NORTHERN DISTRICT GROUNDWATER FLOW MODEL VERSION 5.0

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LIST OF ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
APT	aquifer performance test
cfs	cubic feet per second
DEM	Digital Elevation Model
DS	Dynamic Solutions, LLC
ET	evapotranspiration
FGS	Florida Geological Survey
ft	feet
ft^2/d	square feet per day
HGL	HydroGeoLogic, Inc.
ICU	intermediate confining unit
in/yr	inches per year
LFA	Lower Floridan Aquifer
MAE	mean absolute error
MCU	middle confining unit
ME	mean error
MFL	minimum flow and level
NDM	Northern District Model
NDM 4	Northern District Model Version 4.0
NDM 5	Northern District Model Version 5.0
NED	National Elevation Dataset
SA	surficial aquifer
SDI	SDI Environmental Services, Inc.
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SRWMD	Suwannee River Water Management District
SWFWMD	Southwest Florida Water Management District
UFA	Upper Floridan aquifer
USGS	U.S. Geological Survey

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NORTHERN DISTRICT GROUNDWATER FLOW MODEL VERSION 5.0

1.0 INTRODUCTION

HydroGeoLogic, Inc. (HGL) and Dynamic Solutions, LLC (DS) were retained by the St. Johns River Water Management District (SJRWMD) to update the existing Northern District Model (NDM) Version 4.0 (NDM 4) (HGL, 2013) (Figure 1.1). The project was a collaborative effort between the SJRWMD and the Southwest Florida Water Management District (SWFWMD). The principal goal of this project was to update the existing NDM 4 to include new hydraulic and hydrogeologic information that became available after the completion of the model. The updated groundwater model will facilitate the simulation of effects of current and future groundwater withdrawals on aquifer water levels, river base flows and spring discharges. The results of these predictions are needed to support Regional Water Supply Plan assessments and establishment of minimum flows and levels (MFLs).

Historical details of the NDM development are provided in the NDM 4 document (HGL, 2013) which includes: a conceptual model of the project area; geological, hydrological, hydrogeological, and climatological information on which the model is based; data used to calibrate the model; sensitivity analysis results; and predictive simulation results. NDM 4 consists of two calibrated models: a steady-state model based on the 1995 average conditions, and a transient model based on the conditions from 1996 to 2006. In the current update, these two models were updated and recalibrated with additional data. A 2010 steady-state model was also developed using average pumping, hydrologic, and hydrogeologic conditions in 2010 to verify the results under more recent stressed conditions. The recalibrated model is referred to as the Northern District Model Version 5.0 (NDM 5).

The NDM has been and is currently used by the SWFWMD and SJRWMD for water supply planning and analysis of groundwater impacts to MFL springs. Each District is required by law to conduct a water supply assessment every five years that forecasts future water demand 20 years into the future. Both Districts use the results of the NDM to examine predicted drawdown in aquifers, reductions in springflows, and reductions in river baseflows. The model is the chief basis for developing a prevention strategy if MFLs are predicted to be exceeded over the planning horizon. NDM 5 was used to perform five predictive scenario simulations and the results are documented in this report.

Details of the model updates are documented in this report. New information and data used in the update are described in Section 2. Section 3 provides the details of the model recalibration and verification. Section 4 presents the results of the predictive scenario simulations. A summary and a list of references are provided in Sections 5 and 6, respectively.

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2.0 UPDATED AND NEW MODELS

The current steady-state (1995) and transient (1996-2006) models were based on the existing conceptual model which was developed using available quantitative data and inferences derived from qualitative information on hydrogeologic properties that may affect groundwater flow. Details of the conceptual model are given in HGL (2013). New data for the NDM 4 update (i.e., the NDM 5) were provided by the SJRWMD (2016) and the SWFWMD (2016). A list of new data is provided in Appendix E. The existing steady-state and transient models are briefly described in Section 2.1 and the new steady-state 2010 model is presented in Section 2.2.

2.1 EXISTING 1995 STEADY-STATE AND 1996-2006 TRANSIENT MODELS

The existing NDM 4 covers the area shown in Figure 1.1. As in the previous versions of NDM, the groundwater flow and solute transport modeling computer code MODFLOW-SURFACT (HGL, 2011) was selected for the project to maintain continuity. MODFLOW-SURFACT is an enhanced version of the U.S. Geological Survey (USGS) modular three-dimensional groundwater-flow code (McDonald and Harbaugh, 1988). Additional discussion relating to MODFLOW-SURFACT is provided in HGL (2013).

The domain of the MODFLOW-SURFACT-based NDM includes portions of the SWFWMD, the SJRWMD, the Suwannee River Water Management District (SRWMD), and the South Florida Water Management District (SFWMD) (Figure 1.1). The landward extent of the regional groundwater-flow model extends to the St Johns River. The western boundary of the model domain is located approximately 5 miles offshore to account for submarine discharge of freshwater. The assignment of the western boundary 5 miles offshore is consistent with results from the saltwater-transport model developed by HGL for the SWFWMD (HGL, 2010).

The regional model finite-difference grid consists of 212 columns and 275 rows with a uniform grid spacing of 2,500 feet (ft) (HGL, 2013). The vertical grid spacing is variable across the model domain. In general, the elevations assigned to represent the top and bottom of the finite-difference cells correspond to the contacts between the hydrogeologic units. Topographic elevations assigned to the top of model layer 1 were from a Digital Elevation Model (DEM) provided by SJRWMD (2013) and SWFWMD (2004), based on the USGS 30-meter National Elevation Dataset (NED).

Seven layers of finite-difference cells were assigned in the model to represent the primary geologic and hydrogeologic units: (1) Surficial Aquifer (SA); (2) Intermediate Confining Unit (ICU); (3) Suwannee Limestone; (4) Ocala Limestone; (5) upper Avon Park Formation; (6) Middle Confining Unit (MCU) I and MCU II; and (7) lower Avon Park Formation or Oldsmar Formation. A detailed discussion on the hydrogeologic framework of the NDM domain is provided in HGL (2013). The Upper Floridan Aquifer (UFA) is composed of the Suwannee Limestone, Ocala Limestone, and Upper Avon Park; the Lower Floridan Aquifer (LFA) is composed of the permeable parts of both the lower Avon Park and the Oldsmar Formations. Because of the permeability contrasts between the units, each unit is simulated as a discrete model layer rather than using one model layer to represent a thick sequence of permeable units. As discussed in HGL (2013), the ICU is absent, thin, or discontinuous throughout most of western half of the NDM region where the Upper Floridan aquifer is regionally unconfined. In regions where the ICU is missing, the second model layer represents the UFA. The Suwannee Limestone is absent over a large part of the model domain. Where the Suwannee Formation is absent, model layers 3 and 4 represent the Ocala Limestone. The Ocala Limestone is absent in some local areas in the northernmost region of the project area. In those areas, model layers 3 through 5 represent the Avon Park Formation. With the exception of the eastern part of the model domain, the Oldsmar Formation is assumed to have a relatively low permeability being similar to the permeability of the overlying MCU II, which includes the lower Avon Park Formation. Consequently, the finite-difference cells representing the LFA (model layer 7) are active only where MCU I is present east of the eastern extent boundary of MCU II.

2.1.1 Hydraulic Property Changes to Version 4.0

In 2014, an aquifer performance test (APT) was conducted at the Sleepy Creek Ranch Lands site located off County Road 315 in northeast Marion County, Florida (Intera, 2014). The APT site is located approximately 3.5 miles northwest of Fort McCoy and 7.5 miles southwest of Orange Springs. The City of Ocala is 17.5 miles to the southwest. The APT was conducted in the northern section of the Ranch. Hydrologic features of interest near this location include Rodman Reservoir to the north and Silver Springs to the south. The APT consisted of a 12-day constant rate pumping test followed by a 7-day recovery observation period. Results from the analysis using the drawdown data collected from 18 on-site observation wells and several off-site wells in the SJRWMD observation well network indicated that: (1) transmissivity within the APT-influenced area varied from 62,000 to 102,500 square feet per day (ft^2/day), (2) storativity varied from $3.7x10^{-4}$ to $5.5x10^{-3}$; and (3) leakance varied from $6.9x10^{-5}$ to $7.2x10^{-4}$ 1/day.

A sub-regional model was developed by SDI Environmental Services, Inc., (SDI) and the SJRWMD to simulate the drawdown and recovery of the APT (SDI, 2015). Hydraulic property changes made to Version 5 were based on those extracted from the SJRWMD sub-regional model in the vicinity of the APT area (SDI, 2015). The areal extent of the sub-regional model and the distribution of transmissivity within the sub-regional model near and surrounding the APT site are shown in Figure 2.1. As the discretizations of NDM 5 and the sub-regional model are not identical, the transfer of the sub-regional model parameters to NDM 5 was performed in such a way that the hydraulic characteristics of the sub-regional domain are preserved. The final distributions of calibrated hydraulic properties are presented in Section 3.2. The UFA transmissivities before and after sub-regional alteration are presented in Figures H.1 and H.2 in Appendix H, respectively.

In southeastern Lake County, water table mounding was observed above land surface along portions of the Lake Wales Ridge in Version 4.0 of the 1995 steady-state calibrated model. Review of available hydrogeologic data indicated that the leakance coefficient for model layer 2 (ICU) was an order of magnitude too tight and thus contributing to the mounding issue. The leakance coefficient was increased by an order of magnitude and this significantly reduced water table mounding in the area. It also improved the water level calibration in nearby monitor wells.

2.1.2 Springs

Information regarding springs is provided in HGL (2013). The locations of all 115 springs in the model area are shown in Figure 2.2. Spring names corresponding to the numbers in the figure are given in Table 2.1. The springs shown in Figure 2.2 and Table 2.1 are springs with measurable and continuous discharge. Of the 115 springs, 74 of them have observed discharge data. The remaining 41 springs are small, with no observed discharge data. Spring discharge data are further discussed in Section 3.2.5.

Below are the changes implemented in the current model:

Removed Springs

The following springs were removed from Version 4.0. Rock Spring (Marion County), Scott Spring (Marion County), and Blue Grotto Spring (Levy County). The discharge of these springs was found to be intermittent and insignificant. Prior information supporting their inclusion could not be found in a literature search or within FGS spring publications.

Added Springs
The following springs were added to the current model: Belton's Millpond Spring (Sumter County), and Blue Spring (Levy County). The average discharge rates of these springs are about 7 and 8 cubic feet per second (cfs), respectively. The data for these springs were provided by the SWFWMD (2016).

Also added to the model were a number of submerged springs in Rodman Reservoir, which is an artificial reservoir located on the Ocklawaha River in Putnam and Marion Counties. Within the reservoir footprint, a number of small submerged springs are present. These springs are: Wells Landing Spring, Catfish Spring, Blue Spring Marion, Riversites Spring, Tobacco Patch Spring, Fish Hook No. 1 Spring, Fish Hook No. 2 Spring, Bright Angel Spring, and Sims Spring Marion. Blue Spring (Marion County), and Tobacco Patch Spring were already included in the previous version of the model. The remaining seven springs were incorporated into the current model. These springs are relatively small springs with average discharge rate ranging from approximately 0.5 to 5.2 cfs. The locations of these springs are given in Figure 2.2. The spring data were provided by the SJRWMD (2016).

Updated Springs
After the completion of NDM 4, the daily spring discharge data for Silver Springs published by German (2010) was replaced by the USGS data and the current NDM 5 was calibrated with the USGS flow data. The use of the USGS reported discharge at Silver Springs is consistent with the source of all observed flows from all other springs in the model where continuous measurements are available. A comparison between the two data sets between 1996 and 2006 is shown in Figure 2.3.

Additional data for Gum Springs in Sumter County and Seven Springs in Pasco County were provided by the SWFWMD during the development of this model. Also provided were additional data for Bugg Spring in Lake County by the SJRWMD. The average discharge rates of the Gum Spring group (Gum Springs and Alligator Spring), Seven Springs, and Bugg Spring are about 73 cfs, 5 cfs, and 11 cfs, respectively.

2.1.3 Recharge

Recharge in the internally drained areas in northern Marion County was slightly increased (approximately 1 inch per year) to account for the increase in the target discharge for Silver Springs (see Section 2.1.2, above). Recharge to the internally drained area contributes directly to the discharge of Rainbow and Silver Springs. Recharge in the Eastern groundwater basin was increased by about 5 percent or 0.4 inches per year. The rest of the model area remains unchanged. Recharge was modified only for the 1995 steady-state model.

2.1.4 Pumping

For the 1995 steady-state model, pumping of the permitted and non-permitted wells remains unchanged. The 1995 withdrawals and injection of permitted wells in the UFA and the LFA, and the withdrawals and injection of non-permitted wells are graphically displayed in Figures G.1, G.3, and G.5, Appendix G, respectively. For the transient model, pumping of the non-permitted (domestic self-supply, agriculture, etc.) wells along the northern and eastern boundaries was adjusted to be consistent with the most current data. It should be noted that for both models, in the unconfined UFA area, domestic well withdrawals were reduced by 60 percent to account for return of some of the pumped water as recharge due to septic tank leakage (HGL, 2010; Knowles et al., 2002).

2.1.5 External Boundary Conditions

Details of the model's boundary conditions are described in HGL (2013). The lateral and lower model boundaries were assigned constant head (prescribed head), general-head, or no-flow boundary conditions. The rationale for assigning these conditions is described below.

Constant-Head Boundaries
The SA (Model Layer 1) along the southeastern lateral model boundary is represented with prescribed model heads. The southeastern model boundary refers to the part of the model in southwestern Orange, Polk, and Hillsborough Counties. Constant-head boundary conditions were also assigned along the western boundary of the model domain to represent the presence of the saltwater interface. In all of the active model layers, equivalent freshwater heads were assigned to all of the finite-difference cells located along the Gulf of Mexico. The use of equivalent freshwater head can mimic the presence of the saltwater/freshwater interface by causing inflow in the deep zone of the UFA and coastal discharge in the upper zone of the UFA. To account only for the freshwater discharge along the Gulf coast, lateral fluxes were estimated at one mile inland (two cells) from the coast to avoid possible recirculatory flow near the marine coast.

General-Head Boundaries
Previous regional-scale modeling results (Sepulveda, 2002) were used to assign general-head boundary conditions along the southeastern portion of the model domain in southwestern Orange and northern Polk Counties. The general-head condition along this boundary was assigned to the Suwannee Limestone (model layer 3), the Ocala Limestone (model layer 4), and the upper and lower Avon Park Formations (Model Layers 5 and 7). General-head boundary condition based on inferences from observation records was also assigned to the SA boundary from Keystone Heights to 30 miles west of Keystone Heights.

No-Flow Boundaries
All lateral model boundaries not defined with constant-head or general-head boundaries were assigned no-flow boundary conditions. No-flow boundary conditions were assigned along the southern and northern portions of the model domain. These no-flow cells represent the groundwater divide that are present in these areas. No-flow boundary conditions were also assigned along the boundaries of the competent confining units. In these units, groundwater flow direction is restricted to the vertical direction due to their very low horizontal hydraulic conductivity. In the western portion of the model, no-flow boundaries are assigned at the base of model layer 6 which represents MCU II. In this area, the LFA is represented in the model by inactive cells and groundwater flow is not simulated.

2.2 2010 STEADY STATE MODEL

The 2010 model run was a verification run based on the calibration of the model from 1995-2006. Model recharge was estimated for 2010, groundwater withdrawals were included for 2010, and boundary heads were set to 2010.

2.2.1 Hydraulic Properties

All hydraulic properties (horizontal and vertical hydraulic conductivities) are the same as those in the 1995 steady-state and 1996-2006 transient models. The distributions of calibrated hydraulic properties are presented in Section 3.2.

2.2.2 Springs

The new spring data (discharge and pool elevations) are based on the data provided by the SJRWMD and SWFWMD (see Section 2.1.2).

2.2.3 Rivers and Lakes

The new river and lake stage data were based on data provided by the SJRWMD and SWFWMD. River hydrographs were provided by the SJRWMD and the SWFWMD. Supplementary data were obtained from the USGS. River base flows for 2010 were estimated from river hydrographs using Perry's Method (Perry, 1995).

2.2.4 Recharge

For each model cell, a relationship between monthly recharge and precipitation from January 1996 to December 2006 was established by correlating monthly rainfall and monthly recharge in the transient model. The individual-cell correlations were used to estimate individual-cell recharge for the 2010 model. Each individual correlation is considered robust as it is based on 132 monthly data points which include extreme climatic periods: a very dry period in 2000 and a very wet period in 2004. An example of correlation at a location in western Marion County is shown in Figure 2.4. The distribution of 2010 recharge is presented in Figure D.1, Appendix D.

2.2.5 Pumping

The new pumping data (for permitted and non-permitted wells) are based on those provided by the SJRWMD (2016). Permitted well use outside of the SWFWMD was updated based on recent data developed for the North Florida-Southeast Georgia groundwater flow model. Metered and estimated water use within the SWFWMD for permitted wells was unchanged from the Version 4.0 2010 scenario run. A comparison between the 1995 and 2010 county-wide withdrawals is presented in Table G.1, Appendix G. The 2010 withdrawals and injection of permitted wells in the UFA and the LFA, and the withdrawals and injection of domestic self-supply wells are graphically displayed in Figures G.2, G.4, and G.6, Appendix G, respectively.

A return water package for agricultural and recreational irrigation was developed explicitly for the 2010 pumping package. Return water rates of 20 percent of water withdrawn for recreational withdrawals (average of golf course irrigation and other public area irrigation) and 35 percent of water withdrawn for agricultural withdrawals were based on data from FDEP reuse inventory report for those water use types (Page 19, FDEP, 2016). These rates were applied as injection wells in model layer 1 at the locations of irrigation withdrawals. Total quantities were 40.3 mgd across the model domain in 2010 (see Table 4.1 in Section 4).

2.2.6 Boundary Conditions

Boundary conditions in 2010 are similar to those of the 1995 model. All the heads along the constant-head and general-head boundaries were updated using the 2010 data.

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3.0 MODEL CALIBRATON AND VERIFICATION

The new data and information presented in Section 2 were used to update the NDM 4 (HGL, 2013). The calibration and verification procedure and calibration targets are described in Section 3.1. Recalibration results for the 1995 and transient models are presented in Sections 3.2 and 3.3, respectively. Verification results for the new 2010 model are presented in Section 3.4.

3.1 CALIBRATION AND VERIFICATION PROCESS

3.1.1 Calibration and Verification

The NDM was recalibrated using a variety of hydrologic data including measured water-level elevations; observed spring discharge, and estimated base flow contributions using river gauging data. The calibration was divided into two steps: 1995 steady-state calibration and 1996-2006 transient calibration. Initially, the NDM was calibrated to average, steady-state conditions observed in 1995, which is known to be a near-average year in terms of precipitation (McGurk and Presley, 2003). Once the 1995 steady-state model had been calibrated, the model was calibrated to transient conditions. The available transient data are from 1996 to 2006. This period includes extreme precipitation conditions including wet (El Niño 1997 through 1998), dry (1999 through 2000 drought) and wet (2004) periods. During the recalibration simulations, hydraulic parameters were adjusted in some key areas systematically within reasonable ranges. Simulated water-level distributions in all aquifers were compared with observed water-level data and trends, simulated spring flow and base flow were compared to observed values, and simulated potentiometric surfaces were visually compared to observed potentiometric-surface maps. Statistical analysis and visual inspection were used to evaluate the recalibration simulations. The use of a transient calibration provides another test of reasonableness of the model calibration if it can mimic periods of high and low stresses through time while incorporating important storage properties of the aquifers.

In the earlier versions (NDM 1 and NDM 2), model calibration was performed by dividing the model domain into zones of similar hydraulic and hydrogeologic characteristics and each zone was assumed to be homogeneous. The calibration for local-scale areas was refined in subsequent versions of the NDM by cell-by-cell parameter adjustment. In the current version, the recalibration began with the parameters from NDM 4, cell-by-cell adjustment was performed to improve on the correspondence between the observations and the model.

After recalibration, the updated NDM was verified by comparing simulated versus observed annual average 2010 water levels in the SA, UFA, and LFA, as well as spring discharge, and base flow data. Recharge was determined from correlation between precipitation and recharge between 1996 and 2006 and applied to the radar estimated rainfall for 2010 (see Section 2.2.3). Boundary conditions were based on observed 2010 conditions.

3.1.2 Calibration Targets

Calibration and verification targets for the 1995 steady-state and 1996-2006 transient calibration and the 2010 verification included interpreted potentiometric surfaces, observed groundwater levels, measured spring flow, and estimated river base flow. In addition, throughout the model calibration process, the model-simulated water budget was carefully evaluated and compared to water-budget information derived from previous modeling studies and other hydrogeologic investigations.

Observed Potentiometric Elevations

The locations of observation wells with water-level records that were used for the 1995 model steady-state calibration in the SA and UFA are shown in Figures 3.1, and 3.2, respectively. There were no LFA water-level data available for steady-state calibration. The locations of observation wells with water-level records that were used for model transient calibration in the SA, UFA, and LFA are shown in Figures 3.3, 3.4, and 3.5, respectively. The locations of observation wells with water-level records that were used for the 2010 model verification run in the SA, UFA, and LFA are shown in Figures 3.6, 3.7, and 3.8, respectively.

The average 1995, May 2000, May 2004, and average 2010 potentiometric surfaces prepared by the USGS were used for visual comparison with the simulated UFA potentiometric surfaces. These surfaces are presented in the following sections.

Inter-aquifer Potentiometric Differences
In addition to comparing observed and simulated heads, head difference direction and magnitude across the ICU and MCU were also used to verify the model to provide additional assurance of congruency between the model and regional hydrogeology. Locations of well pairs where head difference information is available across the ICU and MCU are shown in Figures 3.9, and 3.10, respectively.

Spring Discharge
Observed spring discharge data from 115 springs with measurable and continuous discharge were used for comparing against simulated spring discharge. These springs are presented in Tables 3.9, 3.19, and 3.29 in the ensuing sections of this report. Total simulated discharge should be within ten percent of total observed discharge. Simulated discharge at major springs should be within five percent of respective observed discharge.

Baseflow
River base flow estimates were calculated using gauging data for the Withlacoochee, Hillsborough, Anclote, Pithlachascotee, and Ocklawaha Rivers. During the model-calibration process, the flux of water from river cells representing these rivers were compared to the estimated base flow computed for various reaches of the rivers. Total simulated base flow should be within ten percent of total estimated base flow.

Model's Goodness of Fit
Observation well records were selected for calibration based on their distance from a model boundary, on the availability of water-level data (period of record), and on physical well attributes (for example, well screen and bottom elevations). Groundwater levels in observation wells were used to calculate residuals between measured and simulated water levels. The groundwater residuals were then used to determine the goodness of fit between observed and simulated water-level elevations. The objective of the calibration effort was to minimize errors between observed and simulated water levels as well as to minimize spatial bias in the errors. For each hydrogeologic unit in each groundwater basin, the mean error (ME) should be as close to 0 ft as possible and the mean absolute error (MAE) should be within 5 percent of the differences between the maximum and minimum observed head values. Five percent is a typical criterion for the measurement of closeness between a model and observations (Smith et al., 2003). The MAE target values range from 6.5 ft (5 percent of the difference between 0.8 and 130 ft above mean sea level [amsl] for the UFA) to 7 ft (5 percent of the difference between 2.7 and 142.4 ft amsl for the SA). A target MAE for the LFA was not established, as there are no LFA observation wells in 1995 and fewer than four LFA observation wells in a given groundwater basin between 1996 and 2006. However, during the calibration, an attempt was made to achieve an MAE of less than 4 ft for each groundwater basin.

3.2 STEADY-STATE CALIBRATION RESULTS BASED ON THE 1995 DATA

3.2.1 Calibrated Hydraulic Properties

Hydraulic Conductivity and Transmissivity

In the recalibration process, the calibrated horizontal hydraulic conductivity values were obtained by manual adjustments of local parameters. The resulting hydraulic conductivity distributions are presented on Figures 3.11 through 3.15. The calibrated hydraulic conductivities are noted to be consistent with previous modeling efforts and are within the range of values inferred from transmissivities determined during previous hydrogeological field studies.

Although transmissivity was not explicitly assigned as an input parameter in the current regional model, the transmissivity was calculated using the assigned hydraulic conductivity values and model layer thicknesses to facilitate comparison with data from aquifer performance tests and transmissivity values from other models. Model layer thicknesses were an input parameter based on the Florida Geological Survey (FGS) data and were not changed in the calibration process. Previous modeling investigations assigned transmissivity values to represent the entire UFA. Consequently, maps illustrating the spatial distribution of transmissivity were prepared to compare the results of the current model to the results of previous modeling studies and aquifer performance tests. The calibrated aquifer transmissivities for the UFA (model layers 3 to 5 in the confined area and 2 to 5 in the unconfined area) and the LFA (model layer 7) are presented on Figures 3.16 and 3.17, respectively. All values are noted to be within the range of field observed values for each aquifer unit within the model or consistent with previous modeling efforts in the region. A comparison between the pre-recalibration UFA transmissivity (NDM4) and post-recalibration UFA transmissivity (NDM5) is given in Figures H.1 and H.2, Appendix H.

Vertical Hydraulic Conductivity and Leakance

The calibrated vertical hydraulic conductivities for the semi-confining units of the ICU and the MCU within the NDM are presented on Figures 3.18 and 3.19, respectively. The calibrated leakance coefficients of the ICU and MCU are presented on Figures 3.20 and 3.21, respectively. Modifications were made to the ICU leakance in the Lake Wales Ridge area in central Lake County. A comparison between the pre-recalibration ICU leakance (NDM4) and post-recalibration ICU leakance (NDM5) is given in Figures H3 and H.4, Appendix H. The leakance coefficients were calculated by dividing the vertical hydraulic conductivity by the thickness of the layer. The calibrated vertical hydraulic conductivities and leakance coefficients are noted to be within the expected range from previous modeling efforts and other hydrological studies. Vertical head differences were used a guide during the calibration process even though some of the data was only recently collected.

3.2.2 Recharge

The net groundwater recharge used in the 1995 steady-state period is shown on Figure 3.22. Annual net groundwater recharge values used in the 1995 steady-state and 1996 through 2006 transient periods are summarized in Table 3.1. The Northern, Central, and Eastern groundwater basins listed in Table 3.1 are shown in Figure 3.23. As shown in the table, the 1995 recharge ranges from 9 to 13 inches/year, which is consistent with estimated recharge in other studies. Low and high recharge in 2000 and 2004 reflects the fact that these two years were dry and wet years, respectively. The distribution of the 2010 recharge (Figure D.1, Appendix D) is similar to that in 1995 (Figure 3.22). As the regional precipitation in 2010 is slightly lower than the 1995 precipitation, the 2010 recharge is correspondingly smaller than the 1995 recharge.

3.2.3 Potentiometric Surface

The average potentiometric surfaces simulated by the calibrated groundwater-flow model for the 1995 steady-state condition are presented in Figure 3.24 for the SA and in Figure 3.25 for the UFA. The SA water levels (Figure 3.24) generally follow the topographic surface elevations throughout the model domain. In areas where topographic elevation gradients are relatively steep, the potentiometric gradients are correspondingly steep (see also Figure 2.1 in HGL [2013]). These areas include the Brooksville Ridge (Pasco and Hernando Counties), eastern Marion County, northeastern Lake County, northwestern Orange County, the Keystone Heights area in Alachua County, and southwestern Putnam County. The general shape of the simulated UFA potentiometric surface and the observed field data are shown in Figure 3.25. The general shape of the potentiometric surface, however, is in good agreement with the observed field data across the model domain, including the known groundwater level highs in the southern part of the Brooksville Ridge area, in the Green Swamp area, and the Keystone Heights area. Flow patterns along the Withlacoochee River in southwestern Marion County, and along the St Johns River along the northeastern model boundary, and the water-level dome that is directed northward from the Green Swamp and which determines the groundwater basin boundary between the Northern West-Central Florida Groundwater Basin (North Basin) and the Northern East-Central Groundwater Basin (East Basin) are simulated reasonably well. The model slightly over predicts water-level elevations, on the order of a few feet, in the area with small hydraulic gradient in central Marion County.

Spatial distributions and variability of groundwater-level residuals (simulated minus observed water levels) across the NDM for the SA and UFA are shown in Figures 3.26 and 3.27, respectively. In these figures, one can observe that the distributions of residuals do not show any distinct spatial patterns or biases. It should be noted, however, that larger residuals are present in Pasco, Pinellas, and Hillsborough Counties more so than other areas in the model domain. This observation is attributed to the fact that, in this area, there are major wellfield withdrawals, the potentiometric gradient is steepest, and that the density of observation wells is the highest. As discussed in HGL (2013) (Section 4.4.1 therein), the calibration of the model focused on two groundwater basins: the Northern and Eastern Basins. Because the Central Basin area was not a focus of the model calibration, the larger residuals were not considered as a model limitation.

The model was also verified by comparing simulated vertical head differences across the ICU and the MCU against observed head differences where data are available. Locations of well pairs where head difference information is available across the ICU and MCU are shown in Figures 3.9, and 3.10, respectively. Comparison between the estimated and simulated vertical head differences across the ICU and MCU are presented in Tables 3.2, and 3.3, respectively. In these two tables, favorable agreement in both direction and magnitude for the head differences across the ICU and MCU is evident at more than 90 percent of the well pairs (14 of 16 well pairs for the ICU and all 9 well pairs for the MCU). As shown in Tables 3.2 and 3.3, the time windows at which observed data were obtained are not always in 1995. For this reason, this comparison should be regarded as a qualitative verification of the model.

3.2.4 Calibration Statistics

Summaries of the steady-state model residual statistics are presented in Tables 3.4 through 3.8. The locations of the groundwater basins referred to in the tables are given in Figure 3.23. In general, the calibration statistics of the current model are comparable with those of the previous calibration efforts (HGL, 2013). The MEs (Table 3.4) in the UFA (model layers 3 to 5) and formations (Suwannee Limestone) therein are, in general, similar to those of the previous version of the NDM (Table 4.3, HGL, 2013). Comparing the MAEs (Table 3.4) against the criteria in Table 3.5, the current MAEs, relative to the differences between the maxima and minima in respective aquifers, are 3 to 5 percent. An inspection of the statistics in Tables 3.6 to 3.8 indicates that all the calibration criteria are satisfied. The UFA MAEs of the Northern and Eastern Basins are less than 4 ft and the MEs are equal to or less than 0.5 ft.

A scatter plot of the simulated and observed hydraulic heads in the UFA is shown in Figure 3.28. The correlation of the plot is 0.977 which suggests favorable consistency between the observed and simulated potentiometric elevations. For observed water-level values greater than 40 ft, most points lie close to the regression line with a small scatter indicating minimal calibration bias. For observed water levels lower than 40 ft, the scatter plot shows the simulated water levels are marginally higher (about 3 ft on average, as indicated by the intercept of the vertical axis) than the observed water levels.

3.2.5 Spring Discharge

There are 115 springs with measurable and continuous discharge in the current version of the NDM. The calibrated steady-state simulated spring discharge is compared with observed spring discharge and the results are presented in Table 3.9. Of the 115 springs, there are 74 springs with observed discharge data, and 41 small springs with no observed discharge data. For these 41 springs, a nominal rate of 5 cfs was assigned for comparison purposes. The observed 1995 average annual spring flow data for Rainbow, Silver, and Weeki Wachee Springs were reported by the USGS. The simulated spring flows for the two major springs (Rainbow and Silver) are within one percent of the observed values. The simulated discharge rate of the Weeki Wachee Spring in Hernando County is approximately one percent smaller than the average observed rate. In the Eastern Basin, the simulated spring flows for Alexander and Silver Glen Springs are within one percent of the observed rates. The total discharge within the NDM was found to be 3 percent (all 115 springs), and 2 percent (74 springs with observations) lower than the respective observed total discharge.

3.2.6 Base Flow

The calibrated steady-state simulated base flow is compared with estimated base flow and is presented in Table 3.10. The observed base flow was estimated using a 120-day minimum moving average of the observed river flows (Perry, 1995). The observed and simulated base flows along the Withlacoochee and Ocklawaha Rivers are graphically summarized in Figures B.1 and B.5, respectively, in Appendix B. The calibration effort was focused on these two major rivers in the model. Along the Withlacoochee River, the cumulative simulated base flow values were found to be lower than or equal to the observed base flow estimates upstream and slightly larger than the observed base flow estimates downstream (at Wysong Dam and Holder). The observed and simulated base flow rates along the Withlacoochee River are graphically summarized in Figure B.1 in Appendix B, in which favorable agreement between the observed and simulated base flow is evident.

The cumulative base flow error at the Holder gage, which represents 108 miles of Withlacoochee River length, is just one percent. Simulated base flows at the Trilby and Croom stations are about 6 and 8 percent higher and lower than observed, respectively. Simulated base flows at the Conner station at the downstream end of the Silver River, and Conner and Eureka stations along the Ocklawaha River are about 8 percent below, 6 percent above, and 19 percent greater than observed, respectively. The estimated base flow at the Moss Bluff station, which is downstream from Lake Griffin, may be affected by the operation of a control structure. The overall difference between the simulated and observed cumulative base flows is approximately 9 percent.

3.2.7 Water Budget

The regional water budget for the 1995 calibrated steady-state NDM is shown in Tables 3.11 through 3.13. The water budget is subdivided into the three (onshore) groundwater basins (Northern, Eastern, and Central Basins, as shown in Figure 3.23). Lateral fluxes along the Gulf coast were estimated at one mile inland (two cells) from the coast to avoid possible recirculatory flow near the marine coast.

Recharge in the model domain occupied by the three basins varies from an average of 9.1 inches per year (in/yr) in the Eastern Basin to 13 in/yr in the Northern Basin and is the major input of water to the model domain. It is noted that recharge is largest in the Northern Basin. In the Northern Basin, recharge is larger than in the other two basins because of less runoff due to internal drainage. In addition, in the Northern Basin the UFA is mainly unconfined with much greater capacity for infiltration from land surface. Spring flow, represented as flow from drains in the model domain occupied by the three basins, varies from 4.8 in/yr in the Eastern Basin to 10 in/yr in the Northern Basin (where most of the springs are located). Vertical flow to the UFA in the model domain, occupied by the three basins, varies from 7 in/yr in the Eastern Basin to 14 in/yr in the Northern Basin (where the SA is absent in most parts). Pumpage, represented as flow from wells in the model, varies from 0.9 in/yr in the Northern Basin to 3.4 in/yr in the Central Basin where most of the major wellfields serving the Tampa metro area are located. Rivers and lakes were simulated using river cells (HGL, 2013). Regionally, these water bodies discharge water to the rivers that, in turn, discharge to the Gulf of Mexico. The regional discharge rates vary from 1, 4.2, and 4.4 in/yr in the Northern, Central, and Eastern Basins, respectively. These rates represent the net rates that rivers in the three basins receive from the groundwater. Overall, the rivers in the three basins are gaining streams that are consistent with the regional conceptual model.

3.3 TRANSIENT CALIBRATION RESULTS BASED ON THE 1996-2006 DATA

3.3.1 Potentiometric Surface

To evaluate and calibrate the transient model simulation, the potentiometric surfaces during dry periods of both a dry (May 2000) and a wet (May 2004) year were selected and are discussed below.

The May 2000 potentiometric surfaces for the SA and the UFA are shown on Figures 3.29 and 3.30, respectively. The simulated SA potentiometric surface is assumed to follow the land-surface topography except where the SA and UFA potentiometric surfaces coincide. The simulated shape of the UFA potentiometric surface is in reasonable agreement with the shape of the observed field data contours across the model domain. The May 2004 potentiometric surfaces for the SA and the UFA are presented on Figures 3.31 and 3.32, respectively. The simulated SA potentiometric surface is assumed to generally follow the land-surface topography except where the SA and UFA potentiometric surfaces coincide. The simulated shape of the UFA potentiometric surface is in reasonable agreement with the observed shape of the UFA potentiometric surface across most of the model domain. The average transient (1996 through 2006) water-level residuals for the SA and UFA are summarized and presented in Figures 3.33 and 3.34, respectively. It is noted that the residuals show minimal spatial bias, with both positive and negative residuals occurring across the model domain.

Simulated transient groundwater levels were compared to observed groundwater levels measured in 439 wells (each with at least 5 months of water level data) across the model domain and are presented in Appendix A. The transient water-level comparisons were used extensively during the calibration process to assess the transient groundwater response to changes in hydraulic parameter values and boundary conditions. Examples of hydrographs for the UFA, SA, and LFA are shown in Figures 3.35a and 3.35b, Figures 3.35c and 3.35d, and Figure 3.35e, respectively. Favorable agreement between the model and water level records were observed in these figures.

3.3.2 Calibration Statistics

Summaries of the monthly average transient model residual statistics are given in Tables 3.14 through 3.18. In general, the calibration statistics of the current model are comparable to those of the previous calibration efforts (HGL, 2013). The MEs (Table 3.14) in the UFA and formations therein are comparable to those of the previous NDM (Table 4.9, HGL, 2013). In terms of MAEs (Table 3.15), the current MAEs, relative to the differences between the maxima and minima in respective aquifers, are 3 to 5 percent, comparable to the previous version of NDM (Table 4.10, HGL, 2013). An inspection of the statistics in Tables 3.16 to 3.18 indicates that all the calibration criteria are satisfied. The UFA MAEs of the Northern and Eastern Basins are less than 4 ft and the MEs are equal to or less than 0.5 ft. Calibration statistics for 2000 (drought year) and 2004 (wet year) for the NDM and three individual groundwater basins are shown in Tables F.1 to F.8 in Appendix F. In general, the calibration statistics for these two years are similar to the aggregate calibration statistics in Tables 3.14, 3.16, 3.17, and 3.18. However, as shown in Tables F.1 to F.4, the model tends to underestimate water level during the dry year (2000). As shown in Tables F.5 to F.6, the model shows less bias levels (smaller MEs as compared with 1995) for the combined three groundwater basins and for the Northern Basin.

A scatter plot of the simulated and observed hydraulic heads is shown in Figure 3.36. This plot is similar to the plot in Figure 3.28 for the 1995 steady-state model.

3.3.3 Spring Discharge

Transient spring flow summaries from three major 1st magnitude springs (Silver, Rainbow, and Weeki Wachee) are presented in Figures 3.37 through 3.39. The simulated spring flows at these springs show general agreement with the estimated observed discharge rates. Spring discharge at significant second magnitude springs (which are individual measured springs within first magnitude spring groups) include: Homosassa 1 Spring, Chassahowitzka Main Spring, Crystal Springs near Zephyrhills), Gum Springs, Alexander Springs, Rock Springs, Salt Springs, Sweetwater Springs, and Silver Glen Springs are shown in Figures C.1 to C.9, in Appendix C. In these figures, simulated spring flow shows generally good agreement with respective observed spring flow in terms of temporal variability. For Crystal Springs, the model consistently under-simulates the discharge rate temporal fluctuation (Figure C.3). It is speculated that the current knowledge of hydrogeology and hydrology in the vicinity of these springs is incomplete. However, this spring is located in the central basin which is not the focus of this model.

The calibrated time-averaged simulated spring flows from 1996 to 2006 are compared with observed spring flows and the results are presented in Table 3.19. The observed average spring discharge for Rainbow, Silver Springs, Weeki Wachee, Homosassa 1 Spring, Chassahowitzka Main Spring, and Crystal Springs near Zephyrhills was reported by the USGS. The simulated spring flows for the two major springs within the NDM, Rainbow and Silver Springs, are 2 and 1 percent, respectively, less than the observed. The simulated discharge rate of the Weeki Wachee Spring in Hernando County is approximately 1 percent larger than the average observed rate. The total discharge within the NDM is 4 percent (all 115 springs) and 3 percent (74 springs with observations) lower than the respective observed total discharge.

3.3.4 Base Flow

For the 1996-2006 transient calibration, river reaches known to be dry during the dry periods were assigned with a small river conductance to reflect the local no-flow conditions during these periods. The simulated annually averaged transient base flows in 2000 and 2004 (dry and wet years, respectively) are compared with the estimates and are presented in Table 3.20. The simulated and estimated base flows along the Withlacoochee River are graphically summarized in Figures B.2 and B.3, in Appendix B, for 2000 and 2004, respectively. Similar plots for the Ocklawaha River are shown in Figures B.6, and B.7, respectively. For the Withlacoochee River, during the dry year (2000), the model tends to over-estimate the simulated base flow (Figure B.2) and under-estimate the simulated base flow for the wet year (2004) (Figure B.3). The over-simulation and under-simulation of base flows during the dry and wet years are likely the result of using river conductance values estimated using only the 1995 data. River conductance is expected to be larger during wet periods because of lateral expansion of the river. The opposite is expected during dry periods. For the Ocklawaha River, the model slightly underestimates the base flows in both the dry and wet years. The reason for this behavior of the model may be due to the fact that the dynamic interaction with the Rodman Reservoir could not be fully accounted for by the model.

Considering the uncertainties associated with both the base flow estimates and the hydraulic properties of the riverbed, the qualitative agreement between the model and the available data was considered reasonable. As the simulation uncertainties are related to river conductance, it may be necessary to use time-dependent river conductance in order to improve the agreement between the simulated and observed base flow. Another alternative is to adopt an integrated modeling approach to account fully for river dynamics in which surface water and groundwater are simultaneously simulated. The latter accounts for all pertinent and interrelated hydrologic and hydrogeologic processes, including: overland flow, channel/river flow, and dynamic changes in river conductance. Recharge tends to be more accurately estimated with the second approach as detailed information relating to precipitation, evapotranspiration (ET), and interception storage is utilized. The second alternative is more data intensive and more computationally demanding than the first alternative, and should be used only when all the necessary data are available.

3.3.5 Water Budget

The average 1996 to 2006 water budgets for the calibrated transient model for the three basins are shown in Tables 3.21 through 3.23. Recharge varies from an average of 7.5 in/yr in the Central Basin to 14.2 in/yr in the Northern Basin and is the major inflow of water to the model domain. Spring flow varies from an average of 3.0 in/yr in the Central Basin to 11 in/yr in the Northern Basin. All vertically downward flux to the UFA varies from 6.3 in/yr in the Eastern Basin to 15.4 in/yr in the Northern Basin. Similar to the steady-state results, the area-normalized regional river net discharge varies from 0.9, 3, and 3.8 in/yr in the Northern, Central, and Eastern Basins, respectively.

3.4 VERIFICATION RESULTS BASED ON THE 2010 DATA

As stated in Section 3.1, the recalibrated model was verified using the 2010 conditions. A comparison of county-wide pumping between 1995 and 2010 is shown in Table G.1, Appendix G. In the table, it can be observed that, in most counties, the respective annual average pumping is lower in 2010 than in 1995, except in Citrus, Hernando, and Sumter Counties. In Pasco County, the partnership agreement between Tampa Bay Water and the SWFWMD, which required an approximate 40 percent reduction in wellfield withdrawals, went into effect in 2008. Thus, the county’s withdrawal total reflects this reduction in 2010. Spring pool elevations, river stages, and lateral boundaries based on the 2010 conditions were incorporated into the model. Observed potentiometric elevations, spring discharge rates, and baseflows in 2010 were used as metrics for model verification. The hydraulic properties of the 2010 model are identical to those of the 1995 model. Results are presented below.

3.4.1 Potentiometric Surface

The average potentiometric surfaces simulated by the calibrated groundwater-flow model for the 2010 steady-state condition are presented in Figure 3.40 for the SA and in Figure 3.41 for the UFA. As expected, the potentiometric distributions shown in Figures 3.40 and 3.41 are consistent with those in Figures 3.24, 3.25, 3.29, 3.30, 3.31, and 3.32. In comparing the UFA potentiometric distributions in 1995 (Figure 3.25) and 2010 (Figure 3.41), it can be seen that the two models share similar characteristics in terms of deviation in some sub-regional areas from the respective USGS-interpreted potentiometric distributions. These sub-regional areas include: northeastern Levy and northwestern Marion Counties, southwestern Marion County near Rainbow Springs, eastern Citrus County, Pasco and Hillsborough Counties, southern Sumter County, and eastern Lake County. These sub-regional areas tend to have steep hydraulic gradients and/or complex local hydrogeology. Spatial distributions and variability of groundwater-level residuals (simulated minus observed water levels) across the NDM for the SA and UFA are shown in Figures 3.42 and 3.43, respectively. The residual distributions in these figures are spatially unbiased, similar to those in Figures 3.26, 3.27, 3.33, and 3.34. In comparing the SA residuals in 1995 and 2010 (Figures 3.26 and 3.42, respectively), the residuals of the two models are not regionally similar. However, the 2010 model has many more observation locations. In comparing Figures 3.26 and 3.42, the UFA residuals are regionally similar; however, at some identical locations, residuals are opposite in signs. This observation suggests that the two models' inputs and stresses are independent and the 2010 data are appropriate for model verification.

3.4.2 Calibration Statistics

Summaries of the 2010 steady-state model residual statistics are presented in Tables 3.24 through 3.28. In general, the calibration statistics of the 2010 model are comparable with those of the previous calibration efforts (HGL, 2013). The MEs (Table 3.24) in the UFA (layers 3 to 5) and formations (Suwannee Limestone) therein are in general smaller than one ft. In terms of the MAEs (Table 3.25), the MAEs, relative to the differences between the maxima and minima in respective aquifers, are 3 to 5 percent. An inspection of the statistics in Tables 3.26 to 3.28 indicates that all the calibration criteria are satisfied. The UFA MAEs of the Northern and Eastern Basins are slightly greater than 4 ft and the MEs are equal to or less than 0.5 ft. A comparison between Tables 3.4 to 3.8 and Tables 3.24 to 3.28 suggests that MEs and MAEs in 2010 are, in general, slightly greater than those for the 1995 model.

A scatter plot of the simulated and observed hydraulic heads is shown in Figure 3.44. This plot is similar to those in Figures 3.28 and 3.36 for the 1995 steady-state model and transient model, respectively.

3.4.3 Spring Discharge

The 2010 steady-state simulated spring flows are compared with observed spring flows and the results are presented in Table 3.29. The simulated spring flows for the two major springs (Rainbow and Silver) are within 1 percent of the observed values. The simulated discharge rate of the Weeki Wachee Spring in Hernando County is approximately 1 percent larger than the average observed rate. In the eastern basin, the simulated spring flows for Alexander and Silver Glen Springs are within 4 and 9 percent of the observed rates, respectively. The total discharge within the NDM is 4 percent (for all 115 springs), and 3 percent (for 74 springs with observations) lower than the respective observed total discharge.

3.4.4 Base Flow

A comparison between the 2010 steady-state simulated base flow and the estimated base flow is presented in Table 3.30. As shown in the table, along the Withlacoochee River, the simulated cumulative base flow is found to be similar to the observed cumulative base flow. The cumulative simulated base flow is within 1 percent of the estimated base flow at the Holder gage. The observed and simulated base flows along the Withlacoochee River are graphically summarized in Figure B.4, in Appendix B, in which favorable agreement between the observed and simulated base flow is evident. As shown in Table 3.30, the simulated cumulative base flows at the Conner gage at the downstream end of the Silver River, and at the Eureka gage downstream of the Ocklawaha River are about 8 percent below, and 19 percent greater than observed, respectively. Favorable agreement between the observed and simulated base flows along the Ocklawaha River is graphically presented in Figure B.8 in Appendix B. The overall difference between the simulated and observed cumulative base flows is approximately 10 percent.

3.4.5 Water Budget

The water budgets for the 2010 steady-state NDM are shown in Tables 3.31 through 3.33. Regional recharge varies from an average of 7 in/yr in the Eastern Basin to 11.8 in/yr in the Northern Basin. Spring flow varies from 3.2 in/yr in the Central Basin to 9.3 in/yr in the Northern Basin. Vertical flow to the UFA varies from 5.6 in/yr in the Eastern Basin to 13.8 in/yr in the Northern Basin. Pumpage represented as flow from wells in the model varies from 0.85 in/yr in the Northern Basin to 2.5 in/yr in the Central Basin. Regional river net discharge rate varies from 0.8, 4.3, and 4 in/yr in the Northern, Central, and Eastern Basins, respectively.

4.0 PREDICTIVE SIMULATIONS

The NDM has been and is currently used by the SWFWMD and SJRWMD for water supply planning and analysis of groundwater impacts to MFL springs. The Districts use the NDM with projections of future demand based upon population projection forecasts for public water supply projections. Each District is required by law to conduct a water supply assessment every five years that forecasts future water demand for the next 20 years (in this case with the NDM 5, up to 2035). Both Districts use the results of the NDM to examine predicted drawdown in aquifers, reductions in spring flows, and reductions in river base flows. These changes are examined under long-term average change conditions.

Predictive simulations were conducted using the calibrated transient model. Five predictive scenarios, given below, were simulated.

- Scenario 1: 2010 pumping conditions;
- Scenario 2: 2014 pumping conditions;
- Scenario 3: 2025 pumping conditions;
- Scenario 4: 2035 pumping conditions;
- Scenario 5: 2035 pumping conditions with conservation and reuse;

A summary of pumping and injection for the above scenarios is presented in Table 4.1. The first two scenarios are based on historical records. The following three scenarios are based on information contained within regional water supply planning reports required by law that each District completes every five years (e.g., SWFWMD (2015)). The impact of each scenario was assessed by comparing the results from each scenario against baseline conditions. The baseline conditions (potentiometric elevations, base flow, and spring flow) are the conditions at the end of a one-year transient simulation using the transient model calibrated storages (see Section 3.3) with no pumping. The 1995 boundary conditions and the initial conditions based on the 1995 steady-state heads were imposed. The baseline case may be regarded as a surrogate for the predevelopment scenario. The one-year no pumping time period was selected because it best matches statistically the USGS predevelopment potentiometric surface published by the USGS, and minimizes water above land surface across the domain. Longer simulation periods under no pumping conditions result in increasingly poorer matches with the USGS predevelopment surface and greater areas within the domain with water above land surface. For each scenario, the same transient model was used to simulate a given pumping scenario for five years to ensure reaching a pseudo steady-state condition. Each pumping scenario consisted of average annual withdrawal rates using one stress period and multiple time steps using a time-step multiplier. The five-year run time was chosen to ensure a pseudo-steady-state condition because the regional water supply planning and the MFL impact evaluation for springs are viewed on a long-term average change basis. Model simulations show that the system comes to a near steady-state condition within one to two years. So the 5-year period is a conservative approach. The differences between the simulation results at the end of scenario runs and at the end of the baseline simulation were used as the metrics for scenario impacts.

The input files for the well and fracture-well packages were created to represent pumping in domestic and permitted wells, respectively. Information for wells within the SRWMD, SFWMD and SJRWMD jurisdictions was provided by the SJRWMD. Information for wells within the SWFWMD jurisdiction was provided by the SWFWMD. Results for the five scenarios are discussed below.

4.1 SCENARIO 1: 2010 PUMPING CONDITIONS

The 5-year transient NDM 5 was used to simulate the impact of 2010 pumping conditions. Model-simulated drawdown is relative to the no-pumping baseline conditions. The areal extents and magnitudes of the SA, UFA, and LFA drawdowns caused by groundwater withdrawals in 2010 are shown in Figures 4.1, 4.2, and 4.3, respectively. The drawdown in the UFA (Figure 4.2) is limited to two major areas across the model domain. The first area encompasses Pasco County, southern Hernando County, and northern Hillsborough County. The second area includes northeastern Sumter County (the Villages area), and southern two thirds of Lake County, western Orange County, and southeastern Marion County. Drawdowns in these areas vary from 1 to 5 ft, with the major drawdowns occurring in Pasco and Lake Counties. There are areas with small areal extents of drawdown close to the southern and eastern boundaries of the models. Drawdowns in these areas range from 1 to 3 ft.

The drawdown in the SA (Figure 4.1) mimics the drawdown in the UFA; however, the areal extents are smaller than those in the UFA. There are localized areas in eastern Pasco County, northwestern Hillsborough County, and southern Lake County where the water table rises up to 5 ft. The rise is in response to the application of return flow directly to the SA (model layer 1). The drawdown in the LFA (Figure 4.3) is on the order of 1 ft or less and reflects the drawdown in the UFA in Lake and Orange Counties.

The predicted baseline and Scenario 1 baseflows are summarized in Table 4.2a and the differences between baseline and Scenario 1 are summarized in Table 4.2b. The total baseline baseflow is 1,370.3 cfs, and the predicted baseflow for Scenario 1 is 1,322.3 cfs. These results represent a decrease in base flow of approximately 3.5 percent. The Scenario 1 pumping slightly decreases base flow in the two major rivers (the Withlacoochee River and the Ocklawaha River) and two creeks (Cypress Creek and Trout Creek) in Pasco County. However, an increase of about 0.7 cfs in simulated base flow is observed in the Pithlachascotee River. The increase is attributed to the application of return flow directly to the SA discussed above.

The predicted baseline and Scenario 1 spring discharge rates are summarized in Table 4.3a and the differences between baseline and Scenario 1 are summarized in Table 4.3b. As shown in Table 4.3a, the total baseline spring flow is 3,383.1 cfs, and the total spring flow for Scenario 1 is 3,295.0 cfs. These results represent a change in total spring flow of approximately 88.1 cfs or 2.6 percent. The three major springs: Weeki Wachee, Rainbow, and Silver decrease by 10.1, 8.2, and 25.6 cfs (or 6.3, 1.2, and 3.5 percent), respectively.

4.2 SCENARIO 2: 2014 PUMPING CONDITIONS

Pumping in 2014 for each county was determined using the county-specific ratios (2014 pumping/2010 pumping) in Table 4.4. These ratios were obtained from historical records of county pumping totals in 2010 and 2014 (SJRWMD, 2016; SWFWMD, 2016). As shown in the table, pumping in most counties was reduced in 2014 by 3 to 33 percent. The reduction in groundwater use from 2010 to 2014 is consistent with District-wide trends for both SJRWMD and SWFWMD. This is mostly due to improved water conservation practices and wetter climatic conditions that occurred in 2014. However, pumping was increased by 5 to 17 percent in Alachua and Pinellas Counties, respectively.

The areal extents and magnitudes of the SA, UFA, and LFA drawdowns caused by groundwater withdrawals in 2014 are shown in Figures 4.4, 4.5, and 4.6, respectively. The drawdown extents in these figures are similar to those in Figures 4.1 to 4.3, respectively, but smaller as the amount of pumping in this scenario is 16 percent less than that in Scenario 1.

The extent of the rise in water table in northwestern Hillsborough County is greater than that in Scenario 1.

The predicted Scenario 2 base flow is summarized in Table 4.2a and the differences between baseline and Scenario 2 are summarized in Table 4.2b. The total Scenario 2 base flow is 1,340.5 cfs which represents a decrease in base flow of approximately 29.8 cfs or 2.2 percent from baseline. However, increases in simulated base flows along the upstream segments of the Withlacoochee River from Dade City to Floral City (0.3 to 1.3 cfs), the Hillsborough River above Crystal Springs (0.1 cfs), the Anclote River (0.5 cfs), and the Pithlachascotee River (0.9 cfs) are observed in Table 4.2b. The increases occur within the confined area of the UFA where return flow is applied directly to the SA (model layer 1). Comparing the Scenario 2 pumping with the Scenario 1 pumping (Table 4.1), there is a small reduction in the return flow application in the SA (5.6 mgd) while there is a major reduction in pumping in the UFA and the LFA (75.2 mgd). The rise in water level in the SA, caused by the disparity in pumping reduction in the two aquifer systems, results in the increases in base flows in the rivers over the confined area of the UFA.

The predicted baseline and Scenario 2 spring discharge rates are summarized in Table 4.3a and the differences between baseline and Scenario 2 are summarized in Table 4.3b. As shown in Table 4.3a, the total spring flow for Scenario 2 is 3,320.2 cfs. This represents a decrease in total spring flow of approximately 63.0 cfs or 1.9 percent. The three major springs: Weeki Wachee, Rainbow, and Silver decrease by 6.7, 6.1, and 18.4 cfs (or 4.2, 0.9, and 2.5 percent), respectively.

4.3 SCENARIO 3: 2025 PUMPING CONDITIONS

The 2025 pumping conditions were linearly interpolated between the 2010 and 2035 conditions. The areal extents and magnitudes of the SA, UFA, and LFA drawdowns caused by projected groundwater withdrawals in 2025 are shown in Figures 4.7, 4.8, and 4.9, respectively. The drawdown extents in these figures are similar to those in Figures 4.1 to 4.3, respectively but larger as the amount of pumping in this scenario is 18 percent larger than that in Scenario 1. The maximum drawdown in the two main drawdown areas (see Section 4.1) still remains at 5 ft.

The predicted Scenario 3 base flow is summarized in Table 4.2a and the differences between baseline and Scenario 3 are summarized in Table 4.2b. The total Scenario 3 base flow is 1,291.0 cfs which represents a decrease in base flow of approximately 79.3 cfs or 5.8 percent from baseline. An increase of about 0.5 cfs in simulated base flow is observed in the Pithlachascotee River.

The predicted baseline and Scenario 3 spring discharge rates are summarized in Table 4.3a and the differences between baseline and Scenario 3 are summarized in Table 4.3b. As shown in Table 4.3a, the total spring flow for Scenario 3 is 3,256.8 cfs. This represents a decrease in total spring flow of approximately 126.3 cfs or 3.7 percent. The three major springs: Weeki Wachee, Rainbow, and Silver Springs decrease by 12.5, 12.7, and 39.2 cfs (or 7.8, 1.9, and 5.3 percent), respectively.

4.4 SCENARIO 4: 2035 PUMPING CONDITIONS

The areal extents and magnitudes of the SA, UFA, and LFA drawdowns caused by projected groundwater withdrawals in 2035 are shown in Figures 4.10, 4.11, and 4.12, respectively. The drawdown extents in these figures are similar to those in Figures 4.7 to 4.9, respectively, but larger as the amount of pumping in this scenario is 35 percent larger than that in Scenario

1. The maximum drawdown in the two main drawdown areas (see Section 4.1) still remains at 5 ft.

The predicted Scenario 4 base flow is summarized in Table 4.2a and the differences between baseline and Scenario 4 are summarized in Table 4.2b. The total Scenario 4 base flow is 1,271.8 cfs which represents a decrease in base flow of approximately 98.5 cfs or 7.2 percent from baseline. An increase of about 0.4 cfs in simulated base flow is observed in the Pithlachascotee River.

The predicted baseline and Scenario 4 spring discharge rates are summarized in Table 4.3a and the differences between baseline and Scenario 4 are summarized in Table 4.3b. As shown in Table 4.3a, the total spring flow for Scenario 4 is 3,234.0 cfs. This represents a decrease in total spring flow of approximately 149.1 cfs or 4.4 percent. The three major springs: Weeki Wachee, Rainbow, and Silver Springs decrease by 14.2, 15.6, and 47.9 cfs (or 8.8, 2.4, and 6.5 percent), respectively.

4.5 SCENARIO 5: 2035 PUMPING CONDITIONS WITH CONSERVATION AND REUSE

The areal extents and magnitudes of the SA, UFA, and LFA drawdowns caused by groundwater withdrawals in 2035 with conservation and reuse are shown in Figures 4.13, 4.14, and 4.15, respectively. The drawdown extents in these figures are similar to those in Figures 4.10 to 4.12, respectively, but smaller as the amount of pumping in this scenario is 9 percent smaller than that in Scenario 4. The reduction in pumping is attributed to conservation and reuse of water. The maximum drawdown in the two main drawdown areas (see Section 4.1) still remains at 5 ft.

The predicted Scenario 5 base flow is summarized in Table 4.2a and the differences between baseline and Scenario 5 are summarized in Table 4.2b. The total Scenario 5 base flow is 1,287.5 cfs which represents a decrease in base flow of approximately 82.8 cfs or 6.0 percent from baseline. An increase of about 0.5 cfs in simulated base flow is observed in the Pithlachascotee River.

The predicted baseline and Scenario 5 spring discharge rates are summarized in Table 4.3a and the differences between baseline and Scenario 5 are summarized in Table 4.3b. As shown in Table 4.3a, the total spring flow for Scenario 5 is 3,254.6 cfs. This represents a decrease in total spring flow of approximately 128.5 cfs or 3.8 percent. The three major springs: Weeki Wachee, Rainbow, and Silver Springs decrease by 11.8, 13.5, and 41.7 cfs (or 7.4, 2.0, and 5.7 percent), respectively.

5.0 SUMMARY

The NDM 5 was developed for the purpose of predicting the effects of current and future groundwater withdrawals on groundwater flow and levels, base flow and spring discharge. The model was developed based on the existing NDM 4 that was further enhanced with the most recent data. Using a set of pre-established calibration criteria, the model was recalibrated in two stages: steady-state calibration based on observations in 1995; and transient calibration based on observations from 1996 to 2006. After model calibration, the model was satisfactorily verified using annual average data for 2010. The NDM Version 5.0 was utilized to perform five predictive simulations to evaluate the impacts due to five pumping scenarios. Simulation results are summarized in Section 4.

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6.0 REFERENCES

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FIGURES

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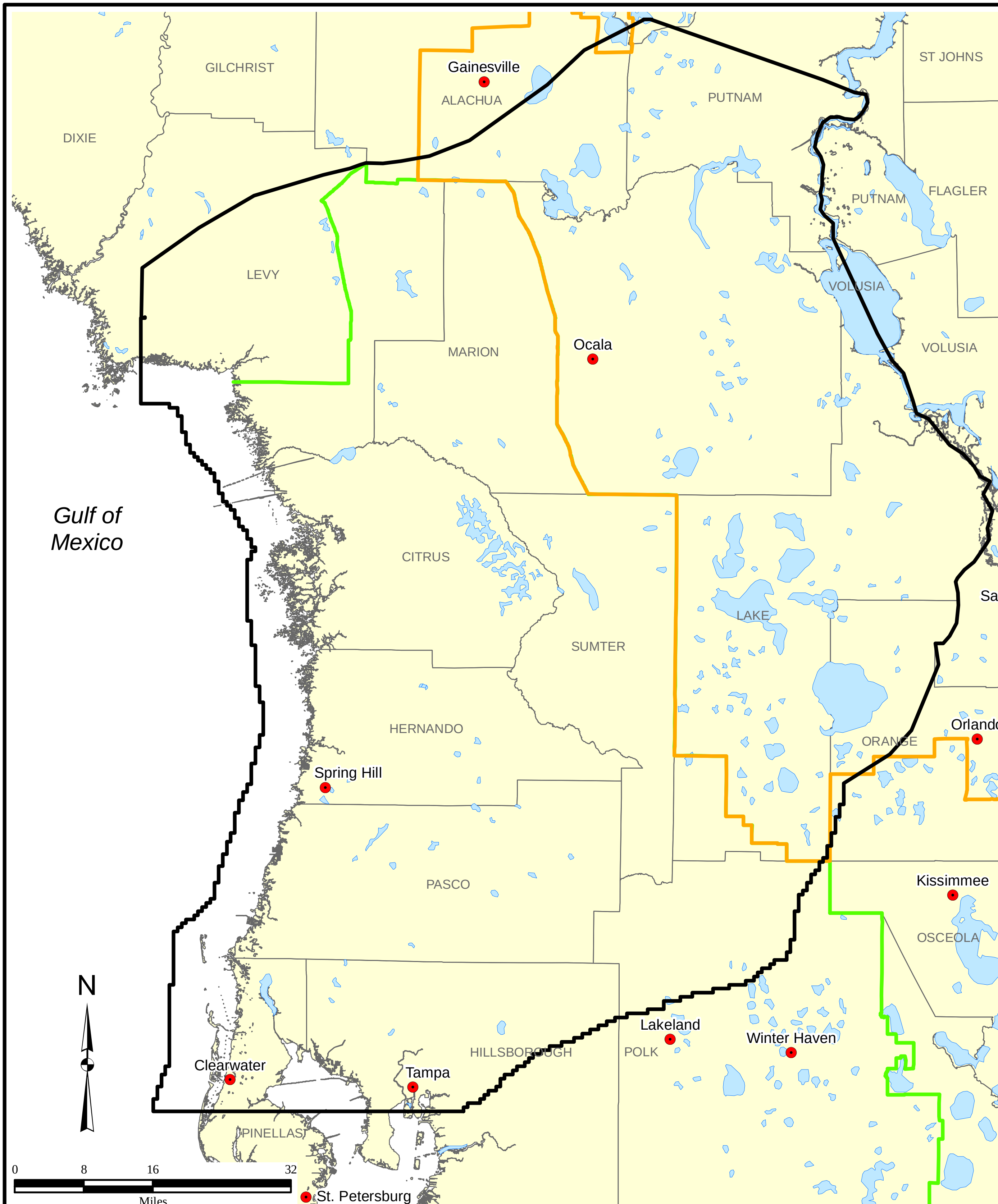


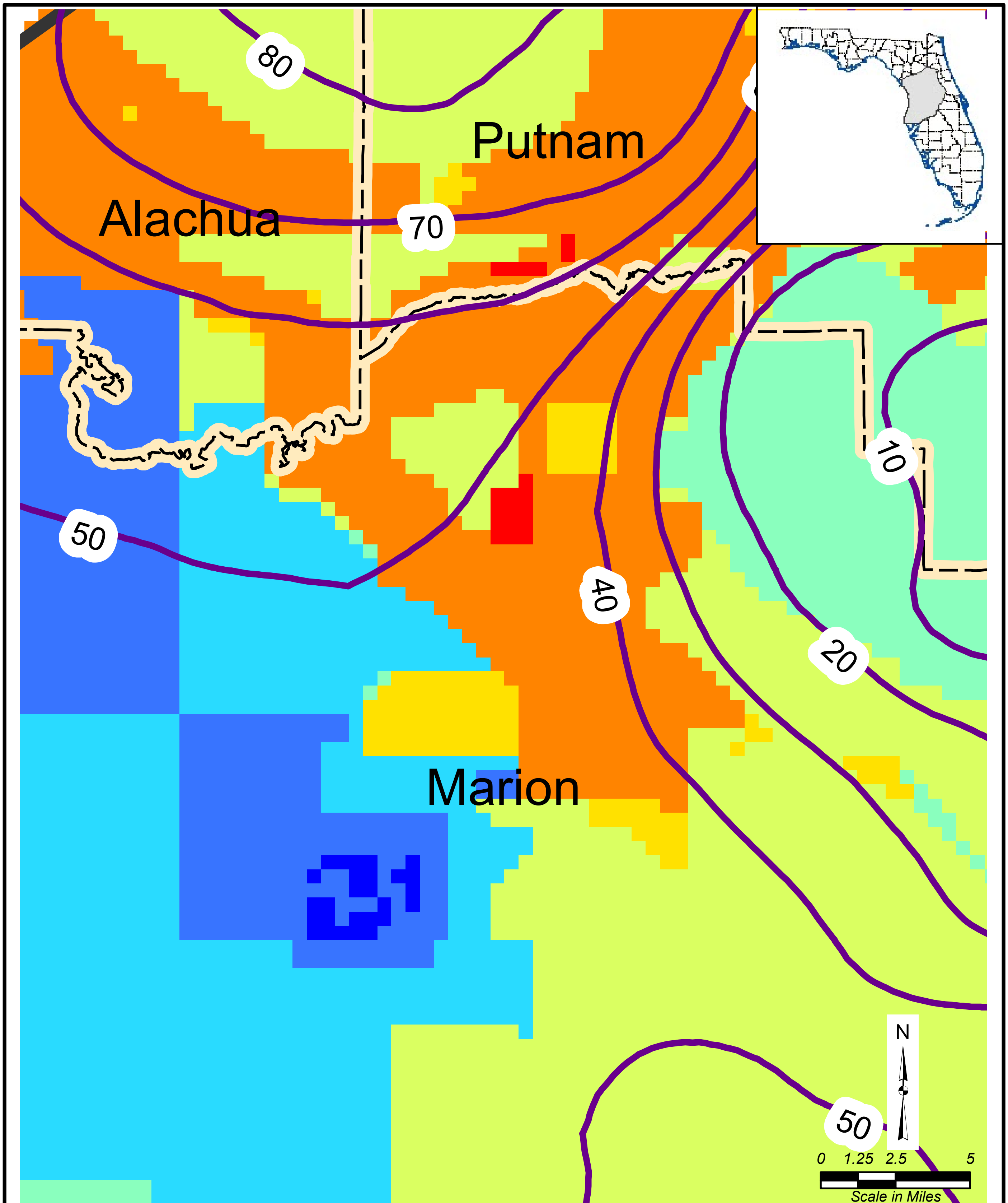
Filename: X:/SWF025/WO_04/Maps/
North_Dist_Flow_Model4/NDWRAP_Loc.mxd
12/6/2013 TH

Legend

- County Boundary
- SWFWMD Boundary
- SJRWMD Boundary
- Rivers and Lakes
- Current Project Area

HGL HydroGeoLogic, Inc

Figure 1.1
Location of the Project Area



P:
DS_2003
Reporting
Figures
Fig 2_1 - Transmissivity_UFA_MarionCounty.mxd
5/24/2016 HC

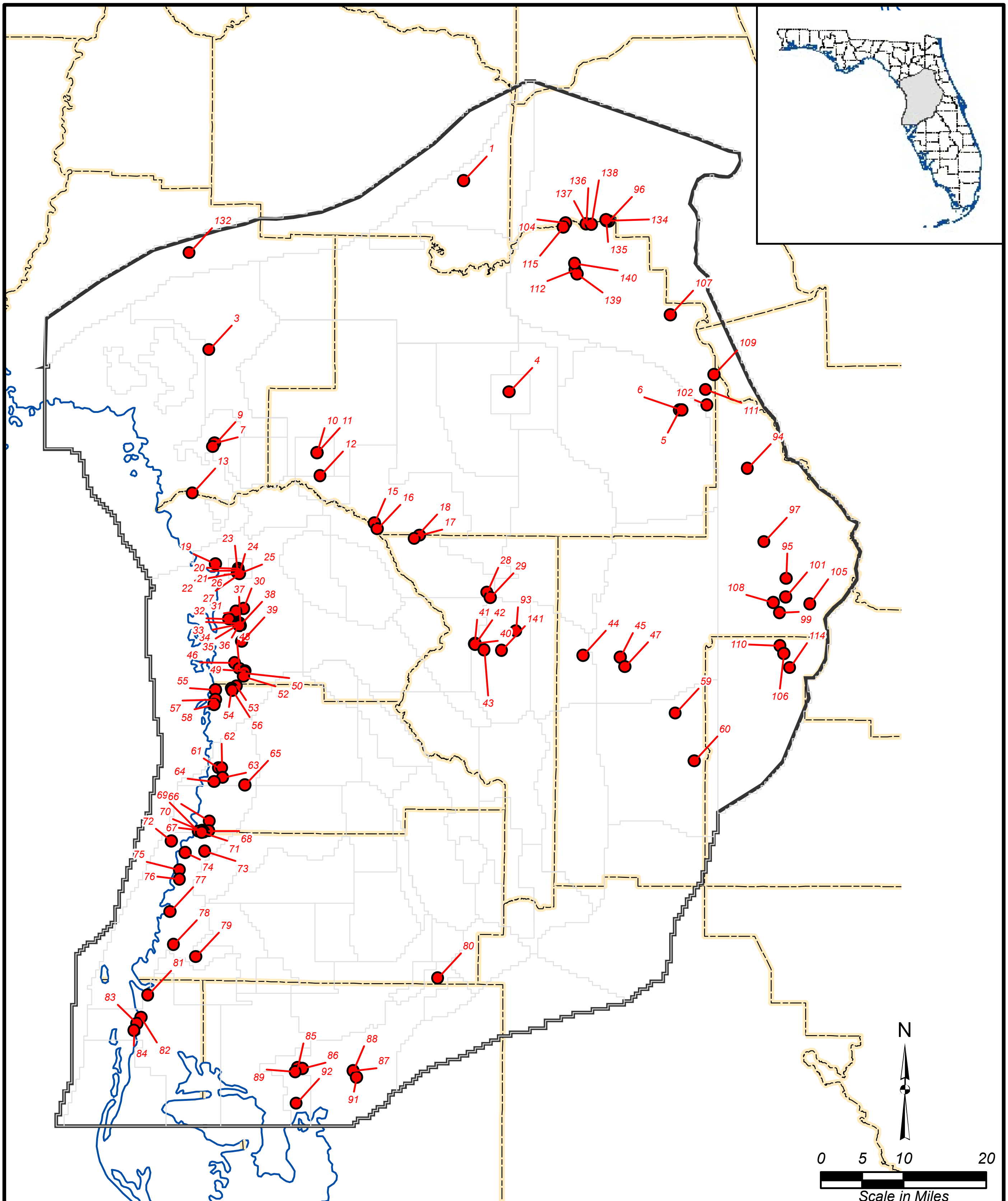
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone
1995 UFA Water Levels (Ft NGVD 29)

TRANUFA(ft2/d)
2,661 - 10,000.0
10,000 - 50,000
50,000 - 100,000
100,000 - 500,000
500,000 - 1,000,000
1,000,000 - 5,000,000
5,000,000 - 10,000,000
10,000,000 - 13,686,412

Figure 2.1 Transmissivity Distribution in Northeastern Marion County



P:
DS_2003
Reporting
Figures
Fig 2_2 - Spring Locations.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Hydraulic Conductivity Zone
Simulated Springs
Northern District Model Area
114 Spring Group Number

Figure 2.2
Locations of Springs in the Project Area

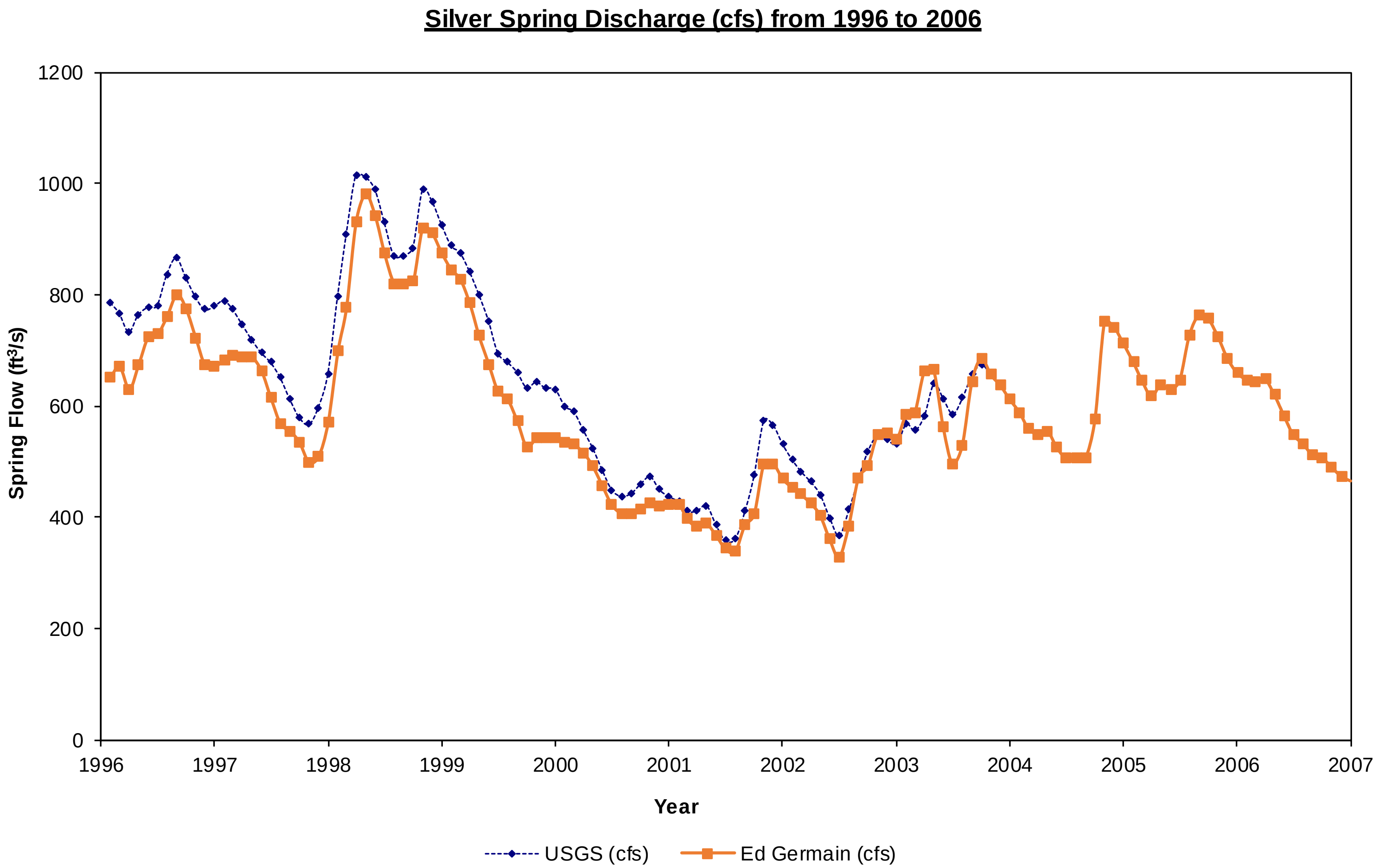


Figure 2.3 Silver Springs Discharge (cfs) from 1996 to 2006

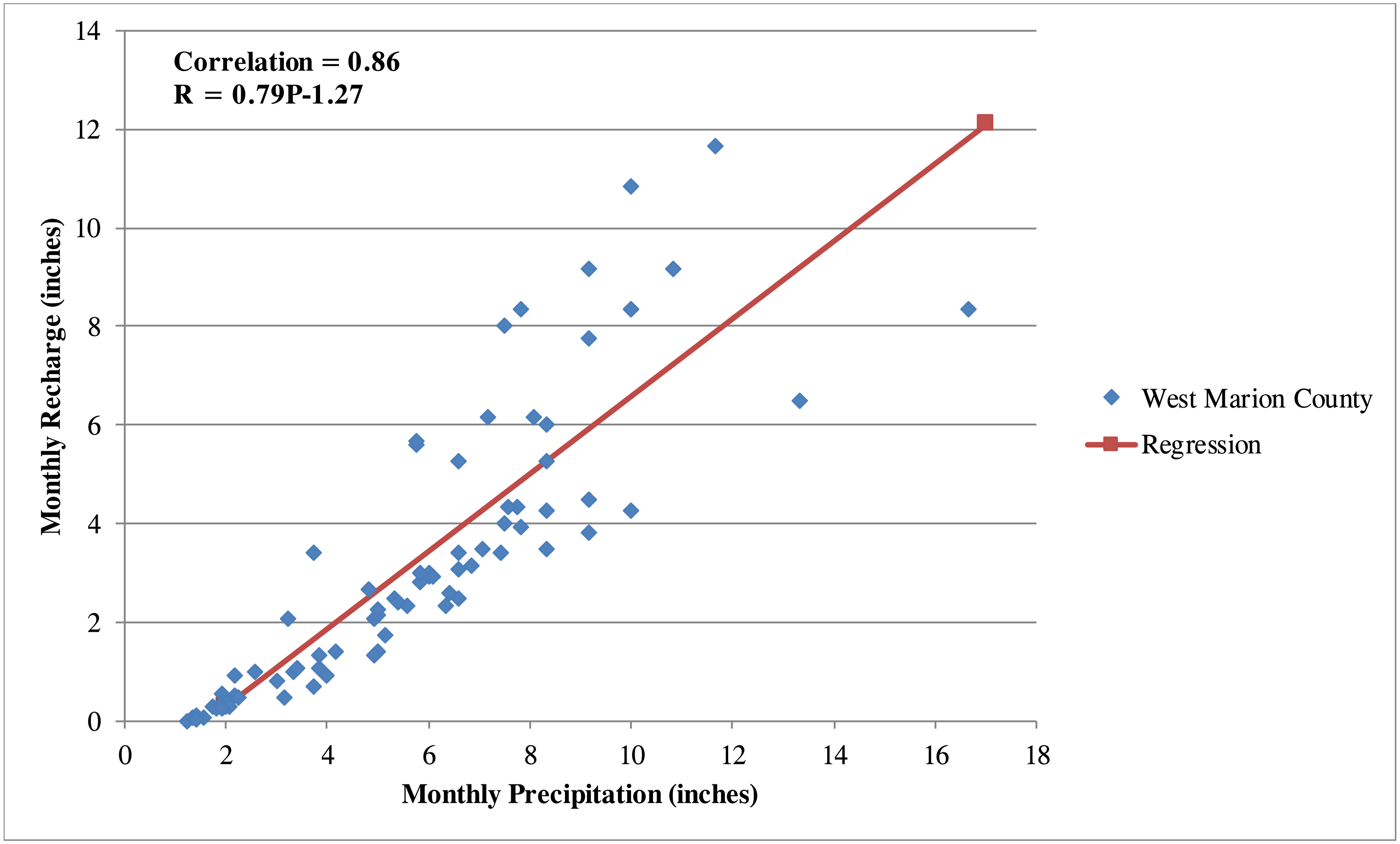
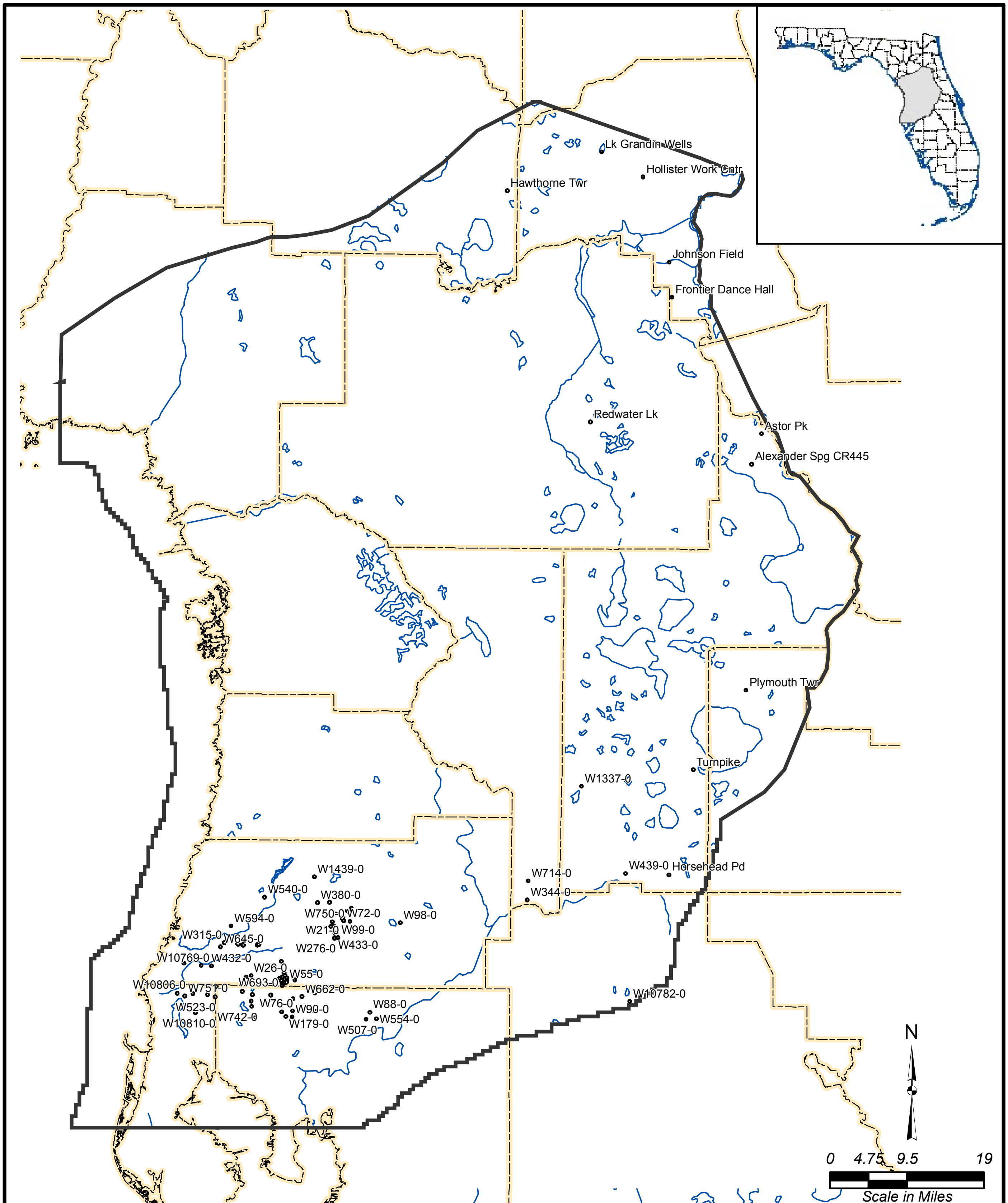


Figure 2.4 Correlation between Recharge and Precipitation



P:
DS_2003
Reporting
Figures

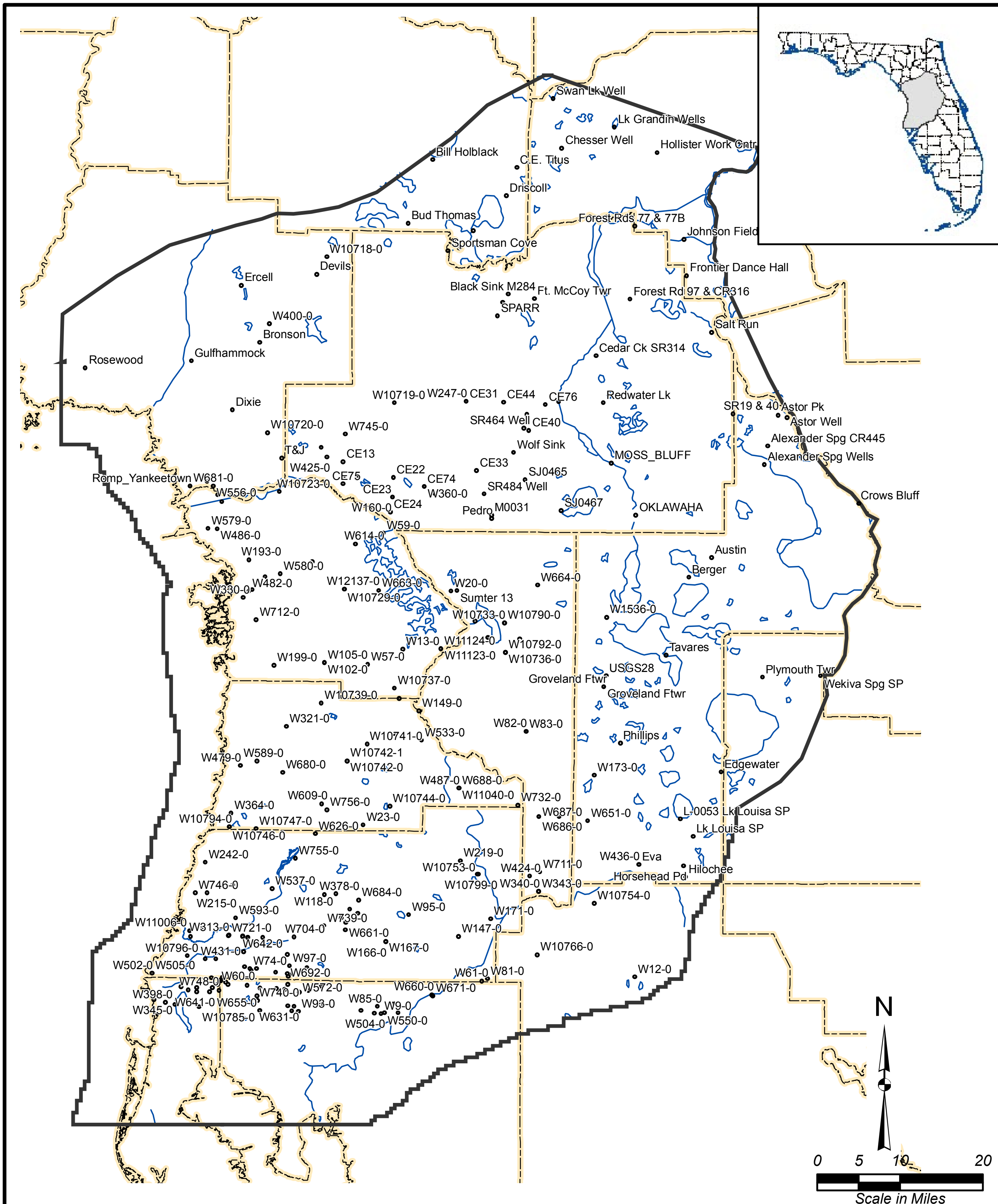
Fig 3_01 - Observation Wells.mxd
1/12/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.1
1995 Steady State Calibration Targets- Observation Wells (SA)



P:
DS_2003
Reporting
Figures

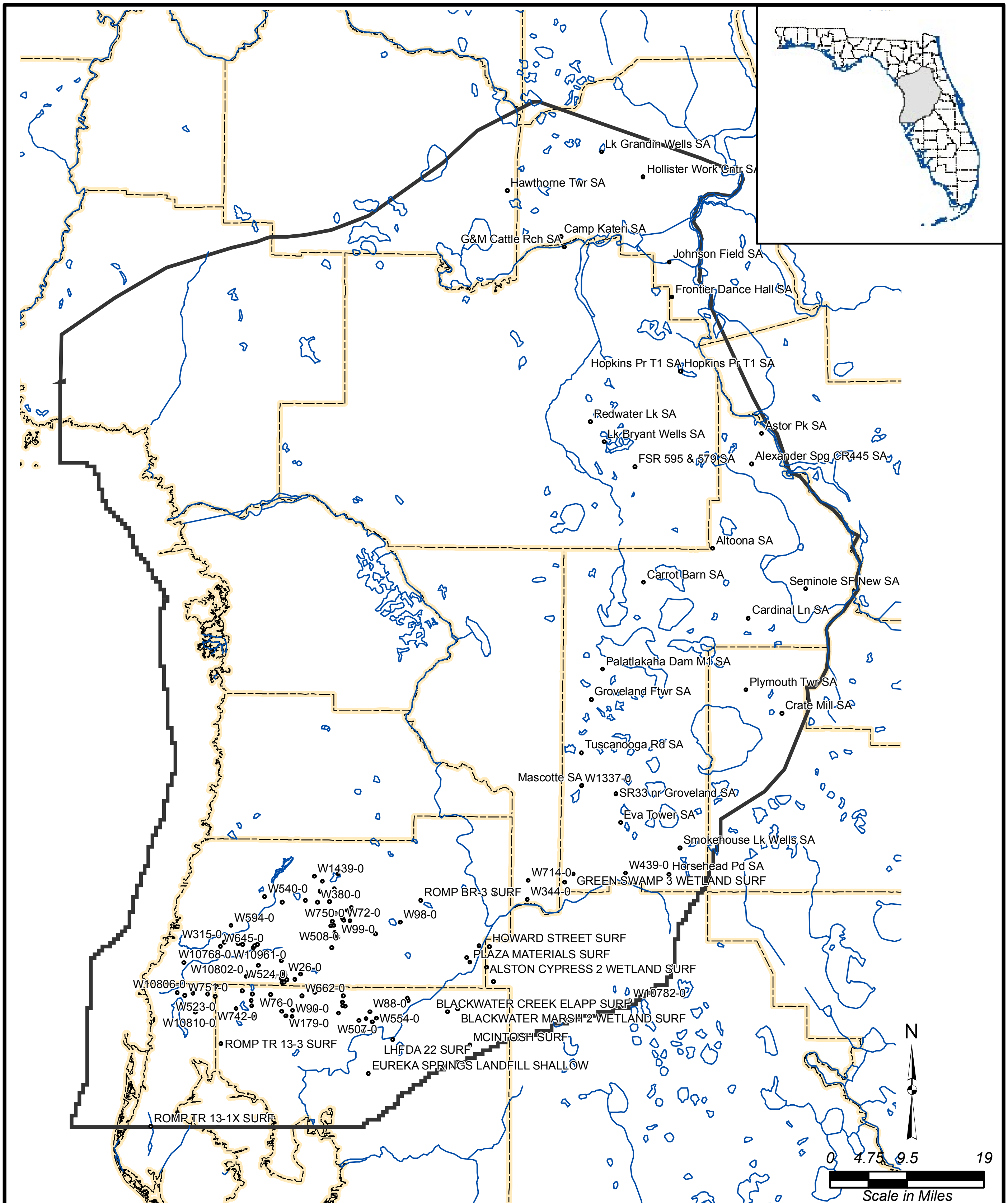
Fig 3_02 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.2
1995 Steady State Calibration Targets-Observation Wells (UFA)



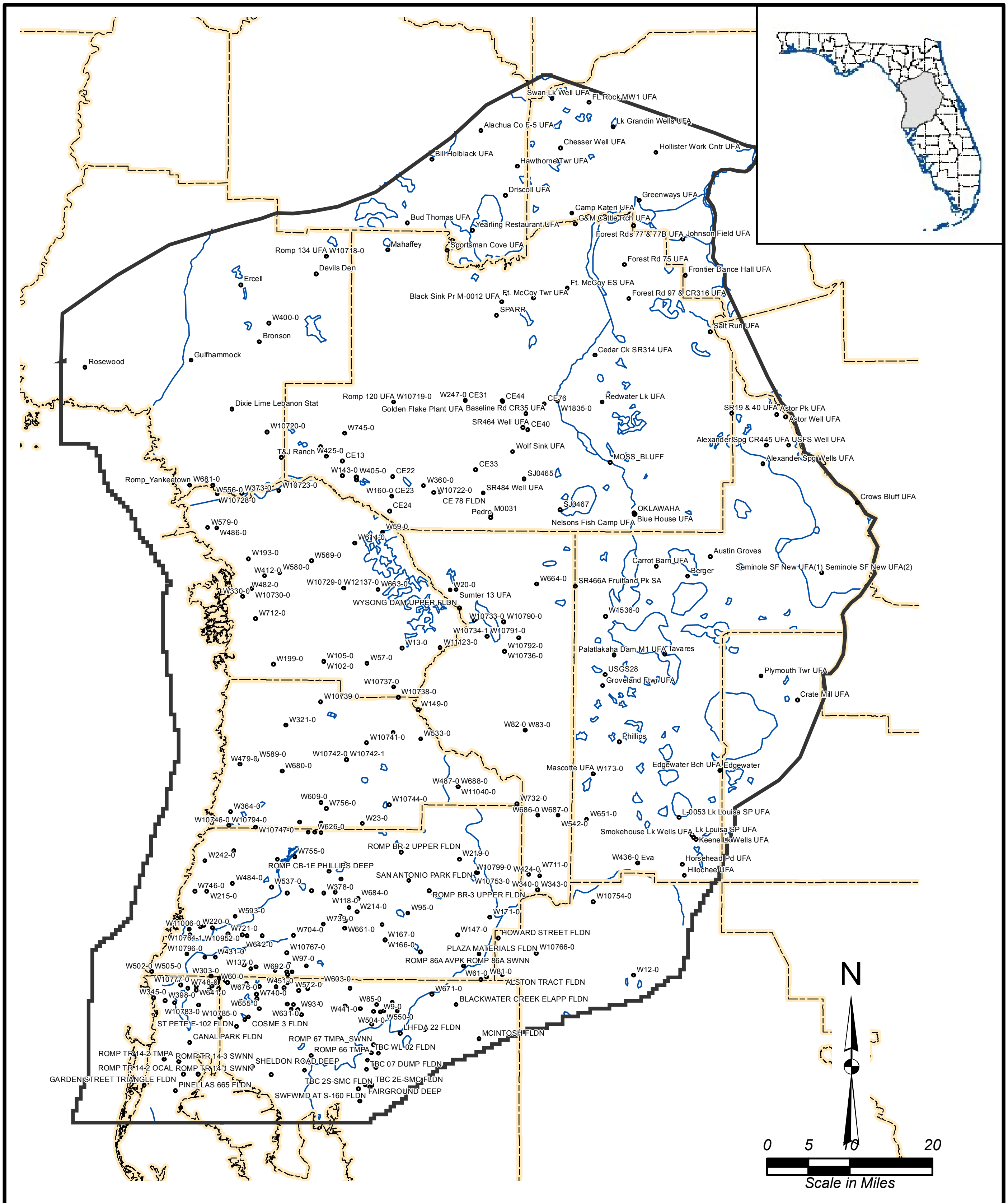
P:
DS_2003
Reporting
Figures
Fig 3_03 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.3
Transient Calibration Targets-Observation Wells (SA)



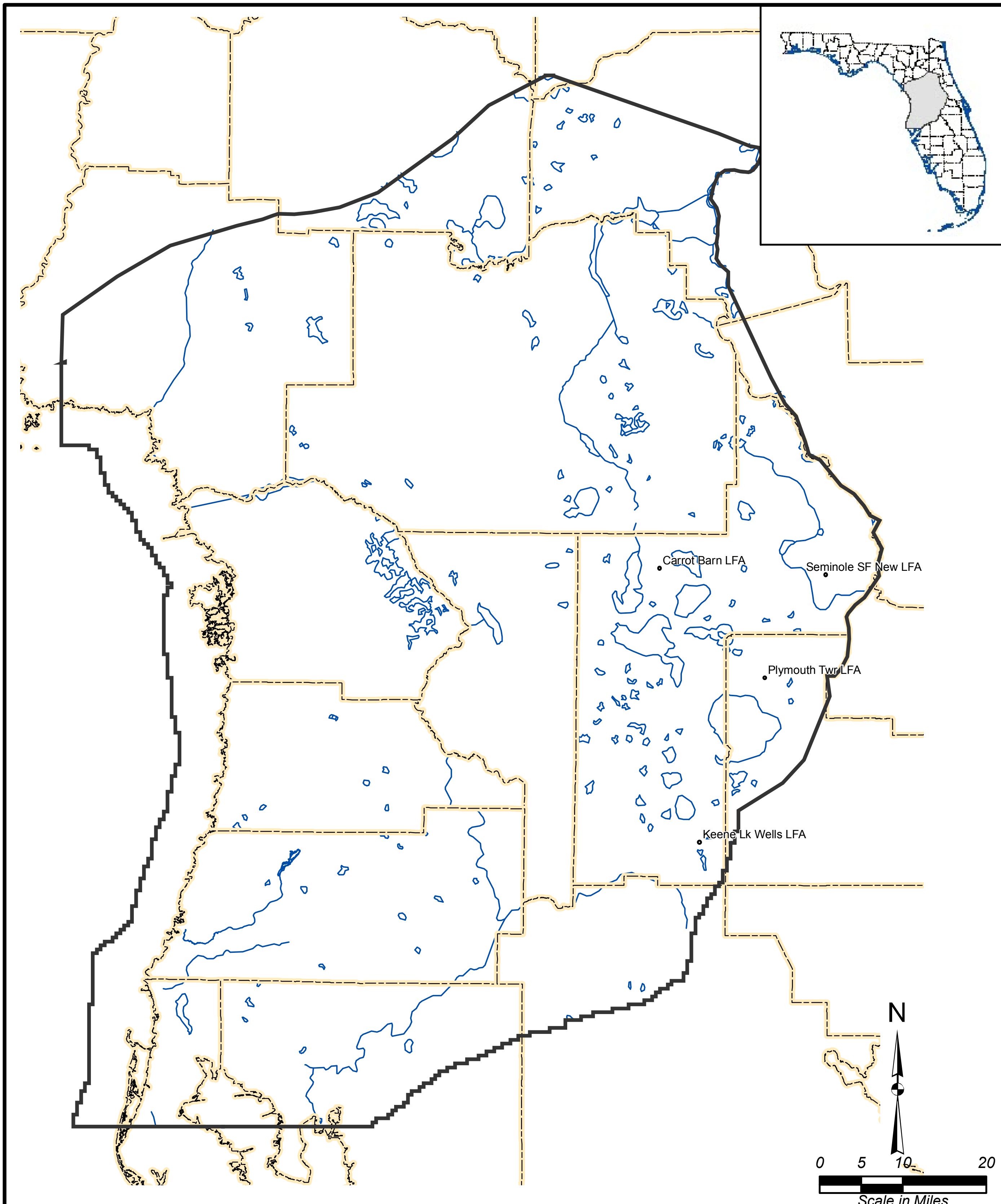
P:
DS_2003
Reporting
Figures
Fig 3_04 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.4
Transient Calibration Targets-Observation Wells (UFA)



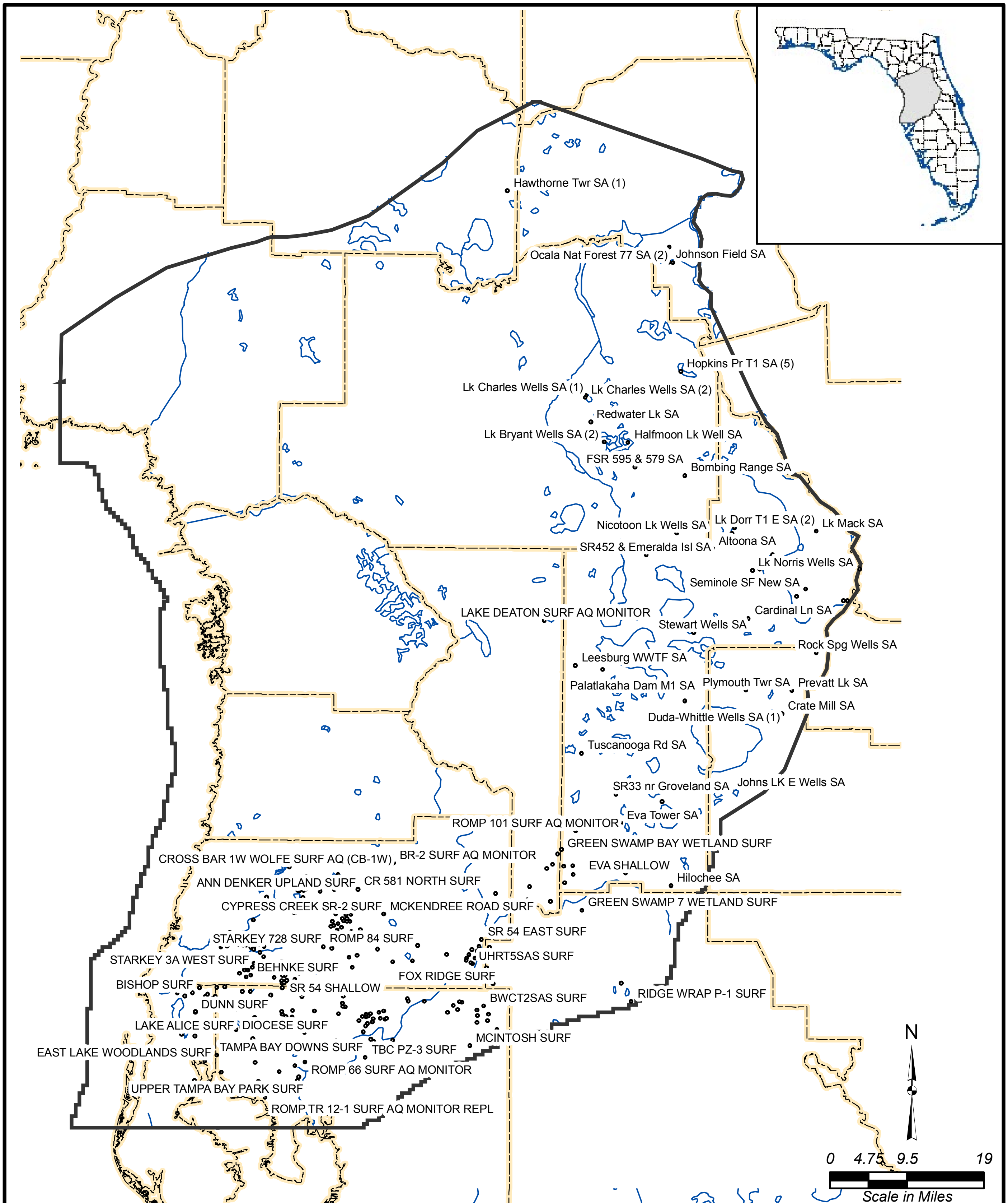
P:
DS_2003
Reporting
Figures
Fig 3_05 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Observation Wells
Florida Surface Water
Northern District Model Area
County Boundary

Figure 3.5
Transient Calibration Targets-Observation Wells (LFA)



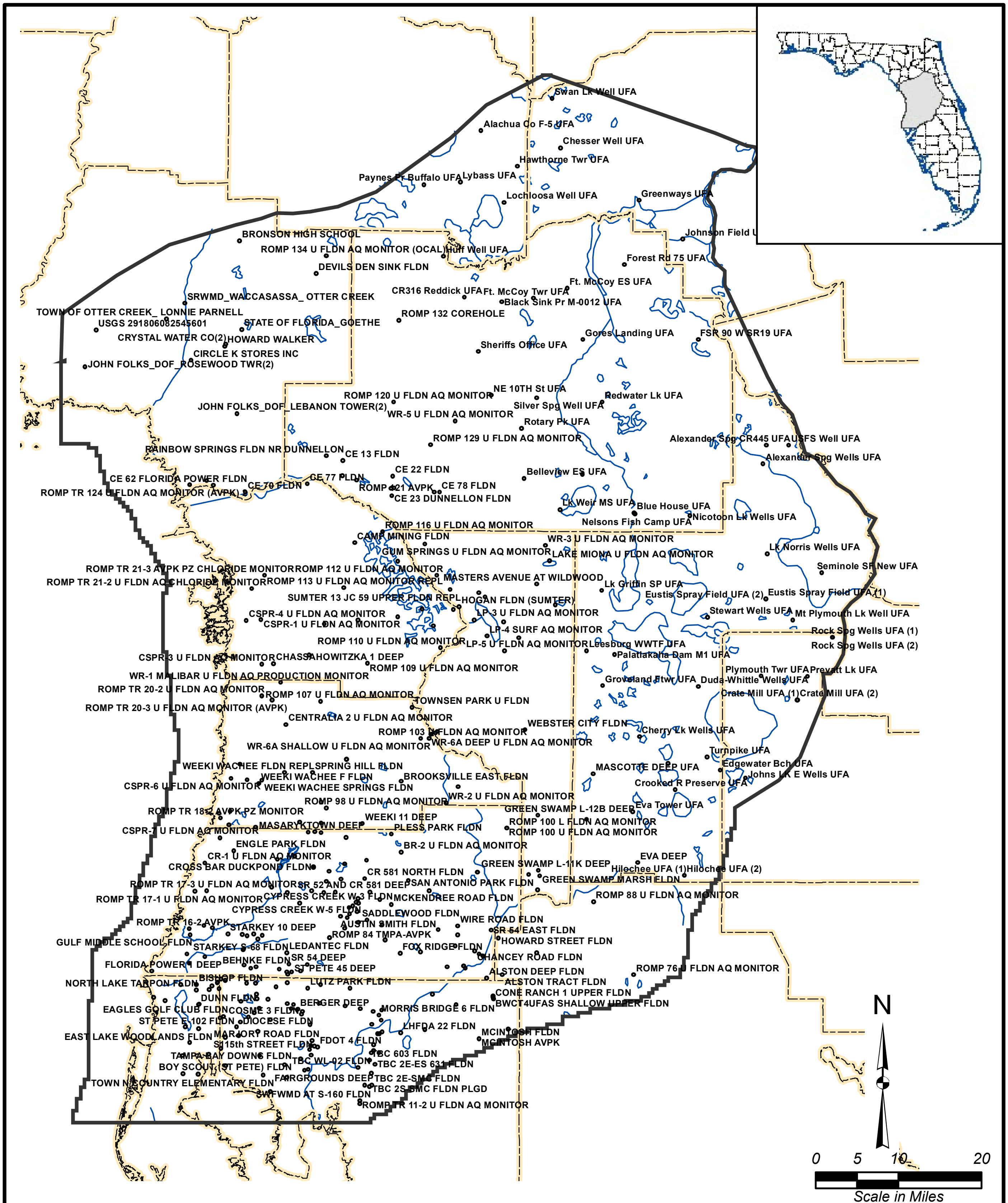
P:
DS_2003
Reporting
Figures
Fig 3_06 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.6
2010 Verification Targets-Observation Wells (SA)



P:
DS_2003
Reporting
Figures

Fig 3_07 - Observation Wells.mxd

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

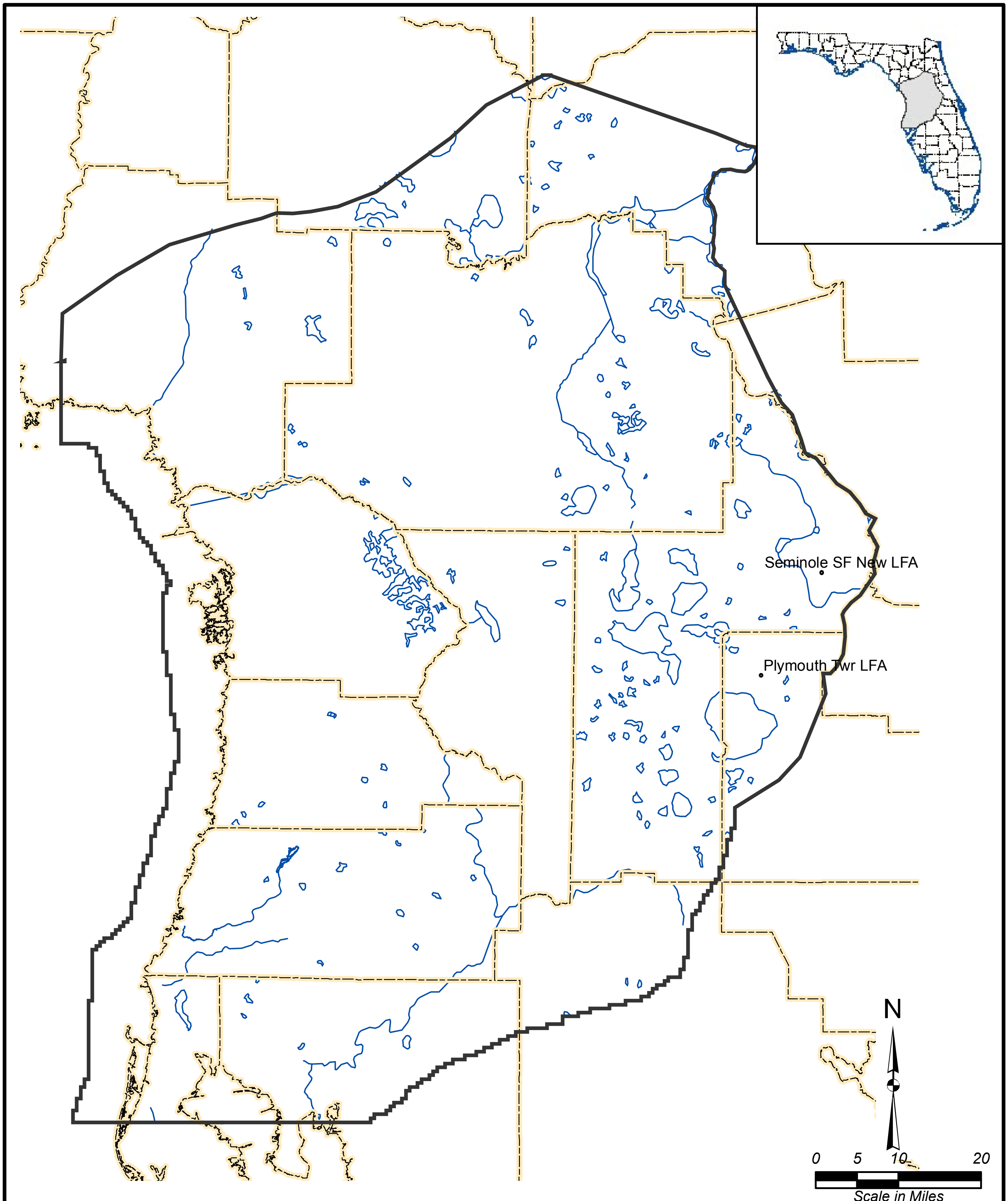
Observation Wells

Florida Surface Water

Northern District Model Area

County Boundary

Figure 3.7
2010 Verification Targets- Observation Wells (UFA)



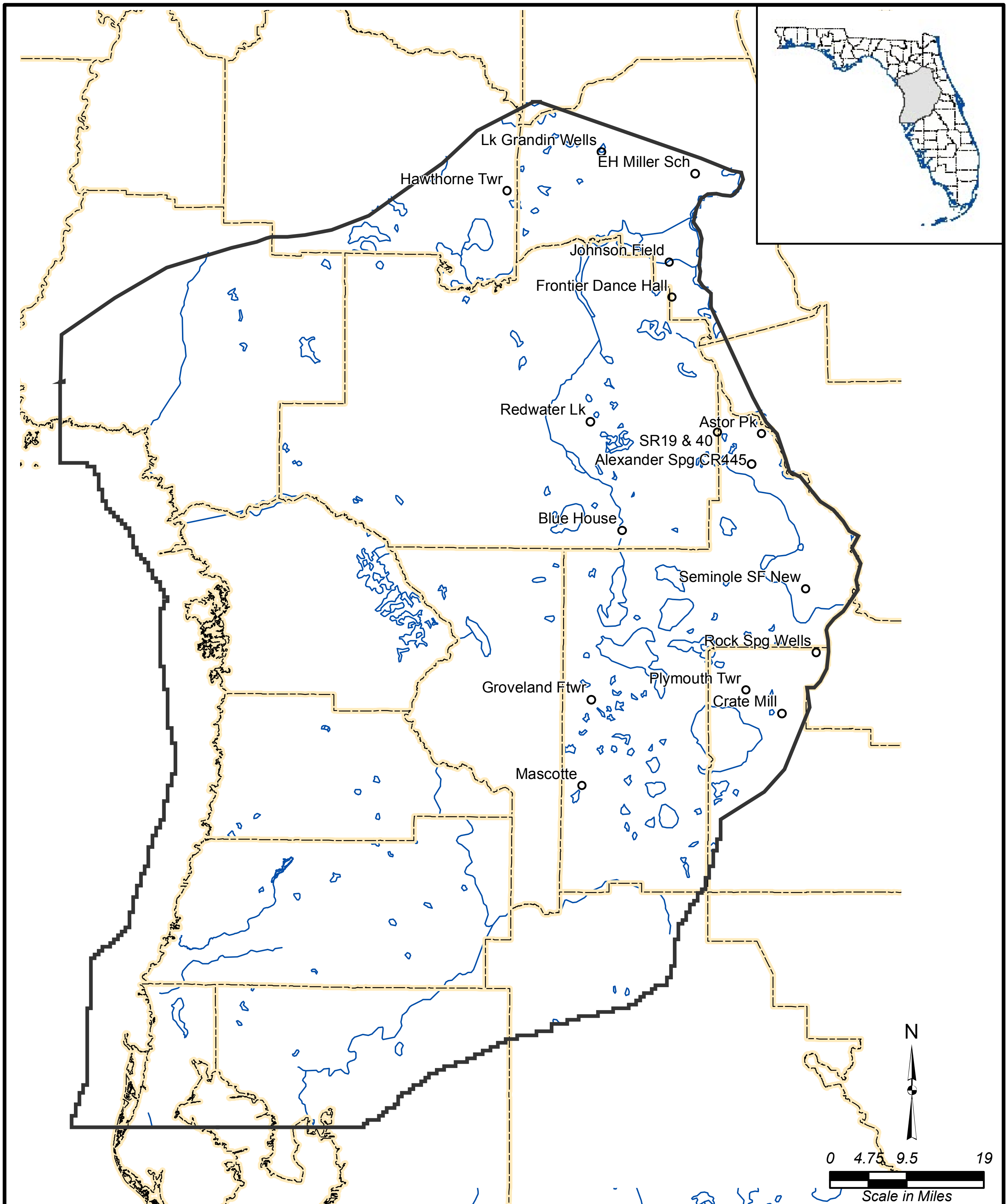
P:
DS_2003
Reporting
Figures
Fig 3_08 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Observation Wells
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.8
2010 Verification Targets-Observation Wells (LFA)



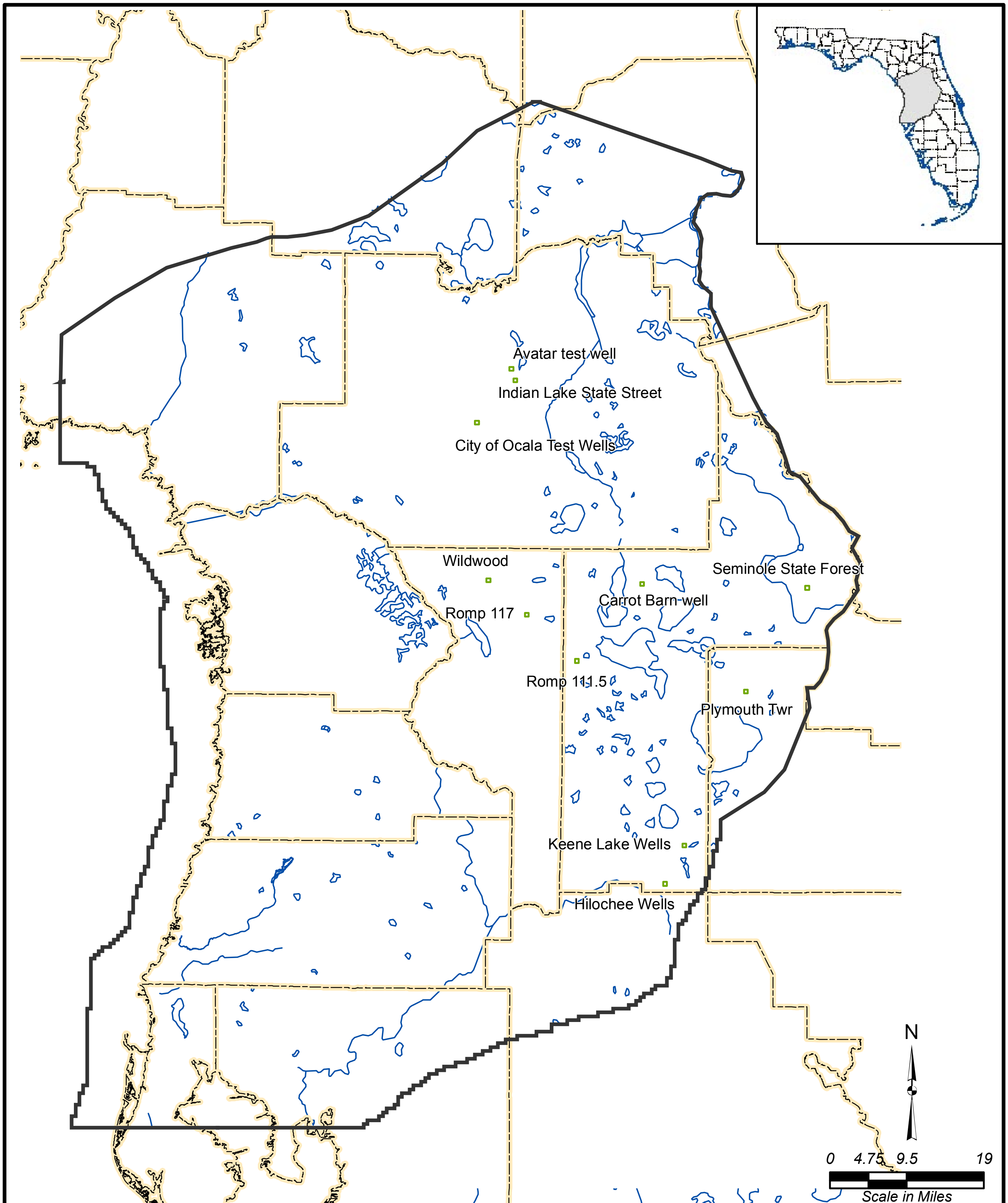
P:
DS_2003
Reporting
Figures
Fig 3_09 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Observation Well Pairs
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.9
Observation Well Pairs Across ICU



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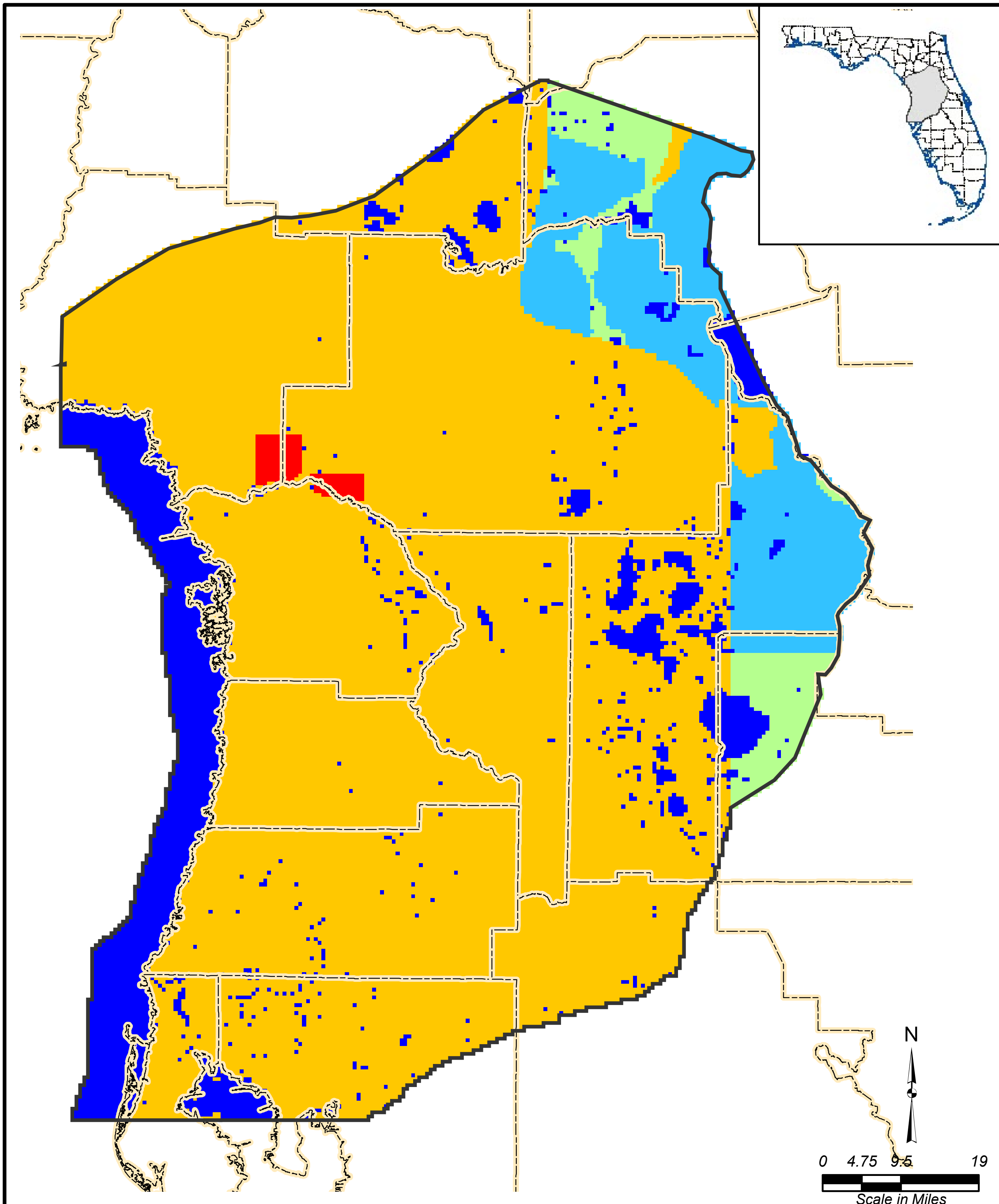
DS_2003
Reporting
Figures
Fig 3_10 - Observation Wells.mxd
5/20/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Observation Well Pairs
- Florida Surface Water
- Northern District Model Area
- County Boundary

Figure 3.10
Observation Well Pairs Across MCU I



P:
DS_2003
Reporting
Figures
Fig 3_11 - K_SAS.mxd
5/25/2016 HC

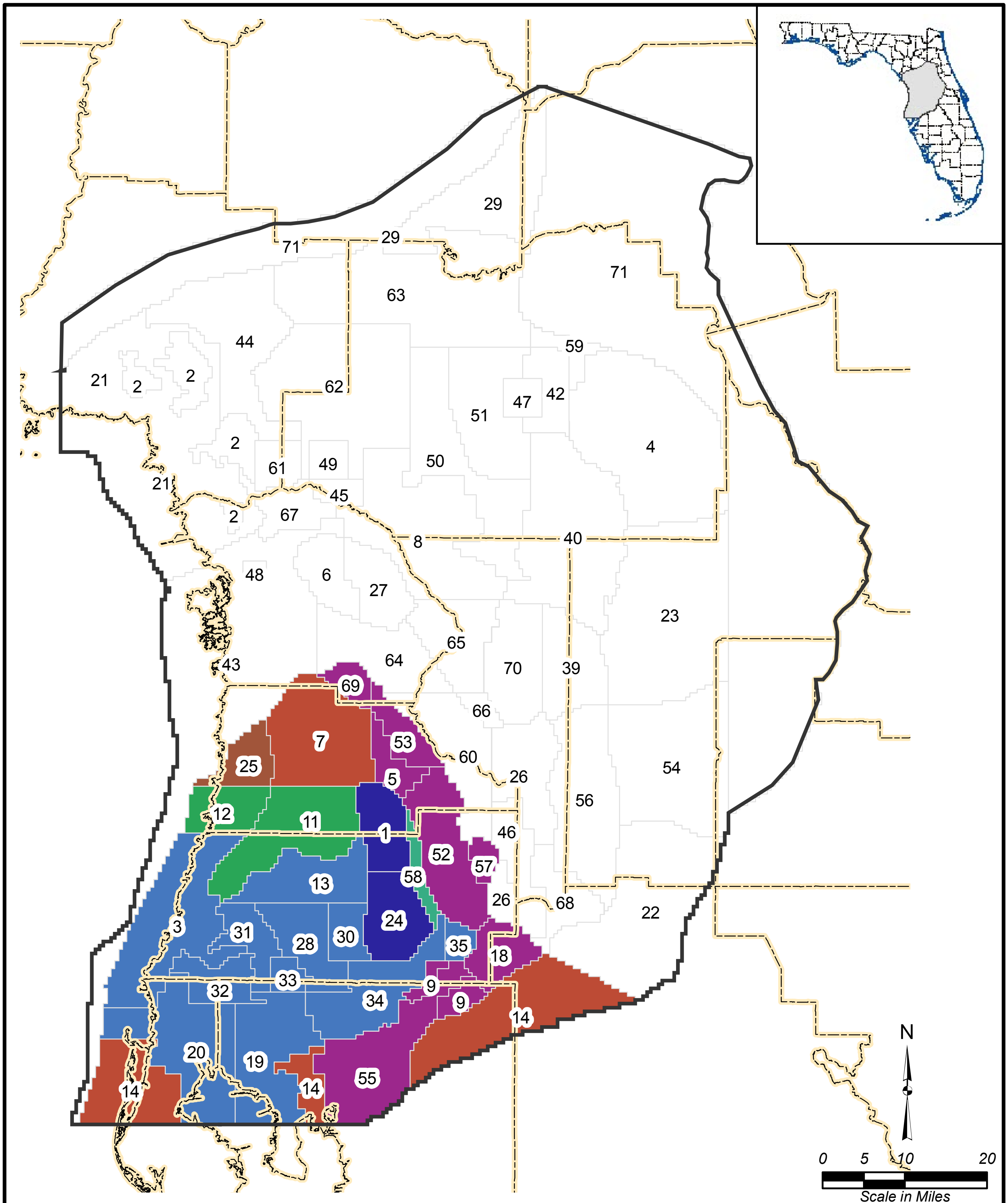
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary

SA K (ft/d)
0.1
10
10 - 20
20 - 40
5000

Figure 3.11
Map of Calibrated Hydraulic Conductivity SA



Legend

Northern District Model Area

County Boundary

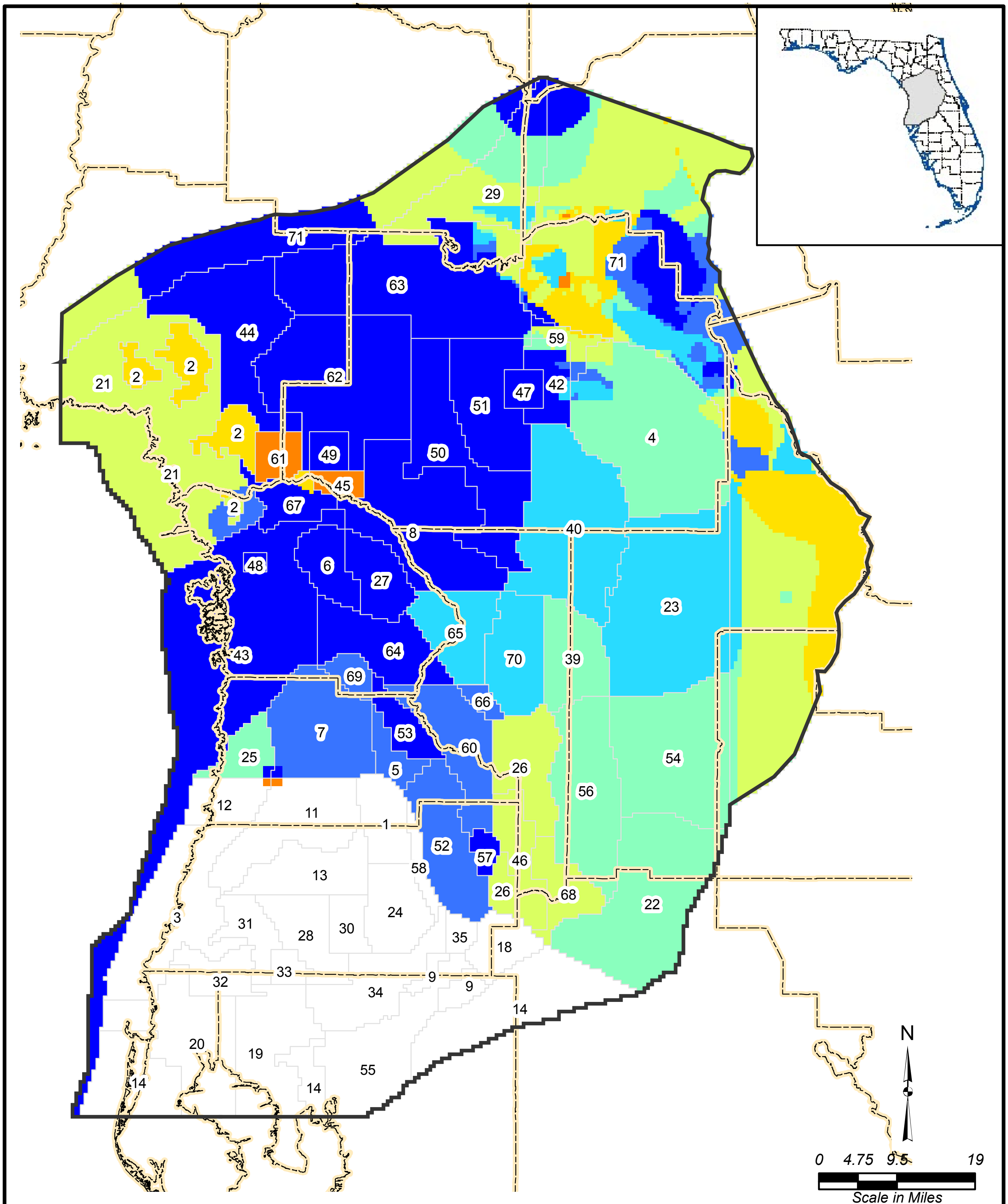
Hydraulic Conductivity Zone

Suwannee K (ft/d)
7
10
40
100
1000
2000
5000
8000

P:
DS_2003
Reporting
Figures
Fig 3_12 - K_Suwannee.mxd
5/25/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Figure 3.12
Map of Calibrated Hydraulic Conductivity Suwannee



P:
DS_2003
Reporting
Figures
Fig 3_13 - K_Ocala.mxd
5/25/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area

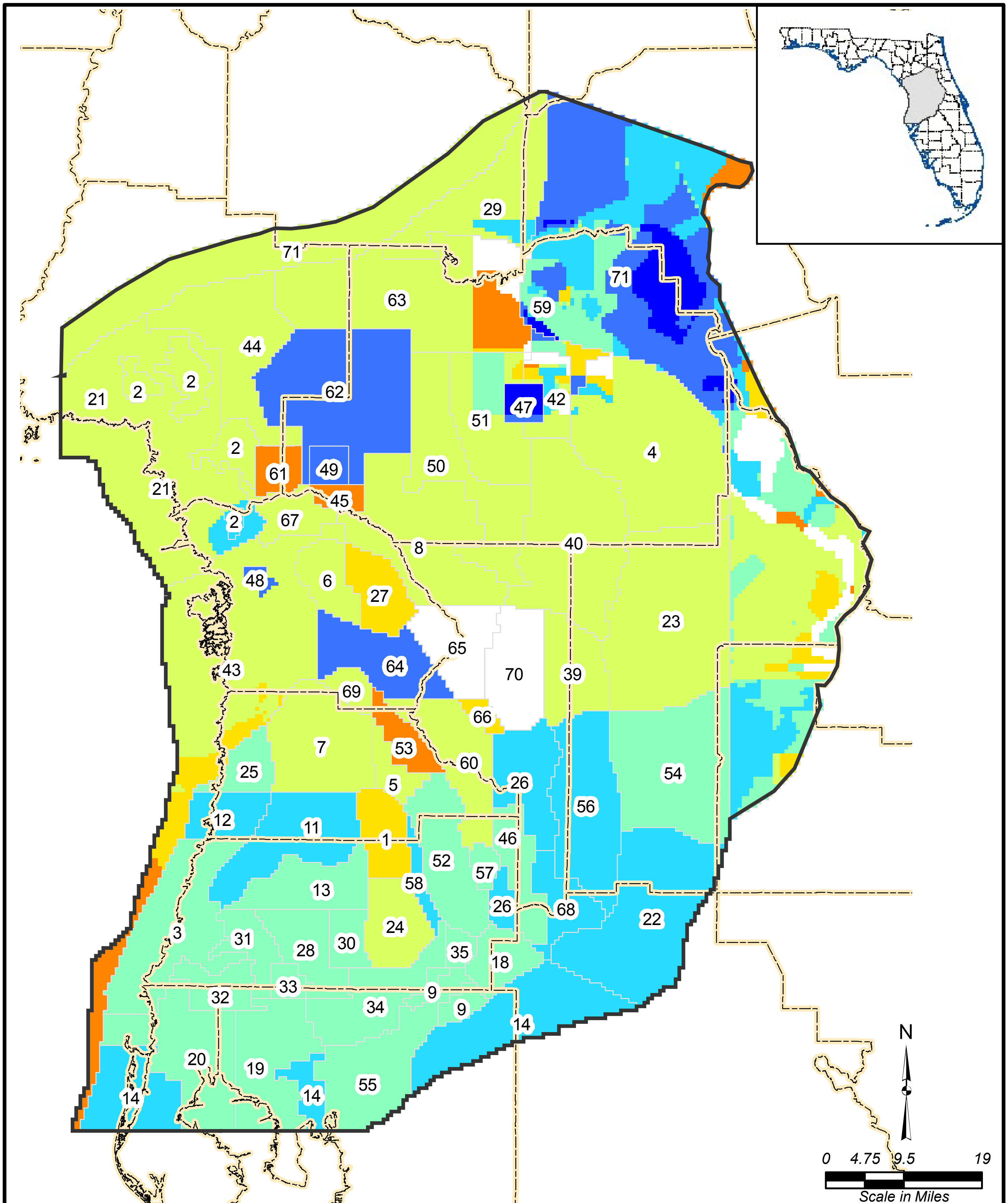
County Boundary

Hydraulic Conductivity Zone

Ocala K (ft/d)

- < 5
- 5.00 - 25.00
- 25.00 - 100.00
- 100.00 - 500.00
- 500.00 - 1000.00
- 1000.00 - 2500.00
- 2500.00 - 5000.00
- >5000

Figure 3.13
Map of Calibrated Hydraulic Conductivity Ocala



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DS_2003
Reporting
Figures
Fig 3_14 - K_UpperAvonPark.mxd
5/25/2016 HC

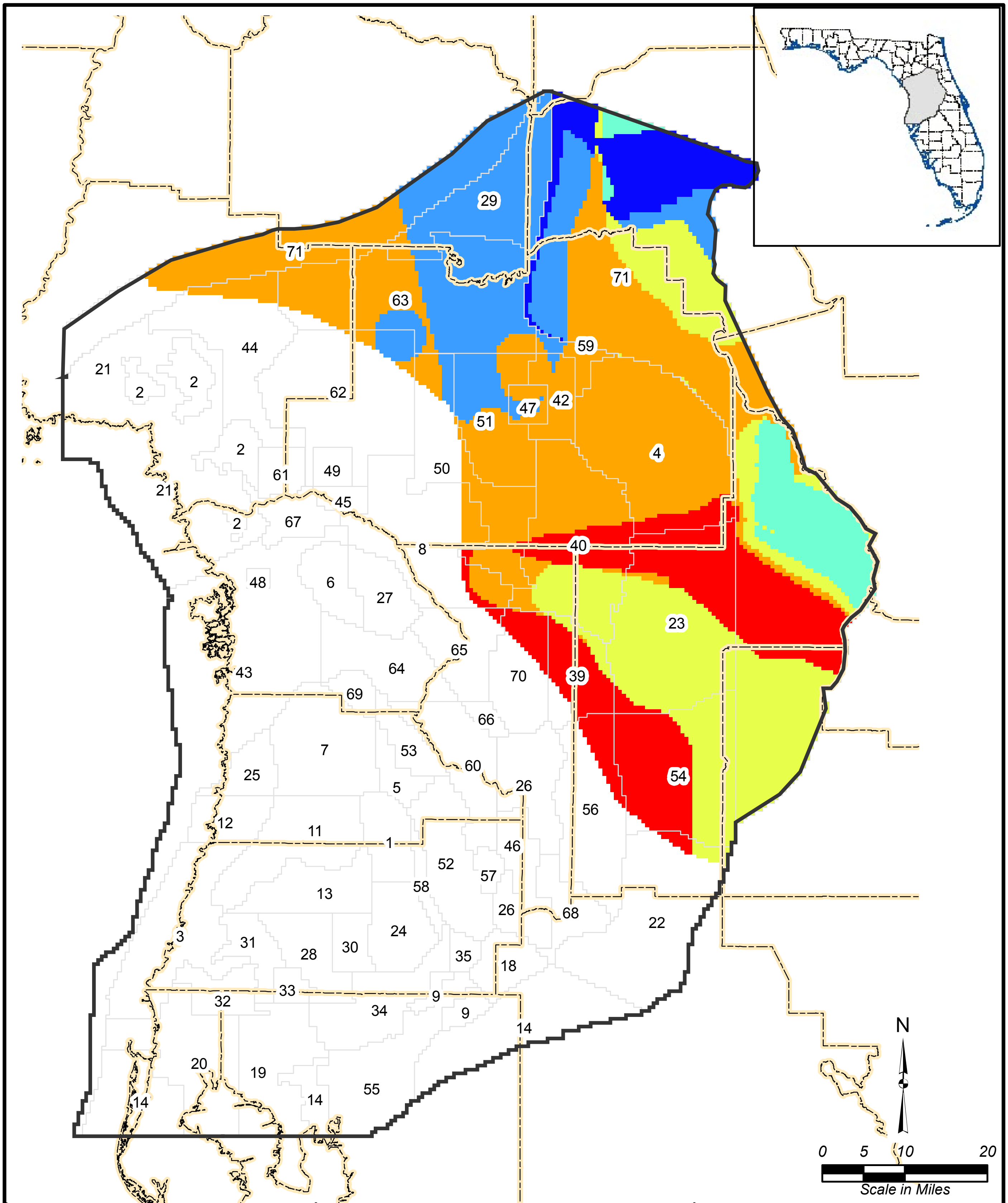
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Hydraulic Conductivity Zone

UAP K (ft/d)
- < 5.0
- 5.0 - 10.0
- 10.0 - 25.0
- 25.0 - 50.0
- 50.0 - 100.0
- 100.0 - 500.0
- 500.0 - 5000.0
- > 5000.0

Figure 3.14 Map of Calibrated Hydraulic Conductivity Upper Avon Park



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DS_2003
Reporting
Figures
Fig 3_15 - K_LowerAvonPark.mxd
5/25/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

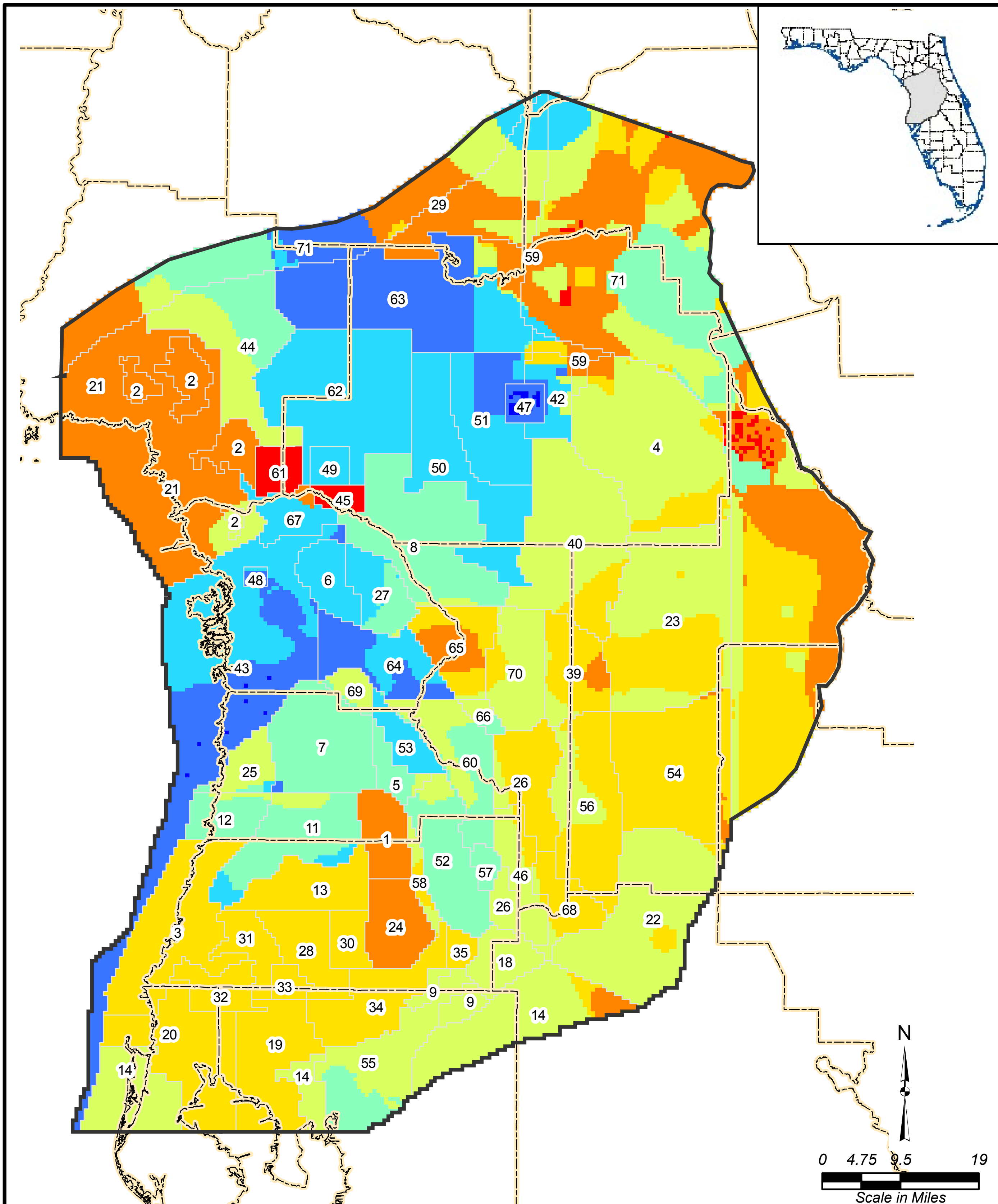
Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

LFA K (ft/d)

30.2 - 100.0
100.0 - 250.0
250.0 - 500.0
500.0 - 750.0
750.0 - 1000.0
1000.0 - 2068.2

Figure 3.15
Map of Calibrated Hydraulic Conductivity Lower Avon Park



P:
DS_2003
Reporting
Figures
Fig 3_16 - Transmissivity_UFA.mxd
5/25/2016 HC

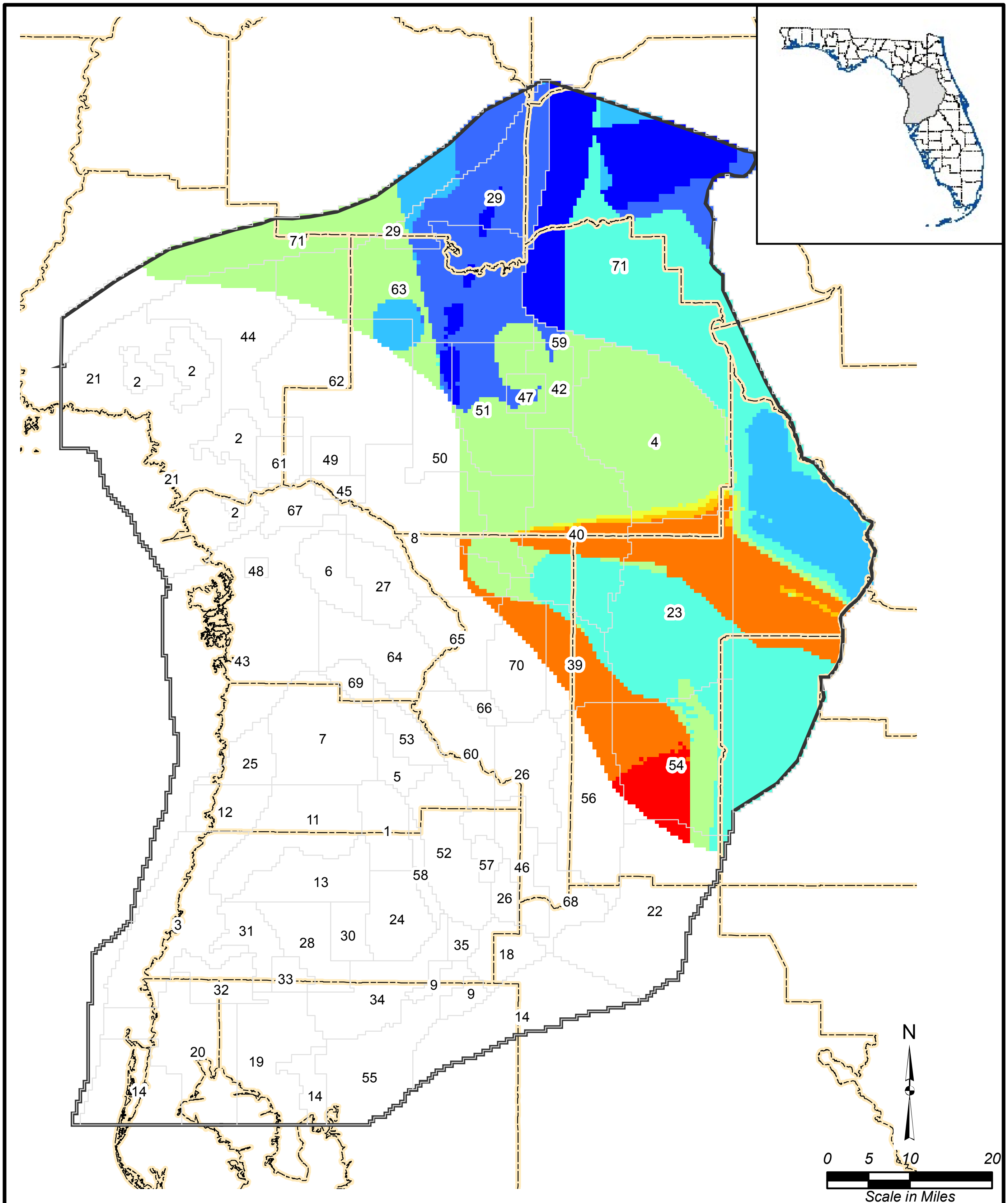
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

TRANUFA(ft2/d)
2661 - 10000.0
10000 - 50000
50000 - 100000
100000 - 500000
500000 - 1000000
1000000 - 5000000
5000000 - 10000000
10000000 - 10000034

Figure 3.16
Map of Calibrated UFA Transmissivity



P:
DS_2003
Reporting
Figures
Fig 3_17 - Transmissivity_LFA.mxd
5/25/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

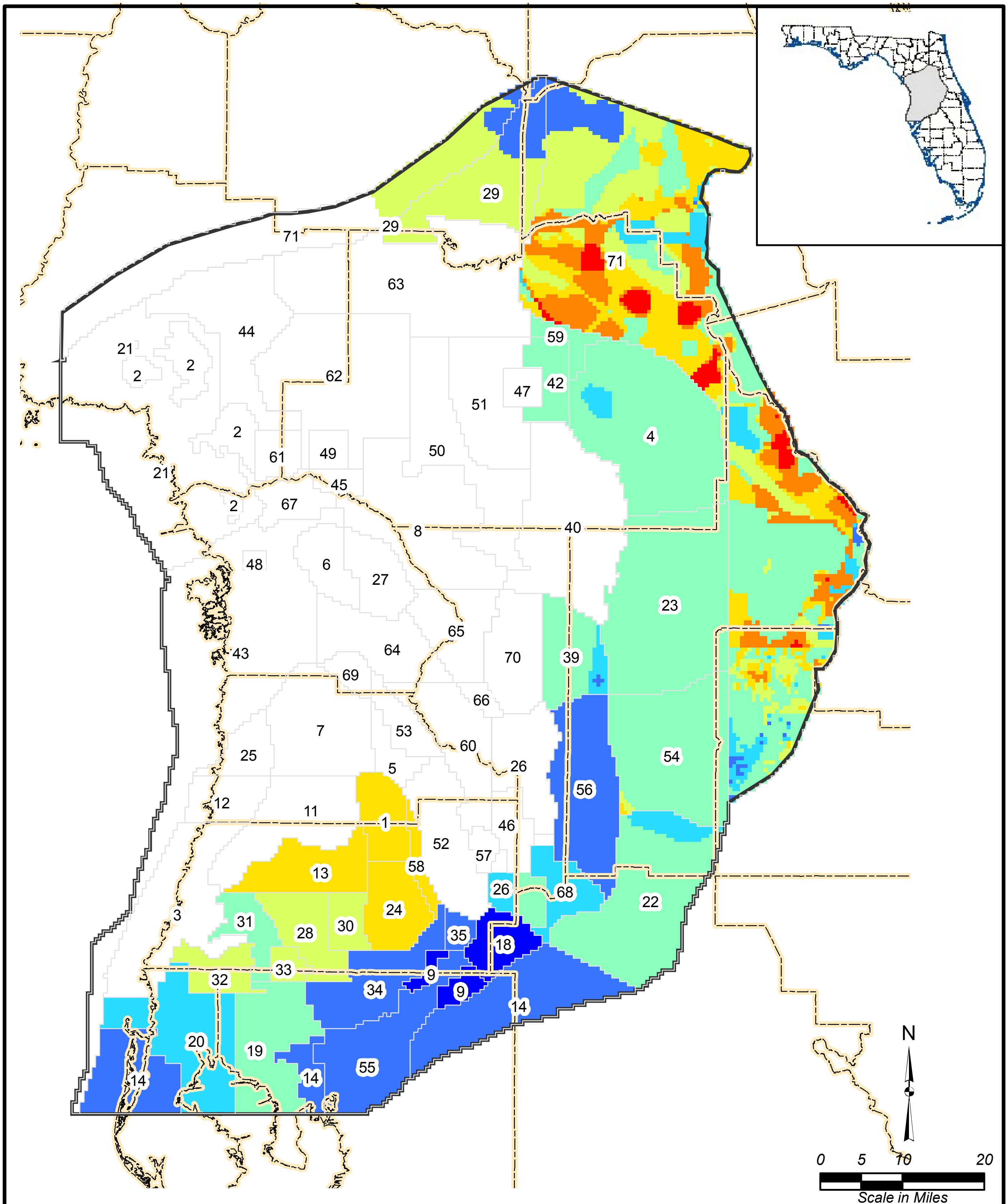
Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

LFA Transmissivity(ft2/d

19106 - 25000
25000 - 50000
50000 - 75000
75000 - 100000
100000 - 250000
250000 - 500000
500000 - 750000
750000 - 1000000
1000000 -2000000

Figure 3.17 Map of Calibrated LFA Transmissivity



P:
DS_2003
Reporting
Figures
Fig 3_18 - K_ICU.mxd
5/25/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

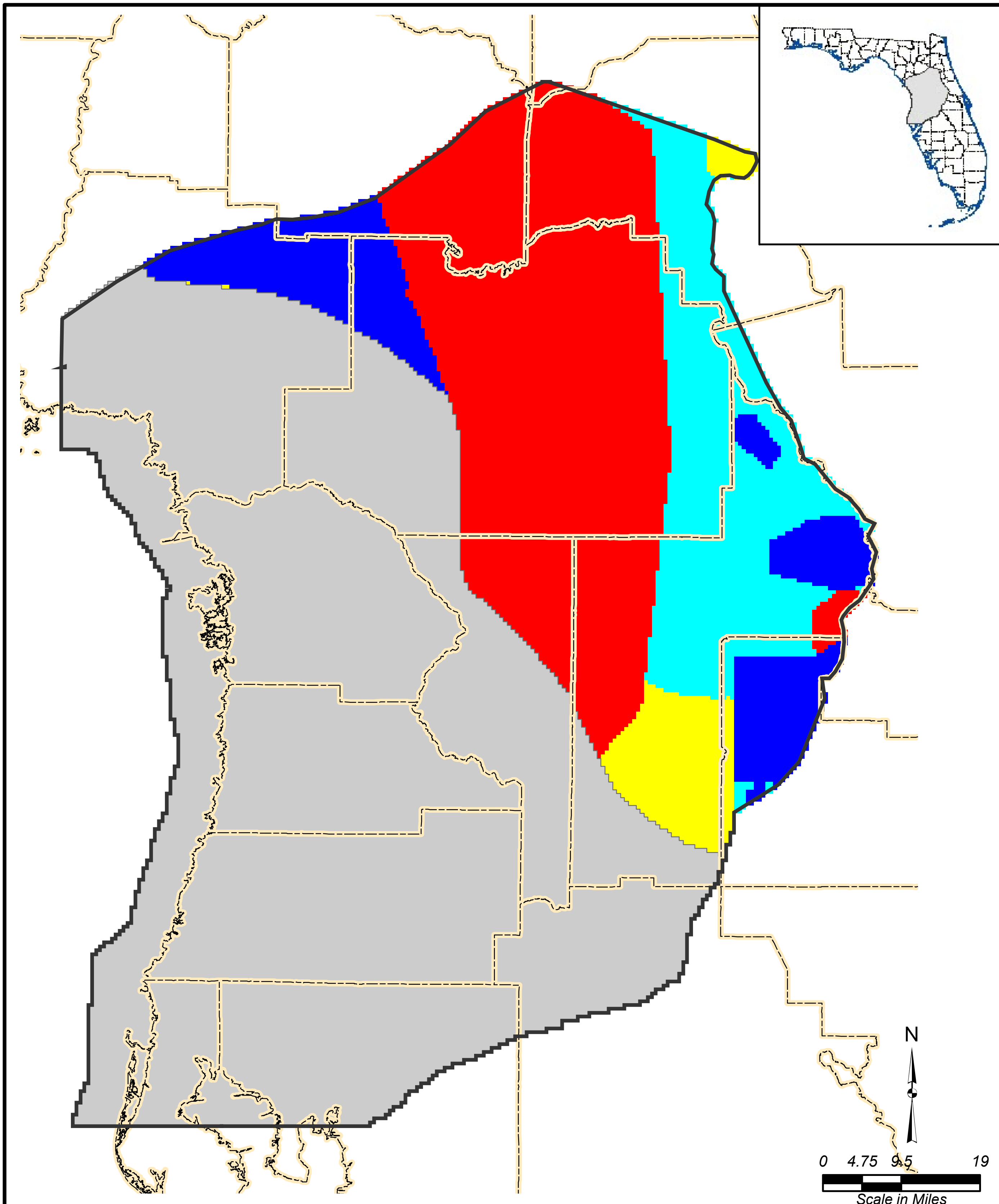
Legend

- Northern District Model Area
- County Boundary
- Hydraulic Conductivity Zone

ICU Vertical K(ft/d)

- 0.00001 - 0.0001
- 0.0001 - 0.001
- 0.001 - 0.005
- 0.005 - 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 1.0
- 1.0 - 4.7

Figure 3.18
Map of Calibrated ICU Vertical Hydraulic Conductivity



P:
DS_2003
Reporting
Figures
Fig 3_19 - K_MCU.mxd
5/25/2016 HC

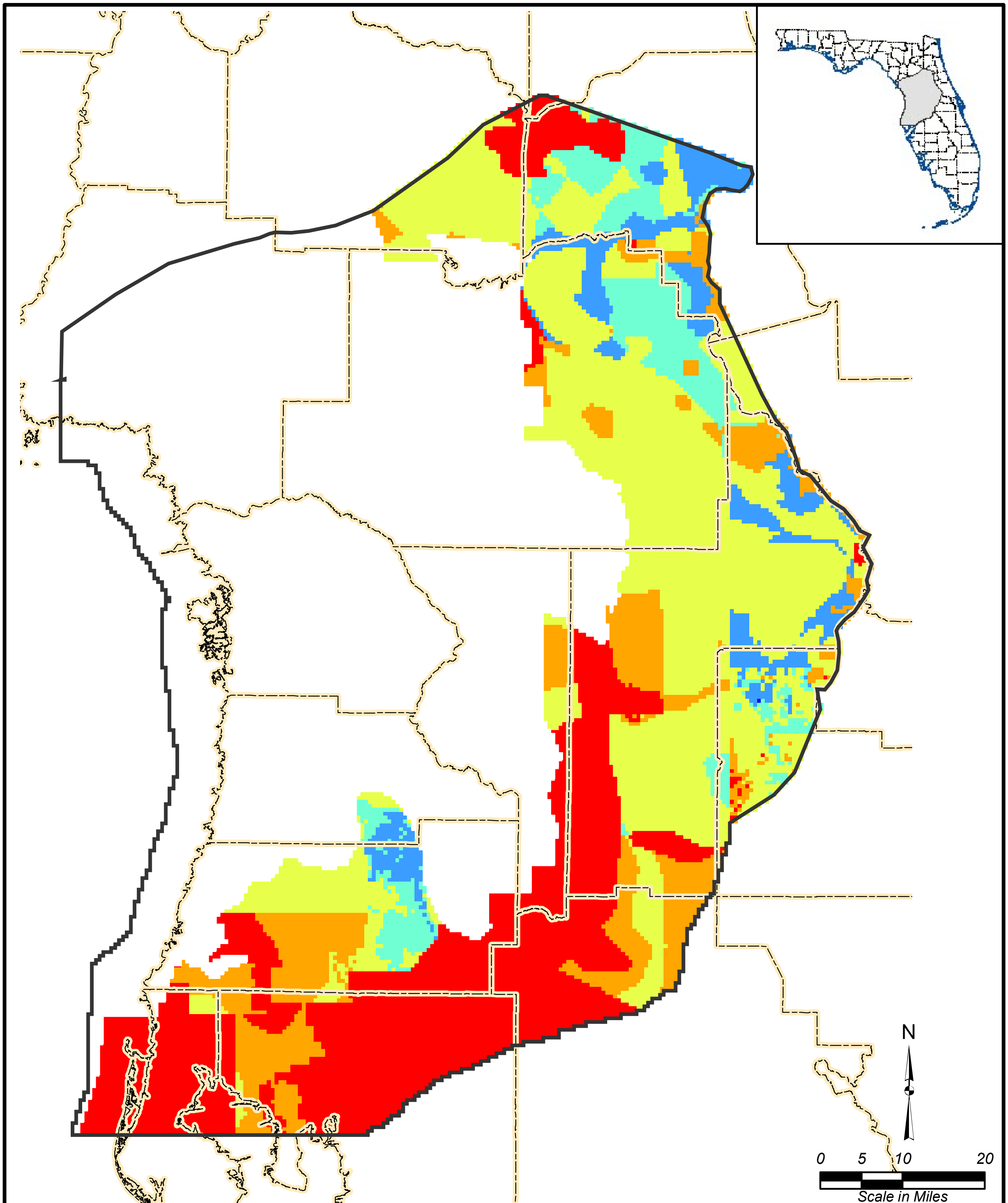
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary

MCU Vertical K (ft/d)
0.002 - 0.01
0.01 - 0.05
0.05 - 0.1
0.1 - 0.4

Figure 3.19
Map of Calibrated MCU Vertical Hydraulic Conductivity



P:
DS_2003
Reporting
Figures
Fig 3_20 - Vleakance_ICU.mxd
5/25/2016 HC

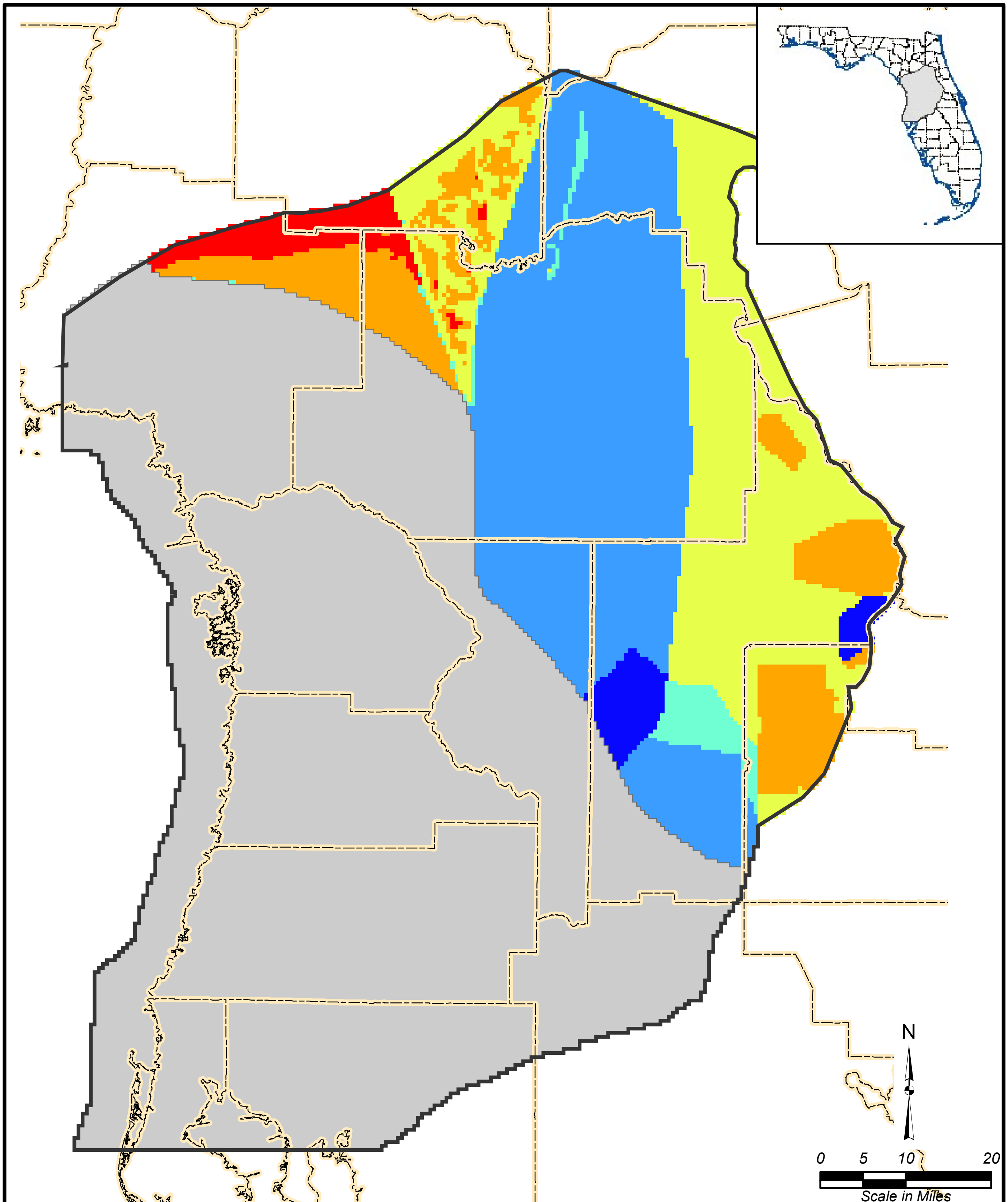
HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

ICU Leakance (day-1)
0.000001 - 0.00001
0.00001 - 0.00005
0.00005 - 0.0001
0.0001 - 0.0005
0.0005 - 0.001
0.001 - 0.5

Figure 3.20
Map of Calibrated ICU Vertical Leakance



Legend

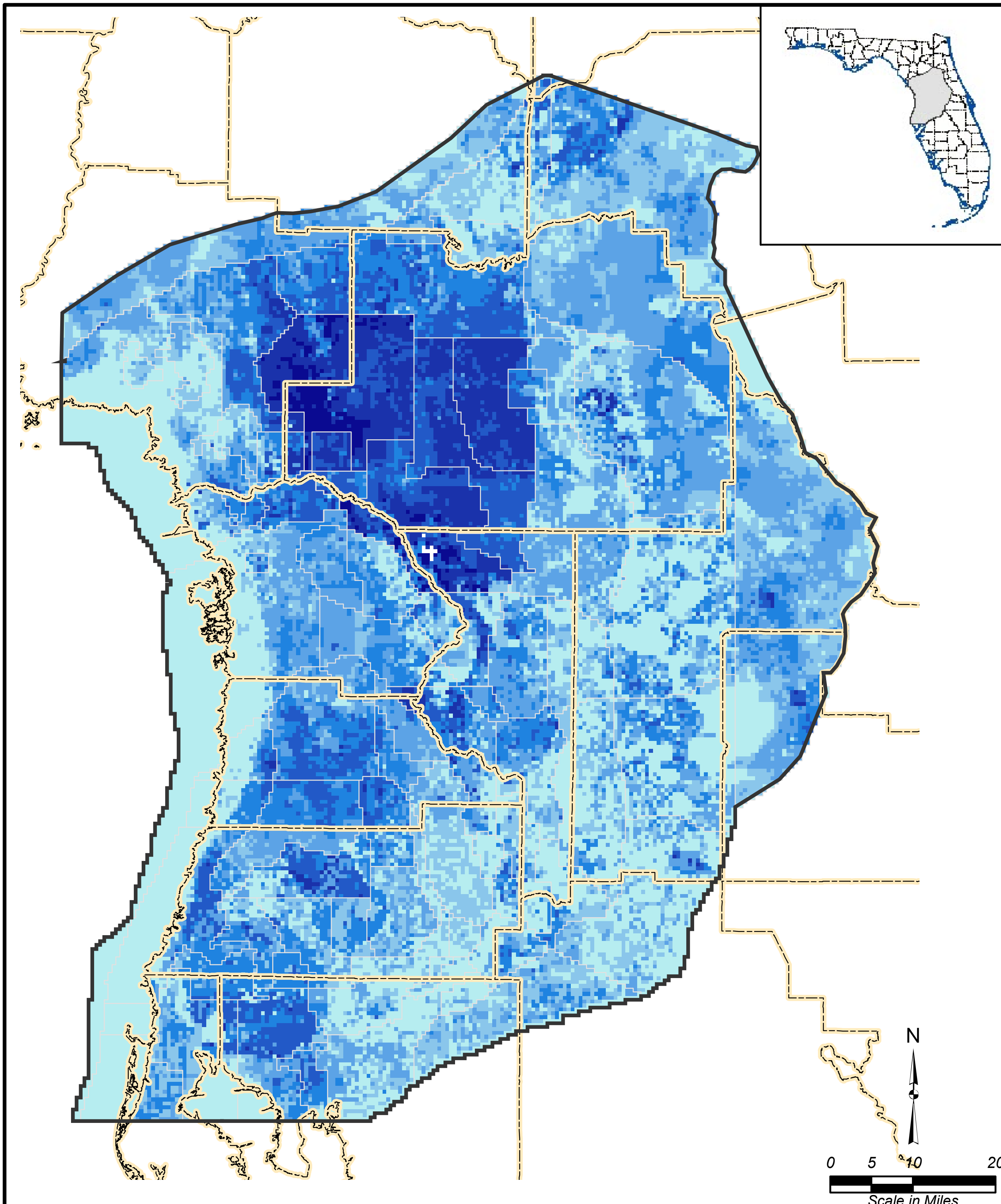
Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

MCU Leakance (day-1)
- 0.000003 - 0.00001
- 0.00001 - 0.00005
- 0.00005 - 0.0001
- 0.0001 - 0.0005
- 0.0005 - 0.001
- 0.001 - 0.00275

P:
DS_2003
Reporting
Figures
Fig 3_21 - Vleakance_MCU.mxd
5/25/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Figure 3.21
Map of Calibrated MCU Vertical Leakance



P:
DS_2003
Reporting
Figures
Fig 3_22 - SS_Recharge.mxd
5/20/2016 HC

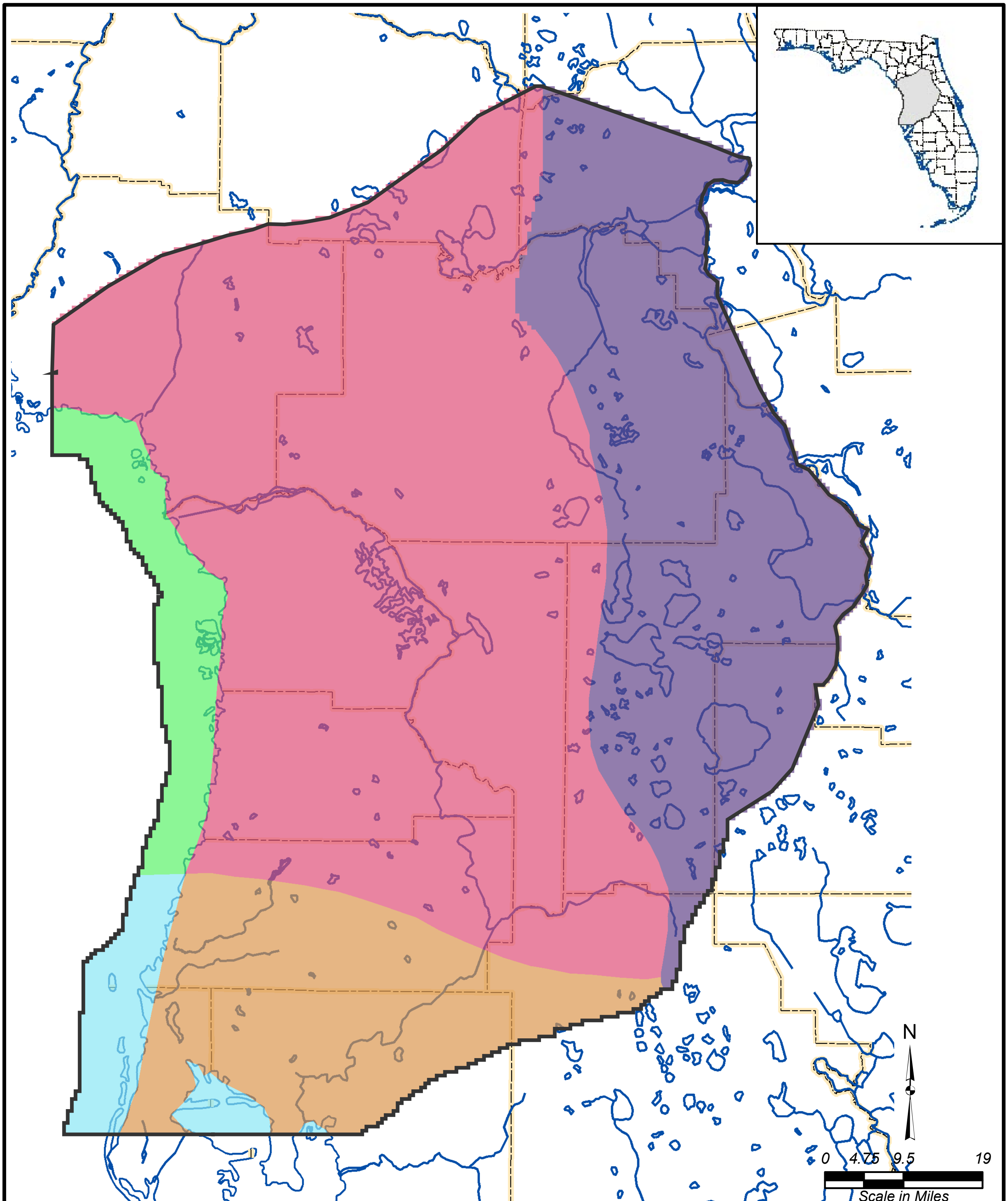
HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

SS Recharge (in/yr)
0.0 - 5.0
5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 37.8

Figure 3.22
Annualized Steady-State Recharge



P:
DS_2003
Reporting
Figures

Fig 3_23 - Groundwater Basins.mxd
5/20/2016 HC

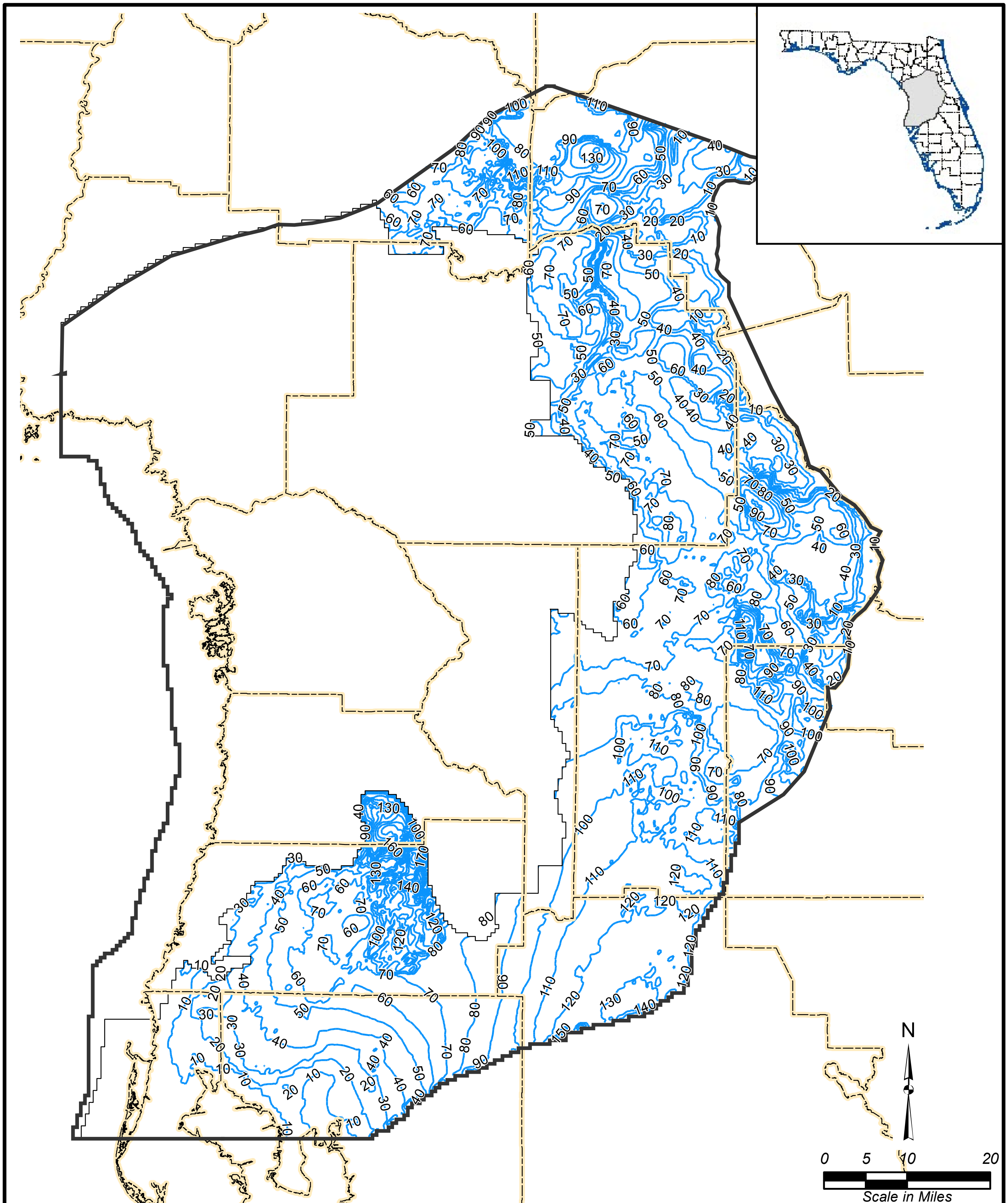
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Groundwater Budget Basins

- Central Basin
- Central Offshore
- Eastern Basin
- Northern Basin
- Northern Offshore
- Northern District Model Area
- Florida Surface Water

Figure 3.23 Groundwater Basins



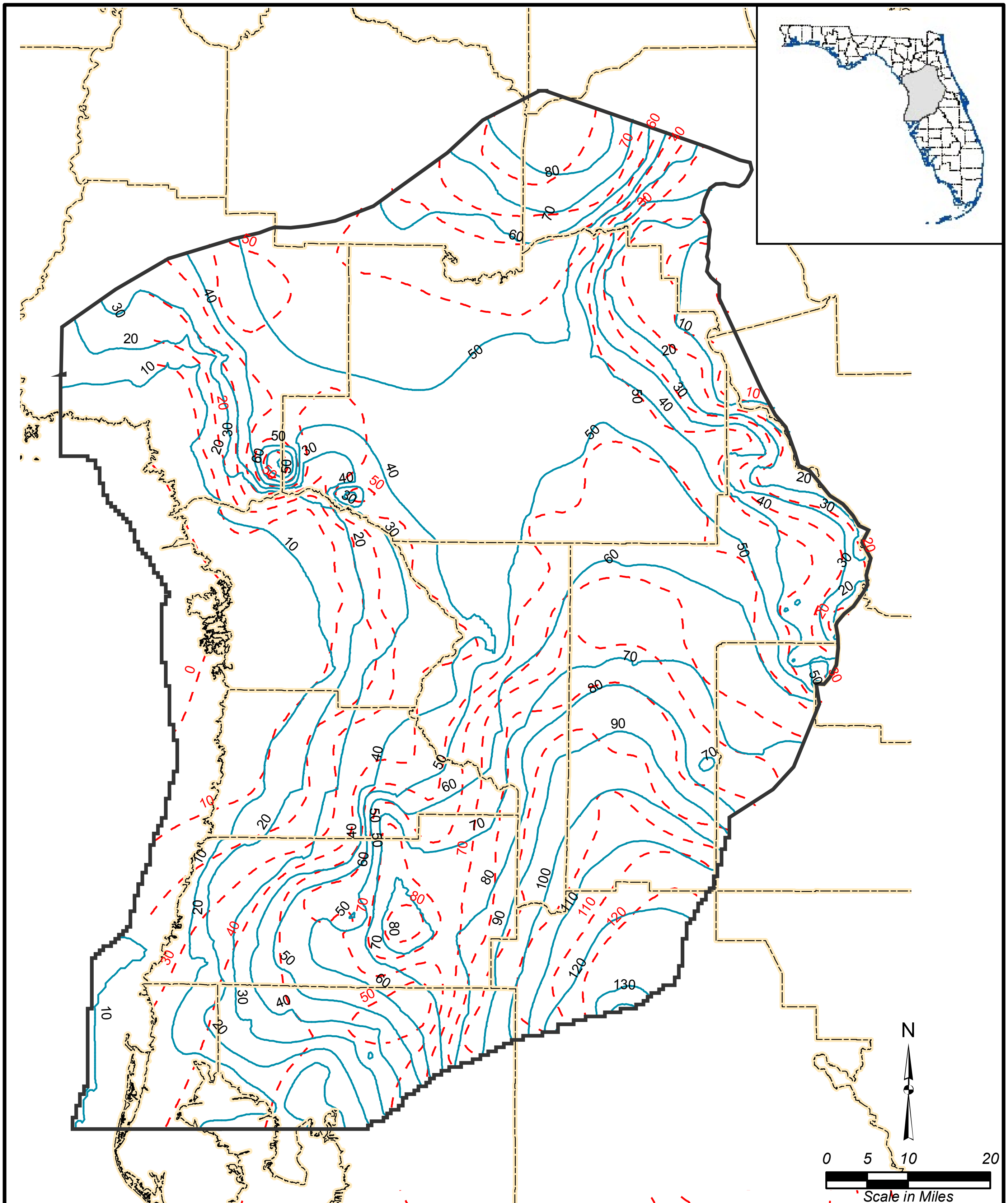
P:
DS_2003
Reporting
Figures
Fig 3_24 - SS_SAS_WL_1995.mxd
5/26/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- SA Water Levels (Ft NGVD 29)

Figure 3.24
Simulated Steady-state
1995
SA Potentiometric
Surface



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DS_2003
Reporting
Figures

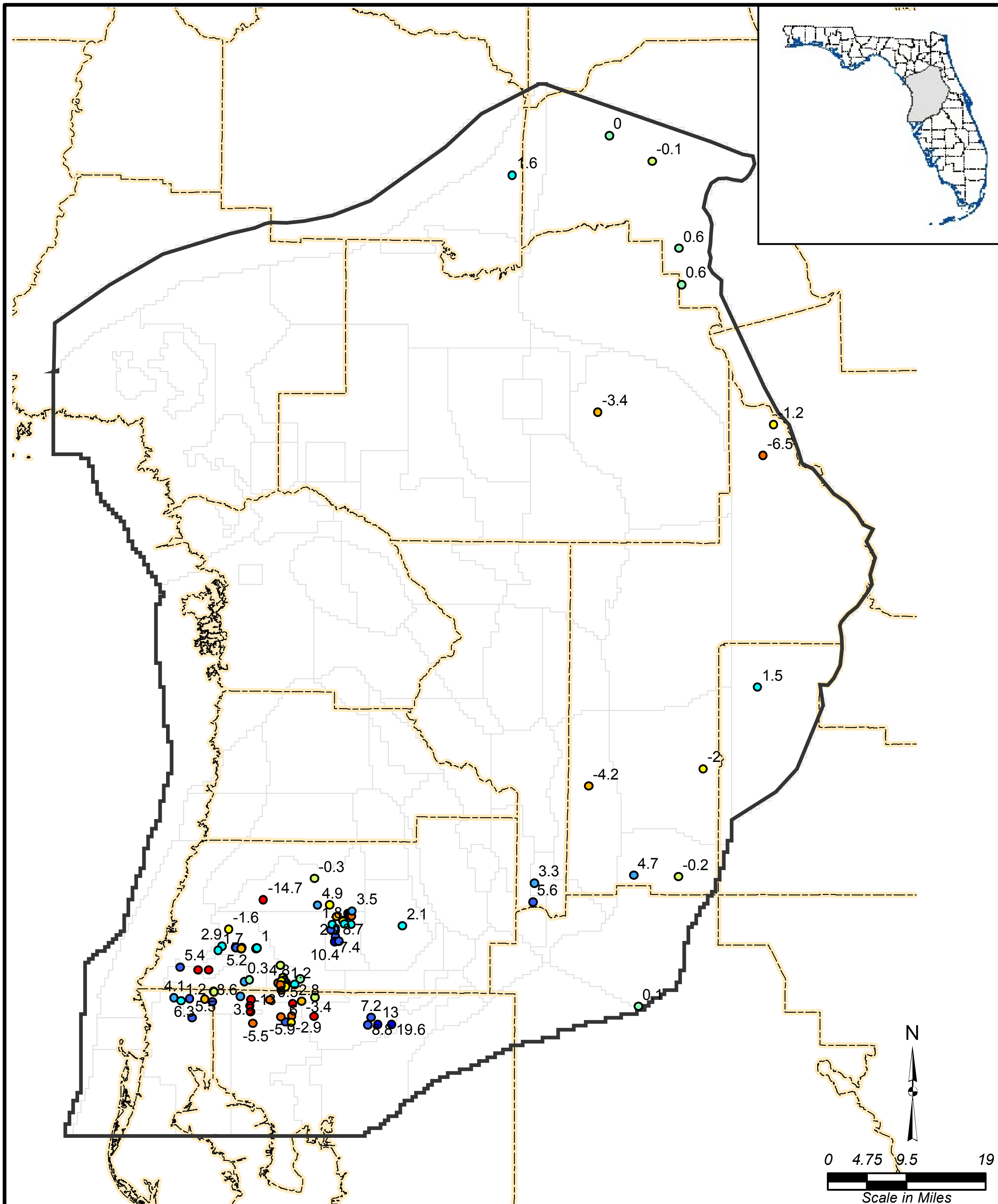
Fig 3_25 - SS_UFA_WL_1995.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- UFA Water Levels (Ft NGVD 29)
- Ave 95 Water Levels (Ft NGVD 29)

Figure 3.25
Simulated Steady-state 1995
UFA Potentiometric Surface



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DS_2003
Reporting
Figures

Fig 3_26 - SS SAS Residual_overview_1995.mxd
1/12/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

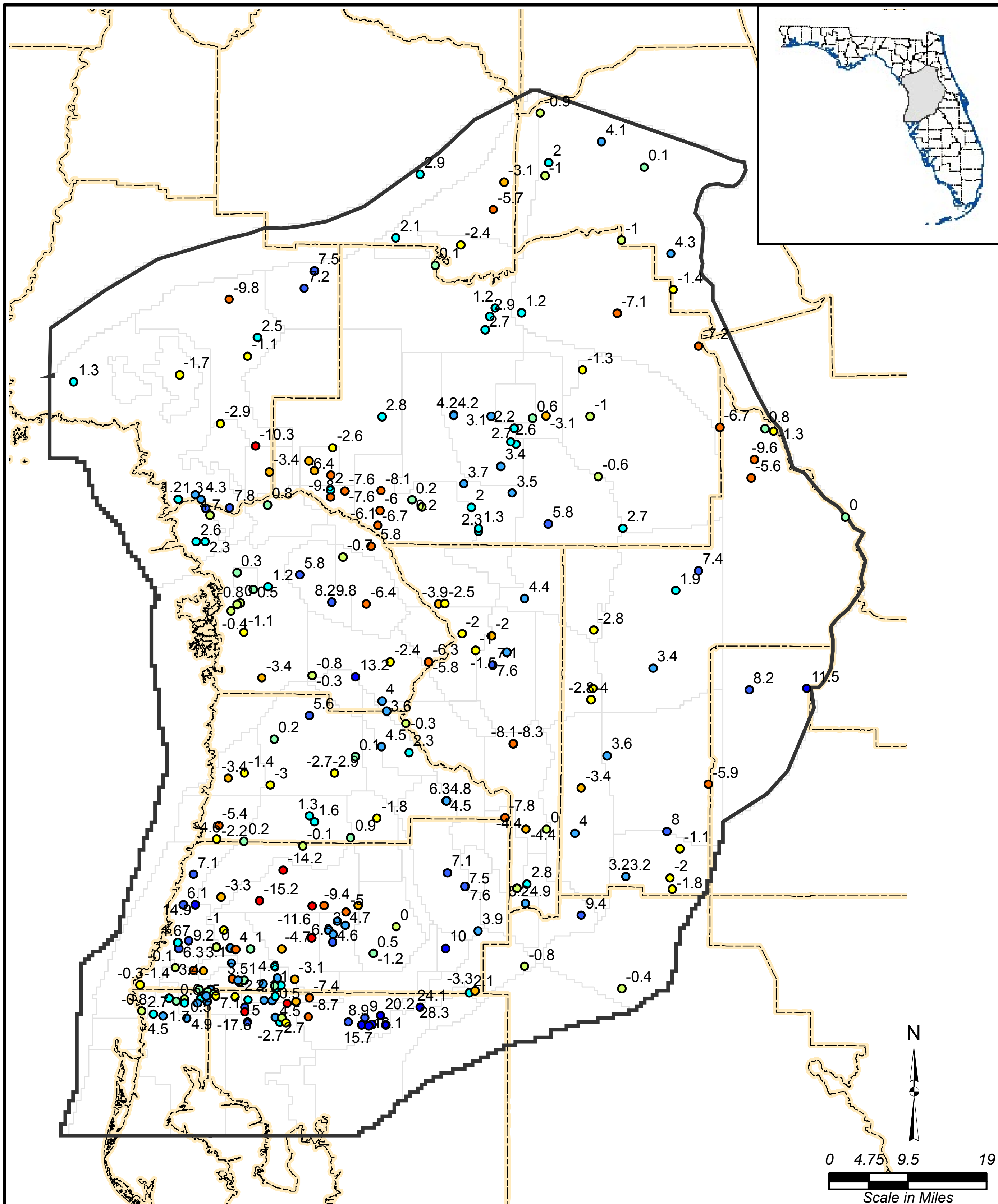
Northern District Model Area

County Boundary

Residuals (ft)

- -16.1 - -10.0
- -10.0 - -5.0
- -5.0 - -3.0
- -3.0 - -1.0
- -1.0 - 0.0
- 0.0 - 1.0
- 1.0 - 3.0
- 3.0 - 5.0
- 5.0 - 10.0
- 10.0 - 18.8

Figure 3.26
Simulated Steady-State
1995
SA Residuals



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DS_2003
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Fig 3_27 - SS UFA Residual_overview_1995.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary

Residuals (ft)

- -17.9- -10.0
- -10.0 - -5.0
- -5.0 - -3.0
- -3.0 - -1.0
- -1.0 - 0.0
- 0.0 - 1.0
- 1.0 - 3.0
- 3.0 - 5.0
- 5.0 - 10.0
- 10.0 - 27.8

Figure 3.27
Simulated Steady-State
1995
UFA Residuals

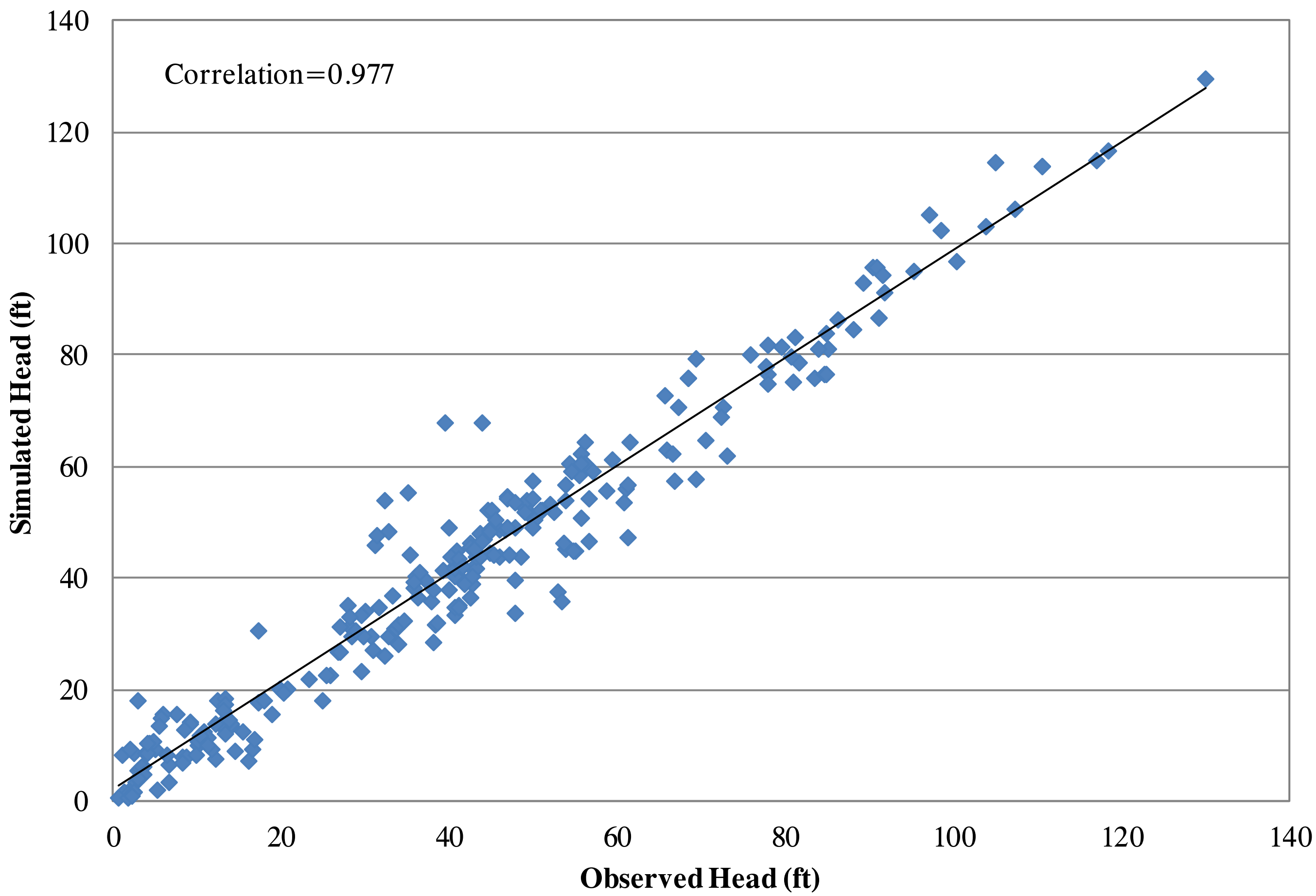
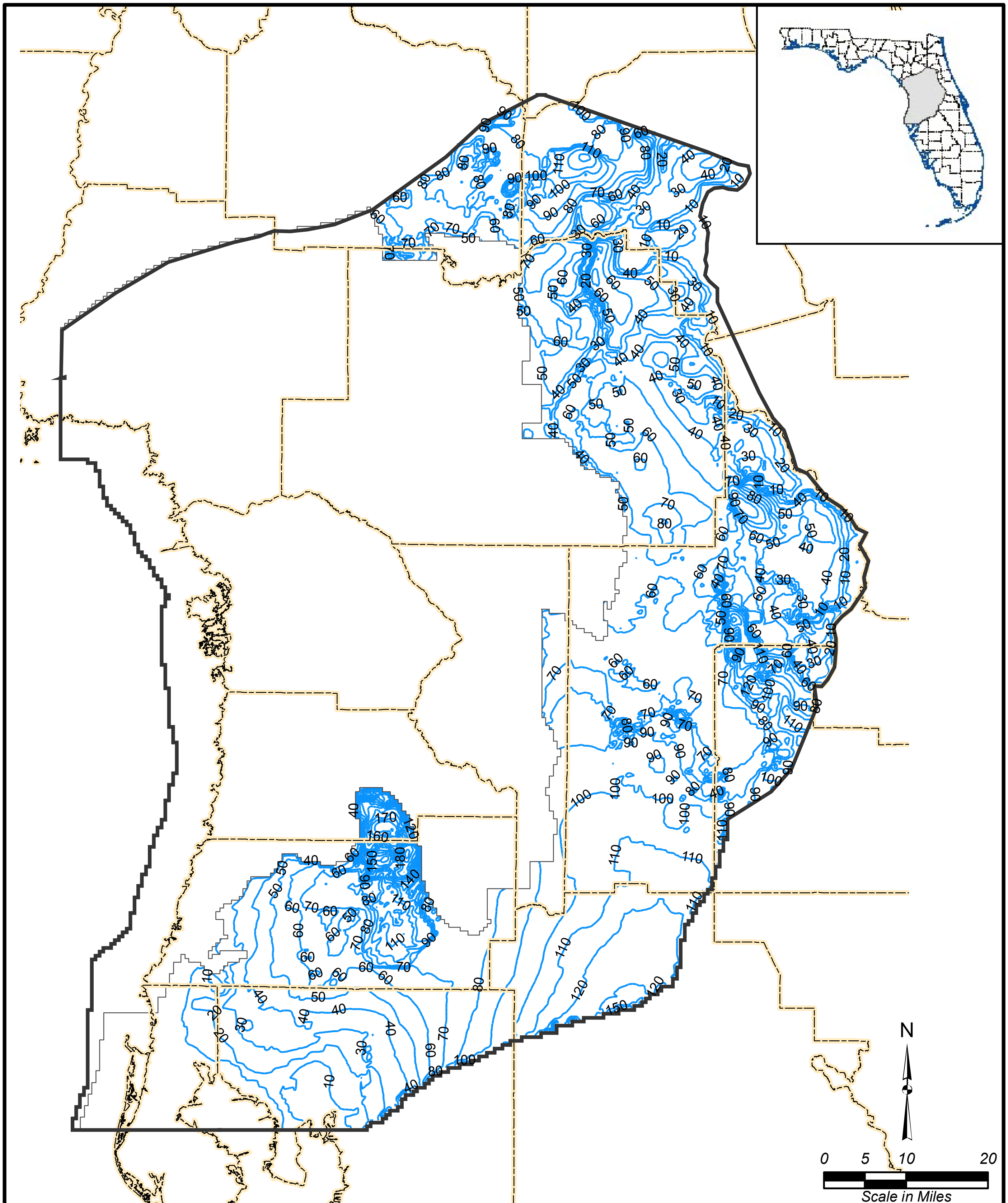


Figure 3.28 UFA Water-level Scatter Plot based on the 1995 Steady-State Calibration



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DS_2003
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Figures

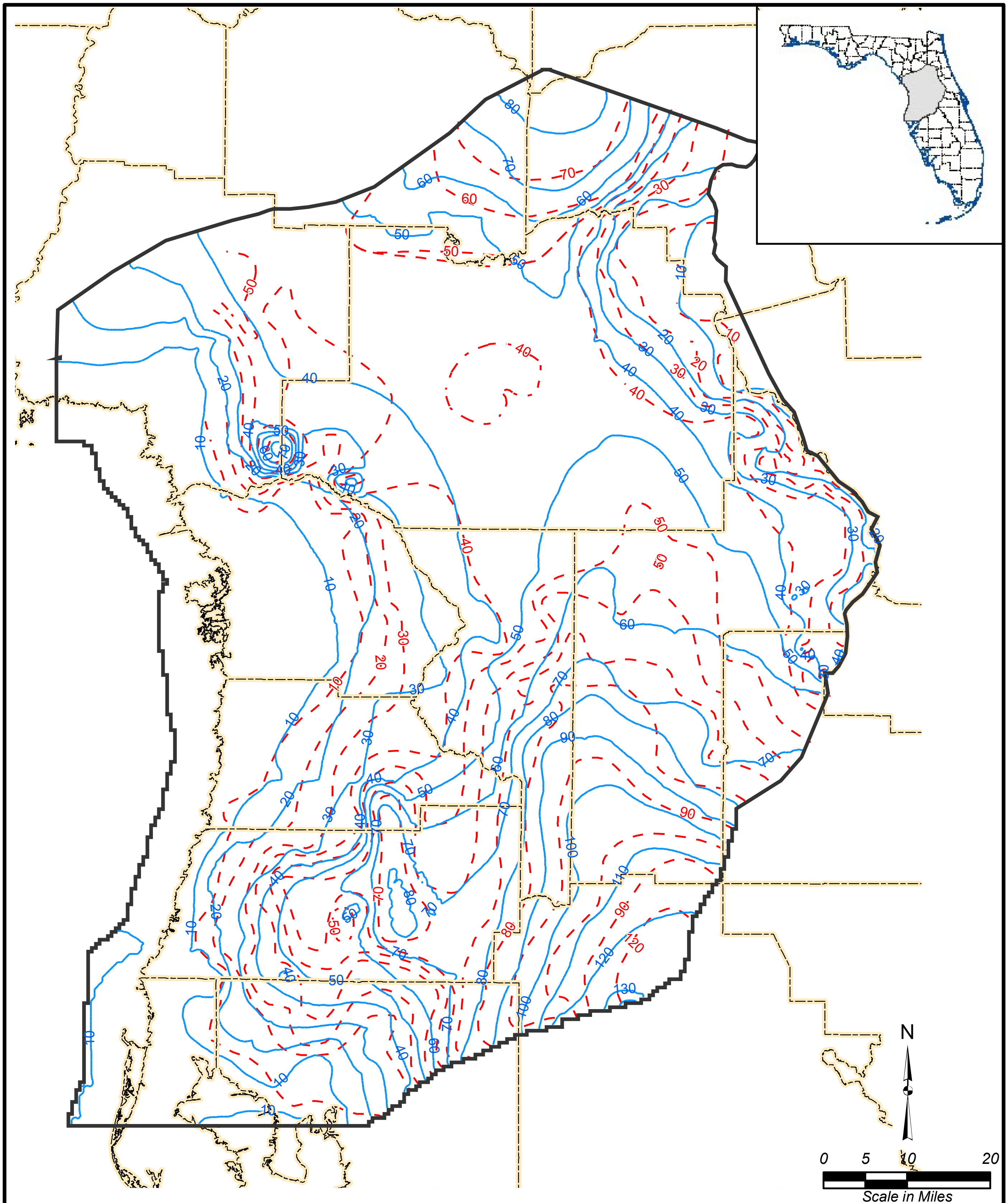
Fig 3_29 - Tran_SAS_WL_0500.mxd
5/26/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated SA Water Levels (Ft NGVD 29)

Figure 3.29
Simulated SA
Potentiometric Surface
May 2000



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DS_2003
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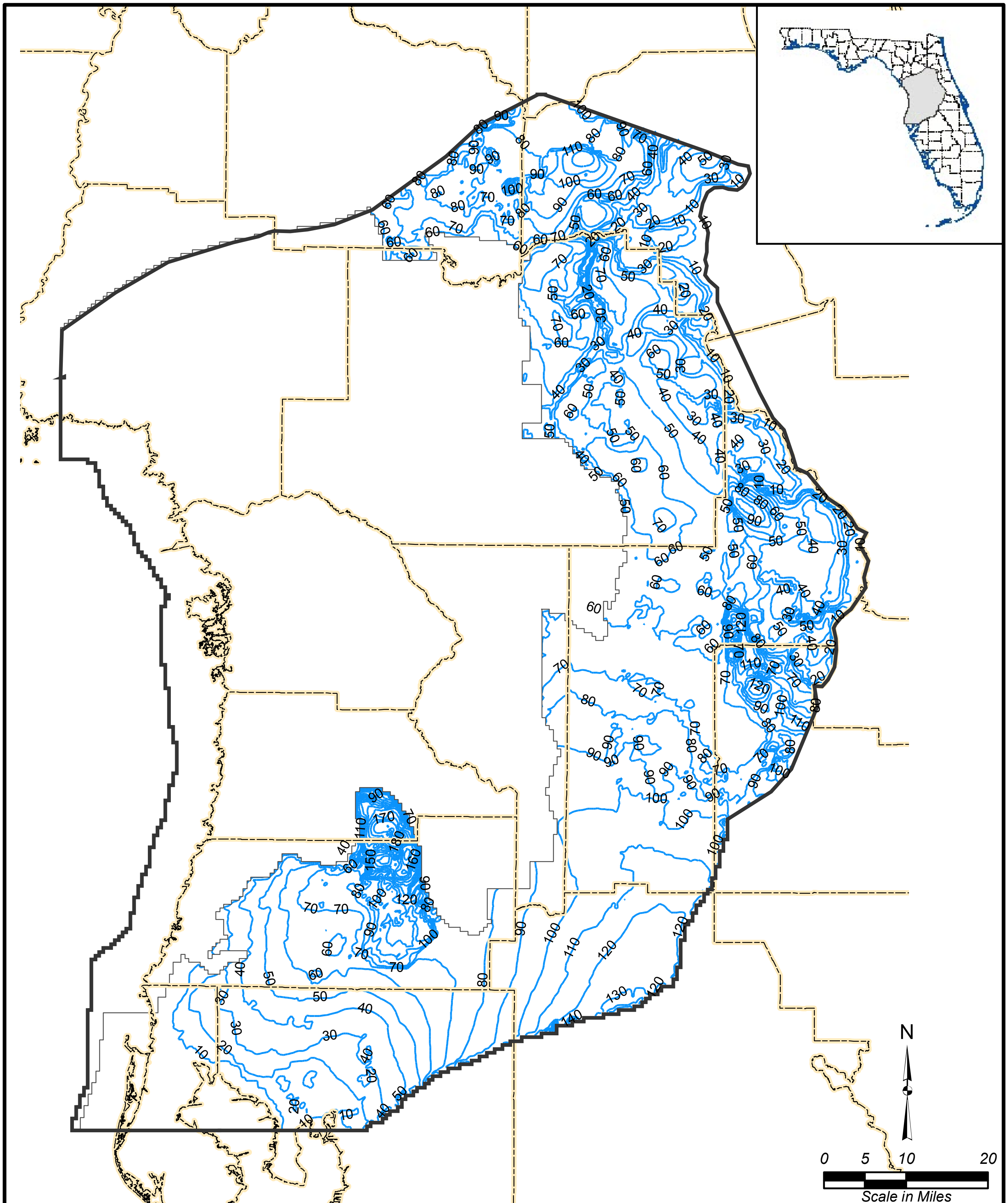
Fig 3_30- Tran_UFA_WL_0500.mxd
5/26/2016 HC

Legend

- Northern District Model Area
- County Boundary
- Simulated UFA Water Levels (Ft NGVD 29)
- Estimated UFA Water Levels (Ft NGVD 29)

Figure 3.30
Simulated UFA Potentiometric Surface
May 2000



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DS_2003
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Figures

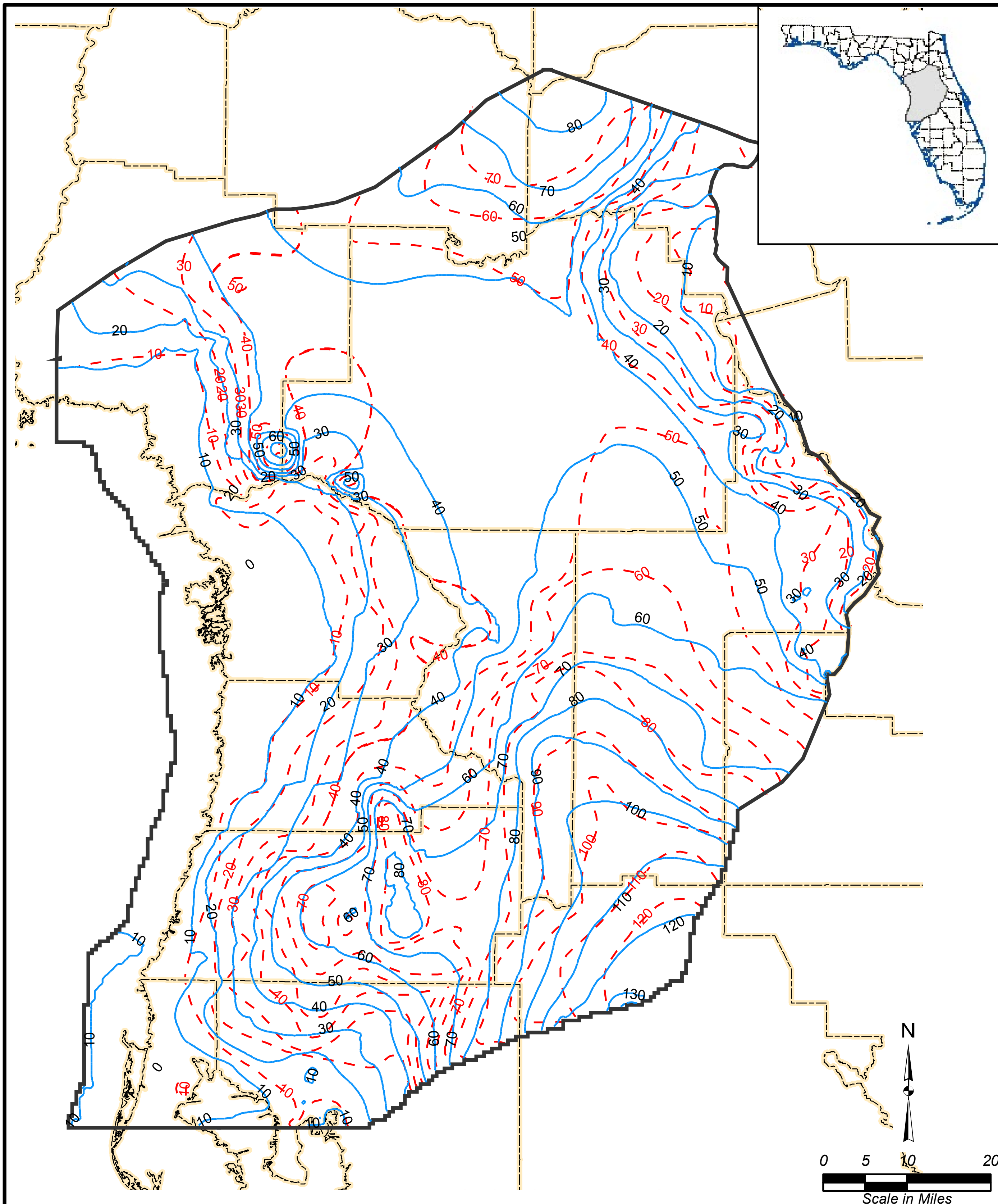
Fig 3_31 - Tran_SAS_WL_0504.mxd
5/26/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated SA Water Levels (Ft NGVD 29)

Figure 3.31
Simulated SA Potentiometric Surface
May 2004



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DS_2003
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Figures

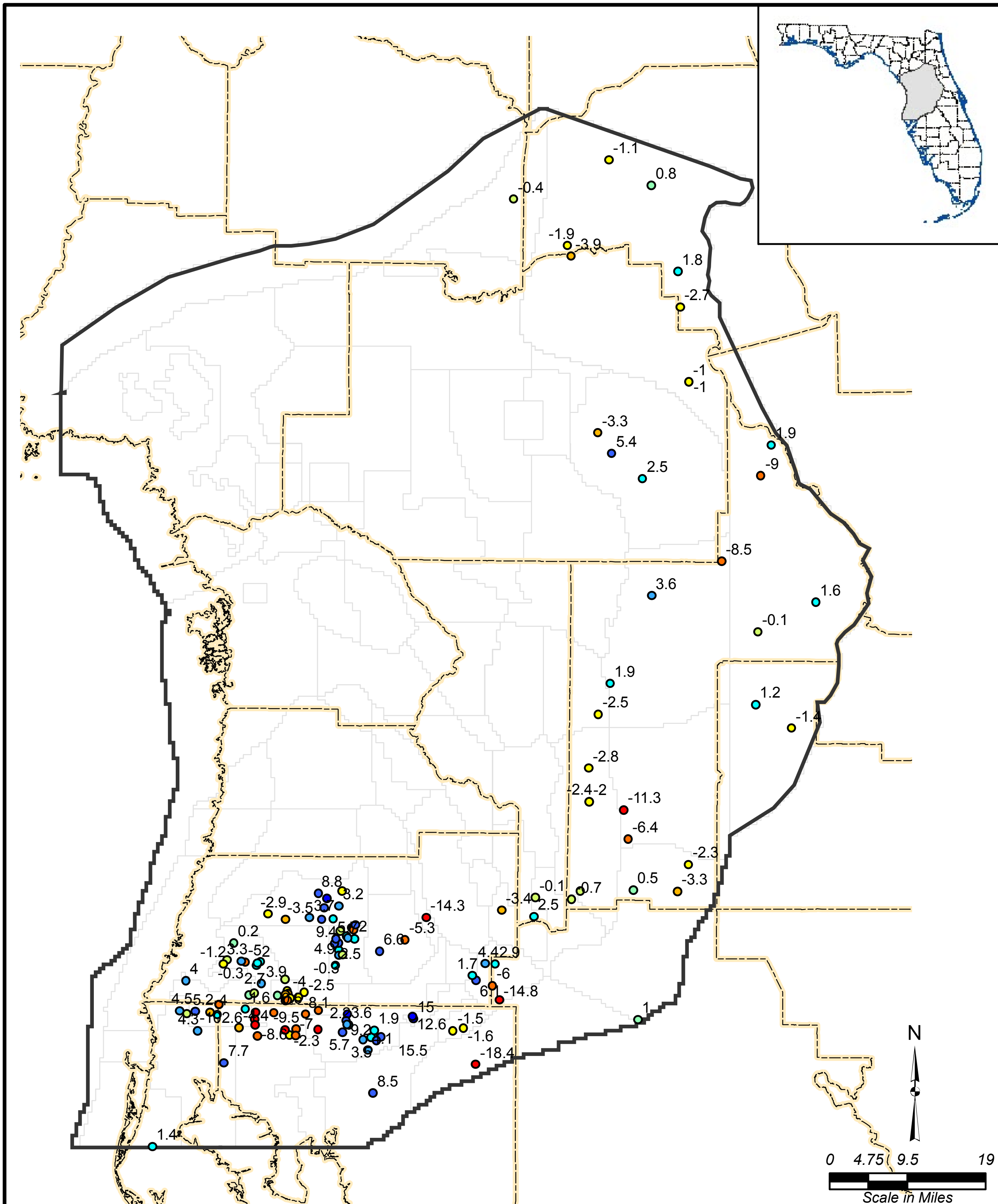
Fig 3_32- Tran_UFA_WL_0504.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated UFA Water Levels (Ft NGVD 29)
Estimated UFA Water Levels (Ft NGVD 29)

Figure 3.32
Simulated UFA Potentiometric Surface
May 2004



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DS_2003
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Fig 3_33 - TR SAS Residual_overview.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

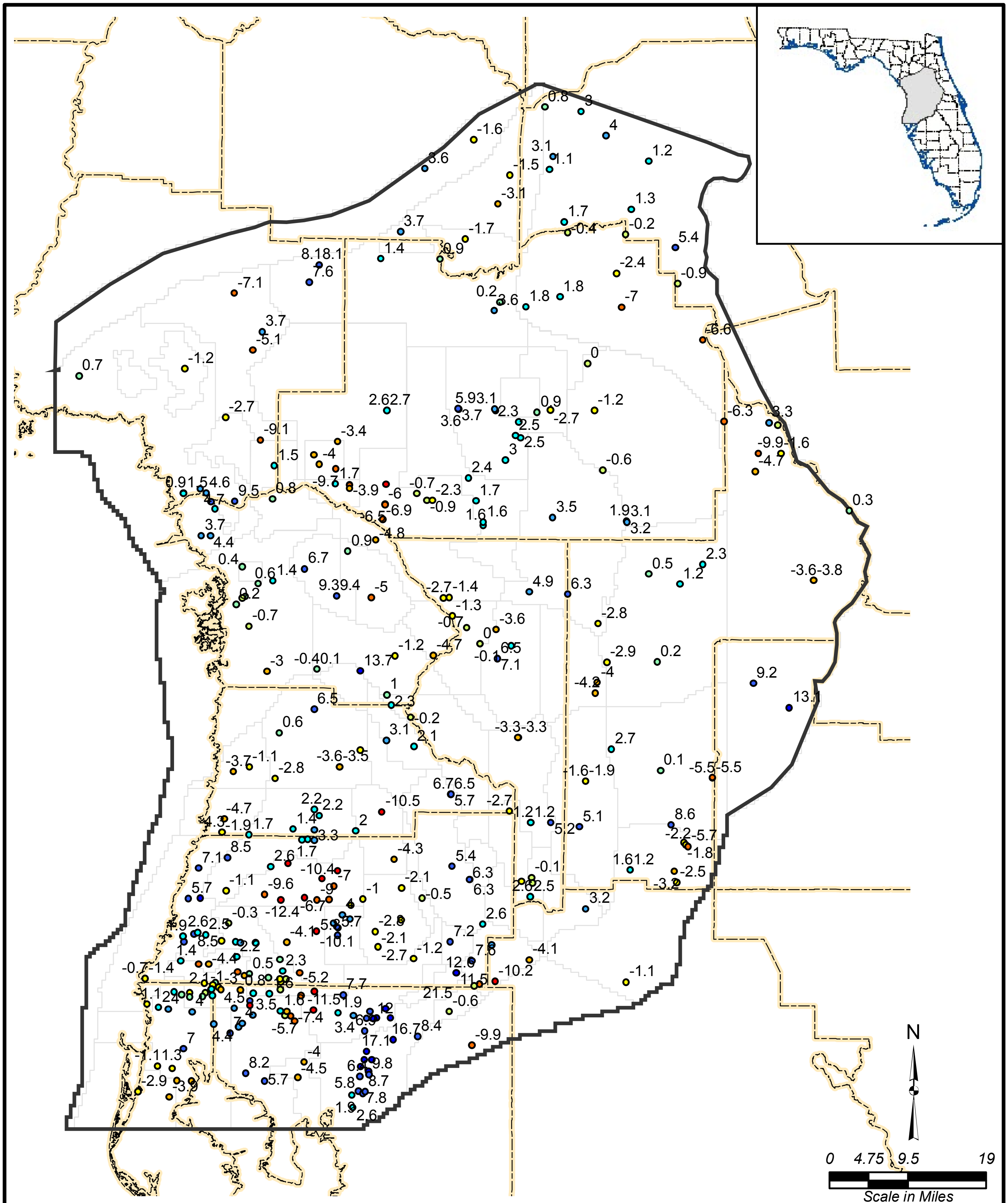
Northern District Model Area

County Boundary

Residuals (ft)

- -18.8 - -10.0
- -10.0 - -5.0
- -5.0 - -3.0
- -3.0 - -1.0
- -1.0 - 0.0
- 0.0 - 1.0
- 1.0 - 3.0
- 3.0 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0

Figure 3.33
Average SA Residuals
based on
the Transient Calibration



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DS_2003
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Fig 3_34 - TR UFA Residual_overview.mxd
6/3/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area

County Boundary

Residuals (ft)

- -18.7 - -9.7
- -9.6 - -5.9
- -5.8 - -3.5
- -3.4 - -1.8
- -1.7 - 0.1
- 0.2 - 2.0
- 2.1 - 4.2
- 4.3 - 7.2
- 7.3 - 11.3
- 11.4 - 20.8

Figure 3.34
Average UFA Residuals based on the Transient Calibration

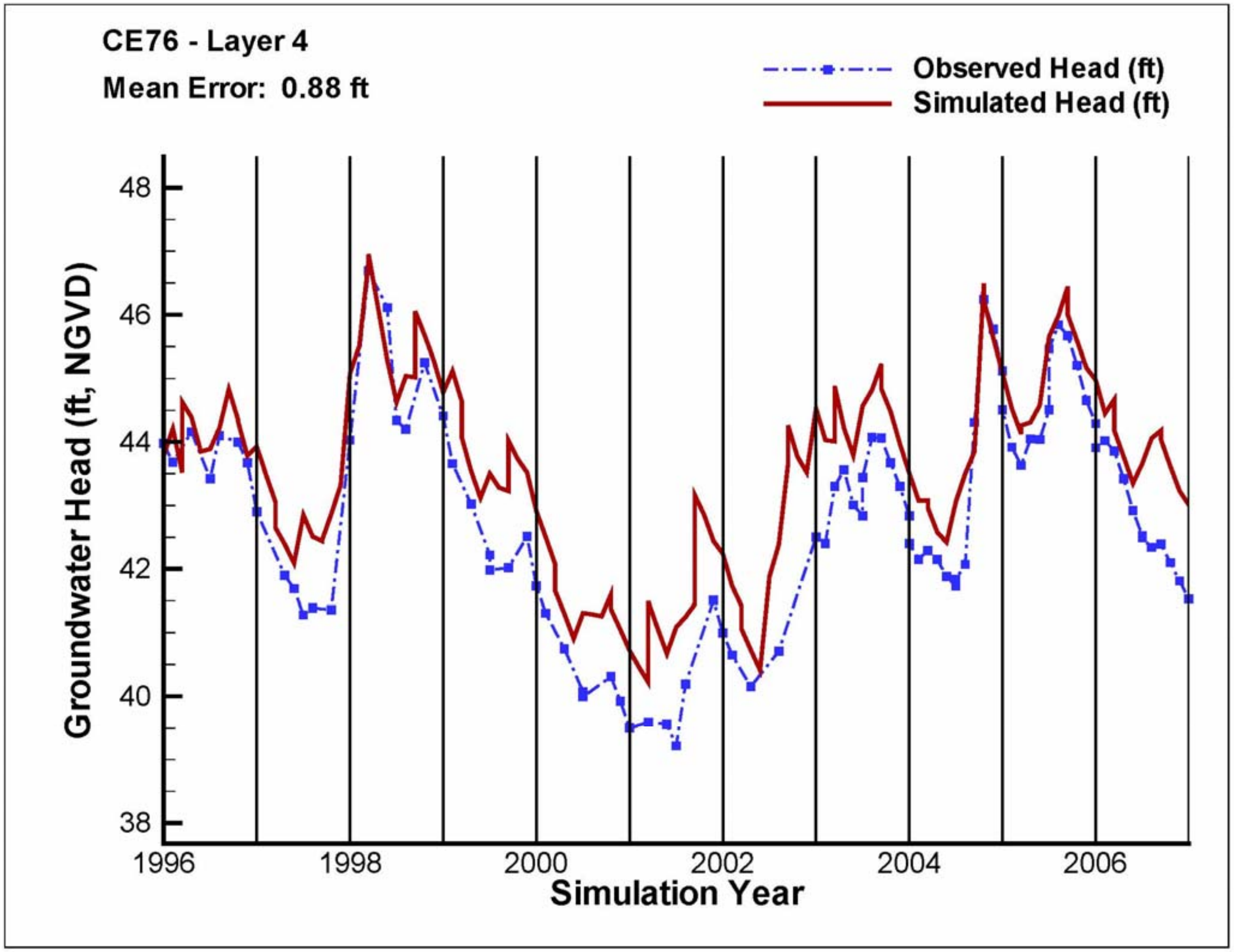

Figure 3.35.a Hydrograph for CE 76

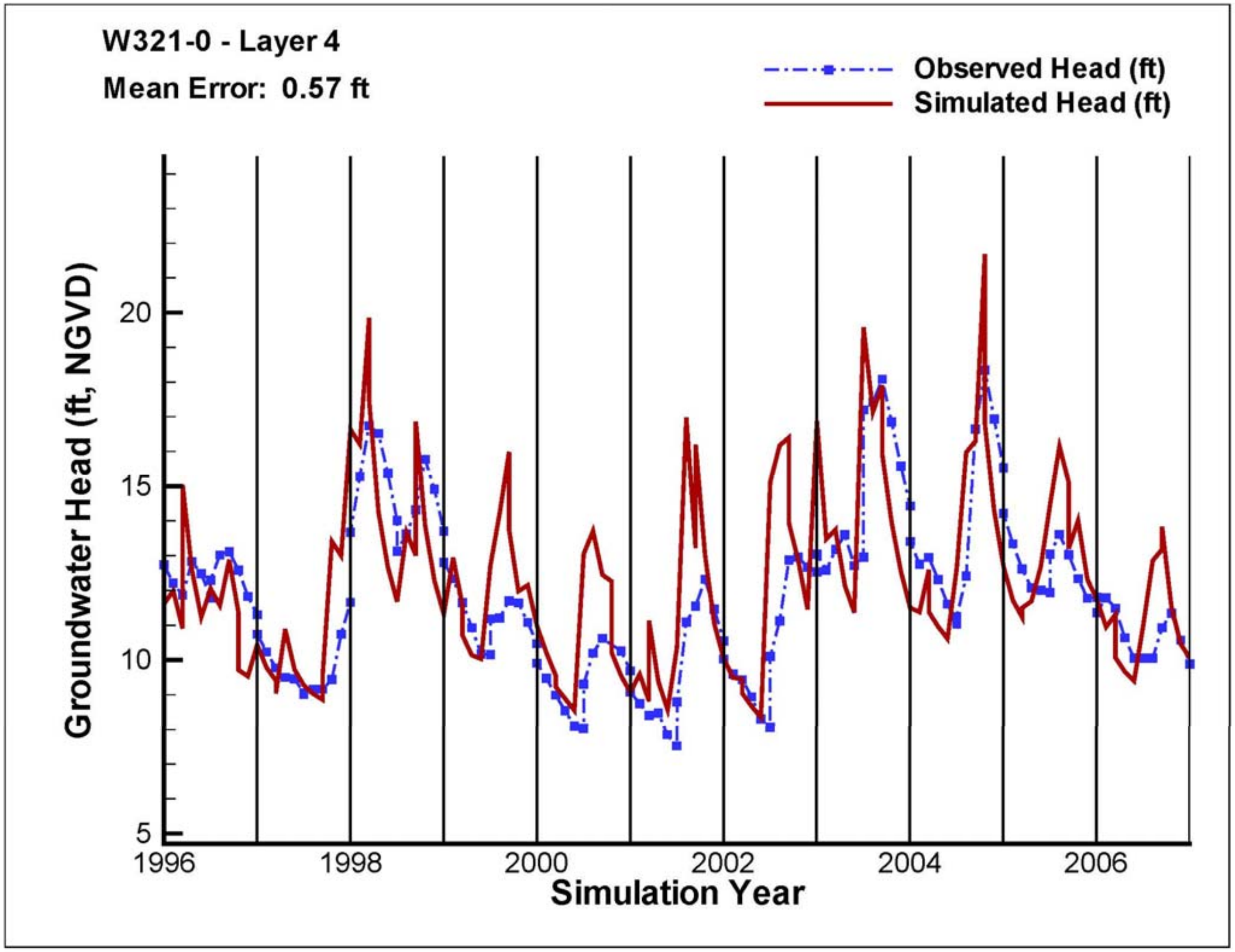

Figure 3.35.b Hydrograph for W321-0

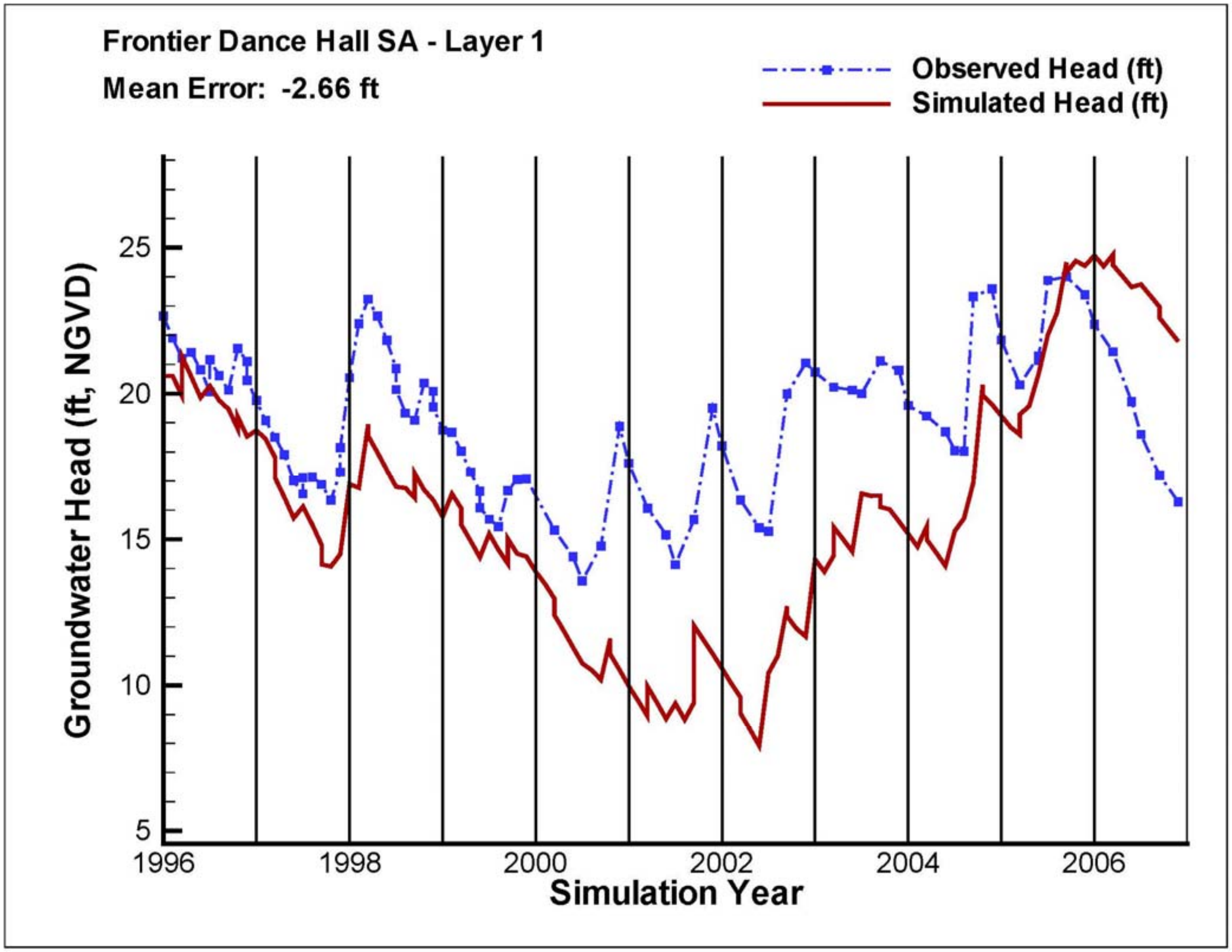

Figure 3.35.c Hydrograph for Frontier Dance Hall SA

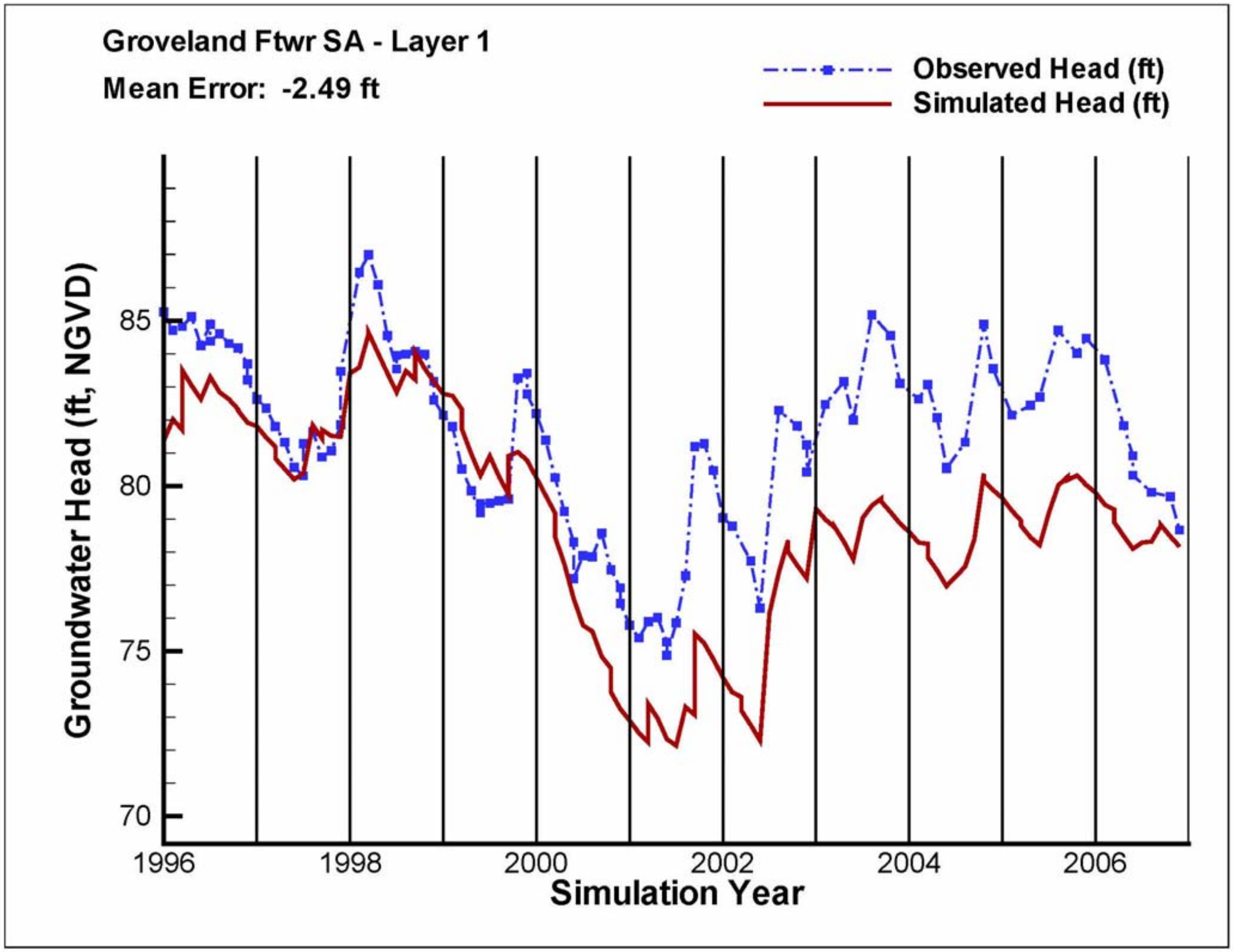

Figure 3.35.d Hydrograph for Groveland Ftwr SA

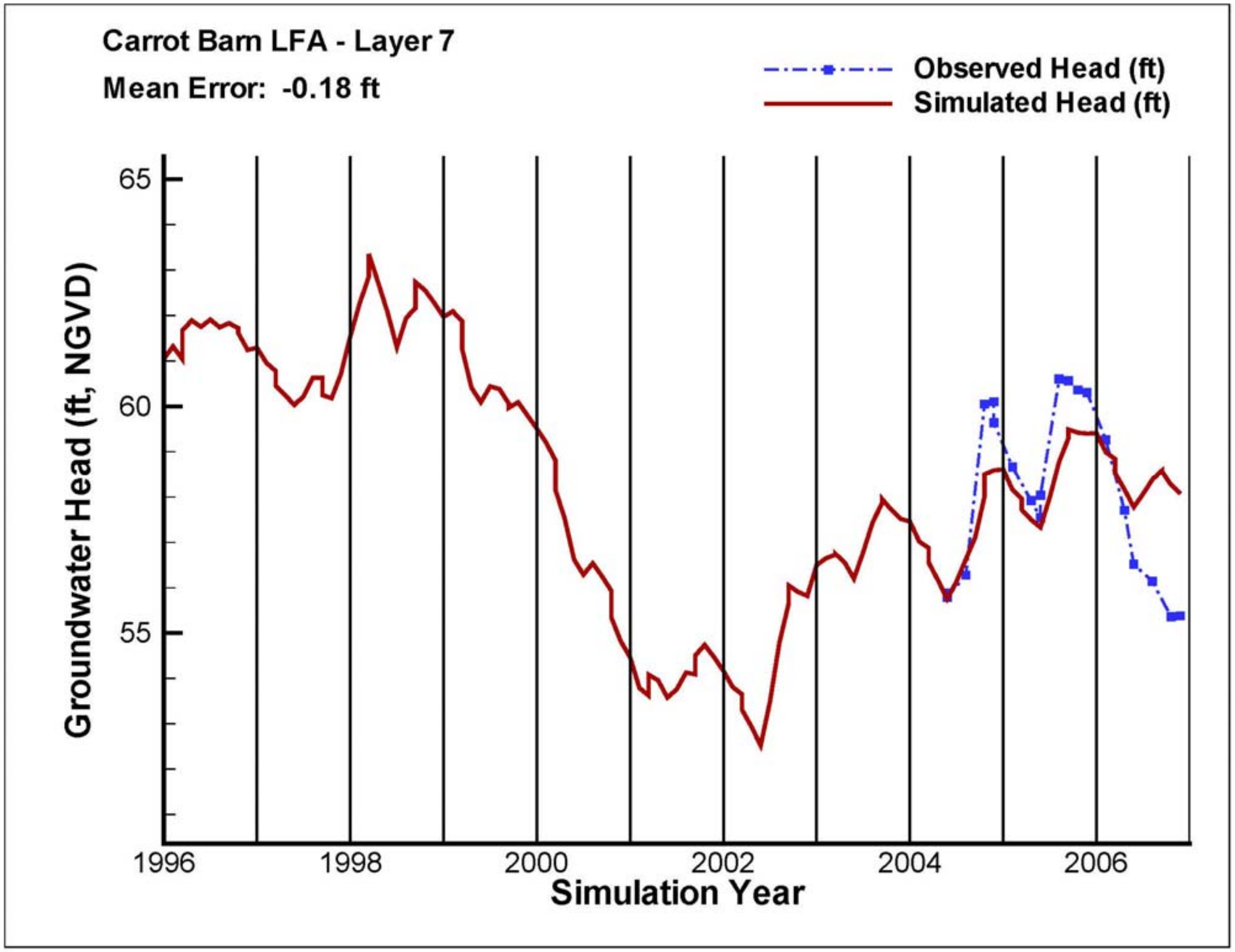

Figure 3.35.e Hydrograph for Carrot Barn LFA

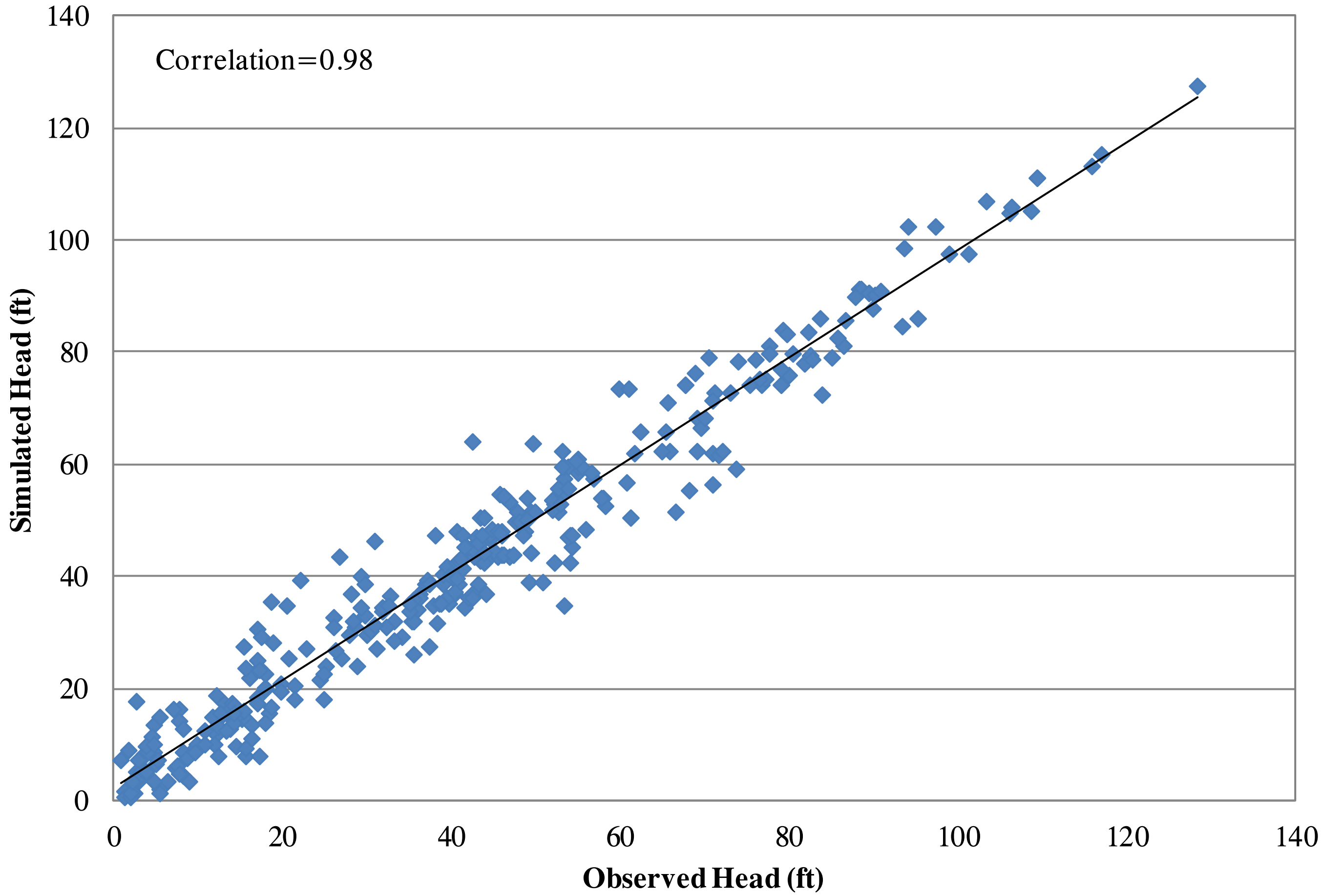

Figure 3.36 Monthly Average UFA Water-level Scatter Plot based on the Transient Calibration

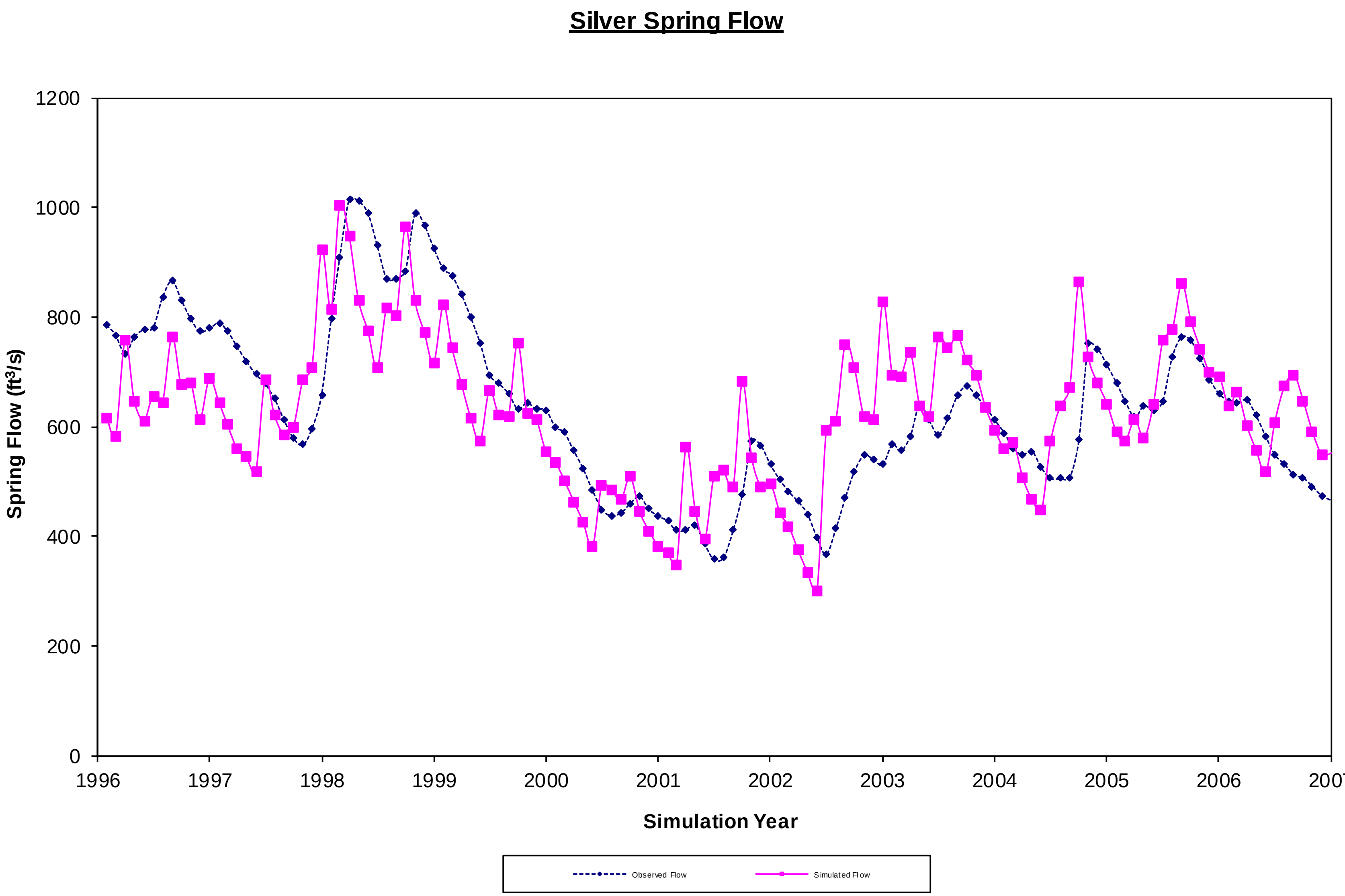

Figure 3.37 Simulated Discharge for Silver Spring

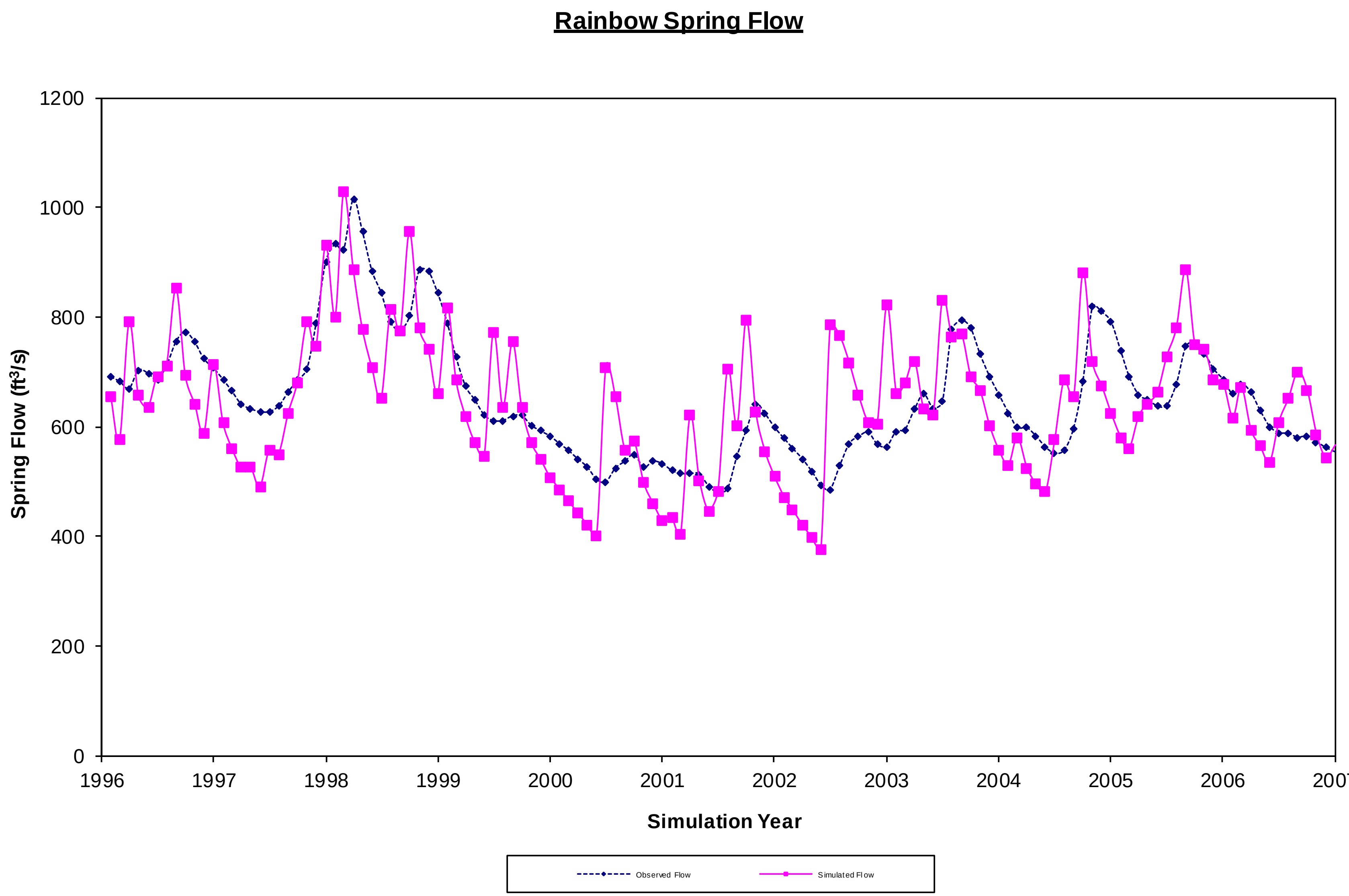

Figure 3.38 Simulated Discharge for Rainbow Spring

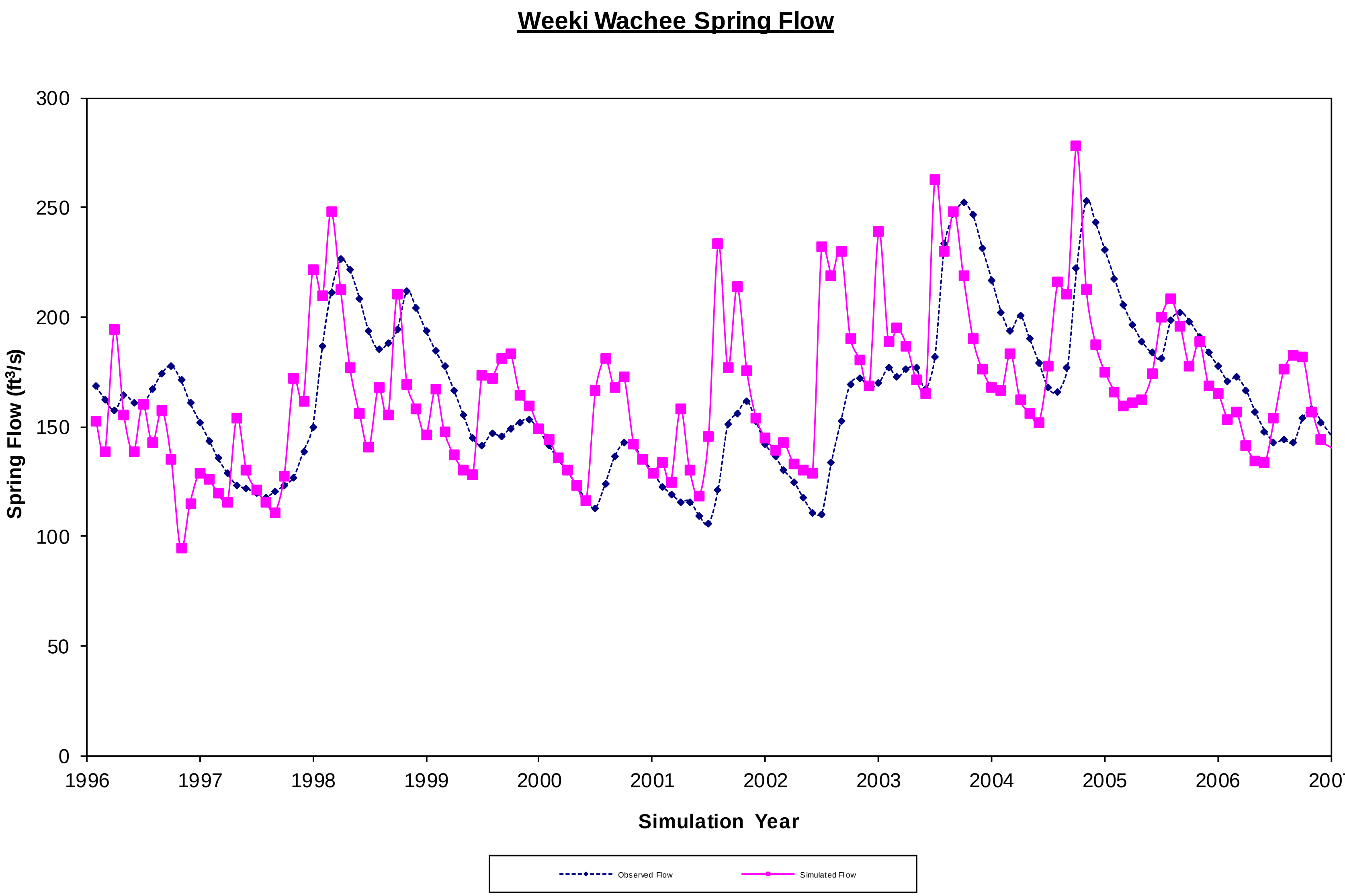

Figure 3.39 Simulated Discharge for Weeki Wachee Spring

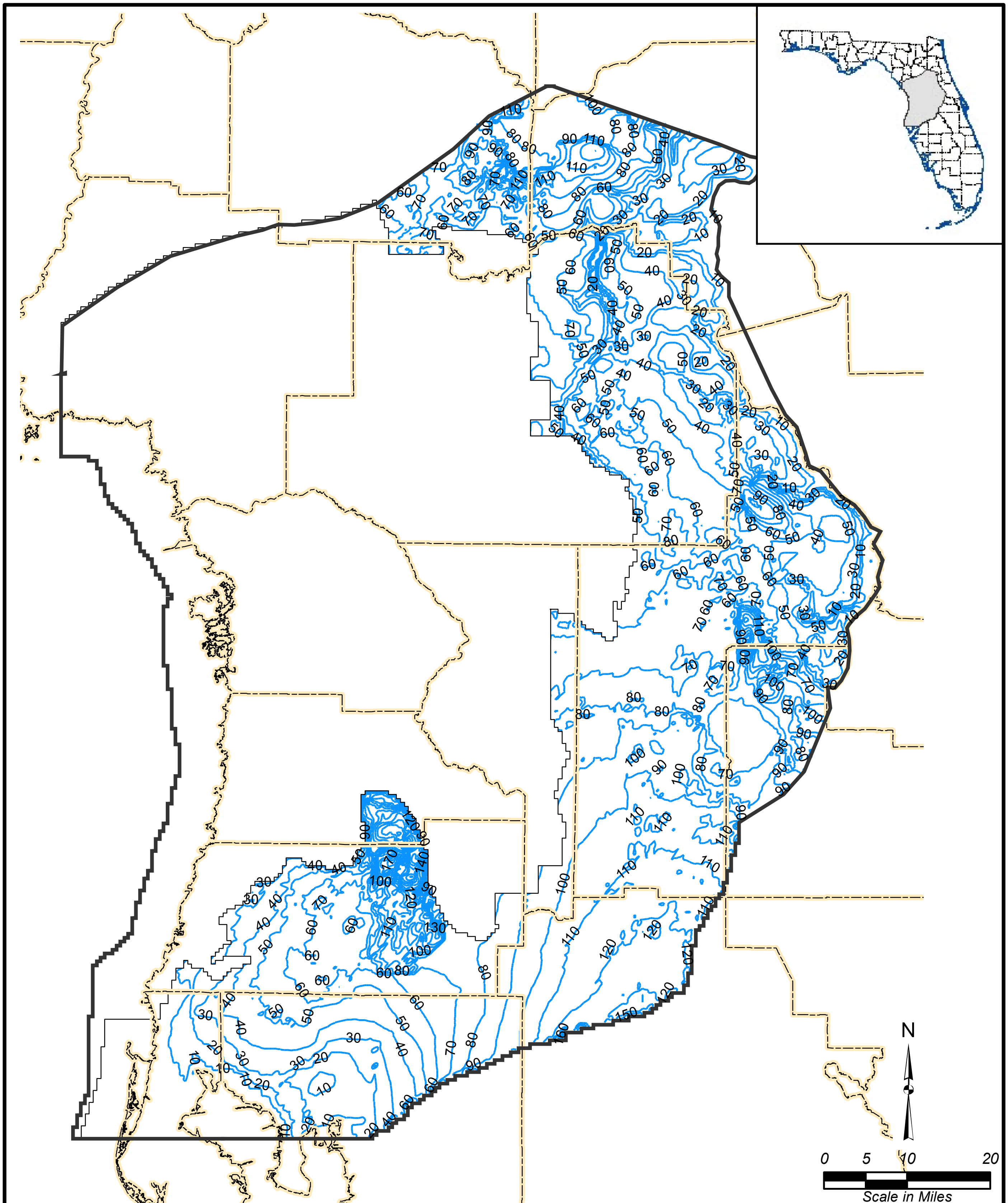

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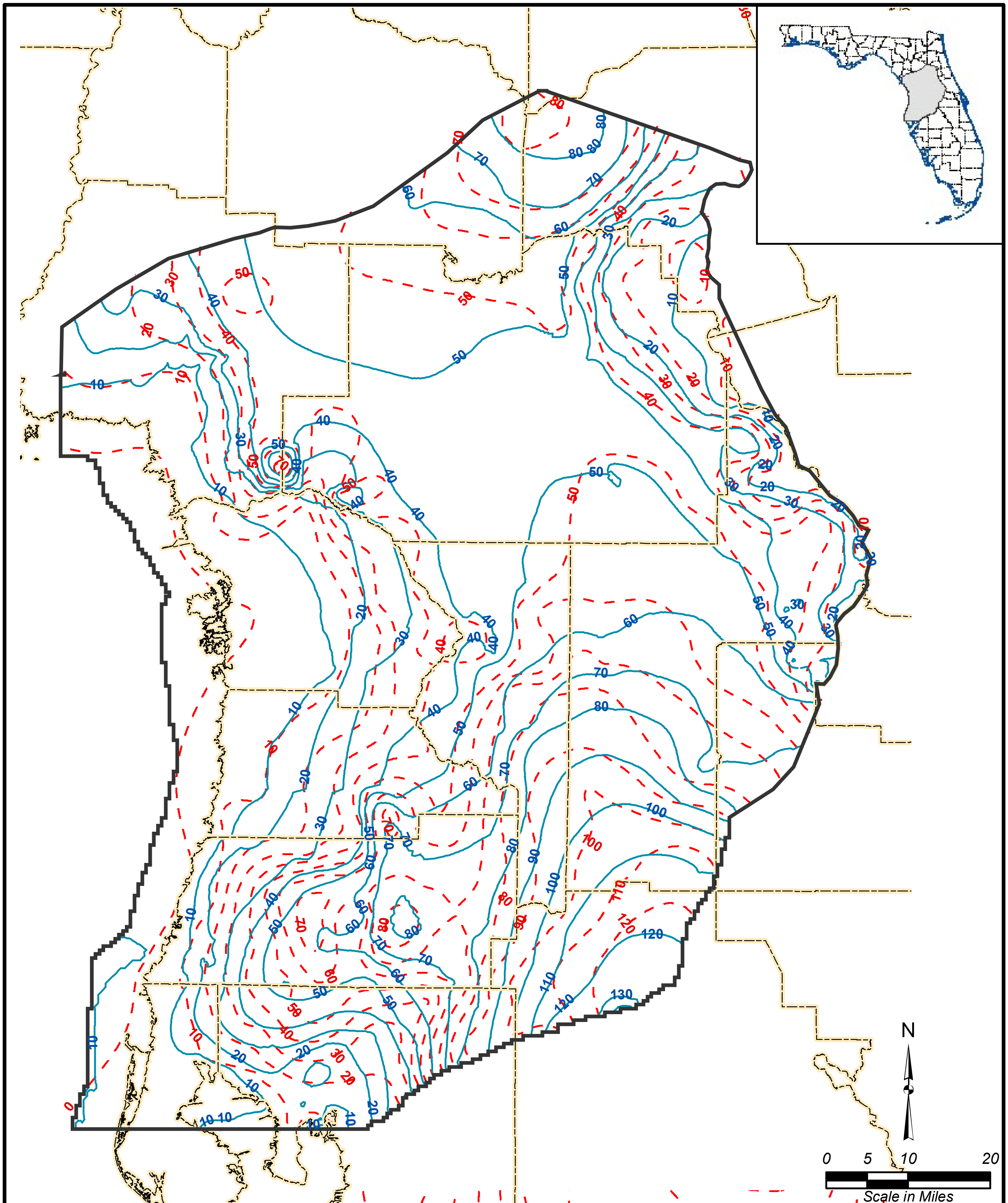
Fig 3_40 - SS_SAS_WL_2010.mxd
1/12/2016 HC

Legend

- Northern District Model Area
- County Boundary
- SA Water Levels (Ft NGVD 29)

Figure 3.40
Simulated Steady-state
2010
SA Potentiometric
Surface



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DS_2003
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Figures

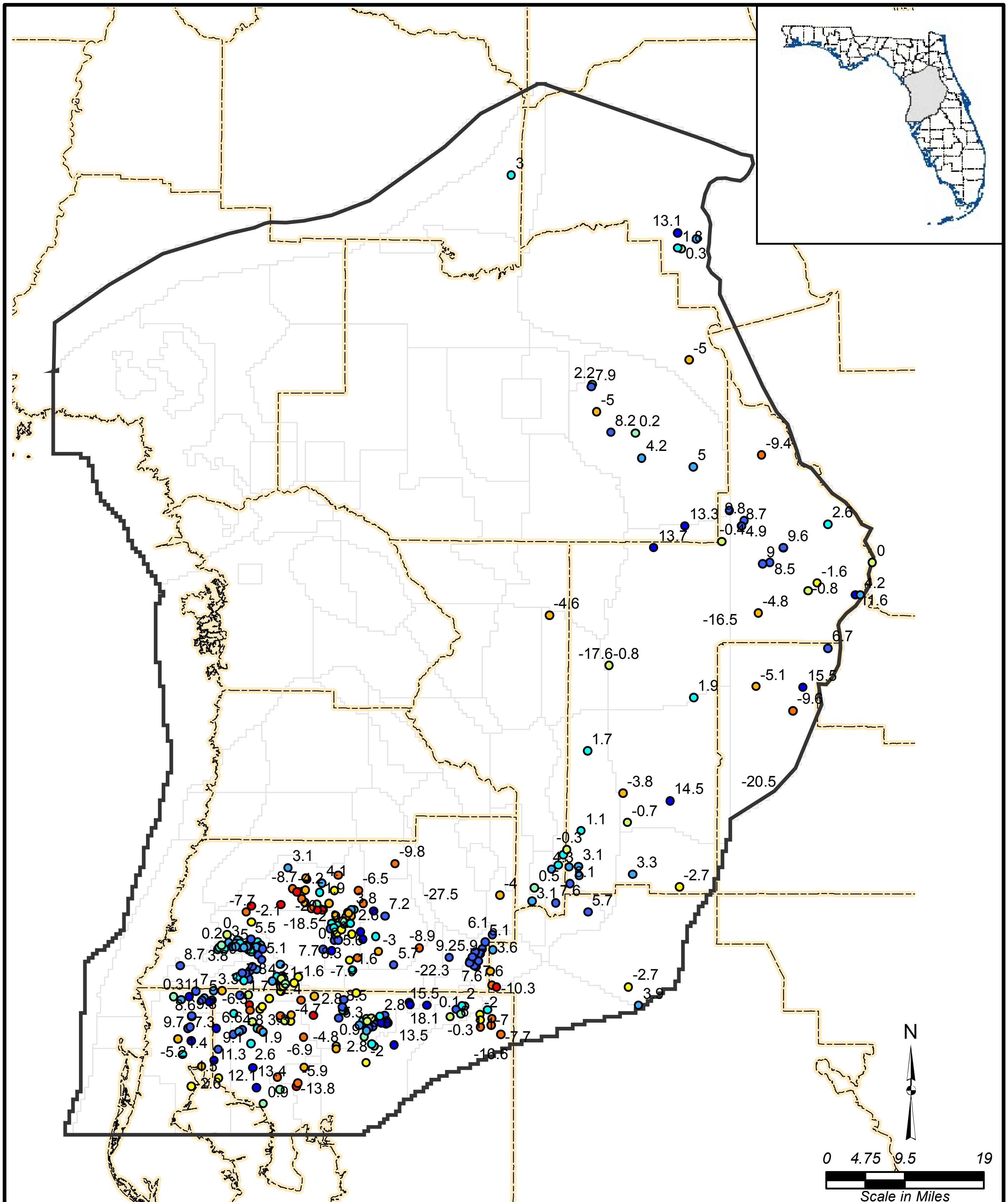
Fig 3_41 - SS_UFA_WL_2010.mxd
5/26/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- UFA Water Levels (Ft NGVD 29)
- Ave 2010 Water Levels (Ft NGVD 29)

Figure 3.41
Simulated Steady-state 2010 UFA Potentiometric Surface



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DS_2003
Reporting
Figures

Fig 3_42 - SS SAS Residual_overview_2010.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

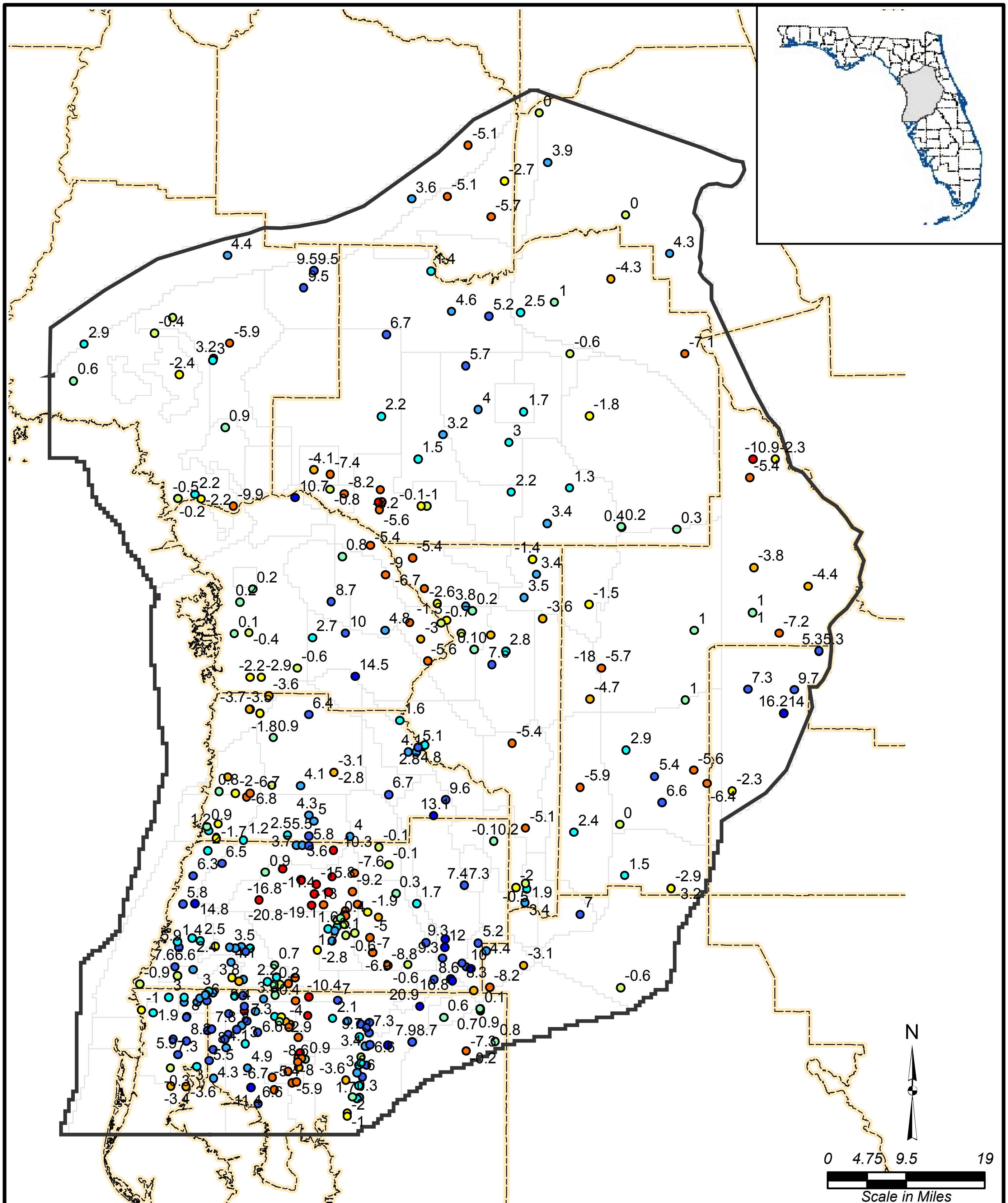
Northern District Model Area

County Boundary

Residuals (ft)

- -16.1 - -10.0
- -10.0 - -5.0
- -5.0 - -3.0
- -3.0 - -1.0
- -1.0 - 0.0
- 0.0 - 1.0
- 1.0 - 3.0
- 3.0 - 5.0
- 5.0 - 10.0
- 10.0 - 18.8

Figure 3.42
Simulated Steady-State
2010
SA Residuals



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DS_2003
Reporting
Figures

Fig 3_43 - SS UFA Residual_overview_2010.mxd
5/26/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area

County Boundary

Residuals (ft)

- -17.9- -10.0
- -10.0 - -5.0
- -5.0 - -3.0
- -3.0 - -1.0
- -1.0 - 0.0
- 0.0 - 1.0
- 1.0 - 3.0
- 3.0 - 5.0
- 5.0 - 10.0
- 10.0 - 27.8

Figure 3.43
Simulated Steady-State
2010
UFA Residuals

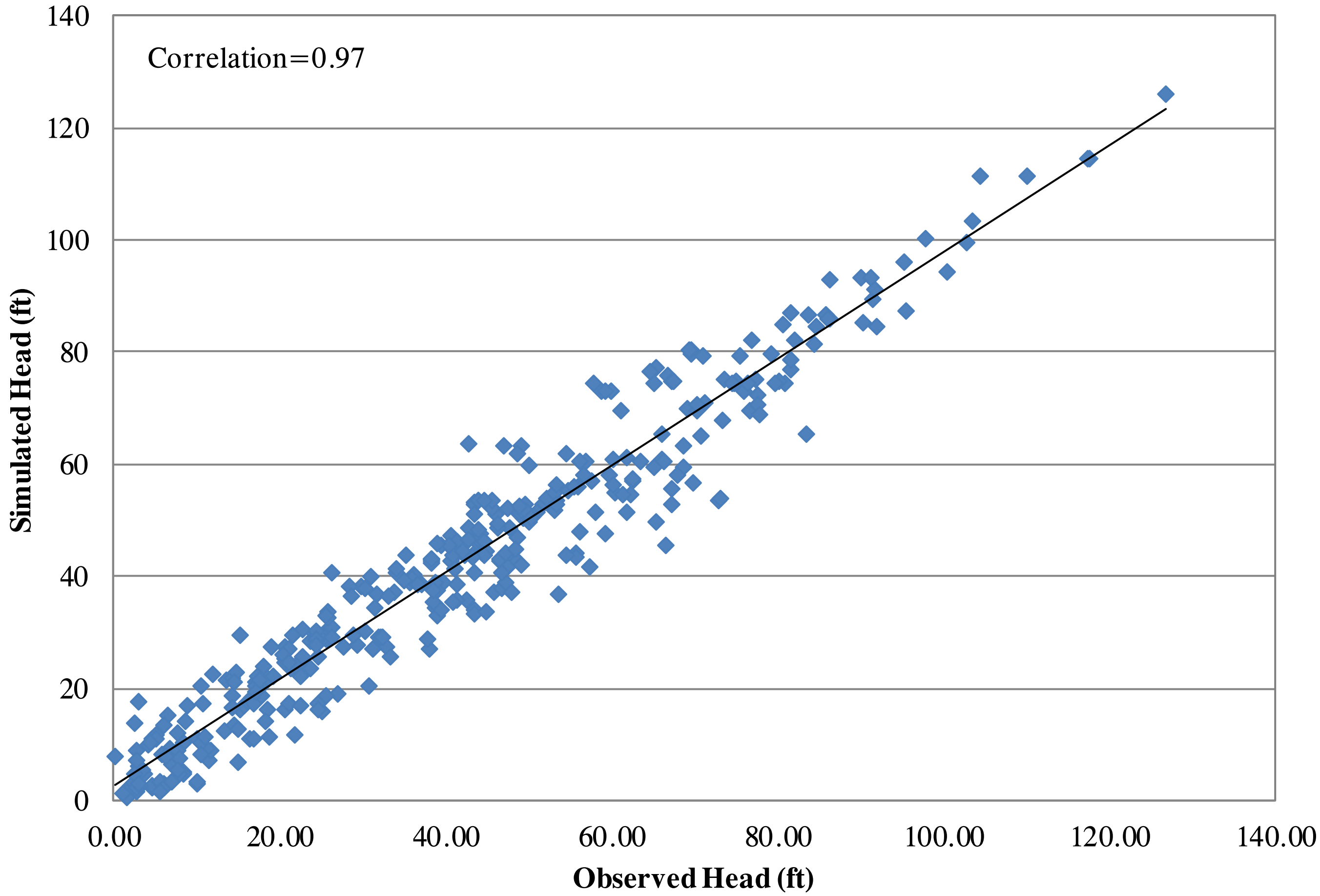
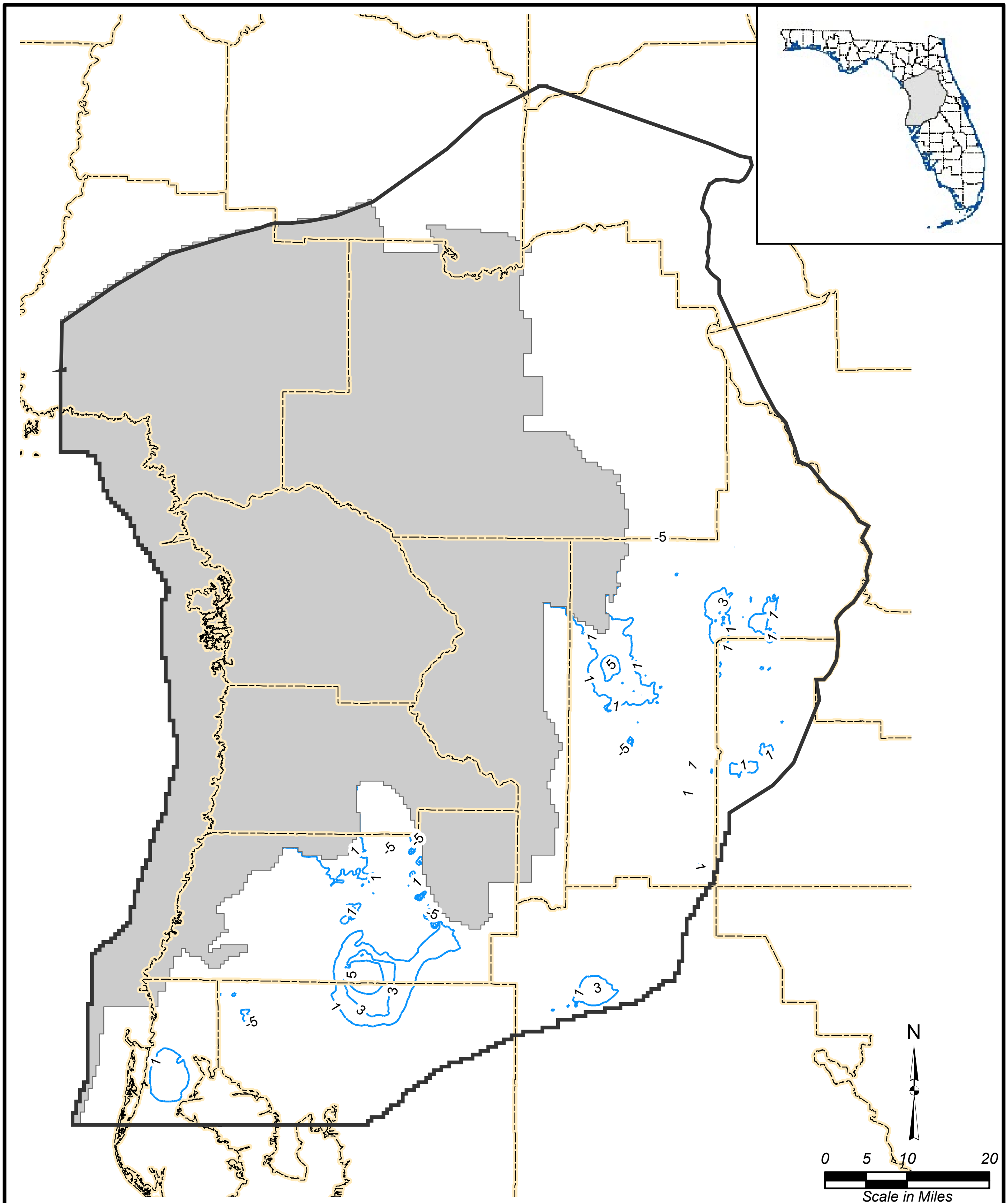


Figure 3.44 UFA Water-level Scatter Plot based on the 2010 Steady-State Verification Run



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DS_2003
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Figures

Fig 4_01 - DDN_SA_2010Pumping.mxd
5/31/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated Drawdown (ft)

Figure 4.1
Predicted SA Drawdown
(Scenario 1)

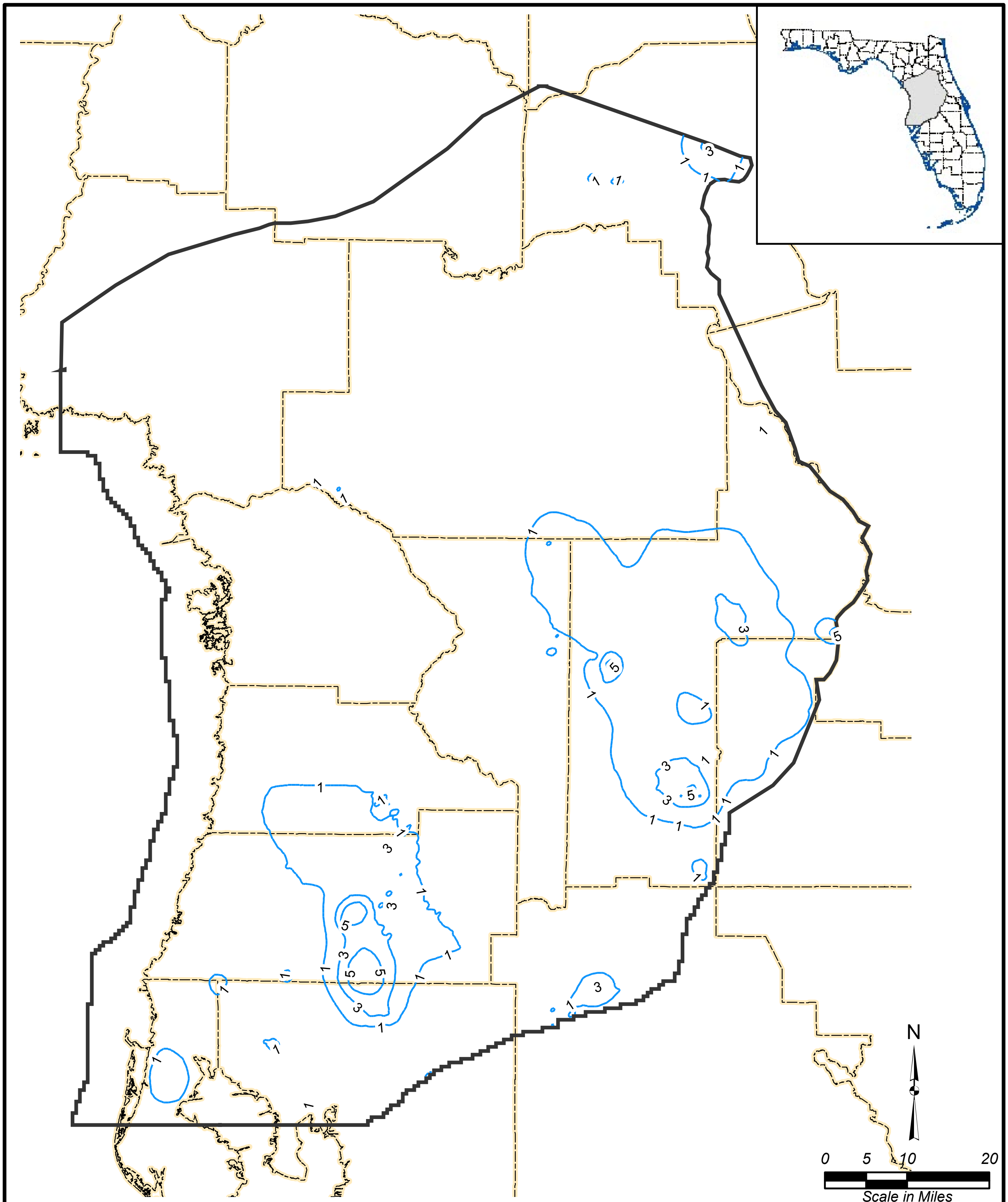

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Fig 4_02 - DDN_UFA_2010Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.2
Predicted UFA Drawdown
(Scenario 1)

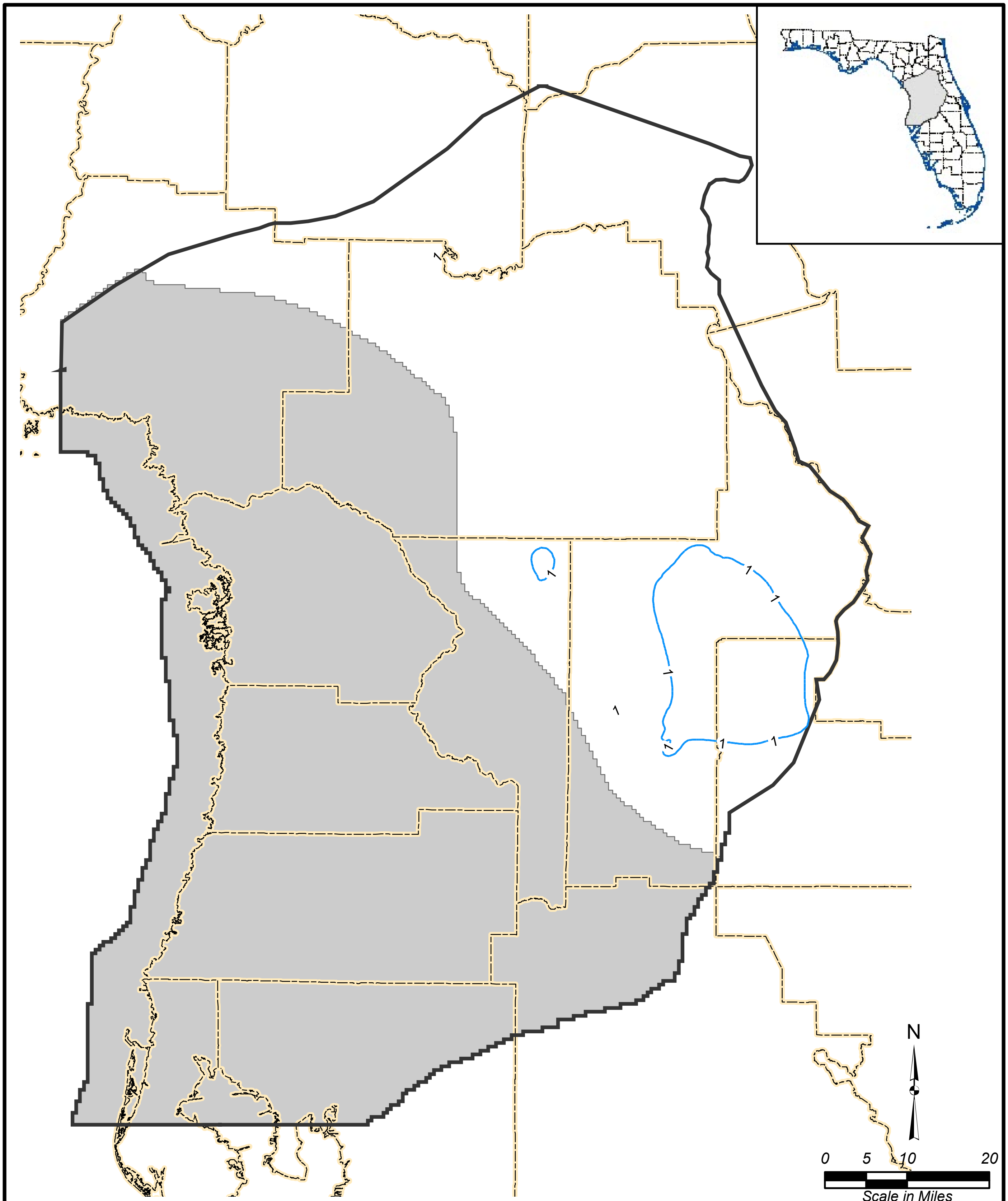

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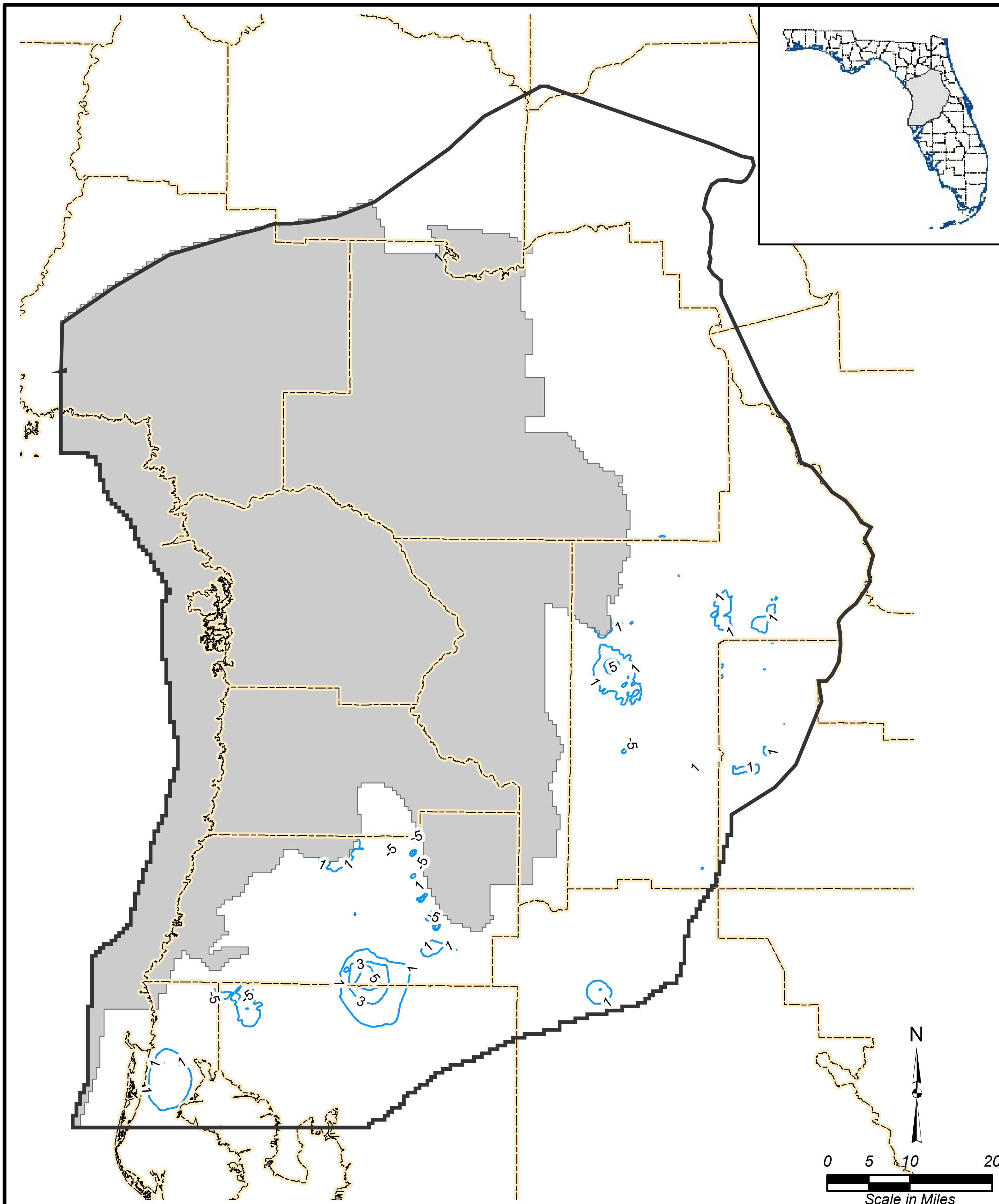
Fig 4_03 - DDN_LFA_2010Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.3
Predicted LFA Drawdown
(Scenario 1)



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Figures

Fig 4_04 - DDN_SA_2014Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.4
Predicted SA Drawdown
(Scenario 2)

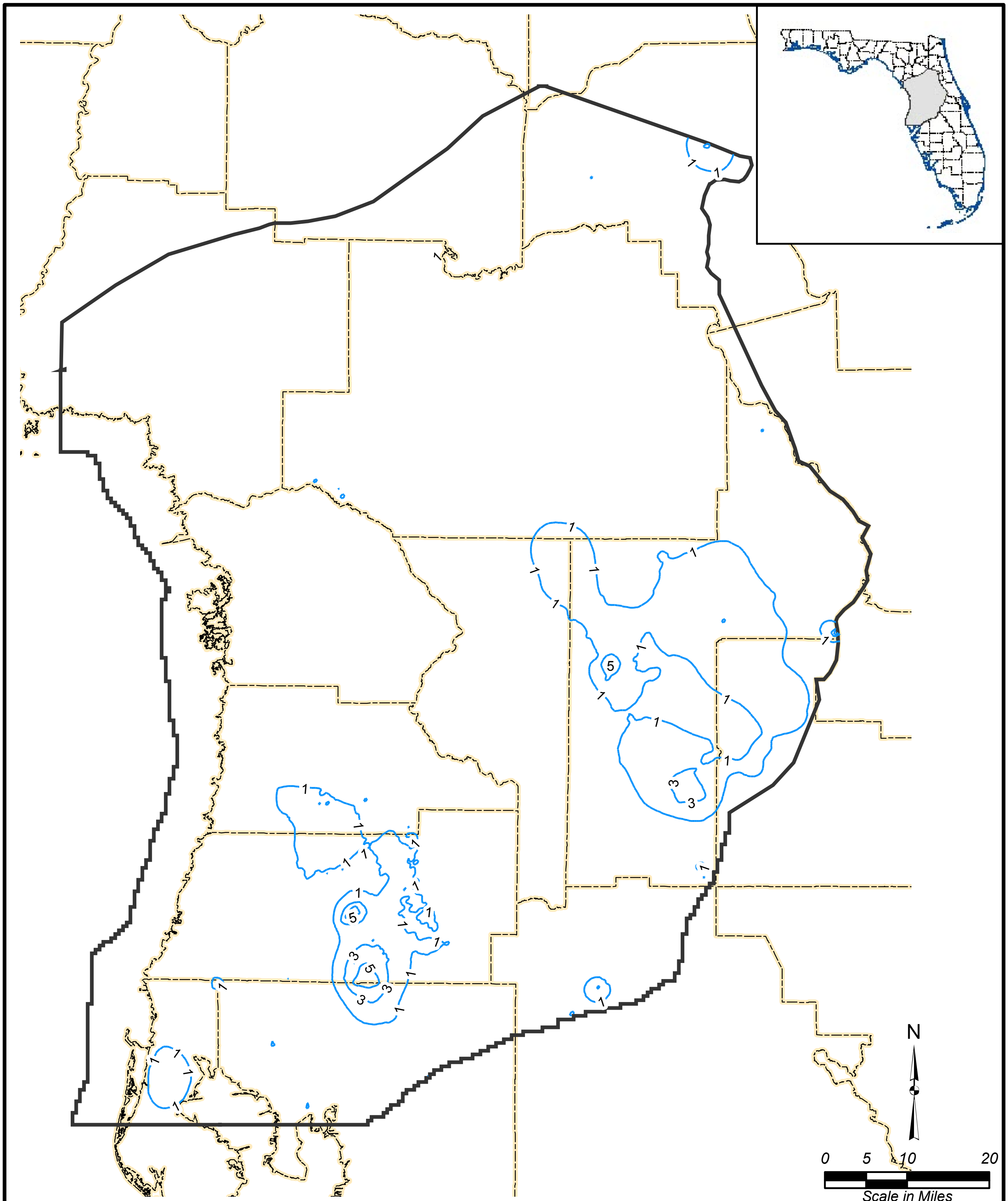

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Fig 4_05 - DDN_UFA_2014Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.5
Predicted UFA Drawdown
(Scenario 2)

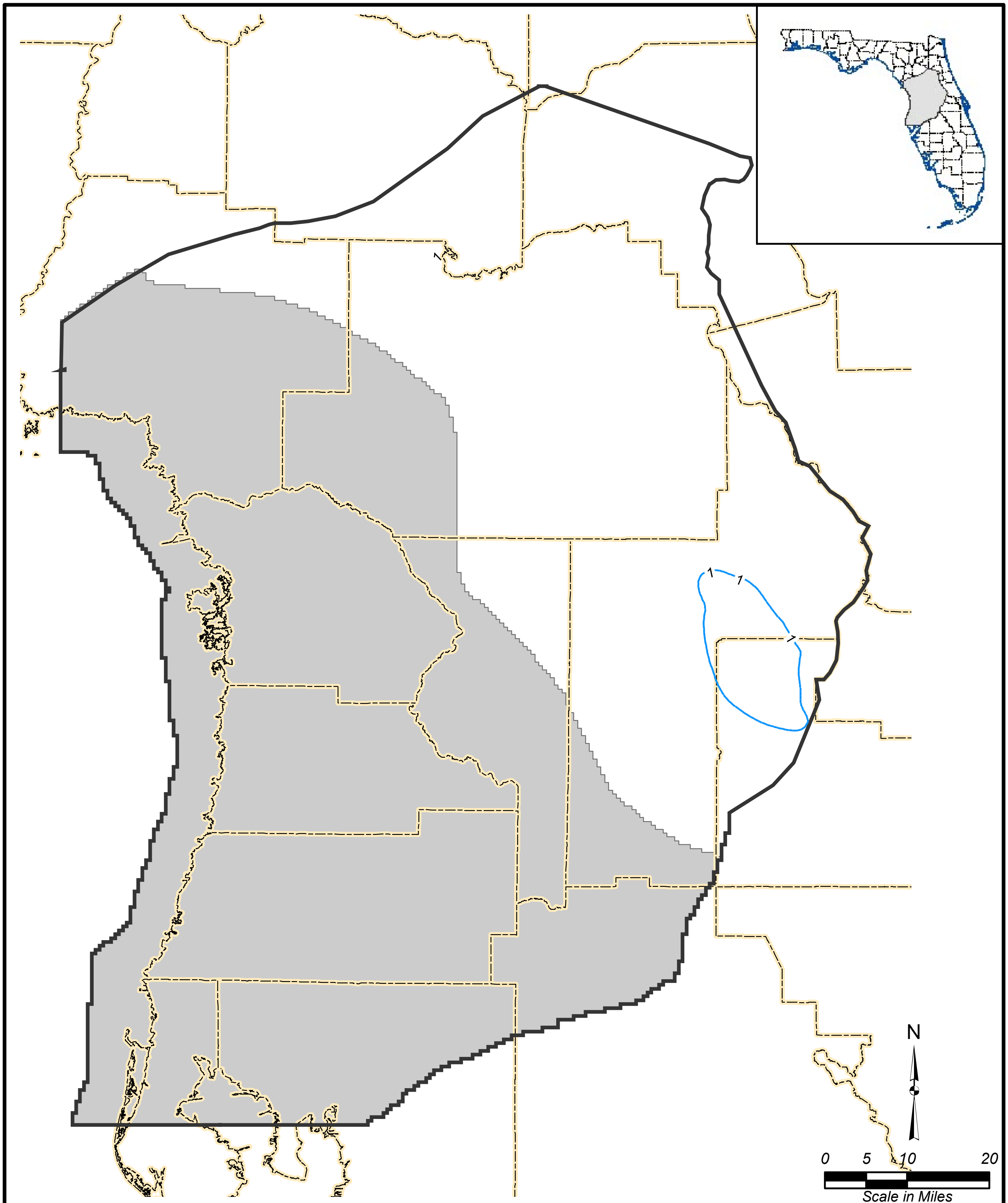

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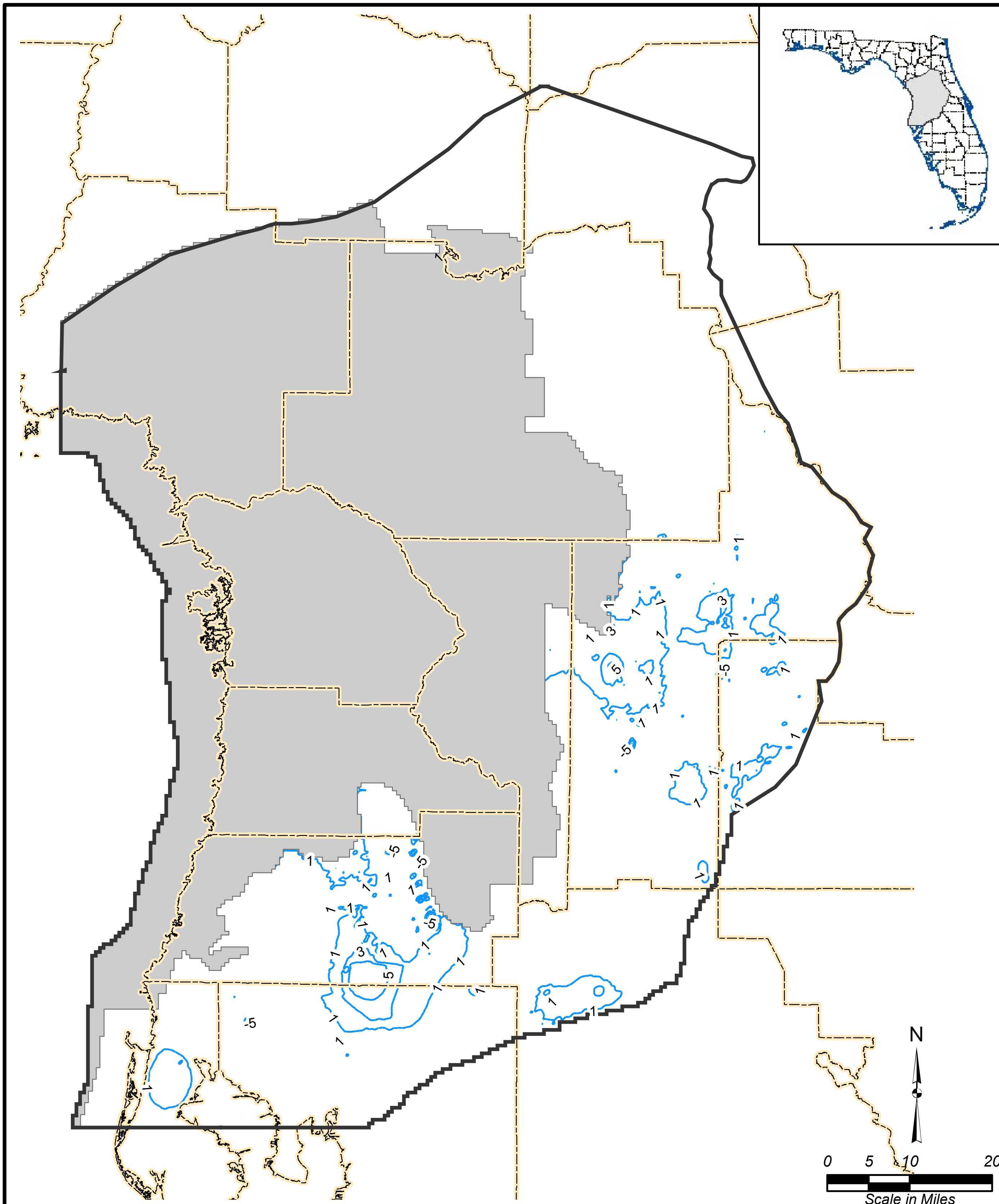
Fig 4_06 - DDN_LFA_2014Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.6
Predicted LFA Drawdown
(Scenario 2)



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Figures

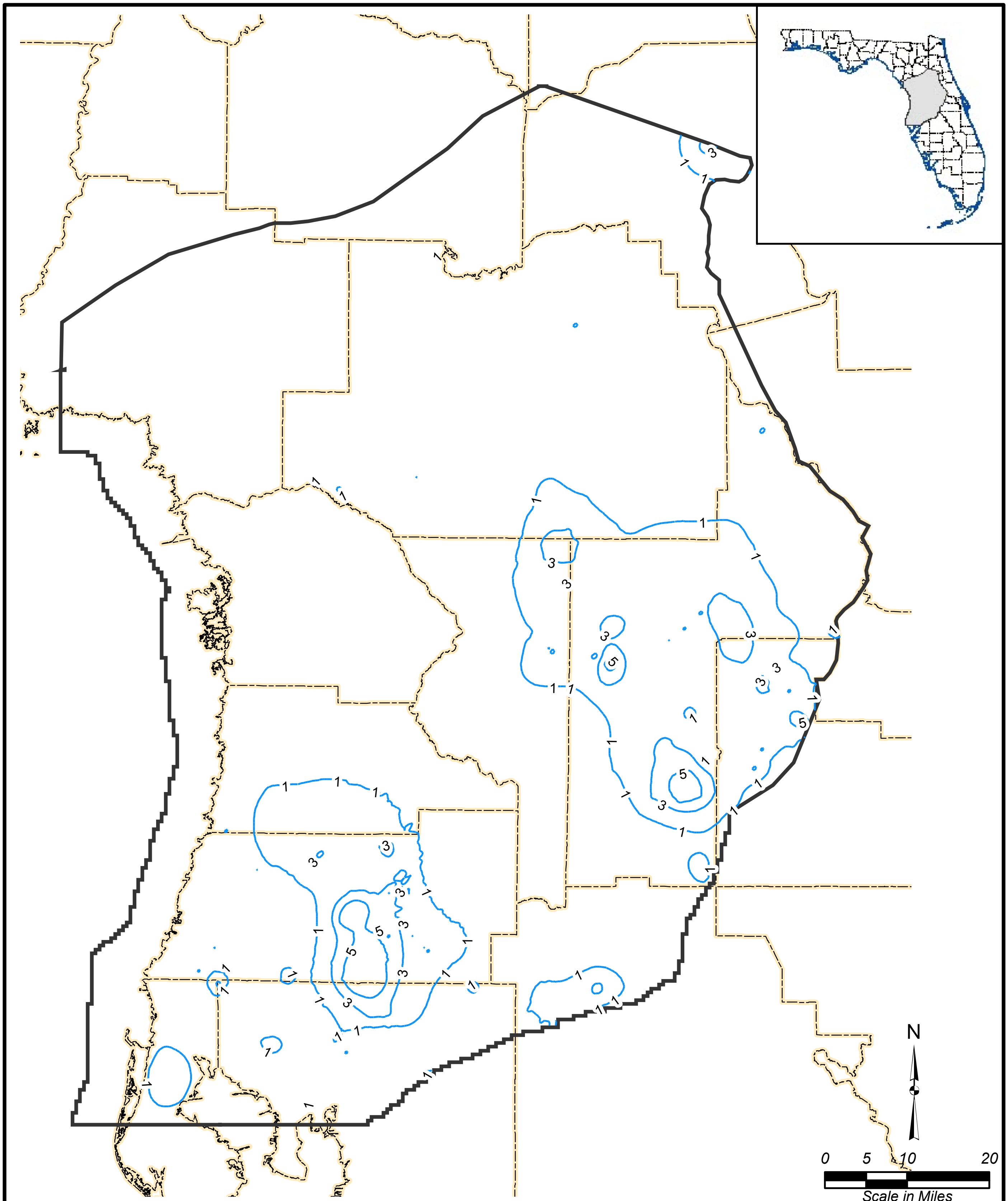
Fig 4_07 - DDN_SA_2025Pumping.mxd
5/31/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated Drawdown (ft)

Figure 4.7
Predicted SA Drawdown
(Scenario 3)



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DS_2003
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Figures

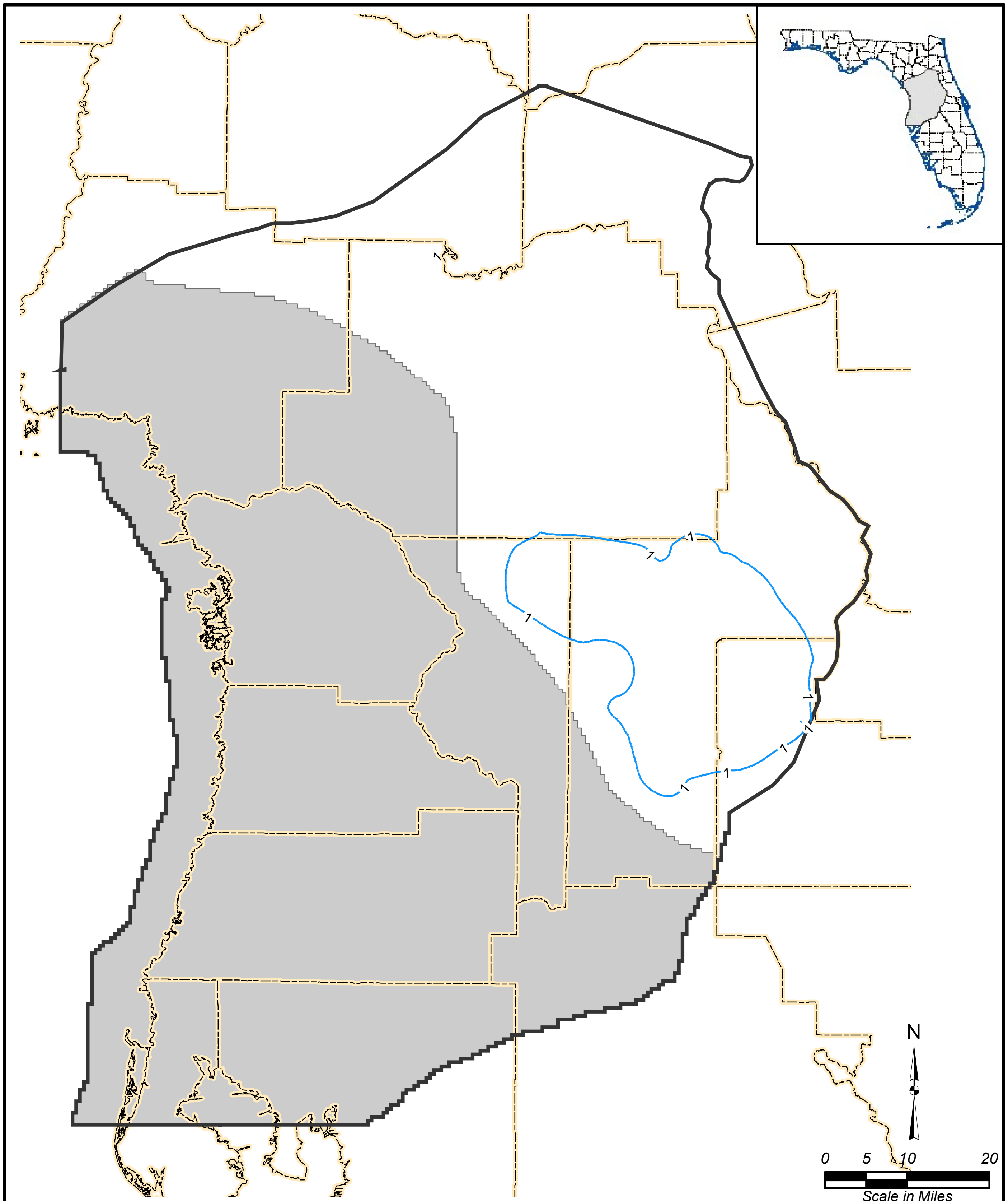
Fig 4_08 - DDN_UFA_2025Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.8
Predicted UFA Drawdown
(Scenario 3)



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DS_2003
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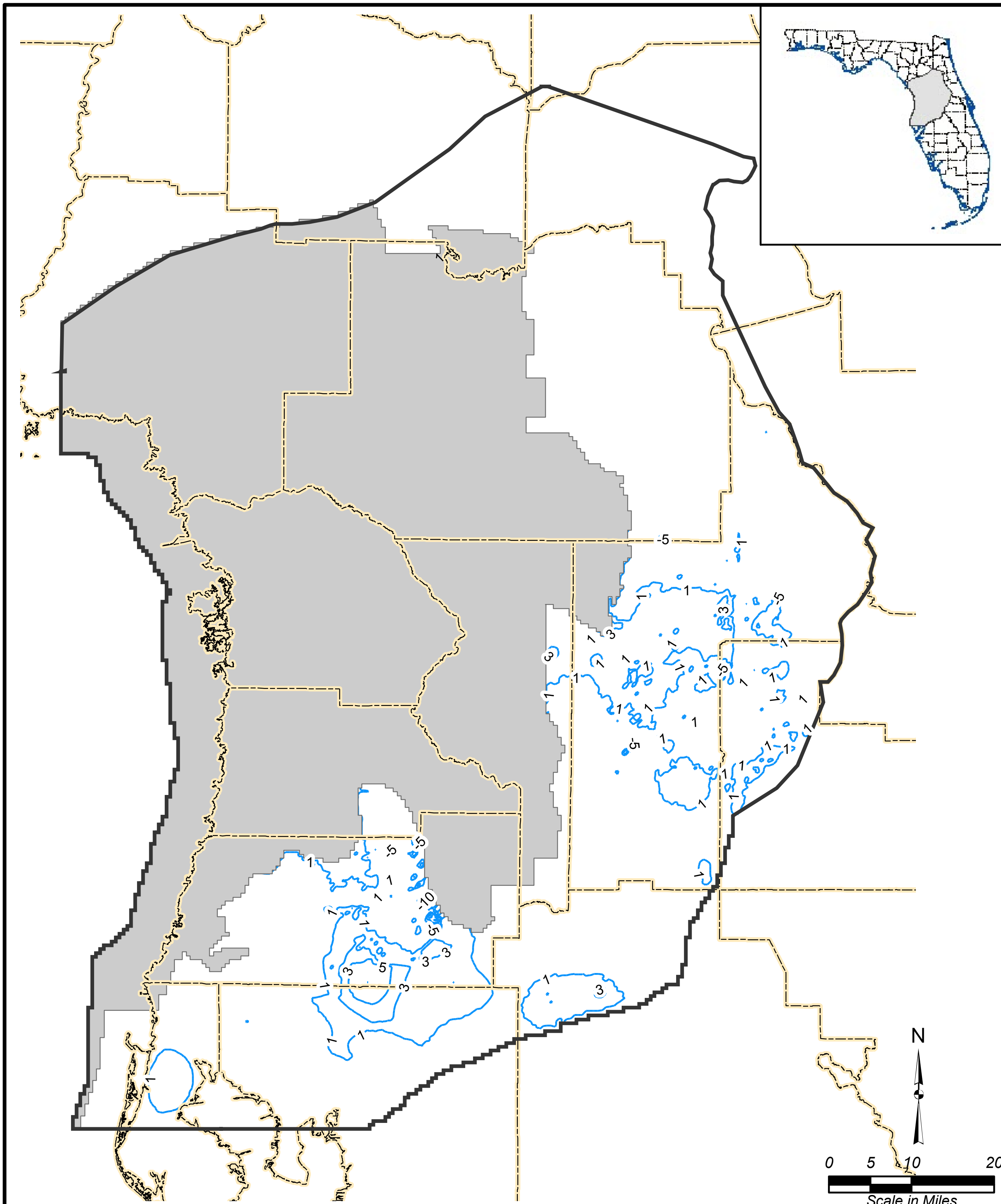
Fig 4_09 - DDN_LFA_2025Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.9
Predicted LFA Drawdown
(Scenario 3)



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DS_2003
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Figures

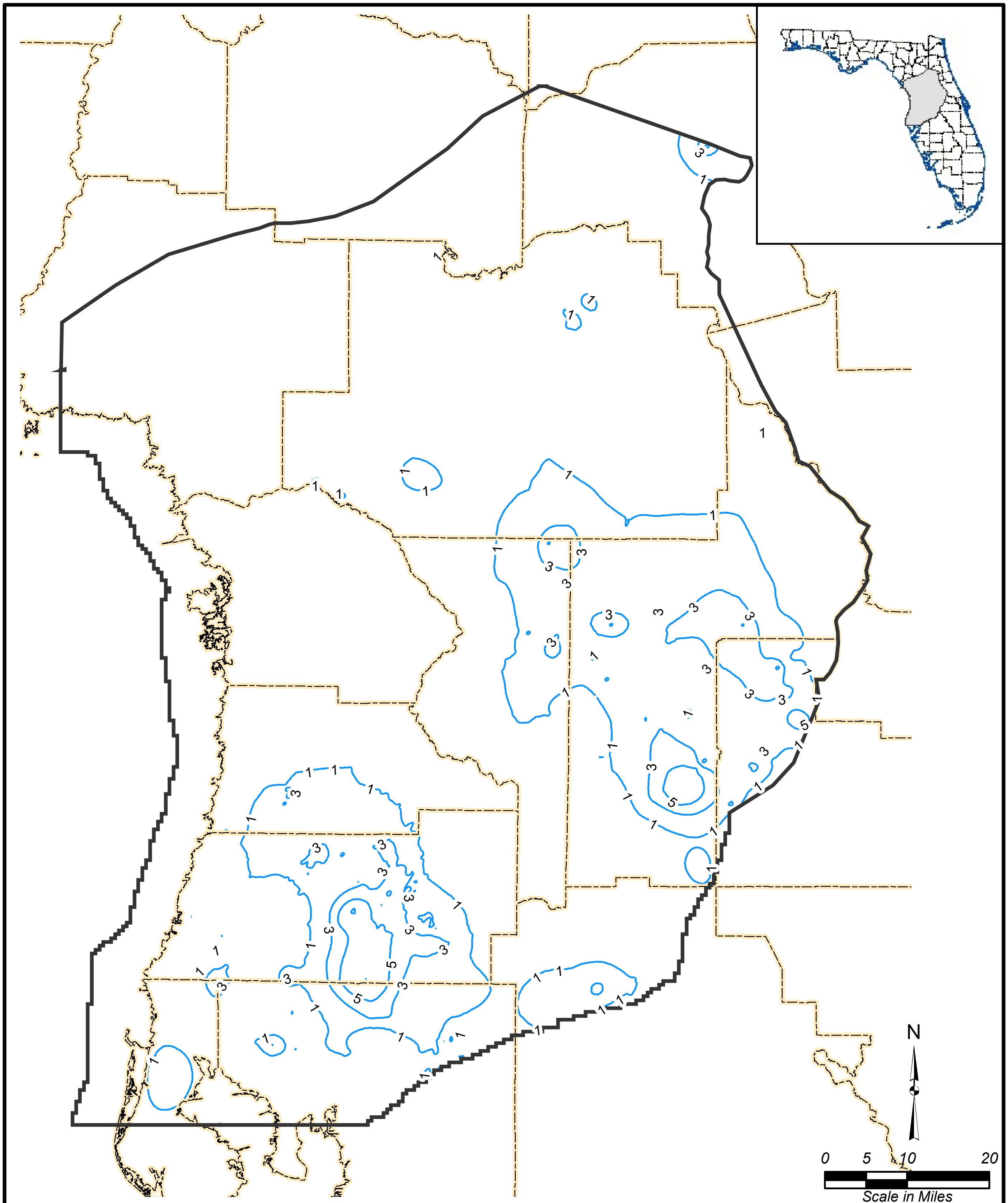
Fig 4_10 - DDN_SA_2035Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.10
Predicted SA Drawdown
(Scenario 4)



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DS_2003
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Fig 4_11 - DDN_UFA_2035Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area

County Boundary

Simulated Drawdown (ft)

Figure 4.11
Predicted UFA Drawdown
(Scenario 4)

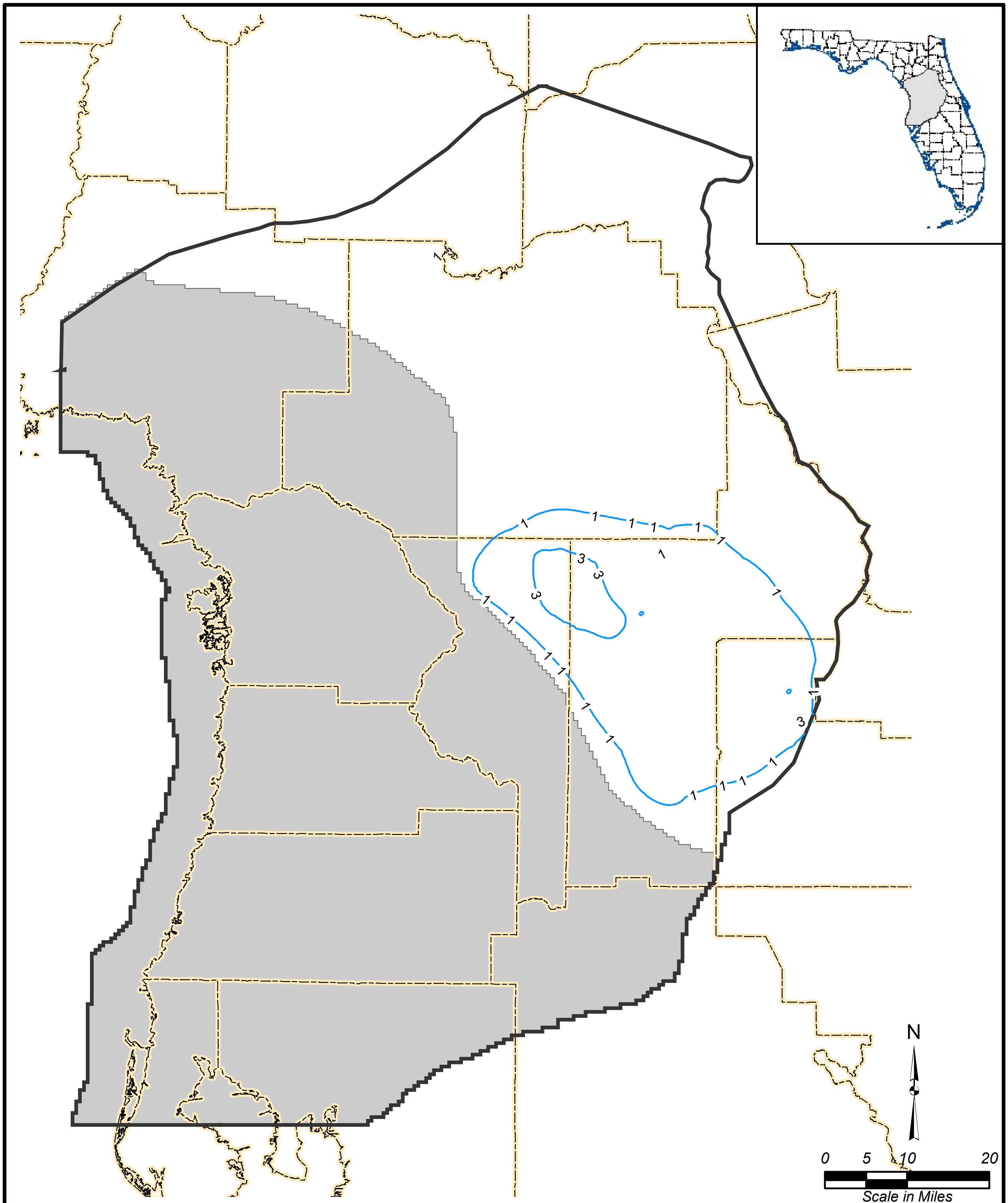

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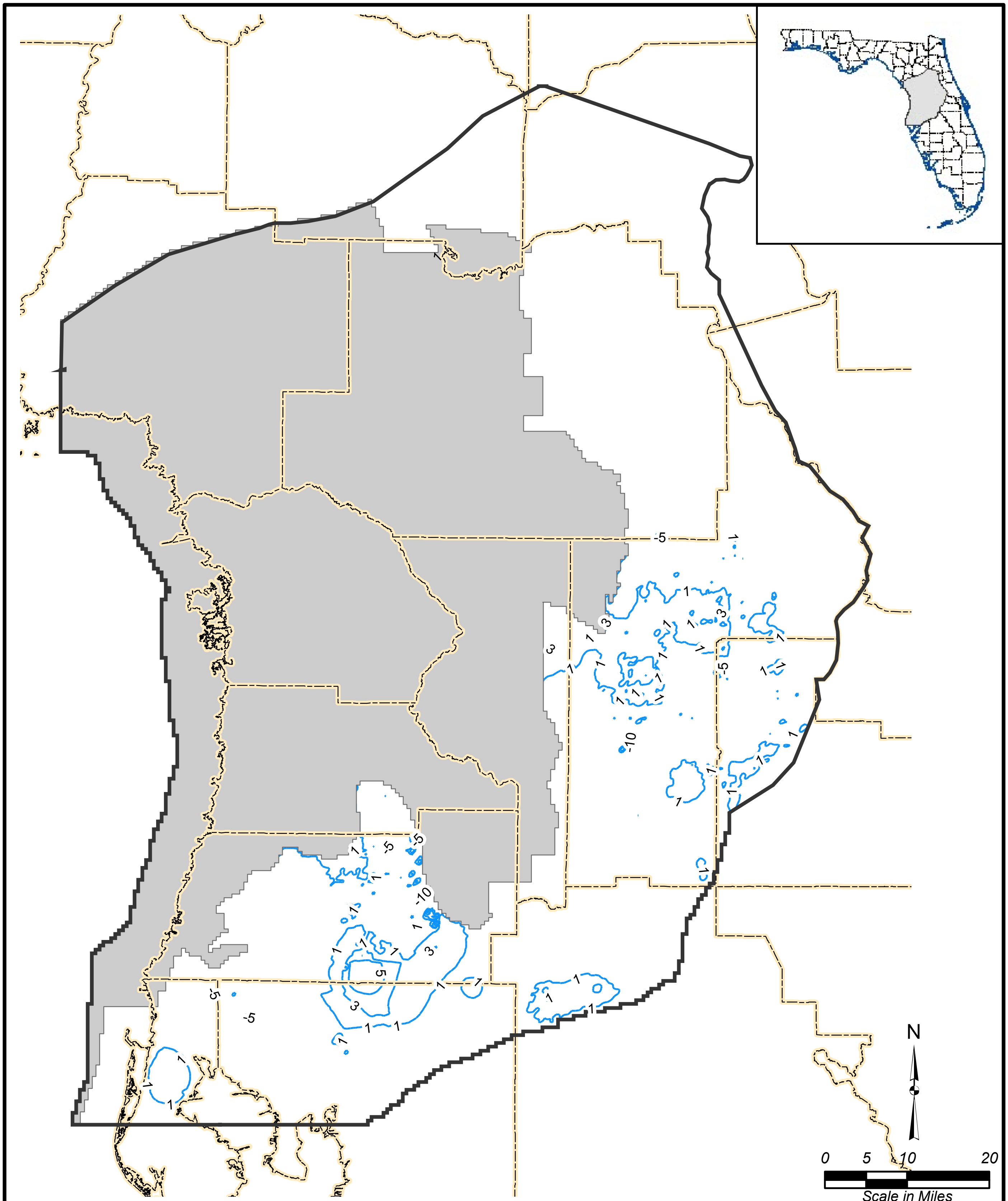
Fig 4_12 - DDN_LFA_2035Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.12
Predicted LFA Drawdown (Scenario 4)



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DS_2003
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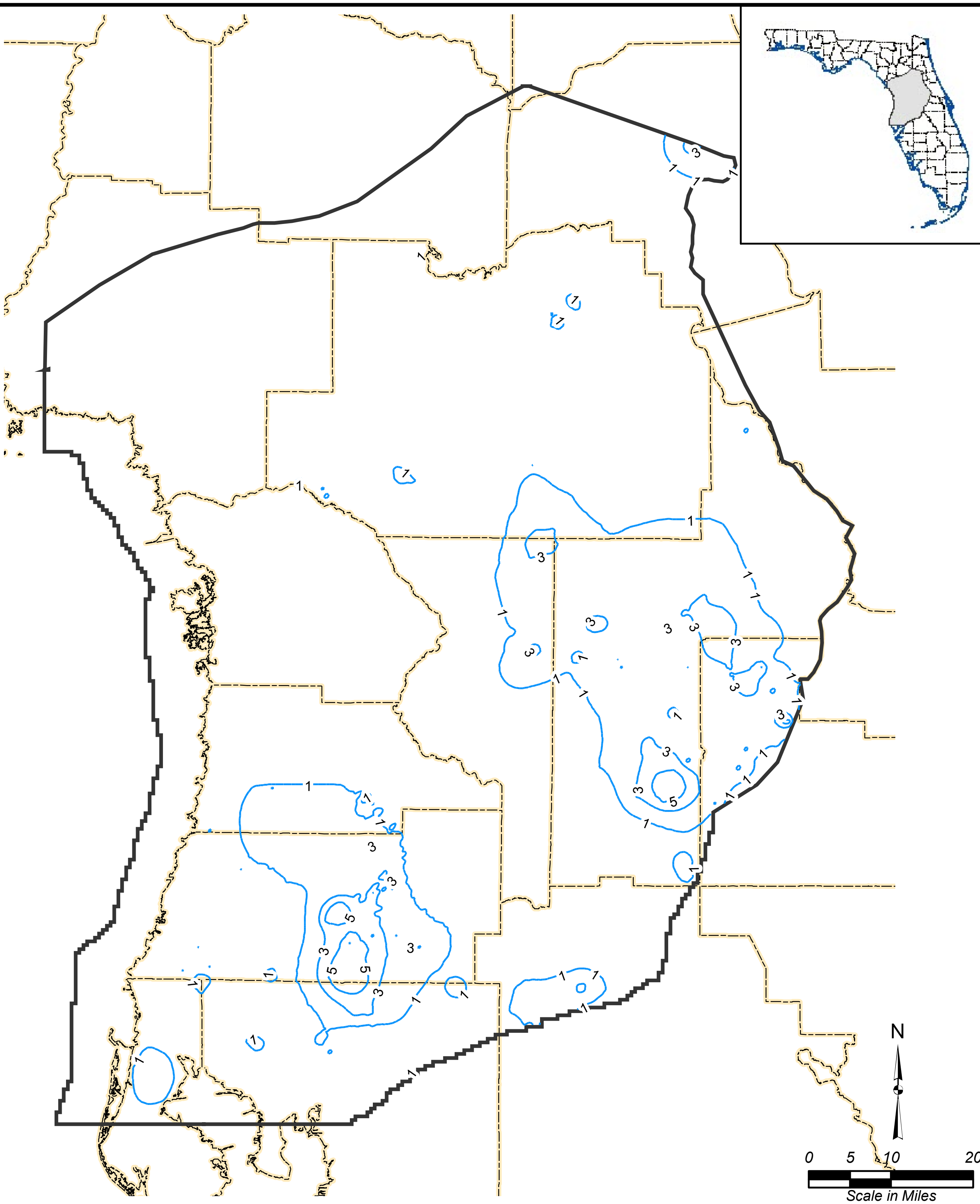
Fig 4_13 - DDN_SA_2035Pumping.mxd
5/31/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Simulated Drawdown (ft)

Figure 4.13
Predicted SA Drawdown
(Scenario 5)



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DS_2003
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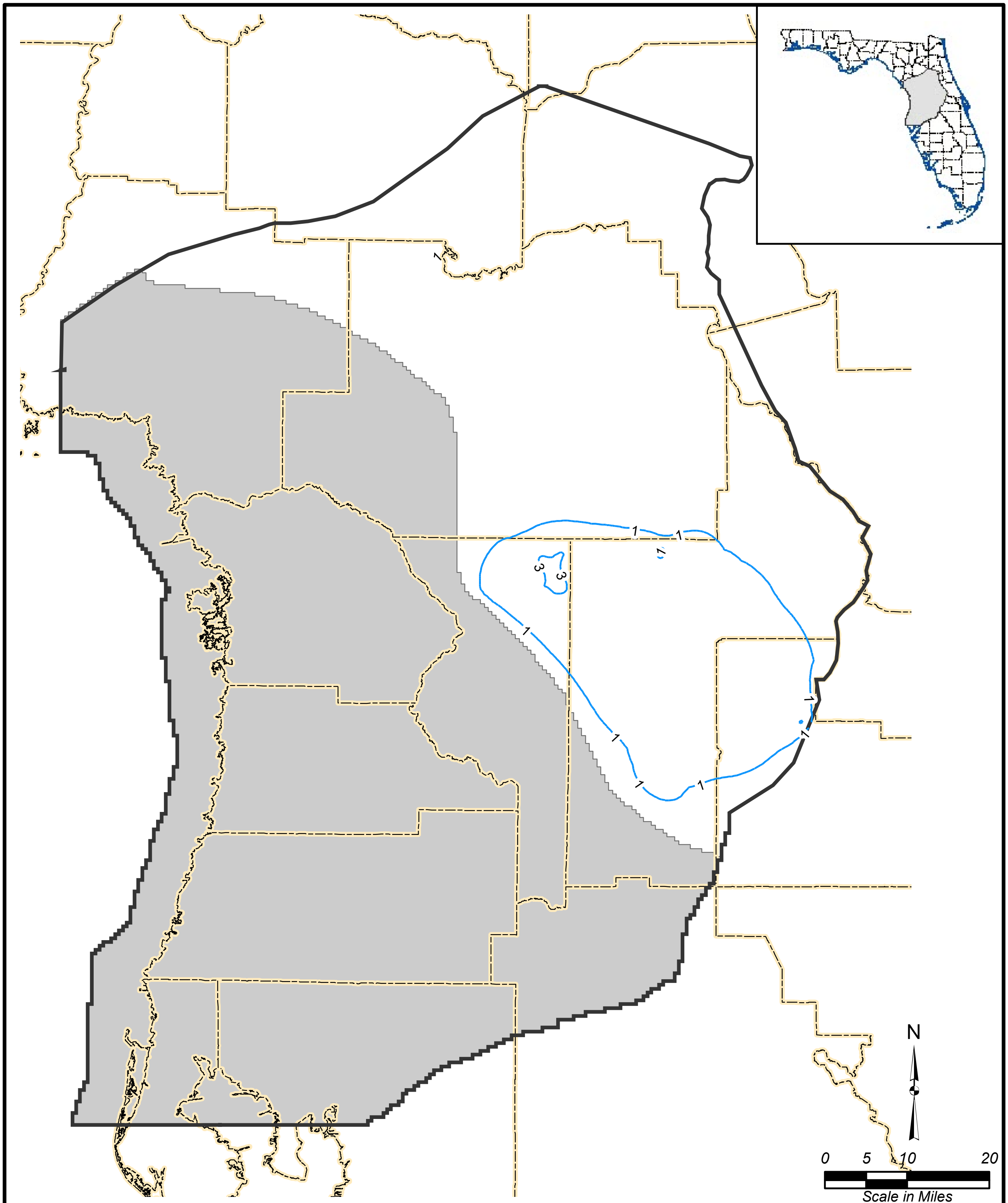
Fig 4_14 - DDN_UFA_2035Pumping.mxd
5/27/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated Drawdown (ft)

Figure 4.14
Predicted UFA Drawdown
(Scenario 5)



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DS_2003
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Fig 4_15 - DDN_LFA_2035Pumping.mxd
5/27/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

- Northern District Model Area
- County Boundary
- Simulated Drawdown (ft)

Figure 4.15
Predicted LFA Drawdown
(Scenario 5)

TABLES

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Table 2.1
Springs in the Northern District Model Domain

Spring ID***	Spring Name	Magnitude	County
1	Magnesia Springs*	3	Alachua
3	Wekiva	2	Levy
4	Silver Springs Nr Ocala	1	Marion
5	Juniper Springs	3	Marion
6	Fern Hammock Springs	2	Marion
7	Big King Spring*	3	Levy
9	Little King Spring	4	Levy
10	Waterfall Spring*	3	Marion
11	Rainbow 1 Spring	1	Marion
12	Bubbling Spring*	3	Marion
13	Sulfur Springs*	3	Citrus
15	Wilson Head Spring	3	Marion
16	Citrus-Blue Spring*	3	Citrus
17	Gum Springs 1	2	Sumter
18	Alligator Spring*	3	Sumter
19	Tarpon Spring*	3	Citrus
20	House Spring*	3	Citrus
21	Hunters Spring*	3	Citrus
22	Crystal River Group	1	Citrus
23	Manatee Sanctuary Spring	1	Citrus
24	Middle Springs*	3	Citrus
25	Three Sisters Run Spg 2*	3	Citrus
26	Three Sisters Run Spring*	3	Citrus
27	Idiots Delight Spring*	3	Citrus
28	Henry Green Spring*	3	Sumter
29	A Wayne Lee Spring*	3	Sumter
30	Halls River Head Main Spg	1	Citrus
31	Halls River 1 Spring*	3	Citrus
32	Belcher Spring*	3	Citrus
33	Abdoney Spring*	3	Citrus
34	Mcclain Spring*	3	Citrus
35	Trotter 1*	3	Citrus
36	Homosassa 1 Spring	2	Citrus
37	Se Fork Homosassa Spg	2	Citrus
38	Pumphouse Spring*	3	Citrus
39	Hidden River Head Spring	3	Citrus
40	Canal 485A Spring 2*	3	Sumter
41	Canal 485A Spring 1B*	3	Sumter
42	Canal 485 Spring 5*	3	Sumter
43	Big Hole (Dead Spring)*	3	Sumter
44	Bugg	3	Lake
45	Blue Springs	3	Lake
46	Potters Creek Spring	2	Citrus
47	Holiday Springs	3	Lake
48	Salt Creek Springs	4	Citrus
49	Crab Spring	2	Citrus
50	Chassahowitzka Main Spg	2	Citrus
52	Baird Spring	3	Citrus
53	Betee Jay Spring	3	Hernando
54	Ryle Creek Spring	3	Hernando
55	Blue Run Spring*	3	Hernando
56	Hernando Unnamed 10	2	Hernando
57	Hernando Unnamed 08*	3	Hernando
58	Blind Spring	2	Hernando
59	Bear*	3	Lake

Table 2.1 (continued)
Springs in the Northern District Model Domain

Spring ID***	Spring Name	Magnitude	County
60	Apopka	2	Lake
61	Mud Spring	2	Hernando
62	Salt Spring	2	Hernando
63	Hospital Hole*	3	Hernando
64	Jenkins Creek Spring	2	Hernando
65	Weeki Wachee Spring	1	Hernando
66	Hernando Unnamed 02	4	Hernando
67	Boat Spring	4	Hernando
68	Bobhill Spg Nr Aripeka	3	Hernando
69	Palm Island Spring*	3	Hernando
70	Magnolia Spring	3	Hernando
71	Gator Spring	4	Pasco
72	Jewfish Hole*	3	Pasco
73	Isabella Spring*	3	Pasco
74	Horseshoe Springs	2	Pasco
75	Cedar Island A And B*	3	Pasco
76	Hudson Spring*	3	Pasco
77	Salt Spring 2	3	Pasco
78	Pasco Unnamed 1A And 1B	4	Pasco
79	Seven Springs	2	Pasco
80	Crystal Spgs Nr Zephyrhills	2	Pasco
81	Tarpon Springs*	3	Pinellas
82	Health Spring*	3	Pinellas
83	Sage Spring*	3	Pinellas
84	Crystal Beach Spring*	3	Pinellas
85	Purity Spring	4	Hillsborough
86	Sulphur Spgs At Sul Spgs	2	Hillsborough
87	Lettuce Lake Spring	3	Hillsborough
88	Six Mile Creek Spring	3	Hillsborough
89	Lowry Park Spring*	3	Hillsborough
91	Eureka Springs	3	Hillsborough
92	City Of Tampa Water Supply*	3	Hillsborough
93	Fenney Springs	2	Sumter
94	Alexander Springs	1	Lake
95	Blackwater Springs	3	Lake
96	Blue Spring – Marion**	4	Marion
97	Camp La No Che Spring	3	Lake
99	Droty Spring	4	Lake
101	Messant Spring	2	Lake
102	Morman Branch Springs	3	Marion
104	Orange Spring	3	Marion
105	Palm Springs - Lake	4	Lake
106	Rock Springs	2	Orange
107	Salt Springs	2	Marion
108	Seminole Springs - Lake	2	Lake
109	Silver Glen Springs	1	Marion
110	Sulphur Spring	4	Orange
111	Sweetwater Springs	2	Marion
112	Tobacco Patch Landing Springs**	3	Marion
114	Witherington Spring	3	Orange
115	Camp Seminole	4	Marion
132	Blue Spring	3	Levy
134	Catfish Spring**	3	Marion
135	Bright Angel Spring**	3	Marion
136	Fish Hook # 2 Spring**	3	Marion
137	Fish Hook # 1 Spring**	3	Marion
138	Sims Spring Marion**	3	Marion

Table 2.1 (continued)
Springs in the Northern District Model Domain

Spring ID***	Spring Name	Magnitude	County
139	Wells Landing**	3	Marion
140	Riversites Spring**	3	Marion
141***	Belton's Millpond Springs	3	Sumter

Note:
* Estimated, no observed spring discharge available.
** Estimated based on relationship between Rodman stage, nearby wells, and discharge measurements.
*** There are gaps in the spring ID number. There are 115 springs in this table.

Table 3.1
Annual Net Recharge[1]
Used in the Northern District Model

Groundwater Basin	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2010	Average
Northern	12.95	14.58	17.50	18.58	9.91	5.72	12.42	20.47	14.41	18.22	16.57	8.31	11.84	13.96
Central	9.09	8.90	11.27	10.51	2.83	-2.73	6.47	13.81	8.27	13.65	13.63	4.11	7.04	8.22
Eastern	9.86	2.70	12.49	12.24	3.91	1.91	6.97	15.96	6.69	12.11	4.61	2.67	8.50	7.74

Note:
[1]in/yr.

Table 3.2
Comparison of Observed and Simulated Head Differences Across the Intermediate Confining Unit

Site Name	County	Data Period	Observed Head Difference (ft)	Simulated Head Difference (ft) 1995	Simulated Head Difference (ft) 2010
Lk Grandin Wells	Putnam	1995	5.2	1.0	0.9
Hawthorne Tower	Alachua	1995	48.7	53.8	52.8
EH Miller School	Putnam	8/1999-8/2012	28.7	7.5	3.7
Johnson Field	Putnam	1995	-3.2	-7.0	-6.5
Frontier Dance Hall	Putnam	1995	8.5	10.6	7.9
Redwater Lake	Marion	1995	4.9	3.4	2.6
SR19 & 40	Marion	6/2008-12/2012	-0.8	4.4	3.4
Astor Park	Lake	1995	3.3	1.2	0.8
Alexander Spring CR445	Lake	1995	2.4	5.6	4.3
Blue House	Marion	5/2003-1/2013	3.1	2.3	1.8
Seminole SF New	Lake	6/2002-9/2012	3.3	8.2	6.4
Rock Spring Wells	Orange	11/1997-1/2013	0.4	1.3	0.8
Groveland Fire Tower	Lake	1995	-1.2	0.0	0.1
Plymouth Tower	Orange	1995	71.3	64.6	57.7
Crate Mill	Orange	1/2003-1/2013	67.5	51.8	42.2
Mascotte SA	Lake	1995	0.8	0.02	0.02

Notes:
Head difference = head in the SAS – head in the UFA

Table 3.3
Comparison of Observed and Simulated Head Differences Across the Middle Confining Unit

Site Name	County	Data Period	Observed Head Difference (ft)	Simulated Head Difference (ft) 1995	Simulated Head Difference (ft) 2010
Avatar Test Well	Marion	1/9/2013	-3.3	-3.4	-2.8
Indian Lake State Street	Marion	1/9/2013	-2.6	-3.1	-2.5
City of Ocala Test Wells	Marion	2011	NA	-3.1	-2.9
Wildwood	Sumter	2010	-2.4	-2.7	-2.7
Carrot Barn Wells	Lake	05/2004-07/2012	-0.5	0.0	-1.0
Romp 117	Sumter	10/2011-03/2013	-5.0	-0.5	-0.5
Romp 111.5	Lake	12/2011-02/2012	6.0	4.1	3.1
Seminole State Forest	Lake	06/2002-09/2012	1.0	1.4	0.9
Plymouth Tower	Orange	03/2004-12/2012	4.2	0.6	0.4
Keene Lake Wells	Lake	09/2000-11/2012	31.8	31.3	31.7

Notes:
Head difference = head in the UFA – head in the LFA

Table 3.4
1995 Steady-State Calibration Statistics Summary for Three Groundwater Basins in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	117	-0.65	5.07	6.48	-15.92	19.57
UFA	3 - 5	267	0.68	4.26	5.94	-17.64	28.32
Suwannee Limestone	3	86	0.43	4.75	6.83	-17.64	28.32
Ocala Limestone	4	118	0.77	3.80	5.07	-9.84	21.42
Upper Avon Park Formation	5	63	0.88	4.45	6.12	-14.21	20.22
MCUI/MCUII	6	1	-10.66	10.66	10.66	-10.66	-10.66

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.5
1995 Steady-State Calibration Statistics Summary
Relative to the 5 Percent Criterion for the Northern District Model

Unit	Minimum Value (ft)	Maximum Value (ft)	5 Percent of Total Observed Water Level Change MAE[1] Criteria (ft)	MAE[1] / Observed Water Level Change	RMSE[2] / Observed Water Level Change
SA	2.70	142.40	6.99	4%	5%
UFA	0.80	130.00	6.46	3%	5%
Suwannee Limestone	0.80	91.20	4.52	5%	8%
Ocala Limestone	1.20	118.40	5.86	3%	4%
Upper Avon Park Formation	1.30	130.00	6.44	3%	5%
MCU1/MCUII	43.00	43.00	NA	NA	NA

Notes:
[1]MAE= Mean Absolute Error
[2]RMSE = Root Mean Square Error

Table 3.6
1995 Steady-State Calibration Statistics Summary for the Northern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	6	1.79	3.29	3.77	-4.19	5.65
UFA	3 - 5	137	0.17	3.77	4.73	-14.21	13.17
Suwannee Limestone	3	17	-0.35	4.04	4.73	-7.80	7.13
Ocala Limestone	4	71	0.20	3.53	4.33	-9.84	9.81
Upper Avon Park Formation	5	49	0.31	4.03	5.26	-14.21	13.17
MCUI/MCUII	6	1	-10.66	10.66	10.66	-10.66	-10.66

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.7
1995 Steady-State Calibration Statistics Summary for the Central Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	101	-0.75	5.52	6.86	-15.92	19.57
UFA	3 - 5	96	1.84	5.30	7.72	-17.64	28.32
Suwannee Limestone	3	69	0.62	4.93	7.26	-17.64	28.32
Ocala Limestone	4	14	6.37	6.41	8.88	-0.23	21.42
Upper Avon Park Formation	5	13	3.40	6.05	8.71	-9.40	20.22
MCUI/MCUII	6	0	N/A	N/A	N/A	0.00	0.00

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.8
1995 Steady-State Calibration Statistics Summary for the Eastern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual [1] (ft)
SA	1	10	-1.05	1.60	2.48	-6.48	1.45
UFA	3 - 5	34	-0.51	3.31	4.26	-9.55	8.17
Suwannee Limestone	3	0	N/A	N/A	N/A	N/A	N/A
Ocala Limestone	4	33	-0.40	3.29	4.27	-9.55	8.17
Upper Avon Park Formation	5	1	-3.95	3.95	0.69	-3.95	-3.95
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.9
1995 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Magnesia Springs*	3	Alachua	3.17	5.00	-1.83	-37%
House Spring*	3	Citrus	2.43	5.00	-2.57	-51%
Crystal River Group	1	Citrus	343.29	350.00	-6.71	-2%
Manatee Sanctuary Spring	1	Citrus	98.07	100.00	-1.93	-2%
Halls River Head Main Spg	1	Citrus	98.71	102.00	-3.29	-3%
Halls River 1 Spring*	3	Citrus	6.21	5.00	1.21	24%
Belcher Spring*	3	Citrus	4.71	5.00	-0.29	-6%
Abdoney Spring*	3	Citrus	5.50	5.00	0.50	10%
Mcclain Spring*	3	Citrus	5.50	5.00	0.50	10%
Trotter 1*	3	Citrus	4.82	5.00	-0.18	-4%
Homosassa 1 Spring	2	Citrus	85.74	86.70	-0.96	-1%
Pumphouse Spring*	3	Citrus	4.17	5.00	-0.83	-17%
Hidden River Head Spring	3	Citrus	5.57	7.00	-1.43	-20%
Se Fork Homosassa Spg	2	Citrus	36.96	43.00	-6.04	-14%
Potters Creek Spring	2	Citrus	14.65	14.00	0.65	5%
Crab Spring	2	Citrus	33.53	35.00	-1.47	-4%
Chassahowitzka Main Spg	2	Citrus	65.26	65.80	-0.54	-1%
Tarpon Spring*	3	Citrus	4.03	5.00	-0.97	-19%
Sulfur Springs*	3	Citrus	4.21	5.00	-0.79	-16%
Citrus-Blue Spring*	3	Citrus	4.08	5.00	-0.92	-18%
Baird Spring	3	Citrus	3.34	3.00	0.34	11%
Salt Creek Springs	4	Citrus	0.44	0.40	0.04	9%
Hunters Spring*	3	Citrus	3.65	5.00	-1.35	-27%
Middle Springs*	3	Citrus	3.65	5.00	-1.35	-27%
Three Sisters Run Spg 2*	3	Citrus	3.65	5.00	-1.35	-27%
Three Sisters Run Spring*	3	Citrus	3.65	5.00	-1.35	-27%
Idiots Delight Spring*	3	Citrus	3.65	5.00	-1.35	-27%
Weeki Wachee Spring	1	Hernando	147.12	148.00	-0.88	-1%
Hernando Unnamed 10	2	Hernando	19.89	19.00	0.89	5%
Blind Spring	2	Hernando	42.77	43.00	-0.23	-1%
Mud Spring	2	Hernando	8.24	17.00	-8.76	-52%
Salt Spring	2	Hernando	22.04	22.00	0.04	0%
Jenkins Creek Spring	2	Hernando	17.42	15.00	2.42	16%
Betee Jay Spring	3	Hernando	7.30	7.00	0.30	4%
Ryle Creek Spring	3	Hernando	8.23	8.00	0.23	3%
Blue Run Spring*	3	Hernando	5.19	5.00	0.19	4%
Hernando Unnamed 08*	3	Hernando	5.00	5.00	0.00	0%
Hospital Hole*	3	Hernando	5.12	5.00	0.12	2%
Bobhill Spg Nr Aripeka	3	Hernando	2.00	2.00	0.00	0%
Palm Island Spring*	3	Hernando	5.00	5.00	0.00	0%
Magnolia Spring	3	Hernando	1.00	1.00	0.00	0%
Hernando Unnamed 02	4	Hernando	0.70	0.70	0.00	0%
Boat Spring	4	Hernando	0.40	0.40	0.00	0%
Sulphur Spgs At Sul Spgs	2	Hillsborough	7.07	25.00	-17.93	-72%
Lettuce Lake Spring	3	Hillsborough	7.83	8.00	-0.17	-2%
Six Mile Creek Spring	3	Hillsborough	0.98	1.00	-0.02	-2%
Eureka Springs	3	Hillsborough	0.99	1.00	-0.01	-1%
City Of Tampa Water Supply*	3	Hillsborough	1.26	5.00	-3.74	-75%
Purity Spring	4	Hillsborough	0.02	0.10	-0.08	-83%
Lowry Park Spring*	3	Hillsborough	4.25	5.00	-0.75	-15%

Table 3.9 (continued)
1995 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Apopka	2	Lake	25.73	25.10	0.63	3%
Bugg	3	Lake	9.26	10.70	-1.44	-13%
Blue Springs	3	Lake	4.27	3.00	1.27	42%
Bear*	3	Lake	9.24	5.00	4.24	85%
Holiday Springs	3	Lake	2.77	4.00	-1.23	-31%
Blue Spring	3	Levy	8.30	8.43	-0.13	-2%
Wekiva	2	Levy	45.12	45.00	0.12	0%
Big King Spring*	3	Levy	1.48	5.00	-3.52	-70%
Little King Spring	4	Levy	0.54	0.50	0.04	7%
Waterfall Spring*	3	Marion	4.53	5.00	-0.47	-9%
Wilson Head Spring	3	Marion	1.70	2.00	-0.30	-15%
Silver Springs Nr Ocala	1	Marion	700.66	707.90	-7.24	-1%
Rainbow 1 Spring	1	Marion	651.07	652.00	-0.93	0%
Fern Hammock Springs	2	Marion	5.77	11.00	-5.23	-48%
Juniper Springs	3	Marion	2.37	8.00	-5.63	-70%
Bubbling Spring*	3	Marion	1.73	5.00	-3.27	-65%
Horseshoe Springs	2	Pasco	5.78	10.00	-4.22	-42%
Seven Springs	2	Pasco	5.74	5.00	0.74	15%
Crystal Spgs Nr Zephyrhills	2	Pasco	38.48	42.67	-4.19	-10%
Jewfish Hole*	3	Pasco	5.00	5.00	0.00	0%
Isabella Spring*	3	Pasco	5.00	5.00	0.00	0%
Cedar Island A And B*	3	Pasco	5.00	5.00	0.00	0%
Hudson Spring*	3	Pasco	5.01	5.00	0.01	0%
Salt Spring 2	3	Pasco	7.87	8.00	-0.13	-2%
Gator Spring	4	Pasco	0.50	0.50	0.00	0%
Pasco Unnamed 1A And 1B	4	Pasco	0.10	0.10	0.00	0%
Tarpon Springs*	3	Pinellas	2.35	5.00	-2.65	-53%
Health Spring*	3	Pinellas	1.03	5.00	-3.97	-79%
Sage Spring*	3	Pinellas	0.93	5.00	-4.07	-81%
Crystal Beach Spring*	3	Pinellas	0.66	5.00	-4.34	-87%
Canal 485A Spring 2*	3	Sumter	2.23	5.00	-2.77	-55%
Gum Springs 1	2	Sumter	68.60	68.00	0.60	1%
Alligator Spring*	3	Sumter	4.78	5.00	-0.22	-4%
Canal 485 Spring 5*	3	Sumter	3.84	5.00	-1.16	-23%
Henry Green Spring*	3	Sumter	6.92	5.00	1.92	38%
A Wayne Lee Spring*	3	Sumter	6.00	5.00	1.00	20%
Canal 485A Spring 1B*	3	Sumter	2.24	5.00	-2.76	-55%
Big Hole (Dead Spring)*	3	Sumter	3.89	5.00	-1.11	-22%
Fenney Springs	2	Sumter	14.44	15.00	-0.56	-4%
Belton's Millpond Springs	3	Sumter	7.01	7.00	0.01	0%
Alexander Springs	1	Lake	105.07	105.00	0.07	0%
Blackwater Springs	3	Lake	1.54	1.80	-0.26	-14%
Camp La No Che Spring	3	Lake	0.98	1.00	-0.02	-2%
Droty Spring	4	Lake	0.70	0.80	-0.10	-12%
Messant Spring	2	Lake	14.67	15.50	-0.83	-5%
Palm Springs - Lake	4	Lake	0.15	0.50	-0.35	-70%
Seminole Springs - Lake	2	Lake	34.97	37.00	-2.03	-5%
Blue Spring - Marion**	3	Marion	5.22	5.10	0.12	2%
Morman Branch Springs	3	Marion	0.96	1.00	-0.04	-4%
Orange Spring	3	Marion	0.83	2.10	-1.27	-61%
Salt Springs	2	Marion	69.99	73.00	-3.01	-4%
Silver Glen Springs	1	Marion	108.63	108.00	0.63	1%

Table 3.9 (continued)
1995 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Sweetwater Springs	2	Marion	13.50	13.00	0.50	4%
Tobacco Patch Landing Springs**	3	Marion	2.05	2.00	0.05	3%
Catfish Spring	3	Marion	2.63	2.40	0.23	9%
Bright Angel Spring**	3	Marion	1.07	1.00	0.07	7%
Fish Hook # 2 Spring**	4	Marion	0.53	0.50	0.03	5%
Fish Hook # 1 Spring**	4	Marion	0.53	0.50	0.03	5%
Sims Spring Marion**	4	Marion	0.52	0.50	0.02	4%
Wells Landing**	3	Marion	5.20	5.20	0.00	0%
Riversites Spring**	3	Marion	1.31	1.30	0.01	1%
Camp Seminole	4	Marion	0.72	0.79	-0.07	-9%
Rock Springs	2	Orange	60.14	60.60	-0.46	-1%
Sulphur Spring	4	Orange	0.78	0.60	0.18	30%
Witherington Spring	3	Orange	2.43	1.00	1.43	143%
Total All Springs			3285.47	3404.19	-118.72	-3%
Total Springs with Observations			3114.97	3194.19	-79.22	-2%

Notes:
[1]Magnitudes are based on 1995 observations.
* Estimated, no observed spring discharge available.
** Estimated based on relationship between Rodman stage, nearby wells, and discharge measurements.

Table 3.10
1995 Steady-State Simulated and Observed Base Flow in the Northern District Model Domain

USGS Gage	Simulated Base Flow[1,5] (cfs)	Observed Base Flow[1,5] (cfs)	Simulation Error[2]	Percentage Error
Withlacoochee River near Cumpressco	8.3	8.1	0.2	3%
Withlacoochee River near Dade City	12.6	12.1	0.5	4%
Withlacoochee River at Trilby	39.4	37.1	2.3	6%
Withlacoochee River at Croom	75.6	70.3	5.3	8%
Withlacoochee River near Floral City	81.6	77.1	4.5	6%
Withlacoochee River at Wysong Dam	166.0	184.4	-18.4	-10%
Withlacoochee River near Holder[6]	**309.0**	**312.6**	**-3.6**	**-1%**
Hillsborough River above Crystal Springs	12.4	12.7	-0.3	-2%
Hillsborough River near Zephyrhills[3,4]	61.2	81.4	-20.2	-25%
Hillsborough River at Morris Bridge[4,6]	63.1	81.9	-18.8	-23%
Pithlachascotee River near Fivay	0.0	0.3	-0.3	-100%
Pithlachascotee River near New Port Richey[6]	**0.6**	**1.1**	**-0.5**	**-45%**
Anclote River near Elfers[6]	**3.1**	**3.7**	**-0.6**	**-16%**
Waccasassa River at Gulf Hammock[6]	**100.2**	**100.0**	**0.2**	**0%**
Cypress Creek at Worthington	**3.6**	**0.8**	**2.8**	**3%**
Trout Creek near Sulphur Springs	**0.3**	**0.3**	**-0.1**	**-20%**
Silver River at Conner	55.0	60.0	-5.0	-8%
Ocklawaha River near Moss Bluff	46.6	28.7	17.9	62%
Ocklawaha River at Conner	819.7	770.9	48.8	6%
Ocklawaha River near Eureka[6]	**830.0**	**699.3**	**130.8**	**19%**
Total[7]	**1306.0**	**1198.6**	**107.5**	**9%**

Notes:
[1]Cumulative base flow.
[2]Simulated error is the calculated difference between simulated and observed base flow values.
[3]Discharge at Crystal Springs not included in the net change in base flow between the Hillsborough River above Crystal Springs and Hillsborough River near Zephyrhills gages.
[4]Simulated base flow for Hillsborough River below Crystal spring include simulated spring discharge from Crystal spring near Zephyrhills.
[5]Base flow rates represent average values for the 1995 period.
[6]Downstream-most gage
[7]Sum of downstream-most gages

Table 3.11
1995 Simulated Steady-State Water Budget – Northern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	12.95	0.00
	Rivers and Lakes	0.88	1.13
	Boundaries	1.16	0.86
	Springs	0.00	1.98
	Wells	0.00	0.00
	Vertical flow between the SAS and UFA	3.00	14.03
Upper Floridan Aquifer	Rivers and Lakes	0.34	1.06
	Boundaries	1.54	2.36
	Springs	0.00	8.02
	Wells	0.02	0.88
	Vertical flow between the UFA and LFA	0.13	0.74
Lower Floridan Aquifer	Boundaries	0.11	0.72
	Wells	0.00	0.00

Table 3.12
1995 Simulated Steady-State Water Budget – Central Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	9.86	0.00
	Rivers and Lakes	0.88	2.64
	Boundaries	2.53	2.25
	Springs	0.00	2.05
	Wells	0.00	0.00
	Vertical flow between the SAS and UFA	6.19	12.52
Upper Floridan Aquifer	Rivers and Lakes	2.02	4.48
	Boundaries	2.24	1.74
	Springs	0.00	1.01
	Wells	0.00	3.36
	Vertical flow between the UFA and LFA	0.00	0.00
Lower Floridan Aquifer	Boundaries	0.00	0.00
	Wells	0.00	0.00

Table 3.13
1995 Simulated Steady-State Water Budget – Eastern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	9.09	0.00
	Rivers and Lakes	0.12	2.56
	Boundaries	0.07	0.12
	Springs	0.00	1.62
	Wells	0.00	0.00
	Vertical flow between the SAS and UFA	1.92	6.90
Upper Floridan Aquifer	Rivers and Lakes	0.00	2.01
	Boundaries	0.60	0.56
	Springs	0.00	3.15
	Wells	0.02	1.20
	Vertical flow between the UFA and LFA	3.09	1.77
Lower Floridan Aquifer	Boundaries	1.79	0.36
	Wells	0.00	0.11

Table 3.14
Transient Calibration Statistics Summary for Three Groundwater Basins in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	137	-0.33	4.77	6.32	-18.45	15.84
UFA	3 - 5	348	0.74	4.14	5.53	-18.45	21.46
Suwannee Limestone	3	106	0.33	4.19	5.82	-18.45	21.46
Ocala Limestone	4	167	0.89	4.16	5.48	-11.90	17.14
Upper Avon Park Formation	5	75	0.99	4.01	5.21	-10.51	13.74
MCUI/MCUII	6	1	-7.48	7.48	7.48	-7.48	-7.48
LFA	7	4	0.69	4.88	6.28	-4.32	11.13

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.15
Transient Calibration Statistics Relative to the 5 Percent Maximum Absolute Error Criterion for the Northern District Model

Unit	Minimum Value (ft)	Maximum Value (ft)	5 Percent of Total Observed Water Level Change MAE[1] Criteria (ft)	MAE[1] / Observed Water Level Change	RMSE[2] / Observed Water Level Change
SA	1.12	141.49	7.02	3%	5%
UFA	0.84	128.44	6.38	3%	4%
Suwannee Limestone	1.29	89.49	4.41	5%	7%
Ocala Limestone	0.84	117.14	5.81	4%	5%
Upper Avon Park Formation	1.47	128.44	6.35	3%	4%
MCU1/MCUII	45.22	45.22	NA	NA	NA

Notes:
[1]MAE= Mean Absolute Error
[2]RMSE = Root Mean Square Error

Table 3.16
Transient Calibration Statistics Summary for the Northern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	18	0.98	3.28	4.14	-6.36	8.78
UFA	3 - 5	157	0.41	3.61	4.59	-11.90	13.74
Suwannee Limestone	3	19	1.13	3.26	3.83	-6.66	7.11
Ocala Limestone	4	83	0.20	3.69	4.67	-11.90	9.41
Upper Avon Park Formation	5	55	0.47	3.59	4.72	-10.51	13.74
MCUI/MCUII	6	1	-7.48	7.48	7.48	-7.48	-7.48

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.17
Transient Calibration Statistics Summary for the Central Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	96	-0.33	5.44	7.04	-18.45	15.84
UFA	3 - 5	140	1.46	5.09	6.77	-18.45	21.46
Suwannee Limestone	3	85	0.20	4.45	6.23	-18.45	21.46
Ocala Limestone	4	35	3.99	6.58	8.12	-11.85	17.14
Upper Avon Park Formation	5	20	2.40	5.18	6.38	-6.73	12.76
MCUI/MCUII	6	0	N/A	N/A	N/A	0.00	0.00

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.18
Transient Calibration Statistics Summary for the Eastern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	23	-1.37	3.17	4.21	-11.26	5.36
UFA	3 - 5	50	-0.20	3.18	4.24	-9.93	13.09
Suwannee Limestone	3	2	-1.75	3.18	2.56	-3.62	0.13
Ocala Limestone	4	48	-0.13	3.24	4.30	-9.93	13.09
Upper Avon Park Formation	5	0	N/A	N/A	N/A	N/A	0.00
MCUI/MCUII	6	0	N/A	N/A	N/A	0.00	0.00
LFA	7	4	0.69	4.88	6.28	-4.32	11.13

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.19
Time-Averaged Transient Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Magnesia Springs*	3	Alachua	3.72	5.00	-1.28	-26%
House Spring*	3	Citrus	2.83	5.00	-2.17	-43%
Crystal River Group	1	Citrus	364.02	350.00	14.02	4%
Manatee Sanctuary Spring	1	Citrus	103.99	100.00	3.99	4%
Halls River Head Main Spg	1	Citrus	106.15	102.00	4.15	4%
Halls River 1 Spring*	3	Citrus	6.63	5.00	1.63	33%
Belcher Spring*	3	Citrus	5.61	5.00	0.61	12%
Abdoney Spring*	3	Citrus	5.89	5.00	0.89	18%
Mcclain Spring*	3	Citrus	5.89	5.00	0.89	18%
Trotter 1*	3	Citrus	5.16	5.00	0.16	3%
Homosassa 1 Spring	**2**	**Citrus**	92.24	**92.01**	**0.23**	**0%**
Pumphouse Spring*	3	Citrus	4.47	5.00	-0.53	-11%
Hidden River Head Spring	3	Citrus	7.44	7.00	0.44	6%
Se Fork Homosassa Spg	2	Citrus	39.54	43.00	-3.46	-8%
Potters Creek Spring	2	Citrus	15.57	14.00	1.57	11%
Crab Spring	2	Citrus	36.08	35.00	1.08	3%
Chassahowitzka Main Spg	**2**	**Citrus**	61.01	**60.43**	**0.58**	**1%**
Tarpon Spring*	3	Citrus	4.38	5.00	-0.62	-12%
Sulfur Springs*	3	Citrus	4.37	5.00	-0.63	-13%
Citrus-Blue Spring*	3	Citrus	4.14	5.00	-0.86	-17%
Baird Spring	3	Citrus	3.55	3.00	0.55	18%
Salt Creek Springs	4	Citrus	0.46	0.40	0.06	16%
Hunters Spring*	3	Citrus	3.67	5.00	-1.33	-27%
Middle Springs*	3	Citrus	3.67	5.00	-1.33	-27%
Three Sisters Run Spg 2*	3	Citrus	3.67	5.00	-1.33	-27%
Three Sisters Run Spring*	3	Citrus	3.67	5.00	-1.33	-27%
Idiots Delight Spring*	3	Citrus	3.67	5.00	-1.33	-27%
Weeki Wachee Spring	1	Hernando	165.80	164.71	1.09	1%
Hernando Unnamed 10	2	Hernando	21.02	19.00	2.02	11%
Blind Spring	2	Hernando	43.35	43.00	0.35	1%
Mud Spring	2	Hernando	10.40	17.00	-6.60	-39%
Salt Spring	2	Hernando	23.75	22.00	1.75	8%
Jenkins Creek Spring	2	Hernando	18.83	15.00	3.83	26%
Betee Jay Spring	3	Hernando	7.61	7.00	0.61	9%
Ryle Creek Spring	3	Hernando	8.61	8.00	0.61	8%
Blue Run Spring*	3	Hernando	5.46	5.00	0.46	9%
Hernando Unnamed 08*	3	Hernando	5.00	5.00	0.00	0%
Hospital Hole*	3	Hernando	5.50	5.00	0.50	10%
Bobhill Spg Nr Aripeka	3	Hernando	2.40	2.00	0.40	20%
Palm Island Spring*	3	Hernando	5.02	5.00	0.02	0%
Magnolia Spring	3	Hernando	1.06	1.00	0.06	6%
Hernando Unnamed 02	4	Hernando	1.99	0.70	1.29	184%
Boat Spring	4	Hernando	0.42	0.40	0.02	5%
Sulphur Spgs At Sul Spgs	2	Hillsborough	11.61	25.00	-13.39	-54%
Lettuce Lake Spring	3	Hillsborough	7.30	8.00	-0.70	-9%
Six Mile Creek Spring	3	Hillsborough	0.91	1.00	-0.09	-9%
Eureka Springs	3	Hillsborough	0.88	1.00	-0.12	-12%
City Of Tampa Water Supply*	3	Hillsborough	2.54	5.00	-2.46	-49%
Purity Spring	4	Hillsborough	0.03	0.10	-0.07	-71%
Lowry Park Spring*	3	Hillsborough	5.92	5.00	0.92	18%

Table 3.19 (continued)
Time-Averaged Transient Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Apopka	2	Lake	22.55	25.10	-2.55	-10%
Bugg	3	Lake	7.30	9.00	-1.70	-19%
Blue Springs	3	Lake	1.99	3.00	-1.01	-34%
Bear*	3	Lake	3.78	5.00	-1.22	-24%
Holiday Springs	3	Lake	0.96	4.00	-3.04	-76%
Blue Spring	3	Levy	8.68	8.43	0.25	3%
Wekiva	2	Levy	45.21	45.00	0.21	0%
Big King Spring*	3	Levy	1.81	5.00	-3.19	-64%
Little King Spring	4	Levy	0.56	0.50	0.06	12%
Waterfall Spring*	3	Marion	4.48	5.00	-0.52	-10%
Wilson Head Spring	3	Marion	1.81	2.00	-0.19	-10%
Silver Springs Nr Ocala	1	Marion	626.55	634.36	-7.80	-1%
Rainbow 1 Spring	1	Marion	637.38	652.46	-15.08	-2%
Fern Hammock Springs	2	Marion	5.37	11.00	-5.63	-51%
Juniper Springs	3	Marion	1.94	8.00	-6.06	-76%
Bubbling Spring*	3	Marion	1.69	5.00	-3.31	-66%
Horseshoe Springs	2	Pasco	5.92	10.00	-4.08	-41%
Seven Springs	2	Pasco	5.37	50.00	-44.63	-89%
Crystal Spgs Nr Zephyrhills	**2**	**Pasco**	33.64	**41.83**	**-8.19**	**-20%**
Jewfish Hole*	3	Pasco	5.00	5.00	0.00	0%
Isabella Spring*	3	Pasco	5.47	5.00	0.47	9%
Cedar Island A And B*	3	Pasco	4.84	5.00	-0.16	-3%
Hudson Spring*	3	Pasco	4.78	5.00	-0.22	-4%
Salt Spring 2	3	Pasco	7.17	8.00	-0.83	-10%
Gator Spring	4	Pasco	0.52	0.50	0.02	4%
Pasco Unnamed 1A And 1B	4	Pasco	0.09	0.10	-0.01	-15%
Tarpon Springs*	3	Pinellas	2.23	5.00	-2.77	-55%
Health Spring*	3	Pinellas	0.87	5.00	-4.13	-83%
Sage Spring*	3	Pinellas	0.84	5.00	-4.16	-83%
Crystal Beach Spring*	3	Pinellas	0.59	5.00	-4.41	-88%
Canal 485A Spring 2*	3	Sumter	1.93	5.00	-3.07	-61%
Gum Springs 1	2	Sumter	60.05	59.06	0.99	2%
Alligator Spring*	3	Sumter	3.79	5.00	-1.21	-24%
Canal 485 Spring 5*	3	Sumter	3.67	5.00	-1.33	-27%
Henry Green Spring*	3	Sumter	6.21	5.00	1.21	24%
A Wayne Lee Spring*	3	Sumter	4.81	5.00	-0.19	-4%
Canal 485A Spring 1B*	3	Sumter	1.93	5.00	-3.07	-61%
Big Hole (Dead Spring)*	3	Sumter	3.22	5.00	-1.78	-36%
Fenney Springs	2	Sumter	11.89	15.00	-3.11	-21%
Belton's Millpond Springs	3	Sumter	3.05	7.00	-3.95	-56%
Alexander Springs	1	Lake	100.85	104.86	-4.01	-4%
Blackwater Springs	3	Lake	1.45	1.80	-0.35	-19%
Camp La No Che Spring	3	Lake	0.94	1.00	-0.06	-6%
Droty Spring	4	Lake	0.68	0.80	-0.12	-16%
Messant Spring	2	Lake	13.49	15.50	-2.01	-13%
Palm Springs - Lake	4	Lake	0.10	0.50	-0.40	-80%
Seminole Springs - Lake	2	Lake	31.96	37.00	-5.04	-14%
Blue Spring - Marion**	3	Marion	5.35	4.80	0.55	11%
Morman Branch Springs	3	Marion	0.92	1.00	-0.08	-8%
Orange Spring	3	Marion	1.70	2.10	-0.40	-19%
Salt Springs	2	Marion	74.30	82.48	-8.17	-10%

Table 3.19 (continued)
Time-Averaged Transient Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Silver Glen Springs	1	Marion	111.47	102.65	8.82	9%
Sweetwater Springs	2	Marion	14.13	13.42	0.71	5%
Tobacco Patch Landing Springs**	3	Marion	2.10	1.94	0.16	8%
Catfish Spring	3	Marion	2.69	2.26	0.43	19%
Bright Angel Spring**	3	Marion	1.10	0.98	0.12	12%
Fish Hook # 2 Spring**	4	Marion	0.53	0.51	0.02	4%
Fish Hook # 1 Spring**	4	Marion	0.53	0.51	0.02	4%
Sims Spring Marion**	4	Marion	0.53	0.51	0.02	4%
Wells Landing**	3	Marion	5.32	5.13	0.19	4%
Riversites Spring**	3	Marion	1.34	1.23	0.11	9%
Camp Seminole	4	Marion	0.73	0.79	-0.06	-8%
Rock Springs	2	Orange	55.69	55.48	0.22	0%
Sulphur Spring	4	Orange	0.74	0.60	0.14	24%
Witherington Spring	3	Orange	2.25	1.00	1.25	125%
Total All Springs			3237.71	3379.95	-142.24	-4%
Total Springs with Observations			3074.89	3174.95	-100.06	-3%

Notes:
[1]Magnitudes are based on 1995 observations.
* Estimated, no observed spring discharge available.
** Estimated based on relationship between Rodman stage, nearby wells, and discharge measurements.

Table 3.20
Transient Simulated and Observed Base Flow in the Northern District Model Domain

USGS Gage	Ave 2000 Simulated Base Flow [1] (cfs)	Ave 2000 Estimated Base Flow [1] (cfs)	2000 Simulation Error [2] (cfs)	Ave 2004 Simulated Base Flow[1] (cfs)	Ave 2004 Estimated Base Flow[1] (cfs)	2004 Simulation Error[2] (cfs)
Withlacoochee River near Cumpressco	6.6	0.2	6.4	4.6	6.3	-1.8
Withlacoochee River near Dade City	9.5	0.5	9.0	7.5	13.9	-6.4
Withlacoochee River at Trilby	21.4	3.1	18.4	25.1	55.9	-30.8
Withlacoochee River at Croom	46.4	4.9	41.5	75.5	139.7	-64.2
Withlacoochee River near Floral City	41.1	3.2	37.9	89.1	141.2	-52.1
Withlacoochee River at Wysong Dam	100.6	44.0	56.6	170.3	225.2	-55.0
Withlacoochee River near Holder [3]	**142.5**	**76.1**	**66.4**	**288.0**	**358.8**	**-70.8**
Hillsborough River above Crystal Springs	9.8	5.3	4.5	10.3	19.6	-9.4
Hillsborough River near Zephyrhills	50.9	33.7	17.2	52.1	83.4	-31.3
Hillsborough River at Morris Bridge [3]	**52.5**	**29.1**	**23.5**	**53.7**	**70.1**	**-16.4**
Cypress Creek at Worthington	1.5	0.0	1.4	1.5	6.8	-5.3
Trout Creek near Sulphur Springs	0.1	0.0	0.1	0.1	0.8	-0.6
Ocklawaha River at Eureka[3]	**476.1**	**562.7**	**-86.6**	**629.6**	**713.5**	**-83.9**

Notes:
[1]Cumulative base flow.
[2]Simulated error is the difference between simulated and observed base flow values.
[3]Downstream-most gage

Table 3.21
Simulated Transient Water Budget – Northern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	14.22	0.00
	Rivers and Lakes	1.17	1.10
	Boundaries	1.16	0.88
	Springs	0.00	2.95
	Wells	0.00	0.00
	Storage	5.76	5.68
	Vertical flow between the SAS and UFA	3.69	15.36
Upper Floridan Aquifer	Rivers and Lakes	0.37	1.37
	Boundaries	1.43	2.69
	Springs	0.00	7.96
	Wells	0.02	1.02
	Storage	0.89	0.75
	Vertical flow between the UFA and LFA	0.16	0.75
Lower Floridan Aquifer	Boundaries	0.11	0.70
	Wells	0.01	0.01
	Storage	0.00	0.00

Table 3.22
Simulated Transient Water Budget – Central Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	7.46	0.00
	Rivers and Lakes	0.93	2.60
	Boundaries	2.88	2.17
	Springs	0.00	2.00
	Wells	0.00	0.00
	Storage	6.09	5.66
	Vertical flow between the SAS and UFA	7.01	11.95
Upper Floridan Aquifer	Rivers and Lakes	2.47	3.76
	Boundaries	2.21	1.51
	Springs	0.00	1.01
	Wells	0.00	3.35
	Storage	0.11	0.08
	Vertical flow between the UFA and LFA	0.00	0.00
Lower Floridan Aquifer	Boundaries	0.00	0.00
	Wells	0.00	0.00
	Storage	0.00	0.00

Table 3.23
Simulated Transient Water Budget – Eastern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	8.19	0.00
	Rivers and Lakes	0.89	2.66
	Boundaries	0.11	0.11
	Springs	0.00	2.60
	Wells	0.00	0.00
	Storage	5.81	5.31
	Vertical flow between the SAS and UFA	1.98	6.34
Upper Floridan Aquifer	Rivers and Lakes	0.00	2.00
	Boundaries	0.64	0.45
	Springs	0.00	3.04
	Wells	0.02	0.90
	Storage	0.03	0.02
	Vertical flow between the UFA and LFA	3.05	1.70
Lower Floridan Aquifer	Boundaries	1.86	0.32
	Wells	0.02	0.01
	Storage	0.00	0.18

Table 3.24
2010 Steady-State Calibration Statistics Summary for Three Groundwater Basins in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	302	1.14	5.64	7.28	-27.50	18.87
ICU	2	7	0.23	3.80	4.48	-3.63	8.57
UFA	3 - 5	381	0.61	4.89	6.33	-20.79	20.89
Suwannee Limestone	3	215	0.05	5.13	6.61	-20.79	16.81
Ocala Limestone	4	136	1.26	4.50	5.92	-18.02	20.89
Upper Avon Park Formation	5	30	1.71	4.95	6.02	-8.70	13.28
MCUI/MCUII	6	1	12.88	12.88	12.88	12.88	12.88
LFA	7	2	4.11	8.16	9.14	-4.05	12.27

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.25
2010 Steady-State Calibration Statistics Summary
Relative to the 5 Percent Criterion for the Northern District Model

Unit	Minimum Value (ft)	Maximum Value (ft)	5 Percent of Total Observed Water Level Change MAE[1] Criteria (ft)	MAE[1] / Observed Water Level Change	RMSE[2] / Observed Water Level Change
SA	0.76	163.81	8.15	3%	4%
ICU	20.39	118.81	4.92	4%	5%
UFA	-3.62	126.79	6.52	4%	5%
Suwannee Limestone	0.89	117.62	5.84	4%	6%
Ocala Limestone	1.66	126.79	6.26	4%	5%
Upper Avon Park Formation	-3.62	117.36	6.05	4%	5%
MCU1/MCUII	-3.74	-3.74	NA	NA	NA
LFA	37.55	77.79	2.01	20%	23%

Notes:
[1]MAE= Mean Absolute Error
[2]RMSE = Root Mean Square Error

Table 3.26
2010 Steady-State Calibration Statistics Summary for the Northern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	30	-0.44	5.18	7.46	-27.50	7.58
UFA	3 - 5	161	-0.11	4.24	5.54	-18.02	14.52
Suwannee Limestone	3	106	-0.28	4.52	5.80	-15.77	14.52
Ocala Limestone	4	43	0.79	3.81	5.16	-18.02	10.03
Upper Avon Park Formation	5	12	-1.86	3.34	4.43	-8.70	7.39
MCUI/MCUII	6	1	12.88	12.88	12.88	12.88	12.88

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.27
2010 Steady-State Calibration Statistics Summary for the Central Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	230	1.07	5.49	7.02	-22.35	18.87
UFA	3 - 5	181	1.33	5.59	7.07	-20.79	20.89
Suwannee Limestone	3	93	0.59	5.96	7.55	-20.79	16.81
Ocala Limestone	4	73	1.50	4.96	6.36	-11.56	20.89
Upper Avon Park Formation	5	15	5.04	6.39	7.29	-7.02	13.28
MCUI/MCUII	6	0	N/A	N/A	N/A	0.00	0.00

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.28
Summary Steady-State Calibration Statistics Summary for the Eastern Groundwater Basin in the Northern District Model

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual [1] (ft)
SA	1	42	2.69	6.79	8.45	-20.53	15.50
ICU	2	7	0.23	3.80	4.48	-3.63	8.57
UFA	3 - 5	39	0.28	4.30	5.66	-10.92	16.19
Suwannee Limestone	3	16	-0.96	4.30	5.72	-10.92	14.04
Ocala Limestone	4	20	1.41	4.32	5.79	-7.14	16.19
Upper Avon Park Formation	5	3	-0.66	4.17	1.66	-4.33	5.28
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A
LFA	7	2	4.11	8.16	2.89	-4.05	12.27

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table 3.29
2010 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Magnesia Springs*	3	Alachua	2.54	5.00	-2.46	-49%
House Spring*	3	Citrus	2.18	5.00	-2.82	-56%
Crystal River Group	1	Citrus	330.58	315.00	15.58	5%
Manatee Sanctuary Spring	1	Citrus	94.43	100.00	-5.57	-6%
Halls River Head Main Spg	1	Citrus	112.43	102.00	10.43	10%
Halls River 1 Spring*	3	Citrus	5.86	5.00	0.86	17%
Belcher Spring*	3	Citrus	4.01	5.00	-0.99	-20%
Abdoney Spring*	3	Citrus	5.49	5.00	0.49	10%
Mcclain Spring*	3	Citrus	5.50	5.00	0.50	10%
Trotter 1*	3	Citrus	4.76	5.00	-0.24	-5%
Homosassa 1 Spring	**2**	**Citrus**	**74.50**	**75.43**	-0.93	-1%
Pumphouse Spring*	3	Citrus	4.07	5.00	-0.93	-19%
Hidden River Head Spring	3	Citrus	4.67	7.00	-2.33	-33%
Se Fork Homosassa Spg	2	Citrus	36.01	43.00	-6.99	-16%
Potters Creek Spring	2	Citrus	14.28	14.00	0.28	2%
Crab Spring	2	Citrus	32.52	35.00	-2.48	-7%
Chassahowitzka Main Spg	**2**	**Citrus**	**56.16**	**57.04**	-0.88	-2%
Tarpon Spring*	3	Citrus	3.83	5.00	-1.17	-23%
Sulfur Springs*	3	Citrus	0.00	5.00	-5.00	-100%
Citrus-Blue Spring*	3	Citrus	3.45	5.00	-1.55	-31%
Baird Spring	3	Citrus	3.25	3.00	0.25	8%
Salt Creek Springs	4	Citrus	0.42	0.40	0.02	6%
Hunters Spring*	3	Citrus	3.64	5.00	-1.36	-27%
Middle Springs*	3	Citrus	3.64	5.00	-1.36	-27%
Three Sisters Run Spg 2*	3	Citrus	3.64	5.00	-1.36	-27%
Three Sisters Run Spring*	3	Citrus	3.64	5.00	-1.36	-27%
Idiots Delight Spring*	3	Citrus	3.64	5.00	-1.36	-27%
Weeki Wachee Spring	1	Hernando	146.56	144.77	1.79	1%
Hernando Unnamed 10	2	Hernando	19.40	19.00	0.40	2%
Blind Spring	2	Hernando	42.54	43.00	-0.46	-1%
Mud Spring	2	Hernando	12.00	17.00	-5.00	-29%
Salt Spring	2	Hernando	19.45	22.00	-2.55	-12%
Jenkins Creek Spring	2	Hernando	16.42	15.00	1.42	9%
Betee Jay Spring	3	Hernando	7.17	7.00	0.17	2%
Ryle Creek Spring	3	Hernando	8.08	8.00	0.08	1%
Blue Run Spring*	3	Hernando	5.07	5.00	0.07	1%
Hernando Unnamed 08*	3	Hernando	5.00	5.00	0.00	0%
Hospital Hole*	3	Hernando	4.76	5.00	-0.24	-5%
Bobhill Spg Nr Aripeka	3	Hernando	1.84	2.00	-0.16	-8%
Palm Island Spring*	3	Hernando	4.99	5.00	-0.01	0%
Magnolia Spring	3	Hernando	0.98	1.00	-0.02	-2%
Hernando Unnamed 02	4	Hernando	0.30	0.70	-0.40	-57%
Boat Spring	4	Hernando	0.39	0.40	-0.01	-2%
Sulphur Spgs At Sul Spgs	2	Hillsborough	8.70	25.00	-16.30	-65%
Lettuce Lake Spring	3	Hillsborough	4.88	8.00	-3.12	-39%
Six Mile Creek Spring	3	Hillsborough	0.61	1.00	-0.39	-39%
Eureka Springs	3	Hillsborough	0.50	1.00	-0.50	-50%
City Of Tampa Water Supply*	3	Hillsborough	5.15	5.00	0.15	3%
Purity Spring	4	Hillsborough	0.01	0.10	-0.09	-92%
Lowry Park Spring*	3	Hillsborough	8.26	5.00	3.26	65%

Table 3.29 (continued)
2010 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Apopka	2	Lake	22.71	25.10	-2.39	-10%
Bugg	3	Lake	4.59	10.12	-5.53	-55%
Blue Springs	3	Lake	1.76	3.00	-1.24	-41%
Bear*	3	Lake	4.24	5.00	-0.76	-15%
Holiday Springs	3	Lake	0.30	4.00	-3.70	-92%
Blue Spring	3	Levy	7.71	8.43	-0.72	-9%
Wekiva	2	Levy	44.13	45.00	-0.87	-2%
Big King Spring*	3	Levy	1.32	5.00	-3.68	-74%
Little King Spring	4	Levy	0.49	0.50	-0.01	-2%
Waterfall Spring*	3	Marion	4.39	5.00	-0.61	-12%
Wilson Head Spring	3	Marion	1.07	2.00	-0.93	-47%
Silver Springs Nr Ocala	1	Marion	577.29	579.57	-2.28	0%
Rainbow 1 Spring	1	Marion	614.36	618.19	-3.83	-1%
Fern Hammock Springs	2	Marion	3.98	11.00	-7.02	-64%
Juniper Springs	3	Marion	0.45	8.00	-7.55	-94%
Bubbling Spring*	3	Marion	1.63	5.00	-3.37	-67%
Horseshoe Springs	2	Pasco	5.78	10.00	-4.22	-42%
Seven Springs	2	Pasco	12.03	5.00	7.03	141%
Crystal Spgs Nr Zephyrhills	**2**	**Pasco**	**32.54**	47.33	-14.79	-31%
Jewfish Hole*	3	Pasco	5.00	5.00	0.00	0%
Isabella Spring*	3	Pasco	4.80	5.00	-0.20	-4%
Cedar Island A And B*	3	Pasco	4.94	5.00	-0.06	-1%
Hudson Spring*	3	Pasco	4.90	5.00	-0.10	-2%
Salt Spring 2	3	Pasco	7.64	8.00	-0.36	-5%
Gator Spring	4	Pasco	0.49	0.50	-0.01	-2%
Pasco Unnamed 1A And 1B	4	Pasco	0.09	0.10	-0.01	-7%
Tarpon Springs*	3	Pinellas	2.47	5.00	-2.53	-51%
Health Spring*	3	Pinellas	1.07	5.00	-3.93	-79%
Sage Spring*	3	Pinellas	0.95	5.00	-4.05	-81%
Crystal Beach Spring*	3	Pinellas	0.67	5.00	-4.33	-87%
Canal 485A Spring 2*	3	Sumter	1.84	5.00	-3.16	-63%
Gum Springs 1	2	Sumter	60.51	60.00	0.51	1%
Alligator Spring*	3	Sumter	4.60	5.00	-0.40	-8%
Canal 485 Spring 5*	3	Sumter	3.28	5.00	-1.72	-34%
Henry Green Spring*	3	Sumter	6.34	5.00	1.34	27%
A Wayne Lee Spring*	3	Sumter	2.08	5.00	-2.92	-58%
Canal 485A Spring 1B*	3	Sumter	1.84	5.00	-3.16	-63%
Big Hole (Dead Spring)*	3	Sumter	3.33	5.00	-1.67	-33%
Fenney Springs	2	Sumter	11.75	15.00	-3.25	-22%
Belton's Millpond Springs	3	Sumter	5.99	7.00	-1.01	-14%
Alexander Springs	1	Lake	95.99	99.96	-3.97	-4%
Blackwater Springs	3	Lake	1.36	1.80	-0.44	-25%
Camp La No Che Spring	3	Lake	0.82	1.00	-0.18	-18%
Droty Spring	4	Lake	0.65	0.80	-0.15	-18%
Messant Spring	2	Lake	12.28	15.50	-3.22	-21%
Palm Springs - Lake	4	Lake	0.10	0.50	-0.40	-79%
Seminole Springs - Lake	2	Lake	30.06	37.00	-6.94	-19%
Blue Spring - Marion**	3	Marion	4.50	2.20	2.30	105%
Morman Branch Springs	3	Marion	0.83	1.00	-0.17	-17%
Orange Spring	3	Marion	0.81	3.32	-2.51	-76%
Salt Springs	2	Marion	68.11	70.24	-2.13	-3%

Table 3.29 (continued)
2010 Steady-State Simulated and Observed Spring Discharge in the Northern District Model Domain

Spring	Magnitude[1]	County	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated) (cfs)	Percentage Error
Silver Glen Springs	1	Marion	104.51	97.80	6.71	7%
Sweetwater Springs	2	Marion	17.46	13.13	4.33	33%
Tobacco Patch Landing Springs**	3	Marion	1.86	1.60	0.26	16%
Catfish Spring	3	Marion	2.28	1.70	0.58	34%
Bright Angel Spring**	3	Marion	0.93	0.80	0.13	17%
Fish Hook # 2 Spring**	4	Marion	0.48	0.40	0.08	20%
Fish Hook # 1 Spring**	4	Marion	0.48	0.40	0.08	20%
Sims Spring Marion**	4	Marion	0.47	0.40	0.07	16%
Wells Landing**	3	Marion	4.71	4.60	0.11	2%
Riversites Spring**	3	Marion	1.19	0.90	0.29	32%
Camp Seminole	4	Marion	0.67	0.79	-0.12	-16%
Rock Springs	2	Orange	55.42	55.47	-0.05	0%
Sulphur Spring	4	Orange	0.72	0.60	0.12	20%
Witherington Spring	3	Orange	2.21	1.00	1.21	121%
Total All Springs			3026.41	3152.59	-126.18	-4%
Total Springs with Observations			2873.62	2947.59	-73.97	-3%

Notes:
[1]Magnitudes are based on 1995 observations.
* Estimated, no observed spring discharge available.
** Estimated based on relationship between Rodman stage, nearby wells, and discharge measurements.

Table 3.30
2010 Steady-State Simulated and Observed Base Flow in the Northern District Model Domain

USGS Gage	Simulated Base Flow[1,5] (cfs)	Observed Base Flow[1,5] (cfs)	Simulation Error[2]	Percentage Error
Withlacoochee River near Cumpressco	7.7	2.4	5.3	222%
Withlacoochee River near Dade City	6.3	6.6	-0.3	-5%
Withlacoochee River at Trilby	29.4	21.0	8.4	40%
Withlacoochee River at Croom	46.2	38.3	7.9	21%
Withlacoochee River near Floral City	53.1	34.6	18.5	54%
Withlacoochee River at Wysong Dam	132.6	121.6	11.0	9%
Withlacoochee River near Holder[6]	**245.3**	**244.0**	**1.3**	**1%**
Hillsborough River above Crystal Springs	28.6	11.2	17.4	156%
Hillsborough River near Zephyrhills[3,4]	68.8	75.1	-6.3	-8%
Hillsborough River at Morris Bridge[4,6]	67.5	67.1	0.4	1%
Pithlachascotee River near Fivay	0.0	0.2	-0.2	-100%
Pithlachascotee River near New Port Richey[6]	**5.7**	**1.3**	**4.4**	**340%**
Anclote River near Elfers[6]	**10.1**	**6.8**	**3.3**	**48%**
Waccasassa River at Gulf Hammock[6]	**99.3**	**104.0**	**-4.7**	**-4%**
Cypress Creek at Worthington	**0.9**	**0.8**	**0.1**	**0%**
Trout Creek near Sulphur Springs	**0.2**	**0.2**	**0.0**	**-25%**
Silver River at Conner	60.6	57.0	3.6	6%
Ocklawaha River near Moss Bluff	39.4	29.0	10.4	36%
Ocklawaha River at Conner	695.3	563.57	131.8	23%
Ocklawaha River near Eureka[6]	**710.5**	**607.5**	**103.0**	**17%**
Total[7]	**1138.4**	**1030.7**	**107.8**	**10%**

Notes:
[1]Cumulative base flow.
[2]Simulated error is the calculated difference between simulated and observed base flow values.
[3]Discharge at Crystal Springs not included in the net change in base flow between the Hillsborough River above Crystal Springs and Hillsborough River near Zephyrhills gages.
[4]Simulated base flow for Hillsborough River below Crystal spring include simulated spring discharge from Crystal spring near Zephyrhills.
[5]Base flow rates represent average values for the 2010 period.
[6]Downstream-most gage
[7]Sum of downstream-most gages

Table 3.31
2010 Simulated Steady-State Water Budget – Northern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	11.84	0.00
	Rivers and Lakes	1.61	1.03
	Boundaries	1.17	0.86
	Springs	0.00	1.86
	Wells	0.10	0.00
	Vertical flow between the SAS and UFA	2.81	13.78
Upper Floridan Aquifer	Rivers and Lakes	0.35	1.75
	Boundaries	1.42	2.25
	Springs	0.00	7.36
	Wells	0.02	0.87
	Vertical flow between the UFA and LFA	0.14	0.67
Lower Floridan Aquifer	Boundaries	0.12	0.63
	Wells	0.00	0.03

Table 3.32
2010 Simulated Steady-State Water Budget – Central Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	8.50	0.00
	Rivers and Lakes	0.67	2.56
	Boundaries	3.17	2.04
	Springs	0.00	2.10
	Wells	0.12	0.00
	Vertical flow between the SAS and UFA	6.11	11.86
Upper Floridan Aquifer	Rivers and Lakes	1.27	3.65
	Boundaries	2.00	1.80
	Springs	0.00	1.08
	Wells	0.00	2.50
	Vertical flow between the UFA and LFA	0.00	0.00
Lower Floridan Aquifer	Boundaries	0.00	0.00
	Wells	0.00	0.00

Table 3.33
2010 Simulated Steady-State Water Budget – Eastern Basin

Aquifer System	Flux Category	Inflow (inches/year)	Outflow (inches/year)
Surficial Aquifer System	Recharge	7.04	0.00
	Rivers and Lakes	0.15	2.24
	Boundaries	0.08	0.08
	Springs	0.00	1.25
	Wells	0.10	0.00
	Vertical flow between the SAS and UFA	1.82	5.62
Upper Floridan Aquifer	Rivers and Lakes	0.00	1.89
	Boundaries	0.65	0.33
	Springs	0.00	2.89
	Wells	0.02	1.09
	Vertical flow between the UFA and LFA	3.18	1.45
Lower Floridan Aquifer	Boundaries	2.28	0.34
	Wells	0.00	0.21

Table 4.1
Summary of Pumping and Injection for All Pumping Scenarios

Pumping Category	Baseline Scenario[1, 2]	Scenario 1[1, 2]: 2010	Scenario 2[1, 2]: 2014	Scenario 3[1, 2]: 2025	Scenario 4[1, 2]: 2035	Scenario 5[1, 2]: 2035 with Conservation and Reuse
Permitted Wells (mgd)	0.0	-436.7	-368.2	-513.0	-563.8	-505.3
Non-permitted Wells (mgd)	0.0	-42.4	-35.7	-59.7	-71.3	-71.3
Drainage Wells (mgd)	0.0	6.3	6.3	6.3	6.3	6.3
Return Flow (mgd)	0.0	40.3	33.9	47.7	52.7	52.7
Total (mgd)	0.0	-432.5	-363.7	-518.7	-576.1	-517.6

Notes:
[1] Positive = injection,
[2] Negative = pumping

Table 4.2a
Summary of Predicted Base Flow for All Pumping Scenarios

USGS Gage	Baseline Scenario[1,5] (cfs)	Scenario 1 2010[1,5] (cfs)	Scenario 2 2014[1,5] (cfs)	Scenario 3 2025[1,5] (cfs)	Scenario 4 2035[1,5] (cfs)	Scenario 5 2035 with Conservation and Reuse[1,5] (cfs)
Withlacoochee River near Cumpressco	8.5	8.5	8.6	8.4	8.4	8.4
Withlacoochee River near Dade City	13.1	13.1	13.4	12.9	12.7	12.9
Withlacoochee River at Trilby	41.7	41.7	42.6	40.9	40.3	41.1
Withlacoochee River at Croom	79.6	79.1	80.9	77.7	76.7	78.2
Withlacoochee River near Floral City	86.8	85.5	87.9	83.5	82.2	84.1
Withlacoochee River at Wysong Dam	173.1	169.9	173.1	165.7	163.2	166.1
Withlacoochee River near Holder[7]	**325.1**	**312.0**	**318.1**	**301.5**	**295.2**	**300.8**
Hillsborough River above Crystal Springs	12.9	12.8	13.0	12.5	12.3	12.5
Hillsborough River near Zephyrhills[3,4]	63.1	62.1	62.9	60.8	59.9	60.5
Hillsborough River at Morris Bridge[4,6]	**65.0**	**64.0**	**64.9**	**62.7**	**61.7**	**62.4**
Pithlachascotee River near Fivay	0.0	0.0	0.0	0.0	0.0	0.0
Pithlachascotee River near New Port Richey[6]	**1.5**	**2.2**	**2.4**	**2.0**	**1.9**	**2.0**
Anclote River near Elfers[6]	**6.8**	**6.9**	**7.3**	**6.5**	**6.3**	**6.7**
Waccasassa River at Gulf Hammock[6]	**100.3**	**100.3**	**100.3**	**100.3**	**100.2**	**100.3**
Cypress Creek at Worthington	4.0	3.7	3.8	3.6	3.5	3.7
Trout Creek near Sulphur Springs	0.3	0.2	0.2	0.2	0.2	0.2
Silver River at Conner	56.9	55.4	55.8	54.6	54.0	54.4
Ocklawaha River near Moss Bluff	52.9	45.8	48.4	41.7	39.6	41.7
Ocklawaha River at Conner	861.1	826.7	837.1	807.8	796.3	805.1
Ocklawaha River near Eureka[6]	**871.5**	**837.0**	**847.5**	**818.1**	**806.5**	**815.4**
Total[7]	**1370.3**	**1322.3**	**1340.5**	**1291.0**	**1271.8**	**1287.5**

Notes:
[1]Cumulative base flow.
[2]Simulated error is the calculated difference between simulated and observed base flow values.
[3]Discharge at Crystal Springs not included in the net change in base flow between the Hillsborough River above Crystal Springs and Hillsborough River near Zephyrhills gages.
[4]Simulated base flow for Hillsborough River below Crystal spring include simulated spring discharge from Crystal spring near Zephyrhills.
[5]Base flow rate represents value at the end of scenario simulation.
[6]Downstream-most gage
[7]Sum of downstream-most gages

Table 4.2b
Summary of Base Flow Differences from Baseline for All Pumping Scenarios

USGS Gage	Baseline Scenario[1,5] (cfs)	Difference from Baseline[8] Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Cons & Reuse (cfs)
Withlacoochee River near Cumpressco	8.5	0.0	0.1	-0.1	-0.1	-0.1
Withlacoochee River near Dade City	13.1	0.0	0.3	-0.2	-0.4	-0.2
Withlacoochee River at Trilby	41.7	0.0	0.9	-0.8	-1.4	-0.6
Withlacoochee River at Croom	79.6	-0.5	1.3	-1.9	-2.9	-1.4
Withlacoochee River near Floral City	86.8	-1.3	1.1	-3.3	-4.6	-2.7
Withlacoochee River at Wysong Dam	173.1	-3.2	0.0	-7.4	-9.9	-7.0
Withlacoochee River near Holder[7]	**325.1**	-13.1	-7.0	-23.6	-29.9	-24.3
Hillsborough River above Crystal Springs	12.9	-0.1	0.1	-0.4	-0.6	-0.4
Hillsborough River near Zephyrhills[3,4]	63.1	-1.0	-0.2	-2.3	-3.2	-2.6
Hillsborough River at Morris Bridge[4,6]	**65.0**	-1.0	-0.1	-2.3	-3.3	-2.6
Pithlachascotee River near Fivay	0.0	0.0	0.0	0.0	0.0	0.0
Pithlachascotee River near New Port Richey[6]	**1.5**	0.7	0.9	0.5	0.4	0.5
Anclote River near Elfers[6]	**6.8**	0.1	0.5	-0.3	-0.5	-0.1
Waccasassa River at Gulf Hammock[6]	**100.3**	0.0	0.0	0.0	-0.1	0.0
Cypress Creek at Worthington	4.0	-0.3	-0.2	-0.4	-0.5	-0.3
Trout Creek near Sulphur Springs	0.3	-0.1	-0.1	-0.1	-0.1	-0.1
Silver River at Conner	56.9	-1.5	-1.1	-2.3	-2.9	-2.5
Ocklawaha River near Moss Bluff	52.9	-7.1	-4.5	-11.2	-13.3	-11.2
Ocklawaha River at Conner	861.1	-34.4	-24.0	-53.3	-64.8	-56.0
Ocklawaha River near Eureka[6]	**871.5**	-34.5	-24.0	-53.4	-65.0	-56.1
Total[7]	**1370.3**	-48.0	-29.8	-79.3	-98.5	-82.8

Notes:
[1]Cumulative base flow.
[2]Simulated error is the calculated difference between simulated and observed base flow values.
[3]Discharge at Crystal Springs not included in the net change in base flow between the Hillsborough River above Crystal Springs and Hillsborough River near Zephyrhills gages.
[4]Simulated base flow for Hillsborough River below Crystal spring include simulated spring discharge from Crystal spring near Zephyrhills.
[5]Base flow rate represents value at the end of scenario simulation.
[6]Downstream-most gage
[7]Sum of downstream-most gages
[8]Difference = Scenario - Baseline

Table 4.3a
Summary of Predicted Spring Flow for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Magnesia Springs*	3.39	3.30	3.33	3.27	3.25	3.27
House Spring*	2.50	2.40	2.43	2.37	2.34	2.36
Crystal River Group	347.28	341.98	343.32	340.17	338.97	339.95
Manatee Sanctuary Spring	99.21	97.69	98.08	97.18	96.83	97.11
Halls River Head Main Spg	100.19	98.40	98.89	97.72	97.27	97.66
Halls River 1 Spring*	6.29	6.19	6.22	6.15	6.13	6.15
Belcher Spring*	4.88	4.68	4.73	4.60	4.55	4.59
Abdoney Spring*	5.57	5.48	5.51	5.45	5.43	5.45
Mcclain Spring*	5.57	5.49	5.51	5.45	5.43	5.45
Trotter 1*	4.88	4.80	4.83	4.78	4.76	4.77
Homosassa 1 Spring	86.90	85.51	85.91	85.02	84.68	84.99
Pumphouse Spring*	4.23	4.16	4.18	4.14	4.12	4.14
Hidden River Head Spring	5.95	5.50	5.63	5.35	5.25	5.36
Se Fork Homosassa Spg	37.45	36.87	37.03	36.66	36.52	36.65
Potters Creek Spring	14.85	14.62	14.69	14.55	14.50	14.56
Crab Spring	34.15	33.44	33.65	33.23	33.08	33.24
Chassahowitzka Main Spg	66.21	65.10	65.44	64.78	64.56	64.81
Tarpon Spring*	4.08	4.00	4.02	3.98	3.96	3.97
Sulfur Springs*	4.21	4.21	4.21	4.21	4.21	4.21
Citrus-Blue Spring*	4.10	4.07	4.08	4.06	4.05	4.06
Baird Spring	3.39	3.33	3.35	3.31	3.30	3.32
Salt Creek Springs	0.44	0.43	0.44	0.43	0.43	0.43
Hunters Spring*	3.65	3.65	3.65	3.65	3.65	3.65
Middle Springs*	3.65	3.65	3.65	3.65	3.65	3.65
Three Sisters Run Spg 2*	3.65	3.65	3.65	3.65	3.65	3.65
Three Sisters Run Spring*	3.65	3.65	3.65	3.65	3.65	3.65
Idiots Delight Spring*	3.65	3.65	3.65	3.65	3.65	3.65
Weeki Wachee Spring	160.31	150.18	153.63	147.77	146.13	148.49
Hernando Unnamed 10	20.14	19.85	19.94	19.77	19.72	19.79
Blind Spring	42.89	42.76	42.80	42.73	42.70	42.73
Mud Spring	9.11	8.44	8.68	8.27	8.16	8.32
Salt Spring	22.82	22.21	22.42	22.06	21.95	22.10
Jenkins Creek Spring	18.32	17.75	17.96	17.57	17.47	17.62
Betee Jay Spring	7.37	7.29	7.32	7.27	7.25	7.27
Ryle Creek Spring	8.31	8.22	8.25	8.20	8.18	8.20
Blue Run Spring*	5.25	5.18	5.20	5.16	5.15	5.17
Hernando Unnamed 08*	5.00	5.00	5.00	5.00	5.00	5.00
Hospital Hole*	5.37	5.20	5.26	5.15	5.12	5.16
Bobhill Spg Nr Aripeka	2.23	2.09	2.15	2.08	2.05	2.09
Palm Island Spring*	5.02	5.01	5.01	5.01	5.00	5.01
Magnolia Spring	1.04	1.02	1.03	1.01	1.01	1.01
Hernando Unnamed 02	1.50	1.08	1.27	0.94	0.84	0.97
Boat Spring	0.41	0.41	0.41	0.40	0.40	0.40
Sulphur Spgs At Sul Spgs	7.31	7.22	7.27	7.14	7.09	7.13
Lettuce Lake Spring	7.96	7.86	7.88	7.81	7.79	7.81
Six Mile Creek Spring	0.99	0.98	0.99	0.98	0.97	0.98
Eureka Springs	1.01	1.00	1.00	0.99	0.98	0.99
City Of Tampa Water Supply*	1.28	1.21	1.22	1.21	1.23	1.23
Purity Spring	0.02	0.02	0.02	0.02	0.02	0.02
Lowry Park Spring*	4.27	4.26	4.27	4.26	4.25	4.26
Apopka	30.26	26.17	27.05	24.72	23.72	24.39

Table 4.3a (continued)
Summary of Predicted Spring Flow for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Bugg	10.50	8.04	8.49	7.25	8.27	8.64
Blue Springs	5.15	3.99	4.27	3.67	3.96	4.16
Bear*	11.35	9.42	10.01	8.76	8.26	8.71
Holiday Springs	3.75	2.71	3.00	2.44	2.64	2.84
Blue Spring	8.43	8.36	8.39	8.35	8.34	8.36
Wekiva	45.41	45.30	45.34	45.26	45.23	45.27
Big King Spring*	1.49	1.45	1.46	1.45	1.45	1.45
Little King Spring	0.54	0.53	0.53	0.53	0.53	0.53
Waterfall Spring*	4.55	4.53	4.54	4.51	4.50	4.51
Wilson Head Spring	1.72	1.70	1.70	1.68	1.67	1.68
Silver Springs Nr Ocala	733.49	707.87	715.14	694.30	685.61	691.81
Rainbow 1 Spring	659.58	651.37	653.51	646.88	643.94	646.13
Fern Hammock Springs	5.83	5.78	5.81	5.75	5.72	5.74
Juniper Springs	2.43	2.39	2.41	2.35	2.32	2.33
Bubbling Spring*	1.75	1.73	1.73	1.72	1.71	1.71
Horseshoe Springs	5.79	5.79	5.79	5.78	5.78	5.78
Seven Springs	7.21	6.95	7.09	6.80	6.72	6.86
Crystal Spgs Nr Zephyrhills	39.63	38.94	39.44	38.14	37.58	37.97
Jewfish Hole*	5.00	5.00	5.00	5.00	5.00	5.00
Isabella Spring*	5.24	5.21	5.29	5.11	5.02	5.08
Cedar Island A And B*	5.01	5.01	5.01	5.00	4.99	5.00
Hudson Spring*	5.05	5.05	5.06	5.01	4.98	4.99
Salt Spring 2	8.03	7.89	7.92	7.80	7.73	7.77
Gator Spring	0.51	0.51	0.51	0.50	0.50	0.50
Pasco Unnamed 1A And 1B	0.10	0.10	0.10	0.10	0.10	0.10
Tarpon Springs*	2.48	2.46	2.46	2.42	2.39	2.42
Health Spring*	1.11	1.13	1.12	1.11	1.09	1.11
Sage Spring*	0.99	0.99	0.98	0.98	0.97	0.98
Crystal Beach Spring*	0.72	0.70	0.70	0.69	0.68	0.70
Canal 485A Spring 2*	2.31	2.26	2.27	2.23	2.22	2.23
Gum Springs 1	71.13	68.08	68.90	66.32	65.30	66.13
Alligator Spring*	4.85	4.77	4.79	4.73	4.70	4.72
Canal 485 Spring 5*	3.87	3.85	3.85	3.83	3.82	3.83
Henry Green Spring*	7.12	6.86	6.94	6.66	6.56	6.64
A Wayne Lee Spring*	7.08	5.63	6.09	4.35	3.74	4.24
Canal 485A Spring 1B*	2.31	2.26	2.27	2.23	2.22	2.23
Big Hole (Dead Spring)*	3.98	3.90	3.93	3.79	3.72	3.77
Fenney Springs	15.07	14.23	14.52	13.07	12.50	12.88
Belton's Millpond Springs	7.30	7.03	7.13	6.66	6.46	6.60
Alexander Springs	105.78	105.11	105.33	104.92	104.73	104.85
Blackwater Springs	1.59	1.54	1.55	1.54	1.54	1.55
Camp La No Che Spring	1.02	0.98	0.99	0.98	0.98	0.98
Droty Spring	0.72	0.70	0.71	0.70	0.70	0.70
Messant Spring	15.46	14.67	14.86	14.70	14.68	14.77
Palm Springs - Lake	0.22	0.18	0.19	0.19	0.20	0.20
Seminole Springs - Lake	36.74	34.67	35.15	34.67	34.57	34.83
Blue Spring - Marion	5.32	5.23	5.25	5.23	5.23	5.23
Morman Branch Springs	0.96	0.96	0.96	0.96	0.96	0.96
Orange Spring	0.85	0.84	0.84	0.83	0.82	0.82
Salt Springs	70.49	70.20	70.28	70.00	69.85	69.87
Silver Glen Springs	108.81	108.73	108.82	108.60	108.45	108.49
Sweetwater Springs	13.63	13.54	13.59	13.48	13.41	13.43

Table 4.3a (continued)
Summary of Predicted Spring Flow for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Tobacco Patch Landing Springs	2.11	2.09	2.09	2.06	2.05	2.05
Catfish Spring	2.68	2.63	2.64	2.63	2.63	2.63
Bright Angel Spring	1.10	1.08	1.08	1.08	1.08	1.08
Fish Hook # 2 Spring	0.54	0.53	0.53	0.53	0.53	0.53
Fish Hook # 1 Spring	0.54	0.53	0.53	0.53	0.53	0.53
Sims Spring Marion	0.53	0.52	0.53	0.52	0.52	0.52
Wells Landing	5.36	5.30	5.31	5.24	5.20	5.20
Riversites Spring	1.35	1.33	1.33	1.32	1.31	1.31
Camp Seminole	0.74	0.73	0.73	0.72	0.71	0.71
Rock Springs	63.15	59.68	60.38	58.40	57.30	57.97
Sulphur Spring	0.82	0.78	0.79	0.76	0.74	0.75
Witherington Spring	2.59	2.41	2.44	2.36	2.32	2.35
Total All Springs	3383.11	3295.01	3320.16	3256.77	3234.01	3254.60
Total Springs with Observations	3205.49	3122.98	3146.31	3087.92	3067.03	3085.92

Table 4.3b
Summary of Spring Flow Differences from Baseline for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Difference from Baseline				
		Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Magnesia Springs*	3.39	-0.09	-0.06	-0.12	-0.14	-0.12
House Spring*	2.50	-0.10	-0.07	-0.13	-0.16	-0.14
Crystal River Group	347.28	-5.30	-3.96	-7.11	-8.31	-7.33
Manatee Sanctuary Spring	99.21	-1.52	-1.13	-2.03	-2.38	-2.10
Halls River Head Main Spg	100.19	-1.79	-1.30	-2.47	-2.92	-2.53
Halls River 1 Spring*	6.29	-0.10	-0.07	-0.14	-0.16	-0.14
Belcher Spring*	4.88	-0.20	-0.15	-0.28	-0.33	-0.29
Abdoney Spring*	5.57	-0.09	-0.06	-0.12	-0.14	-0.12
Mcclain Spring*	5.57	-0.08	-0.06	-0.12	-0.14	-0.12
Trotter 1*	4.88	-0.08	-0.05	-0.10	-0.12	-0.11
Homosassa 1 Spring	86.90	-1.39	-0.99	-1.88	-2.22	-1.91
Pumphouse Spring*	4.23	-0.07	-0.05	-0.09	-0.11	-0.09
Hidden River Head Spring	5.95	-0.45	-0.32	-0.60	-0.70	-0.59
Se Fork Homosassa Spg	37.45	-0.58	-0.42	-0.79	-0.93	-0.80
Potters Creek Spring	14.85	-0.23	-0.16	-0.30	-0.35	-0.29
Crab Spring	34.15	-0.71	-0.50	-0.92	-1.07	-0.91
Chassahowitzka Main Spg	66.21	-1.11	-0.77	-1.43	-1.65	-1.40
Tarpon Spring*	4.08	-0.08	-0.06	-0.10	-0.12	-0.11
Sulfur Springs*	4.21	0.00	0.00	0.00	0.00	0.00
Citrus-Blue Spring*	4.10	-0.03	-0.02	-0.04	-0.05	-0.04
Baird Spring	3.39	-0.06	-0.04	-0.08	-0.09	-0.07
Salt Creek Springs	0.44	-0.01	0.00	-0.01	-0.01	-0.01
Hunters Spring*	3.65	0.00	0.00	0.00	0.00	0.00
Middle Springs*	3.65	0.00	0.00	0.00	0.00	0.00
Three Sisters Run Spg 2*	3.65	0.00	0.00	0.00	0.00	0.00
Three Sisters Run Spring*	3.65	0.00	0.00	0.00	0.00	0.00
Idiots Delight Spring*	3.65	0.00	0.00	0.00	0.00	0.00
Weeki Wachee Spring	160.31	-10.13	-6.68	-12.54	-14.18	-11.82
Hernando Unnamed 10	20.14	-0.29	-0.20	-0.37	-0.42	-0.35
Blind Spring	42.89	-0.13	-0.09	-0.16	-0.19	-0.16
Mud Spring	9.11	-0.67	-0.43	-0.84	-0.95	-0.79
Salt Spring	22.82	-0.61	-0.40	-0.76	-0.87	-0.72
Jenkins Creek Spring	18.32	-0.57	-0.36	-0.75	-0.85	-0.70
Betee Jay Spring	7.37	-0.08	-0.05	-0.10	-0.12	-0.10
Ryle Creek Spring	8.31	-0.09	-0.06	-0.11	-0.13	-0.11
Blue Run Spring*	5.25	-0.07	-0.05	-0.09	-0.10	-0.08
Hernando Unnamed 08*	5.00	0.00	0.00	0.00	0.00	0.00
Hospital Hole*	5.37	-0.17	-0.11	-0.22	-0.25	-0.21
Bobhill Spg Nr Aripeka	2.23	-0.14	-0.08	-0.15	-0.18	-0.14
Palm Island Spring*	5.02	-0.01	-0.01	-0.01	-0.02	-0.01
Magnolia Spring	1.04	-0.02	-0.01	-0.03	-0.03	-0.03
Hernando Unnamed 02	1.50	-0.42	-0.23	-0.56	-0.66	-0.53
Boat Spring	0.41	0.00	0.00	-0.01	-0.01	-0.01
Sulphur Spgs At Sul Spgs	7.31	-0.09	-0.04	-0.17	-0.22	-0.18
Lettuce Lake Spring	7.96	-0.10	-0.08	-0.15	-0.17	-0.15
Six Mile Creek Spring	0.99	-0.01	0.00	-0.01	-0.02	-0.01
Eureka Springs	1.01	-0.01	-0.01	-0.02	-0.03	-0.02
City Of Tampa Water Supply*	1.28	-0.07	-0.06	-0.07	-0.05	-0.05
Purity Spring	0.02	0.00	0.00	0.00	0.00	0.00
Lowry Park Spring*	4.27	-0.01	0.00	-0.01	-0.02	-0.01

Table 4.3b (continued)
Summary of Predicted Spring Flow for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Difference from Baseline Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Apopka	30.26	-4.09	-3.21	-5.54	-6.54	-5.87
Bugg	10.50	-2.46	-2.01	-3.25	-2.23	-1.86
Blue Springs	5.15	-1.16	-0.88	-1.48	-1.19	-0.99
Bear*	11.35	-1.93	-1.34	-2.59	-3.09	-2.64
Holiday Springs	3.75	-1.04	-0.75	-1.31	-1.11	-0.91
Blue Spring	8.43	-0.07	-0.04	-0.08	-0.09	-0.07
Wekiva	45.41	-0.11	-0.07	-0.15	-0.18	-0.14
Big King Spring*	1.49	-0.04	-0.03	-0.04	-0.04	-0.04
Little King Spring	0.54	-0.01	-0.01	-0.01	-0.01	-0.01
Waterfall Spring*	4.55	-0.02	-0.01	-0.04	-0.05	-0.04
Wilson Head Spring	1.72	-0.02	-0.02	-0.04	-0.05	-0.04
Silver Springs Nr Ocala	733.49	-25.62	-18.35	-39.19	-47.88	-41.68
Rainbow 1 Spring	659.58	-8.21	-6.07	-12.70	-15.64	-13.45
Fern Hammock Springs	5.83	-0.05	-0.02	-0.08	-0.11	-0.09
Juniper Springs	2.43	-0.04	-0.02	-0.08	-0.11	-0.10
Bubbling Spring*	1.75	-0.02	-0.02	-0.03	-0.04	-0.04
Horseshoe Springs	5.79	0.00	0.00	-0.01	-0.01	-0.01
Seven Springs	7.21	-0.26	-0.12	-0.41	-0.49	-0.35
Crystal Spgs Nr Zephyrhills	39.63	-0.69	-0.19	-1.49	-2.05	-1.66
Jewfish Hole*	5.00	0.00	0.00	0.00	0.00	0.00
Isabella Spring*	5.24	-0.03	0.05	-0.13	-0.22	-0.16
Cedar Island A And B*	5.01	0.00	0.00	-0.01	-0.02	-0.01
Hudson Spring*	5.05	0.00	0.01	-0.04	-0.07	-0.06
Salt Spring 2	8.03	-0.14	-0.11	-0.23	-0.30	-0.26
Gator Spring	0.51	0.00	0.00	-0.01	-0.01	-0.01
Pasco Unnamed 1A And 1B	0.10	0.00	0.00	0.00	0.00	0.00
Tarpon Springs*	2.48	-0.02	-0.02	-0.06	-0.09	-0.06
Health Spring*	1.11	0.02	0.01	0.00	-0.02	0.00
Sage Spring*	0.99	0.00	-0.01	-0.01	-0.02	-0.01
Crystal Beach Spring*	0.72	-0.02	-0.02	-0.03	-0.04	-0.02
Canal 485A Spring 2*	2.31	-0.05	-0.04	-0.08	-0.09	-0.08
Gum Springs 1	71.13	-3.05	-2.23	-4.81	-5.83	-5.00
Alligator Spring*	4.85	-0.08	-0.06	-0.12	-0.15	-0.13
Canal 485 Spring 5*	3.87	-0.02	-0.02	-0.04	-0.05	-0.04
Henry Green Spring*	7.12	-0.26	-0.18	-0.46	-0.56	-0.48
A Wayne Lee Spring*	7.08	-1.45	-0.99	-2.73	-3.34	-2.84
Canal 485A Spring 1B*	2.31	-0.05	-0.04	-0.08	-0.09	-0.08
Big Hole (Dead Spring)*	3.98	-0.08	-0.05	-0.19	-0.26	-0.21
Fenney Springs	15.07	-0.84	-0.55	-2.00	-2.57	-2.19
Belton's Millpond Springs	7.30	-0.27	-0.17	-0.64	-0.84	-0.70
Alexander Springs	105.78	-0.67	-0.45	-0.86	-1.05	-0.93
Blackwater Springs	1.59	-0.05	-0.04	-0.05	-0.05	-0.04
Camp La No Che Spring	1.02	-0.04	-0.03	-0.04	-0.04	-0.04
Droty Spring	0.72	-0.02	-0.01	-0.02	-0.02	-0.02
Messant Spring	15.46	-0.79	-0.60	-0.76	-0.78	-0.69
Palm Springs - Lake	0.22	-0.04	-0.03	-0.03	-0.02	-0.02
Seminole Springs - Lake	36.74	-2.07	-1.59	-2.07	-2.17	-1.91
Blue Spring - Marion	5.32	-0.09	-0.07	-0.09	-0.09	-0.09
Morman Branch Springs	0.96	0.00	0.00	0.00	0.00	0.00
Orange Spring	0.85	-0.01	-0.01	-0.02	-0.03	-0.03
Salt Springs	70.49	-0.29	-0.21	-0.49	-0.64	-0.62

Table 4.3b (continued)
Summary of Predicted Spring Flow for All Pumping Scenarios

Spring	Baseline Scenario (cfs)	Difference from Baseline				
		Scenario 1 2010 (cfs)	Scenario 2 2014 (cfs)	Scenario 3 2025 (cfs)	Scenario 4 2035 (cfs)	Scenario 5 2035 with Conservation (cfs)
Silver Glen Springs	108.81	-0.08	0.01	-0.21	-0.36	-0.32
Sweetwater Springs	13.63	-0.09	-0.04	-0.15	-0.22	-0.20
Tobacco Patch Landing Springs	2.11	-0.02	-0.02	-0.05	-0.06	-0.06
Catfish Spring	2.68	-0.05	-0.04	-0.05	-0.05	-0.05
Bright Angel Spring	1.10	-0.02	-0.02	-0.02	-0.02	-0.02
Fish Hook # 2 Spring	0.54	-0.01	-0.01	-0.01	-0.01	-0.01
Fish Hook # 1 Spring	0.54	-0.01	-0.01	-0.01	-0.01	-0.01
Sims Spring Marion	0.53	-0.01	0.00	-0.01	-0.01	-0.01
Wells Landing	5.36	-0.06	-0.05	-0.12	-0.16	-0.16
Riversites Spring	1.35	-0.02	-0.02	-0.03	-0.04	-0.04
Camp Seminole	0.74	-0.01	-0.01	-0.02	-0.03	-0.03
Rock Springs	63.15	-3.47	-2.77	-4.75	-5.85	-5.18
Sulphur Spring	0.82	-0.04	-0.03	-0.06	-0.08	-0.07
Witherington Spring	2.59	-0.18	-0.15	-0.23	-0.27	-0.24
Total All Springs	3383.11	-88.10	-62.95	-126.34	-149.10	-128.51
Total Springs with Observations	3205.49	-82.51	-59.18	-117.57	-138.46	-119.57

Table 4.4
Summary of County-Specific Ratios of 2014 Pumping over 2010 Pumping

County	2014 Pumping/ 2010 Pumping
Alachua	1.05
Bradford	0.67
Citrus	0.78
Clay	0.97
Hernando	0.76
Hillsborough	0.84
Lake	0.84
Levy	0.86
Marion	0.82
Orange	0.86
Pasco	0.85
Pinellas	1.17
Polk	0.81
Putnam	0.80
Seminole	0.83
Sumter	0.86
Volusia	0.70

APPENDIX A

TRANSIENT GROUNDWATER LEVELS

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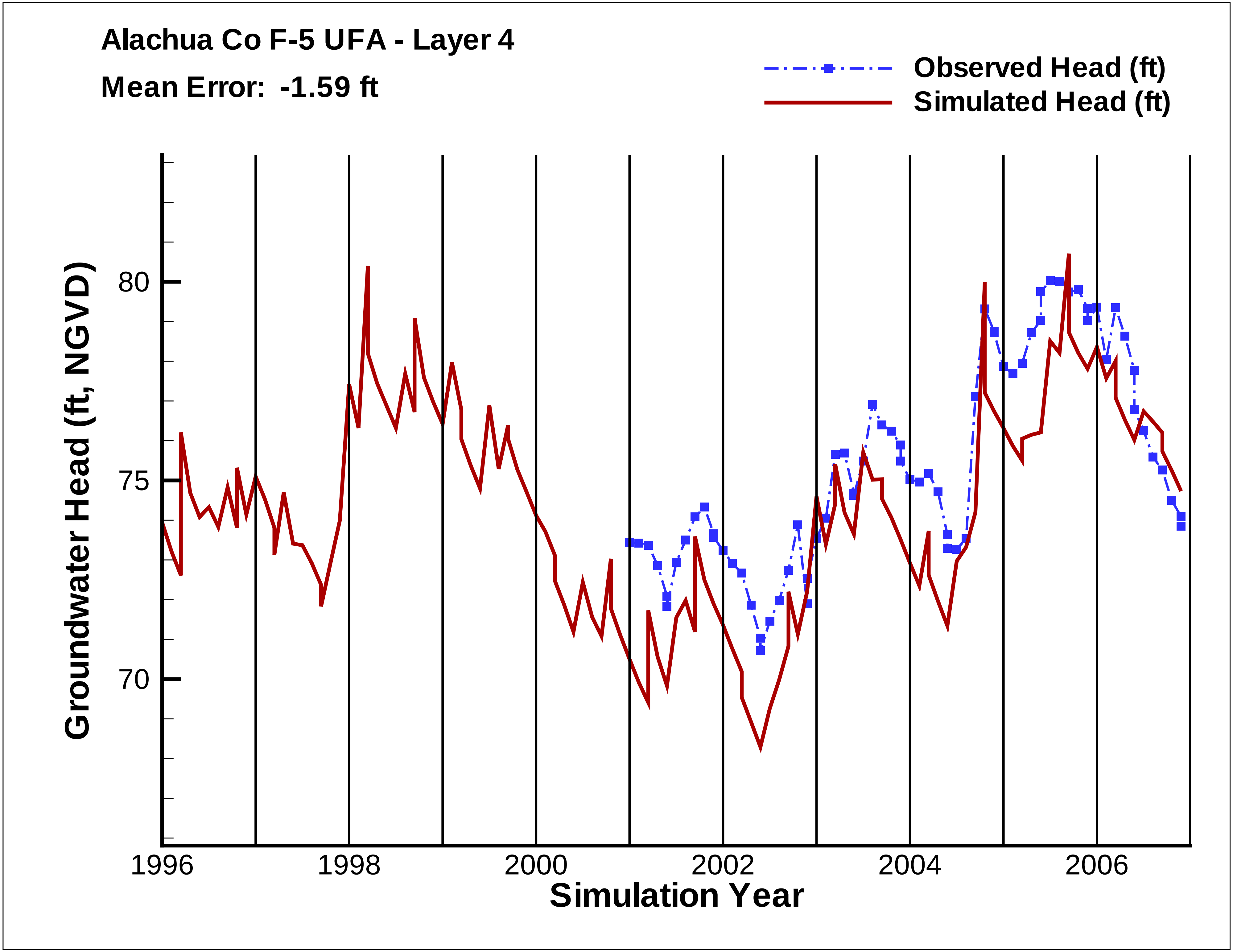
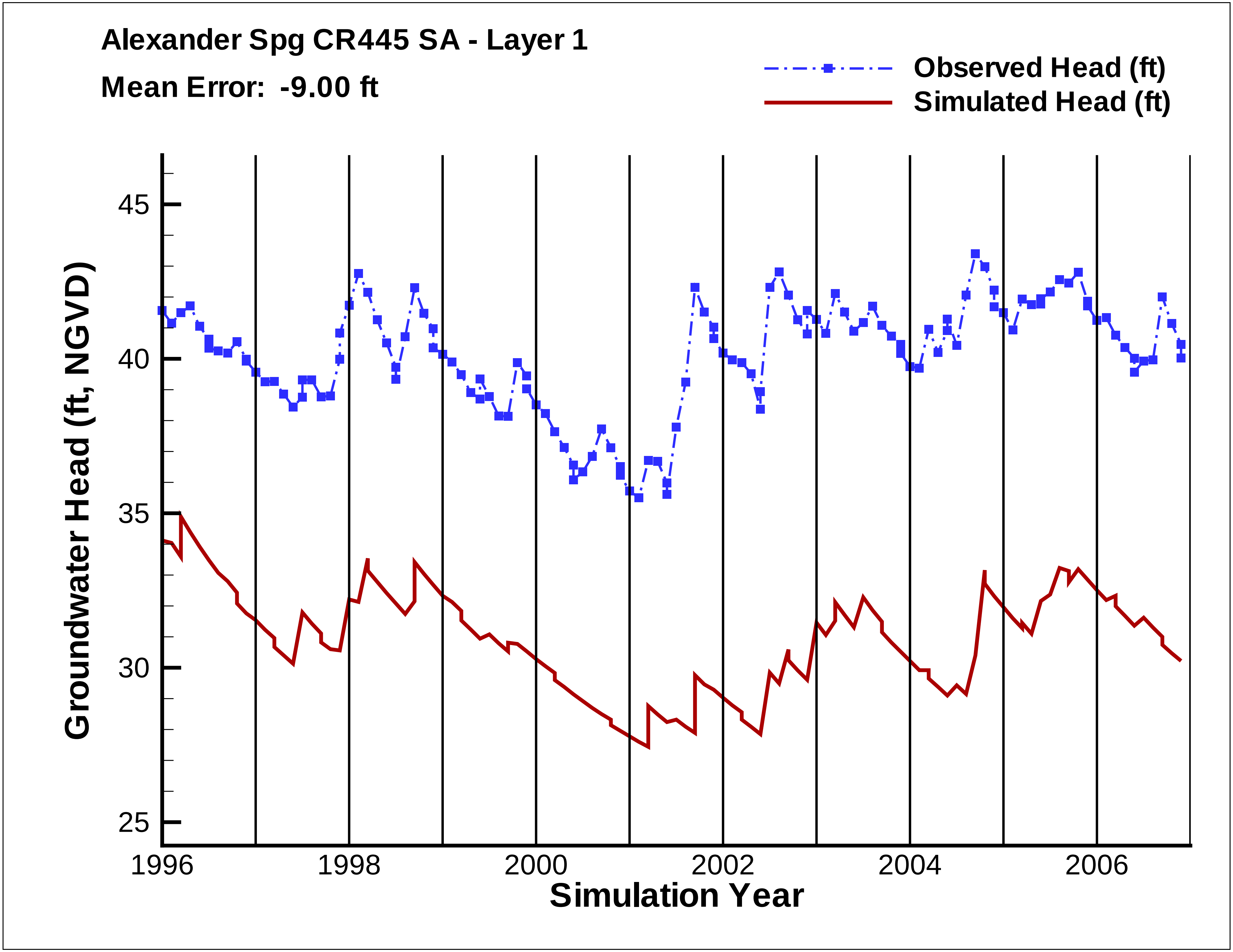
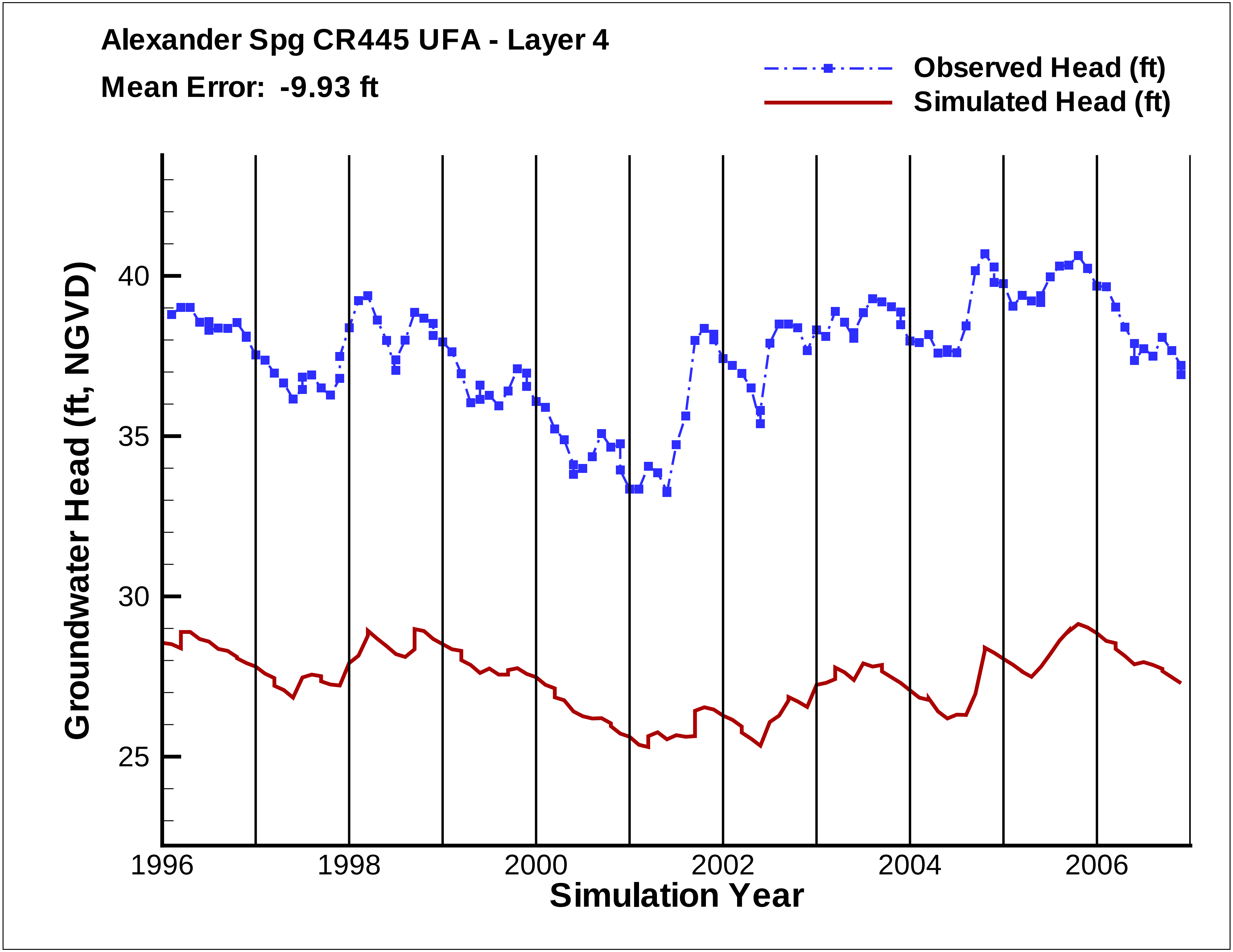
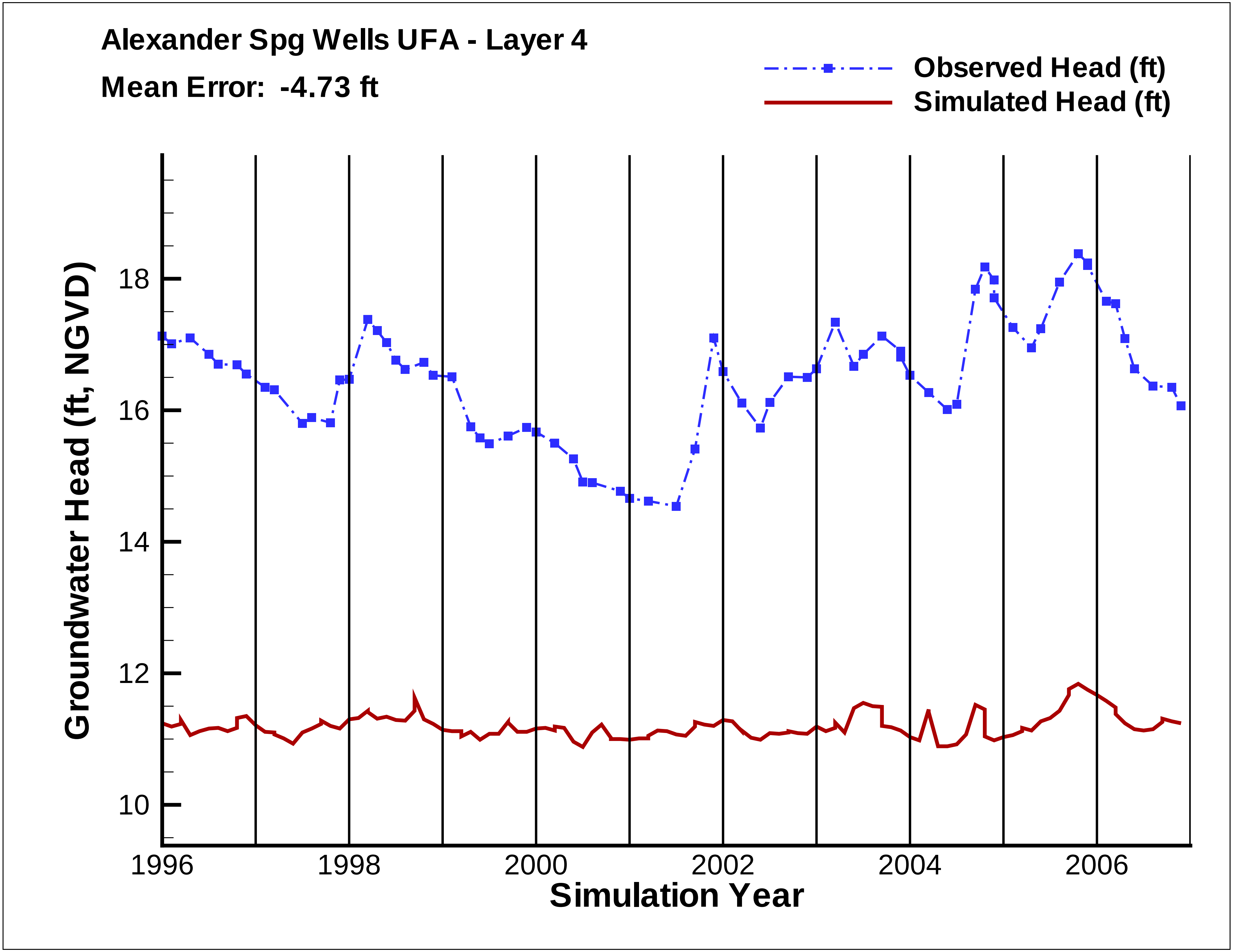


Alachua Co F-5 UFA - Layer 4
Mean Error: -1.59 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

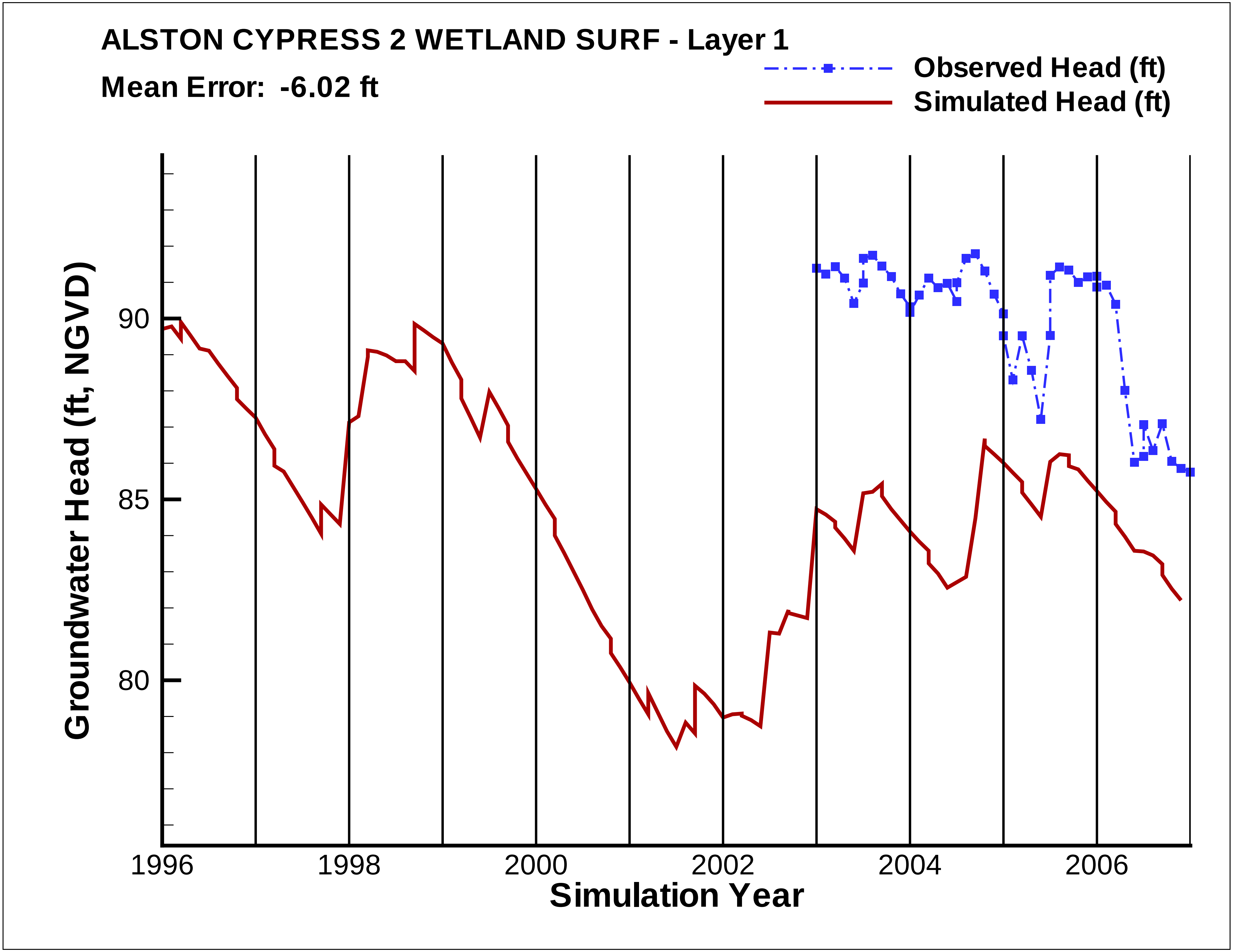

Alexander Spg CR445 SA - Layer 1
Mean Error: -9.00 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



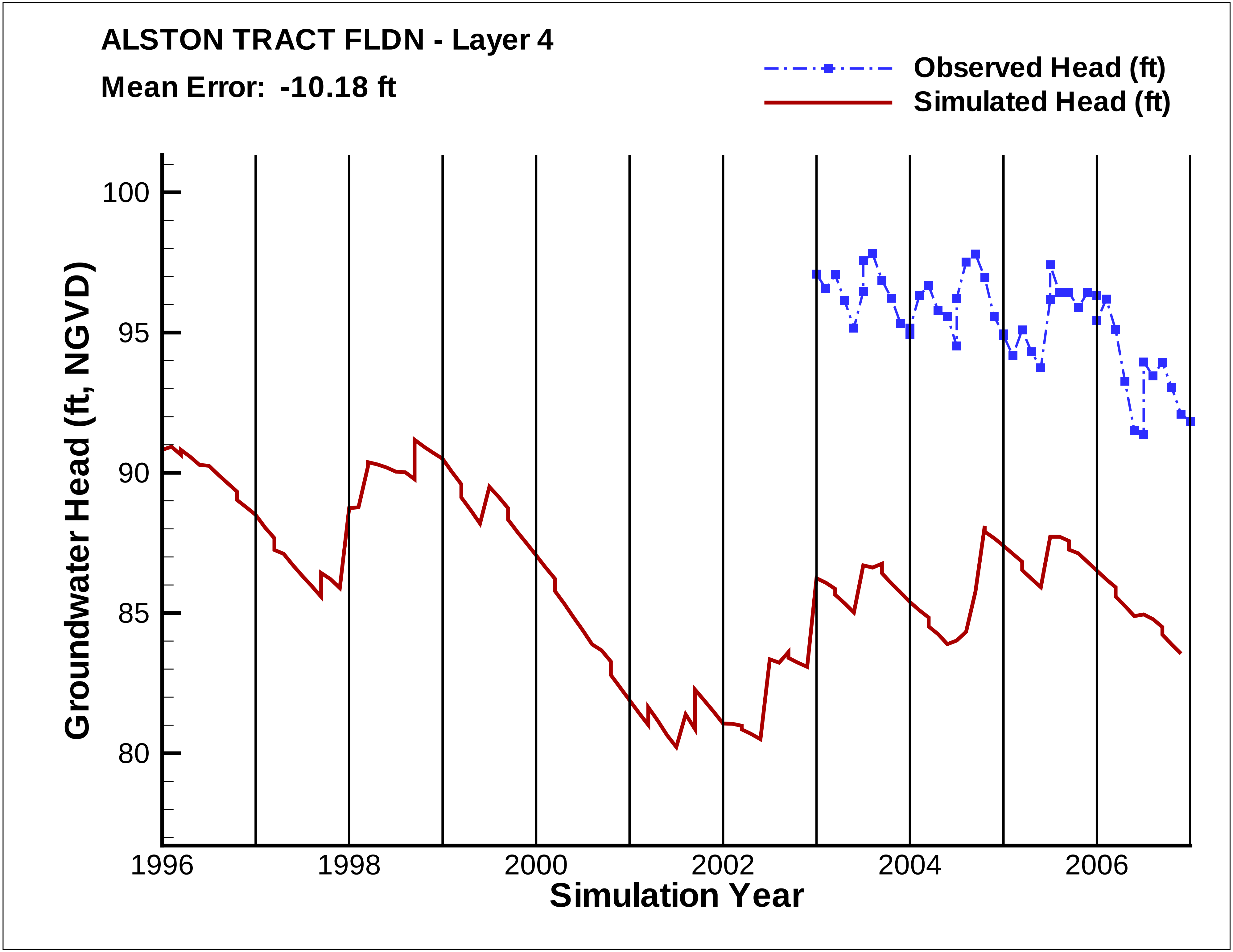
Alexander Spg CR445 UFA - Layer 4
Mean Error: -9.93 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



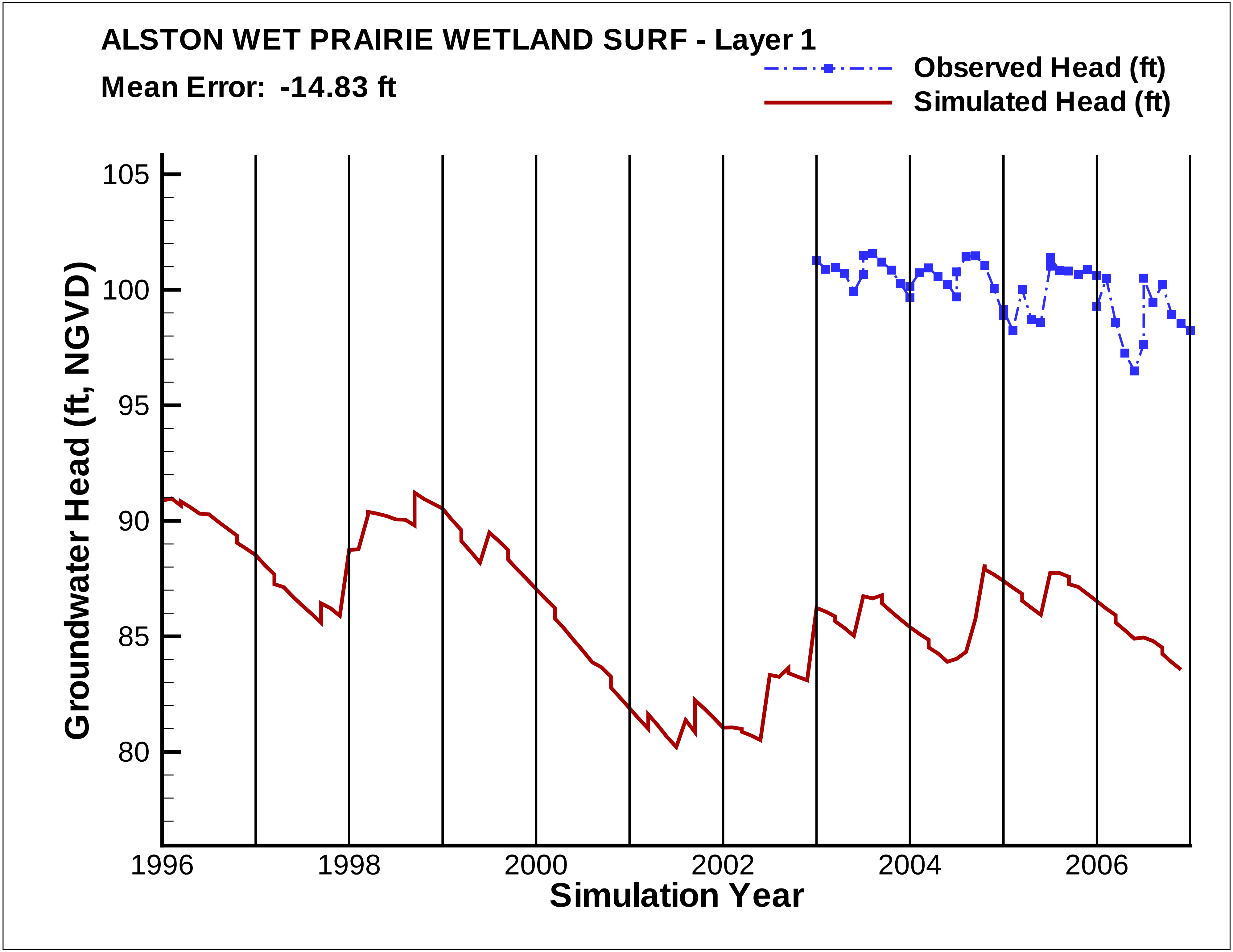
Alexander Spg Wells UFA - Layer 4
Mean Error: -4.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
12
14
16
18
1996
1998
2000
2002
2004
2006
Simulation Year

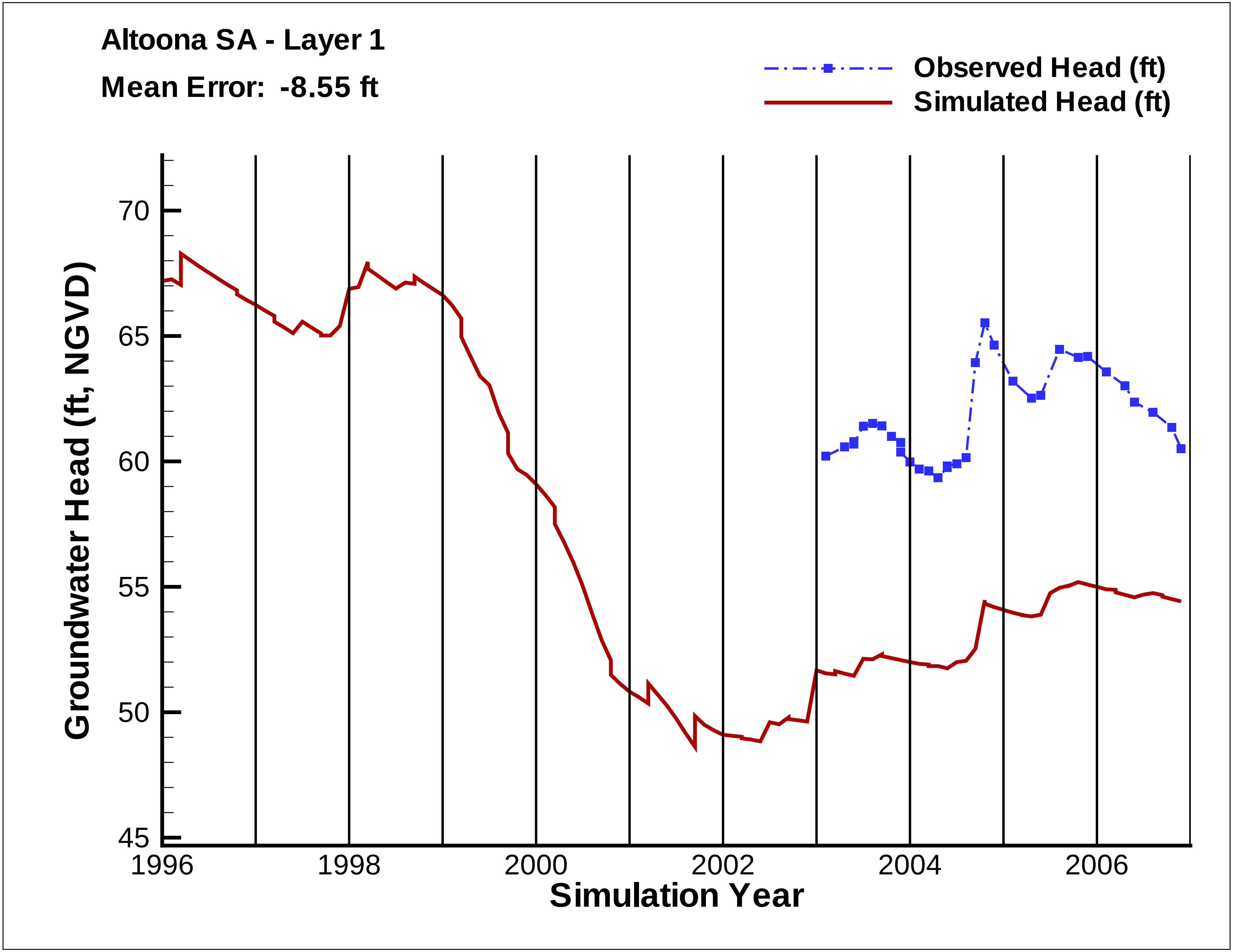


ALSTON CYPRESS 2 WETLAND SURF - Layer 1
Mean Error: -6.02 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

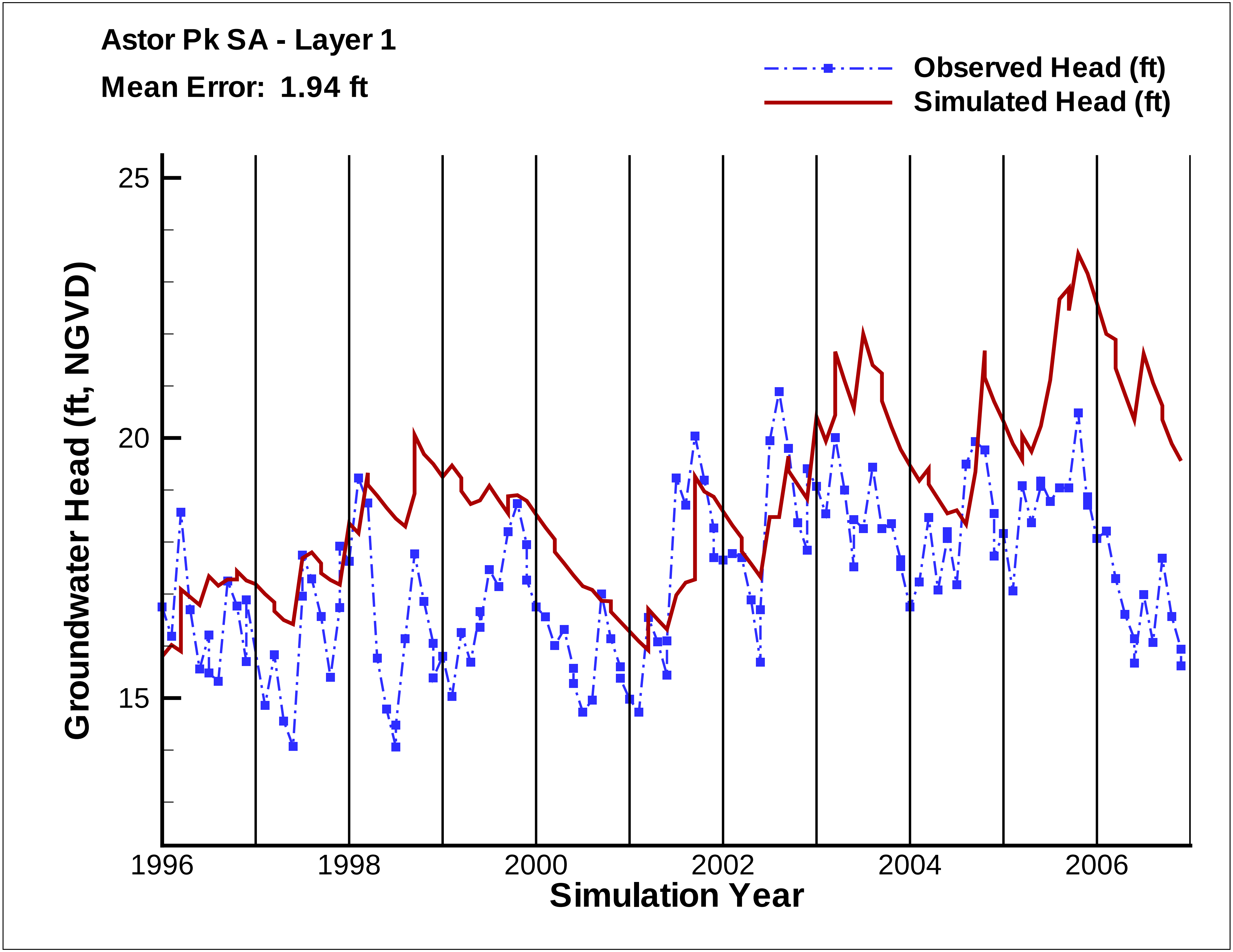


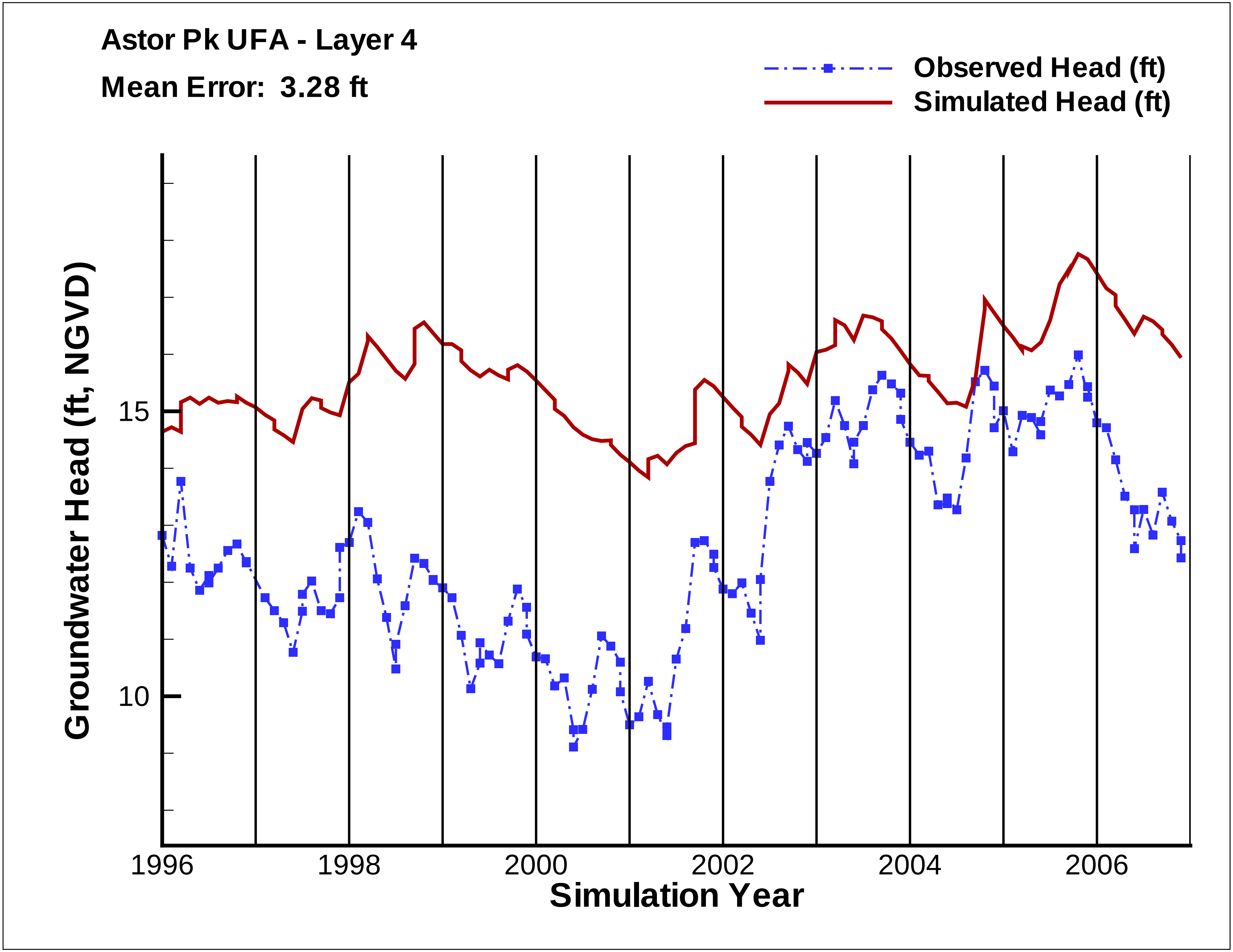
ALSTON TRACT FLDN - Layer 4
Mean Error: -10.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

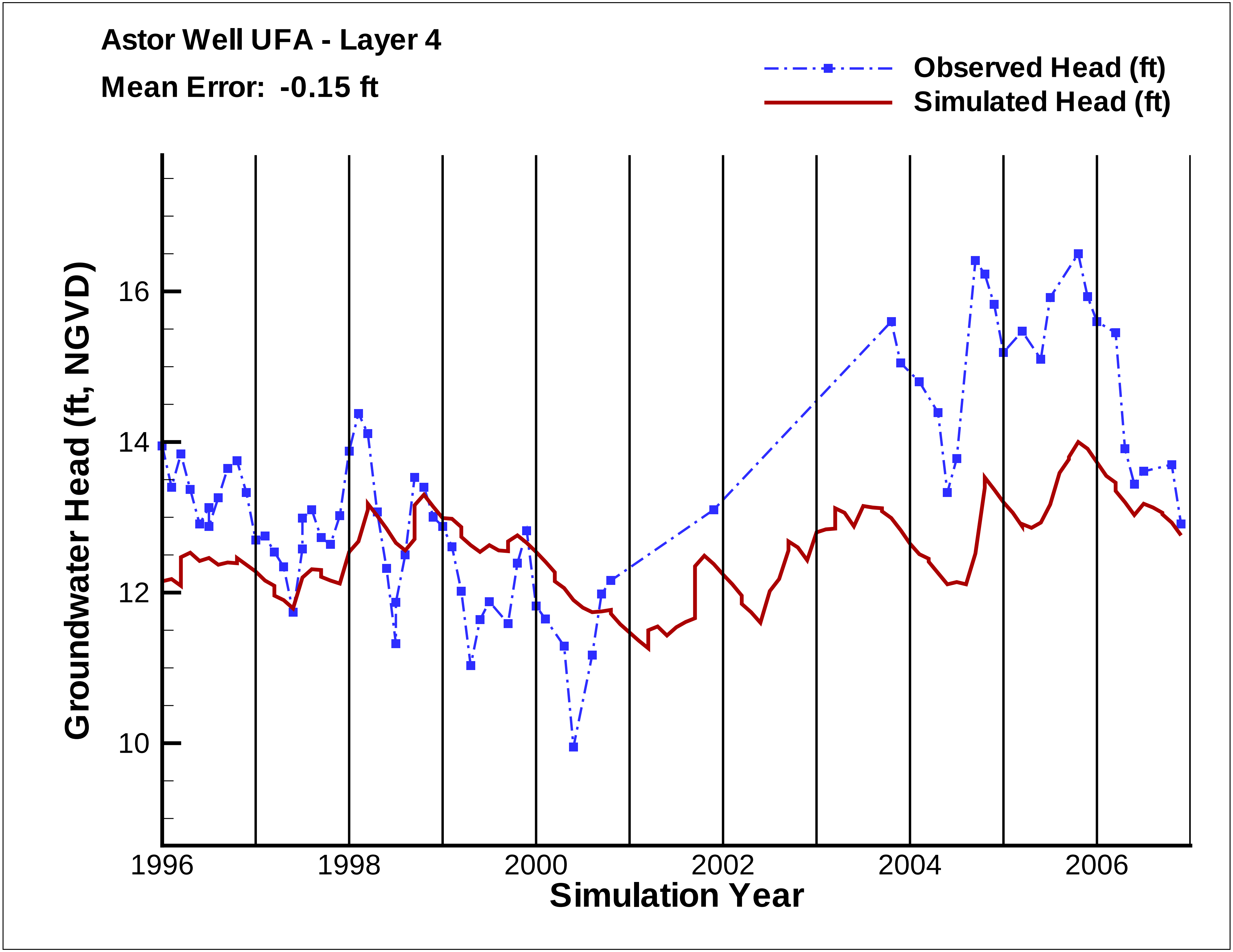

ALSTON WET PRAIRIE WETLAND SURF - Layer 1
Mean Error: -14.83 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
105
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year



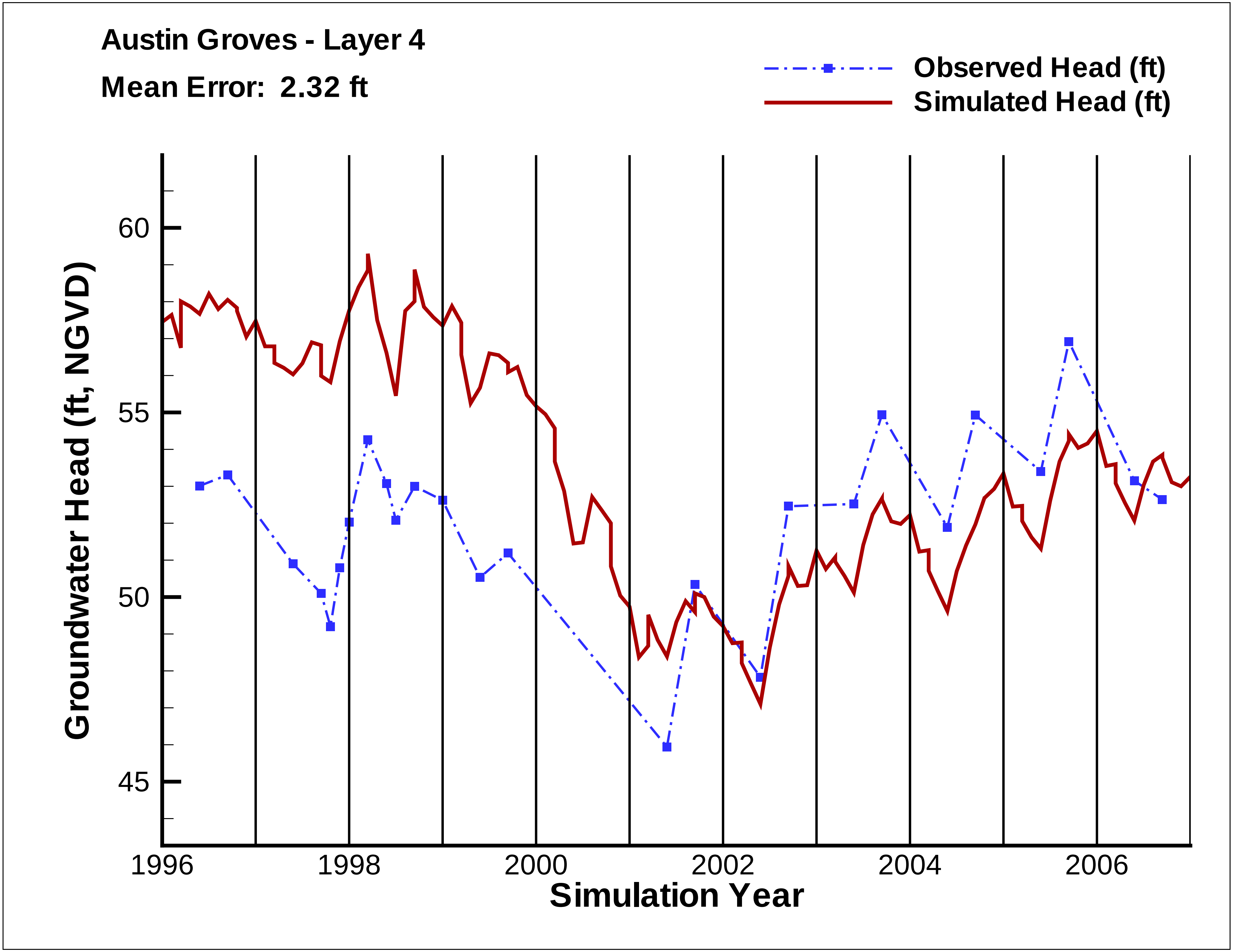
Altoona SA - Layer 1
Mean Error: -8.55 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
50
55
60
65
70
1996
1998
2000
2002
2004
2006
Simulation Year

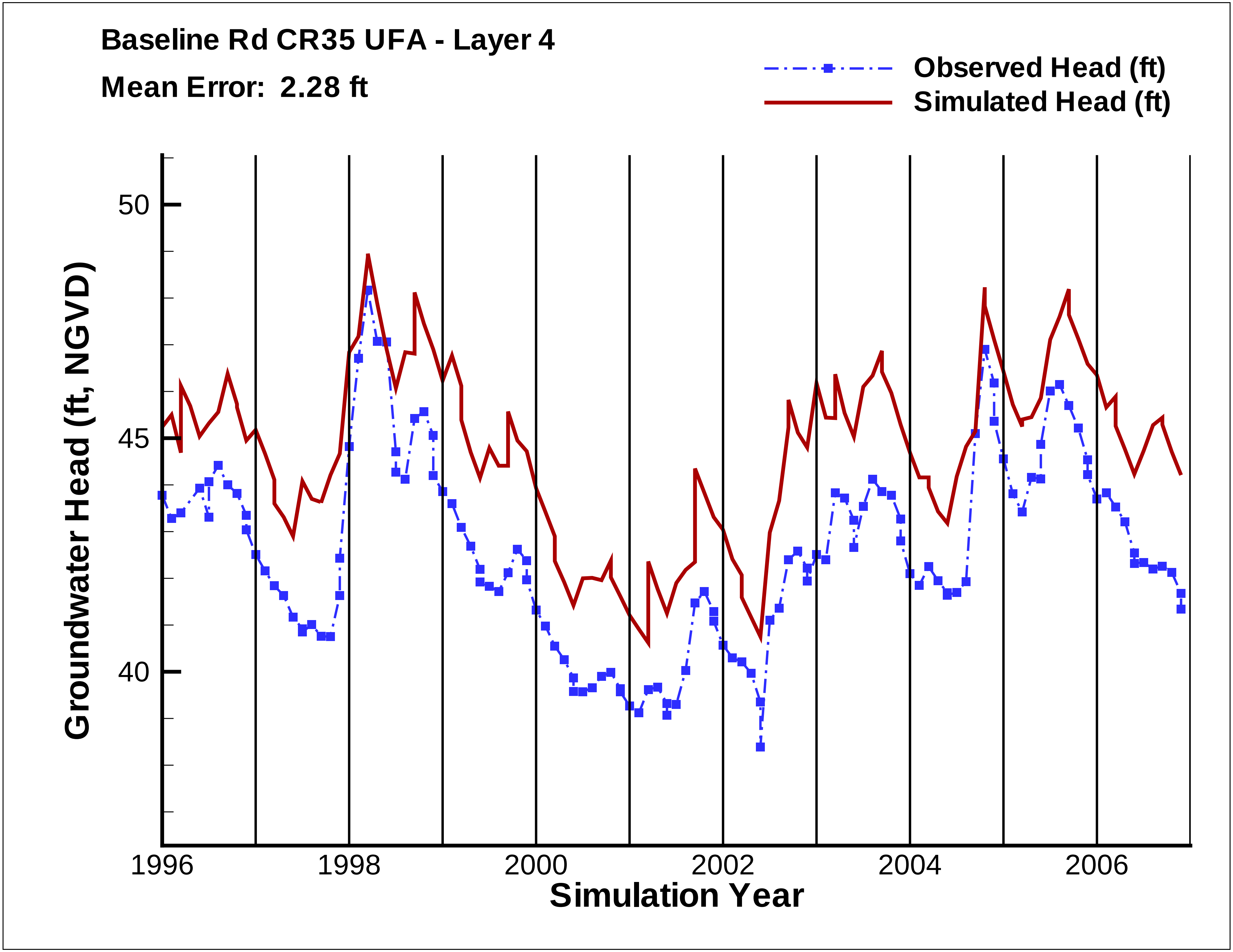

Astor Pk SA - Layer 1
Mean Error: 1.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year


Astor Pk UFA - Layer 4
Mean Error: 3.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

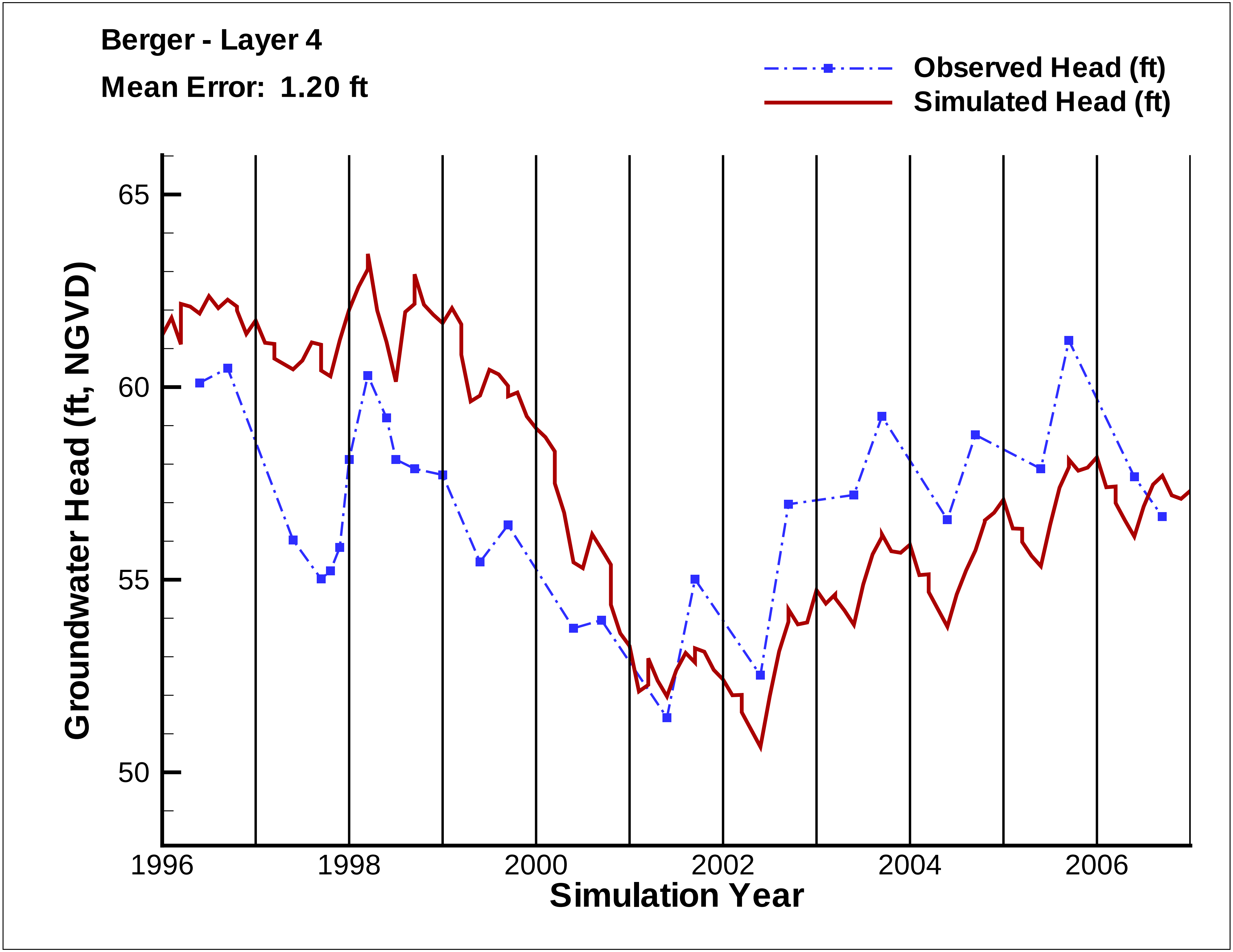


Astor Well UFA - Layer 4
Mean Error: -0.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
16
14
12
10
1996
1998
2000
2002
2004
2006
Simulation Year

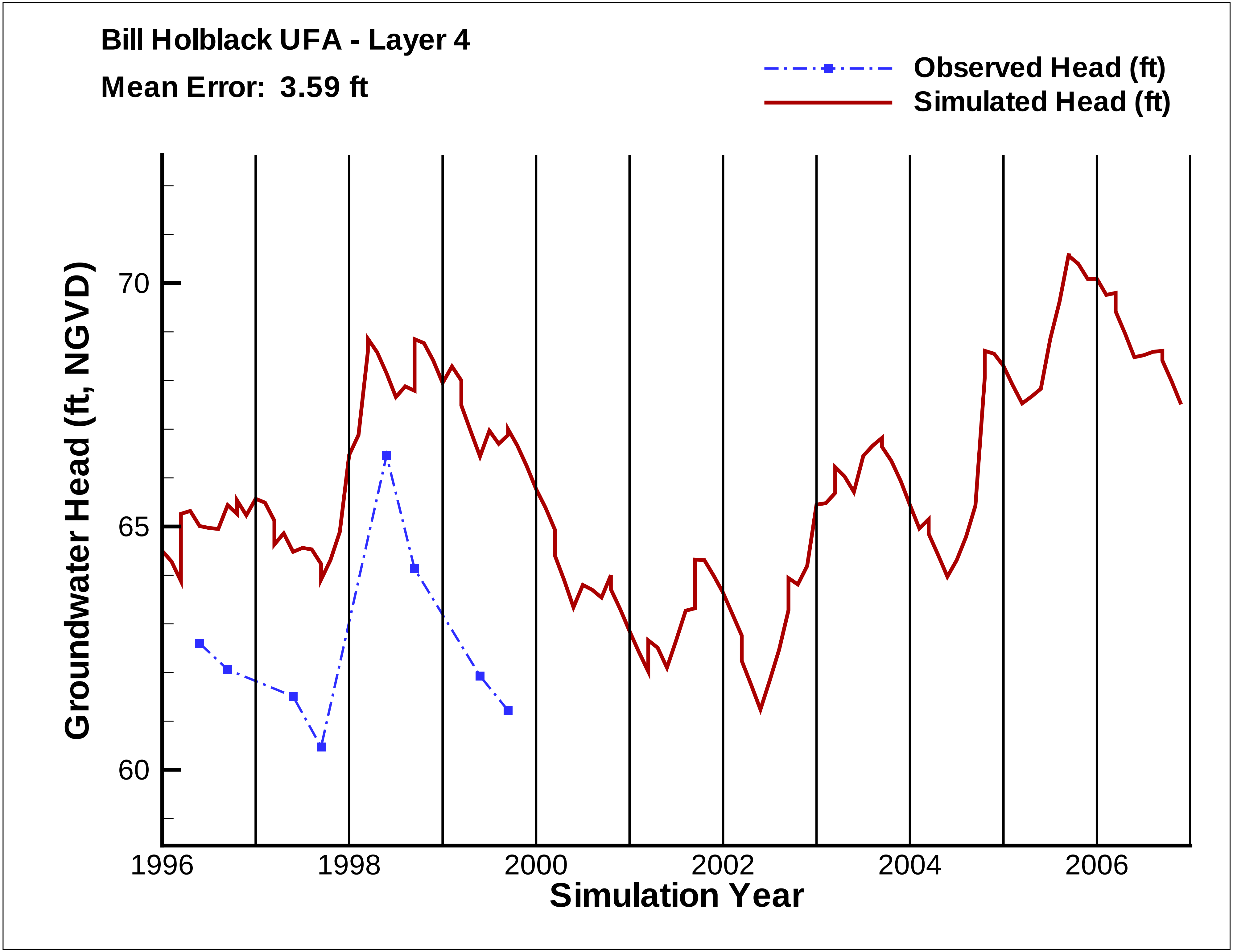

Austin Groves - Layer 4
Mean Error: 2.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

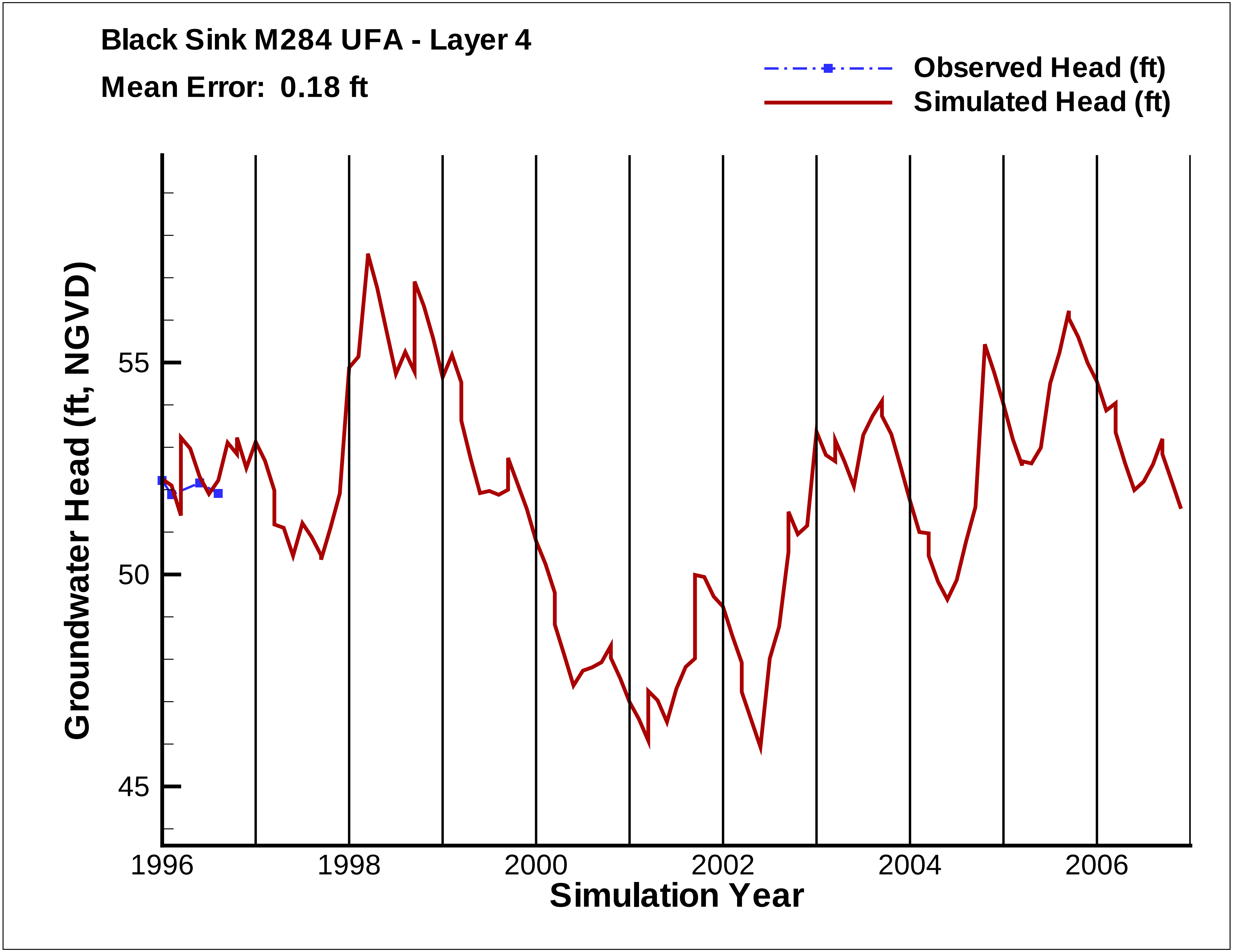


Baseline Rd CR35 UFA - Layer 4
Mean Error: 2.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

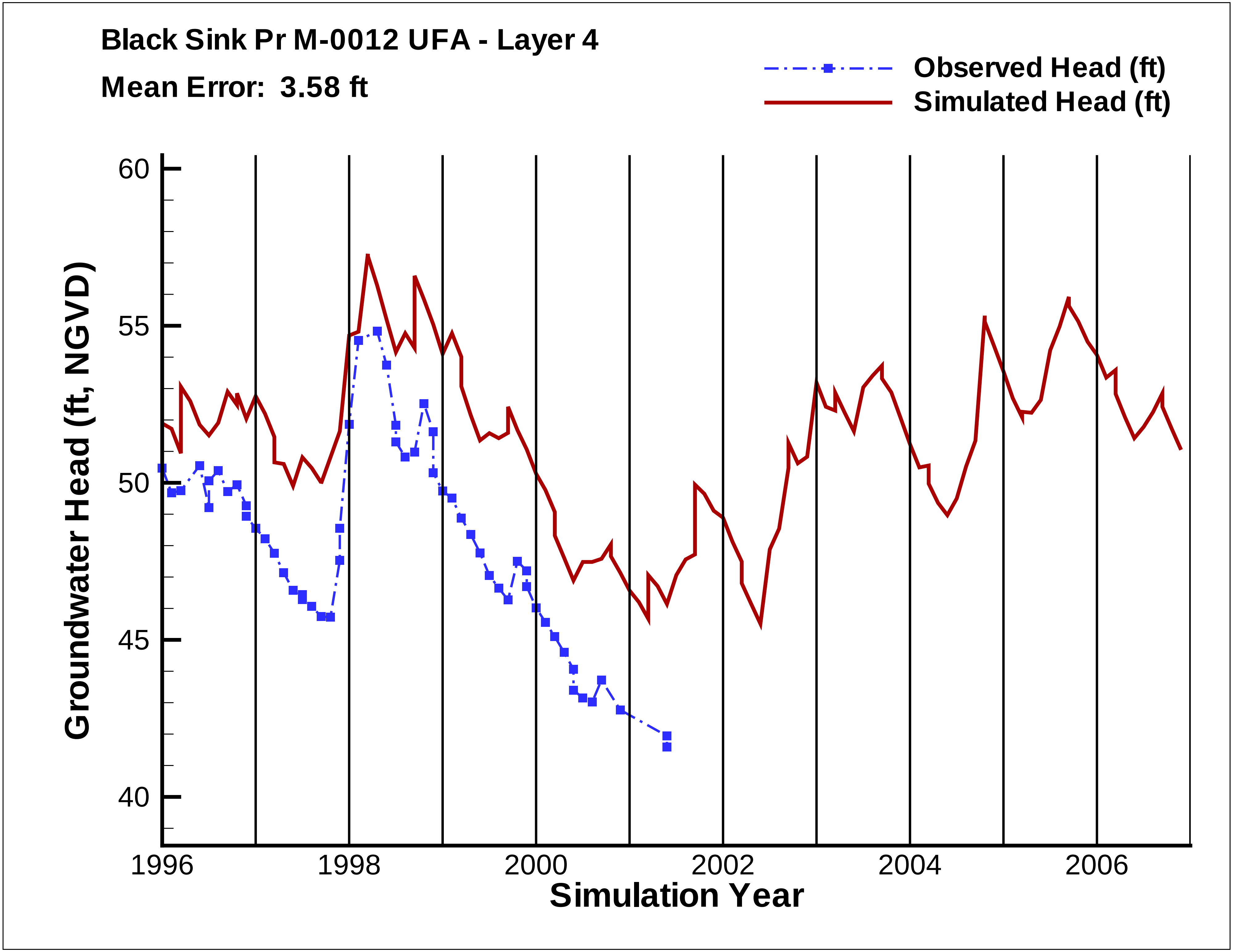


Berger - Layer 4
Mean Error: 1.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

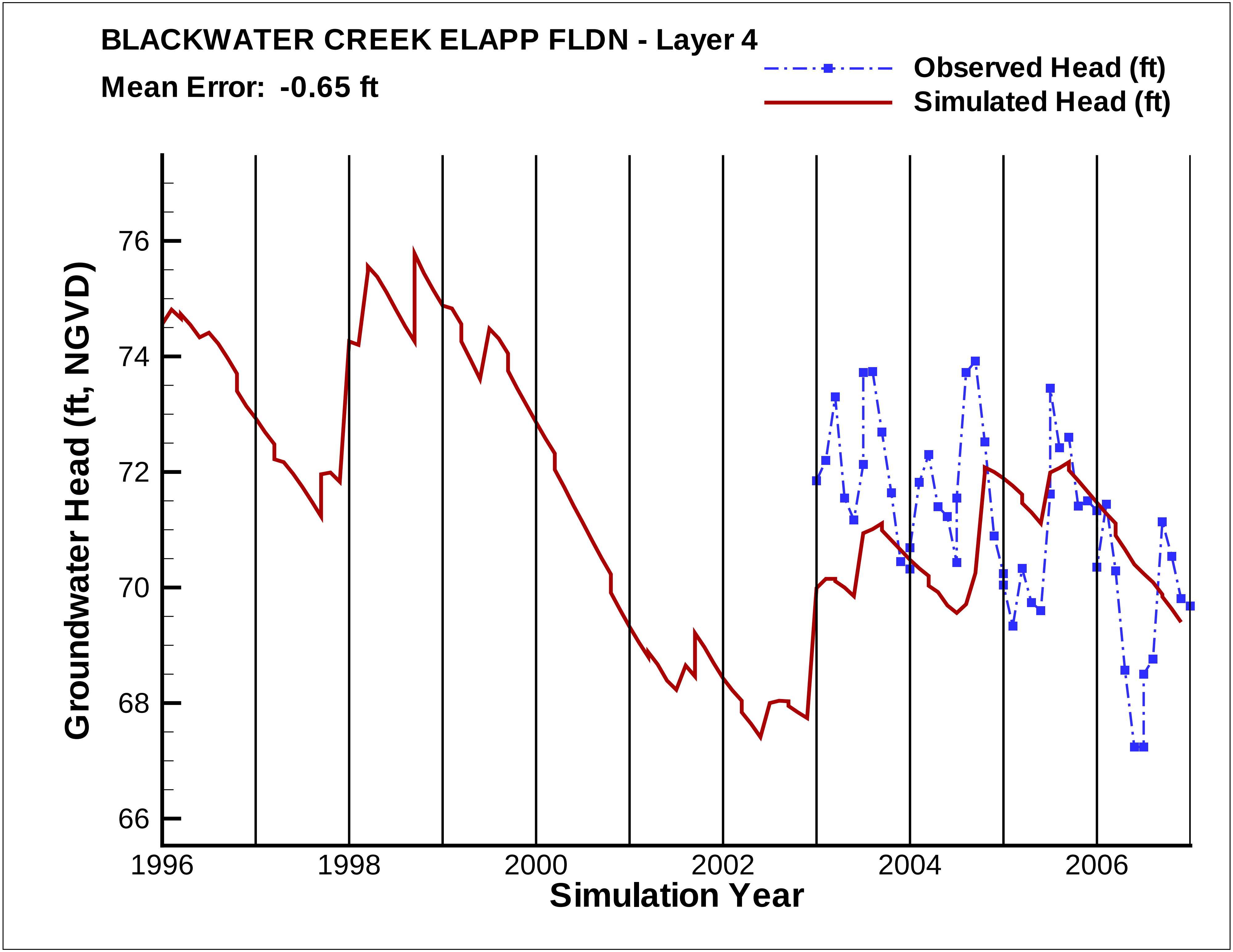

Bill Holblack UFA - Layer 4
Mean Error: 3.59 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
1996
1998
2000
2002
2004
2006
Simulation Year



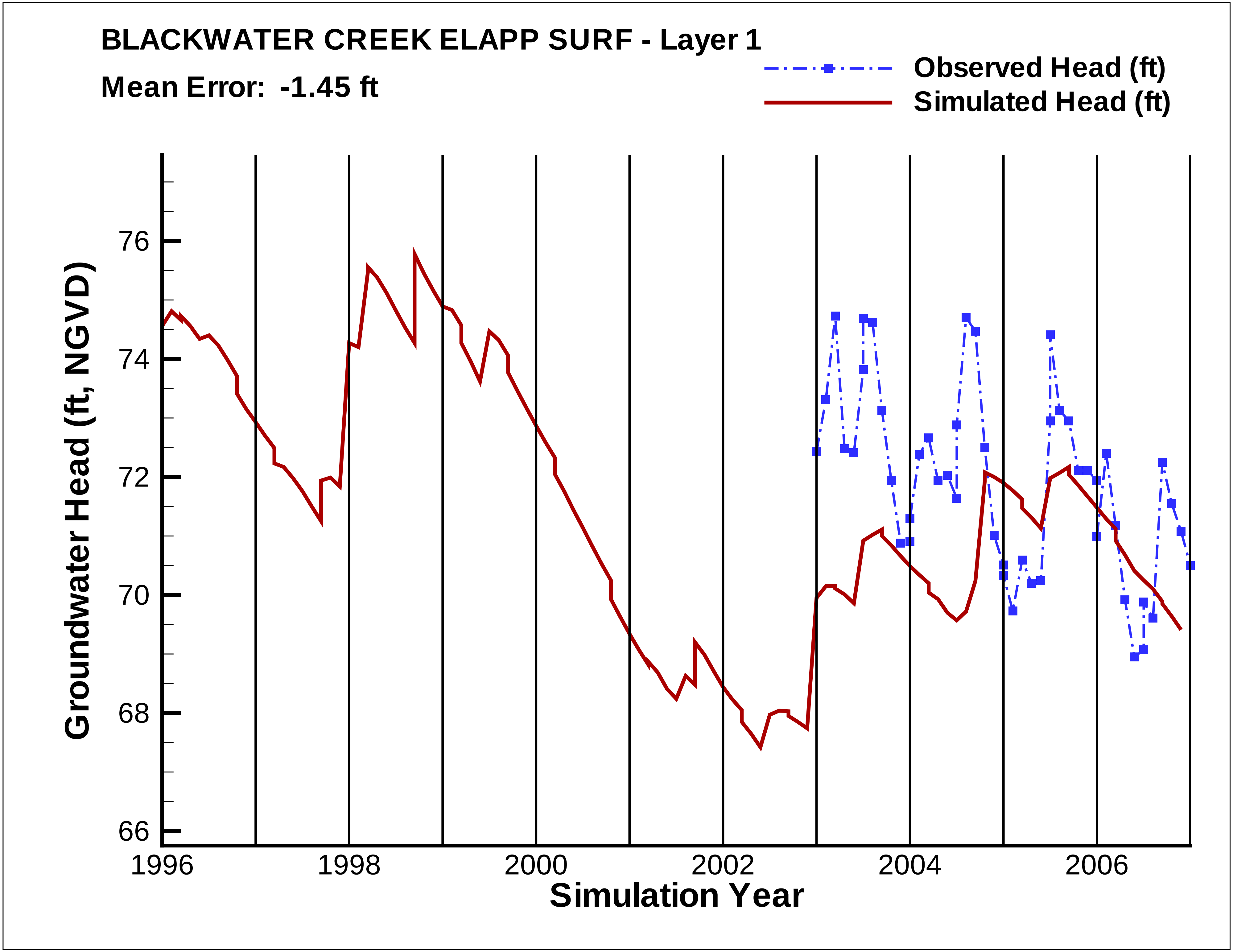
Black Sink M284 UFA - Layer 4
Mean Error: 0.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

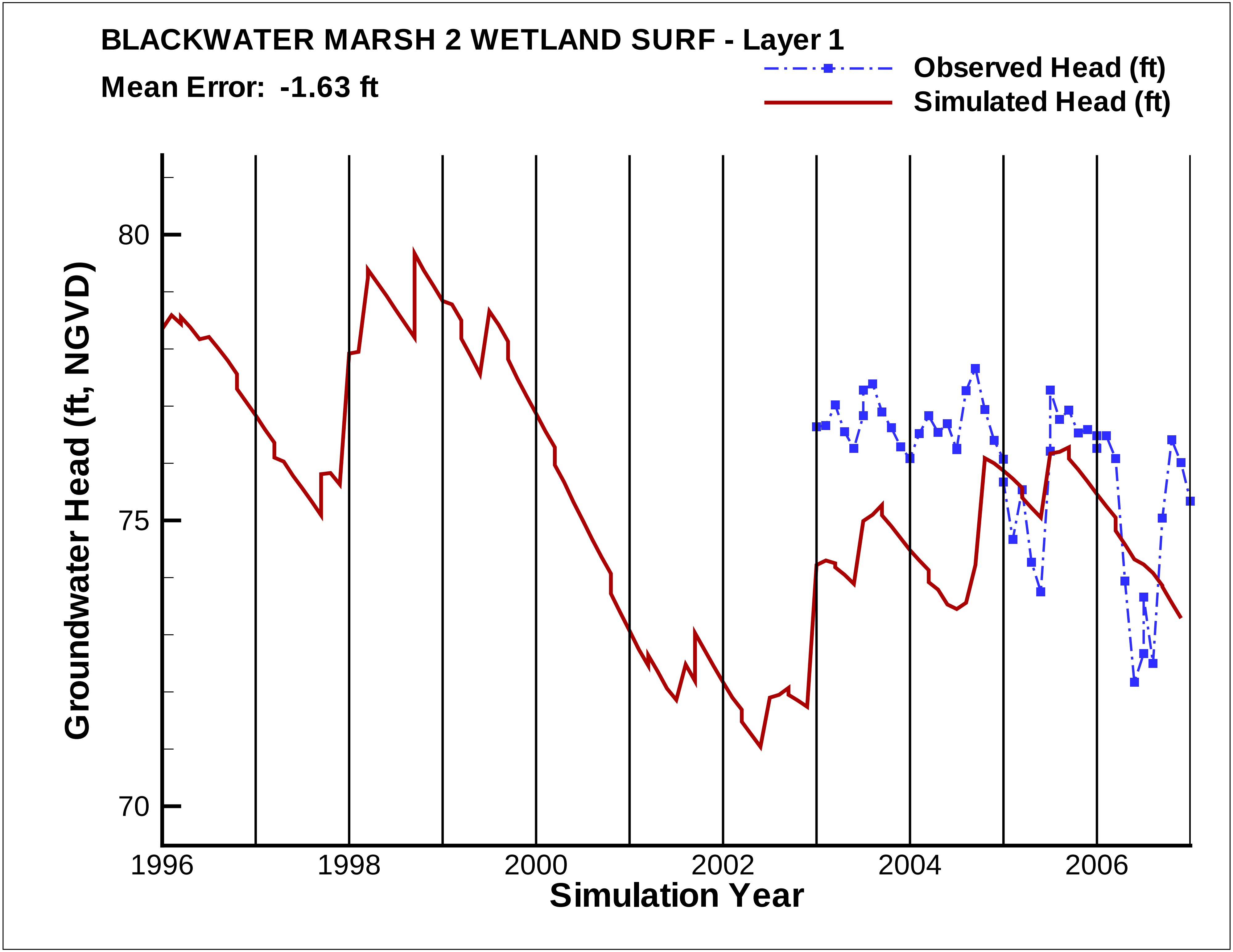


Black Sink Pr M-0012 UFA - Layer 4
Mean Error: 3.58 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

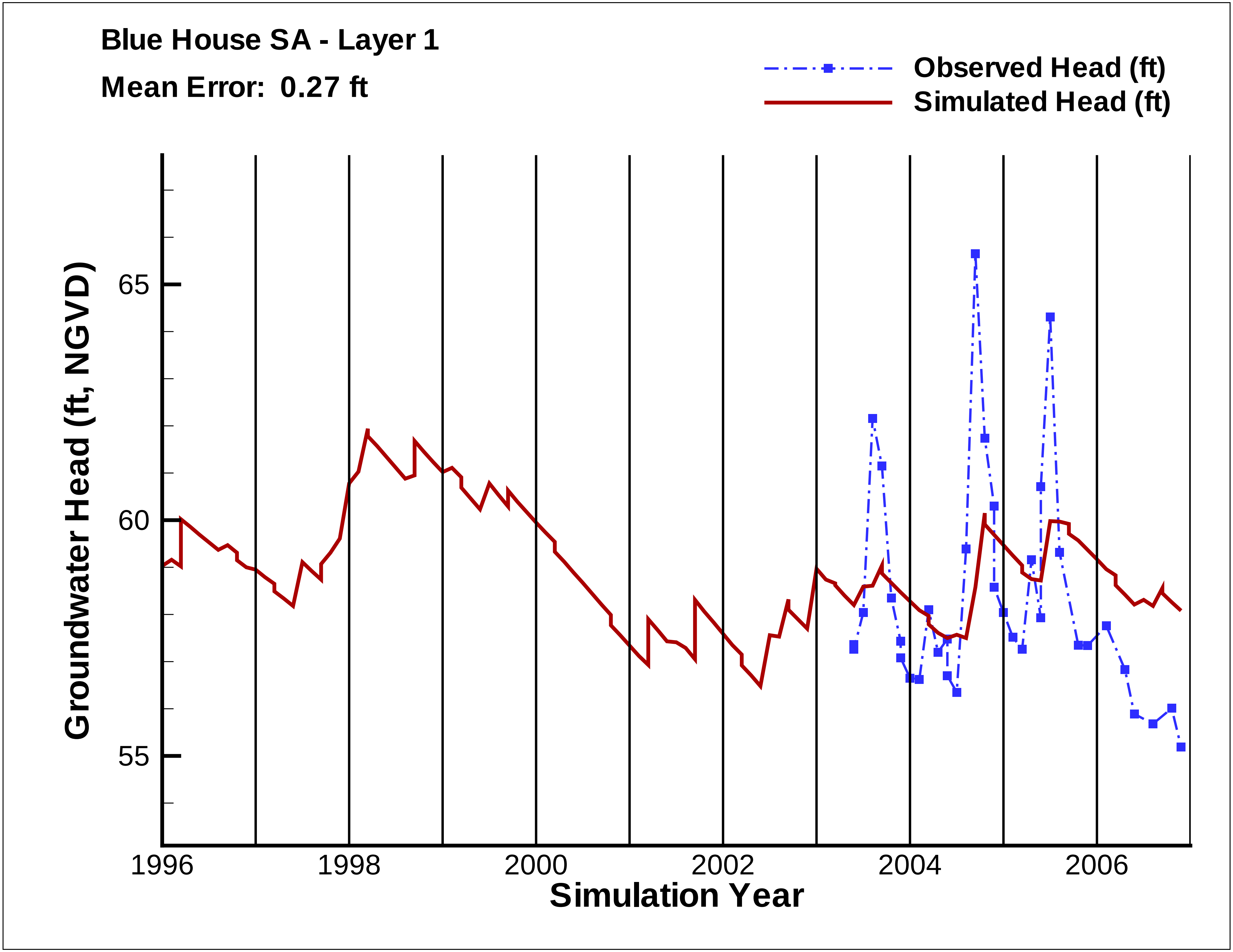


BLACKWATER CREEK ELAPP FLDN - Layer 4
Mean Error: -0.65 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
66
68
70
72
74
76
1996
1998
2000
2002
2004
2006
Simulation Year

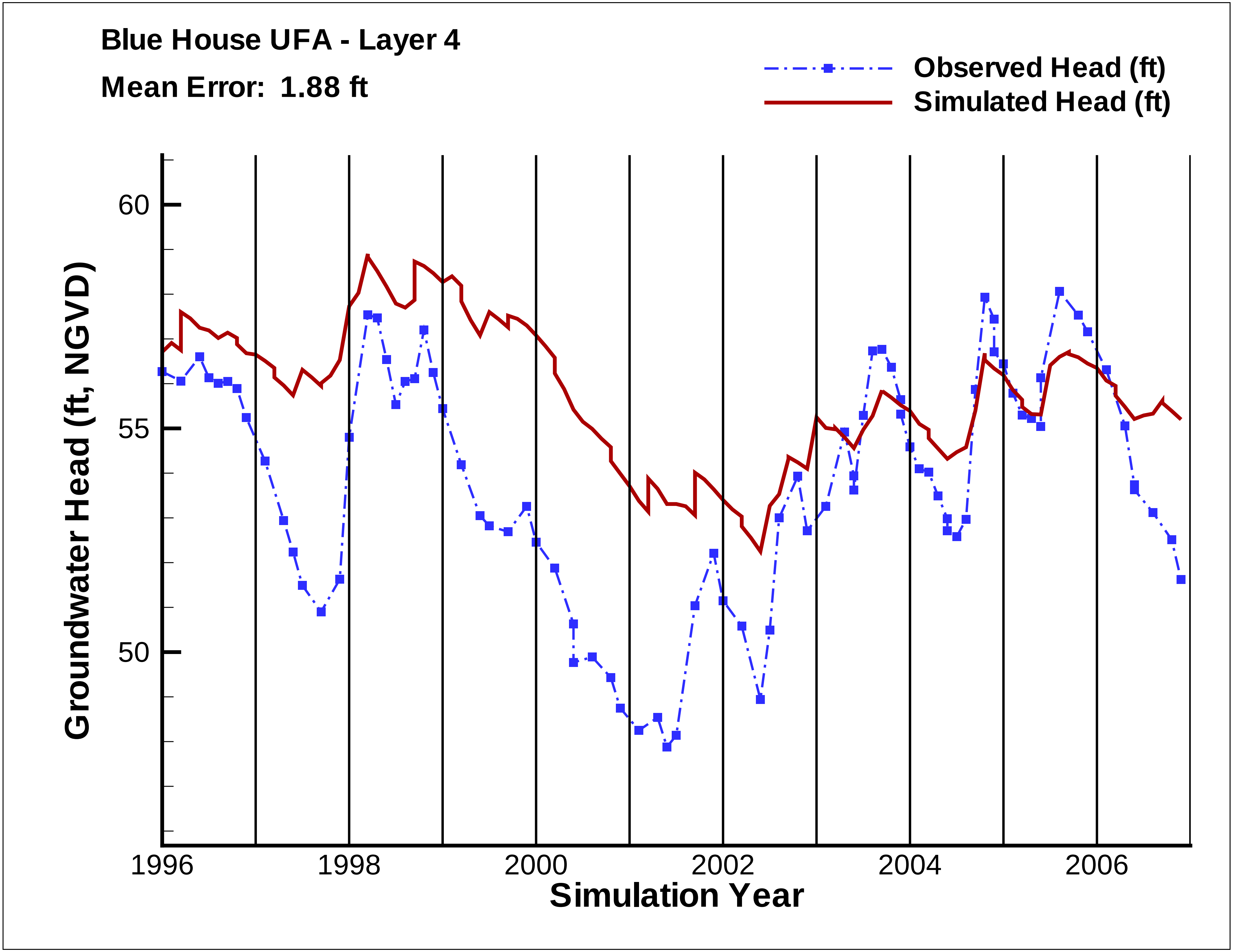

BLACKWATER CREEK ELAPP SURF - Layer 1
Mean Error: -1.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
76
74
72
70
68
66
1996
1998
2000
2002
2004
2006
Simulation Year

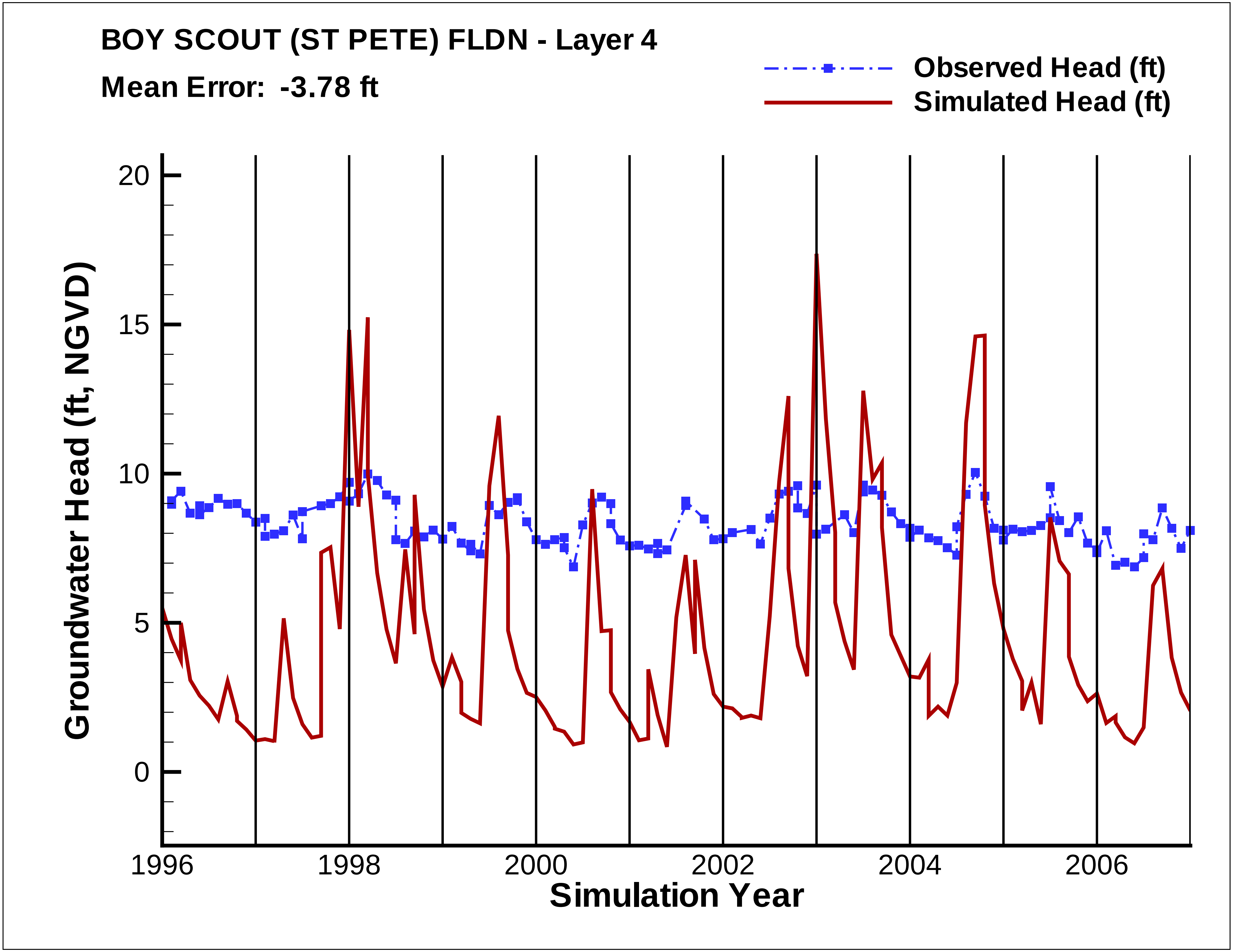


BLACKWATER MARSH 2 WETLAND SURF - Layer 1
Mean Error: -1.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

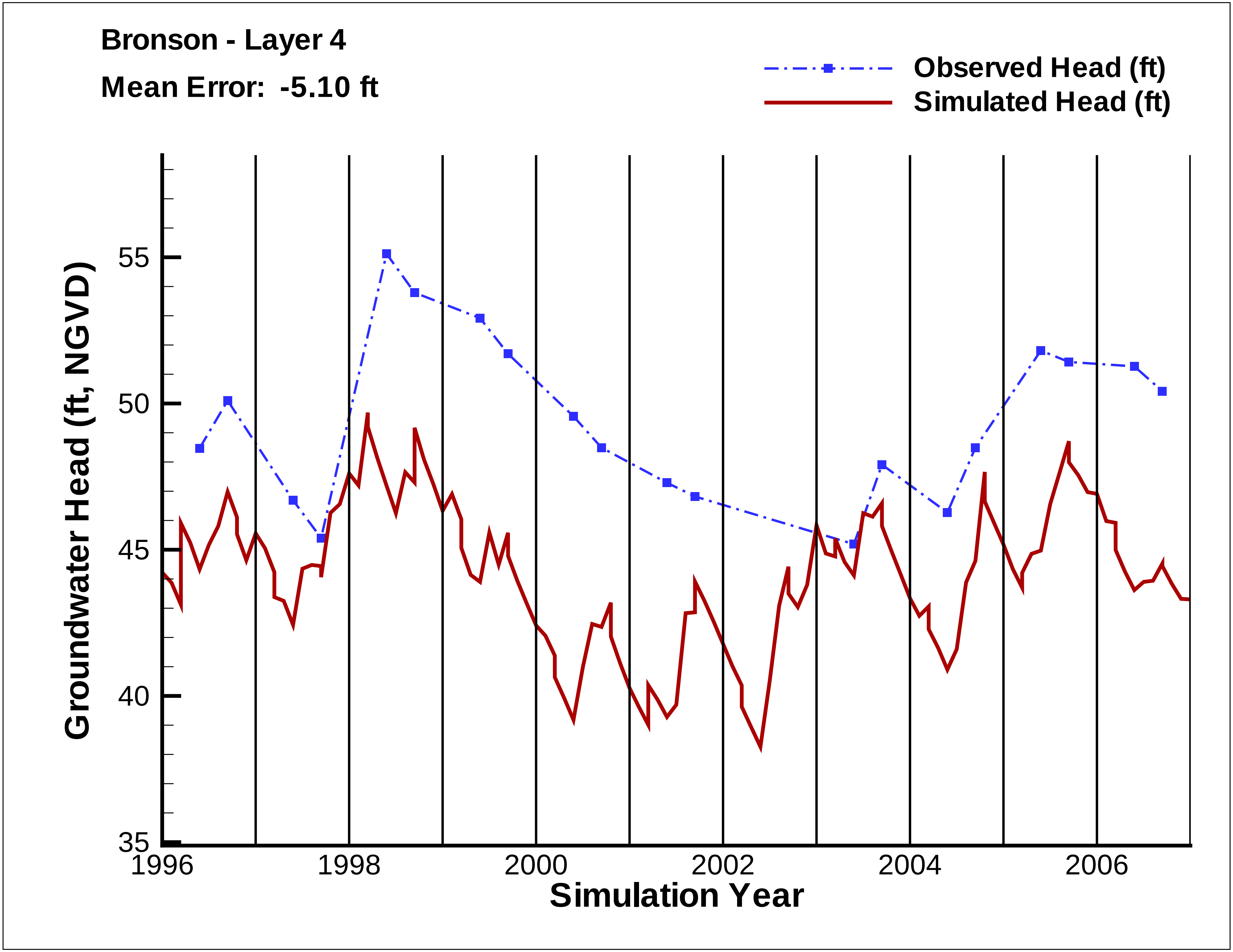


Blue House SA - Layer 1
Mean Error: 0.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

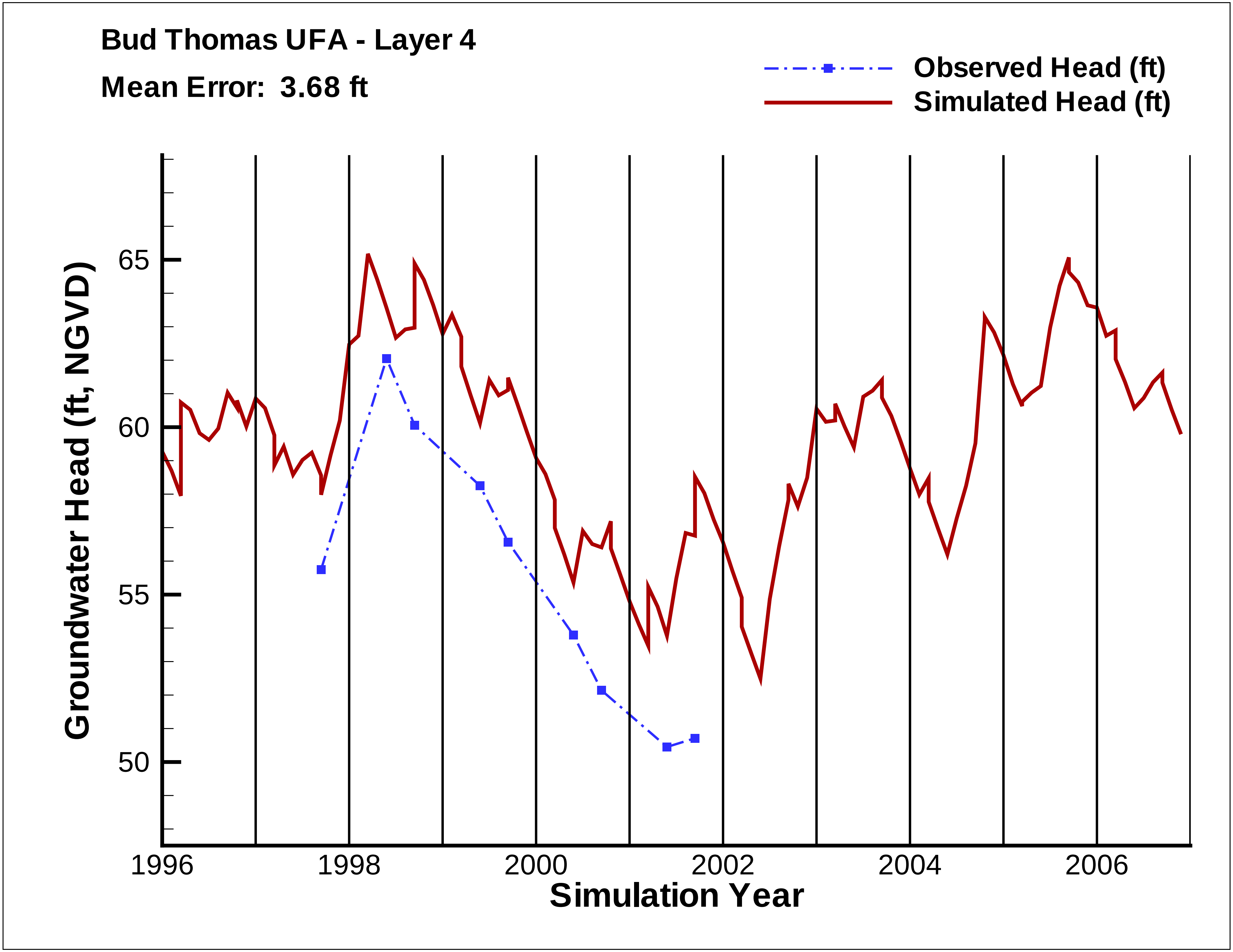

Blue House UFA - Layer 4
Mean Error: 1.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

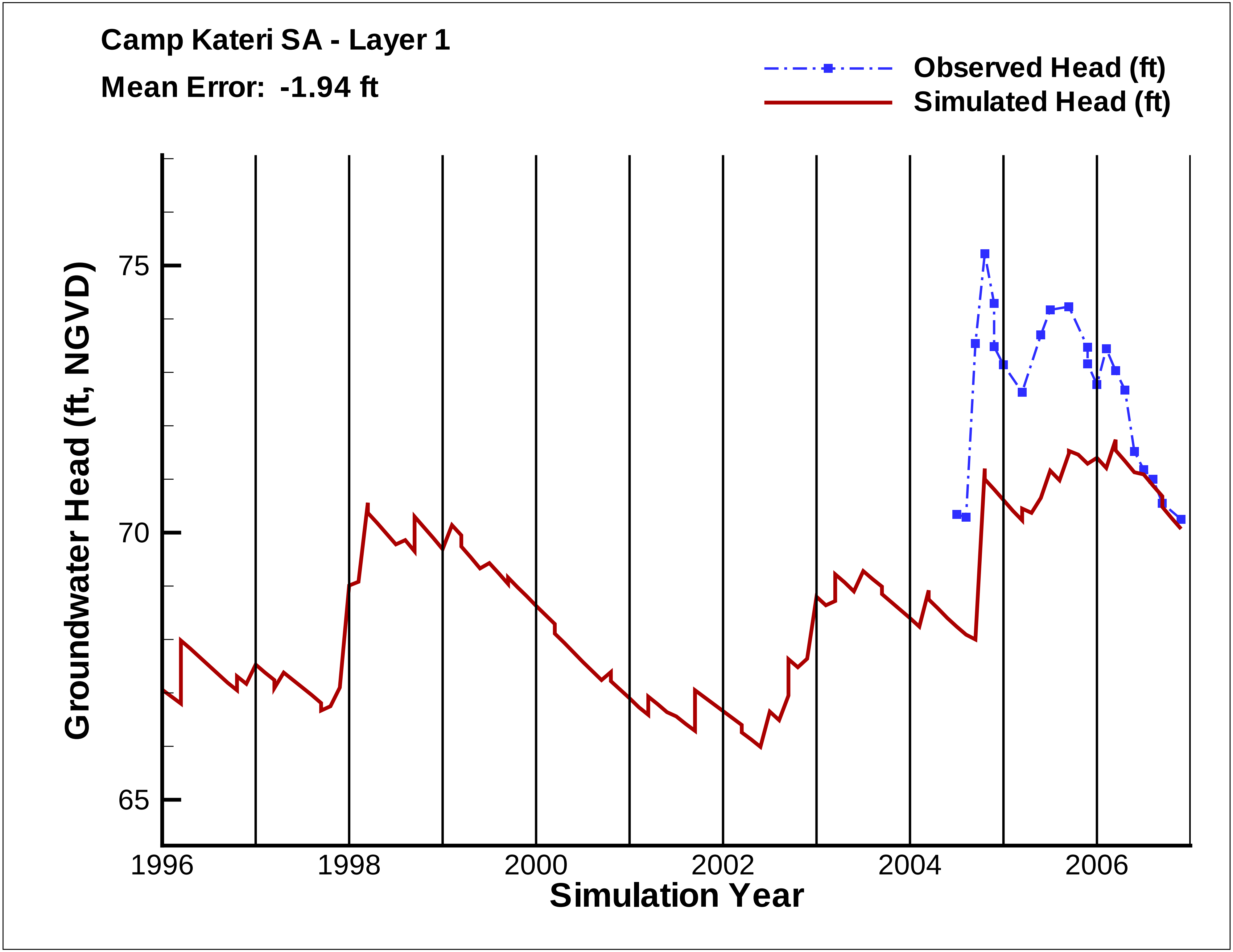


BOY SCOUT (ST PETE) FLDN - Layer 4
Mean Error: -3.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
5
0
1996
1998
2000
2002
2004
2006
Simulation Year

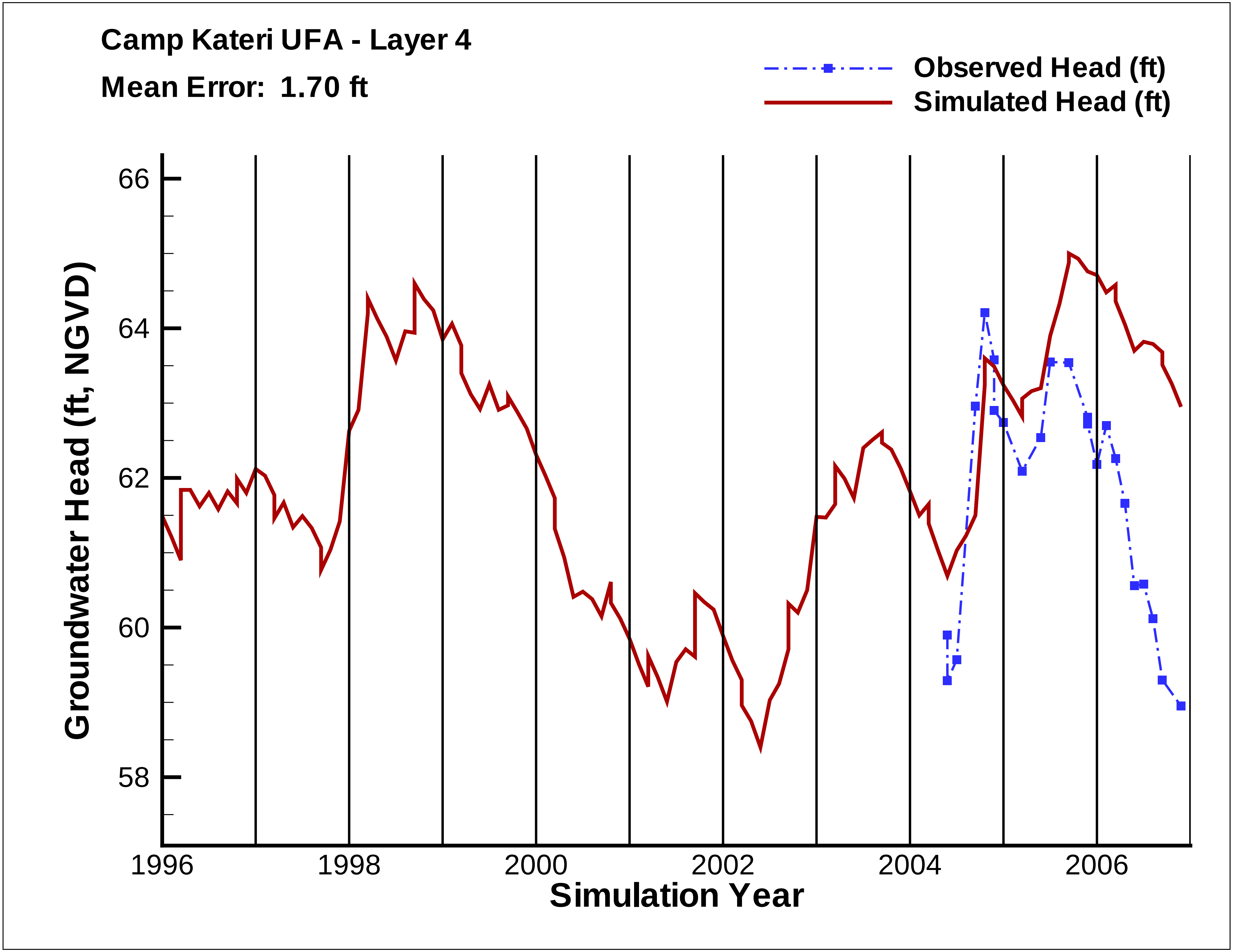


Bronson - Layer 4
Mean Error: -5.10 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
40
45
50
55
1996
1998
2000
2002
2004
2006
Simulation Year

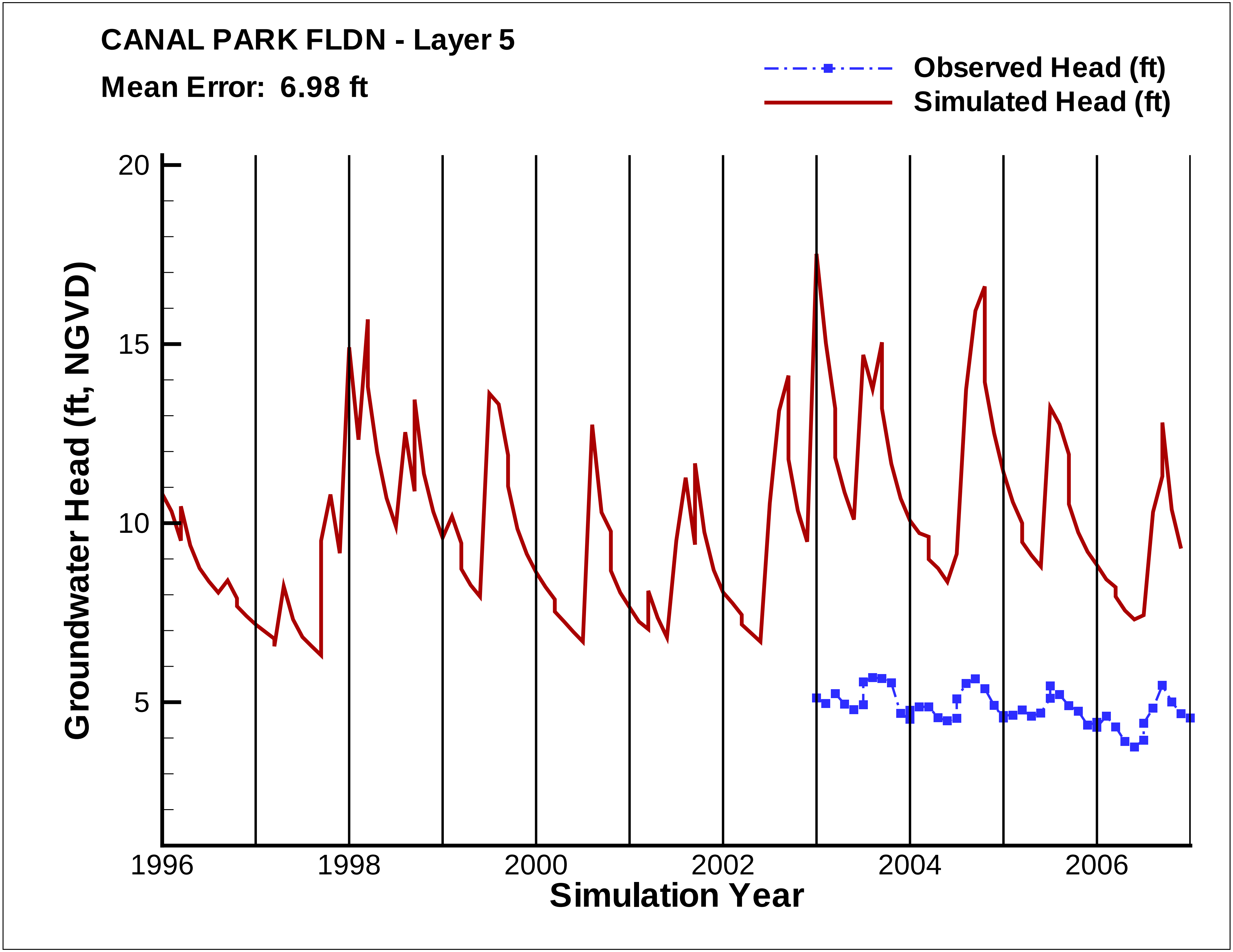

Bud Thomas UFA - Layer 4
Mean Error: 3.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



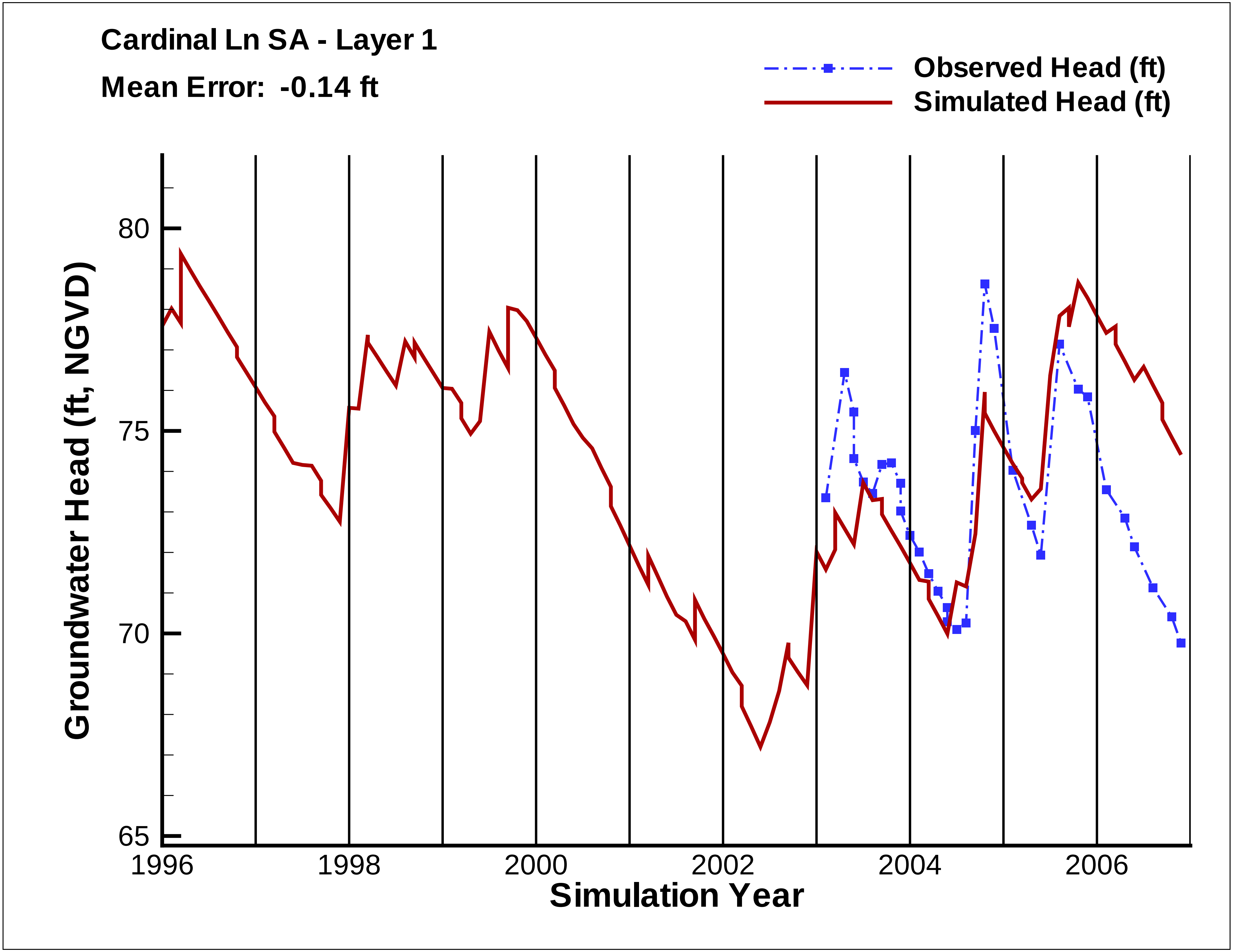
Camp Kateri SA - Layer 1
Mean Error: -1.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



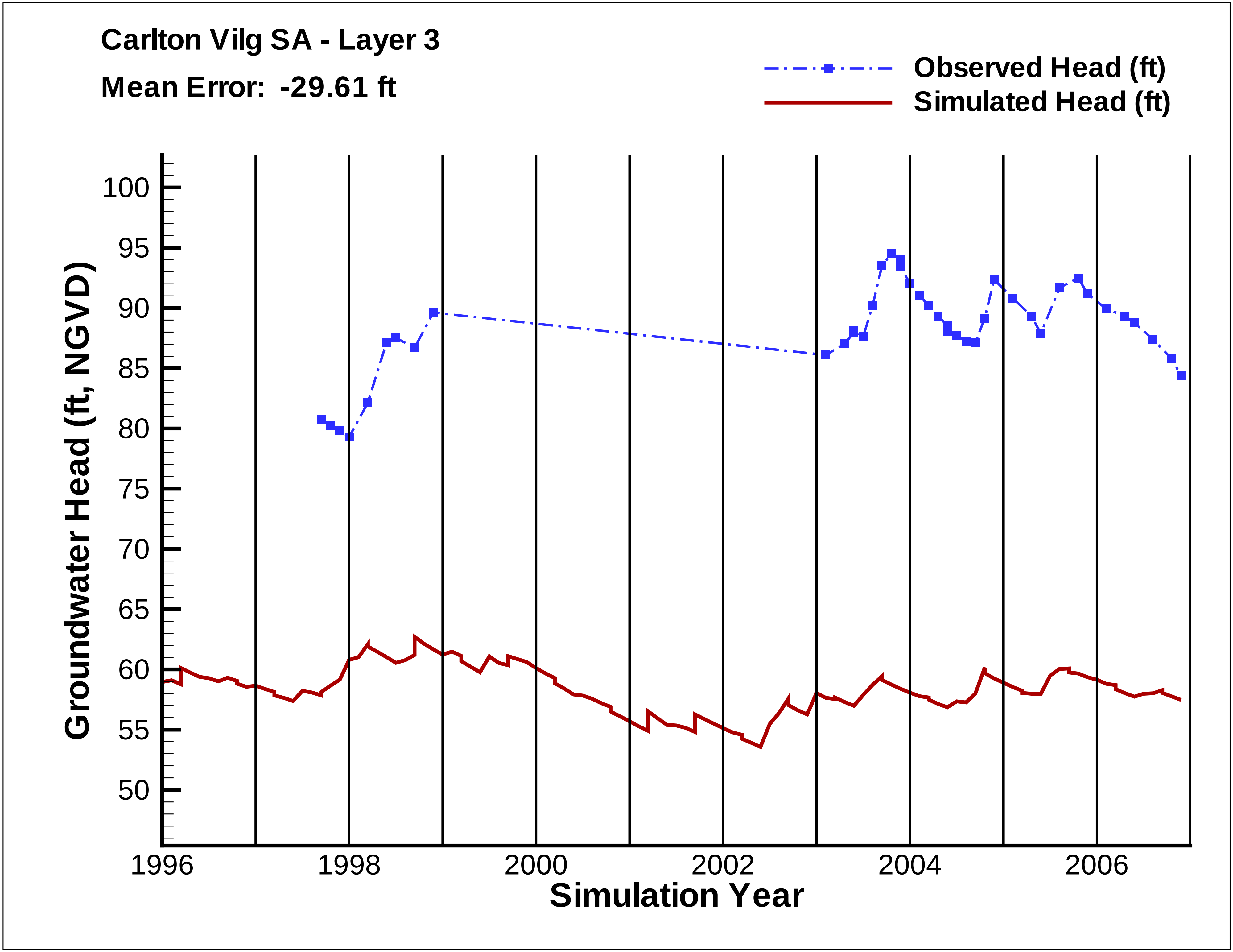
Camp Kateri UFA - Layer 4
Mean Error: 1.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
66
64
62
60
58
1996
1998
2000
2002
2004
2006
Simulation Year



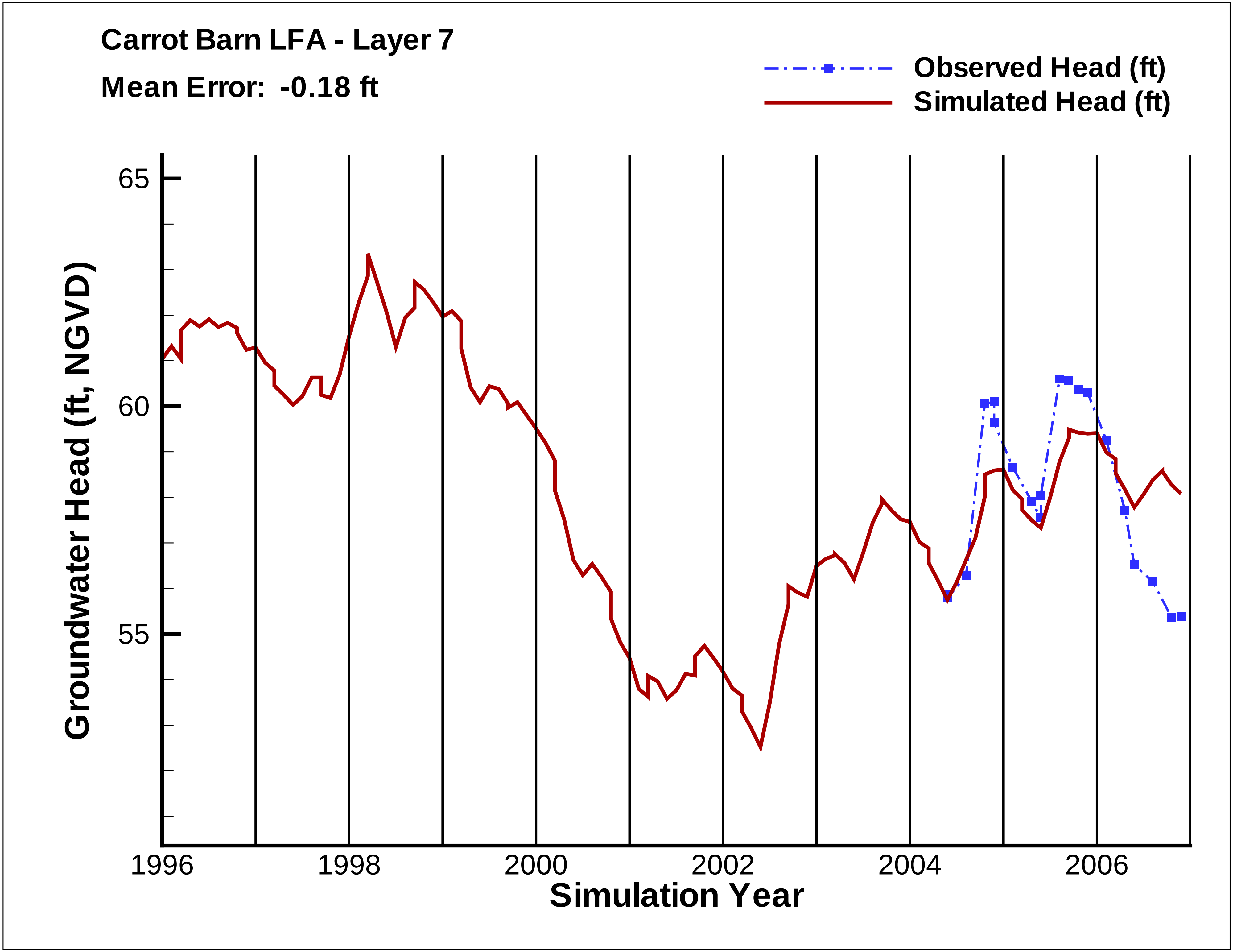
CANAL PARK FLDN - Layer 5
Mean Error: 6.98 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



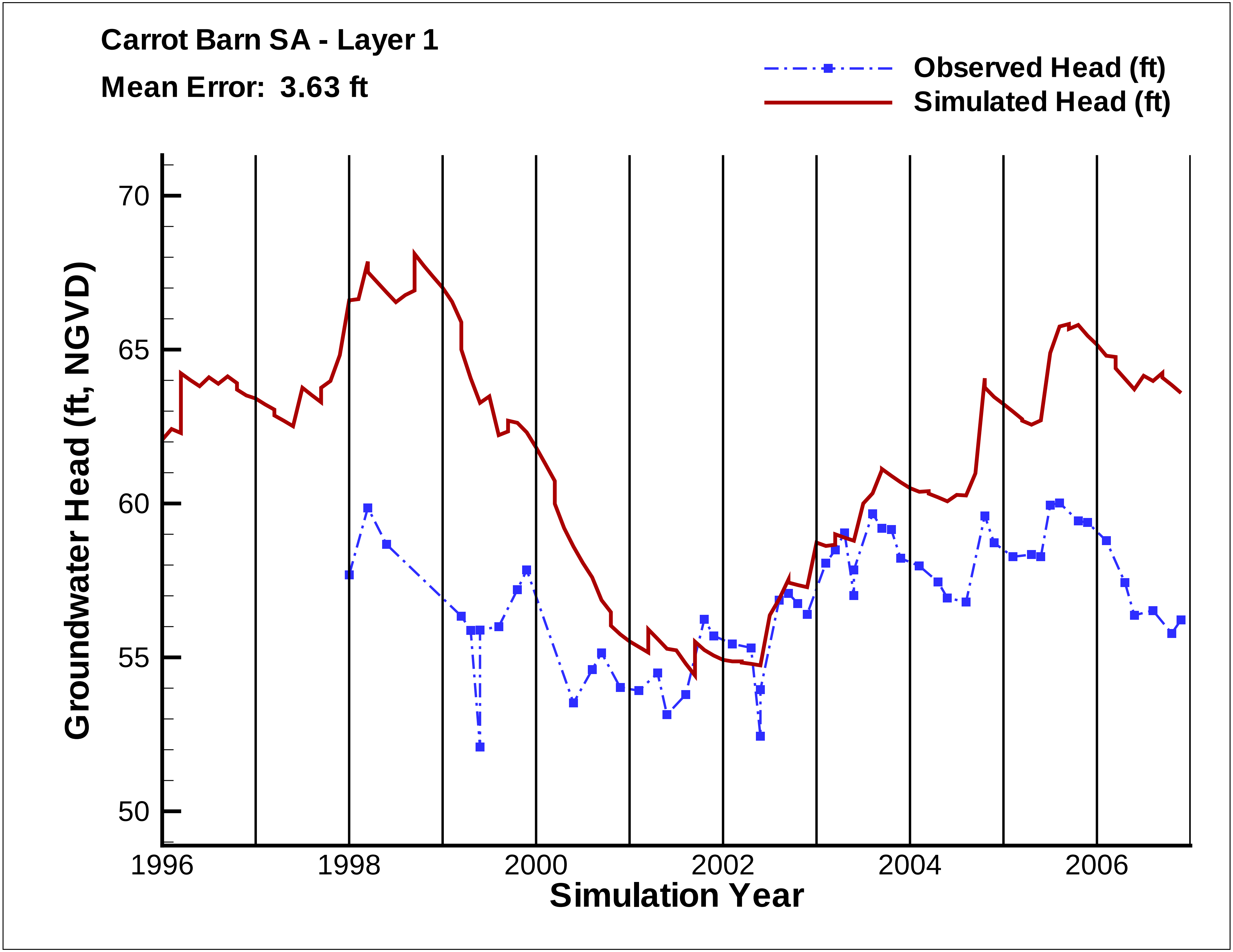
Cardinal Ln SA - Layer 1
Mean Error: -0.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



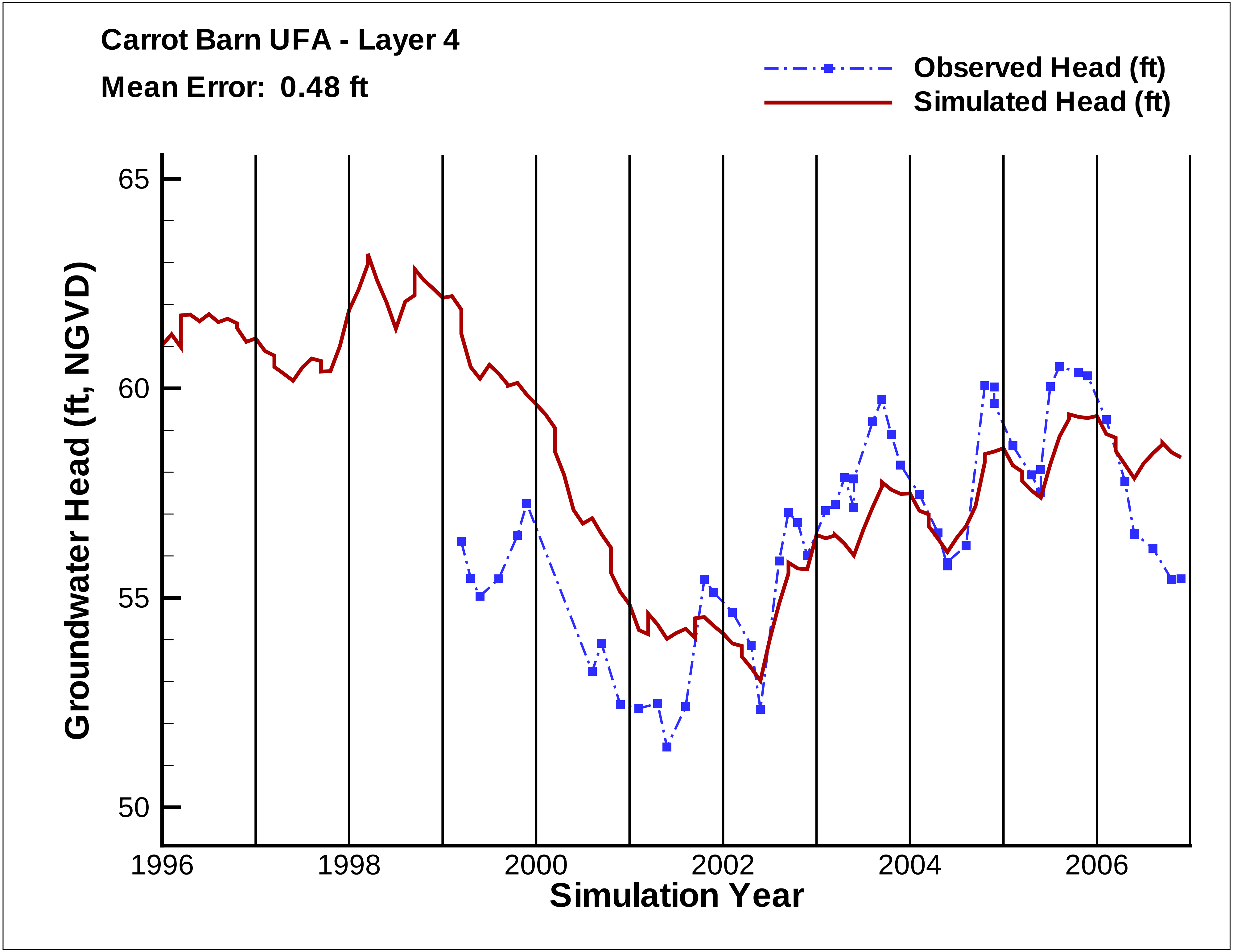
Carlton Vilg SA - Layer 3
Mean Error: -29.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



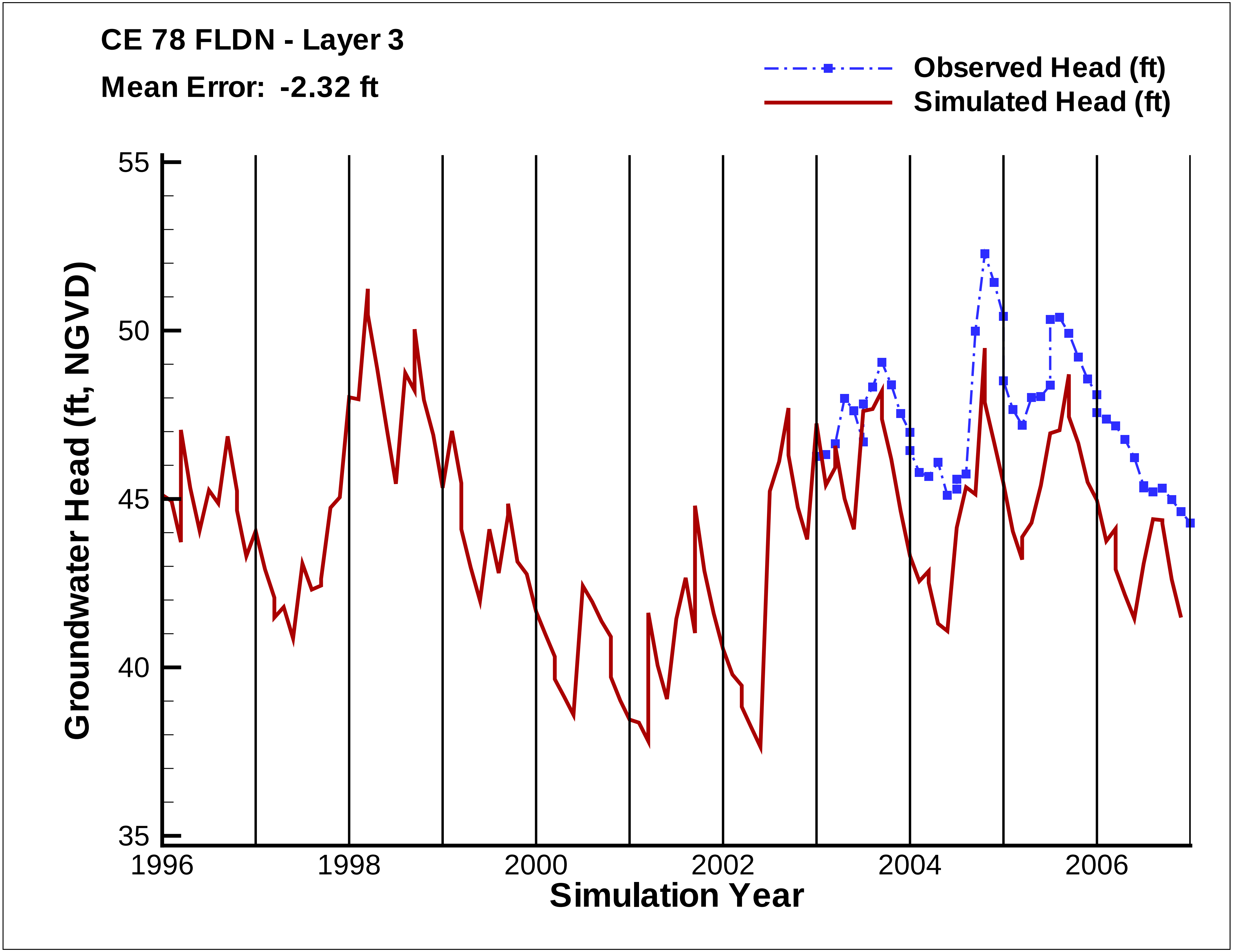
Carrot Barn LFA - Layer 7
Mean Error: -0.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

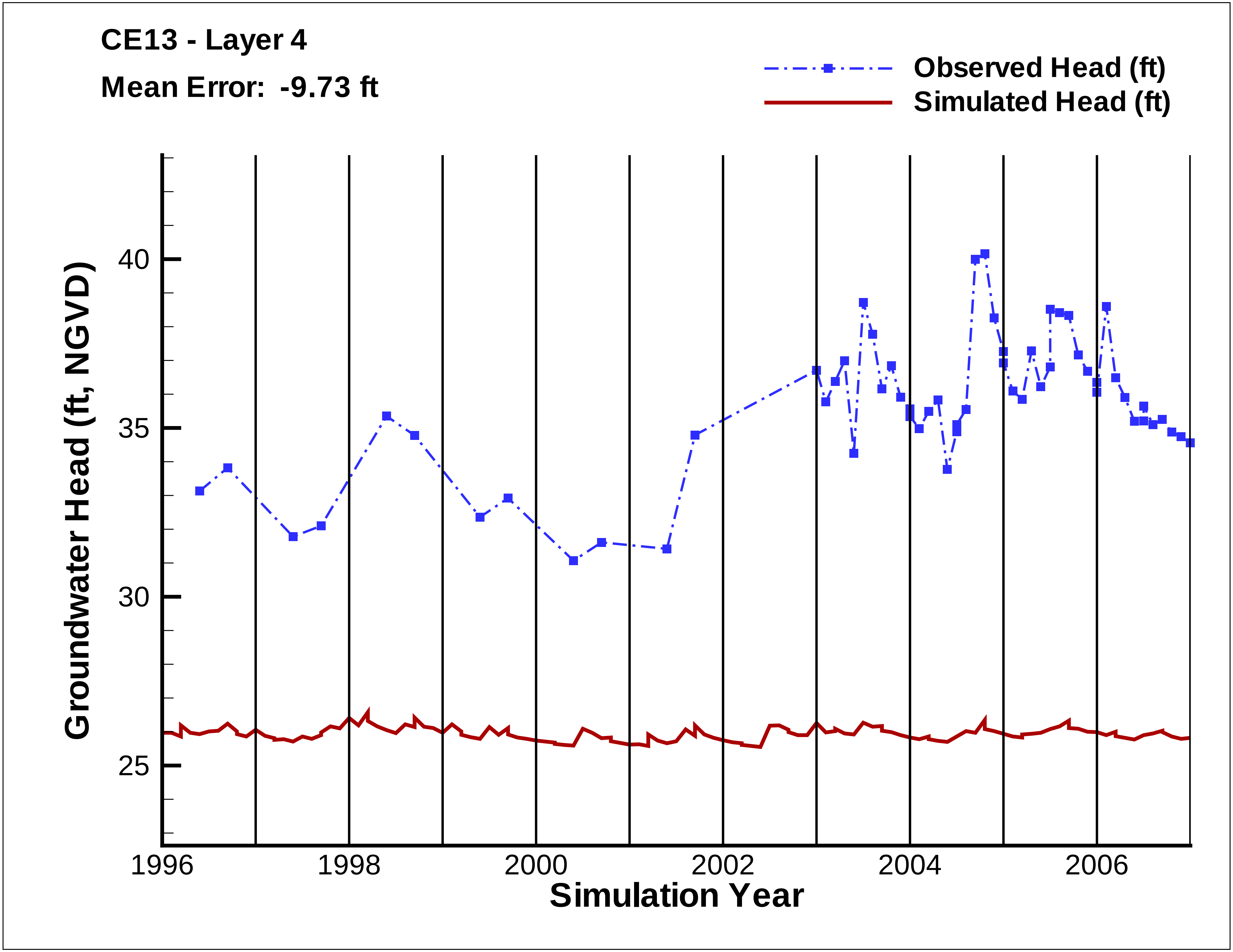


Carrot Barn SA - Layer 1
Mean Error: 3.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

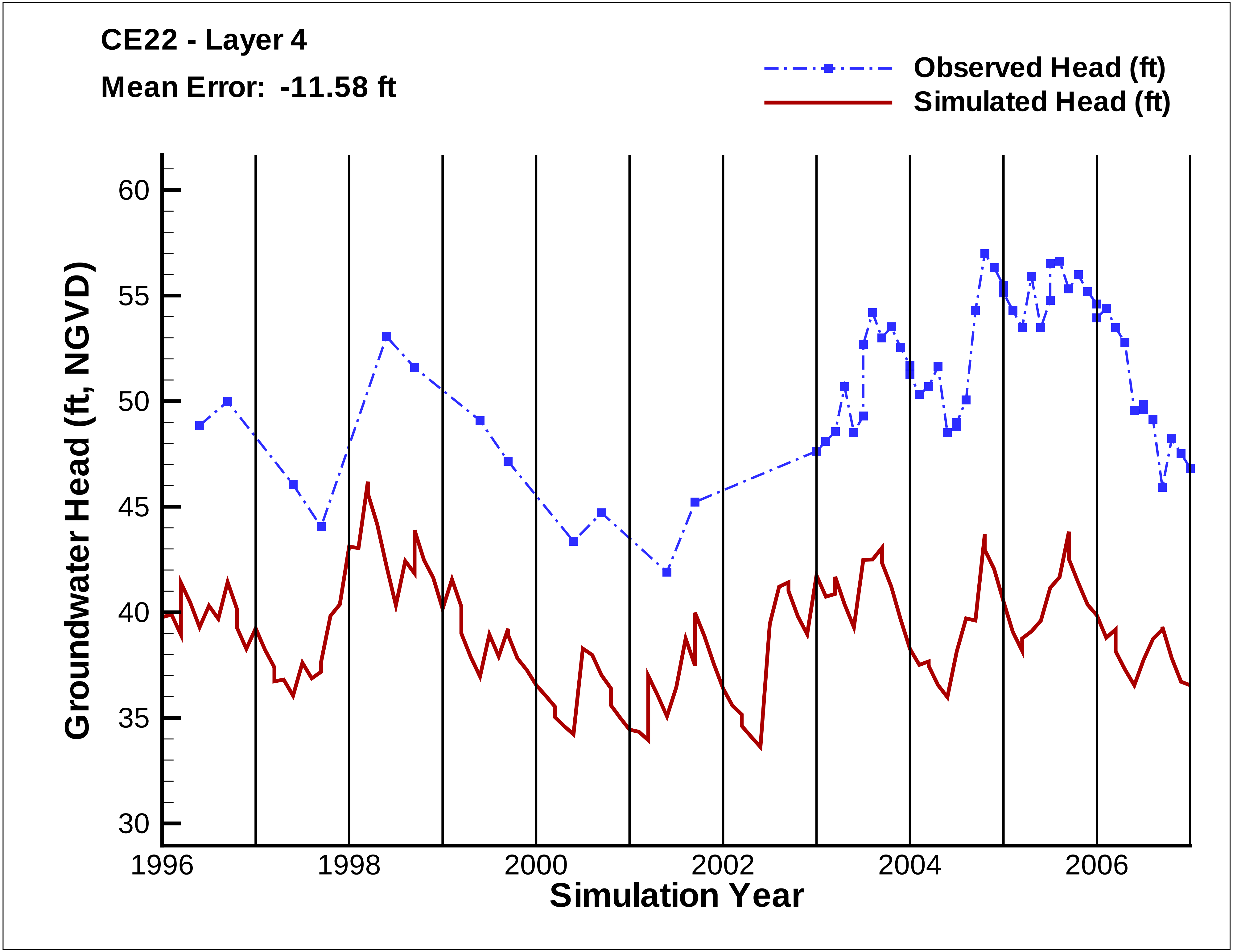


Carrot Barn UFA - Layer 4
Mean Error: 0.48 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

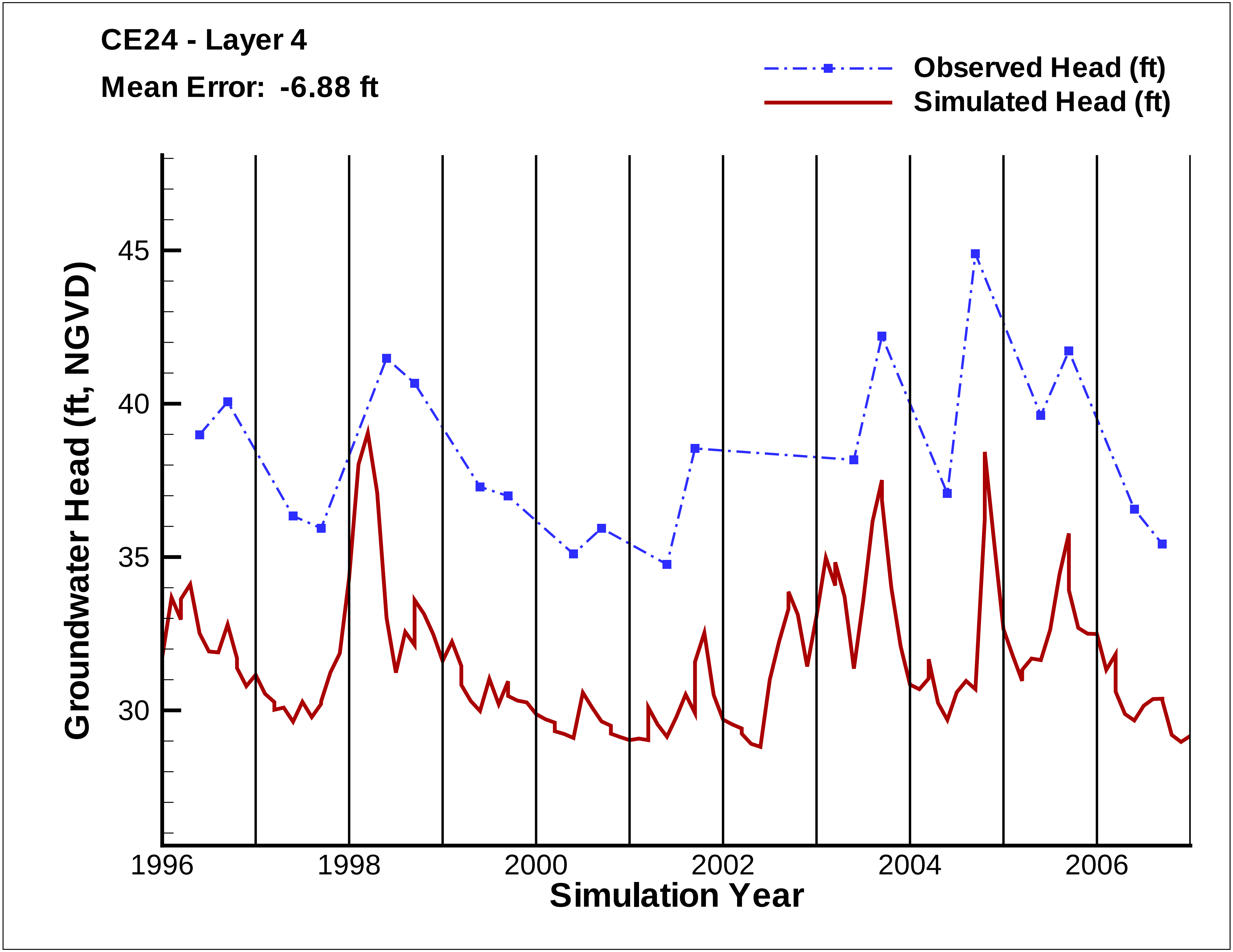

CE 78 FLDN - Layer 3
Mean Error: -2.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



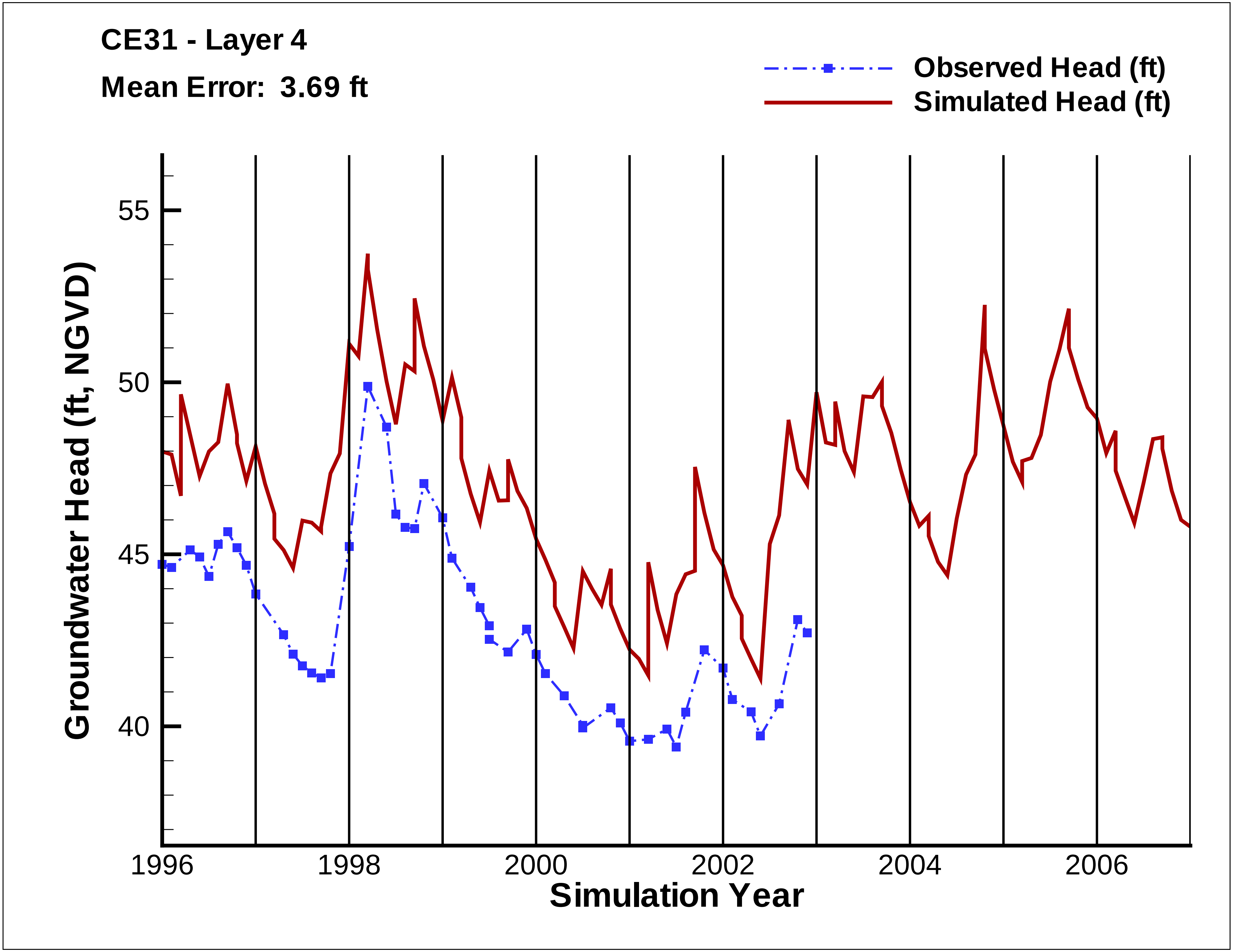
CE13 - Layer 4
Mean Error: -9.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



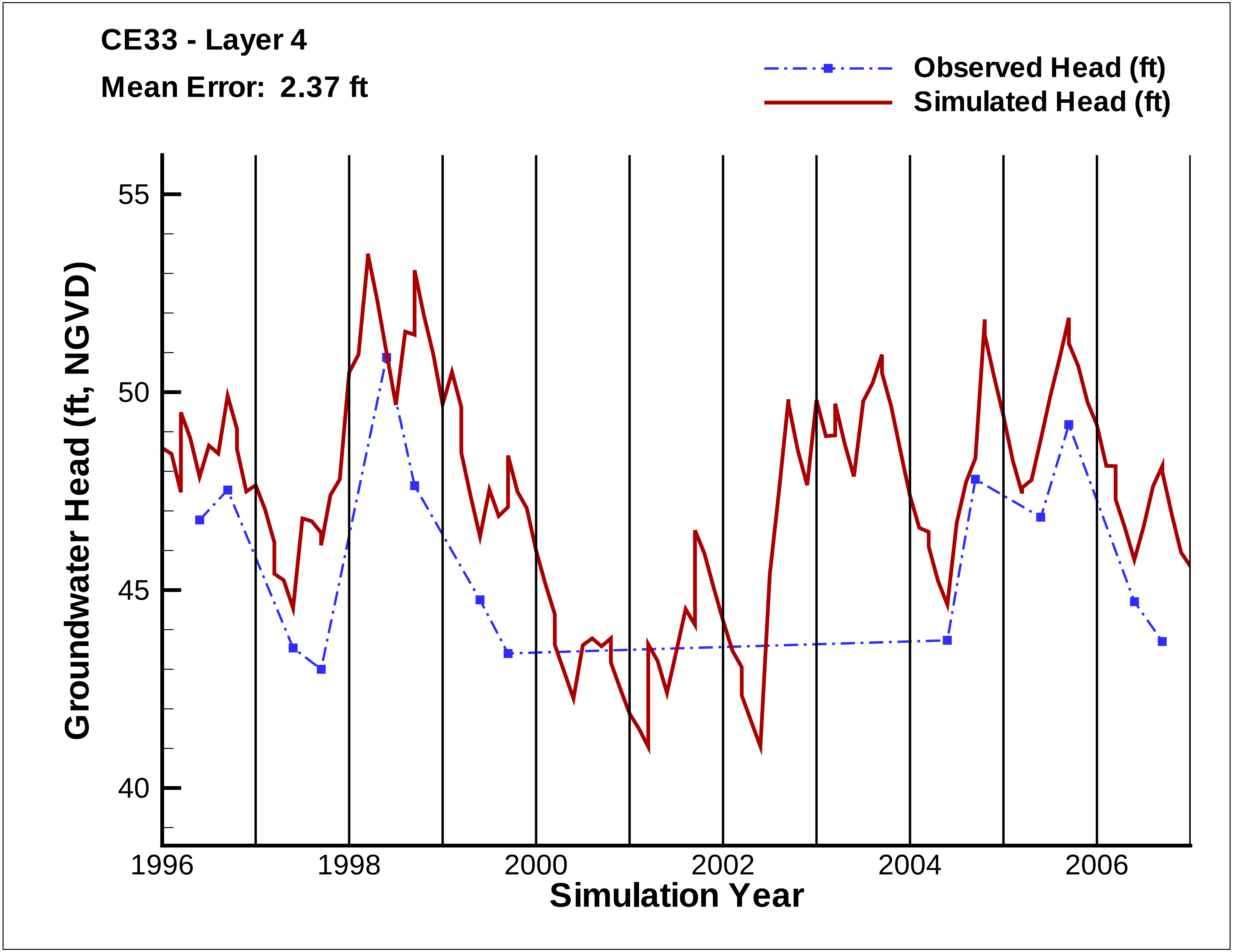
CE22 - Layer 4
Mean Error: -11.58 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year



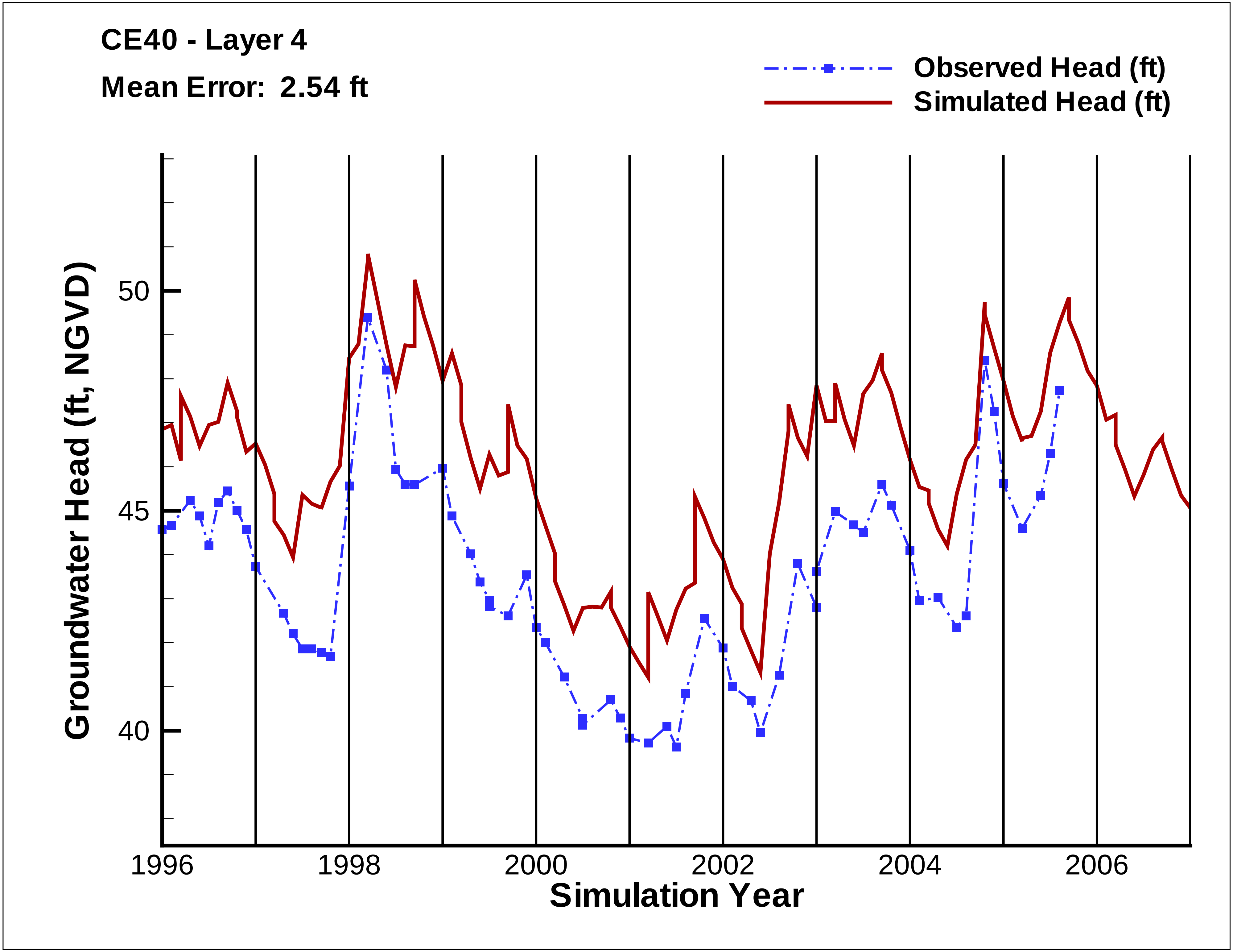
CE24 - Layer 4
Mean Error: -6.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year



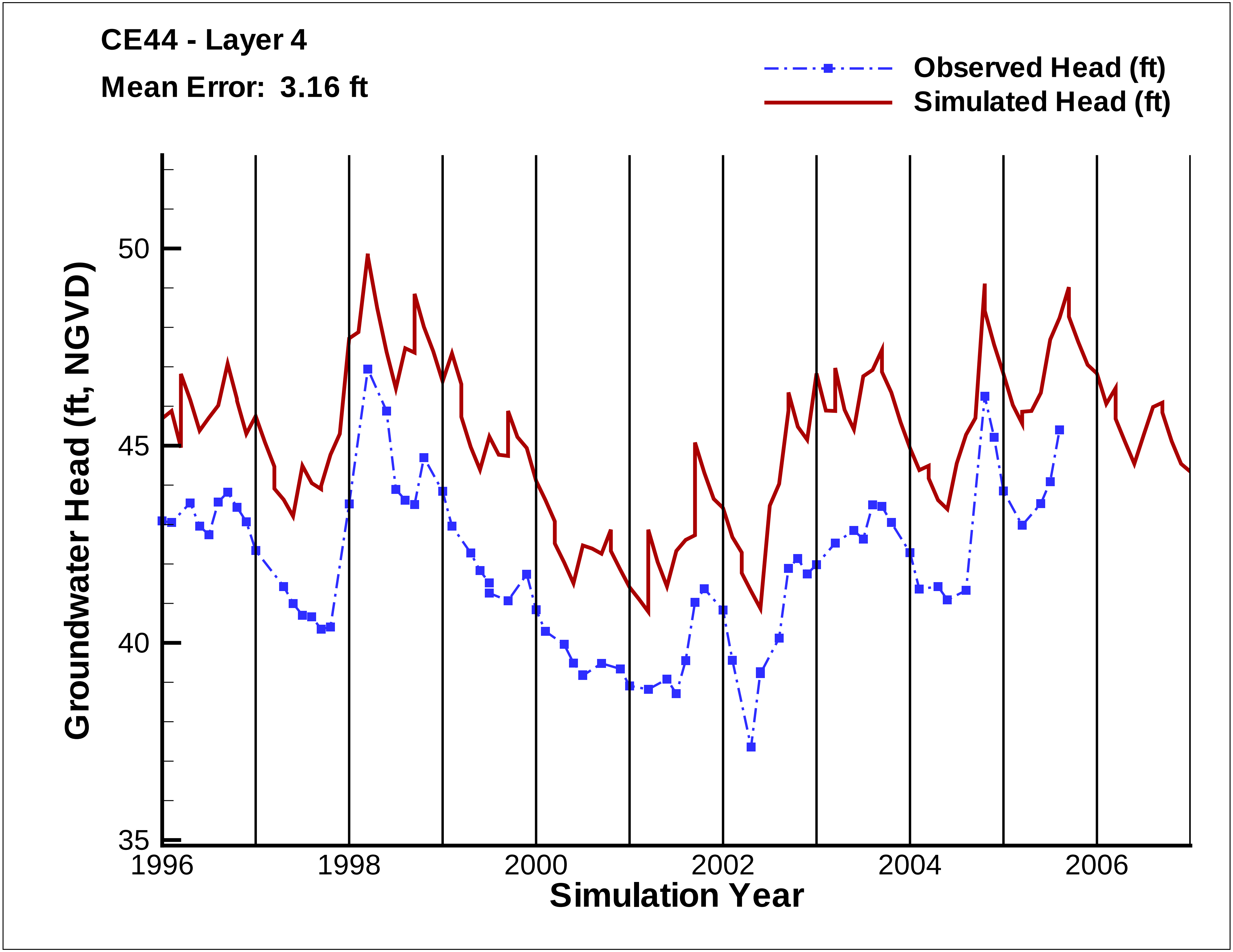
CE31 - Layer 4
Mean Error: 3.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



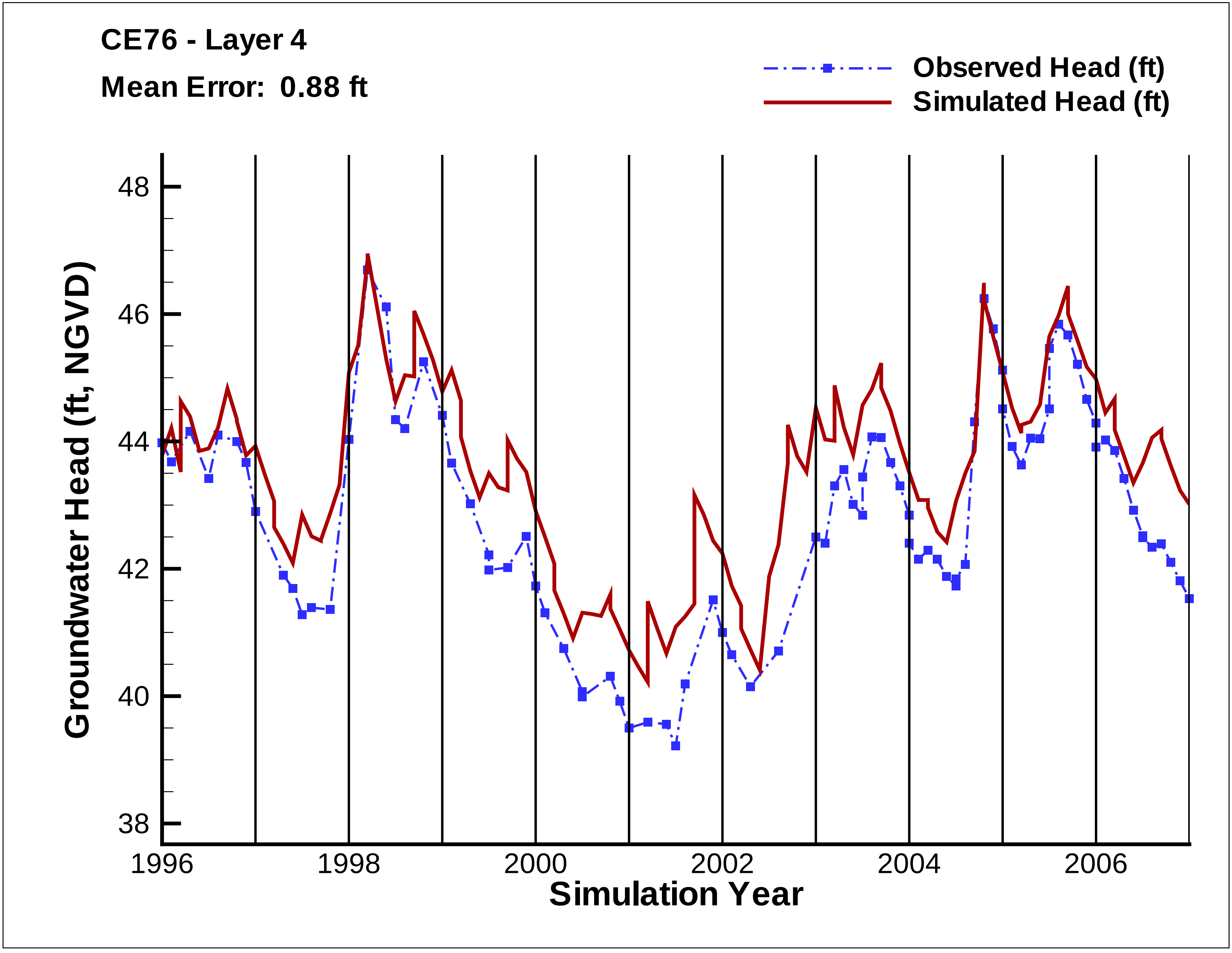
CE33 - Layer 4
Mean Error: 2.37 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

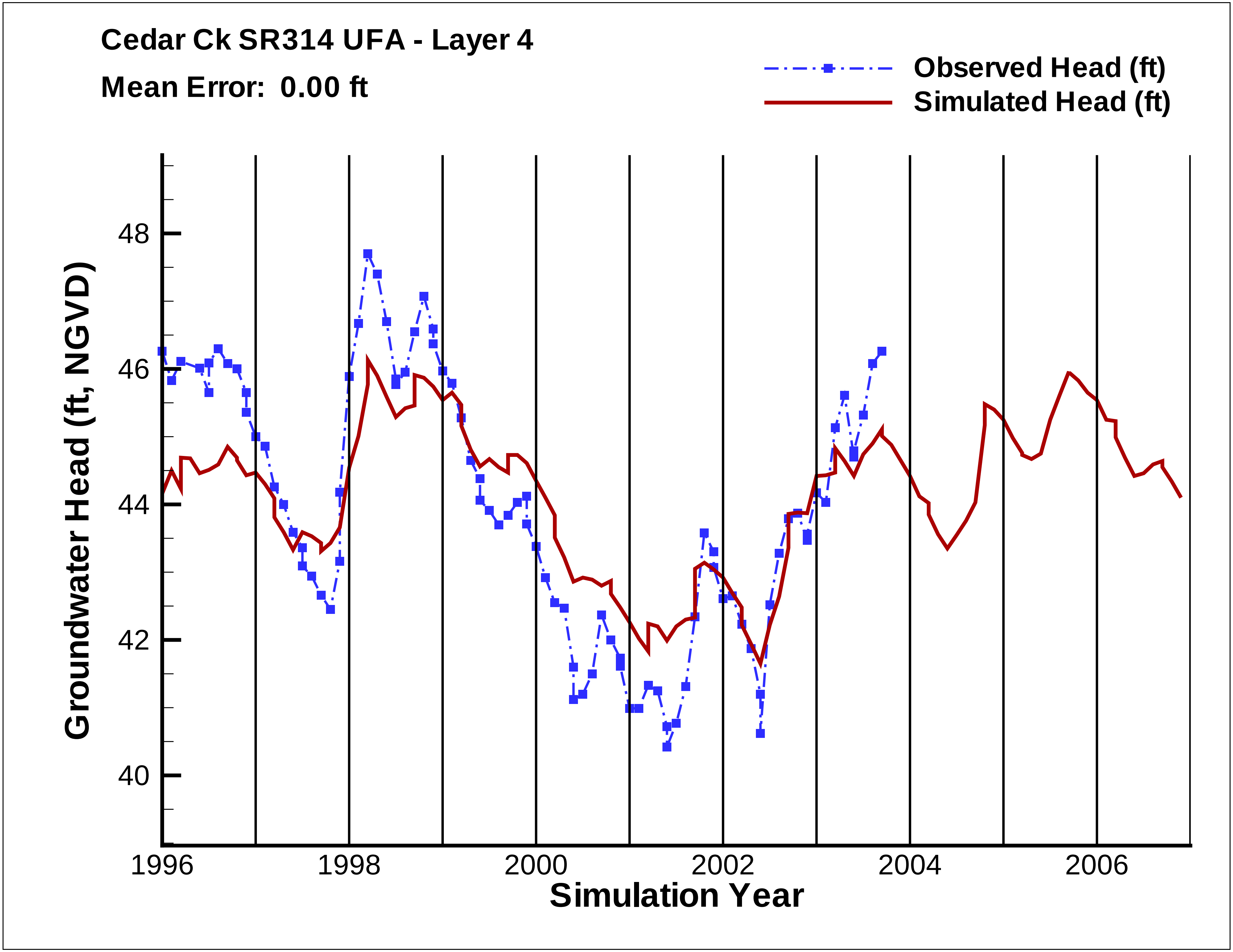


CE40 - Layer 4
Mean Error: 2.54 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

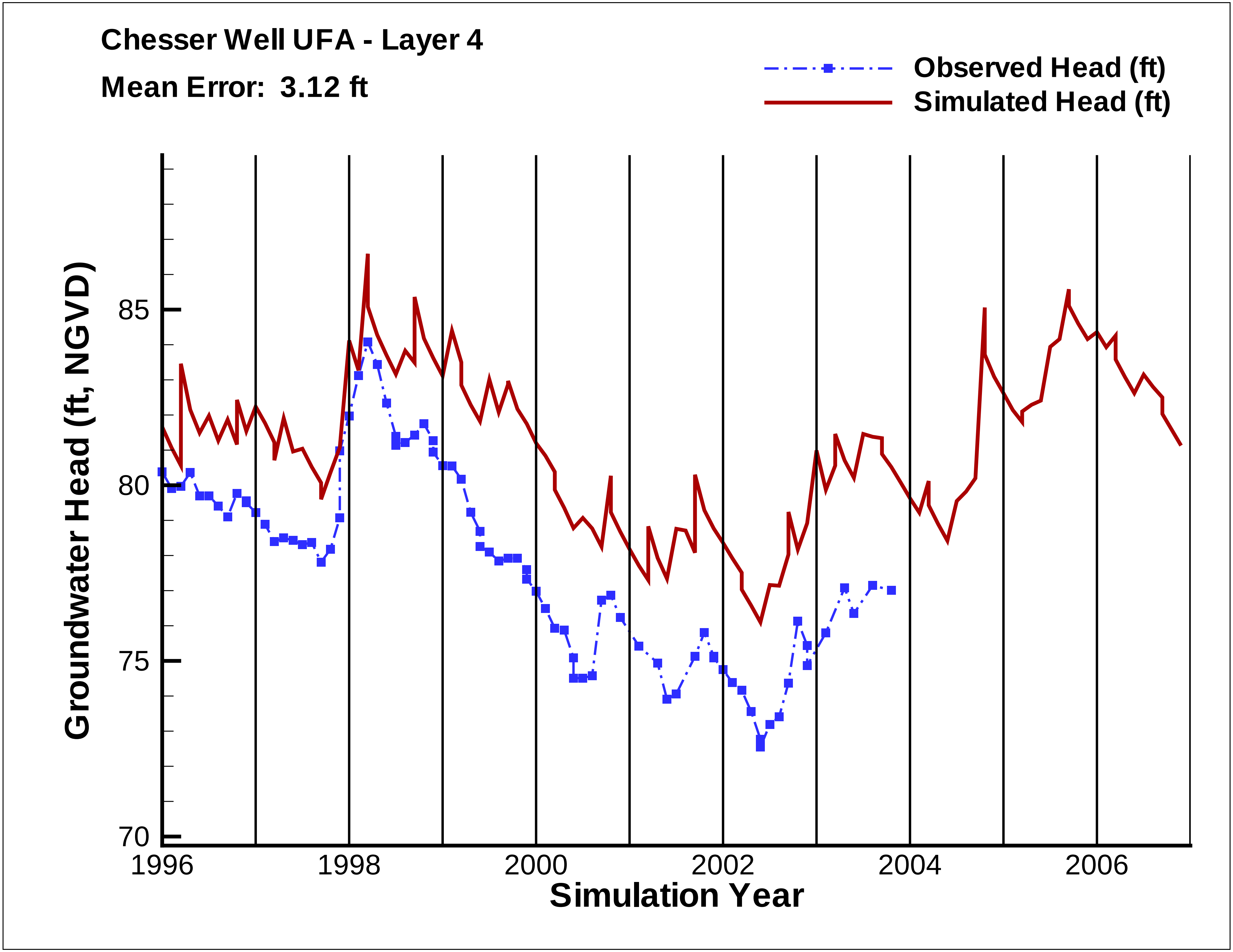


CE44 - Layer 4
Mean Error: 3.16 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

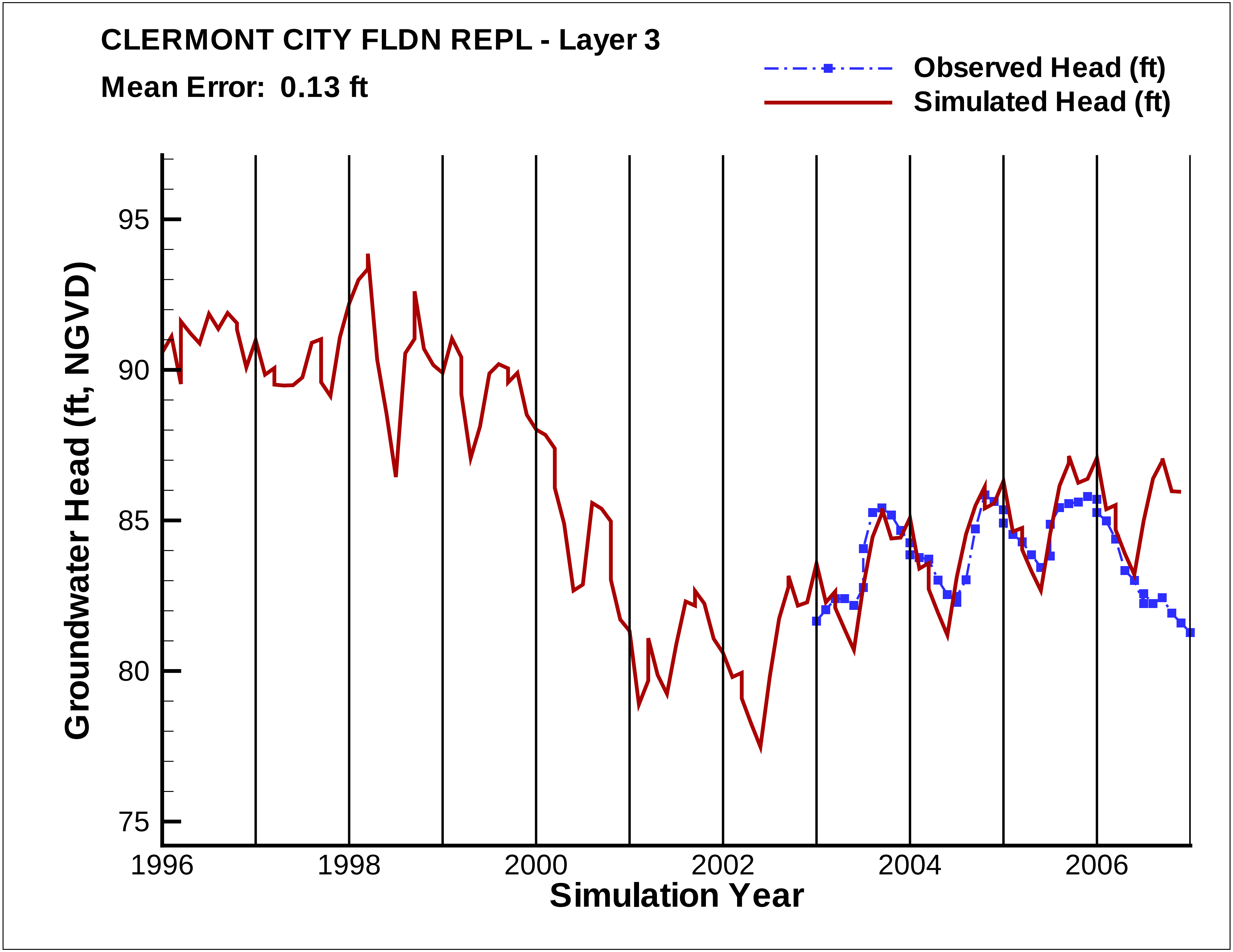

CE76 - Layer 4
Mean Error: 0.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
48
46
44
42
40
38
1996
1998
2000
2002
2004
2006
Simulation Year



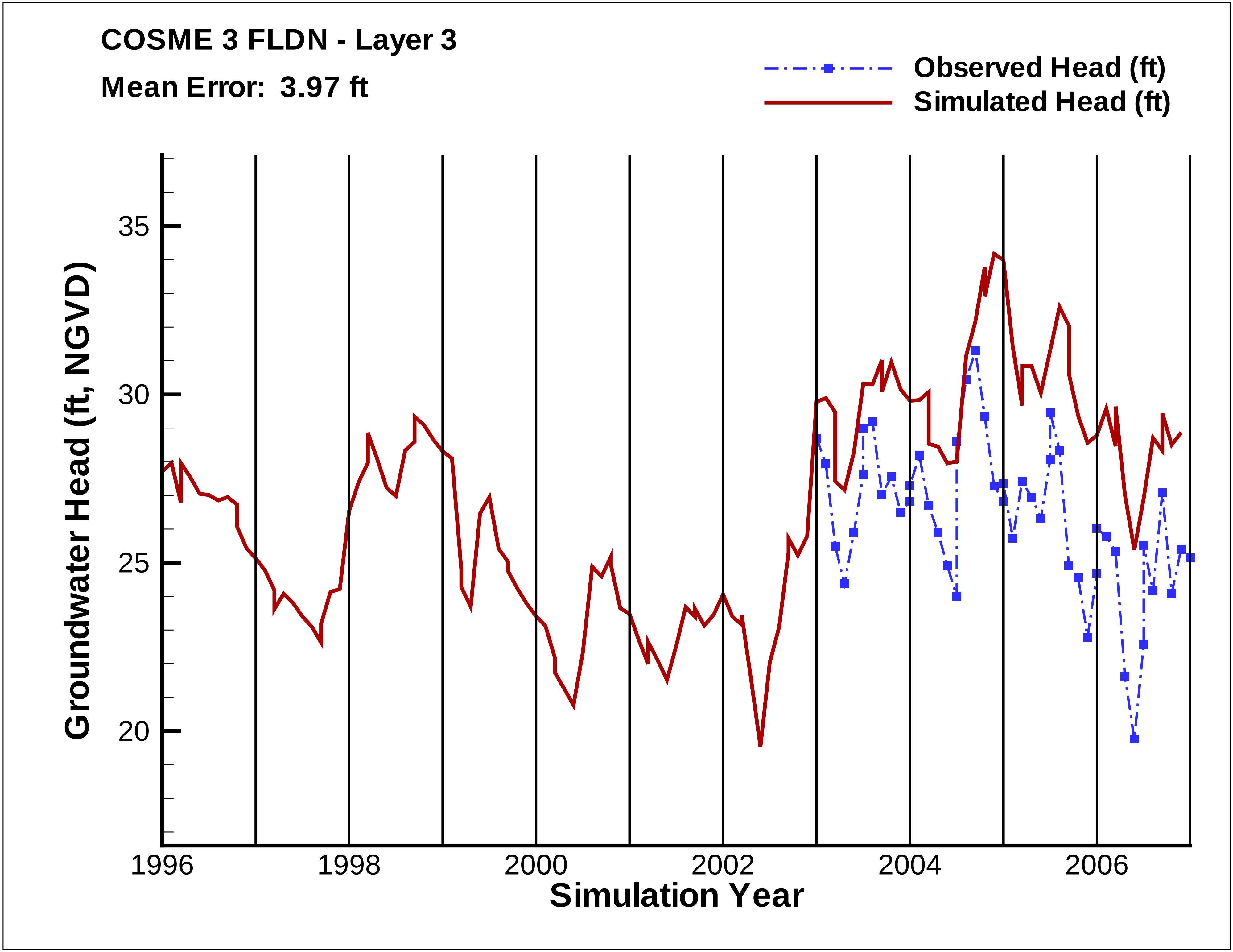
Cedar Ck SR314 UFA - Layer 4
Mean Error: 0.00 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
42
44
46
48
1996
1998
2000
2002
2004
2006
Simulation Year

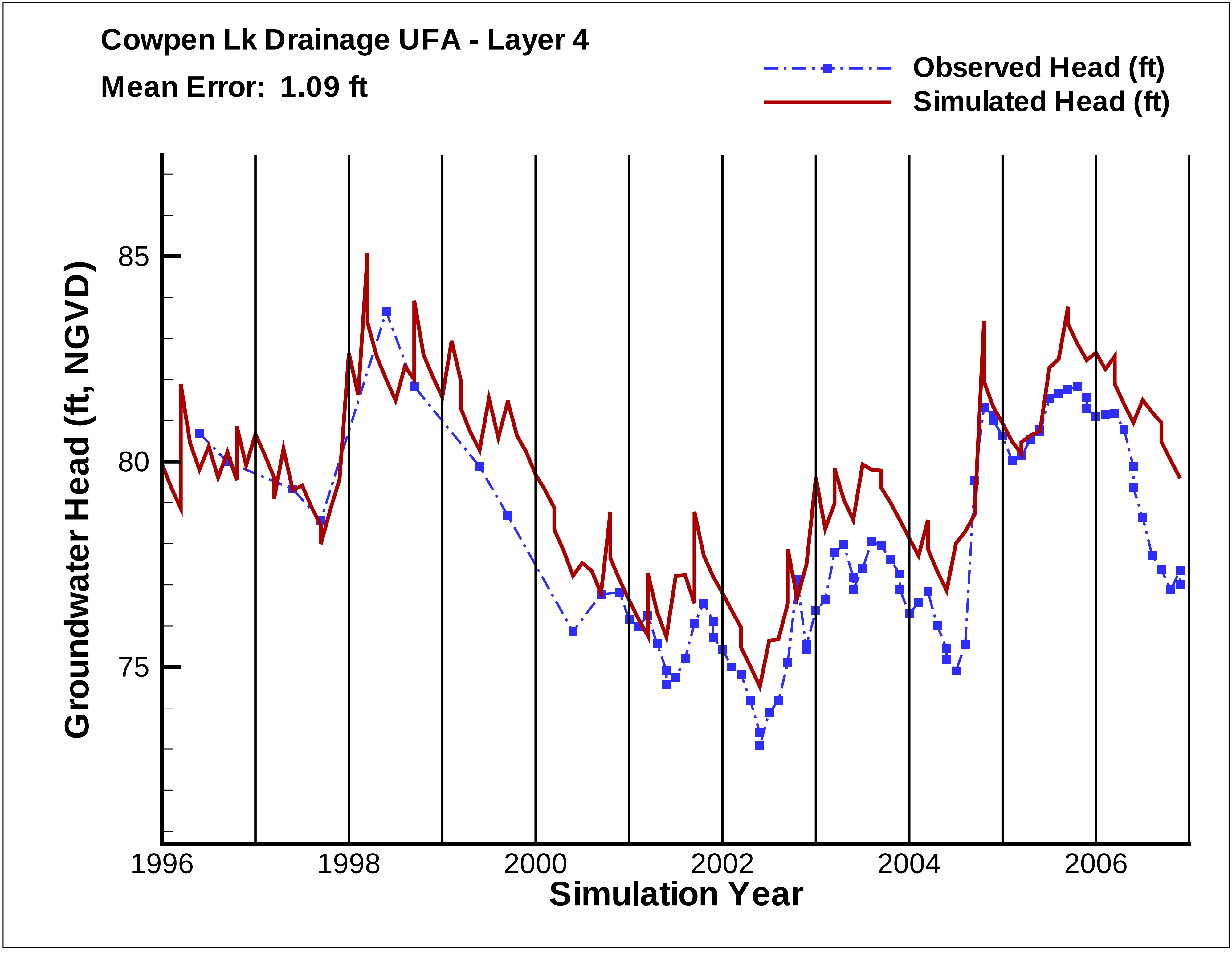


Chesser Well UFA - Layer 4
Mean Error: 3.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

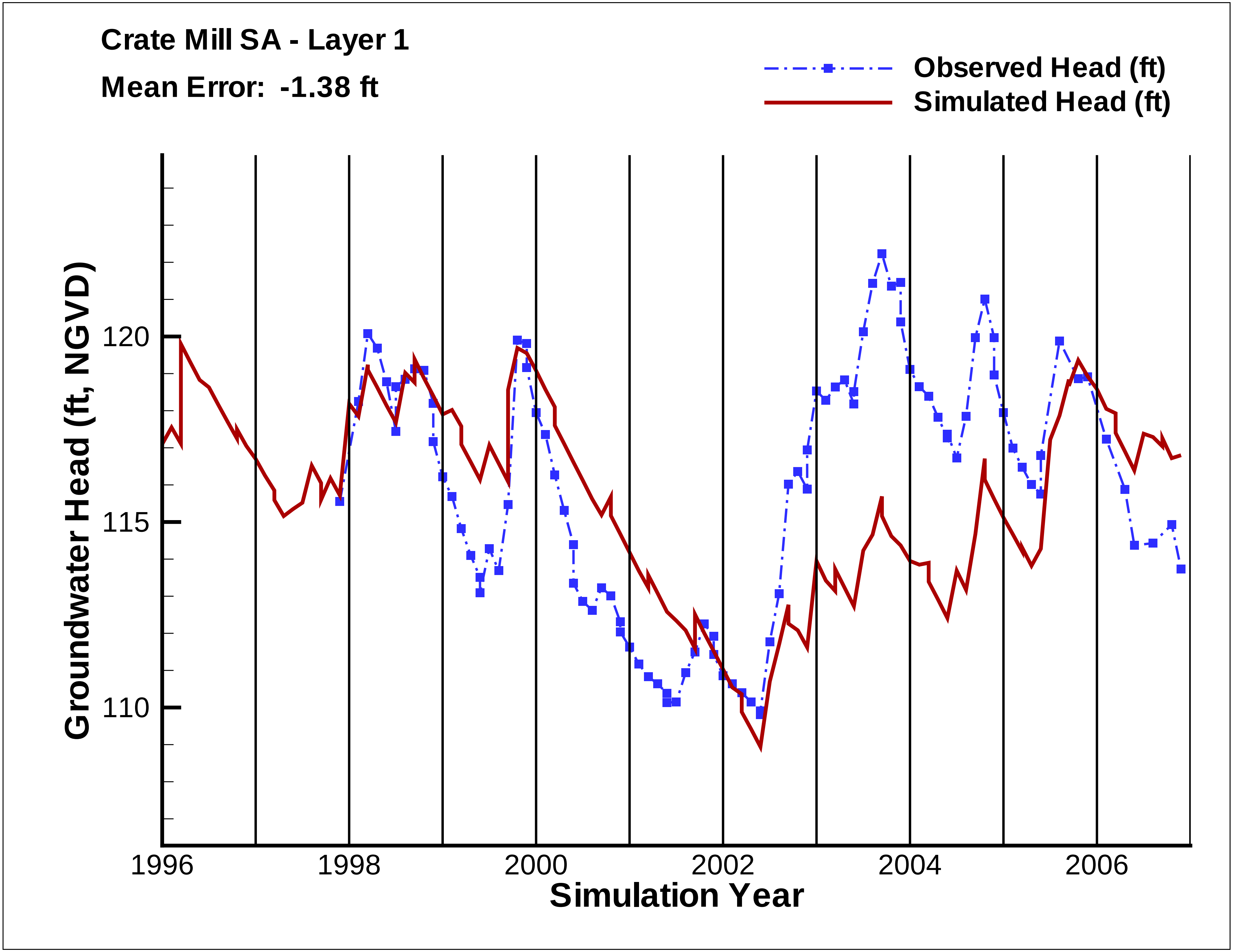


CLERMONT CITY FLDN REPL - Layer 3
Mean Error: 0.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

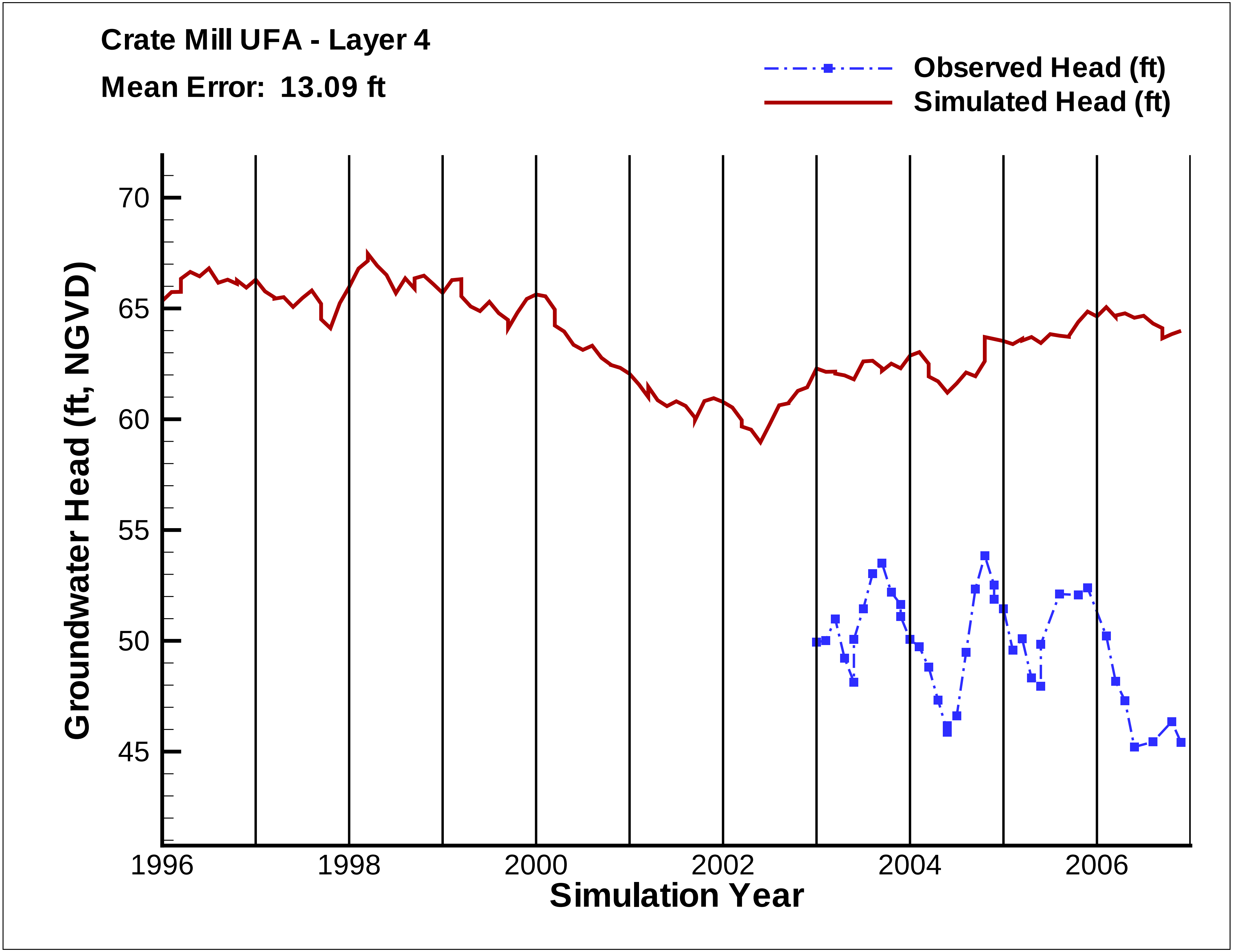

COSME 3 FLDN - Layer 3
Mean Error: 3.97 ft
Observed Head (ft)
Simulated Head (ft)
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year
Groundwater Head (ft, NGVD)

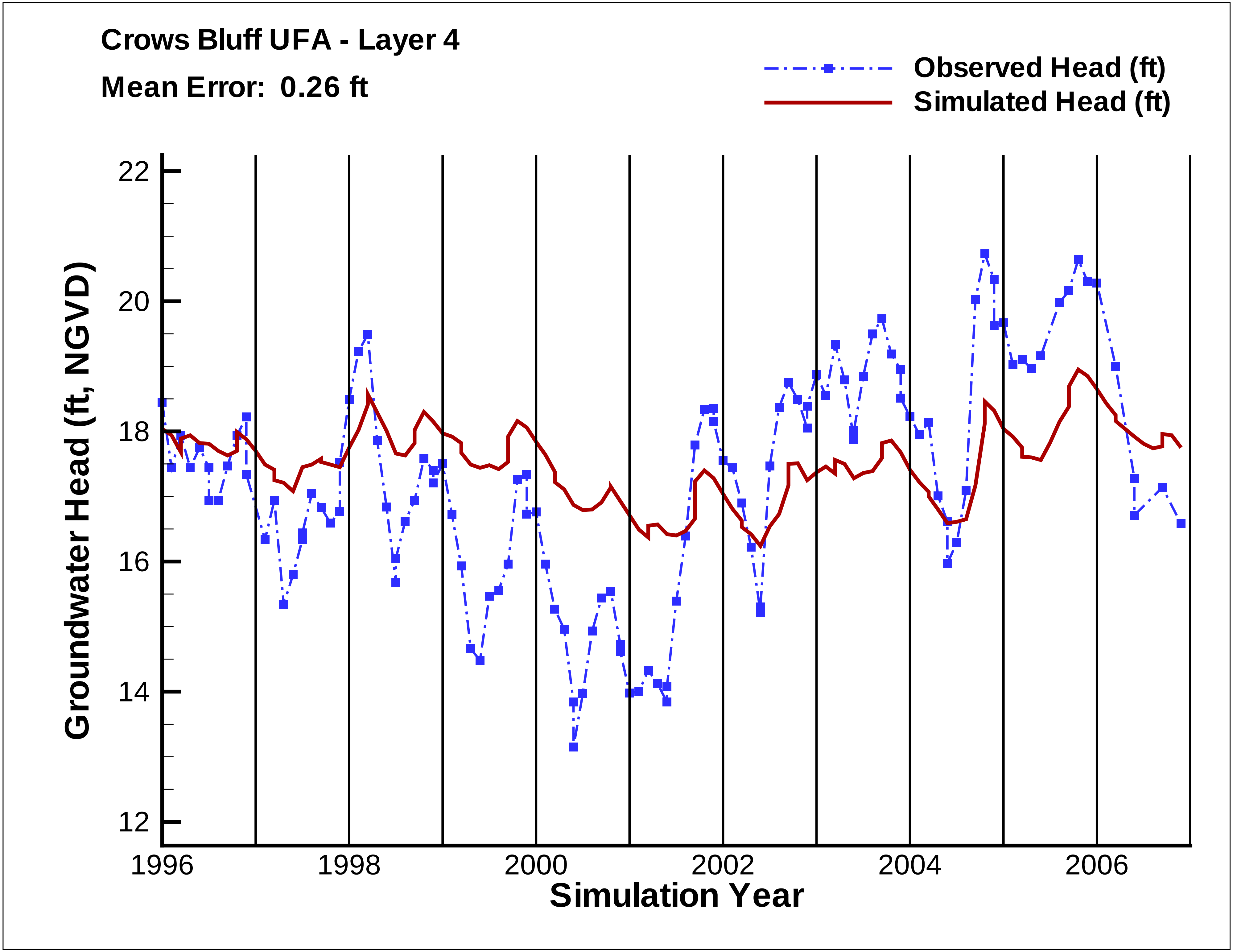


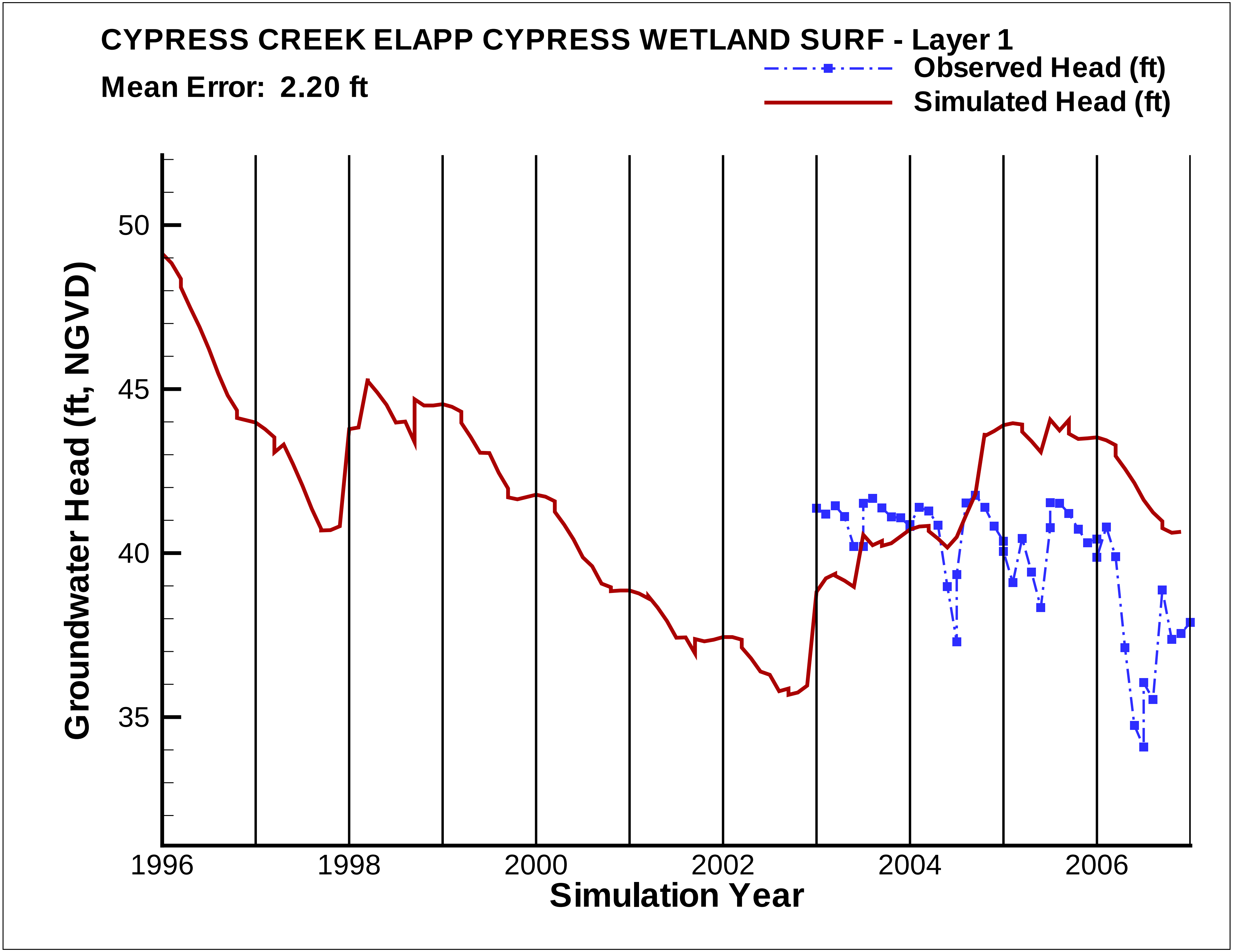
Cowpen Lk Drainage UFA - Layer 4
Mean Error: 1.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

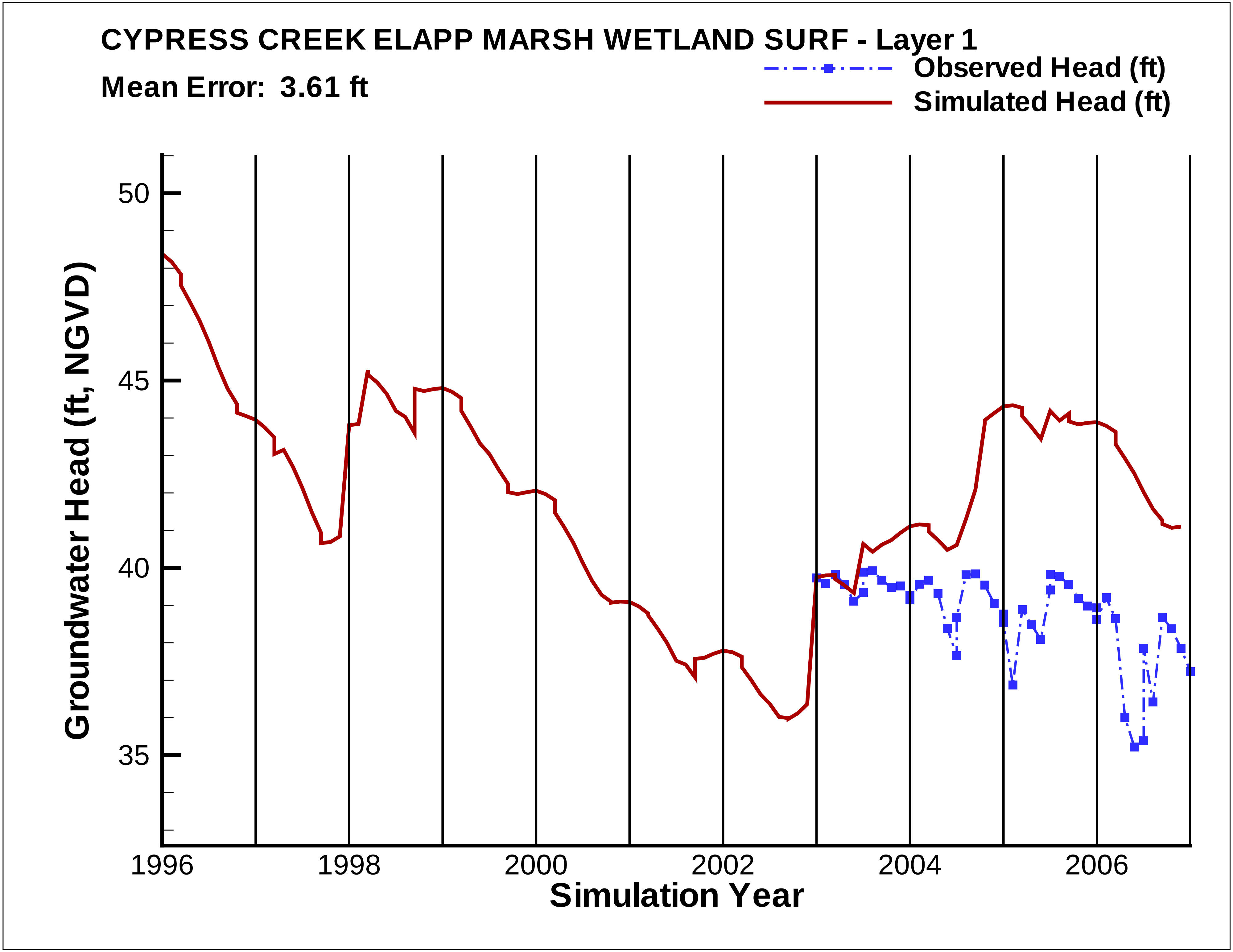


Crate Mill SA - Layer 1
Mean Error: -1.38 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
120
115
110
1996
1998
2000
2002
2004
2006
Simulation Year

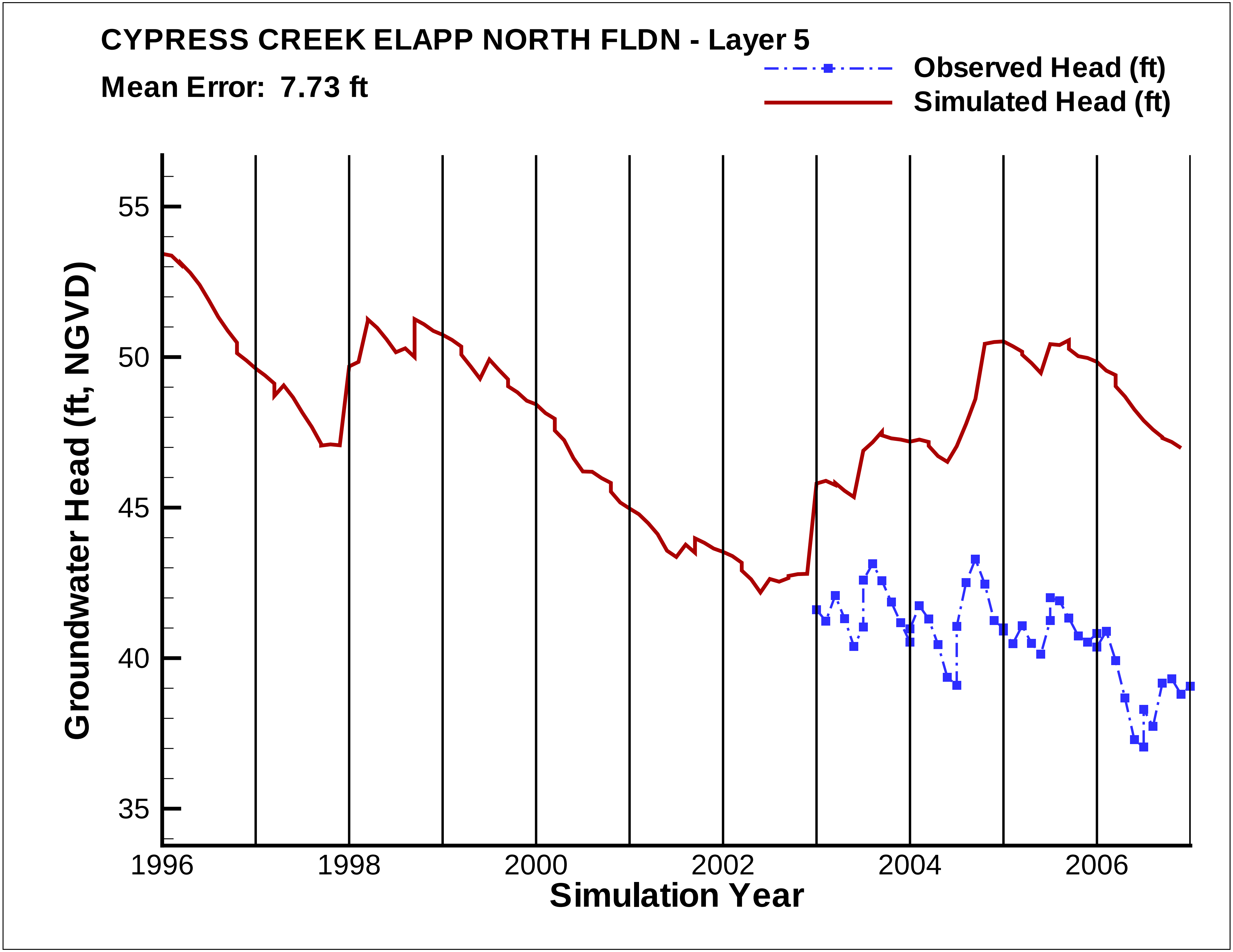

Crate Mill UFA - Layer 4
Mean Error: 13.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year


Crows Bluff UFA - Layer 4
Mean Error: 0.26 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
22
20
18
16
14
12
1996
1998
2000
2002
2004
2006
Simulation Year

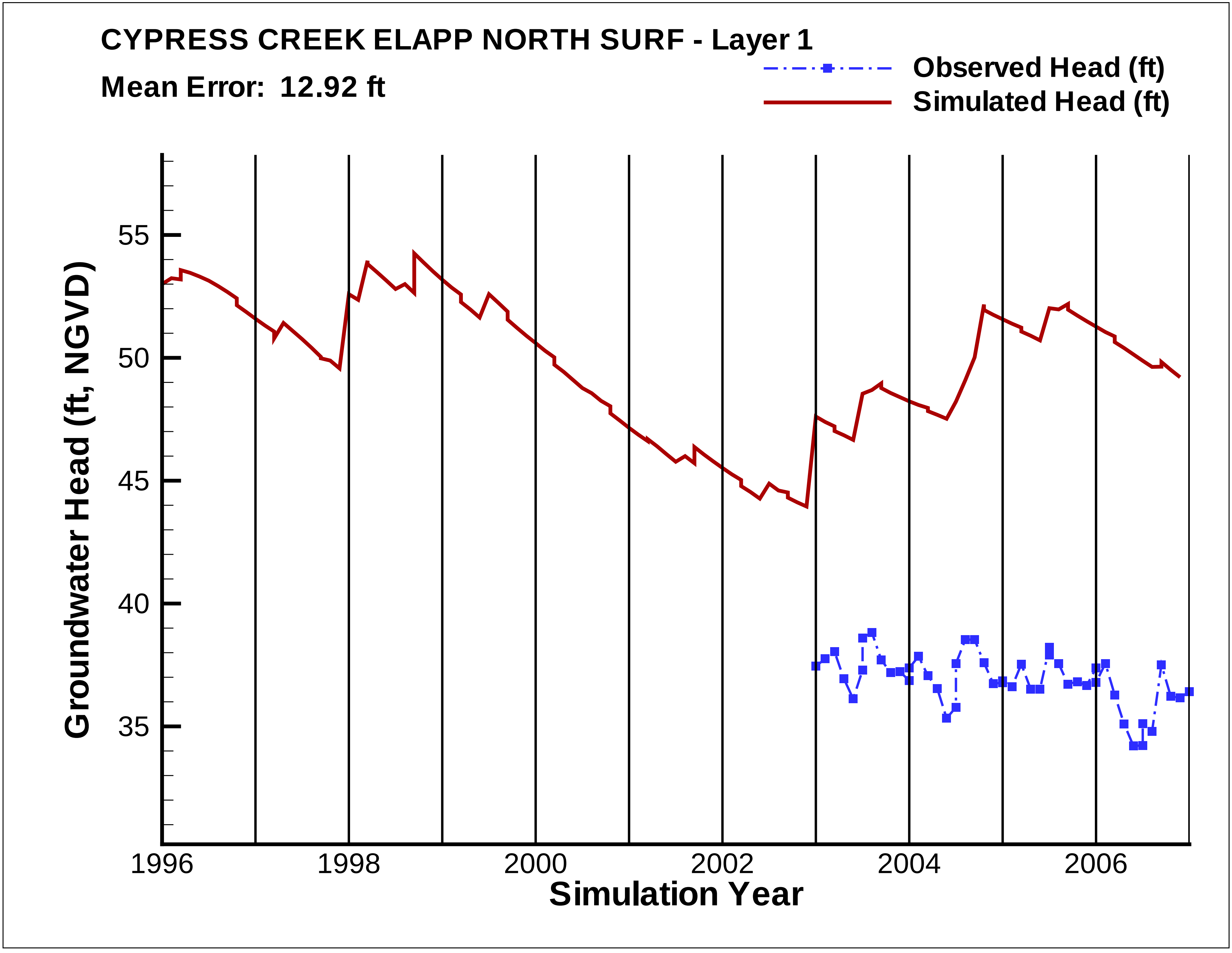

CYPRESS CREEK ELAPP CYPRESS WETLAND SURF - Layer 1
Mean Error: 2.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



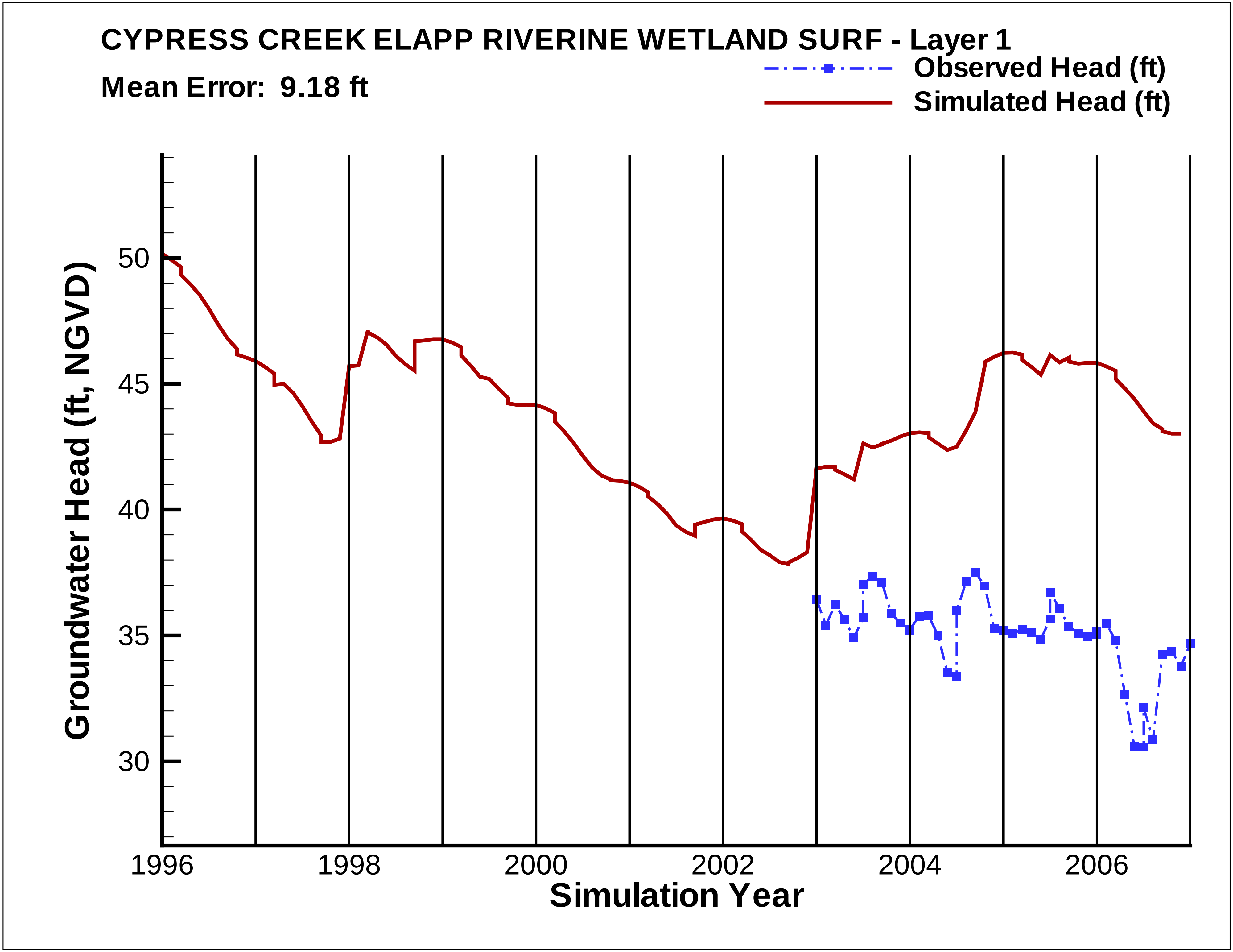
CYPRESS CREEK ELAPP MARSH WETLAND SURF - Layer 1
Mean Error: 3.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

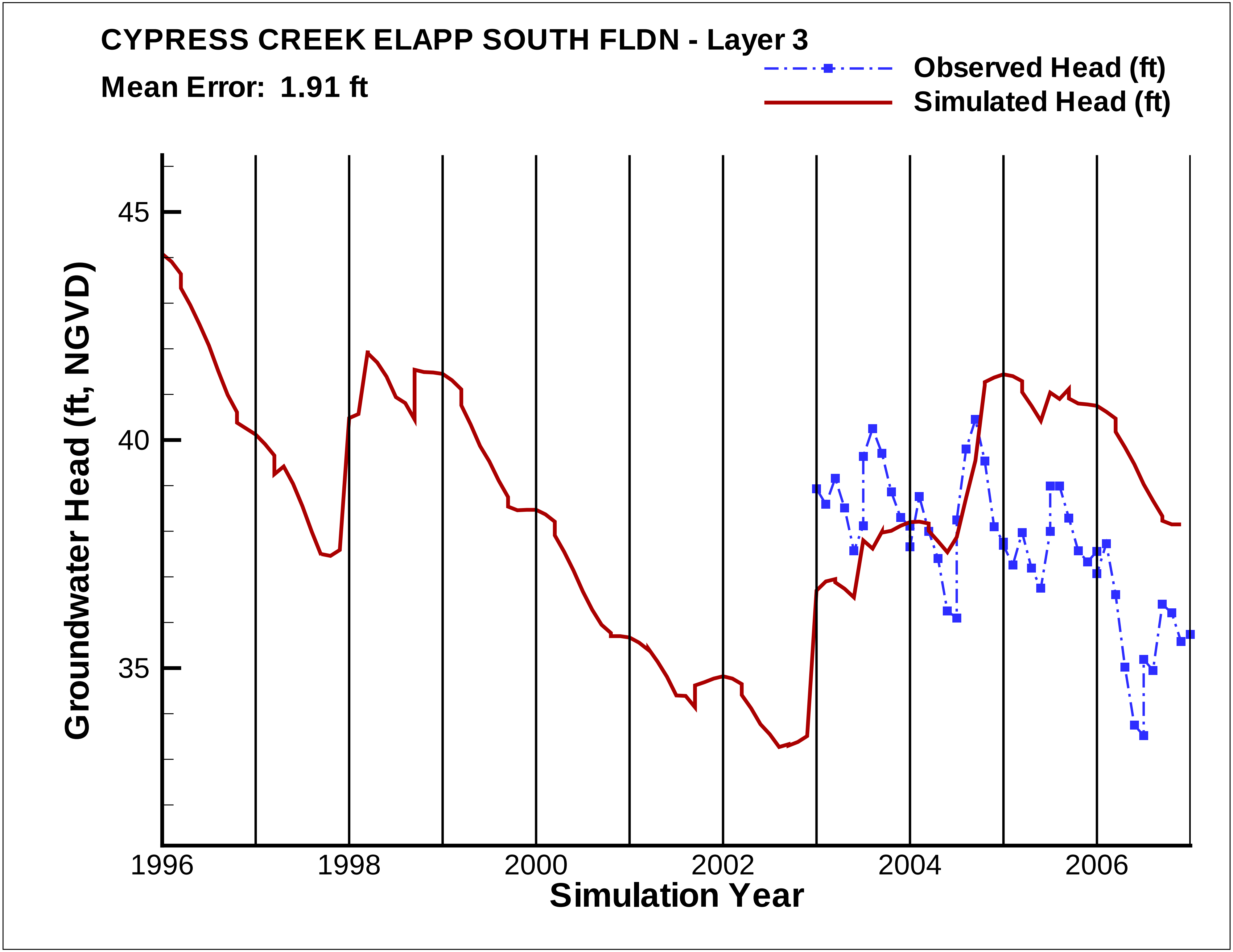


CYPRESS CREEK ELAPP NORTH FLDN - Layer 5
Mean Error: 7.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

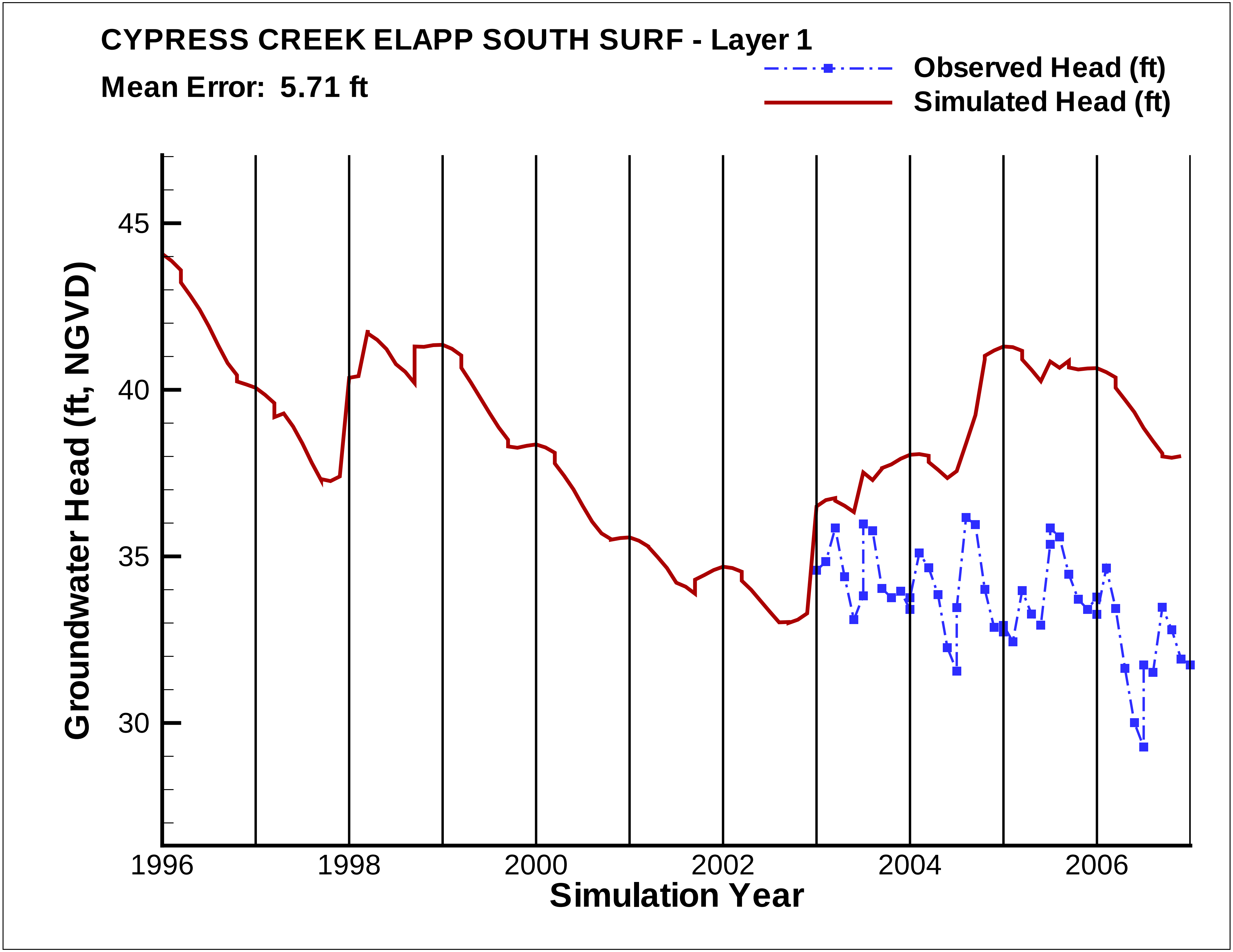


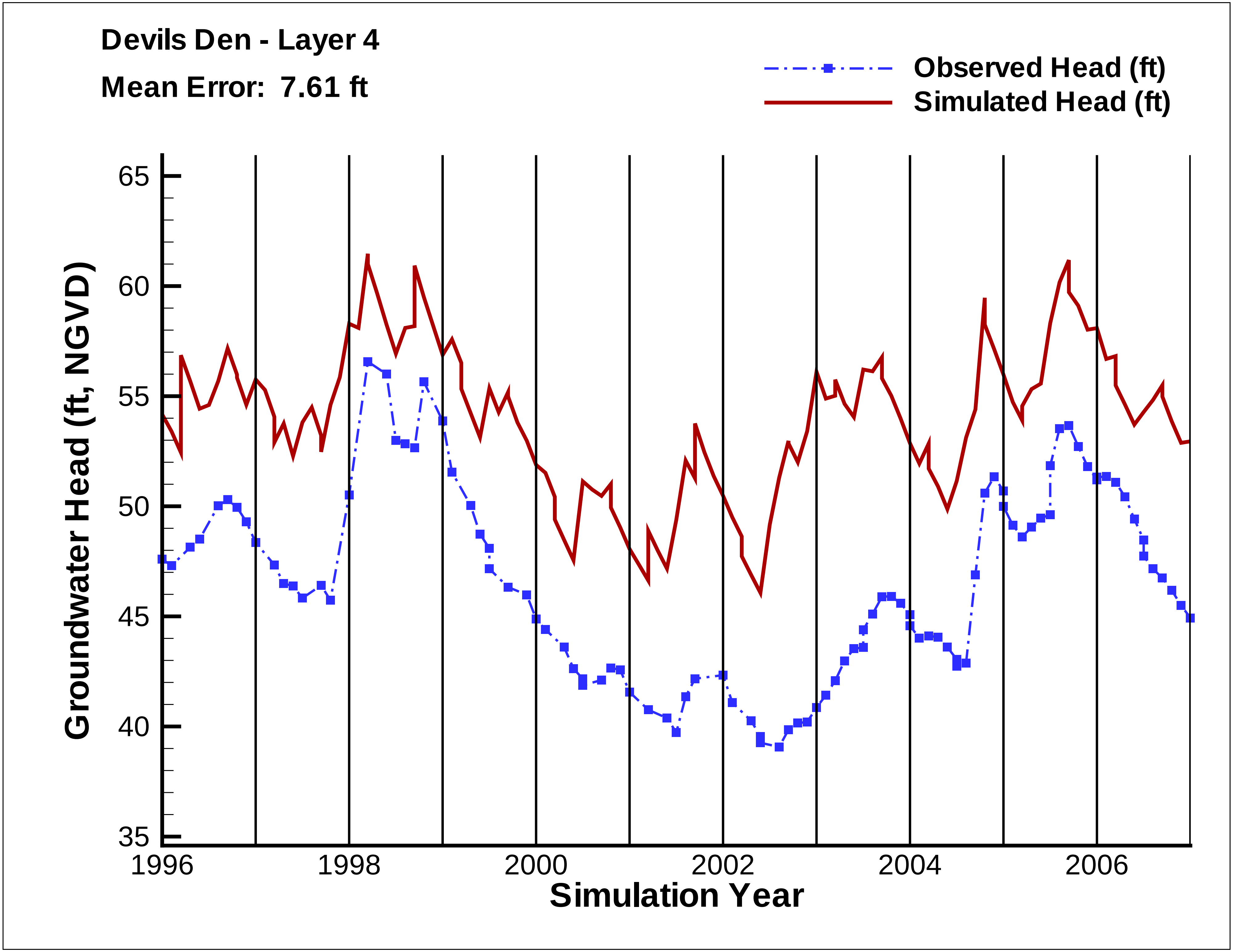
CYPRESS CREEK ELAPP NORTH SURF - Layer 1
Mean Error: 12.92 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year


CYPRESS CREEK ELAPP RIVERINE WETLAND SURF - Layer 1
Mean Error: 9.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

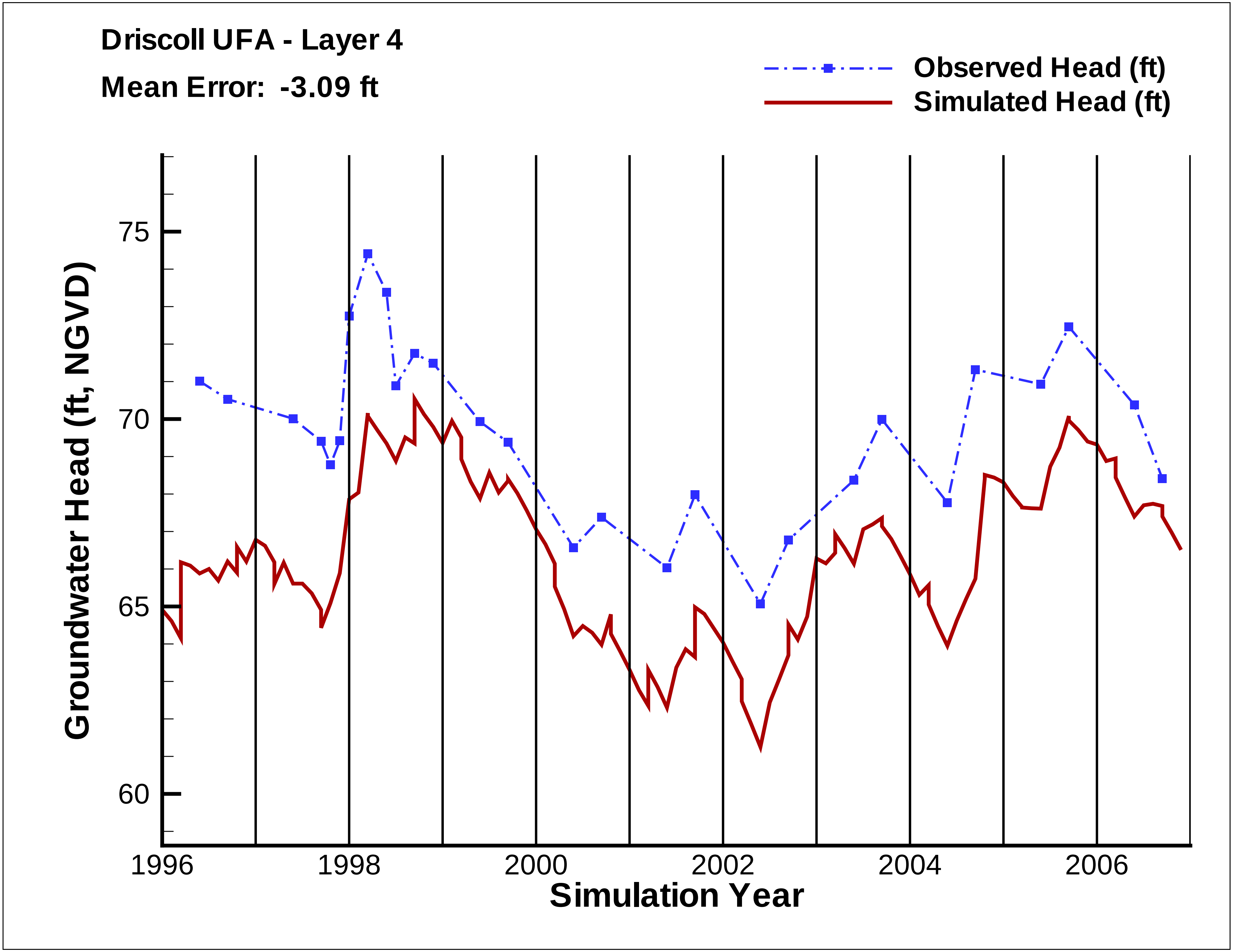


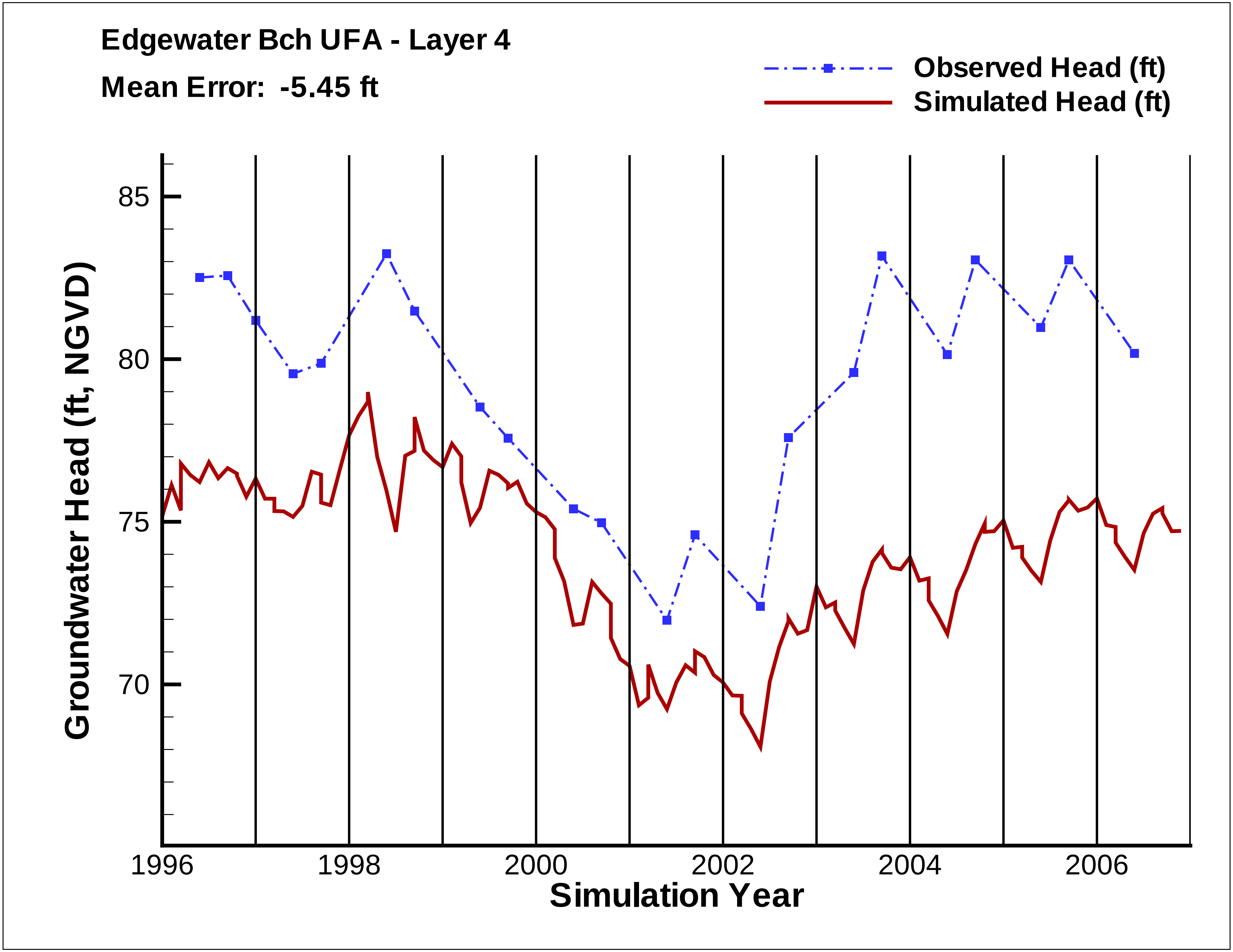
CYPRESS CREEK ELAPP SOUTH FLDN - Layer 3
Mean Error: 1.91 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year


CYPRESS CREEK ELAPP SOUTH SURF - Layer 1
Mean Error: 5.71 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

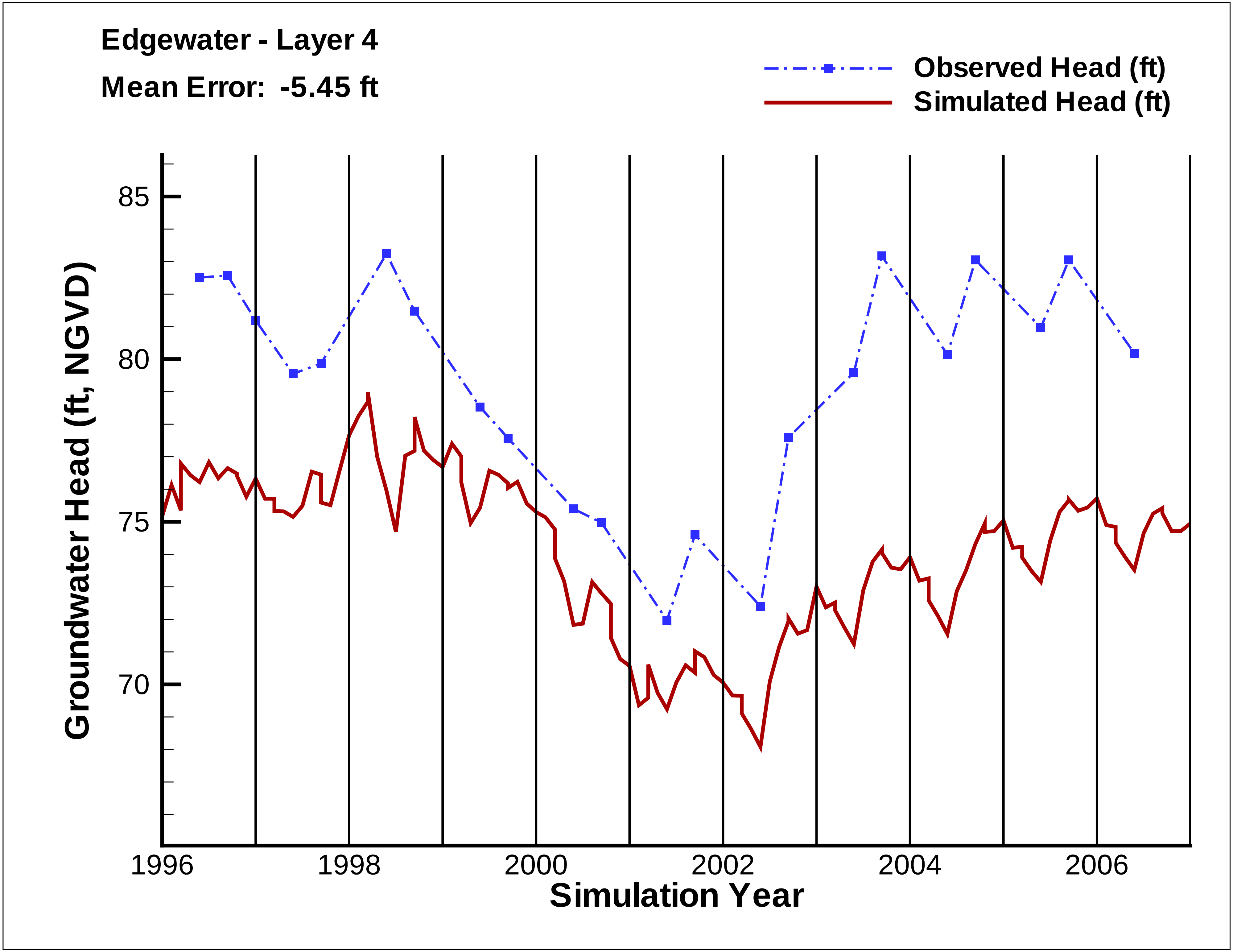


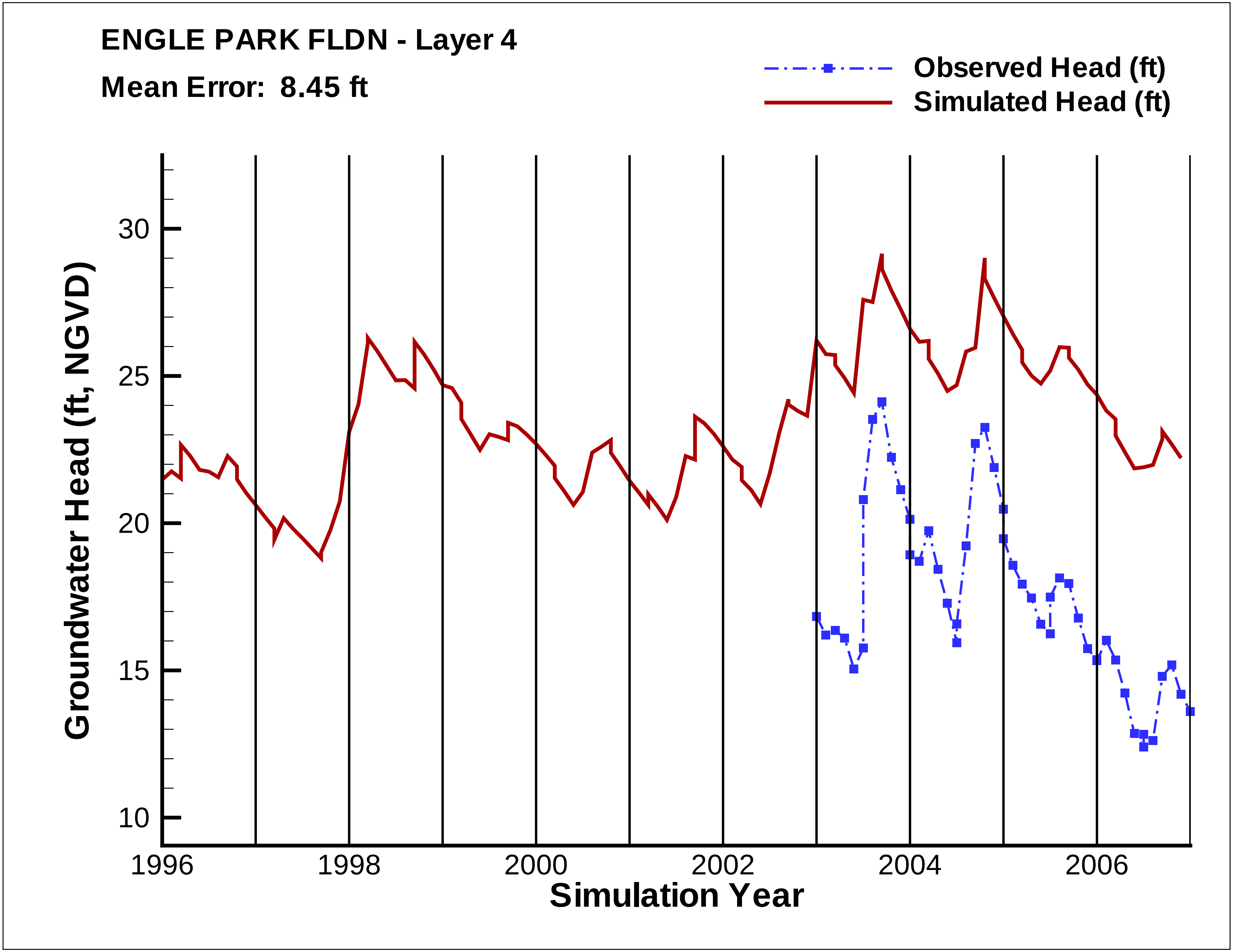
Devils Den - Layer 4
Mean Error: 7.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

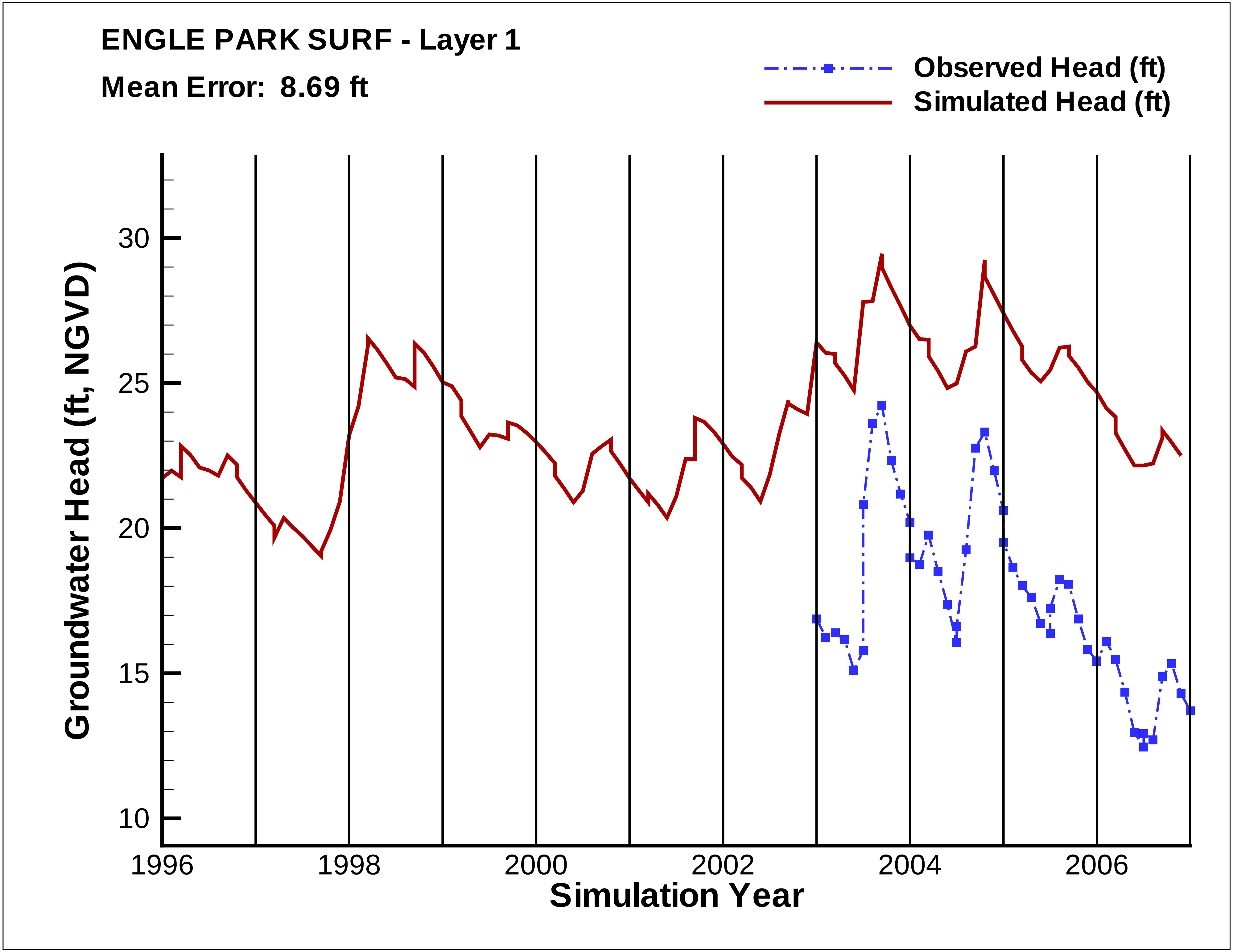

Driscoll UFA - Layer 4
Mean Error: -3.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
1996
1998
2000
2002
2004
2006
Simulation Year

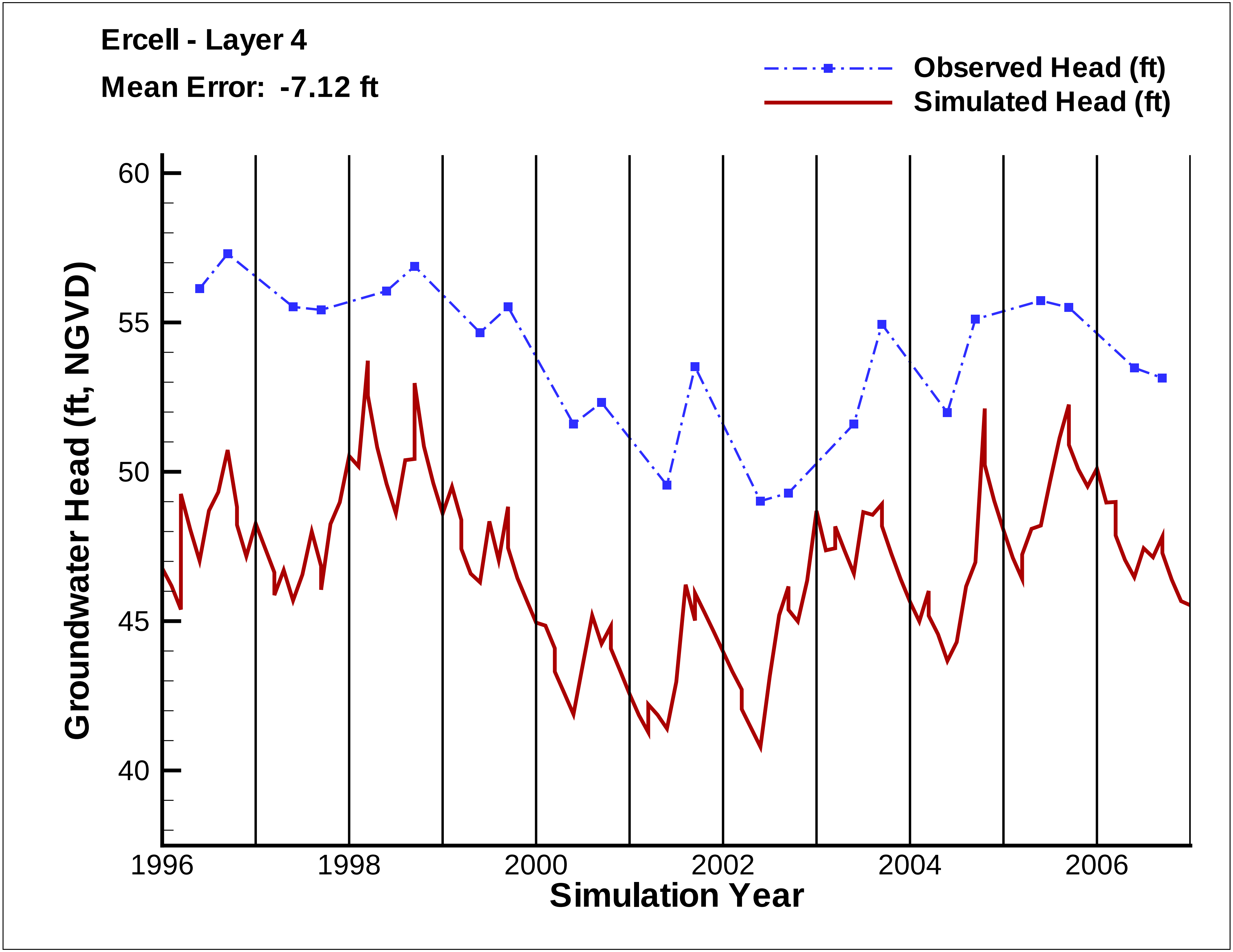


Edgewater Bch UFA - Layer 4
Mean Error: -5.45 ft
Observed Head (ft)
Simulated Head (ft)
85
80
75
70
Groundwater Head (ft, NGVD)
1996
1998
2000
2002
2004
2006
Simulation Year

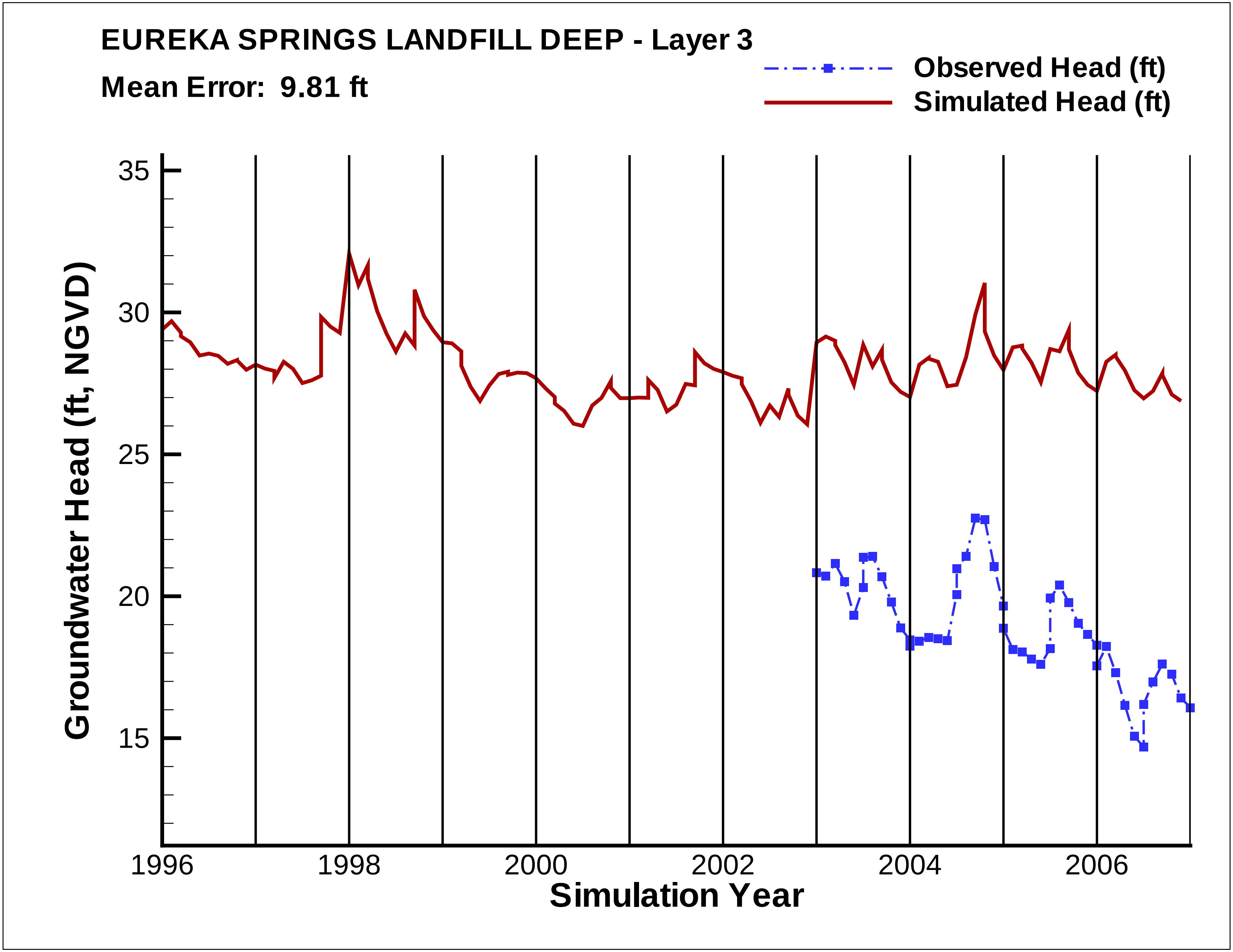

Edgewater - Layer 4
Mean Error: -5.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year


ENGLE PARK FLDN - Layer 4
Mean Error: 8.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

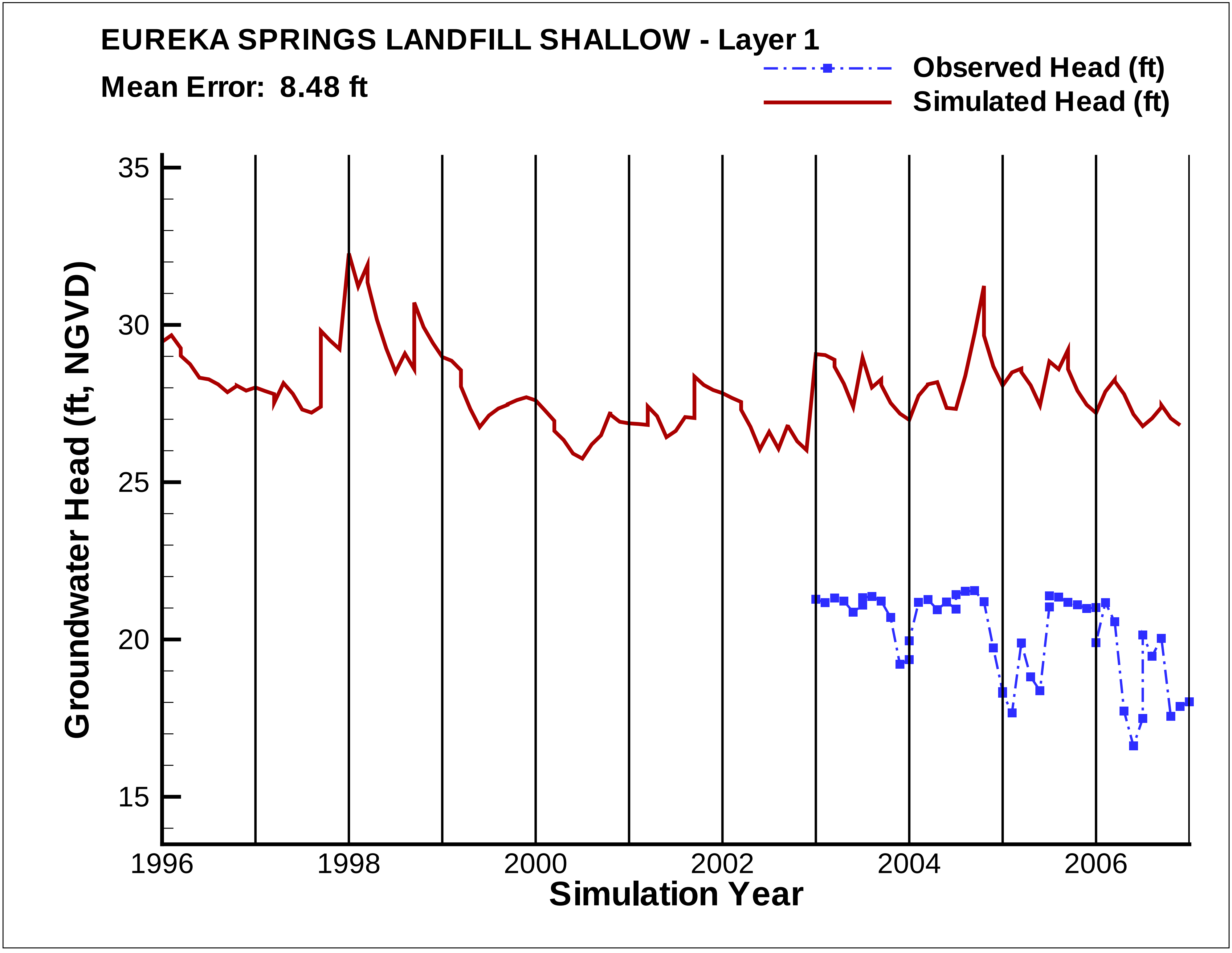

ENGLE PARK SURF - Layer 1
Mean Error: 8.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



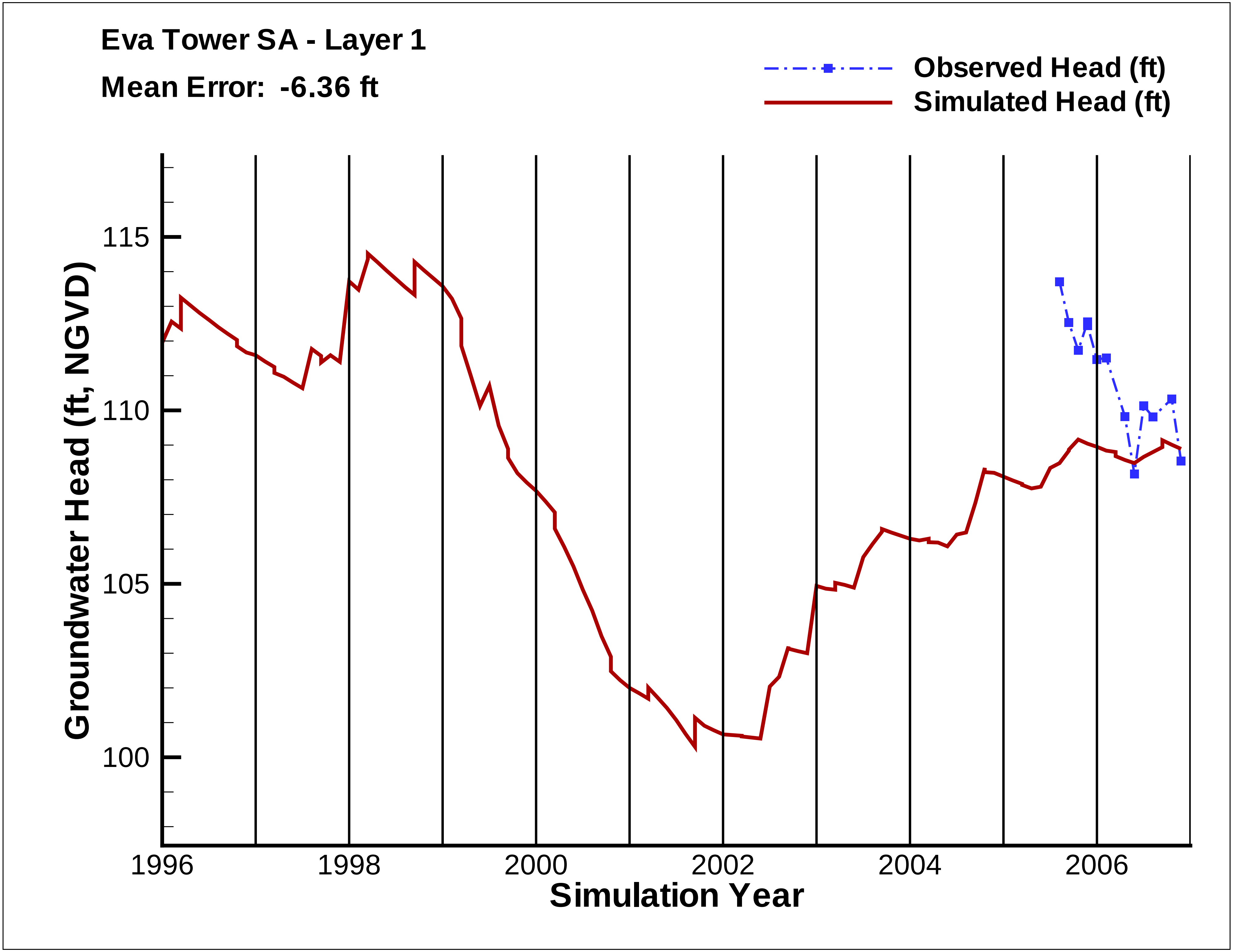
Ercell - Layer 4
Mean Error: -7.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

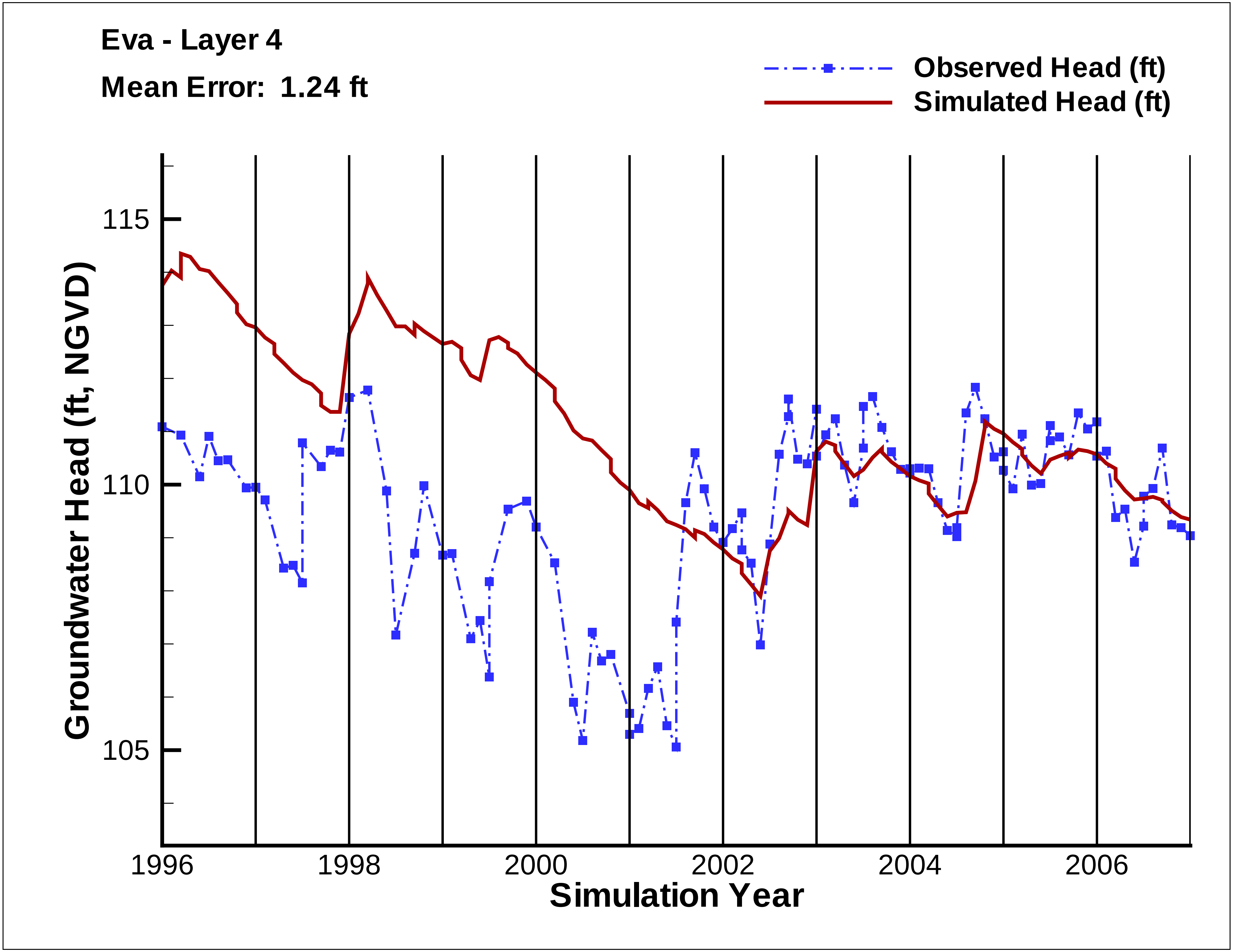


EUREKA SPRINGS LANDFILL DEEP - Layer 3
Mean Error: 9.81 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

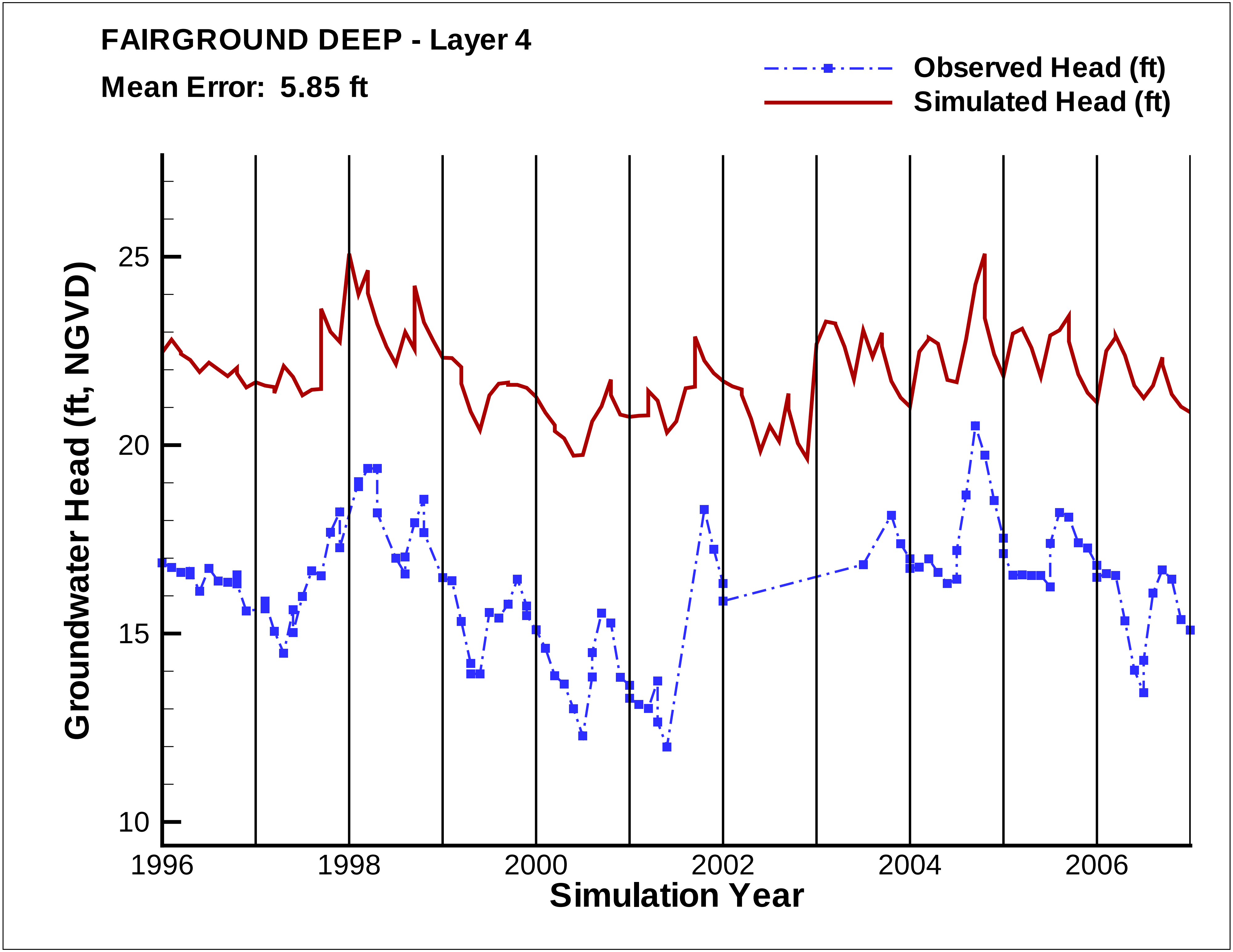


EUREKA SPRINGS LANDFILL SHALLOW - Layer 1
Mean Error: 8.48 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

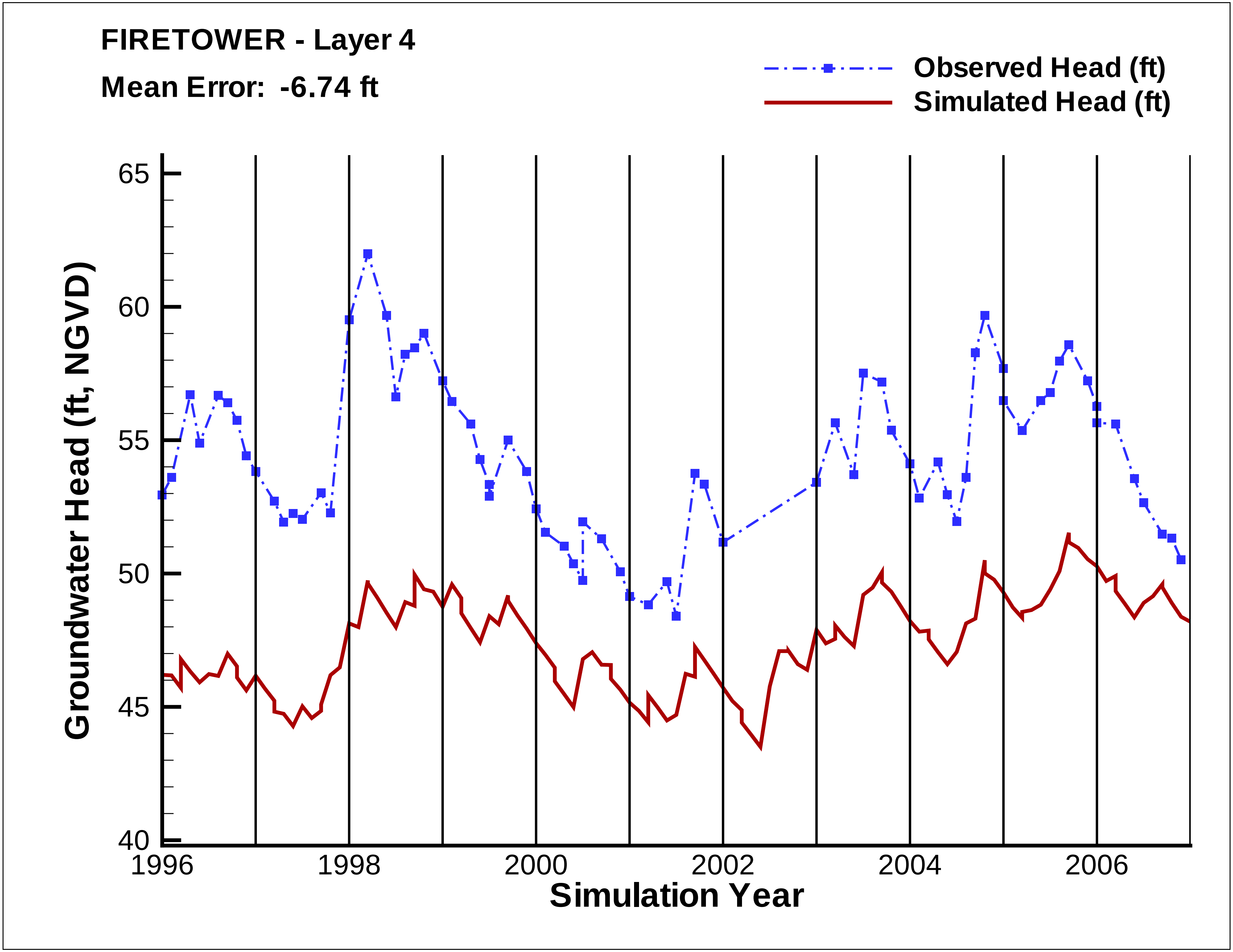

Eva Tower SA - Layer 1
Mean Error: -6.36 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
100
1996
1998
2000
2002
2004
2006
Simulation Year



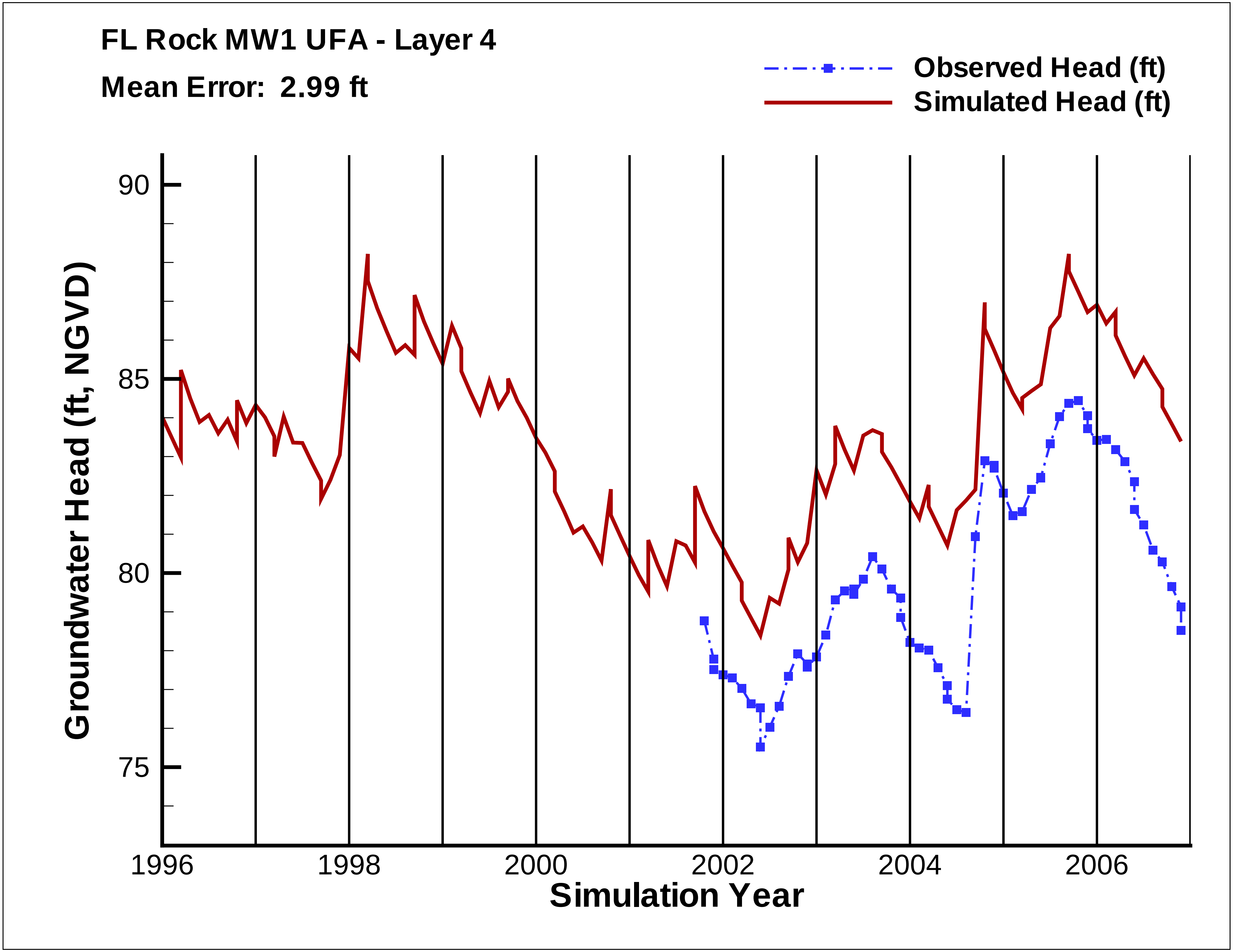
Eva - Layer 4
Mean Error: 1.24 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
1996
1998
2000
2002
2004
2006
Simulation Year



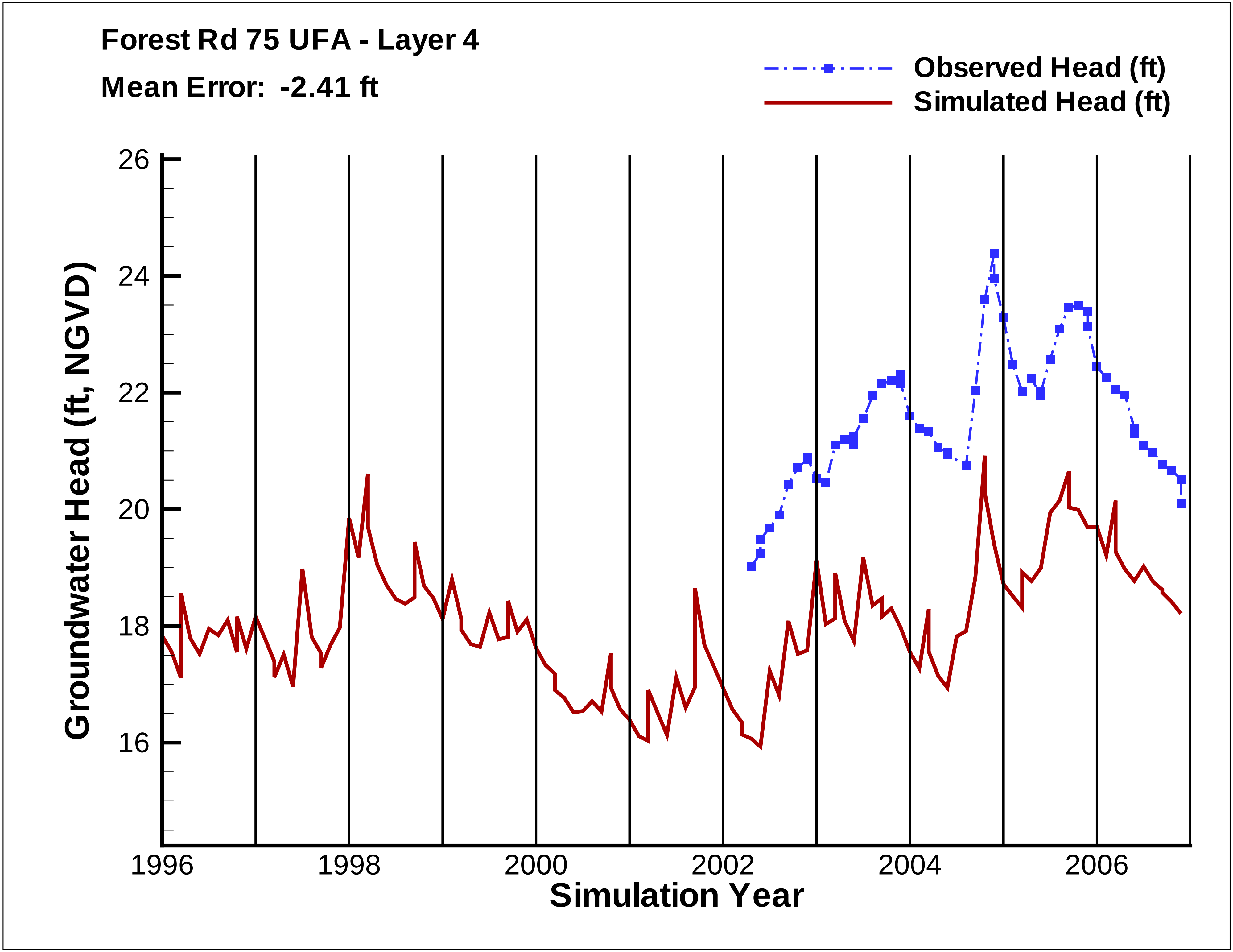
FAIRGROUND DEEP - Layer 4
Mean Error: 5.85 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



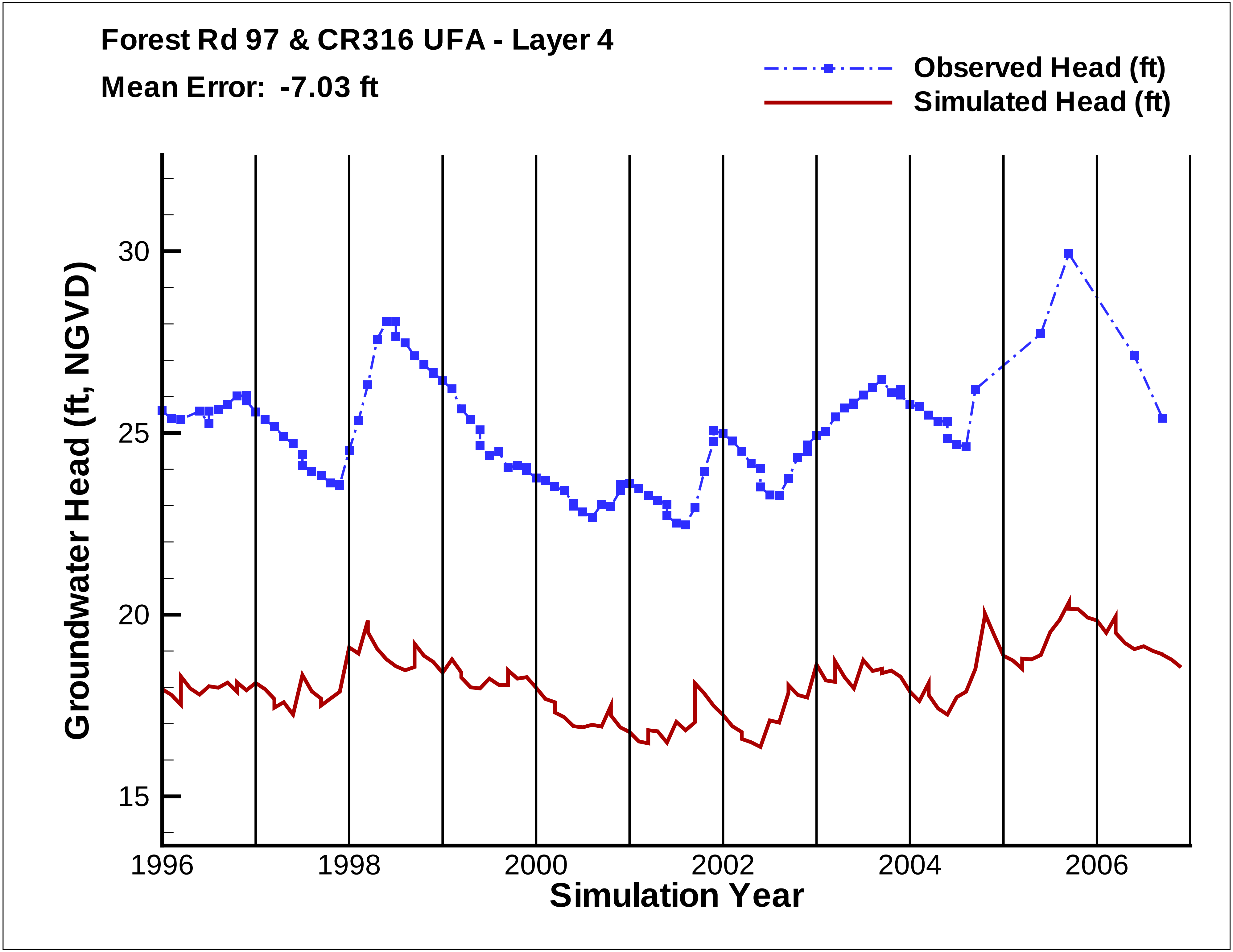
FIRETOWER - Layer 4
Mean Error: -6.74 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



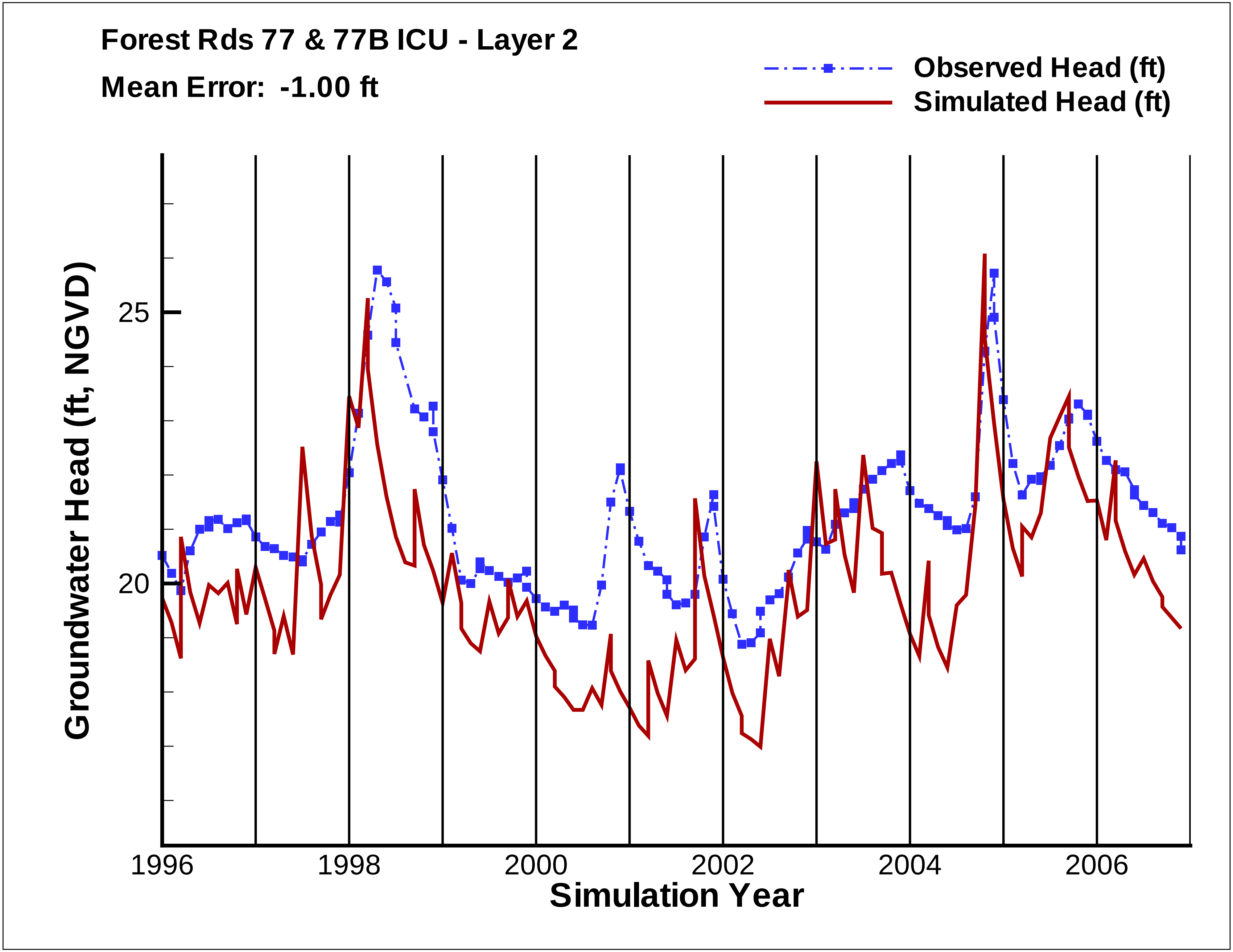
FL Rock MW1 UFA - Layer 4
Mean Error: 2.99 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

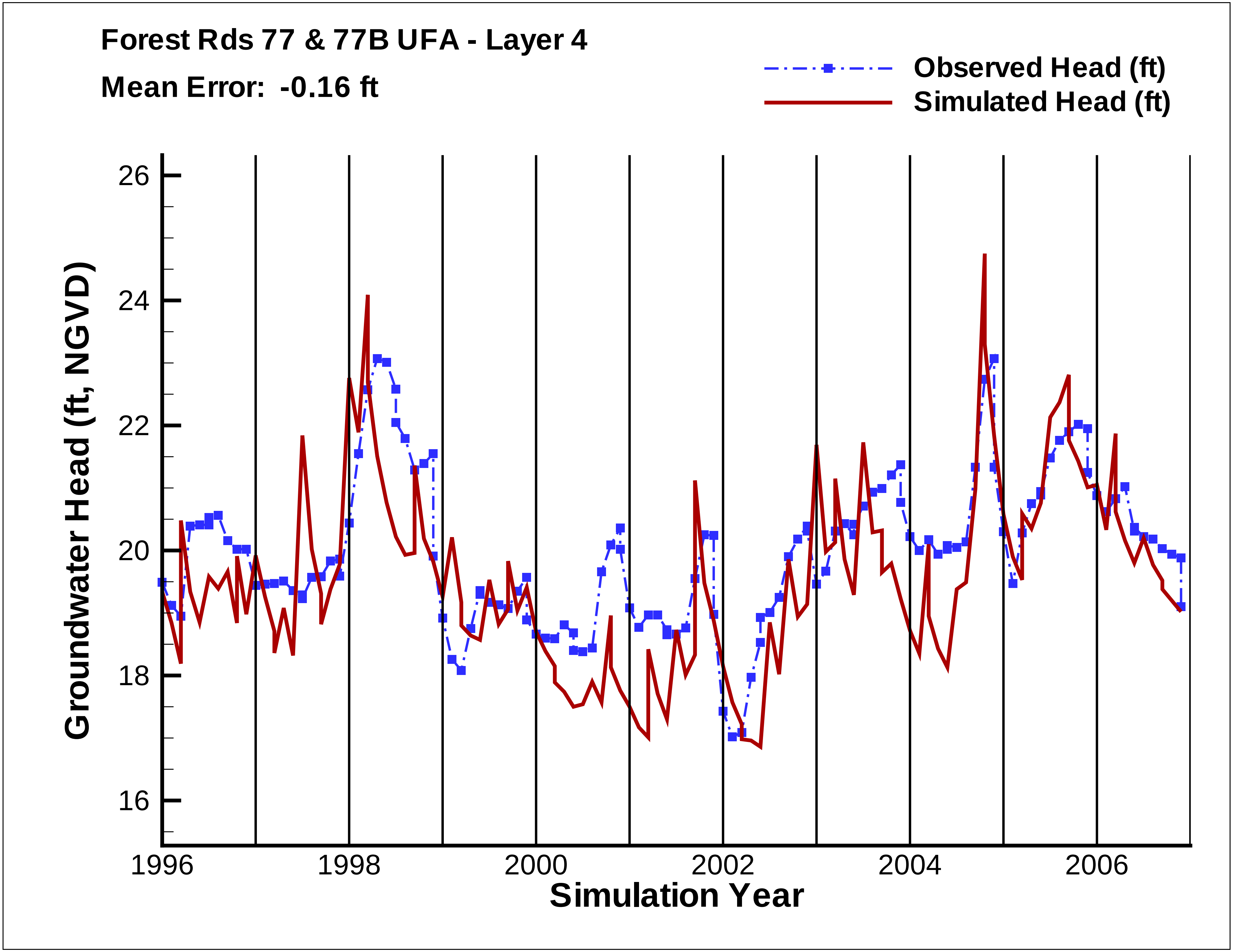


Forest Rd 75 UFA - Layer 4
Mean Error: -2.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
26
24
22
20
18
16
1996
1998
2000
2002
2004
2006
Simulation Year

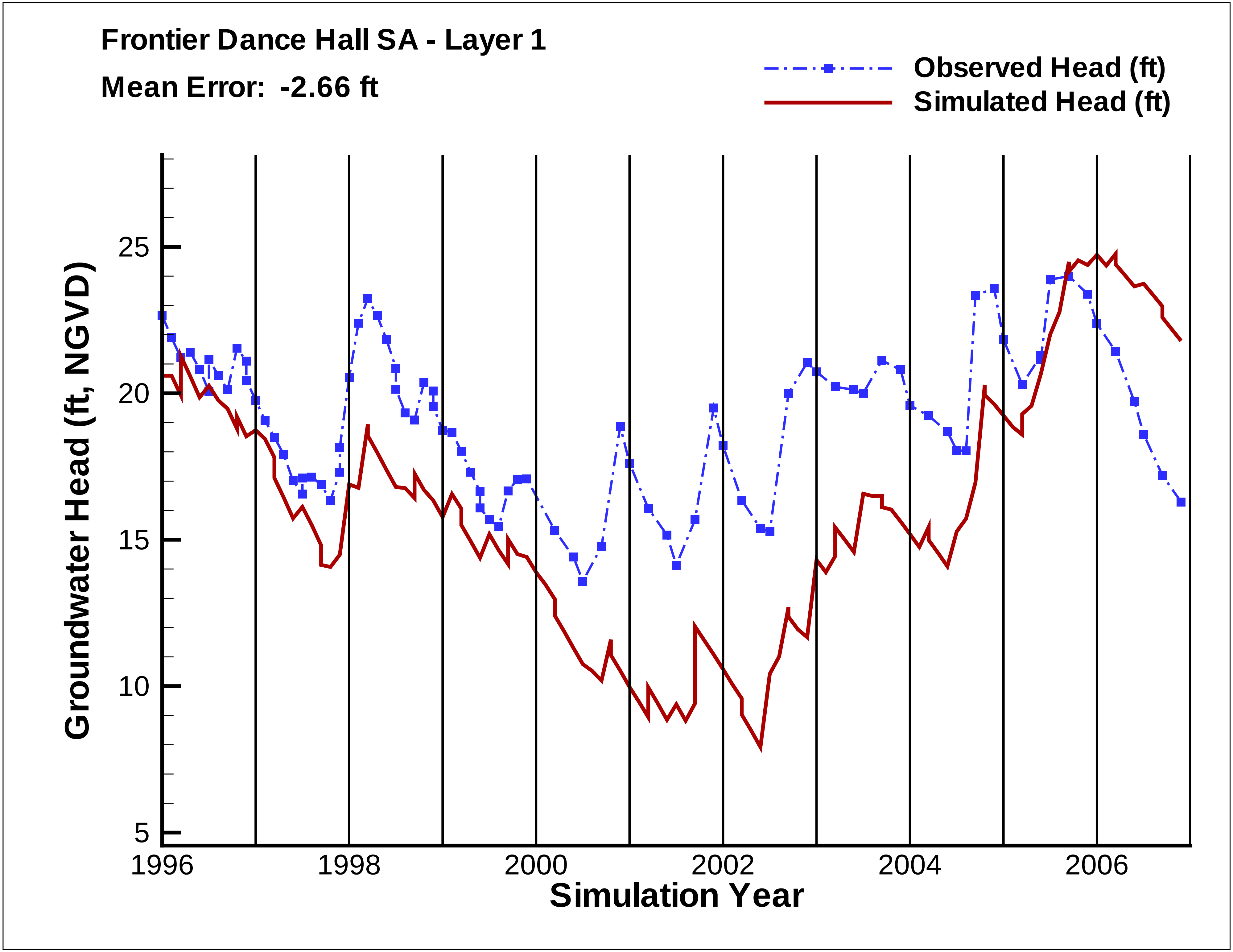


Forest Rd 97 & CR316 UFA - Layer 4
Mean Error: -7.03 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

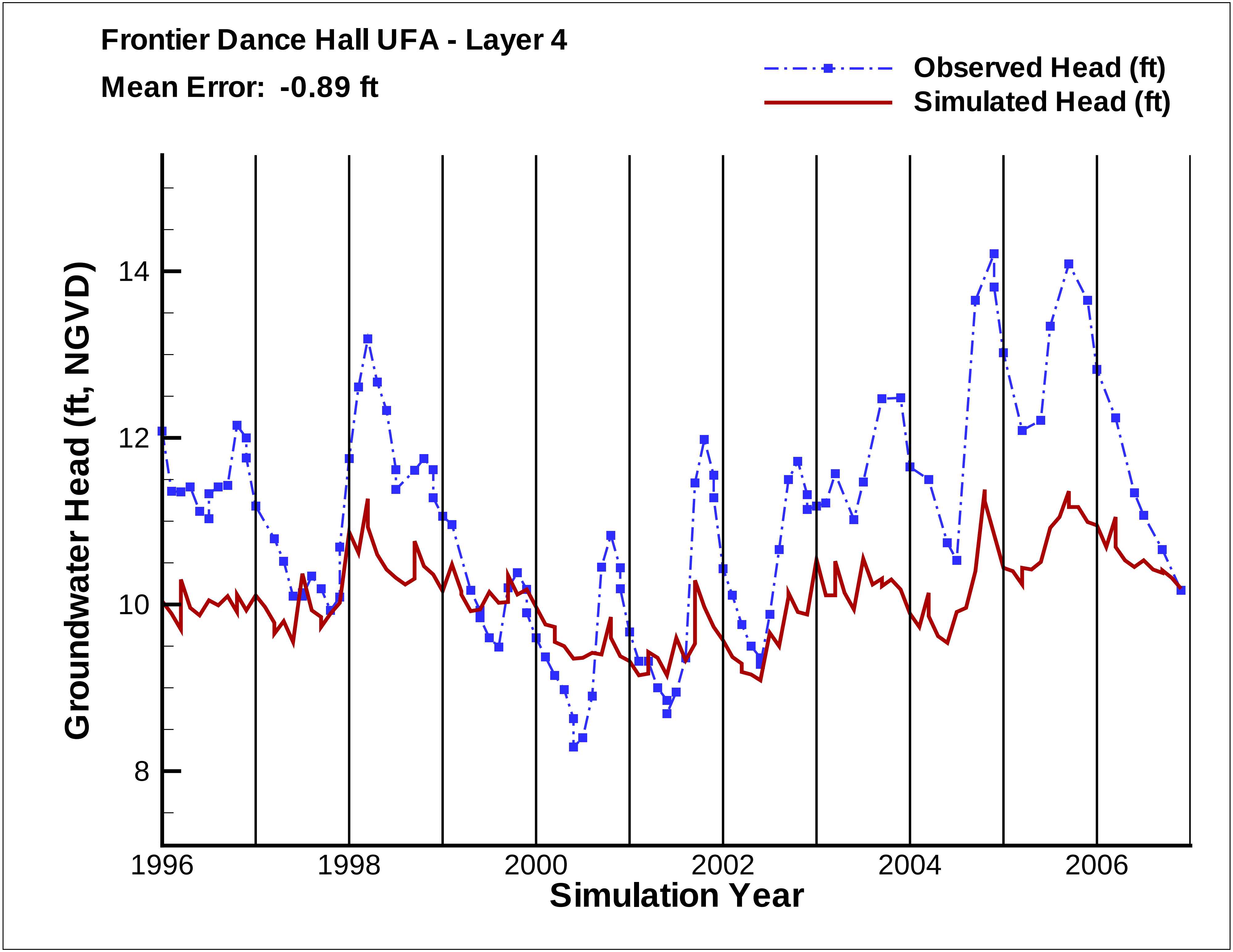

Forest Rds 77 & 77B ICU - Layer 2
Mean Error: -1.00 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

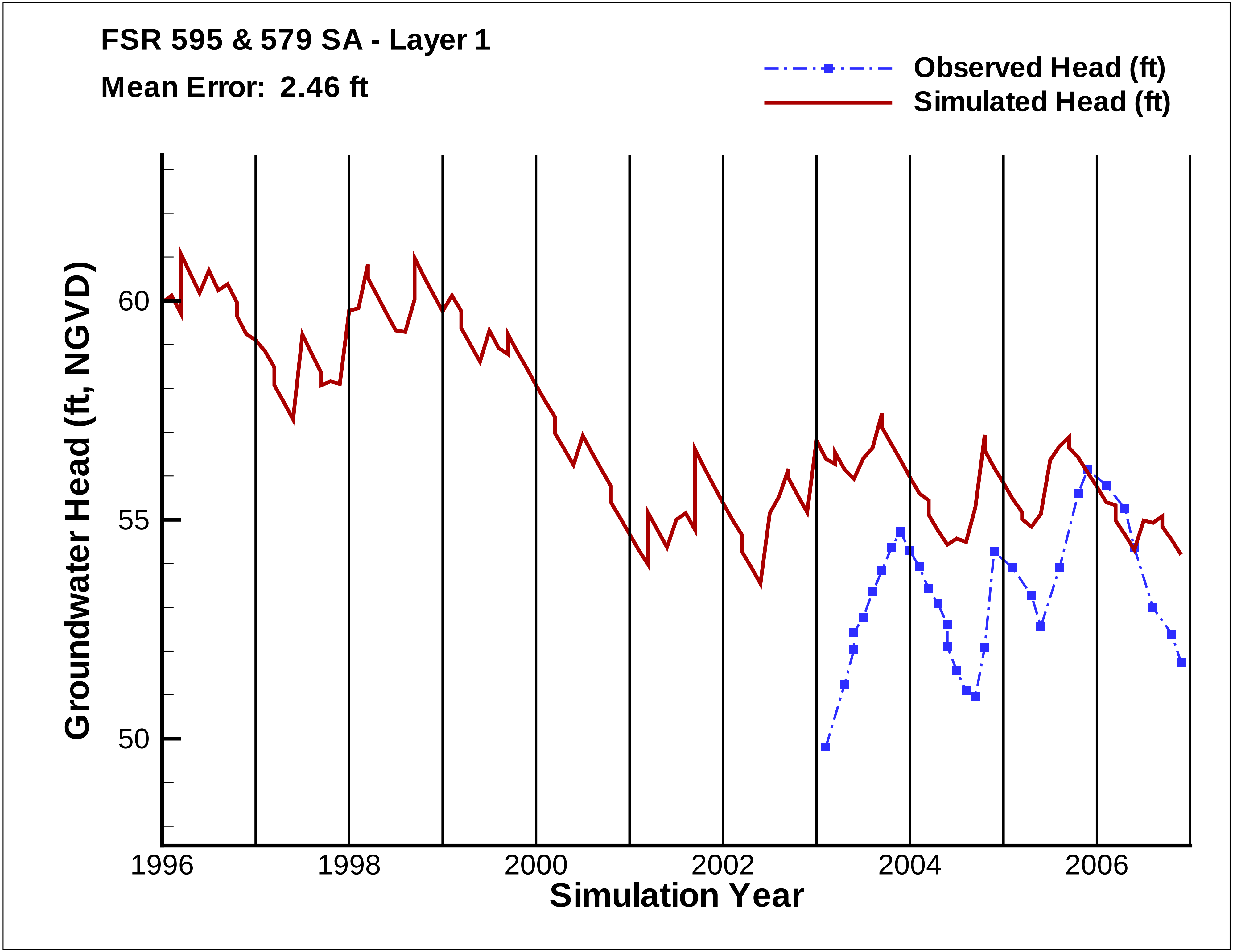


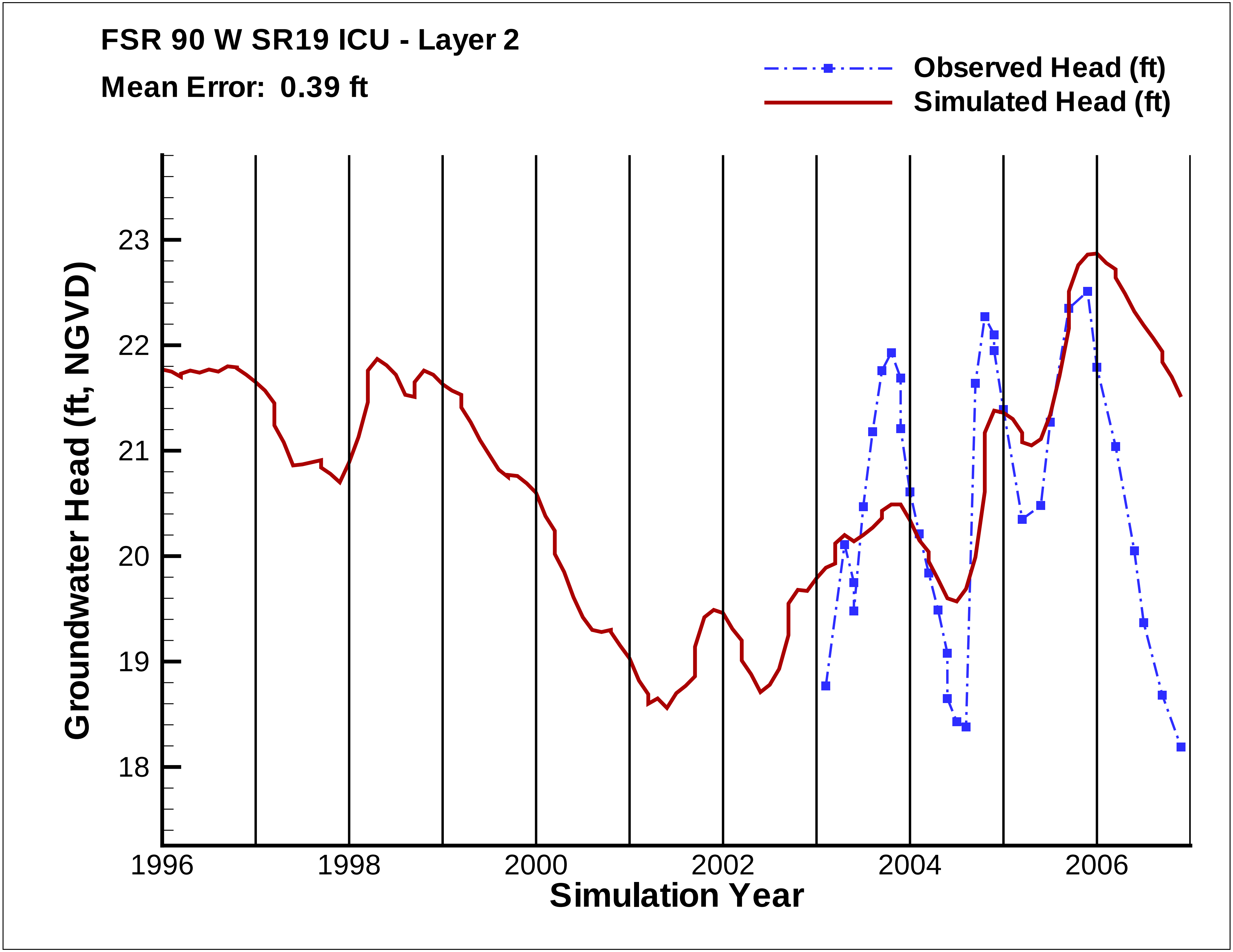
Forest Rds 77 & 77B UFA - Layer 4
Mean Error: -0.16 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
26
24
22
20
18
16
1996
1998
2000
2002
2004
2006
Simulation Year



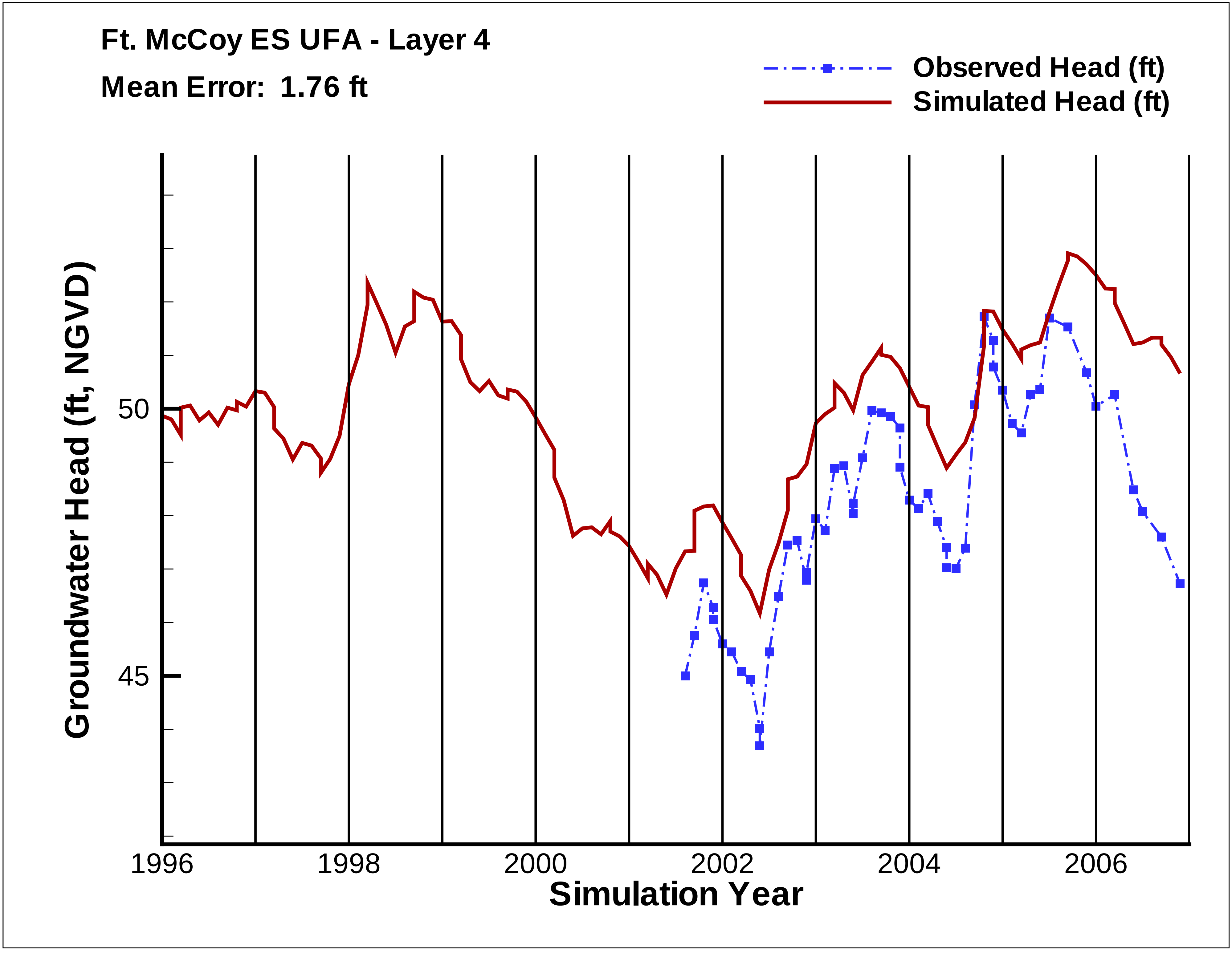
Frontier Dance Hall SA - Layer 1
Mean Error: -2.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year


Frontier Dance Hall UFA - Layer 4
Mean Error: -0.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
Simulation Year
8
10
12
14
1996
1998
2000
2002
2004
2006

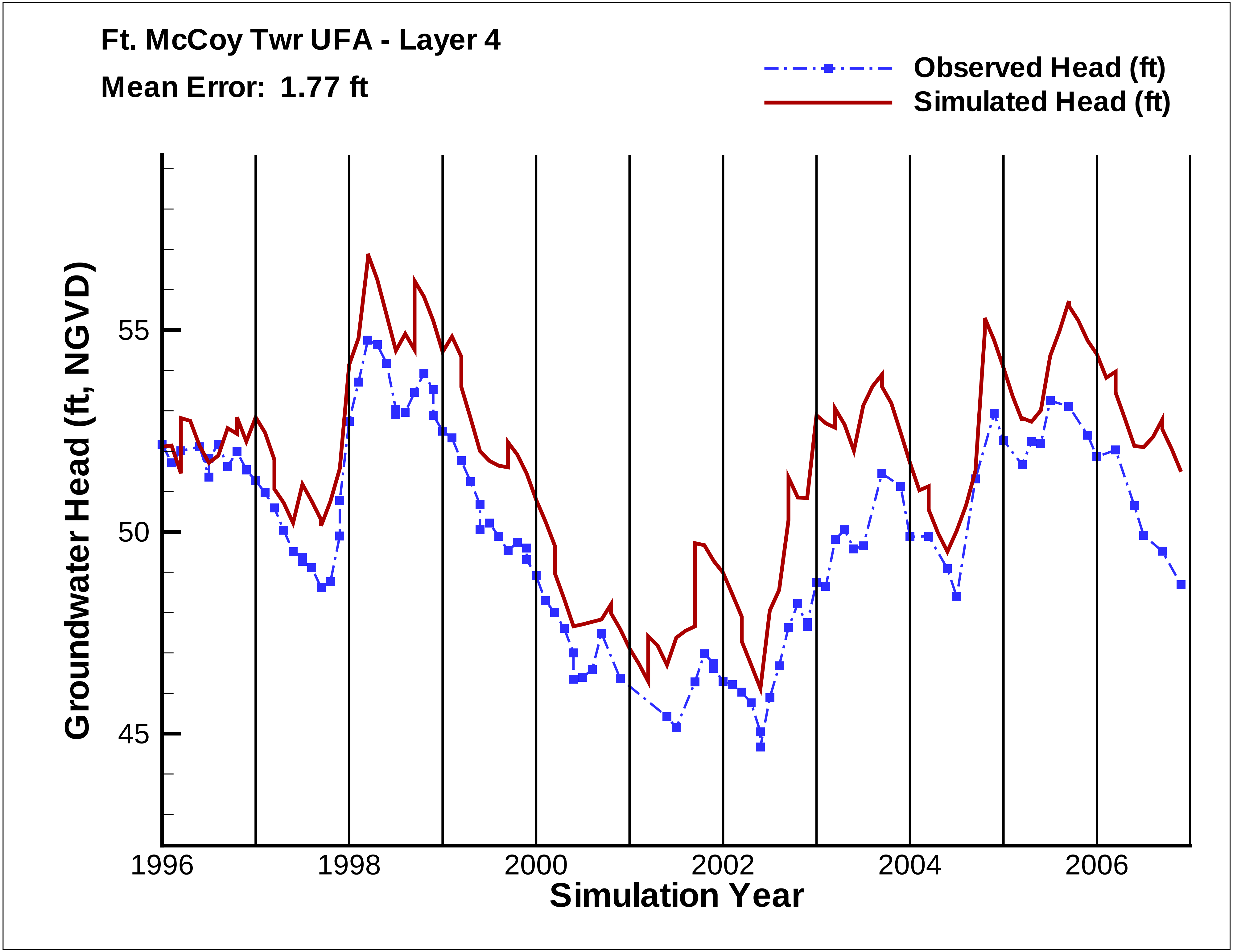

FSR 595 & 579 SA - Layer 1
Mean Error: 2.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



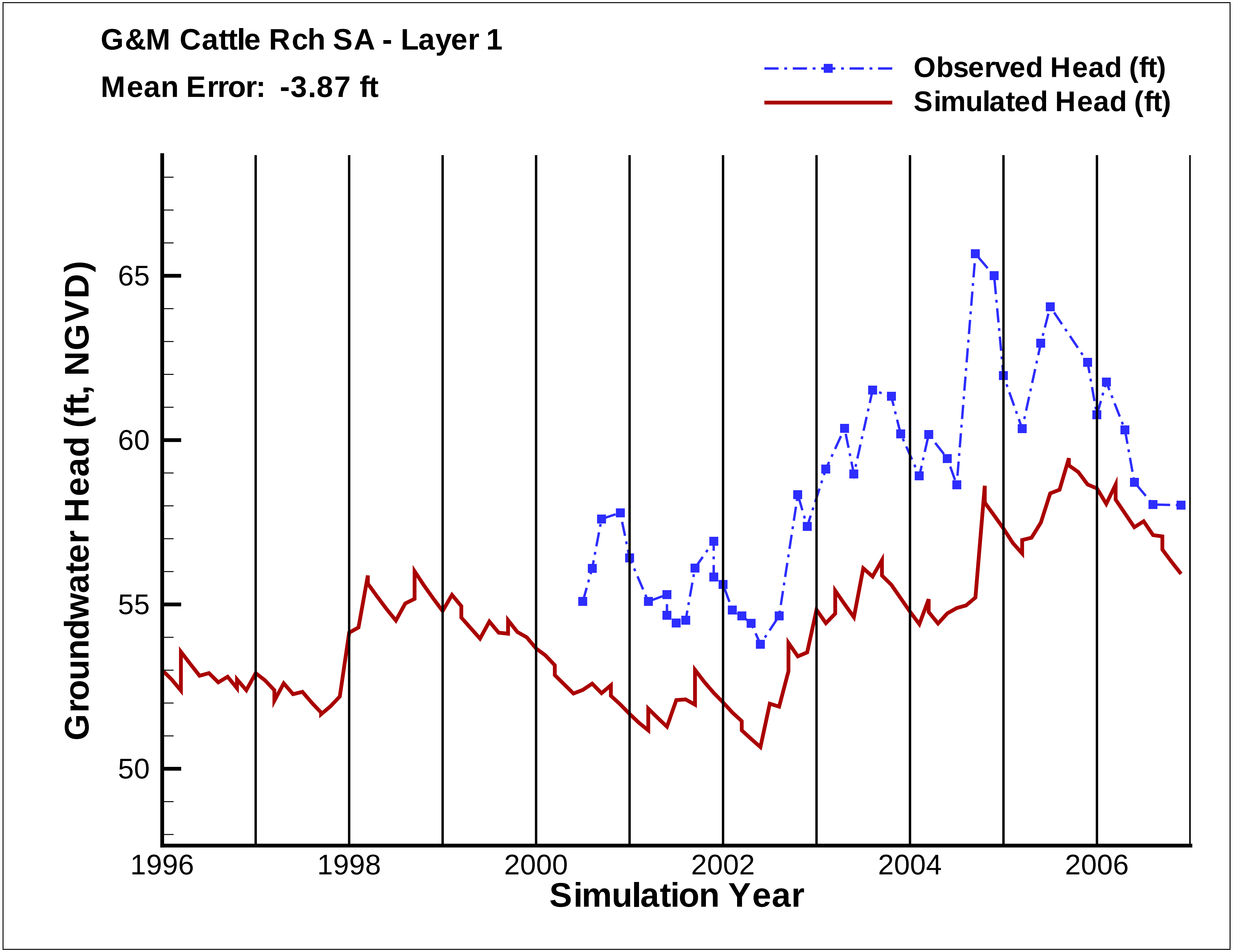
FSR 90 W SR19 ICU - Layer 2
Mean Error: 0.39 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
23
22
21
20
19
18
1996
1998
2000
2002
2004
2006
Simulation Year



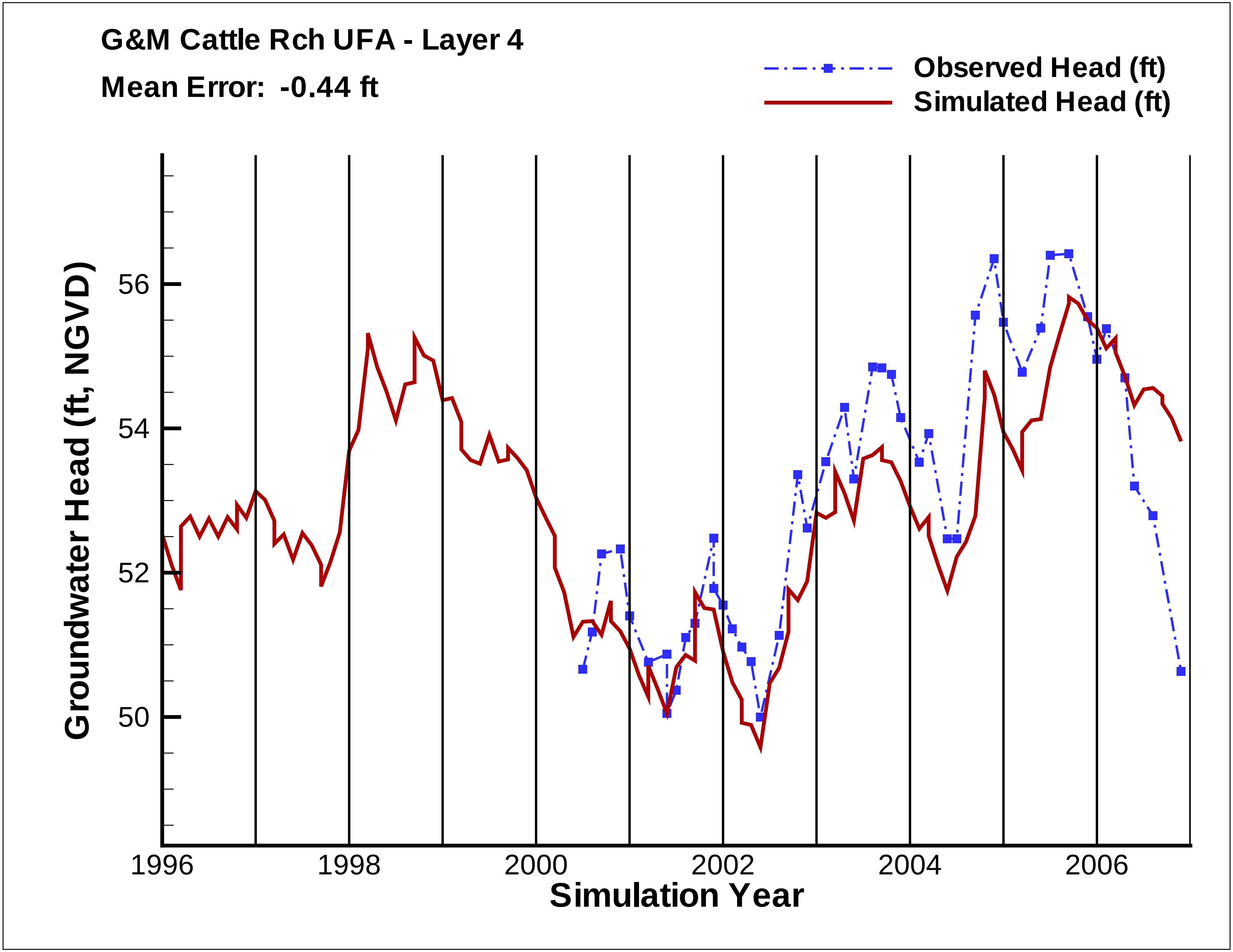
Ft. McCoy ES UFA - Layer 4
Mean Error: 1.76 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

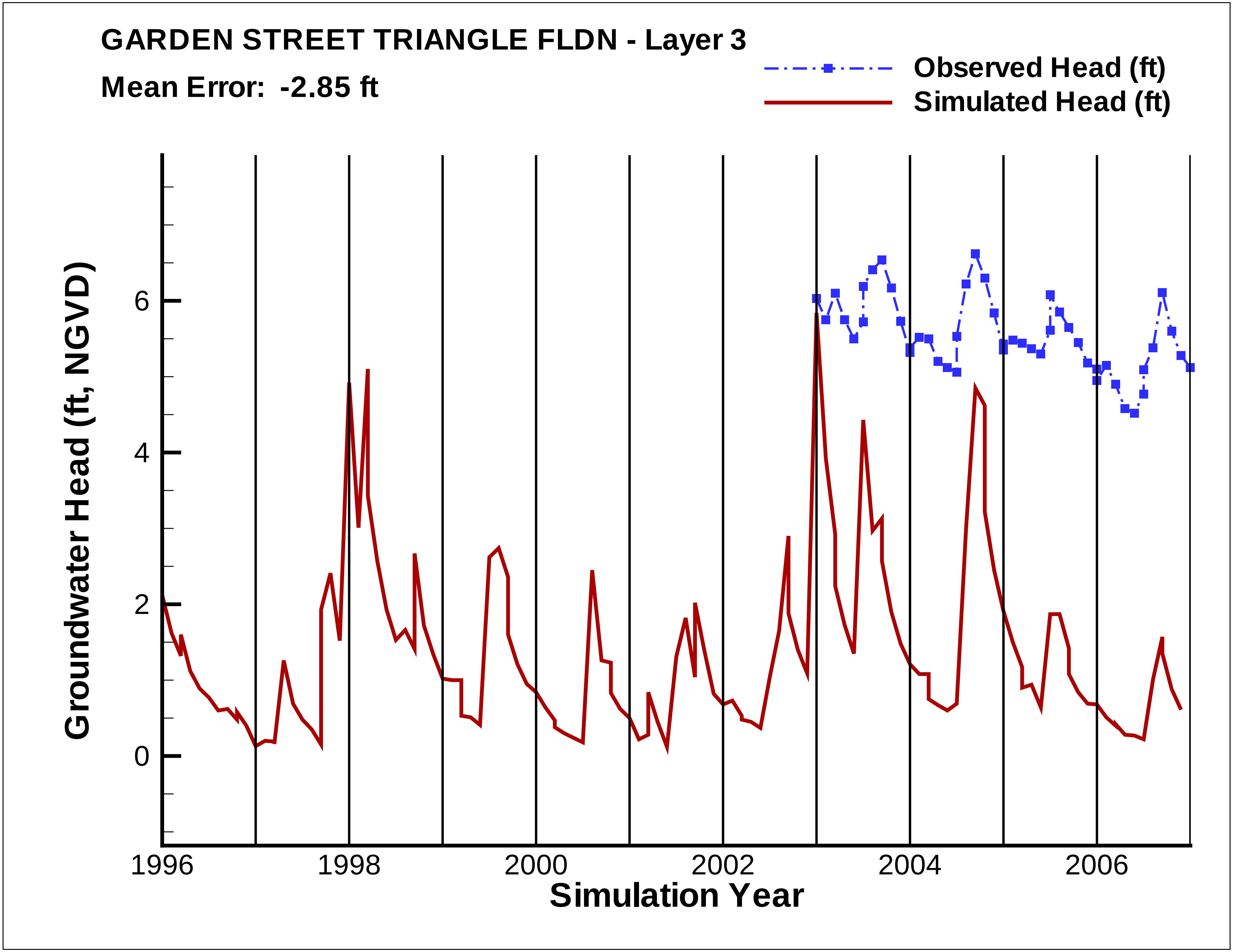


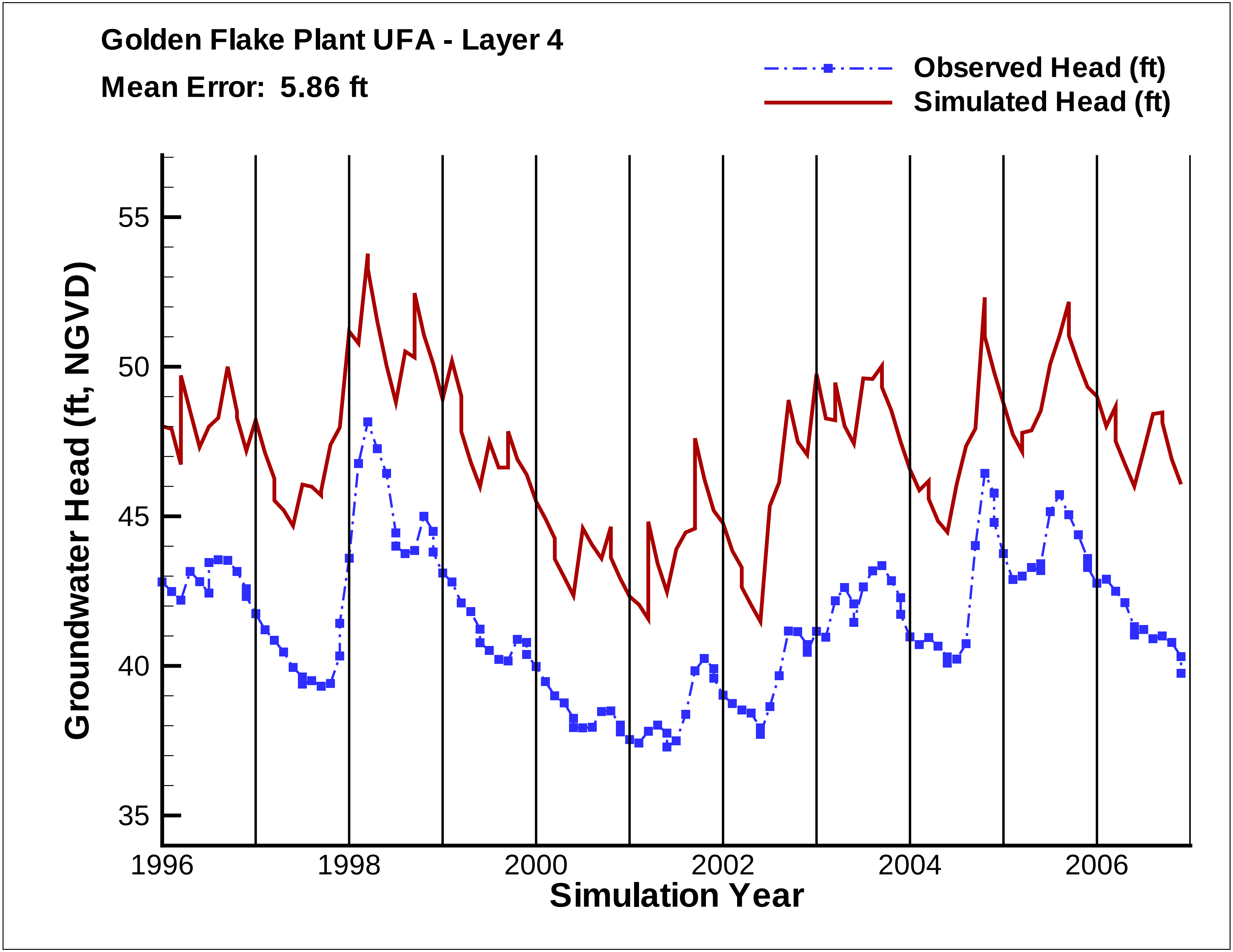
Ft. McCoy Twr UFA - Layer 4
Mean Error: 1.77 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year



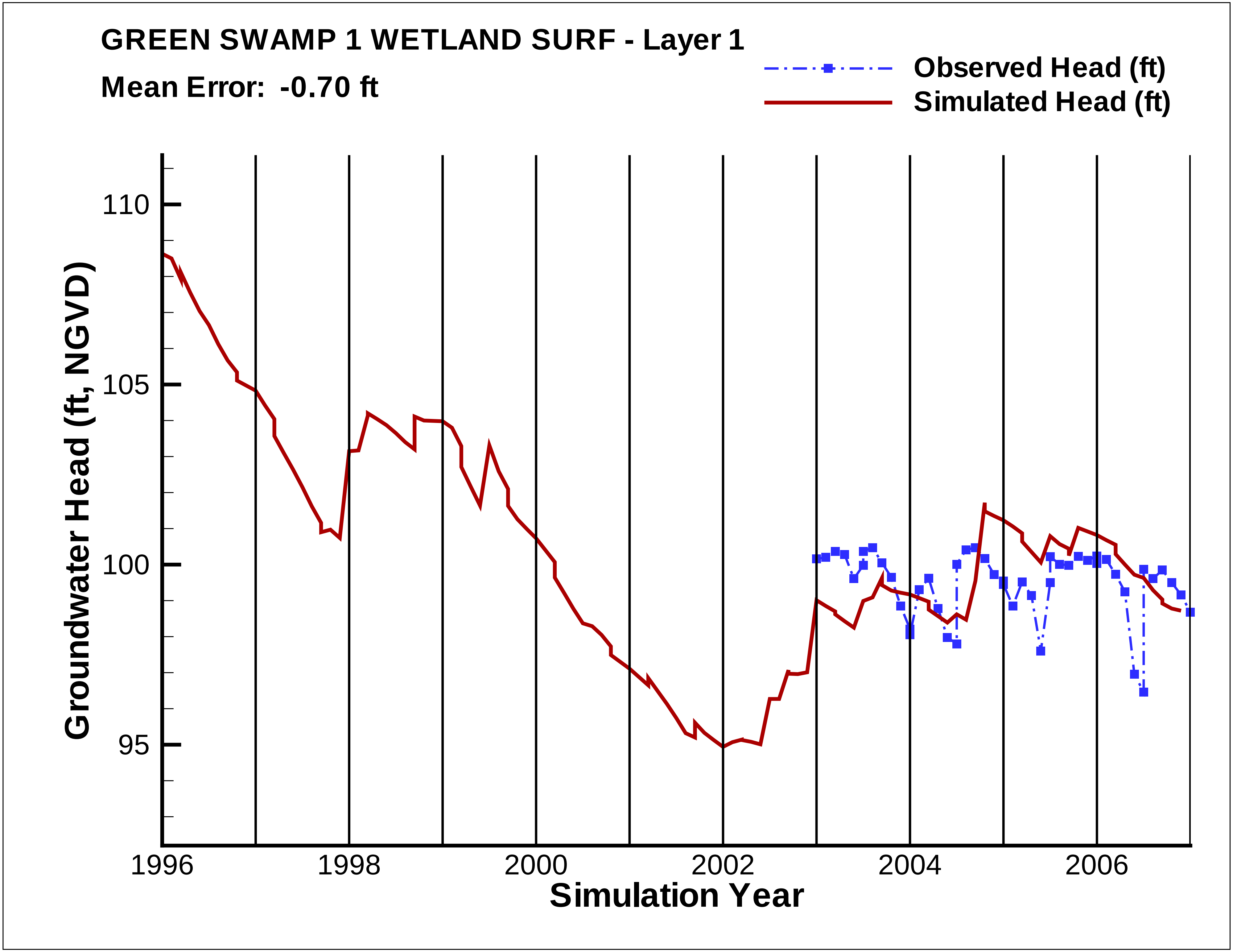
G&M Cattle Rch SA - Layer 1
Mean Error: -3.87 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year


G&M Cattle Rch UFA - Layer 4
Mean Error: -0.44 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
56
54
52
50
1996
1998
2000
2002
2004
2006
Simulation Year

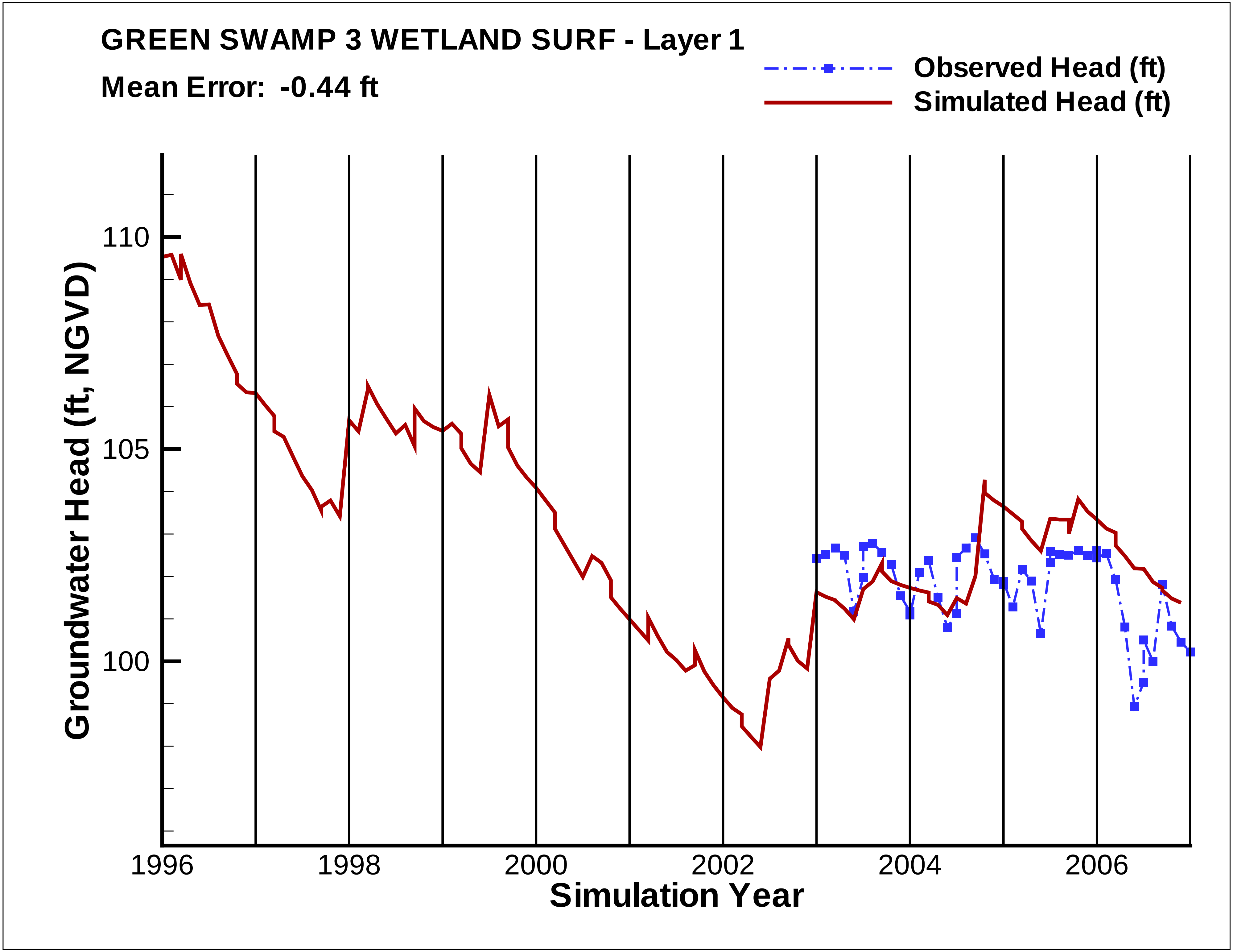

GARDEN STREET TRIANGLE FLDN - Layer 3
Mean Error: -2.85 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
2
4
6
1996
1998
2000
2002
2004
2006
Simulation Year

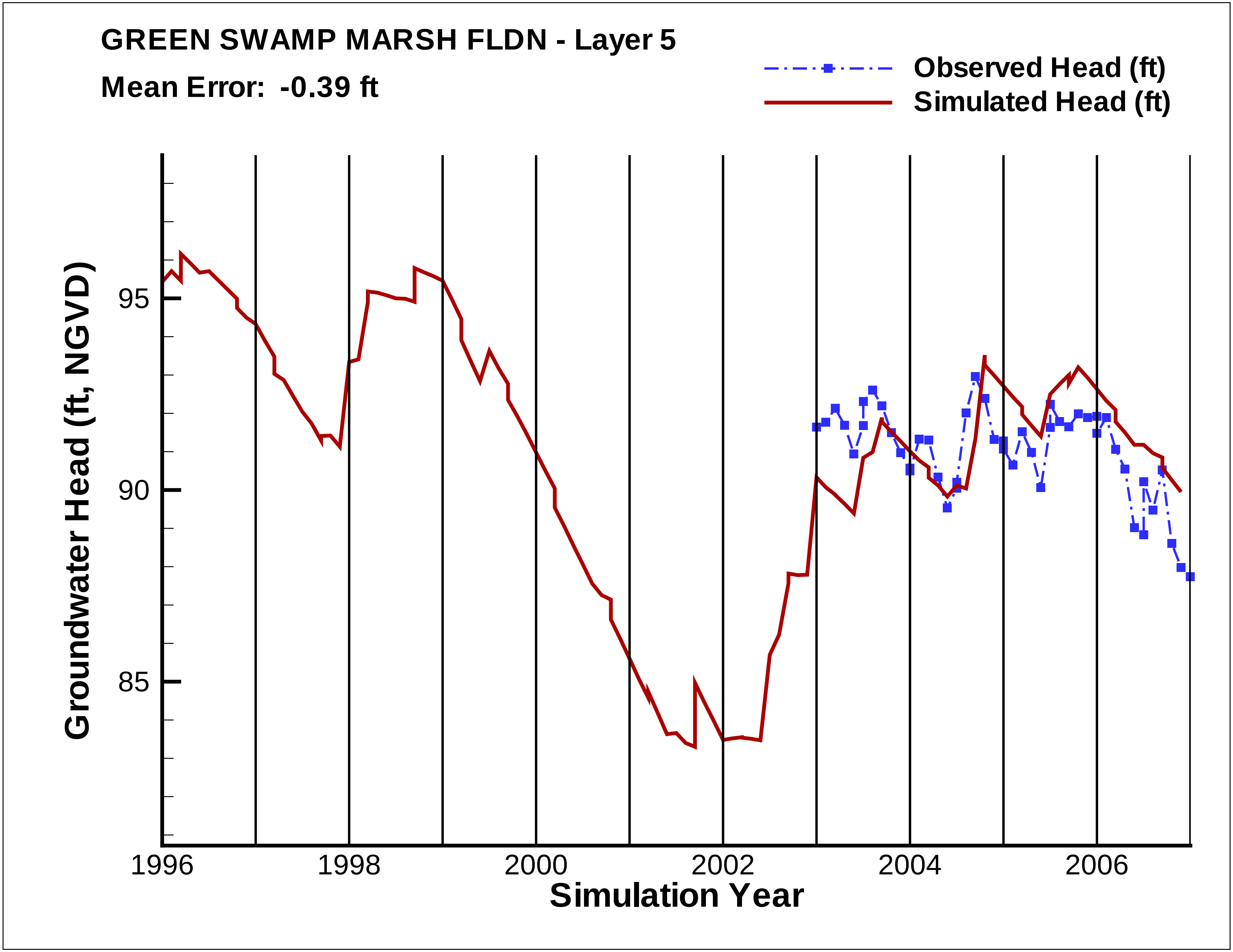


Golden Flake Plant UFA - Layer 4
Mean Error: 5.86 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

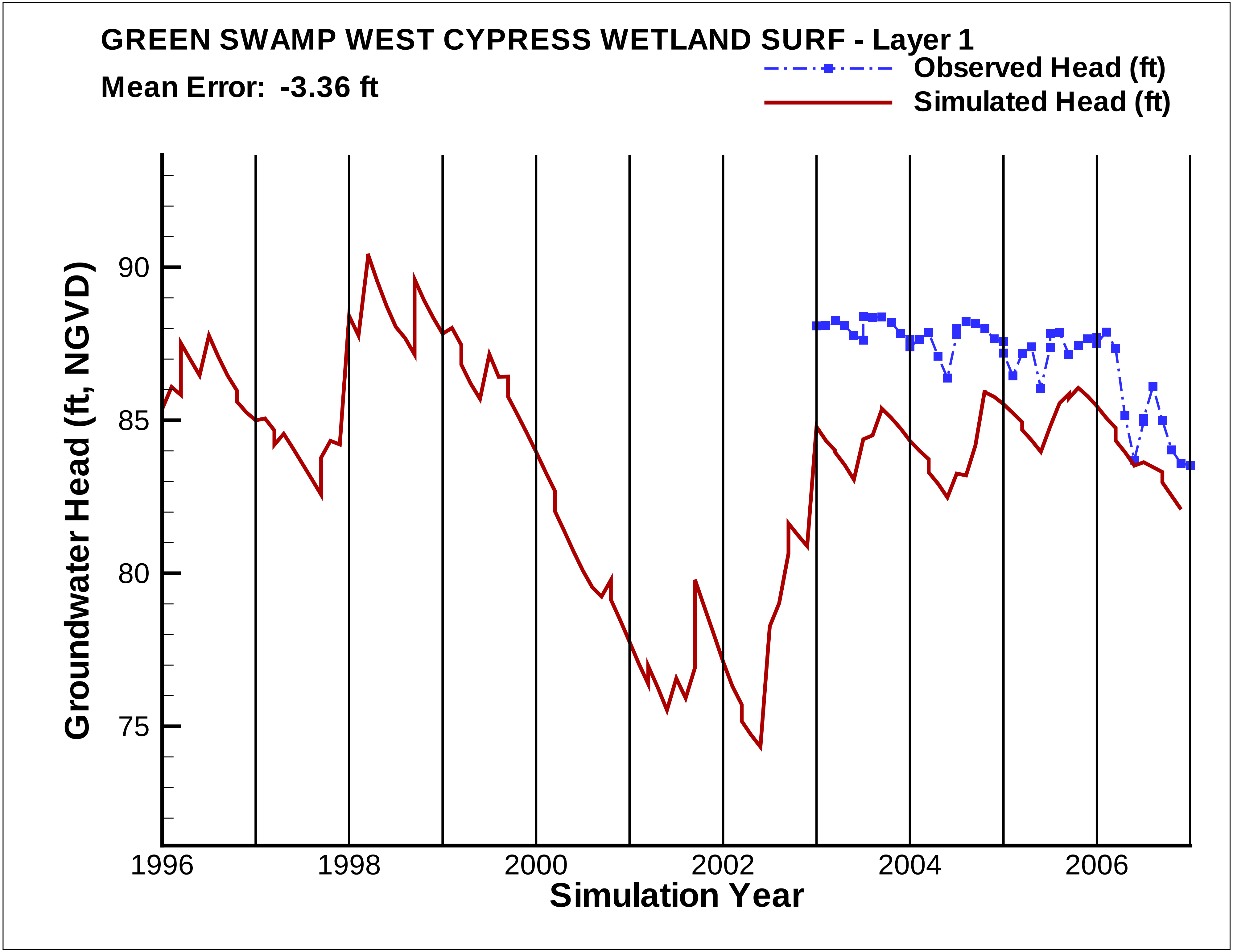


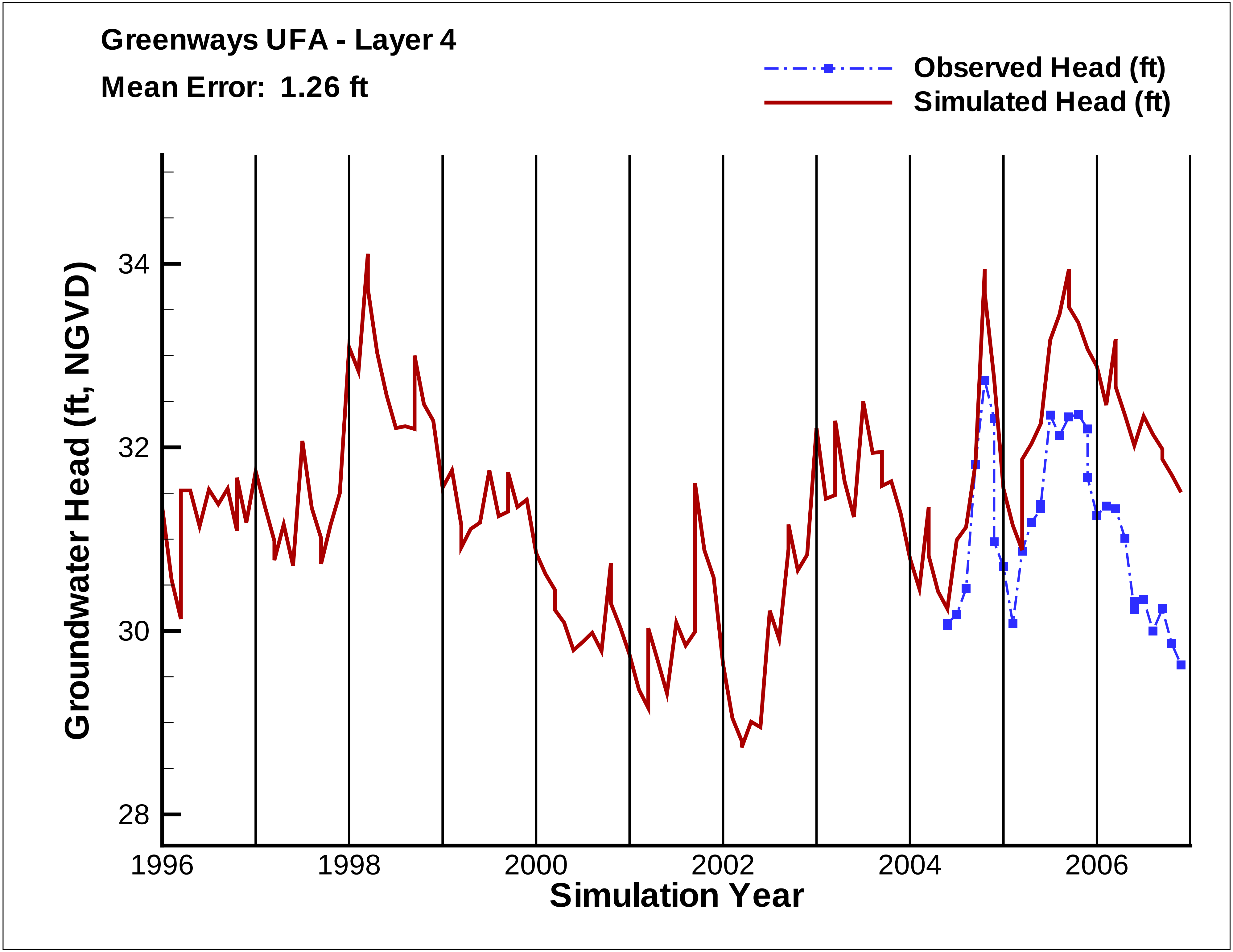
GREEN SWAMP 1 WETLAND SURF - Layer 1
Mean Error: -0.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
95
1996
1998
2000
2002
2004
2006
Simulation Year


GREEN SWAMP 3 WETLAND SURF - Layer 1
Mean Error: -0.44 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
1996
1998
2000
2002
2004
2006
Simulation Year

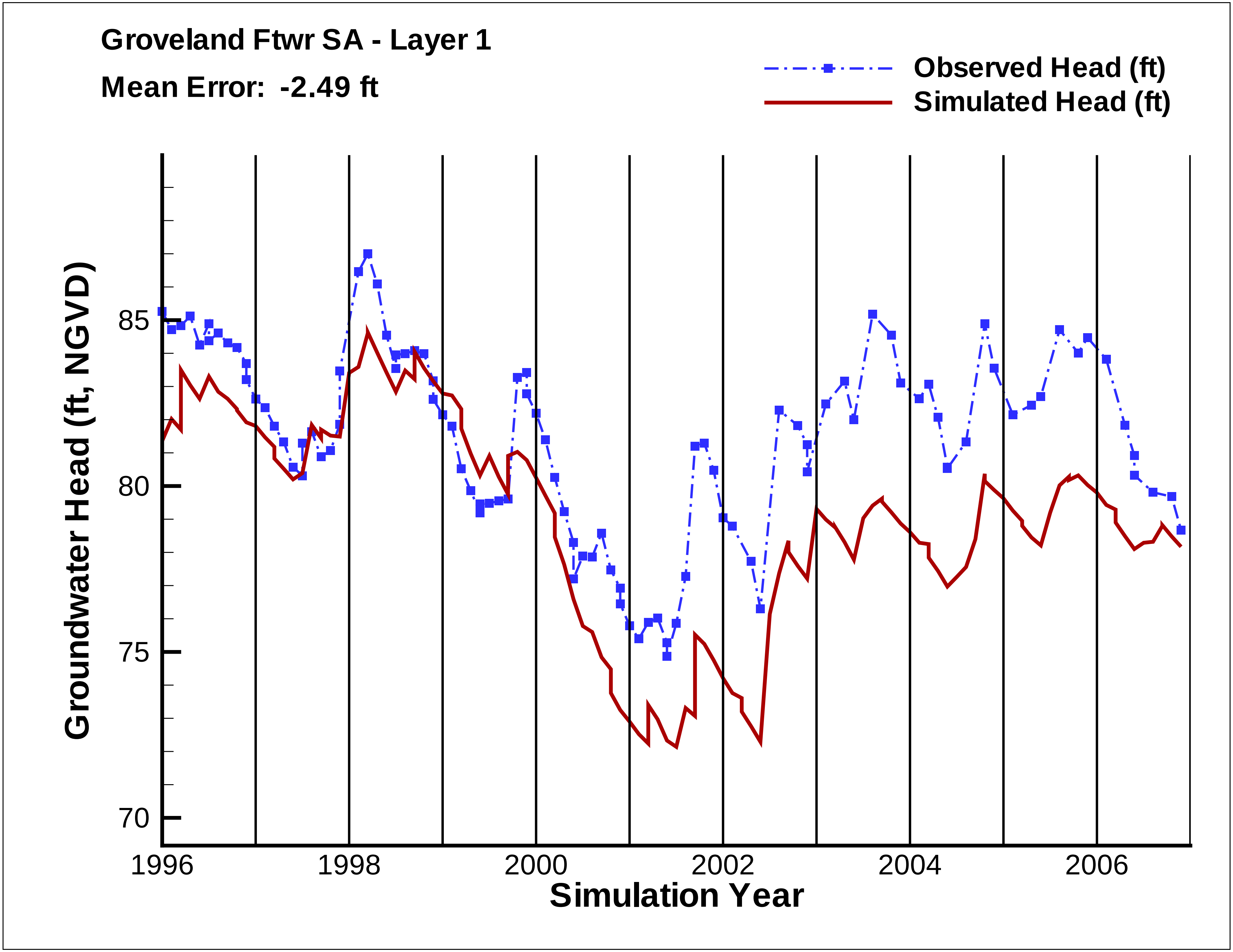


GREEN SWAMP MARSH FLDN - Layer 5
Mean Error: -0.39 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
1996
1998
2000
2002
2004
2006
Simulation Year

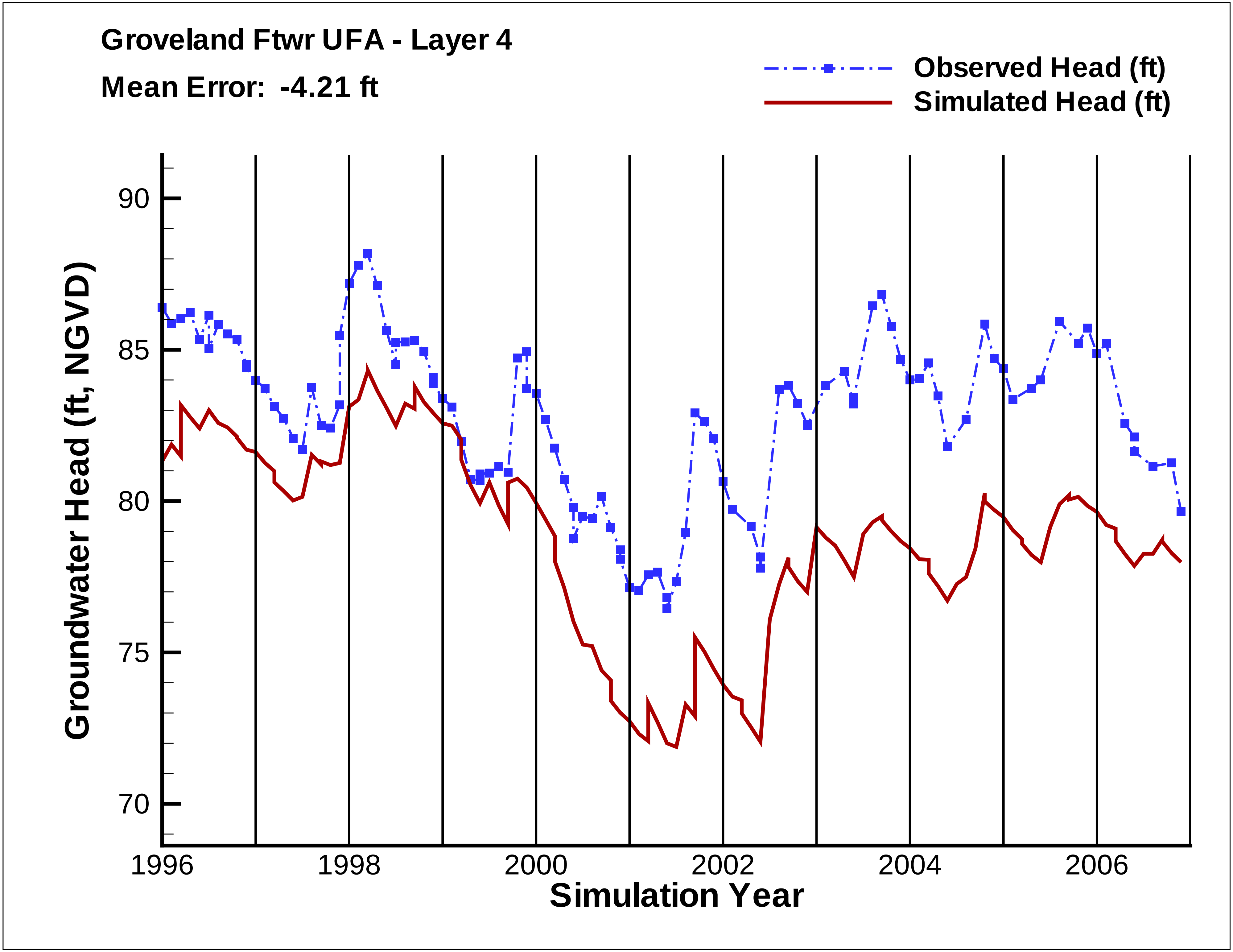

GREEN SWAMP WEST CYPRESS WETLAND SURF - Layer 1
Mean Error: -3.36 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

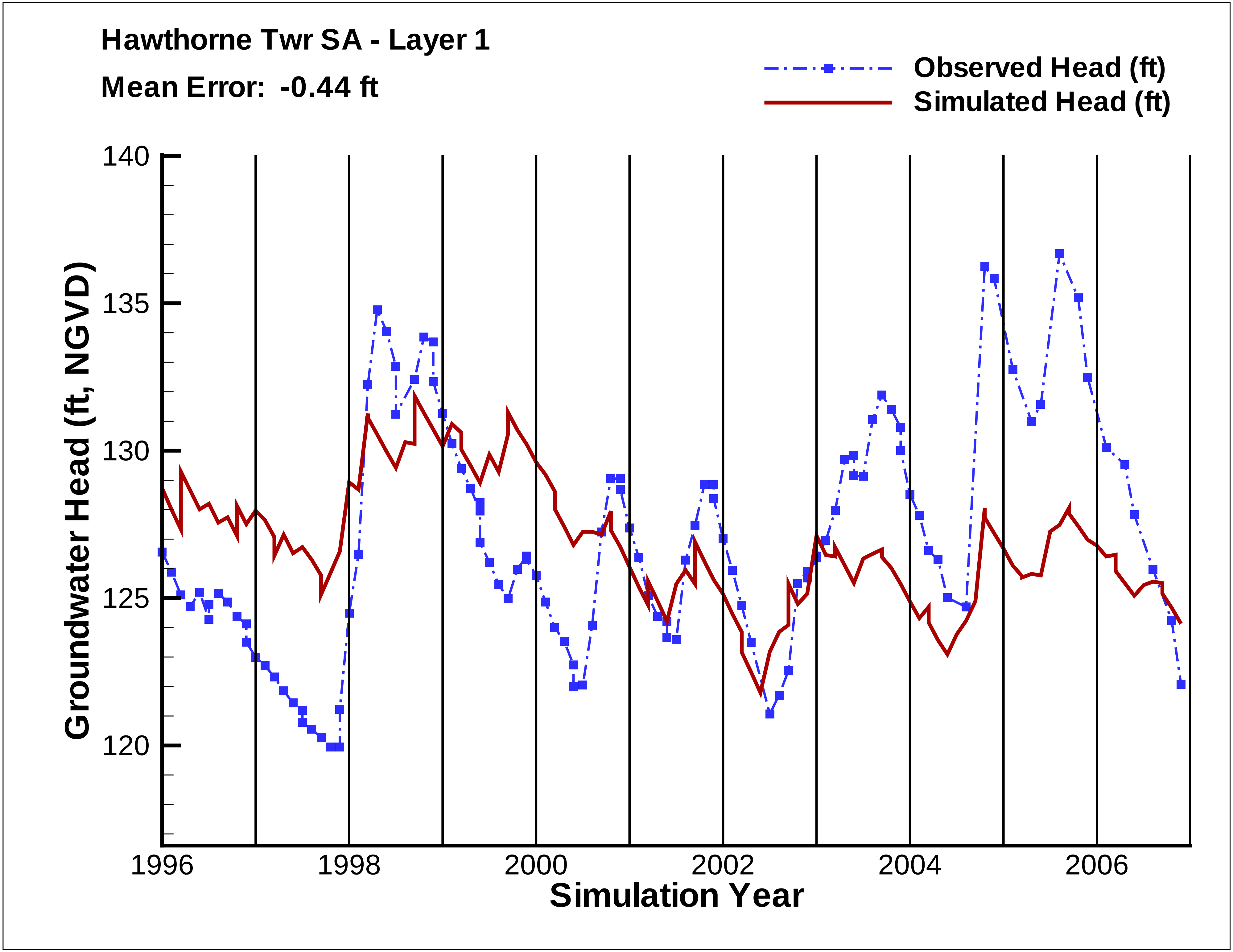


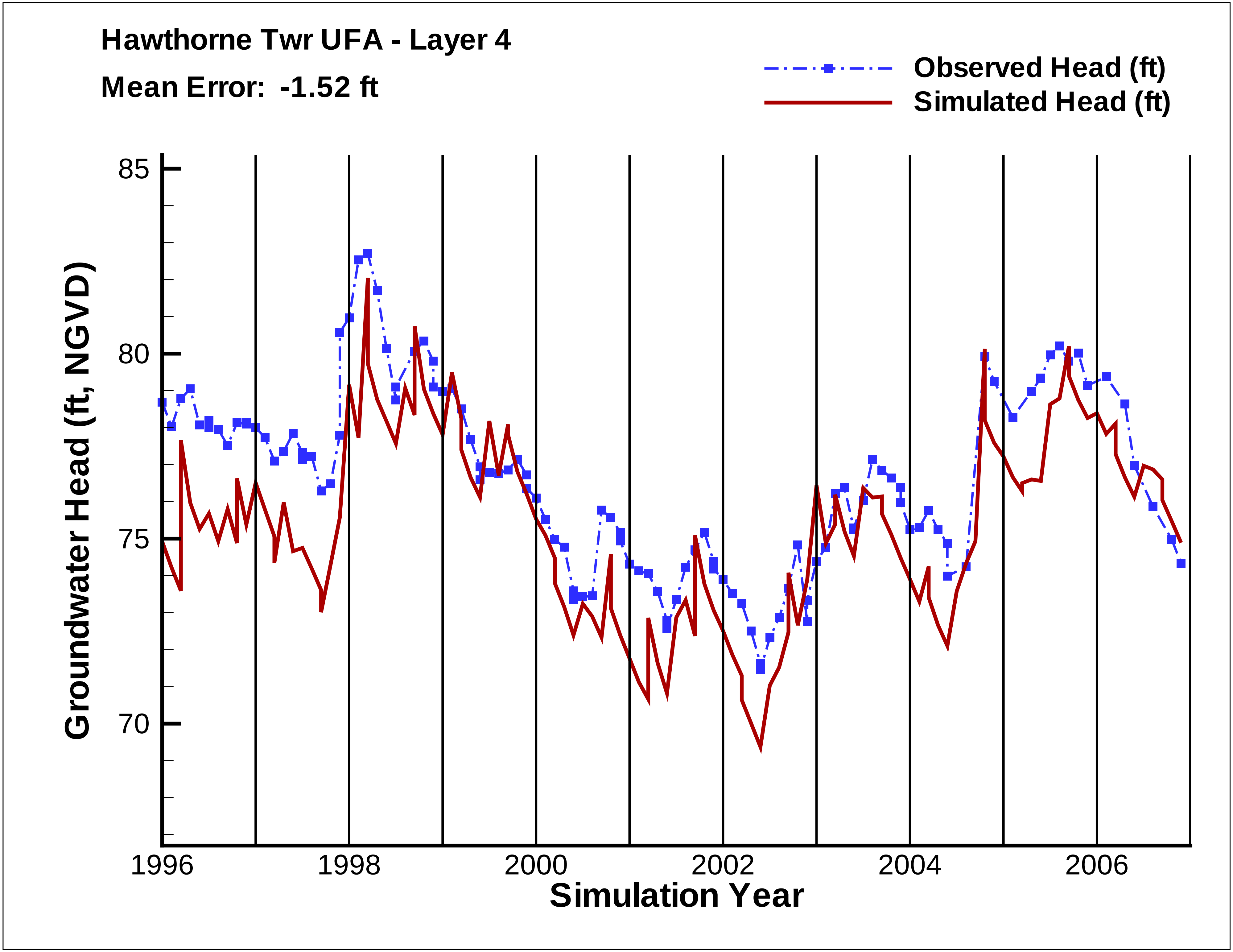
Greenways UFA - Layer 4
Mean Error: 1.26 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
34
32
30
28
1996
1998
2000
2002
2004
2006
Simulation Year



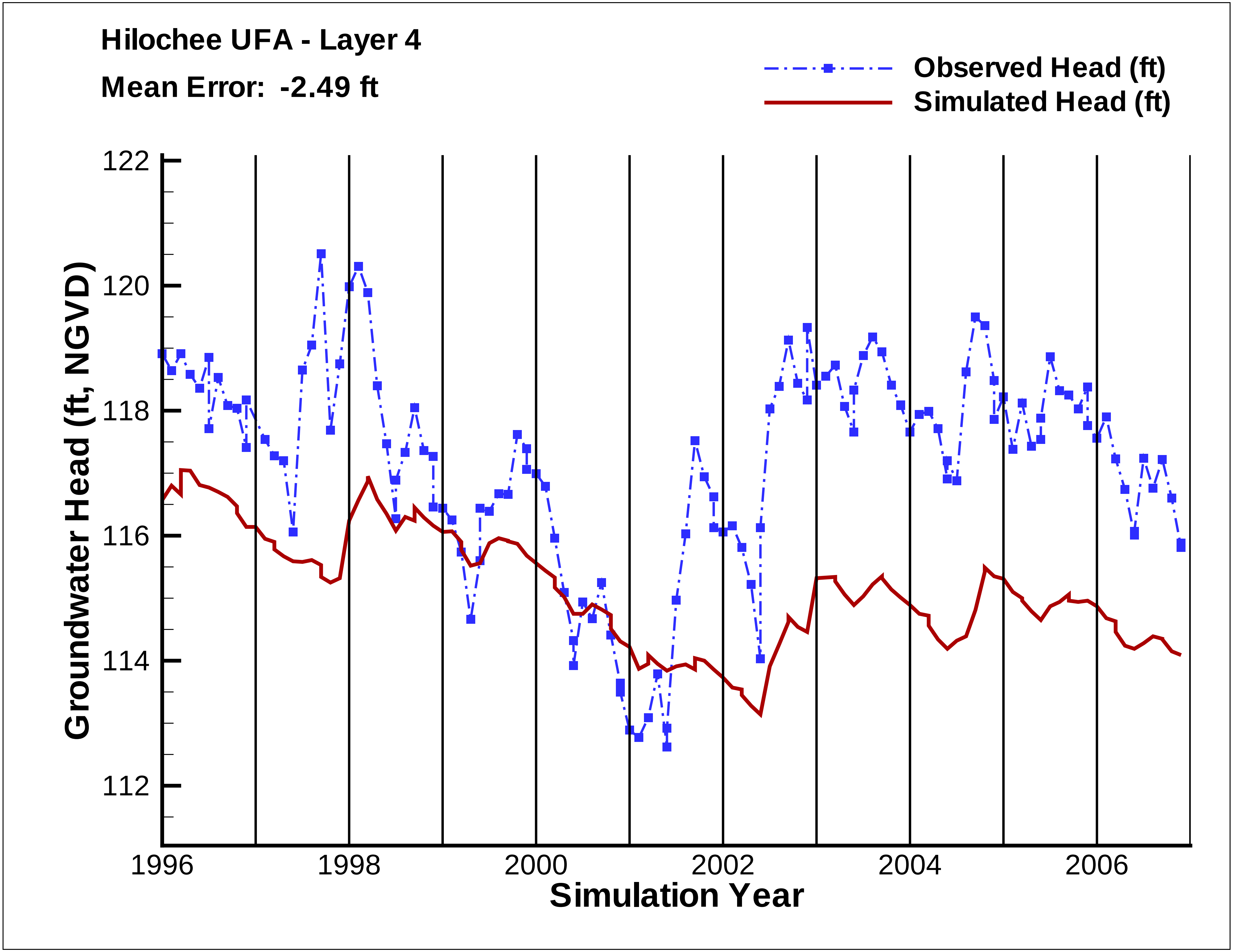
Groveland Ftwr SA - Layer 1
Mean Error: -2.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year


Groveland Ftwr UFA - Layer 4
Mean Error: -4.21 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

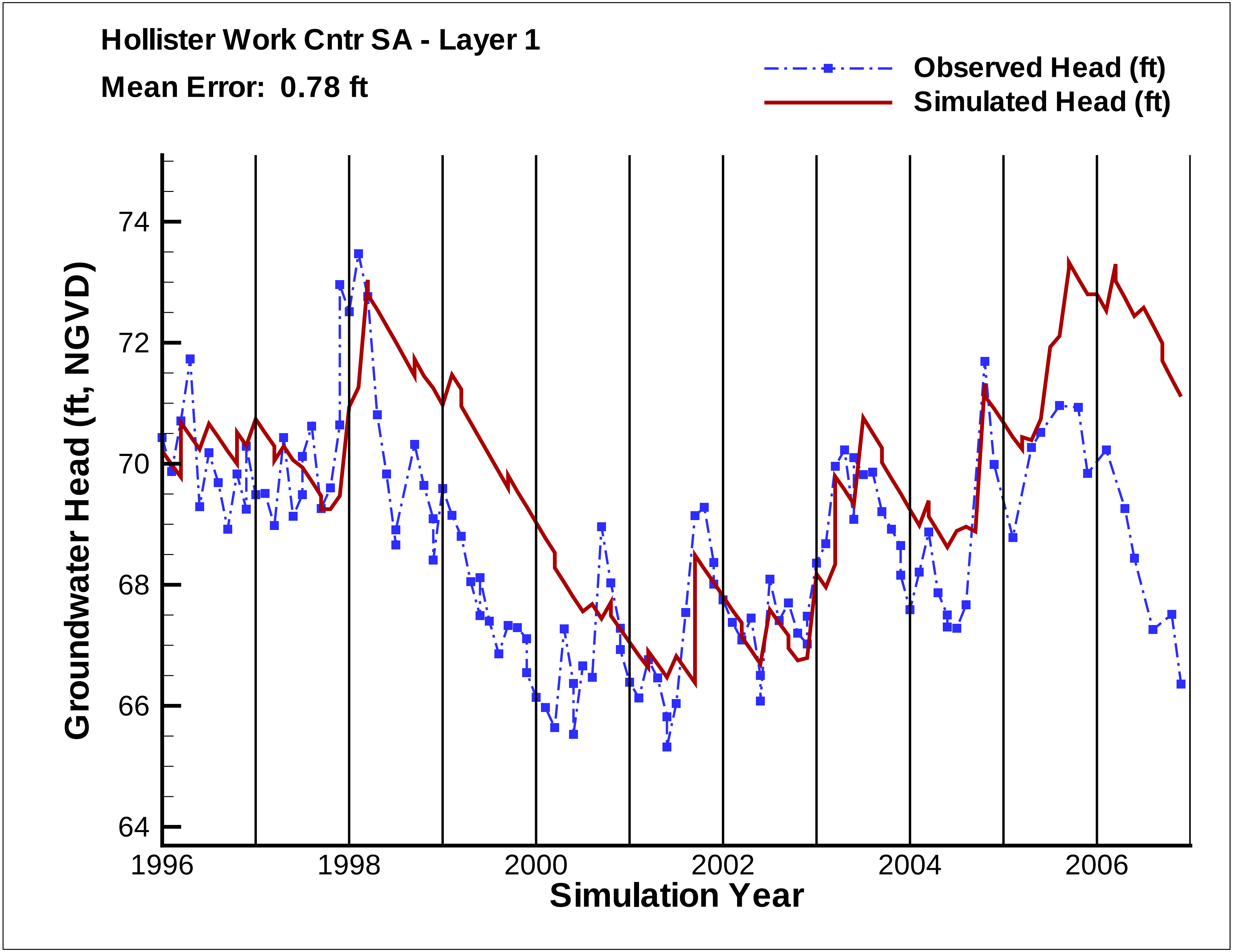

Hawthorne Twr SA - Layer 1
Mean Error: -0.44 ft
Observed Head (ft)
Simulated Head (ft)
140
135
130
125
120
Groundwater Head (ft, NGVD)
1996
1998
2000
2002
2004
2006
Simulation Year

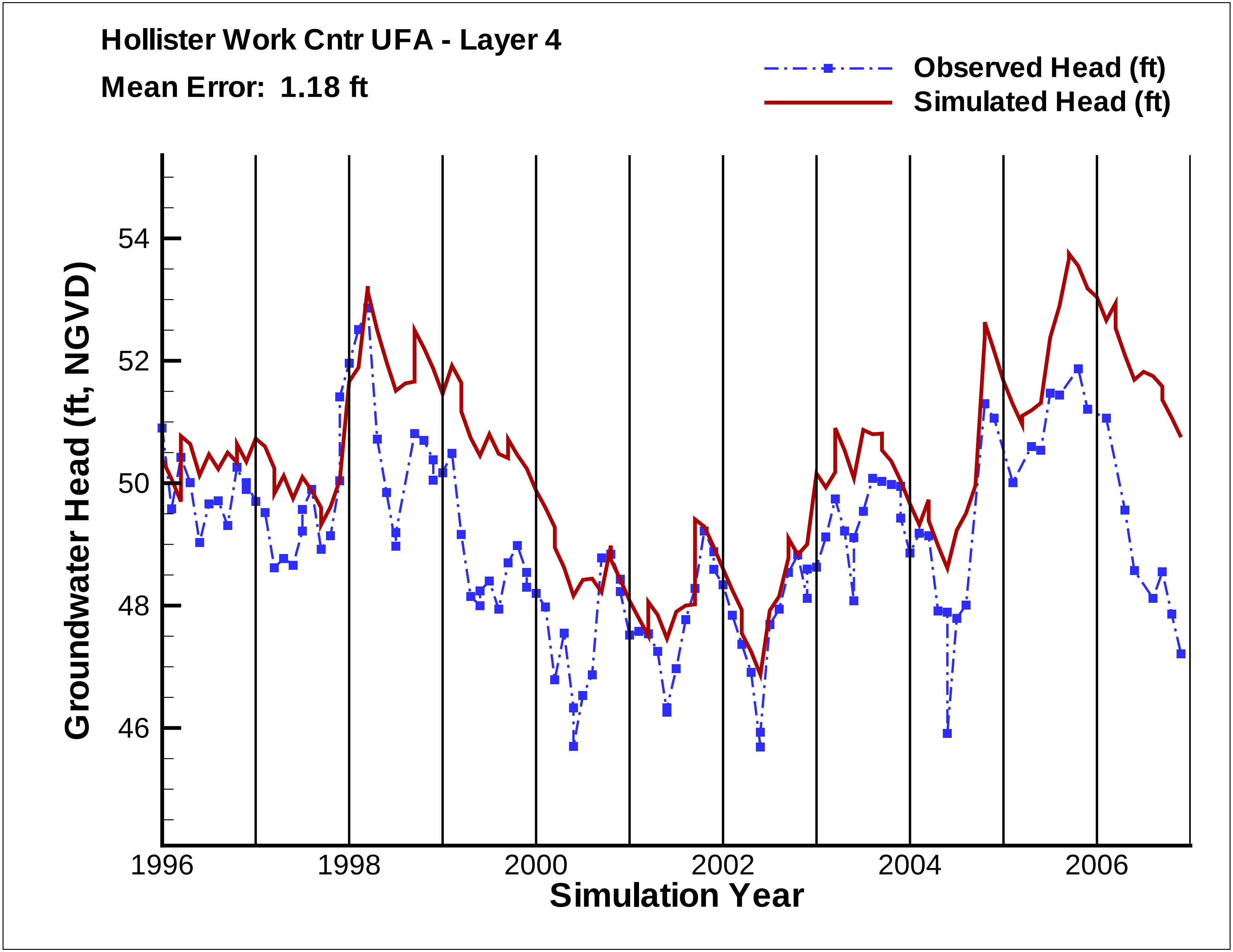


Hawthorne Twr UFA - Layer 4
Mean Error: -1.52 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

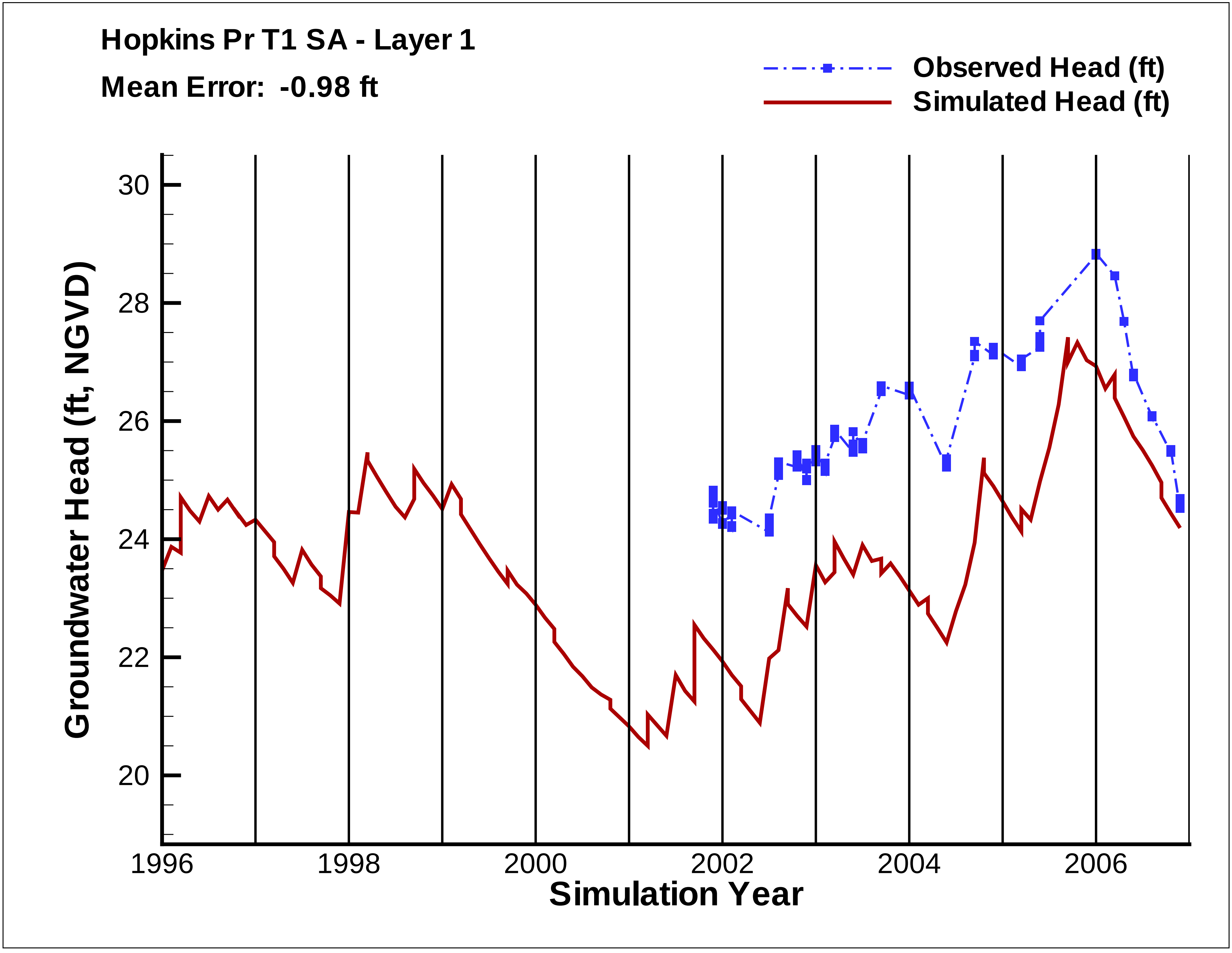


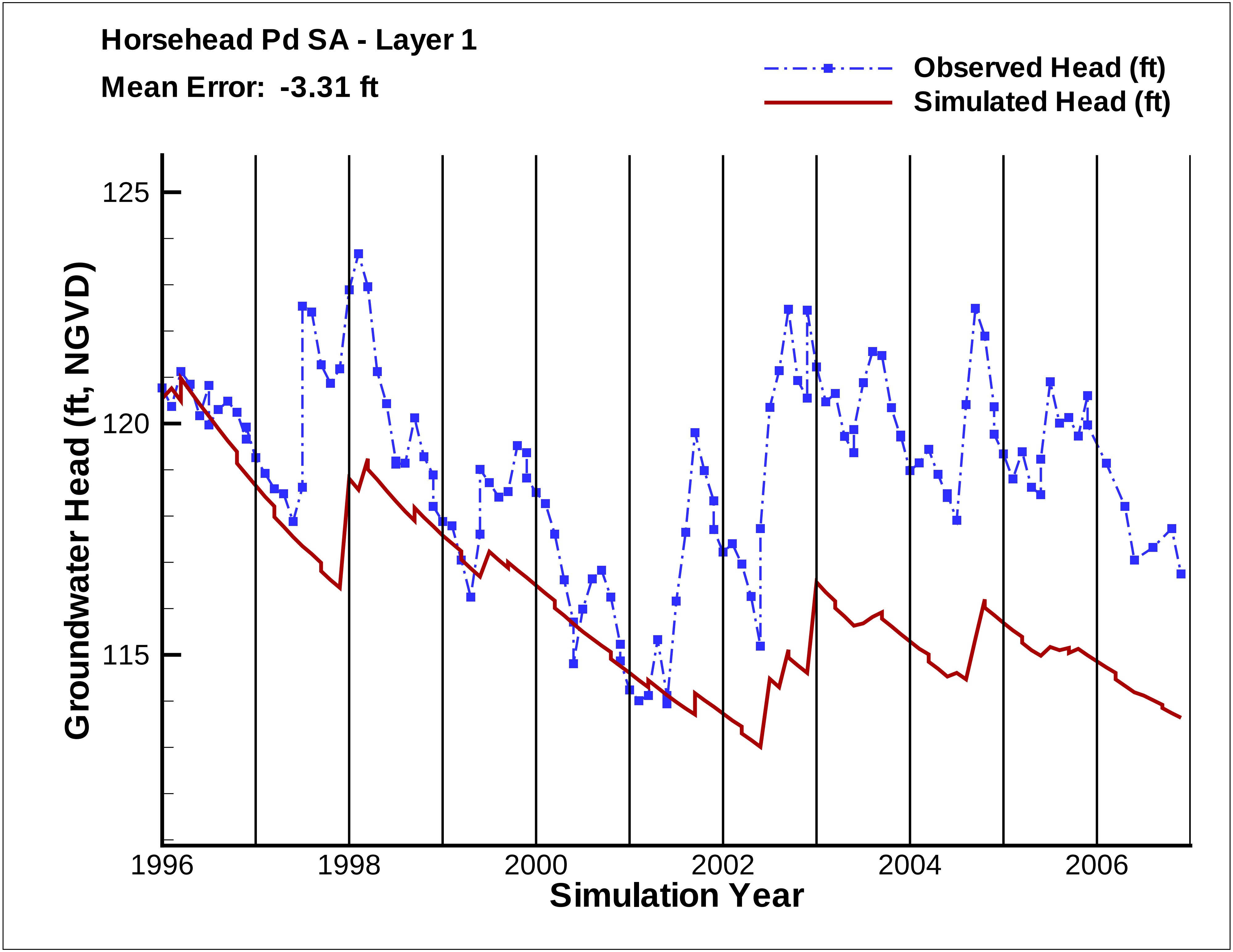
Hilochee UFA - Layer 4
Mean Error: -2.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
122
120
118
116
114
112
1996
1998
2000
2002
2004
2006
Simulation Year


Hollister Work Cntr SA - Layer 1
Mean Error: 0.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
74
72
70
68
66
64
1996
1998
2000
2002
2004
2006
Simulation Year

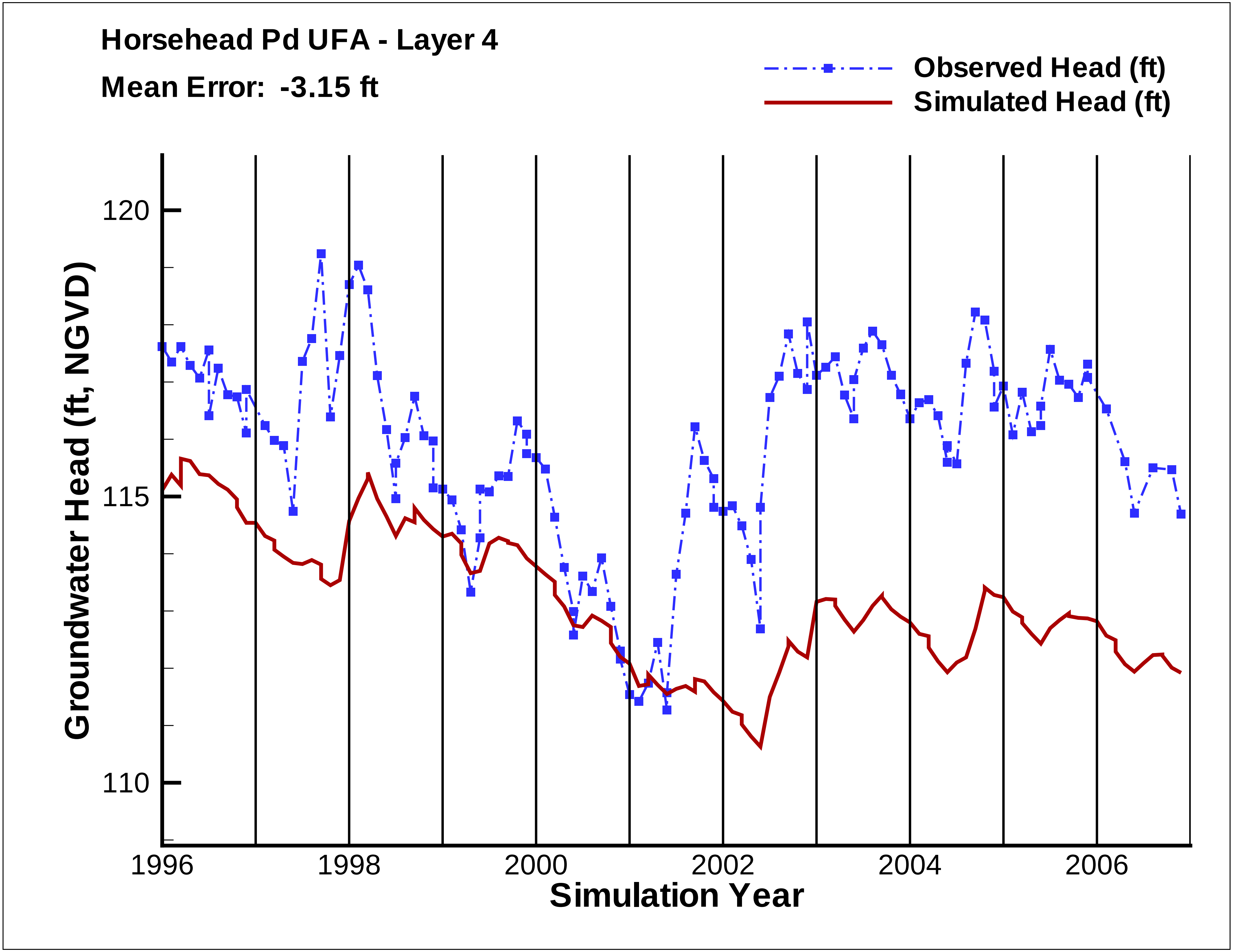


Hollister Work Cntr UFA - Layer 4
Mean Error: 1.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
54
52
50
48
46
1996
1998
2000
2002
2004
2006
Simulation Year

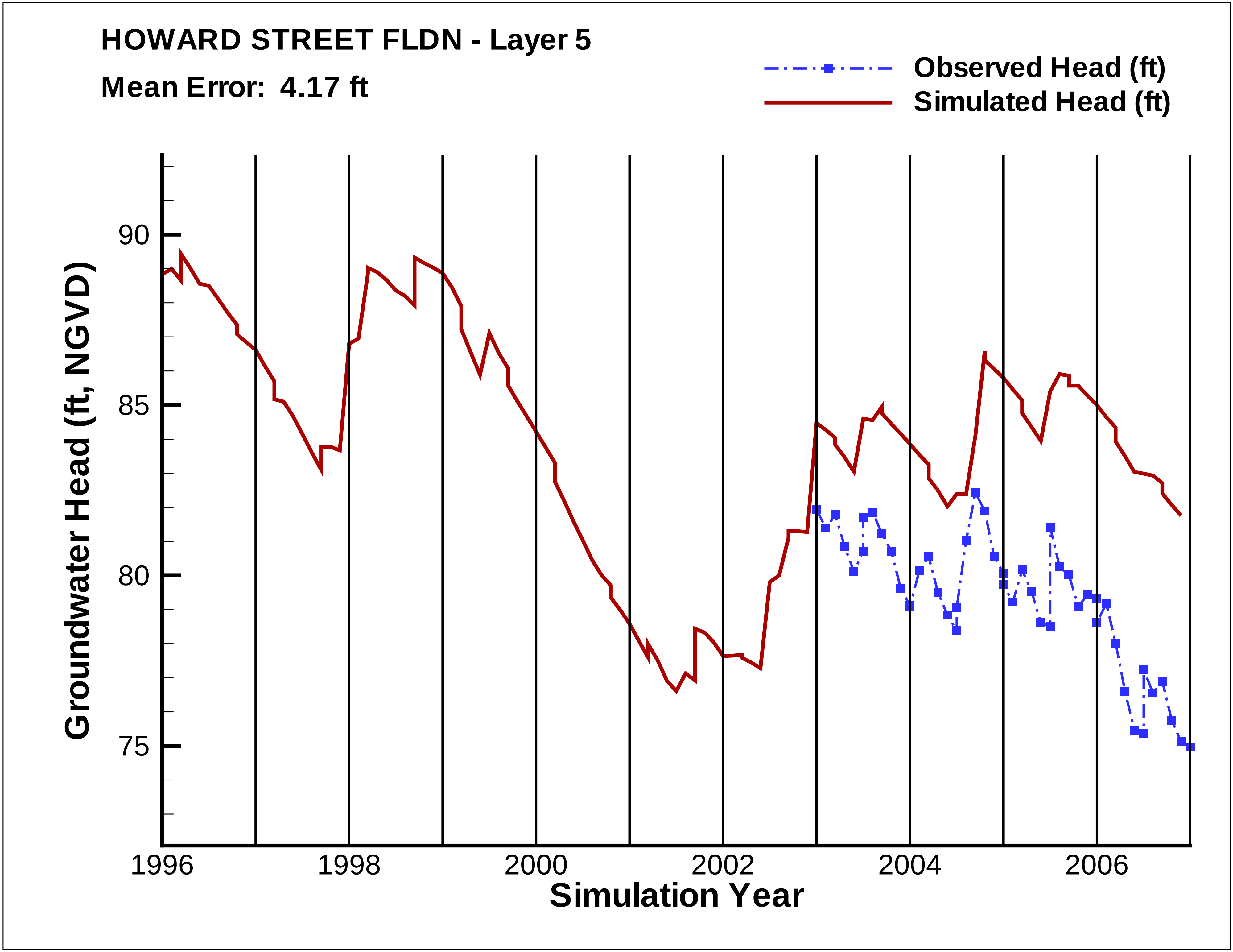

Hopkins Pr T1 SA - Layer 1
Mean Error: -0.98 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
22
24
26
28
30
1996
1998
2000
2002
2004
2006
Simulation Year

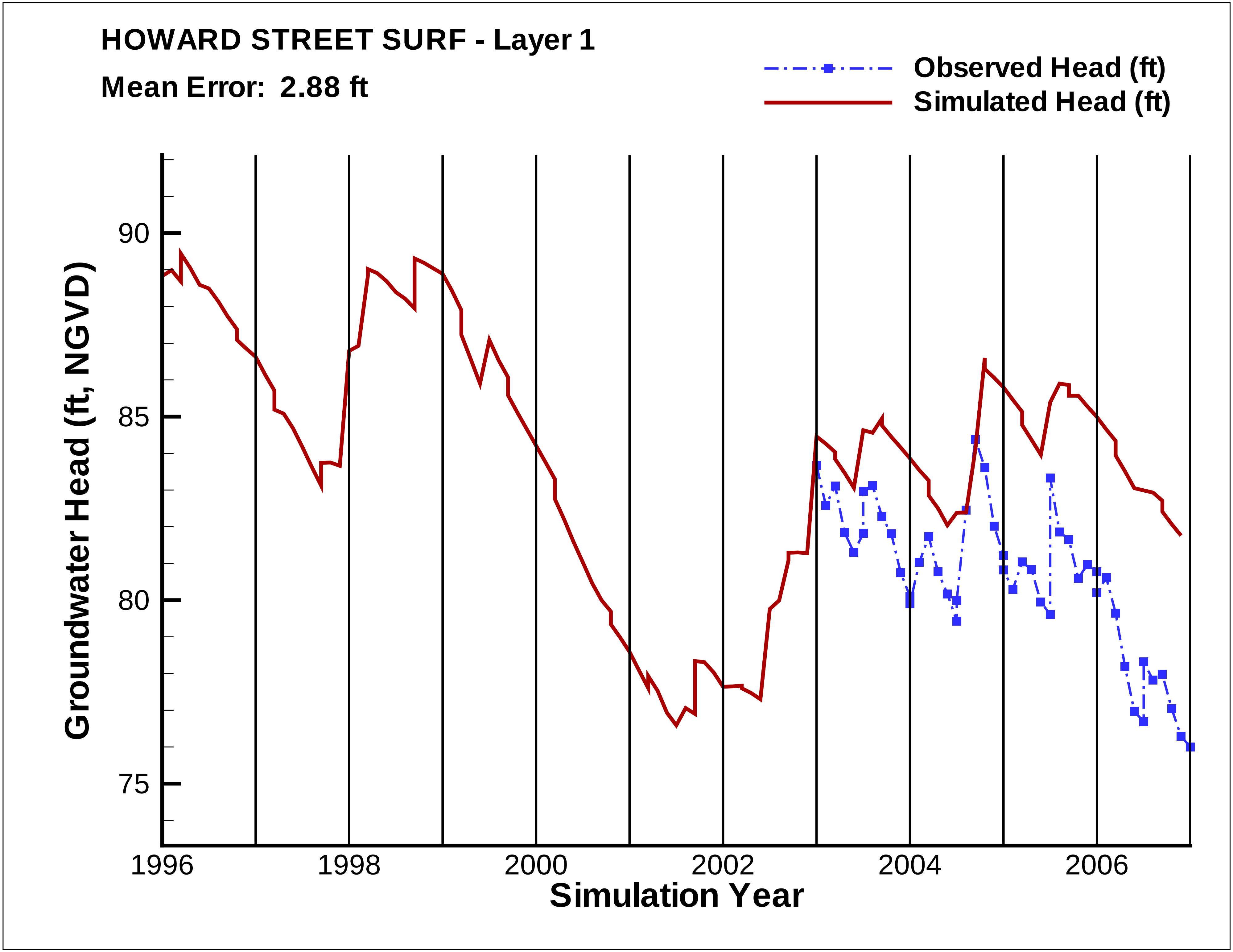


Horsehead Pd SA - Layer 1
Mean Error: -3.31 ft
Observed Head (ft)
Simulated Head (ft)
125
120
115
1996
1998
2000
2002
2004
2006
Simulation Year
Groundwater Head (ft, NGVD)

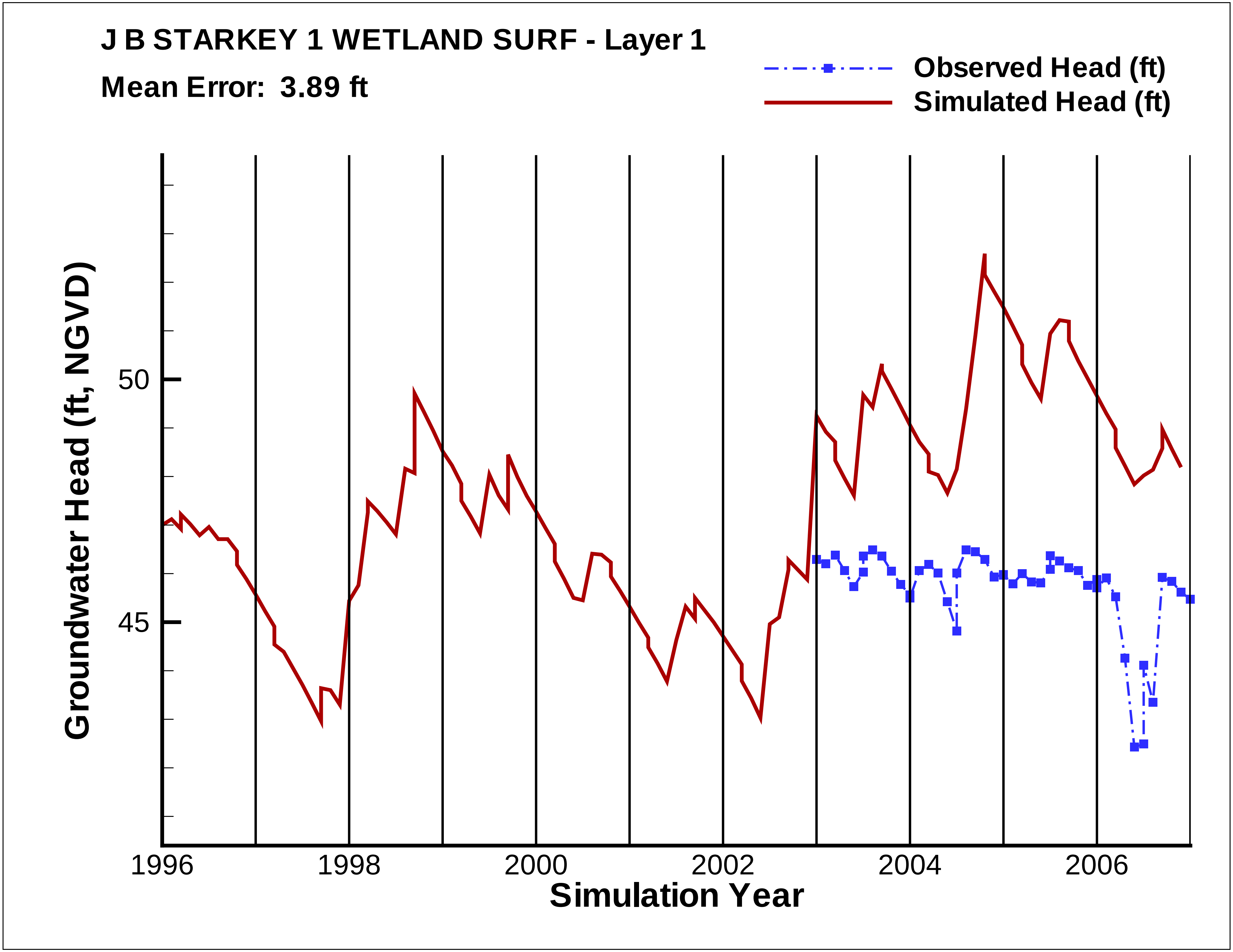


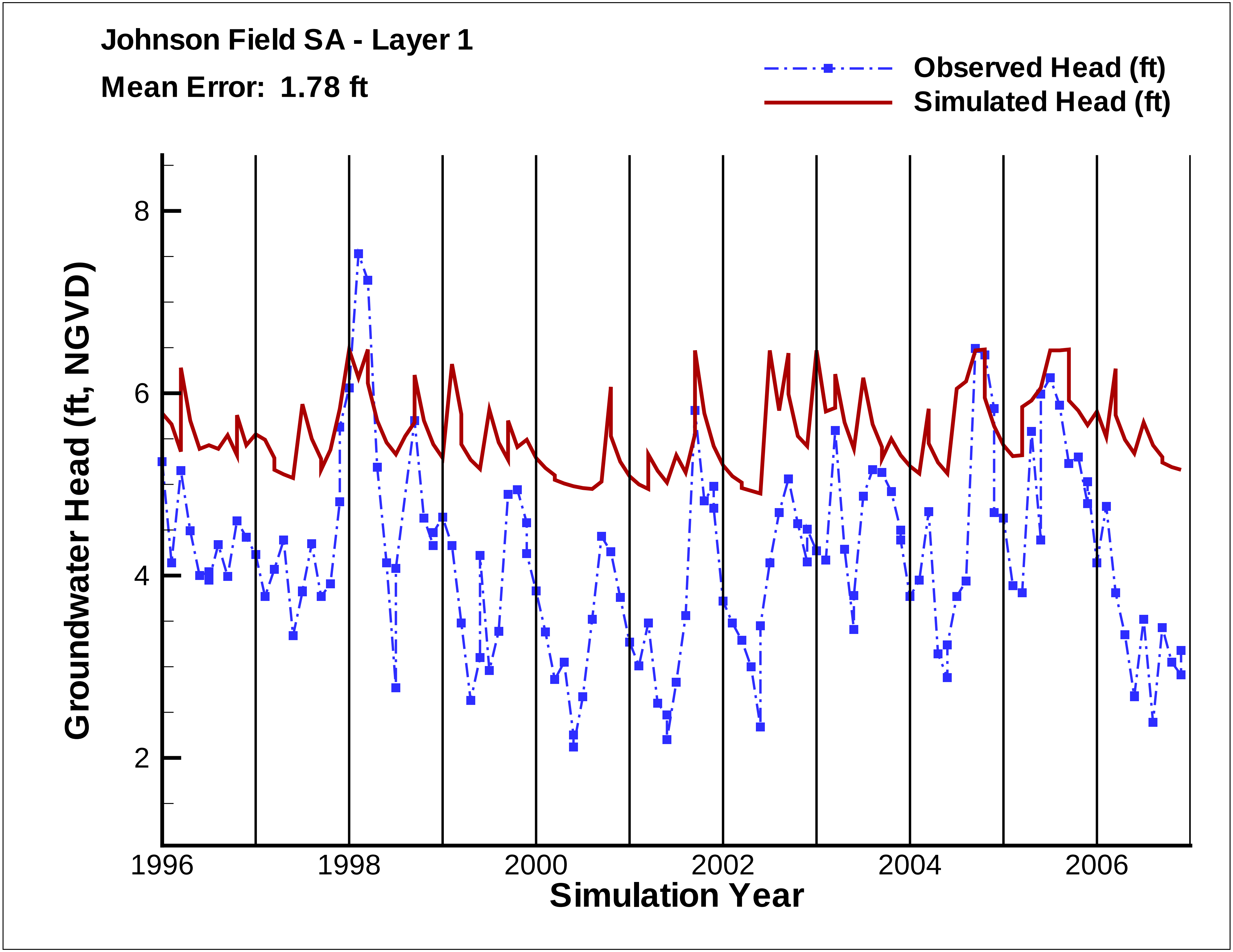
Horsehead Pd UFA - Layer 4
Mean Error: -3.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
120
115
110
1996
1998
2000
2002
2004
2006
Simulation Year


HOWARD STREET FLDN - Layer 5
Mean Error: 4.17 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

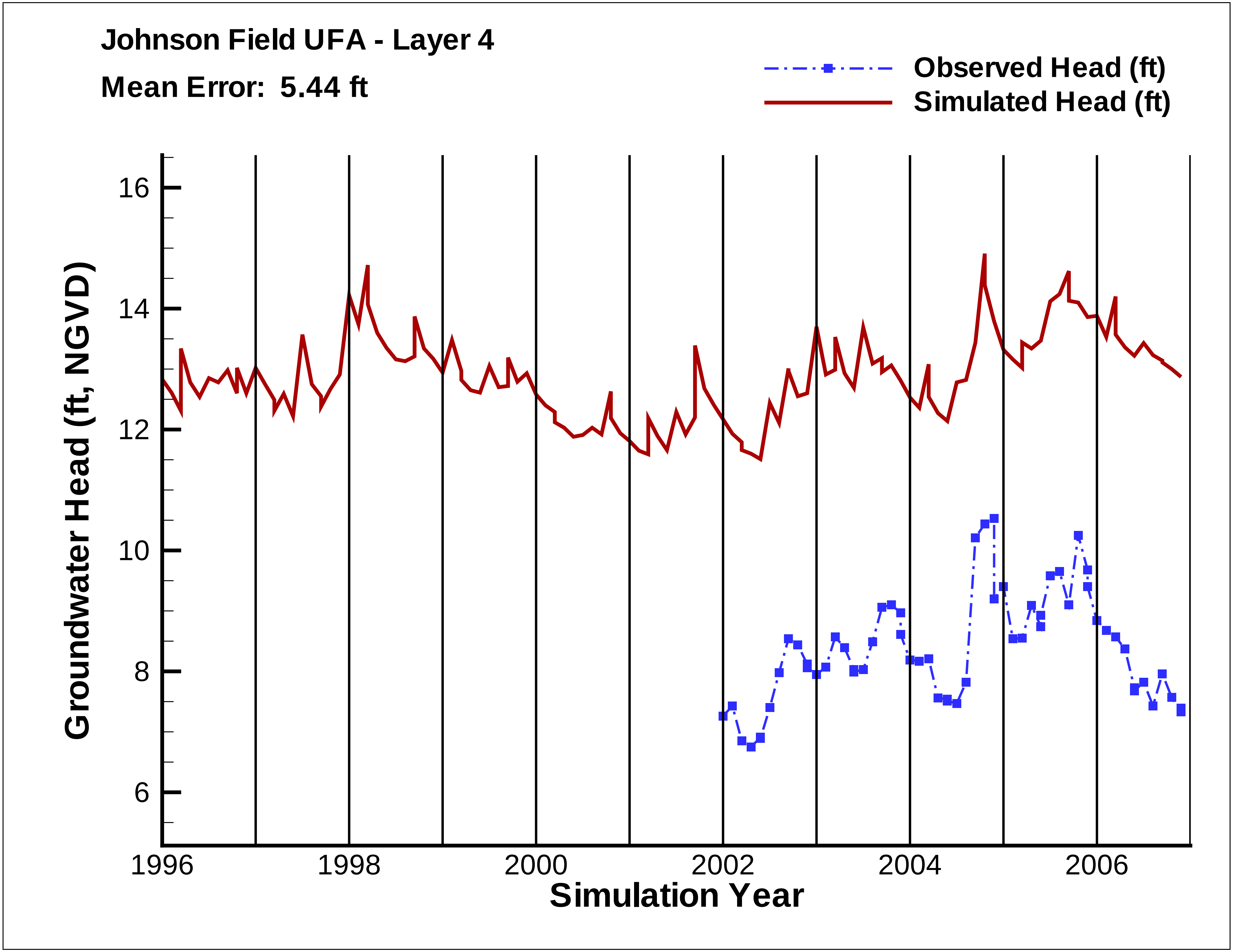


HOWARD STREET SURF - Layer 1
Mean Error: 2.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

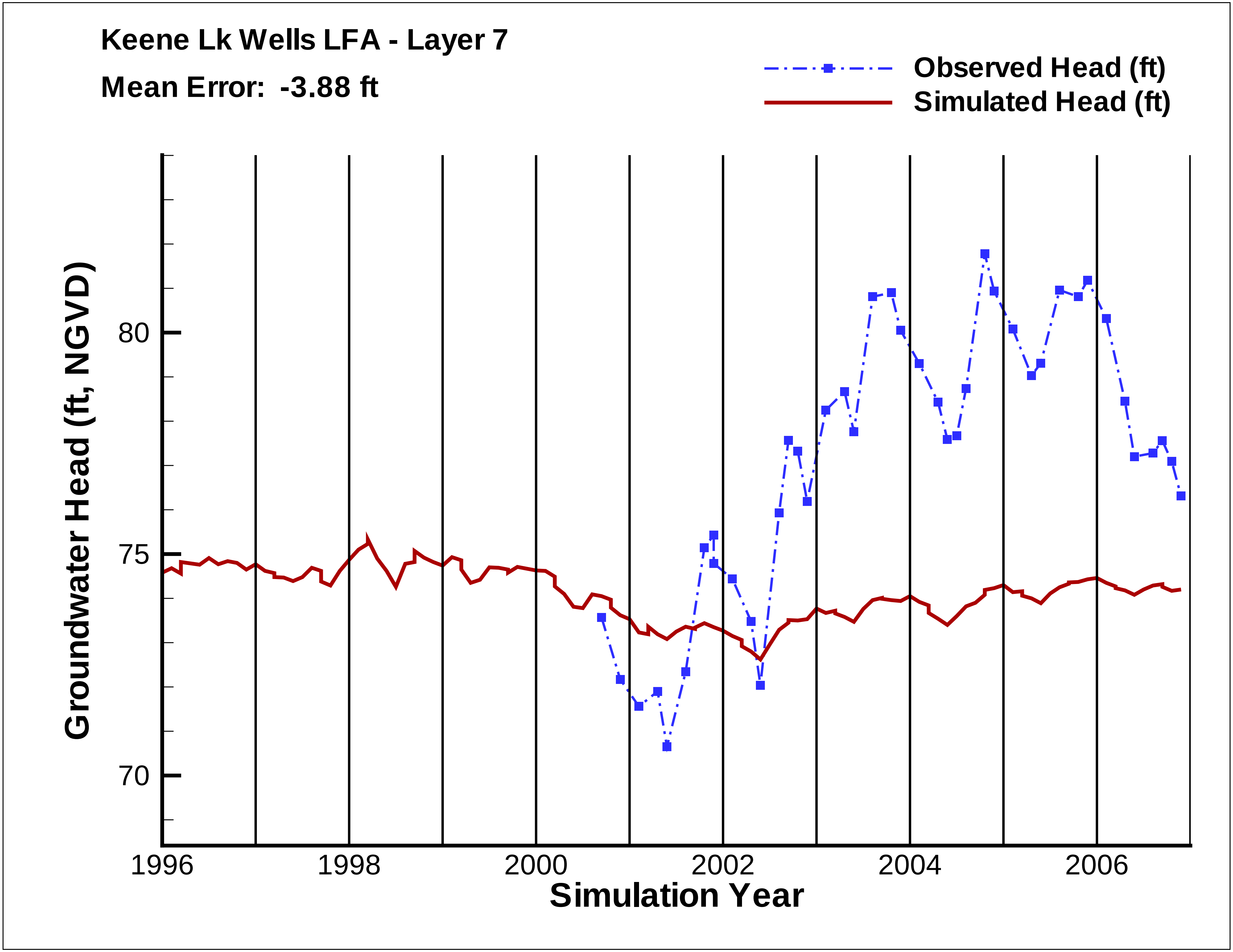

J B STARKEY 1 WETLAND SURF - Layer 1
Mean Error: 3.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

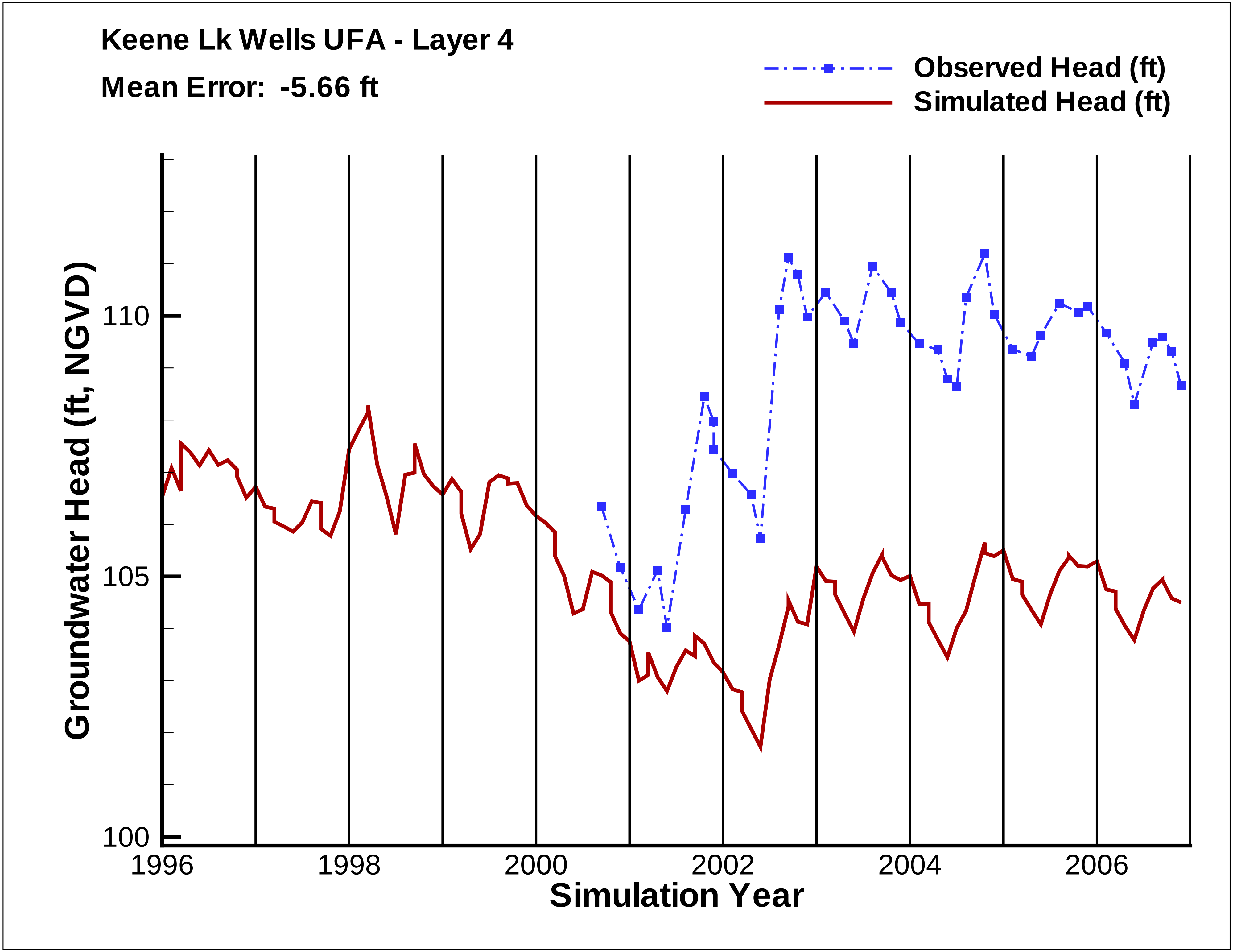


Johnson Field SA - Layer 1
Mean Error: 1.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
Simulation Year
2
4
6
8
1996
1998
2000
2002
2004
2006

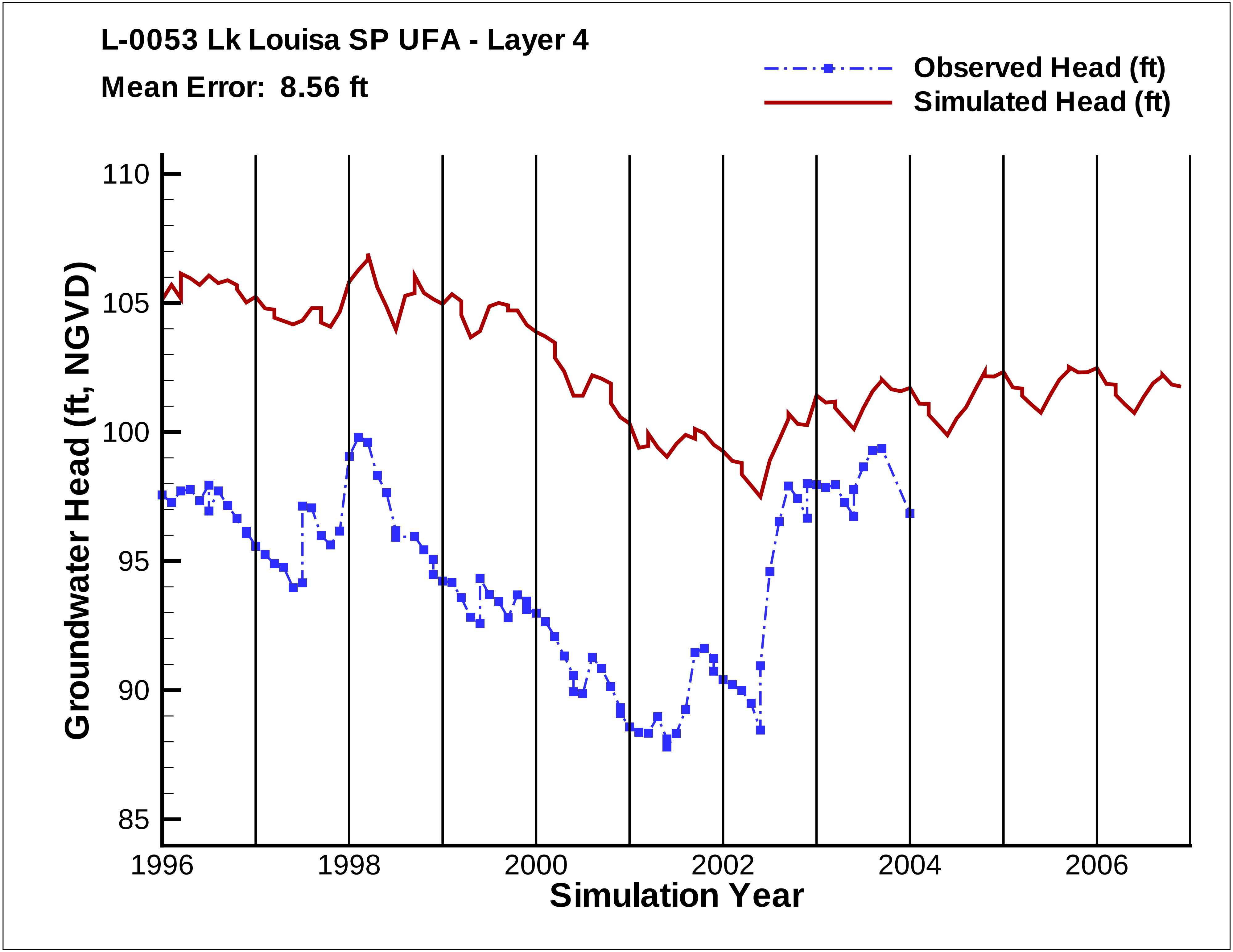


Johnson Field UFA - Layer 4
Mean Error: 5.44 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
6
8
10
12
14
16
1996
1998
2000
2002
2004
2006
Simulation Year

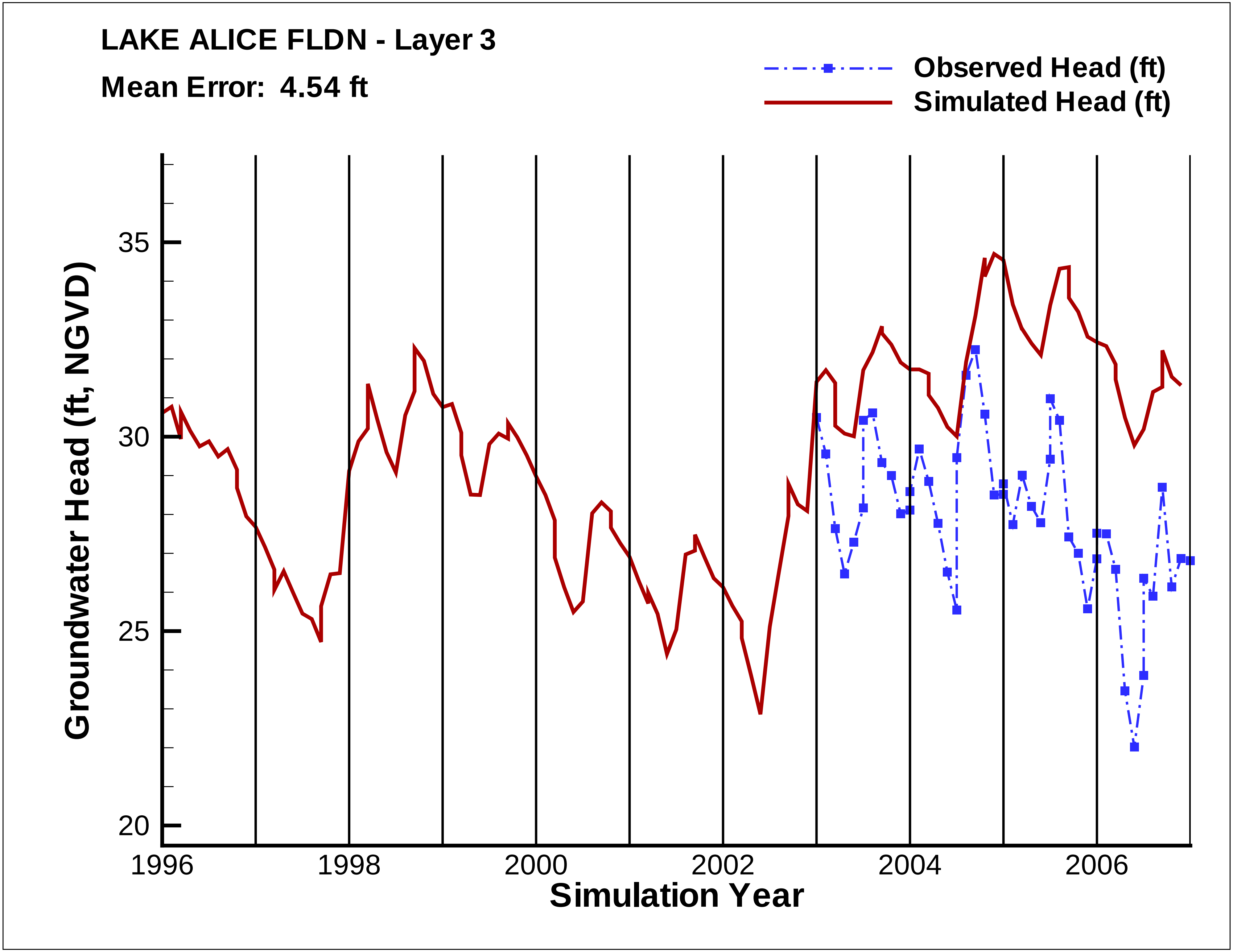

Keene Lk Wells LFA - Layer 7
Mean Error: -3.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year



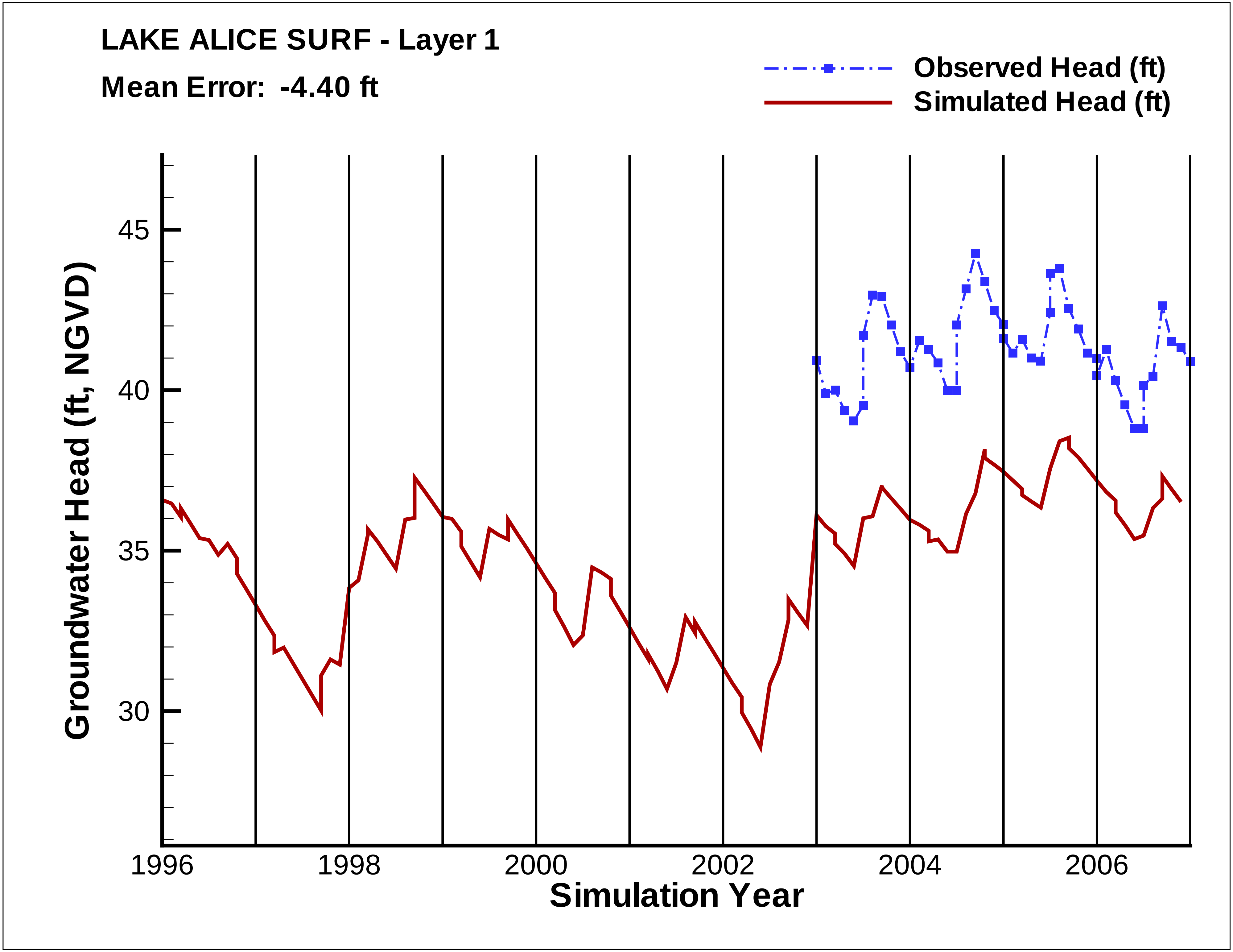
Keene Lk Wells UFA - Layer 4
Mean Error: -5.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
1996
1998
2000
2002
2004
2006
Simulation Year

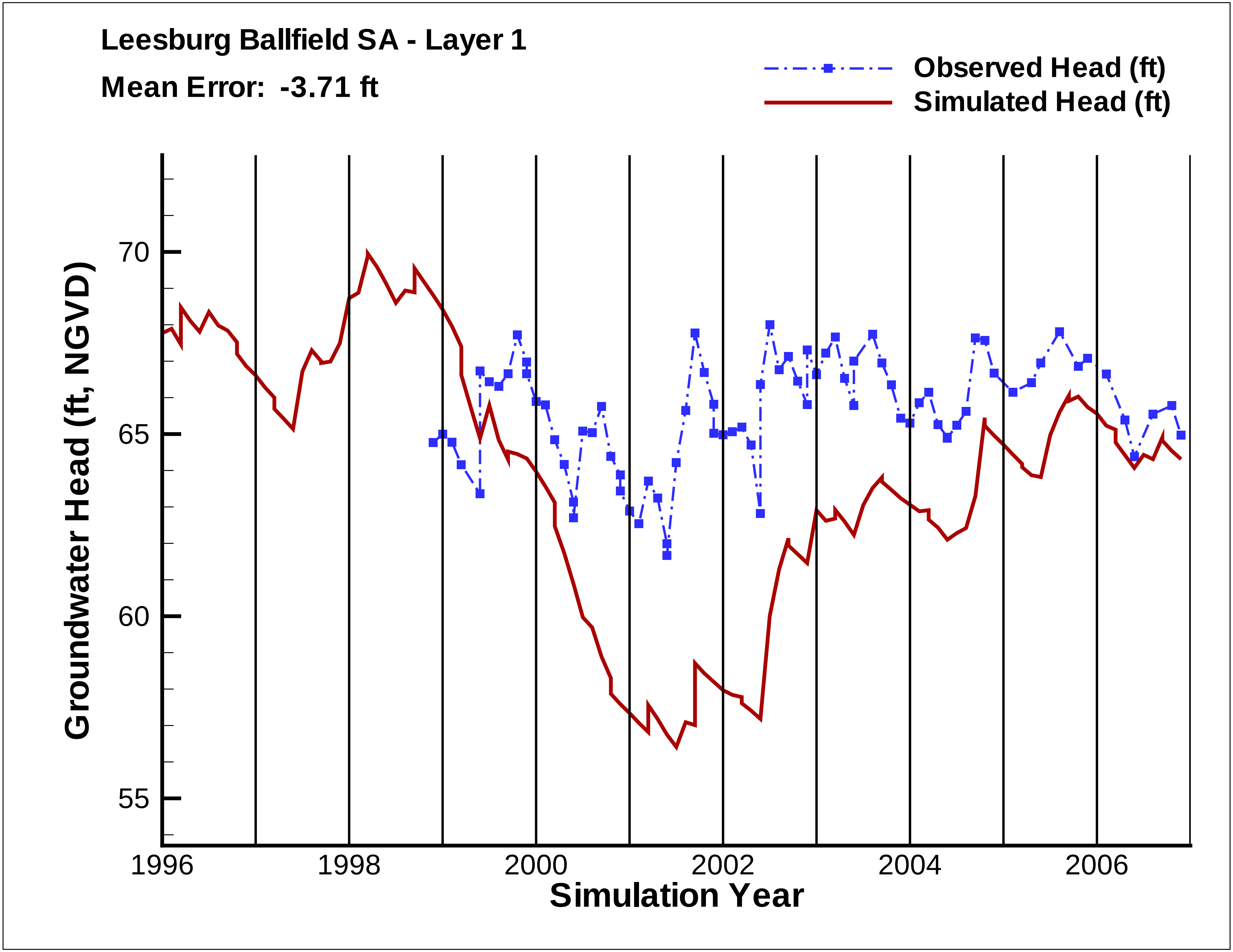


L-0053 Lk Louisa SP UFA - Layer 4
Mean Error: 8.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
95
90
85
1996
1998
2000
2002
2004
2006
Simulation Year

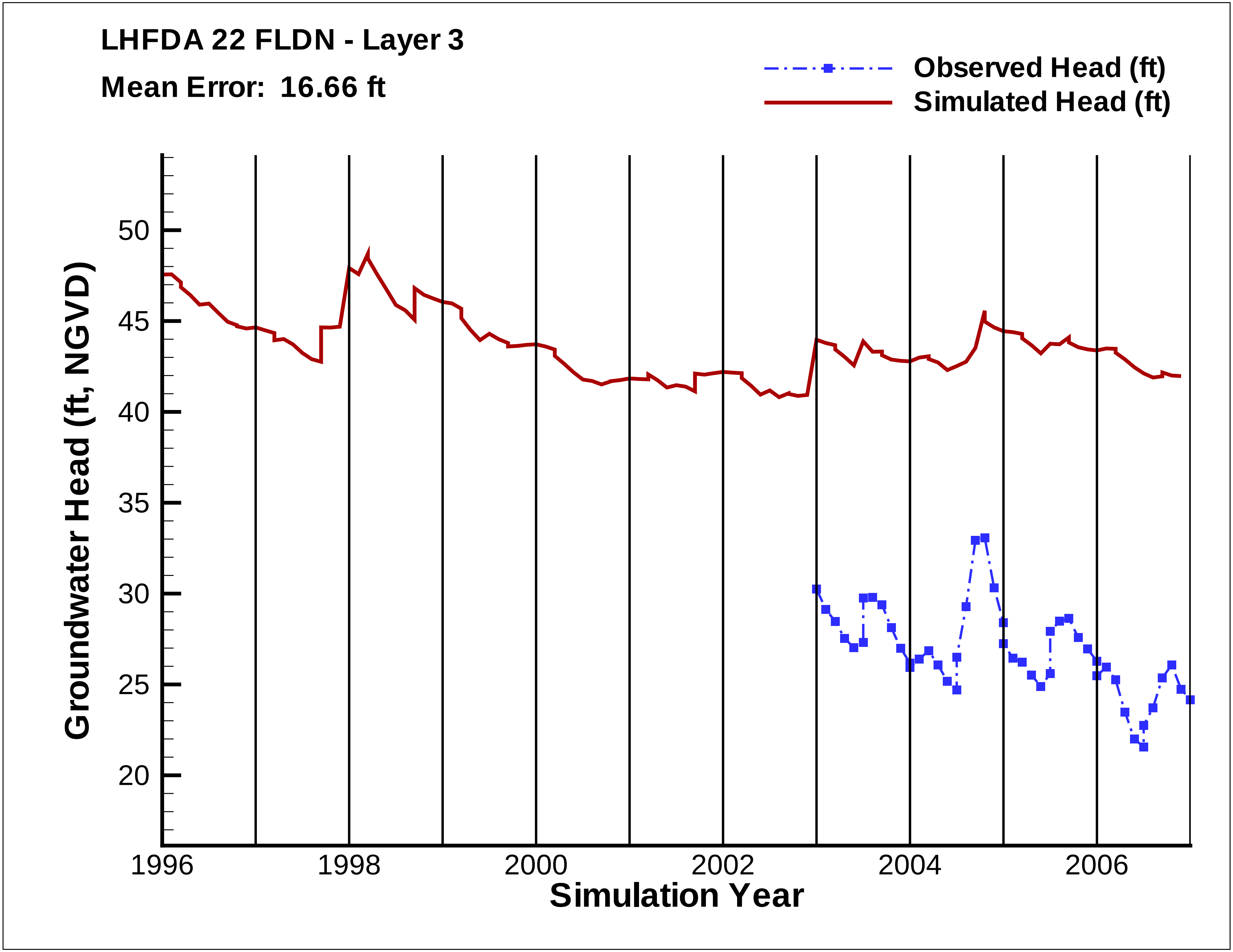


LAKE ALICE FLDN - Layer 3
Mean Error: 4.54 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

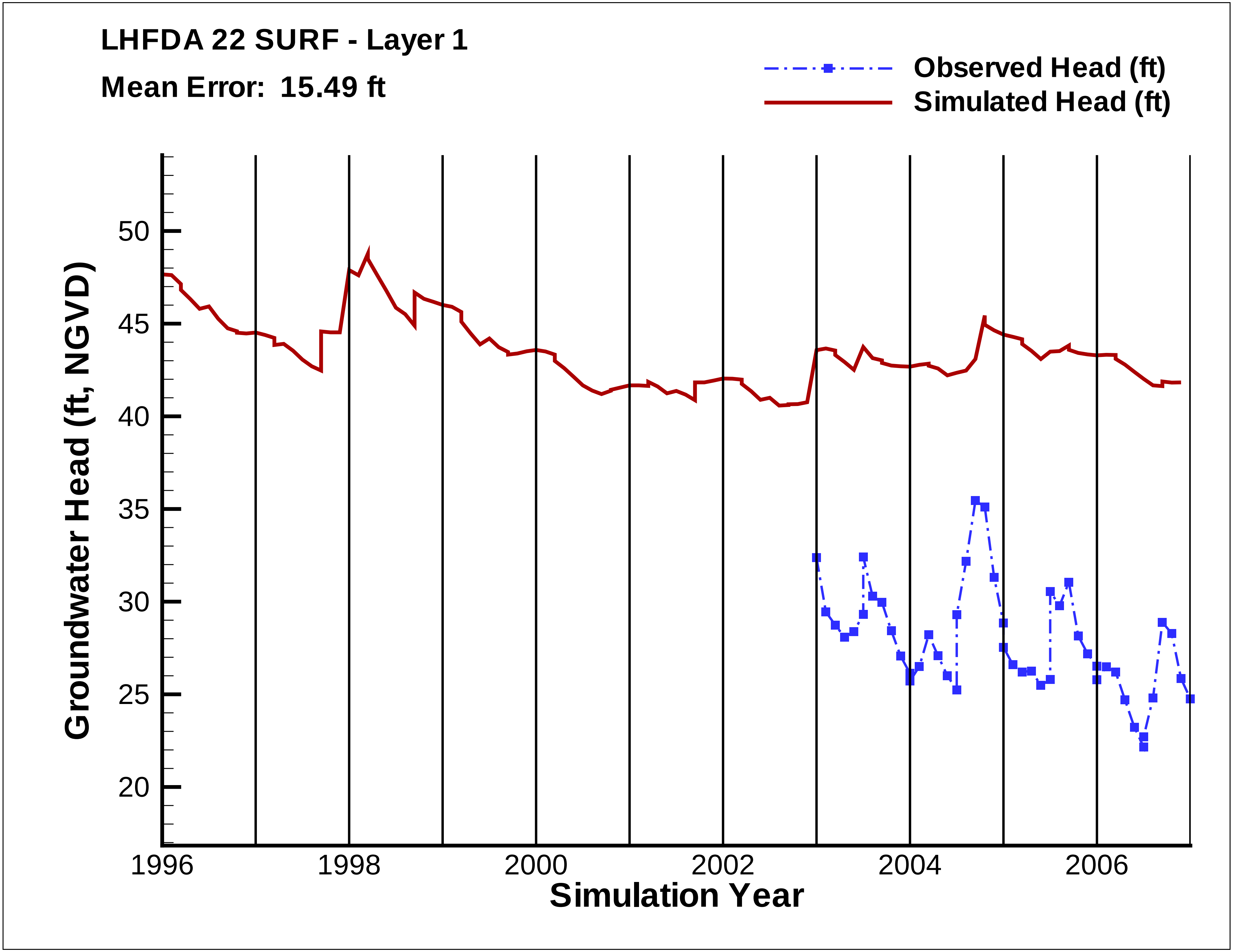

LAKE ALICE SURF - Layer 1
Mean Error: -4.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

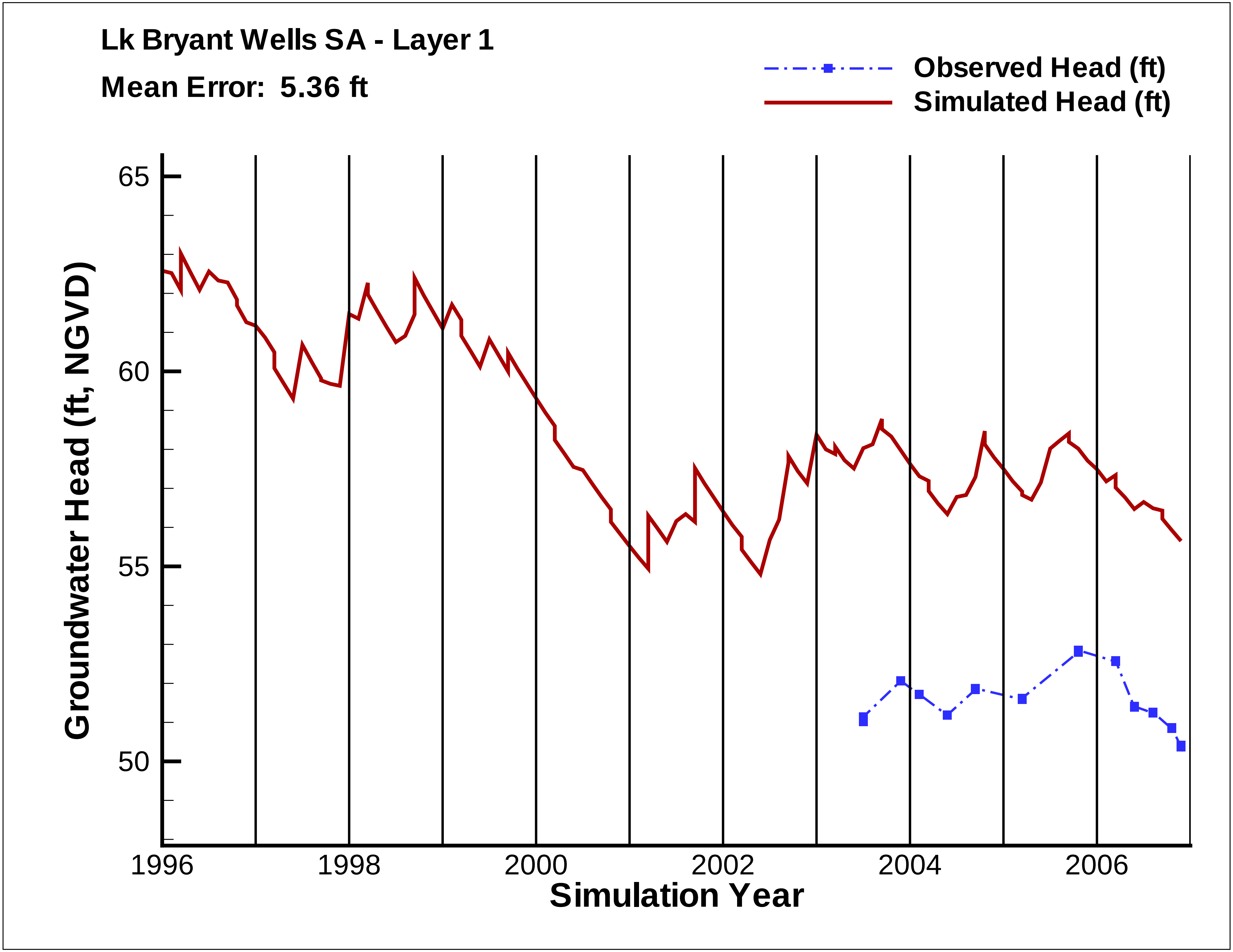


Leesburg Ballfield SA - Layer 1
Mean Error: -3.71 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

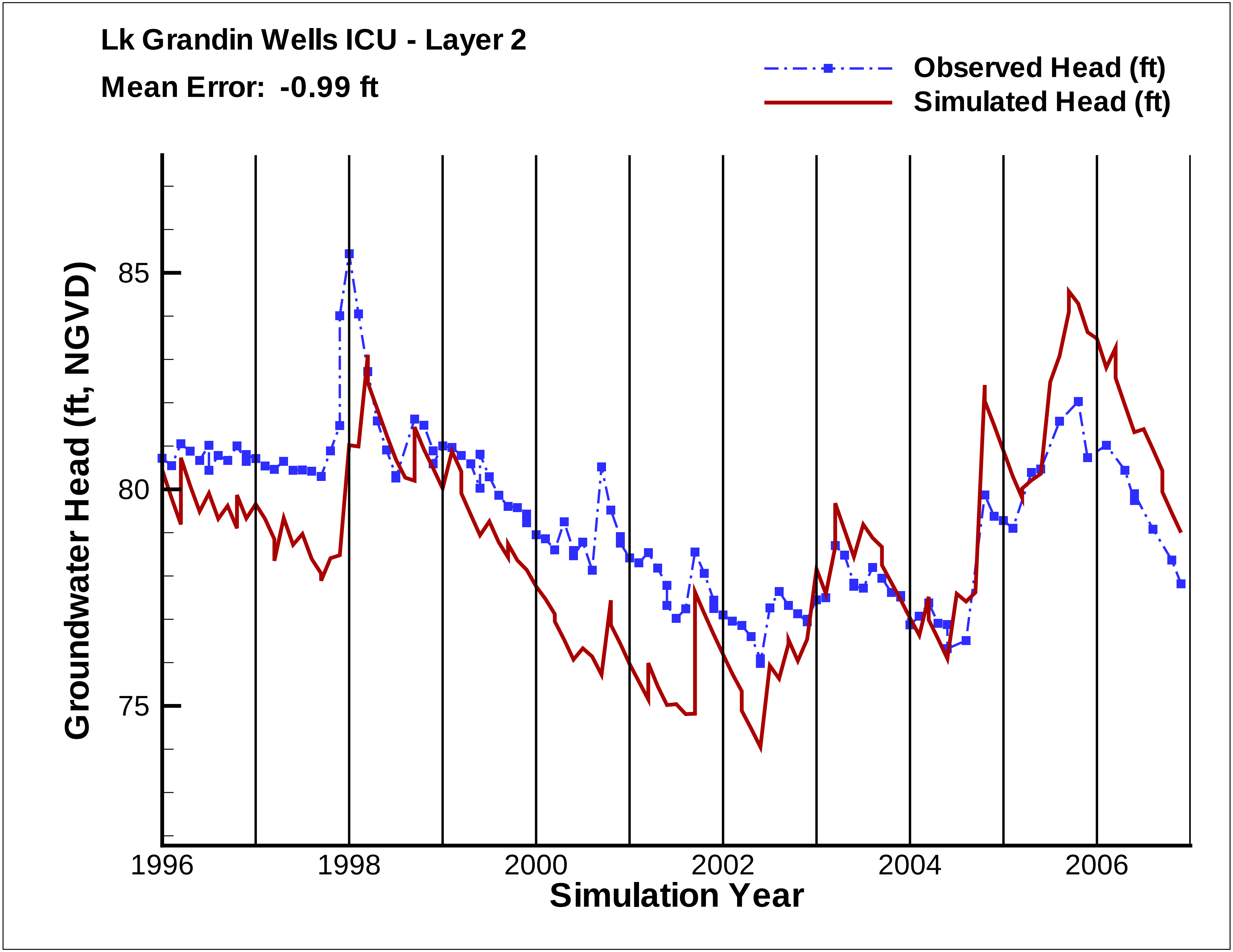


LHFDA 22 FLDN - Layer 3
Mean Error: 16.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

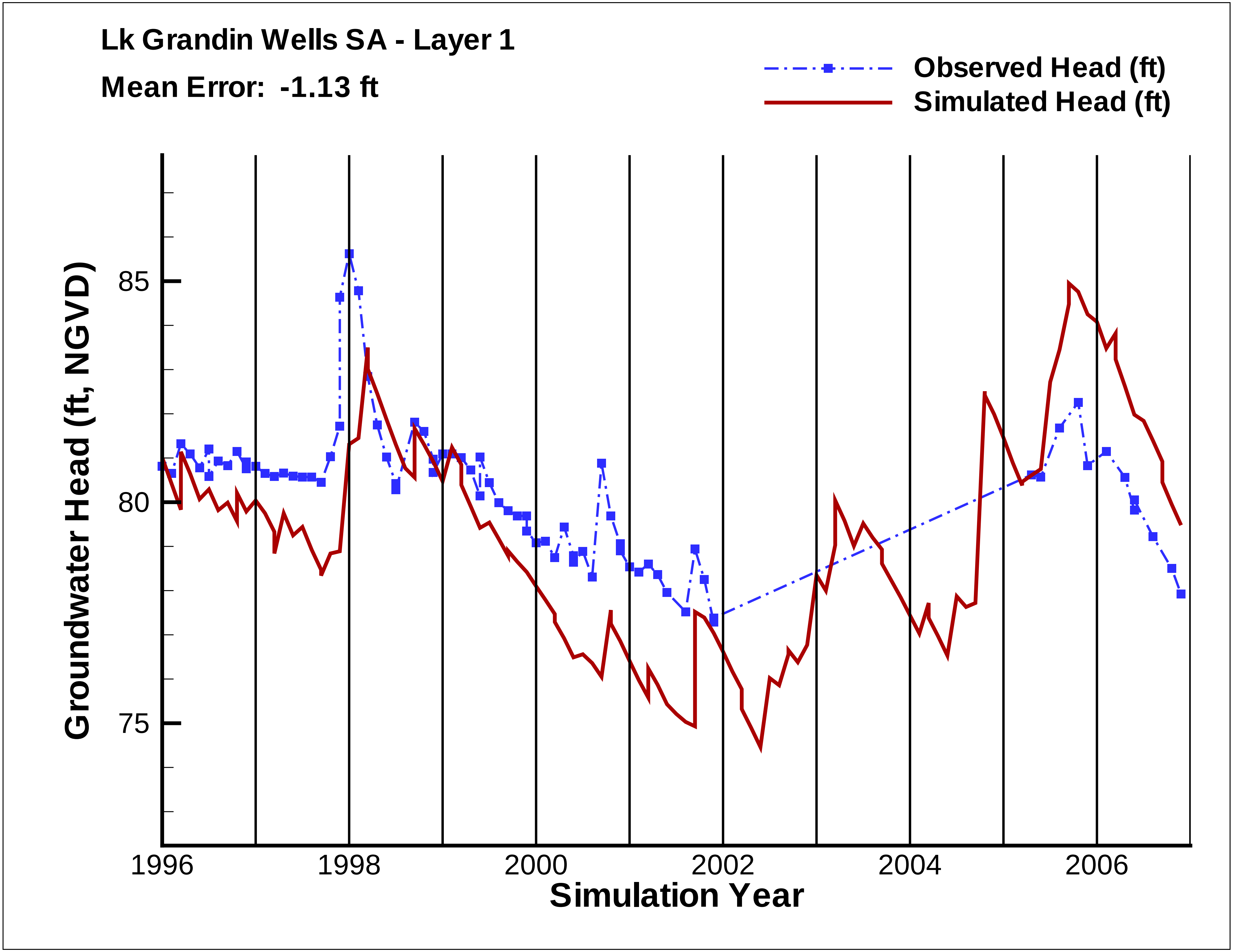

LHFDA 22 SURF - Layer 1
Mean Error: 15.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year



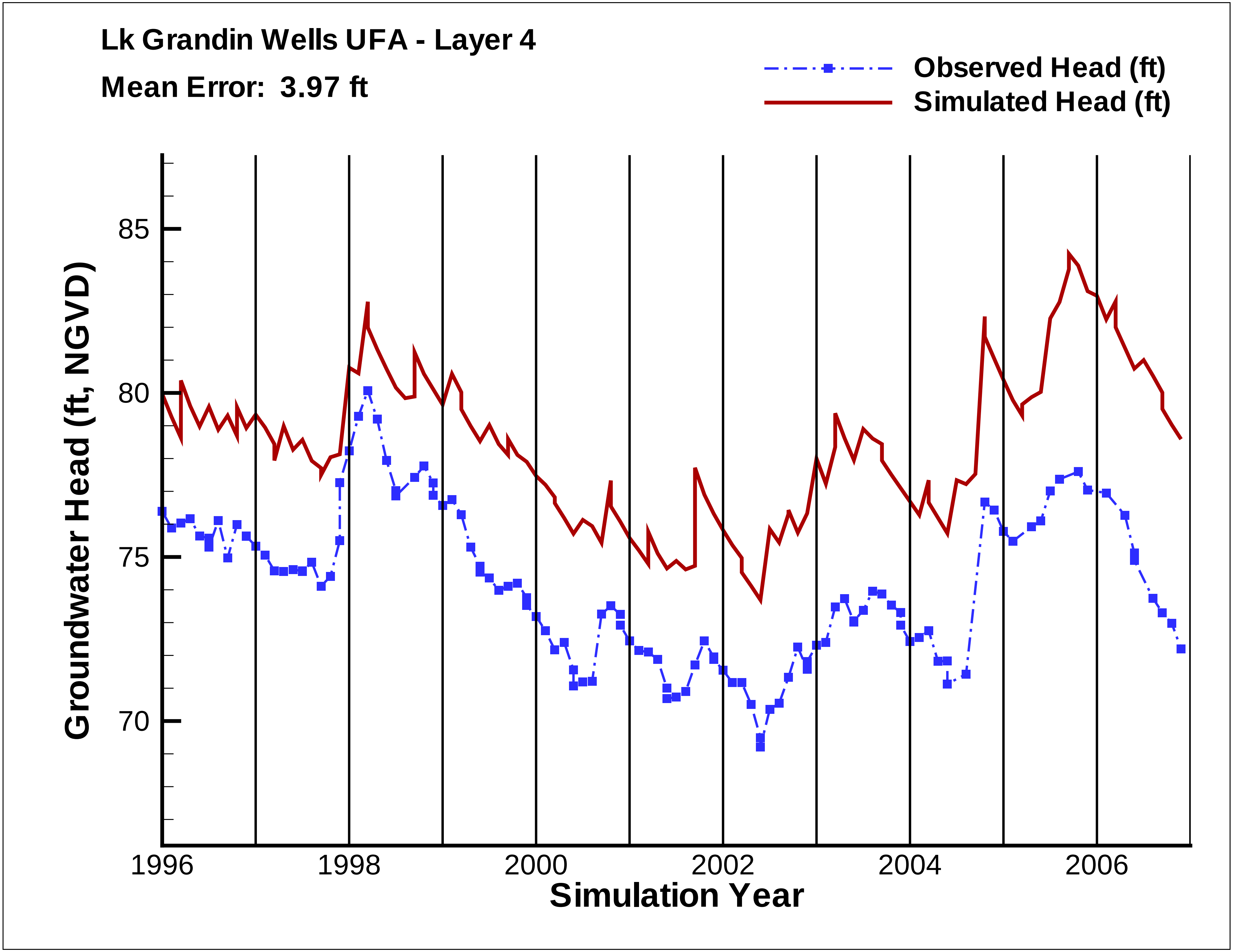
Lk Bryant Wells SA - Layer 1
Mean Error: 5.36 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



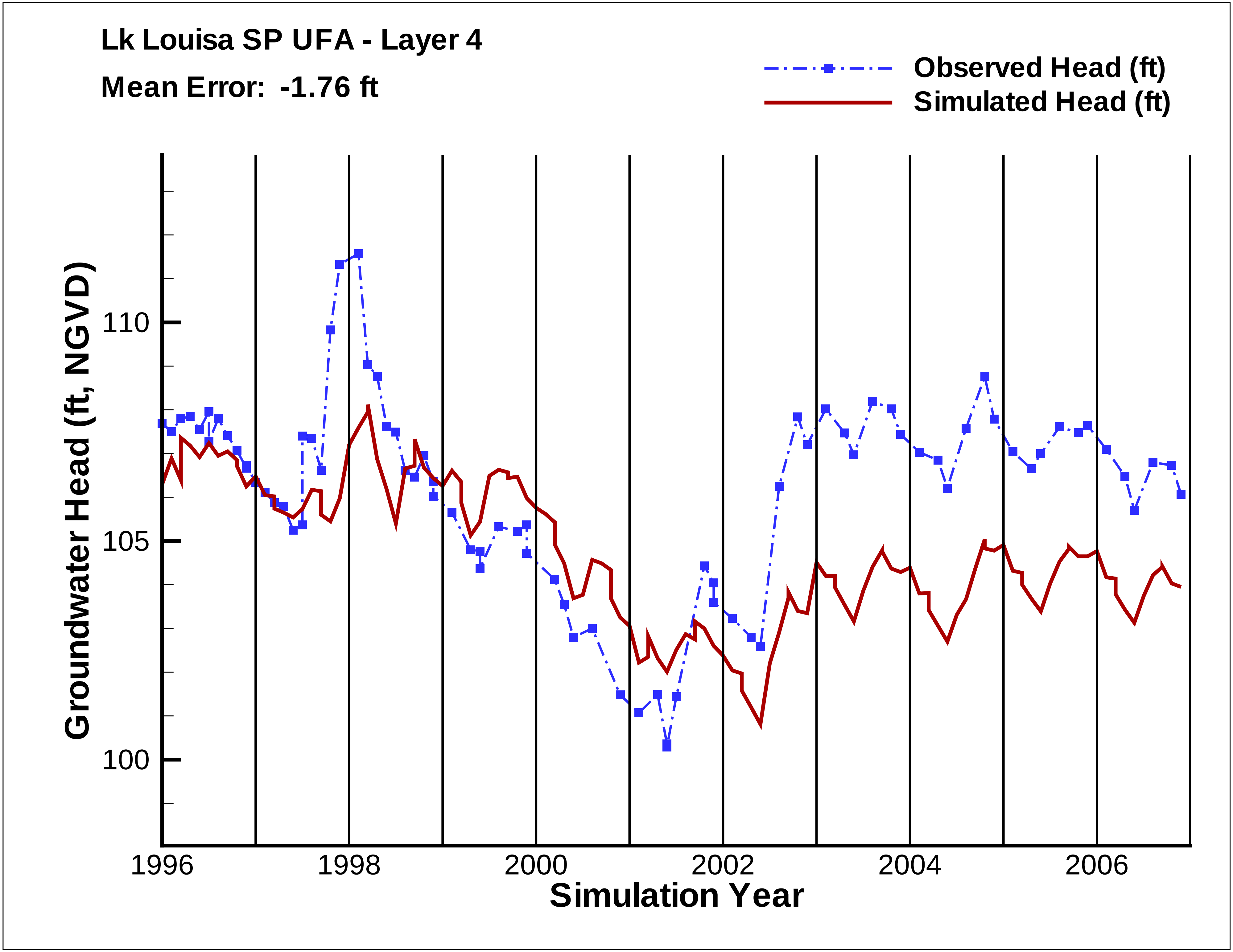
Lk Grandin Wells ICU - Layer 2
Mean Error: -0.99 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year



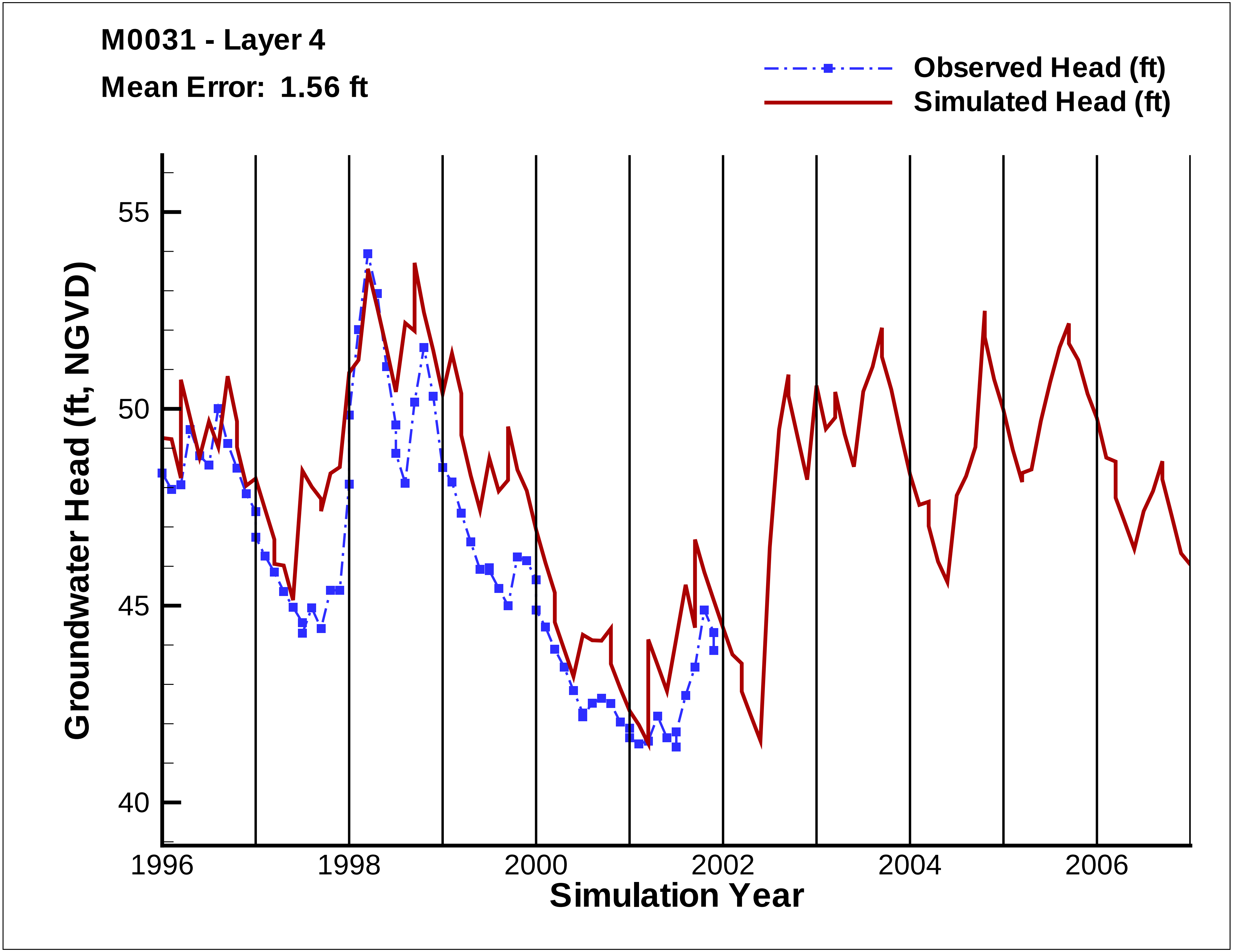
Lk Grandin Wells SA - Layer 1
Mean Error: -1.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year



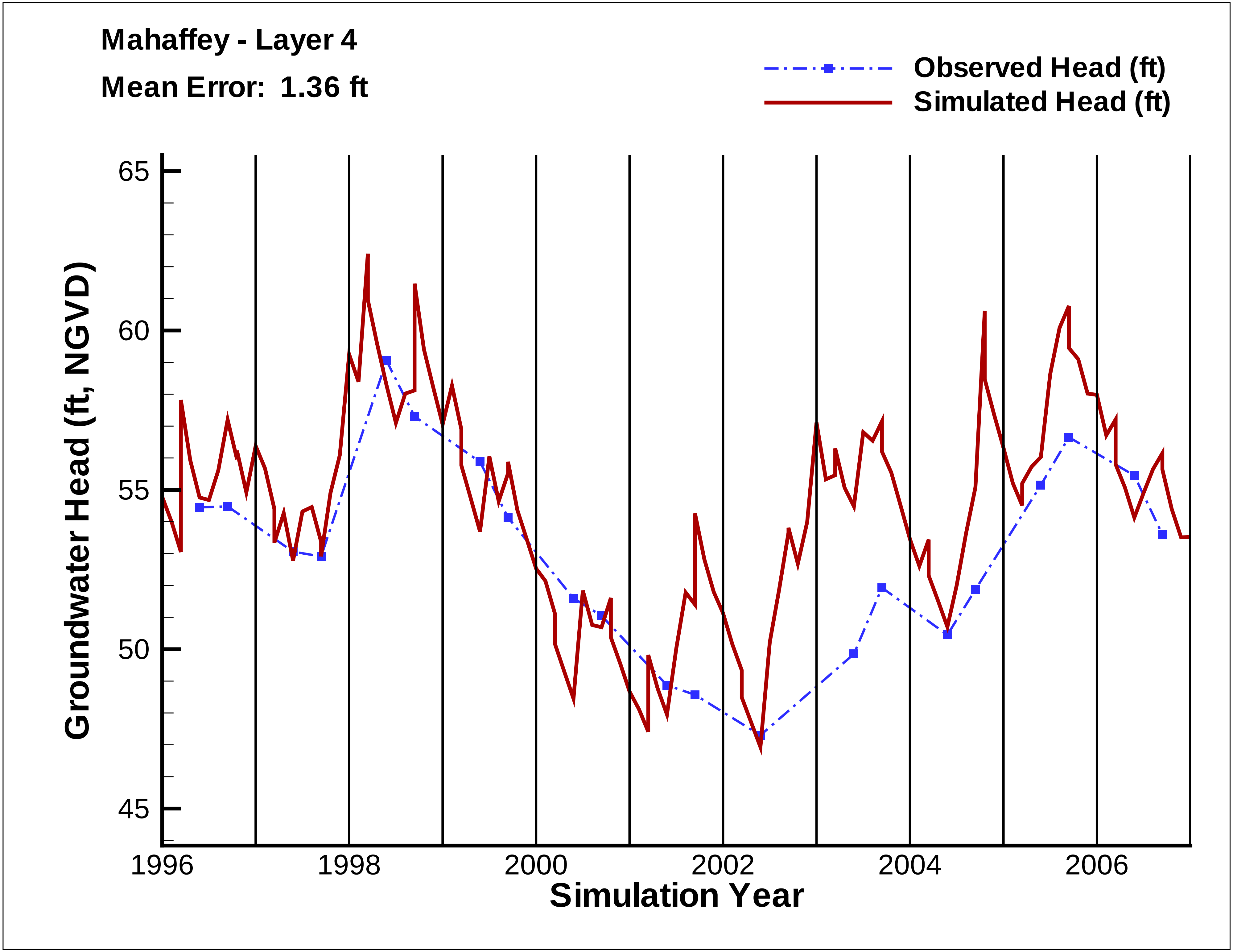
Lk Grandin Wells UFA - Layer 4
Mean Error: 3.97 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year



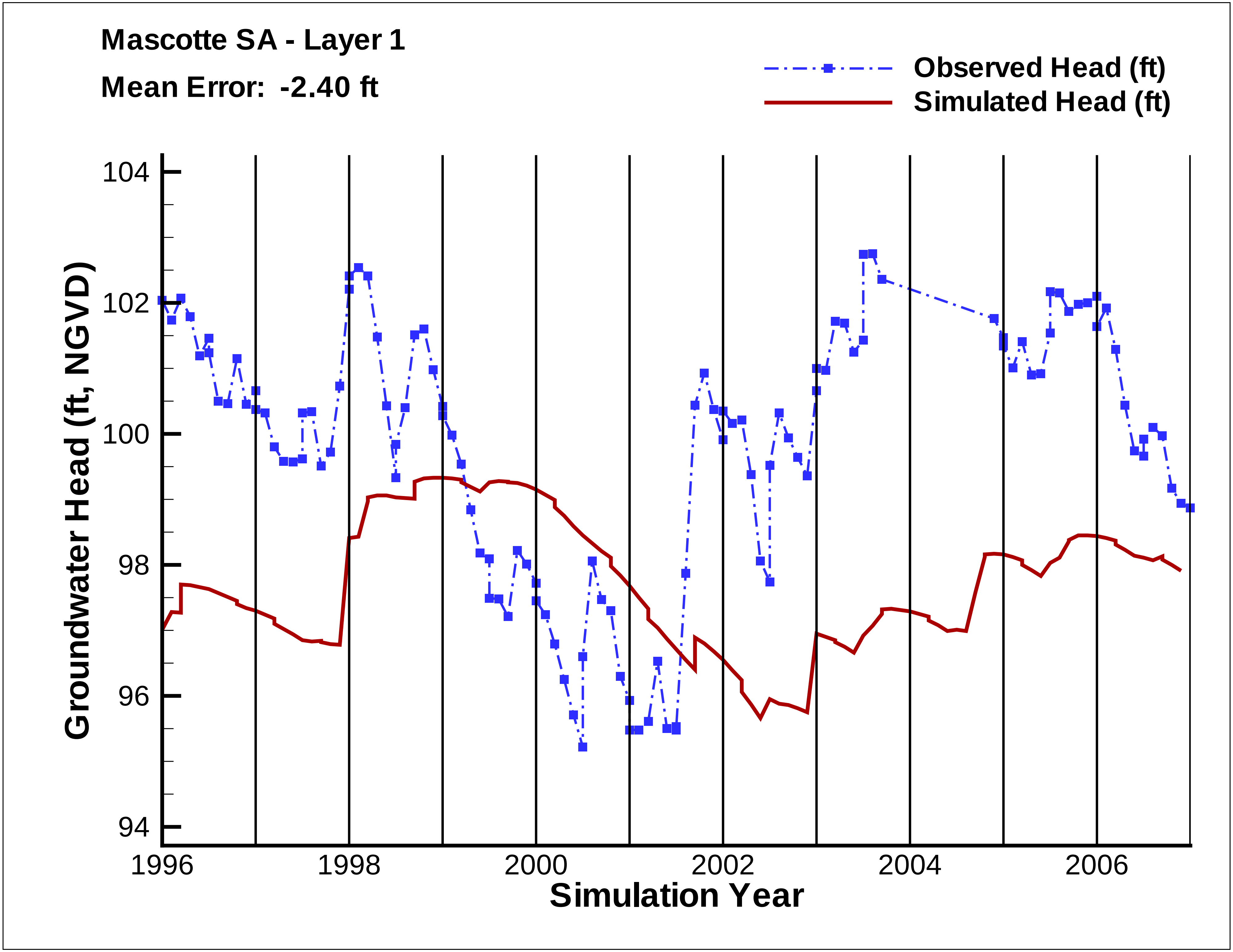
Lk Louisa SP UFA - Layer 4
Mean Error: -1.76 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
1996
1998
2000
2002
2004
2006
Simulation Year



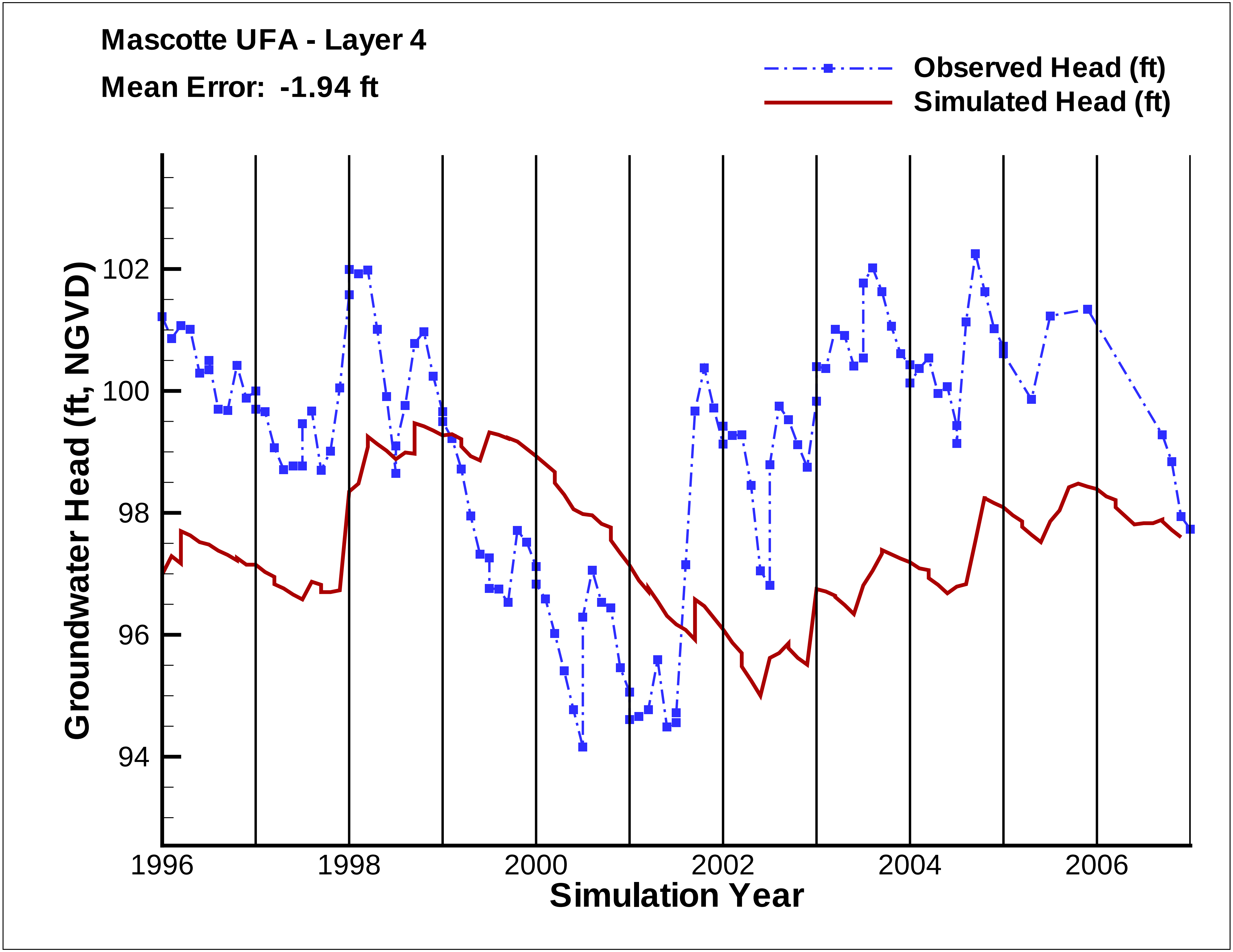
M0031 - Layer 4
Mean Error: 1.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



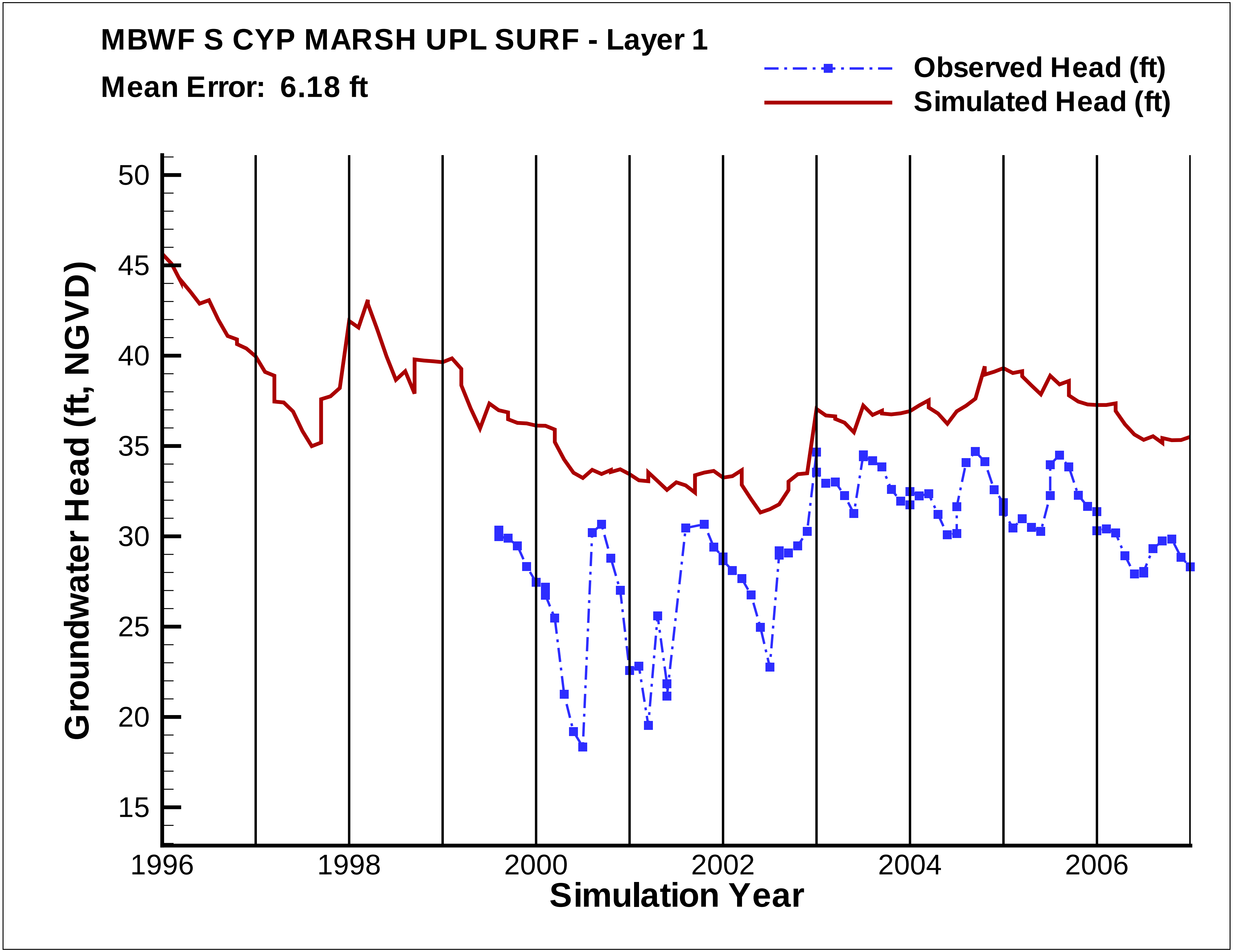
Mahaffey - Layer 4
Mean Error: 1.36 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

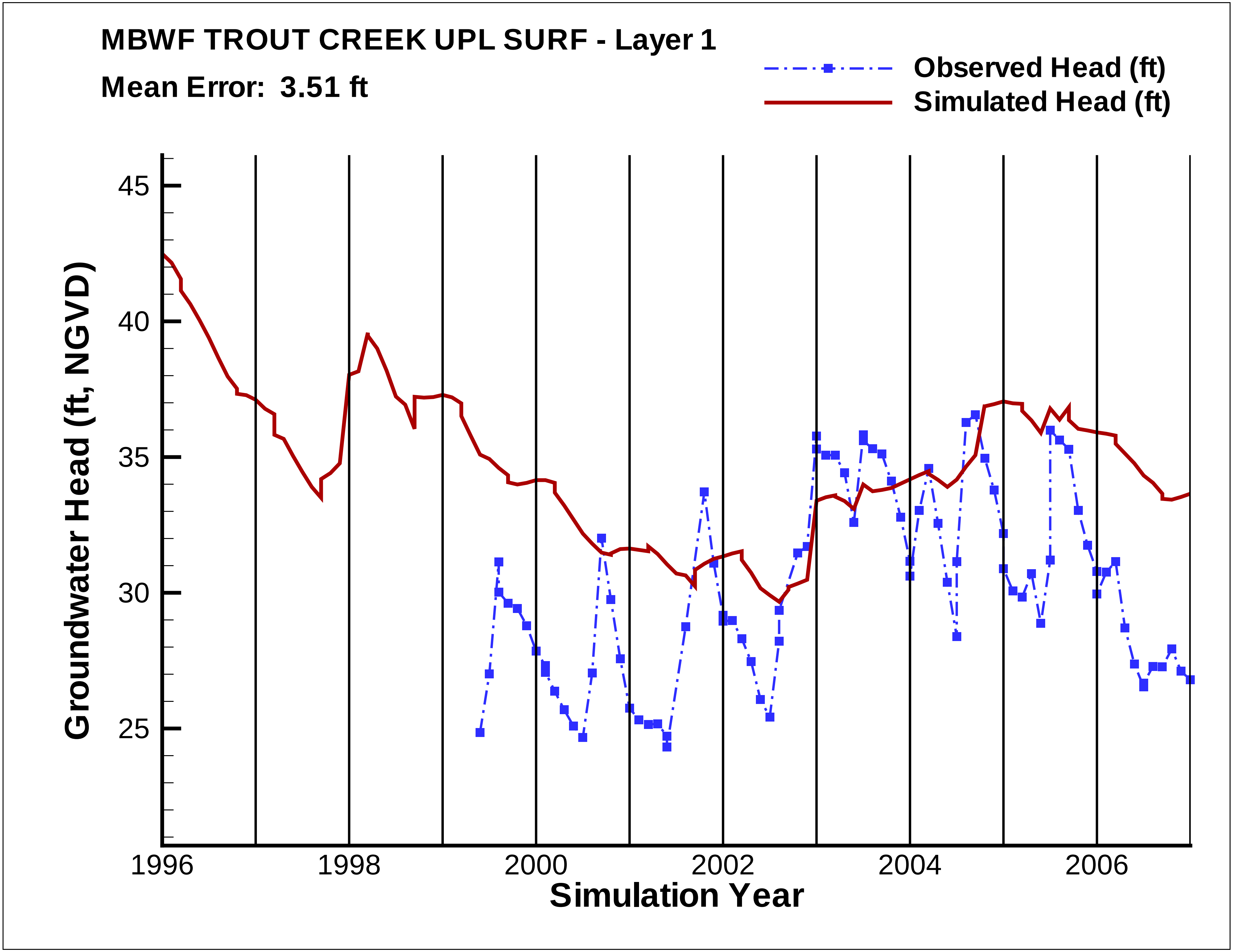


Mascotte SA - Layer 1
Mean Error: -2.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
104
102
100
98
96
94
1996
1998
2000
2002
2004
2006
Simulation Year

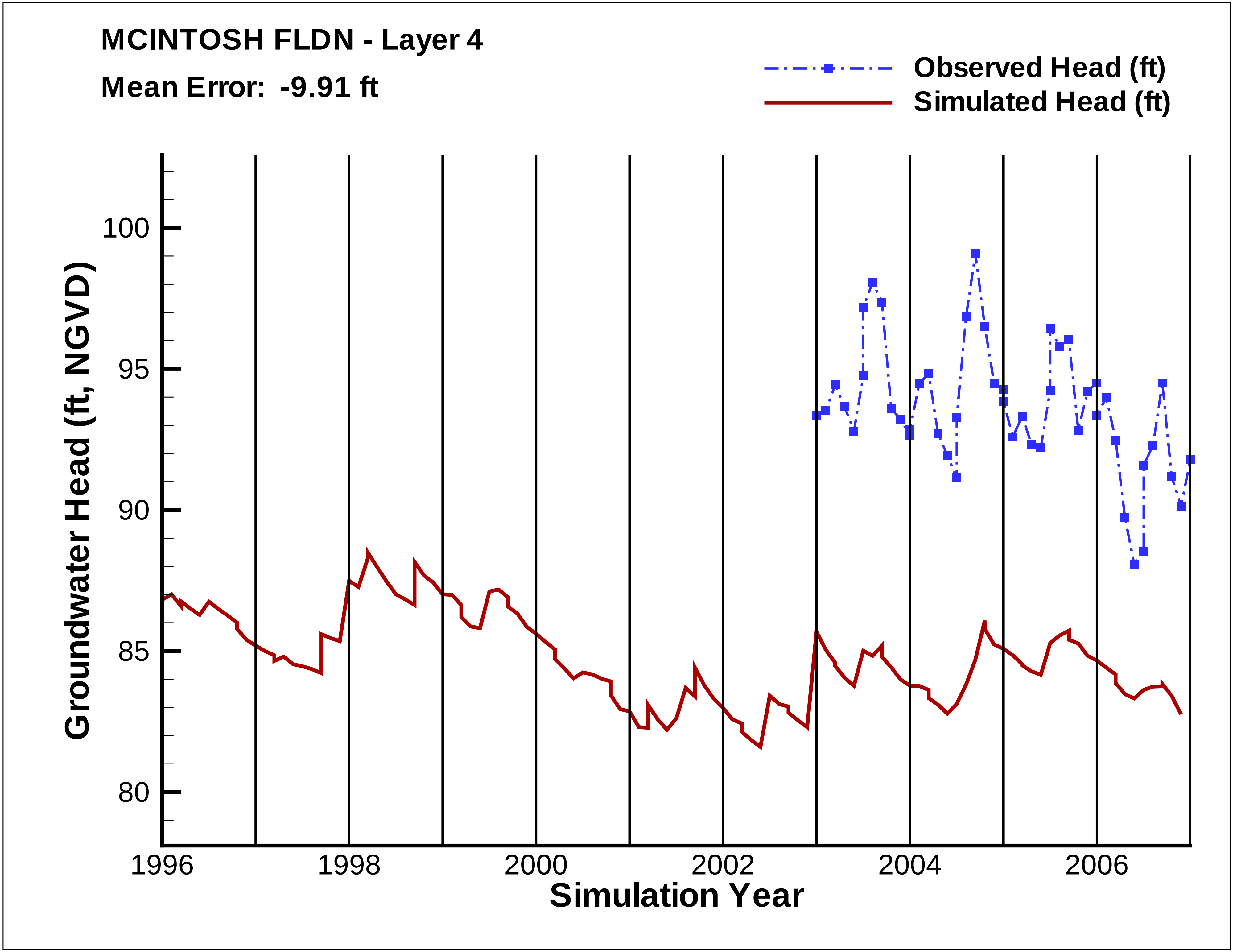


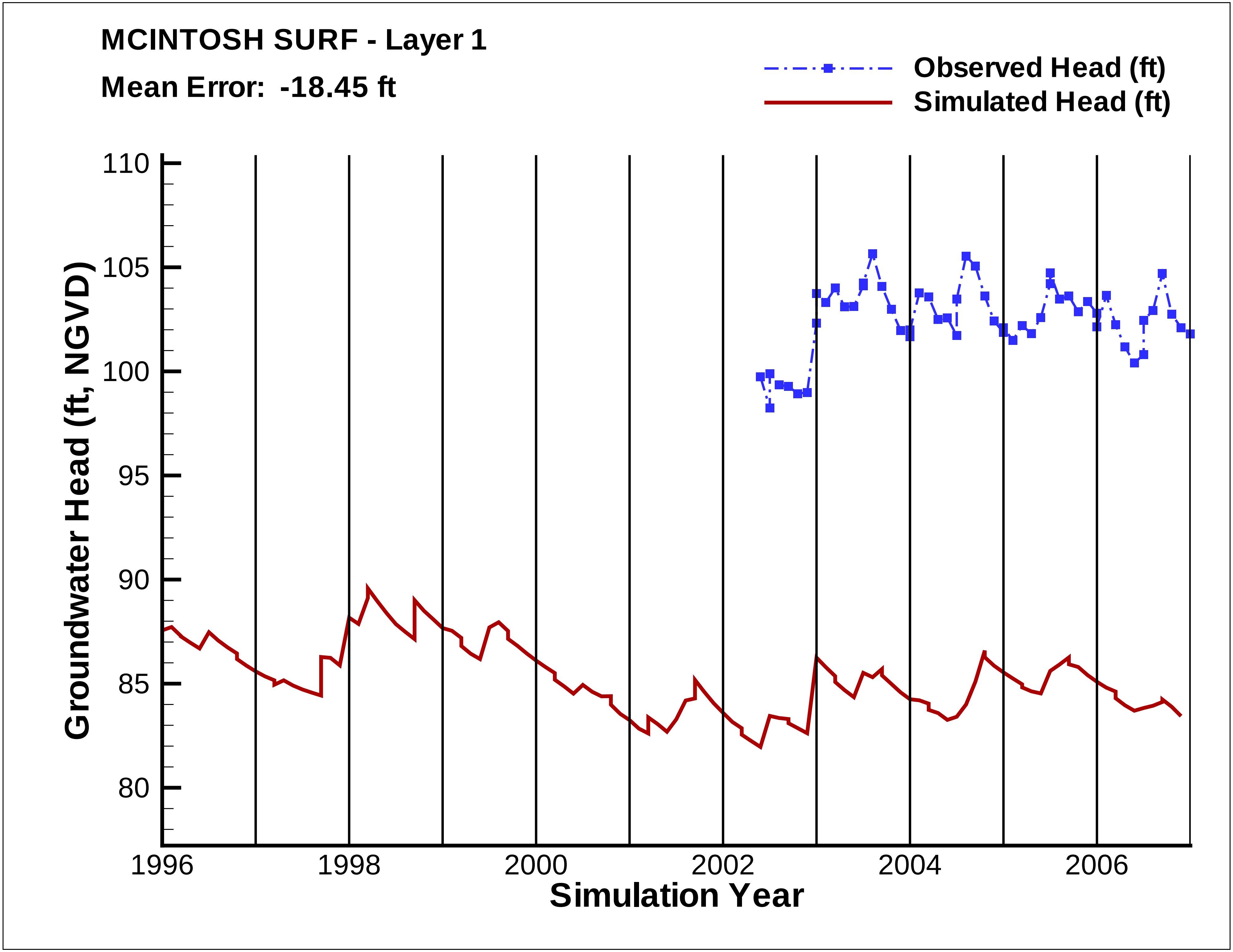
Mascotte UFA - Layer 4
Mean Error: -1.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
102
100
98
96
94
1996
1998
2000
2002
2004
2006
Simulation Year

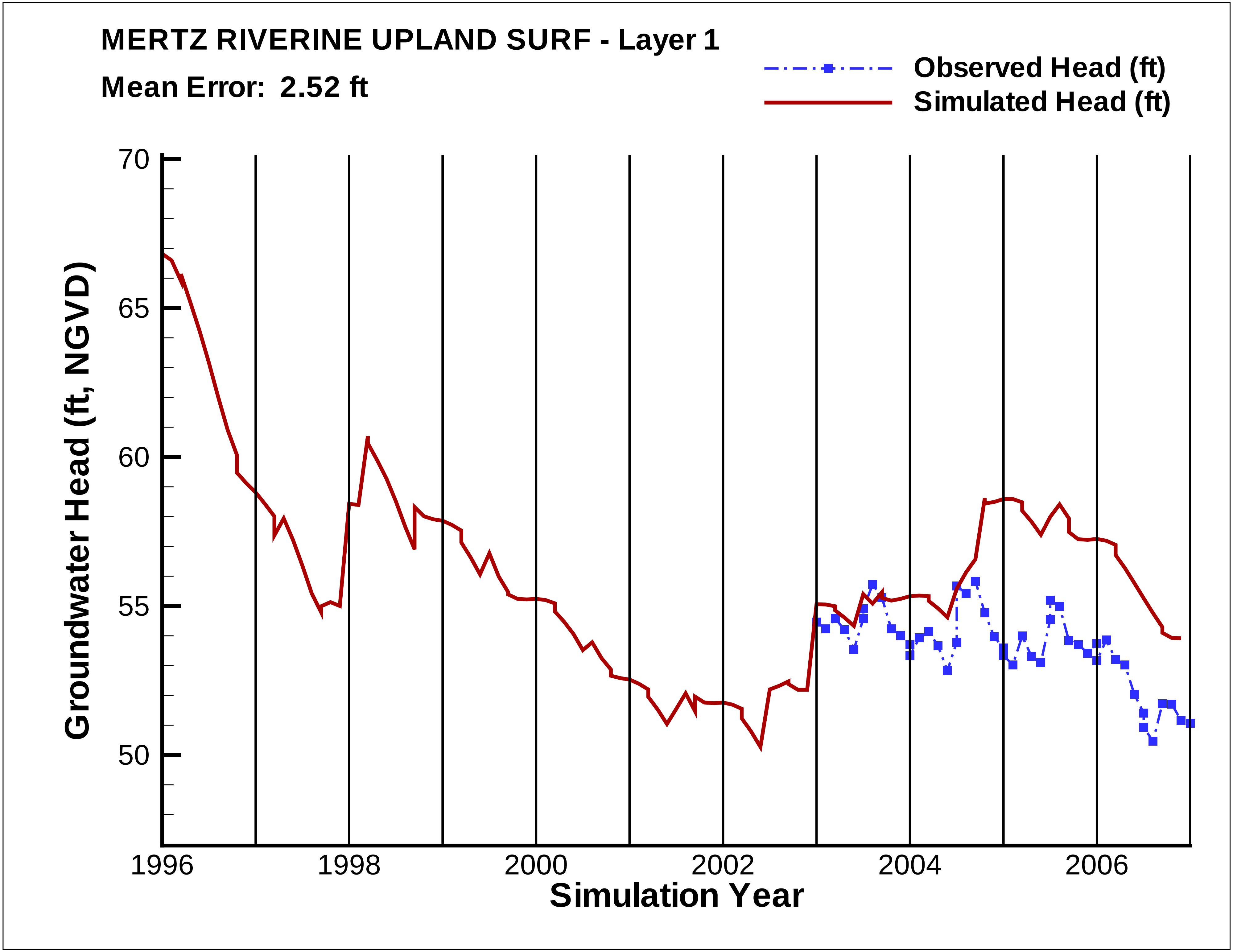

MBWF S CYP MARSH UPL SURF - Layer 1
Mean Error: 6.18 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year



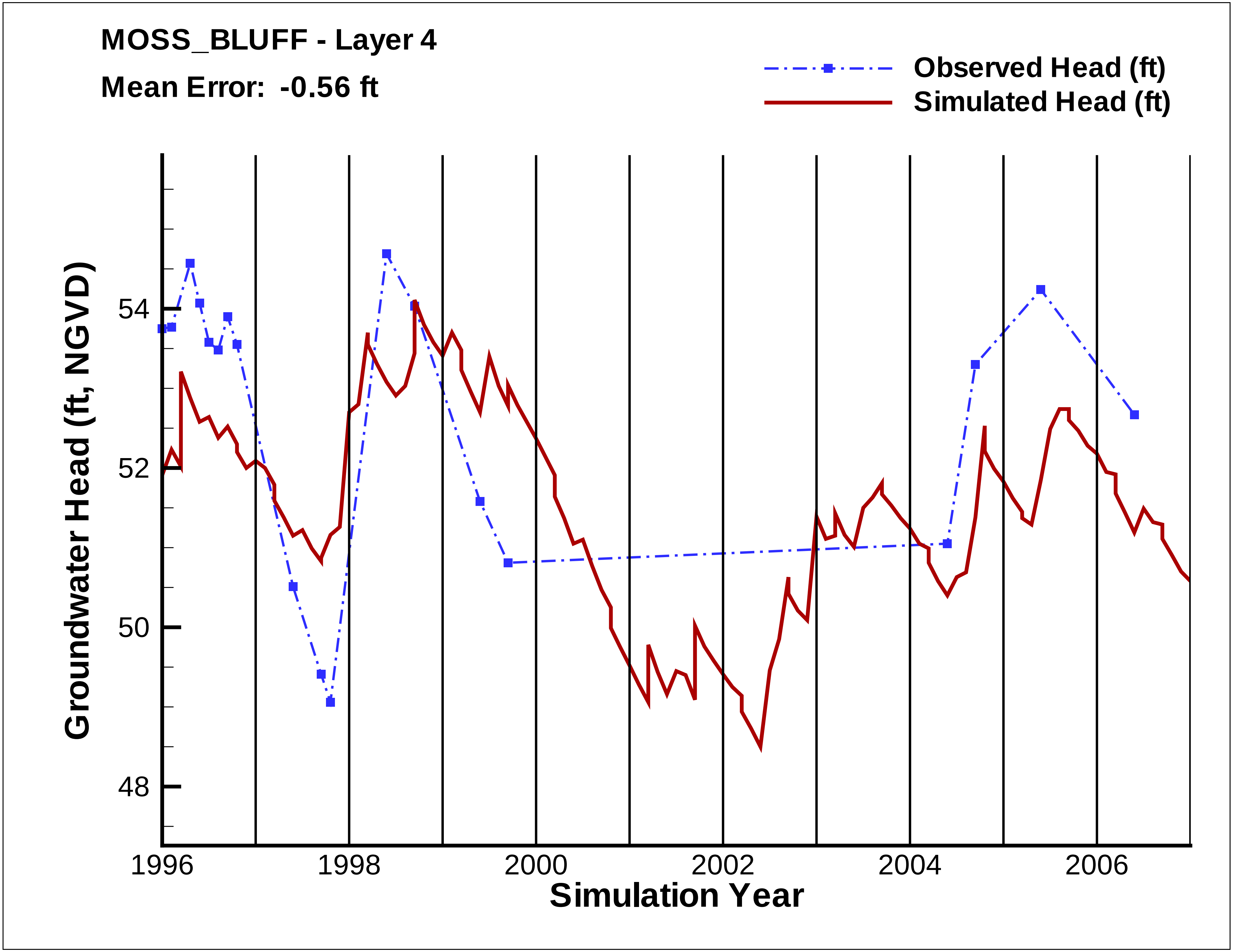
MBWF TROUT CREEK UPL SURF - Layer 1
Mean Error: 3.51 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year


MCINTOSH FLDN - Layer 4
Mean Error: -9.91 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

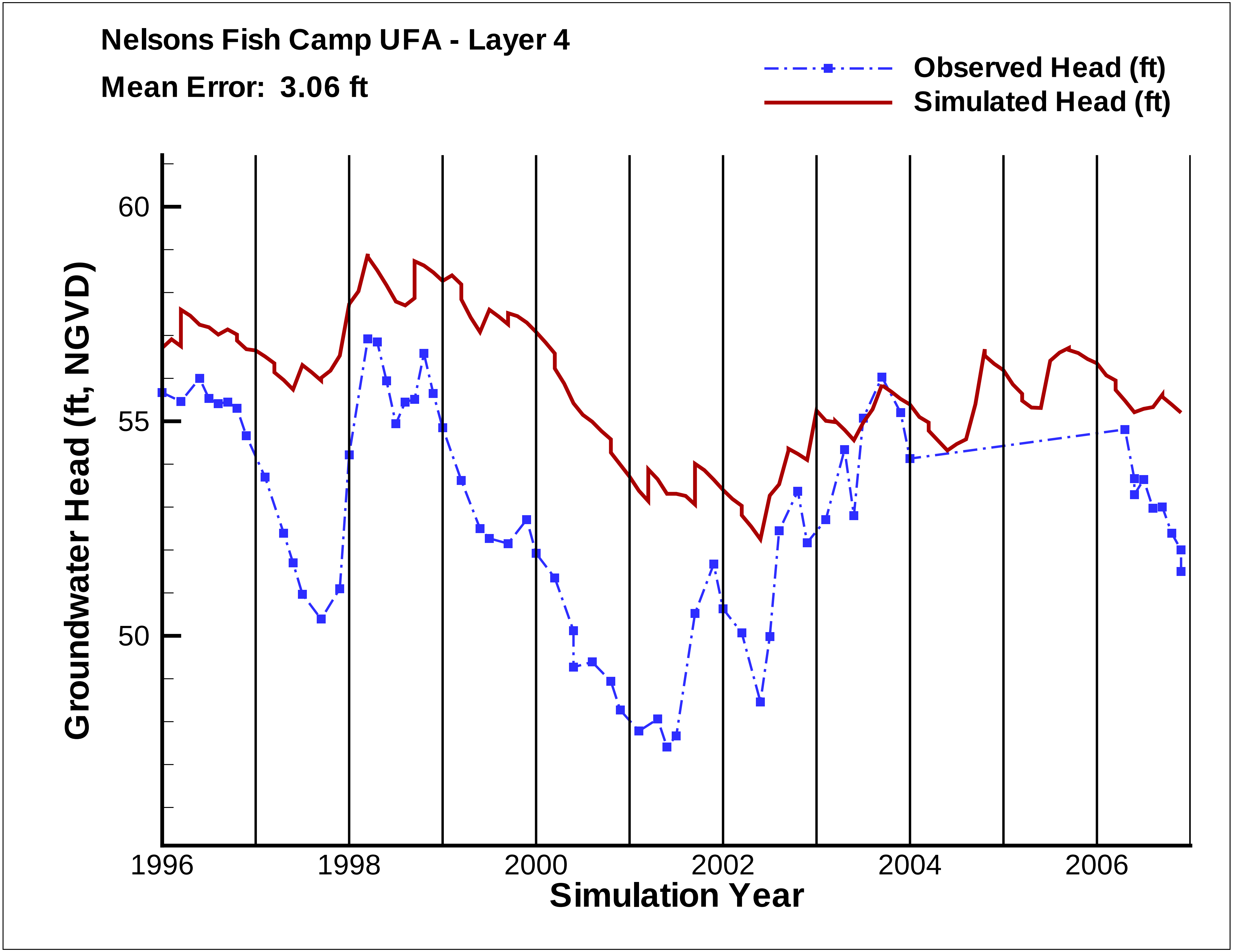

MCINTOSH SURF - Layer 1
Mean Error: -18.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year



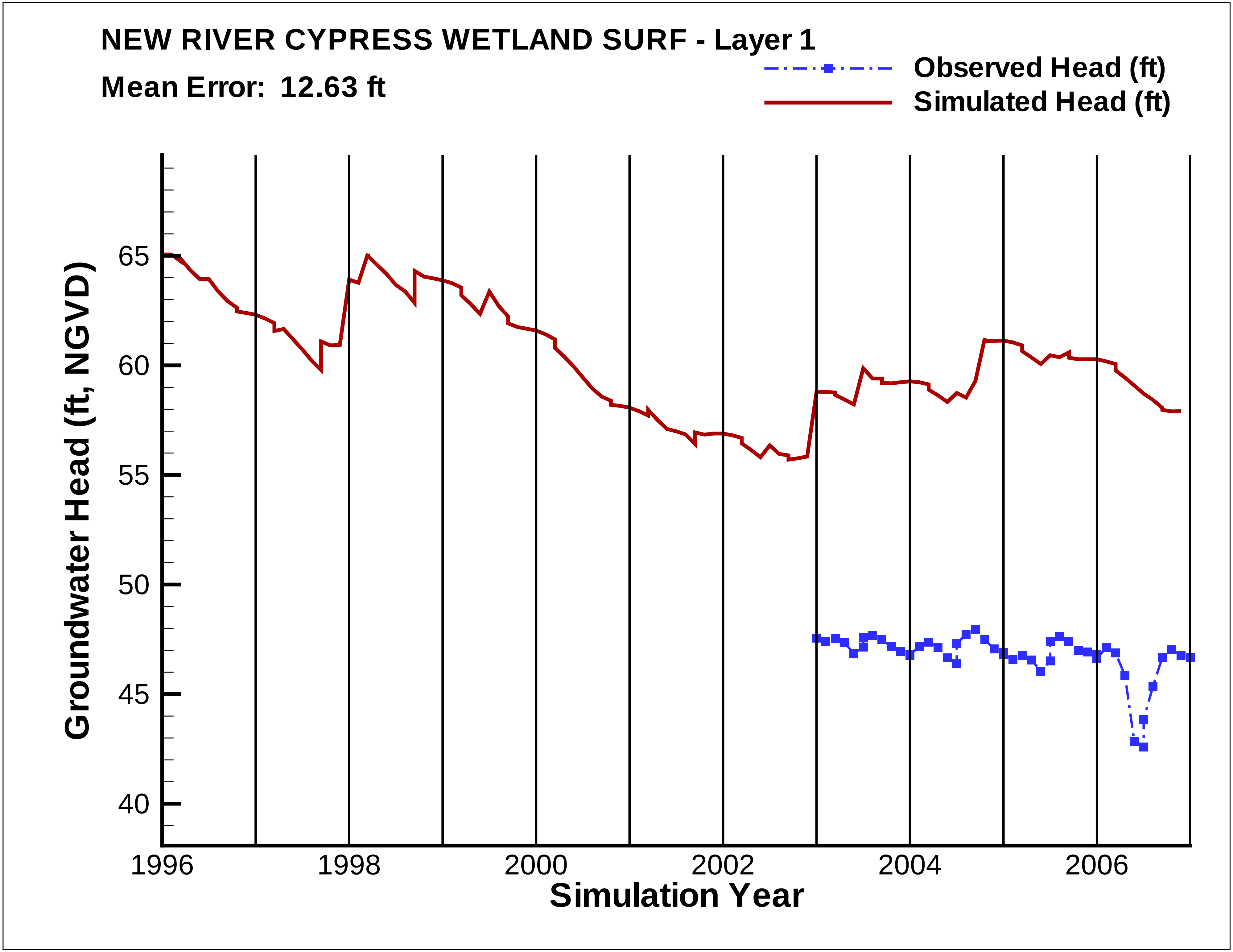
MERTZ RIVERINE UPLAND SURF - Layer 1
Mean Error: 2.52 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



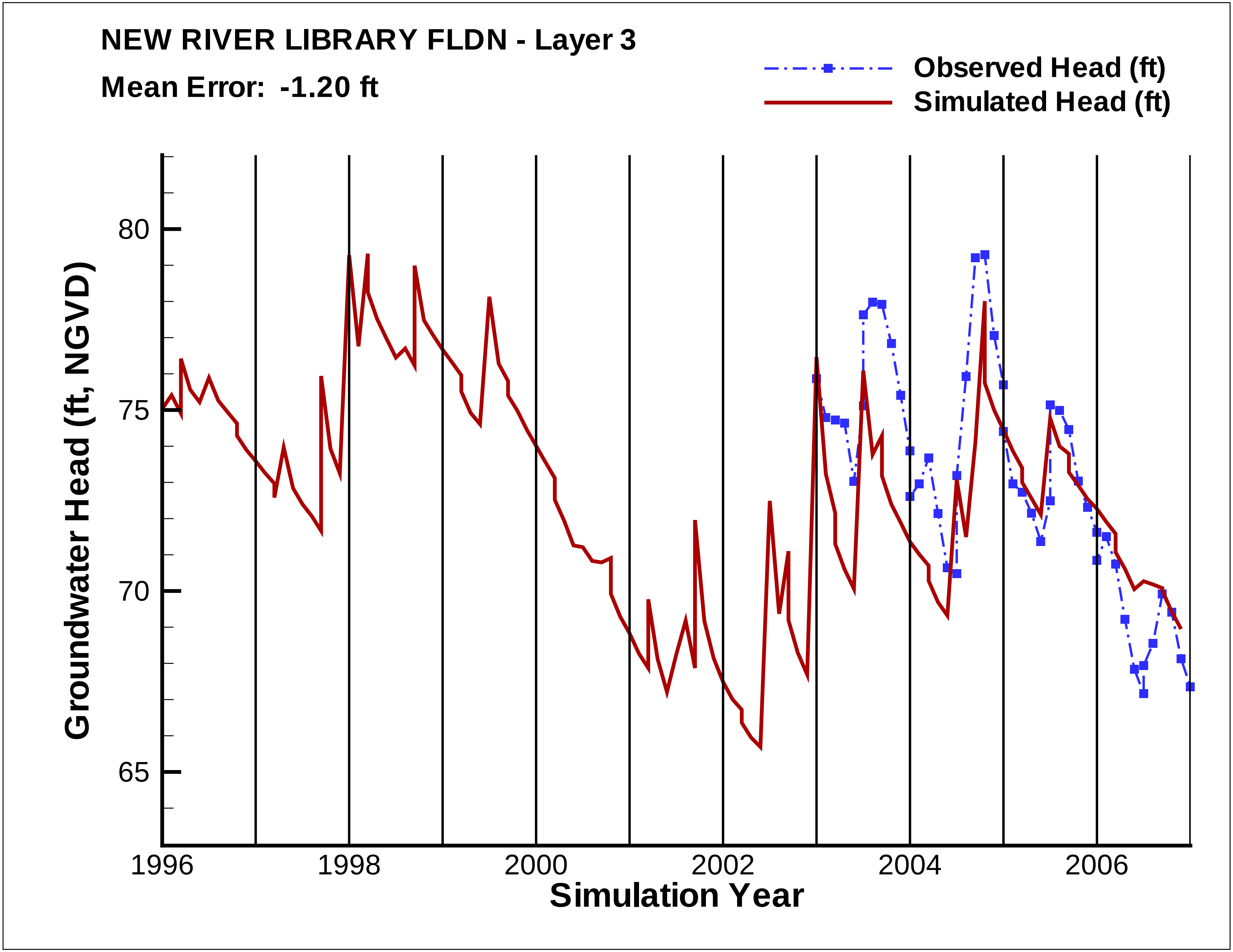
MOSS_BLUFF - Layer 4
Mean Error: -0.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
54
52
50
48
1996
1998
2000
2002
2004
2006
Simulation Year

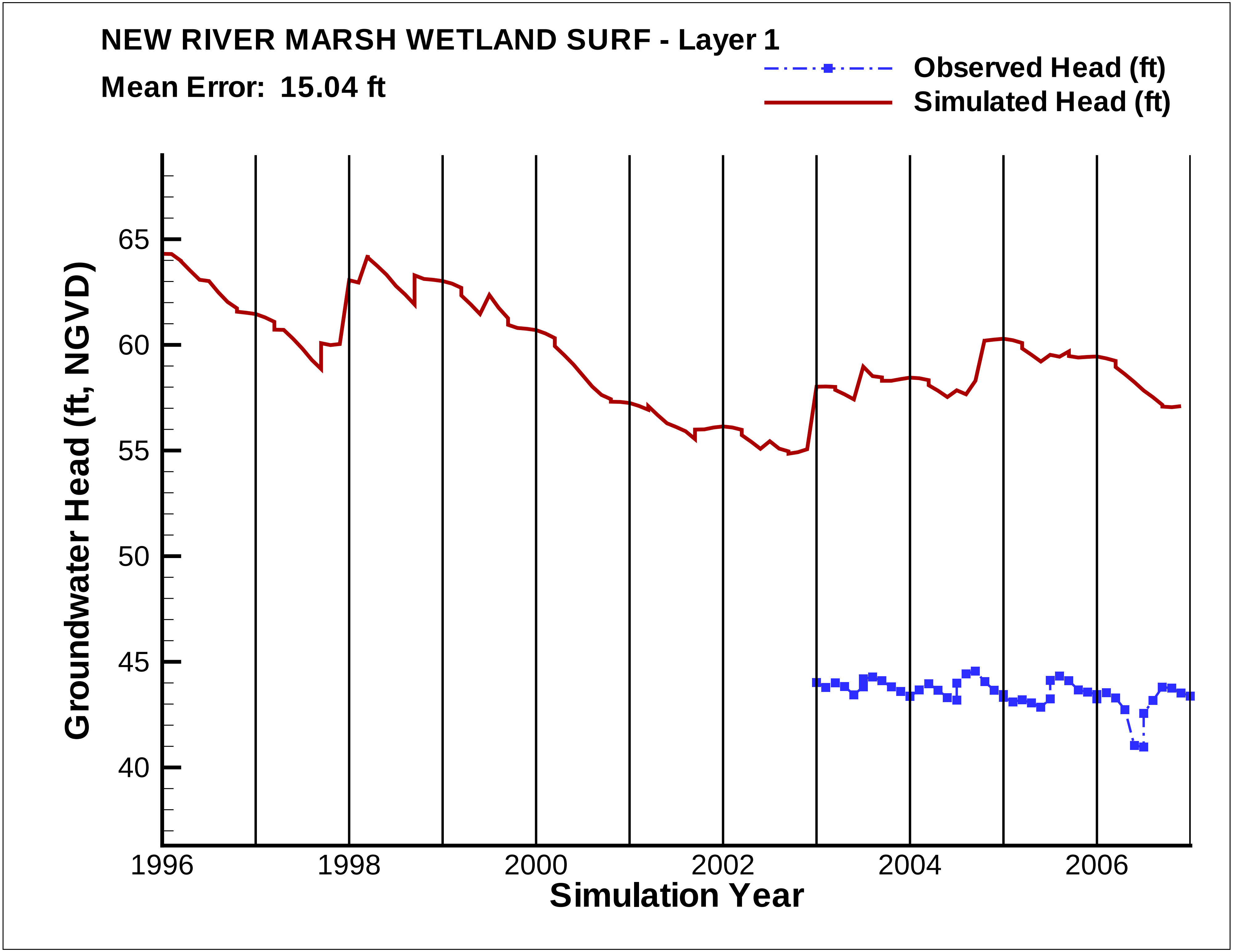


Nelsons Fish Camp UFA - Layer 4
Mean Error: 3.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

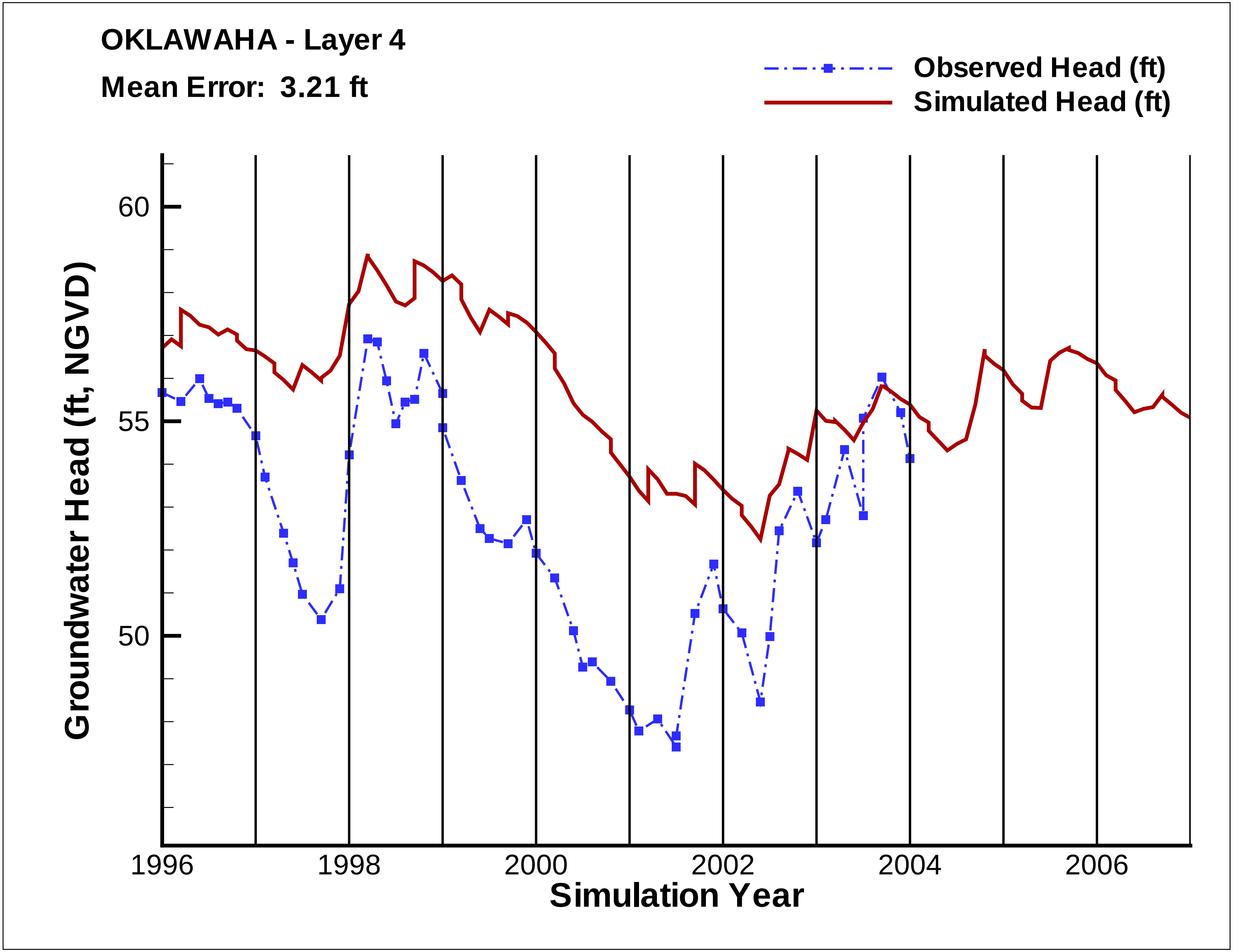


NEW RIVER CYPRESS WETLAND SURF - Layer 1
Mean Error: 12.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

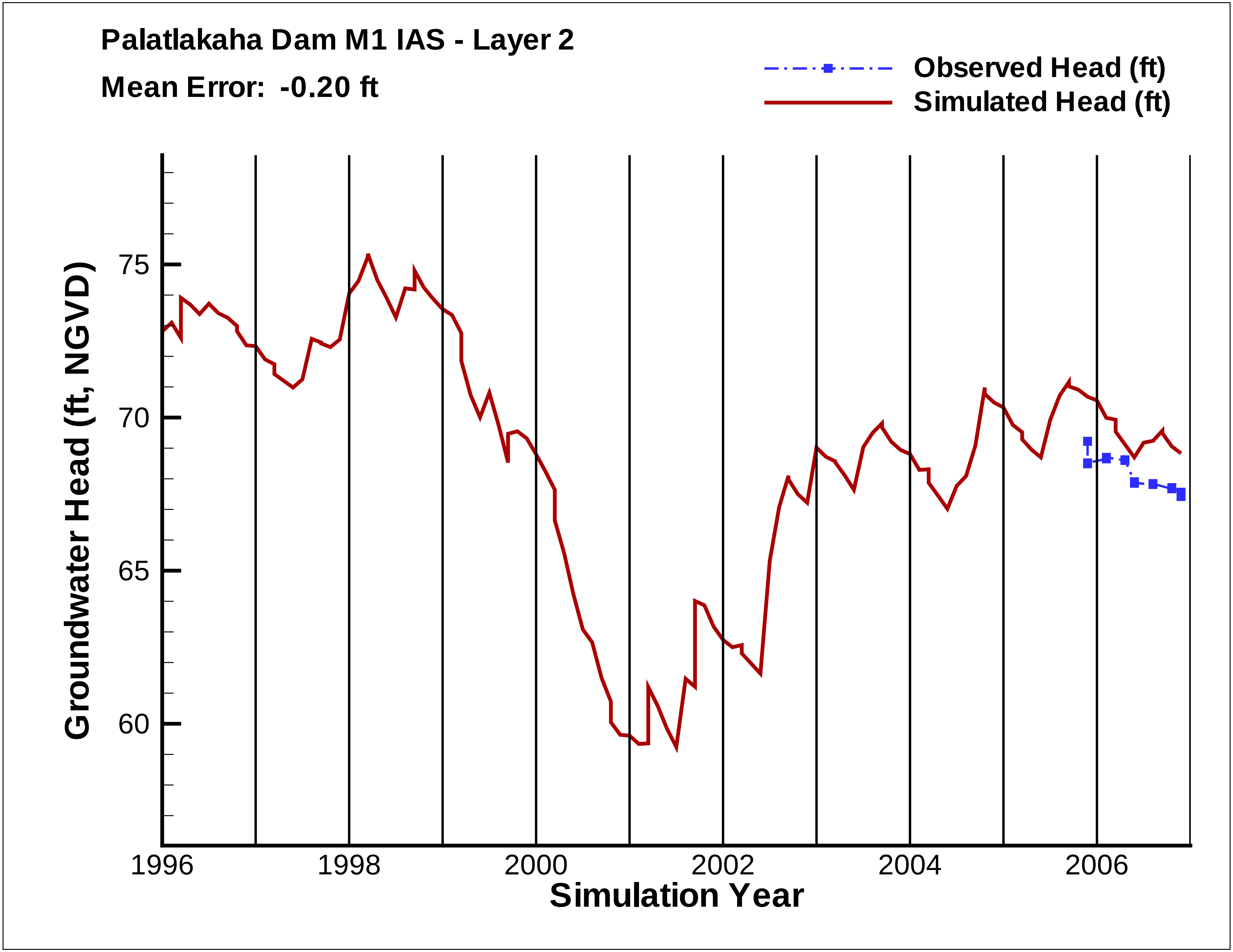

NEW RIVER LIBRARY FLDN - Layer 3
Mean Error: -1.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



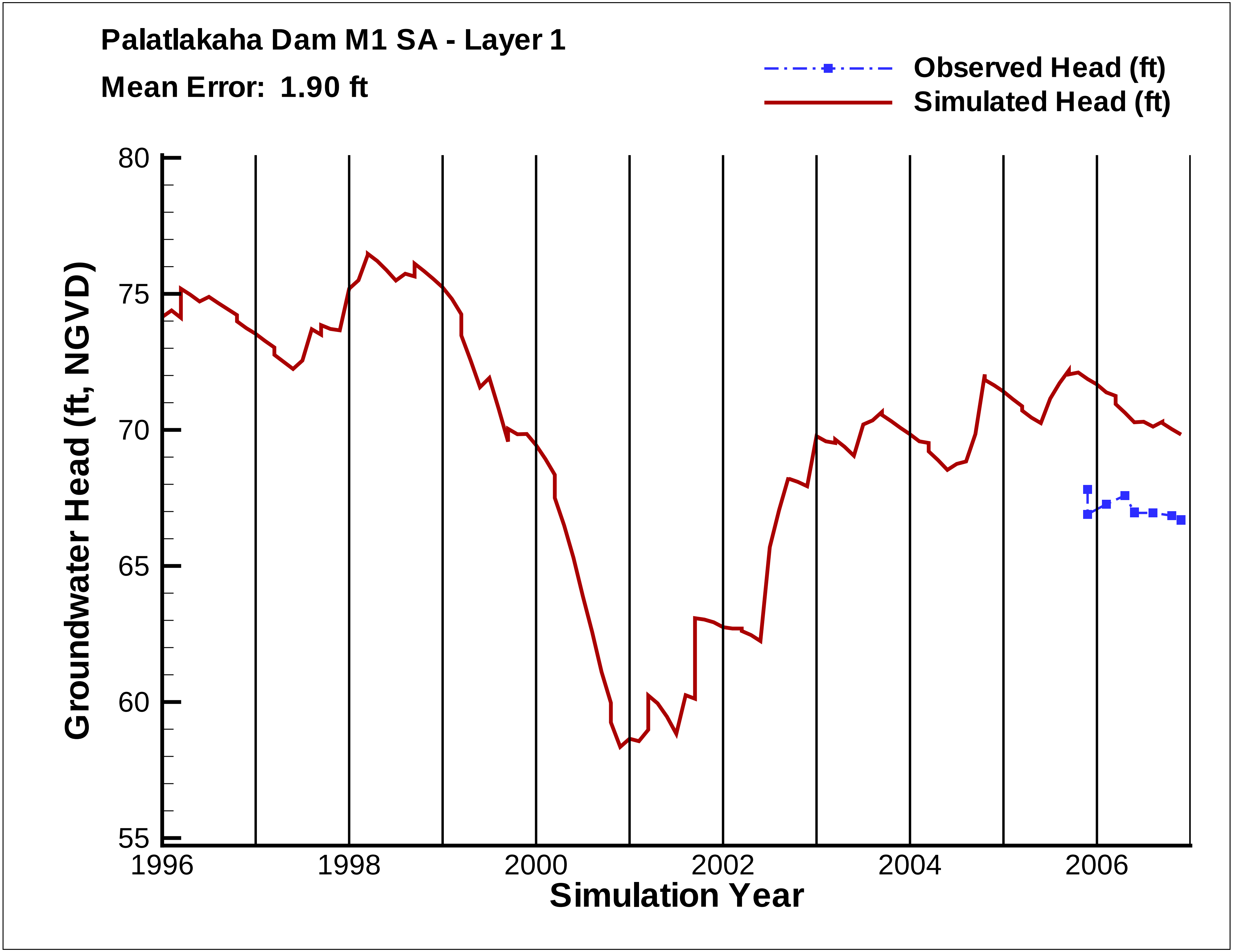
NEW RIVER MARSH WETLAND SURF - Layer 1
Mean Error: 15.04 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

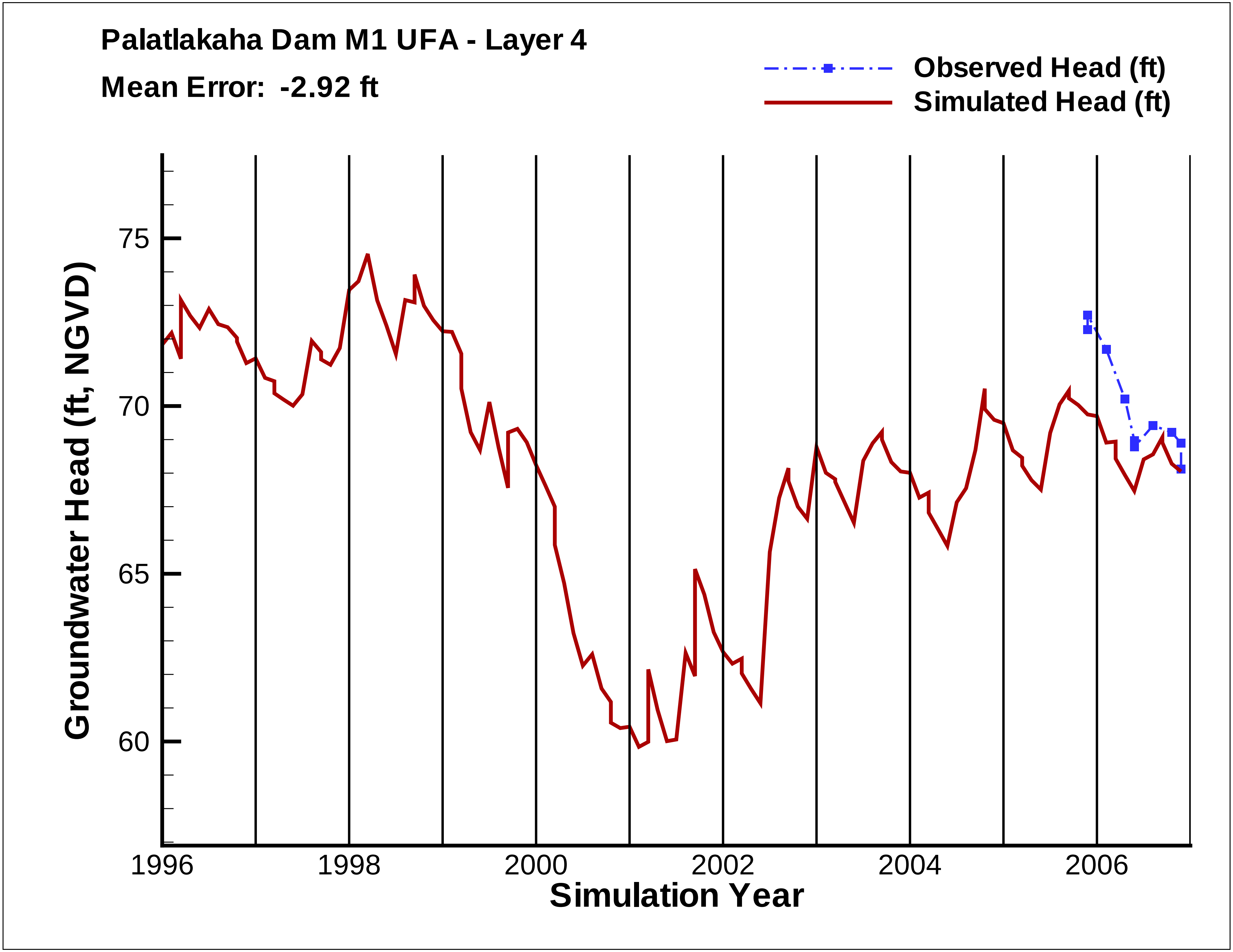


OKLAWAHA - Layer 4
Mean Error: 3.21 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

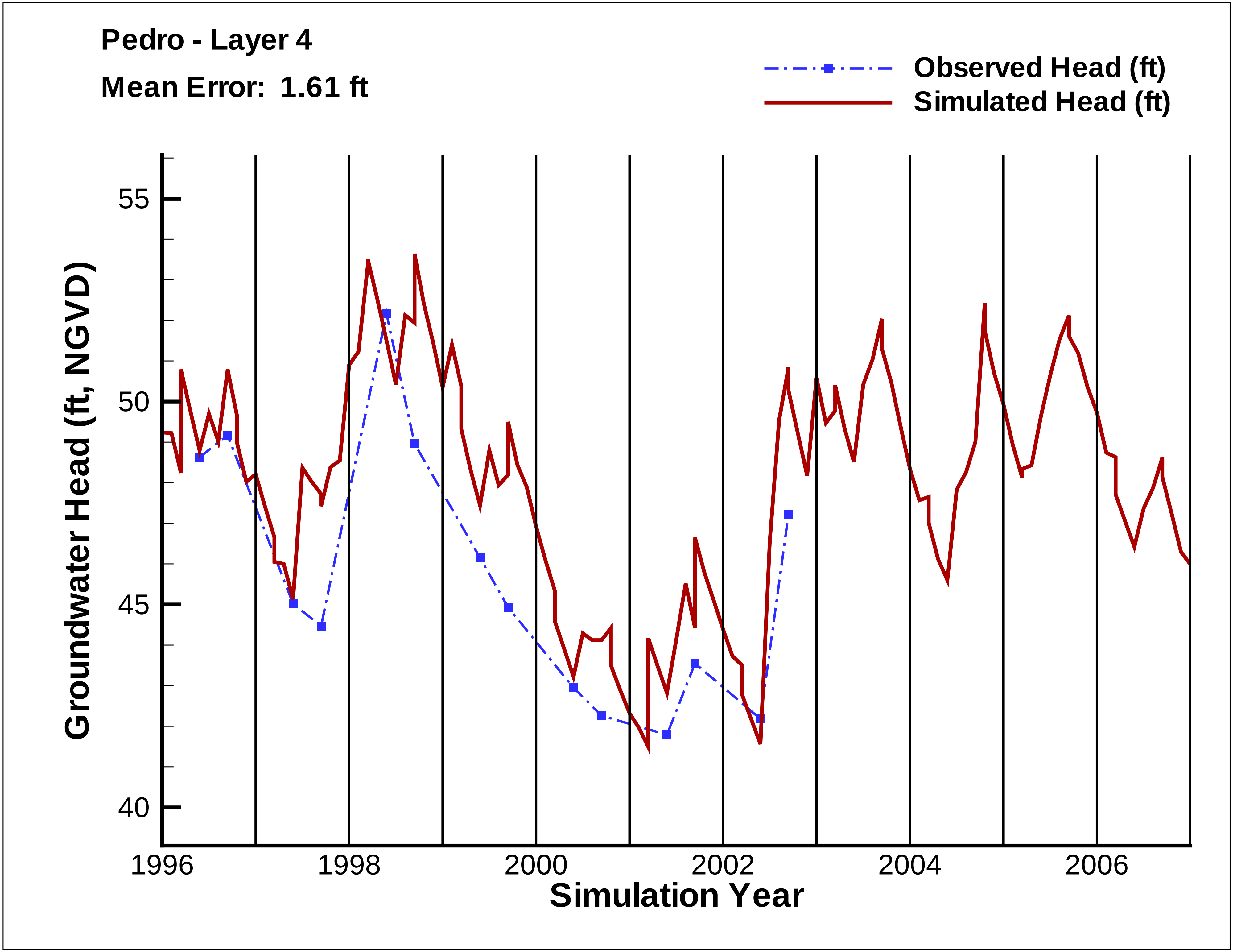


Palatlakaha Dam M1 IAS - Layer 2
Mean Error: -0.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
1996
1998
2000
2002
2004
2006
Simulation Year

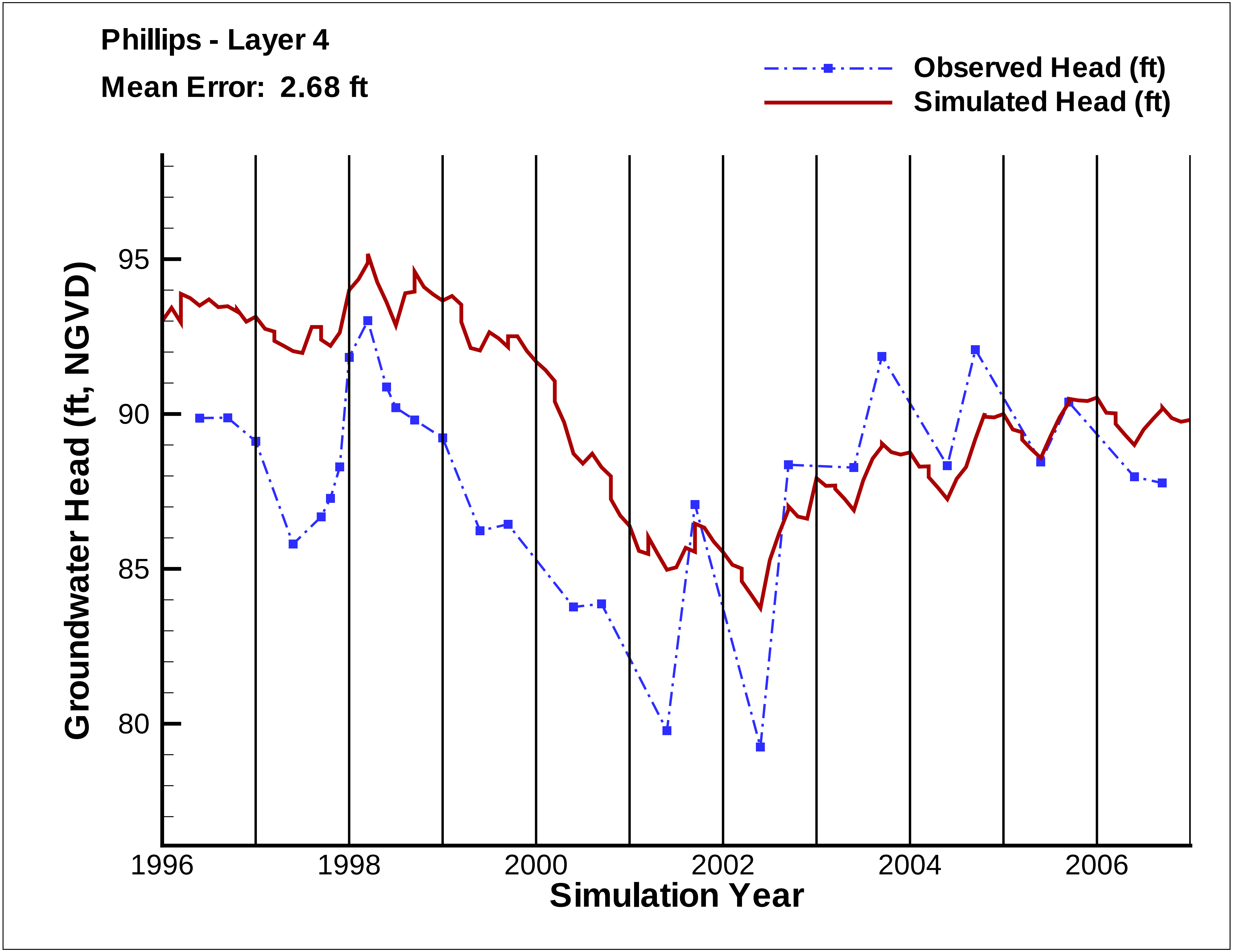

Palatlakaha Dam M1 SA - Layer 1
Mean Error: 1.90 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year



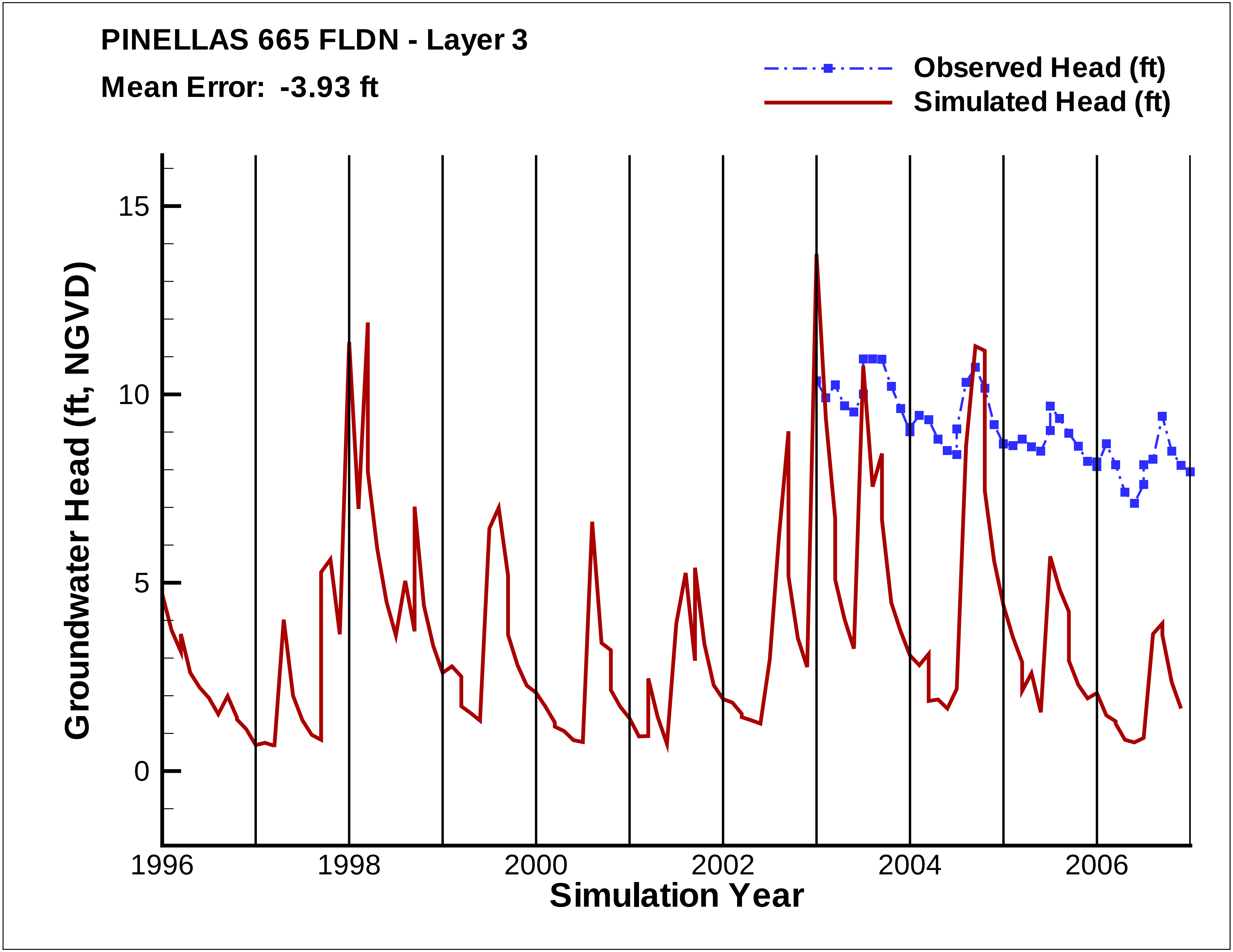
Palatlakaha Dam M1 UFA - Layer 4
Mean Error: -2.92 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
1996
1998
2000
2002
2004
2006
Simulation Year



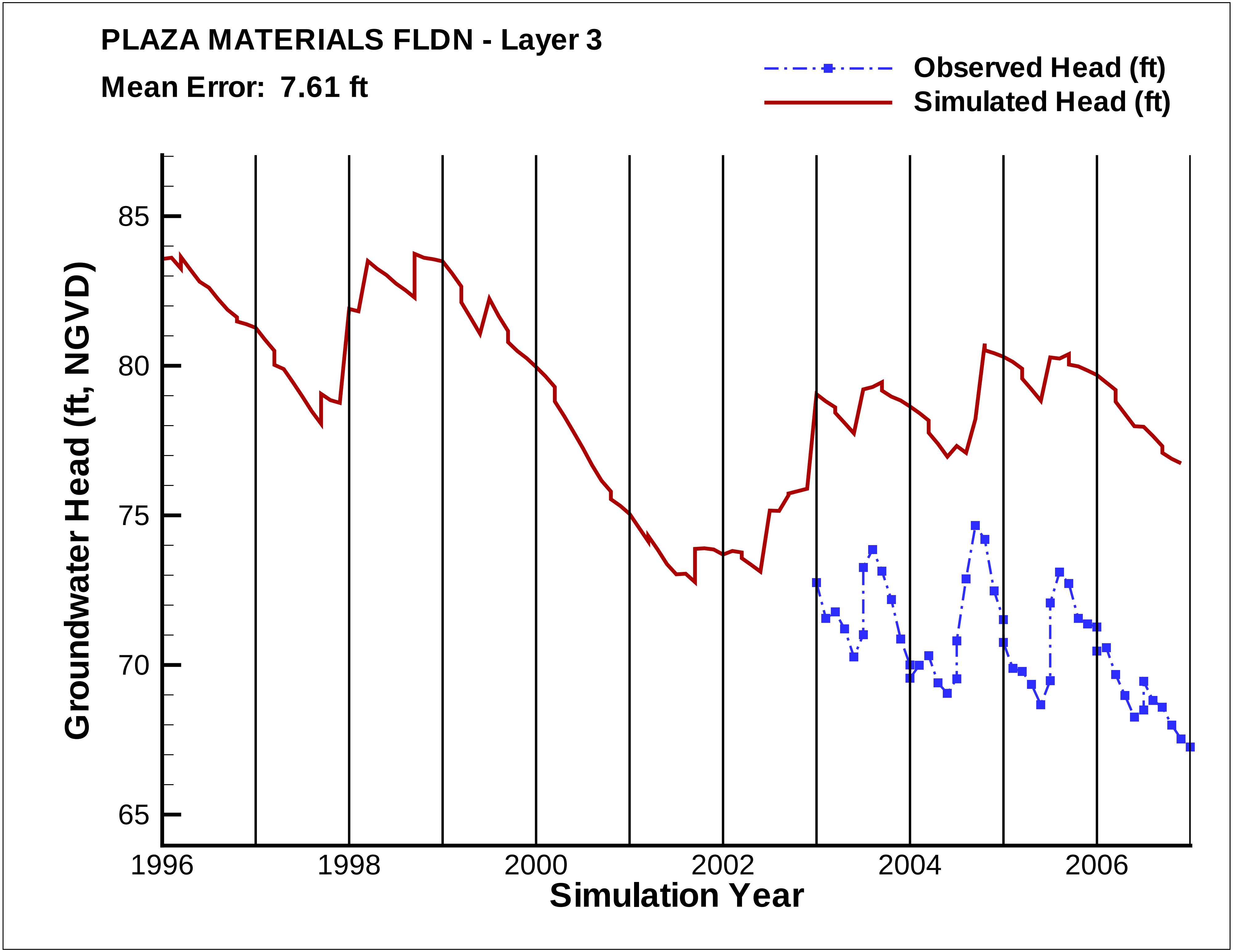
Pedro - Layer 4
Mean Error: 1.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



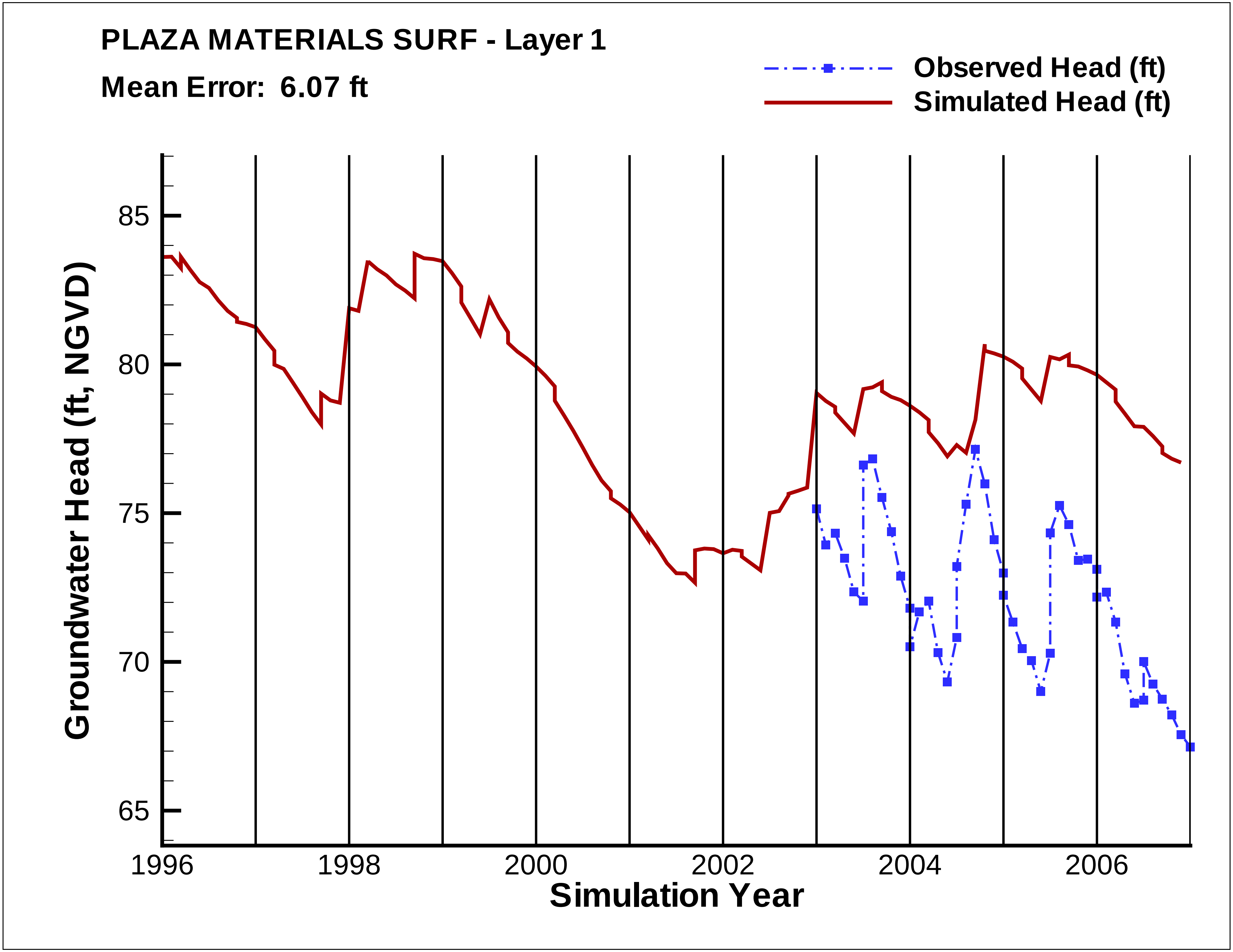
Phillips - Layer 4
Mean Error: 2.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

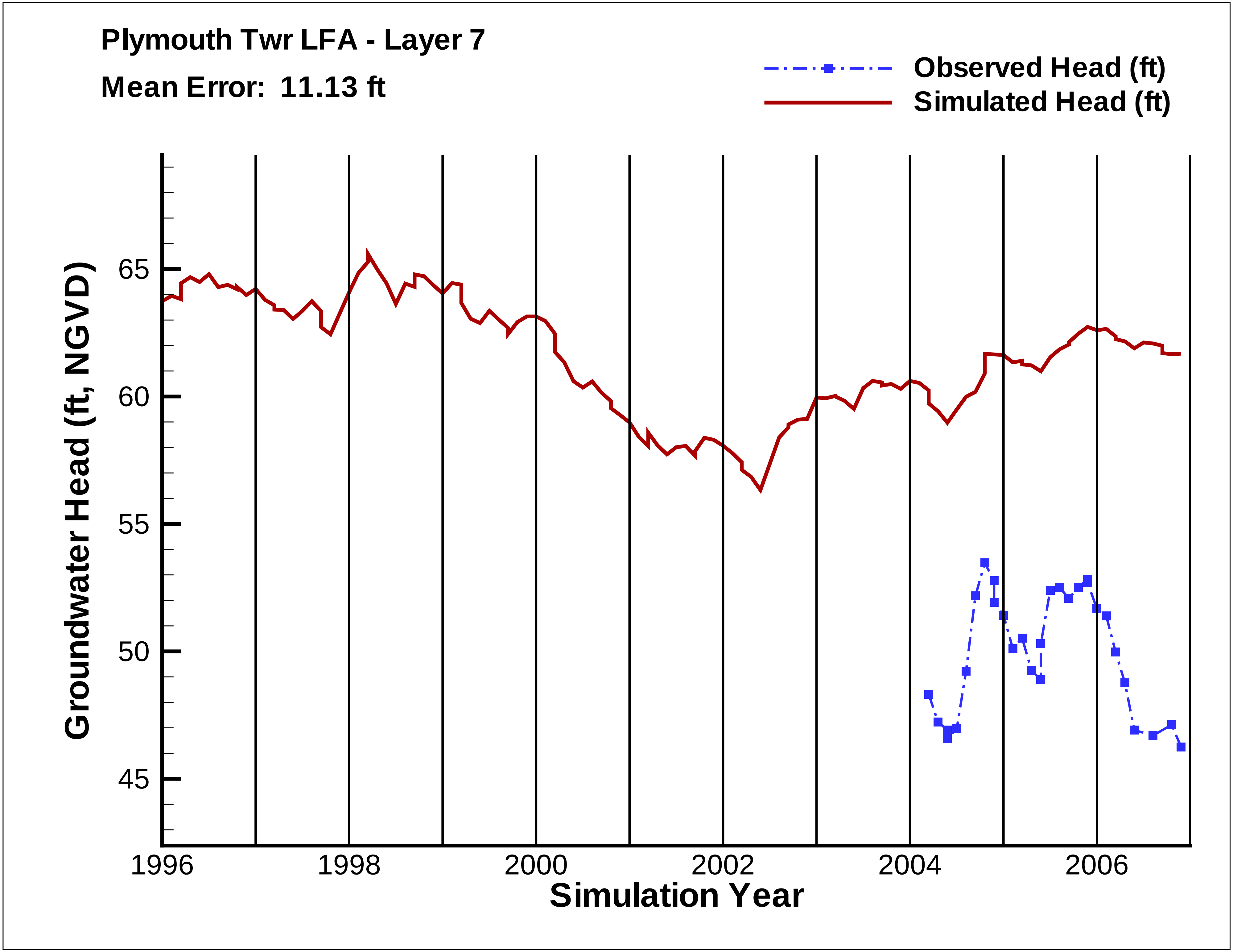


PINELLAS 665 FLDN - Layer 3
Mean Error: -3.93 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
1996
1998
2000
2002
2004
2006
Simulation Year

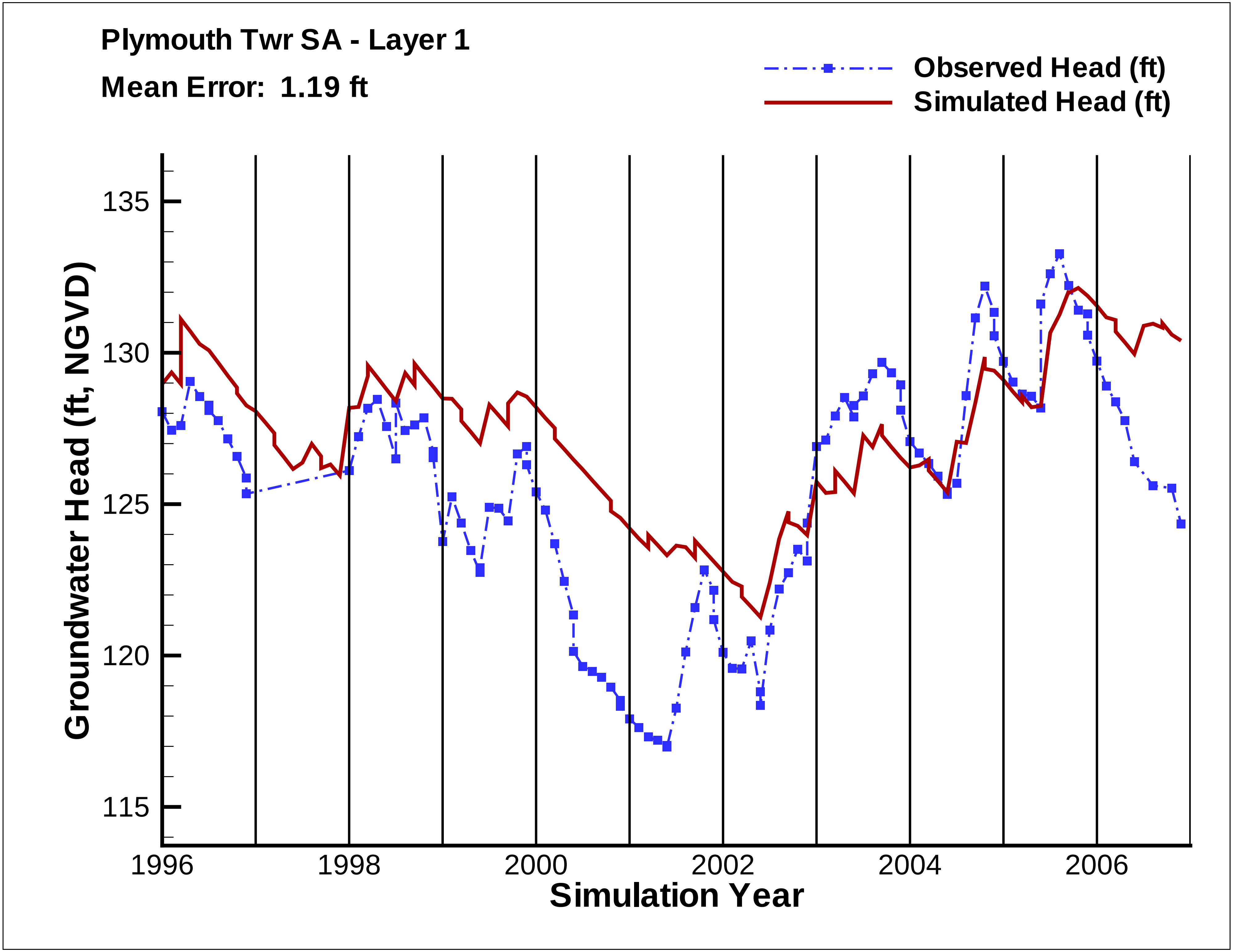


PLAZA MATERIALS FLDN - Layer 3
Mean Error: 7.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year

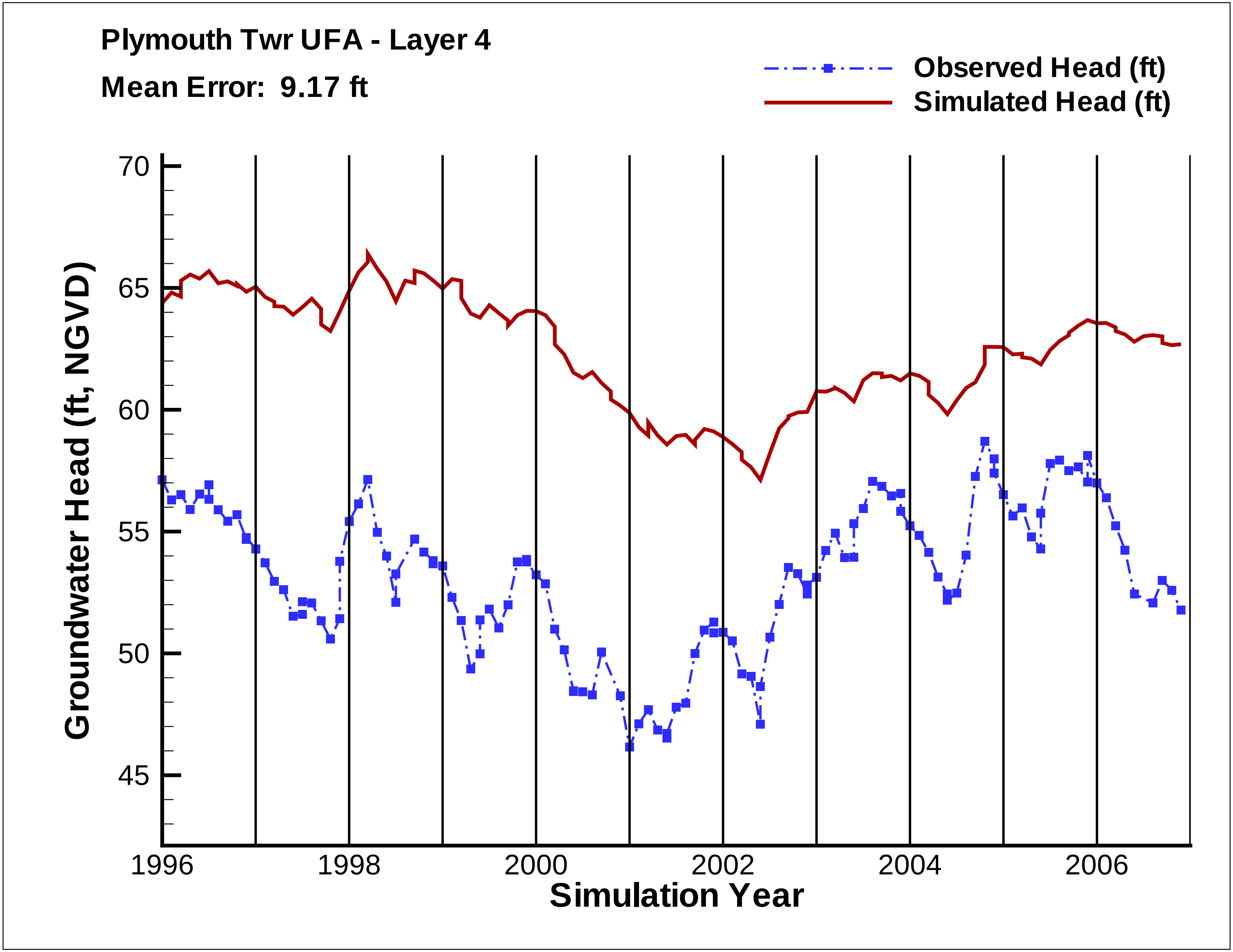

PLAZA MATERIALS SURF - Layer 1
Mean Error: 6.07 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



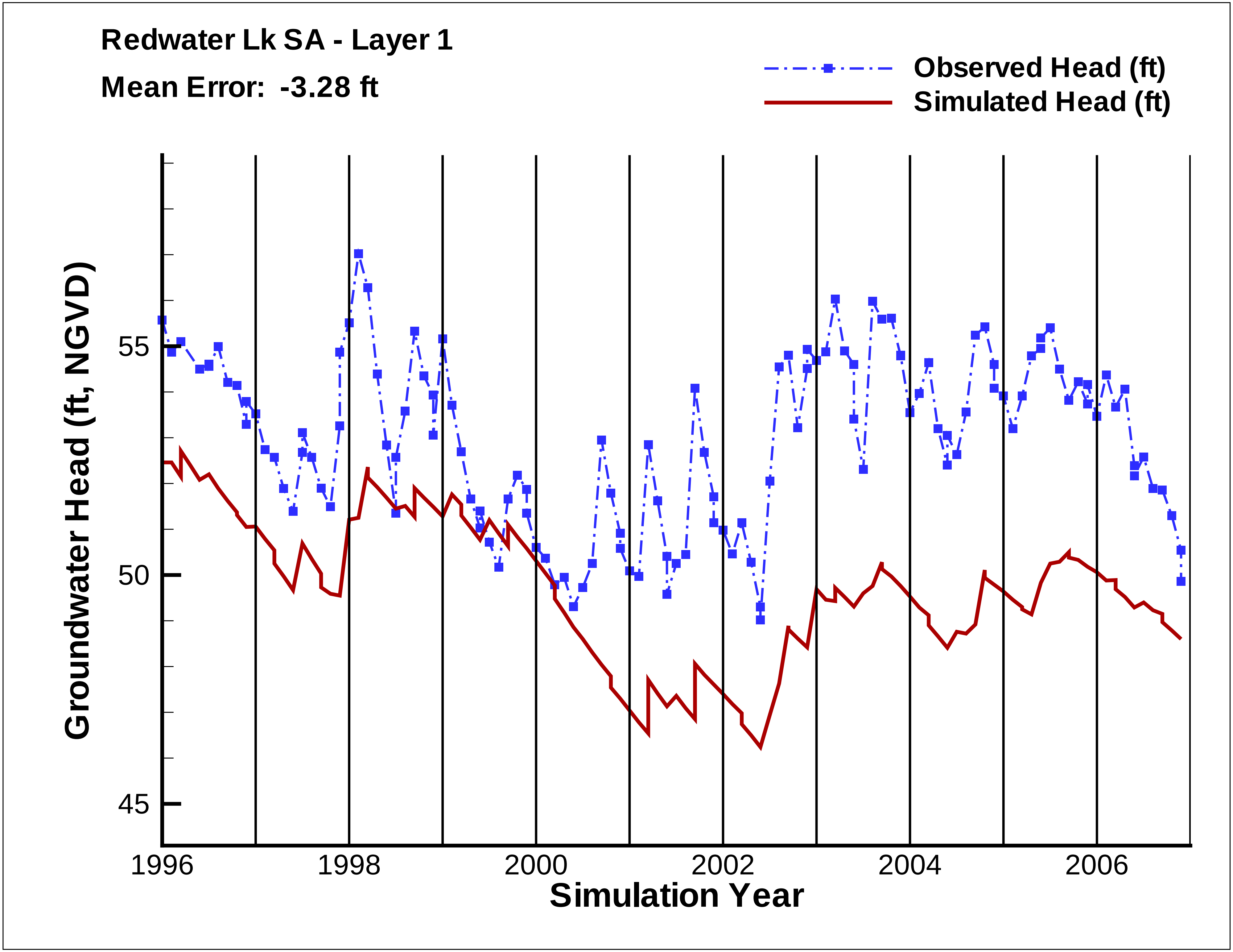
Plymouth Twr LFA - Layer 7
Mean Error: 11.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

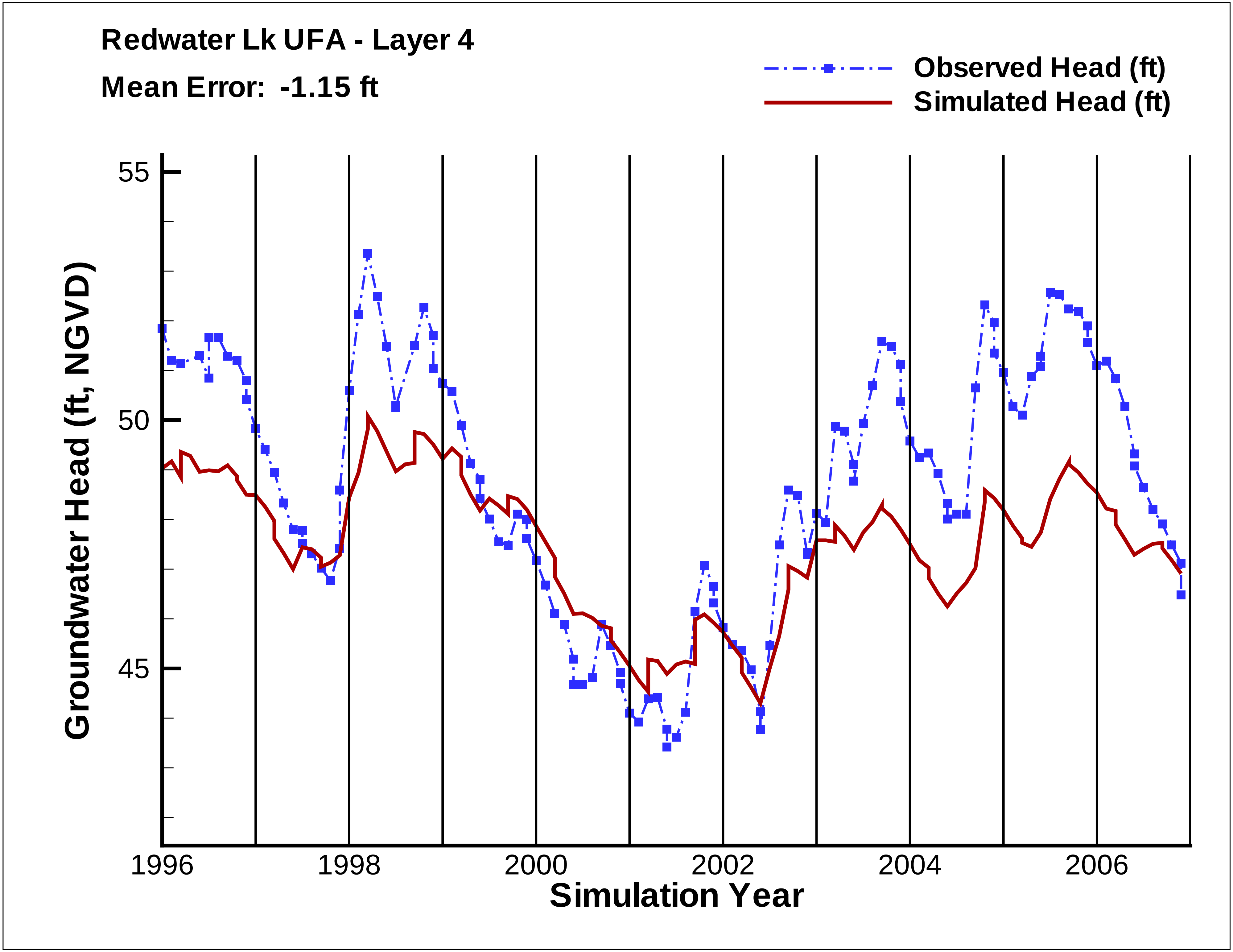


Plymouth Twr SA - Layer 1
Mean Error: 1.19 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
135
130
125
120
115
1996
1998
2000
2002
2004
2006
Simulation Year

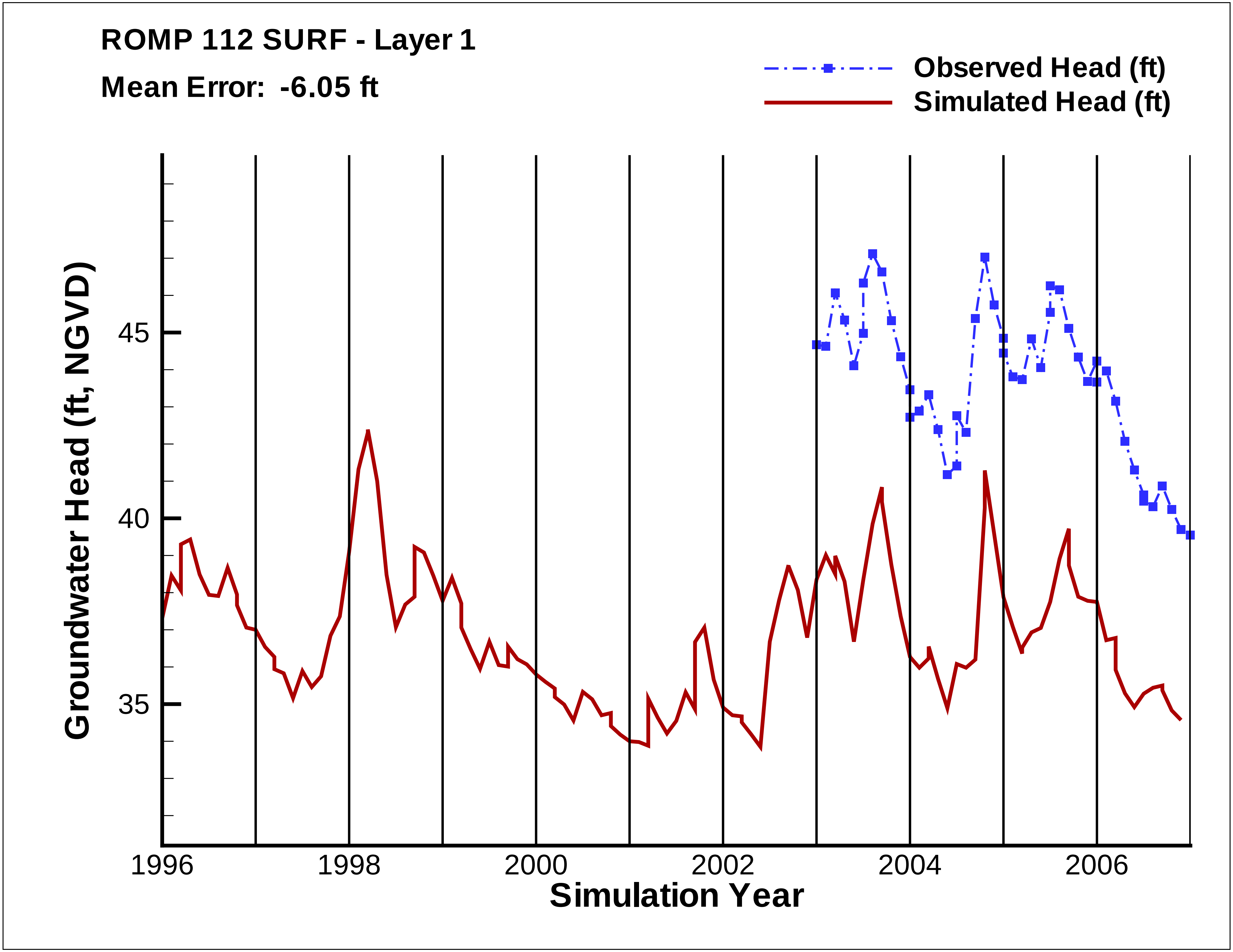


Plymouth Twr UFA - Layer 4
Mean Error: 9.17 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

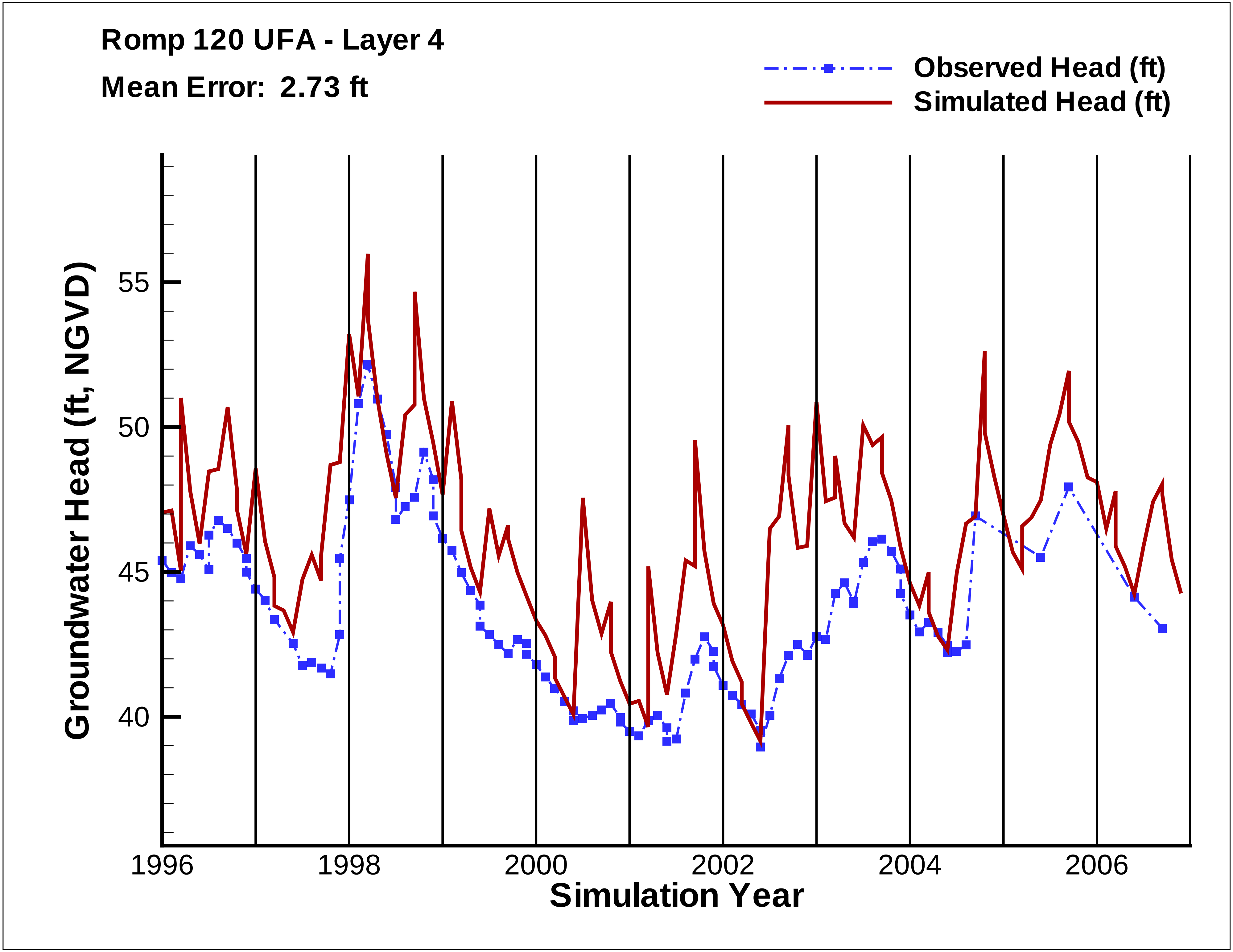

Redwater Lk SA - Layer 1
Mean Error: -3.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year



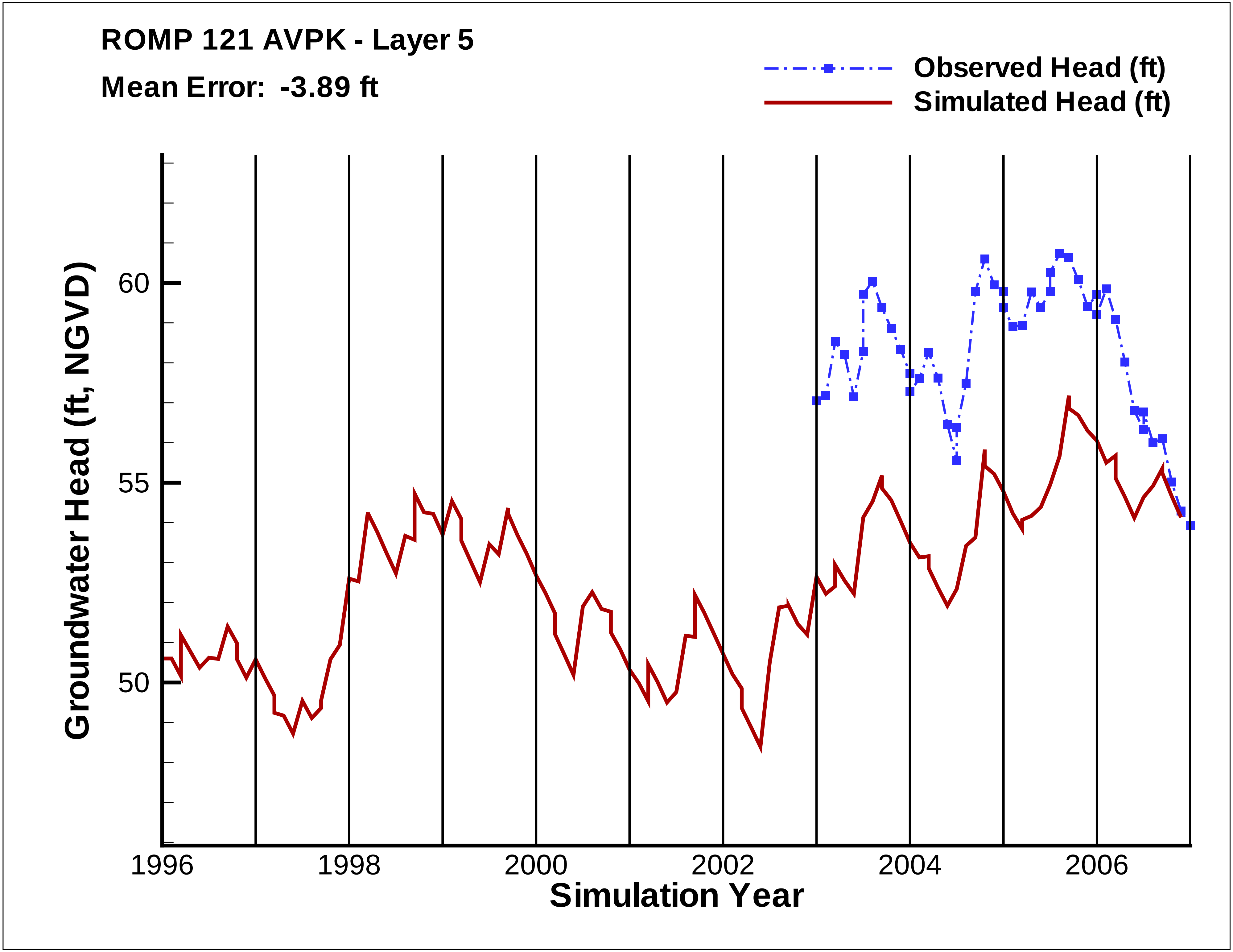
Redwater Lk UFA - Layer 4
Mean Error: -1.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year



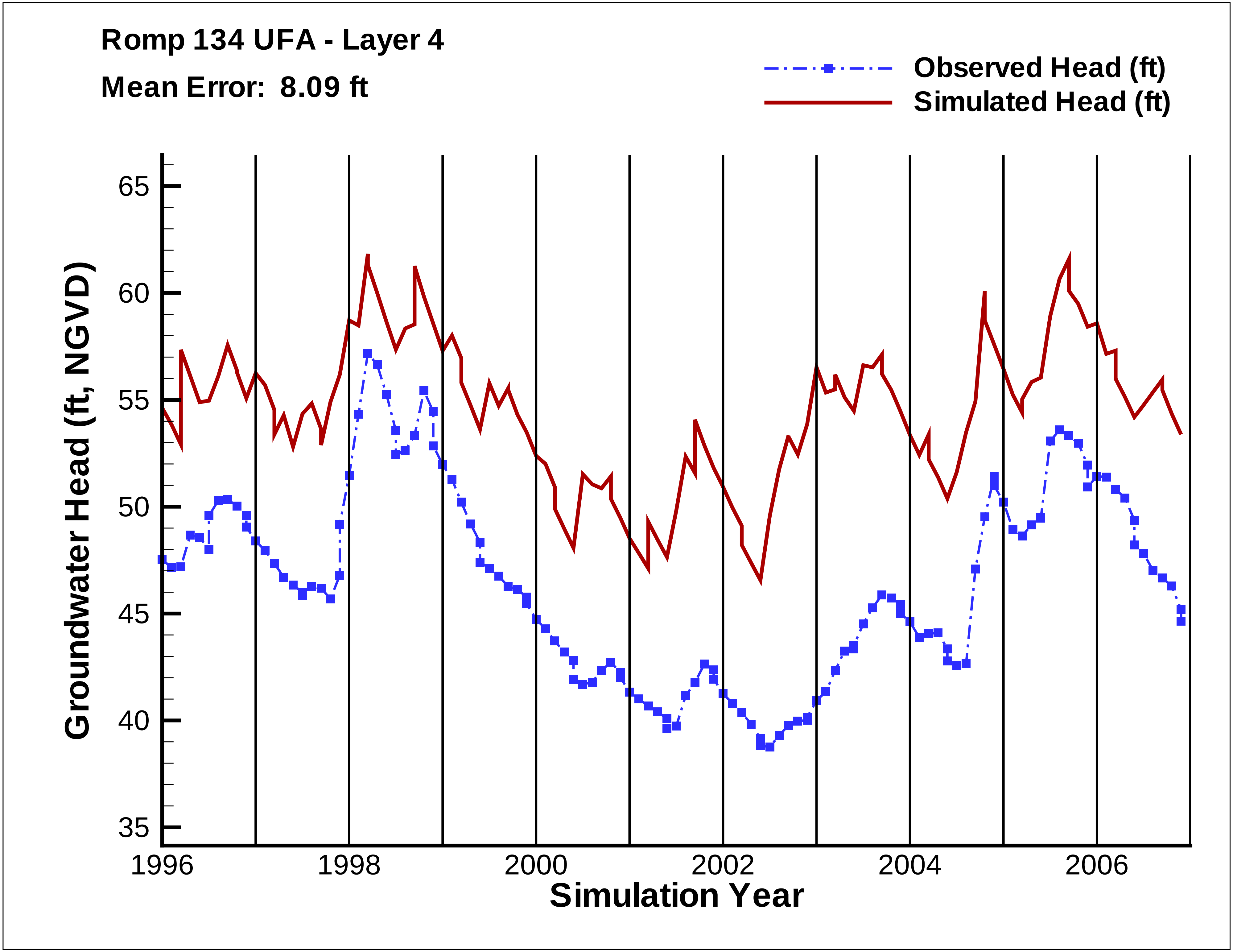
ROMP 112 SURF - Layer 1
Mean Error: -6.05 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



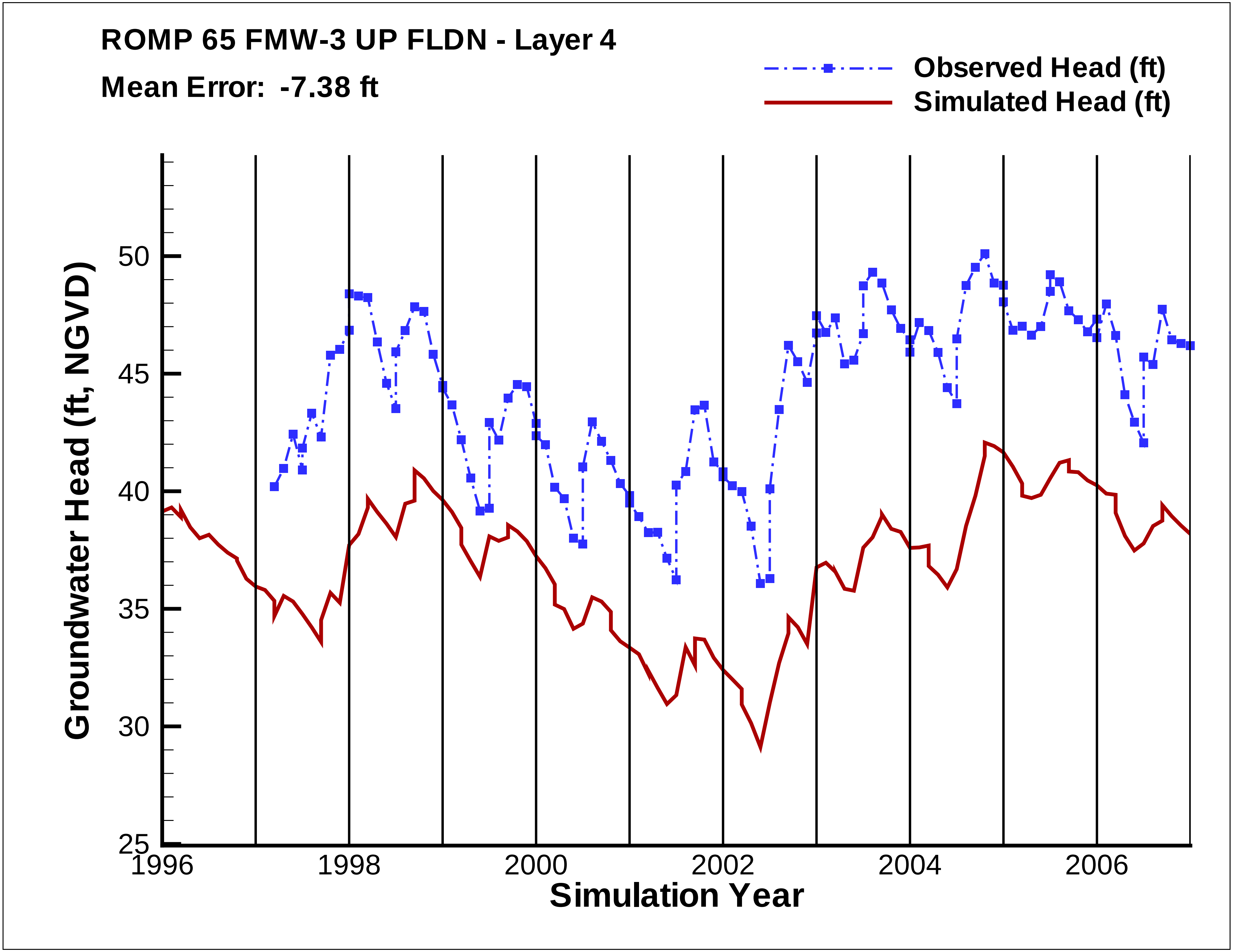
Romp 120 UFA - Layer 4
Mean Error: 2.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



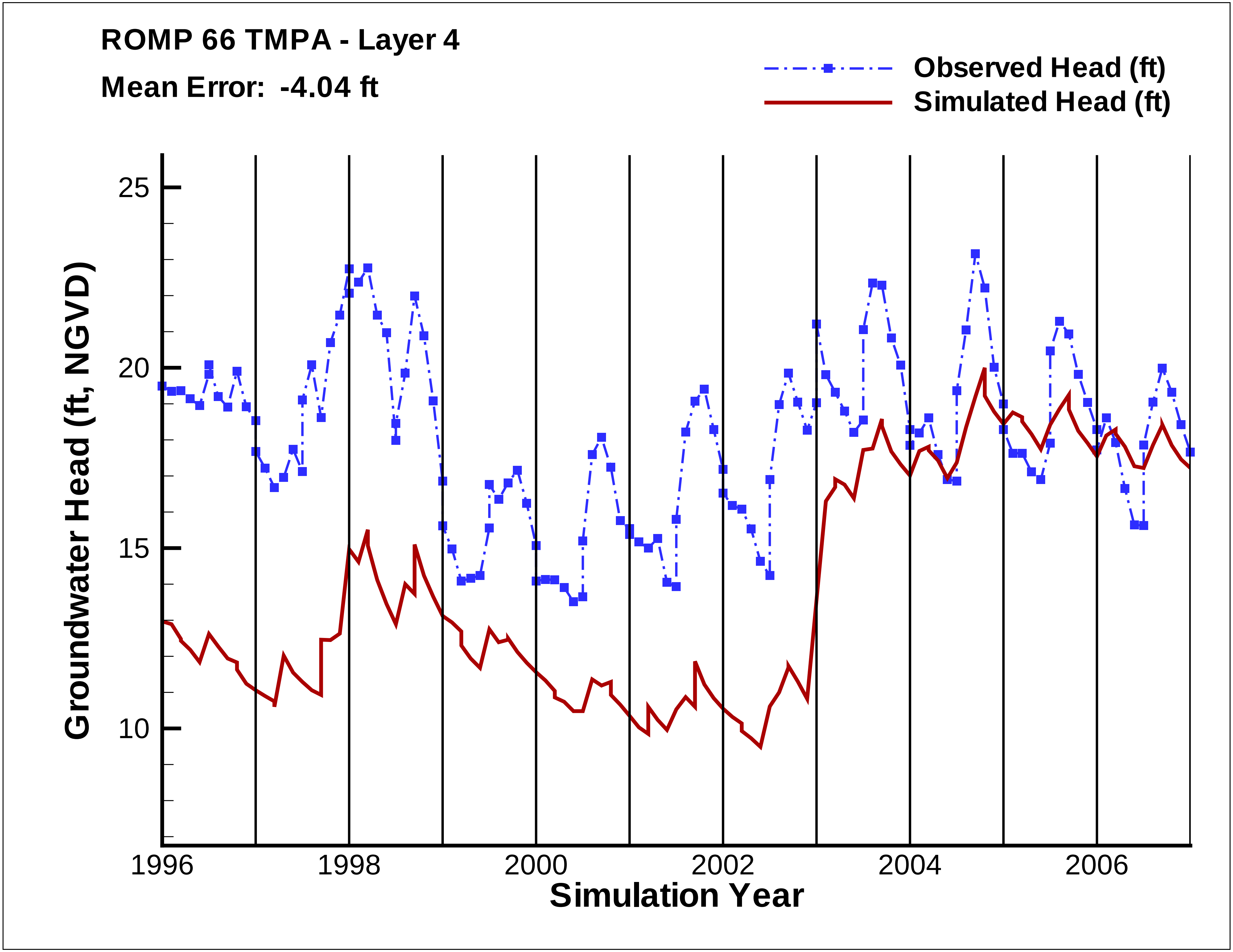
ROMP 121 AVPK - Layer 5
Mean Error: -3.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



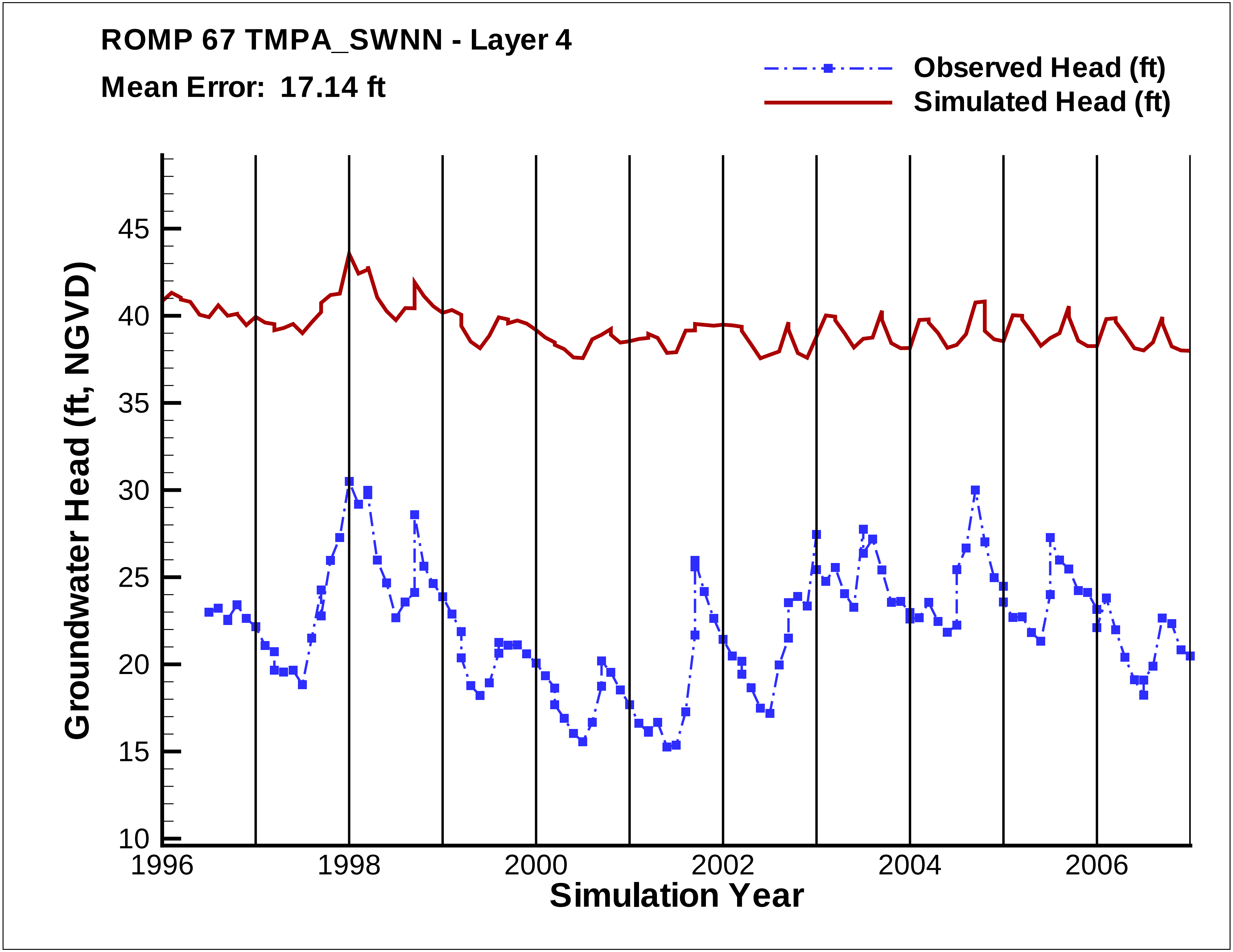
Romp 134 UFA - Layer 4
Mean Error: 8.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



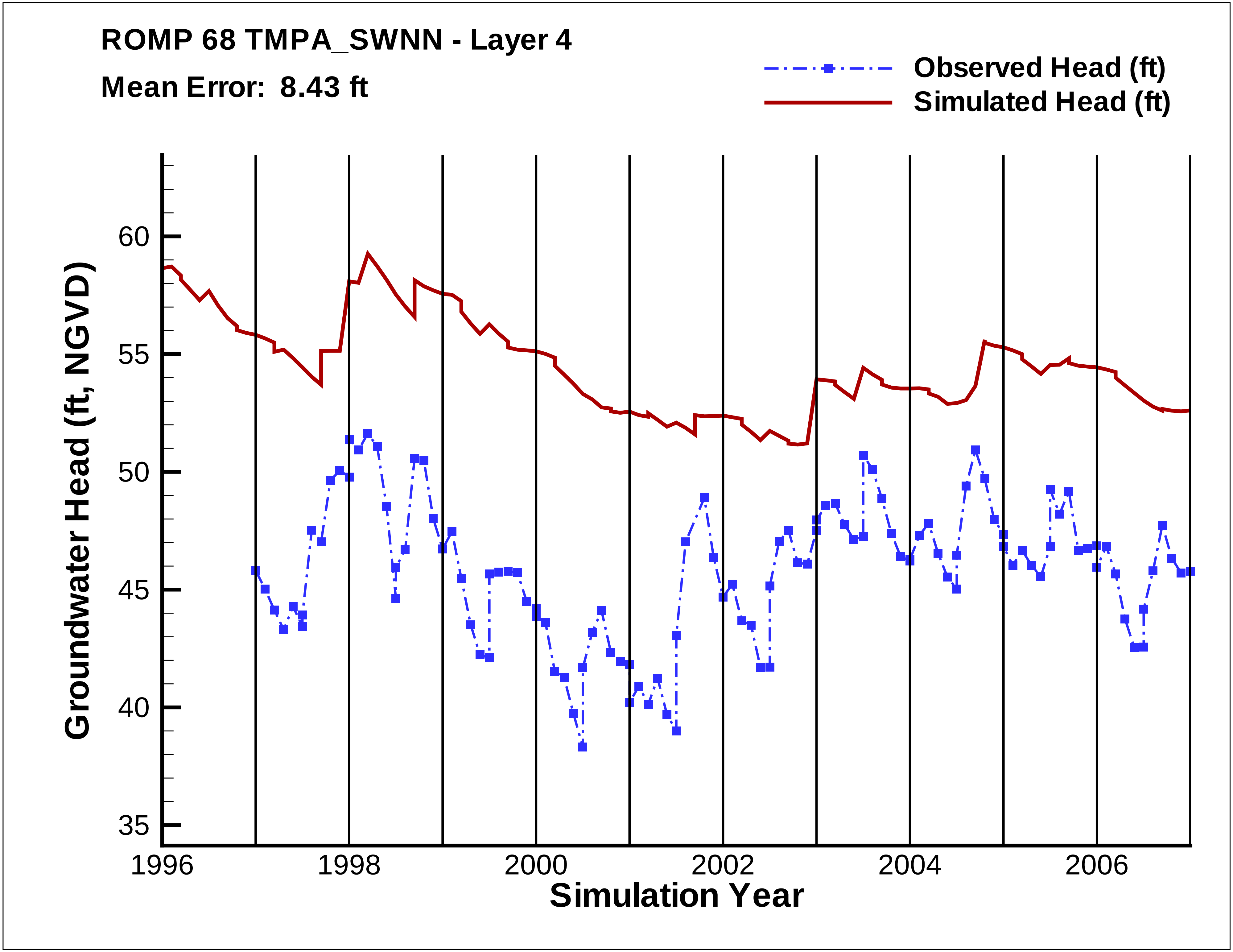
ROMP 65 FMW-3 UP FLDN - Layer 4
Mean Error: -7.38 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
30
35
40
45
50
1996
1998
2000
2002
2004
2006
Simulation Year



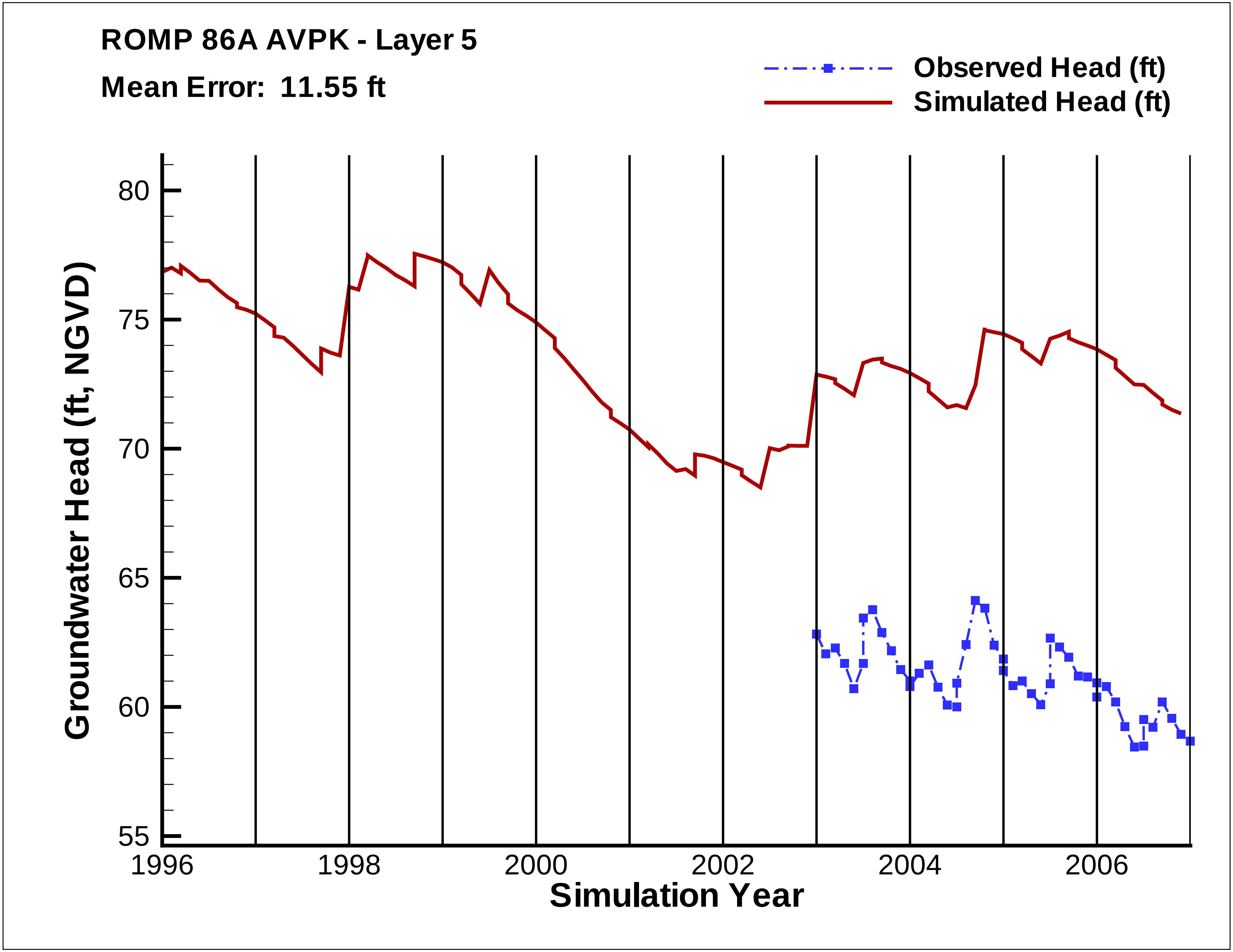
ROMP 66 TMPA - Layer 4
Mean Error: -4.04 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

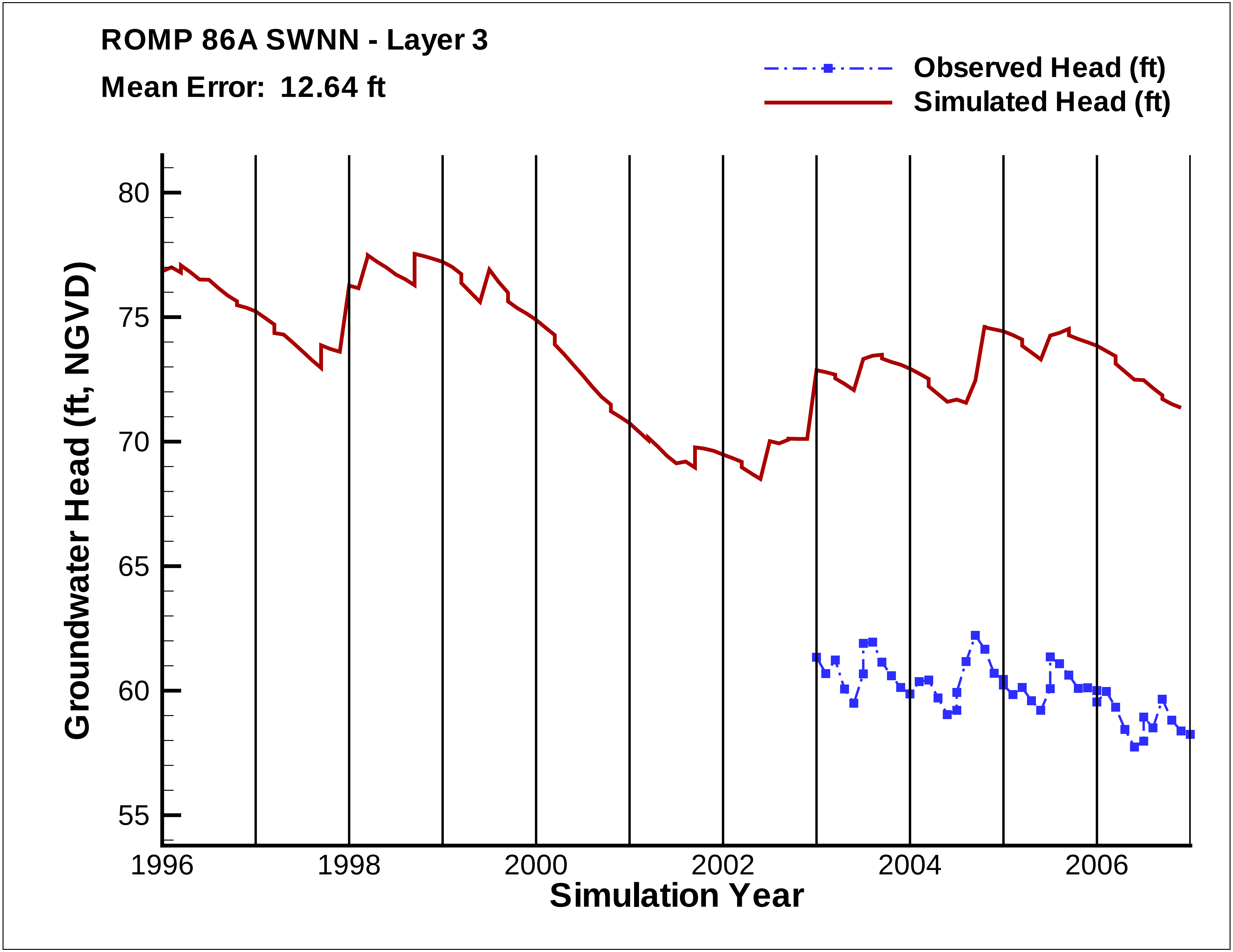


ROMP 67 TMPA_SWNN - Layer 4
Mean Error: 17.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
30
35
40
45
1996
1998
2000
2002
2004
2006
Simulation Year

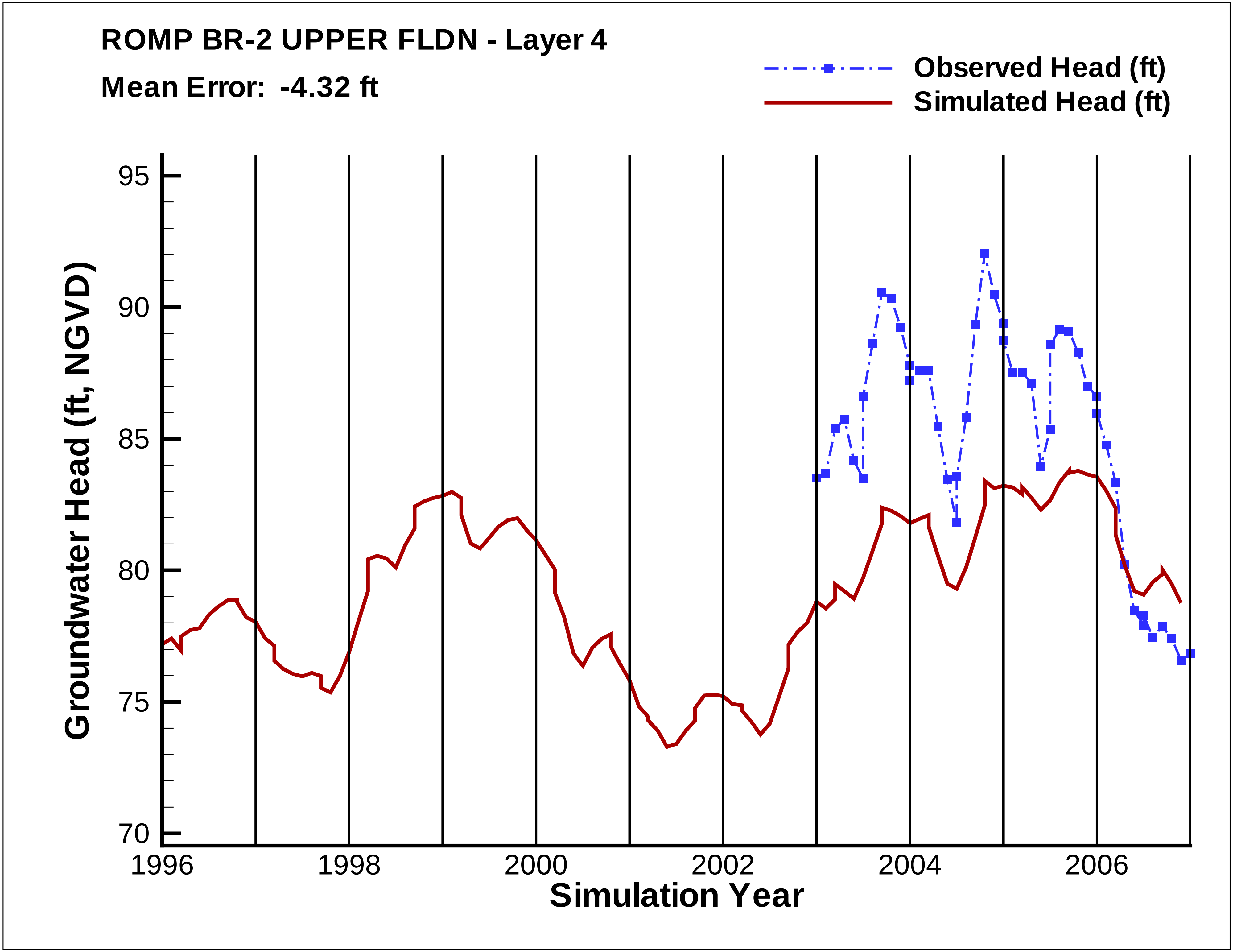


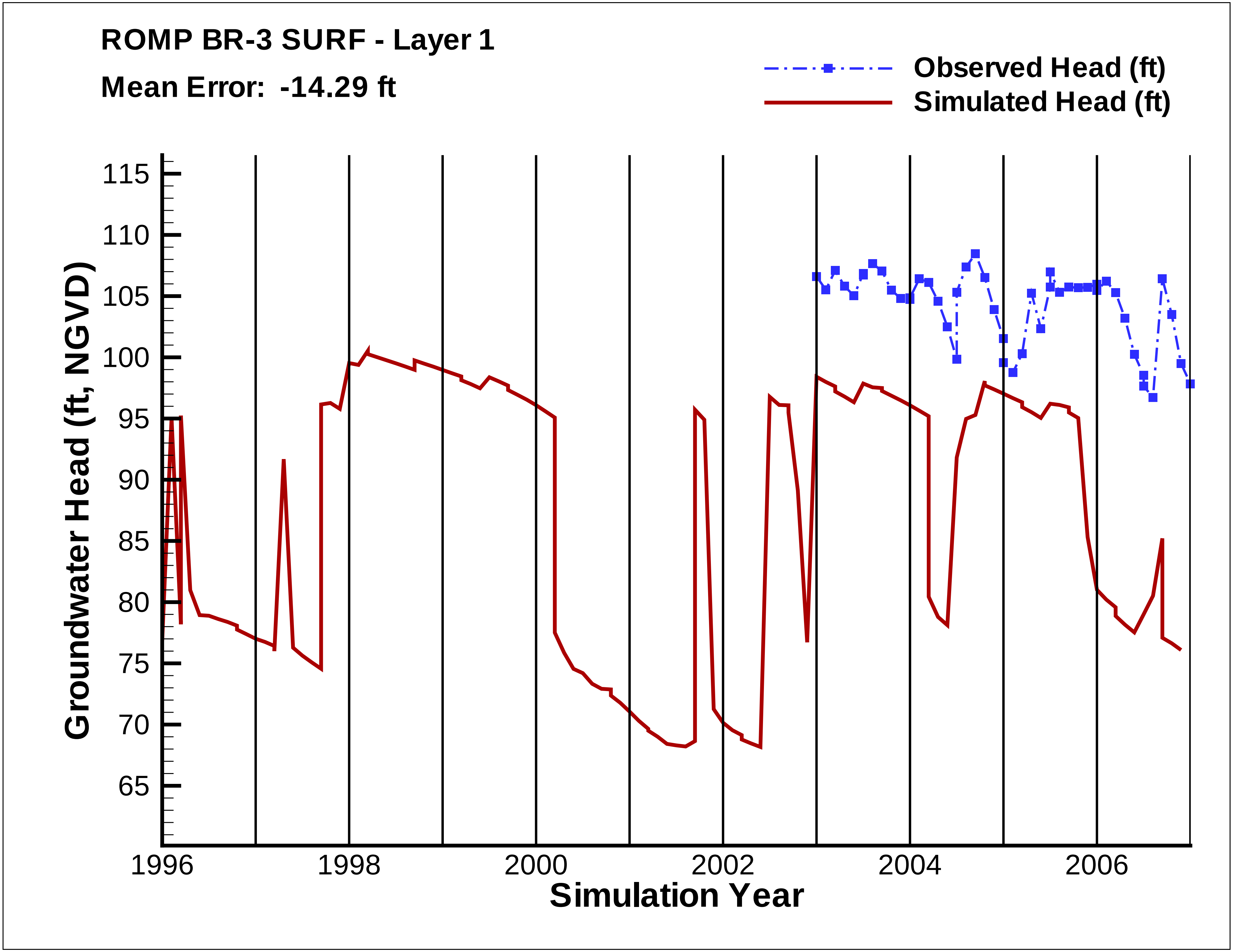
ROMP 68 TMPA_SWNN - Layer 4
Mean Error: 8.43 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
40
45
50
55
60
1996
1998
2000
2002
2004
2006
Simulation Year


ROMP 86A AVPK - Layer 5
Mean Error: 11.55 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

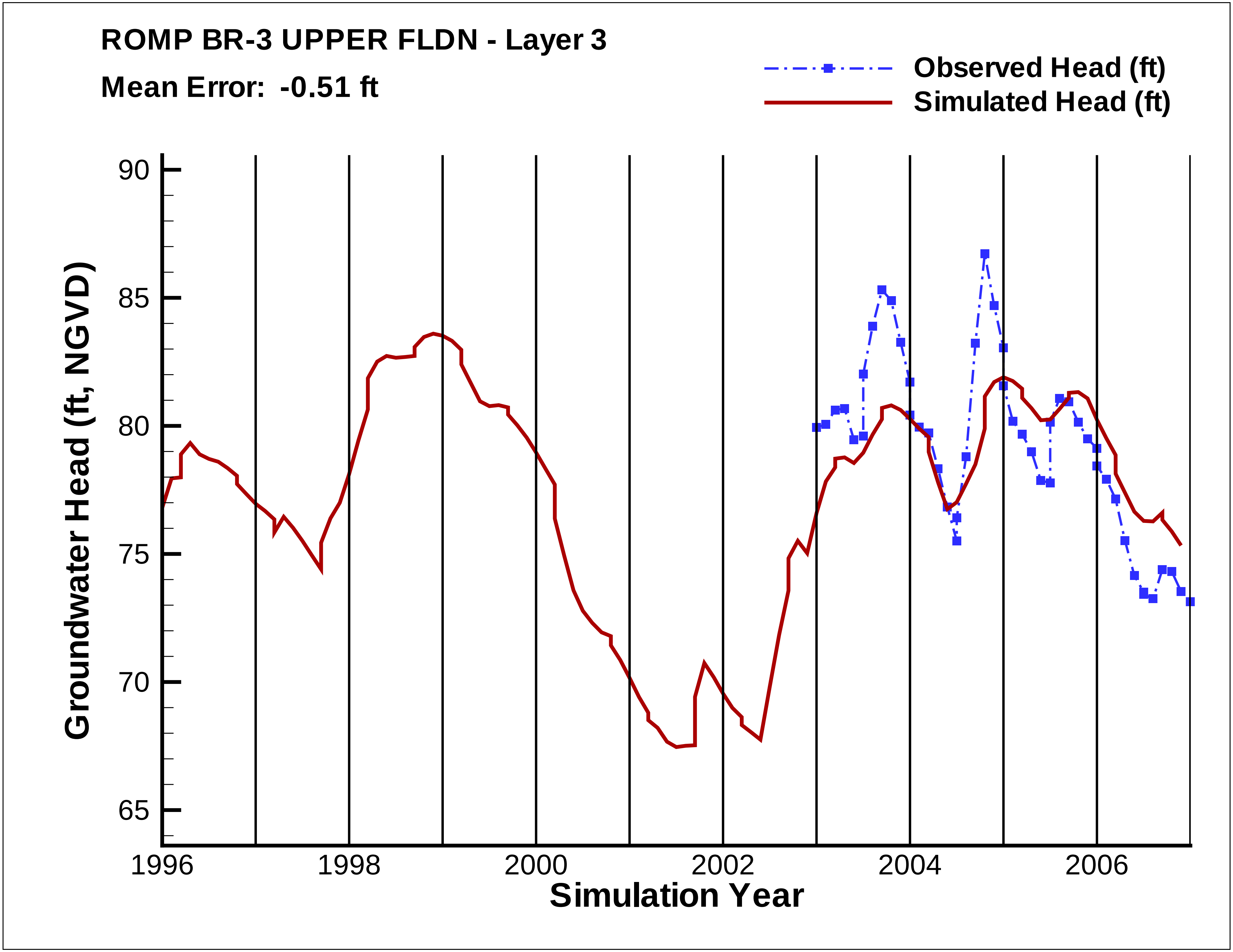


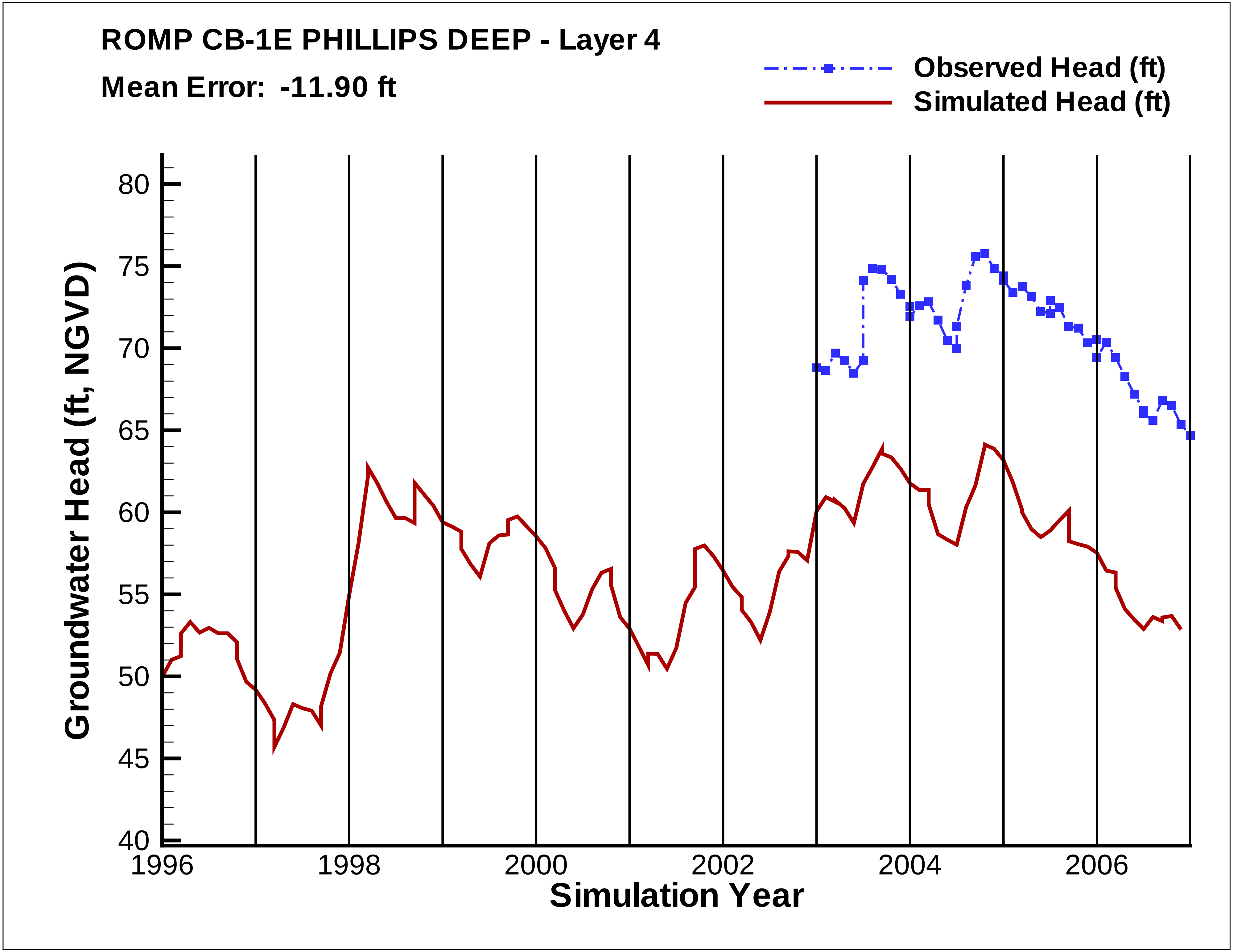
ROMP 86A SWNN - Layer 3
Mean Error: 12.64 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

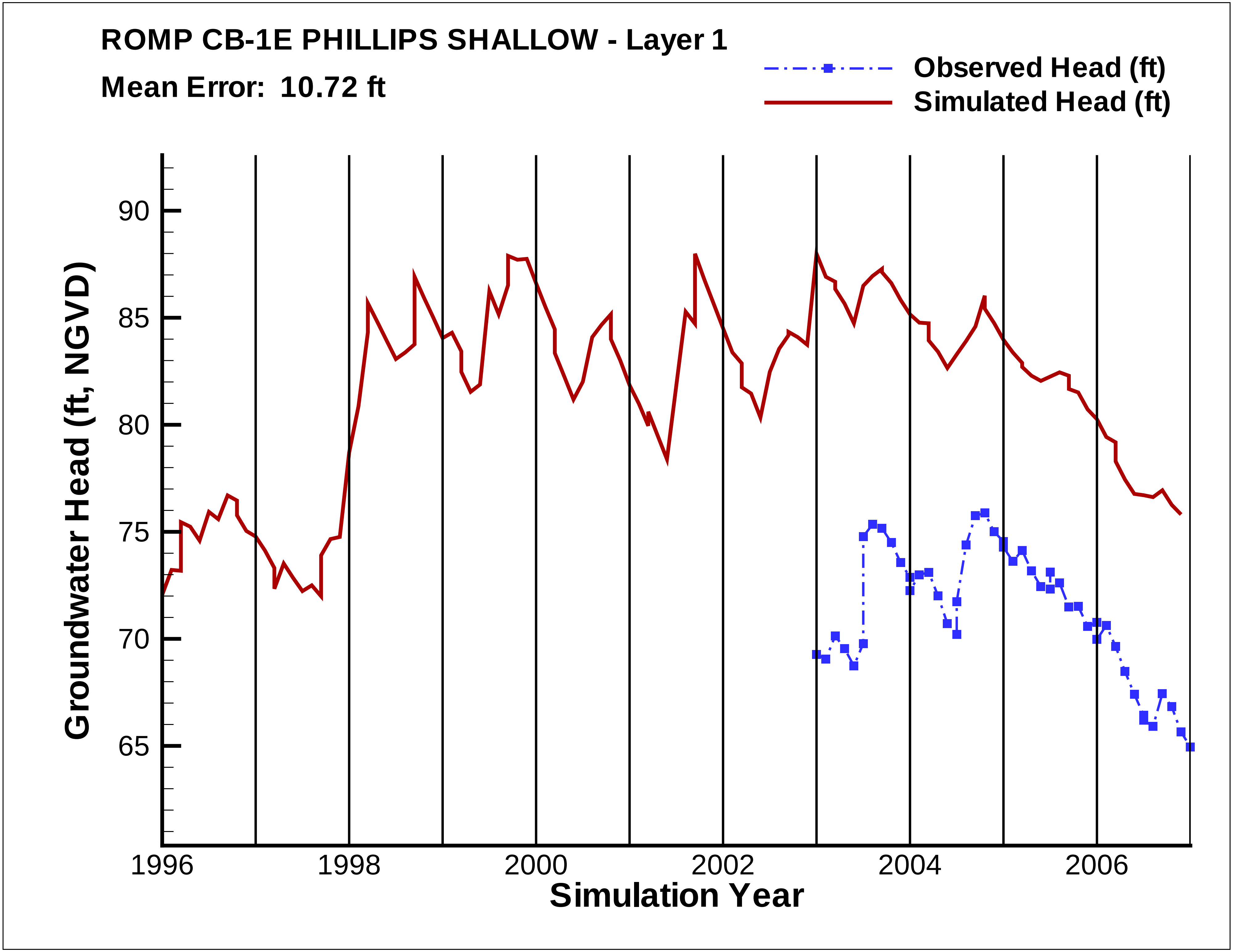

ROMP BR-2 UPPER FLDN - Layer 4
Mean Error: -4.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

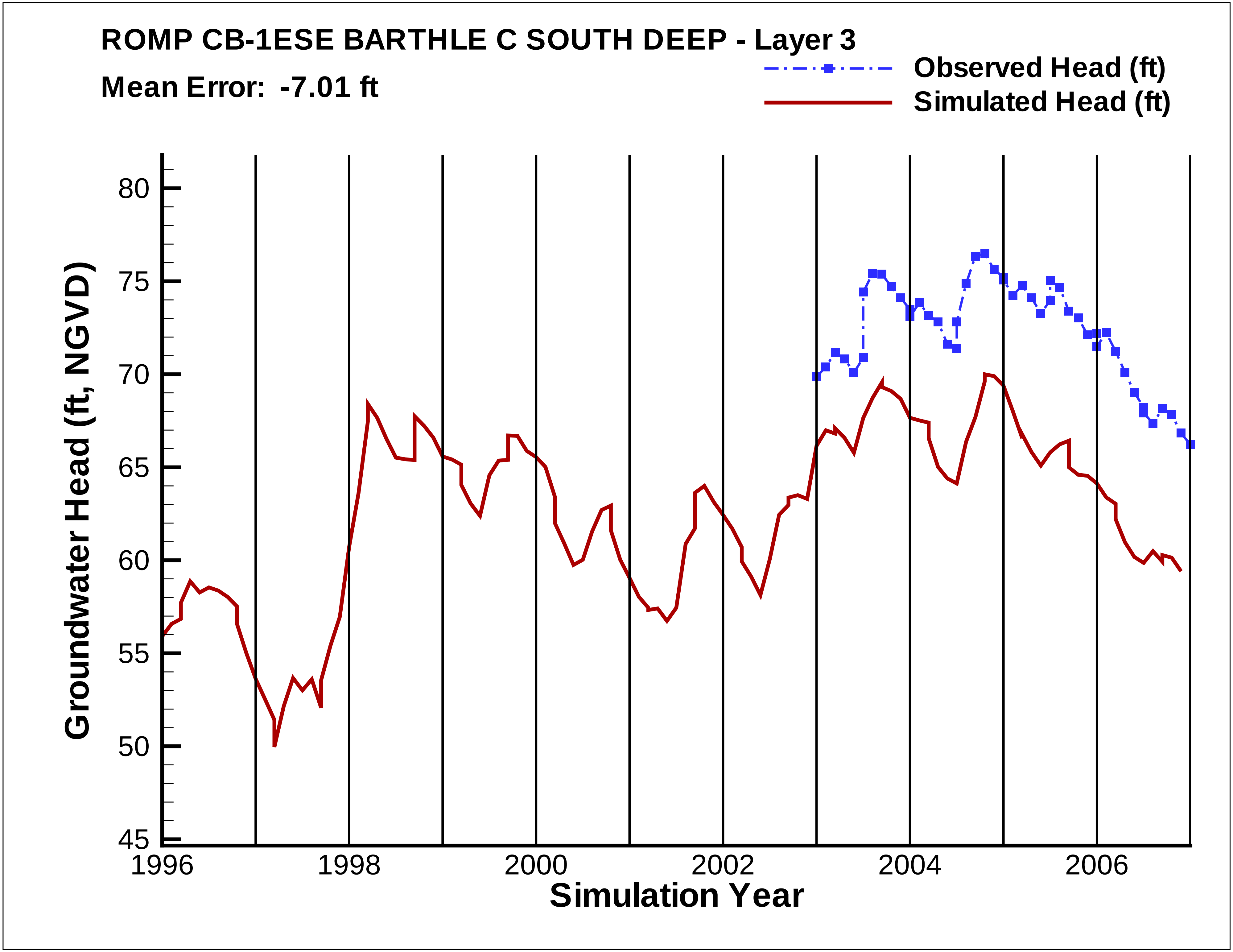


ROMP BR-3 SURF - Layer 1
Mean Error: -14.29 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
100
95
90
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year

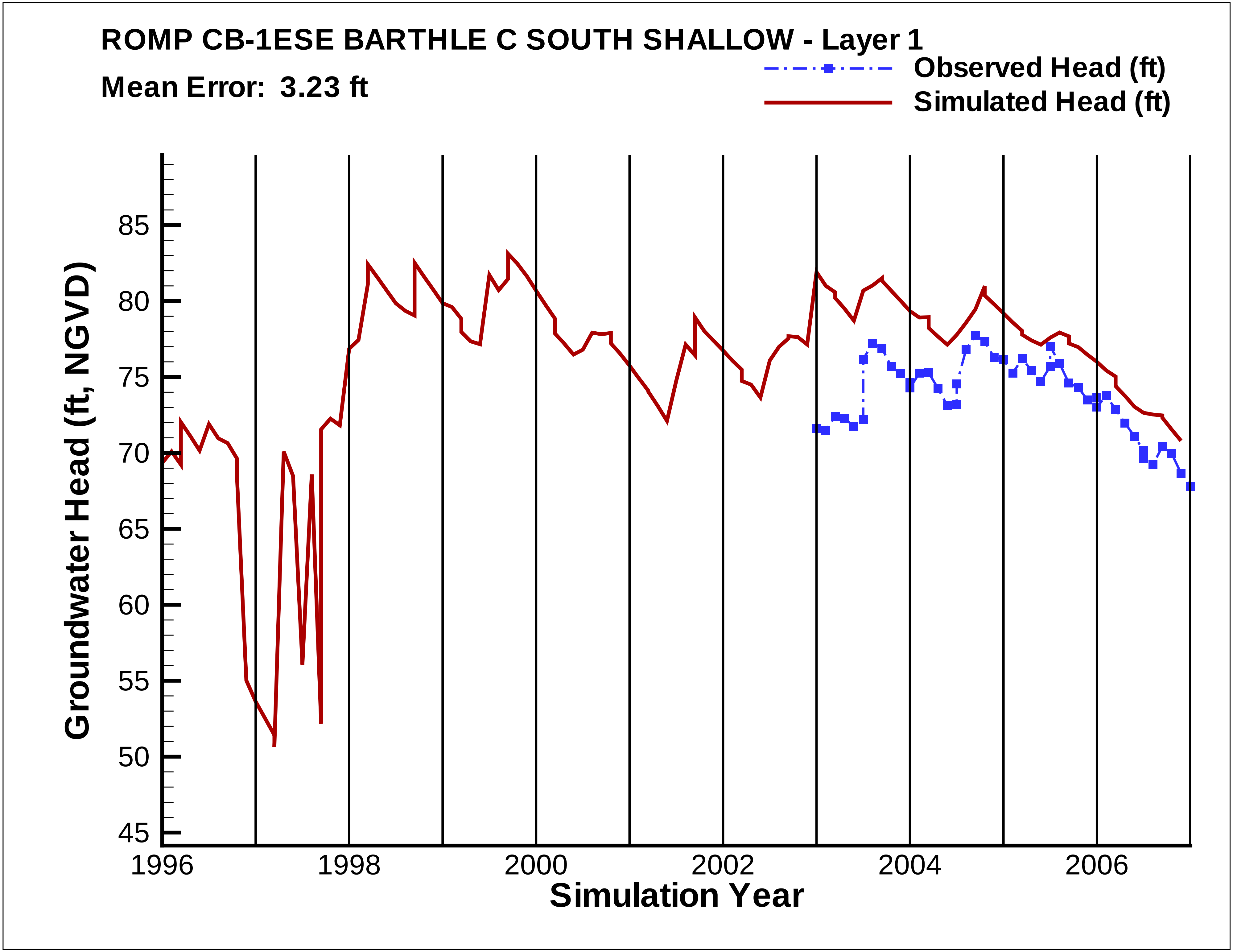

ROMP BR-3 UPPER FLDN - Layer 3
Mean Error: -0.51 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year


ROMP CB-1E PHILLIPS DEEP - Layer 4
Mean Error: -11.90 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

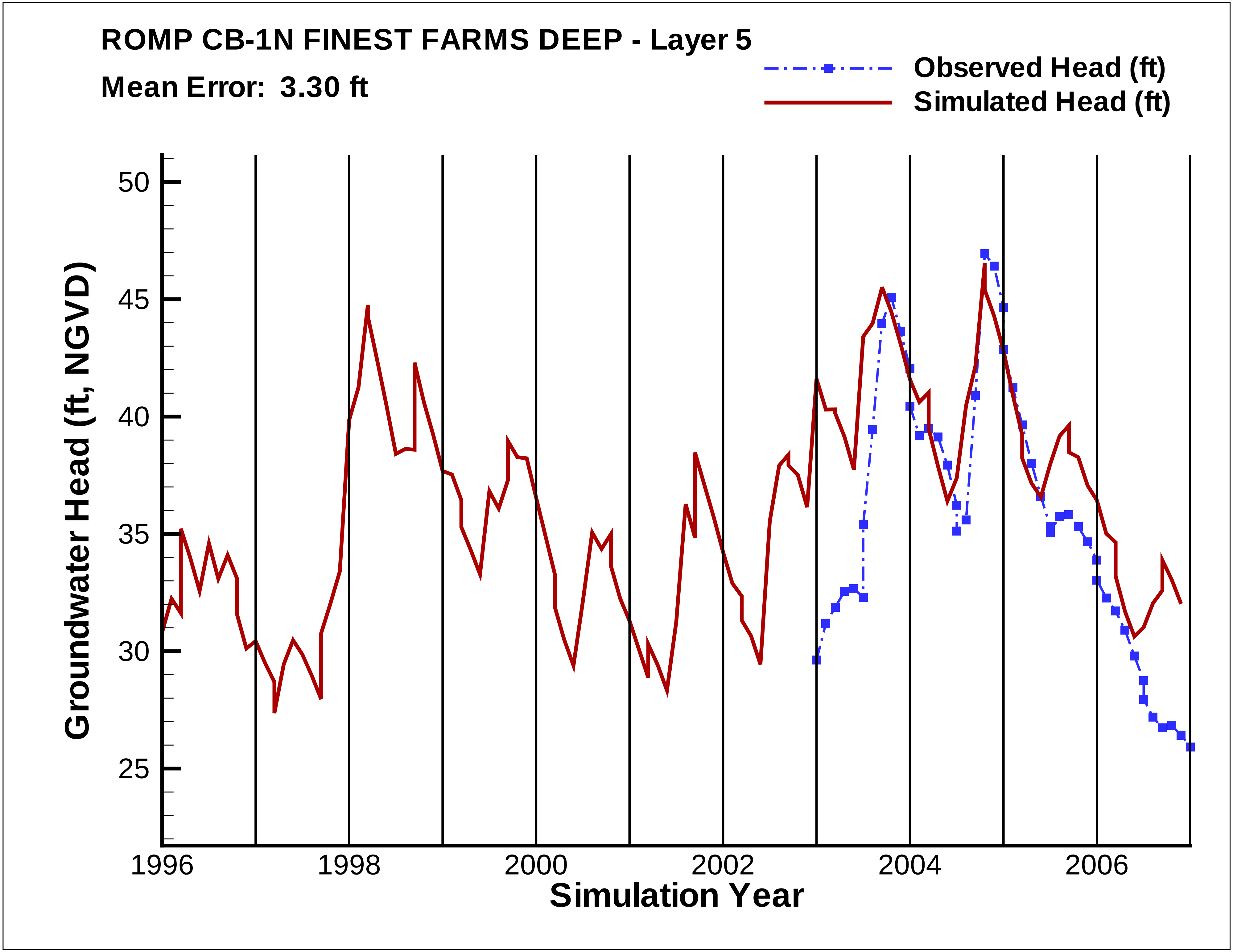

ROMP CB-1E PHILLIPS SHALLOW - Layer 1
Mean Error: 10.72 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



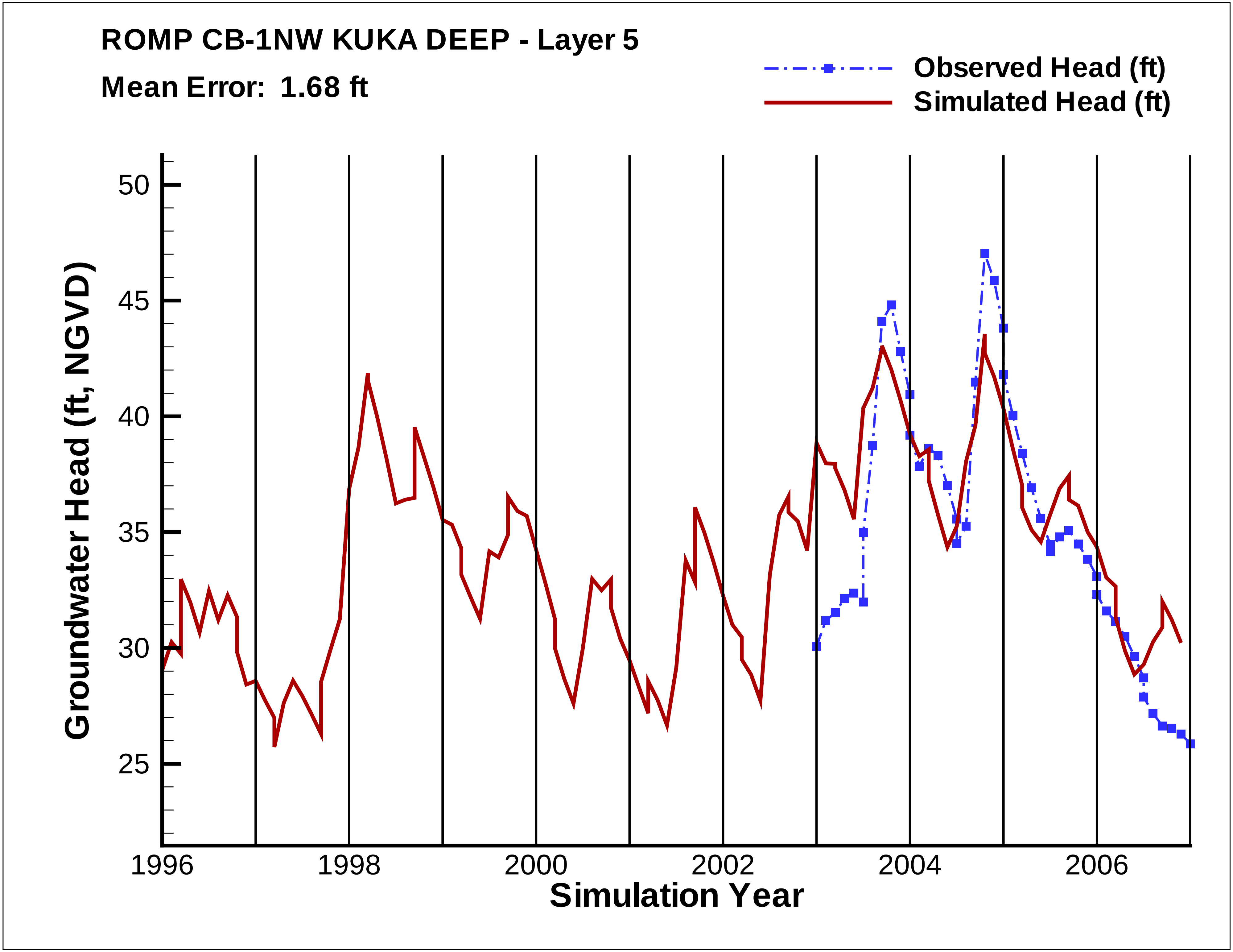
ROMP CB-1ESE BARTHLE C SOUTH DEEP - Layer 3
Mean Error: -7.01 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

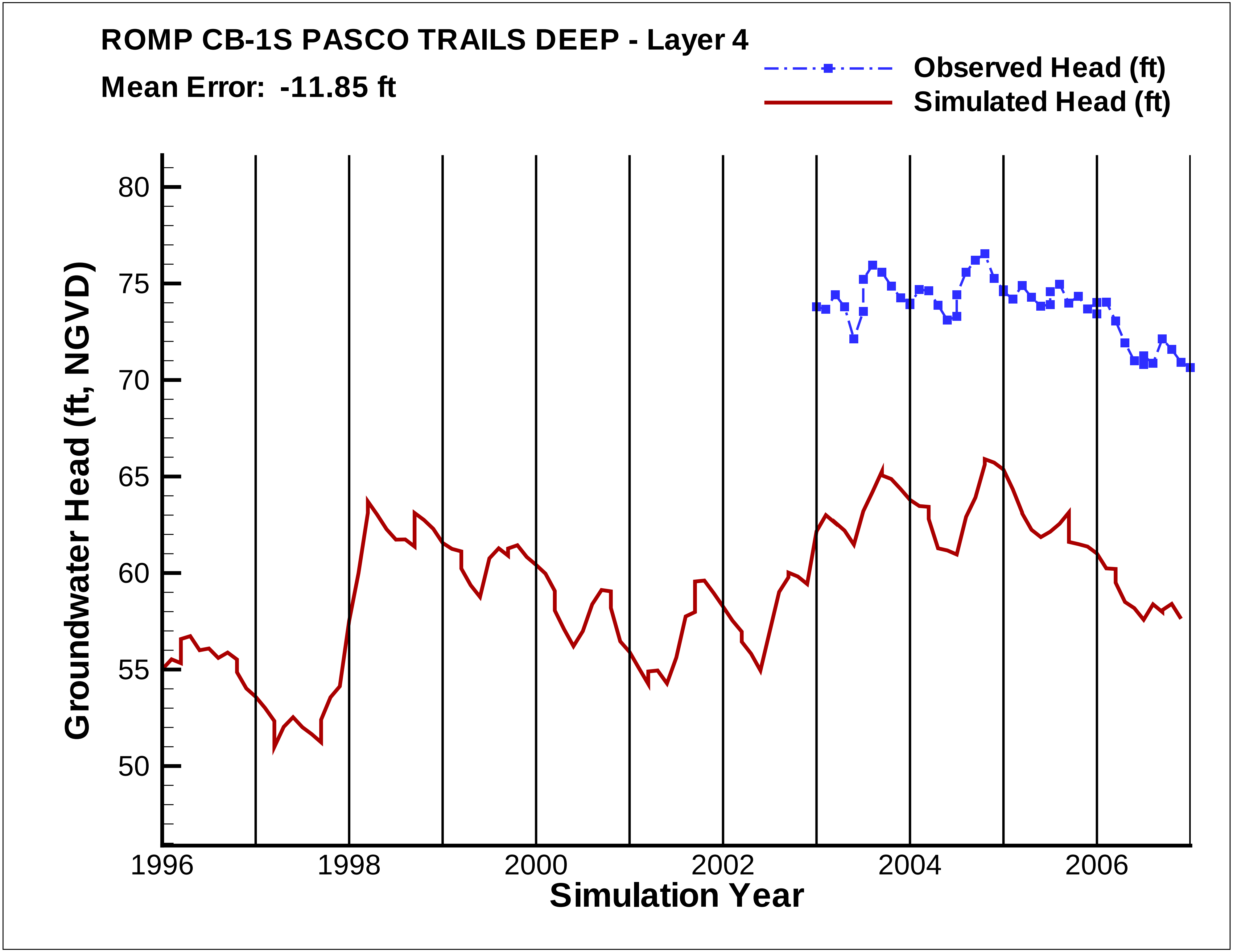


ROMP CB-1ESE BARTHLE C SOUTH SHALLOW - Layer 1
Mean Error: 3.23 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

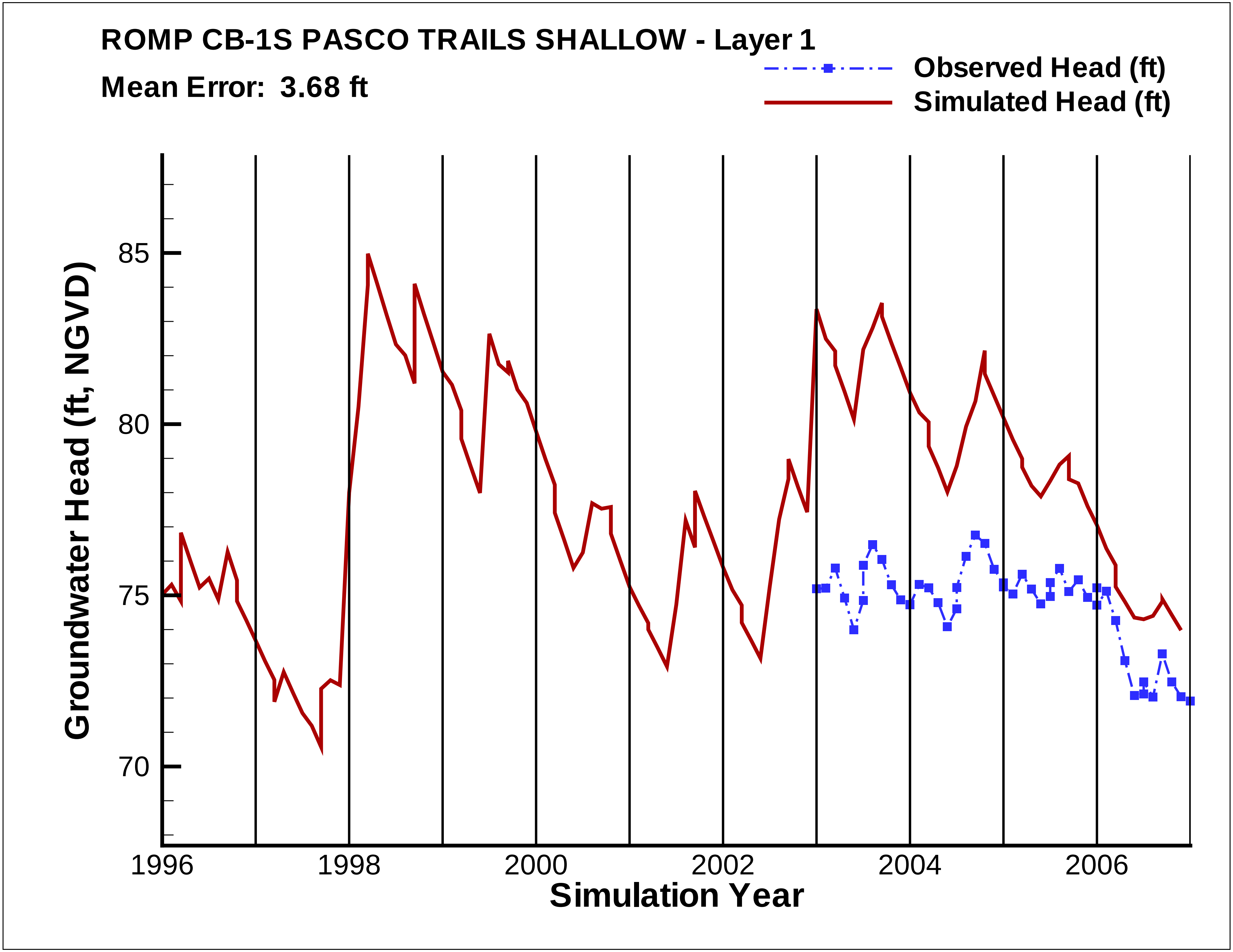


ROMP CB-1N FINEST FARMS DEEP - Layer 5
Mean Error: 3.30 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

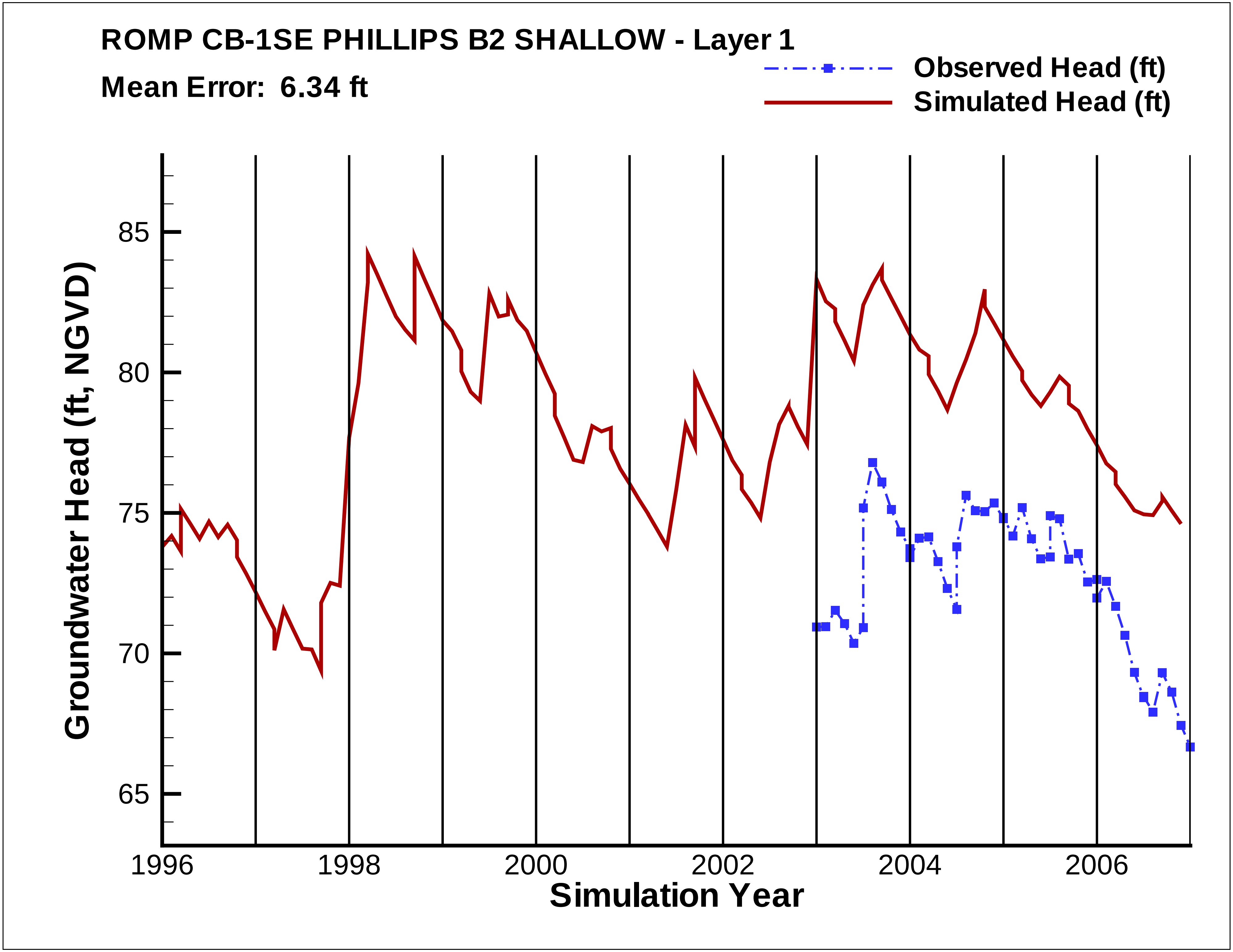

ROMP CB-1NW KUKA DEEP - Layer 5
Mean Error: 1.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

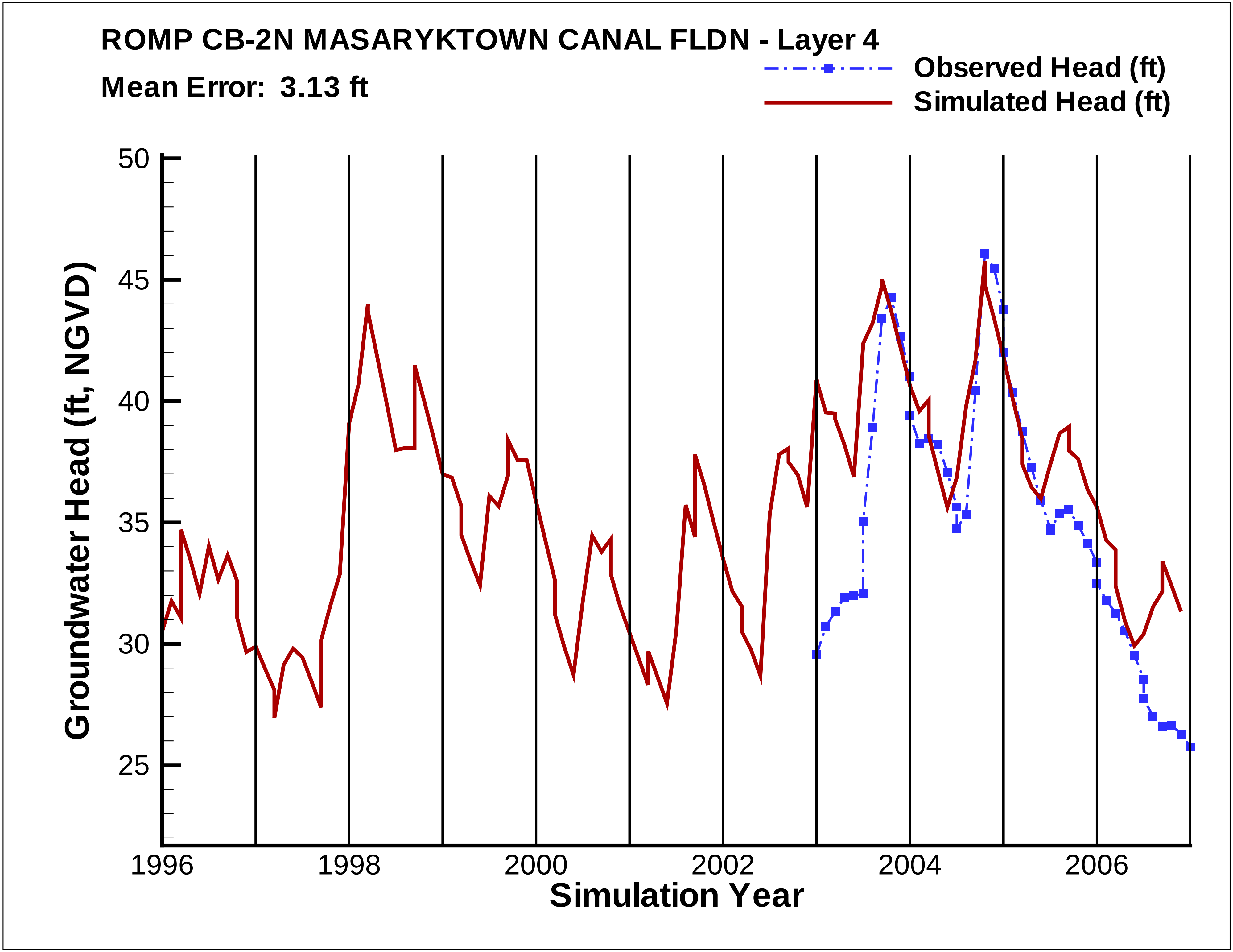


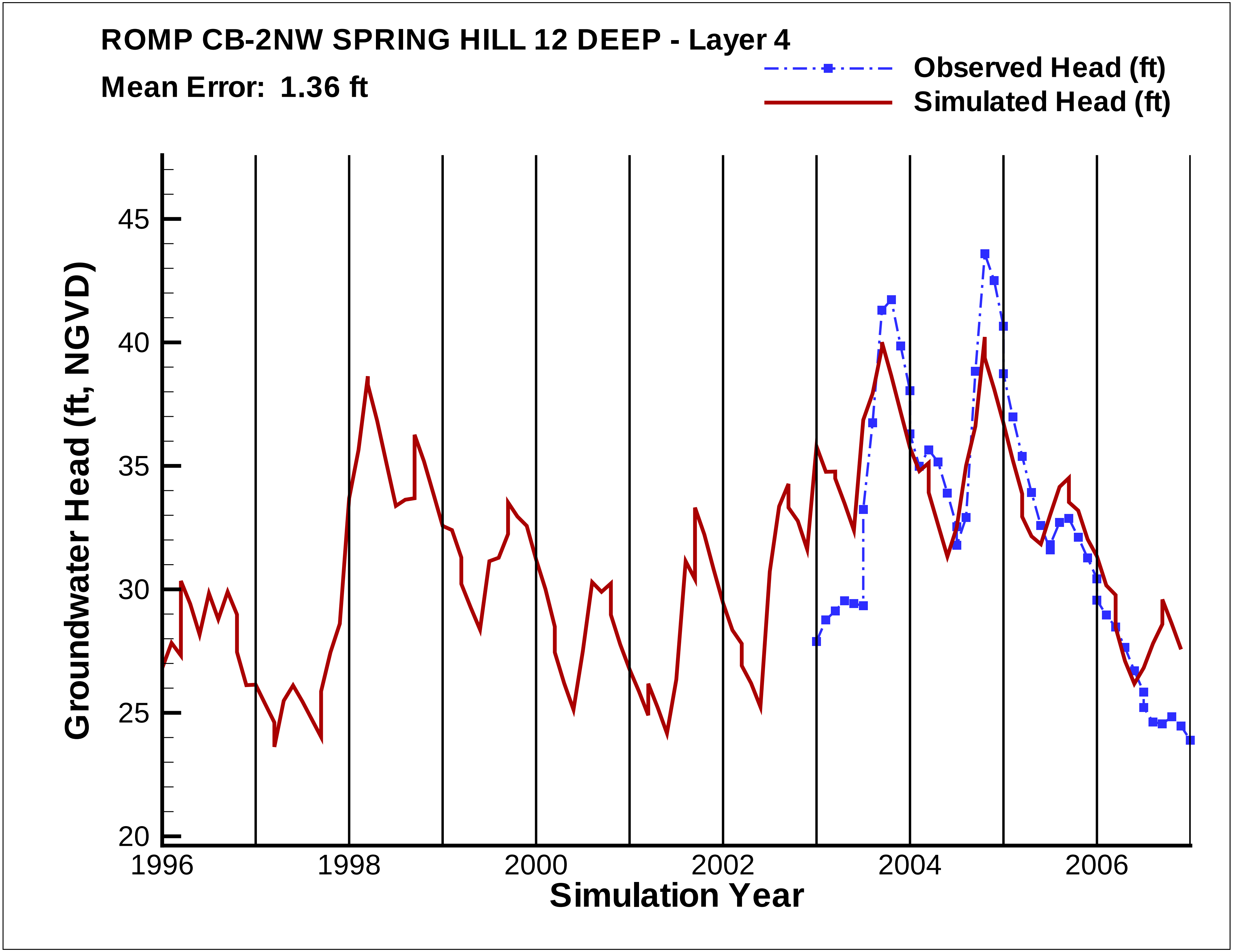
ROMP CB-1S PASCO TRAILS DEEP - Layer 4
Mean Error: -11.85 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

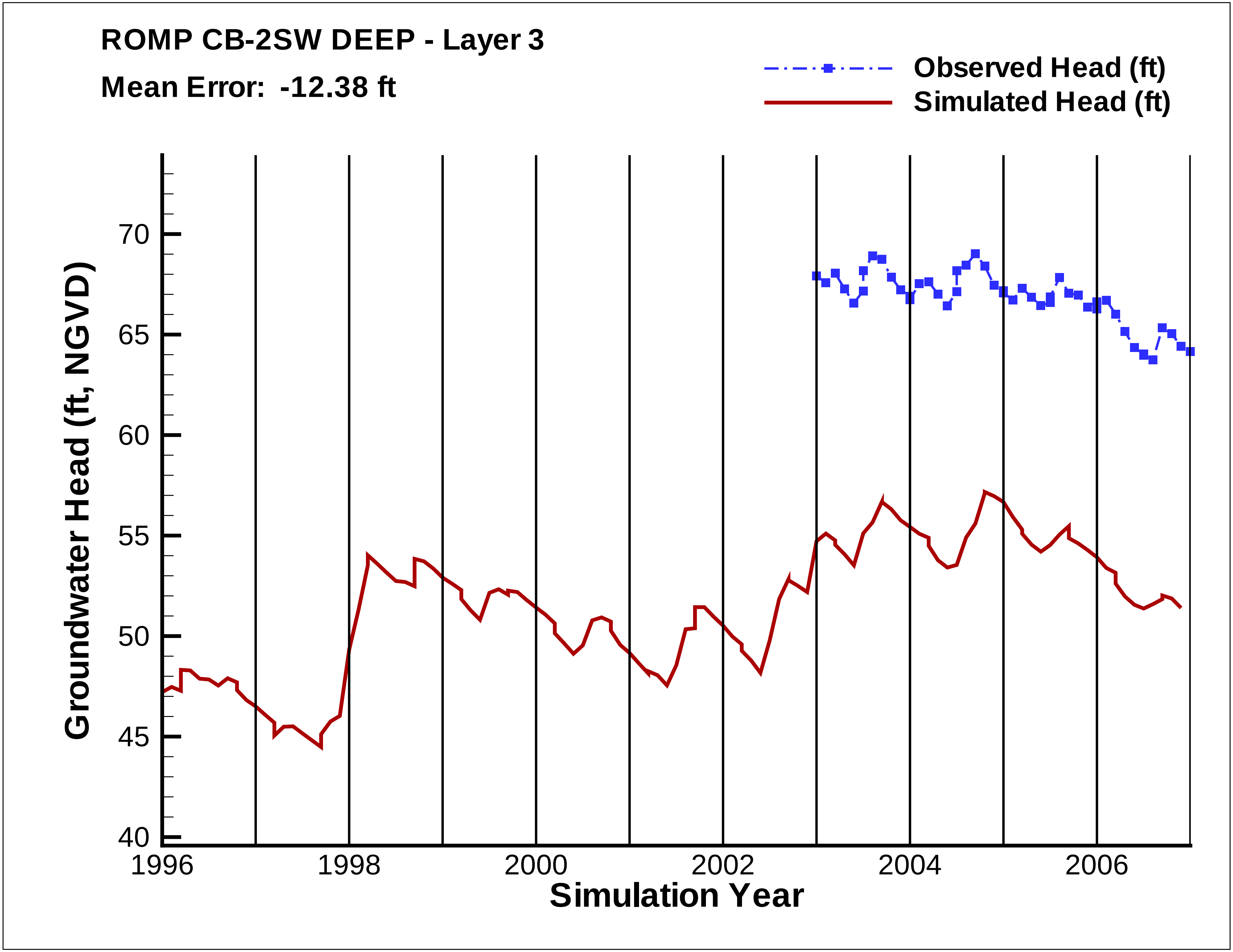


ROMP CB-1S PASCO TRAILS SHALLOW - Layer 1
Mean Error: 3.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

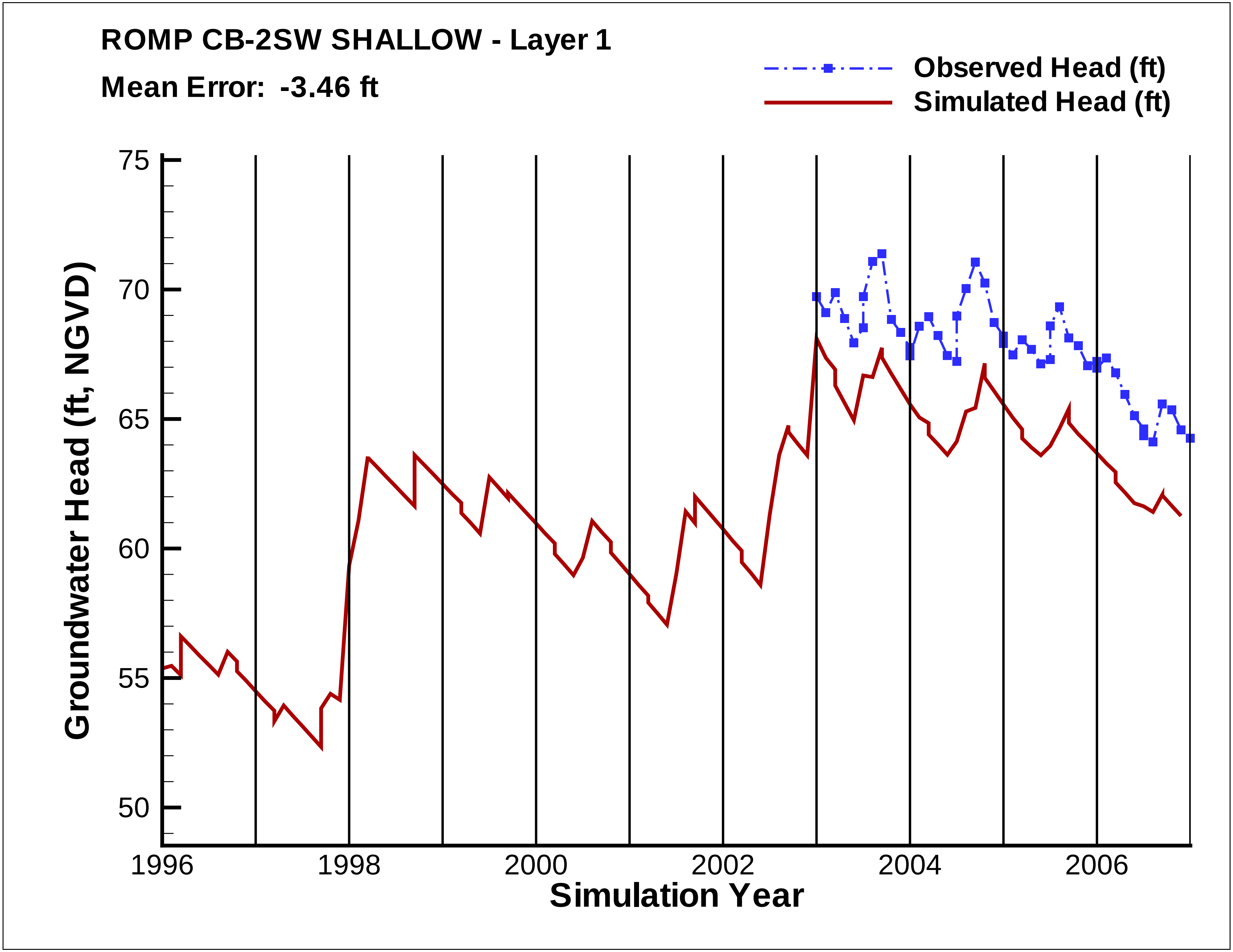

ROMP CB-1SE PHILLIPS B2 SHALLOW - Layer 1
Mean Error: 6.34 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year


ROMP CB-2N MASARYKTOWN CANAL FLDN - Layer 4
Mean Error: 3.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

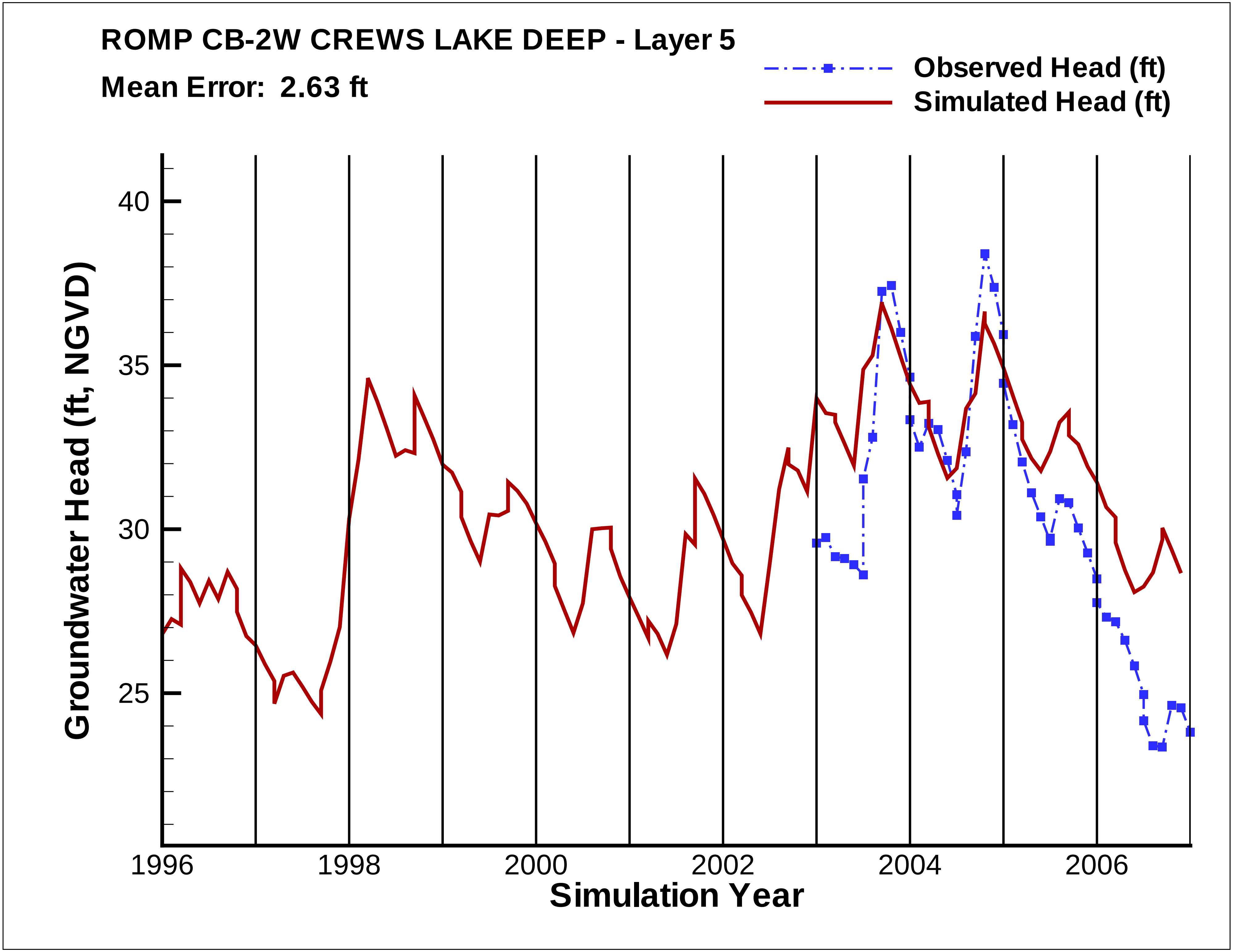

ROMP CB-2NW SPRING HILL 12 DEEP - Layer 4
Mean Error: 1.36 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
25
30
35
40
45
1996
1998
2000
2002
2004
2006
Simulation Year

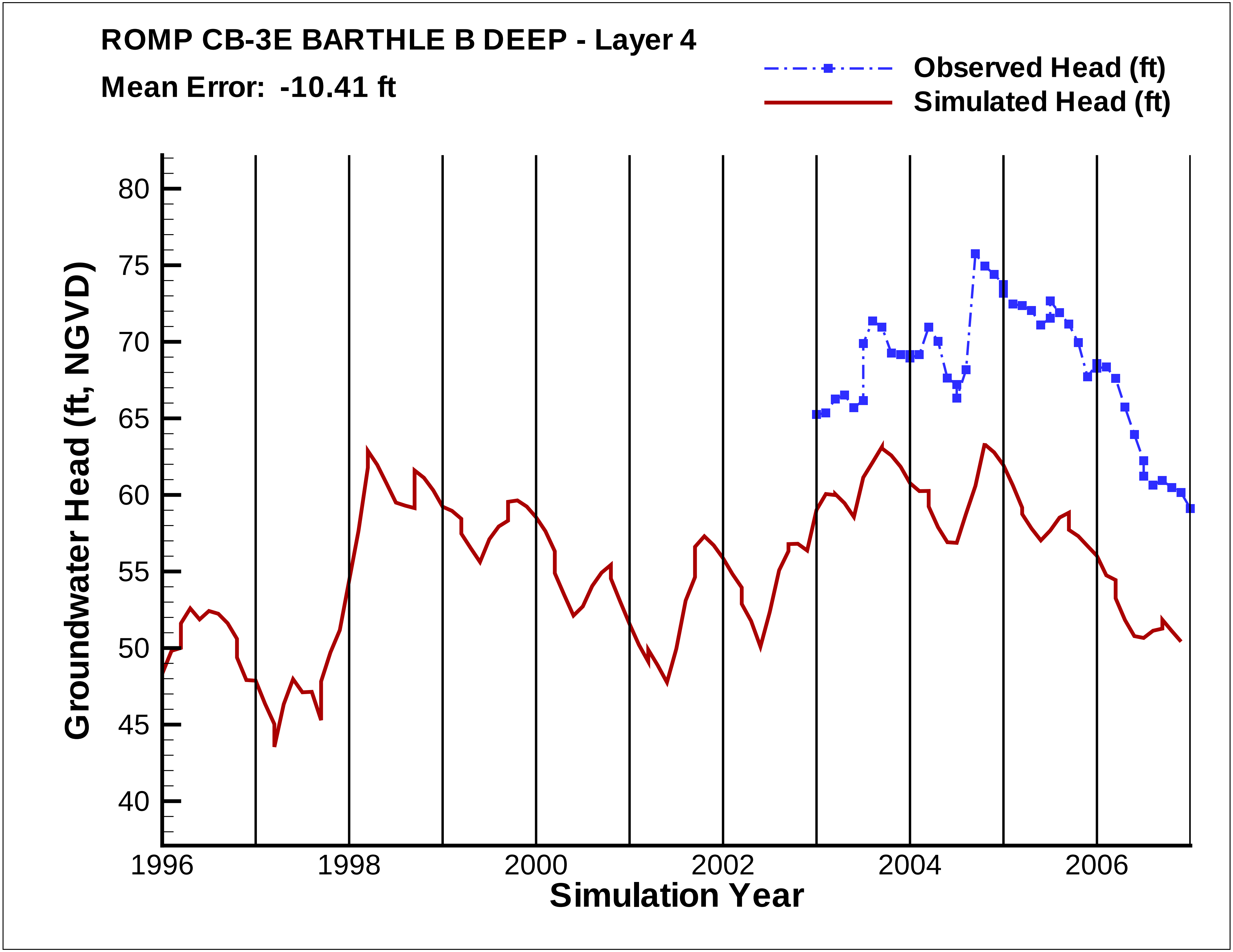


ROMP CB-2SW DEEP - Layer 3
Mean Error: -12.38 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

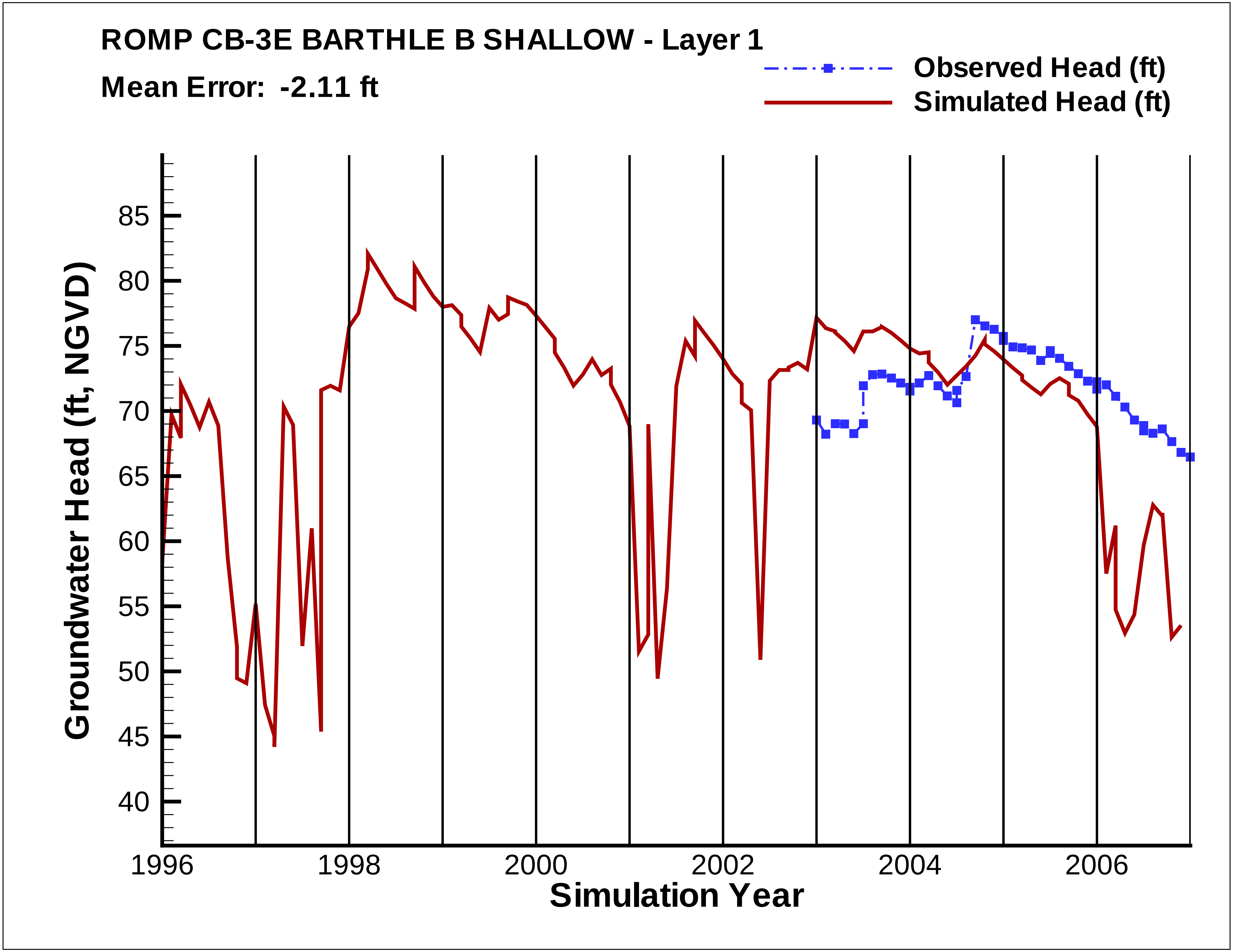


ROMP CB-2SW SHALLOW - Layer 1
Mean Error: -3.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

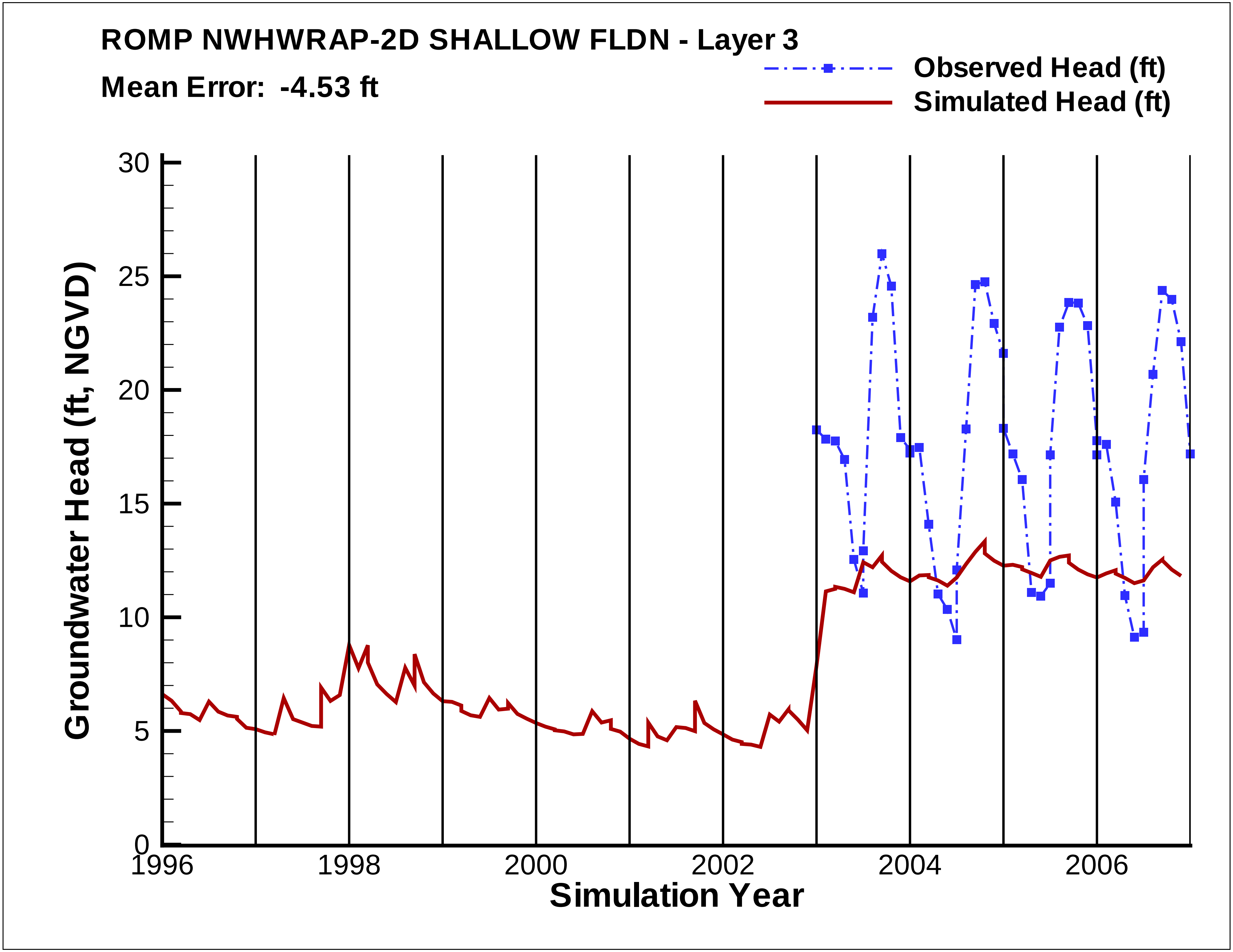

ROMP CB-2W CREWS LAKE DEEP - Layer 5
Mean Error: 2.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

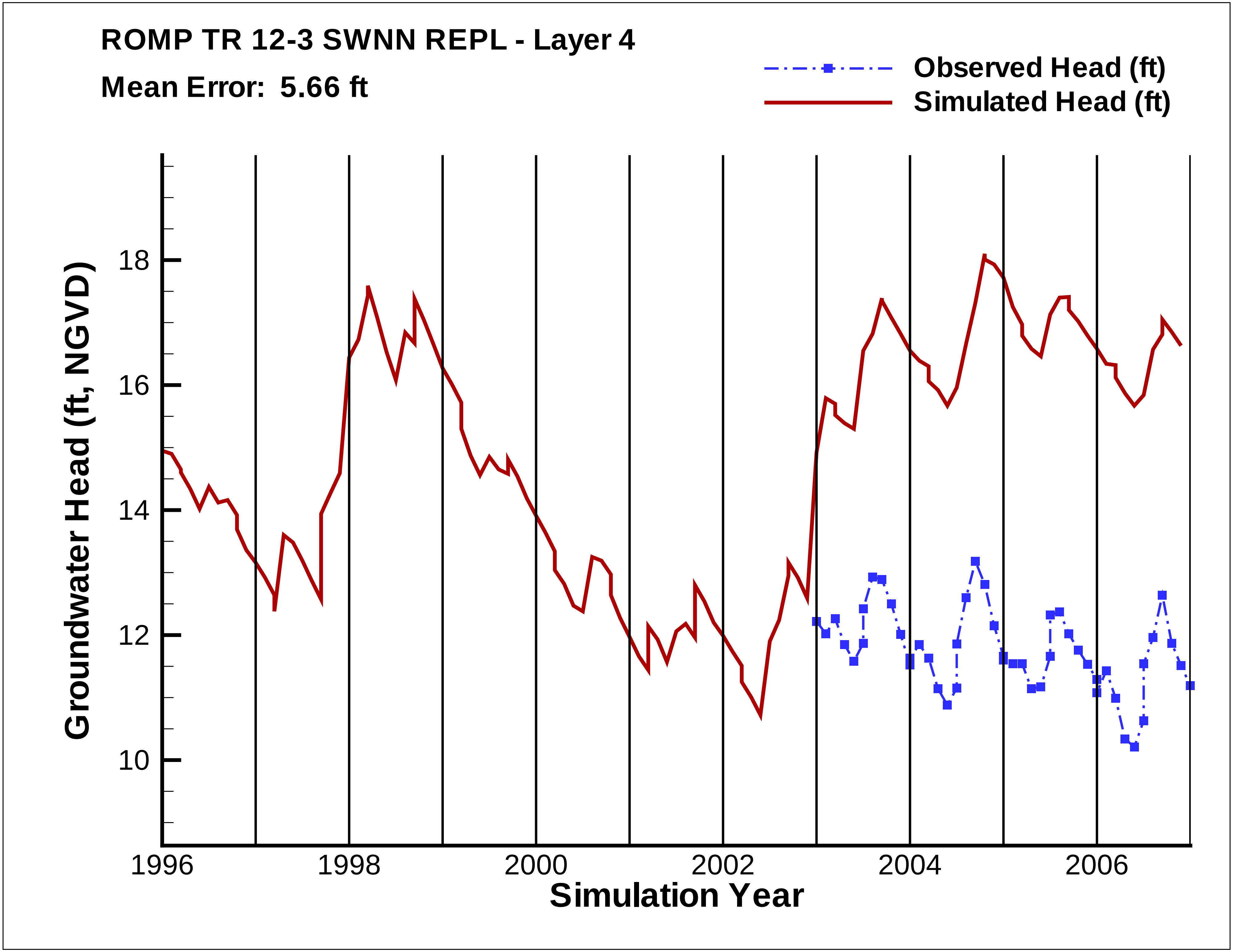


ROMP CB-3E BARTHLE B DEEP - Layer 4
Mean Error: -10.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

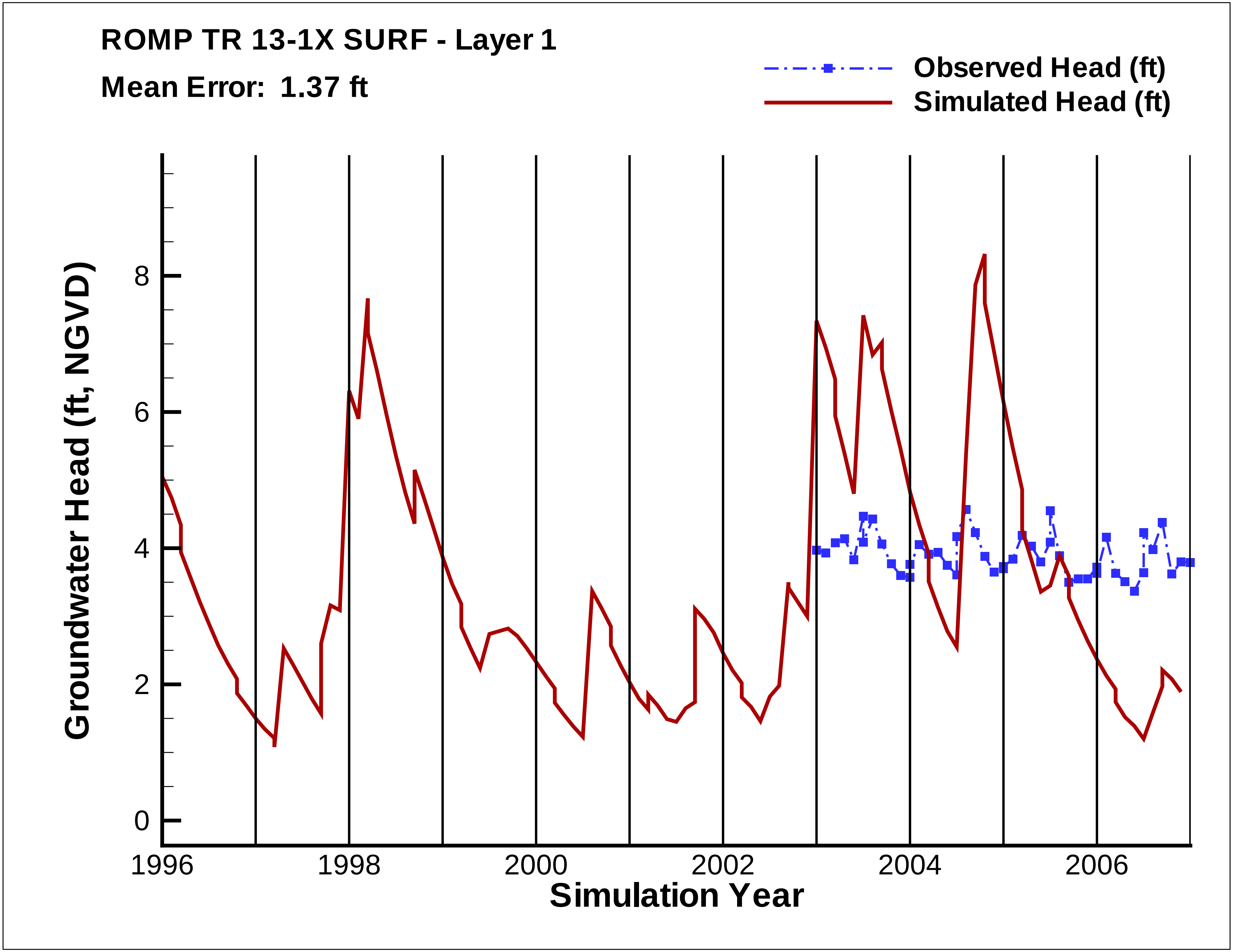


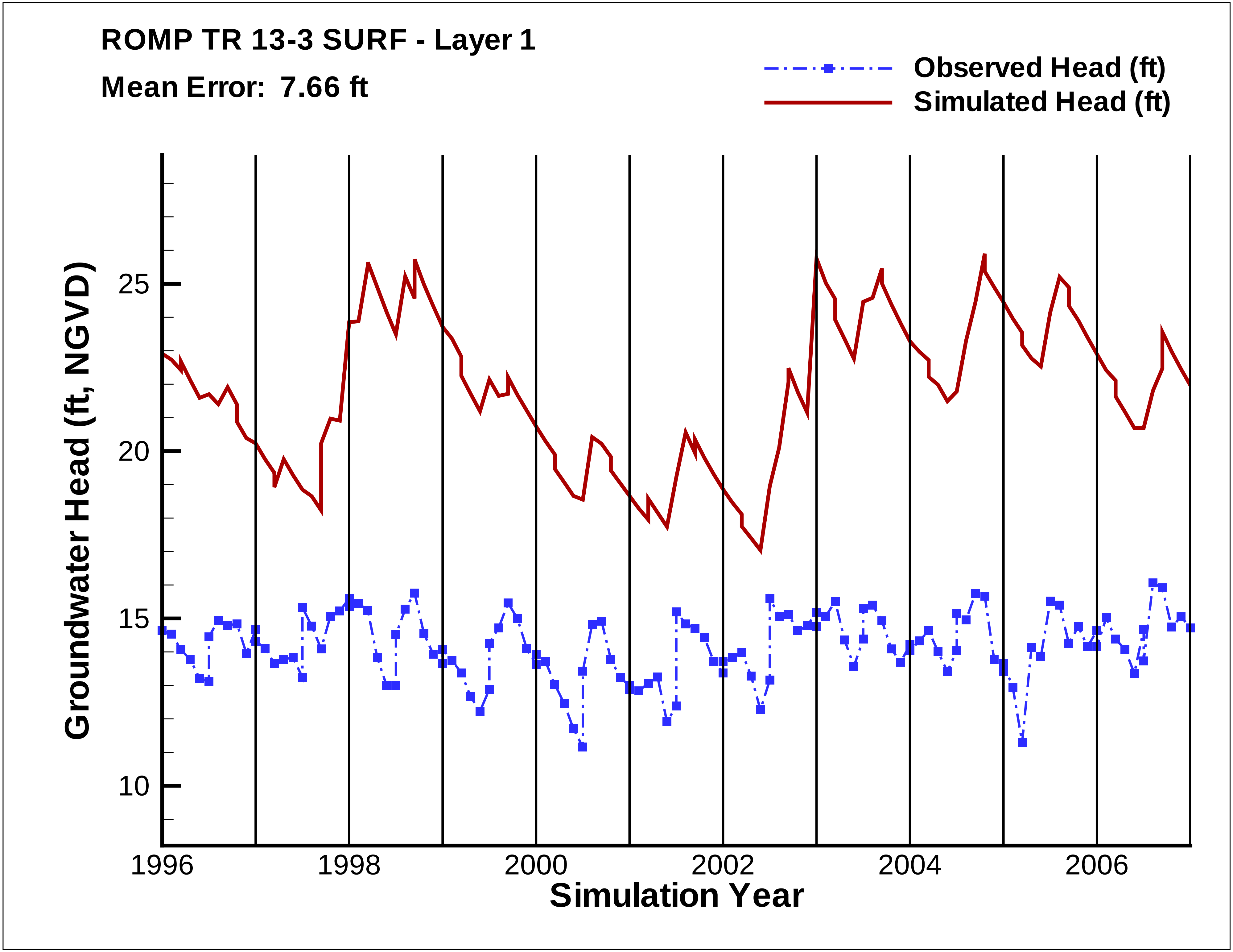
ROMP CB-3E BARTHLE B SHALLOW - Layer 1
Mean Error: -2.11 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
Simulation Year
85
80
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006

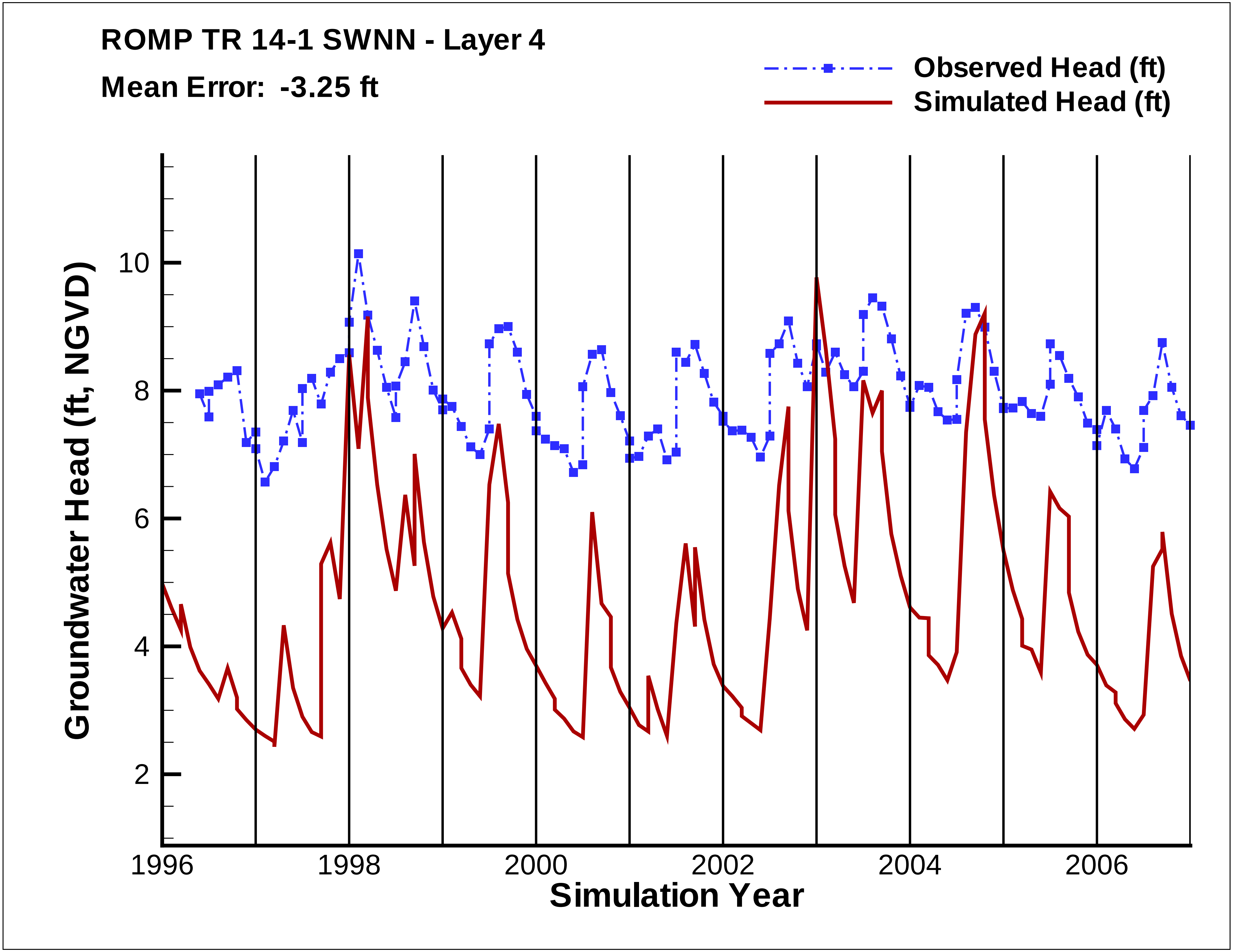

ROMP NWHWRAP-2D SHALLOW FLDN - Layer 3
Mean Error: -4.53 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
Simulation Year
0
5
10
15
20
25
30
1996
1998
2000
2002
2004
2006



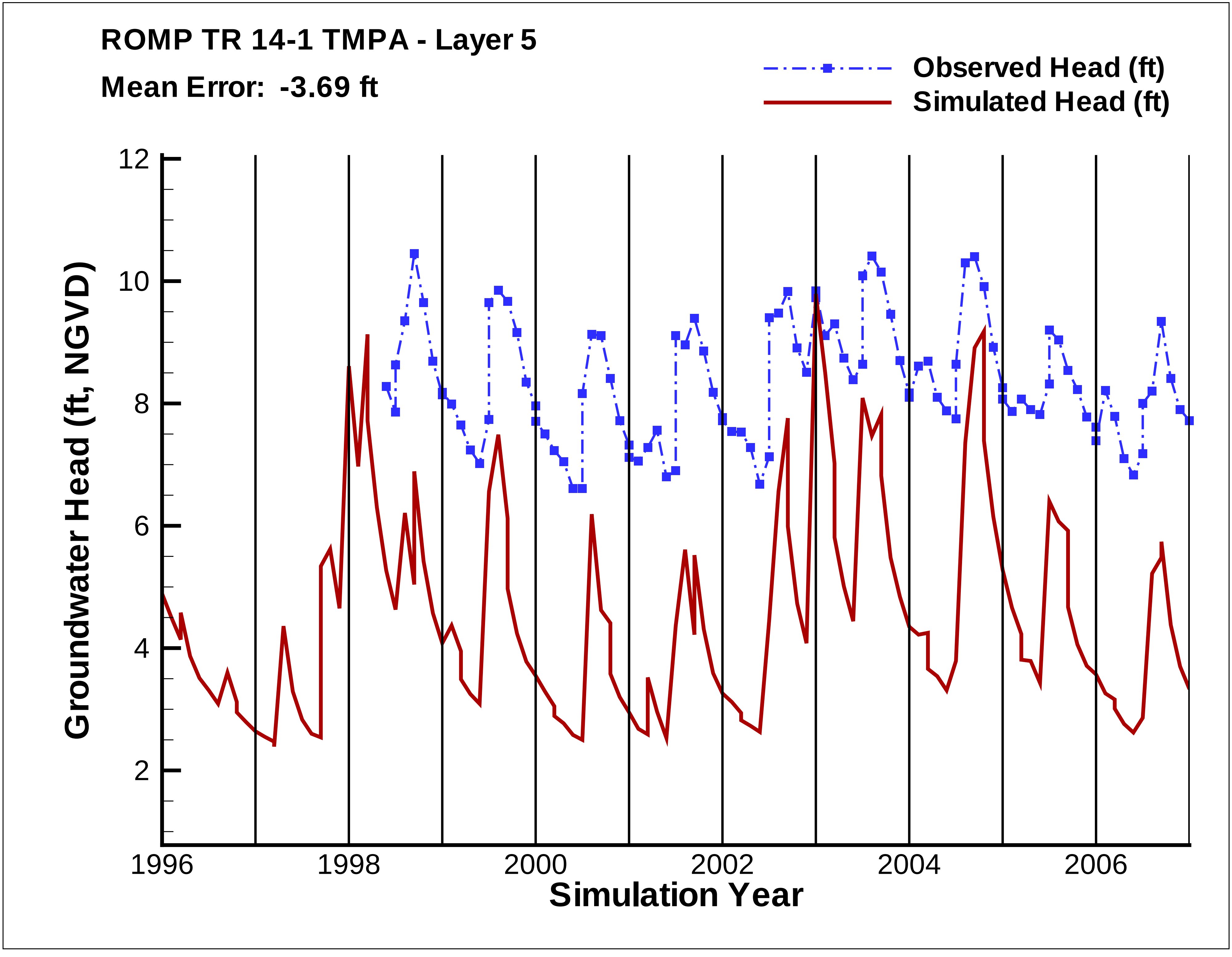
ROMP TR 12-3 SWNN REPL - Layer 4
Mean Error: 5.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
18
16
14
12
10
1996
1998
2000
2002
2004
2006
Simulation Year


ROMP TR 13-1X SURF - Layer 1
Mean Error: 1.37 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
2
4
6
8
1996
1998
2000
2002
2004
2006
Simulation Year

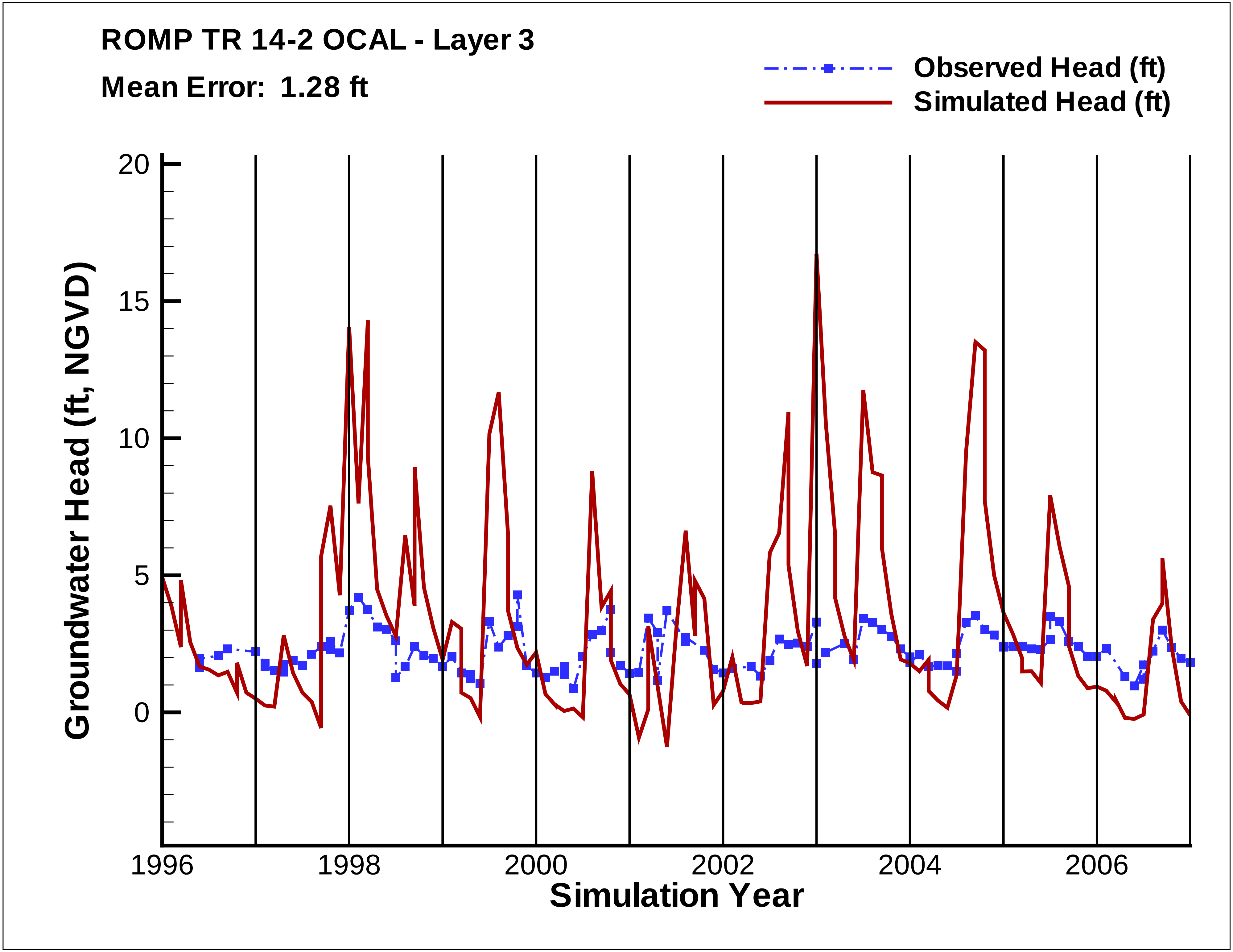

ROMP TR 13-3 SURF - Layer 1
Mean Error: 7.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



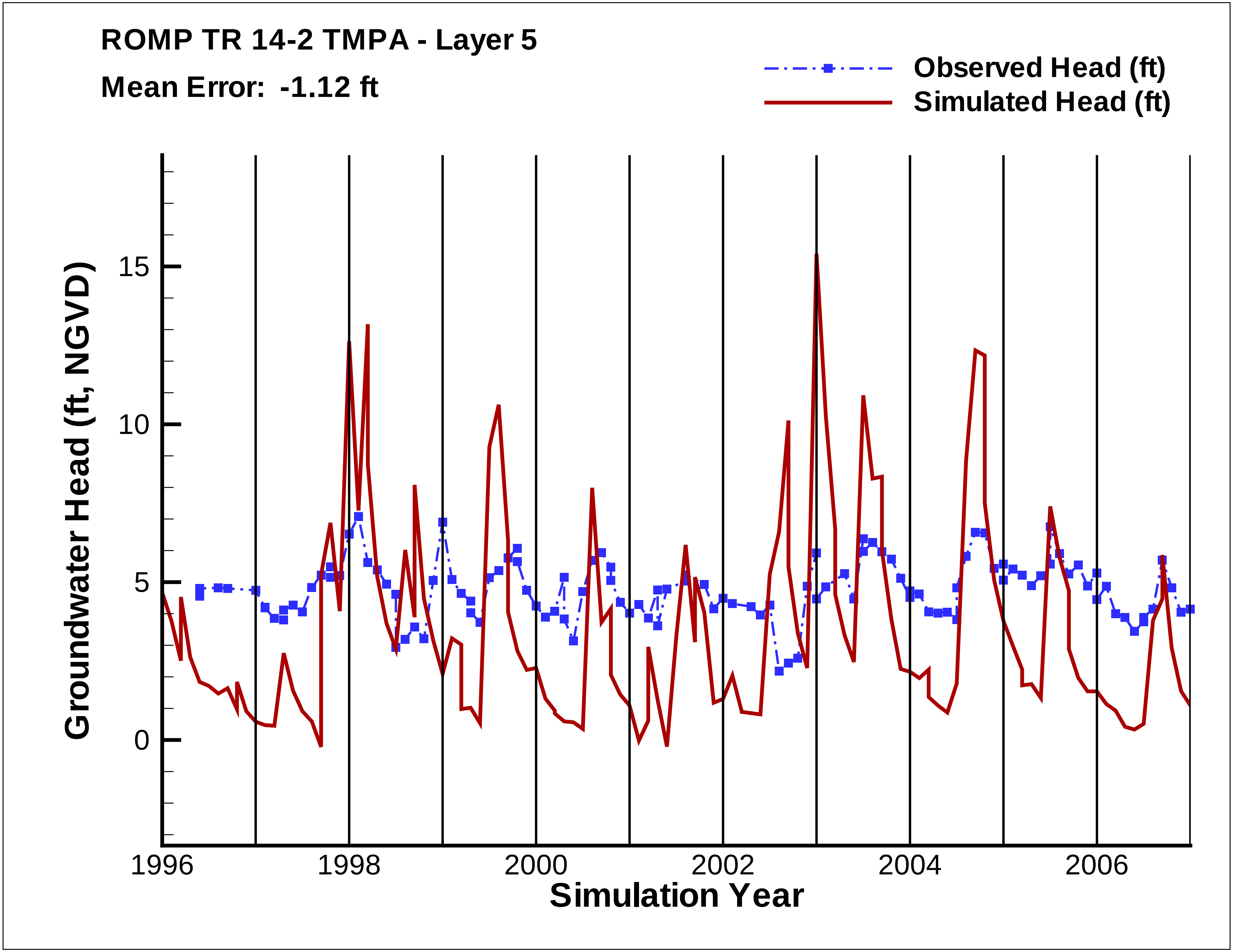
ROMP TR 14-1 SWNN - Layer 4
Mean Error: -3.25 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
2
4
6
8
10
1996
1998
2000
2002
2004
2006
Simulation Year



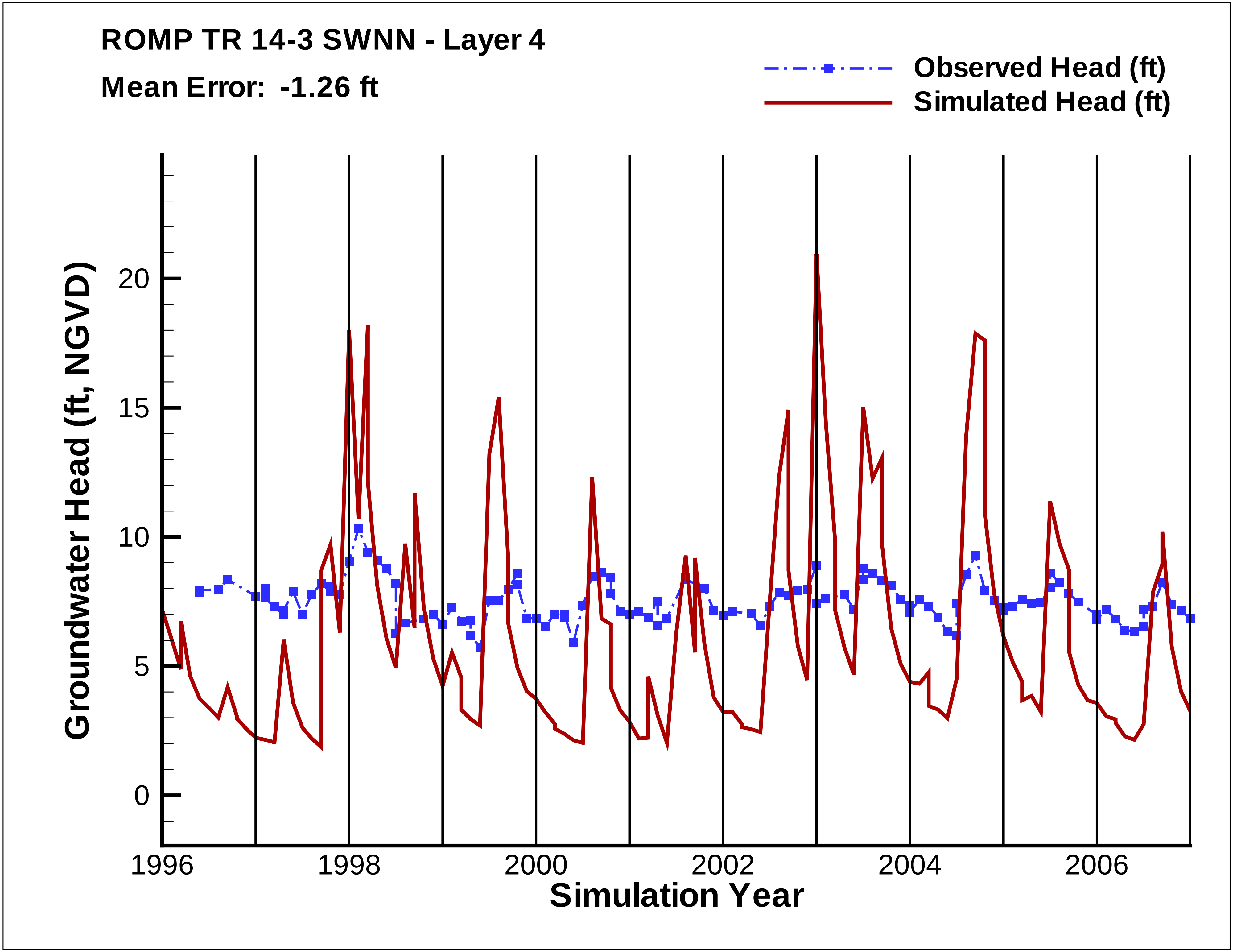
ROMP TR 14-1 TMPA - Layer 5
Mean Error: -3.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
12
10
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year



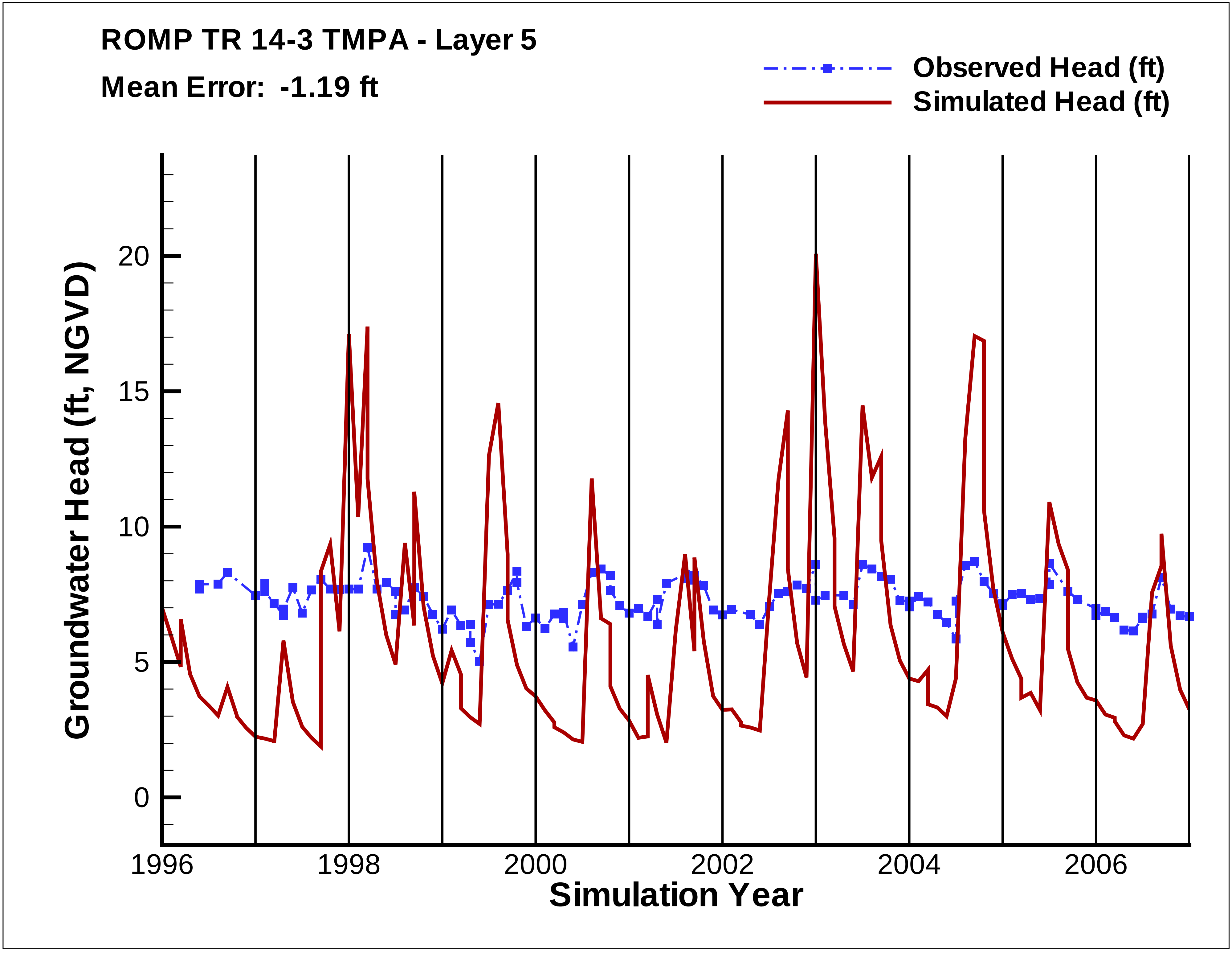
ROMP TR 14-2 OCAL - Layer 3
Mean Error: 1.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
5
0
1996
1998
2000
2002
2004
2006
Simulation Year

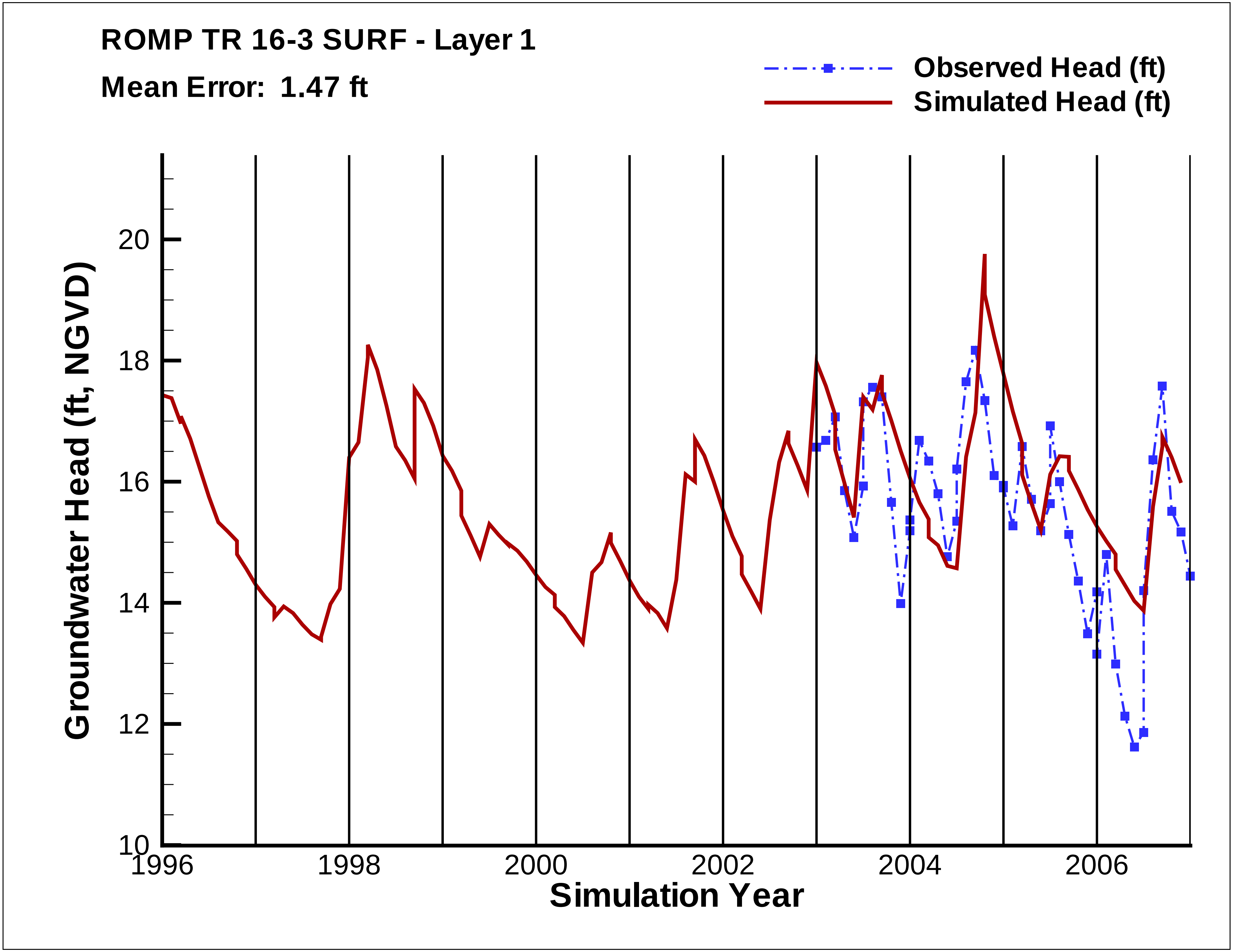


ROMP TR 14-2 TMPA - Layer 5
Mean Error: -1.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
0
1996
1998
2000
2002
2004
2006
Simulation Year

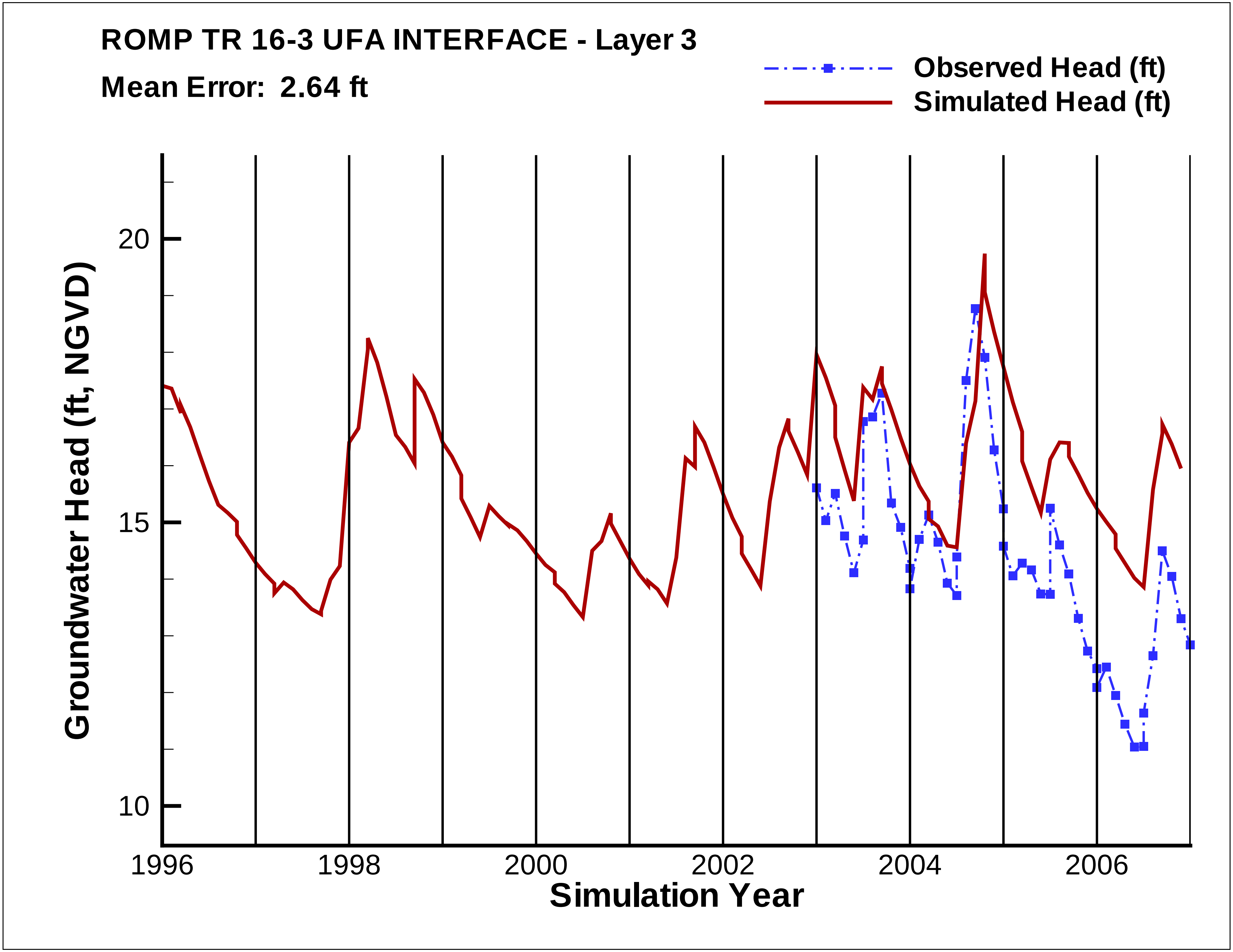


ROMP TR 14-3 SWNN - Layer 4
Mean Error: -1.26 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
1996
1998
2000
2002
2004
2006
Simulation Year

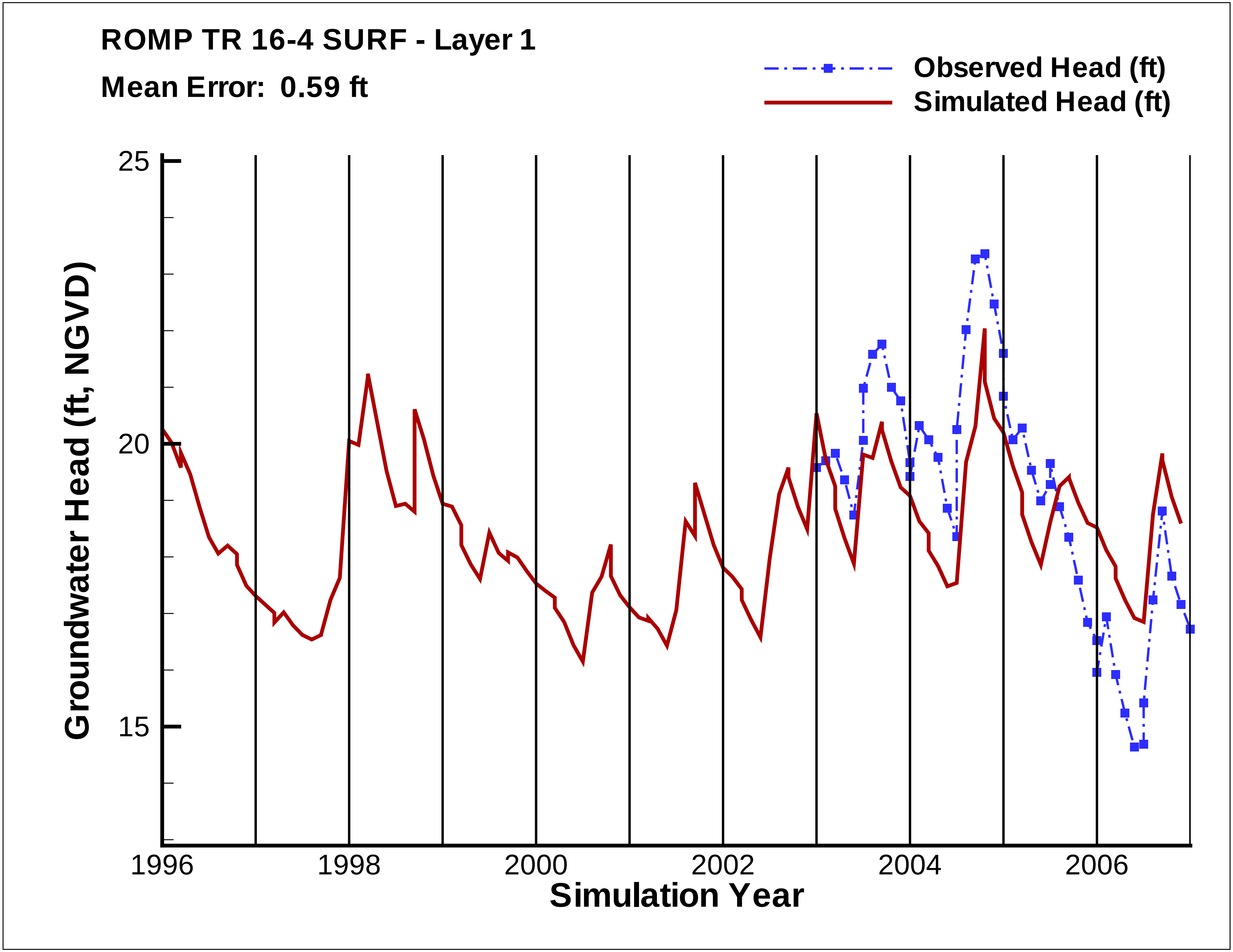

ROMP TR 14-3 TMPA - Layer 5
Mean Error: -1.19 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
1996
1998
2000
2002
2004
2006
Simulation Year



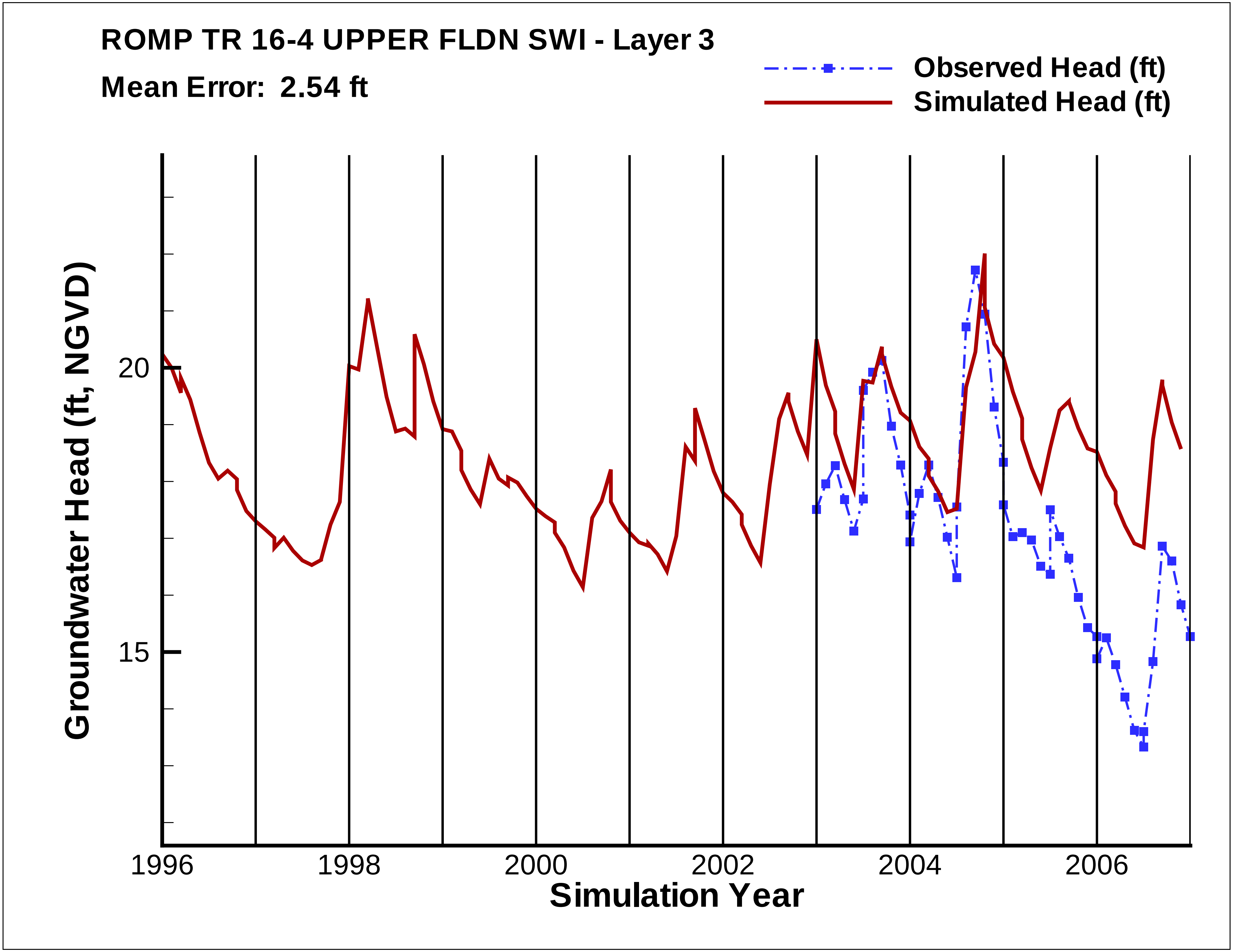
ROMP TR 16-3 SURF - Layer 1
Mean Error: 1.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
12
14
16
18
20
1996
1998
2000
2002
2004
2006
Simulation Year

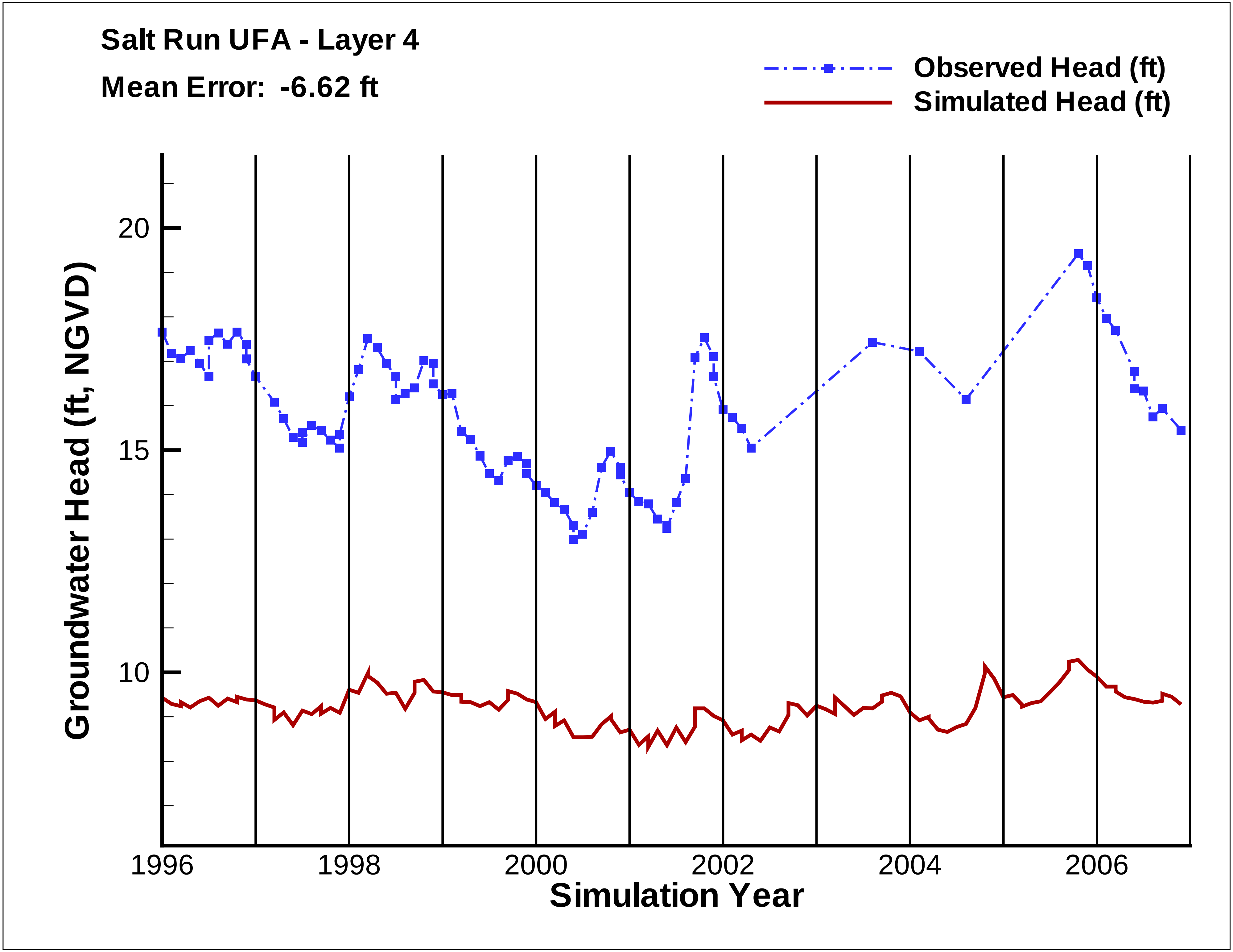


ROMP TR 16-3 UFA INTERFACE - Layer 3
Mean Error: 2.64 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

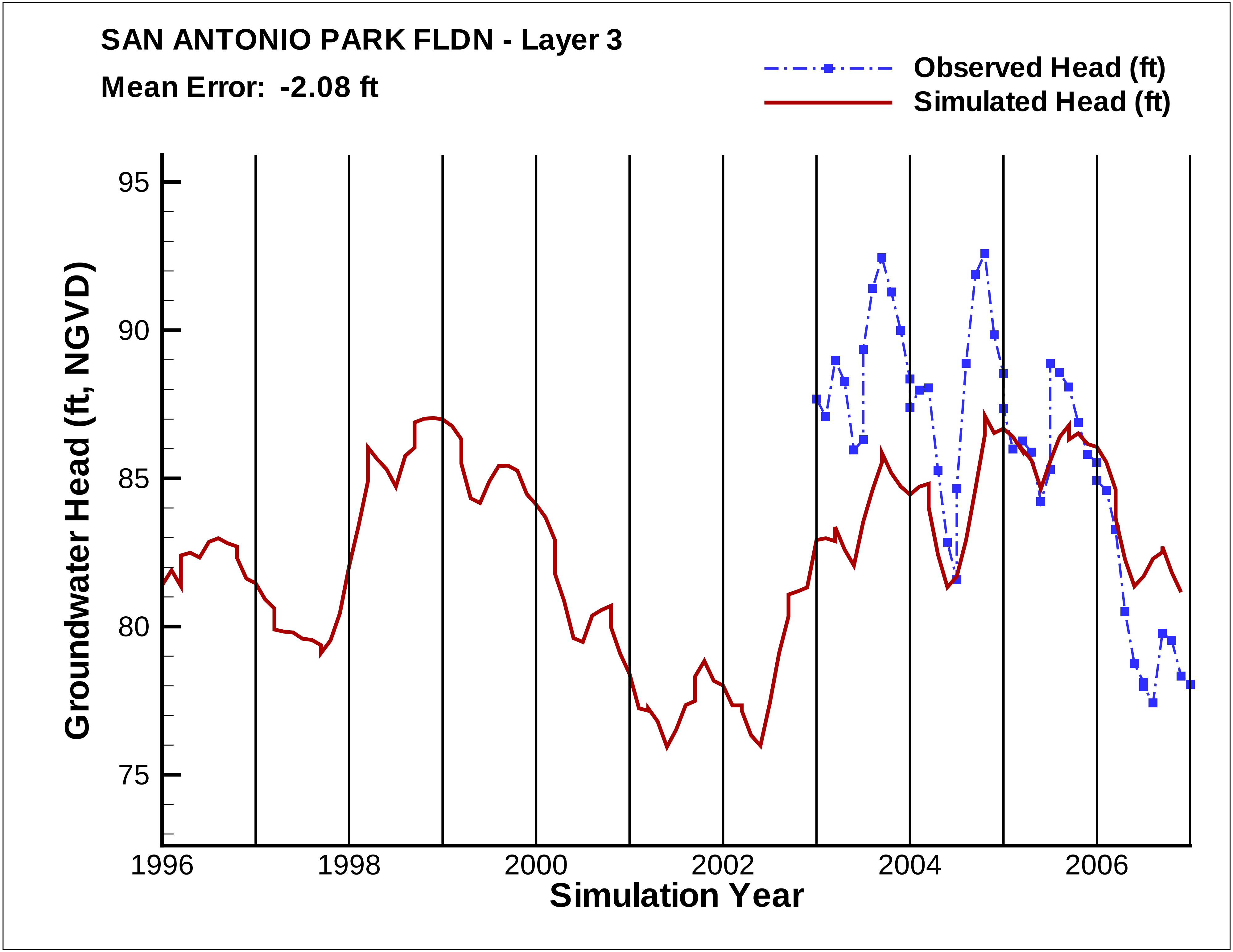


ROMP TR 16-4 SURF - Layer 1
Mean Error: 0.59 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

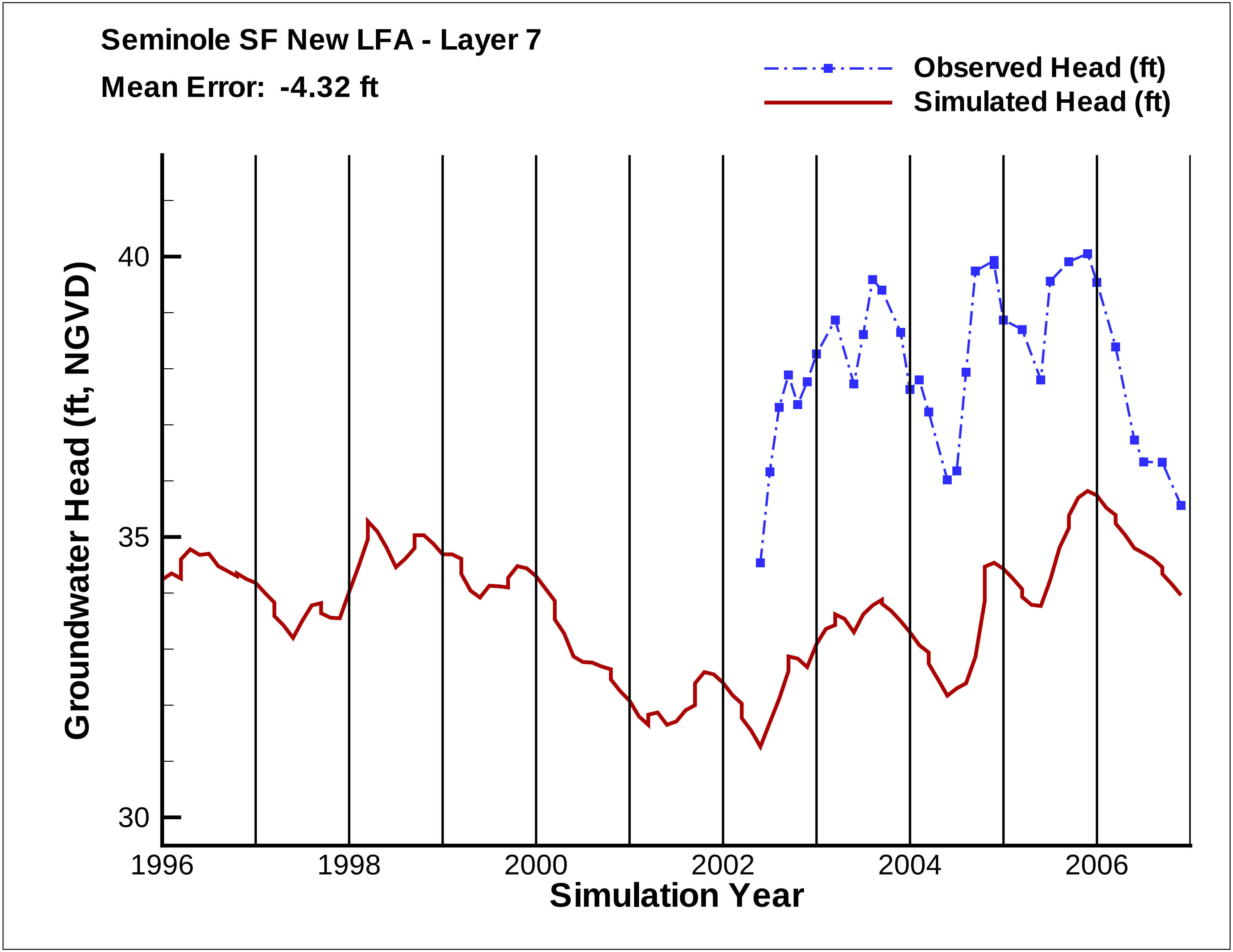

ROMP TR 16-4 UPPER FLDN SWI - Layer 3
Mean Error: 2.54 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
1996
1998
2000
2002
2004
2006
Simulation Year



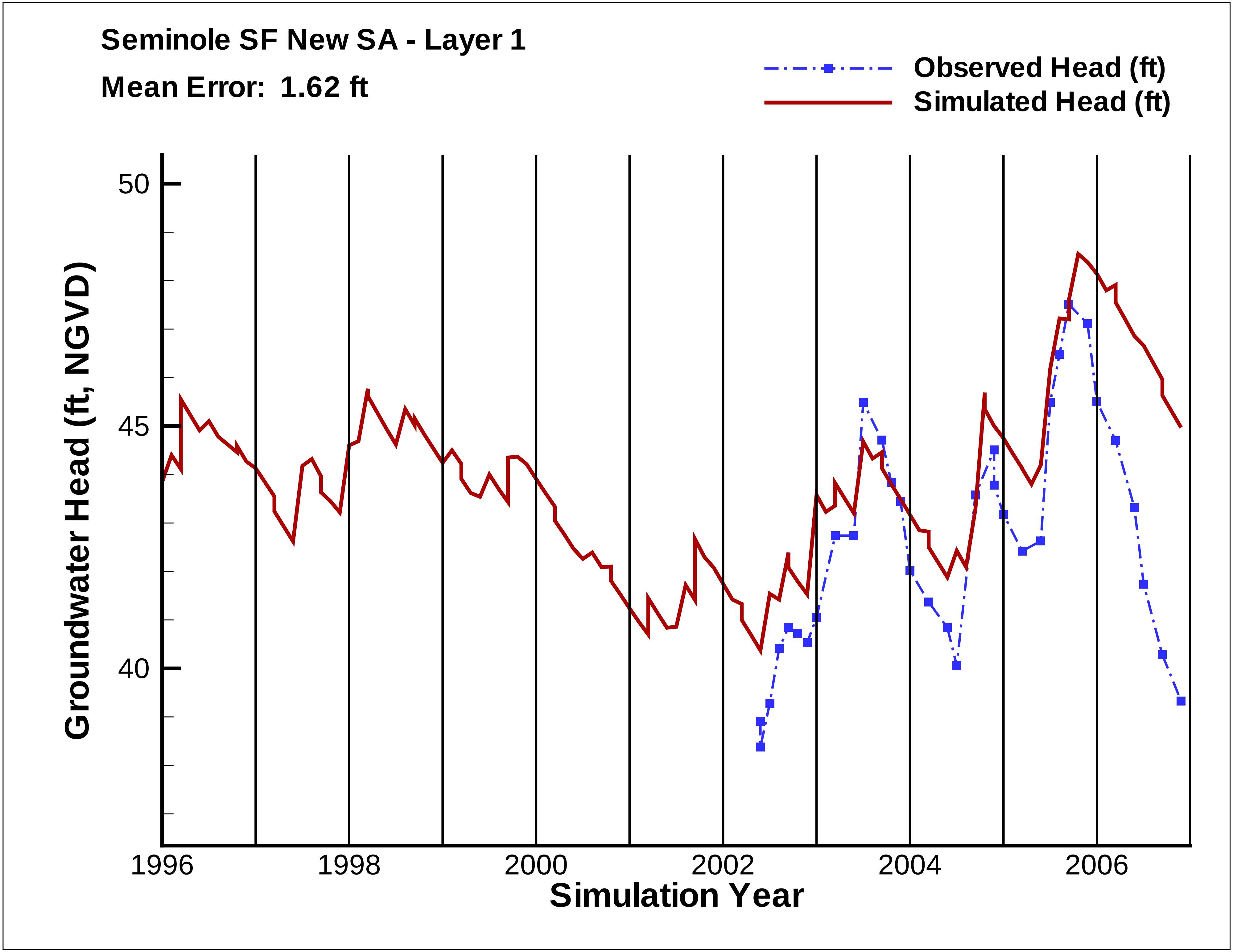
Salt Run UFA - Layer 4
Mean Error: -6.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

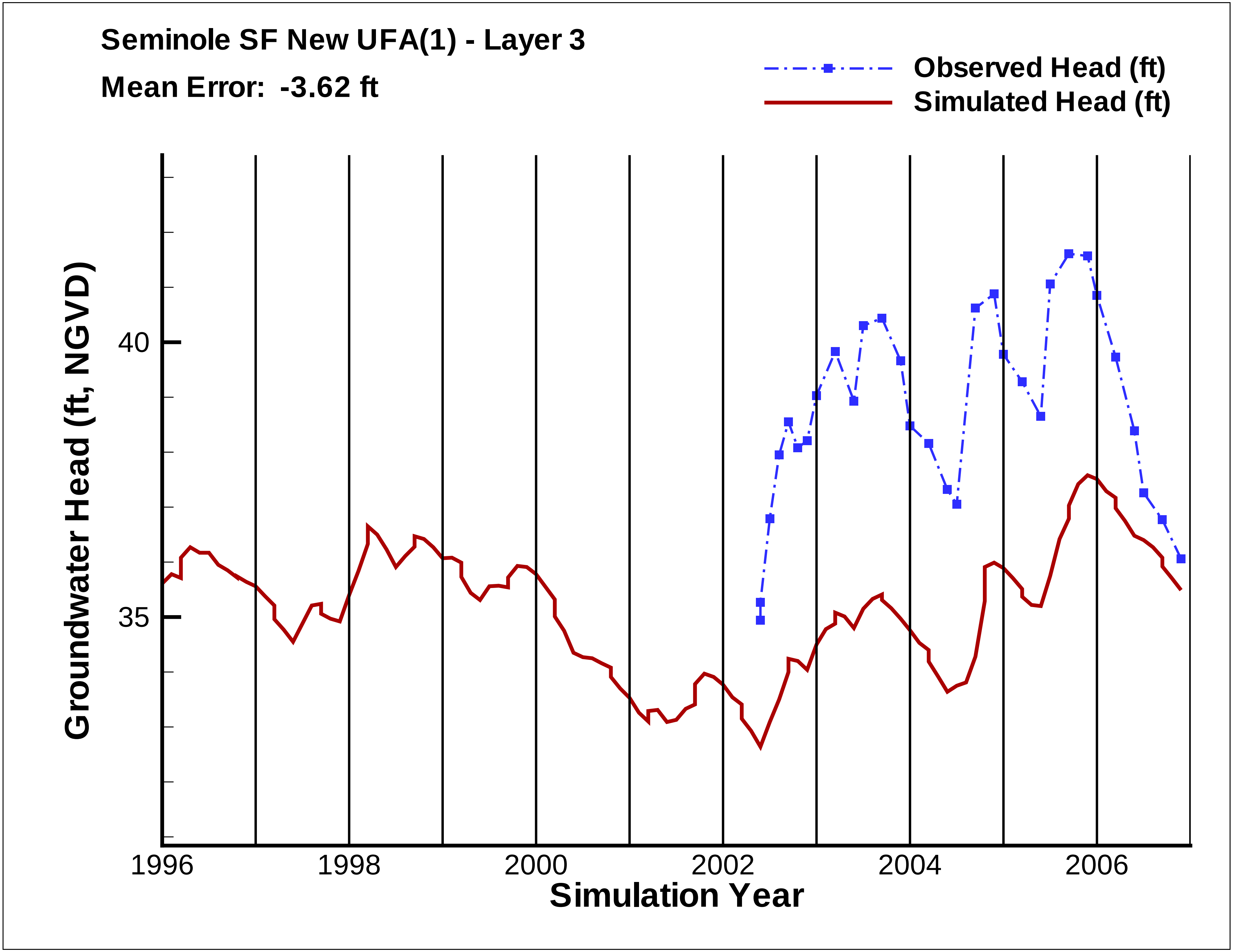


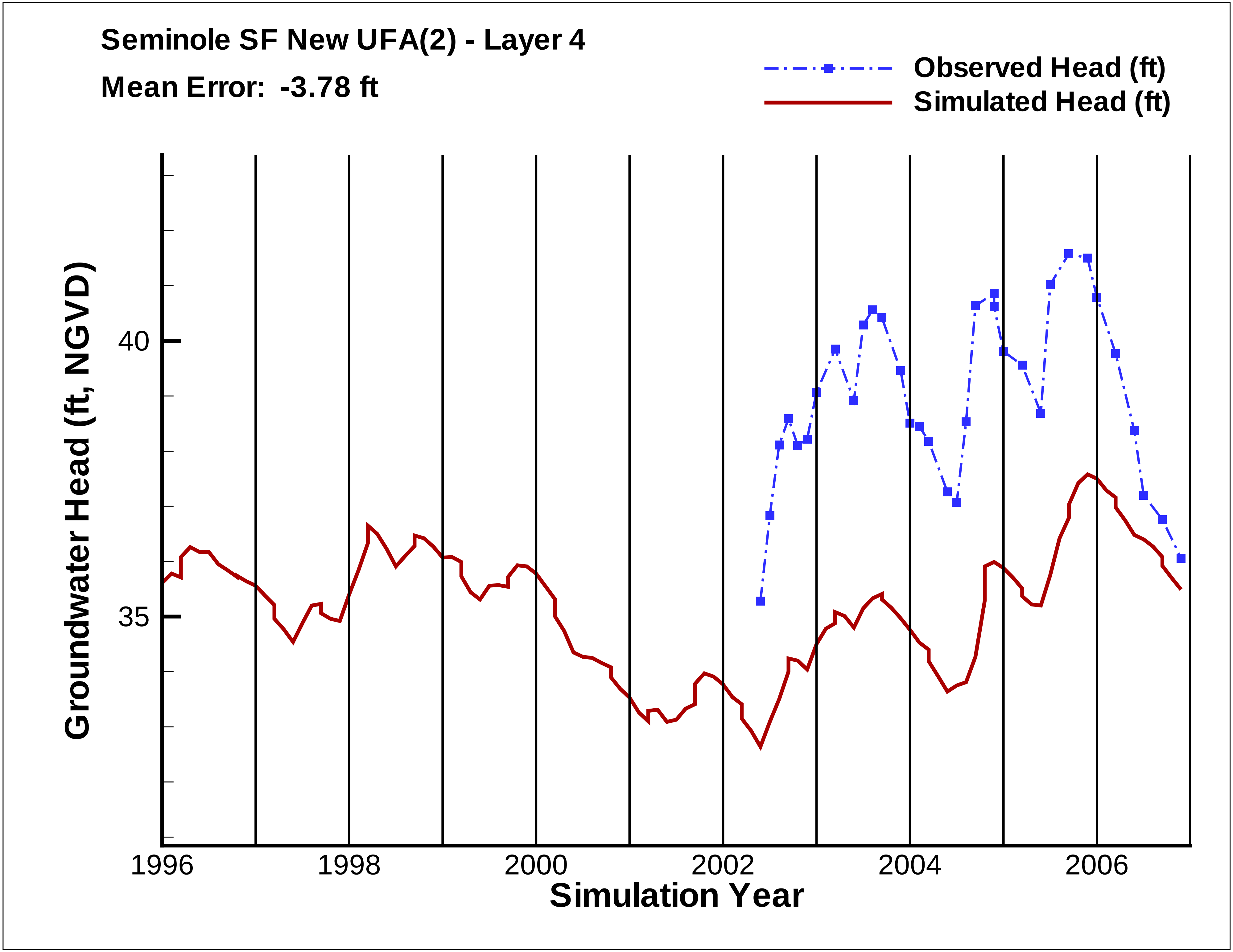
SAN ANTONIO PARK FLDN - Layer 3
Mean Error: -2.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year



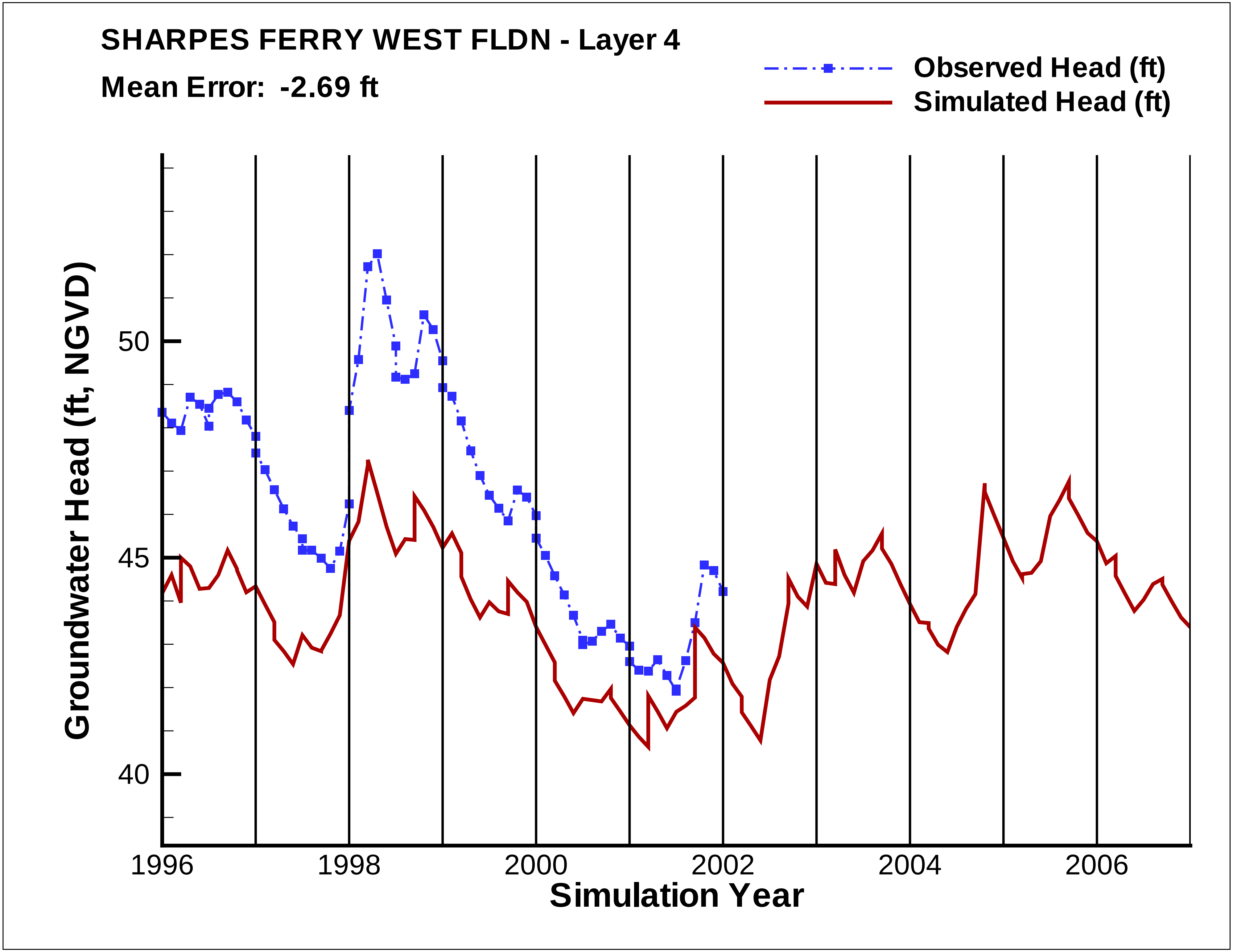
Seminole SF New LFA - Layer 7
Mean Error: -4.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year


Seminole SF New SA - Layer 1
Mean Error: 1.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

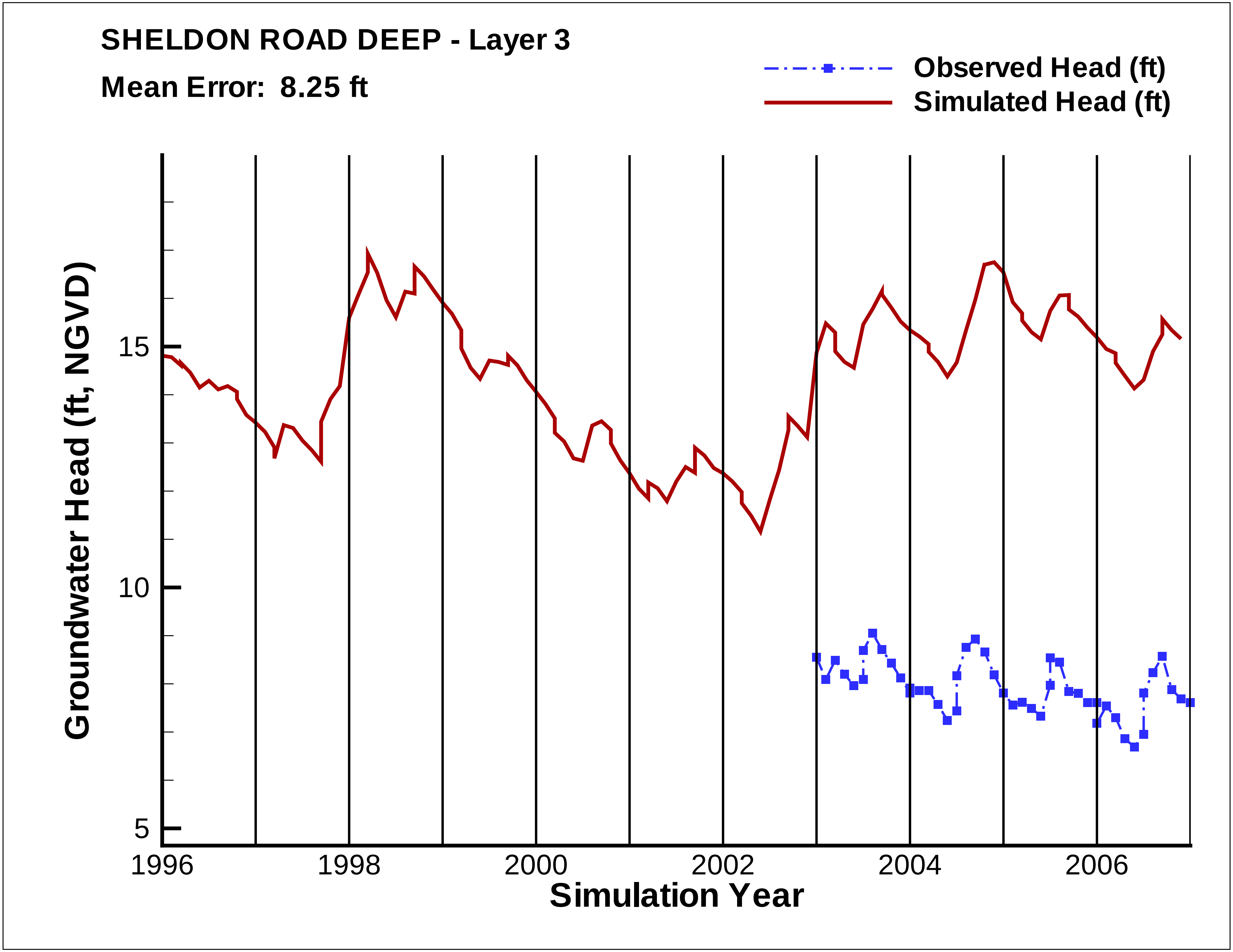

Seminole SF New UFA(1) - Layer 3
Mean Error: -3.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



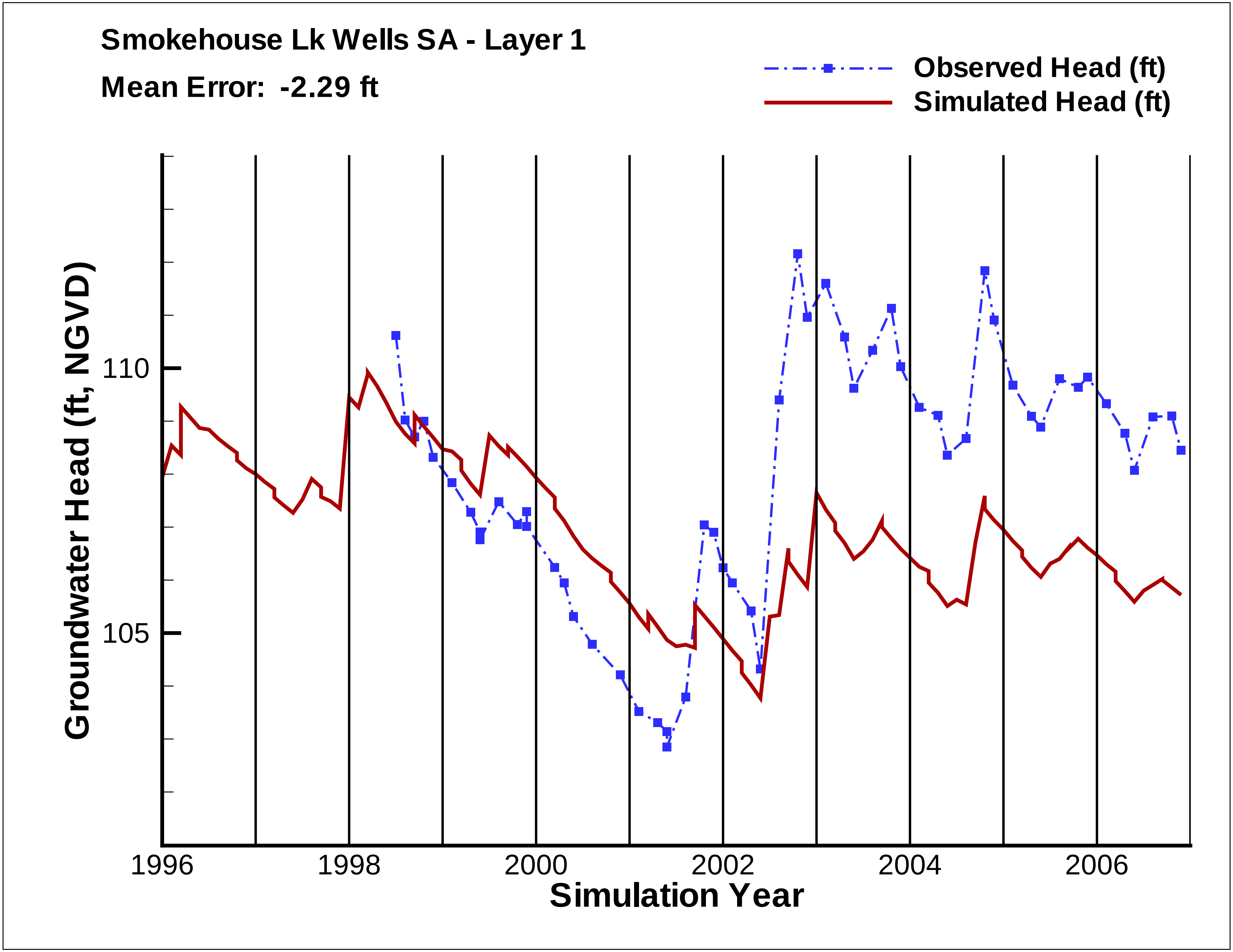
Seminole SF New UFA(2) - Layer 4
Mean Error: -3.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



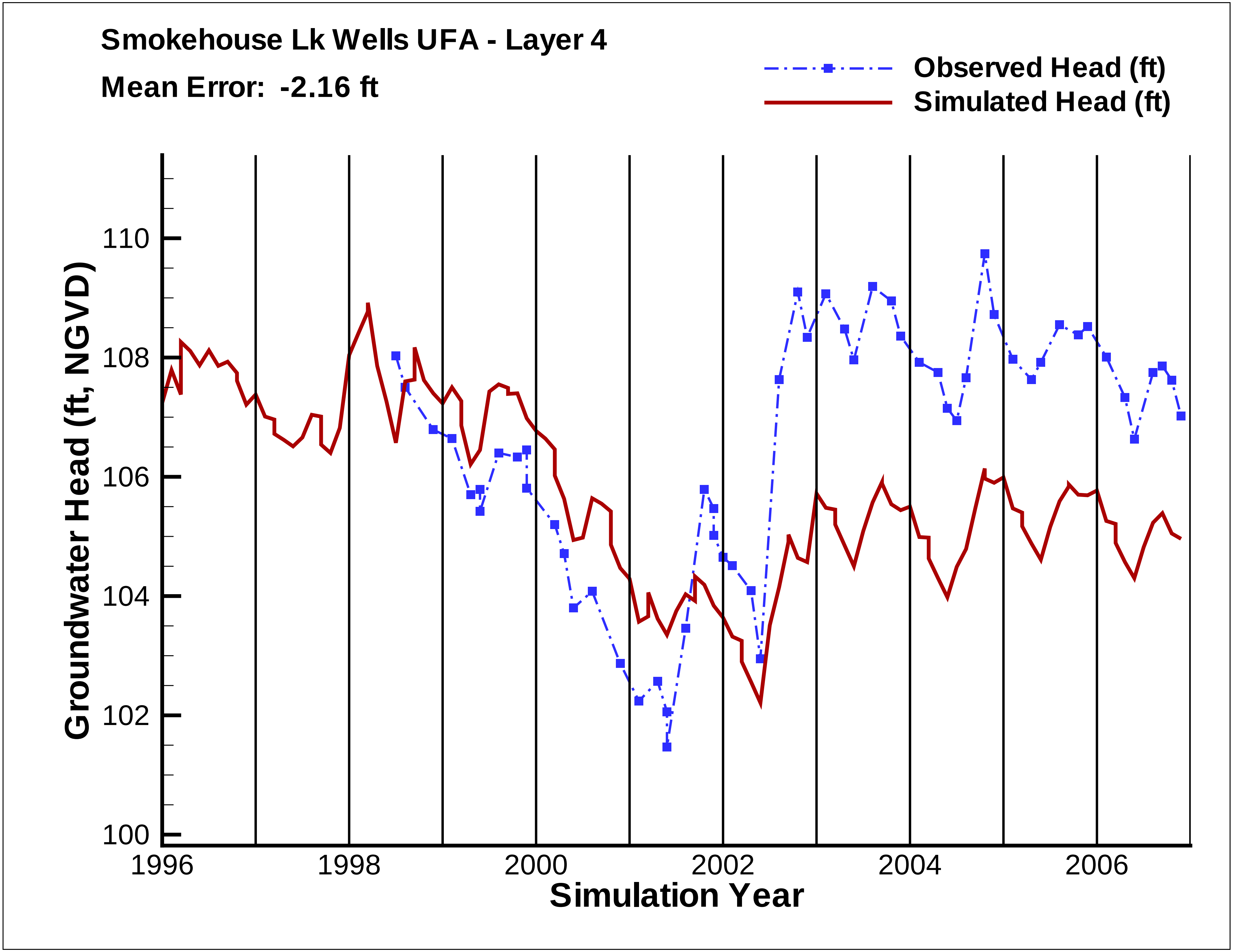
SHARPES FERRY WEST FLDN - Layer 4
Mean Error: -2.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

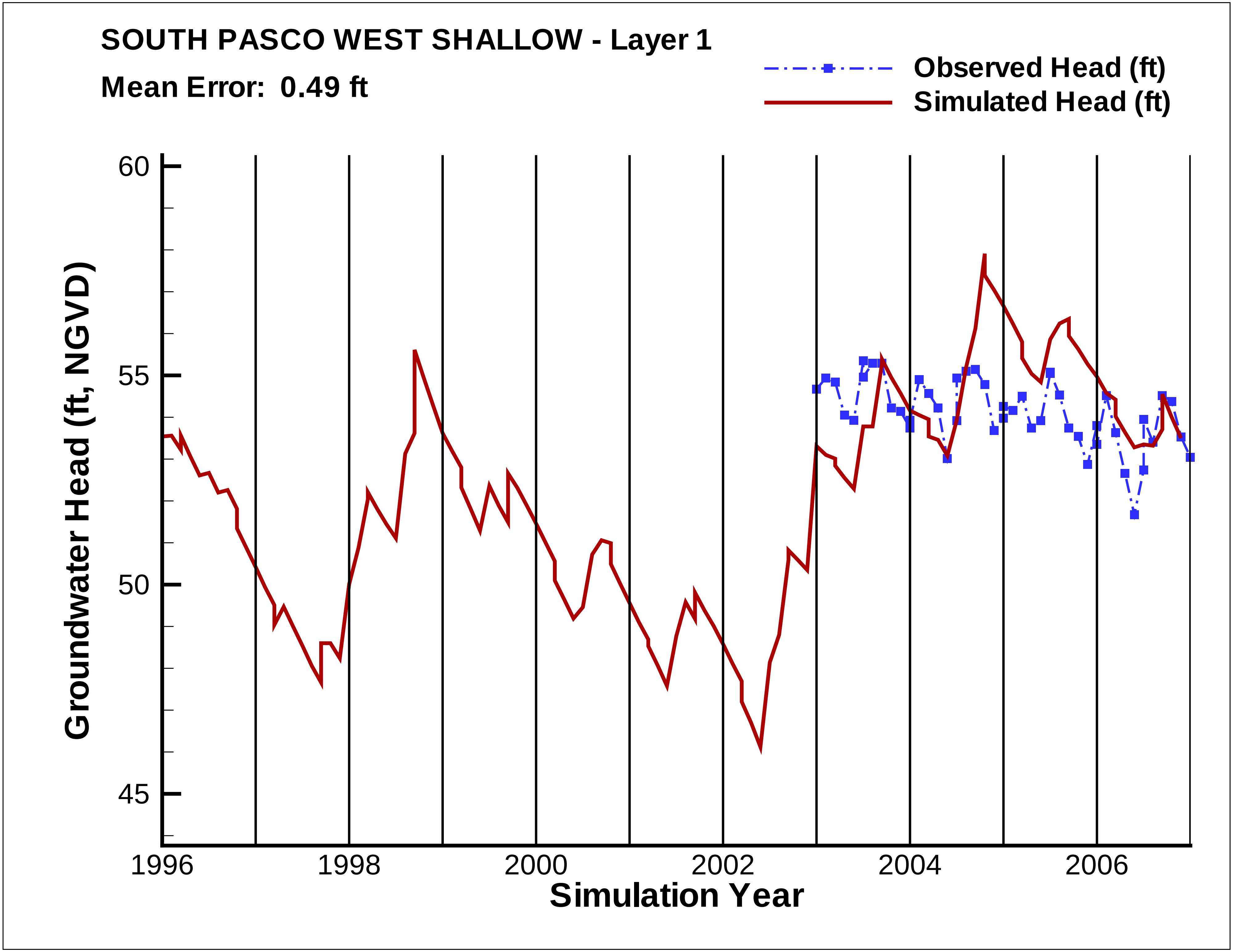


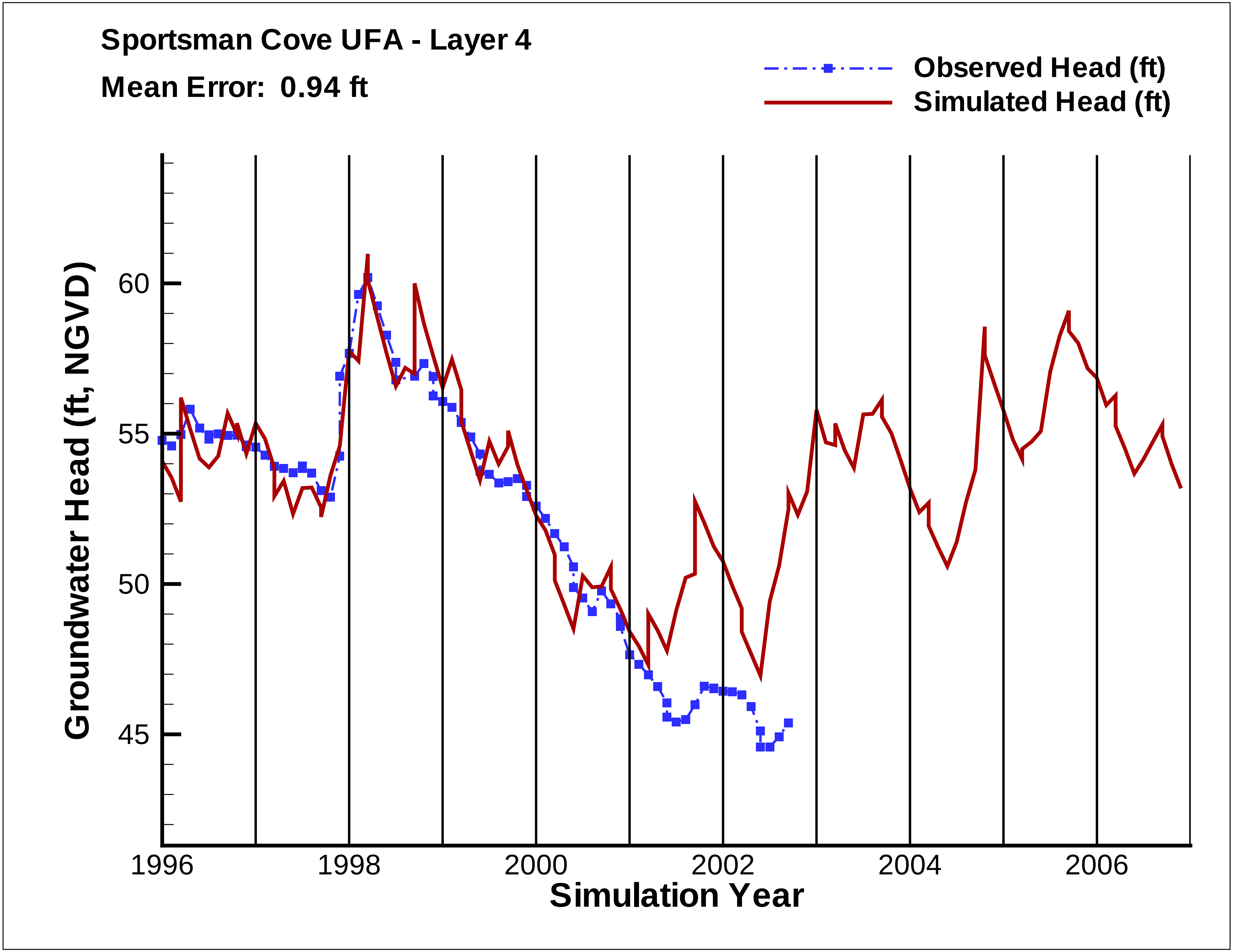
SHELDON ROAD DEEP - Layer 3
Mean Error: 8.25 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



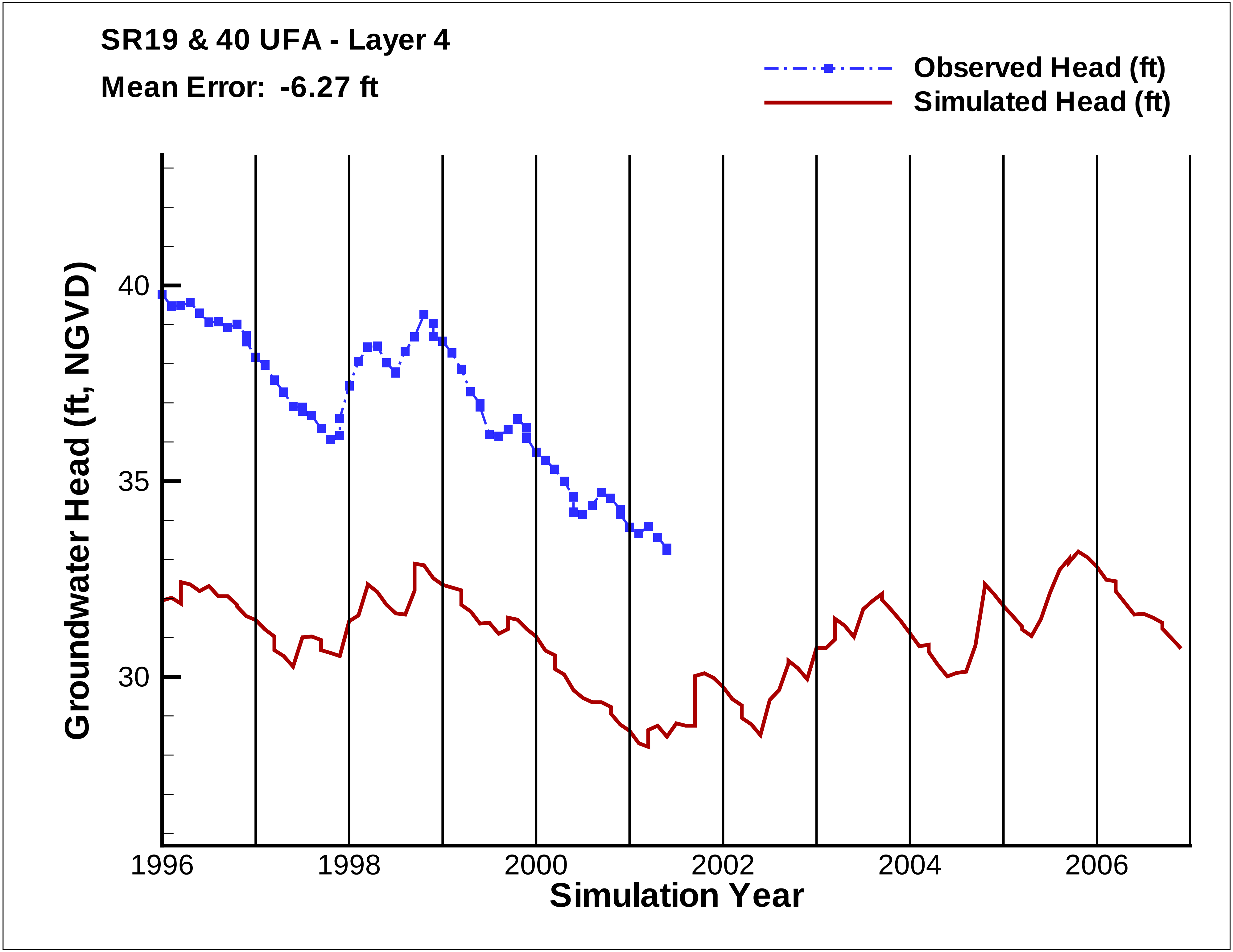
Smokehouse Lk Wells SA - Layer 1
Mean Error: -2.29 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
1996
1998
2000
2002
2004
2006
Simulation Year

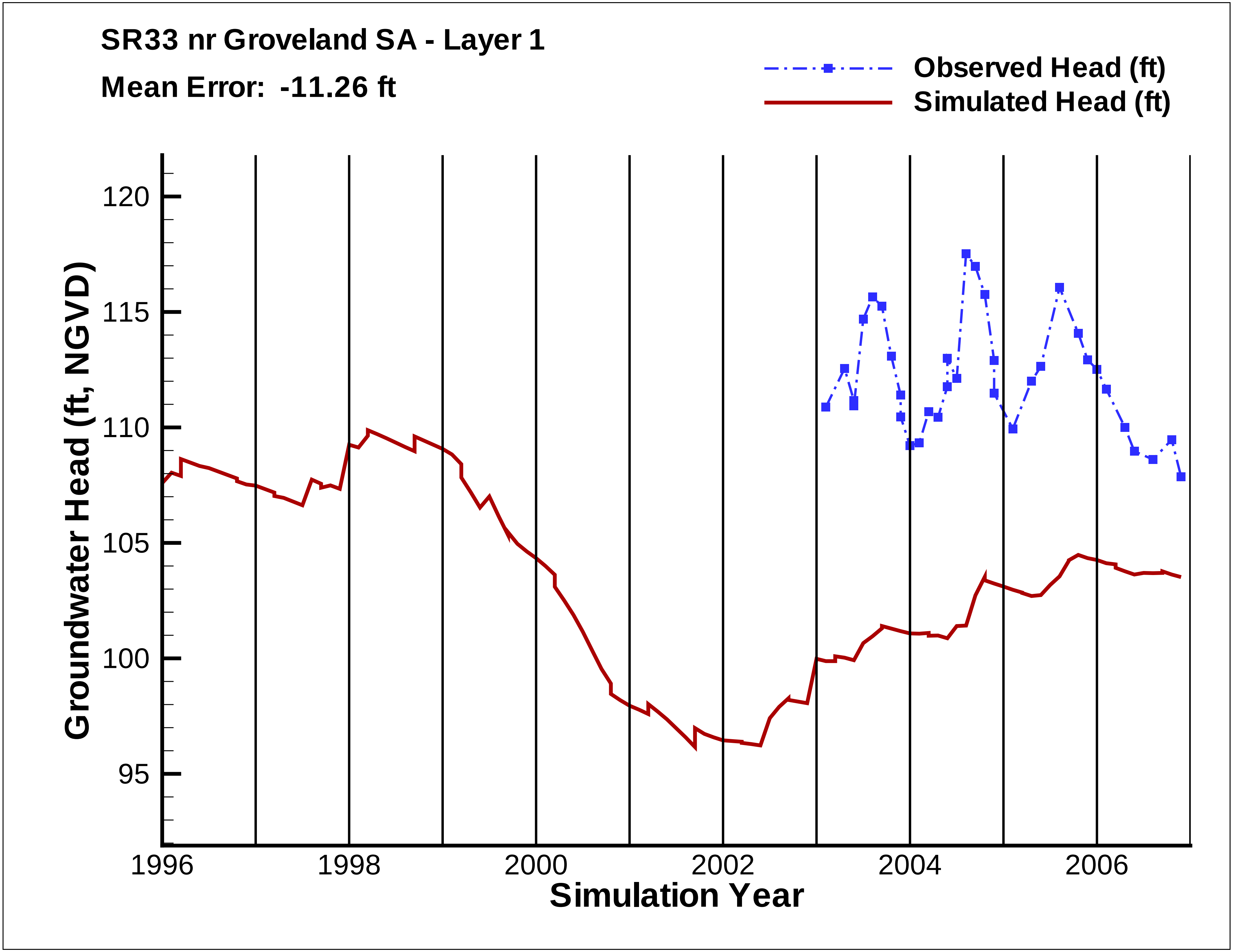

Smokehouse Lk Wells UFA - Layer 4
Mean Error: -2.16 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
108
106
104
102
100
1996
1998
2000
2002
2004
2006
Simulation Year

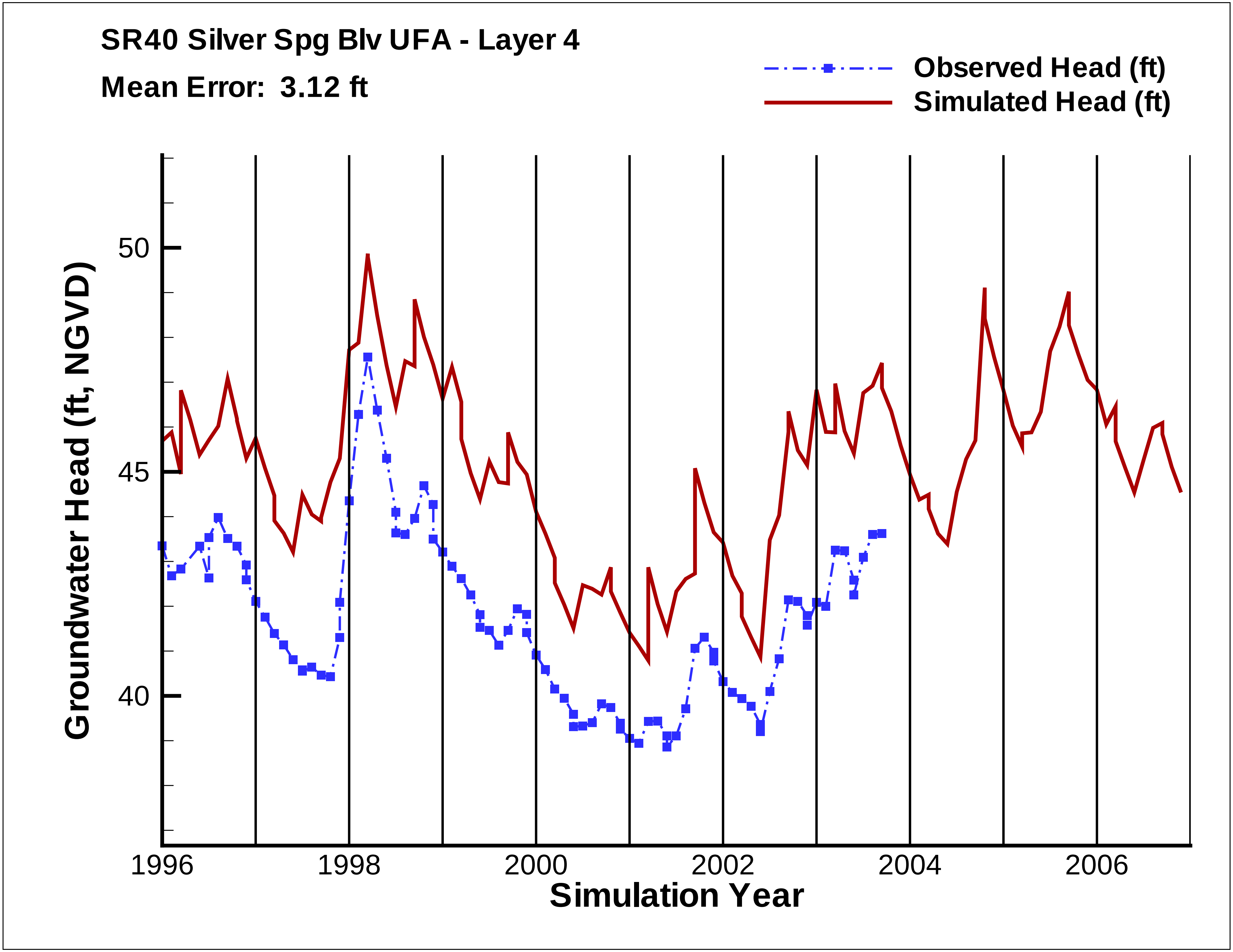

SOUTH PASCO WEST SHALLOW - Layer 1
Mean Error: 0.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year



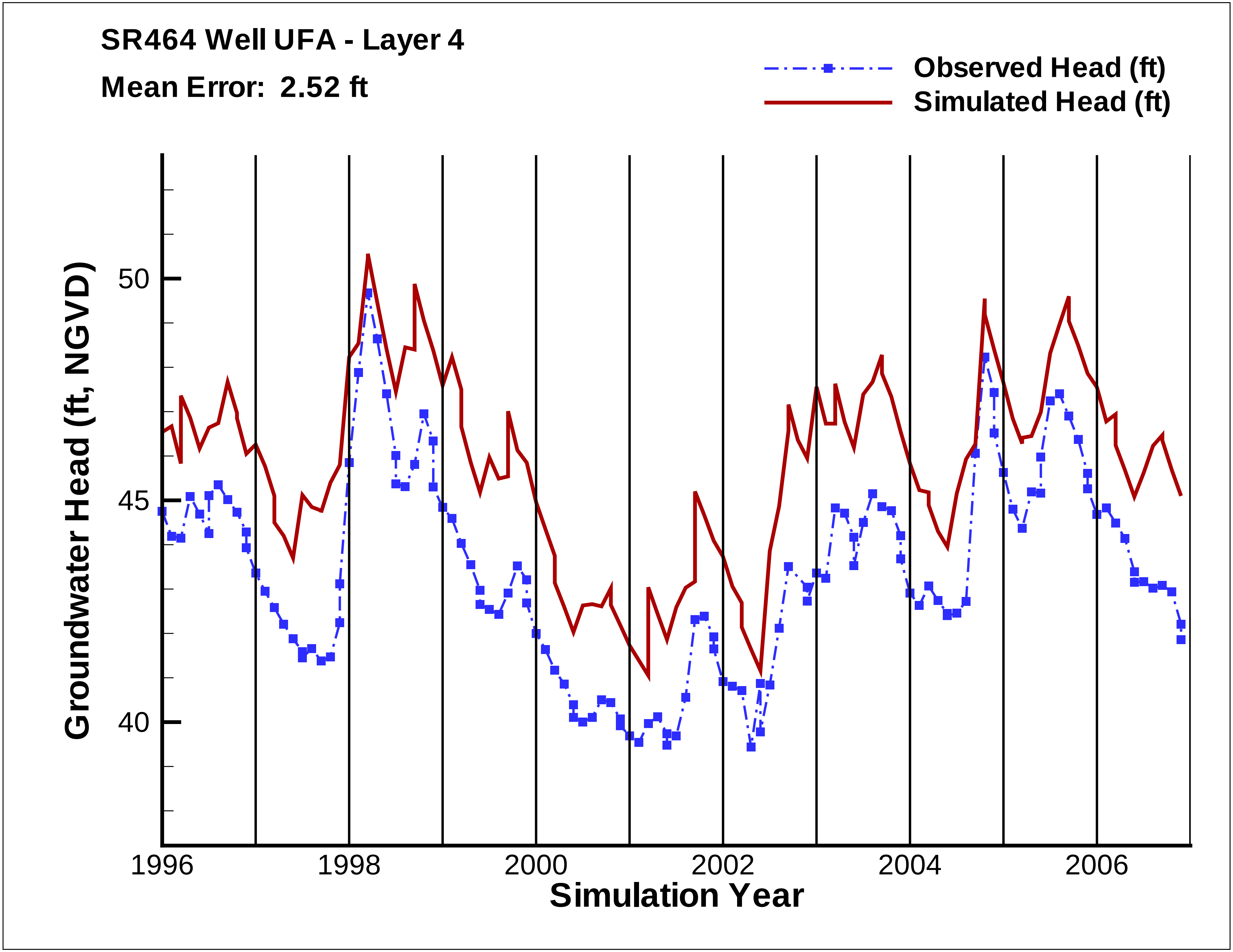
Sportsman Cove UFA - Layer 4
Mean Error: 0.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year


SR19 & 40 UFA - Layer 4
Mean Error: -6.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

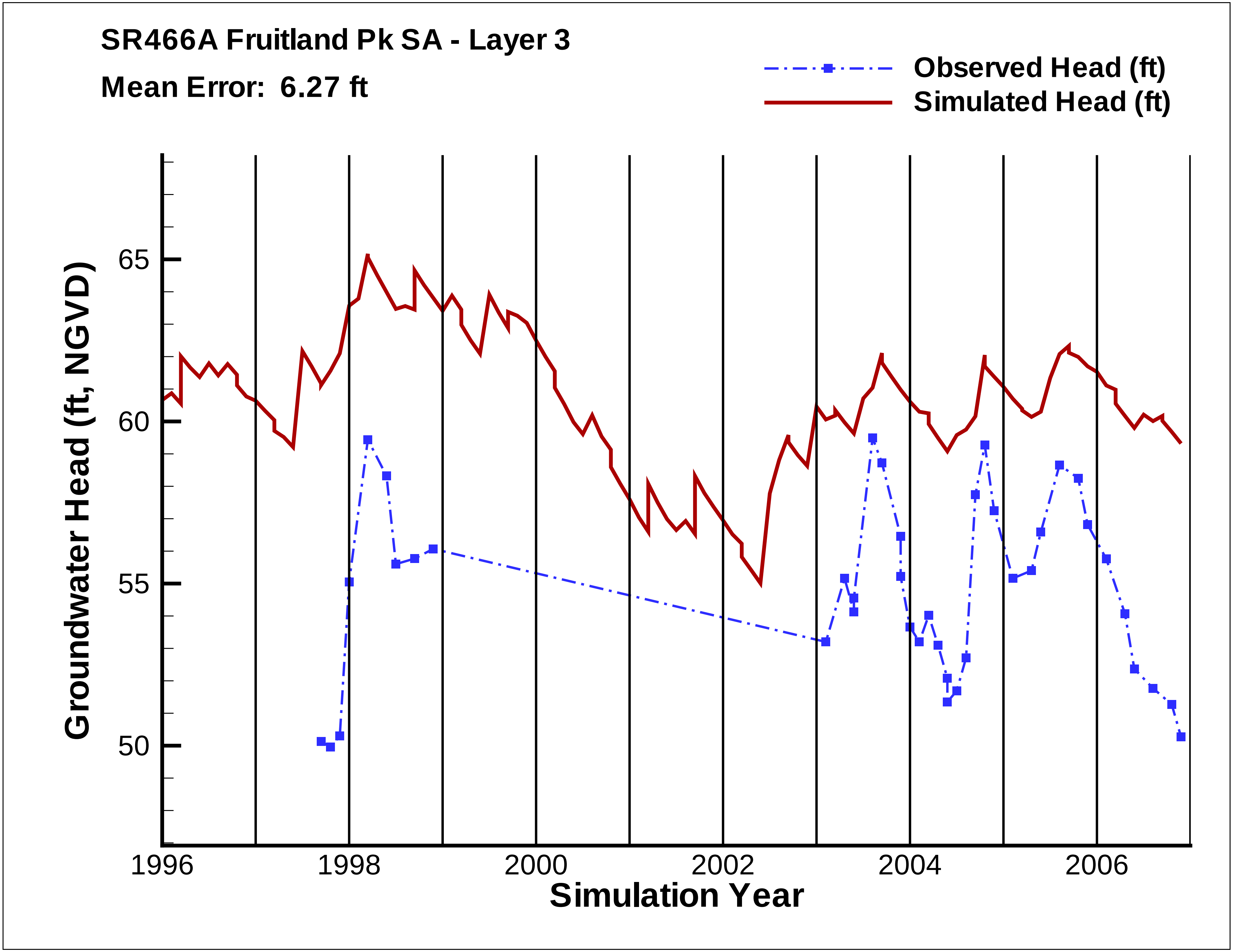

SR33 nr Groveland SA - Layer 1
Mean Error: -11.26 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
120
115
110
105
100
95
1996
1998
2000
2002
2004
2006
Simulation Year

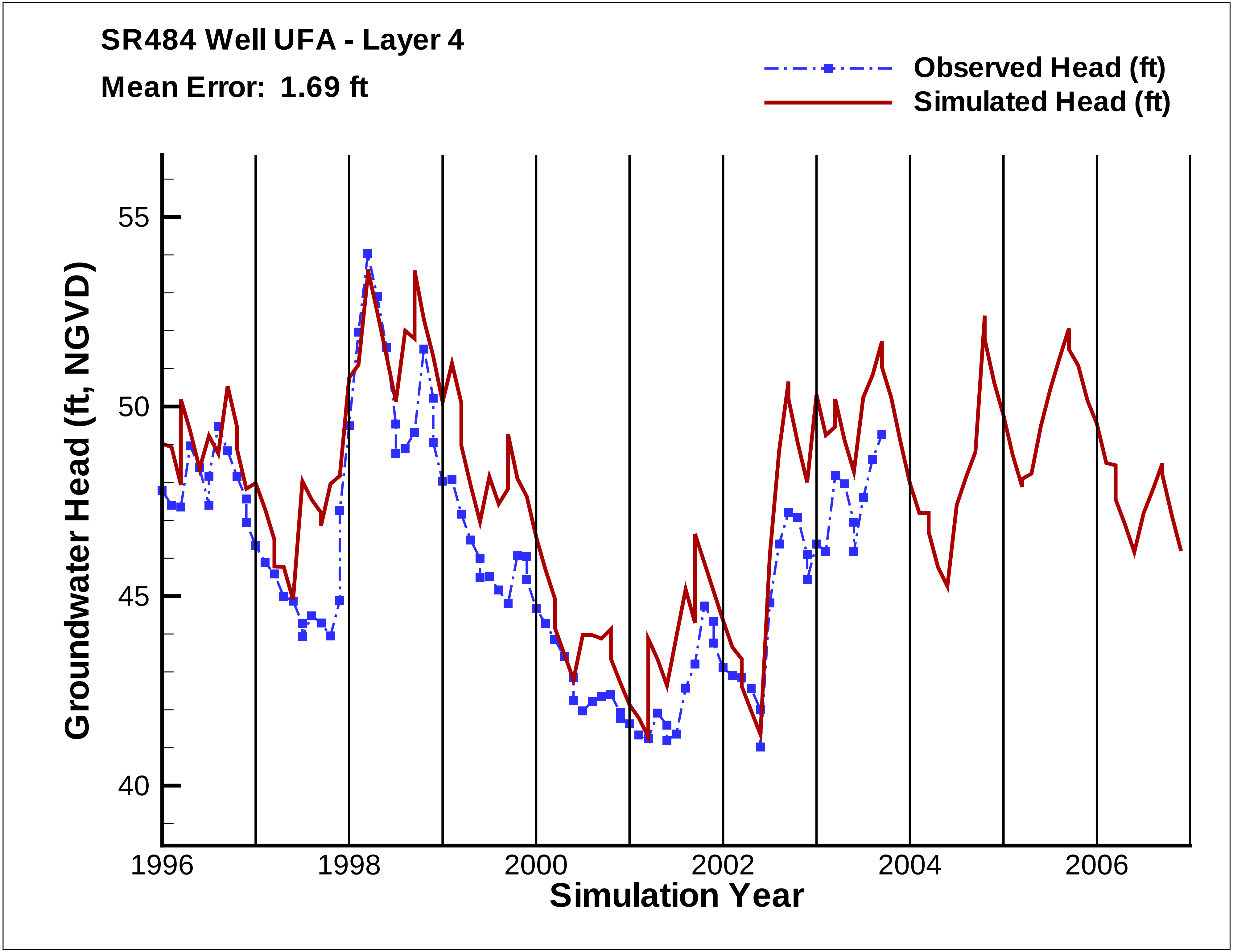


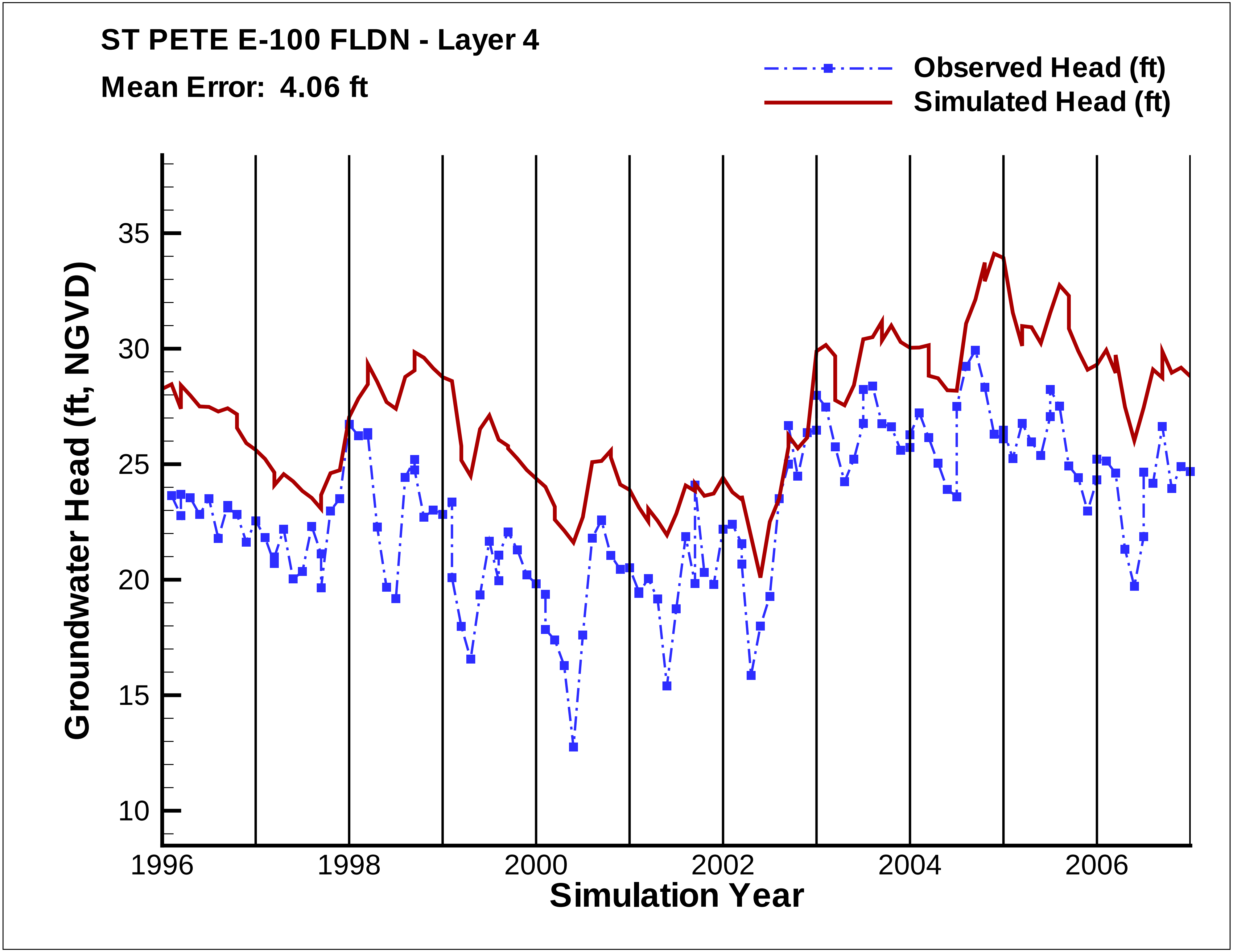
SR40 Silver Spg Blv UFA - Layer 4
Mean Error: 3.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

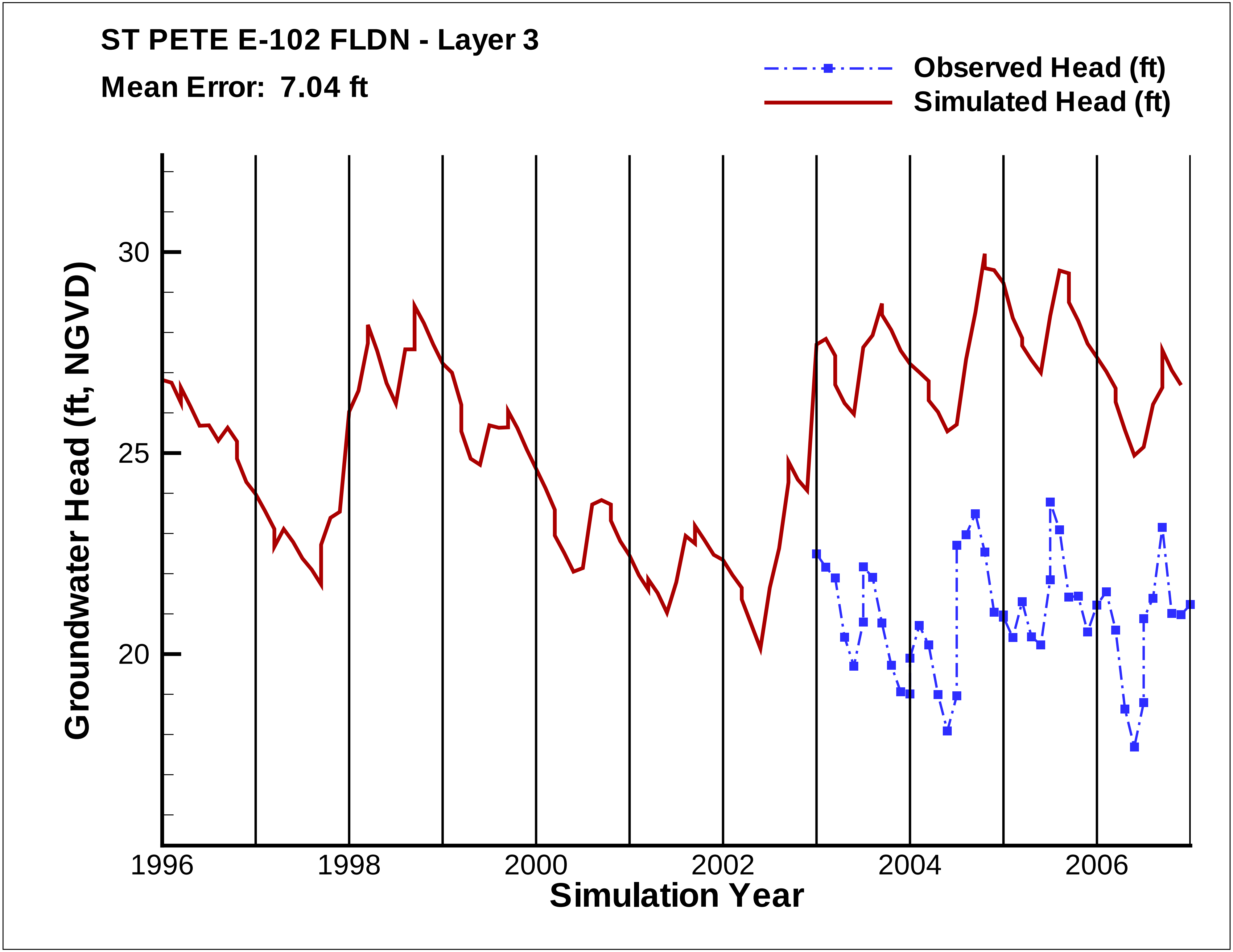


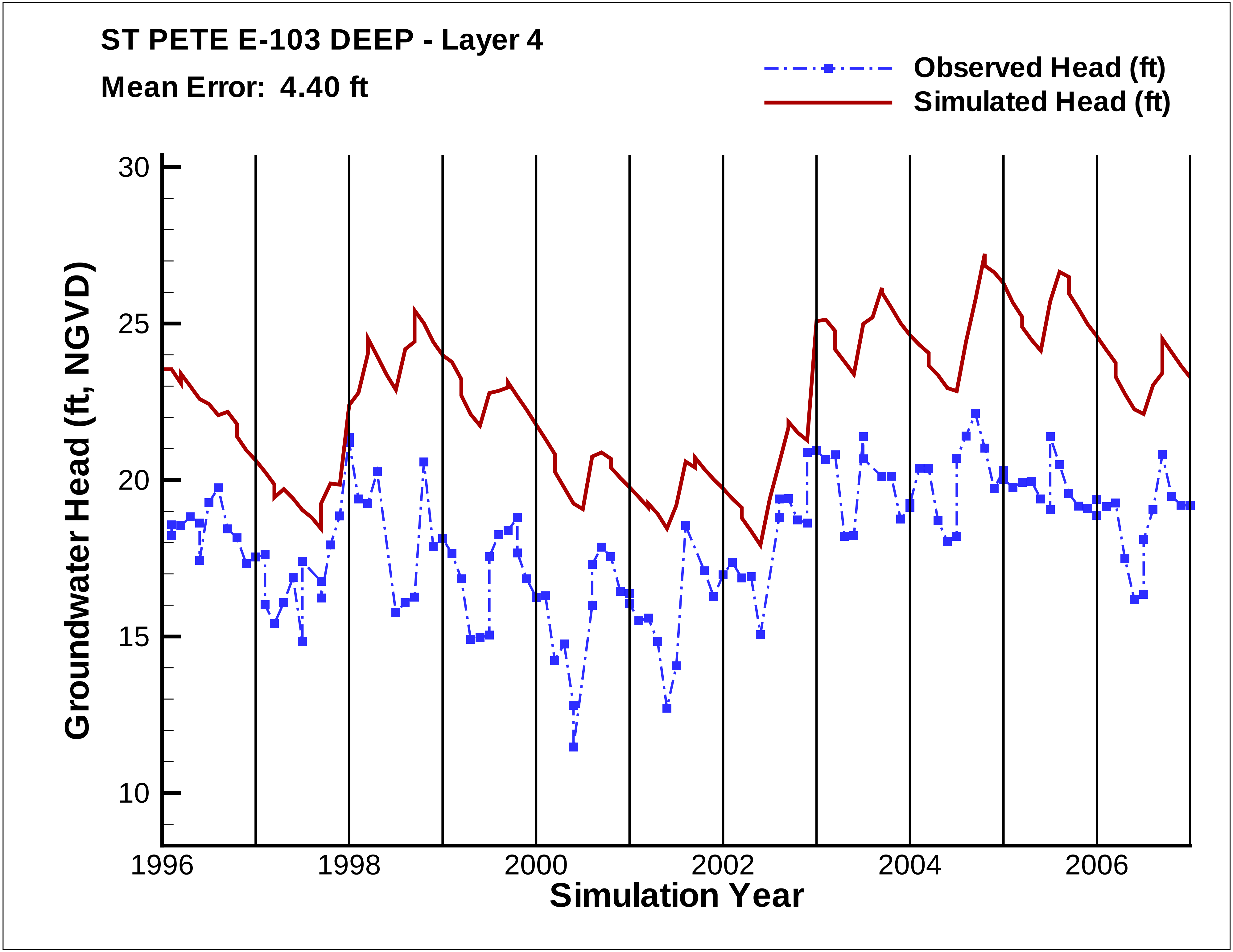
SR464 Well UFA - Layer 4
Mean Error: 2.52 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year


SR466A Fruitland Pk SA - Layer 3
Mean Error: 6.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

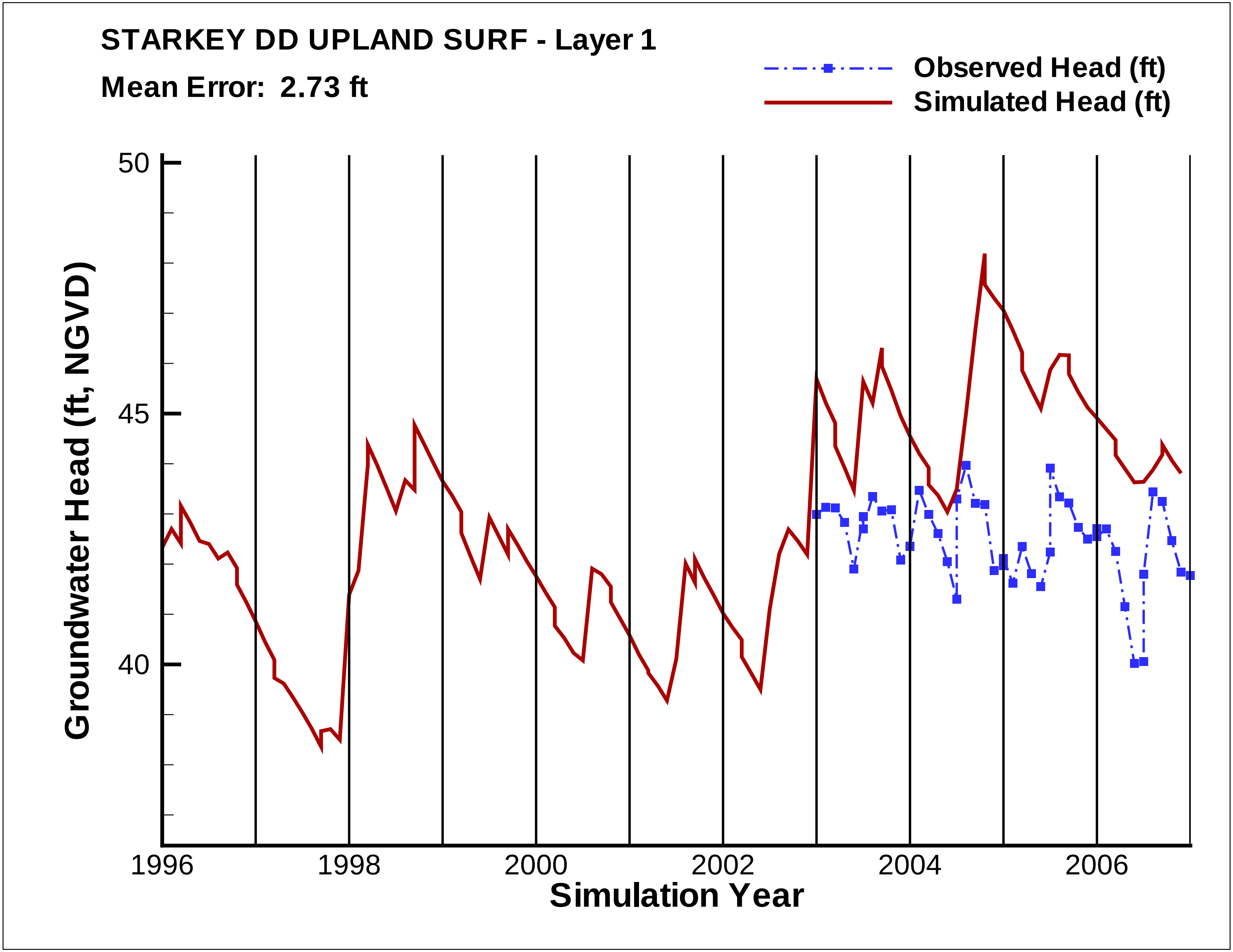

SR484 Well UFA - Layer 4
Mean Error: 1.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

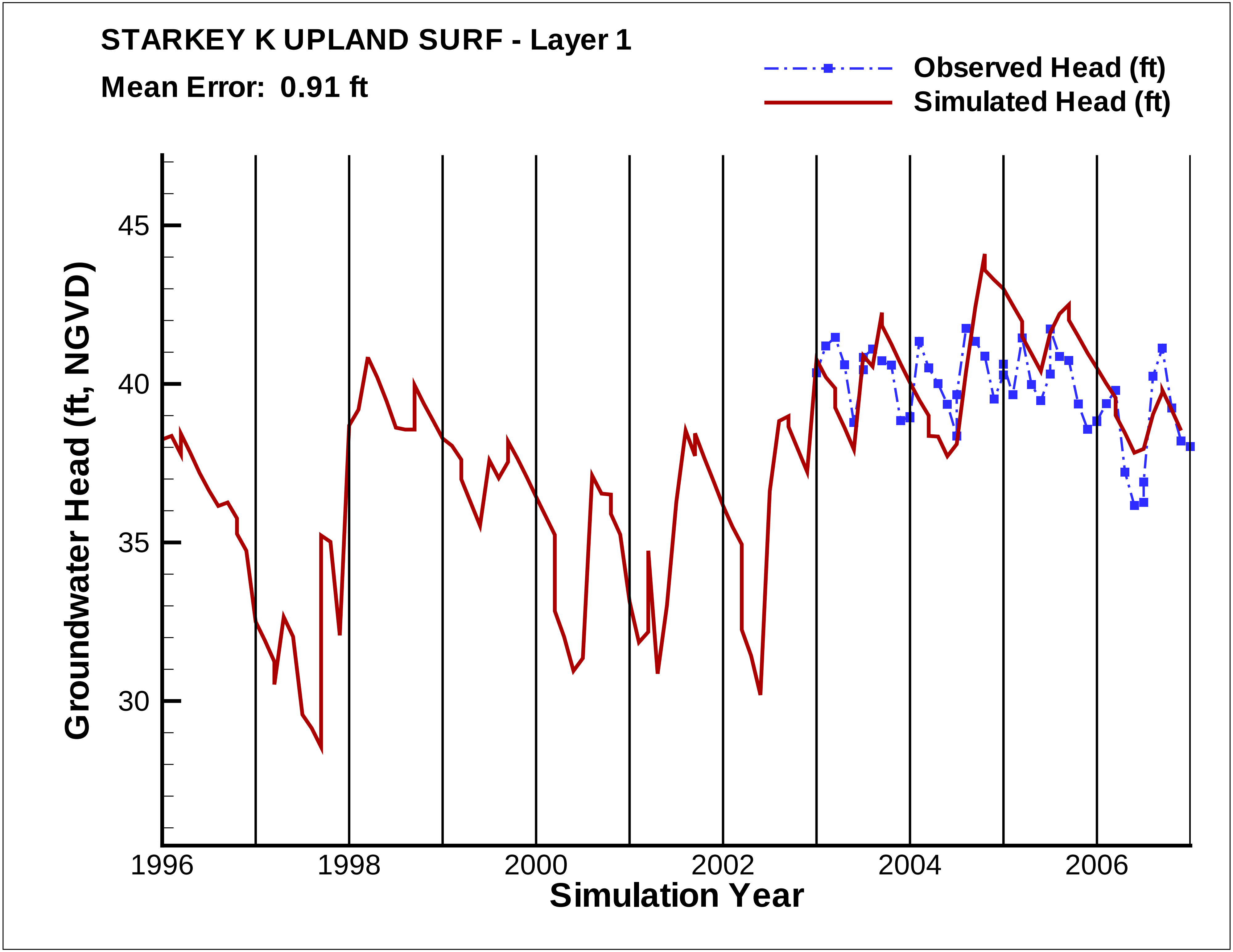

ST PETE E-100 FLDN - Layer 4
Mean Error: 4.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
30
35
1996
1998
2000
2002
2004
2006
Simulation Year

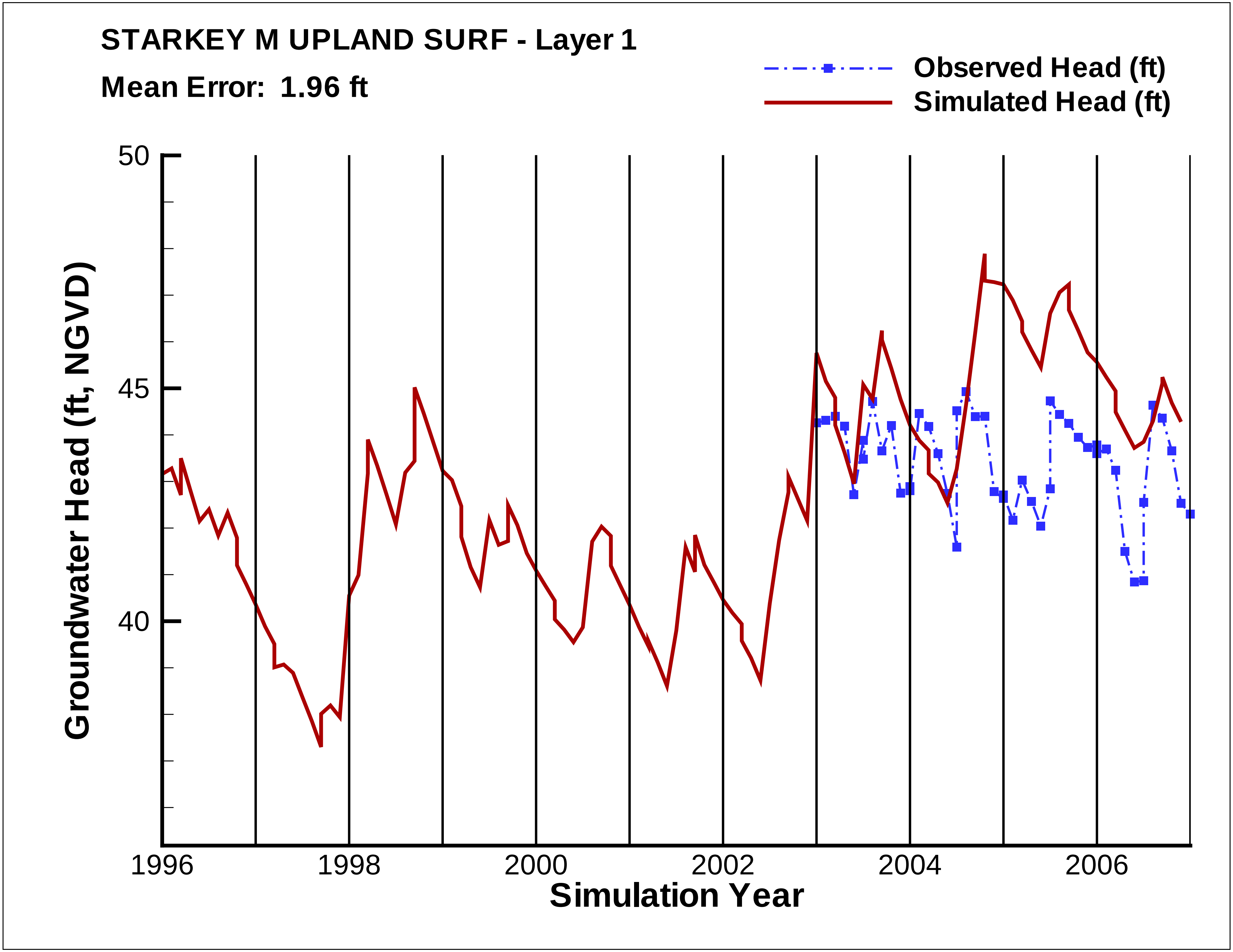

ST PETE E-102 FLDN - Layer 3
Mean Error: 7.04 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year



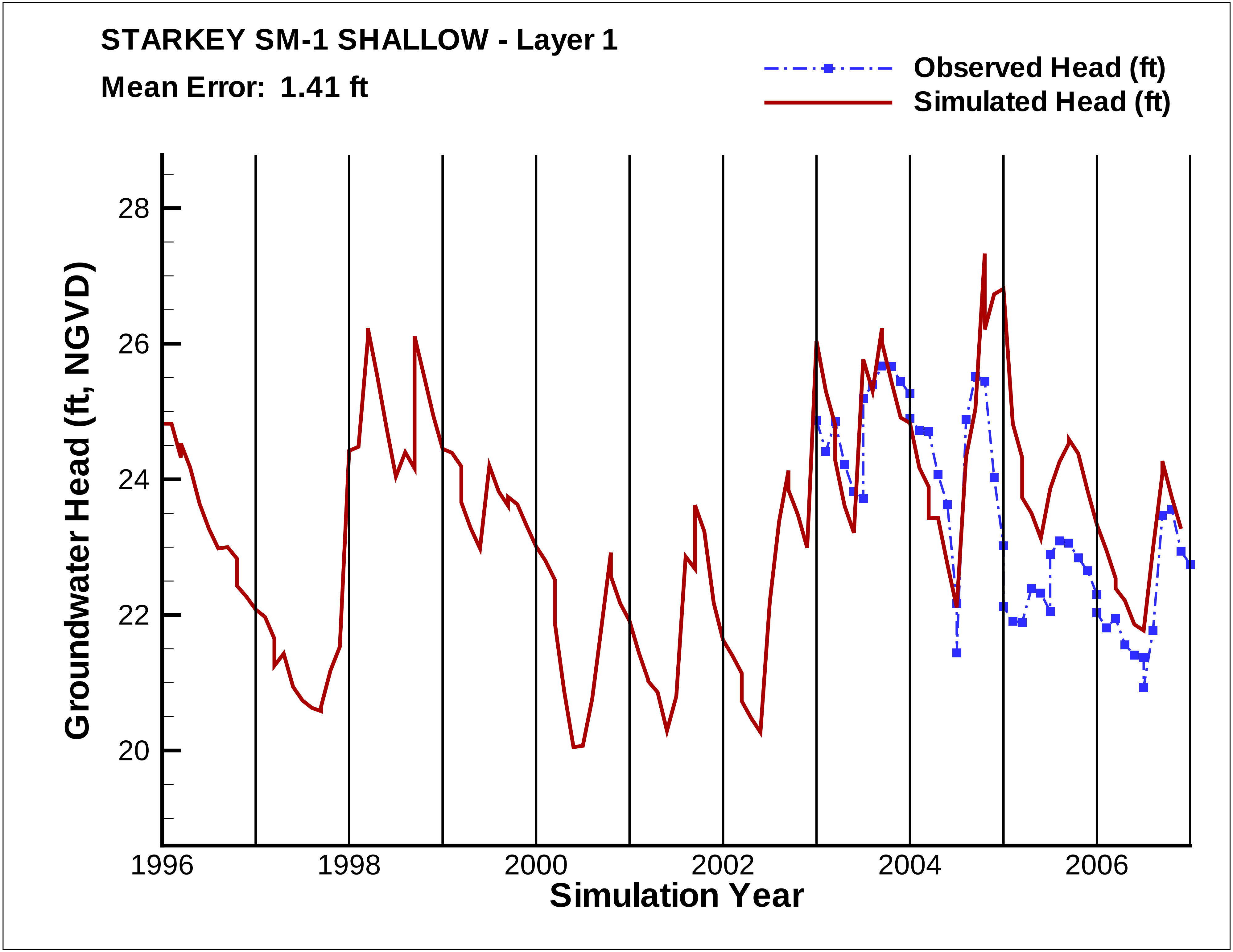
ST PETE E-103 DEEP - Layer 4
Mean Error: 4.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

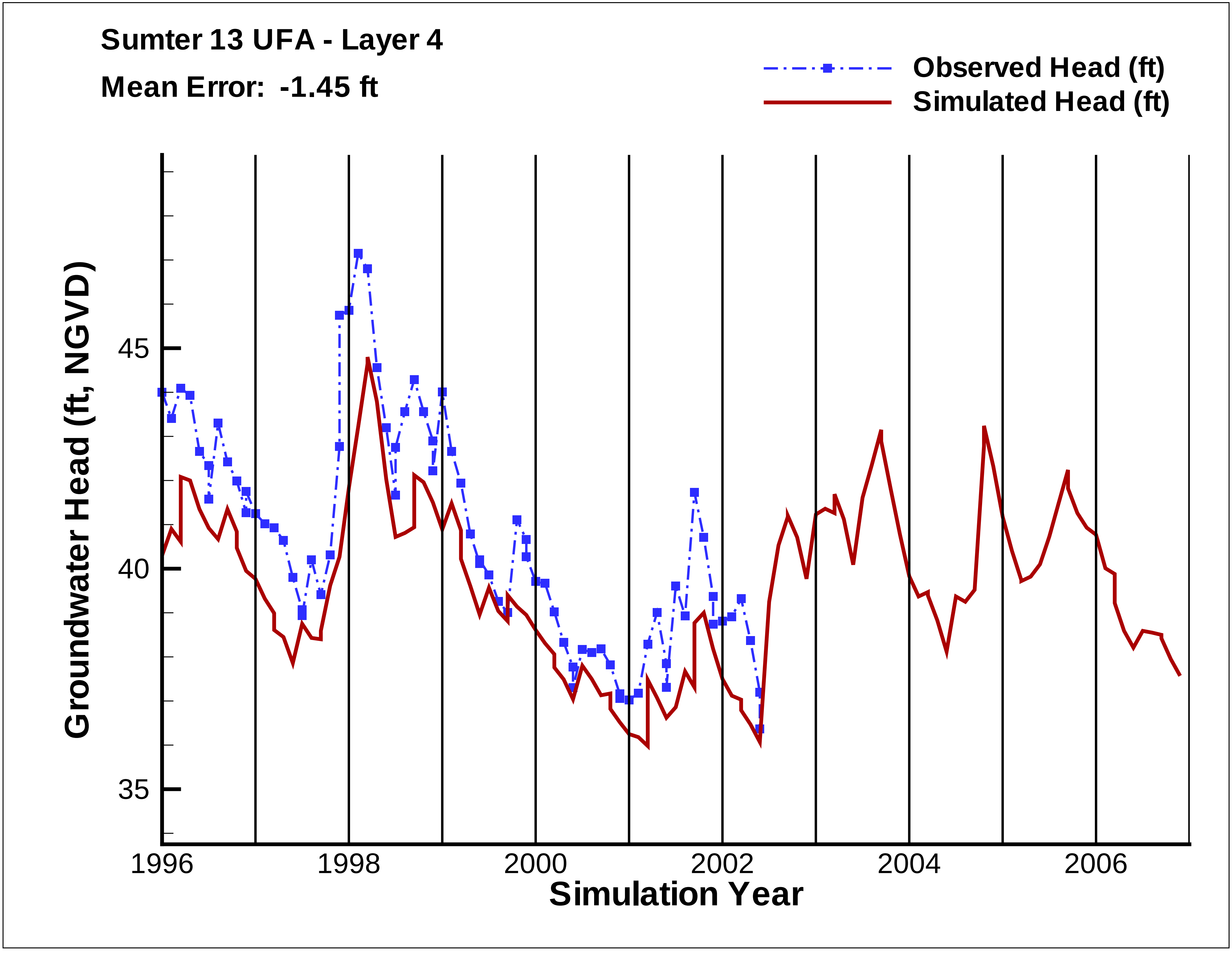

STARKEY DD UPLAND SURF - Layer 1
Mean Error: 2.73 ft
Observed Head (ft)
Simulated Head (ft)
50
45
40
Groundwater Head (ft, NGVD)
1996
1998
2000
2002
2004
2006
Simulation Year


STARKEY K UPLAND SURF - Layer 1
Mean Error: 0.91 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

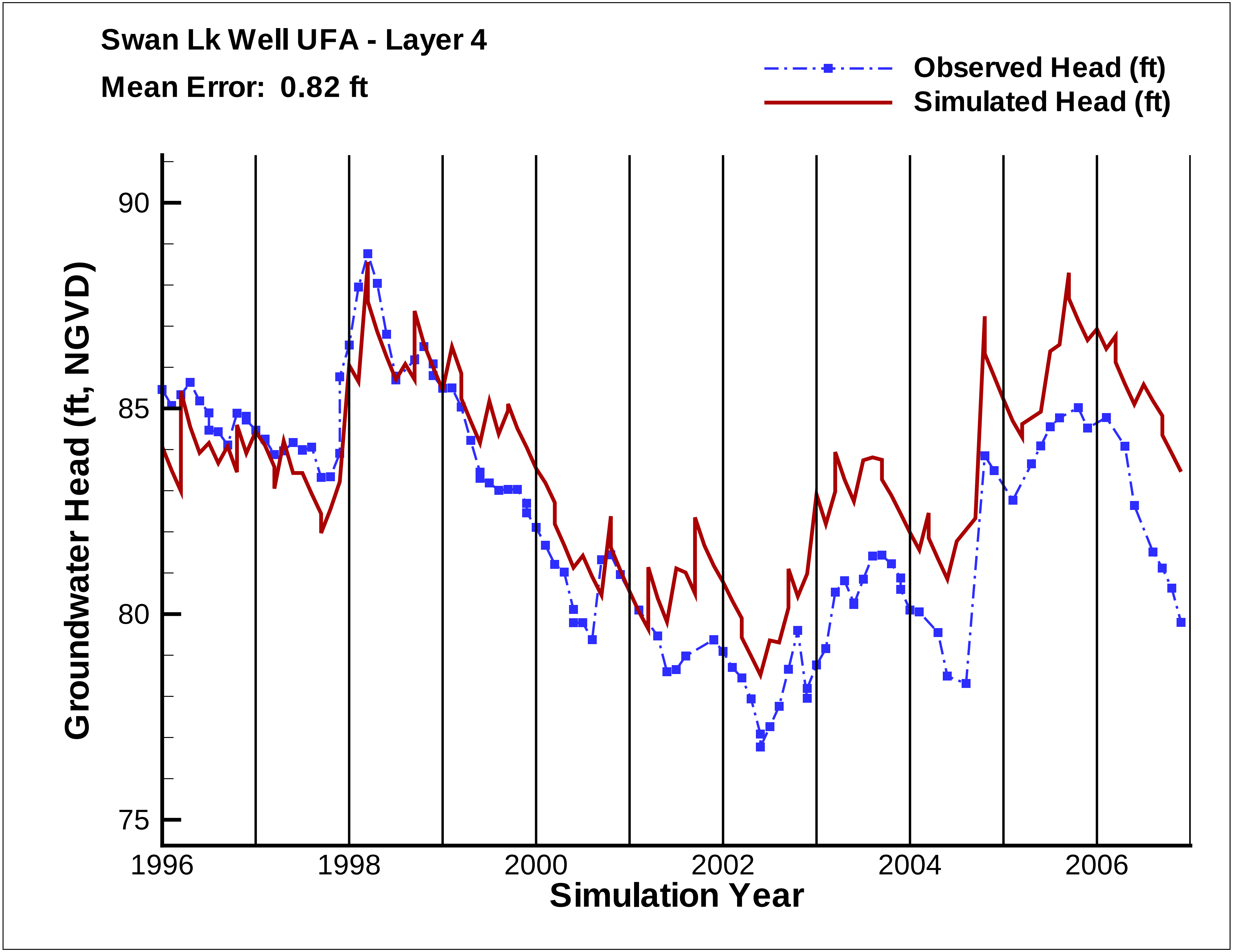


STARKEY M UPLAND SURF - Layer 1
Mean Error: 1.96 ft
Observed Head (ft)
Simulated Head (ft)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year
Groundwater Head (ft, NGVD)

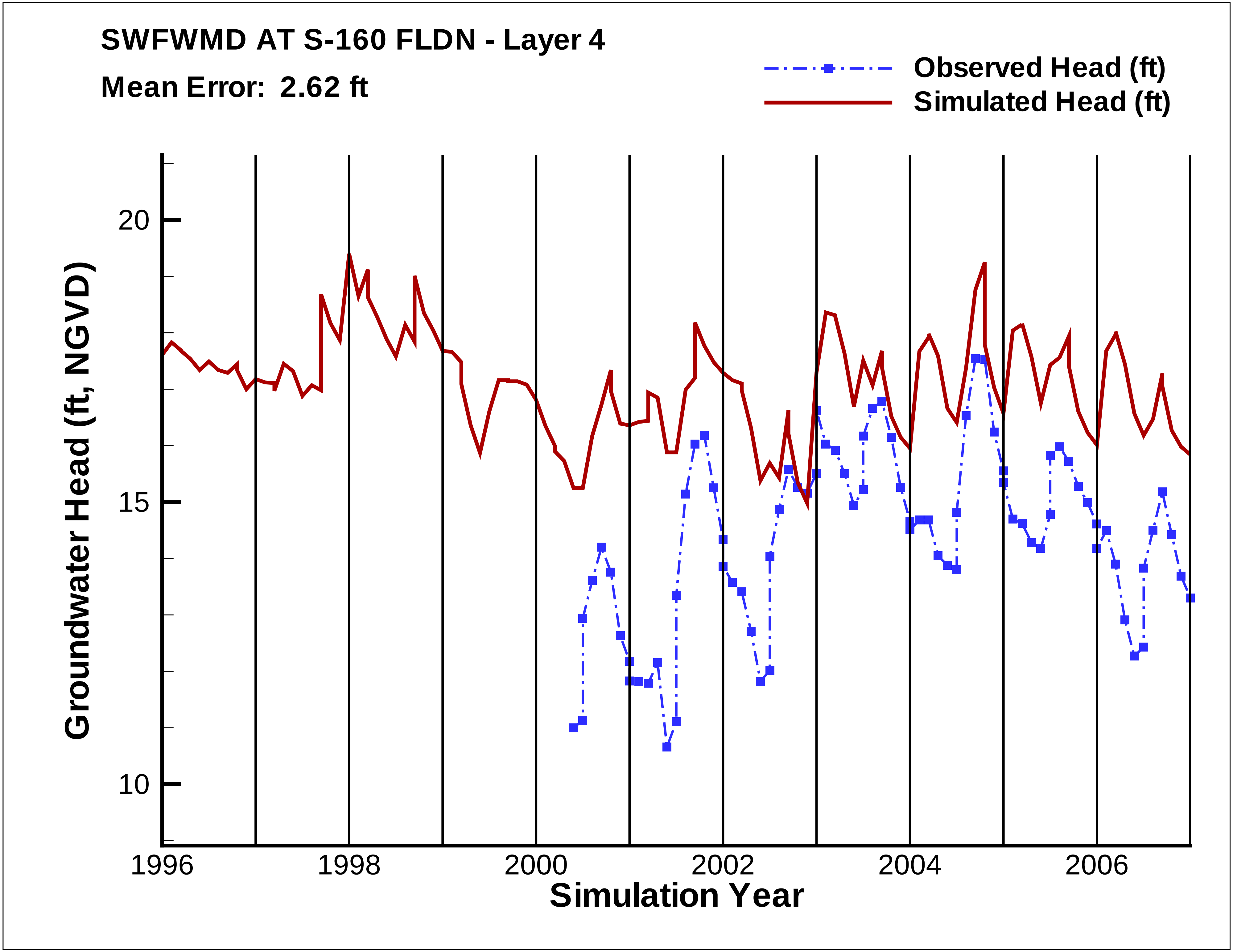

STARKEY SM-1 SHALLOW - Layer 1
Mean Error: 1.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
28
26
24
22
20
1996
1998
2000
2002
2004
2006
Simulation Year

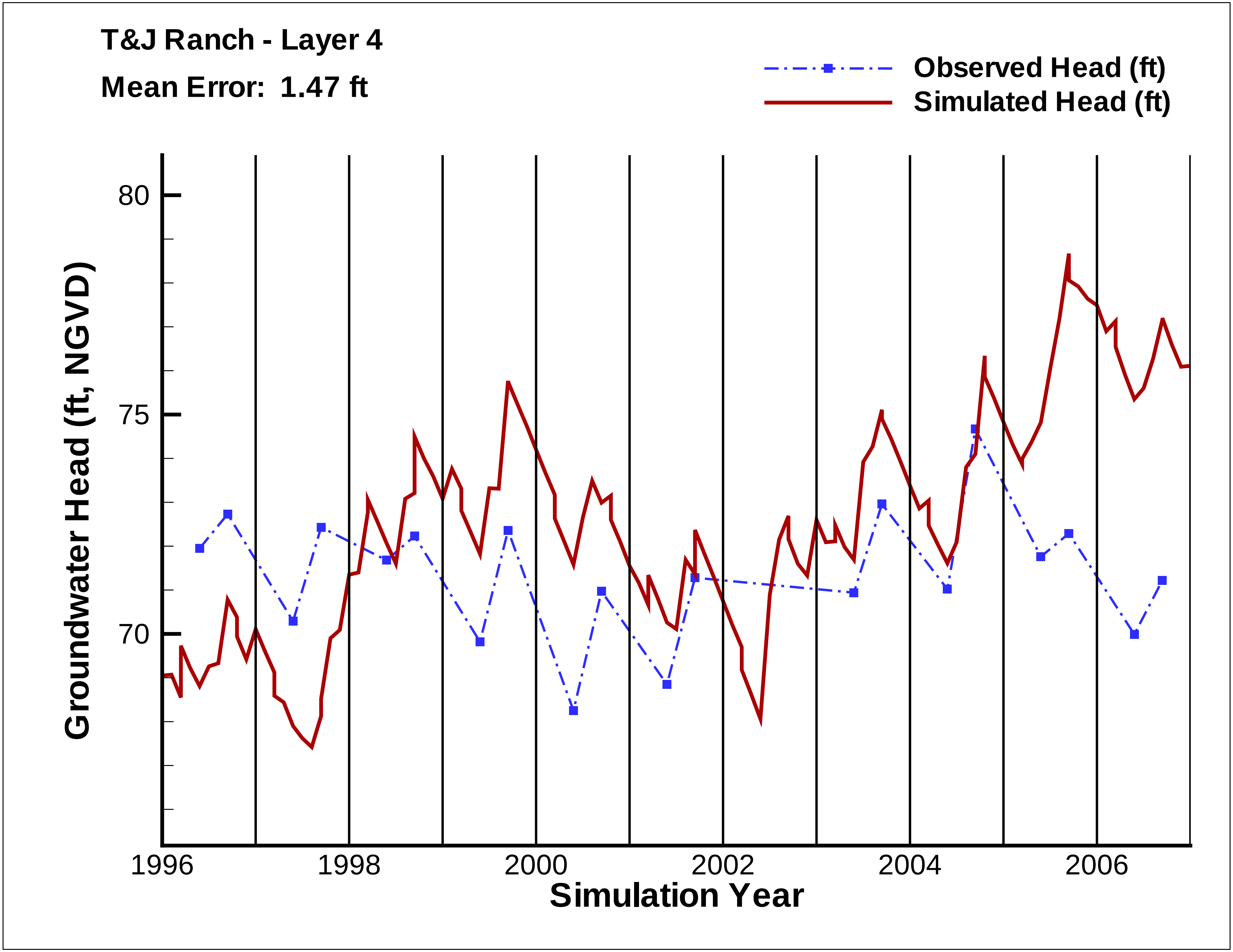


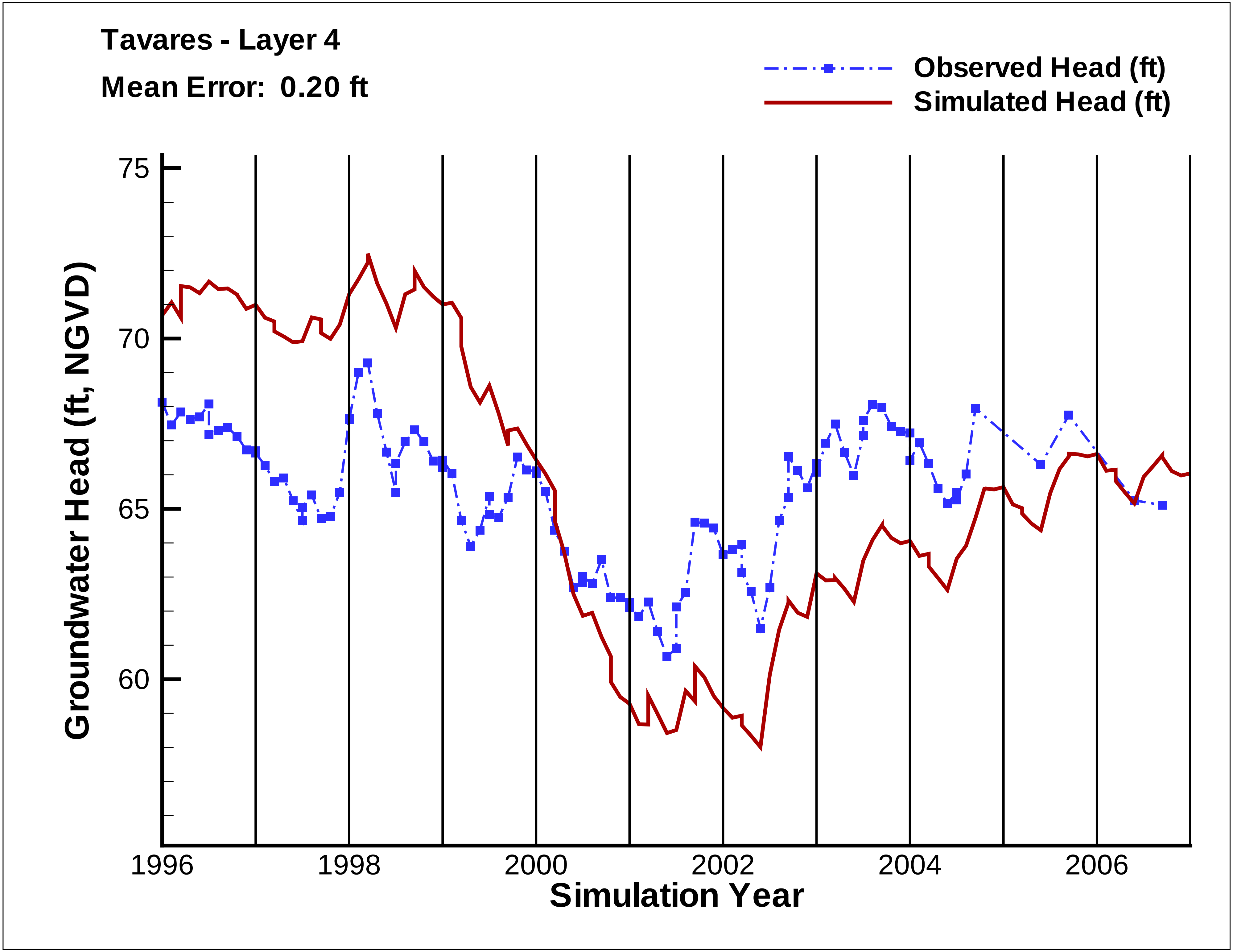
Sumter 13 UFA - Layer 4
Mean Error: -1.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

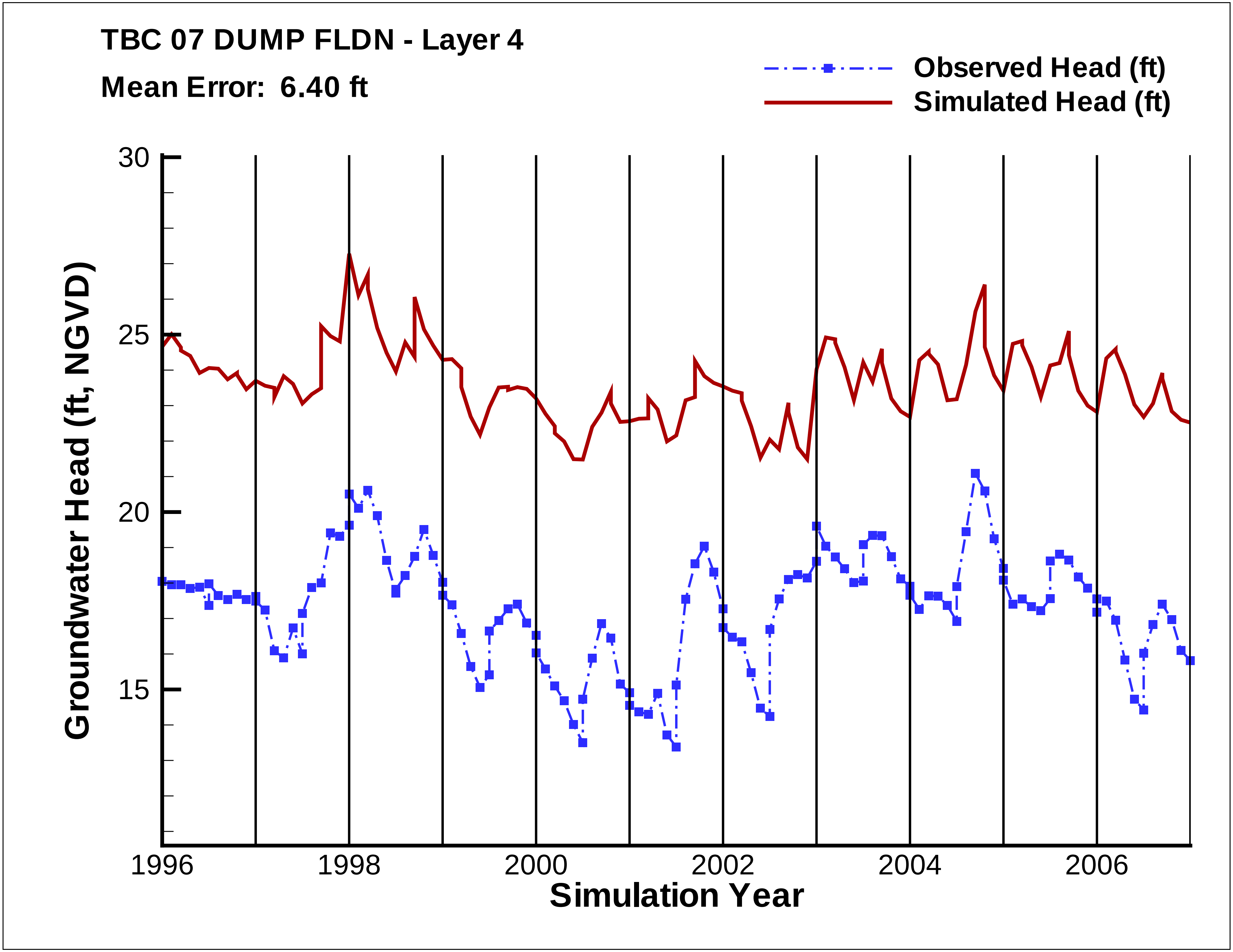


Swan Lk Well UFA - Layer 4
Mean Error: 0.82 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

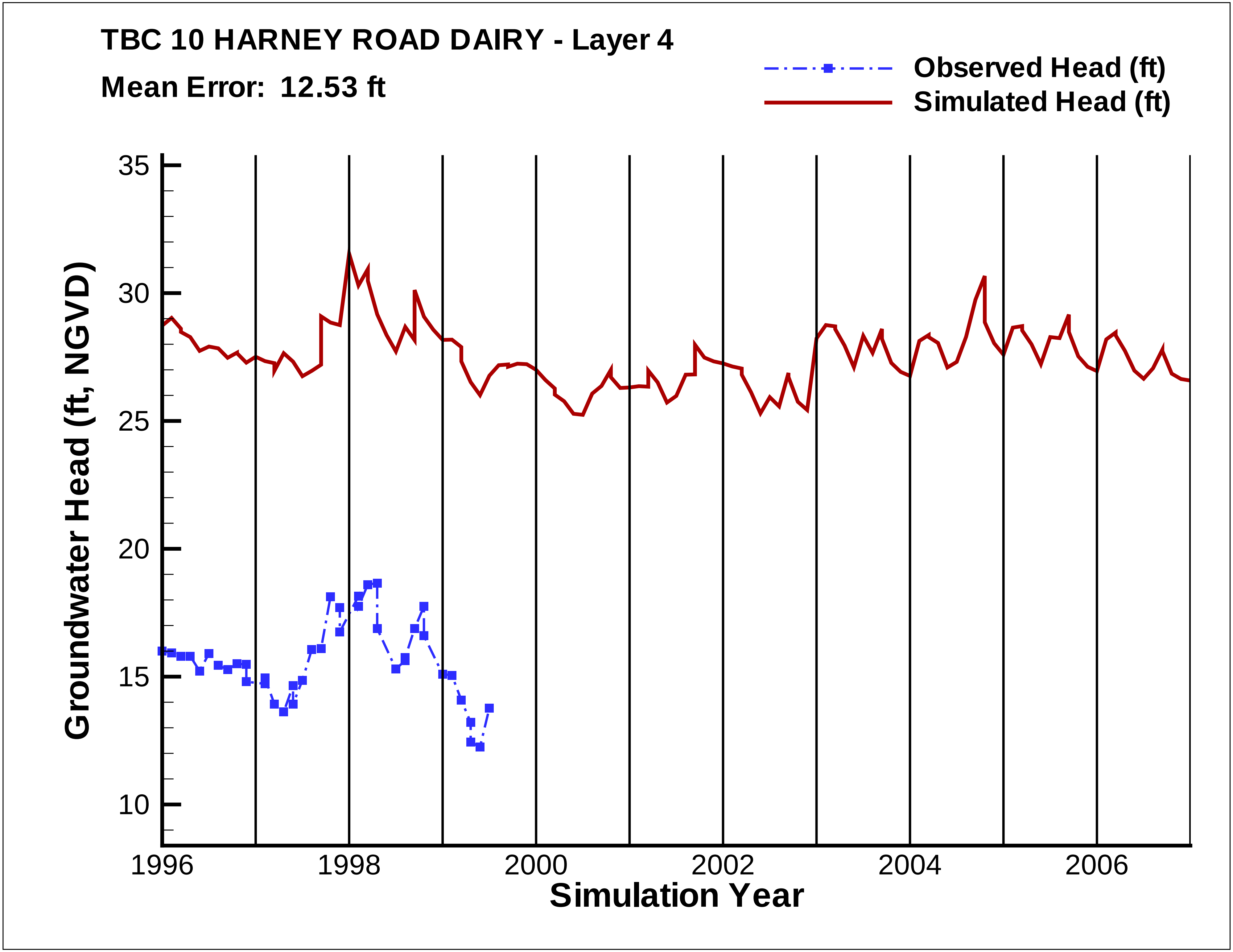

SWFWMD AT S-160 FLDN - Layer 4
Mean Error: 2.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

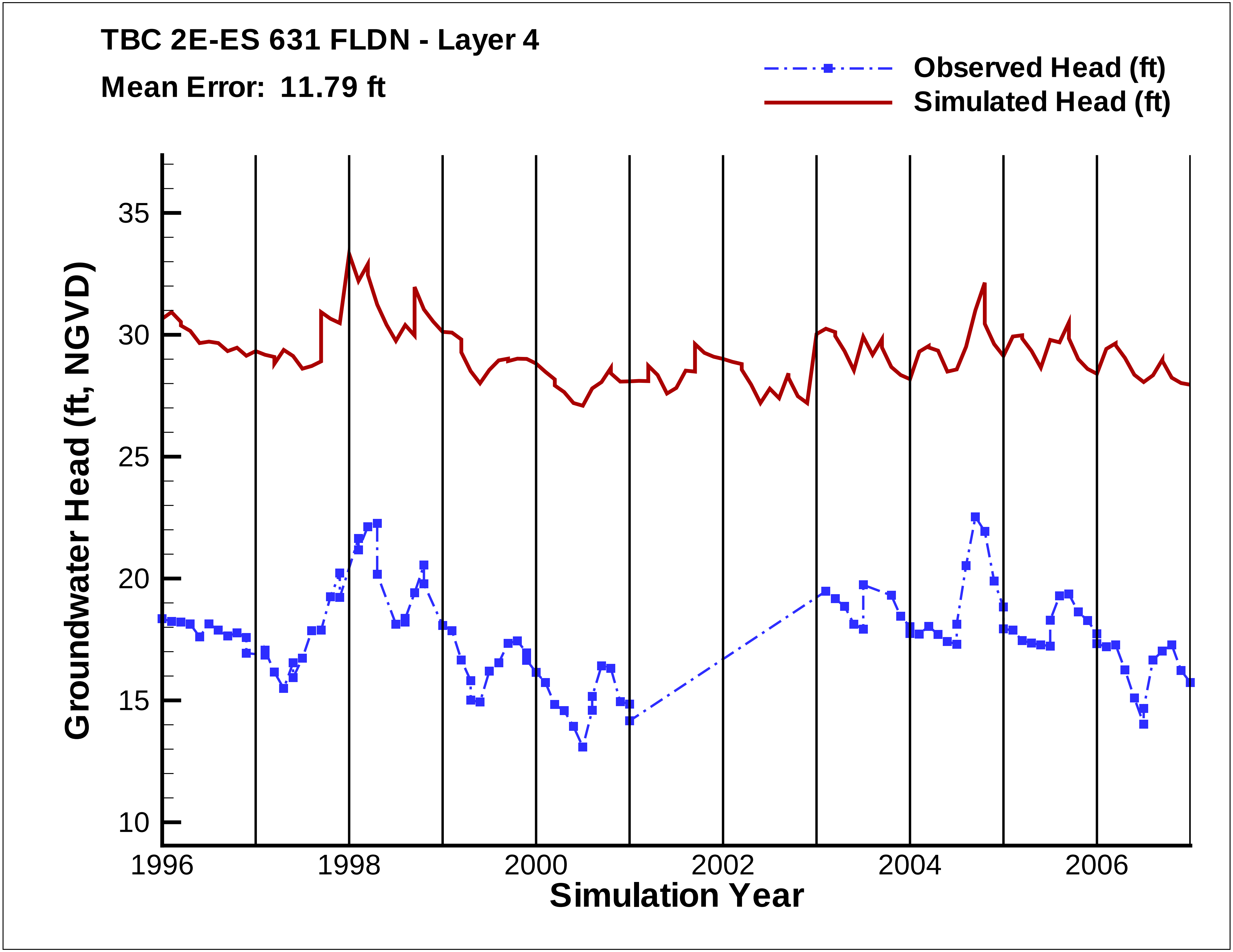

T&J Ranch - Layer 4
Mean Error: 1.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year


Tavares - Layer 4
Mean Error: 0.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
1996
1998
2000
2002
2004
2006
Simulation Year

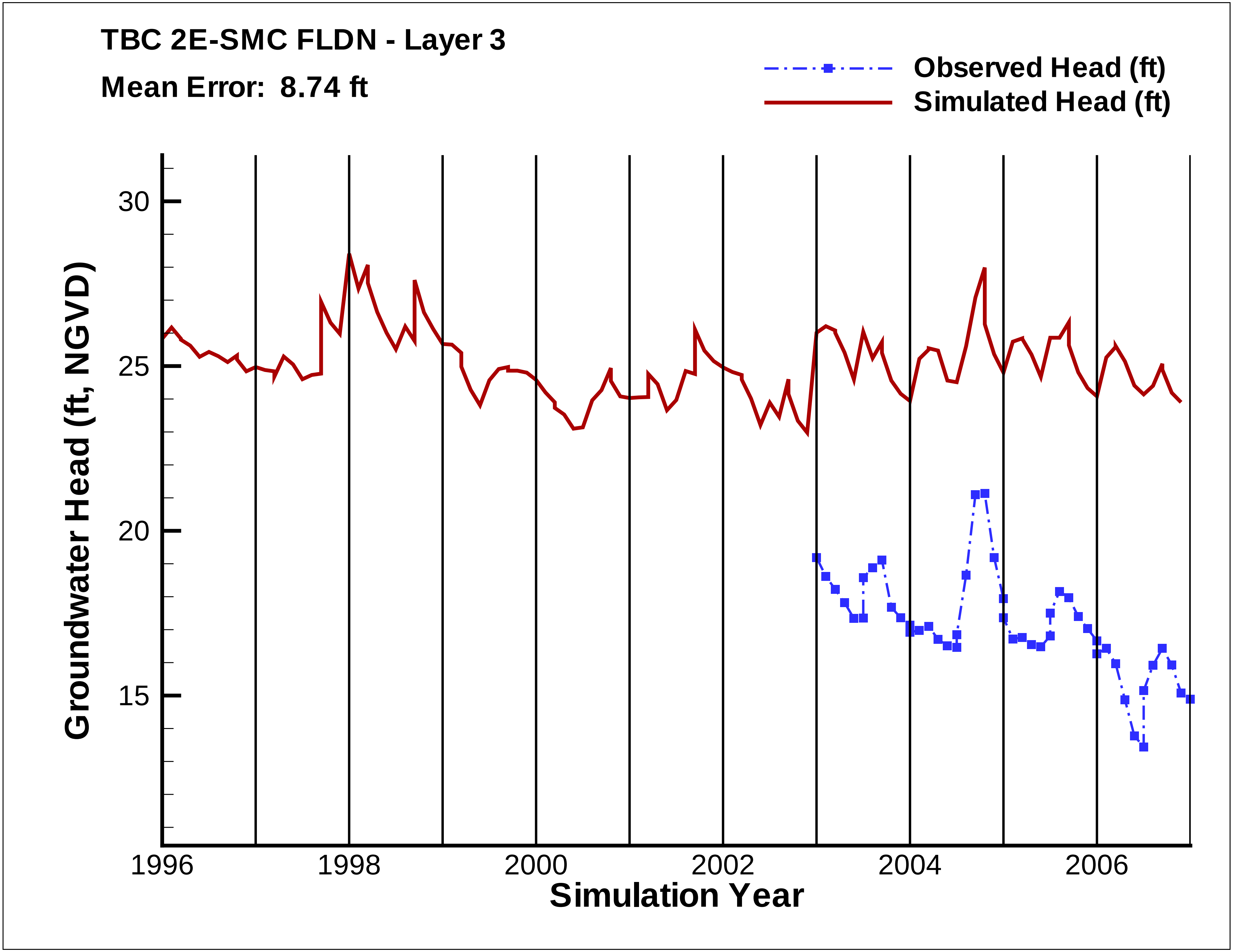


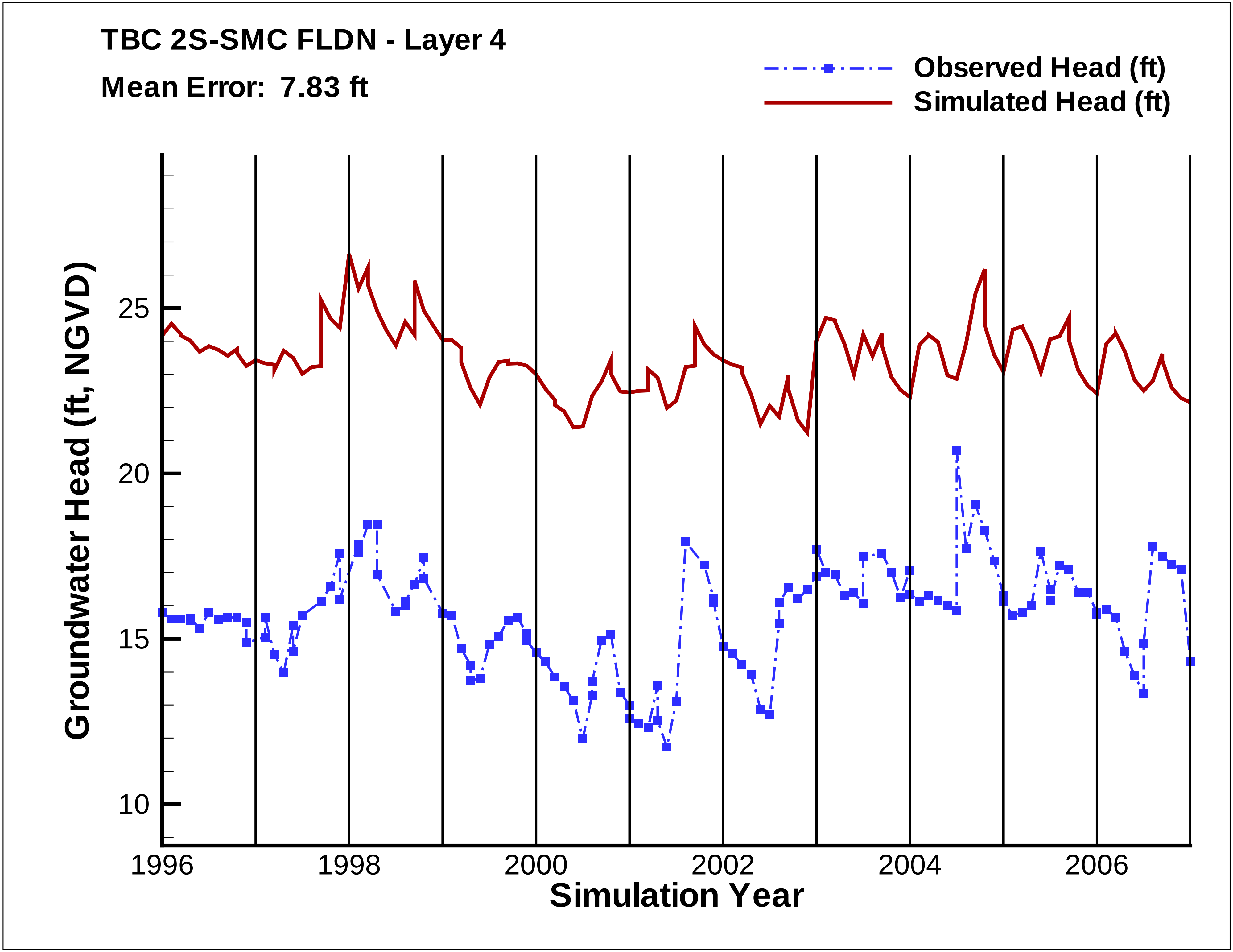
TBC 07 DUMP FLDN - Layer 4
Mean Error: 6.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year


TBC 10 HARNEY ROAD DAIRY - Layer 4
Mean Error: 12.53 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

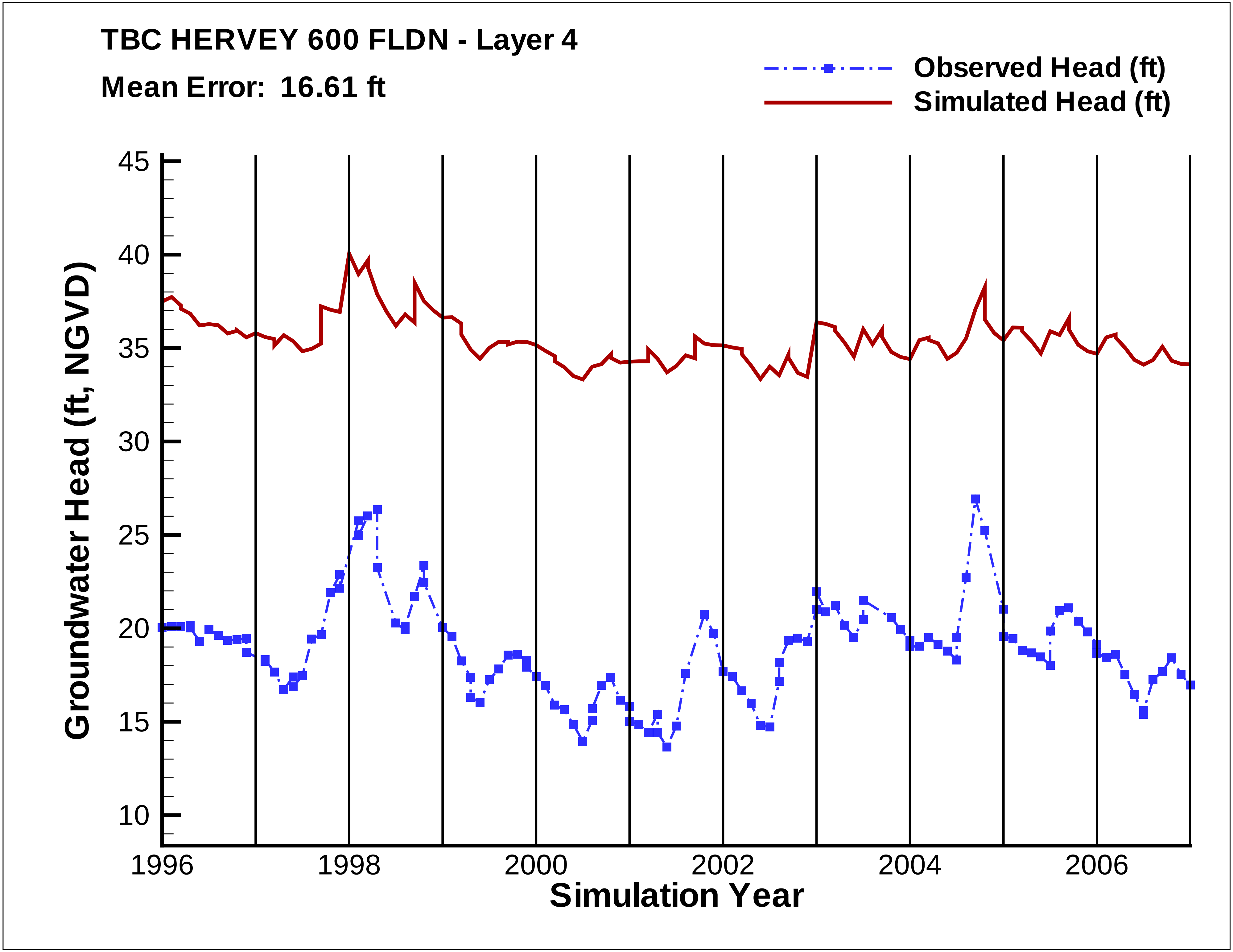


TBC 2E-ES 631 FLDN - Layer 4
Mean Error: 11.79 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

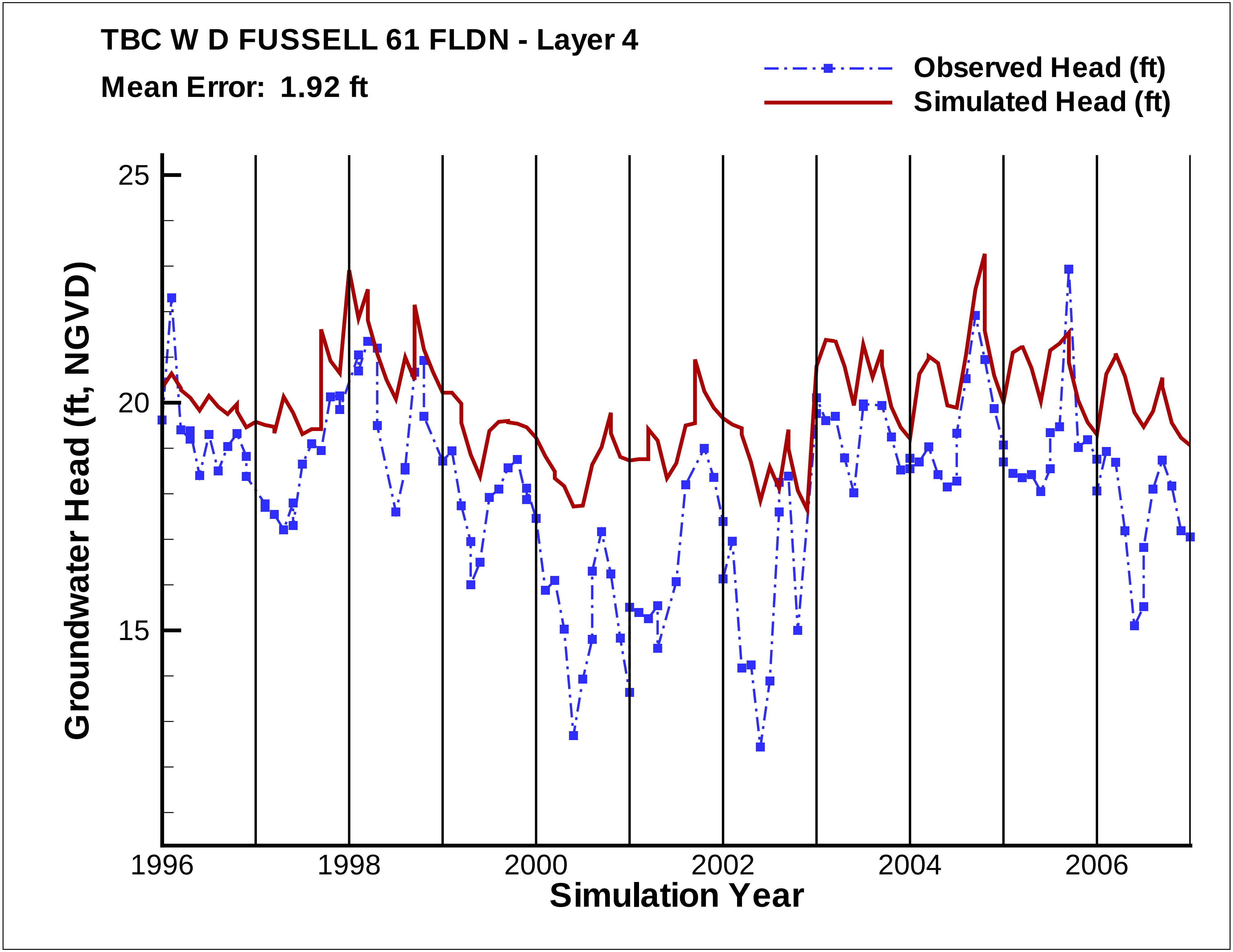

TBC 2E-SMC FLDN - Layer 3
Mean Error: 8.74 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year



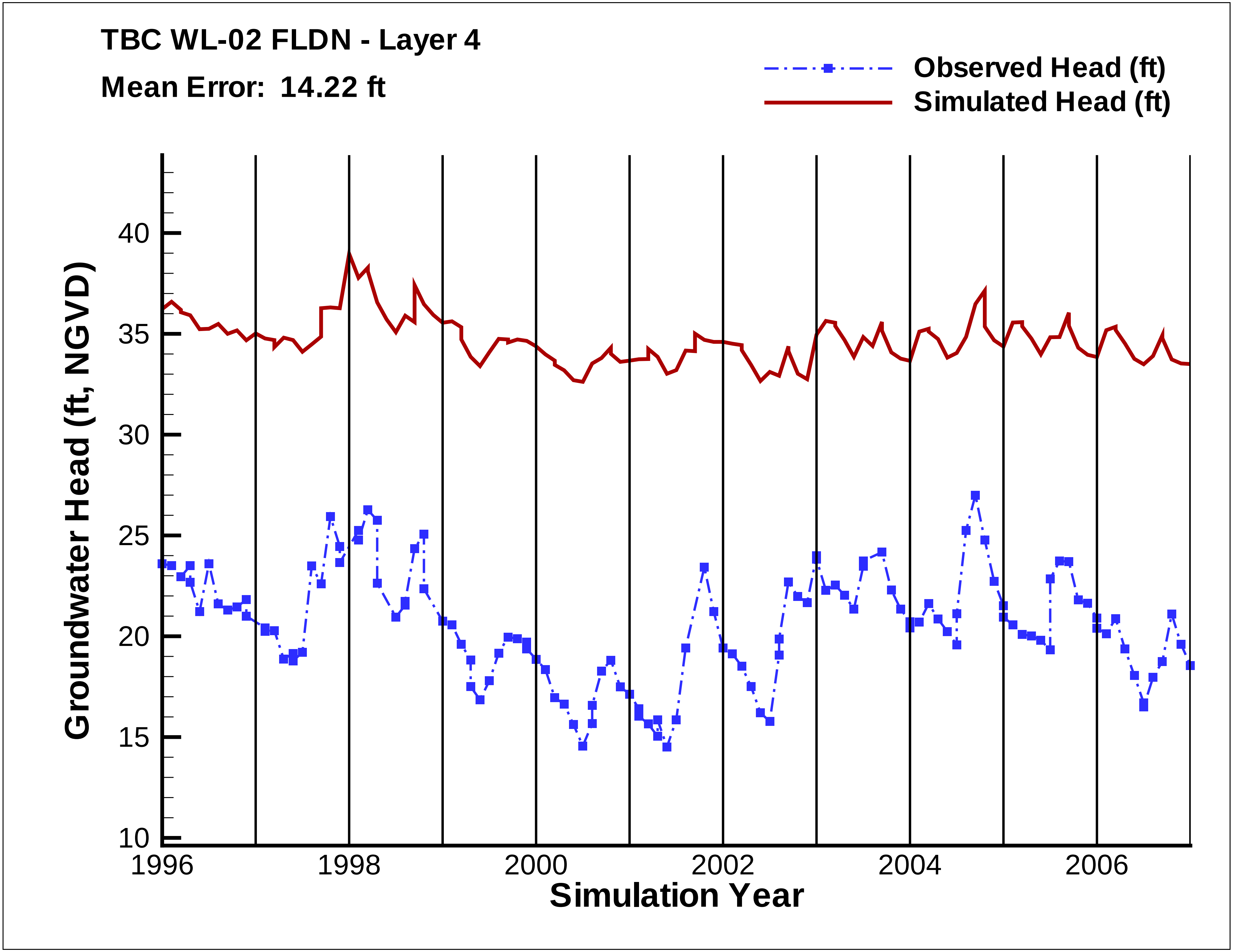
TBC 2S-SMC FLDN - Layer 4
Mean Error: 7.83 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
1996
1998
2000
2002
2004
2006
Simulation Year

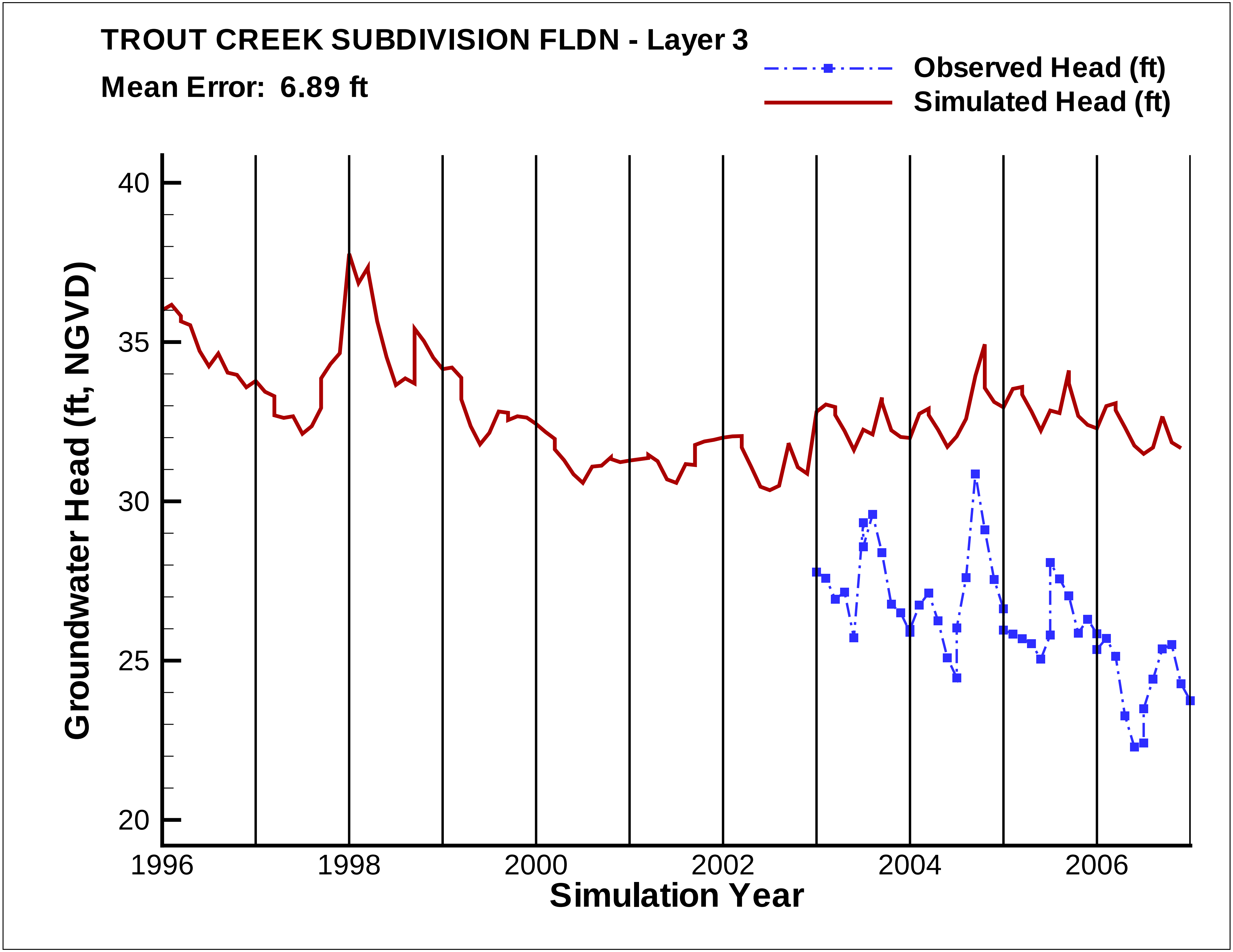


TBC HERVEY 600 FLDN - Layer 4
Mean Error: 16.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

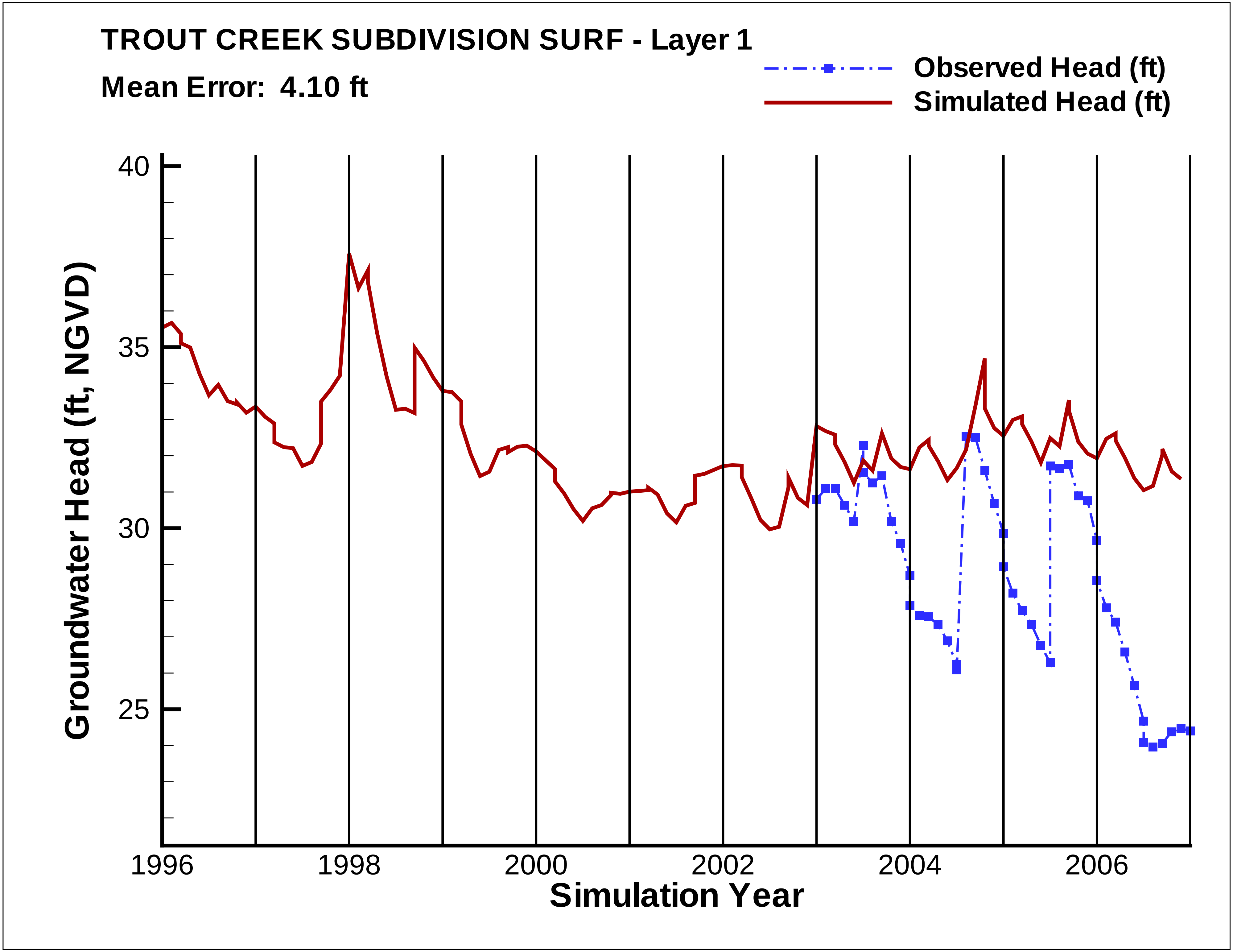


TBC W D FUSSELL 61 FLDN - Layer 4
Mean Error: 1.92 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

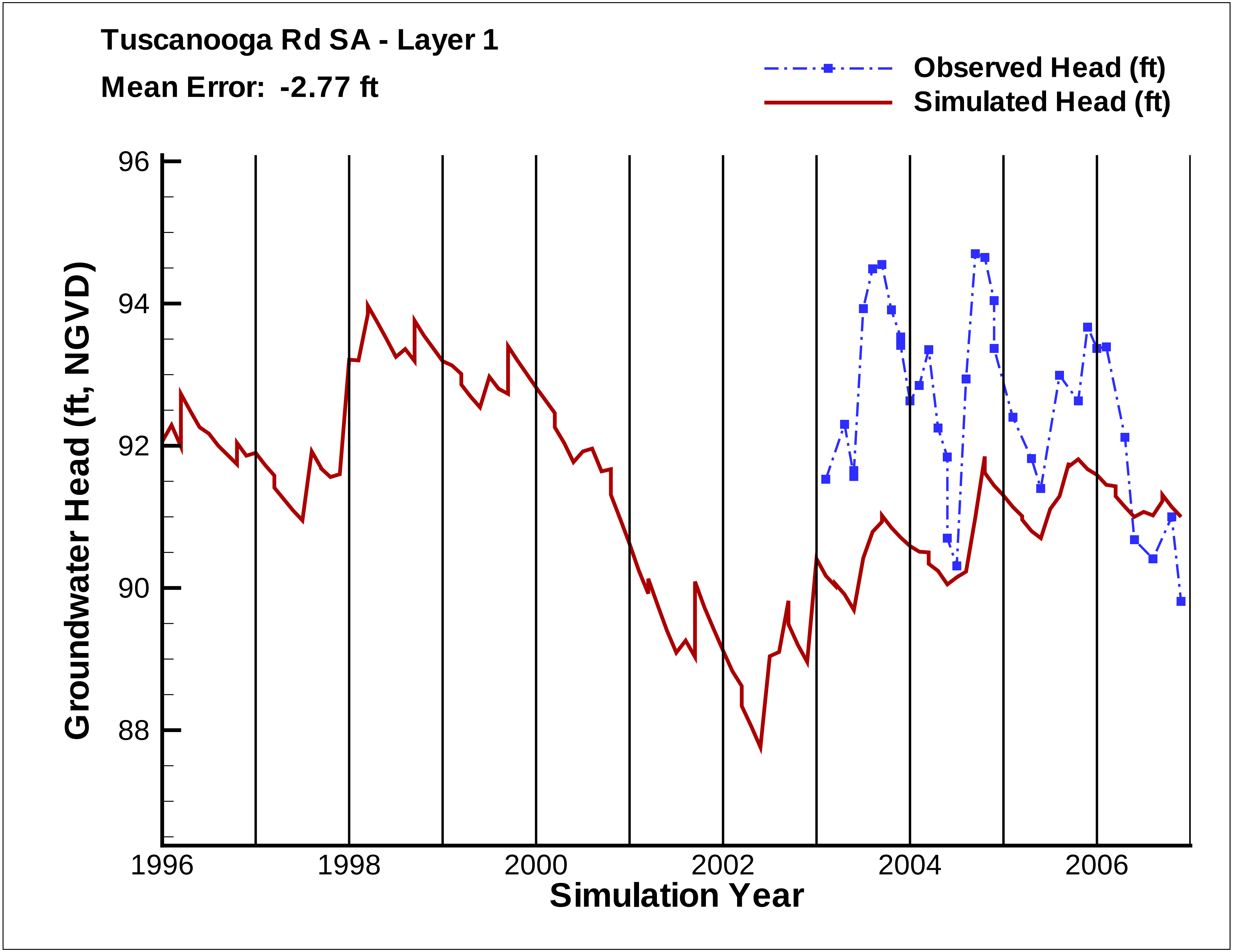

TBC WL-02 FLDN - Layer 4
Mean Error: 14.22 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
30
35
40
1996
1998
2000
2002
2004
2006
Simulation Year



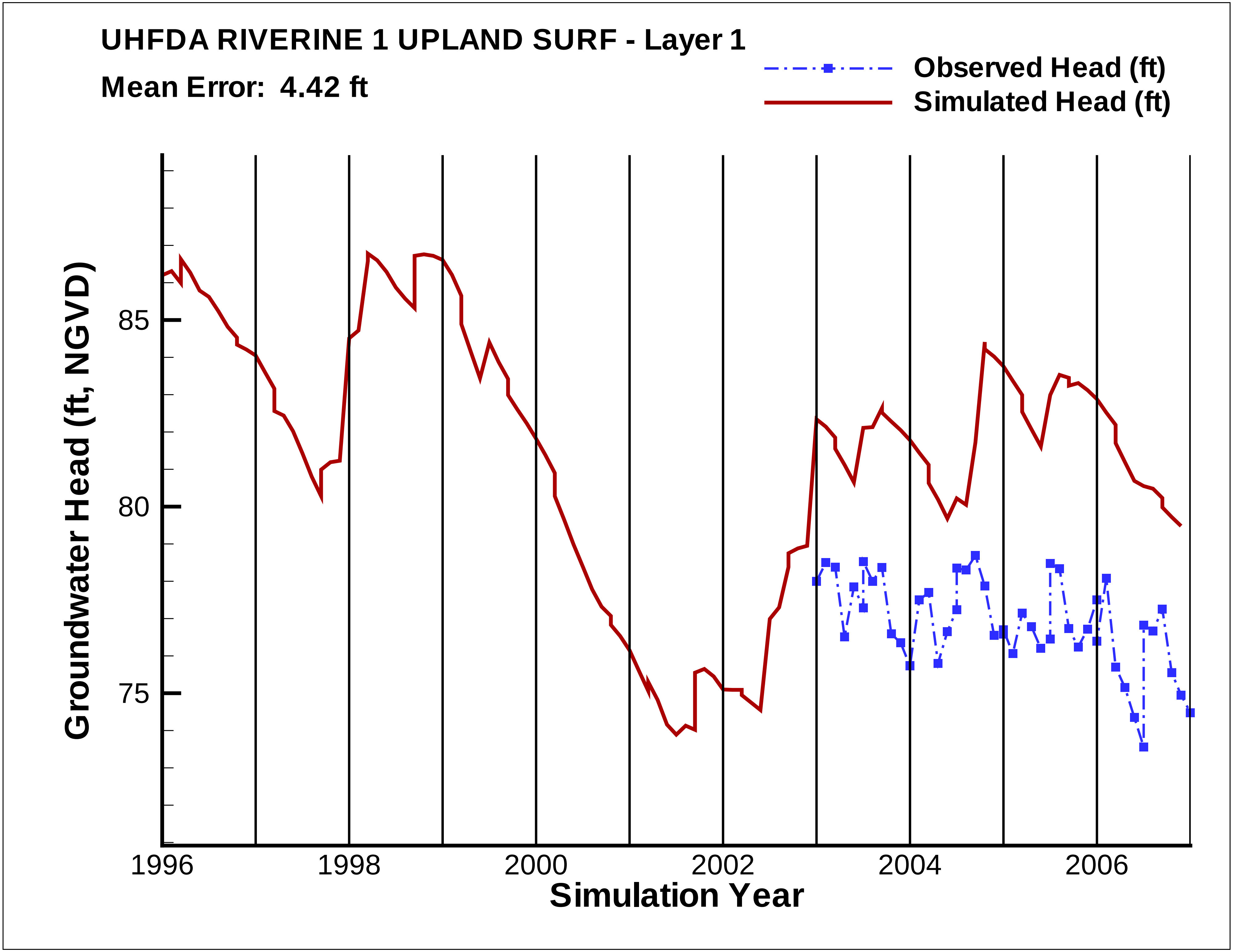
TROUT CREEK SUBDIVISION FLDN - Layer 3
Mean Error: 6.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year



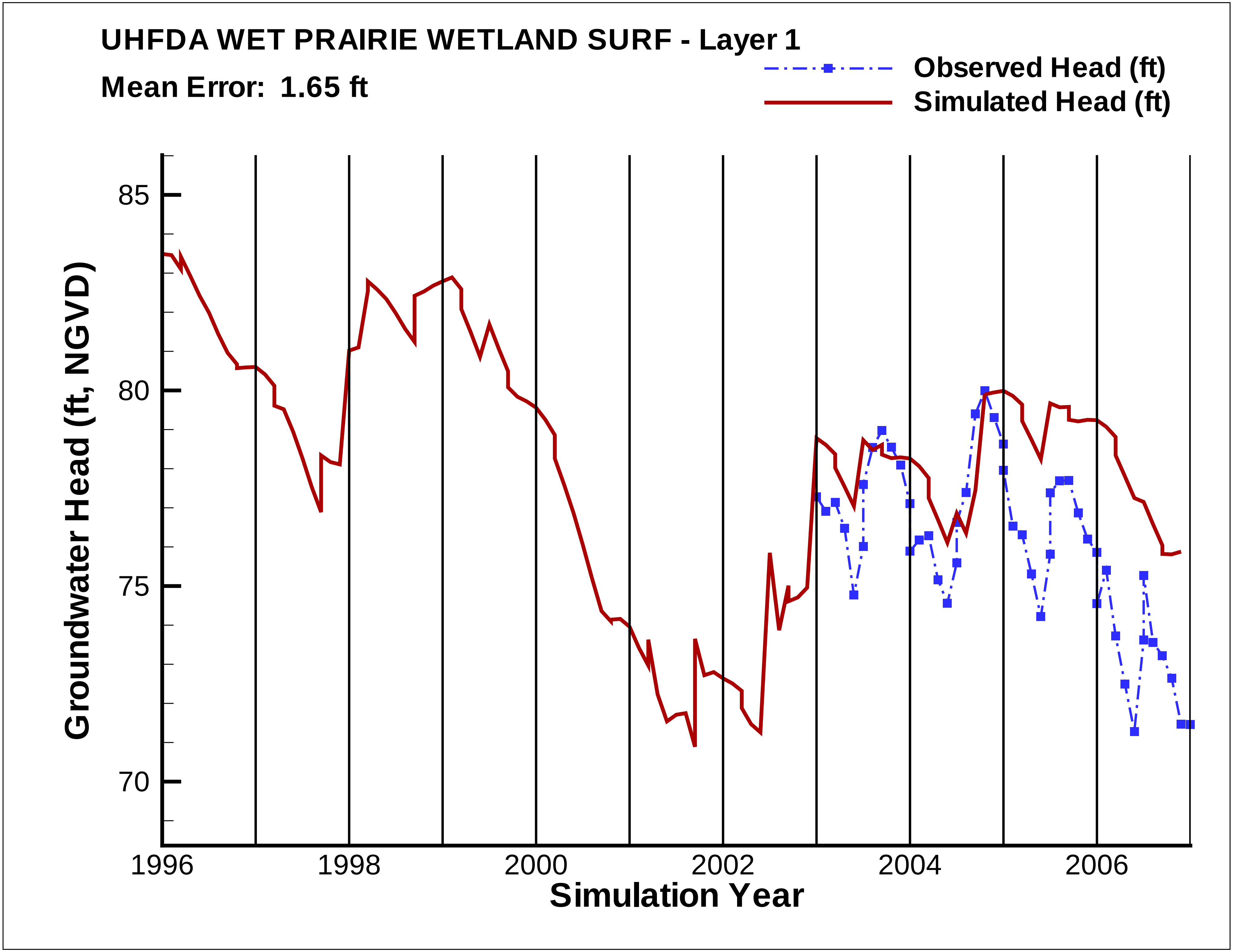
TROUT CREEK SUBDIVISION SURF - Layer 1
Mean Error: 4.10 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



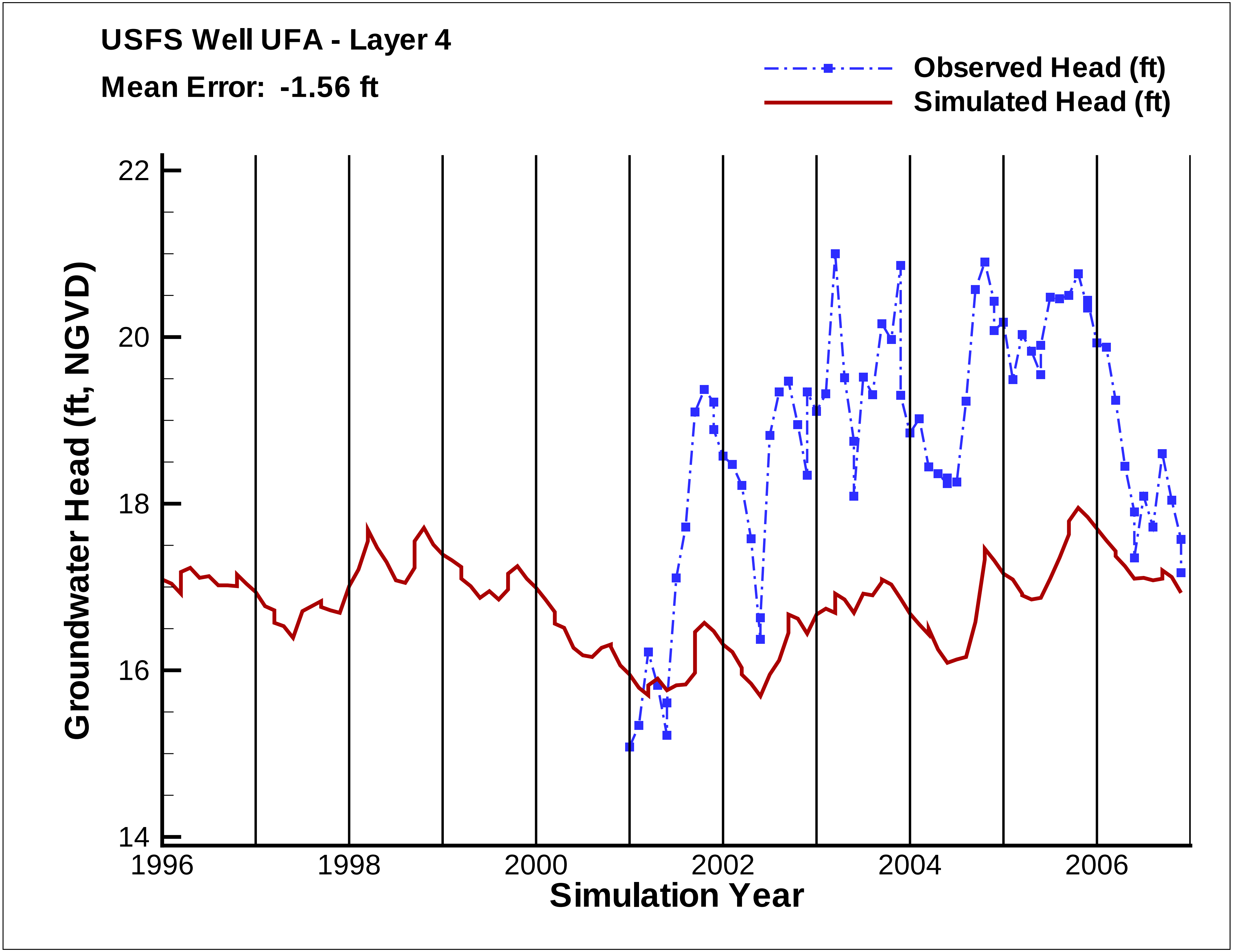
Tuscanooga Rd SA - Layer 1
Mean Error: -2.77 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
96
94
92
90
88
1996
1998
2000
2002
2004
2006
Simulation Year

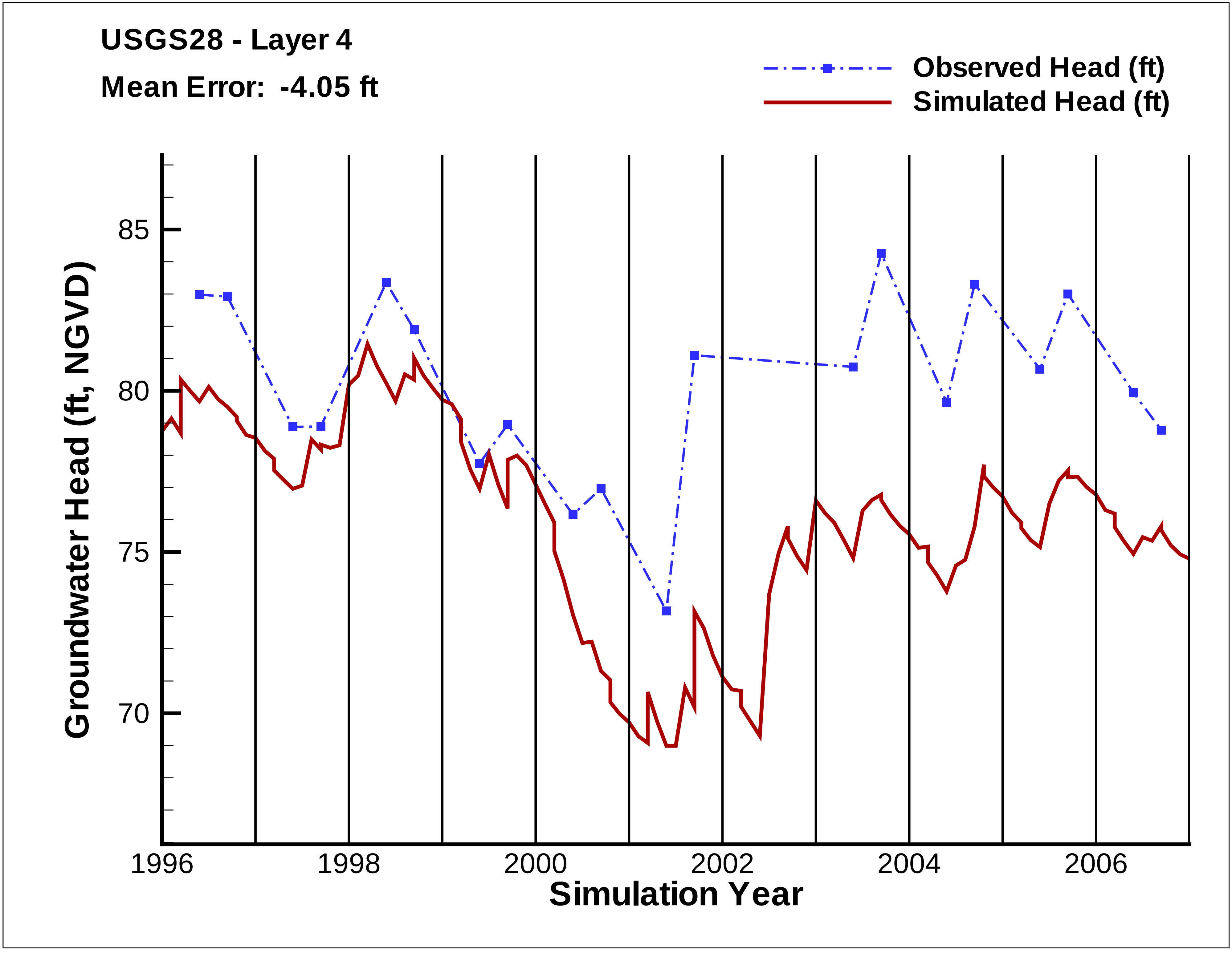


UHFDA RIVERINE 1 UPLAND SURF - Layer 1
Mean Error: 4.42 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

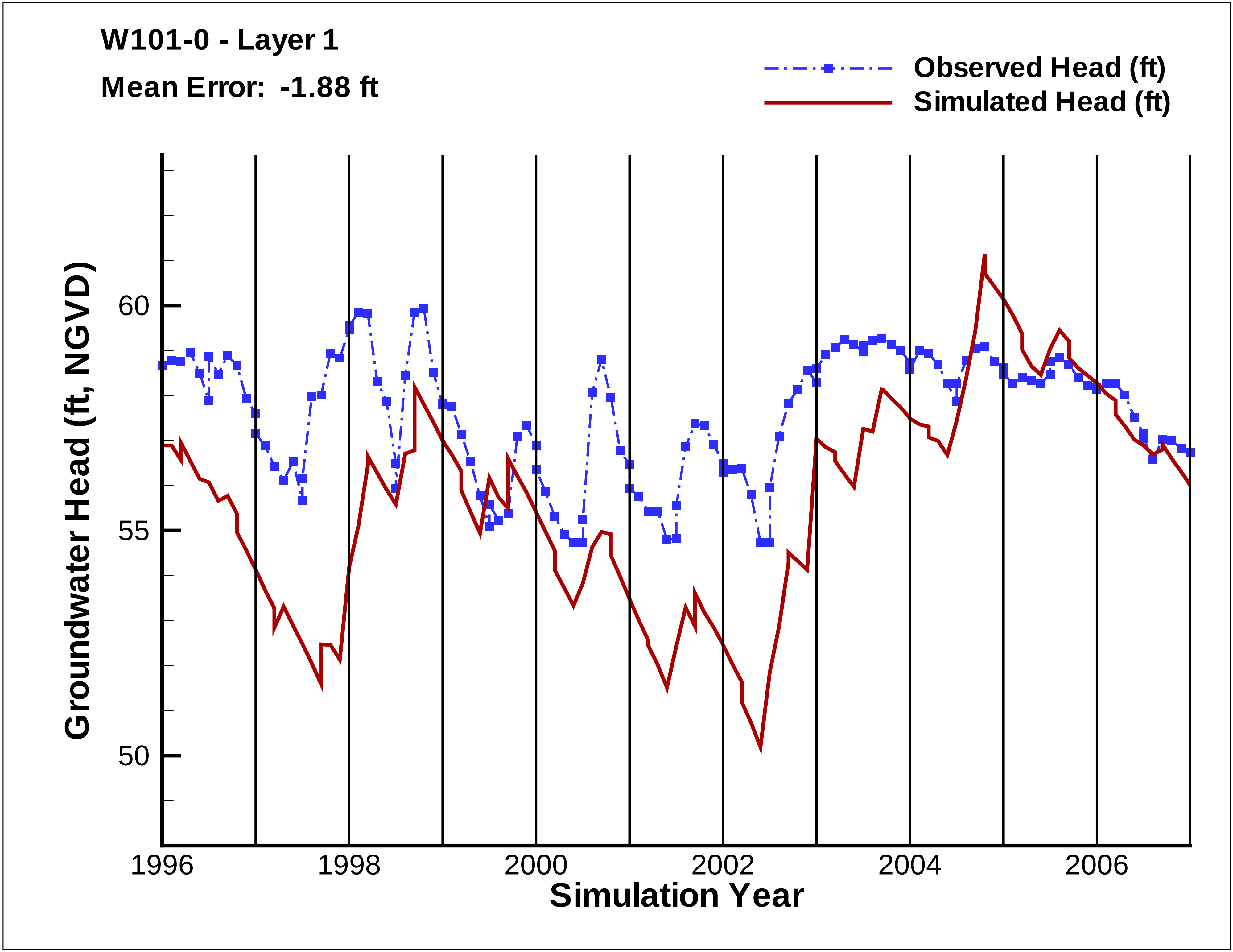


UHFDA WET PRAIRIE WETLAND SURF - Layer 1
Mean Error: 1.65 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

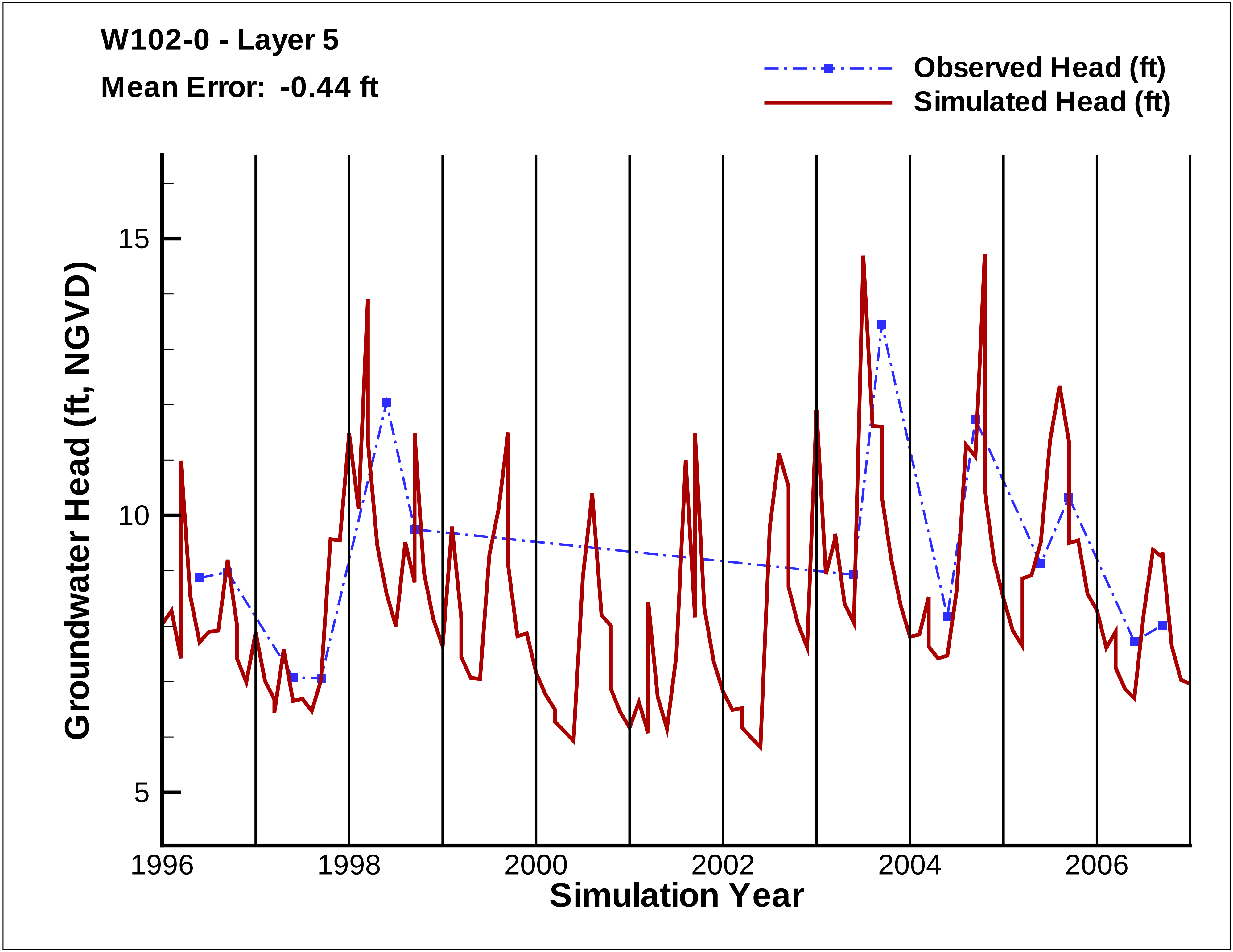

USFS Well UFA - Layer 4
Mean Error: -1.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
22
20
18
16
14
1996
1998
2000
2002
2004
2006
Simulation Year



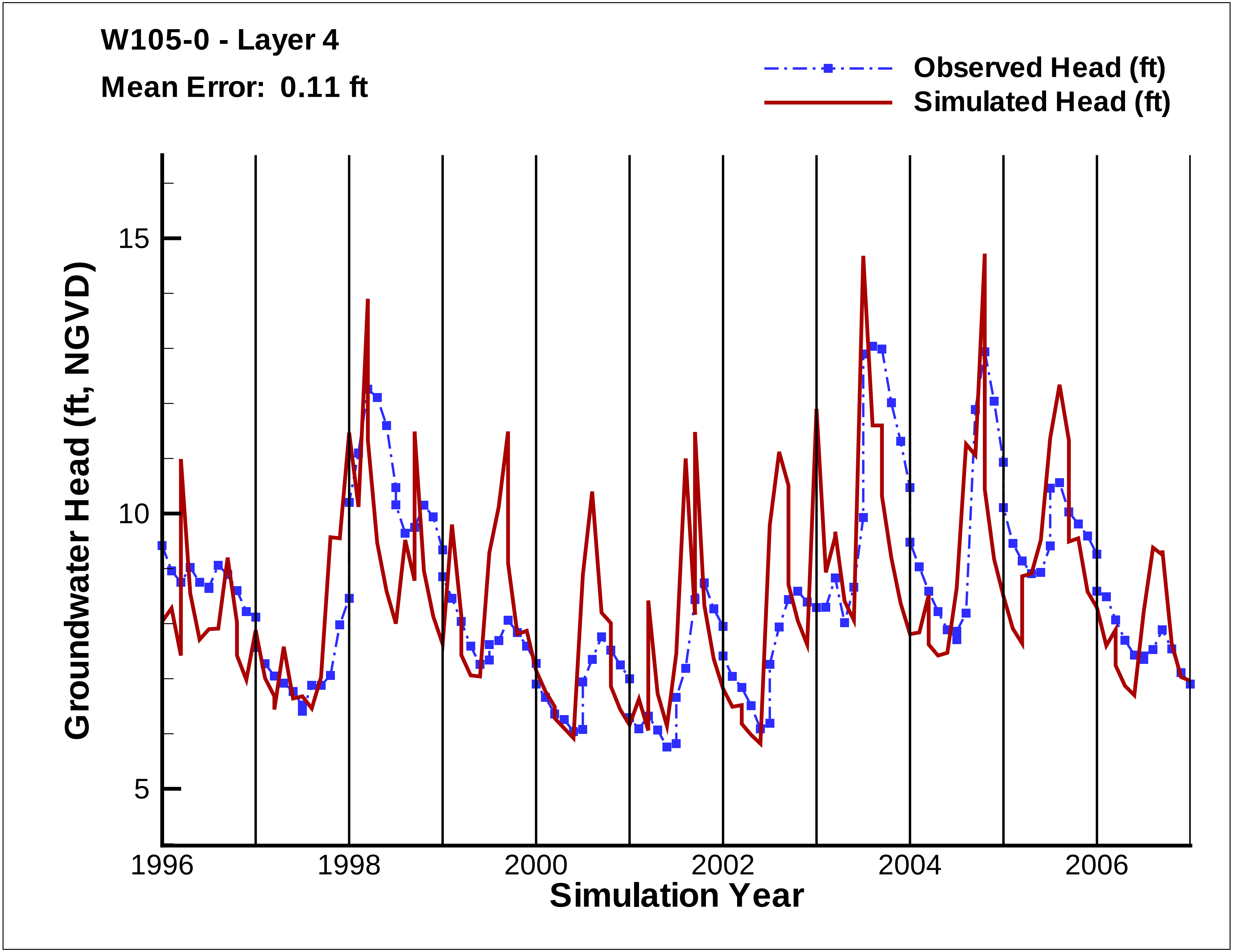
USGS28 - Layer 4
Mean Error: -4.05 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

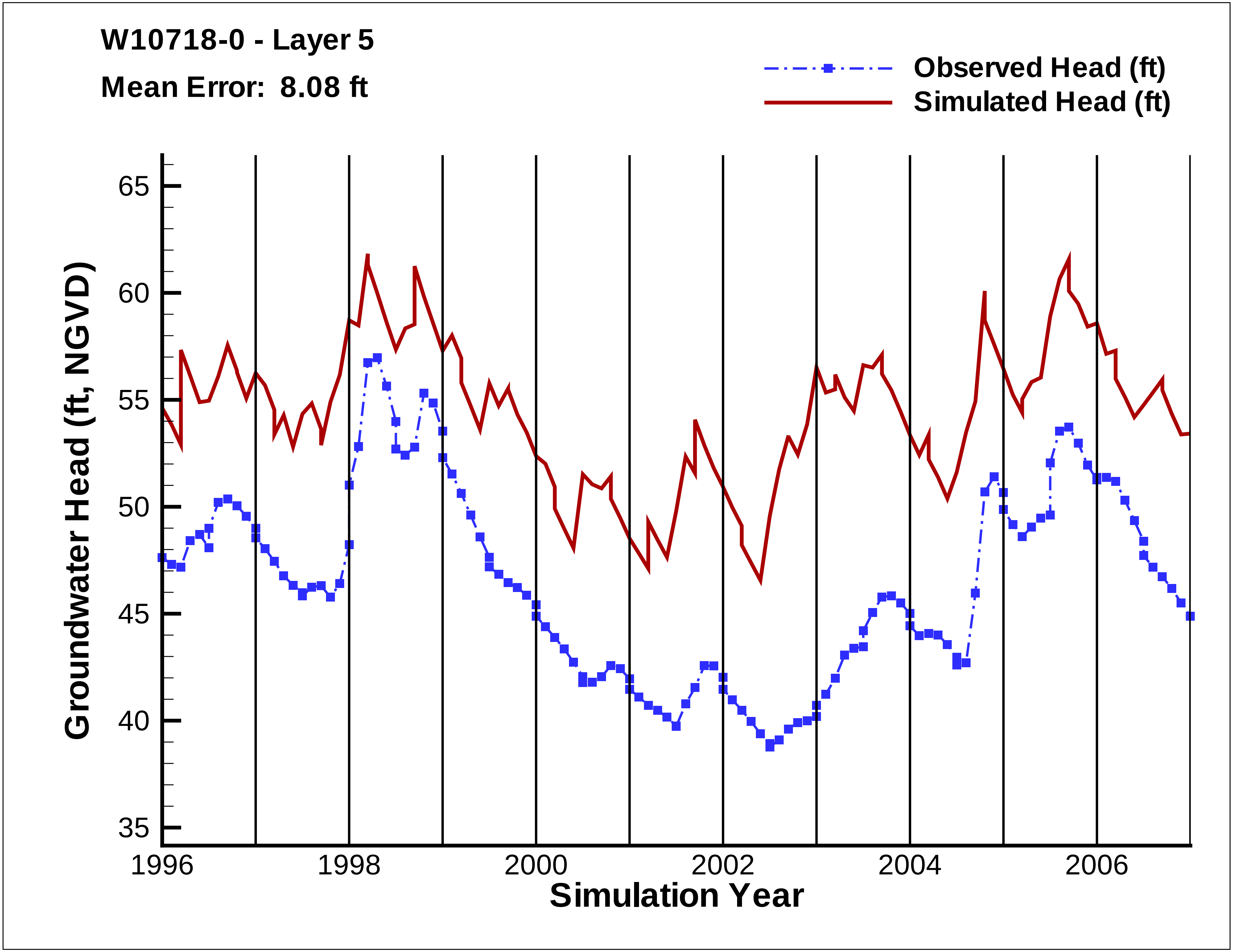


W101-0 - Layer 1
Mean Error: -1.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

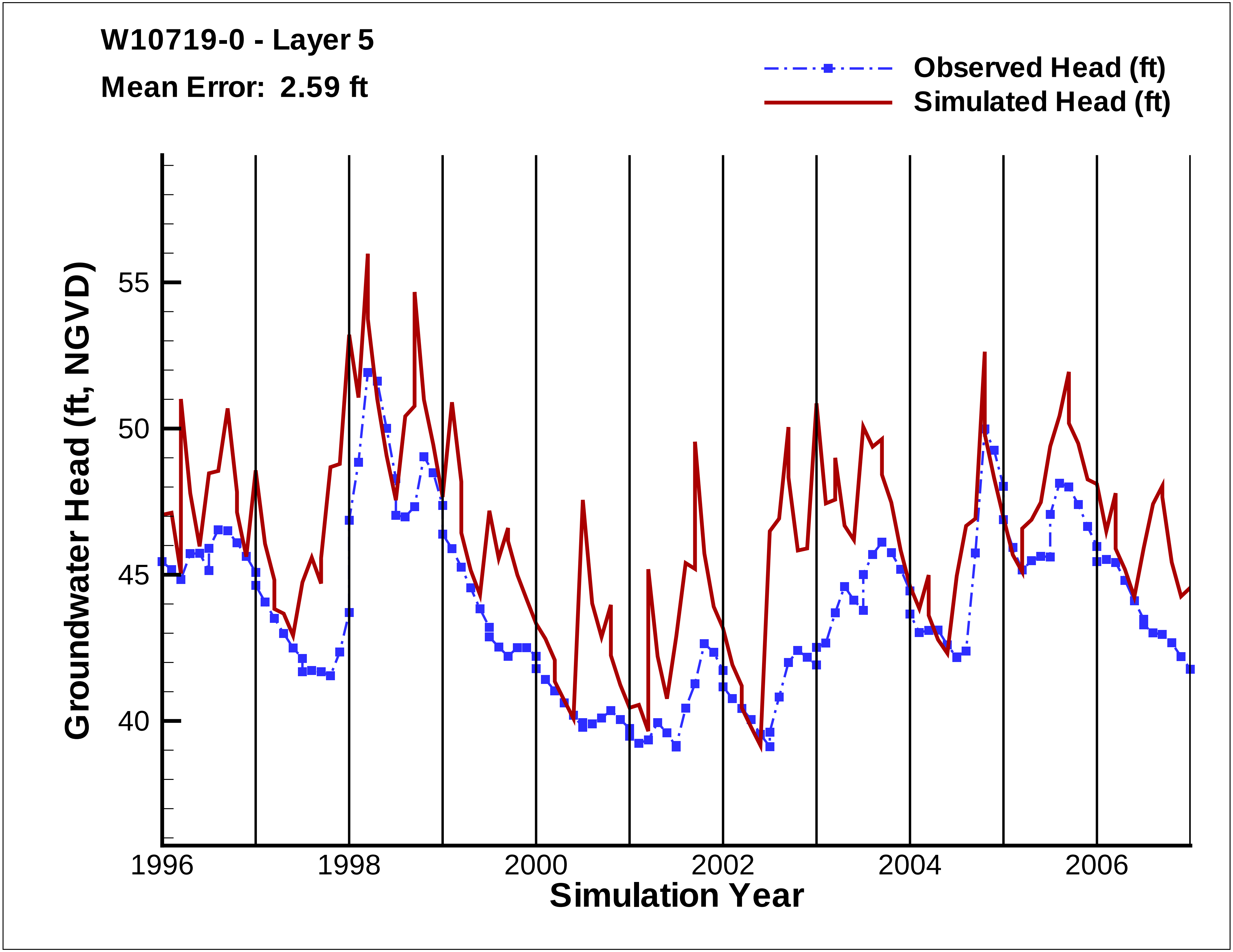


W102-0 - Layer 5
Mean Error: -0.44 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year

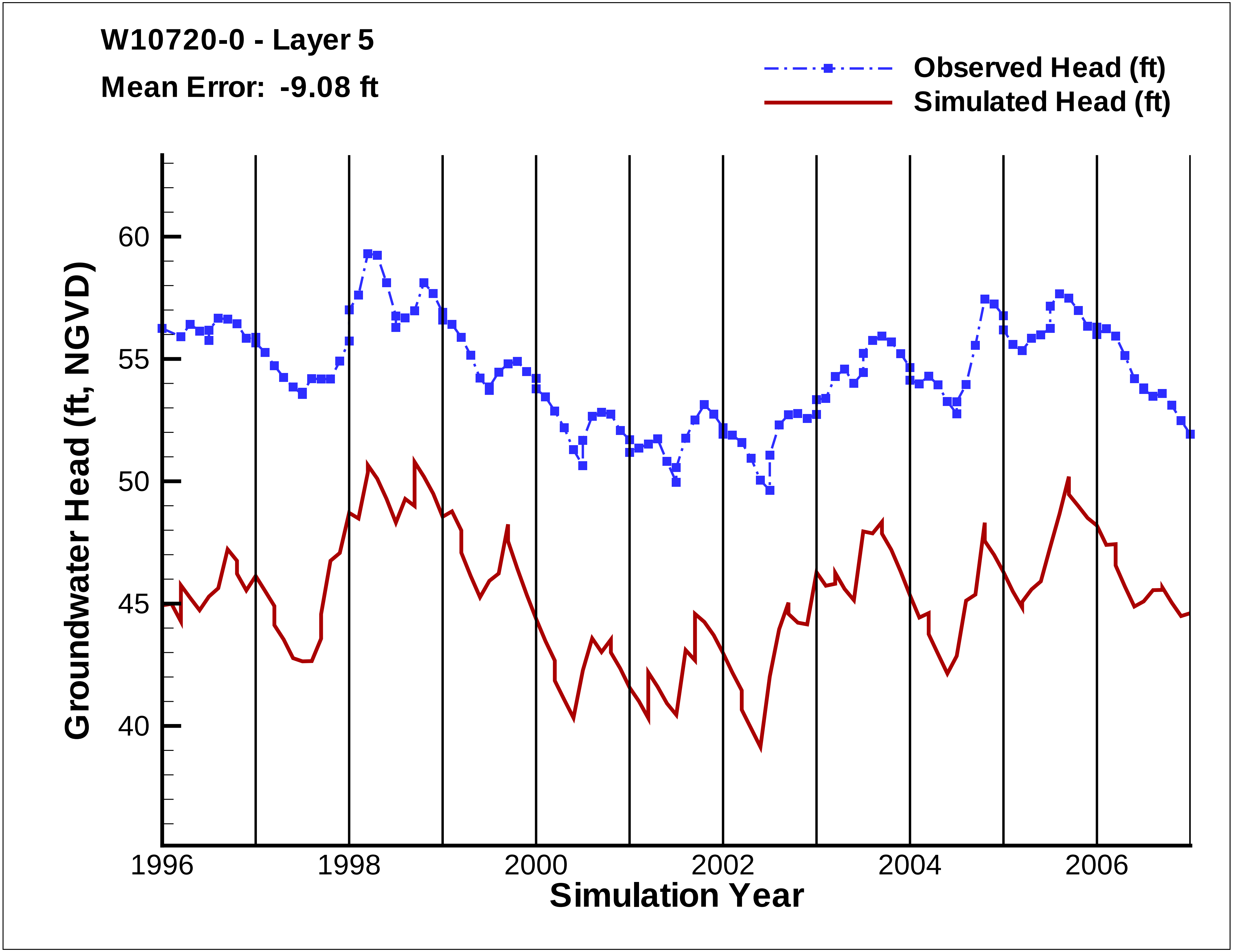

W105-0 - Layer 4
Mean Error: 0.11 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



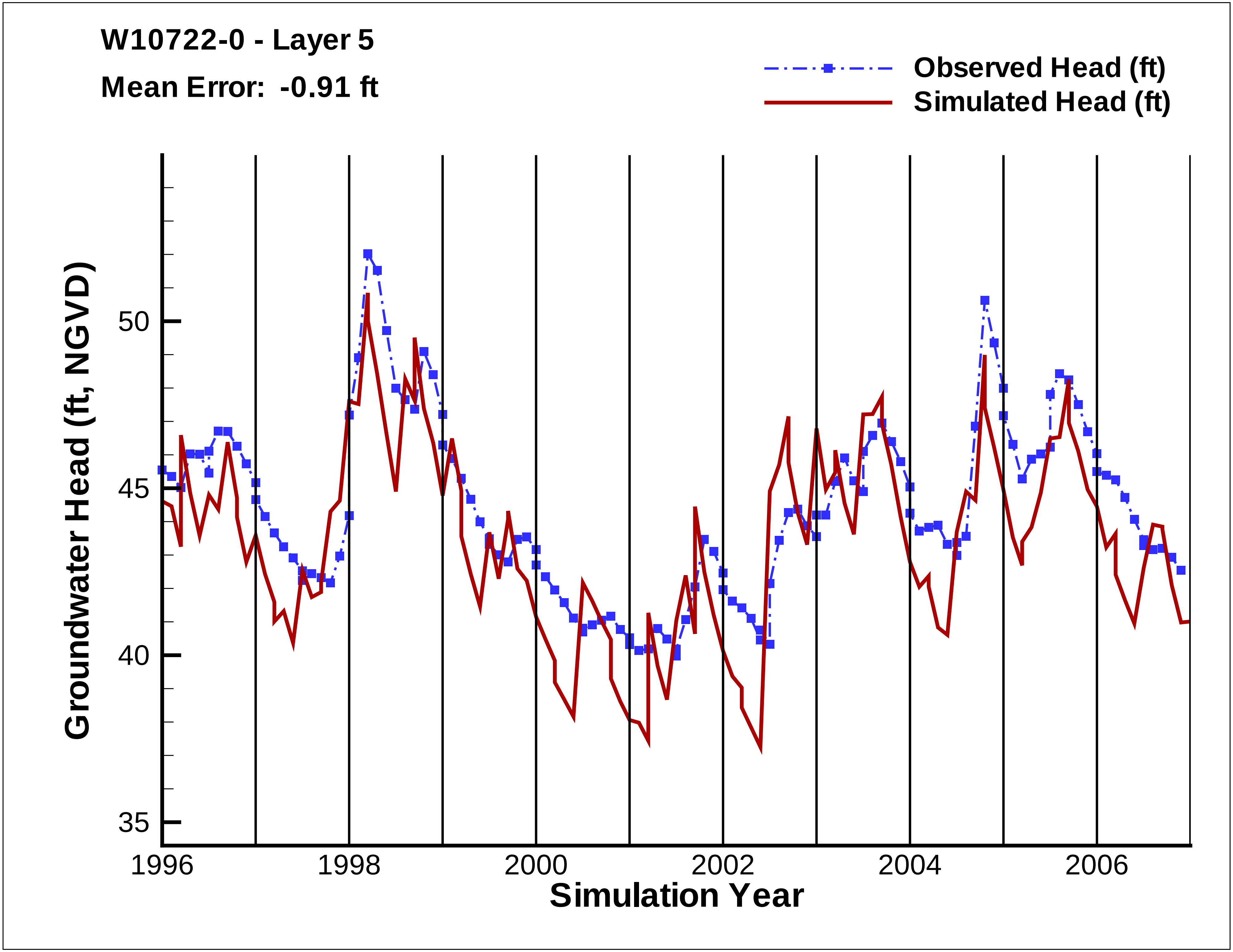
W10718-0 - Layer 5
Mean Error: 8.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
40
45
50
55
60
65
1996
1998
2000
2002
2004
2006
Simulation Year



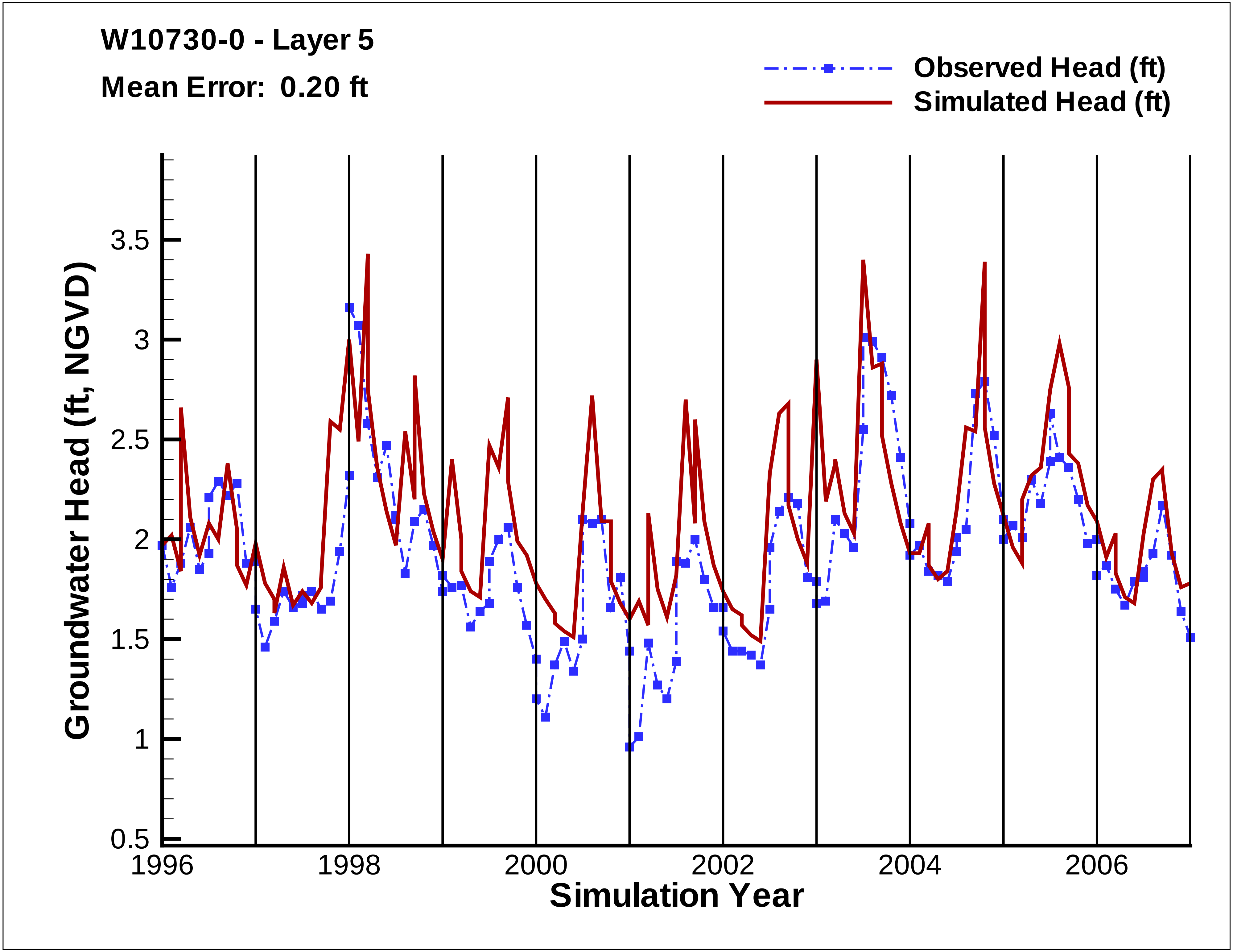
W10719-0 - Layer 5
Mean Error: 2.59 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

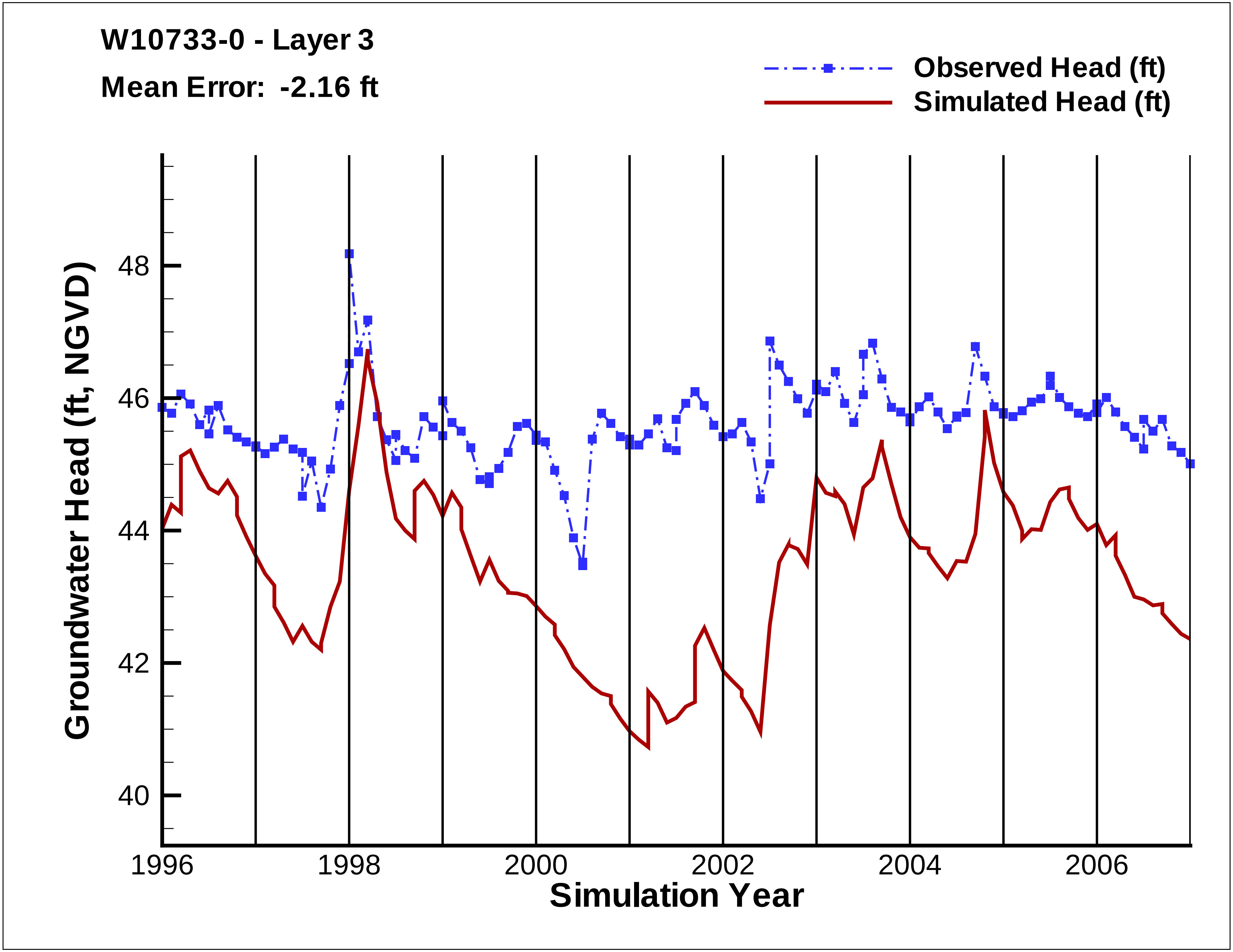


W10720-0 - Layer 5
Mean Error: -9.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

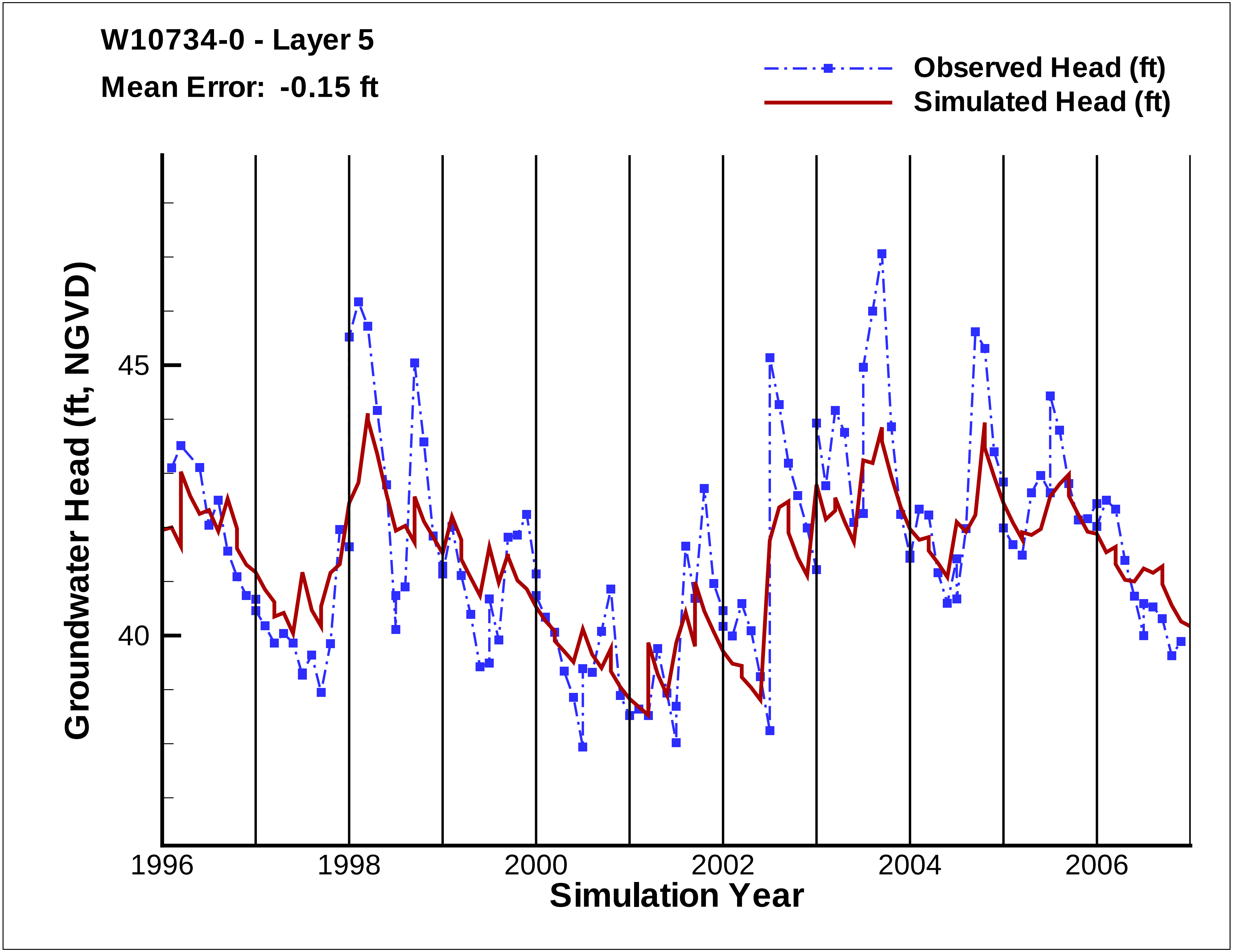


W10722-0 - Layer 5
Mean Error: -0.91 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

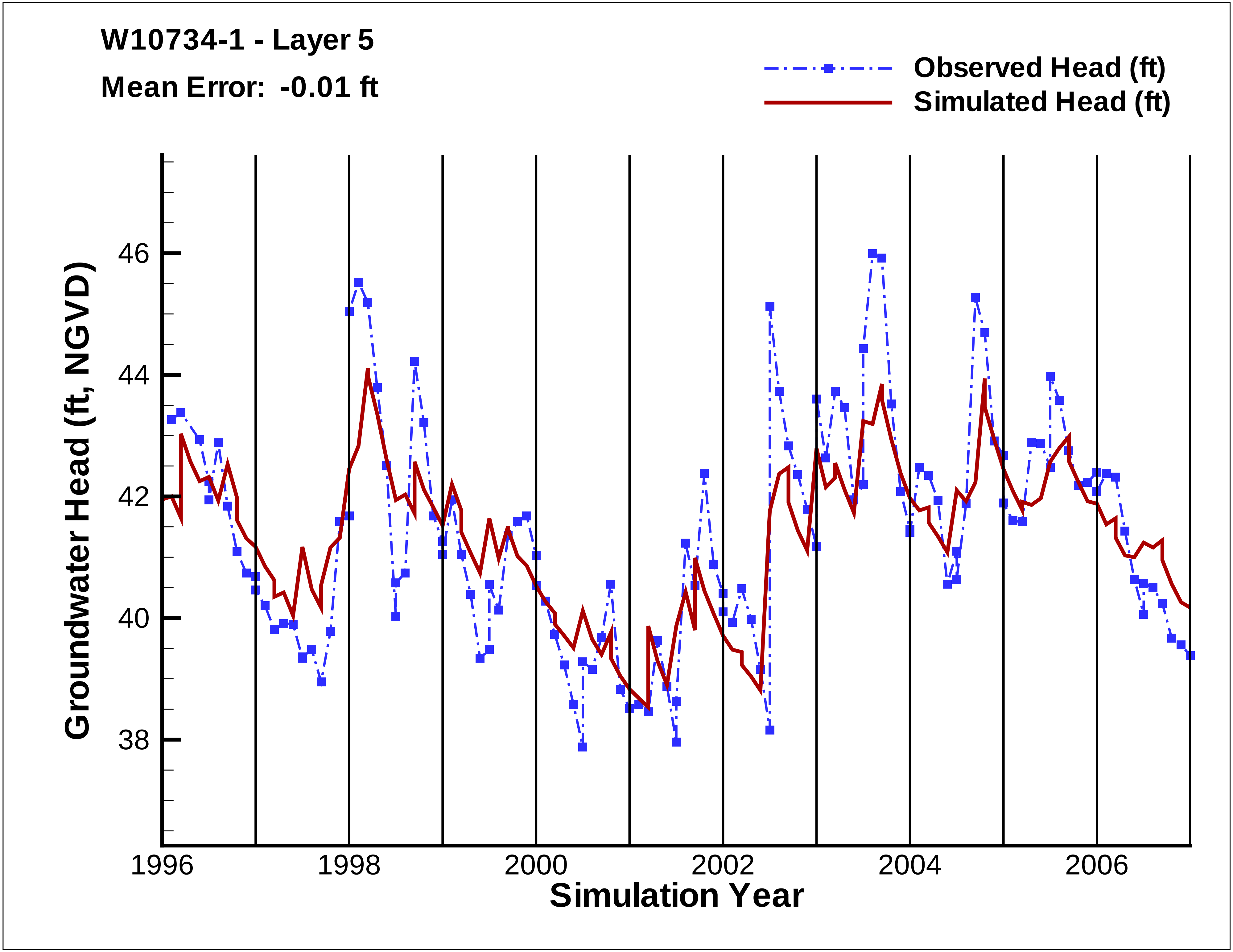

W10730-0 - Layer 5
Mean Error: 0.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
3.5
3
2.5
2
1.5
1
0.5
1996
1998
2000
2002
2004
2006
Simulation Year



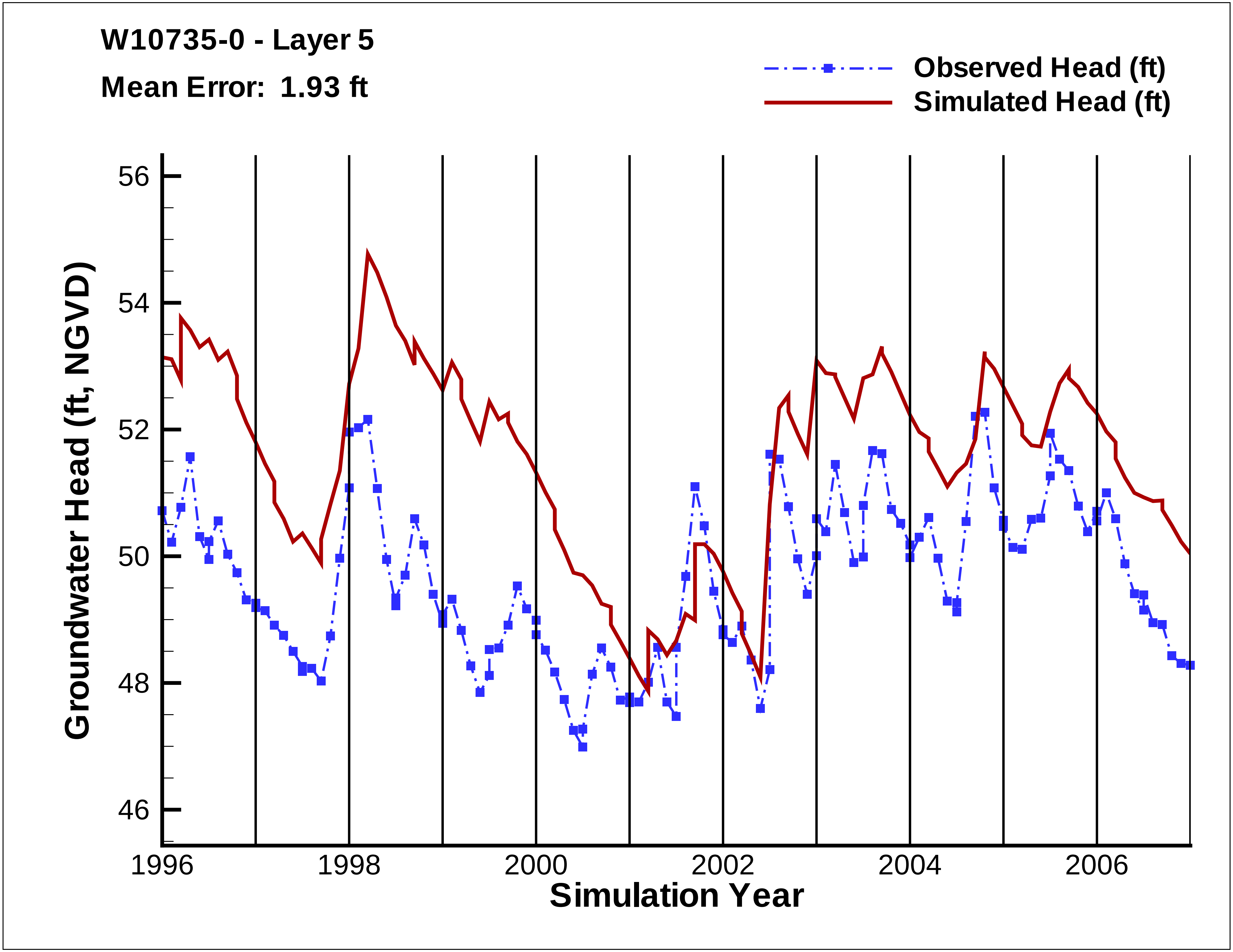
W10733-0 - Layer 3
Mean Error: -2.16 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
42
44
46
48
1996
1998
2000
2002
2004
2006
Simulation Year

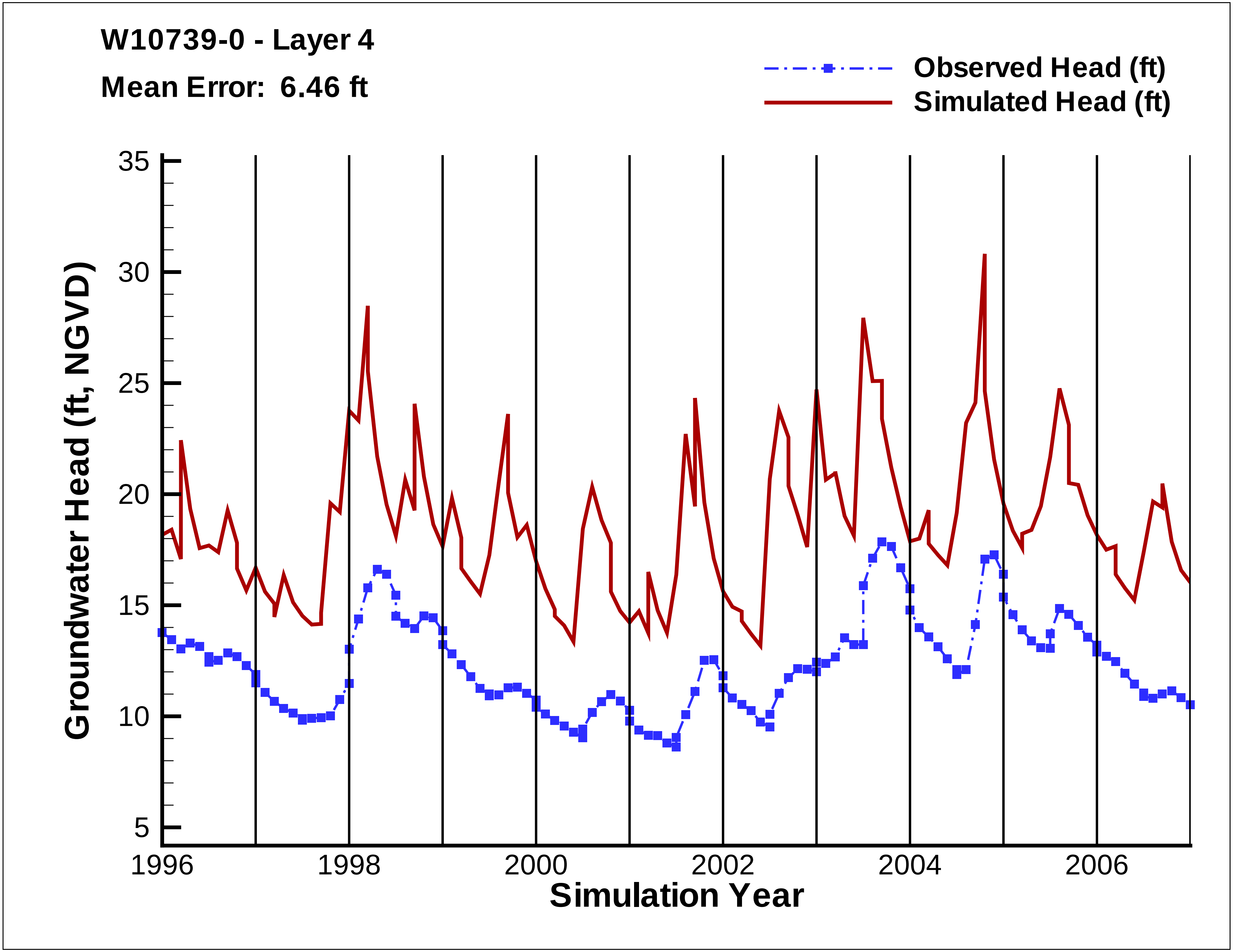


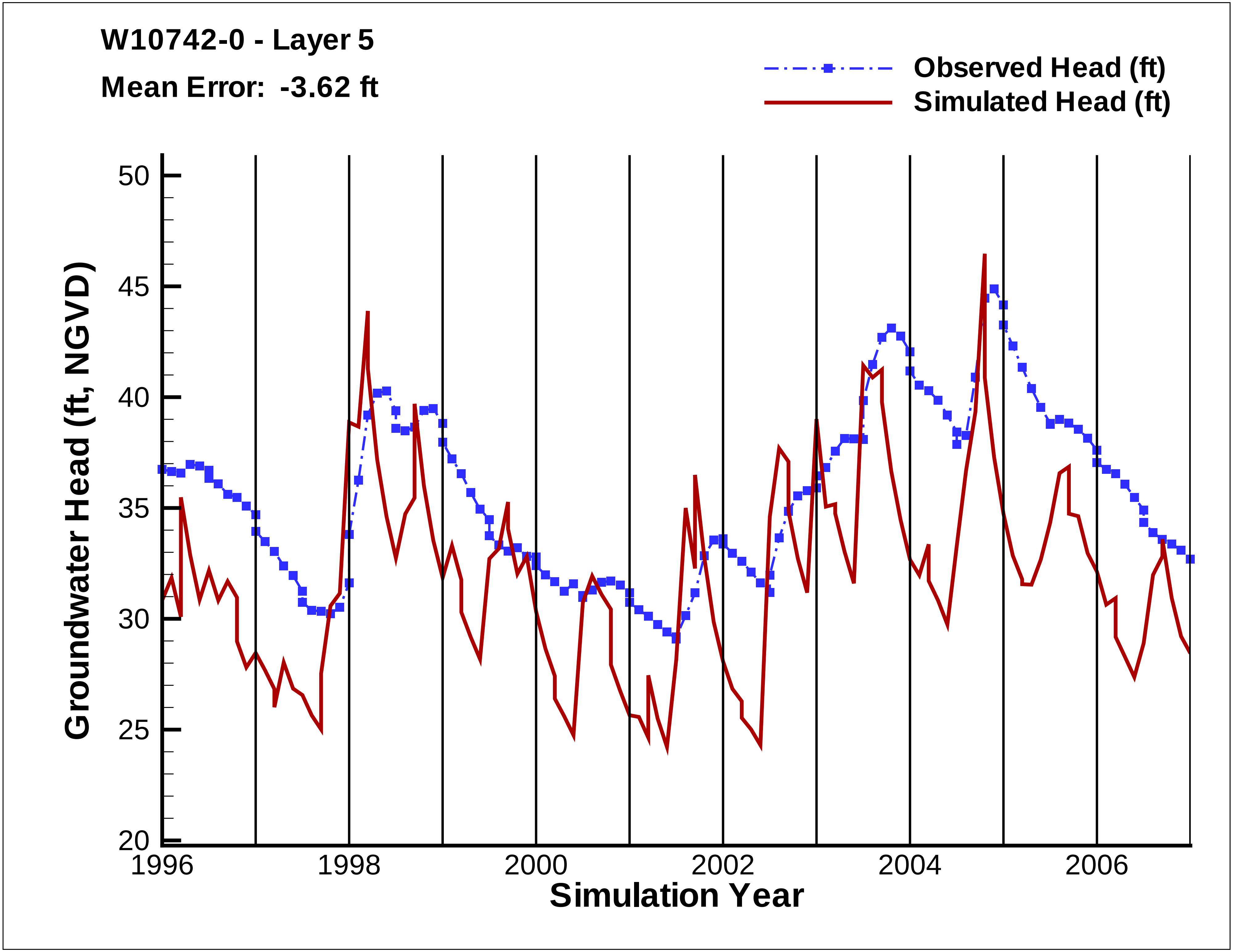
W10734-0 - Layer 5
Mean Error: -0.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



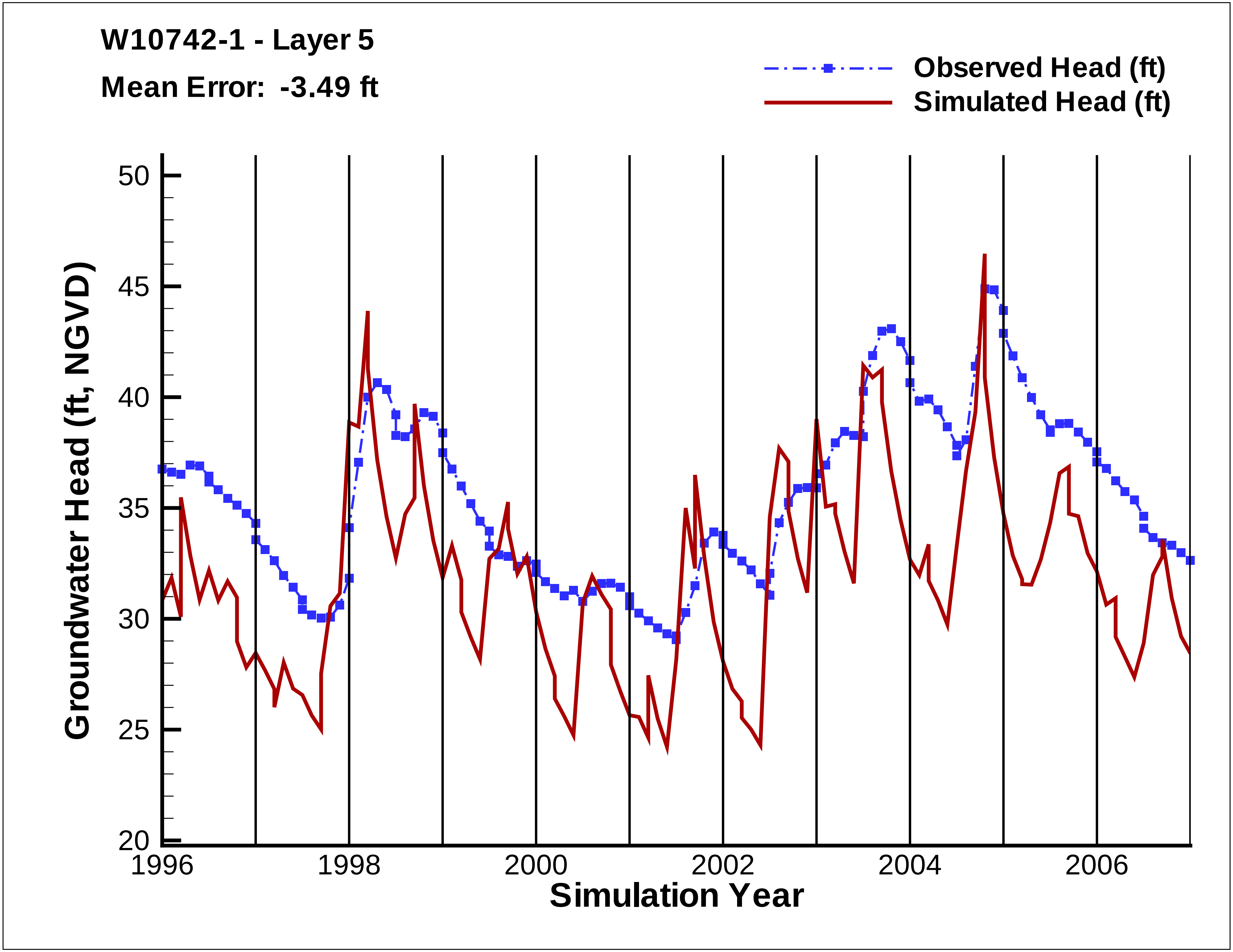
W10734-1 - Layer 5
Mean Error: -0.01 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
46
44
42
40
38
1996
1998
2000
2002
2004
2006
Simulation Year


W10735-0 - Layer 5
Mean Error: 1.93 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
56
54
52
50
48
46
1996
1998
2000
2002
2004
2006
Simulation Year

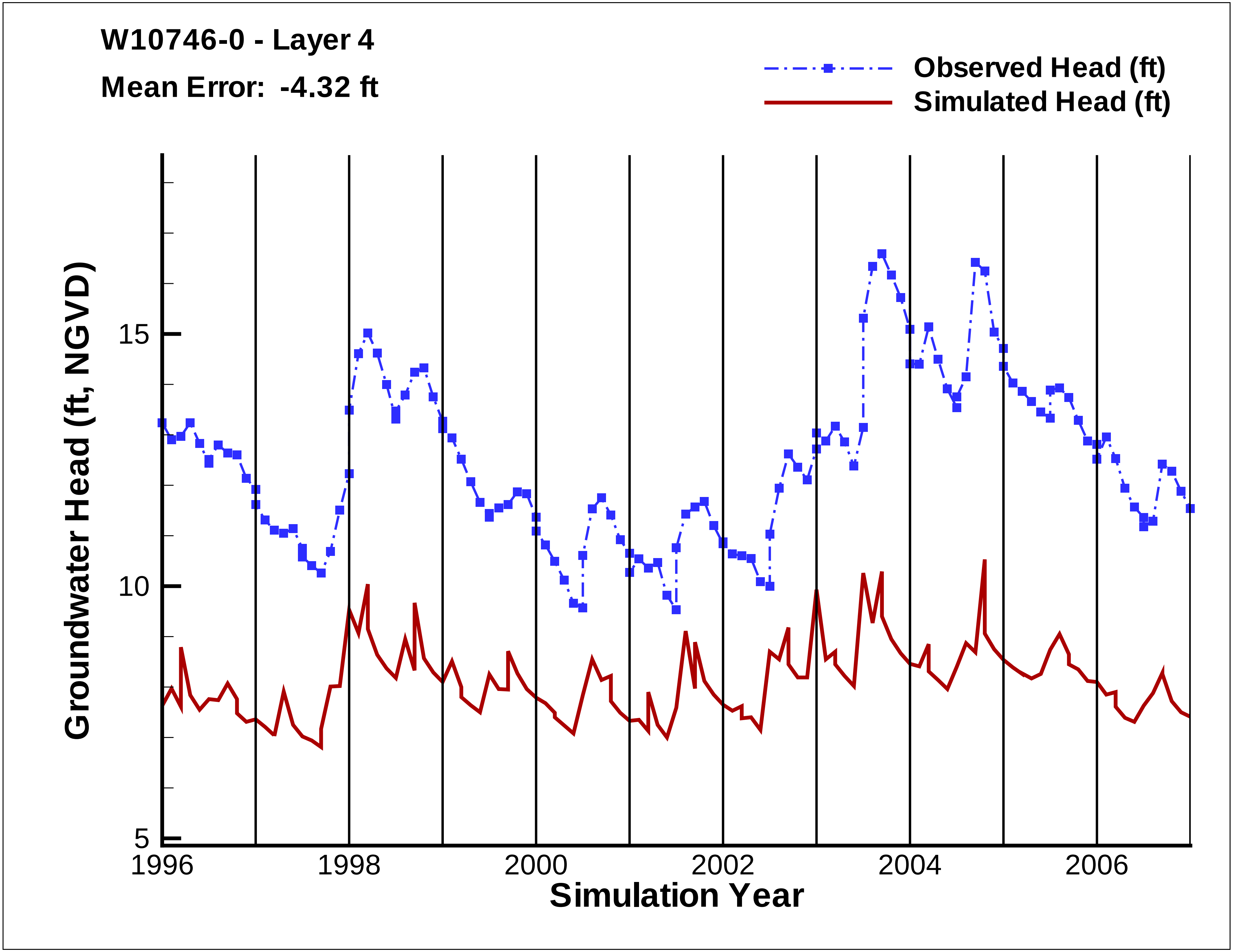

W10739-0 - Layer 4
Mean Error: 6.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year

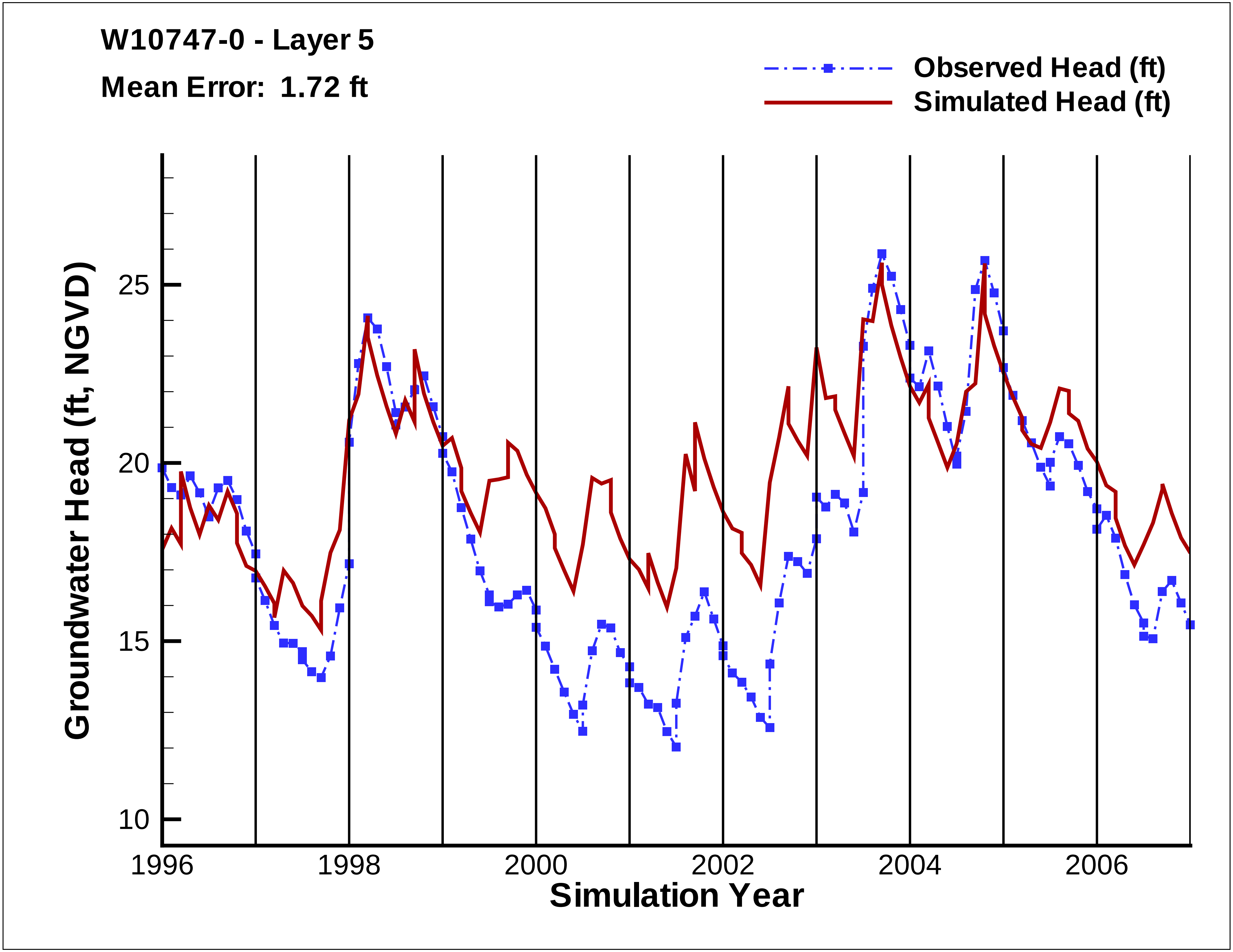


W10742-0 - Layer 5
Mean Error: -3.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

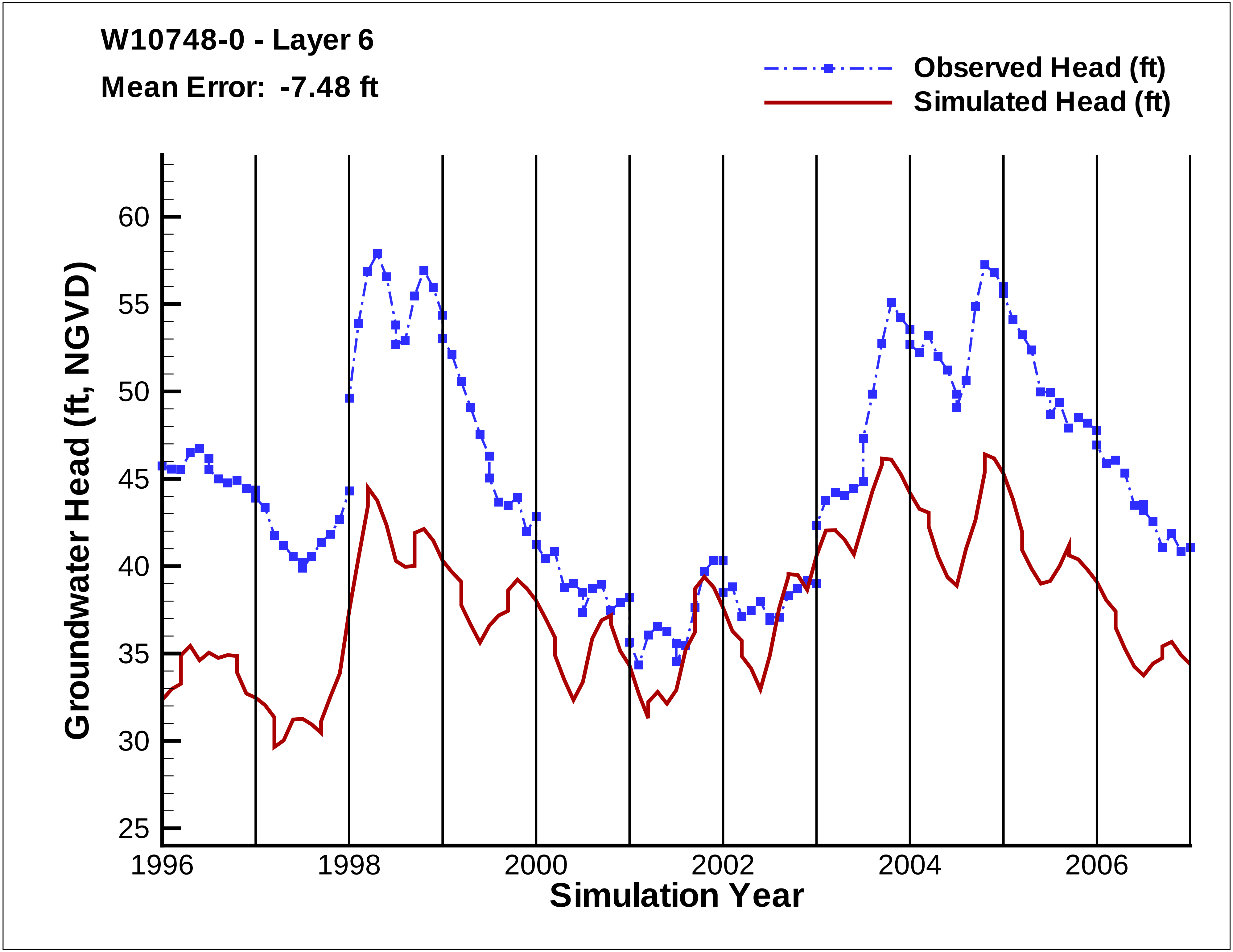


W10742-1 - Layer 5
Mean Error: -3.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

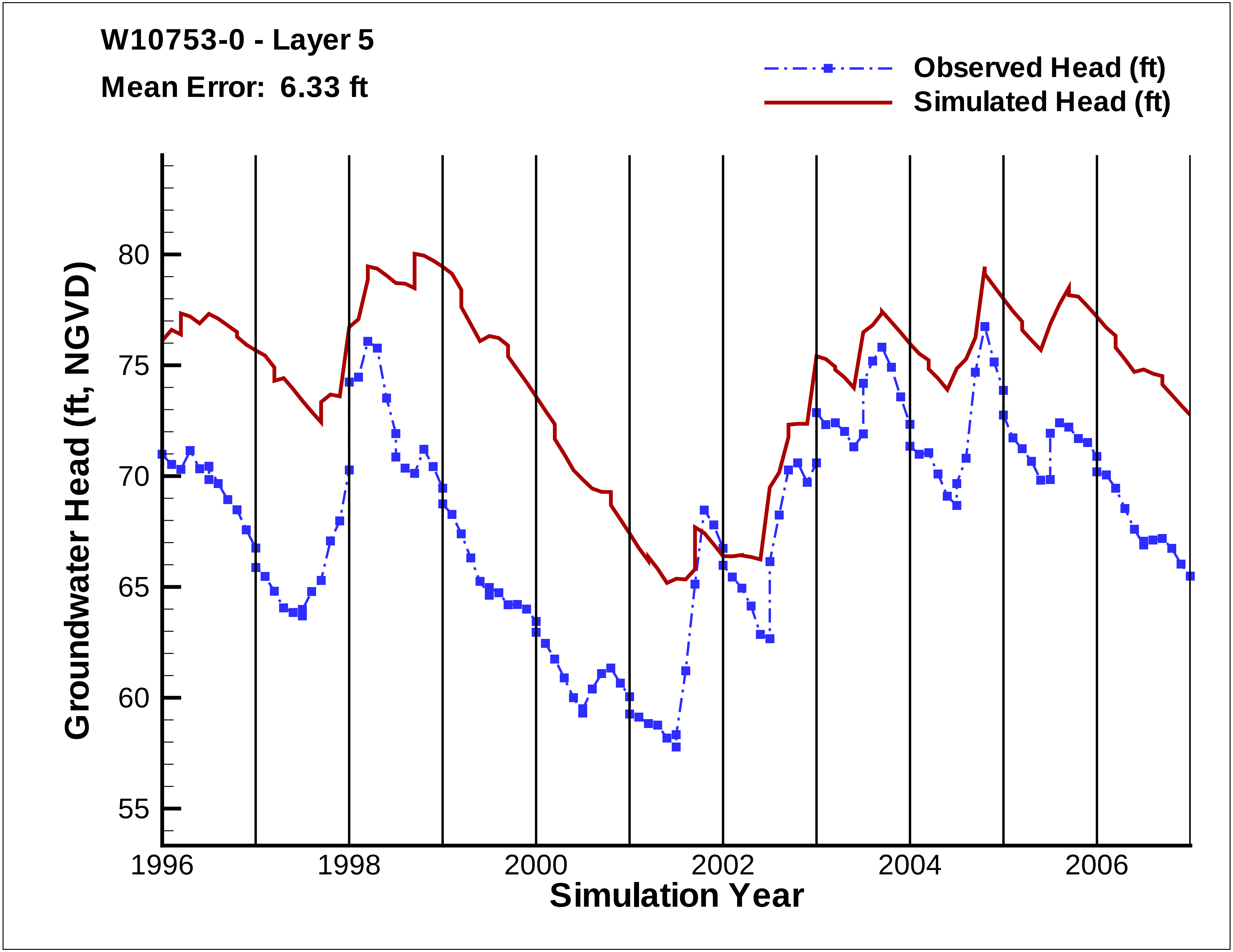

W10746-0 - Layer 4
Mean Error: -4.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



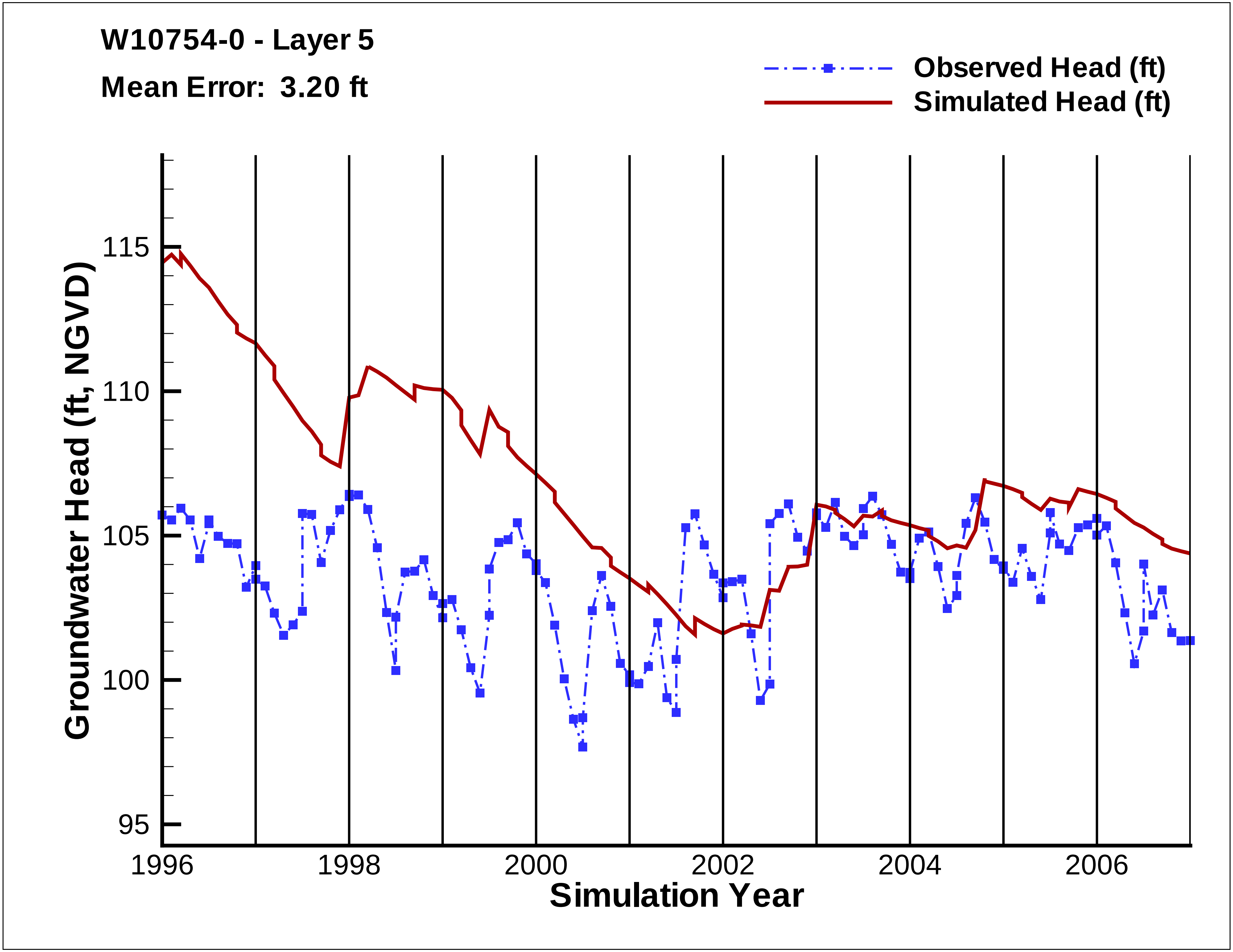
W10747-0 - Layer 5
Mean Error: 1.72 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
1996
1998
2000
2002
2004
2006
Simulation Year

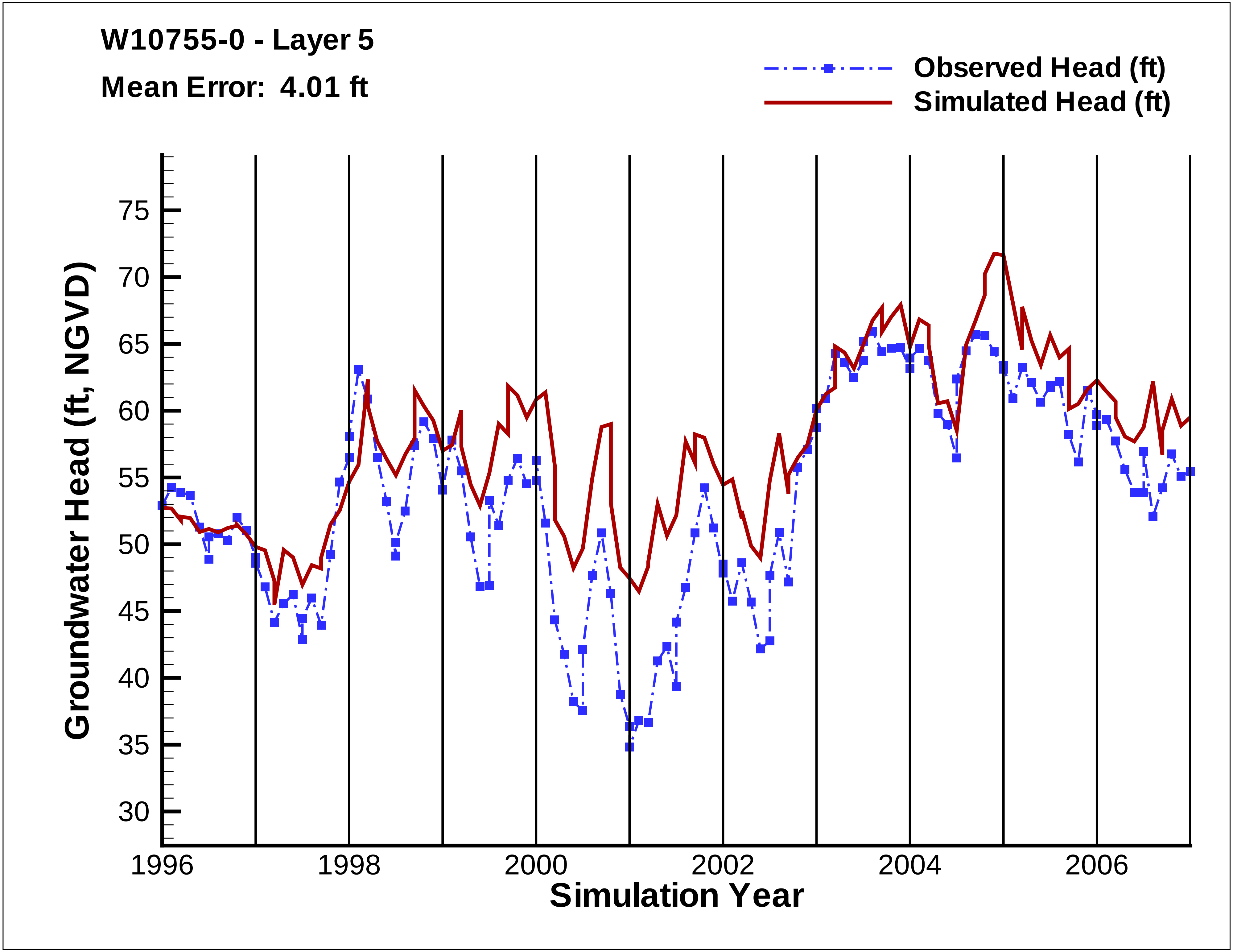


W10748-0 - Layer 6
Mean Error: -7.48 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
30
35
40
45
50
55
60
1996
1998
2000
2002
2004
2006
Simulation Year

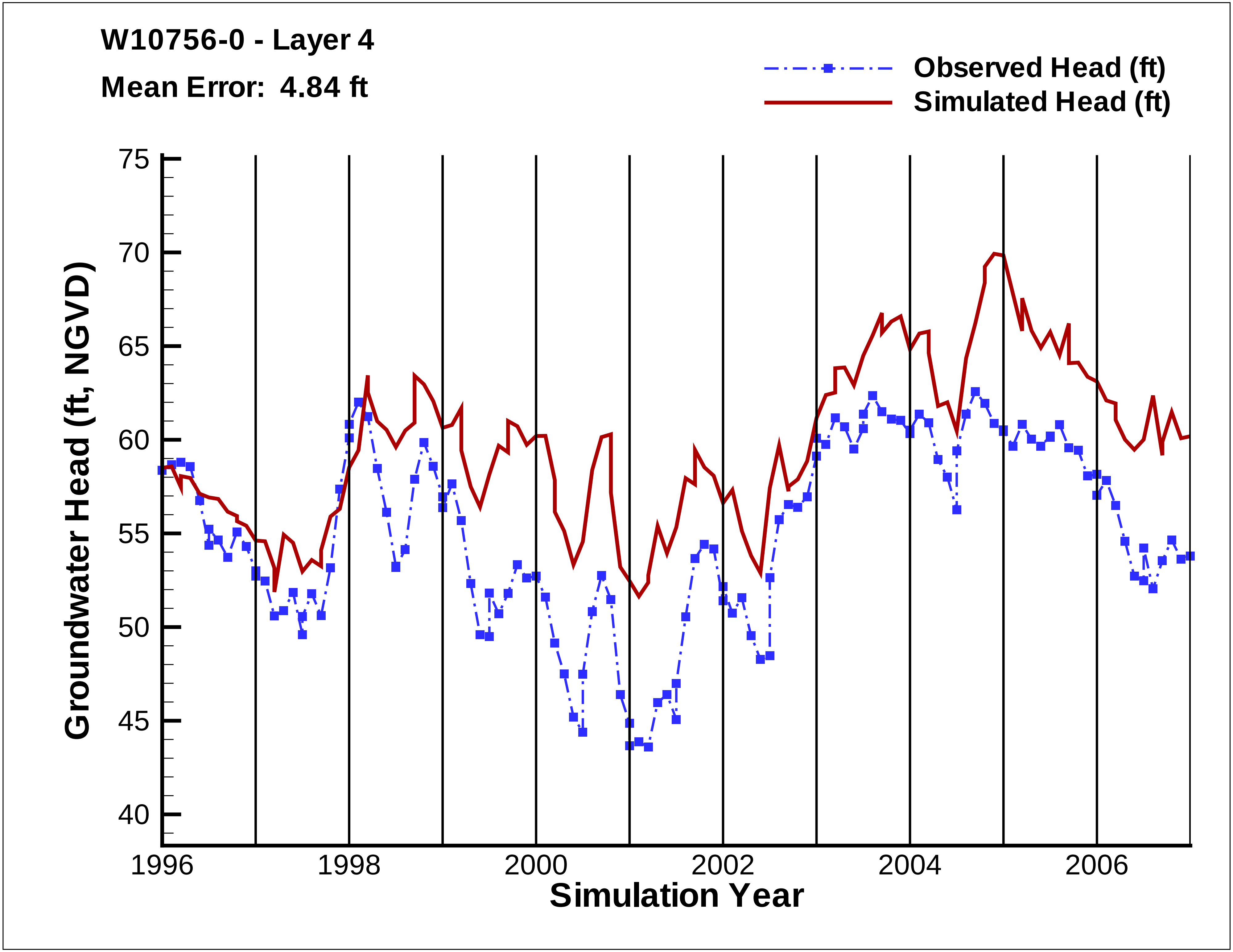


W10753-0 - Layer 5
Mean Error: 6.33 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

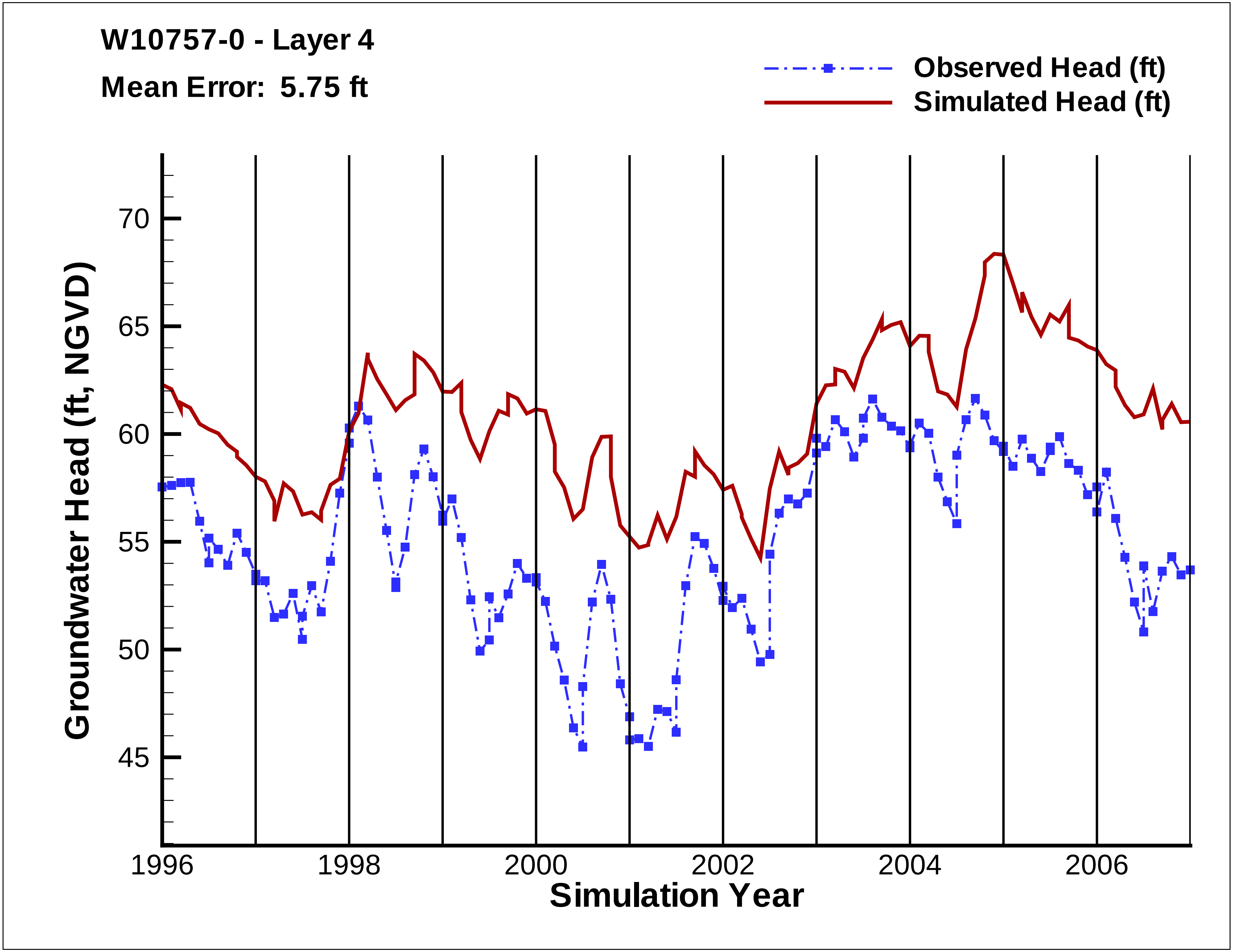

W10754-0 - Layer 5
Mean Error: 3.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
100
95
1996
1998
2000
2002
2004
2006
Simulation Year

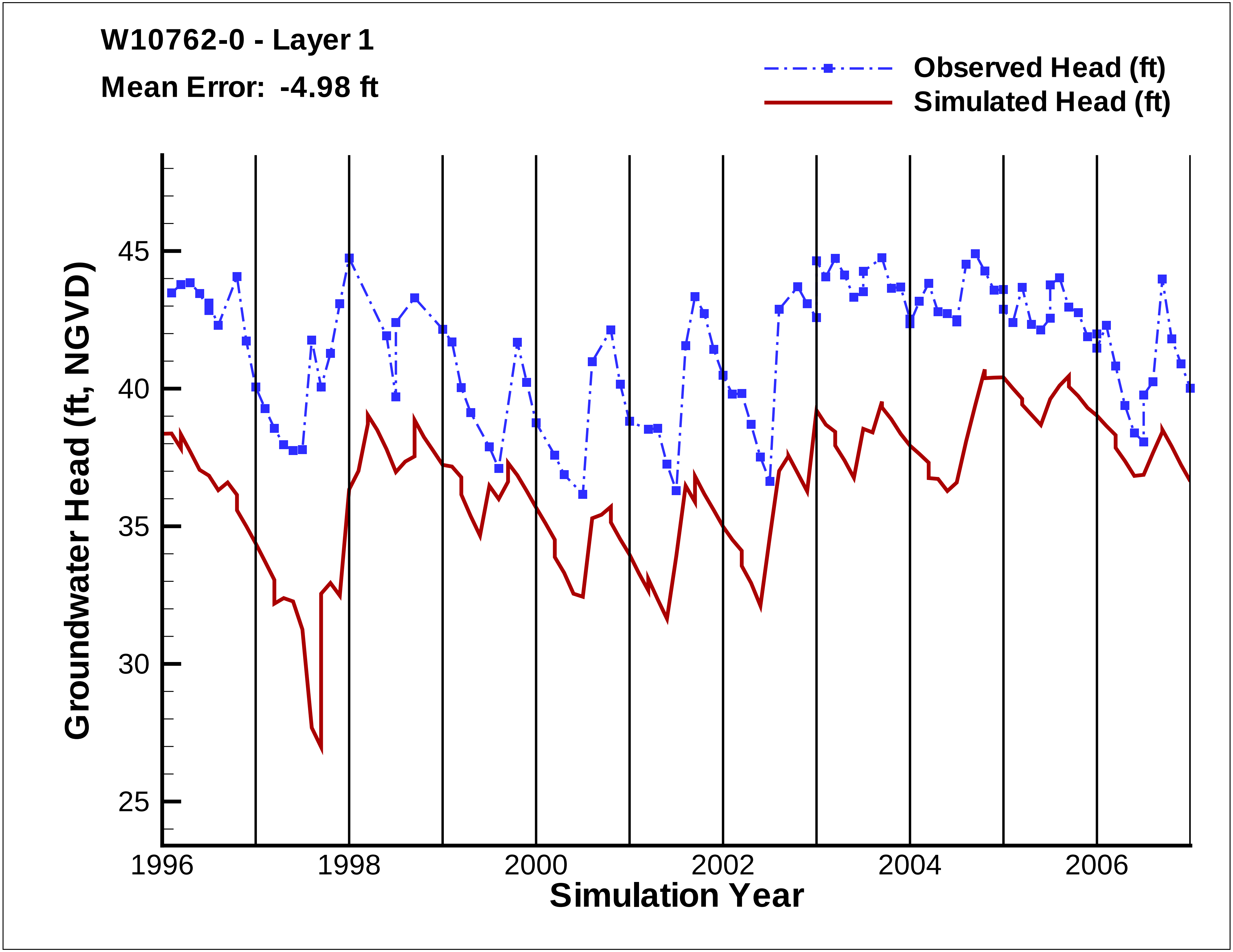


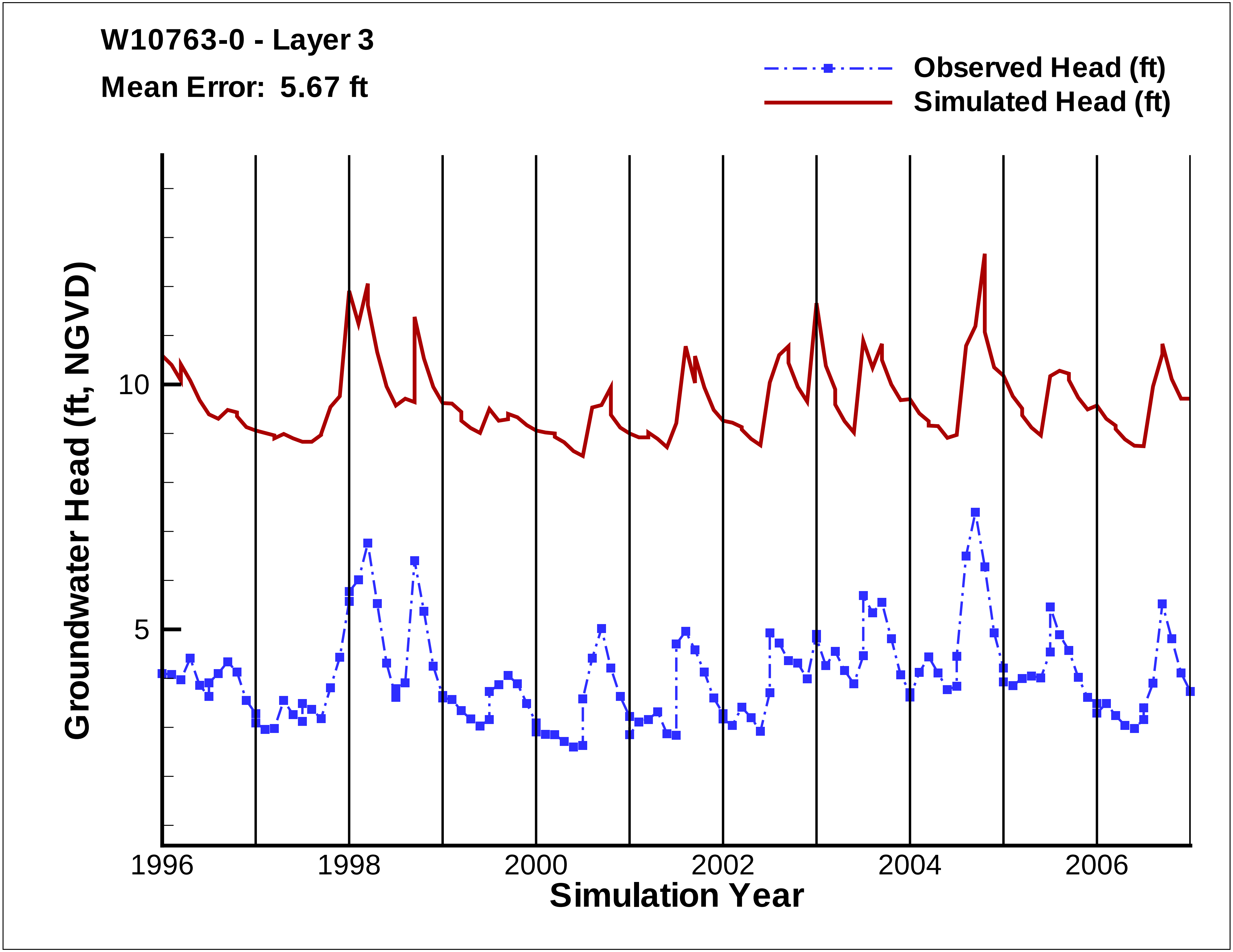
W10755-0 - Layer 5
Mean Error: 4.01 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

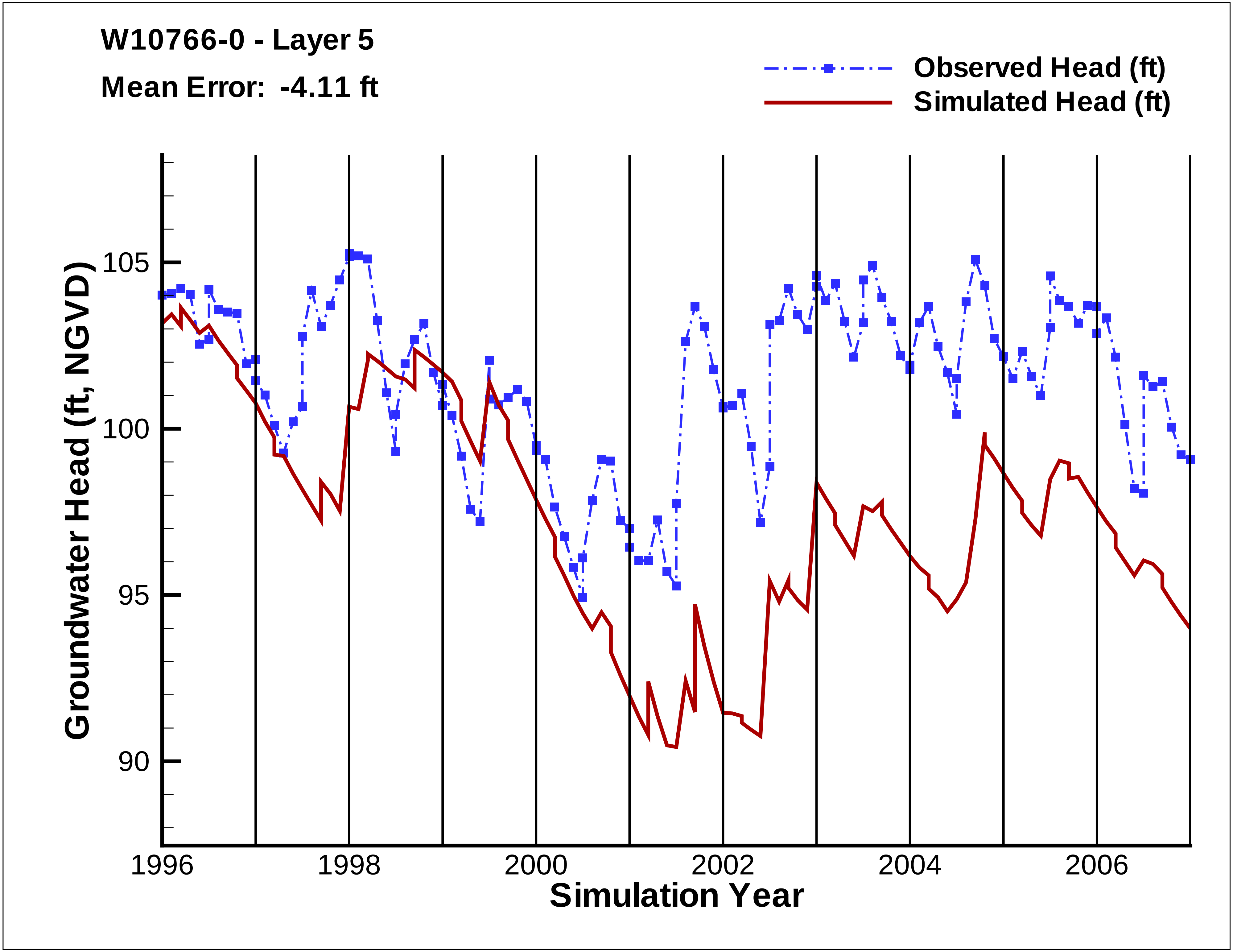


W10756-0 - Layer 4
Mean Error: 4.84 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

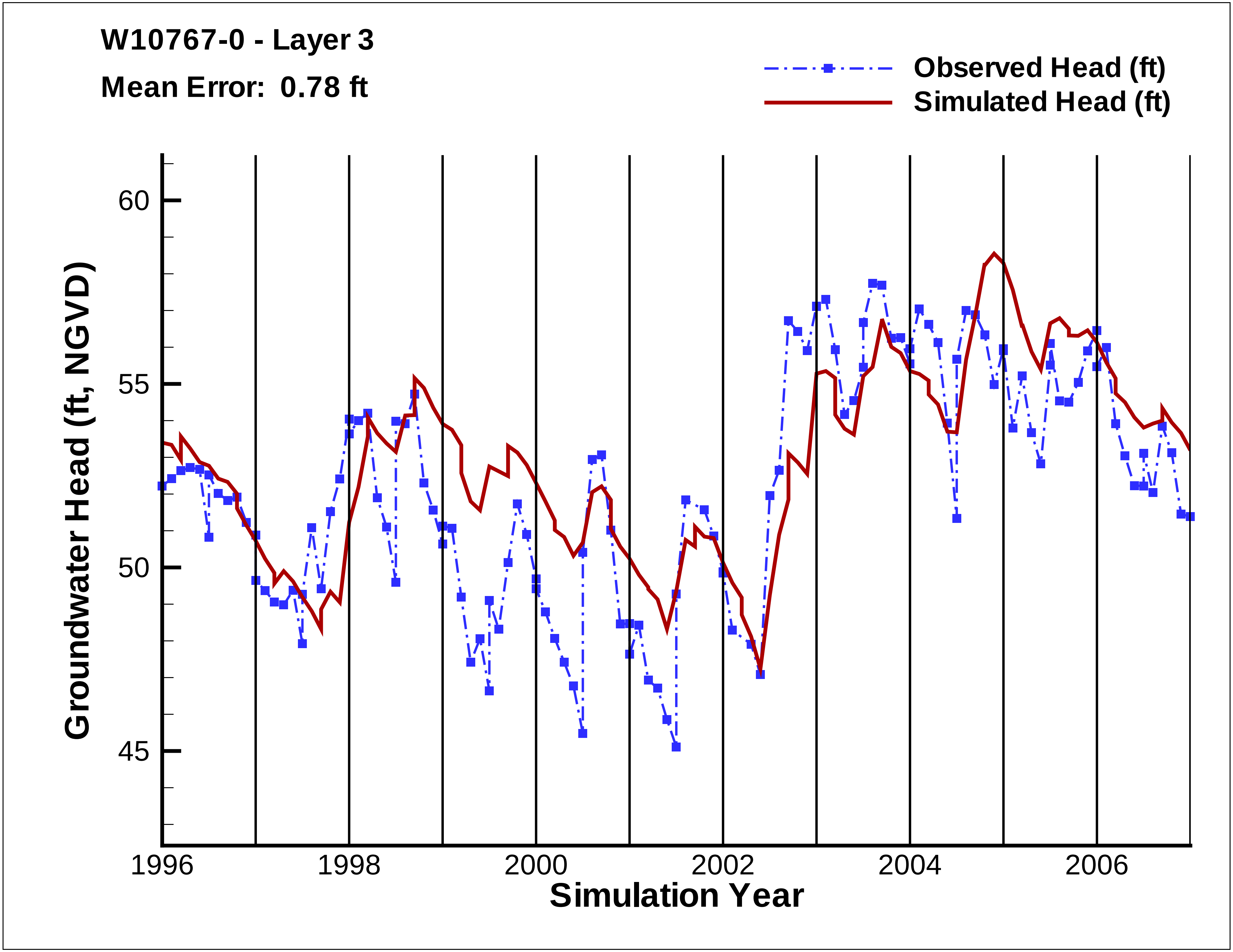

W10757-0 - Layer 4
Mean Error: 5.75 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

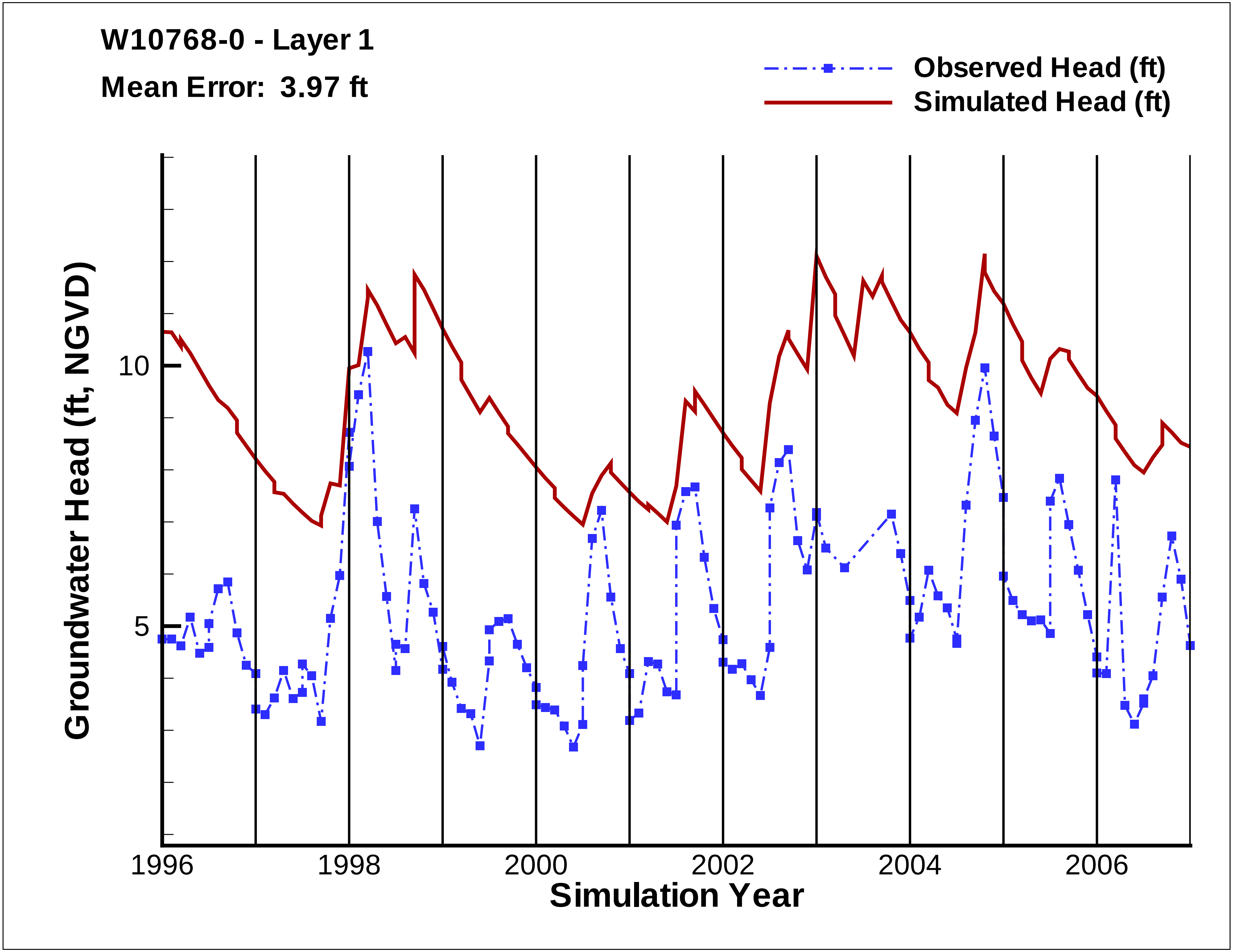

W10762-0 - Layer 1
Mean Error: -4.98 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

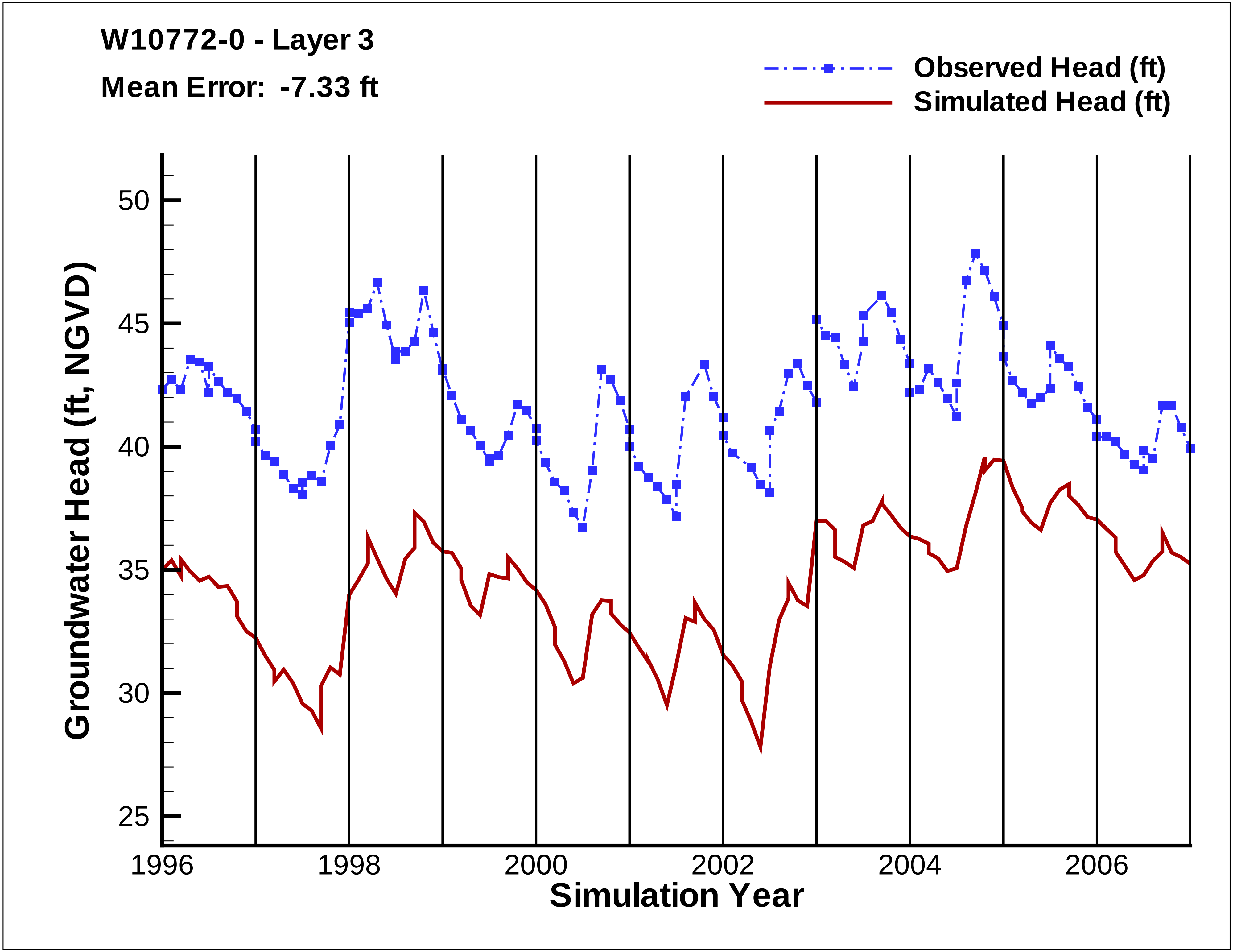

W10763-0 - Layer 3
Mean Error: 5.67 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



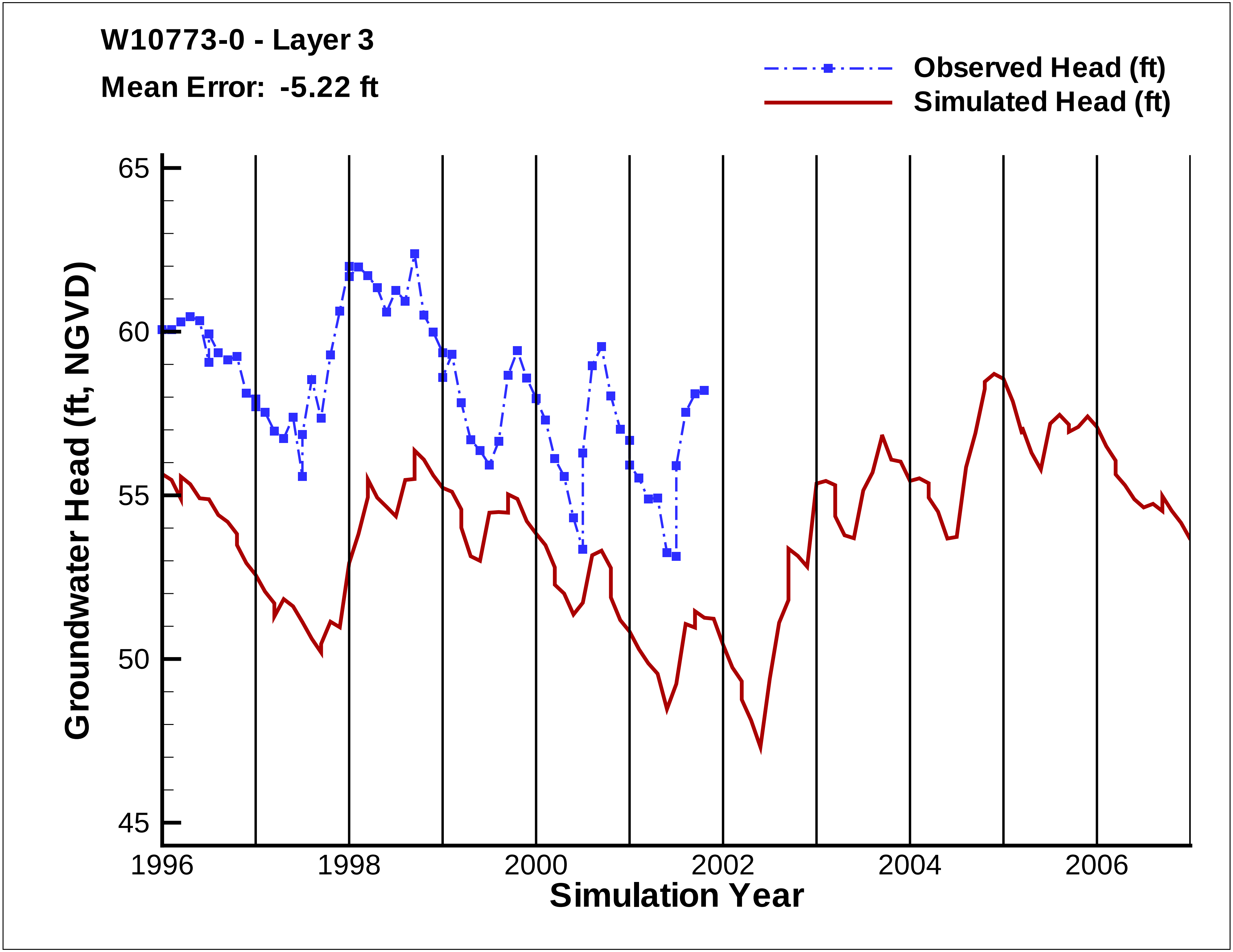
W10766-0 - Layer 5
Mean Error: -4.11 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
105
100
95
90
1996
1998
2000
2002
2004
2006
Simulation Year

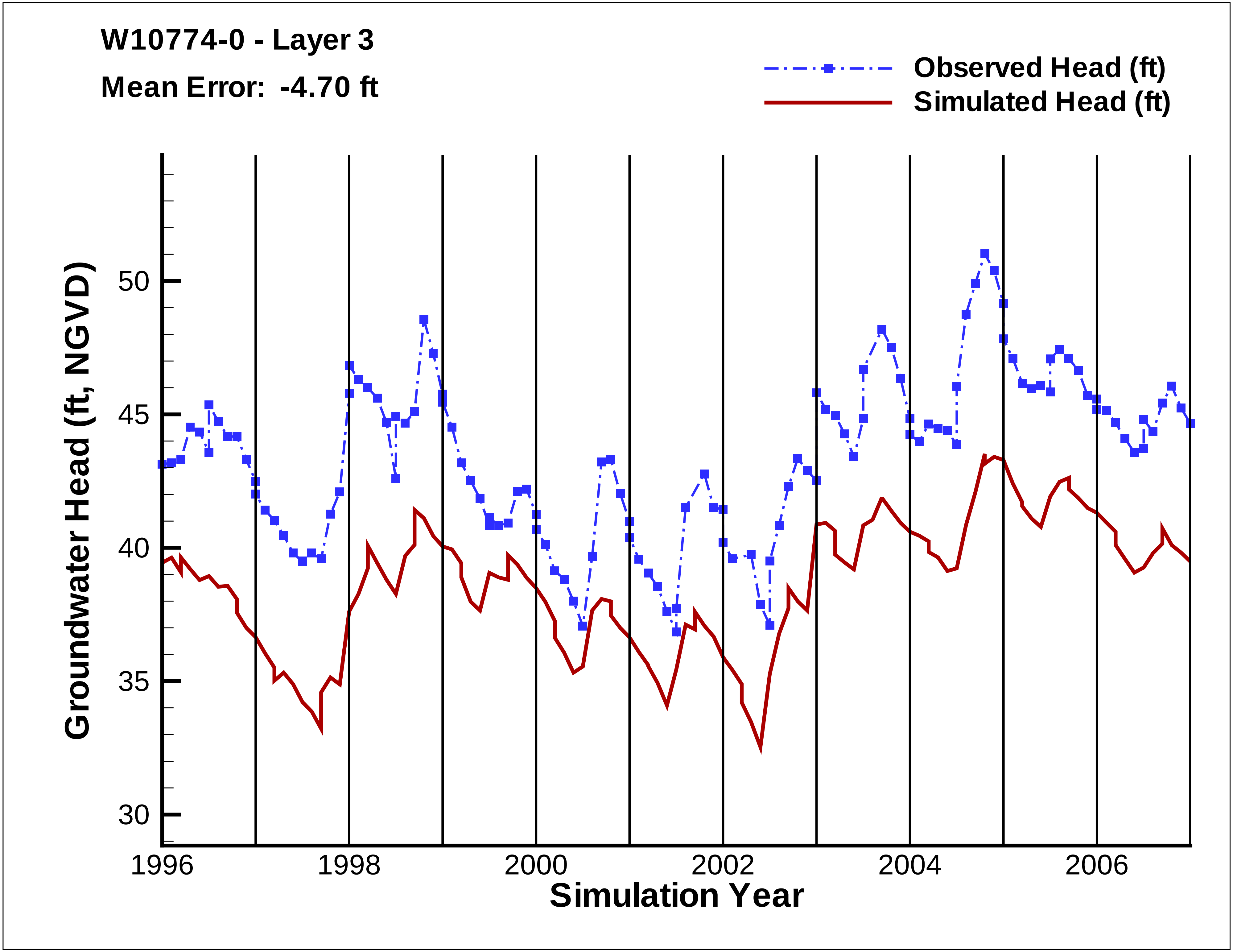

W10767-0 - Layer 3
Mean Error: 0.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year


W10768-0 - Layer 1
Mean Error: 3.97 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
5
1996
1998
2000
2002
2004
2006
Simulation Year

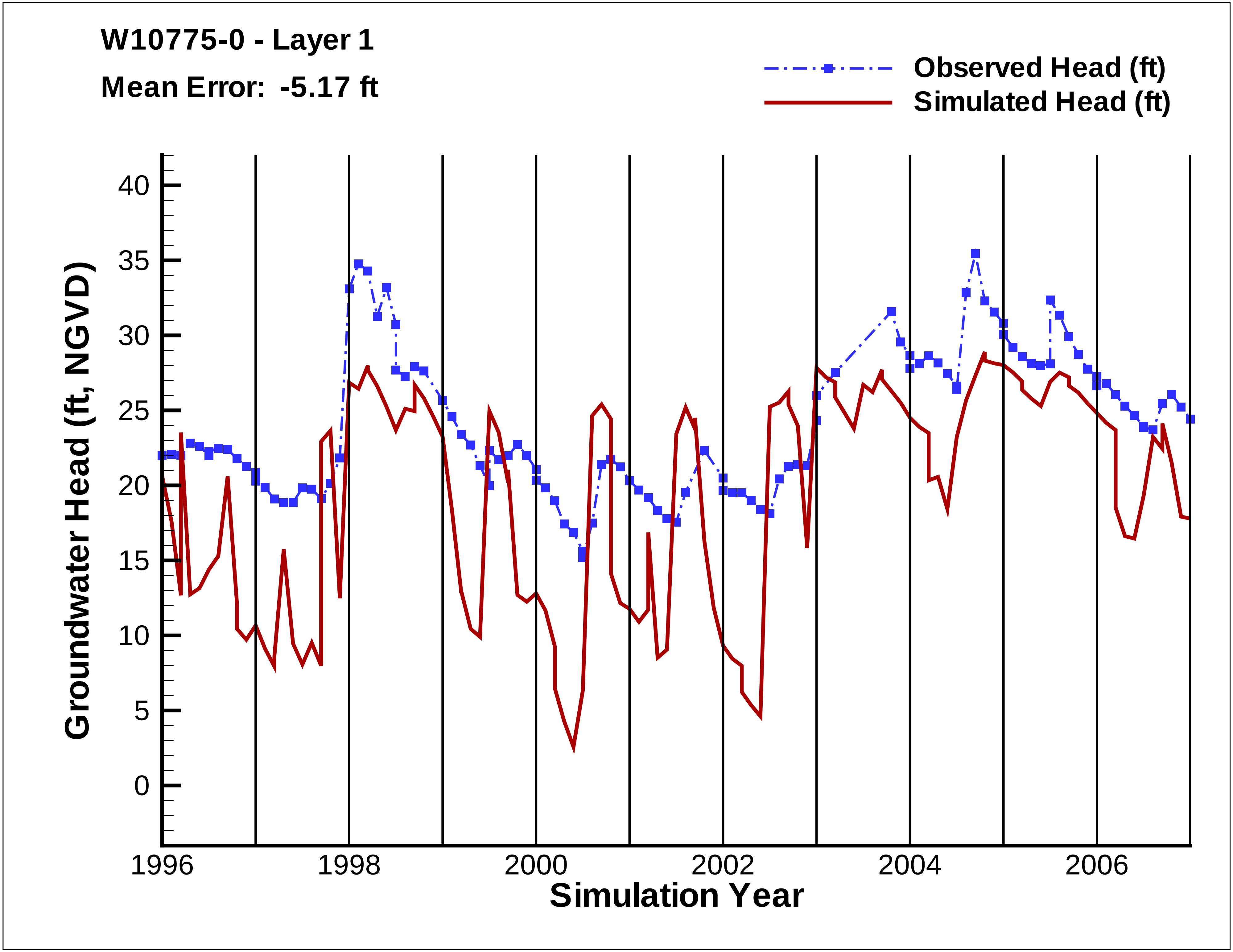


W10772-0 - Layer 3
Mean Error: -7.33 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

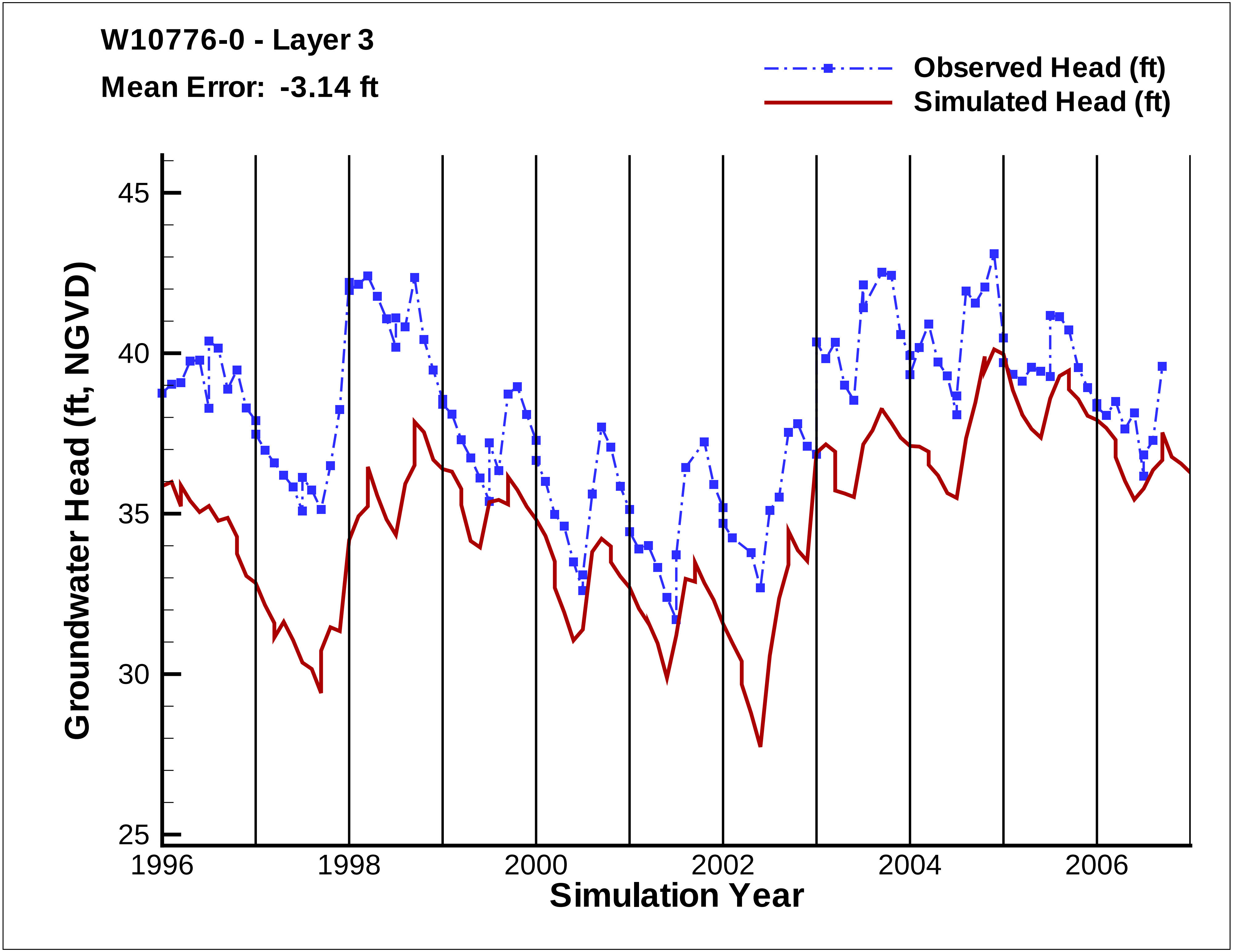

W10773-0 - Layer 3
Mean Error: -5.22 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

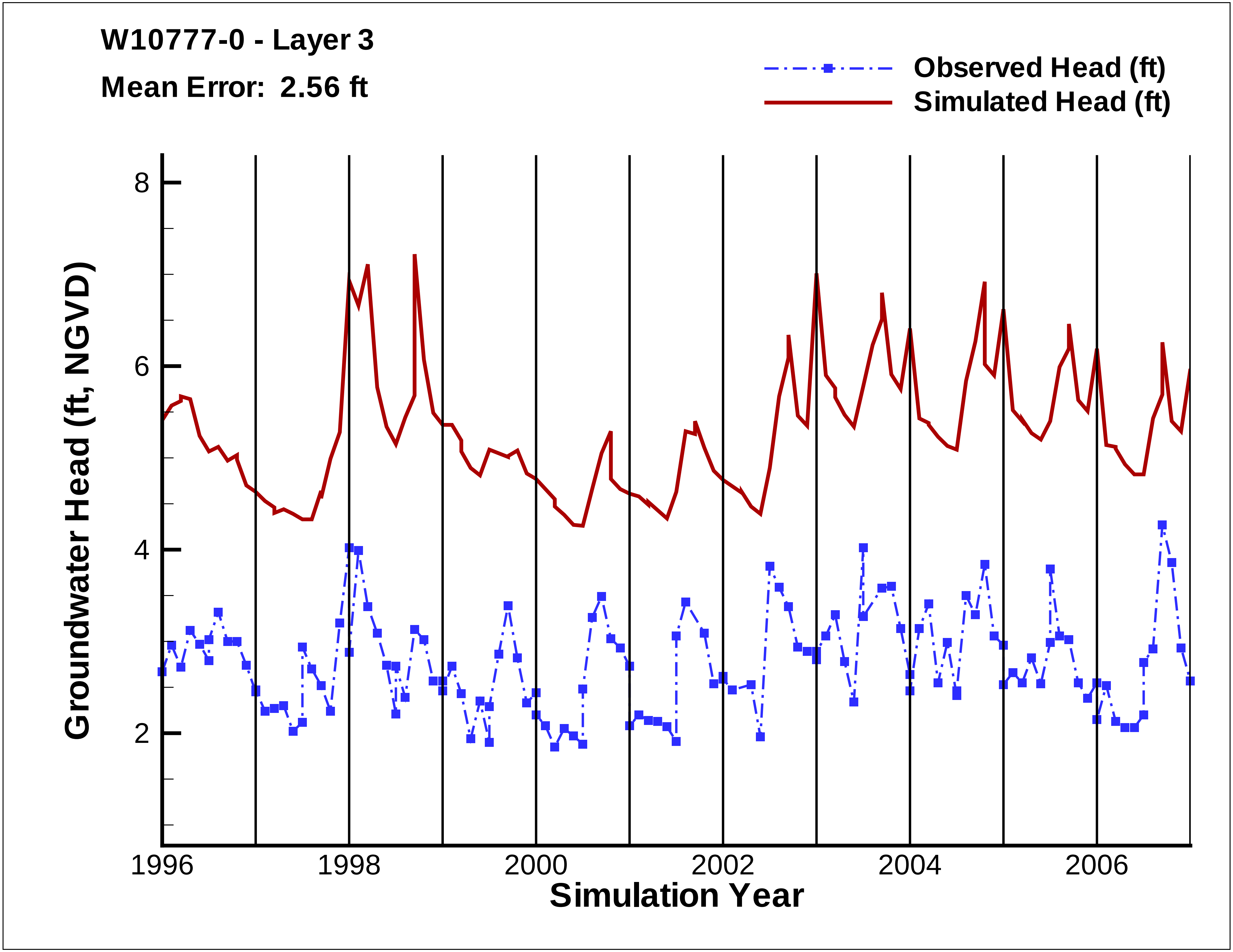


W10774-0 - Layer 3
Mean Error: -4.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

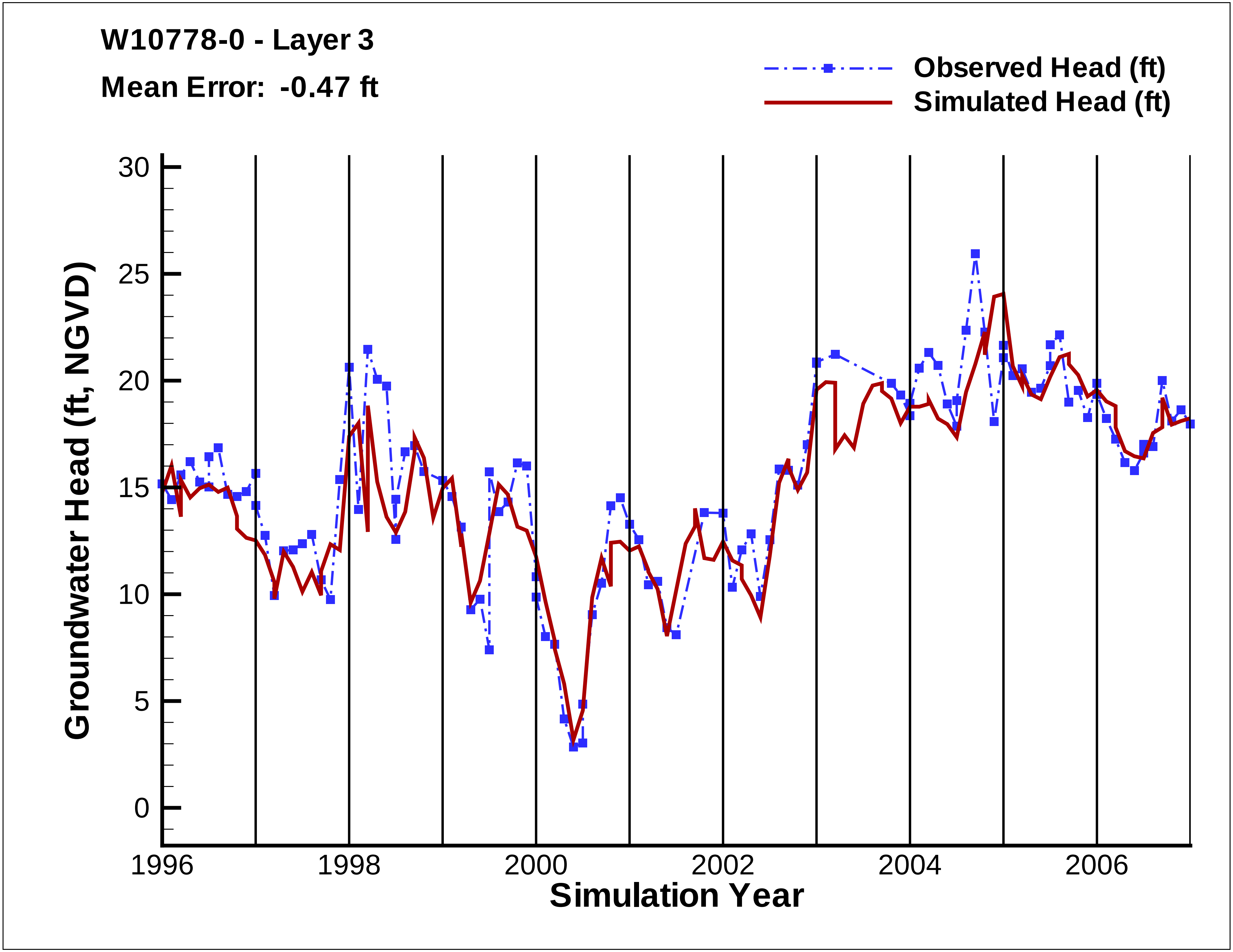


W10775-0 - Layer 1
Mean Error: -5.17 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
25
30
35
40
1996
1998
2000
2002
2004
2006
Simulation Year

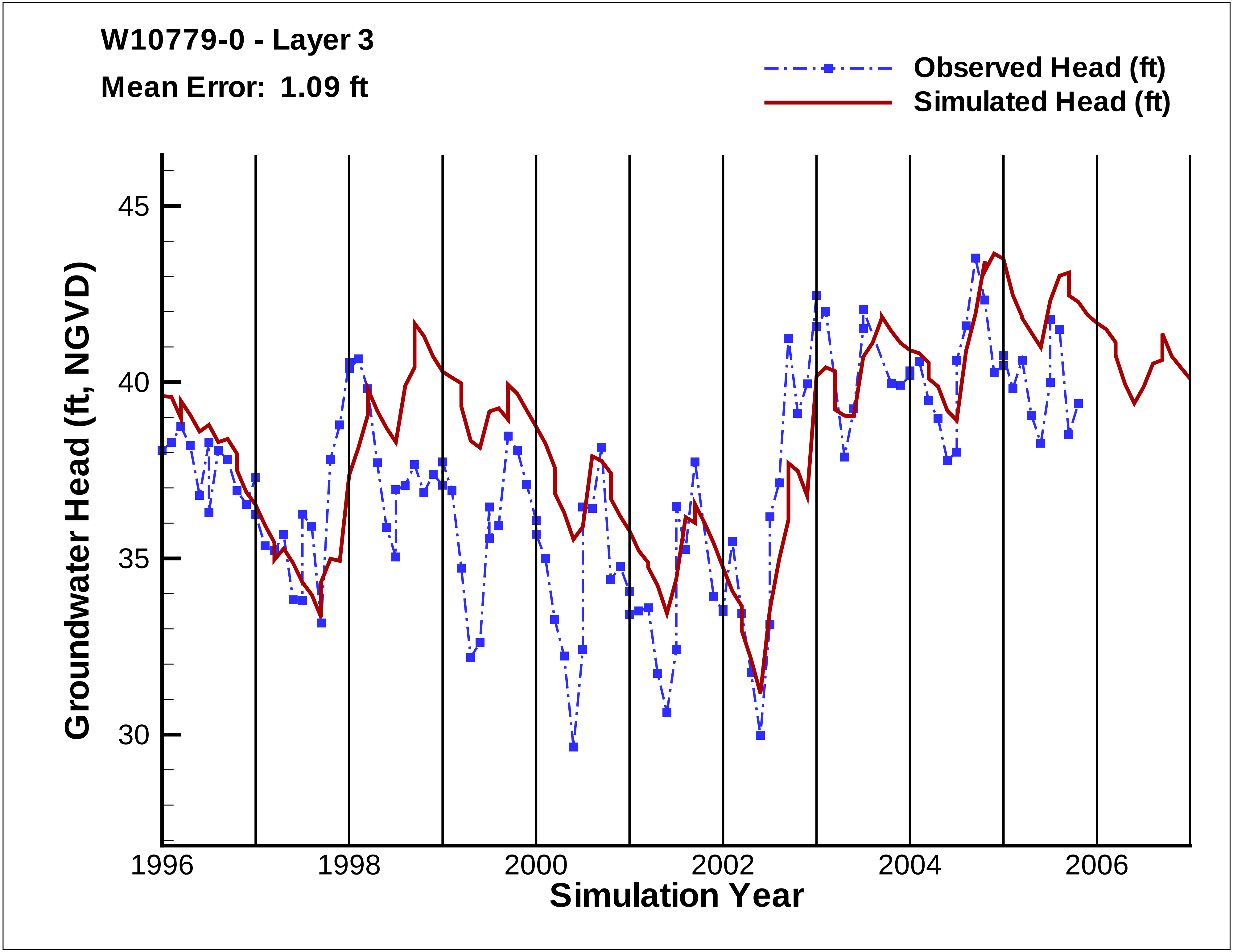

W10776-0 - Layer 3
Mean Error: -3.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



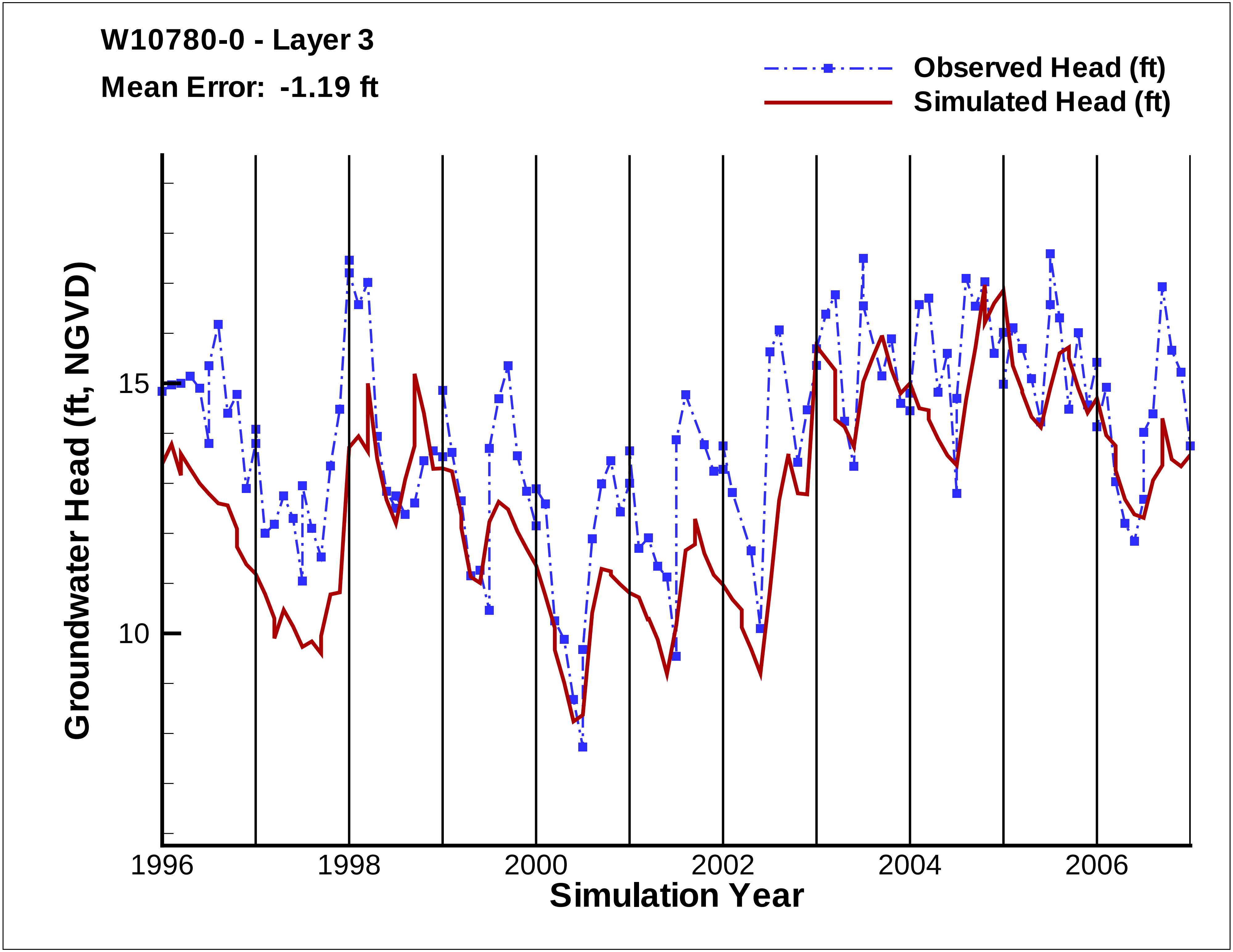
W10777-0 - Layer 3
Mean Error: 2.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year

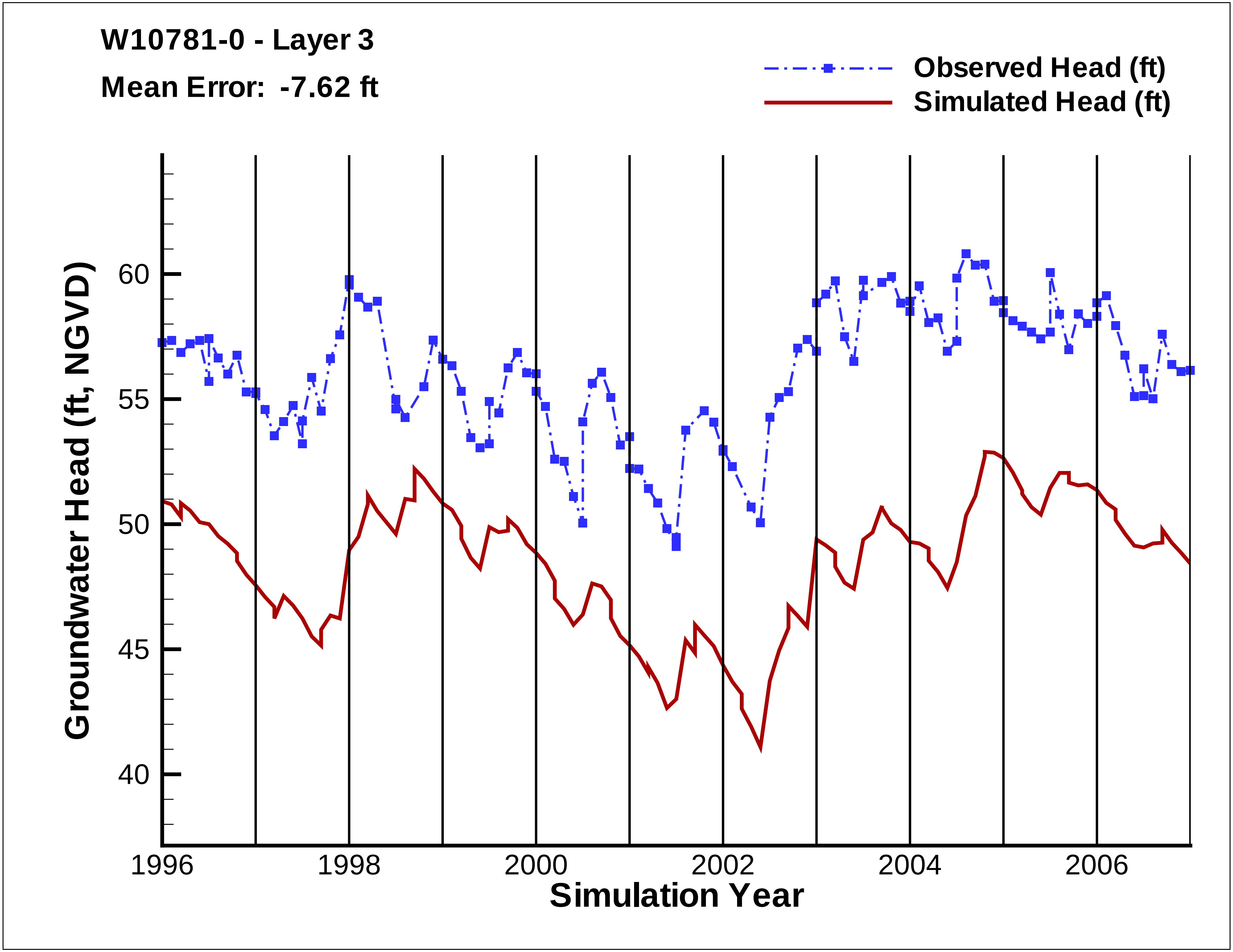


W10778-0 - Layer 3
Mean Error: -0.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
5
0
1996
1998
2000
2002
2004
2006
Simulation Year

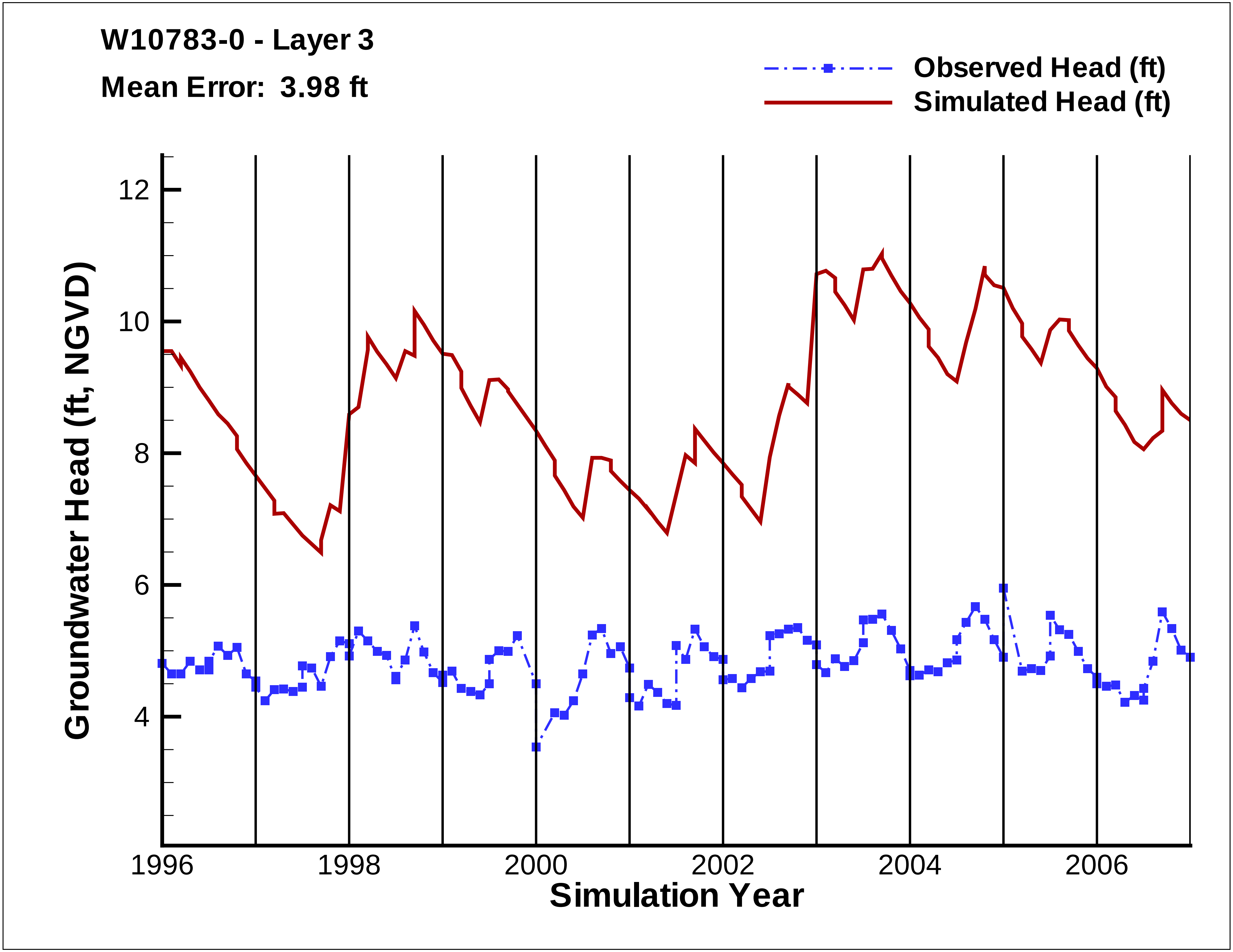


W10779-0 - Layer 3
Mean Error: 1.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

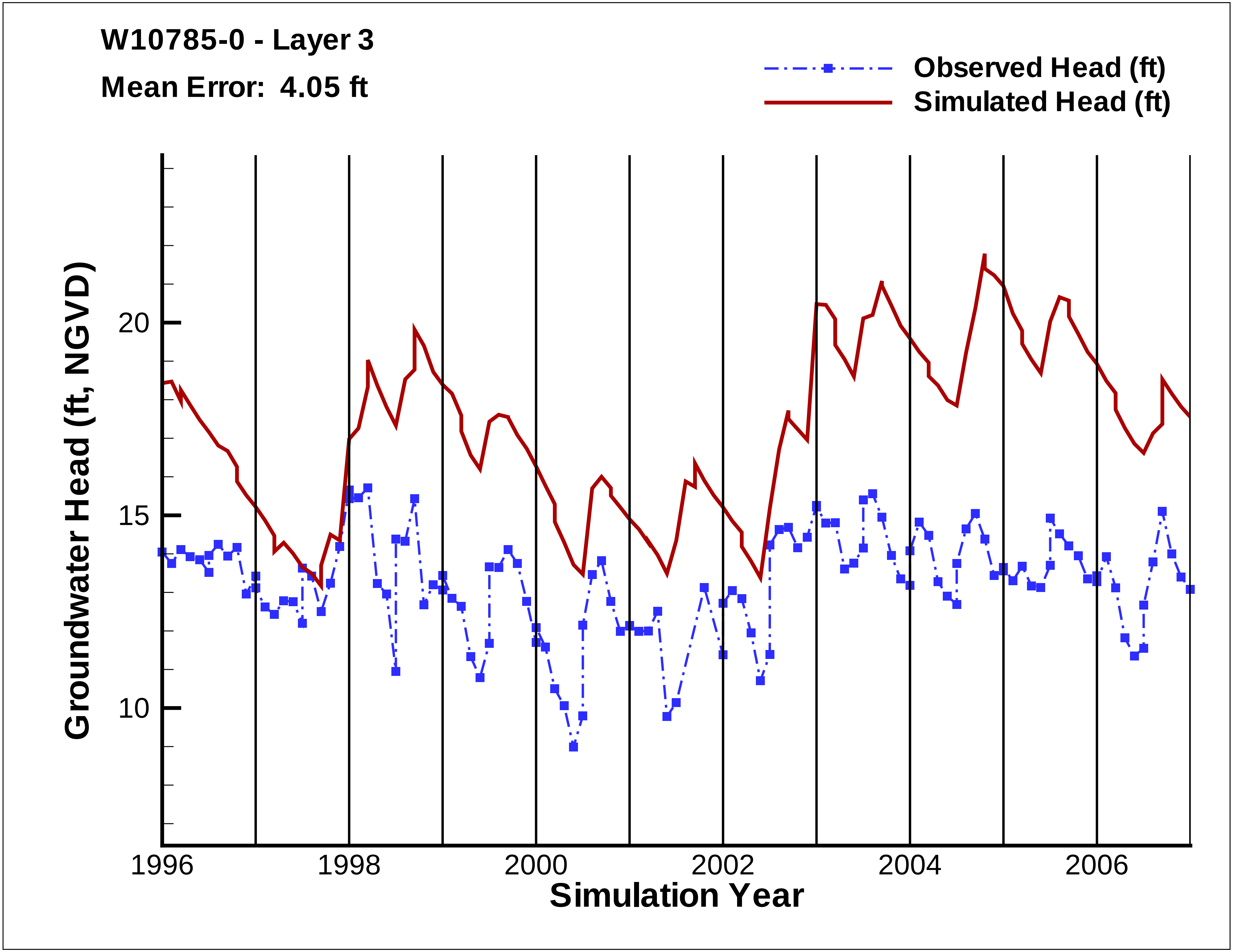

W10780-0 - Layer 3
Mean Error: -1.19 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



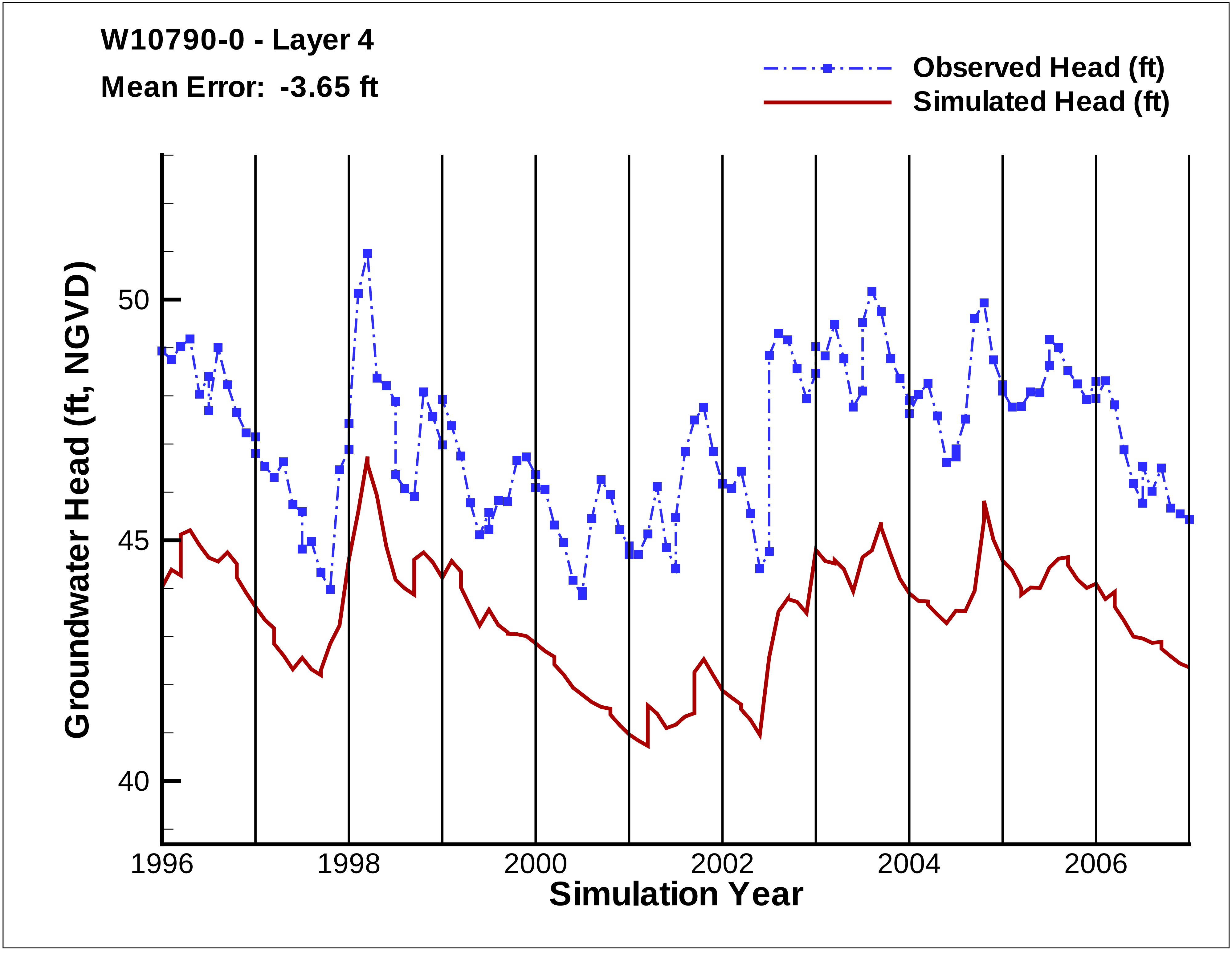
W10781-0 - Layer 3
Mean Error: -7.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

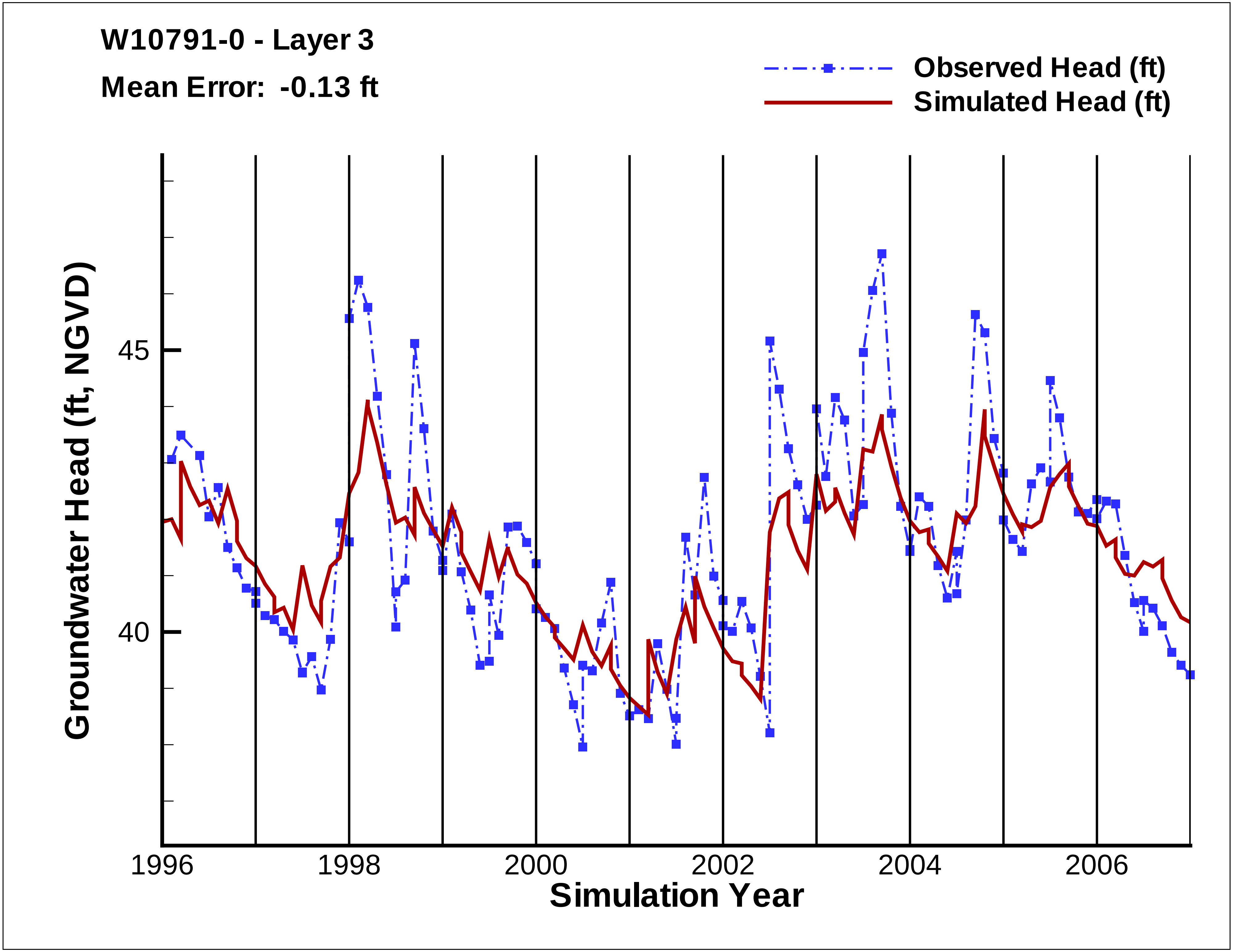


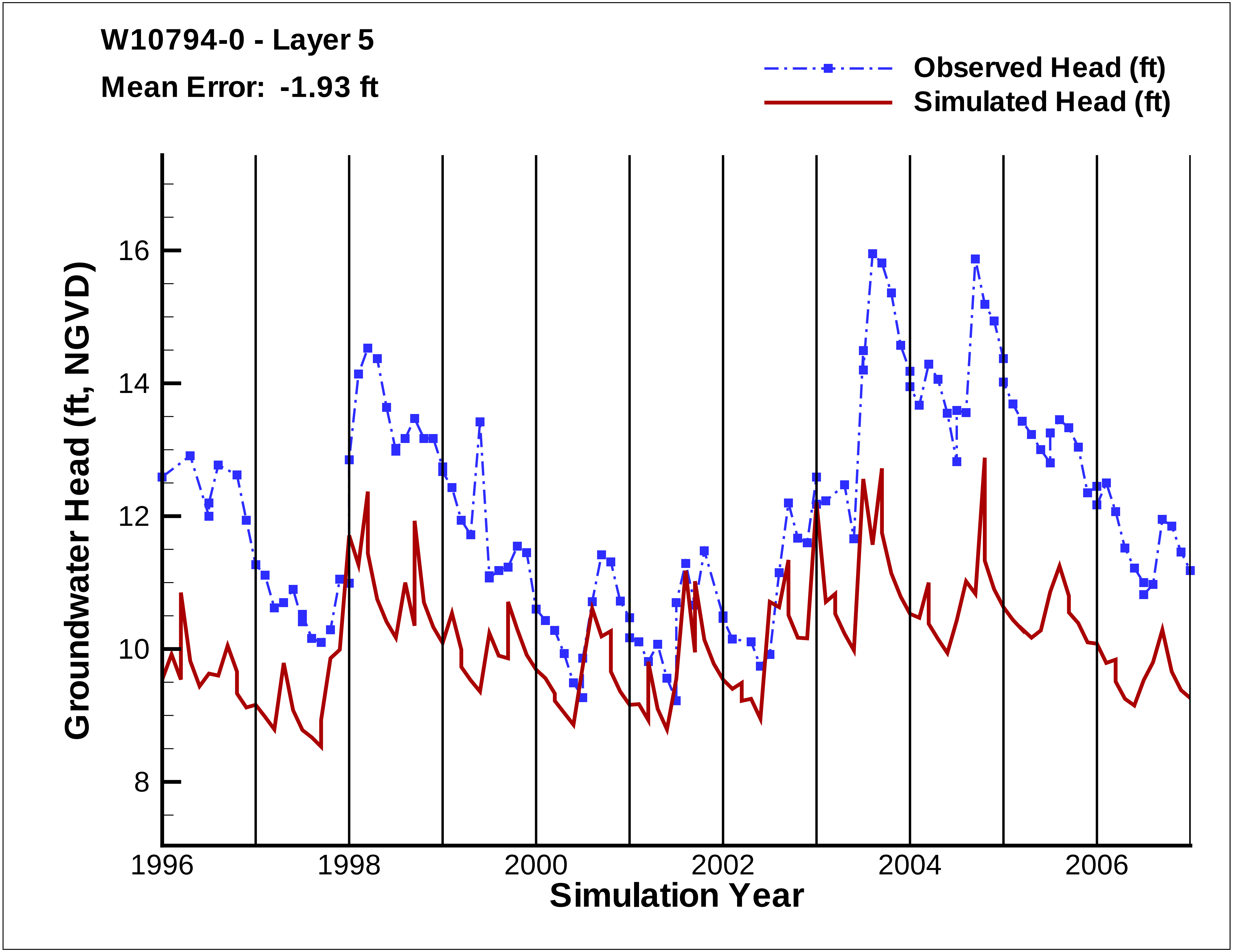
W10783-0 - Layer 3
Mean Error: 3.98 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
12
10
8
6
4
1996
1998
2000
2002
2004
2006
Simulation Year



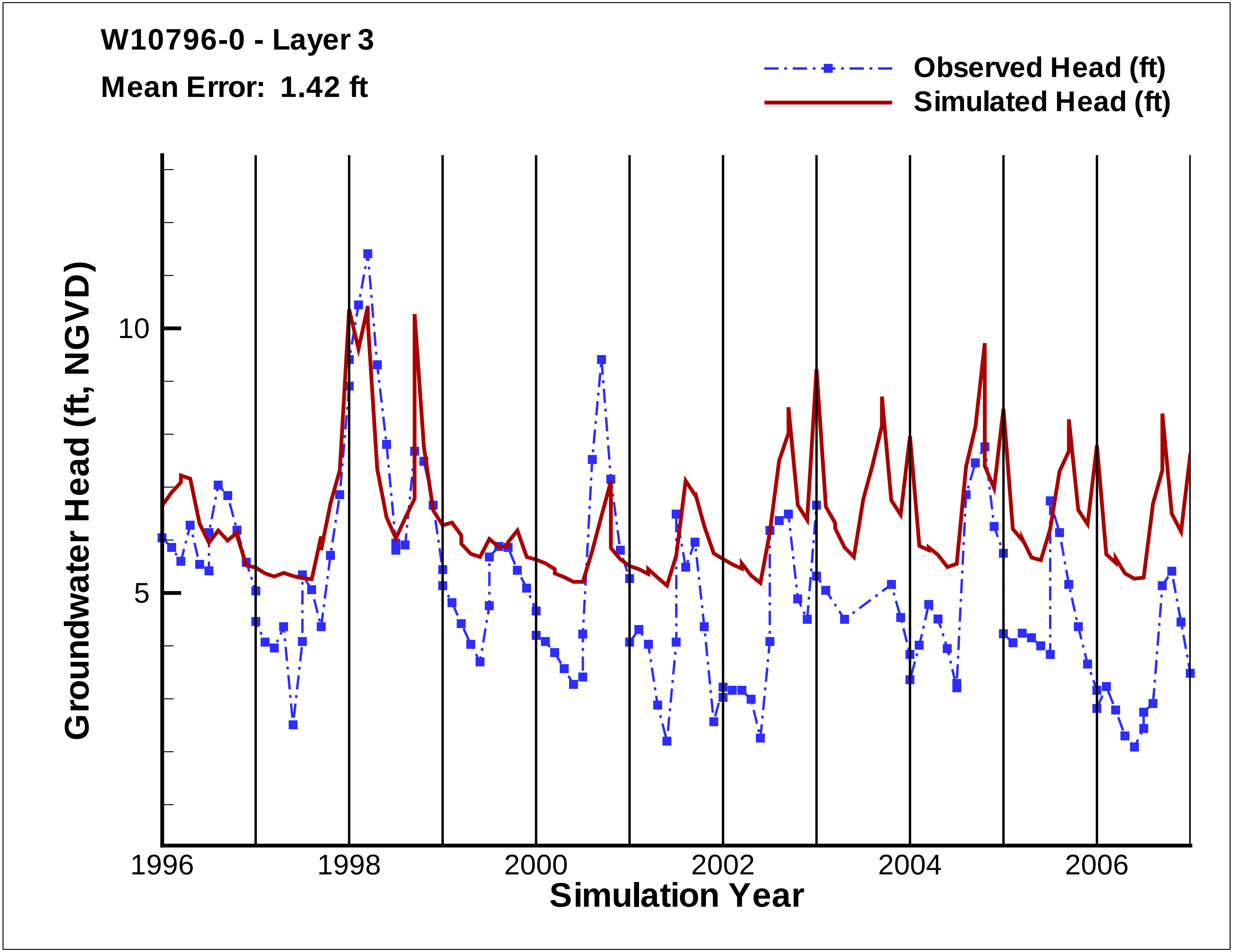
W10785-0 - Layer 3
Mean Error: 4.05 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year


W10790-0 - Layer 4
Mean Error: -3.65 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

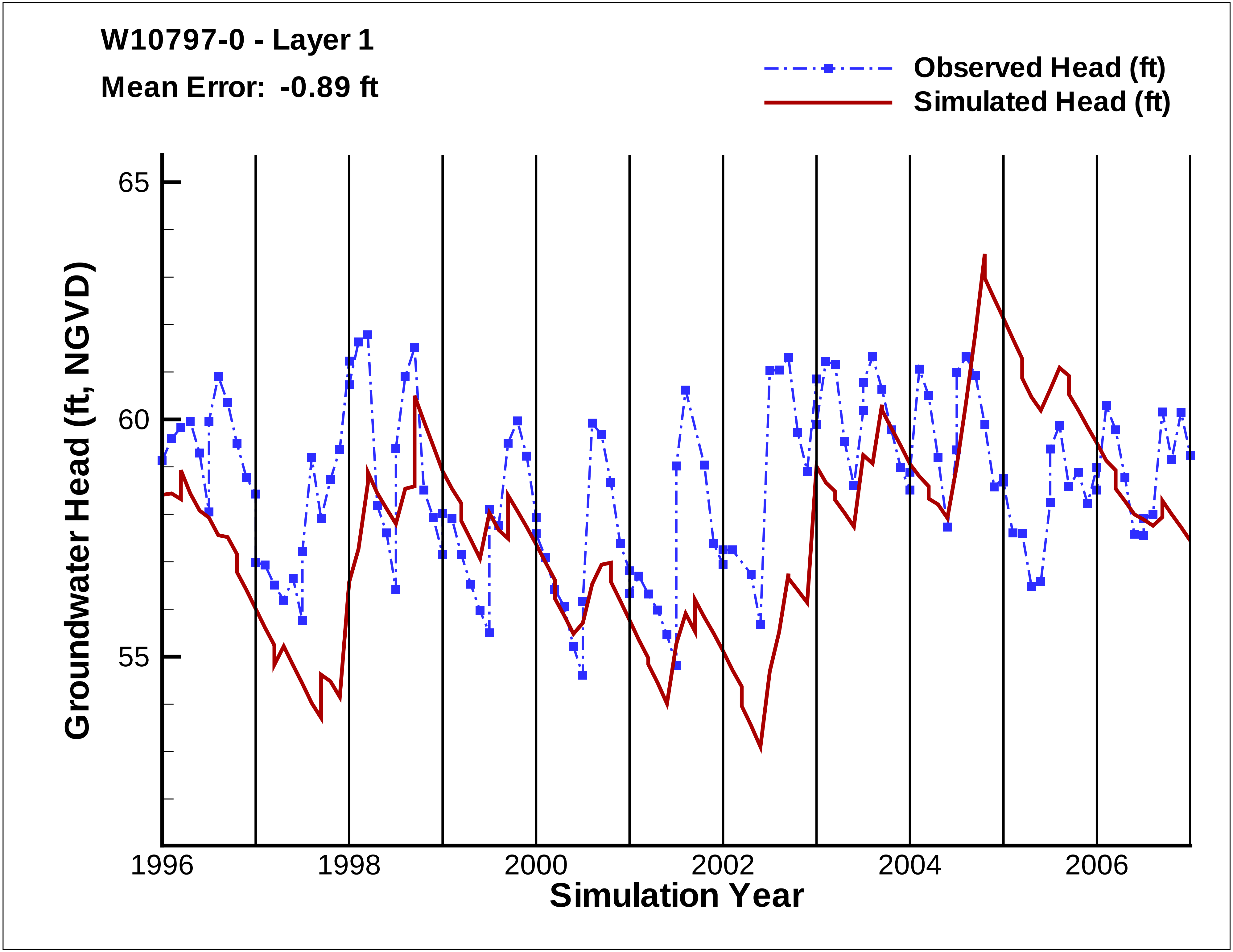

W10791-0 - Layer 3
Mean Error: -0.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



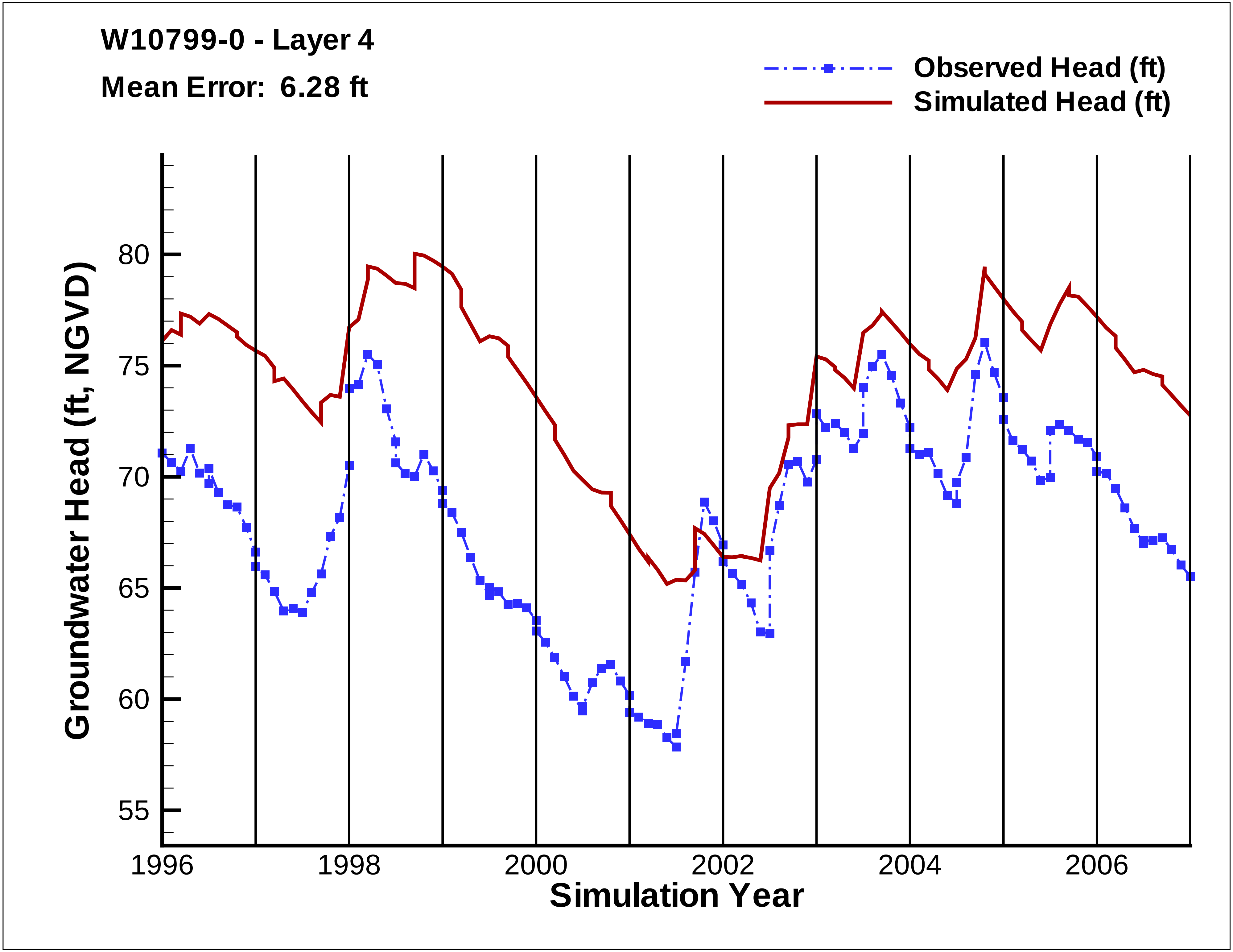
W10794-0 - Layer 5
Mean Error: -1.93 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
8
10
12
14
16
1996
1998
2000
2002
2004
2006
Simulation Year



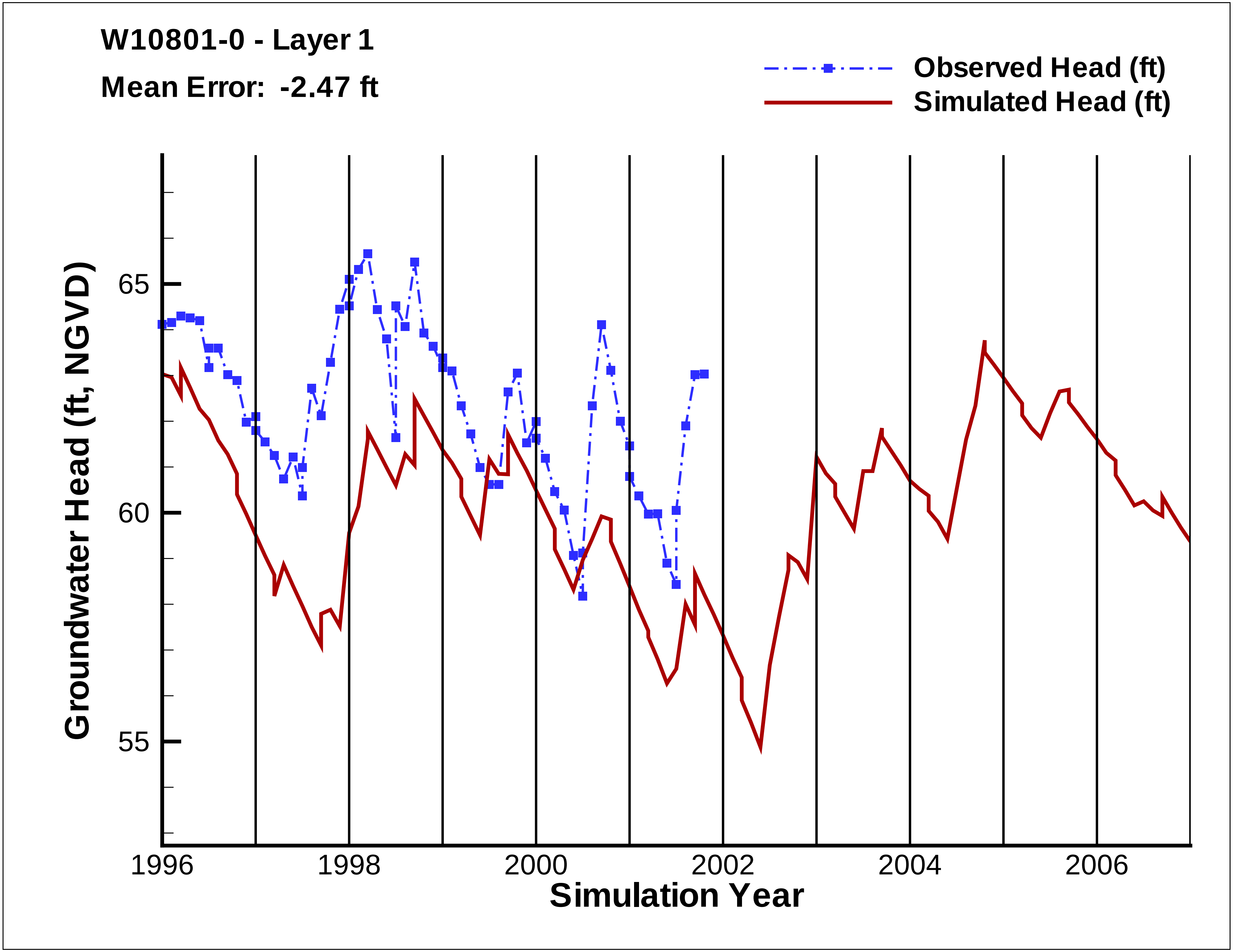
W10796-0 - Layer 3
Mean Error: 1.42 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



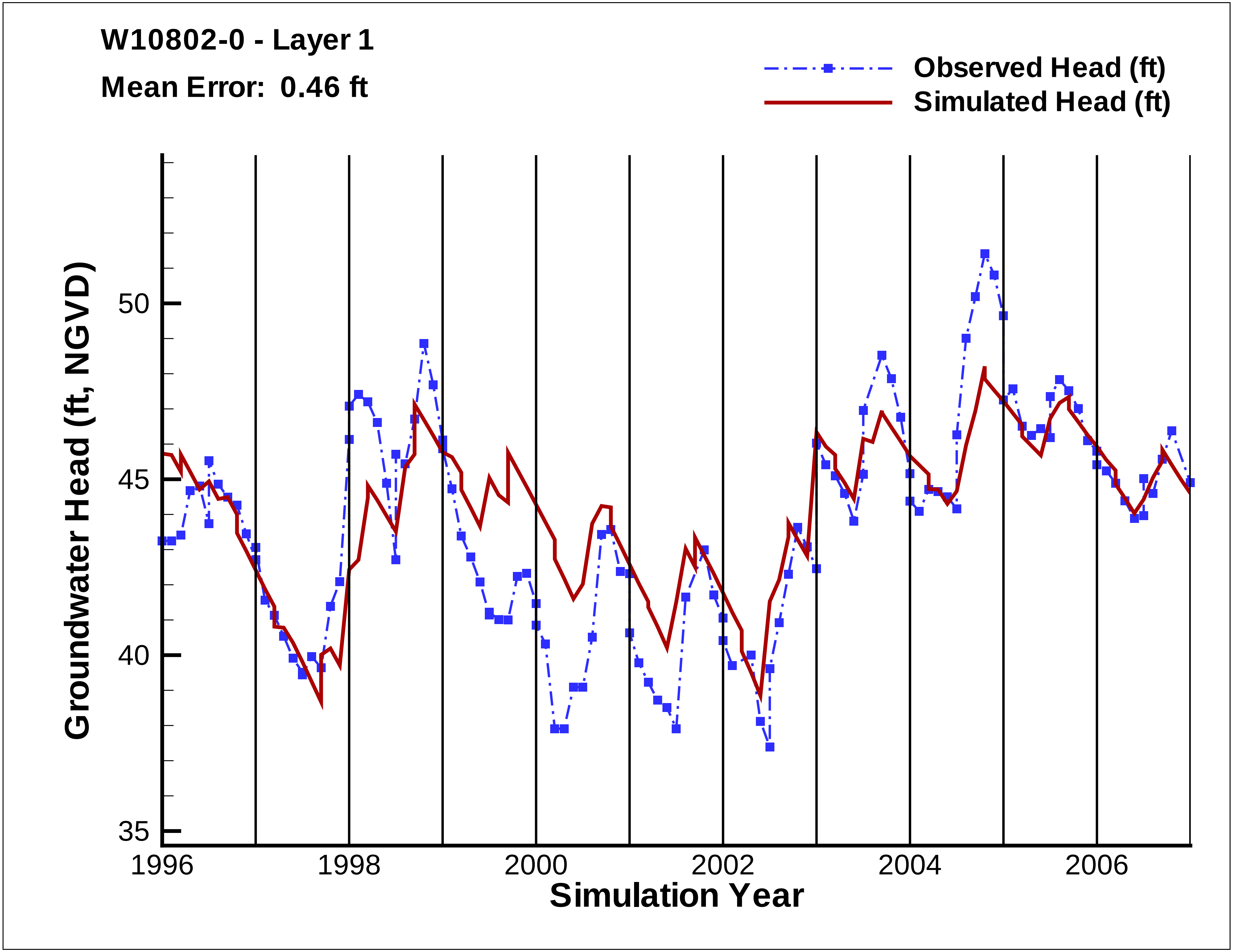
W10797-0 - Layer 1
Mean Error: -0.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year



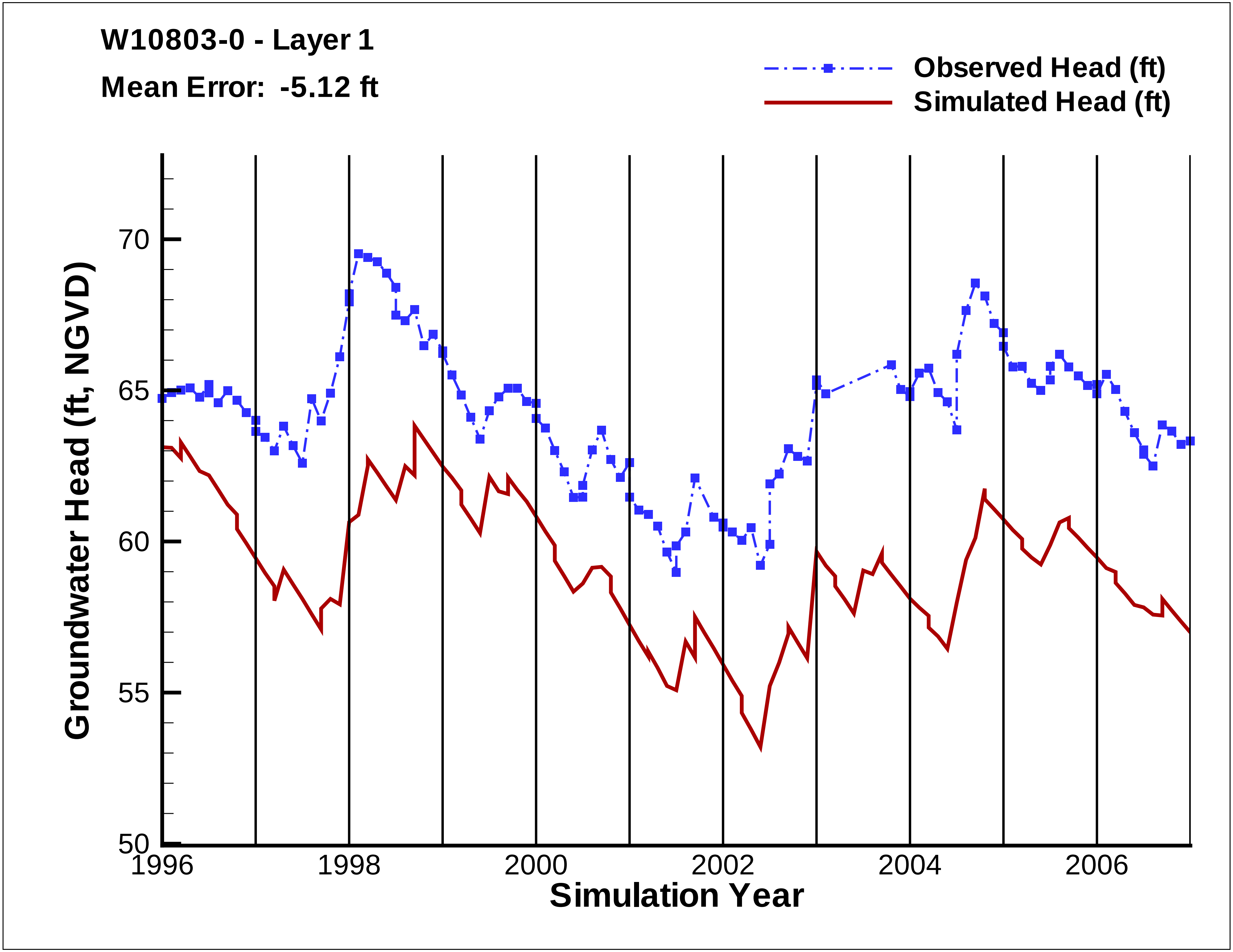
W10799-0 - Layer 4
Mean Error: 6.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
60
65
70
75
80
1996
1998
2000
2002
2004
2006
Simulation Year

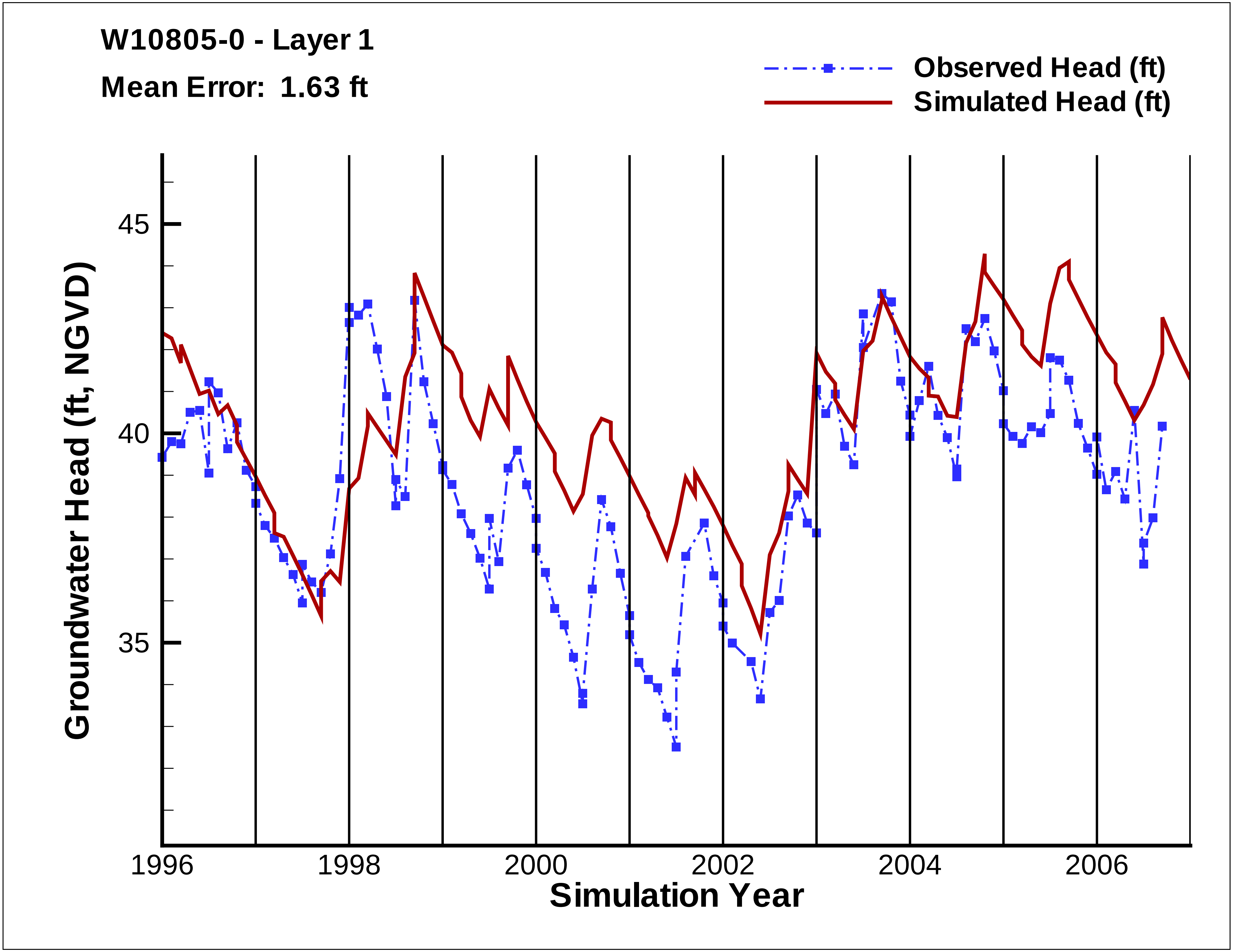


W10801-0 - Layer 1
Mean Error: -2.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

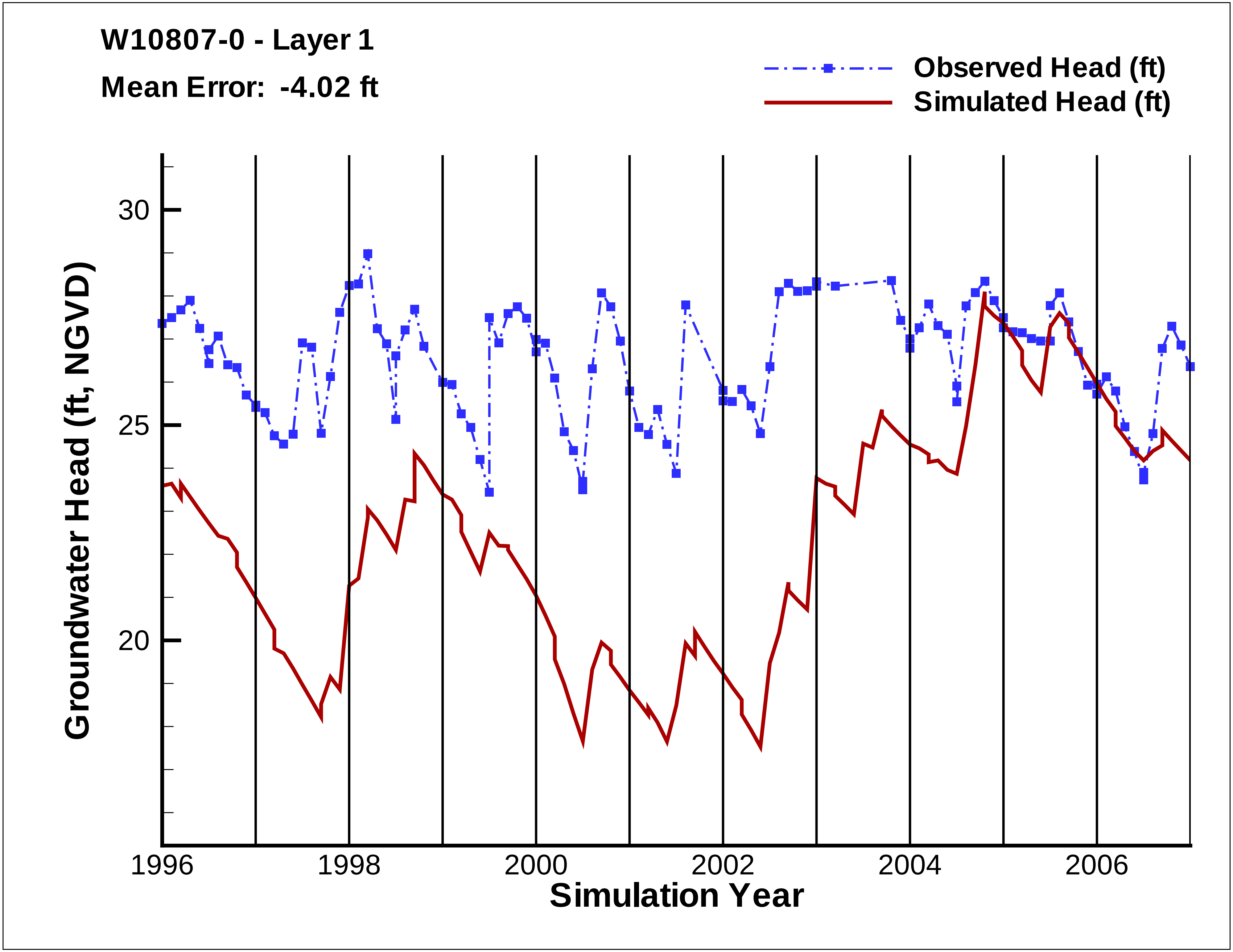


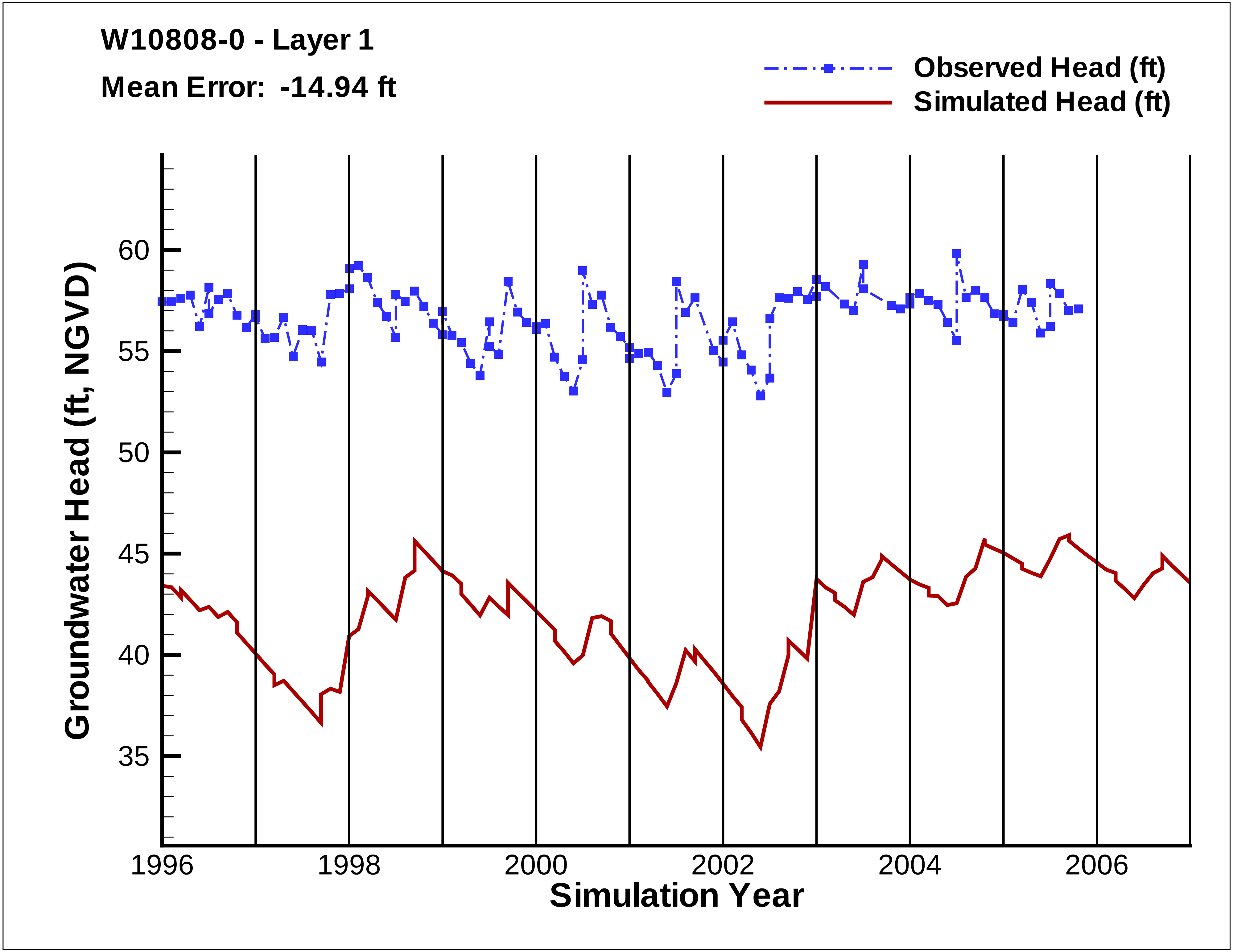
W10802-0 - Layer 1
Mean Error: 0.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
40
45
50
1996
1998
2000
2002
2004
2006
Simulation Year

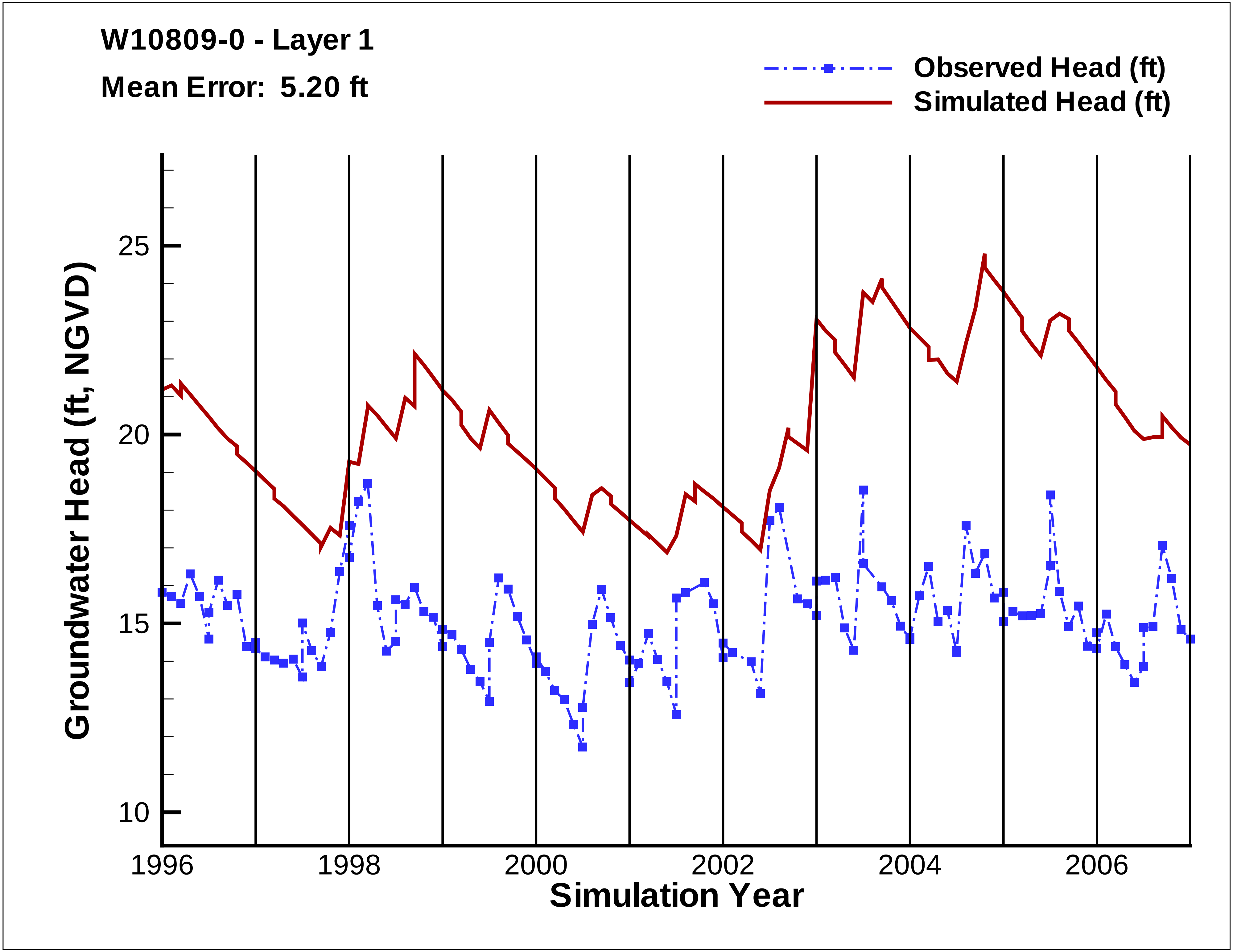

W10803-0 - Layer 1
Mean Error: -5.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



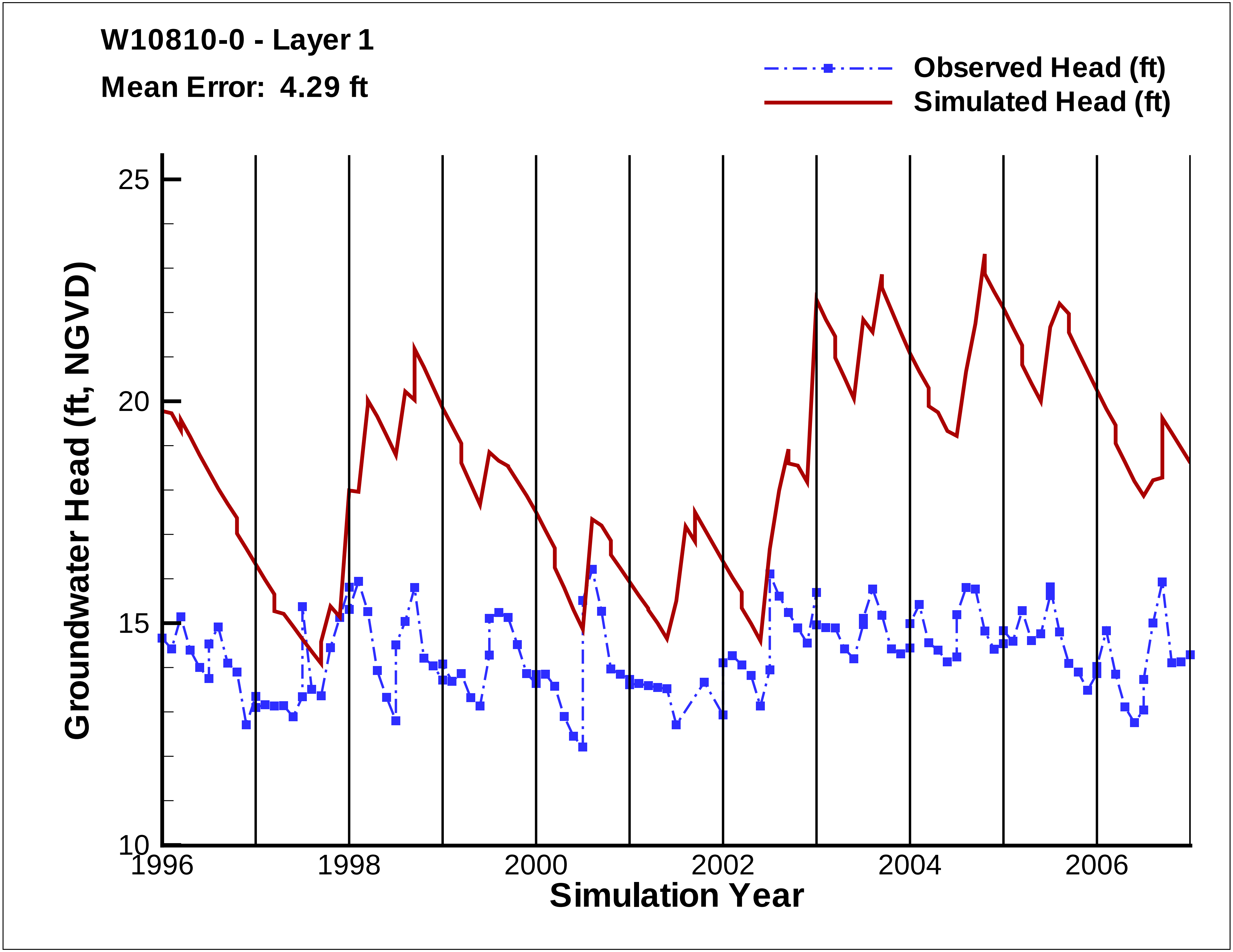
W10805-0 - Layer 1
Mean Error: 1.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year


W10807-0 - Layer 1
Mean Error: -4.02 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

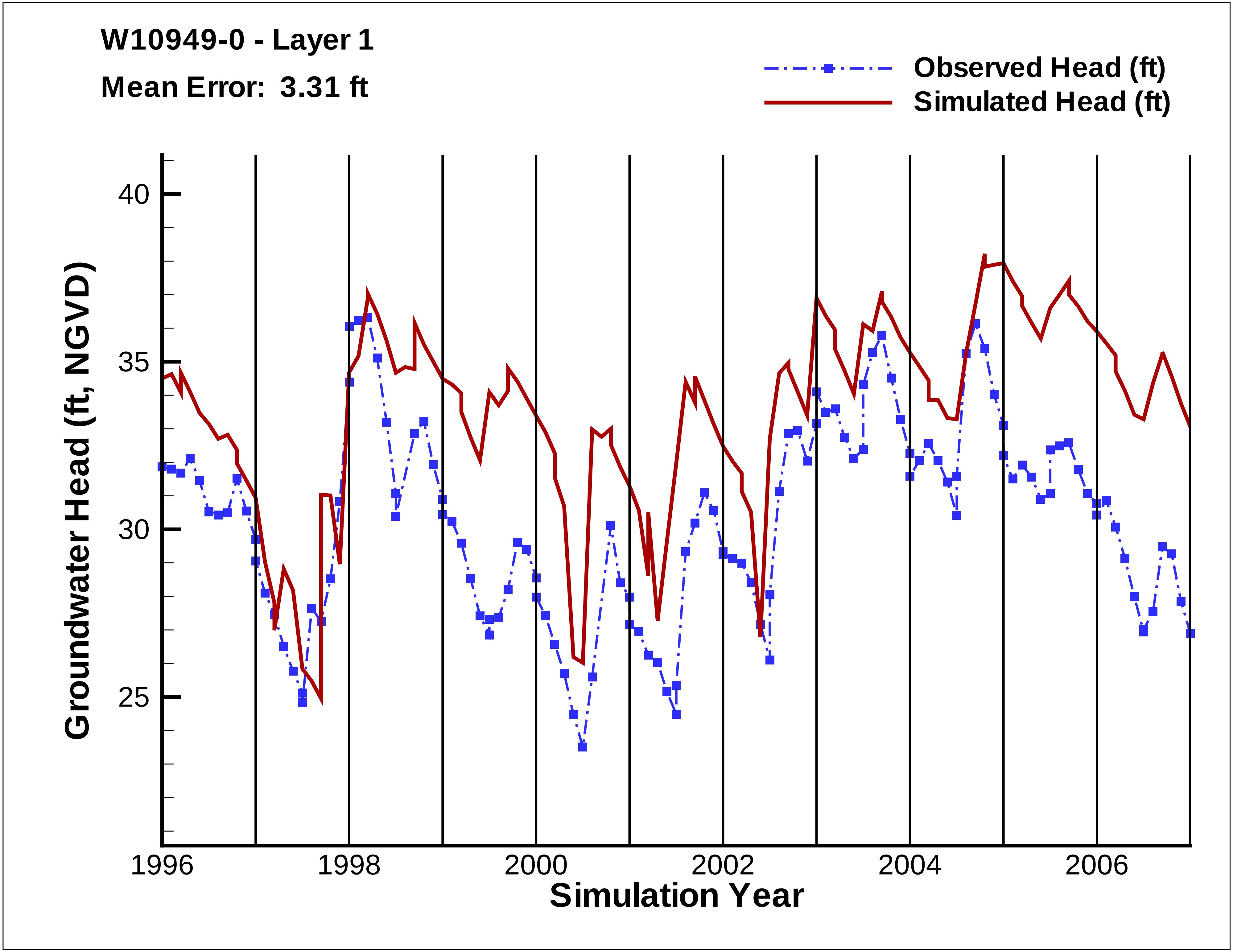

W10808-0 - Layer 1
Mean Error: -14.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



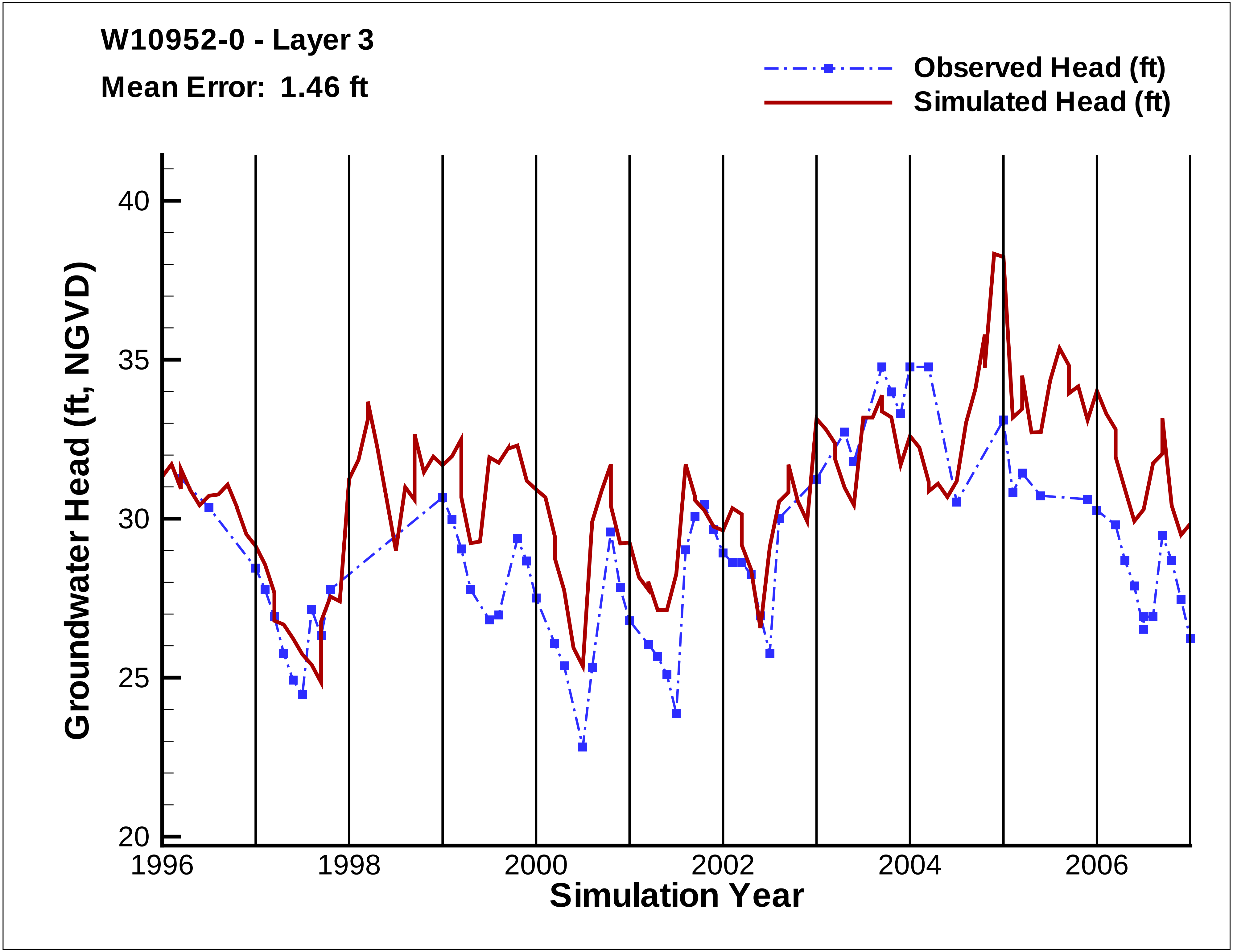
W10809-0 - Layer 1
Mean Error: 5.20 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



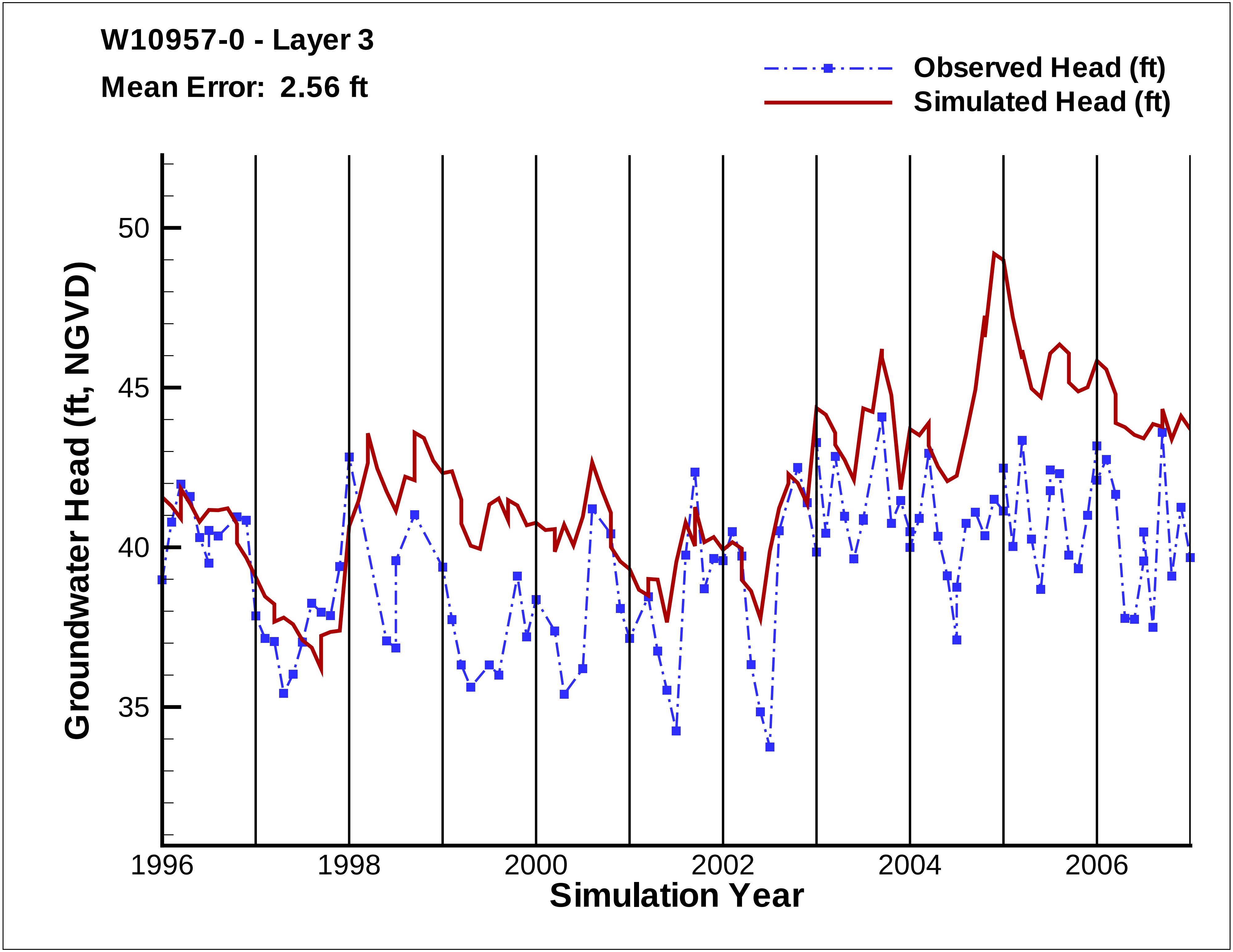
W10810-0 - Layer 1
Mean Error: 4.29 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



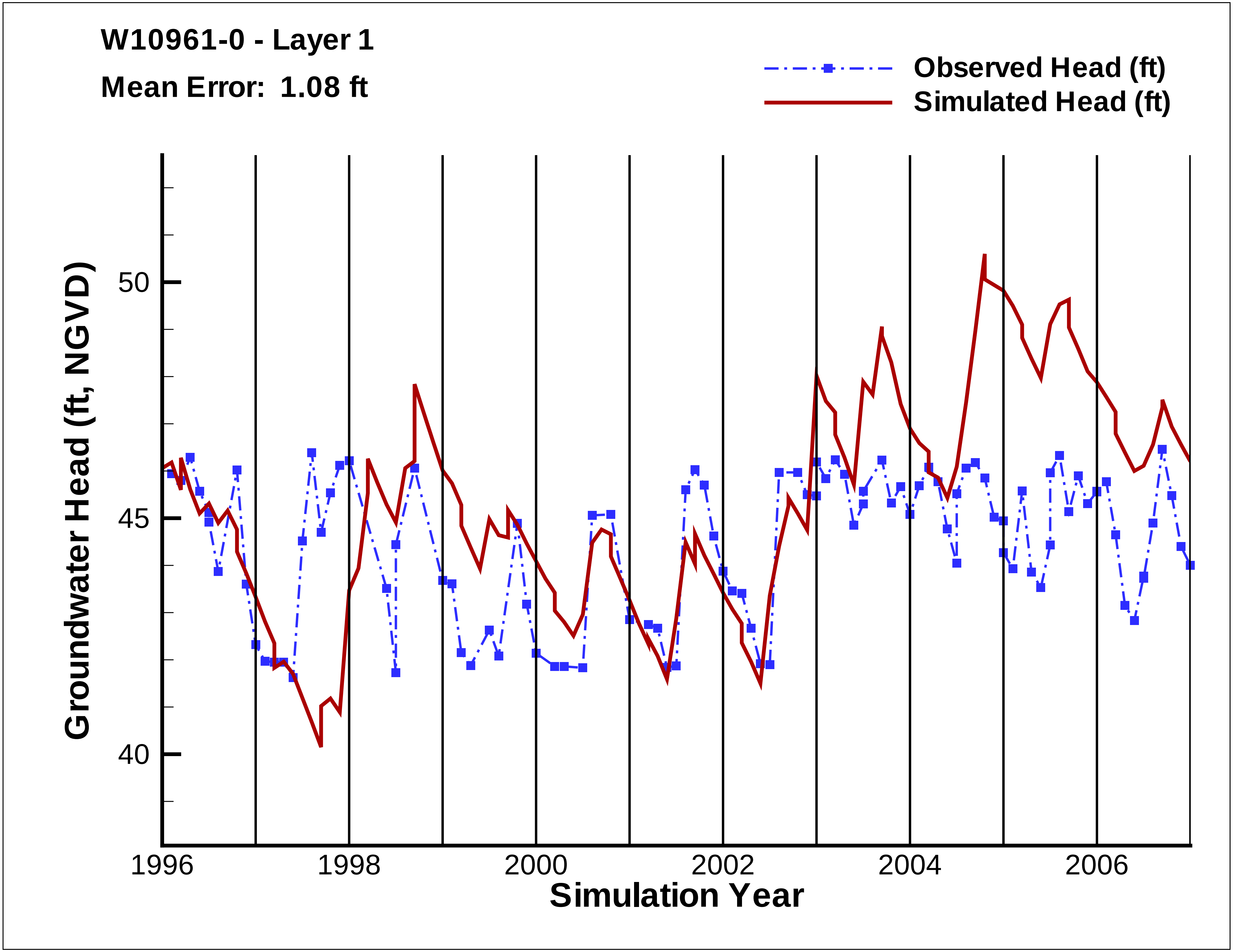
W10949-0 - Layer 1
Mean Error: 3.31 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

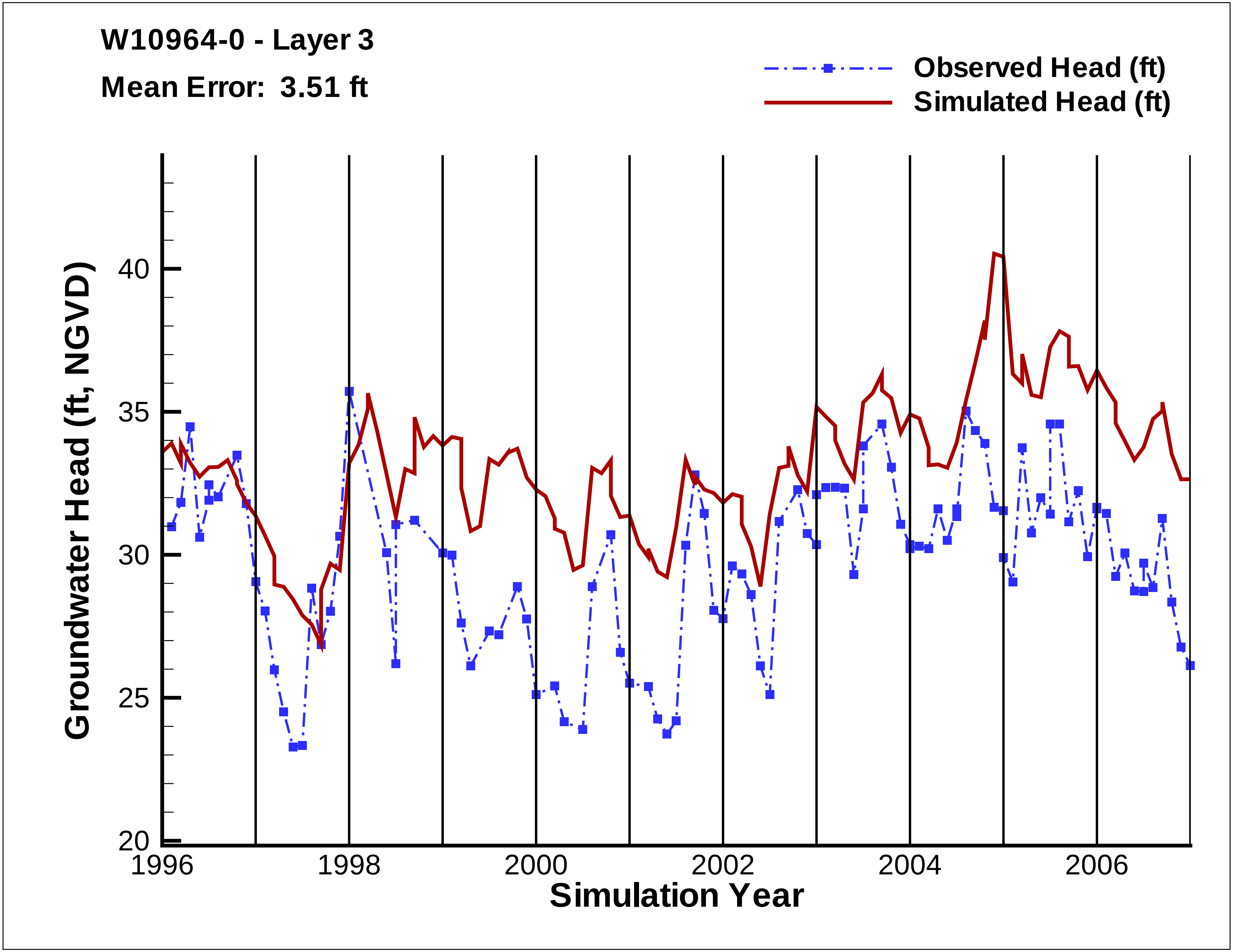


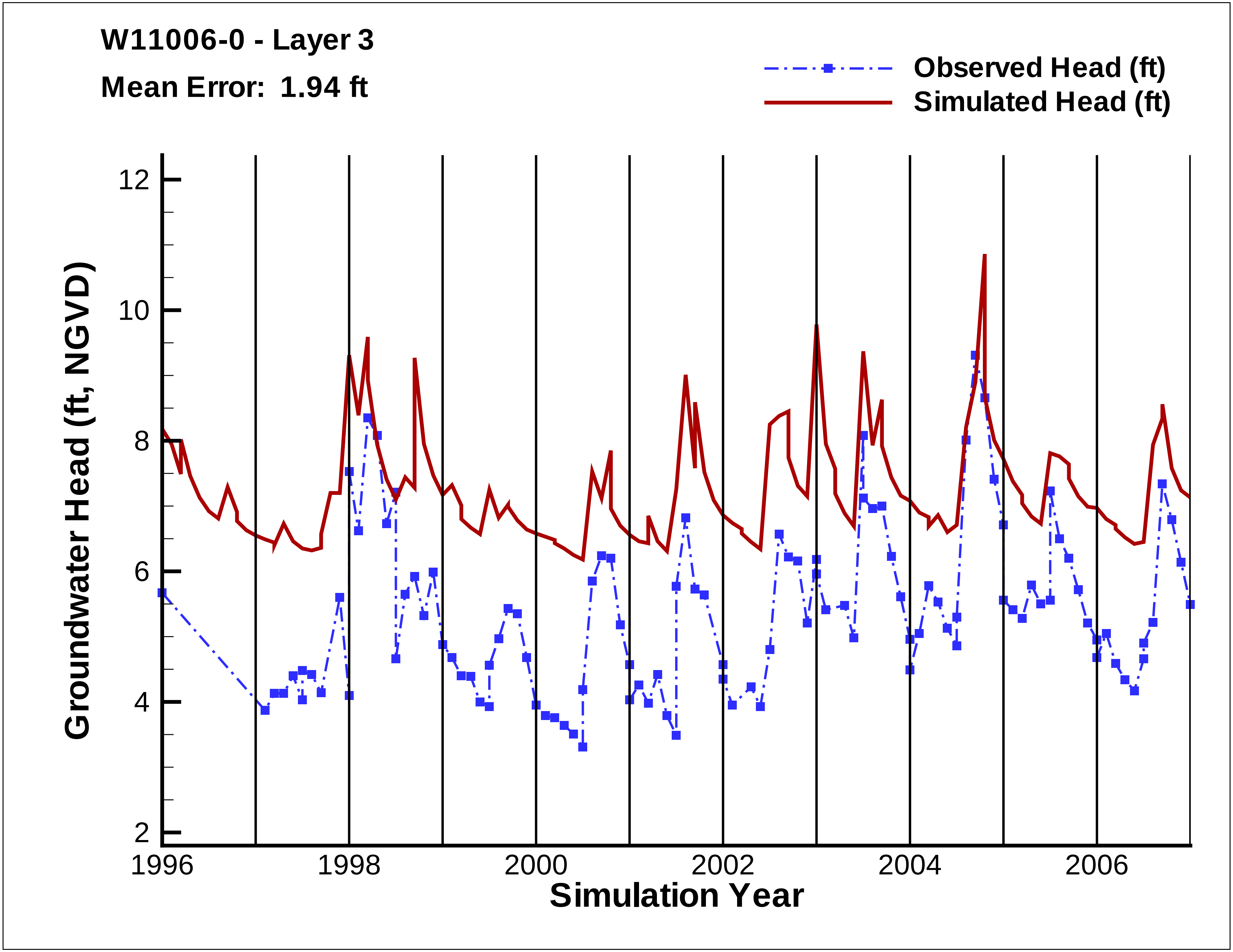
W10952-0 - Layer 3
Mean Error: 1.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year



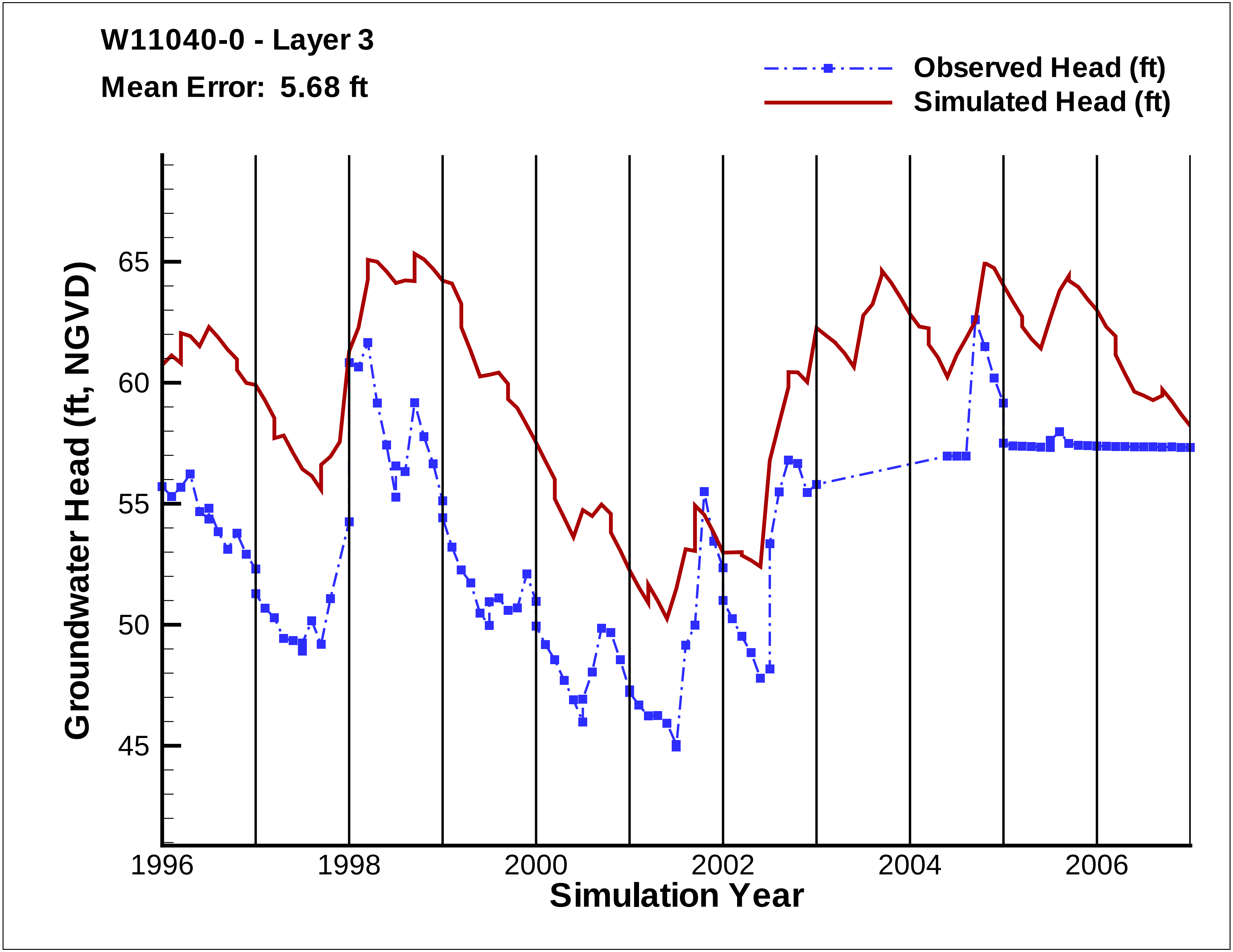
W10957-0 - Layer 3
Mean Error: 2.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

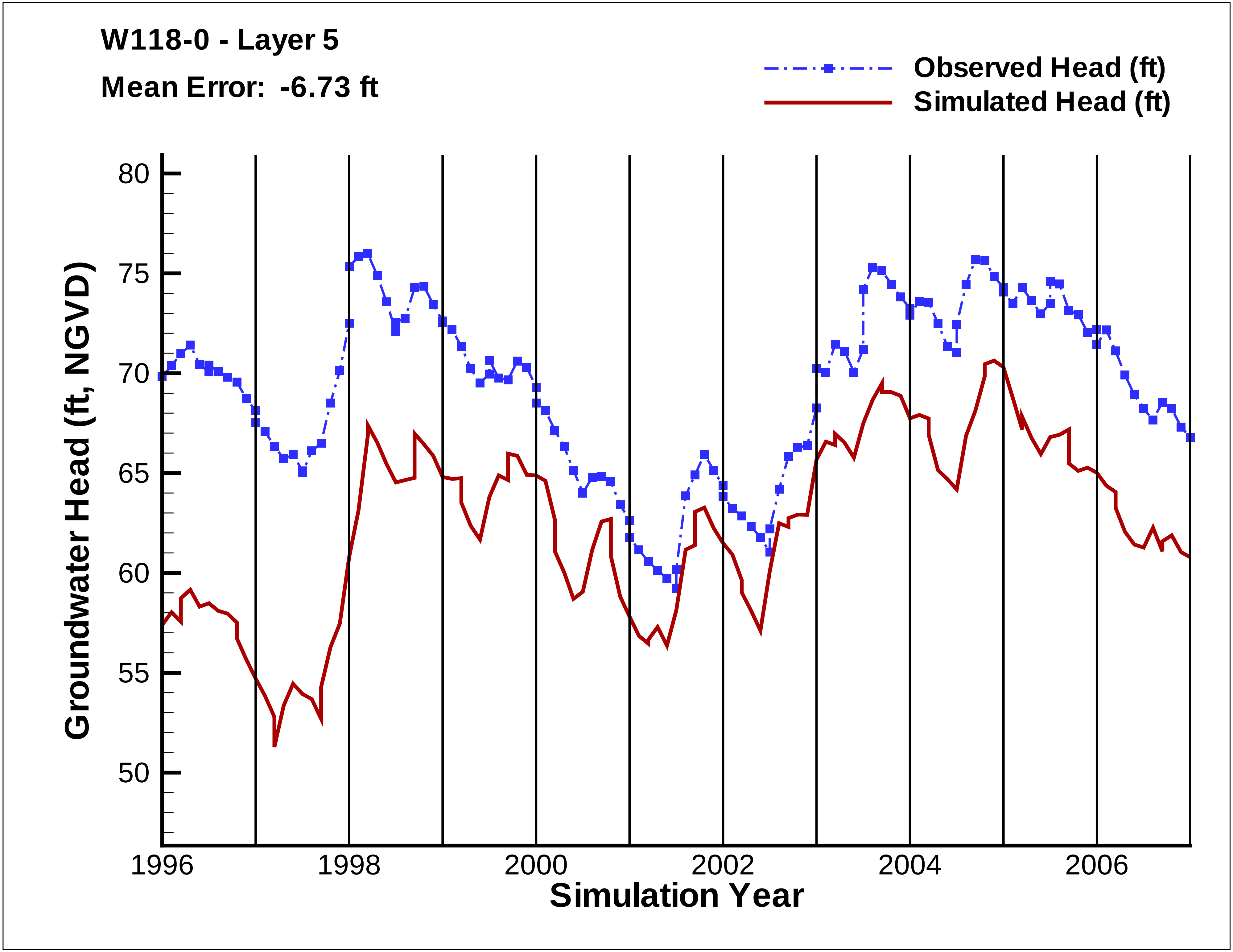

W10961-0 - Layer 1
Mean Error: 1.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year


W10964-0 - Layer 3
Mean Error: 3.51 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
25
30
35
40
1996
1998
2000
2002
2004
2006
Simulation Year

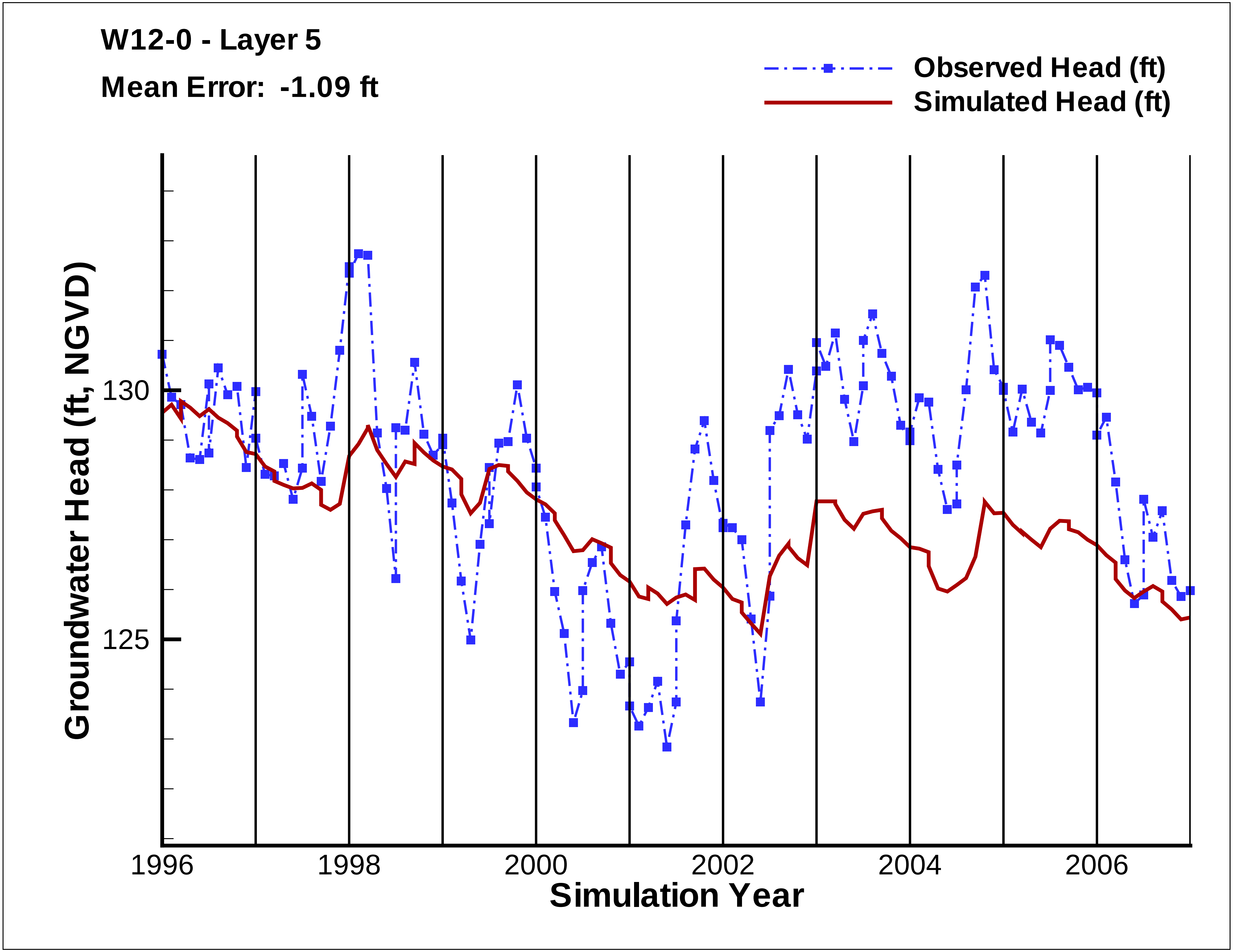


W11006-0 - Layer 3
Mean Error: 1.94 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
12
10
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year

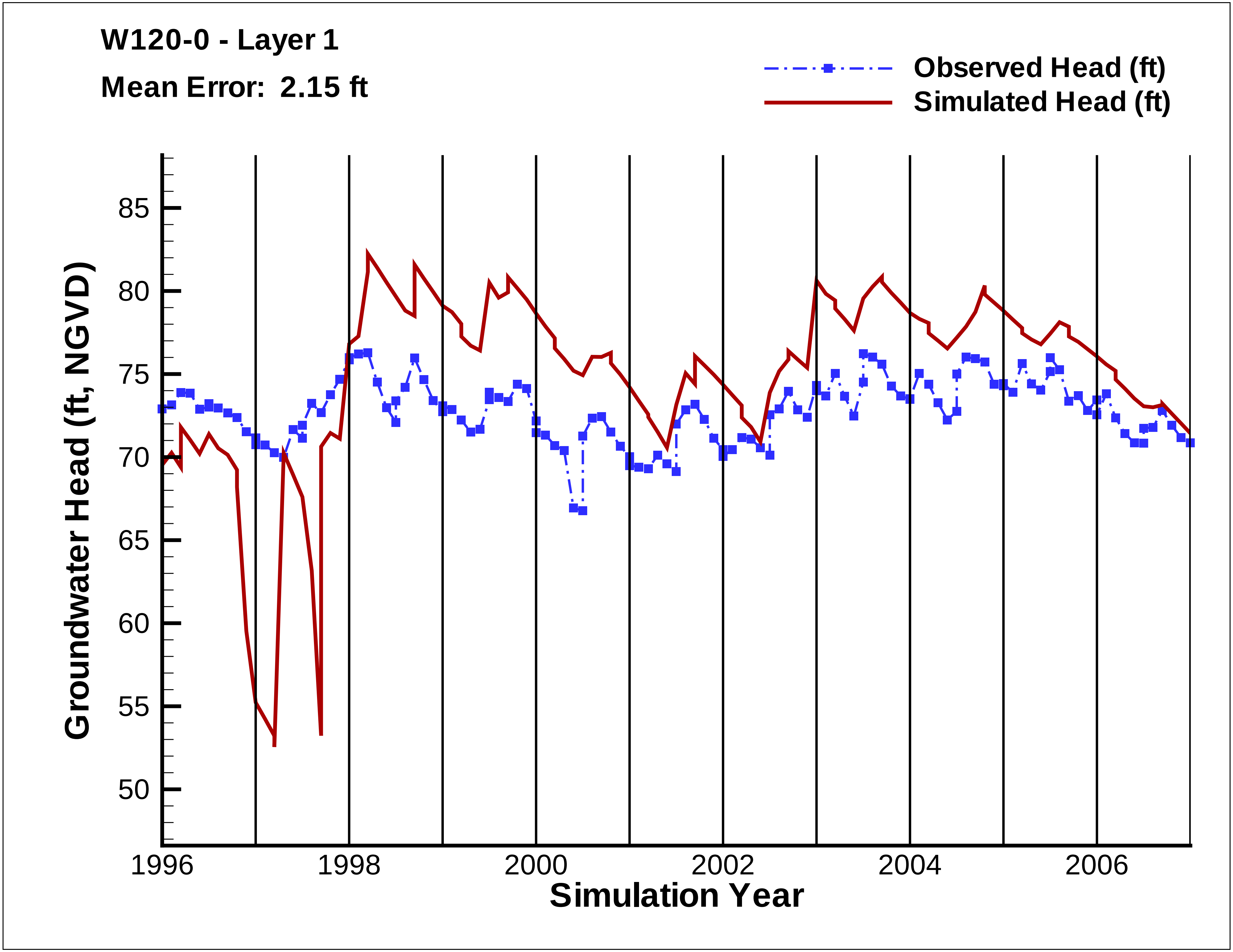

W11040-0 - Layer 3
Mean Error: 5.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

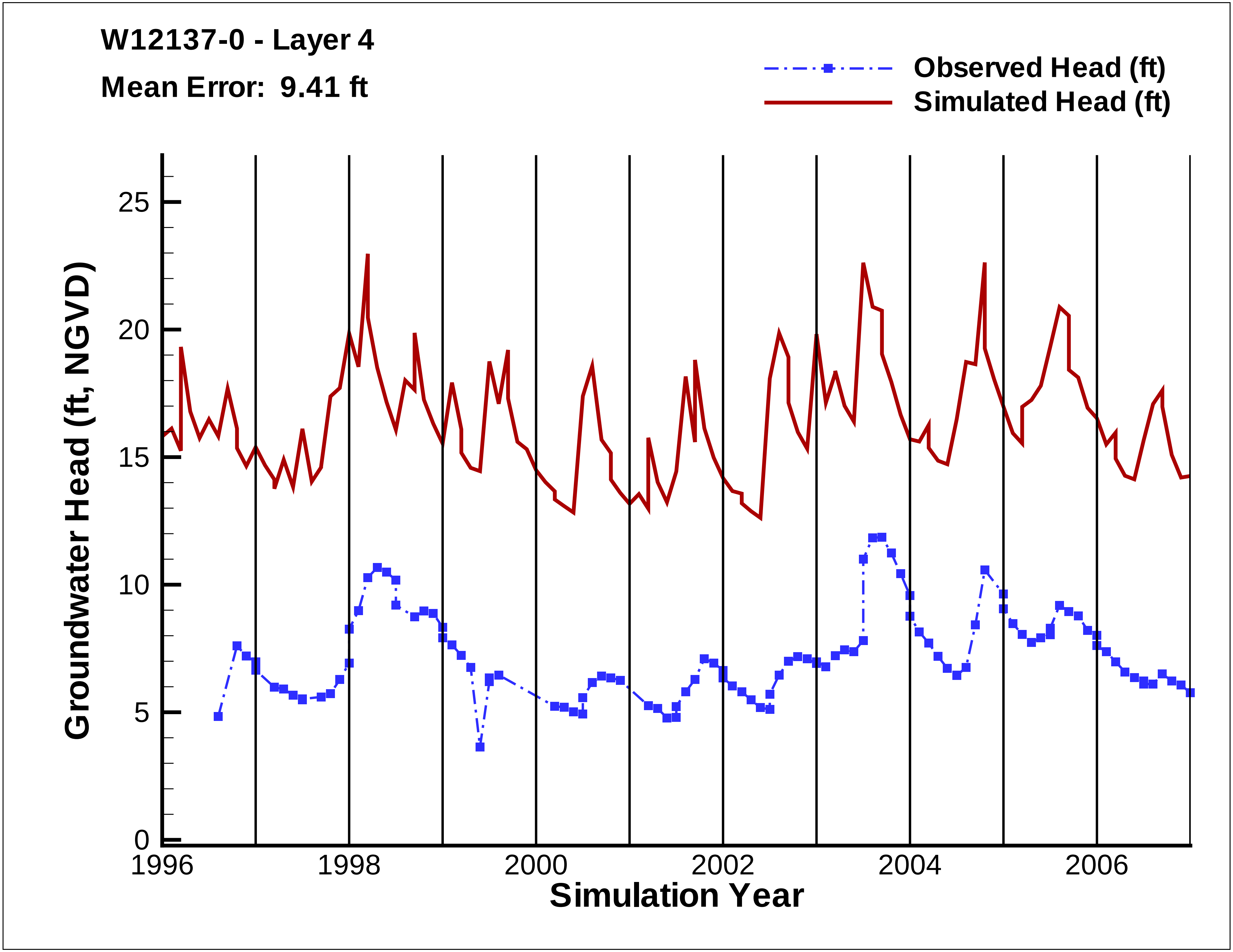


W118-0 - Layer 5
Mean Error: -6.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

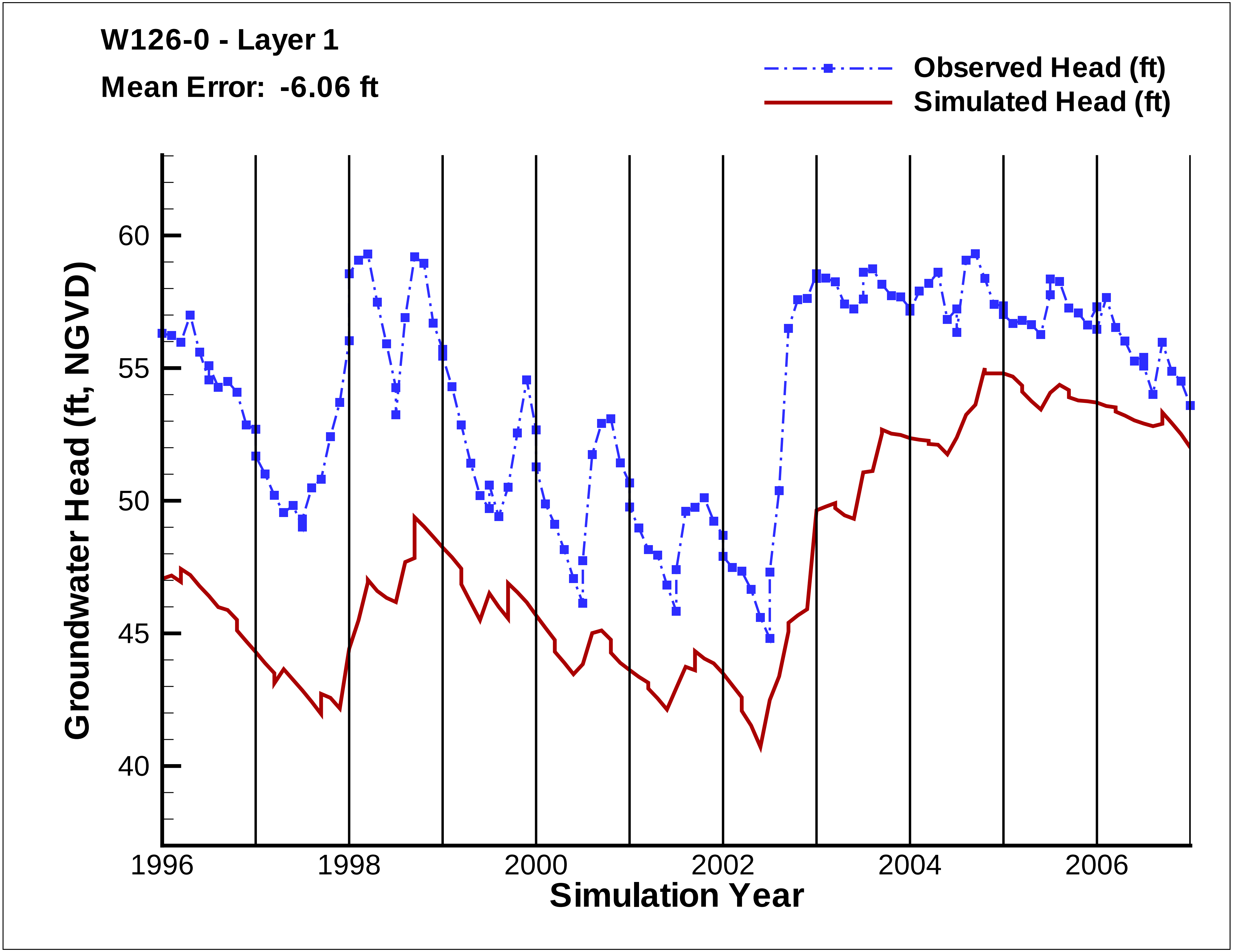


W12-0 - Layer 5
Mean Error: -1.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
130
125
1996
1998
2000
2002
2004
2006
Simulation Year

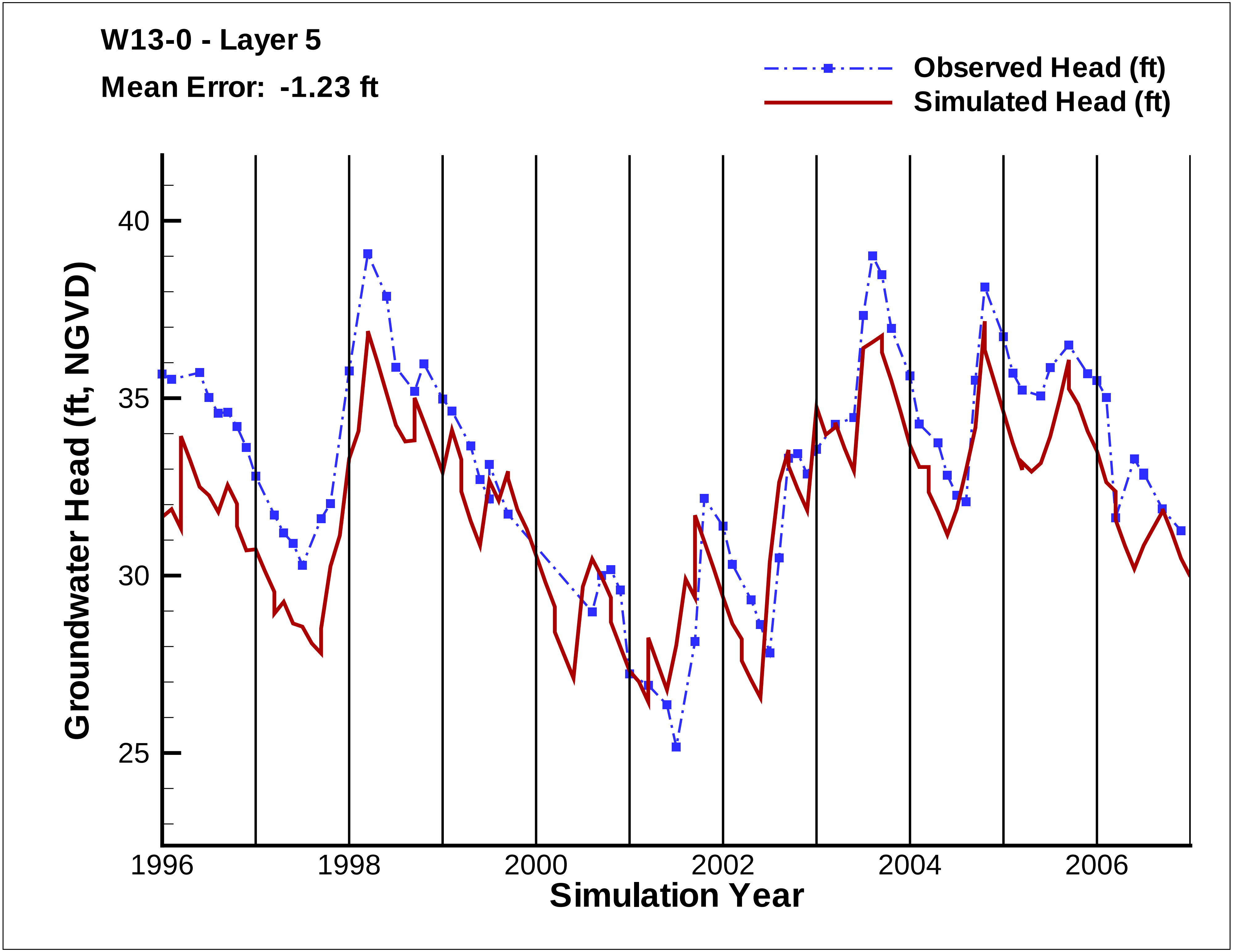

W120-0 - Layer 1
Mean Error: 2.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year



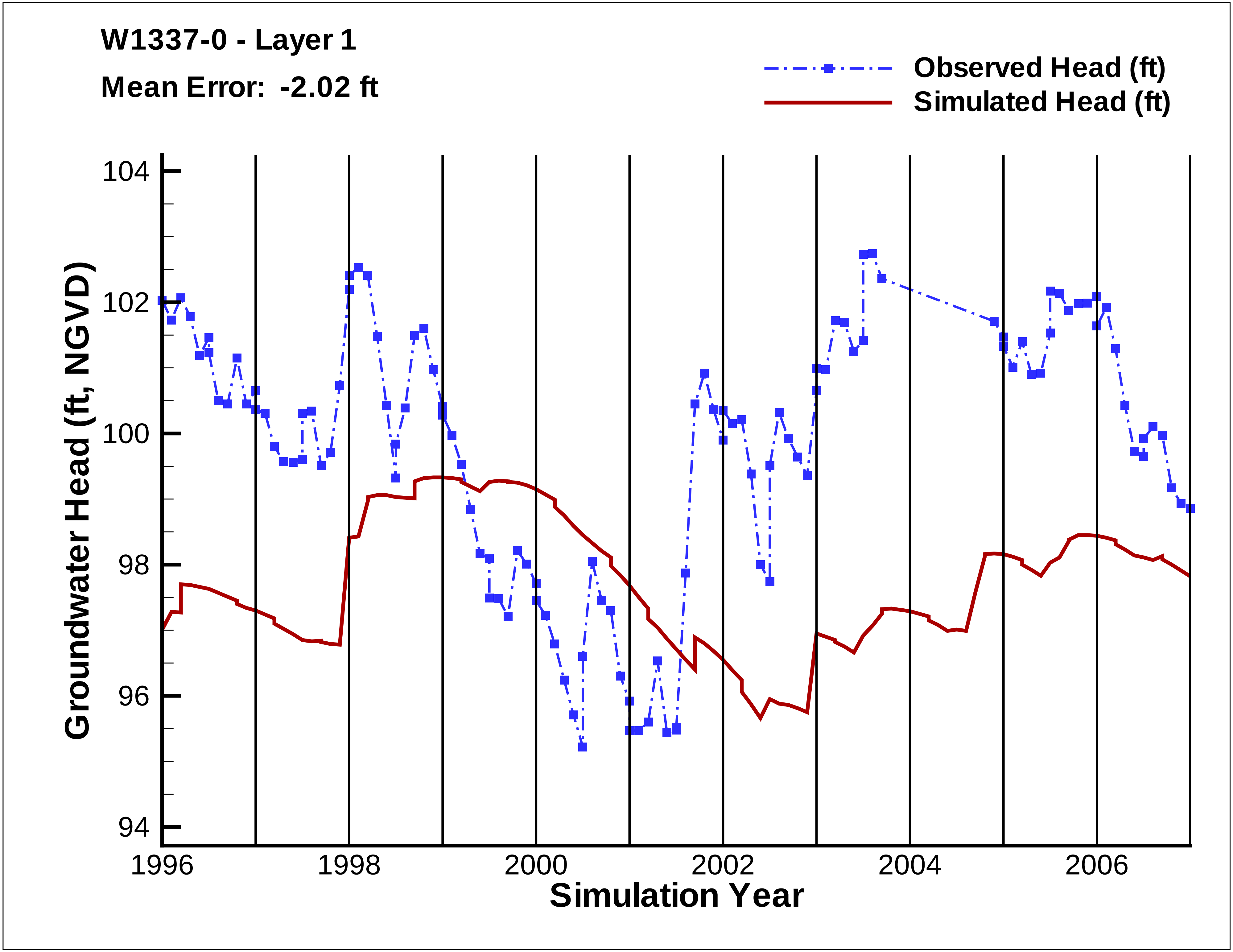
W12137-0 - Layer 4
Mean Error: 9.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
25
1996
1998
2000
2002
2004
2006
Simulation Year



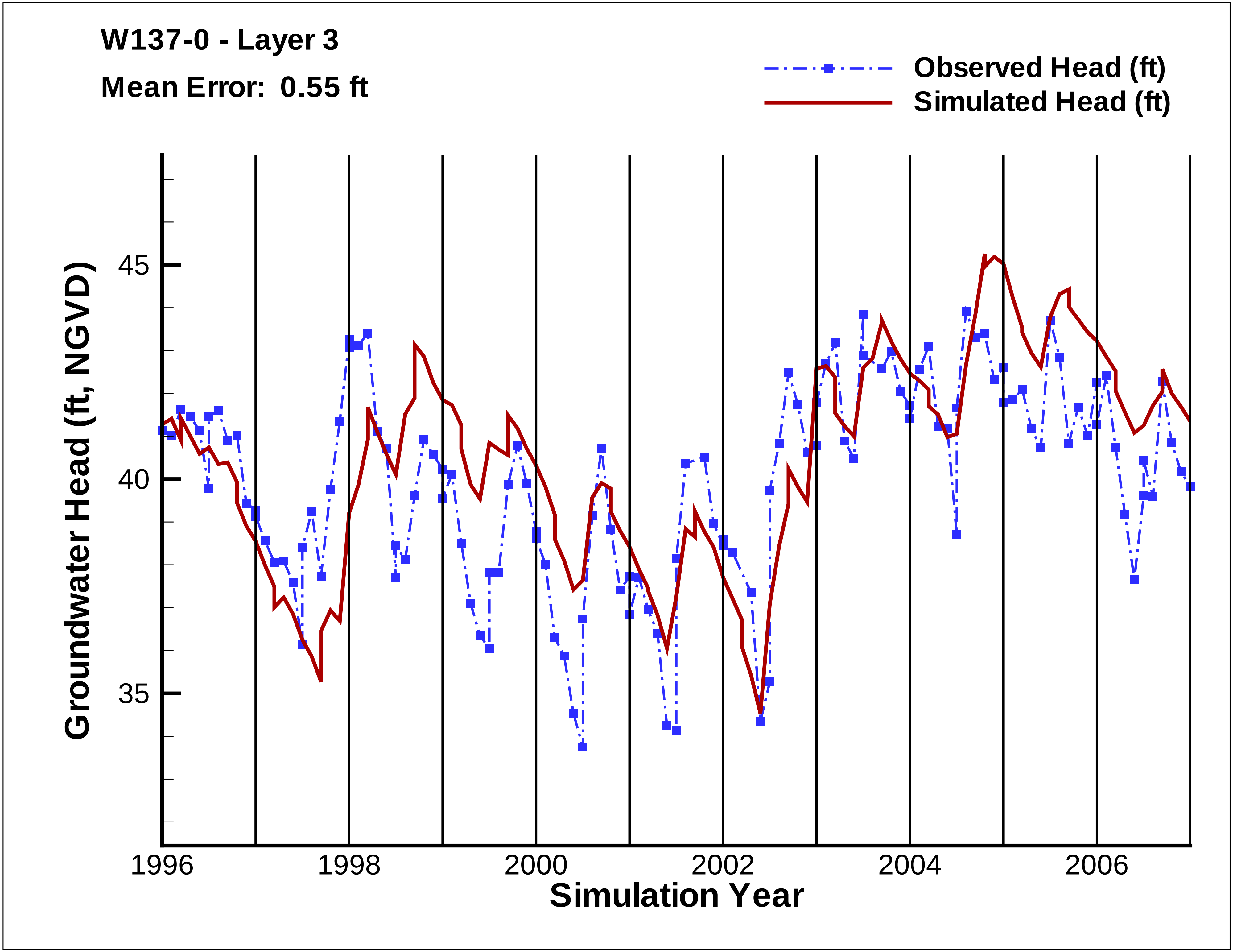
W126-0 - Layer 1
Mean Error: -6.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



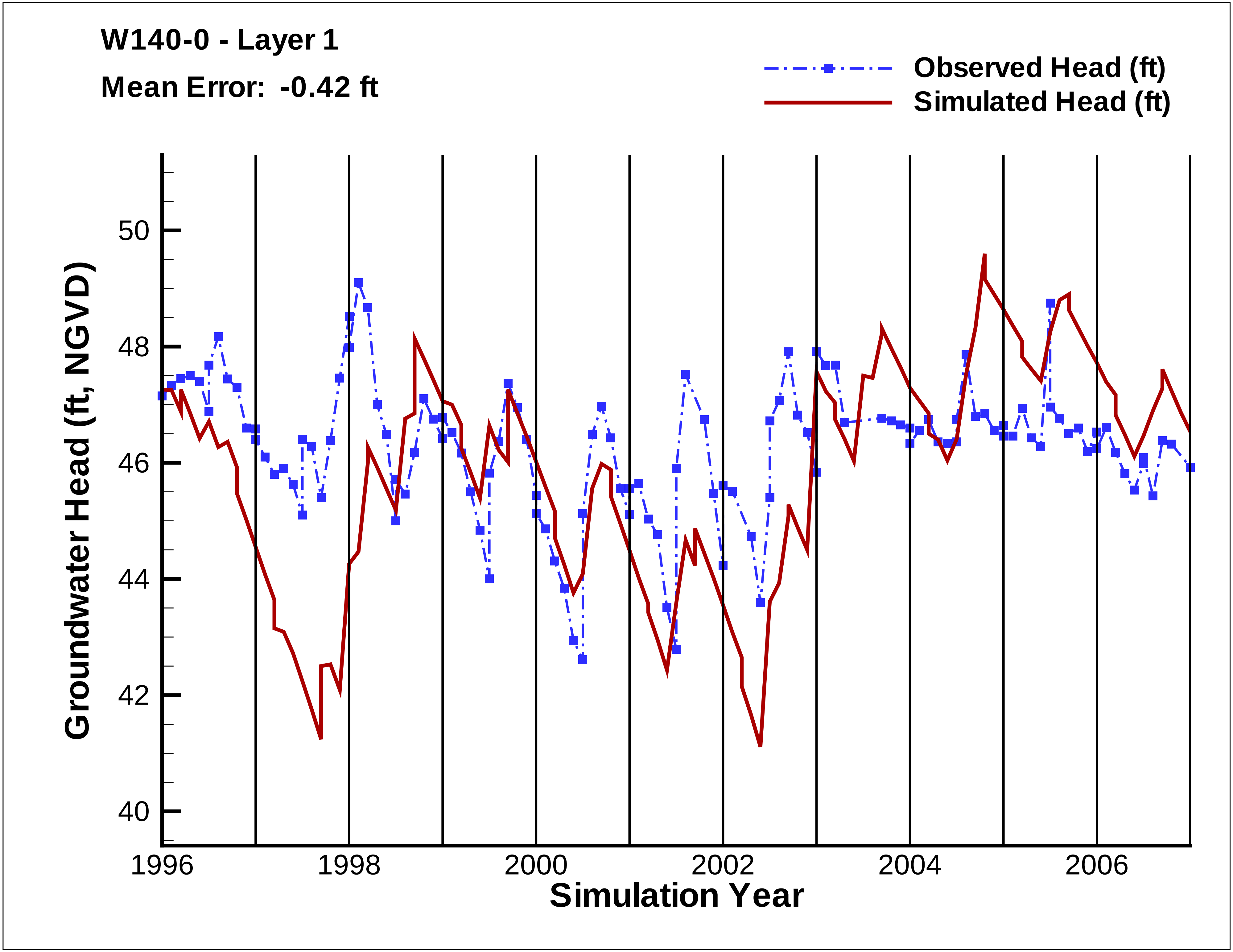
W13-0 - Layer 5
Mean Error: -1.23 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

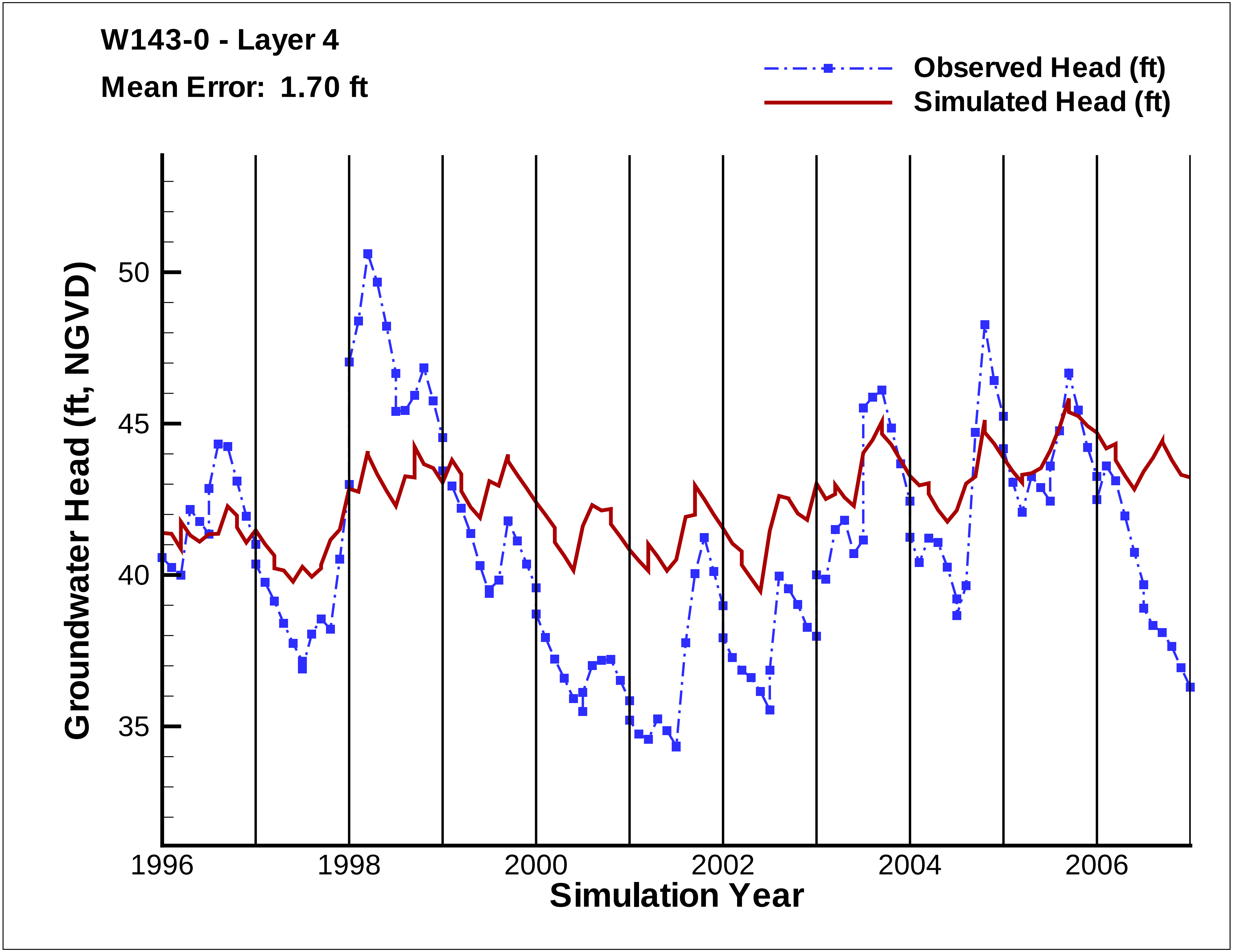


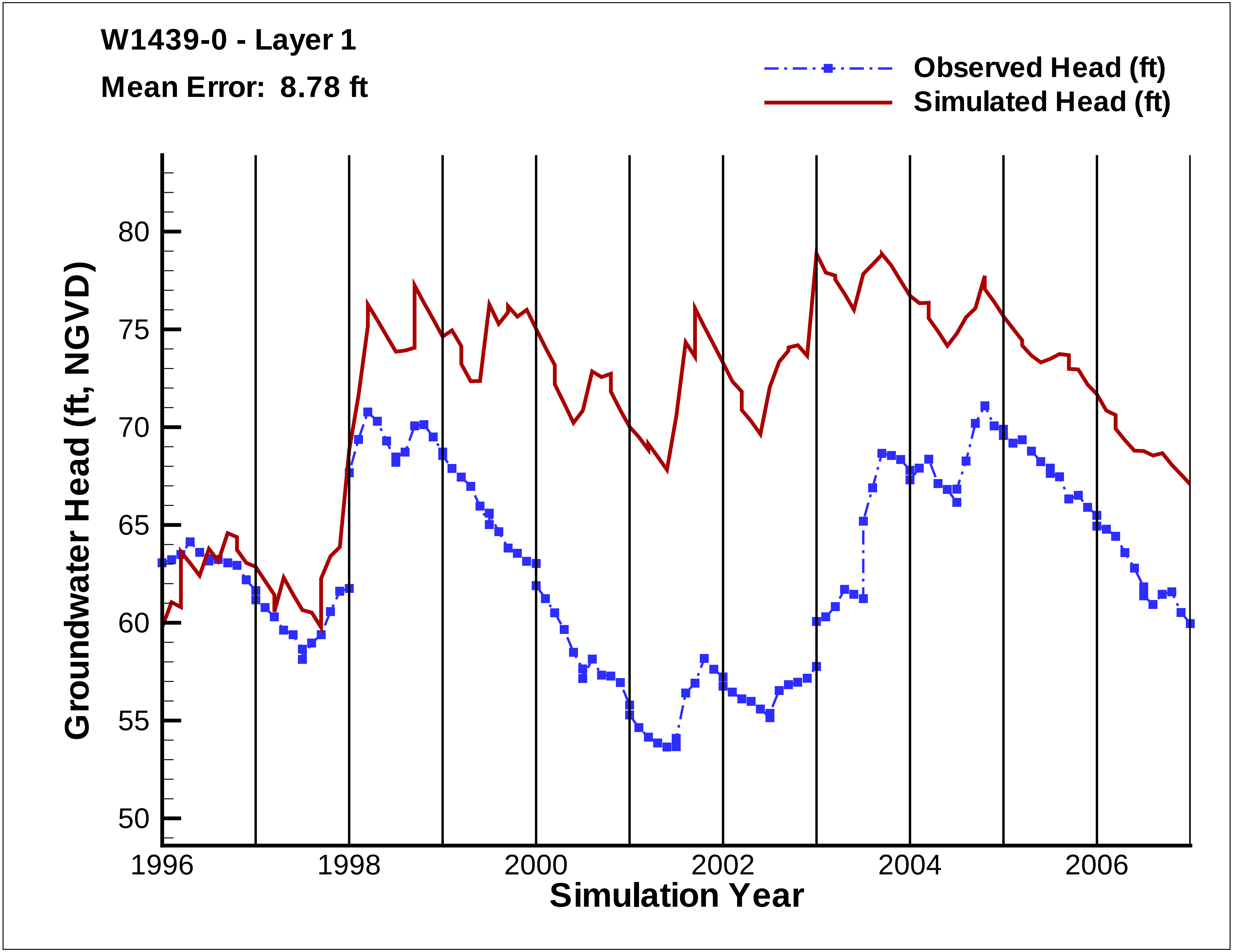
W1337-0 - Layer 1
Mean Error: -2.02 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
104
102
100
98
96
94
1996
1998
2000
2002
2004
2006
Simulation Year

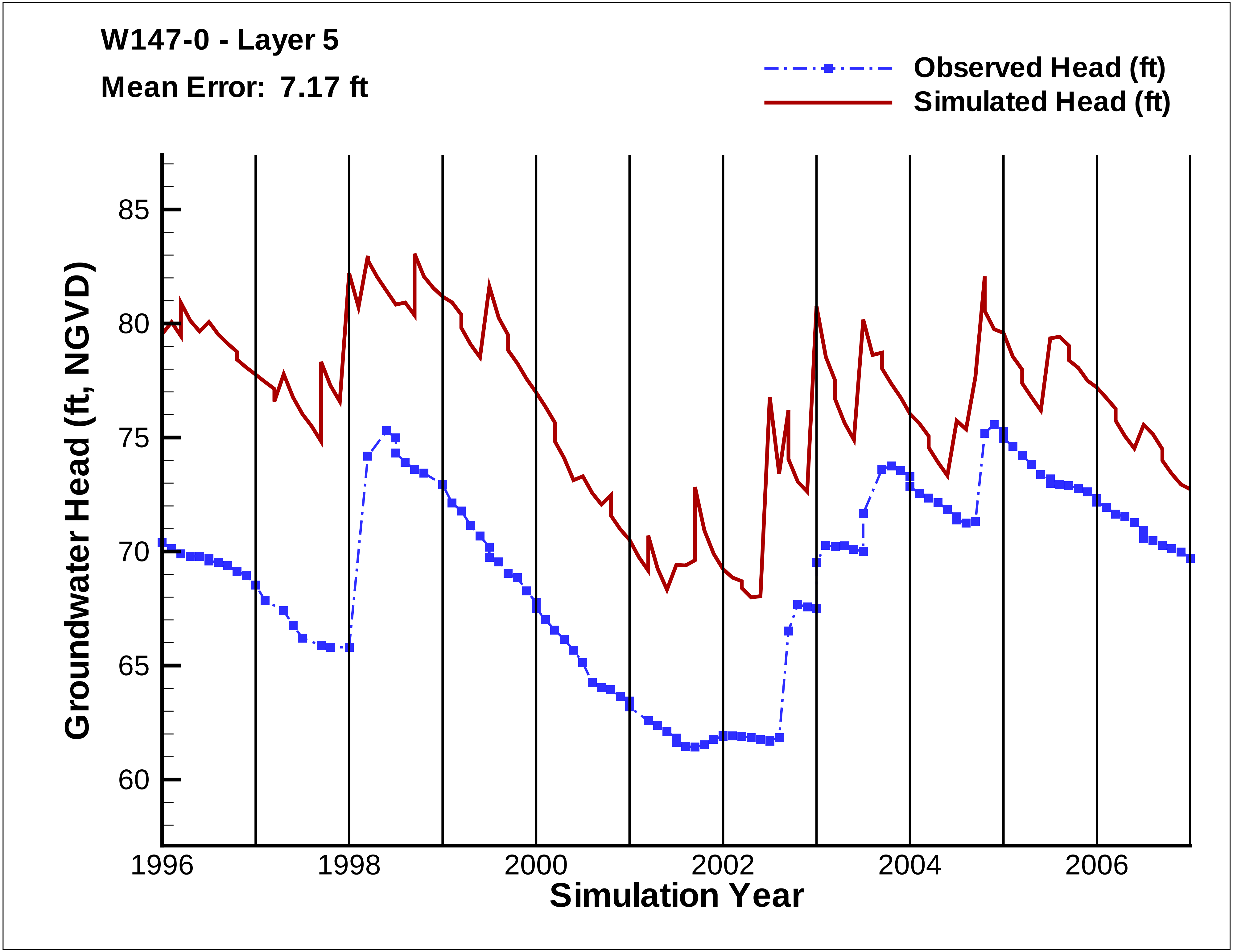


W137-0 - Layer 3
Mean Error: 0.55 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

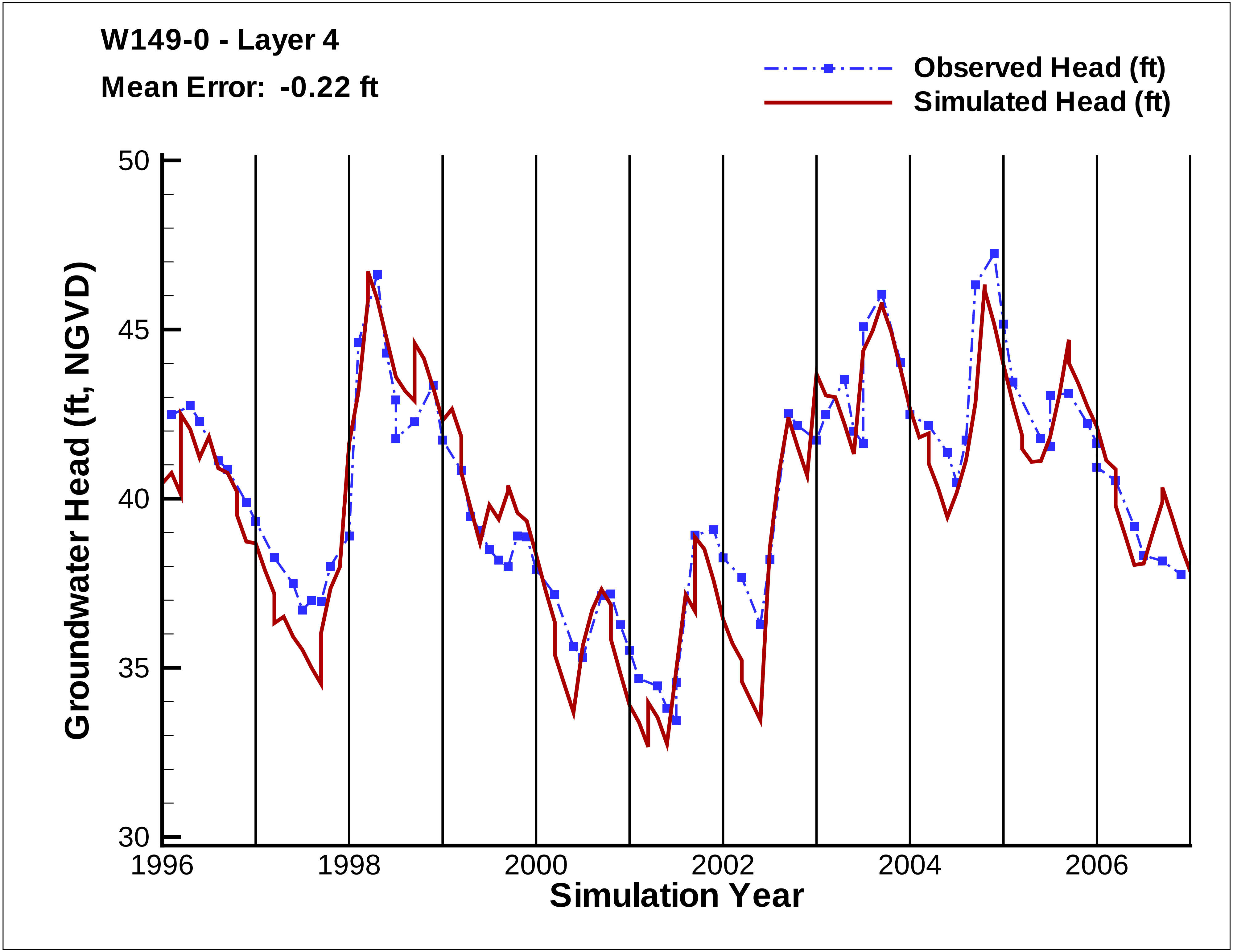

W140-0 - Layer 1
Mean Error: -0.42 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
48
46
44
42
40
1996
1998
2000
2002
2004
2006
Simulation Year


W143-0 - Layer 4
Mean Error: 1.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

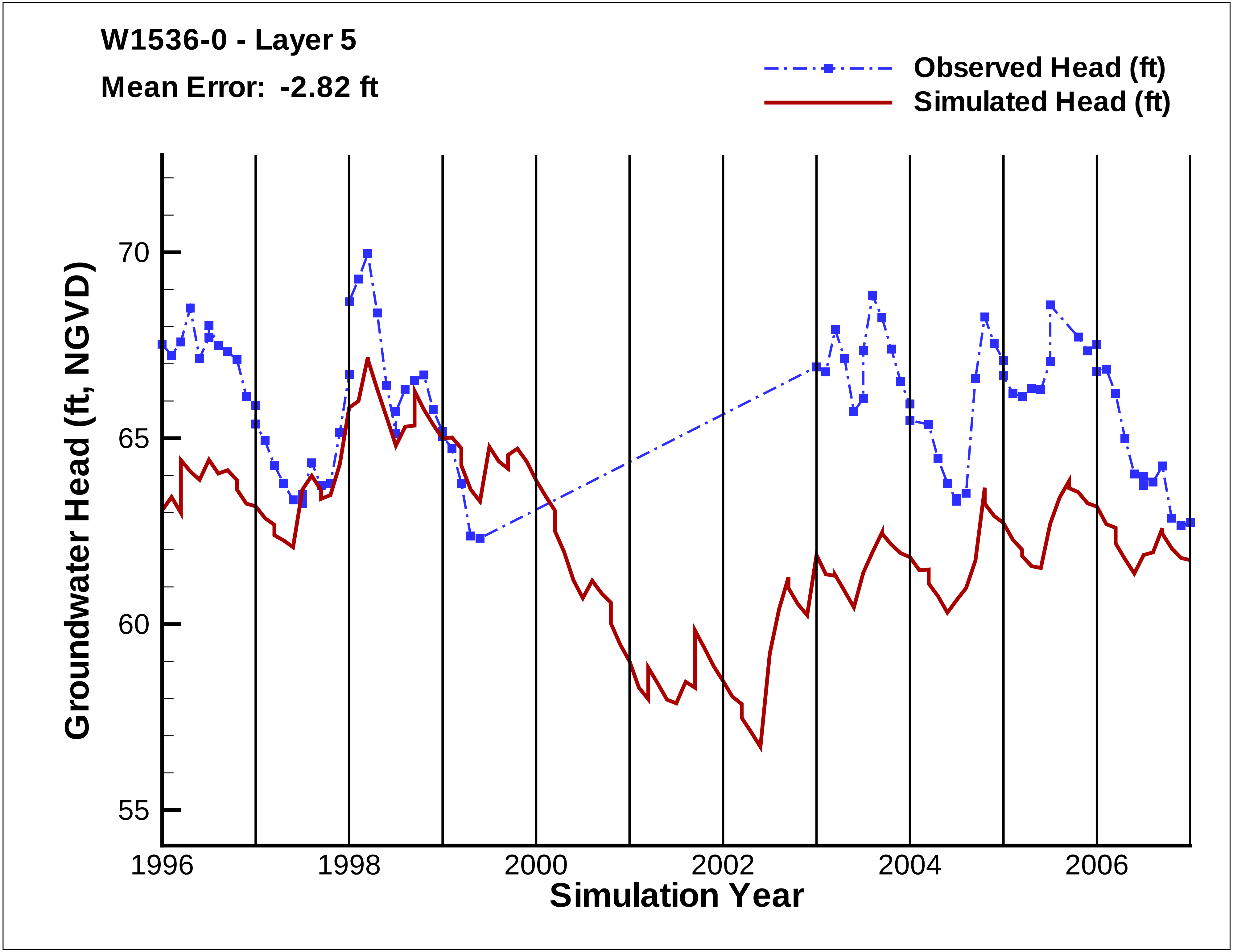

W1439-0 - Layer 1
Mean Error: 8.78 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

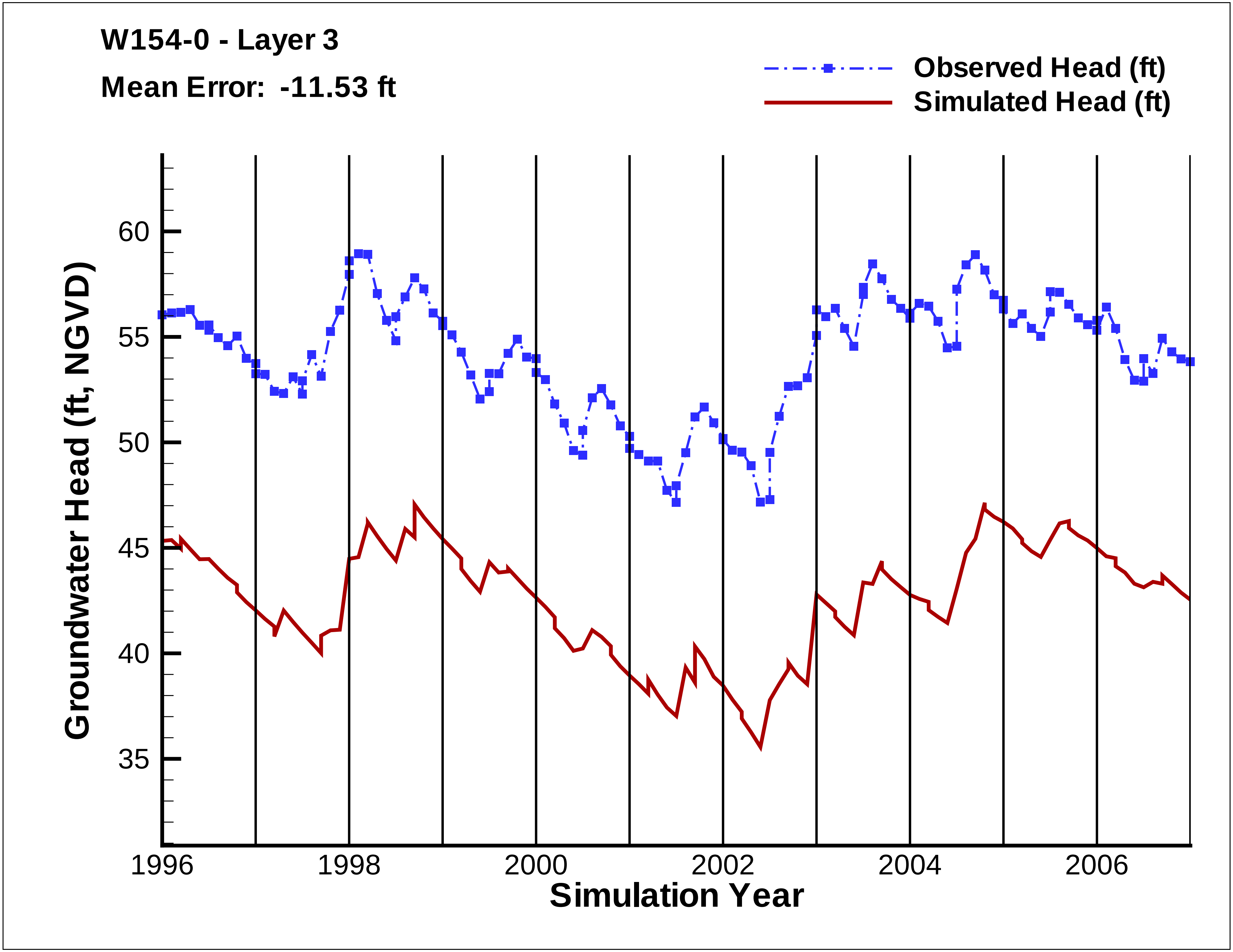


W147-0 - Layer 5
Mean Error: 7.17 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
65
70
75
80
85
1996
1998
2000
2002
2004
2006
Simulation Year

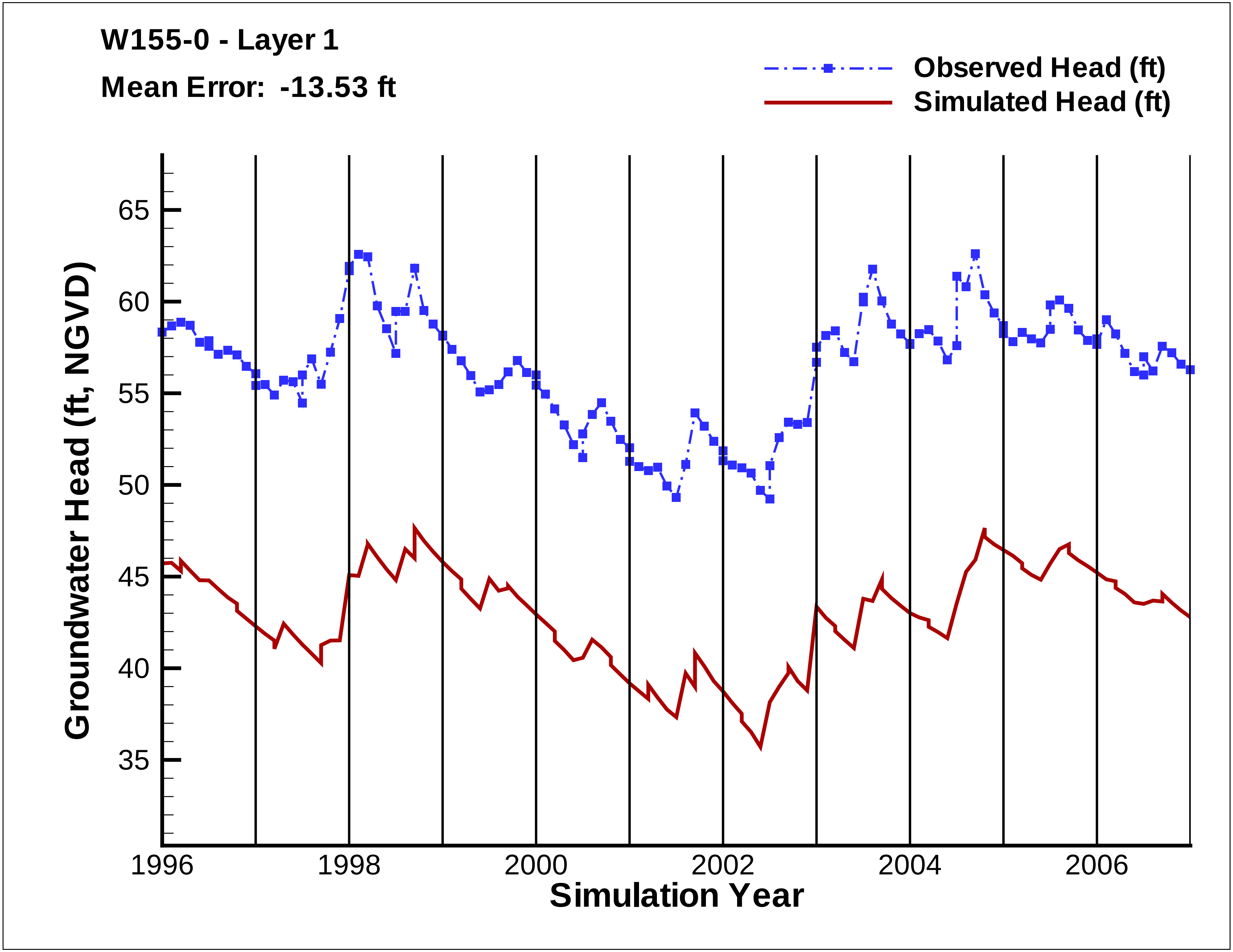


W149-0 - Layer 4
Mean Error: -0.22 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

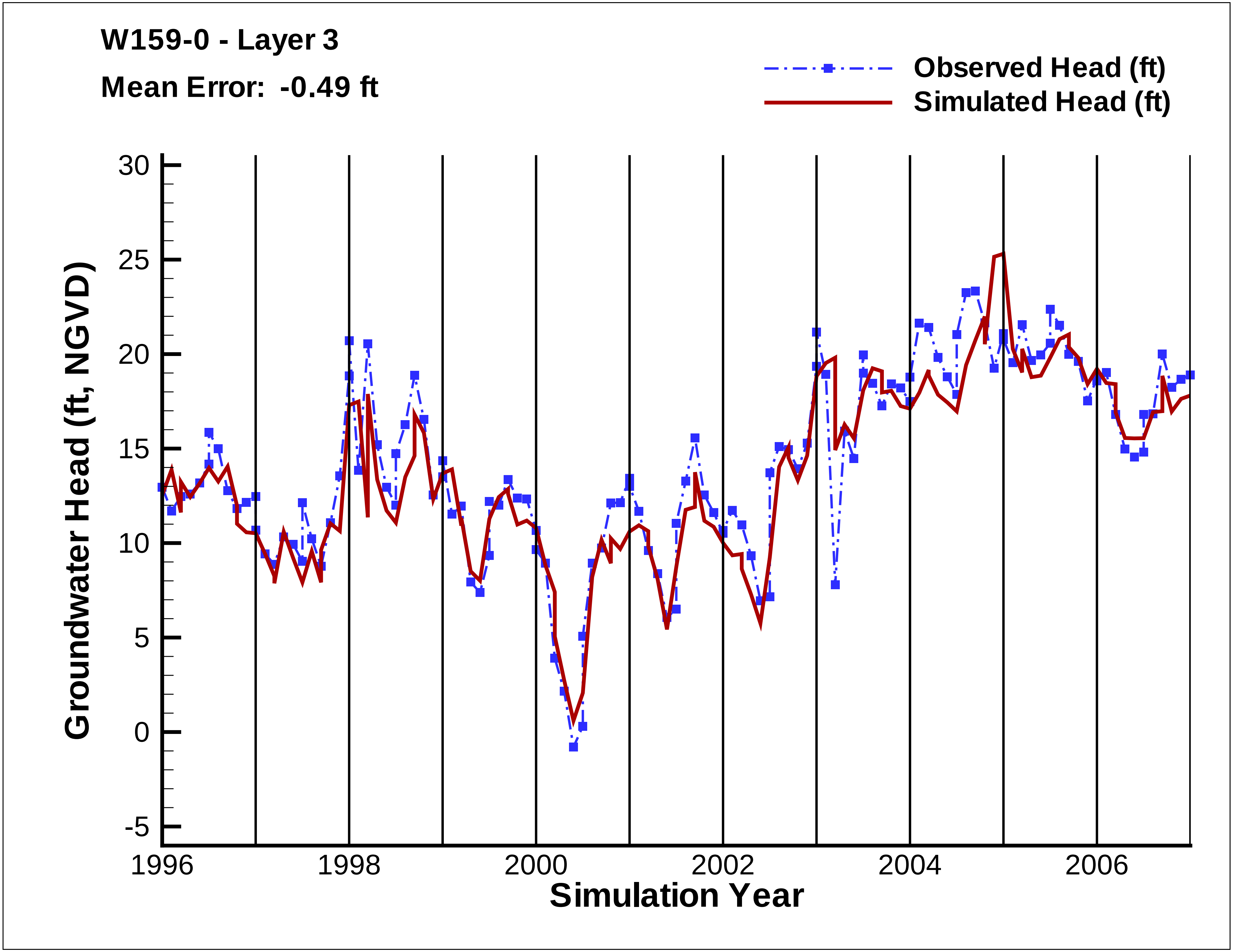

W1536-0 - Layer 5
Mean Error: -2.82 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

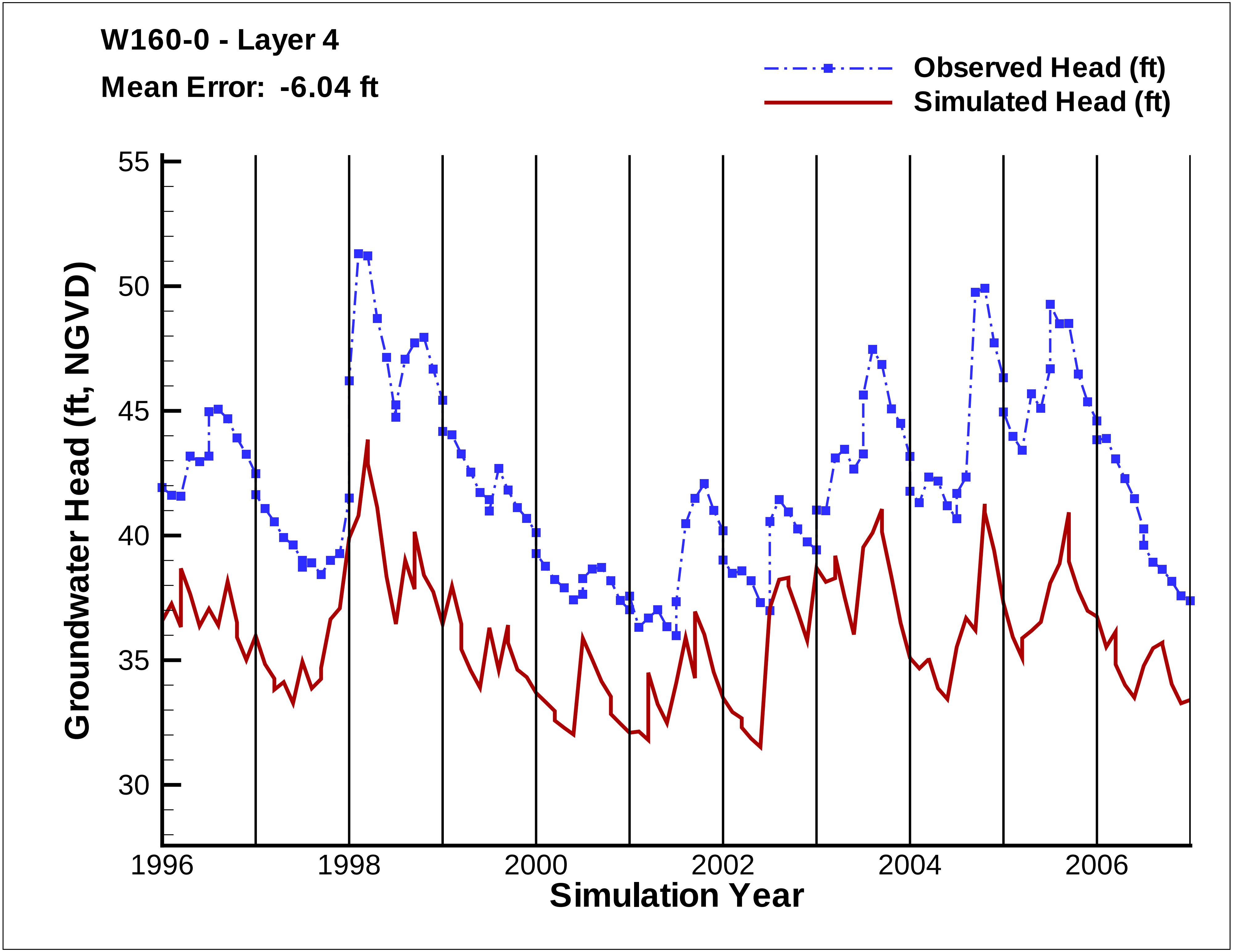


W154-0 - Layer 3
Mean Error: -11.53 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

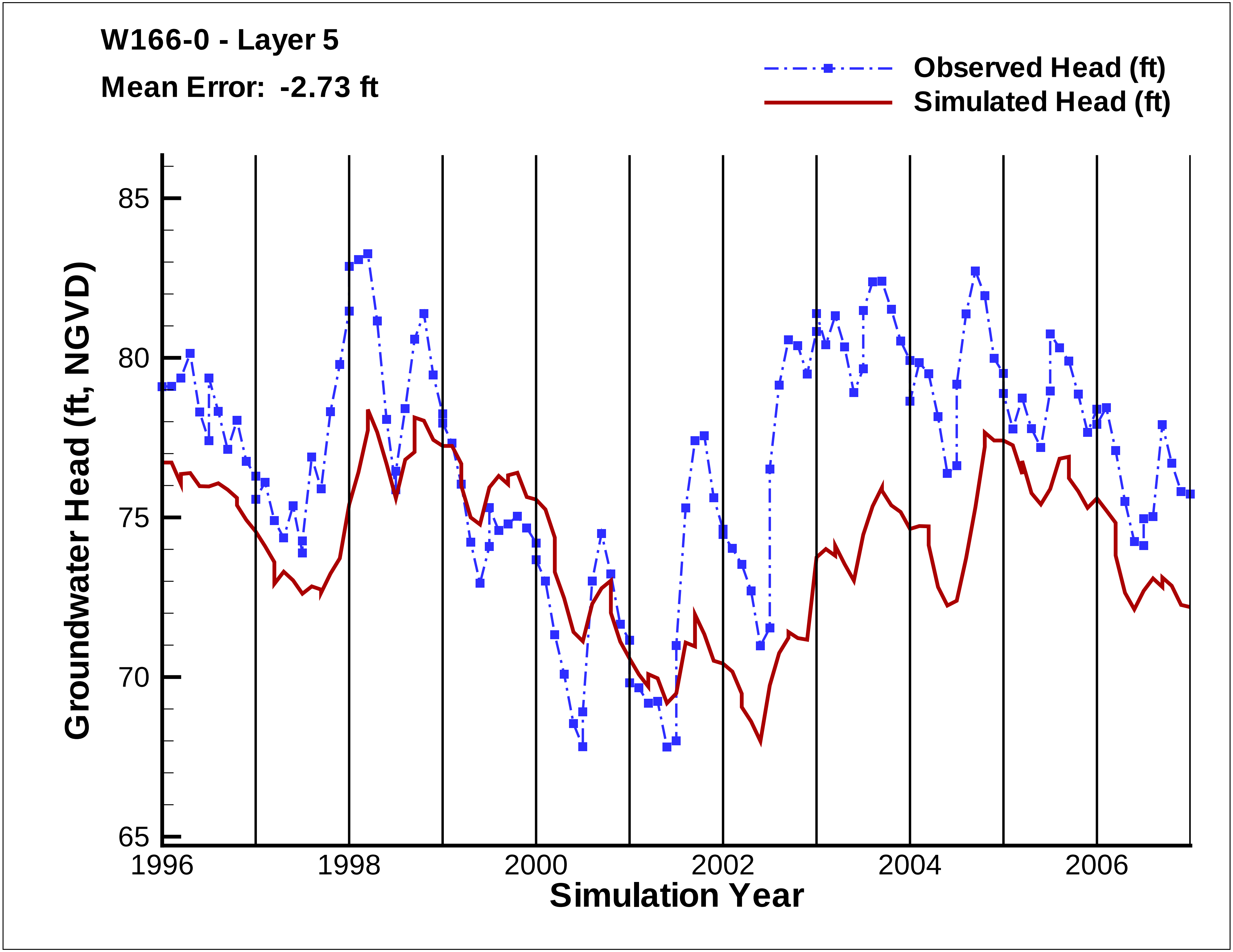


W155-0 - Layer 1
Mean Error: -13.53 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

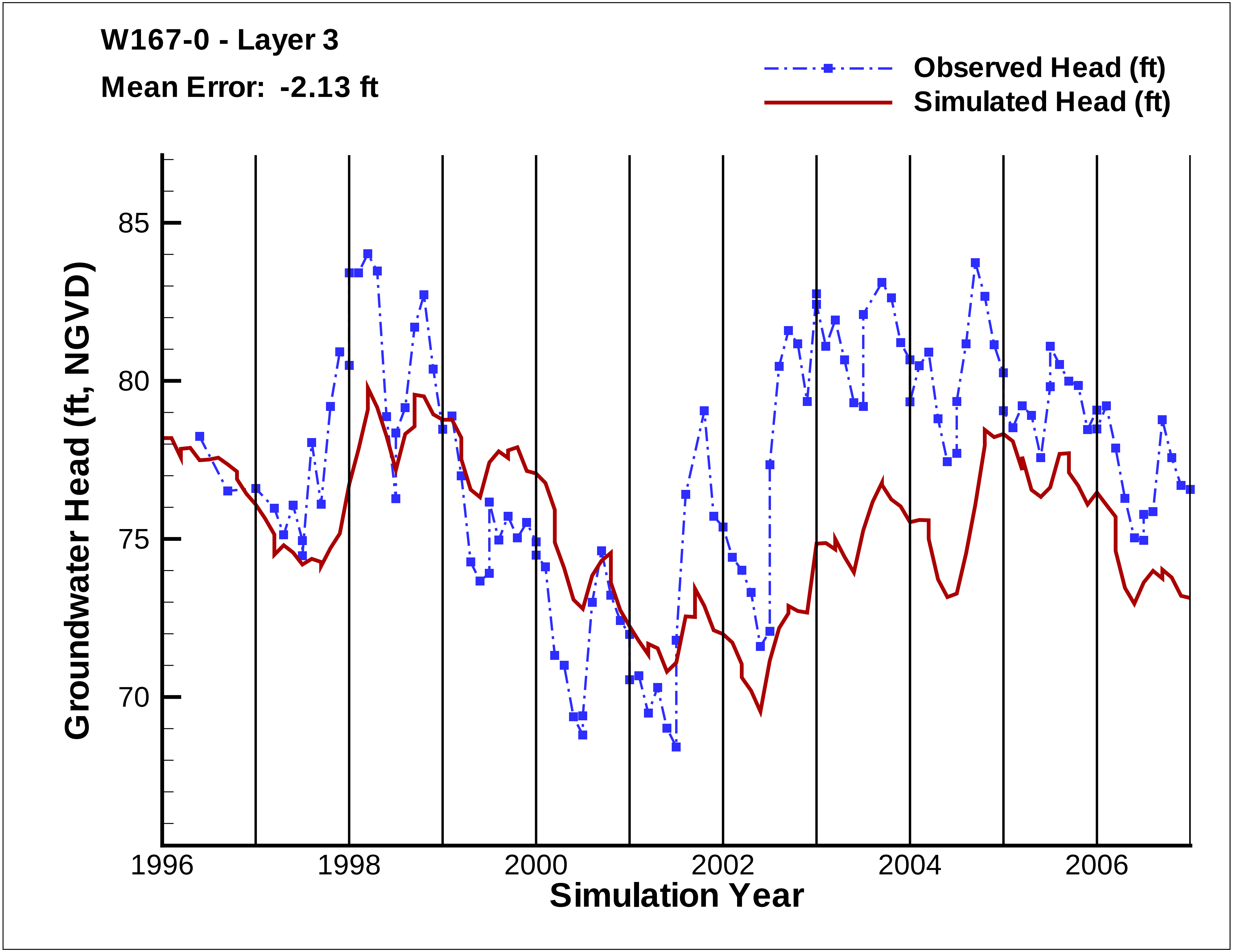

W159-0 - Layer 3
Mean Error: -0.49 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
5
0
-5
1996
1998
2000
2002
2004
2006
Simulation Year



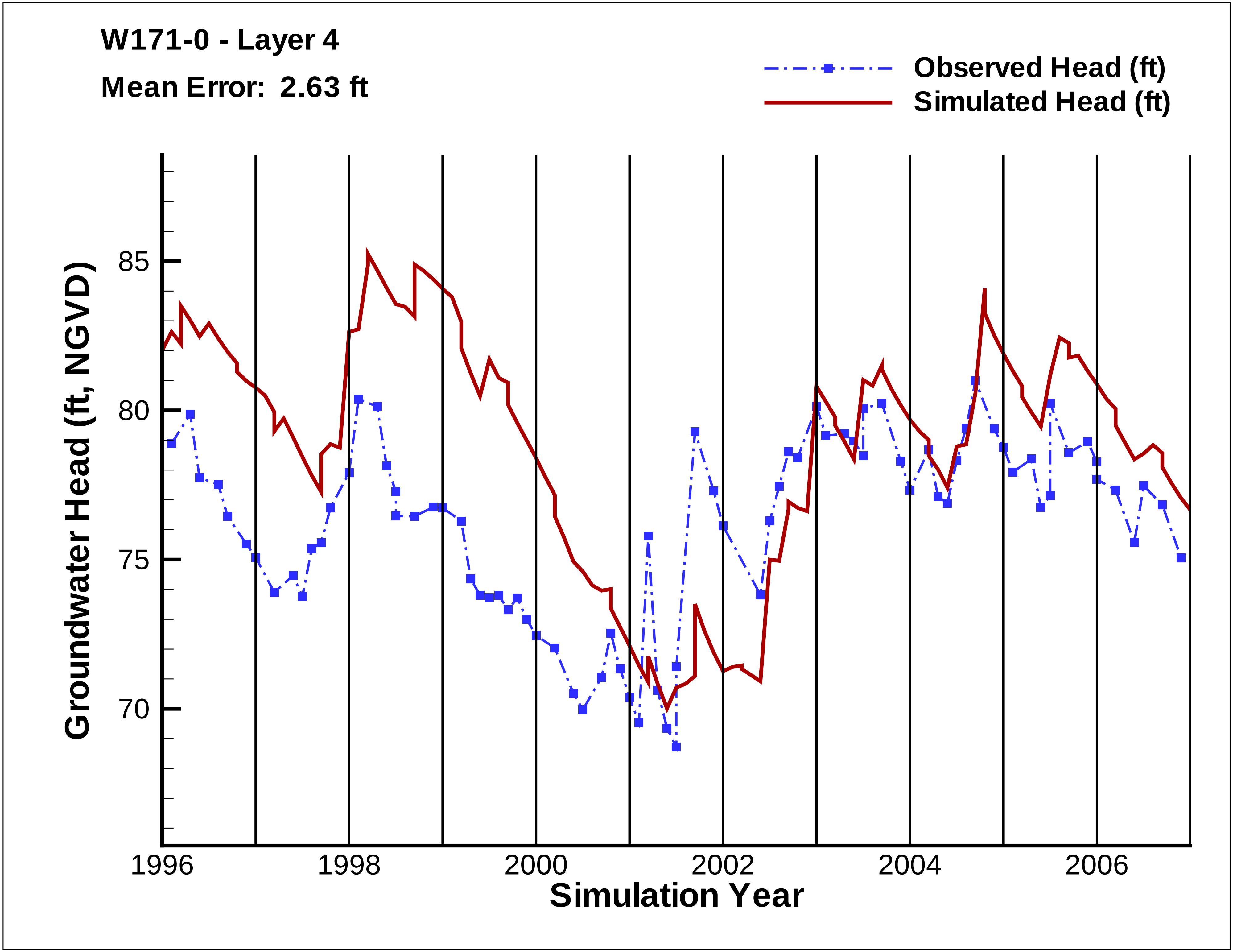
W160-0 - Layer 4
Mean Error: -6.04 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

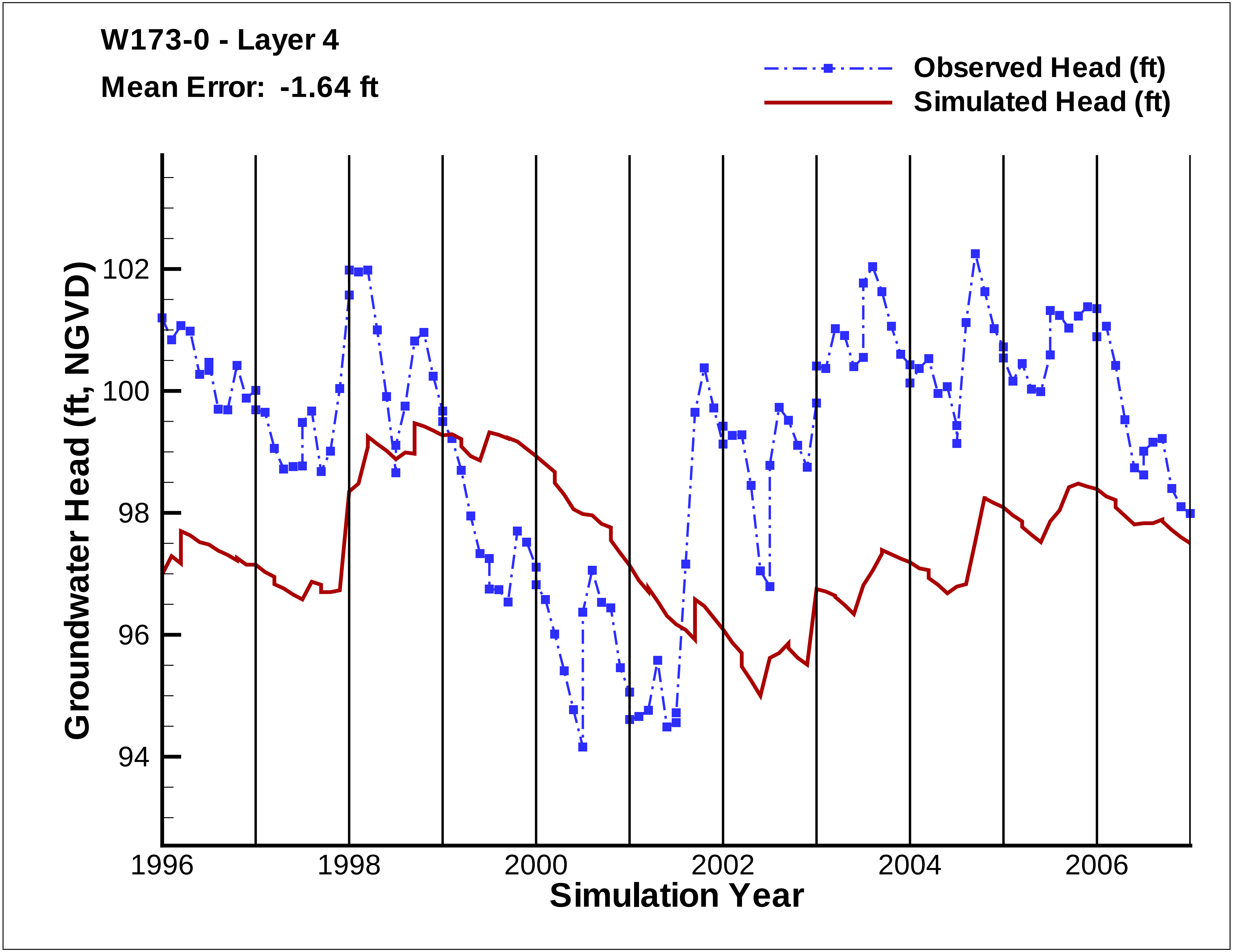


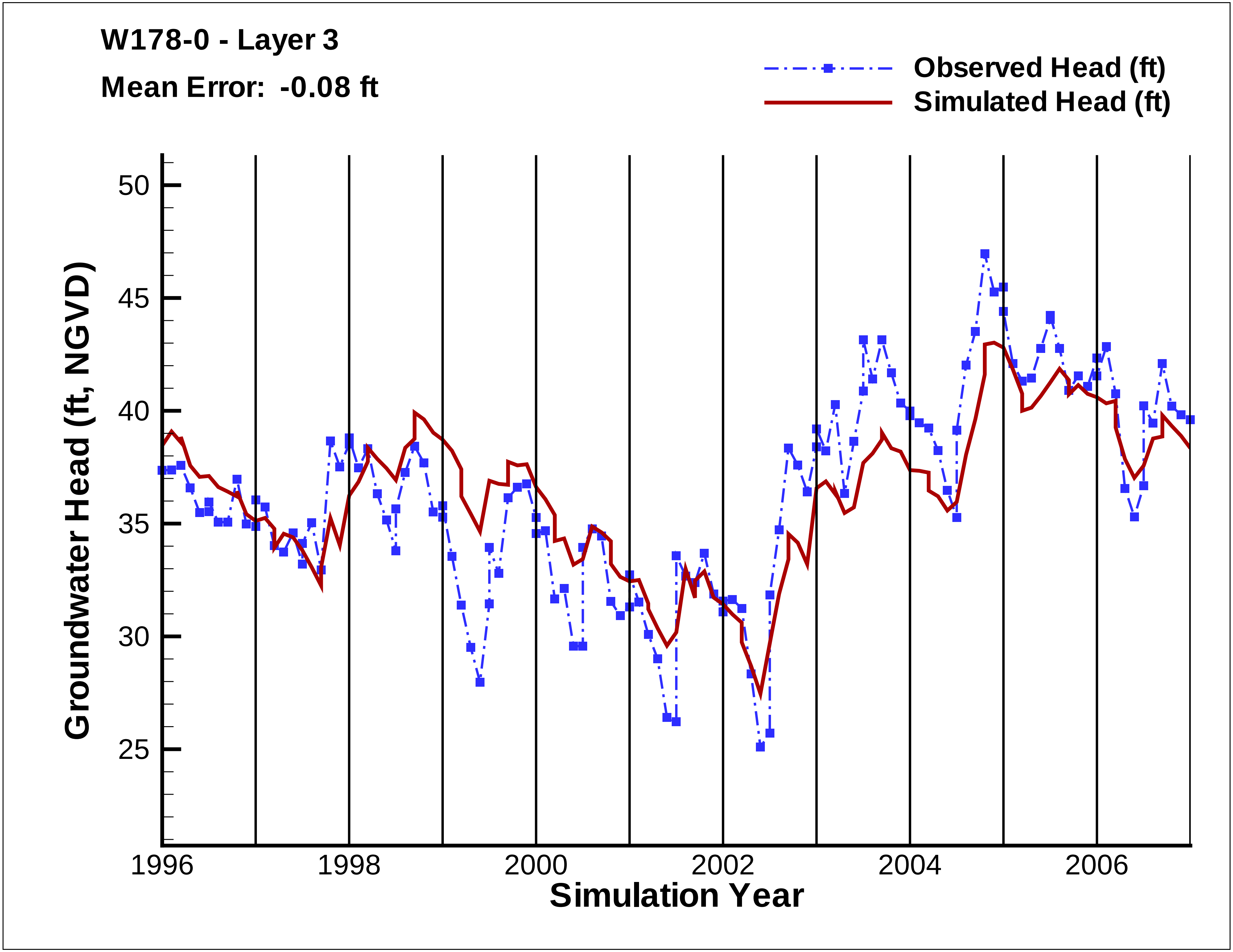
W166-0 - Layer 5
Mean Error: -2.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
65
1996
1998
2000
2002
2004
2006
Simulation Year



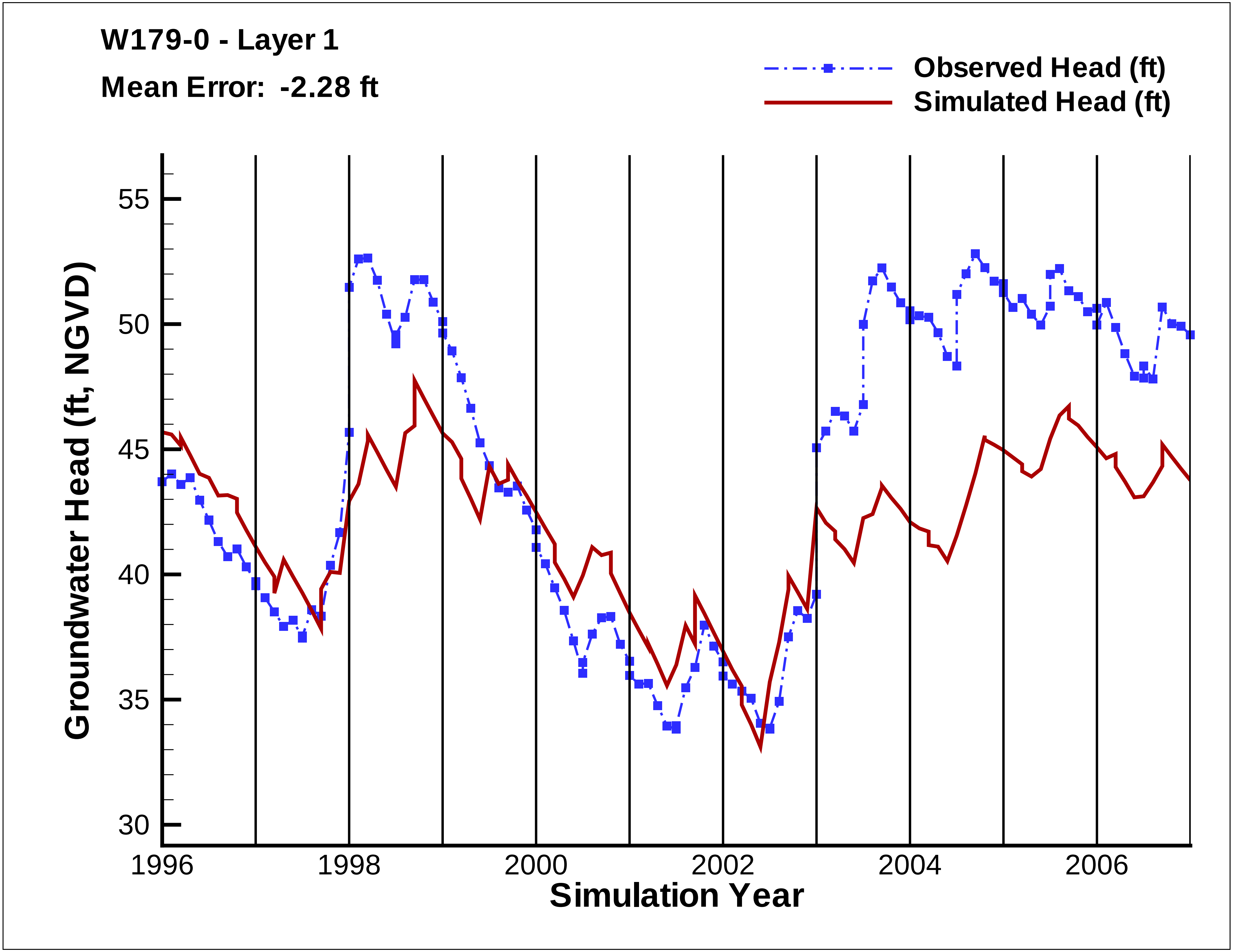
W167-0 - Layer 3
Mean Error: -2.13 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year


W171-0 - Layer 4
Mean Error: 2.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

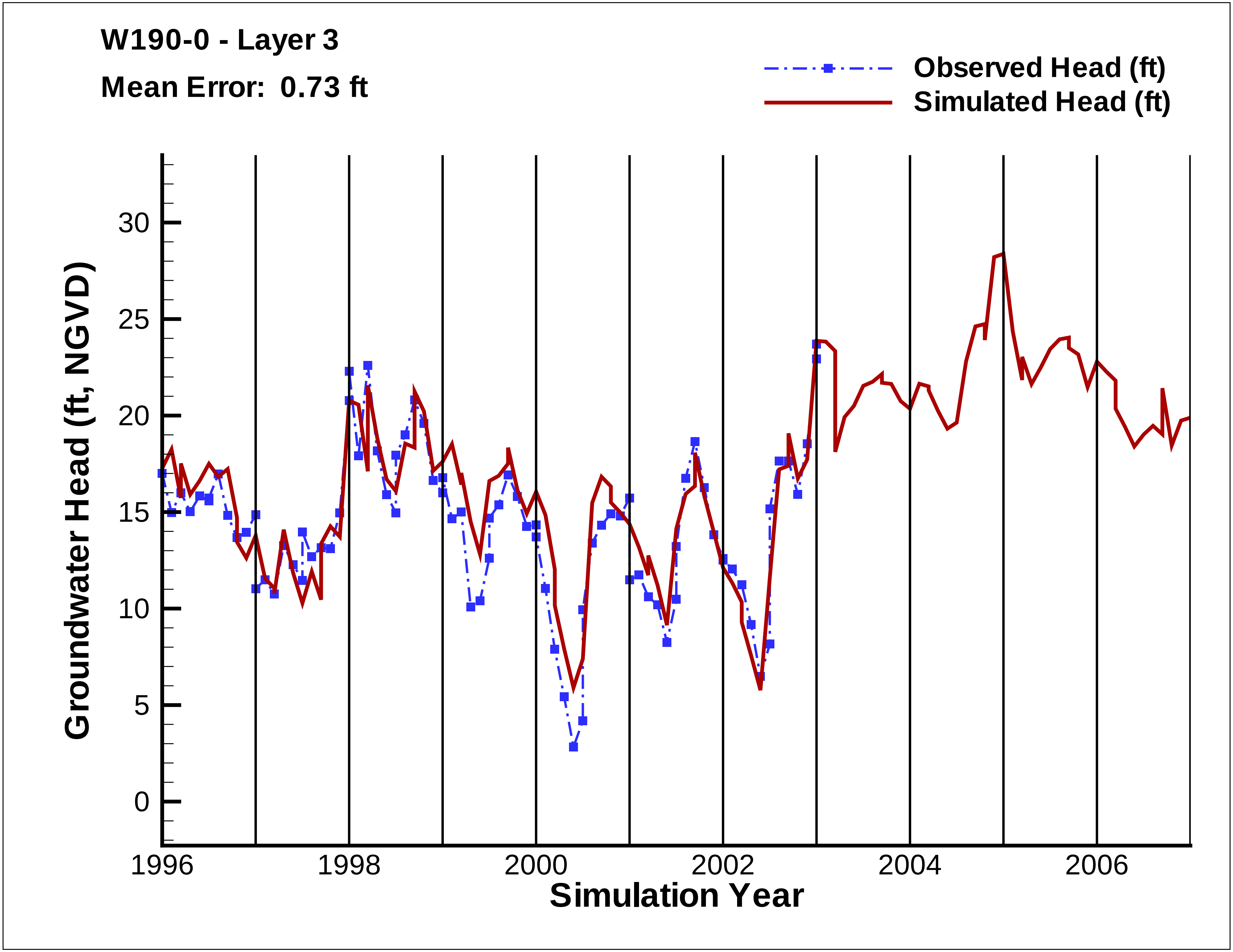

W173-0 - Layer 4
Mean Error: -1.64 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
102
100
98
96
94
1996
1998
2000
2002
2004
2006
Simulation Year

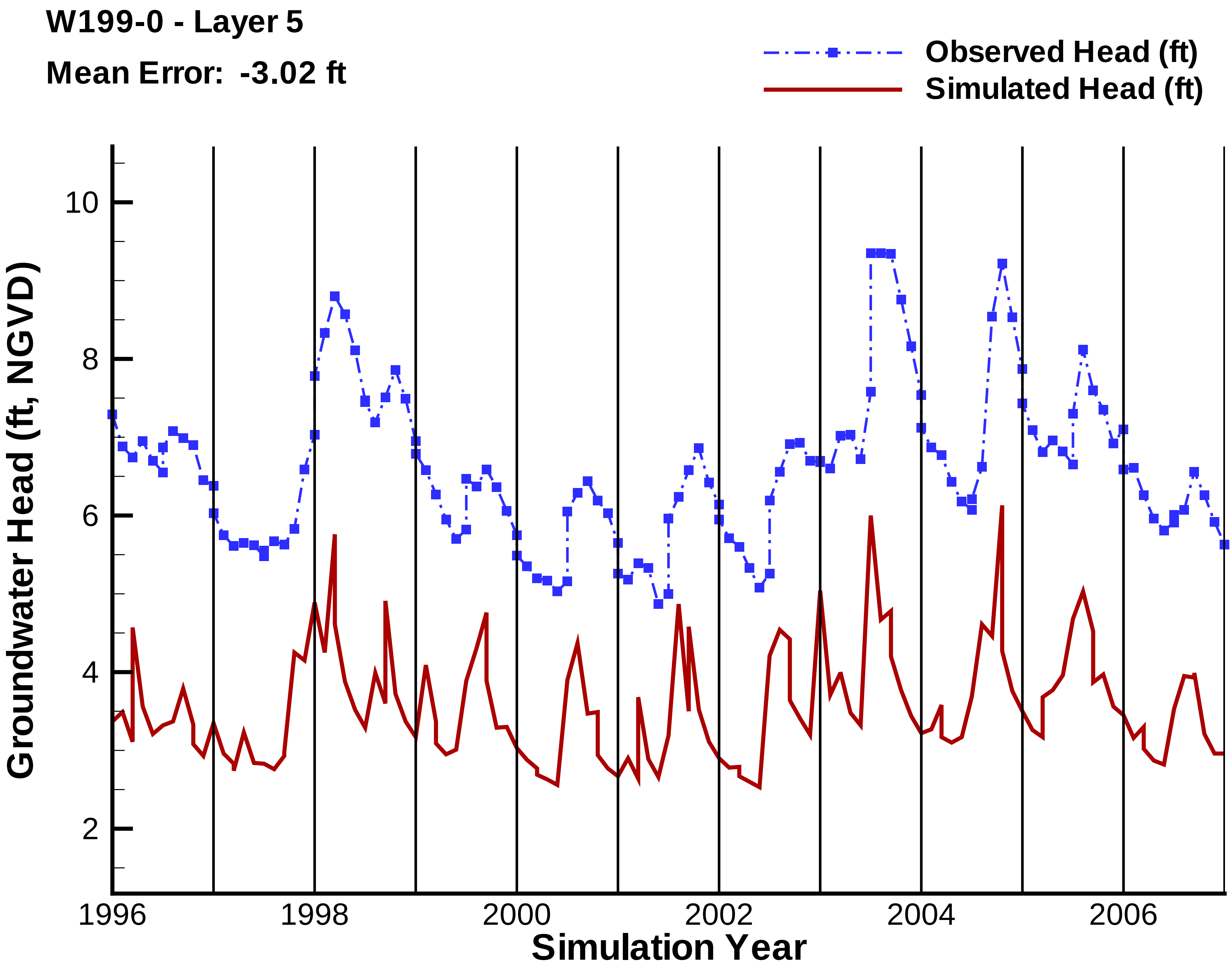


W178-0 - Layer 3
Mean Error: -0.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

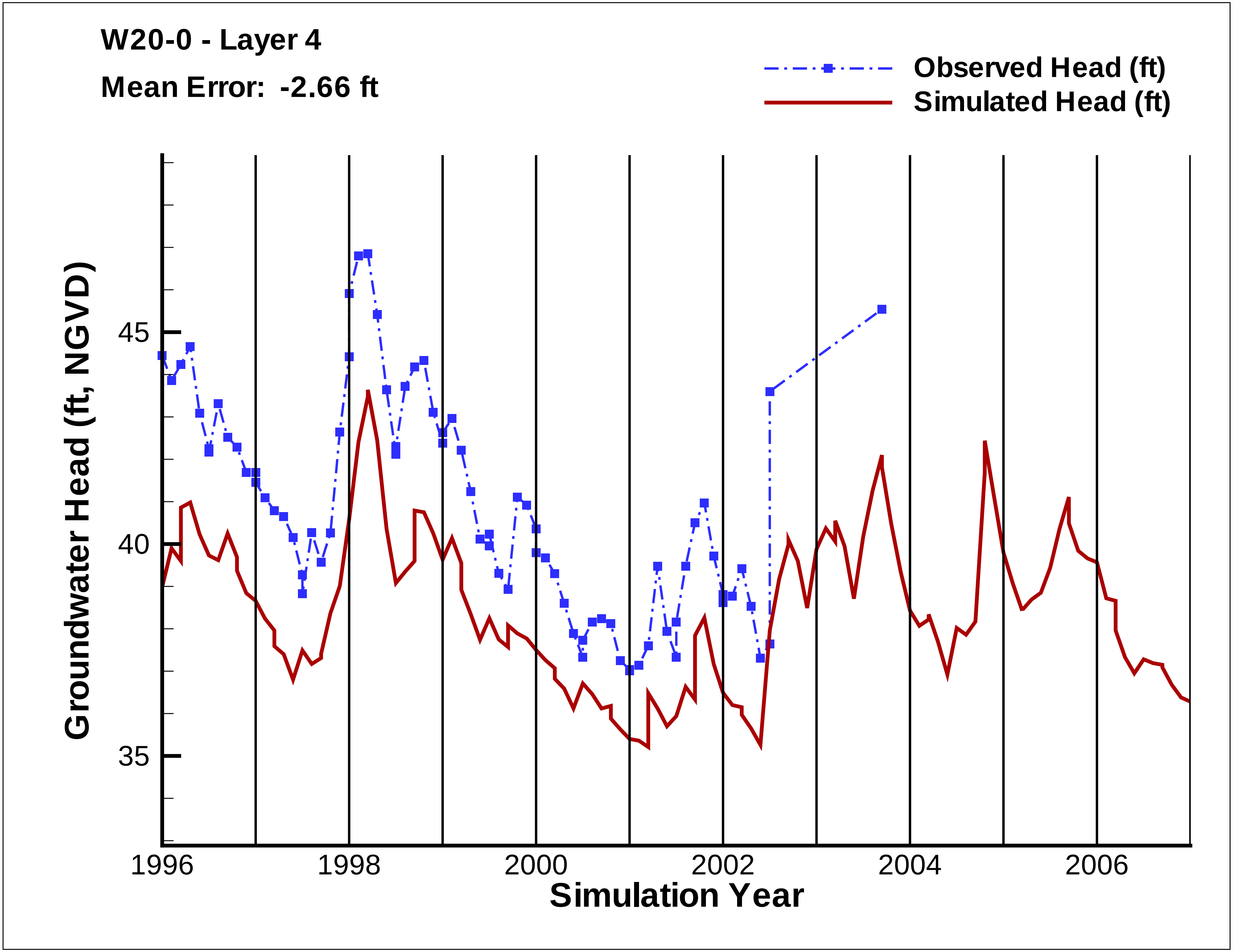


W179-0 - Layer 1
Mean Error: -2.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

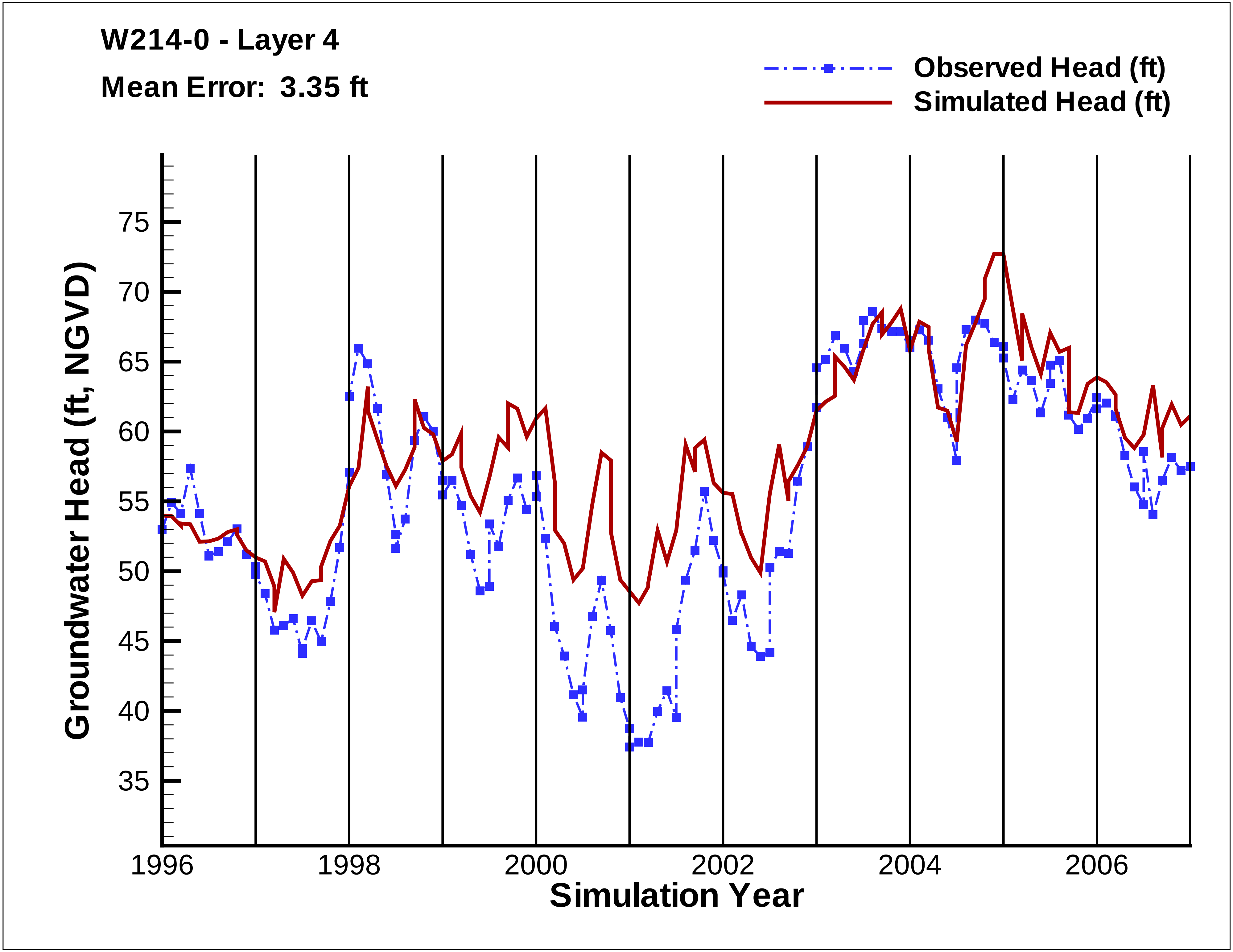

W190-0 - Layer 3
Mean Error: 0.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
25
30
1996
1998
2000
2002
2004
2006
Simulation Year

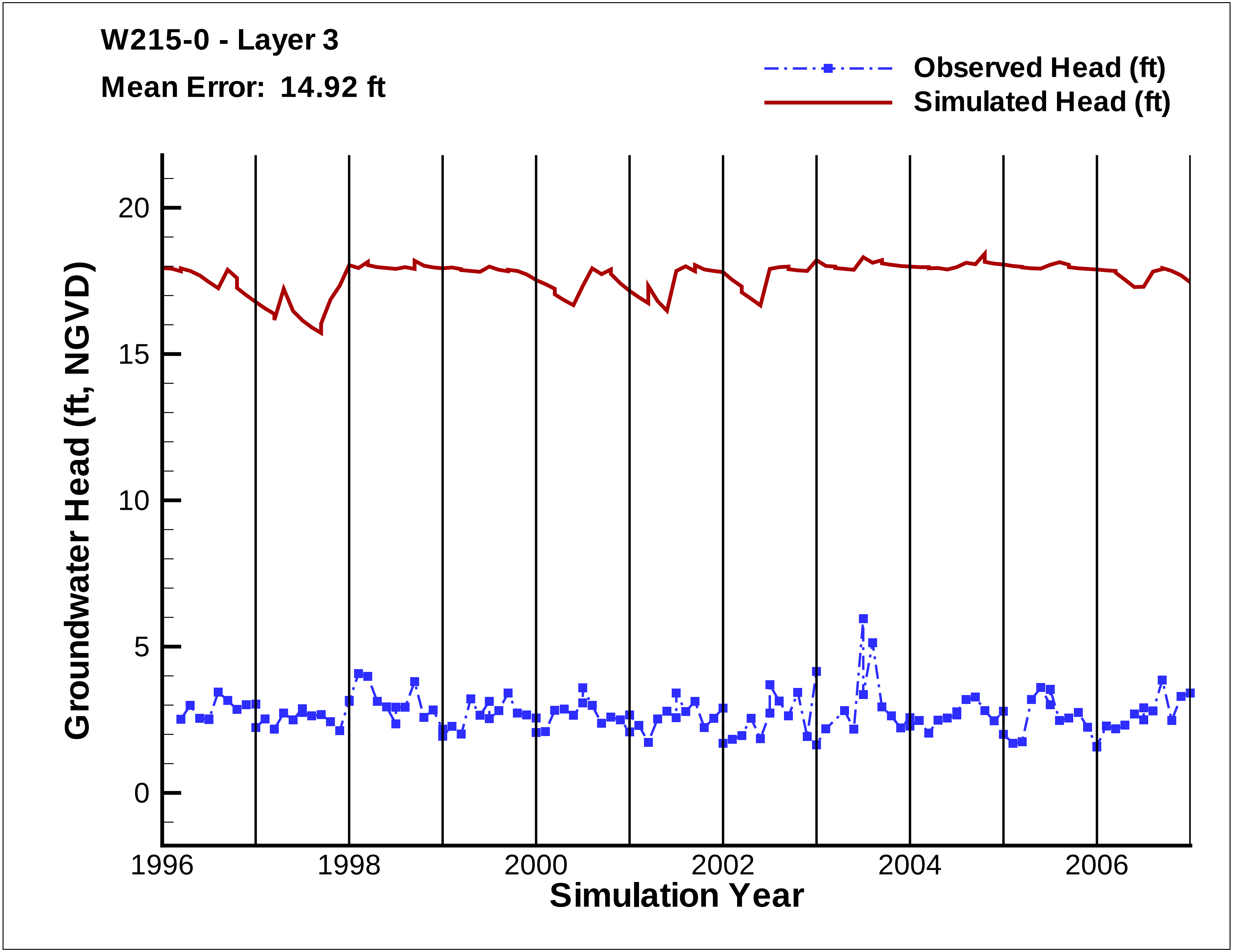


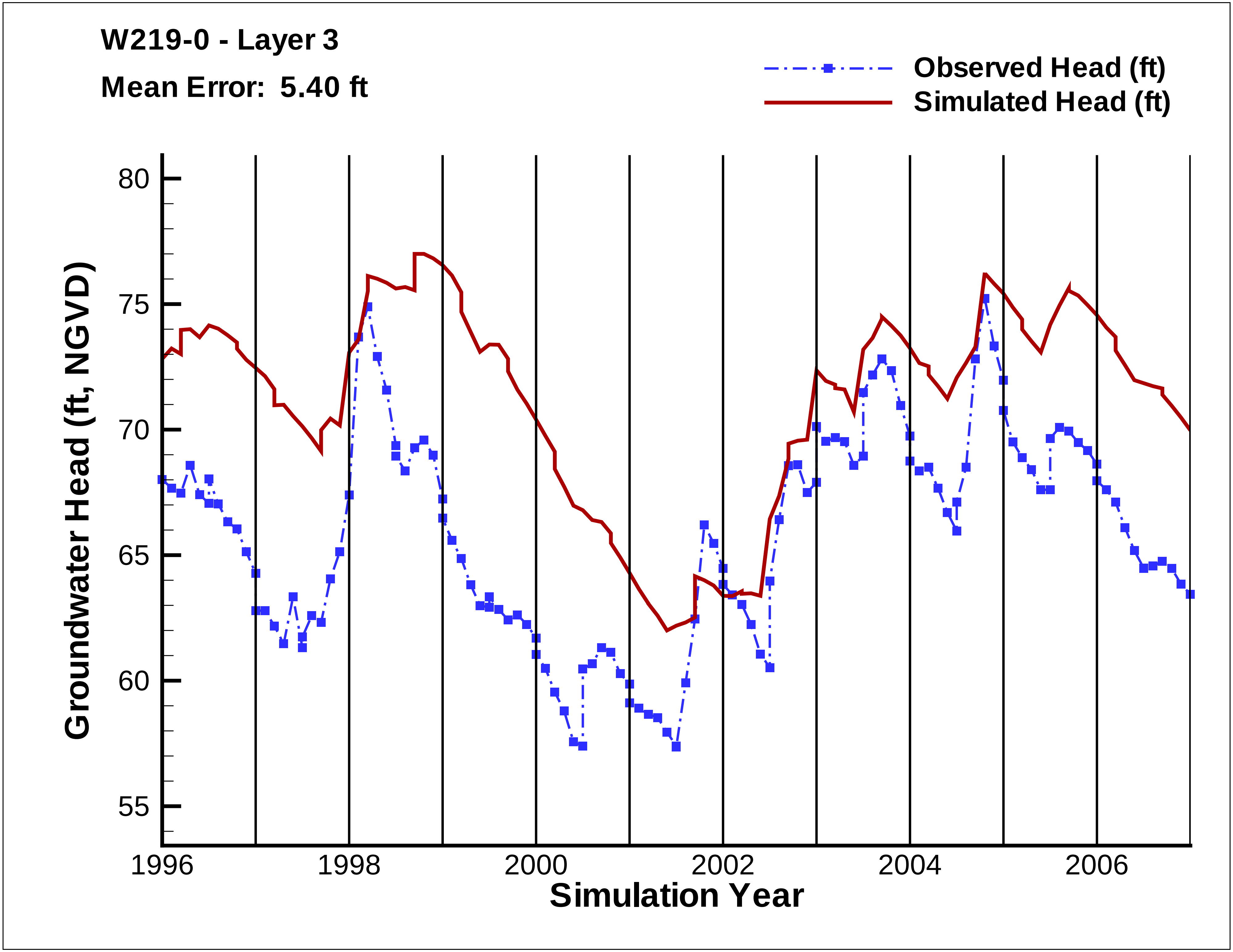
W199-0 - Layer 5
Mean Error: -3.02 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year



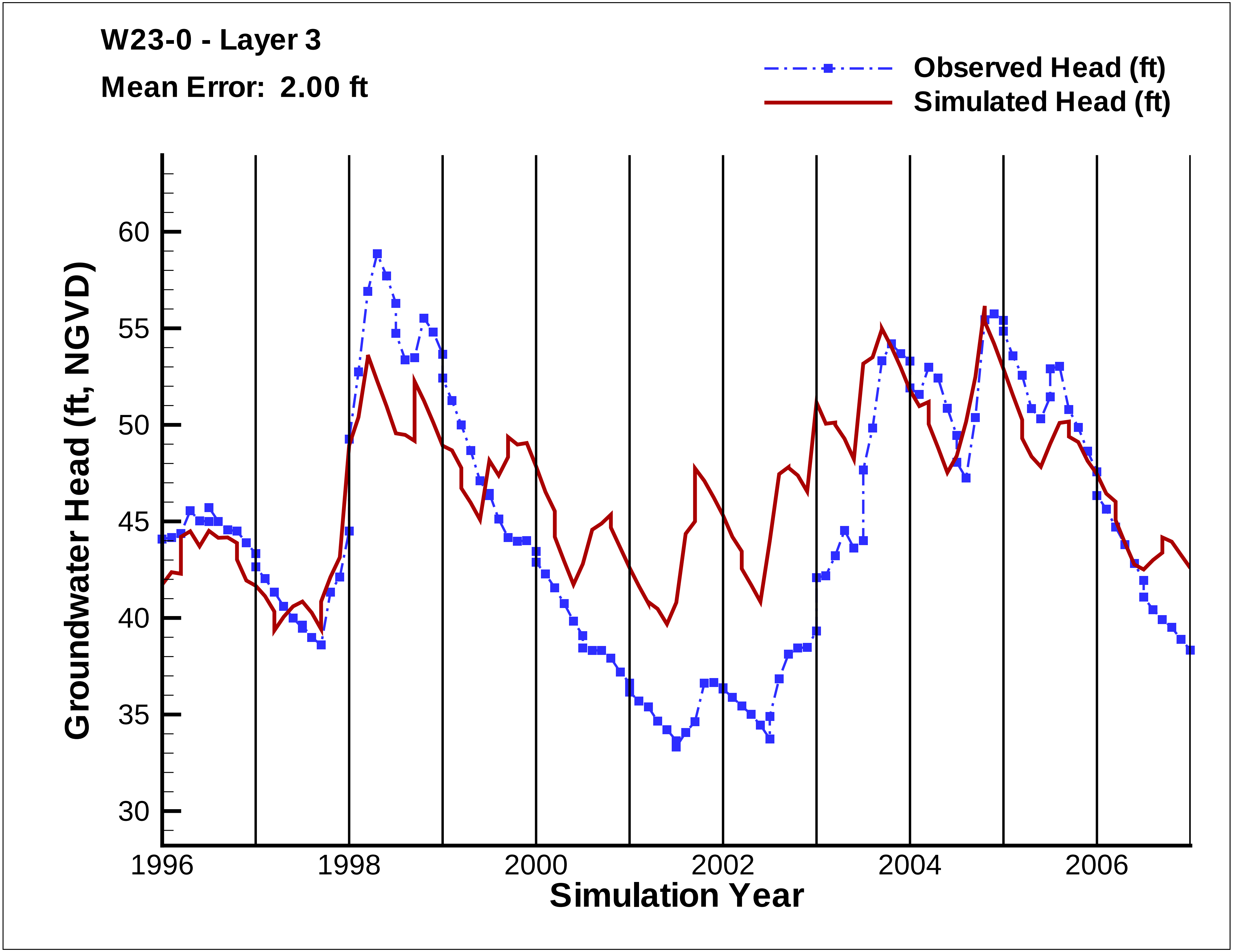
W20-0 - Layer 4
Mean Error: -2.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year


W214-0 - Layer 4
Mean Error: 3.35 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
Simulation Year
75
70
65
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006

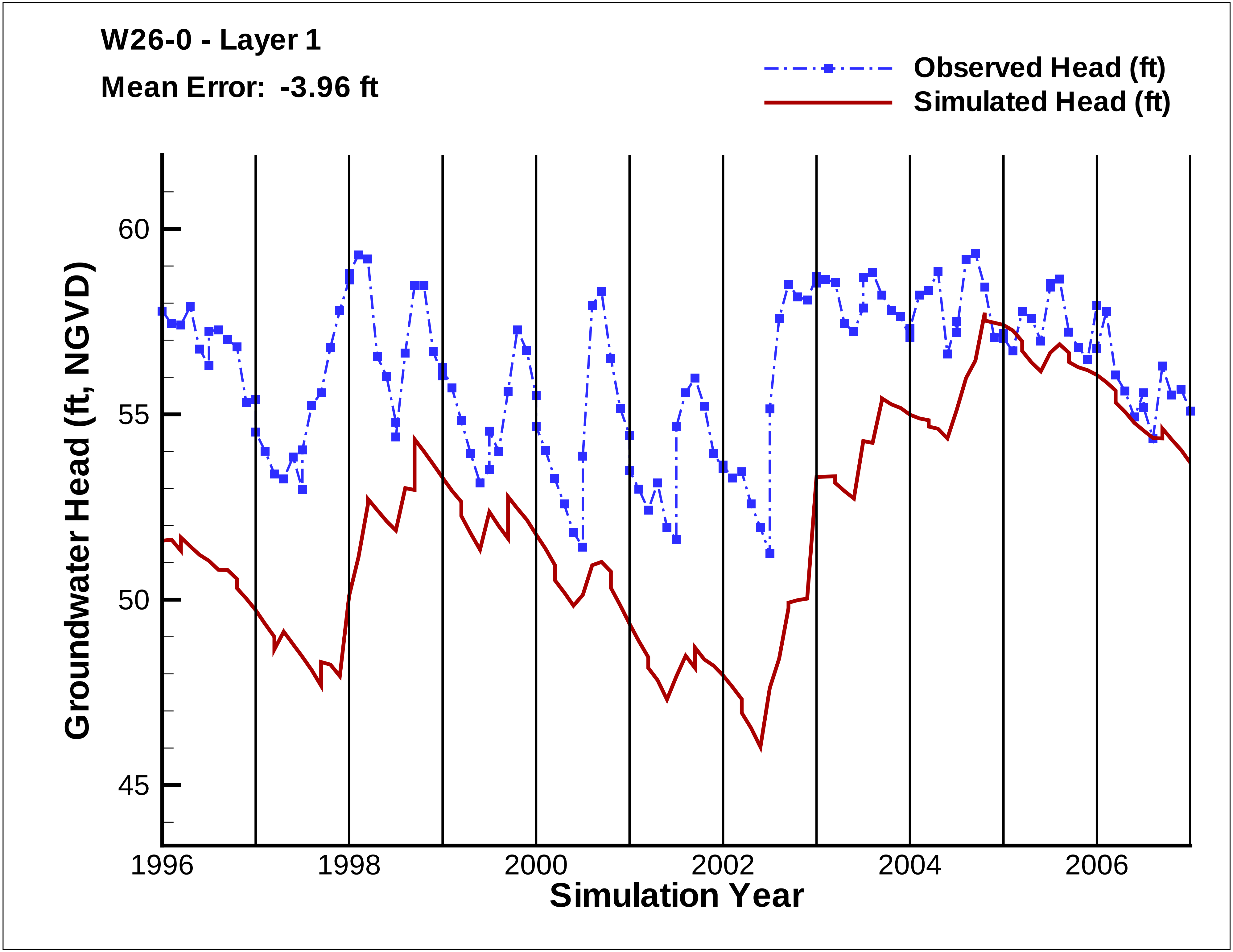

W215-0 - Layer 3
Mean Error: 14.92 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
1996
1998
2000
2002
2004
2006
Simulation Year



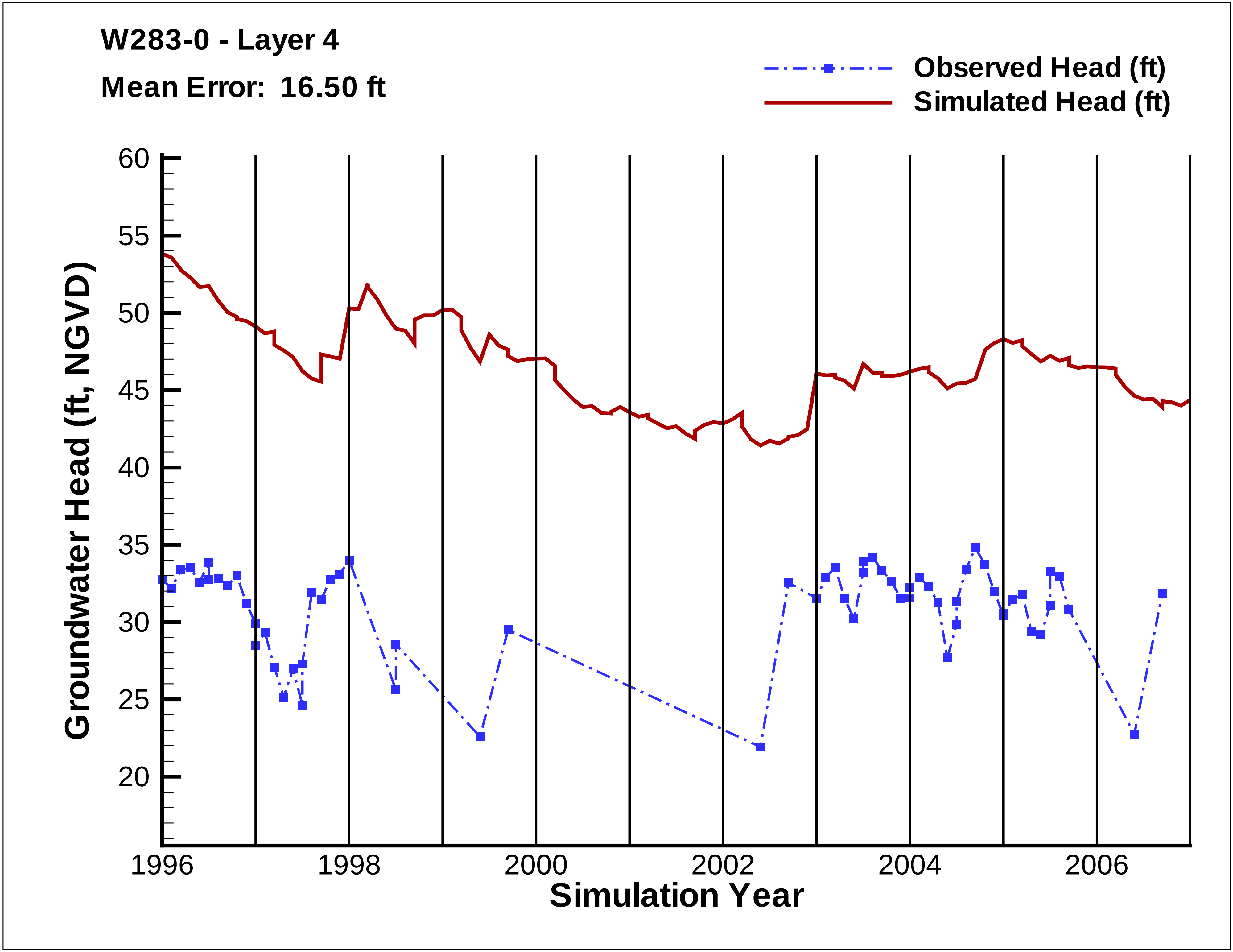
W219-0 - Layer 3
Mean Error: 5.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year



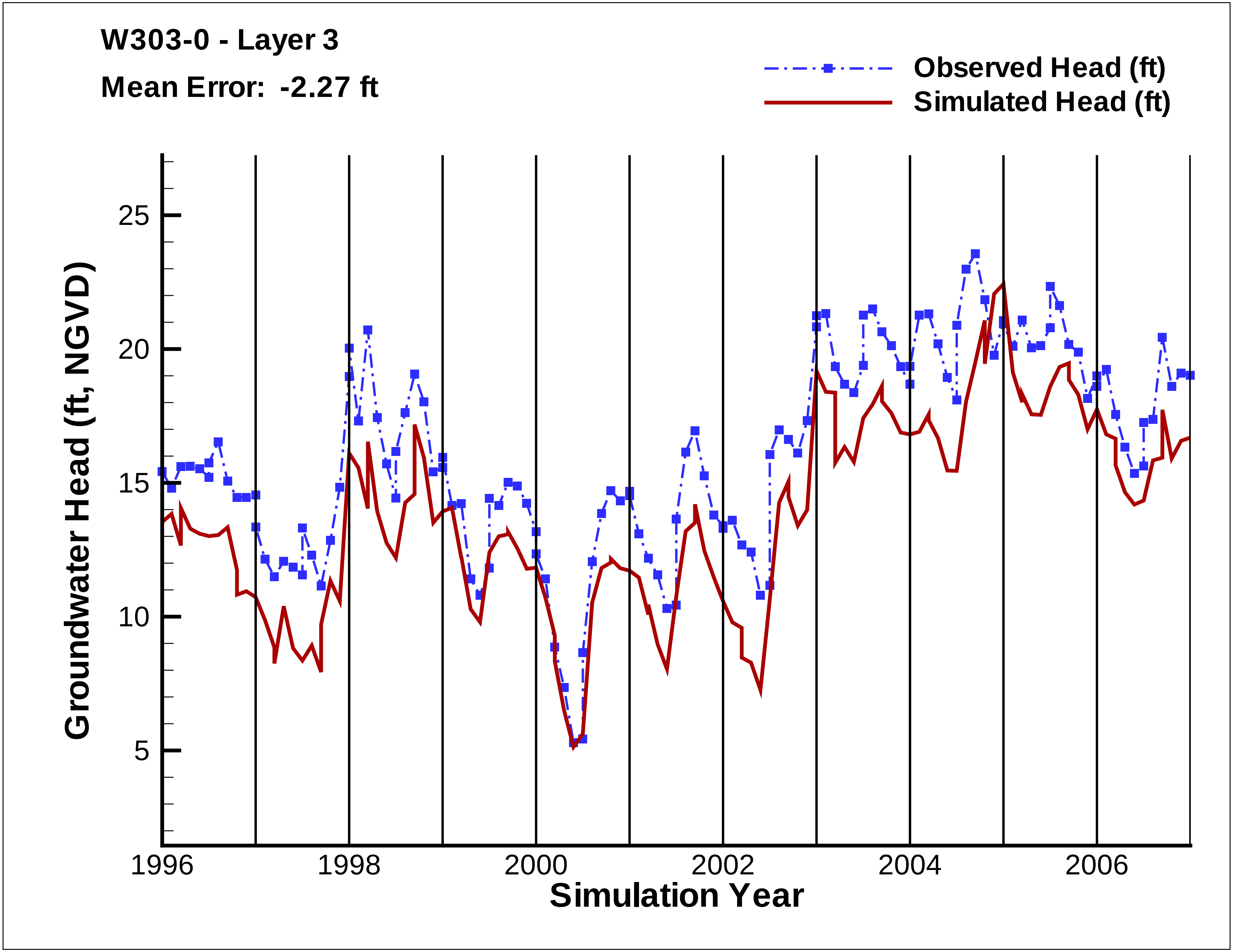
W23-0 - Layer 3
Mean Error: 2.00 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year



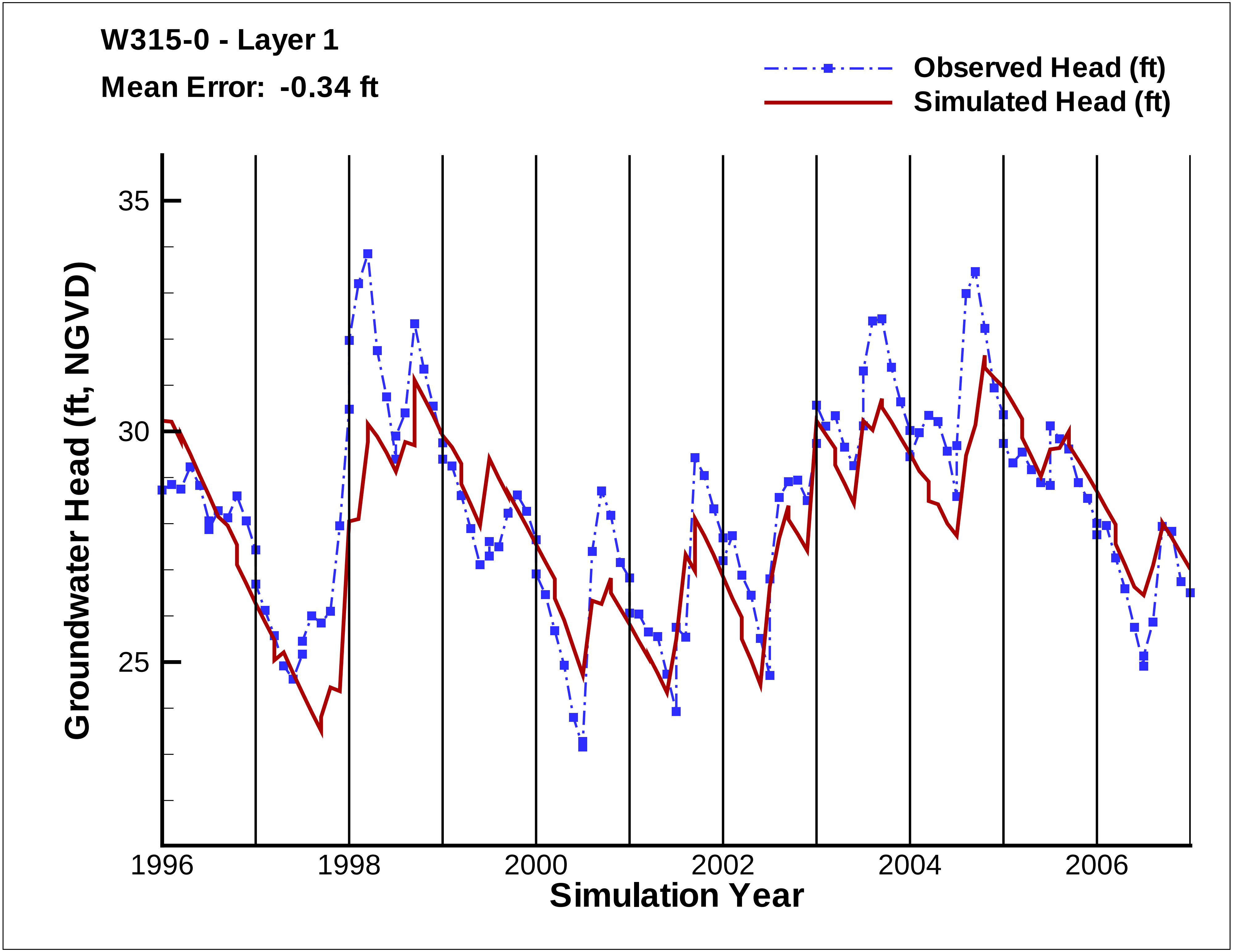
W26-0 - Layer 1
Mean Error: -3.96 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

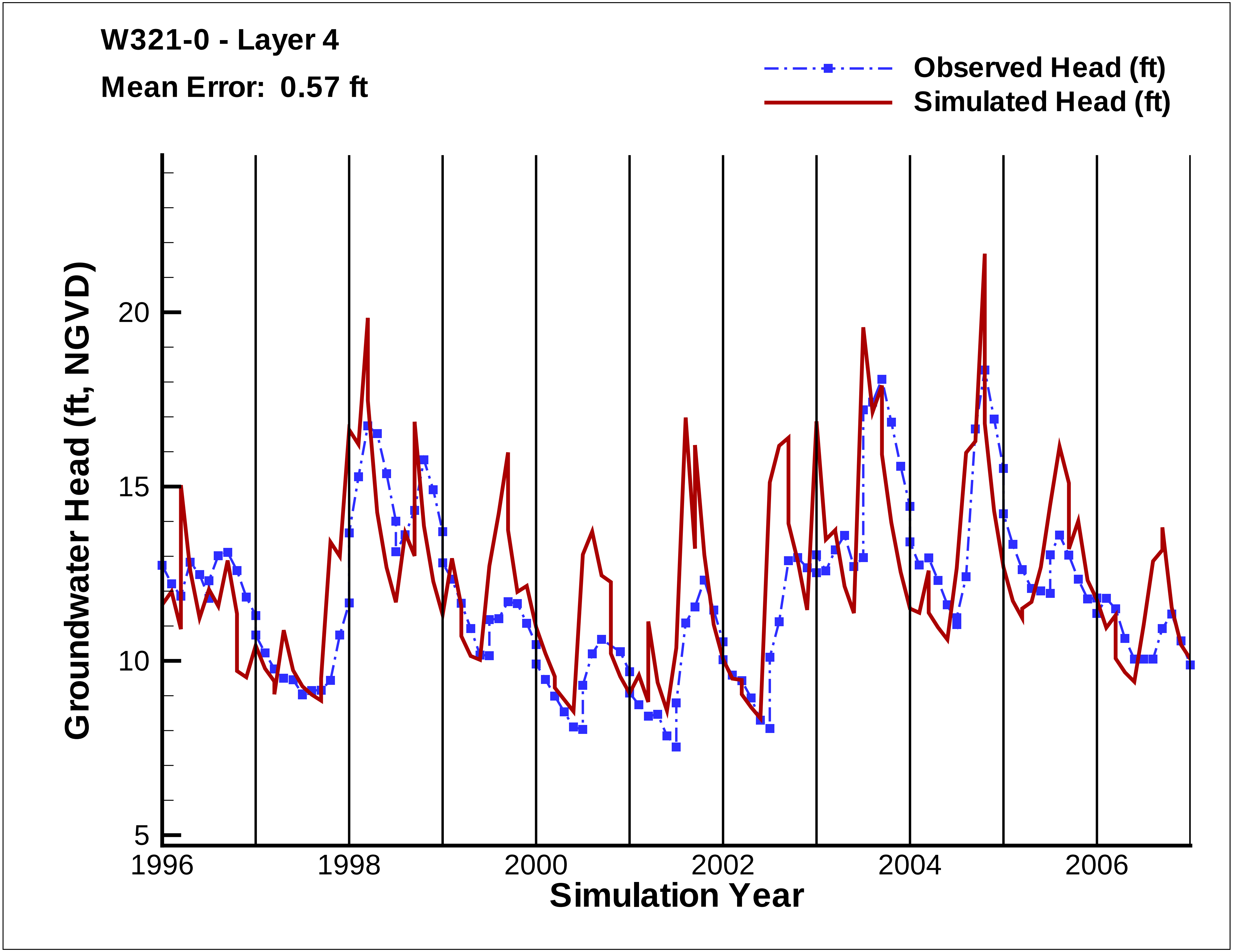


W283-0 - Layer 4
Mean Error: 16.50 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

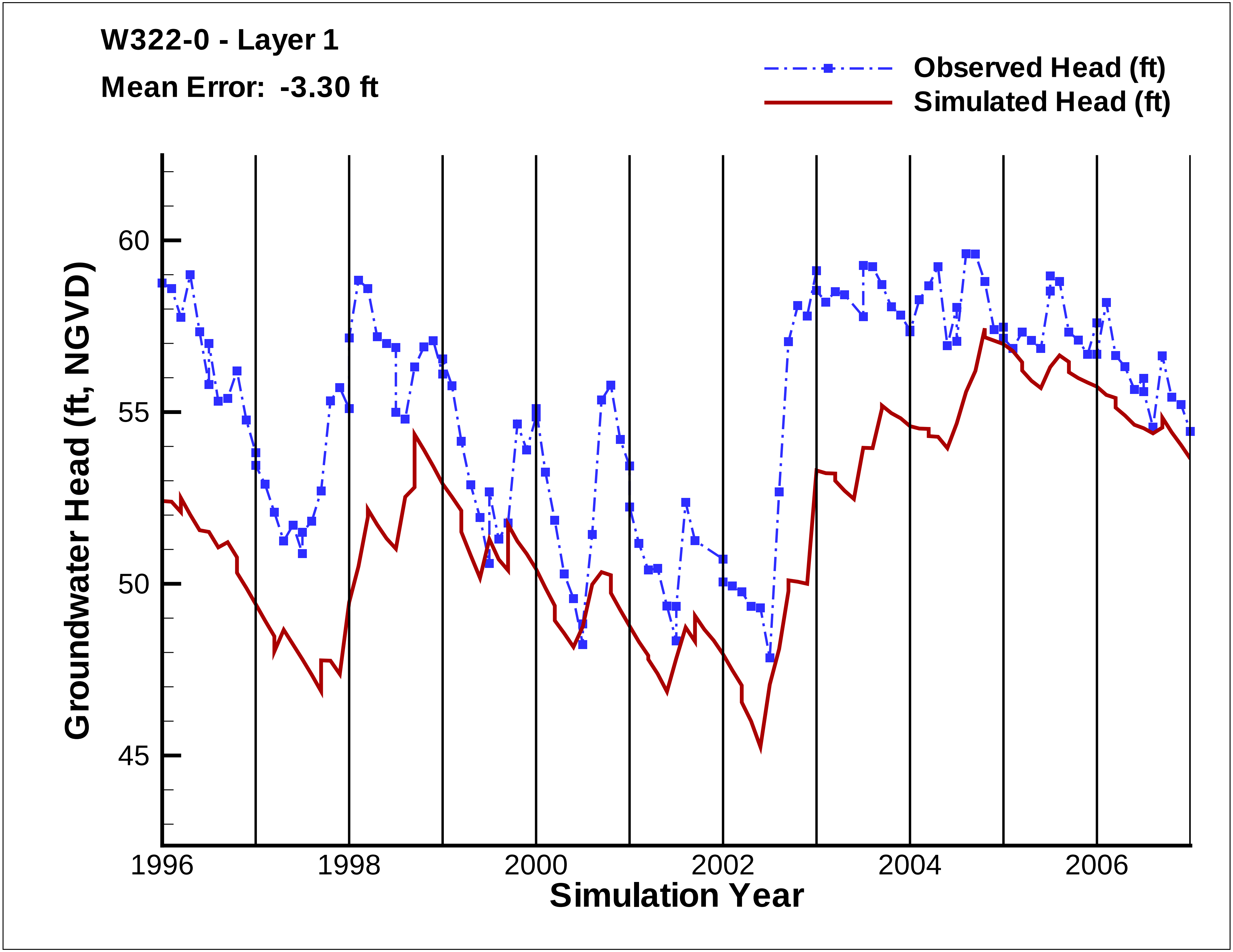


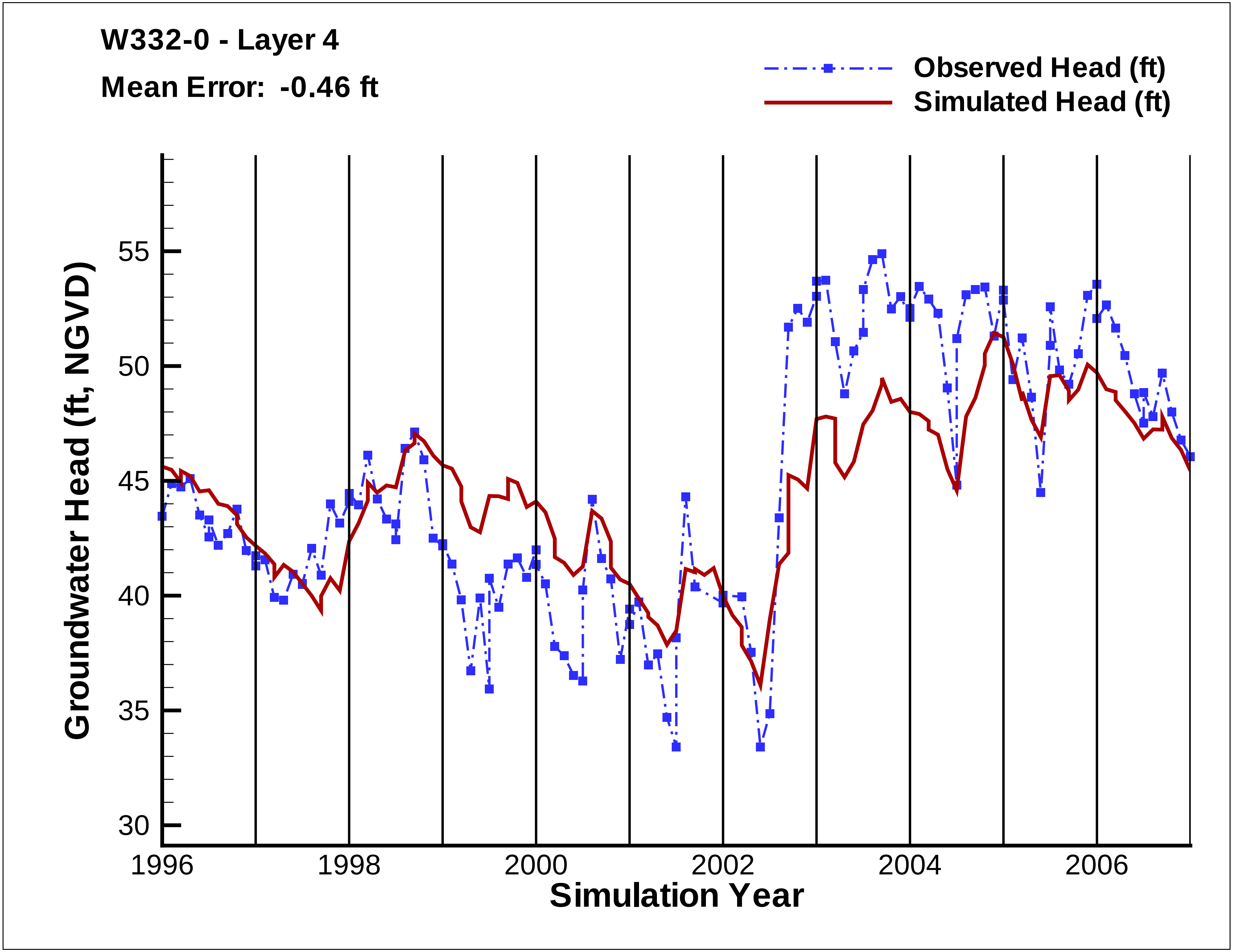
W303-0 - Layer 3
Mean Error: -2.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year


W315-0 - Layer 1
Mean Error: -0.34 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

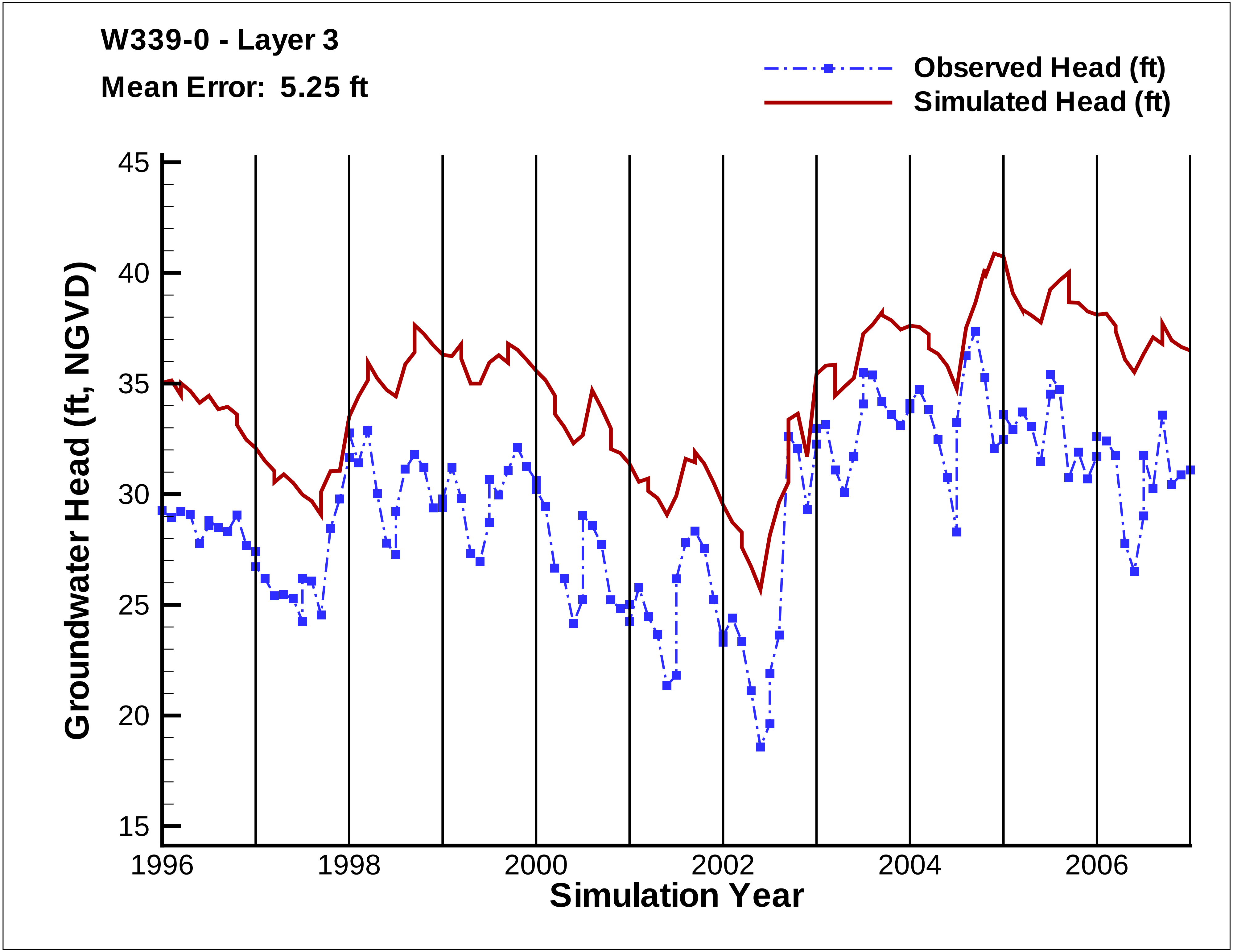


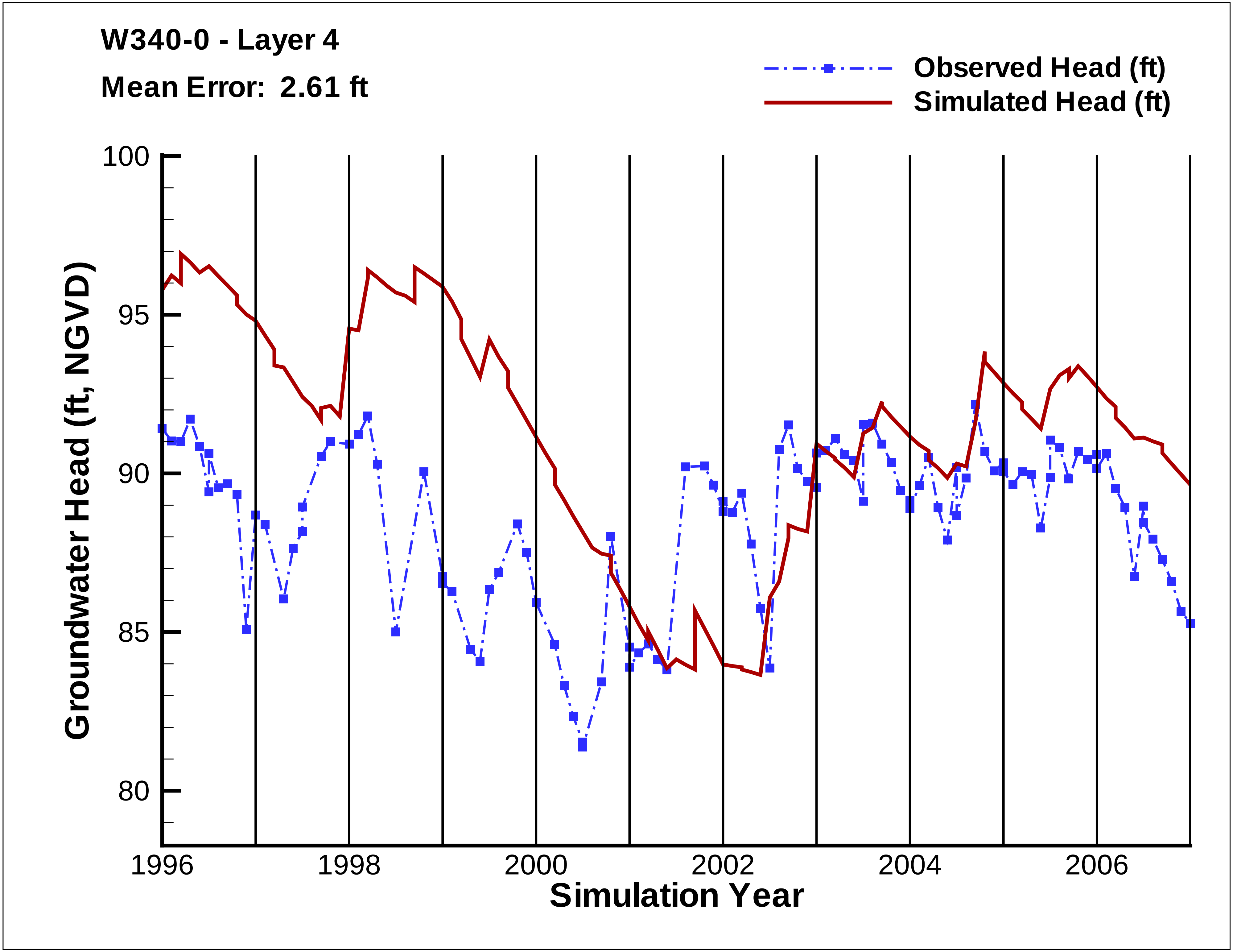
W321-0 - Layer 4
Mean Error: 0.57 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year


W322-0 - Layer 1
Mean Error: -3.30 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

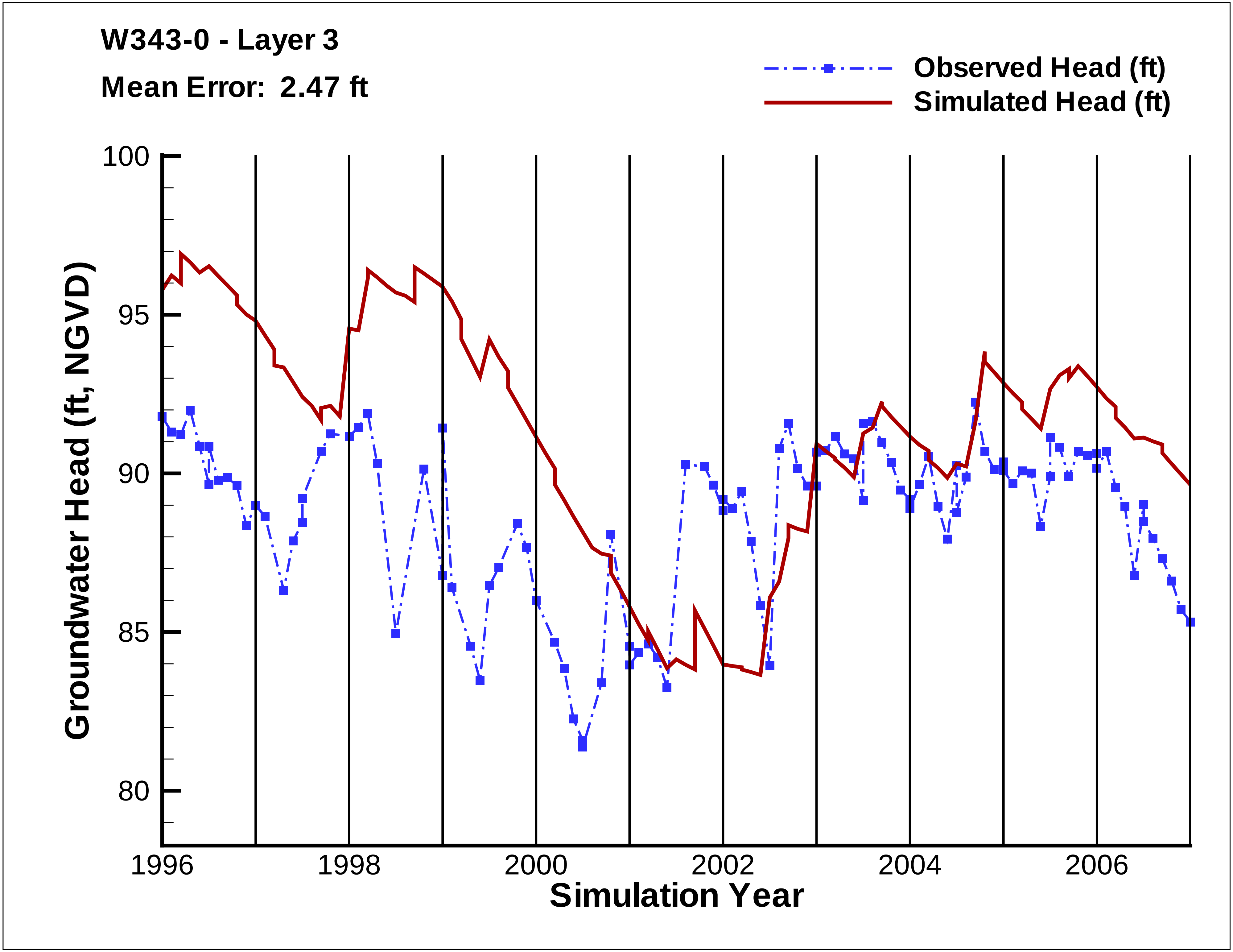


W332-0 - Layer 4
Mean Error: -0.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

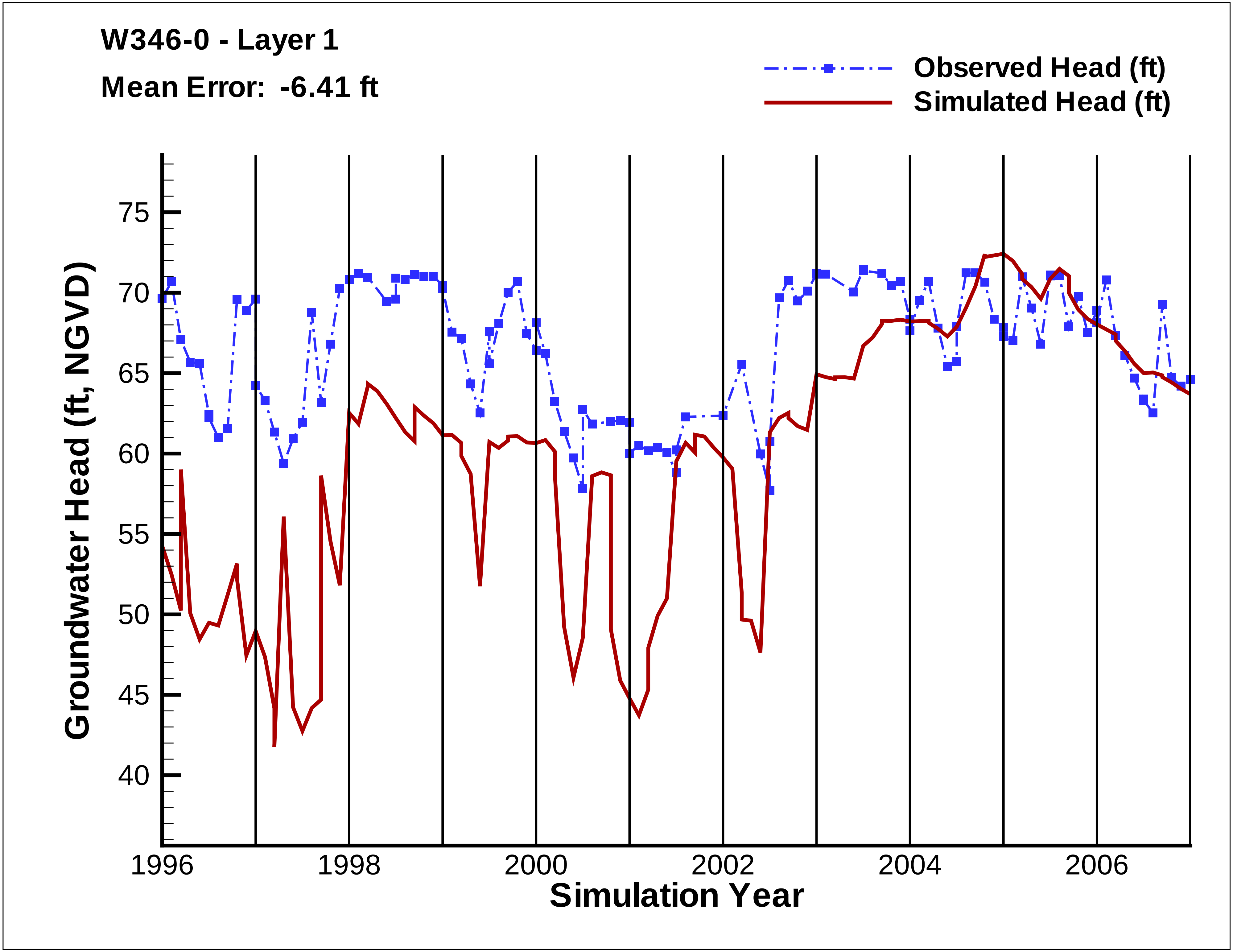

W339-0 - Layer 3
Mean Error: 5.25 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year

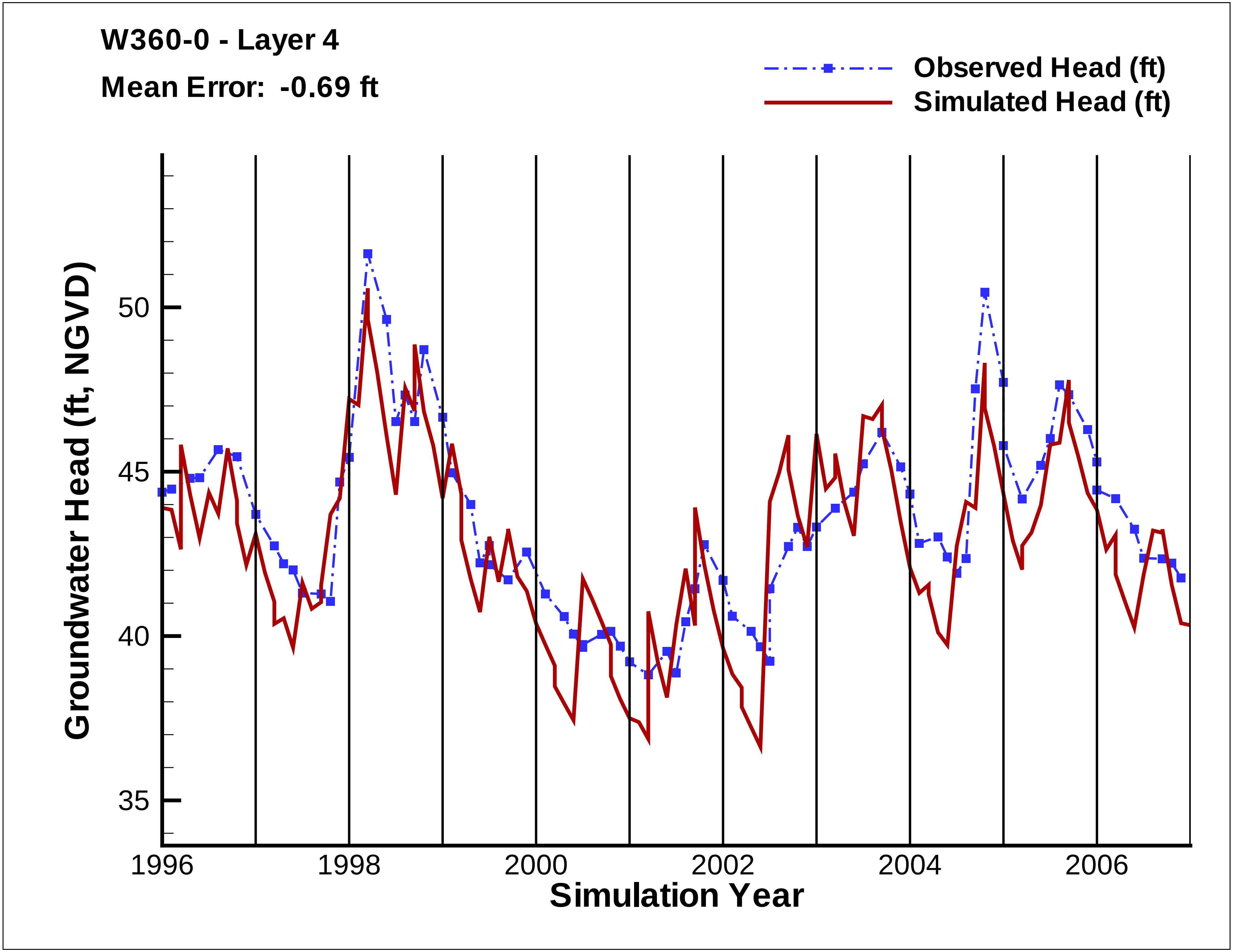


W340-0 - Layer 4
Mean Error: 2.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

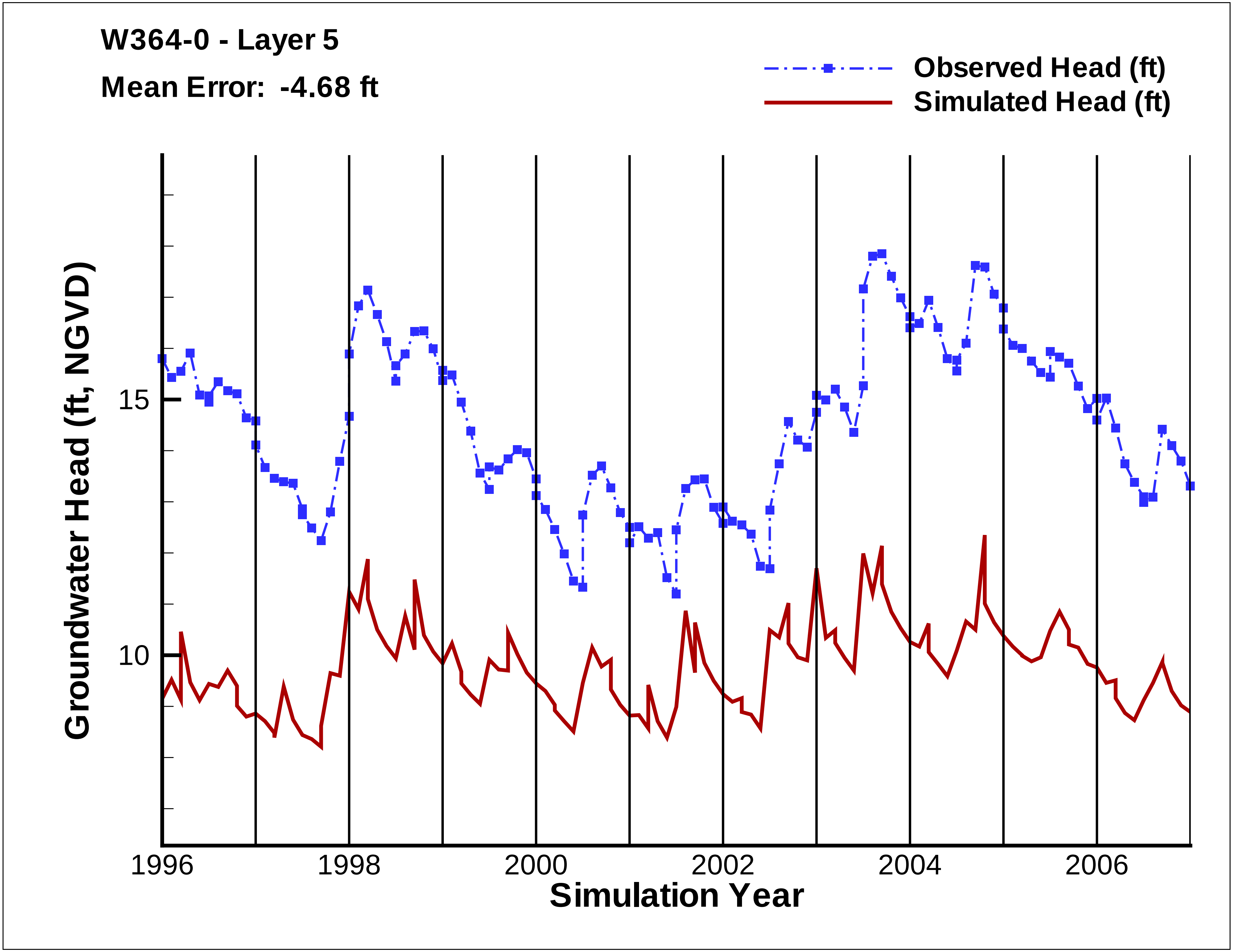


W343-0 - Layer 3
Mean Error: 2.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

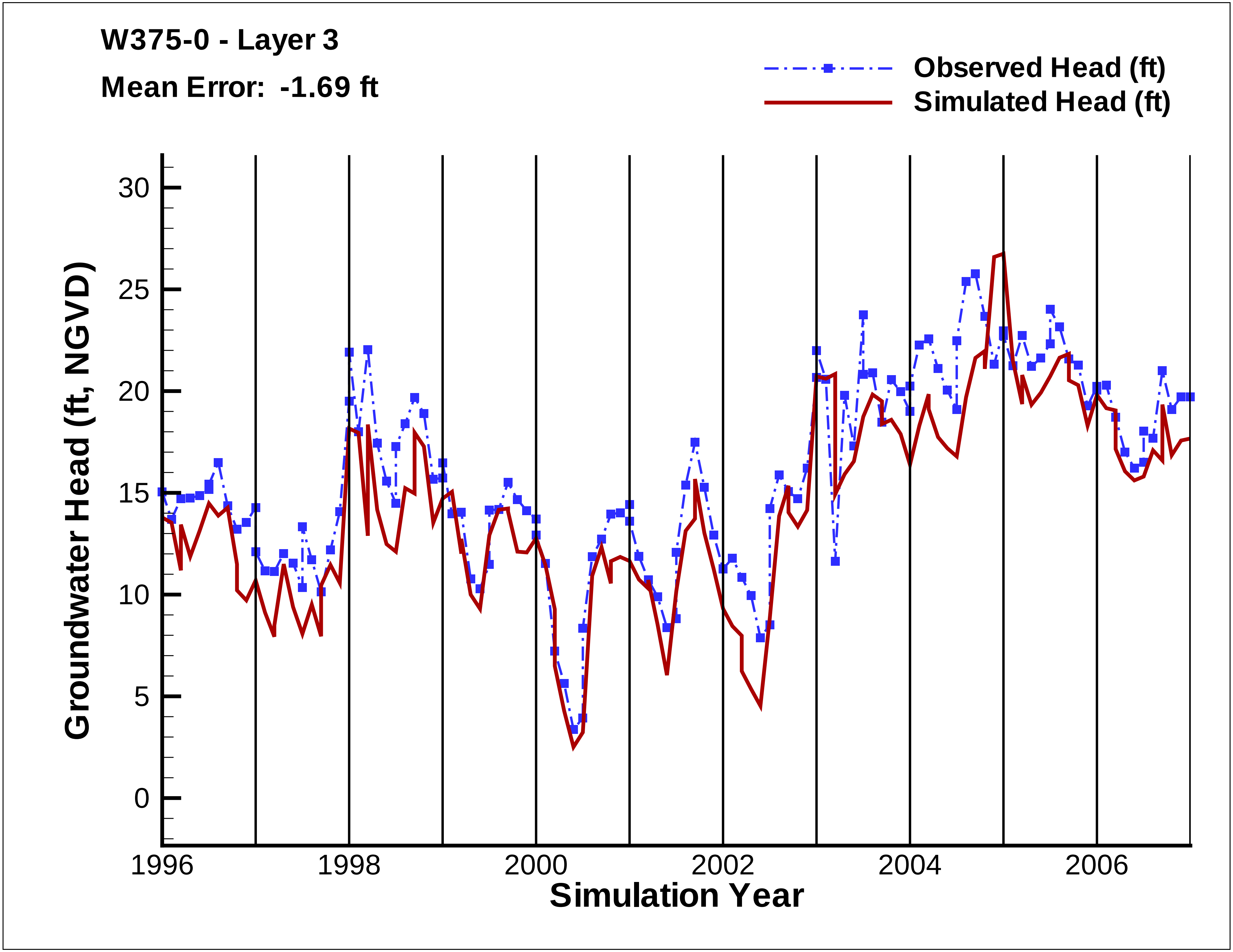

W346-0 - Layer 1
Mean Error: -6.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



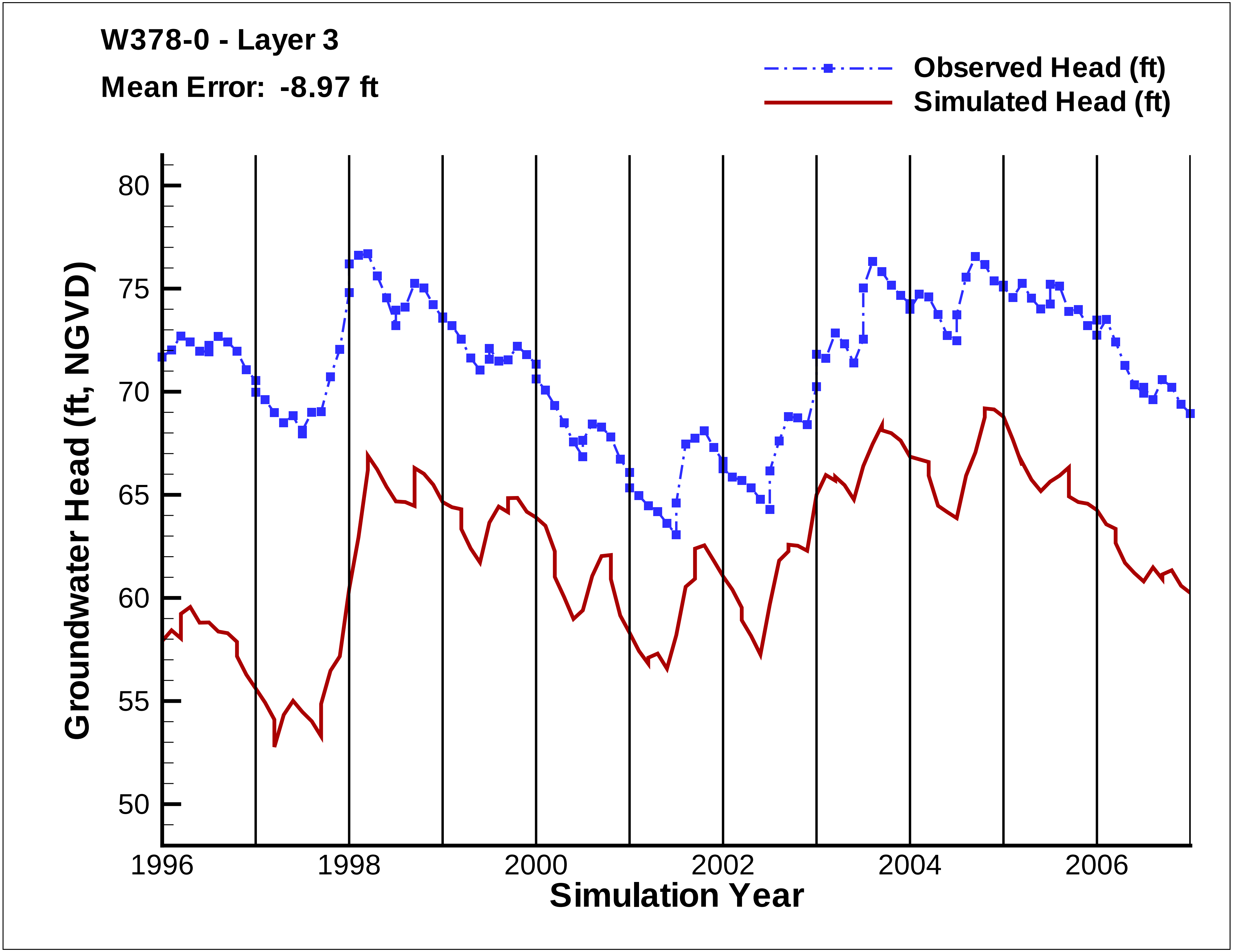
W360-0 - Layer 4
Mean Error: -0.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

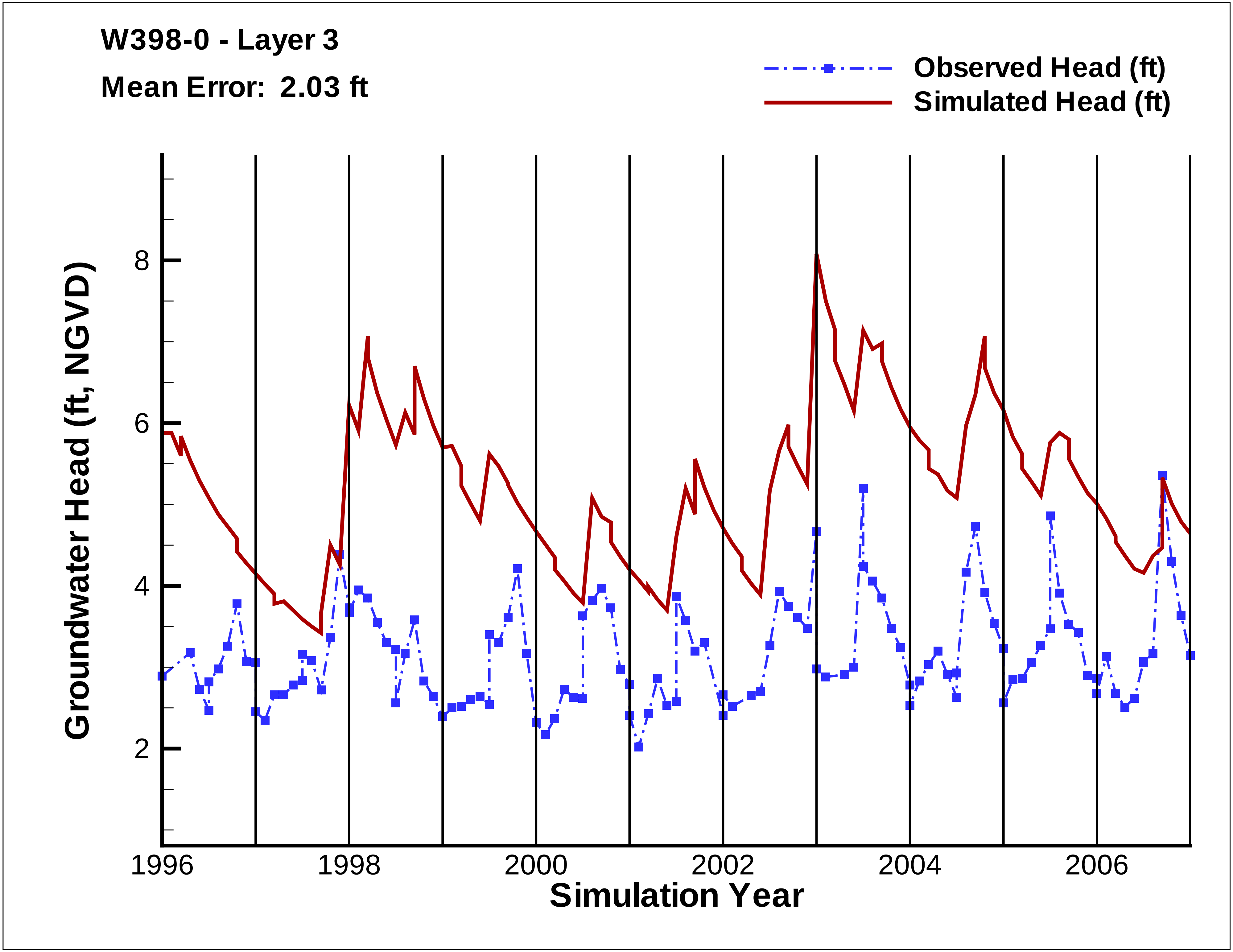


W364-0 - Layer 5
Mean Error: -4.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

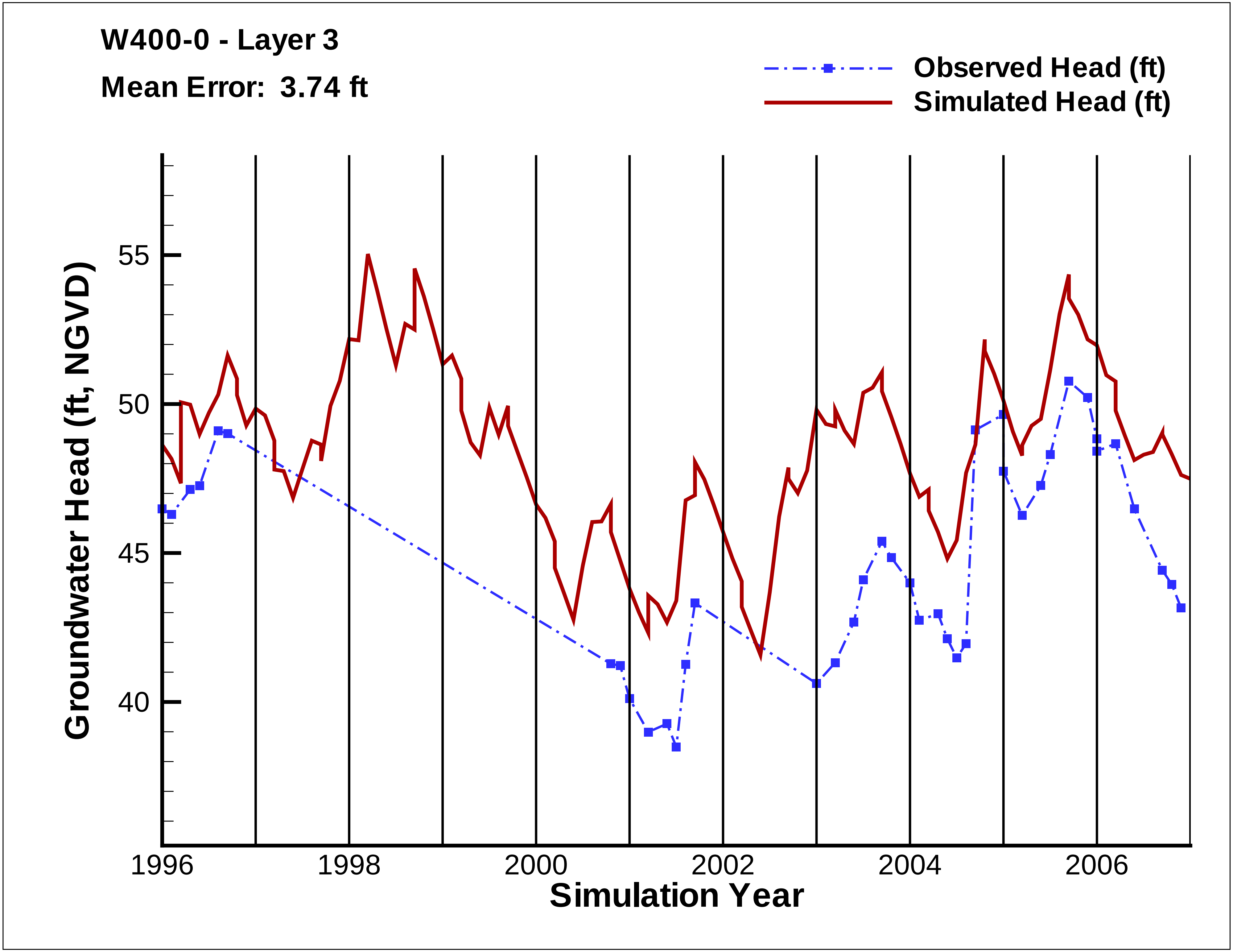


W375-0 - Layer 3
Mean Error: -1.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
5
0
1996
1998
2000
2002
2004
2006
Simulation Year

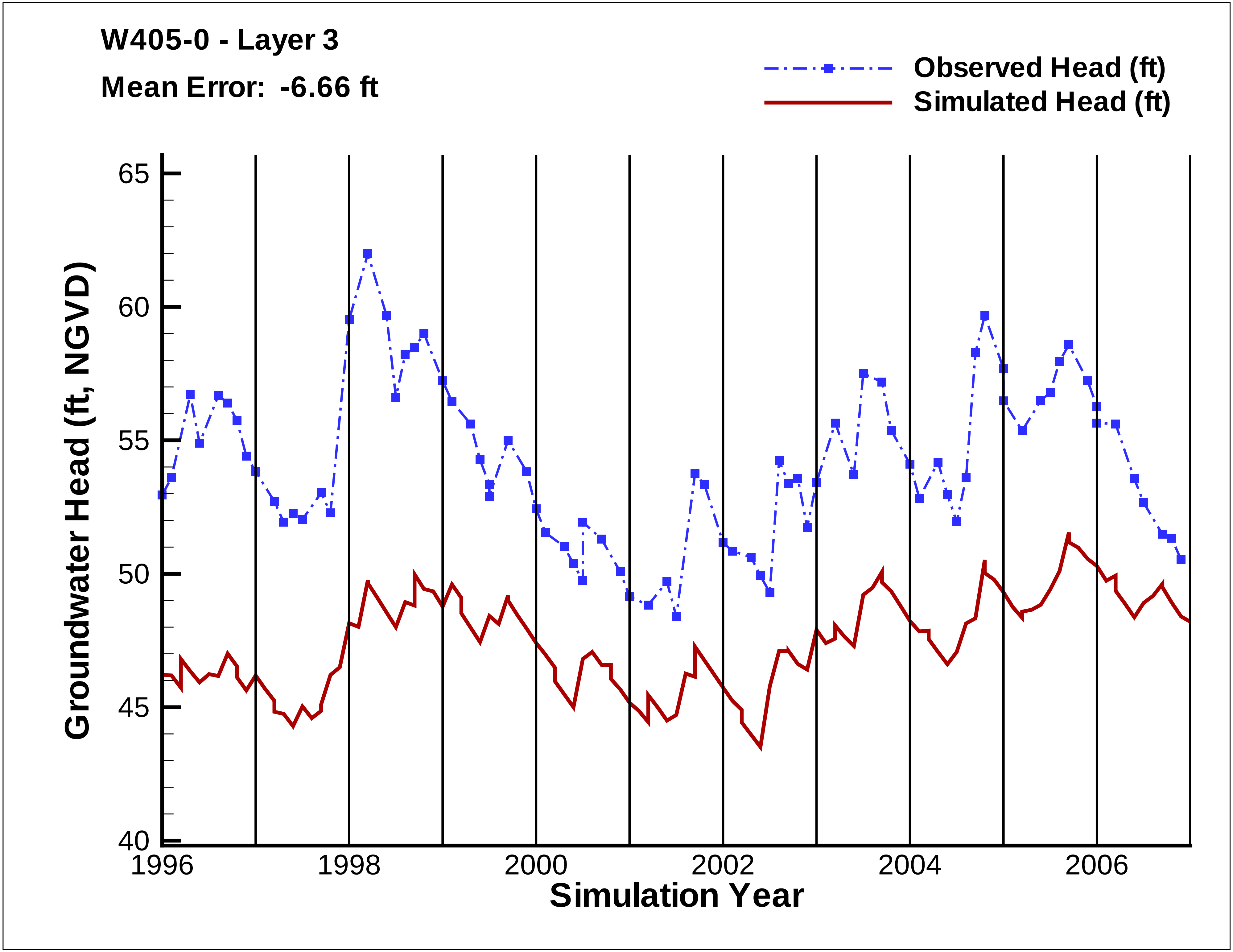

W378-0 - Layer 3
Mean Error: -8.97 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

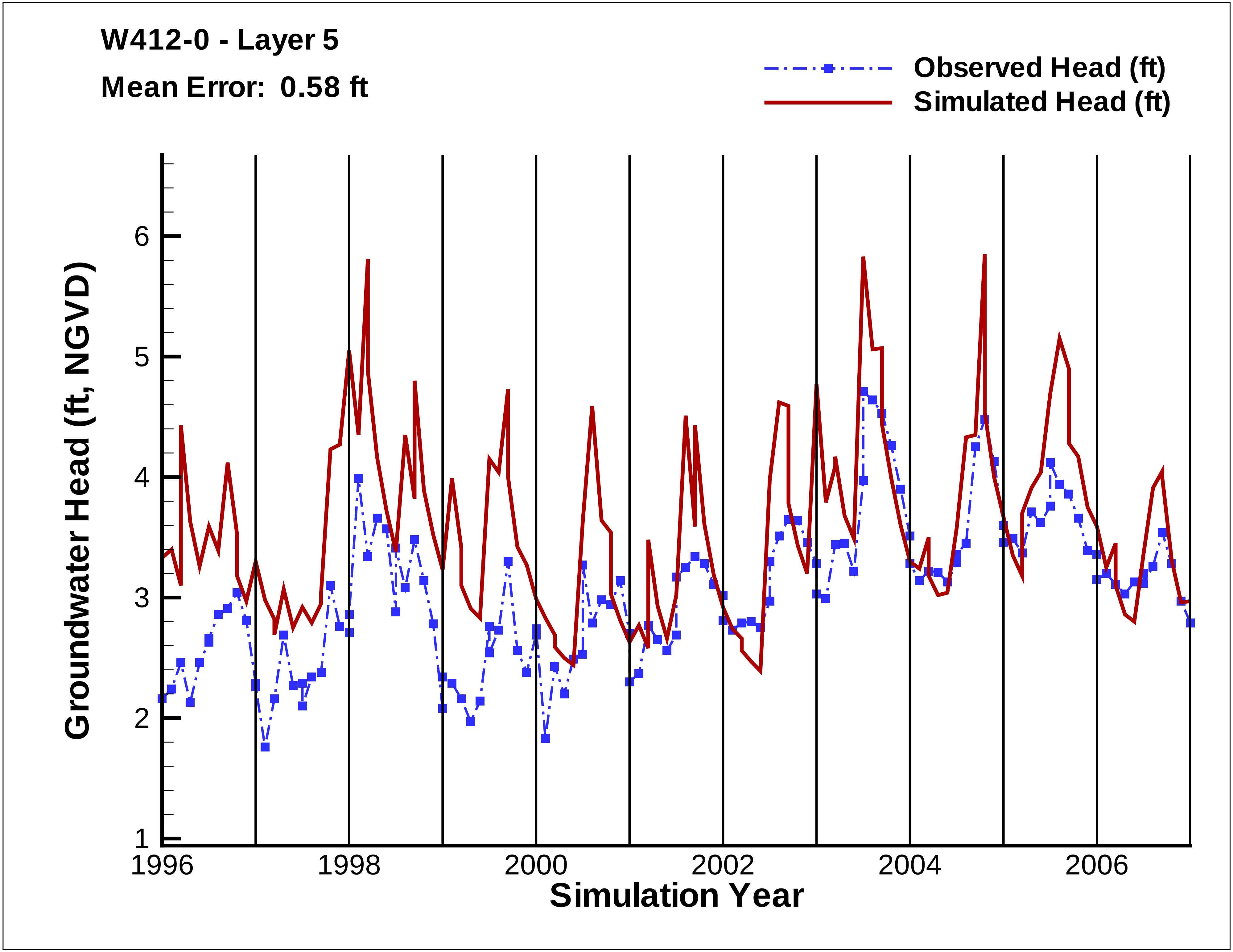


W398-0 - Layer 3
Mean Error: 2.03 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
2
4
6
8
1996
1998
2000
2002
2004
2006
Simulation Year

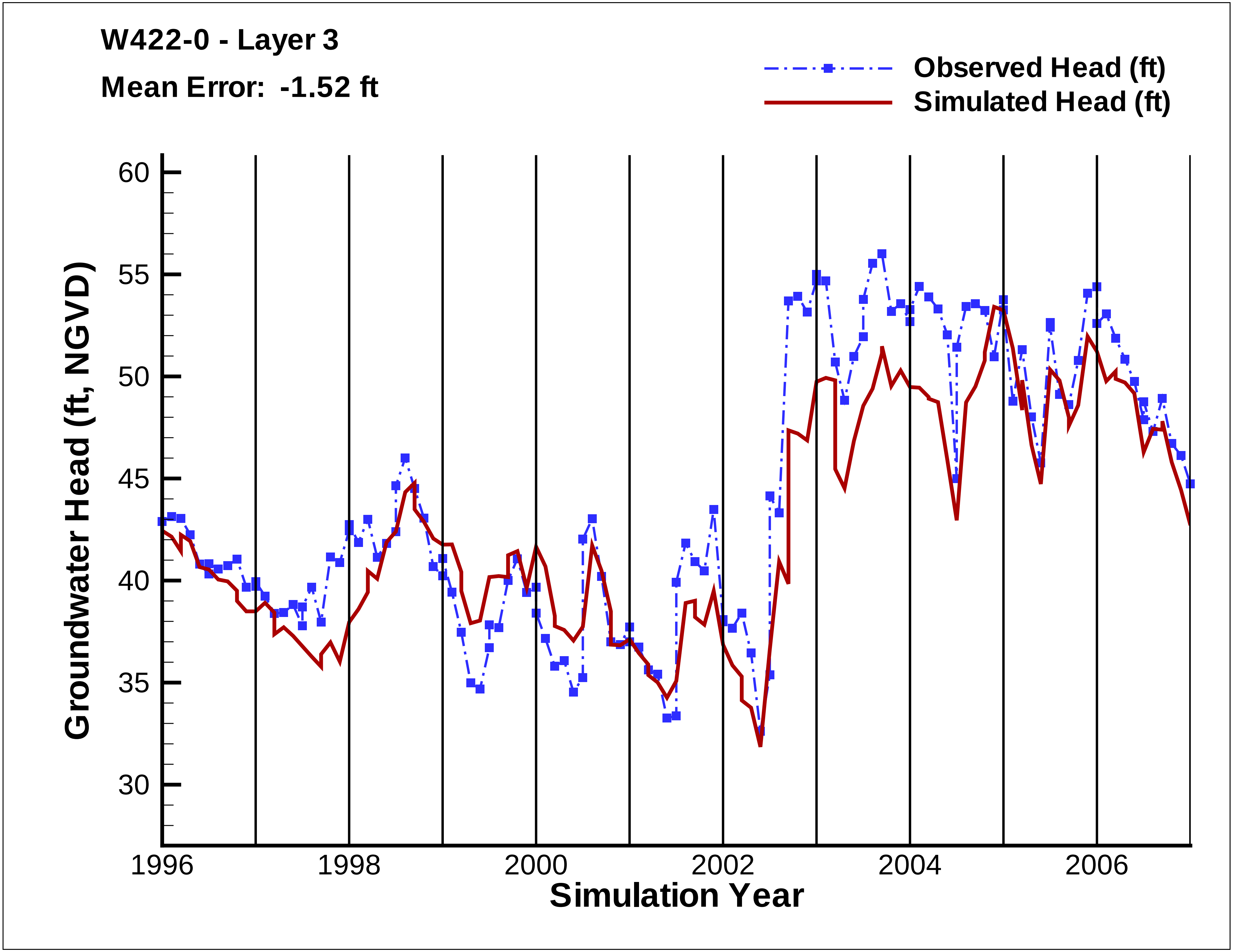


W400-0 - Layer 3
Mean Error: 3.74 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

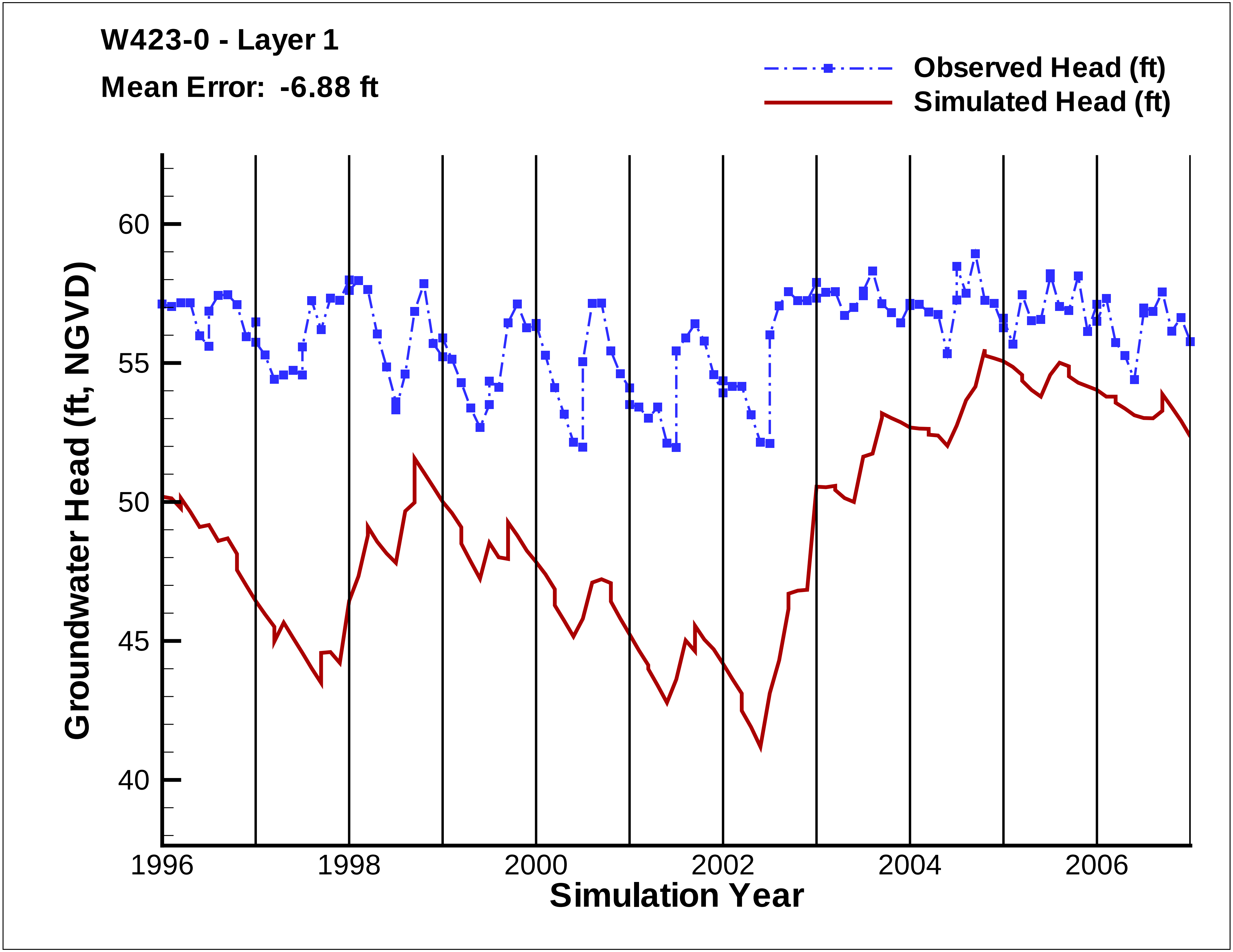

W405-0 - Layer 3
Mean Error: -6.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

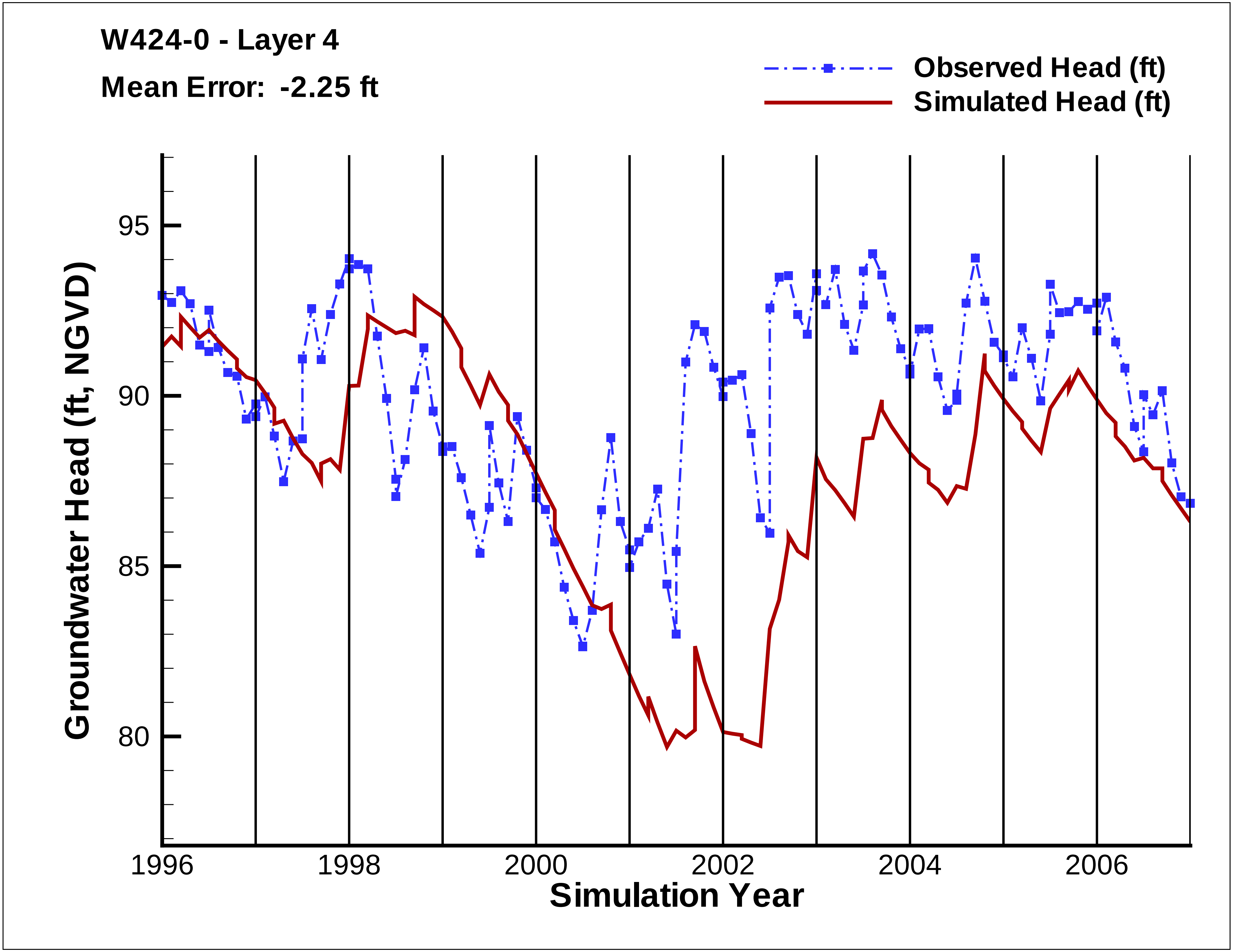


W412-0 - Layer 5
Mean Error: 0.58 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
1
2
3
4
5
6
1996
1998
2000
2002
2004
2006
Simulation Year

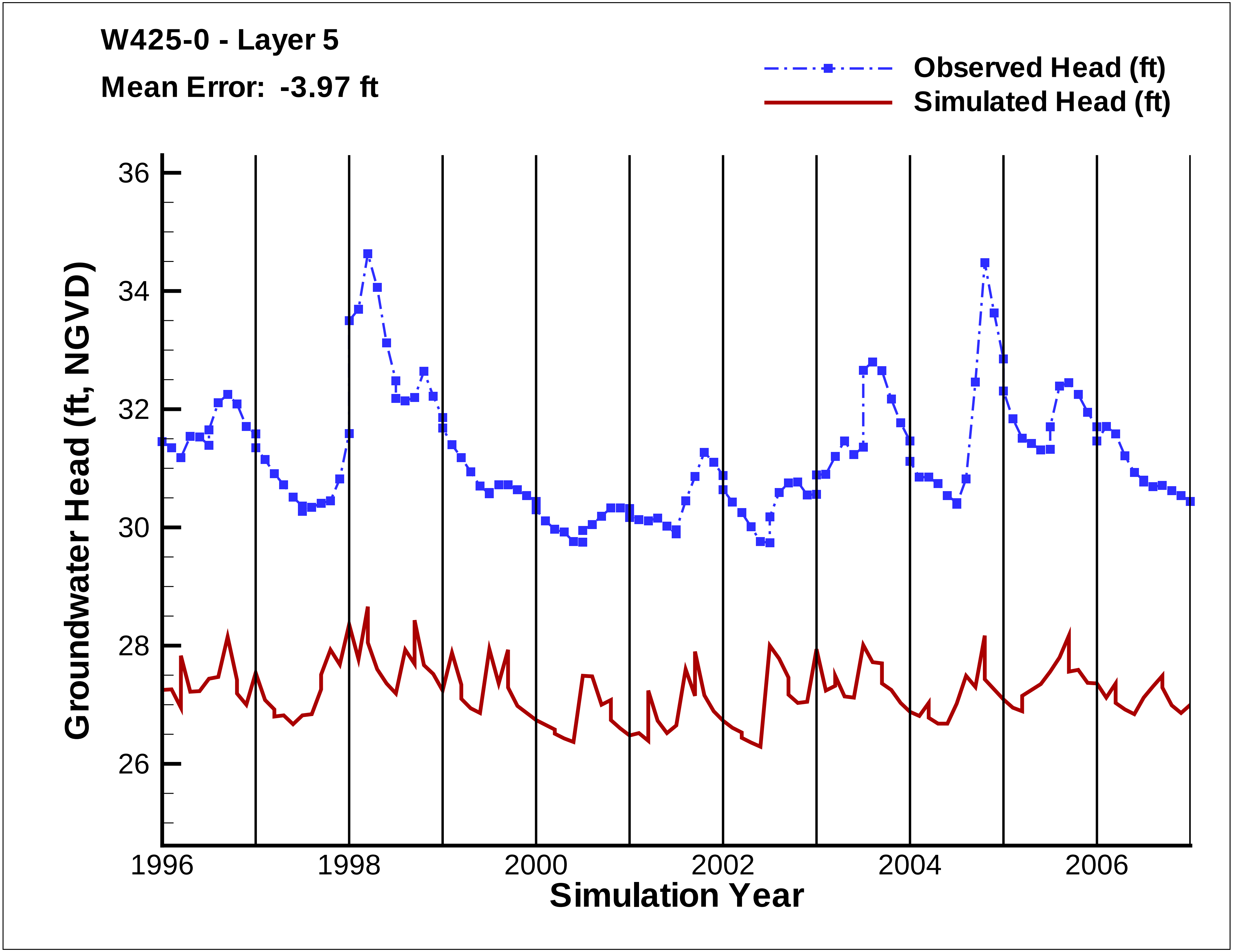


W422-0 - Layer 3
Mean Error: -1.52 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

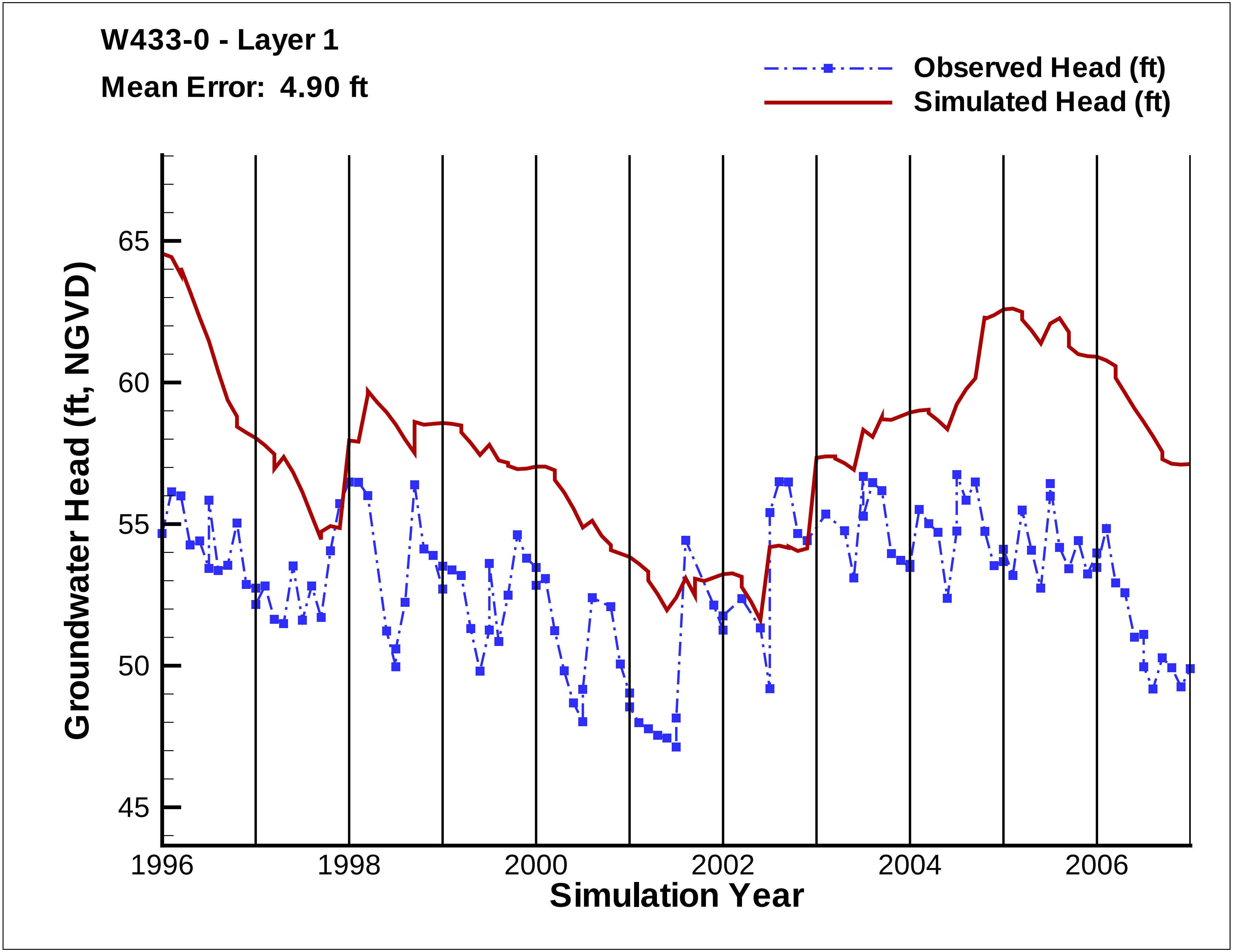

W423-0 - Layer 1
Mean Error: -6.88 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



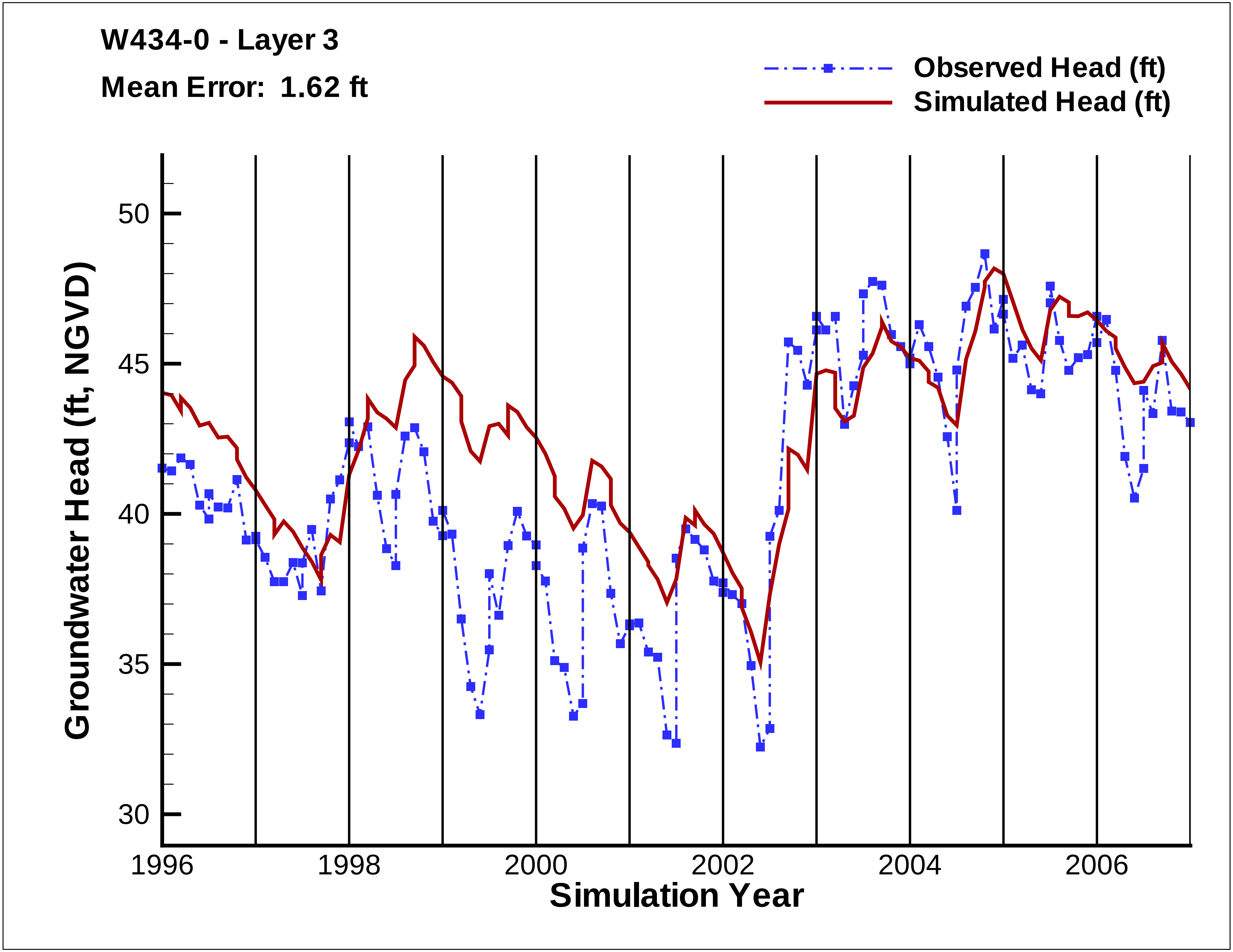
W424-0 - Layer 4
Mean Error: -2.25 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

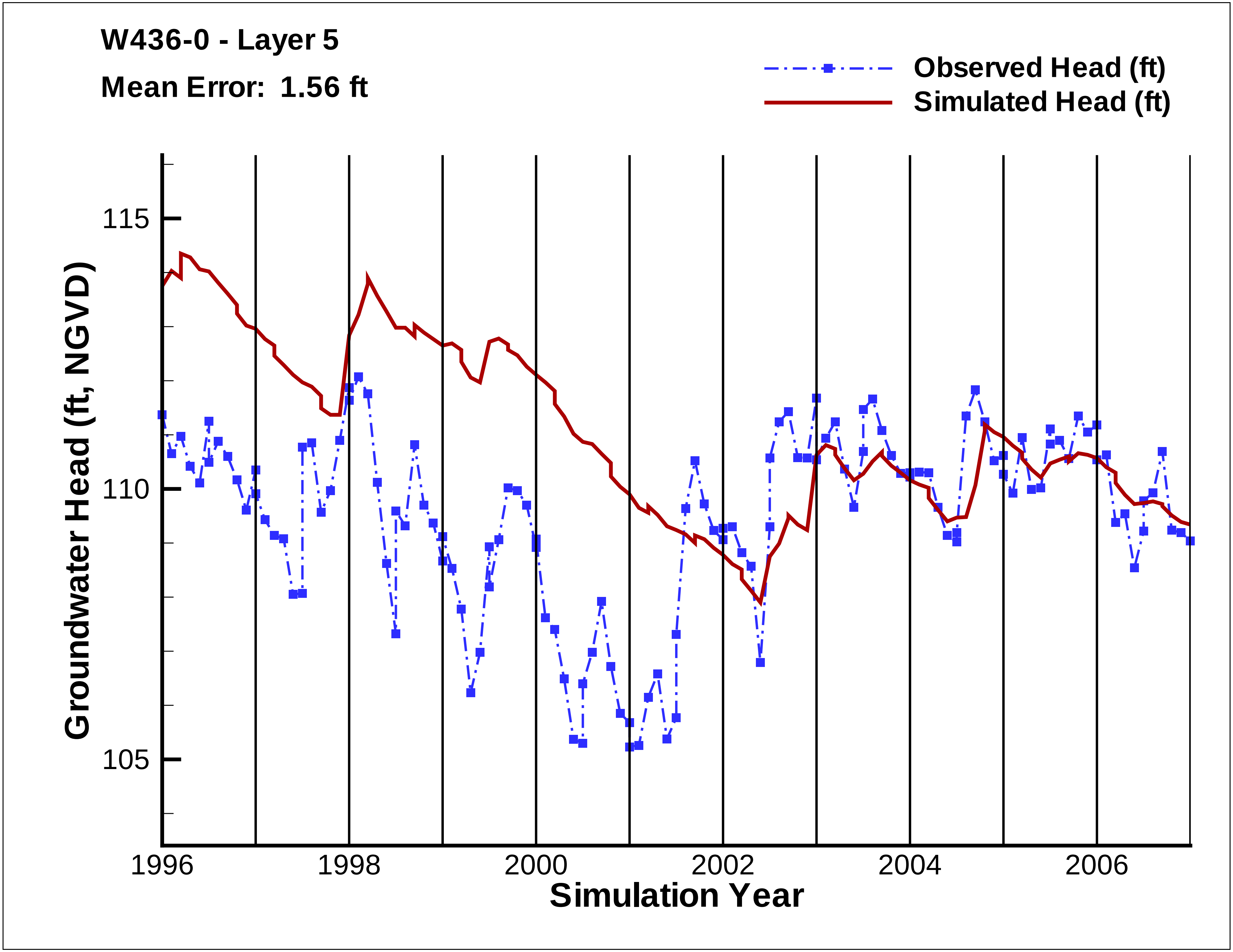


W425-0 - Layer 5
Mean Error: -3.97 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
36
34
32
30
28
26
1996
1998
2000
2002
2004
2006
Simulation Year

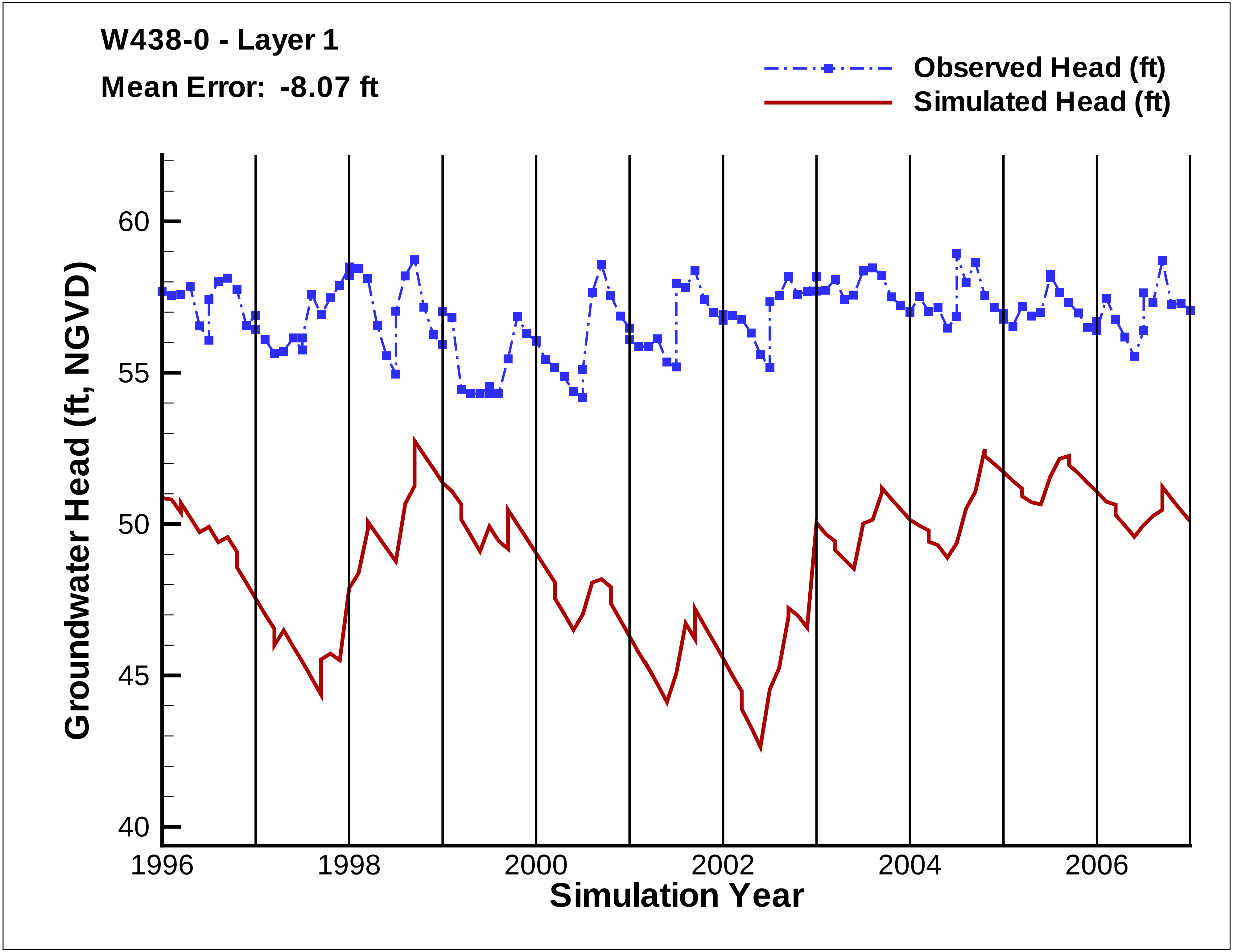


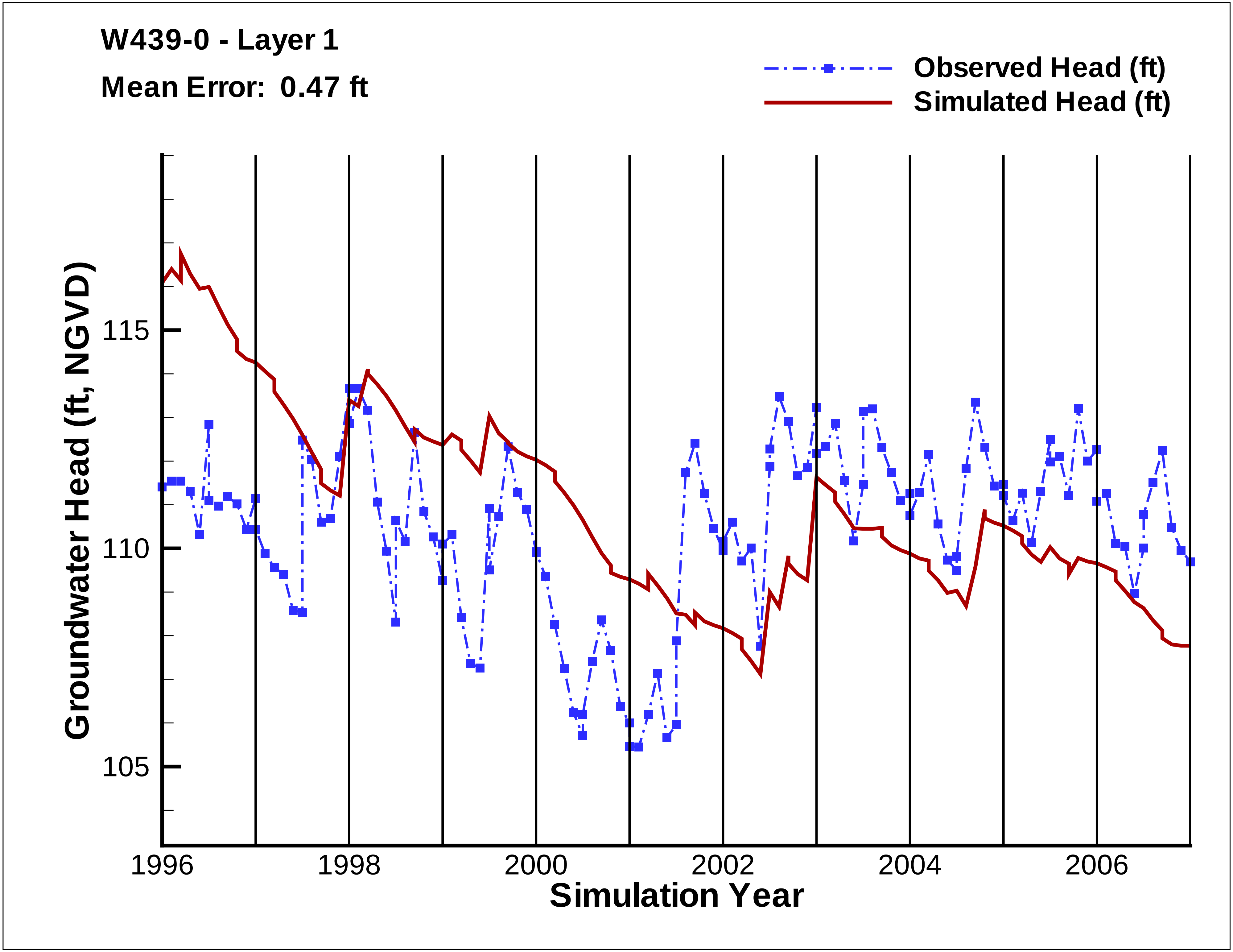
W433-0 - Layer 1
Mean Error: 4.90 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

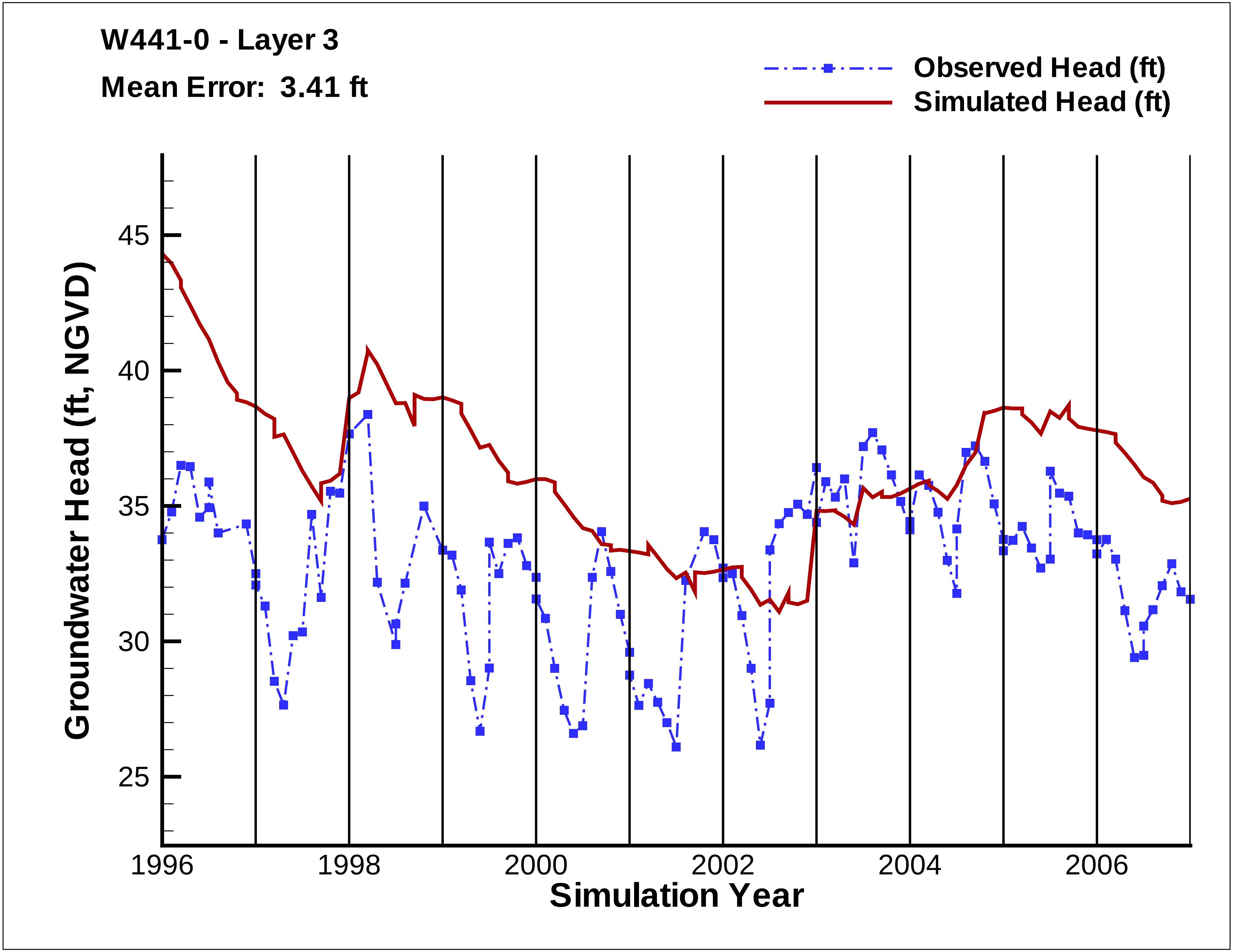

W434-0 - Layer 3
Mean Error: 1.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

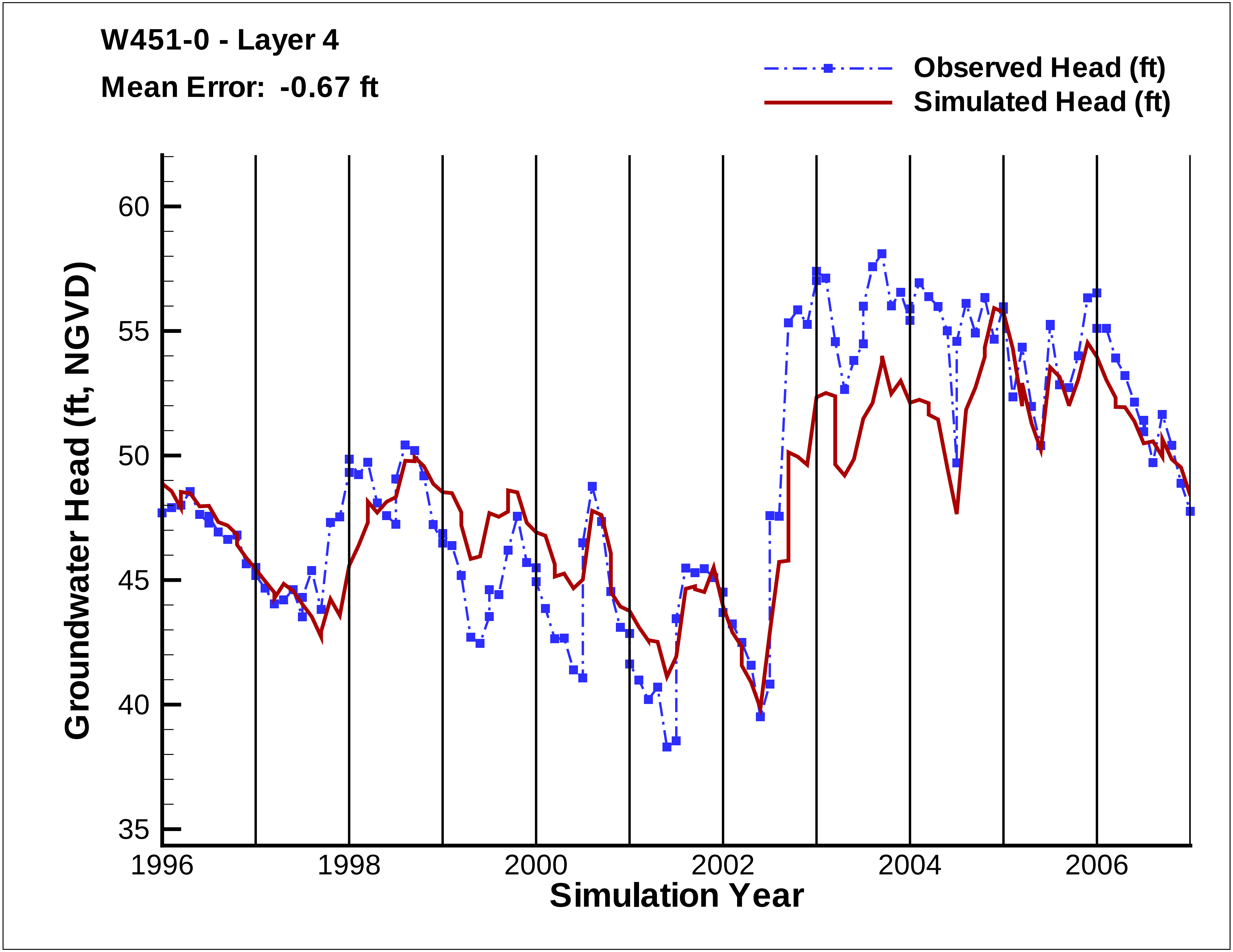


W436-0 - Layer 5
Mean Error: 1.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
1996
1998
2000
2002
2004
2006
Simulation Year

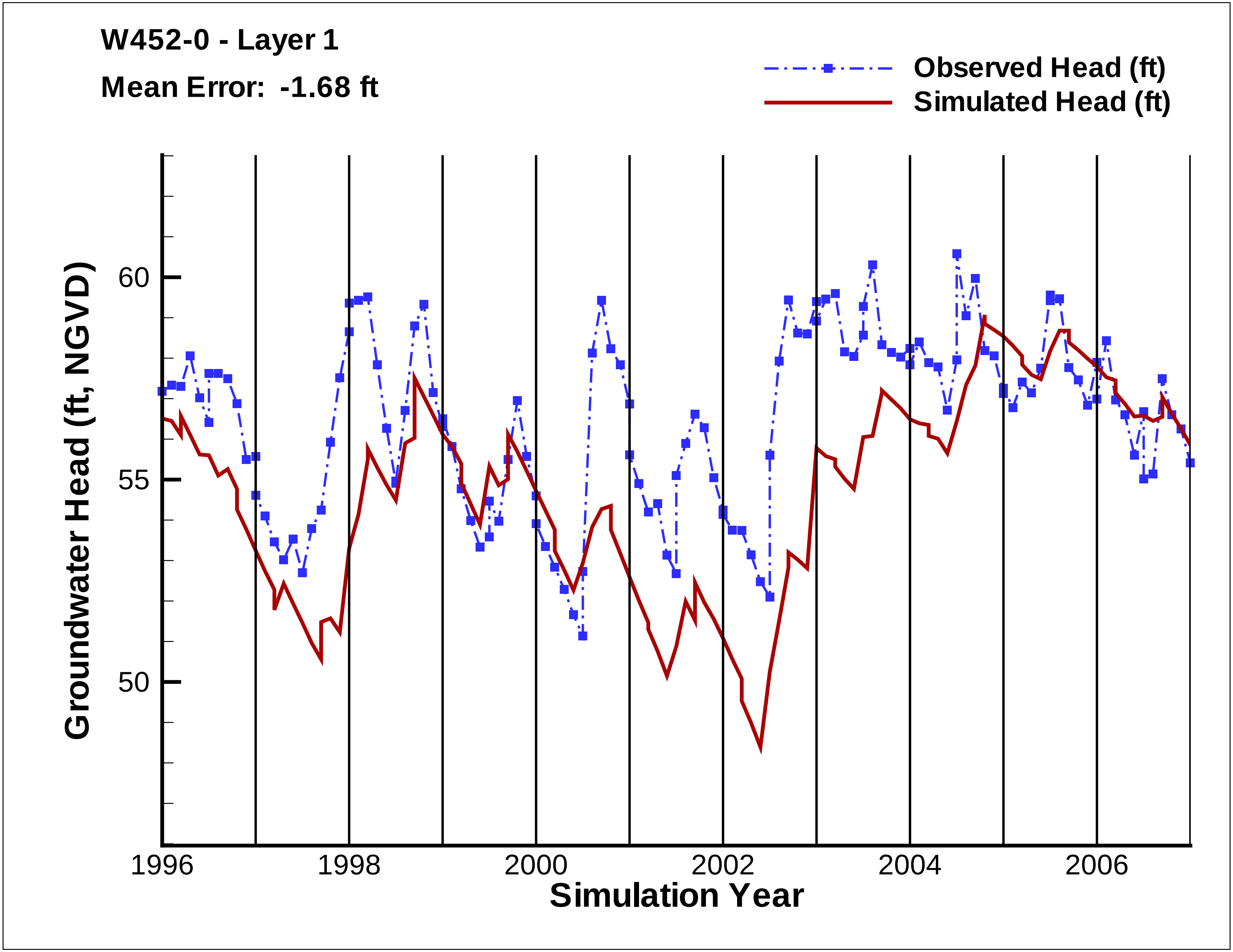

W438-0 - Layer 1
Mean Error: -8.07 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year


W439-0 - Layer 1
Mean Error: 0.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
115
110
105
1996
1998
2000
2002
2004
2006
Simulation Year

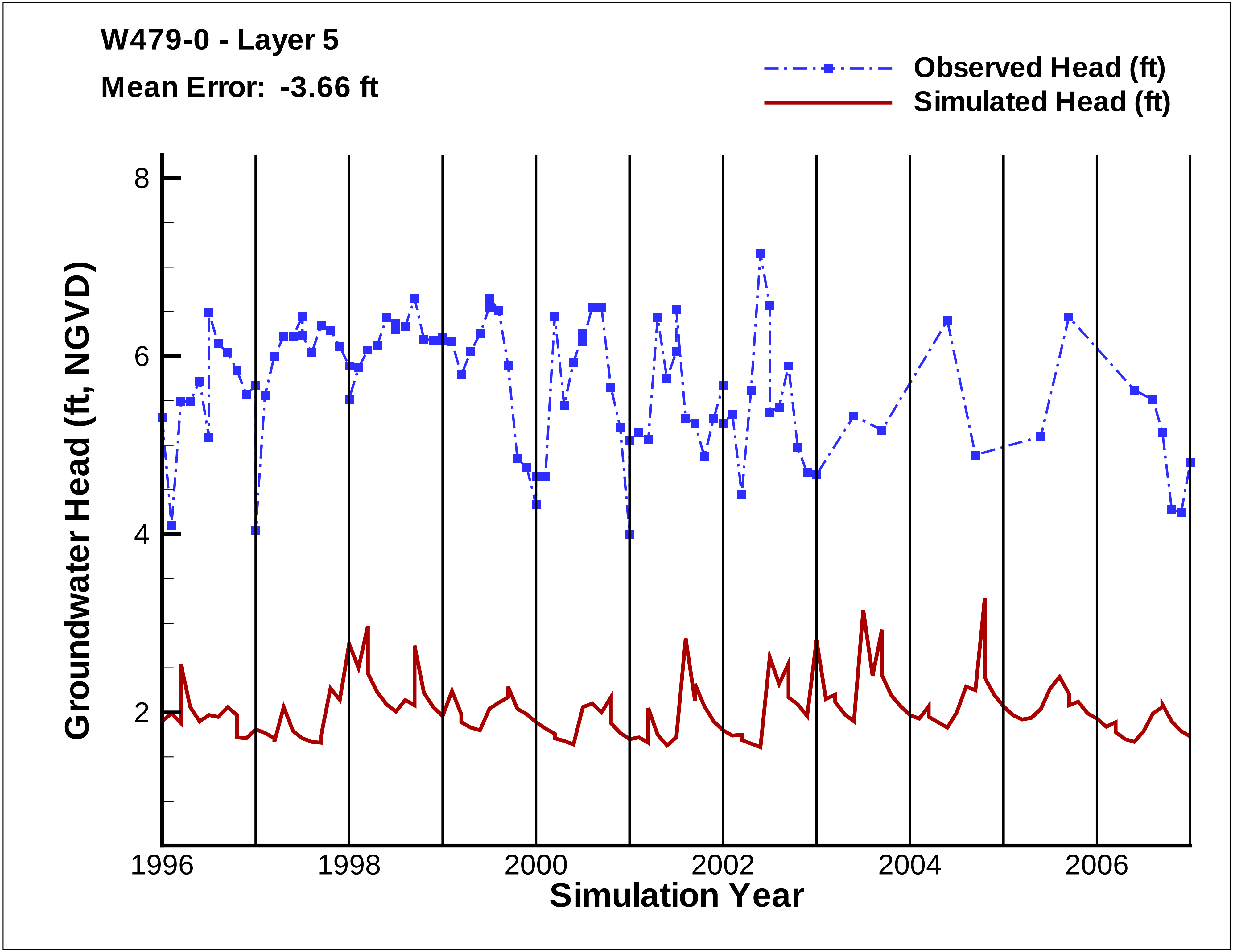

W441-0 - Layer 3
Mean Error: 3.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
30
35
40
45
1996
1998
2000
2002
2004
2006
Simulation Year



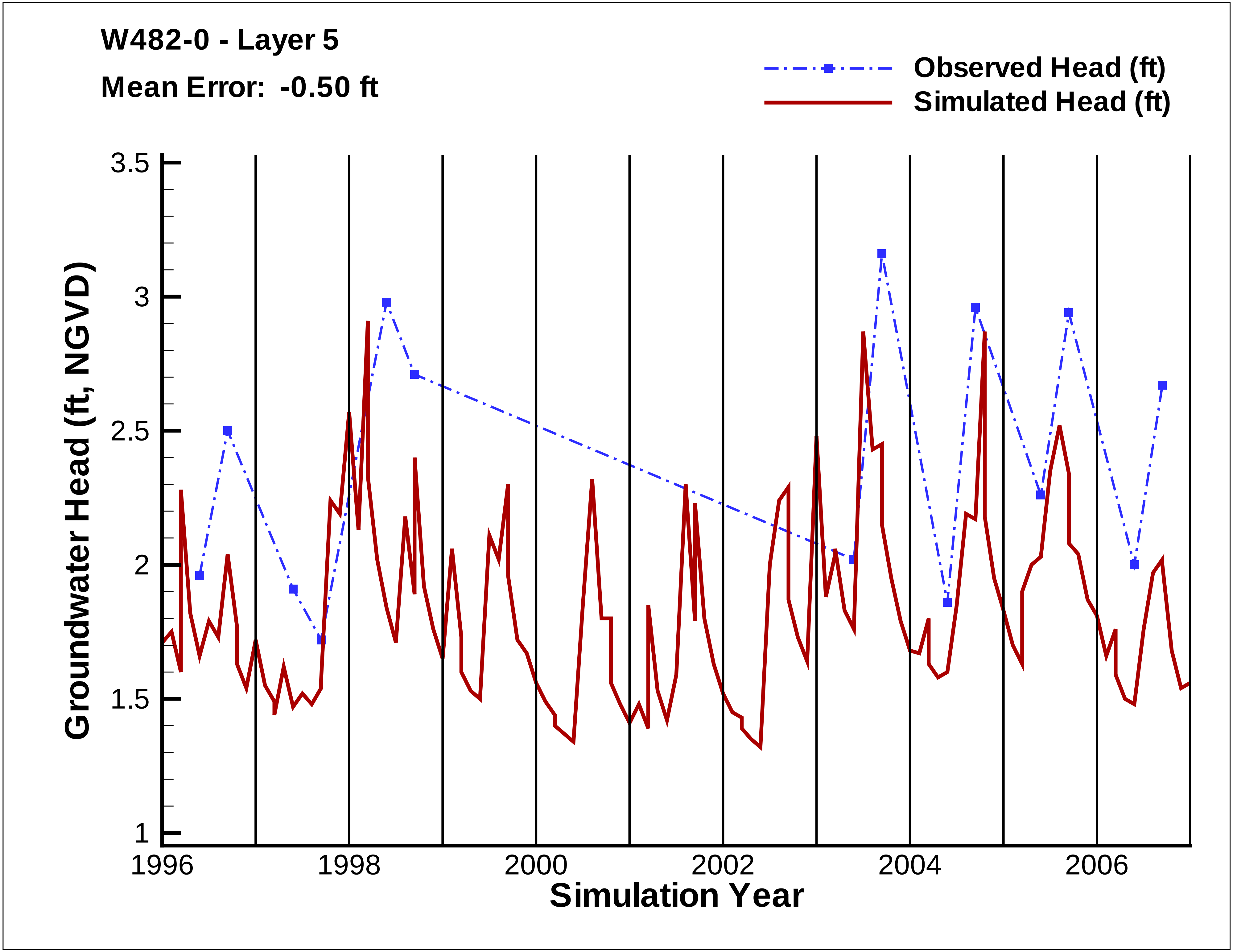
W451-0 - Layer 4
Mean Error: -0.67 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year



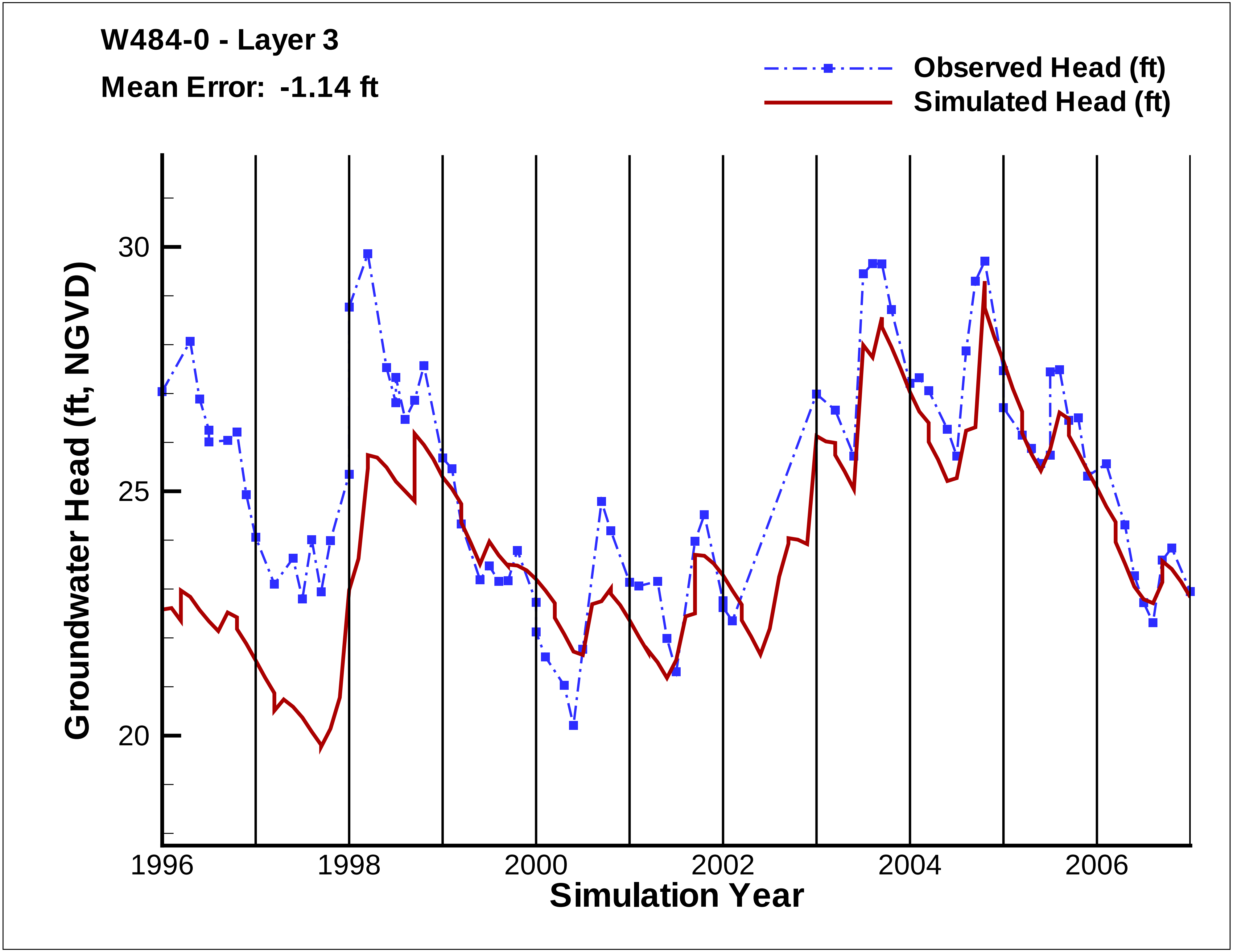
W452-0 - Layer 1
Mean Error: -1.68 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

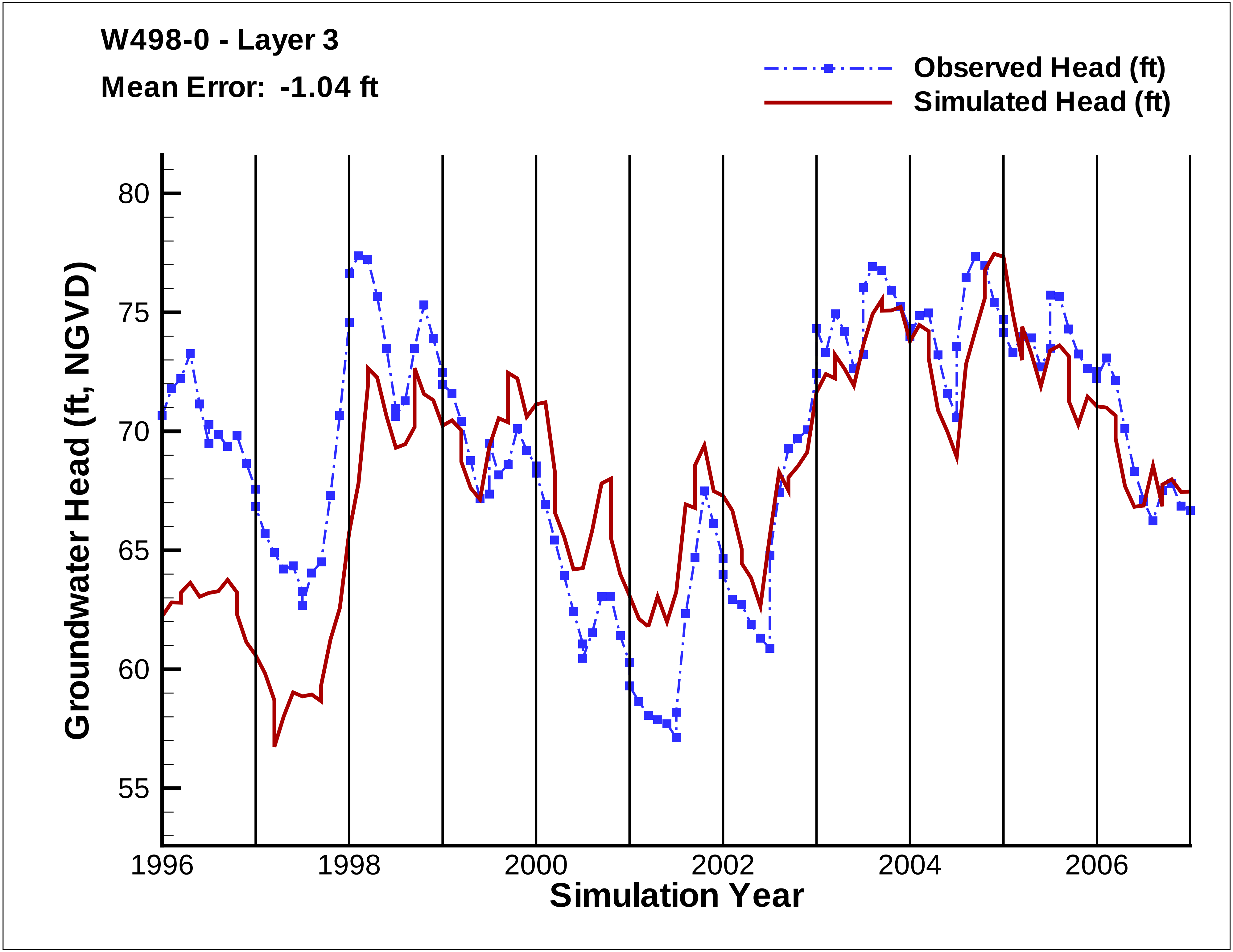


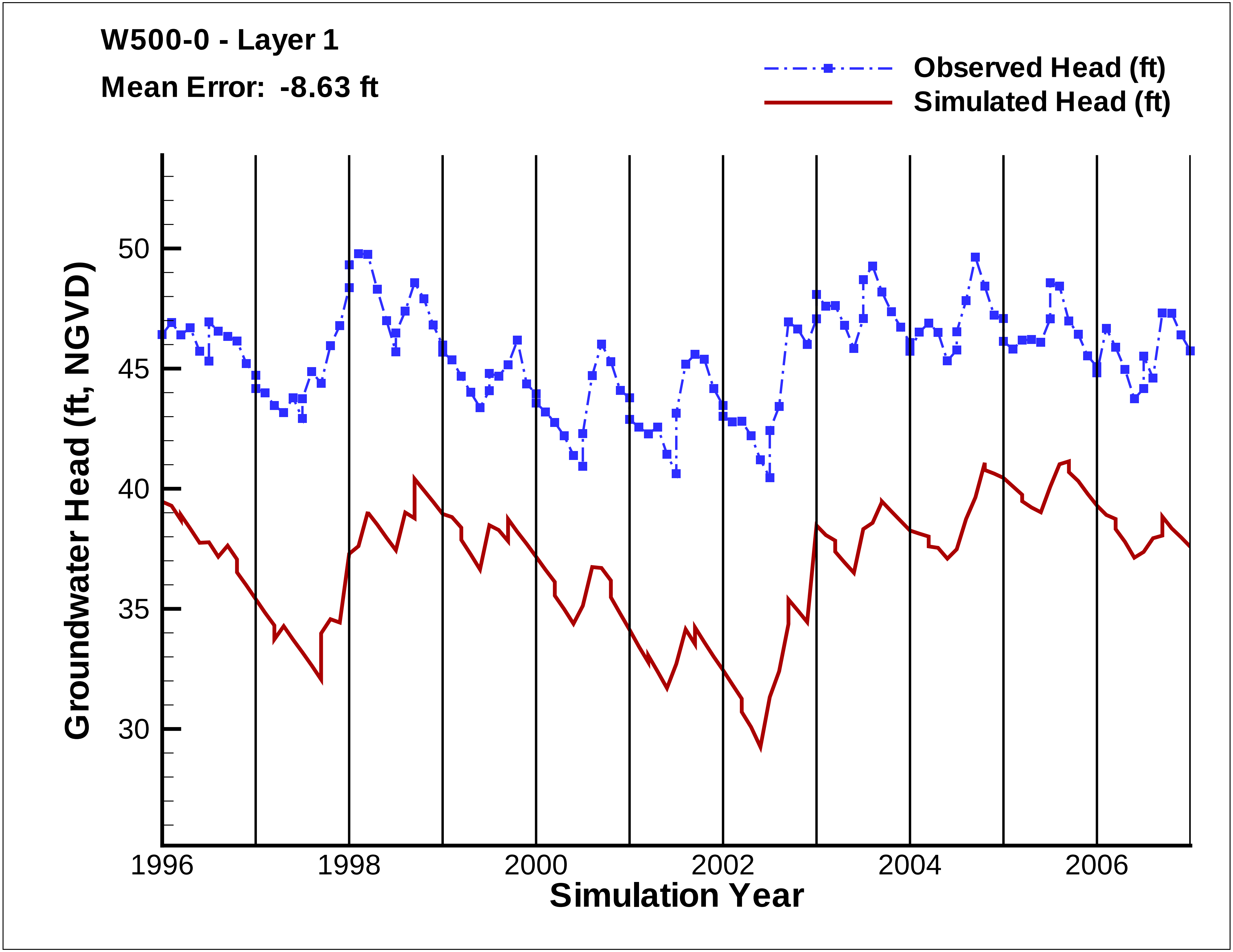
W479-0 - Layer 5
Mean Error: -3.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year

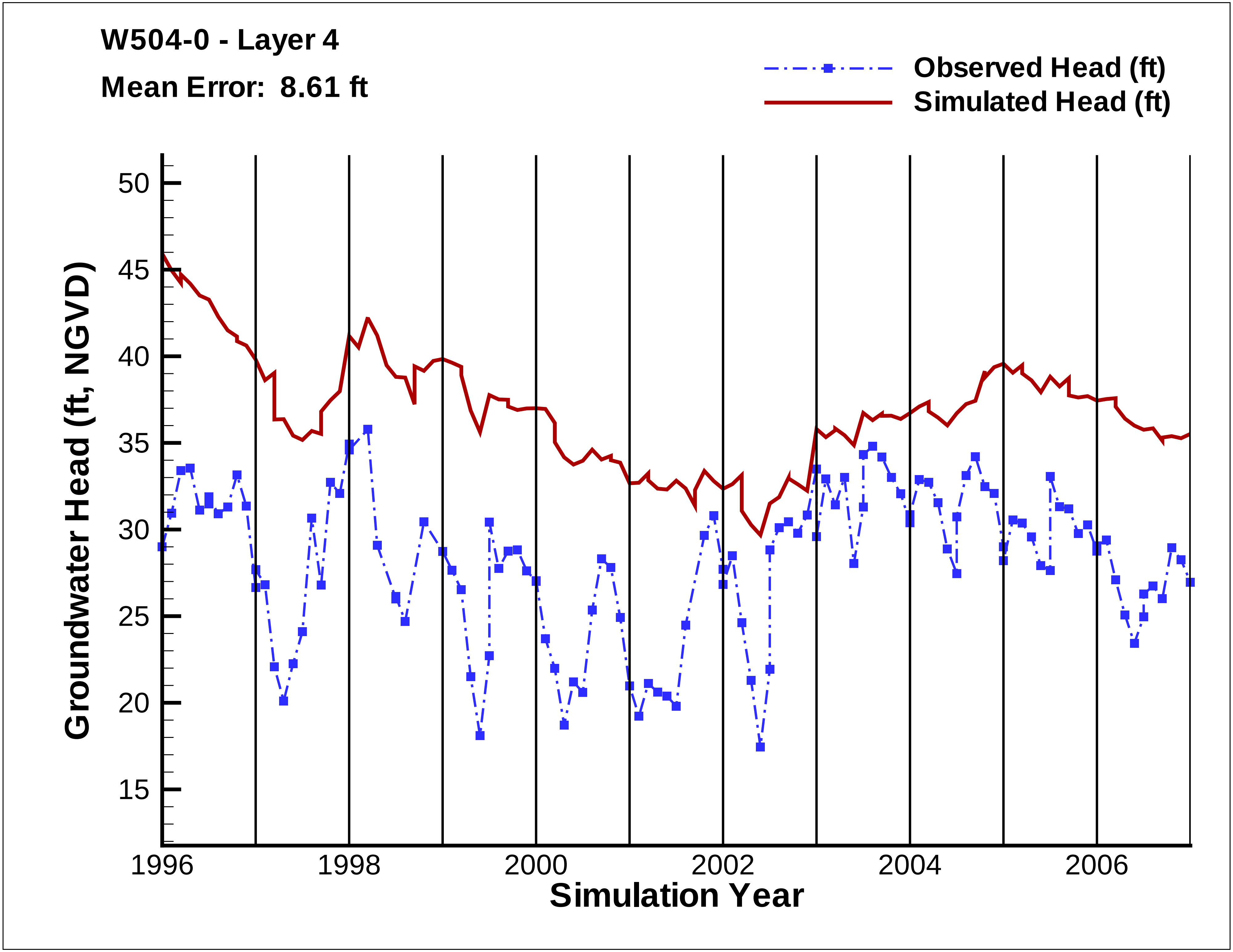


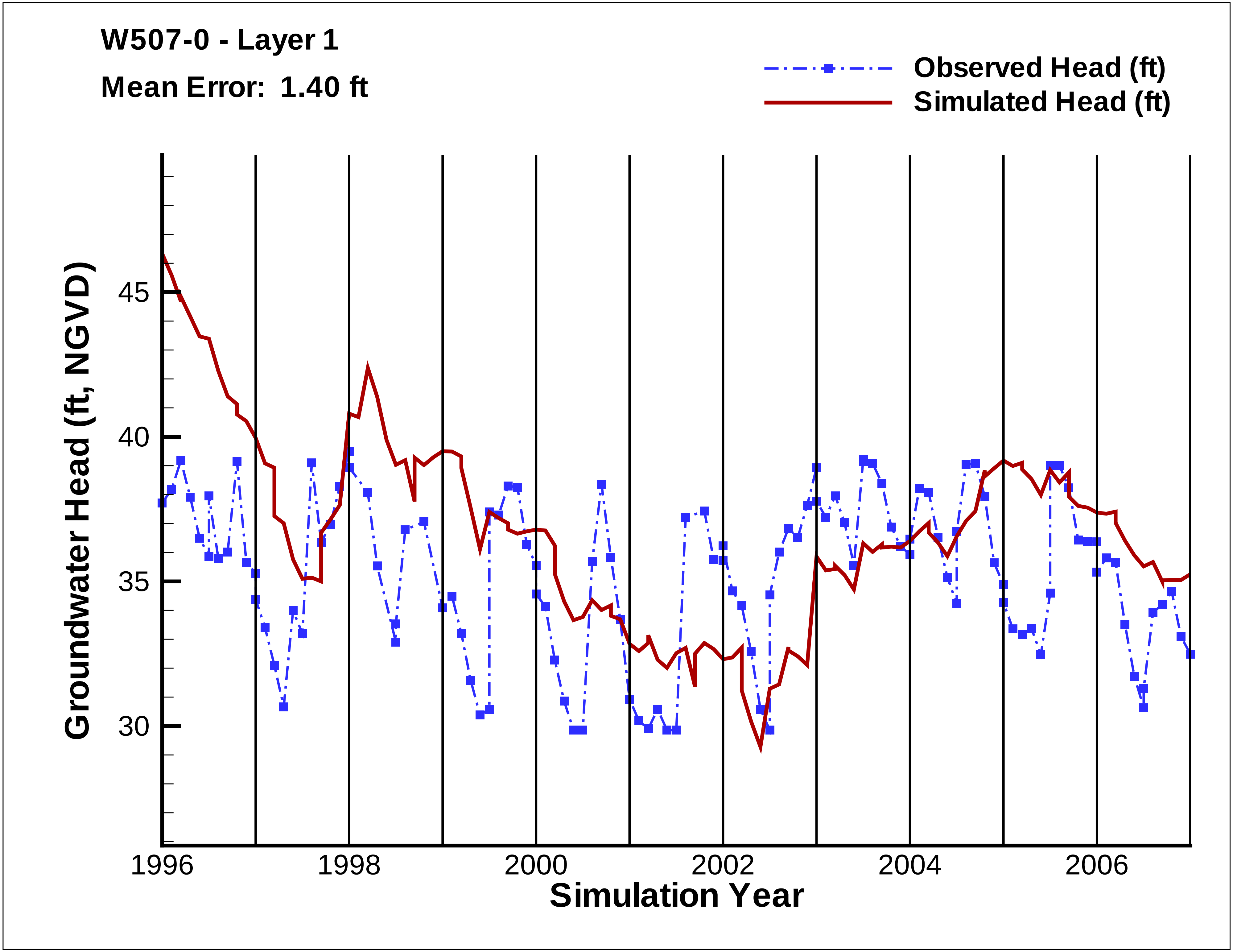
W482-0 - Layer 5
Mean Error: -0.50 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
3.5
3
2.5
2
1.5
1
1996
1998
2000
2002
2004
2006
Simulation Year


W484-0 - Layer 3
Mean Error: -1.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

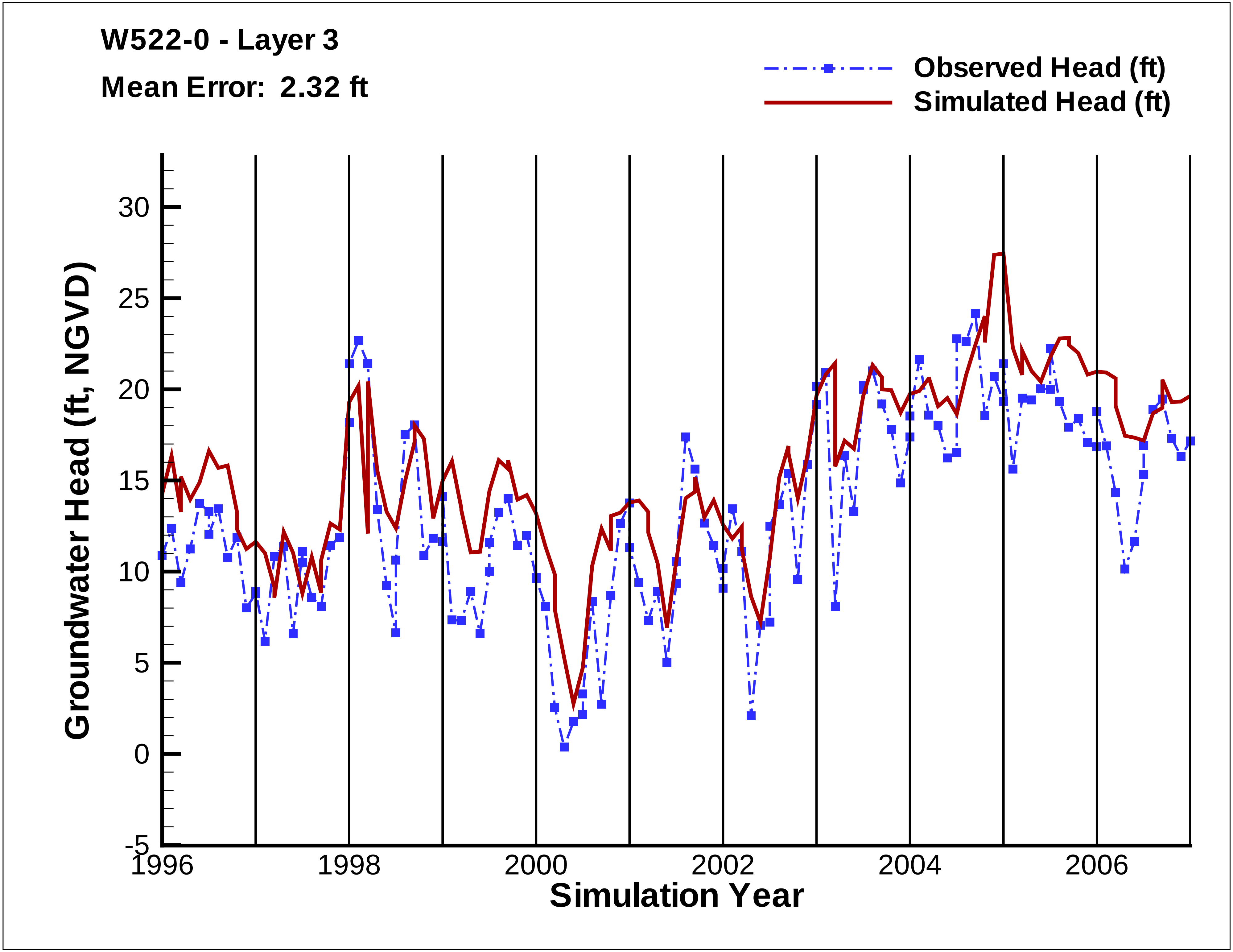

W498-0 - Layer 3
Mean Error: -1.04 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
80
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

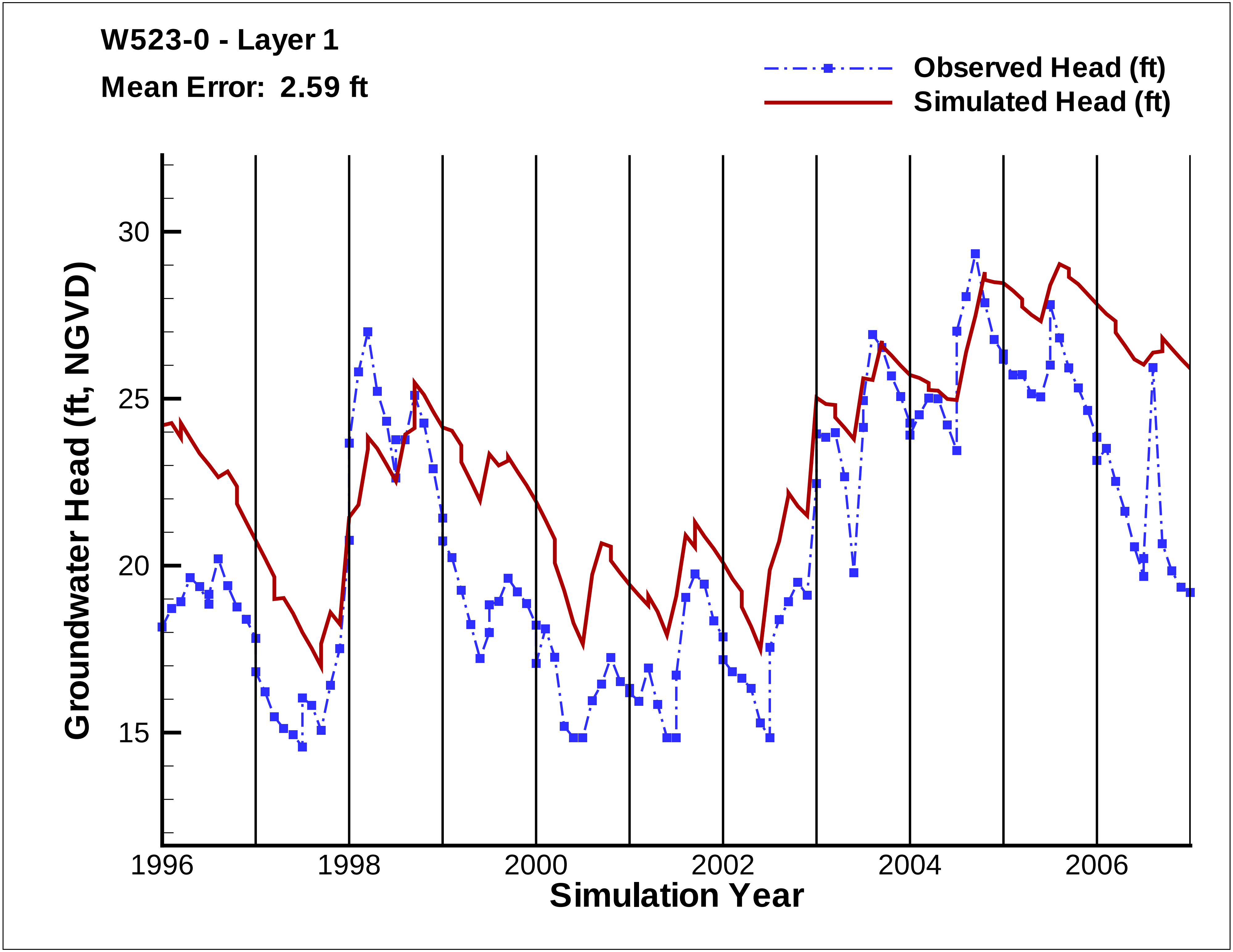

W500-0 - Layer 1
Mean Error: -8.63 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
35
40
45
50
1996
1998
2000
2002
2004
2006
Simulation Year

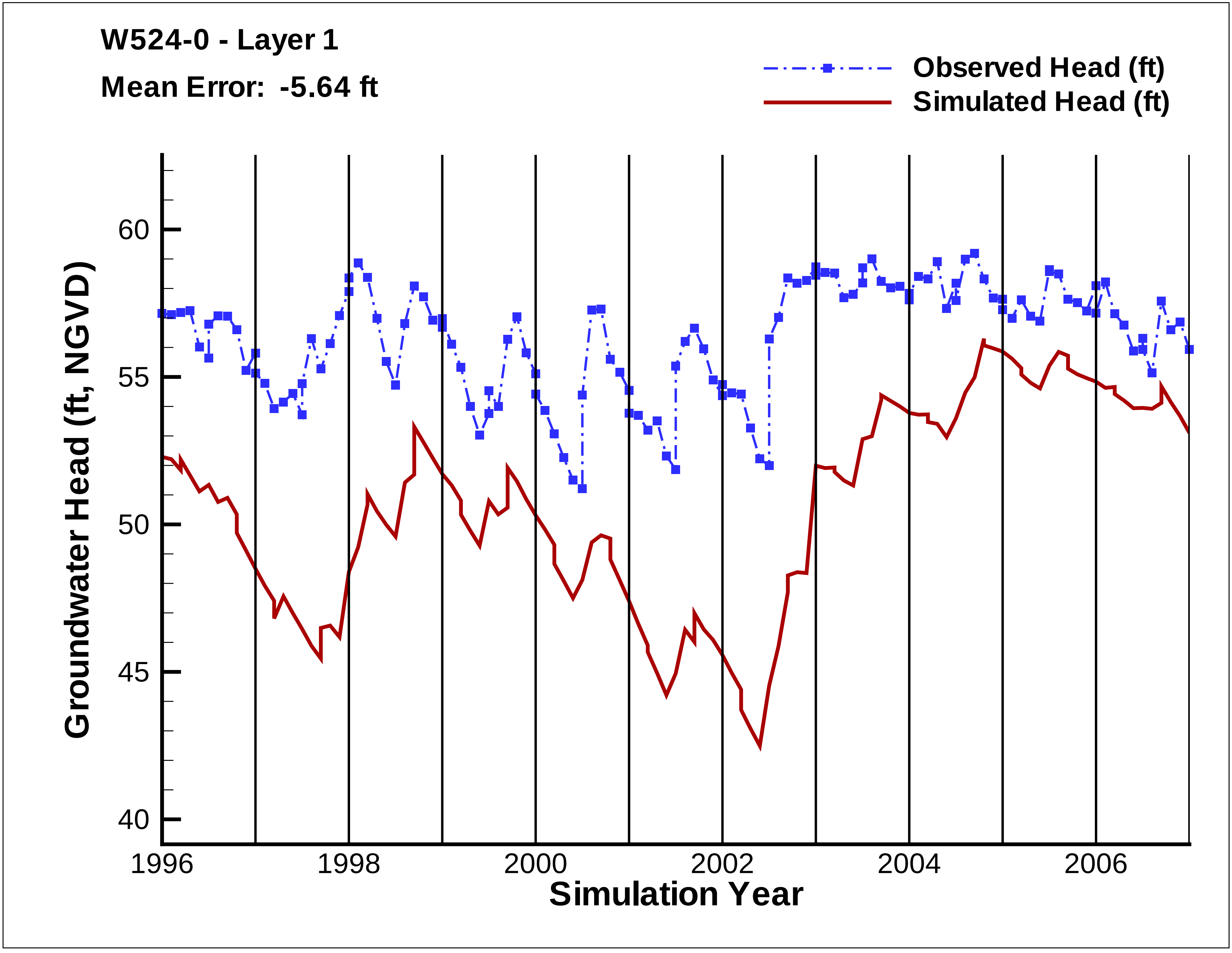

W504-0 - Layer 4
Mean Error: 8.61 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year



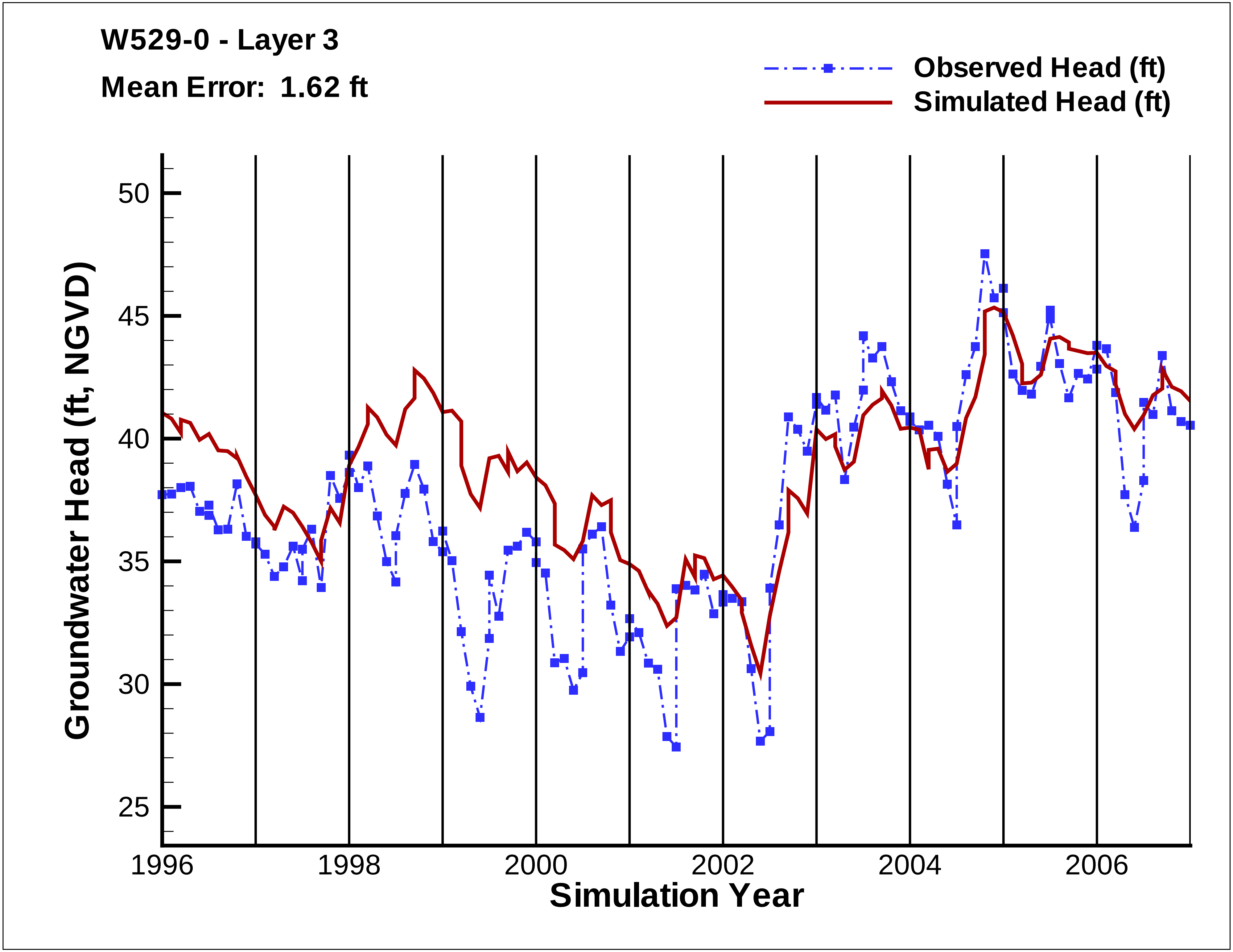
W507-0 - Layer 1
Mean Error: 1.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

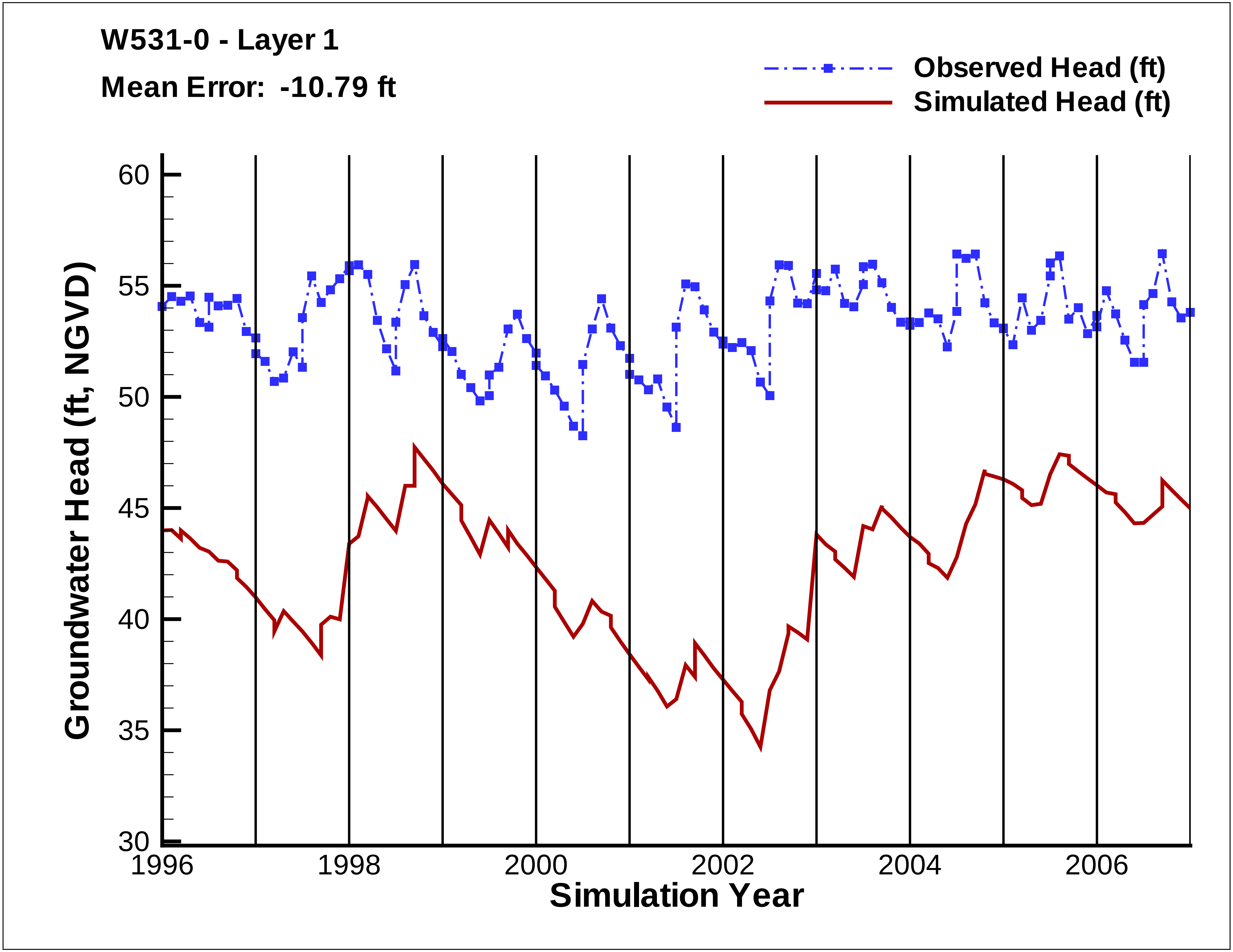

W522-0 - Layer 3
Mean Error: 2.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
5
0
-5
1996
1998
2000
2002
2004
2006
Simulation Year

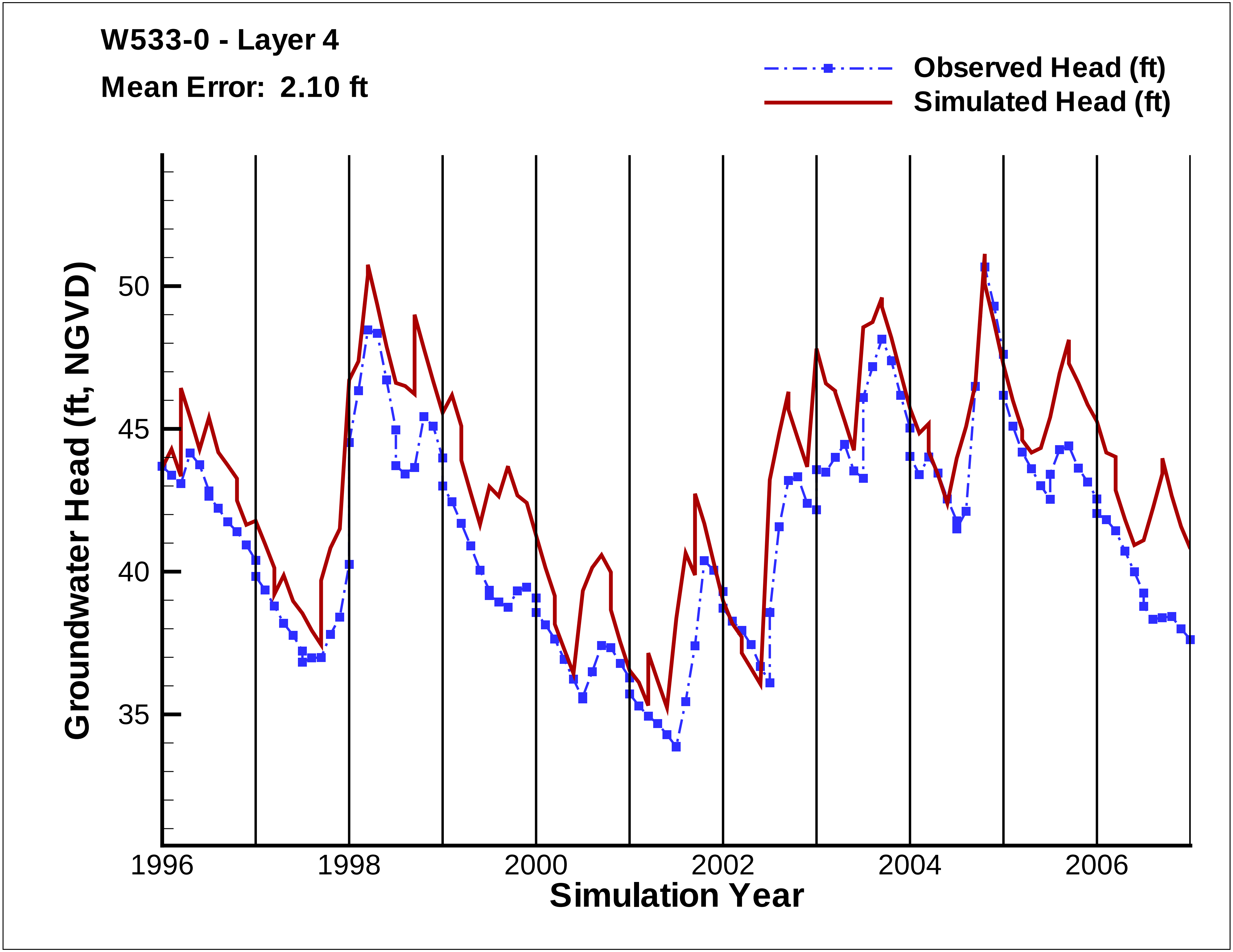

W523-0 - Layer 1
Mean Error: 2.59 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
1996
1998
2000
2002
2004
2006
Simulation Year



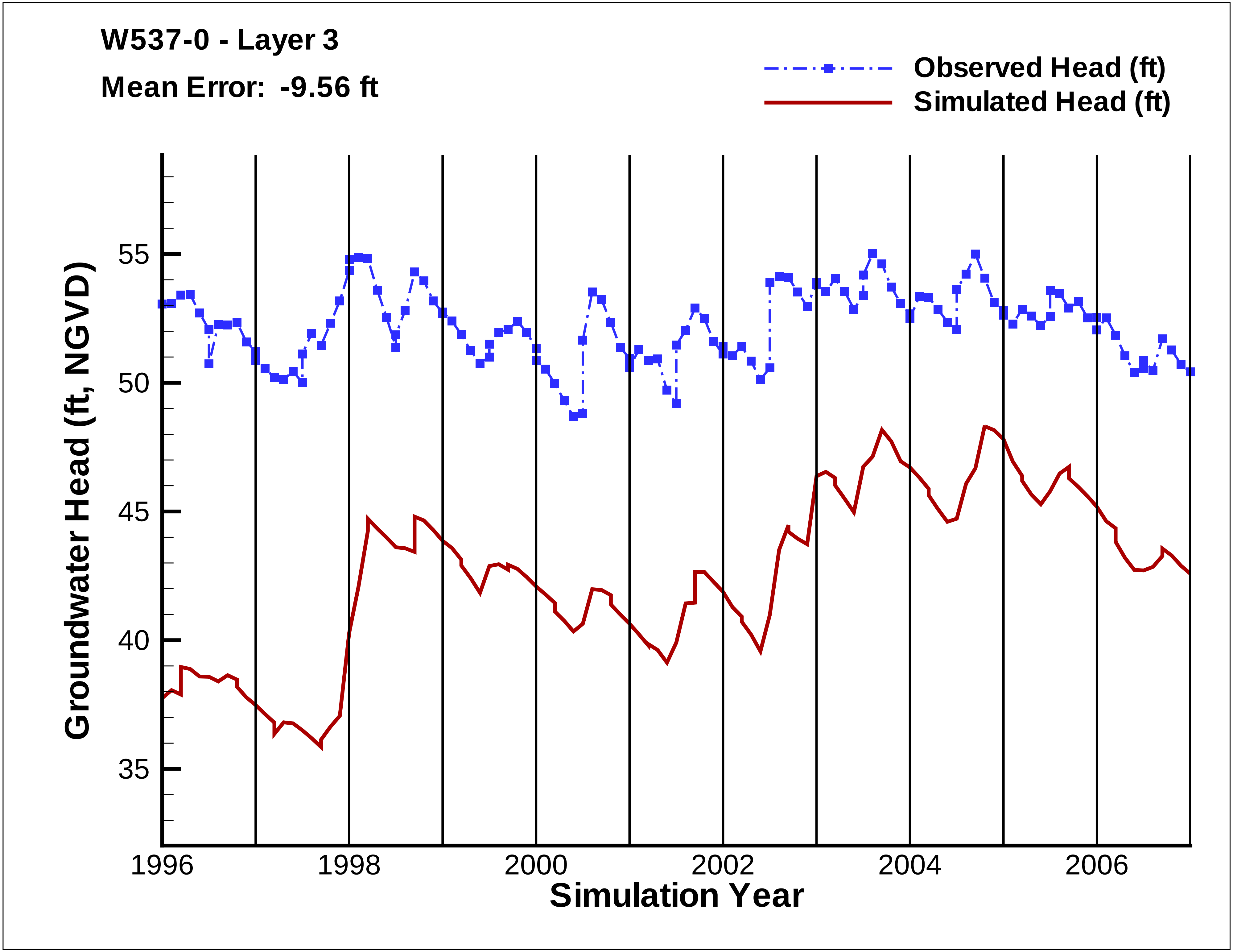
W524-0 - Layer 1
Mean Error: -5.64 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

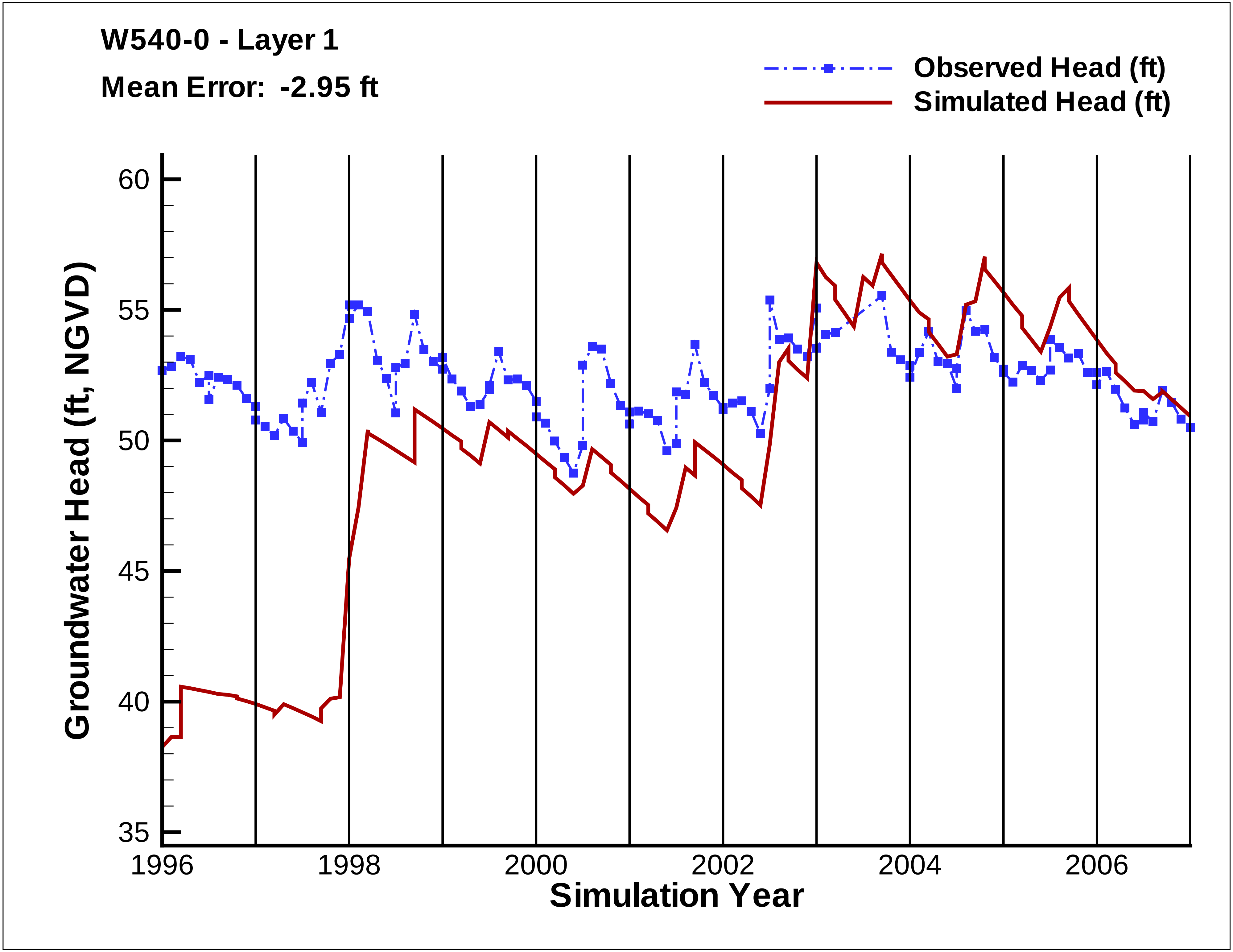

W529-0 - Layer 3
Mean Error: 1.62 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

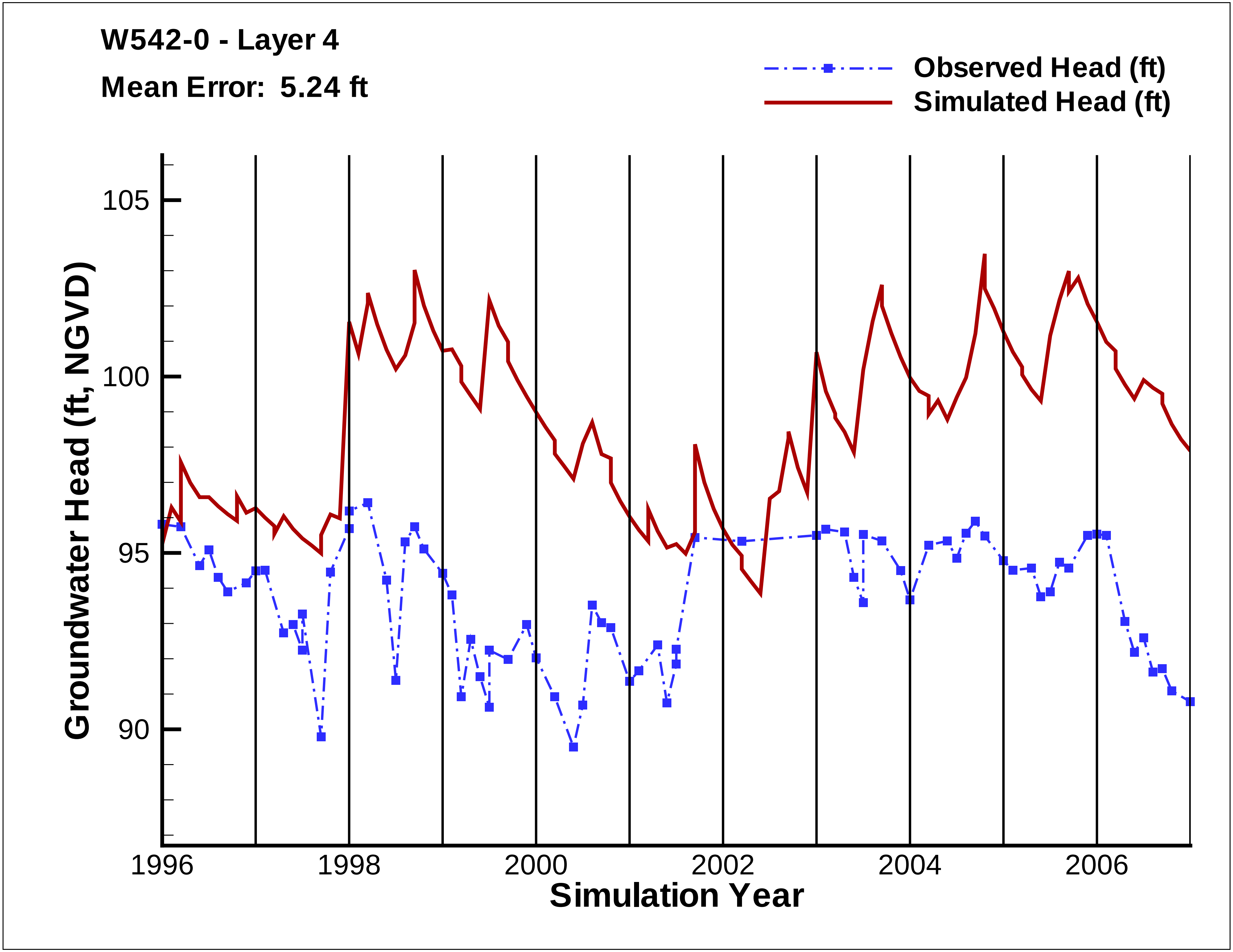

W531-0 - Layer 1
Mean Error: -10.79 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

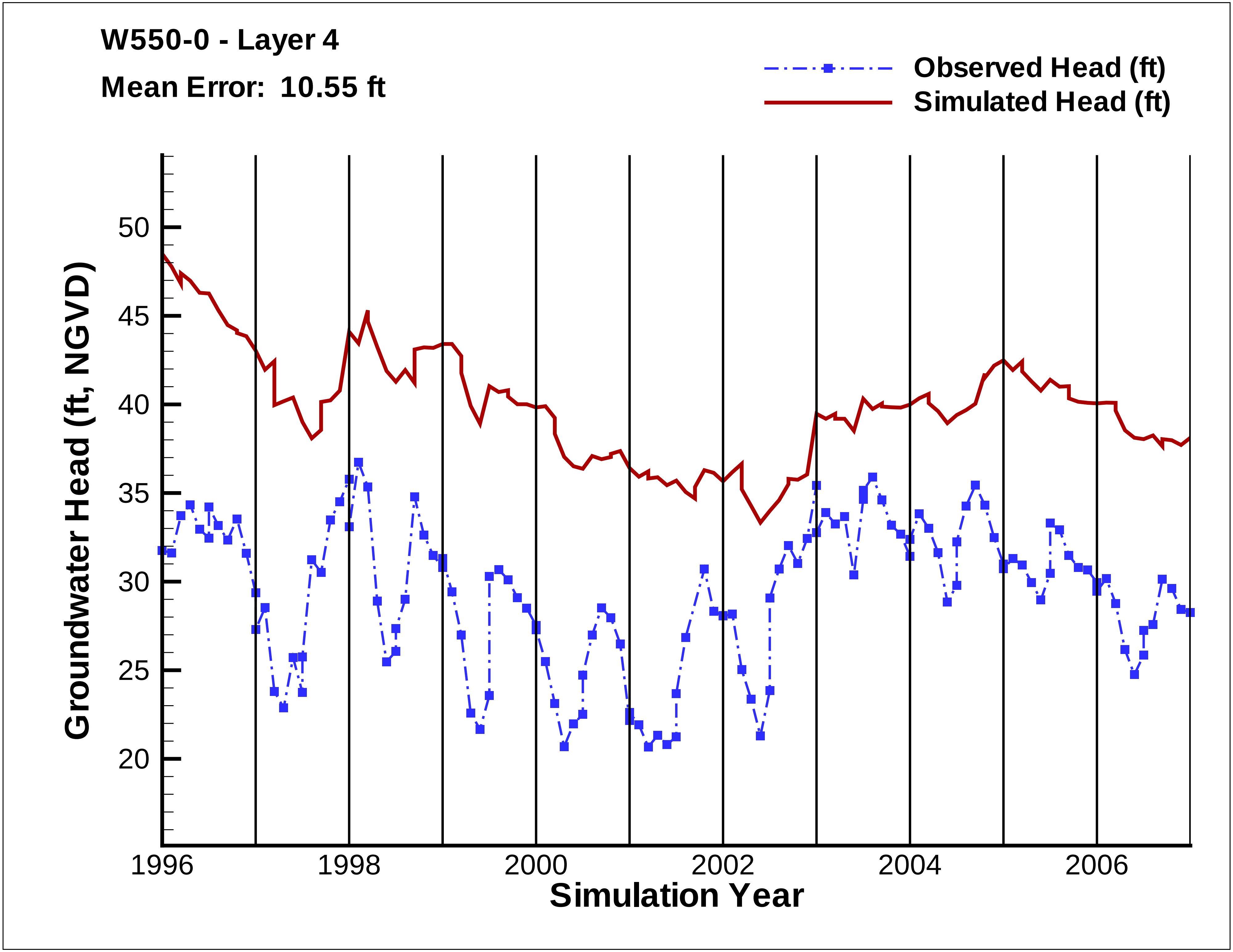


W533-0 - Layer 4
Mean Error: 2.10 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

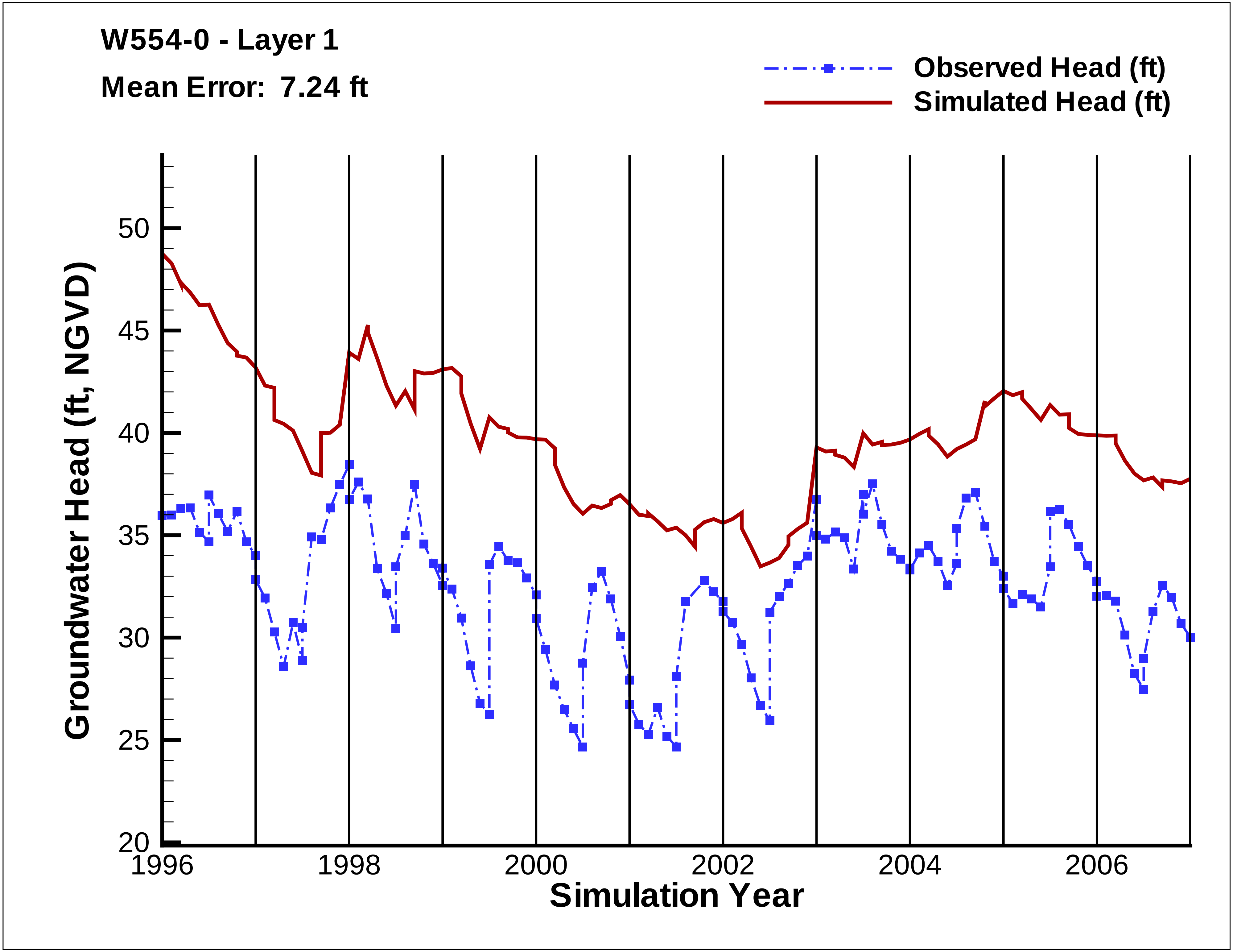

W537-0 - Layer 3
Mean Error: -9.56 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year


W540-0 - Layer 1
Mean Error: -2.95 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

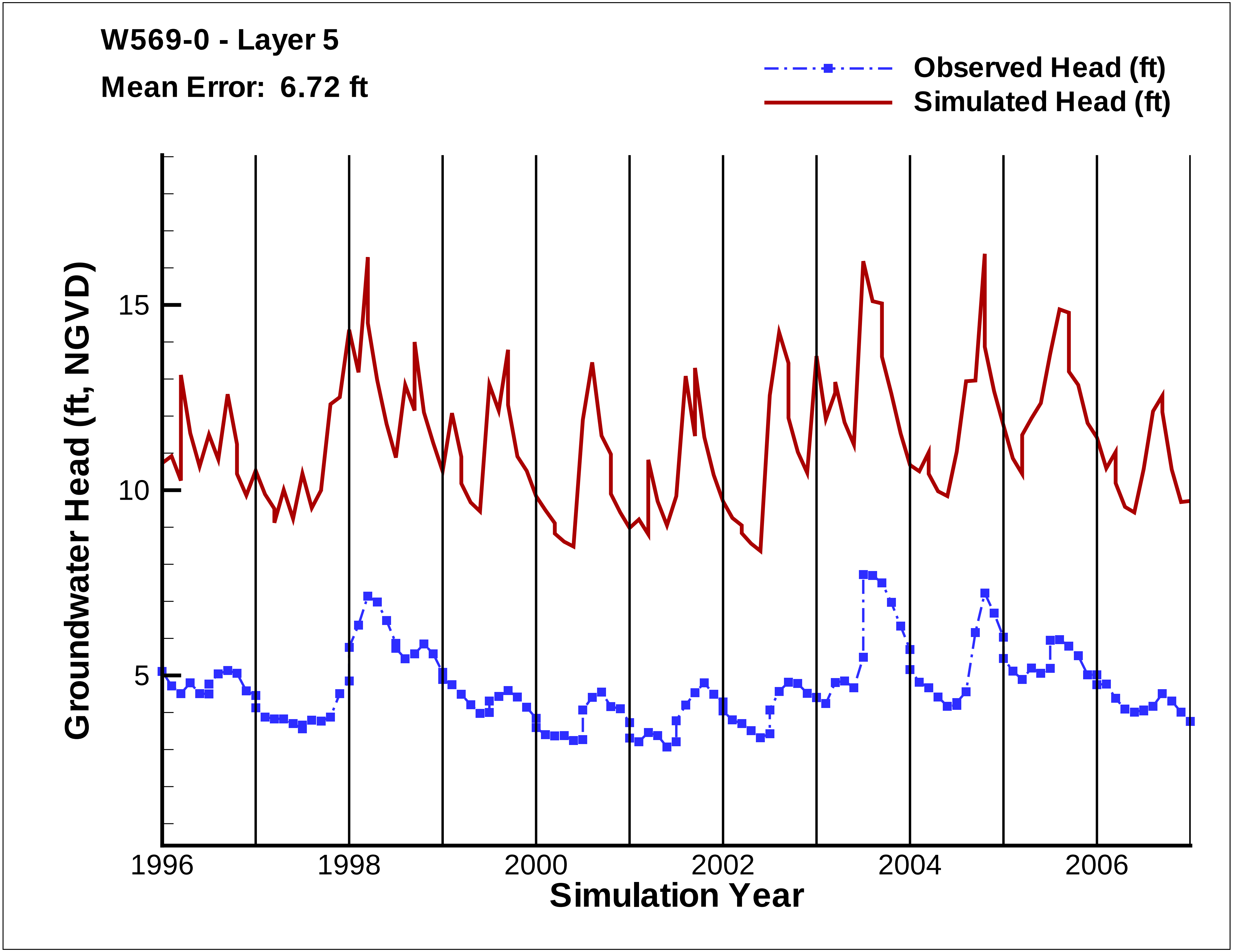

W542-0 - Layer 4
Mean Error: 5.24 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
105
100
95
90
1996
1998
2000
2002
2004
2006
Simulation Year

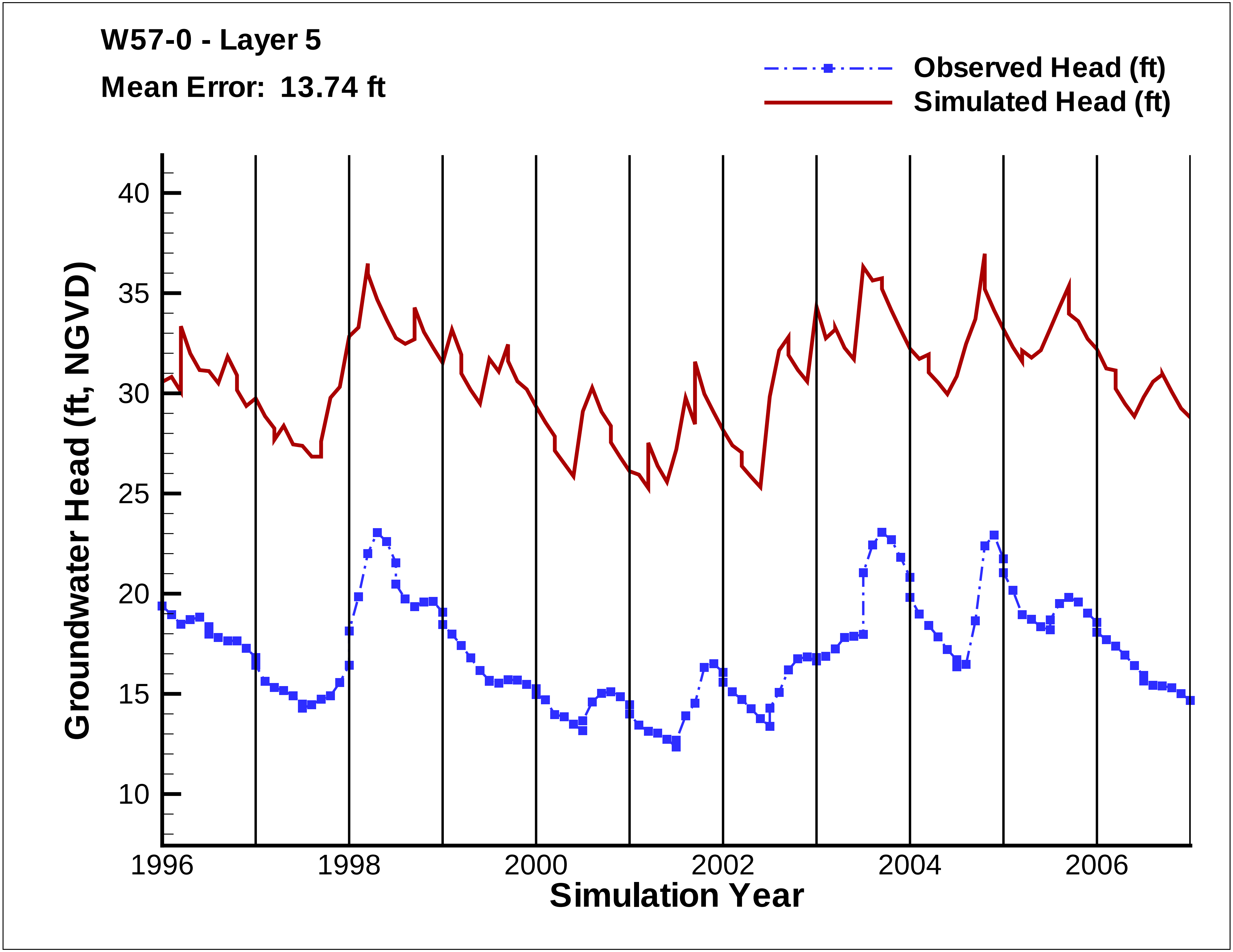


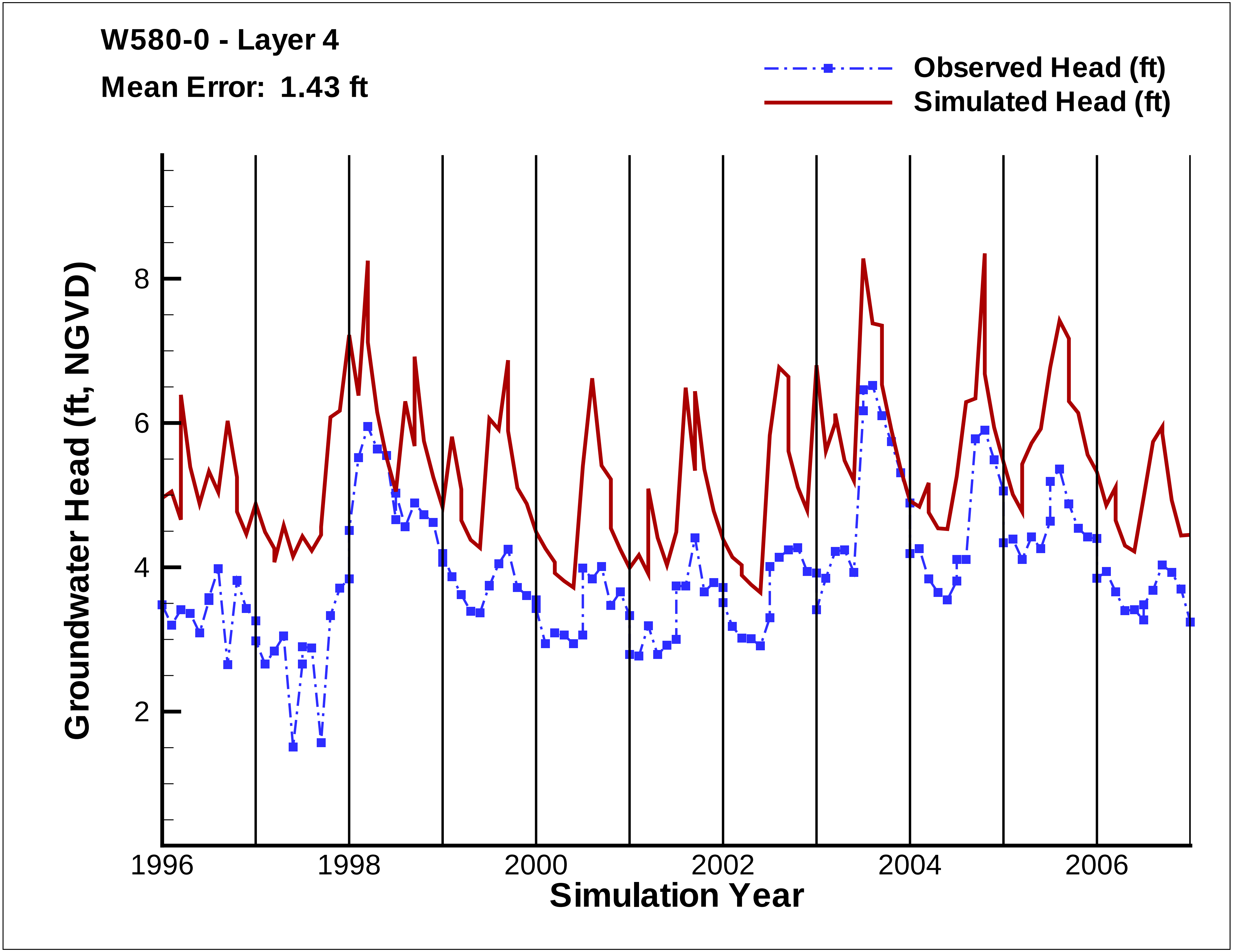
W550-0 - Layer 4
Mean Error: 10.55 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year



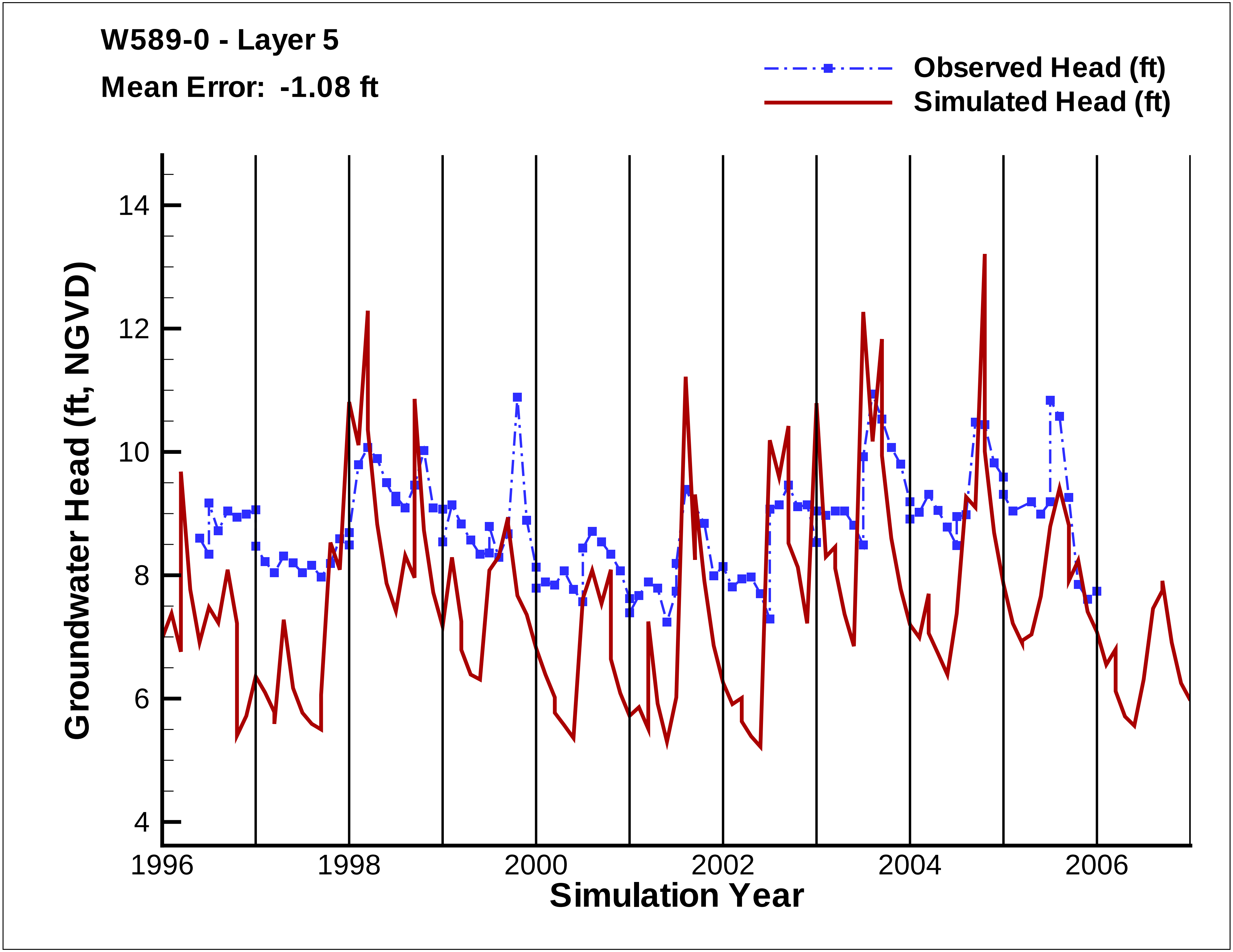
W554-0 - Layer 1
Mean Error: 7.24 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
25
30
35
40
45
50
1996
1998
2000
2002
2004
2006
Simulation Year


W569-0 - Layer 5
Mean Error: 6.72 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year

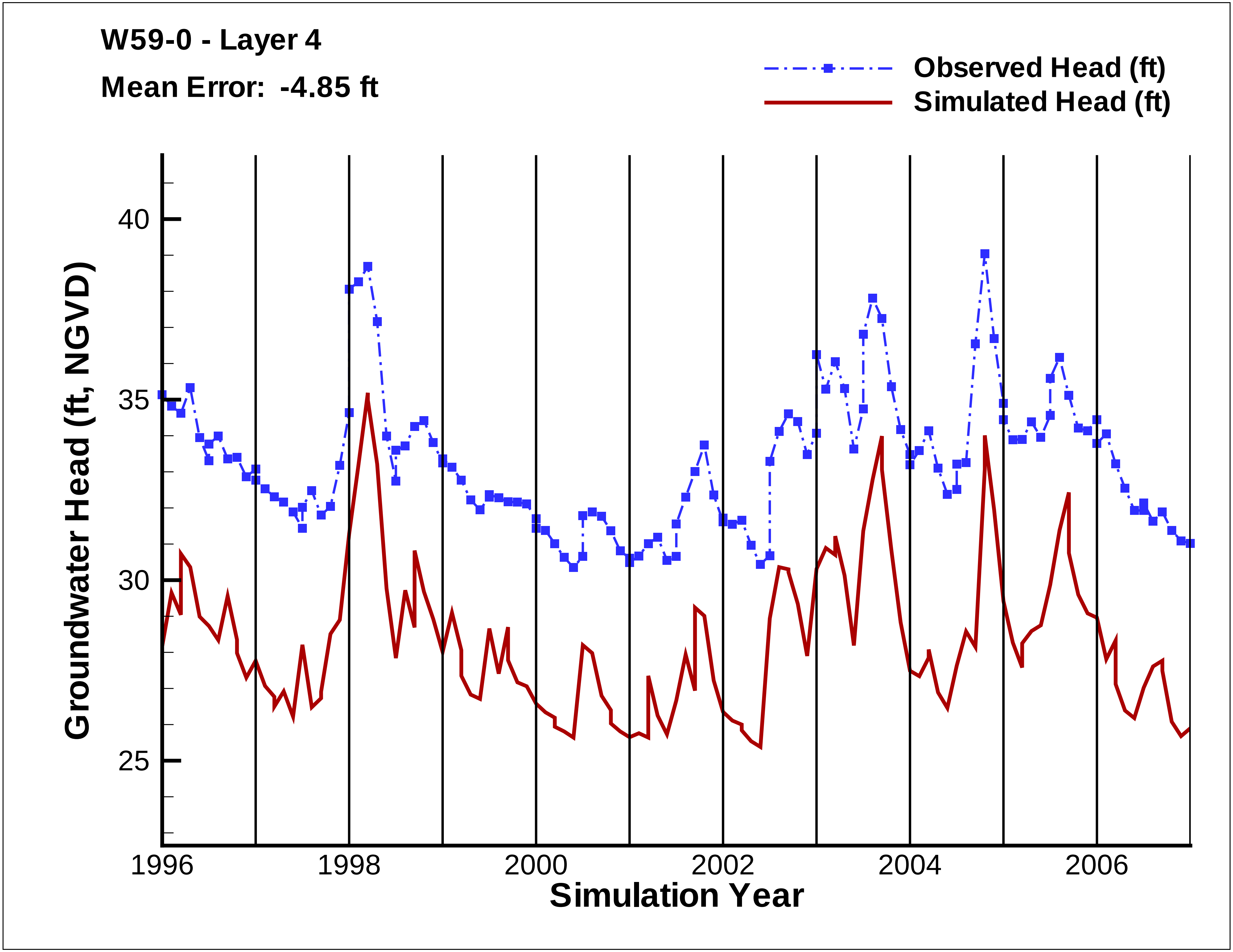

W57-0 - Layer 5
Mean Error: 13.74 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year



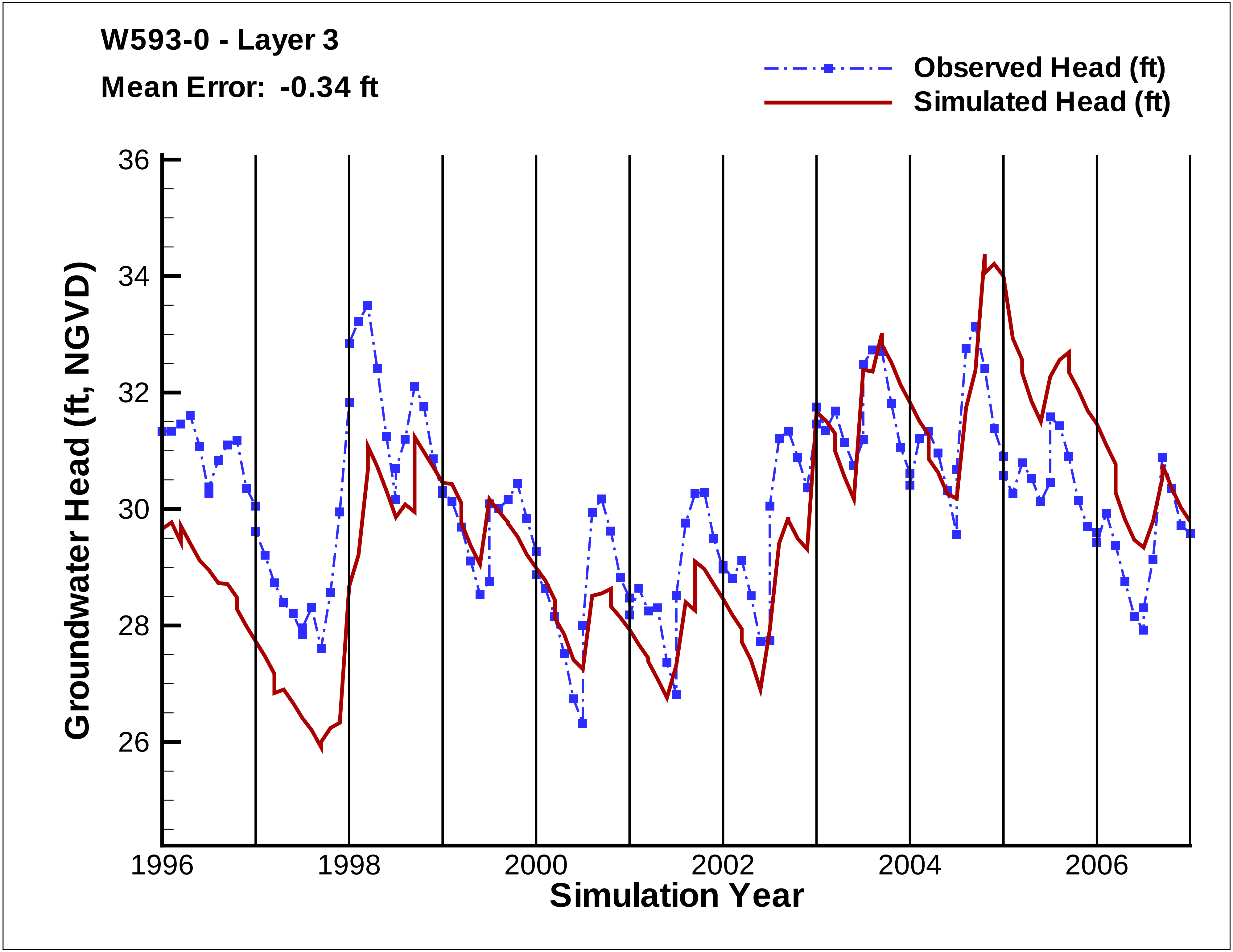
W580-0 - Layer 4
Mean Error: 1.43 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
8
6
4
2
1996
1998
2000
2002
2004
2006
Simulation Year

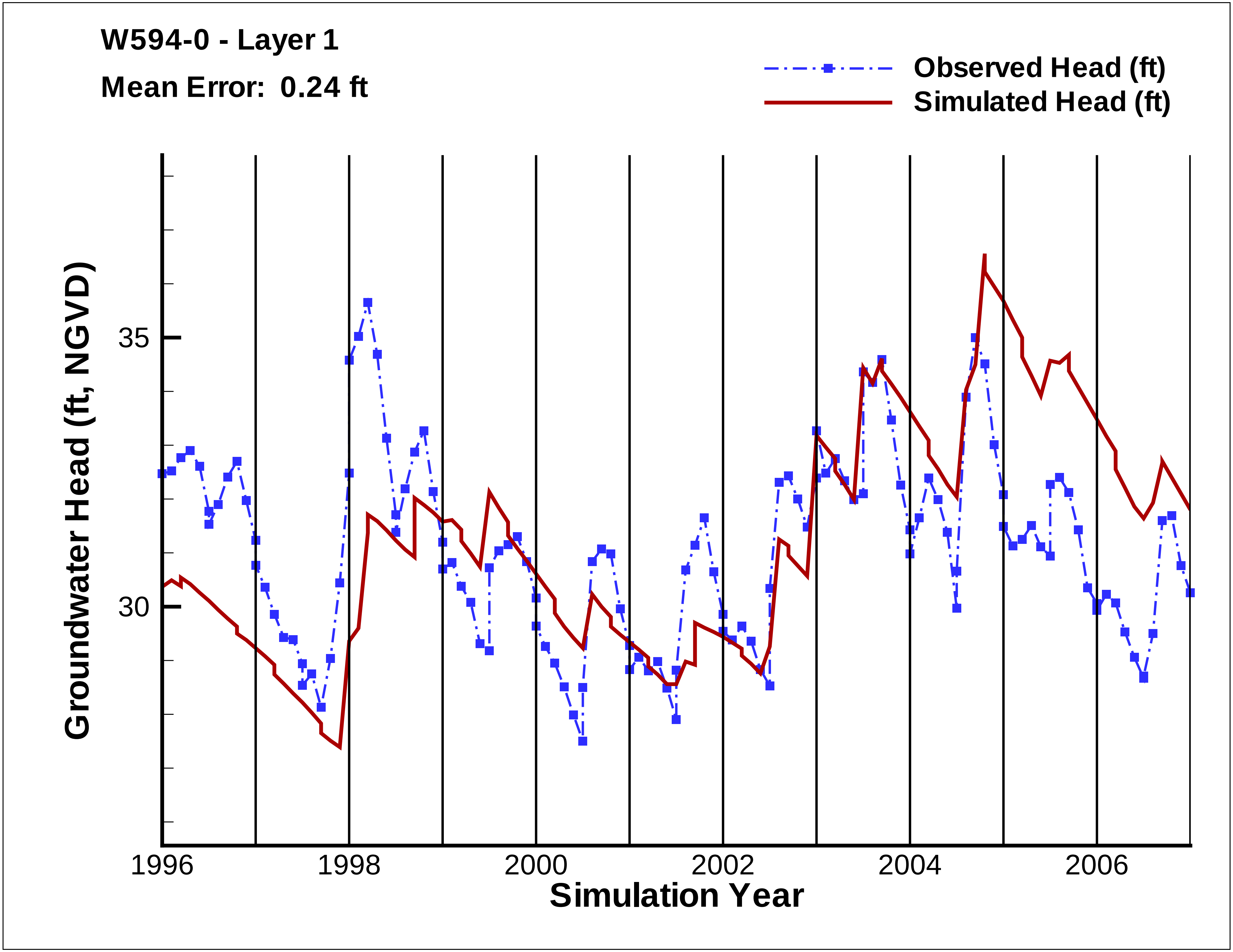


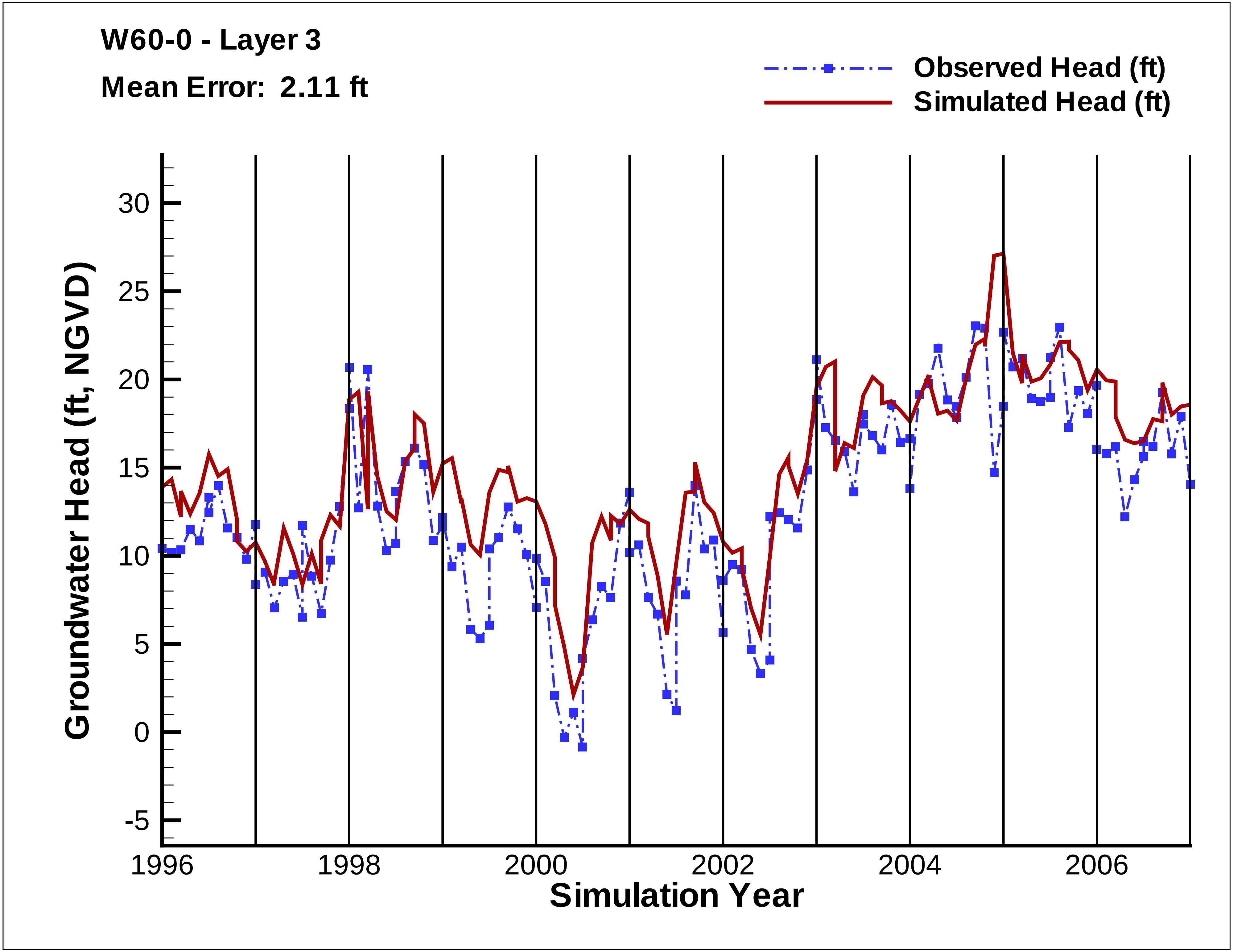
W589-0 - Layer 5
Mean Error: -1.08 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
4
6
8
10
12
14
1996
1998
2000
2002
2004
2006
Simulation Year

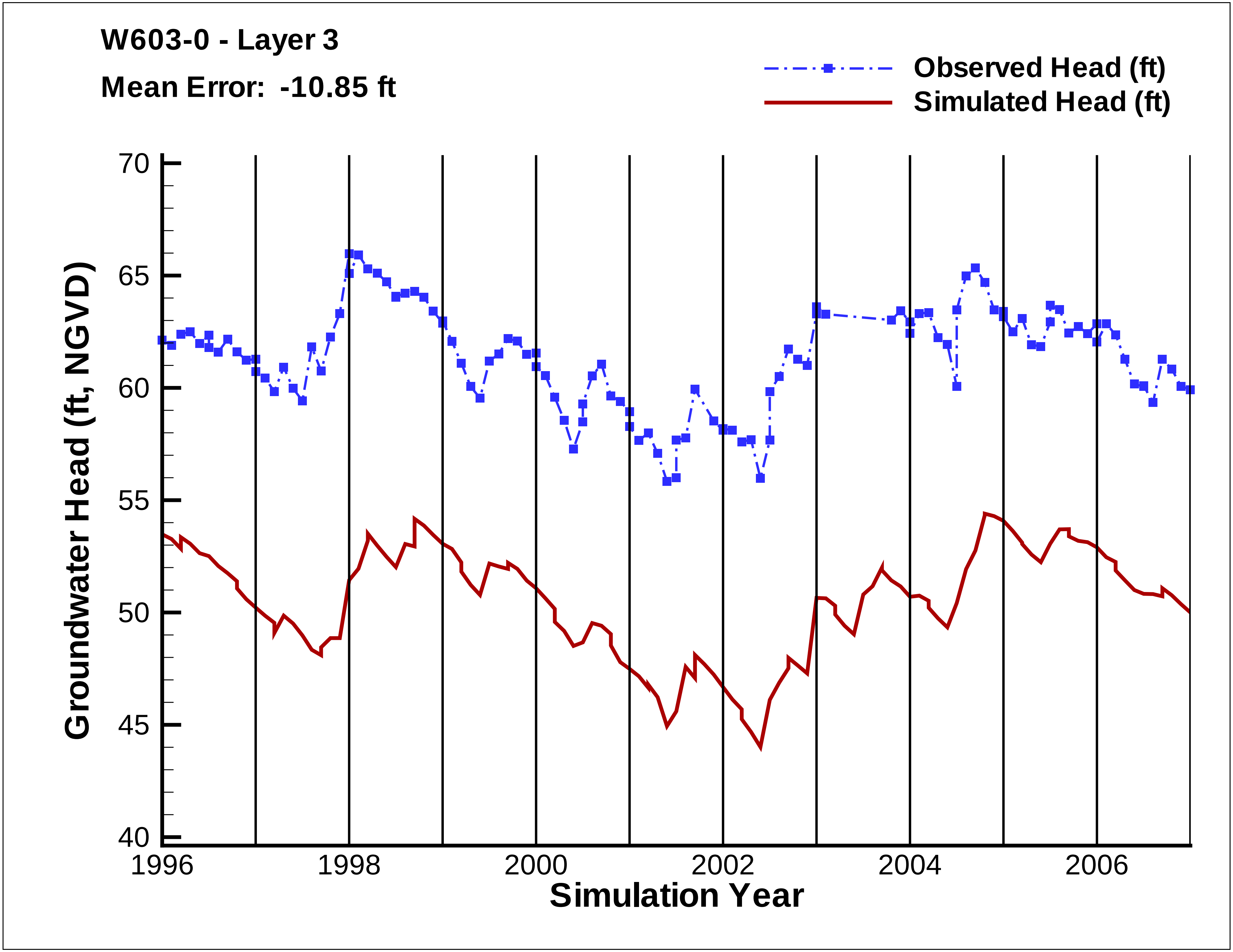


W59-0 - Layer 4
Mean Error: -4.85 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

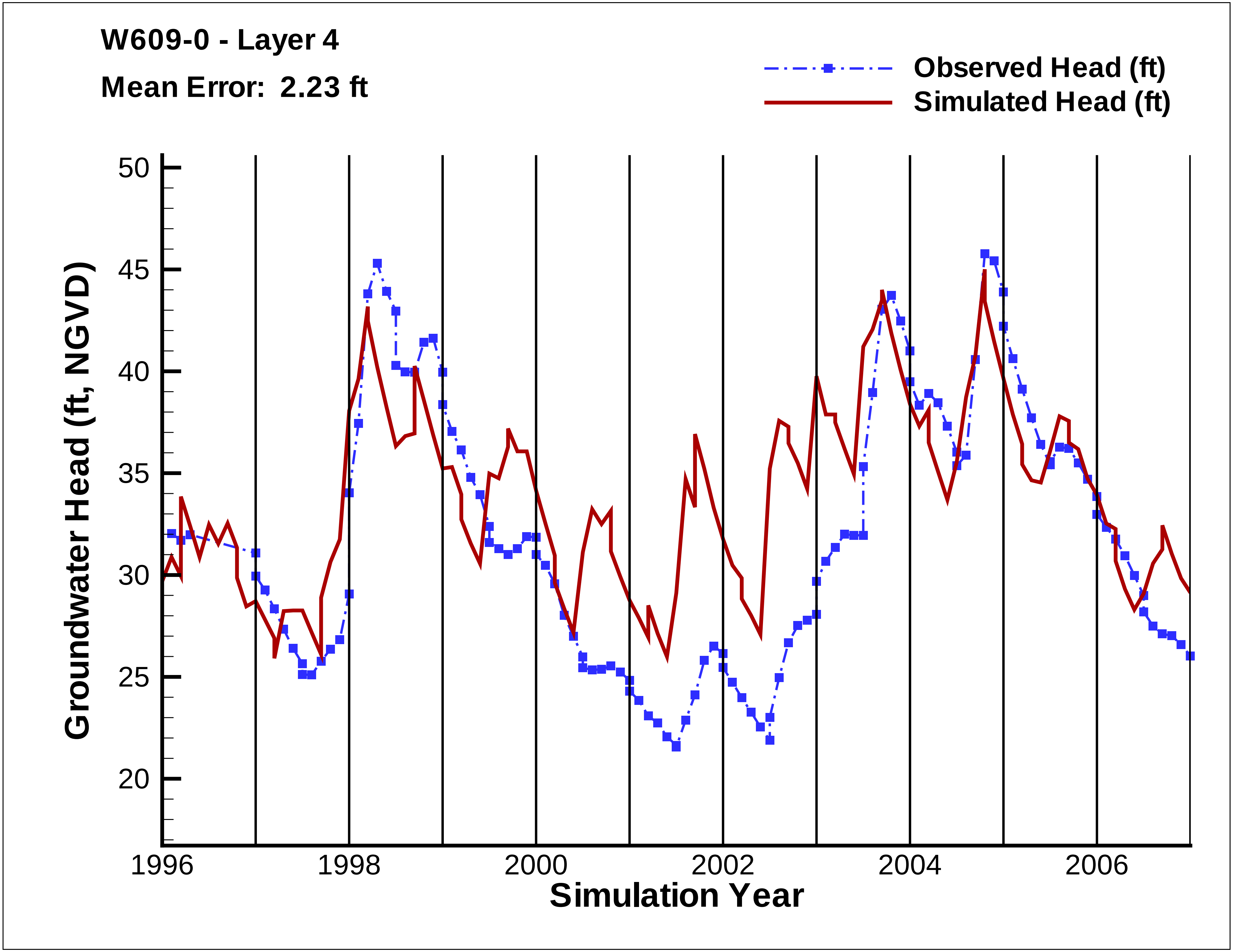

W593-0 - Layer 3
Mean Error: -0.34 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
36
34
32
30
28
26
1996
1998
2000
2002
2004
2006
Simulation Year


W594-0 - Layer 1
Mean Error: 0.24 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

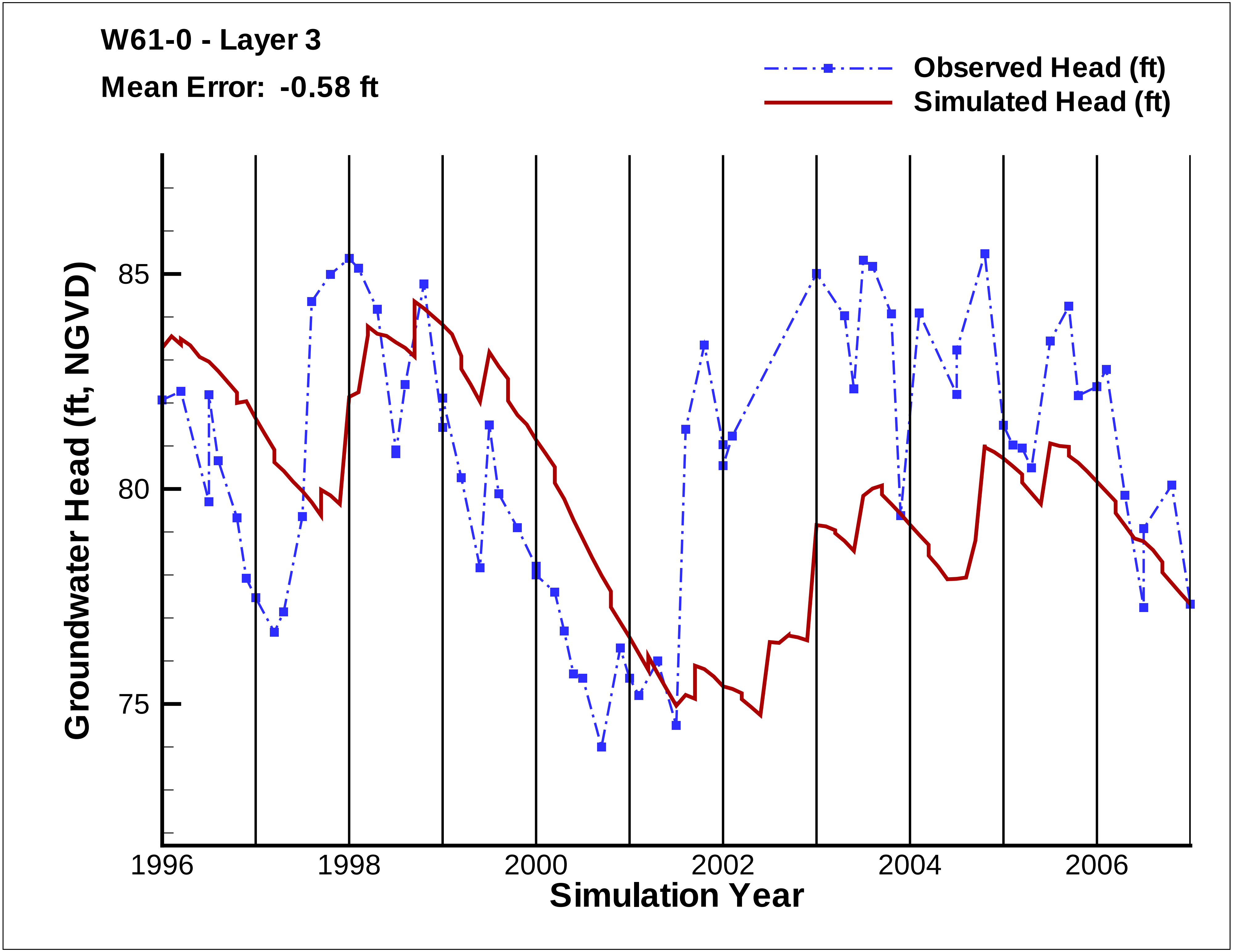

W60-0 - Layer 3
Mean Error: 2.11 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
15
10
5
0
-5
1996
1998
2000
2002
2004
2006
Simulation Year



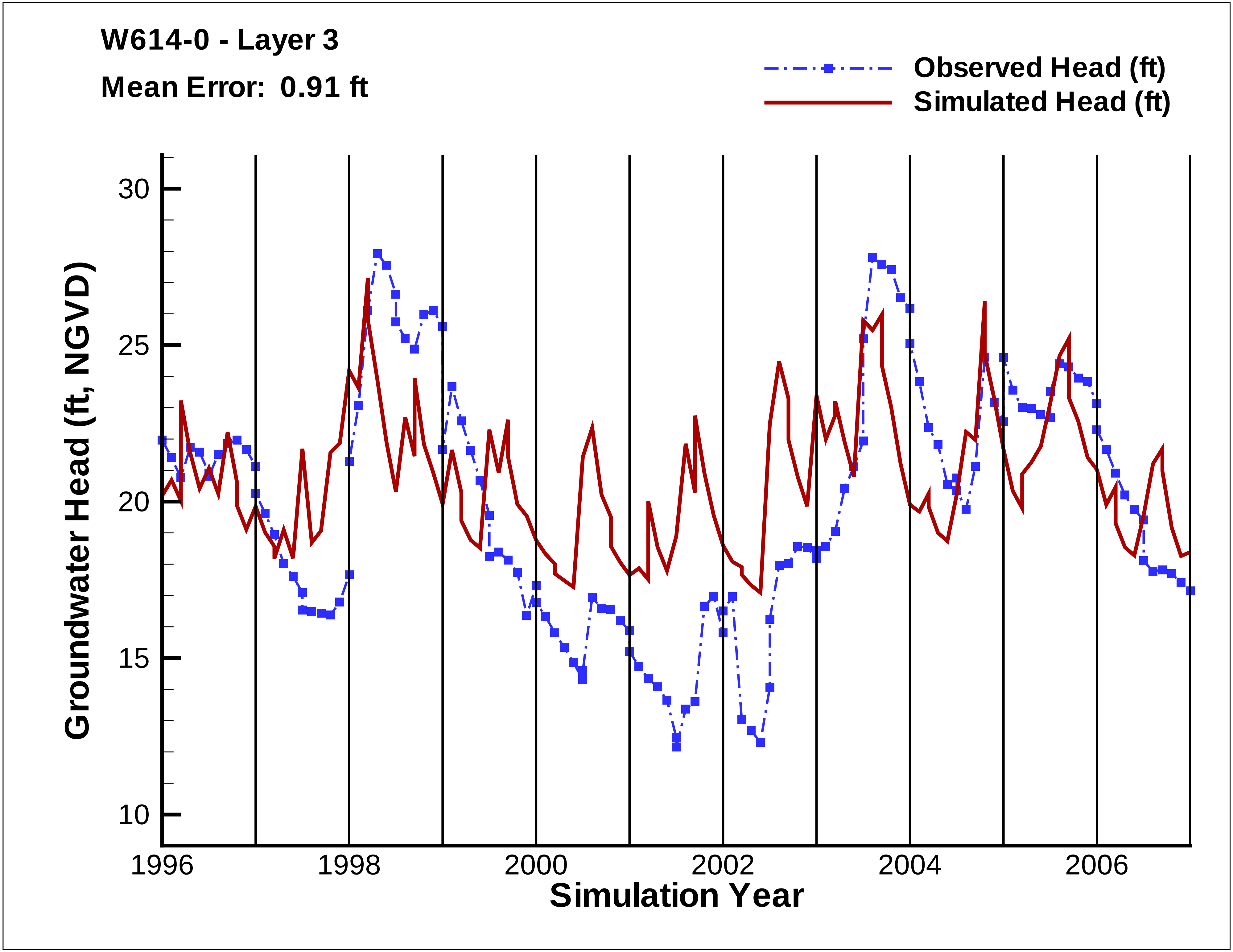
W603-0 - Layer 3
Mean Error: -10.85 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

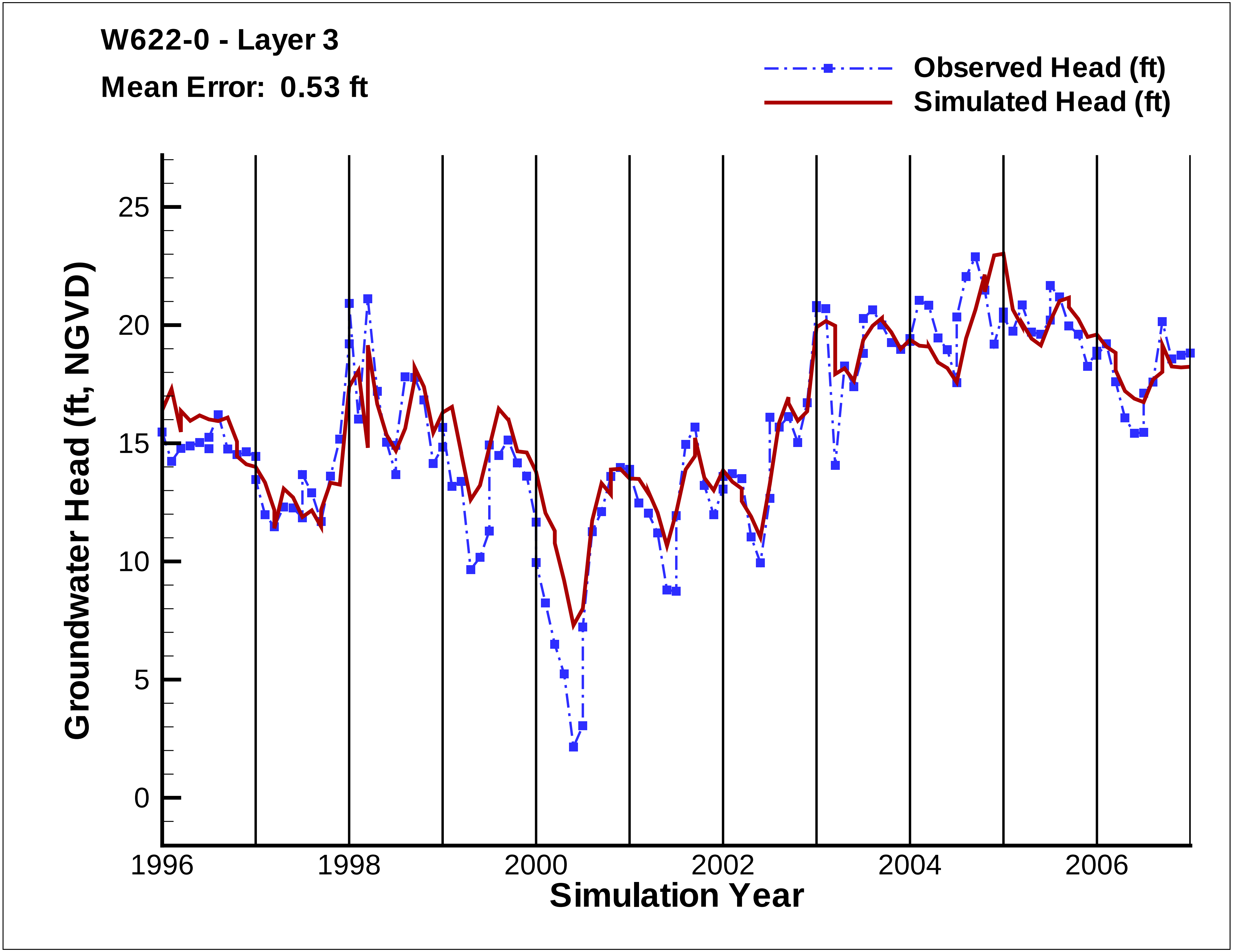


W609-0 - Layer 4
Mean Error: 2.23 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

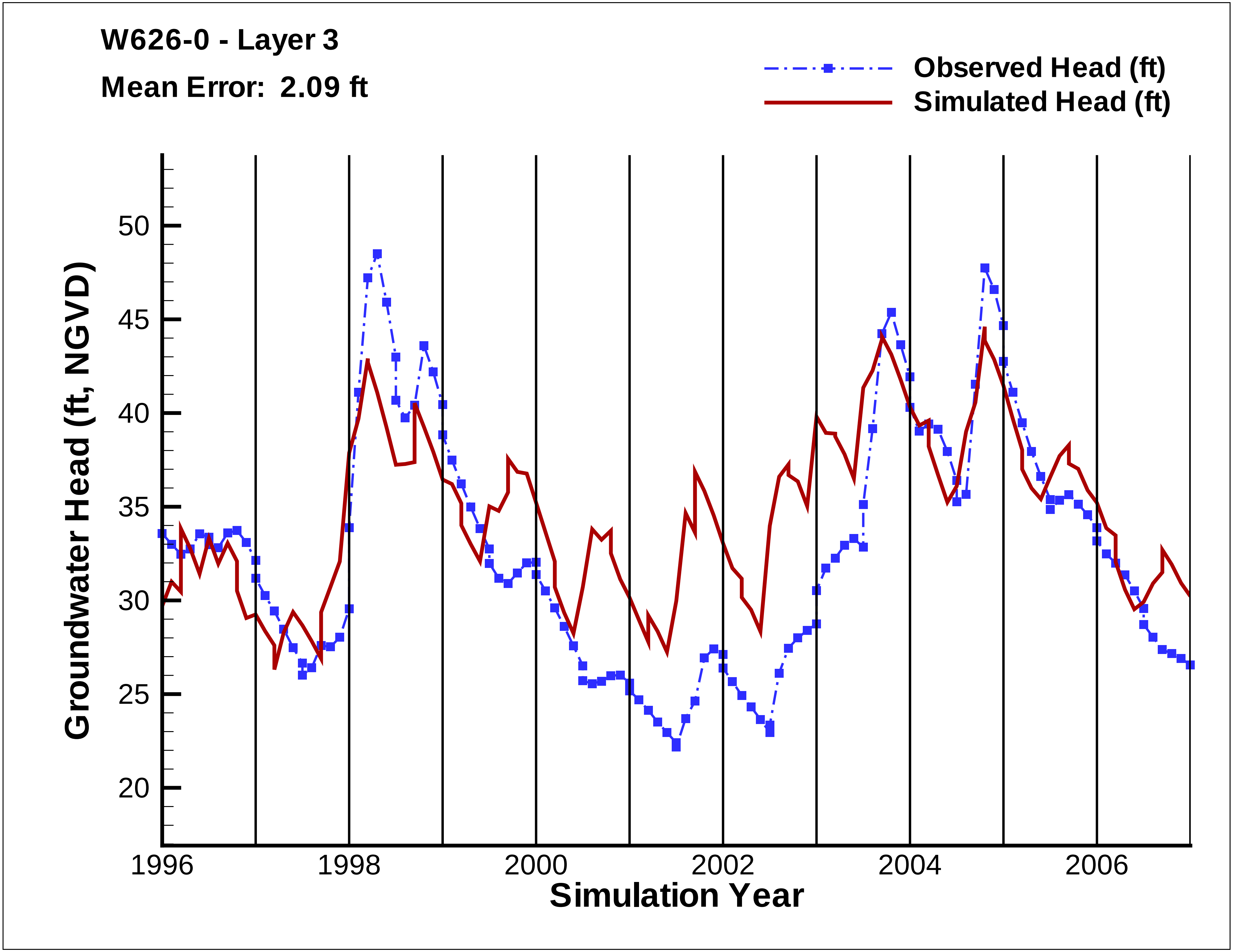


W61-0 - Layer 3
Mean Error: -0.58 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

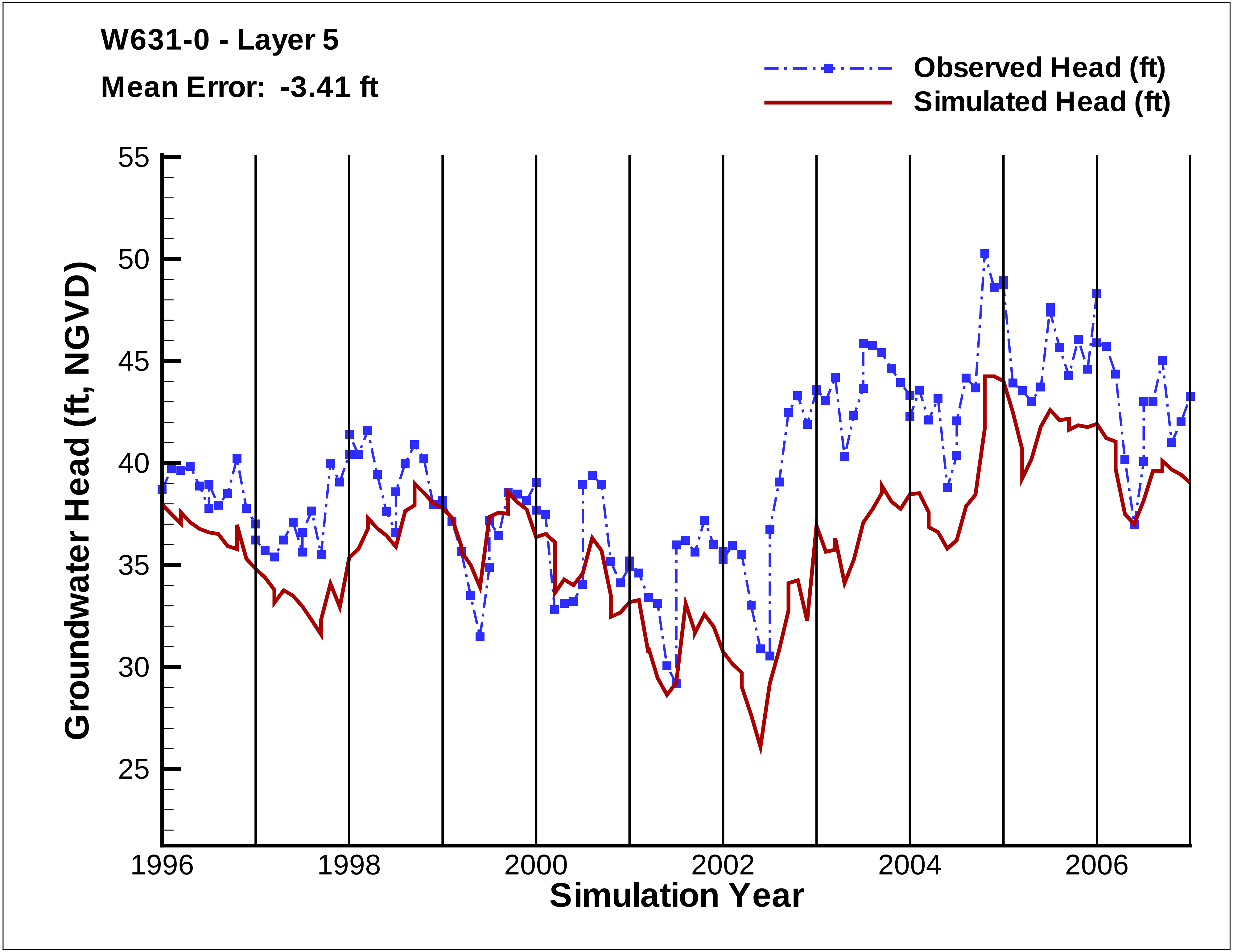

W614-0 - Layer 3
Mean Error: 0.91 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
30
1996
1998
2000
2002
2004
2006
Simulation Year

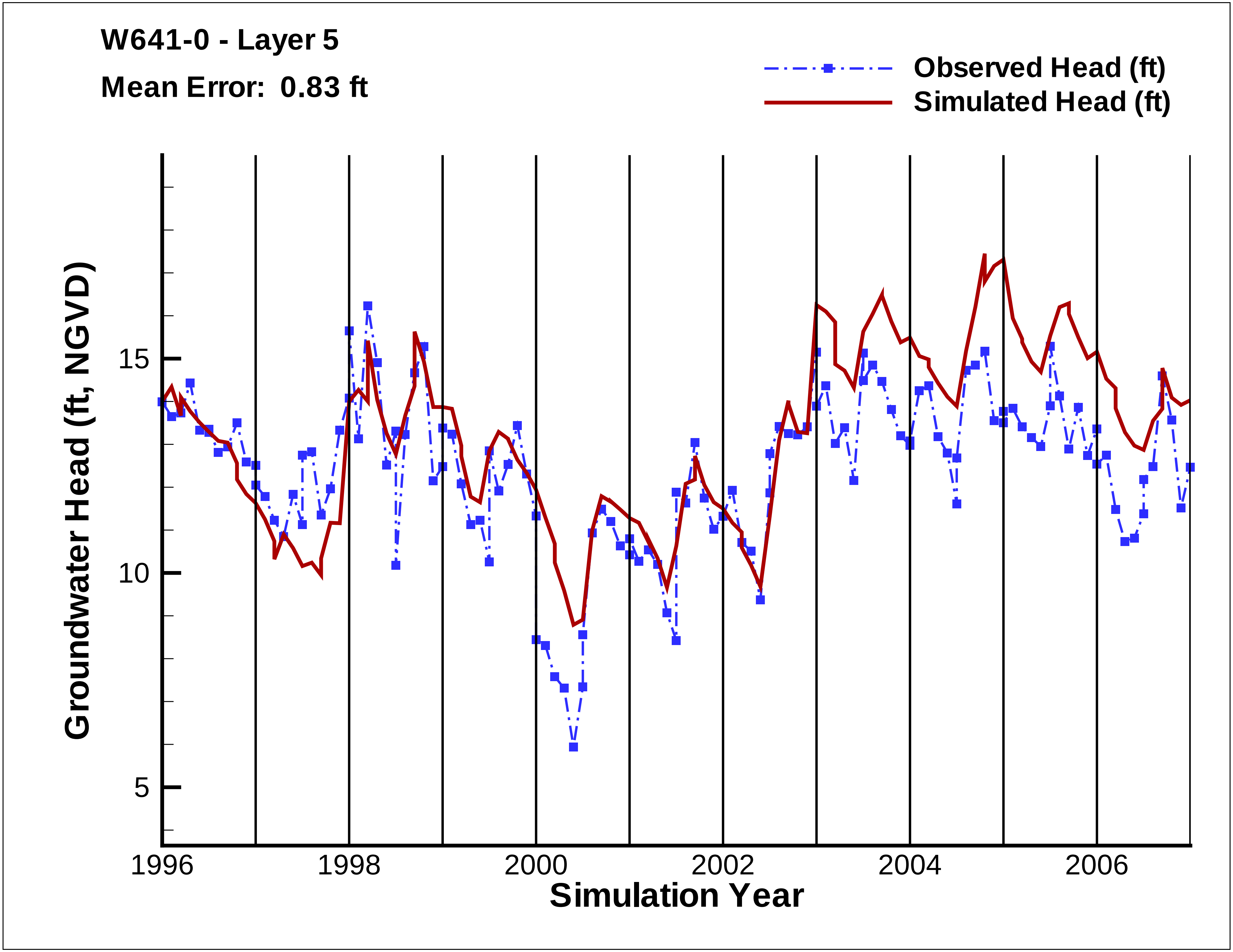


W622-0 - Layer 3
Mean Error: 0.53 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
0
5
10
15
20
25
1996
1998
2000
2002
2004
2006
Simulation Year

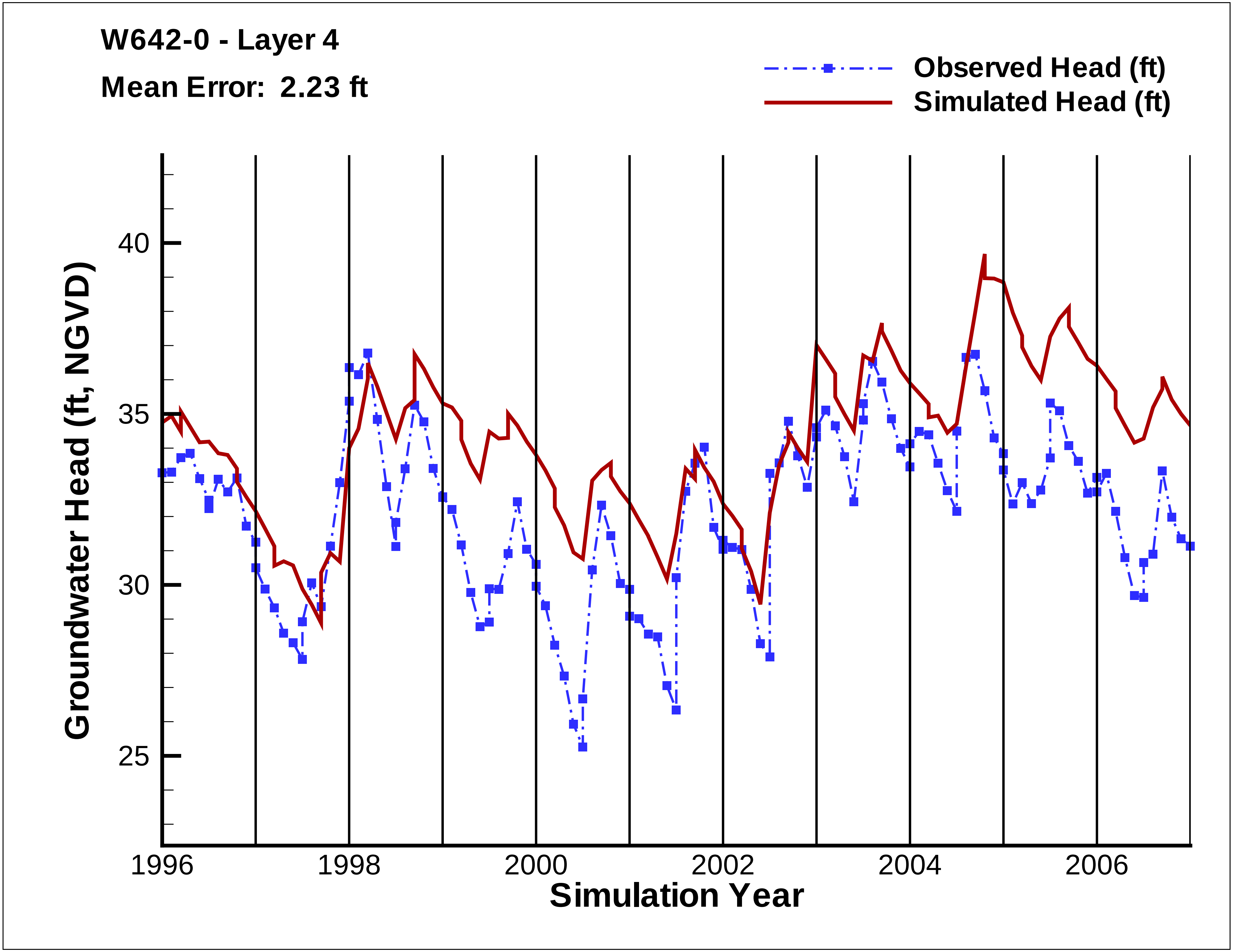


W626-0 - Layer 3
Mean Error: 2.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

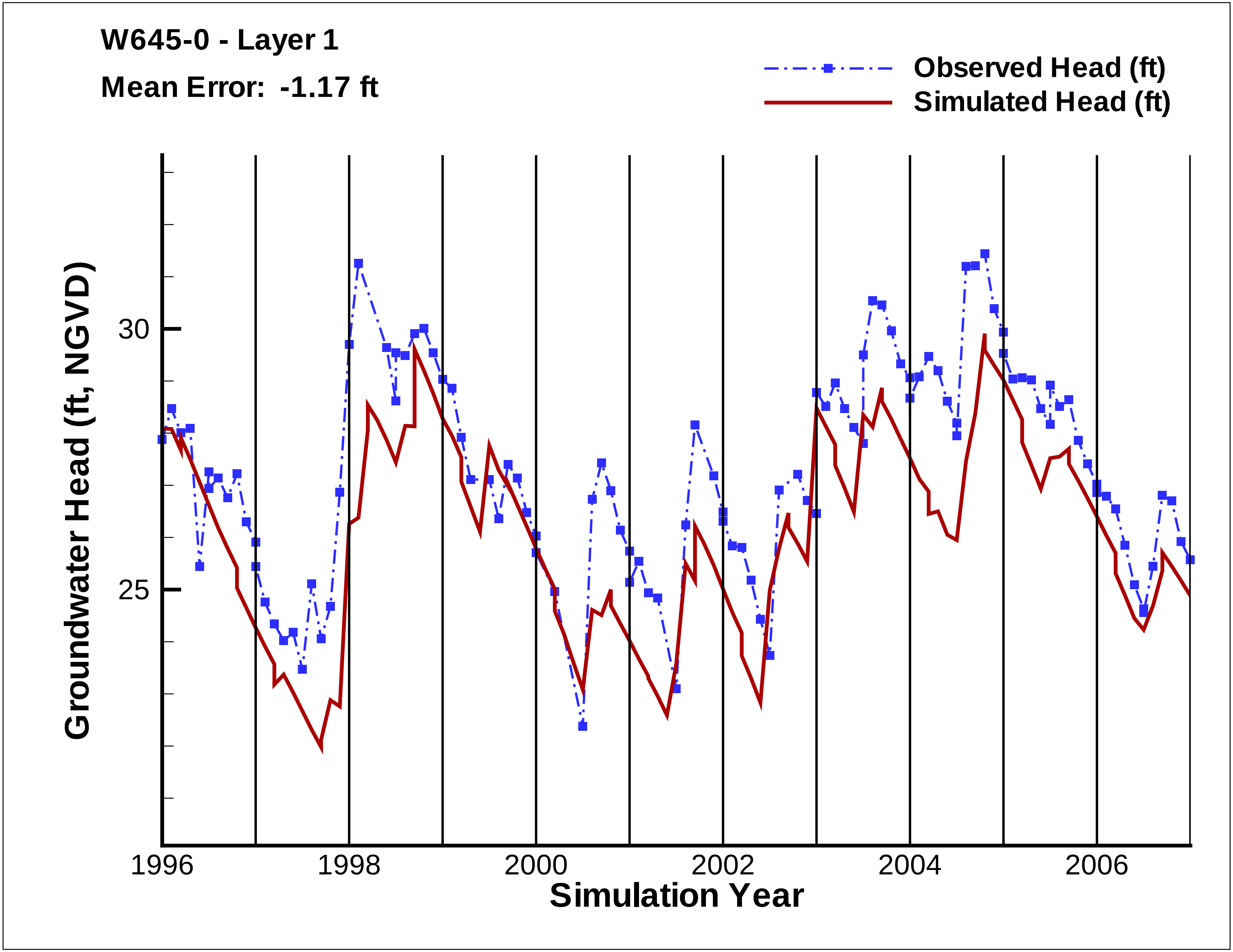

W631-0 - Layer 5
Mean Error: -3.41 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



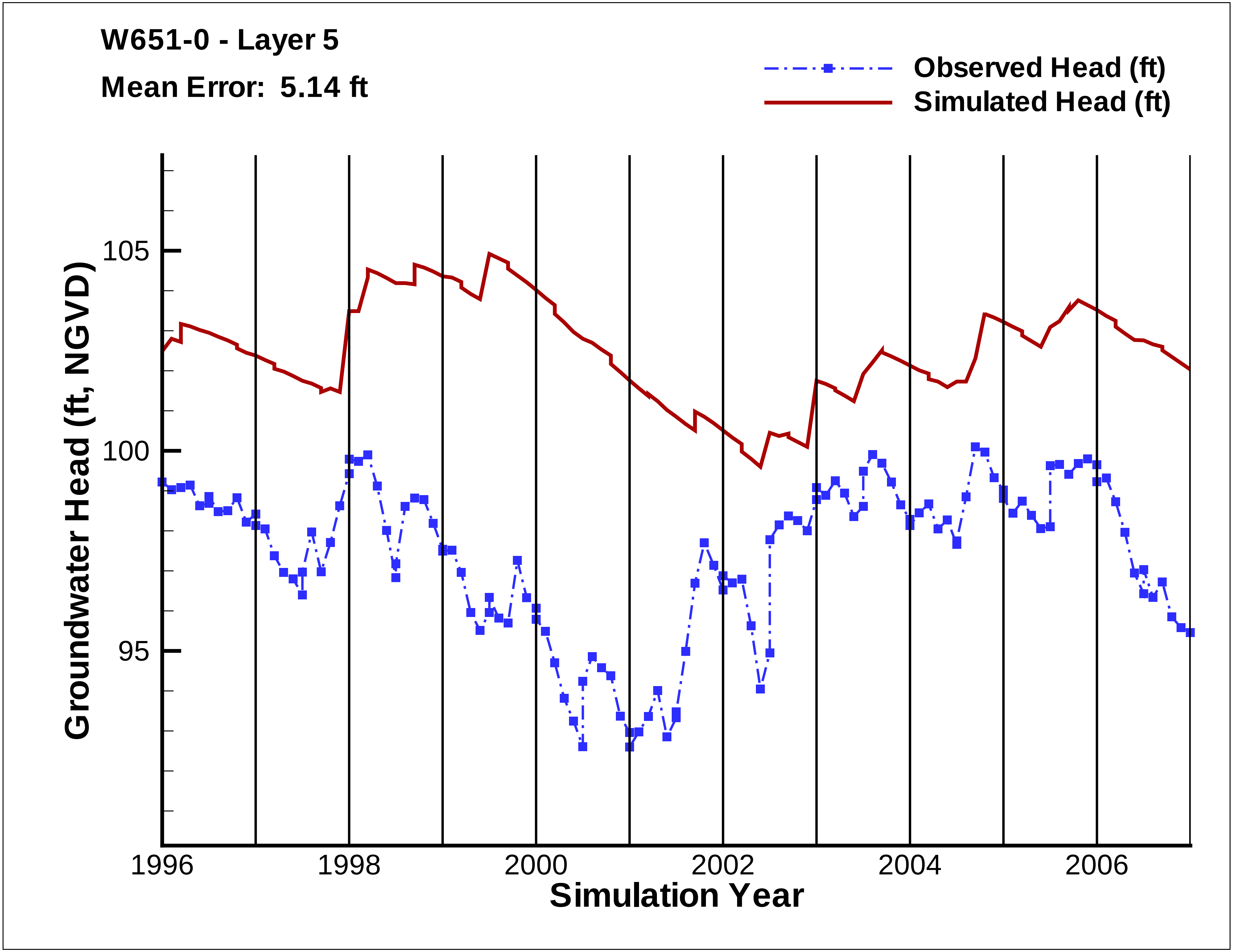
W641-0 - Layer 5
Mean Error: 0.83 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
15
10
5
1996
1998
2000
2002
2004
2006
Simulation Year



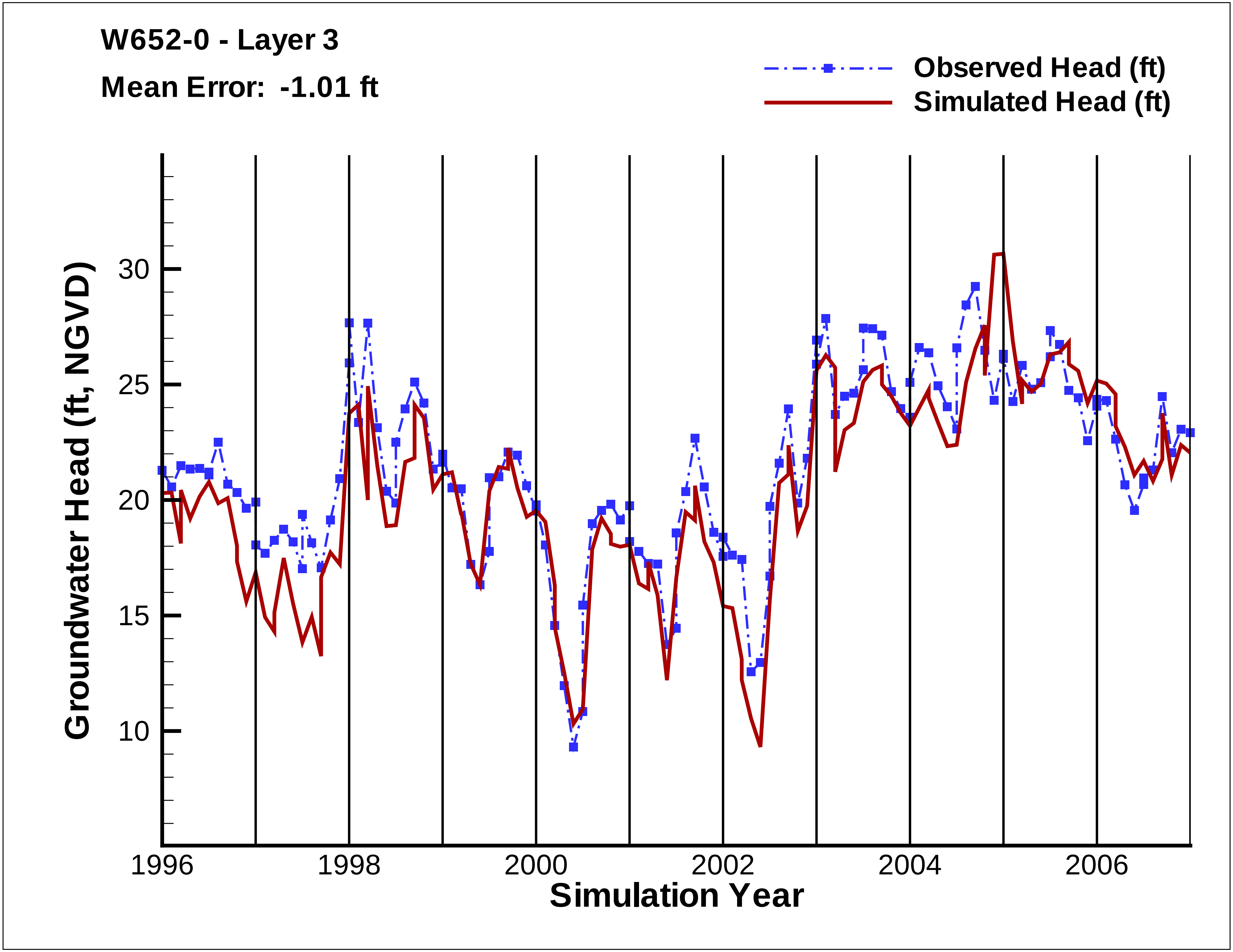
W642-0 - Layer 4
Mean Error: 2.23 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



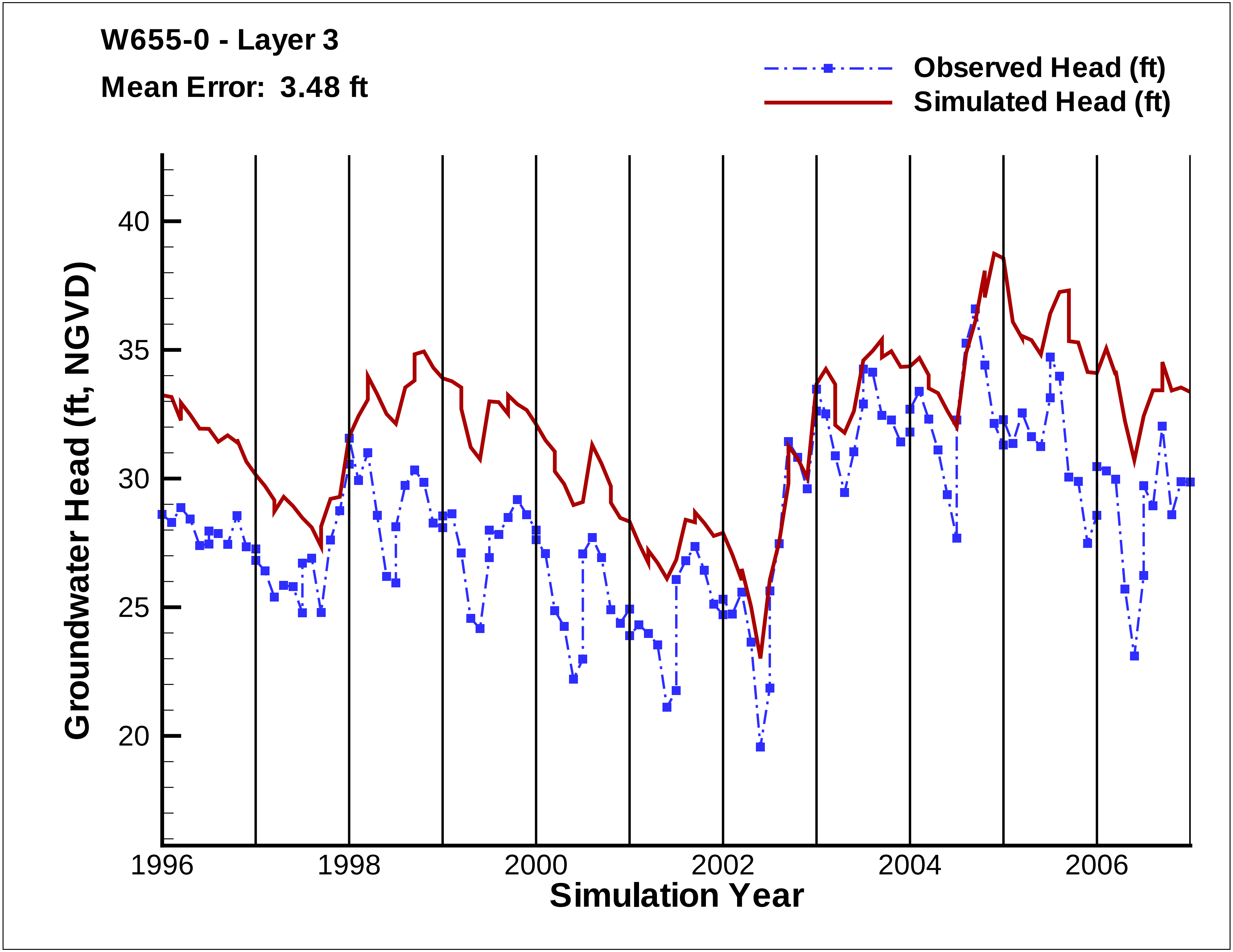
W645-0 - Layer 1
Mean Error: -1.17 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

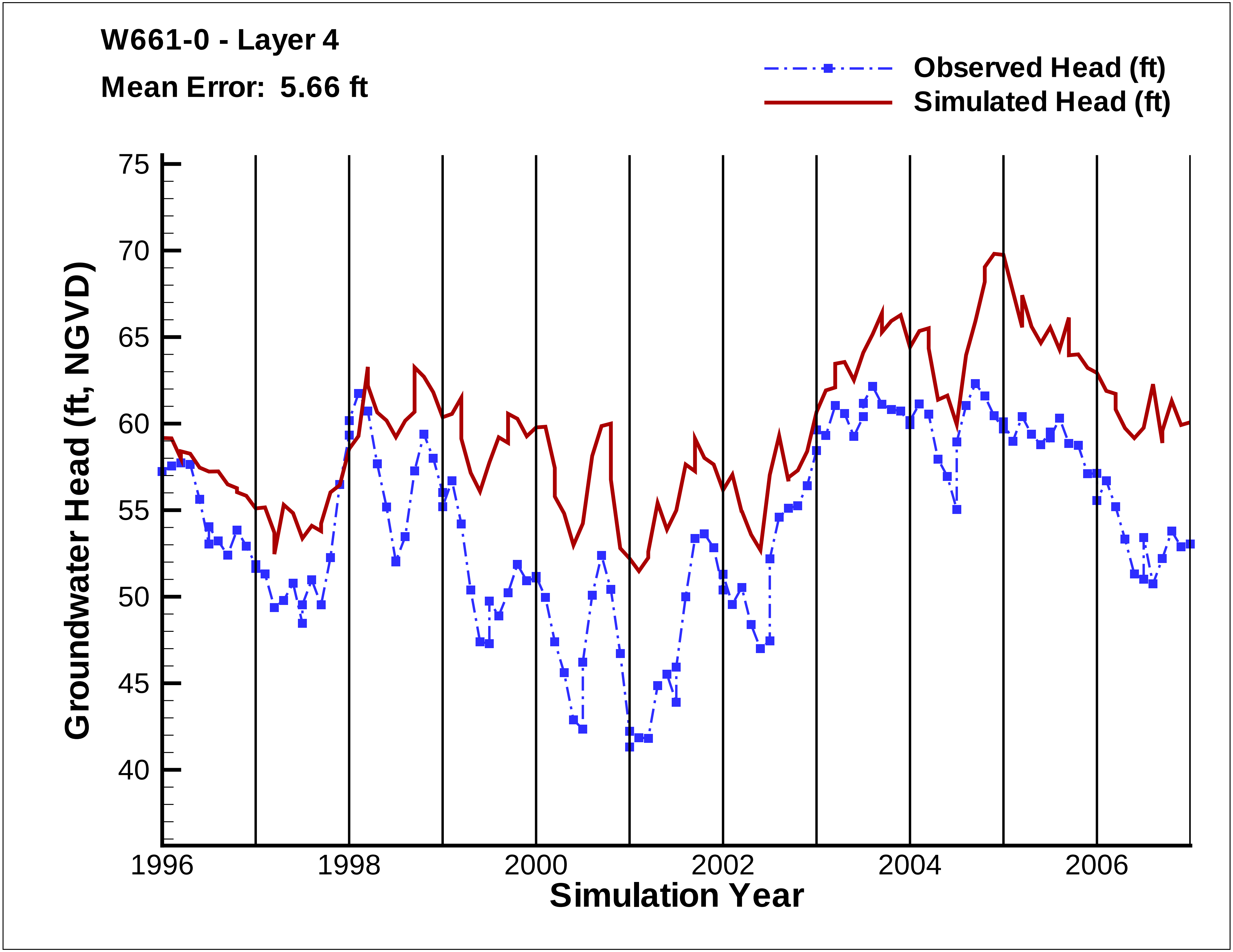


W651-0 - Layer 5
Mean Error: 5.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
105
100
95
1996
1998
2000
2002
2004
2006
Simulation Year

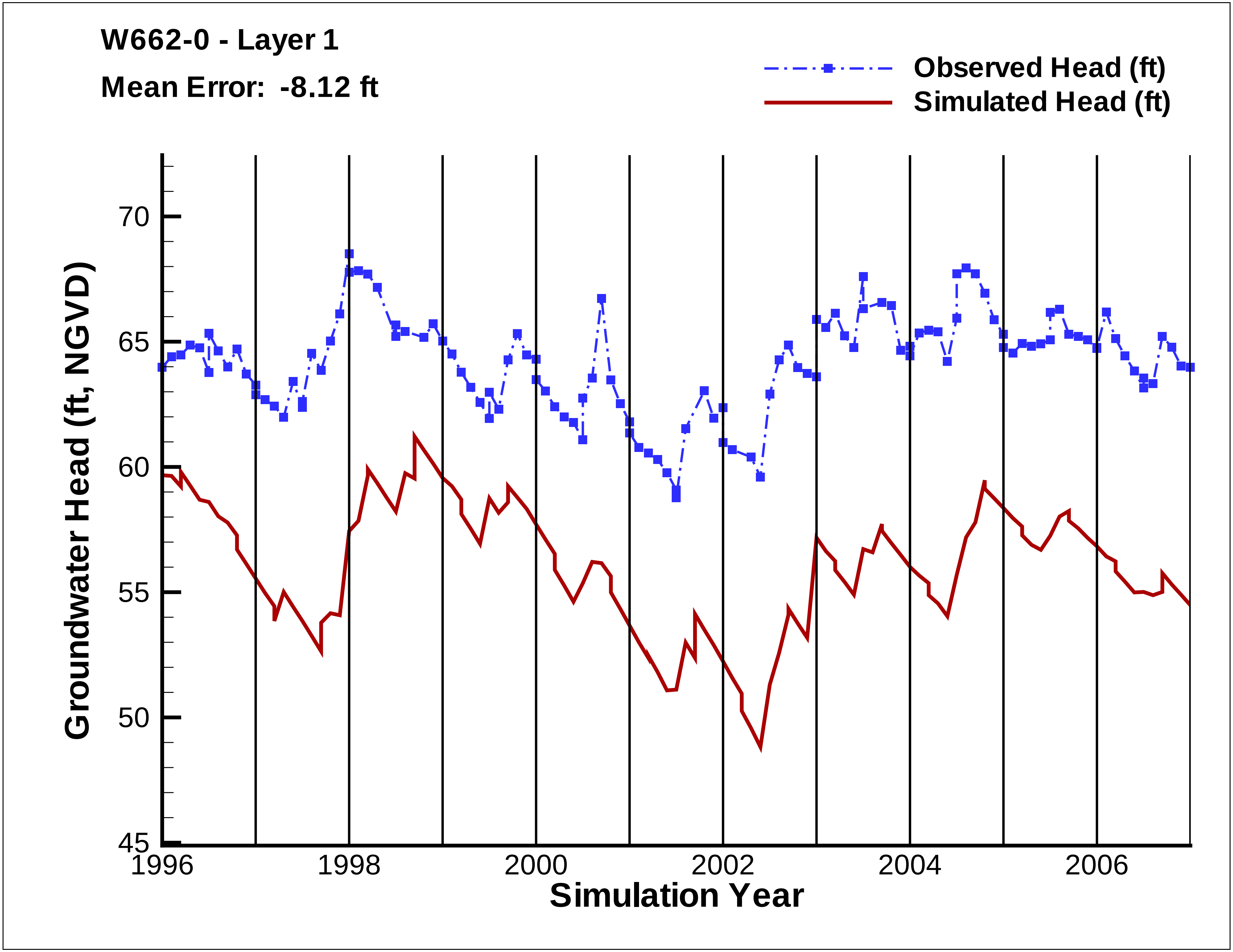


W652-0 - Layer 3
Mean Error: -1.01 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
15
20
25
30
1996
1998
2000
2002
2004
2006
Simulation Year

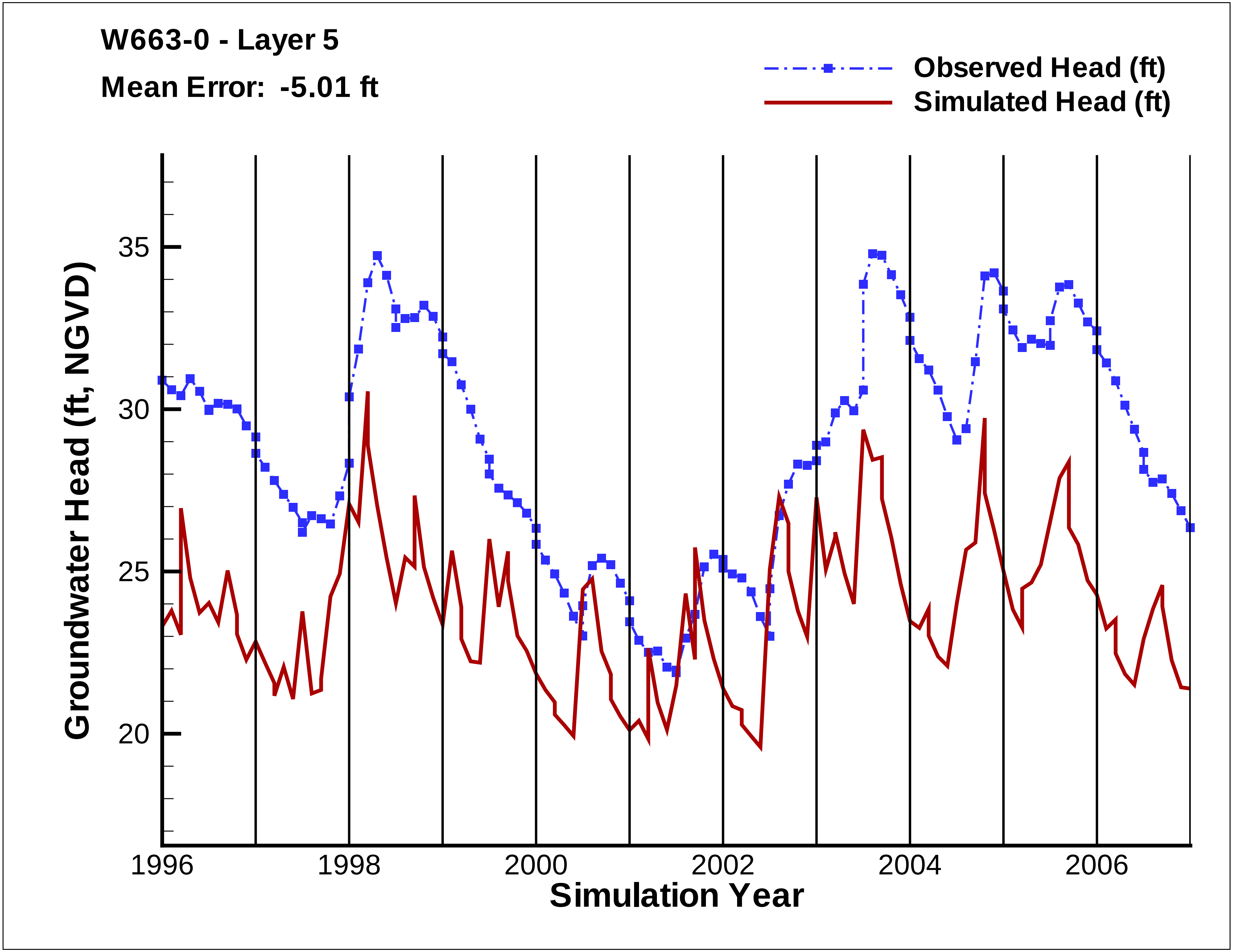

W655-0 - Layer 3
Mean Error: 3.48 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
20
25
30
35
40
1996
1998
2000
2002
2004
2006
Simulation Year



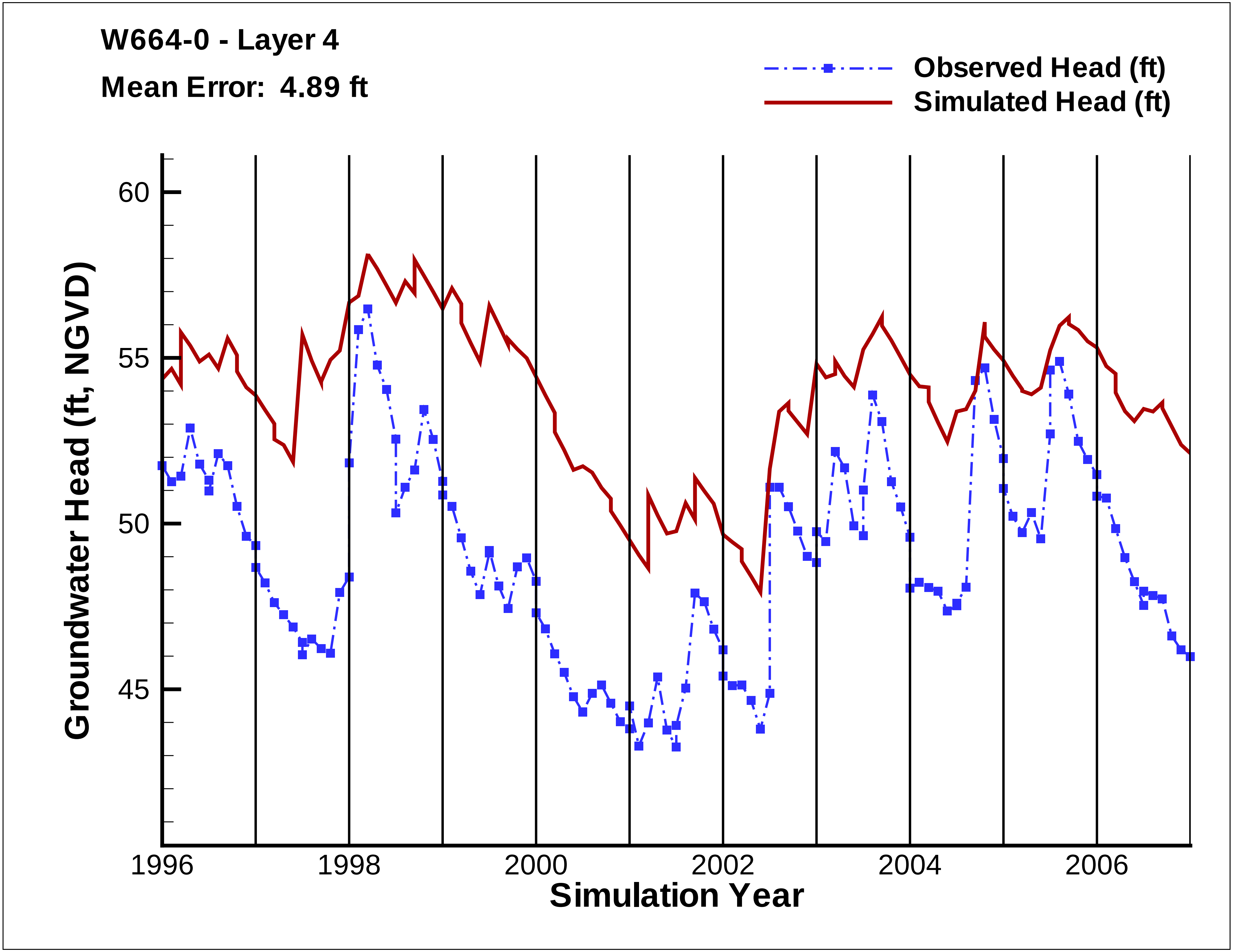
W661-0 - Layer 4
Mean Error: 5.66 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year

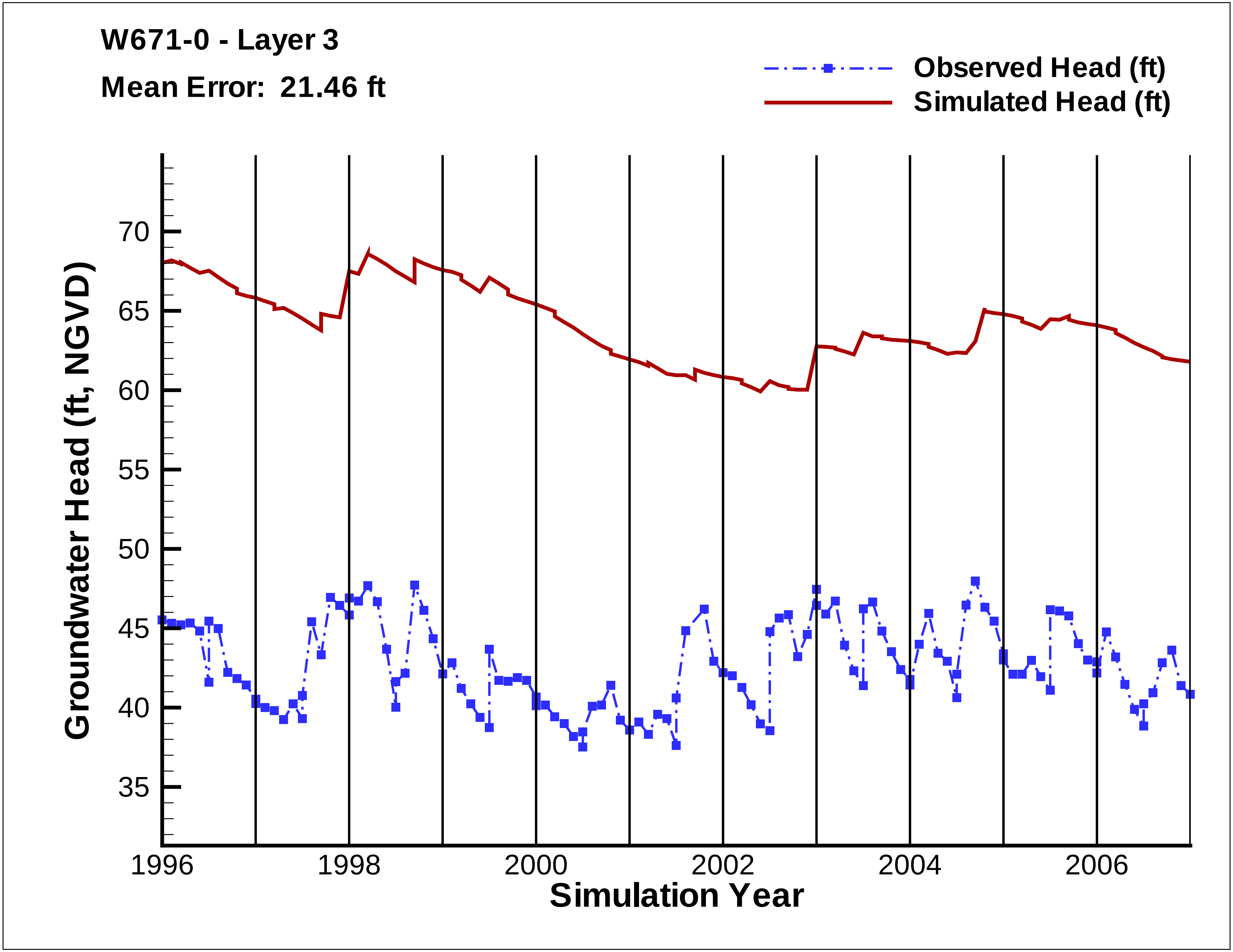


W662-0 - Layer 1
Mean Error: -8.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

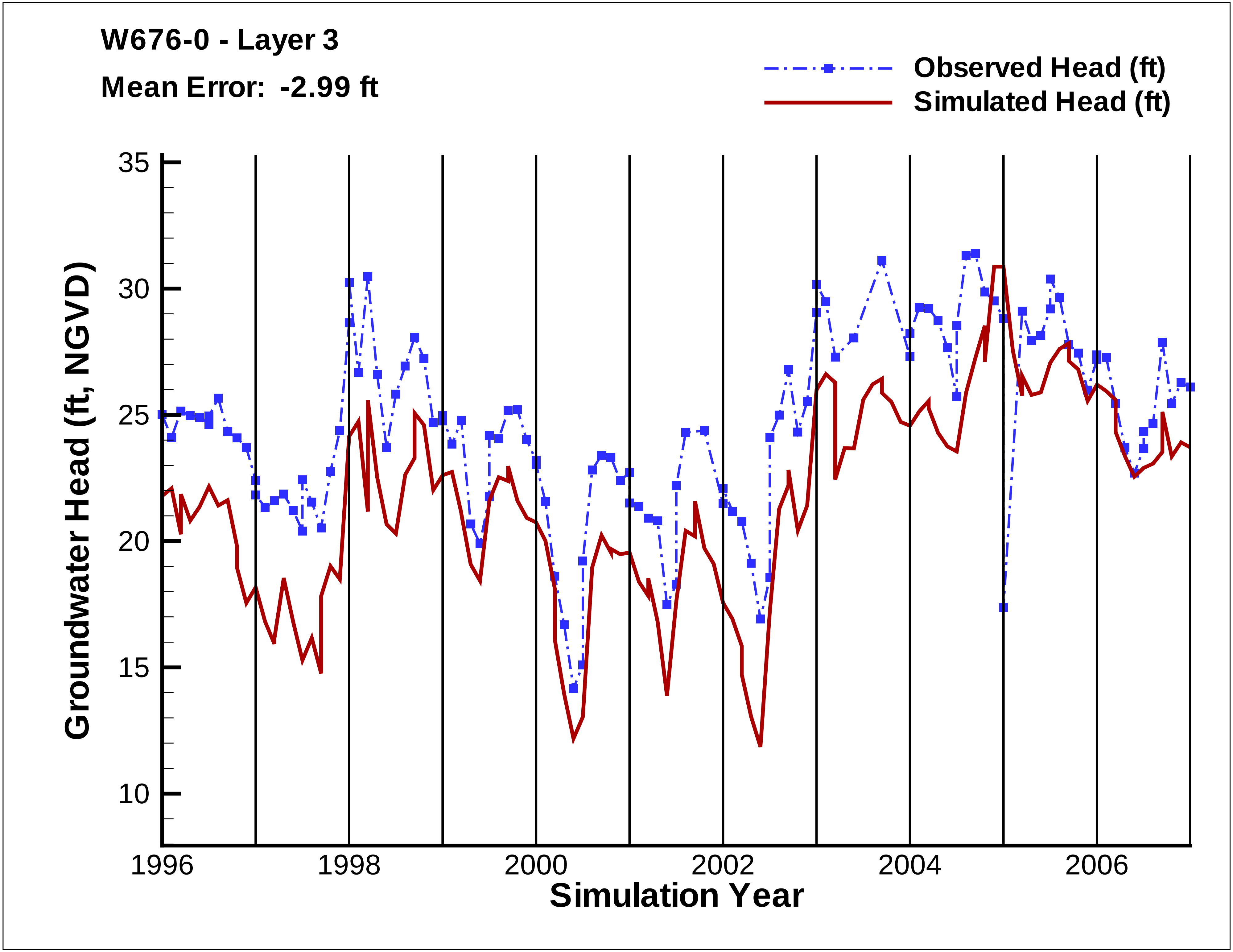


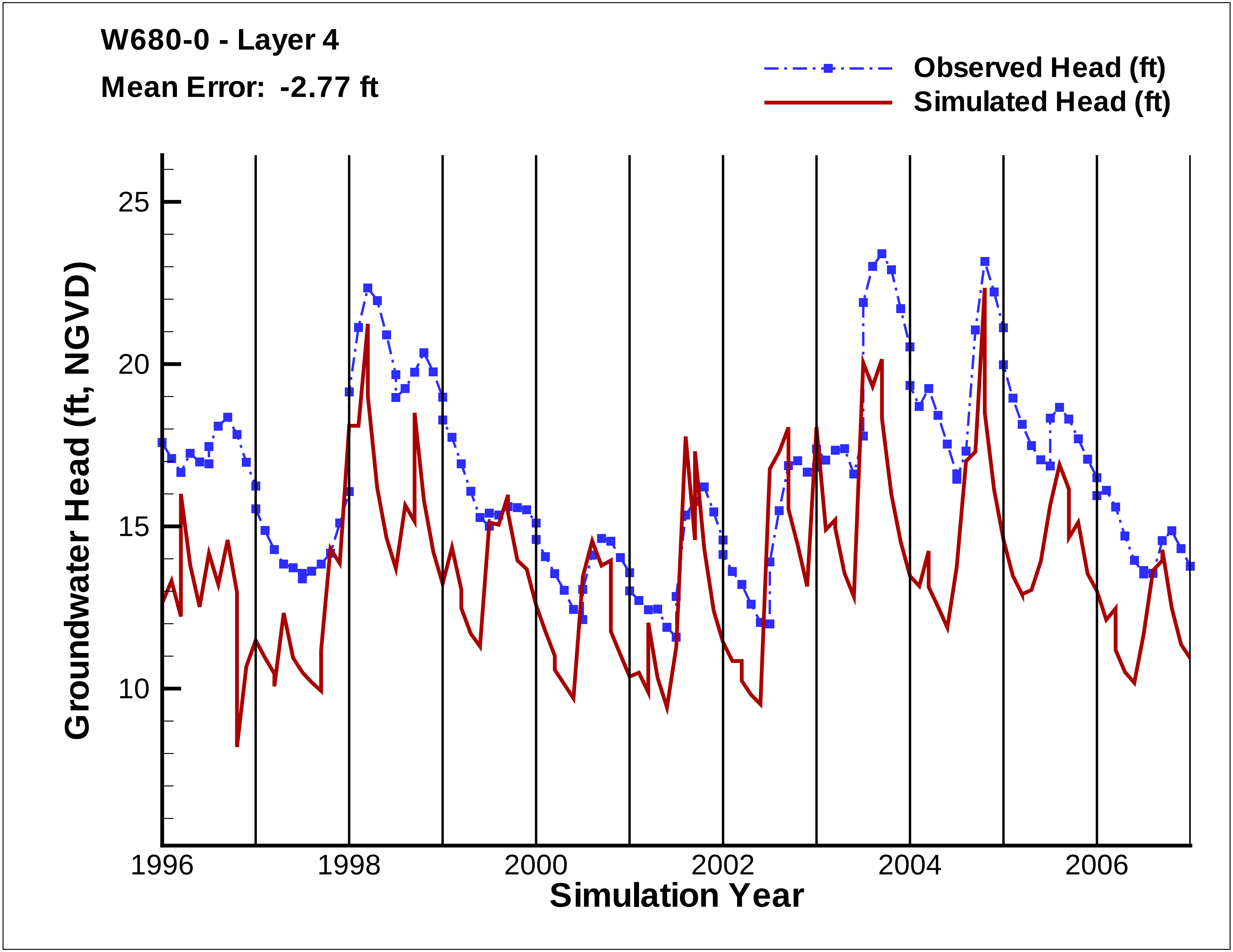
W663-0 - Layer 5
Mean Error: -5.01 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

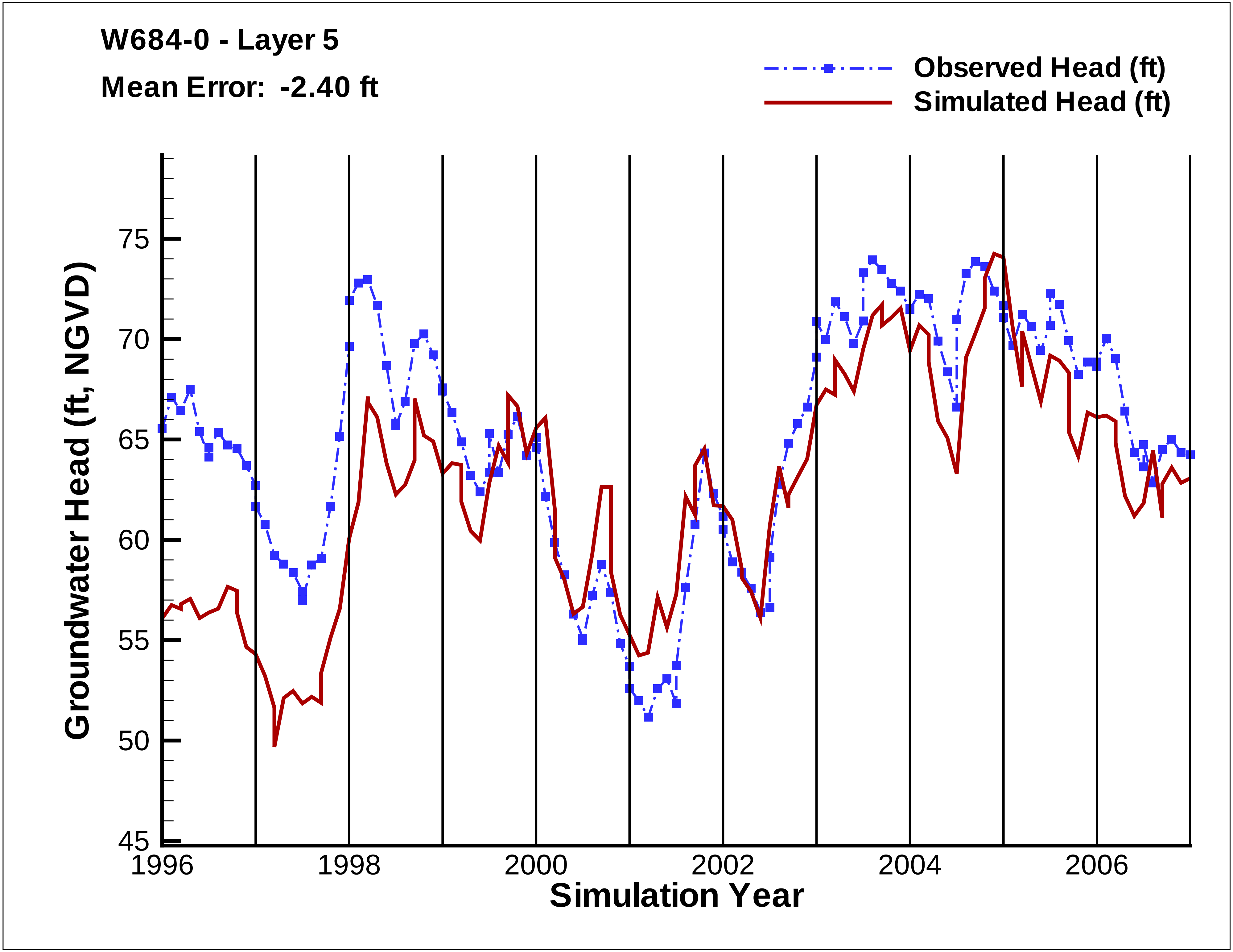

W664-0 - Layer 4
Mean Error: 4.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year



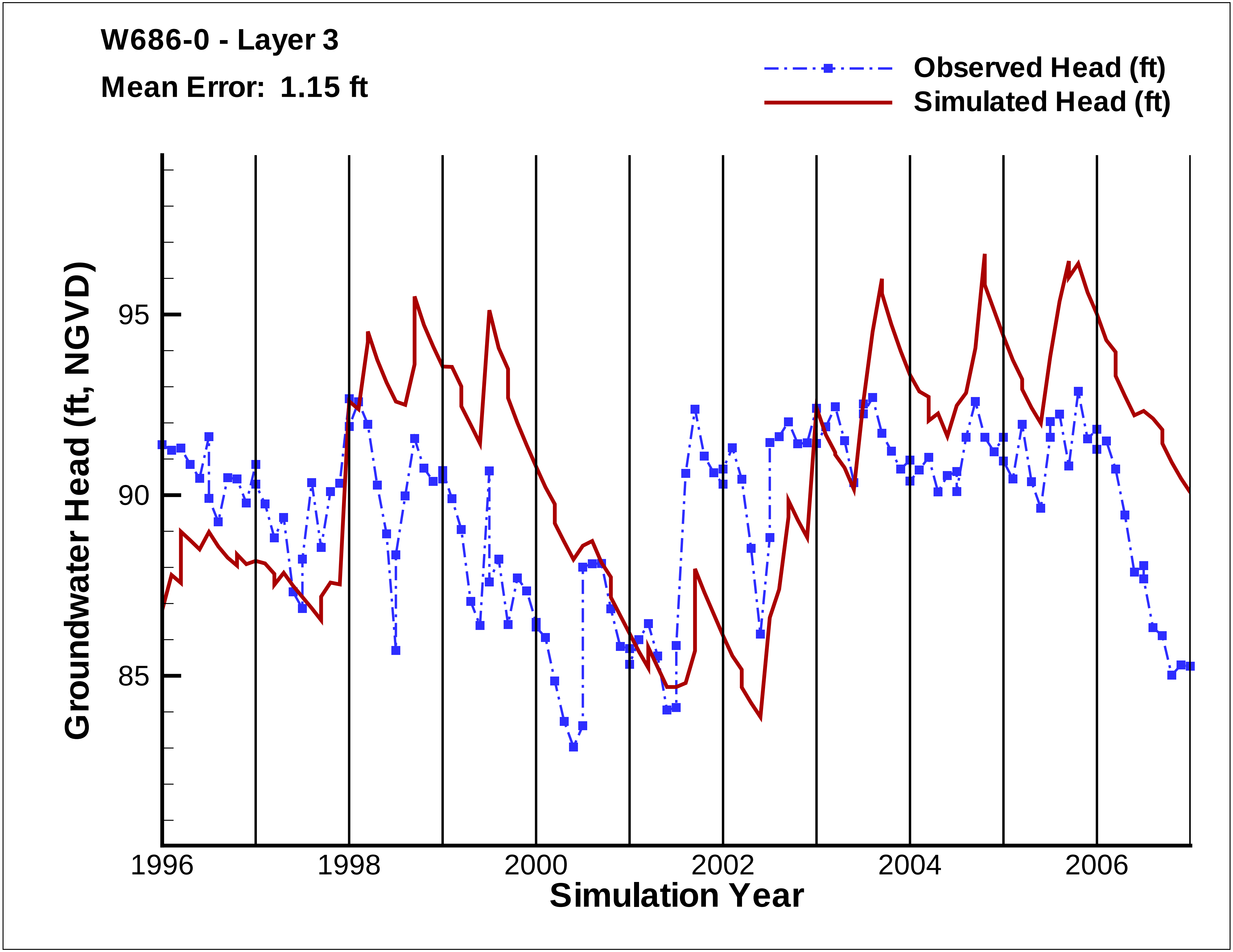
W671-0 - Layer 3
Mean Error: 21.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

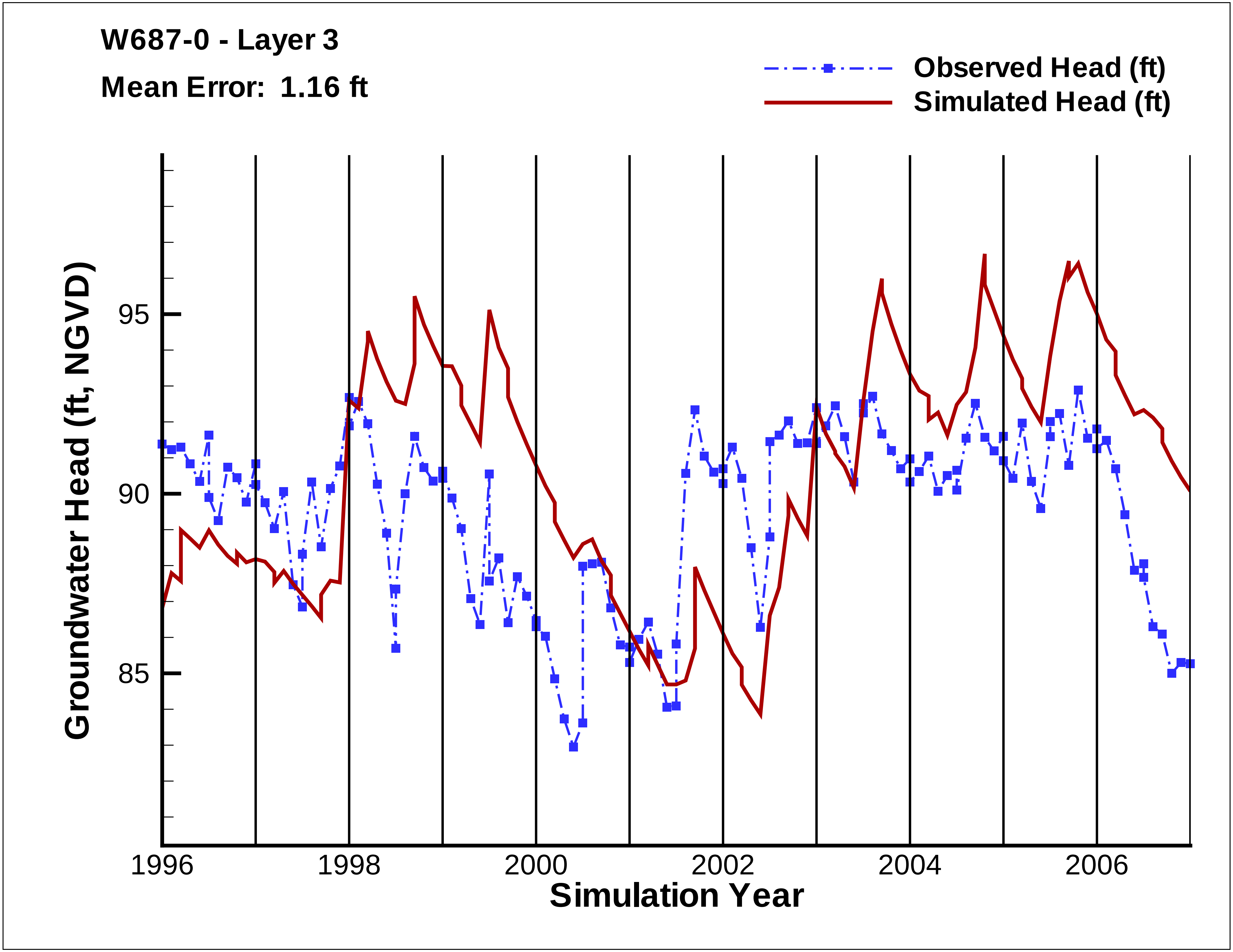

W676-0 - Layer 3
Mean Error: -2.99 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
30
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year


W680-0 - Layer 4
Mean Error: -2.77 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
25
20
15
10
1996
1998
2000
2002
2004
2006
Simulation Year

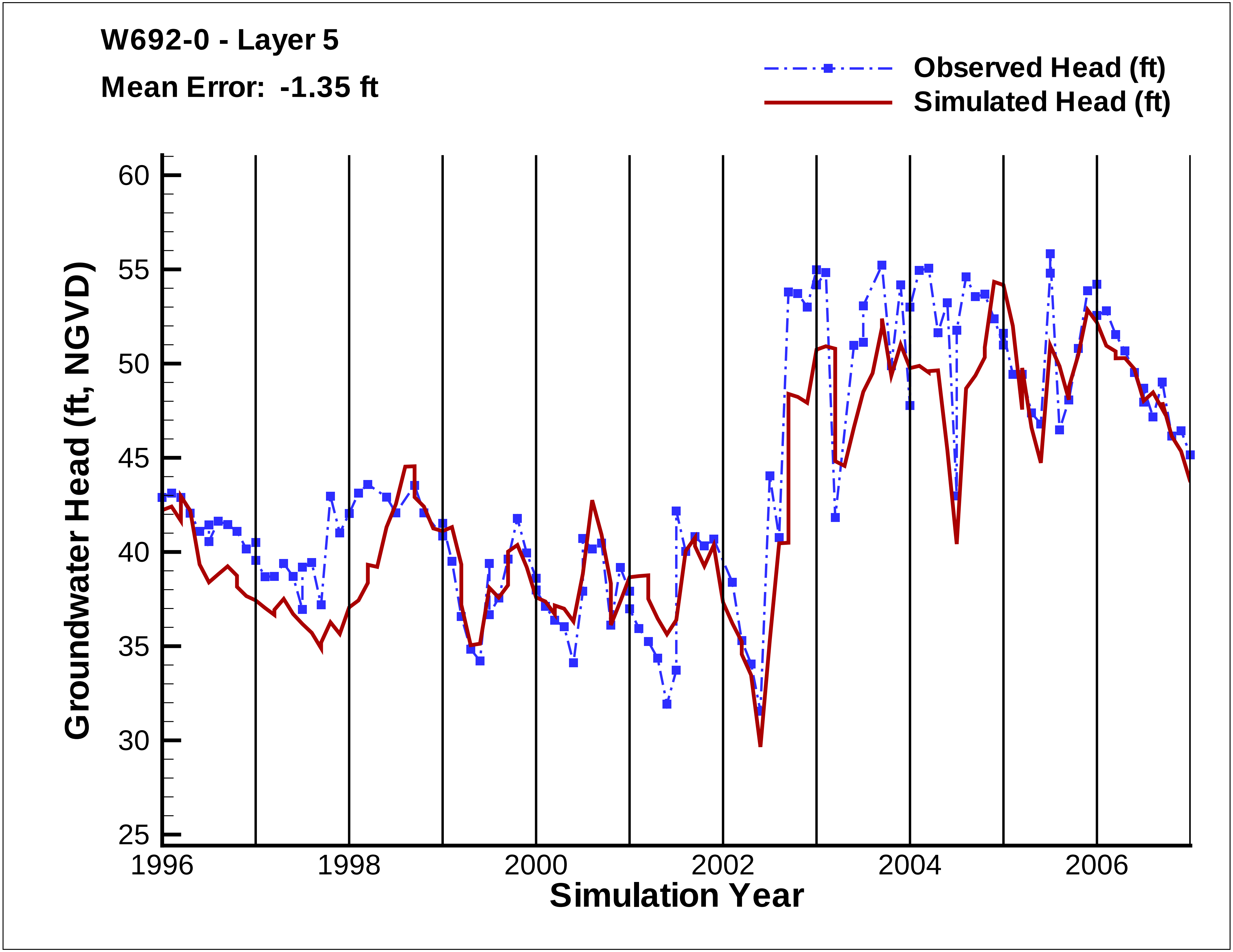


W684-0 - Layer 5
Mean Error: -2.40 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

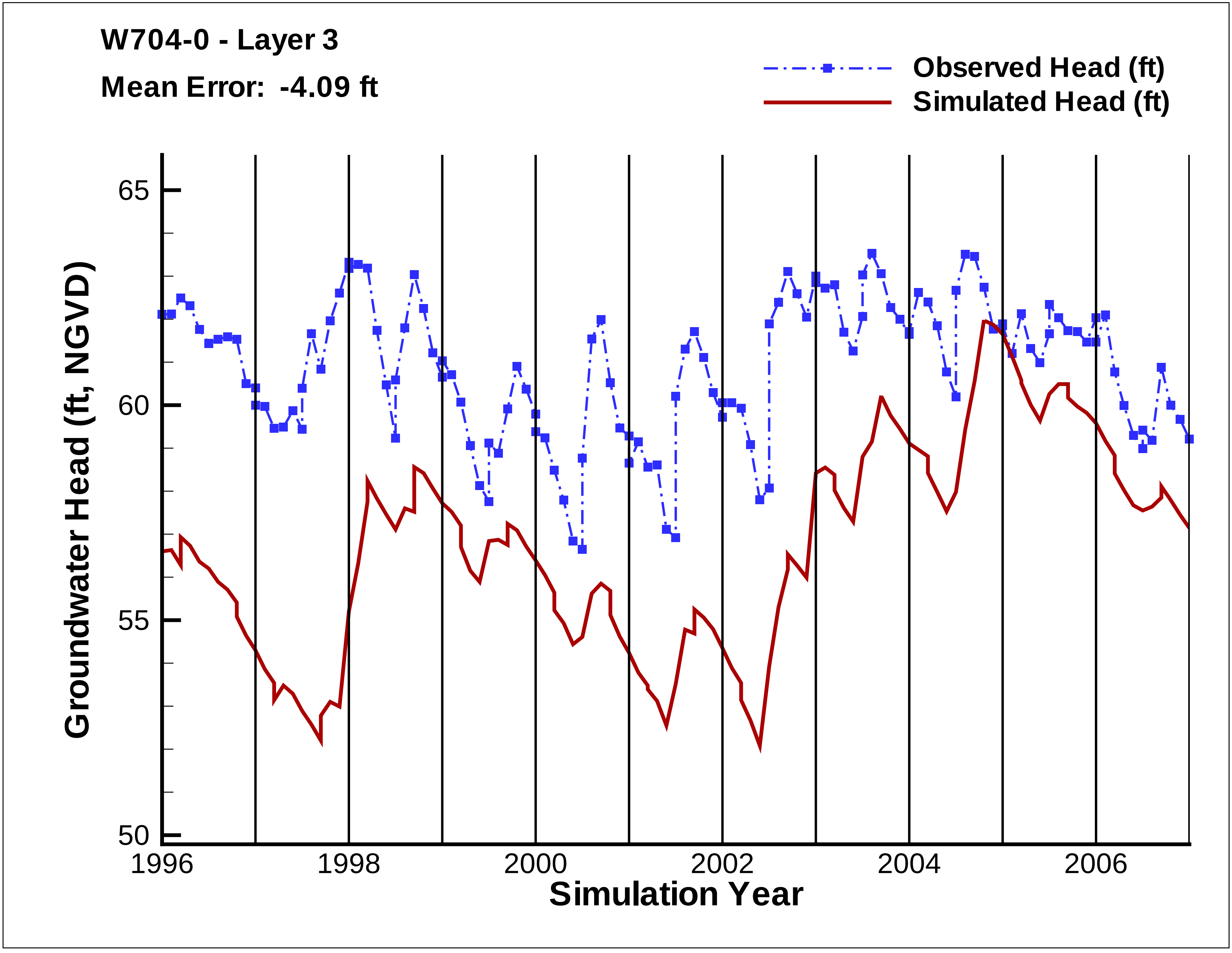

W686-0 - Layer 3
Mean Error: 1.15 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
1996
1998
2000
2002
2004
2006
Simulation Year



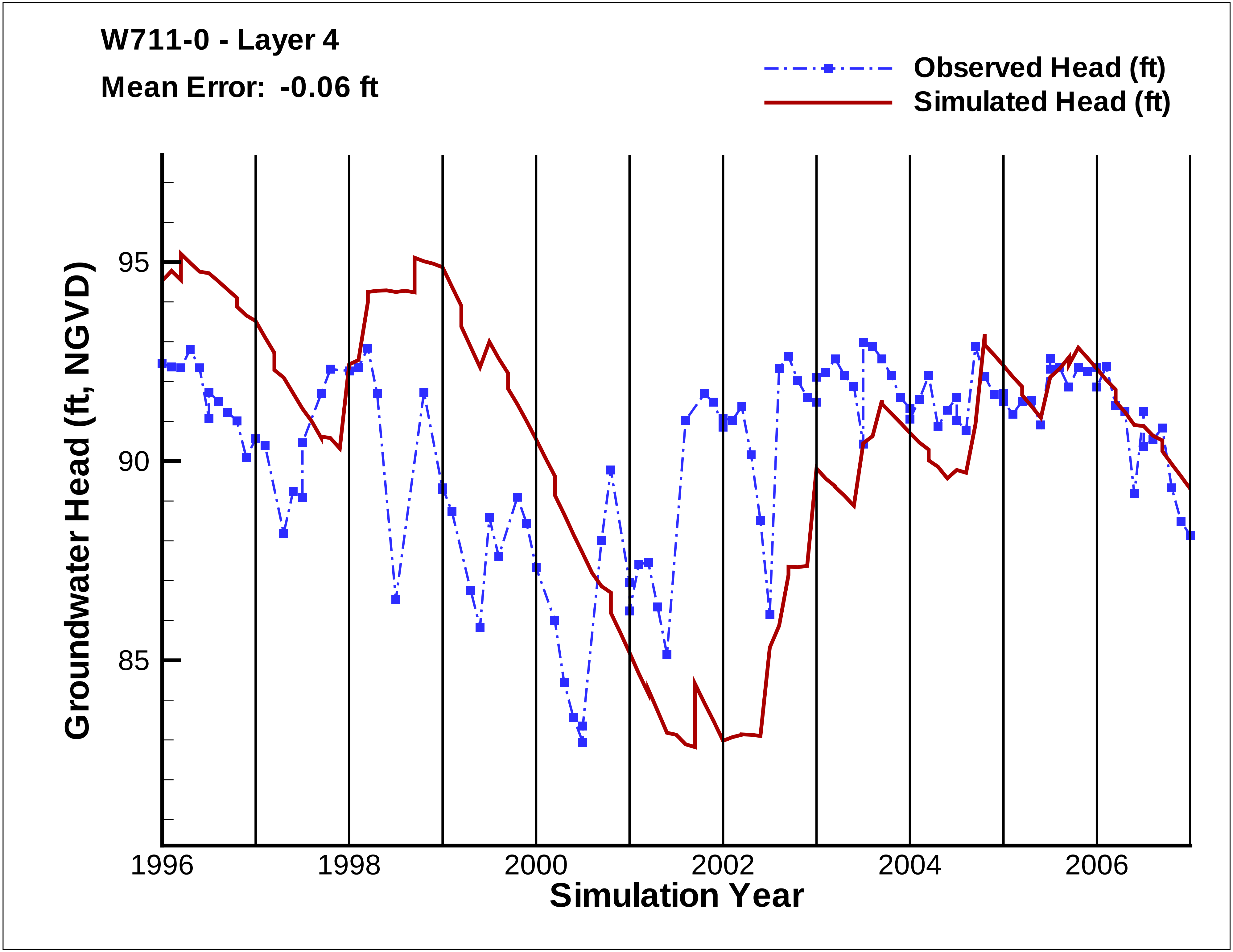
W687-0 - Layer 3
Mean Error: 1.16 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
1996
1998
2000
2002
2004
2006
Simulation Year



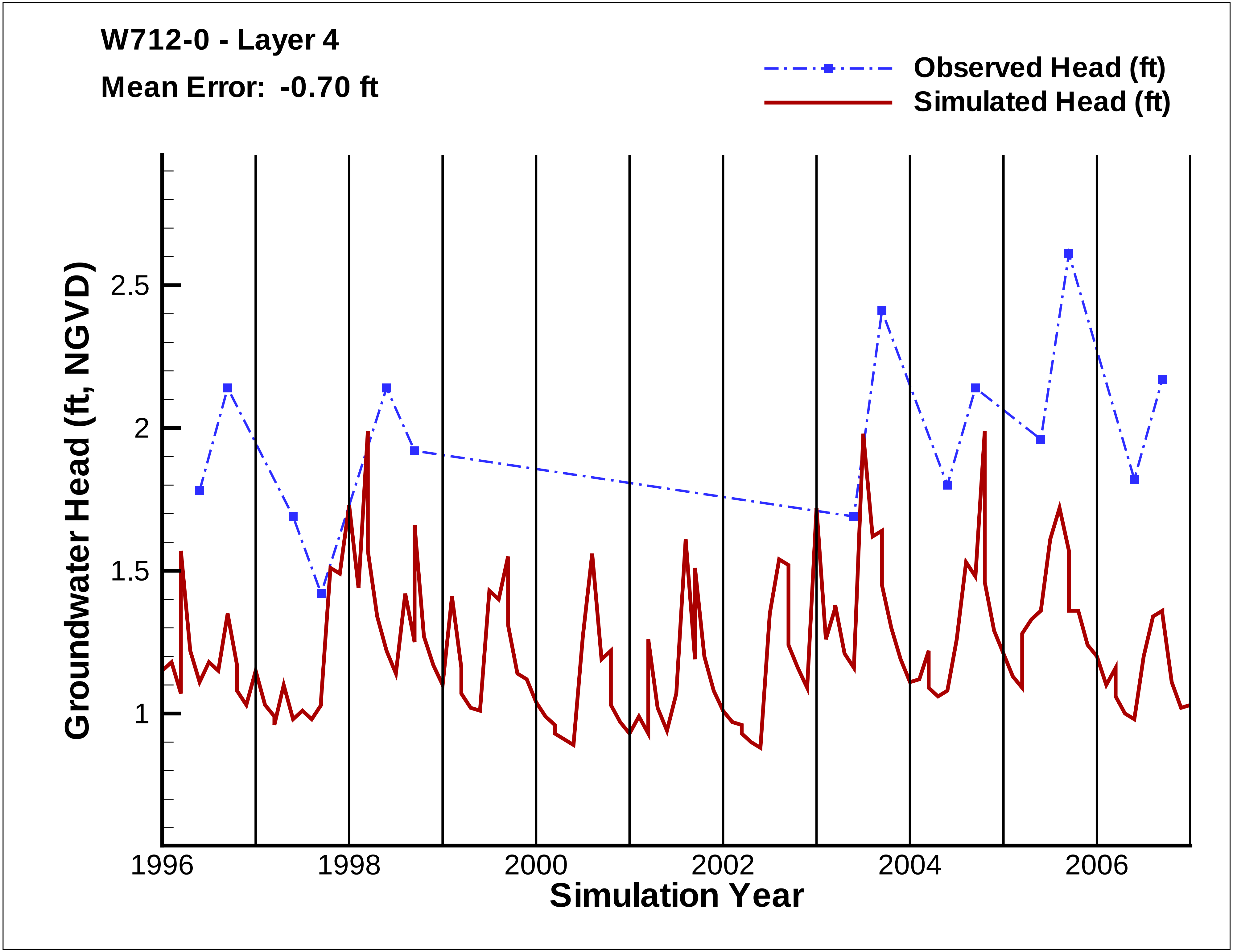
W692-0 - Layer 5
Mean Error: -1.35 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year



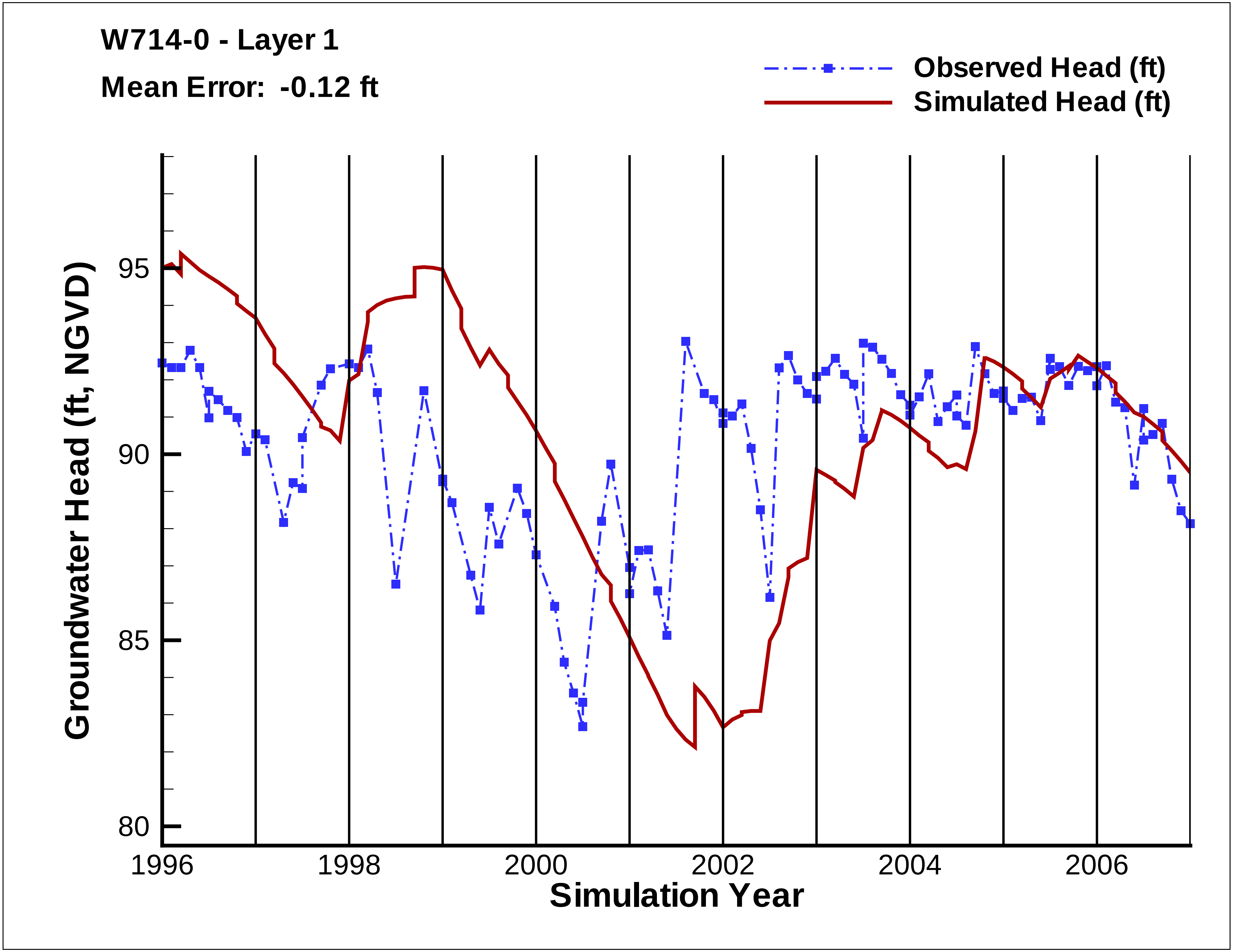
W704-0 - Layer 3
Mean Error: -4.09 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
1996
1998
2000
2002
2004
2006
Simulation Year

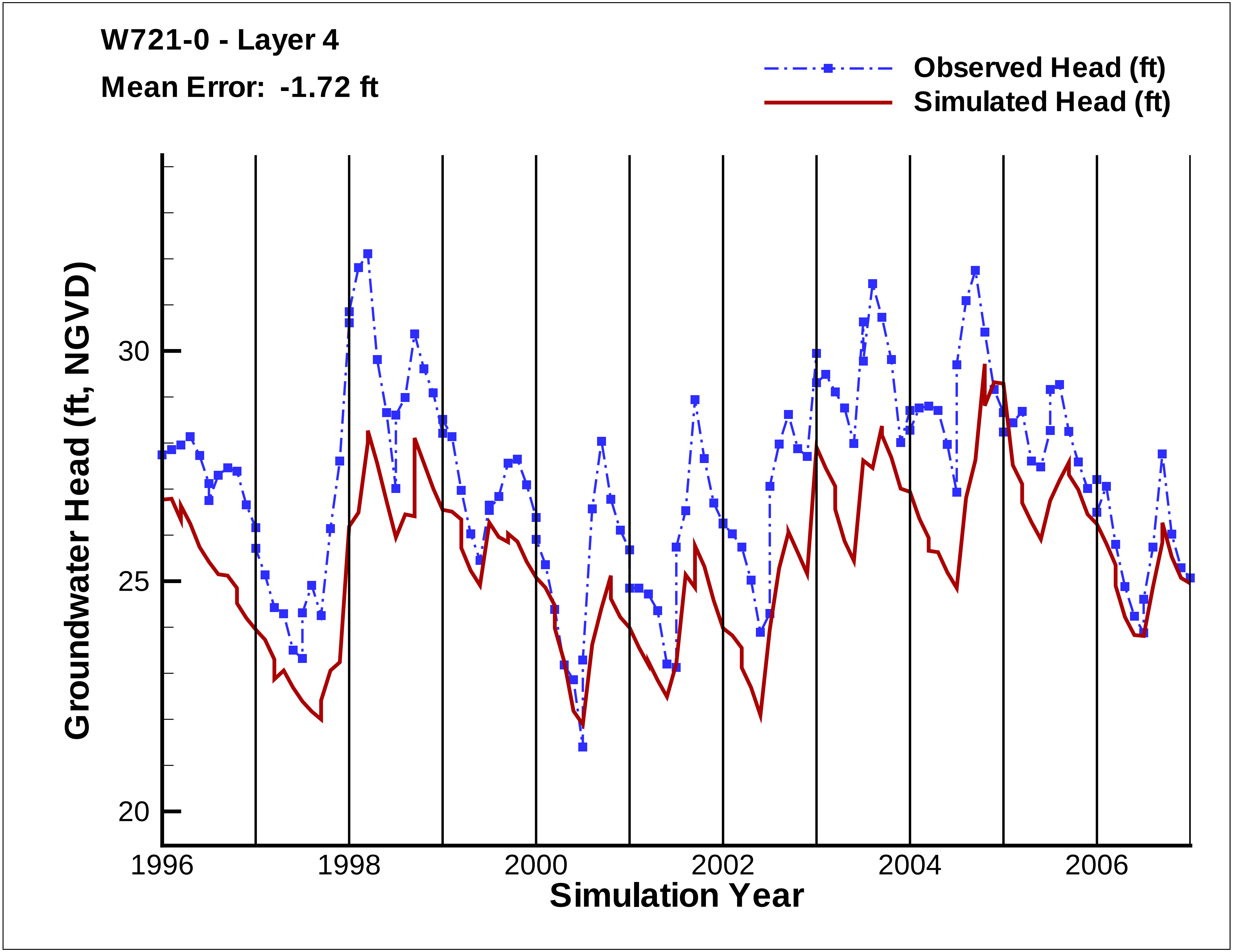


W711-0 - Layer 4
Mean Error: -0.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
1996
1998
2000
2002
2004
2006
Simulation Year

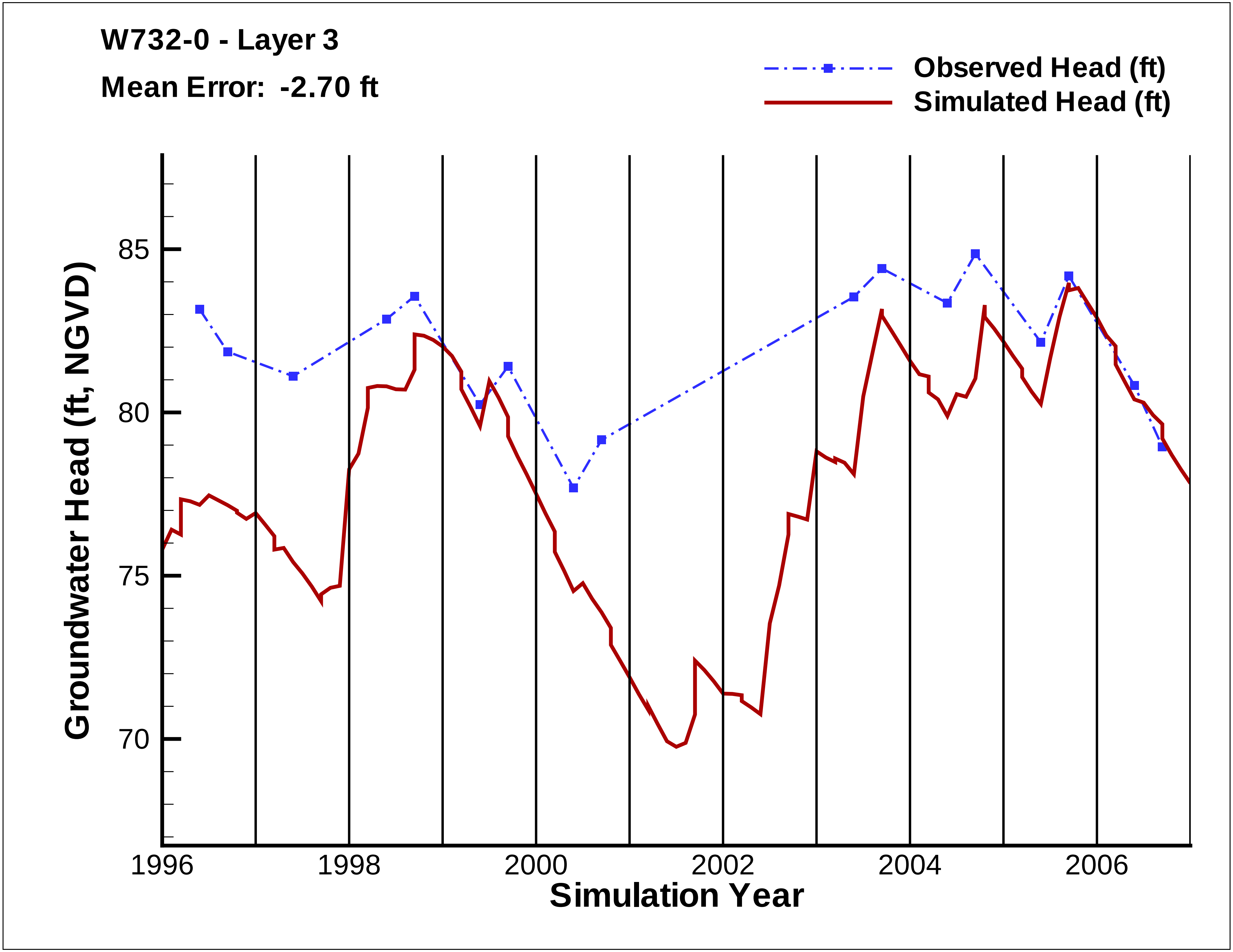


W712-0 - Layer 4
Mean Error: -0.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
2.5
2
1.5
1
1996
1998
2000
2002
2004
2006
Simulation Year

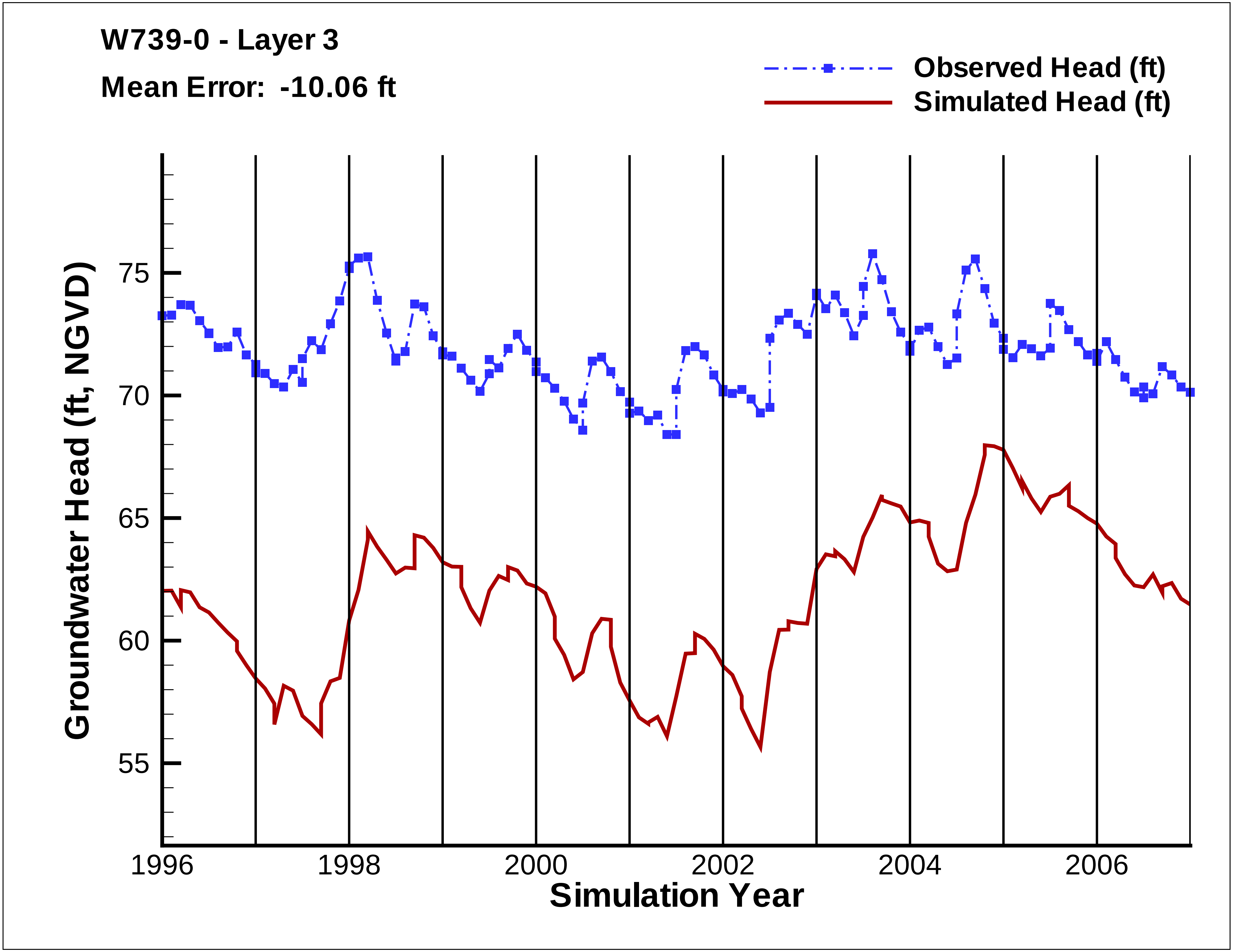

W714-0 - Layer 1
Mean Error: -0.12 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
95
90
85
80
1996
1998
2000
2002
2004
2006
Simulation Year

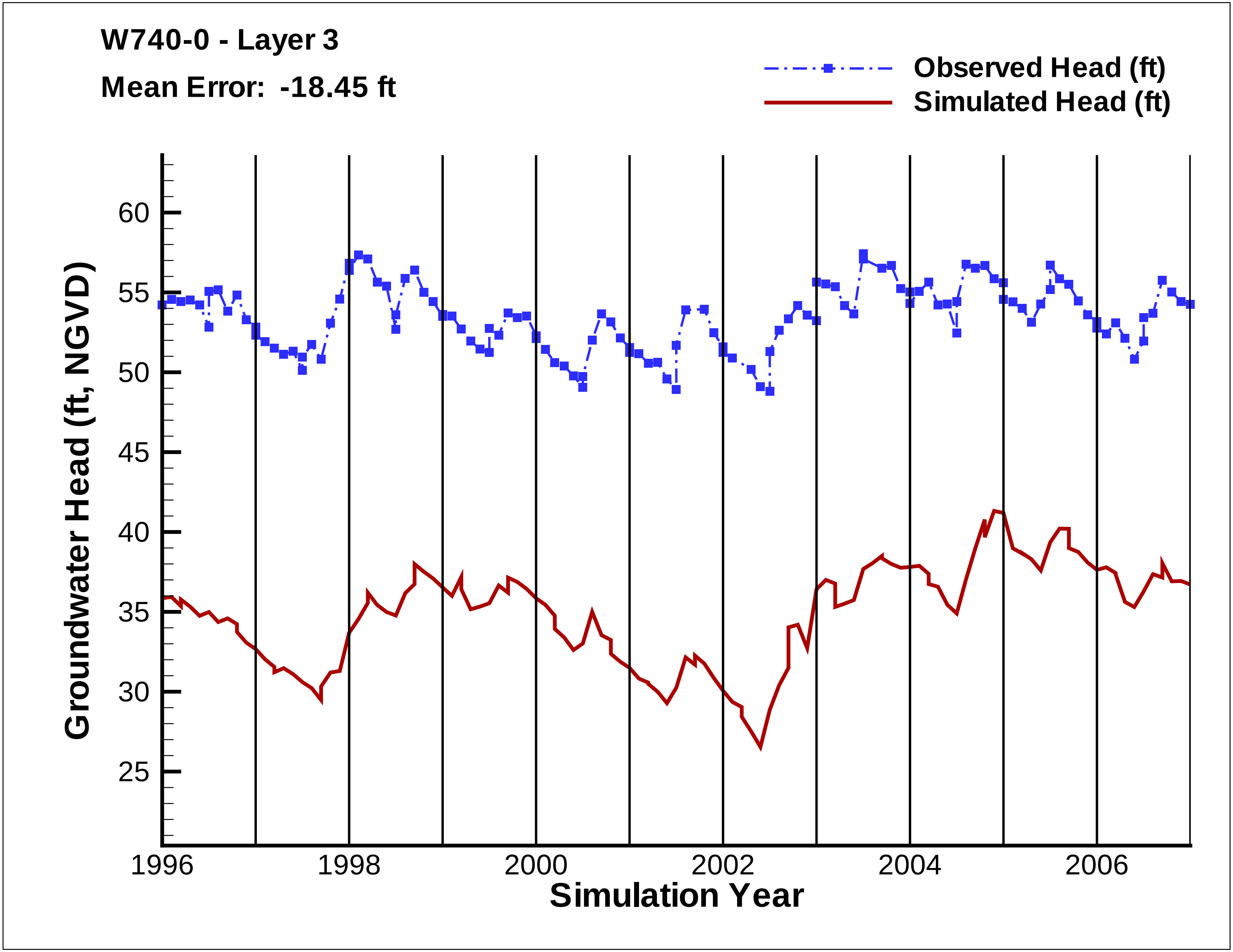


W721-0 - Layer 4
Mean Error: -1.72 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

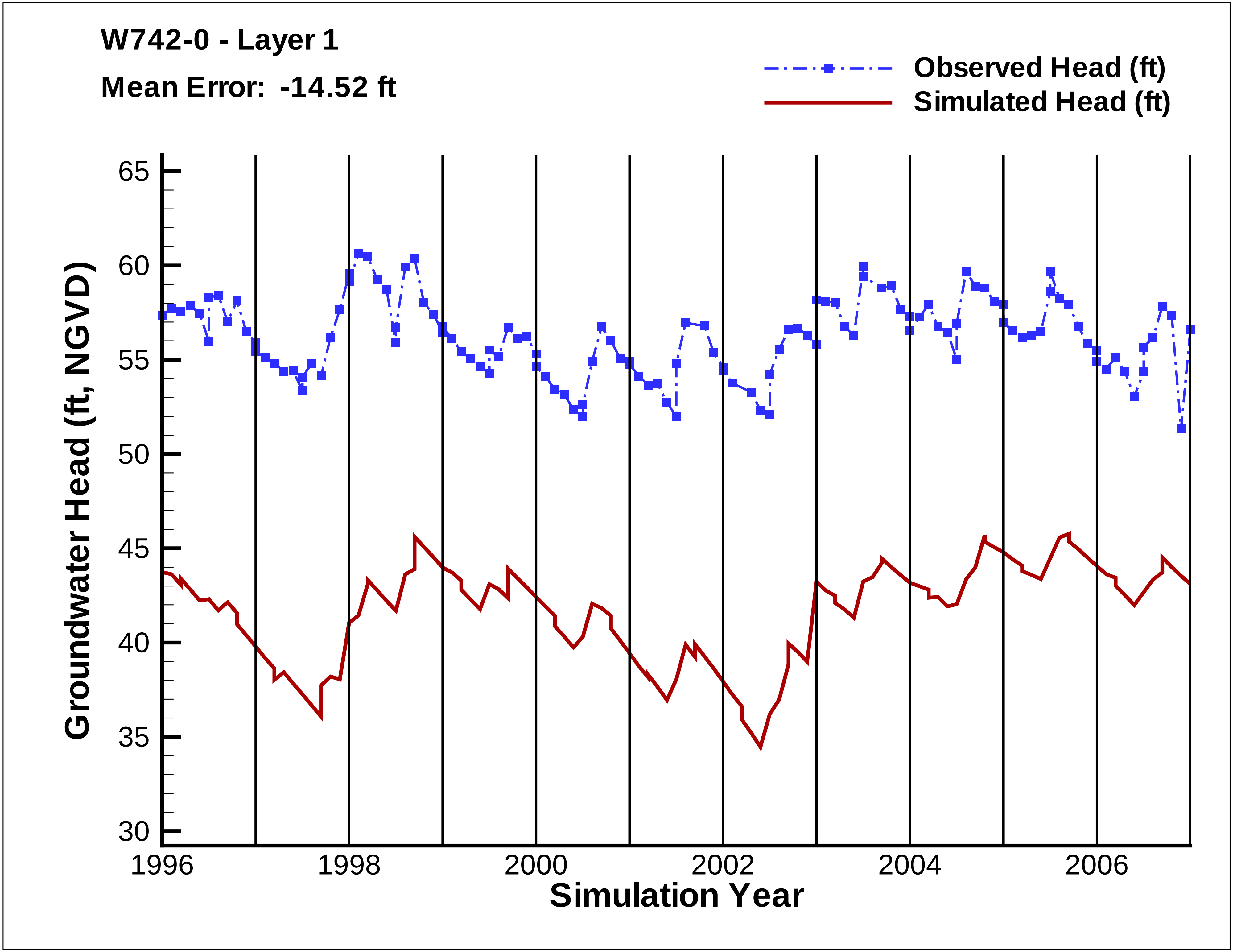


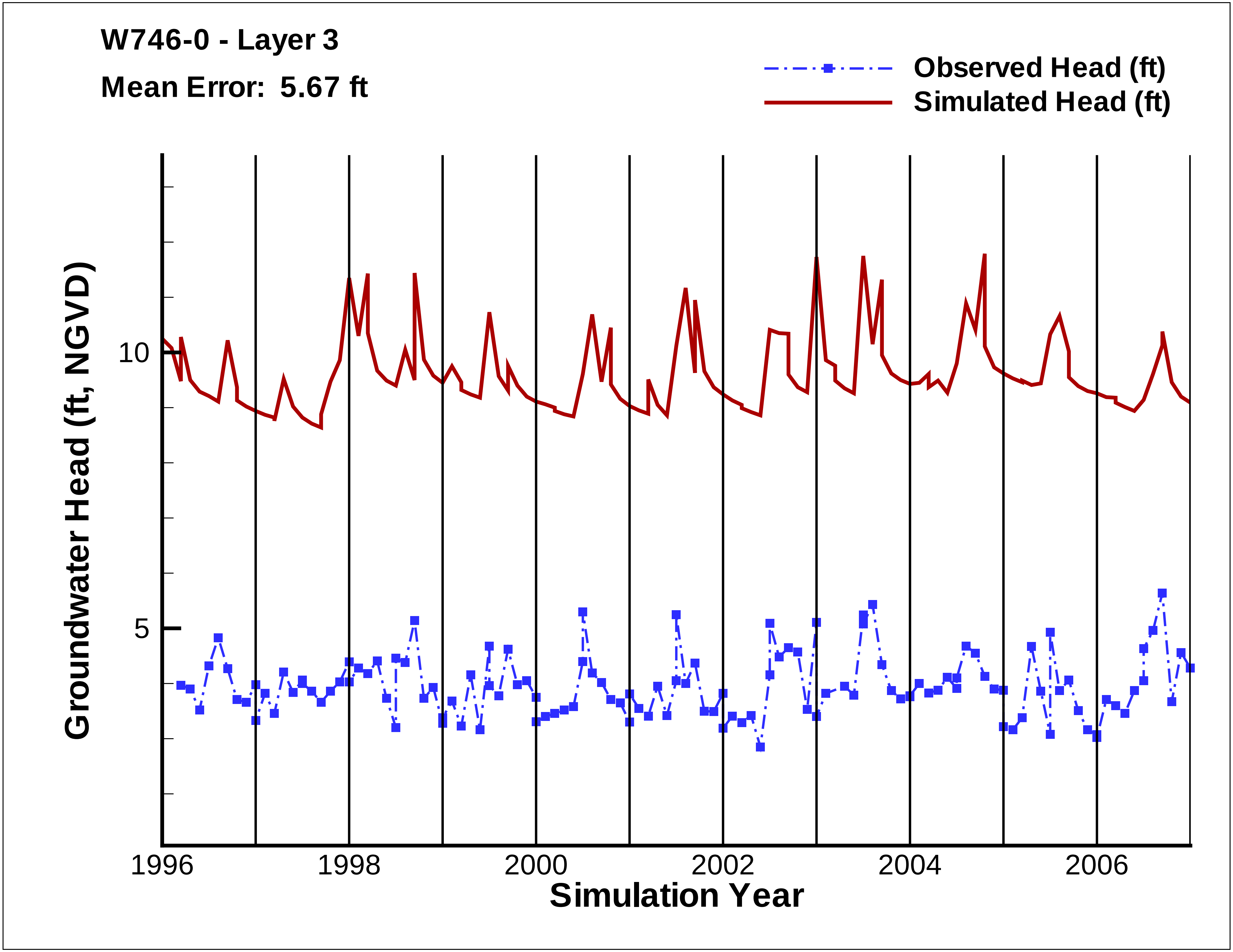
W732-0 - Layer 3
Mean Error: -2.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

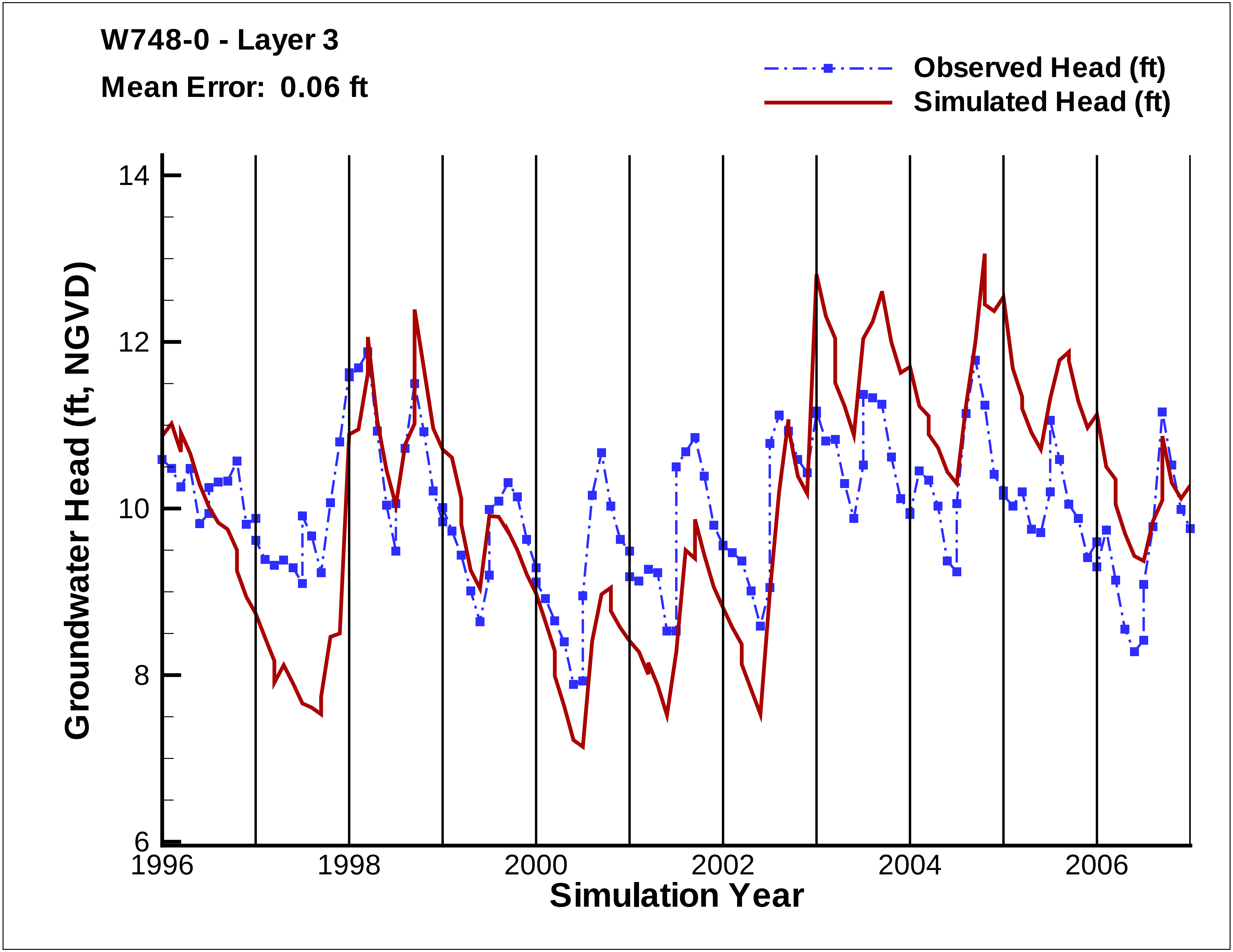

W739-0 - Layer 3
Mean Error: -10.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
75
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

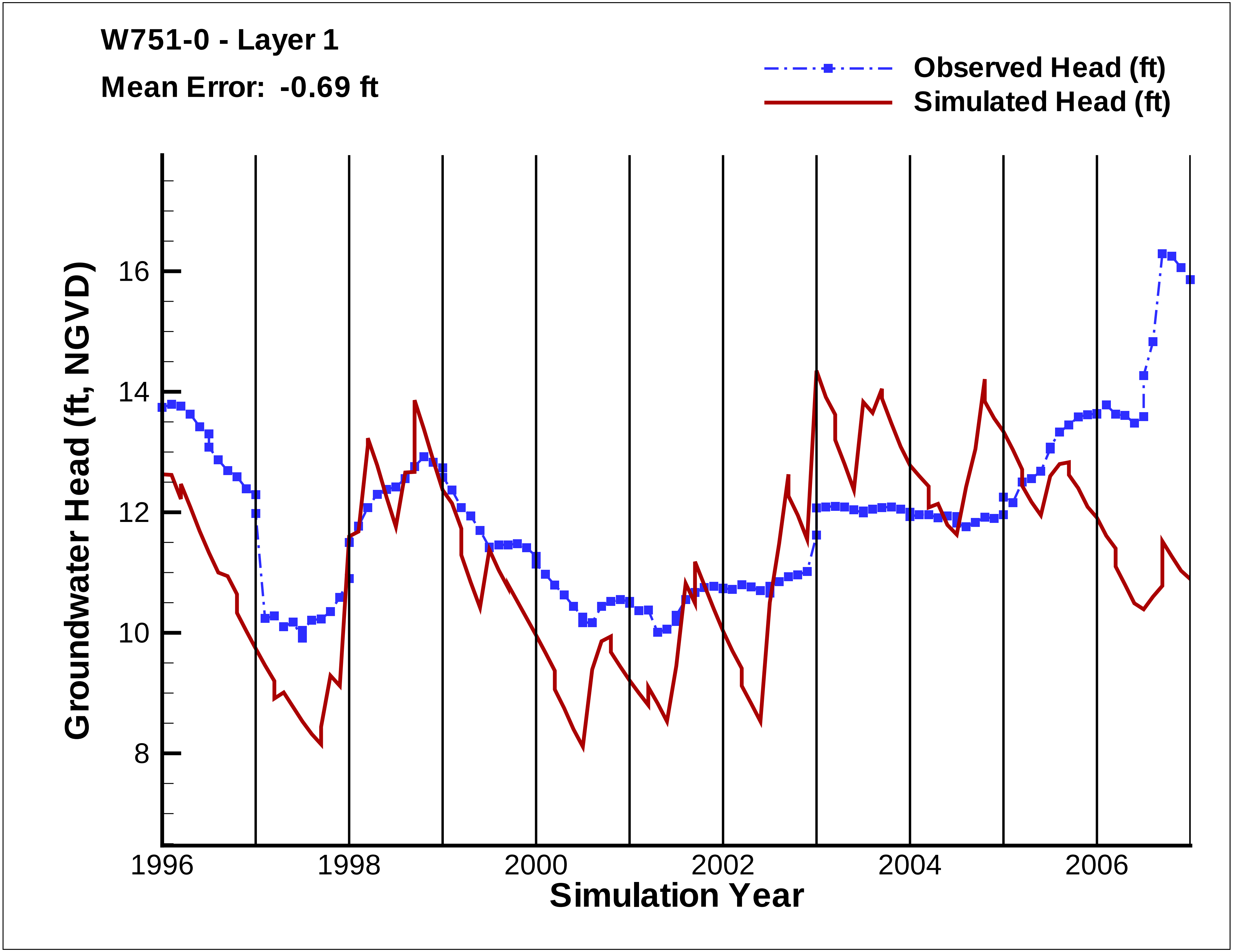


W740-0 - Layer 3
Mean Error: -18.45 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

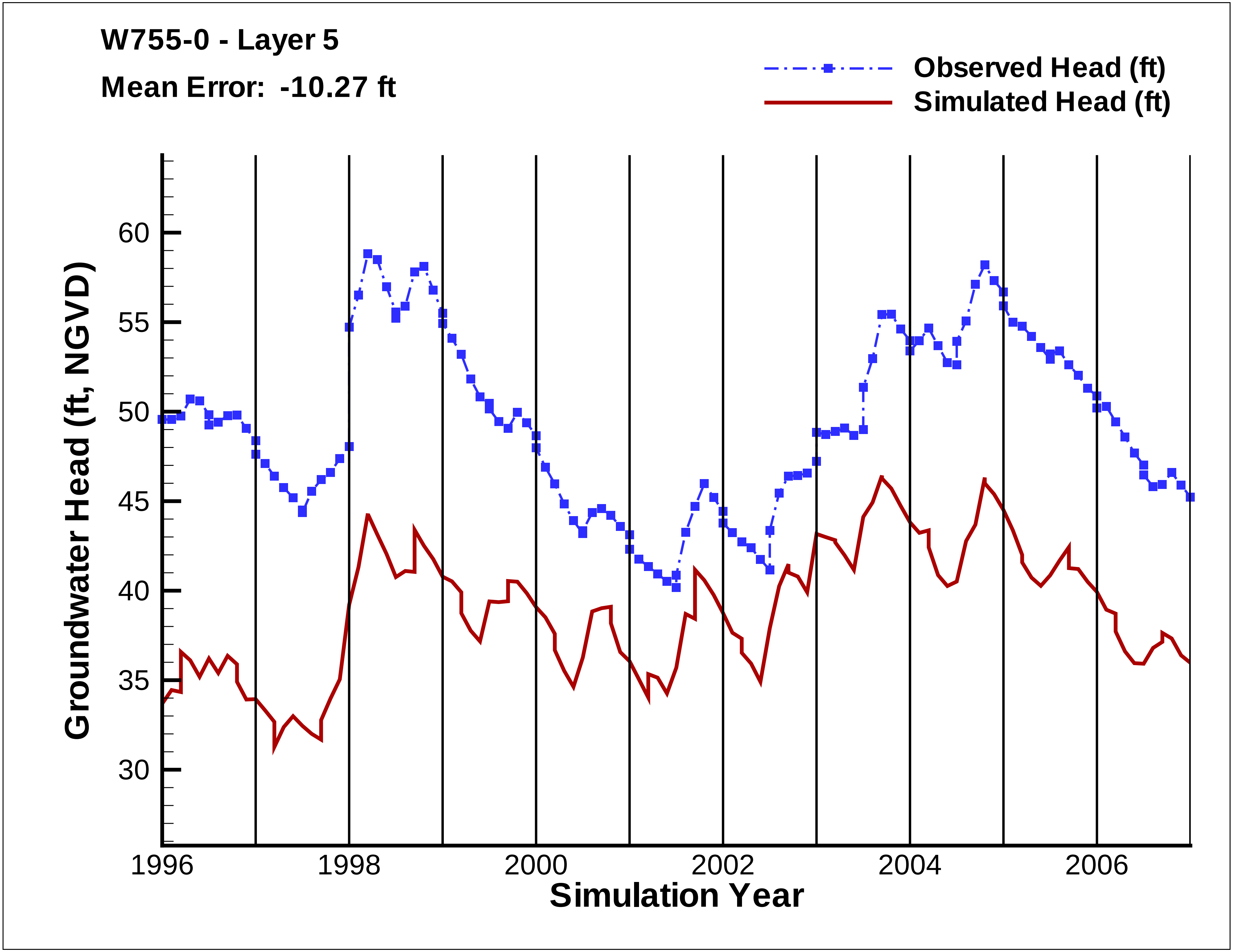

W742-0 - Layer 1
Mean Error: -14.52 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
65
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year


W746-0 - Layer 3
Mean Error: 5.67 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
10
5
1996
1998
2000
2002
2004
2006
Simulation Year

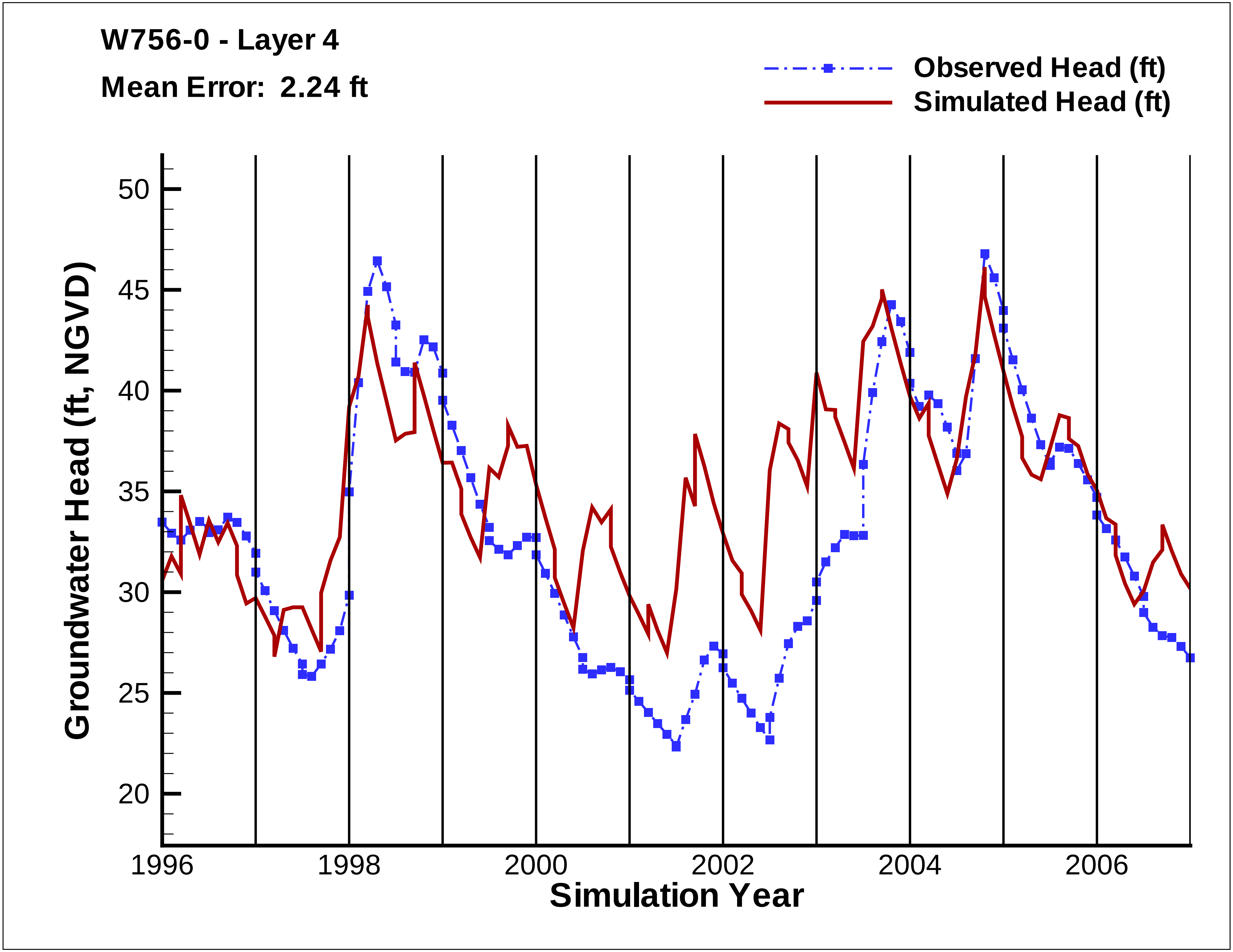

W748-0 - Layer 3
Mean Error: 0.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
14
12
10
8
6
1996
1998
2000
2002
2004
2006
Simulation Year

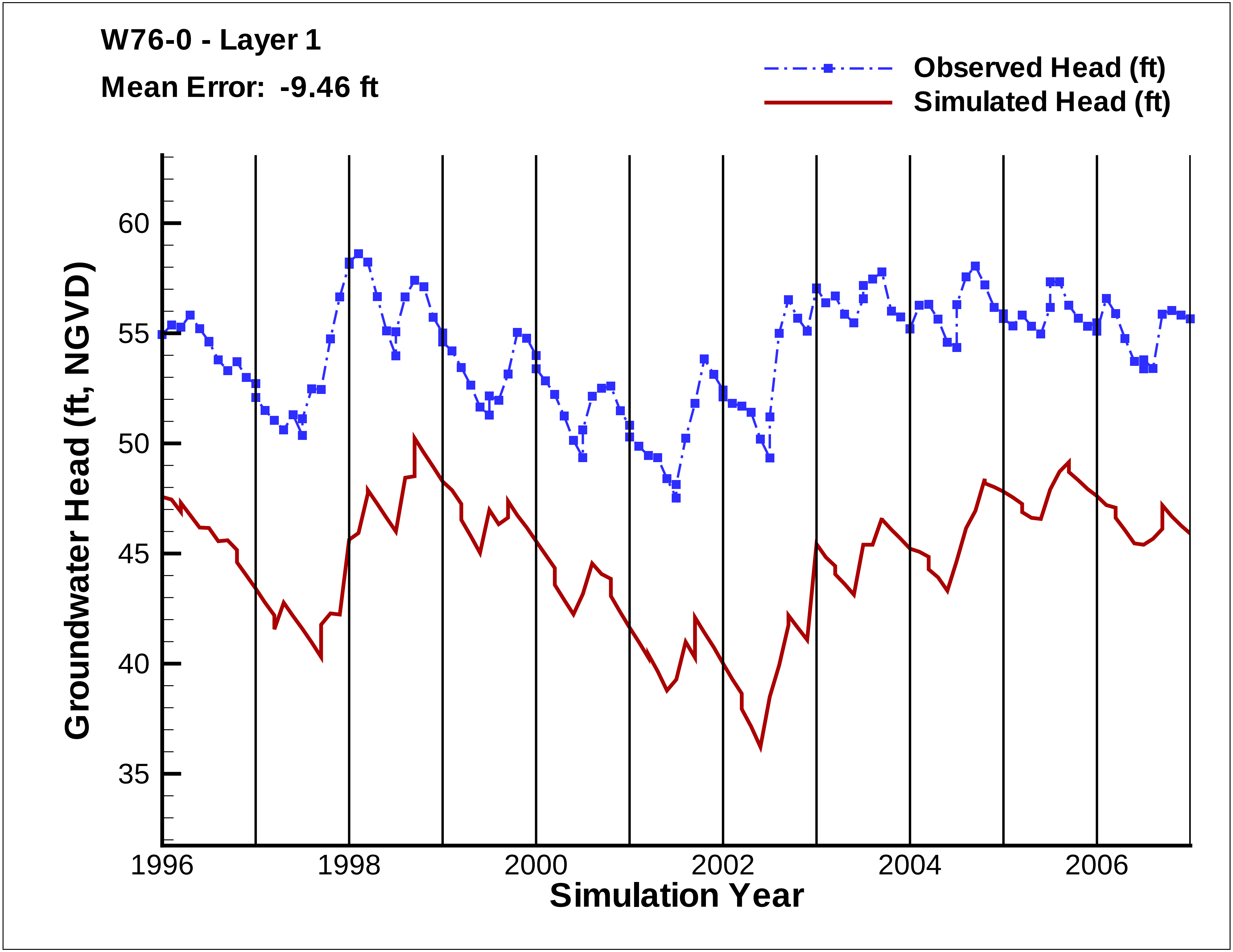


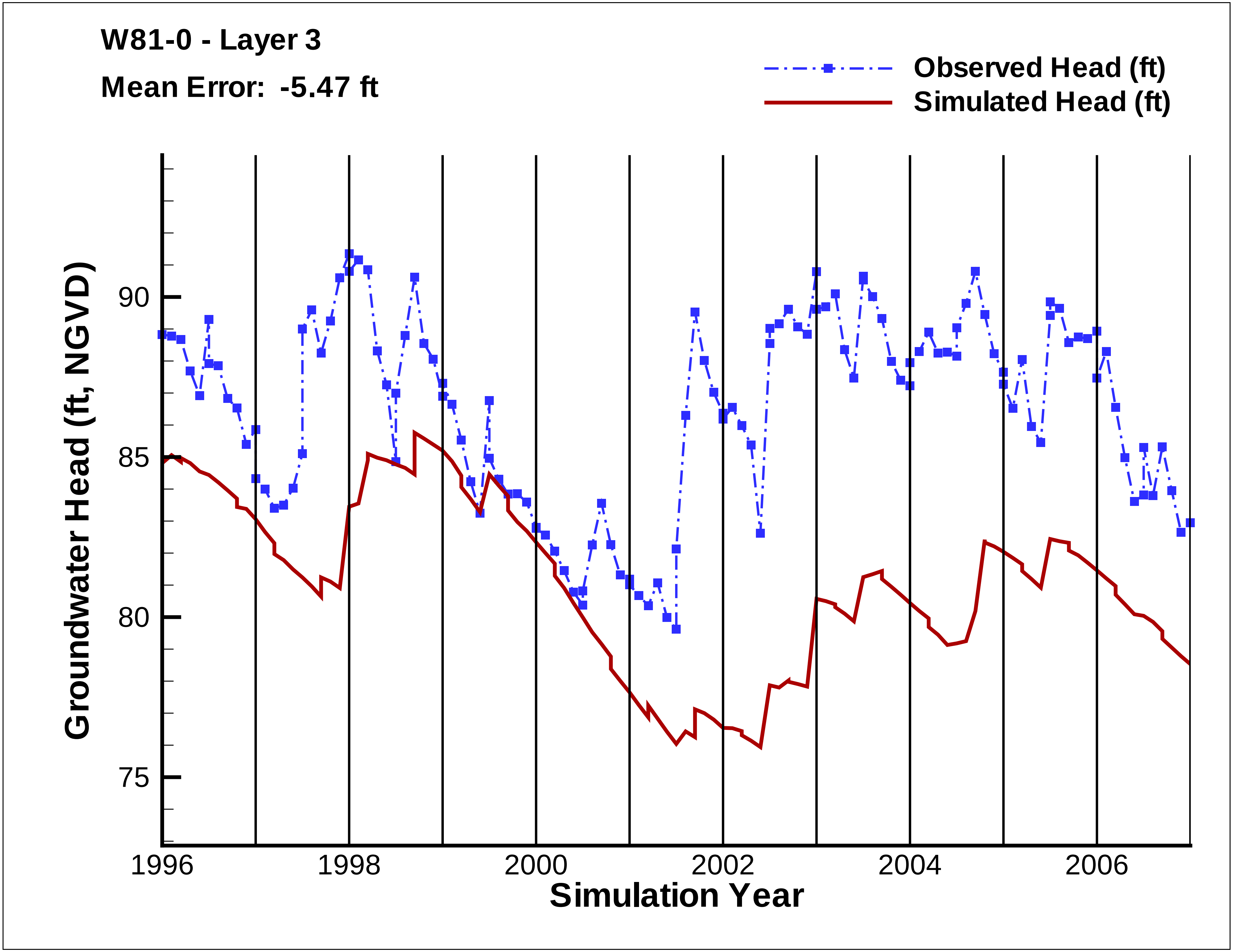
W751-0 - Layer 1
Mean Error: -0.69 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
16
14
12
10
8
1996
1998
2000
2002
2004
2006
Simulation Year



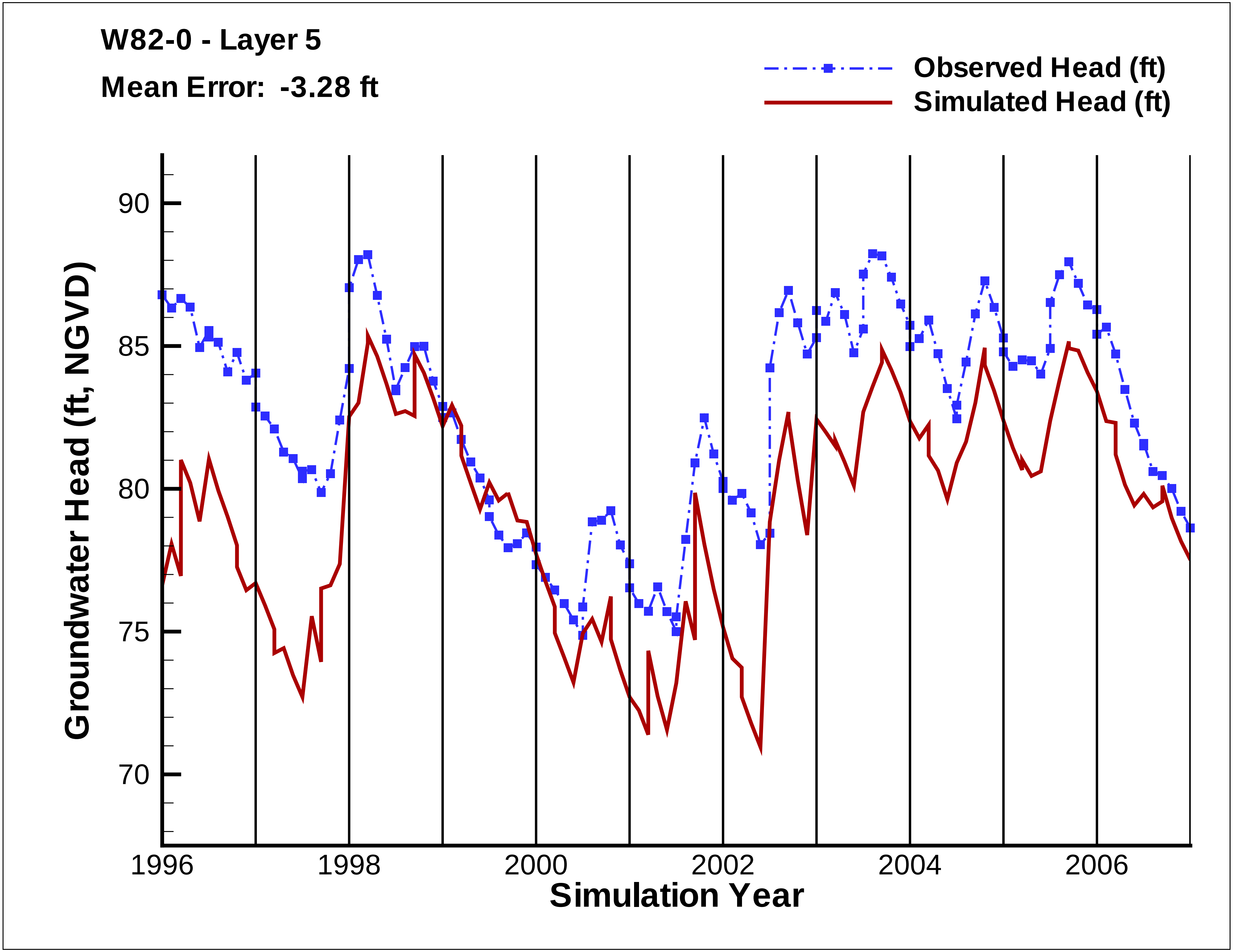
W755-0 - Layer 5
Mean Error: -10.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year


W756-0 - Layer 4
Mean Error: 2.24 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
20
1996
1998
2000
2002
2004
2006
Simulation Year

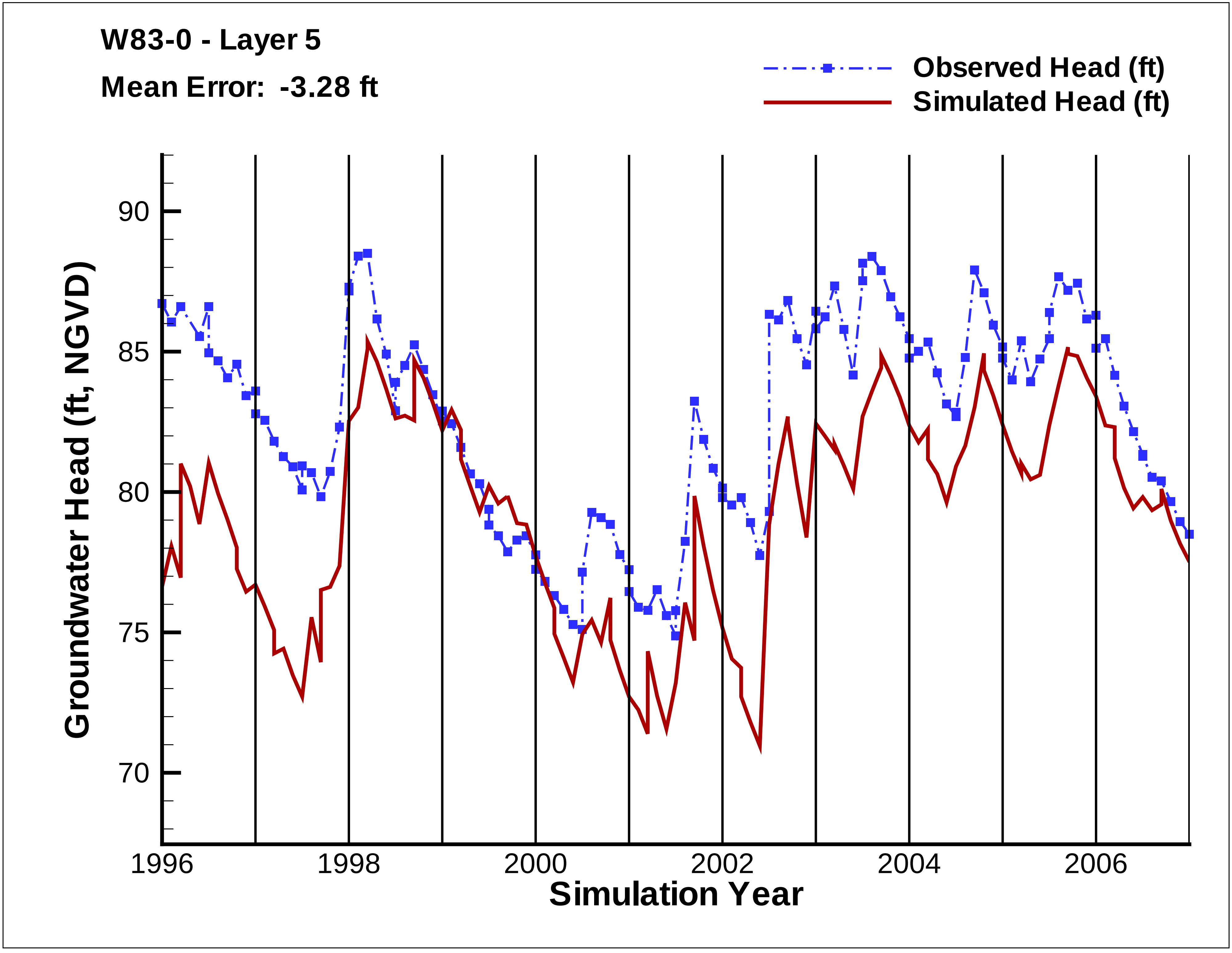

W76-0 - Layer 1
Mean Error: -9.46 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
35
40
45
50
55
60
1996
1998
2000
2002
2004
2006
Simulation Year

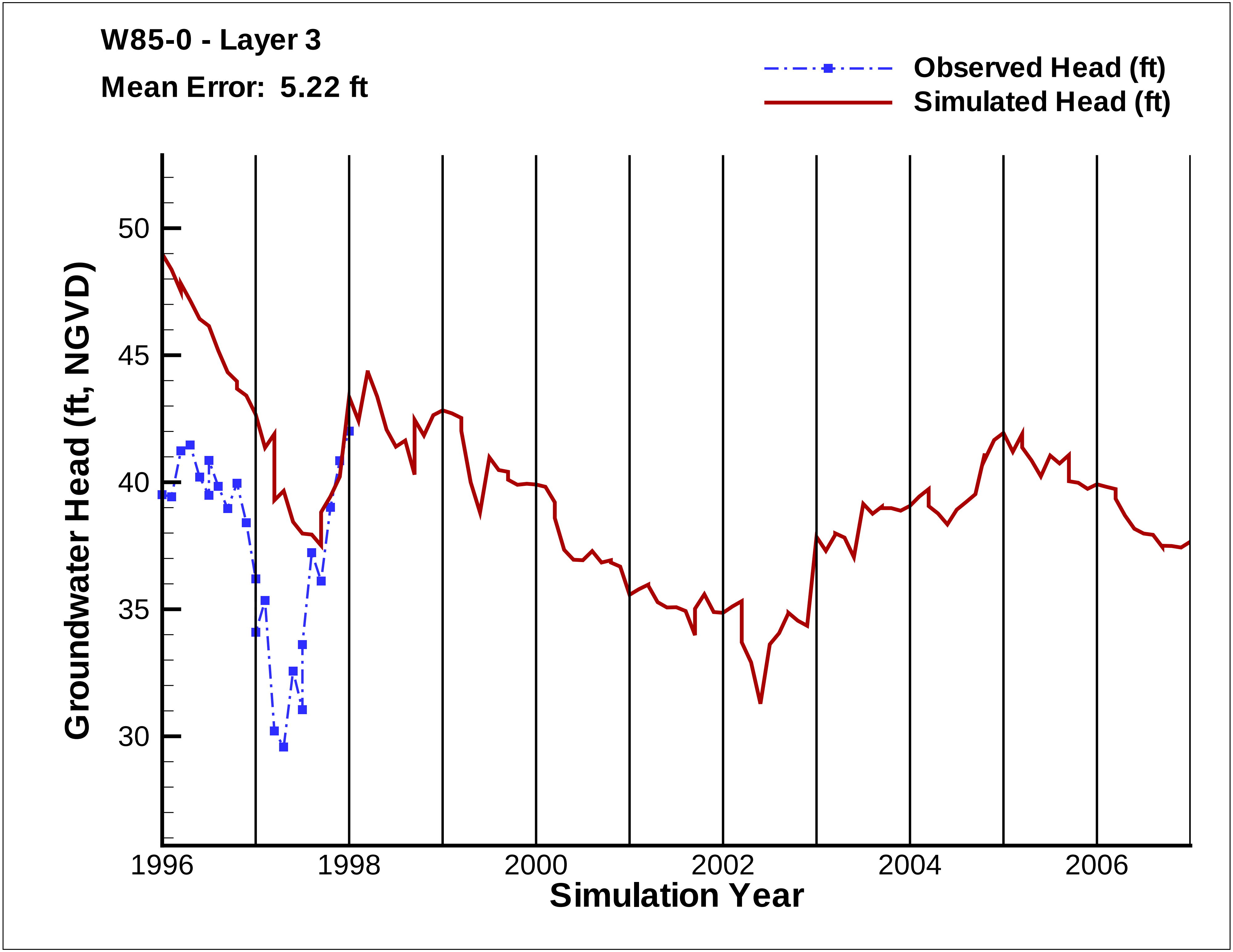


W81-0 - Layer 3
Mean Error: -5.47 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
1996
1998
2000
2002
2004
2006
Simulation Year

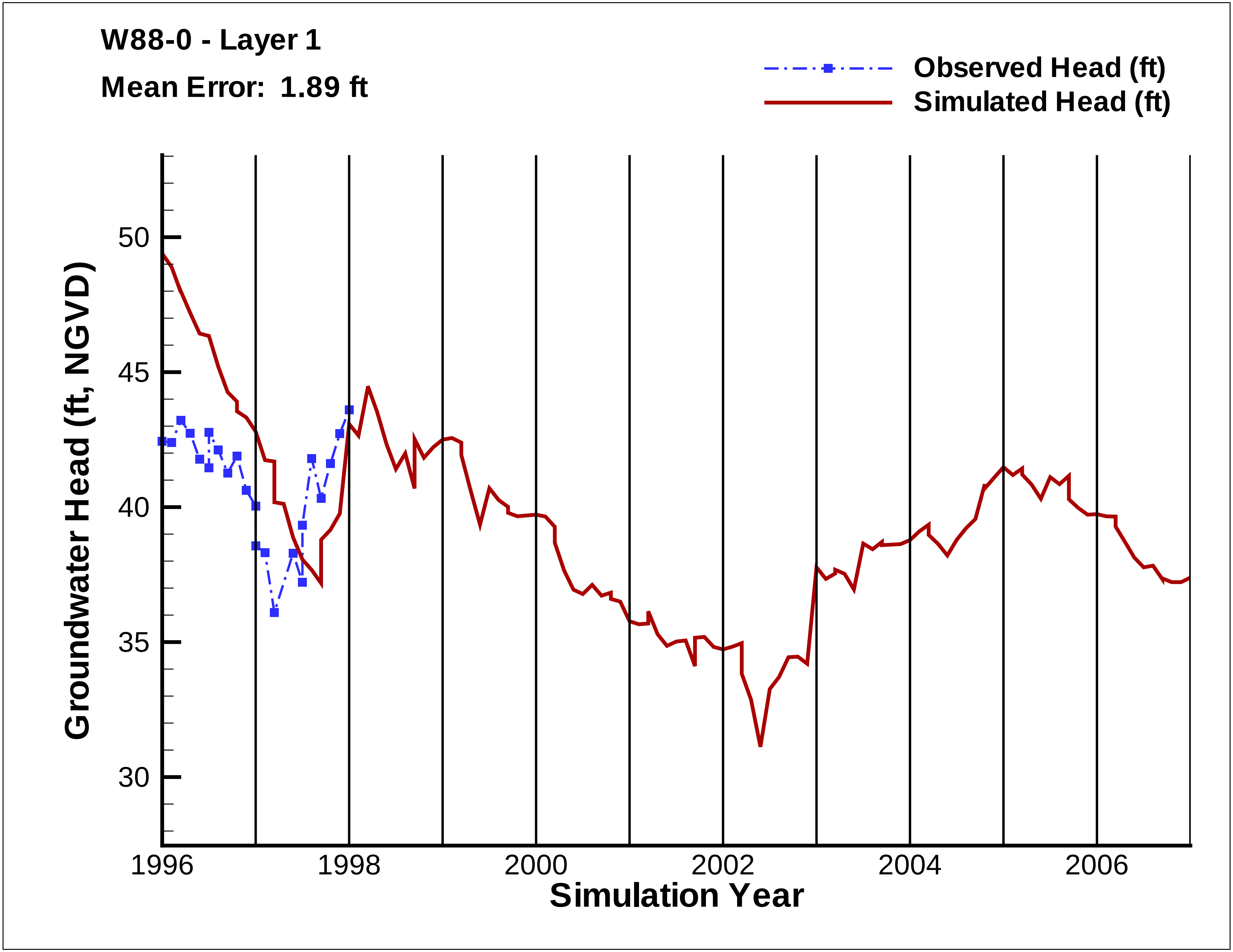


W82-0 - Layer 5
Mean Error: -3.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

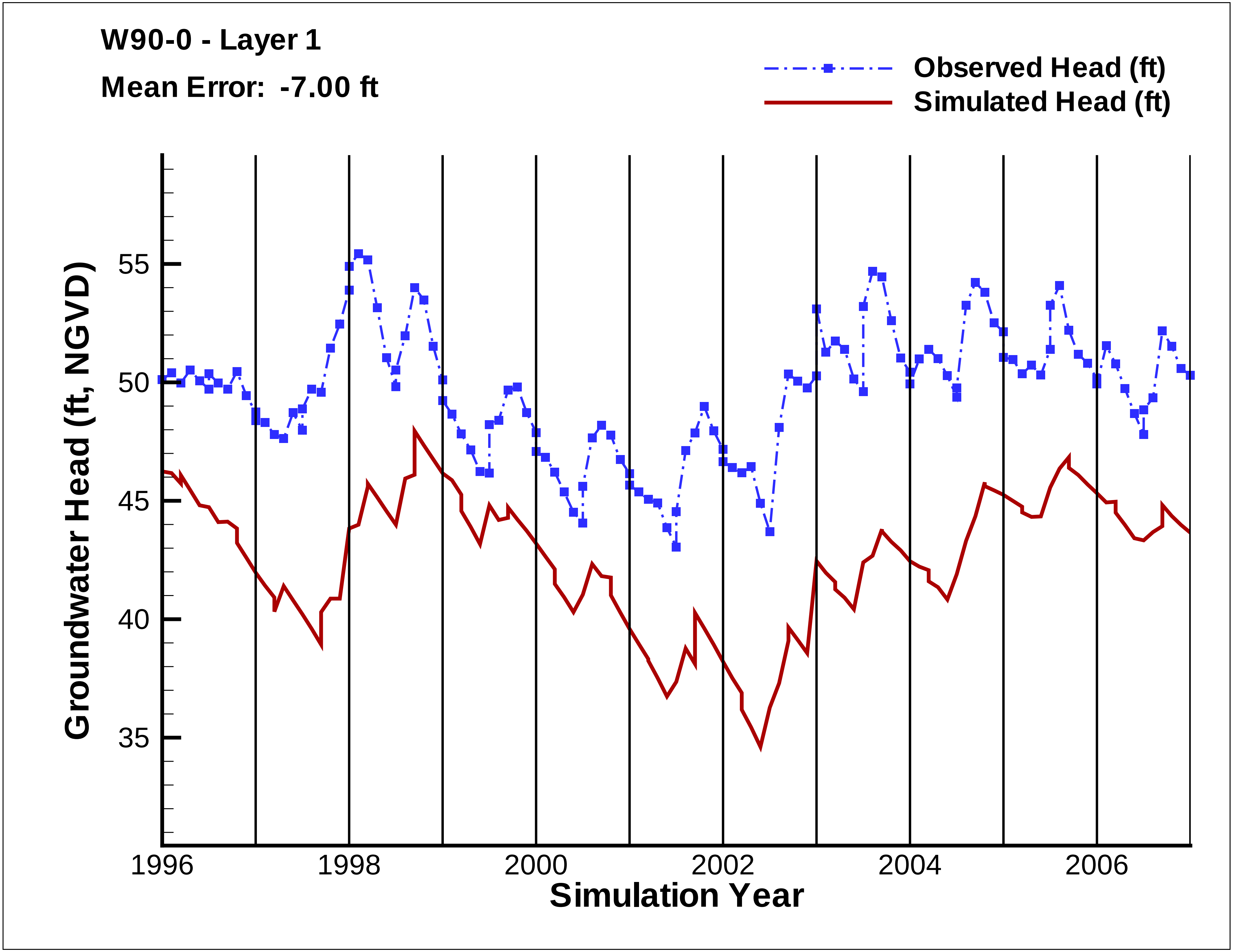

W83-0 - Layer 5
Mean Error: -3.28 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
90
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year



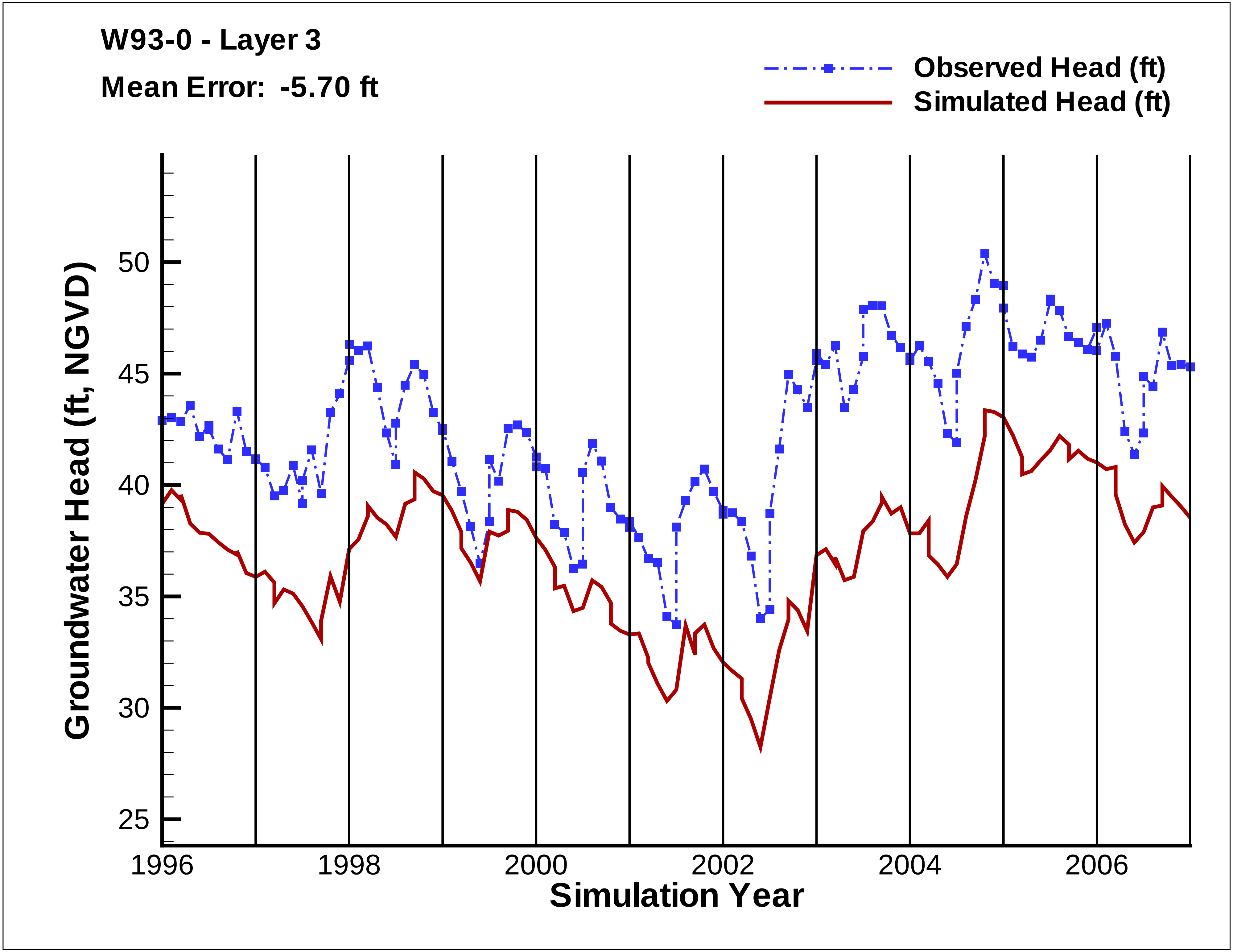
W85-0 - Layer 3
Mean Error: 5.22 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year

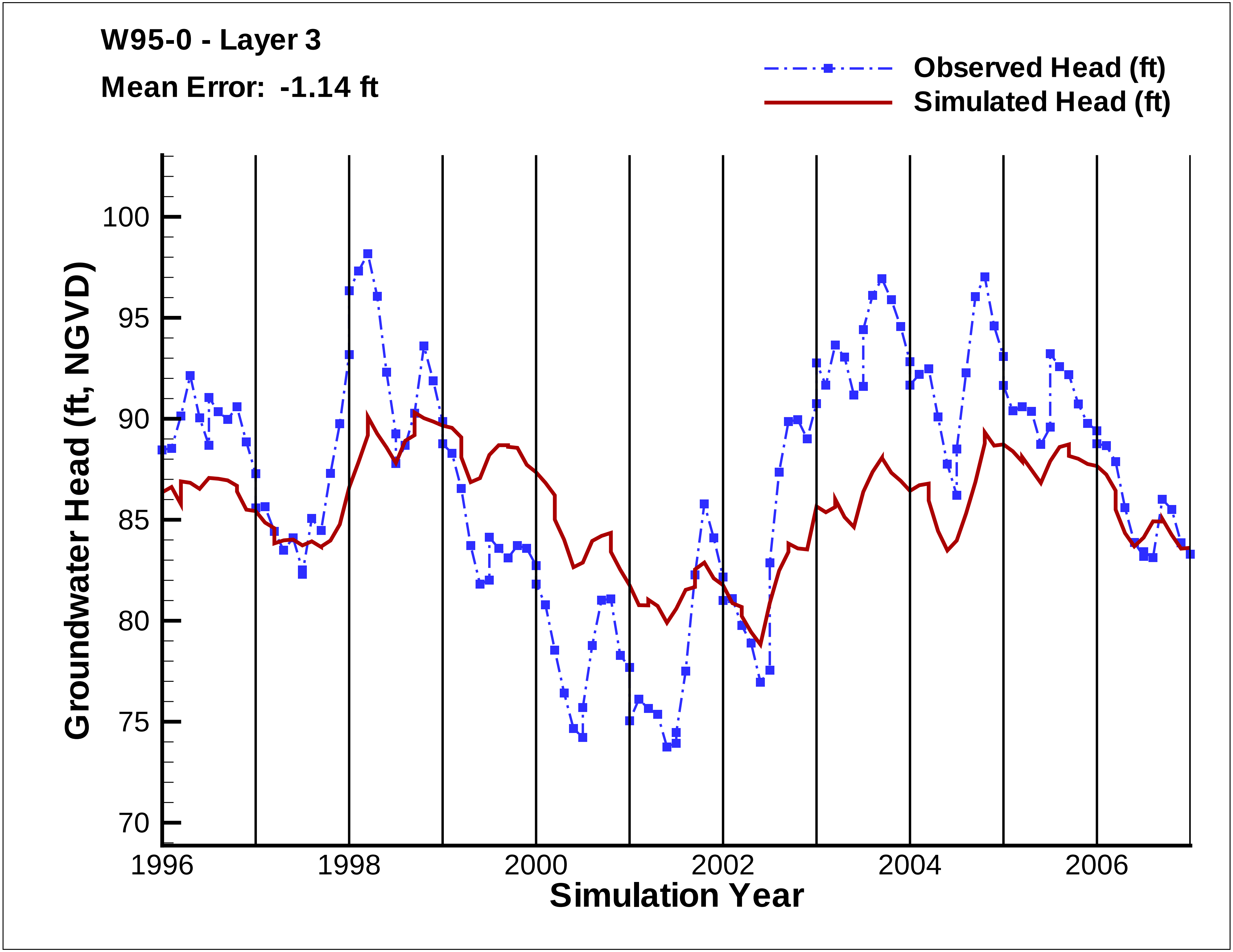


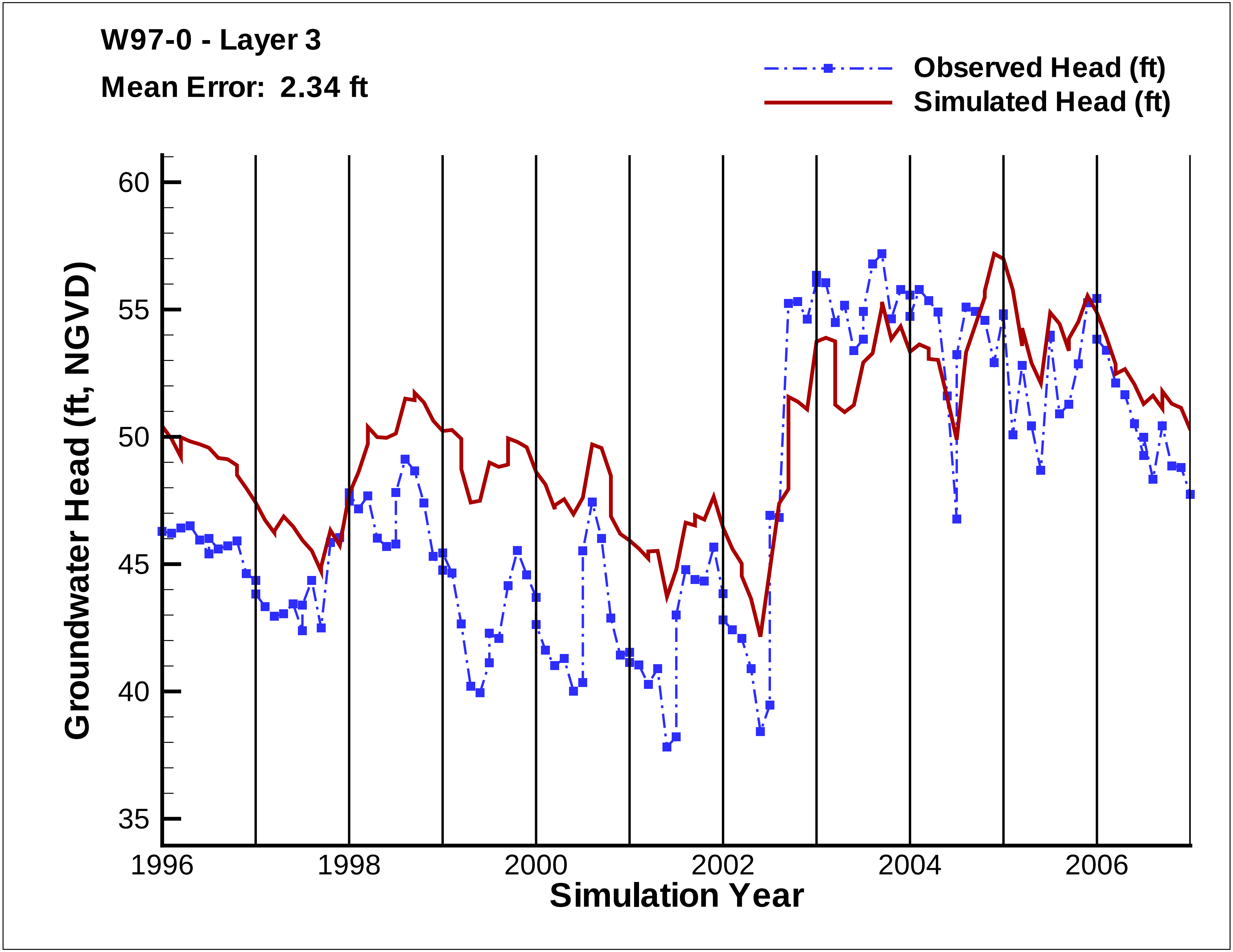
W88-0 - Layer 1
Mean Error: 1.89 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
1996
1998
2000
2002
2004
2006
Simulation Year



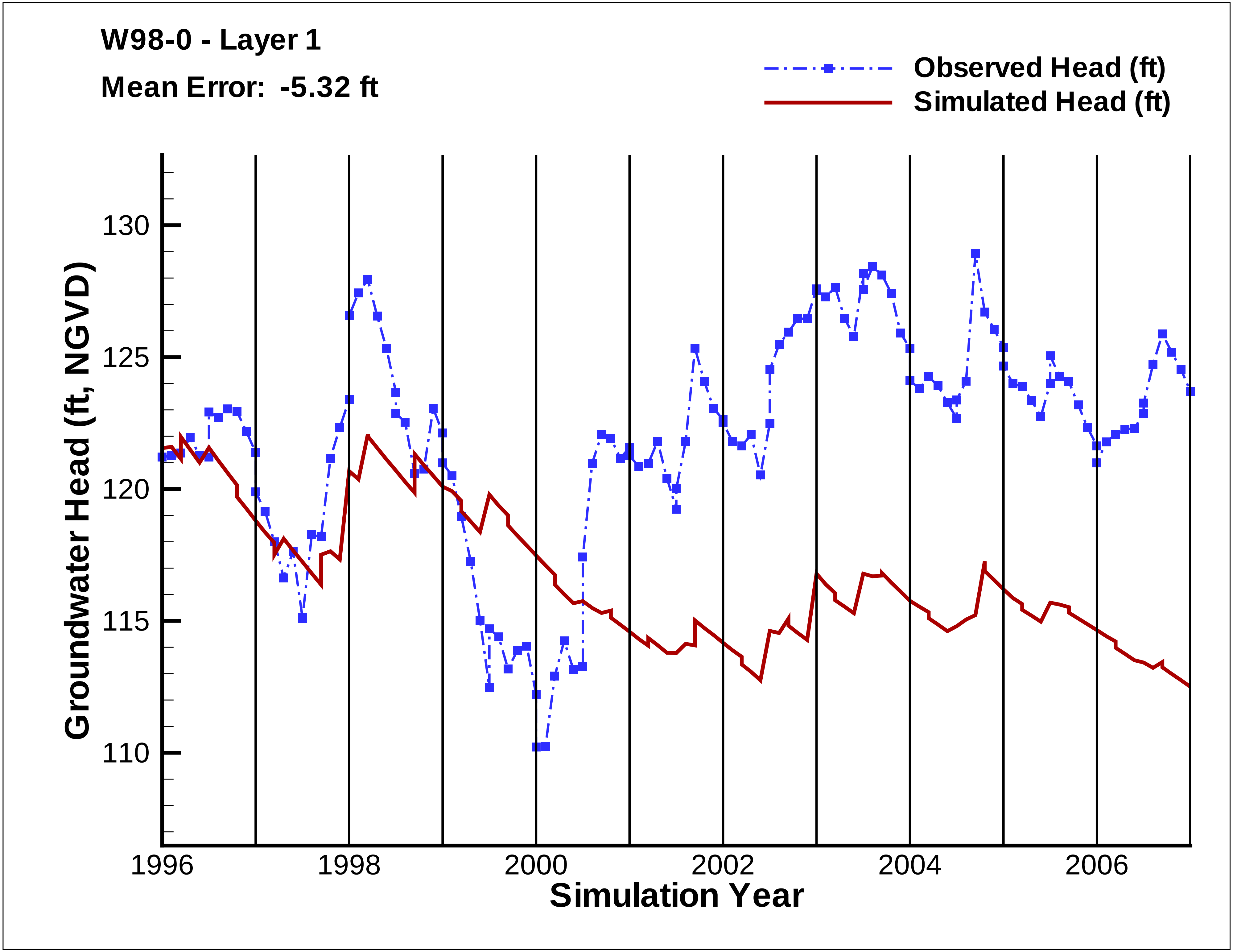
W90-0 - Layer 1
Mean Error: -7.00 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

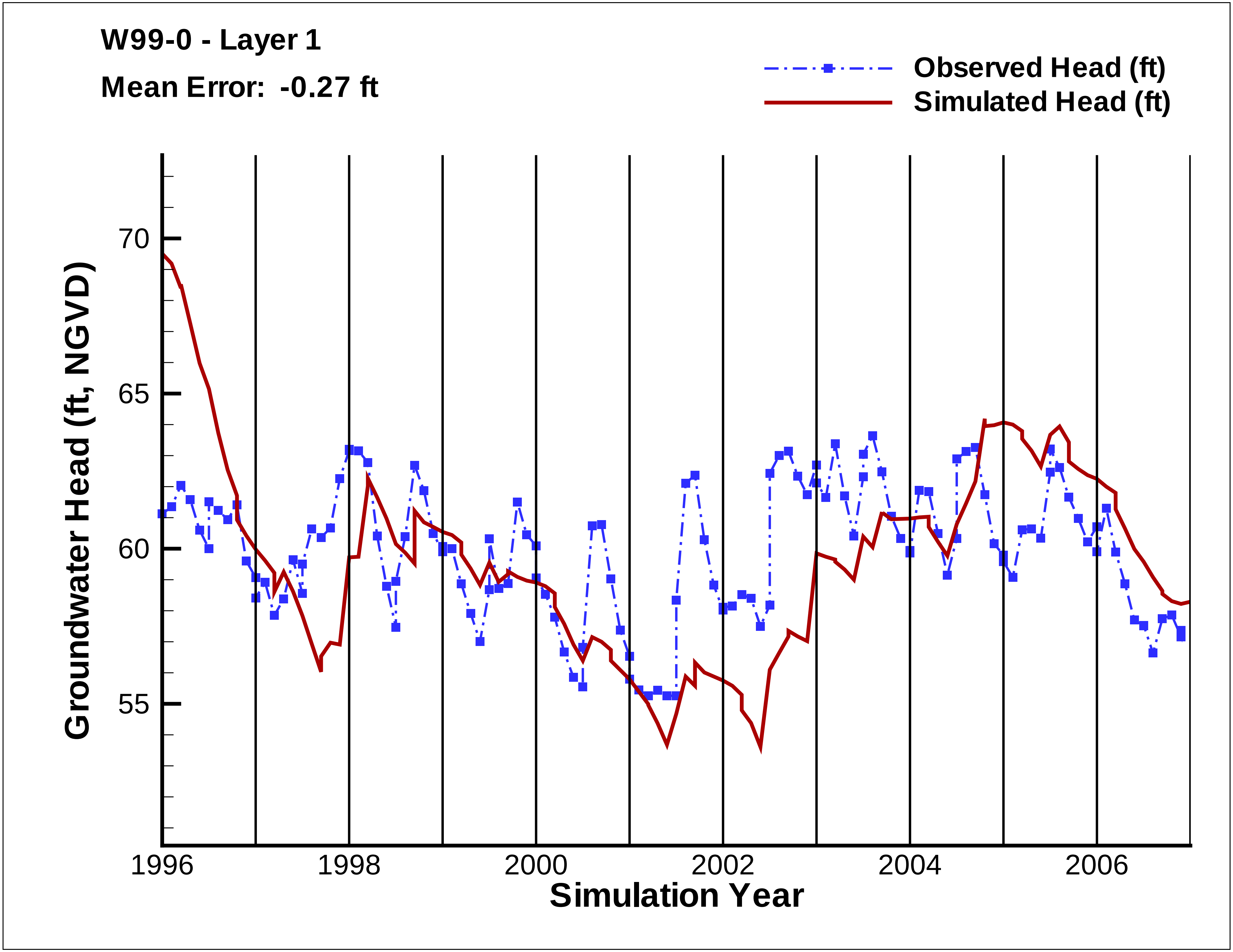

W93-0 - Layer 3
Mean Error: -5.70 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
50
45
40
35
30
25
1996
1998
2000
2002
2004
2006
Simulation Year

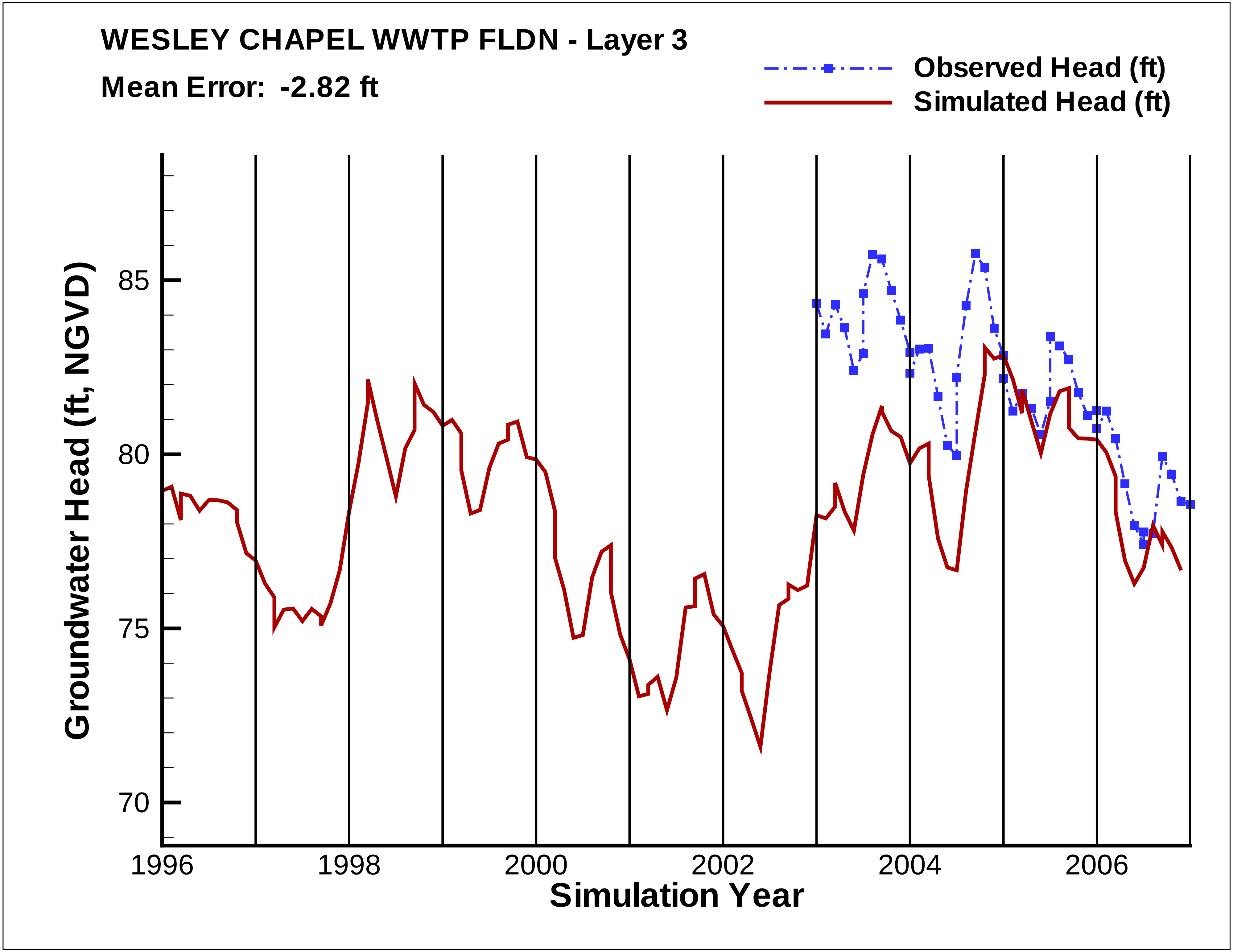

W95-0 - Layer 3
Mean Error: -1.14 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
100
95
90
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year

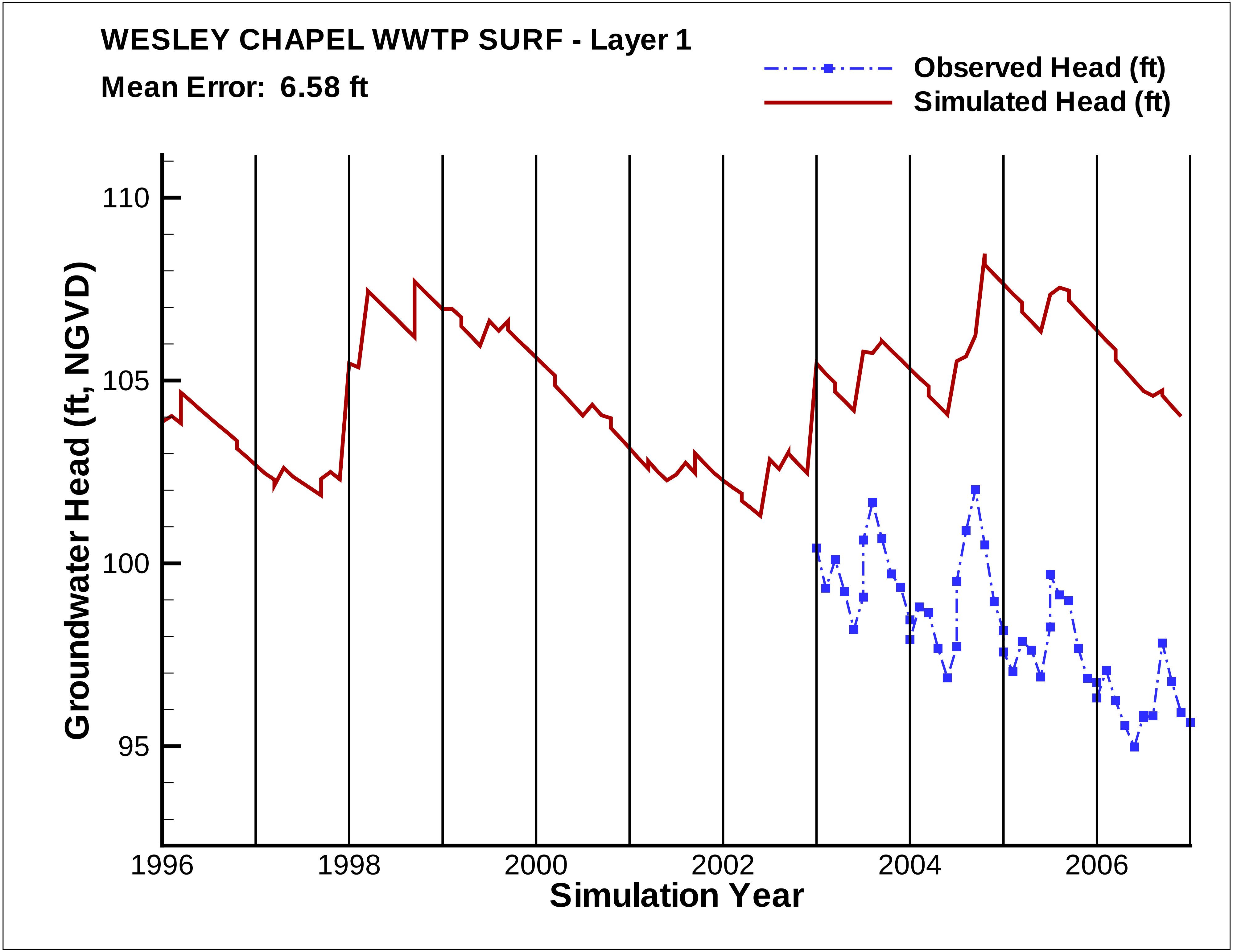


W97-0 - Layer 3
Mean Error: 2.34 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
40
35
1996
1998
2000
2002
2004
2006
Simulation Year

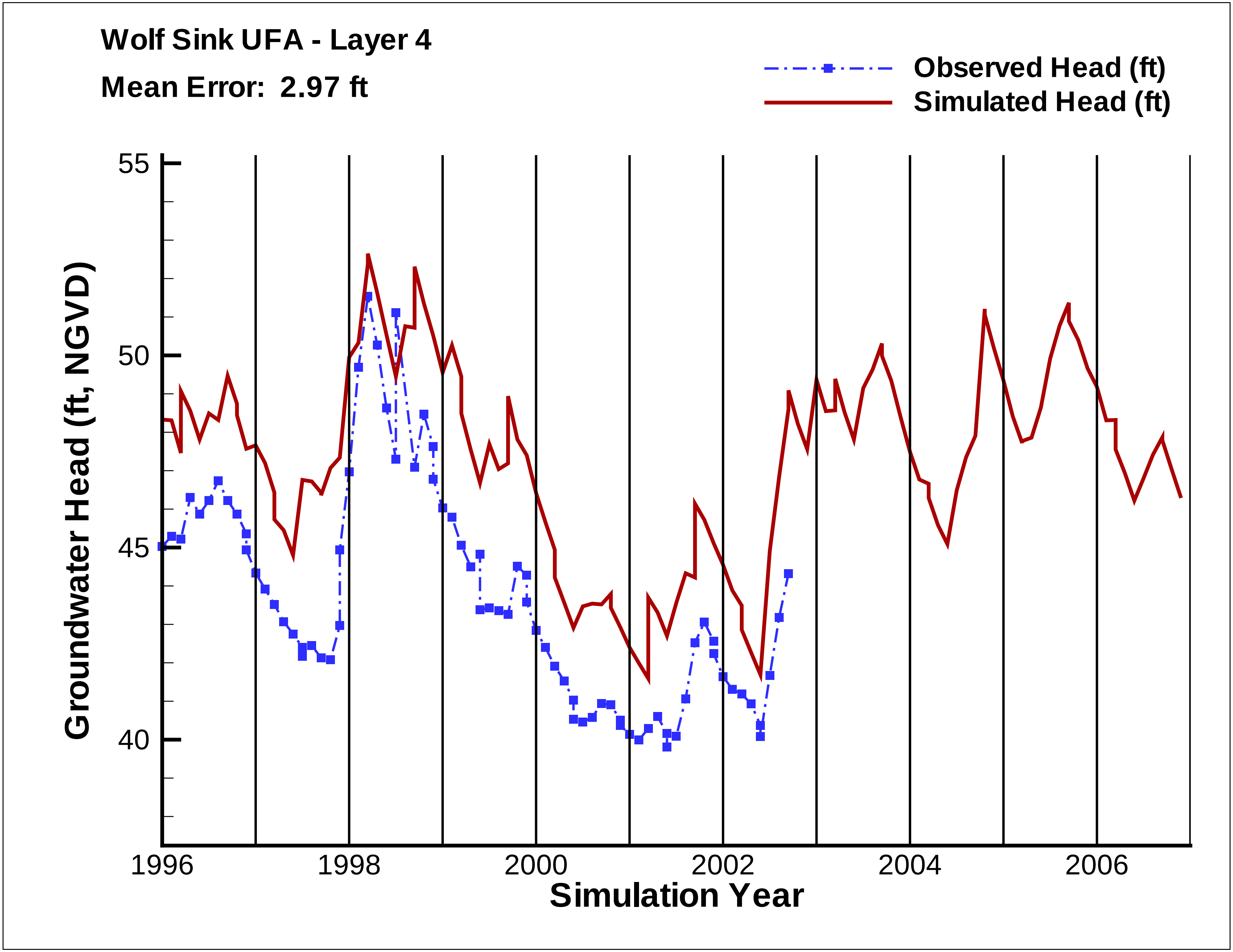

W98-0 - Layer 1
Mean Error: -5.32 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
130
125
120
115
110
1996
1998
2000
2002
2004
2006
Simulation Year


W99-0 - Layer 1
Mean Error: -0.27 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
70
65
60
55
1996
1998
2000
2002
2004
2006
Simulation Year

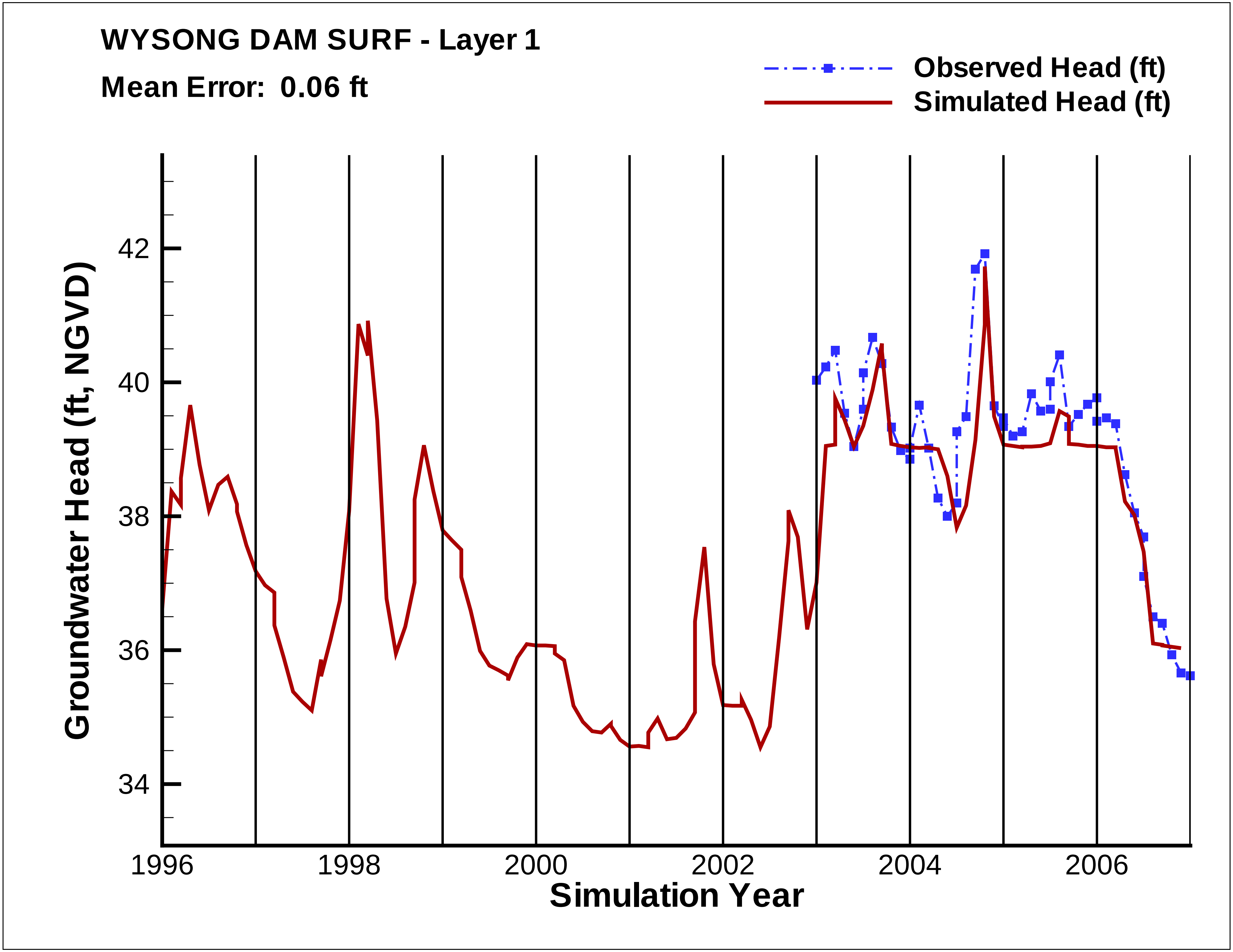

WESLEY CHAPEL WWTP FLDN - Layer 3
Mean Error: -2.82 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
85
80
75
70
1996
1998
2000
2002
2004
2006
Simulation Year



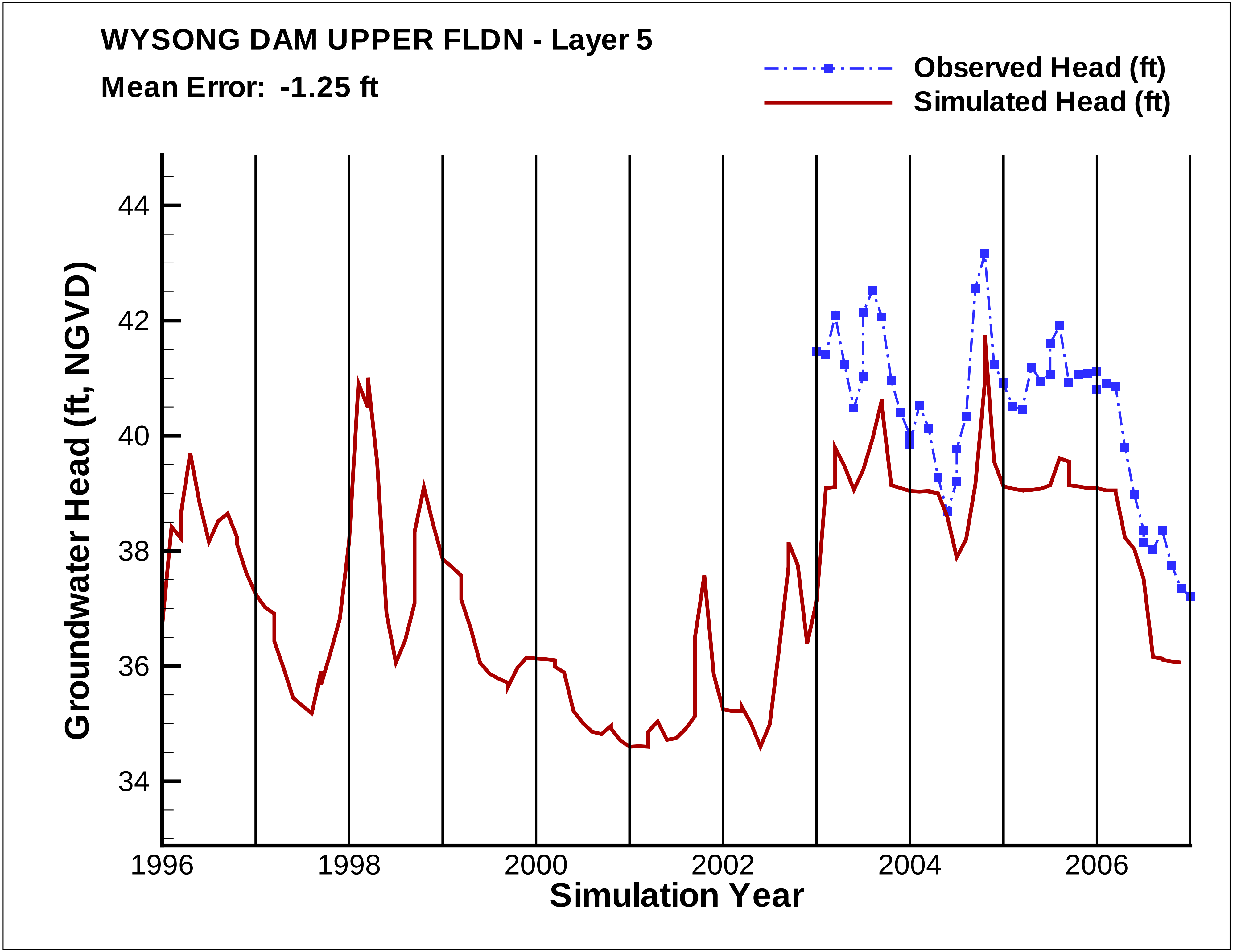
WESLEY CHAPEL WWTP SURF - Layer 1
Mean Error: 6.58 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
110
105
100
95
1996
1998
2000
2002
2004
2006
Simulation Year



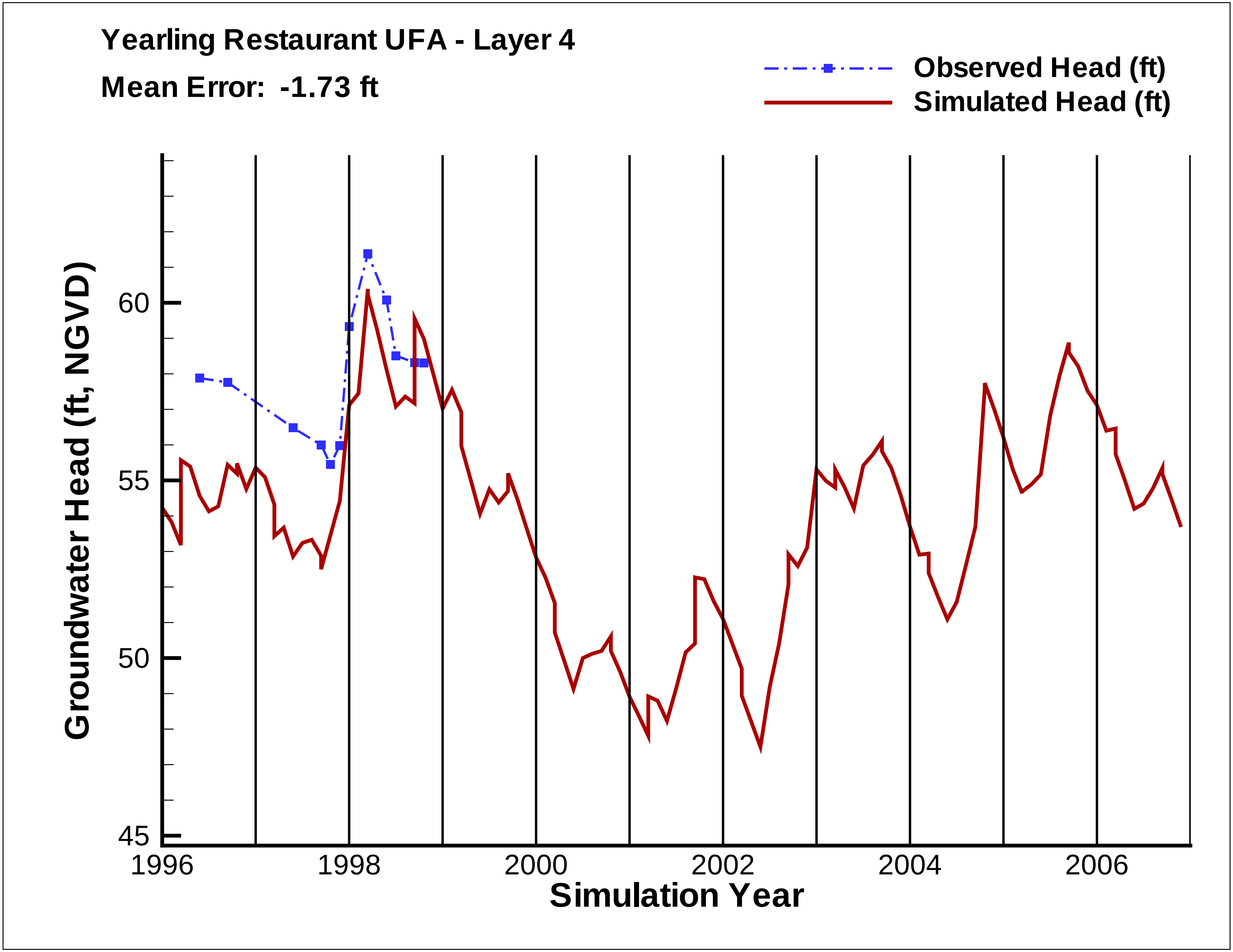
Wolf Sink UFA - Layer 4
Mean Error: 2.97 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
55
50
45
40
1996
1998
2000
2002
2004
2006
Simulation Year



WYSONG DAM SURF - Layer 1
Mean Error: 0.06 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
34
36
38
40
42
1996
1998
2000
2002
2004
2006
Simulation Year



WYSONG DAM UPPER FLDN - Layer 5
Mean Error: -1.25 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
44
42
40
38
36
34
1996
1998
2000
2002
2004
2006
Simulation Year


Yearling Restaurant UFA - Layer 4
Mean Error: -1.73 ft
Observed Head (ft)
Simulated Head (ft)
Groundwater Head (ft, NGVD)
60
55
50
45
1996
1998
2000
2002
2004
2006
Simulation Year

APPENDIX B

BASE FLOW ALONG THE WITHLACOOCHEE AND OCKLAWAHA RIVERS

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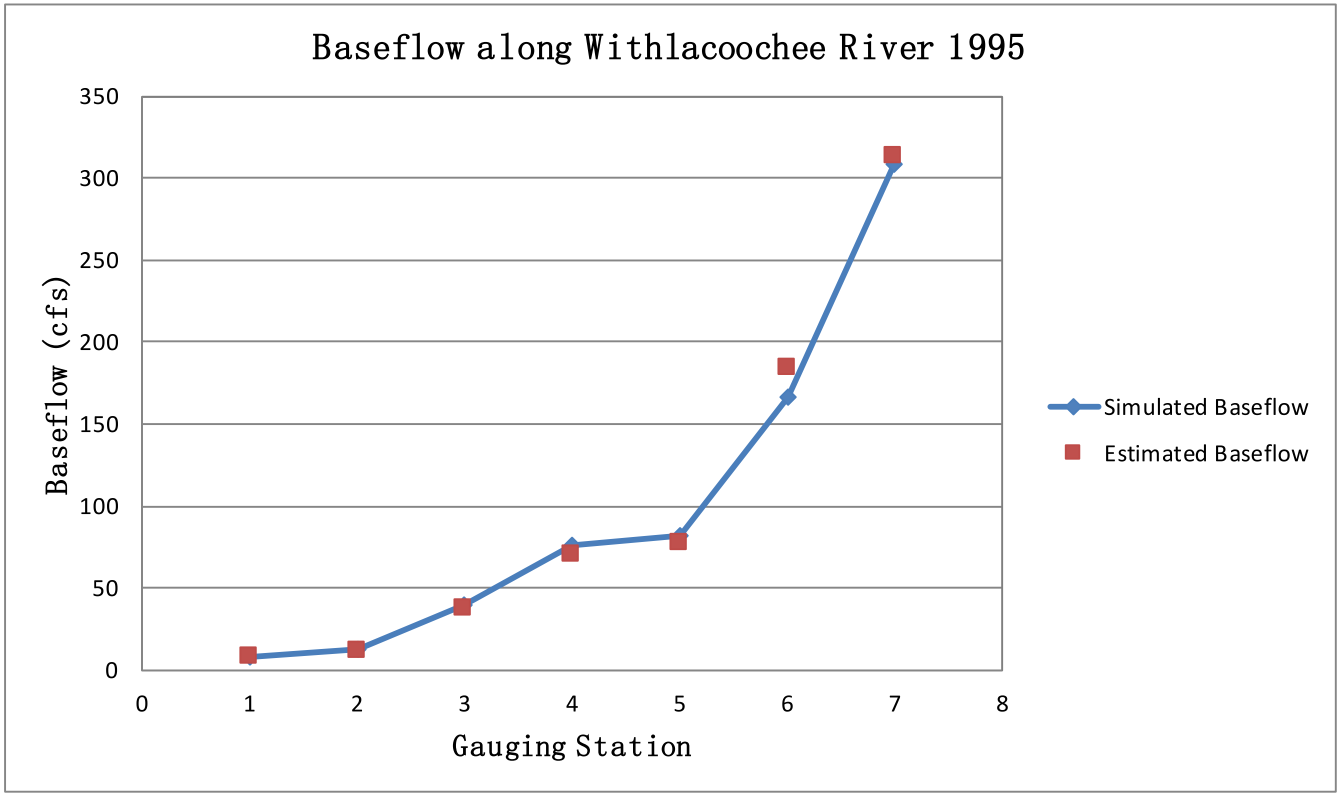
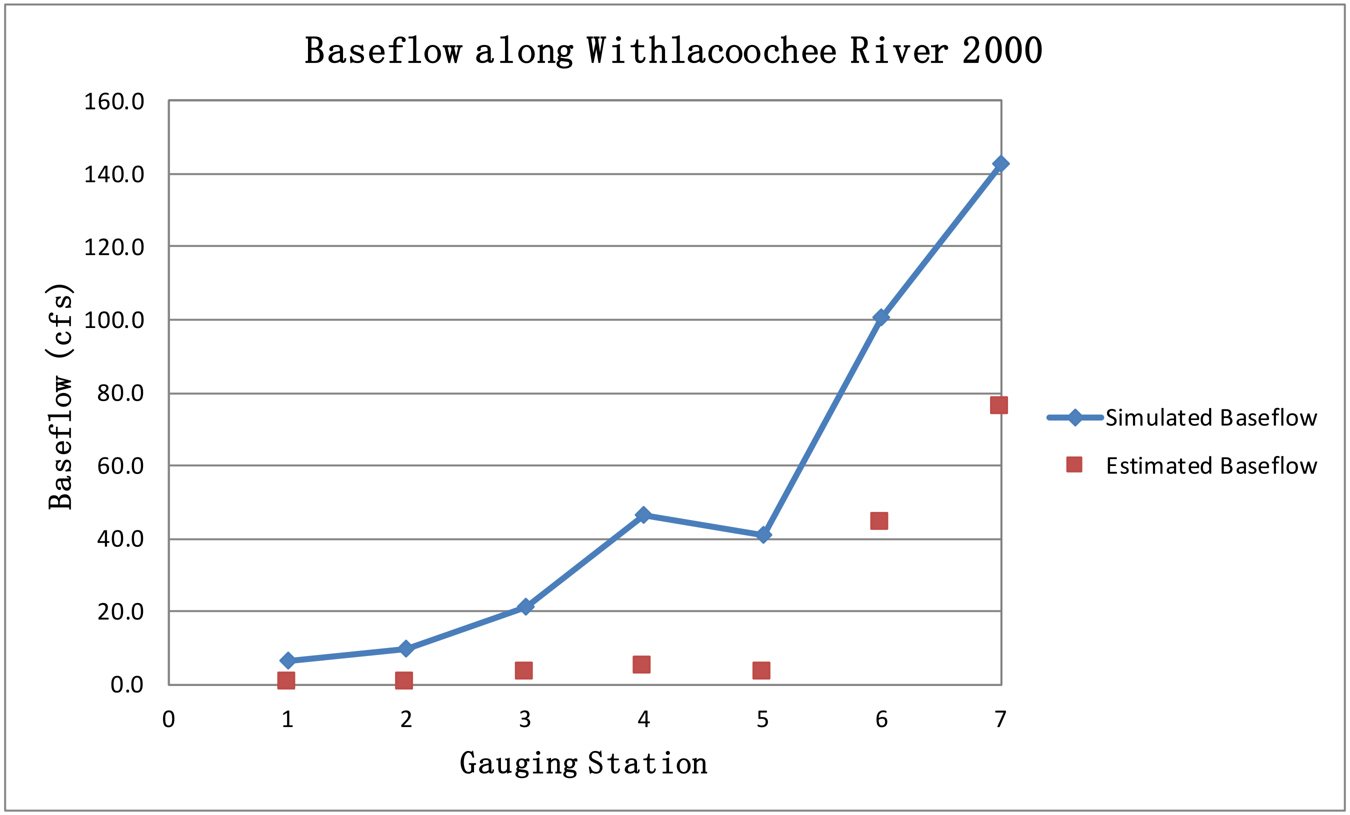


Note:

1. Withlacoochee River near Cumpressco
2. Withlacoochee River near Dade City
3. Withlacoochee River at Trilby
4. Withlacoochee River at Croom
5. Withlacoochee River near Floral City
6. Withlacoochee River at Wysong Dam
7. Withlacoochee River near Holder

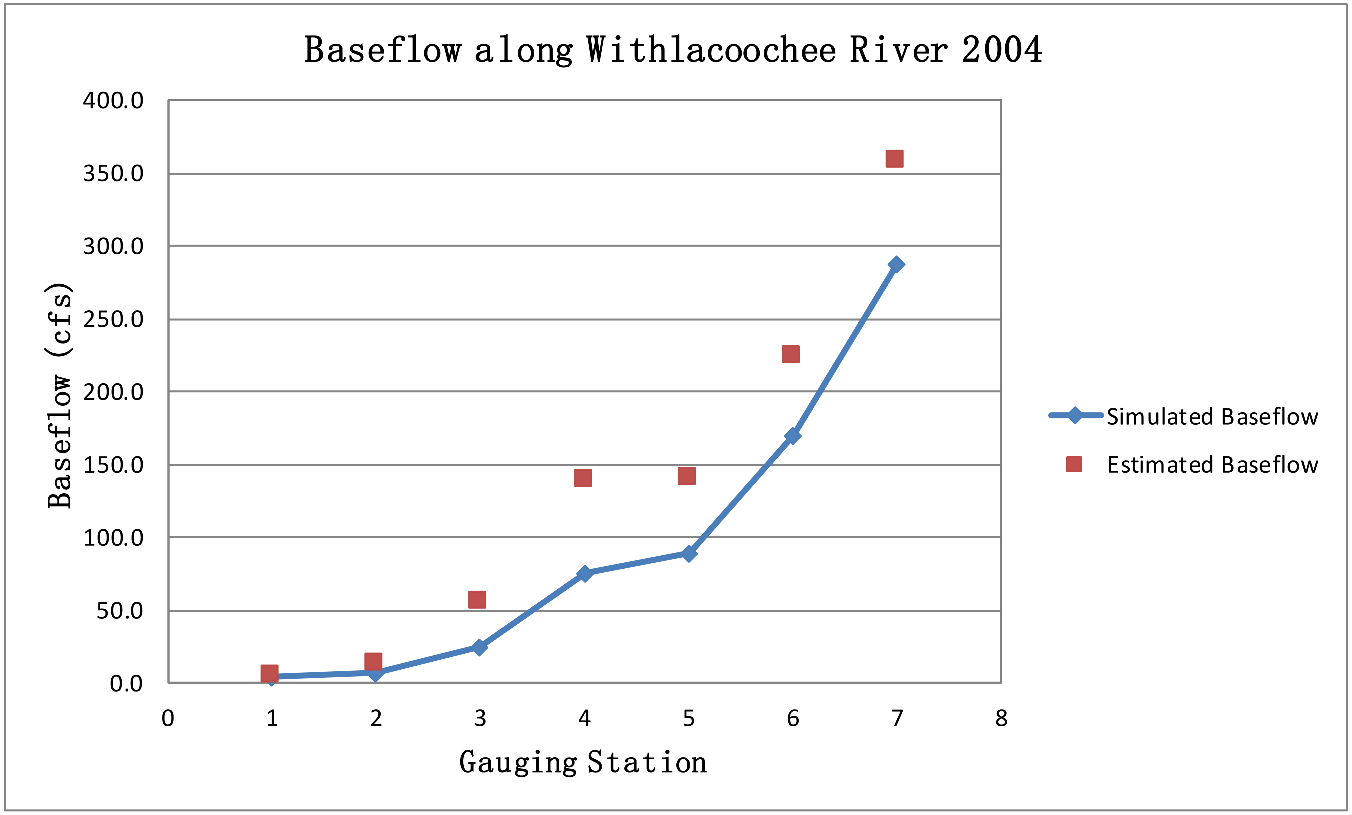
Figure B.1 Base Flow along the Withlacoochee River: Steady State 1995



Note:

1. Withlacoochee River near Cumpressco
2. Withlacoochee River near Dade City
3. Withlacoochee River at Trilby
4. Withlacoochee River at Croom
5. Withlacoochee River near Floral City
6. Withlacoochee River at Wysong Dam
7. Withlacoochee River near Holder

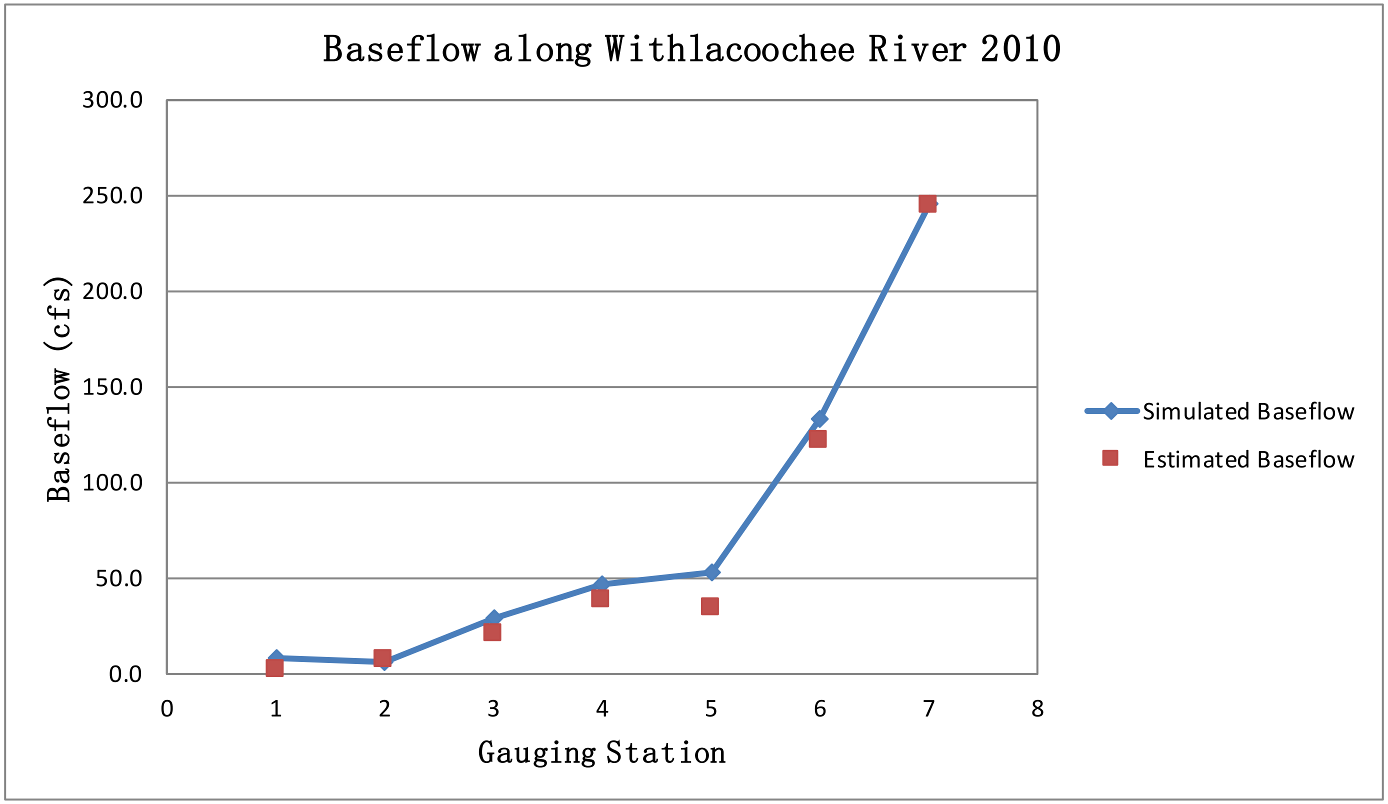
Figure B.2 Base Flow along the Withlacoochee River: Annual Average 2000



Note:

1. Withlacoochee River near Cumpressco
2. Withlacoochee River near Dade City
3. Withlacoochee River at Trilby
4. Withlacoochee River at Croom
5. Withlacoochee River near Floral City
6. Withlacoochee River at Wysong Dam
7. Withlacoochee River near Holder

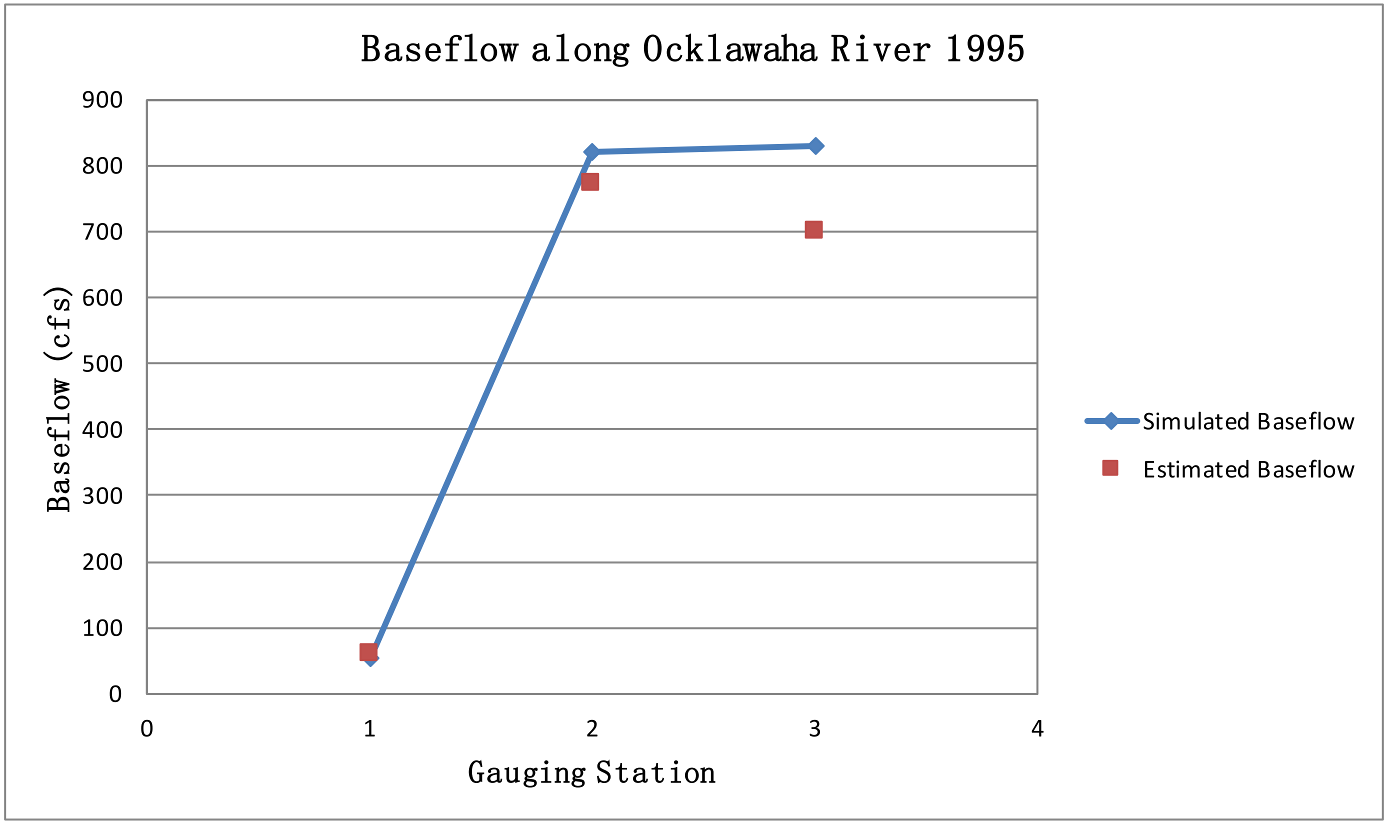
Figure B.3 Base Flow along the Withlacoochee River: Annual Average 2004



Note:

1. Withlacoochee River near Cumpressco
2. Withlacoochee River near Dade City
3. Withlacoochee River at Trilby
4. Withlacoochee River at Croom
5. Withlacoochee River near Floral City
6. Withlacoochee River at Wysong Dam
7. Withlacoochee River near Holder

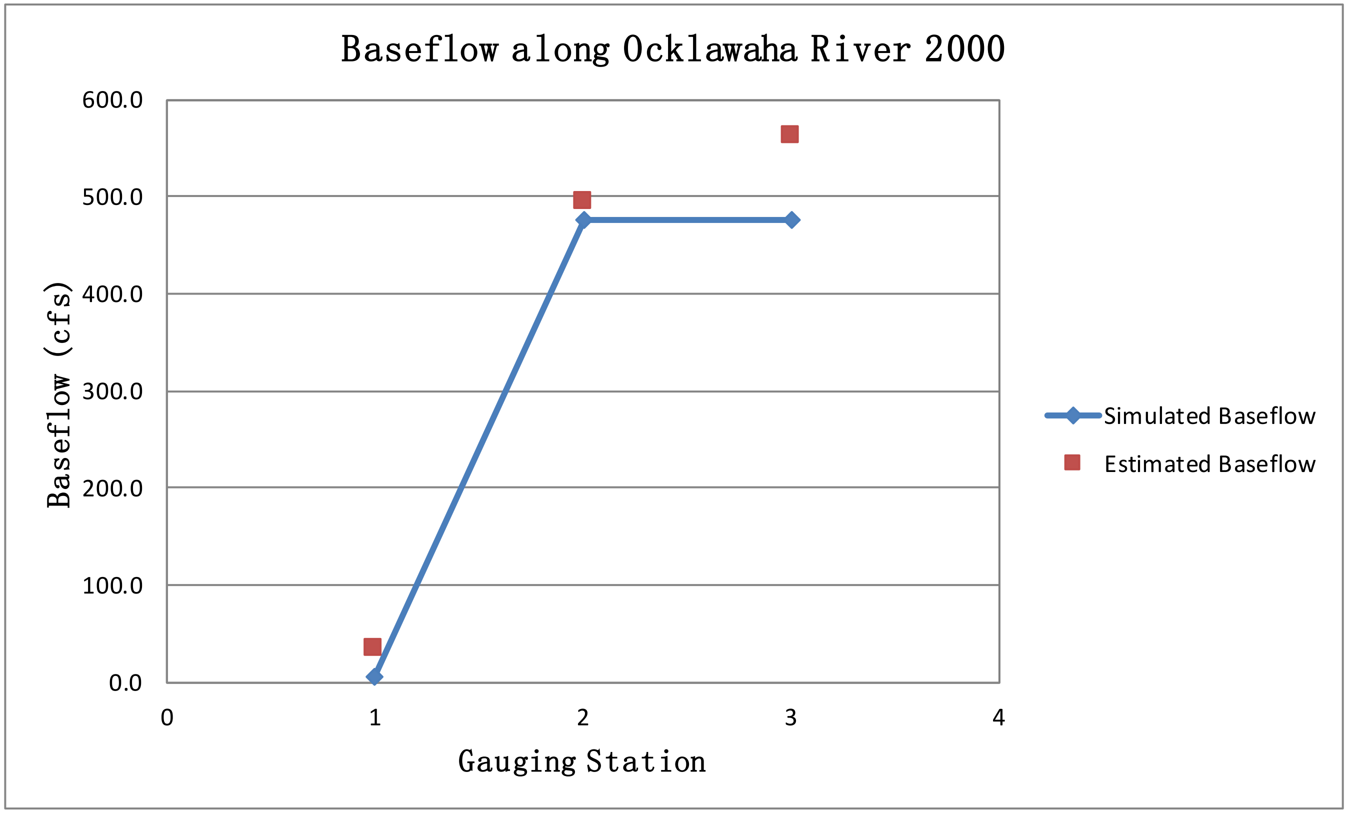
Figure B.4 Base Flow along the Withlacoochee River: Steady State 2010



Note:

1. Ocklawaha River near Moss Bluff
2. Ocklawaha River at Conner
3. Ocklawaha River at Eureka

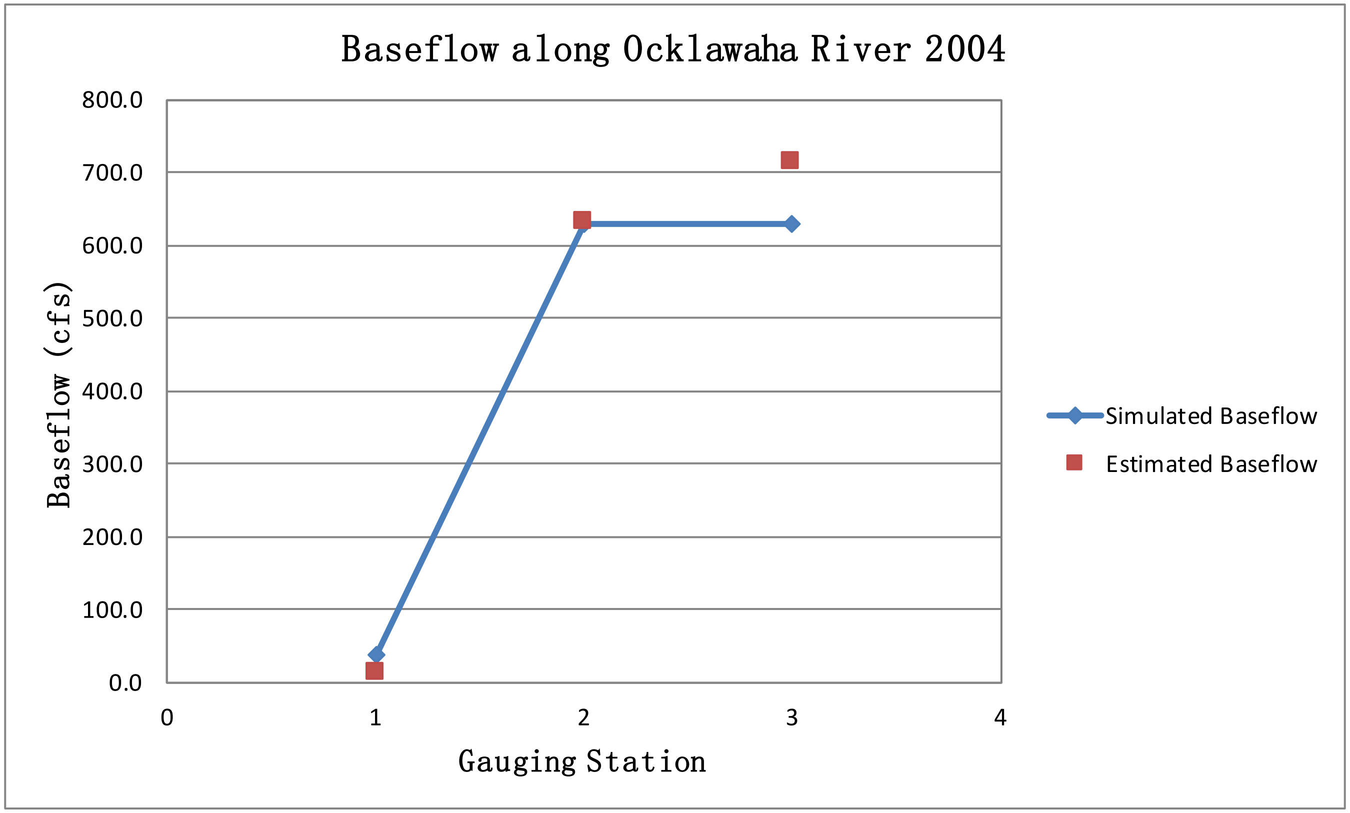
Figure B.5 Base Flow along the Ocklawaha River: Steady State 1995



Note:

1. Ocklawaha River near Moss Bluff
2. Ocklawaha River at Conner
3. Ocklawaha River at Eureka

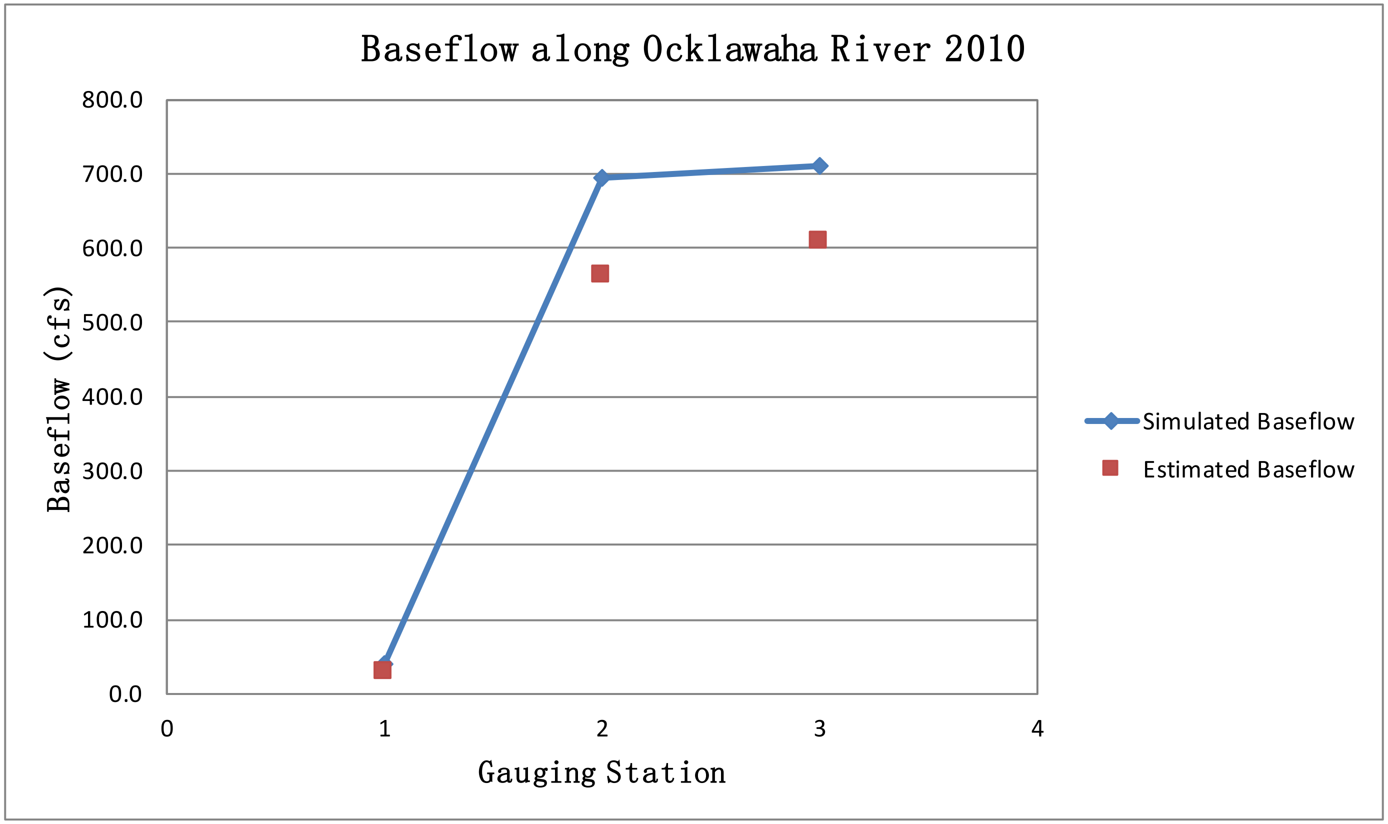
Figure B.6 Base Flow along the Ocklawaha River: Annual Average 2000



Note:

1. Ocklawaha River near Moss Bluff
2. Ocklawaha River at Conner
3. Ocklawaha River at Eureka

Figure B.7 Base Flow along the Ocklawaha River: Annual Average 2004



Note:

1. Ocklawaha River near Moss Bluff
2. Ocklawaha River at Conner
3. Ocklawaha River at Eureka

Figure B.8 Base Flow along the Ocklawaha River: Steady State 2010

APPENDIX C

SPRING DISCHARGE FROM THE TRANSIENT MODEL

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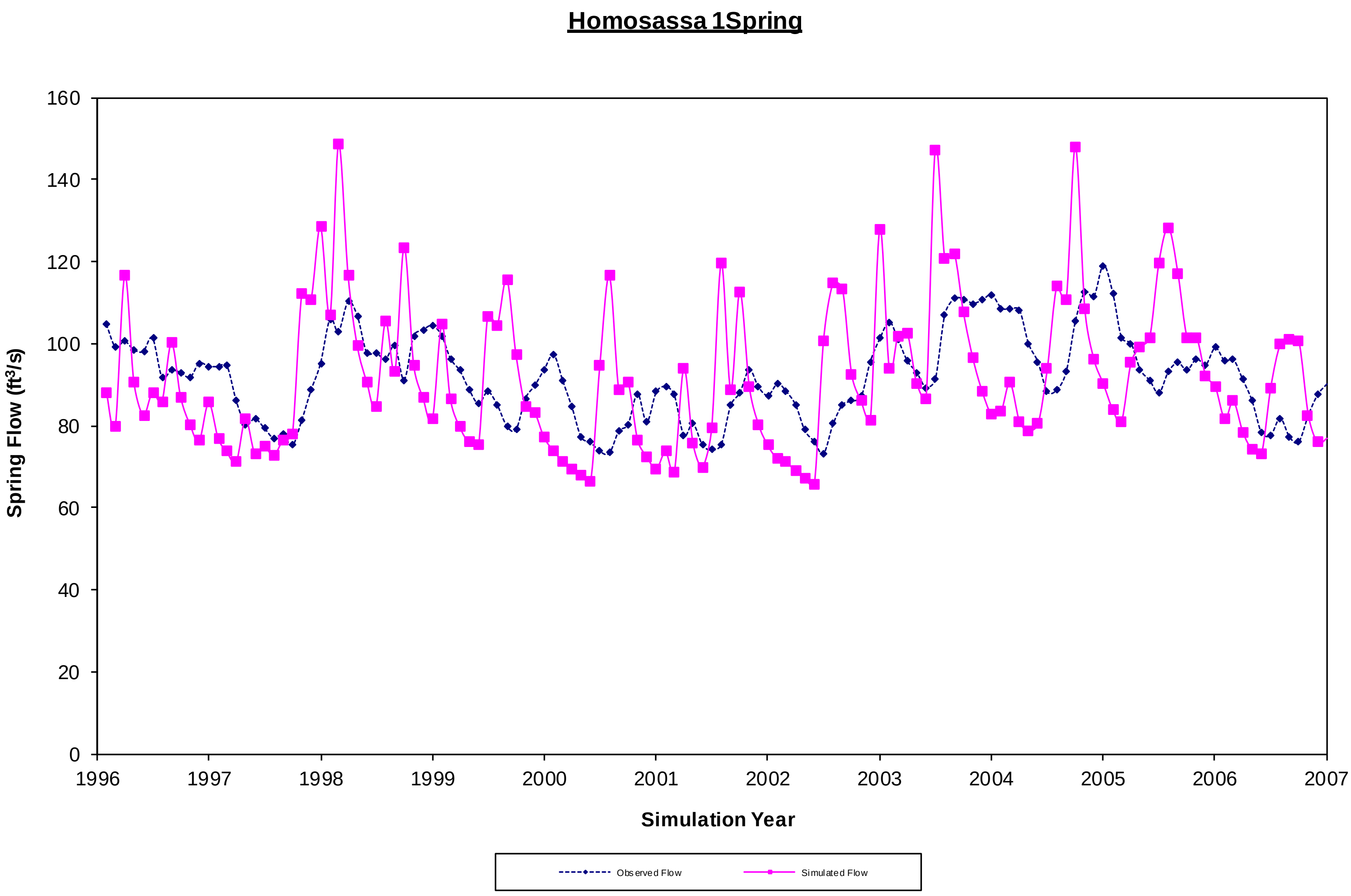

Figure C.1 Simulated Flow for Homosassa 1 Spring

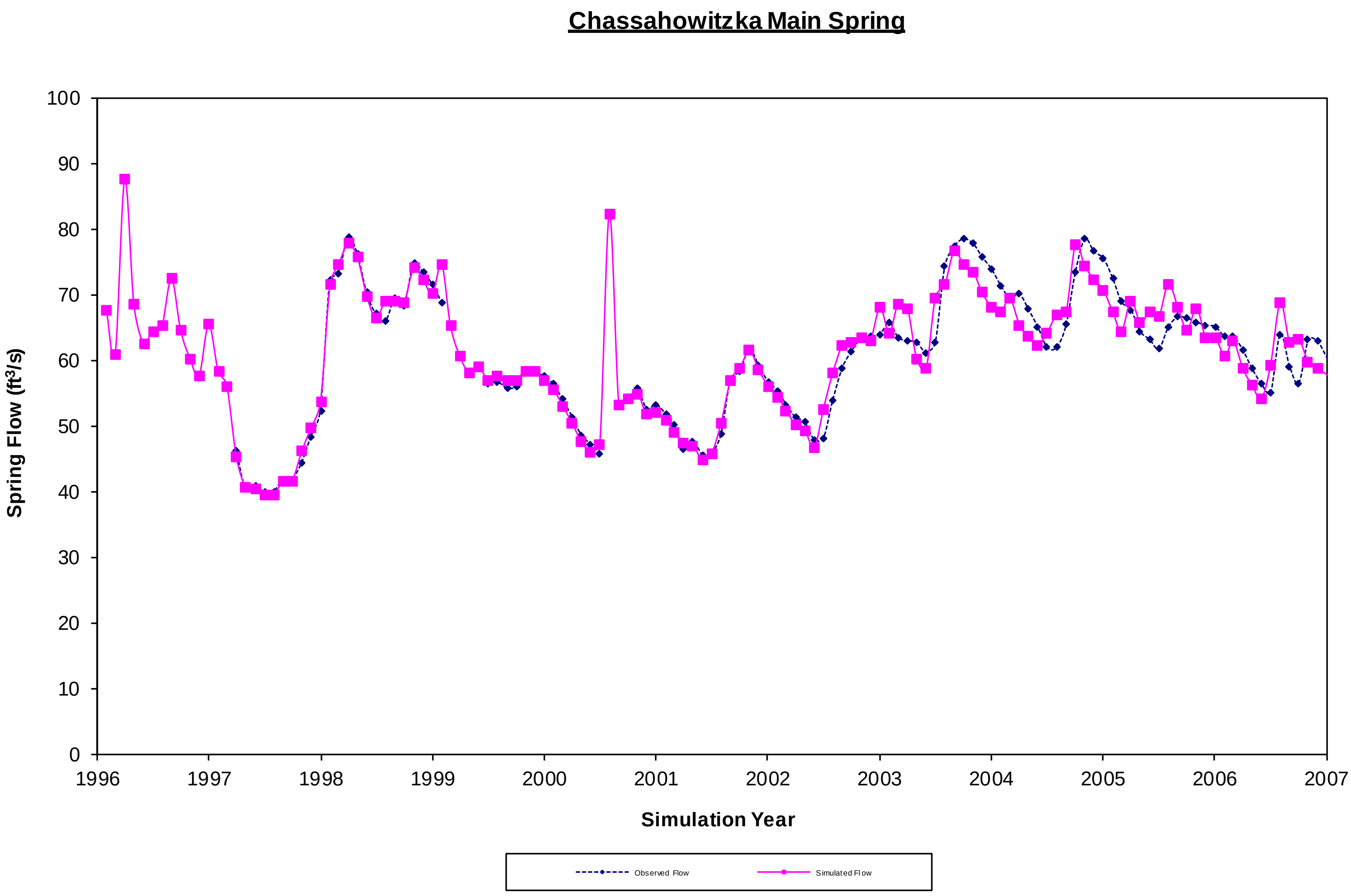

Figure C.2 Simulated Flow for Chassahowitzka Main Spring

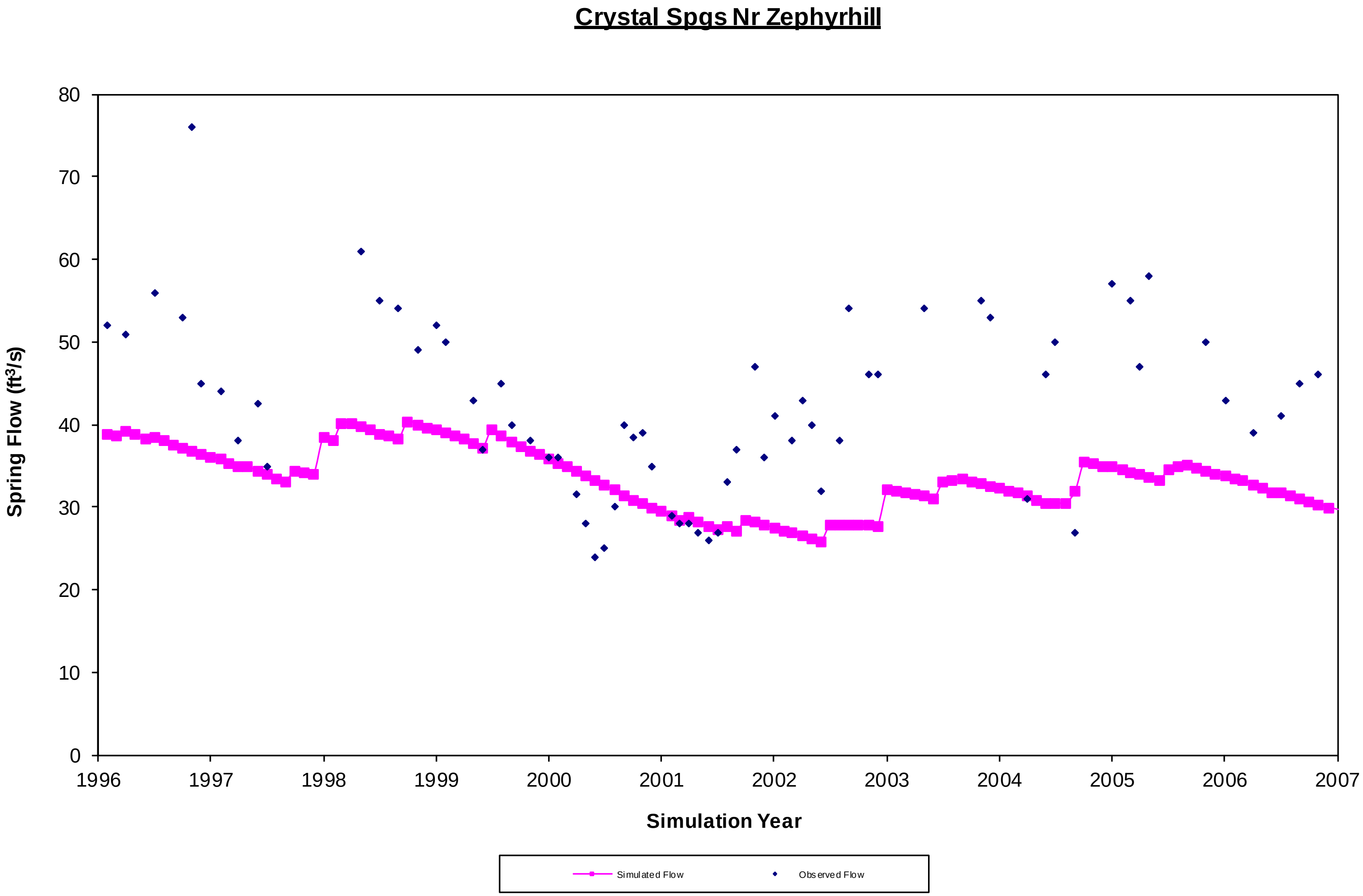

Figure C.3 Simulated Flow for Crystal Springs Near Zephyrhills

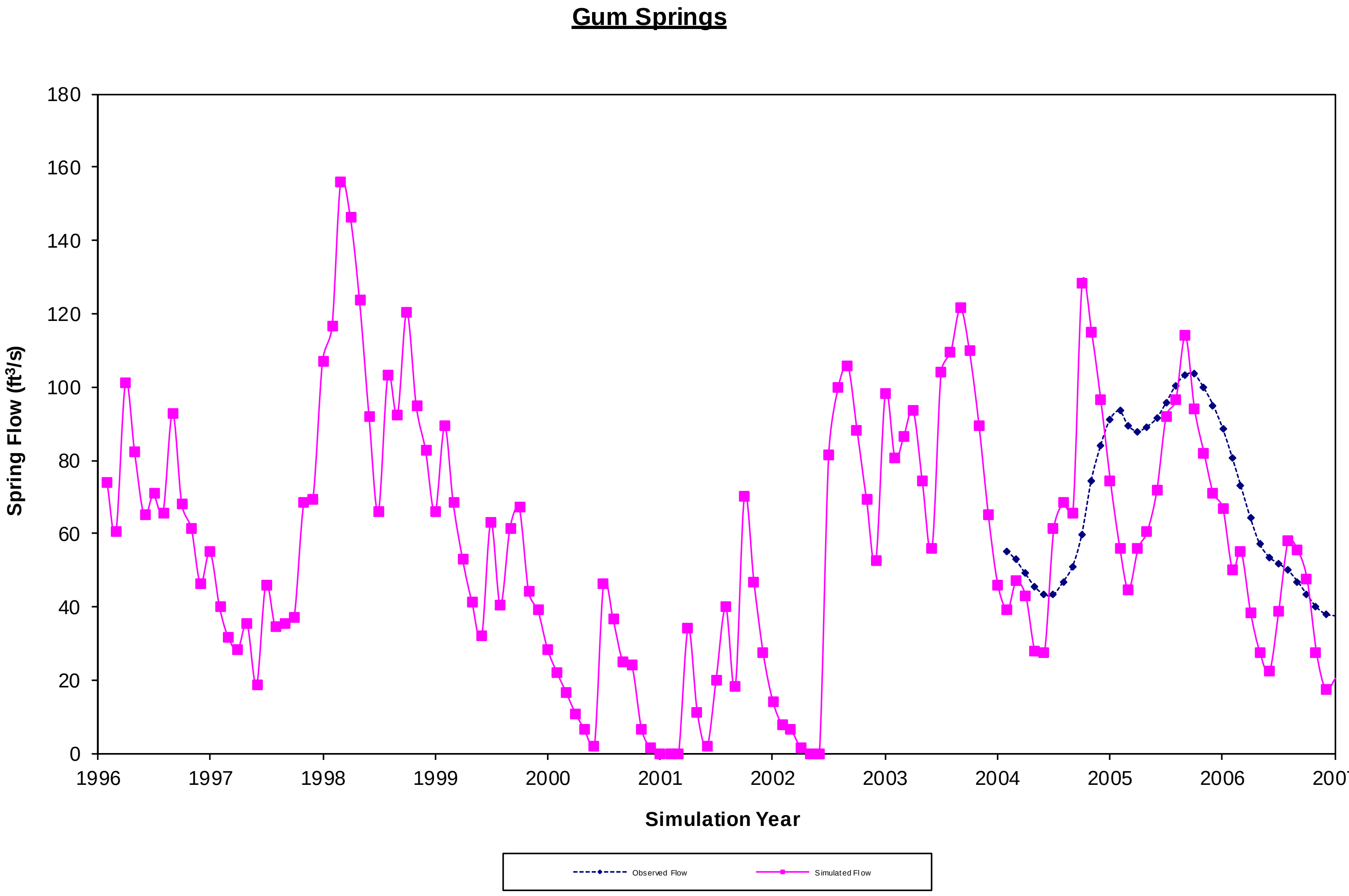

Figure C.4 Simulated Flow for Gum Springs

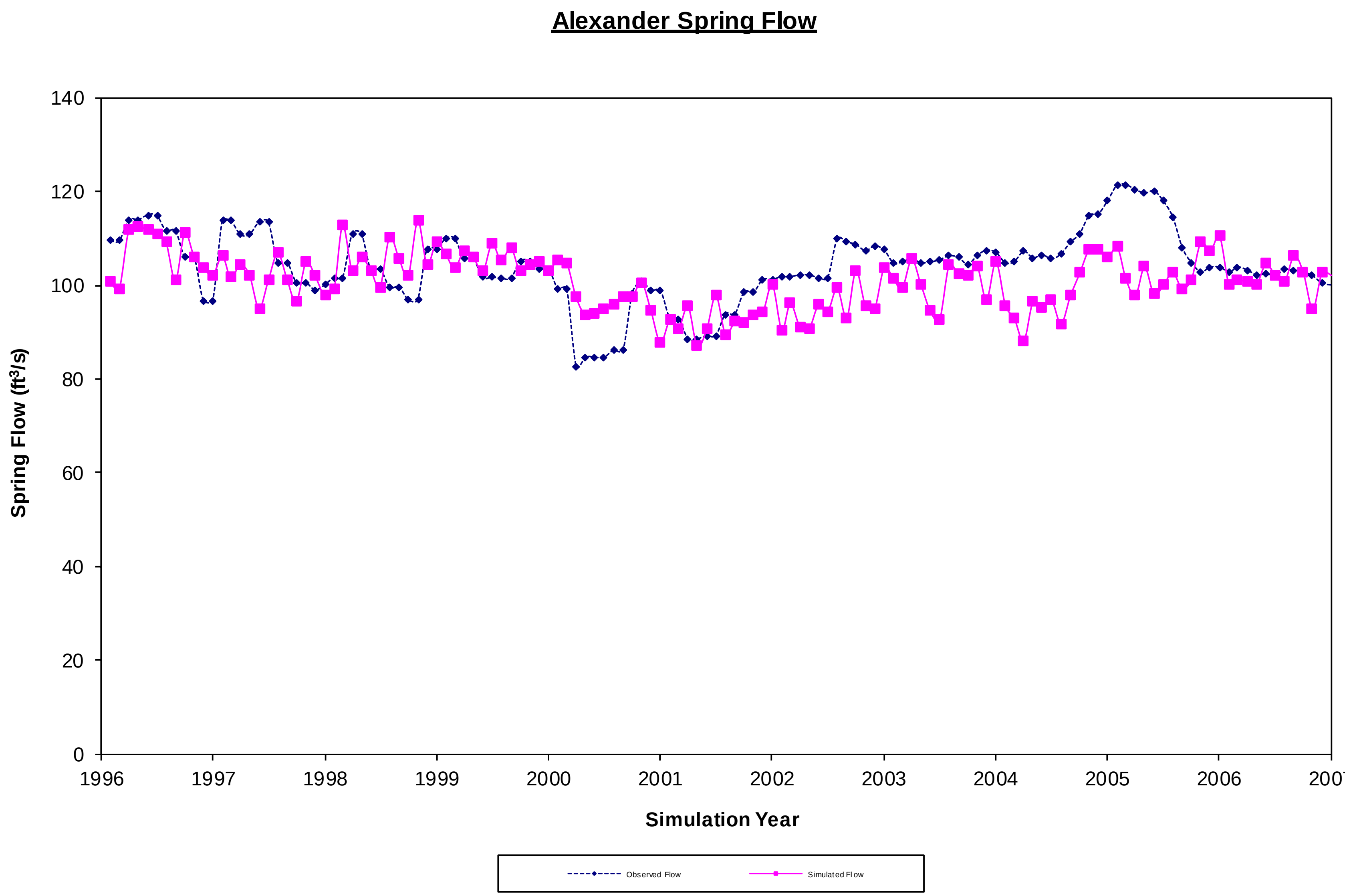

Figure C.5 Simulated Flow for Alexander Spring

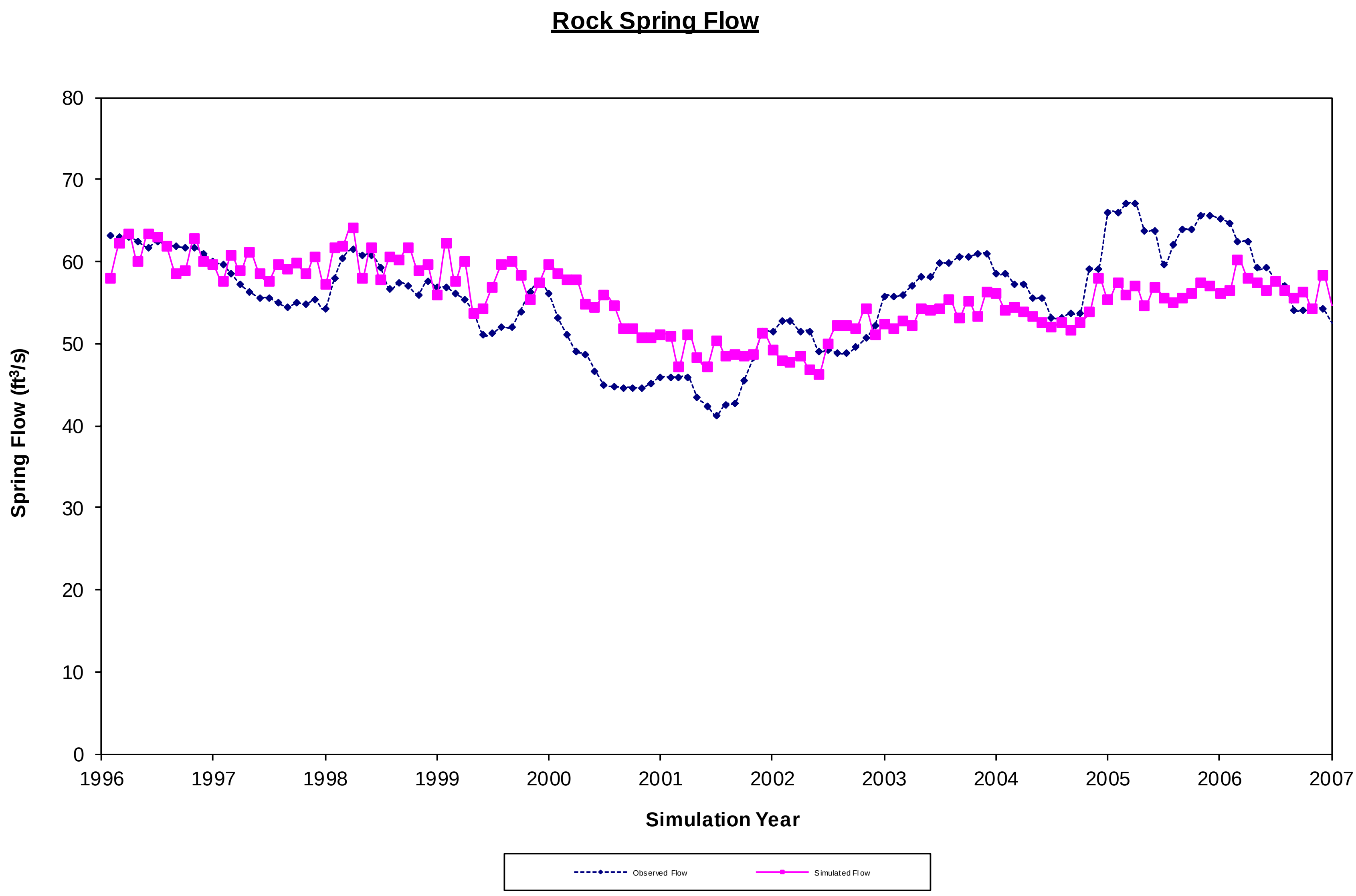

Figure C.6 Simulated Flow for Rock Spring

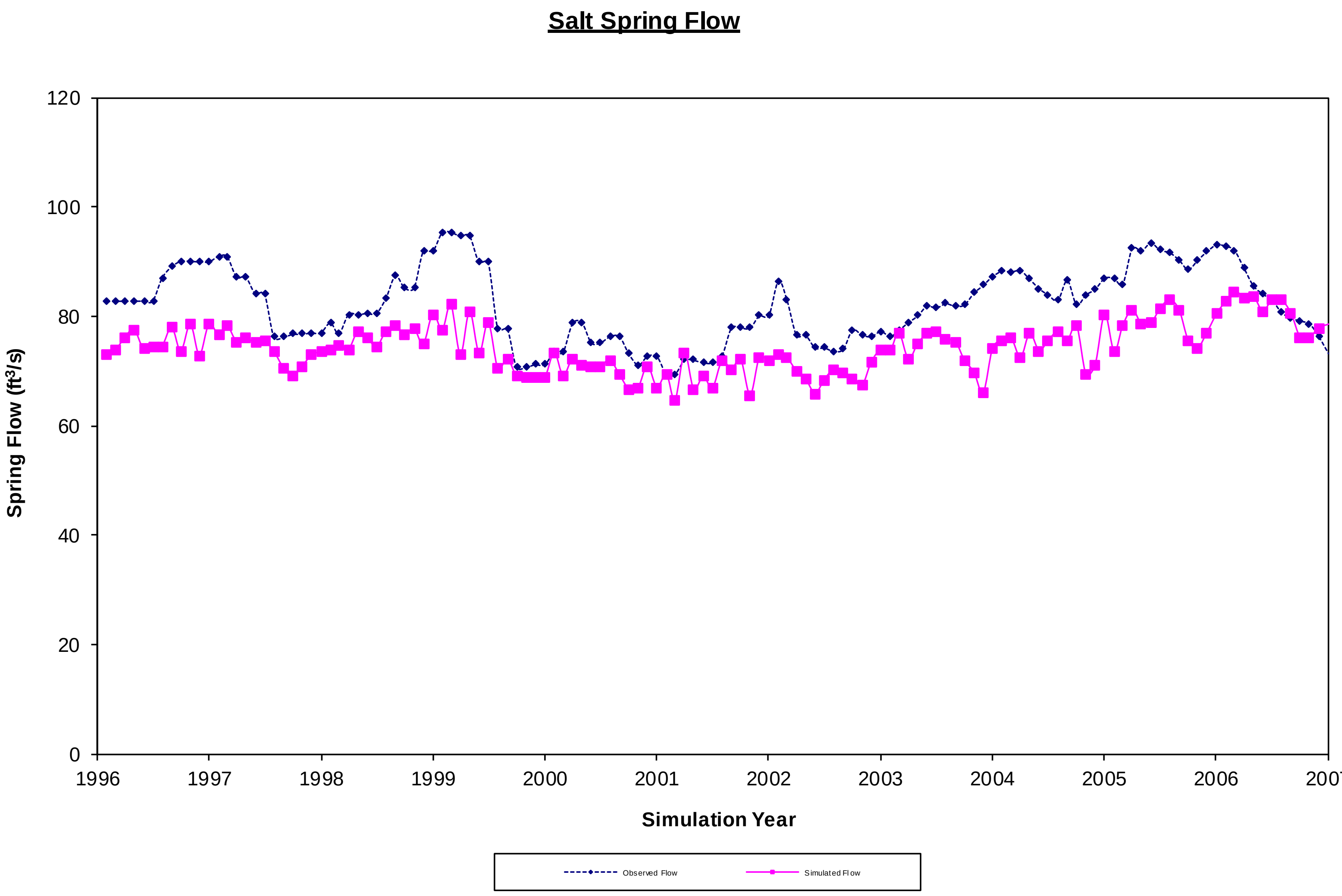

Figure C.7 Simulated Flow for Salt Spring

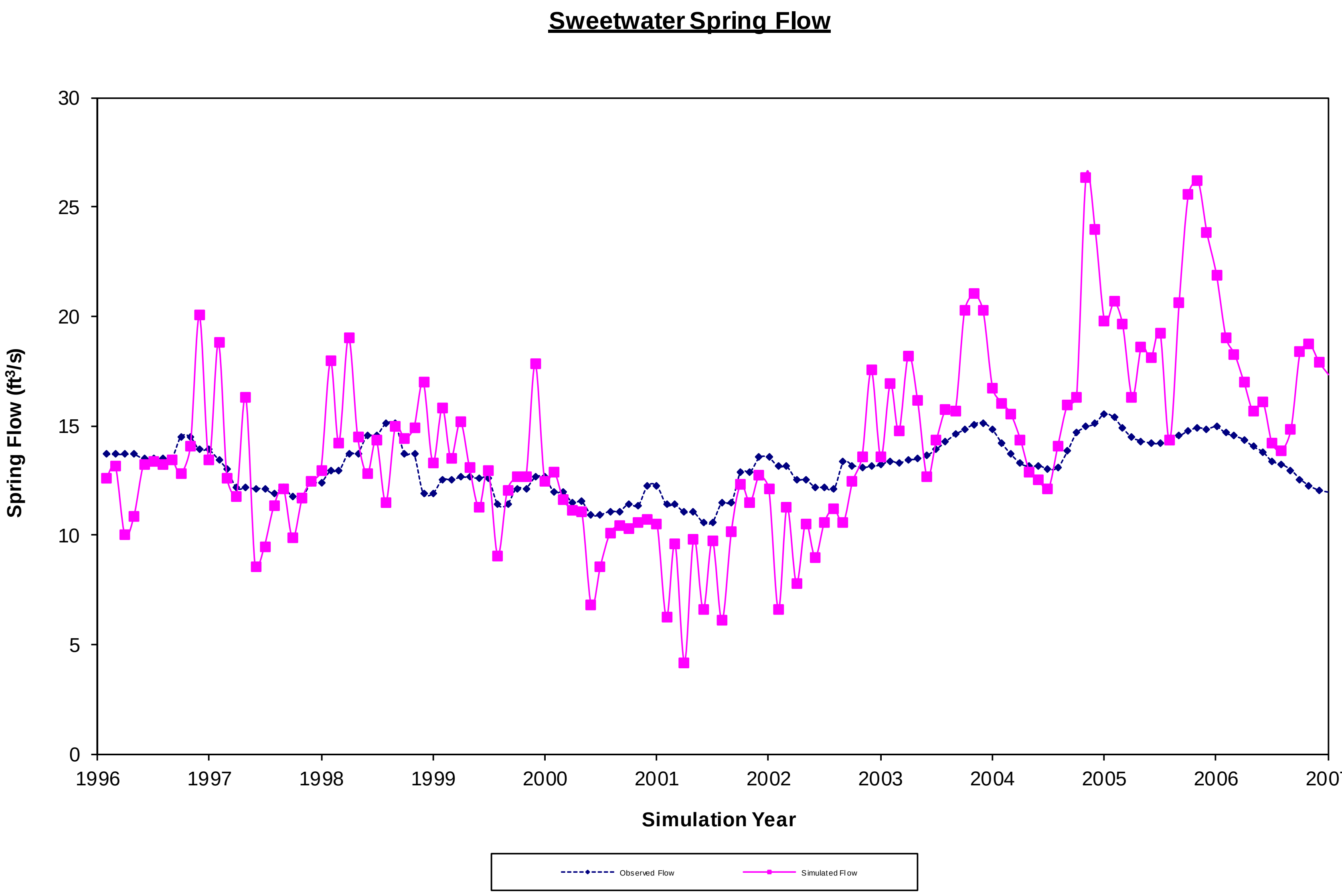

Figure C.8 Simulated Flow for Sweetwater Spring

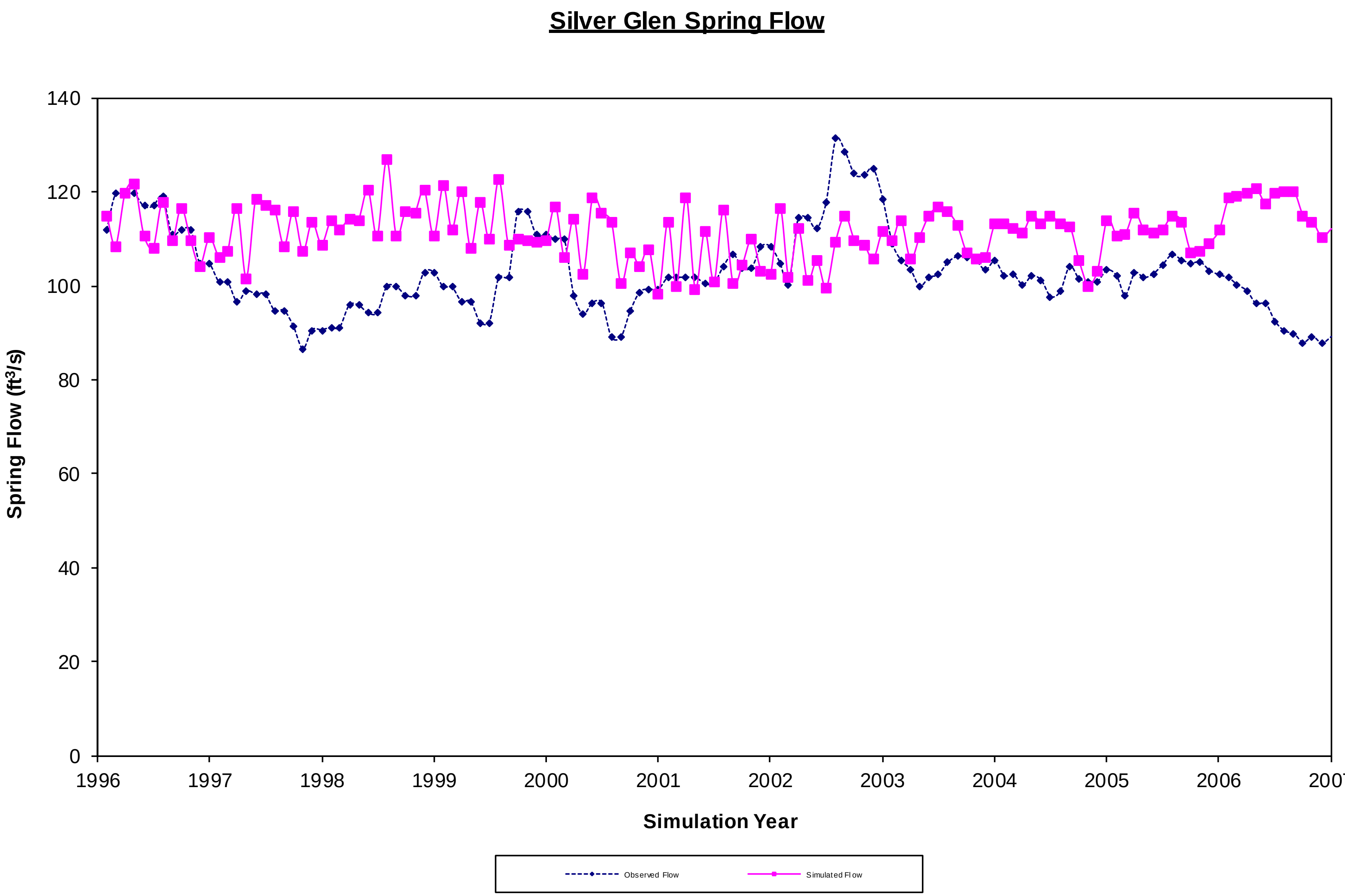

Figure C.9 Simulated Flow for Silver Glen Spring

APPENDIX D

2010 RECHARGE

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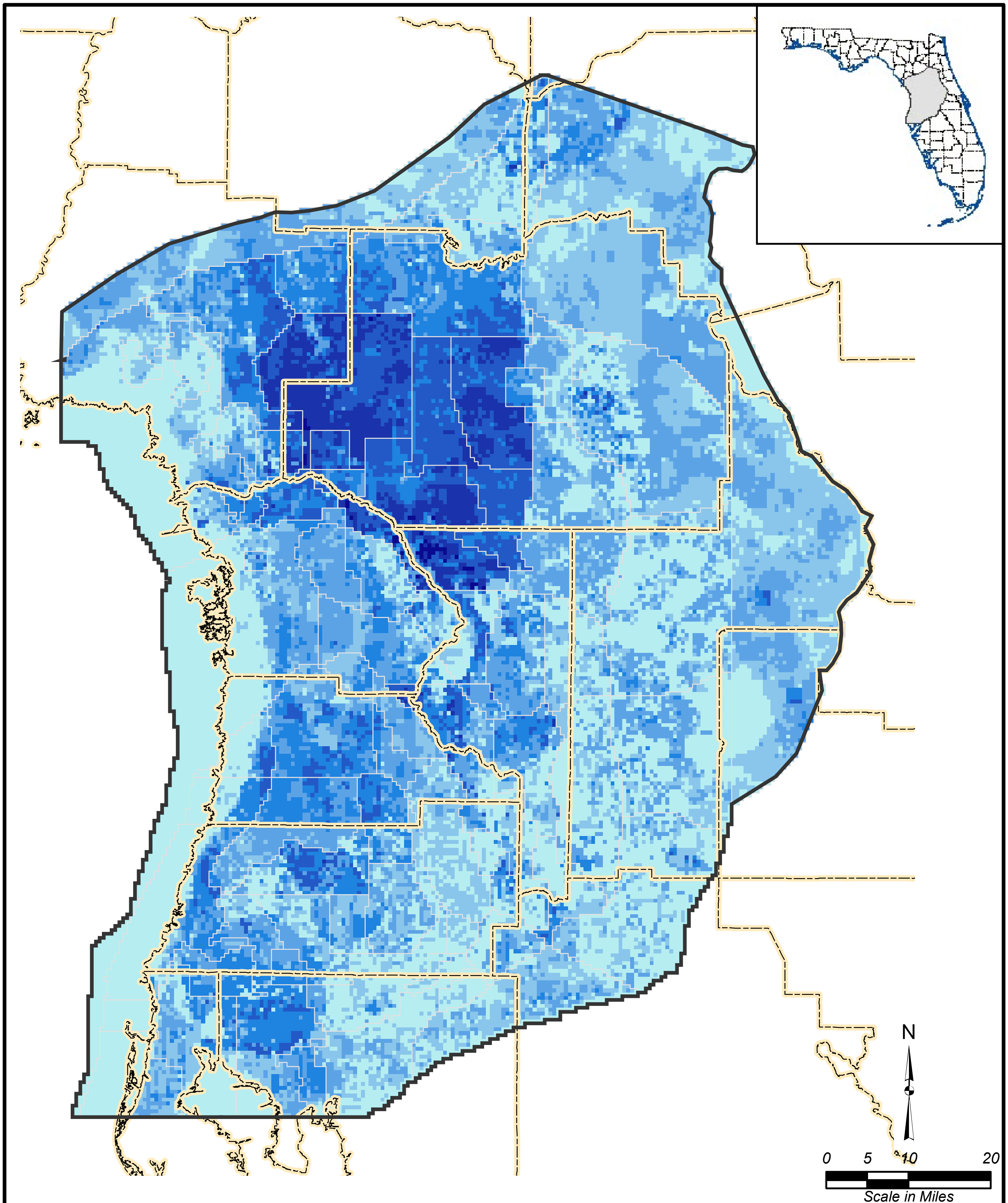

P:
DS_2003
Reporting
Figures
Fig D_1 -2010 SS_Recharge.mxd
8/16/2016 HC

HGL
HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

SS Recharge (in/yr)
0.0 - 5.0
5.0 - 10.0
10.0 - 15.0
15.0 - 20.0
20.0 - 25.0
25.0 - 30.0
30.0 - 37.8

Figure D.1
Annualized 2010
Steady State Recharge

APPENDIX E

DATA FROM THE ST JOHNS RIVER AND SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICTS

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Table E.1 Additional Data and Data Sources

Item	Description	Data Sources
1	Hydraulic properties for the UFA of the sub-regional model	SJRWMD
2	Potentiometric contours in the UFA in May and September 2010	SJRWMD and SWFWMD
3	Springs	USGS (Silver Springs) SJRWMD (Submerged springs) SWFWMD (Gum, Blue (Levy), Crystal, and Belton's Millpond)
4	Baseflows	SJRWMD (Ocklawaha River) SWFWMD (Waccasassa River)
5	Cell-wise NEXRAD precipitation	SJRWMD and SWFWMD
6	Wells for 2010 (locations, construction details, and rates)	SJRWMD and SWFWMD
7	Wells for predictive scenarios (locations, construction details, and rates)	SJRWMD and SWFWMD

APPENDIX F

ADDITIONAL CALIBRATION STATISTICS FOR THE TRANSIENT MODEL

Table F.1
Transient Calibration Statistics Summary for Three Groundwater Basins in the Northern District Model for the Year 2000

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	135	0.71	4.65	4.74	-13.38	14.98
UFA	3 - 5	309	-1.29	4.14	4.95	-24.02	17.91
Suwannee Limestone	3	100	-0.54	4.10	4.94	-24.02	17.91
Ocala Limestone	4	150	-1.95	4.31	5.16	-20.50	8.37
Upper Avon Park Formation	5	59	-0.75	3.78	4.41	-13.44	9.93
MCUI/MCUII	6	1	3.69	3.69	3.69	3.69	3.69
LFA	7	1	-1.14	1.14	1.14	-1.14	-1.14

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.2
Transient Calibration Statistics Summary for the Northern Groundwater Basin in the Northern District Model for the Year 2000

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	7	-3.79	3.79	5.46	-13.38	-1.71
UFA	3 - 5	110	-1.07	3.72	4.53	-13.44	9.93
Suwannee Limestone	3	13	-2.03	3.88	4.23	-6.96	4.89
Ocala Limestone	4	61	-0.97	3.52	4.23	-8.98	8.25
Upper Avon Park Formation	5	36	-0.90	4.01	5.09	-13.44	9.93
MCUI/MCUII	6	1	3.69	3.69	3.69	3.69	3.69

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.3
Transient Calibration Statistics Summary for the Central Groundwater Basin in the Northern District Model for the Year 2000

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	66	1.22	5.11	6.35	-10.28	14.98
UFA	3 - 5	101	-1.75	4.95	6.79	-24.02	17.91
Suwannee Limestone	3	61	-0.22	4.15	6.01	-24.02	17.91
Ocala Limestone	4	27	-5.87	7.62	9.10	-20.50	5.78
Upper Avon Park Formation	5	13	-0.33	3.16	4.05	-8.95	4.45
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.4
Transient Calibration Statistics Summary for the Eastern Groundwater Basin in the Northern District Model for the Year 2000

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	14	0.58	2.89	3.47	-4.98	8.22
UFA	3 - 5	36	-0.67	3.26	4.32	-11.66	8.37
Suwannee Limestone	3	0	N/A	N/A	N/A	N/A	N/A
Ocala Limestone	4	36	-0.67	3.26	4.32	-11.66	8.37
Upper Avon Park Formation	5	0	N/A	N/A	N/A	N/A	N/A
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A
LFA	7	1	-1.14	1.14	1.14	-1.14	-1.14

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.5
Transient Calibration Statistics Summary for Three Groundwater Basins in the Northern District Model for the Year 2004

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	130	0.29	4.95	6.36	-14.82	18.65
UFA	3 - 5	325	0.06	4.12	5.37	-19.11	17.27
Suwannee Limestone	3	100	0.10	4.15	5.71	-19.11	17.27
Ocala Limestone	4	154	-0.01	4.37	5.38	-14.87	12.81
Upper Avon Park Formation	5	71	0.16	3.60	4.82	-13.60	11.73
MCUI/MCUII	6	1	10.22	10.22	10.22	10.22	10.22
LFA	7	4	0.12	5.48	6.50	-10.72	5.35

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.6
Transient Calibration Statistics Summary for the Northern Groundwater Basin in the Northern District Model for the Year 2004

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	17	-1.01	3.38	4.11	-7.64	4.20
UFA	3 - 5	134	0.29	3.70	4.90	-13.60	12.81
Suwannee Limestone	3	19	-0.50	3.01	3.59	-6.97	6.89
Ocala Limestone	4	61	0.55	4.15	5.33	-9.30	12.81
Upper Avon Park Formation	5	54	0.27	3.43	4.79	-13.60	11.73
MCUI/MCUII	6	1	10.22	10.22	10.22	10.22	10.22

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.7
Transient Calibration Statistics Summary for the Central Groundwater Basin in the Northern District Model for the Year 2004

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	89	0.03	5.46	7.07	-14.82	18.65
UFA	3 - 5	130	-0.68	4.78	6.29	-19.11	17.27
Suwannee Limestone	3	79	0.20	4.48	6.16	-19.11	17.27
Ocala Limestone	4	34	-2.99	5.79	7.14	-14.87	11.27
Upper Avon Park Formation	5	17	-0.18	4.16	4.91	-11.11	6.22
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

Table F.8
Transient Calibration Statistics Summary for the Eastern Groundwater Basin in the Northern District Model for the Year 2004

Unit	Model Layer	Number of Wells	Mean Error (ft)	Mean Absolute Error (ft)	RMSE[2] (ft)	Minimum Residual[1] (ft)	Maximum Residual[1] (ft)
SA	1	21	2.47	4.04	4.98	-5.69	10.85
UFA	3 - 5	47	1.43	3.55	4.60	-12.85	11.61
Suwannee Limestone	3	2	2.03	3.55	2.98	-0.16	4.21
Ocala Limestone	4	45	1.40	3.61	4.66	-12.85	11.61
Upper Avon Park Formation	5	0	N/A	N/A	N/A	N/A	N/A
MCUI/MCUII	6	0	N/A	N/A	N/A	N/A	N/A
LFA	7	4	0.12	5.48	6.50	-10.72	5.35

Notes:
[1]Residual = (Simulated - Observed) * Observation Weight
[2]RMSE = Root Mean Square Error

APPENDIX G

1995 AND 2010 PUMPING RECORDS

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Table G.1
Summary of County-Specific Pumping in 1995 and 2010

County	1995 Pumping (mgd)	2010 Pumping (mgd)
Levy	8.6	7.1
Marion	60.8	57.4
Lake	79.1	77.5
Citrus	17.1	23.4
Hernando	24.7	35.2
Pasco	130.3	94.3
Sumter	16.7	30.4

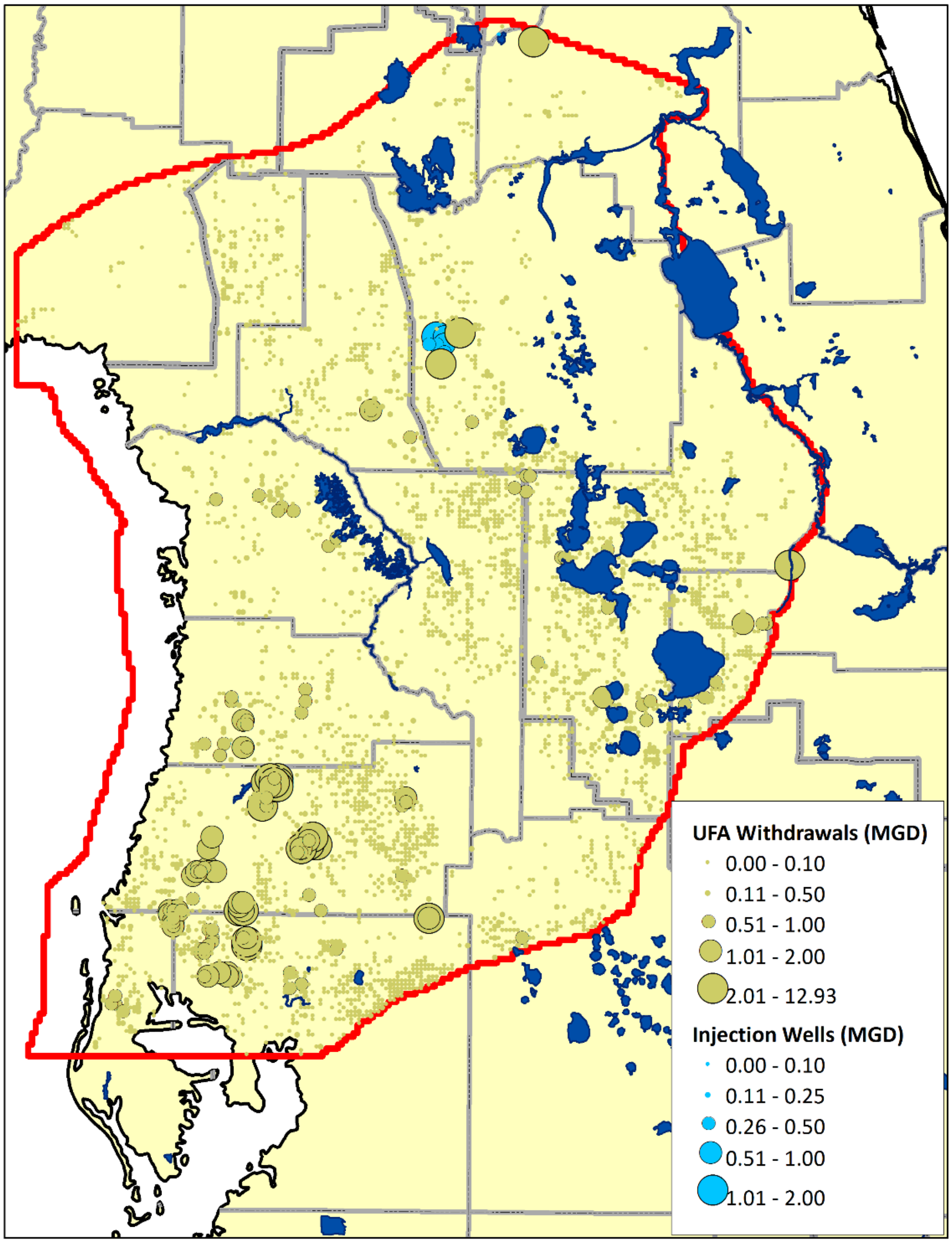

Figure G.1 Distribution of Groundwater Withdrawals/Injection from the UFA (mgd) in 1995. Total Withdrawals = 446.6 mgd, and Total Injection = 4.2 mgd.

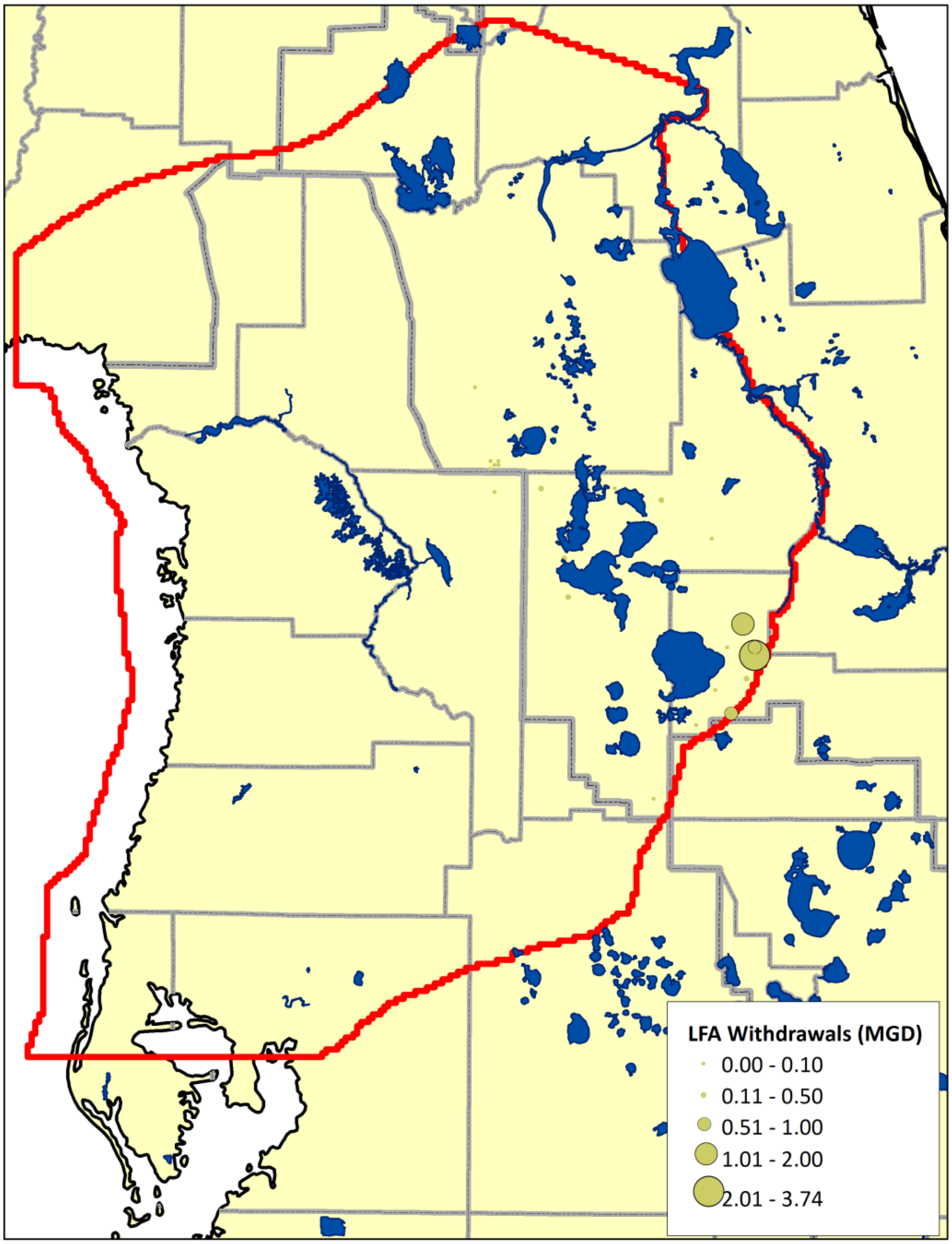

Figure G.2 Distribution of Groundwater Withdrawals from the LFA (mgd) in 1995. Total Withdrawals = 11.8 mgd.

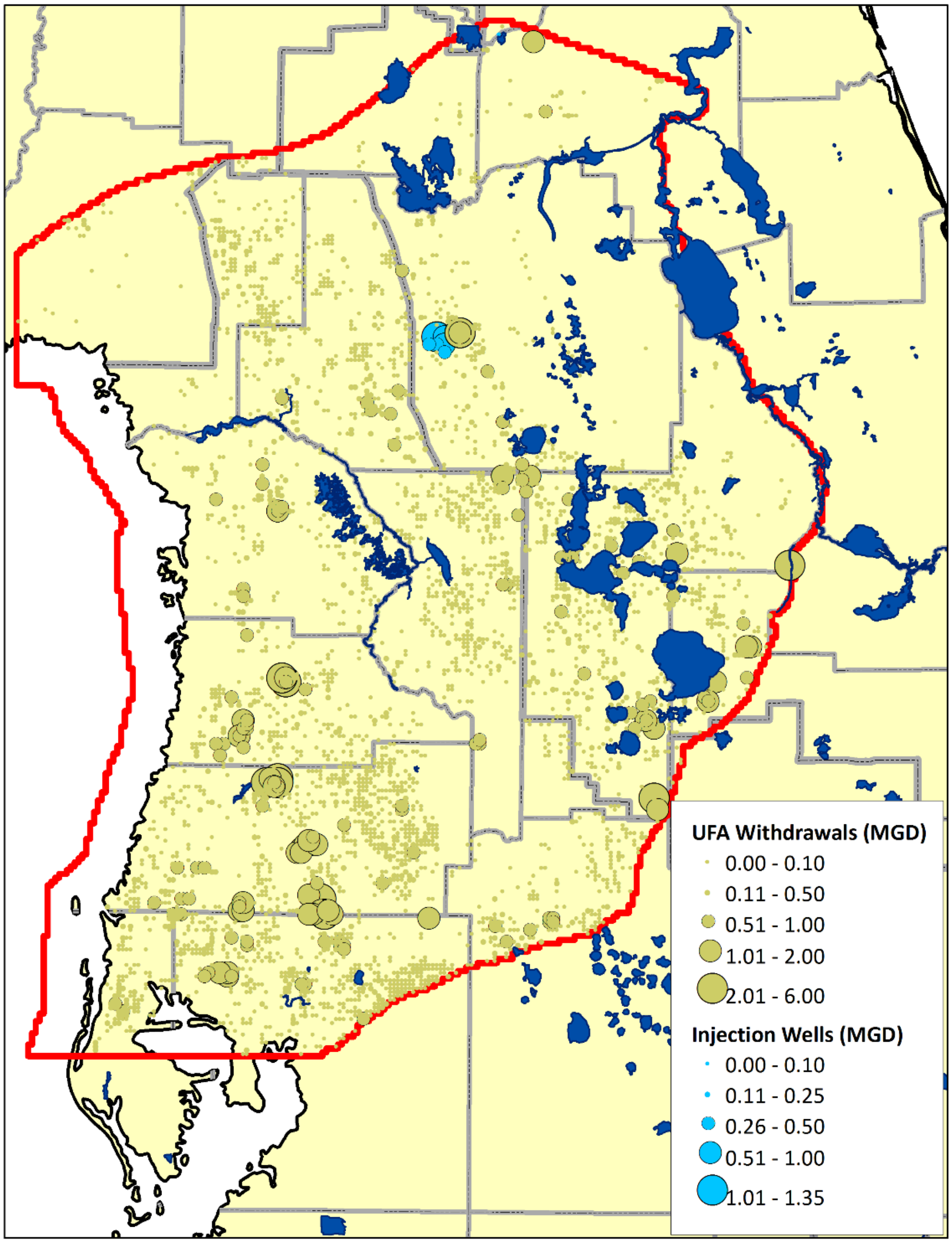

Figure G.3 Distribution of Groundwater Withdrawals/Injection from the UFA (mgd) in 2010. Total Withdrawals = 408.5 mgd, and Total Injection = 4.2 mgd.

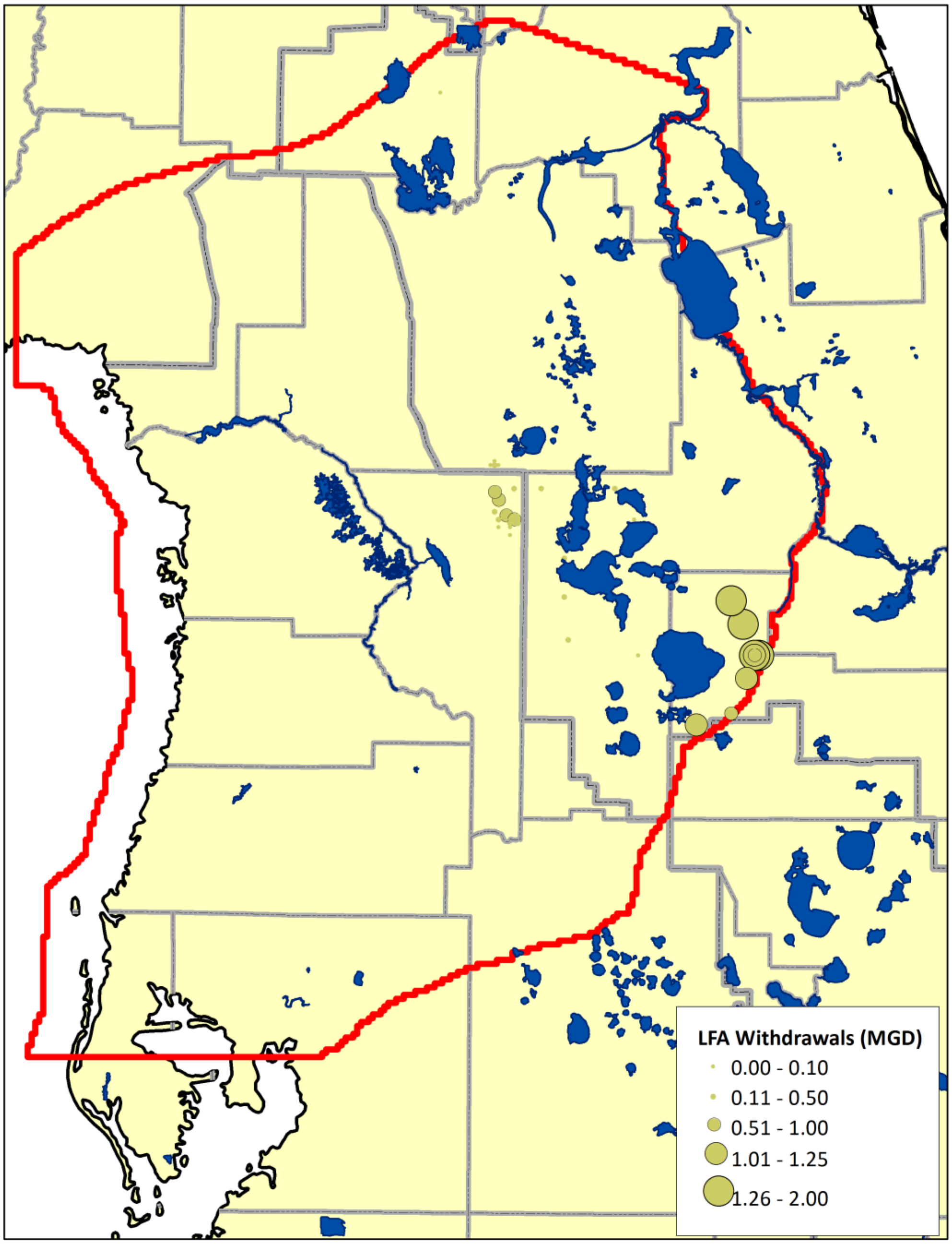

Figure G.4 Distribution of Groundwater Withdrawals from the LFA (mgd) in 2010. Total Withdrawals = 28.2 mgd.

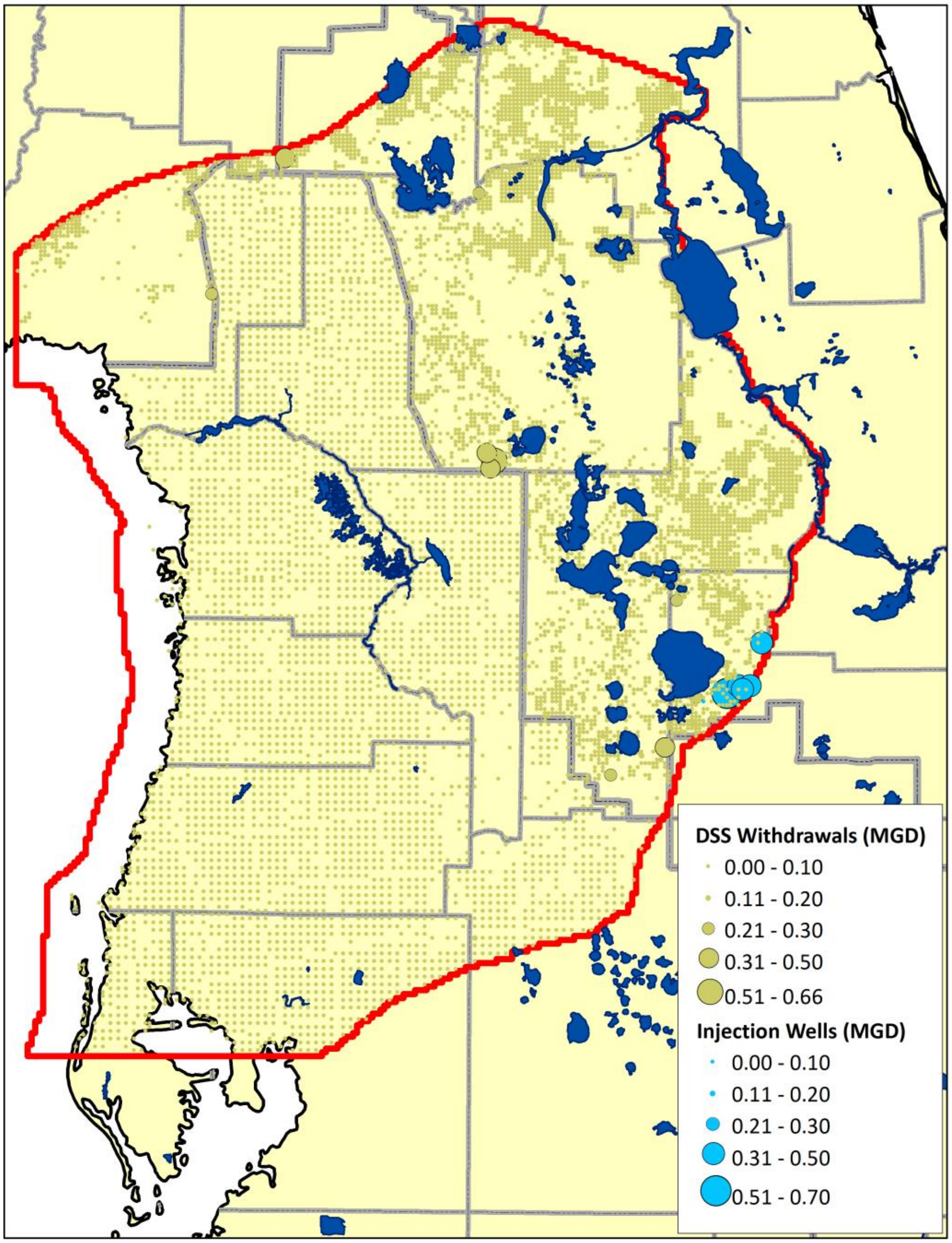

Figure G.5 Distribution of Domestic Self Supply Groundwater Withdrawals/Injection from the UFA (mgd) in 1995. Total Withdrawals = 61.7 mgd, and Total Injection = 2.1 mgd.

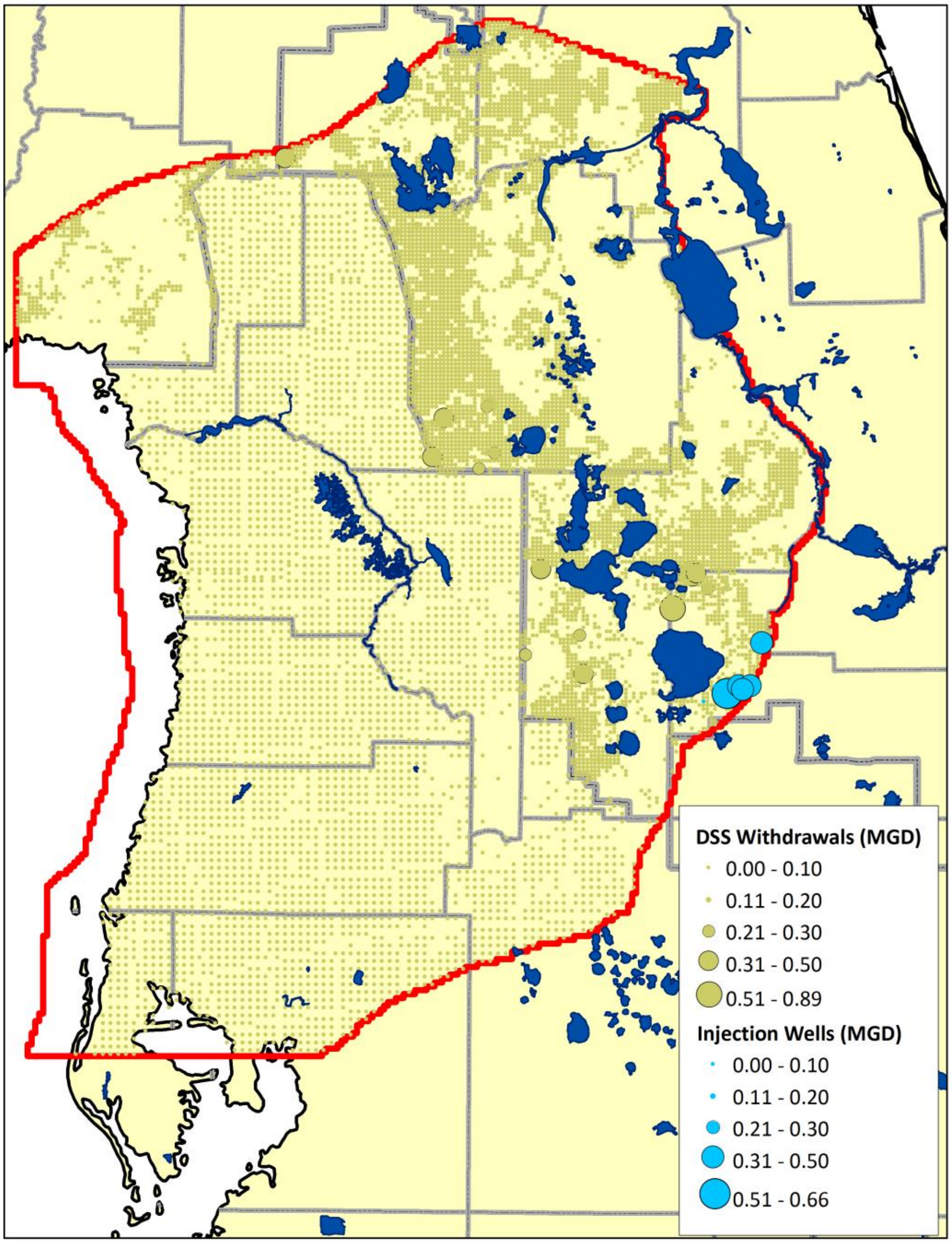

Figure G.6 Distribution of Domestic Self-Supply Groundwater Withdrawals/Injection from the UFA (mgd) in 2010. Total Withdrawals = 42.4 mgd, and Total Injection = 2.1 mgd.

APPENDIX H

THE UPPER FLORIDAN TRANSMISSIVITIES AND THE INTERMEDIATE CONFINING UNIT LEAKANCES BEFORE AND AFTER RECALIBRATION

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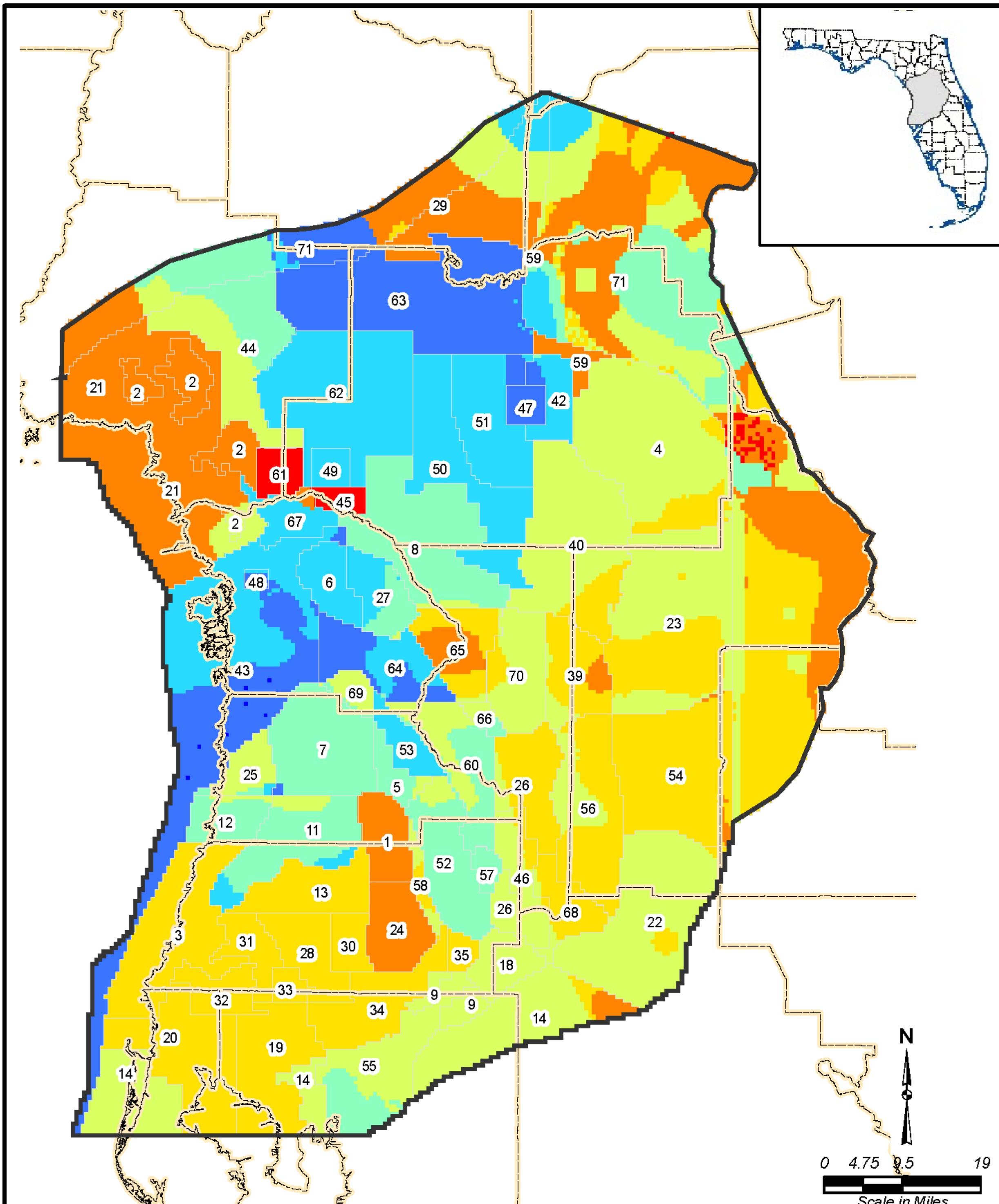


P:
DS_2003
Reporting
Figures
Fig 3_16a - Transmissivity_UFA.mxd
9/22/2016 HC

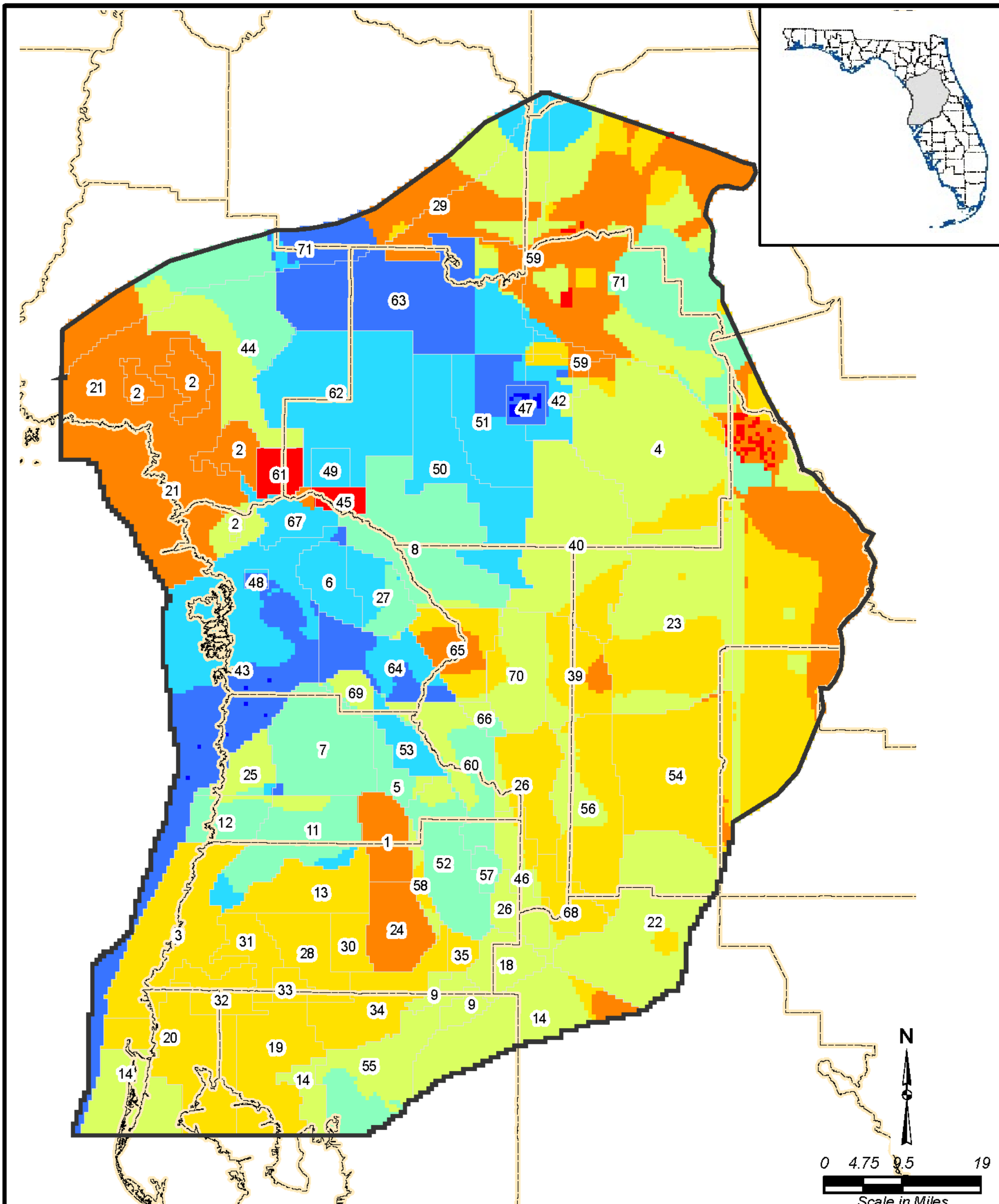
HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

TRANUFA(ft2/d)
2661 - 10000.0
10000 - 50000
50000 - 100000
100000 - 500000
500000 - 1000000
1000000 - 5000000
5000000 - 10000000
10000000 - 10000034

Figure H.1
Map of Calibrated UFA Transmissivity (NDM4)



P:
DS_2003
Reporting
Figures
Fig 3_16b - Transmissivity_UFA.mxd
9/22/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Legend

Northern District Model Area

County Boundary

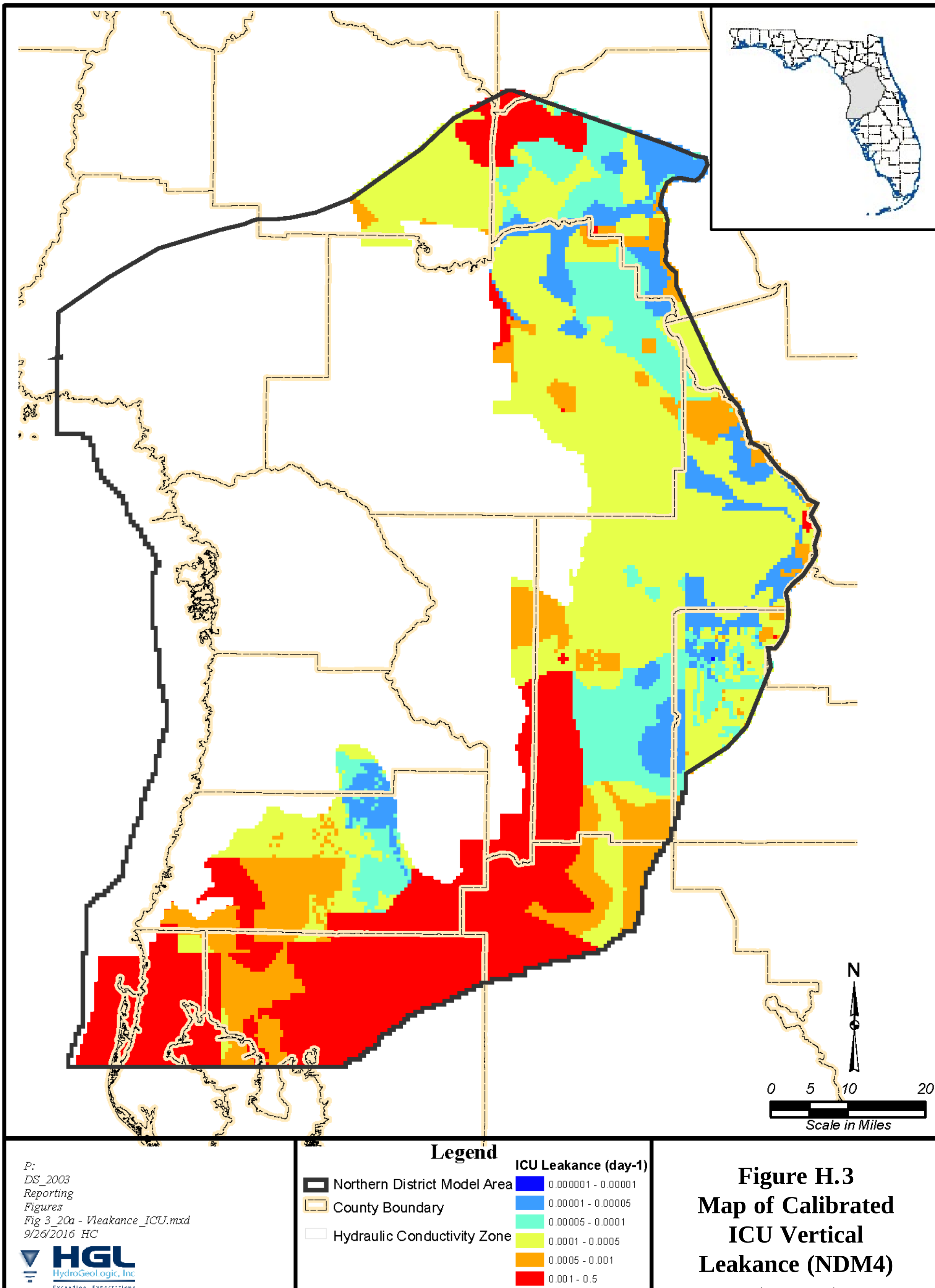
Hydraulic Conductivity Zone

TRANUFA(ft2/d)

- 2661 - 10000.0
- 10000 - 50000
- 50000 - 100000
- 100000 - 500000
- 500000 - 1000000
- 1000000 - 5000000
- 5000000 - 10000000
- 10000000 - 10000034

Figure H.2

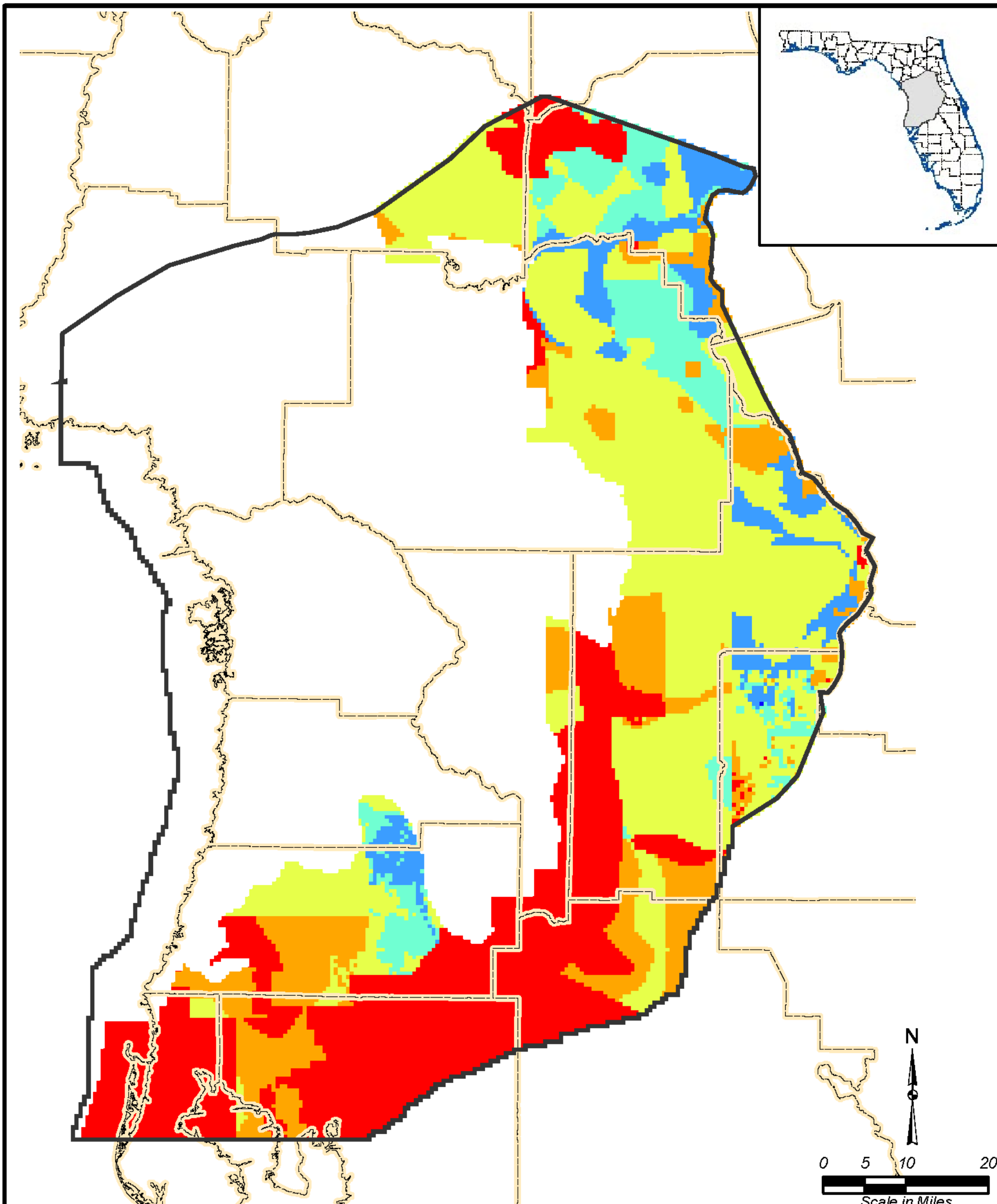
Map of Calibrated UFA Transmissivity (NDM5)



P:
DS_2003
Reporting
Figures
Fig 3_20a - Vleakance_ICU.mxd
9/26/2016 HC

HGL HydroGeoLogic, Inc Exceeding Expectations

Figure H.3
Map of Calibrated ICU Vertical Leakance (NDM4)



P:
DS_2003
Reporting
Figures
Fig 3_20b - Vleakance_ICU.mxd
9/26/2016 HC

HGL HydroGeoLogic, Inc
Exceeding Expectations

Legend

Northern District Model Area
County Boundary
Hydraulic Conductivity Zone

ICU Leakance (day-1)

0.000001 - 0.00001
0.00001 - 0.00005
0.00005 - 0.0001
0.0001 - 0.0005
0.0005 - 0.001
0.001 - 0.5

Figure H.4
Map of Calibrated ICU Vertical Leakance (NDM5)