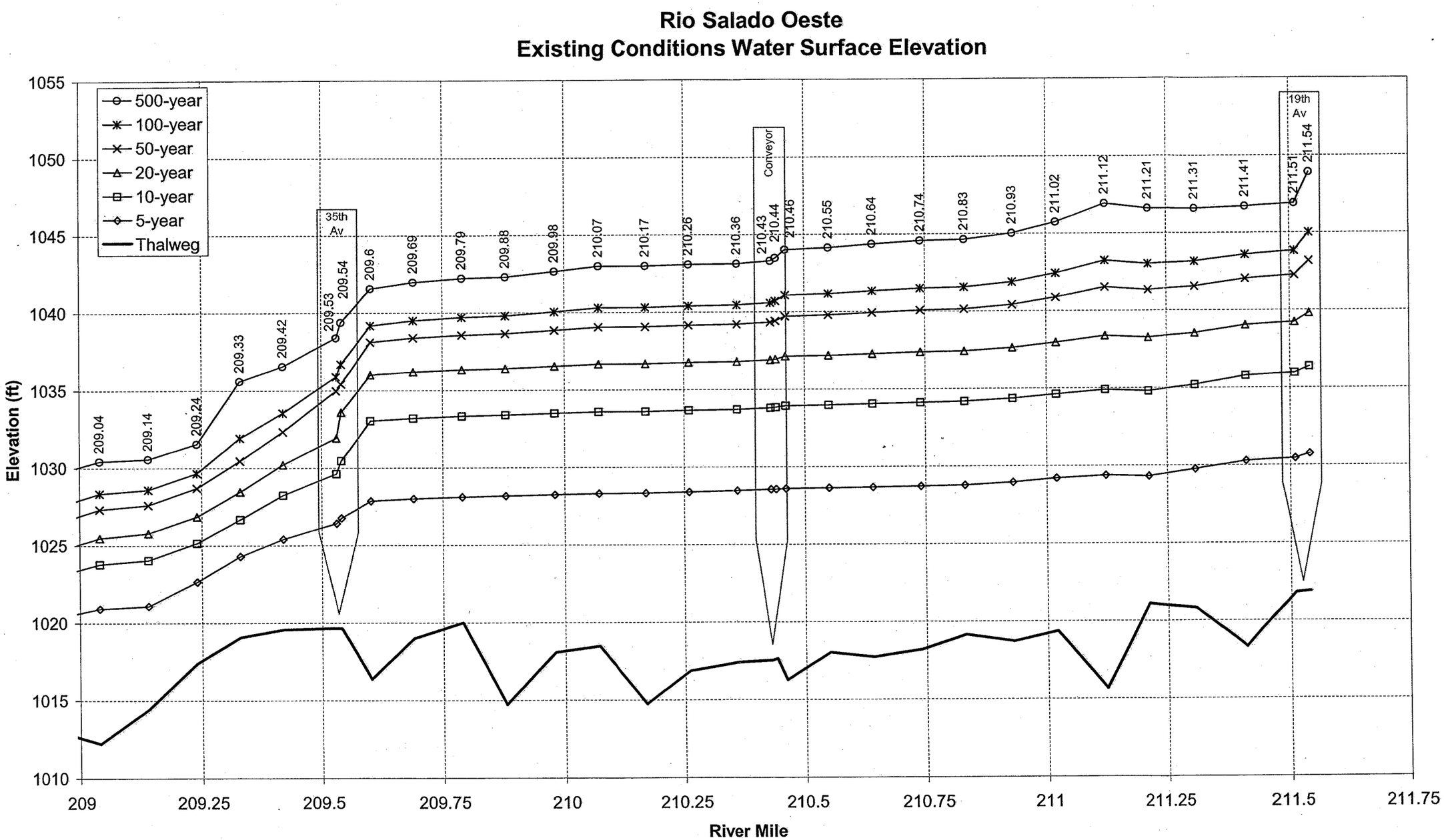


Figure 2-1. ***Continued.***

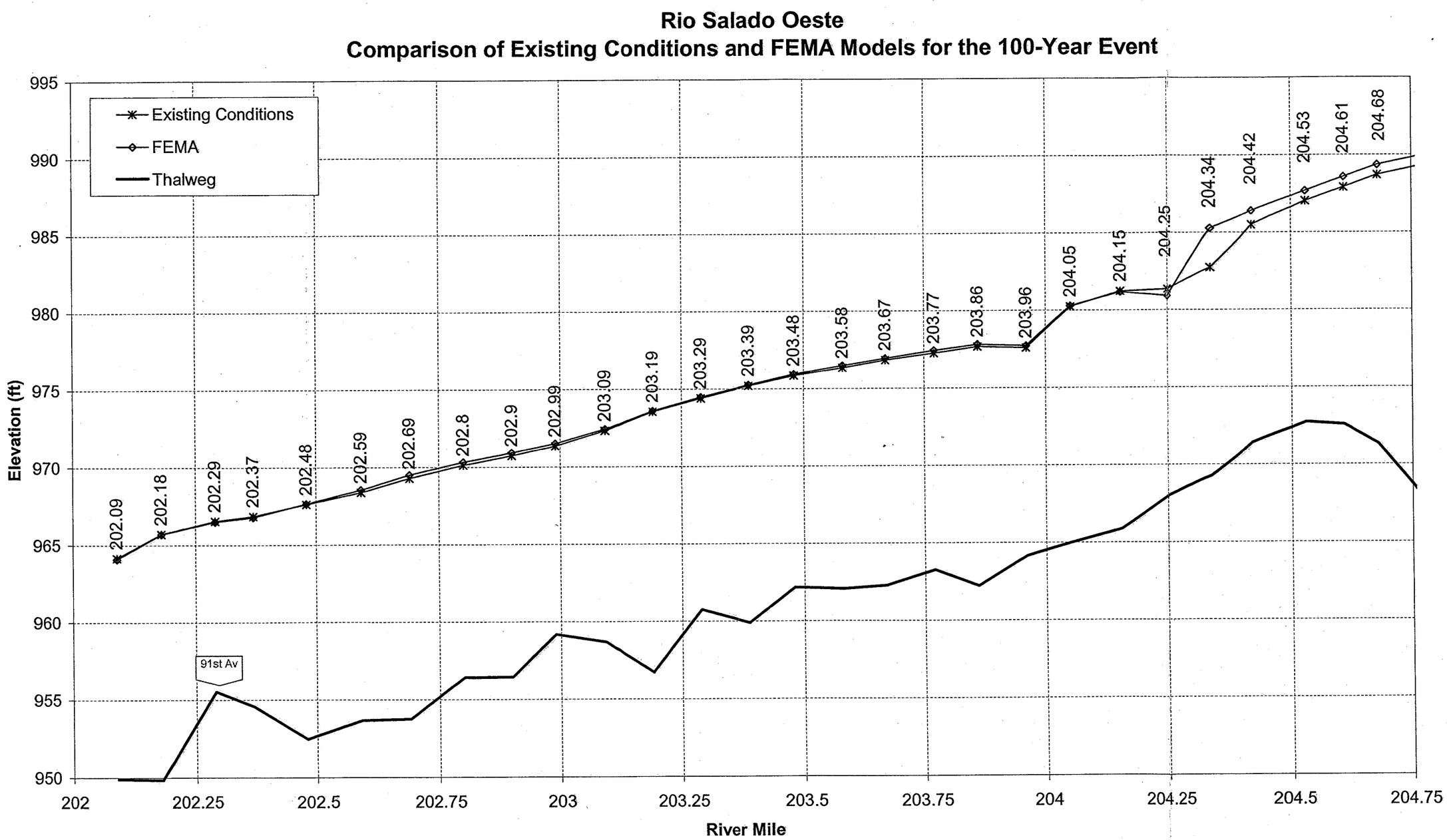


Figure 2-2. Comparison of existing conditions and FEMA models for the 100-year profile.

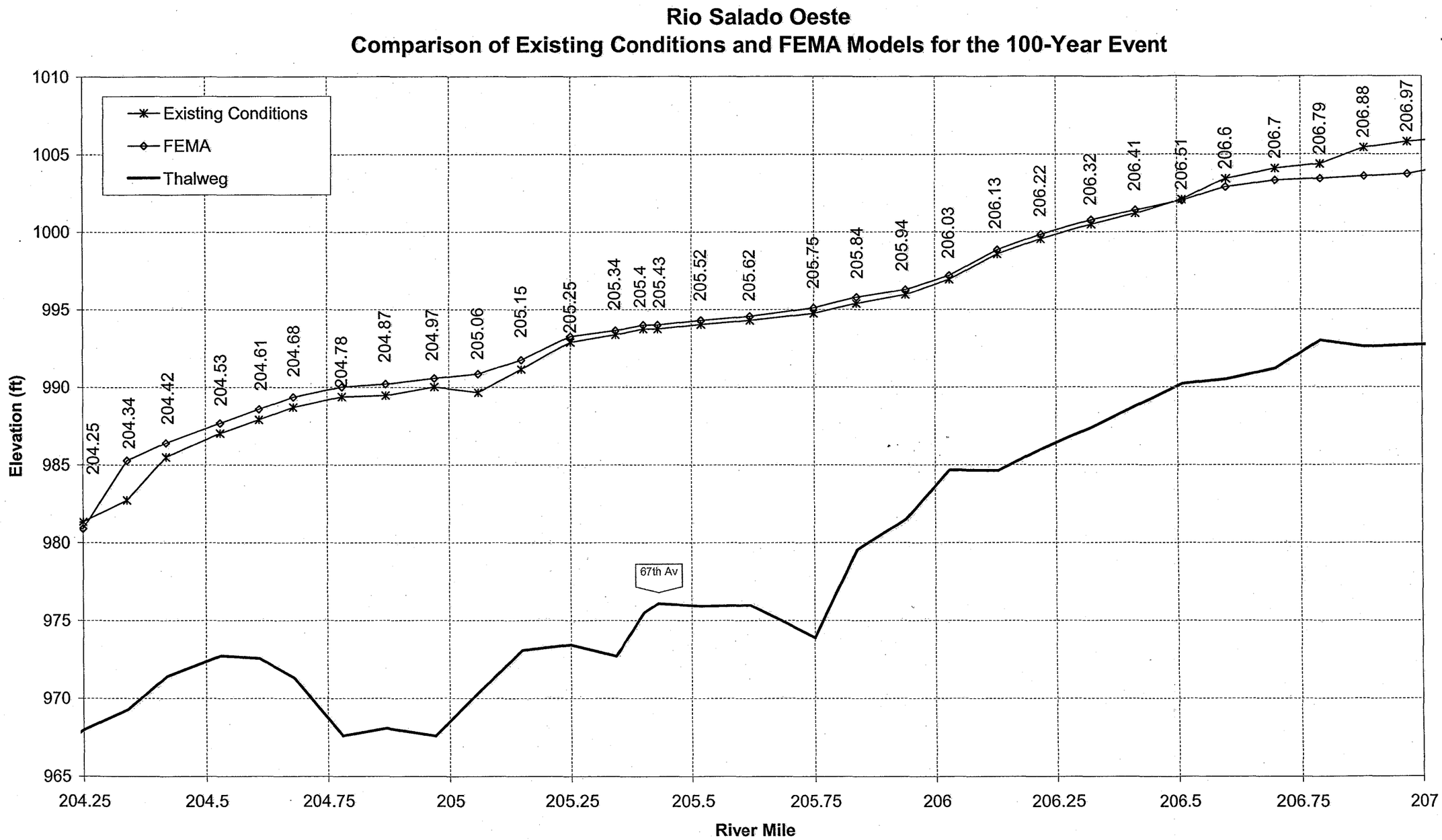


Figure 2-2. ***Continued.***

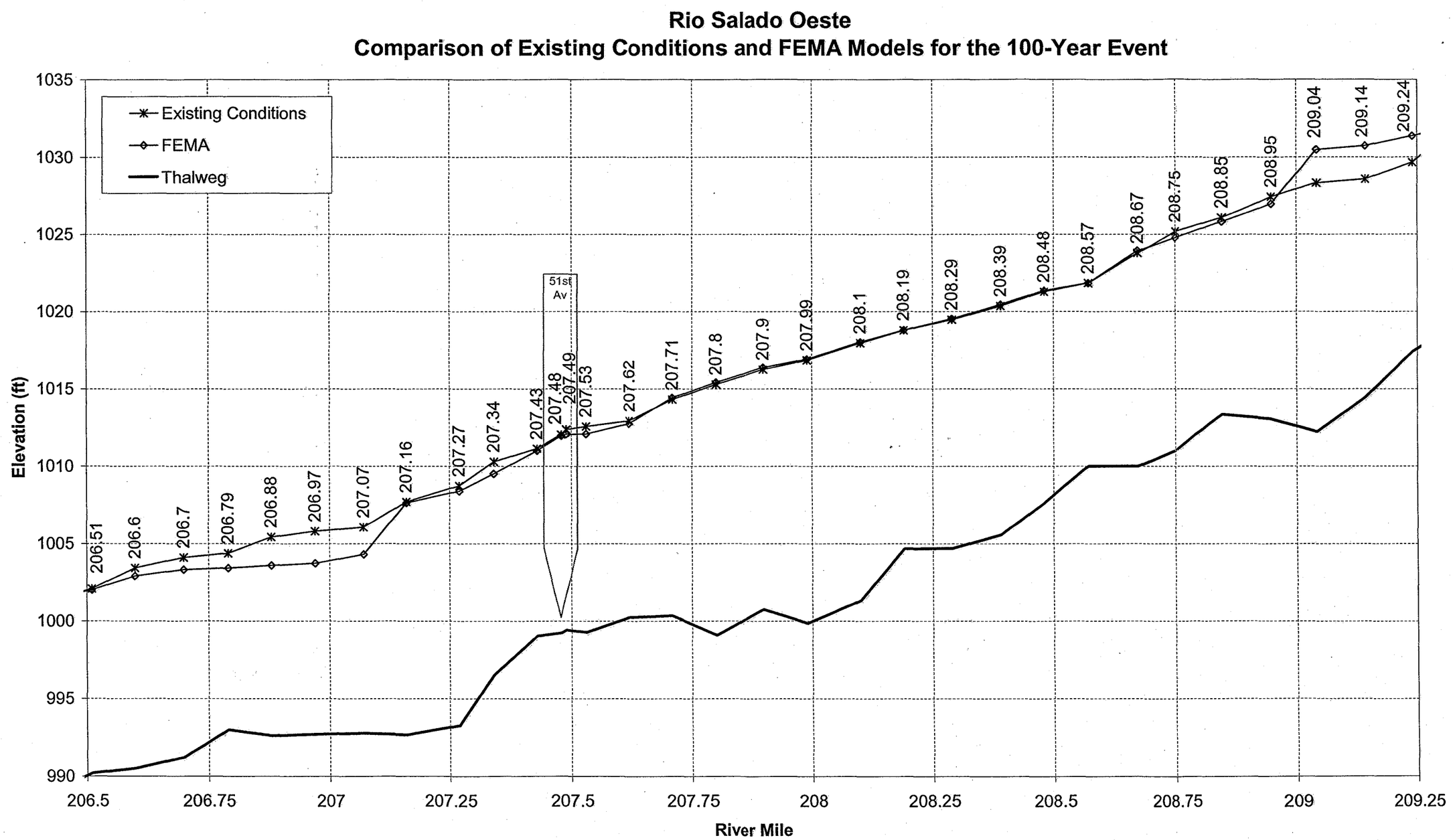


Figure 2-2. ***Continued.***

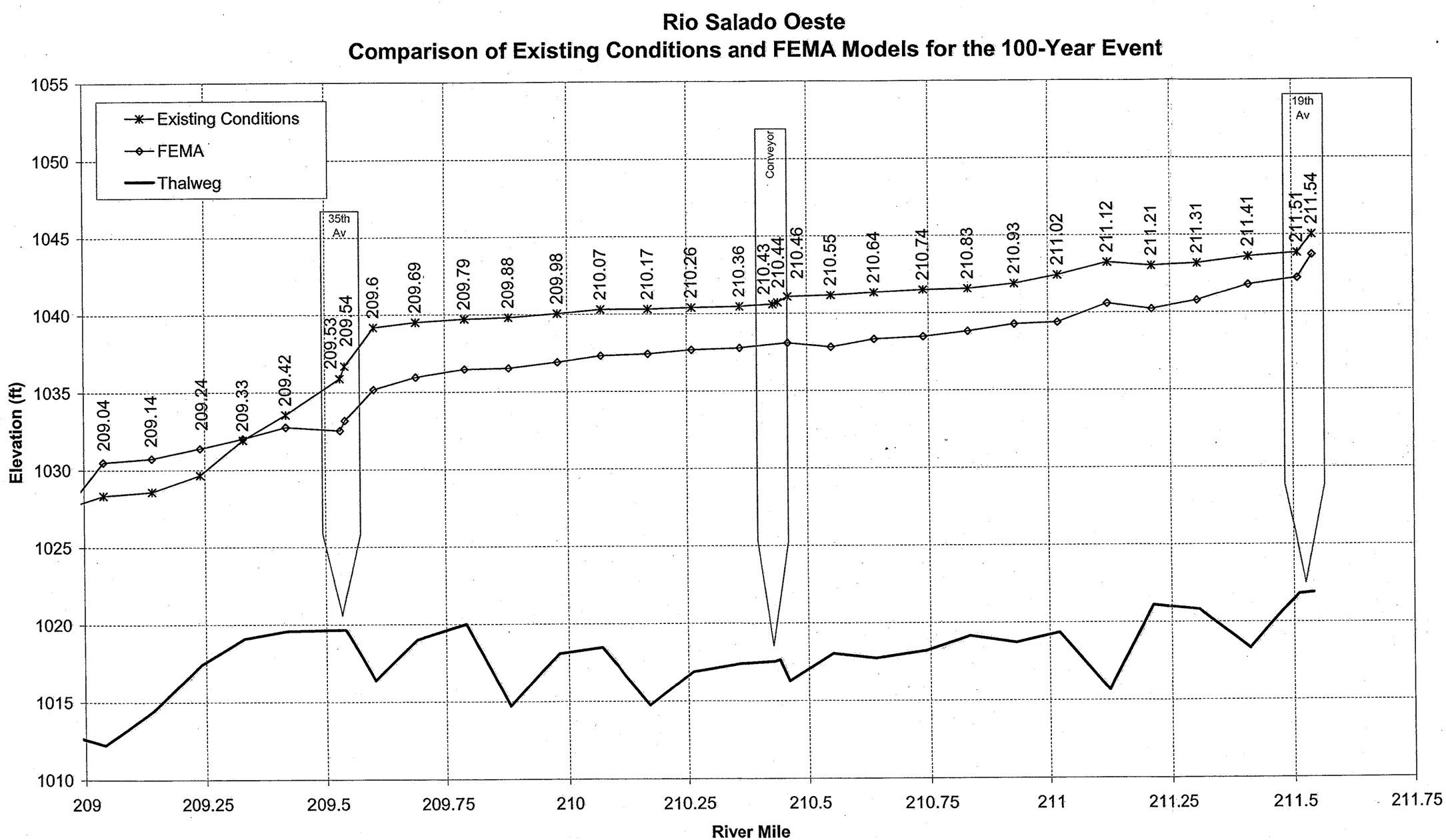


Figure 2-2. ***Continued.***

3. Sediment Transport Analysis

3.1. General

The objective of the sediment transport analysis is to identify baseline sediment conditions, which will be used with later alternative conditions studies to identify the preferred project alternatives. A base conditions sediment transport model was created using the geometry from the existing conditions hydraulic model described in the previous chapter.

The computer program HEC-6T "Sedimentation in Stream Networks", version 5.13.15 of May 24, 2001, was used to conduct the numerical sediment transport modeling in this study. HEC-6T was developed by Mr. William A. Thomas of Mobile Boundary Hydraulics, Clinton, Mississippi.

3.2. HEC-RAS Model Conversion

3.2.1. Model Geometry

The geometry of the hydraulic model was converted into a text file with the format required by the HEC-6T program. Roughness coefficients in several cross sections of the hydraulic model vary horizontally with distance in the cross section. HEC-6T does not allow as much horizontal variation of Manning's n, so an alternative method of expressing the roughness coefficient was required. After running the 5-, 10-, 20-, 50-, 100- and 500-year flood events in HEC-RAS, the profile output tables were used to request conveyance weighted Manning's n values for the channel, left and right overbanks for the different discharges. These data were then entered into the HEC-6T input file using NV records. A default value of 0.04 was used to fill blanks when the conveyance in an overbank area was zero. The result was a configuration of roughness coefficients changing in the vertical by discharge rather than in the horizontal by distance.

Conveyance limits defined in HEC-RAS using ineffective flow boundaries were coded using XL records in HEC-6T. The advantage of using XL records is that they allow deposition to occur in the ineffective flow areas. The effect of bridges crossing the river in the study area was accounted for using a single cross section with the pier geometry superimposed as recommended in the HEC-6T manual. Of the two bounding cross sections used to define each bridge in HEC-RAS, only the upstream one was retained in HEC-6T. The two bounding cross sections are very close to each other and keeping both in HEC-6T could cause numerical instabilities.

3.2.2. Fixed Bed Simulation

An elevation-discharge rating curve was developed at the downstream boundary (cross section 1) for starting water surface elevations. Water surface elevations were computed at this location assuming normal depth and a slope of 0.0019 ft/ft, for discharge values ranging from 7500 cfs to 285000 cfs, at 7500 cfs increments (Figure 3-1).

HEC-6T was then run with a fixed bed using the 5-, 10- and 100-year flood events, and the resulting water surface elevations were compared to the HEC-RAS

existing conditions model. In order to guarantee the quality of the sediment model, the water surface elevations computed by HEC-6T for each of the three events were examined at each cross section to ensure that they did not differ from the HEC-RAS results by either 10% of the maximum depth or 1 foot, whichever was less. The results of this analysis are shown in Appendix D.

3.3. Sediment Parameters

The Corps computer program SAMAID was used to select the most appropriate sediment transport relationship. SAMAID results indicated that Madden's 1985 modification of Laursen's equation and Yang's equation were respectively best and second best sediment transport relations for the characteristics of the study reach. Schoklitsch's equation came out in third place. WEST has used Yang's equation in the past on the Salt River upstream and downstream of the project site. In general, this equation performs well for mid sized rivers transporting large amounts of sand, which is typical of many streams in Arizona. Therefore, the sediment transport equation selected for this study was Yang's unit stream power.

3.3.1. Bed Sediment Characteristics

Nineteen locations were identified for sediment sampling and development of gradation curves. Sampling sites were located approximately 0.5 miles apart, from 19th Avenue to 91st Avenue. Samples were collected from 0 to 2 feet, and laboratory grain-size analyses were performed on the samples. In addition, an in-situ particle count consisting of 100 particles spaced at 1 foot intervals was performed. Bed gradation data were entered into the HEC-6T input file using PF records. Sediment gradations and sample locations are shown in Appendix E.

3.3.2. Inflowing Sediment Rating Curve

Recorded information about sediment loads in the Salt River upstream of the study reach is not available. There are however previous studies reporting sediment transport simulations. One of these studies is the Low Flow Channel Design Analysis for Rio Salado (2000) performed by WEST for the Corps. This study presented a sediment transport model of the Salt River from approximately the I-10 Bridge to the 27th Avenue alignment, based on the Toffaleti, Meyer-Peter and Muller combination transport method. The model used an estimated sediment inflow at the upstream end of the reach based on an equilibrium bed material load analysis performed on a 0.5 mile reach upstream of I-10.

The simulated loads from this previous study were not considered appropriate inflow loads to our model because they were not developed using any of the sediment transport equations identified as suitable for the current study (Yang's equation or Madden's 1985 modification of Laursen's equation). If a sediment inflow based on a different equation was used in the current model, depending on the amount of the sediment loads, there is a possibility that it could lead to either unrealistic erosion or deposition in the upstream end of our study reach.

Since we were confronted with a lack of adequate data on inflowing sediment loads into our study reach, an equilibrium bed material load was assumed. The inflowing load at the upstream end of the model was determined on a reach approximately 3 miles

long at the upstream end of the study reach (from RM 211.21 to RM 214.14) with the gradation information from the two most upstream sediment sample locations. Equilibrium sediment loads for this reach were determined for a range of discharges from 20 to 200000 cfs. To determine the equilibrium load, HEC-6T was run using clear water inflow as the initial condition and the recirculation option on ($RE record). The recirculation option instructs the program to use the sediment discharge at the downstream end of the reach as the sediment inflow at the upstream end for the following time step. When equilibrium is attained, sediment load entering the reach is about equal to the load leaving the reach. For discharges between 20 and 50000 cfs, the simulations were run typically for 10 to 100 days with time steps in the order of 0.01 to 0.1 days. For larger discharges (100000 to 200000 cfs), typical durations were between 5 and 10 days with time steps of 0.001 to 0.01 days.

The inflowing sediment loads defined with Yang and Laursen-Madden relationships are shown in Figures 3-2 and 3-3. The gradation of the inflowing load from the equilibrium analysis is shown in Figures 3-4 and 3-5. This information was entered into the HEC-6T input files using LQ, LT and LF records.

3.3.3. Movable Bed Limits

In general, sediment dynamics tend to be more significant within the active channel, where the bed can either degrade or aggrade in response to erosion or deposition. The overbank areas tend to be more stable and normally are free of erosion, but can experience deposition. HD records were used to specify a bed sediment depth of 20 feet for all cross sections but one. At river mile 211.54 the sediment depth was set to zero to account for the grade control structure located immediately downstream of the 19th Avenue Bridge. Movable bed limits were not identified in the HD records, implying that deposition could occur anywhere in the wetted perimeter. In addition, HE records were used to limit erosion within the channel bank stations.

In order to develop a sound hydraulic model, the mining pits, in particular those located in the channel, were blocked to ensure a solution with a subcritical water profile along the reach. However, when flooded, the mining pits will likely act as sediment traps. For that reason, the sediment deposited on top of the blocked areas within or next to the channel was removed from the system using the dredging options in HEC-6T. HI records were used to identify the areas where sediment should be removed in the case that deposition took place, and the $DREDGE record was used to instantaneously take away the deposited sediment after each time step. In addition, when mining pits were located in the channel, the HE limits were relocated to exclude the pit from the area of potential erosion.

3.4. Hydrology

A continuous 50-year hydrograph consisting of historical flows between 1889 and 1938 was provided by the Corps. This flow series corresponds to the "worst case" continuous 50-year period, in terms of both peak flows and storm volumes, within the 105 years of record, from 1889 to 1993. Discharges less than 20 cfs were removed from the hydrology since no sediment was transported for flows of 20 cfs or less.

Simulations were performed with the 50-year hydrograph, with simulation results requested by decade. Figure 3-6 shows the complete 50-year hydrologic input and identifies the end of each decade. The individual hydrographs used to compile the 50-year long hydrograph are shown in Appendix F.

3.5. Results

The sediment transport analysis results are presented in terms of average bed elevation by decade (Figure 3-7 and Appendix G). The average bed elevation corresponding to a 10,000 cfs discharge of very short duration (0.00001 days) was computed in HEC-6T at 10-year intervals. This discharge was selected to generate average bed elevations because, in general, it provided coverage of the channel bottom (HEC-6T computes average bed elevations only from "wetted" points of the cross sections). The 10,000 cfs discharge is used only to generate output, and the short duration minimizes sediment movement.

The results show two distinct areas with respect to sediment dynamics. Downstream of 35th Avenue the reach mainly experiences degradation, with deposition limited to just a few cross sections. One of the depositional areas is defined by cross sections 203.58 to 203.86, and corresponds to an abandoned mining operation. The end result is a channel with a more homogenous bed slope. There are two areas downstream of 35th Avenue where the model predicts severe erosion:

- The first one is defined by cross sections 206.7 to 206.97. This is an area with active mining pits in the channel and a small berm to prevent low flows into the pit. The small flows (the majority in the hydrologic input) are then confined to a channel just about 200 feet wide resulting in severe degradation. Due to the limitations of the model (1-D steady state) it is not possible to simulate the complex interaction that may occur between the mining pit and the channel. The flows could very well breach the berm and enter the pit, limiting degradation in the channel but creating a headcut that would progress upstream.

- The second area corresponds to cross sections 209.24 to 209.54. This is another mined reach with pits on the right overbank and channel in cross sections 209.24 and 209.33. Cross section 209.54 represents the small bridge opening at 35th Avenue. Erosion in this case is associated with the cross sectional area reduction and velocity increase caused by the bridge.

Upstream of the 35th Avenue Bridge the bed slope is milder. That, along with the backwater effect of the bridge, creates the conditions for sediment deposition in most of the cross sections.

In general, average bed elevation changes are more significant in regions of the reach that are currently affected by mining operations in the channel. Where mining is not an issue, average bed changes reach a maximum of 5.8 ft after 50 years of sediment transport, with an average change of 1.9 ft.

During the simulations most of the bed changes took place in the first decade, with minor adjustments occurring in the remaining time. The first decade contained the flow events with the two largest peaks. In addition, it can be seen that the trend observed

after the first decade is sometimes reversed after subsequent decades. This is a consequence of both changes in the cross section geometry with time, and changes in sediment dynamics associated with flows of very different magnitudes.

Appendix H shows plots comparing the cross sections before and after the sediment transport analysis.

3.6. Sensitivity Analysis

The purpose of the analysis was to explore the sensitivity of the sediment transport model to variations in the parameters, in an attempt to determine the appropriateness of the selected values. Sensitivity runs were performed on the base conditions HEC-6T input file to determine the relative effect of changes to Manning's n, inflowing sediment load, and transport equation to the average bed elevation profiles. Results in tabular and graphic format are provided in Appendix I.

3.6.1. Hydraulic Roughness

The sensitivity of the sediment transport model to the hydraulic roughness coefficients was examined. The base conditions sediment transport model results have been compared to simulation outputs resulting from increasing and reducing all Manning's n coefficients in the input file by 25%.

After 50 years of simulating sediment dynamics, the high roughness profile is generally higher than the base condition profile. This is the result of deposition or reduced scour due to reduced flow velocities caused by the higher roughness coefficients. On the other hand, the low roughness profile is generally lower than the base conditions profile because of higher flow velocities. The average bed profile change was 0.7 ft for high roughness and 1.2 ft for low roughness, implying that small errors in the roughness coefficients selected for the base conditions model probably will not have a significant effect on the results.

The largest differences occur in mined reaches, where a 25% increase in Manning's n can reduce erosion by as much as 3.7 ft, and a 25% decrease in Manning's n can augment erosion by as much as 5.9 ft.

3.6.2. Inflowing Sediment Load

The effect of the inflowing sediment load has been assessed by comparing the base conditions sediment transport model with simulation results after increasing and reducing the sediment discharge to twice and half the equilibrium load determined with Yang's equation.

The most important differences can be observed upstream of the 35th Avenue Bridge. In the reach between cross sections 210.07 and 211.34 the double-inflow profile elevation increases an average of 0.6 ft with respect to the base condition, while for the half inflow profile it decreases an average of 0.5 ft. Downstream of 35th Avenue the differences are reduced as the sediment load reaches equilibrium.

3.6.3. Sediment Transport Equation

Simulation results generated with Yang's unit stream power equation have been compared to the simulation results produced with Madden's 1985 modification of Laursen's sediment transport equation.

The two equations yield bed profiles with the same trends in terms of degradational and agradational areas, with slight differences in the depth of eroded or deposited material. The main differences appear at the upstream end of the study reach. The upstream end of the reach is a transition between a narrow segment with levees in both banks and a wider segment severely disturbed by mining operations. It is not surprising that the model results show some instability in this area, until a new equilibrium is reached a little distance downstream. Laursen's equation, as modified by Madden, seems more susceptible to this effect than Yang's equation.

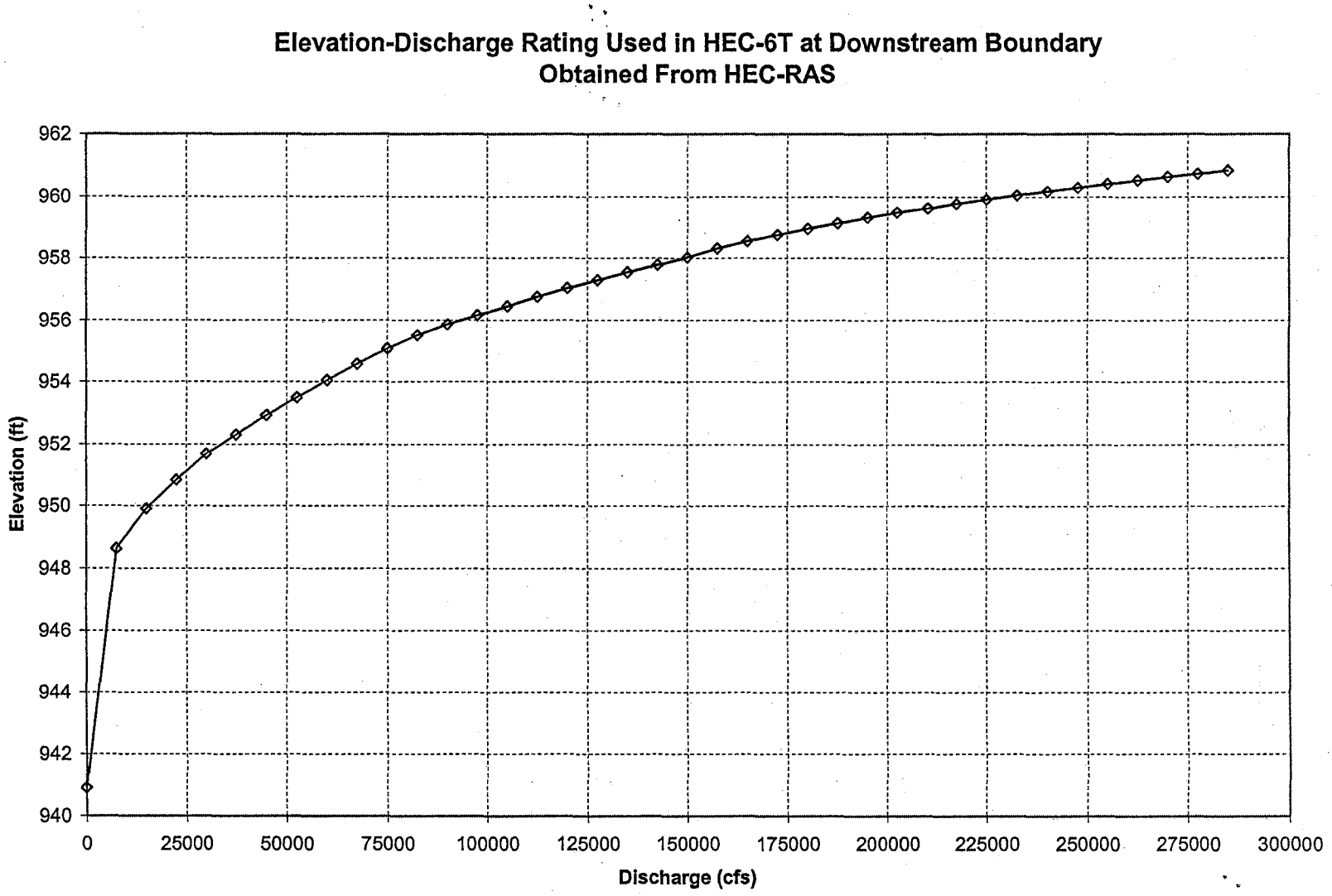


Figure 3-1. Rating curve at downstream end of sediment transport model.

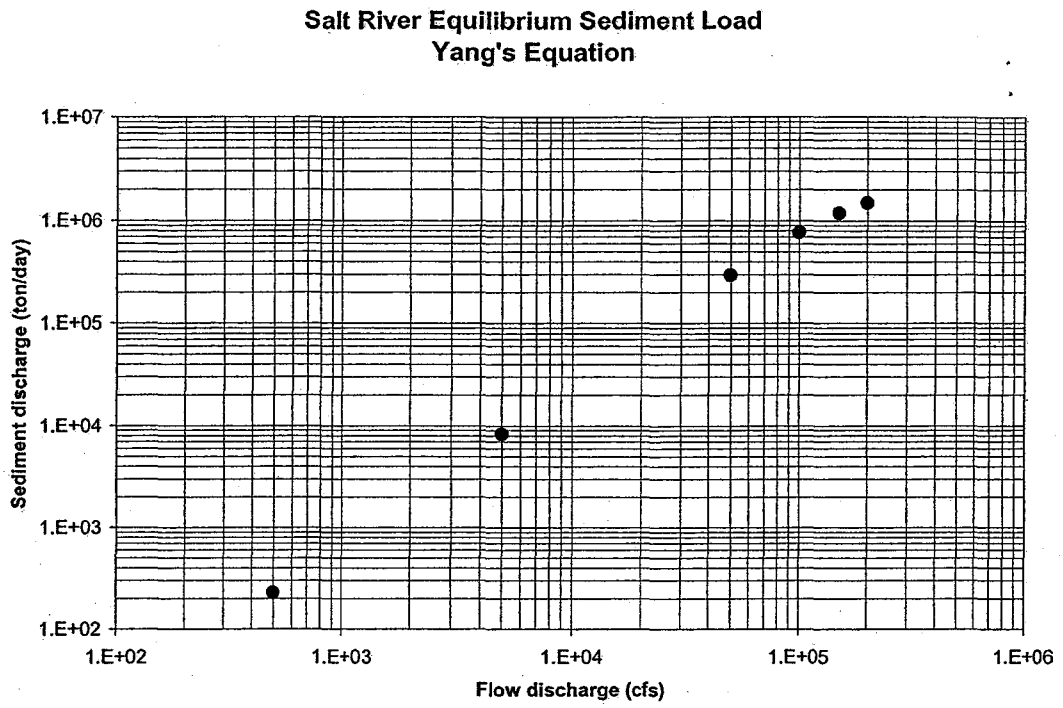


Figure 3-2. Equilibrium sediment load with Yang's equation.

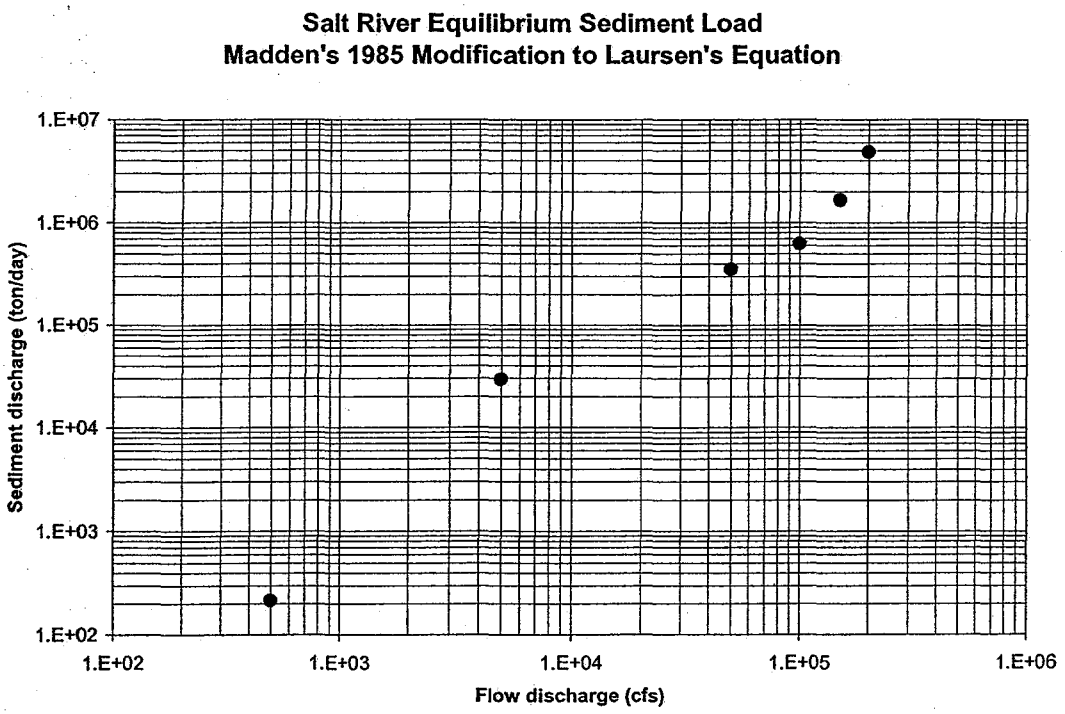


Figure 3-3. Equilibrium sediment load with Laursen-Madden's relation.

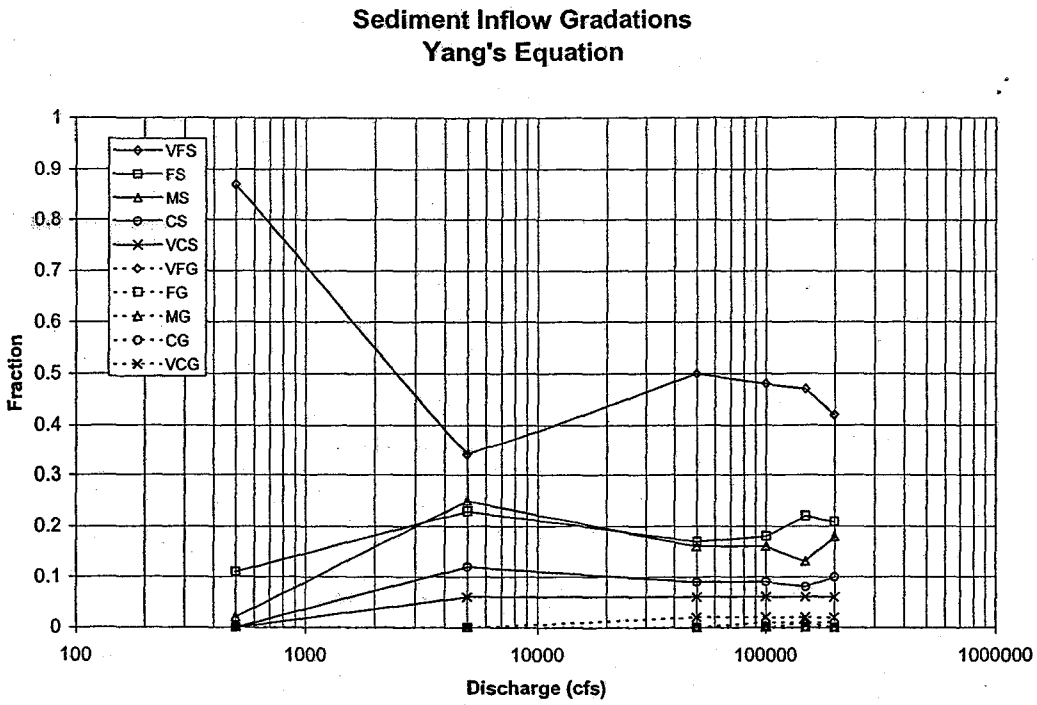


Figure 3-4. Sediment inflow gradations with Yang's equation.

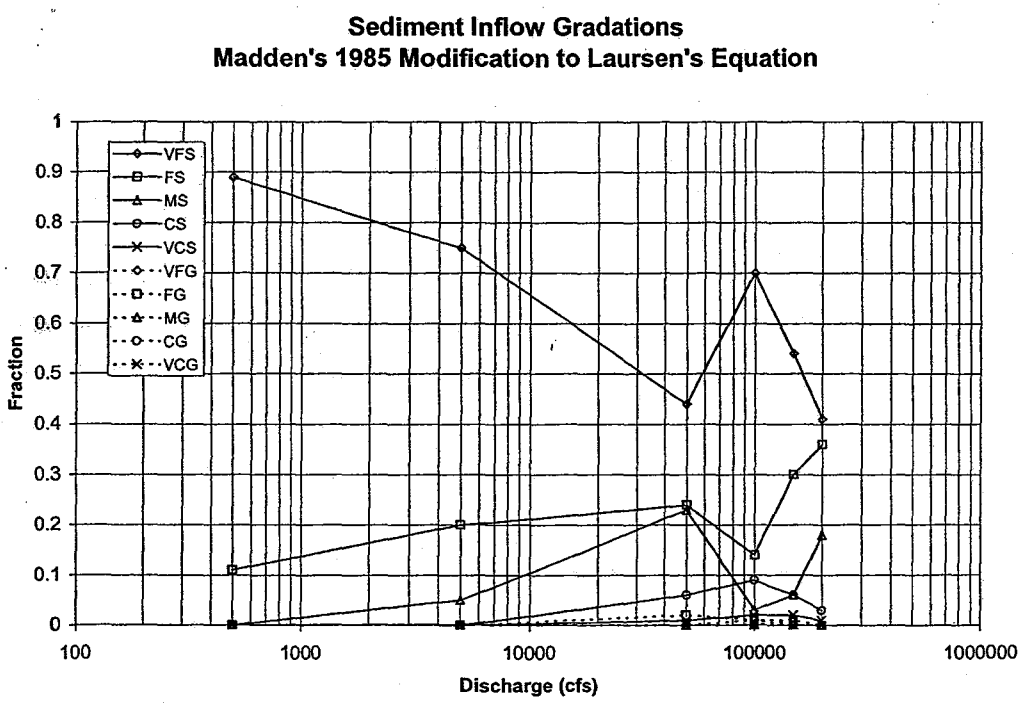


Figure 3-5. Sediment inflow gradations with Laursen-Madden's relation.

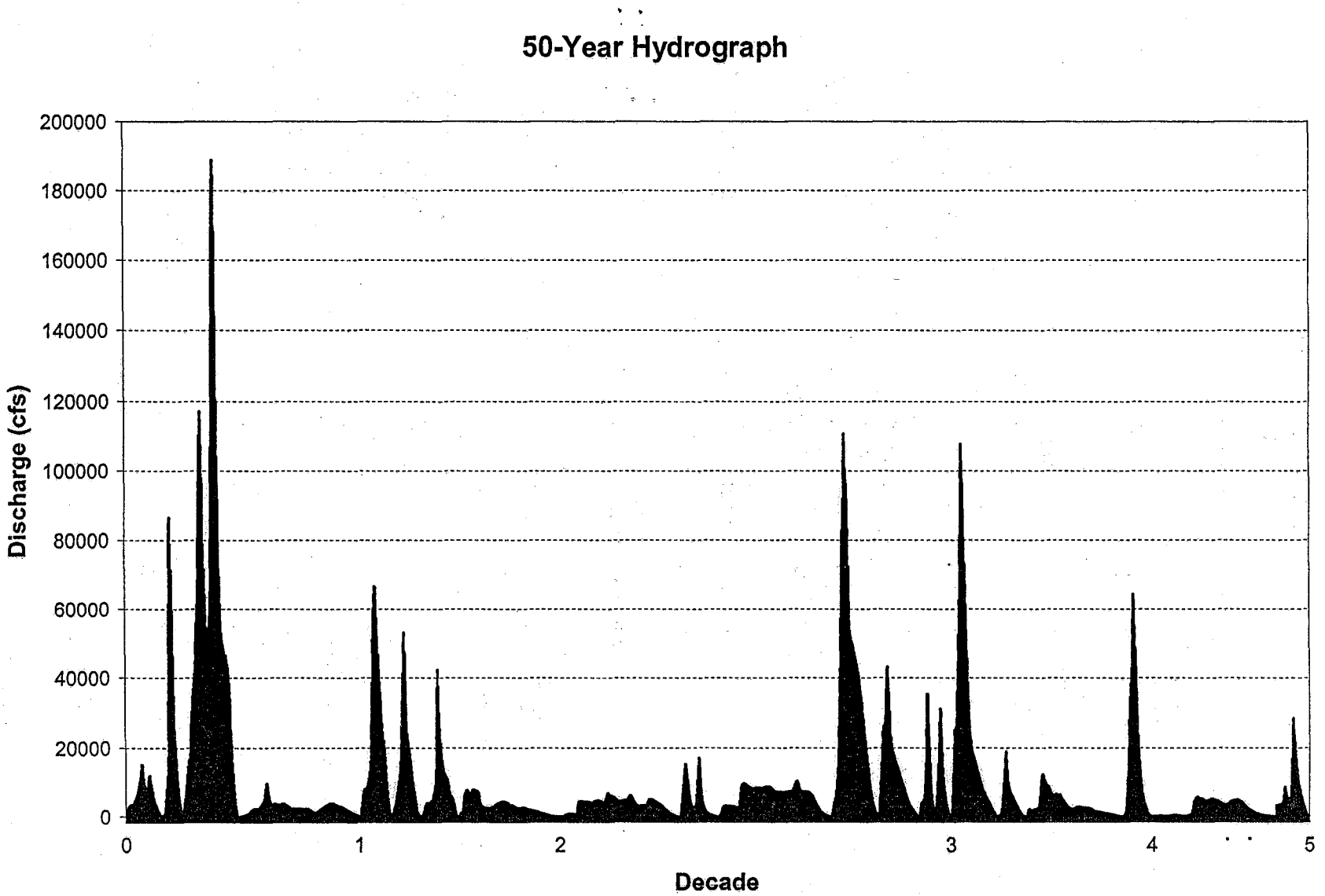


Figure 3-6. 50-year hydrograph used to run the sediment transport model.

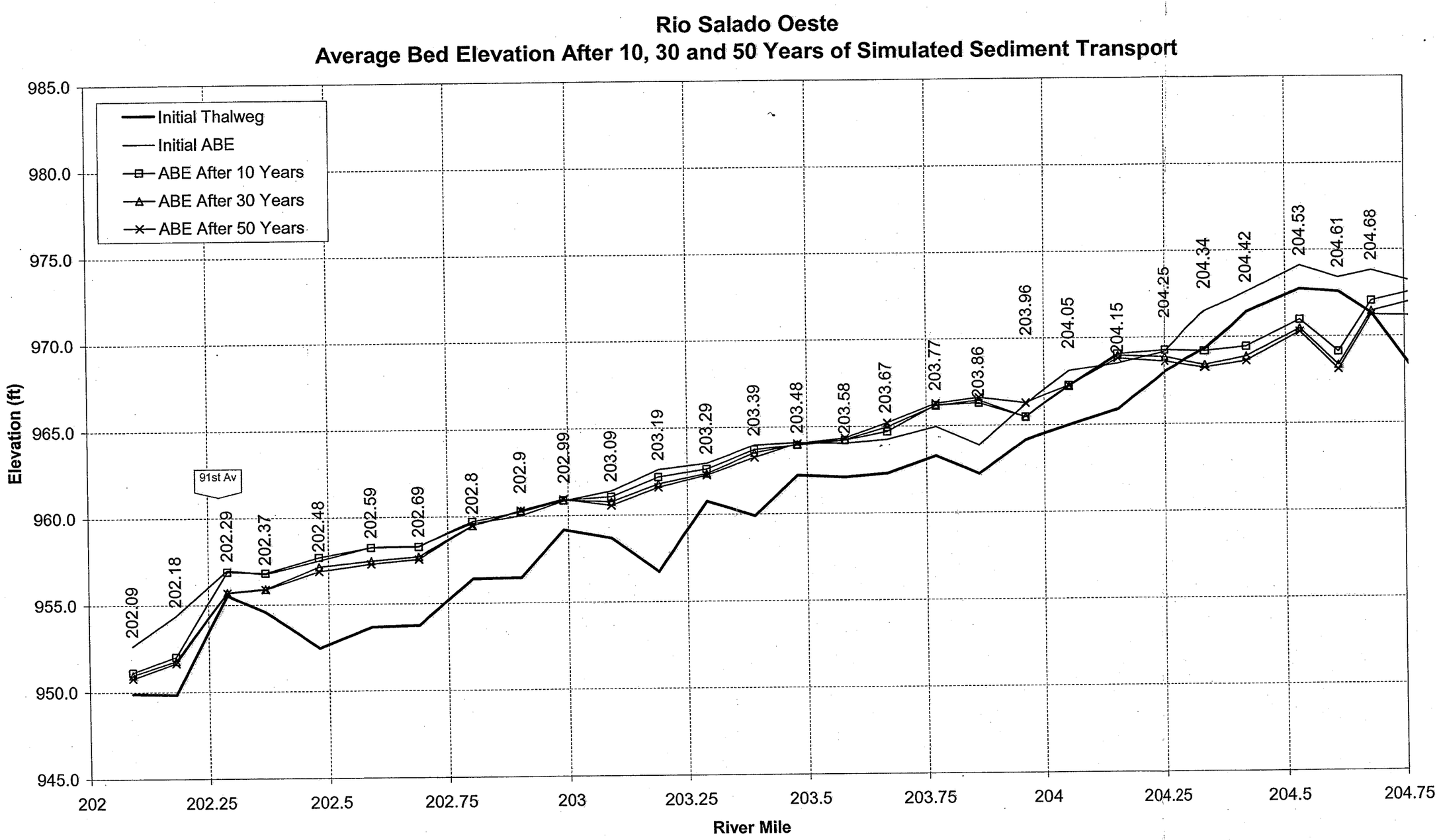


Figure 3-7. Simulated average bed elevation for selected decades.

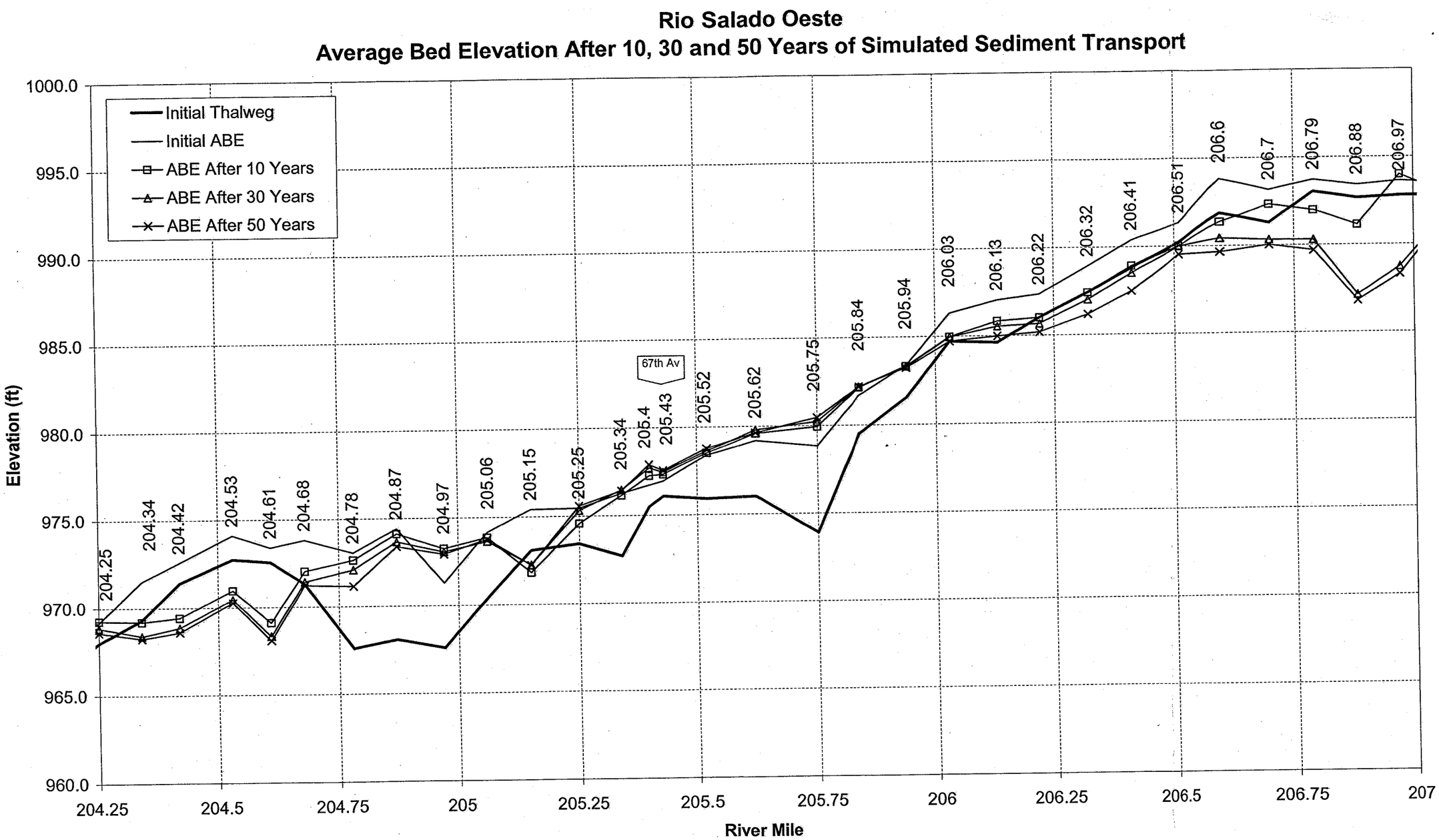


Figure 3-7. ***Continued.***

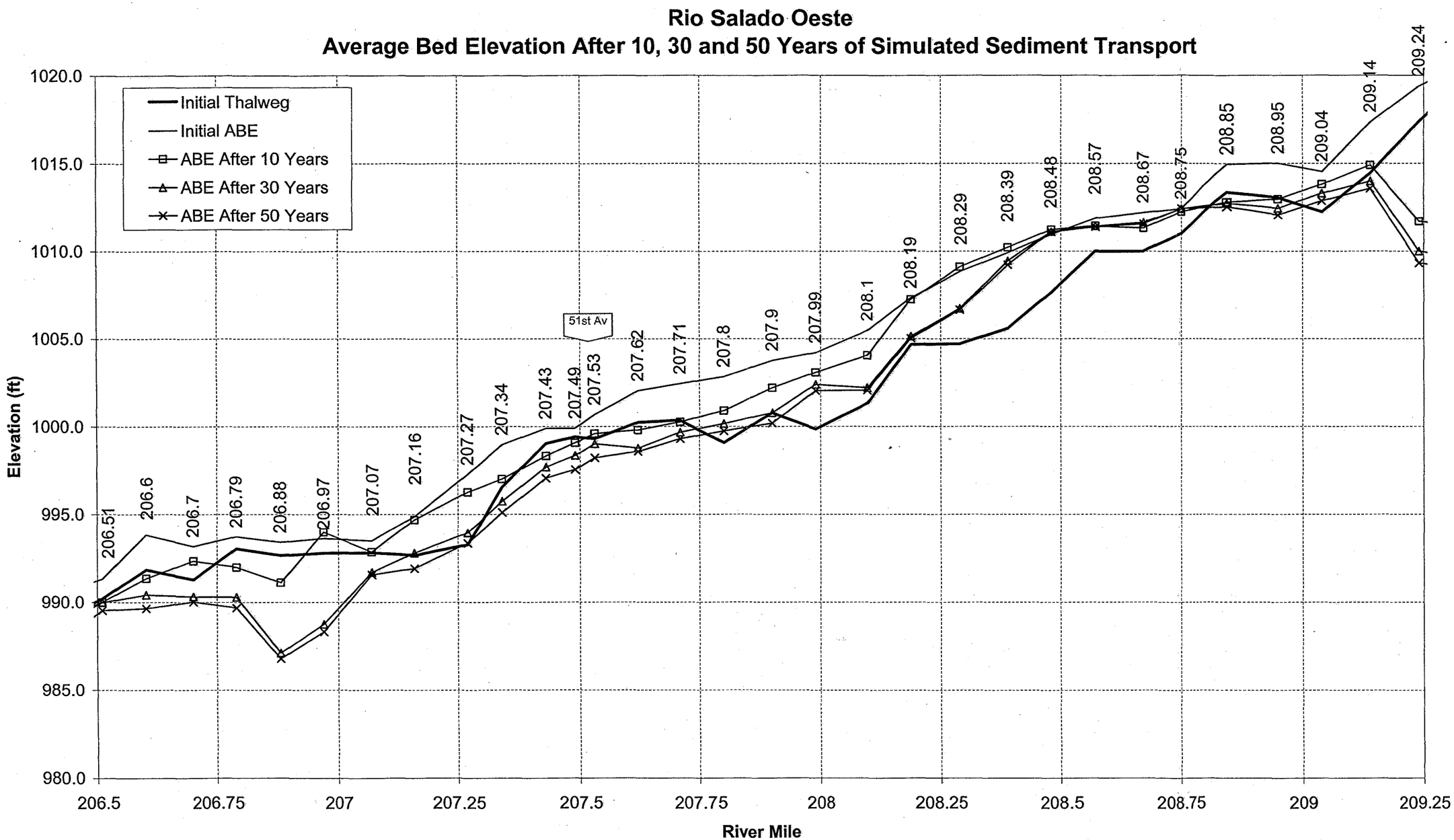


Figure 3-7. ***Continued.***

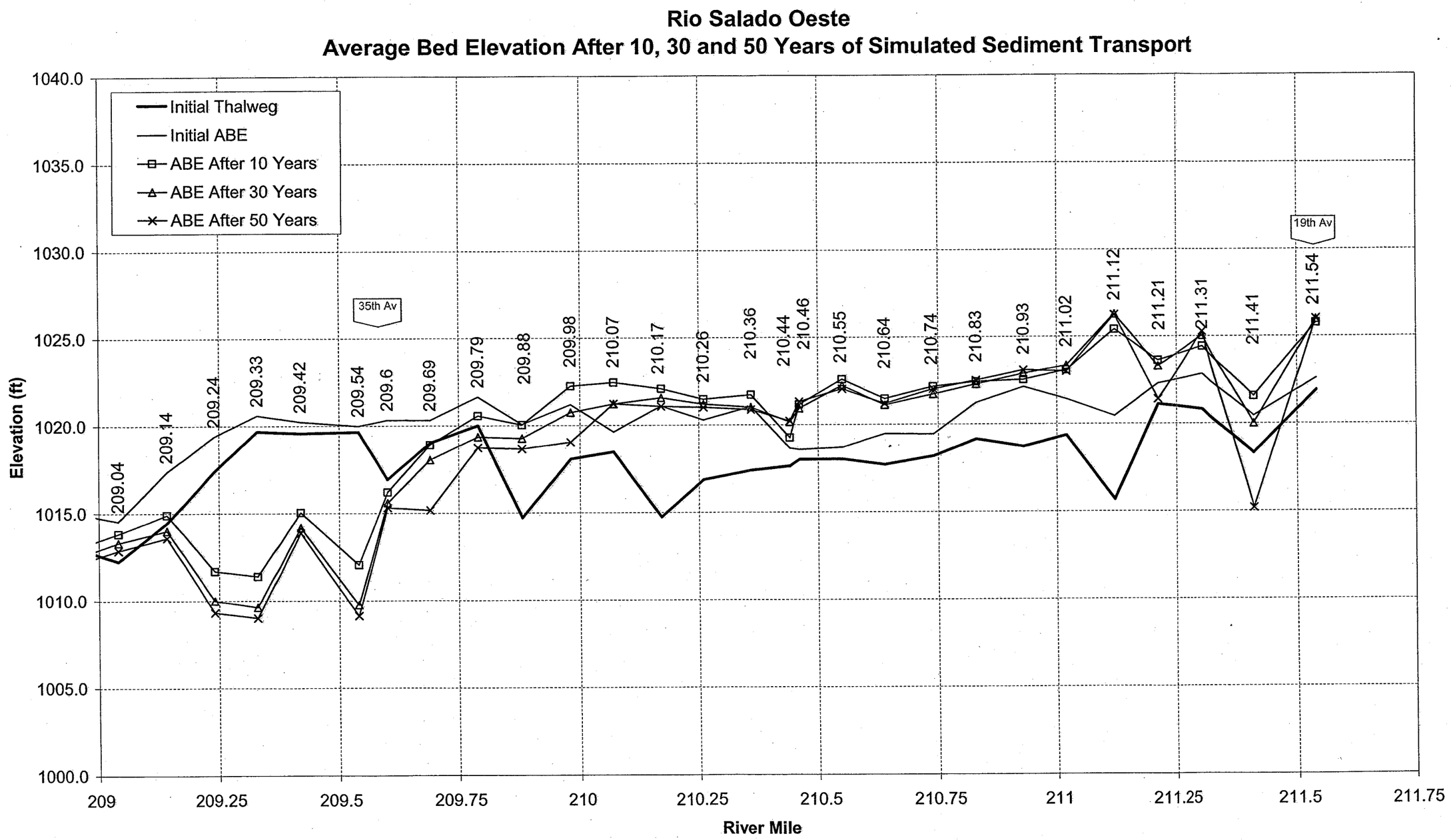


Figure 3-7. ***Continued.***

4. Geomorphic Analysis

The primary goal of the geomorphic analysis is to identify historical behavior of the subject river system by the collection and review of historical aerial photographs and the application of geomorphic relationships. The principle objective is to evaluate lateral channel migration, historical bank lines as well as low flow channel locations and sediment aggradation/degradation potential. A qualitative analysis of historical changes to river morphology is followed by a quantitative analysis for basic geomorphic factors of the subject river system.

4.1. Historical Setting

The Salt River was a perennial stream prior to construction of upstream water supply dams in the period 1908-1930. Historical accounts and photographs indicate that the Salt River was a wide, braided channel that supported significant vegetation but was also prone to major flood events. Since completion of the upstream dams on the Salt and Verde Rivers, the study reach has experienced significant periods of virtually no flow.

4.2. Analysis of Historical Photographs and Maps

WEST obtained historical aerial photographs of the project reach for the years 1937, 1958, 1979, and 1999 (approximately every 20 years). In addition, maps from the original land surveys filed in 1870 showing the outline of the river were obtained. The photos and maps were scanned and geo-referenced so as to be compatible with the recent aerial photographs and GIS coordinates. Based on the map and photographic images, a number of analyses were performed and are described in the following sections.

4.2.1. Bank Lines and Lateral Migration

The historical bank lines and channels were reviewed from 1870 to 1999. The historical bank lines, superimposed on the 1999 aerial photography, are shown in Figure 4-1. The Salt River through this reach has been relatively stable but still the river banks have moved laterally by as much as one-half mile in some locations during the 130 year record. Much of the lands along the south side of the river have been recovered from the active braided channel system during the period of historical photos. Delineating the active channels and banks was made much more complex by the reclamation of fields with active channel scars both upstream and downstream of the new fields as well as expansion of mining pits. Some of the reclaimed areas have subsequently been developed by industrial users.

The lines marked Recent Geologic Banks were determined from reviewing the aerial photos from 1937 to 1999 and viewing the shape of the topographic lines along the river. The boundaries were initially set to include all areas where abandoned meander features were found as well as extending to the areas where the contour lines changed direction from following the regional slopes to being perpendicular to the river channel. This coverage should be fairly close to the maximum historical meander belt for the river in this reach. It varies from approximately two miles in width at 19th Avenue to approximately four miles in width at 91st Avenue.

The river is constrained upstream from 19th Ave by levees constructed as part of earlier projects. The soil cement levees end just downstream from the 19th Ave Bridge and the river is unconstrained by levees until just above the 91st Ave water treatment plant. River alignment is fixed to some extent by bridges located at 35th Ave., 51st Ave. and additional proposed bridges for a future freeway crossing at approximately 61st Ave. The 35th Ave Bridge is very short and provides a significant constriction to flows. The other bridges have much larger openings and provide little, if any, flow constriction.

4.2.2. Low Flow Channel

The historical centerline of the low flow channel, or thalweg, was determined by using the same information previously described. Identification of the main flow channel was sometimes difficult as the system is braided and multiple flow paths can usually be seen at any given time around islands and bars. The thalweg lines from 1870 to 1999 are shown in Figure 4-2. Similar to the bank lines, one can observe that the thalweg consistently shifts its position within the meander belt (compare the thalweg location with the bank lines shown in Figure 4-1). This shifting is typical of braided river systems. The thalweg locations are, however, all within 2000 feet of one another from the downstream boundary of the study at 91st Avenue up to about 35th Avenue. Upstream of this point, the thalweg locations diverge. Available evidence indicates that the river used more northerly channels up until the 1950's, with a shift in the thalweg location to a more southerly location from that time to the present.

4.2.3. Vegetation

Sparse vegetation can still be seen in the 1937 aerial photographs. However, the other sets of aerial photos (1958-1999) show no significant amounts of vegetation in the study reach.

4.2.4. Mining Activities

Mining activities in the Salt River play a significant part in the sediment balance of the river system. In the 1937 photographs, no significant mining activities are seen in or near the river channel. In 1958, two large pits can be seen at the upper end of the study reach (upstream of 35th Avenue). The increase in observable mining activities continues in the 1979 photographs where more pits are observed. These are still located primarily in the upstream part of the study reach. The 1999 photographs show at least 12 pits in and near the river channel more evenly distributed along the reach than in previous years (although still predominantly in the upper portion of the study reach). Since some of these pits are located near the main channel and the river currently flows through some of these pits, they have significant impacts on local flows. These impacts include the redirection of flows through the pits and away from former channel alignments, erosion upstream and downstream from the pits as well as deposition of sediment in the pits.

4.3. Channel Response to Flood Events

To accurately gage the changes wrought by the river to its channel during major flood events, photographs immediately prior to and after the event should be compared. Such a detailed comparison is not part of the present study and photos immediately prior to the floods are not available. However, some information may still be gleaned from the

photos used in this study. For example, in each period in between the dates of the aerial photography (1937-1957, 1958-1979, 1979-1999) a major flood occurred on the Salt River, with the exception of the period 1937-1958. Observing the bank lines and aerial photographs for the period with out large floods reveals that very little change occurred in the channel in the absence of large flood events. During the period between 1973 and 1999 (includes the 1993 Flood) for example the banks in the upstream reach were impacted primarily by gravel mining while areas near 67th Ave and 83rd Avenues widened significantly due to flood events. The widening of selected sections can be seen in comparing the banklines from the various time periods in Figure 4-1.

4.4. Geomorphic Relationships

The current channel geomorphic properties were analyzed in order to quantitatively examine channel stability and potential for lateral migration.

4.4.1. Channel Planform

Leopold, Wolman, and Miller (1964) adopted the sinuosity ratio, defined as the channel (thalweg) length divided by the valley length of the stream, as a criterion which could be used to classify river patterns. Through the observation of several natural river systems, they concluded that systems with a sinuosity greater than or equal to 1.5 would be classified as meandering, while those less than 1.5 would be braided or straight. The average sinuosity for the study reach was approximately 1.4.

Also, Lane (1957) and Leopold & Wolman (1957) developed relationships between channel pattern, channel gradient, and mean discharge based on field data. Figure 4-3 shows these relationships graphically. The significance of this figure is that rivers situated close to the meandering-braided threshold would be expected to experience transitions between one channel form and the other. Utilizing the 5- and 10-year discharges (20,200 and 53,000 cfs, respectively) as indicators of either the mean (Lane) or bankfull (Leopold & Wolman) discharge, error bars are shown for the study reach. The error bar indicates the range of slopes found in geomorphically similar subreaches within the study reach. It can be seen that the study reach plots well into the braided region for both criteria.

4.4.2. Width / Depth Ratio

Width/depth ratios were computed for the study reach using the HEC-RAS model results for both the 5- and 10-year discharges. Results are shown in Table 4-1. It is seen that the channels are very wide and shallow, reflecting the observed braided system (several researchers have defined ratios of 40 or above as "very high", e.g. Rosgen, 1994).

Table 4-1. Width / depth ratios.

	5-Year Flow	10-Year Flow
Maximum	800	561
Minimum	44	31
Average	193	176

4.5. Sediment Aggradation/Degradation Potential

It is common in geomorphic studies to identify "equilibrium" conditions that the channel would experience if inflowing and outflowing amounts of sediment were perfectly in balance. Then areas expected to experience aggradation (deposition) or degradation (erosion) could be identified for areas not conforming to the predicted equilibrium conditions. However, this type of analysis is usually performed either as a precursor to, or in place of, a more detailed sedimentation modeling study. Because such a modeling effort forms part of the current study, and results in predictions of erosional or depositional areas, a separate and more general geomorphic analysis will not be performed here with the exception of a review of recent historical thalweg elevations.

An historic HEC-2 model was obtained from the FCD that contained cross section and thalweg elevations for 1982. This data was compared with the data collected by Baker in 1994 that served as the basis for the current study. These data were also compared with the thalweg from the 50 year simulation as plotted in Figure 4-5. It can be noted that there are some differences between the 1982 (pre-flood) and 1994 (post-flood Baker) data. One of the primary differences is at the 35th Ave bridge where the Baker data shows an extremely deep scour hole under the bridge due to the flood. The 1982 and the future condition thalwegs in this area are nearly in agreement indicating that the channel is relatively stable in this reach for the conditions modeled with large floods scouring deep holes under the bridge to facilitate passage of their high flows.

The channel topography in the TIN supplied for analysis appears to be based on the water level in the river under the bridge rather than the bed elevation as can be seen in Figure 4-6. It was noted, however, that the bed adjusted to the same elevation in the future conditions model regardless of whether the channel elevations from the Baker model (deep scour hole under bridge) or the water surface was used as the initial channel invert.

The 1982 and future thalweg elevations are within approximately 5 ft of each other with most of the larger differences in areas that were mined in prior to the 1982 topography. Differences can be seen at RM 209 and 210.5 for example where mining pits appear to have filled during the 1993 flood.

The correlation between the historical and predicted future conditions again indicates that the river is in a state of dynamic equilibrium and tends to return to its pre-existent state if adequate flow and sediment is available. The impact of gravel mining, at least since 1982, does not appear to have impacted the overall stability of this reach although impacts near the pits are significant.

4.6. Geomorphic Summary

The entire study reach is classified as a braided channel system, conforming to observations in the field and from historical documents and photographs. Braided systems generally have wide main channels in which multiple low flow channels cross, resulting in the braided channel.

Braiding is believed to result primarily from random deposition of materials (sediment) transported during high flows in quantities or sizes too great for continued transport during low flows. Accordingly, as the stream discharge is reduced, larger sediment particles begin to drop to the bed as the stream "sorts" or leaves behind those sizes of the transported sediment (load) which it is unable to transport. The accumulation of these particles on the channel bed initiates the formation of a bar which serves to trap even more sediment particles. Although the depth of flow over the growing bar is gradually decreased, velocity over the bar tends to remain undiminished or even to increase so that some particles moving along the bar are deposited beyond the downstream end where a significant decrease in velocity is associated with the marked increase in depth of flow. Thus, the bar grows by successive addition of sediment particles at its downstream end and some additional growth along its sides. Additional bars will then be propagated through the same process described until the channel obtains its characteristic braided pattern. Growth of the bars will eventually reach a size that will significantly alter the channel conveyance capacity at which time the channel will seek a new equilibrium condition.

The shifting, changing nature of braided channels and the fact that they are often generated by sediment deposition and bed aggradation has led many engineers and river scientists to associate them almost exclusively with disequilibrium in the fluvial system. However, as Leopold et al. (1964) pointed out, braided river systems are a distinct and viable category of dynamically stable planform, along with straight and meandering systems. The recent historical evidence examined here indicates that the project reach is in quasi-equilibrium, although adjustments to bank and thalweg lines within the historical meander belt are possible.

4.7. Lateral Bank Migration Rates

It is extremely difficult to predict bank retreat or lateral migration rates in braided river systems. A braided river system regularly attacks its banks and moves them back as the braided meander patterns shift across and along the river. Once a braid of the river directly attacks a bank it normally will retreat rapidly until the meander shifts and the attack terminates. The rate of bank retreat may thus be several hundred feet for a single event but over the historical record be only a few feet per year. Thus a bank that appears stable can retreat very rapidly while under attack and yet appear stable for long periods of time while the river is attacking the bank in other locations. Other banks are relatively resistant and can withstand a direct impact of a braid with little retreat. The limited number of flows in the Salt River only increases the difficulty of estimating long term rates of retreat.

The fact that a bank has been stable for the historic record may only mean that the full force of the river has not, as yet, been redirected toward that bank. If the historic record of bank lines is reviewed in the context of limits presented in Figure 4-2 as the

Recent Geologic Banks, it can be noted that the river has moved widely on the floodplain over its geologic past. Given the proper flows, meander bends, braid patterns, and bank conditions, the river could again move to its geologic limits or even beyond. Given the exiting constraints the movement of the river to its Recent Geologic Banks is unlikely however.

Notwithstanding the difficulty in the estimation of retreat rates, some estimate of probable bank movement can be made based on current constraints, existing patterns within the river and historical bank lines. Based on the historical record as well as geomorphic principles, it is probable that the river will stay within the limits shown in Figure 4-4 as the Probable Lateral Migration Limits. That is not to say that without protection that the river will stay within these limits indefinitely but only that for flows up to and including the 100 year event the river would not be expected to move dramatically beyond the limits shown in a single or short series of events. These lines take into account the historical bank lines as well as the expected bank attacks during high flows.

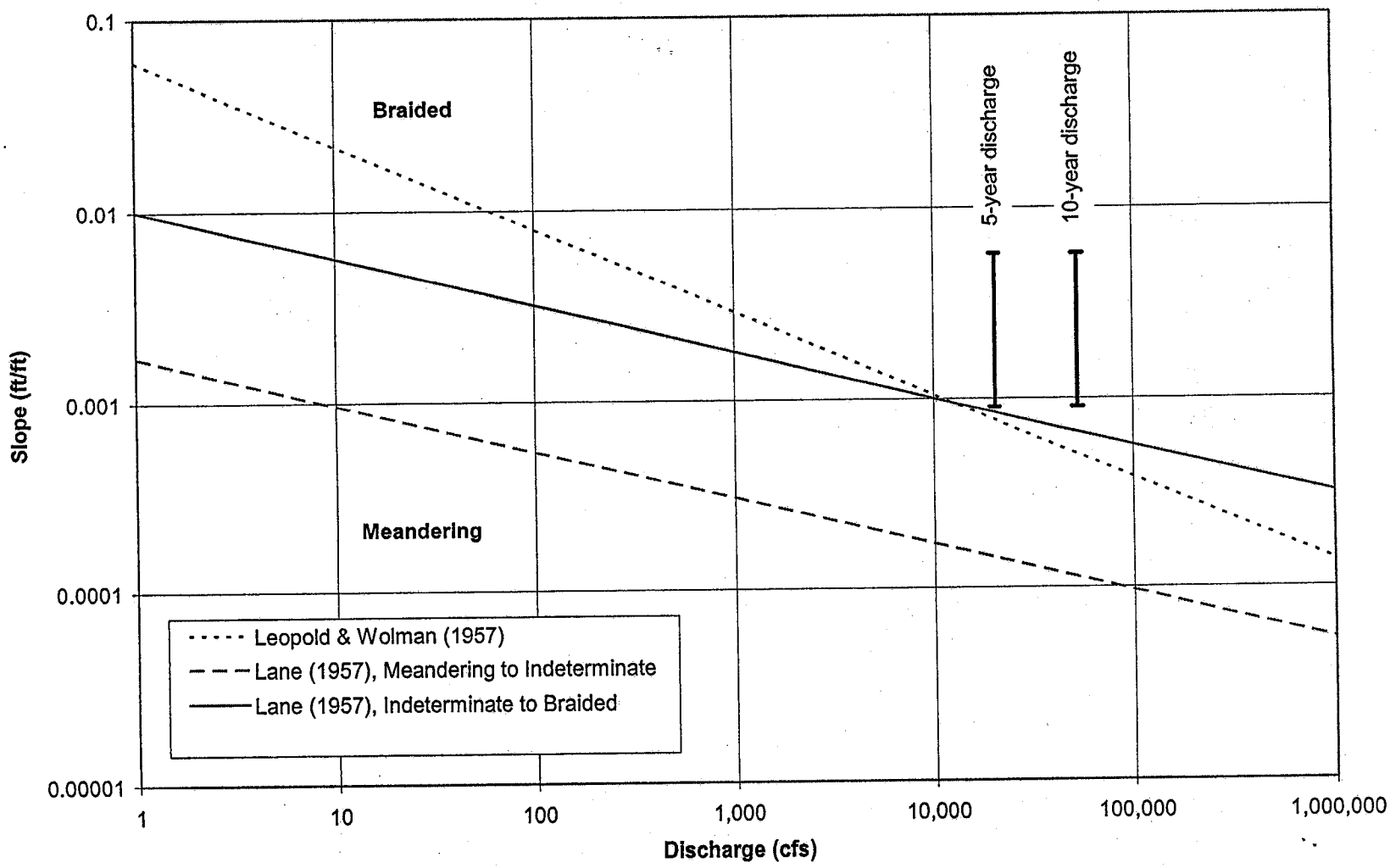


Figure 4-1. Project reach predicted channel form.

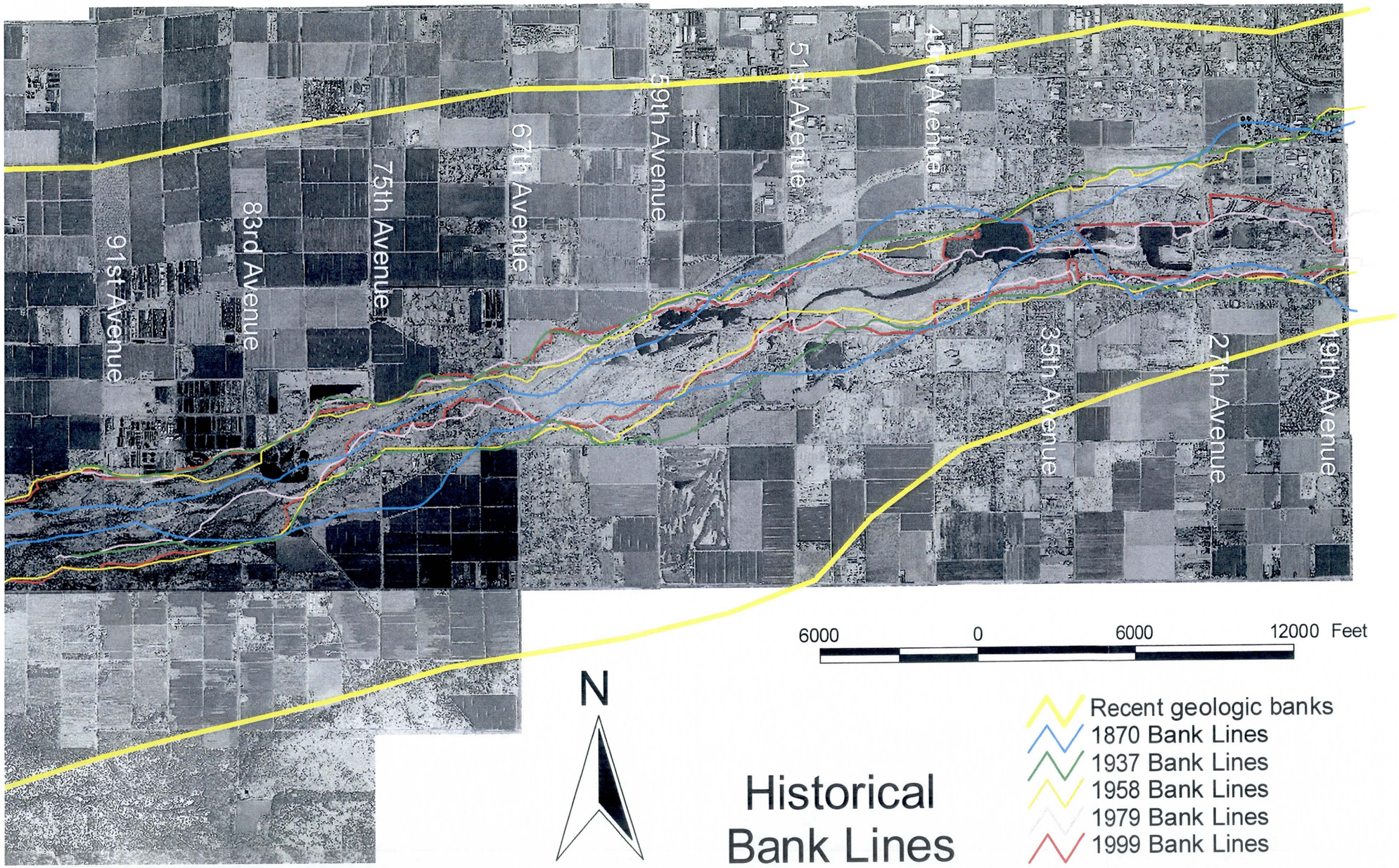


Figure 4-2. Historical bank lines.

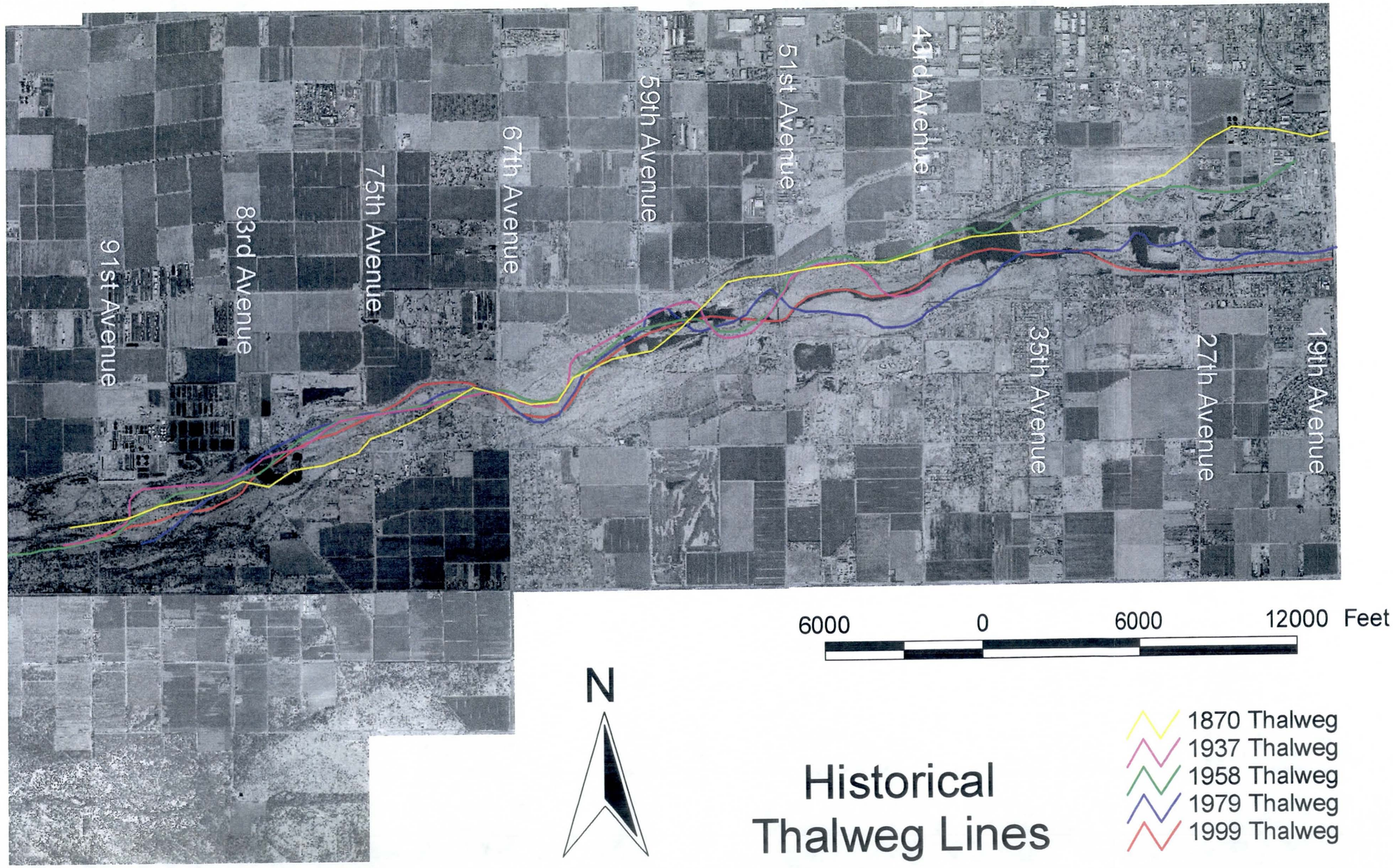


Figure 4-3. **Historical thalweg lines.**

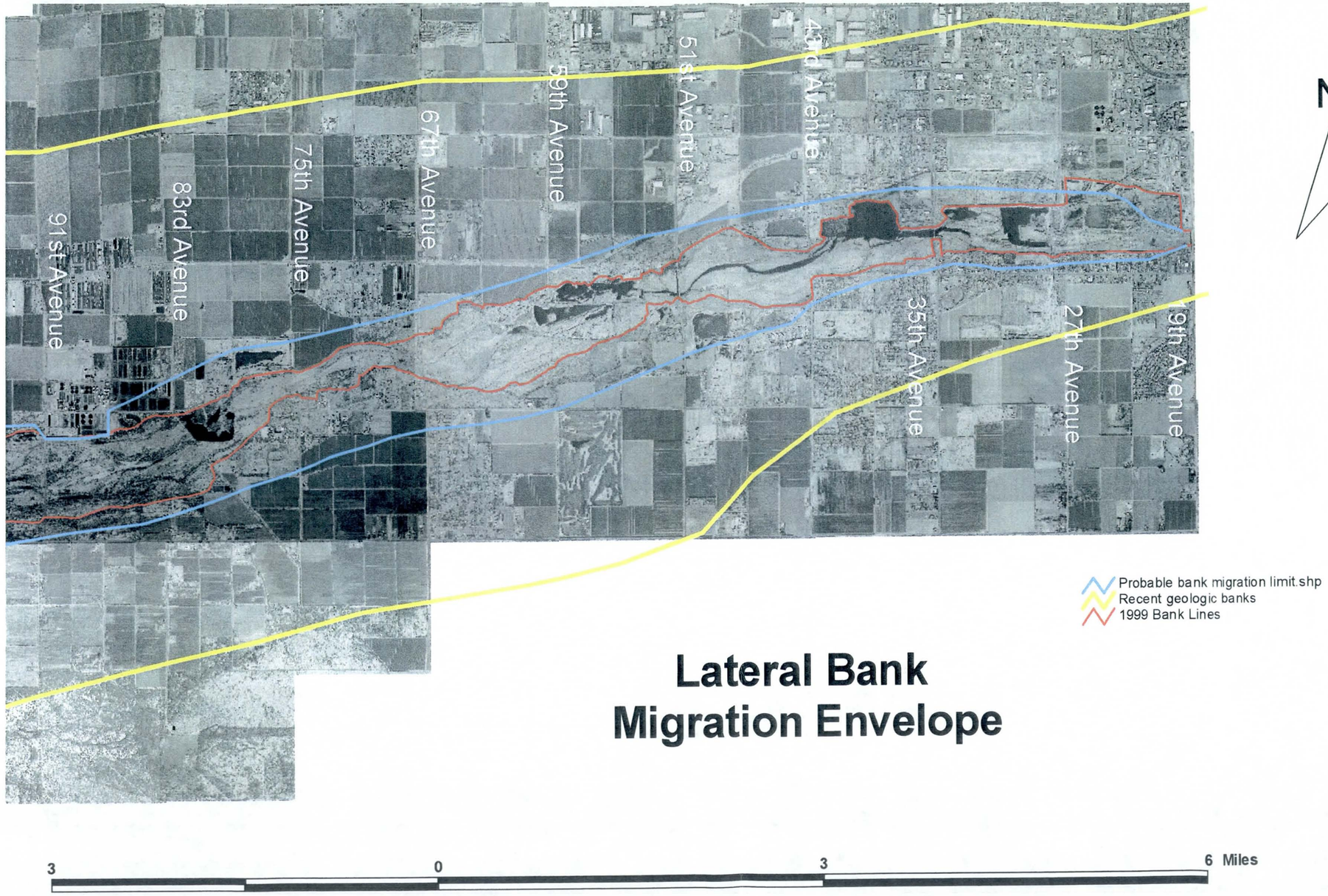


Figure 4-4. Estimated Lateral Bank Migration Limits.

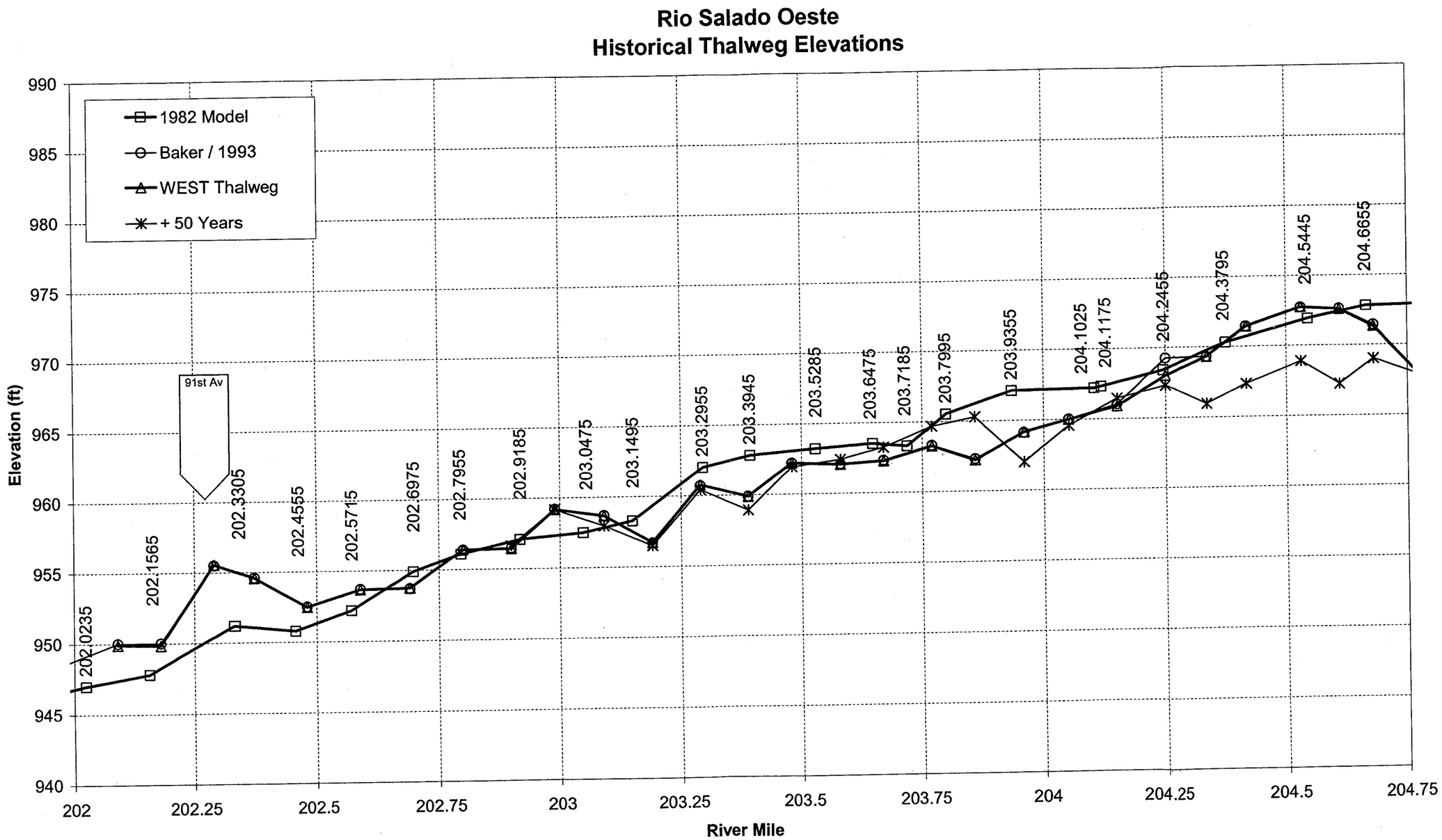


Figure 4-5. Recent Historical Thalweg Elevations of Salt River from 19th Avenue to 91st Avenue.

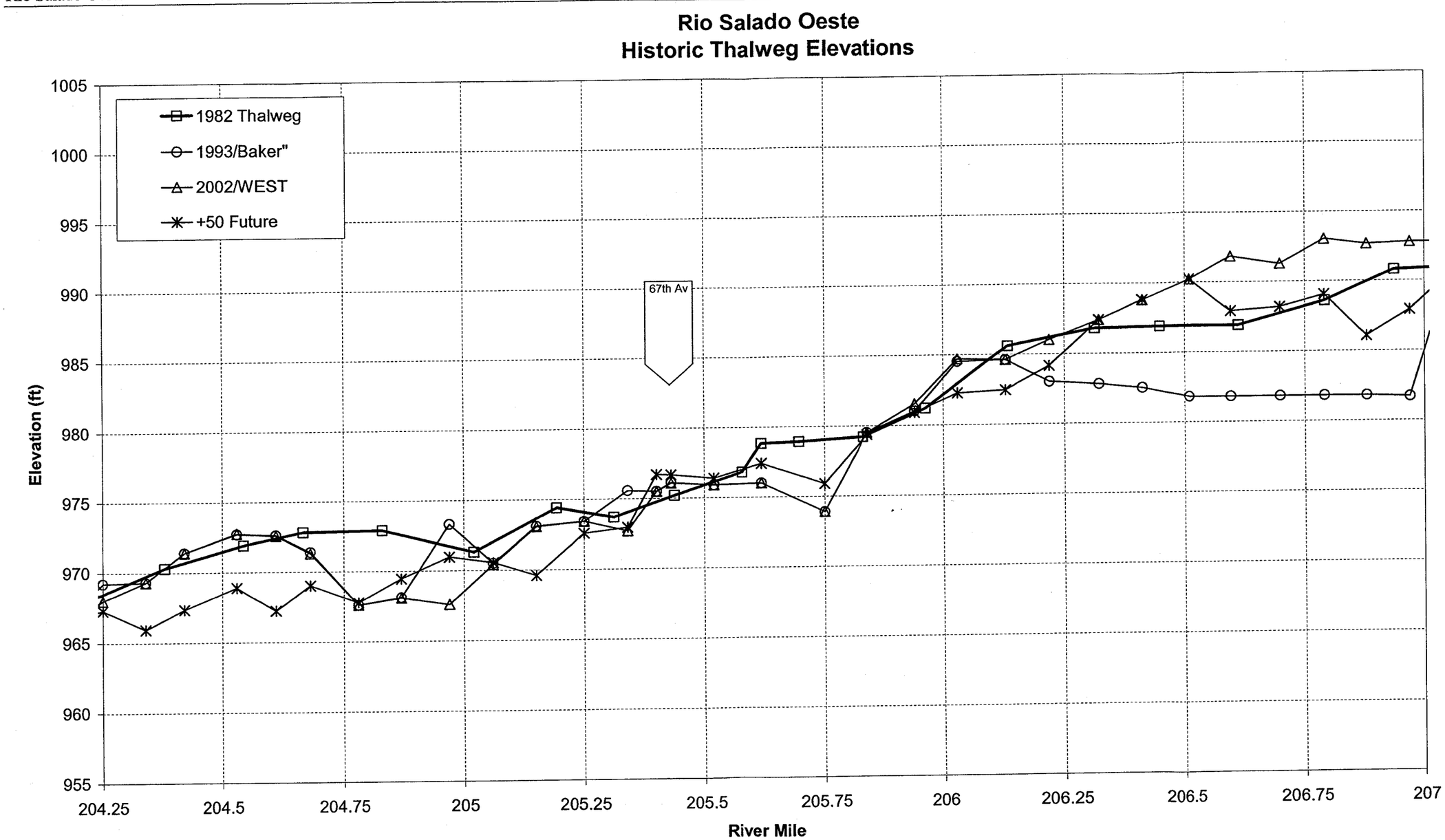


Figure 4-5. *Continued.*

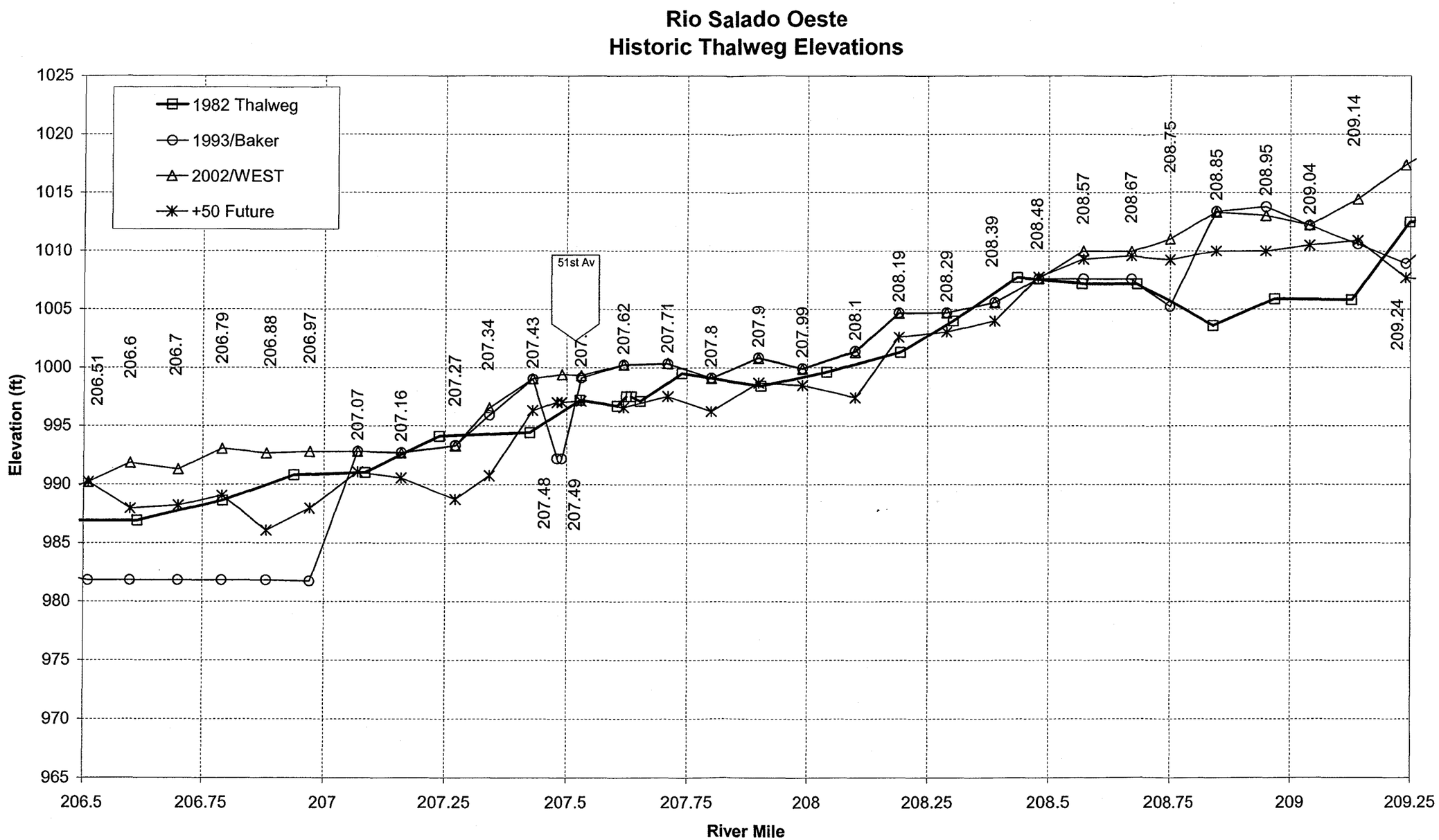


Figure 4-5. *Continued*

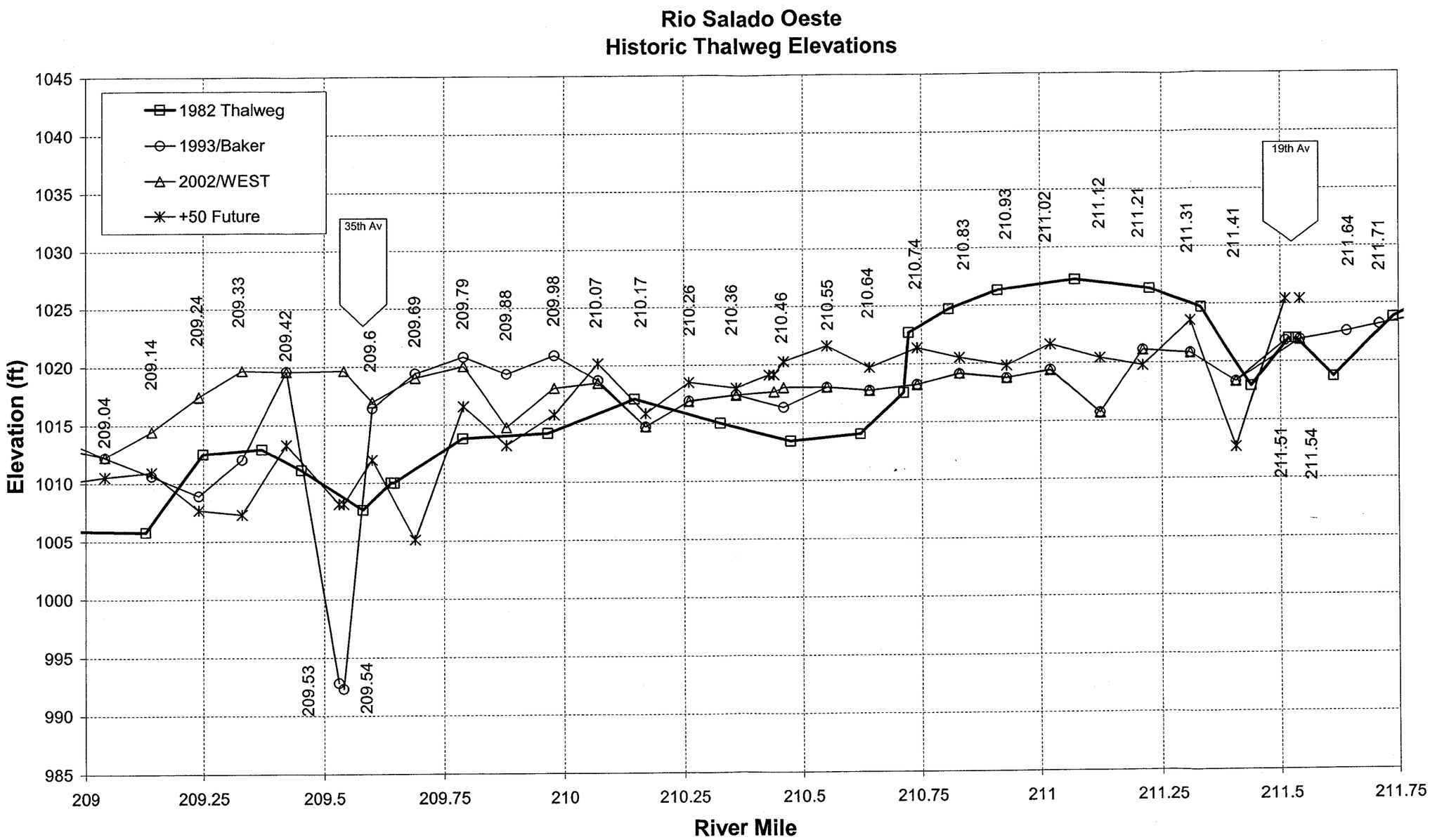


Figure 4-5. *Continued.*

5. Future Without-Project Hydraulic Analysis

HEC-6T generates an output file with the extension T12 where it stores the model geometry at the end of the simulation. The cross section geometry after 10, 20, 30, 40 and 50 years of sediment transport simulation was used to create five new hydraulic models in HEC-RAS. The new cross sections reflect the erosion or deposition that occurred during the sediment transport simulation.

The bridge geometry from the existing conditions model was added to the future conditions model, but first some manipulation of the T12 file was required. HEC-6T uses just one cross section with the superimposed pier geometry to represent each bridge, while HEC-RAS uses two cross sections with bridge geometry specified between the cross sections. Therefore, it was necessary to remove the piers from the bridge cross sections in the T12 file, and a copy of each bridge cross section in the T12 file (with the piers already removed) was placed downstream of each bridge in the HEC-RAS model. The stations of the new downstream cross sections were then adjusted laterally to match the end points and banks of the cross sections downstream of the bridges in the existing conditions model. These new cross sections, placed at the downstream side of the bridges, preserved the distances in the existing conditions model, and the bridge geometry was then imported from the existing conditions HEC-RAS model to complete the future conditions HEC-RAS model.

Hydraulic simulations were performed using the roughness coefficients (Manning's n) in the existing conditions model. Channel and overbank roughness values were then increased 10, 20 and 30% to reflect vegetation growth assuming no clearing is carried out during the 50-year simulation period. Complete simulation results are provided in Appendix J.

Water surface profiles by decade were generated for the 5-, 10-, 20-, 50-, 100- and 500-year discharges in HEC-RAS. Figures 5-1, 5-2 and 5-3 show the water surface profiles for the 10-, 100- and 500-year flood events after 10, 30 and 50 years of sediment transport simulation.

The future conditions water surface profiles are smoother than the existing conditions profiles, as expected for a bed profile with a more homogenous slope. The main differences appear upstream of the 35th Avenue Bridge. The bridge opening in the future conditions model is bigger due to the erosion of the cross section, and therefore the backwater effect diminishes. As a consequence, the inundation boundaries for the future conditions model upstream of 35th Avenue would not extend as far from the channel as for the existing conditions model. If the topography in the TIN shows the water surface under the bridge the initial water surface elevation would be lower and flooding would not be as widespread as indicated in the initial conditions model. A verification of the actual bed elevations should be performed if the bridge is not scheduled for replacement.

The effect of increasing the roughness coefficients to simulate vegetation growth is shown in Table 5-1. The table shows the average increase in water surface elevation caused by an increase of 10, 20 or 30% in Manning's n from the values in the Existing Conditions model.

Table 5-1. Future conditions hydraulic analysis: sensitivity to roughness coefficients.

Flood Event	Average increase in water surface elevation (ft)		
	10% increase in Manning's n	20% increase in Manning's n	30% increase in Manning's n
5-year	0.3	0.5	0.8
10-year	0.4	0.8	1.1
20-year	0.4	0.9	1.3
50-year	0.5	1.0	1.5
100-year	0.5	1.1	1.5
500-year	0.5	1.0	1.5

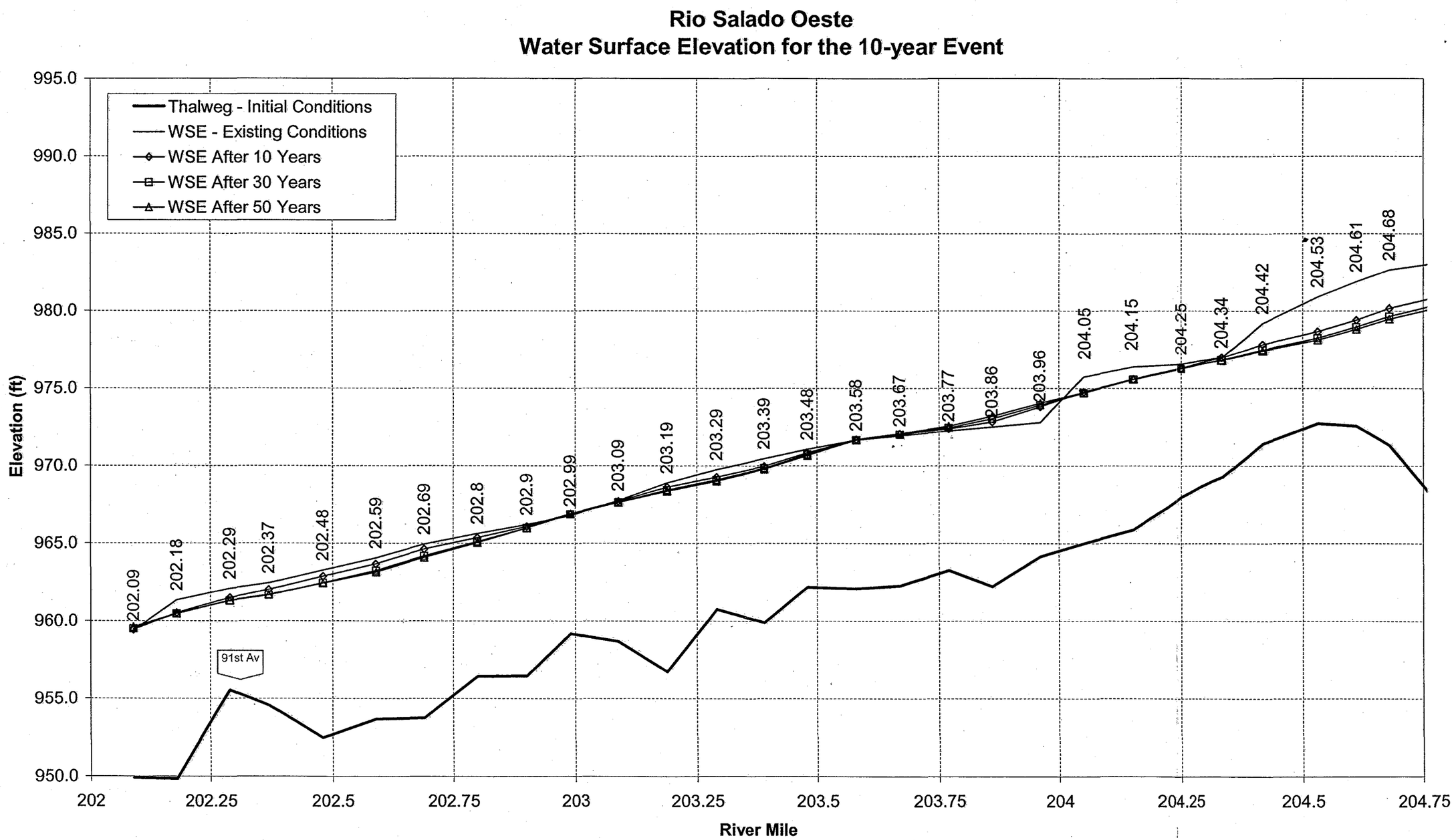


Figure 5-1. Future conditions hydraulic analysis: 10-year flood event.

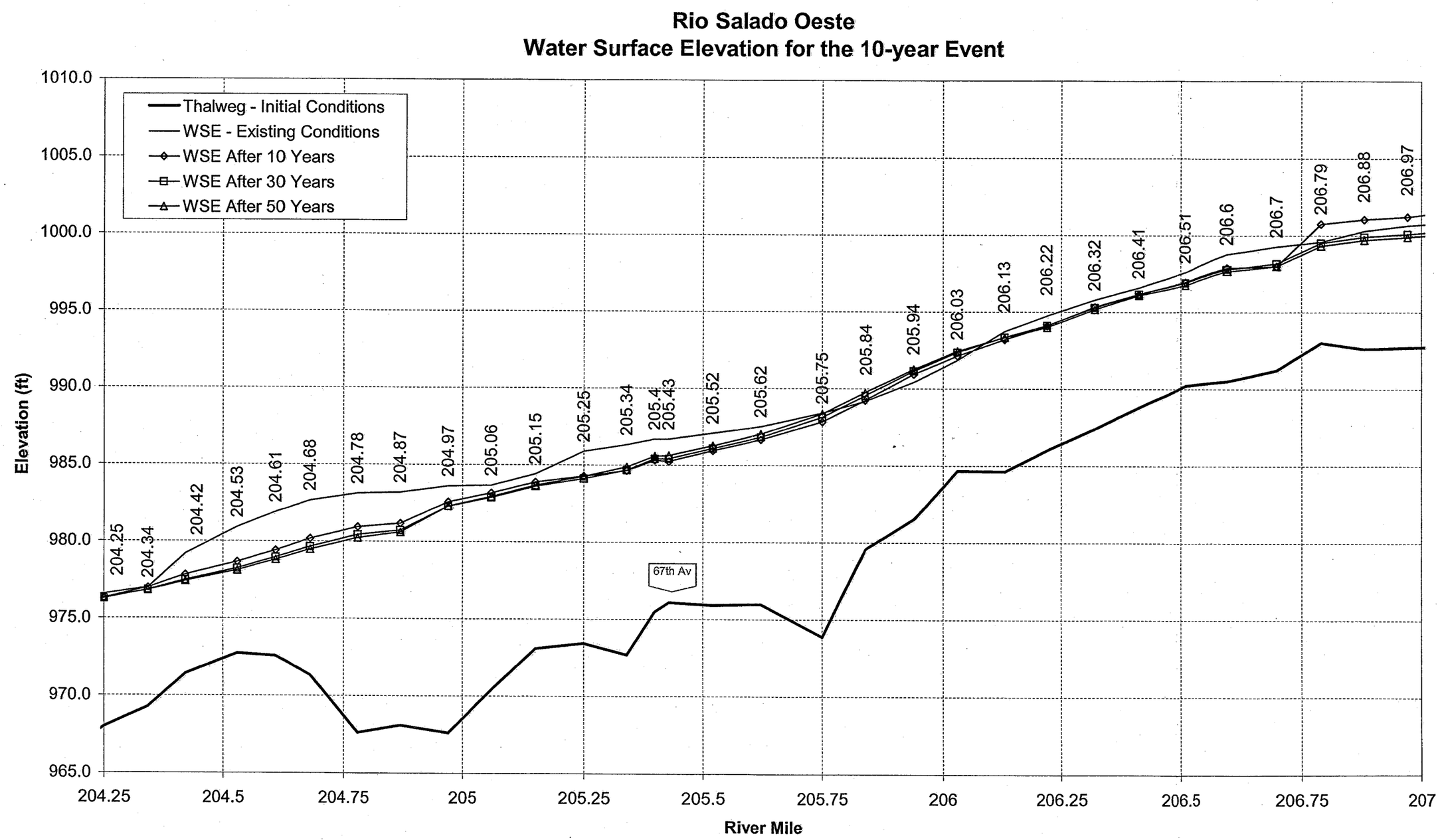


Figure 5-1. ***Continued.***

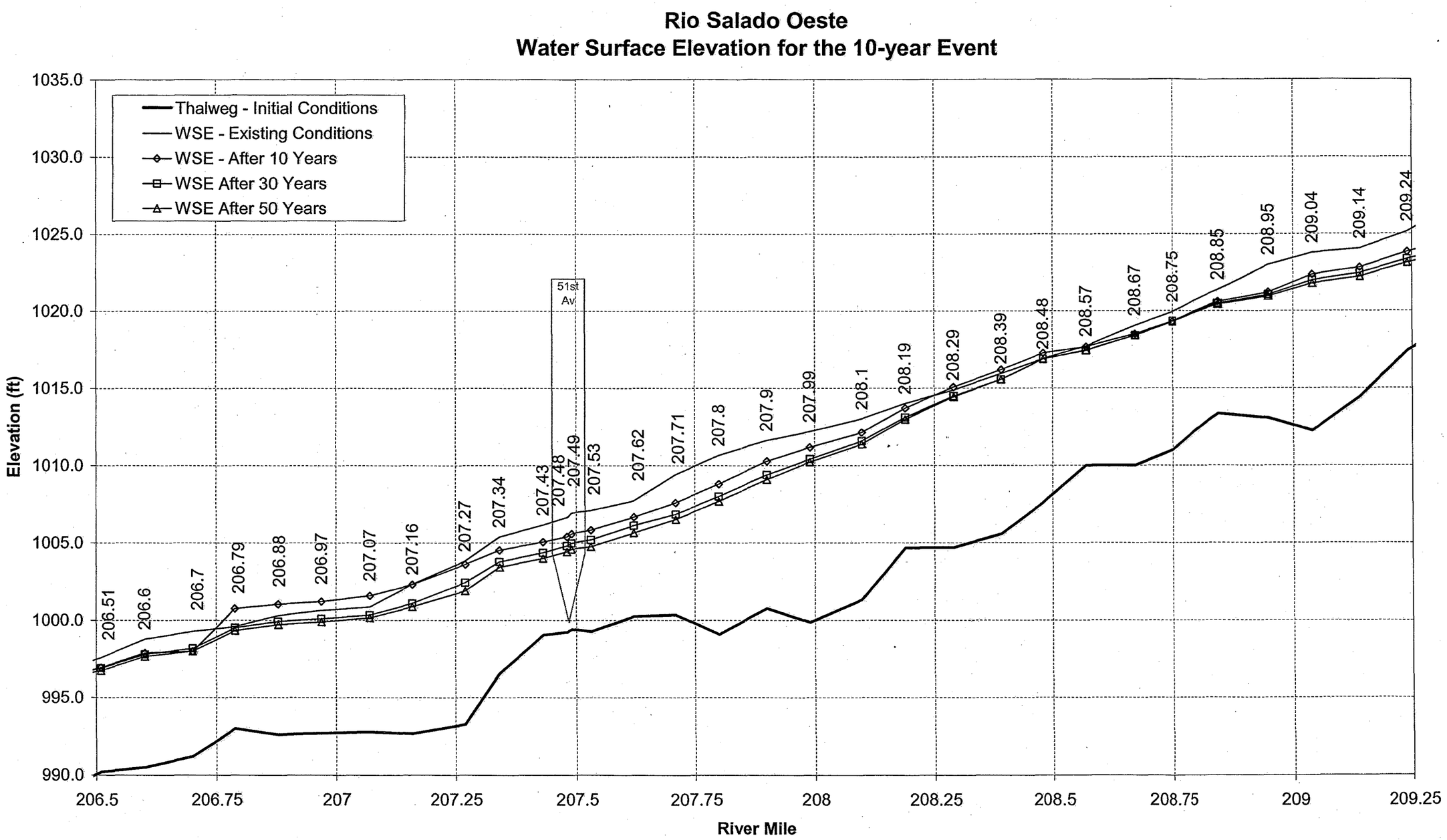


Figure 5-1. ***Continued.***

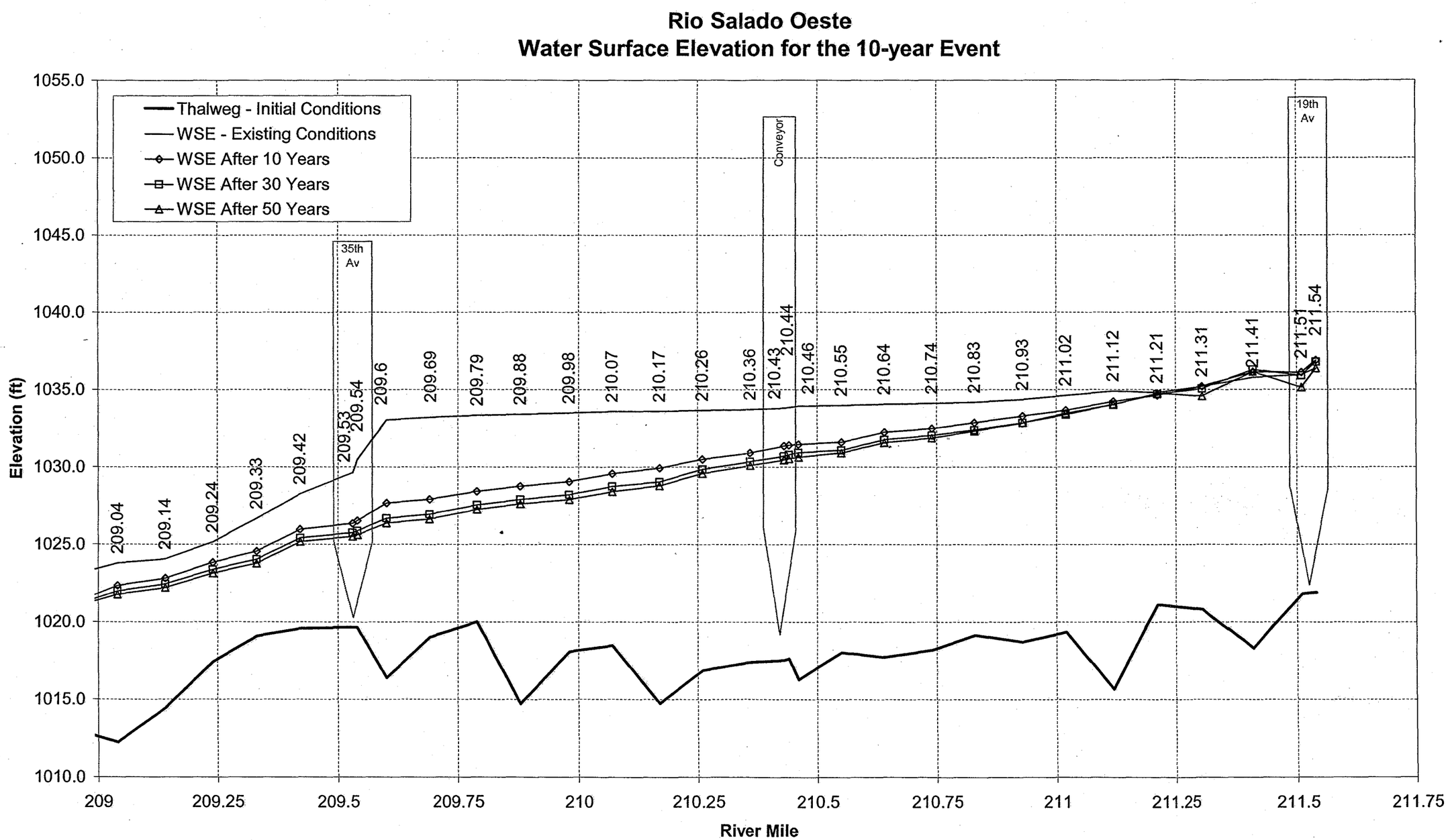


Figure 5-1. ***Continued.***

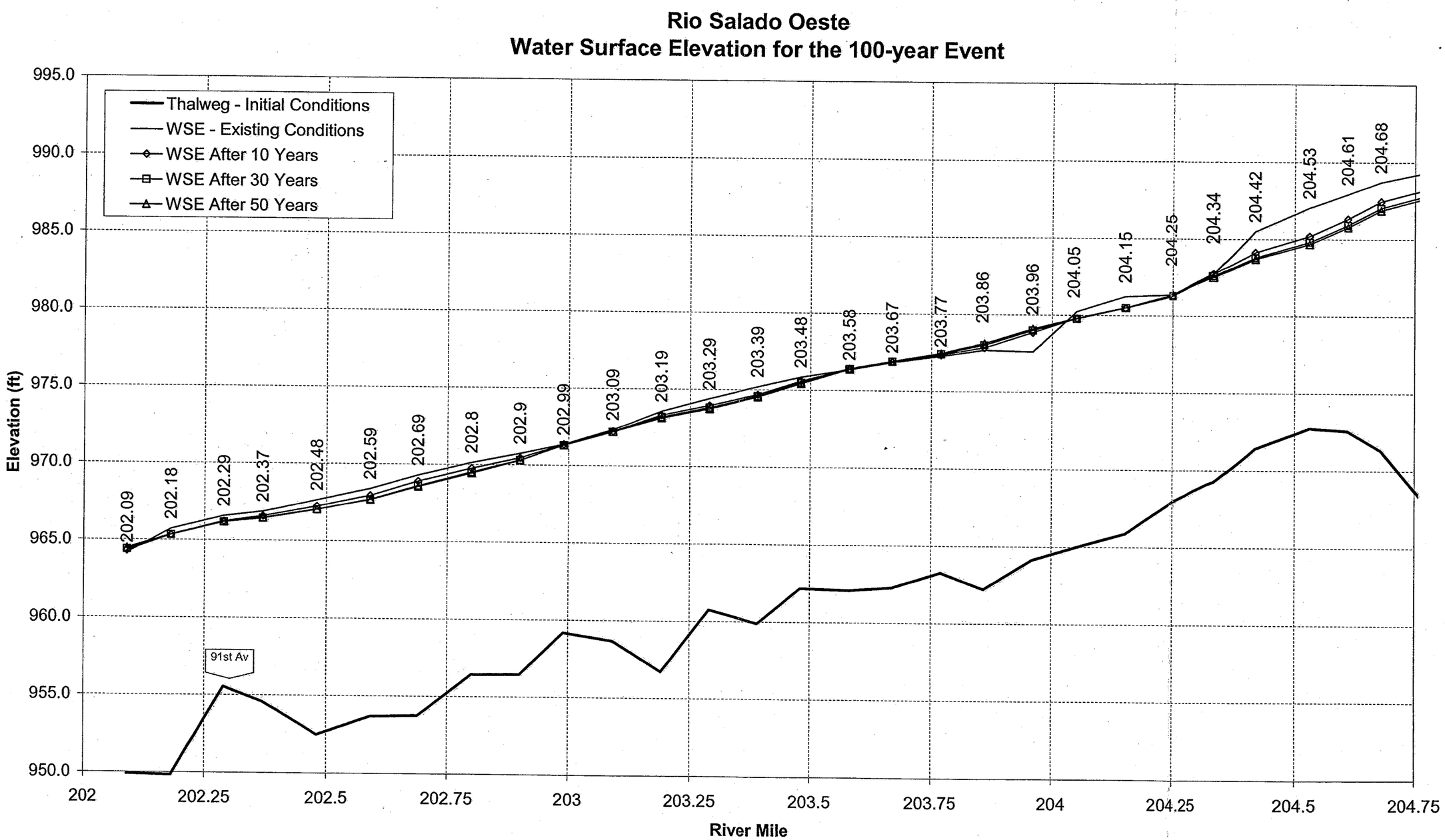


Figure 5-2. Future conditions hydraulic analysis: 100-year flood event.

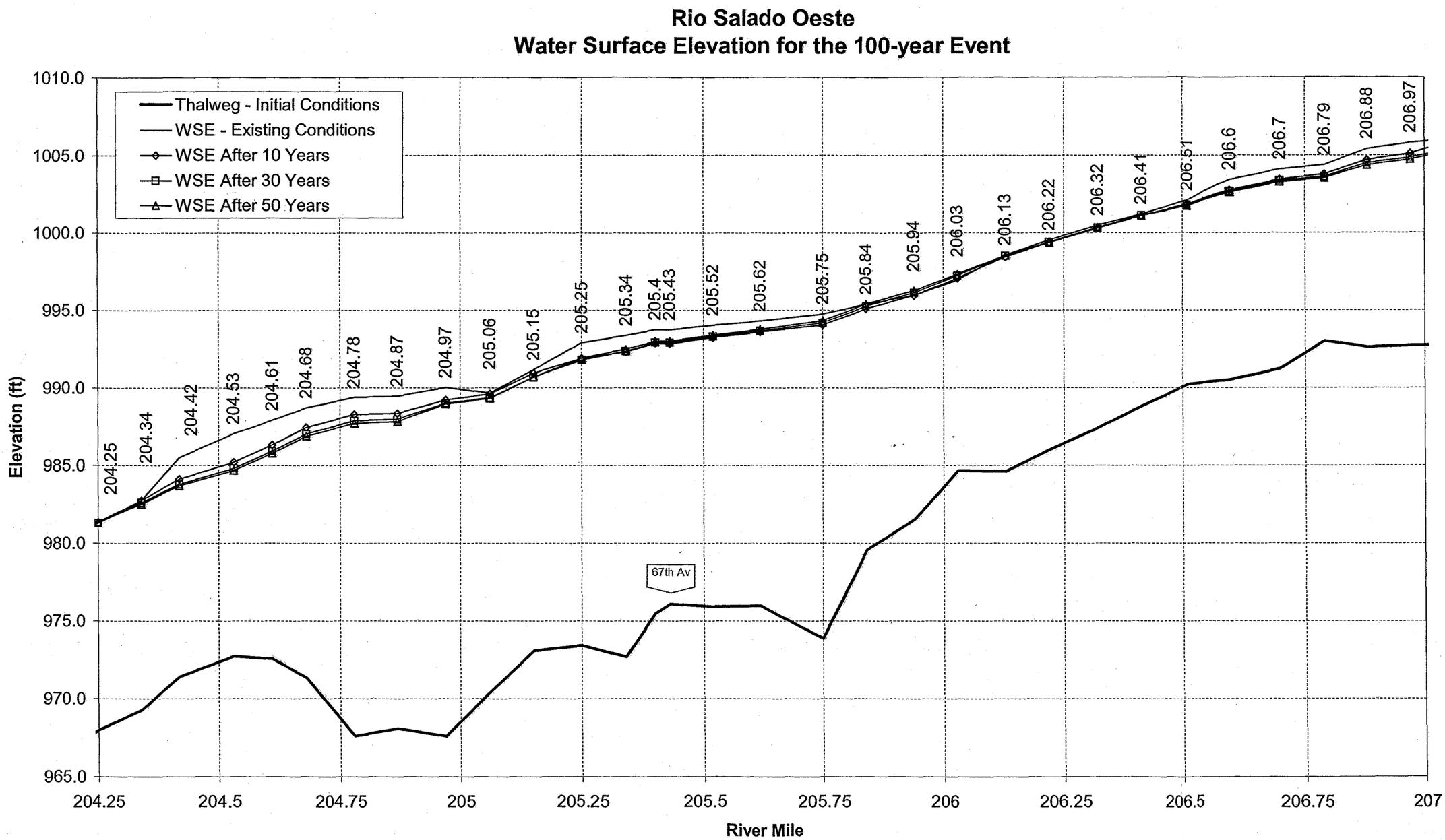
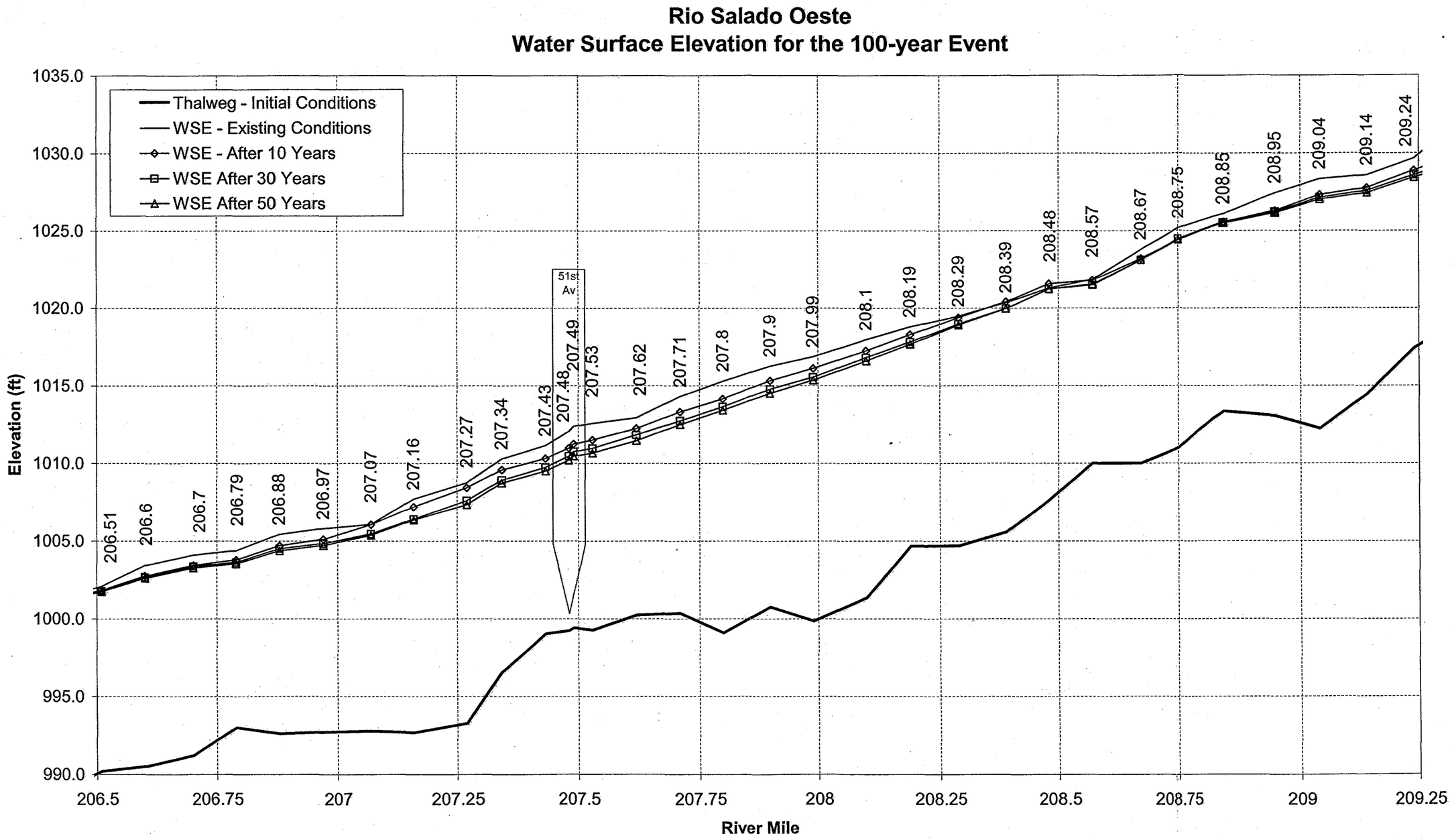


Figure 5-2. ***Continued.***



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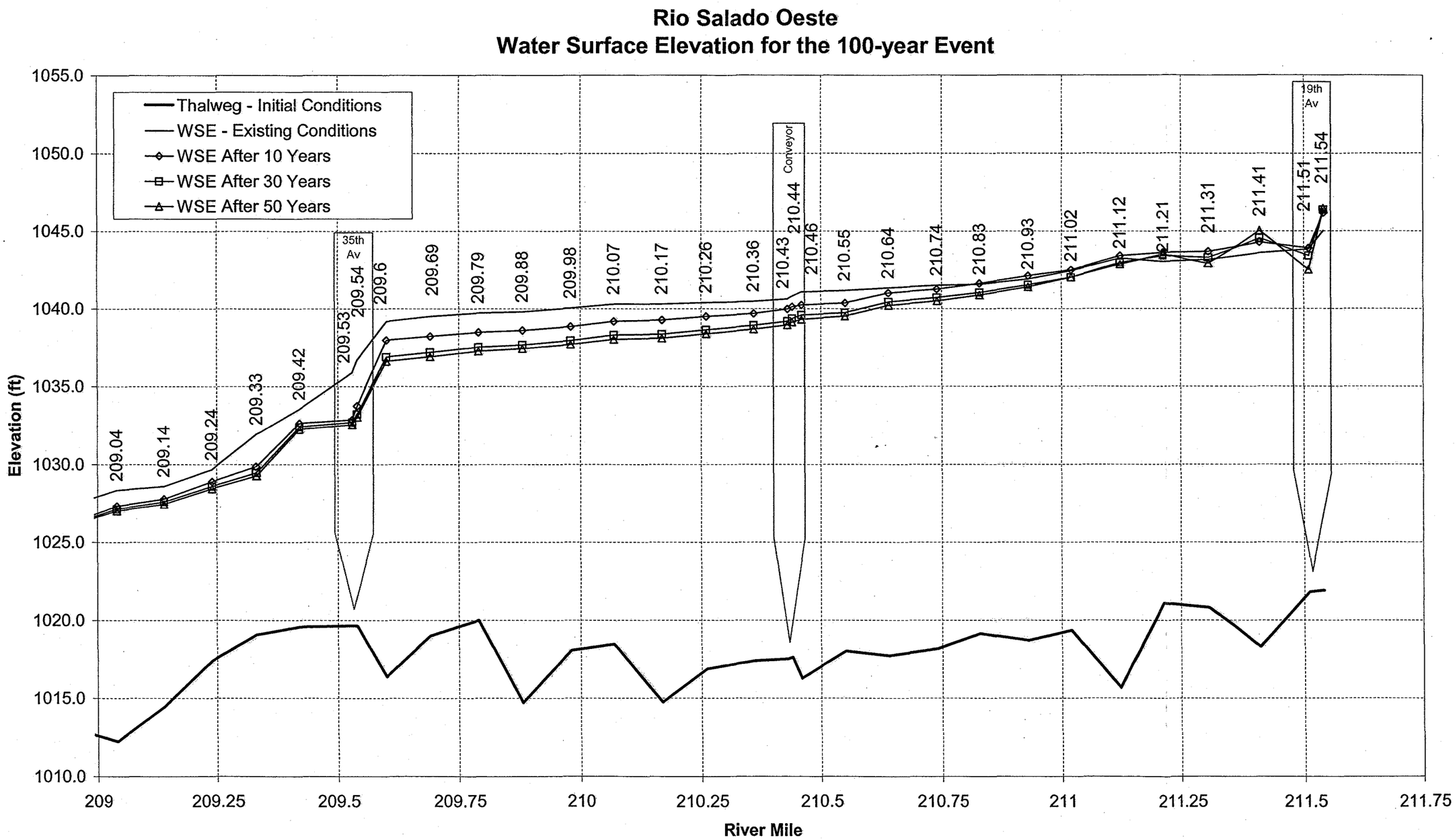


Figure 5-2. ***Continued.***

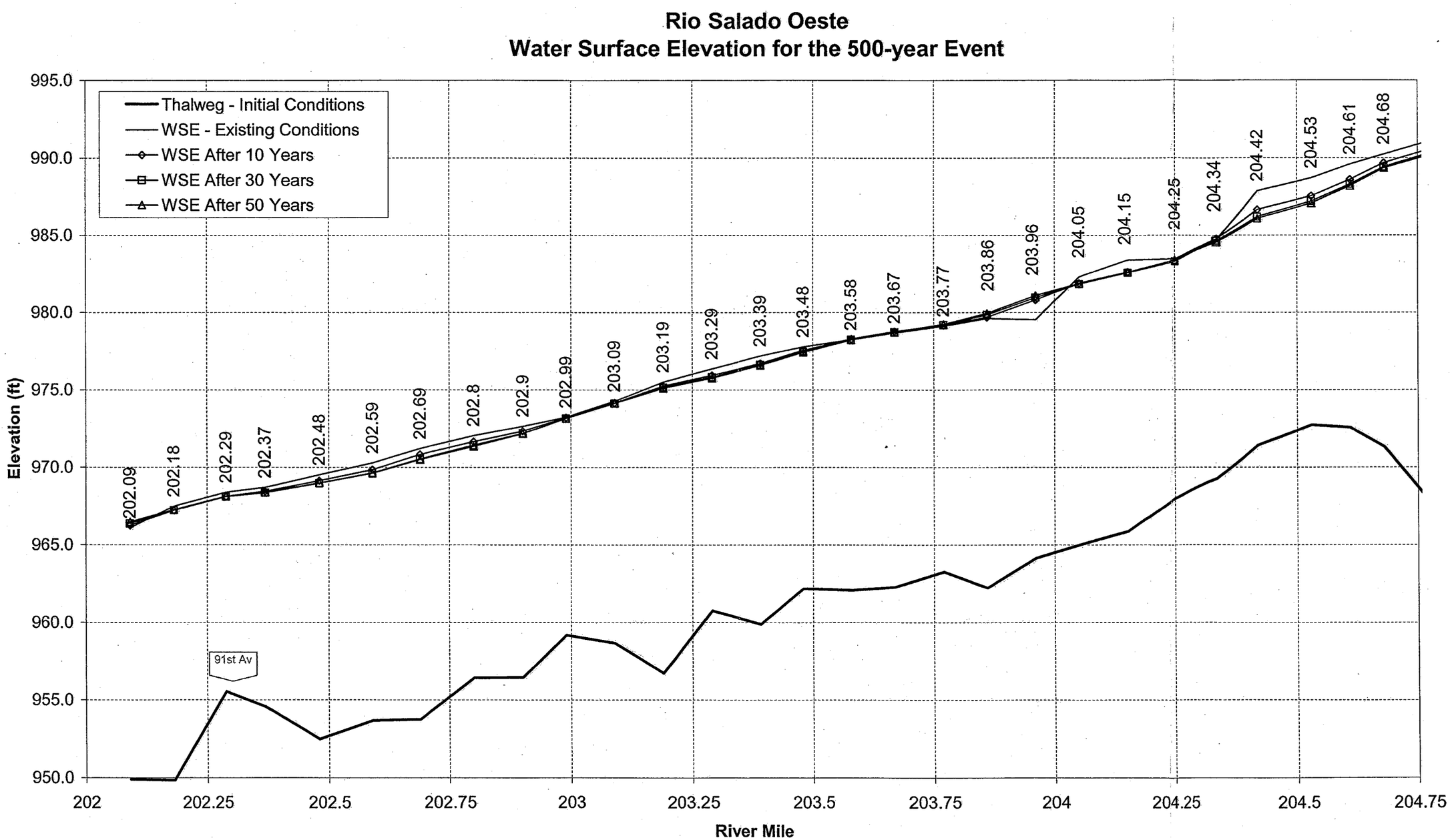
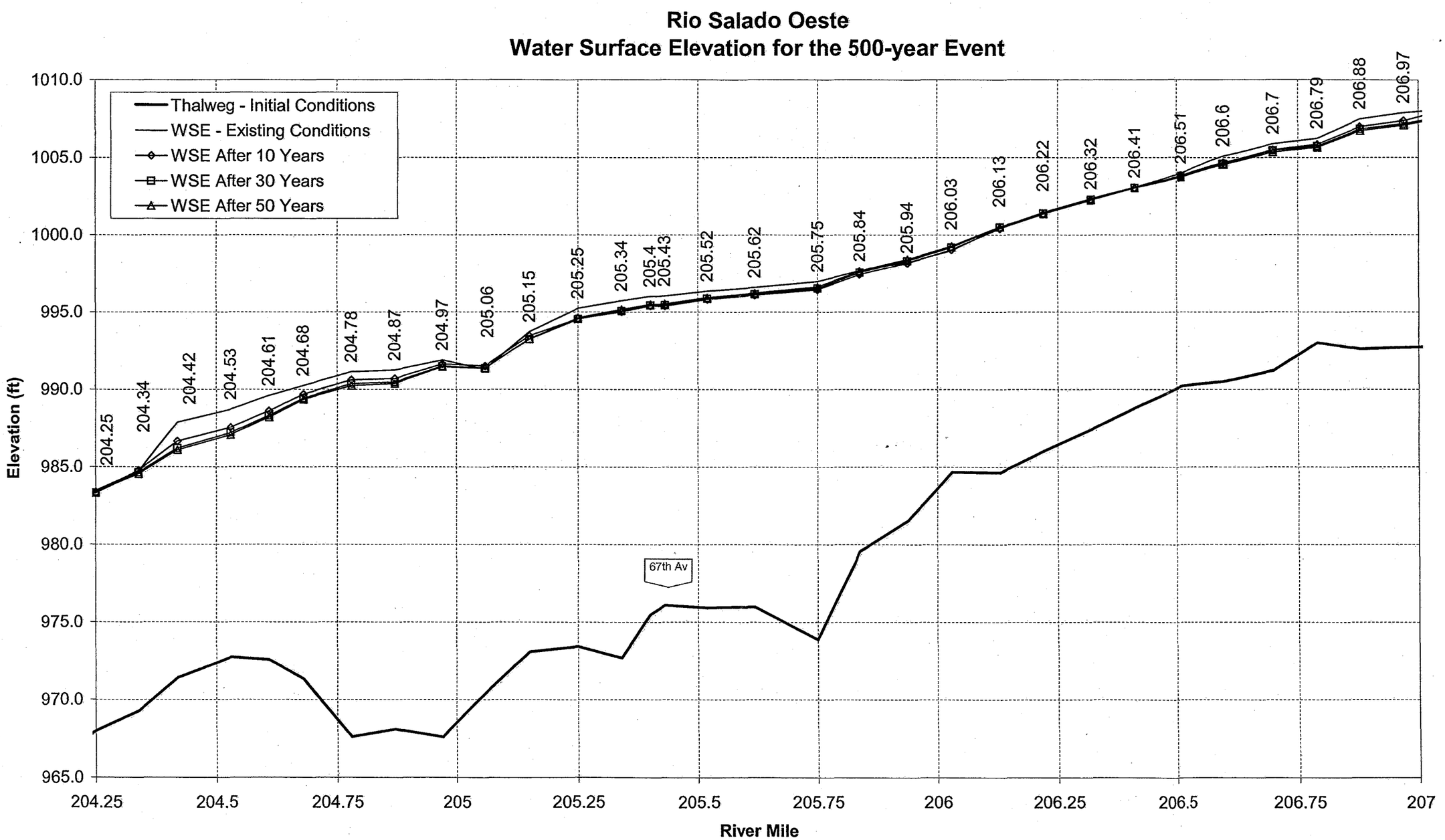


Figure 5-3. Future conditions hydraulic analysis: 500-year flood event.



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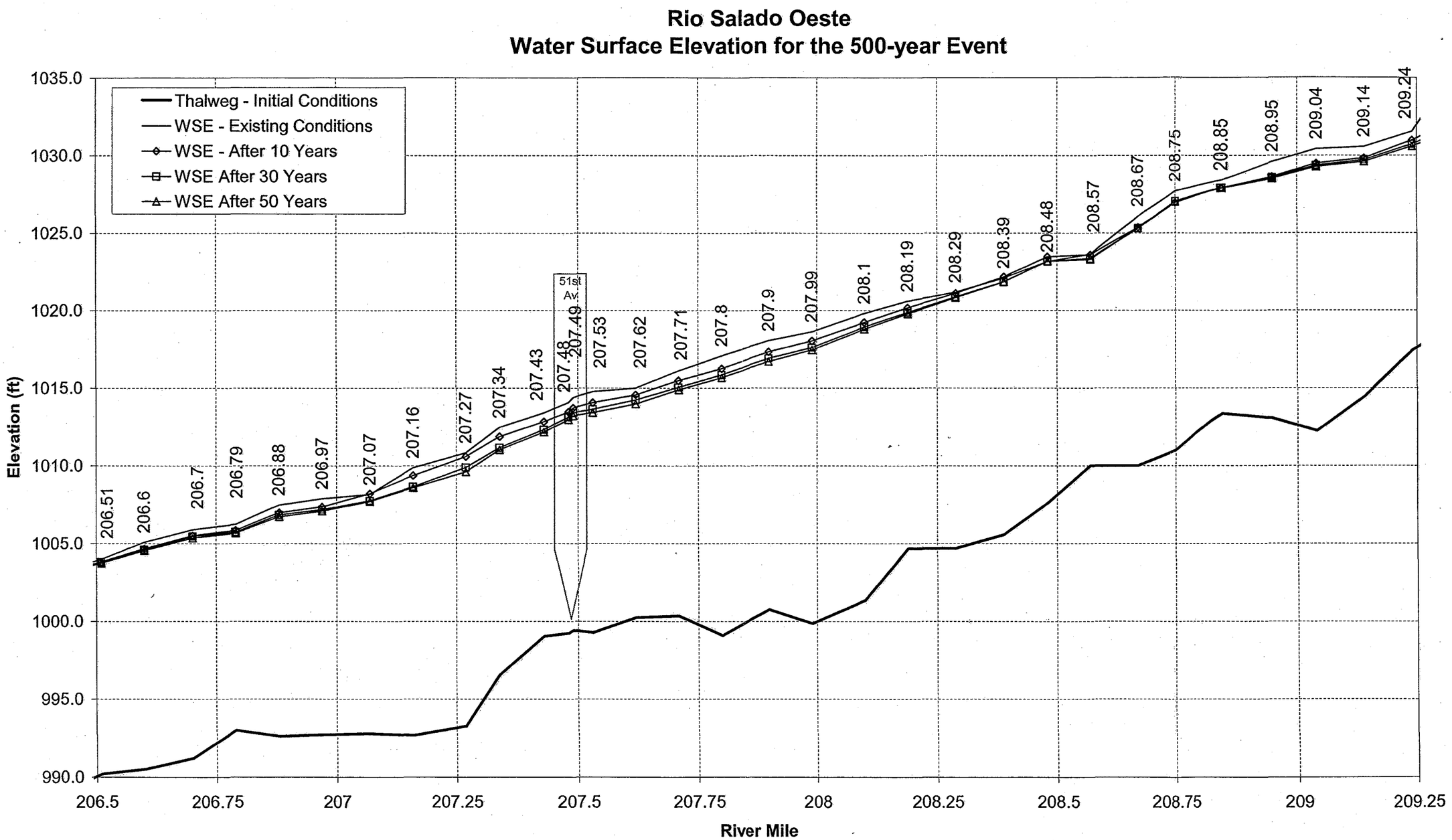

Figure 5-3. ***Continued.***

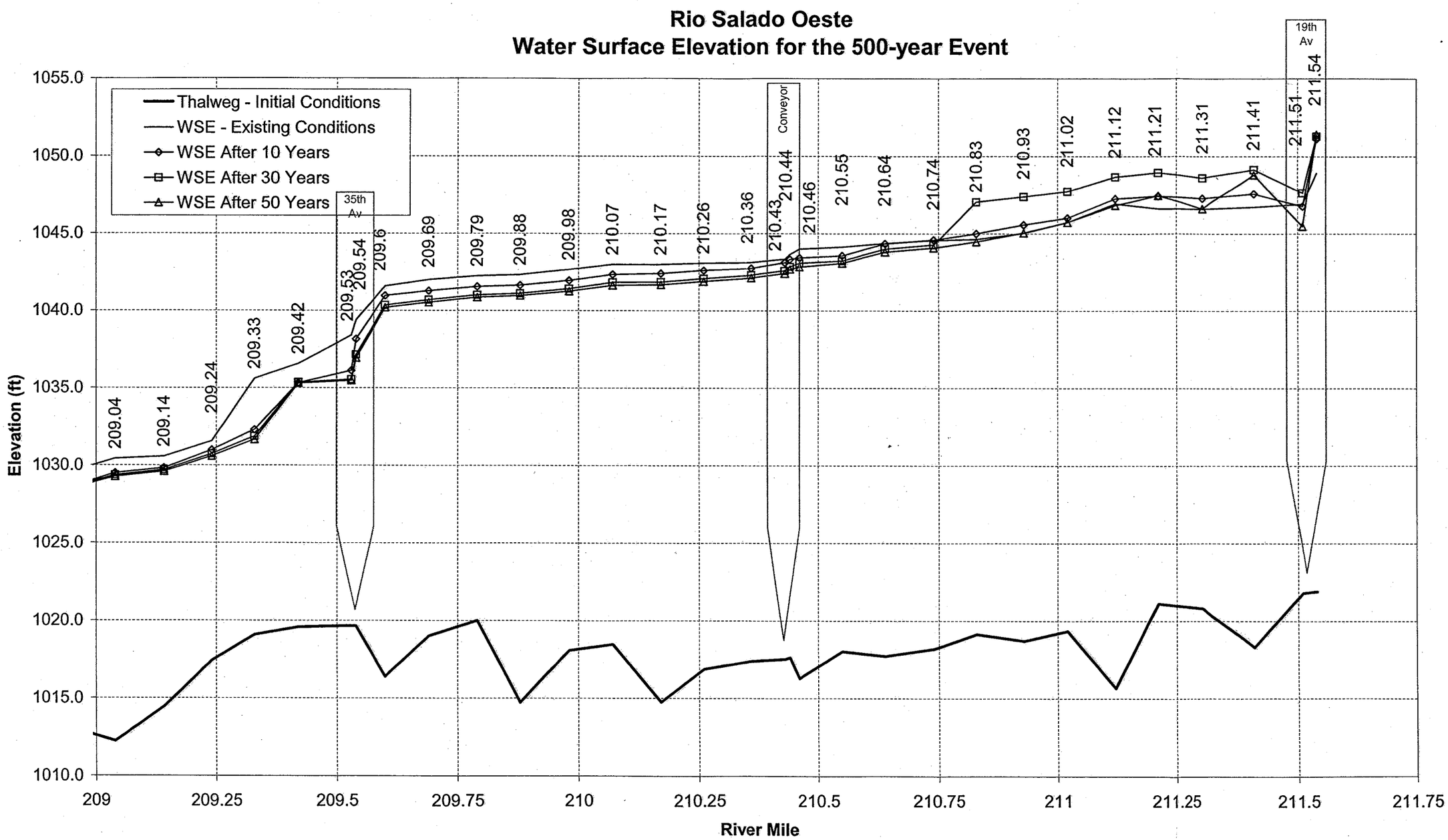

Figure 5-3. ***Continued.***

6. Summary and Conclusions

The results of this hydraulic and sedimentation analysis are intended to support the U.S. Army Corps of Engineers Rio Salado Oeste Feasibility – F3 Phase Study.

A hydraulic model was developed in HEC-RAS to represent existing conditions in the Salt River from 19th Avenue to 91st Avenue. The hydraulic model was used to generate water surface profiles and inundation boundaries for a series of frequency flood events ranging from 5- to 500-year return periods. Small flows are generally contained in the main channel, and only the large flows (100-year and 500-year) occupy significant portions of the floodplains. All the bridges in the study reach but one seem appropriate to pass these large flows without important problems. The exception is the 35th Avenue Bridge, which has a very narrow opening and causes significant backwater and inundation on the overbanks.

The hydraulic model was converted to a sediment transport model in HEC-6T, which was used to simulate sediment dynamics in the study reach during a 50-year time frame. The hydrologic input consisted of flows measured in the Salt River from 1889 through 1938, and corresponds to the "worst case" continuous 50-year period, in terms of both peak flows and storm volumes, in 105 years of record. Results of the sediment transport analysis show that sediment dynamics are more significant in the proximity of mining operations. The study also revealed that downstream of 35th Avenue the reach experienced mainly erosion, while upstream of 35th Avenue the main process was deposition. The bridge cross section suffered severe degradation due to the increase in flow velocity caused by the small size of the bridge opening. In general, most of the changes to the existing conditions geometry took place in the first 10 years of the sediment transport simulation.

The output geometry of the sediment transport model was imported back into HEC-RAS and used to carry out a future conditions without-project hydraulic analysis. The future conditions water surface profiles were then compared to the existing conditions profiles. Results showed the most important differences upstream of the 35th Avenue Bridge. Degradation in the bridge cross section made it possible to increase the conveyance through the bridge opening and reduce the backwater. As a consequence, in the reach upstream of the bridge, the inundation boundaries in the future without-project conditions are expected to stay closer to the channel.

The study includes also a basic geomorphic analysis of the study reach, including historical changes to the river morphology based on the review of historical aerial photographs, and the application of geomorphic relationships. The historical evidence examined here indicates that the project reach is in quasi-equilibrium, although adjustments to bank and thalweg lines within the historical meander belt are possible.

7. References

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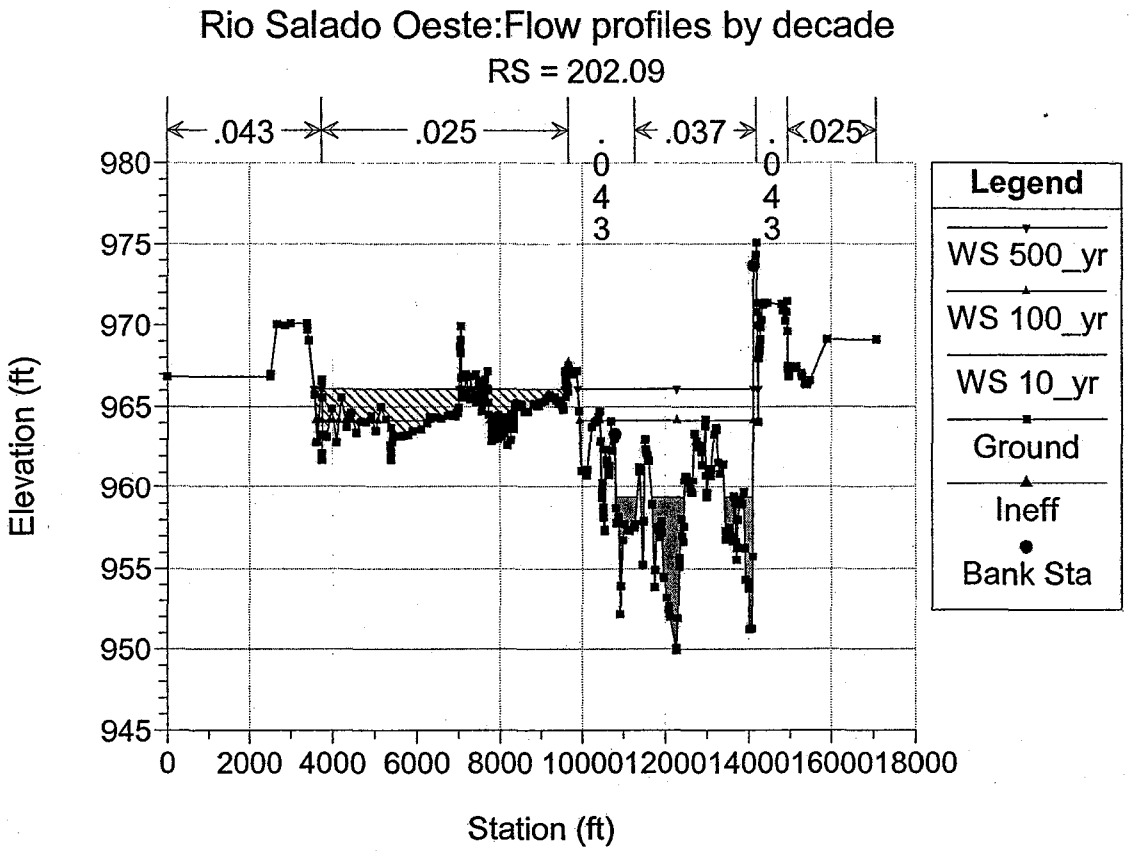
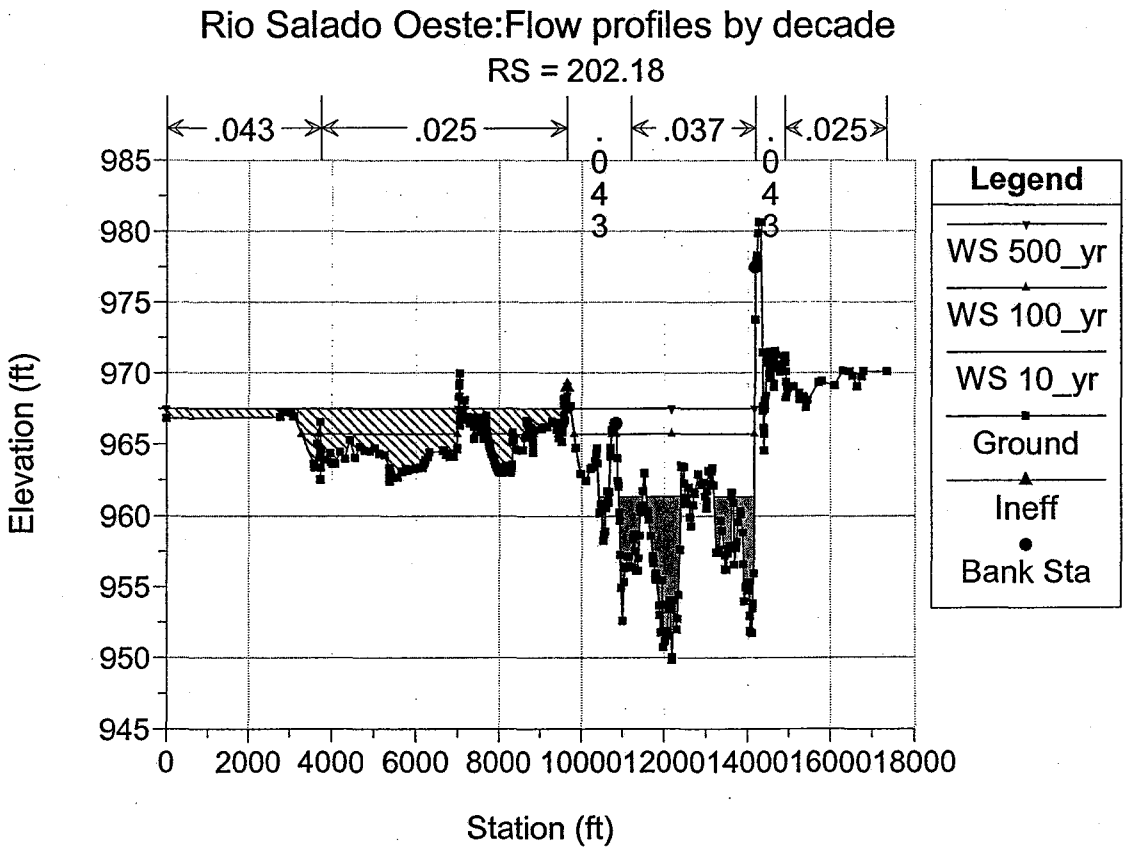
Appendix A

Existing Conditions: Cross Section Plots


Rio Salado Oeste:Flow profiles by decade
RS = 202.09
.043
.025
.043
.037
.043
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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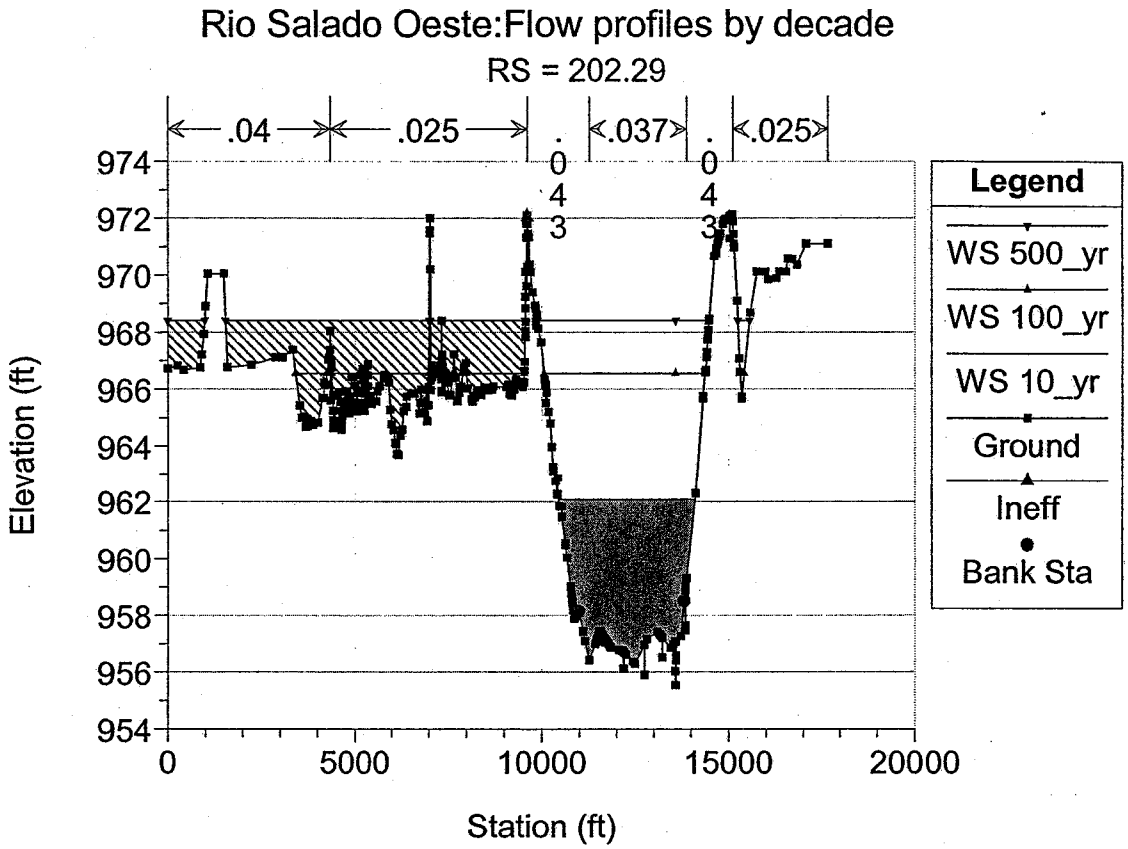
.025
.043
.037
.043
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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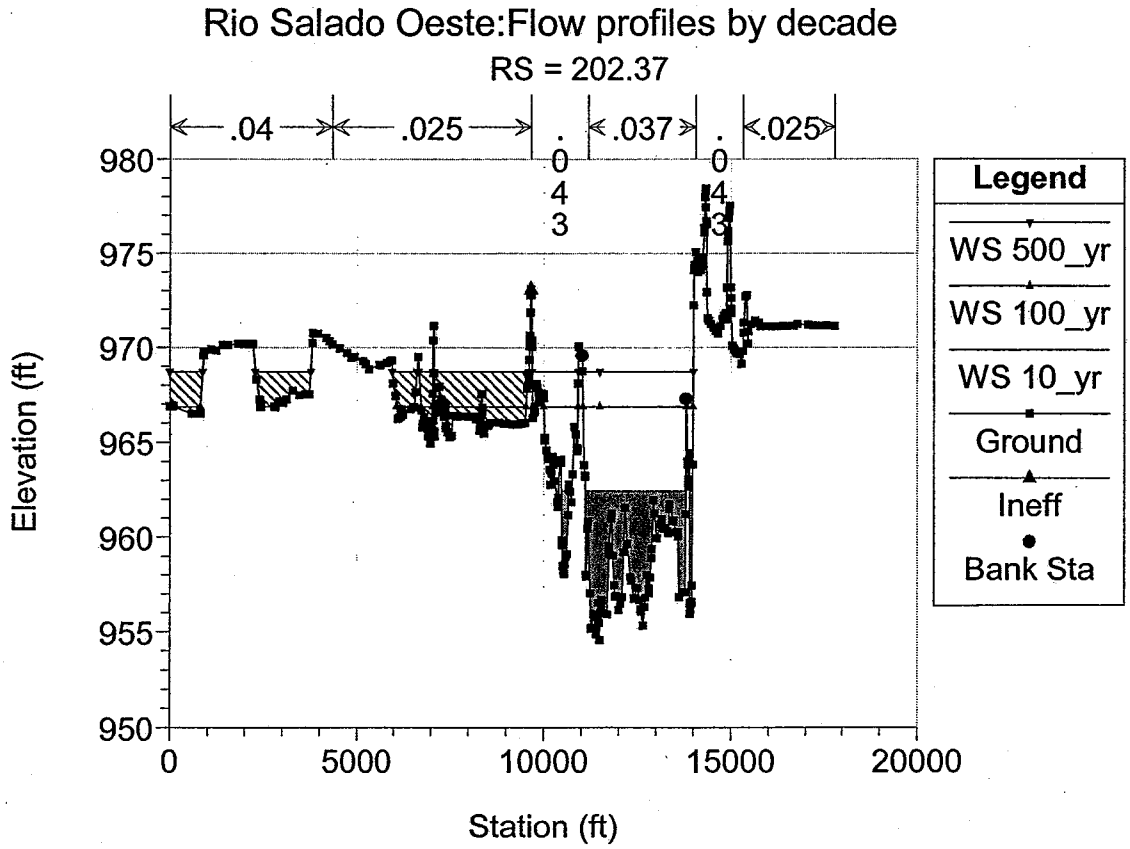
.025
.043
.037
.043
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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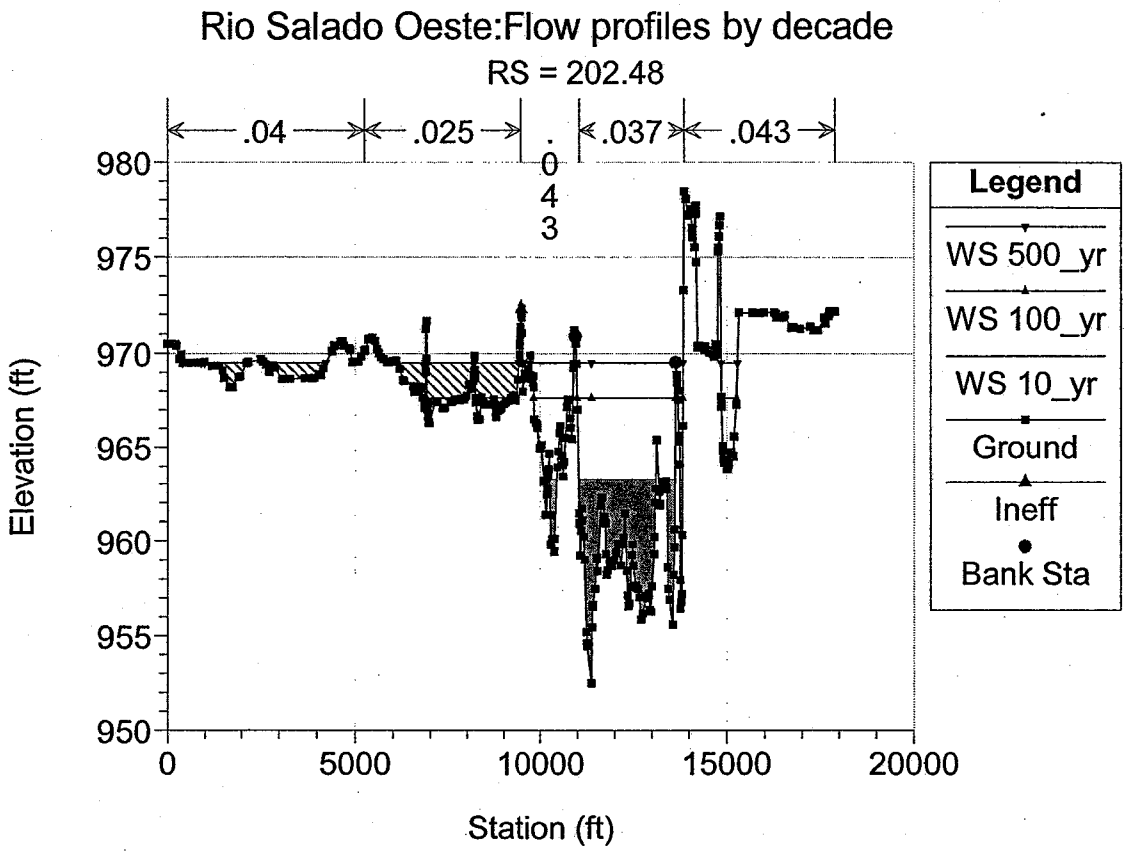
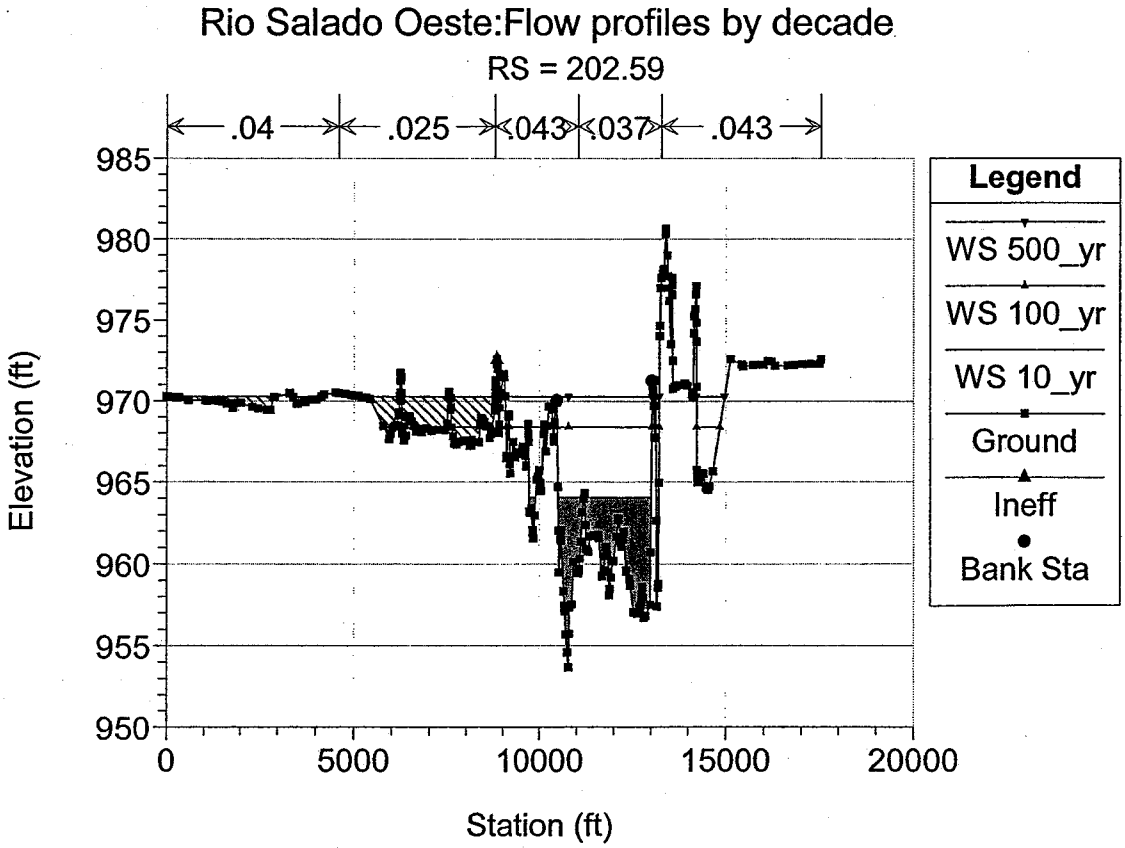
.025
.043
.037
.043
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 202.48
.04
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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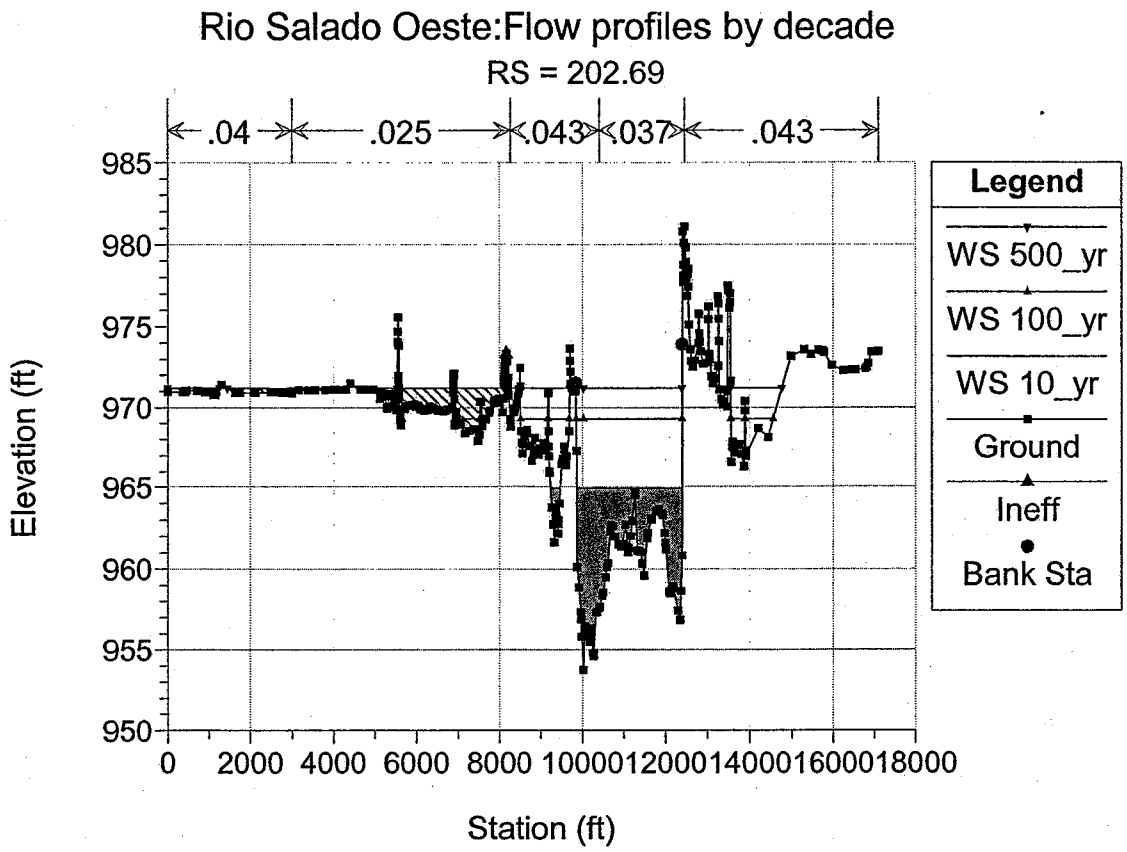
.04
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 202.69
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.025
.043
.037
.043
Elevation (ft)
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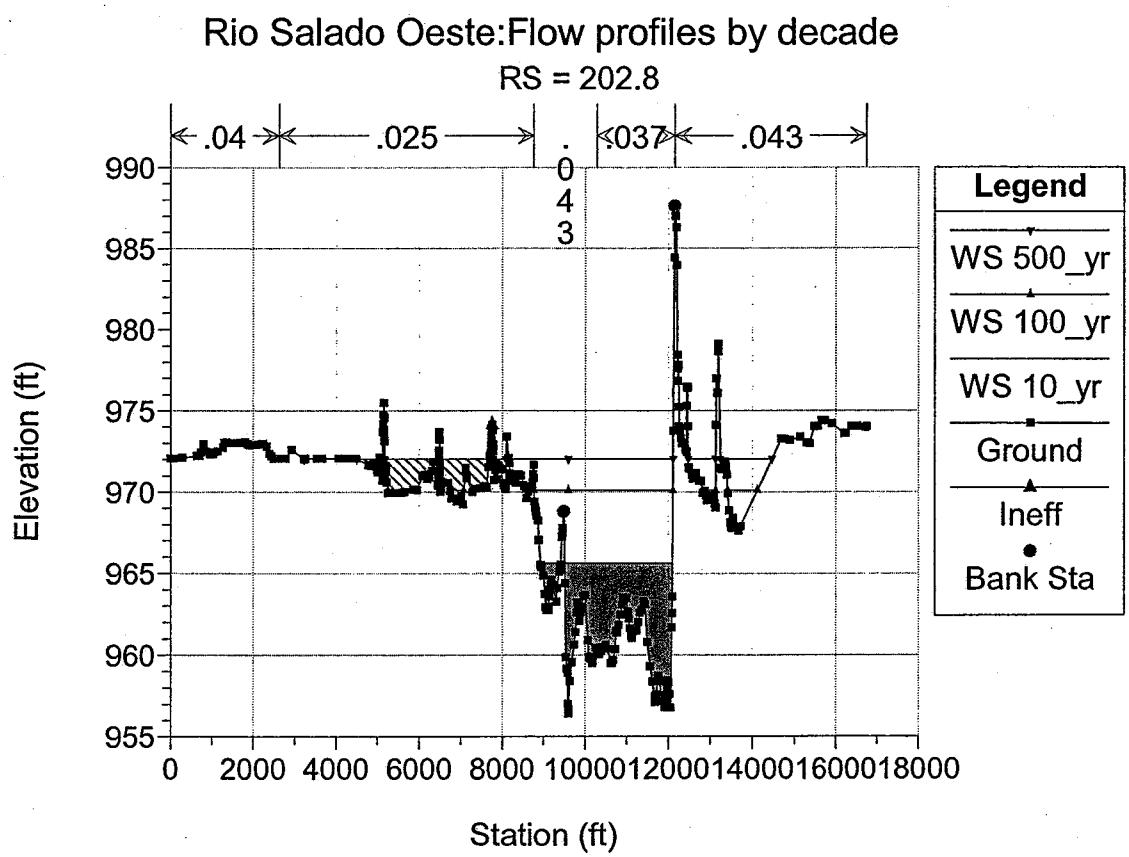
980
975
970
965
960
955
950
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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.025
.043
.037
.043
Elevation (ft)
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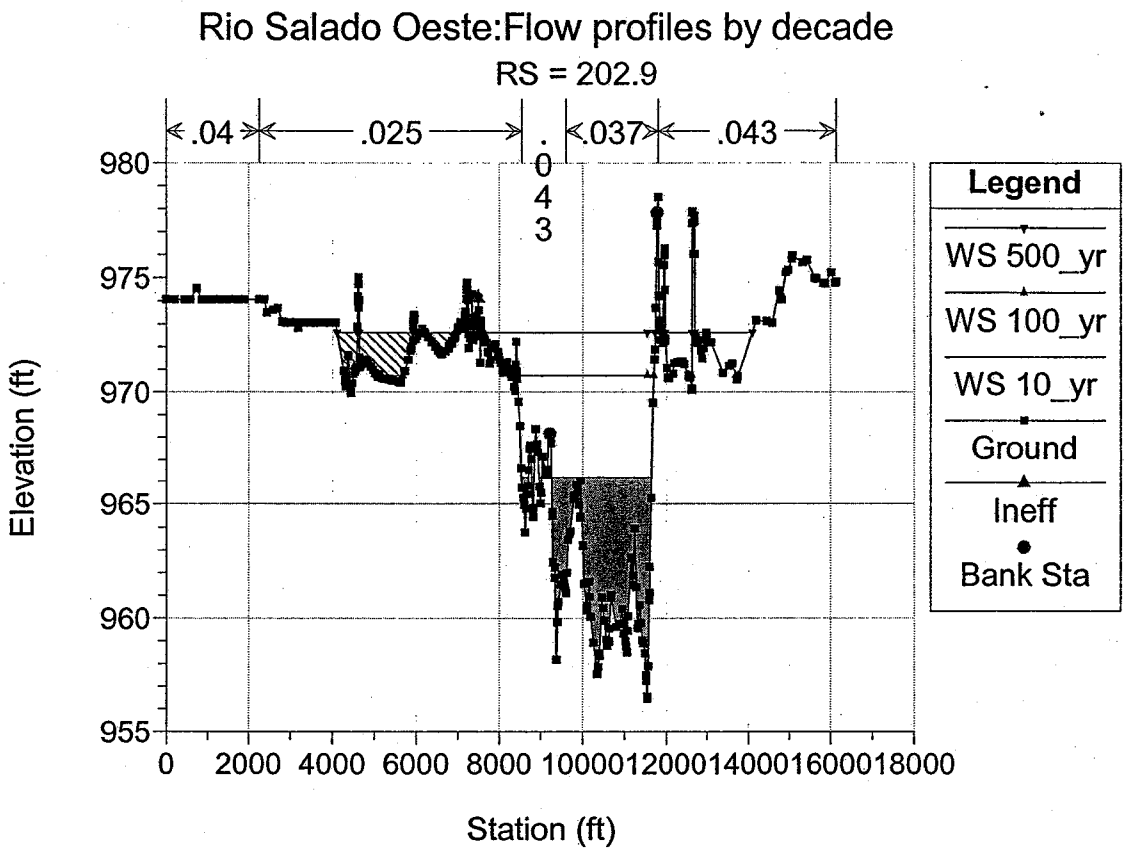
985
980
975
970
965
960
955
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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.025
.043
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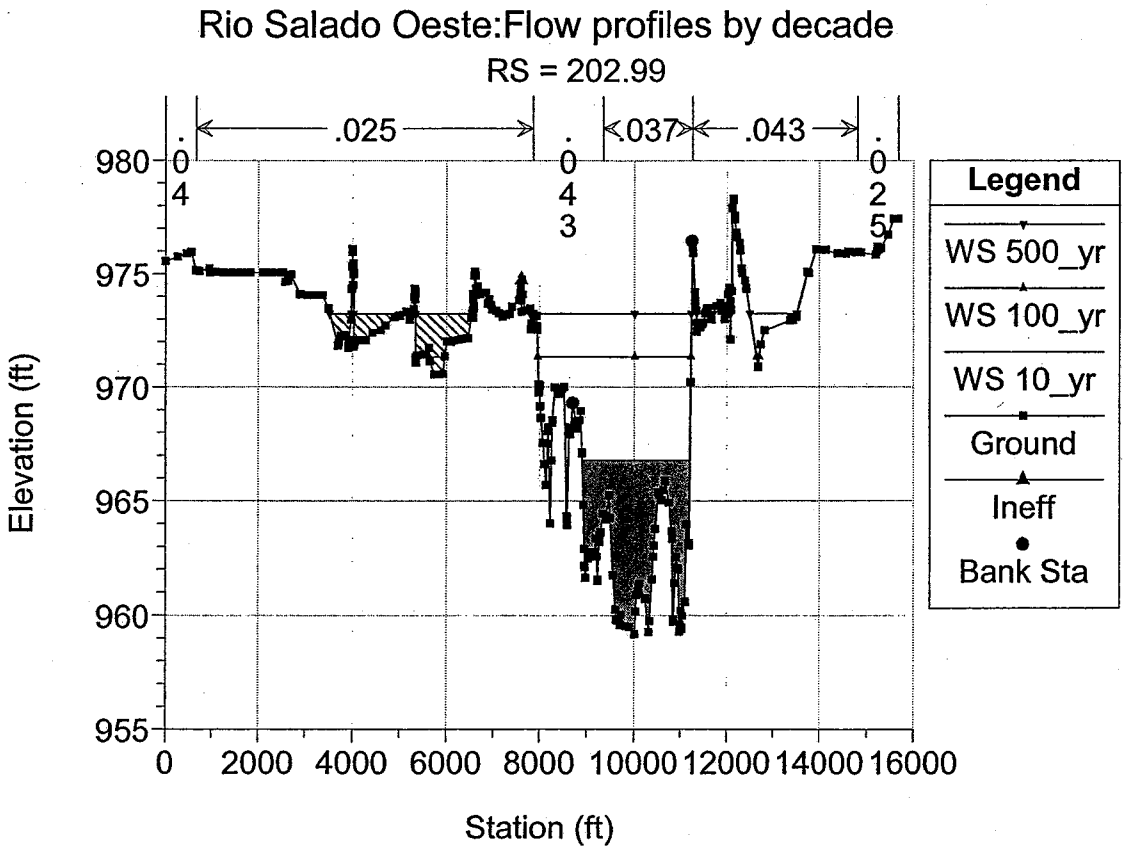
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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.043
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.043
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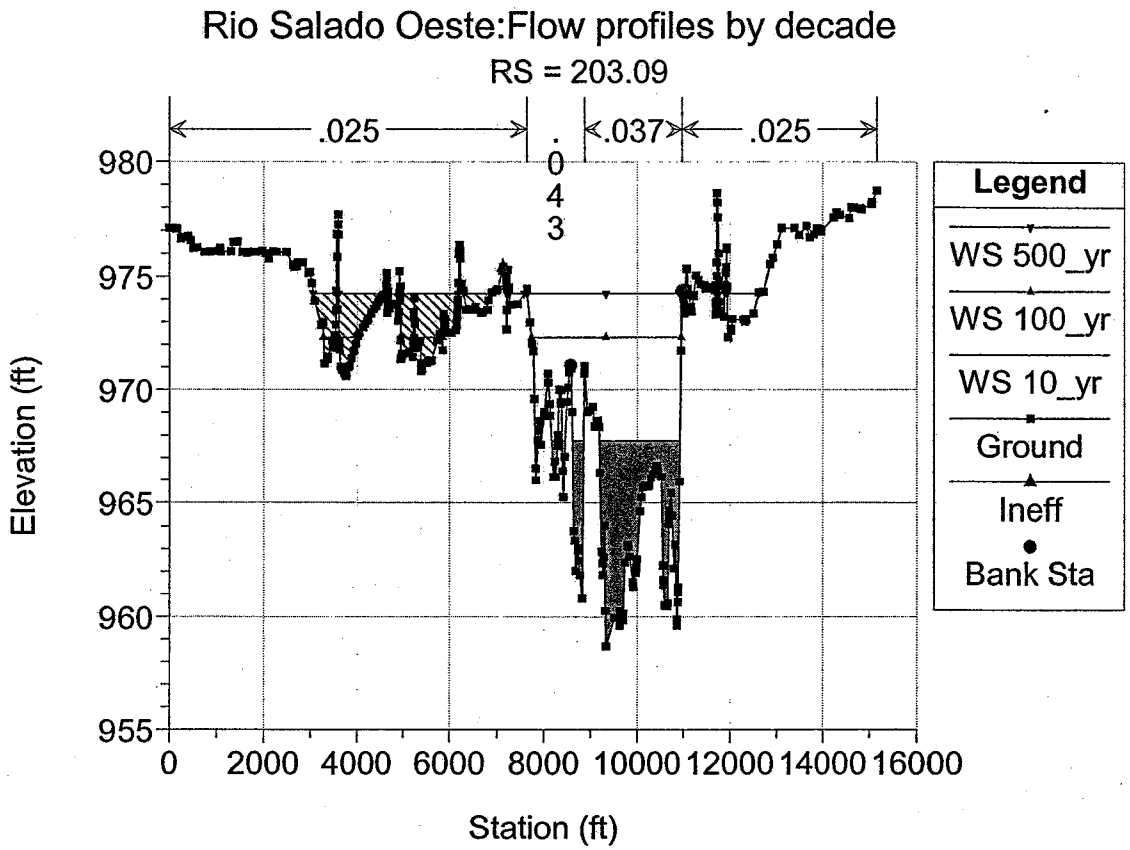
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 203.09
.025
.043
.037
.025
Elevation (ft)
980
975
970
965
960
955
0
2000
4000
6000
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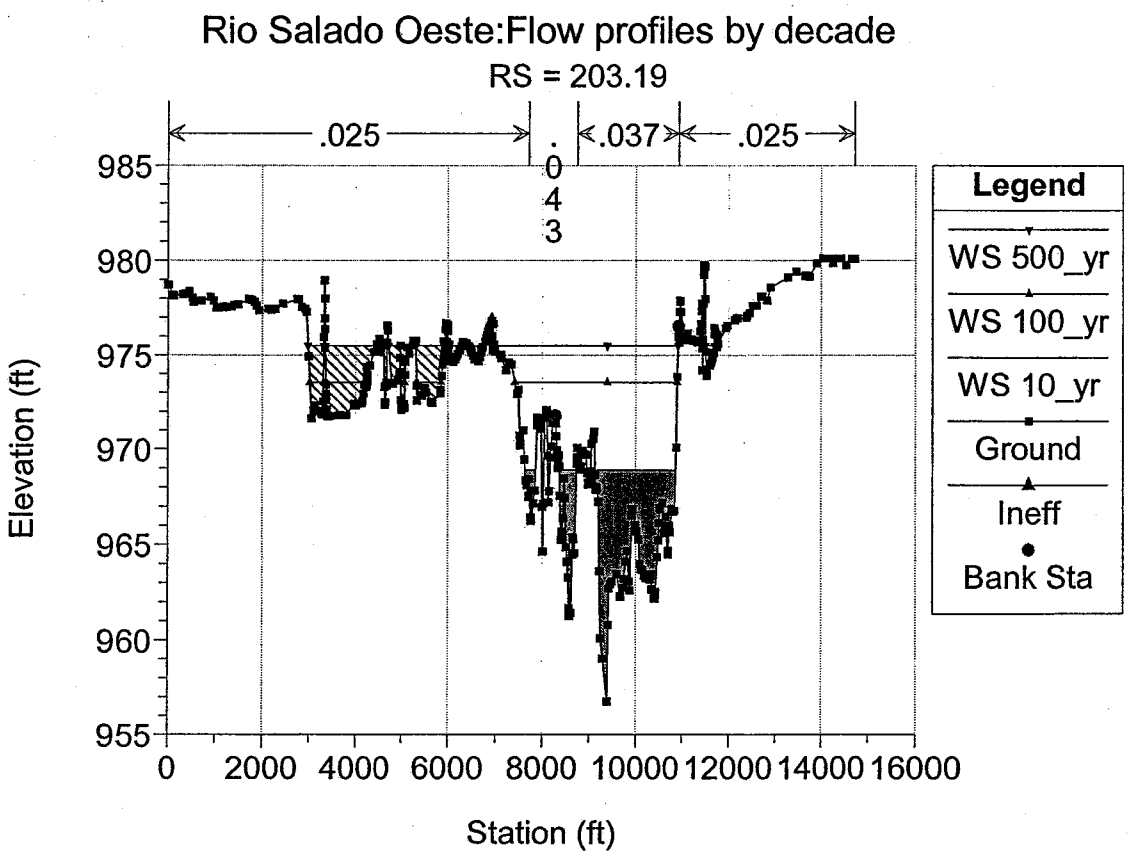
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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.043
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.025
Elevation (ft)
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960
955
0
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Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
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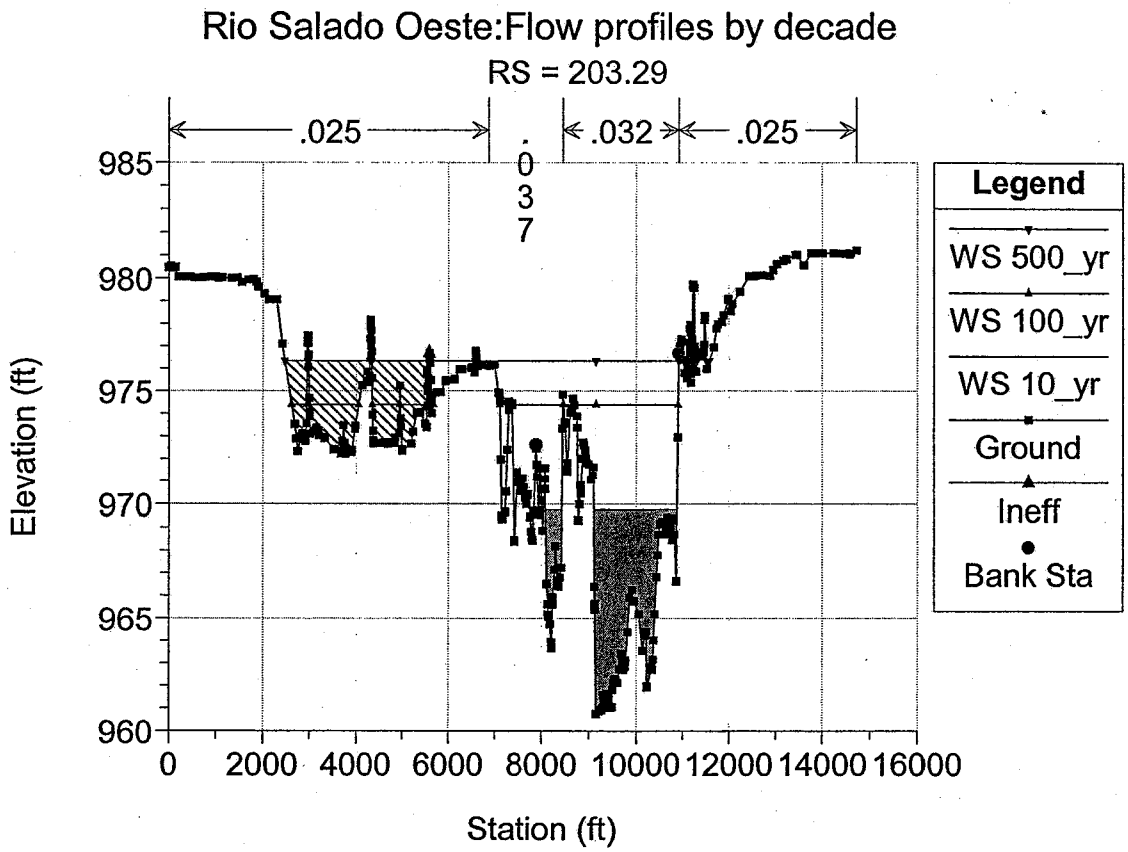
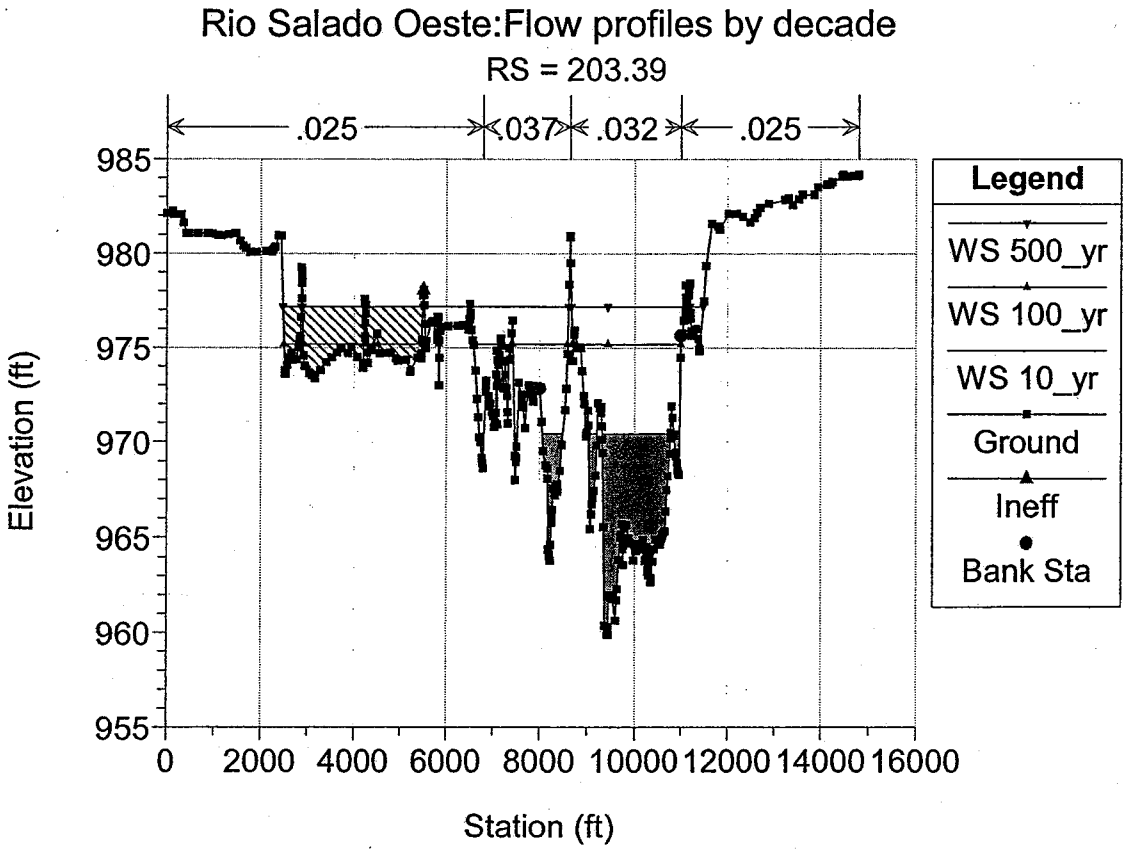
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 203.29
.025
.037
.032
.025
Elevation (ft)
985
980
975
970
965
960
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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.025
.037
.032
.025
Elevation (ft)
985
980
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970
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960
955
0
2000
4000
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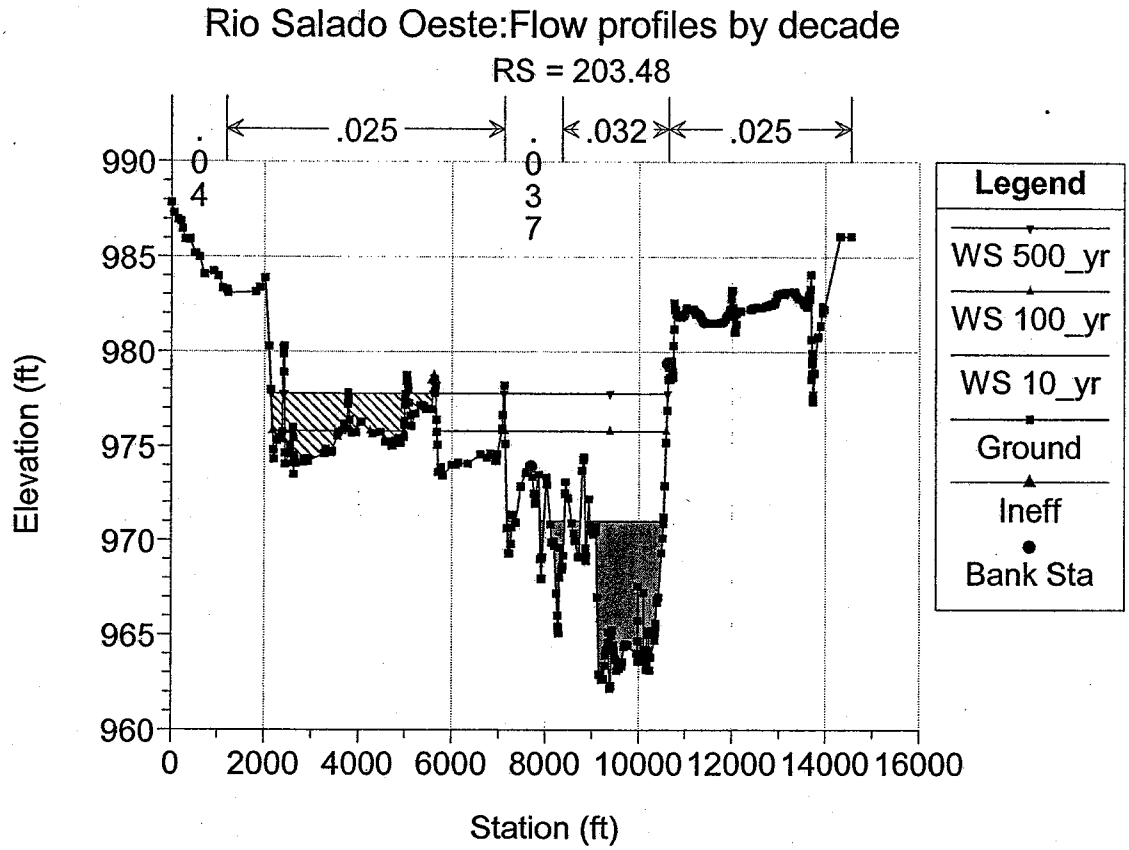
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 203.48
.025
.04
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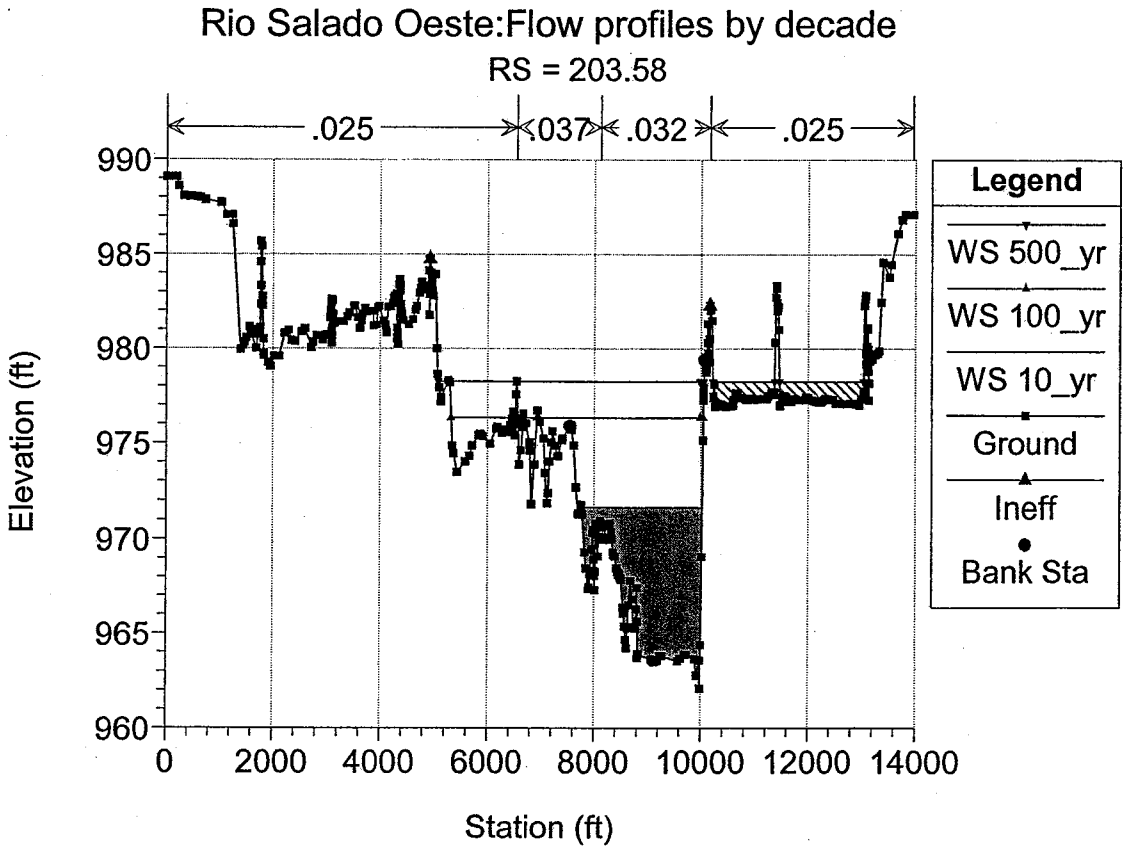
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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Elevation (ft)
Station (ft)
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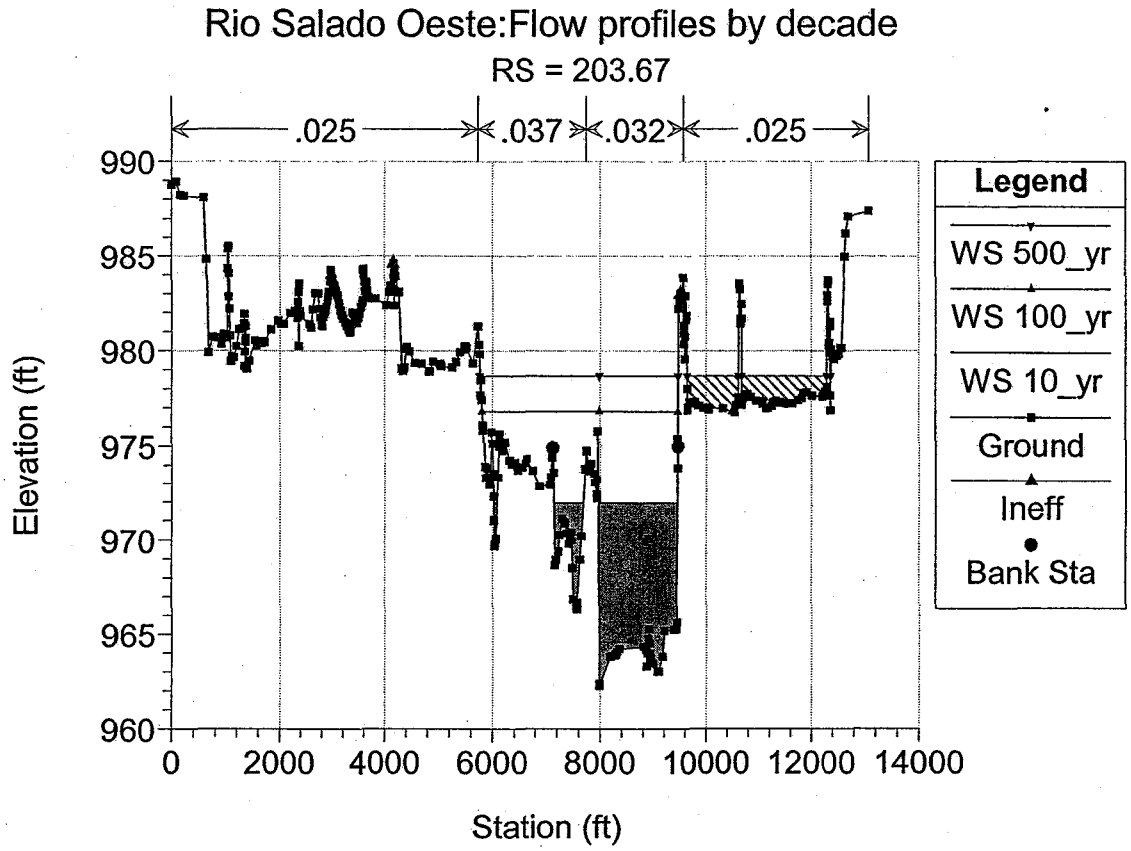
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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960
0
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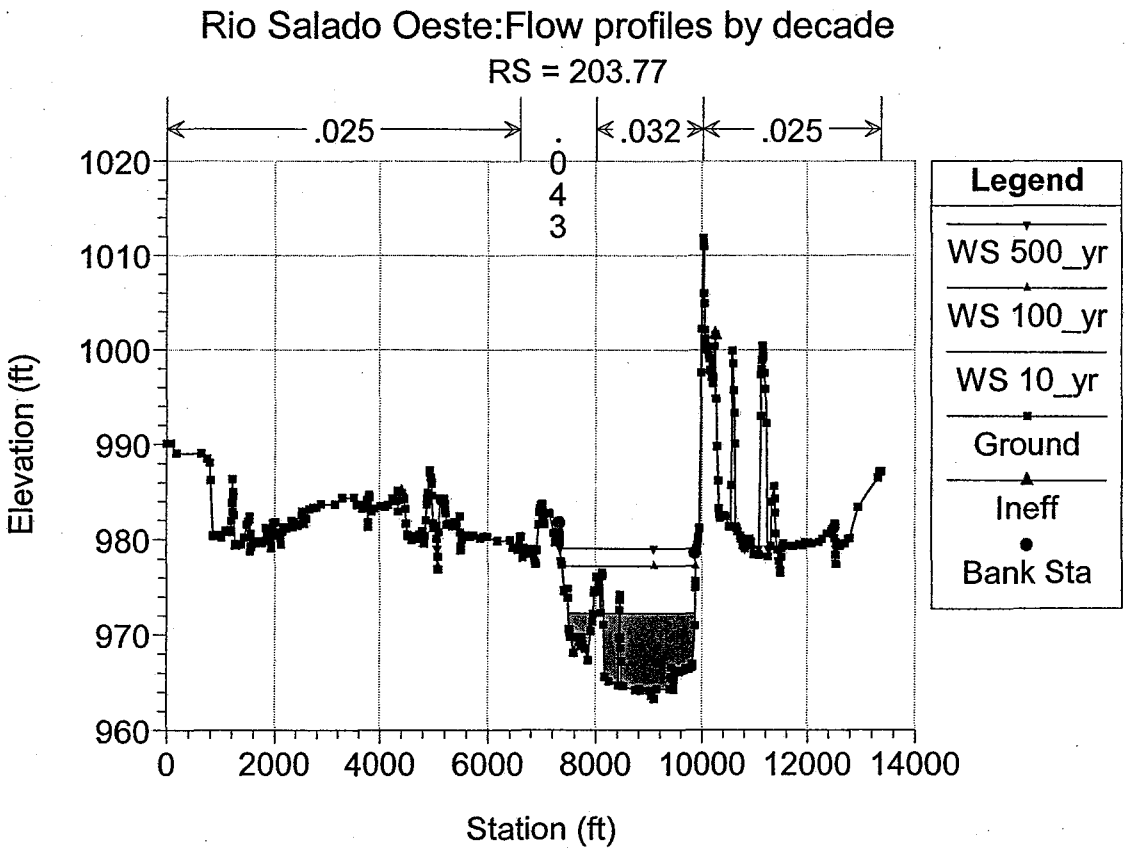
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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970
960
0
2000
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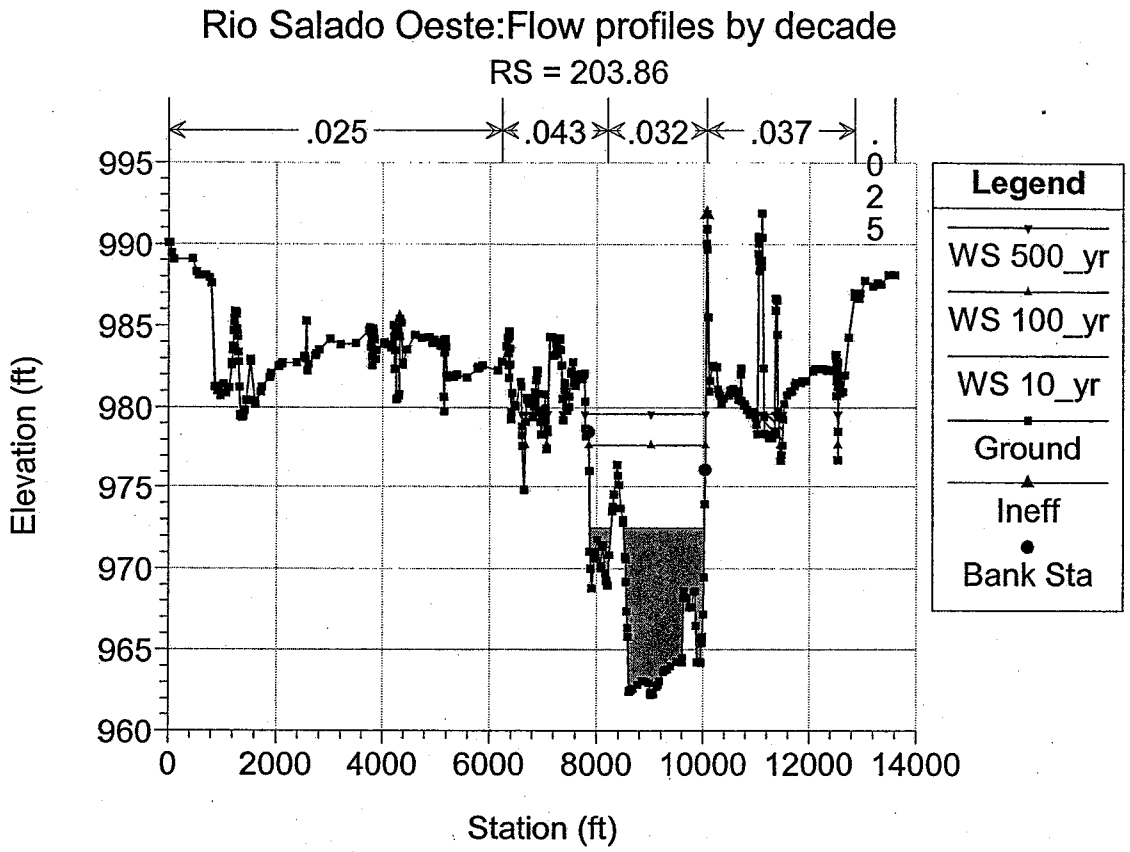
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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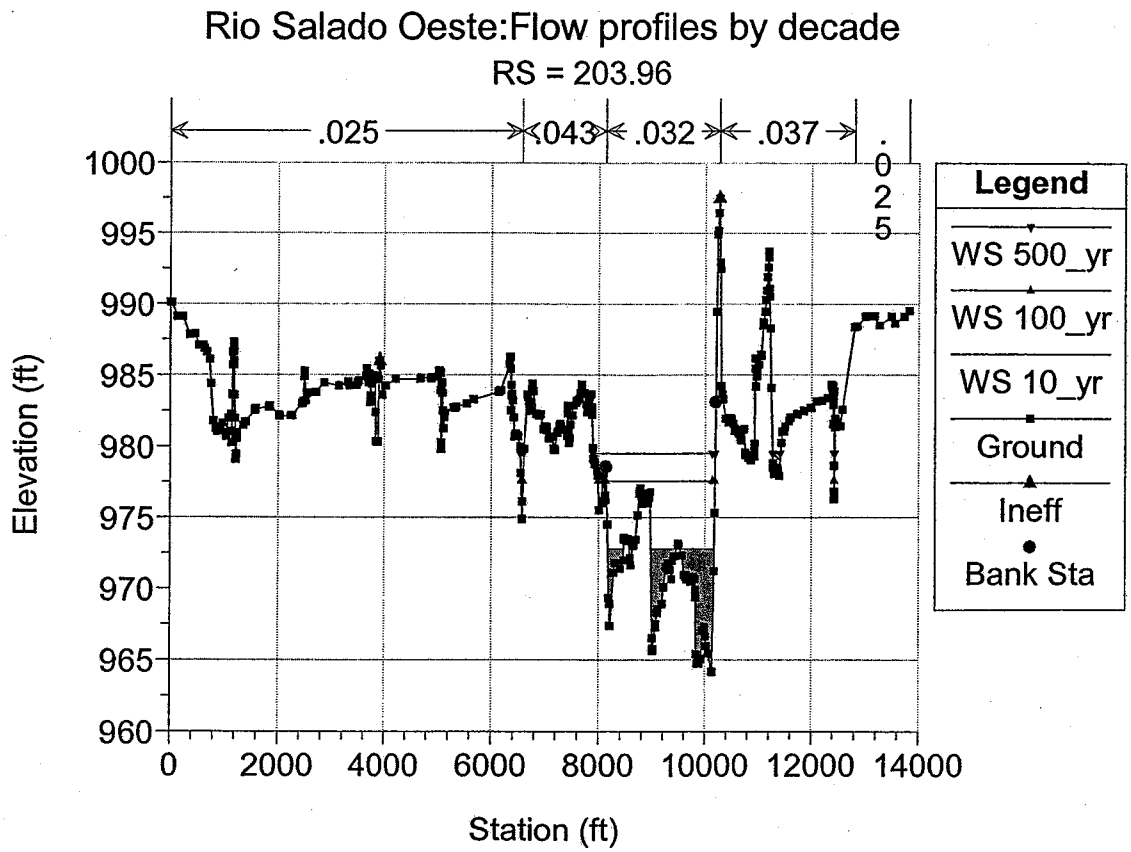
.043
.032
.037
.025
Elevation (ft)
995
990
985
980
975
970
965
960
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 203.96
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.043
.032
.037
.025
Elevation (ft)
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995
990
985
980
975
970
965
960
0
2000
4000
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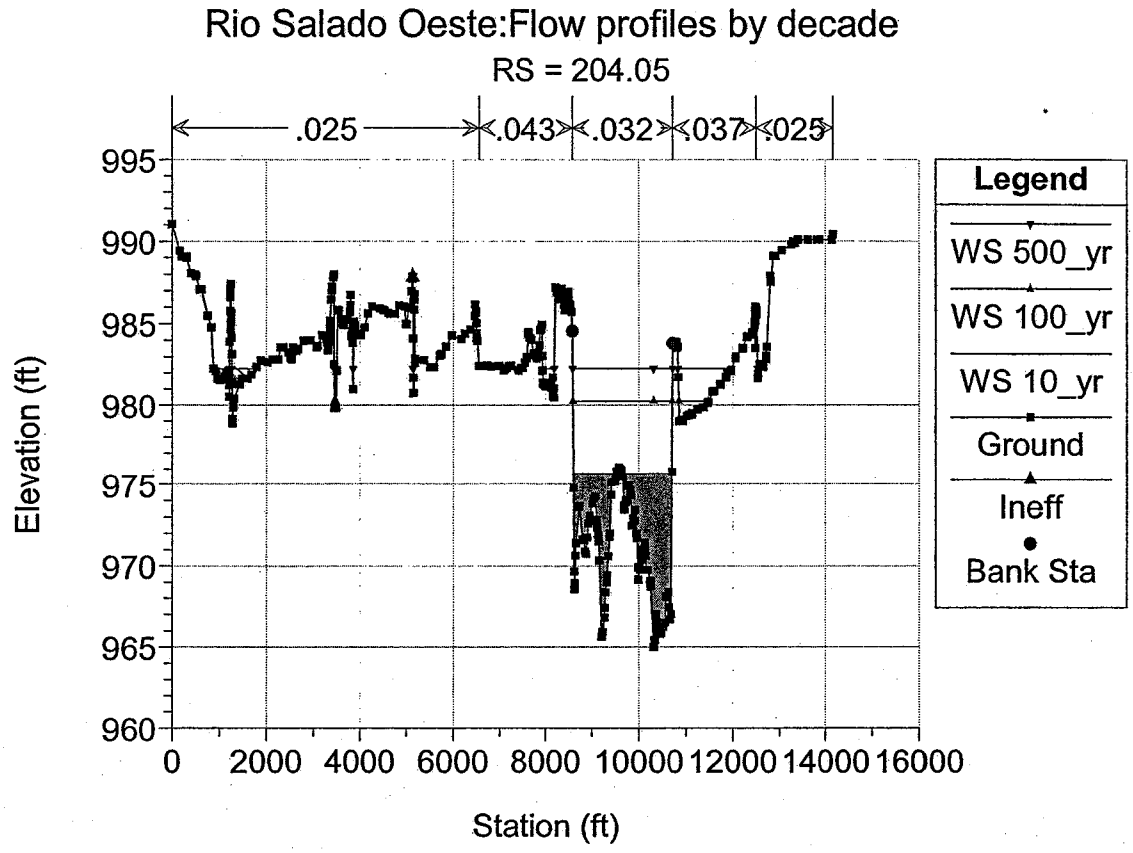
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta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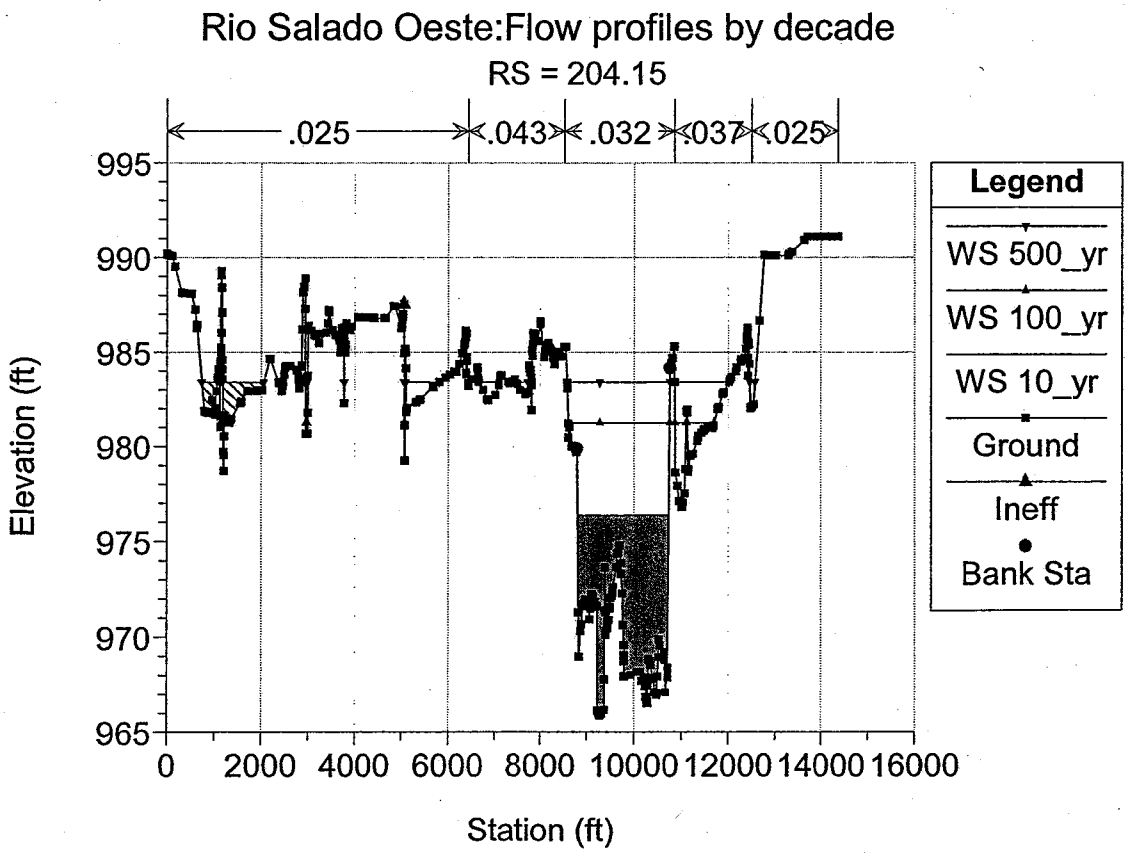
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
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.043
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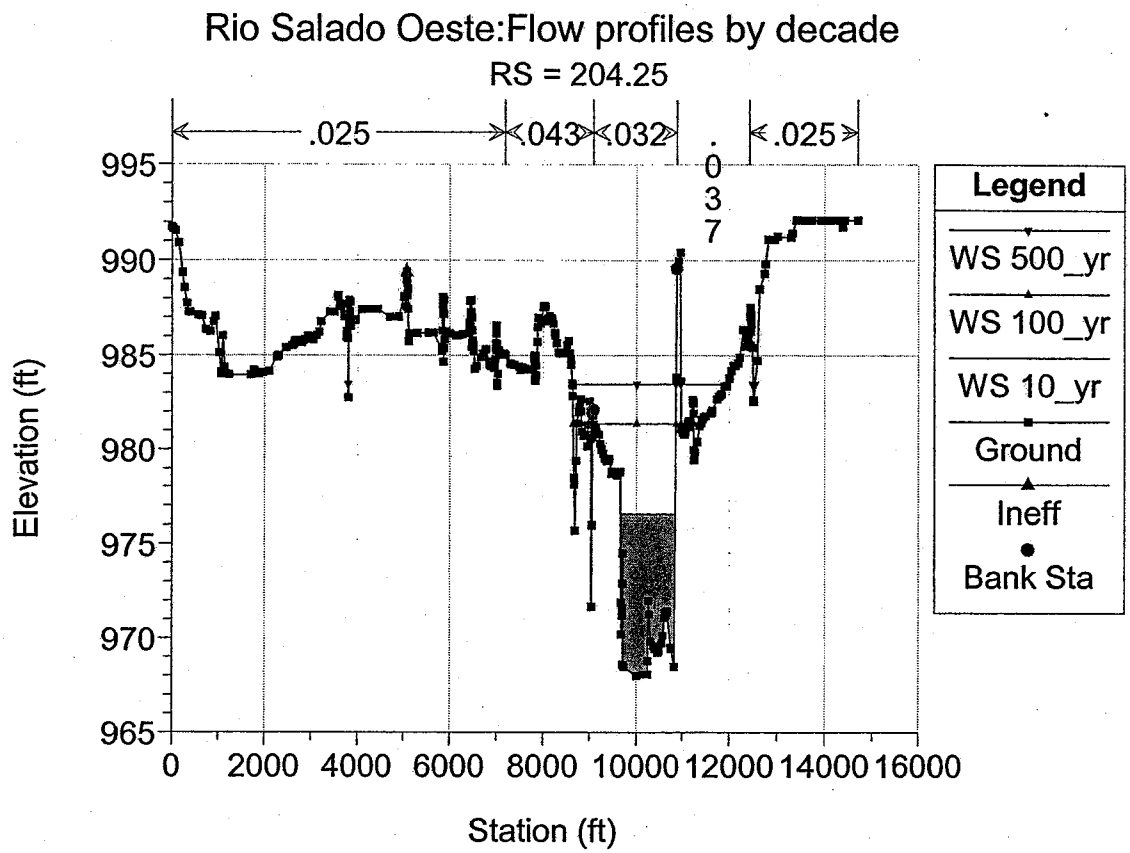
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 204.25
.025
.043
.032
.037
.025
Elevation (ft)
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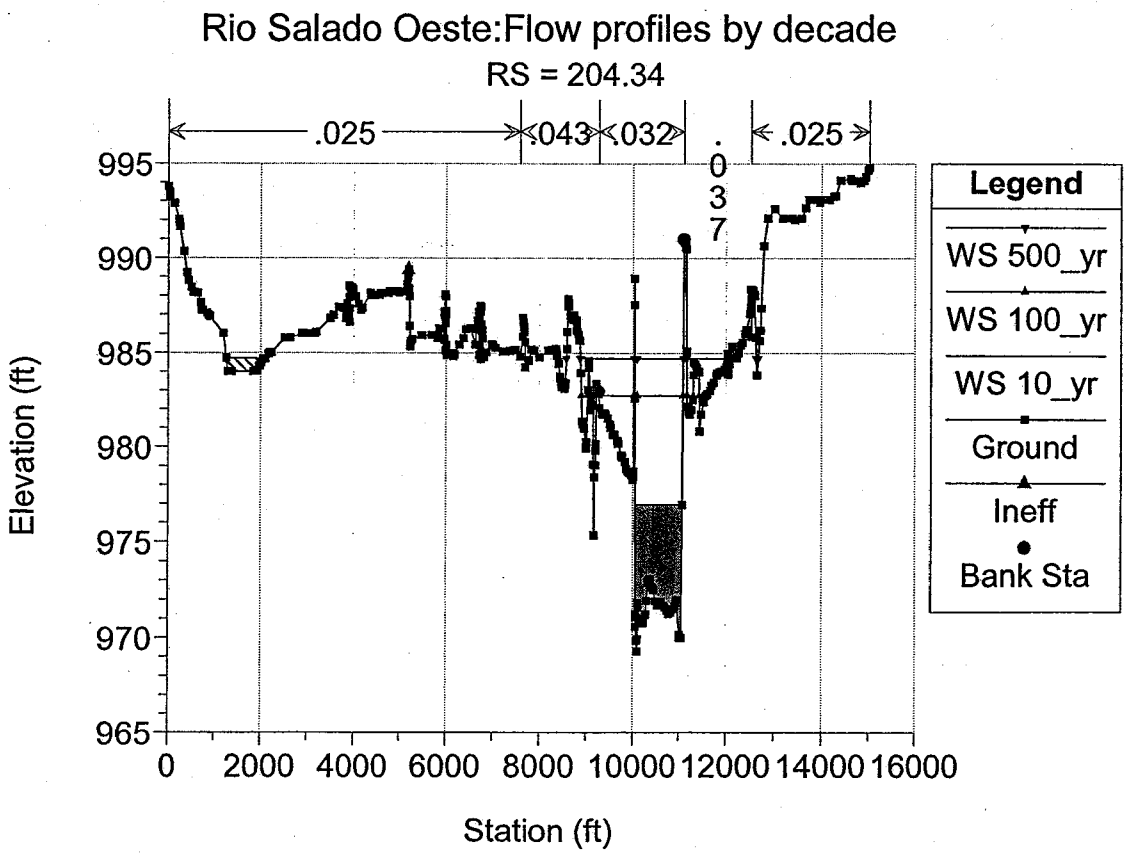
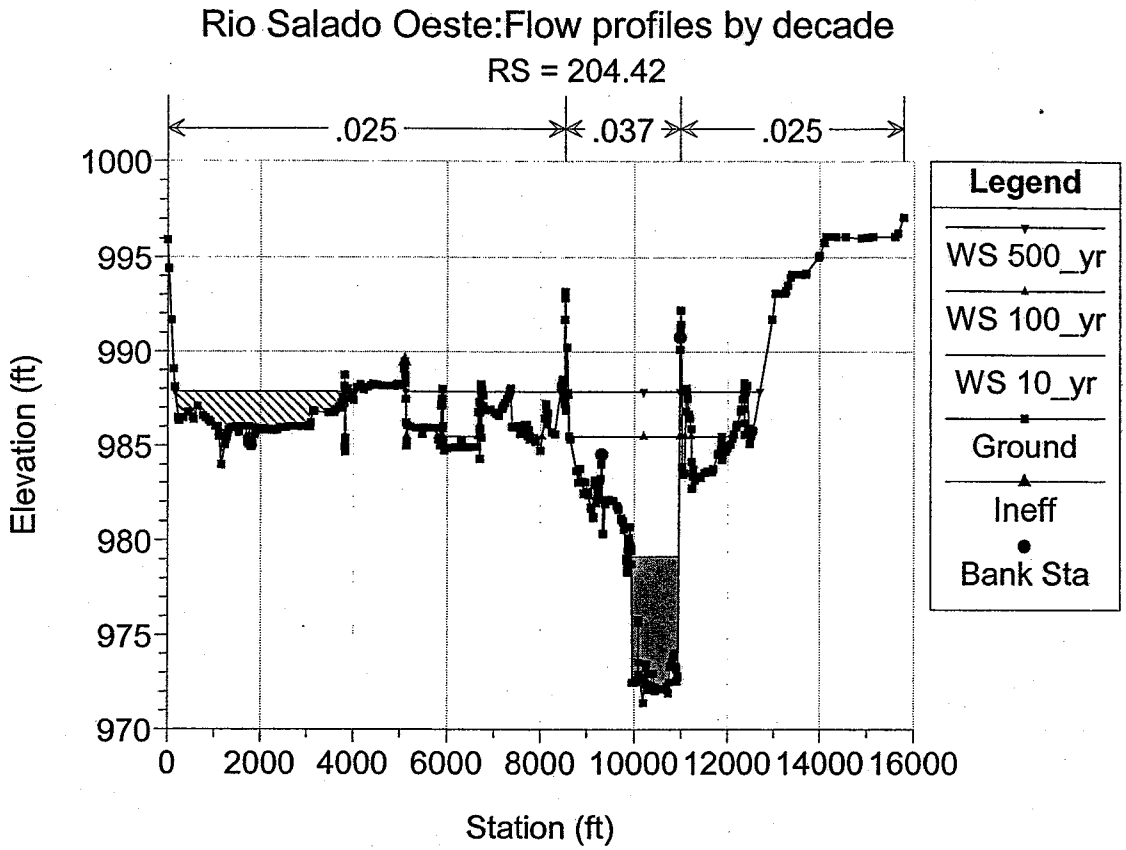
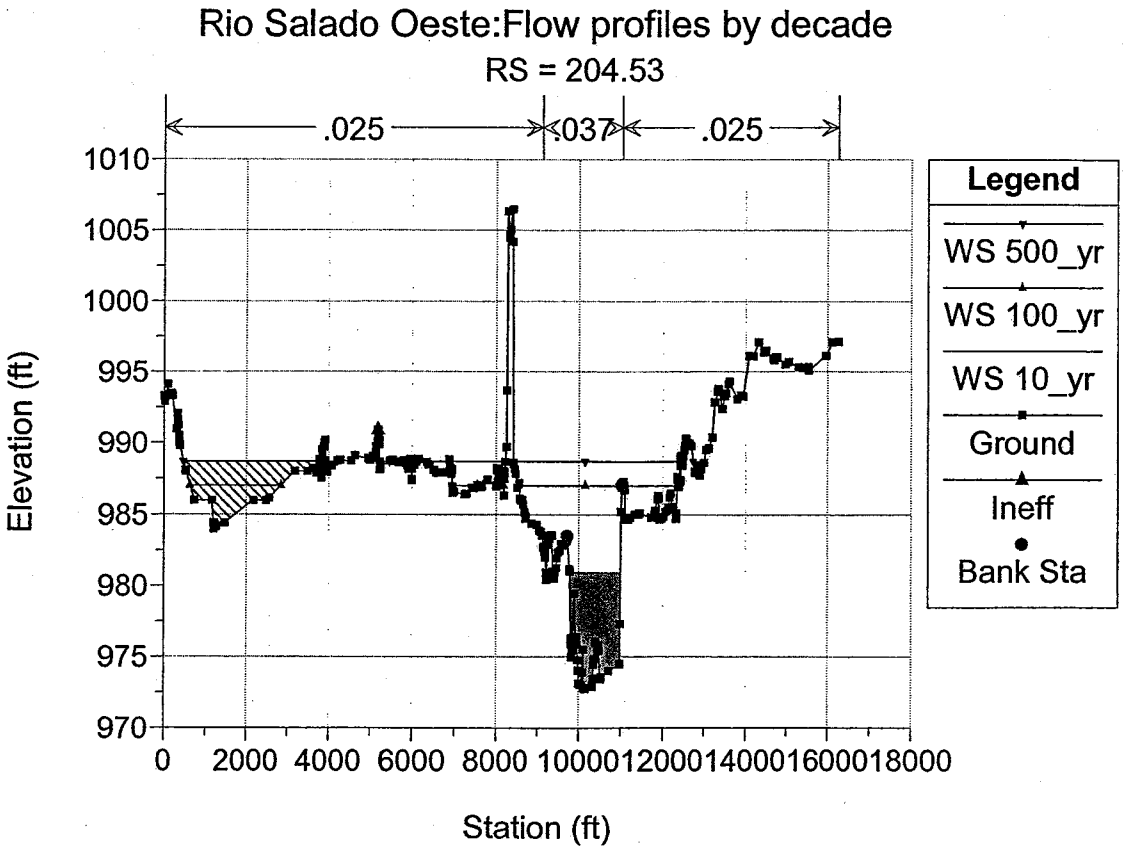
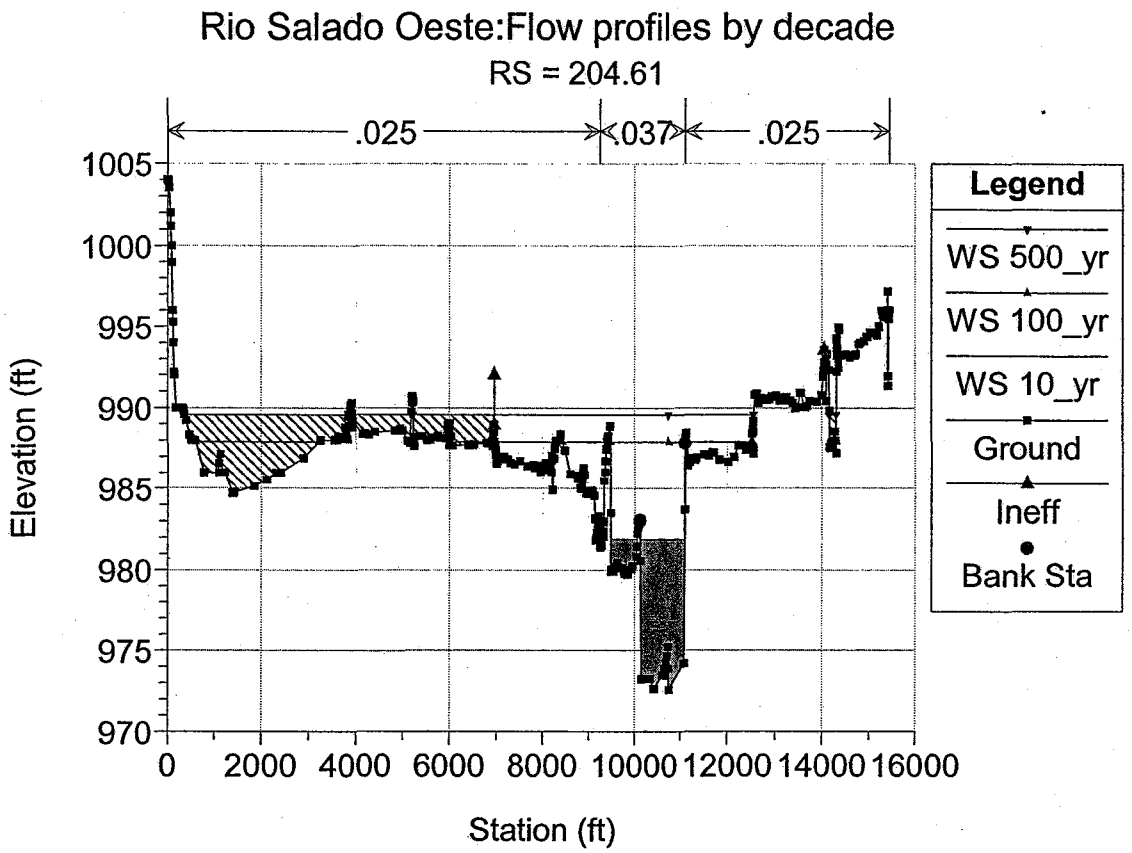
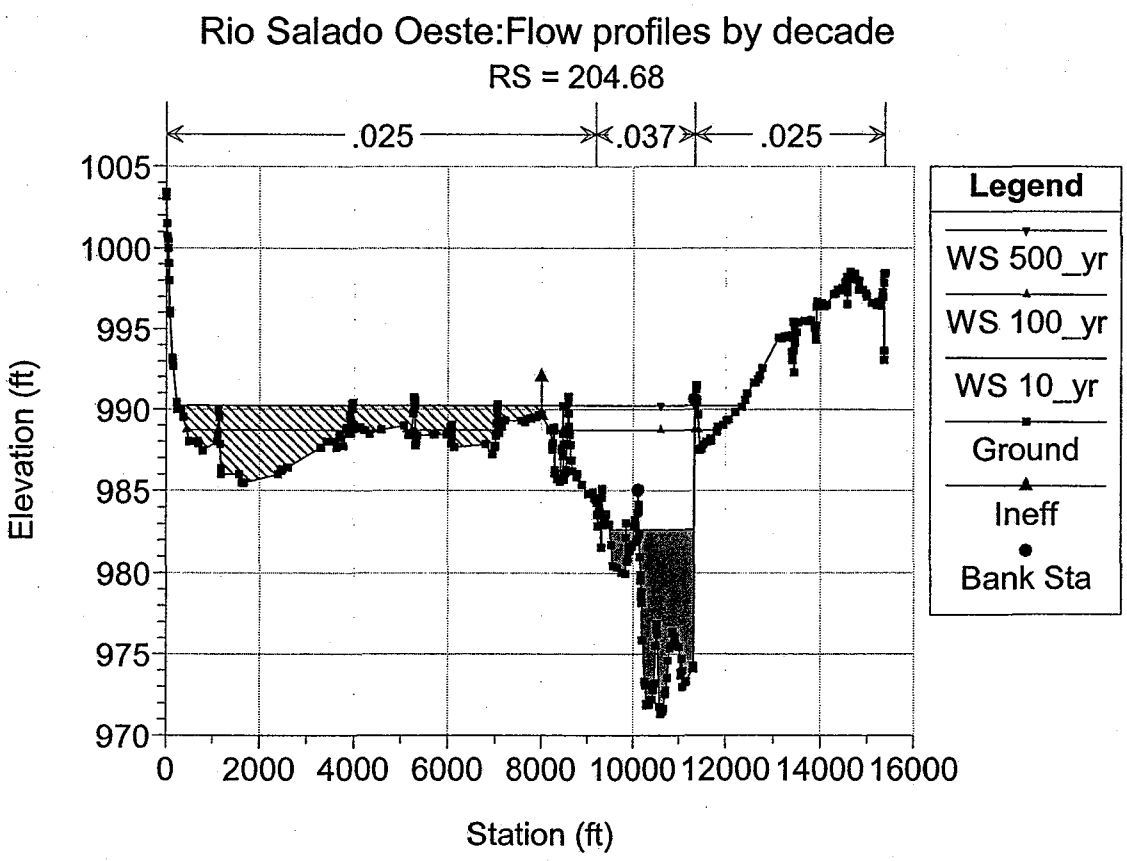
990
985
980
975
970
965
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

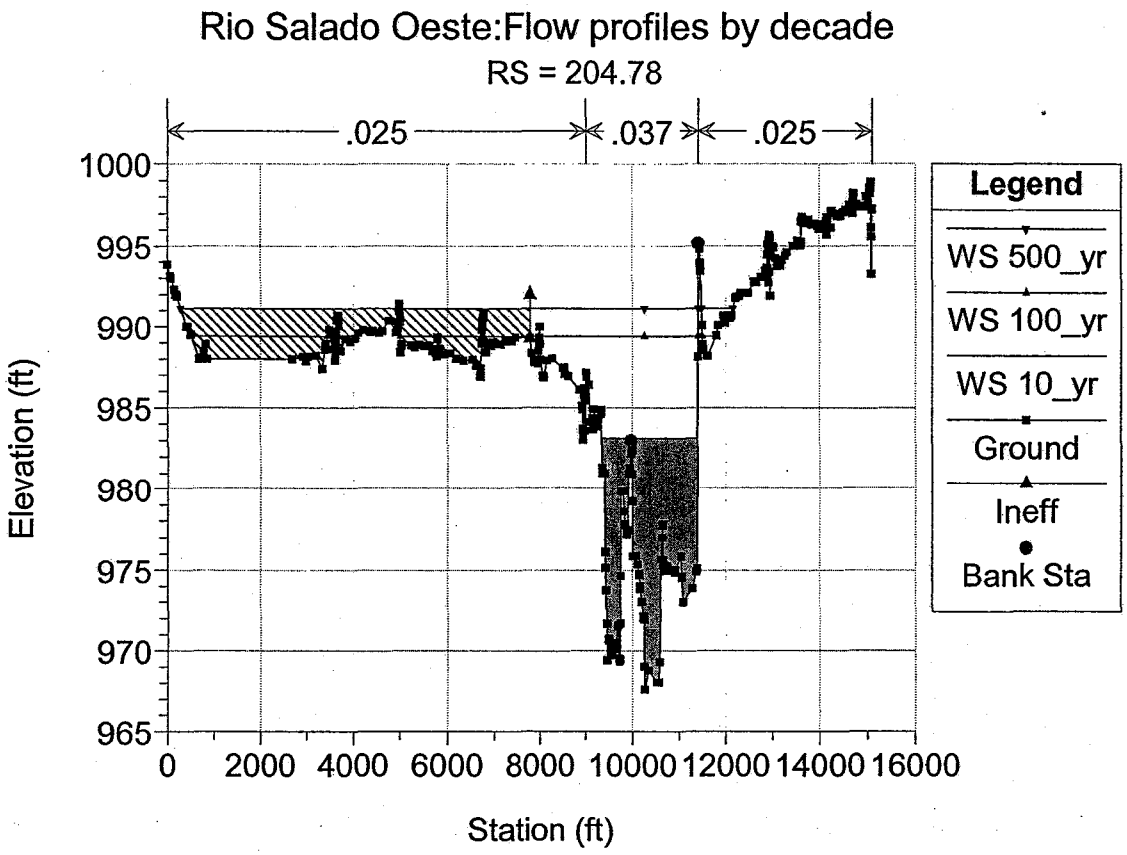

Rio Salado Oeste:Flow profiles by decade
RS = 204.34
.025
.043
.032
.037
.025
Elevation (ft)
995
990
985
980
975
970
965
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

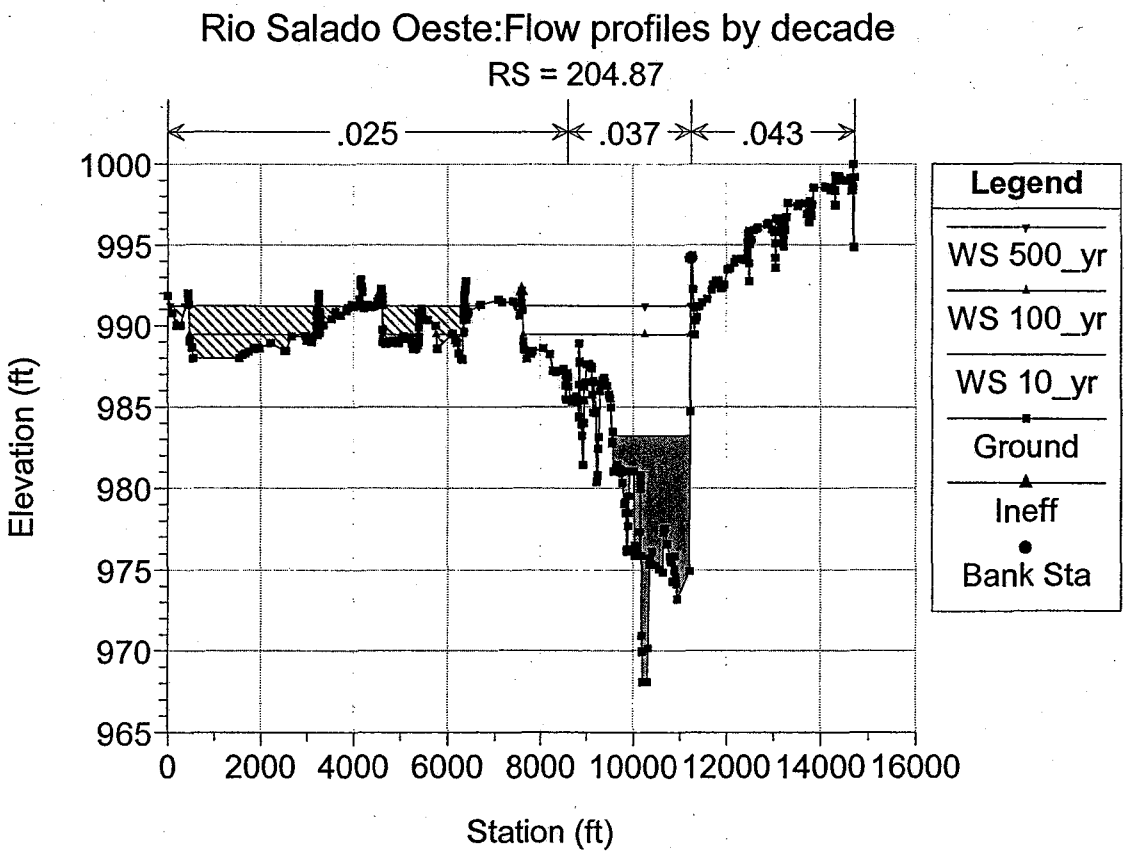

Rio Salado Oeste:Flow profiles by decade
RS = 204.42
.025
.037
.025
Elevation (ft)
1000
995
990
985
980
975
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

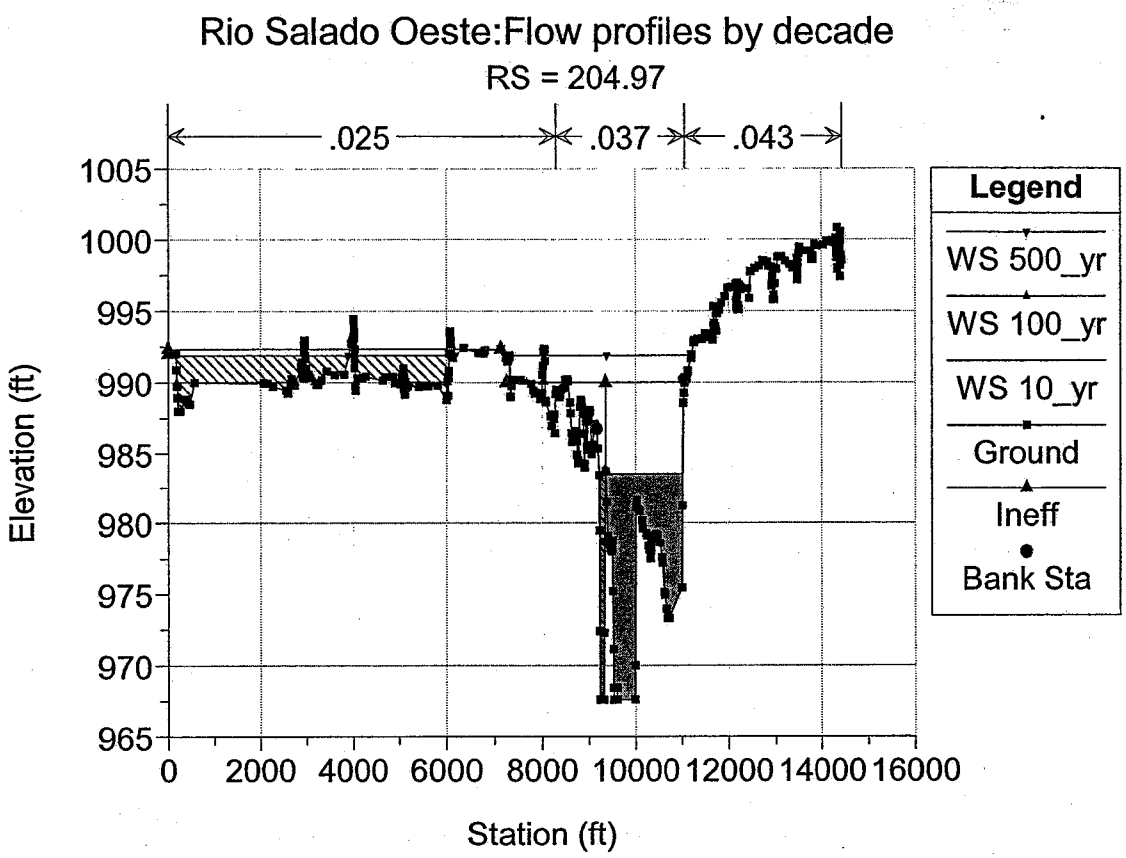

Rio Salado Oeste:Flow profiles by decade
RS = 204.53
.025
.037
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
975
970
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

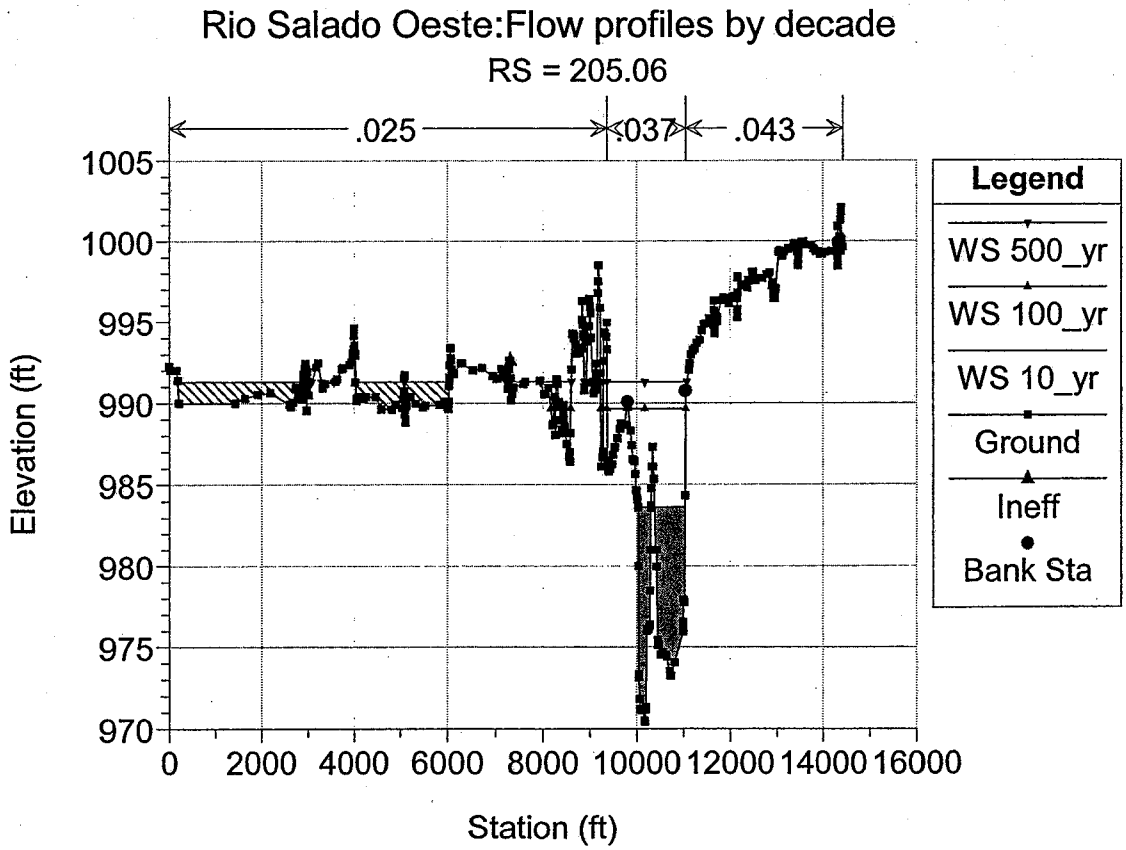

Rio Salado Oeste:Flow profiles by decade
RS = 204.61
.025
.037
.025
Elevation (ft)
1005
1000
995
990
985
980
975
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

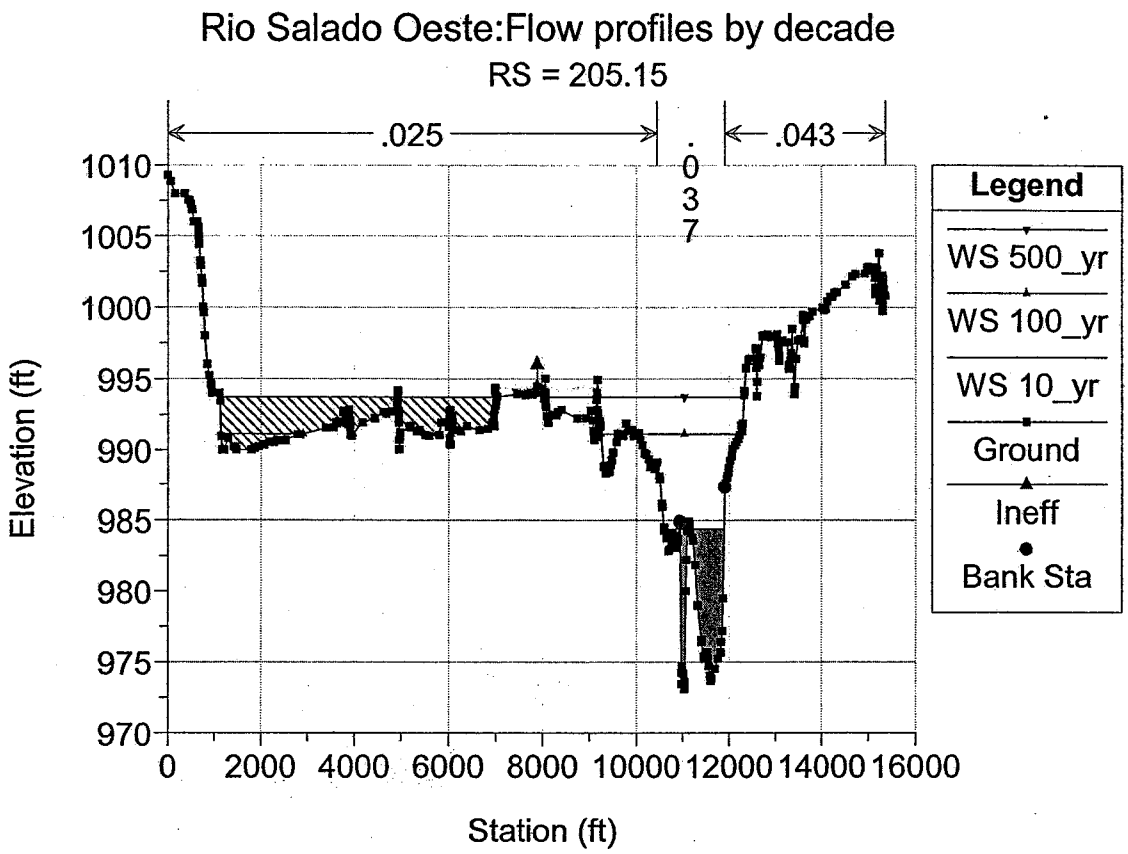

Rio Salado Oeste:Flow profiles by decade
RS = 204.68
.025
.037
.025
Elevation (ft)
1005
1000
995
990
985
980
975
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

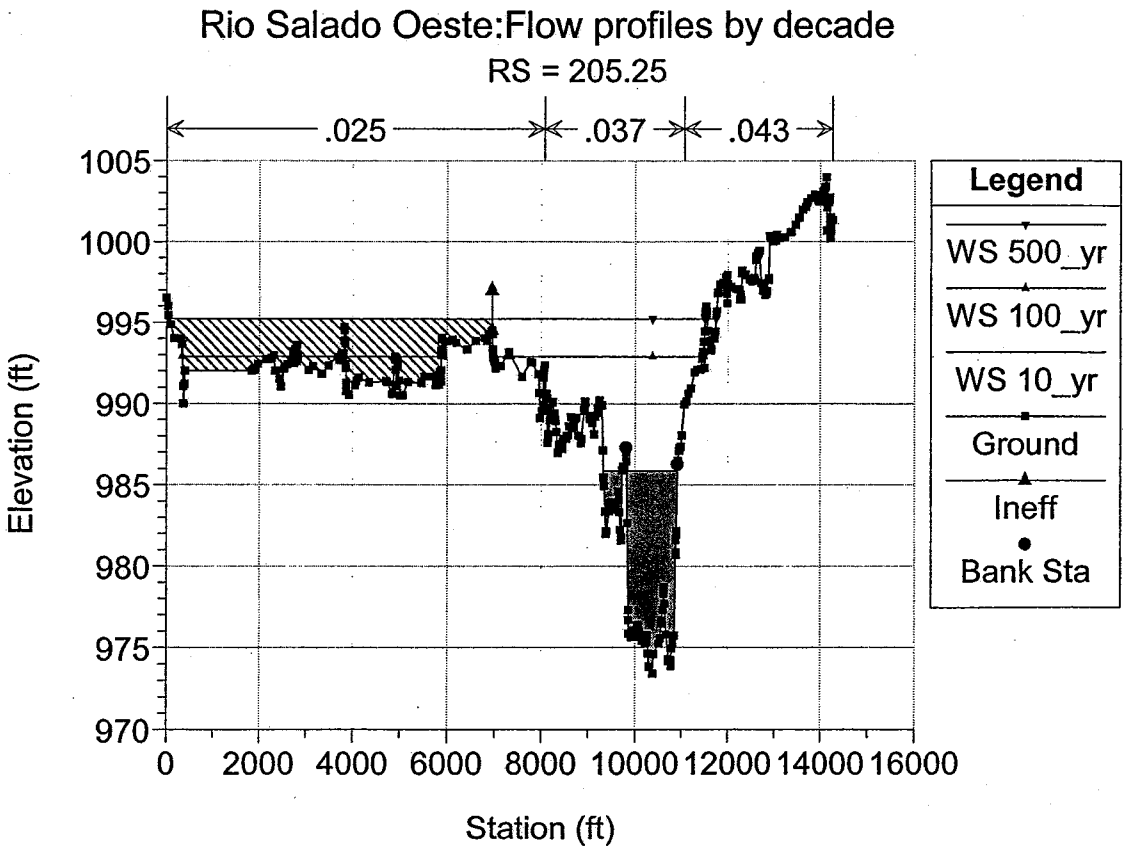

Rio Salado Oeste:Flow profiles by decade
RS = 204.78
.025
.037
.025
Elevation (ft)
1000
995
990
985
980
975
970
965
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

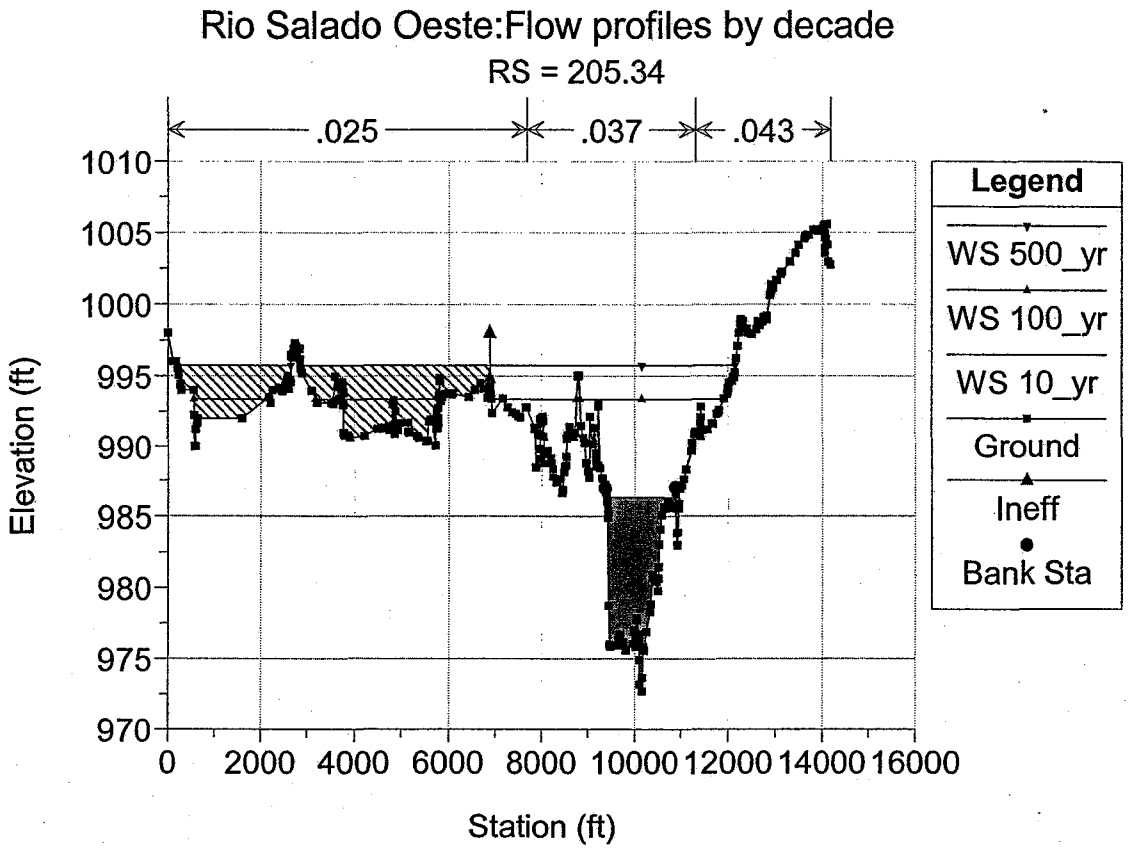

Rio Salado Oeste:Flow profiles by decade
RS = 204.87
.025
.037
.043
Elevation (ft)
1000
995
990
985
980
975
970
965
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

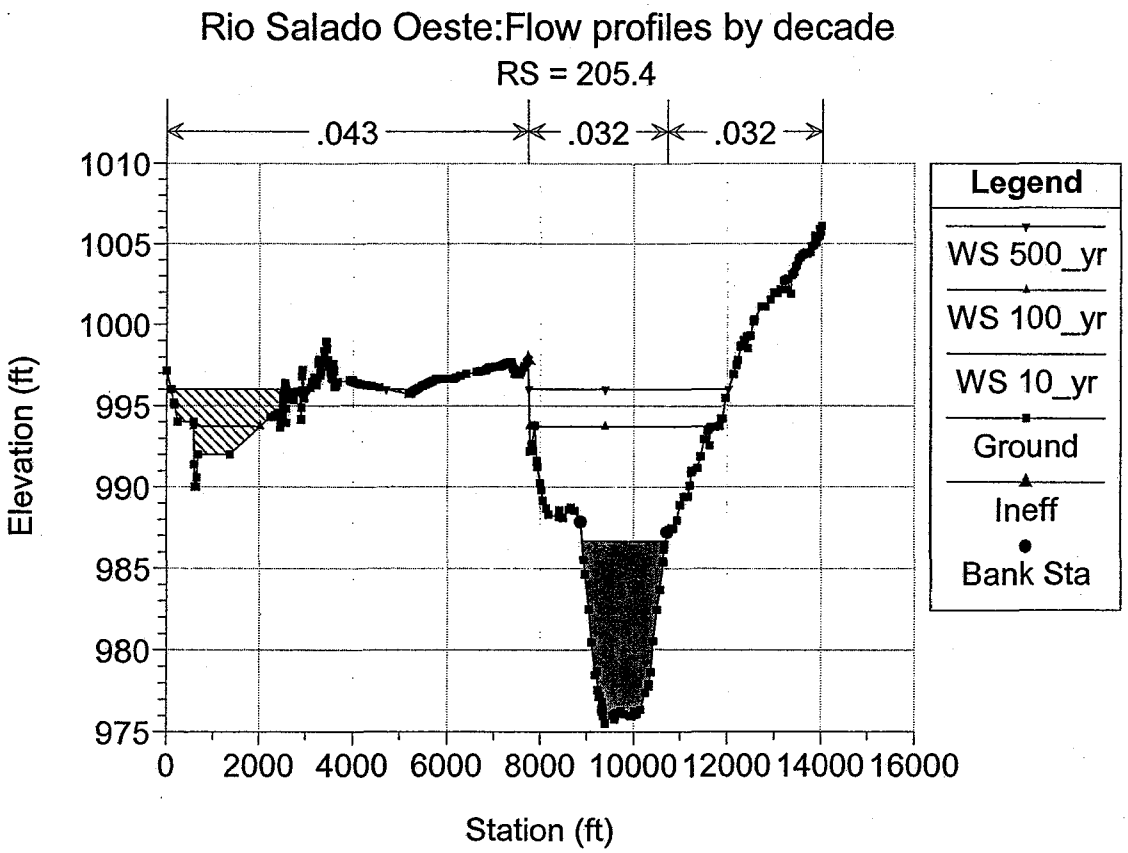

Rio Salado Oeste:Flow profiles by decade
RS = 204.97
.025
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

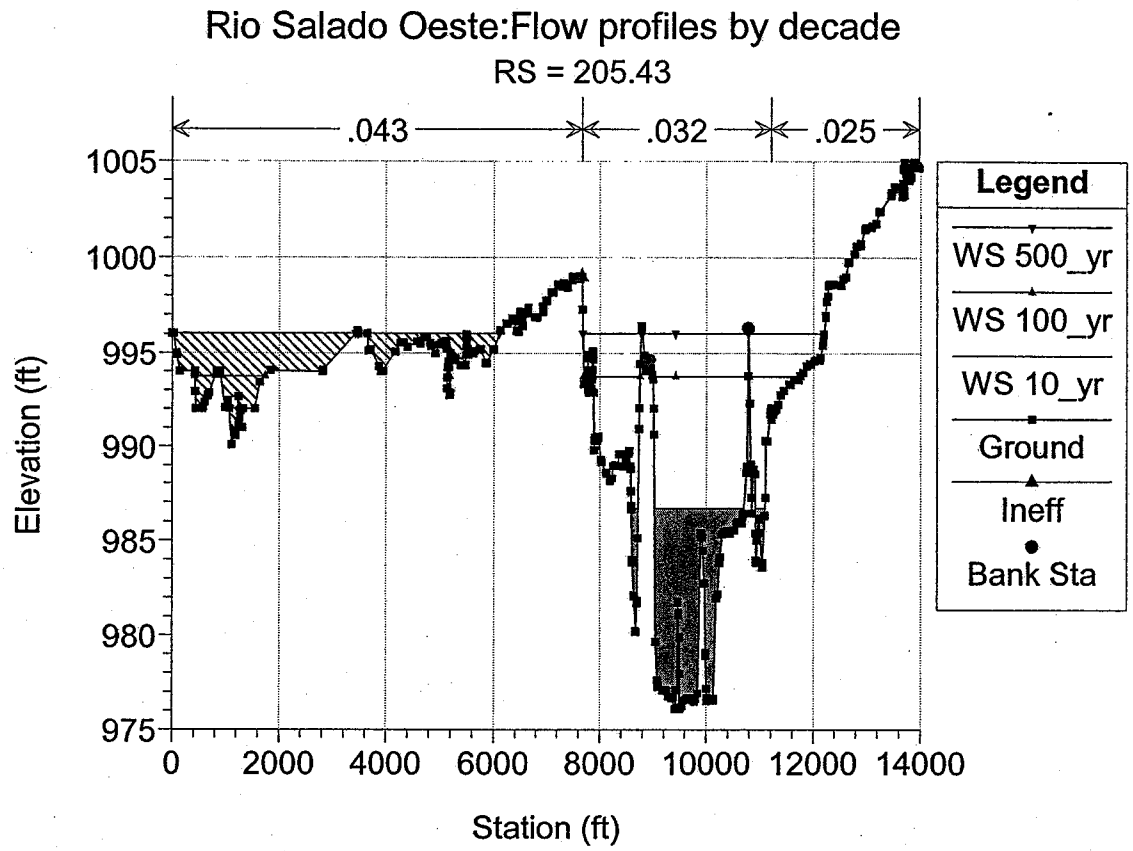

Rio Salado Oeste:Flow profiles by decade
RS = 205.06
.025
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

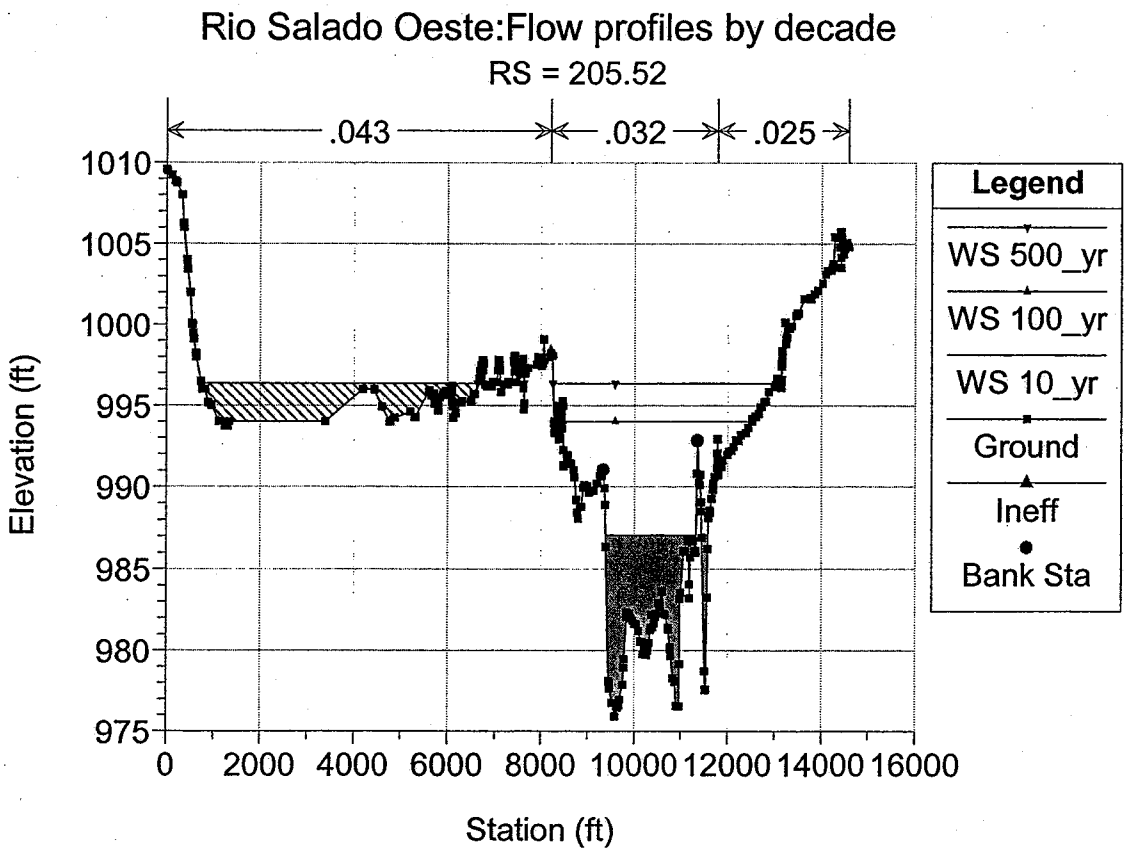

Rio Salado Oeste:Flow profiles by decade
RS = 205.15
.025
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

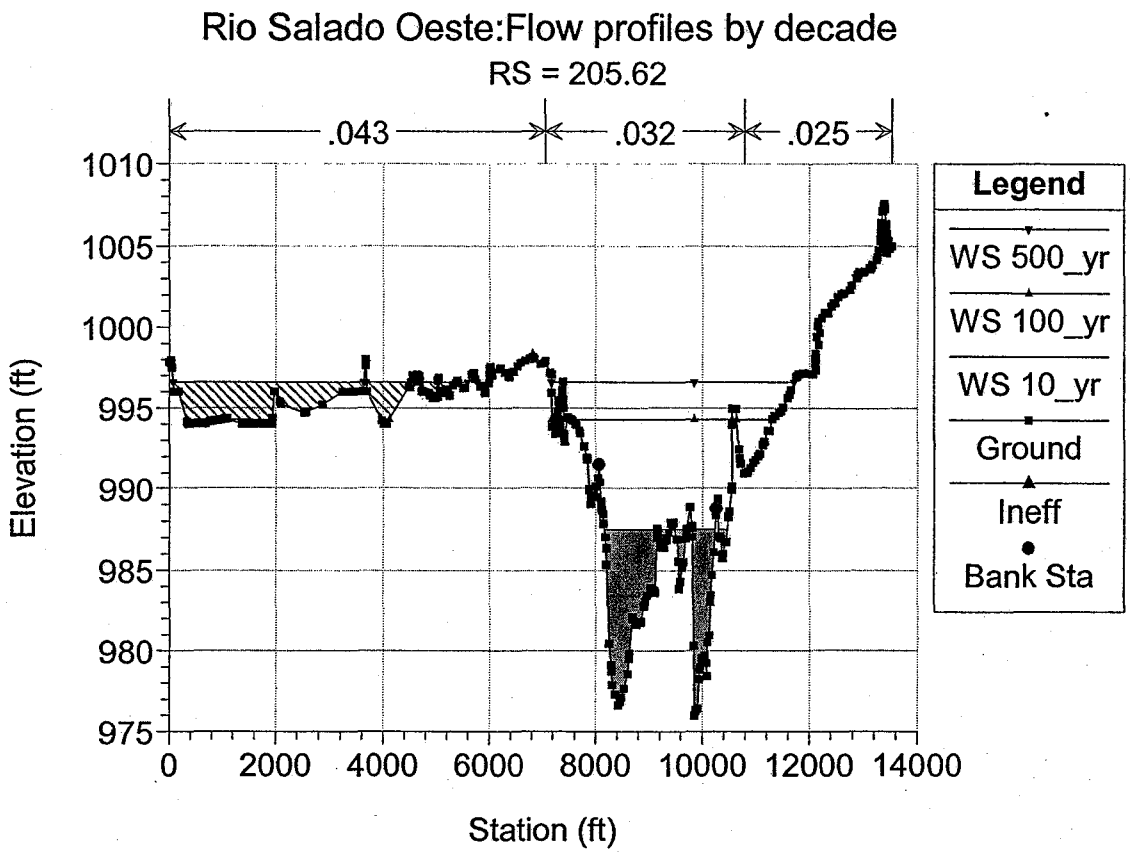

Rio Salado Oeste:Flow profiles by decade
RS = 205.25
.025
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

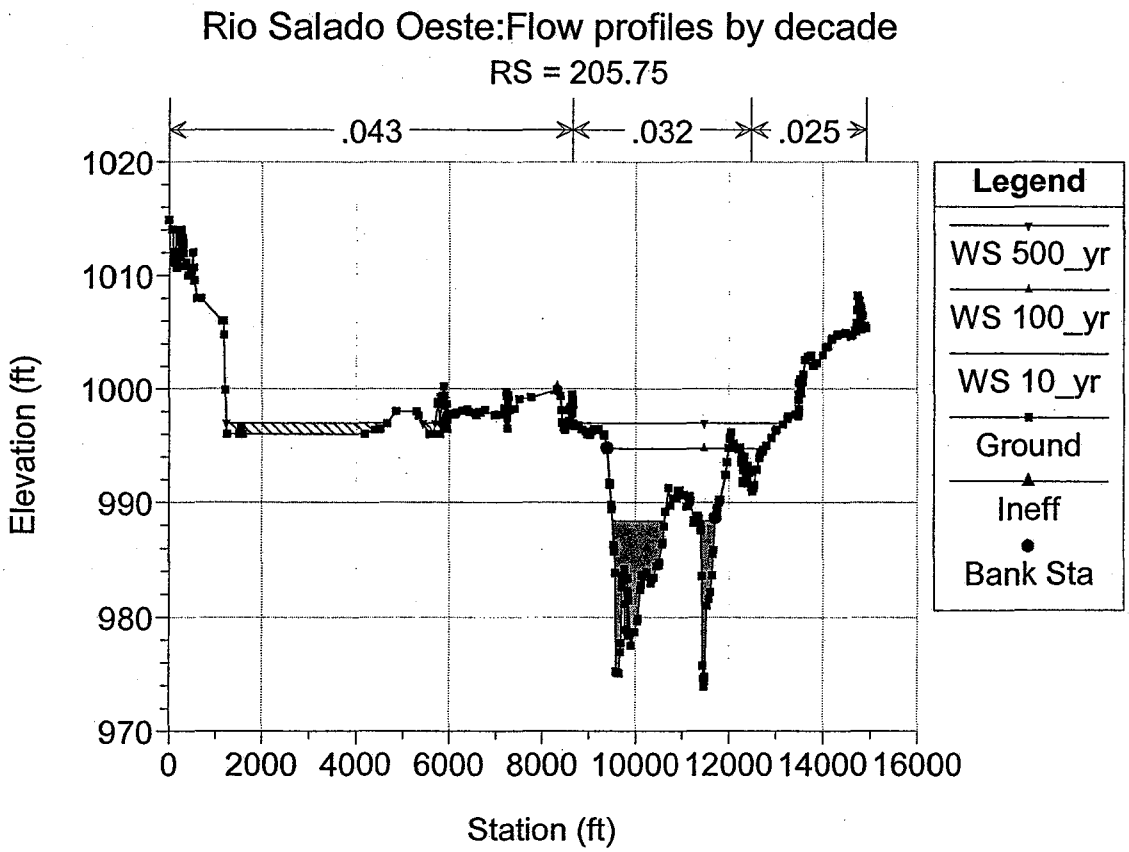

Rio Salado Oeste:Flow profiles by decade
RS = 205.34
.025
.037
.043
Elevation (ft)
1010
1005
1000
995
990
985
980
975
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

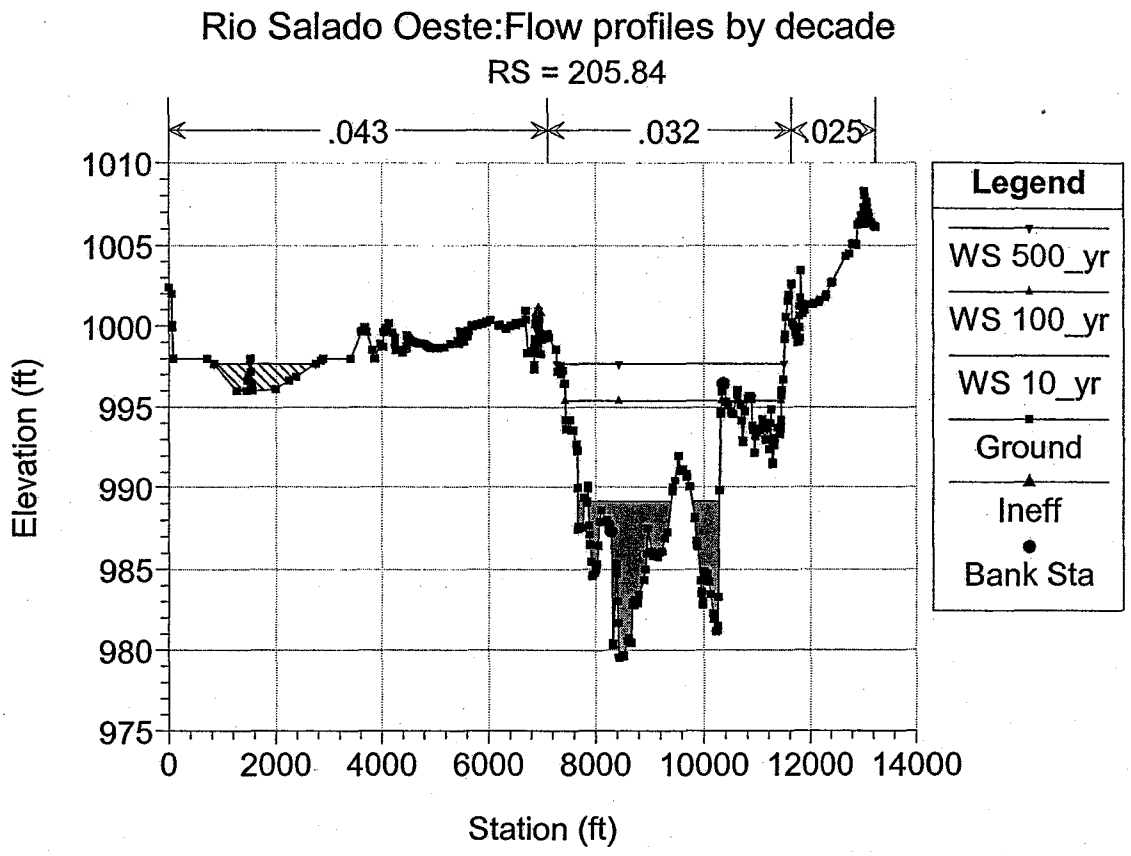

Rio Salado Oeste:Flow profiles by decade
RS = 205.4
.043
.032
.032
Elevation (ft)
1010
1005
1000
995
990
985
980
975
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

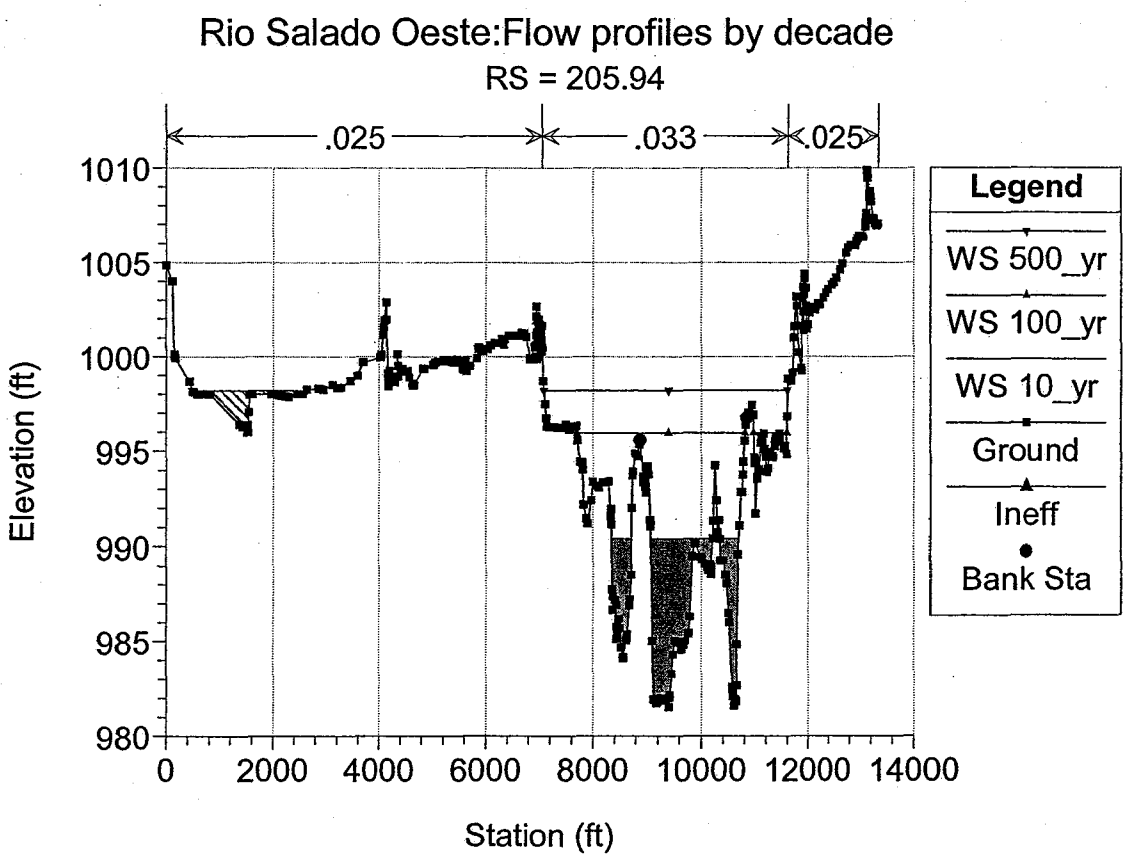

Rio Salado Oeste:Flow profiles by decade
RS = 205.43
.043
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

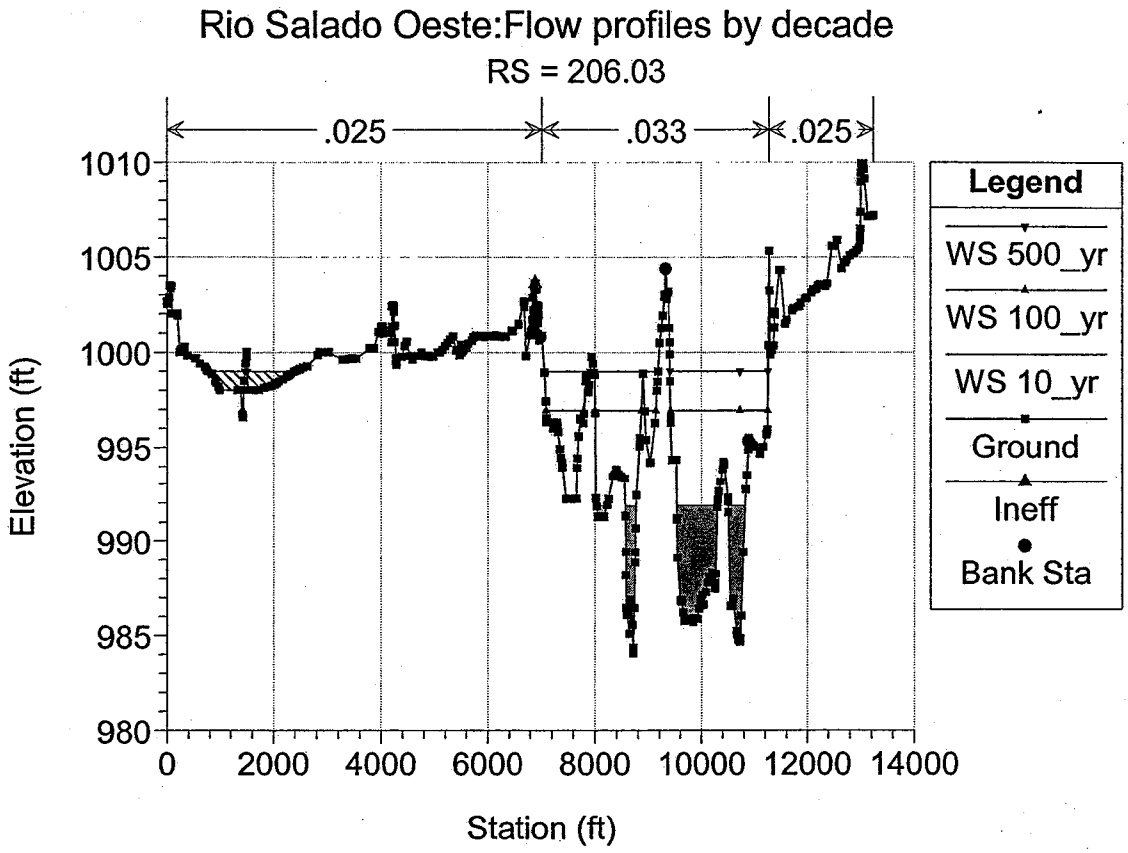

Rio Salado Oeste:Flow profiles by decade
RS = 205.52
.043
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

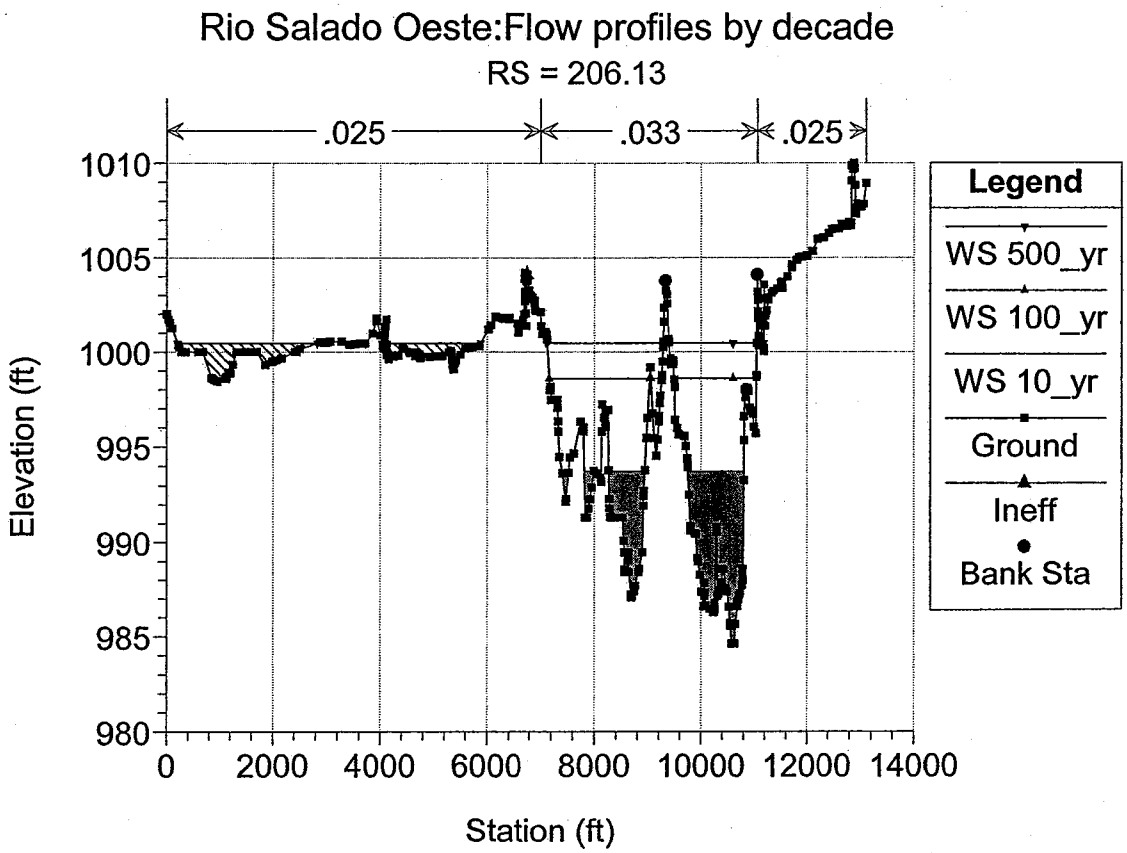

Rio Salado Oeste:Flow profiles by decade
RS = 205.62
.043
.032
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
975
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

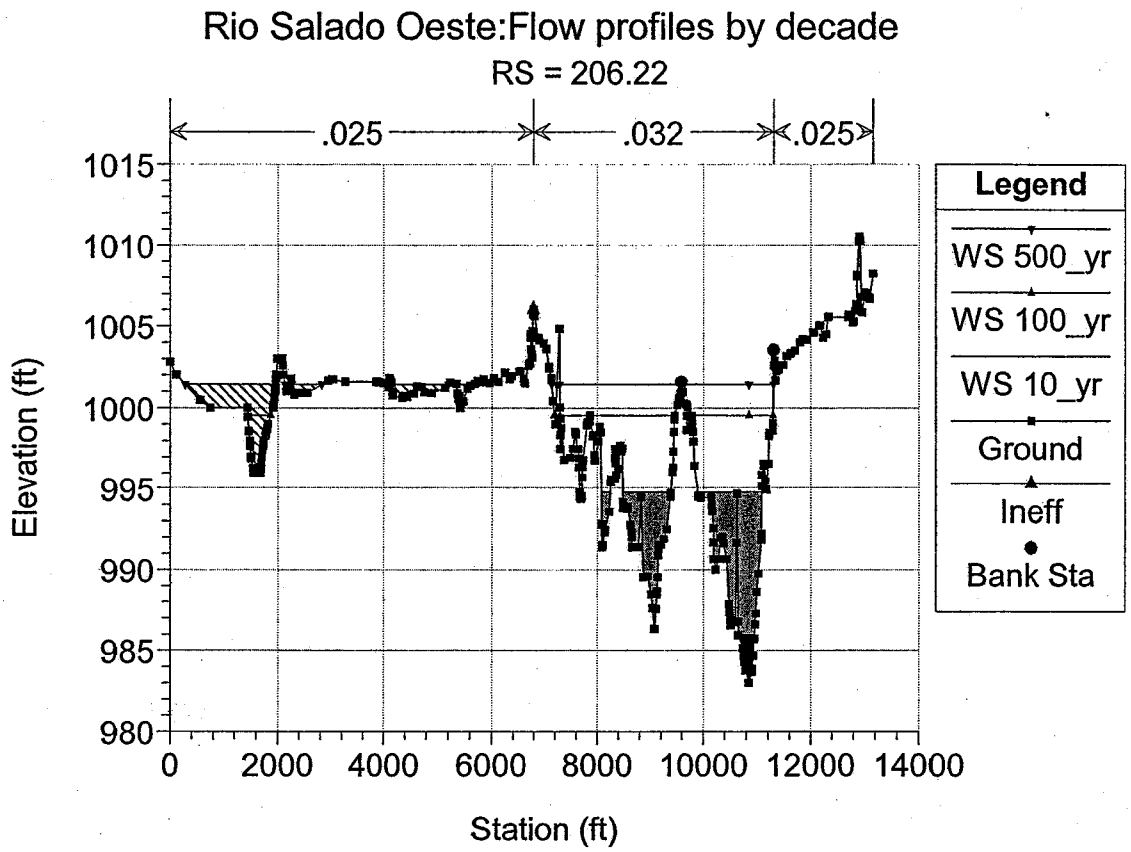

Rio Salado Oeste:Flow profiles by decade
RS = 205.75
.043
.032
.025
Elevation (ft)
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

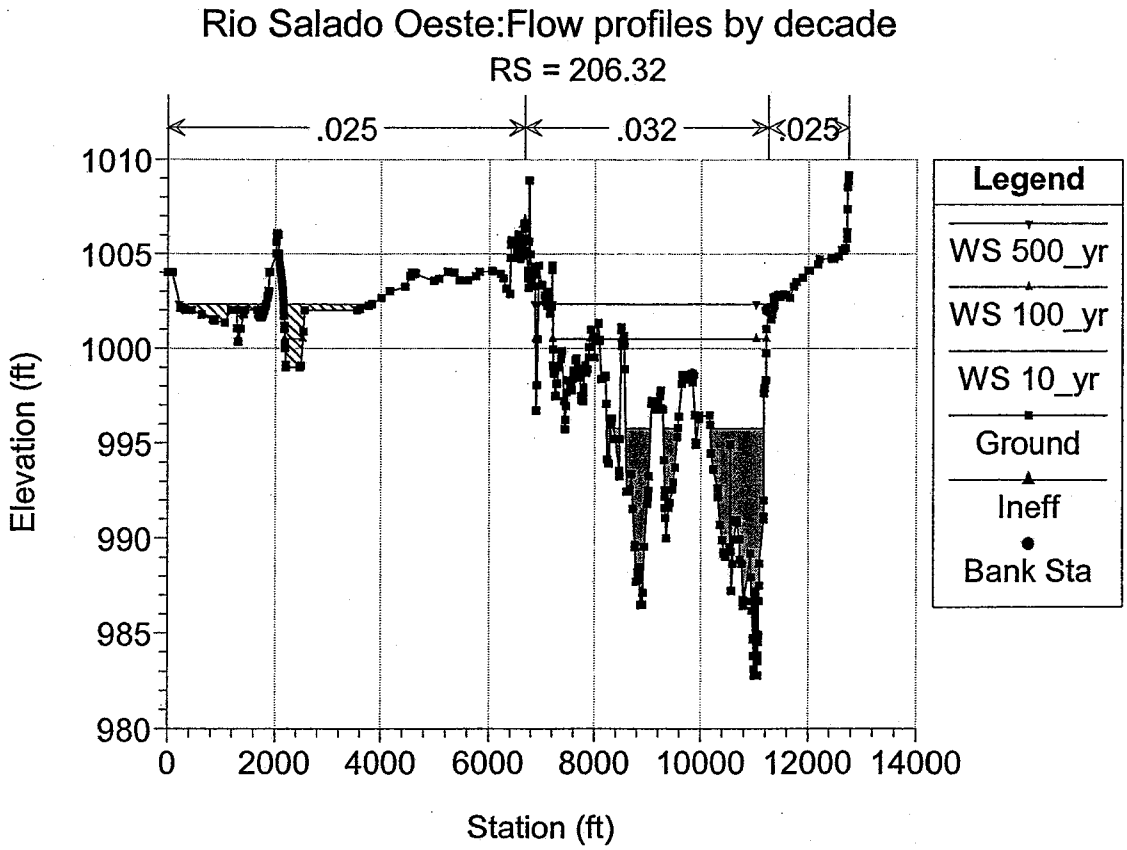

Rio Salado Oeste:Flow profiles by decade
RS = 205.84
.043
.032
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
975
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

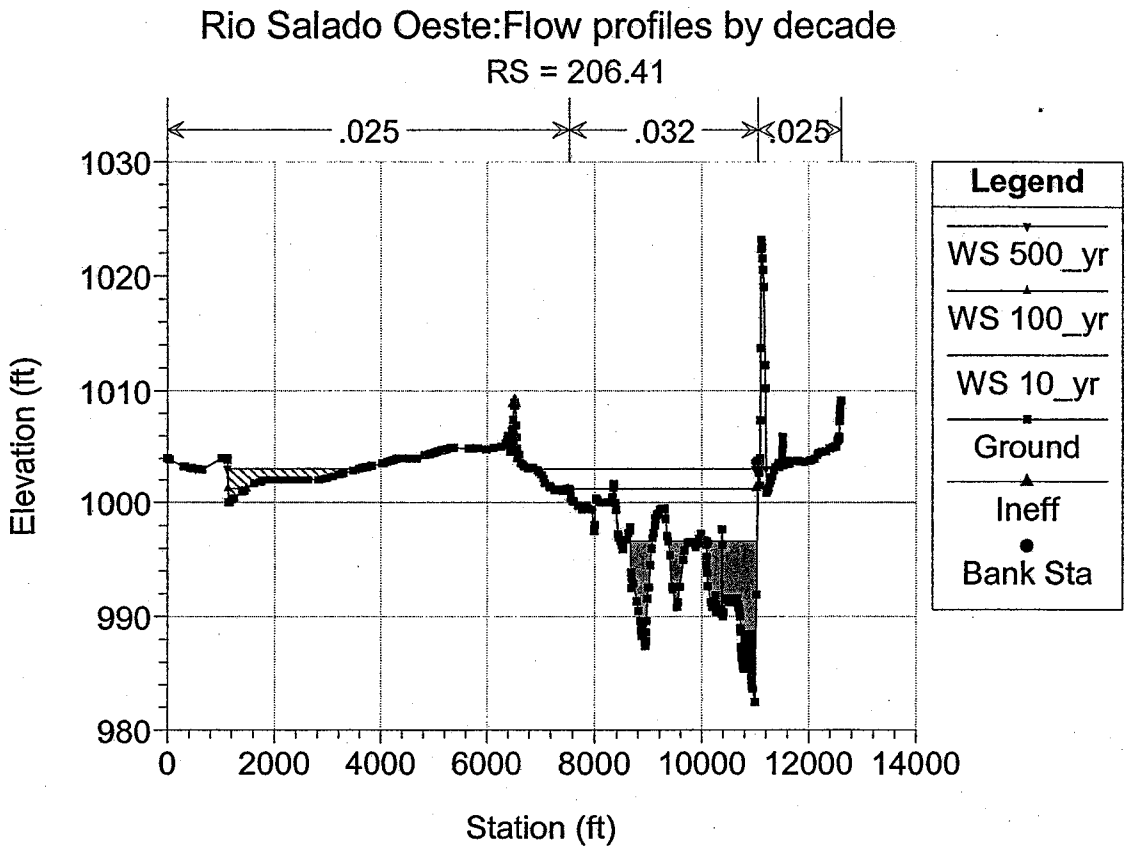

Rio Salado Oeste:Flow profiles by decade
RS = 205.94
.025
.033
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

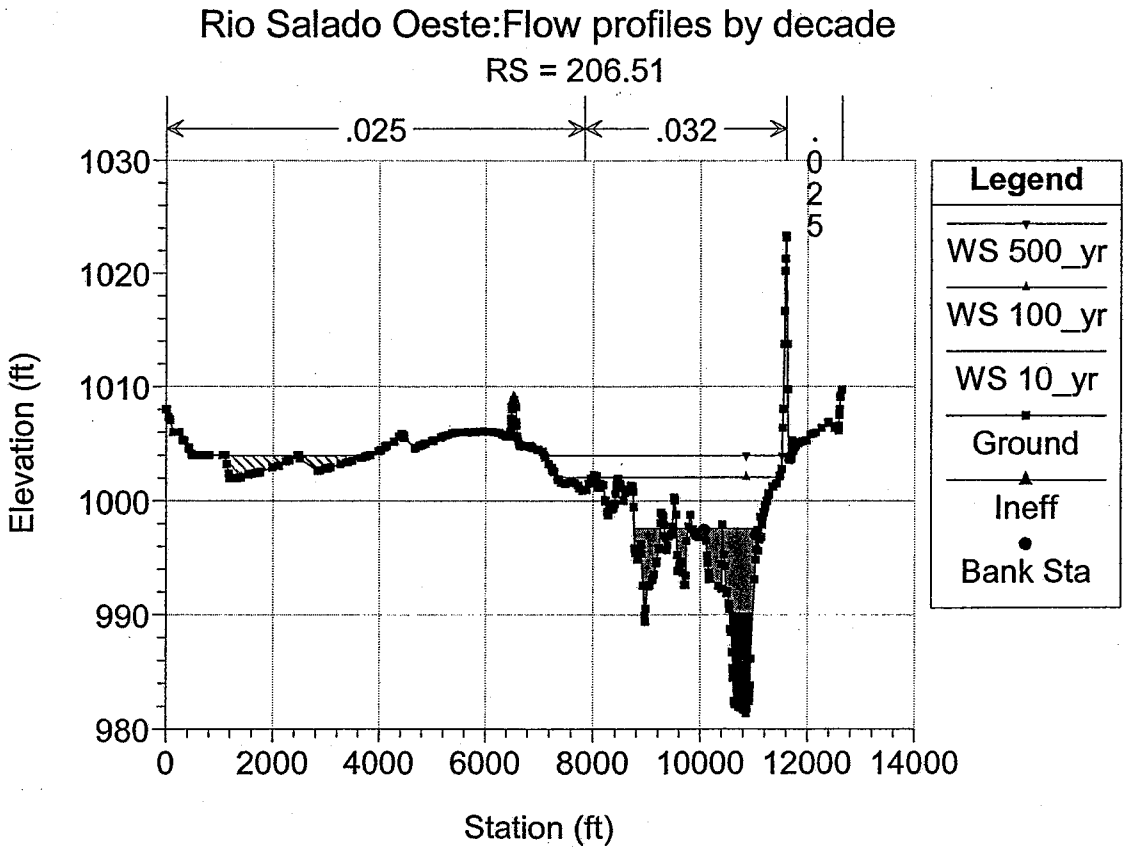

Rio Salado Oeste:Flow profiles by decade
RS = 206.03
.025
.033
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

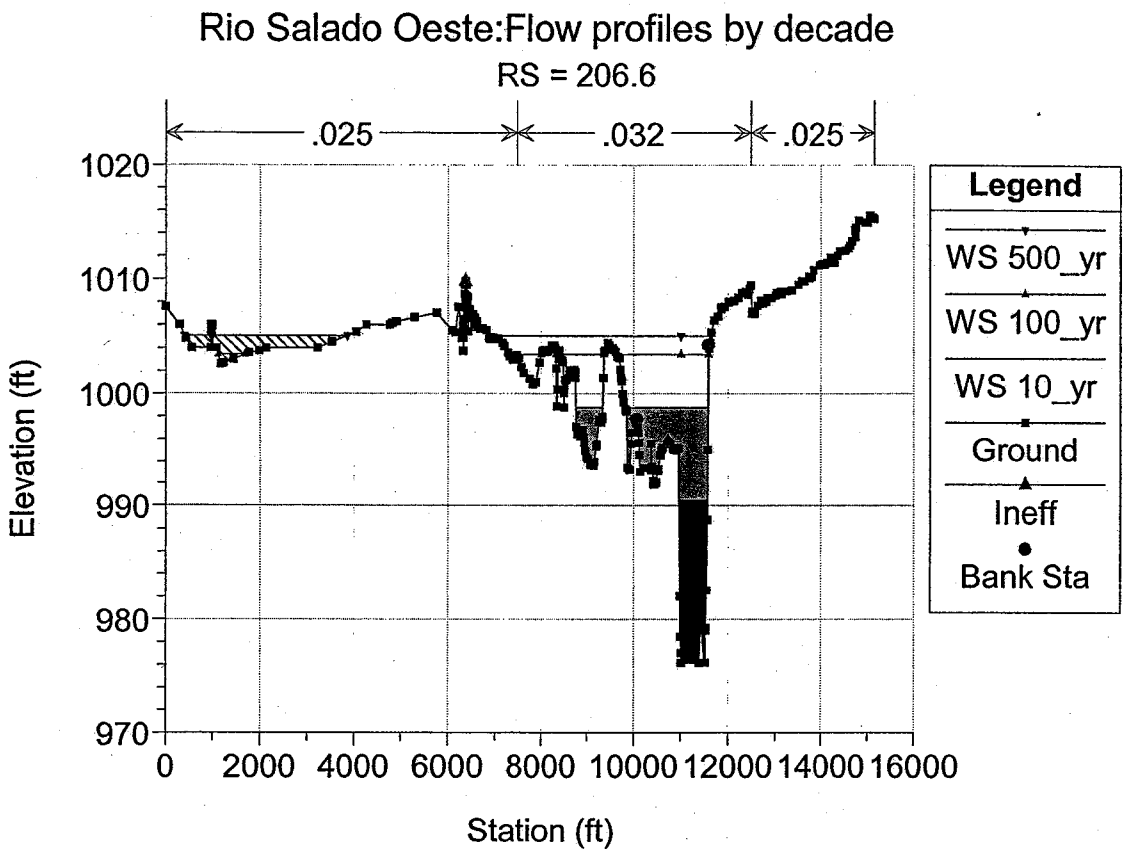

Rio Salado Oeste:Flow profiles by decade
RS = 206.13
.025
.033
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

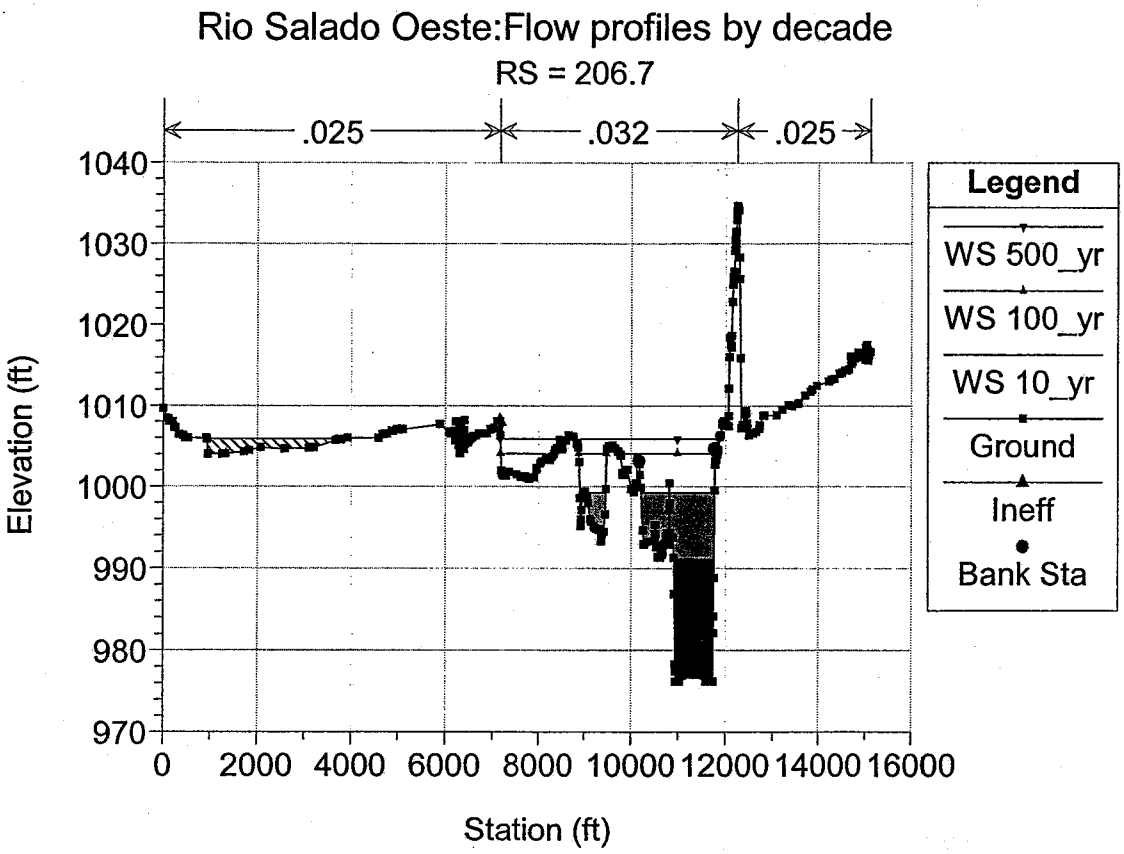

Rio Salado Oeste:Flow profiles by decade
RS = 206.22
.025
.032
.025
Elevation (ft)
1015
1010
1005
1000
995
990
985
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

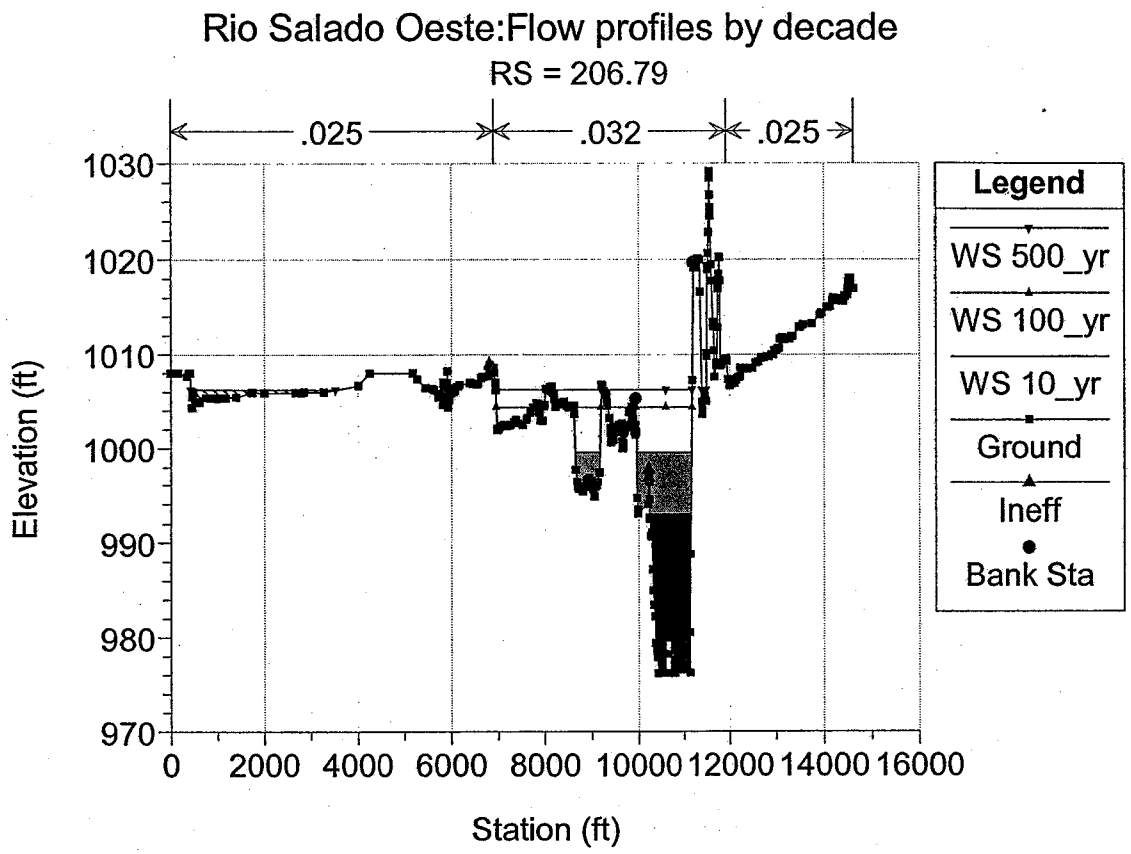

Rio Salado Oeste:Flow profiles by decade
RS = 206.32
.025
.032
.025
Elevation (ft)
1010
1005
1000
995
990
985
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

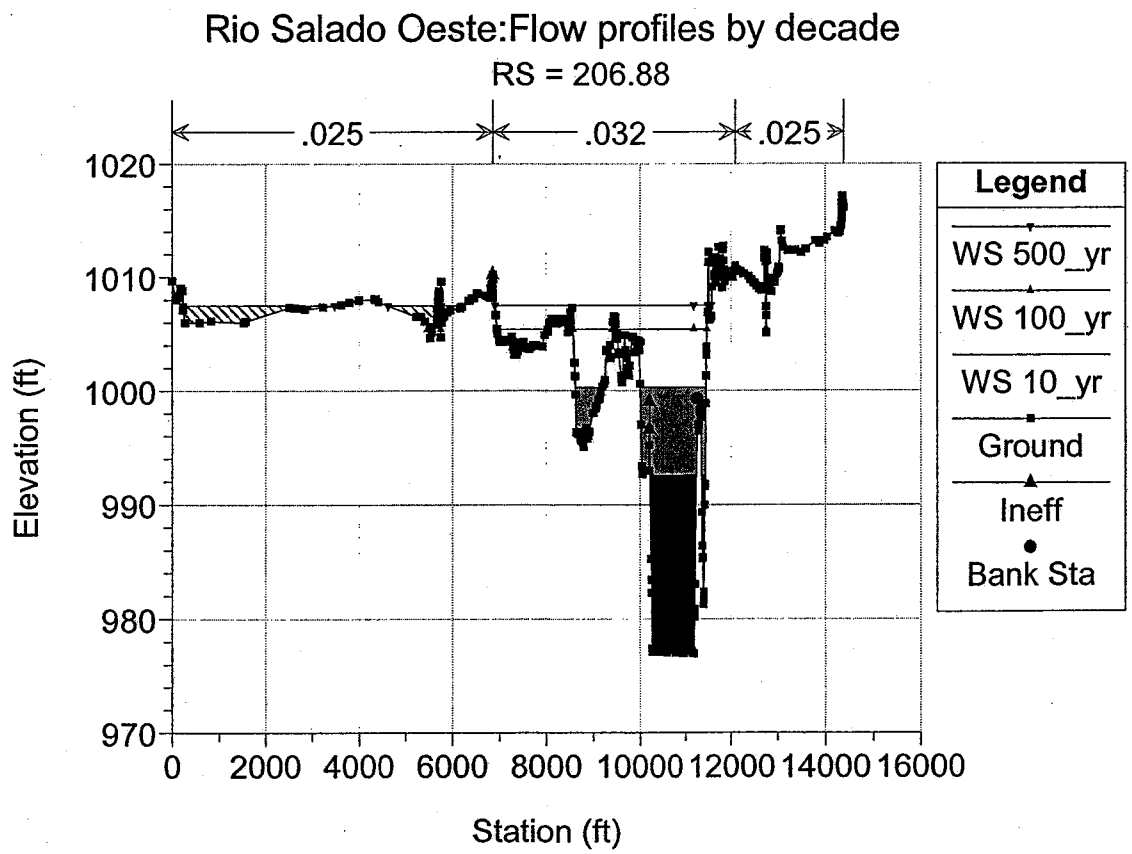

Rio Salado Oeste:Flow profiles by decade
RS = 206.41
.025
.032
.025
Elevation (ft)
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

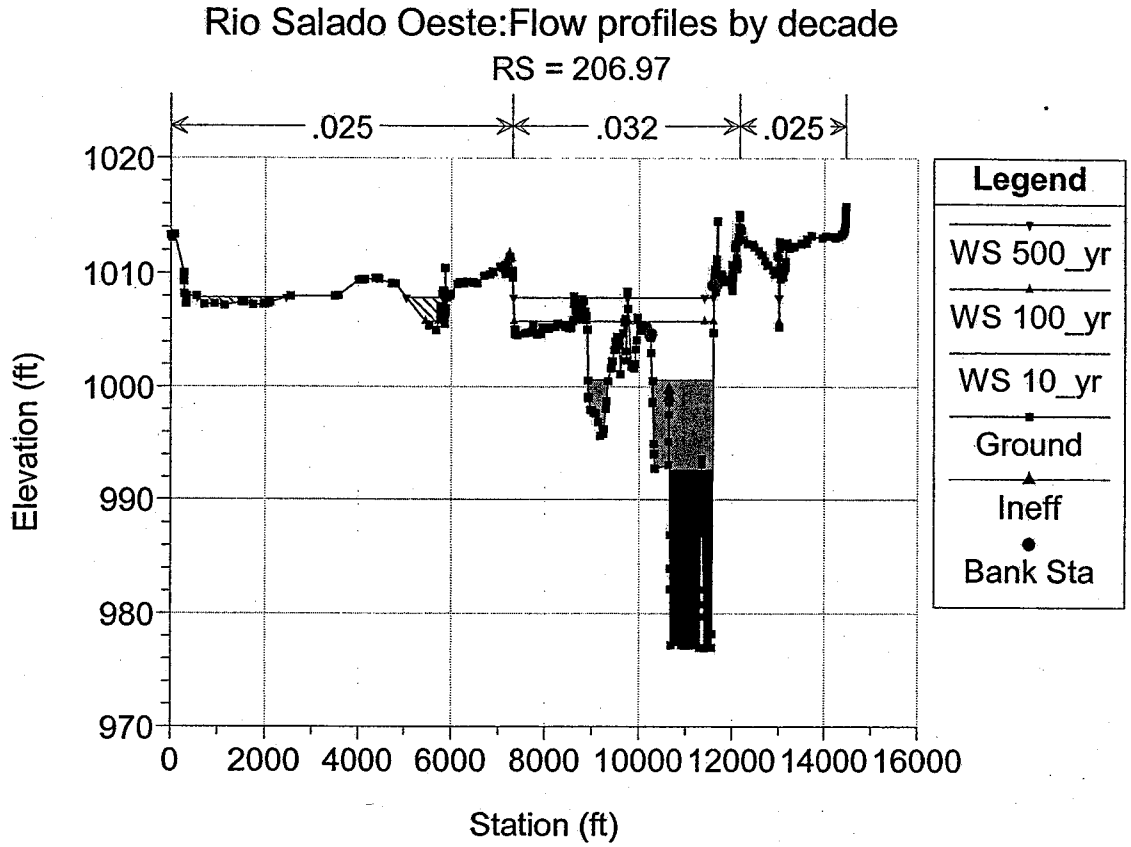

Rio Salado Oeste:Flow profiles by decade
RS = 206.51
.025
.032
.025
Elevation (ft)
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

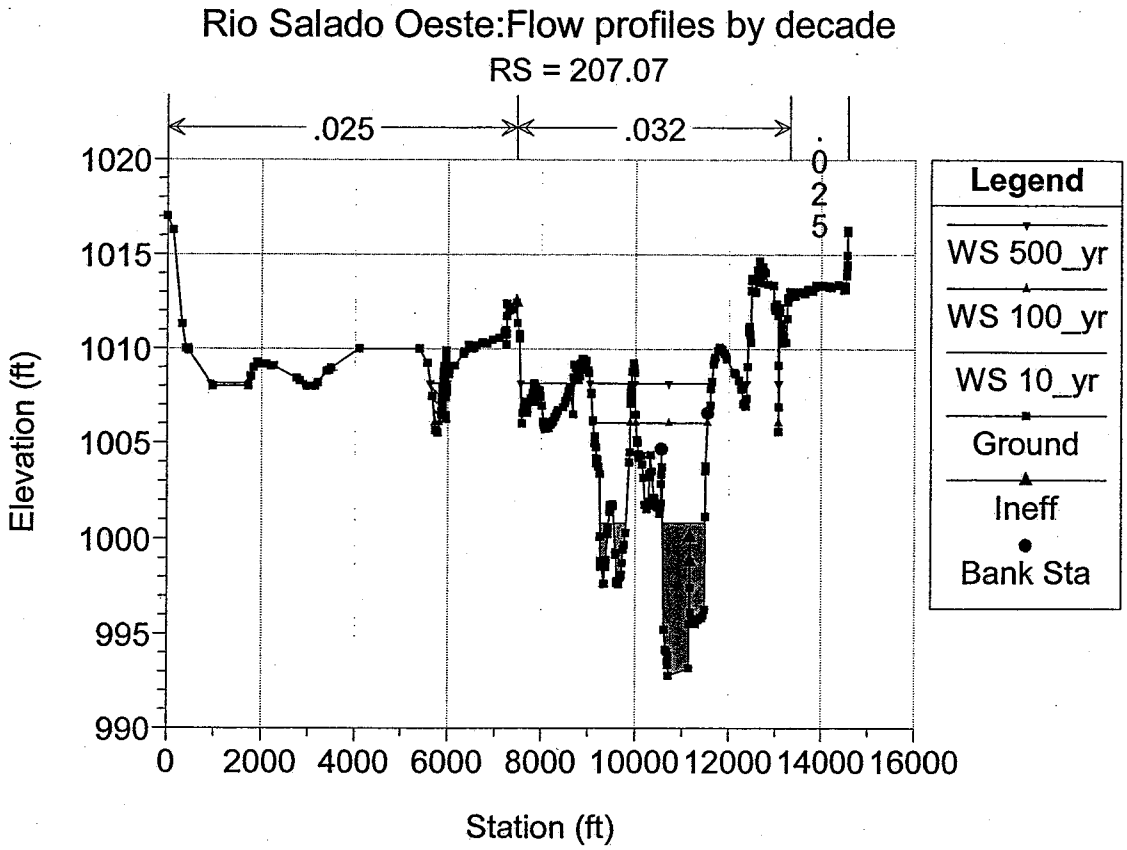

Rio Salado Oeste:Flow profiles by decade
RS = 206.6
.025
.032
.025
Elevation (ft)
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

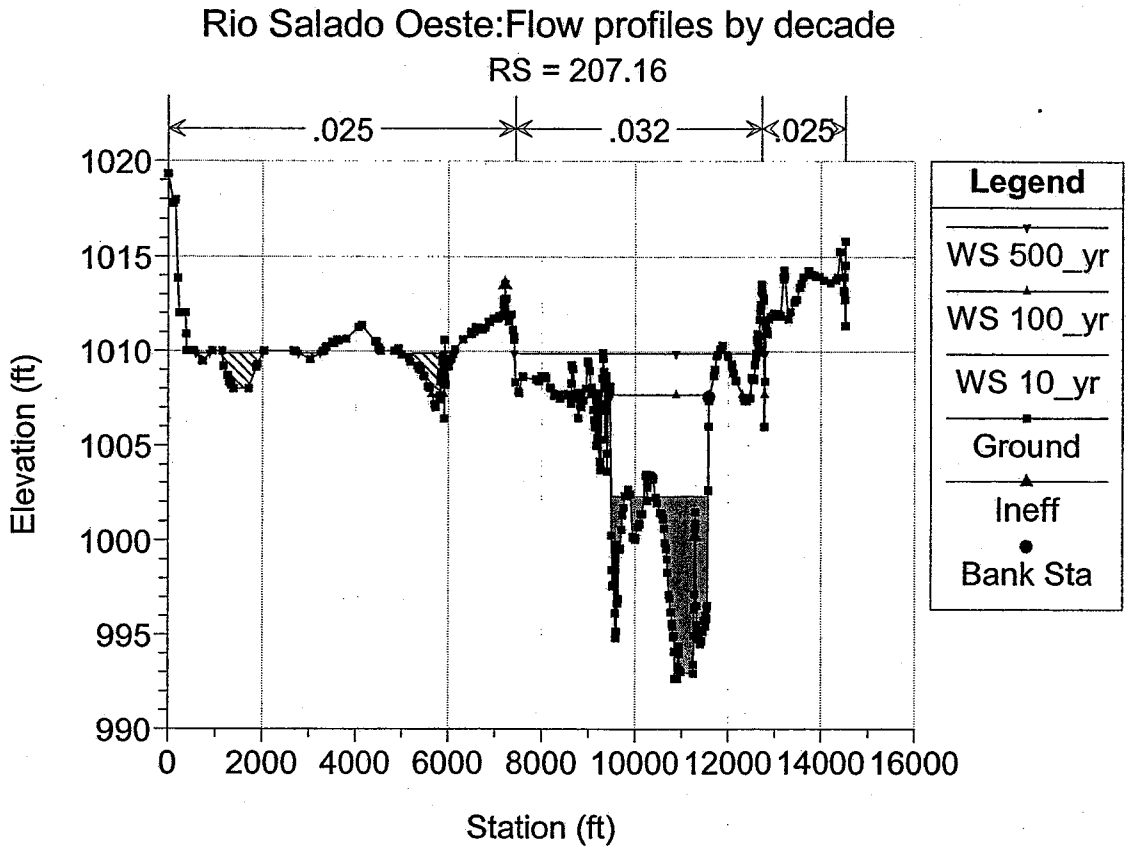

Rio Salado Oeste:Flow profiles by decade
RS = 206.7
.025
.032
.025
Elevation (ft)
1040
1030
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

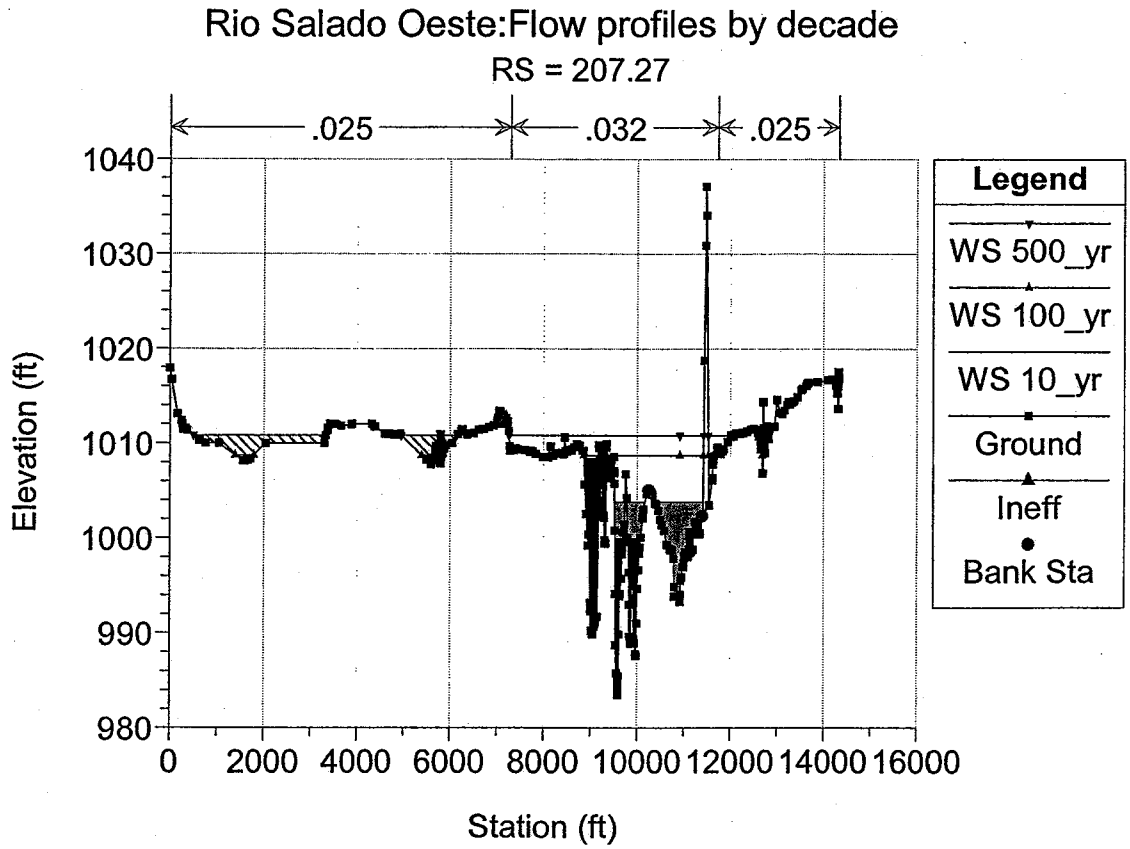

Rio Salado Oeste:Flow profiles by decade
RS = 206.79
.025
.032
.025
Elevation (ft)
1030
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

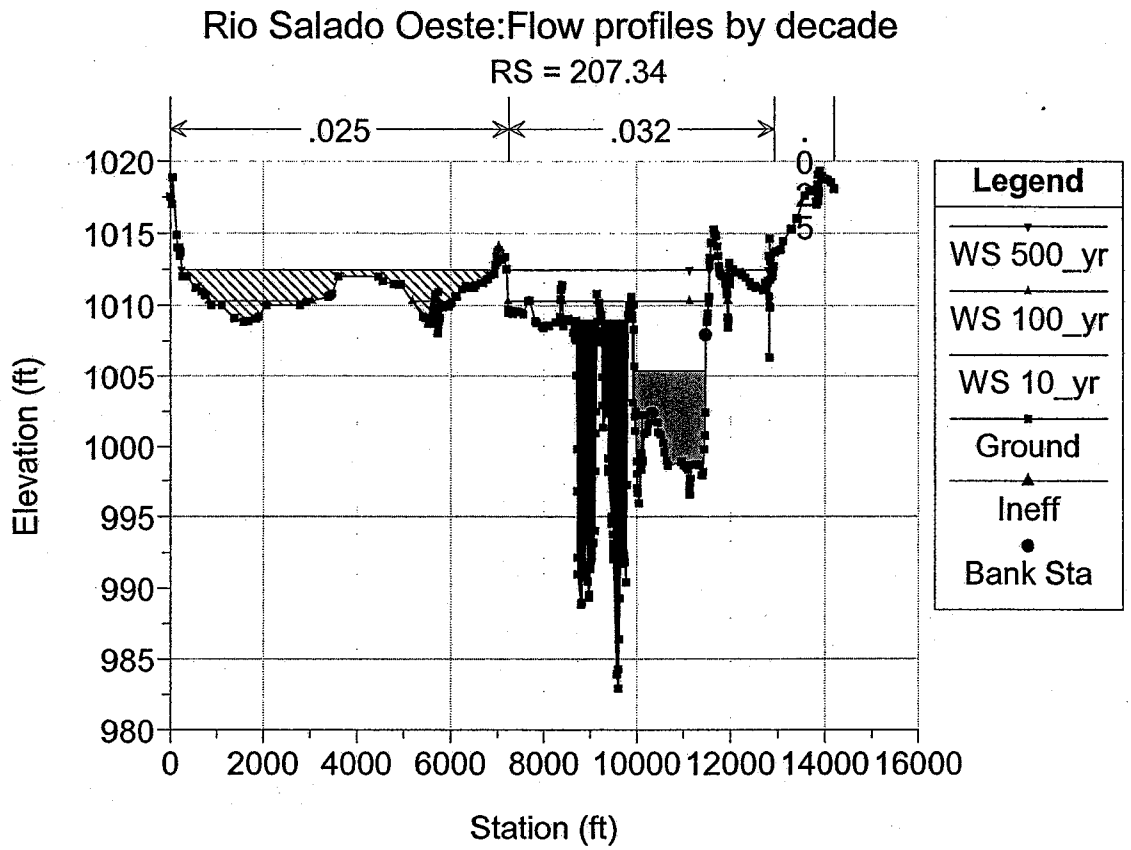

Rio Salado Oeste:Flow profiles by decade
RS = 206.88
.025
.032
.025
Elevation (ft)
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

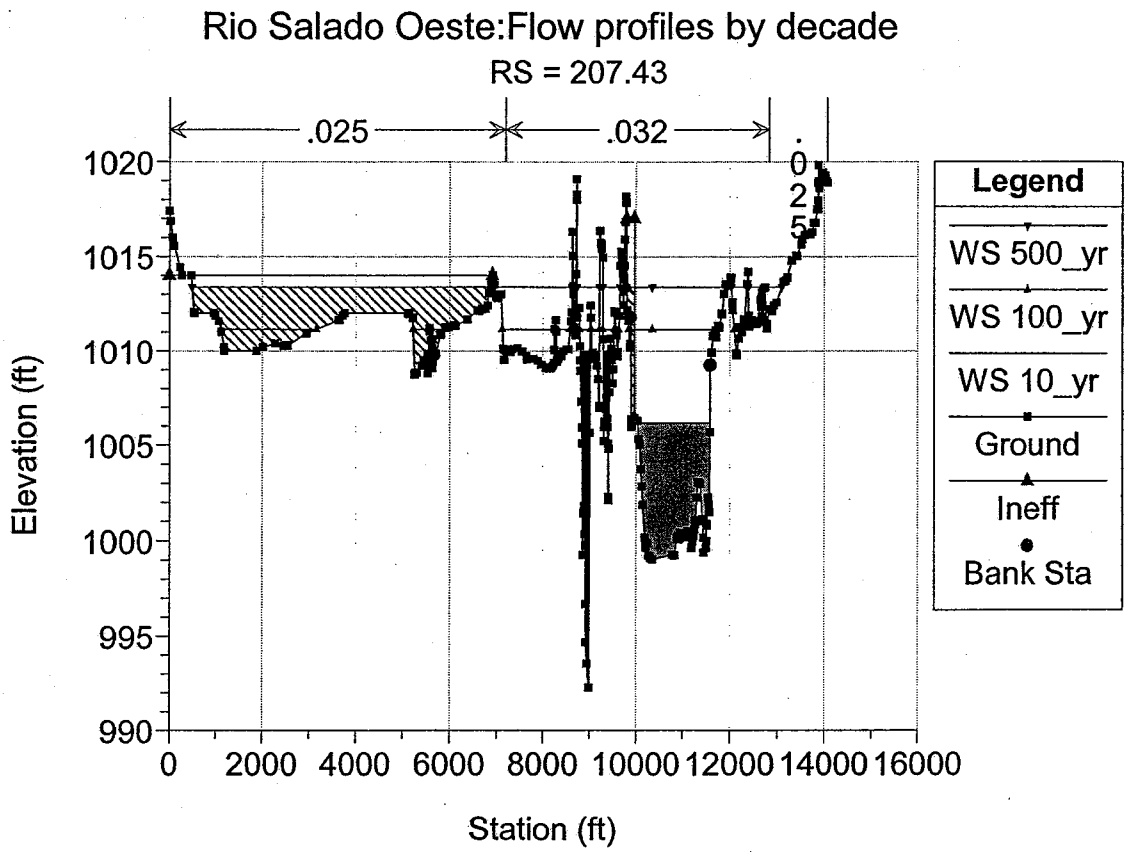

Rio Salado Oeste:Flow profiles by decade
RS = 206.97
.025
.032
.025
Elevation (ft)
1020
1010
1000
990
980
970
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

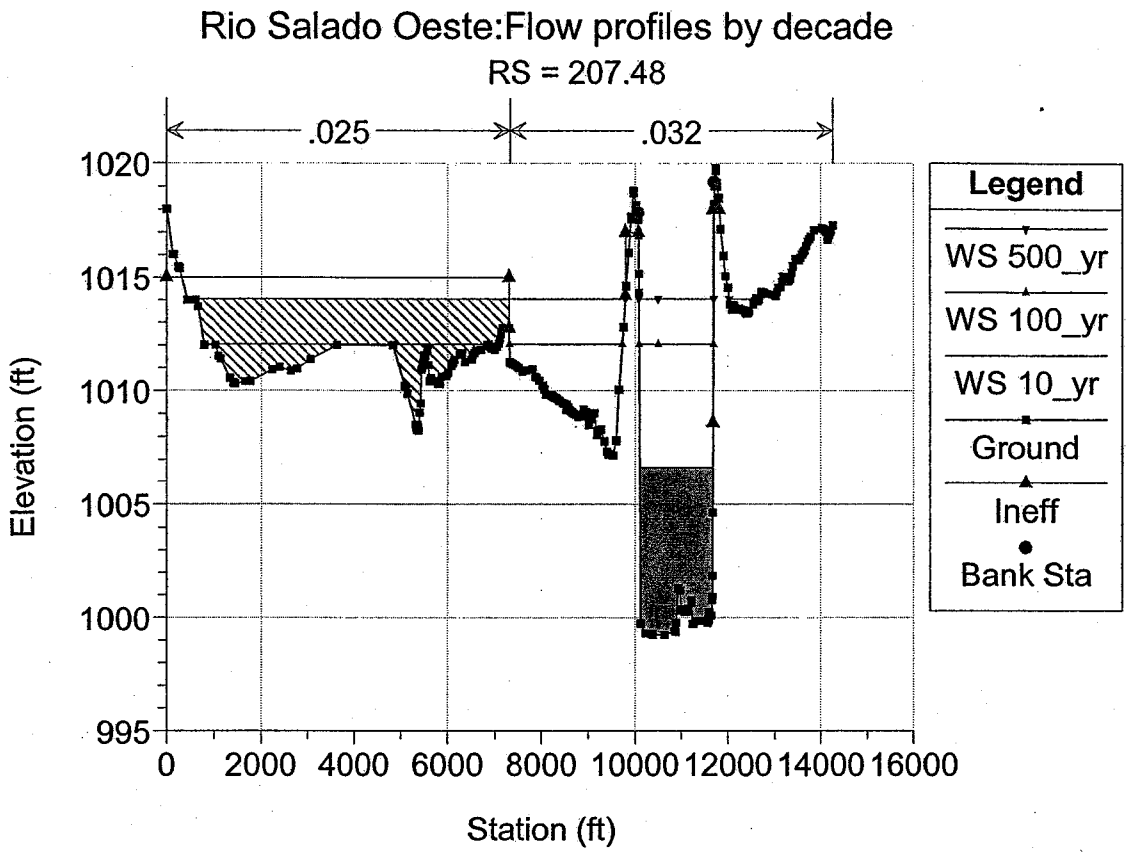

Rio Salado Oeste:Flow profiles by decade
RS = 207.07
.025
.032
.025
Elevation (ft)
1020
1015
1010
1005
1000
995
990
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

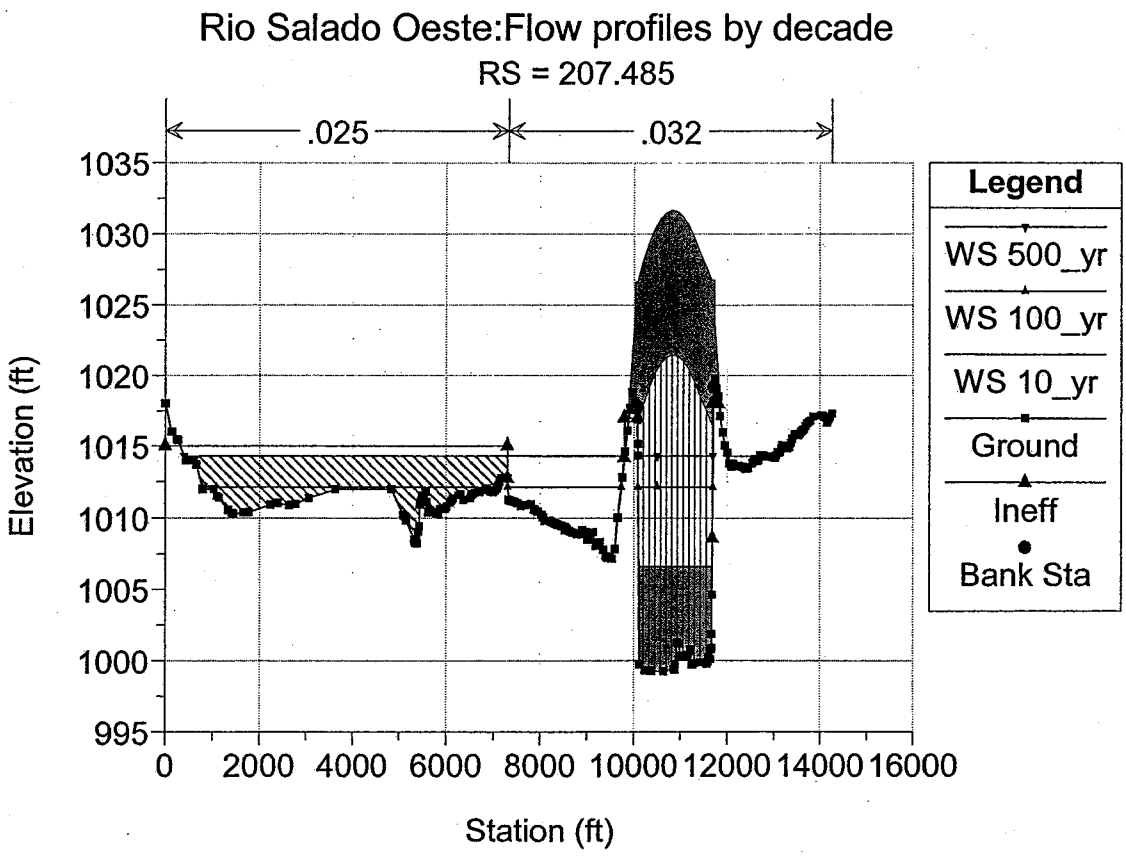

Rio Salado Oeste:Flow profiles by decade
RS = 207.16
.025
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

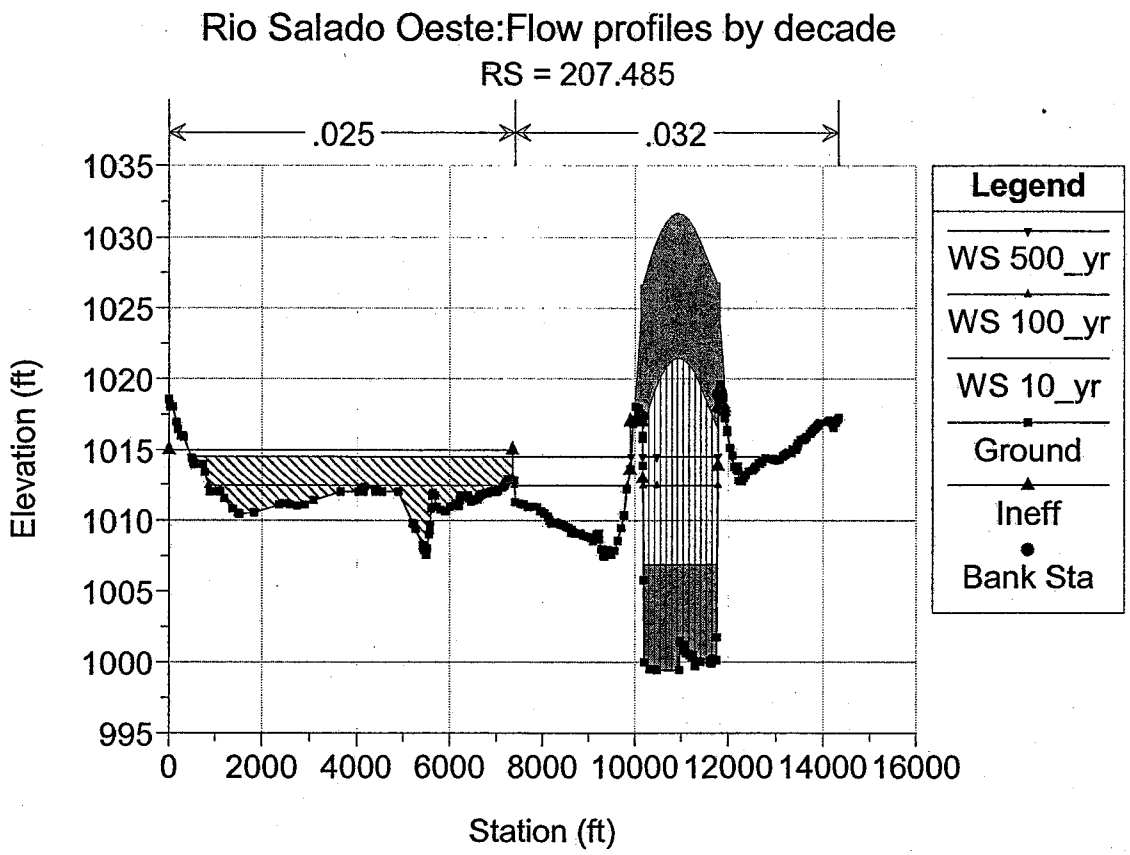

Rio Salado Oeste:Flow profiles by decade
RS = 207.27
.025
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

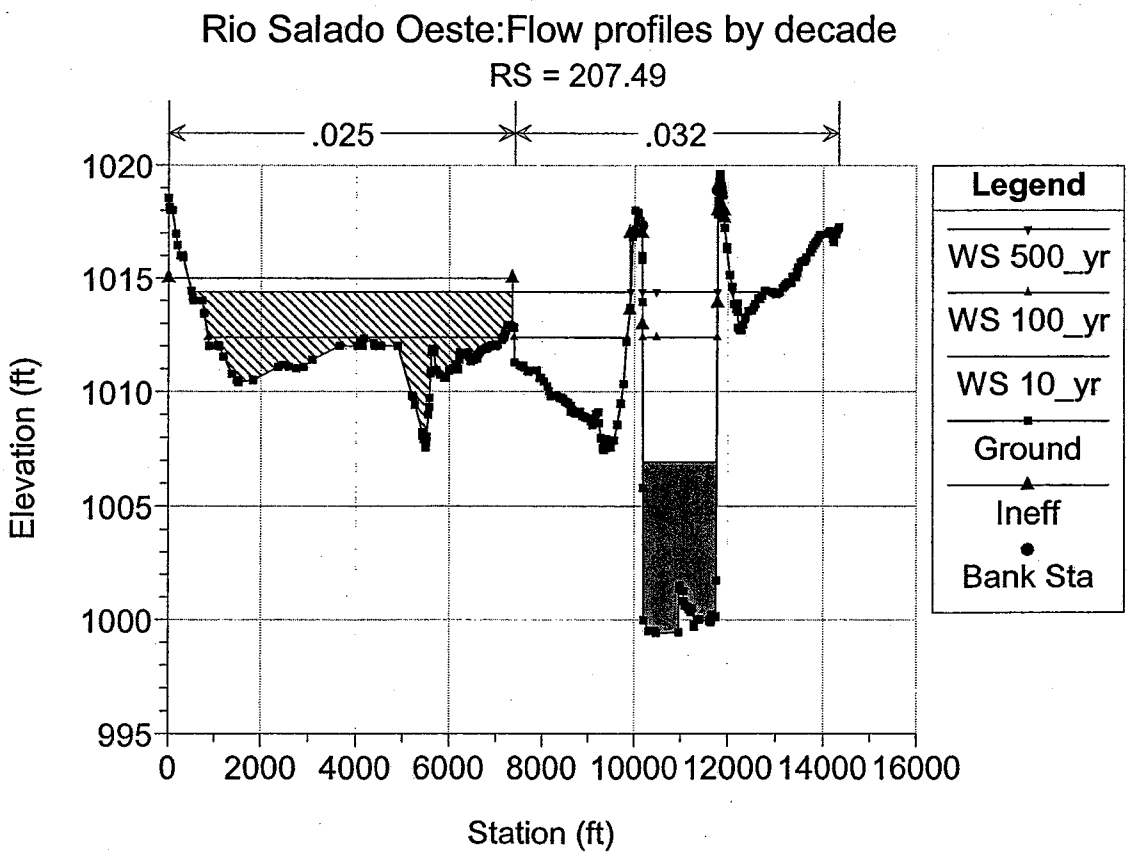

Rio Salado Oeste:Flow profiles by decade
RS = 207.34
.025
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

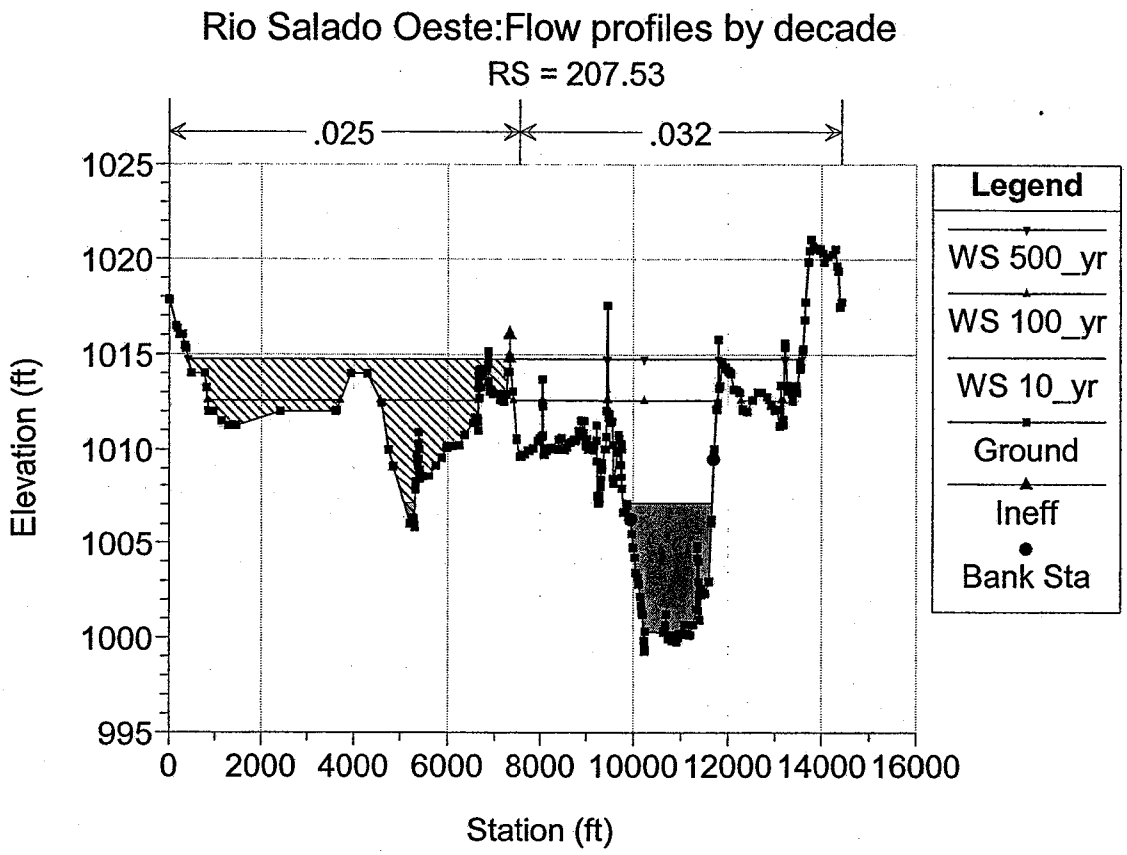

Rio Salado Oeste:Flow profiles by decade
RS = 207.43
.025
.032
.025
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

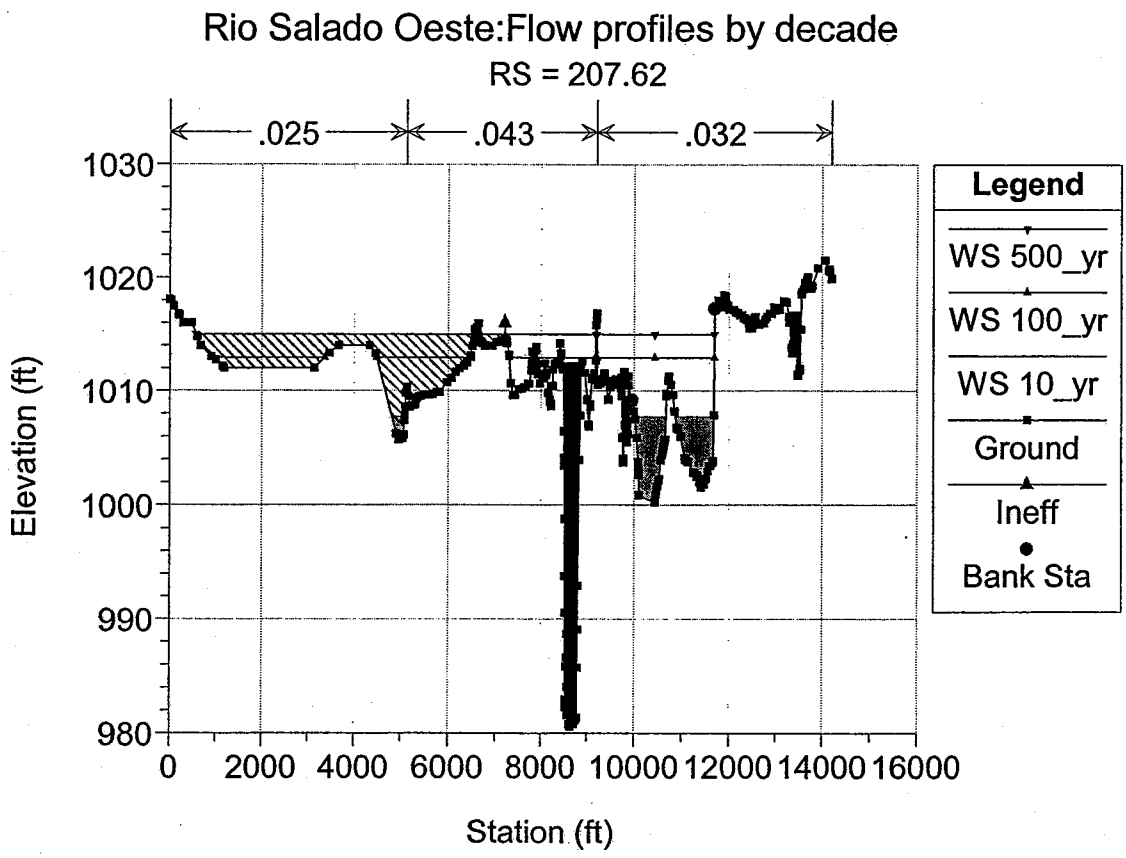

Rio Salado Oeste:Flow profiles by decade
RS = 207.48
.025
.032
Elevation (ft)
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

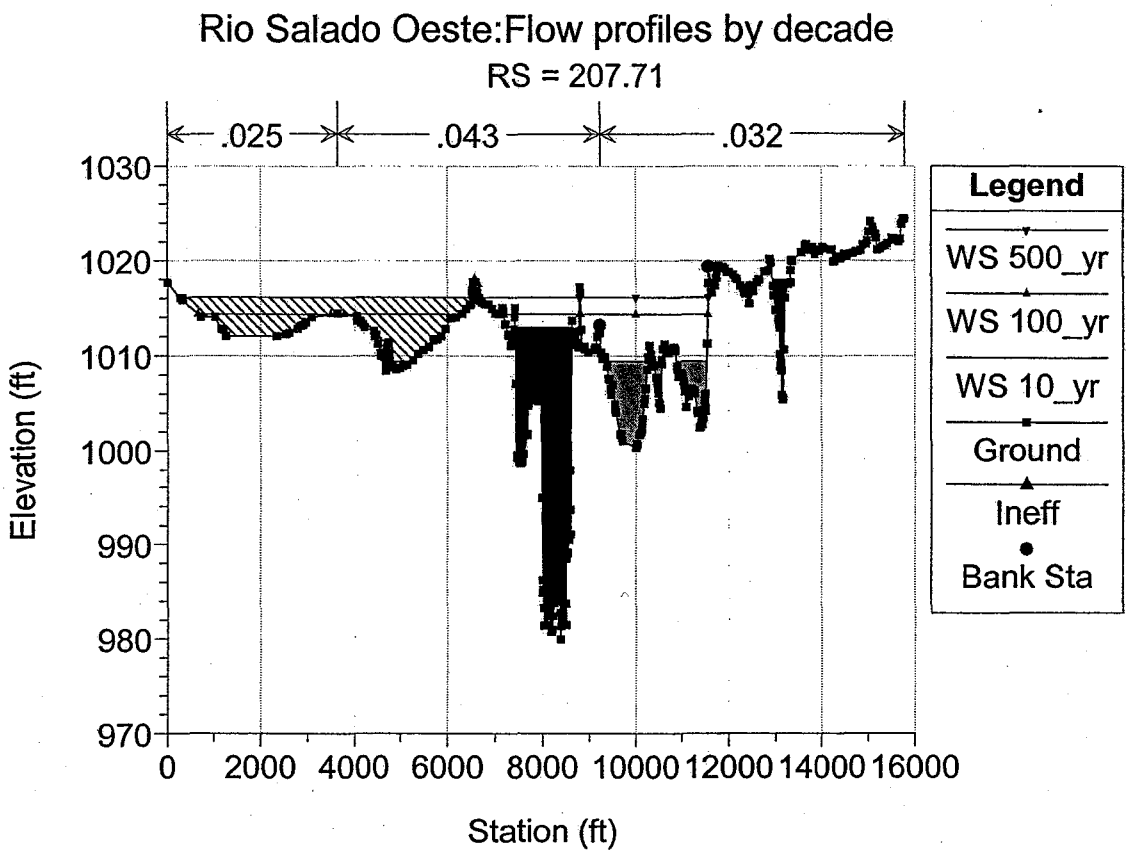

Rio Salado Oeste:Flow profiles by decade
RS = 207.485
.025
.032
Elevation (ft)
1035
1030
1025
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

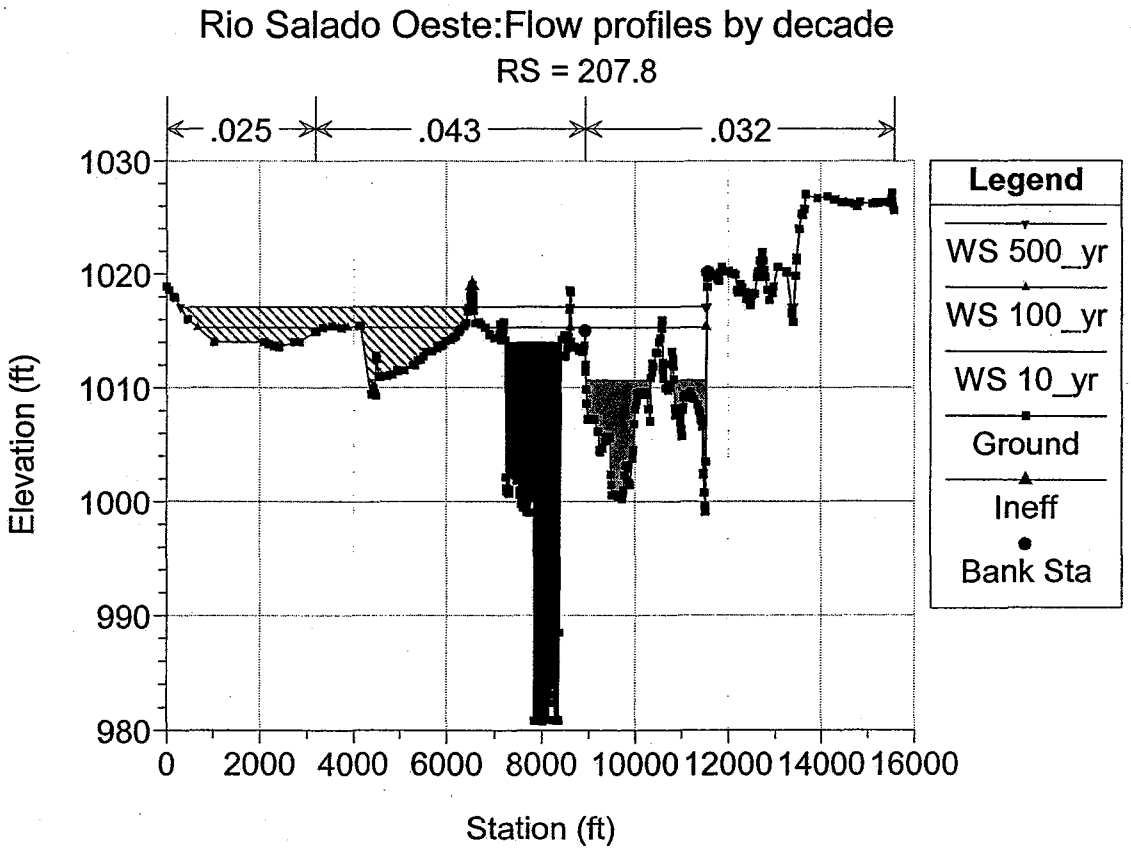

Rio Salado Oeste:Flow profiles by decade
RS = 207.485
.025
.032
Elevation (ft)
1035
1030
1025
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

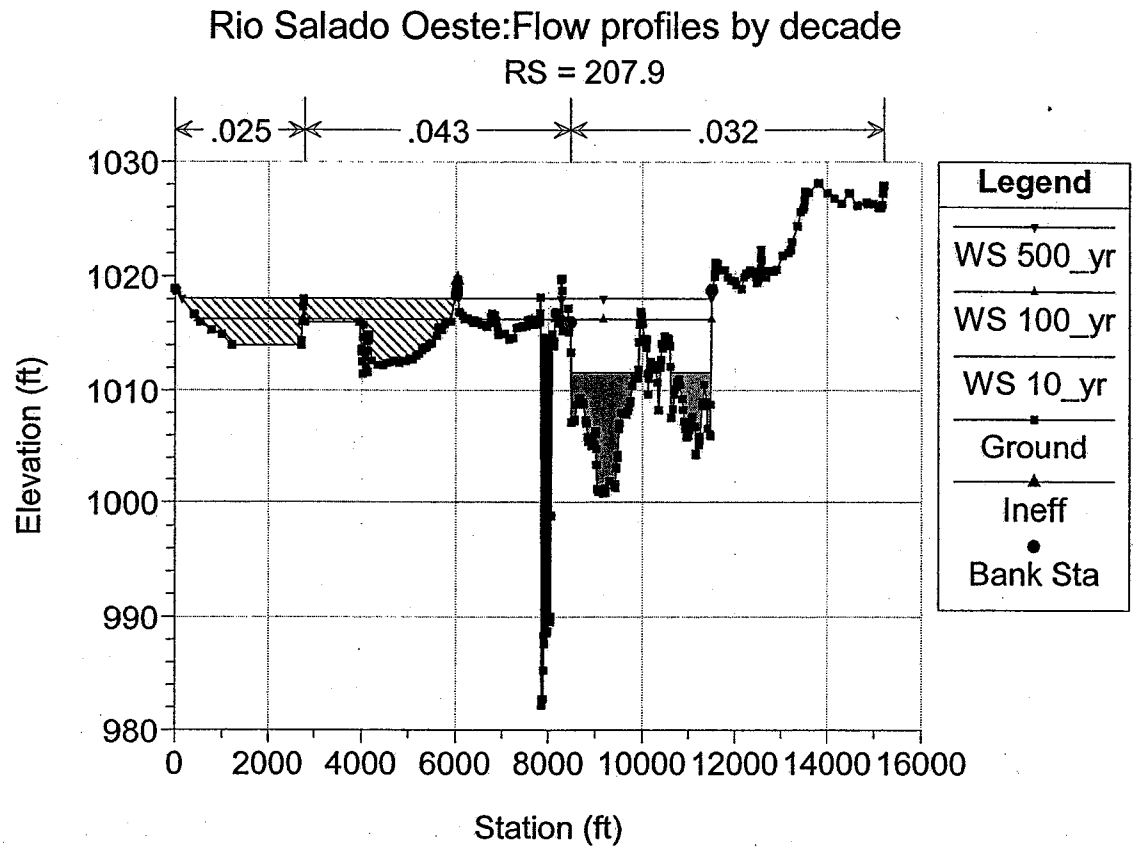

Rio Salado Oeste:Flow profiles by decade
RS = 207.49
.025
.032
Elevation (ft)
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

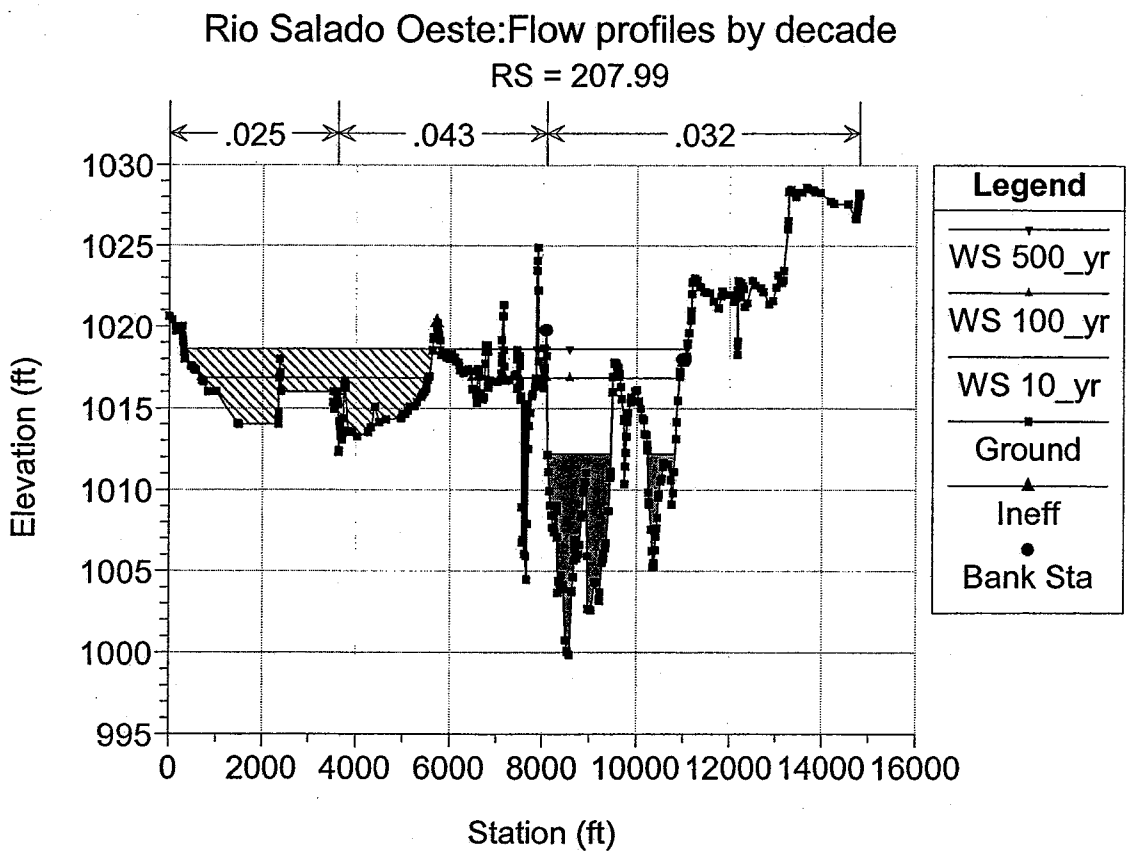

Rio Salado Oeste:Flow profiles by decade
RS = 207.53
.025
.032
Elevation (ft)
1025
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

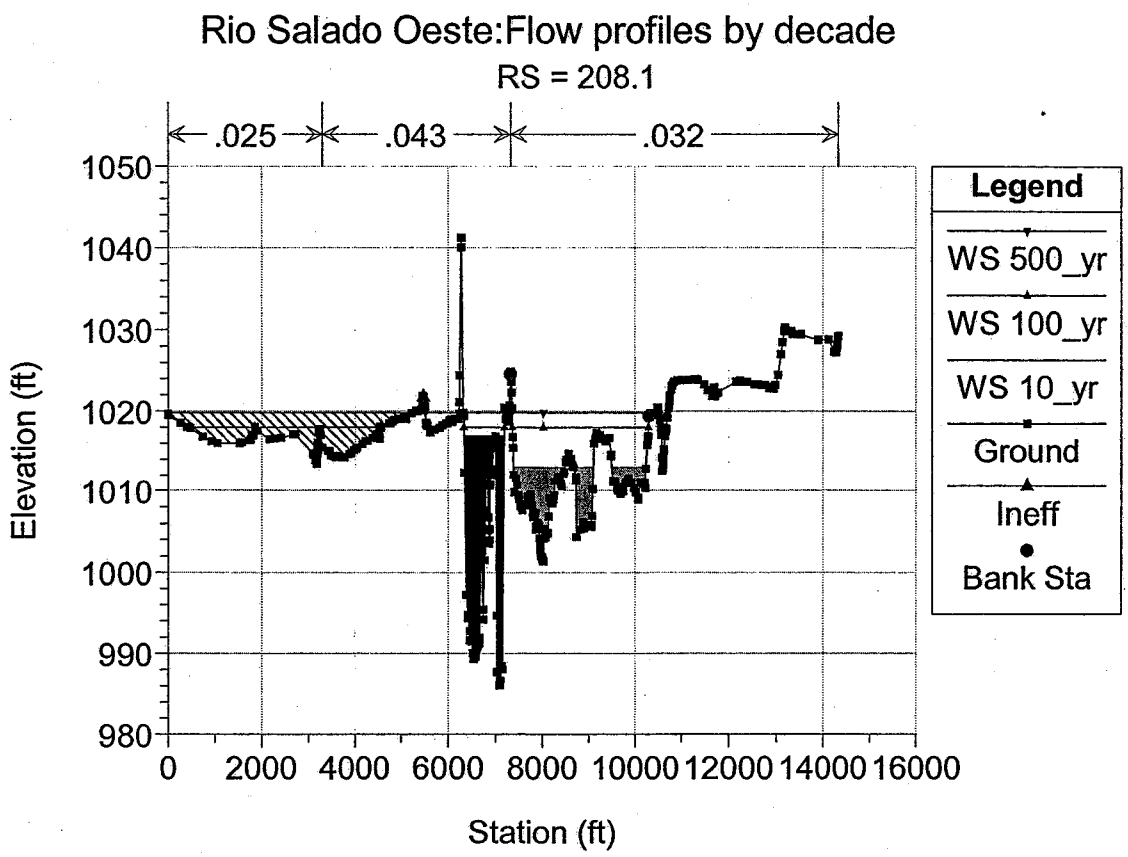

Rio Salado Oeste:Flow profiles by decade
RS = 207.62
.025
.043
.032
Elevation (ft)
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

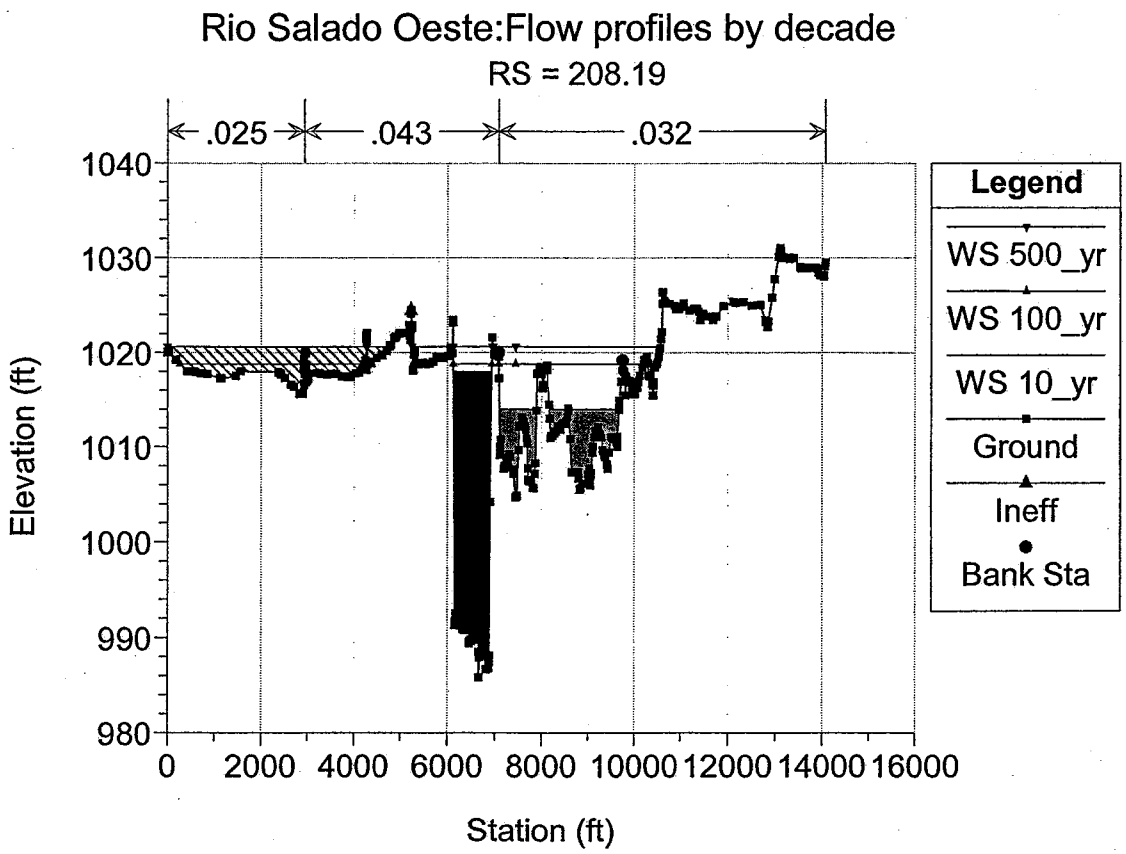

Rio Salado Oeste:Flow profiles by decade
RS = 207.71
.025
.043
.032
1030
1020
1010
1000
990
980
970
Elevation (ft)
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

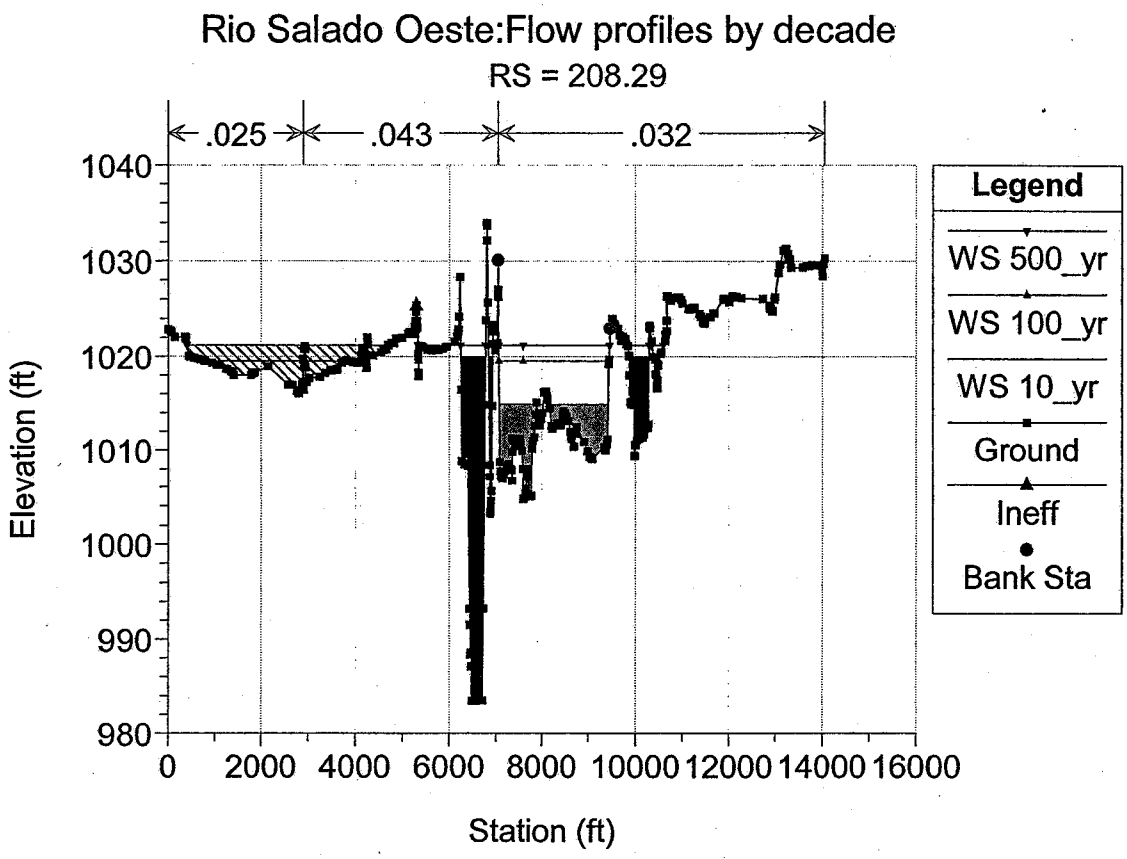

Rio Salado Oeste:Flow profiles by decade
RS = 207.8
.025
.043
.032
1030
1020
1010
1000
990
980
Elevation (ft)
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

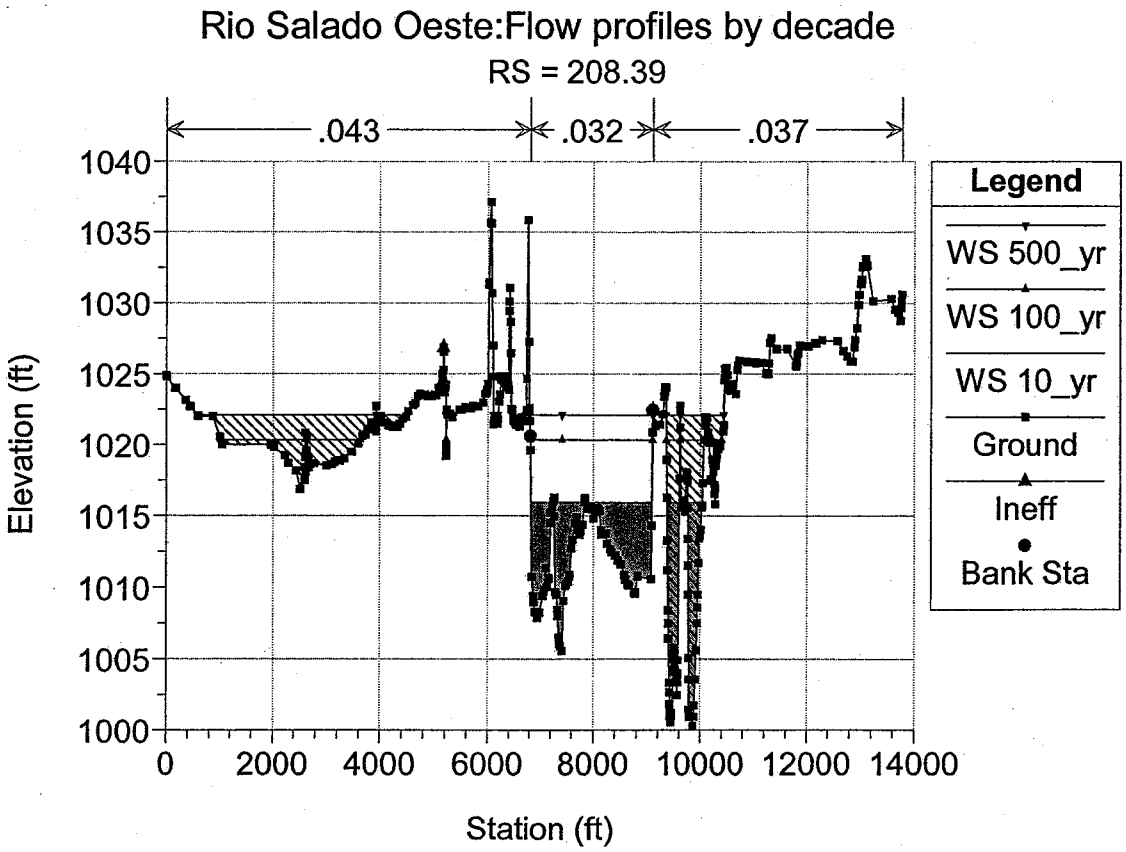

Rio Salado Oeste:Flow profiles by decade
RS = 207.9
.025
.043
.032
Elevation (ft)
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

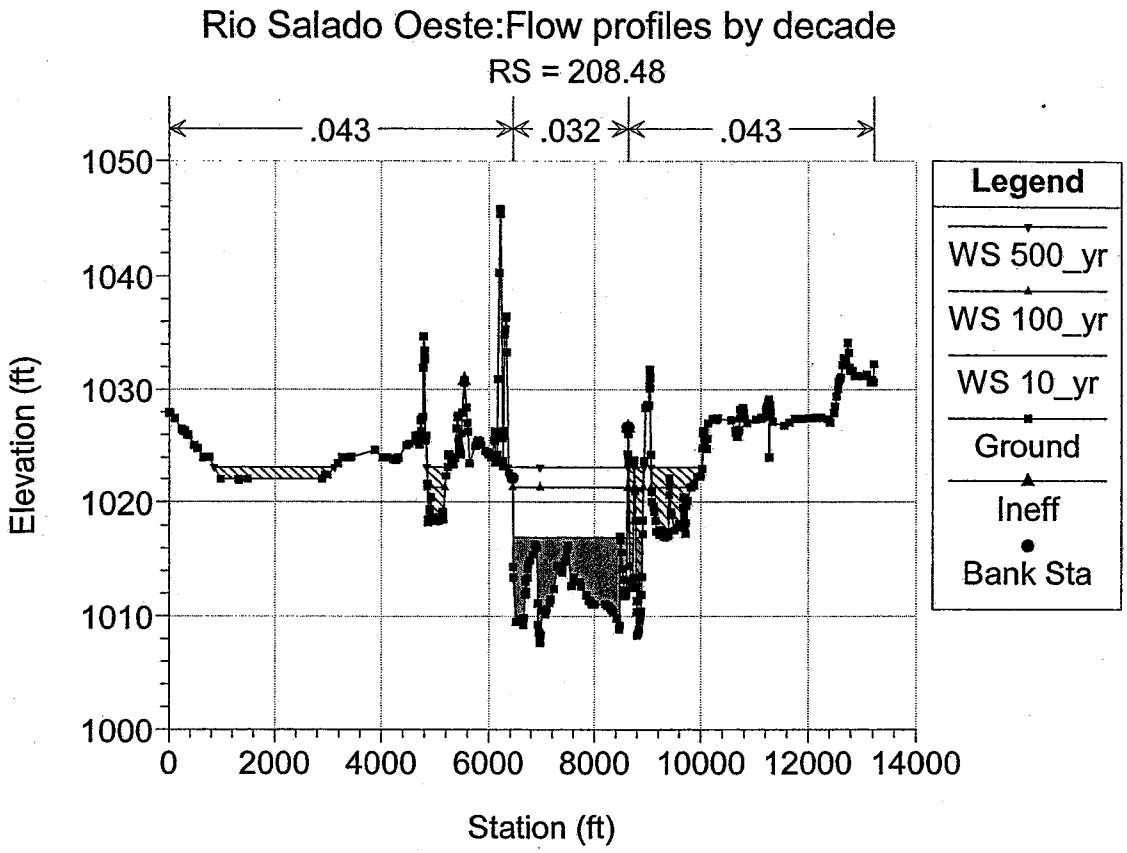

Rio Salado Oeste:Flow profiles by decade
RS = 207.99
.025
.043
.032
Elevation (ft)
1030
1025
1020
1015
1010
1005
1000
995
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

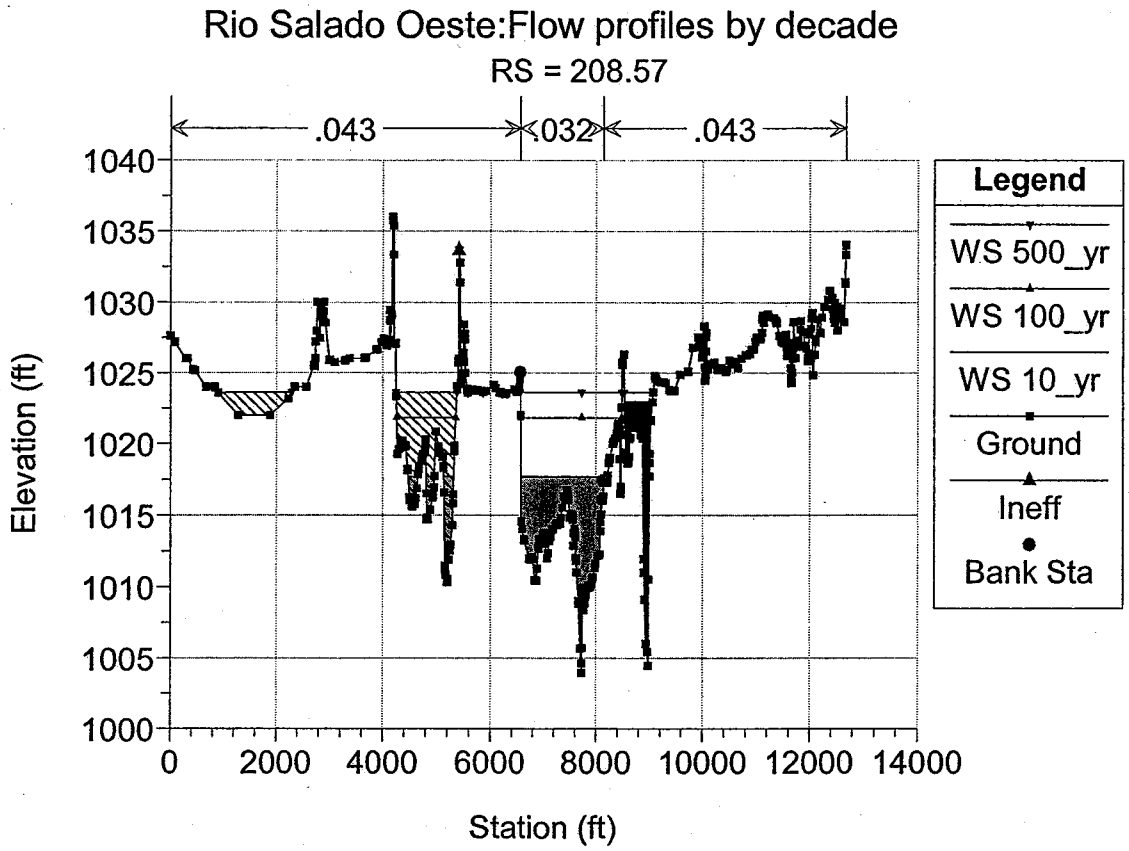

Rio Salado Oeste:Flow profiles by decade
RS = 208.1
.025
.043
.032
Elevation (ft)
1050
1040
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

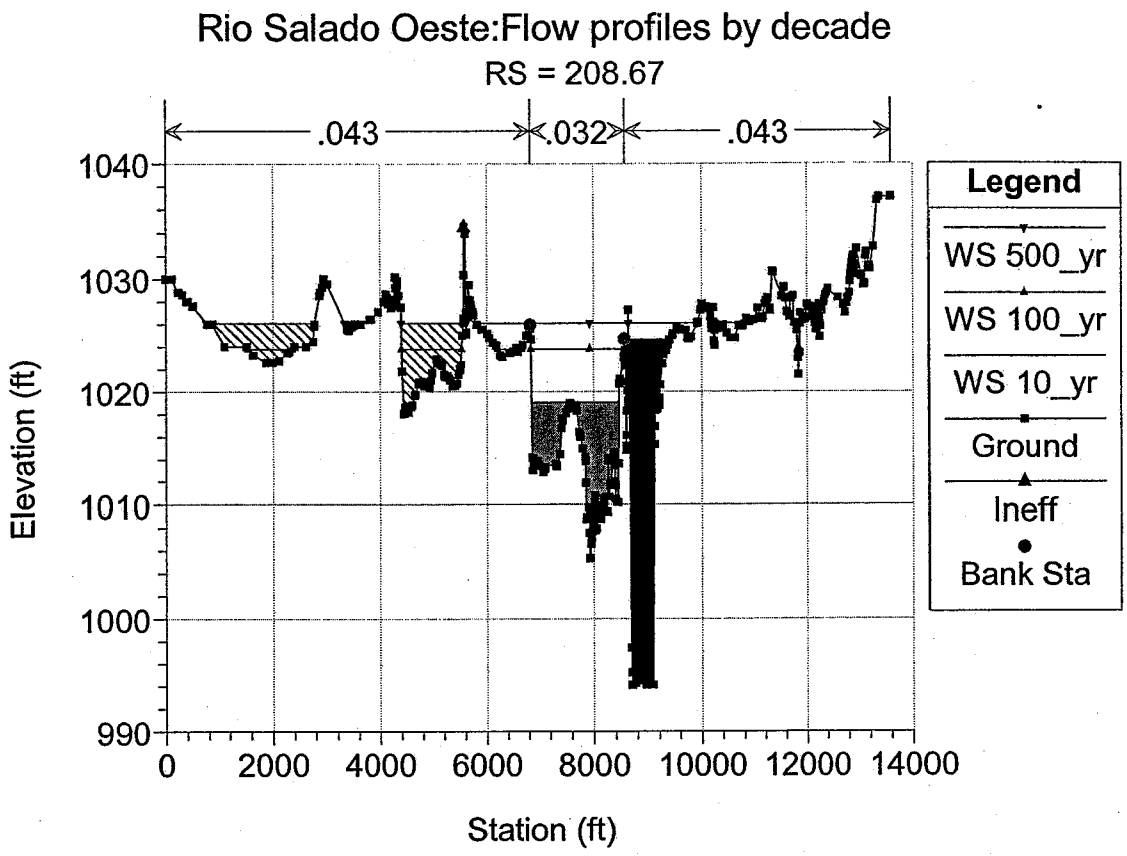

Rio Salado Oeste:Flow profiles by decade
RS = 208.19
.025
.043
.032
Elevation (ft)
1040
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
16000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

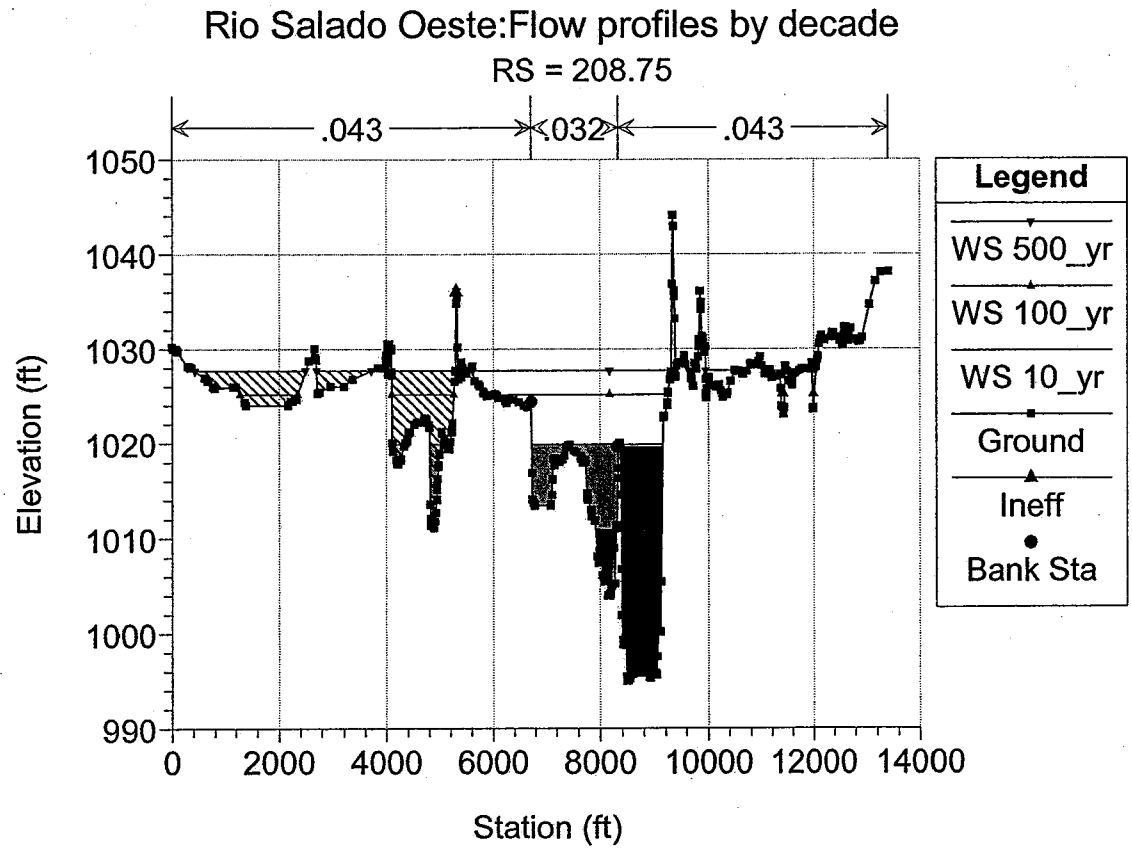

Rio Salado Oeste:Flow profiles by decade
RS = 208.29
.025
.043
.032
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

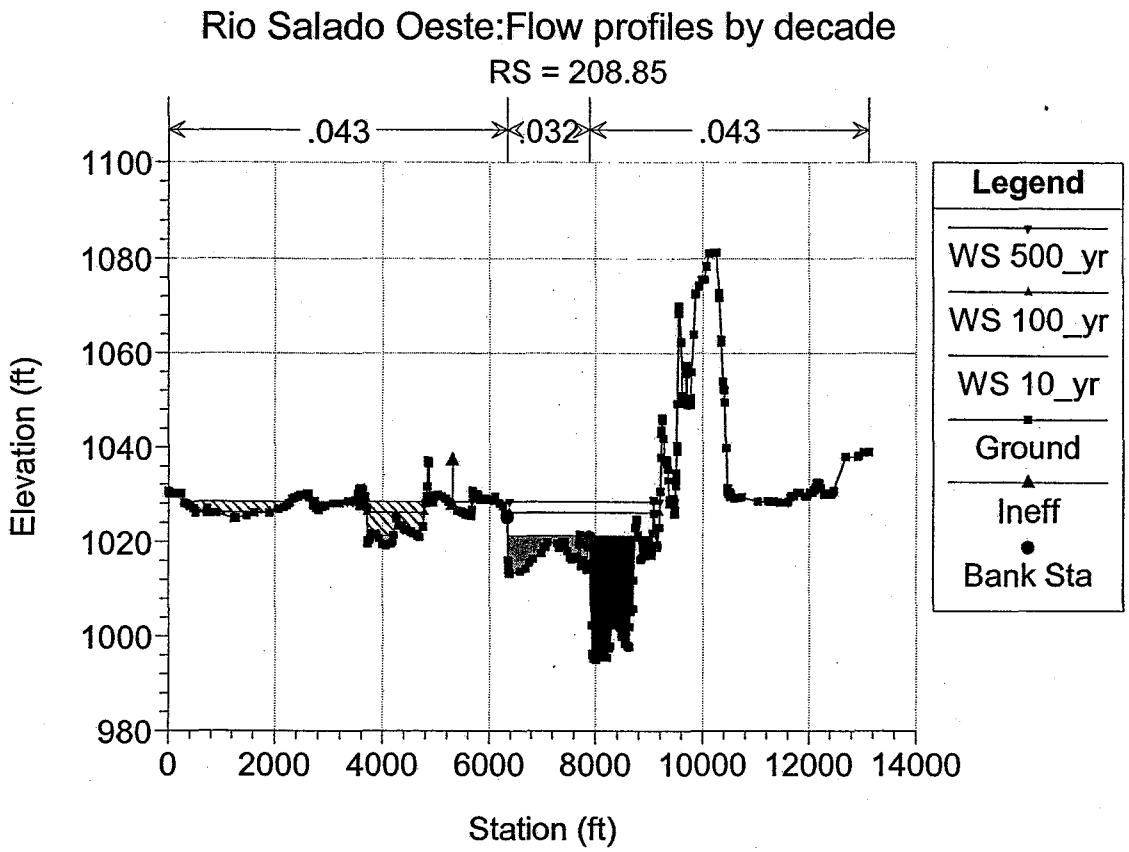

Rio Salado Oeste:Flow profiles by decade
RS = 208.39
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

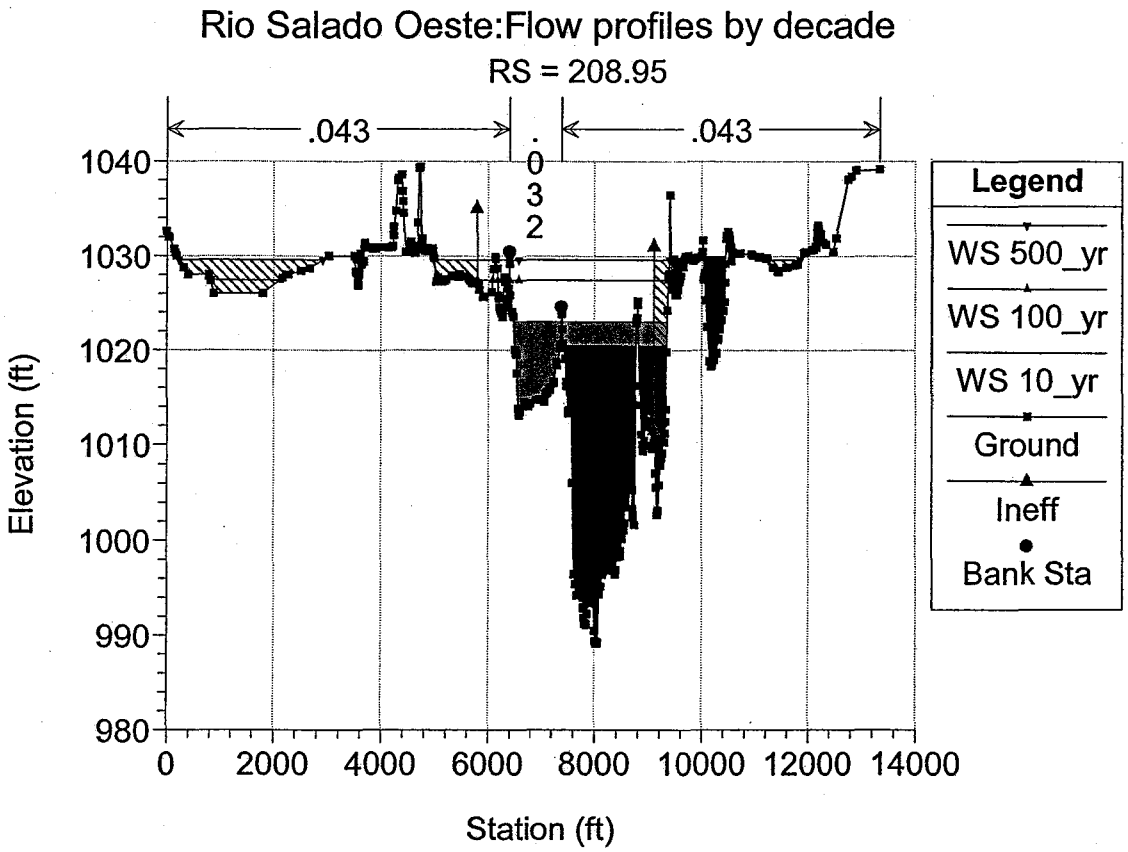

Rio Salado Oeste:Flow profiles by decade
RS = 208.48
.043
.032
.043
Elevation (ft)
1050
1040
1030
1020
1010
1000
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

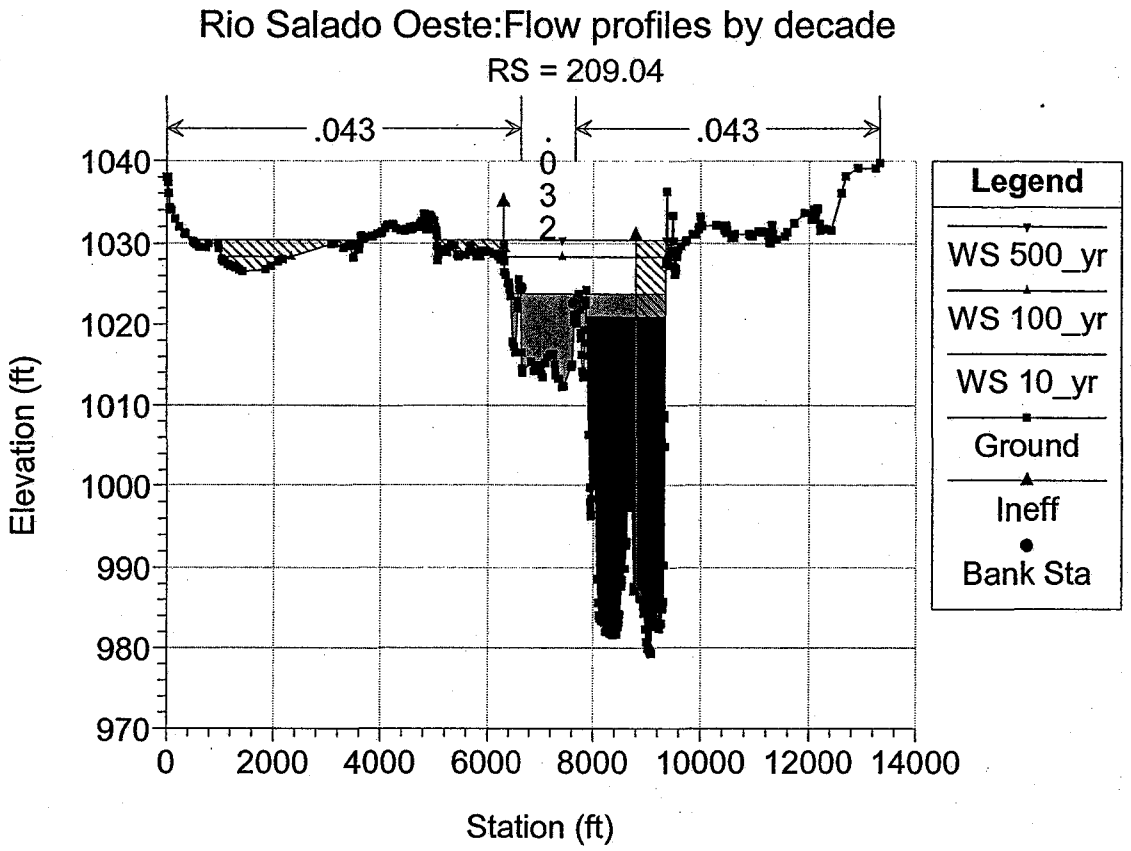

Rio Salado Oeste:Flow profiles by decade
RS = 208.57
.043
.032
.043
Elevation (ft)
1040
1035
1030
1025
1020
1015
1010
1005
1000
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

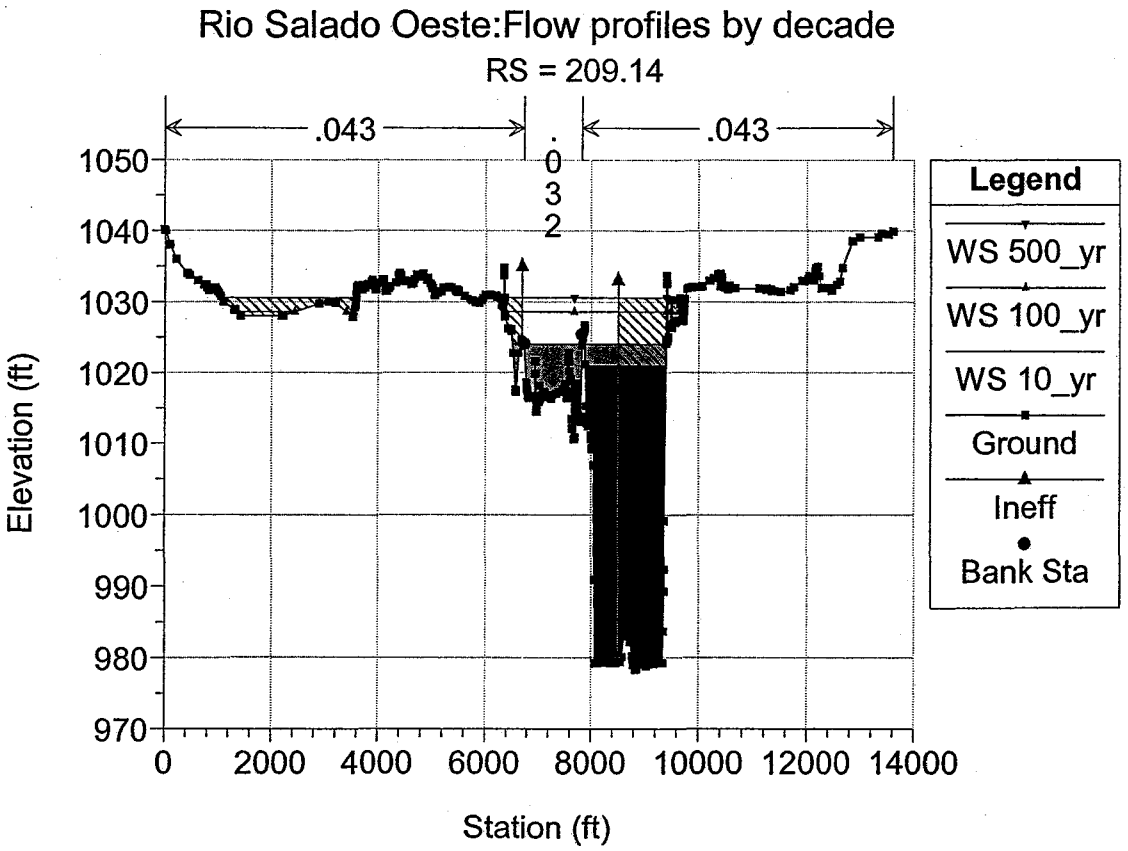

Rio Salado Oeste:Flow profiles by decade
RS = 208.67
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

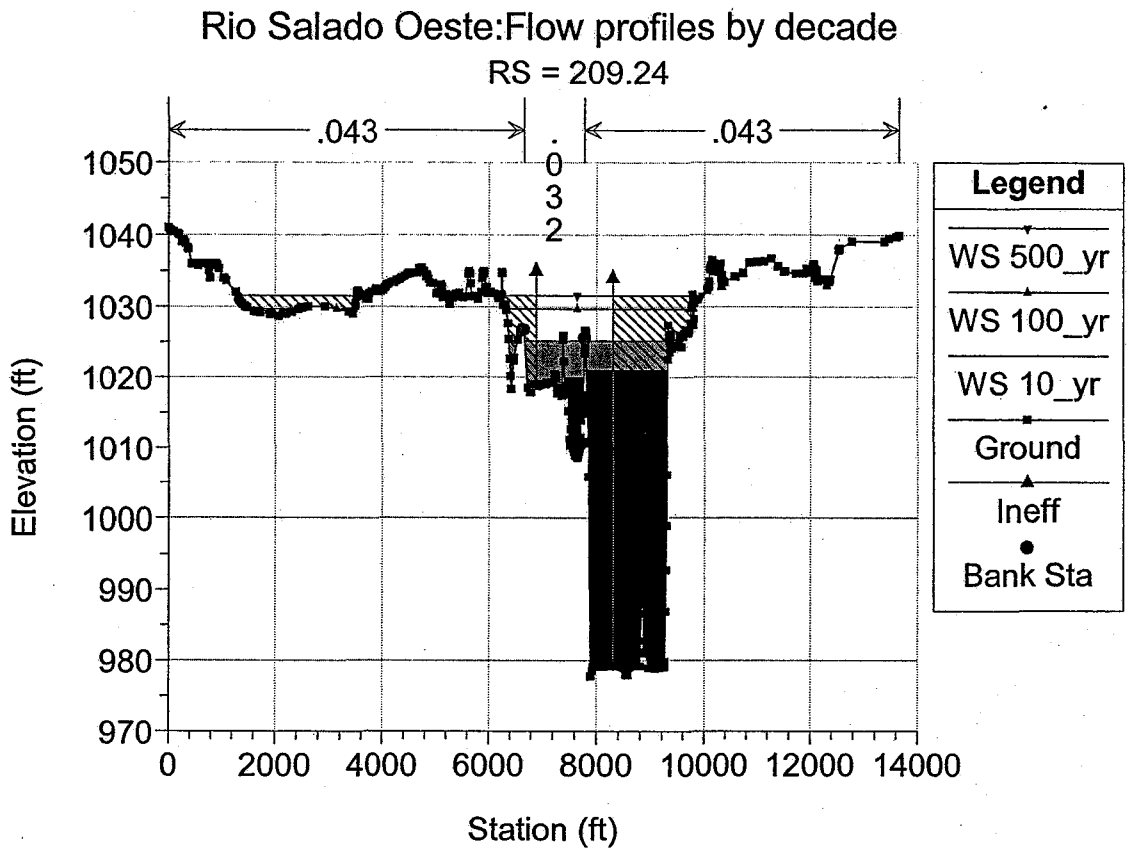

Rio Salado Oeste:Flow profiles by decade
RS = 208.75
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

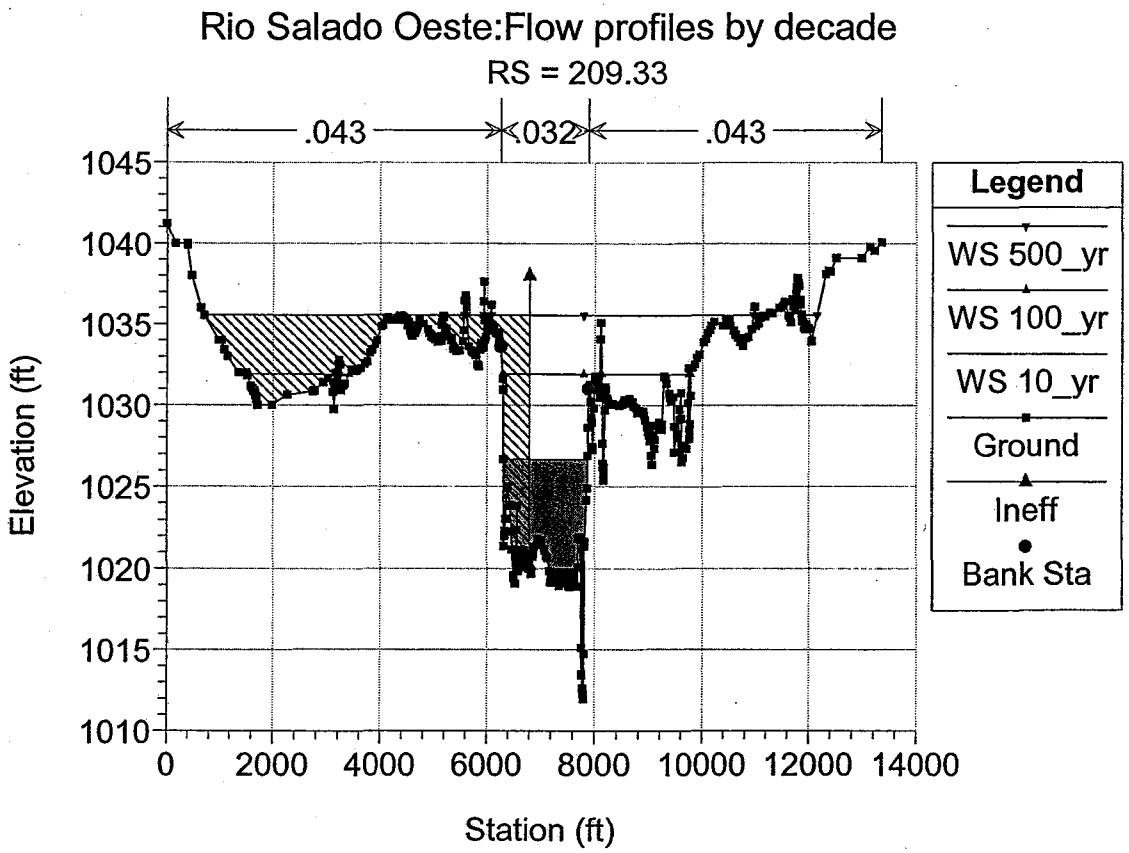

Rio Salado Oeste:Flow profiles by decade
RS = 208.85
.043
.032
.043
Elevation (ft)
1100
1080
1060
1040
1020
1000
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

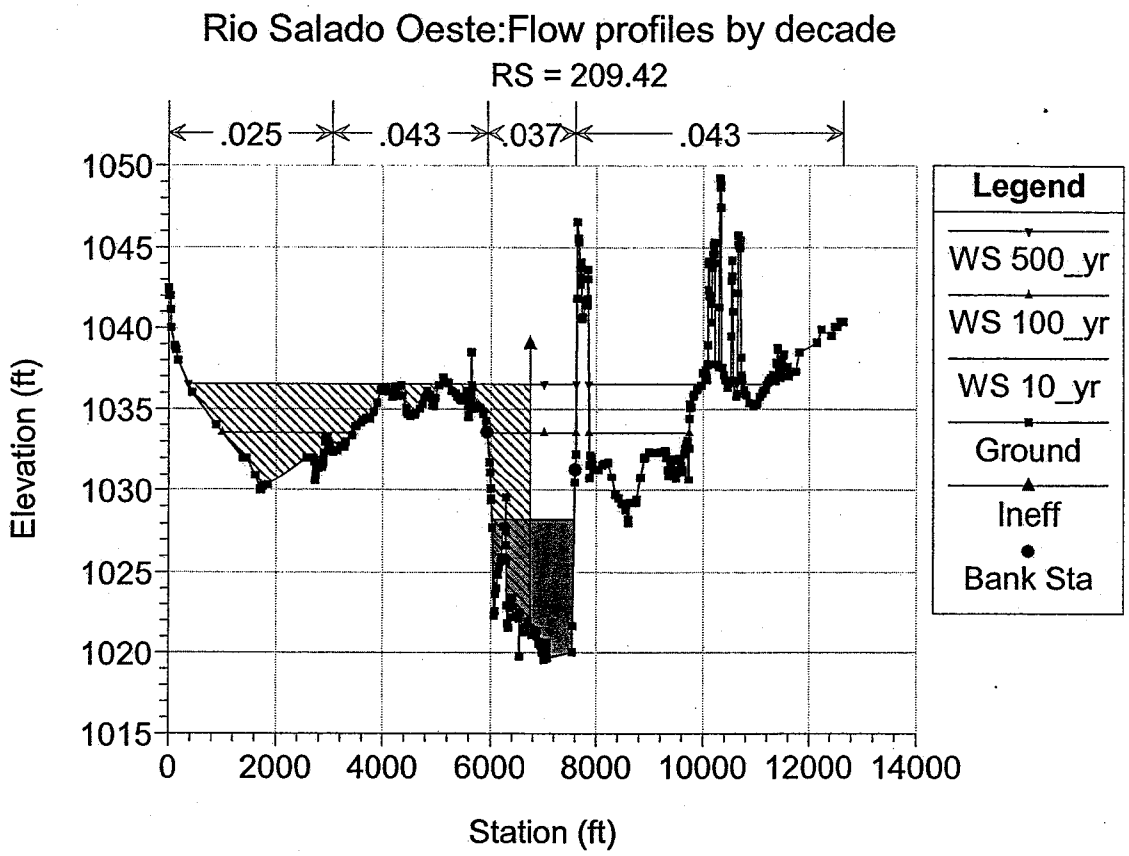

Rio Salado Oeste:Flow profiles by decade
RS = 208.95
.043
.032
.043
Elevation (ft)
1040
1030
1020
1010
1000
990
980
0
2000
4000
6000
8000
10000
12000
14000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

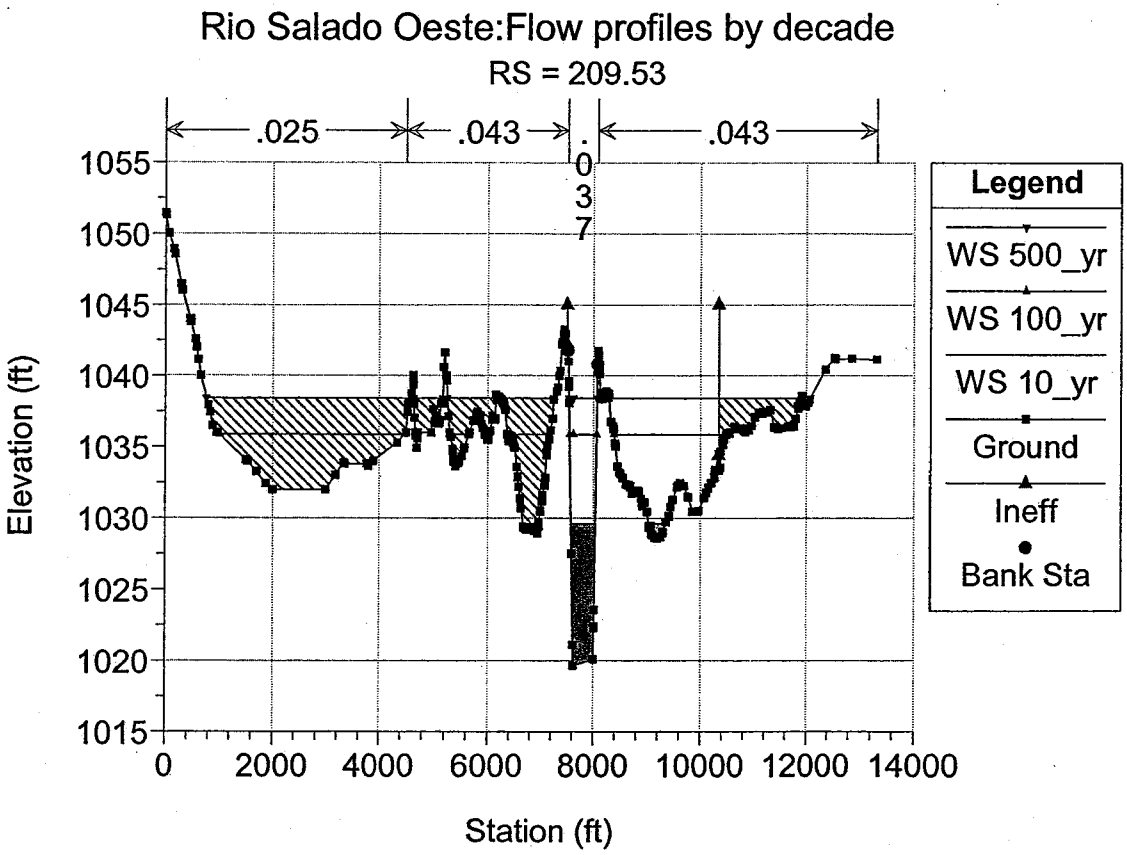

Rio Salado Oeste:Flow profiles by decade
RS = 209.04
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

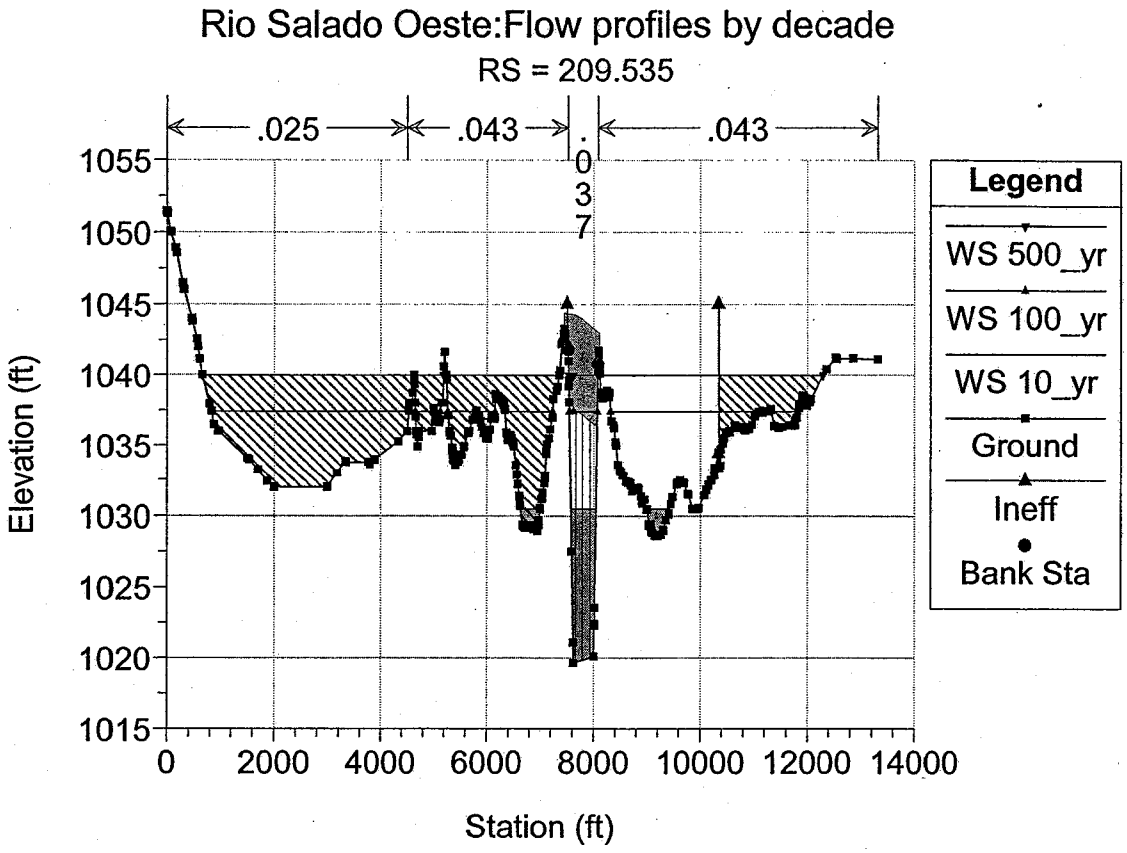

Rio Salado Oeste:Flow profiles by decade
RS = 209.14
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

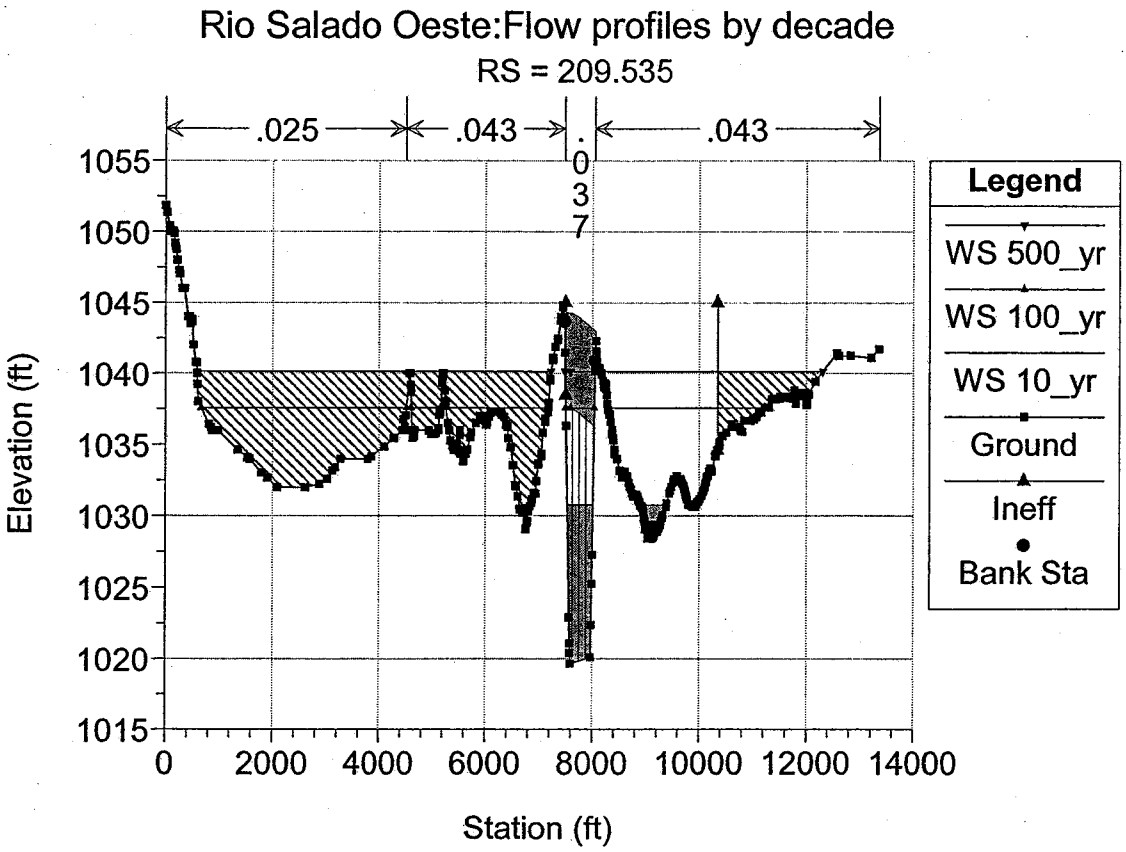

Rio Salado Oeste:Flow profiles by decade
RS = 209.24
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

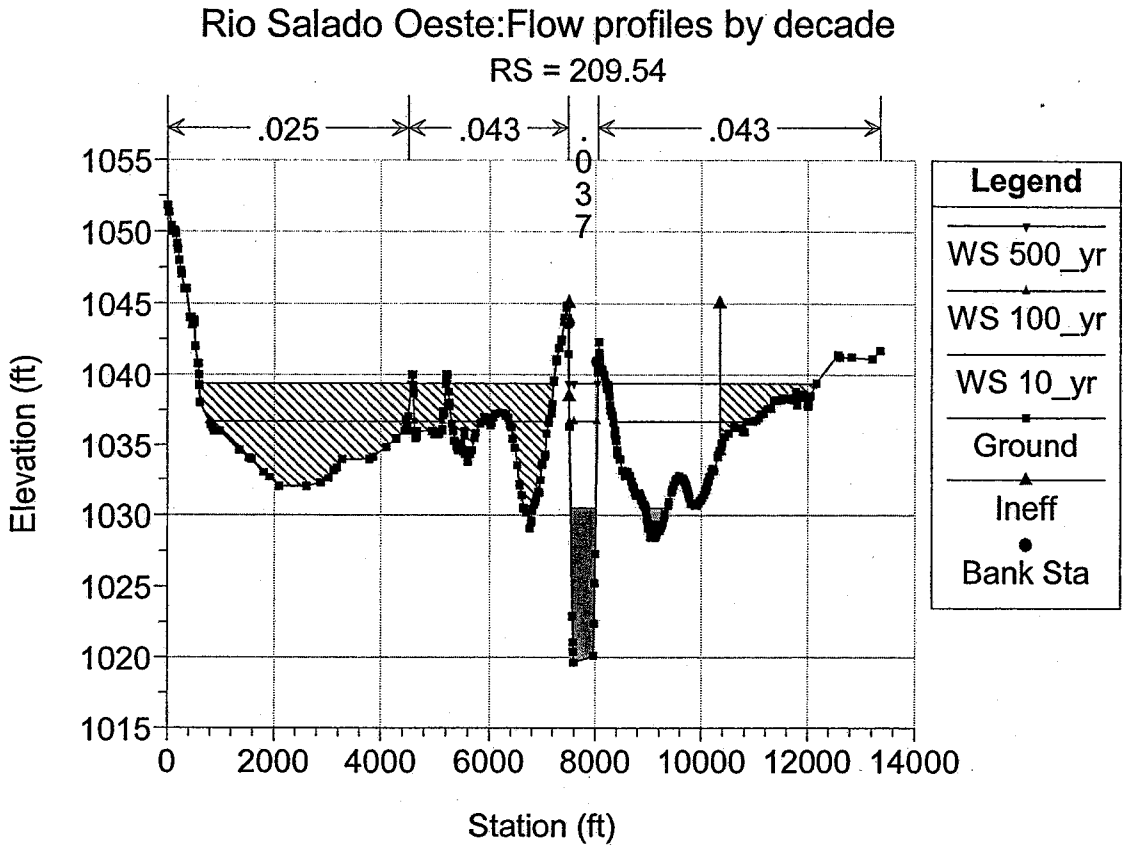

Rio Salado Oeste:Flow profiles by decade
RS = 209.33
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

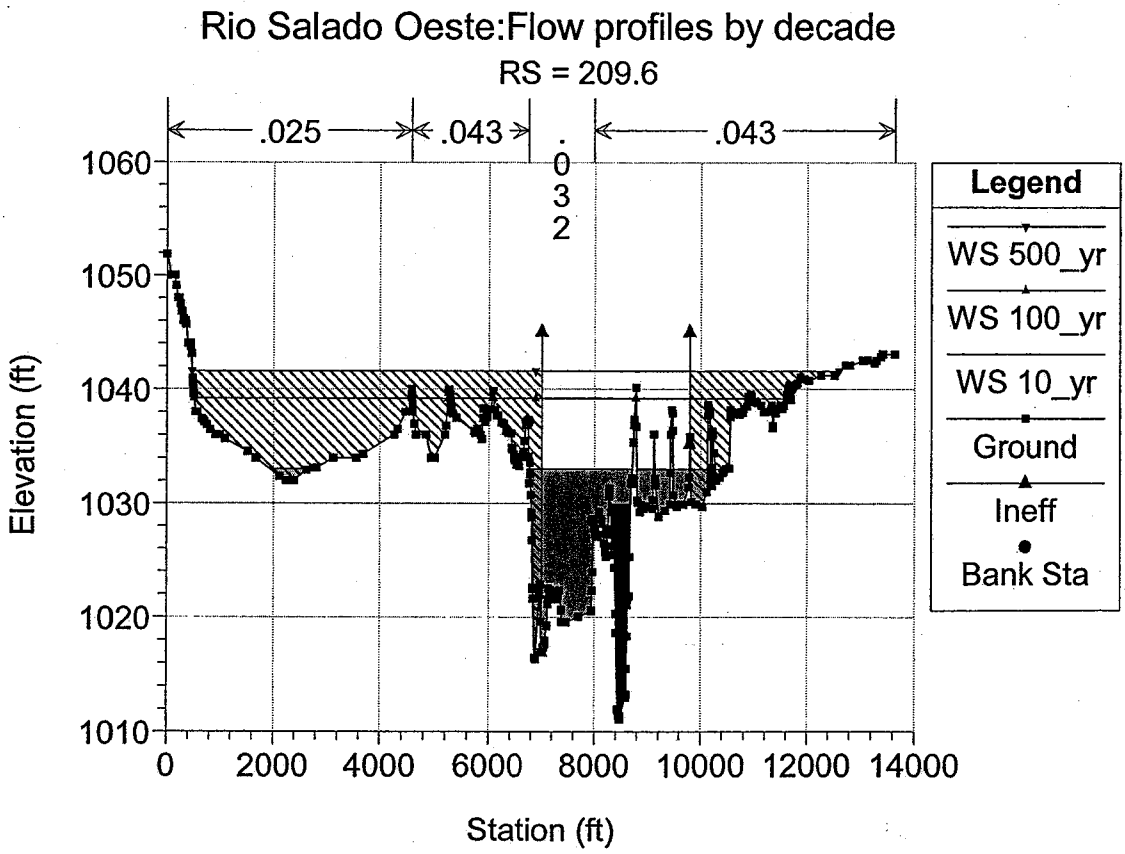

Rio Salado Oeste:Flow profiles by decade
RS = 209.42
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

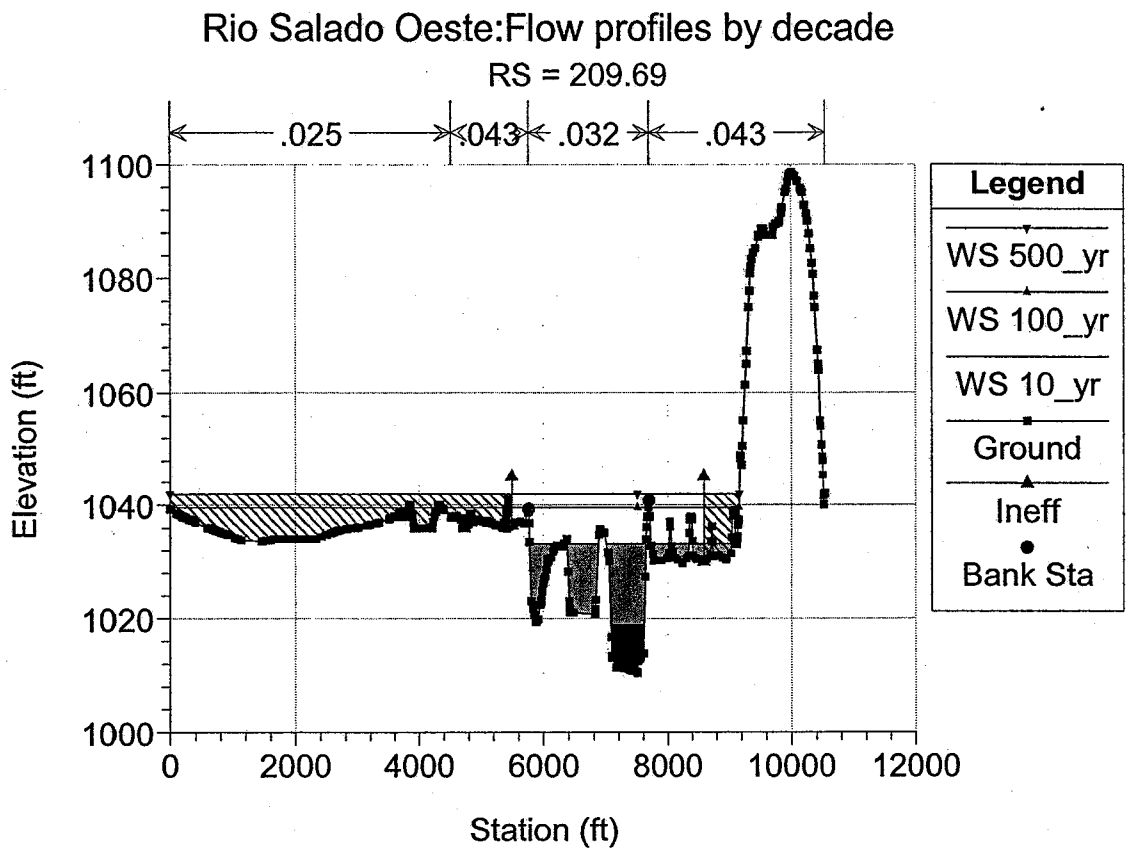

Rio Salado Oeste:Flow profiles by decade
RS = 209.53
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

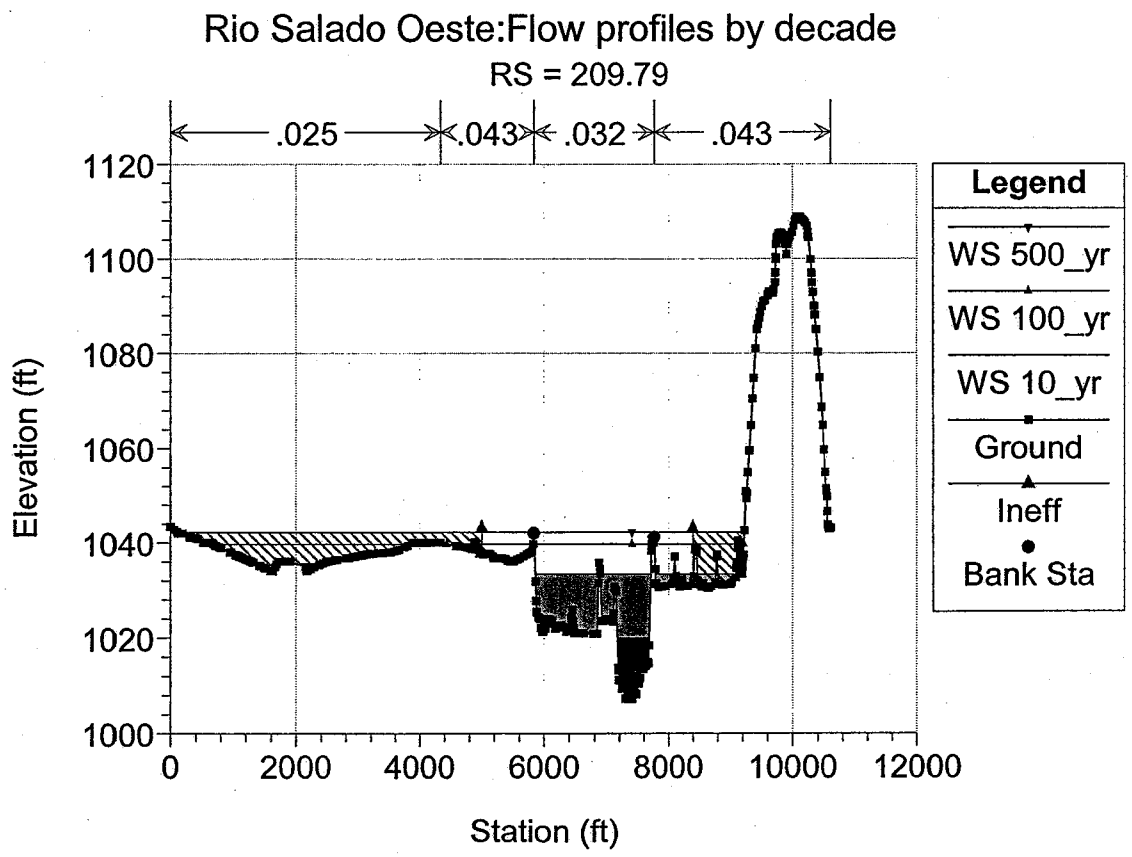

Rio Salado Oeste:Flow profiles by decade
RS = 209.535
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

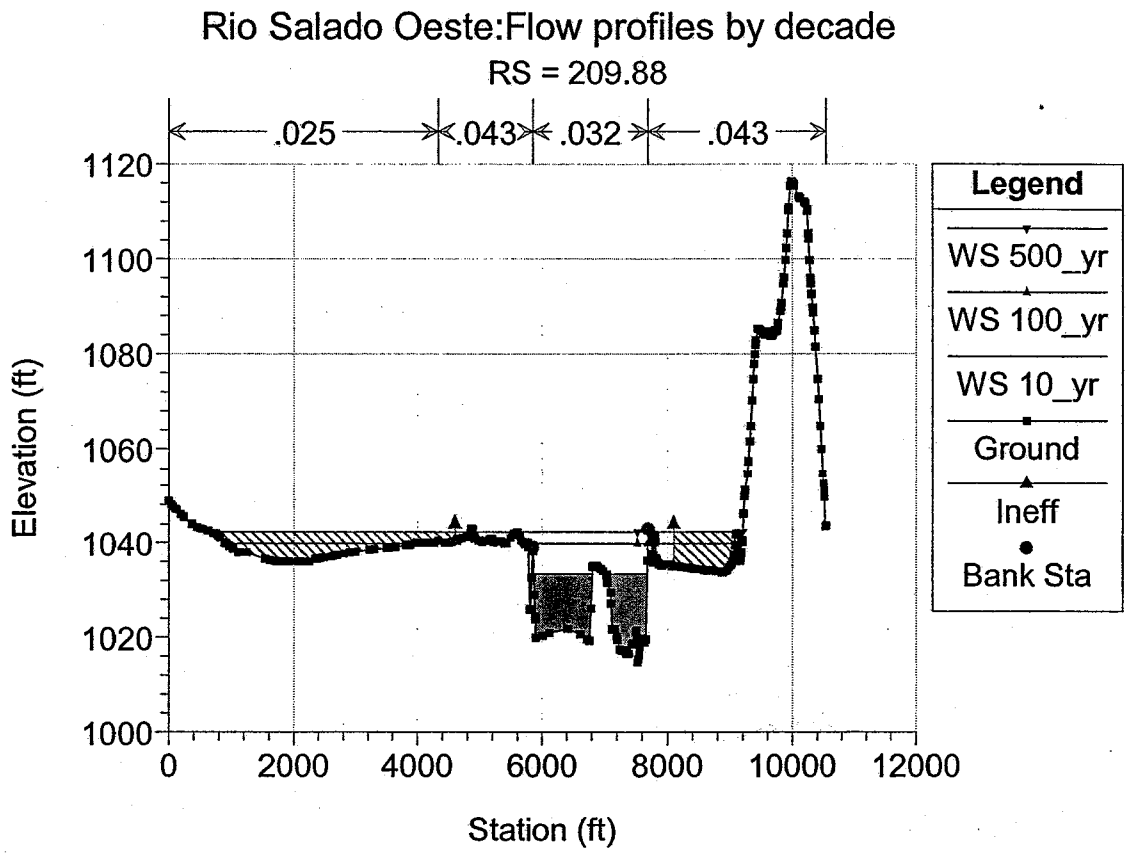

Rio Salado Oeste:Flow profiles by decade
RS = 209.535
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

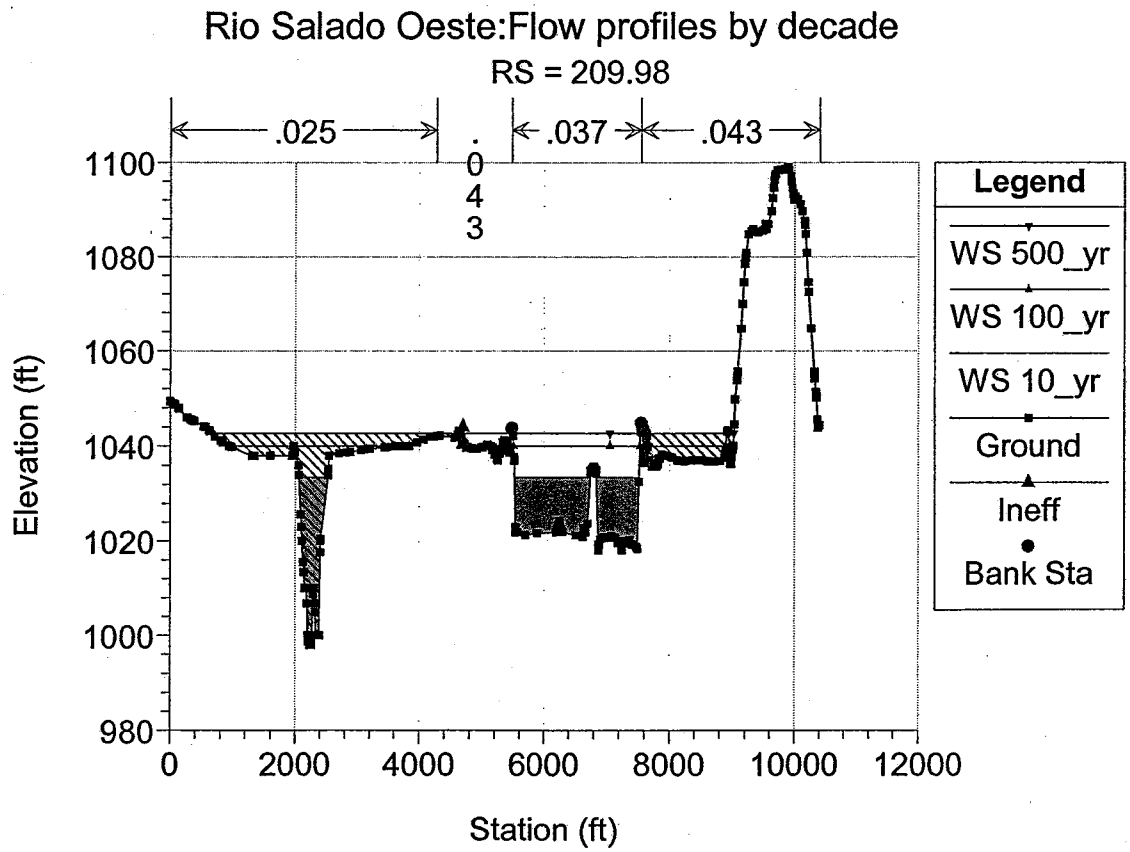

Rio Salado Oeste:Flow profiles by decade
RS = 209.54
.025
.043
.037
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

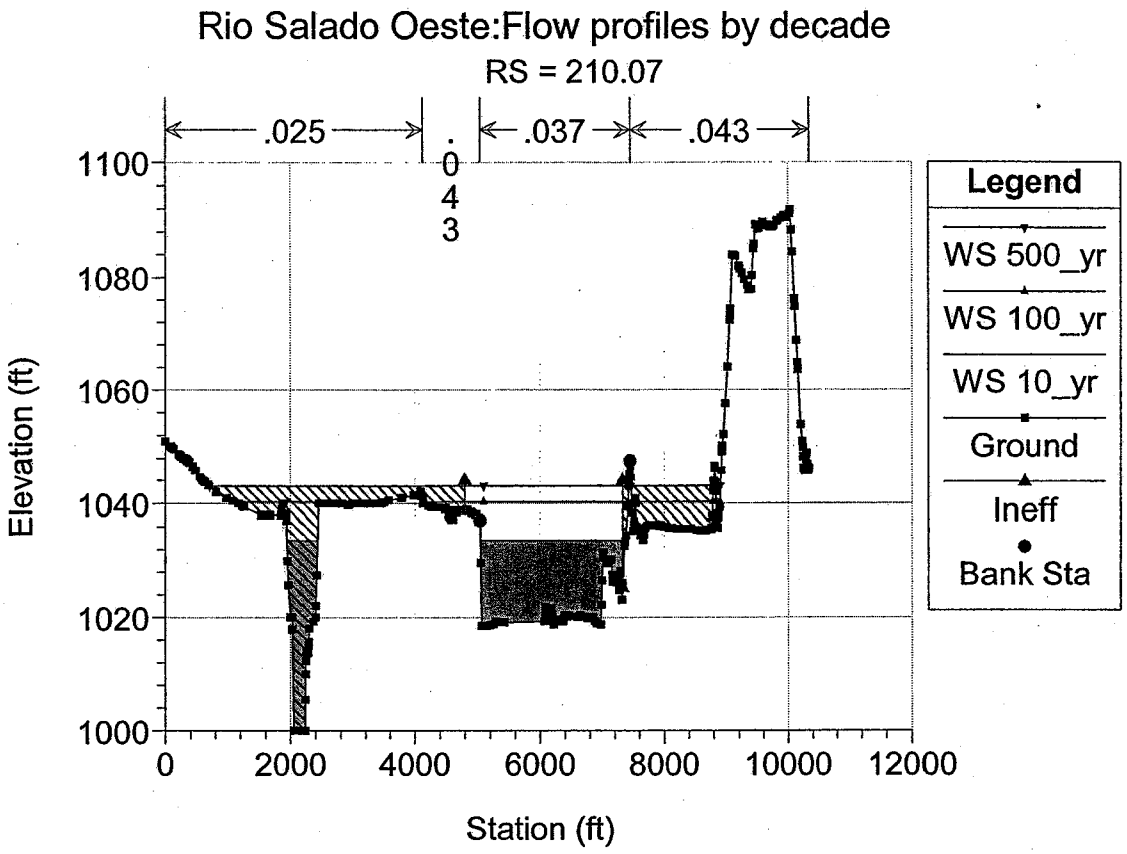

Rio Salado Oeste:Flow profiles by decade
RS = 209.6
.025
.043
.032
.043
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

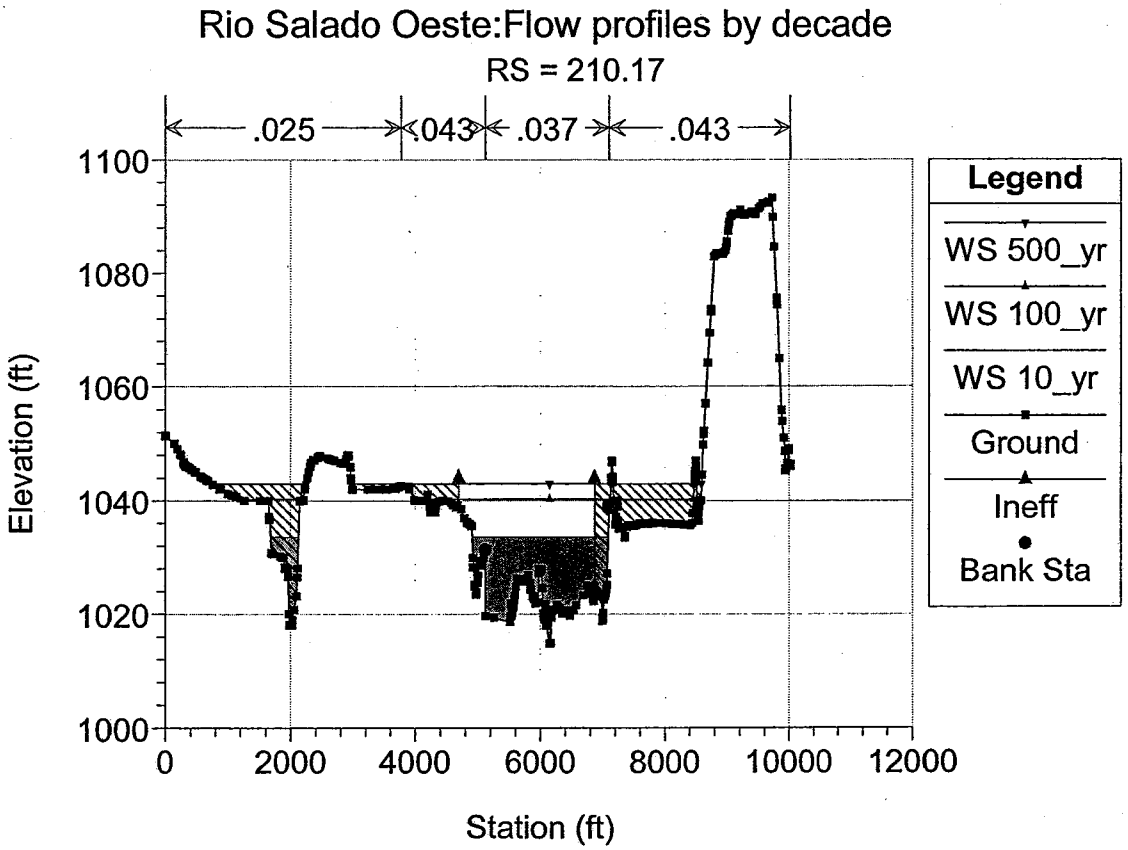

Rio Salado Oeste:Flow profiles by decade
RS = 209.69
.025
.043
.032
.043
Elevation (ft)
1100
1080
1060
1040
1020
1000
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

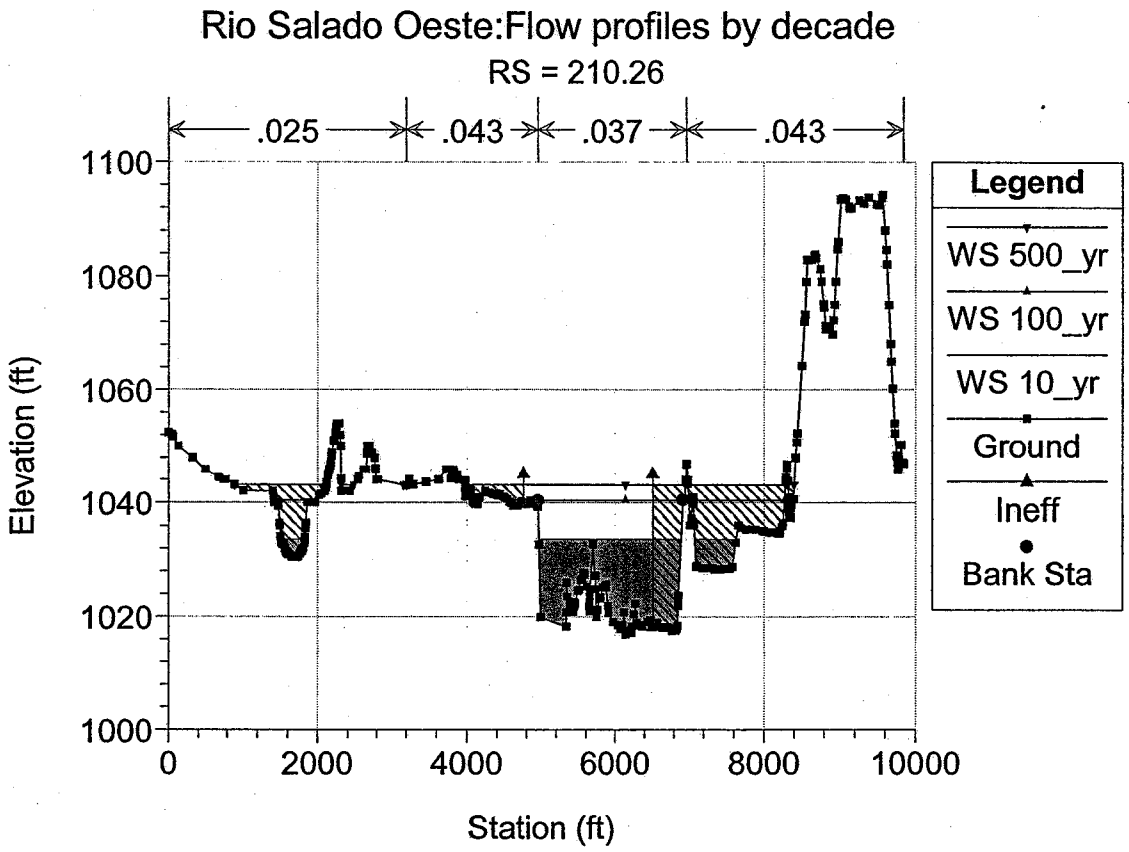

Rio Salado Oeste:Flow profiles by decade
RS = 209.79
.025
.043
.032
.043
Elevation (ft)
1120
1100
1080
1060
1040
1020
1000
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

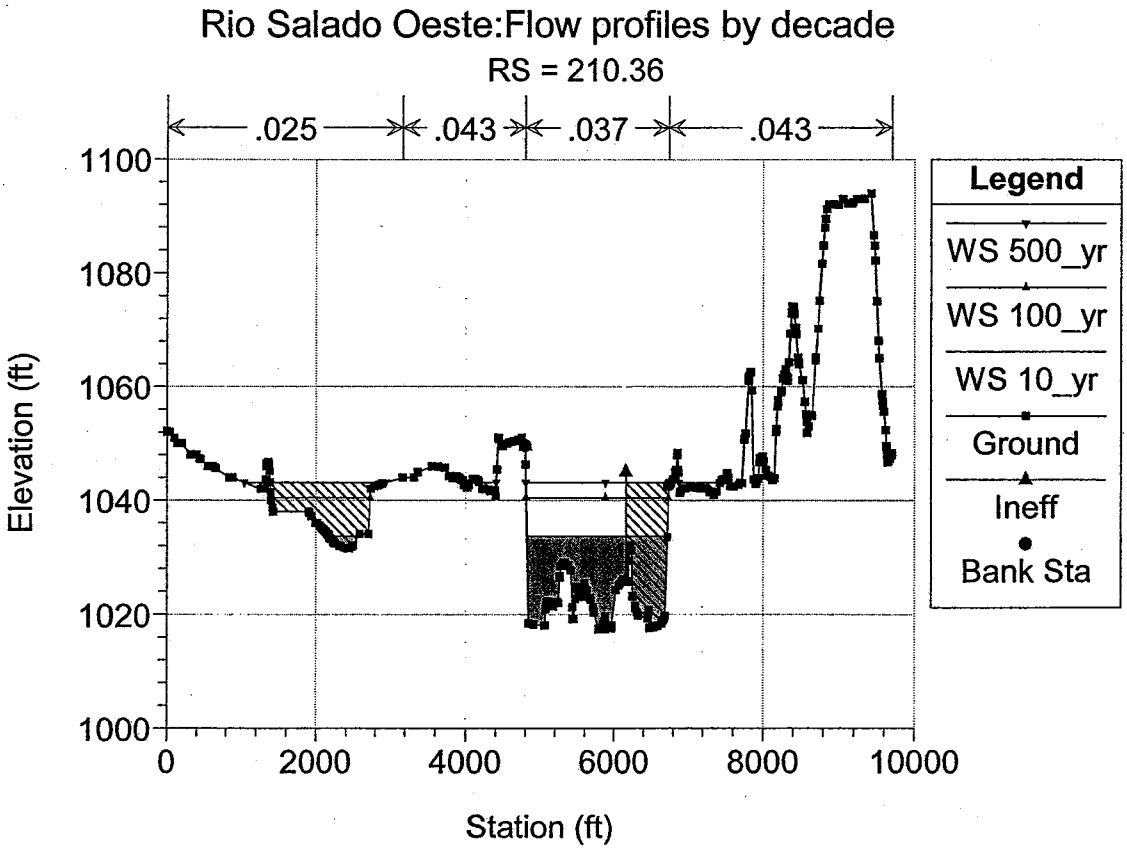

Rio Salado Oeste:Flow profiles by decade
RS = 209.88
.025
.043
.032
.043
Elevation (ft)
1120
1100
1080
1060
1040
1020
1000
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

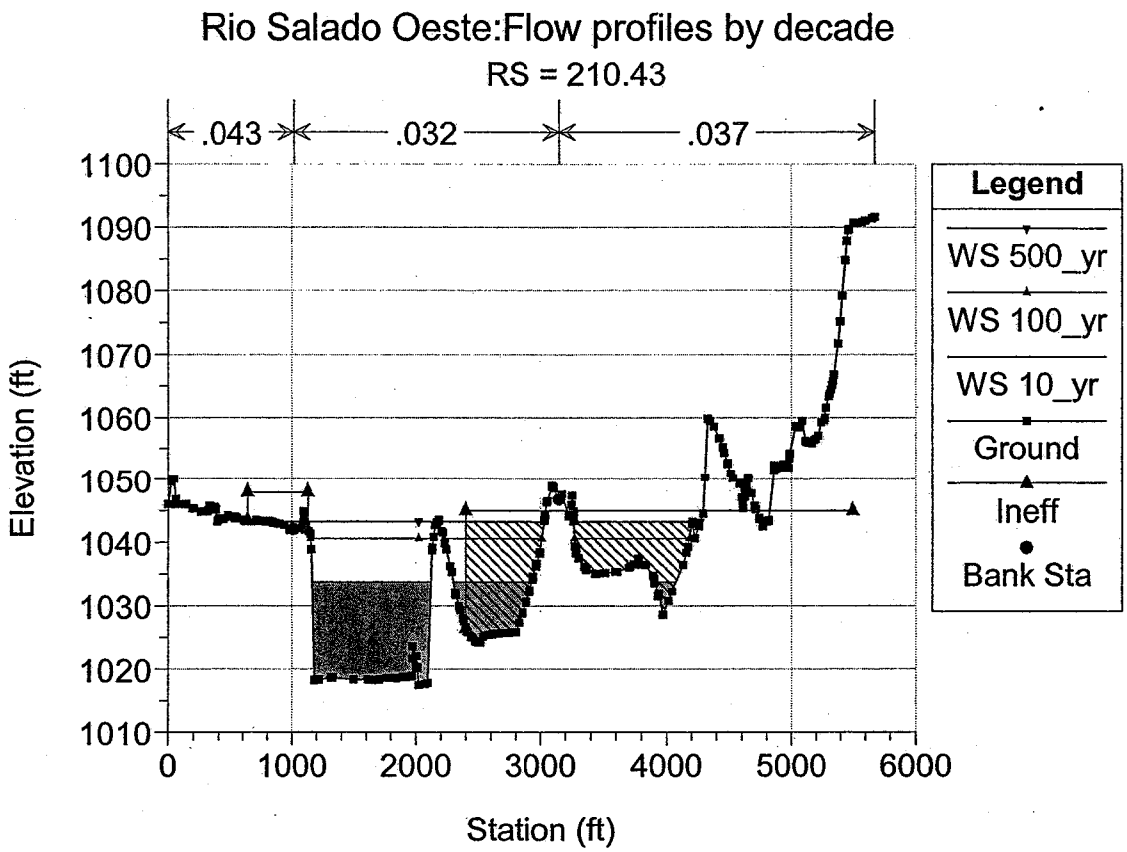

Rio Salado Oeste:Flow profiles by decade
RS = 209.98
.025
.043
.037
.043
Elevation (ft)
1100
1080
1060
1040
1020
1000
980
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

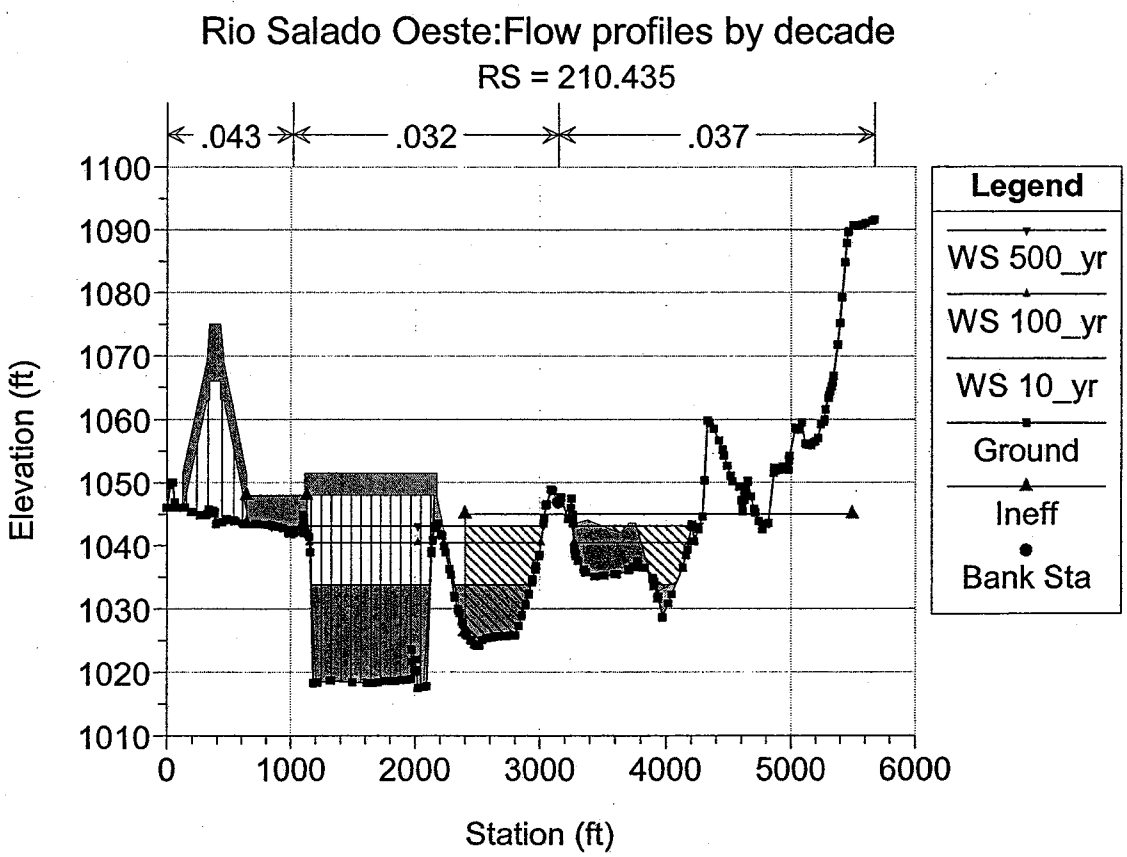

Rio Salado Oeste:Flow profiles by decade
RS = 210.07
.025
.043
.037
.043
Elevation (ft)
1100
1080
1060
1040
1020
1000
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

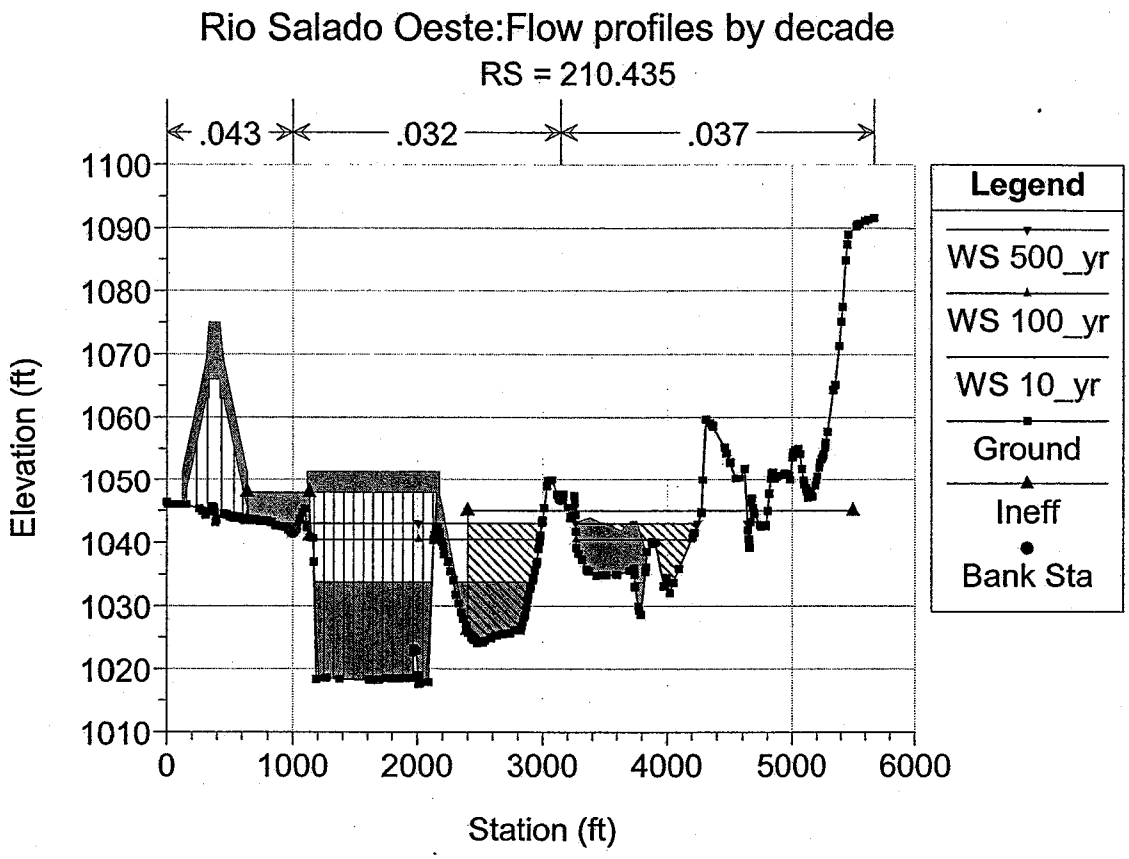

Rio Salado Oeste:Flow profiles by decade
RS = 210.17
.025
.043
.037
.043
Elevation (ft)
1100
1080
1060
1040
1020
1000
0
2000
4000
6000
8000
10000
12000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

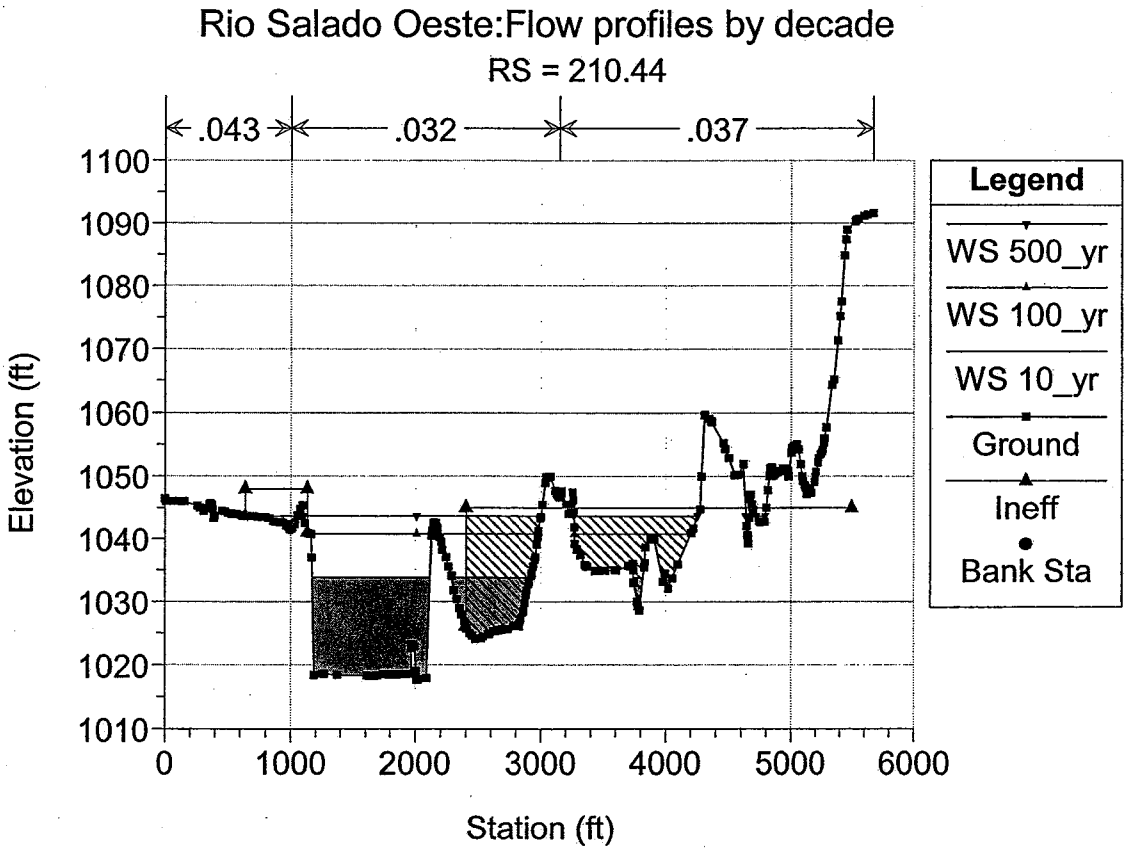

Rio Salado Oeste:Flow profiles by decade
RS = 210.26
.025
.043
.037
.043
1100
1080
1060
1040
1020
1000
Elevation (ft)
0
2000
4000
6000
8000
10000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

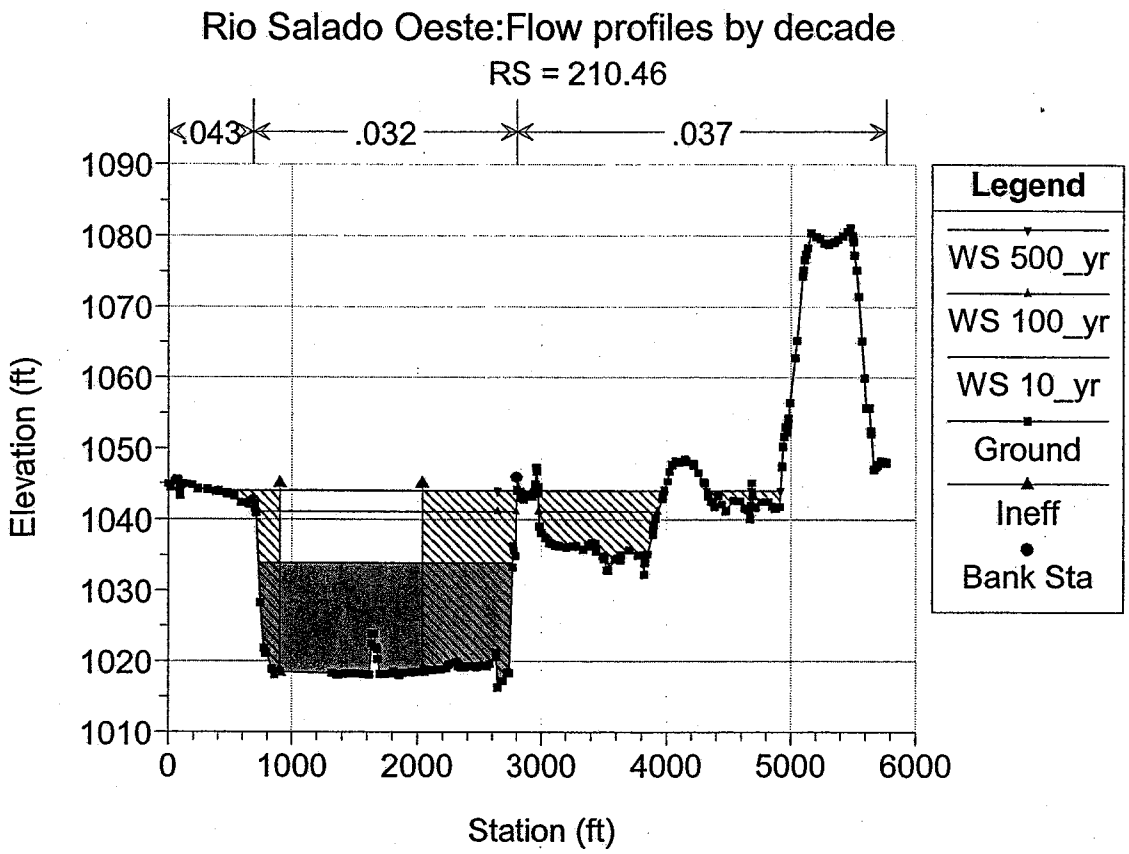

Rio Salado Oeste:Flow profiles by decade
RS = 210.36
.025
.043
.037
.043
1100
1080
1060
1040
1020
1000
Elevation (ft)
0
2000
4000
6000
8000
10000
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

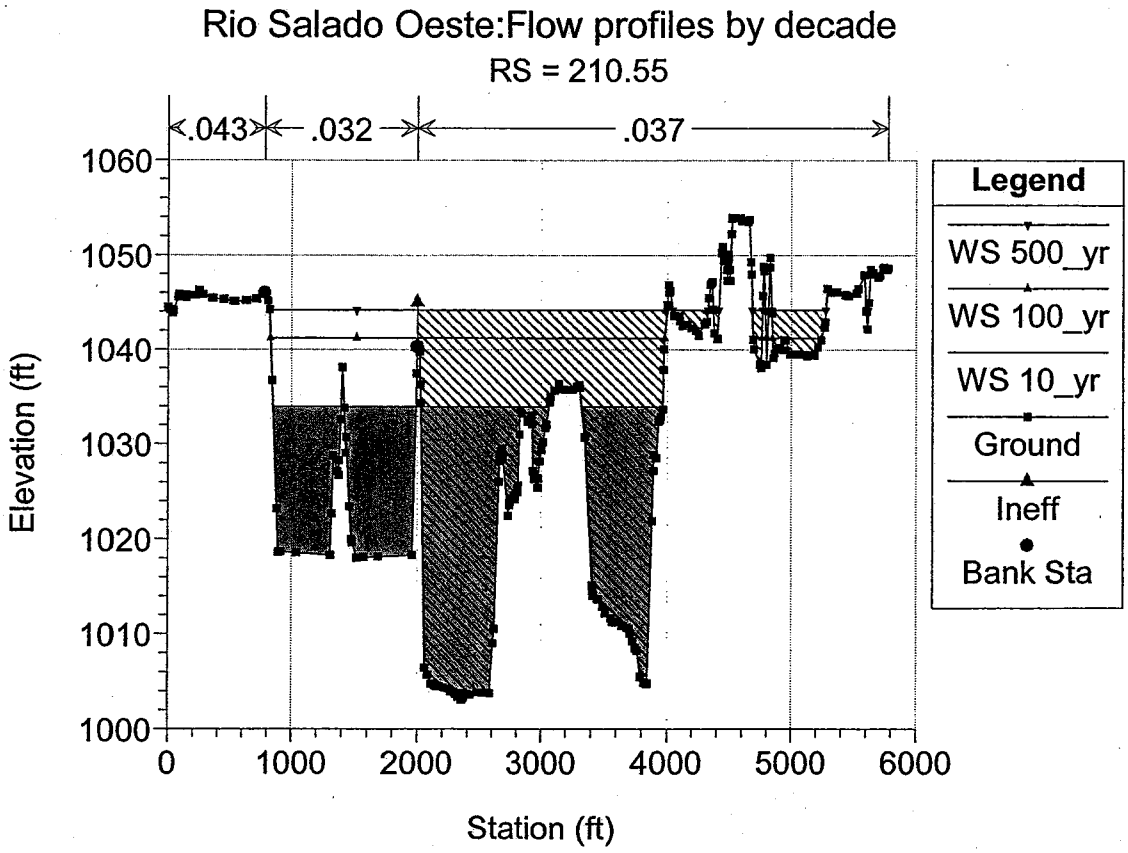

Rio Salado Oeste:Flow profiles by decade
RS = 210.43
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

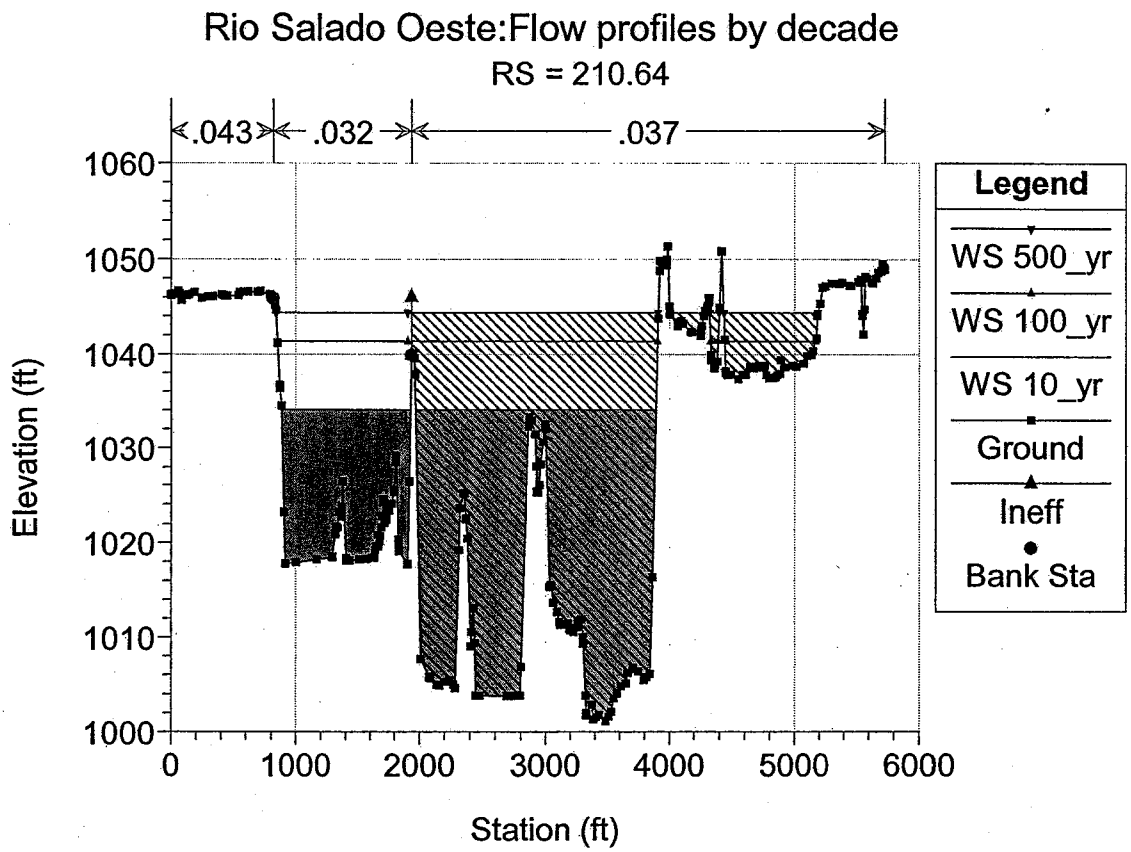

Rio Salado Oeste:Flow profiles by decade
RS = 210.435
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

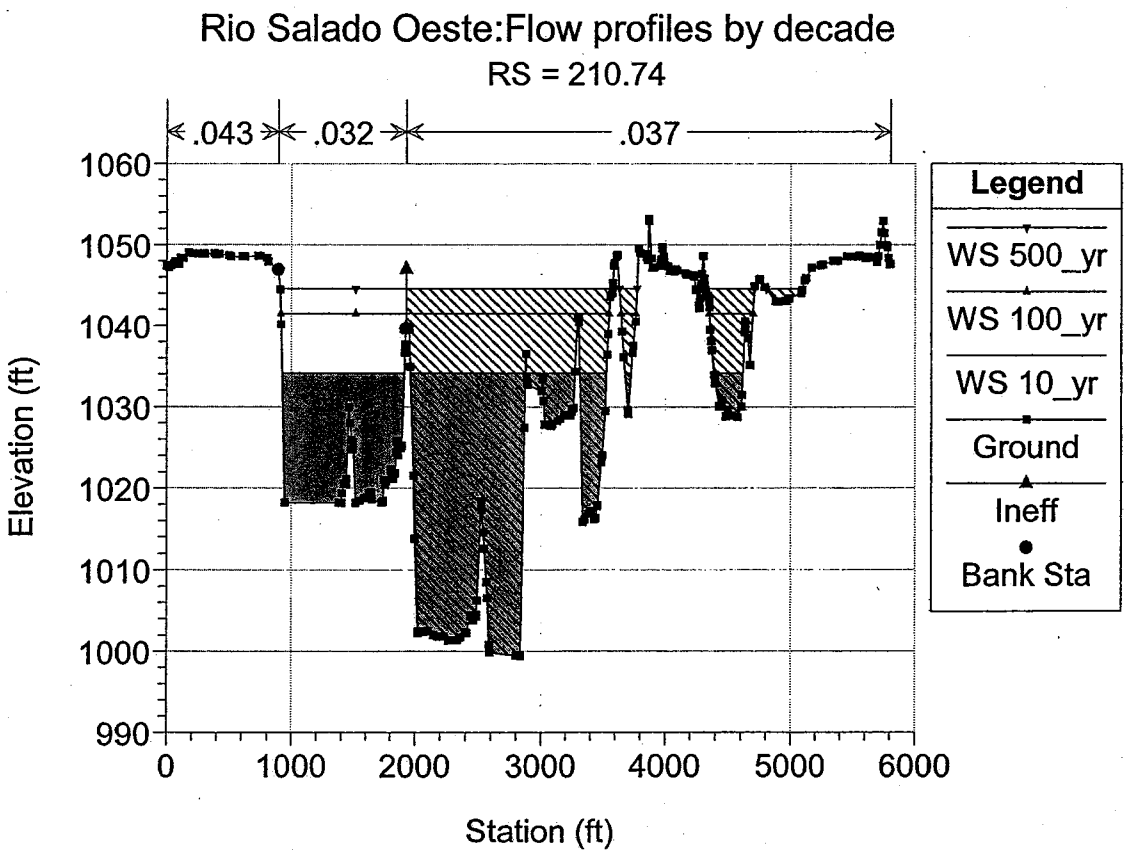

Rio Salado Oeste:Flow profiles by decade
RS = 210.435
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

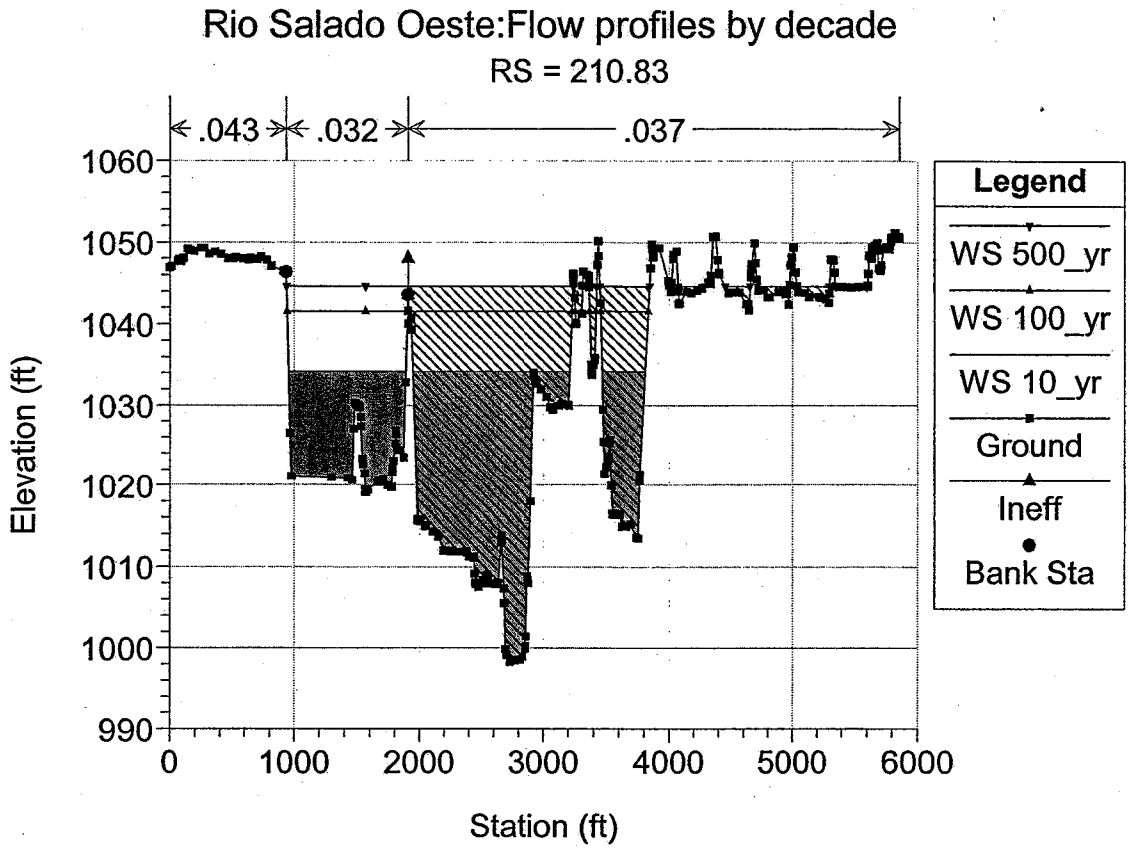

Rio Salado Oeste:Flow profiles by decade
RS = 210.44
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

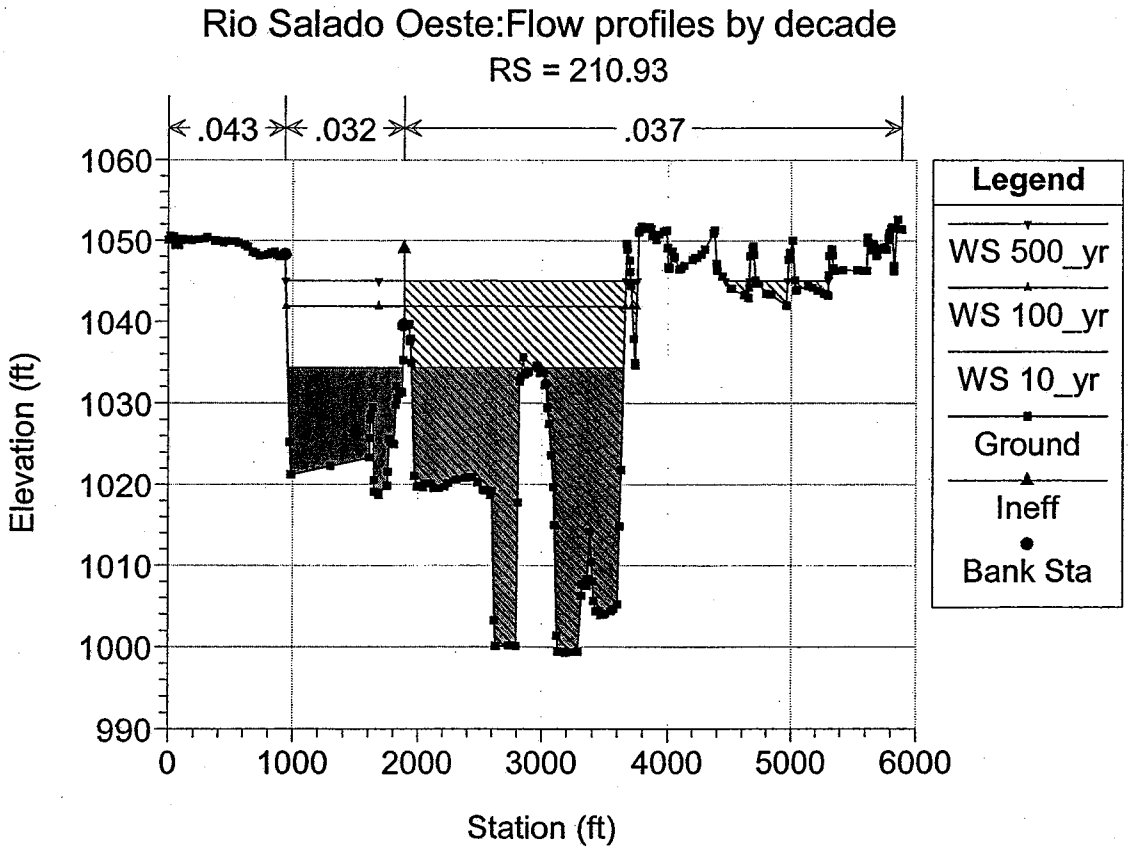

Rio Salado Oeste:Flow profiles by decade
RS = 210.46
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

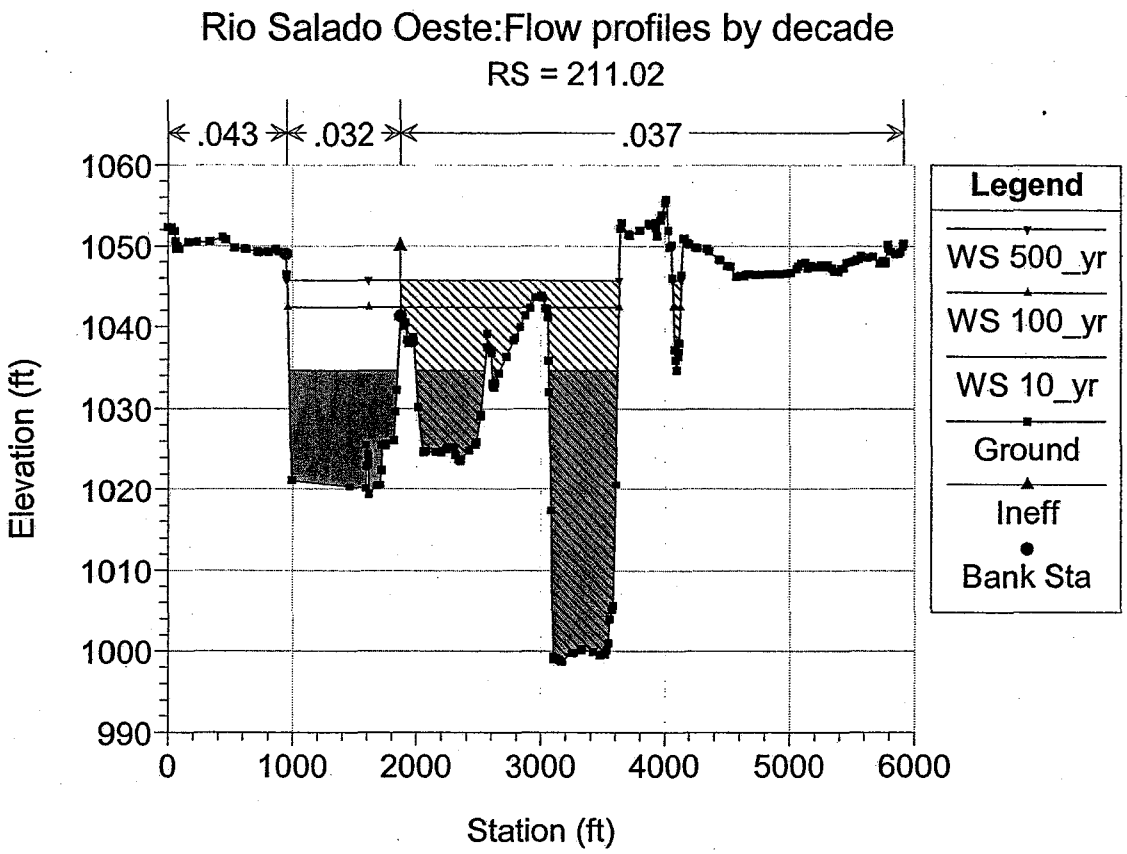

Rio Salado Oeste:Flow profiles by decade
RS = 210.55
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

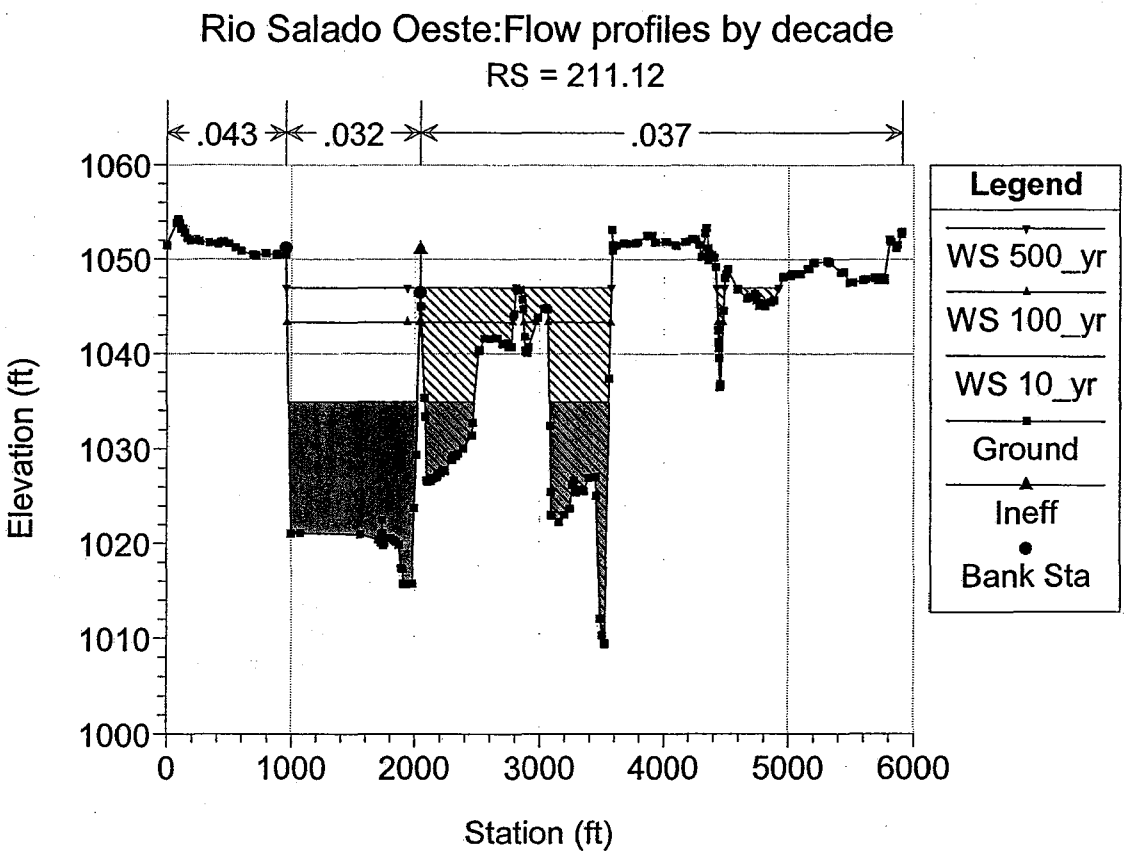

Rio Salado Oeste:Flow profiles by decade
RS = 210.64
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

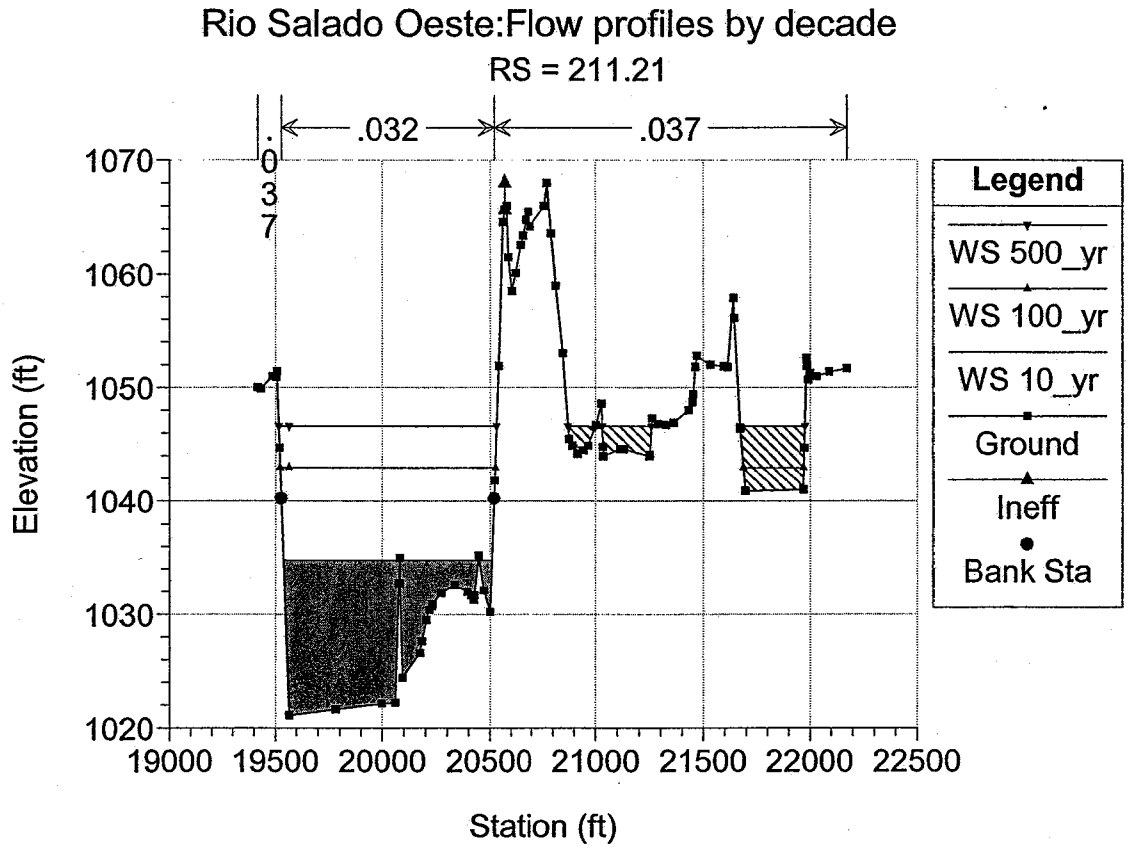

Rio Salado Oeste:Flow profiles by decade
RS = 210.74
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

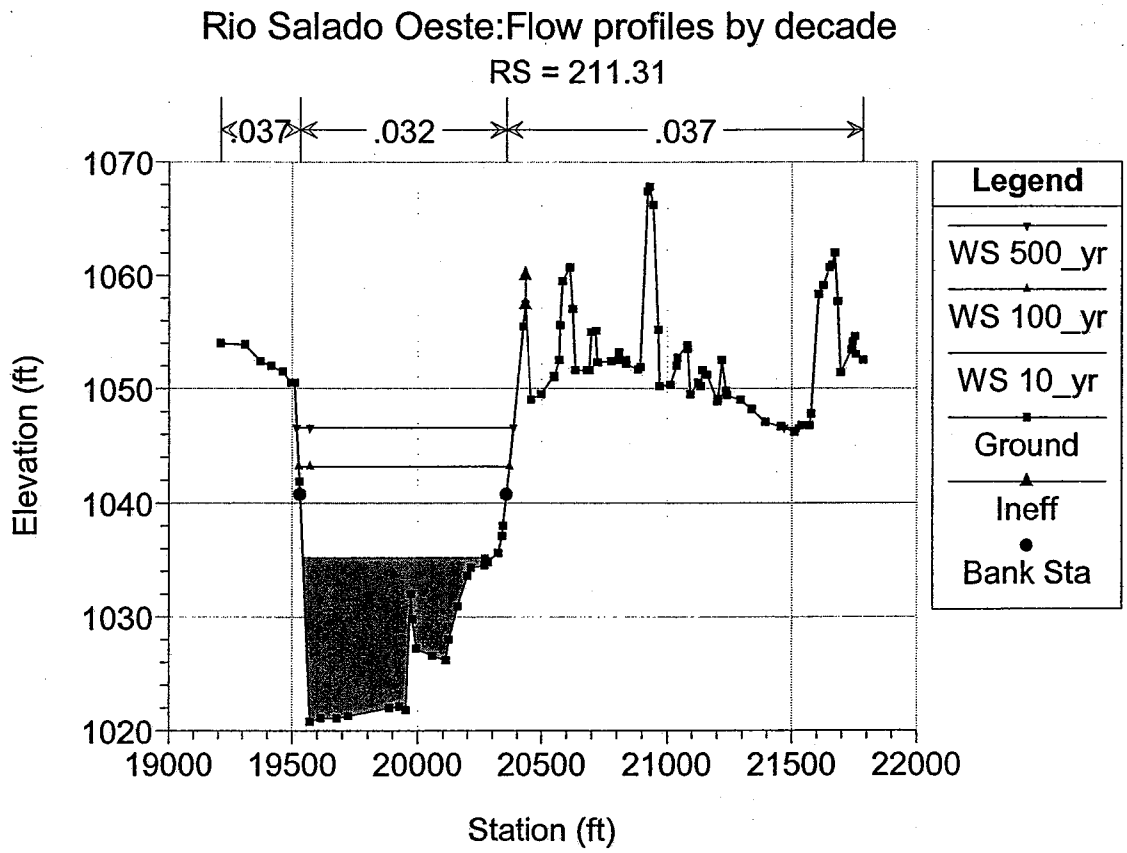

Rio Salado Oeste:Flow profiles by decade
RS = 210.83
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

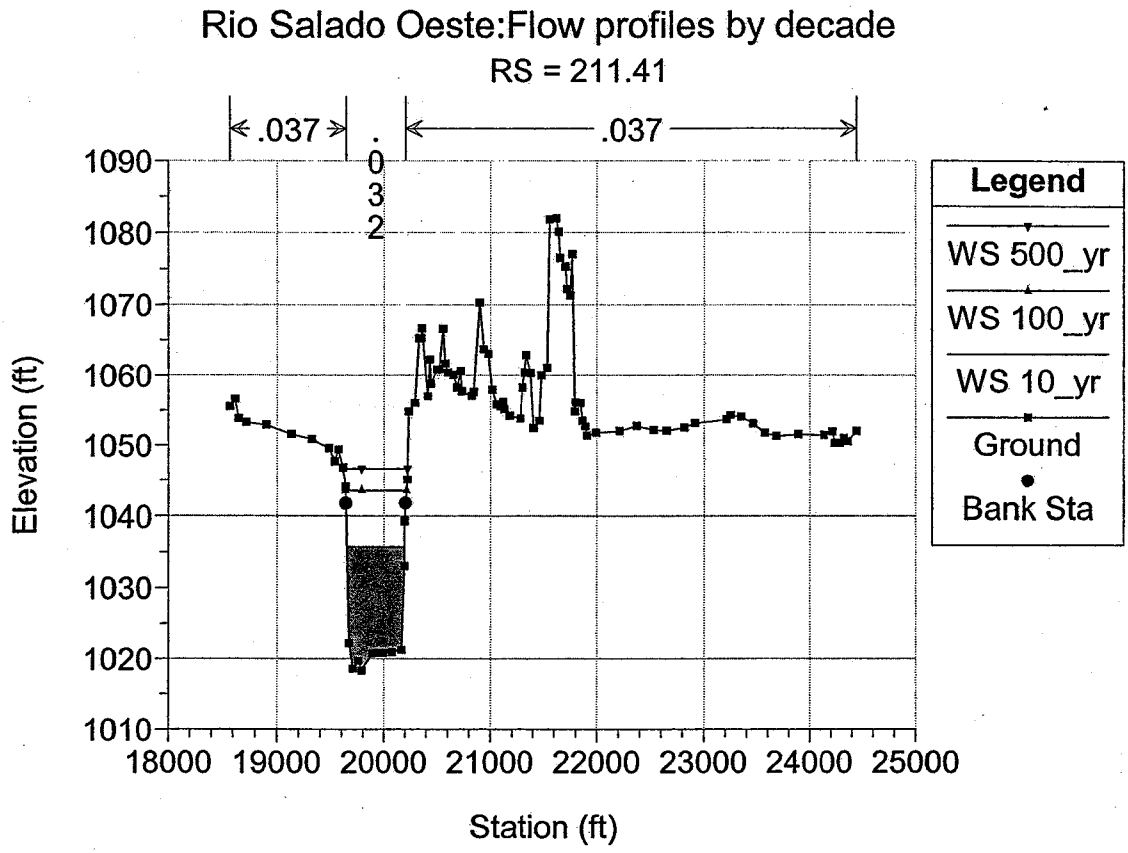

Rio Salado Oeste:Flow profiles by decade
RS = 210.93
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

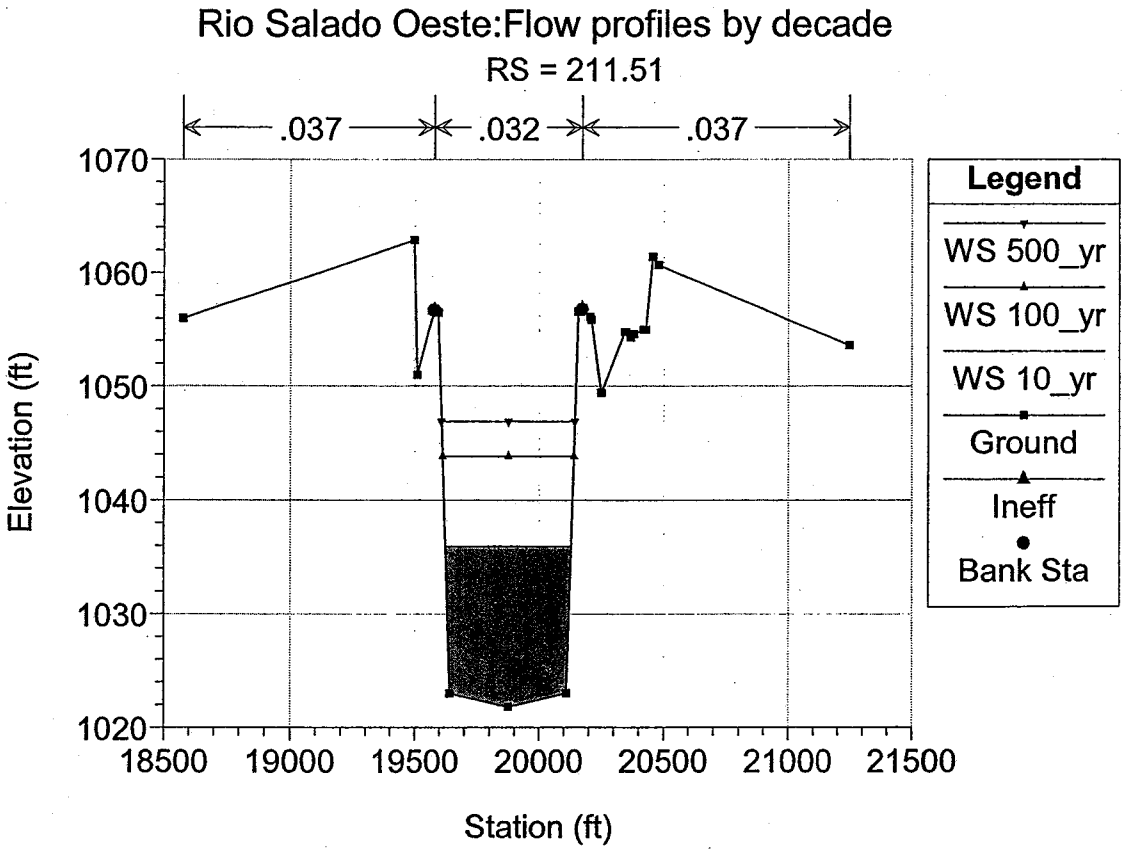

Rio Salado Oeste:Flow profiles by decade
RS = 211.02
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

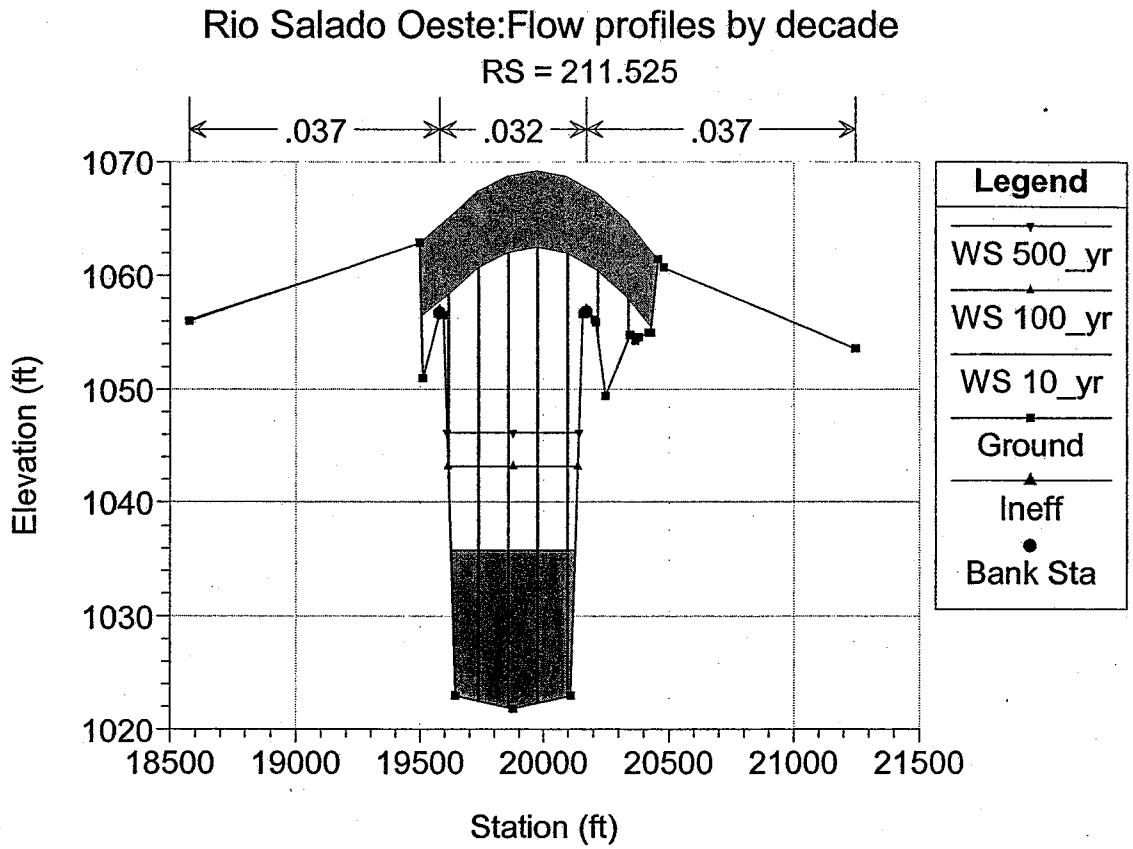

Rio Salado Oeste:Flow profiles by decade
RS = 211.12
.043
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

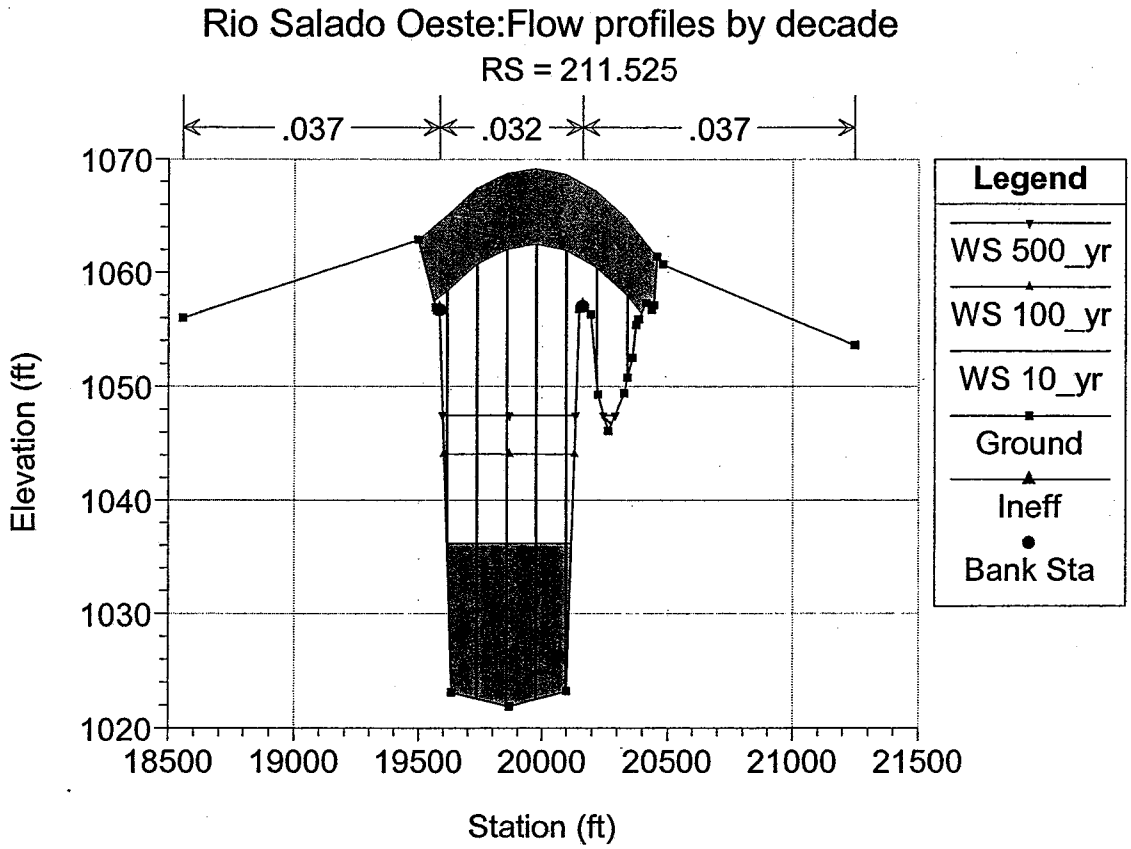

Rio Salado Oeste:Flow profiles by decade
RS = 211.21
.037
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

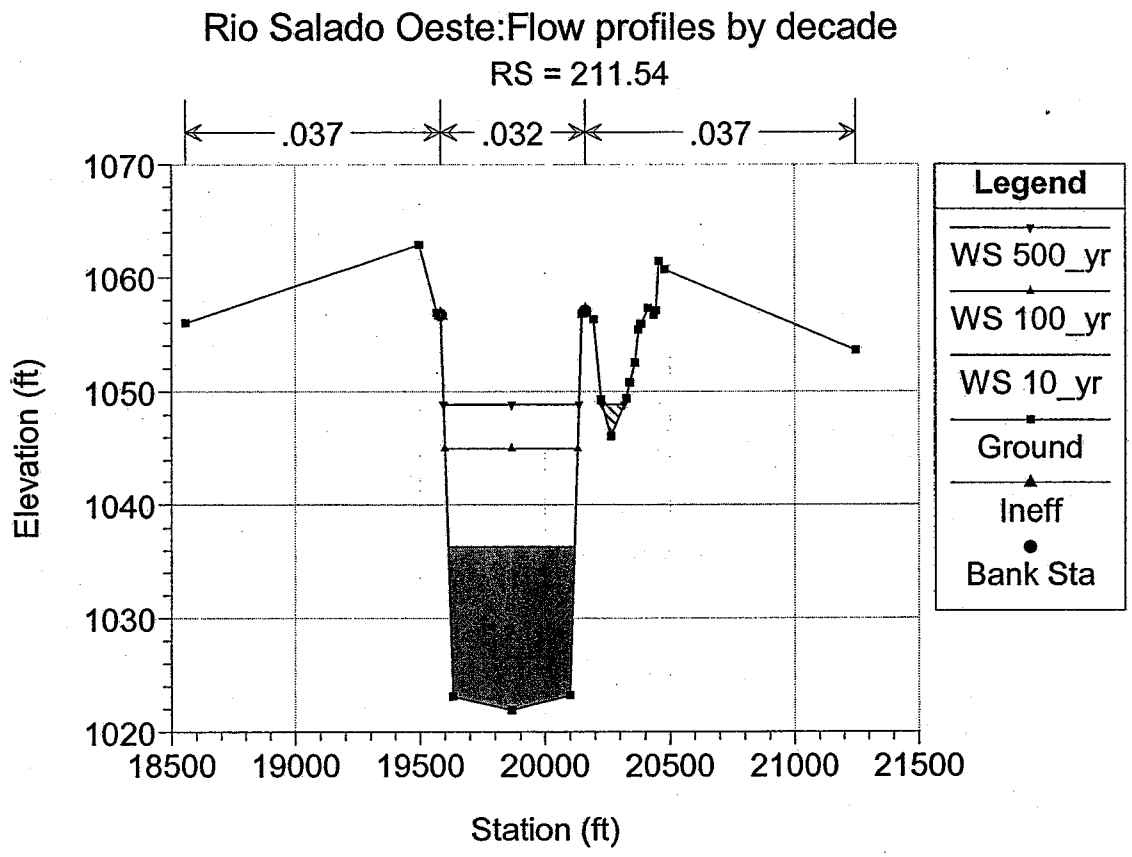

Rio Salado Oeste:Flow profiles by decade
RS = 211.31
.037
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 211.41
.037
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 211.51
.037
.032
.037
Elevation (ft)
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 211.525
.037
.032
.037
1070
1060
1050
1040
1030
1020
Elevation (ft)
18500
19000
19500
20000
20500
21000
21500
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 211.525
.037
.032
.037
1070
1060
1050
1040
1030
1020
Elevation (ft)
18500
19000
19500
20000
20500
21000
21500
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta


Rio Salado Oeste:Flow profiles by decade
RS = 211.54
.037
.032
.037
1070
1060
1050
1040
1030
1020
Elevation (ft)
18500
19000
19500
20000
20500
21000
21500
Station (ft)
Legend
WS 500_yr
WS 100_yr
WS 10_yr
Ground
Ineff
Bank Sta

Appendix B

Existing Conditions Hydraulic Analysis Results

Hydraulic modeling results for the 5-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	950.54	948.69	950.79	0.001957	3.97	5042.16	1605.3	0.39
2	951.99	949.84	952.17	0.001974	3.38	5920.97	2109.4	0.36
3	954.03	952.88	954.5	0.005048	5.56	3598.55	1488.69	0.63
4	954.96	950.1	955.01	0.000293	1.91	10457.57	2387.58	0.16
5	955.15	952.05	955.3	0.000912	3.14	6375.81	1569.35	0.27
6	955.54	952.21	955.67	0.000671	2.85	7016.06	1770.6	0.25
7	955.61	953.74	955.94	0.002475	4.63	4321.29	1260.88	0.44
202.09	956.39	955.78	957.34	0.008267	7.83	2553.09	817.18	0.78
202.18	958.66	955.8	958.82	0.001356	3.26	6130.31	1853.47	0.31
202.29	959.52	958.15	959.63	0.001365	2.72	7524.62	3183.65	0.3
202.37	960.06	958.34	960.25	0.001747	3.49	5821.27	2031.88	0.36
202.48	960.9	958.74	961.05	0.001296	3.07	6582.92	2213.59	0.31
202.59	961.73	959.86	961.92	0.002237	3.49	5707.73	2164.33	0.38
202.69	962.61	959.67	962.76	0.001137	3.07	6534.9	2077.04	0.3
202.8	963.26	960.94	963.38	0.001254	2.83	7091.77	2477.67	0.29
202.9	963.81	961.36	963.93	0.000924	2.8	7143.83	2040.11	0.26
202.99	964.33	962.49	964.54	0.001937	3.71	5387.49	1853.41	0.38
203.09	965.28	963.24	965.52	0.001827	3.91	5118.39	1465.99	0.37
203.19	966.32	964.5	966.57	0.002316	3.99	5019.8	1692.65	0.41
203.29	967.13	964.7	967.33	0.001054	3.61	5540.49	1585.17	0.34
203.39	967.7	965.75	967.9	0.001204	3.65	5476.44	1644.86	0.35
203.48	968.25	965.92	968.45	0.000936	3.56	5621	1439.88	0.32
203.58	968.68	965.71	968.81	0.000564	2.88	6952.5	1724.06	0.25
203.67	968.94	965.88	969.06	0.000438	2.72	7356.78	1629.83	0.23
203.77	969.19	966.52	969.31	0.000544	2.78	7200.32	1895.63	0.25
203.86	969.44	965.49	969.55	0.00038	2.66	7521.48	1543.09	0.21
203.96	970.01	970.01	971.56	0.010354	9.99	2001.19	648.06	1
204.05	972.91	970.25	973.16	0.001354	4.01	4989.56	1385.33	0.37
204.15	973.46	970.01	973.57	0.000493	2.66	7509.07	1803.17	0.23
204.25	973.71	971.18	973.93	0.000909	3.8	5265.54	1177.58	0.32
204.34	974.22	973.85	975.08	0.006875	7.41	2698.74	1008.58	0.8
204.42	976.58	974.91	976.98	0.002552	5.07	3944.08	995.61	0.45
204.53	977.95	976.25	978.29	0.002323	4.65	4305.47	1156.15	0.42
204.61	978.8	975.77	979.04	0.001012	3.91	5112.14	951.96	0.3
204.68	979.33	975.8	979.49	0.000685	3.22	6212.14	1155.85	0.24
204.78	979.58	972.6	979.62	0.000131	1.59	12102.38	1845.56	0.11
204.87	979.64	976.29	979.79	0.000774	3.19	6278.62	1297.98	0.26
204.97	979.95	971.49	980.03	0.00029	2.26	8865.62	1592.36	0.16
205.06	980.08	976.66	980.33	0.000972	4.02	4970.38	857.79	0.29
205.15	980.68	978.53	981.22	0.002647	5.93	3370.09	689.49	0.47
205.25	981.73	977.66	981.88	0.000535	3.1	6442.07	1057.38	0.22
205.34	982.1	978.57	982.3	0.000831	3.51	5699.62	1078.2	0.27
205.4	982.37	978.49	982.48	0.000371	2.68	7467.03	1441.71	0.21
205.43	982.39	979.27	982.6	0.000744	3.68	5478.83	1145.54	0.29
205.52	982.87	980.91	983.16	0.002012	4.31	4637.55	1553.84	0.44
205.62	983.8	981.24	984.11	0.00159	4.5	4485.97	1180.8	0.41
205.75	984.82	981.51	985.11	0.001365	4.28	4720.44	1188.47	0.38
205.84	985.71	984.89	986.35	0.004305	6.44	3192.42	1127.91	0.65
205.94	987.57	985.94	987.96	0.002064	5.12	4189.08	1230.68	0.45

Hydraulic modeling results for the 5-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	989.13	988.67	989.86	0.006323	6.57	2980.15	1150.69	0.73
206.13	991.13	989.42	991.42	0.001833	4.53	4645.24	1387.22	0.42
206.22	992.05	990.18	992.4	0.001996	5	4365.17	1461.37	0.45
206.32	993.02	991.09	993.3	0.001489	4.4	4788.27	1441.18	0.39
206.41	993.86	992.4	994.17	0.001978	4.69	4532.19	1464.93	0.45
206.51	994.95	993.8	995.42	0.002903	5.73	3780.4	1309.52	0.54
206.6	996.14	995.75	996.34	0.001164	3.63	5824.64	1872.06	0.34
206.7	996.72	996.33	997.66	0.005588	8.17	2712.73	1874.37	0.76
206.79	998.2	997.75	998.34	0.000516	3.07	7042.59	1711.2	0.24
206.88	999.05	999.05	999.12	0.000209	2.27	9617.02	1909.46	0.16
206.97	998.39	998.39	1000.02	0.006026	10.7	2165.65	1627.19	0.83
207.07	1000.6	996.72	1000.77	0.000469	3.38	6379.34	1316.5	0.24
207.16	1000.83	997.26	1001.03	0.000613	3.69	5662.78	1307.51	0.27
207.27	1001.16	1000.85	1001.99	0.005643	7.6	2937.38	1242.56	0.75
207.34	1002.96	1001	1003.19	0.00129	3.97	5259.53	1517.18	0.37
207.43	1003.61	1001.74	1003.86	0.001375	3.94	5120.64	1475.76	0.37
207.48	1003.96	1001.48	1004.1	0.000657	3.09	6538.4	1562.49	0.27
207.485	Mult Open							
207.49	1004.19	1001.63	1004.33	0.000616	3.03	6669.52	1563.77	0.26
207.53	1004.32	1002.46	1004.55	0.001327	3.8	5312.39	1574.91	0.36
207.62	1005.13	1004.29	1005.68	0.004129	5.95	3402.39	1218.22	0.62
207.71	1006.75	1004.68	1007.09	0.002081	4.72	4281.36	1286.37	0.46
207.8	1007.75	1005.14	1008.07	0.00185	4.51	4482.78	1319.2	0.43
207.9	1008.66	1005.75	1008.87	0.001283	3.69	5477.03	1656.35	0.36
207.99	1009.23	1006.33	1009.44	0.001015	3.7	5463.95	1381.11	0.33
208.1	1009.97	1008.25	1010.37	0.002792	5.05	4003.57	1354.54	0.52
208.19	1011.31	1009.45	1011.58	0.001823	4.15	4871.35	1607.31	0.42
208.29	1012.3	1010.84	1012.61	0.002239	4.46	4532.73	1565.64	0.46
208.39	1013.38	1011.81	1013.67	0.001943	4.32	4677.35	1967.67	0.43
208.48	1014.32	1012.7	1014.56	0.00176	3.97	5086.63	1918.23	0.41
208.57	1015.33	1014.01	1015.72	0.002745	5	4042.32	1599.5	0.51
208.67	1016.38	1014.17	1016.63	0.001198	4.03	5012.76	1258.3	0.36
208.75	1016.9	1014.8	1017.26	0.00147	4.77	4234.37	1110.62	0.4
208.85	1018	1017.88	1019.08	0.00968	8.35	2419.19	977.18	0.94
208.95	1020.3	1017.65	1020.67	0.001329	4.85	4167.24	859.17	0.39
209.04	1020.92	1016.75	1021.06	0.00036	3.01	7077.13	1223.11	0.21
209.14	1021.09	1019.74	1021.56	0.002553	5.49	3733.21	2593.76	0.51
209.24	1022.66	1022.01	1023.24	0.003977	6.41	3582.28	2626.97	0.63
209.33	1024.29	1022.88	1024.72	0.002304	5.29	3820.57	1485.42	0.49
209.42	1025.4	1022.88	1025.76	0.001612	4.8	4211.91	1393.67	0.37
209.53	1026.42	1024.21	1027.3	0.003146	7.53	2682.59	437.46	0.54
209.535	Mult Open							
209.54	1026.77	1024.22	1027.55	0.002646	7.12	2838.94	442.72	0.5
209.6	1027.87	1022.64	1027.98	0.000239	2.74	7514.5	1345.48	0.18
209.69	1028.01	1022.11	1028.08	0.000153	2.16	9344.72	1274.62	0.14
209.79	1028.11	1022.84	1028.16	0.000131	1.83	11063.69	1732.18	0.13
209.88	1028.18	1021.8	1028.23	0.000085	1.71	11826.03	1491.36	0.11
209.98	1028.25	1022.64	1028.29	0.000114	1.57	12893.51	2242.55	0.1
210.07	1028.31	1020.95	1028.33	0.00005	1.16	17444.7	2593.85	0.07
210.17	1028.33	1022.02	1028.38	0.000148	1.72	11892.79	2256.2	0.12

Hydraulic modeling results for the 5-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1028.4	1021.24	1028.45	0.000129	1.76	11469.31	2005.13	0.11
210.36	1028.47	1022.14	1028.55	0.000255	2.34	8641.94	1737.7	0.16
210.43	1028.55	1021	1028.62	0.000112	2.19	9241.95	1427.05	0.13
210.435	Mult Open							
210.44	1028.56	1020.94	1028.64	0.000112	2.18	9255.79	1438.54	0.12
210.46	1028.59	1020.53	1028.64	0.000067	1.77	11409.88	2014.35	0.1
210.55	1028.63	1020.86	1028.69	0.000103	2.08	9725.21	2408.24	0.12
210.64	1028.67	1021.13	1028.74	0.000119	2.18	9271.15	2818.43	0.13
210.74	1028.72	1021.35	1028.81	0.000133	2.32	8723.87	2197.74	0.14
210.83	1028.78	1023.67	1028.93	0.000329	3.17	6371.92	2134.9	0.21
210.93	1028.95	1024.66	1029.15	0.000502	3.64	5546.04	2283.57	0.25
211.02	1029.2	1023.56	1029.34	0.000292	3.08	6559	1888.07	0.2
211.12	1029.37	1022.71	1029.44	0.000127	2.23	9063.74	1734.08	0.13
211.21	1029.31	1025.42	1029.66	0.000851	4.77	4239.13	636.53	0.33
211.31	1029.75	1025.86	1030.2	0.001148	5.41	3732.15	580.24	0.38
211.41	1030.28	1023.95	1030.52	0.000353	3.94	5132.19	530.71	0.22
211.51	1030.44	1026.26	1030.87	0.000836	5.27	3835.04	488.64	0.33
211.525	Bridge							
211.54	1030.74	1026.39	1031.15	0.000777	5.15	3921.51	489.04	0.32

Hydraulic modeling results for the 10-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	953.37	950.5	953.76	0.001957	5	10200.08	2077.28	0.4
2	954.71	951.76	954.95	0.001487	4	12760.46	2877.14	0.33
3	956.39	955.04	956.96	0.005252	6.06	8409.75	2724.58	0.61
4	957.54	952.29	957.68	0.000465	2.98	17202.46	2860.82	0.21
5	957.84	954.1	958.13	0.001333	4.32	11845.87	2524.31	0.35
6	958.43	954.08	958.66	0.000936	3.86	13247.63	2615.07	0.3
7	958.54	955.95	958.97	0.002431	5.3	9624.91	2357.64	0.46
202.09	959.37	958.4	960.18	0.006355	7.25	7068.84	2090.9	0.69
202.18	961.33	958.08	961.61	0.001468	4.22	12258.71	2786.32	0.34
202.29	962.08	959.14	962.25	0.000797	3.31	16263	3669.55	0.26
202.37	962.44	959.86	962.71	0.001644	4.21	12275.45	3088.89	0.36
202.48	963.26	960.37	963.53	0.001402	4.16	12530.17	2897.12	0.34
202.59	964.05	961.65	964.36	0.001797	4.46	11557.32	2704.54	0.37
202.69	964.94	961.89	965.2	0.001348	4.17	12444.15	2764.45	0.34
202.8	965.62	962.57	965.84	0.001107	3.8	13849.89	3073.32	0.3
202.9	966.19	962.89	966.45	0.001187	4.09	12651.44	2660.73	0.32
202.99	966.78	964.25	967.13	0.001866	4.75	10861.54	2479.48	0.39
203.09	967.76	965.1	968.19	0.002164	5.26	9878.13	2245.06	0.42
203.19	968.9	966.37	969.28	0.002038	4.95	10545.6	2509.4	0.41
203.29	969.75	966.75	970.13	0.001419	4.95	10401.89	2381.78	0.4
203.39	970.45	967.39	970.79	0.001184	4.69	10989.1	2379.2	0.37
203.48	971.06	967.69	971.41	0.001264	4.8	10706.44	2342.19	0.39
203.58	971.64	967.42	971.89	0.000675	3.96	12891.54	2315.3	0.3
203.67	971.94	967.45	972.18	0.000535	3.94	12993.03	2086.24	0.28
203.77	972.25	968.03	972.46	0.000544	3.76	13558.4	2166.16	0.26
203.86	972.5	967.36	972.75	0.000521	3.95	12901.5	1929.91	0.27
203.96	972.79	972.79	974.44	0.010062	10.3	4951.65	1502.07	1
204.05	975.72	972.7	976.14	0.001508	5.22	9773.85	1980.79	0.41
204.15	976.37	972.04	976.6	0.000562	3.91	13030.23	1937.07	0.27
204.25	976.55	973.1	977.09	0.001161	5.91	8661.04	1217.23	0.39
204.34	976.97	975.82	978.31	0.004286	9.3	5490.75	1032.1	0.71
204.42	979.17	976.96	980.11	0.003274	7.79	6550.45	1047.12	0.55
204.53	980.9	978.13	981.56	0.002204	6.51	7842.47	1276.86	0.45
204.61	981.89	977.87	982.43	0.001349	6.05	9087.93	1610.19	0.37
204.68	982.65	977.82	983.01	0.000852	4.87	11099.37	1780.34	0.29
204.78	983.12	975.55	983.24	0.000226	2.77	19083.19	2056.37	0.16
204.87	983.19	978.27	983.49	0.000809	4.43	11801.75	1762.06	0.28
204.97	983.6	975.41	983.78	0.00041	3.47	14698.86	1793.55	0.21
205.06	983.66	979.01	984.26	0.001339	6.24	8176.7	927.56	0.37
205.15	984.41	981.36	985.42	0.003057	8.11	6499.14	1219.97	0.54
205.25	985.87	979.71	986.18	0.000601	4.54	11803.29	1493.88	0.25
205.34	986.31	980.87	986.66	0.001002	4.79	10731.59	1524.07	0.31
205.4	986.67	980.36	986.86	0.000355	3.54	14416.17	1772.11	0.22
205.43	986.68	981.38	986.99	0.000774	4.49	11664.1	1974.46	0.31
205.52	987.08	983.11	987.35	0.00078	4.23	12119.15	2071.7	0.31
205.62	987.51	984.01	987.96	0.001432	5.35	10007.91	2012.55	0.41
205.75	988.4	984.74	988.89	0.001282	5.6	9463.45	1519.89	0.4
205.84	989.16	987.14	989.72	0.002104	6.18	9074.45	2183.41	0.49
205.94	990.41	988.17	991.02	0.002599	6.32	8433.74	1858.98	0.52

Hydraulic modeling results for the 10-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	991.84	990.62	992.92	0.004236	8.36	6376.58	1486.56	0.67
206.13	993.73	991.19	994.27	0.001801	6.29	9315.21	2150.2	0.45
206.22	994.74	992.62	995.28	0.002261	6.31	9202.08	2306.42	0.51
206.32	995.78	993.19	996.28	0.001593	5.96	9529.1	1989.17	0.44
206.41	996.58	994.24	997.17	0.001861	6.58	8870.8	2014.05	0.47
206.51	997.58	995.95	998.3	0.002569	7.31	8113.6	2129.52	0.55
206.6	998.78	995.98	999.13	0.001059	4.98	11573.82	2347.41	0.36
206.7	999.27	997.16	999.56	0.000675	4.42	12644.14	2086.86	0.29
206.79	999.58	997.76	1000.1	0.001436	6.01	9418.74	1731.13	0.42
206.88	1000.29	999.06	1000.62	0.000733	4.79	12063.99	2010.9	0.31
206.97	1000.63	999.76	1001	0.000773	4.95	11313.59	1753.81	0.32
207.07	1000.84	1000.1	1001.91	0.002812	8.49	6702.33	1342.01	0.59
207.16	1002.33	1000.21	1003.1	0.002139	7.2	7938.78	1766.38	0.51
207.27	1003.82	1002.73	1004.77	0.004009	8.22	6875.97	1665.78	0.67
207.34	1005.38	1002.86	1005.93	0.001539	6.06	8966.06	1543.95	0.43
207.43	1006.15	1003.55	1006.7	0.001571	5.93	8944.72	1582.48	0.43
207.48	1006.64	1003.06	1007.02	0.000872	4.93	10755.67	1575.98	0.33
207.485	Mult Open							
207.49	1006.93	1003.2	1007.3	0.000815	4.83	10980.07	1576.79	0.32
207.53	1007.09	1004.2	1007.54	0.001267	5.34	9975.09	2120.8	0.39
207.62	1007.72	1006.3	1008.63	0.00347	7.66	6978.02	1826.34	0.62
207.71	1009.42	1007.2	1010.04	0.002354	6.32	8381	2284.33	0.51
207.8	1010.66	1008.07	1011.12	0.001986	5.47	9690.01	2406.81	0.46
207.9	1011.61	1008.47	1011.93	0.001214	4.57	11609.52	2446.29	0.37
207.99	1012.19	1008.75	1012.59	0.001319	5.1	10394.44	1973.33	0.39
208.1	1013.02	1010.76	1013.47	0.001911	5.38	9851.55	2291.66	0.46
208.19	1014.01	1011.55	1014.41	0.001616	5.09	10406.17	2304.7	0.42
208.29	1014.87	1012.8	1015.34	0.002021	5.53	9592.51	2222.87	0.47
208.39	1015.93	1013.69	1016.43	0.002168	5.68	9336.51	2767.59	0.48
208.48	1016.89	1014.49	1017.31	0.001572	5.19	10202.2	2347.24	0.42
208.57	1017.71	1016	1018.46	0.002743	6.98	7626.52	2168.12	0.56
208.67	1019.05	1016.18	1019.63	0.001831	6.11	8679.55	1783.89	0.46
208.75	1019.92	1017.04	1020.61	0.002459	6.69	8120.31	2928.56	0.53
208.85	1021.37	1020.25	1022.32	0.004001	7.86	6925.42	3142.37	0.66
208.95	1023	1021.11	1023.56	0.001434	6.57	10700.59	2832.06	0.43
209.04	1023.78	1018.86	1024.11	0.000592	4.89	13360.48	2859.67	0.29
209.14	1024.05	1022.06	1024.73	0.001915	6.92	8674.97	2733.09	0.48
209.24	1025.14	1023.85	1026.15	0.003473	8.62	6969.78	2963.63	0.64
209.33	1026.67	1024.95	1027.75	0.003001	8.35	6362.81	1591.95	0.6
209.42	1028.24	1025.31	1029.25	0.002591	8.08	6559.46	1565.46	0.51
209.53	1029.62	1028.01	1032.12	0.005487	12.74	4348.22	1085.39	0.75
209.535	Mult Open							
209.54	1030.46	1028.01	1032.44	0.004007	11.43	5025.93	1065.11	0.65
209.6	1033.03	1024.82	1033.22	0.00022	3.73	18085.52	4143.94	0.19
209.69	1033.2	1024.13	1033.34	0.000207	3.07	18682.86	2895.42	0.17
209.79	1033.33	1024.68	1033.43	0.000123	2.56	21645.4	3003.36	0.13
209.88	1033.39	1023.44	1033.5	0.000118	2.68	19937.4	1647.81	0.13
209.98	1033.49	1024.13	1033.57	0.000125	2.34	22685.06	2360.31	0.12
210.07	1033.57	1022.34	1033.62	0.000069	1.82	29139.86	2814.75	0.09
210.17	1033.59	1024.07	1033.68	0.00014	2.47	22050.33	2632.97	0.13

Hydraulic modeling results for the 10-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1033.65	1023.45	1033.77	0.000159	2.72	19476.26	2797.19	0.14
210.36	1033.71	1024.86	1033.89	0.000273	3.4	15601.72	2299.71	0.18
210.43	1033.79	1023.32	1034	0.000188	3.63	14599.43	1762.59	0.17
210.435	Mult Open							
210.44	1033.84	1023.27	1034.04	0.000186	3.62	14635.89	1723.09	0.17
210.46	1033.92	1022.55	1034.07	0.000112	3.03	17463.19	2105.75	0.14
210.55	1033.96	1023.11	1034.14	0.000164	3.42	15500.46	2787.86	0.16
210.64	1034.04	1023.7	1034.23	0.000176	3.57	14838.41	2967.31	0.17
210.74	1034.11	1023.83	1034.33	0.000198	3.78	14008.87	2788.02	0.18
210.83	1034.17	1026.2	1034.51	0.000373	4.69	11302.39	2547.65	0.24
210.93	1034.34	1027.21	1034.75	0.000494	5.13	10323.99	2571.53	0.27
211.02	1034.61	1026.36	1034.96	0.000349	4.71	11240.93	2049	0.23
211.12	1034.89	1024.8	1035.09	0.000176	3.59	14775.36	1913.54	0.17
211.21	1034.79	1028.59	1035.37	0.000944	6.11	8671.35	965.22	0.36
211.31	1035.18	1029.68	1036.02	0.001259	7.35	7212.64	758.88	0.42
211.41	1035.77	1027.27	1036.44	0.000557	6.54	8097.98	546.38	0.3
211.51	1035.94	1029.7	1036.95	0.001006	8.07	6569.48	504.36	0.39
211.525	Bridge							
211.54	1036.35	1029.83	1037.32	0.000939	7.9	6710.86	505.04	0.38

Hydraulic modeling results for the 20-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	955.57	951.87	956.02	0.001962	5.41	15540.35	2974.16	0.41
2	956.76	952.92	957.07	0.001171	4.45	18859.27	3076.07	0.31
3	958	956.38	958.64	0.003844	6.4	13124.87	3103.9	0.55
4	959.2	953.63	959.42	0.000591	3.82	22201.56	3093.77	0.25
5	959.55	955.64	959.96	0.001422	5.2	16364.76	2812.83	0.37
6	960.21	955.73	960.54	0.001063	4.63	18221.23	2901.04	0.32
7	960.36	957.65	960.88	0.002461	5.79	14500.93	2980.46	0.46
202.09	961.15	959.7	962.01	0.005343	7.5	11316.29	2872.17	0.64
202.18	963.08	959.43	963.44	0.0016	4.81	17870.83	4153.64	0.37
202.29	963.85	959.97	964.08	0.000751	3.92	23025.31	3991.51	0.26
202.37	964.15	961.17	964.51	0.001425	4.9	17893.49	3507.56	0.36
202.48	964.9	961.53	965.27	0.001381	4.97	17692.25	3490.64	0.36
202.59	965.65	962.72	966.08	0.001754	5.35	16237.48	3335.34	0.39
202.69	966.54	963.27	966.94	0.001419	5.08	16955.76	2875.16	0.36
202.8	967.29	963.76	967.6	0.001123	4.6	19024.74	3155.91	0.31
202.9	967.85	964.05	968.24	0.001255	5.02	17429.65	3047.13	0.34
202.99	968.44	965.56	968.94	0.001847	5.69	15168.65	2750.84	0.41
203.09	969.47	966.72	970.05	0.002375	6.18	14159.72	2837	0.45
203.19	970.71	967.73	971.17	0.001974	5.54	15623.33	3081.51	0.41
203.29	971.54	968.12	972.04	0.00145	5.71	15269.25	3093.5	0.42
203.39	972.29	968.8	972.73	0.001263	5.39	16037.24	3196.38	0.39
203.48	972.93	969.2	973.38	0.0013	5.47	15705.15	2995.19	0.41
203.58	973.51	968.84	973.87	0.000736	4.85	17429.83	2541.71	0.32
203.67	973.86	968.76	974.23	0.000713	4.92	17498.12	2886.68	0.31
203.77	974.23	969.35	974.57	0.00064	4.68	17955.06	2258.19	0.29
203.86	974.54	969	974.92	0.000664	4.95	16974.08	2065.24	0.3
203.96	974.22	974.17	976.26	0.00908	11.47	7325.22	1751.25	0.99
204.05	977.38	974.35	978	0.001611	6.35	13238.73	2102.08	0.45
204.15	978.15	973.35	978.55	0.000698	5.08	16647	2120.64	0.31
204.25	978.27	974.63	979.22	0.001557	7.85	10787.06	1257.47	0.46
204.34	978.8	977.55	980.8	0.005144	11.35	7431.02	1200.92	0.8
204.42	981.68	978.67	982.9	0.003634	8.84	9508.75	1404.99	0.59
204.53	983.47	979.73	984.33	0.001977	7.51	11655.47	1831.04	0.45
204.61	984.45	979.64	985.13	0.001257	6.95	13597.4	1836.27	0.37
204.68	985.21	979.41	985.68	0.000855	5.74	16396.95	2408.61	0.31
204.78	985.76	976.96	985.95	0.000287	3.65	24970.55	2421.65	0.18
204.87	985.83	979.82	986.24	0.00078	5.28	16767.37	2165.52	0.29
204.97	986.25	977.37	986.55	0.000467	4.39	19123.01	2059.53	0.23
205.06	986.22	980.99	987.17	0.001761	7.83	10755.67	1159.86	0.43
205.15	987.19	984.12	988.33	0.002503	8.82	10211.28	1383.67	0.51
205.25	988.64	981.42	989.09	0.000651	5.54	16709.1	2253.01	0.27
205.34	989.1	982.53	989.56	0.000906	5.54	16127.39	2481.92	0.31
205.4	989.48	981.86	989.76	0.000355	4.22	21024.14	3131.19	0.23
205.43	989.5	983.16	989.87	0.000616	4.97	17839.7	2636.71	0.29
205.52	989.81	984.41	990.15	0.000611	4.77	18136.12	2525.22	0.29
205.62	990.14	985.62	990.6	0.00105	5.52	16178.35	2625.1	0.37
205.75	990.88	986.4	991.48	0.001518	6.26	13995.43	2275.59	0.43
205.84	991.71	988.48	992.23	0.001424	5.97	15210.64	2636.38	0.42
205.94	992.5	989.9	993.24	0.002126	6.99	12649.22	2221.31	0.5

Hydraulic modeling results for the 20-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	993.71	992.46	995.02	0.004454	9.68	9900.37	2307	0.71
206.13	995.78	992.95	996.38	0.001742	6.74	14225.78	2768.25	0.46
206.22	996.69	994.42	997.29	0.001856	6.58	14093.81	2917.2	0.47
206.32	997.65	994.7	998.28	0.00187	6.84	13956	2760.36	0.48
206.41	998.49	995.59	999.24	0.001811	7.76	13325.63	2491.86	0.49
206.51	999.42	997.54	1000.3	0.002268	8.31	12333.44	2516.45	0.54
206.6	1000.61	997.33	1001.1	0.001054	5.92	15989.82	2479.01	0.37
206.7	1001.11	1000.4	1001.56	0.000793	5.54	16731.76	2440.87	0.33
206.79	1001.42	998.55	1002.18	0.001522	7.31	12709.02	1868.99	0.45
206.88	1002.27	997.89	1002.75	0.000815	5.88	16278.14	2244.68	0.34
206.97	1002.64	999.11	1003.19	0.0009	6.2	15061.13	2015.13	0.36
207.07	1002.82	1001.05	1004.21	0.002752	9.94	9852.1	1801.12	0.61
207.16	1004.46	1002	1005.35	0.001905	7.94	12195.41	2101.08	0.5
207.27	1005.72	1004.16	1006.85	0.003393	8.95	10345.65	1953.88	0.64
207.34	1007.14	1004.18	1008	0.001736	7.6	11696.79	1563.79	0.48
207.43	1008.04	1004.92	1008.86	0.001699	7.25	11997.79	1695.08	0.47
207.48	1008.63	1004.34	1009.23	0.000997	6.22	14299.56	2153.81	0.37
207.485	Mult Open							
207.49	1008.94	1004.49	1009.51	0.000938	6.1	14624.21	2523.31	0.36
207.53	1009.13	1005.55	1009.75	0.001234	6.37	14039.33	2942.23	0.4
207.62	1009.64	1007.84	1010.8	0.003082	8.69	10282.61	2856.2	0.62
207.71	1011.41	1008.78	1012.15	0.002364	6.94	12759.09	3918.23	0.53
207.8	1012.56	1009.84	1013.15	0.001683	6.16	14115.62	3622.66	0.45
207.9	1013.44	1009.9	1013.88	0.001166	5.32	16352.45	3797.37	0.38
207.99	1013.98	1010.4	1014.58	0.001436	6.18	14075.94	2748.65	0.42
208.1	1014.86	1012.17	1015.43	0.00171	6.09	14306.44	3149.59	0.45
208.19	1015.73	1012.96	1016.29	0.001519	6.04	14422.44	2514.76	0.43
208.29	1016.53	1014.09	1017.18	0.001941	6.5	13394.16	2481.75	0.48
208.39	1017.52	1015.06	1018.22	0.002061	6.73	12932.6	3041.51	0.5
208.48	1018.47	1015.72	1019.11	0.001637	6.4	13594.88	2901.64	0.45
208.57	1019.21	1017.43	1020.38	0.002991	8.71	10151.12	2446.62	0.61
208.67	1020.76	1017.79	1021.66	0.001985	7.61	11431.72	2165.46	0.5
208.75	1021.72	1019.31	1022.59	0.002146	7.66	12474.96	3233.06	0.52
208.85	1022.94	1021.95	1024.08	0.003394	8.86	11229.94	3627.95	0.64
208.95	1024.6	1022.55	1025.34	0.001641	7.8	14939.46	2986.14	0.47
209.04	1025.47	1020.53	1026	0.0008	6.37	17337.21	2981.6	0.34
209.14	1025.78	1023.48	1026.78	0.002101	8.5	11707.88	2902.13	0.53
209.24	1026.86	1025.31	1028.35	0.003639	10.51	9373.4	3309.99	0.69
209.33	1028.46	1026.63	1030.14	0.003332	10.43	8661.29	2010.55	0.66
209.42	1030.21	1027.32	1031.91	0.003284	10.49	8659.43	2138.7	0.59
209.53	1031.92	1031.92	1035.34	0.006185	15.4	6959.78	2177.49	0.82
209.535	Mult Open							
209.54	1033.59	1032.48	1035.51	0.003247	12.04	10170.35	4275.95	0.61
209.6	1036	1026.64	1036.25	0.000234	4.44	26000.57	7842.17	0.2
209.69	1036.19	1025.72	1036.38	0.000232	3.63	26429.08	6008.88	0.19
209.79	1036.32	1025.95	1036.48	0.000145	3.22	28992.97	4747.11	0.15
209.88	1036.39	1024.83	1036.57	0.000172	3.46	25556.29	3835.32	0.16
209.98	1036.53	1025.31	1036.67	0.000167	3.04	28609.85	2654.8	0.14
210.07	1036.66	1023.47	1036.75	0.000091	2.4	36178.25	4122.1	0.11
210.17	1036.67	1025.58	1036.83	0.000174	3.2	28170.95	3989.76	0.15

Hydraulic modeling results for the 20-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1036.74	1025.07	1036.94	0.000207	3.59	24251.9	3506.6	0.16
210.36	1036.8	1026.65	1037.1	0.000338	4.41	19732.43	2673.43	0.2
210.43	1036.9	1025.16	1037.26	0.000269	4.85	17944.91	2461.05	0.21
210.435	Mult Open							
210.44	1036.98	1025.1	1037.35	0.000268	4.82	18049.79	2358.38	0.21
210.46	1037.12	1024.22	1037.38	0.000161	4.12	21091.67	2899.6	0.17
210.55	1037.17	1024.94	1037.49	0.000229	4.55	19120.26	3093.39	0.2
210.64	1037.27	1025.6	1037.62	0.000245	4.77	18256.31	3002.06	0.2
210.74	1037.37	1025.87	1037.76	0.000271	5.04	17257.76	2914.24	0.21
210.83	1037.42	1028.18	1037.99	0.000461	6.06	14356.56	2618.65	0.27
210.93	1037.62	1029.28	1038.28	0.000575	6.52	13353.61	2658.02	0.3
211.02	1037.95	1028.35	1038.54	0.000443	6.13	14196.53	2270.75	0.27
211.12	1038.37	1026.54	1038.72	0.000231	4.72	18430.67	1981.7	0.2
211.21	1038.25	1031.17	1039.06	0.000875	7.22	12048.01	984.77	0.36
211.31	1038.52	1032.31	1039.73	0.001303	8.82	9867.03	809.72	0.45
211.41	1039.03	1030	1040.23	0.00079	8.8	9886.16	553.05	0.37
211.51	1039.22	1032.56	1040.95	0.001314	10.56	8236.69	513.7	0.46
211.525	Bridge							
211.54	1039.8	1032.65	1041.44	0.001202	10.27	8468.21	514.85	0.45

Hydraulic modeling results for the 50-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	957.47	953.47	958.07	0.00196	6.22	21217.02	3586.49	0.42
2	958.72	954.24	959.15	0.001229	5.3	24959.52	3739.46	0.33
3	959.89	957.52	960.62	0.002982	6.86	19245.97	3669.78	0.5
4	961.09	955.14	961.44	0.000711	4.76	28335.94	3591.53	0.28
5	961.48	957.48	962.06	0.001511	6.13	22120.04	3356.26	0.39
6	962.21	957.41	962.68	0.001134	5.53	24475.87	3772.96	0.34
7	962.39	959.16	962.99	0.00217	6.25	21264.69	3701.32	0.44
202.09	963.05	961.21	963.96	0.004319	7.75	17573.41	3817.54	0.6
202.18	964.77	960.92	965.25	0.001569	5.62	24645.09	8275.92	0.38
202.29	965.59	960.97	965.92	0.000826	4.78	30067.25	5883.13	0.29
202.37	965.9	962.28	966.39	0.001427	5.82	24337.42	4383.86	0.37
202.48	966.65	962.88	967.16	0.001418	5.92	24342.13	4207.25	0.38
202.59	967.41	963.95	967.99	0.001727	6.28	22654.22	4267.54	0.4
202.69	968.31	964.56	968.87	0.001519	6.12	23139.88	4318.95	0.38
202.8	969.13	964.89	969.59	0.001188	5.55	25411.15	3813.56	0.34
202.9	969.72	965.5	970.26	0.001317	5.98	23332.12	3210.06	0.36
202.99	970.32	966.84	970.99	0.001865	6.67	20776.93	3238.26	0.43
203.09	971.33	968.13	972.08	0.002252	7.11	19792.38	3691.26	0.46
203.19	972.54	969.17	973.15	0.001855	6.41	21605.02	4599.01	0.42
203.29	973.38	969.92	974.01	0.001512	6.48	21360.91	5499.87	0.43
203.39	974.13	970.37	974.7	0.001237	6.21	22730.99	4597.95	0.4
203.48	974.76	971.1	975.35	0.001299	6.25	22490.52	5581.08	0.41
203.58	975.33	970.52	975.88	0.000874	5.99	22894.53	3682.47	0.35
203.67	975.78	970.48	976.31	0.000844	5.94	24051.72	3640.18	0.35
203.77	976.22	970.79	976.75	0.000819	5.82	22670.62	2472.34	0.34
203.86	976.6	970.83	977.2	0.000851	6.18	21400.28	2221.2	0.35
203.96	976.47	975.64	978.55	0.005929	11.57	11453.04	2047.82	0.84
204.05	979.2	976	980.12	0.001717	7.73	17084.28	2245.15	0.48
204.15	980.12	974.86	980.75	0.00085	6.42	21048.58	2492.35	0.35
204.25	980.25	976.56	981.7	0.002629	9.71	13795.78	1792.8	0.59
204.34	981.45	980.08	983.63	0.00497	11.89	11267.82	1773.44	0.79
204.42	984.26	981.11	985.6	0.003288	9.4	14924.72	2847.3	0.58
204.53	985.9	981.74	986.92	0.00182	8.44	17915.1	4483.68	0.45
204.61	986.83	982.35	987.7	0.00133	8.13	19229.17	6039.45	0.4
204.68	987.68	981.67	988.26	0.000862	6.59	23244.57	5581.19	0.32
204.78	988.28	978.49	988.56	0.000353	4.56	32247.97	6916.42	0.21
204.87	988.34	981.9	988.92	0.000846	6.35	23424.37	4473.19	0.31
204.97	988.79	980.21	989.28	0.000597	5.65	23355.56	2905.97	0.27
205.06	988.69	983.36	990.09	0.002244	9.58	14295.69	1779.19	0.5
205.15	989.88	986.5	991.31	0.002324	10.07	14703.82	2118.12	0.51
205.25	991.51	983.58	992.08	0.000683	6.51	25011.75	4962.47	0.29
205.34	991.98	984.66	992.53	0.000807	6.2	24828.07	5774.62	0.31
205.4	992.37	983.66	992.71	0.00034	4.85	30672.46	4518.06	0.23
205.43	992.37	985.73	992.82	0.00055	5.6	26223.2	3900.98	0.29
205.52	992.65	985.93	993.07	0.000536	5.36	27065.16	3661.93	0.28
205.62	992.94	987.83	993.45	0.000769	5.87	24355.99	3294.27	0.33
205.75	993.45	988.43	994.13	0.0012	6.71	20723.25	2862.58	0.4
205.84	994.12	990.13	994.73	0.001121	6.51	22143.78	3407.73	0.39
205.94	994.75	991.44	995.62	0.002085	7.87	18670.42	3118.51	0.51

Hydraulic modeling results for the 50-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	995.89	994.48	997.12	0.003291	9.58	15912.19	3226.94	0.63
206.13	997.64	994.57	998.4	0.001959	7.68	20051.86	3439.17	0.49
206.22	998.6	995.67	999.33	0.001708	7.38	20082.03	3772.31	0.47
206.32	999.49	996.48	1000.26	0.001799	7.77	19969.2	4014.93	0.49
206.41	1000.27	997.58	1001.24	0.001864	9	18336.94	3484.28	0.51
206.51	1001.2	999.17	1002.28	0.002159	9.38	17245.38	3201.53	0.55
206.6	1002.41	998.64	1003.12	0.001207	7.26	21107.34	3184.42	0.41
206.7	1003.04	1000.41	1003.65	0.000894	6.66	22716.1	3400.34	0.36
206.79	1003.33	1000.03	1004.37	0.001661	8.74	17260.71	2996.96	0.49
206.88	1004.32	999.59	1005.01	0.000942	7.15	21572.55	3468.13	0.38
206.97	1004.72	999.96	1005.54	0.001064	7.64	19522.83	2540.47	0.4
207.07	1004.97	1003.14	1006.64	0.0027	11.18	14151.17	2208.74	0.62
207.16	1006.63	1003.95	1007.72	0.001737	8.9	16774.8	2123.53	0.5
207.27	1007.68	1005.69	1009.11	0.002952	10.07	14247.41	2014.38	0.63
207.34	1008.96	1005.77	1010.28	0.002036	9.45	14734.72	2546.59	0.54
207.43	1010.04	1006.63	1011.24	0.00182	8.8	15830.61	4627.4	0.51
207.48	1010.91	1005.9	1011.69	0.001006	7.27	20961.38	5616.58	0.39
207.485	Mult Open							
207.49	1011.23	1006.07	1011.97	0.000952	7.13	21789.11	6765.65	0.38
207.53	1011.43	1007.14	1012.18	0.001119	7.2	21338.78	6557.08	0.4
207.62	1011.85	1009.58	1013.12	0.002625	9.35	16473.62	5174.44	0.59
207.71	1013.37	1010.63	1014.26	0.001932	7.68	18978.37	7979.2	0.5
207.8	1014.39	1011.17	1015.18	0.001697	7.17	19571.61	8276.28	0.47
207.9	1015.36	1011.38	1015.96	0.001249	6.2	22043.94	7347.56	0.4
207.99	1015.95	1012.18	1016.76	0.001724	7.25	18746.59	6178.77	0.47
208.1	1016.98	1013.5	1017.69	0.001611	6.79	19977.05	6233.42	0.45
208.19	1017.78	1014.22	1018.52	0.001443	6.92	19885.23	5124.86	0.44
208.29	1018.48	1015.4	1019.35	0.001746	7.48	18077.59	4300.9	0.48
208.39	1019.37	1016.57	1020.33	0.001962	7.89	17119.16	4293.84	0.51
208.48	1020.29	1017.11	1021.21	0.001702	7.71	17518.79	3386.49	0.48
208.57	1020.91	1019.03	1022.62	0.003228	10.58	13178.42	2937.14	0.66
208.67	1022.73	1019.67	1024.05	0.002209	9.19	14698.05	3088.5	0.55
208.75	1023.94	1021.25	1024.97	0.001814	8.5	17936.59	3767.74	0.5
208.85	1024.95	1023.33	1026.18	0.002635	9.46	16850.8	3932.49	0.59
208.95	1026.4	1023.99	1027.34	0.00175	8.99	20083.04	4413.16	0.5
209.04	1027.32	1022.91	1028.1	0.000999	7.91	21892.73	3869.44	0.39
209.14	1027.61	1025.11	1029.07	0.002388	10.39	14987.47	3208.27	0.58
209.24	1028.7	1027.05	1030.87	0.003975	12.76	11940.8	3443.52	0.74
209.33	1030.45	1029.04	1032.75	0.003511	12.42	12430.35	3614.64	0.71
209.42	1032.34	1030.22	1034.75	0.003799	12.79	12357.71	4862.95	0.66
209.53	1034.96	1034.96	1037.45	0.004207	14.54	13755.3	6308.37	0.7
209.535	Mult Open							
209.54	1035.41	1035.06	1037.63	0.003661	13.78	14542.71	6651.72	0.66
209.6	1038.11	1028.89	1038.51	0.000326	5.69	31766.46	10166.71	0.24
209.69	1038.38	1027.69	1038.68	0.000303	4.62	32781.27	8595.37	0.22
209.79	1038.56	1027.44	1038.81	0.000203	4.19	35872.43	6930.54	0.18
209.88	1038.64	1026.51	1038.96	0.000247	4.58	30475.75	5463.22	0.2
209.98	1038.85	1026.72	1039.1	0.000246	4.06	33384.14	5134.58	0.18
210.07	1039.05	1024.82	1039.21	0.000137	3.24	41828.28	5332.68	0.13
210.17	1039.06	1027.27	1039.33	0.000252	4.26	33215.77	4316.35	0.18

Hydraulic modeling results for the 50-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1039.14	1026.94	1039.5	0.000311	4.82	27981.1	3602.22	0.2
210.36	1039.21	1028.74	1039.75	0.000492	5.88	22975.7	3236.62	0.25
210.43	1039.35	1027.38	1040.01	0.000423	6.53	20682.85	2636.68	0.27
210.435	Mult Open							
210.44	1039.48	1027.38	1040.12	0.000418	6.46	20902.29	2578.82	0.27
210.46	1039.7	1026.15	1040.19	0.000251	5.62	24023.76	3001.13	0.22
210.55	1039.78	1027.19	1040.35	0.000347	6.1	22140.68	3417.69	0.25
210.64	1039.92	1027.74	1040.56	0.000369	6.39	21113.18	3788.24	0.26
210.74	1040.07	1028.1	1040.77	0.000407	6.76	19976.69	3057.83	0.27
210.83	1040.13	1030.63	1041.12	0.000651	7.98	16925.88	2668.44	0.33
210.93	1040.4	1031.78	1041.51	0.000777	8.46	15950.24	2734.44	0.36
211.02	1040.87	1030.71	1041.87	0.00062	8.03	16820.79	2507.89	0.33
211.12	1041.53	1028.63	1042.13	0.000324	6.2	21782.71	2271.72	0.24
211.21	1041.34	1034.23	1042.58	0.001	8.93	15117	1268.73	0.4
211.31	1041.55	1035.68	1043.41	0.001523	10.93	12351.36	830.22	0.5
211.41	1042.04	1033.23	1044.15	0.001168	11.66	11575.31	569.49	0.46
211.51	1042.27	1035.96	1045.21	0.00181	13.75	9816.65	522.41	0.56
211.525	Bridge							
211.54	1043.18	1036.06	1045.89	0.00159	13.2	10226.75	524.5	0.53

Hydraulic modeling results for the 100-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	958.58	954.43	959.26	0.00196	6.62	25067.33	5231.68	0.42
2	959.85	954.92	960.35	0.001234	5.71	29242.39	5656.86	0.34
3	960.96	958.19	961.75	0.002652	7.15	23200.36	5941.84	0.48
4	962.16	955.9	962.58	0.000766	5.27	32222.31	5776.98	0.29
5	962.57	958.24	963.24	0.001538	6.62	25725.2	5172.98	0.39
6	963.34	958.29	963.89	0.001213	5.95	28614.39	5011.7	0.35
7	963.55	959.91	964.19	0.002062	6.47	25635.49	5544.17	0.43
202.09	964.15	961.98	965.07	0.003612	7.84	21839.57	6369.83	0.56
202.18	965.71	961.82	966.26	0.001539	6.05	28590.51	9028.27	0.38
202.29	966.55	961.53	966.95	0.000873	5.27	34183.51	9892.45	0.3
202.37	966.86	962.78	967.43	0.001428	6.29	28063.75	7676.61	0.38
202.48	967.63	963.59	968.21	0.001423	6.41	28364.26	6284.87	0.38
202.59	968.39	964.72	969.05	0.001713	6.75	26789.7	6465.84	0.4
202.69	969.29	965.24	969.93	0.001526	6.59	27611.38	5398.8	0.39
202.8	970.12	965.6	970.65	0.001228	6.06	29439.35	5405.69	0.35
202.9	970.73	966.32	971.36	0.001374	6.54	26643.98	4363.92	0.37
202.99	971.34	967.58	972.11	0.001861	7.2	24090.12	3658.81	0.43
203.09	972.33	969.14	973.19	0.002209	7.65	22979.29	4702.91	0.47
203.19	973.54	969.95	974.24	0.00182	6.9	25044.88	5369.13	0.42
203.29	974.39	970.82	975.1	0.001545	6.9	24973.2	6289.46	0.44
203.39	975.18	971.24	975.81	0.001261	6.57	26981.82	6950.87	0.41
203.48	975.83	971.97	976.44	0.001187	6.48	27568.86	7083.7	0.4
203.58	976.33	971.42	976.98	0.000926	6.54	27166.51	4608.29	0.37
203.67	976.82	971.43	977.44	0.000879	6.46	27836.41	3716.58	0.36
203.77	977.25	971.58	977.91	0.000912	6.5	25238.57	2538.88	0.36
203.86	977.67	971.84	978.41	0.00094	6.92	23782.69	2300.05	0.37
203.96	977.58	976.73	979.8	0.005323	11.97	13840.28	2212.08	0.82
204.05	980.23	976.82	981.34	0.00177	8.49	19677.33	2812.26	0.5
204.15	981.23	975.68	982.01	0.000919	7.14	24028.06	3034.13	0.37
204.25	981.35	977.7	983.06	0.00291	10.54	16042.92	2347.11	0.63
204.34	982.74	981.58	985.02	0.004815	12.19	13951.49	2330.91	0.79
204.42	985.49	982.76	986.84	0.002883	9.64	19201.66	4766.09	0.55
204.53	987.03	983.05	988.06	0.00174	8.73	22300.82	6754.87	0.45
204.61	987.91	983.61	988.82	0.001327	8.55	24439.92	8945.22	0.4
204.68	988.71	982.88	989.39	0.00094	7.22	26606.98	9029.36	0.34
204.78	989.38	979.38	989.73	0.0004	5.08	36425.97	10060.54	0.22
204.87	989.45	982.89	990.12	0.000904	6.94	27377.25	7578.16	0.33
204.97	990.01	981.33	990.49	0.000543	5.62	30964.95	7021.9	0.26
205.06	989.65	984.96	991.4	0.002642	10.77	16128.58	2271.06	0.55
205.15	991.15	987.61	992.72	0.002314	10.75	17682.04	4924.52	0.52
205.25	992.89	985.16	993.51	0.00069	6.92	30247.69	9708.66	0.3
205.34	993.37	986.4	993.95	0.000777	6.52	30950.31	8943.68	0.31
205.4	993.74	984.7	994.13	0.000356	5.29	35766.78	5450.07	0.24
205.43	993.74	986.77	994.24	0.000552	5.99	30845.23	4980.35	0.29
205.52	994.03	986.99	994.49	0.000515	5.67	32501.07	6495.45	0.28
205.62	994.29	988.67	994.84	0.000716	6.18	29135.7	5495.71	0.33
205.75	994.74	989.52	995.49	0.001114	7.06	24560.2	3118.19	0.4
205.84	995.38	990.98	996.04	0.001031	6.8	26672.03	3774.7	0.38
205.94	995.95	992.46	996.85	0.001863	8.08	22824.18	3738.2	0.49

Hydraulic modeling results for the 100-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	996.94	995.24	998.2	0.002907	9.83	19547.72	3623.56	0.61
206.13	998.57	995.66	999.4	0.001941	7.98	23345.34	3864.54	0.49
206.22	999.54	996.38	1000.37	0.001879	8.06	23480.86	4154.23	0.5
206.32	1000.48	997.32	1001.3	0.001667	8.08	23709.33	4222.4	0.48
206.41	1001.2	998.56	1002.25	0.001841	9.49	21564.62	4152.66	0.52
206.51	1002.09	999.96	1003.35	0.00236	10.44	20541.93	4322.78	0.58
206.6	1003.43	999.43	1004.25	0.001245	7.88	24513.67	4259.35	0.43
206.7	1004.1	1000.41	1004.79	0.000923	7.2	26563.75	4230.18	0.37
206.79	1004.38	1000.93	1005.53	0.001671	9.34	20570.96	3418.56	0.5
206.88	1005.42	1000.33	1006.19	0.00096	7.69	25711.64	4034.56	0.38
206.97	1005.8	1000.82	1006.75	0.001119	8.32	23067.05	4150.8	0.41
207.07	1006.06	1004.12	1007.87	0.00267	11.78	16672.04	2580.56	0.63
207.16	1007.7	1004.74	1008.96	0.001765	9.58	19125.31	2834.99	0.51
207.27	1008.74	1006.53	1010.4	0.003037	11.1	16578.8	3578.34	0.65
207.34	1010.29	1006.69	1011.54	0.00184	9.8	19854.27	7322.67	0.52
207.43	1011.13	1007.52	1012.44	0.001772	9.34	19975.93	6878.18	0.51
207.48	1012.04	1006.82	1012.89	0.000999	7.73	25429.3	10309.08	0.39
207.485	Mult Open							
207.49	1012.38	1006.97	1013.16	0.000927	7.49	26397.37	10346.25	0.38
207.53	1012.58	1008.07	1013.36	0.001046	7.49	26489.06	9853.3	0.4
207.62	1012.93	1010.77	1014.23	0.002341	9.62	20705.68	8720.13	0.57
207.71	1014.3	1011.51	1015.28	0.001864	8.16	22965.16	9690.26	0.5
207.8	1015.28	1011.91	1016.17	0.001701	7.69	23597.53	9791.22	0.48
207.9	1016.25	1012.13	1016.95	0.001289	6.74	25827.8	10348.74	0.42
207.99	1016.85	1012.97	1017.8	0.001853	7.86	21722.88	8658.74	0.5
208.1	1017.96	1014.29	1018.77	0.001602	7.23	23850.34	8306.44	0.46
208.19	1018.78	1014.96	1019.61	0.001533	7.4	23641.14	8199.03	0.45
208.29	1019.47	1016.16	1020.5	0.001758	8.13	20507.77	5740.37	0.49
208.39	1020.35	1017.32	1021.49	0.001977	8.58	19359.84	5824.33	0.52
208.48	1021.28	1017.83	1022.38	0.001756	8.44	19665.87	3501.57	0.49
208.57	1021.84	1019.93	1023.88	0.003349	11.58	14933.22	2999.19	0.68
208.67	1023.79	1020.55	1025.36	0.002306	10.06	16670.04	4055.56	0.57
208.75	1025.17	1022.05	1026.28	0.001681	8.91	21660.57	5812.95	0.49
208.85	1026.09	1024.05	1027.38	0.002359	9.79	20195.85	5525.69	0.57
208.95	1027.44	1024.69	1028.48	0.001739	9.56	23336	5167.84	0.51
209.04	1028.34	1023.88	1029.27	0.001093	8.72	24431.04	4543.18	0.42
209.14	1028.59	1026.02	1030.35	0.002541	11.41	16759.35	4482.45	0.61
209.24	1029.66	1028.04	1032.31	0.004235	14.08	13287.14	4669.72	0.78
209.33	1031.92	1030.3	1034.15	0.002977	12.55	16511.92	5287.72	0.67
209.42	1033.54	1031.65	1036.08	0.003702	13.47	15622.59	5988.22	0.66
209.53	1035.88	1035.74	1038.54	0.004415	15.43	16007.4	7375.37	0.73
209.535	Mult Open							
209.54	1036.69	1035.92	1038.81	0.003398	13.91	17754.34	8758.45	0.64
209.6	1039.18	1030.82	1039.67	0.000383	6.42	34734.8	10903.96	0.26
209.69	1039.5	1028.77	1039.88	0.000346	5.18	36218.14	9034.8	0.24
209.79	1039.71	1028.3	1040.03	0.000238	4.73	39700.52	7855.23	0.2
209.88	1039.79	1027.46	1040.2	0.000293	5.22	33040.35	6301.77	0.22
209.98	1040.04	1027.54	1040.38	0.000295	4.64	36138.82	6830.77	0.19
210.07	1040.29	1025.63	1040.5	0.000165	3.72	44967.57	7051.1	0.15
210.17	1040.3	1028.14	1040.65	0.000299	4.85	35911.33	5454.04	0.2

Hydraulic modeling results for the 100-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1040.39	1027.96	1040.86	0.000377	5.55	30012.31	4341.9	0.22
210.36	1040.46	1029.81	1041.16	0.000589	6.73	24654.73	3261.19	0.28
210.43	1040.62	1028.73	1041.49	0.000525	7.5	22145.48	2685.05	0.3
210.435	Mult Open							
210.44	1040.79	1028.71	1041.64	0.000521	7.4	22445.6	2717.63	0.3
210.46	1041.07	1027.27	1041.72	0.000308	6.49	25577.02	3059.26	0.24
210.55	1041.16	1028.51	1041.92	0.000417	6.99	23759.41	3630.99	0.27
210.64	1041.33	1028.95	1042.17	0.000445	7.33	22644.12	3839.83	0.28
210.74	1041.5	1029.42	1042.43	0.000488	7.74	21433.76	3105.76	0.3
210.83	1041.56	1031.95	1042.84	0.000765	9.07	18298.65	2760.75	0.37
210.93	1041.88	1033.1	1043.3	0.000892	9.57	17338.8	2746.73	0.39
211.02	1042.43	1032.06	1043.71	0.000721	9.1	18240.91	2611.93	0.36
211.12	1043.25	1029.86	1044.02	0.000377	7.03	23624.69	2438.73	0.26
211.21	1043.02	1035.52	1044.54	0.001067	9.89	16798.06	1284.77	0.42
211.31	1043.17	1037.18	1045.46	0.001634	12.13	13706.75	841.39	0.52
211.41	1043.59	1035.12	1046.35	0.001381	13.32	12468.57	578.55	0.5
211.51	1043.83	1037.93	1047.61	0.002125	15.61	10634.01	526.85	0.61
211.525	Bridge							
211.54	1045.01	1038.03	1048.42	0.00181	14.84	11187.89	529.69	0.57

Hydraulic modeling results for the 500-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	960.4	956.09	961.23	0.001963	7.44	32899.79	11632.99	0.43
2	961.68	956.24	962.36	0.001318	6.67	37142.76	11516.67	0.36
3	962.8	959.47	963.77	0.002444	7.98	30693.27	11087.35	0.48
4	964.07	957.48	964.65	0.000871	6.22	40875.88	13317.23	0.32
5	964.5	959.79	965.38	0.001626	7.67	32647.79	10329.76	0.42
6	965.39	959.78	966.08	0.001312	6.83	36492.03	8847	0.37
7	965.59	961.39	966.37	0.001818	7.13	33962.16	9823.35	0.42
202.09	966.08	963.43	967.11	0.002843	8.36	29954.87	9882.95	0.52
202.18	967.49	963.27	968.2	0.00155	6.96	36361.89	13950.36	0.4
202.29	968.4	962.75	968.93	0.000959	6.21	42780.39	13885.15	0.32
202.37	968.7	964.14	969.46	0.001484	7.29	35616.86	10111.16	0.4
202.48	969.51	965.04	970.26	0.001435	7.3	36670.4	11209.22	0.4
202.59	970.27	966.19	971.09	0.001707	7.66	35531.48	12213.72	0.42
202.69	971.2	966.54	971.96	0.001508	7.41	37270.03	13061.3	0.39
202.8	972.03	966.9	972.7	0.001248	6.89	39692.14	9268.36	0.36
202.9	972.64	967.83	973.43	0.001425	7.46	36443.24	9074.91	0.39
202.99	973.23	969.21	974.25	0.001936	8.32	31140.04	7819.08	0.45
203.09	974.26	970.7	975.33	0.002151	8.64	30289.69	8168.88	0.48
203.19	975.48	971.42	976.37	0.001804	7.85	32377.03	7417.54	0.43
203.29	976.34	972.49	977.21	0.001476	7.73	33462.55	8538.95	0.45
203.39	977.18	972.82	977.89	0.001165	7.13	37264.38	8781.77	0.4
203.48	977.78	973.59	978.46	0.001067	6.98	37124.01	8307.7	0.39
203.58	978.23	972.99	979	0.000953	7.36	36172.83	7685.05	0.38
203.67	978.68	973.2	979.5	0.000985	7.59	34669.39	6293.14	0.39
203.77	979.11	973.2	980.08	0.001114	7.91	30118.74	3196.14	0.41
203.86	979.6	973.66	980.71	0.001147	8.46	28323.27	2973.88	0.42
203.96	979.52	978.43	982.23	0.004695	13.29	18290.94	2704.48	0.8
204.05	982.29	978.39	983.73	0.001793	9.76	26166.54	4696.31	0.52
204.15	983.4	977.41	984.44	0.001014	8.39	31833.25	6371.55	0.4
204.25	983.46	980.89	985.57	0.002795	11.89	22074.15	3260.34	0.64
204.34	984.71	983.7	987.41	0.004316	13.45	19577.64	4288.77	0.78
204.42	987.87	985.91	988.82	0.001767	8.74	33914.2	11155.11	0.45
204.53	988.71	986.48	989.8	0.001702	9.43	31515.64	10533.24	0.45
204.61	989.59	985.8	990.57	0.001355	9.3	33711.2	12251.15	0.41
204.68	990.23	985.38	991.2	0.001196	8.7	32583.34	12009.91	0.39
204.78	991.13	980.95	991.63	0.000521	6.21	43556.45	11796.83	0.26
204.87	991.23	984.89	992.12	0.001075	8.18	33882.68	9897.98	0.37
204.97	991.88	983.31	992.57	0.000702	6.9	37987.68	9756.22	0.3
205.06	991.29	988.48	993.8	0.003367	13.12	19833.35	7973.48	0.63
205.15	993.72	990.56	995.21	0.00191	11	27008.29	10125.36	0.49
205.25	995.23	987.7	995.92	0.000699	7.6	41095.9	11645.39	0.31
205.34	995.73	988.89	996.35	0.000739	7.05	43024.24	11759.96	0.31
205.4	996.01	986.76	996.53	0.000404	6.2	45244.66	7818.18	0.26
205.43	996.03	988.57	996.65	0.000597	6.81	40544.66	10545.61	0.31
205.52	996.35	988.62	996.91	0.000524	6.41	42927.82	11039.64	0.29
205.62	996.59	990.39	997.27	0.000709	6.97	39024.21	10014.5	0.34
205.75	996.98	991.91	997.92	0.001082	7.98	33013.62	8376.66	0.41
205.84	997.67	992.33	998.45	0.000982	7.57	35893.45	6106.2	0.39
205.94	998.21	994.3	999.18	0.001584	8.63	32606.73	6660.48	0.47

Hydraulic modeling results for the 500-year profile

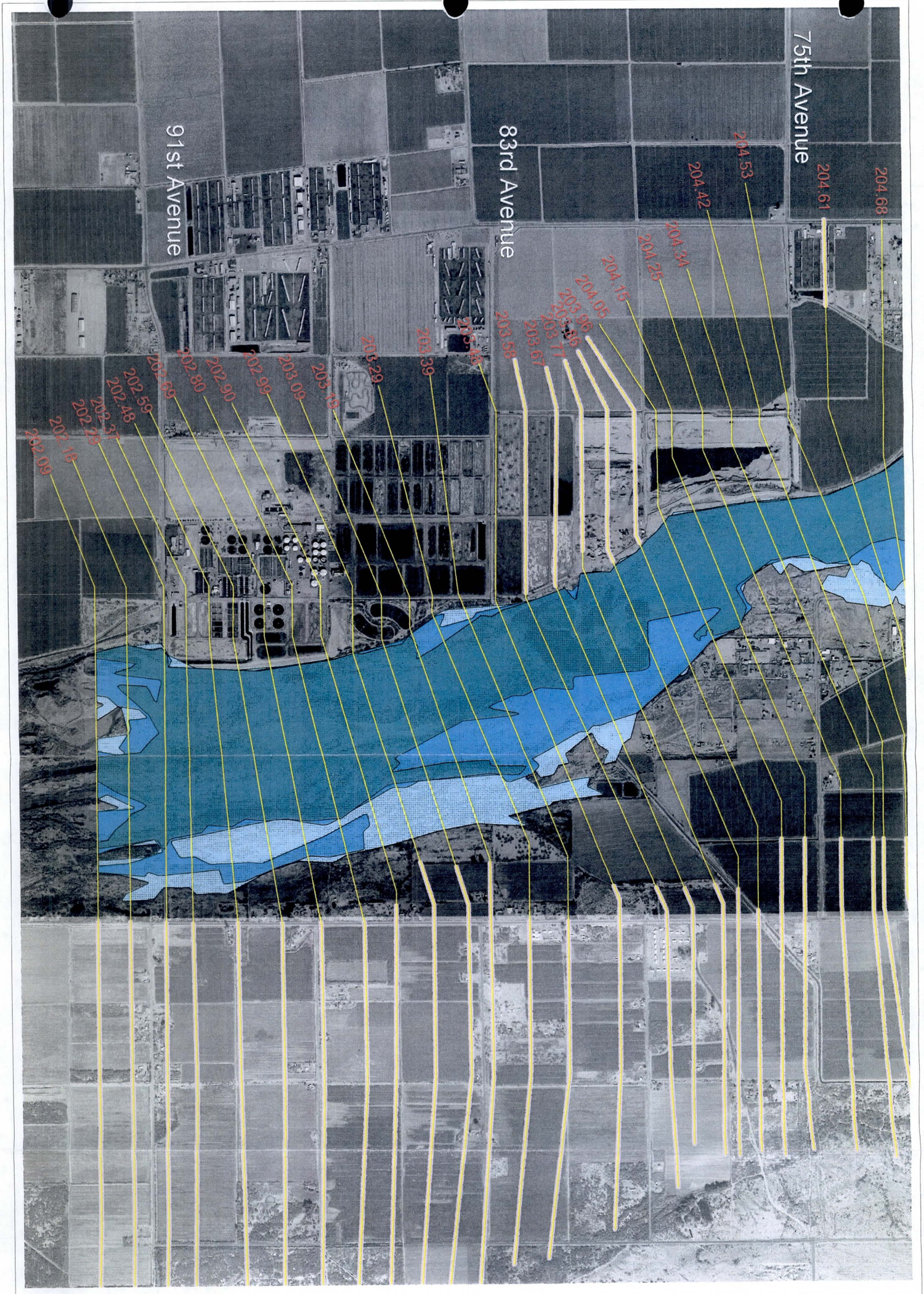
River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
206.03	998.98	996.84	1000.35	0.002485	10.5	27148.6	5482.72	0.58
206.13	1000.46	997.06	1001.46	0.001895	8.7	30348.49	8638.14	0.5
206.22	1001.44	998.08	1002.4	0.001802	8.56	30970.57	7880.35	0.5
206.32	1002.33	999.23	1003.33	0.001702	9.13	31237.6	7568.33	0.5
206.41	1003.06	1000.65	1004.3	0.001853	10.59	29158.53	6919.74	0.53
206.51	1003.98	1001.35	1005.29	0.002057	10.94	28683.34	7141.47	0.56
206.6	1005.08	1000.99	1006.2	0.001485	9.47	31562.33	8226.82	0.48
206.7	1005.88	1000.95	1006.86	0.00111	8.68	34055.43	7616.85	0.42
206.79	1006.23	1003.36	1007.72	0.001896	11	27785.52	7635.4	0.54
206.88	1007.48	1002.29	1008.46	0.001061	8.95	34735.64	9436.49	0.42
206.97	1007.89	1002.91	1009.06	0.0012	9.54	31594.58	7017.33	0.44
207.07	1008.16	1006.38	1010.21	0.002576	12.94	23228.24	5239.41	0.63
207.16	1009.87	1006.36	1011.28	0.001707	10.63	28292.76	7768.23	0.52
207.27	1010.83	1008.22	1012.73	0.003029	12.73	25384.64	8824.14	0.67
207.34	1012.47	1009.98	1013.86	0.001777	10.87	30093.21	12140.15	0.53
207.43	1013.4	1010.58	1014.67	0.001485	9.75	31020.97	12097.69	0.48
207.48	1014.06	1009.14	1015.06	0.001025	8.66	33864.93	11616.63	0.41
207.485	Mult Open							
207.49	1014.39	1009.5	1015.32	0.000953	8.39	35243.81	11858.43	0.39
207.53	1014.76	1010.09	1015.55	0.000914	7.89	38880.89	13096.43	0.38
207.62	1014.99	1012.99	1016.33	0.001981	10.15	29733.55	11046.03	0.54
207.71	1016.09	1013.24	1017.27	0.001809	9.15	31351.79	11164.9	0.51
207.8	1017.07	1013.49	1018.14	0.001643	8.6	32428.56	11184.16	0.48
207.9	1018.05	1013.61	1018.91	0.001291	7.64	35408.75	11233.31	0.43
207.99	1018.62	1014.85	1019.81	0.001983	8.91	29728.91	10460.22	0.52
208.1	1019.8	1015.75	1020.8	0.001546	8.16	32296.13	10249.68	0.47
208.19	1020.6	1016.56	1021.62	0.001497	8.34	32567.06	10021.47	0.46
208.29	1021.17	1017.66	1022.6	0.00197	9.66	26381.42	8779.1	0.53
208.39	1022.1	1018.86	1023.74	0.002213	10.26	23555.78	7879.63	0.57
208.48	1023.16	1019.41	1024.74	0.001963	10.1	23817.45	6163.95	0.54
208.57	1023.64	1021.98	1026.46	0.003683	13.7	18721.12	5165.7	0.74
208.67	1026.08	1022.58	1028.01	0.002245	11.34	24419.02	8398.96	0.58
208.75	1027.69	1023.63	1028.89	0.001435	9.55	32271.77	9652.37	0.47
208.85	1028.41	1025.54	1029.86	0.002027	10.56	27822.13	7605.5	0.55
208.95	1029.6	1026.18	1030.87	0.001716	10.69	30307.83	8129.79	0.52
209.04	1030.42	1025.78	1031.72	0.001277	10.36	29635.74	7843.32	0.46
209.14	1030.56	1027.96	1033.02	0.002888	13.6	20295.4	6291.15	0.67
209.24	1031.54	1030.19	1035.37	0.004889	16.95	15915.9	6560.78	0.86
209.33	1035.58	1032.88	1037.36	0.001822	11.88	29247.57	10738.31	0.55
209.42	1036.55	1034.84	1038.82	0.002819	13.51	24507.86	9764.61	0.6
209.53	1038.39	1037.5	1040.92	0.003844	15.69	22407.75	10605.71	0.69
209.535	Mult Open							
209.54	1039.38	1037.63	1041.43	0.00295	14.22	24785.73	11049.67	0.61
209.6	1041.57	1033.24	1042.27	0.000479	7.77	41415.86	12129.8	0.3
209.69	1041.99	1031.7	1042.52	0.000408	6.21	43909.83	9192.51	0.26
209.79	1042.24	1030.16	1042.71	0.000298	5.73	48281.61	9122.52	0.23
209.88	1042.31	1029.58	1042.95	0.000378	6.49	40537.29	8454.67	0.26
209.98	1042.66	1029.3	1043.17	0.000382	5.77	43425.33	8224.06	0.23
210.07	1043	1027.39	1043.34	0.000222	4.7	51808.05	8132.19	0.18
210.17	1043	1030.05	1043.54	0.000387	6.04	41770.48	7060.25	0.23

Hydraulic modeling results for the 500-year profile

River Sta	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
210.26	1043.08	1030.02	1043.84	0.000505	7.01	34719.93	5783.35	0.26
210.36	1043.13	1031.98	1044.25	0.000785	8.49	28263.77	4844.89	0.33
210.43	1043.34	1031.54	1044.72	0.00077	9.43	25437.78	3252.98	0.37
210.435	Mult Open							
210.44	1043.65	1031.52	1044.97	0.000718	9.23	26012.15	3390.78	0.36
210.46	1044.01	1029.7	1045.08	0.000427	8.3	28916.52	4167.88	0.29
210.55	1044.14	1031.17	1045.35	0.000557	8.8	27264.32	4090.99	0.32
210.64	1044.36	1031.57	1045.69	0.000598	9.25	25959.75	4201.84	0.34
210.74	1044.57	1032.14	1046.05	0.000653	9.77	24565.41	3533.04	0.35
210.83	1044.63	1034.75	1046.61	0.000985	11.29	21250.25	4028.84	0.42
210.93	1045.02	1035.94	1047.19	0.001112	11.82	20301.67	3499.35	0.45
211.02	1045.73	1035.04	1047.71	0.000912	11.29	21262.43	2751.05	0.41
211.12	1046.94	1032.44	1048.12	0.000477	8.7	27598.57	3012.95	0.3
211.21	1046.61	1038.23	1048.77	0.001173	11.79	20420.22	1674.22	0.46
211.31	1046.59	1040.33	1049.86	0.001825	14.52	16619.87	922.85	0.57
211.41	1046.72	1039.15	1051.12	0.001849	16.85	14322.52	610.11	0.59
211.51	1046.91	1042.15	1052.85	0.002829	19.56	12272.38	535.65	0.72
211.525	Bridge							
211.54	1048.91	1042.26	1053.98	0.002208	18.07	13279.27	629.41	0.64

Appendix C

Existing Conditions: Inundation Boundaries

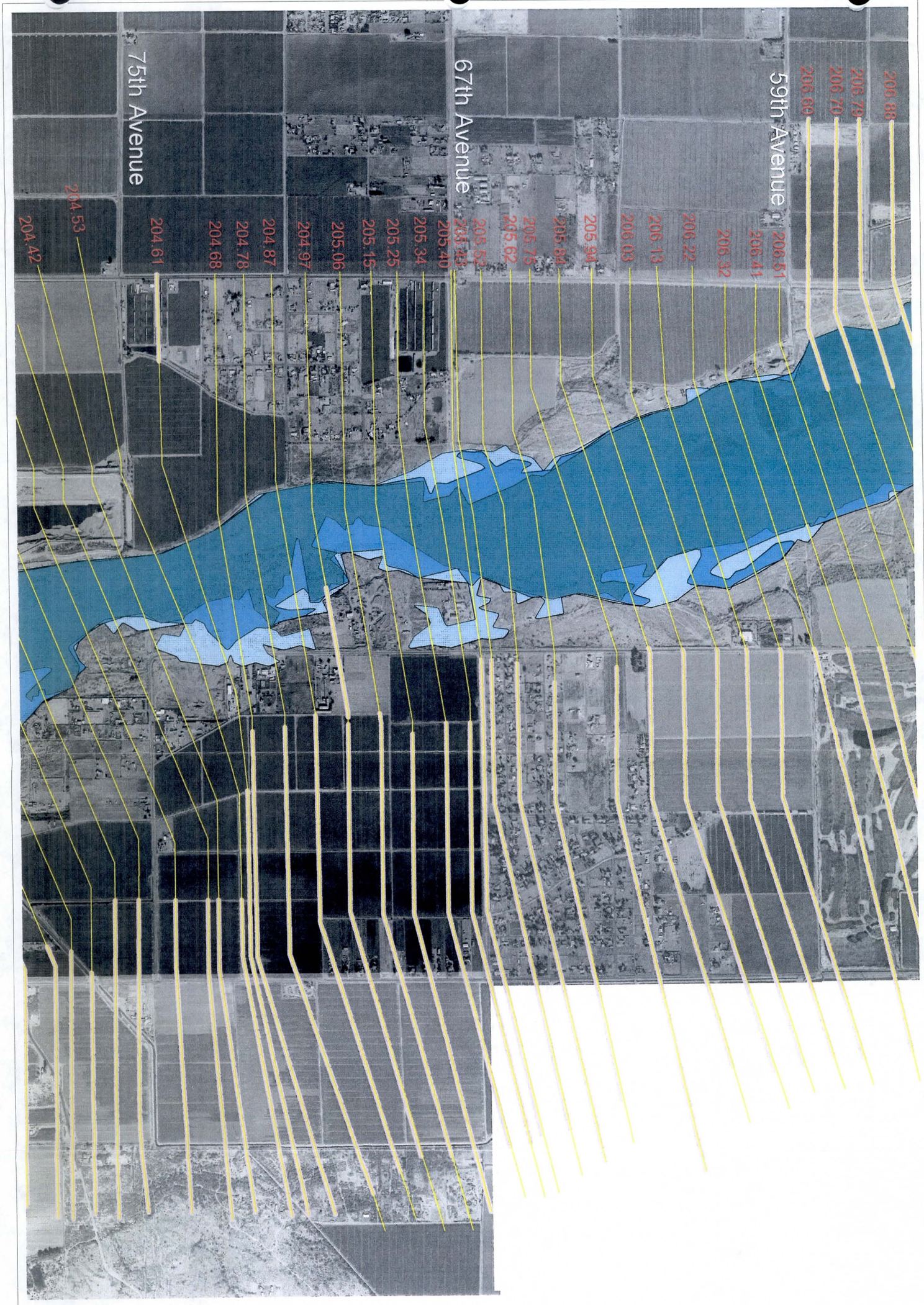


Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 1 of 8

N

1000 0 1000 2000 3000 Feet

Cross Sections
Ineffective Flow
5 Year Floodplain
10 Year Floodplain
20 Year Floodplain

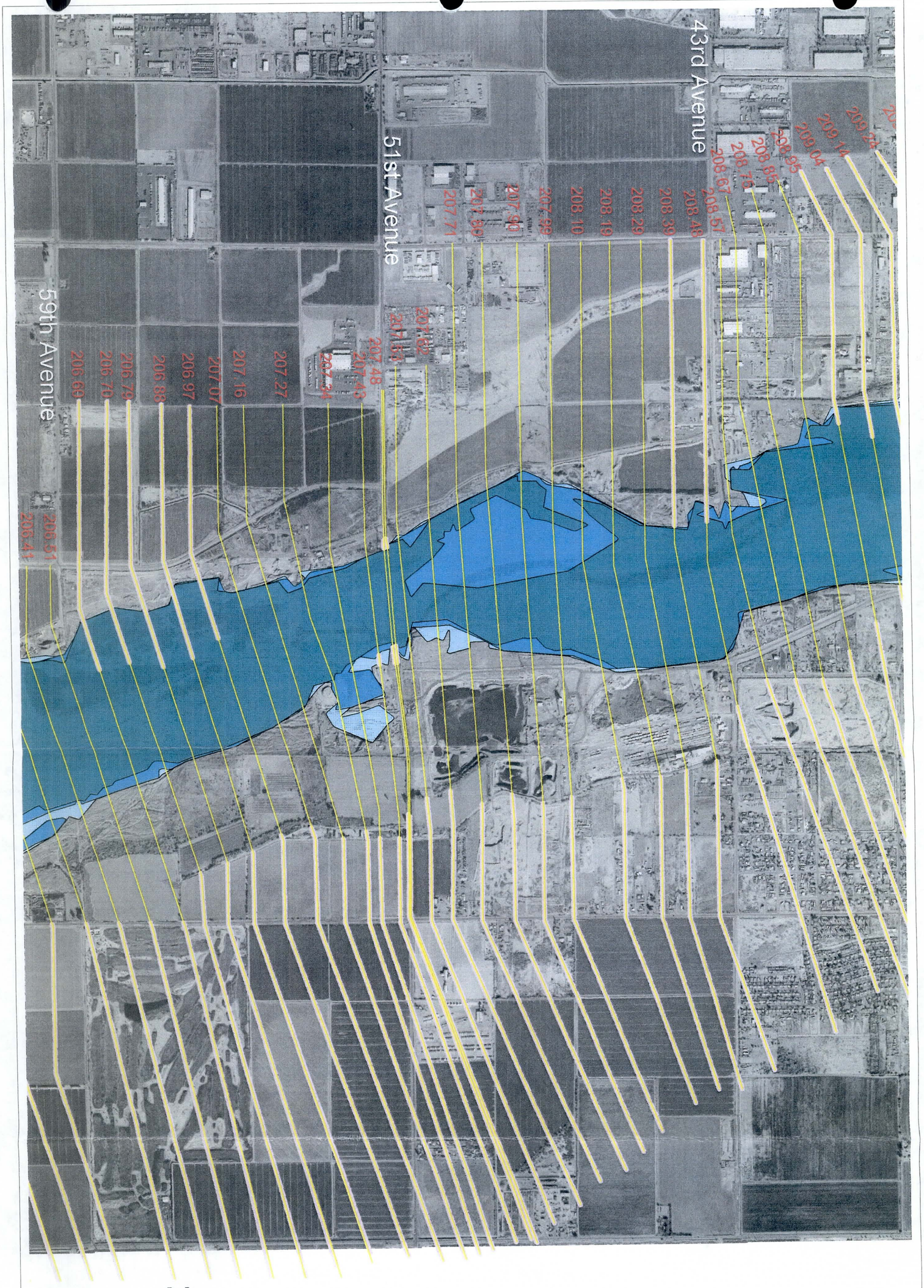


N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 2 of 8

Cross Sections
Ineffective Flow
5 Year Floodplain
10 Year Floodplain
20 Year Floodplain

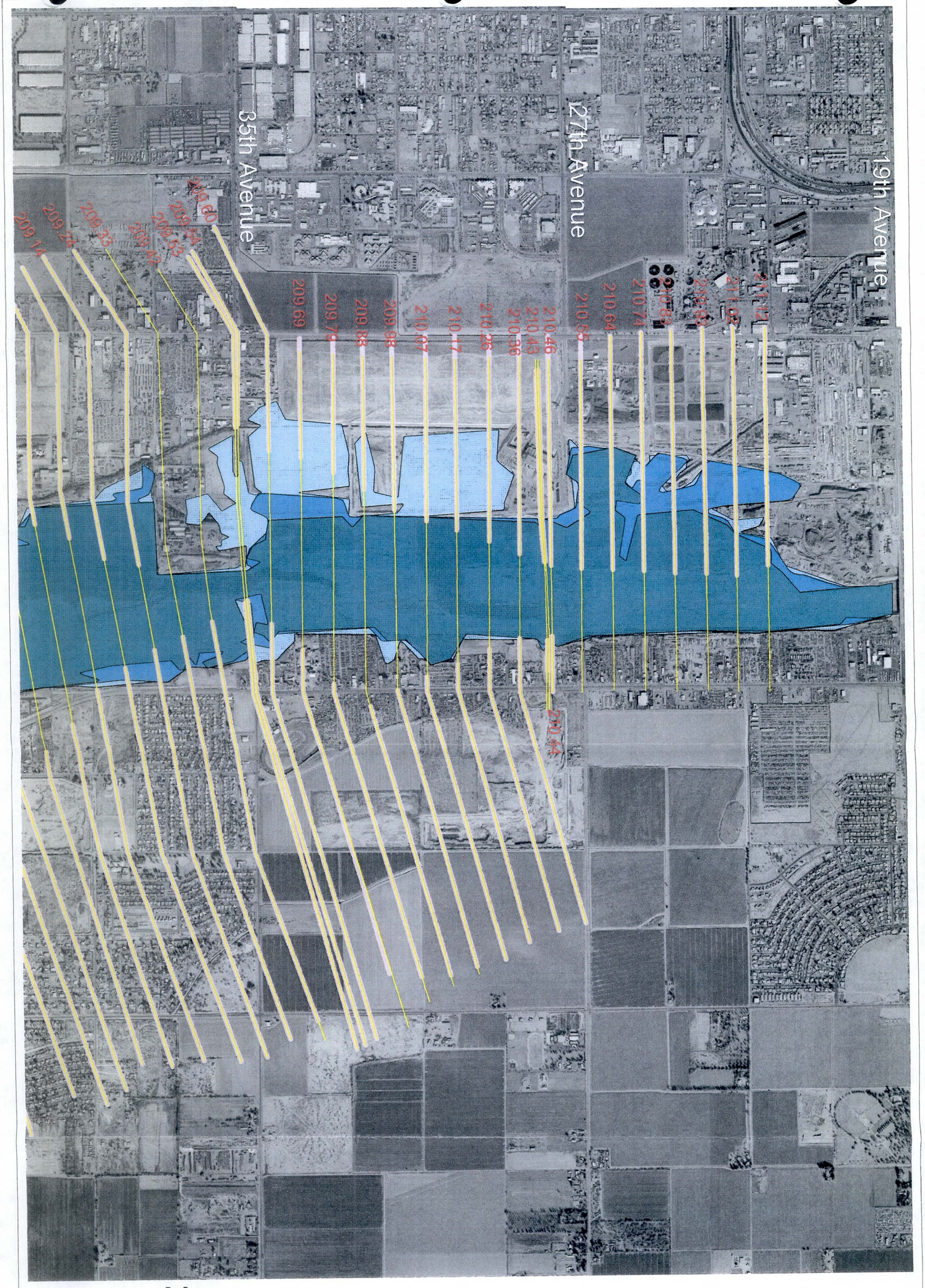


N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 3 of 8

Cross Sections
Ineffective Flow
5 Year Floodplain
10 Year Floodplain
20 Year Floodplain



N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 4 of 8

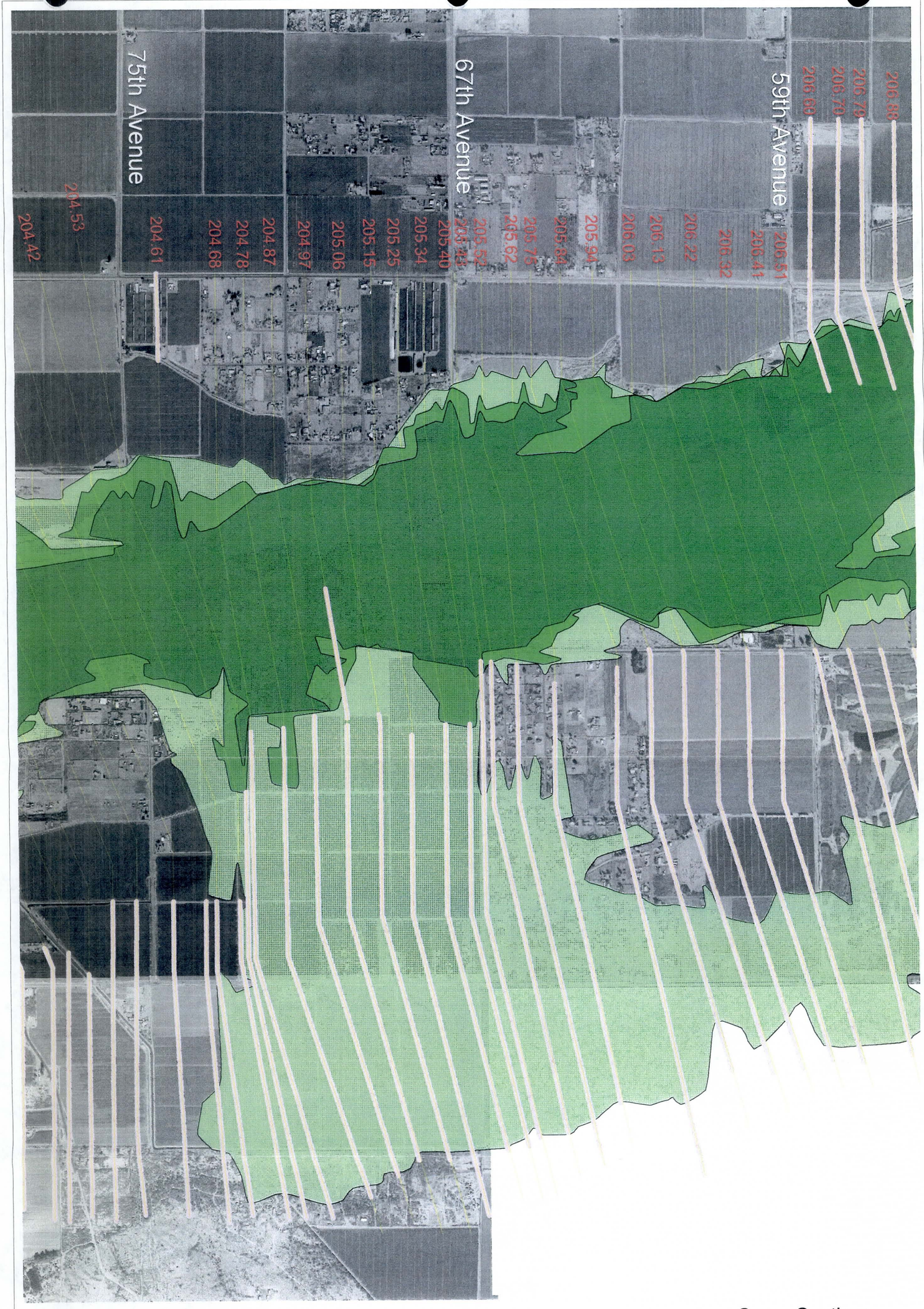
Cross Sections
Ineffective Flow
5 Year Floodplain
10 Year Floodplain
20 Year Floodplain

N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 5 of 8

Cross Sections
Ineffective Flow
50 Year Floodplain
100 Year Floodplain
500 Year Floodplain



N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 6 of 8

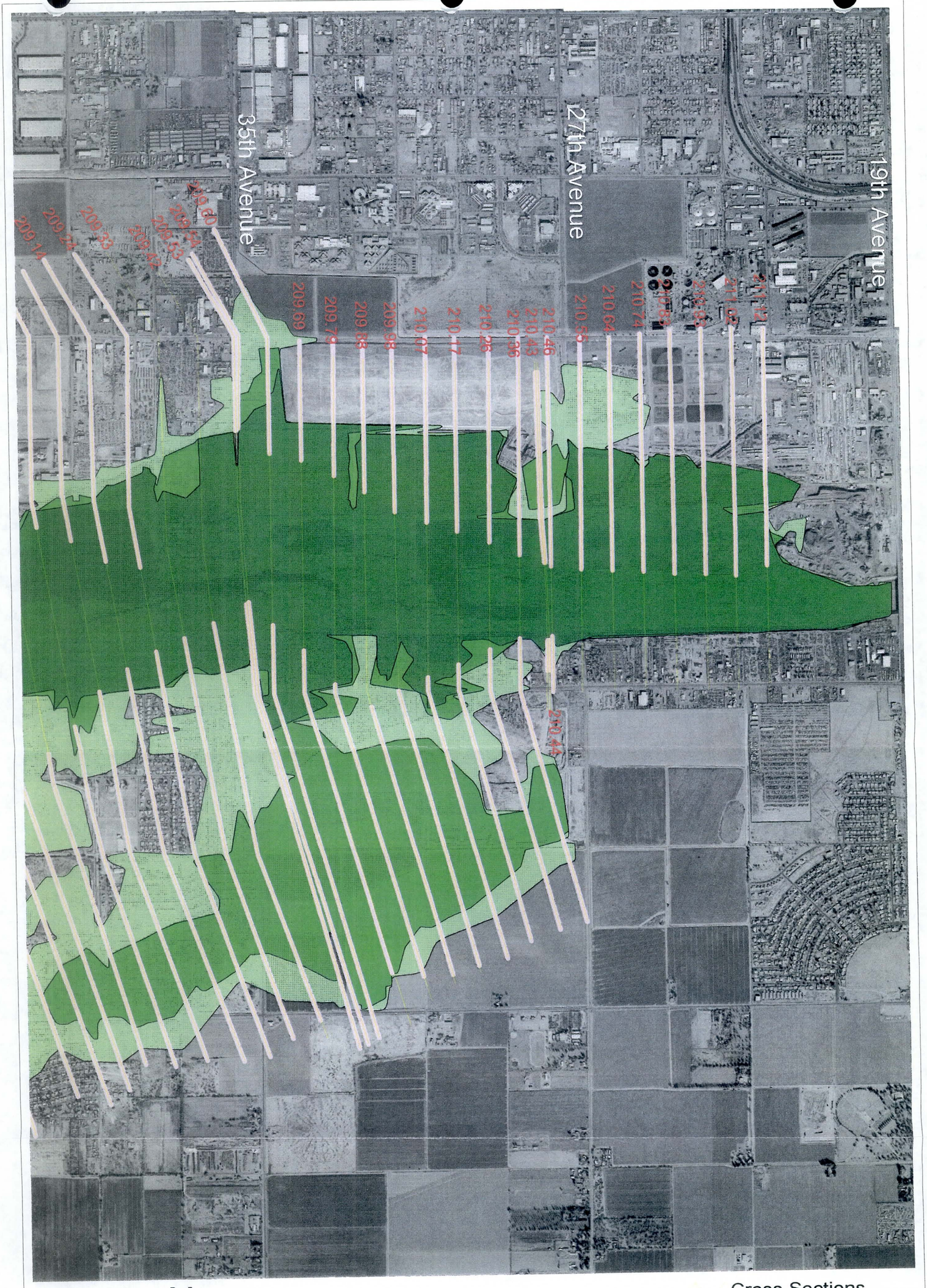
Cross Sections
Ineffective Flow
50 Year Floodplain
100 Year Floodplain
500 Year Floodplain

N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 7 of 8

Cross Sections
Ineffective Flow
50 Year Floodplain
100 Year Floodplain
500 Year Floodplain



N

1000 0 1000 2000 3000 Feet

Rio Salado Oeste
Floodplain Delineation for
Existing Conditions
Sheet 8 of 8

Cross Sections
Ineffective Flow
50 Year Floodplain
100 Year Floodplain
500 Year Floodplain

Appendix D

Calibration of the Hydraulic Component of the Sediment Transport Model

Water Surface Elevation Comparison
HEC-RAS vs HEC-6T

	HEC-RAS			HEC-6T			DIFFERENCE		
XSECT	WS5	WS10	WS100	WS5	WS10	WS100	WS5	WS10	WS100
211.54	1030.7	1036.4	1045.0	1030.6	1036.4	1044.5	-0.10	0.00	-0.55
211.41	1030.3	1035.8	1043.6	1030.4	1036.1	1043.7	0.13	0.32	0.06
211.31	1029.8	1035.2	1043.2	1029.8	1035.5	1043.3	0.03	0.30	0.09
211.21	1029.3	1034.8	1043.0	1029.4	1035.2	1043.1	0.04	0.36	0.10
211.12	1029.4	1034.9	1043.3	1029.4	1035.2	1043.3	0.03	0.33	0.09
211.02	1029.2	1034.6	1042.4	1029.2	1035.0	1042.5	0.03	0.35	0.08
210.93	1029.0	1034.3	1041.9	1029.0	1034.7	1042.0	0.03	0.37	0.10
210.83	1028.8	1034.2	1041.6	1028.8	1034.6	1041.7	0.03	0.40	0.12
210.74	1028.7	1034.1	1041.5	1028.8	1034.5	1041.6	0.04	0.41	0.11
210.64	1028.7	1034.0	1041.3	1028.7	1034.5	1041.5	0.03	0.41	0.13
210.55	1028.6	1034.0	1041.2	1028.7	1034.4	1041.3	0.02	0.42	0.13
210.46	1028.6	1033.9	1041.1	1028.6	1034.4	1041.2	0.03	0.43	0.12
210.44	1028.6	1033.8	1040.6	1028.6	1034.2	1040.7	0.02	0.44	0.12
210.36	1028.5	1033.7	1040.5	1028.5	1034.2	1040.6	0.01	0.44	0.16
210.26	1028.4	1033.7	1040.4	1028.4	1034.1	1040.6	0.02	0.46	0.17
210.17	1028.3	1033.6	1040.3	1028.4	1034.1	1040.5	0.02	0.46	0.18
210.07	1028.3	1033.6	1040.3	1028.3	1034.0	1040.5	0.02	0.47	0.17
209.98	1028.3	1033.5	1040.0	1028.3	1034.0	1040.2	0.02	0.47	0.19
209.88	1028.2	1033.4	1039.8	1028.2	1033.9	1040.0	0.02	0.48	0.16
209.79	1028.1	1033.3	1039.7	1028.1	1033.8	1039.9	0.03	0.48	0.16
209.69	1028.0	1033.2	1039.5	1028.0	1033.7	1039.7	0.03	0.51	0.17
209.6	1027.9	1033.0	1039.2	1027.9	1033.6	1039.4	0.03	0.54	0.20
209.54	1026.8	1030.5	1036.7	1026.5	1029.6	1037.0	-0.30	-0.83	0.27
209.42	1025.4	1028.2	1033.5	1025.5	1028.5	1033.8	0.13	0.23	0.21
209.33	1024.3	1026.7	1031.9	1024.3	1026.8	1031.9	0.05	0.11	0.02
209.24	1022.7	1025.1	1029.7	1022.7	1025.2	1029.7	0.02	0.02	0.02
209.14	1021.1	1024.1	1028.6	1021.2	1024.1	1028.6	0.07	0.06	0.04
209.04	1020.9	1023.8	1028.3	1021.0	1023.8	1028.4	0.04	0.05	0.03
208.95	1020.3	1023.0	1027.4	1020.3	1023.1	1027.5	0.01	0.06	0.01
208.85	1018.0	1021.4	1026.1	1018.1	1021.4	1026.2	0.11	0.00	0.06
208.75	1016.9	1019.9	1025.2	1016.9	1019.9	1025.2	0.02	0.00	0.03
208.67	1016.4	1019.1	1023.8	1016.4	1019.1	1023.8	0.02	0.00	0.00
208.57	1015.3	1017.7	1021.8	1015.3	1017.7	1021.8	0.01	-0.02	0.00
208.48	1014.3	1016.9	1021.3	1014.3	1016.9	1021.3	-0.01	0.00	-0.01
208.39	1013.4	1015.9	1020.4	1013.4	1015.9	1020.4	0.00	-0.02	0.00
208.29	1012.3	1014.9	1019.5	1012.3	1014.9	1019.5	0.00	0.00	0.02
208.19	1011.3	1014.0	1018.8	1011.3	1014.0	1018.8	0.01	0.00	0.03

ELMIN	Lesser of 10% Depth or 1.0		
	WS5	WS10	WS100
1021.9	0.9	1.0	1.0
1018.3	1.0	1.0	1.0
1020.8	0.9	1.0	1.0
1021.1	0.8	1.0	1.0
1015.67	1.0	1.0	1.0
1019.35	1.0	1.0	1.0
1018.71	1.0	1.0	1.0
1019.14	1.0	1.0	1.0
1018.18	1.0	1.0	1.0
1017.72	1.0	1.0	1.0
1018.02	1.0	1.0	1.0
1016.27	1.0	1.0	1.0
1016.27	1.0	1.0	1.0
1017.39	1.0	1.0	1.0
1016.87	1.0	1.0	1.0
1014.74	1.0	1.0	1.0
1018.47	1.0	1.0	1.0
1018.07	1.0	1.0	1.0
1014.72	1.0	1.0	1.0
1020	0.8	1.0	1.0
1019	0.9	1.0	1.0
1016.38	1.0	1.0	1.0
1019.64	0.7	1.0	1.0
1019.56	0.6	0.9	1.0
1019.07	0.5	0.8	1.0
1017.41	0.5	0.8	1.0
1014.45	0.7	1.0	1.0
1012.24	0.9	1.0	1.0
1013.05	0.7	1.0	1.0
1013.35	0.5	0.8	1.0
1011	0.6	0.9	1.0
1010	0.6	0.9	1.0
1010	0.5	0.8	1.0
1007.62	0.7	0.9	1.0
1005.57	0.8	1.0	1.0
1004.7	0.8	1.0	1.0
1004.66	0.7	0.9	1.0

Water Surface Elevation Comparison
HEC-RAS vs HEC-6T

XSECT	HEC-RAS			HEC-6T			DIFFERENCE		
	WS5	WS10	WS100	WS5	WS10	WS100	WS5	WS10	WS100
208.1	1010.0	1013.0	1018.0	1010.0	1013.0	1018.0	0.01	-0.02	0.03
207.99	1009.2	1012.2	1016.9	1009.2	1012.2	1016.9	-0.01	-0.02	0.06
207.9	1008.7	1011.6	1016.3	1008.7	1011.6	1016.3	-0.01	-0.01	0.07
207.8	1007.8	1010.7	1015.3	1007.8	1010.7	1015.4	0.00	0.00	0.11
207.71	1006.8	1009.4	1014.3	1006.8	1009.4	1014.5	0.02	0.02	0.15
207.62	1005.1	1007.7	1012.9	1005.1	1007.7	1013.3	0.00	-0.02	0.41
207.53	1004.3	1007.1	1012.6	1004.3	1007.1	1013.0	-0.06	-0.04	0.46
207.49	1004.2	1006.9	1012.4	1004.1	1006.9	1012.8	-0.07	-0.08	0.40
207.43	1003.6	1006.2	1011.1	1003.7	1006.2	1011.9	0.06	0.09	0.79
207.34	1003.0	1005.4	1010.3	1003.0	1005.4	1010.7	0.05	0.06	0.41
207.27	1001.2	1003.8	1008.7	1001.3	1003.9	1009.0	0.12	0.04	0.24
207.16	1000.8	1002.3	1007.7	1000.8	1002.3	1007.9	0.01	0.00	0.22
207.07	1000.6	1000.8	1006.1	1000.6	1001.0	1006.5	0.02	0.13	0.41
206.97	998.4	1000.6	1005.8	998.3	1000.7	1006.1	-0.06	0.11	0.34
206.88	999.1	1000.3	1005.4	999.1	1000.4	1005.8	0.07	0.10	0.35
206.79	998.2	999.6	1004.4	998.3	999.7	1004.6	0.05	0.12	0.24
206.7	996.7	999.3	1004.1	996.8	999.4	1004.3	0.03	0.13	0.23
206.6	996.1	998.8	1003.4	996.2	998.9	1003.6	0.05	0.15	0.20
206.51	995.0	997.6	1002.1	995.0	997.7	1002.3	0.07	0.15	0.21
206.41	993.9	996.6	1001.2	994.0	996.7	1001.3	0.09	0.11	0.07
206.32	993.0	995.8	1000.5	993.1	995.9	1000.5	0.05	0.08	0.05
206.22	992.1	994.7	999.5	992.0	994.9	999.6	-0.01	0.11	0.08
206.13	991.1	993.7	998.6	991.2	993.9	998.7	0.02	0.13	0.15
206.03	989.1	991.8	996.9	989.2	991.9	997.1	0.04	0.06	0.12
205.94	987.6	990.4	996.0	987.6	990.5	996.2	0.06	0.08	0.23
205.84	985.7	989.2	995.4	985.8	989.2	995.6	0.04	0.08	0.24
205.75	984.8	988.4	994.7	984.9	988.5	995.0	0.06	0.06	0.24
205.62	983.8	987.5	994.3	983.9	987.6	994.5	0.11	0.09	0.25
205.52	982.9	987.1	994.0	982.9	987.1	994.2	0.01	0.00	0.16
205.43	982.4	986.7	993.7	982.4	986.7	994.0	0.00	0.03	0.22
205.4	982.4	986.7	993.7	982.4	986.7	994.0	-0.01	0.02	0.23
205.34	982.1	986.3	993.4	982.1	986.4	993.6	0.02	0.04	0.26
205.25	981.7	985.9	992.9	981.7	985.9	993.1	0.01	0.04	0.23
205.15	980.7	984.4	991.2	980.7	984.4	991.2	-0.02	-0.01	0.04
205.06	980.1	983.7	989.7	980.1	983.6	989.9	-0.02	-0.04	0.27
204.97	980.0	983.6	990.0	980.0	983.6	990.2	0.03	0.04	0.21
204.87	979.6	983.2	989.5	979.7	983.2	989.7	0.06	0.05	0.26

ELMIN	Lesser of 10% Depth or 1.0		
	WS5	WS10	WS100
1001.33	0.9	1.0	1.0
999.85	0.9	1.0	1.0
1000.76	0.8	1.0	1.0
999.08	0.9	1.0	1.0
1000.34	0.6	0.9	1.0
1000.23	0.5	0.7	1.0
999.27	0.5	0.8	1.0
999.41	0.5	0.8	1.0
999.03	0.5	0.7	1.0
996.54	0.6	0.9	1.0
993.27	0.8	1.0	1.0
992.67	0.8	1.0	1.0
992.78	0.8	0.8	1.0
992.7	0.6	0.8	1.0
992.6	0.6	0.8	1.0
993	0.5	0.7	1.0
991.2	0.6	0.8	1.0
990.5	0.6	0.8	1.0
990.2	0.5	0.7	1.0
988.8	0.5	0.8	1.0
987.4	0.6	0.8	1.0
986	0.6	0.9	1.0
984.62	0.7	0.9	1.0
984.67	0.4	0.7	1.0
981.52	0.6	0.9	1.0
979.54	0.6	1.0	1.0
973.88	1.0	1.0	1.0
975.97	0.8	1.0	1.0
975.91	0.7	1.0	1.0
976.08	0.6	1.0	1.0
975.49	0.7	1.0	1.0
972.7	0.9	1.0	1.0
973.42	0.8	1.0	1.0
973.07	0.8	1.0	1.0
970.41	1.0	1.0	1.0
967.59	1.0	1.0	1.0
968.08	1.0	1.0	1.0

Water Surface Elevation Comparison
HEC-RAS vs HEC-6T

	HEC-RAS			HEC-6T			DIFFERENCE		
XSECT	WS5	WS10	WS100	WS5	WS10	WS100	WS5	WS10	WS100
204.78	979.6	983.1	989.4	979.6	983.2	989.6	0.04	0.04	0.22
204.68	979.3	982.7	988.7	979.3	982.7	988.9	0.01	0.04	0.21
204.61	978.8	981.9	987.9	978.8	981.9	988.0	0.04	0.04	0.07
204.53	978.0	980.9	987.0	978.0	981.0	987.1	0.05	0.07	0.08
204.42	976.6	979.2	985.5	976.7	979.4	985.7	0.15	0.20	0.24
204.34	974.2	977.0	982.7	974.3	977.0	982.8	0.07	0.07	0.04
204.25	973.7	976.6	981.4	973.7	976.6	981.4	0.00	0.05	0.06
204.15	973.5	976.4	981.2	973.5	976.4	981.3	0.00	0.05	0.03
204.05	972.9	975.7	980.2	972.9	975.8	980.3	0.01	0.07	0.03
203.96	970.0	972.8	977.6	970.1	972.9	977.7	0.04	0.06	0.15
203.86	969.4	972.5	977.7	969.5	972.6	977.7	0.04	0.08	0.07
203.77	969.2	972.3	977.3	969.2	972.3	977.3	0.04	0.06	0.06
203.67	968.9	971.9	976.8	969.0	972.0	976.9	0.03	0.04	0.05
203.58	968.7	971.6	976.3	968.7	971.7	976.3	0.02	0.01	0.01
203.48	968.3	971.1	975.8	968.3	971.0	975.8	0.01	-0.02	-0.02
203.39	967.7	970.5	975.2	967.7	970.4	975.2	0.00	-0.05	-0.03
203.29	967.1	969.8	974.4	967.1	969.7	974.3	-0.03	-0.08	-0.07
203.19	966.3	968.9	973.5	966.4	969.0	973.6	0.06	0.05	0.03
203.09	965.3	967.8	972.3	965.4	967.8	972.4	0.08	0.05	0.07
202.99	964.3	966.8	971.3	964.4	966.8	971.4	0.05	0.05	0.06
202.9	963.8	966.2	970.7	963.9	966.2	970.8	0.07	0.05	0.04
202.8	963.3	965.6	970.1	963.4	965.7	970.2	0.15	0.09	0.06
202.69	962.6	964.9	969.3	962.9	965.1	969.4	0.24	0.13	0.07
202.59	961.7	964.1	968.4	961.8	964.1	968.4	0.08	0.07	0.00
202.48	960.9	963.3	967.6	960.9	963.3	967.6	0.03	0.02	-0.02
202.37	960.1	962.4	966.9	960.1	962.5	966.9	0.04	0.03	0.00
202.29	959.5	962.1	966.6	959.6	962.1	966.6	0.03	0.05	0.01
202.18	958.7	961.3	965.7	958.7	961.4	965.8	0.06	0.09	0.05
202.09	956.4	959.4	964.2	956.5	959.6	964.2	0.10	0.20	0.06
							0.24	0.54	0.79
						MIN	-0.30	-0.83	-0.55

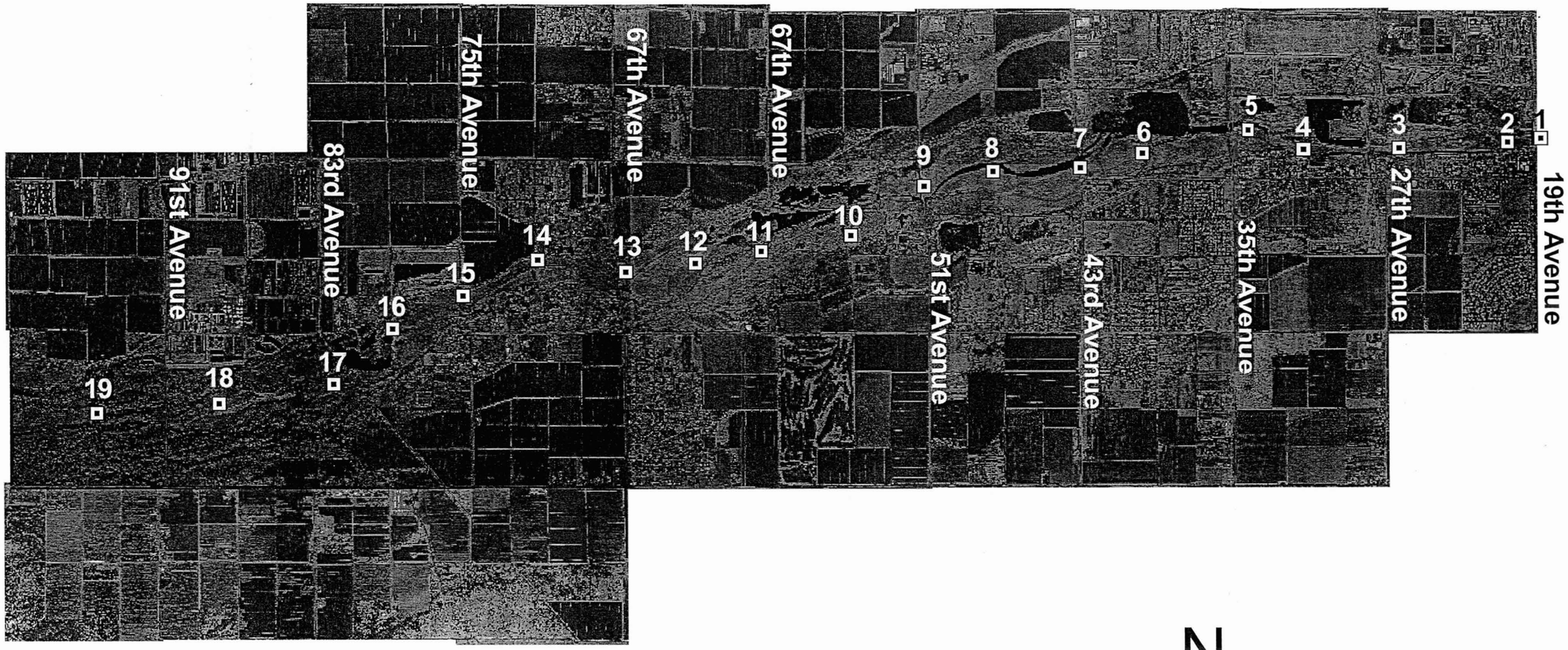
ELMIN	Lesser of 10% Depth or 1.0		
	WS5	WS10	WS100
967.6	1.0	1.0	1.0
971.32	0.8	1.0	1.0
972.56	0.6	0.9	1.0
972.73	0.5	0.8	1.0
971.4	0.5	0.8	1.0
969.27	0.5	0.8	1.0
967.99	0.6	0.9	1.0
965.87	0.8	1.0	1.0
964.99	0.8	1.0	1.0
964.14	0.6	0.9	1.0
962.22	0.7	1.0	1.0
963.26	0.6	0.9	1.0
962.27	0.7	1.0	1.0
962.07	0.7	1.0	1.0
962.18	0.6	0.9	1.0
959.89	0.8	1.0	1.0
960.75	0.6	0.9	1.0
956.72	1.0	1.0	1.0
958.67	0.7	0.9	1.0
959.17	0.5	0.8	1.0
956.45	0.7	1.0	1.0
956.41	0.7	0.9	1.0
953.74	0.9	1.0	1.0
953.67	0.8	1.0	1.0
952.48	0.8	1.0	1.0
954.57	0.5	0.8	1.0
955.54	0.4	0.7	1.0
949.84	0.9	1.0	1.0
949.9	0.6	0.9	1.0

Appendix E

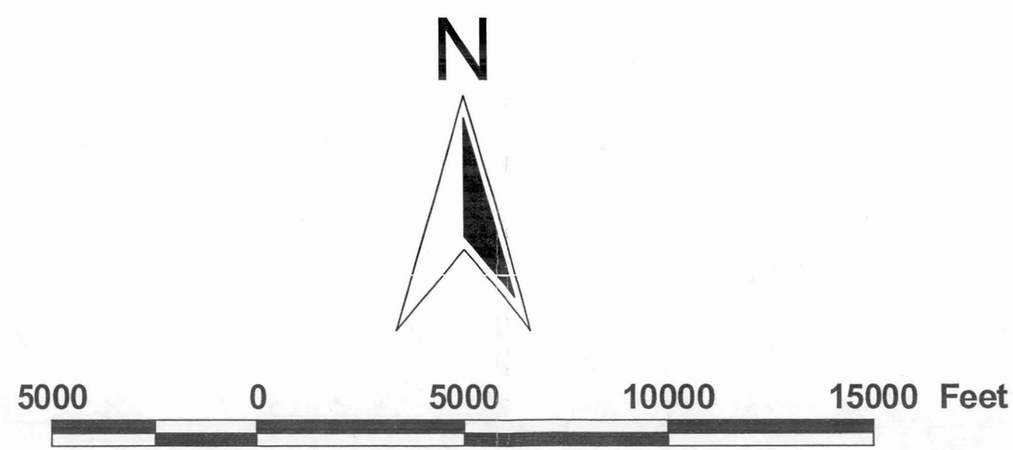
Sediment Data

Rio Salado Oeste. Sediment Samples Sieve Analysis.

Location	Silt or Clay	SAND								GRAVEL								COBBLES		
		Fine			Medium			Coarse		Fine				Coarse						
	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	12"
	SIEVE NUMBER									SIEVE OPENING										
	PERCENT PASSING BY WEIGHT																			
#1	9.9	12	15	18	22	28	31	32	36	39	45	49	57	61	65	69		95	100	100
#2	2.4	3	6	8	11	15	17	18	22	50	55	58	64	68	72	74		86	100	100
#3	13	16	26	32	38	43	44	44	45	46	47	48	51	54	57	60		74	91	100
#4	1.7	3	9	22	34	42	45	45	48	49	51	53	59	64	70	73		79	94	100
#5	6	9	19	25	30	35	35	35	35	36	36	37	38	39	40	43	48	56	67	
#6	1.8	4	10	13	16	21	22	23	25	27	30	32	37	41	46	48	53	65	86	
#7	1.3	4	14	18	20	23	24	25	27	28	31	33	38	43	47	51	56	74	92	
#8	1.8	5	10	12	14	17	18	19	20	21	23	26	31	35	39	42	47	63	84	
#9	5.1	8	13	17	22	29	32	33	36	38	41	44	51	56	61	66	73	86	96	
#10	1.3	3	8	11	16	23	26	26	29	31	34	37	43	49	53	58	62	77	87	
#11	1	2	7	10	14	21	22	22	24	25	27	28	33	36	39	43	47	57	75	
#12	1.5	3	9	13	19	25	28	29	32	34	36	39	46	52	60	68	81	97	100	
#13	1.2	2	6	8	11	18	20	20	23	24	27	30	39	47	55	61	73	87	97	100
#14	1.4	2	4	7	10	15	16	17	18	18	19	20	22	23	24	26	28	40	75	100
#15	1.2	2	7	14	23	29	30	30	31	31	31	31	33	34	36	39	42	53	87	100
#16	0.9	1	3	4	5	10	12	13	16	17	19	21	28	33	41	48	58	87	100	100
#17	1.6	4	10	14	18	22	24	24	26	27	29	32	37	42	45	51	59	78	100	100
#18	1.3	3	9	12	15	20	23	24	26	29	33	37	46	53	59	63	71	91	100	100
#19	0.4	1	5	9	12	20	22	23	25	26	29	33	41	47	54	60	76	90	100	100

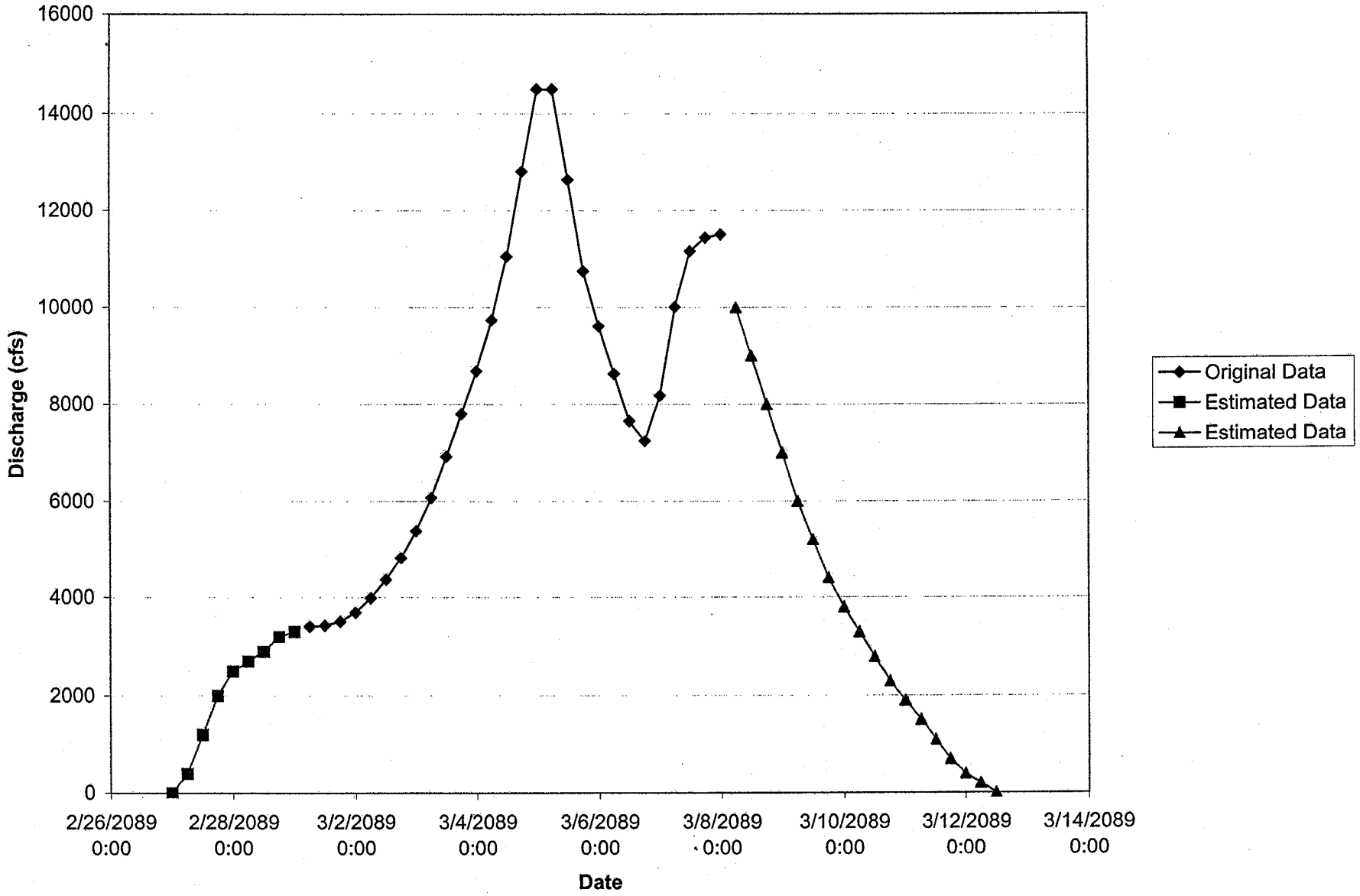


SEDIMENT SAMPLE LOCATIONS



Appendix F

50-year Hydrologic Input for Sediment Transport Model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6000
4000
2000
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2/28/2089 0:00
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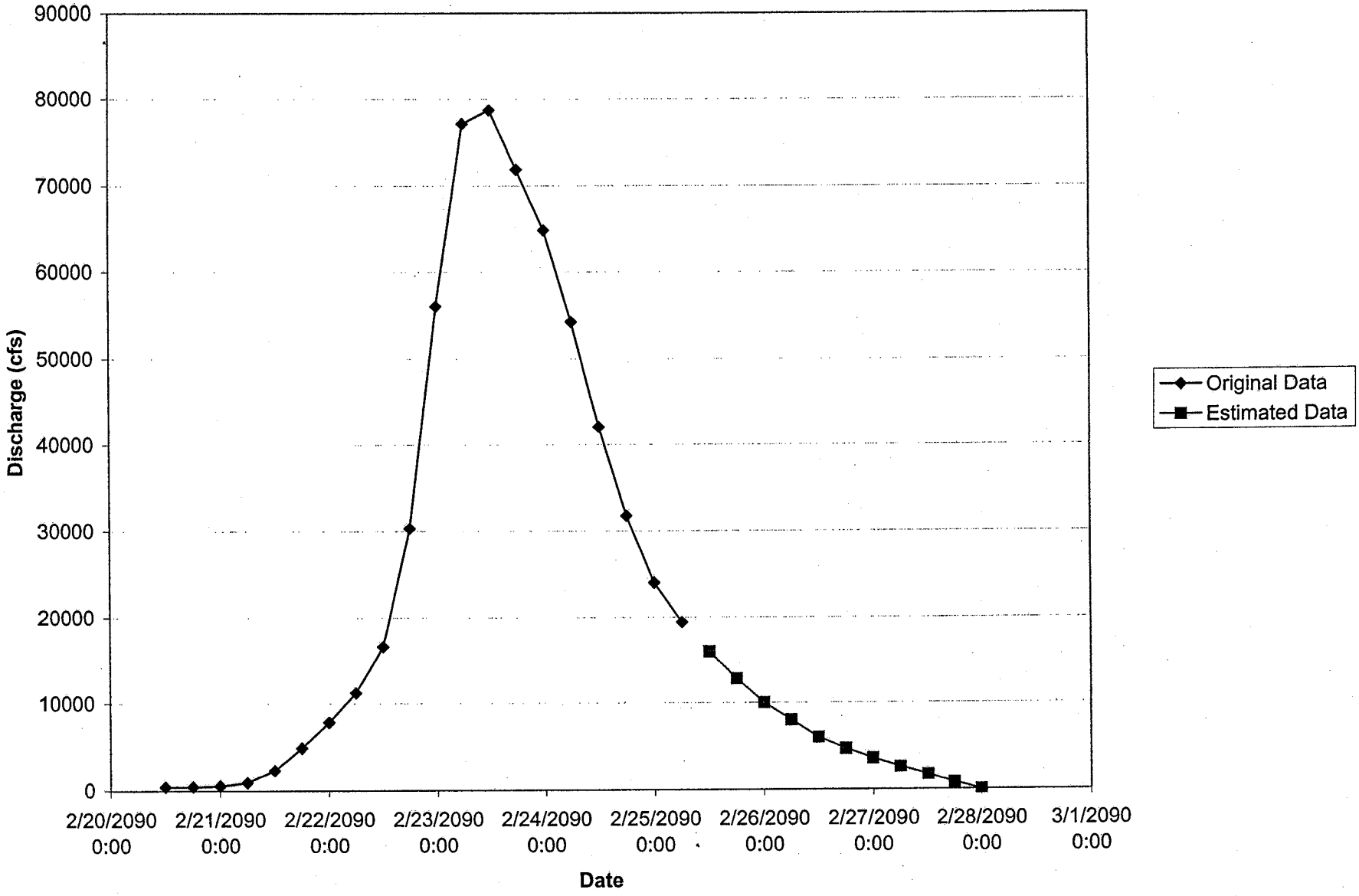
3/4/2089 0:00
3/6/2089 0:00
3/8/2089 0:00
3/10/2089 0:00
3/12/2089 0:00
3/14/2089 0:00
Date
Original Data
Estimated Data
Estimated Data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60000
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40000
30000
20000
10000
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2/22/2090 0:00
2/23/2090 0:00
2/24/2090 0:00
2/25/2090 0:00
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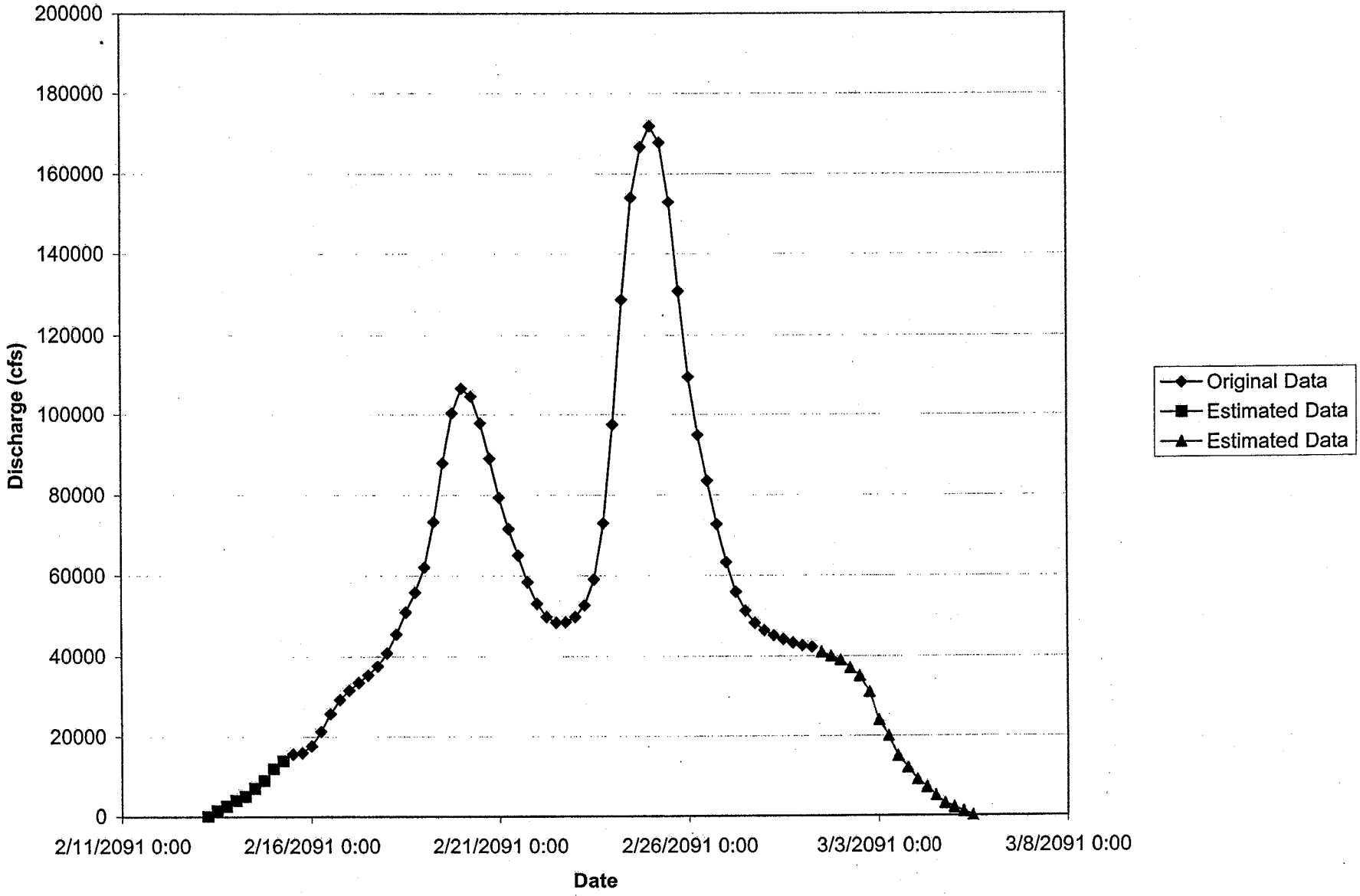
2/27/2090 0:00
2/28/2090 0:00
3/1/2090 0:00
Date
Original Data
Estimated Data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120000
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80000
60000
40000
20000
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2/16/2091 0:00
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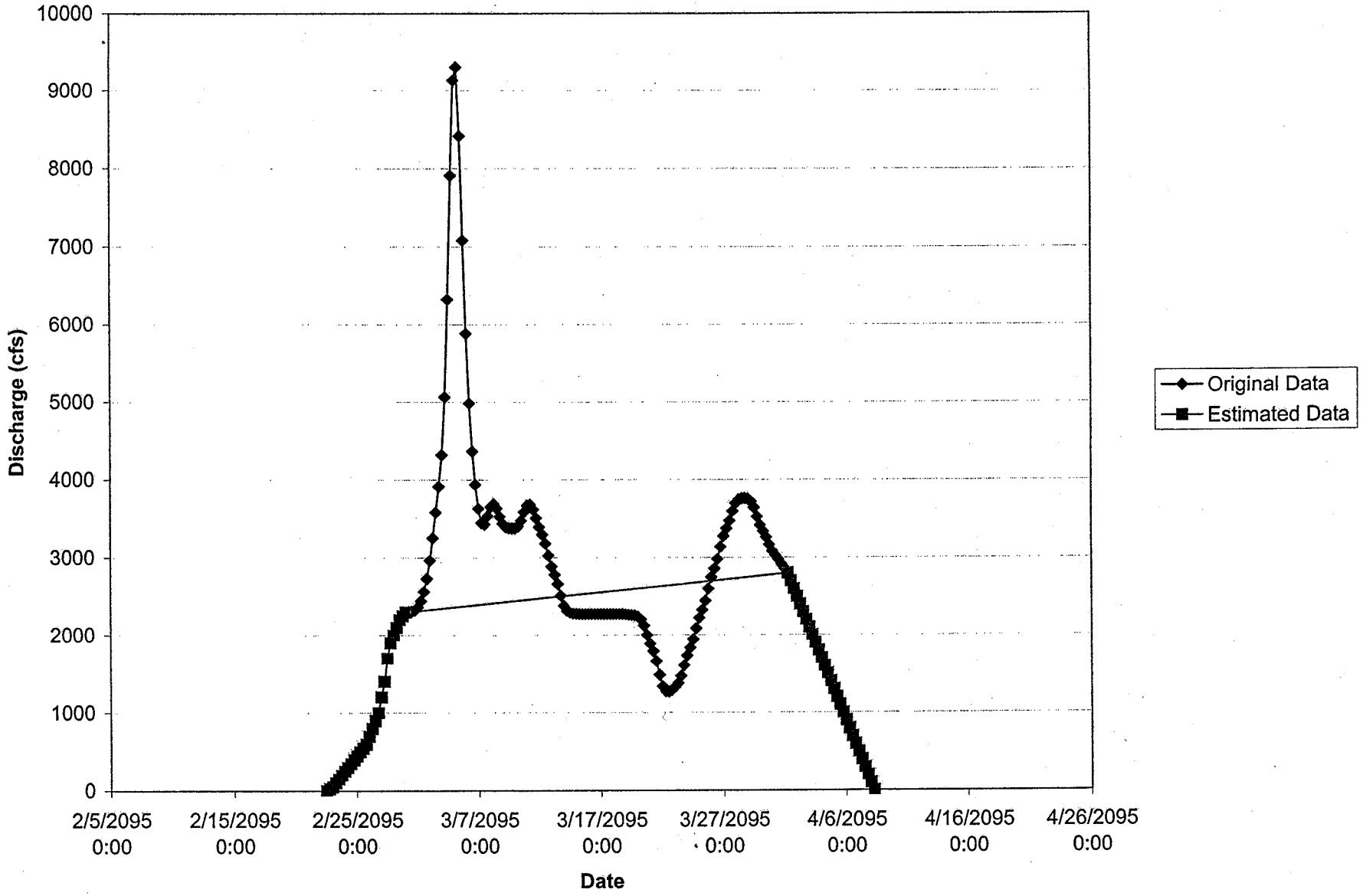
Date
Original Data
Estimated Data
Estimated Data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7000
6000
5000
4000
3000
2000
1000
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2/15/2095 0:00
2/25/2095 0:00
3/7/2095 0:00
3/17/2095 0:00
3/27/2095 0:00
4/6/2095 0:00
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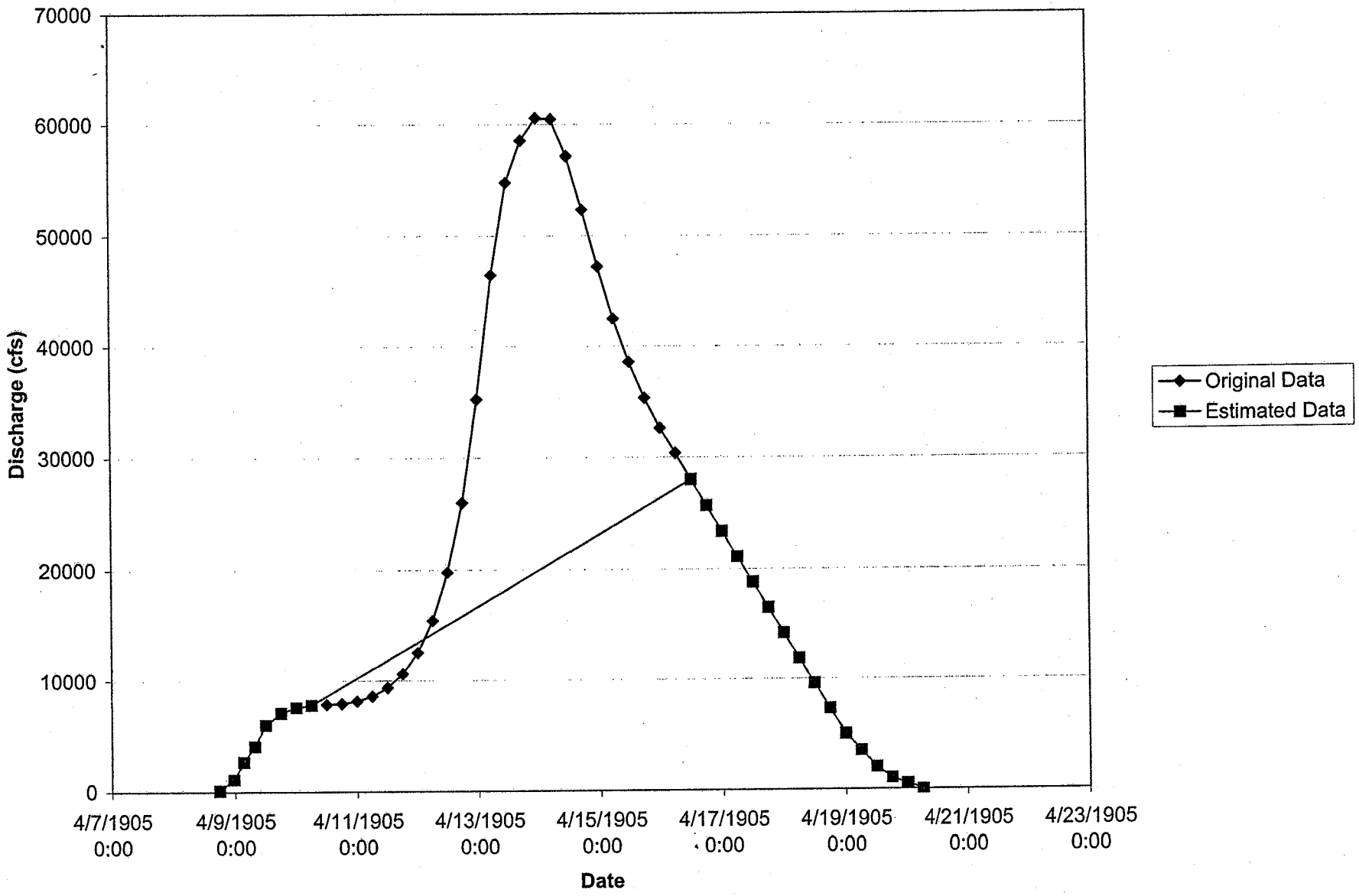
4/26/2095 0:00
Date
Original Data
Estimated Data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40000
30000
20000
10000
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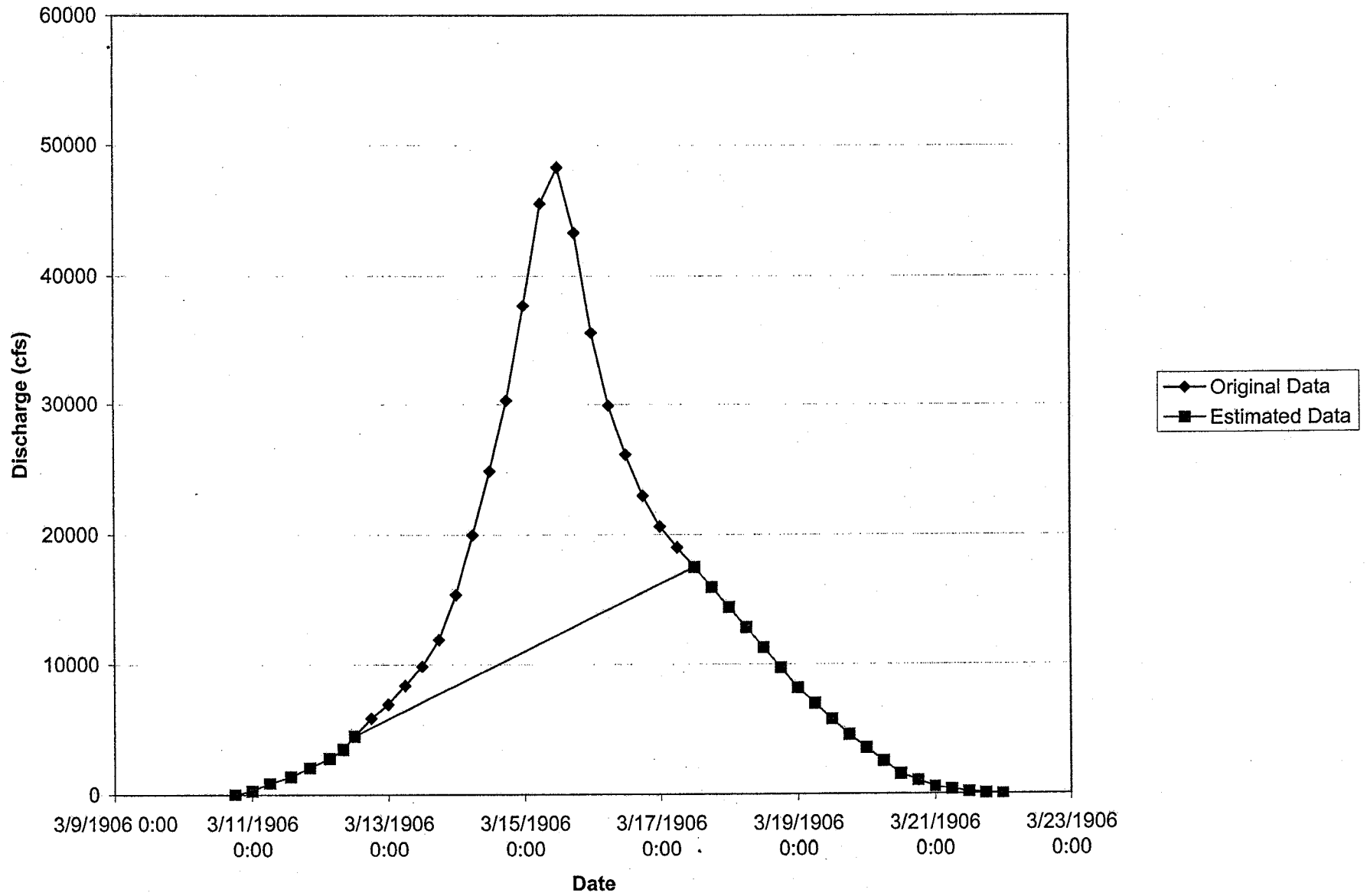
4/15/1905 0:00
4/17/1905 0:00
4/19/1905 0:00
4/21/1905 0:00
4/23/1905 0:00
Date
Original Data
Estimated Data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3/15/1906 0:00
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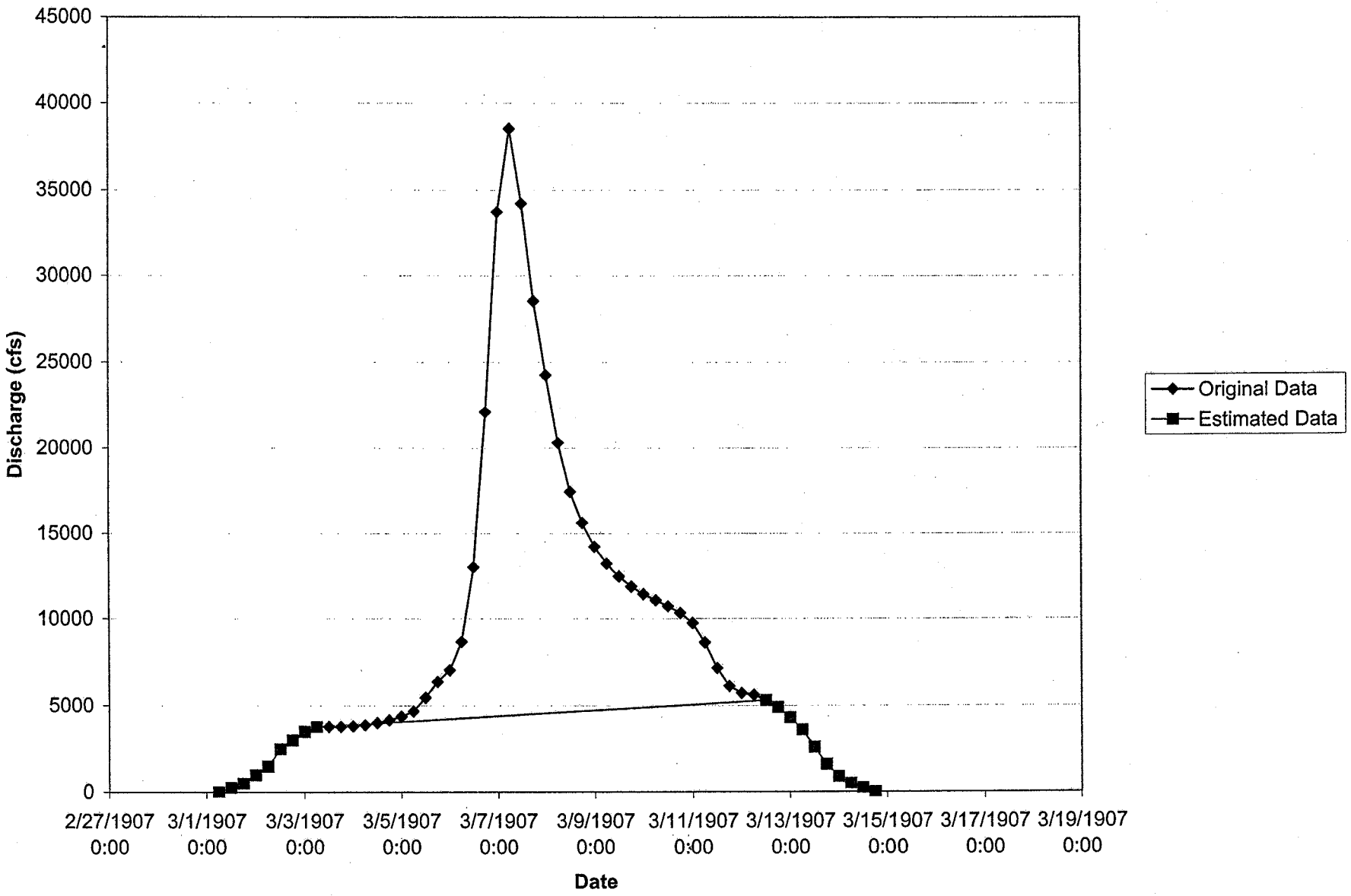
Date
Original Data
Estimated Data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3/1/1907 0:00
3/3/1907 0:00
3/5/1907 0:00
3/7/1907 0:00
3/9/1907 0:00
3/11/1907 0:00
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3/15/1907 0:00
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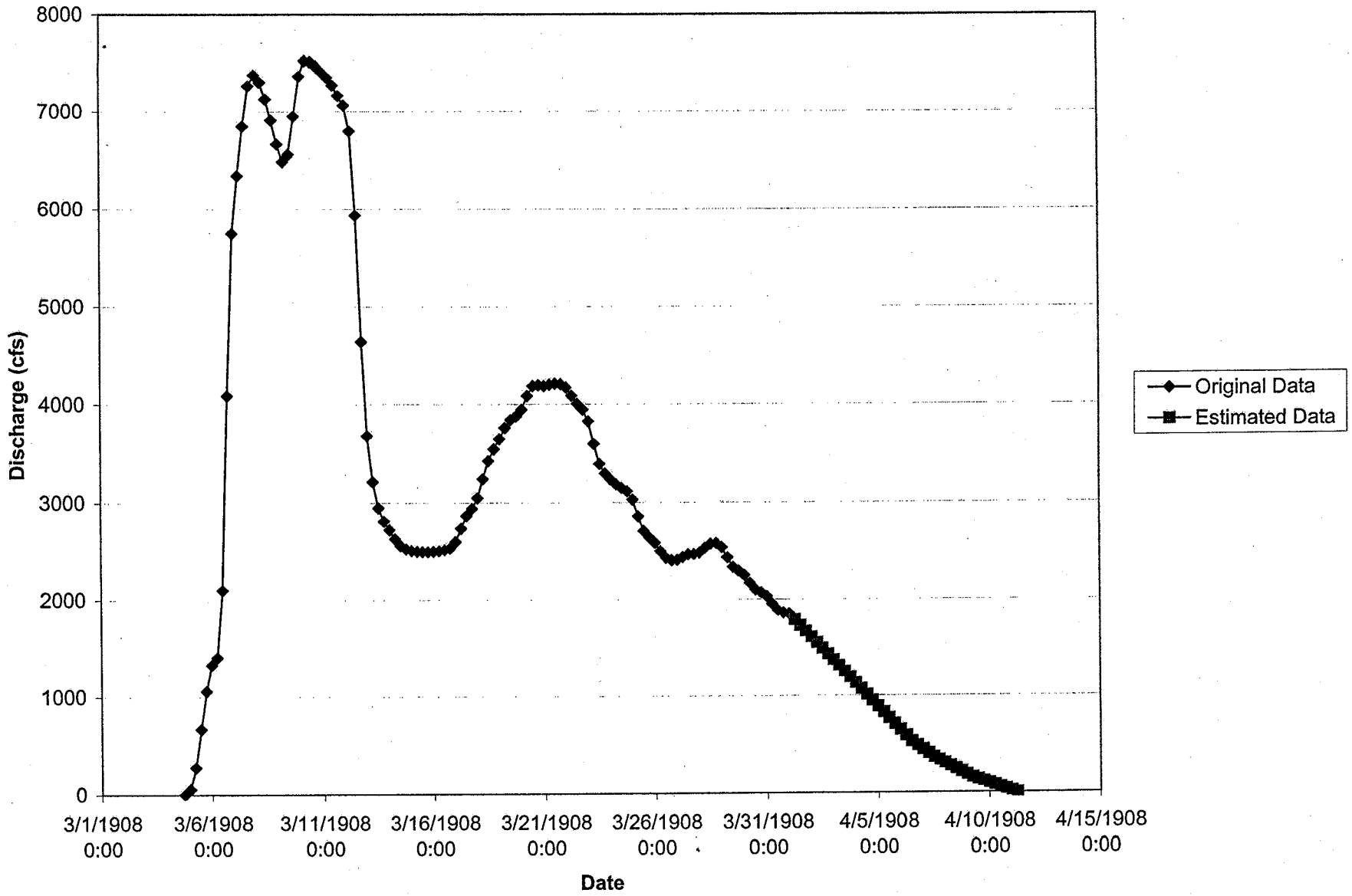
3/19/1907 0:00
Date
Original Data
Estimated Data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7000
6000
5000
4000
3000
2000
1000
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3/26/1908 0:00
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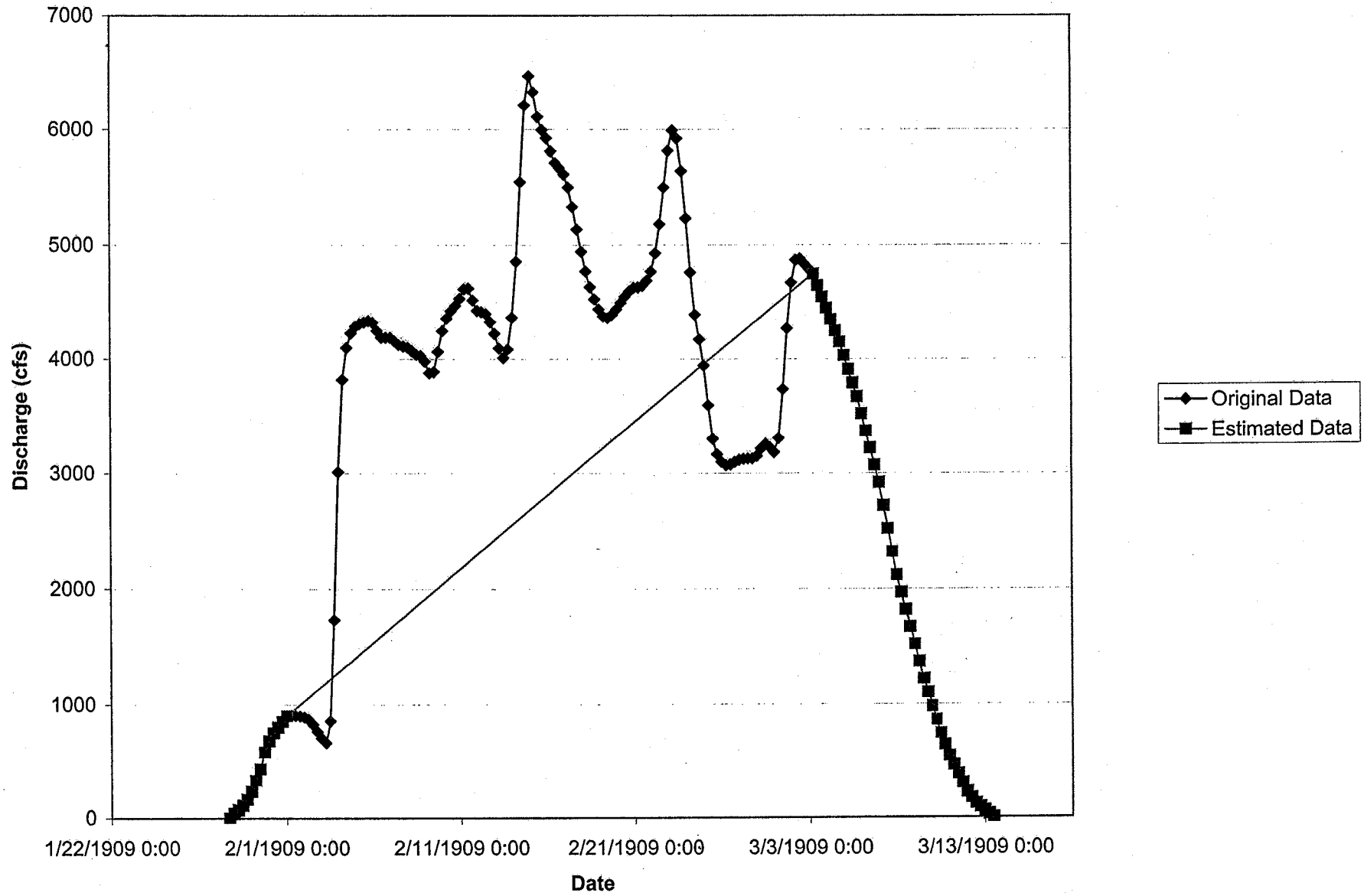
4/5/1908 0:00
4/10/1908 0:00
4/15/1908 0:00
Date
Original Data
Estimated Data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2000
1000
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2/21/1909 0:00
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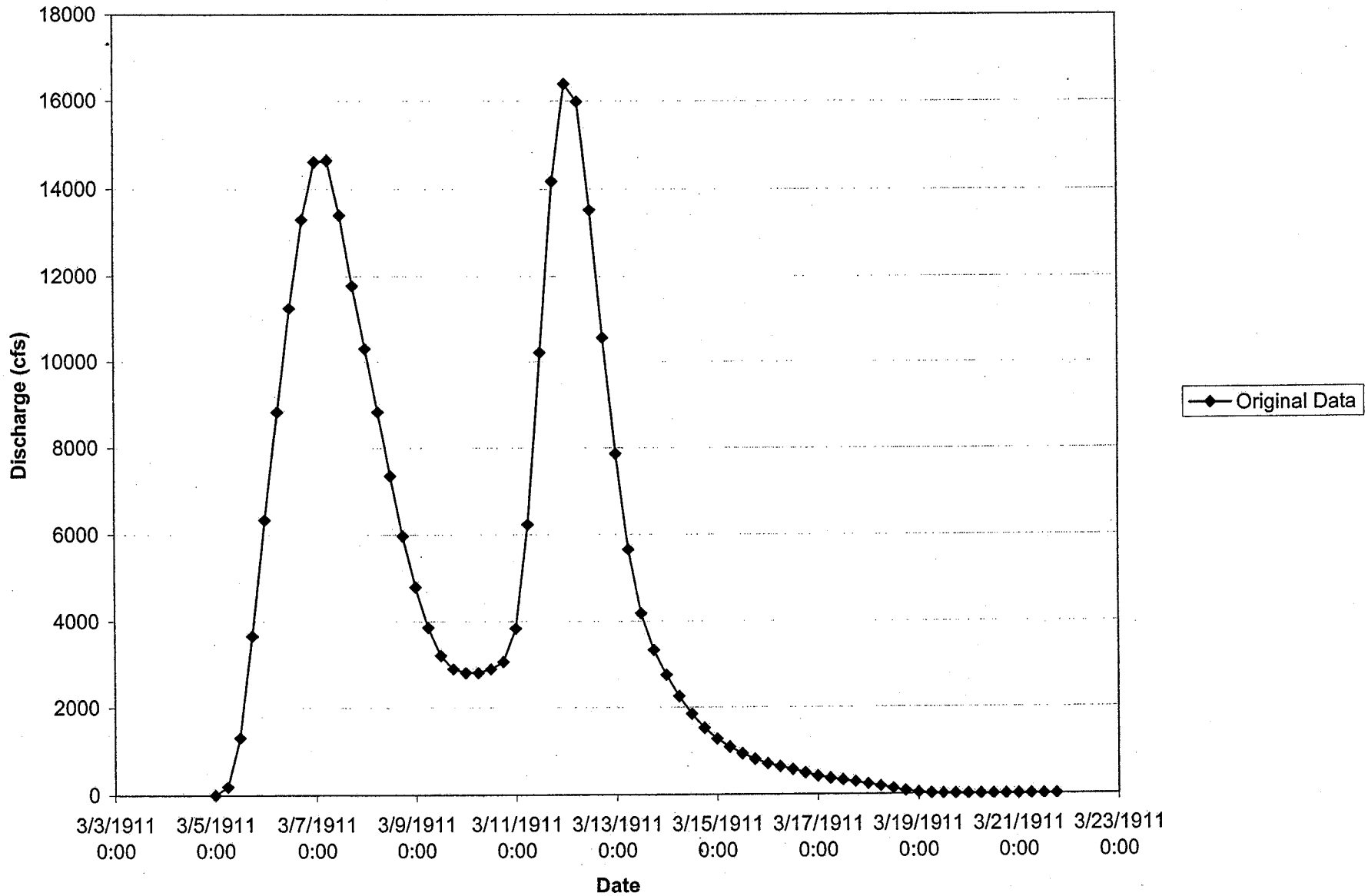
3/13/1909 0:00
Date
Original Data
Estimated Data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8000
6000
4000
2000
0
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3/5/1911 0:00
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3/13/1911 0:00
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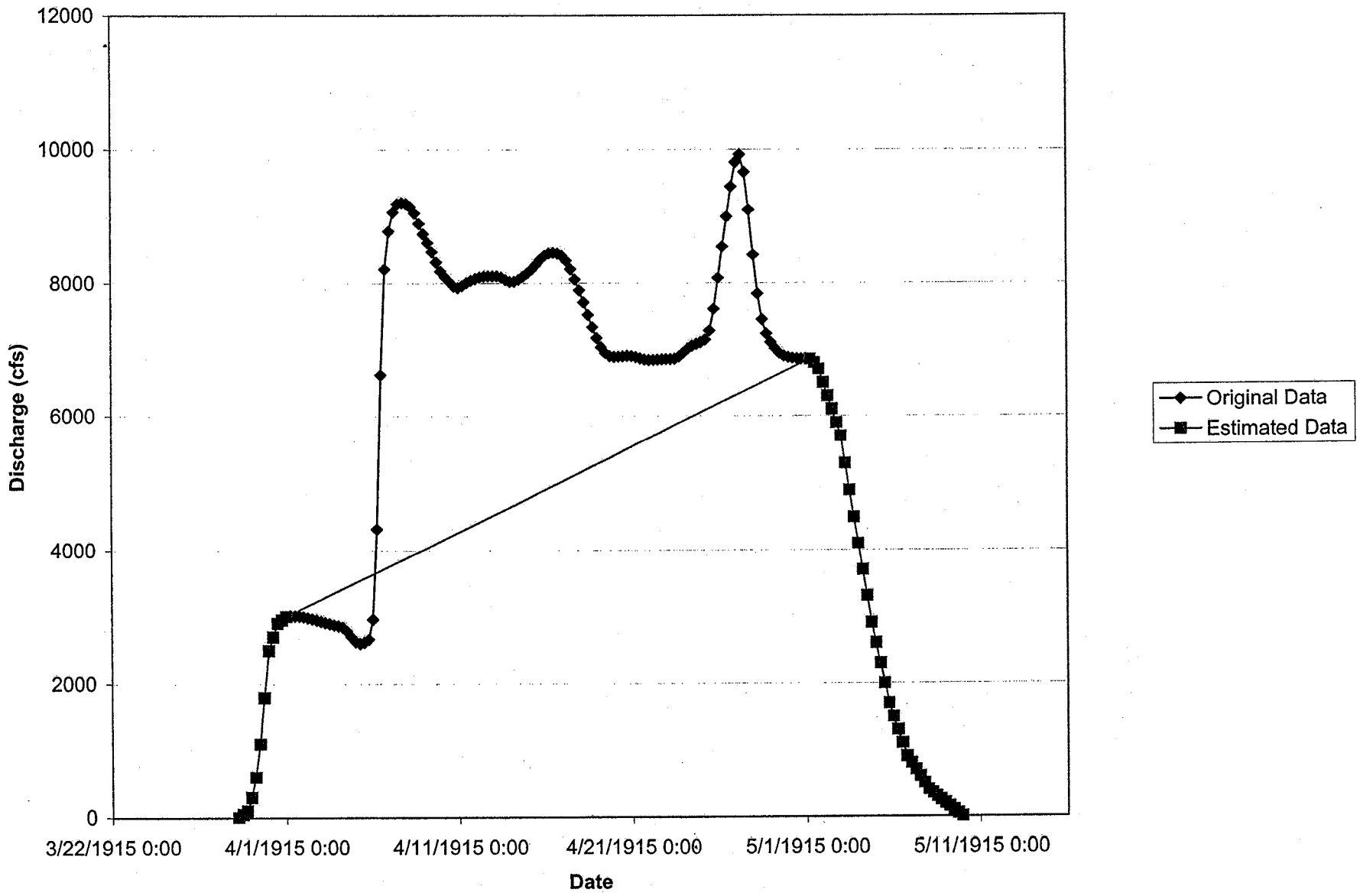
3/17/1911 0:00
3/19/1911 0:00
3/21/1911 0:00
3/23/1911 0:00
Date
Original Data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4000
2000
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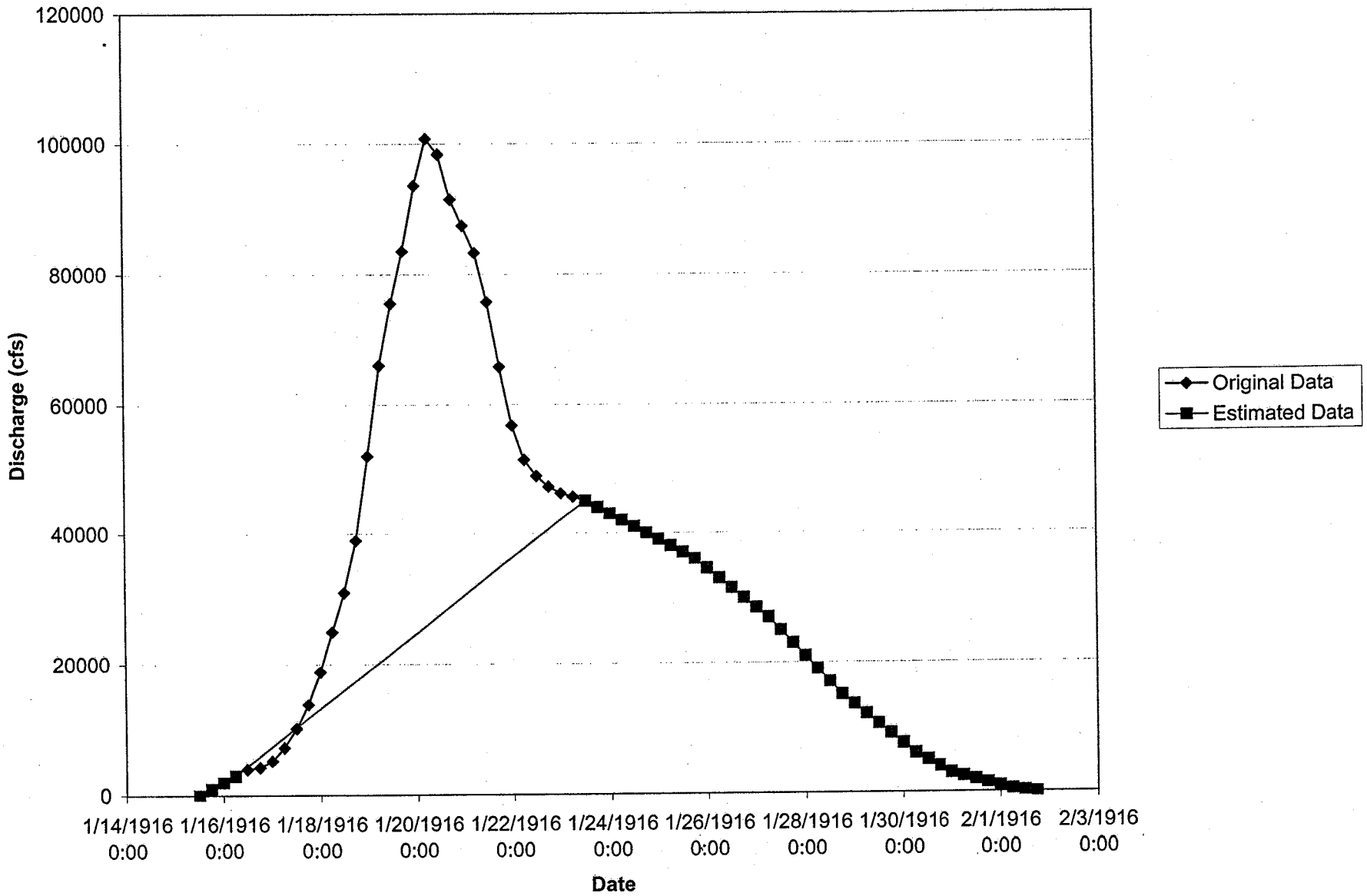
5/11/1915 0:00
Date
Original Data
Estimated Data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60000
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20000
0
Discharge (cfs)
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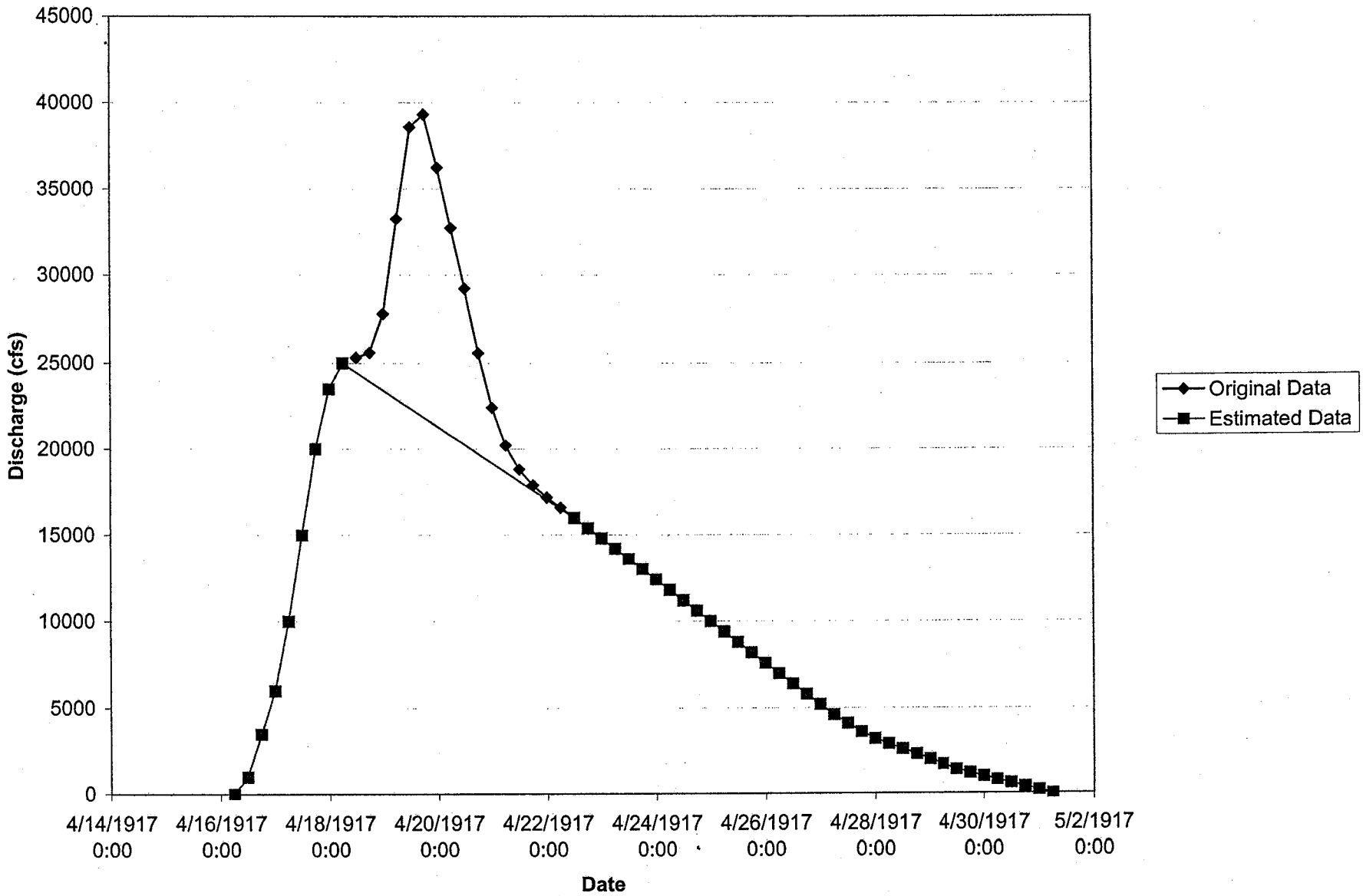
1/16/1916 0:00
1/18/1916 0:00
1/20/1916 0:00
1/22/1916 0:00
1/24/1916 0:00
1/26/1916 0:00
1/28/1916 0:00
1/30/1916 0:00
2/1/1916 0:00
2/3/1916 0:00
Date
Original Data
Estimated Data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10000
5000
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4/16/1917 0:00
4/18/1917 0:00
4/20/1917 0:00
4/22/1917 0:00
4/24/1917 0:00
4/26/1917 0:00
4/28/1917 0:00
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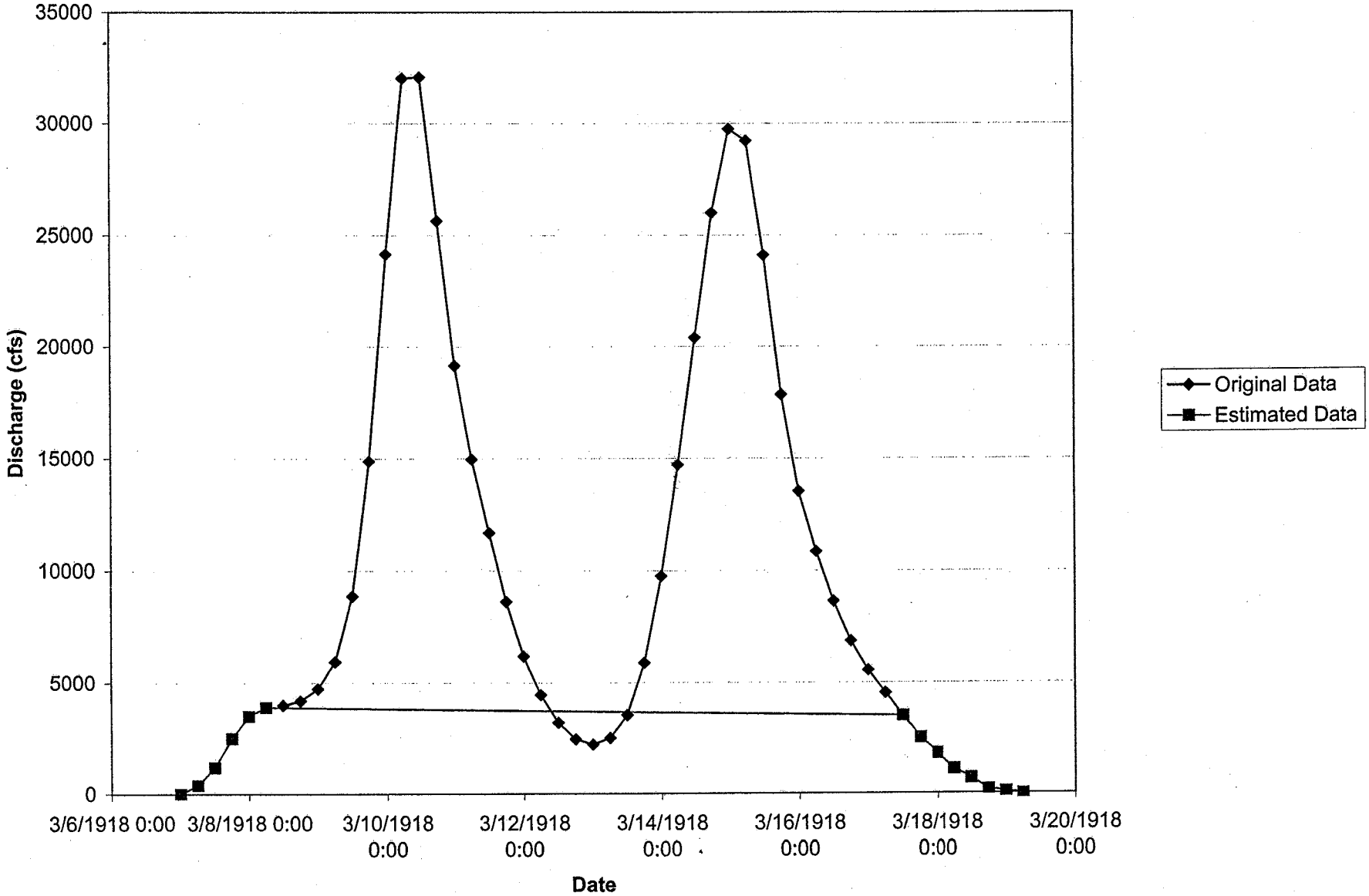
5/2/1917 0:00
Date
Original Data
Estimated Data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3/8/1918 0:00
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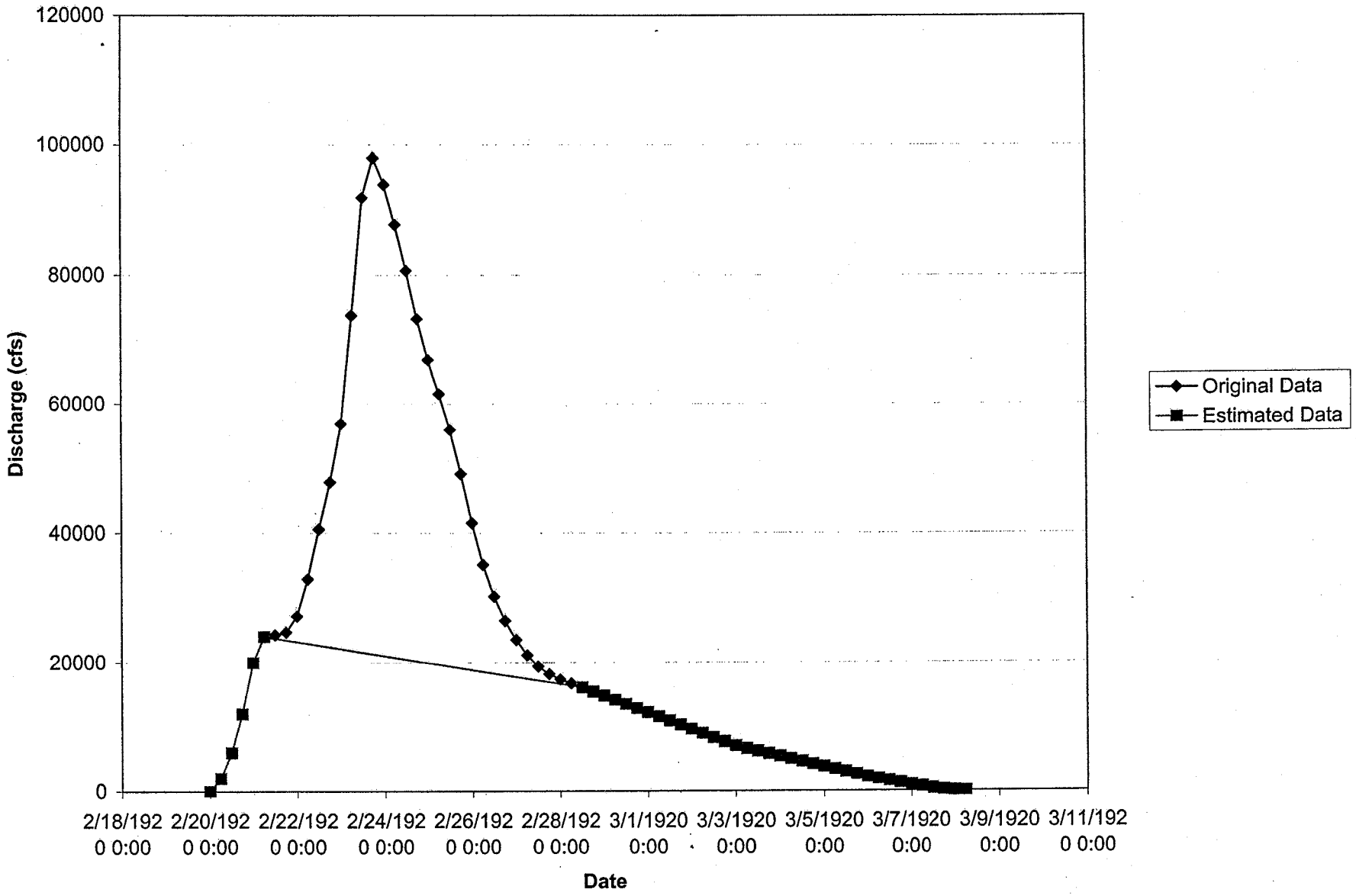
3/18/1918 0:00
3/20/1918 0:00
Date
Original Data
Estimated Data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2/20/1920 0:00
2/22/1920 0:00
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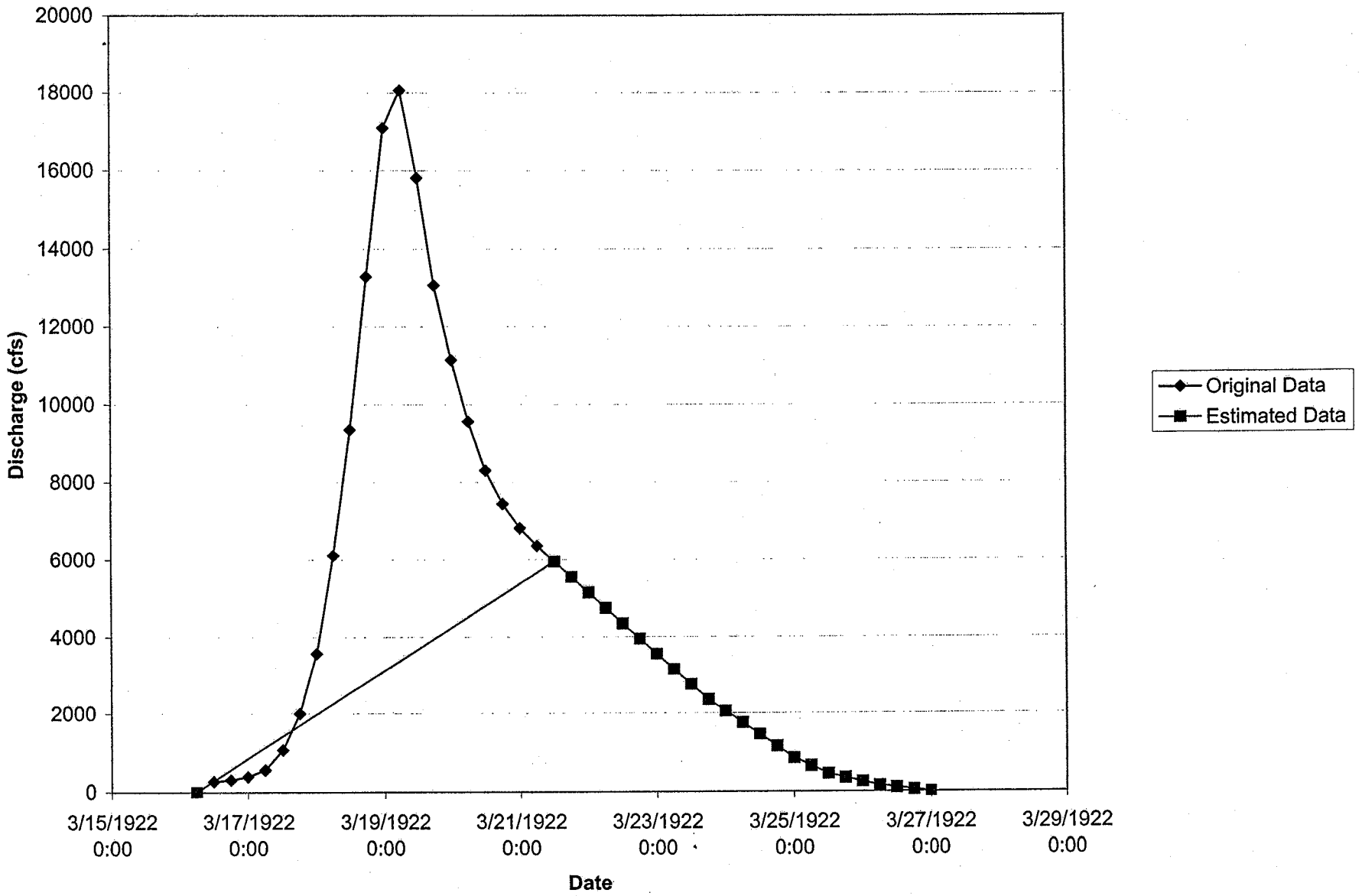
3/7/1920 0:00
3/9/1920 0:00
3/11/1920 0:00
Date
Original Data
Estimated Data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10000
8000
6000
4000
2000
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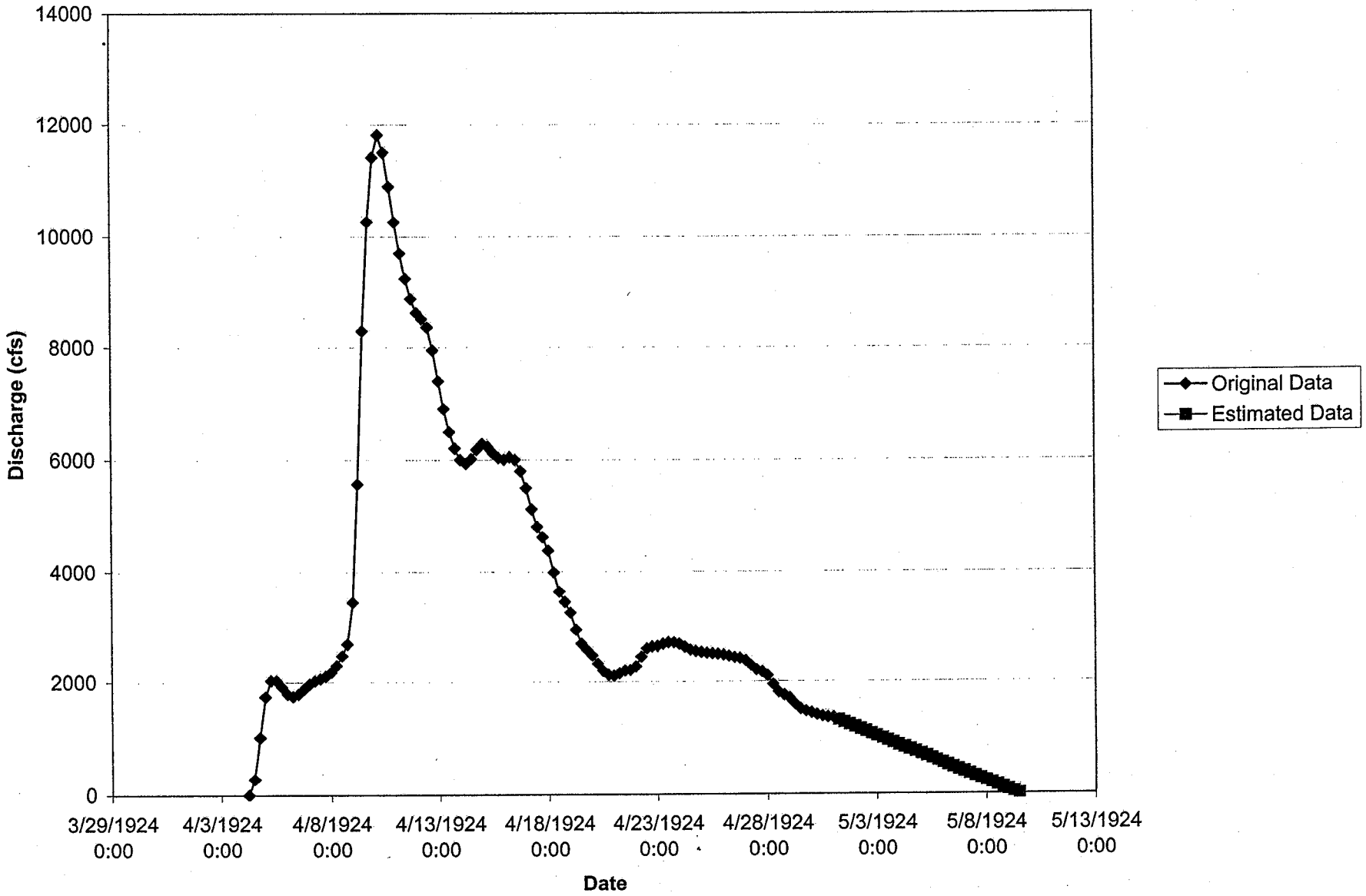
3/17/1922 0:00
3/19/1922 0:00
3/21/1922 0:00
3/23/1922 0:00
3/25/1922 0:00
3/27/1922 0:00
3/29/1922 0:00
Date
Original Data
Estimated Data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8000
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2000
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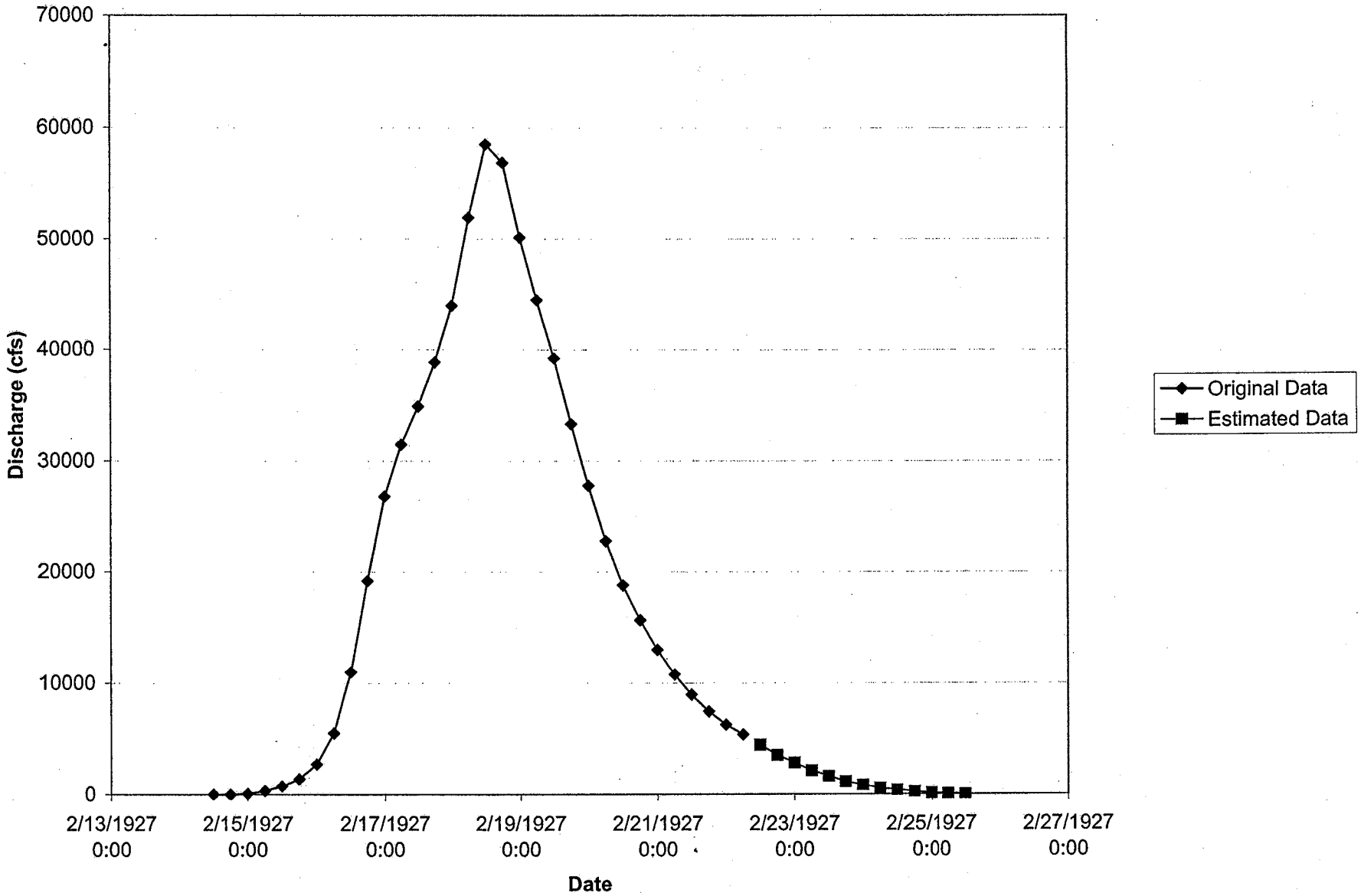
4/23/1924 0:00
4/28/1924 0:00
5/3/1924 0:00
5/8/1924 0:00
5/13/1924 0:00
Date
Original Data
Estimated Data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60000
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10000
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2/15/1927 0:00
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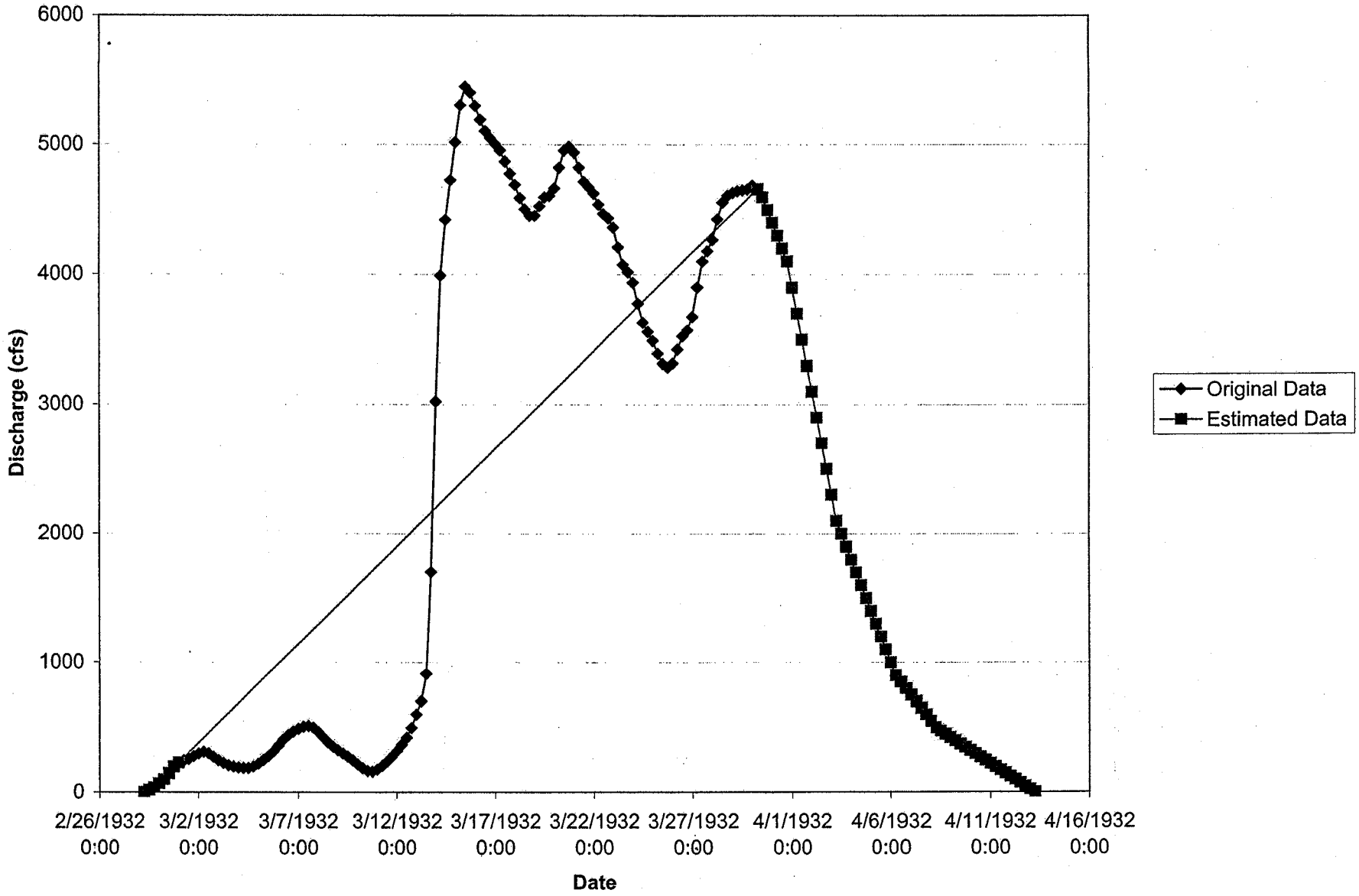
2/19/1927 0:00
2/21/1927 0:00
2/23/1927 0:00
2/25/1927 0:00
2/27/1927 0:00
Date
Original Data
Estimated Data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5000
4000
3000
2000
1000
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3/2/1932 0:00
3/7/1932 0:00
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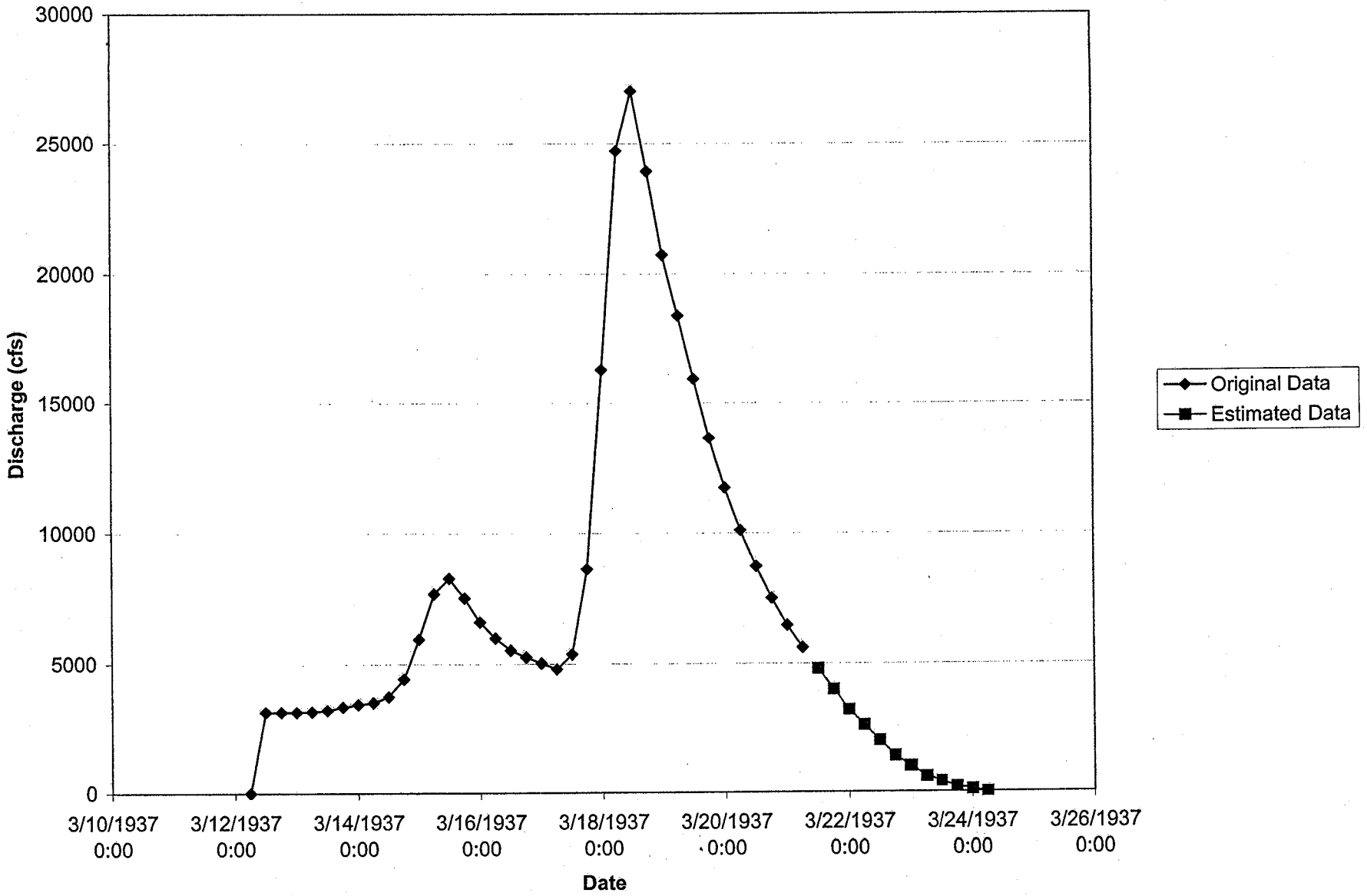
3/27/1932 0:00
4/1/1932 0:00
4/6/1932 0:00
4/11/1932 0:00
4/16/1932 0:00
Date
Original Data
Estimated Data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25000
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15000
10000
5000
0
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3/12/1937 0:00
3/14/1937 0:00
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3/18/1937 0:00
3/20/1937 0:00
3/22/1937 0:00
3/24/1937 0:00
3/26/1937 0:00
Date
Original Data
Estimated Data

Appendix G

Sediment Transport Results by Decade

Rio Oeste
Average Elevation By Decade

Cross Section	Thalweg	Average Bed Elevation						Difference from Existing				
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1022.6	1025.8	1025.8	1026.0	1026.0	1026.0	3.2	3.2	3.4	3.4	3.4
211.41	1018.3	1020.4	1021.6	1022.1	1020.0	1015.7	1015.2	1.1	1.7	-0.4	-4.8	-5.2
211.31	1020.8	1022.8	1024.4	1024.6	1025.0	1025.1	1025.3	1.6	1.8	2.2	2.3	2.4
211.21	1021.1	1022.3	1023.6	1023.5	1023.3	1021.5	1021.4	1.3	1.2	1.0	-0.8	-0.9
211.12	1015.7	1020.4	1025.4	1025.8	1026.3	1026.2	1026.2	5.0	5.4	5.8	5.8	5.8
211.02	1019.4	1021.4	1023.1	1023.1	1023.3	1023.0	1023.0	1.7	1.7	1.9	1.6	1.6
210.93	1018.7	1022.1	1022.5	1022.5	1022.9	1022.9	1023.1	0.4	0.4	0.8	0.8	1.0
210.83	1019.1	1021.2	1022.4	1022.0	1022.3	1022.5	1022.5	1.2	0.8	1.0	1.2	1.3
210.74	1018.2	1019.4	1022.2	1021.5	1021.7	1022.0	1022.0	2.7	2.1	2.3	2.5	2.6
210.64	1017.7	1019.5	1021.5	1021.1	1021.1	1021.2	1021.2	2.0	1.7	1.6	1.7	1.7
210.55	1018.0	1018.7	1022.6	1022.4	1022.2	1022.1	1022.0	3.9	3.7	3.5	3.4	3.3
210.46	1018.0	1018.6	1021.1	1020.9	1020.9	1021.3	1021.3	2.6	2.3	2.3	2.7	2.7
210.44	1017.6	1018.7	1019.3	1019.0	1020.2	1020.3	1020.2	0.6	0.4	1.5	1.6	1.6
210.36	1017.4	1021.0	1021.7	1021.4	1021.0	1021.0	1020.9	0.7	0.4	0.0	-0.1	-0.2
210.26	1016.9	1020.3	1021.5	1021.4	1021.2	1021.1	1021.0	1.2	1.1	0.9	0.8	0.7
210.17	1014.7	1021.1	1022.1	1021.9	1021.6	1021.4	1021.1	1.0	0.8	0.5	0.3	0.0
210.07	1018.5	1019.6	1022.4	1022.1	1021.2	1021.2	1021.2	2.8	2.5	1.6	1.6	1.6
209.98	1018.1	1021.2	1022.2	1022.0	1020.7	1019.9	1019.0	1.1	0.8	-0.4	-1.3	-2.1
209.88	1014.7	1020.1	1020.0	1019.8	1019.3	1019.0	1018.7	0.0	-0.3	-0.8	-1.1	-1.4
209.79	1020.0	1021.6	1020.6	1020.1	1019.3	1019.0	1018.7	-1.1	-1.5	-2.3	-2.7	-2.9
209.69	1019.0	1020.3	1018.9	1018.8	1018.0	1017.9	1015.2	-1.4	-1.5	-2.3	-2.4	-5.1
209.6	1016.9	1020.3	1016.2	1016.1	1015.6	1015.2	1015.3	-4.1	-4.2	-4.7	-5.1	-5.0
209.54	1019.6	1020.0	1012.1	1010.8	1009.8	1009.0	1009.1	-7.9	-9.2	-10.2	-11.0	-10.9
209.42	1019.6	1020.2	1015.0	1014.7	1014.2	1013.9	1013.9	-5.2	-5.5	-6.0	-6.3	-6.4
209.33	1019.7	1020.6	1011.4	1010.6	1009.6	1009.0	1009.0	-9.2	-10.0	-11.0	-11.6	-11.6
209.24	1017.4	1019.4	1011.7	1011.0	1010.0	1009.3	1009.3	-7.7	-8.4	-9.4	-10.1	-10.1
209.14	1014.5	1017.4	1014.9	1014.7	1014.0	1013.6	1013.6	-2.5	-2.7	-3.4	-3.8	-3.8
209.04	1012.2	1014.5	1013.8	1013.6	1013.3	1012.9	1012.9	-0.7	-1.0	-1.2	-1.6	-1.7
208.95	1013.1	1015.0	1013.0	1012.9	1012.5	1012.1	1012.1	-2.0	-2.1	-2.6	-2.9	-2.9
208.85	1013.4	1015.0	1012.8	1012.9	1012.7	1012.5	1012.5	-2.2	-2.1	-2.2	-2.4	-2.4
208.75	1011.0	1012.4	1012.3	1012.6	1012.4	1012.4	1012.4	-0.2	0.2	0.0	0.0	0.0
208.67	1010.0	1012.2	1011.3	1011.6	1011.6	1011.6	1011.6	-0.9	-0.6	-0.6	-0.6	-0.6
208.57	1010.0	1011.9	1011.4	1011.5	1011.4	1011.4	1011.4	-0.4	-0.4	-0.4	-0.5	-0.5
208.48	1007.6	1010.9	1011.2	1011.2	1011.1	1011.1	1011.1	0.3	0.3	0.2	0.2	0.1
208.39	1005.6	1009.9	1010.2	1010.2	1009.4	1009.3	1009.2	0.3	0.3	-0.5	-0.6	-0.7
208.29	1004.7	1008.8	1009.1	1009.1	1006.7	1006.7	1006.6	0.3	0.3	-2.1	-2.2	-2.2
208.19	1004.7	1007.3	1007.2	1006.9	1005.1	1005.0	1005.0	-0.1	-0.4	-2.2	-2.3	-2.3

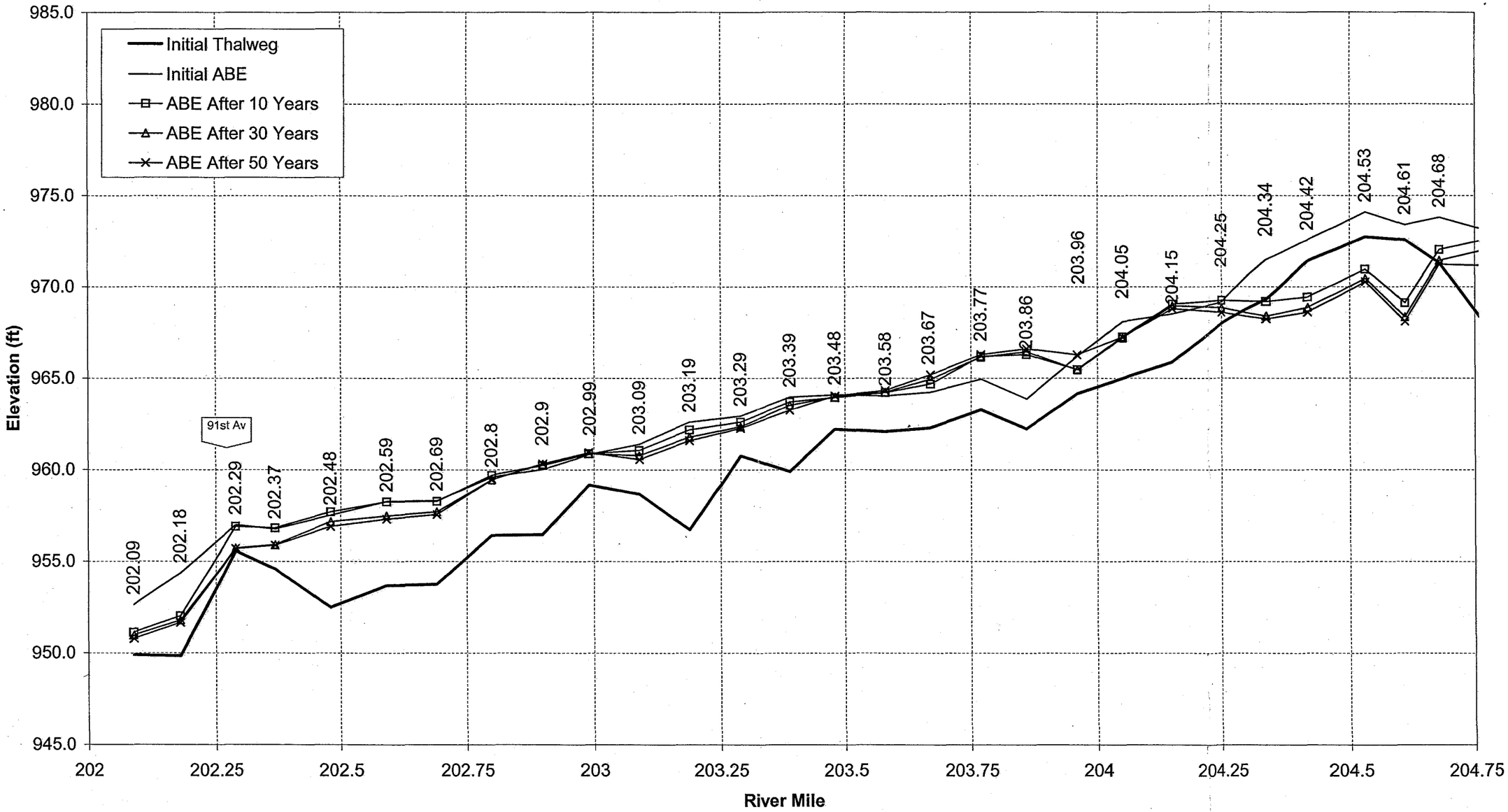
Rio Oeste
Average Elevation By Decade

Cross Section	Thalweg	Average Bed Elevation						Difference from Existing				
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
208.1	1001.3	1005.5	1004.0	1003.3	1002.2	1002.1	1002.0	-1.4	-2.2	-3.3	-3.4	-3.4
207.99	999.9	1004.2	1003.1	1002.8	1002.4	1002.0	1002.0	-1.1	-1.4	-1.8	-2.2	-2.2
207.9	1000.8	1003.8	1002.2	1001.5	1000.8	1000.2	1000.2	-1.6	-2.2	-3.0	-3.6	-3.6
207.8	999.1	1002.8	1000.9	1000.5	1000.2	999.7	999.7	-1.9	-2.3	-2.7	-3.1	-3.1
207.71	1000.3	1002.4	1000.3	1000.1	999.7	999.3	999.3	-2.2	-2.3	-2.8	-3.1	-3.1
207.62	1000.2	1002.0	999.8	999.7	998.8	998.6	998.6	-2.2	-2.3	-3.3	-3.5	-3.4
207.53	999.3	1000.7	999.6	999.6	999.0	998.2	998.2	-1.1	-1.1	-1.7	-2.5	-2.5
207.49	999.4	999.9	999.1	999.1	998.3	997.5	997.5	-0.8	-0.8	-1.6	-2.4	-2.4
207.43	999.0	999.9	998.3	998.3	997.7	997.1	997.1	-1.6	-1.6	-2.2	-2.8	-2.8
207.34	996.5	999.0	997.0	996.7	995.7	995.3	995.1	-2.0	-2.3	-3.2	-3.6	-3.9
207.27	993.3	997.3	996.3	994.8	994.0	993.5	993.4	-1.0	-2.5	-3.3	-3.8	-3.9
207.16	992.7	994.9	994.7	993.2	992.8	992.1	991.9	-0.2	-1.7	-2.1	-2.8	-3.0
207.07	992.8	993.5	992.9	992.3	991.7	991.5	991.6	-0.6	-1.2	-1.8	-1.9	-1.9
206.97	992.8	993.6	994.0	989.8	988.7	987.6	988.3	0.4	-3.8	-4.9	-6.1	-5.3
206.88	992.7	993.4	991.1	987.9	987.1	986.6	986.8	-2.3	-5.5	-6.3	-6.8	-6.6
206.79	993.0	993.7	992.0	991.6	990.3	989.9	989.7	-1.7	-2.1	-3.4	-3.8	-4.0
206.7	991.3	993.2	992.3	991.2	990.3	990.3	990.0	-0.8	-2.0	-2.9	-2.9	-3.1
206.6	991.8	993.8	991.4	990.8	990.4	989.9	989.6	-2.5	-3.0	-3.4	-3.9	-4.2
206.51	990.2	991.3	990.0	990.2	990.0	989.6	989.5	-1.3	-1.2	-1.3	-1.8	-1.8
206.41	988.8	990.4	988.9	988.7	988.5	987.9	987.5	-1.5	-1.7	-1.9	-2.5	-2.9
206.32	987.4	988.9	987.4	987.3	987.0	986.2	986.2	-1.5	-1.6	-1.9	-2.7	-2.8
206.22	986.0	987.3	986.0	985.8	985.7	985.4	985.2	-1.3	-1.5	-1.7	-2.0	-2.2
206.13	984.6	987.0	985.8	985.8	985.5	985.1	985.0	-1.2	-1.3	-1.5	-2.0	-2.1
206.03	984.7	986.3	985.0	985.1	984.9	984.8	984.7	-1.3	-1.3	-1.4	-1.5	-1.6
205.94	981.5	983.4	983.3	983.4	983.3	983.3	983.2	0.0	0.0	-0.1	-0.1	-0.1
205.84	979.5	981.7	982.1	982.1	982.2	982.2	982.2	0.5	0.5	0.5	0.6	0.5
205.75	973.9	978.8	979.9	980.0	980.2	980.5	980.5	1.1	1.2	1.4	1.7	1.6
205.62	976.0	979.2	979.6	979.6	979.8	980.0	979.6	0.4	0.4	0.6	0.8	0.5
205.52	975.9	978.4	978.5	978.5	978.6	978.8	978.8	0.1	0.1	0.2	0.4	0.4
205.43	976.1	976.9	977.3	977.4	977.5	977.5	977.5	0.4	0.4	0.5	0.6	0.6
205.4	975.5	976.7	977.2	977.6	977.7	977.8	977.9	0.5	0.9	1.0	1.1	1.2
205.34	972.7	976.3	976.2	976.4	976.5	976.5	976.4	-0.1	0.1	0.2	0.2	0.1
205.25	973.4	975.5	974.6	975.0	975.3	975.5	975.6	-0.9	-0.5	-0.1	0.1	0.1
205.15	973.1	975.4	971.8	972.2	972.3	972.3	972.2	-3.6	-3.2	-3.2	-3.1	-3.2
205.06	970.4	974.1	973.8	973.6	973.6	973.8	973.7	-0.3	-0.5	-0.5	-0.4	-0.4
204.97	967.6	971.3	973.2	973.1	973.1	973.0	972.9	2.0	1.8	1.8	1.7	1.6
204.87	968.1	974.4	974.1	973.9	973.7	973.5	973.4	-0.3	-0.5	-0.7	-0.9	-1.0

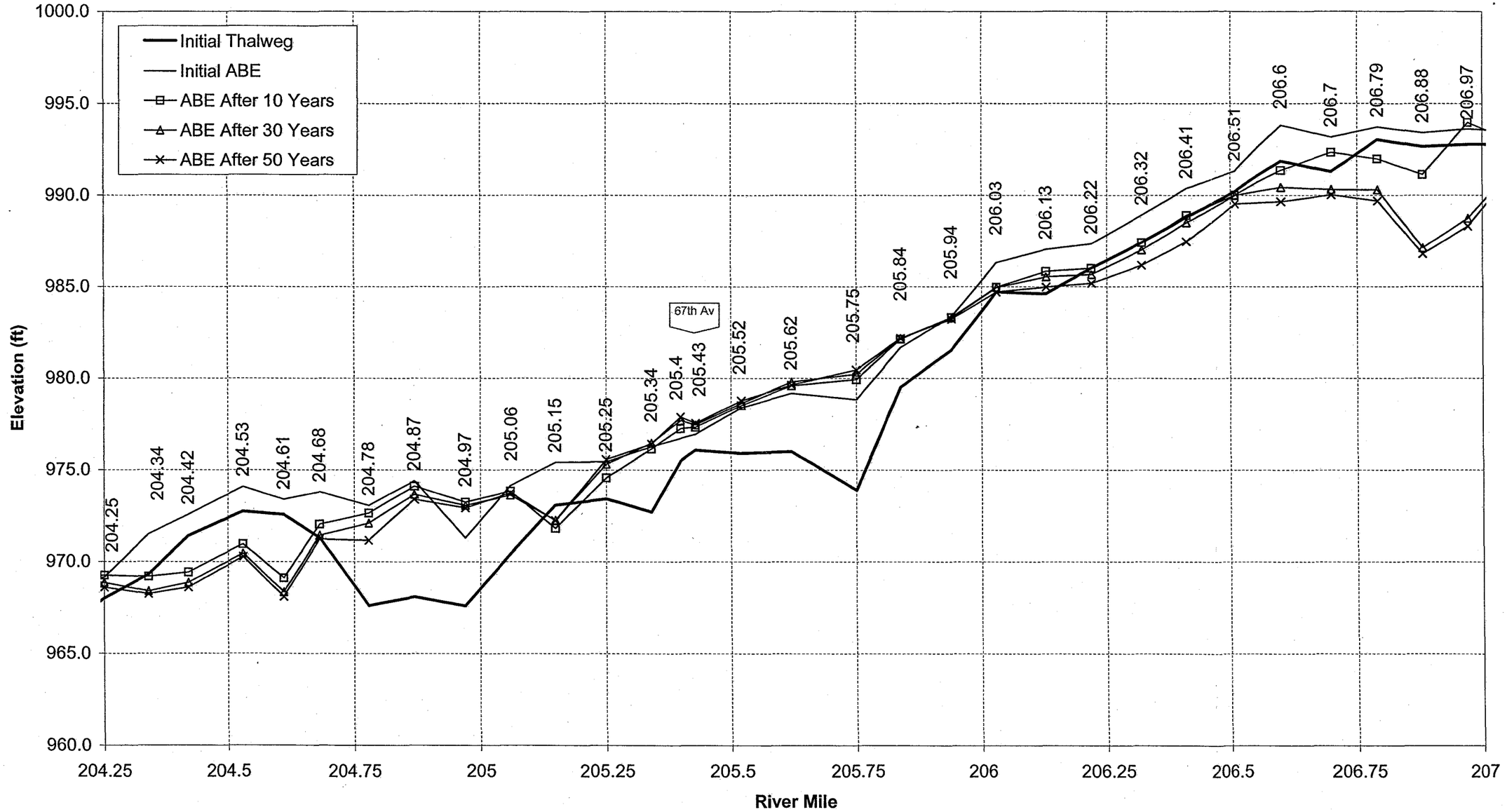
Rio Oeste
Average Elevation By Decade

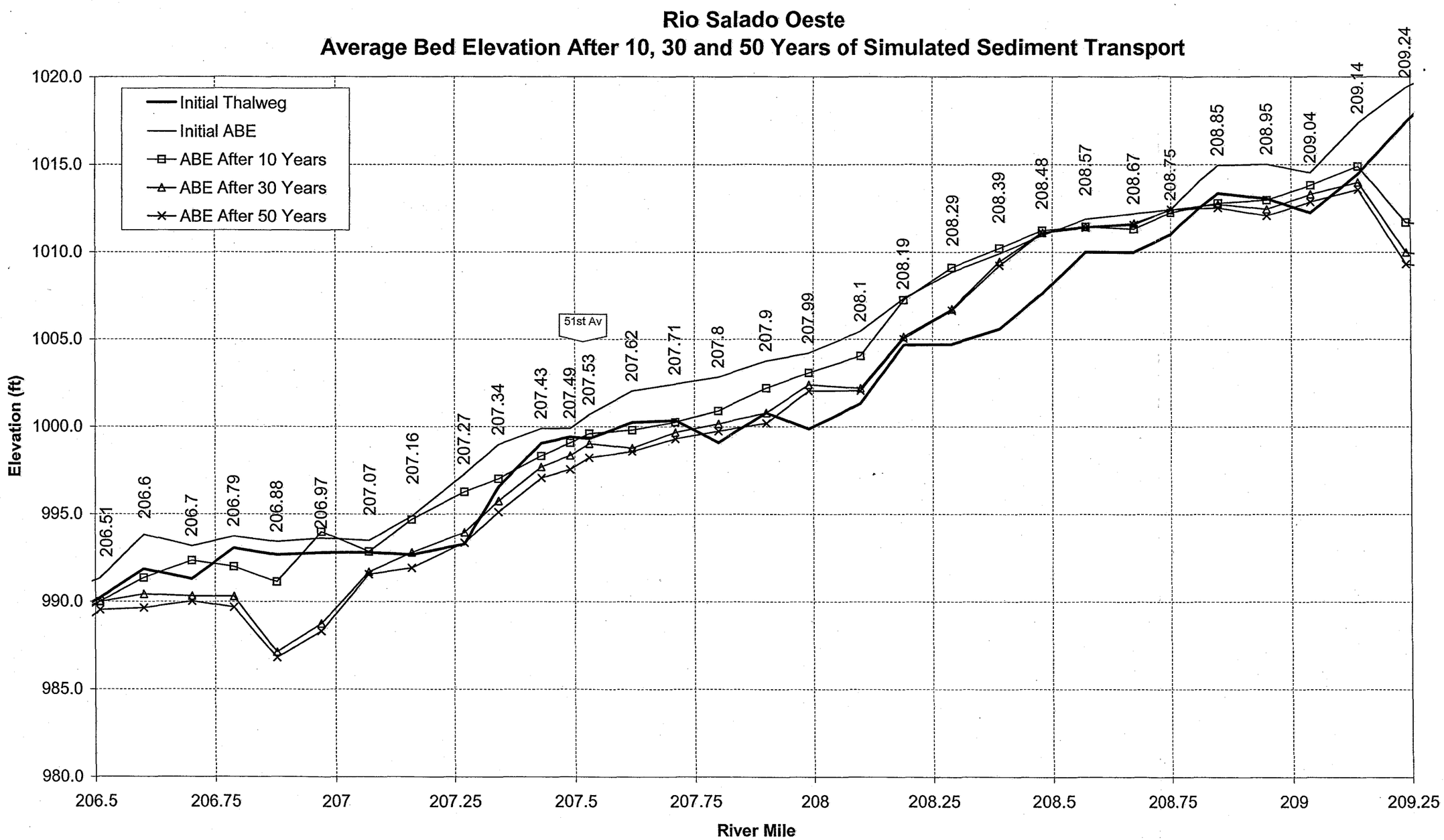
Cross Section	Thalweg	Average Bed Elevation						Difference from Existing				
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
204.78	967.6	973.1	972.6	972.5	972.1	971.2	971.2	-0.4	-0.5	-1.0	-1.8	-1.9
204.68	971.3	973.8	972.0	971.9	971.4	971.2	971.2	-1.8	-1.9	-2.4	-2.6	-2.6
204.61	972.6	973.4	969.1	968.7	968.3	968.1	968.1	-4.3	-4.6	-5.0	-5.3	-5.3
204.53	972.7	974.1	971.0	970.8	970.5	970.3	970.3	-3.1	-3.3	-3.6	-3.8	-3.8
204.42	971.4	972.6	969.4	969.2	968.9	968.6	968.6	-3.1	-3.3	-3.7	-4.0	-4.0
204.34	969.3	971.5	969.2	968.4	968.4	968.3	968.2	-2.3	-3.1	-3.1	-3.2	-3.3
204.25	968.0	969.2	969.3	969.2	968.9	968.6	968.6	0.1	0.1	-0.3	-0.5	-0.6
204.15	965.9	968.5	969.1	969.0	969.0	968.8	968.8	0.5	0.5	0.5	0.3	0.3
204.05	965.0	968.1	967.3	967.2	967.2	967.3	967.3	-0.8	-0.9	-0.9	-0.8	-0.8
203.96	964.1	966.2	965.5	965.2	965.5	966.2	966.3	-0.7	-1.0	-0.7	0.1	0.1
203.86	962.2	963.9	966.3	966.3	966.4	966.5	966.6	2.4	2.5	2.6	2.7	2.7
203.77	963.3	964.9	966.2	966.1	966.1	966.2	966.3	1.2	1.2	1.2	1.3	1.3
203.67	962.3	964.2	964.7	964.8	964.9	965.1	965.2	0.4	0.5	0.7	0.9	0.9
203.58	962.1	964.0	964.2	964.2	964.2	964.3	964.3	0.2	0.2	0.2	0.3	0.3
203.48	962.2	964.1	963.9	964.0	964.0	964.0	964.0	-0.1	-0.1	-0.1	-0.1	-0.1
203.39	959.9	964.0	963.7	963.7	963.5	963.5	963.2	-0.3	-0.3	-0.5	-0.5	-0.7
203.29	960.8	962.9	962.6	962.5	962.3	962.3	962.3	-0.3	-0.4	-0.6	-0.7	-0.7
203.19	956.7	962.6	962.2	962.0	961.8	961.7	961.6	-0.4	-0.6	-0.8	-0.9	-1.0
203.09	958.7	961.4	961.1	961.0	960.8	960.6	960.6	-0.3	-0.4	-0.6	-0.8	-0.8
202.99	959.2	960.8	960.9	960.9	960.9	960.9	960.9	0.0	0.1	0.0	0.1	0.1
202.9	956.5	960.0	960.2	960.3	960.3	960.3	960.3	0.2	0.3	0.3	0.3	0.3
202.8	956.4	959.6	959.7	959.7	959.5	959.5	959.5	0.1	0.1	-0.1	-0.1	-0.1
202.69	953.7	958.3	958.3	958.1	957.7	957.6	957.6	0.0	-0.2	-0.6	-0.7	-0.8
202.59	953.7	958.3	958.2	958.0	957.5	957.4	957.3	0.0	-0.2	-0.8	-0.9	-1.0
202.48	952.5	957.5	957.7	957.4	957.2	957.0	956.9	0.2	-0.1	-0.4	-0.5	-0.6
202.37	954.6	956.8	956.8	956.7	955.9	955.9	955.9	0.1	0.0	-0.9	-0.9	-0.9
202.29	955.5	957.0	956.9	956.8	955.7	955.7	955.7	-0.1	-0.2	-1.3	-1.3	-1.3
202.18	949.8	954.4	952.0	951.9	951.8	951.7	951.7	-2.3	-2.5	-2.6	-2.6	-2.7
202.09	949.9	952.6	951.1	951.1	951.0	950.8	950.8	-1.5	-1.5	-1.7	-1.8	-1.9
							MAX	5.0	5.4	5.8	5.8	5.8
							MIN	-9.2	-10.0	-11.0	-11.6	-11.6

Rio Salado Oeste
Average Bed Elevation After 10, 30 and 50 Years of Simulated Sediment Transport

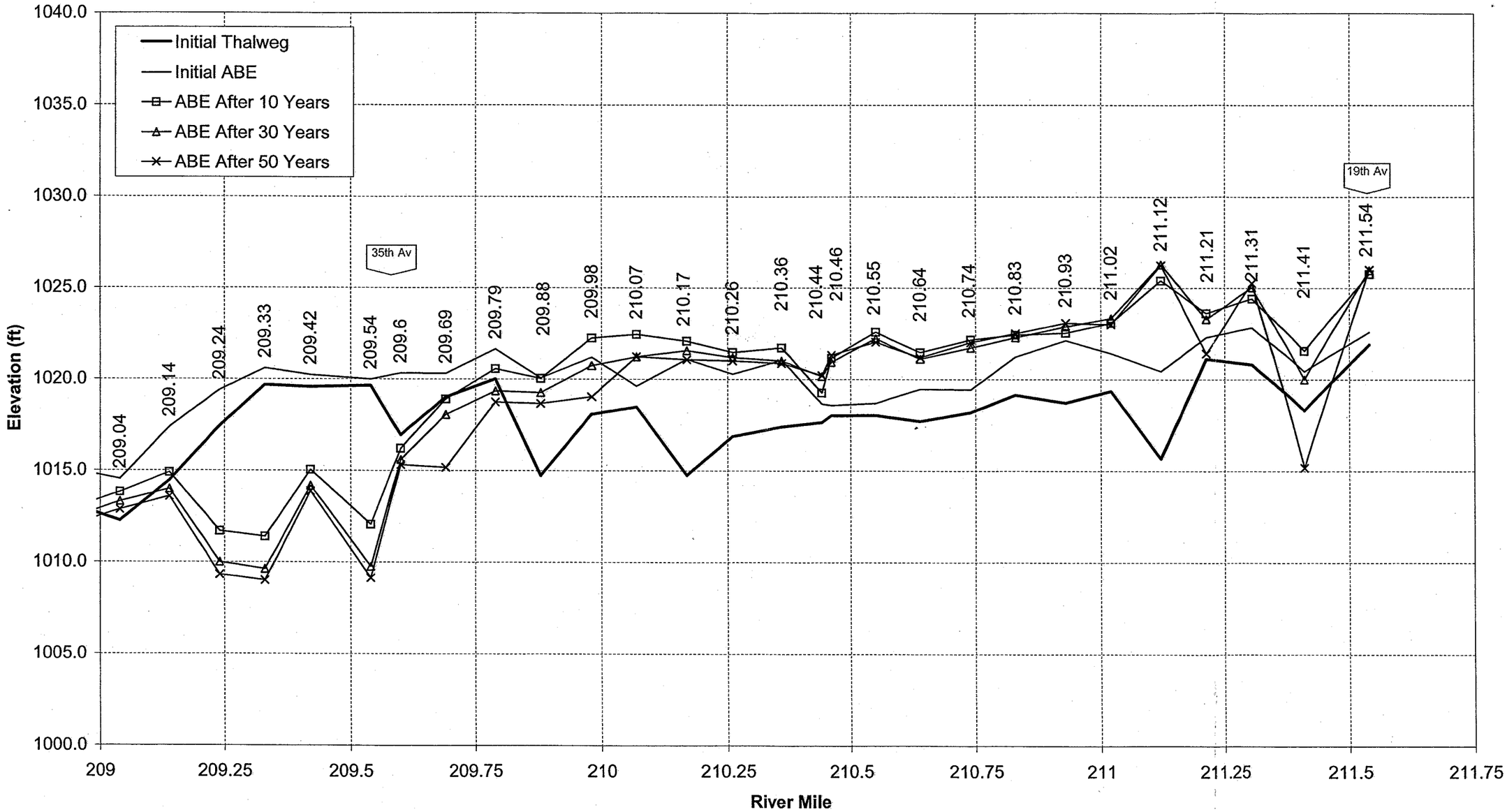


Rio Salado Oeste
Average Bed Elevation After 10, 30 and 50 Years of Simulated Sediment Transport



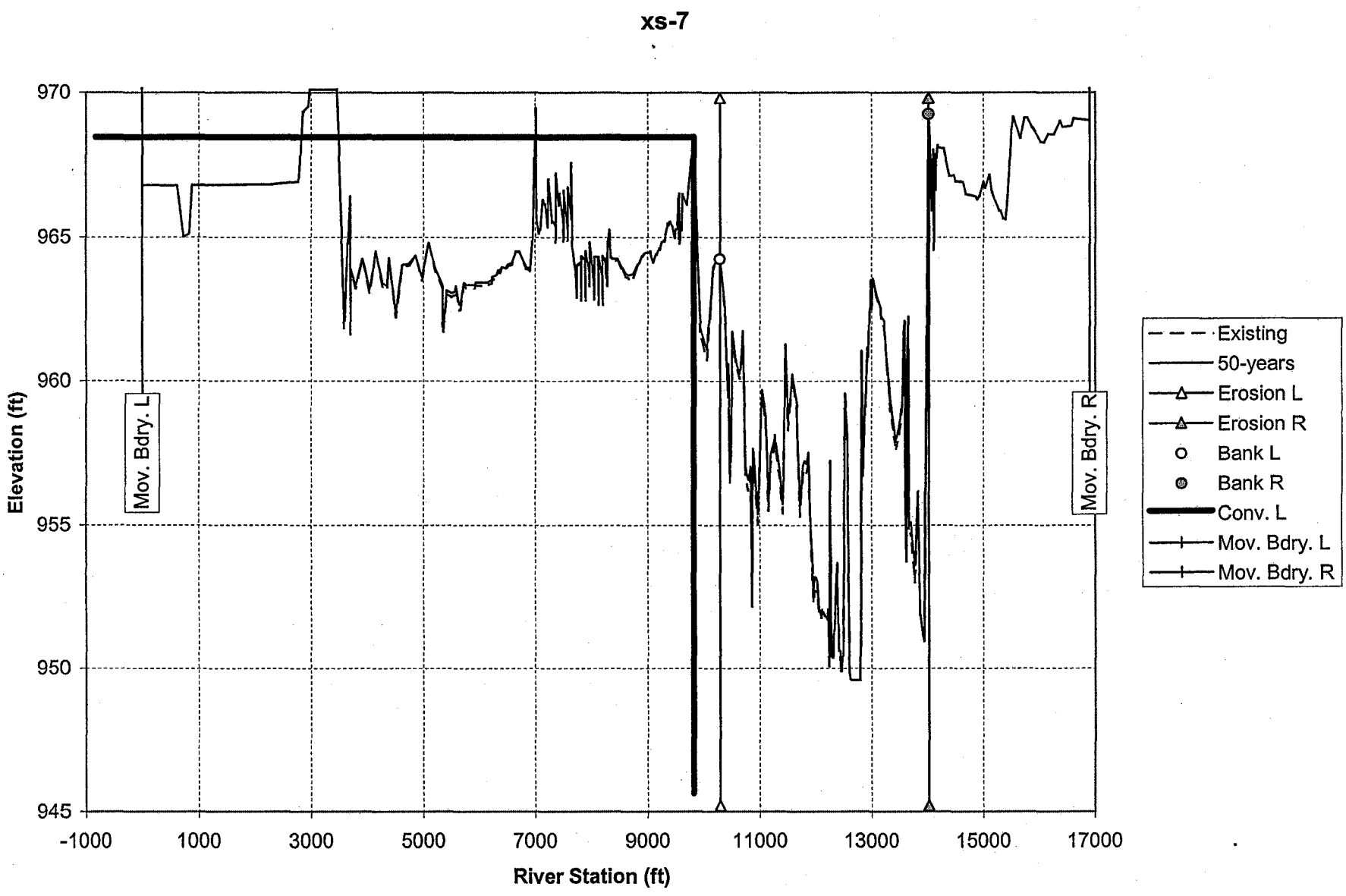

Rio Salado Oeste
Average Bed Elevation After 10, 30 and 50 Years of Simulated Sediment Transport
Initial Thalweg
Initial ABE
ABE After 10 Years
ABE After 30 Years
ABE After 50 Years
Elevation (ft)
River Mile
51st Av
1020.0
1015.0
1010.0
1005.0
1000.0
995.0
990.0
985.0
980.0
206.5
206.75
207
207.25
207.5
207.75
208
208.25
208.5
208.75
209
209.25
206.51
206.6
206.7
206.79
206.88
206.97
207.07
207.16
207.27
207.34
207.43
207.49
207.53
207.62
207.71
207.8
207.9
207.99
208.1
208.19
208.29
208.39
208.48
208.57
208.67
208.75
208.85
208.95
209.04
209.14
209.24

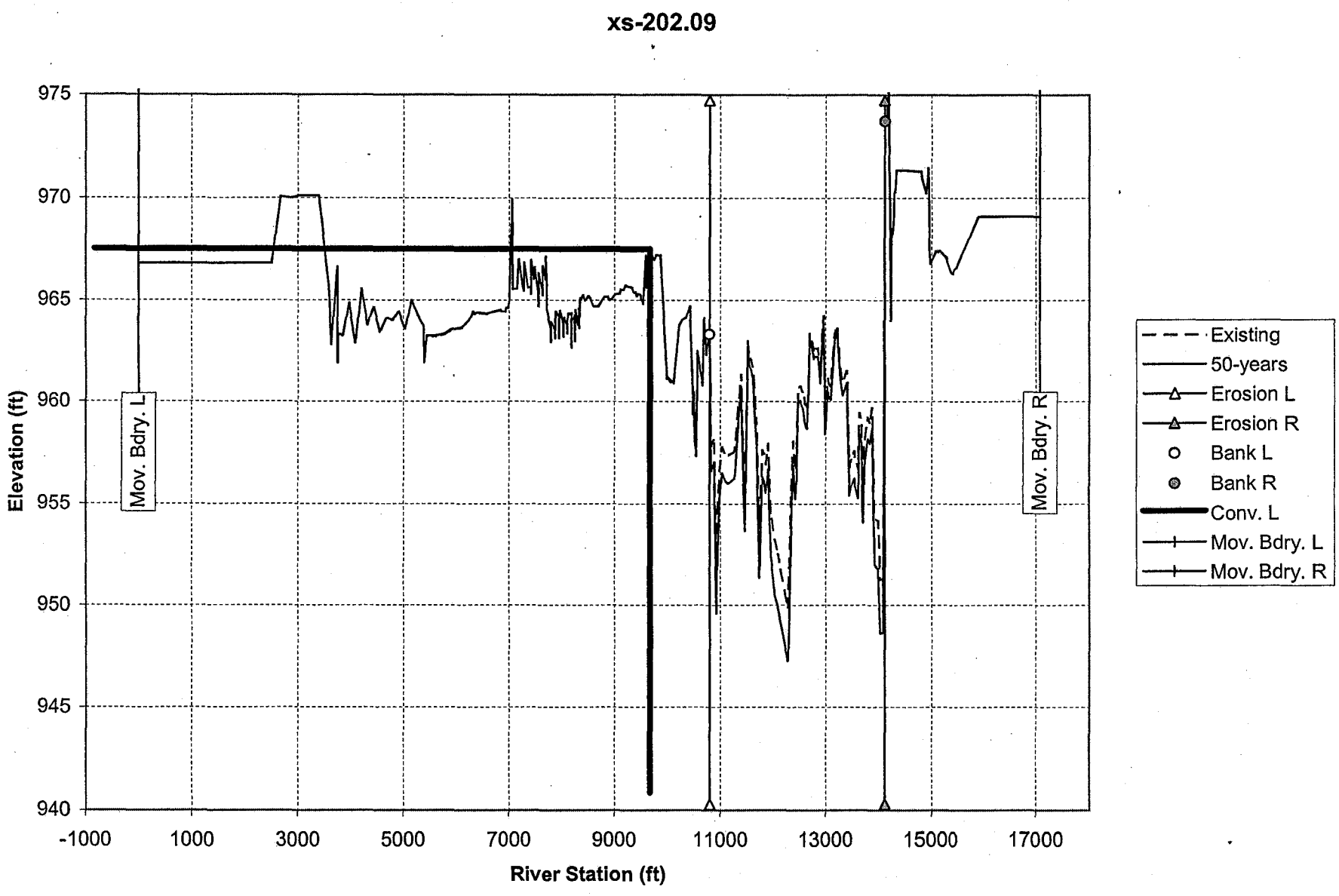
Rio Salado Oeste
Average Bed Elevation After 10, 30 and 50 Years of Simulated Sediment Transport

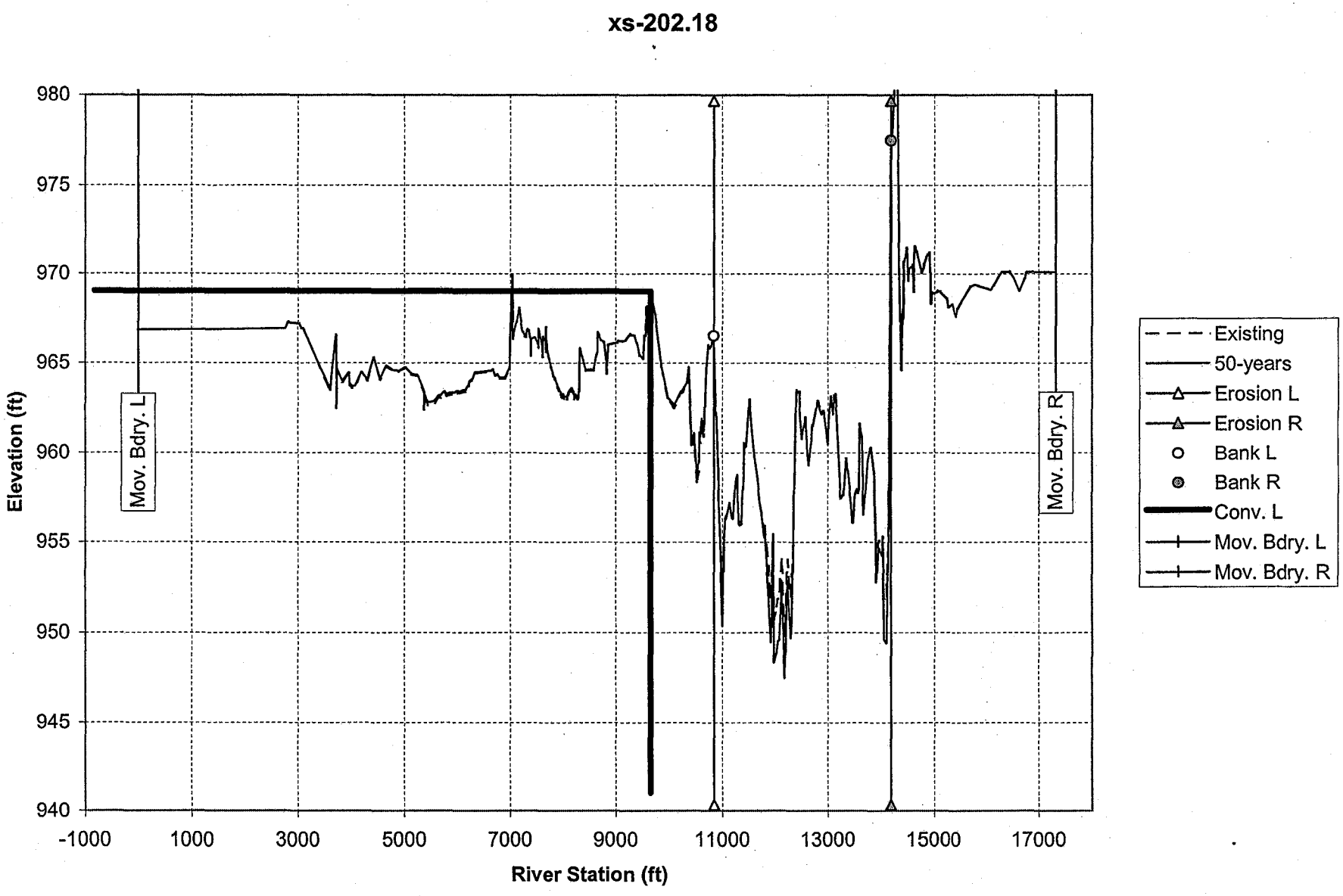


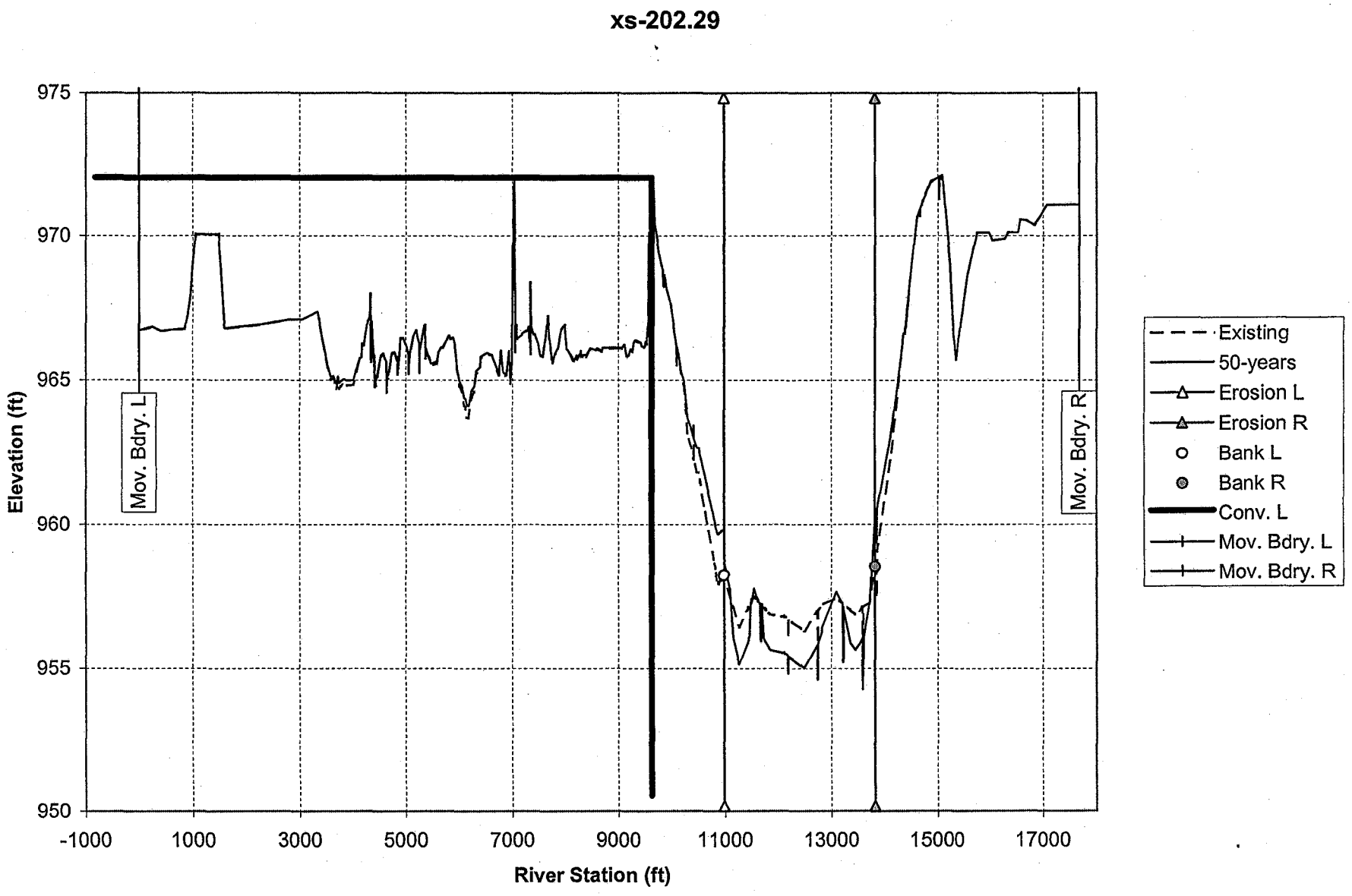
Appendix H

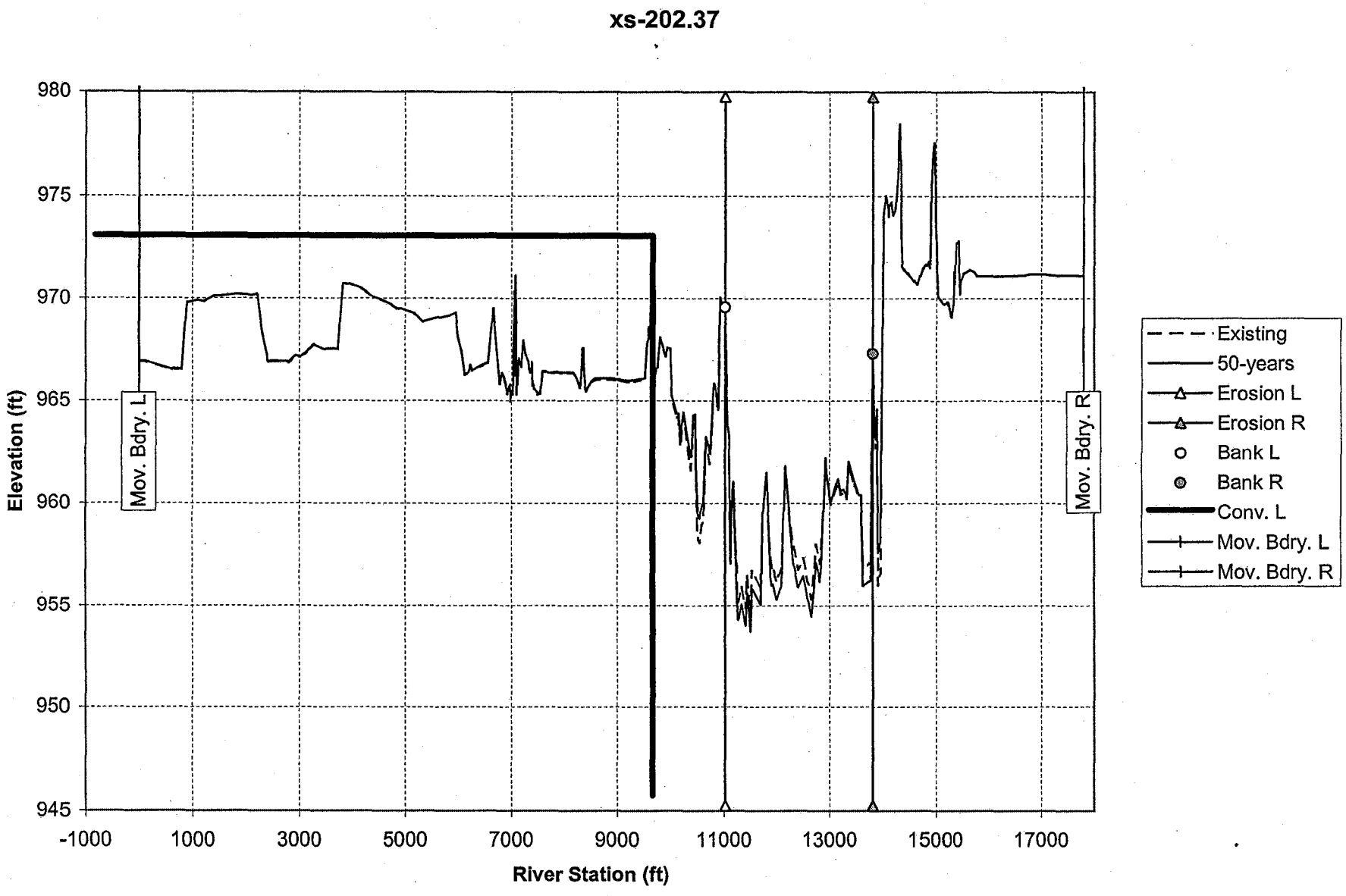
Sediment Transport Results: Cross Section Plots

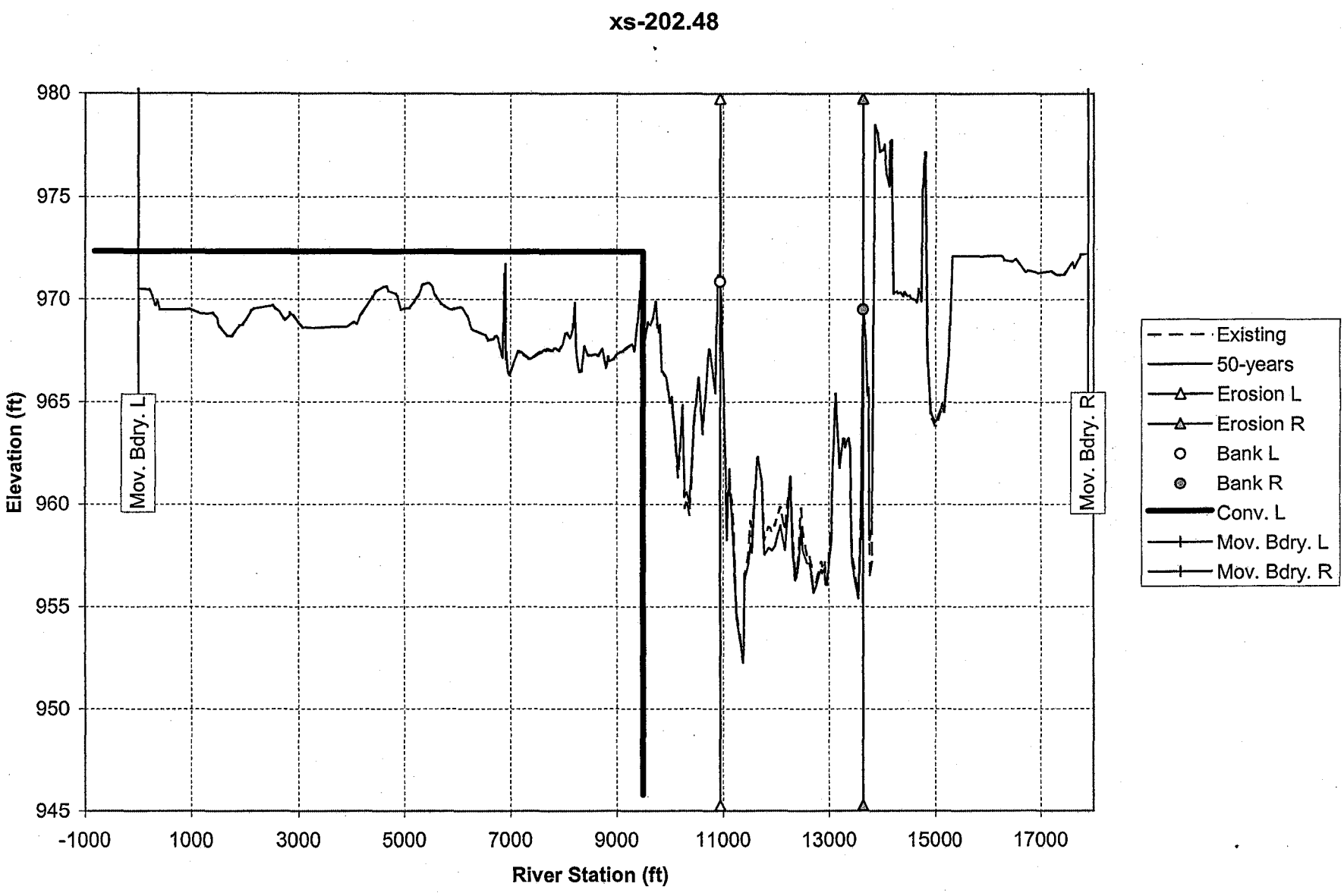

xs-7
970
965
960
955
950
945
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

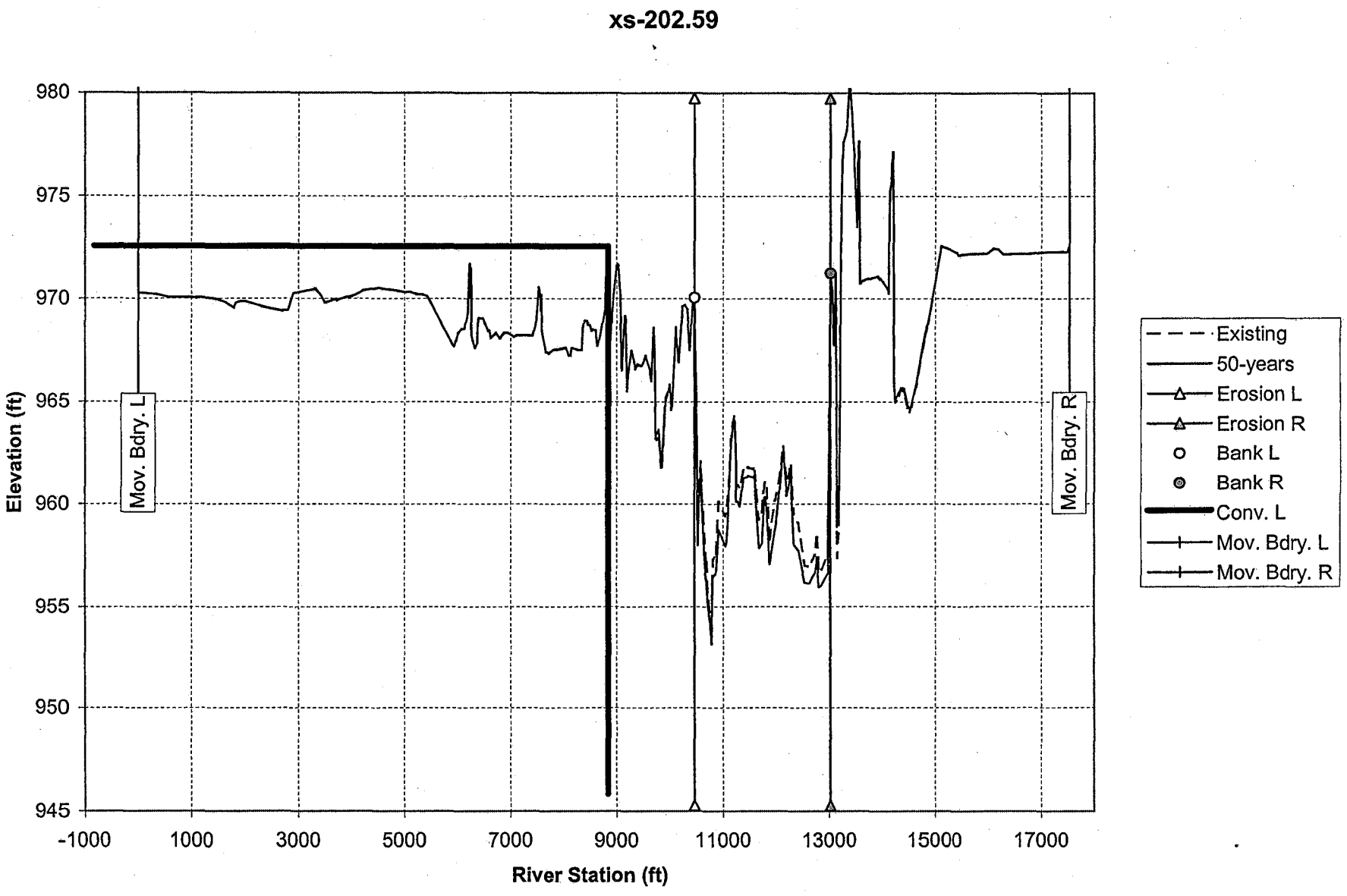

xs-202.09
975
970
965
960
955
950
945
940
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

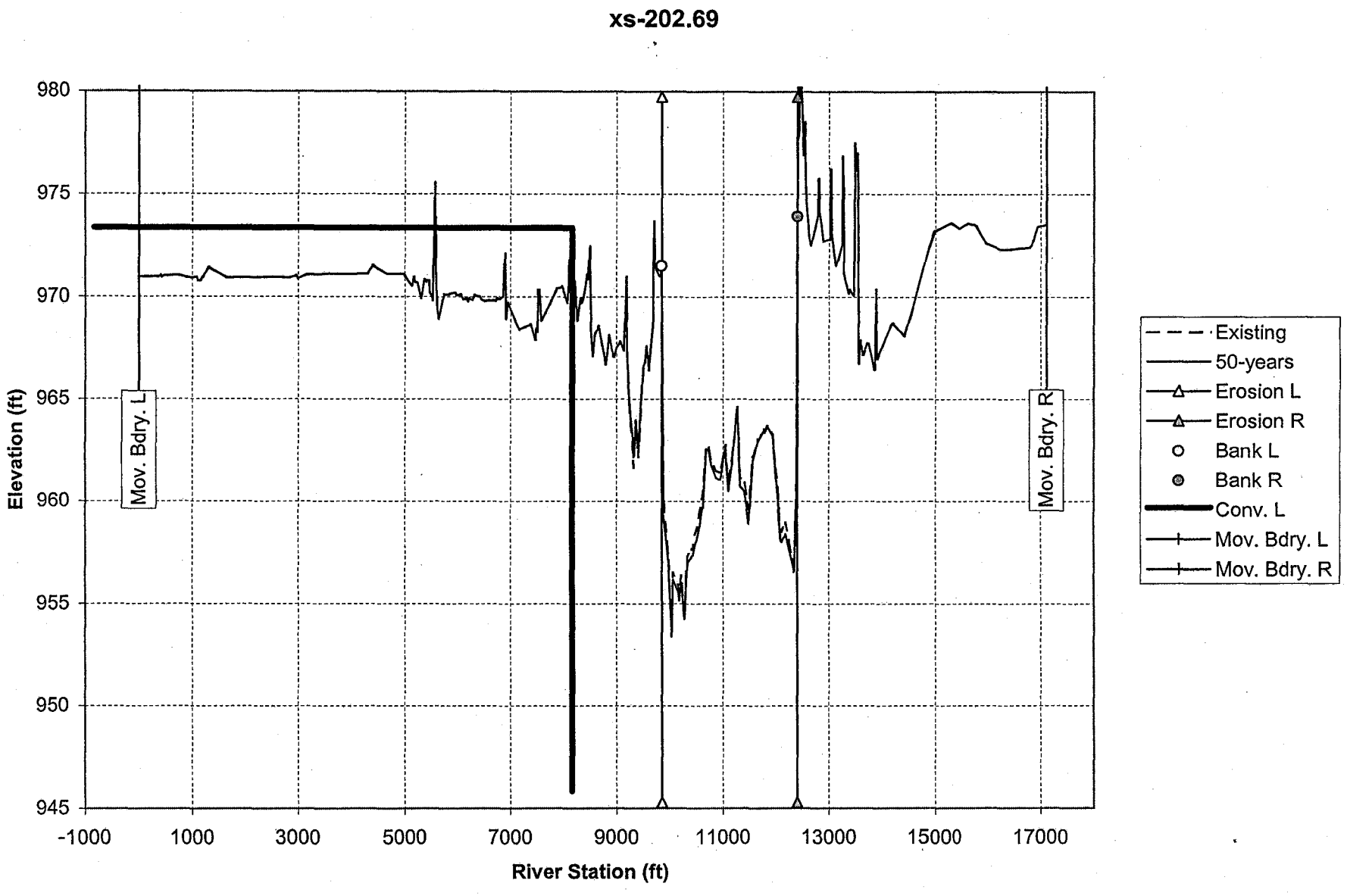

xs-202.18
Elevation (ft)
River Station (ft)
980
975
970
965
960
955
950
945
940
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

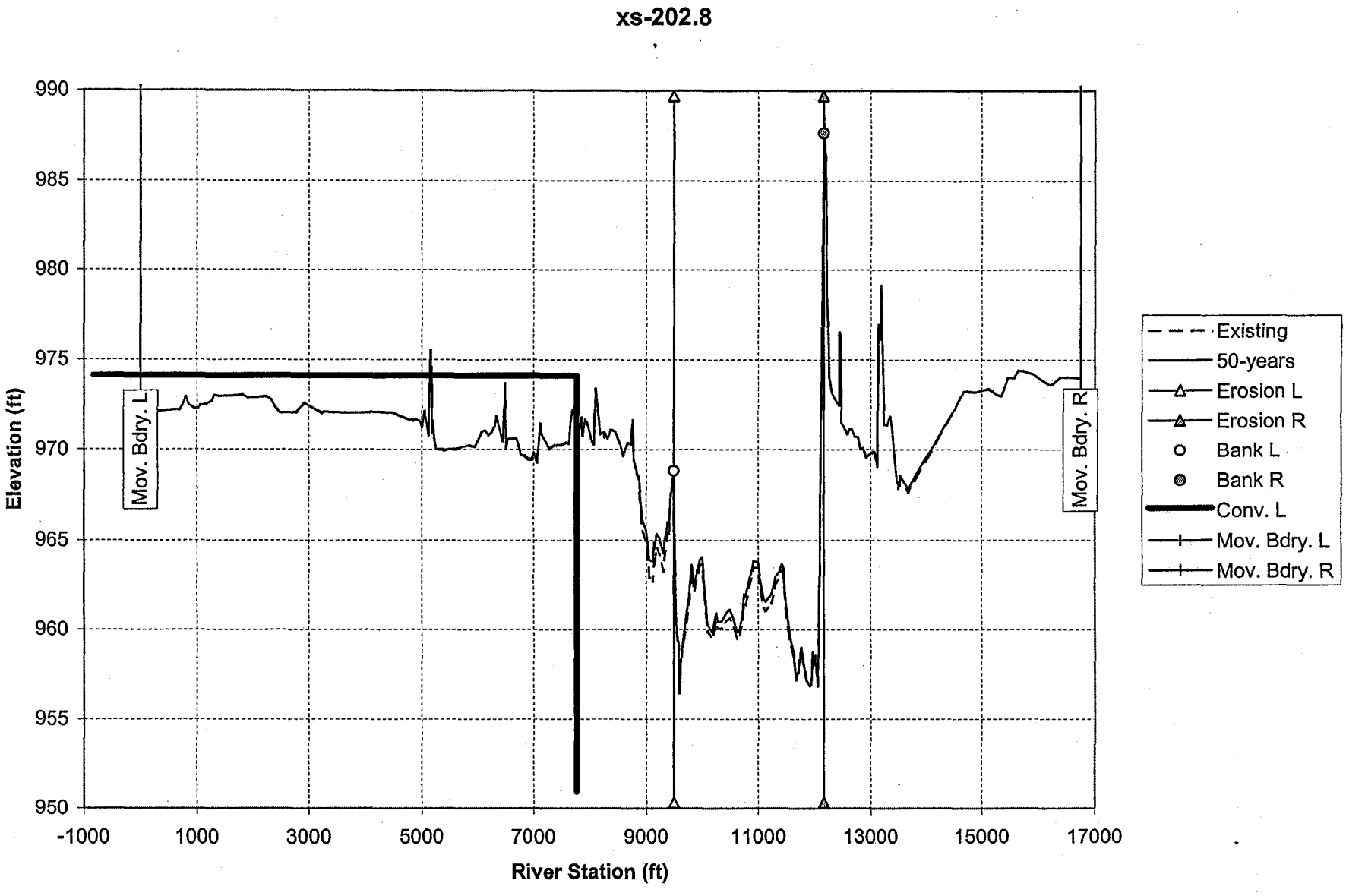

xs-202.29
975
970
965
960
955
950
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

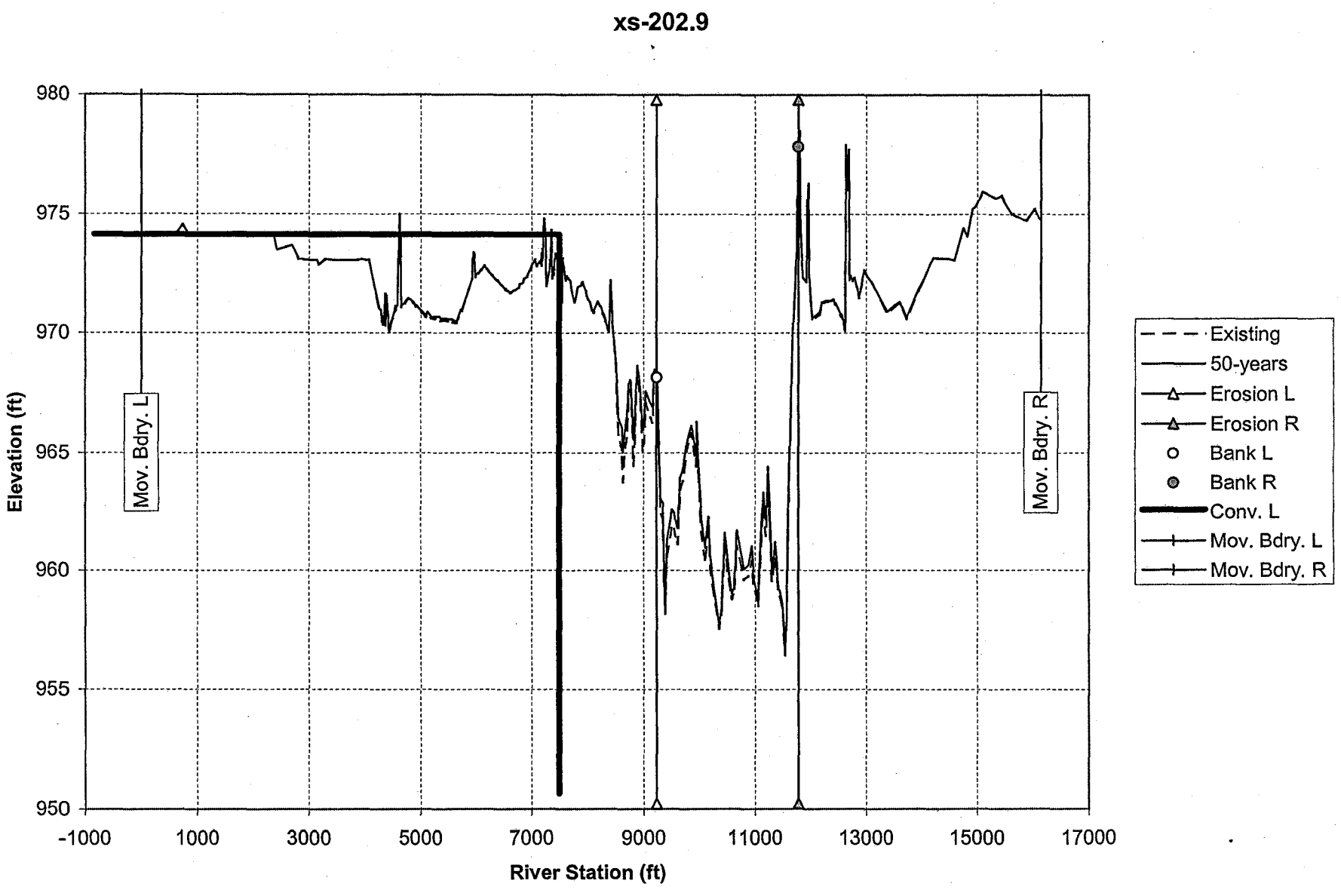

xs-202.37
980
975
970
965
960
955
950
945
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

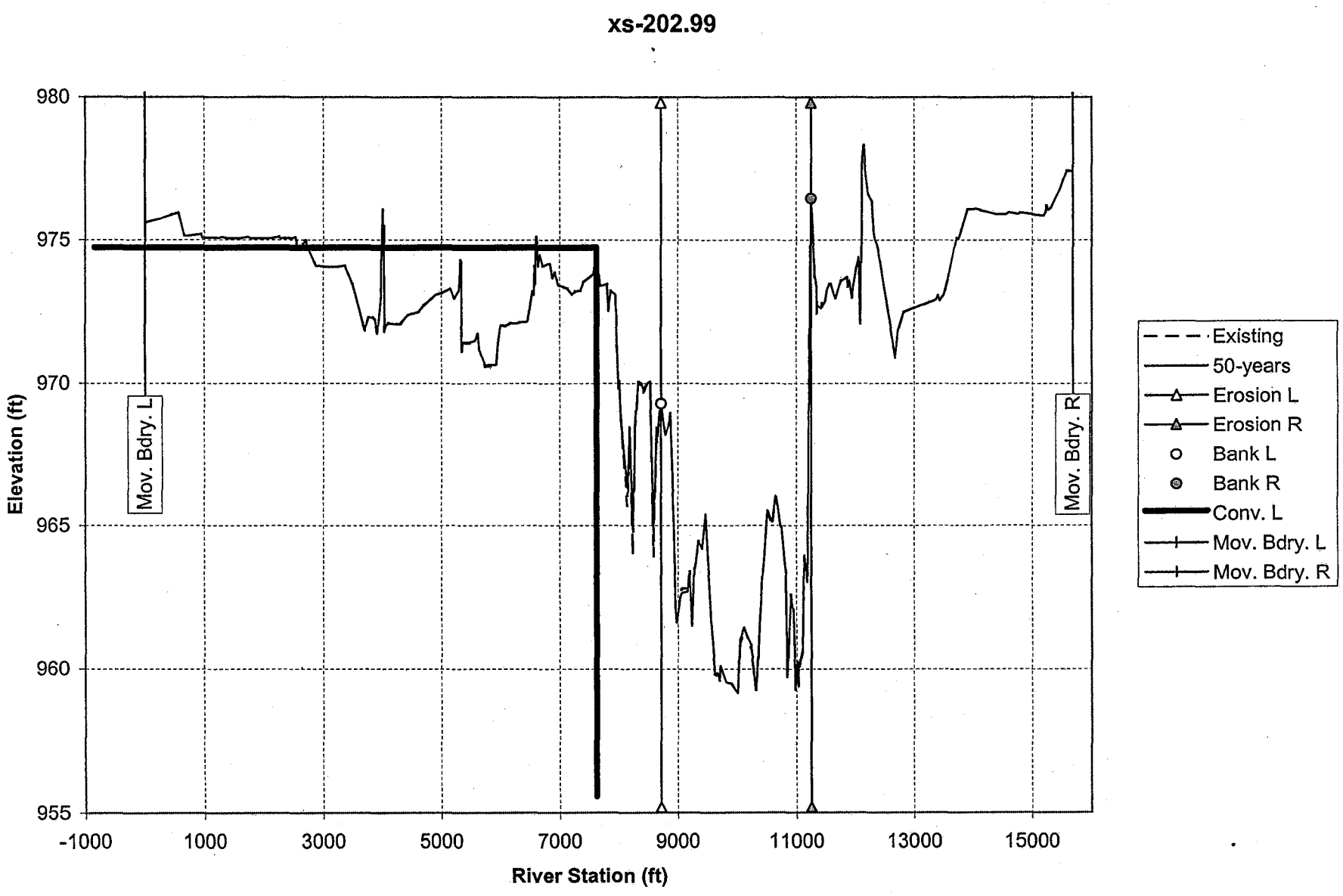

xs-202.48
980
975
970
965
960
955
950
945
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

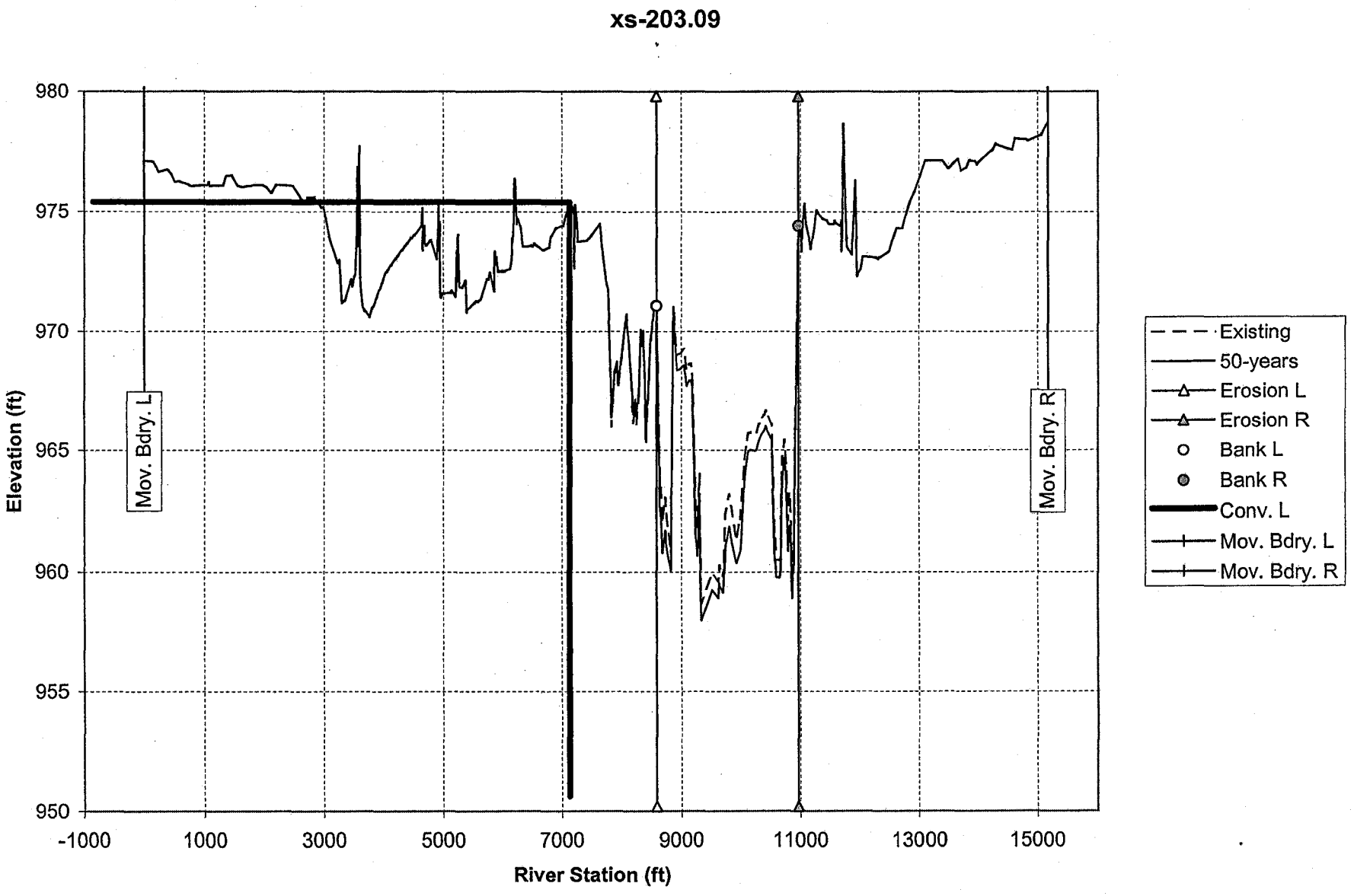

xs-202.59
980
975
970
965
960
955
950
945
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

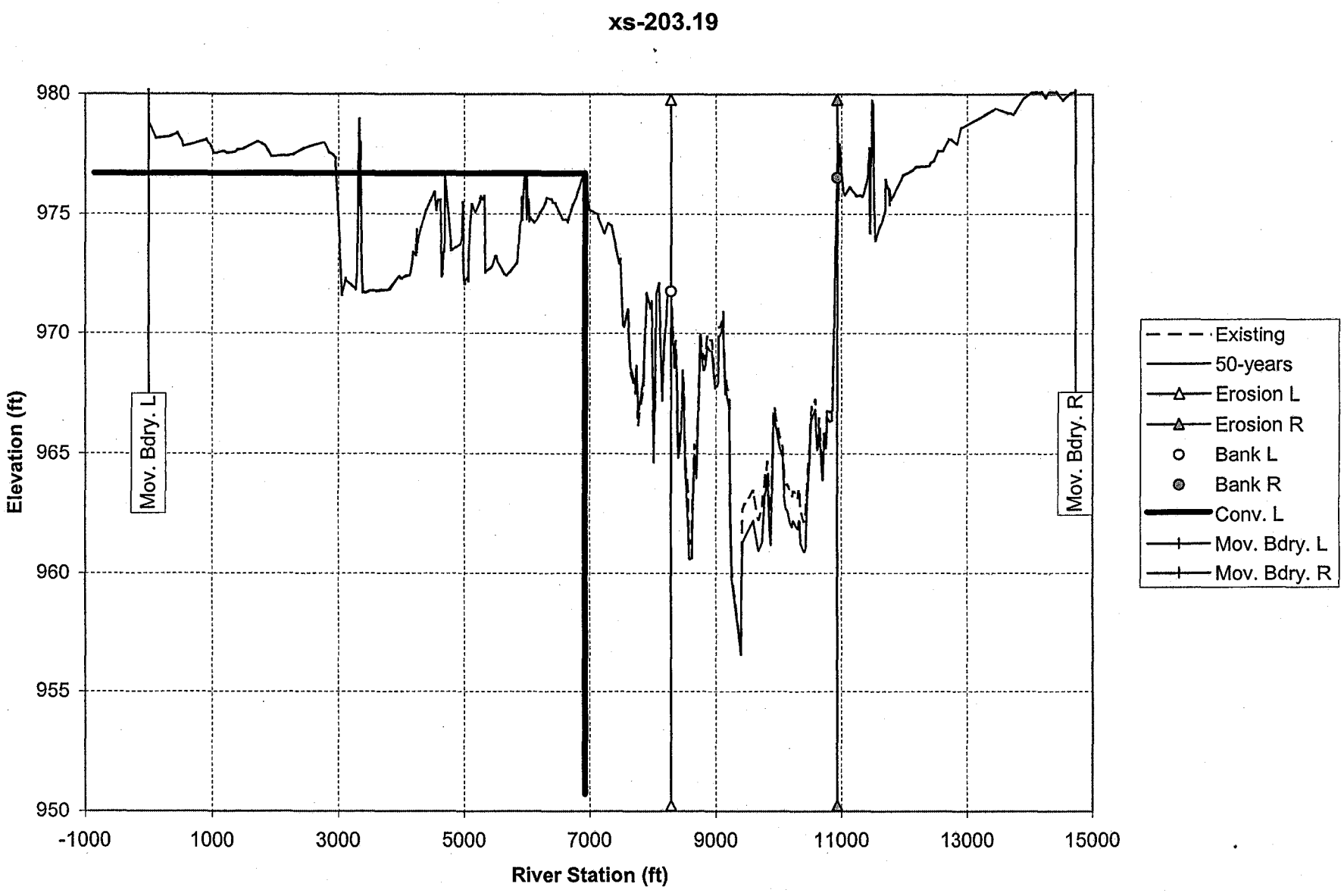

xs-202.69
Elevation (ft)
980
975
970
965
960
955
950
945
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

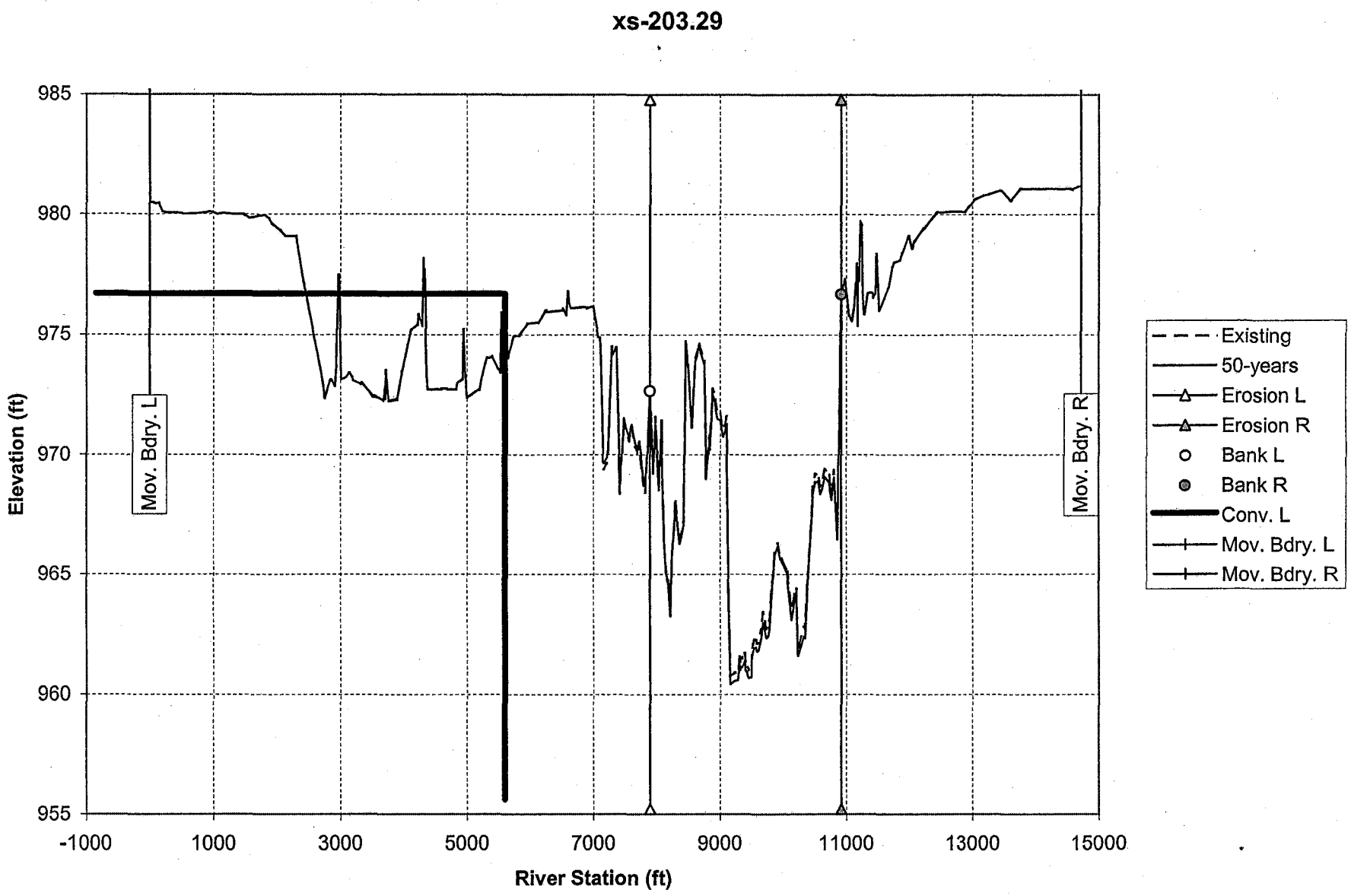

xs-202.8
Elevation (ft)
River Station (ft)
990
985
980
975
970
965
960
955
950
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

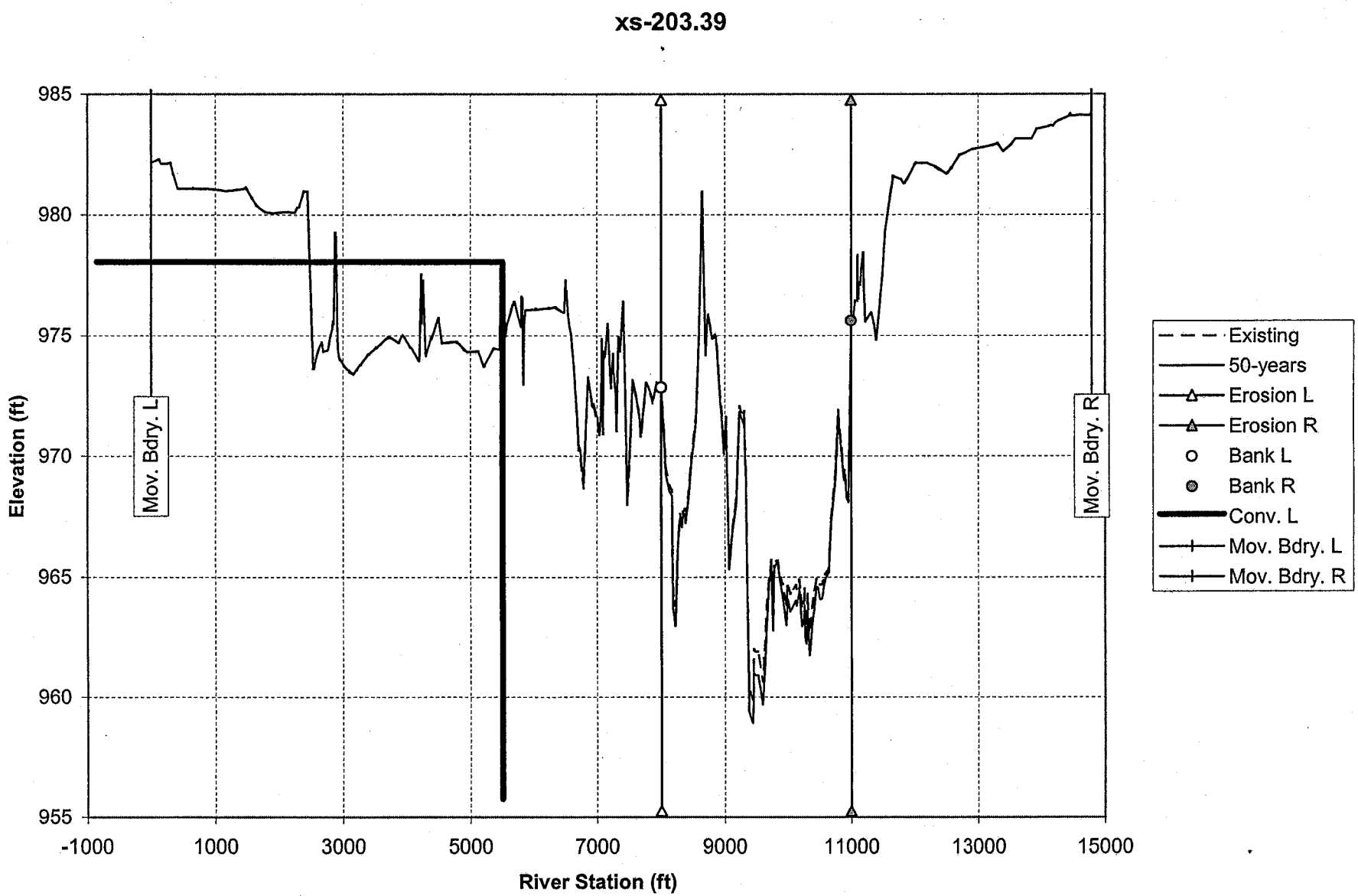

xs-202.9
Elevation (ft)
River Station (ft)
980
975
970
965
960
955
950
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

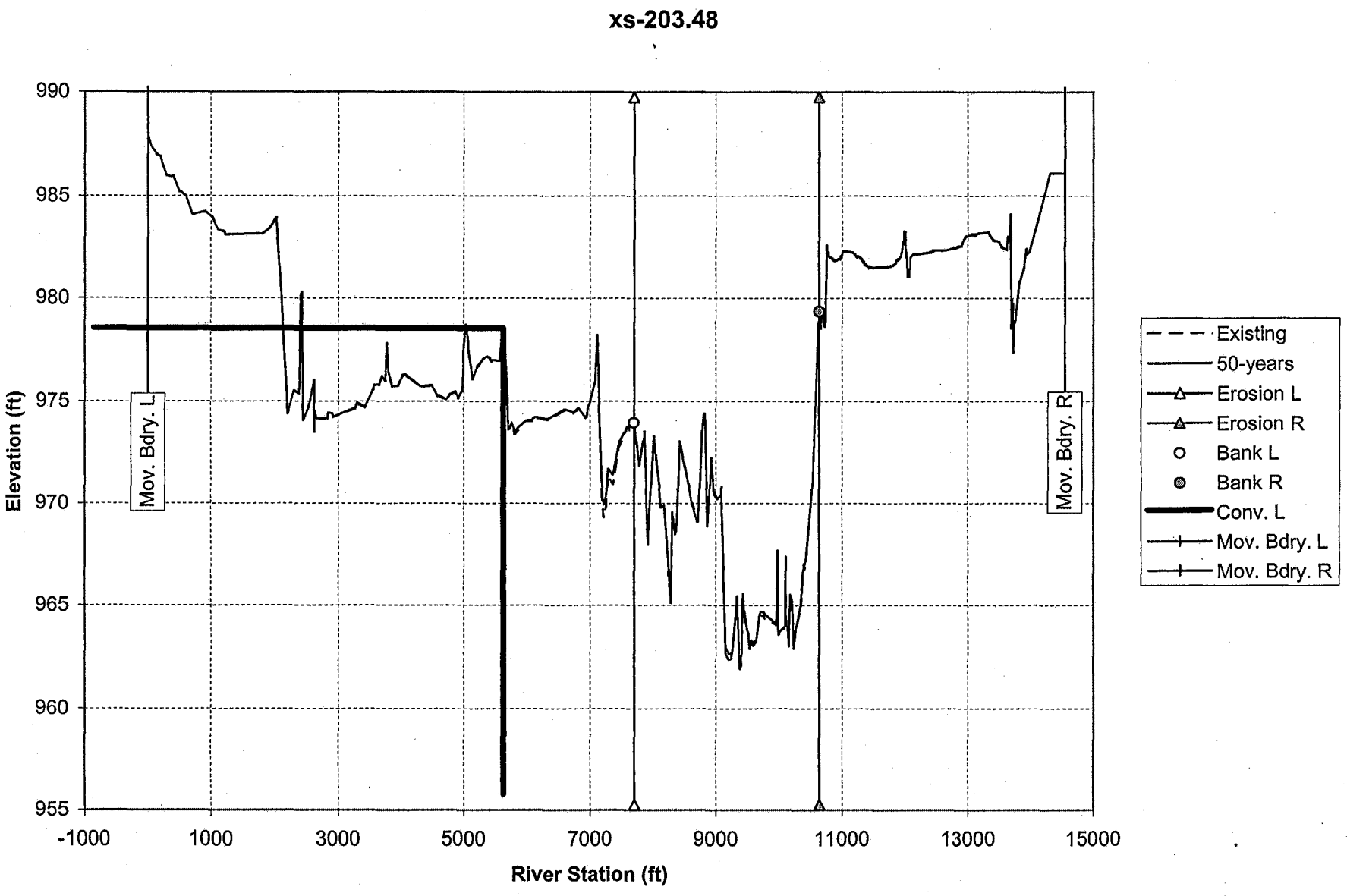

xs-202.99
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

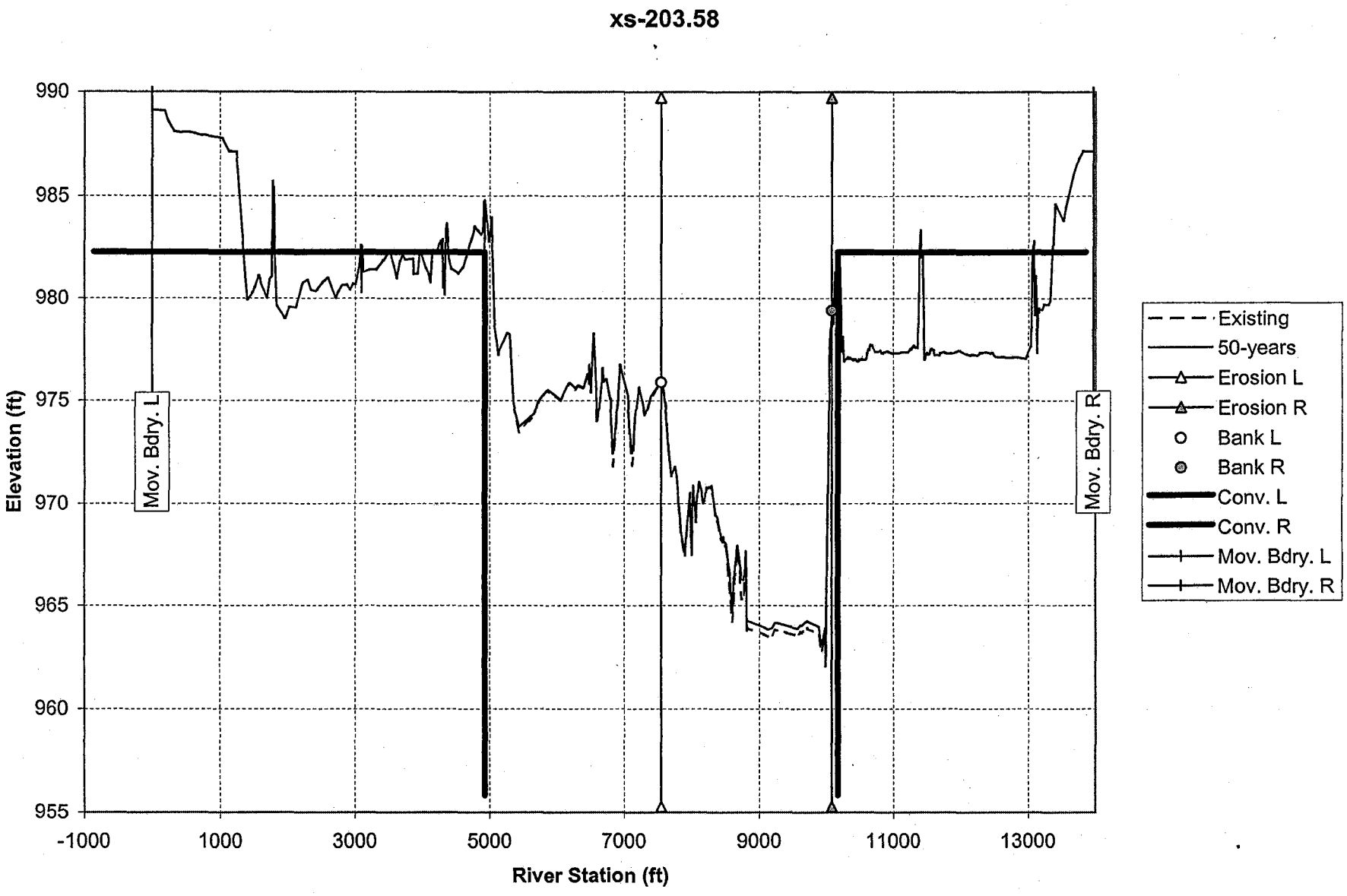

xs-203.09
980
975
970
965
960
955
950
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

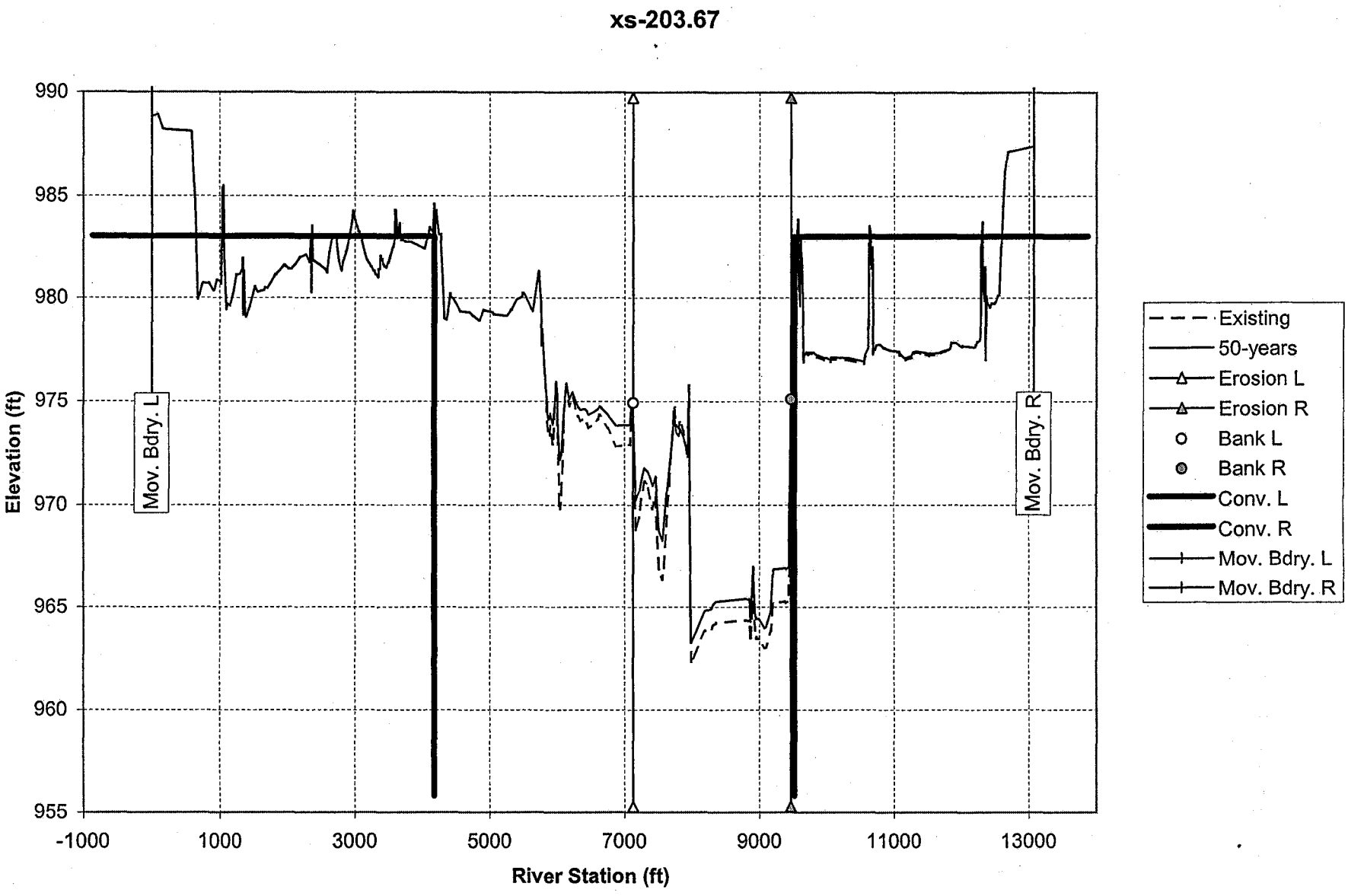

xs-203.19
Elevation (ft)
980
975
970
965
960
955
950
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

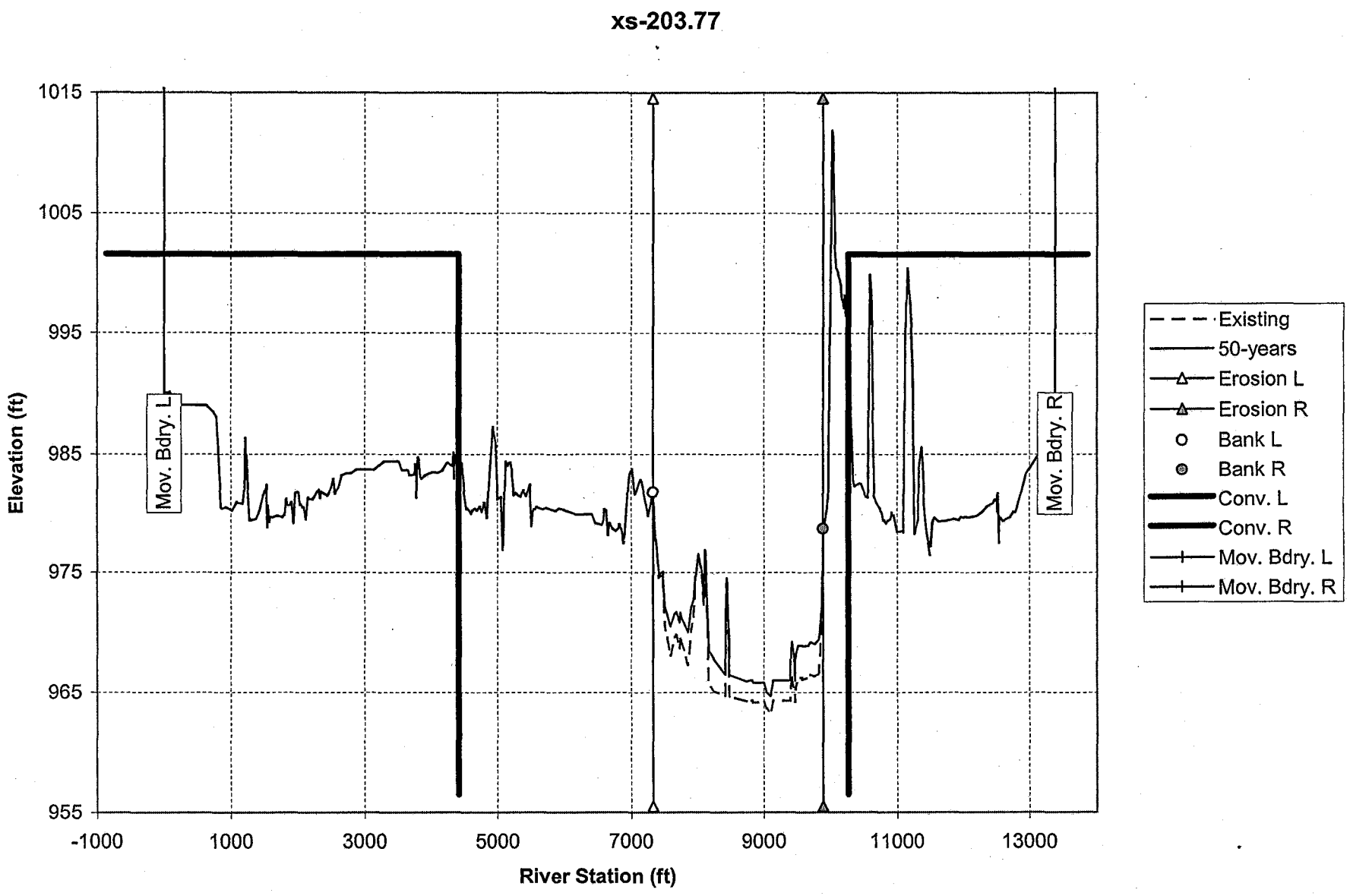

xs-203.29
985
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

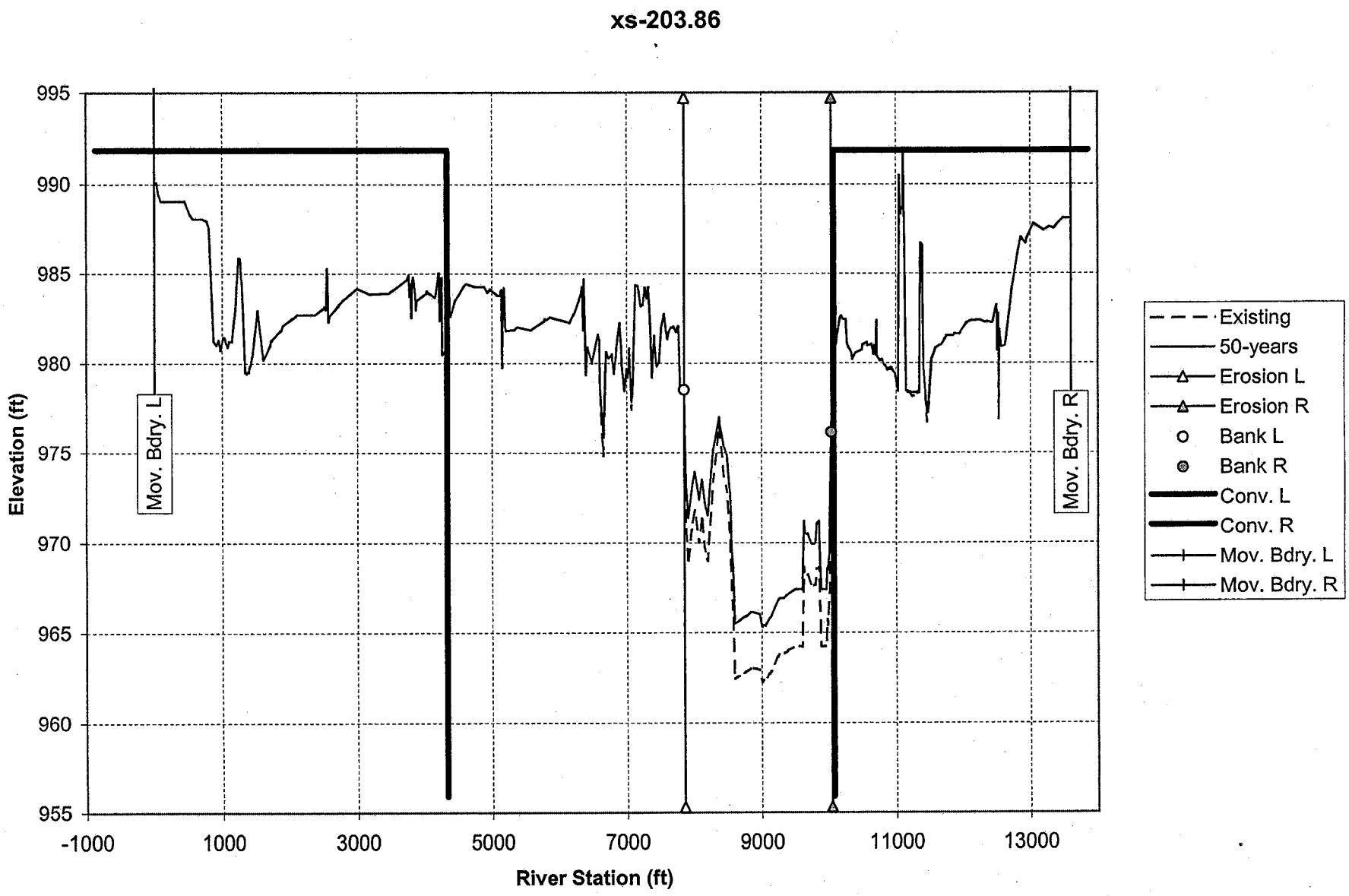

xs-203.39
985
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

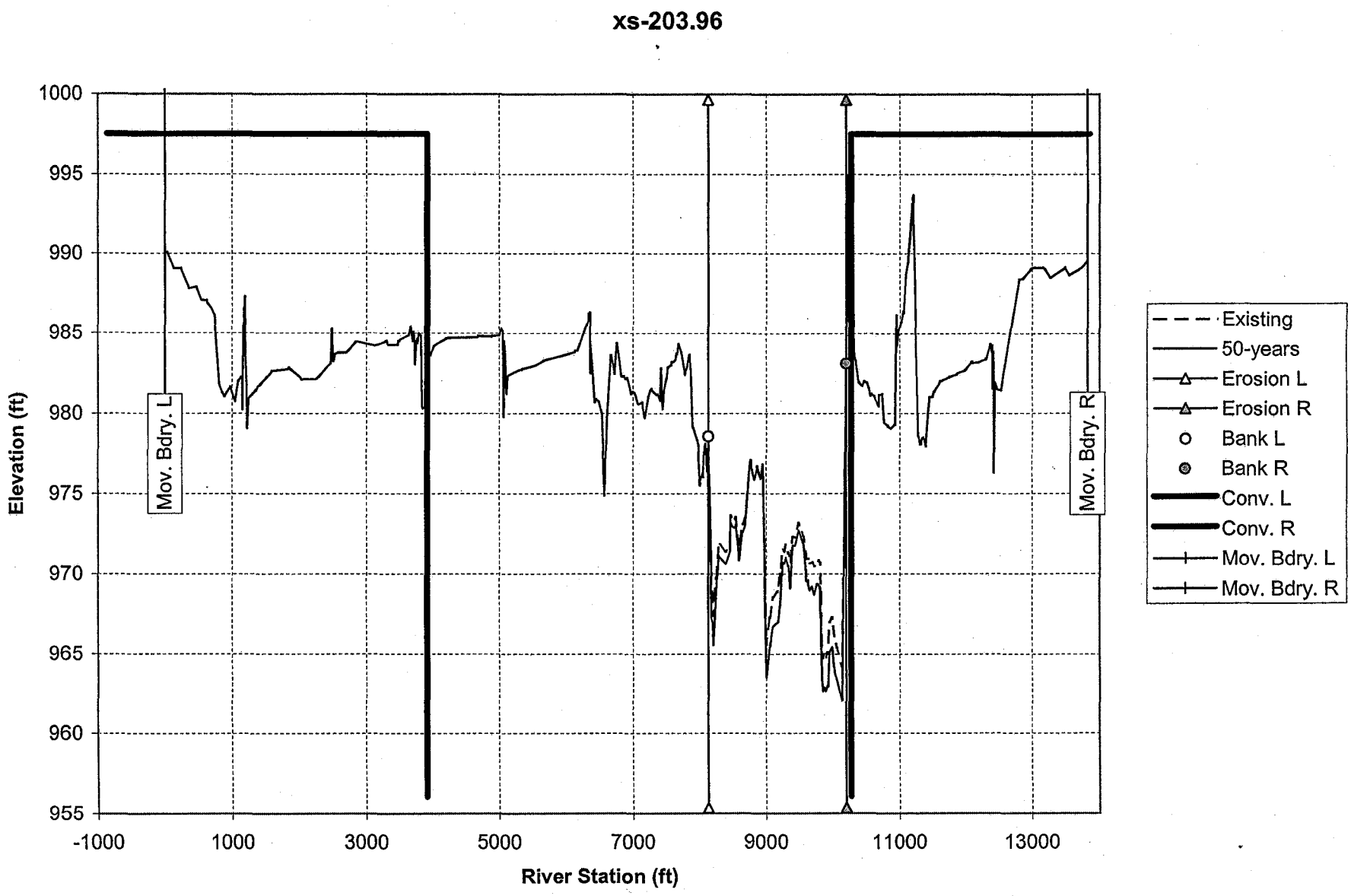

xs-203.48
990
985
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

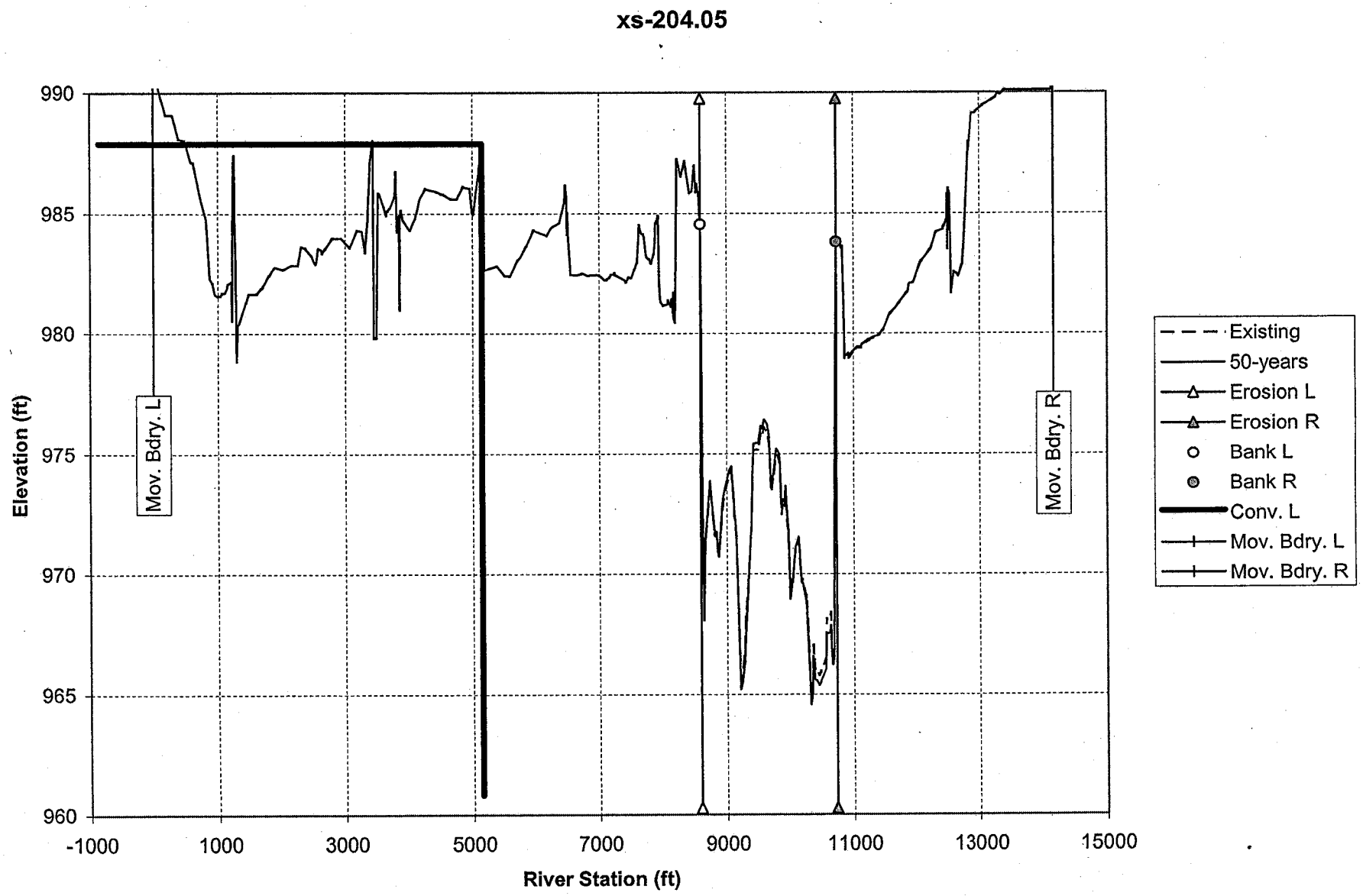

xs-203.58
990
985
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

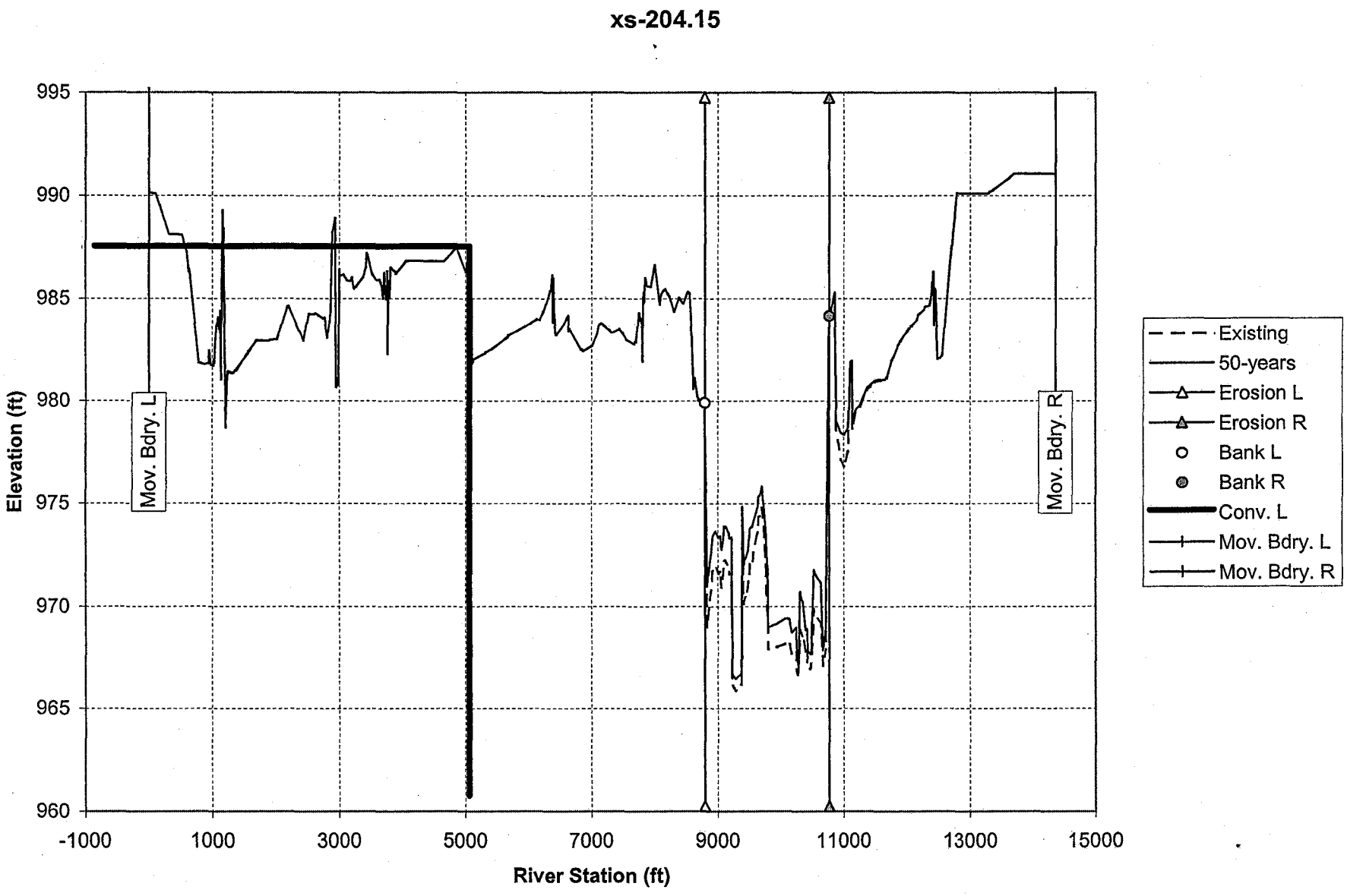

xs-203.67
990
985
980
975
970
965
960
955
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

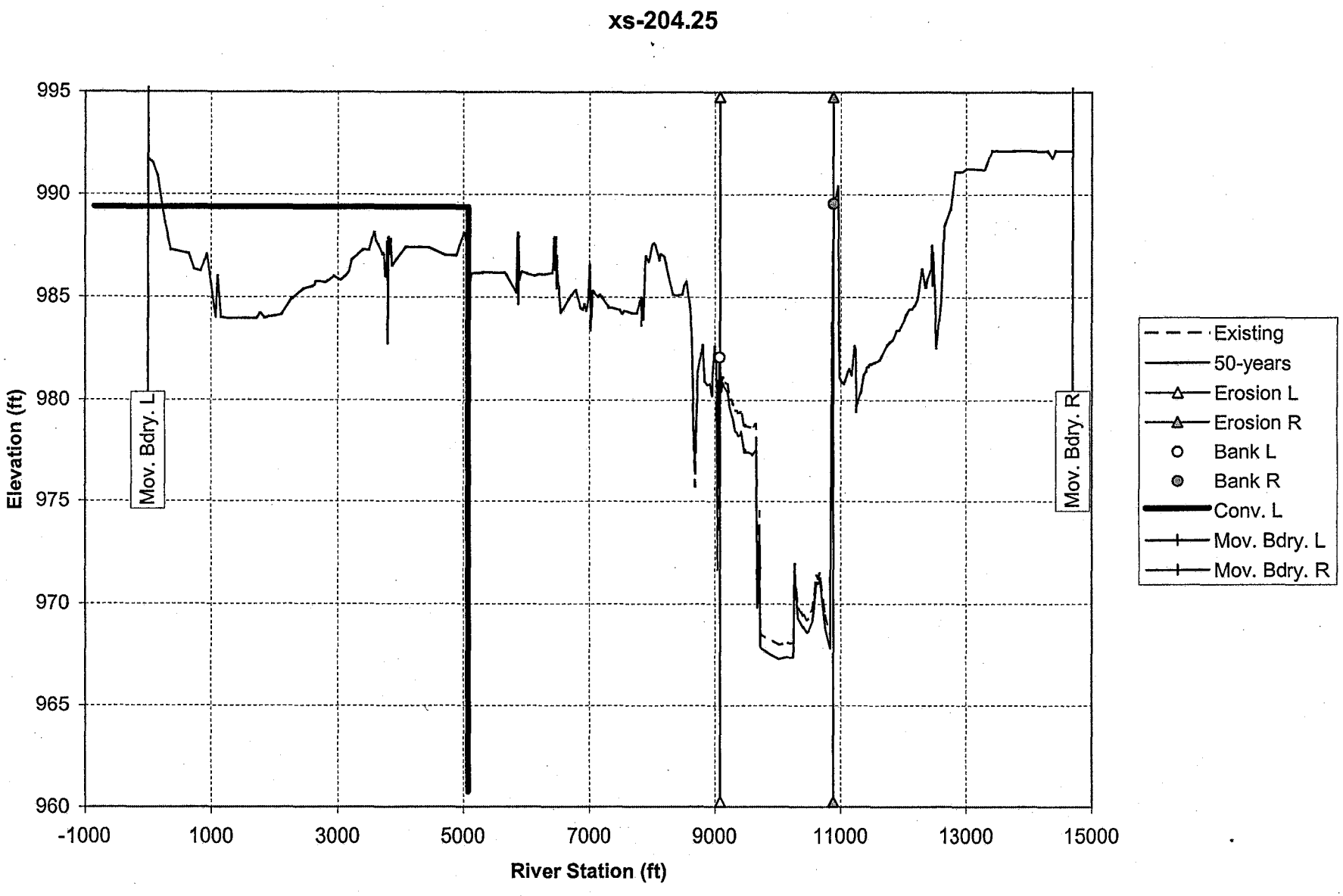

xs-203.77
Elevation (ft)
1015
1005
995
985
975
965
955
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

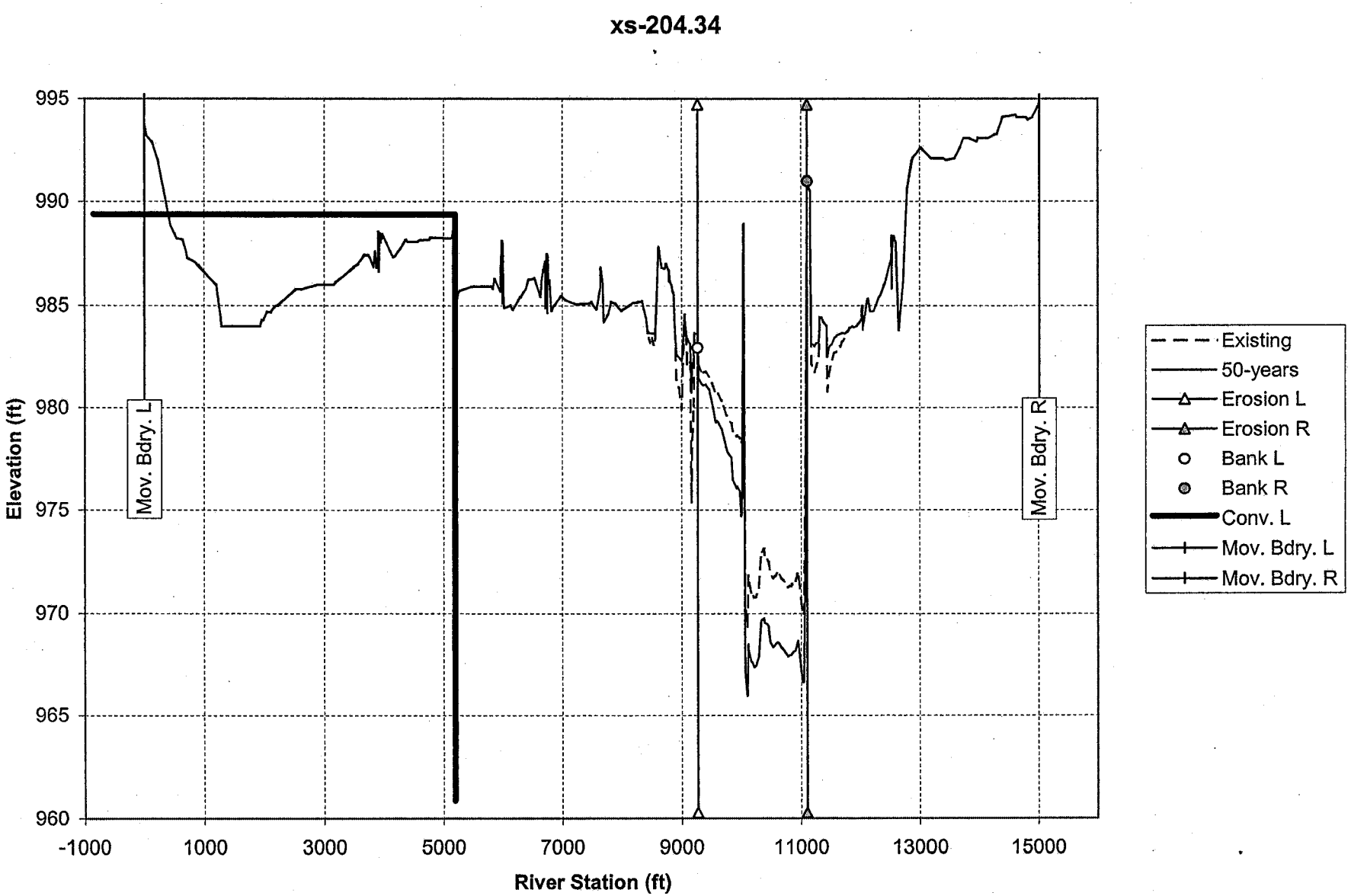

xs-203.86
Elevation (ft)
River Station (ft)
995
990
985
980
975
970
965
960
955
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

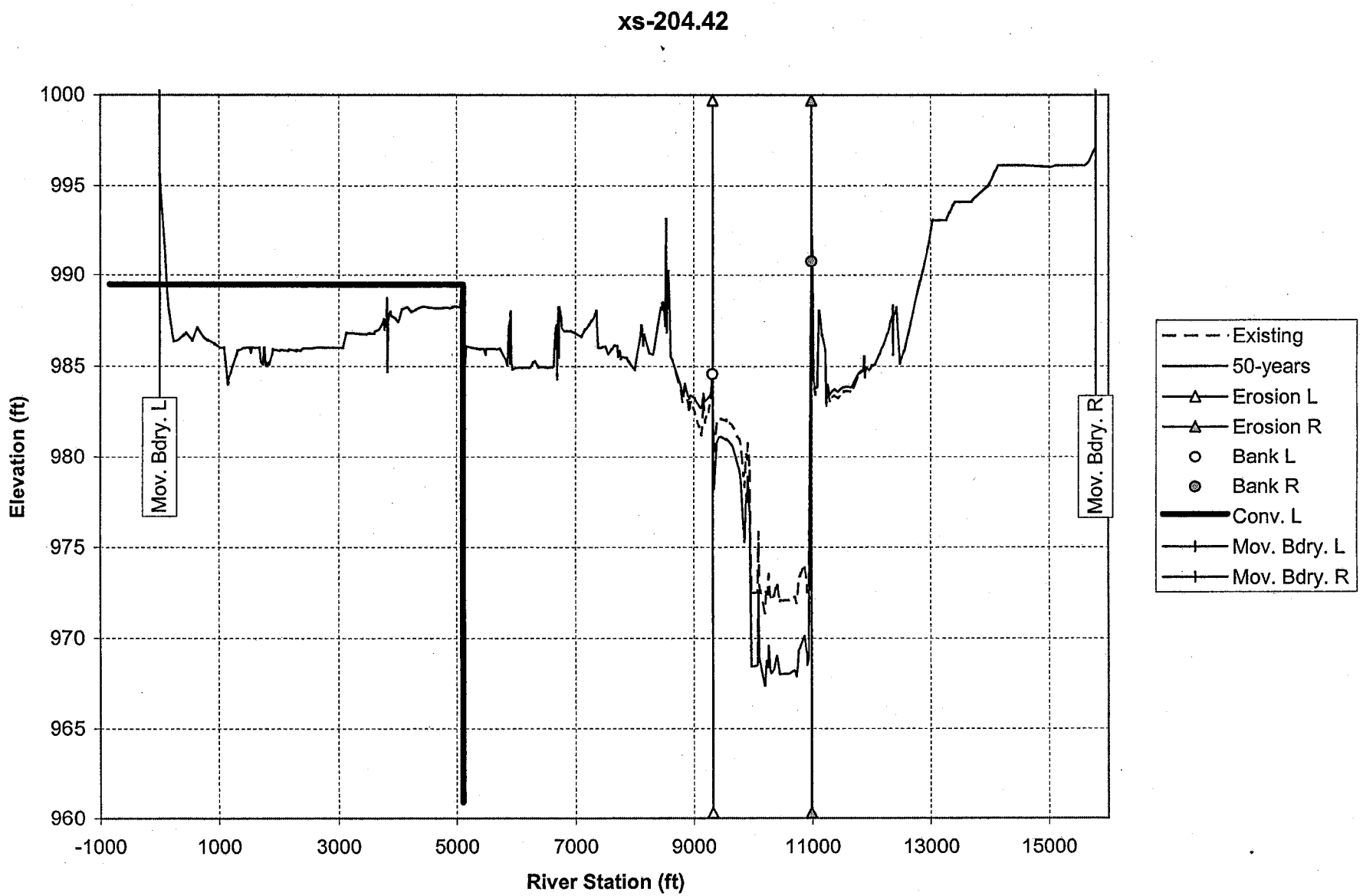

xs-203.96
Elevation (ft)
River Station (ft)
1000
995
990
985
980
975
970
965
960
955
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

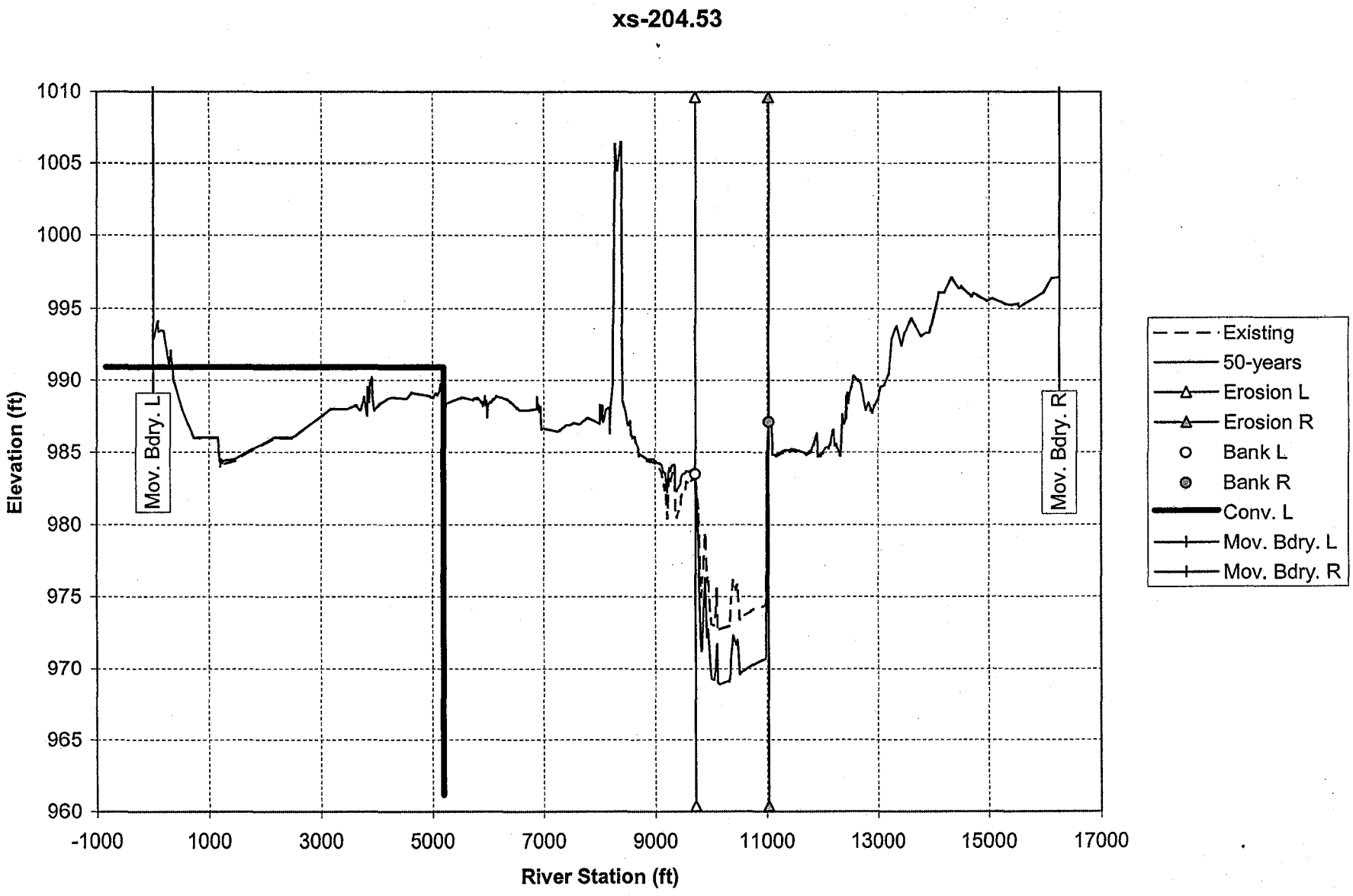

xs-204.05
990
985
980
975
970
965
960
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

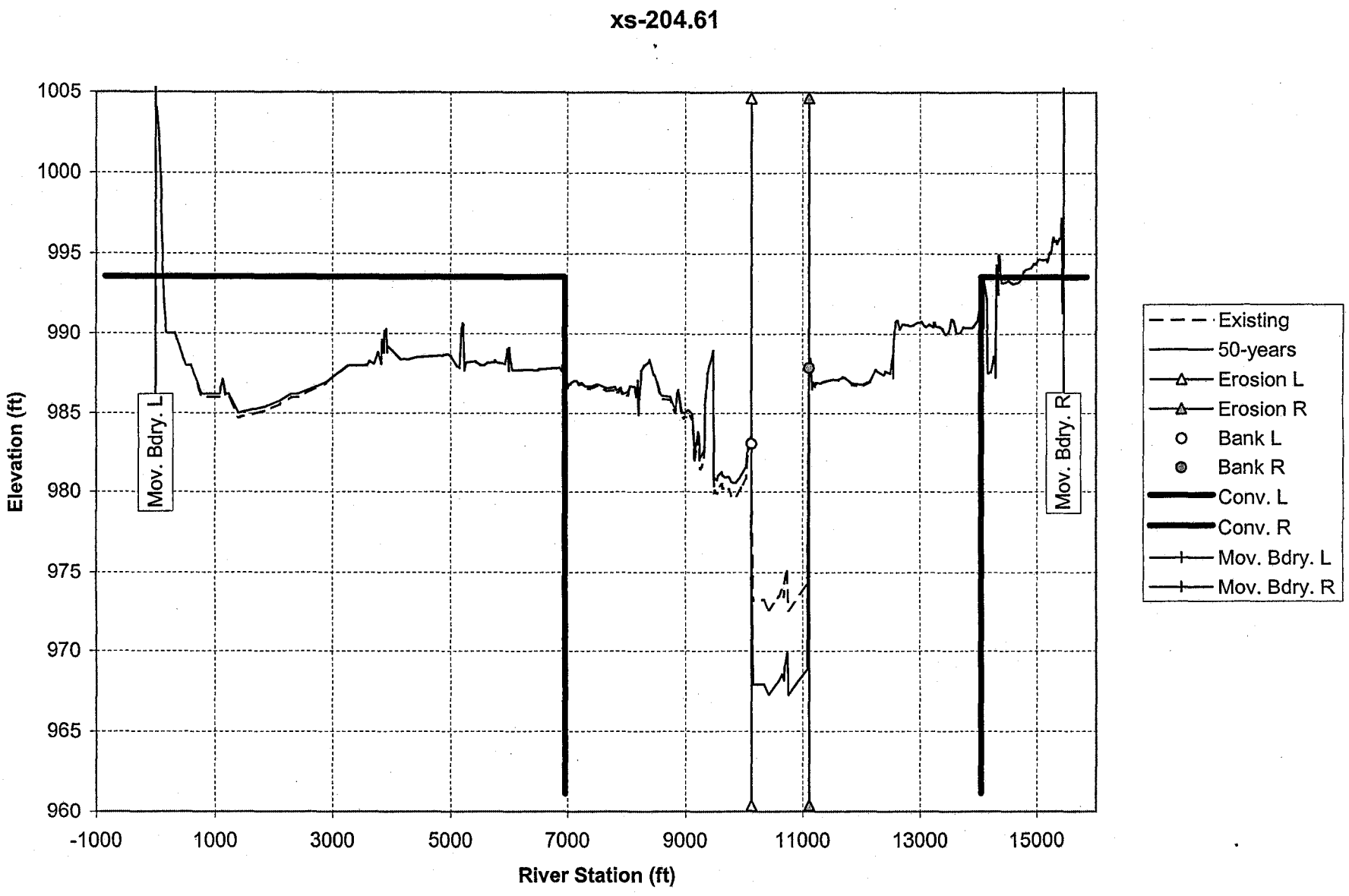

xs-204.15
Elevation (ft)
River Station (ft)
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

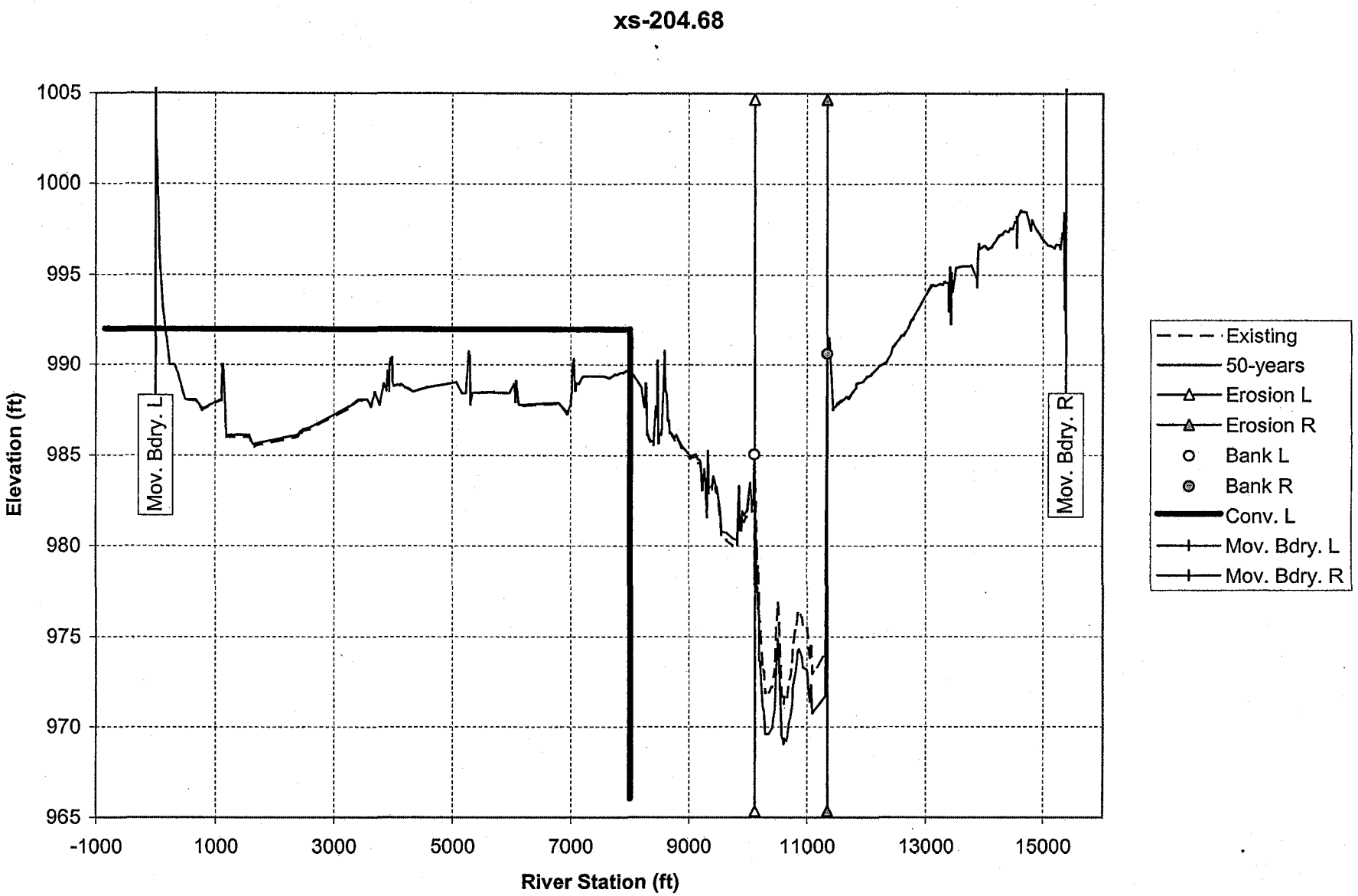

xs-204.25
Elevation (ft)
River Station (ft)
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

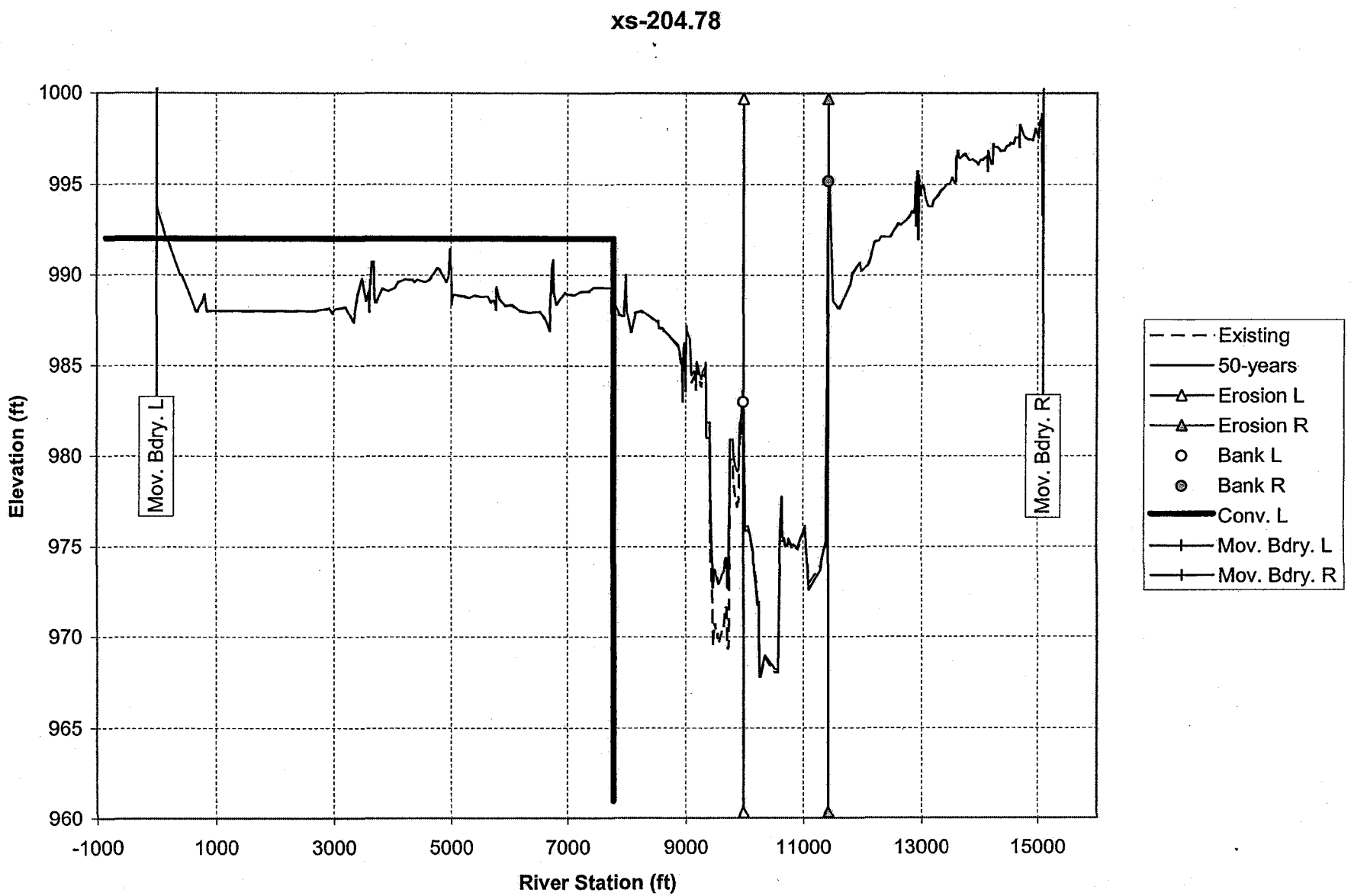

xs-204.34
995
990
985
980
975
970
965
960
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

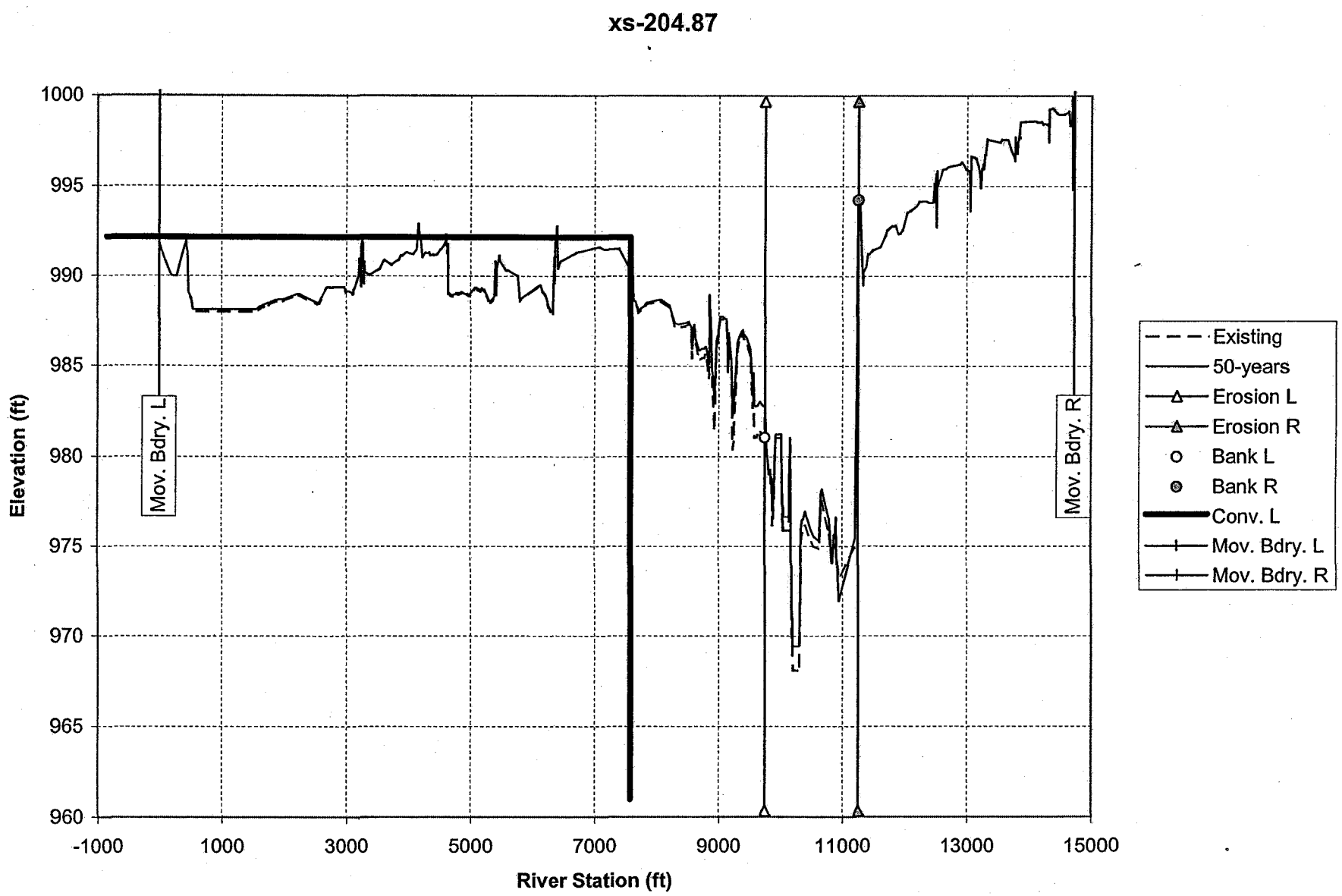

xs-204.42
Elevation (ft)
River Station (ft)
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

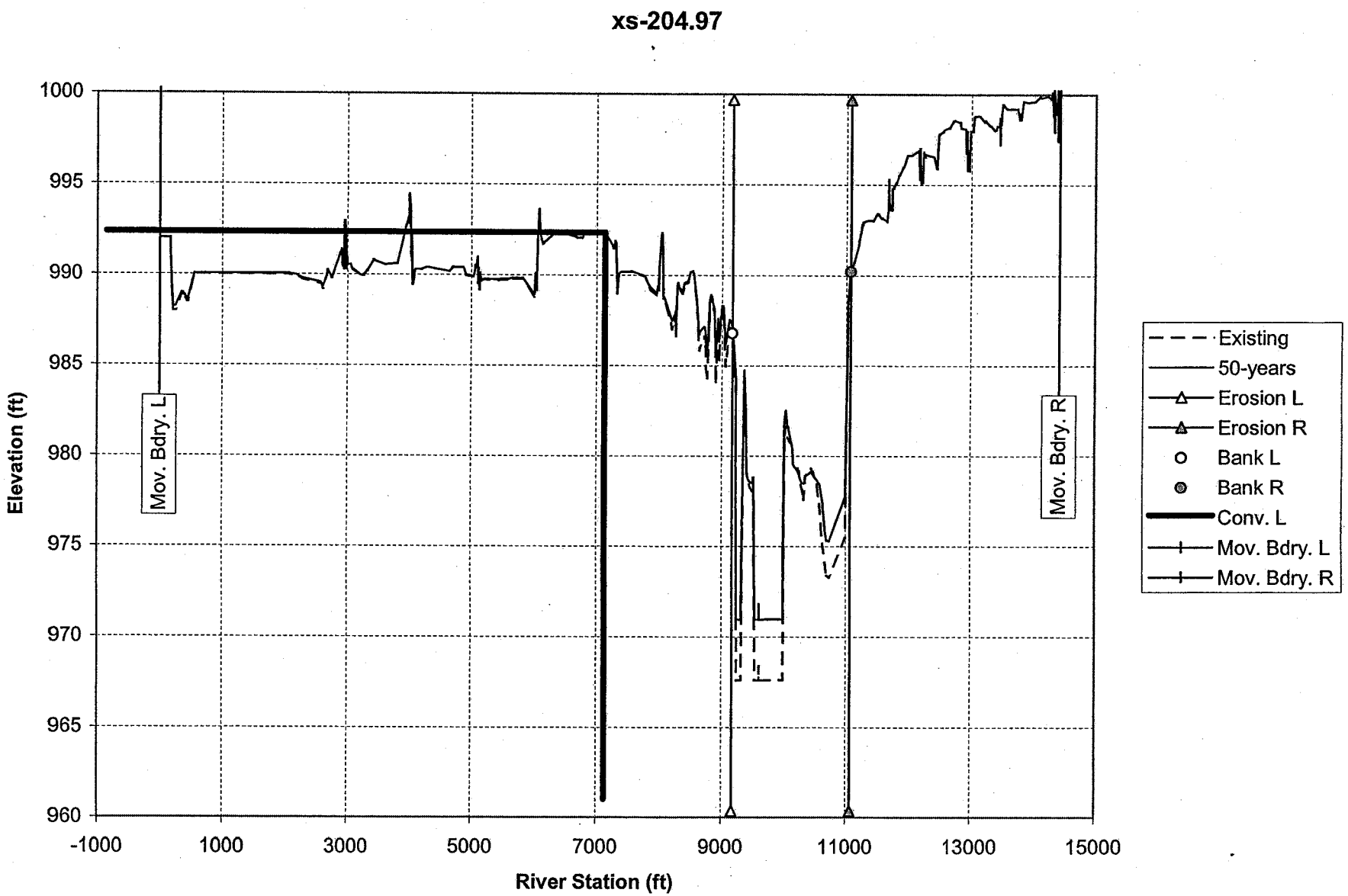

xs-204.53
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
17000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

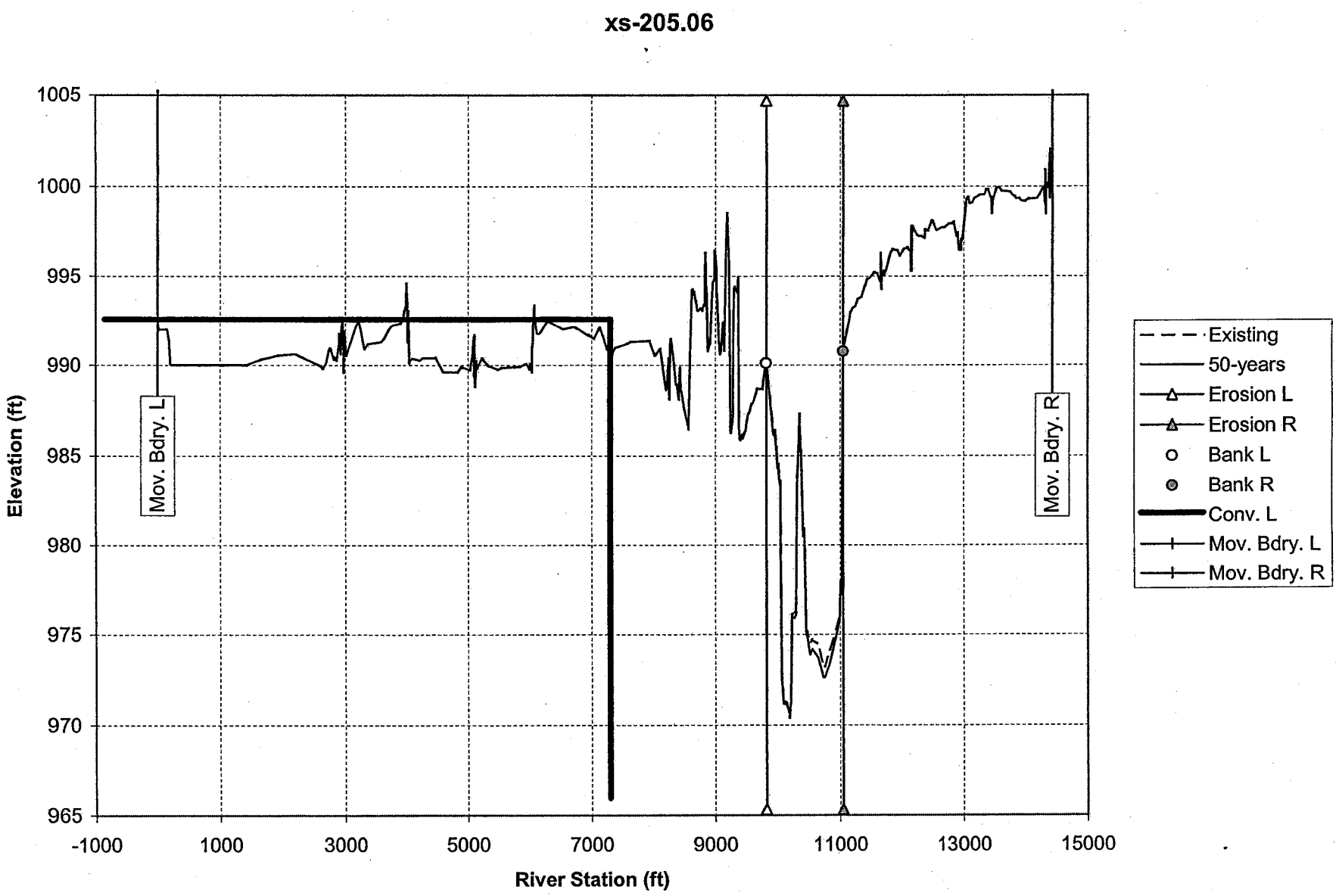

xs-204.61
Elevation (ft)
River Station (ft)
1005
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

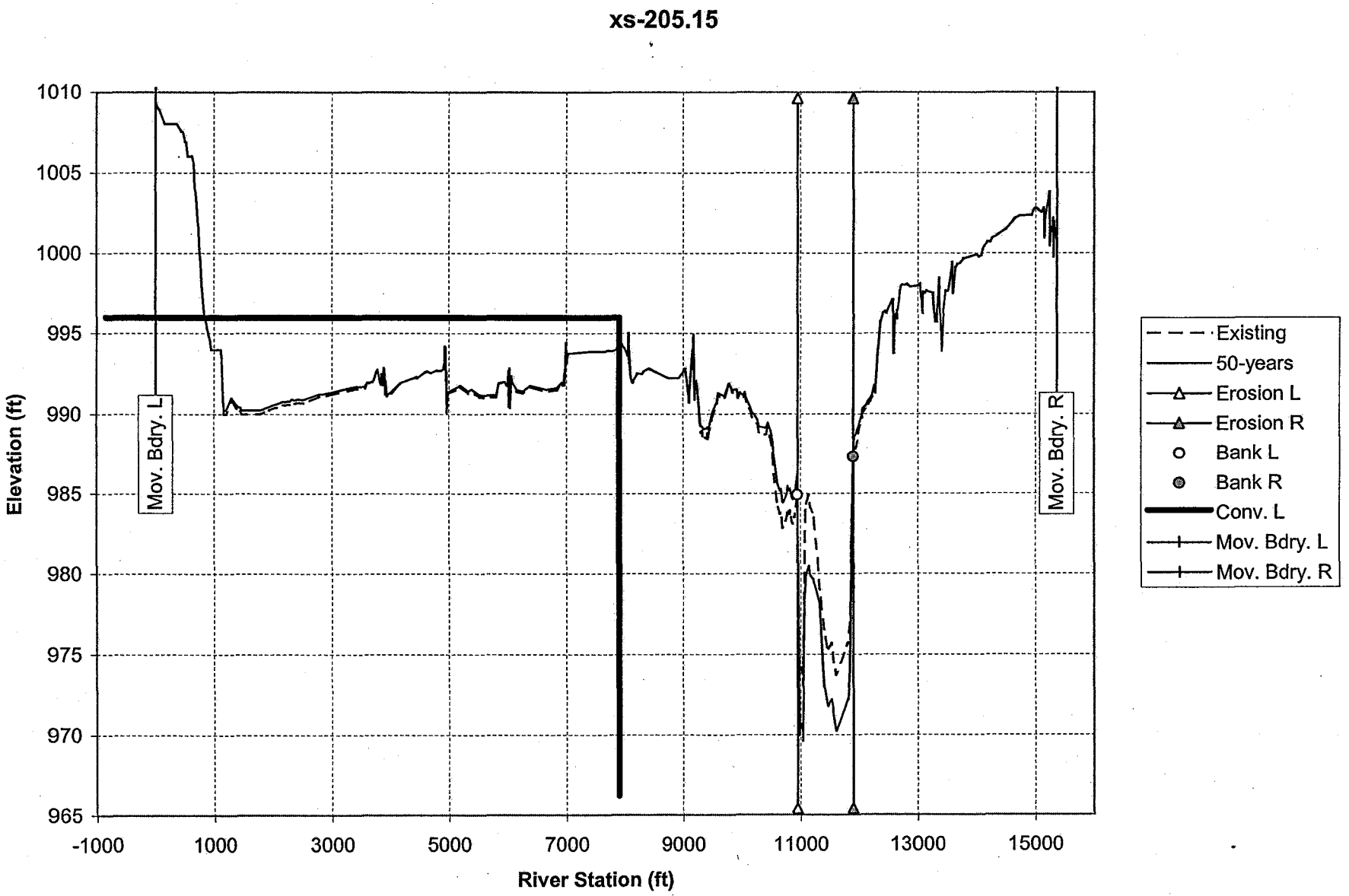

xs-204.68
Elevation (ft)
River Station (ft)
1005
1000
995
990
985
980
975
970
965
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

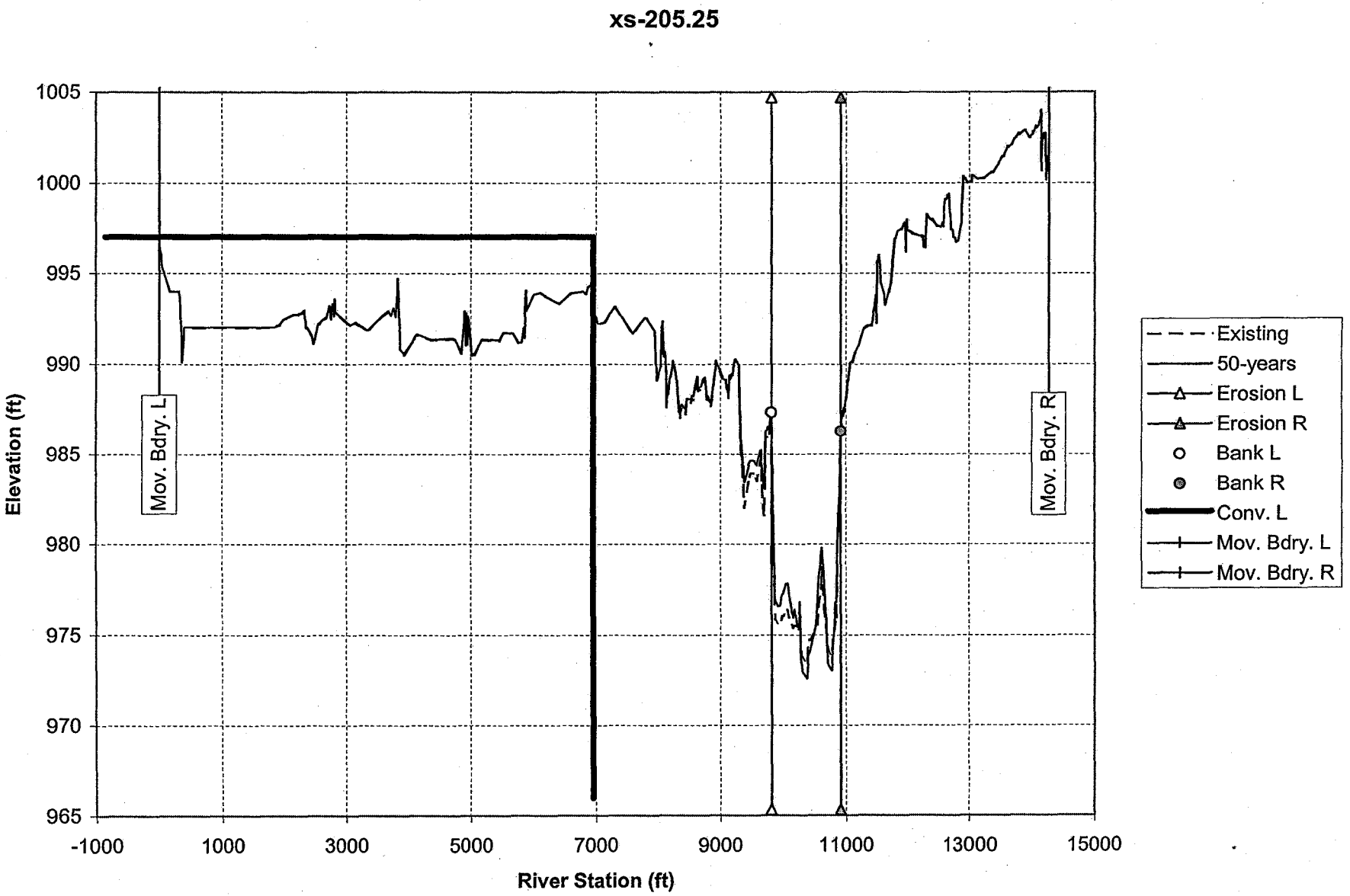

xs-204.78
Elevation (ft)
River Station (ft)
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

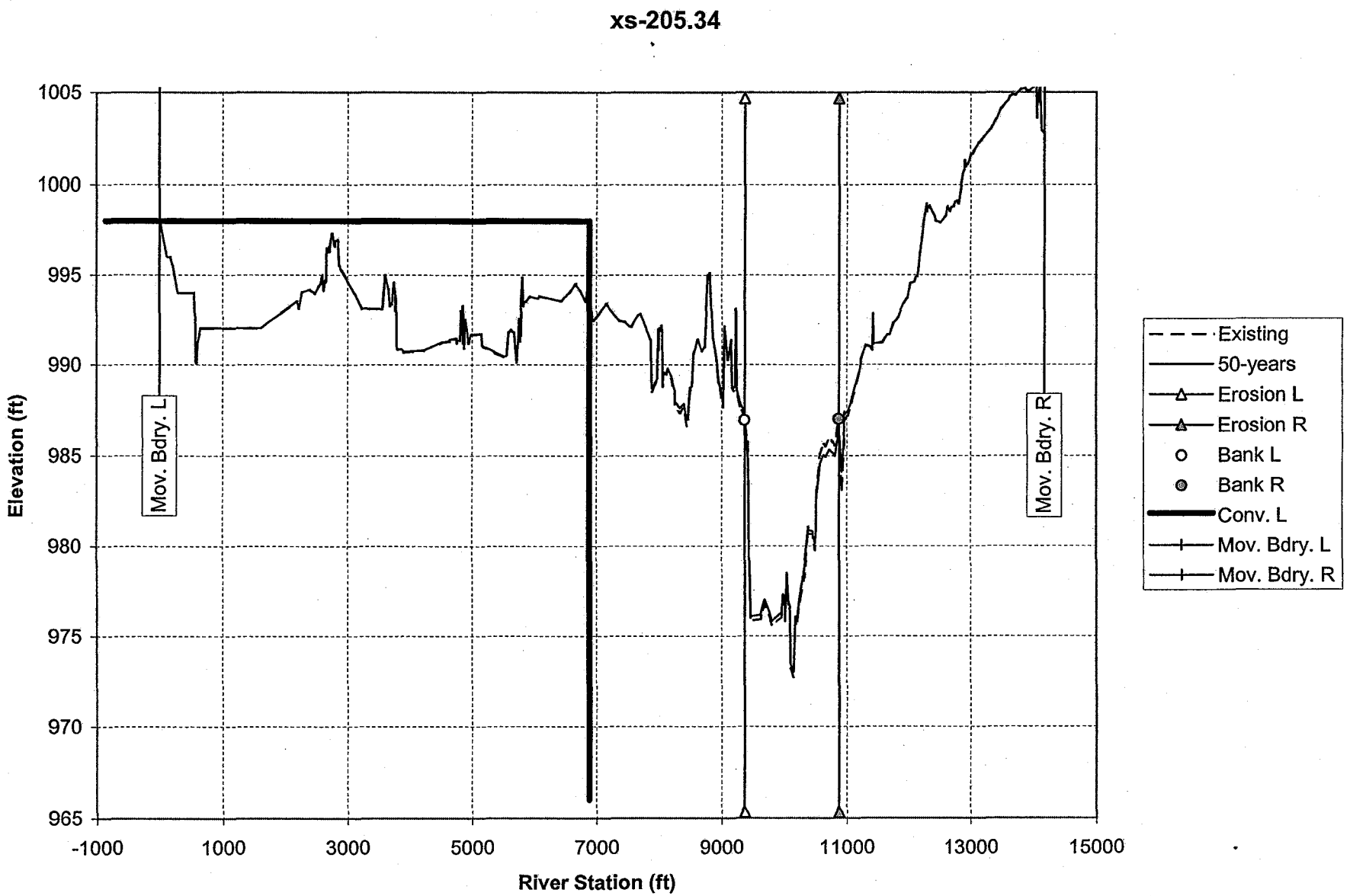

xs-204.87
Elevation (ft)
River Station (ft)
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

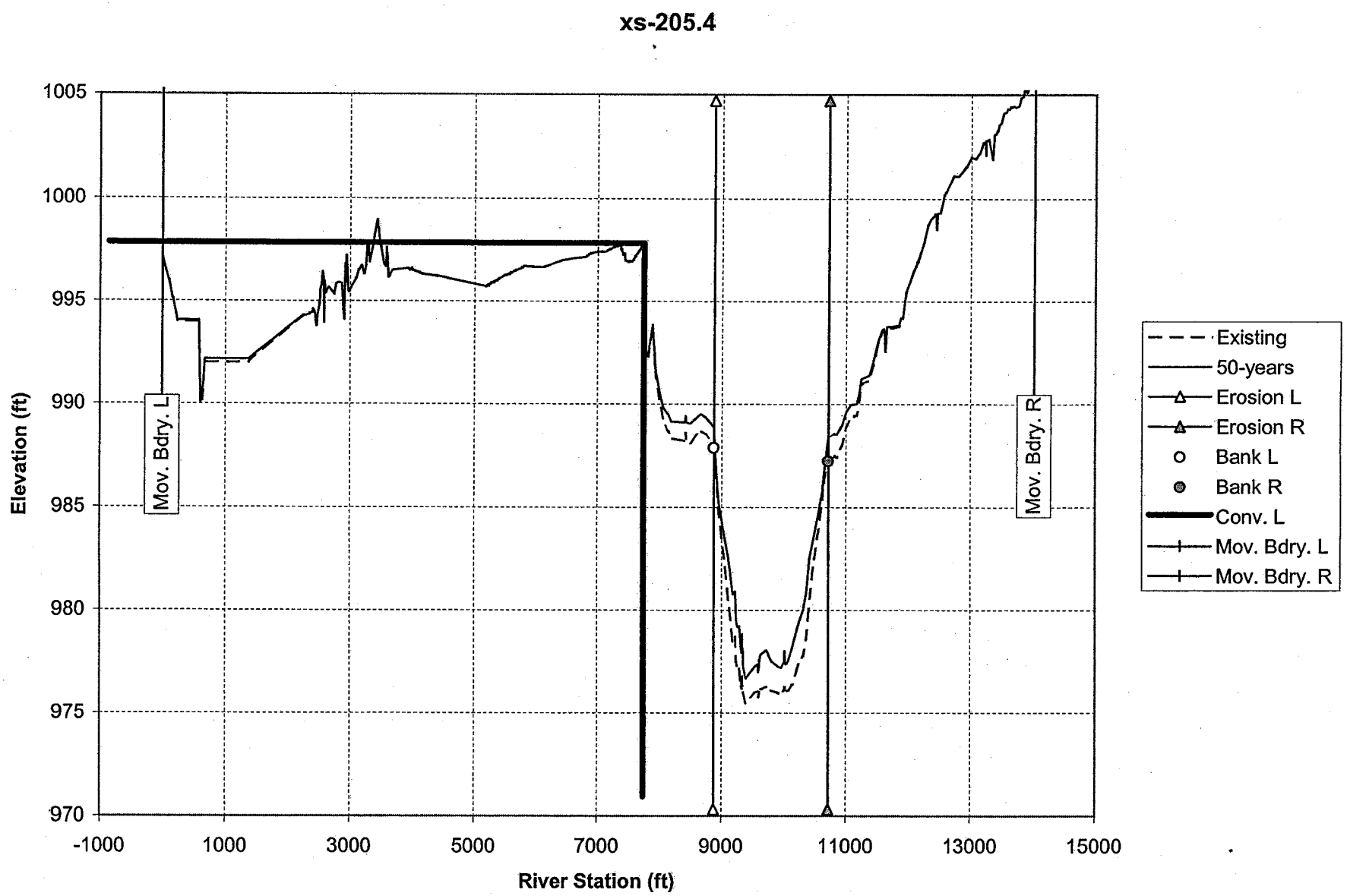

xs-204.97
Elevation (ft)
River Station (ft)
1000
995
990
985
980
975
970
965
960
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

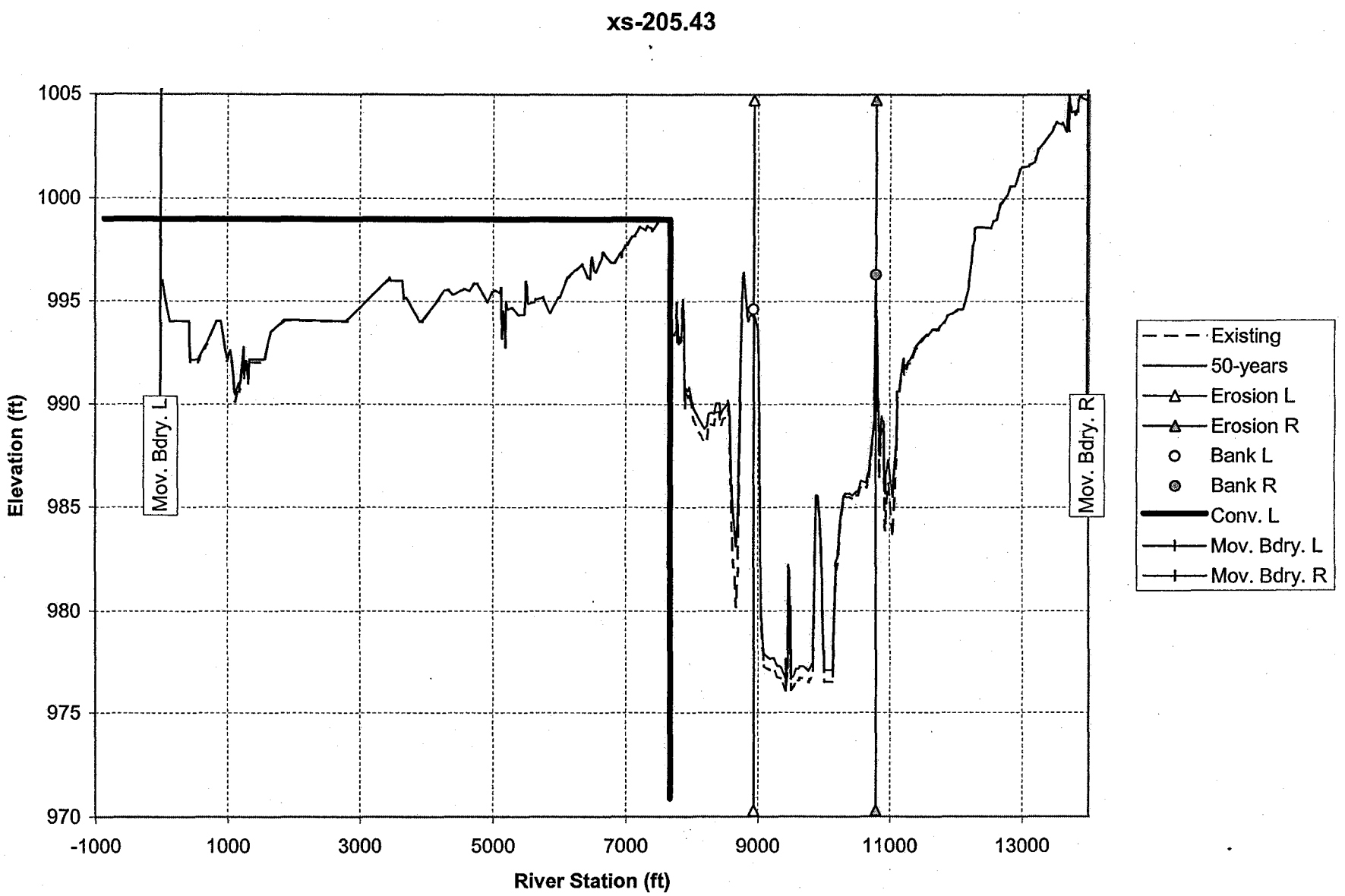

xs-205.06
Elevation (ft)
River Station (ft)
1005
1000
995
990
985
980
975
970
965
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

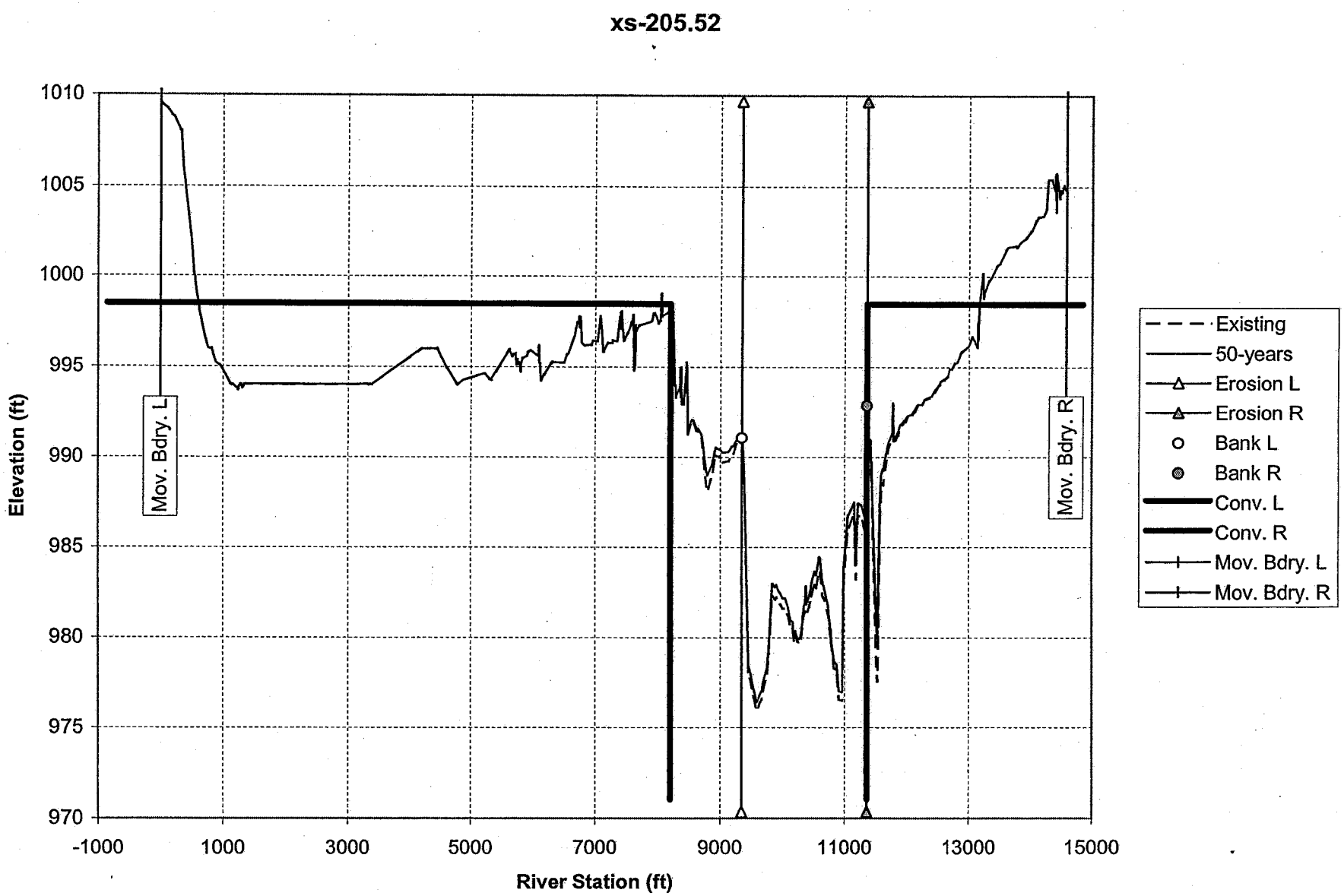

xs-205.15
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
970
965
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

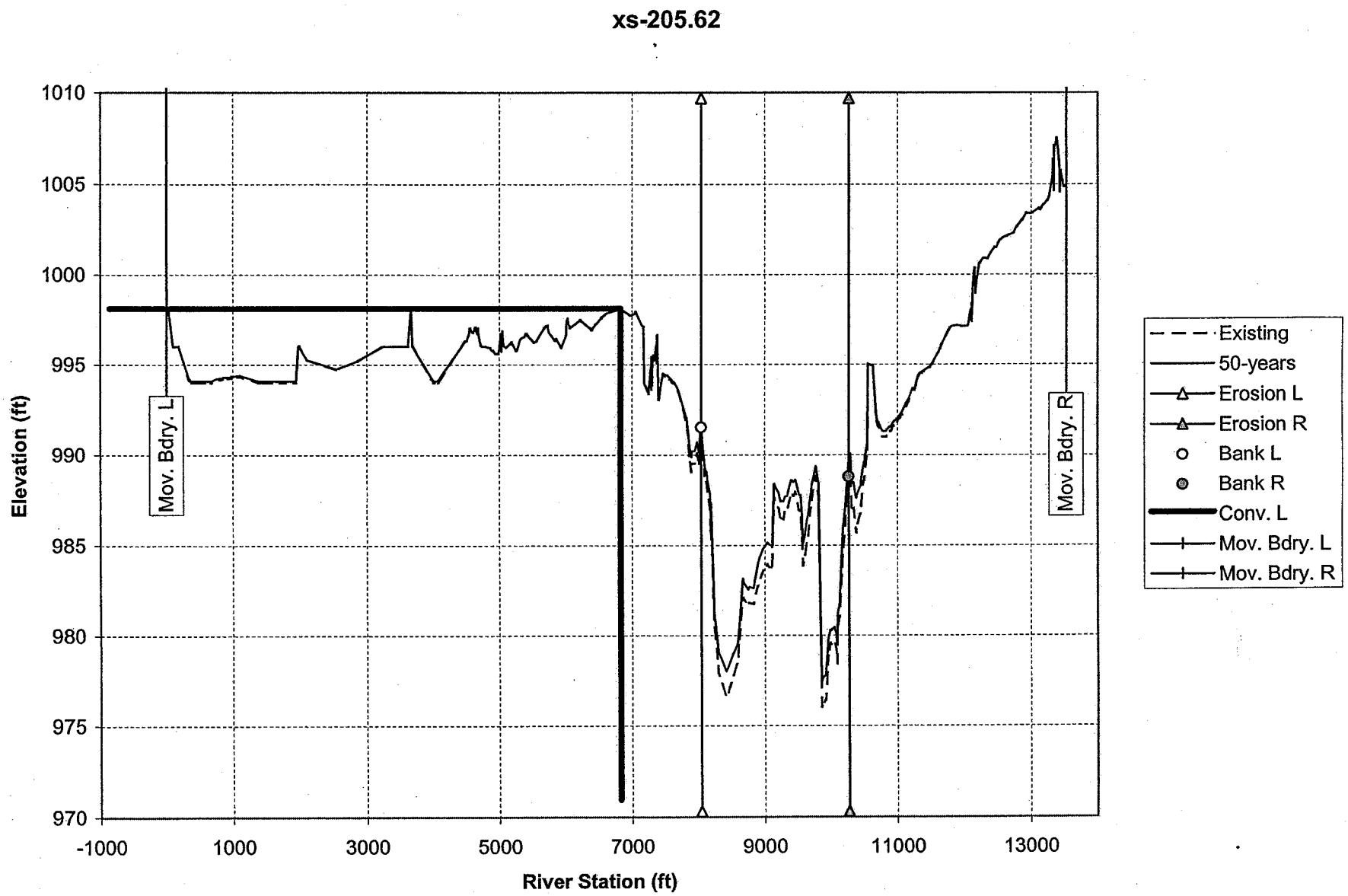

xs-205.25
Elevation (ft)
River Station (ft)
1005
1000
995
990
985
980
975
970
965
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

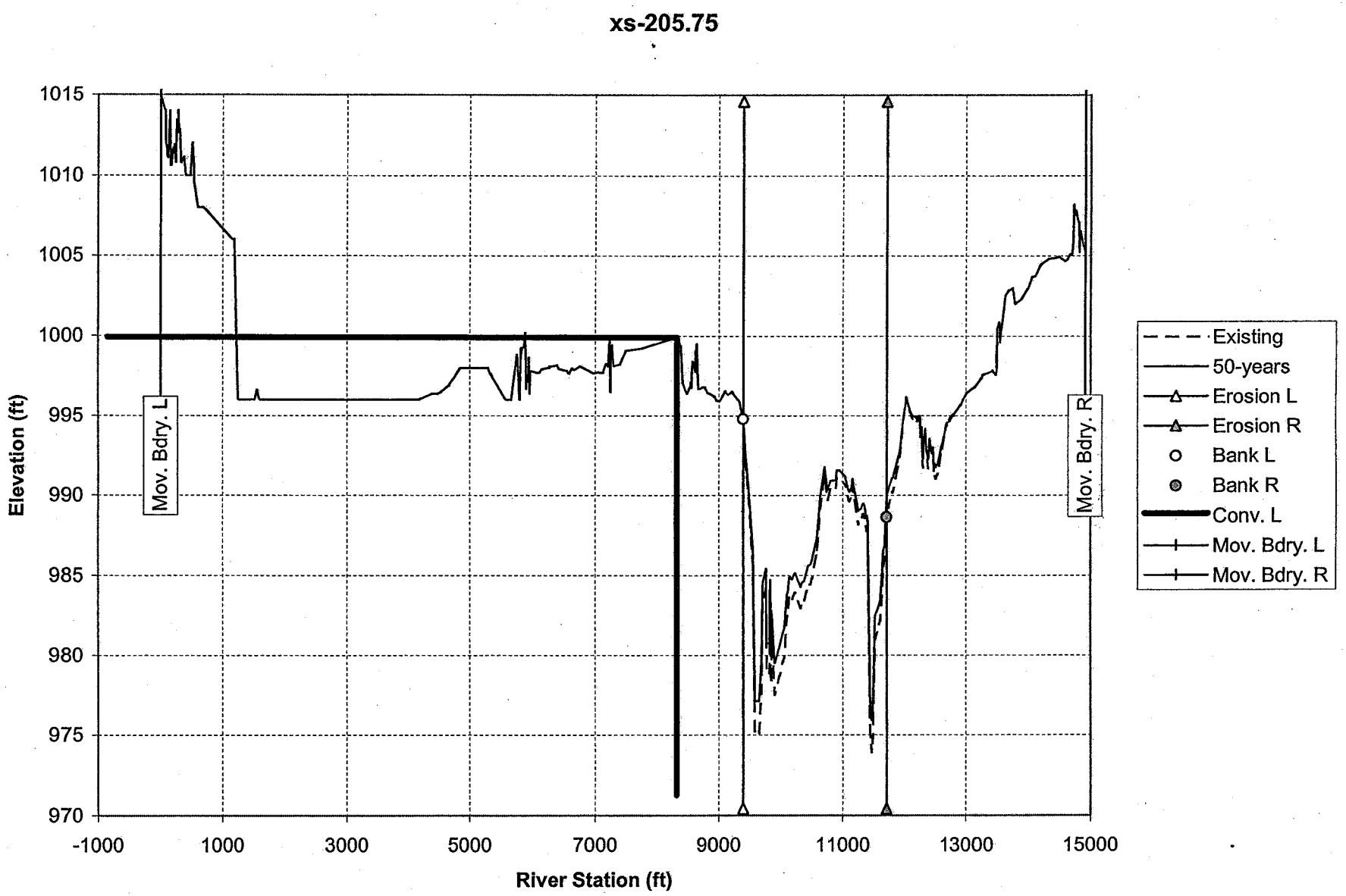

xs-205.34
Elevation (ft)
River Station (ft)
1005
1000
995
990
985
980
975
970
965
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

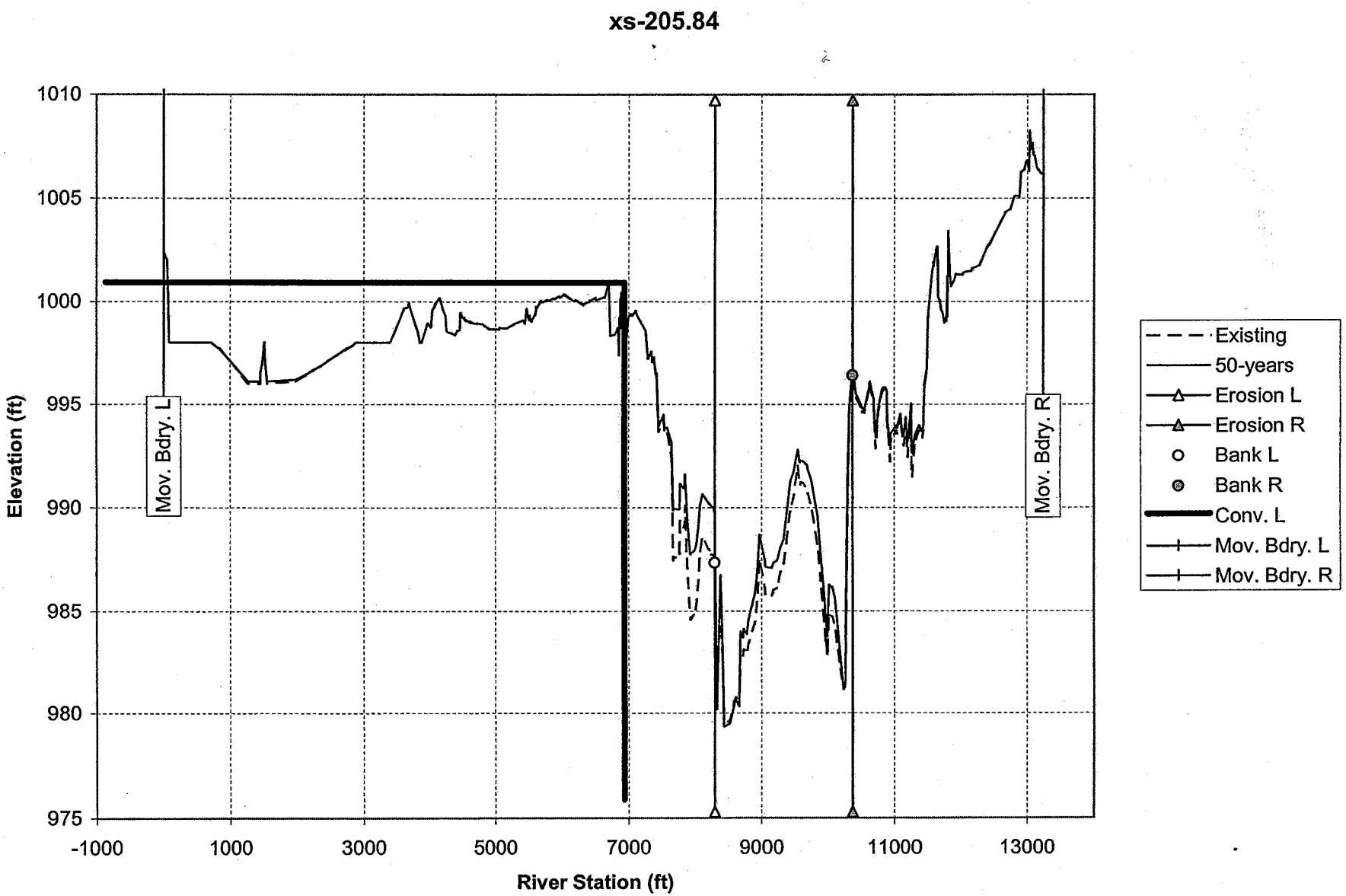

xs-205.4
1005
1000
995
990
985
980
975
970
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

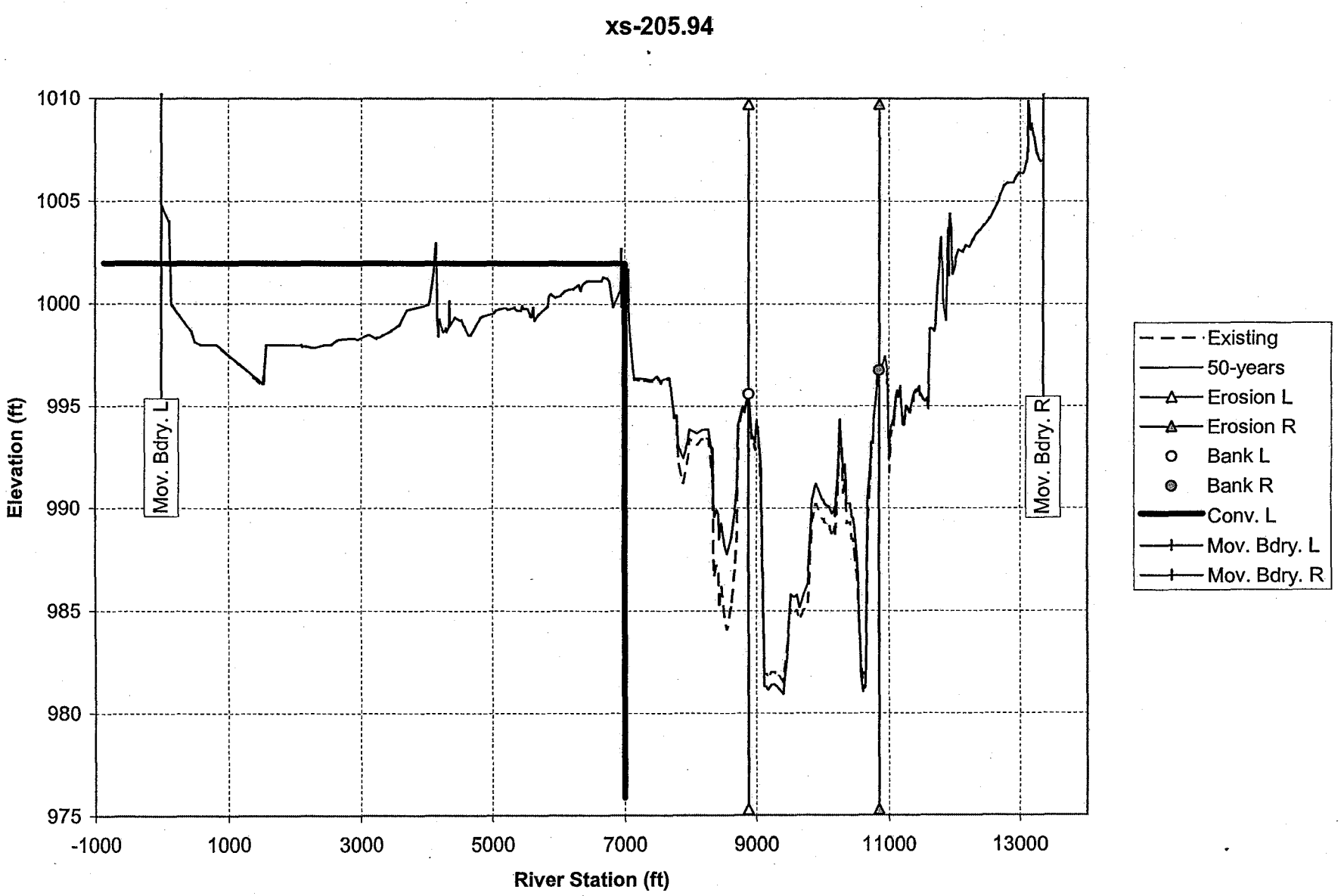

xs-205.43
1005
1000
995
990
985
980
975
970
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

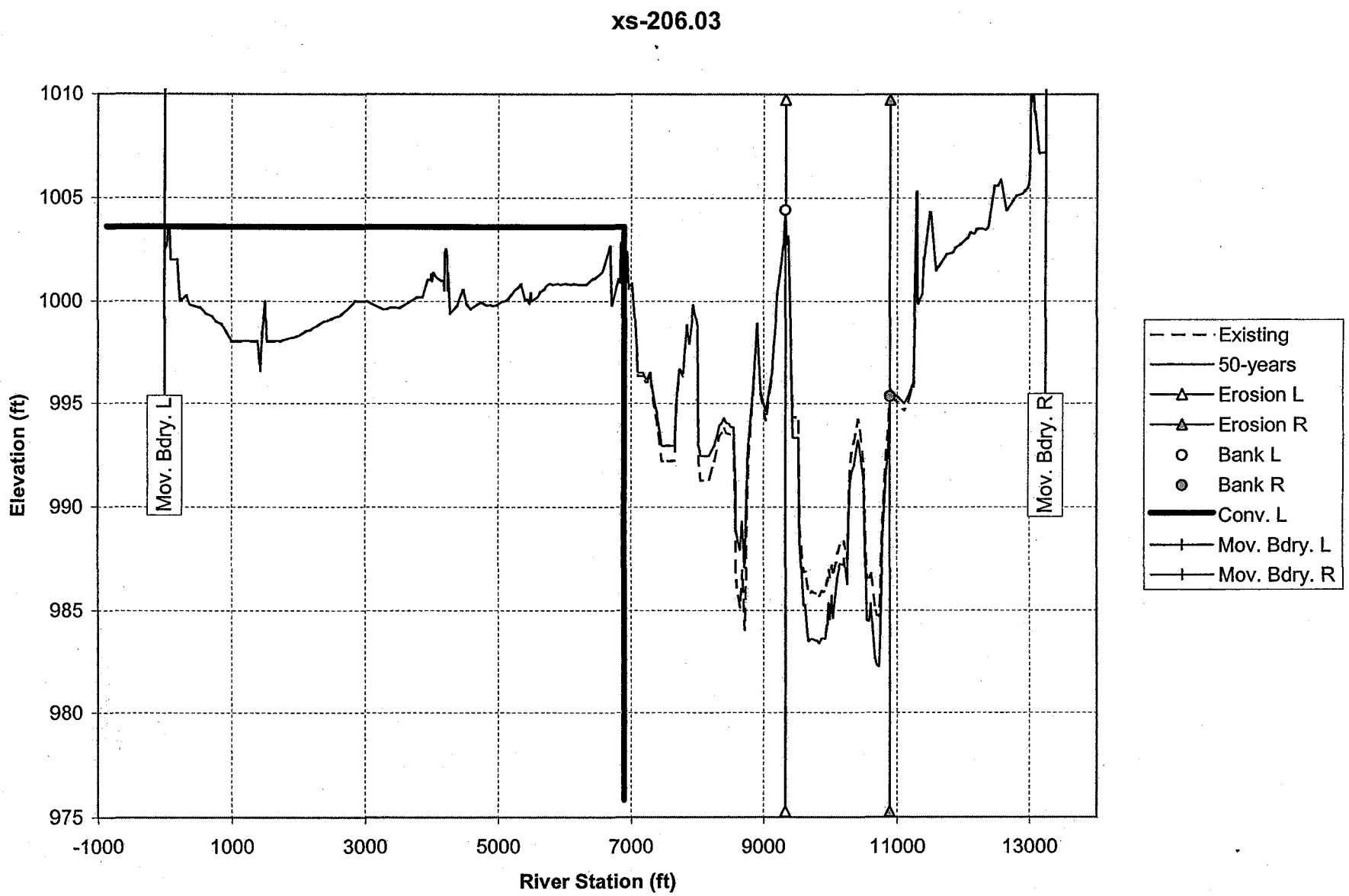

xs-205.52
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
970
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

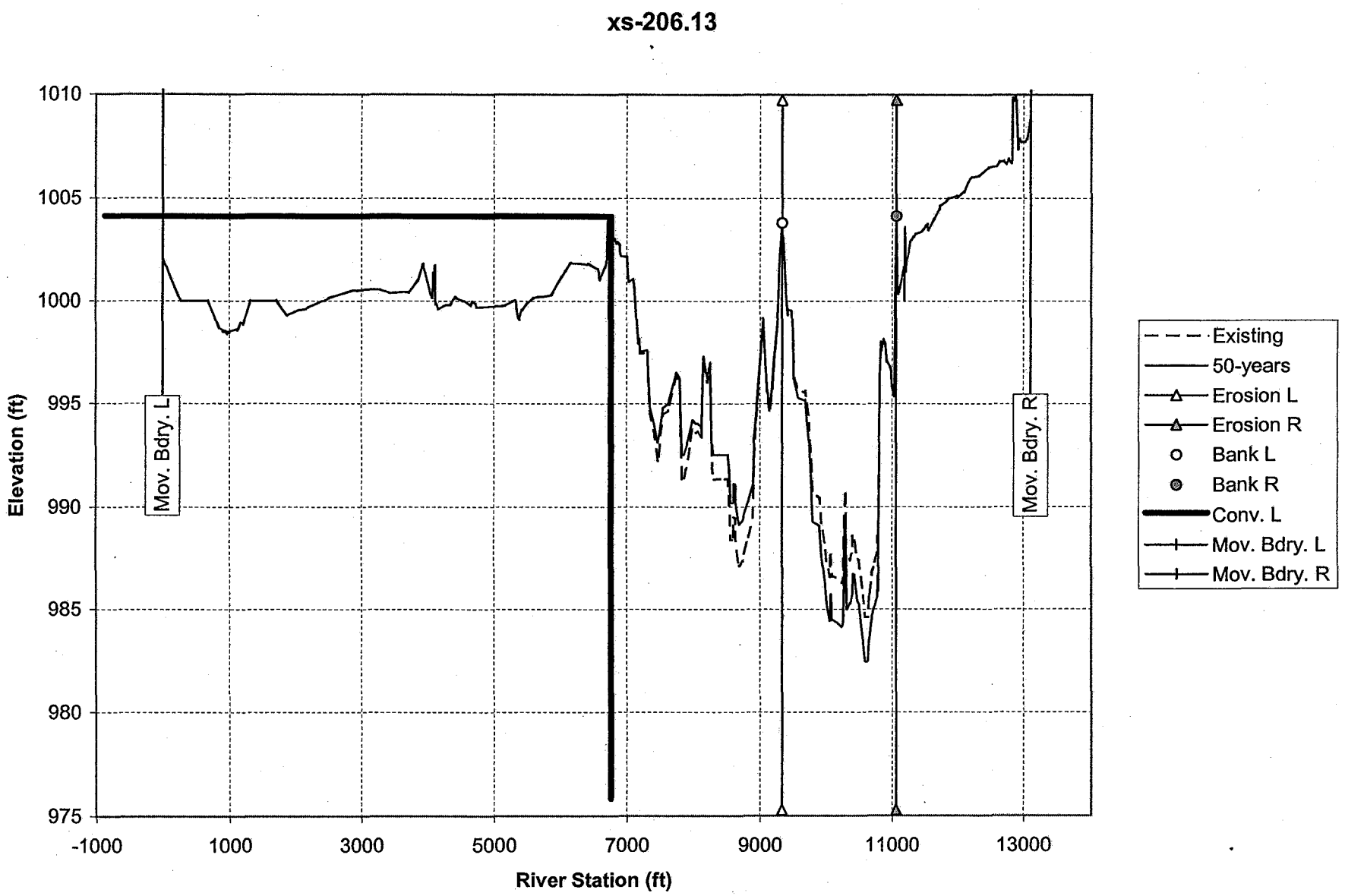

xs-205.62
1010
1005
1000
995
990
985
980
975
970
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

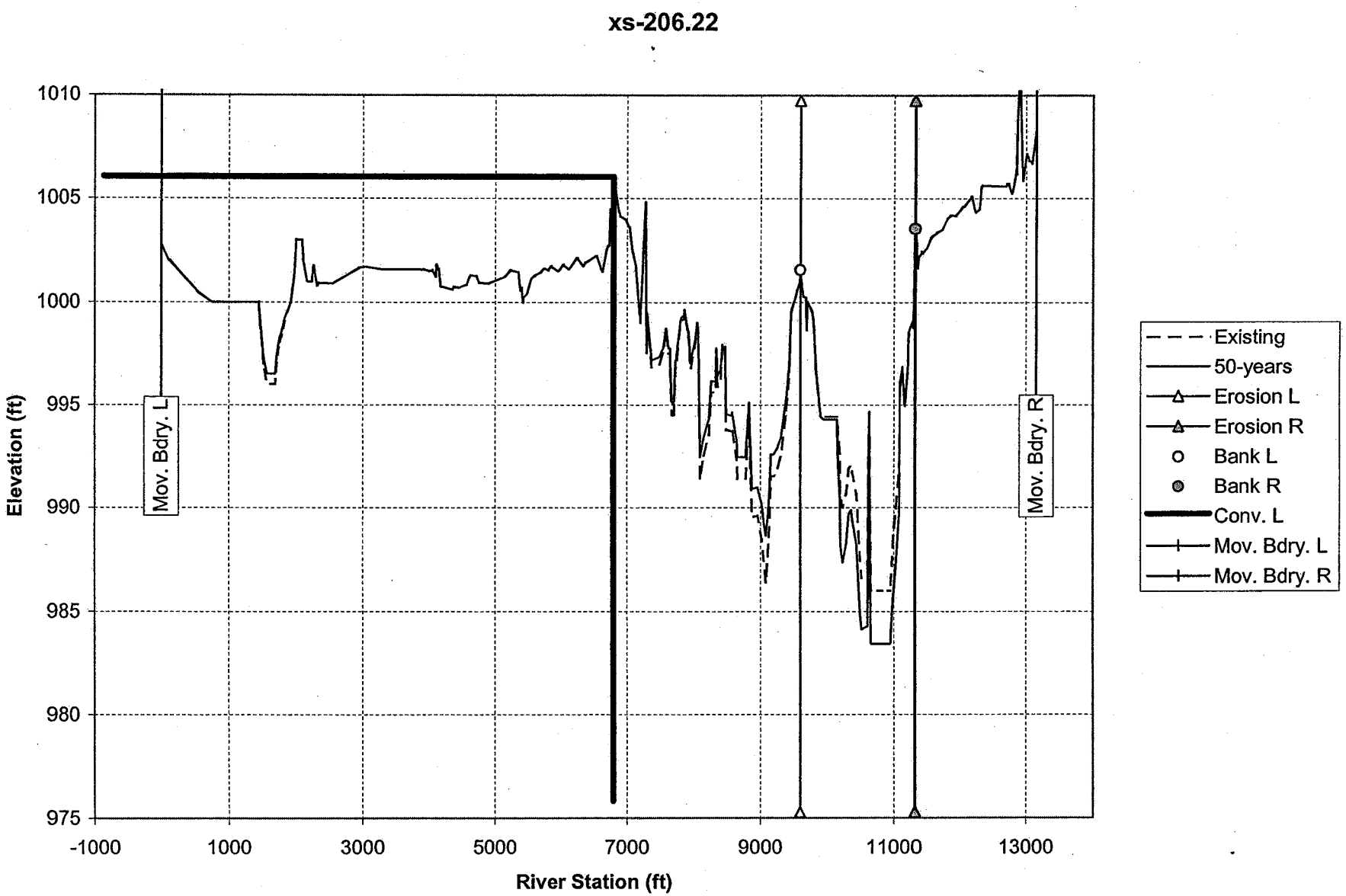

xs-205.75
Elevation (ft)
River Station (ft)
1015
1010
1005
1000
995
990
985
980
975
970
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

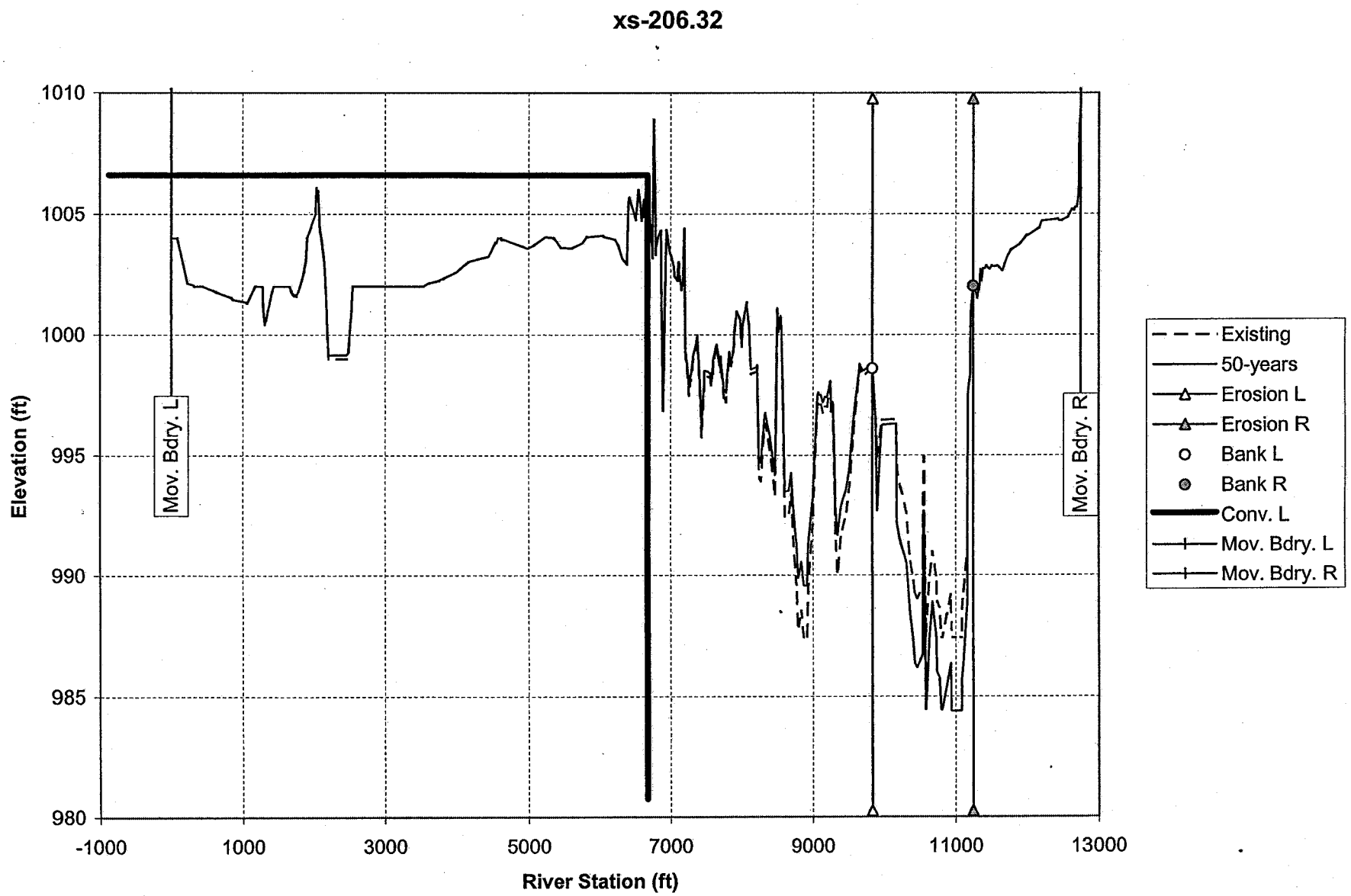

xs-205.84
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

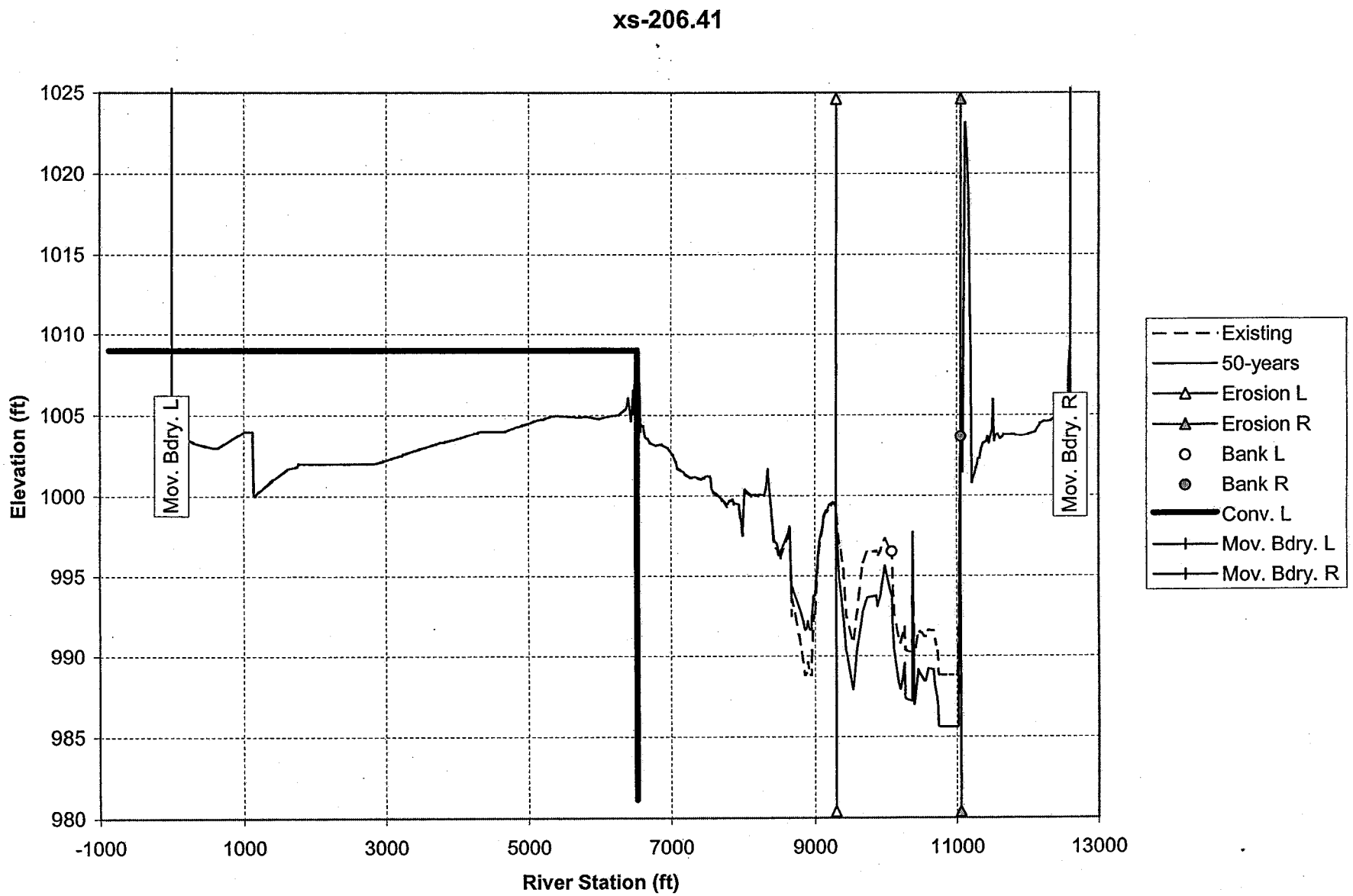

xs-205.94
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

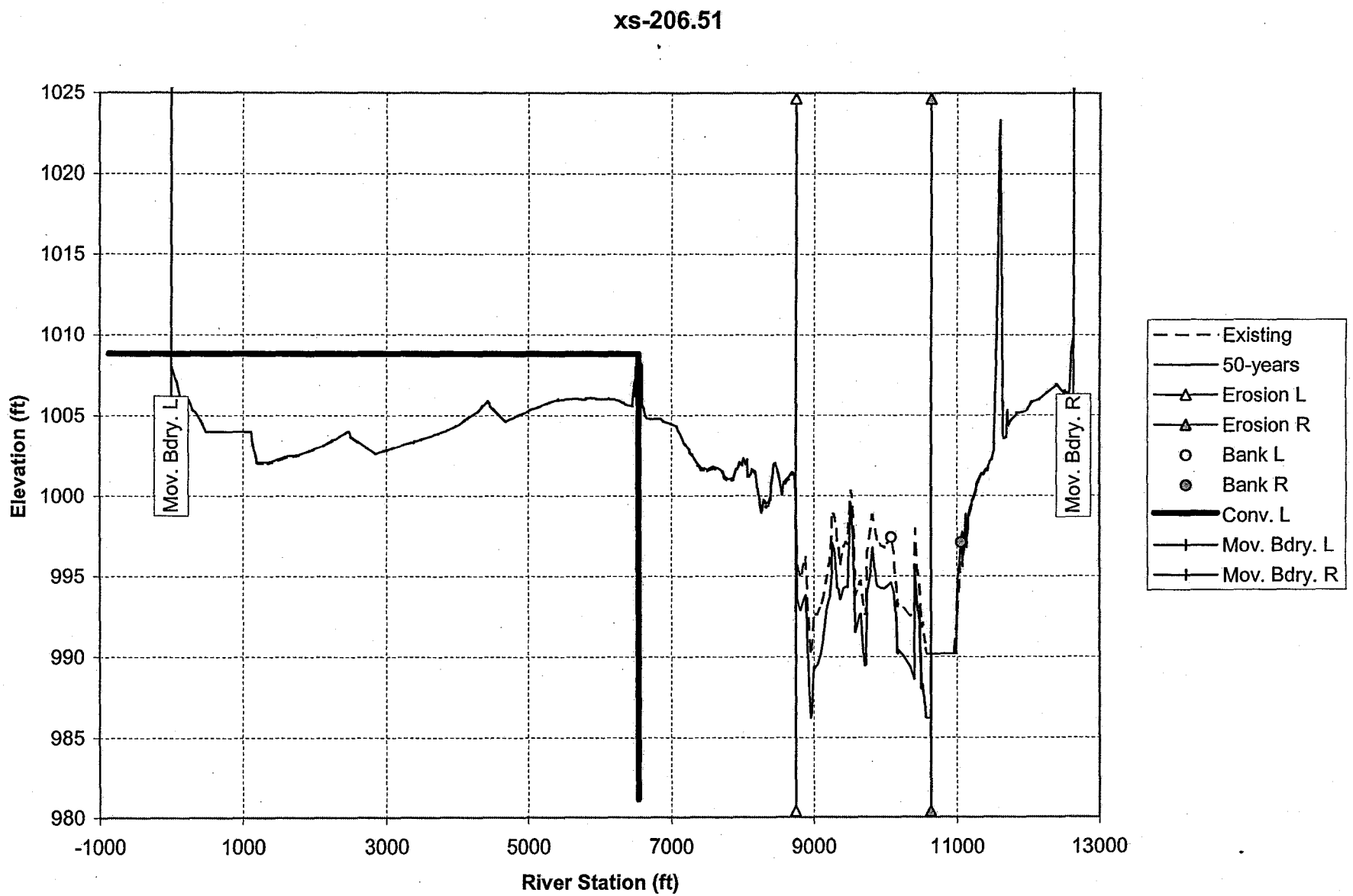

xs-206.03
1010
1005
1000
995
990
985
980
975
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

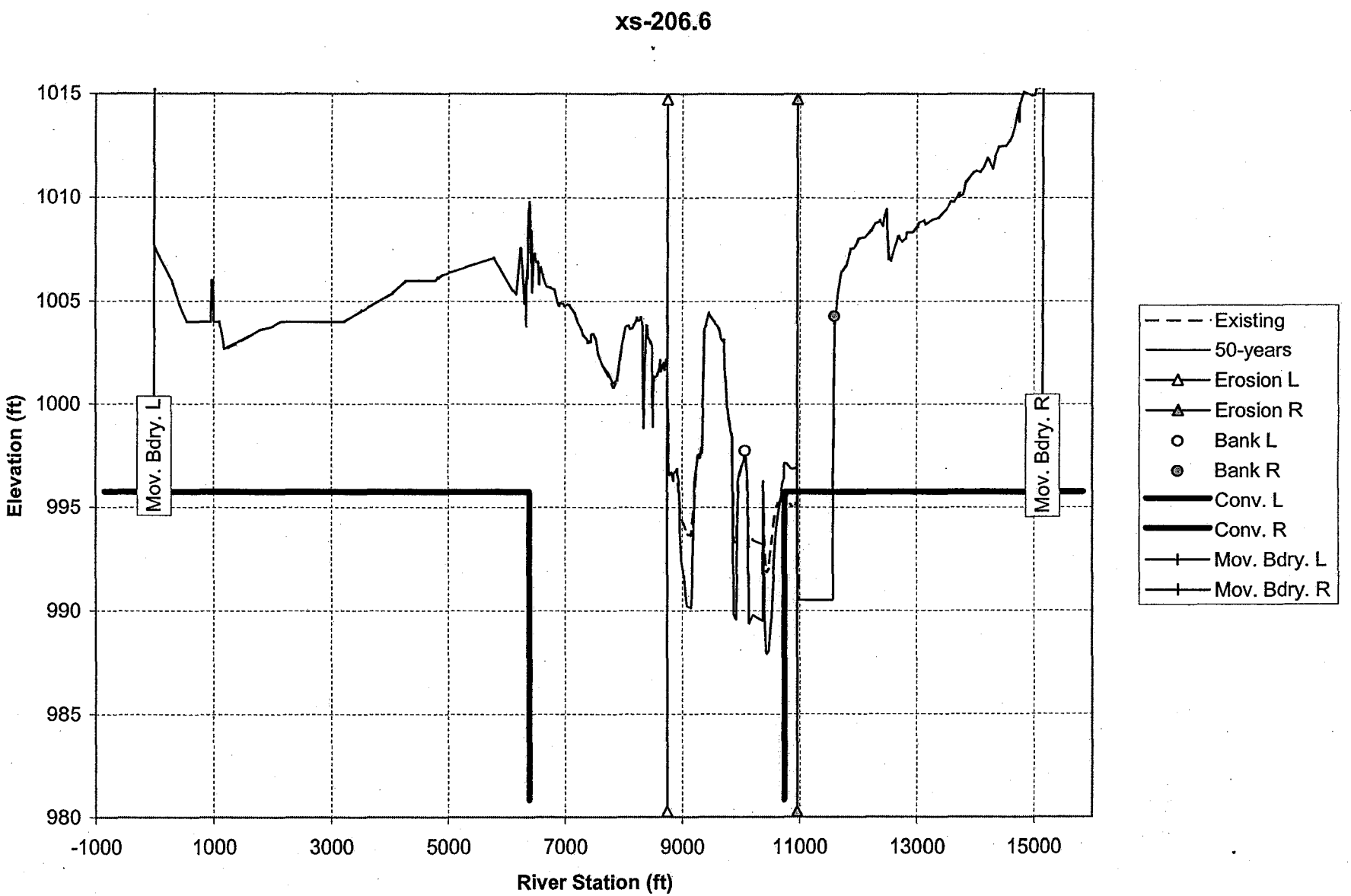

xs-206.13
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

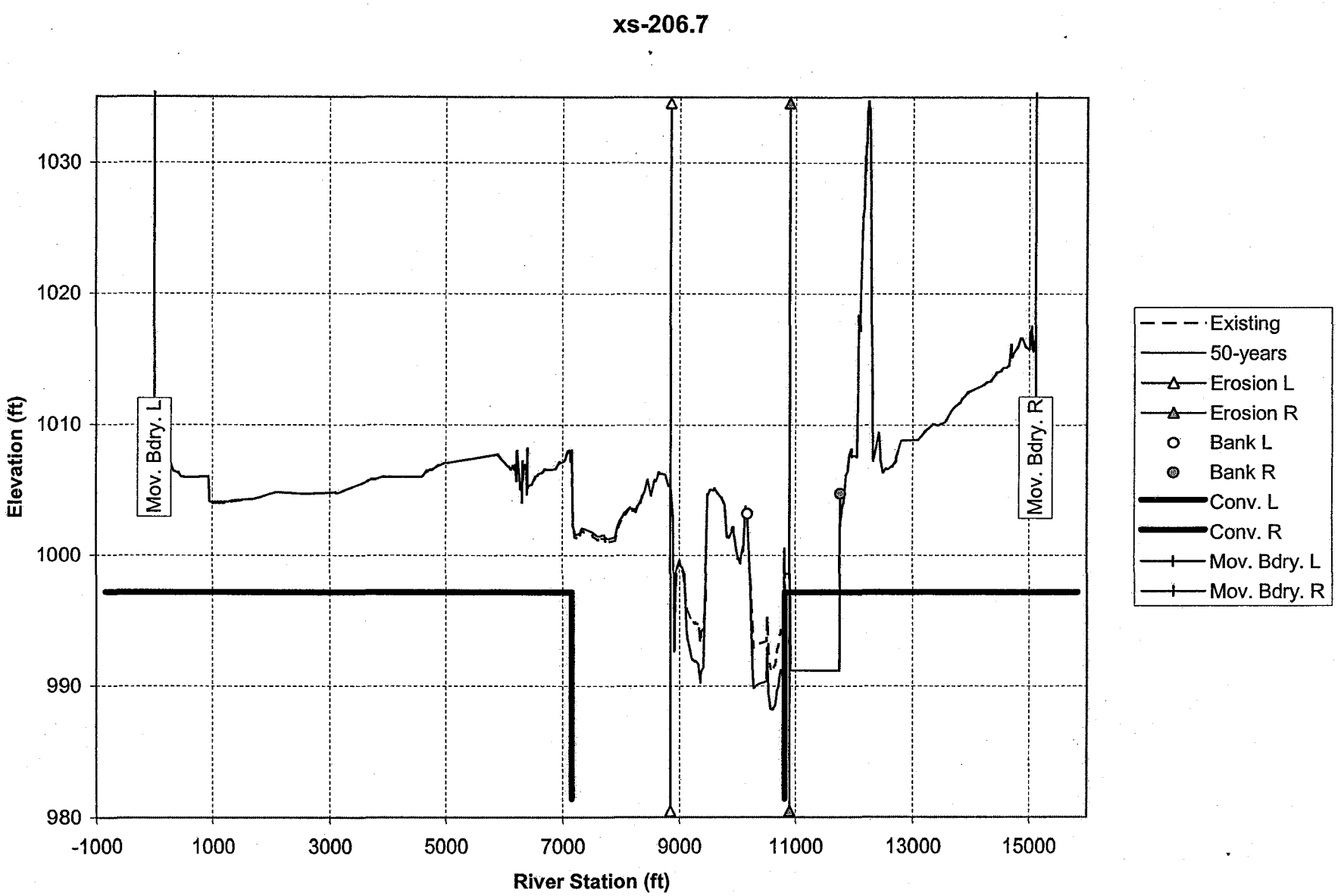

xs-206.22
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
975
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

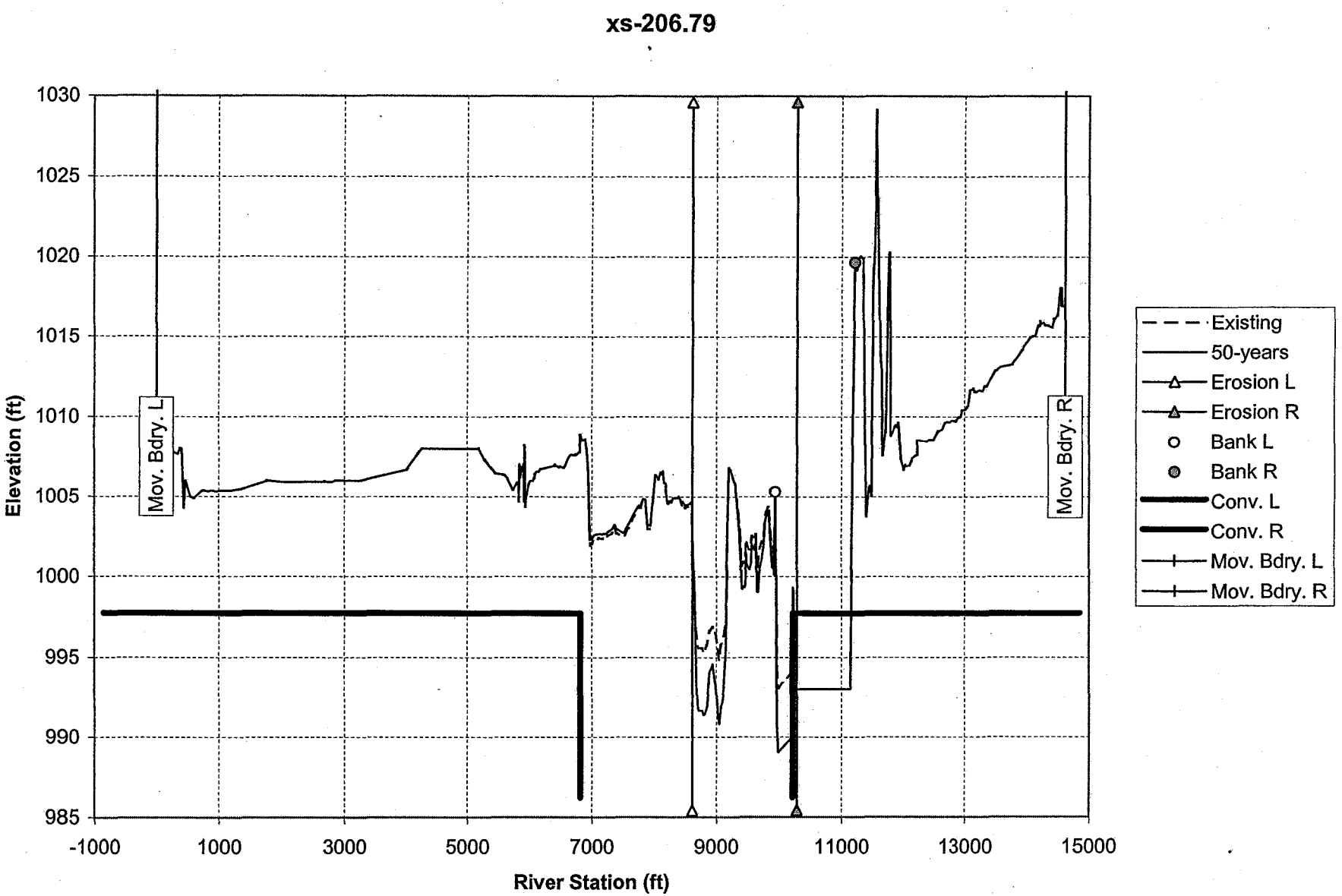

xs-206.32
Elevation (ft)
River Station (ft)
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

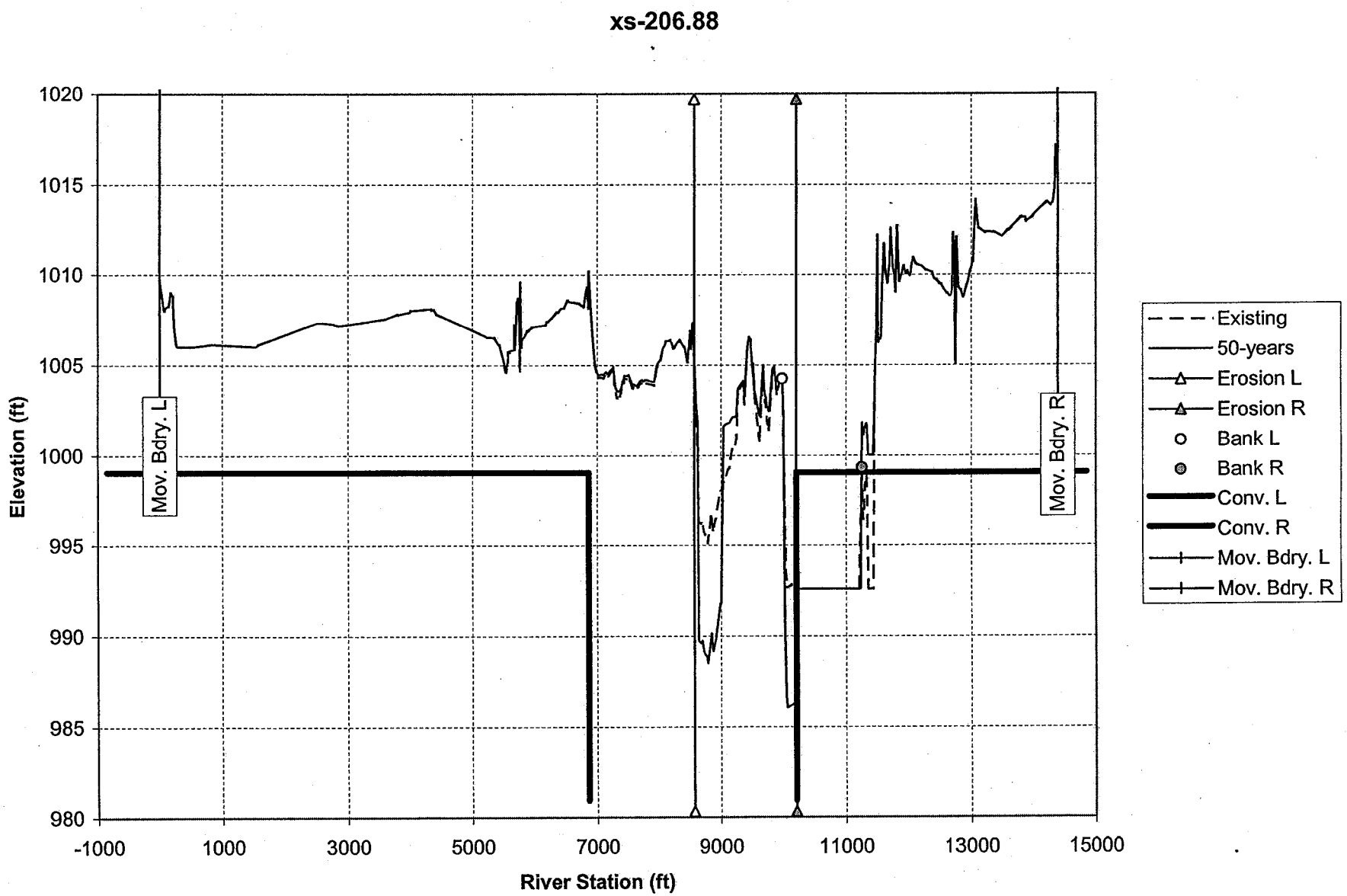

xs-206.41
Elevation (ft)
River Station (ft)
1025
1020
1015
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

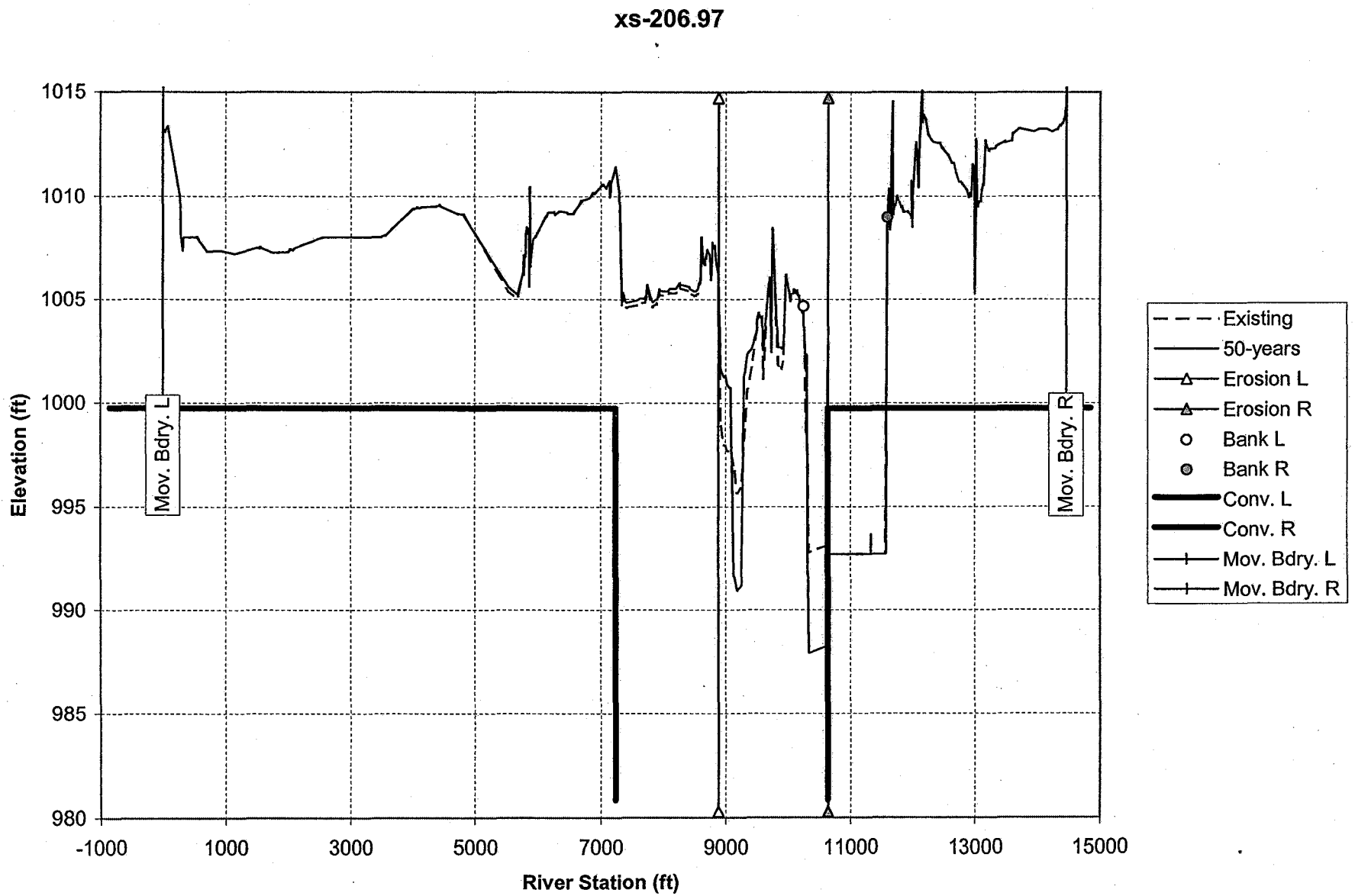

xs-206.51
Elevation (ft)
River Station (ft)
1025
1020
1015
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

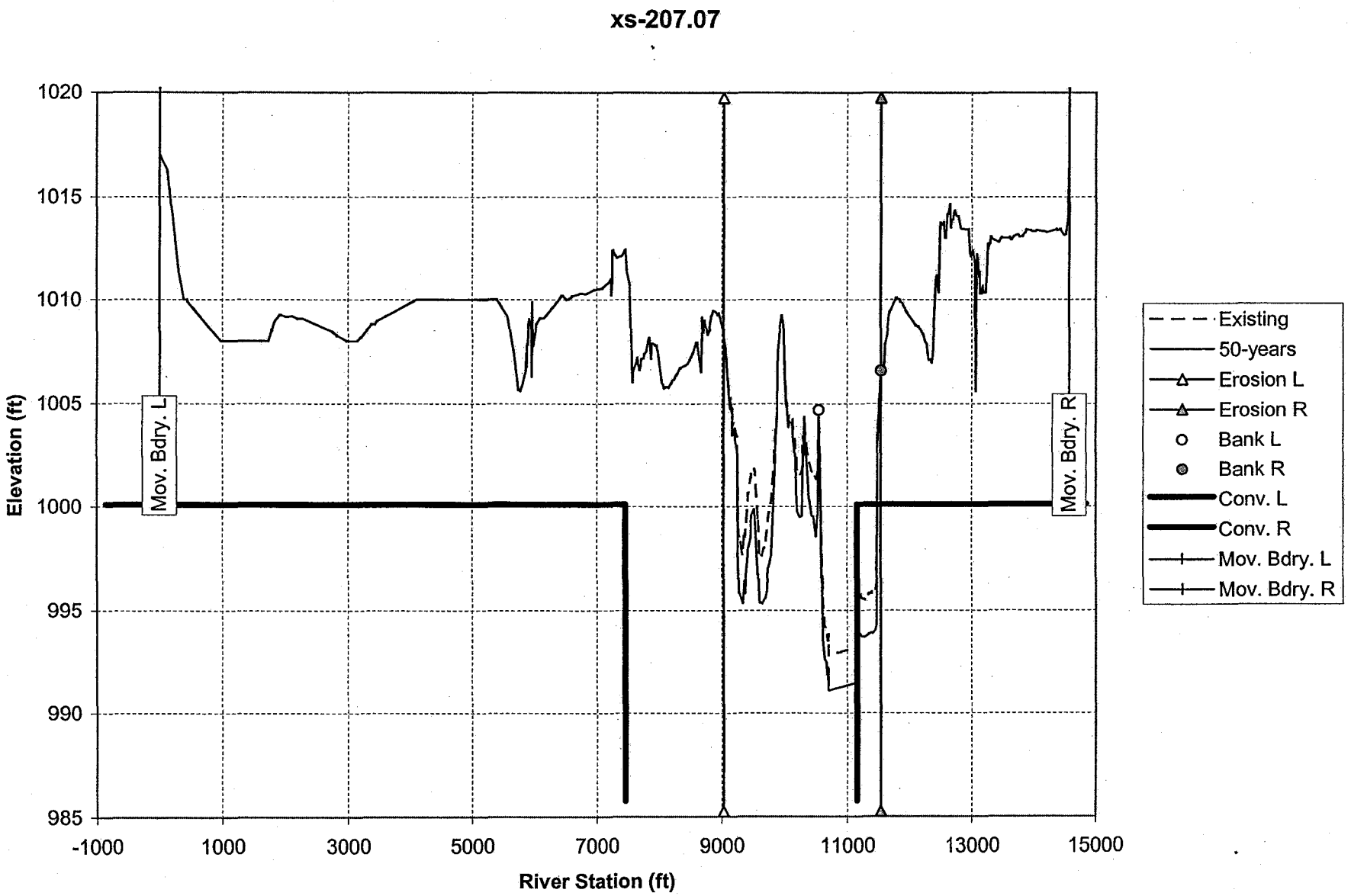

xs-206.6
Elevation (ft)
River Station (ft)
1015
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

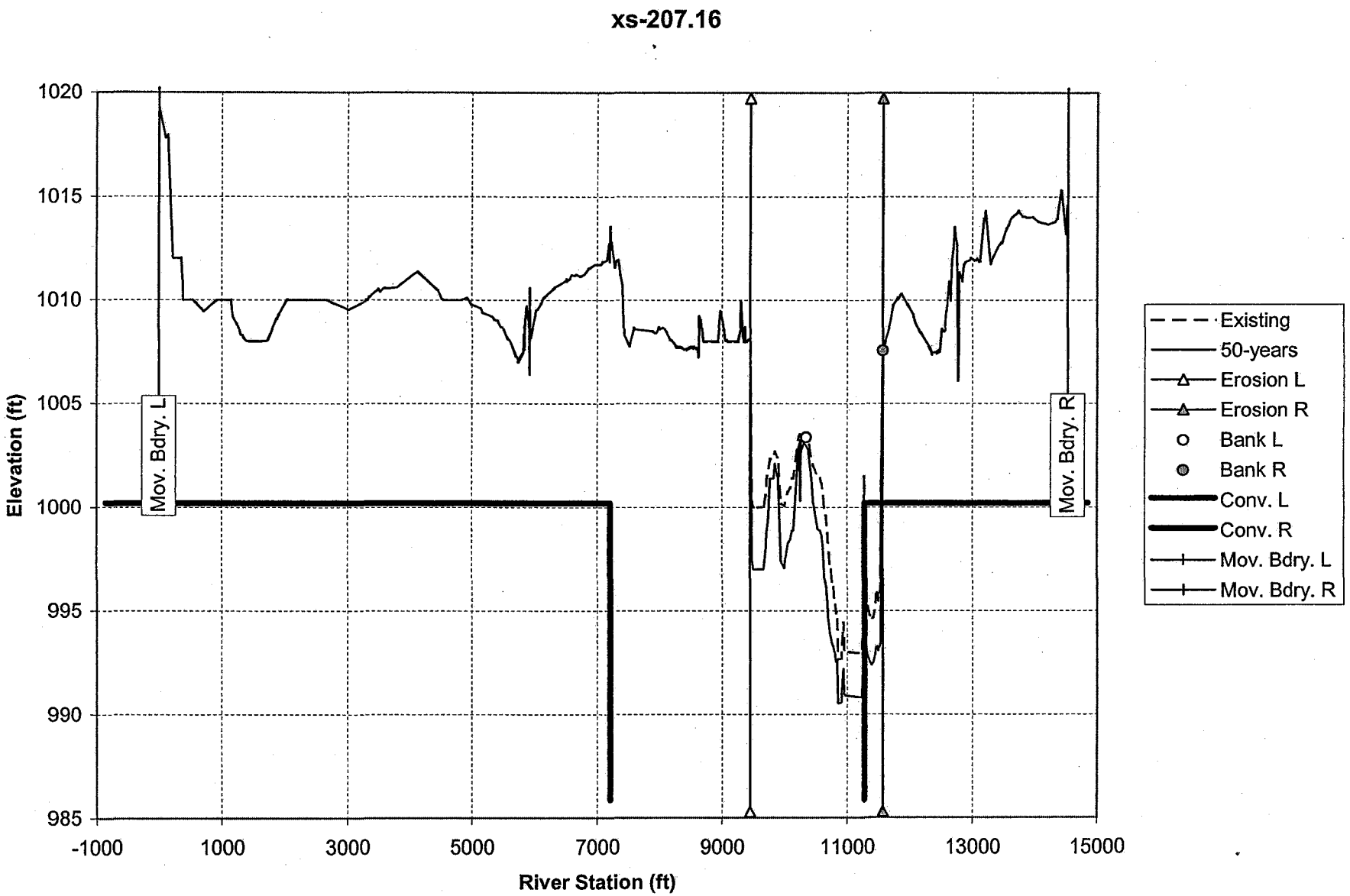

xs-206.7
Elevation (ft)
1030
1020
1010
1000
990
980
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

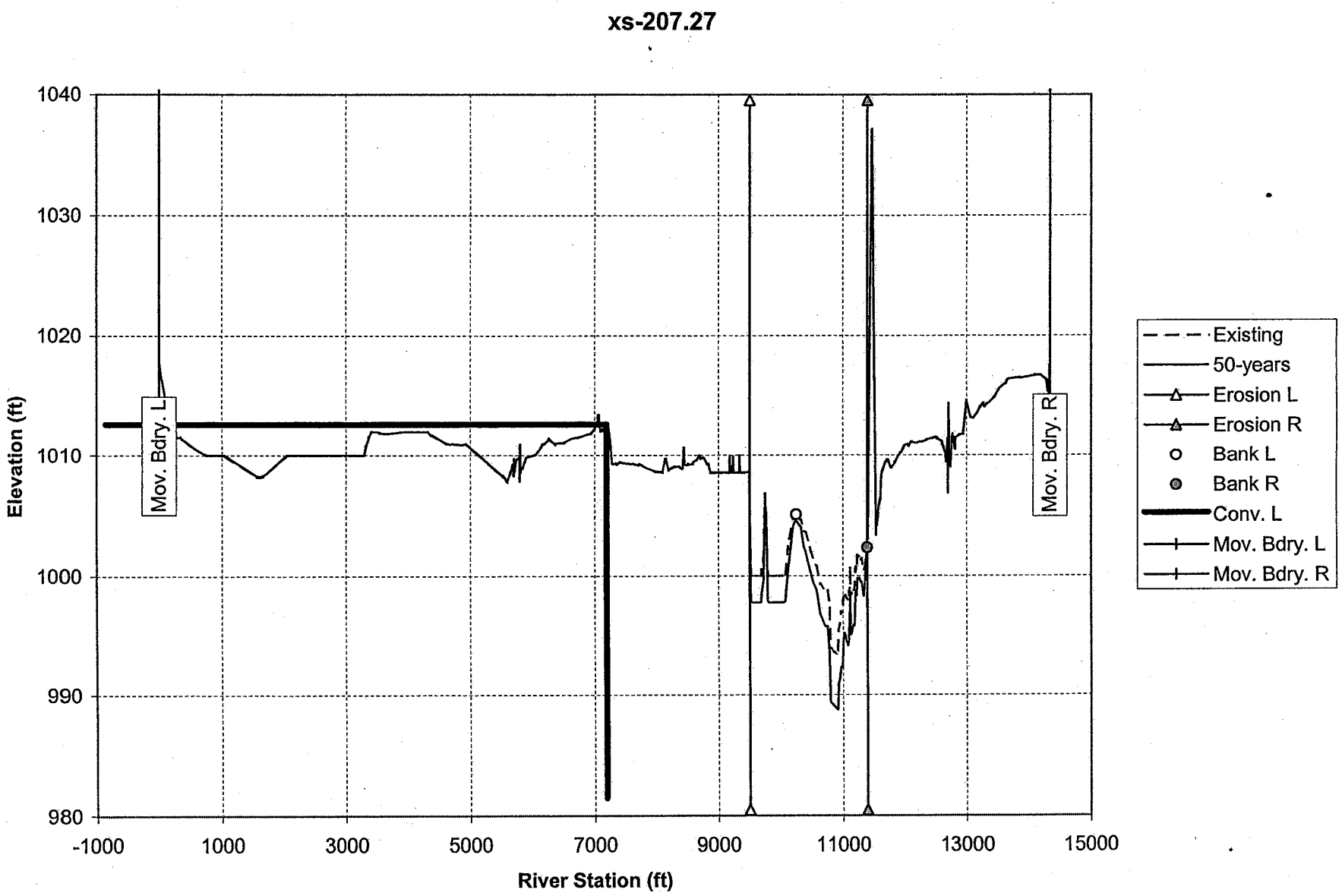

xs-206.79
Elevation (ft)
River Station (ft)
1030
1025
1020
1015
1010
1005
1000
995
990
985
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

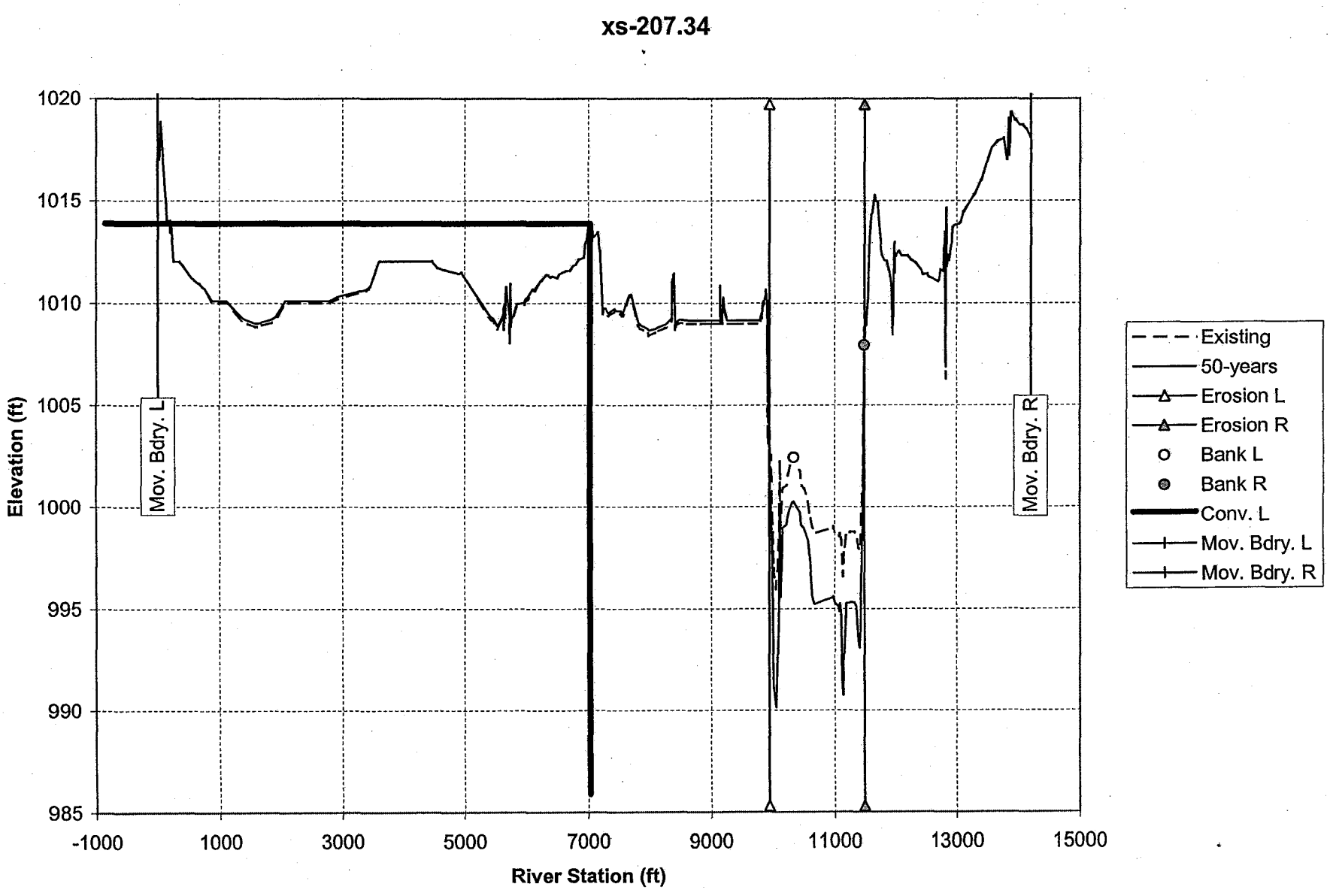

xs-206.88
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

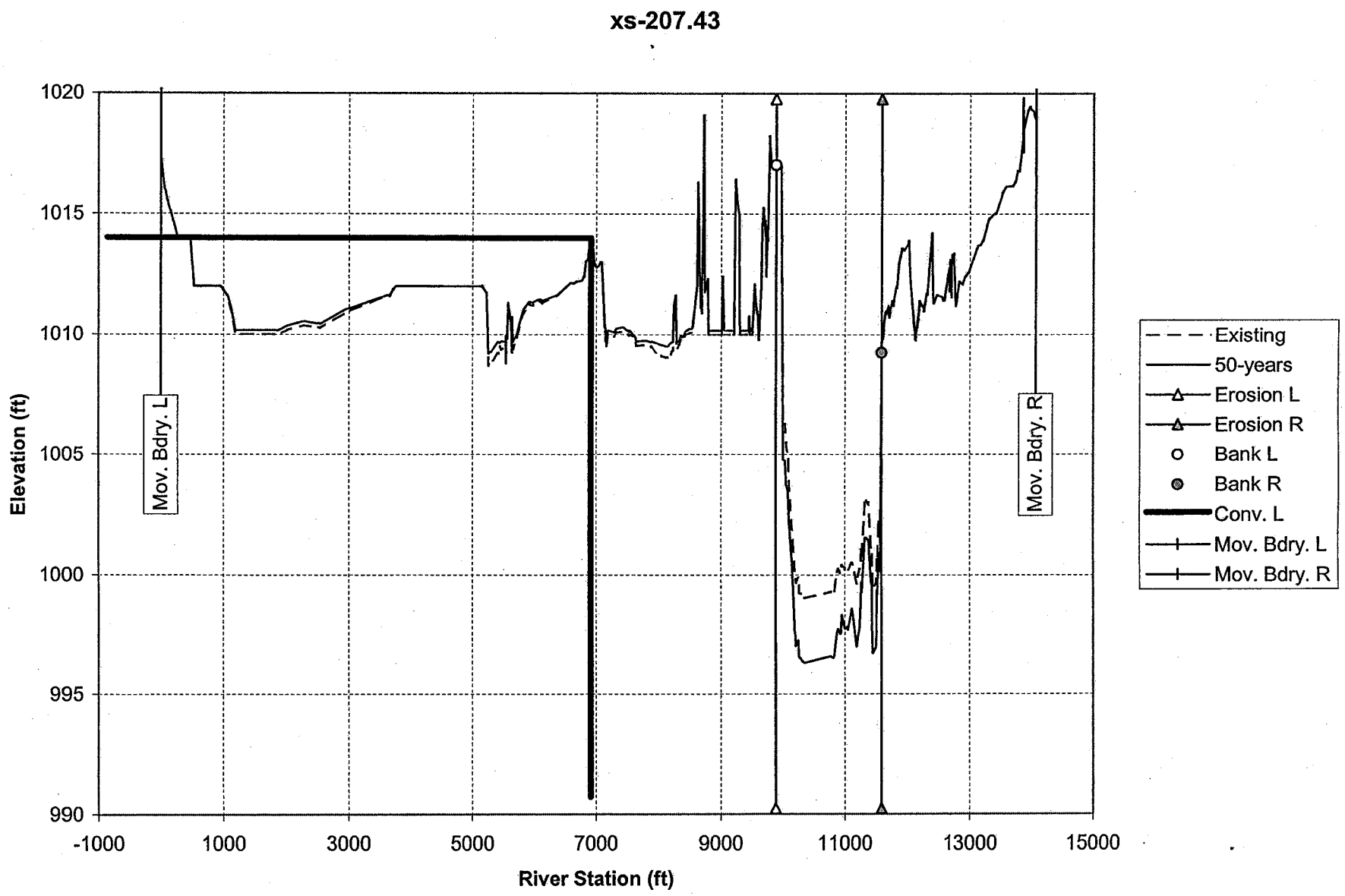

xs-206.97
Elevation (ft)
River Station (ft)
1015
1010
1005
1000
995
990
985
980
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

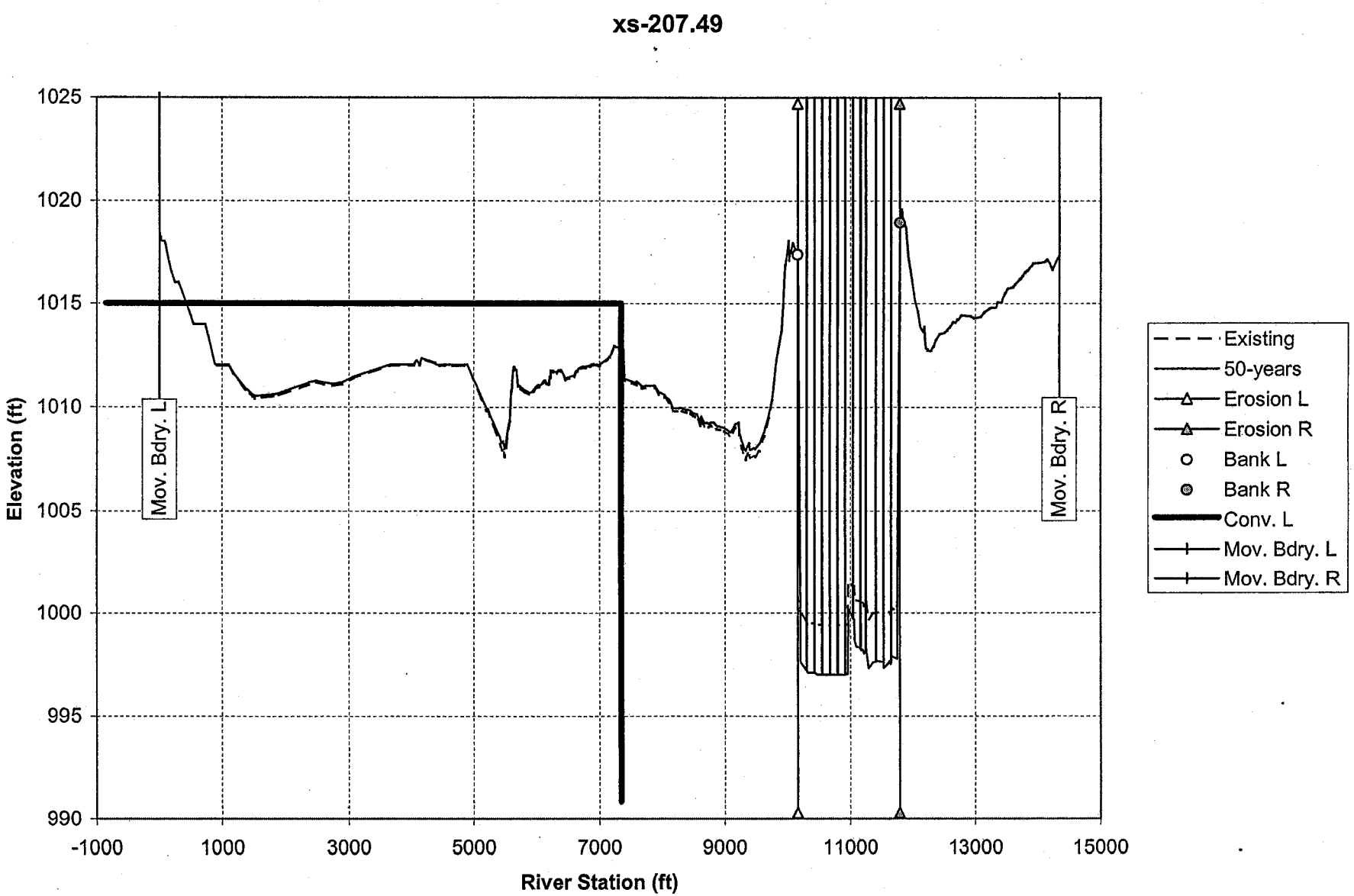

xs-207.07
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
985
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

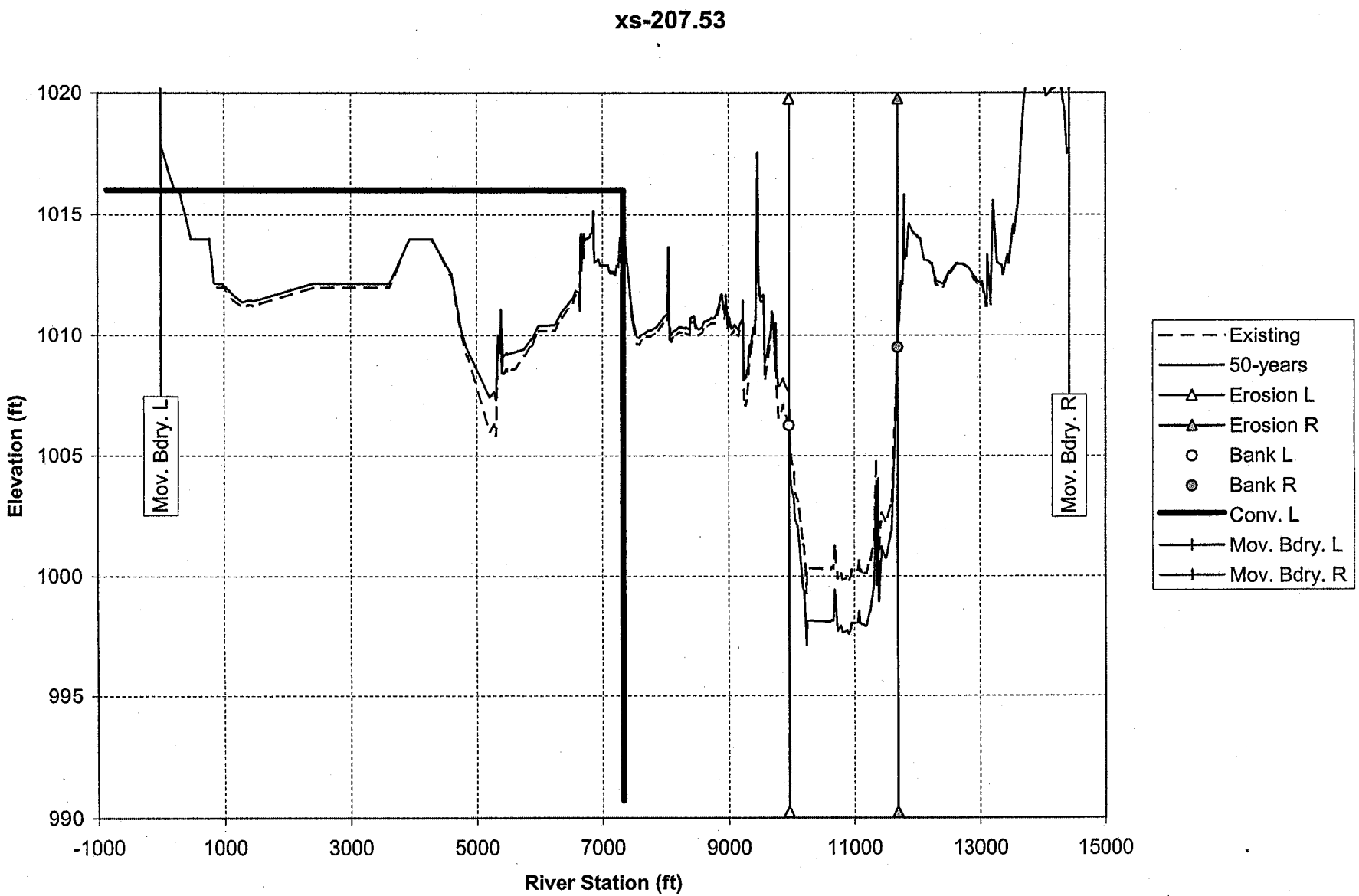

xs-207.16
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
985
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

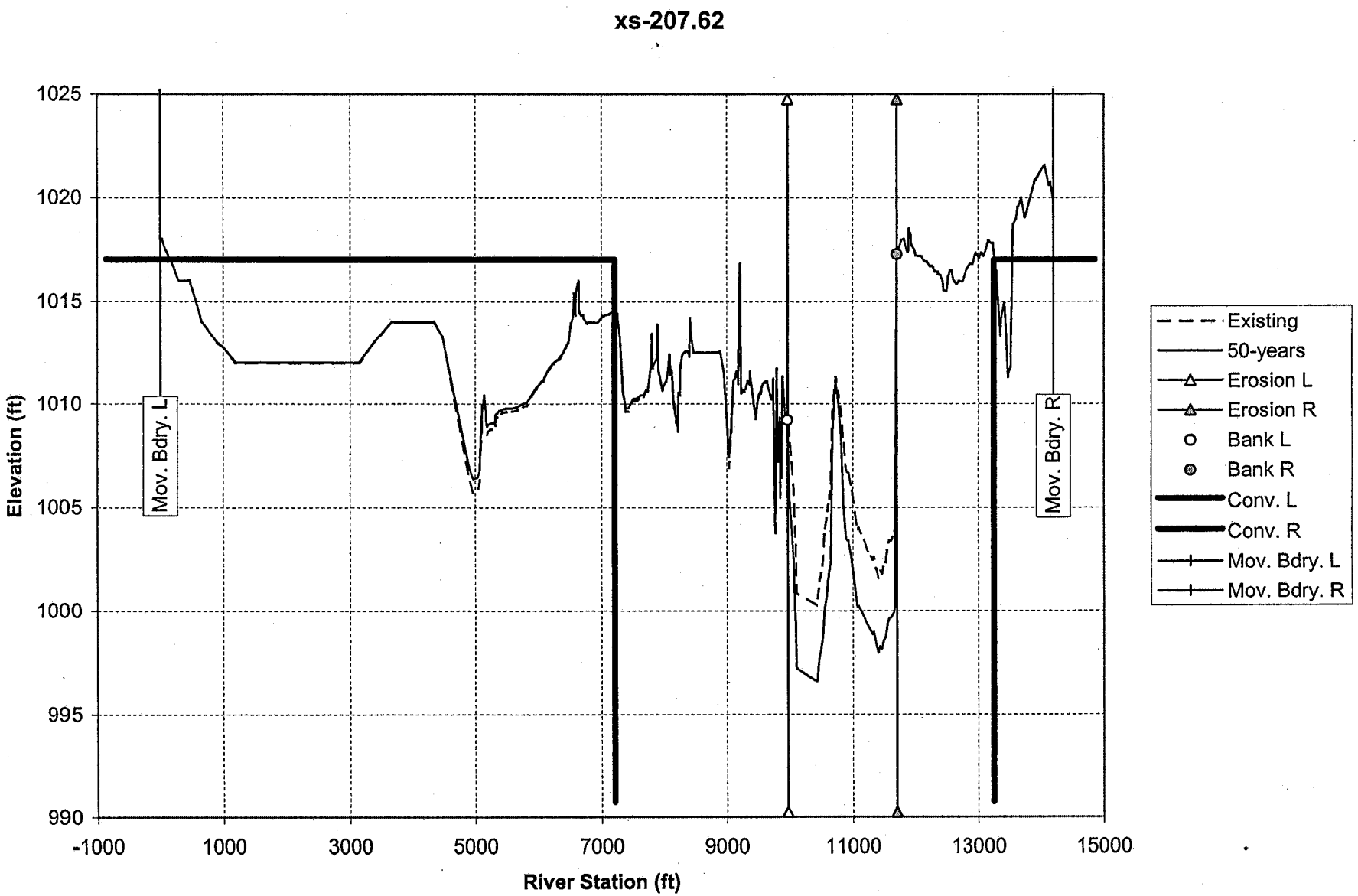

xs-207.27
1040
1030
1020
1010
1000
990
980
Elevation (ft)
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

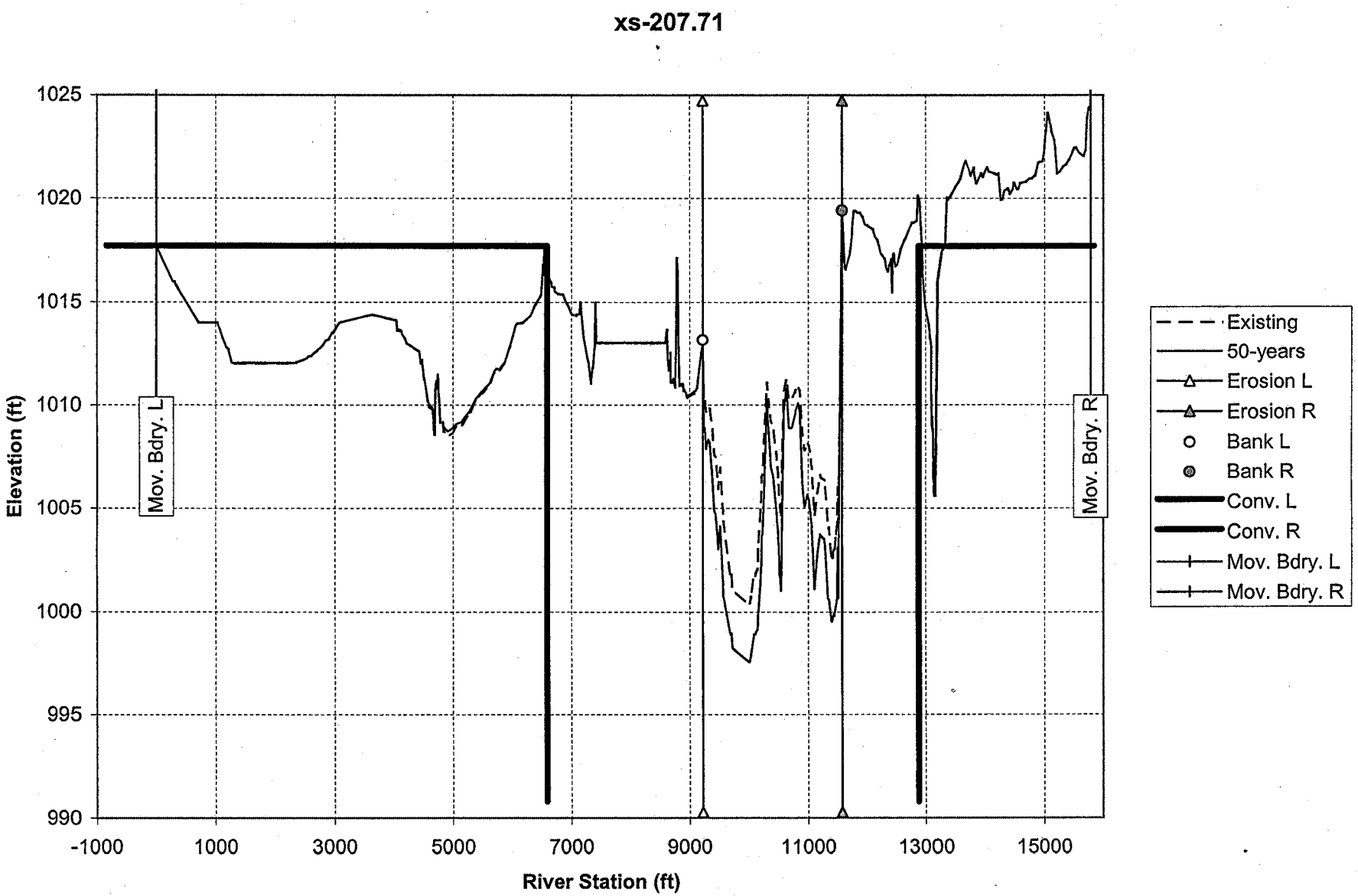

xs-207.34
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
985
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

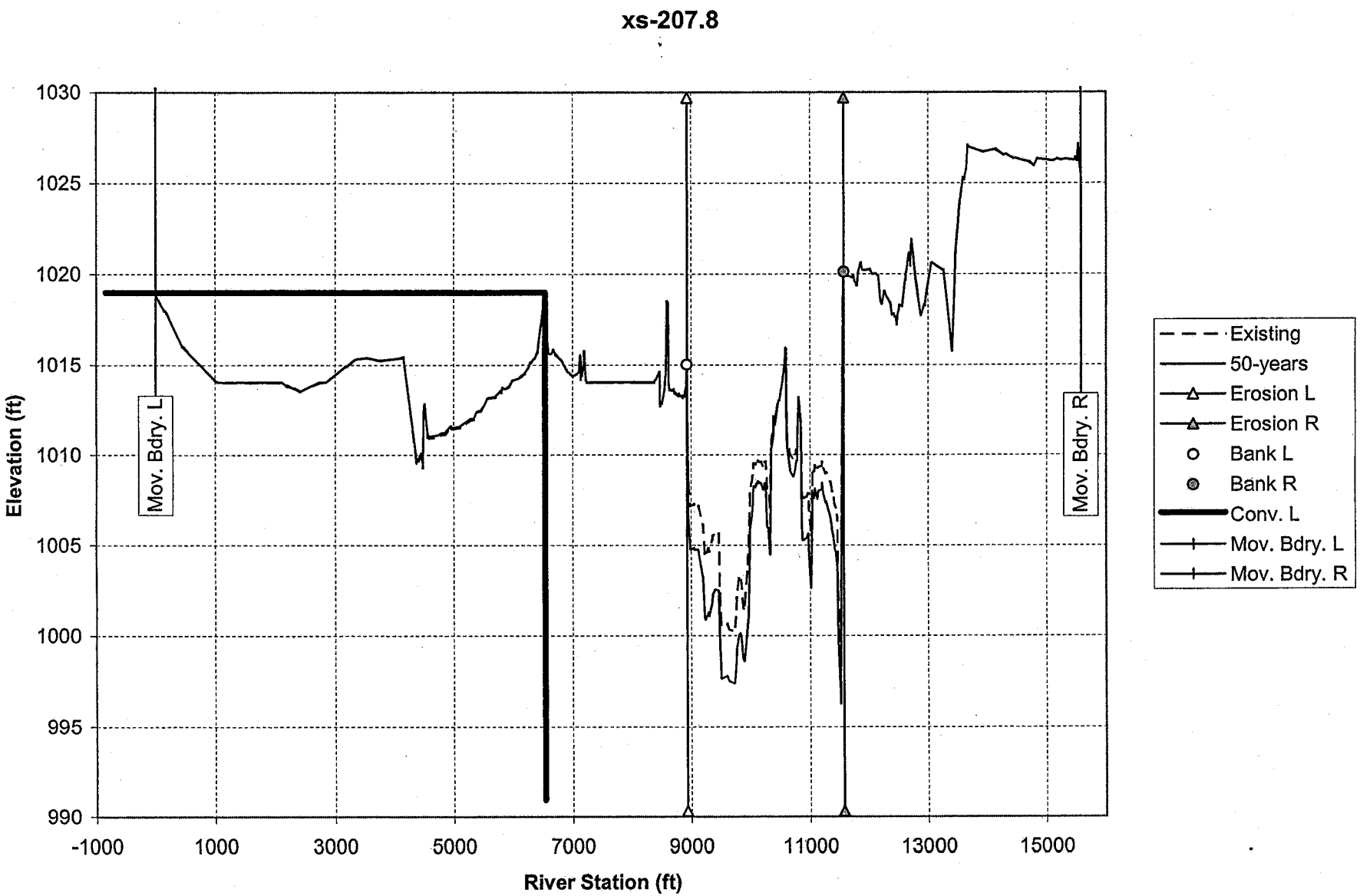

xs-207.43
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

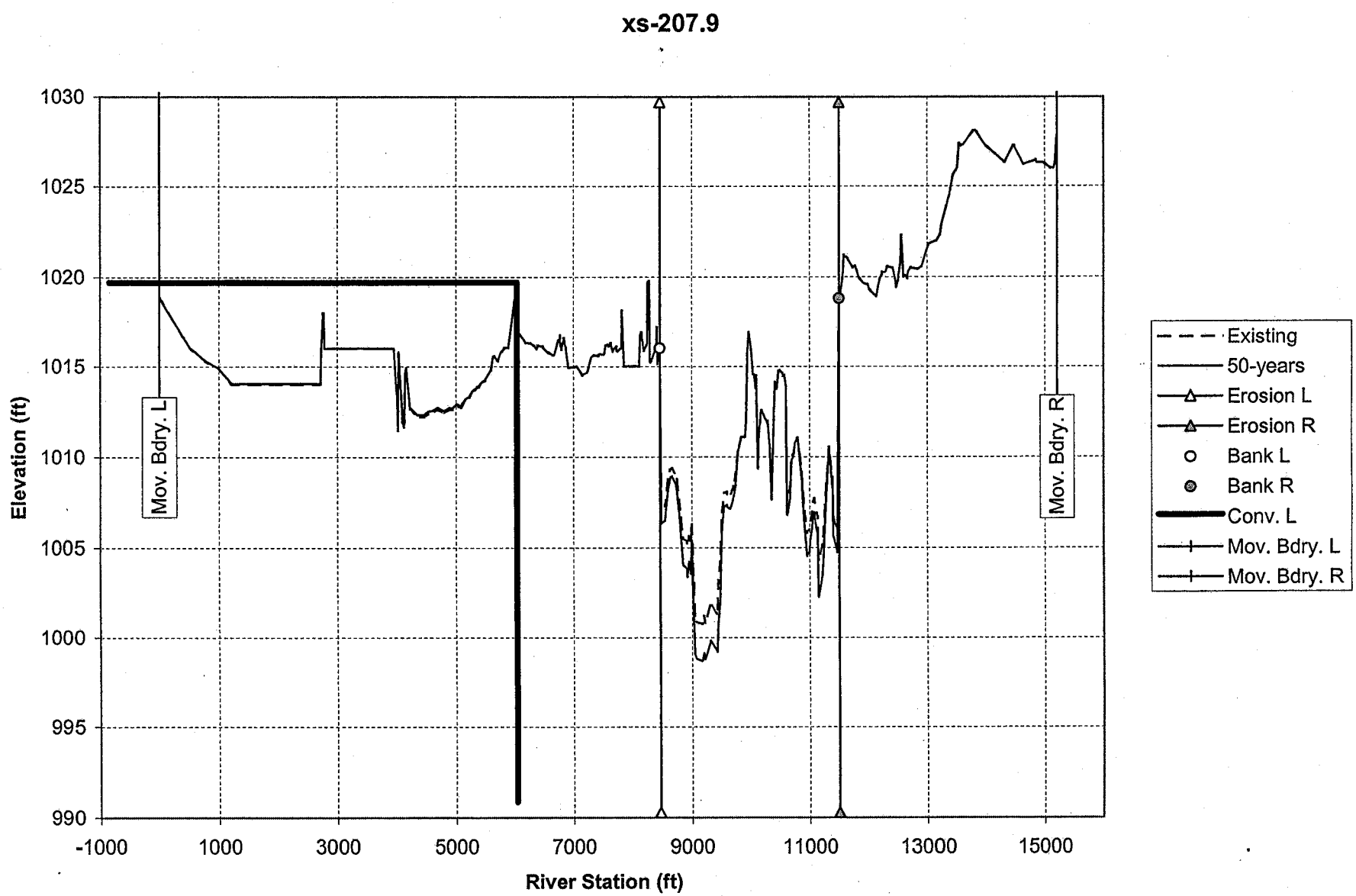

xs-207.49
Elevation (ft)
River Station (ft)
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

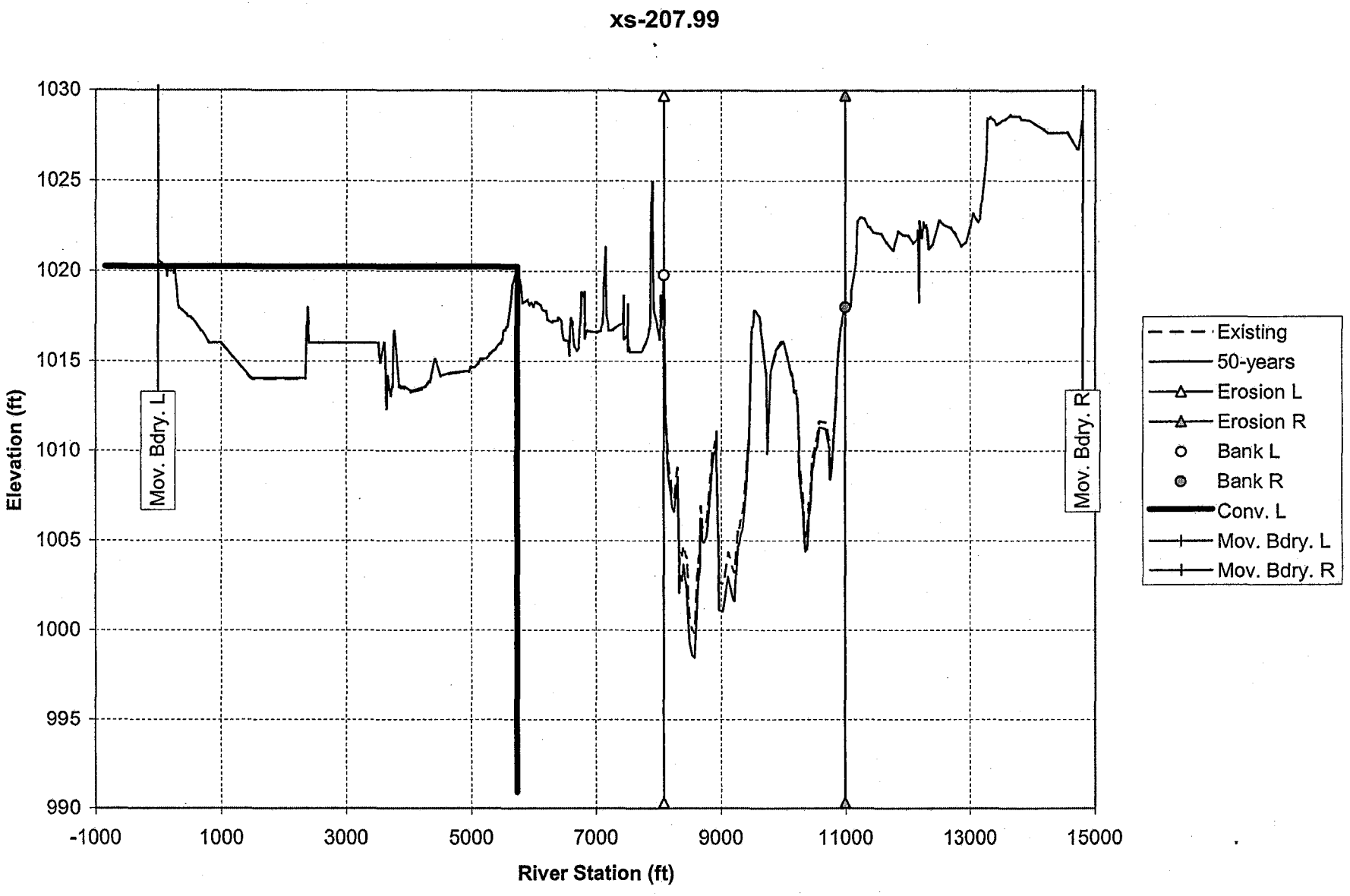

xs-207.53
Elevation (ft)
River Station (ft)
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

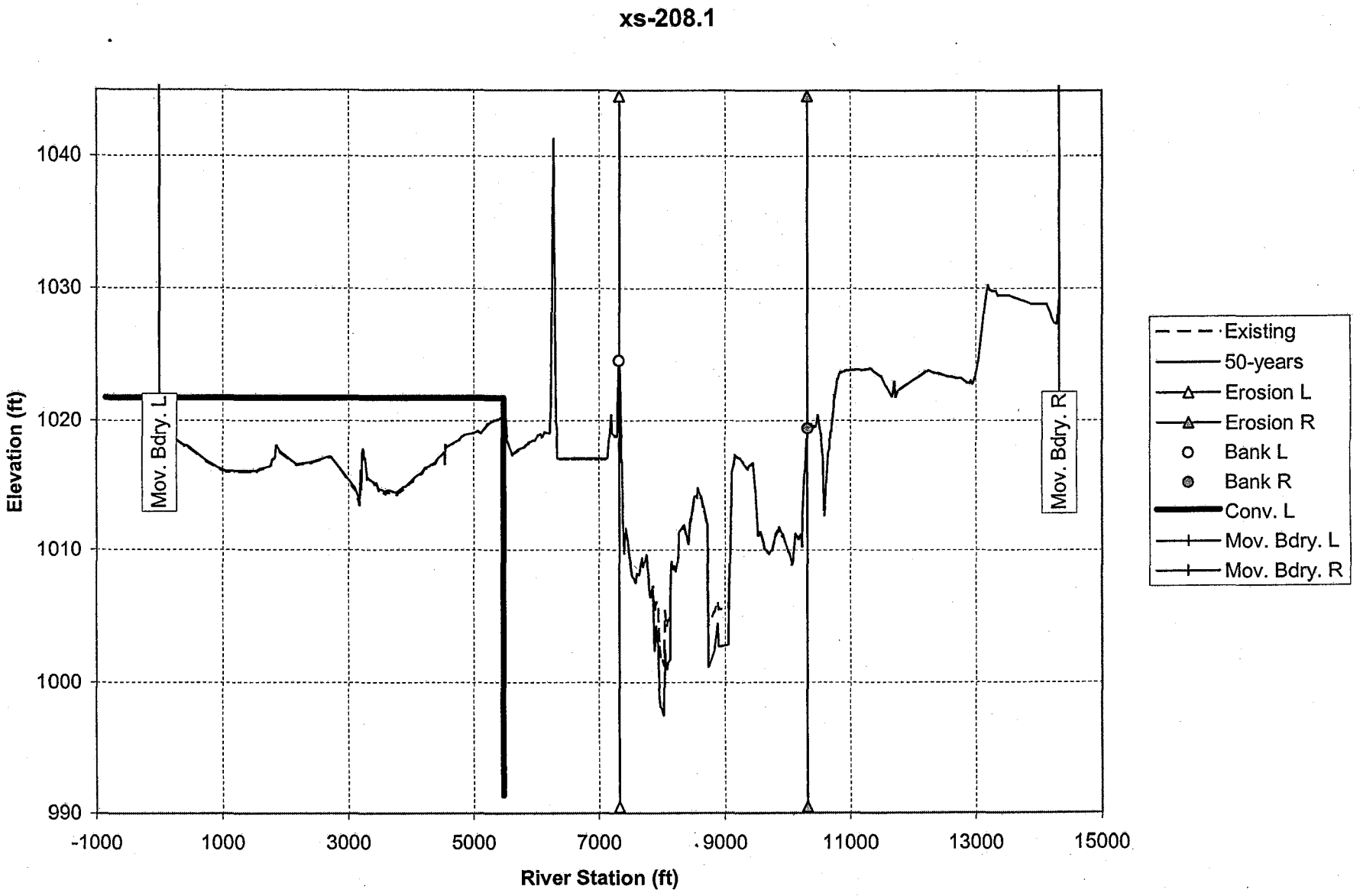

xs-207.62
Elevation (ft)
River Station (ft)
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

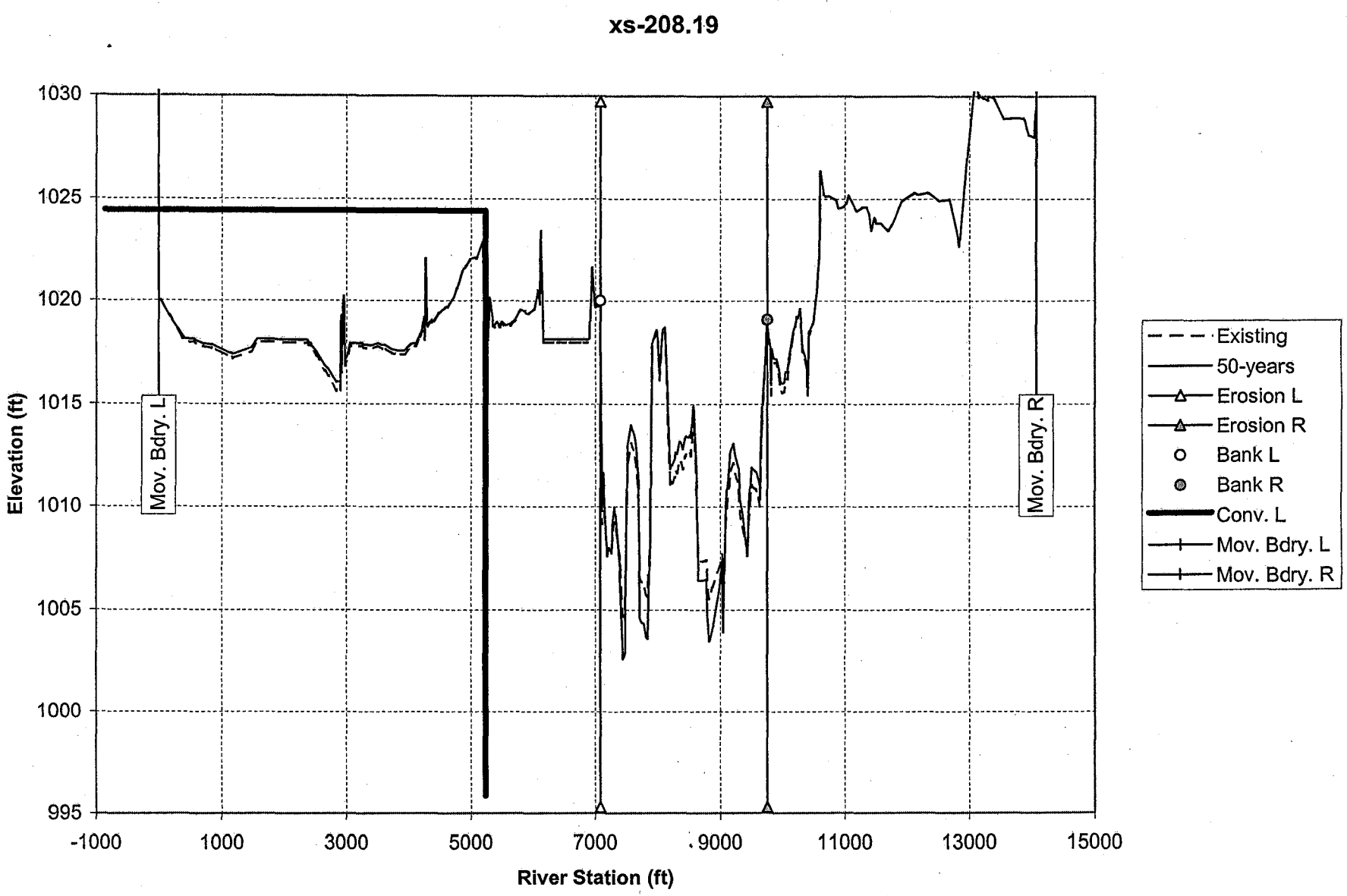

xs-207.71
Elevation (ft)
River Station (ft)
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

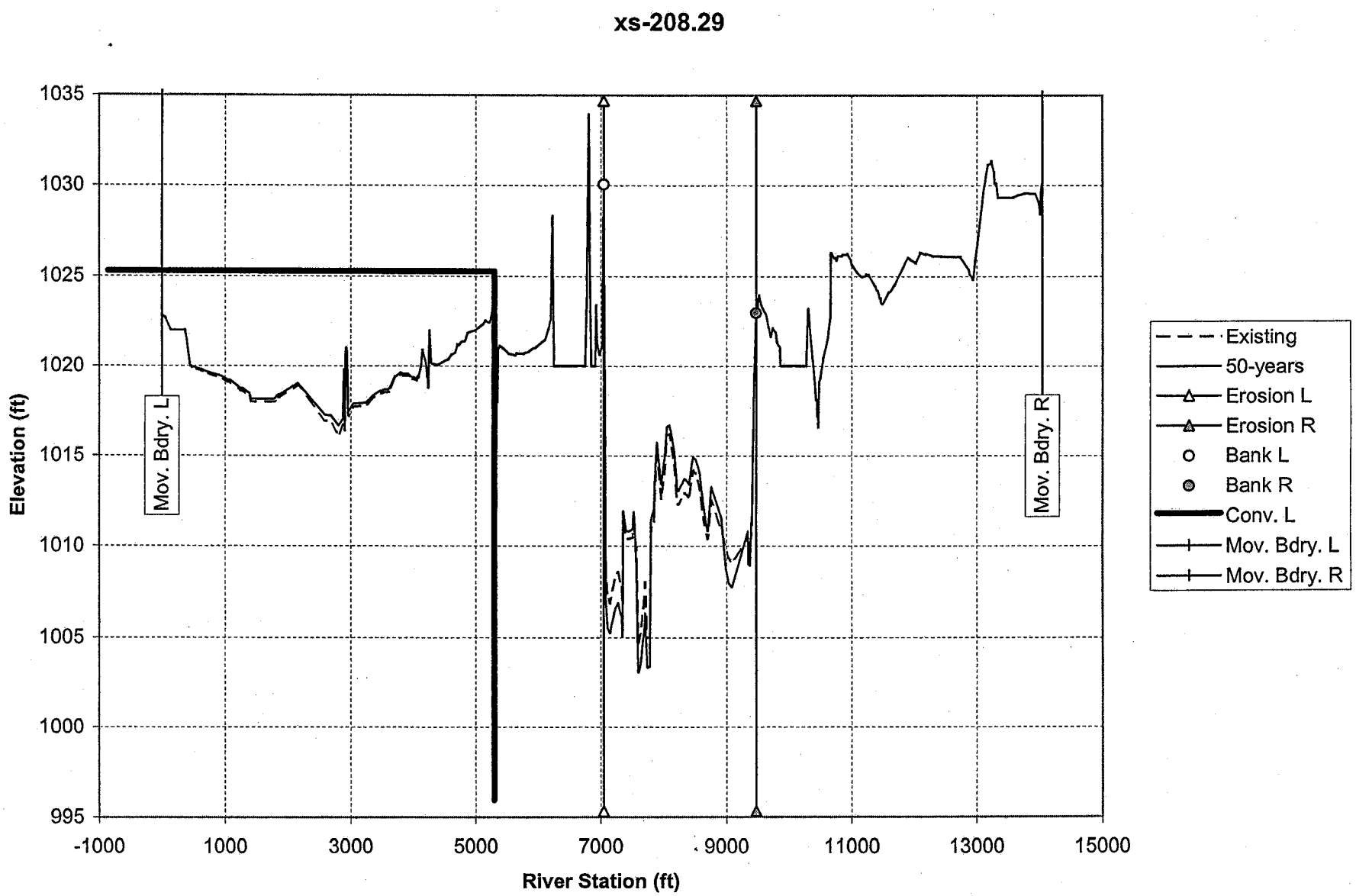

xs-207.8
Elevation (ft)
River Station (ft)
1030
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

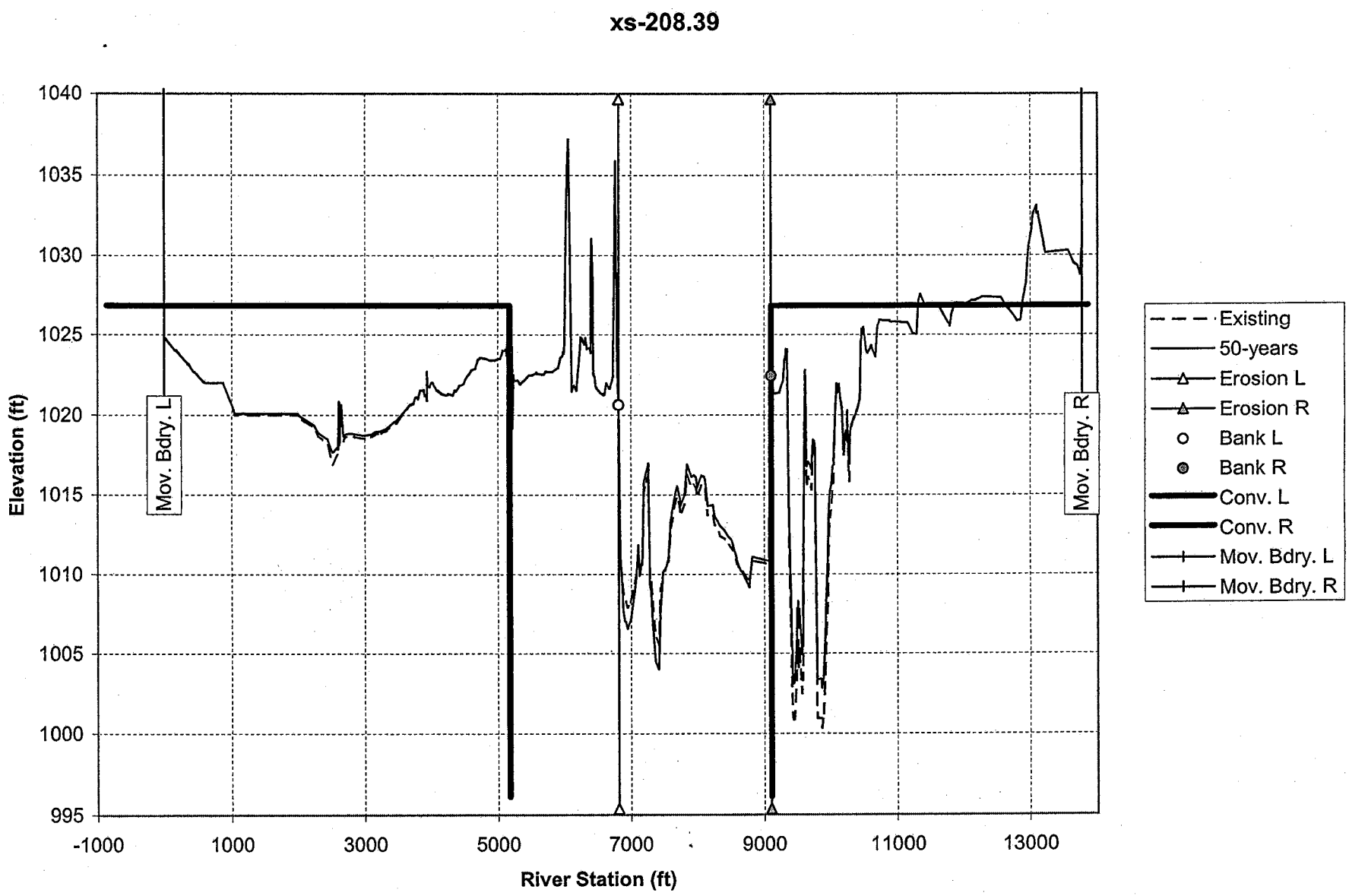

xs-207.9
Elevation (ft)
River Station (ft)
1030
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

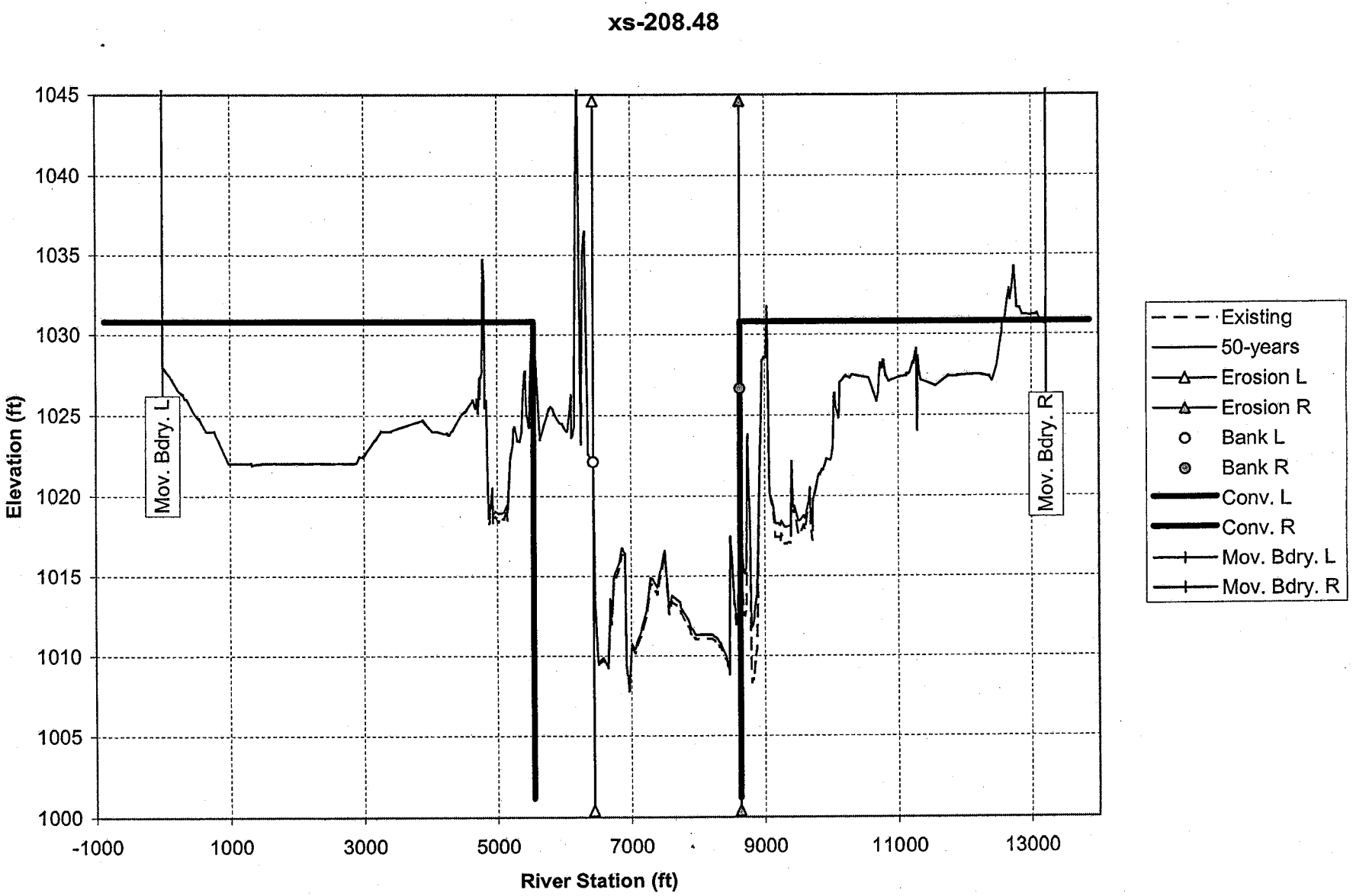

xs-207.99
Elevation (ft)
River Station (ft)
1030
1025
1020
1015
1010
1005
1000
995
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

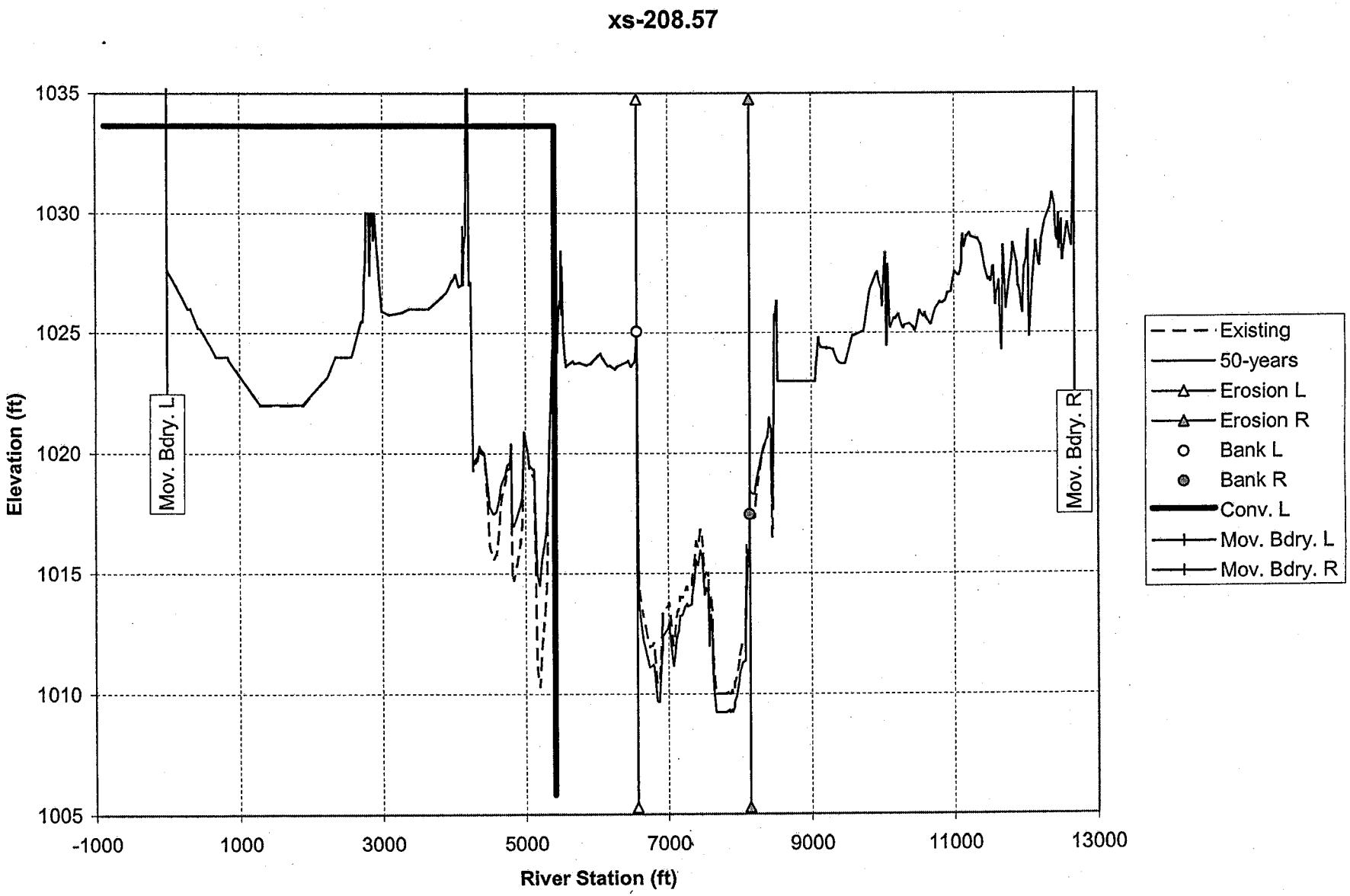

xs-208.1
Elevation (ft)
1040
1030
1020
1010
1000
990
-1000
1000
3000
5000
7000
9000
11000
13000
15000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

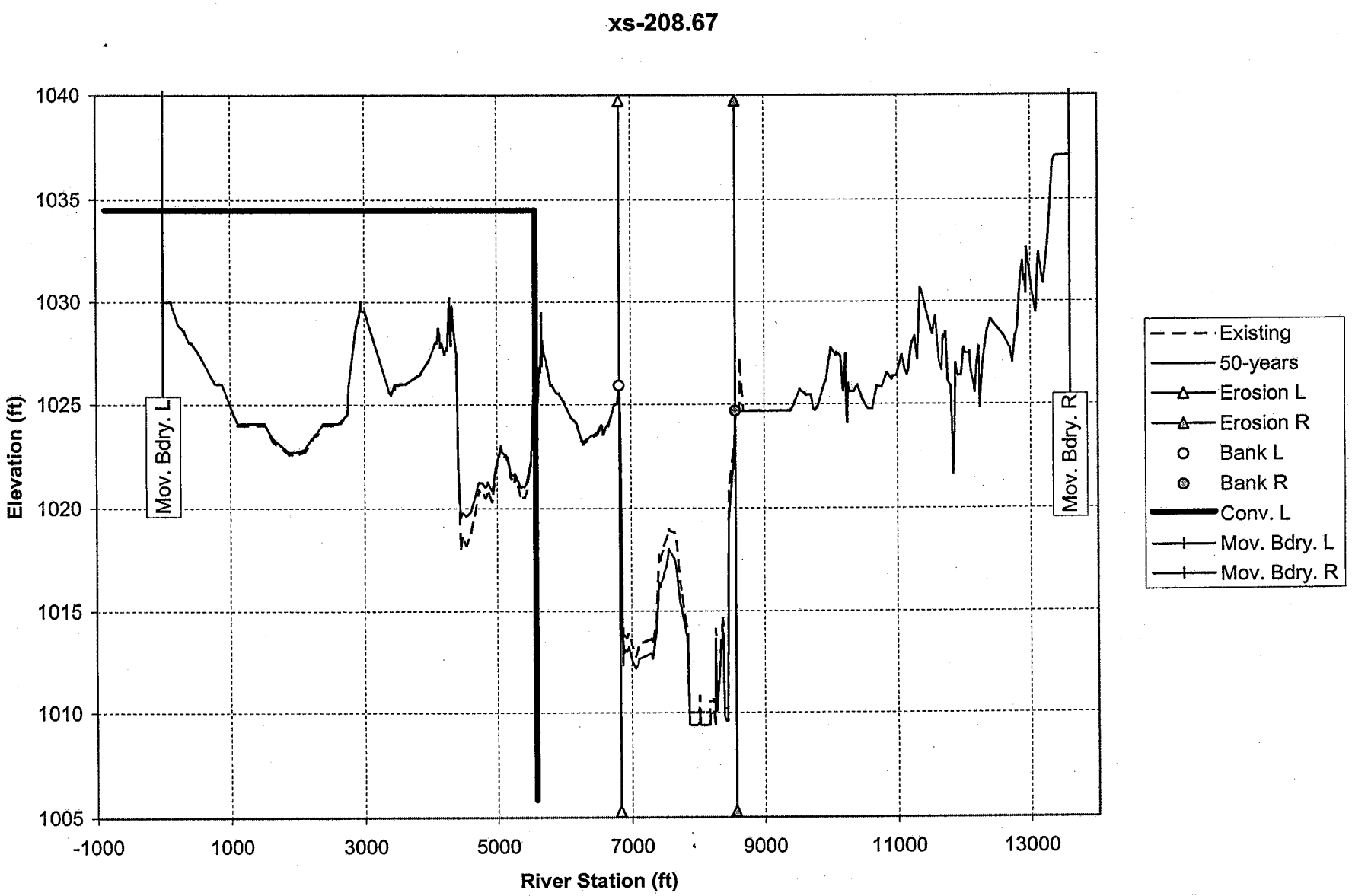

xs-208.19
Elevation (ft)
River Station (ft)
1030
1025
1020
1015
1010
1005
1000
995
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

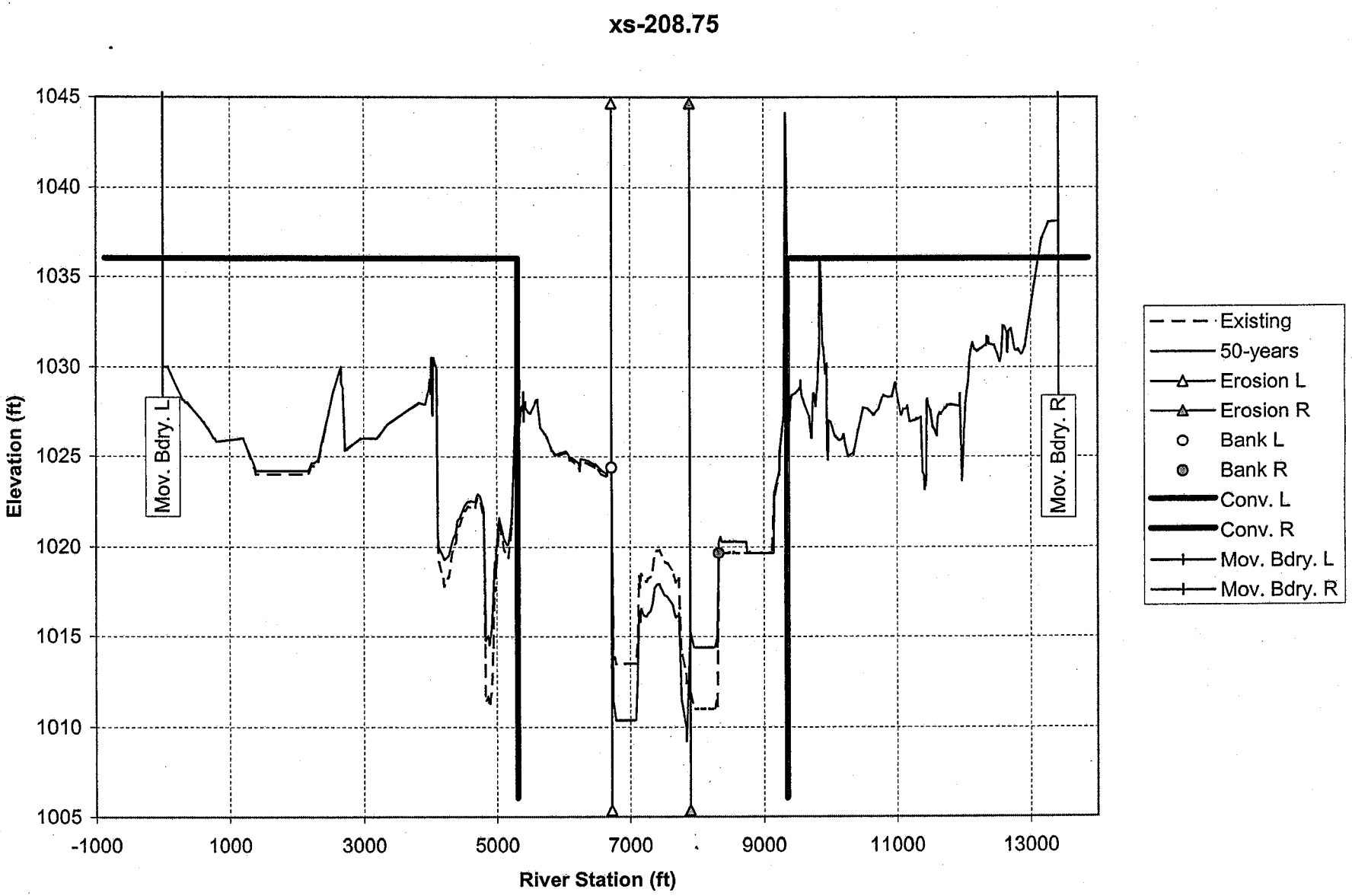

xs-208.29
Elevation (ft)
River Station (ft)
1035
1030
1025
1020
1015
1010
1005
1000
995
-1000
1000
3000
5000
7000
9000
11000
13000
15000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

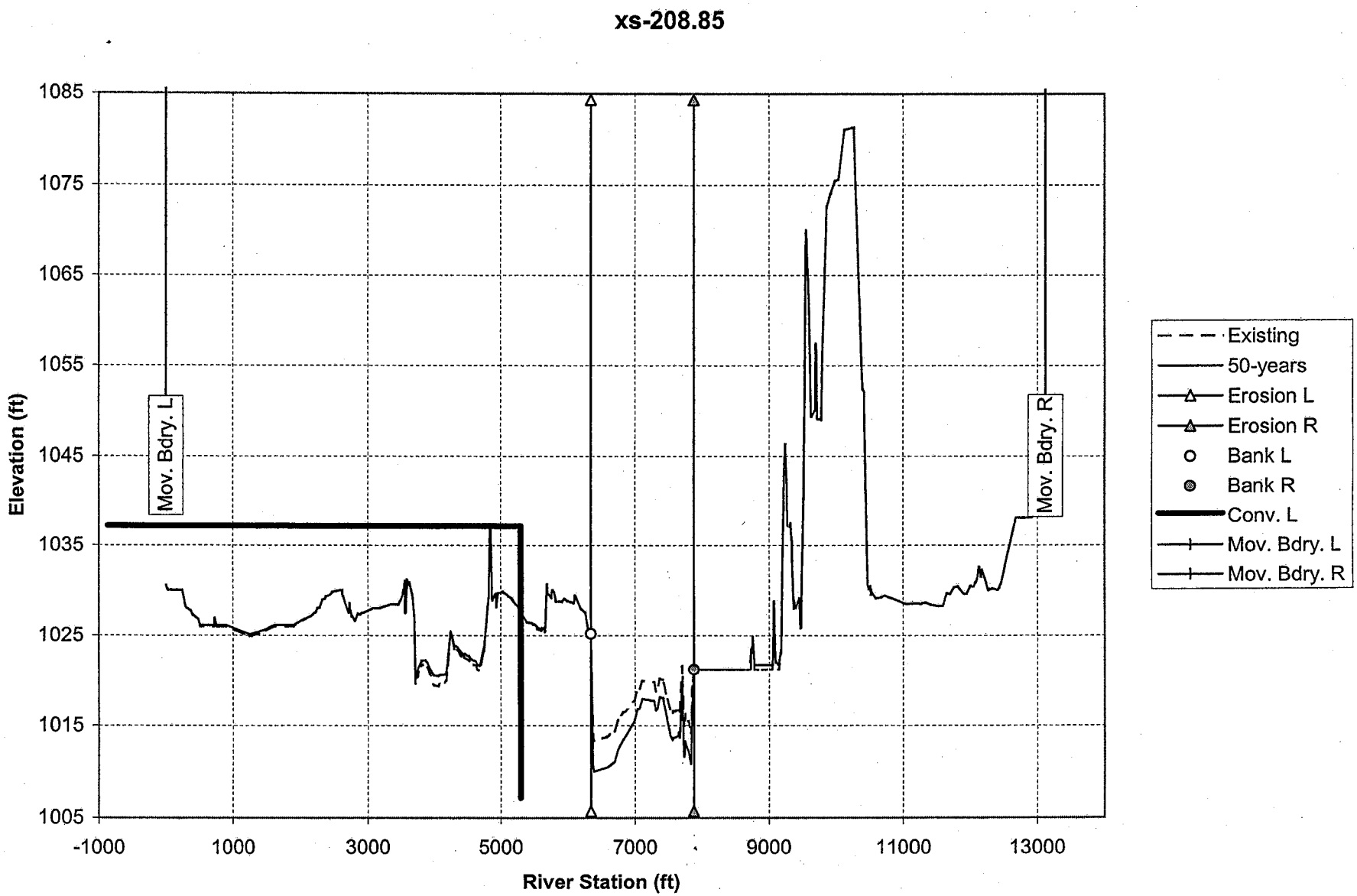

xs-208.39
Elevation (ft)
1040
1035
1030
1025
1020
1015
1010
1005
1000
995
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

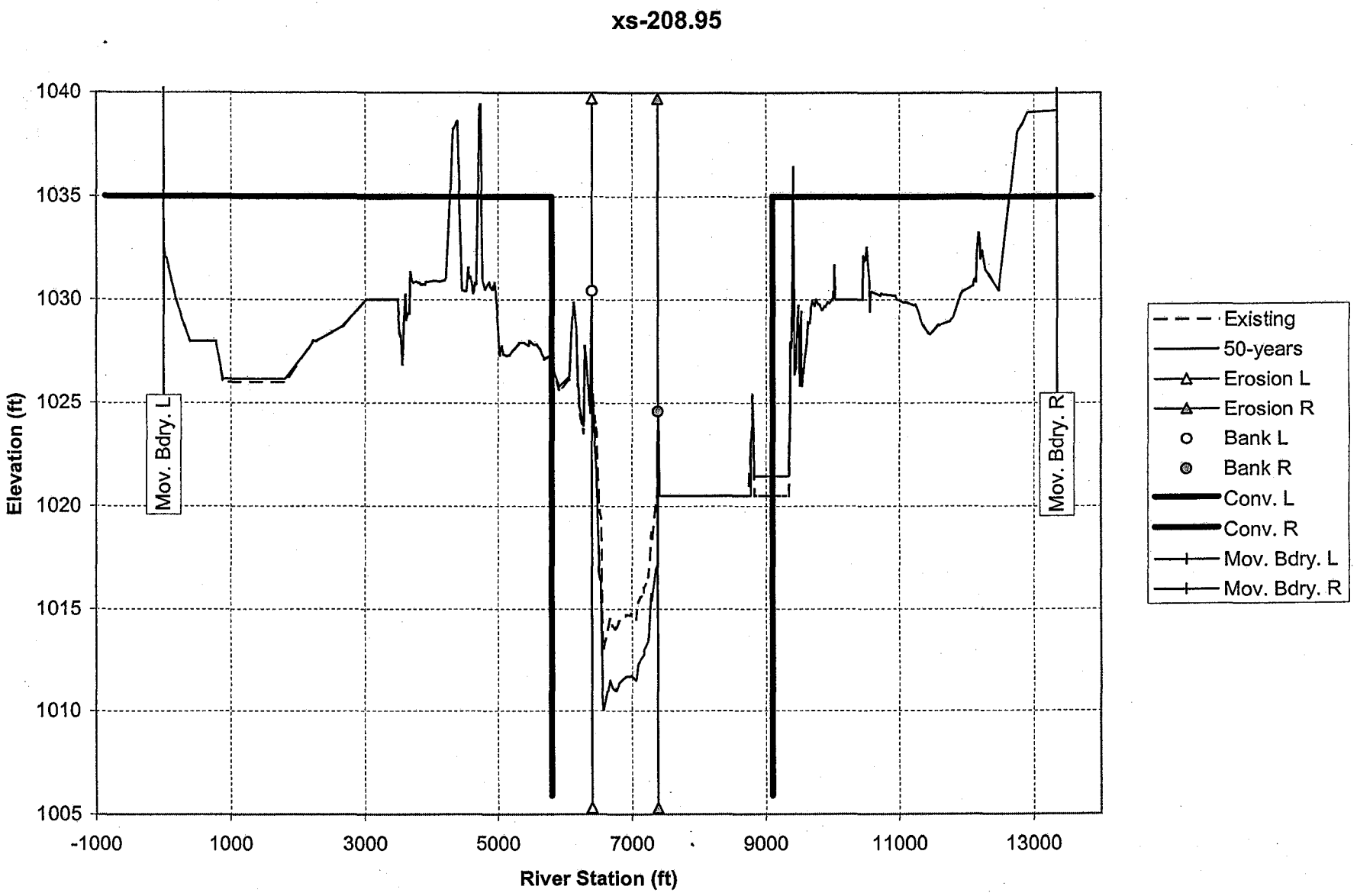

xs-208.48
Elevation (ft)
1045
1040
1035
1030
1025
1020
1015
1010
1005
1000
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

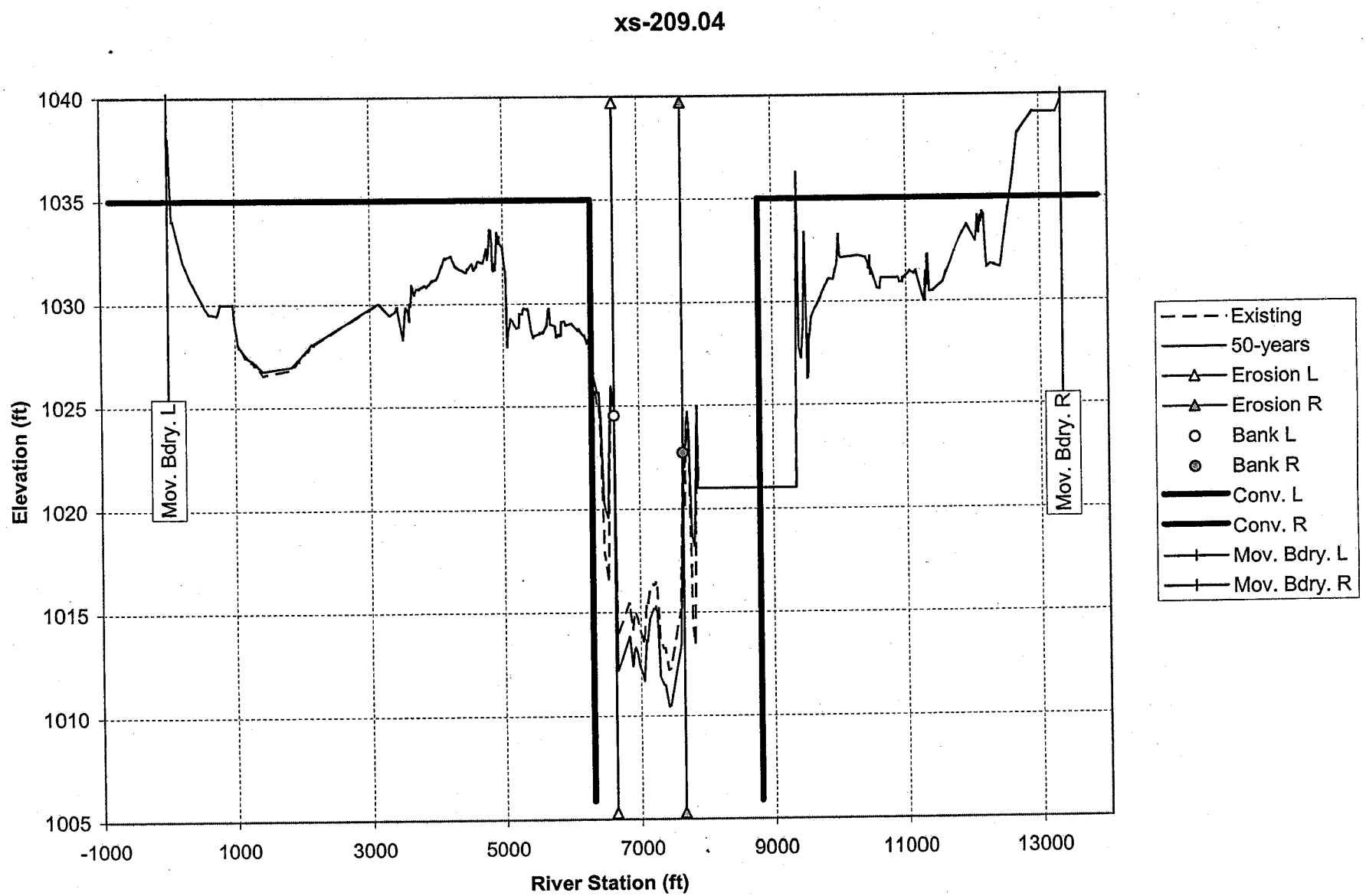

xs-208.57
Elevation (ft)
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

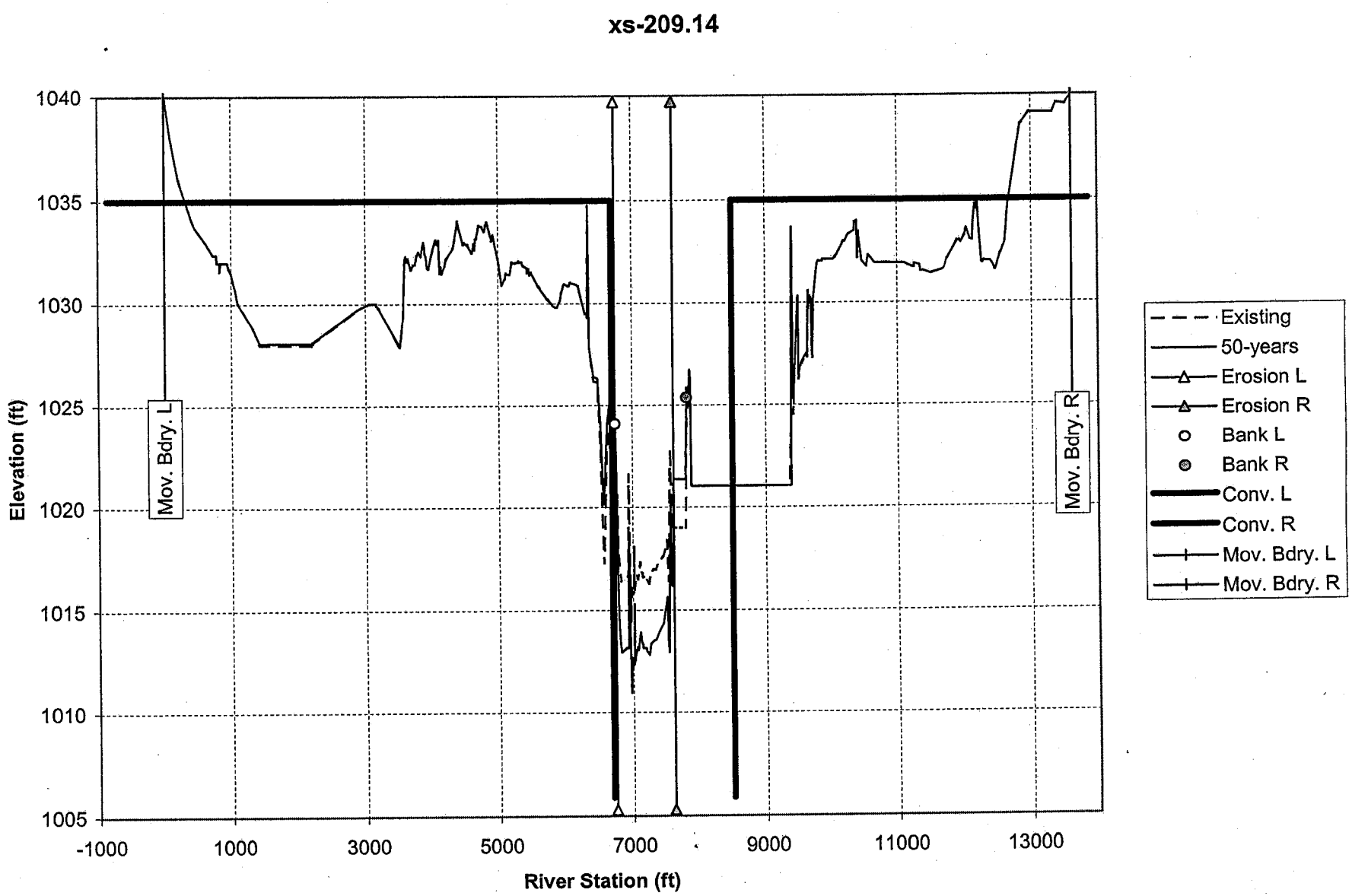

xs-208.67
Elevation (ft)
River Station (ft)
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

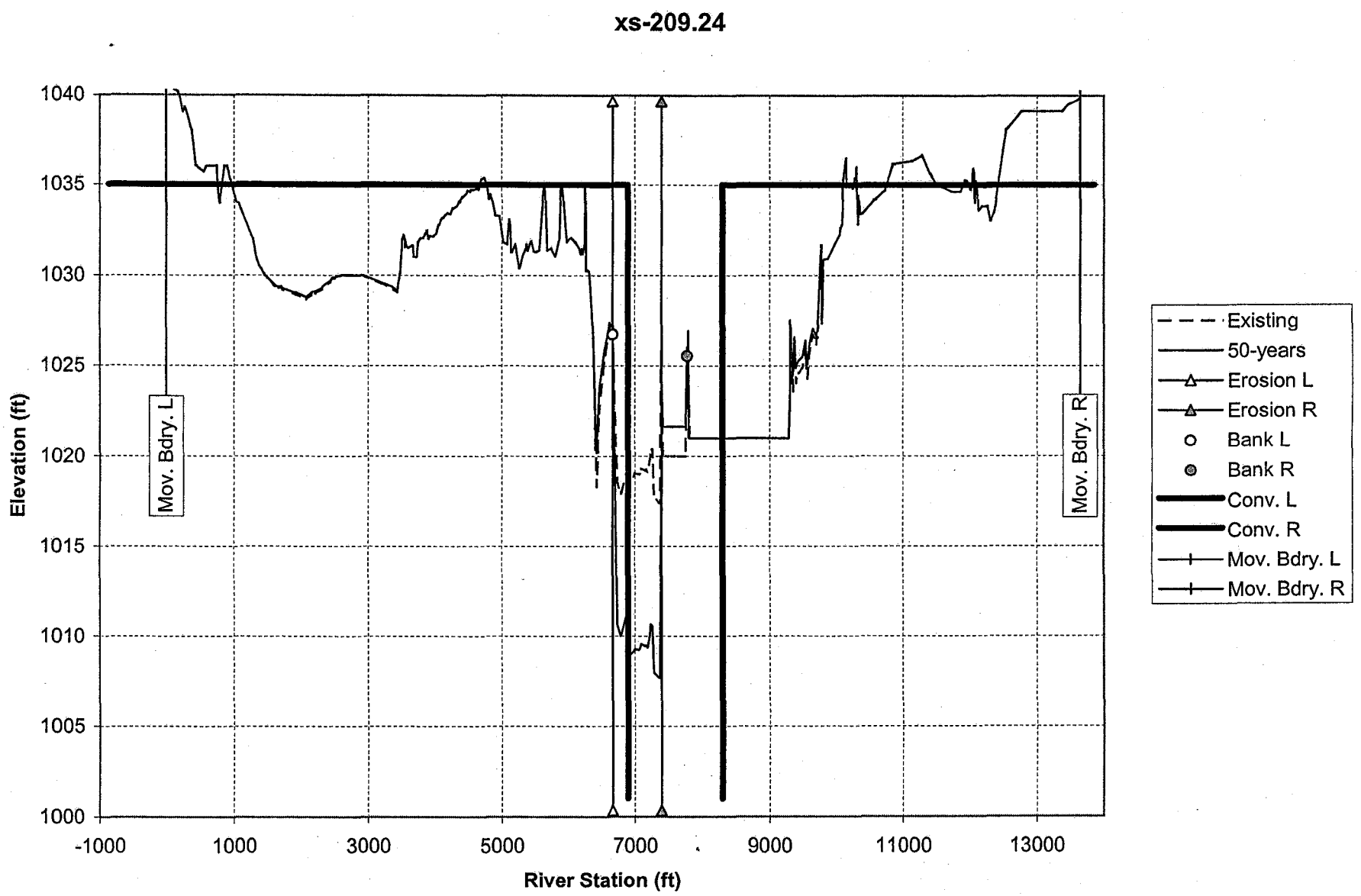

xs-208.75
Elevation (ft)
1045
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

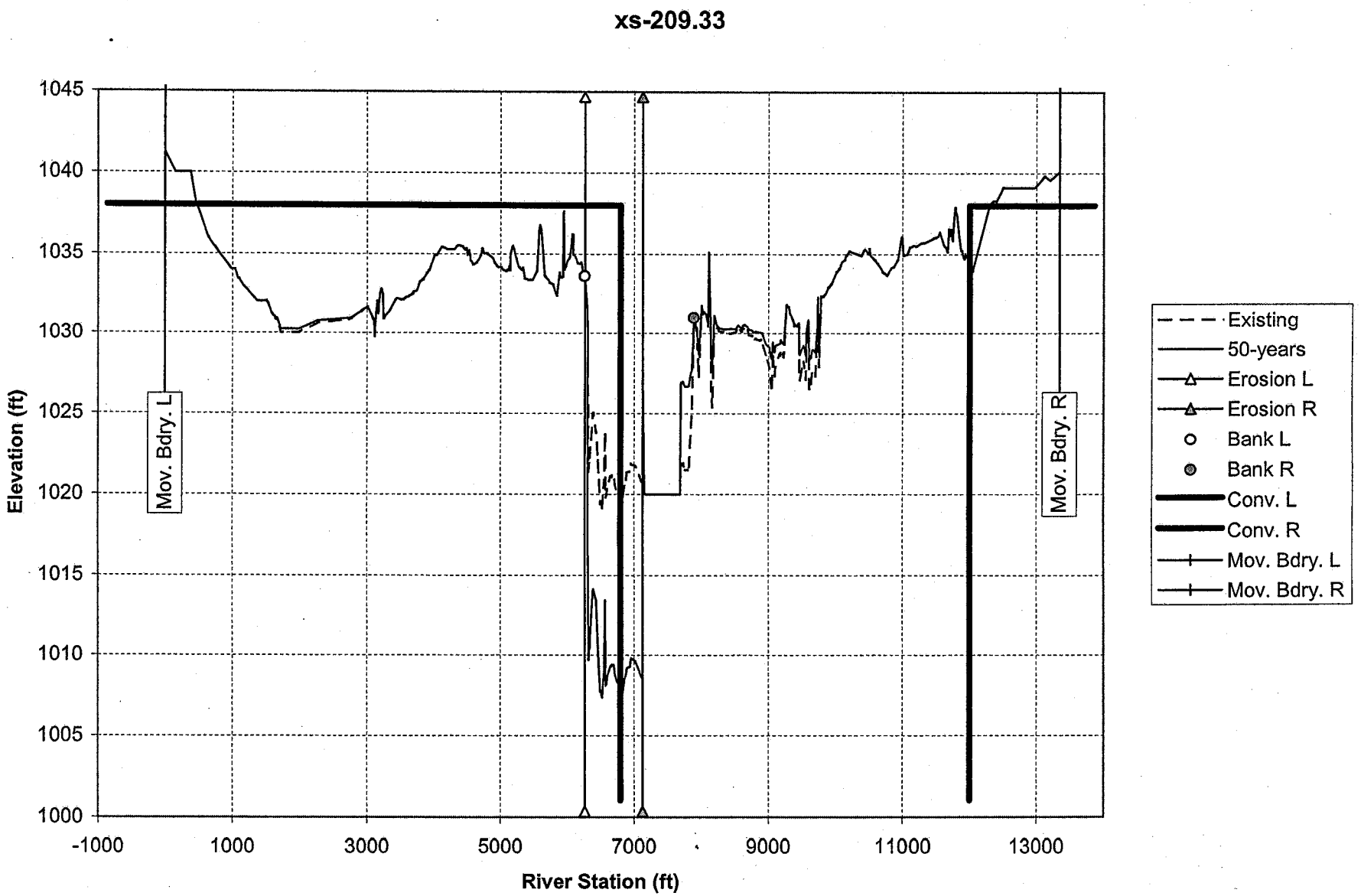

xs-208.85
Elevation (ft)
River Station (ft)
1085
1075
1065
1055
1045
1035
1025
1015
1005
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

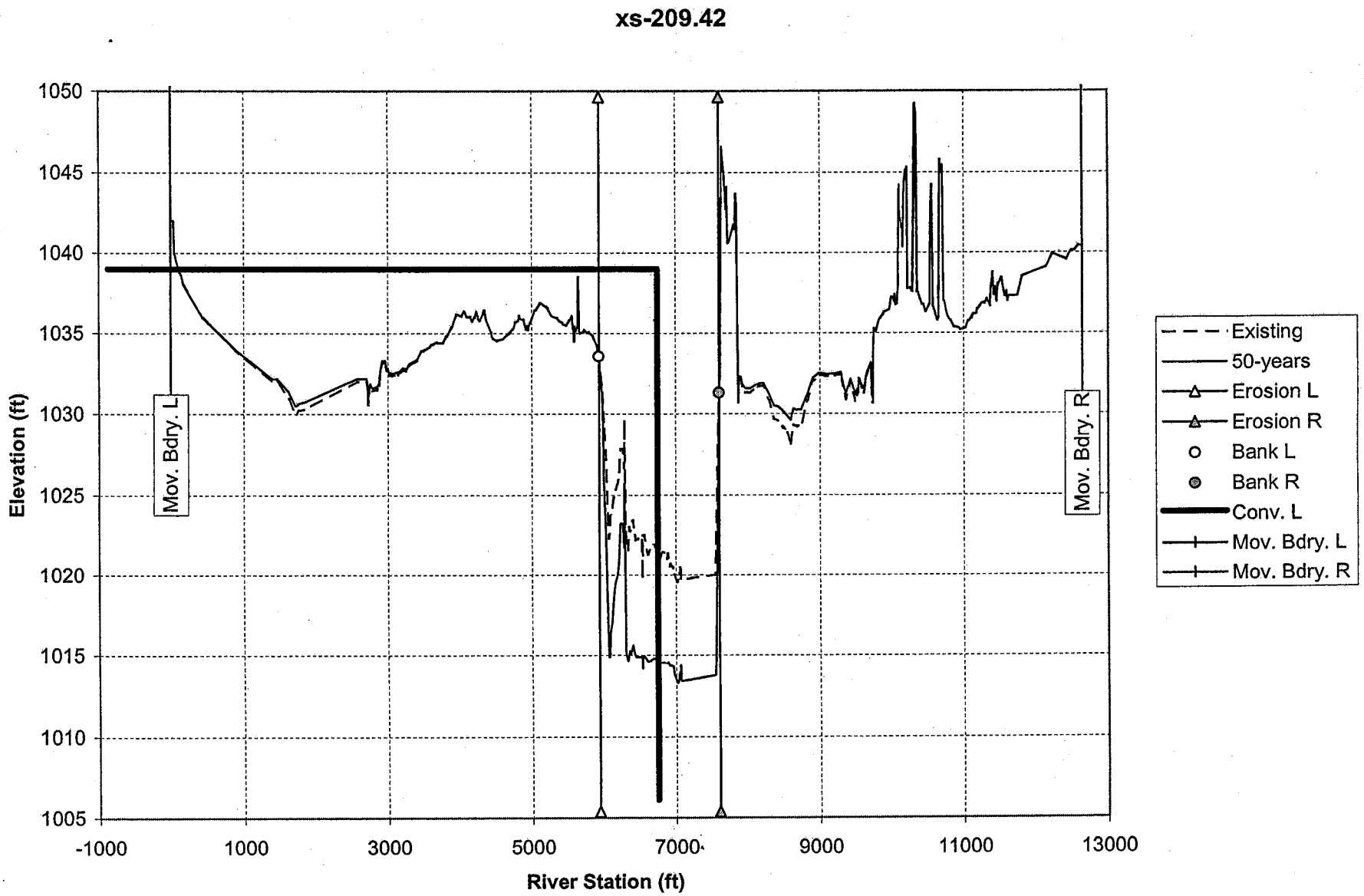

xs-208.95
Elevation (ft)
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

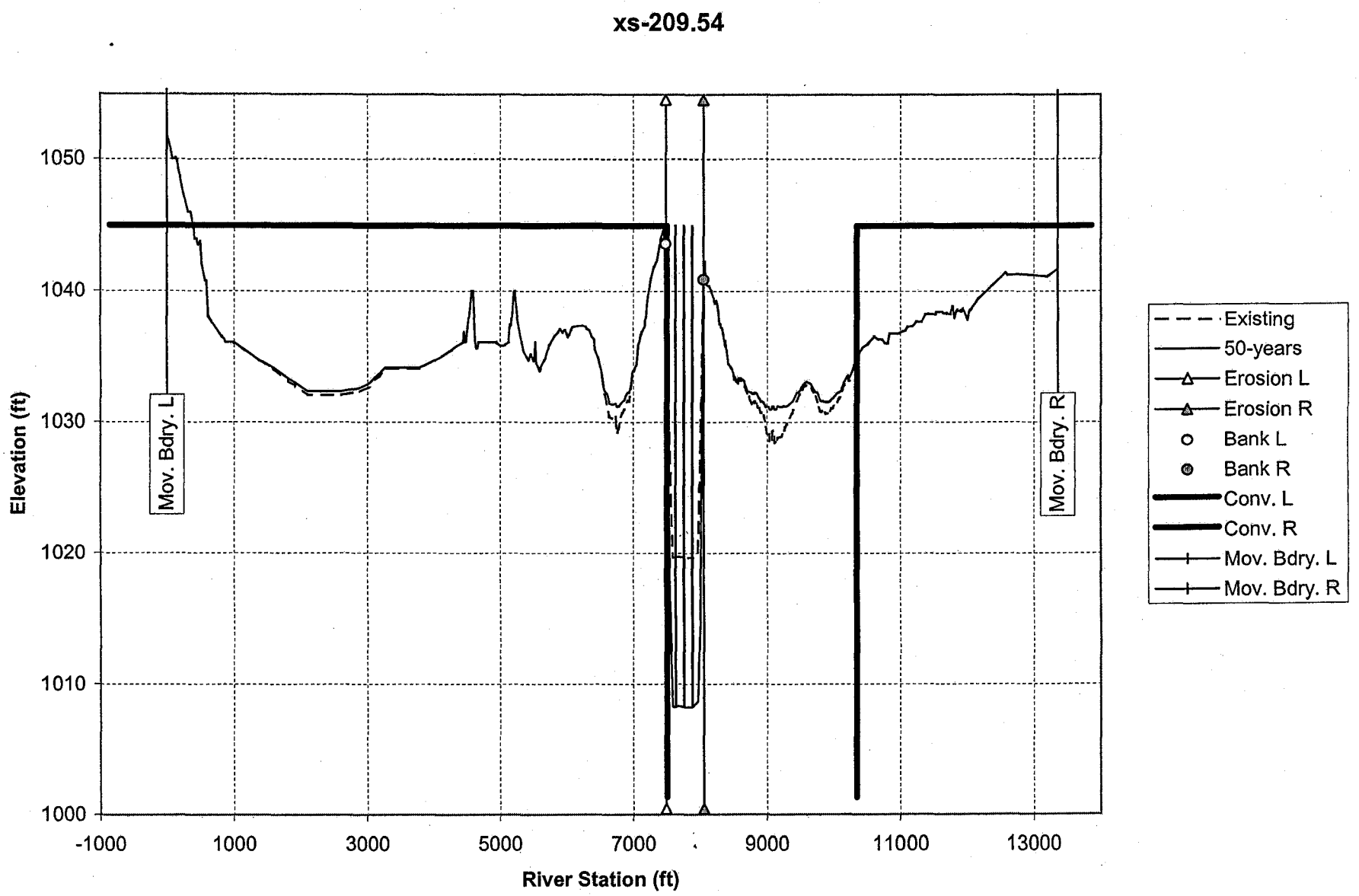

xs-209.04
Elevation (ft)
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

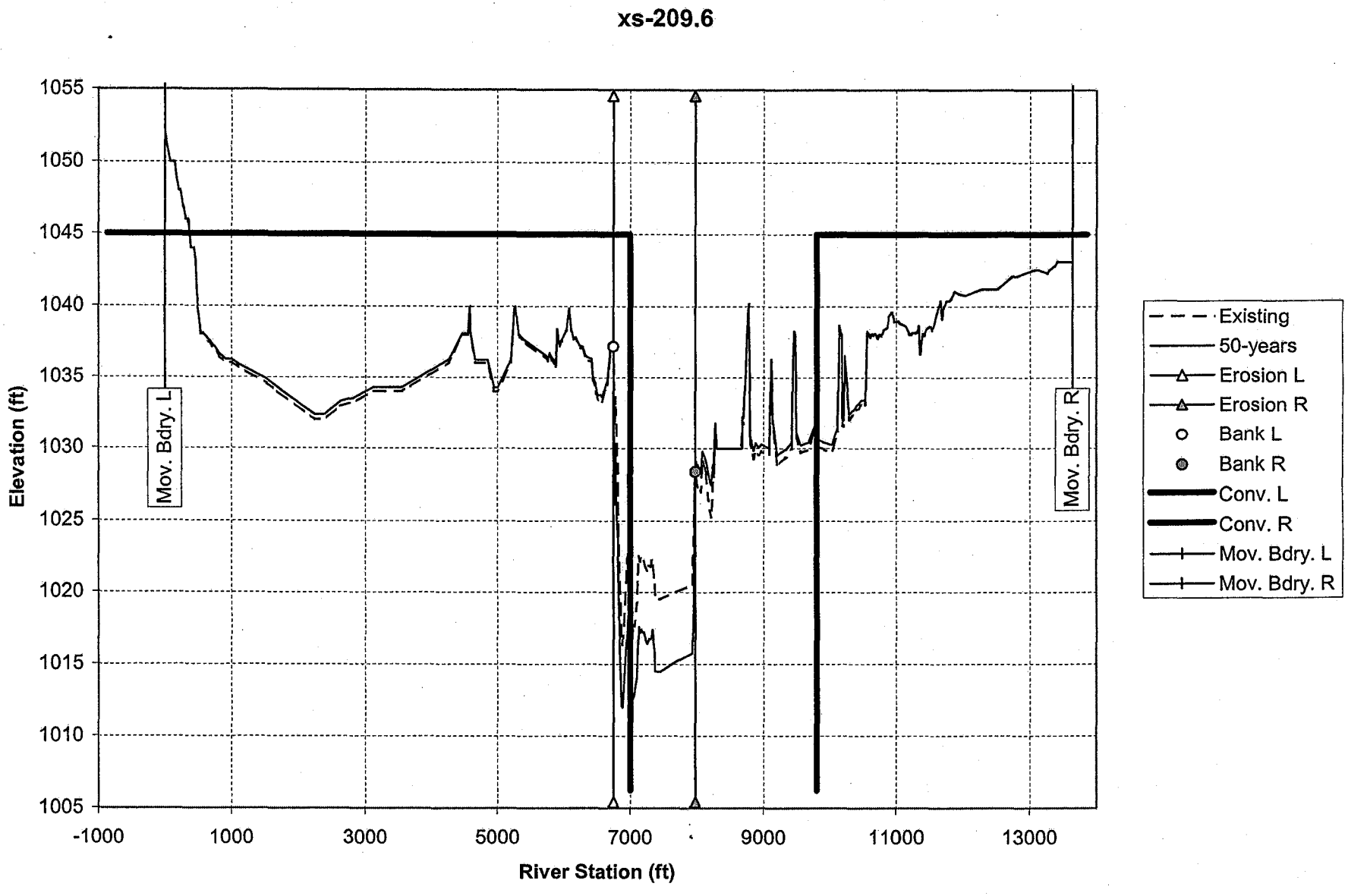

xs-209.14
Elevation (ft)
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

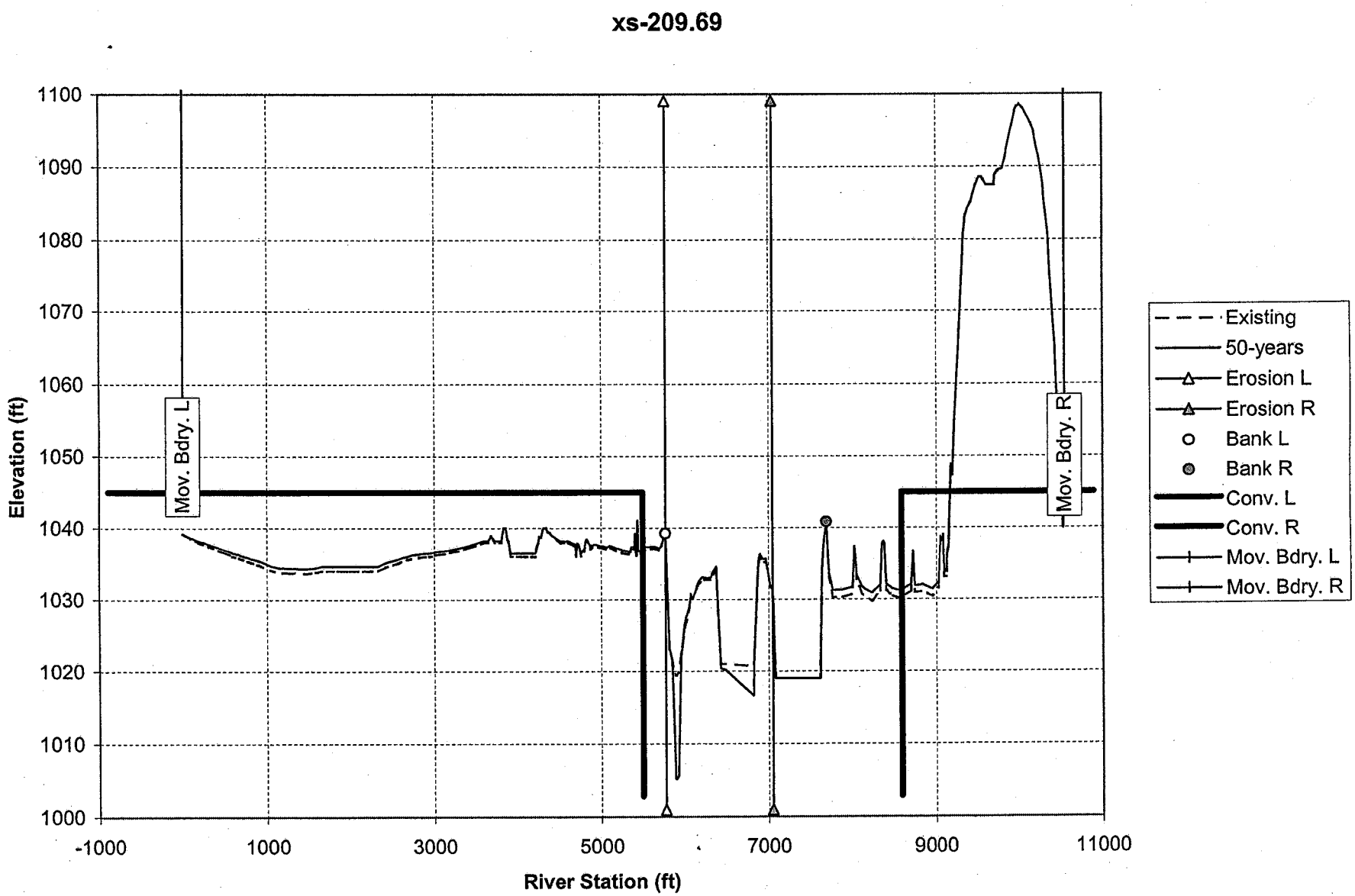

xs-209.24
Elevation (ft)
River Station (ft)
1040
1035
1030
1025
1020
1015
1010
1005
1000
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

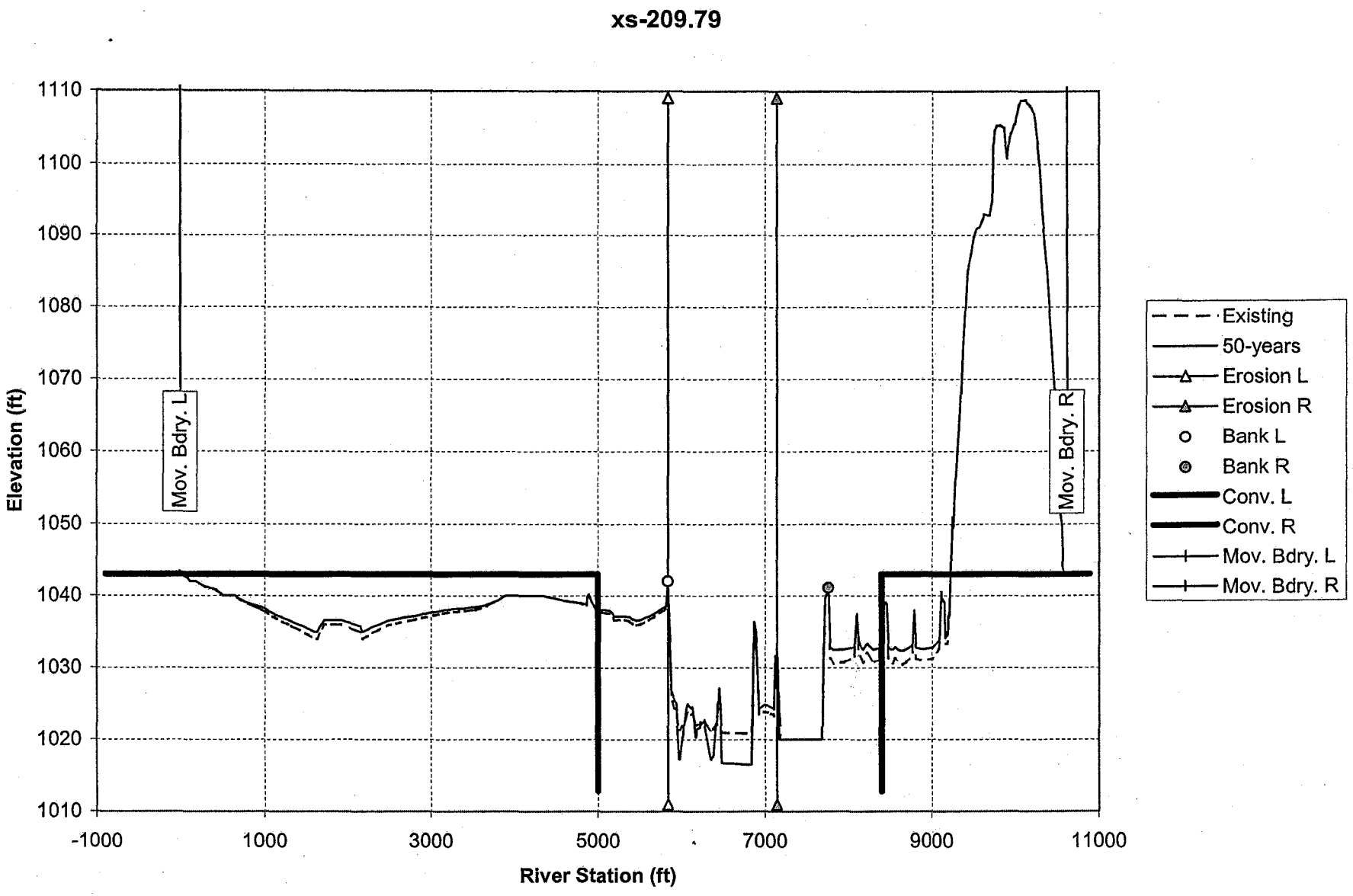

xs-209.33
Elevation (ft)
1045
1040
1035
1030
1025
1020
1015
1010
1005
1000
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

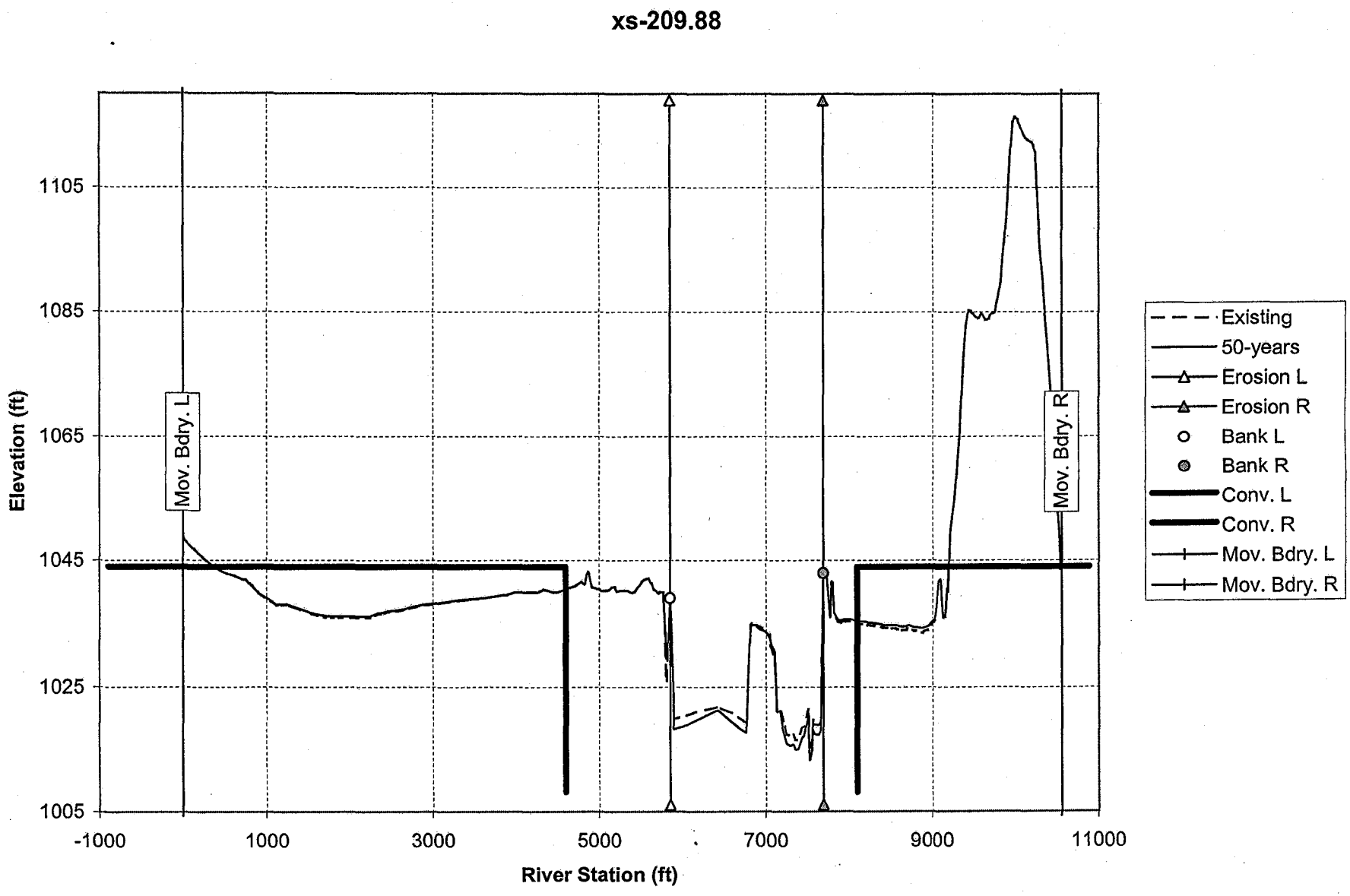

xs-209.42
Elevation (ft)
River Station (ft)
1050
1045
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Mov. Bdry. L
Mov. Bdry. R

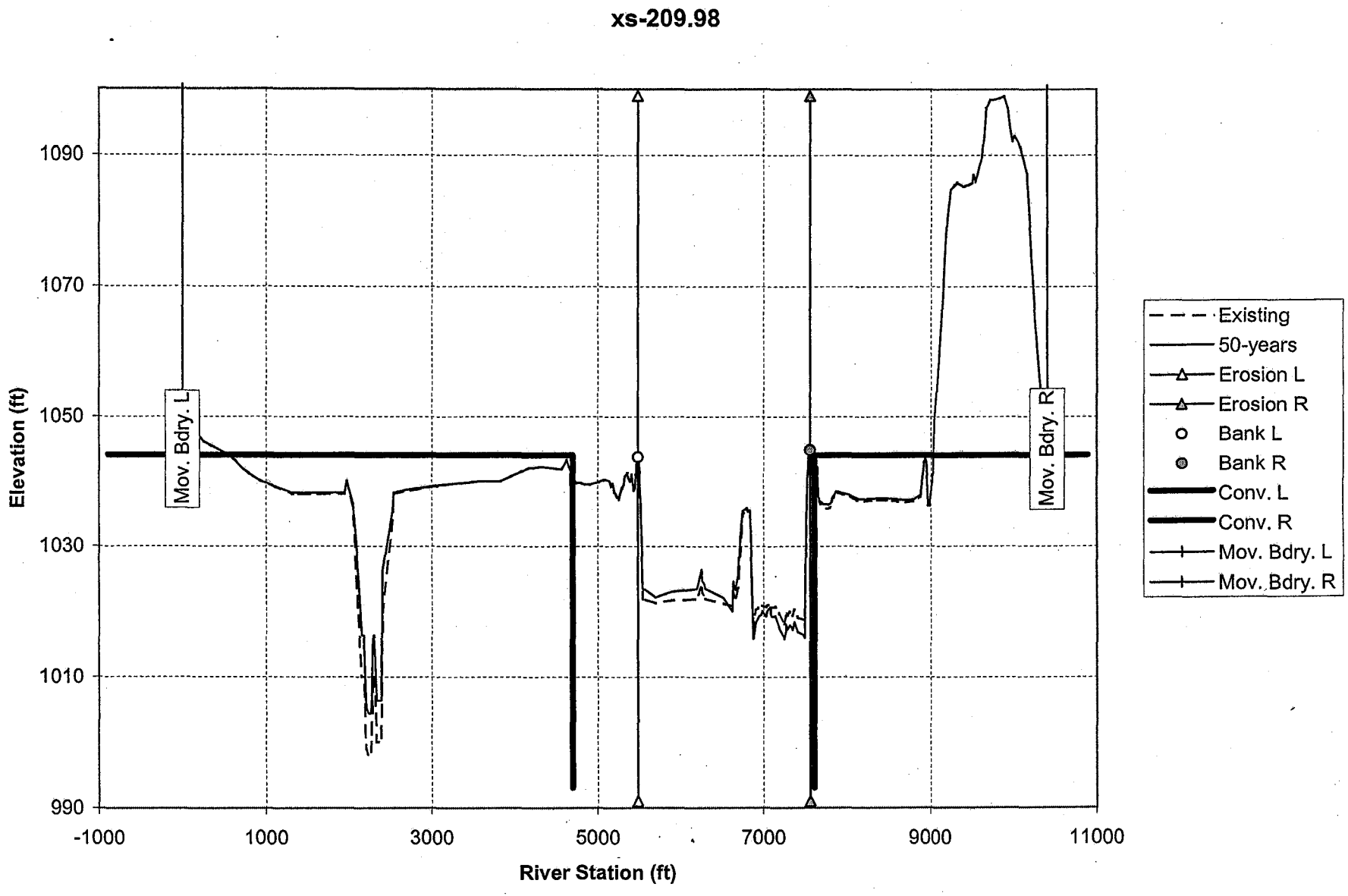

xs-209.54
Elevation (ft)
1050
1040
1030
1020
1010
1000
-1000
1000
3000
5000
7000
9000
11000
13000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

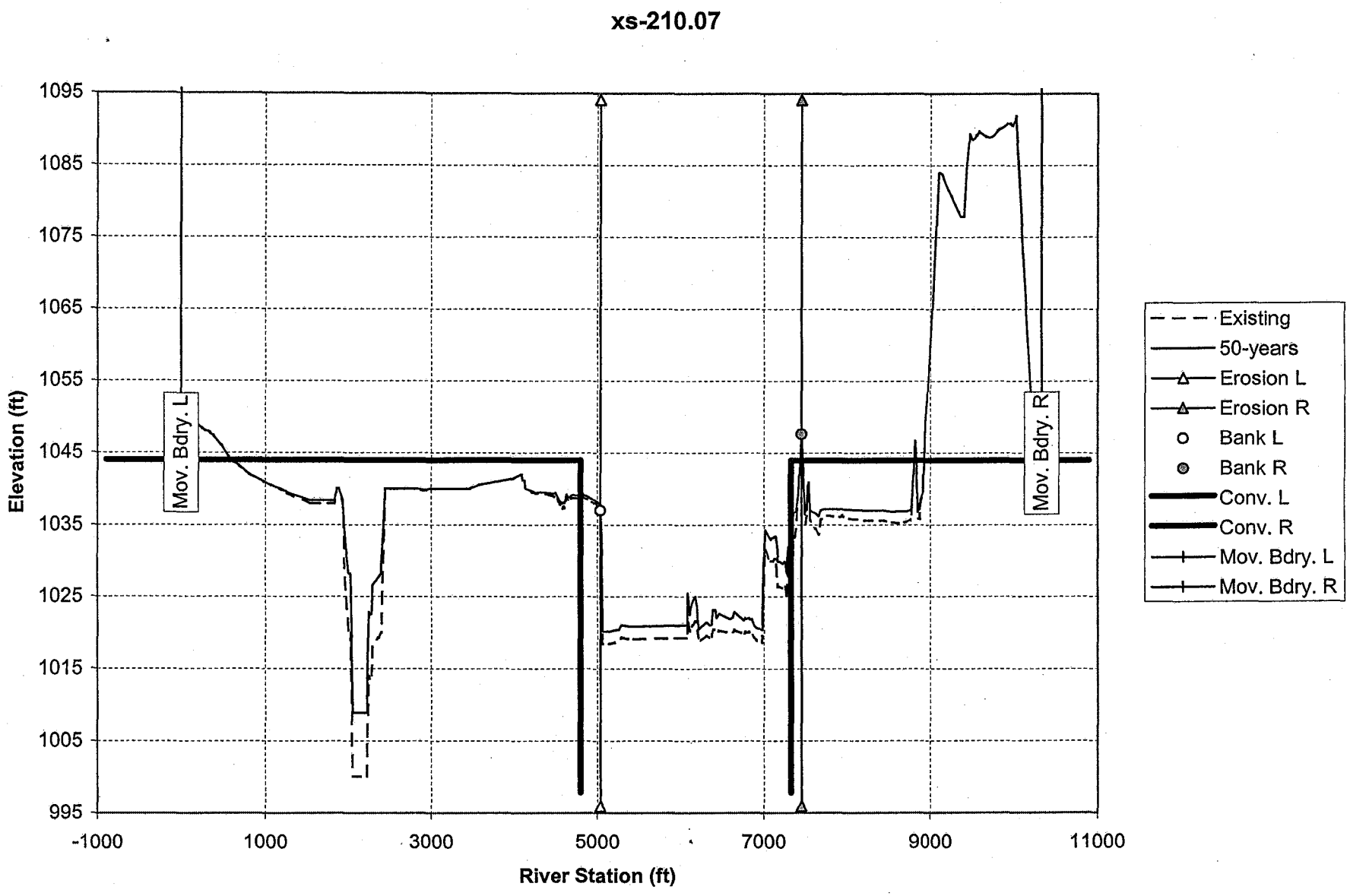

xs-209.6
Elevation (ft)
River Station (ft)
1055
1050
1045
1040
1035
1030
1025
1020
1015
1010
1005
-1000
1000
3000
5000
7000
9000
11000
13000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

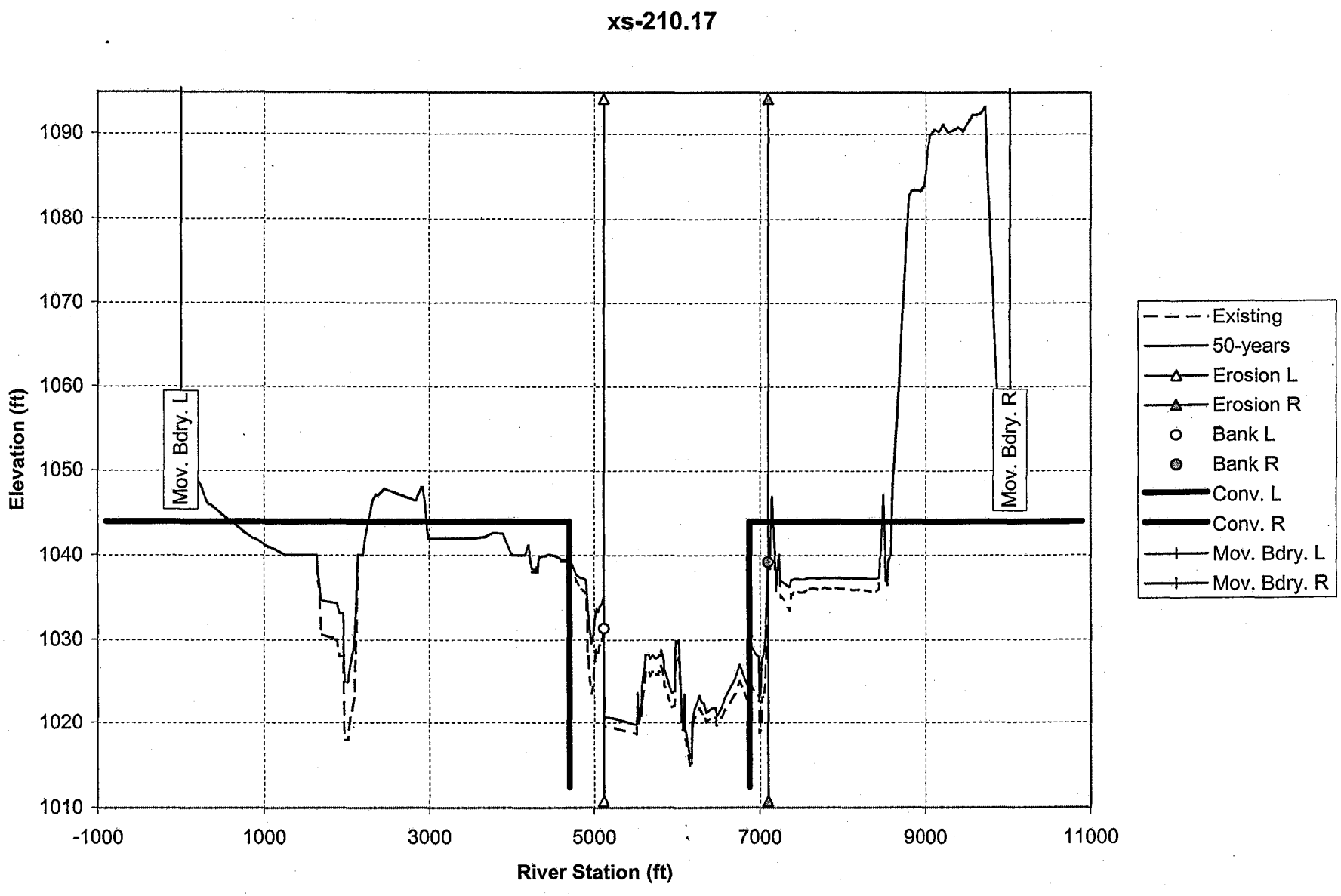

xs-209.69
Elevation (ft)
River Station (ft)
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
1000
-1000
1000
3000
5000
7000
9000
11000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

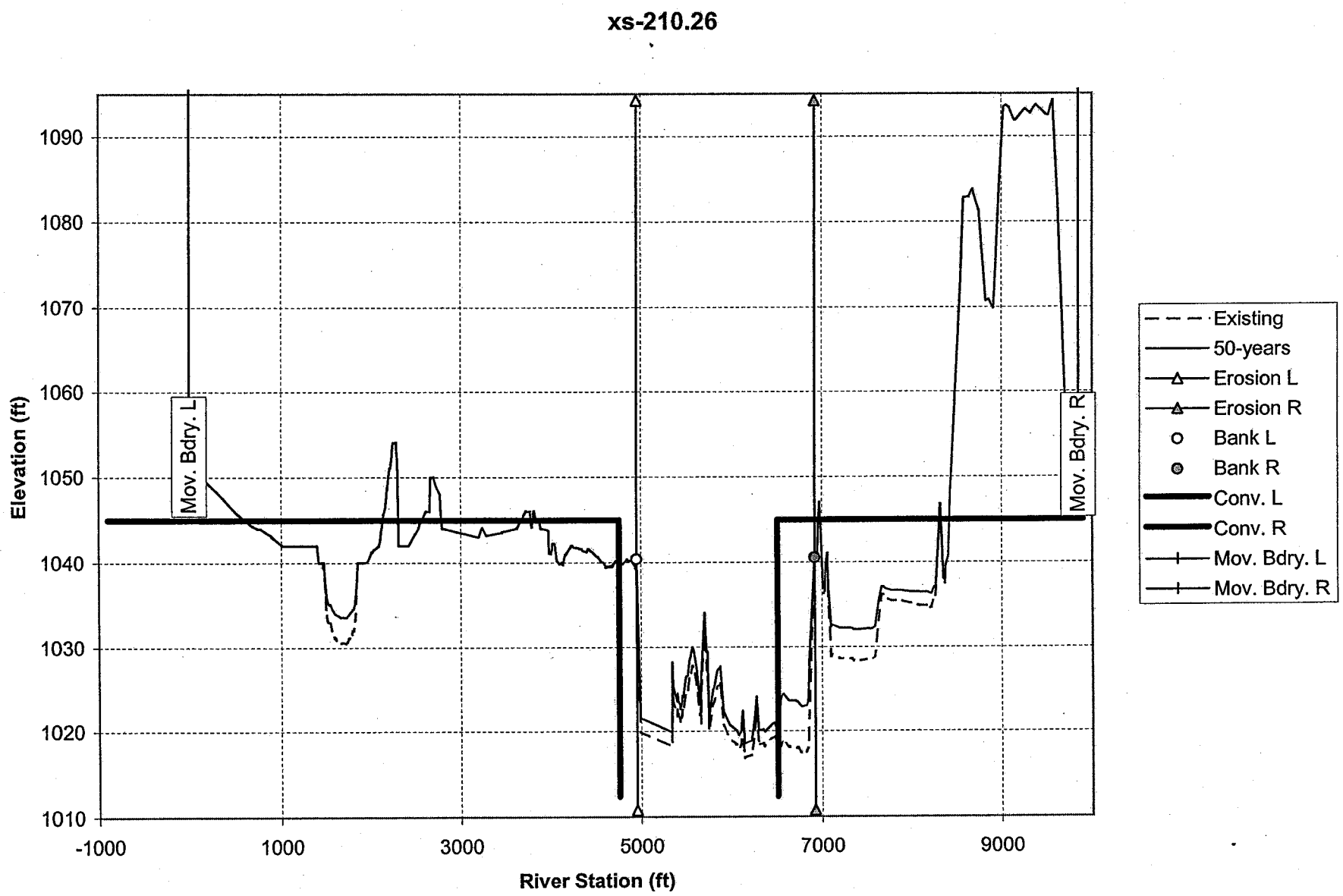

xs-209.79
Elevation (ft)
River Station (ft)
1110
1100
1090
1080
1070
1060
1050
1040
1030
1020
1010
-1000
1000
3000
5000
7000
9000
11000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

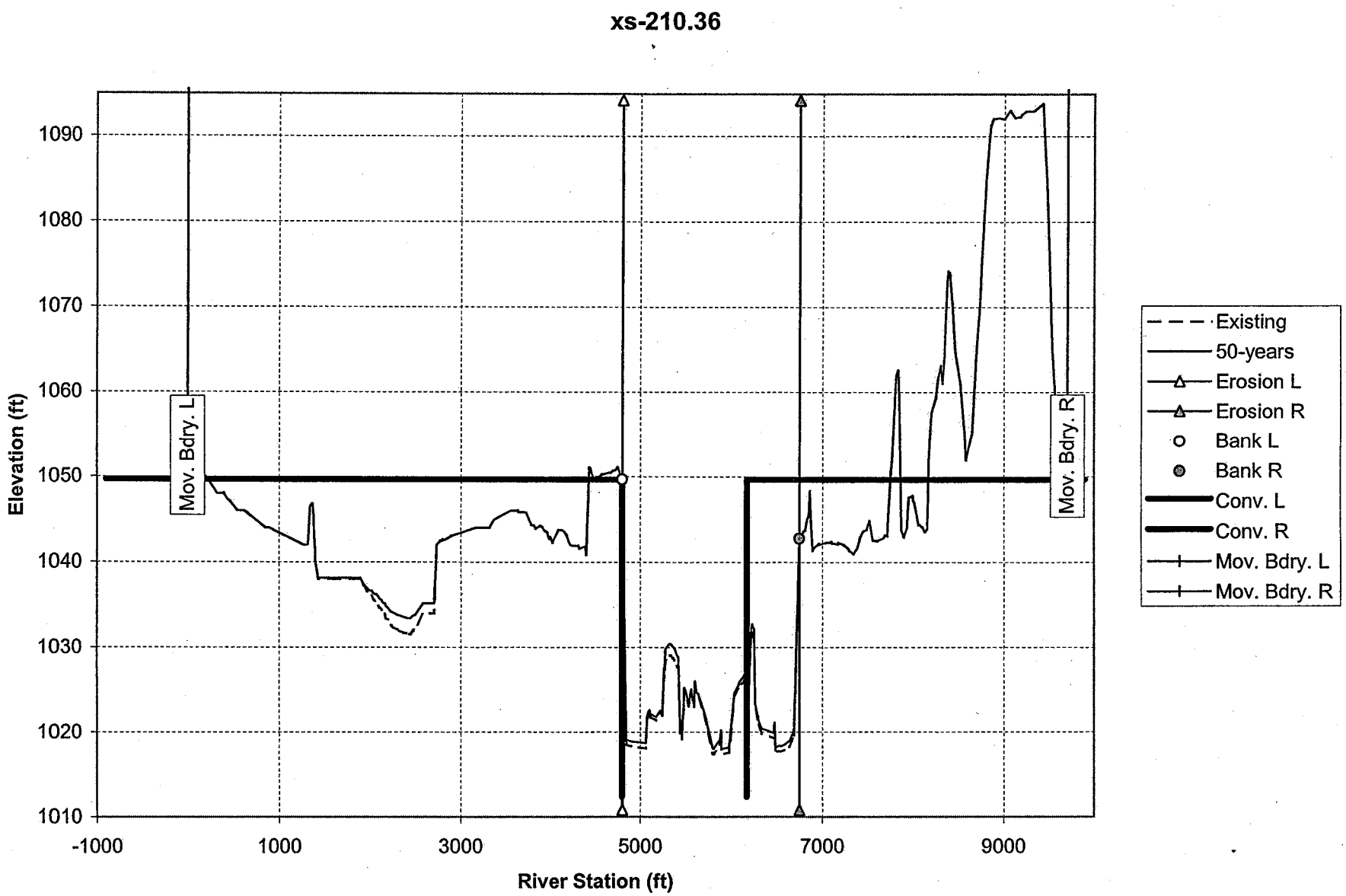

xs-209.88
Elevation (ft)
1105
1085
1065
1045
1025
1005
-1000
1000
3000
5000
7000
9000
11000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

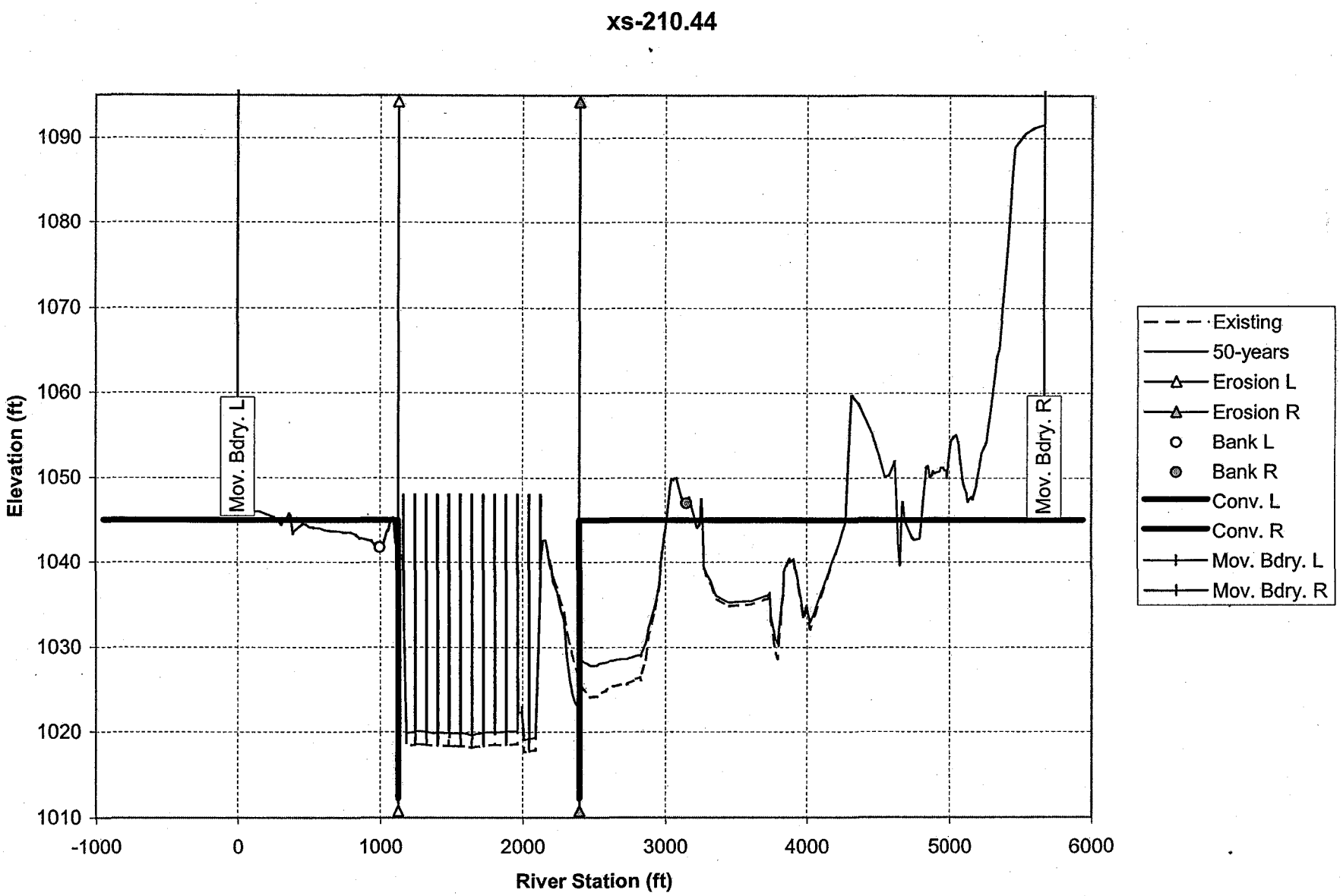

xs-209.98
Elevation (ft)
1090
1070
1050
1030
1010
990
-1000
1000
3000
5000
7000
9000
11000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

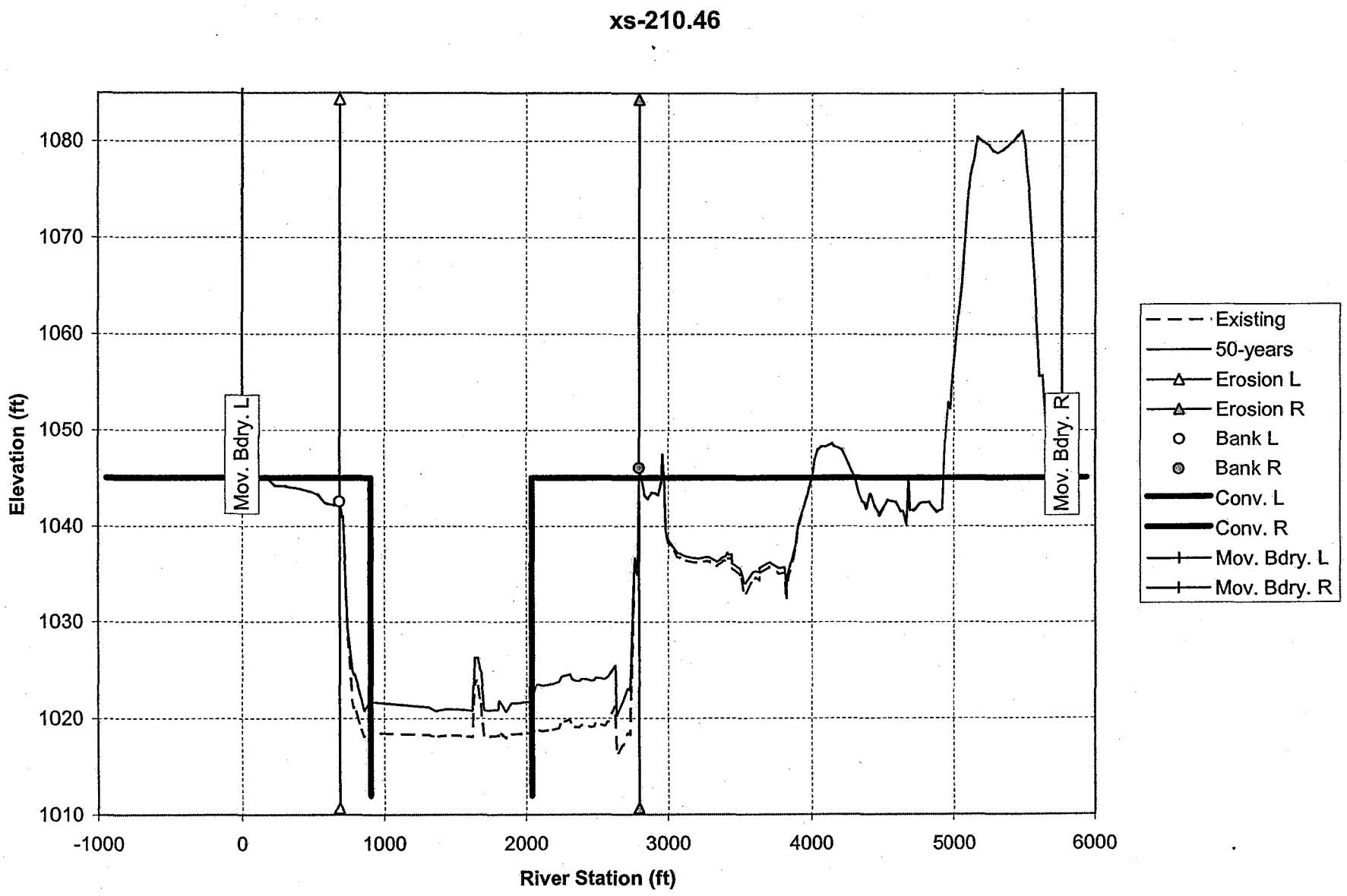

xs-210.07
Elevation (ft)
1095
1085
1075
1065
1055
1045
1035
1025
1015
1005
995
-1000
1000
3000
5000
7000
9000
11000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

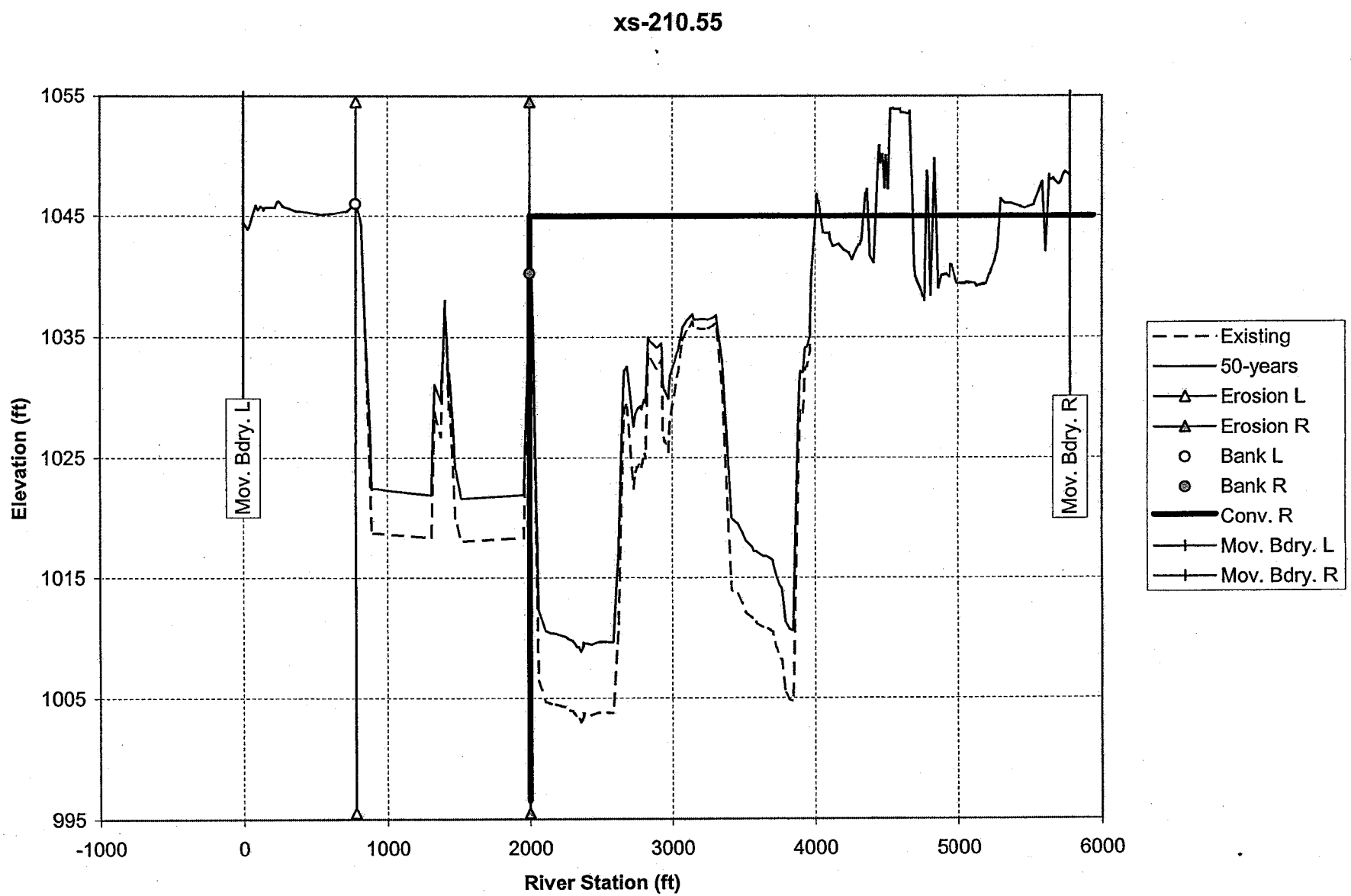

xs-210.17
Elevation (ft)
1090
1080
1070
1060
1050
1040
1030
1020
1010
-1000
1000
3000
5000
7000
9000
11000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

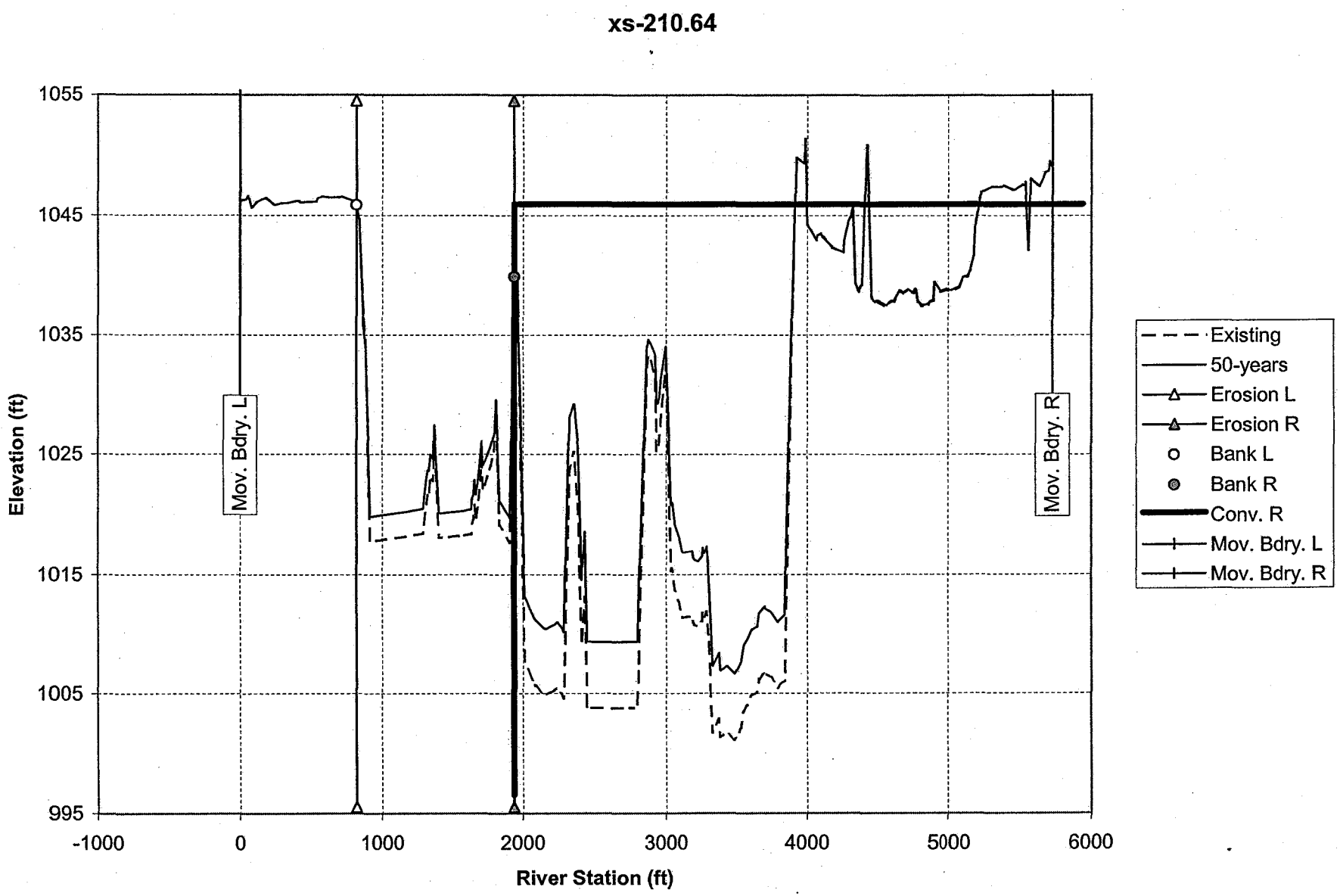

xs-210.26
Elevation (ft)
1090
1080
1070
1060
1050
1040
1030
1020
1010
-1000
1000
3000
5000
7000
9000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

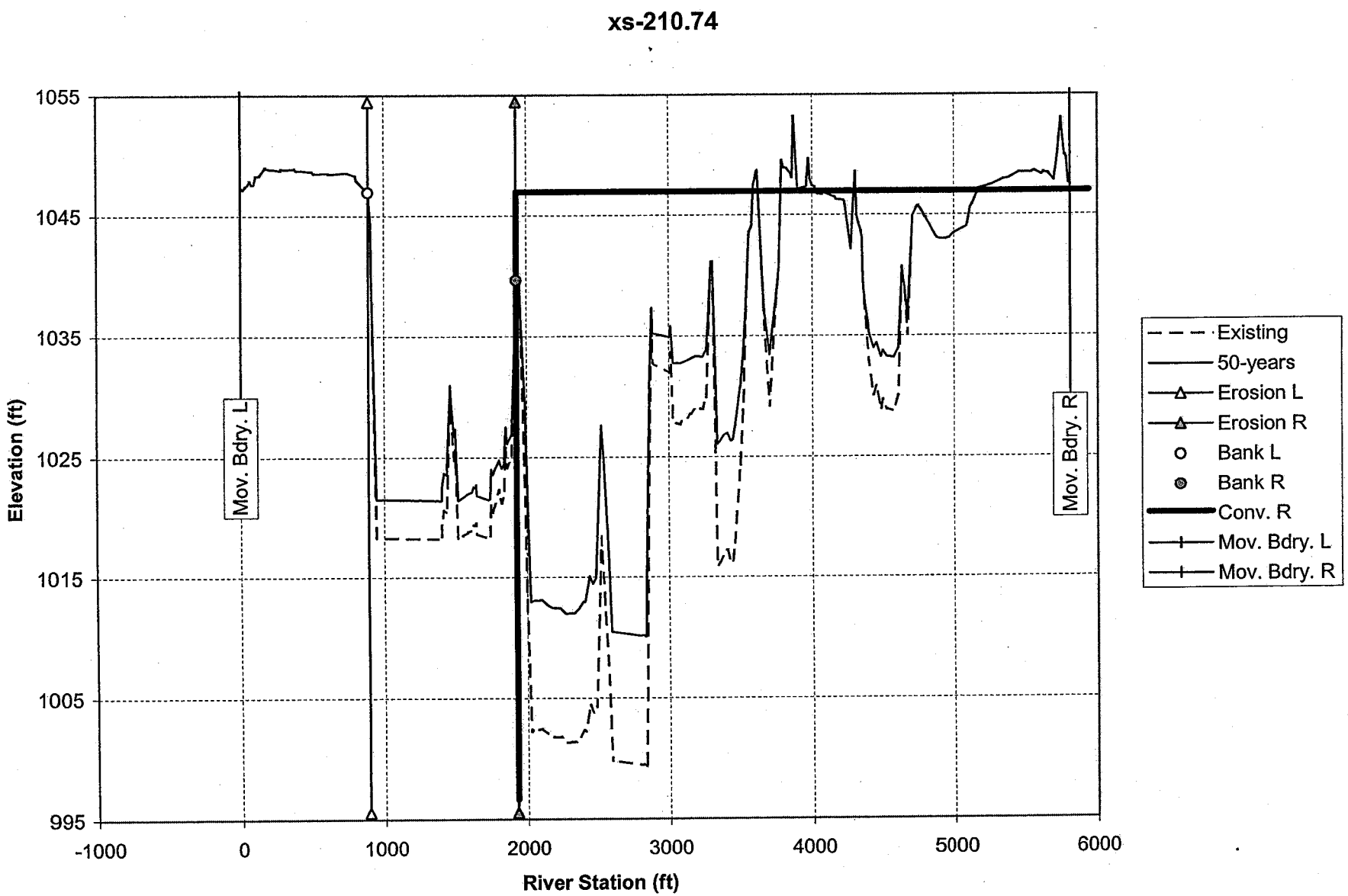

xs-210.36
Elevation (ft)
1090
1080
1070
1060
1050
1040
1030
1020
1010
-1000
1000
3000
5000
7000
9000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

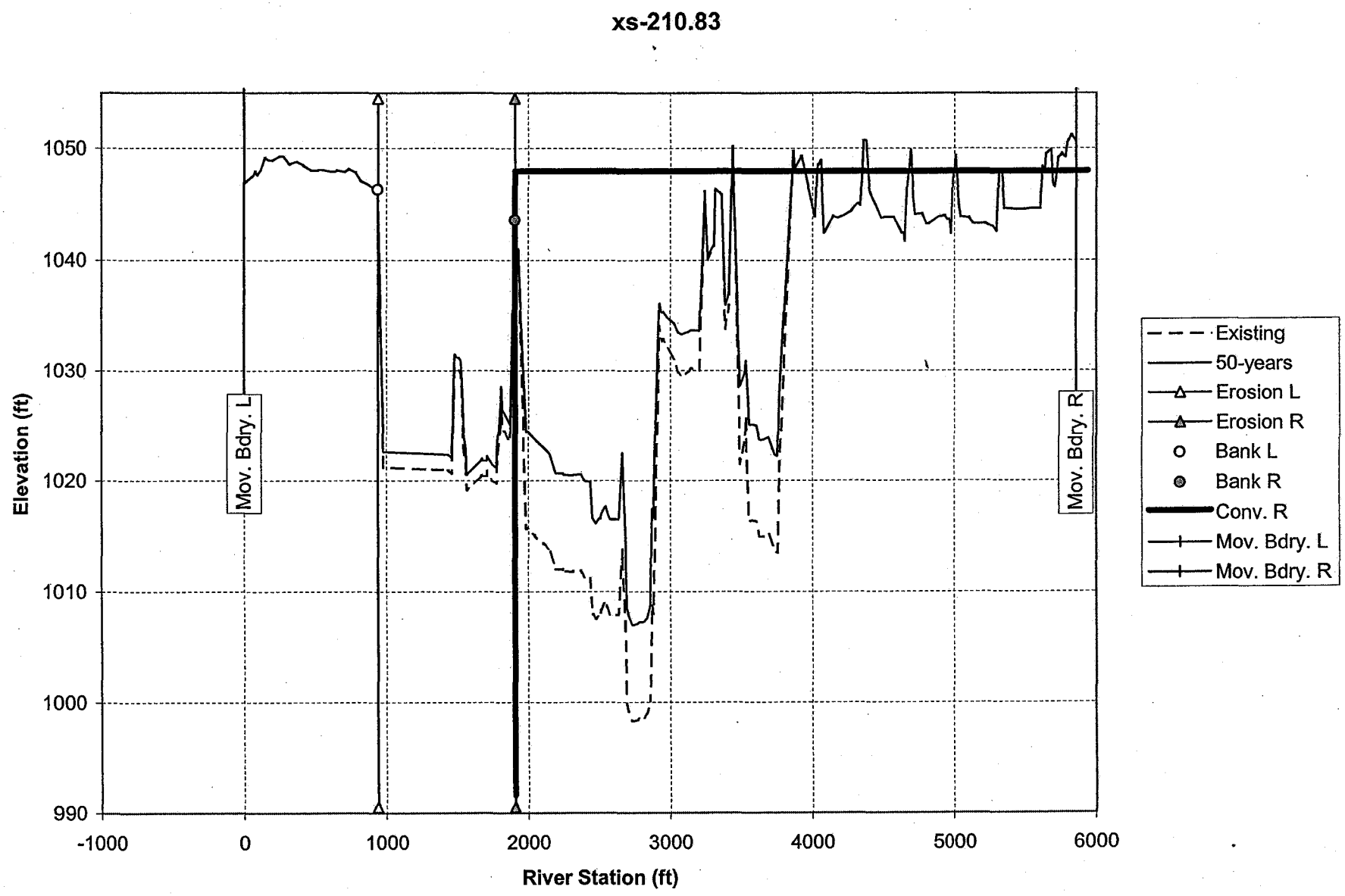

xs-210.44
Elevation (ft)
River Station (ft)
1090
1080
1070
1060
1050
1040
1030
1020
1010
-1000
0
1000
2000
3000
4000
5000
6000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

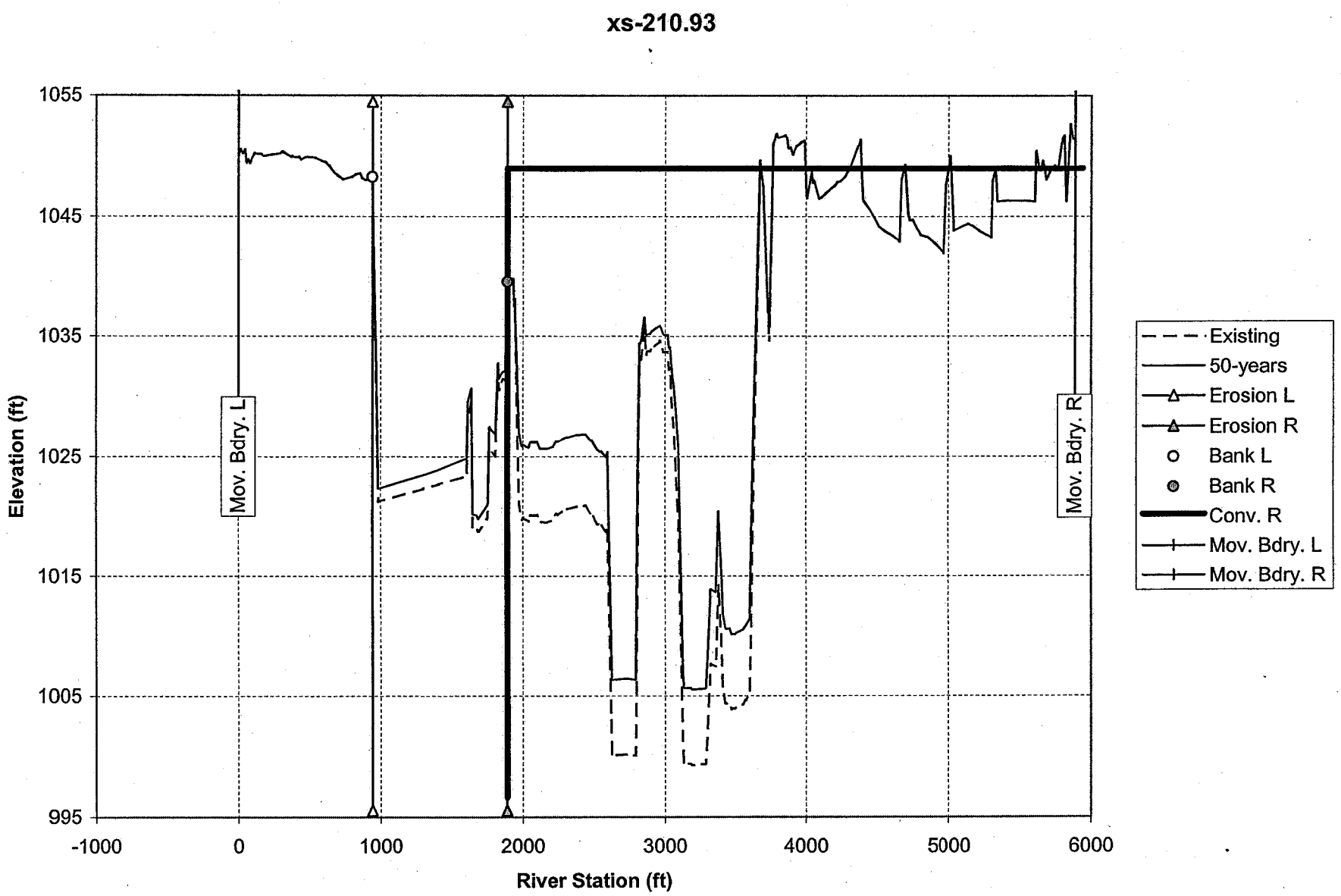

xs-210.46
Elevation (ft)
1080
1070
1060
1050
1040
1030
1020
1010
-1000
0
1000
2000
3000
4000
5000
6000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

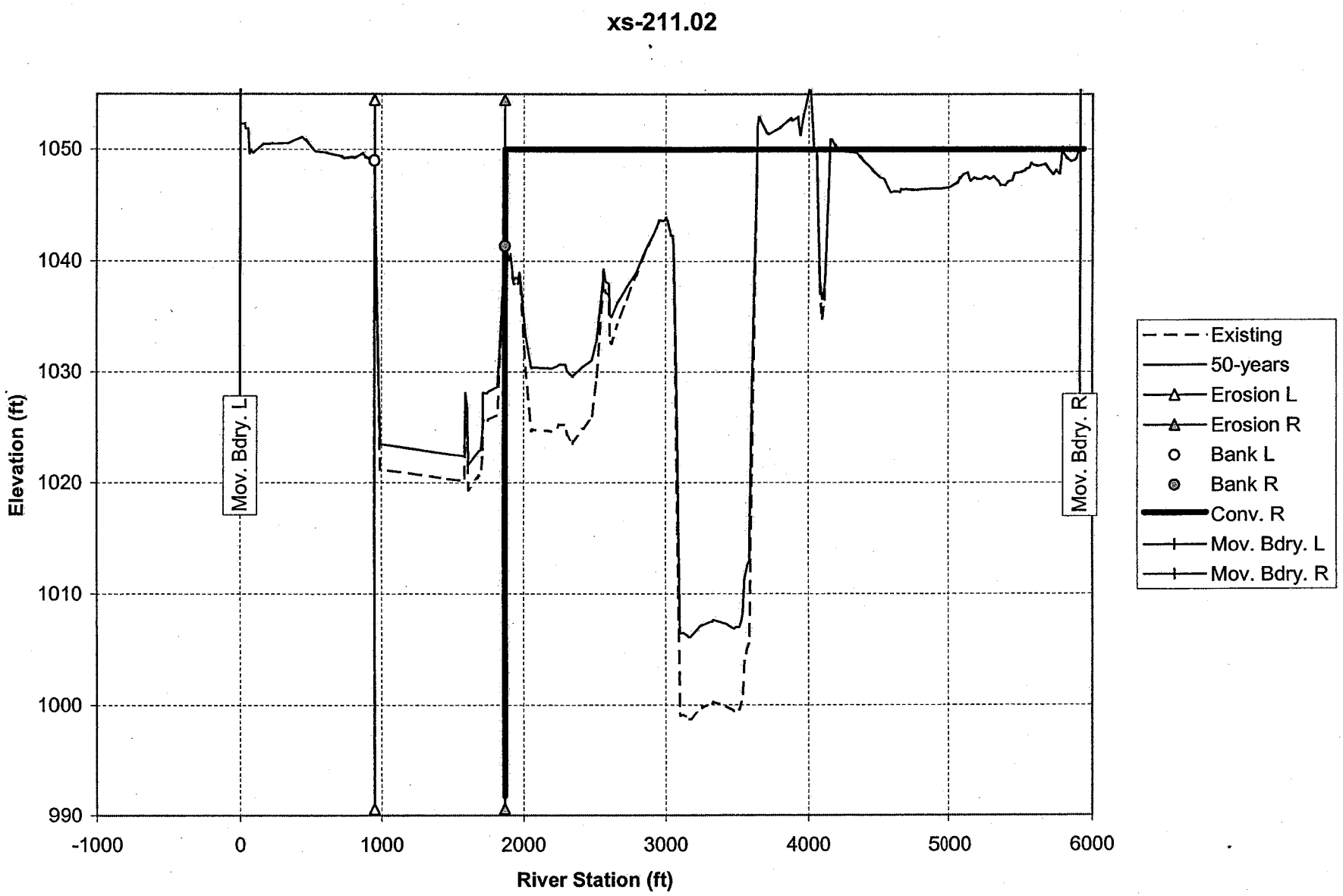

xs-210.55
Elevation (ft)
River Station (ft)
1055
1045
1035
1025
1015
1005
995
-1000
0
1000
2000
3000
4000
5000
6000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R

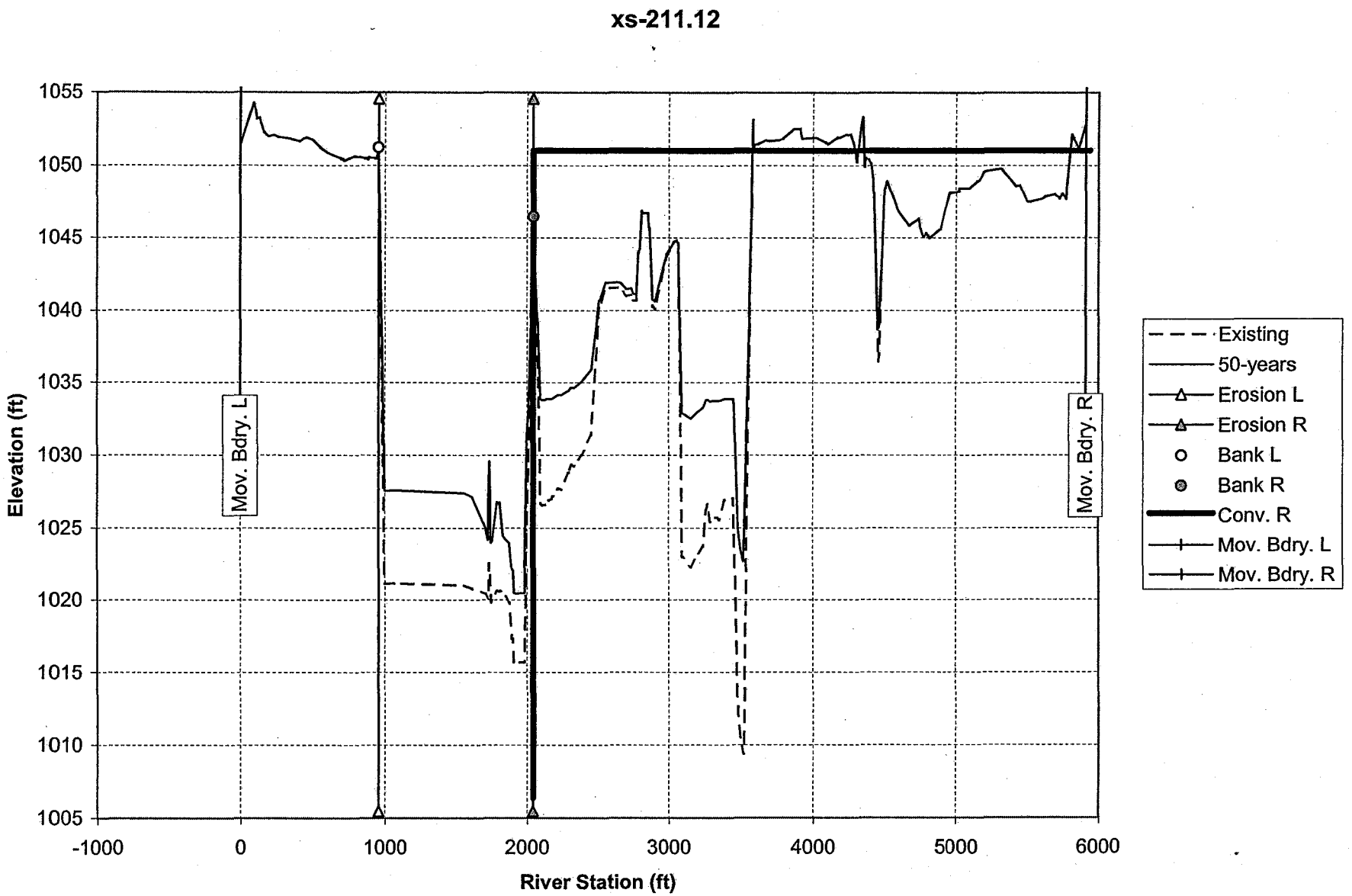

xs-210.64
1055
1045
1035
1025
1015
1005
995
Elevation (ft)
-1000
0
1000
2000
3000
4000
5000
6000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R

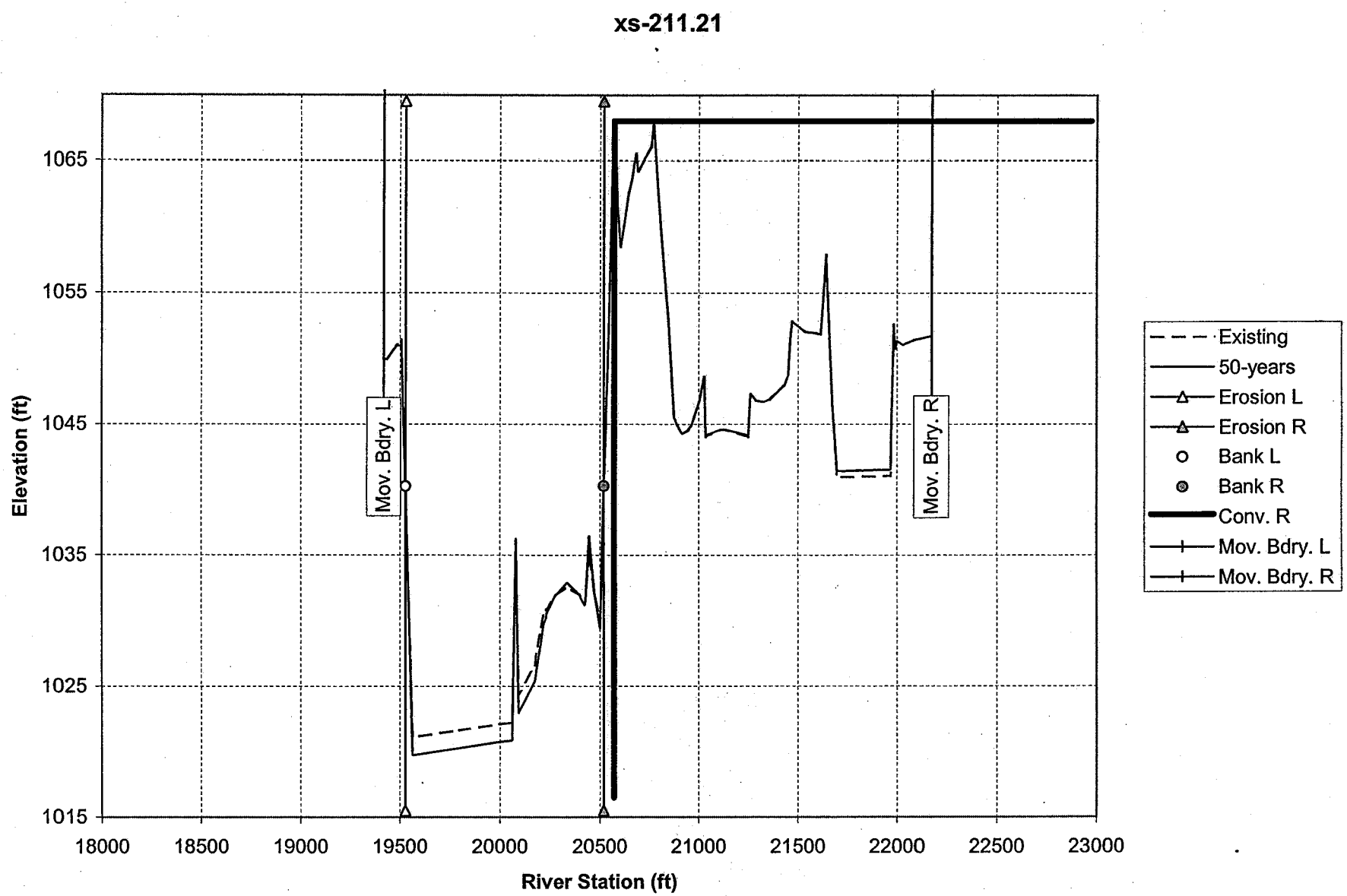

xs-210.74
Elevation (ft)
1055
1045
1035
1025
1015
1005
995
-1000
0
1000
2000
3000
4000
5000
6000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R

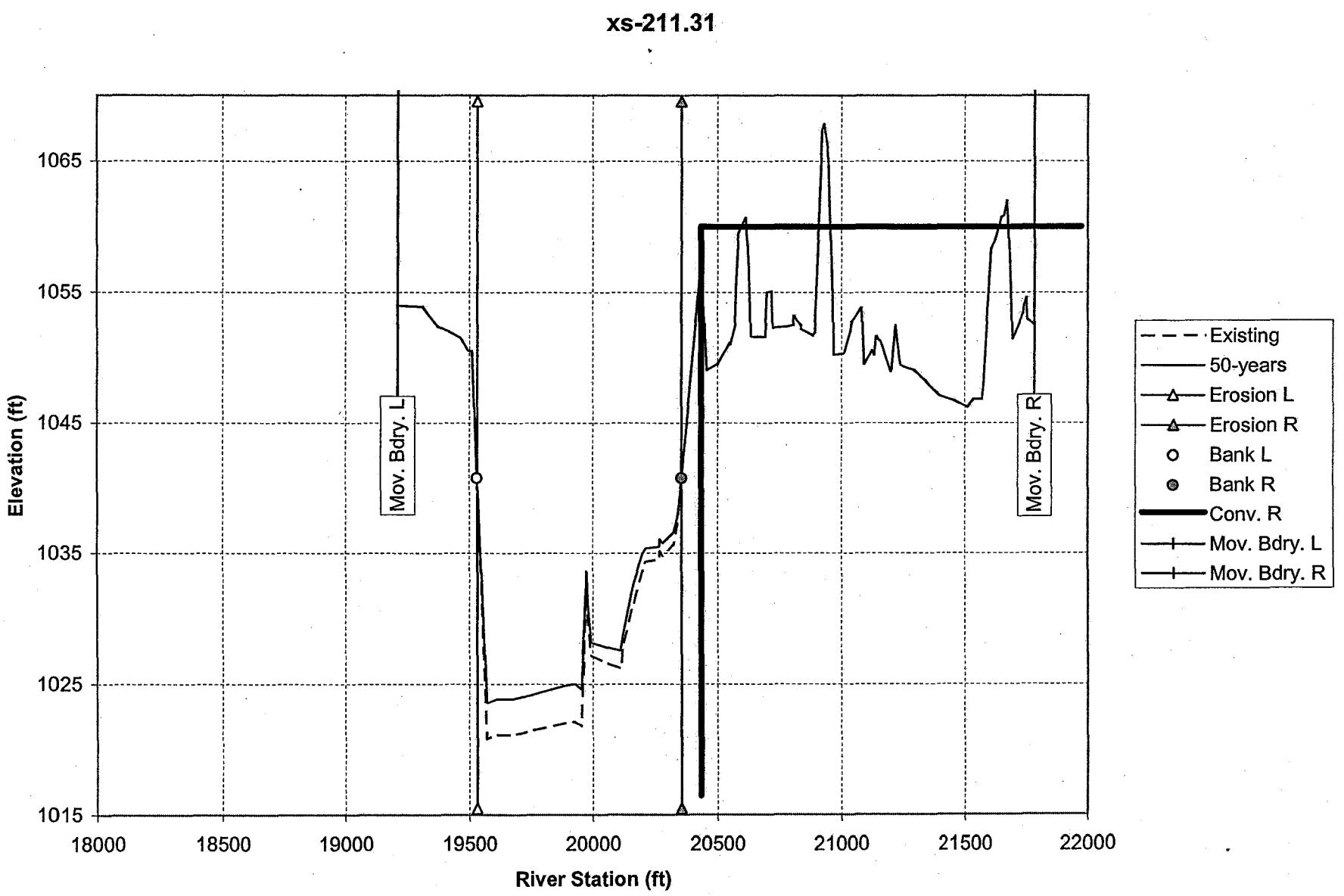

xs-210.83
Elevation (ft)
1050
1040
1030
1020
1010
1000
990
-1000
0
1000
2000
3000
4000
5000
6000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R

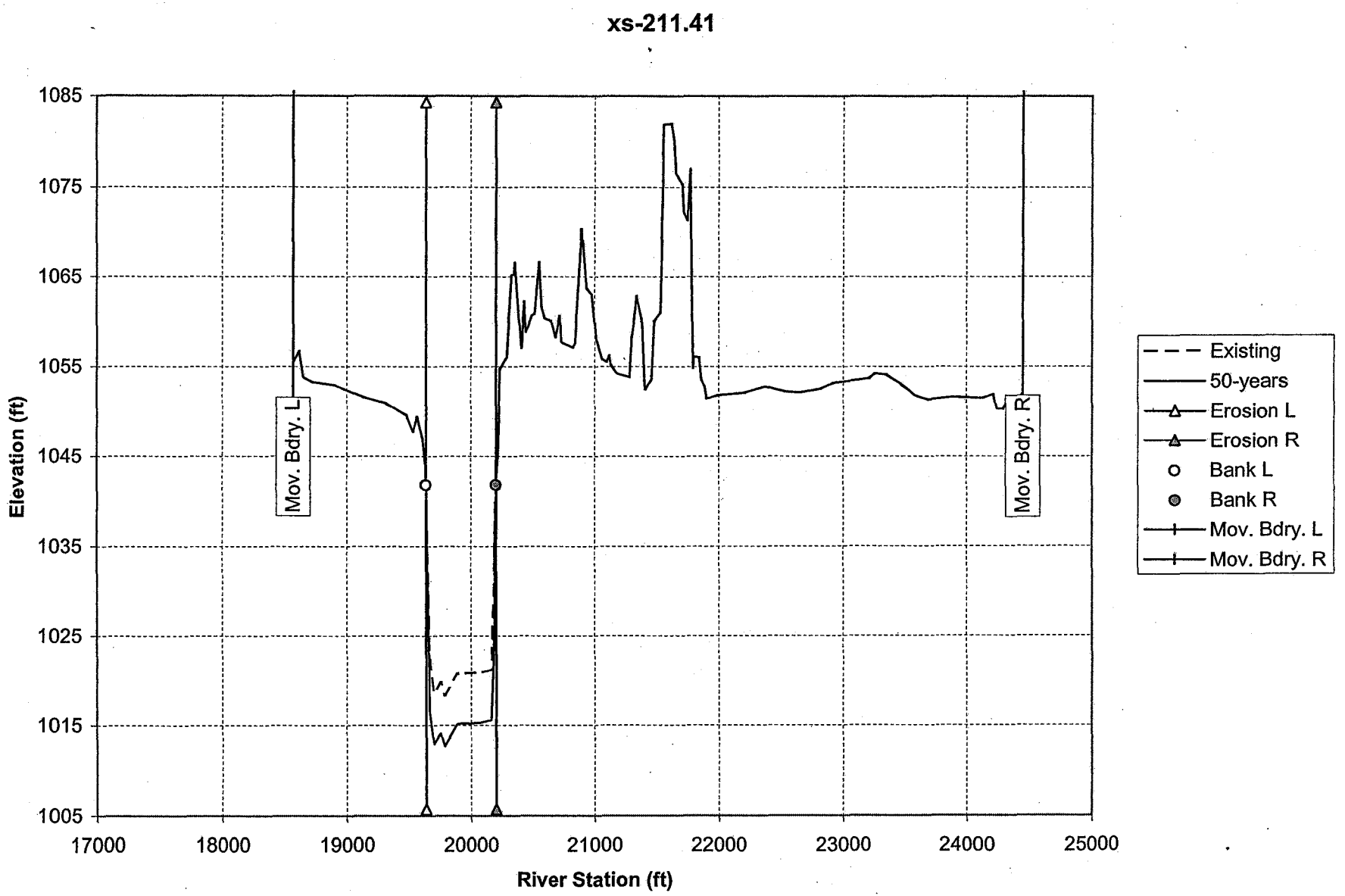

xs-210.93
Elevation (ft)
River Station (ft)
1055
1045
1035
1025
1015
1005
995
-1000
0
1000
2000
3000
4000
5000
6000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R

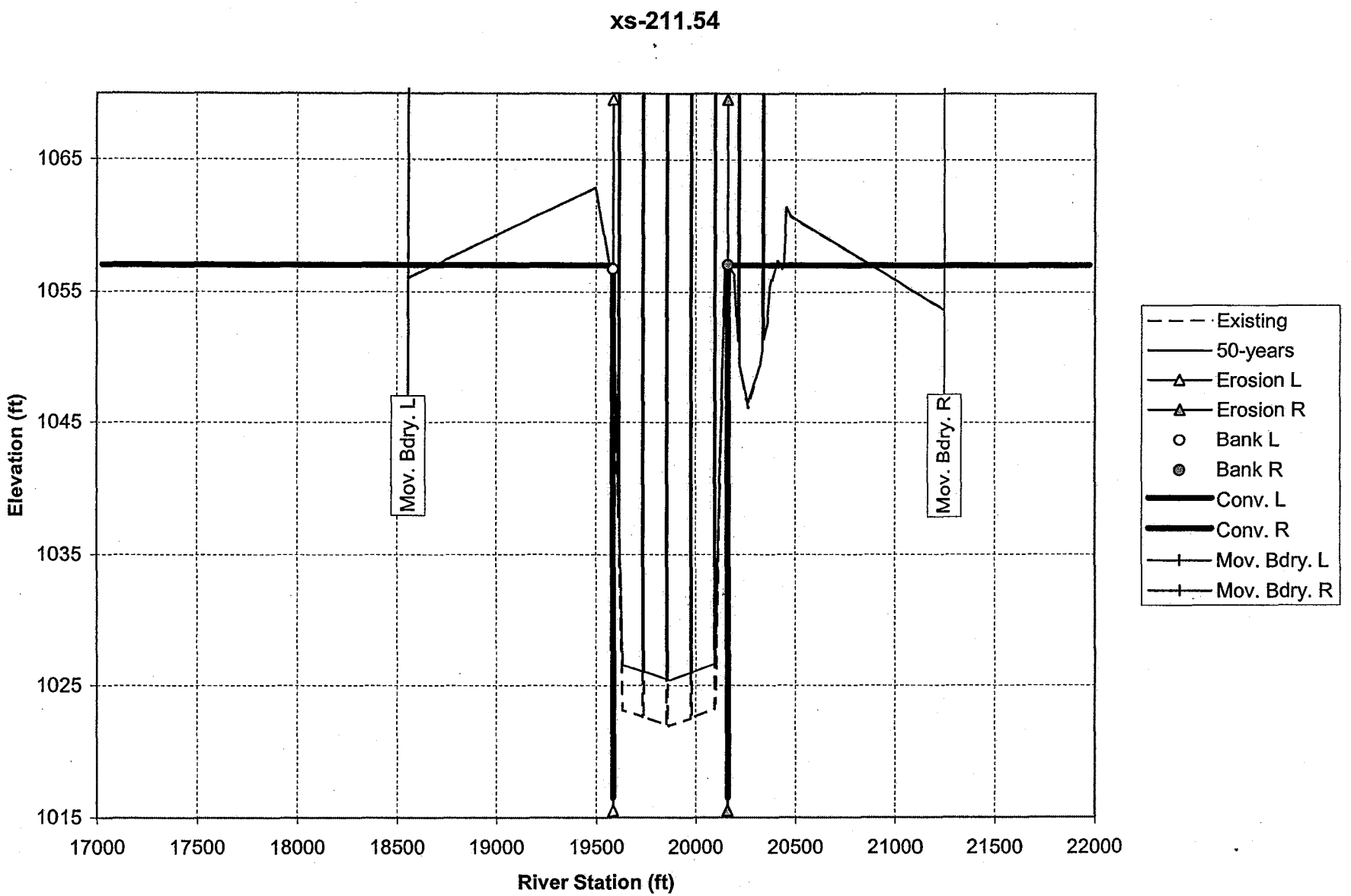

xs-211.02
Elevation (ft)
1050
1040
1030
1020
1010
1000
990
-1000
0
1000
2000
3000
4000
5000
6000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R


xs-211.12
Elevation (ft)
River Station (ft)
1055
1050
1045
1040
1035
1030
1025
1020
1015
1010
1005
-1000
0
1000
2000
3000
4000
5000
6000
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R


xs-211.21
Elevation (ft)
1065
1055
1045
1035
1025
1015
18000
18500
19000
19500
20000
20500
21000
21500
22000
22500
23000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R


xs-211.31
Elevation (ft)
1065
1055
1045
1035
1025
1015
18000
18500
19000
19500
20000
20500
21000
21500
22000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. R
Mov. Bdry. L
Mov. Bdry. R


xs-211.41
Elevation (ft)
1085
1075
1065
1055
1045
1035
1025
1015
1005
17000
18000
19000
20000
21000
22000
23000
24000
25000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Mov. Bdry. L
Mov. Bdry. R


xs-211.54
Elevation (ft)
1065
1055
1045
1035
1025
1015
17000
17500
18000
18500
19000
19500
20000
20500
21000
21500
22000
River Station (ft)
Mov. Bdry. L
Mov. Bdry. R
Existing
50-years
Erosion L
Erosion R
Bank L
Bank R
Conv. L
Conv. R
Mov. Bdry. L
Mov. Bdry. R

Appendix I

Sensitivity Analysis

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
5-yr Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1031.8	1032.1	1032.3	1032.6	0.2	0.5	0.8
211.51	1021.8	1030.6	1031.1	1031.4	1031.8	0.4	0.8	1.2
211.41	1018.3	1031.4	1031.6	1031.9	1032.2	0.3	0.5	0.8
211.31	1020.8	1030.5	1030.8	1031.2	1031.5	0.4	0.7	1.0
211.21	1021.1	1030.6	1030.8	1031.1	1031.4	0.3	0.5	0.8
211.12	1015.7	1029.9	1030.2	1030.5	1030.8	0.3	0.6	0.9
211.02	1019.4	1029.3	1029.6	1029.9	1030.2	0.3	0.6	0.9
210.93	1018.7	1028.8	1029.1	1029.4	1029.7	0.3	0.6	0.9
210.83	1019.1	1028.3	1028.6	1028.9	1029.2	0.3	0.6	0.9
210.74	1018.2	1027.9	1028.2	1028.5	1028.8	0.3	0.6	0.8
210.64	1017.7	1027.7	1028.0	1028.2	1028.5	0.3	0.5	0.8
210.55	1018.0	1027.2	1027.5	1027.8	1028.0	0.3	0.5	0.8
210.46	1016.3	1026.9	1027.2	1027.5	1027.7	0.3	0.5	0.8
210.44	1017.6	1026.9	1027.2	1027.4	1027.7	0.3	0.5	0.8
210.43	1017.5	1026.9	1027.1	1027.4	1027.6	0.3	0.5	0.8
210.36	1017.4	1026.6	1026.8	1027.1	1027.3	0.3	0.5	0.7
210.26	1016.9	1026.2	1026.4	1026.6	1026.9	0.2	0.5	0.7
210.17	1014.7	1025.4	1025.7	1025.9	1026.1	0.2	0.4	0.6
210.07	1018.5	1024.8	1025.0	1025.2	1025.4	0.2	0.4	0.6
209.98	1018.1	1023.8	1024.0	1024.3	1024.6	0.2	0.5	0.8
209.88	1014.7	1023.4	1023.6	1023.9	1024.1	0.2	0.5	0.7
209.79	1020.0	1022.8	1023.0	1023.3	1023.6	0.2	0.6	0.8
209.69	1019.0	1021.4	1021.8	1022.4	1022.7	0.4	1.0	1.3
209.6	1016.4	1020.9	1021.3	1022.0	1022.3	0.4	1.1	1.3
209.54	1019.6	1020.7	1021.1	1021.7	1022.0	0.4	1.0	1.3
209.53	1019.7	1020.7	1021.0	1021.7	1022.0	0.4	1.0	1.3
209.42	1019.6	1020.4	1020.7	1021.4	1021.7	0.4	1.0	1.3
209.33	1019.1	1019.3	1019.7	1020.2	1020.5	0.4	0.9	1.2
209.24	1017.4	1019.3	1019.6	1019.9	1020.1	0.3	0.6	0.9
209.14	1014.5	1018.8	1019.1	1019.4	1019.7	0.3	0.6	0.9
209.04	1012.2	1018.5	1018.8	1019.0	1019.3	0.3	0.6	0.8
208.95	1013.1	1018.0	1018.3	1018.6	1018.8	0.3	0.6	0.8
208.85	1013.4	1017.6	1017.8	1018.1	1018.3	0.3	0.5	0.7
208.75	1011.0	1016.5	1016.8	1017.0	1017.2	0.2	0.5	0.7
208.67	1010.0	1015.8	1016.0	1016.2	1016.4	0.2	0.4	0.6
208.57	1010.0	1015.0	1015.2	1015.4	1015.6	0.2	0.4	0.6
208.48	1007.6	1014.2	1014.4	1014.6	1014.8	0.2	0.4	0.5
208.39	1005.6	1012.6	1012.8	1013.1	1013.3	0.2	0.5	0.7
208.29	1004.7	1011.2	1011.4	1011.6	1011.9	0.2	0.5	0.7
208.19	1004.7	1009.1	1009.5	1009.8	1010.2	0.4	0.7	1.1
208.1	1001.3	1007.8	1008.2	1008.5	1008.8	0.4	0.6	1.0
207.99	999.9	1007.0	1007.3	1007.6	1007.8	0.3	0.6	0.9
207.9	1000.8	1005.7	1006.2	1006.4	1006.7	0.4	0.7	1.0
207.8	999.1	1004.6	1005.0	1005.2	1005.4	0.4	0.6	0.8
207.71	1000.3	1003.5	1003.8	1004.0	1004.3	0.3	0.5	0.7
207.62	1000.2	1002.7	1003.0	1003.2	1003.4	0.2	0.4	0.6
207.53	999.3	1001.6	1001.9	1002.1	1002.3	0.3	0.5	0.7
207.49	999.4	1001.4	1001.6	1001.8	1002.1	0.3	0.5	0.7
207.48	999.2	1001.2	1001.5	1001.7	1001.9	0.3	0.5	0.7

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
5-yr Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.43	999.0	1000.7	1001.1	1001.3	1001.5	0.4	0.6	0.8
207.34	996.5	1000.0	1000.4	1000.6	1000.8	0.4	0.5	0.8
207.27	993.3	998.7	999.0	999.2	999.6	0.4	0.6	0.9
207.16	992.7	998.2	998.5	998.6	998.8	0.3	0.3	0.6
207.07	992.8	997.8	998.1	998.1	998.4	0.3	0.3	0.5
206.97	992.7	997.0	997.3	997.1	997.4	0.3	0.1	0.4
206.88	992.6	997.1	997.4	997.2	997.4	0.2	0.0	0.3
206.79	993.0	996.3	996.6	996.9	997.1	0.3	0.6	0.8
206.7	991.2	995.9	996.2	996.4	996.6	0.2	0.5	0.7
206.6	990.5	995.1	995.3	995.6	995.8	0.2	0.4	0.6
206.51	990.2	993.9	994.1	994.3	994.6	0.2	0.4	0.6
206.41	988.8	993.1	993.3	993.5	993.7	0.2	0.4	0.6
206.32	987.4	992.1	992.3	992.5	992.7	0.2	0.4	0.7
206.22	986.0	990.8	991.0	991.3	991.5	0.3	0.5	0.8
206.13	984.6	990.0	990.2	990.5	990.7	0.3	0.5	0.7
206.03	984.7	989.0	989.3	989.6	989.8	0.3	0.5	0.8
205.94	981.5	988.1	988.4	988.6	988.8	0.3	0.53	0.8
205.84	979.5	986.8	987.1	987.4	987.6	0.3	0.5	0.8
205.75	973.9	985.4	985.7	985.9	986.2	0.3	0.5	0.7
205.62	976.0	984.2	984.4	984.6	984.9	0.2	0.44	0.7
205.52	975.9	982.8	983.1	983.3	983.6	0.3	0.57	0.8
205.43	976.1	982.1	982.4	982.6	982.9	0.3	0.52	0.8
205.4	975.5	982.0	982.3	982.5	982.8	0.3	0.53	0.8
205.34	972.7	981.3	981.6	981.9	982.2	0.3	0.55	0.8
205.25	973.4	980.8	981.0	981.3	981.6	0.3	0.54	0.8
205.15	973.1	980.4	980.6	980.8	981.1	0.3	0.49	0.7
205.06	970.4	979.9	980.2	980.4	980.6	0.2	0.43	0.7
204.97	967.6	979.4	979.6	979.8	980.0	0.2	0.37	0.6
204.87	968.1	977.5	977.8	978.0	978.3	0.3	0.5	0.7
204.78	967.6	976.6	976.9	977.1	977.4	0.3	0.52	0.8
204.68	971.3	975.7	976.0	976.3	976.6	0.3	0.62	0.9
204.61	972.6	975.2	975.5	975.8	976.1	0.3	0.55	0.8
204.53	972.7	974.7	975.0	975.2	975.5	0.3	0.54	0.8
204.42	971.4	974.1	974.4	974.7	974.9	0.3	0.51	0.8
204.34	969.3	973.8	974.0	974.3	974.5	0.2	0.47	0.7
204.25	968.0	973.5	973.7	973.9	974.2	0.2	0.45	0.7
204.15	965.9	972.7	972.9	973.2	973.4	0.3	0.48	0.7
204.05	965.0	971.9	972.1	972.4	972.6	0.24	0.47	0.7
203.96	964.1	971.3	971.5	971.7	972.0	0.2	0.41	0.6
203.86	962.2	970.6	970.8	971.0	971.2	0.2	0.37	0.6
203.77	963.3	969.7	969.9	970.2	970.4	0.23	0.45	0.7
203.67	962.3	969.1	969.3	969.6	969.8	0.22	0.44	0.7
203.58	962.1	968.7	968.9	969.1	969.3	0.22	0.44	0.7
203.48	962.2	967.8	968.1	968.3	968.5	0.22	0.45	0.7
203.39	959.9	967.0	967.2	967.5	967.7	0.2	0.44	0.7
203.29	960.8	966.4	966.6	966.8	967.1	0.2	0.47	0.7
203.19	956.7	965.8	966.0	966.2	966.5	0.23	0.46	0.7
203.09	958.7	965.2	965.4	965.6	965.8	0.2	0.41	0.6
202.99	959.2	964.5	964.7	964.9	965.1	0.19	0.38	0.6

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
5-yr Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.9	956.5	963.7	963.9	964.1	964.3	0.19	0.38	0.6
202.8	956.4	962.6	962.9	963.1	963.3	0.22	0.42	0.6
202.69	953.7	961.7	961.9	962.1	962.3	0.21	0.41	0.6
202.59	953.7	960.7	960.9	961.1	961.3	0.19	0.37	0.5
202.48	952.5	959.9	960.1	960.3	960.5	0.19	0.37	0.6
202.37	954.6	959.1	959.3	959.5	959.7	0.2	0.4	0.6
202.29	955.5	958.5	958.7	958.9	959.1	0.25	0.49	0.7
202.18	949.8	957.4	957.7	957.9	958.1	0.28	0.53	0.8
202.09	949.9	956.6	956.8	957.1	957.3	0.25	0.48	0.7
					Average =	0.3	0.5	0.8

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
10-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1036.4	1036.8	1037.4	1037.9	0.5	1.0	1.5
211.51	1021.8	1035.1	1035.8	1036.4	1036.9	0.6	1.3	1.8
211.41	1018.3	1036.1	1036.6	1037.0	1037.4	0.4	0.9	1.3
211.31	1020.8	1034.6	1035.2	1035.8	1036.3	0.6	1.2	1.7
211.21	1021.1	1034.7	1035.2	1035.7	1036.1	0.5	0.9	1.4
211.12	1015.7	1034.0	1034.5	1035.0	1035.5	0.5	1.0	1.5
211.02	1019.4	1033.5	1034.0	1034.4	1034.9	0.5	1.0	1.5
210.93	1018.7	1032.8	1033.3	1033.8	1034.3	0.5	1.0	1.5
210.83	1019.1	1032.3	1032.8	1033.3	1033.7	0.5	1.0	1.4
210.74	1018.2	1031.9	1032.3	1032.8	1033.2	0.5	0.9	1.4
210.64	1017.7	1031.6	1032.0	1032.5	1032.9	0.5	0.9	1.3
210.55	1018.0	1030.9	1031.4	1031.8	1032.2	0.5	0.9	1.3
210.46	1016.3	1030.6	1031.1	1031.5	1031.9	0.4	0.9	1.3
210.44	1017.6	1030.5	1031.0	1031.4	1031.8	0.4	0.9	1.3
210.43	1017.5	1030.5	1030.9	1031.3	1031.7	0.5	0.9	1.3
210.36	1017.4	1030.1	1030.5	1030.9	1031.4	0.4	0.9	1.3
210.26	1016.9	1029.6	1030.0	1030.4	1030.8	0.4	0.8	1.2
210.17	1014.7	1028.8	1029.2	1029.7	1030.1	0.4	0.9	1.3
210.07	1018.5	1028.4	1028.8	1029.3	1029.7	0.4	0.8	1.3
209.98	1018.1	1027.9	1028.3	1028.8	1029.2	0.4	0.9	1.3
209.88	1014.7	1027.6	1028.1	1028.5	1028.9	0.4	0.9	1.3
209.79	1020.0	1027.3	1027.7	1028.1	1028.6	0.4	0.9	1.3
209.69	1019.0	1026.6	1027.1	1027.6	1028.0	0.5	0.9	1.3
209.6	1016.4	1026.4	1026.8	1027.2	1027.6	0.4	0.9	1.3
209.54	1019.6	1025.6	1026.0	1026.5	1026.9	0.4	0.8	1.2
209.53	1019.7	1025.5	1025.9	1026.3	1026.7	0.4	0.8	1.2
209.42	1019.6	1025.2	1025.5	1025.9	1026.2	0.4	0.7	1.1
209.33	1019.1	1023.8	1024.2	1024.6	1024.9	0.4	0.8	1.2
209.24	1017.4	1023.1	1023.5	1023.8	1024.2	0.4	0.7	1.0
209.14	1014.5	1022.2	1022.6	1023.0	1023.3	0.4	0.8	1.1
209.04	1012.2	1021.8	1022.1	1022.4	1022.7	0.3	0.7	1.0
208.95	1013.1	1020.9	1021.3	1021.6	1021.9	0.3	0.7	1.0
208.85	1013.4	1020.4	1020.7	1021.0	1021.3	0.3	0.6	0.9
208.75	1011.0	1019.3	1019.6	1019.9	1020.2	0.3	0.6	0.9
208.67	1010.0	1018.4	1018.7	1019.0	1019.3	0.3	0.6	0.9
208.57	1010.0	1017.4	1017.7	1018.1	1018.3	0.3	0.6	0.9
208.48	1007.6	1016.9	1017.2	1017.5	1017.7	0.3	0.6	0.9
208.39	1005.6	1015.6	1015.9	1016.3	1016.5	0.4	0.7	1.0
208.29	1004.7	1014.4	1014.8	1015.1	1015.3	0.4	0.7	0.9
208.19	1004.7	1013.0	1013.4	1013.7	1013.9	0.4	0.7	0.9
208.1	1001.3	1011.4	1011.8	1012.1	1012.4	0.4	0.7	1.0
207.99	999.9	1010.2	1010.6	1011.0	1011.2	0.4	0.7	1.0
207.9	1000.8	1009.1	1009.5	1009.9	1010.2	0.4	0.8	1.1
207.8	999.1	1007.7	1008.1	1008.5	1008.8	0.4	0.8	1.1
207.71	1000.3	1006.5	1006.9	1007.2	1007.5	0.4	0.7	1.0
207.62	1000.2	1005.6	1006.0	1006.3	1006.6	0.3	0.7	1.0
207.53	999.3	1004.8	1005.1	1005.4	1005.7	0.3	0.6	1.0
207.49	999.4	1004.6	1004.9	1005.2	1005.5	0.3	0.6	0.9
207.48	999.2	1004.4	1004.8	1005.1	1005.4	0.3	0.6	0.9
207.43	999.0	1004.0	1004.3	1004.6	1005.0	0.3	0.6	1.0

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
10-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.34	996.5	1003.4	1003.7	1004.0	1004.3	0.3	0.6	0.9
207.27	993.3	1001.9	1002.3	1002.7	1003.1	0.5	0.9	1.2
207.16	992.7	1000.9	1001.3	1001.6	1002.0	0.4	0.8	1.1
207.07	992.8	1000.1	1000.5	1000.9	1001.3	0.4	0.8	1.1
206.97	992.7	999.9	1000.2	1000.5	1000.9	0.4	0.7	1.0
206.88	992.6	999.7	1000.0	1000.3	1000.6	0.3	0.6	0.9
206.79	993.0	999.3	999.6	999.9	1000.2	0.3	0.6	0.9
206.7	991.2	998.0	998.4	998.7	999.1	0.4	0.7	1.1
206.6	990.5	997.7	998.0	998.3	998.6	0.3	0.6	0.9
206.51	990.2	996.7	997.1	997.4	997.8	0.4	0.7	1.0
206.41	988.8	996.1	996.5	996.8	997.2	0.4	0.7	1.1
206.32	987.4	995.2	995.6	995.9	996.4	0.5	0.8	1.2
206.22	986.0	994.0	994.5	994.8	995.2	0.5	0.8	1.2
206.13	984.6	993.3	993.7	994.0	994.4	0.4	0.7	1.0
206.03	984.7	992.4	992.8	993.1	993.4	0.3	0.6	1.0
205.94	981.5	991.2	991.6	991.9	992.2	0.3	0.64	1.0
205.84	979.5	989.7	990.1	990.5	990.9	0.4	0.8	1.2
205.75	973.9	988.4	988.8	989.3	989.7	0.4	0.9	1.3
205.62	976.0	987.0	987.5	988.0	988.4	0.5	0.98	1.4
205.52	975.9	986.3	986.8	987.2	987.6	0.5	0.95	1.3
205.43	976.1	985.6	986.1	986.6	987.0	0.5	0.97	1.4
205.4	975.5	985.6	986.1	986.5	986.9	0.5	0.94	1.3
205.34	972.7	984.9	985.4	985.8	986.3	0.5	0.97	1.4
205.25	973.4	984.3	984.7	985.1	985.6	0.4	0.89	1.3
205.15	973.1	983.7	984.1	984.5	984.9	0.4	0.84	1.2
205.06	970.4	982.9	983.3	983.7	984.1	0.4	0.79	1.2
204.97	967.6	982.3	982.7	983.1	983.4	0.4	0.75	1.1
204.87	968.1	980.6	981.1	981.6	982.0	0.5	0.98	1.4
204.78	967.6	980.2	980.7	981.1	981.5	0.4	0.86	1.3
204.68	971.3	979.5	979.9	980.4	980.8	0.5	0.89	1.3
204.61	972.6	978.8	979.2	979.6	980.0	0.4	0.82	1.2
204.53	972.7	978.1	978.5	978.9	979.3	0.4	0.81	1.2
204.42	971.4	977.4	977.8	978.2	978.5	0.4	0.74	1.1
204.34	969.3	976.8	977.1	977.5	977.8	0.3	0.67	1.0
204.25	968.0	976.3	976.6	976.9	977.2	0.3	0.61	0.9
204.15	965.9	975.6	975.9	976.2	976.5	0.3	0.61	0.9
204.05	965.0	974.7	975.1	975.4	975.7	0.34	0.67	1.0
203.96	964.1	974.0	974.4	974.7	975.0	0.3	0.65	1.0
203.86	962.2	973.2	973.5	973.9	974.2	0.3	0.67	1.0
203.77	963.3	972.6	972.9	973.2	973.5	0.35	0.67	1.0
203.67	962.3	972.1	972.4	972.7	973.0	0.32	0.63	0.9
203.58	962.1	971.7	972.0	972.3	972.6	0.31	0.6	0.9
203.48	962.2	970.7	971.0	971.3	971.6	0.33	0.64	0.9
203.39	959.9	969.8	970.1	970.4	970.7	0.3	0.61	0.9
203.29	960.8	969.0	969.4	969.7	970.0	0.3	0.64	1.0
203.19	956.7	968.4	968.7	969.0	969.3	0.35	0.63	0.9
203.09	958.7	967.6	968.0	968.2	968.5	0.31	0.57	0.9
202.99	959.2	966.9	967.2	967.4	967.7	0.27	0.53	0.8
202.9	956.5	966.0	966.2	966.5	966.7	0.26	0.51	0.8
202.8	956.4	965.0	965.3	965.6	965.8	0.27	0.53	0.8

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
10-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.69	953.7	964.1	964.4	964.6	964.9	0.29	0.56	0.8
202.59	953.7	963.1	963.4	963.7	964.0	0.29	0.58	0.9
202.48	952.5	962.4	962.7	963.0	963.3	0.3	0.58	0.9
202.37	954.6	961.7	962.0	962.3	962.6	0.32	0.62	0.9
202.29	955.5	961.3	961.6	961.9	962.2	0.32	0.62	0.9
202.18	949.8	960.5	960.8	961.1	961.4	0.34	0.66	1.0
202.09	949.9	959.6	959.9	960.2	960.5	0.32	0.62	0.9
					Average =	0.4	0.8	1.1

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
20-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1039.7	1040.3	1040.9	1041.6	0.5	1.2	1.9
211.51	1021.8	1038.1	1038.9	1039.7	1040.4	0.8	1.6	2.3
211.41	1018.3	1039.5	1040.0	1040.5	1041.0	0.5	1.0	1.6
211.31	1020.8	1037.5	1038.3	1039.1	1039.7	0.8	1.5	2.2
211.21	1021.1	1037.8	1038.4	1039.1	1039.6	0.6	1.2	1.8
211.12	1015.7	1037.1	1037.8	1038.4	1039.0	0.7	1.3	1.9
211.02	1019.4	1036.5	1037.1	1037.8	1038.4	0.6	1.3	1.9
210.93	1018.7	1035.8	1036.5	1037.1	1037.7	0.7	1.3	1.9
210.83	1019.1	1035.3	1035.9	1036.5	1037.1	0.6	1.3	1.9
210.74	1018.2	1034.8	1035.4	1036.1	1036.6	0.6	1.2	1.8
210.64	1017.7	1034.5	1035.1	1035.7	1036.2	0.6	1.2	1.7
210.55	1018.0	1033.8	1034.4	1035.0	1035.6	0.6	1.2	1.8
210.46	1016.3	1033.5	1034.1	1034.7	1035.2	0.6	1.2	1.7
210.44	1017.6	1033.4	1034.0	1034.5	1035.1	0.6	1.1	1.7
210.43	1017.5	1033.3	1033.8	1034.4	1035.0	0.6	1.2	1.7
210.36	1017.4	1032.9	1033.5	1034.1	1034.6	0.6	1.1	1.7
210.26	1016.9	1032.5	1033.0	1033.6	1034.1	0.5	1.1	1.7
210.17	1014.7	1031.9	1032.5	1033.1	1033.6	0.5	1.1	1.7
210.07	1018.5	1031.7	1032.2	1032.8	1033.3	0.5	1.1	1.6
209.98	1018.1	1031.3	1031.8	1032.4	1032.9	0.5	1.1	1.6
209.88	1014.7	1031.0	1031.6	1032.1	1032.6	0.5	1.1	1.6
209.79	1020.0	1030.8	1031.3	1031.9	1032.4	0.5	1.1	1.6
209.69	1019.0	1030.2	1030.7	1031.3	1031.8	0.5	1.1	1.6
209.6	1016.4	1029.9	1030.4	1031.0	1031.5	0.5	1.0	1.5
209.54	1019.6	1028.4	1028.9	1029.5	1030.0	0.5	1.1	1.6
209.53	1019.7	1028.2	1028.7	1029.3	1029.8	0.5	1.1	1.6
209.42	1019.6	1027.8	1028.2	1028.7	1029.2	0.4	0.9	1.4
209.33	1019.1	1025.9	1026.4	1026.9	1027.4	0.5	1.0	1.5
209.24	1017.4	1025.2	1025.6	1026.1	1026.5	0.5	0.9	1.3
209.14	1014.5	1024.3	1024.7	1025.1	1025.5	0.4	0.8	1.2
209.04	1012.2	1023.8	1024.2	1024.6	1024.9	0.4	0.7	1.1
208.95	1013.1	1022.9	1023.3	1023.7	1024.0	0.4	0.8	1.2
208.85	1013.4	1022.2	1022.6	1023.0	1023.3	0.4	0.7	1.1
208.75	1011.0	1021.1	1021.5	1021.9	1022.2	0.4	0.8	1.1
208.67	1010.0	1020.2	1020.5	1020.9	1021.2	0.4	0.7	1.1
208.57	1010.0	1019.0	1019.4	1019.7	1020.1	0.4	0.7	1.0
208.48	1007.6	1018.6	1018.9	1019.2	1019.5	0.3	0.6	0.9
208.39	1005.6	1017.3	1017.6	1018.0	1018.3	0.3	0.7	1.0
208.29	1004.7	1016.2	1016.5	1016.8	1017.1	0.3	0.7	1.0
208.19	1004.7	1014.7	1015.1	1015.4	1015.8	0.4	0.7	1.1
208.1	1001.3	1013.3	1013.7	1014.1	1014.5	0.4	0.8	1.2
207.99	999.9	1012.2	1012.6	1013.0	1013.4	0.4	0.8	1.2
207.9	1000.8	1011.2	1011.6	1012.0	1012.4	0.4	0.8	1.2
207.8	999.1	1009.9	1010.3	1010.7	1011.1	0.4	0.9	1.3
207.71	1000.3	1008.7	1009.1	1009.6	1010.0	0.5	0.9	1.3
207.62	1000.2	1007.8	1008.2	1008.6	1009.0	0.4	0.8	1.2
207.53	999.3	1007.0	1007.4	1007.8	1008.1	0.4	0.8	1.1
207.49	999.4	1006.8	1007.2	1007.5	1007.9	0.3	0.7	1.1
207.48	999.2	1006.7	1007.0	1007.4	1007.7	0.3	0.7	1.1
207.43	999.0	1006.2	1006.5	1006.9	1007.3	0.3	0.7	1.1

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
20-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.34	996.5	1005.6	1005.8	1006.2	1006.5	0.3	0.6	1.0
207.27	993.3	1004.2	1004.5	1004.9	1005.3	0.2	0.7	1.1
207.16	992.7	1003.3	1003.2	1003.7	1004.2	-0.1	0.4	0.9
207.07	992.8	1002.7	1002.3	1002.8	1003.3	-0.3	0.2	0.6
206.97	992.7	1002.3	1001.8	1002.2	1002.7	-0.5	-0.1	0.3
206.88	992.6	1002.1	1001.5	1001.9	1002.3	-0.6	-0.2	0.1
206.79	993.0	1001.7	1000.8	1001.2	1001.6	-0.9	-0.5	-0.1
206.7	991.2	999.5	1000.5	1000.9	1001.2	1.0	1.4	1.7
206.6	990.5	999.6	1000.0	1000.3	1000.7	0.4	0.8	1.1
206.51	990.2	998.8	999.2	999.6	999.9	0.4	0.8	1.1
206.41	988.8	998.2	998.6	999.0	999.3	0.4	0.8	1.1
206.32	987.4	997.4	997.8	998.1	998.5	0.4	0.8	1.1
206.22	986.0	996.3	996.7	997.1	997.5	0.4	0.8	1.2
206.13	984.6	995.5	995.9	996.3	996.6	0.4	0.8	1.1
206.03	984.7	994.4	994.8	995.3	995.6	0.5	0.9	1.2
205.94	981.5	993.2	993.7	994.1	994.4	0.5	0.85	1.2
205.84	979.5	992.1	992.6	993.0	993.3	0.5	0.9	1.2
205.75	973.9	990.7	991.2	991.6	992.0	0.5	0.9	1.3
205.62	976.0	989.6	990.1	990.5	991.0	0.5	0.97	1.4
205.52	975.9	989.0	989.4	989.9	990.4	0.5	0.95	1.4
205.43	976.1	988.4	988.9	989.4	989.9	0.5	1	1.5
205.4	975.5	988.4	988.9	989.4	989.8	0.5	0.99	1.5
205.34	972.7	987.7	988.3	988.8	989.3	0.5	1.07	1.6
205.25	973.4	987.0	987.6	988.1	988.6	0.6	1.09	1.6
205.15	973.1	986.3	986.8	987.3	987.9	0.6	1.09	1.6
205.06	970.4	985.2	985.8	986.3	986.8	0.5	1.06	1.6
204.97	967.6	984.7	985.2	985.7	986.2	0.5	0.95	1.4
204.87	968.1	983.3	983.9	984.5	985.0	0.6	1.16	1.7
204.78	967.6	983.1	983.6	984.2	984.7	0.6	1.08	1.6
204.68	971.3	982.2	982.9	983.4	984.0	0.6	1.16	1.7
204.61	972.6	981.4	982.0	982.5	983.1	0.6	1.11	1.7
204.53	972.7	980.7	981.2	981.8	982.3	0.6	1.1	1.6
204.42	971.4	979.8	980.4	980.8	981.3	0.6	1.06	1.6
204.34	969.3	979.0	979.5	979.9	980.3	0.5	0.95	1.3
204.25	968.0	978.2	978.7	979.1	979.4	0.5	0.86	1.2
204.15	965.9	977.5	977.9	978.3	978.6	0.4	0.79	1.1
204.05	965.0	976.7	977.1	977.6	977.9	0.49	0.9	1.3
203.96	964.1	976.0	976.4	976.8	977.2	0.5	0.88	1.3
203.86	962.2	975.1	975.6	976.0	976.3	0.4	0.82	1.2
203.77	963.3	974.5	974.9	975.3	975.7	0.4	0.77	1.1
203.67	962.3	974.0	974.4	974.7	975.1	0.38	0.74	1.1
203.58	962.1	973.5	973.9	974.2	974.6	0.36	0.7	1.0
203.48	962.2	972.5	972.9	973.3	973.6	0.39	0.74	1.1
203.39	959.9	971.6	972.0	972.4	972.7	0.4	0.73	1.0
203.29	960.8	970.8	971.2	971.6	971.9	0.4	0.75	1.1
203.19	956.7	970.2	970.6	970.9	971.2	0.37	0.71	1.0
203.09	958.7	969.3	969.7	970.0	970.4	0.36	0.7	1.0
202.99	959.2	968.5	968.8	969.2	969.5	0.35	0.69	1.0
202.9	956.5	967.5	967.9	968.2	968.5	0.35	0.69	1.0
202.8	956.4	966.6	967.0	967.3	967.6	0.35	0.69	1.0

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
20-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.69	953.7	965.7	966.1	966.4	966.8	0.36	0.7	1.0
202.59	953.7	964.8	965.2	965.5	965.9	0.35	0.69	1.0
202.48	952.5	964.2	964.5	964.9	965.2	0.36	0.7	1.0
202.37	954.6	963.5	963.9	964.3	964.6	0.37	0.72	1.1
202.29	955.5	963.2	963.6	963.9	964.3	0.35	0.68	1.0
202.18	949.8	962.4	962.8	963.1	963.5	0.37	0.71	1.1
202.09	949.9	961.4	961.8	962.1	962.5	0.36	0.7	1.1
					Average =	0.4	0.9	1.3

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
50-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1044.0	1044.3	1045.0	1045.8	0.3	1.0	1.8
211.51	1021.8	1041.0	1042.2	1043.2	1044.2	1.2	2.2	3.1
211.41	1018.3	1043.1	1043.7	1044.4	1045.0	0.7	1.3	2.0
211.31	1020.8	1041.0	1042.0	1042.8	1043.6	1.0	1.8	2.7
211.21	1021.1	1041.5	1042.2	1043.0	1043.7	0.8	1.5	2.2
211.12	1015.7	1040.8	1041.6	1042.3	1043.1	0.8	1.6	2.3
211.02	1019.4	1040.0	1040.8	1041.6	1042.3	0.8	1.5	2.2
210.93	1018.7	1039.4	1040.2	1040.9	1041.6	0.8	1.5	2.2
210.83	1019.1	1038.9	1039.6	1040.3	1041.0	0.8	1.5	2.1
210.74	1018.2	1038.5	1039.2	1039.9	1040.5	0.7	1.4	2.0
210.64	1017.7	1038.2	1038.9	1039.5	1040.1	0.7	1.3	1.9
210.55	1018.0	1037.5	1038.2	1038.8	1039.4	0.7	1.3	1.9
210.46	1016.3	1037.3	1037.9	1038.5	1039.1	0.6	1.2	1.8
210.44	1017.6	1037.1	1037.7	1038.3	1038.9	0.6	1.2	1.8
210.43	1017.5	1036.9	1037.6	1038.2	1038.8	0.6	1.3	1.8
210.36	1017.4	1036.6	1037.3	1037.8	1038.4	0.6	1.2	1.8
210.26	1016.9	1036.3	1036.9	1037.5	1038.0	0.6	1.1	1.7
210.17	1014.7	1036.0	1036.5	1037.1	1037.6	0.6	1.1	1.6
210.07	1018.5	1035.9	1036.4	1036.9	1037.4	0.5	1.0	1.5
209.98	1018.1	1035.5	1036.0	1036.5	1037.0	0.5	1.0	1.5
209.88	1014.7	1035.2	1035.7	1036.2	1036.7	0.5	1.0	1.4
209.79	1020.0	1035.0	1035.5	1036.0	1036.4	0.5	1.0	1.4
209.69	1019.0	1034.6	1035.1	1035.6	1036.0	0.5	1.0	1.4
209.6	1016.4	1034.3	1034.8	1035.2	1035.6	0.5	0.9	1.3
209.54	1019.6	1031.5	1032.1	1032.6	1033.2	0.6	1.1	1.7
209.53	1019.7	1031.1	1031.7	1032.2	1032.8	0.6	1.2	1.7
209.42	1019.6	1030.7	1031.2	1031.6	1032.1	0.4	0.9	1.3
209.33	1019.1	1028.1	1028.8	1029.3	1029.9	0.6	1.2	1.8
209.24	1017.4	1027.3	1027.9	1028.4	1028.9	0.6	1.1	1.6
209.14	1014.5	1026.4	1026.9	1027.4	1027.9	0.5	1.0	1.5
209.04	1012.2	1025.9	1026.4	1026.8	1027.2	0.5	0.9	1.3
208.95	1013.1	1025.0	1025.5	1025.9	1026.4	0.5	1.0	1.4
208.85	1013.4	1024.3	1024.8	1025.2	1025.6	0.5	0.9	1.3
208.75	1011.0	1023.2	1023.7	1024.1	1024.6	0.5	0.9	1.4
208.67	1010.0	1022.1	1022.5	1022.9	1023.4	0.5	0.9	1.3
208.57	1010.0	1020.6	1021.1	1021.6	1022.0	0.5	0.9	1.4
208.48	1007.6	1020.3	1020.7	1021.1	1021.5	0.4	0.8	1.2
208.39	1005.6	1019.0	1019.4	1019.9	1020.3	0.4	0.9	1.3
208.29	1004.7	1017.9	1018.3	1018.8	1019.2	0.4	0.9	1.3
208.19	1004.7	1016.6	1017.0	1017.5	1018.0	0.5	1.0	1.5
208.1	1001.3	1015.4	1015.9	1016.4	1016.9	0.5	1.0	1.5
207.99	999.9	1014.2	1014.7	1015.2	1015.7	0.5	1.0	1.5
207.9	1000.8	1013.3	1013.8	1014.3	1014.8	0.5	1.0	1.5
207.8	999.1	1012.2	1012.7	1013.2	1013.6	0.5	1.0	1.4
207.71	1000.3	1011.2	1011.7	1012.2	1012.7	0.5	1.0	1.5
207.62	1000.2	1010.1	1010.6	1011.2	1011.6	0.5	1.0	1.5
207.53	999.3	1009.3	1009.8	1010.3	1010.8	0.5	1.0	1.5
207.49	999.4	1009.1	1009.6	1010.1	1010.5	0.5	1.0	1.4
207.48	999.2	1008.9	1009.4	1009.9	1010.3	0.5	1.0	1.5
207.43	999.0	1008.3	1008.8	1009.3	1009.8	0.5	1.0	1.5

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
50-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.34	996.5	1007.6	1008.0	1008.5	1008.9	0.4	0.9	1.3
207.27	993.3	1006.2	1006.7	1007.3	1007.8	0.6	1.1	1.6
207.16	992.7	1005.2	1005.7	1006.2	1006.7	0.5	1.1	1.5
207.07	992.8	1004.2	1004.7	1005.3	1005.8	0.6	1.1	1.6
206.97	992.7	1003.6	1004.1	1004.6	1005.1	0.5	1.0	1.5
206.88	992.6	1003.2	1003.7	1004.2	1004.6	0.5	1.0	1.4
206.79	993.0	1002.4	1002.9	1003.4	1003.8	0.5	1.0	1.4
206.7	991.2	1002.2	1002.6	1003.1	1003.5	0.4	0.9	1.3
206.6	990.5	1001.6	1002.0	1002.5	1002.8	0.4	0.9	1.3
206.51	990.2	1000.8	1001.2	1001.6	1002.0	0.4	0.8	1.2
206.41	988.8	1000.2	1000.6	1001.0	1001.3	0.4	0.8	1.2
206.32	987.4	999.3	999.7	1000.2	1000.5	0.5	0.9	1.3
206.22	986.0	998.3	998.8	999.2	999.6	0.5	0.9	1.3
206.13	984.6	997.5	998.0	998.3	998.7	0.4	0.8	1.2
206.03	984.7	996.4	996.8	997.2	997.6	0.4	0.8	1.3
205.94	981.5	995.2	995.7	996.1	996.5	0.5	0.89	1.3
205.84	979.5	994.2	994.7	995.1	995.6	0.5	0.9	1.3
205.75	973.9	993.0	993.6	994.1	994.5	0.5	1.0	1.5
205.62	976.0	992.3	992.9	993.4	993.8	0.6	1.09	1.6
205.52	975.9	991.8	992.4	992.9	993.4	0.6	1.07	1.5
205.43	976.1	991.4	992.0	992.5	993.0	0.6	1.09	1.6
205.4	975.5	991.4	992.0	992.5	993.0	0.6	1.08	1.6
205.34	972.7	990.8	991.4	992.0	992.5	0.6	1.15	1.6
205.25	973.4	990.2	990.8	991.4	991.9	0.6	1.15	1.7
205.15	973.1	989.2	989.8	990.4	990.9	0.6	1.2	1.7
205.06	970.4	987.9	988.6	989.2	989.7	0.7	1.27	1.8
204.97	967.6	987.5	988.1	988.6	989.1	0.6	1.08	1.6
204.87	968.1	986.3	986.9	987.5	988.1	0.6	1.2	1.7
204.78	967.6	986.2	986.7	987.3	987.7	0.6	1.08	1.6
204.68	971.3	985.3	985.9	986.5	987.0	0.6	1.19	1.7
204.61	972.6	984.4	984.9	985.5	986.0	0.6	1.12	1.6
204.53	972.7	983.4	984.0	984.5	985.0	0.6	1.06	1.5
204.42	971.4	982.5	983.0	983.5	983.9	0.5	1.01	1.5
204.34	969.3	981.3	981.9	982.3	982.8	0.6	1.02	1.4
204.25	968.0	980.3	980.8	981.3	981.7	0.5	1.01	1.4
204.15	965.9	979.4	979.9	980.4	980.8	0.5	0.93	1.3
204.05	965.0	978.8	979.2	979.7	980.1	0.48	0.92	1.4
203.96	964.1	978.1	978.5	979.0	979.4	0.5	0.89	1.3
203.86	962.2	977.1	977.6	978.0	978.4	0.5	0.89	1.3
203.77	963.3	976.5	976.9	977.3	977.7	0.43	0.83	1.2
203.67	962.3	975.9	976.4	976.7	977.1	0.42	0.81	1.2
203.58	962.1	975.4	975.8	976.2	976.5	0.39	0.76	1.1
203.48	962.2	974.4	974.8	975.2	975.6	0.42	0.81	1.2
203.39	959.9	973.5	973.9	974.3	974.7	0.4	0.82	1.2
203.29	960.8	972.7	973.2	973.6	974.0	0.4	0.86	1.3
203.19	956.7	972.1	972.5	972.9	973.3	0.43	0.84	1.2
203.09	958.7	971.2	971.6	972.0	972.4	0.43	0.84	1.2
202.99	959.2	970.3	970.7	971.1	971.5	0.44	0.85	1.2
202.9	956.5	969.3	969.7	970.2	970.5	0.45	0.87	1.2
202.8	956.4	968.4	968.9	969.3	969.7	0.44	0.85	1.2

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
50-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.69	953.7	967.6	968.0	968.4	968.8	0.44	0.85	1.2
202.59	953.7	966.7	967.1	967.5	967.9	0.43	0.84	1.2
202.48	952.5	966.0	966.5	966.9	967.2	0.43	0.84	1.2
202.37	954.6	965.4	965.9	966.3	966.6	0.43	0.83	1.2
202.29	955.5	965.2	965.6	965.9	966.3	0.4	0.78	1.1
202.18	949.8	964.3	964.8	965.1	965.5	0.43	0.82	1.2
202.09	949.9	963.4	963.9	964.3	964.6	0.46	0.86	1.2
					Average =	0.5	1.0	1.5

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
100-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1046.5	1046.7	1047.2	1048.0	0.2	0.7	1.5
211.51	1021.8	1042.5	1043.9	1045.0	1046.1	1.4	2.5	3.6
211.41	1018.3	1045.0	1045.7	1046.4	1047.2	0.7	1.4	2.1
211.31	1020.8	1042.9	1043.9	1044.9	1045.7	1.0	1.9	2.8
211.21	1021.1	1043.5	1044.3	1045.1	1045.8	0.8	1.6	2.3
211.12	1015.7	1042.9	1043.7	1044.5	1045.2	0.8	1.6	2.4
211.02	1019.4	1042.0	1042.8	1043.6	1044.3	0.8	1.6	2.3
210.93	1018.7	1041.4	1042.2	1042.9	1043.6	0.8	1.5	2.2
210.83	1019.1	1040.9	1041.6	1042.3	1043.0	0.7	1.4	2.1
210.74	1018.2	1040.5	1041.2	1041.8	1042.5	0.7	1.3	2.0
210.64	1017.7	1040.2	1040.8	1041.4	1042.1	0.6	1.2	1.8
210.55	1018.0	1039.5	1040.1	1040.7	1041.3	0.6	1.2	1.8
210.46	1016.3	1039.3	1039.9	1040.4	1041.0	0.6	1.1	1.7
210.44	1017.6	1039.1	1039.7	1040.2	1040.8	0.6	1.1	1.6
210.43	1017.5	1038.9	1039.5	1040.1	1040.6	0.6	1.1	1.7
210.36	1017.4	1038.7	1039.2	1039.7	1040.2	0.5	1.0	1.5
210.26	1016.9	1038.4	1038.9	1039.4	1039.8	0.5	1.0	1.4
210.17	1014.7	1038.1	1038.6	1039.0	1039.4	0.5	0.9	1.3
210.07	1018.5	1038.0	1038.4	1038.9	1039.2	0.4	0.8	1.2
209.98	1018.1	1037.7	1038.1	1038.5	1038.8	0.4	0.8	1.1
209.88	1014.7	1037.4	1037.8	1038.2	1038.5	0.4	0.7	1.1
209.79	1020.0	1037.3	1037.6	1038.0	1038.3	0.4	0.7	1.0
209.69	1019.0	1036.9	1037.2	1037.6	1037.9	0.3	0.7	1.0
209.6	1016.4	1036.6	1036.9	1037.2	1037.5	0.3	0.6	0.9
209.54	1019.6	1033.0	1033.6	1034.2	1034.8	0.6	1.2	1.8
209.53	1019.7	1032.5	1033.2	1033.8	1034.3	0.6	1.2	1.8
209.42	1019.6	1032.3	1032.7	1033.1	1033.5	0.4	0.9	1.3
209.33	1019.1	1029.3	1030.0	1030.6	1031.3	0.7	1.4	2.0
209.24	1017.4	1028.4	1029.0	1029.6	1030.1	0.6	1.2	1.7
209.14	1014.5	1027.5	1028.0	1028.6	1029.1	0.6	1.1	1.6
209.04	1012.2	1027.0	1027.5	1028.0	1028.5	0.5	1.0	1.5
208.95	1013.1	1026.1	1026.7	1027.2	1027.6	0.5	1.0	1.5
208.85	1013.4	1025.5	1026.0	1026.4	1026.9	0.5	1.0	1.4
208.75	1011.0	1024.4	1024.9	1025.4	1025.9	0.5	1.0	1.4
208.67	1010.0	1023.1	1023.6	1024.1	1024.5	0.5	1.0	1.4
208.57	1010.0	1021.5	1022.1	1022.6	1023.1	0.6	1.1	1.6
208.48	1007.6	1021.2	1021.7	1022.2	1022.6	0.5	1.0	1.4
208.39	1005.6	1020.0	1020.5	1021.0	1021.4	0.5	1.0	1.4
208.29	1004.7	1018.9	1019.5	1019.9	1020.3	0.6	1.0	1.4
208.19	1004.7	1017.7	1018.3	1018.8	1019.2	0.6	1.1	1.5
208.1	1001.3	1016.6	1017.2	1017.7	1018.1	0.6	1.1	1.5
207.99	999.9	1015.3	1015.9	1016.4	1016.9	0.6	1.1	1.5
207.9	1000.8	1014.5	1015.0	1015.5	1016.0	0.5	1.0	1.5
207.8	999.1	1013.4	1013.9	1014.4	1014.9	0.5	1.0	1.4
207.71	1000.3	1012.5	1013.0	1013.5	1014.0	0.5	1.0	1.5
207.62	1000.2	1011.5	1012.0	1012.5	1013.0	0.5	1.1	1.6
207.53	999.3	1010.7	1011.2	1011.7	1012.2	0.6	1.1	1.6
207.49	999.4	1010.5	1011.0	1011.5	1012.0	0.5	1.0	1.5
207.48	999.2	1010.2	1010.8	1011.3	1011.8	0.5	1.0	1.6
207.43	999.0	1009.5	1010.1	1010.6	1011.2	0.5	1.1	1.7

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
100-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.34	996.5	1008.7	1009.2	1009.8	1010.4	0.5	1.0	1.6
207.27	993.3	1007.3	1007.9	1008.5	1009.0	0.6	1.1	1.7
207.16	992.7	1006.4	1006.9	1007.4	1008.0	0.6	1.1	1.6
207.07	992.8	1005.4	1006.0	1006.5	1007.1	0.6	1.2	1.7
206.97	992.7	1004.7	1005.3	1005.8	1006.4	0.6	1.1	1.7
206.88	992.6	1004.4	1004.9	1005.4	1006.0	0.5	1.0	1.6
206.79	993.0	1003.5	1004.1	1004.6	1005.1	0.6	1.1	1.5
206.7	991.2	1003.3	1003.8	1004.3	1004.7	0.5	1.0	1.4
206.6	990.5	1002.6	1003.1	1003.6	1004.0	0.5	1.0	1.4
206.51	990.2	1001.7	1002.2	1002.7	1003.2	0.5	1.0	1.4
206.41	988.8	1001.1	1001.6	1002.0	1002.5	0.5	0.9	1.4
206.32	987.4	1000.3	1000.8	1001.2	1001.6	0.5	0.9	1.4
206.22	986.0	999.4	999.8	1000.3	1000.7	0.5	0.9	1.3
206.13	984.6	998.5	999.0	999.4	999.8	0.4	0.8	1.3
206.03	984.7	997.3	997.9	998.3	998.7	0.5	0.9	1.4
205.94	981.5	996.3	996.8	997.2	997.7	0.5	0.97	1.4
205.84	979.5	995.4	995.9	996.4	996.8	0.5	1.0	1.4
205.75	973.9	994.3	994.9	995.4	995.8	0.6	1.0	1.5
205.62	976.0	993.8	994.3	994.8	995.2	0.6	1	1.5
205.52	975.9	993.4	993.9	994.4	994.8	0.5	0.98	1.4
205.43	976.1	993.0	993.5	994.0	994.4	0.5	0.97	1.4
205.4	975.5	993.0	993.5	993.9	994.4	0.5	0.93	1.4
205.34	972.7	992.5	993.1	993.5	994.0	0.6	1.01	1.5
205.25	973.4	991.9	992.5	992.9	993.4	0.6	1	1.5
205.15	973.1	990.7	991.3	991.7	992.3	0.6	1.05	1.6
205.06	970.4	989.3	990.0	990.4	991.0	0.7	1.1	1.6
204.97	967.6	988.9	989.5	990.1	990.5	0.5	1.14	1.6
204.87	968.1	987.8	988.5	989.0	989.5	0.6	1.19	1.7
204.78	967.6	987.7	988.3	988.8	989.2	0.5	1.04	1.5
204.68	971.3	986.9	987.5	988.0	988.5	0.6	1.13	1.6
204.61	972.6	985.8	986.4	986.9	987.4	0.6	1.09	1.6
204.53	972.7	984.7	985.3	985.8	986.3	0.6	1.11	1.6
204.42	971.4	983.7	984.2	984.8	985.2	0.5	1.06	1.5
204.34	969.3	982.5	983.0	983.5	984.0	0.5	1.01	1.5
204.25	968.0	981.4	981.9	982.4	982.9	0.6	1.06	1.5
204.15	965.9	980.5	981.0	981.5	982.0	0.5	1.01	1.5
204.05	965.0	979.8	980.3	980.8	981.3	0.54	1.03	1.5
203.96	964.1	979.1	979.6	980.1	980.6	0.5	1	1.5
203.86	962.2	978.1	978.6	979.1	979.6	0.5	0.98	1.4
203.77	963.3	977.4	977.9	978.4	978.8	0.48	0.93	1.4
203.67	962.3	976.9	977.4	977.8	978.2	0.46	0.89	1.3
203.58	962.1	976.4	976.8	977.2	977.6	0.46	0.88	1.3
203.48	962.2	975.4	975.9	976.4	976.8	0.51	0.96	1.4
203.39	959.9	974.5	975.0	975.5	975.9	0.5	0.96	1.4
203.29	960.8	973.7	974.2	974.7	975.1	0.5	0.97	1.4
203.19	956.7	973.1	973.6	974.0	974.4	0.46	0.91	1.3
203.09	958.7	972.2	972.7	973.1	973.5	0.46	0.91	1.3
202.99	959.2	971.3	971.8	972.2	972.6	0.47	0.92	1.3
202.9	956.5	970.3	970.8	971.2	971.6	0.47	0.92	1.3
202.8	956.4	969.4	969.9	970.4	970.8	0.47	0.92	1.3

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
100-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.69	953.7	968.6	969.0	969.5	969.9	0.48	0.94	1.4
202.59	953.7	967.7	968.1	968.6	969.0	0.47	0.92	1.4
202.48	952.5	967.0	967.5	968.0	968.4	0.47	0.92	1.4
202.37	954.6	966.5	966.9	967.4	967.8	0.47	0.9	1.3
202.29	955.5	966.2	966.6	967.0	967.4	0.44	0.85	1.3
202.18	949.8	965.3	965.8	966.2	966.6	0.44	0.86	1.3
202.09	949.9	964.5	964.9	965.4	965.8	0.46	0.89	1.3
					Average =	0.5	1.1	1.5

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
500-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
211.54	1021.9	1051.4	1051.7	1051.9	1052.3	0.3	0.5	0.9
211.51	1021.8	1045.5	1046.7	1048.2	1049.4	1.3	2.7	3.9
211.41	1018.3	1048.8	1049.6	1050.3	1051.0	0.8	1.5	2.2
211.31	1020.8	1046.6	1047.8	1048.6	1049.4	1.1	2.0	2.8
211.21	1021.1	1047.5	1048.4	1049.0	1049.7	0.9	1.5	2.2
211.12	1015.7	1046.8	1047.7	1048.3	1049.0	0.9	1.5	2.2
211.02	1019.4	1045.7	1046.6	1047.2	1047.8	0.9	1.4	2.1
210.93	1018.7	1045.1	1045.9	1046.4	1046.9	0.9	1.3	1.9
210.83	1019.1	1044.5	1045.3	1045.6	1046.1	0.8	1.2	1.6
210.74	1018.2	1044.1	1044.8	1045.1	1045.5	0.7	1.0	1.4
210.64	1017.7	1043.8	1044.5	1044.6	1044.9	0.6	0.8	1.1
210.55	1018.0	1043.1	1043.7	1045.4	1045.6	0.6	2.3	2.6
210.46	1016.3	1042.8	1043.4	1043.9	1045.4	0.5	1.1	2.5
210.44	1017.6	1042.7	1043.2	1043.7	1045.1	0.5	1.1	2.4
210.43	1017.5	1042.4	1043.0	1043.5	1044.1	0.5	1.1	1.7
210.36	1017.4	1042.1	1042.6	1043.1	1043.6	0.5	1.0	1.5
210.26	1016.9	1041.9	1042.3	1042.8	1043.2	0.4	0.9	1.3
210.17	1014.7	1041.7	1042.0	1042.4	1042.9	0.4	0.8	1.2
210.07	1018.5	1041.6	1041.9	1042.3	1042.7	0.3	0.6	1.0
209.98	1018.1	1041.3	1041.5	1041.9	1042.2	0.3	0.6	1.0
209.88	1014.7	1041.0	1041.2	1041.5	1041.8	0.3	0.5	0.9
209.79	1020.0	1040.9	1041.1	1041.3	1041.6	0.2	0.5	0.8
209.69	1019.0	1040.5	1040.7	1040.9	1041.2	0.2	0.4	0.7
209.6	1016.4	1040.2	1040.3	1040.5	1040.8	0.1	0.3	0.6
209.54	1019.6	1036.9	1037.2	1037.6	1038.1	0.2	0.7	1.2
209.53	1019.7	1035.5	1035.9	1036.5	1037.1	0.4	1.0	1.6
209.42	1019.6	1035.3	1035.4	1035.7	1036.1	0.1	0.4	0.8
209.33	1019.1	1031.6	1032.5	1033.3	1034.1	0.9	1.7	2.4
209.24	1017.4	1030.6	1031.3	1032.0	1032.6	0.7	1.4	2.0
209.14	1014.5	1029.6	1030.3	1030.9	1031.4	0.7	1.3	1.8
209.04	1012.2	1029.3	1029.8	1030.3	1030.8	0.5	1.1	1.6
208.95	1013.1	1028.5	1029.0	1029.5	1030.0	0.5	1.0	1.5
208.85	1013.4	1027.9	1028.3	1028.8	1029.2	0.4	0.9	1.3
208.75	1011.0	1027.0	1027.4	1027.8	1028.2	0.4	0.8	1.2
208.67	1010.0	1025.3	1025.7	1026.2	1026.7	0.4	0.9	1.4
208.57	1010.0	1023.4	1023.6	1024.2	1024.8	0.2	0.8	1.4
208.48	1007.6	1023.2	1023.1	1023.6	1024.1	0.0	0.4	0.9
208.39	1005.6	1021.9	1022.8	1023.2	1023.6	1.0	1.4	1.8
208.29	1004.7	1020.8	1021.3	1021.8	1022.2	0.5	1.0	1.4
208.19	1004.7	1019.8	1020.3	1020.8	1021.2	0.5	1.0	1.4
208.1	1001.3	1018.8	1019.3	1019.8	1020.2	0.5	1.0	1.4
207.99	999.9	1017.5	1018.1	1018.5	1019.0	0.6	1.1	1.5
207.9	1000.8	1016.7	1017.2	1017.7	1018.1	0.5	1.0	1.4
207.8	999.1	1015.7	1016.2	1016.7	1017.1	0.5	1.0	1.4
207.71	1000.3	1014.9	1015.4	1015.9	1016.2	0.5	1.0	1.3
207.62	1000.2	1014.0	1014.5	1015.0	1015.3	0.5	1.0	1.3
207.53	999.3	1013.4	1013.9	1014.4	1014.6	0.5	1.0	1.2
207.49	999.4	1013.2	1013.7	1014.1	1014.3	0.5	0.9	1.1
207.48	999.2	1013.0	1013.5	1013.9	1014.1	0.5	0.9	1.1
207.43	999.0	1012.2	1012.8	1013.3	1014.0	0.7	1.1	1.9

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
500-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
207.34	996.5	1011.0	1011.9	1012.4	1012.8	0.8	1.4	1.8
207.27	993.3	1009.6	1010.2	1010.9	1011.6	0.6	1.3	2.0
207.16	992.7	1008.6	1009.2	1009.9	1010.3	0.6	1.3	1.7
207.07	992.8	1007.7	1008.3	1008.9	1009.4	0.6	1.2	1.7
206.97	992.7	1007.1	1007.6	1008.2	1008.7	0.5	1.1	1.6
206.88	992.6	1006.7	1007.2	1007.7	1008.2	0.5	1.0	1.4
206.79	993.0	1005.7	1006.2	1006.7	1007.2	0.5	1.0	1.5
206.7	991.2	1005.4	1005.8	1006.3	1006.7	0.5	0.9	1.3
206.6	990.5	1004.5	1005.1	1005.5	1006.0	0.5	1.0	1.4
206.51	990.2	1003.7	1004.2	1004.7	1005.1	0.5	1.0	1.4
206.41	988.8	1003.0	1003.5	1004.0	1004.4	0.5	1.0	1.4
206.32	987.4	1002.2	1002.7	1003.2	1003.7	0.5	1.0	1.4
206.22	986.0	1001.4	1001.8	1002.3	1002.7	0.5	0.9	1.4
206.13	984.6	1000.5	1001.0	1001.4	1001.8	0.5	0.9	1.3
206.03	984.7	999.3	999.8	1000.2	1000.7	0.5	0.9	1.4
205.94	981.5	998.4	998.9	999.3	999.8	0.5	0.9	1.4
205.84	979.5	997.7	998.2	998.5	998.9	0.5	0.8	1.3
205.75	973.9	996.6	997.2	997.5	997.9	0.5	0.8	1.3
205.62	976.0	996.2	996.7	996.9	997.3	0.5	0.69	1.1
205.52	975.9	995.9	996.4	996.5	996.9	0.5	0.58	1.0
205.43	976.1	995.5	996.0	996.0	996.4	0.5	0.52	0.9
205.4	975.5	995.5	995.9	996.0	996.3	0.4	0.48	0.8
205.34	972.7	995.2	995.6	995.6	995.9	0.5	0.43	0.8
205.25	973.4	994.6	995.0	994.9	995.2	0.4	0.27	0.6
205.15	973.1	993.3	993.8	993.3	993.7	0.6	0.01	0.4
205.06	970.4	991.3	992.0	992.9	993.4	0.7	1.58	2.0
204.97	967.6	991.5	991.9	992.5	993.0	0.5	1.09	1.5
204.87	968.1	990.4	990.9	991.4	991.8	0.5	0.98	1.4
204.78	967.6	990.2	990.7	991.1	991.4	0.4	0.82	1.2
204.68	971.3	989.3	989.8	990.2	990.6	0.4	0.86	1.2
204.61	972.6	988.2	988.7	989.2	989.6	0.5	0.97	1.4
204.53	972.7	987.1	987.6	988.1	988.6	0.6	1.08	1.5
204.42	971.4	986.1	986.7	987.3	987.7	0.6	1.18	1.6
204.34	969.3	984.5	985.1	985.7	986.3	0.6	1.18	1.7
204.25	968.0	983.4	984.0	984.6	985.1	0.6	1.21	1.7
204.15	965.9	982.6	983.2	983.8	984.3	0.6	1.17	1.7
204.05	965.0	981.9	982.5	983.1	983.6	0.6	1.2	1.7
203.96	964.1	981.1	981.7	982.2	982.7	0.6	1.13	1.6
203.86	962.2	979.9	980.5	981.0	981.4	0.6	1.1	1.5
203.77	963.3	979.2	979.8	980.2	980.6	0.55	1.01	1.3
203.67	962.3	978.7	979.2	979.6	979.9	0.52	0.92	1.2
203.58	962.1	978.2	978.7	979.1	979.3	0.51	0.87	1.0
203.48	962.2	977.4	977.9	978.2	978.6	0.5	0.81	1.2
203.39	959.9	976.6	977.1	977.3	977.6	0.5	0.77	1.1
203.29	960.8	975.8	976.3	976.9	977.2	0.5	1.19	1.5
203.19	956.7	975.1	975.6	976.1	976.3	0.51	0.96	1.2
203.09	958.7	974.1	974.7	975.1	975.7	0.52	0.99	1.6
202.99	959.2	973.2	973.7	974.1	974.6	0.53	0.99	1.4
202.9	956.5	972.2	972.7	973.2	973.7	0.56	1.03	1.5
202.8	956.4	971.3	971.9	972.4	972.8	0.57	1.02	1.5

Future Conditions Hydraulic Analysis: Sensitivity to Manning's n
500-year Profile

Cross Section	Thalweg	Water Surface Elevation After 50 Years				Difference with EC Roughness		
		EC Roughness	EC + 10%	EC+ 20%	EC+ 30%	EC + 10%	EC+ 20%	EC+ 30%
202.69	953.7	970.5	971.1	971.5	972.0	0.57	1	1.5
202.59	953.7	969.6	970.2	970.6	971.0	0.56	0.96	1.4
202.48	952.5	969.0	969.5	969.9	970.3	0.55	0.9	1.4
202.37	954.6	968.4	968.9	969.2	969.7	0.54	0.83	1.3
202.29	955.5	968.1	968.6	968.9	969.3	0.5	0.74	1.1
202.18	949.8	967.3	967.8	967.9	968.3	0.52	0.67	1.1
202.09	949.9	966.5	967.0	967.6	968.0	0.51	1.09	1.5
					Average =	0.5	1.0	1.5

Appendix J

Future Conditions Hydraulic Analysis Results

Rio Oeste
Water Surface Elevation for 5-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1030.7	1032.0	1032.1	1032.1	1031.8	1031.8
211.51	1021.8	1030.4	1031.4	1031.6	1031.4	1030.6	1030.6
211.41	1018.3	1030.3	1031.4	1031.5	1031.7	1031.3	1031.4
211.31	1020.8	1029.8	1030.8	1030.8	1031.0	1030.5	1030.5
211.21	1021.1	1029.3	1030.4	1030.5	1030.7	1030.6	1030.6
211.12	1015.7	1029.4	1029.9	1029.8	1030.0	1029.9	1029.9
211.02	1019.4	1029.2	1029.4	1029.1	1029.2	1029.3	1029.3
210.93	1018.7	1029.0	1029.1	1028.8	1028.7	1028.8	1028.8
210.83	1019.1	1028.8	1028.8	1028.5	1028.3	1028.3	1028.3
210.74	1018.2	1028.7	1028.5	1028.2	1028.0	1028.0	1027.9
210.64	1017.7	1028.7	1028.3	1028.0	1027.8	1027.7	1027.7
210.55	1018.0	1028.6	1027.8	1027.6	1027.3	1027.3	1027.2
210.46	1016.3	1028.6	1027.7	1027.5	1027.2	1027.1	1026.9
210.44	1017.6	1028.6	1027.7	1027.4	1027.1	1027.0	1026.9
210.43	1017.5	1028.6	1027.7	1027.4	1027.1	1027.0	1026.9
210.36	1017.4	1028.5	1027.4	1027.2	1026.8	1026.7	1026.6
210.26	1016.9	1028.4	1027.0	1026.8	1026.4	1026.3	1026.2
210.17	1014.7	1028.3	1026.5	1026.2	1025.6	1025.5	1025.4
210.07	1018.5	1028.3	1026.0	1025.8	1025.2	1025.0	1024.8
209.98	1018.1	1028.3	1025.1	1024.8	1024.2	1023.9	1023.8
209.88	1014.7	1028.2	1024.7	1024.3	1023.7	1023.5	1023.4
209.79	1020.0	1028.1	1024.0	1023.7	1023.1	1022.9	1022.8
209.69	1019.0	1028.0	1023.0	1022.6	1021.8	1021.3	1021.4
209.6	1016.4	1027.9	1022.7	1022.3	1021.4	1021.0	1020.9
209.54	1019.6	1026.8	1022.3	1022.0	1021.1	1020.7	1020.7
209.53	1019.7	1026.4	1022.2	1021.9	1021.1	1020.7	1020.7
209.42	1019.6	1025.4	1021.9	1021.7	1020.8	1020.4	1020.4
209.33	1019.1	1024.3	1020.6	1020.3	1019.7	1019.4	1019.3
209.24	1017.4	1022.7	1020.1	1019.9	1019.6	1019.3	1019.3
209.14	1014.5	1021.1	1019.4	1019.3	1019.0	1018.8	1018.8
209.04	1012.2	1020.9	1018.9	1018.9	1018.6	1018.5	1018.5
208.95	1013.1	1020.3	1018.2	1018.2	1018.1	1018.0	1018.0
208.85	1013.4	1018.0	1017.5	1017.6	1017.6	1017.6	1017.6
208.75	1011.0	1016.9	1016.4	1016.5	1016.5	1016.5	1016.5
208.67	1010.0	1016.4	1015.8	1015.9	1015.8	1015.8	1015.8
208.57	1010.0	1015.3	1015.2	1015.2	1015.0	1015.0	1015.0
208.48	1007.6	1014.3	1014.7	1014.6	1014.3	1014.2	1014.2
208.39	1005.6	1013.4	1013.6	1013.6	1012.7	1012.6	1012.6
208.29	1004.7	1012.3	1012.5	1012.4	1011.2	1011.2	1011.2
208.19	1004.7	1011.3	1010.7	1010.2	1009.3	1009.1	1009.1
208.1	1001.3	1010.0	1008.9	1008.5	1008.1	1007.9	1007.8
207.99	999.9	1009.2	1008.2	1007.7	1007.2	1007.0	1007.0
207.9	1000.8	1008.7	1007.2	1006.7	1006.2	1005.7	1005.7
207.8	999.1	1007.8	1005.8	1005.5	1005.1	1004.6	1004.6
207.71	1000.3	1006.8	1004.7	1004.6	1003.9	1003.5	1003.5
207.62	1000.2	1005.1	1003.9	1003.9	1003.3	1002.7	1002.7
207.53	999.3	1004.3	1002.9	1002.8	1002.2	1001.6	1001.6

Rio Oeste
Water Surface Elevation for 5-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1004.2	1002.6	1002.5	1002.0	1001.4	1001.4
207.48	999.2	1004.0	1002.4	1002.3	1001.8	1001.3	1001.2
207.43	999.0	1003.6	1002.1	1001.8	1001.3	1000.8	1000.7
207.34	996.5	1003.0	1001.6	1001.2	1000.6	1000.1	1000.0
207.27	993.3	1001.2	1000.7	999.7	999.3	998.7	998.7
207.16	992.7	1000.8	999.7	999.0	998.6	998.2	998.2
207.07	992.8	1000.6	999.3	998.5	998.2	997.8	997.8
206.97	992.7	998.4	999.1	997.2	997.4	997.2	997.0
206.88	992.6	999.1	998.2	997.5	997.5	997.3	997.1
206.79	993.0	998.2	998.0	997.3	996.7	996.5	996.3
206.7	991.2	996.7	997.3	996.7	996.3	996.1	995.9
206.6	990.5	996.1	995.6	995.6	995.4	995.1	995.1
206.51	990.2	995.0	994.1	994.2	994.1	993.9	993.9
206.41	988.8	993.9	993.3	993.3	993.2	993.1	993.1
206.32	987.4	993.0	992.4	992.4	992.3	992.2	992.1
206.22	986.0	992.1	991.2	991.2	991.1	990.8	990.8
206.13	984.6	991.1	990.1	990.2	990.1	990.0	990.0
206.03	984.7	989.1	989.0	989.1	989.1	989.1	989.0
205.94	981.5	987.6	988.0	988.0	988.1	988.1	988.1
205.84	979.5	985.7	986.4	986.5	986.7	986.8	986.8
205.75	973.9	984.8	985.0	985.1	985.3	985.5	985.4
205.62	976.0	983.8	983.8	983.9	984.0	984.2	984.2
205.52	975.9	982.9	982.5	982.6	982.7	982.7	982.8
205.43	976.1	982.4	981.6	981.8	981.9	982.1	982.1
205.4	975.5	982.4	981.6	981.7	981.8	982.0	982.0
205.34	972.7	982.1	981.0	981.0	981.1	981.3	981.3
205.25	973.4	981.7	980.7	980.5	980.6	980.8	980.8
205.15	973.1	980.7	980.4	980.3	980.3	980.4	980.4
205.06	970.4	980.1	980.1	979.9	979.9	980.0	979.9
204.97	967.6	980.0	979.5	979.3	979.3	979.4	979.4
204.87	968.1	979.6	977.6	977.6	977.5	977.6	977.5
204.78	967.6	979.6	977.2	977.1	976.8	976.6	976.6
204.68	971.3	979.3	976.5	976.2	975.9	975.7	975.7
204.61	972.6	978.8	975.9	975.7	975.4	975.2	975.2
204.53	972.7	978.0	975.2	975.0	974.8	974.7	974.7
204.42	971.4	976.6	974.6	974.3	974.2	974.2	974.1
204.34	969.3	974.2	974.0	973.9	973.8	973.8	973.8
204.25	968.0	973.7	973.5	973.5	973.5	973.5	973.5
204.15	965.9	973.5	972.7	972.6	972.7	972.7	972.7
204.05	965.0	972.9	971.8	971.8	971.9	971.9	971.9
203.96	964.1	970.0	971.0	971.1	971.2	971.3	971.3
203.86	962.2	969.4	970.1	970.2	970.4	970.6	970.6
203.77	963.3	969.2	969.4	969.5	969.6	969.7	969.7
203.67	962.3	968.9	969.1	969.1	969.1	969.1	969.1
203.58	962.1	968.7	968.7	968.7	968.7	968.7	968.7
203.48	962.2	968.3	968.0	968.0	967.9	967.9	967.8
203.39	959.9	967.7	967.2	967.2	967.1	967.0	967.0

Rio Oeste
Water Surface Elevation for 5-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	967.1	966.6	966.6	966.4	966.4	966.4
203.19	956.7	966.3	966.0	966.0	965.8	965.8	965.8
203.09	958.7	965.3	965.2	965.2	965.2	965.2	965.2
202.99	959.2	964.3	964.5	964.5	964.5	964.5	964.5
202.9	956.5	963.8	963.8	963.7	963.7	963.7	963.7
202.8	956.4	963.3	963.1	962.9	962.7	962.7	962.6
202.69	953.7	962.6	962.4	962.2	961.8	961.7	961.7
202.59	953.7	961.7	961.5	961.3	960.9	960.8	960.7
202.48	952.5	960.9	960.7	960.6	960.0	959.9	959.9
202.37	954.6	960.1	959.9	959.8	959.1	959.1	959.1
202.29	955.5	959.5	958.9	958.8	958.5	958.5	958.5
202.18	949.8	958.7	957.6	957.6	957.5	957.4	957.4
202.09	949.9	956.4	956.5	956.5	956.5	956.6	956.6

Rio Oeste
Water Surface Elevation for 10-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1036.4	1036.9	1036.9	1036.8	1036.3	1036.4
211.51	1021.8	1035.9	1036.1	1036.1	1035.9	1035.1	1035.1
211.41	1018.3	1035.8	1036.1	1036.1	1036.3	1036.1	1036.1
211.31	1020.8	1035.2	1035.2	1035.0	1035.0	1034.6	1034.6
211.21	1021.1	1034.8	1034.6	1034.5	1034.7	1034.7	1034.7
211.12	1015.7	1034.9	1034.2	1034.0	1034.0	1034.0	1034.0
211.02	1019.4	1034.6	1033.7	1033.4	1033.4	1033.4	1033.5
210.93	1018.7	1034.3	1033.3	1033.0	1032.9	1032.9	1032.8
210.83	1019.1	1034.2	1032.9	1032.6	1032.4	1032.3	1032.3
210.74	1018.2	1034.1	1032.5	1032.2	1032.0	1031.9	1031.9
210.64	1017.7	1034.0	1032.2	1032.0	1031.8	1031.6	1031.6
210.55	1018.0	1034.0	1031.6	1031.3	1031.1	1031.0	1030.9
210.46	1016.3	1033.9	1031.5	1031.2	1030.9	1030.7	1030.6
210.44	1017.6	1033.8	1031.4	1031.2	1030.8	1030.6	1030.5
210.43	1017.5	1033.8	1031.3	1031.1	1030.7	1030.5	1030.5
210.36	1017.4	1033.7	1030.9	1030.7	1030.3	1030.2	1030.1
210.26	1016.9	1033.7	1030.5	1030.2	1029.9	1029.7	1029.6
210.17	1014.7	1033.6	1029.9	1029.6	1029.0	1028.8	1028.8
210.07	1018.5	1033.6	1029.6	1029.2	1028.7	1028.5	1028.4
209.98	1018.1	1033.5	1029.1	1028.7	1028.2	1028.0	1027.9
209.88	1014.7	1033.4	1028.8	1028.4	1027.9	1027.6	1027.6
209.79	1020.0	1033.3	1028.4	1028.0	1027.5	1027.3	1027.3
209.69	1019.0	1033.2	1027.9	1027.5	1026.9	1026.6	1026.6
209.6	1016.4	1033.0	1027.7	1027.2	1026.7	1026.4	1026.4
209.54	1019.6	1030.5	1026.5	1026.3	1025.9	1025.6	1025.6
209.53	1019.7	1029.6	1026.4	1026.1	1025.8	1025.5	1025.5
209.42	1019.6	1028.2	1026.0	1025.7	1025.4	1025.2	1025.2
209.33	1019.1	1026.7	1024.6	1024.4	1024.0	1023.8	1023.8
209.24	1017.4	1025.1	1023.8	1023.7	1023.4	1023.1	1023.1
209.14	1014.5	1024.1	1022.8	1022.7	1022.4	1022.2	1022.2
209.04	1012.2	1023.8	1022.3	1022.3	1022.0	1021.8	1021.8
208.95	1013.1	1023.0	1021.2	1021.3	1021.0	1020.9	1020.9
208.85	1013.4	1021.4	1020.6	1020.7	1020.5	1020.4	1020.4
208.75	1011.0	1019.9	1019.3	1019.4	1019.3	1019.3	1019.3
208.67	1010.0	1019.1	1018.5	1018.5	1018.4	1018.4	1018.4
208.57	1010.0	1017.7	1017.7	1017.7	1017.4	1017.4	1017.4
208.48	1007.6	1016.9	1017.3	1017.2	1016.9	1016.9	1016.9
208.39	1005.6	1015.9	1016.2	1016.1	1015.6	1015.6	1015.6
208.29	1004.7	1014.9	1015.1	1015.0	1014.5	1014.4	1014.4
208.19	1004.7	1014.0	1013.7	1013.5	1013.1	1013.0	1013.0
208.1	1001.3	1013.0	1012.1	1011.9	1011.6	1011.4	1011.4
207.99	999.9	1012.2	1011.2	1010.9	1010.4	1010.2	1010.2
207.9	1000.8	1011.6	1010.3	1009.9	1009.4	1009.1	1009.1
207.8	999.1	1010.7	1008.8	1008.6	1008.0	1007.7	1007.7
207.71	1000.3	1009.4	1007.6	1007.5	1006.8	1006.5	1006.5
207.62	1000.2	1007.7	1006.7	1006.6	1006.1	1005.7	1005.6
207.53	999.3	1007.1	1005.8	1005.6	1005.2	1004.8	1004.8

Rio Oeste
Water Surface Elevation for 10-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1006.9	1005.6	1005.4	1005.0	1004.6	1004.6
207.48	999.2	1006.6	1005.4	1005.2	1004.8	1004.5	1004.4
207.43	999.0	1006.2	1005.1	1004.7	1004.4	1004.1	1004.0
207.34	996.5	1005.4	1004.5	1004.1	1003.8	1003.5	1003.4
207.27	993.3	1003.8	1003.6	1002.8	1002.4	1002.0	1001.9
207.16	992.7	1002.3	1002.3	1001.6	1001.1	1000.9	1000.9
207.07	992.8	1000.8	1001.6	1000.8	1000.3	1000.2	1000.1
206.97	992.7	1000.6	1001.2	1000.5	1000.1	1000.0	999.9
206.88	992.6	1000.3	1001.0	1000.4	999.9	999.8	999.7
206.79	993.0	999.6	1000.7	1000.0	999.5	999.4	999.3
206.7	991.2	999.3	998.0	998.2	998.2	998.0	998.0
206.6	990.5	998.8	997.9	998.0	997.8	997.7	997.7
206.51	990.2	997.6	996.9	996.9	996.9	996.8	996.7
206.41	988.8	996.6	996.2	996.2	996.2	996.1	996.1
206.32	987.4	995.8	995.3	995.3	995.3	995.2	995.2
206.22	986.0	994.7	994.1	994.2	994.1	994.0	994.0
206.13	984.6	993.7	993.2	993.4	993.4	993.4	993.3
206.03	984.7	991.8	992.1	992.3	992.4	992.5	992.4
205.94	981.5	990.4	990.9	991.0	991.1	991.3	991.2
205.84	979.5	989.2	989.2	989.3	989.5	989.7	989.7
205.75	973.9	988.4	987.8	988.0	988.1	988.4	988.4
205.62	976.0	987.5	986.7	986.7	986.8	987.0	987.0
205.52	975.9	987.1	985.9	986.0	986.1	986.2	986.3
205.43	976.1	986.7	985.2	985.3	985.4	985.6	985.6
205.4	975.5	986.7	985.3	985.3	985.4	985.6	985.6
205.34	972.7	986.3	984.6	984.6	984.7	984.9	984.9
205.25	973.4	985.9	984.3	984.1	984.1	984.3	984.3
205.15	973.1	984.4	983.9	983.7	983.6	983.7	983.7
205.06	970.4	983.7	983.2	983.0	982.9	982.9	982.9
204.97	967.6	983.6	982.6	982.4	982.3	982.3	982.3
204.87	968.1	983.2	981.2	981.0	980.7	980.6	980.6
204.78	967.6	983.1	980.9	980.7	980.4	980.2	980.2
204.68	971.3	982.7	980.2	979.9	979.6	979.5	979.5
204.61	972.6	981.9	979.4	979.2	979.0	978.8	978.8
204.53	972.7	980.9	978.7	978.4	978.2	978.1	978.1
204.42	971.4	979.2	977.8	977.6	977.5	977.4	977.4
204.34	969.3	977.0	977.0	976.9	976.8	976.8	976.8
204.25	968.0	976.6	976.3	976.3	976.3	976.3	976.3
204.15	965.9	976.4	975.6	975.5	975.6	975.6	975.6
204.05	965.0	975.7	974.8	974.7	974.7	974.7	974.7
203.96	964.1	972.8	973.8	973.9	973.9	974.0	974.0
203.86	962.2	972.5	972.8	972.9	973.0	973.2	973.2
203.77	963.3	972.3	972.4	972.4	972.5	972.5	972.6
203.67	962.3	971.9	972.0	972.0	972.0	972.1	972.1
203.58	962.1	971.6	971.7	971.7	971.6	971.7	971.7
203.48	962.2	971.1	970.8	970.8	970.7	970.7	970.7
203.39	959.9	970.5	970.0	969.9	969.8	969.8	969.8

Rio Oeste
Water Surface Elevation for 10-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	969.8	969.3	969.2	969.1	969.0	969.0
203.19	956.7	968.9	968.6	968.6	968.4	968.4	968.4
203.09	958.7	967.8	967.7	967.7	967.7	967.6	967.6
202.99	959.2	966.8	966.9	966.9	966.9	966.9	966.9
202.9	956.5	966.2	966.1	966.1	966.0	966.0	966.0
202.8	956.4	965.6	965.4	965.3	965.1	965.0	965.0
202.69	953.7	964.9	964.6	964.5	964.2	964.1	964.1
202.59	953.7	964.1	963.7	963.5	963.2	963.2	963.1
202.48	952.5	963.3	962.9	962.8	962.5	962.4	962.4
202.37	954.6	962.4	962.0	962.0	961.7	961.7	961.7
202.29	955.5	962.1	961.5	961.4	961.3	961.3	961.3
202.18	949.8	961.3	960.5	960.5	960.5	960.5	960.5
202.09	949.9	959.4	959.4	959.5	959.5	959.6	959.6

Rio Oeste
Water Surface Elevation for 20-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1039.8	1040.2	1040.2	1040.1	1039.7	1039.7
211.51	1021.8	1039.2	1039.0	1039.1	1038.8	1038.0	1038.1
211.41	1018.3	1039.0	1039.2	1039.1	1039.4	1039.4	1039.5
211.31	1020.8	1038.5	1038.2	1038.0	1038.0	1037.5	1037.5
211.21	1021.1	1038.3	1037.8	1037.6	1037.7	1037.8	1037.8
211.12	1015.7	1038.4	1037.5	1037.2	1037.1	1037.1	1037.1
211.02	1019.4	1038.0	1036.8	1036.5	1036.4	1036.4	1036.5
210.93	1018.7	1037.6	1036.4	1036.0	1035.9	1035.8	1035.8
210.83	1019.1	1037.4	1036.0	1035.6	1035.4	1035.3	1035.3
210.74	1018.2	1037.4	1035.6	1035.3	1035.0	1034.9	1034.8
210.64	1017.7	1037.3	1035.3	1035.0	1034.7	1034.6	1034.5
210.55	1018.0	1037.2	1034.6	1034.3	1034.0	1033.8	1033.8
210.46	1016.3	1037.1	1034.5	1034.1	1033.8	1033.6	1033.5
210.44	1017.6	1037.0	1034.4	1034.0	1033.6	1033.4	1033.4
210.43	1017.5	1036.9	1034.3	1034.0	1033.5	1033.3	1033.3
210.36	1017.4	1036.8	1033.9	1033.6	1033.2	1033.0	1032.9
210.26	1016.9	1036.7	1033.6	1033.2	1032.8	1032.5	1032.5
210.17	1014.7	1036.7	1033.2	1032.8	1032.2	1032.0	1031.9
210.07	1018.5	1036.7	1033.0	1032.6	1032.0	1031.7	1031.7
209.98	1018.1	1036.5	1032.6	1032.2	1031.6	1031.3	1031.3
209.88	1014.7	1036.4	1032.3	1031.9	1031.3	1031.0	1031.0
209.79	1020.0	1036.3	1032.1	1031.6	1031.1	1030.8	1030.8
209.69	1019.0	1036.2	1031.7	1031.1	1030.6	1030.2	1030.2
209.6	1016.4	1036.0	1031.4	1030.8	1030.2	1029.9	1029.9
209.54	1019.6	1033.6	1029.3	1029.0	1028.7	1028.5	1028.4
209.53	1019.7	1031.9	1028.9	1028.7	1028.4	1028.2	1028.2
209.42	1019.6	1030.2	1028.5	1028.3	1028.0	1027.8	1027.8
209.33	1019.1	1028.5	1026.6	1026.5	1026.1	1025.9	1025.9
209.24	1017.4	1026.9	1025.8	1025.7	1025.4	1025.2	1025.2
209.14	1014.5	1025.8	1024.8	1024.7	1024.5	1024.3	1024.3
209.04	1012.2	1025.5	1024.3	1024.2	1024.0	1023.8	1023.8
208.95	1013.1	1024.6	1023.1	1023.1	1023.0	1022.9	1022.9
208.85	1013.4	1022.9	1022.4	1022.5	1022.3	1022.2	1022.2
208.75	1011.0	1021.7	1021.1	1021.1	1021.1	1021.1	1021.1
208.67	1010.0	1020.8	1020.2	1020.2	1020.1	1020.1	1020.2
208.57	1010.0	1019.2	1019.2	1019.2	1019.0	1019.0	1019.0
208.48	1007.6	1018.5	1018.8	1018.8	1018.5	1018.6	1018.6
208.39	1005.6	1017.5	1017.7	1017.6	1017.3	1017.3	1017.3
208.29	1004.7	1016.5	1016.6	1016.5	1016.2	1016.2	1016.2
208.19	1004.7	1015.7	1015.3	1015.1	1014.8	1014.7	1014.7
208.1	1001.3	1014.9	1014.0	1013.8	1013.5	1013.4	1013.3
207.99	999.9	1014.0	1013.0	1012.7	1012.4	1012.2	1012.2
207.9	1000.8	1013.4	1012.1	1011.8	1011.4	1011.2	1011.2
207.8	999.1	1012.6	1010.9	1010.7	1010.2	1009.9	1009.9
207.71	1000.3	1011.4	1009.8	1009.7	1009.0	1008.7	1008.7
207.62	1000.2	1009.6	1008.7	1008.6	1008.2	1007.8	1007.8
207.53	999.3	1009.1	1007.9	1007.8	1007.4	1007.1	1007.0

Rio Oeste
Water Surface Elevation for 20-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1008.9	1007.6	1007.5	1007.2	1006.9	1006.8
207.48	999.2	1008.6	1007.4	1007.3	1007.0	1006.7	1006.7
207.43	999.0	1008.0	1007.0	1006.8	1006.5	1006.3	1006.2
207.34	996.5	1007.1	1006.4	1006.2	1005.9	1005.6	1005.6
207.27	993.3	1005.7	1005.4	1005.0	1004.7	1004.3	1004.2
207.16	992.7	1004.5	1003.9	1004.0	1003.5	1003.4	1003.3
207.07	992.8	1002.8	1002.7	1003.3	1002.8	1002.7	1002.7
206.97	992.7	1002.6	1002.0	1003.0	1002.5	1002.4	1002.3
206.88	992.6	1002.3	1001.6	1002.8	1002.3	1002.2	1002.1
206.79	993.0	1001.4	1000.8	1002.4	1001.9	1001.8	1001.7
206.7	991.2	1001.1	1000.4	999.5	999.7	999.5	999.5
206.6	990.5	1000.6	999.8	999.8	999.7	999.6	999.6
206.51	990.2	999.4	998.9	998.9	998.9	998.8	998.8
206.41	988.8	998.5	998.2	998.2	998.3	998.2	998.2
206.32	987.4	997.7	997.4	997.4	997.4	997.4	997.4
206.22	986.0	996.7	996.3	996.4	996.4	996.3	996.3
206.13	984.6	995.8	995.3	995.5	995.6	995.6	995.5
206.03	984.7	993.7	994.0	994.2	994.3	994.4	994.4
205.94	981.5	992.5	992.8	992.9	993.0	993.2	993.2
205.84	979.5	991.7	991.6	991.7	991.9	992.1	992.1
205.75	973.9	990.9	990.3	990.3	990.5	990.7	990.7
205.62	976.0	990.1	989.3	989.3	989.4	989.6	989.6
205.52	975.9	989.8	988.8	988.8	988.8	988.9	989.0
205.43	976.1	989.5	988.2	988.2	988.3	988.4	988.4
205.4	975.5	989.5	988.2	988.2	988.3	988.4	988.4
205.34	972.7	989.1	987.5	987.5	987.5	987.7	987.7
205.25	973.4	988.6	987.1	987.0	986.9	987.1	987.0
205.15	973.1	987.2	986.5	986.3	986.2	986.3	986.3
205.06	970.4	986.2	985.5	985.3	985.2	985.3	985.2
204.97	967.6	986.3	985.0	984.9	984.8	984.7	984.7
204.87	968.1	985.8	983.9	983.7	983.5	983.3	983.3
204.78	967.6	985.8	983.8	983.6	983.3	983.1	983.1
204.68	971.3	985.2	982.9	982.7	982.4	982.3	982.2
204.61	972.6	984.5	982.0	981.8	981.6	981.4	981.4
204.53	972.7	983.5	981.2	981.0	980.8	980.7	980.7
204.42	971.4	981.7	980.2	980.0	979.9	979.8	979.8
204.34	969.3	978.8	979.2	979.2	979.0	979.0	979.0
204.25	968.0	978.3	978.2	978.1	978.2	978.2	978.2
204.15	965.9	978.2	977.4	977.4	977.4	977.5	977.5
204.05	965.0	977.4	976.7	976.6	976.6	976.6	976.7
203.96	964.1	974.2	975.7	975.8	975.9	975.9	976.0
203.86	962.2	974.5	974.8	974.9	975.0	975.1	975.1
203.77	963.3	974.2	974.4	974.4	974.5	974.5	974.5
203.67	962.3	973.9	974.0	974.0	974.0	974.0	974.0
203.58	962.1	973.5	973.6	973.6	973.5	973.6	973.5
203.48	962.2	972.9	972.7	972.7	972.6	972.6	972.5
203.39	959.9	972.3	971.8	971.8	971.7	971.6	971.6

Rio Oeste
Water Surface Elevation for 20-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	971.5	971.1	971.0	970.9	970.8	970.8
203.19	956.7	970.7	970.4	970.4	970.3	970.2	970.2
203.09	958.7	969.5	969.4	969.4	969.4	969.3	969.3
202.99	959.2	968.4	968.5	968.5	968.5	968.5	968.5
202.9	956.5	967.9	967.7	967.6	967.5	967.5	967.5
202.8	956.4	967.3	967.0	966.9	966.7	966.6	966.6
202.69	953.7	966.5	966.2	966.1	965.8	965.8	965.7
202.59	953.7	965.7	965.2	965.1	964.9	964.9	964.8
202.48	952.5	964.9	964.5	964.4	964.2	964.2	964.2
202.37	954.6	964.2	963.8	963.7	963.5	963.5	963.5
202.29	955.5	963.9	963.4	963.3	963.2	963.2	963.2
202.18	949.8	963.1	962.4	962.4	962.4	962.4	962.4
202.09	949.9	961.2	961.2	961.3	961.3	961.4	961.4

Rio Oeste
Water Surface Elevation for 50-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1043.2	1043.9	1043.9	1043.9	1044.0	1044.0
211.51	1021.8	1042.3	1042.2	1042.2	1041.9	1041.0	1041.0
211.41	1018.3	1042.0	1042.5	1042.3	1042.8	1043.0	1043.1
211.31	1020.8	1041.6	1041.8	1041.5	1041.4	1041.0	1041.0
211.21	1021.1	1041.3	1041.6	1041.3	1041.4	1041.4	1041.5
211.12	1015.7	1041.5	1041.3	1041.0	1040.9	1040.8	1040.8
211.02	1019.4	1040.9	1040.5	1040.1	1040.0	1040.0	1040.0
210.93	1018.7	1040.4	1040.1	1039.7	1039.5	1039.4	1039.4
210.83	1019.1	1040.1	1039.7	1039.3	1039.1	1038.9	1038.9
210.74	1018.2	1040.1	1039.3	1038.9	1038.7	1038.5	1038.5
210.64	1017.7	1039.9	1039.0	1038.7	1038.4	1038.2	1038.2
210.55	1018.0	1039.8	1038.4	1038.0	1037.7	1037.5	1037.5
210.46	1016.3	1039.7	1038.3	1037.9	1037.6	1037.3	1037.3
210.44	1017.6	1039.5	1038.1	1037.7	1037.4	1037.1	1037.1
210.43	1017.5	1039.4	1038.0	1037.6	1037.2	1037.0	1036.9
210.36	1017.4	1039.2	1037.7	1037.3	1036.9	1036.7	1036.6
210.26	1016.9	1039.1	1037.5	1037.0	1036.6	1036.3	1036.3
210.17	1014.7	1039.1	1037.2	1036.8	1036.3	1036.0	1036.0
210.07	1018.5	1039.1	1037.1	1036.6	1036.2	1035.9	1035.9
209.98	1018.1	1038.9	1036.8	1036.3	1035.8	1035.5	1035.5
209.88	1014.7	1038.6	1036.5	1036.0	1035.5	1035.2	1035.2
209.79	1020.0	1038.6	1036.4	1035.8	1035.3	1035.0	1035.0
209.69	1019.0	1038.4	1036.1	1035.4	1034.9	1034.5	1034.6
209.6	1016.4	1038.1	1035.8	1035.2	1034.6	1034.3	1034.3
209.54	1019.6	1035.4	1032.0	1031.8	1031.7	1031.5	1031.5
209.53	1019.7	1035.0	1031.5	1031.3	1031.3	1031.1	1031.1
209.42	1019.6	1032.3	1031.2	1031.0	1030.9	1030.7	1030.7
209.33	1019.1	1030.5	1028.7	1028.6	1028.3	1028.1	1028.1
209.24	1017.4	1028.7	1027.8	1027.7	1027.5	1027.3	1027.3
209.14	1014.5	1027.6	1026.7	1026.7	1026.5	1026.4	1026.4
209.04	1012.2	1027.3	1026.2	1026.2	1026.0	1025.9	1025.9
208.95	1013.1	1026.4	1025.1	1025.2	1025.0	1025.0	1025.0
208.85	1013.4	1025.0	1024.4	1024.5	1024.4	1024.3	1024.3
208.75	1011.0	1023.9	1023.2	1023.2	1023.2	1023.2	1023.2
208.67	1010.0	1022.7	1022.1	1022.1	1022.1	1022.1	1022.1
208.57	1010.0	1020.9	1020.9	1020.8	1020.6	1020.7	1020.6
208.48	1007.6	1020.3	1020.6	1020.5	1020.3	1020.3	1020.3
208.39	1005.6	1019.4	1019.4	1019.3	1019.0	1019.0	1019.0
208.29	1004.7	1018.5	1018.3	1018.2	1018.0	1017.9	1017.9
208.19	1004.7	1017.8	1017.1	1016.9	1016.7	1016.6	1016.6
208.1	1001.3	1017.0	1016.0	1015.9	1015.6	1015.4	1015.4
207.99	999.9	1016.0	1015.0	1014.7	1014.3	1014.2	1014.2
207.9	1000.8	1015.4	1014.2	1013.9	1013.6	1013.3	1013.3
207.8	999.1	1014.4	1013.0	1012.9	1012.4	1012.2	1012.2
207.71	1000.3	1013.4	1012.1	1012.0	1011.5	1011.2	1011.2
207.62	1000.2	1011.9	1011.0	1010.9	1010.5	1010.1	1010.1
207.53	999.3	1011.4	1010.2	1010.0	1009.6	1009.3	1009.3

Rio Oeste
Water Surface Elevation for 50-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1011.2	1009.9	1009.7	1009.4	1009.2	1009.1
207.48	999.2	1010.9	1009.6	1009.4	1009.2	1008.9	1008.9
207.43	999.0	1010.0	1009.2	1008.9	1008.6	1008.4	1008.3
207.34	996.5	1009.0	1008.4	1008.1	1007.8	1007.6	1007.6
207.27	993.3	1007.7	1007.4	1006.8	1006.5	1006.2	1006.2
207.16	992.7	1006.6	1006.1	1005.7	1005.2	1005.1	1005.2
207.07	992.8	1005.0	1004.9	1004.4	1004.3	1004.2	1004.2
206.97	992.7	1004.7	1004.0	1003.9	1003.7	1003.6	1003.6
206.88	992.6	1004.3	1003.6	1003.6	1003.4	1003.3	1003.2
206.79	993.0	1003.3	1002.7	1002.6	1002.5	1002.5	1002.4
206.7	991.2	1003.0	1002.3	1002.4	1002.3	1002.2	1002.2
206.6	990.5	1002.4	1001.7	1001.8	1001.7	1001.6	1001.6
206.51	990.2	1001.2	1000.9	1000.9	1000.9	1000.8	1000.8
206.41	988.8	1000.3	1000.1	1000.2	1000.2	1000.2	1000.2
206.32	987.4	999.5	999.3	999.3	999.3	999.3	999.3
206.22	986.0	998.6	998.4	998.4	998.4	998.4	998.3
206.13	984.6	997.6	997.4	997.5	997.5	997.5	997.5
206.03	984.7	995.9	996.1	996.2	996.3	996.4	996.4
205.94	981.5	994.8	994.9	994.9	995.1	995.2	995.2
205.84	979.5	994.1	993.9	993.9	994.1	994.2	994.2
205.75	973.9	993.5	992.7	992.8	992.9	993.0	993.0
205.62	976.0	992.9	992.1	992.1	992.2	992.3	992.3
205.52	975.9	992.7	991.7	991.7	991.7	991.8	991.8
205.43	976.1	992.4	991.2	991.2	991.3	991.4	991.4
205.4	975.5	992.4	991.3	991.3	991.3	991.4	991.4
205.34	972.7	992.0	990.7	990.6	990.7	990.8	990.8
205.25	973.4	991.5	990.3	990.2	990.1	990.2	990.2
205.15	973.1	989.9	989.5	989.3	989.2	989.2	989.2
205.06	970.4	988.7	988.2	988.1	987.9	987.9	987.9
204.97	967.6	988.8	987.9	987.7	987.6	987.5	987.5
204.87	968.1	988.3	986.9	986.7	986.5	986.3	986.3
204.78	967.6	988.3	986.8	986.6	986.4	986.2	986.2
204.68	971.3	987.7	986.0	985.7	985.5	985.3	985.3
204.61	972.6	986.8	985.0	984.8	984.5	984.4	984.4
204.53	972.7	985.9	984.0	983.8	983.6	983.4	983.4
204.42	971.4	984.3	982.9	982.7	982.6	982.5	982.5
204.34	969.3	981.5	981.6	981.6	981.4	981.3	981.3
204.25	968.0	980.3	980.2	980.1	980.2	980.3	980.3
204.15	965.9	980.1	979.4	979.4	979.4	979.4	979.4
204.05	965.0	979.2	978.7	978.7	978.7	978.7	978.8
203.96	964.1	976.5	977.8	977.9	978.0	978.0	978.1
203.86	962.2	976.6	976.8	976.9	977.0	977.1	977.1
203.77	963.3	976.2	976.4	976.4	976.4	976.5	976.5
203.67	962.3	975.8	975.9	975.9	975.9	975.9	975.9
203.58	962.1	975.3	975.5	975.4	975.4	975.4	975.4
203.48	962.2	974.8	974.6	974.5	974.5	974.5	974.4
203.39	959.9	974.1	973.7	973.6	973.6	973.5	973.5

Rio Oeste
Water Surface Elevation for 50-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	973.4	972.9	972.9	972.8	972.7	972.7
203.19	956.7	972.5	972.3	972.3	972.2	972.1	972.1
203.09	958.7	971.3	971.2	971.3	971.2	971.2	971.2
202.99	959.2	970.3	970.3	970.3	970.3	970.3	970.3
202.9	956.5	969.7	969.5	969.4	969.3	969.3	969.3
202.8	956.4	969.1	968.8	968.7	968.5	968.5	968.4
202.69	953.7	968.3	967.9	967.8	967.6	967.6	967.6
202.59	953.7	967.4	967.0	966.9	966.7	966.7	966.7
202.48	952.5	966.7	966.2	966.2	966.0	966.0	966.0
202.37	954.6	965.9	965.6	965.5	965.4	965.4	965.4
202.29	955.5	965.6	965.2	965.2	965.1	965.2	965.2
202.18	949.8	964.8	964.3	964.3	964.3	964.3	964.3
202.09	949.9	963.1	963.2	963.3	963.3	963.4	963.4

Rio Oeste
Water Surface Elevation for 100-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1045.0	1046.2	1046.2	1046.4	1046.5	1046.5
211.51	1021.8	1043.8	1043.9	1043.9	1043.4	1042.5	1042.5
211.41	1018.3	1043.6	1044.3	1044.1	1044.5	1044.9	1045.0
211.31	1020.8	1043.2	1043.7	1043.4	1043.3	1042.9	1042.9
211.21	1021.1	1043.0	1043.6	1043.4	1043.4	1043.5	1043.5
211.12	1015.7	1043.3	1043.4	1043.1	1043.0	1042.8	1042.9
211.02	1019.4	1042.4	1042.5	1042.1	1042.0	1042.0	1042.0
210.93	1018.7	1041.9	1042.1	1041.7	1041.5	1041.4	1041.4
210.83	1019.1	1041.6	1041.6	1041.3	1041.0	1040.9	1040.9
210.74	1018.2	1041.5	1041.3	1040.9	1040.7	1040.5	1040.5
210.64	1017.7	1041.3	1041.0	1040.7	1040.4	1040.2	1040.2
210.55	1018.0	1041.2	1040.4	1040.0	1039.7	1039.5	1039.5
210.46	1016.3	1041.1	1040.2	1039.9	1039.6	1039.3	1039.3
210.44	1017.6	1040.8	1040.1	1039.8	1039.4	1039.1	1039.1
210.43	1017.5	1040.6	1040.0	1039.6	1039.2	1039.0	1038.9
210.36	1017.4	1040.5	1039.7	1039.3	1038.9	1038.7	1038.7
210.26	1016.9	1040.4	1039.5	1039.1	1038.6	1038.4	1038.4
210.17	1014.7	1040.3	1039.3	1038.8	1038.4	1038.1	1038.1
210.07	1018.5	1040.3	1039.2	1038.7	1038.3	1038.0	1038.0
209.98	1018.1	1040.0	1038.9	1038.4	1037.9	1037.7	1037.7
209.88	1014.7	1039.8	1038.6	1038.1	1037.7	1037.4	1037.4
209.79	1020.0	1039.7	1038.5	1038.0	1037.5	1037.2	1037.3
209.69	1019.0	1039.5	1038.2	1037.7	1037.2	1036.9	1036.9
209.6	1016.4	1039.2	1038.0	1037.4	1036.9	1036.6	1036.6
209.54	1019.6	1036.7	1033.7	1033.4	1033.2	1033.0	1033.0
209.53	1019.7	1035.9	1032.9	1032.7	1032.7	1032.6	1032.5
209.42	1019.6	1033.5	1032.6	1032.4	1032.4	1032.3	1032.3
209.33	1019.1	1031.9	1029.9	1029.7	1029.5	1029.3	1029.3
209.24	1017.4	1029.7	1028.9	1028.8	1028.6	1028.4	1028.4
209.14	1014.5	1028.6	1027.8	1027.7	1027.6	1027.5	1027.5
209.04	1012.2	1028.3	1027.3	1027.3	1027.1	1027.0	1027.0
208.95	1013.1	1027.4	1026.3	1026.4	1026.2	1026.1	1026.1
208.85	1013.4	1026.1	1025.6	1025.7	1025.5	1025.5	1025.5
208.75	1011.0	1025.2	1024.4	1024.5	1024.5	1024.4	1024.4
208.67	1010.0	1023.8	1023.2	1023.2	1023.1	1023.1	1023.1
208.57	1010.0	1021.8	1021.8	1021.7	1021.5	1021.5	1021.5
208.48	1007.6	1021.3	1021.6	1021.5	1021.2	1021.2	1021.2
208.39	1005.6	1020.4	1020.4	1020.3	1020.0	1020.0	1020.0
208.29	1004.7	1019.5	1019.4	1019.2	1019.0	1018.9	1018.9
208.19	1004.7	1018.8	1018.3	1018.1	1017.8	1017.7	1017.7
208.1	1001.3	1018.0	1017.2	1017.1	1016.8	1016.6	1016.6
207.99	999.9	1016.9	1016.1	1015.9	1015.5	1015.3	1015.3
207.9	1000.8	1016.3	1015.3	1015.1	1014.8	1014.5	1014.5
207.8	999.1	1015.3	1014.2	1014.1	1013.6	1013.4	1013.4
207.71	1000.3	1014.3	1013.3	1013.2	1012.7	1012.5	1012.5
207.62	1000.2	1012.9	1012.2	1012.1	1011.8	1011.5	1011.5
207.53	999.3	1012.6	1011.5	1011.3	1011.0	1010.7	1010.7

Rio Oeste
Water Surface Elevation for 100-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1012.4	1011.2	1011.1	1010.7	1010.5	1010.5
207.48	999.2	1012.0	1011.0	1010.8	1010.5	1010.2	1010.2
207.43	999.0	1011.1	1010.3	1010.1	1009.7	1009.5	1009.5
207.34	996.5	1010.3	1009.6	1009.2	1008.9	1008.7	1008.7
207.27	993.3	1008.7	1008.4	1007.9	1007.6	1007.3	1007.3
207.16	992.7	1007.7	1007.2	1006.8	1006.4	1006.3	1006.4
207.07	992.8	1006.1	1006.1	1005.6	1005.5	1005.4	1005.4
206.97	992.7	1005.8	1005.1	1005.0	1004.8	1004.8	1004.7
206.88	992.6	1005.4	1004.7	1004.7	1004.5	1004.4	1004.4
206.79	993.0	1004.4	1003.8	1003.7	1003.6	1003.6	1003.5
206.7	991.2	1004.1	1003.4	1003.5	1003.4	1003.3	1003.3
206.6	990.5	1003.4	1002.8	1002.8	1002.7	1002.6	1002.6
206.51	990.2	1002.1	1001.8	1001.8	1001.8	1001.7	1001.7
206.41	988.8	1001.2	1001.1	1001.1	1001.1	1001.1	1001.1
206.32	987.4	1000.5	1000.4	1000.4	1000.3	1000.3	1000.3
206.22	986.0	999.5	999.4	999.4	999.4	999.4	999.4
206.13	984.6	998.6	998.4	998.5	998.5	998.5	998.5
206.03	984.7	996.9	997.1	997.1	997.2	997.3	997.3
205.94	981.5	996.0	996.0	996.0	996.1	996.3	996.3
205.84	979.5	995.4	995.1	995.1	995.3	995.4	995.4
205.75	973.9	994.7	994.1	994.1	994.2	994.3	994.3
205.62	976.0	994.3	993.6	993.6	993.7	993.8	993.8
205.52	975.9	994.0	993.2	993.3	993.3	993.4	993.4
205.43	976.1	993.7	992.8	992.8	992.9	993.0	993.0
205.4	975.5	993.7	992.9	992.9	992.9	993.0	993.0
205.34	972.7	993.4	992.3	992.3	992.3	992.5	992.5
205.25	973.4	992.9	991.9	991.8	991.8	991.9	991.9
205.15	973.1	991.2	990.9	990.8	990.7	990.7	990.7
205.06	970.4	989.7	989.6	989.5	989.3	989.3	989.3
204.97	967.6	990.0	989.2	989.1	989.0	988.9	988.9
204.87	968.1	989.5	988.4	988.2	988.0	987.8	987.8
204.78	967.6	989.4	988.3	988.1	987.9	987.7	987.7
204.68	971.3	988.7	987.5	987.3	987.0	986.9	986.9
204.61	972.6	987.9	986.3	986.2	985.9	985.8	985.8
204.53	972.7	987.0	985.2	985.0	984.8	984.7	984.7
204.42	971.4	985.5	984.1	983.9	983.8	983.7	983.7
204.34	969.3	982.7	982.7	982.8	982.6	982.5	982.5
204.25	968.0	981.4	981.3	981.2	981.3	981.3	981.4
204.15	965.9	981.2	980.5	980.5	980.5	980.5	980.5
204.05	965.0	980.2	979.8	979.8	979.8	979.8	979.8
203.96	964.1	977.6	978.9	978.9	979.0	979.1	979.1
203.86	962.2	977.7	977.8	977.9	978.0	978.1	978.1
203.77	963.3	977.3	977.3	977.4	977.4	977.4	977.4
203.67	962.3	976.8	976.9	976.9	976.9	976.9	976.9
203.58	962.1	976.3	976.4	976.4	976.4	976.4	976.4
203.48	962.2	975.8	975.6	975.6	975.5	975.5	975.4
203.39	959.9	975.2	974.7	974.7	974.6	974.5	974.5

Rio Oeste
Water Surface Elevation for 100-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	974.4	973.9	973.9	973.8	973.8	973.7
203.19	956.7	973.5	973.3	973.3	973.2	973.1	973.1
203.09	958.7	972.3	972.2	972.3	972.2	972.2	972.2
202.99	959.2	971.3	971.3	971.3	971.3	971.3	971.3
202.9	956.5	970.7	970.5	970.4	970.3	970.3	970.3
202.8	956.4	970.1	969.8	969.7	969.5	969.5	969.4
202.69	953.7	969.3	968.9	968.8	968.6	968.6	968.6
202.59	953.7	968.4	967.9	967.9	967.7	967.7	967.7
202.48	952.5	967.6	967.2	967.2	967.0	967.0	967.0
202.37	954.6	966.9	966.6	966.5	966.4	966.5	966.5
202.29	955.5	966.6	966.2	966.2	966.2	966.2	966.2
202.18	949.8	965.7	965.3	965.3	965.3	965.3	965.3
202.09	949.9	964.2	964.3	964.3	964.4	964.5	964.5

Rio Oeste
Water Surface Elevation for 500-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
211.54	1021.9	1048.9	1051.1	1051.2	1051.3	1051.4	1051.4
211.51	1021.8	1046.9	1046.8	1046.9	1047.6	1045.5	1045.5
211.41	1018.3	1046.7	1047.6	1047.3	1049.1	1048.7	1048.8
211.31	1020.8	1046.6	1047.3	1047.1	1048.6	1046.6	1046.6
211.21	1021.1	1046.6	1047.4	1047.3	1048.9	1047.4	1047.5
211.12	1015.7	1046.9	1047.3	1047.0	1048.7	1046.8	1046.8
211.02	1019.4	1045.7	1046.0	1045.7	1047.7	1045.7	1045.7
210.93	1018.7	1045.0	1045.6	1045.3	1047.4	1045.1	1045.1
210.83	1019.1	1044.6	1045.0	1044.8	1047.0	1044.5	1044.5
210.74	1018.2	1044.6	1044.6	1044.4	1044.3	1044.1	1044.1
210.64	1017.7	1044.4	1044.3	1044.1	1044.0	1043.8	1043.8
210.55	1018.0	1044.1	1043.6	1043.3	1043.2	1043.1	1043.1
210.46	1016.3	1044.0	1043.4	1043.2	1043.1	1042.9	1042.8
210.44	1017.6	1043.7	1043.3	1043.1	1042.9	1042.7	1042.7
210.43	1017.5	1043.3	1043.1	1042.9	1042.6	1042.4	1042.4
210.36	1017.4	1043.1	1042.8	1042.6	1042.3	1042.1	1042.1
210.26	1016.9	1043.1	1042.6	1042.4	1042.1	1041.9	1041.9
210.17	1014.7	1043.0	1042.4	1042.2	1041.8	1041.7	1041.7
210.07	1018.5	1043.0	1042.3	1042.1	1041.8	1041.6	1041.6
209.98	1018.1	1042.7	1041.9	1041.7	1041.4	1041.2	1041.3
209.88	1014.7	1042.3	1041.6	1041.4	1041.1	1040.9	1041.0
209.79	1020.0	1042.2	1041.5	1041.3	1041.0	1040.8	1040.9
209.69	1019.0	1042.0	1041.3	1041.0	1040.7	1040.5	1040.5
209.6	1016.4	1041.6	1041.0	1040.7	1040.3	1040.2	1040.2
209.54	1019.6	1039.4	1038.1	1037.6	1037.1	1036.9	1036.9
209.53	1019.7	1038.4	1036.1	1035.7	1035.5	1035.5	1035.5
209.42	1019.6	1036.6	1035.3	1035.2	1035.3	1035.3	1035.3
209.33	1019.1	1035.6	1032.3	1032.2	1031.9	1031.7	1031.6
209.24	1017.4	1031.5	1031.0	1030.9	1030.7	1030.6	1030.6
209.14	1014.5	1030.6	1029.8	1029.8	1029.7	1029.6	1029.6
209.04	1012.2	1030.4	1029.5	1029.5	1029.4	1029.3	1029.3
208.95	1013.1	1029.6	1028.6	1028.7	1028.6	1028.5	1028.5
208.85	1013.4	1028.4	1027.9	1028.0	1027.9	1027.9	1027.9
208.75	1011.0	1027.7	1027.0	1027.0	1027.0	1027.0	1027.0
208.67	1010.0	1026.1	1025.4	1025.4	1025.3	1025.3	1025.3
208.57	1010.0	1023.6	1023.6	1023.5	1023.3	1023.4	1023.4
208.48	1007.6	1023.2	1023.5	1023.4	1023.2	1023.2	1023.2
208.39	1005.6	1022.1	1022.2	1022.1	1021.9	1021.9	1021.9
208.29	1004.7	1021.2	1021.1	1021.1	1020.9	1020.8	1020.8
208.19	1004.7	1020.6	1020.2	1020.1	1019.9	1019.8	1019.8
208.1	1001.3	1019.8	1019.2	1019.2	1018.9	1018.8	1018.8
207.99	999.9	1018.6	1018.0	1017.9	1017.6	1017.5	1017.5
207.9	1000.8	1018.1	1017.3	1017.2	1016.9	1016.7	1016.7
207.8	999.1	1017.1	1016.3	1016.2	1015.8	1015.7	1015.7
207.71	1000.3	1016.1	1015.5	1015.5	1015.0	1014.9	1014.9
207.62	1000.2	1015.0	1014.6	1014.6	1014.2	1014.0	1014.0
207.53	999.3	1014.8	1014.1	1014.0	1013.6	1013.4	1013.4

Rio Oeste
Water Surface Elevation for 500-yr Event By Decade

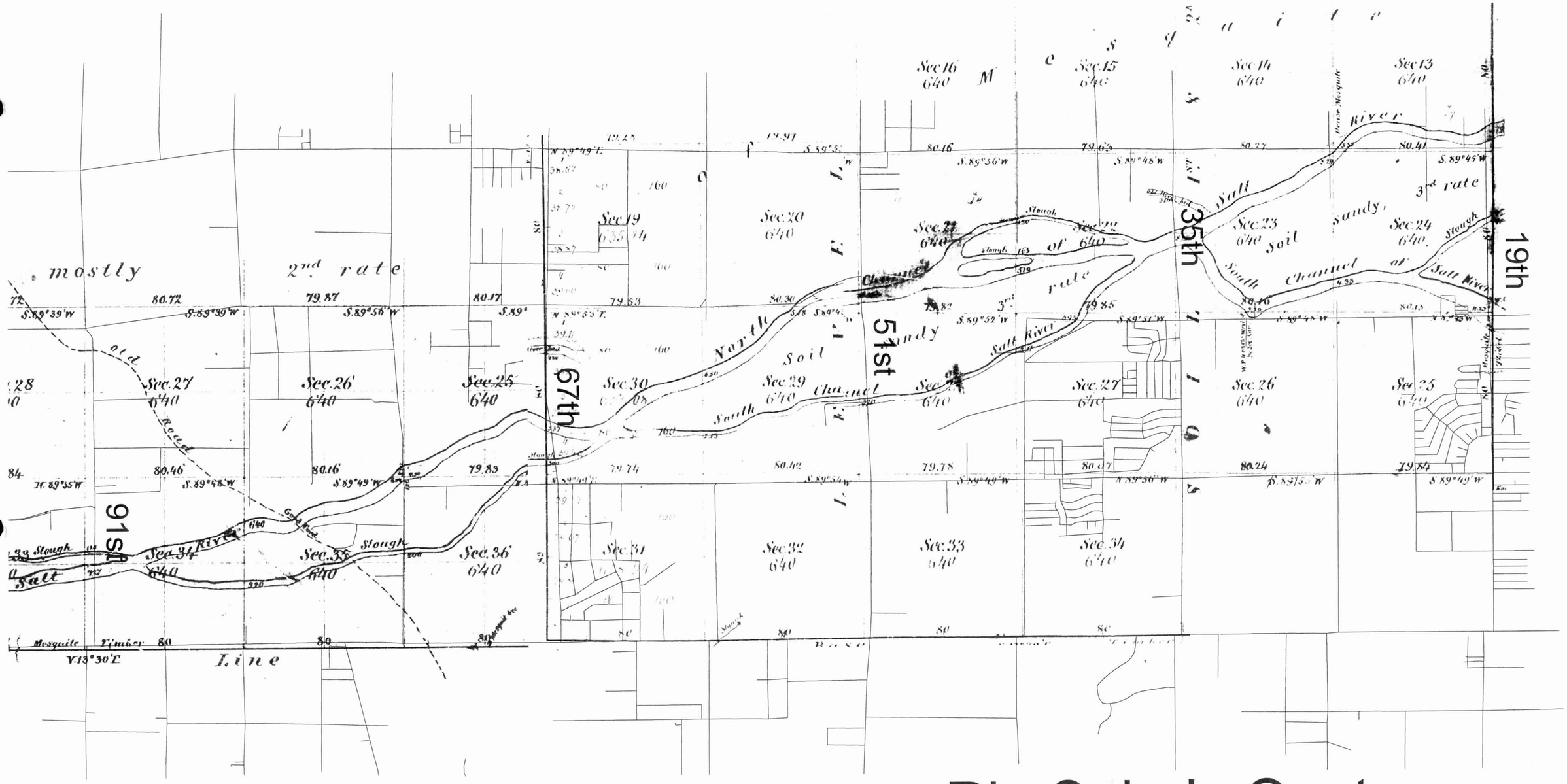
Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
207.49	999.4	1014.4	1013.7	1013.7	1013.4	1013.2	1013.2
207.48	999.2	1014.1	1013.5	1013.4	1013.1	1013.0	1013.0
207.43	999.0	1013.4	1012.8	1012.8	1012.3	1012.2	1012.2
207.34	996.5	1012.5	1011.9	1011.8	1011.2	1011.0	1011.0
207.27	993.3	1010.8	1010.6	1010.0	1009.9	1009.6	1009.6
207.16	992.7	1009.9	1009.4	1009.0	1008.7	1008.6	1008.6
207.07	992.8	1008.2	1008.2	1007.9	1007.8	1007.7	1007.7
206.97	992.7	1007.9	1007.4	1007.3	1007.2	1007.1	1007.1
206.88	992.6	1007.5	1007.0	1007.0	1006.8	1006.8	1006.7
206.79	993.0	1006.2	1005.9	1005.8	1005.7	1005.7	1005.7
206.7	991.2	1005.9	1005.5	1005.5	1005.5	1005.4	1005.4
206.6	990.5	1005.1	1004.7	1004.7	1004.6	1004.6	1004.5
206.51	990.2	1004.0	1003.8	1003.8	1003.8	1003.8	1003.7
206.41	988.8	1003.1	1003.0	1003.1	1003.0	1003.0	1003.0
206.32	987.4	1002.3	1002.3	1002.3	1002.3	1002.3	1002.2
206.22	986.0	1001.4	1001.3	1001.4	1001.4	1001.4	1001.4
206.13	984.6	1000.5	1000.4	1000.5	1000.5	1000.5	1000.5
206.03	984.7	999.0	999.0	999.1	999.2	999.3	999.3
205.94	981.5	998.2	998.2	998.2	998.3	998.4	998.4
205.84	979.5	997.7	997.4	997.5	997.6	997.7	997.7
205.75	973.9	997.0	996.4	996.5	996.5	996.6	996.6
205.62	976.0	996.6	996.1	996.1	996.1	996.2	996.2
205.52	975.9	996.4	995.8	995.8	995.9	995.9	995.9
205.43	976.1	996.0	995.4	995.4	995.4	995.5	995.5
205.4	975.5	996.0	995.4	995.4	995.4	995.5	995.5
205.34	972.7	995.7	995.0	995.0	995.1	995.2	995.2
205.25	973.4	995.2	994.6	994.5	994.5	994.6	994.6
205.15	973.1	993.7	993.5	993.3	993.2	993.3	993.3
205.06	970.4	991.3	991.5	991.4	991.4	991.4	991.3
204.97	967.6	991.9	991.6	991.6	991.5	991.5	991.5
204.87	968.1	991.2	990.7	990.6	990.5	990.4	990.4
204.78	967.6	991.1	990.6	990.5	990.4	990.2	990.2
204.68	971.3	990.2	989.7	989.6	989.4	989.3	989.3
204.61	972.6	989.6	988.6	988.5	988.3	988.2	988.2
204.53	972.7	988.7	987.5	987.3	987.2	987.1	987.1
204.42	971.4	987.9	986.6	986.3	986.2	986.1	986.1
204.34	969.3	984.7	984.8	984.8	984.6	984.6	984.5
204.25	968.0	983.5	983.3	983.3	983.3	983.4	983.4
204.15	965.9	983.4	982.6	982.6	982.6	982.6	982.6
204.05	965.0	982.3	981.9	981.8	981.8	981.8	981.9
203.96	964.1	979.5	980.8	980.9	981.0	981.1	981.1
203.86	962.2	979.6	979.7	979.8	979.8	979.9	979.9
203.77	963.3	979.1	979.2	979.2	979.2	979.2	979.2
203.67	962.3	978.7	978.8	978.7	978.7	978.7	978.7
203.58	962.1	978.2	978.3	978.3	978.2	978.3	978.2
203.48	962.2	977.8	977.6	977.5	977.5	977.5	977.4
203.39	959.9	977.2	976.7	976.7	976.6	976.6	976.6

Rio Oeste
Water Surface Elevation for 500-yr Event By Decade

Cross Section	Thalweg	Water Surface Elevation					
		Existing Condition	After 10 Years	After 20 Years	After 30 Years	After 40 Years	After 50 Years
203.29	960.8	976.3	975.9	975.9	975.8	975.8	975.8
203.19	956.7	975.5	975.2	975.2	975.2	975.1	975.1
203.09	958.7	974.3	974.2	974.1	974.1	974.1	974.1
202.99	959.2	973.2	973.2	973.2	973.2	973.2	973.2
202.9	956.5	972.6	972.3	972.3	972.2	972.2	972.2
202.8	956.4	972.0	971.6	971.6	971.4	971.4	971.3
202.69	953.7	971.2	970.8	970.7	970.5	970.5	970.5
202.59	953.7	970.3	969.8	969.8	969.6	969.6	969.6
202.48	952.5	969.5	969.1	969.1	969.0	969.0	969.0
202.37	954.6	968.7	968.5	968.4	968.4	968.4	968.4
202.29	955.5	968.4	968.1	968.1	968.1	968.1	968.1
202.18	949.8	967.5	967.2	967.2	967.2	967.3	967.3
202.09	949.9	966.1	966.3	966.3	966.4	966.5	966.5

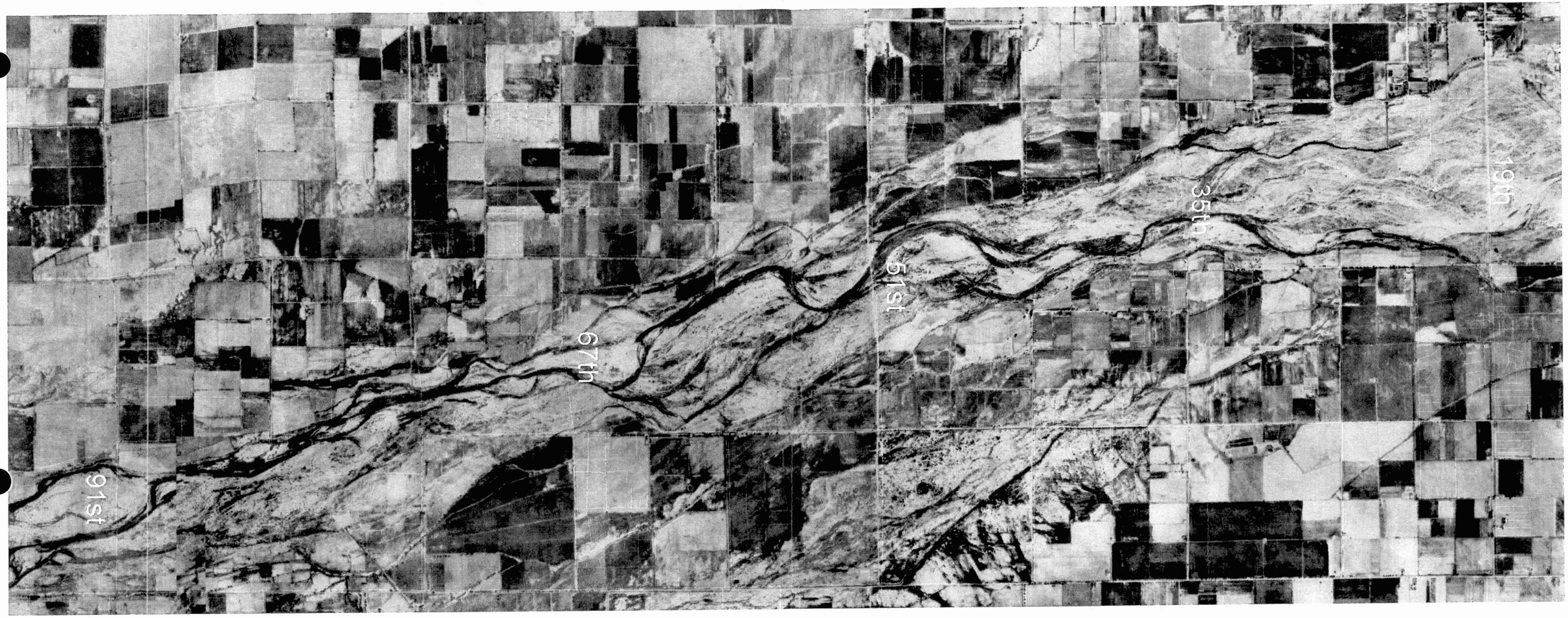
Appendix K

Historic Aerial Photography



1 0 1 2 3 Miles

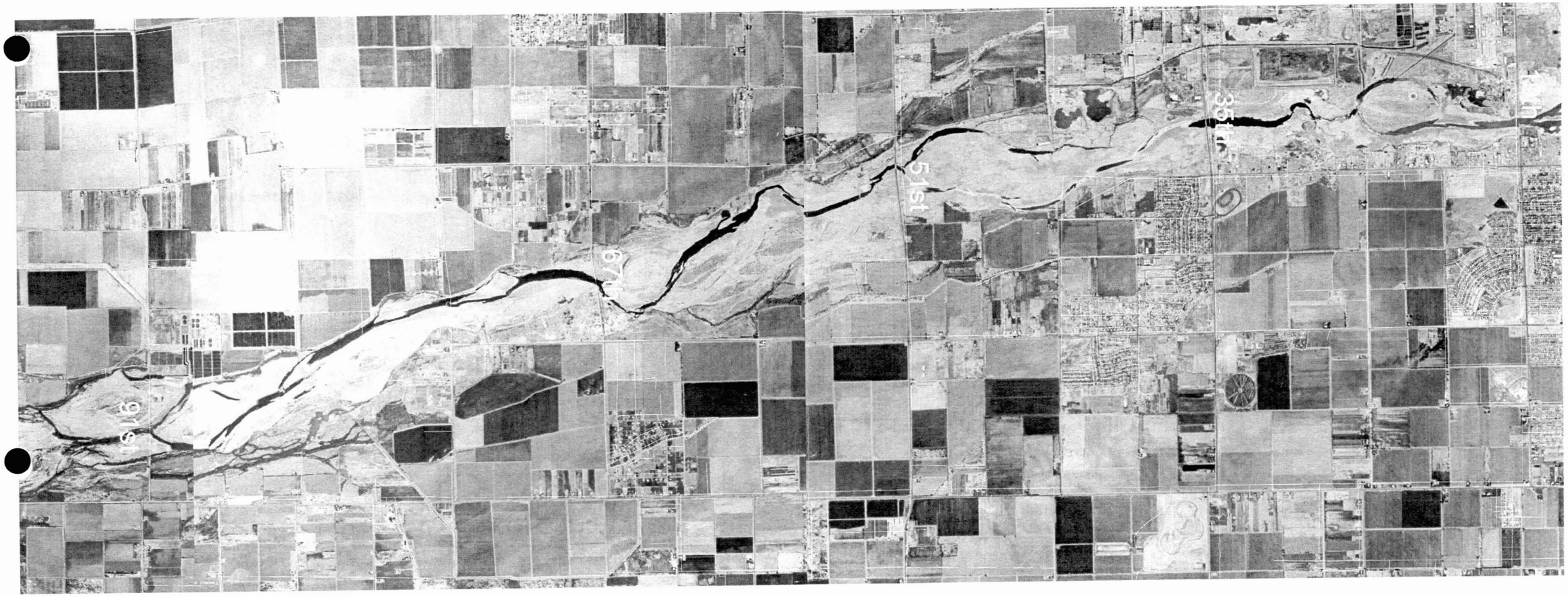
Rio Salado Oeste
Historic Images
BLM Survey 1870



Rio Salado Oeste
Historic Images
Fairchild Photographs 1937

1 0 1 2 3 Miles

Rio Salado Oeste
Historical Images
Aerial Photographs 1958



Rio Salado Oeste
Historical Images
Aerial Photographs 1979