

WHITE OAK CREEK MITIGATION SITE
2007 Annual Monitoring Report (Year 6)

Johnson County
EEP Project No. 417
Design Firm: Rummel, Klepper & Kahl, LLP

NCDOT Format

Prepared for:



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February 2008

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**WHITE OAK CREEK MITIGATION SITE
2007 Annual Monitoring Report (Year 6)**

SUMMARY

The White Oak Creek Mitigation Site (Site) was constructed for “up-front” wetland restoration by the North Carolina Department of Transportation (NCDOT) to be used for compensatory mitigation requirements involving roadway impact to wetlands in the Neuse River Basin. Through an agreement with the Ecosystem Enhancement Program (EEP) and the North Carolina Department of Transportation (NCDOT), EEP has accepted the transfer of all off-site mitigation projects. Therefore, EEP will be responsible for fulfilling the remaining requirements and future remediation for the Site. The NCDOT monitoring report format has been retained for clarity and continuity.

The following report summarizes the monitoring activities that have occurred in the past year at the Site. Site construction was begun in February 2002 and completed in March 2002. The Site was planted in late March 2002. In December 2002, the Site was replanted; therefore vegetation monitoring was restarted beginning in March 2003. The 2007 monitoring report represents the fifth year of vegetation monitoring and the sixth year of hydrological monitoring. The Site must demonstrate both hydrologic and vegetation success for a minimum of five years or until the Site is deemed successful.

The Site contains a total of 38 hydrologic monitoring gauges (36 gauges within restoration areas and 2 reference gauges). The 2007 hydrologic monitoring results revealed that 18 of the 36 monitoring gauges within restoration areas met the success criteria (groundwater within 12 inches of the surface for at least 12.5 percent of the growing season). Eleven monitoring gauges indicated groundwater within 12 inches of the surface for 5 to 12.5 percent of the growing season. The remaining seven monitoring gauges indicated groundwater within 12 inches of the surface for 1 to 5 percent of the growing season.

The 2007 vegetation monitoring results revealed an average density of 311 trees per acre of planted species. This average is above the minimum success criteria of 260 trees per acre after the fifth growing season.

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Site is located adjacent to the west bank of White Oak Creek, immediately south of Winston Road (SR 1550) and north of Austin Pond, approximately 2.5 miles west of Clayton (Figure 1). White Oak Creek flows south for approximately 2 miles to the confluence with Swift Creek. The Site is located in hydrologic unit 03020201110040 (USGS). The Site is bordered on the north and west by residential development. The Site’s eastern boundary is White Oak Creek, which is buffered by mature swamp and bottomland hardwood forest communities.

The Site comprises approximately 50.7 acres of previously open pasture land that was used for grazing horses. The Site was restored to promote natural plant communities and provide water quality benefits to the area. Construction at the Site was begun in January 2002 and completed in March 2002. Planting of the Site was completed in March 2002. Poor vegetation establishment required a second planting in December of 2002. Monitoring of the Site was restarted in 2003.

1.2 PURPOSE

In order to demonstrate successful wetland mitigation, hydrological and vegetative monitoring must be conducted for a minimum of five consecutive years. Success criteria are based on federal guidelines for wetland mitigation. These guidelines stipulate criteria for both hydrological conditions and vegetation survival. The following report details the results of hydrological and vegetative monitoring at the Site during the 2007 growing season.

Included in this report are analyses of both hydrologic and vegetative monitoring results, as well as local climate conditions throughout the growing season, and site photographs.

1.3 PROJECT HISTORY

January-March 2002	Site Construction
March 2002	Site Planted
August 2002	Vegetation Monitoring (1 year)
March-November 2002	Hydrologic Monitoring (1 year)
December 2002	Site Replanted
June 2003	Vegetation Monitoring (Restart year 1)
March-November 2003	Hydrologic Monitoring (2 year)
June 2004	Vegetation Monitoring (2 year)
March-November 2004	Hydrologic Monitoring (3 year)
October 2005	Vegetation Monitoring (3 year)
March-November 2005	Hydrologic Monitoring (4 year)
October 2006	Vegetation Monitoring (4 year)
March-November 2006	Hydrologic Monitoring (5 year)
October 2007	Vegetation Monitoring (5 year)
March-November 2007	Hydrologic Monitoring (6 year)

2.0 HYDROLOGY

2.1 SUCCESS CRITERIA

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology state that the restoration areas must be inundated or saturated (within 12 inches of the surface) by surface water or groundwater for at least 12.5 percent of the growing season (consecutive days) during a normal precipitation year. Areas that have between 5 and 12.5 percent of the

growing season may be considered hydric under certain conditions. Areas inundated for less than 5 percent of the growing season are always classified as non-wetlands.

The growing season in Johnson County begins March 21 and ends November 4. These dates correspond to a 50 percent probability that temperatures will not drop to 28 degrees Fahrenheit or lower after March 21 and before November 4 (Natural Resources Conservation Service, Soil Survey of Johnston County). The growing season is 228 days.

2.2 HYDROLOGIC DESCRIPTION

In March 2002, 38 Remote Data Systems (RDS) continuous logging groundwater gauges were installed. Thirty-six of these gauges were installed within the Site and two were installed as reference gauges on an adjacent property. The on-site gauge locations are shown on Figure 2, Appendix A). The monitoring gauges record daily readings of depth to groundwater. This year's data represents the sixth growing season that the gauges have been monitored. The original reference gauges (Gauges 37 and 38) were found to be non-functioning and were replaced at the start of this years monitoring period. The Site was designed to receive hydrologic inputs from rainfall, groundwater, and surface water from overbanking events.

2.3 RESULTS OF HYDROLOGIC MONITORING

2.3.1 Site Data

The maximum number of consecutive days that groundwater was within 12 inches of the surface was calculated for each monitoring gauge and converted into a percentage of the 228-day growing season (March 21-November 4). The results are presented in Table 1.

Appendix B contains the hydrographs for each monitoring gauge for the current monitoring year. The corresponding rain data collected from the on-site rain gauge is also provided on each hydrograph.

Figure 2 provides the hydrologic results for the current monitoring year. Gauges highlighted in green indicate wetland hydrology for more than 12.5 percent of the growing season. Gauges highlighted in yellow are those that had wetland hydrology between 5 and 12.5 percent of the growing season. Gauges highlighted in red are those that had wetland hydrology less than 5 percent of the growing season.

Table 1. White Oak Hydrologic Monitoring Results

Monitoring Gauge*	<5%	5-12.5%	>12.5%	Actual %	Success Dates	Number of Days Gauges met Success Criteria
GW-1	✓			1		
GW-2		✓		7		
GW-3		✓		8		
GW-4			✓	64	March 21 – August 13	146
GW-5			✓	46	March 21 – July 4	106
GW-6	✓			0		
GW-7	✓			3		
GW-8		✓		7		
GW-9		✓		7		
GW-10		✓		7		
GW-11			✓	31	March 21 – May 30	71
GW-12		✓		6		
GW-13			✓	27	March 21 – May 20	61
GW-14			✓	27	March 21 – May 20	61
GW-15	✓			5		
GW-16			✓	63	March 21 – August 12	145
GW-17			✓	32	March 21 – June 1	73
GW-18			✓	28	March 21 – May 23	64
GW-19	✓			4		
GW-20		✓		7		

GW-21			✓	18	March 21 – May 1	42
GW-22		✓		5		
GW-23	✓			2		
GW-24			✓	21	March 21 – April 8	19
GW-25			✓	26	March 21 – May 18	59
GW-26		✓		9		
GW-27			✓	28	March 21 – May 24	65
GW-28		✓		7		
GW-29			✓	19	March 21 – May 2	43
GW-30	✓			1		
GW-31			✓	100	March 21 – November 4	228
GW-32			✓	67	March 21 – August 20	153
GW-33		✓		6		
GW-34			✓	27	March 21 – May 22	63
GW-35			✓	27	March 21 – May 21	62
GW-36			✓	100	March 21 – November 4	228
GW-37 (Reference)	✓			1		
GW-38 (Reference)		✓		8		

*Monitoring gauges 37 and 38 were installed on May 15, 2007 and April 9, 2007, respectively

2.3.2 Climatic Data

Figure 3 (Appendix A) provides an evaluation of the local climate in comparison with historical data in order to determine whether 2007 was a year with “average” rainfall. The bars are the monthly rainfall totals for the 2007 hydrologic year collected from nearby weather stations. Also represented on the figure are the 30th and 70th percentiles of monthly precipitation for the

Clayton weather station. The historical data and monthly data were collected by the Southeast Regional Climate Data.

A normal yearly rainfall in the area is approximately 45.7 inches. The total rainfall measured from November 2006 through October 2007 was approximately 31 inches. Months with below average rainfall include: December of 2006 and January, February, March, April, May, June, July, August, and September of 2007. October of 2007 experienced average rainfall. November of 2006 received above average rainfall.

2.4 CONCLUSION

The 2007 year represents the sixth year of hydrologic monitoring of the Site. In general, water levels showed a typical pattern of flooding during the spring, followed by a late summer and fall draw down period, punctuated by peaks associated with precipitation events. Overall, 18 of the 36 on-site monitoring gauges met the success criteria (groundwater within 12 inches of the surface for at least 12.5 percent of the growing season). Eleven on-site monitoring gauges indicated groundwater within 12 inches of the surface for 5 to 12.5 percent of the growing season. The remaining seven on-site monitoring gauges indicated groundwater within 12 inches of the surface for 1 to 5 percent of the growing season. Overall, the number of saturation days per monitoring gauge decreased. This is reflected by data indicating fewer gauges meeting success criteria in 2007. Reference gauge data supports the decrease in groundwater saturation at the Site. Reference gauge GW-38 indicated saturation within 12 inches of the surface for 5 to 12.5 percent of the growing season, while GW-37 indicated groundwater within the 12 inches of the surface for 1 to 5 percent of the growing season. The decrease in groundwater saturation is explained by extreme drought conditions resulting in an approximate 15 inch deficit in rainfall from an average year. The Site experienced drought conditions during each month of the growing season and therefore only half of the gauges met the success criteria.

3.0 VEGETATION

3.1 SUCCESS CRITERIA

The success criteria state that at least 320 stems per acre must survive after the completion of the third growing season. The required survival criterion will decrease by 10 percent each year after the third year of vegetation monitoring. The 2007 monitoring report represents the fifth year of vegetation monitoring and requires a minimum survival of 260 stems per acre in order to meet success criteria. Vegetation monitoring followed methods described in the EEP Stem Counting Protocol. The taxonomic standard for vegetation follows *Flora of the Carolinas, Virginia, Georgia, and surrounding areas* (Weakley, 2007). Photograph locations are shown in Figure 4 (Appendix A). Site photographs are provided in Appendix C.

3.2 DESCRIPTION OF SPECIES

The following tree species were planted in the Wetland Areas:

Zone 1: Wetland Restoration Area (10.03 Acres)

Quercus lyrata, Overcup Oak
Quercus michauxii, Swamp Chestnut Oak
Quercus phellos, Willow Oak
Quercus nigra, Water Oak
Nyssa biflora, Swamp Blackgum
Fraxinus pennsylvanica, Green Ash
Cornus amomum, Silky Dogwood
Sambucus canadensis, Elderberry
Cephalanthus occidentalis, Buttonbush

Zone 2: Wetland Enhancement Area (1.58 Acres)

Quercus lyrata, Overcup Oak
Quercus michauxii, Swamp Chestnut Oak
Quercus phellos, Willow Oak
Quercus nigra, Water Oak
Nyssa biflora, Swamp Blackgum
Fraxinus pennsylvanica, Green Ash
Cornus amomum, Silky Dogwood
Sambucus canadensis, Elderberry
Cephalanthus occidentalis, Buttonbush

Zone 3: Wetland Creation Area (6.59 Acres)

Quercus lyrata, Overcup Oak
Quercus michauxii, Swamp Chestnut Oak
Quercus phellos, Willow Oak
Quercus nigra, Water Oak
Nyssa biflora, Swamp Blackgum
Fraxinus pennsylvanica, Green Ash

3.3 RESULTS OF VEGETATION MONITORING

The following table lists the densities of planted tree species recorded in each established 0.06-acre (50-foot by 50-foot) plot marked with yellow fiberglass NCDOT stakes. (Figure 4, Appendix A). Vegetation plots 1, 2, 3, 7, and 8 all exceeded the minimum density requirements during Year 5 monitoring. An inventory of planted species is listed in Table 2.

TABLE 2: Vegetation Monitoring Statistics

Plot Number	1	2	3	4	5	6	7	8	Total
Buttonbush <i>Cephalanthus occidentalis</i>		3	7				1	1	12
Elderberry <i>Sambucus canadensis</i>			6					6	12
Green Ash <i>Fraxinus pennsylvanica</i>	5	8	5	5	7	6	7	7	50
Overcup Oak <i>Quercus lyrata</i>		2	1	1			4	4	12
Silky Dogwood <i>Cornus amomum</i>	5	5	8	1	3		4		26
Swamp Blackgum <i>Nyssa biflora</i>						1			1
Swamp Chestnut Oak <i>Quercus michauxii</i>	4	2		2	1	1	8	1	19
Water Oak <i>Quercus nigra</i>	1								1
Willow Oak <i>Quercus phellos</i>	2	2				2	2		8
Total (2007, Year 5)	21	22	27	9	11	10	24	19	
Total (2006, Year 4)	19	28	17	20	11	9	18	18	140
Total (2005, Year 3)	21	22	18	15	12	10	21	17	115
Total (2003, Year 1)	30	28	40	17	31	21	39	22	198
Total (2002, at Planting)	40	38	45	24	37	31	40	32	247
Density (Trees/Acre)	365.9	383	470	157	192	174	418	331	
Average Density (Trees/Acre)									311

Stem counts were made of additional, volunteer woody species within the study plots. These species are listed in Table 3.

TABLE 3: Volunteer Woody Stem Counts in the Study Plots.

Plot Number	1	2	3	4	5	6	7	8	TOTAL
Black Willow <i>Salix nigra</i>	1	4	10		1	2		2	20
Bradford Pear <i>Pyrus calleryana</i>				3	1				4
Groundsel Bush <i>Baccharis halimifolia</i>	12	3	1		1	1	1	6	25
Loblolly Pine <i>Pinus taeda</i>	46	5	10	2	6	1	79	3	152
Persimmon <i>Diospyros virginiana</i>				10					10
Red Maple <i>Acer rubrum</i>		100	146	3	1	119	5	75	449
Sweetgum <i>Liquidambar styraciflua</i>	2	10	13	2			1	7	35
Tulip Poplar <i>Liriodendron tulipifera</i>								1	1
Wax Myrtle <i>Morella cerifera</i>	2	4	4					2	12
American Elm <i>Ulmus americana</i>		1	1	2				2	6
TOTAL	63	127	185	22	10	123	86	98	714
Density (Trees/Acre)	1098	2213	3223	383	174	2143	1498	1707	
Average Density (Trees/Acre)								1555	

An inventory of herbaceous species on the site was also taken. Dominant herbaceous species over the site as a whole include: blackberry (*Rubus argutus*), climbing hempweed (*Mikania scandens*), common cattail (*Typha latifolia*), dog fennel (*Eupatorium capillifolium*), false nettle (*Boehmeria cylindrica*), goldenrod (*Solidago* sp.), jewelweed (*Impatiens capensis*), meadow beauty (*Rhexia mariana* var. *mariana*), seedbox (*Ludwigia alternifolia*), leathery rush (*Juncus coriaceous*), soft rush (*Juncus effusus*), Arrow-leaf tearthumb (*Persicaria sagittata*), woolgrass (*Scirpus cyperinus*), Virginia buttonweed (*Diodia virginiana*), Virginia creeper (*Parthenocissus quinquefolia*), sneezeweed (*Helenium autumnale*), boneset (*Eupatorium perfoliatum*), Allegheny monkey-flower (*Mimulus ringens* var. *ringens*), beggar ticks (*Bidens frondosa*), broomsedge (*Andropogon virginicus* var. *virginicus*), fescue (*Festuca* sp.), greenbrier (*Smilax rotundifolia*), ragweed (*Ambrosia artemisiifolia*), ragwort (*Senecio* sp.), sericea lespedeza (*Lespedeza cuneata*), and trumpet creeper (*Campsis radicans*).

3.4 CONCLUSION

Of the 50.7 acres on this site, approximately 18.2 acres involved tree planting. Supplemental tree planting was completed in December 2002. An upland buffer area that consisted of 12.04 acres was also planted. The 2007 vegetation monitoring results revealed an average density of 311 trees per acre of planted species. This average is above the minimum success criteria of 260 trees per acre after the fifth growing season.

Nuisance trees such as red maple and loblolly pine occur in significant amounts in some areas of the Site, as seen in Plots 1, 2, 3, 6, and 7. The increase in stem counts of these species over 2006, for example in Plot 2 and 6, is likely due to proximity to seed sources. These occurrences do not appear to have a direct effect on the survivability of planted species. However, several areas within the site have limited vegetative cover with Plots 4, 5 and 6 below minimum planted tree density. Poor soil composition (lack of suitable topsoil) is a likely factor in poor survival.

4.0 REFERENCES

Weakley, A.S. 2007. Flora of the Carolinas, Virginia, Georgia, and surrounding areas. Working draft of January 2007. University of North Carolina Herbarium, North Carolina Botanical Garden, University of North Carolina. 1015pp.

APPENDIX A

FIGURES



Site Location

1 mi. 0 1 mi. 4 mi.
 1:144,000
 Source: 1997 North Carolina Atlas and Gazetteer, p.40-41,62-63.



SITE LOCATION
White Oak Creek Mitigation Site
 Johnston County, North Carolina
 EEP Project # 417

Dwn. by:	MAF
Ckd by:	MCG
Date:	DEC 2007
Project:	06-282.01

FIGURE
1

* FOR MONITORING RESULTS, SEE TABLE 1.

LEGEND

- C/E- CONSERVATION EASEMENT
- EXISTING STREAM
- GAUGE LOCATION *
- % of growing season *
- > 12.5%
- 5-12.5%
- < 5%

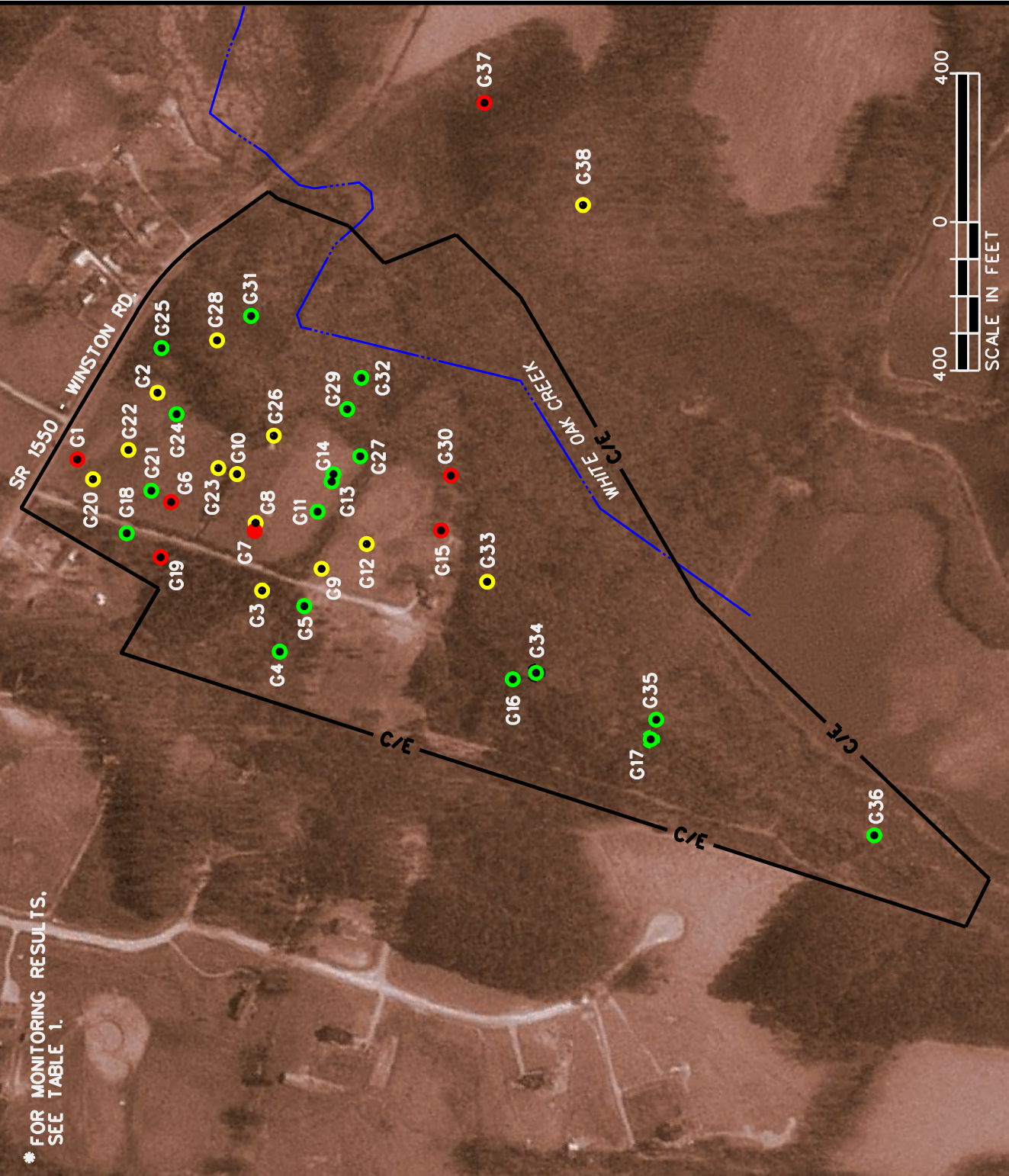


FIGURE
2

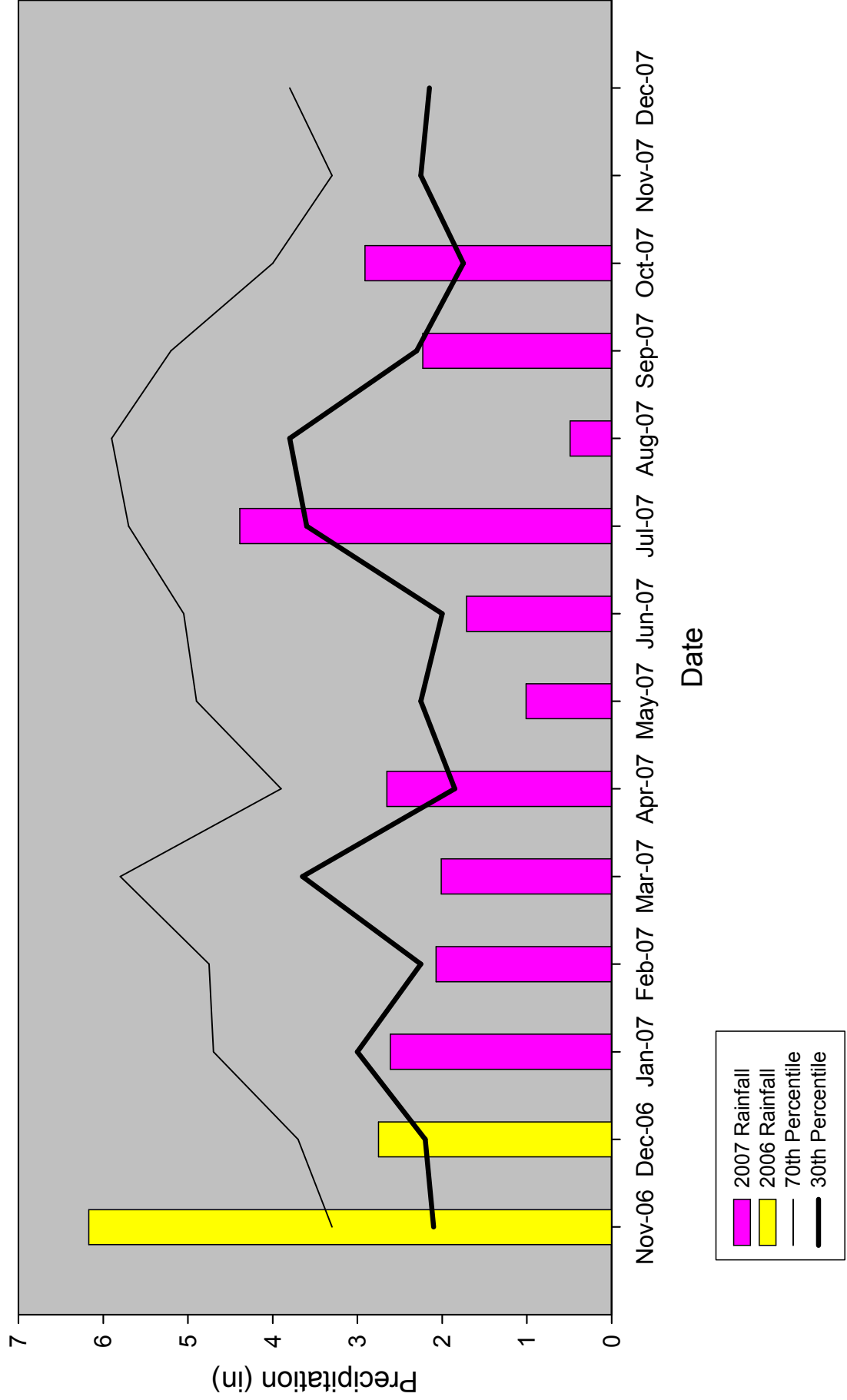
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Checked By:	MCG	Scale:	1" = 400'
ESC Project No.:		06-282.01	

MONITORING GAUGE LOCATIONS AND RESULTS
White Oak Creek Mitigation Site
 JOHNSTON COUNTY, NORTH CAROLINA

Client:

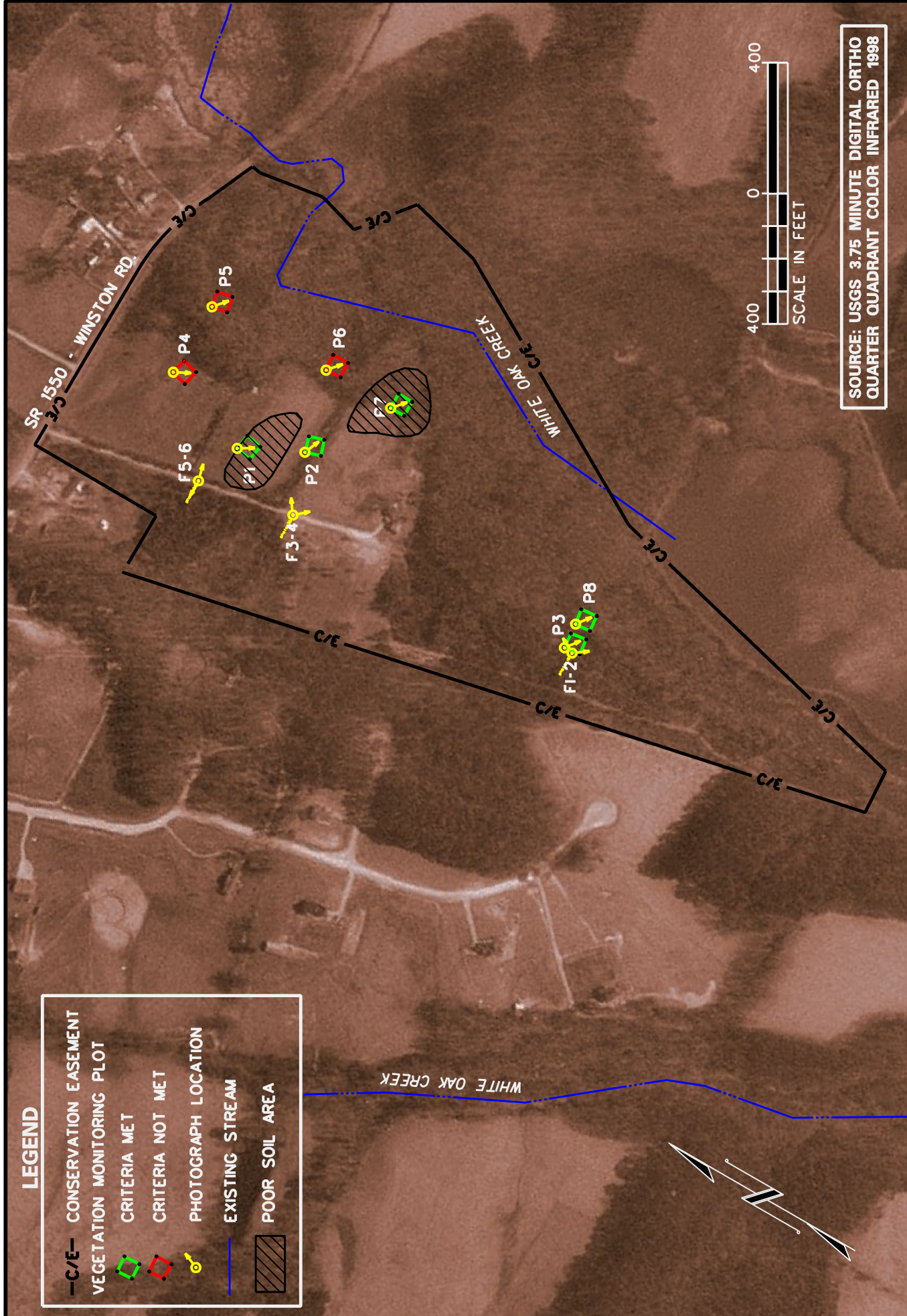
Project:

**Fig 3. White Oak Creek 30-70 Percentile Graph for Rainfall in 2007
Clayton, NC**



LEGEND

- C/E- CONSERVATION EASEMENT
- VEGETATION MONITORING PLOT
- CRITERIA MET
- CRITERIA NOT MET
- PHOTOGRAPH LOCATION
- EXISTING STREAM
- POOR SOIL AREA



SOURCE: USGS 3.75 MINUTE DIGITAL ORTHO QUARTER QUADRANT COLOR INFRARED 1998

Drawn By:	TAL	Date:	NOV 2007
Clad By:	MCG	Scale:	1" = 400'
ESC Project No.:		06.282.01	

Project: VEGETATION MONITORING PLOTS AND PHOTOGRAPH LOCATIONS
White Oak Creek Mitigation Site
EEP Project No. 417
 JOHNSTON COUNTY, NORTH CAROLINA

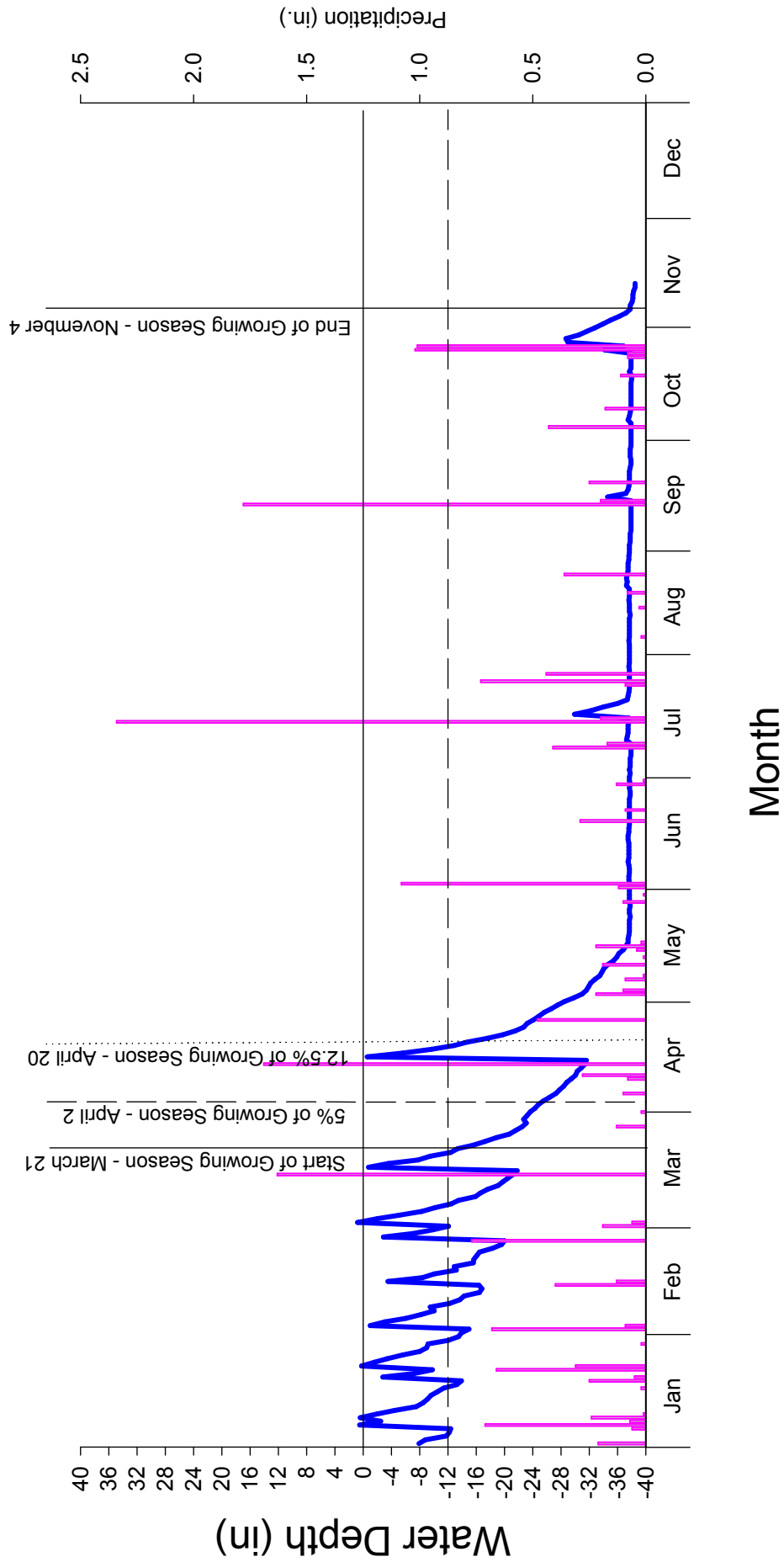


APPENDIX B
GROUNDWATER GAUGE HYDROGRAPHS

White Oak

2007

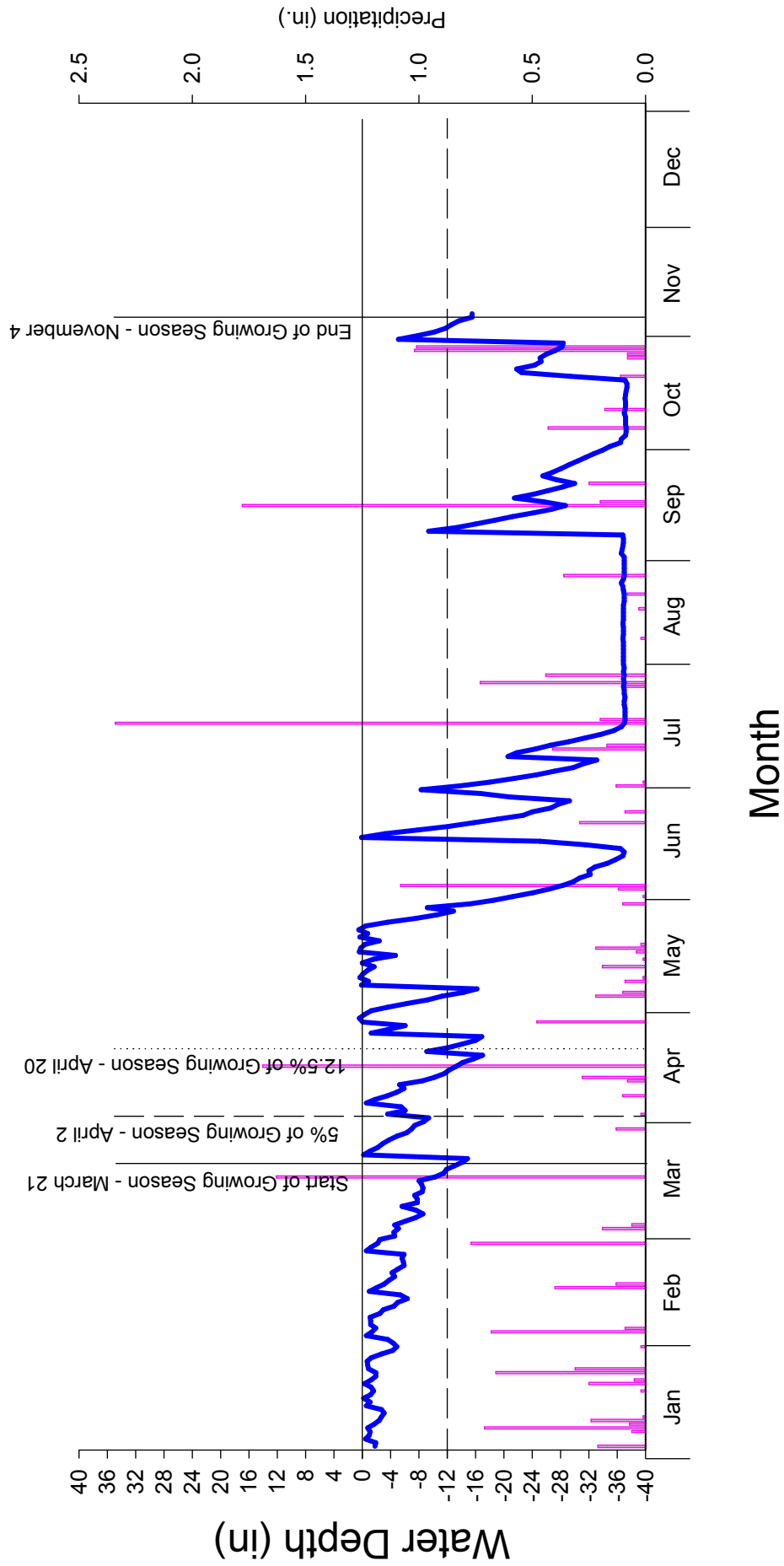
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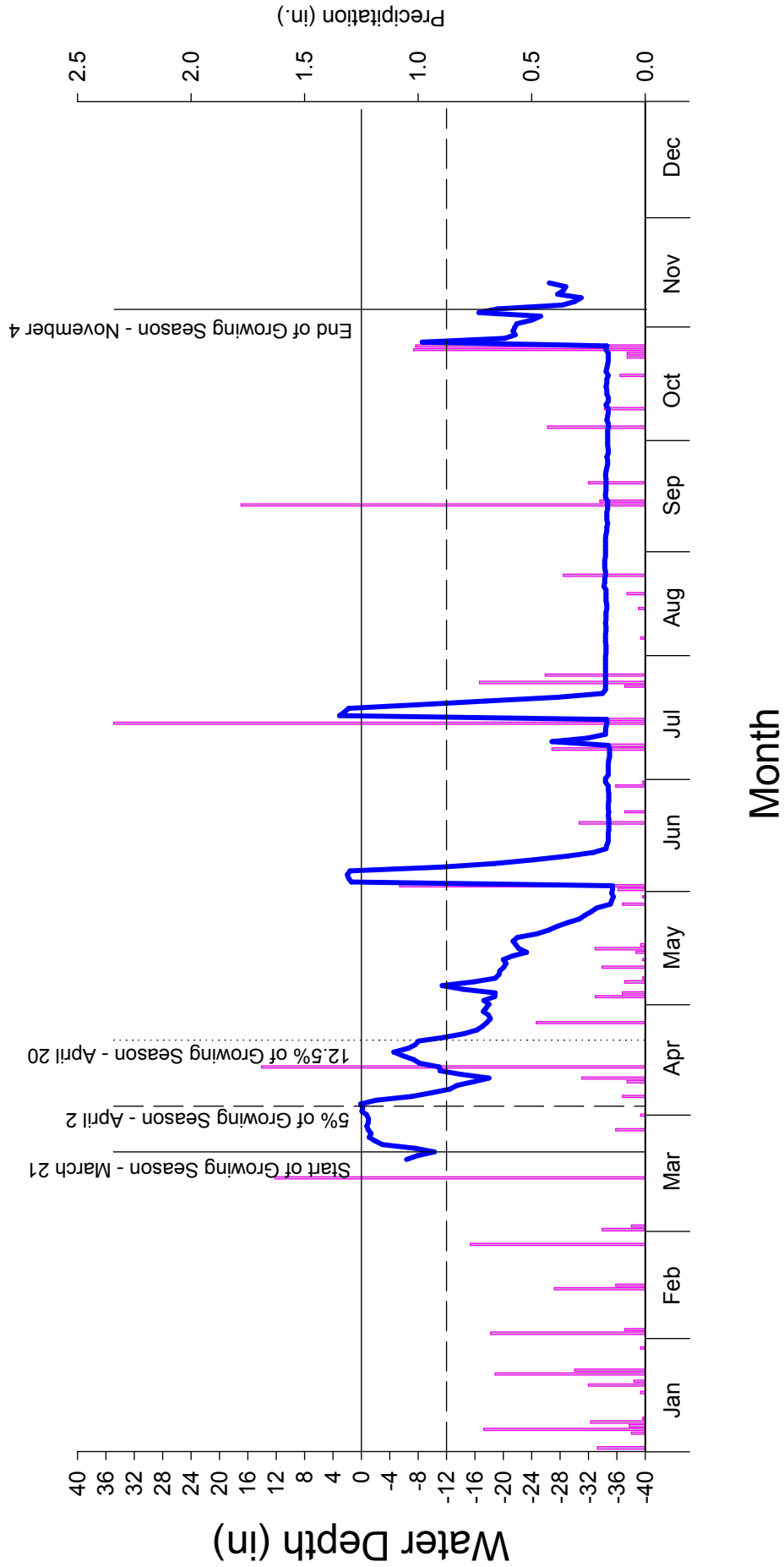
White Oak

2007

Monitoring Gauge 2 - 9BEBBCFA

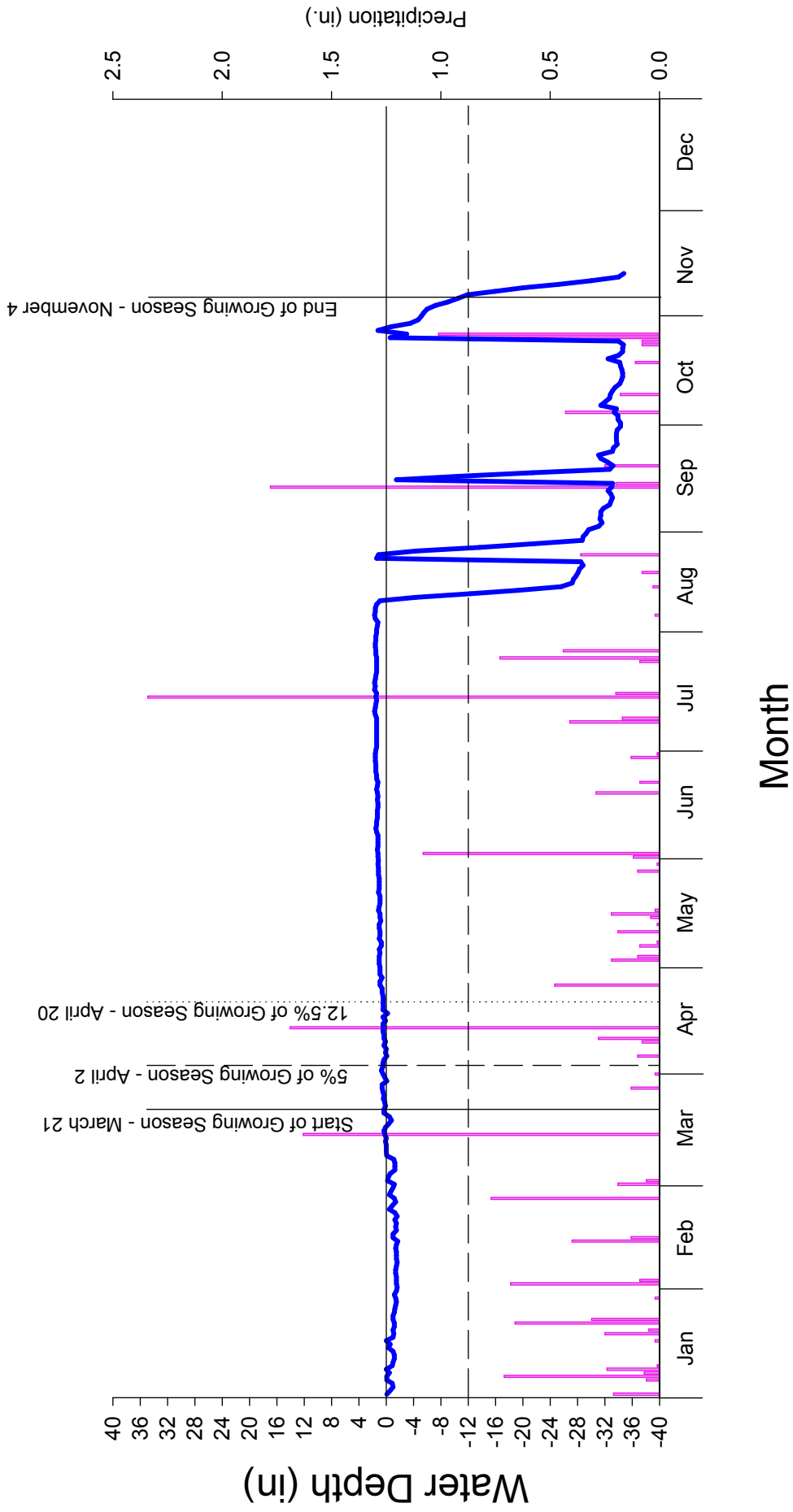


White Oak 2007 Monitoring Gauge 3 - EBCFDEC

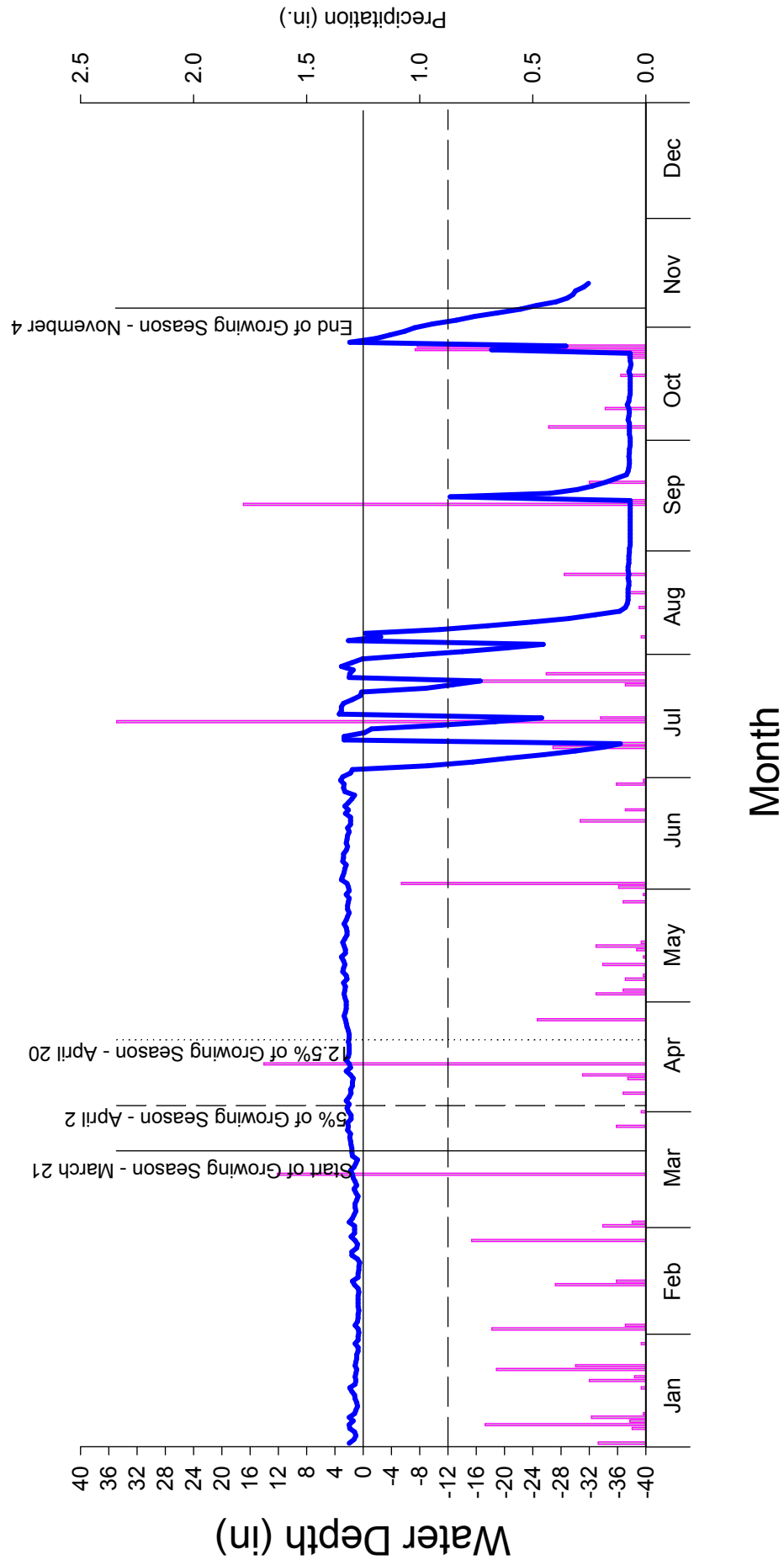


*New gauge installed on March 19

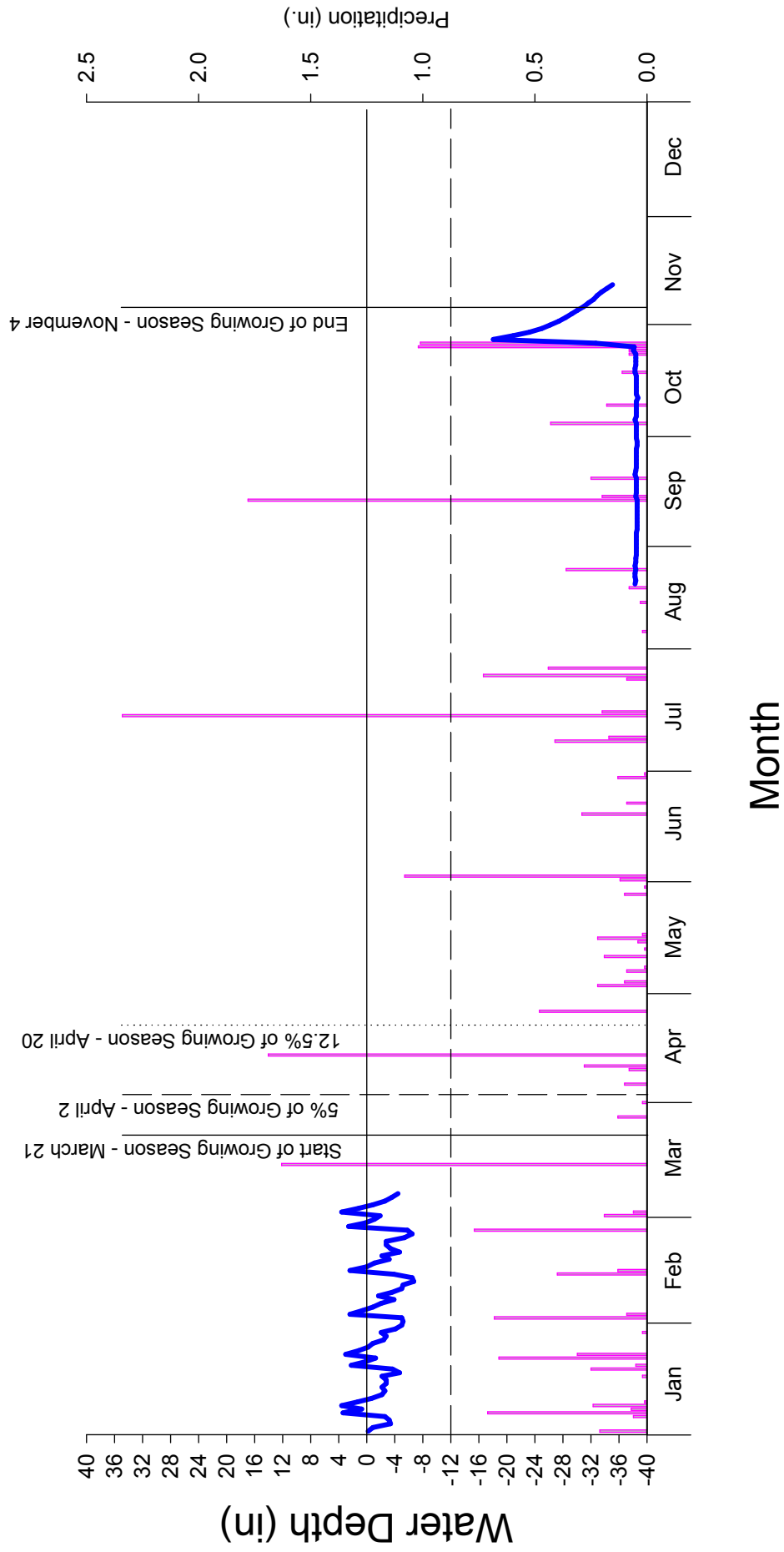
White Oak 2007 Monitoring Gauge 4 - B651405



White Oak 2007 Monitoring Gauge 5 - B65131A

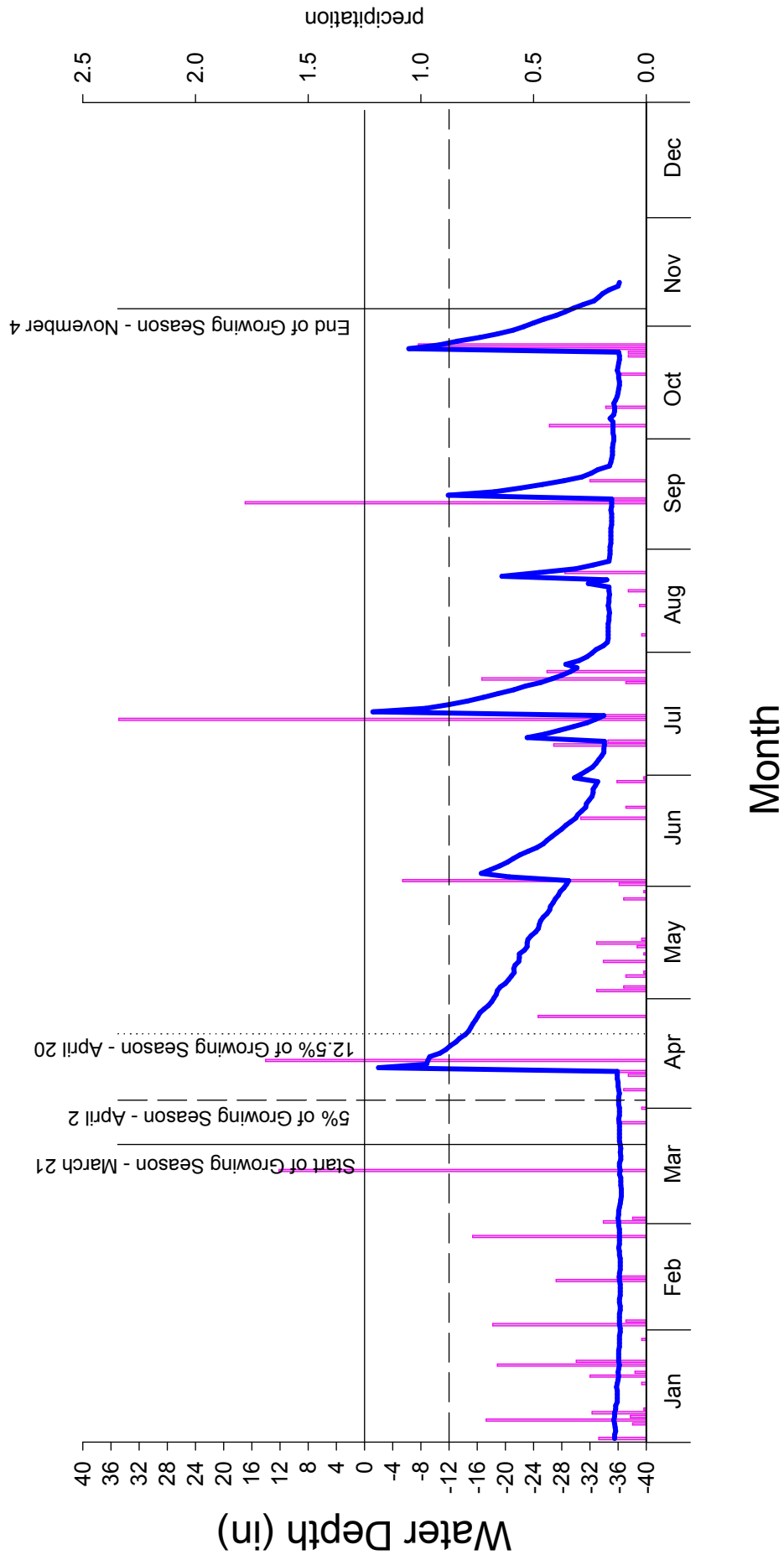


White Oak 2007 Monitoring Gauge 6 - EBDDA3C

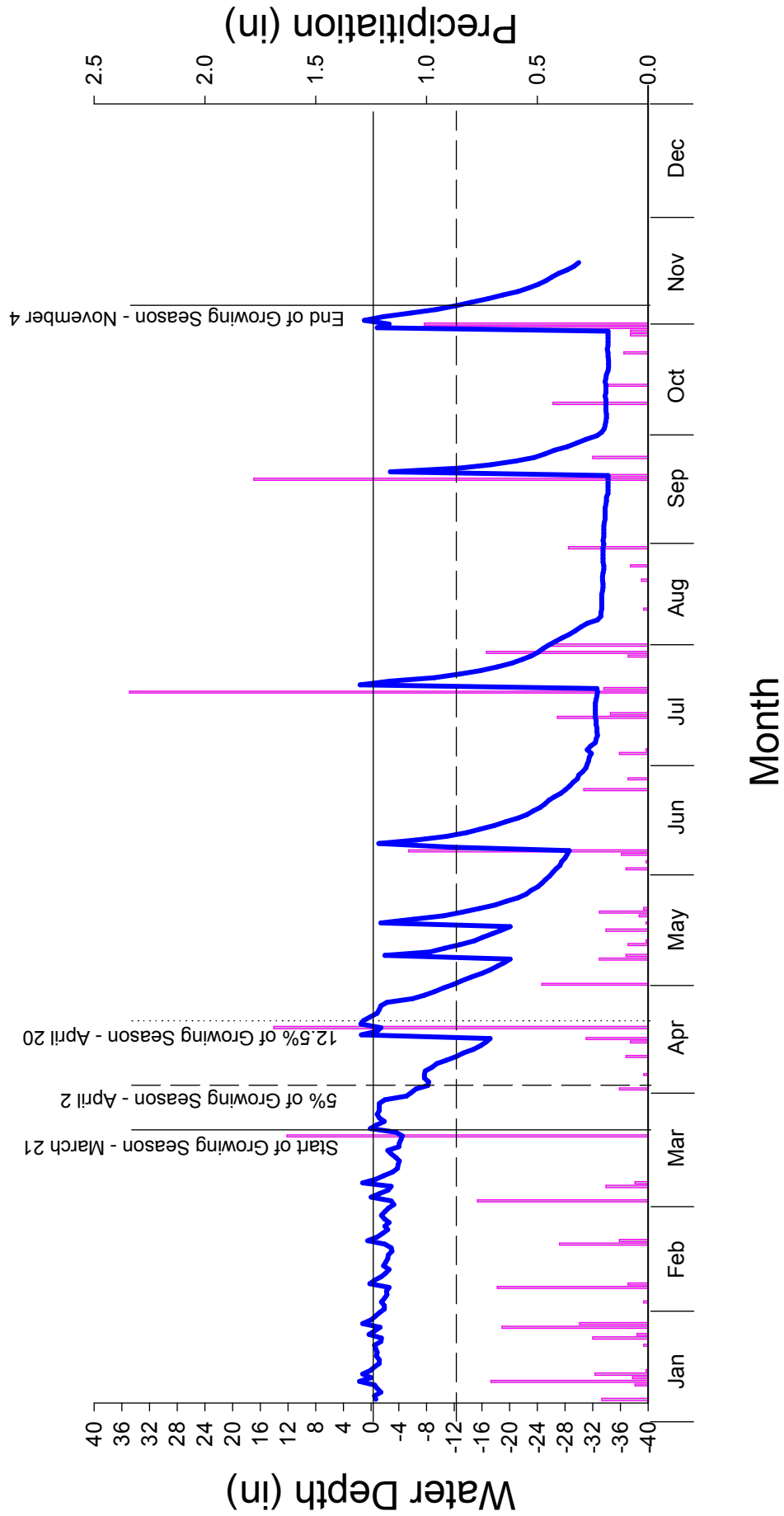


*Gauge malfunctioned on March 7
Reinstalled on August 21

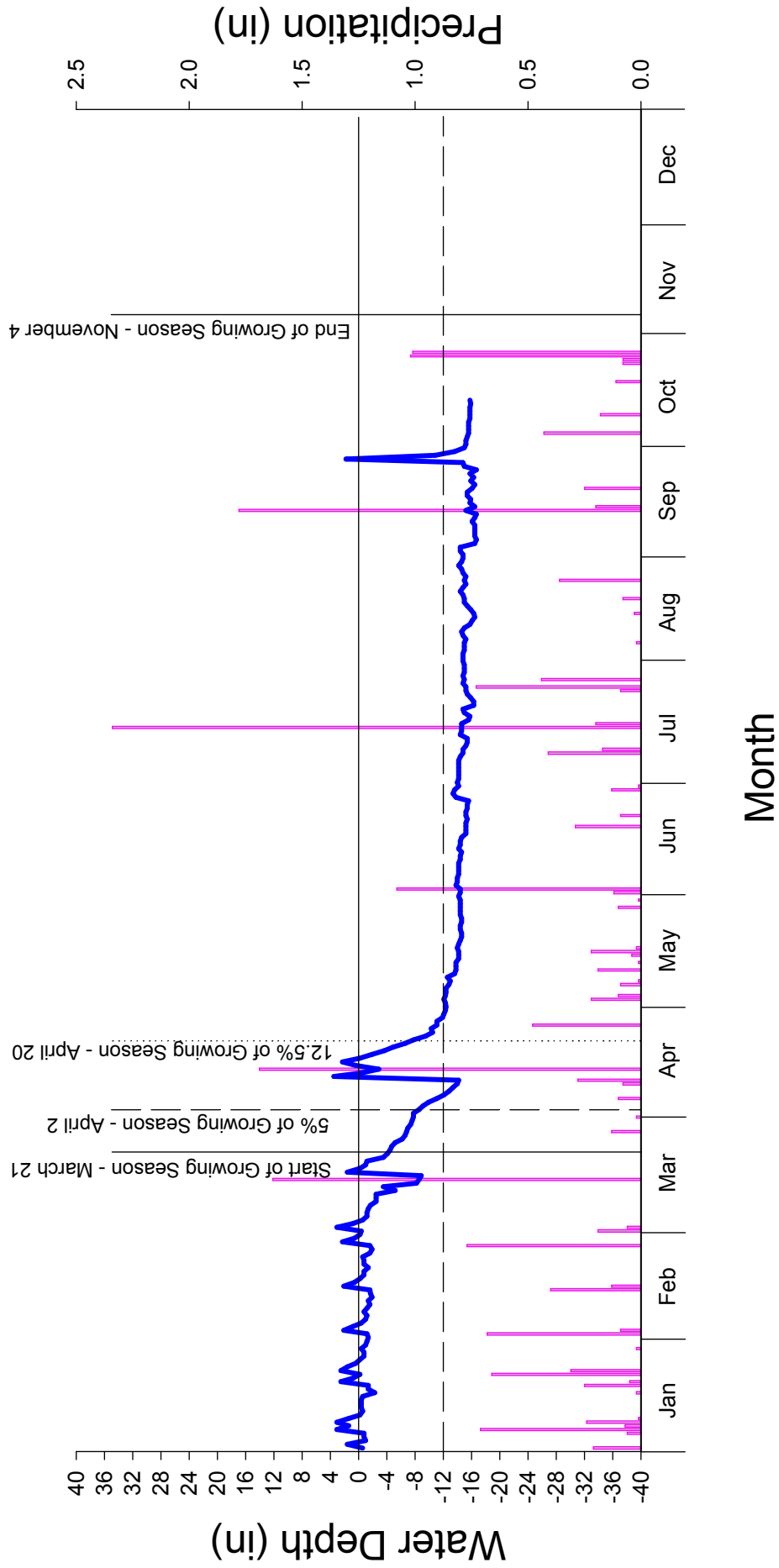
White Oak 2007 Monitoring Gauge 7 - A285ED9



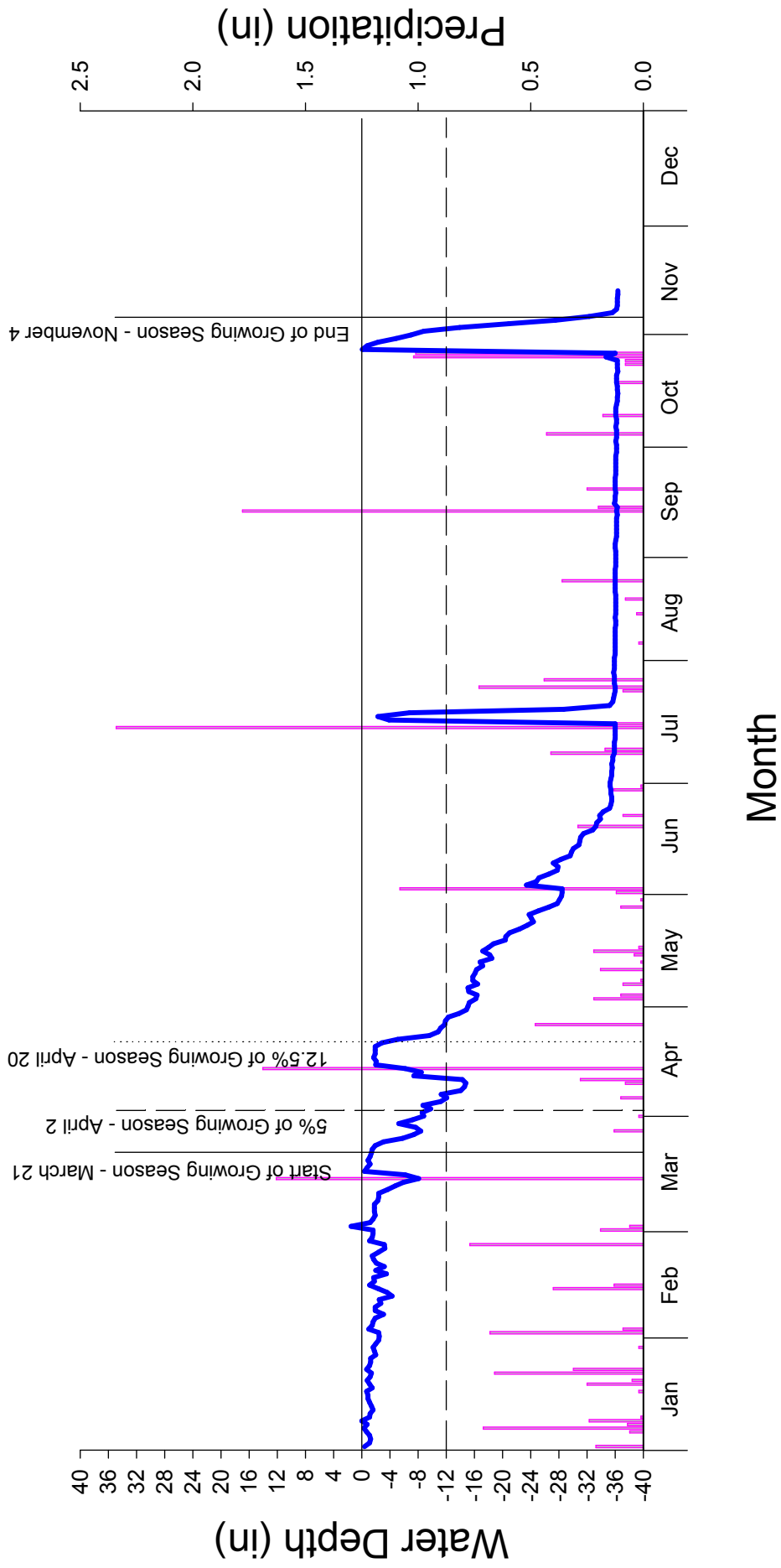
White Oak Creek 2007 Monitoring Gauge 8 - AB37304



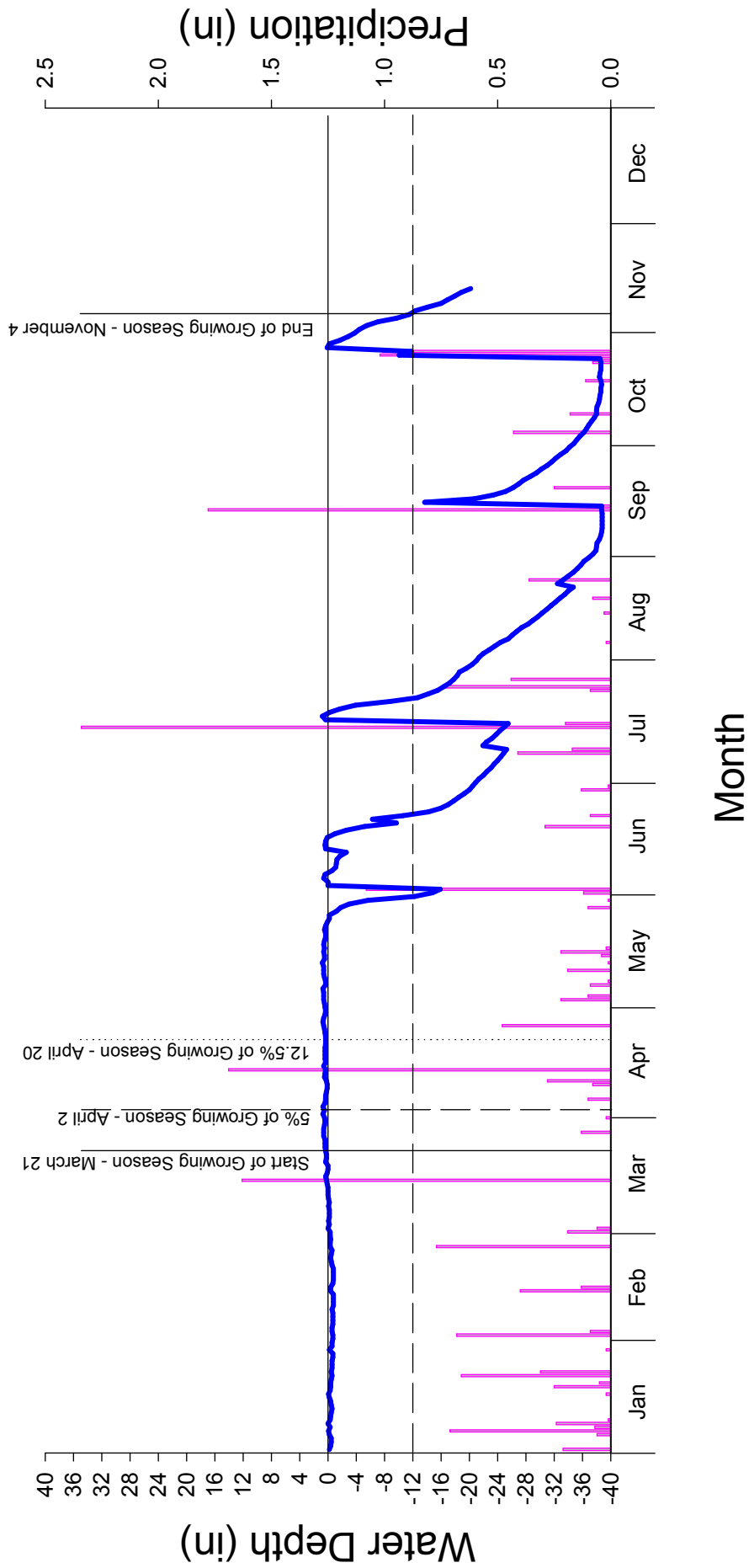
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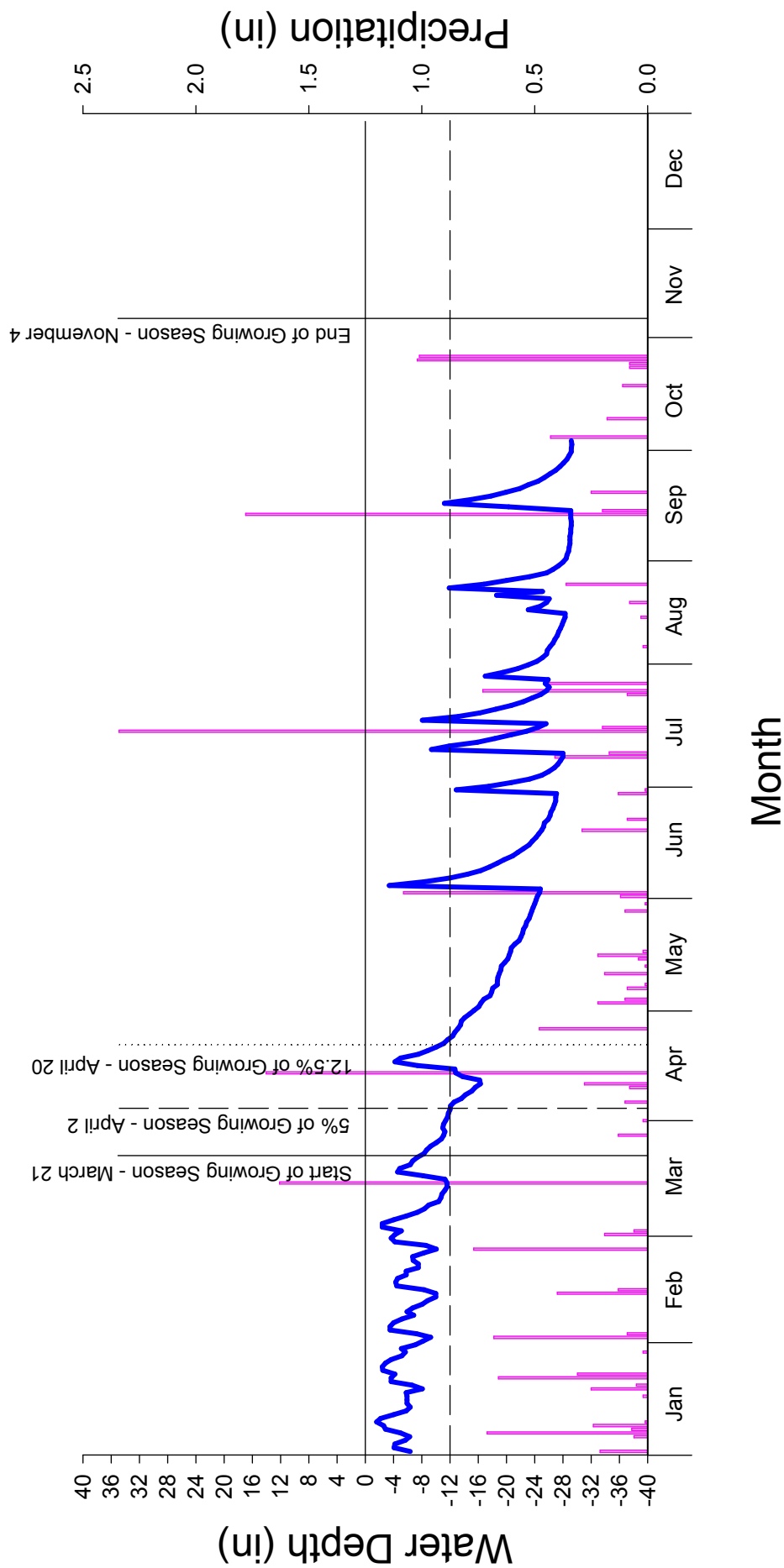
White Oak Creek 2007 Monitoring Gauge 10 - 9DE5CAE



White Oak Creek 2007 Monitoring Gauge 11 - A3C2C3E



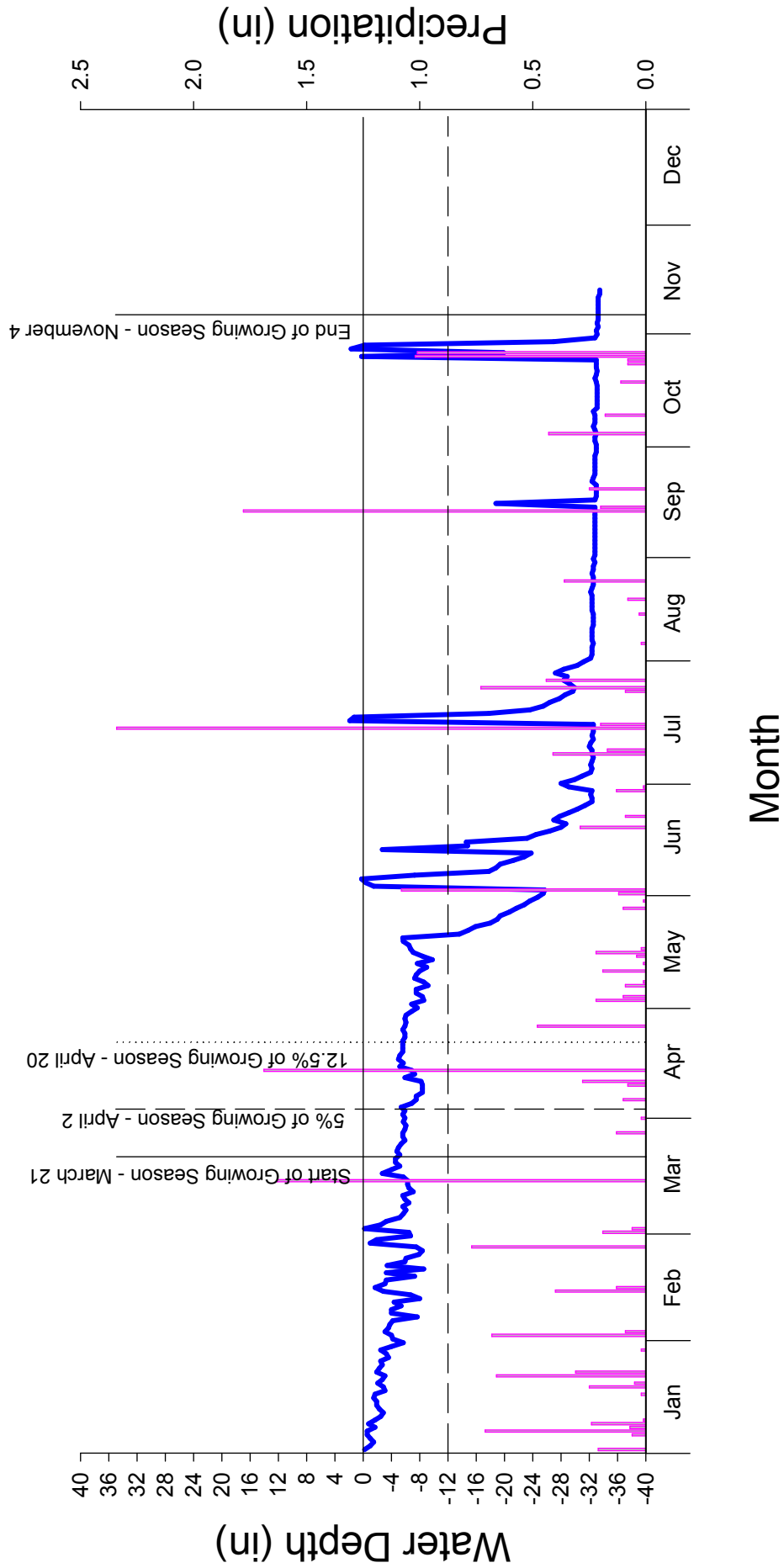
White Oak Creek 2007 Monitoring Gauge 12 - B65222F



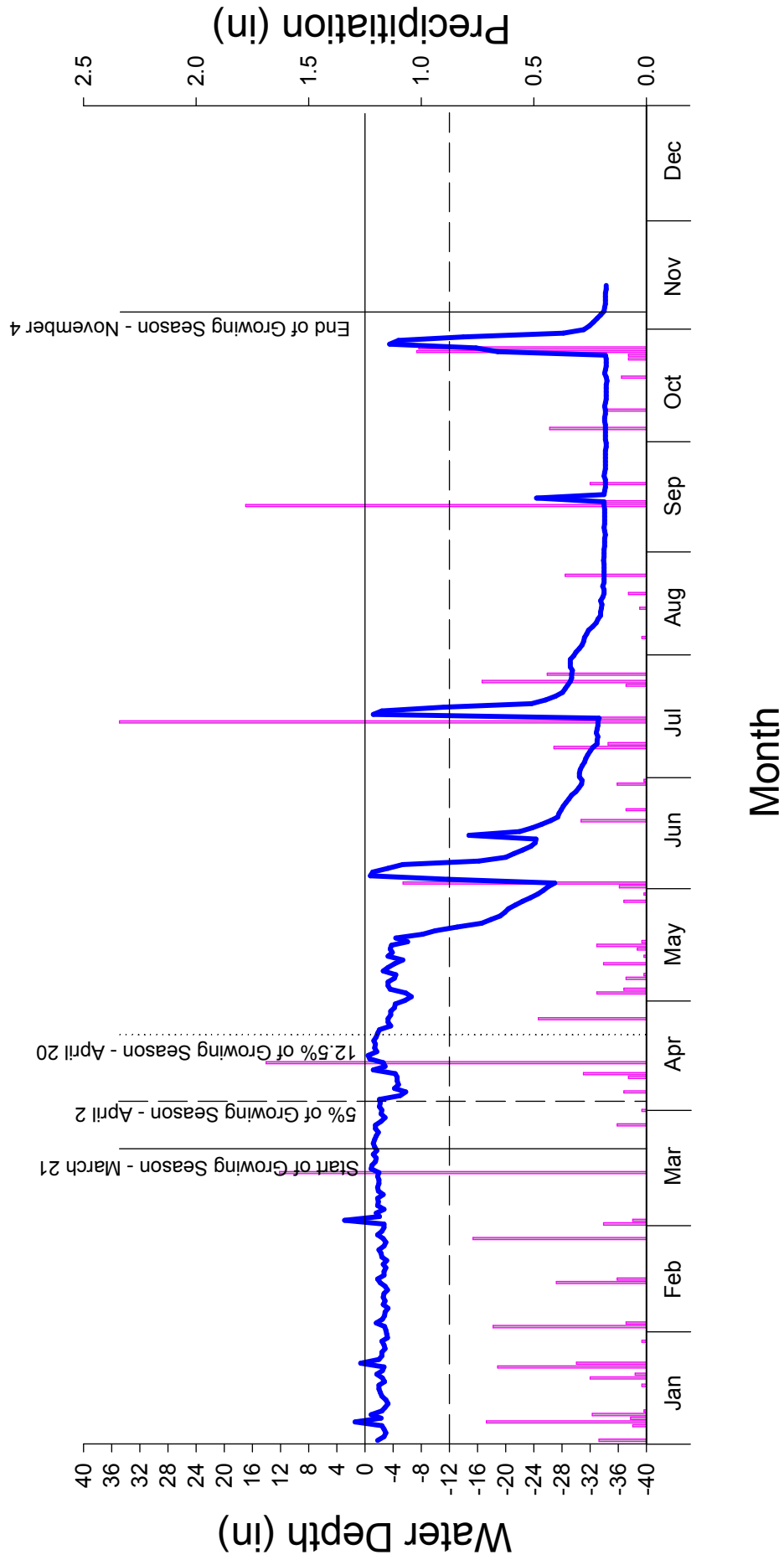
White Oak Creek

2007

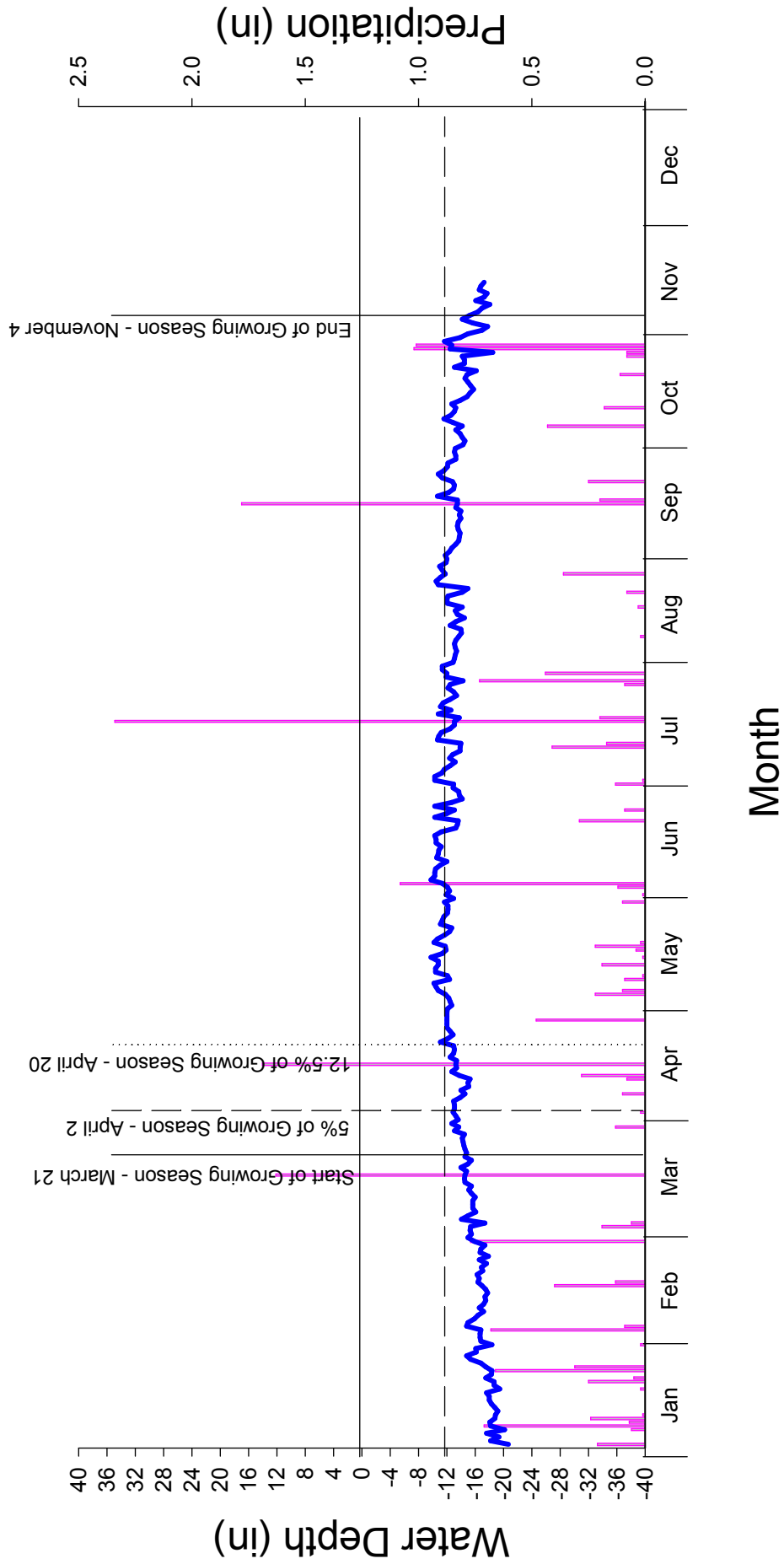
Monitoring Gauge 13 - 04941F4



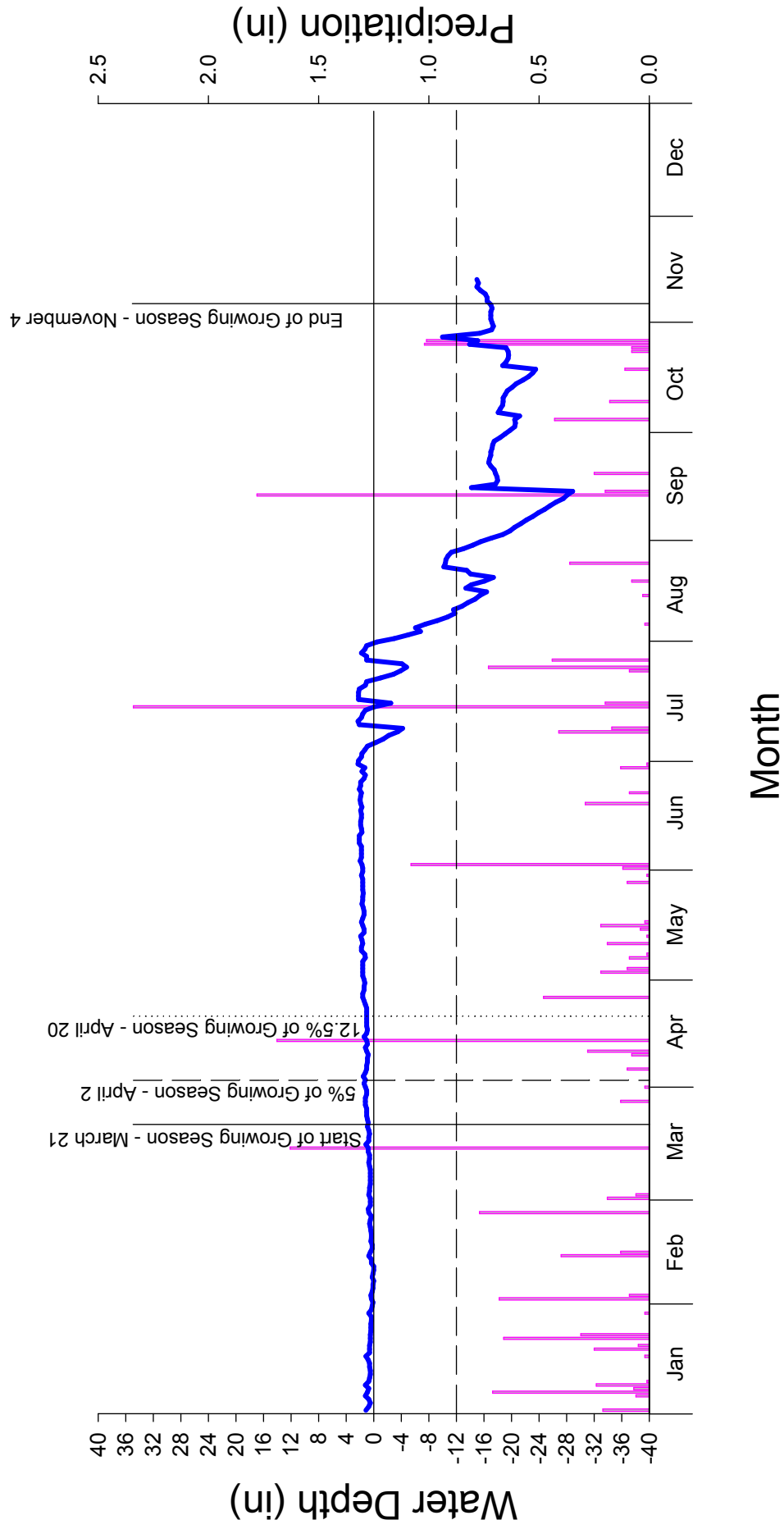
White Oak Creek 2006 Monitoring Gauge 14 - A27B36F



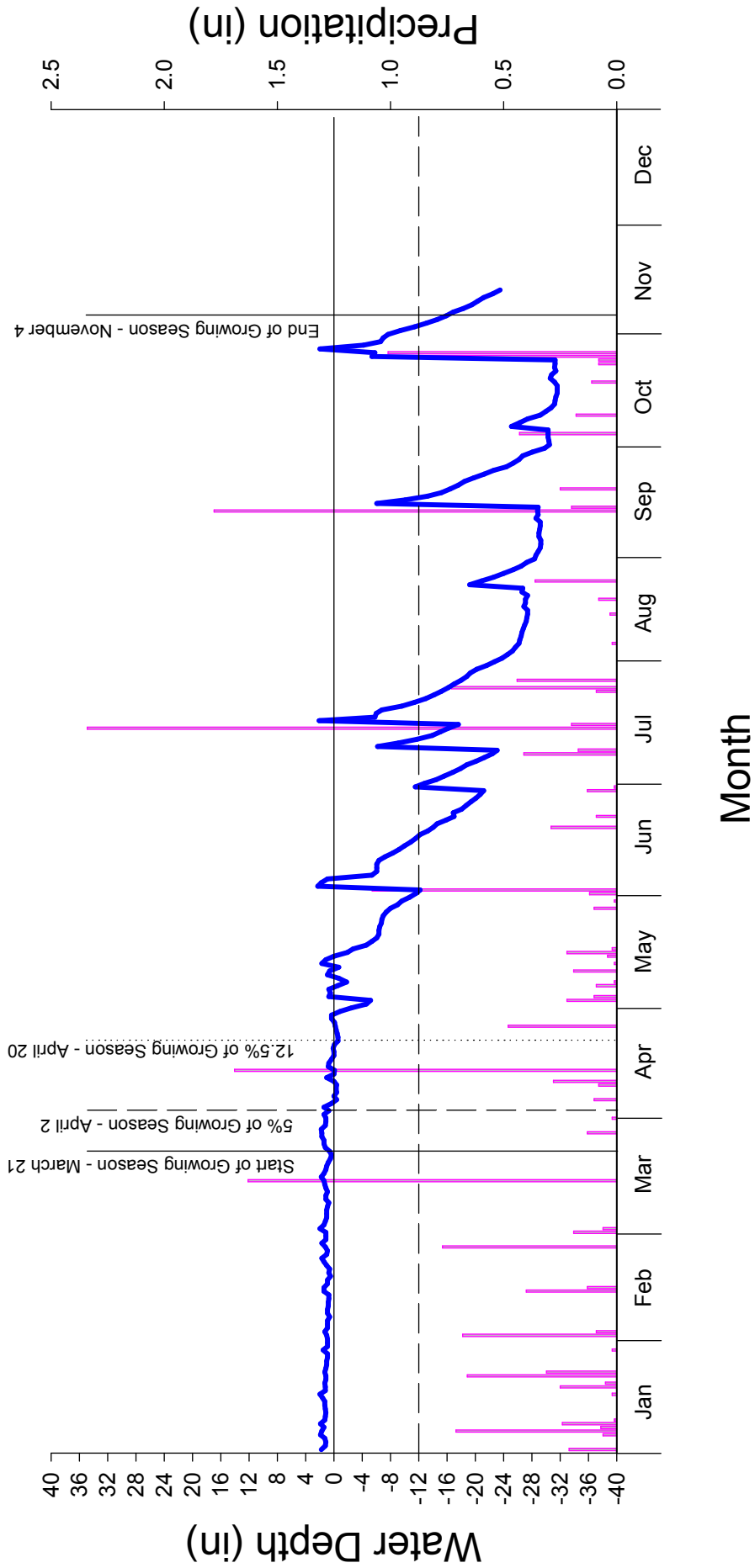
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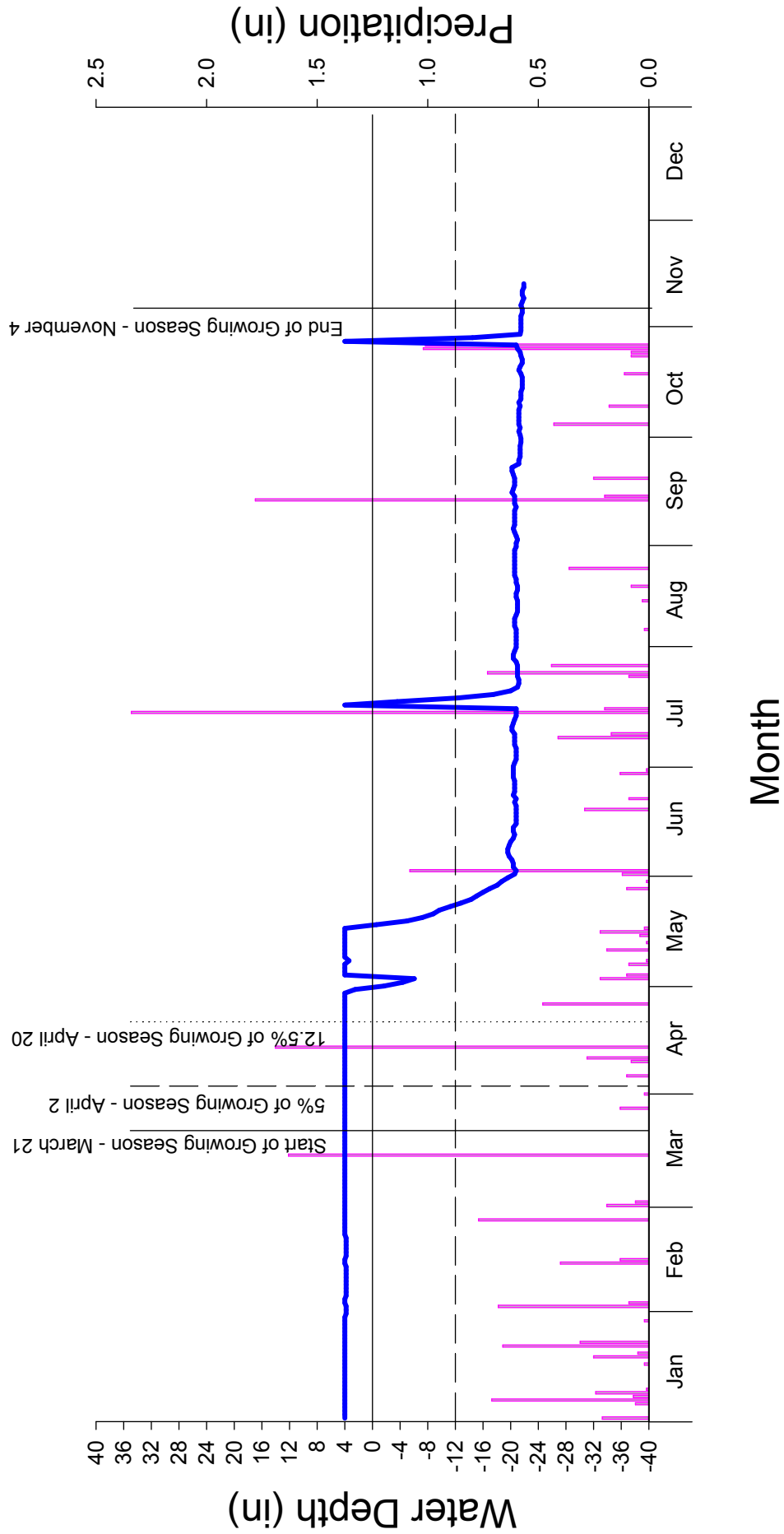
White Oak Creek 2007 Monitoring Gauge 16 - B6513D9



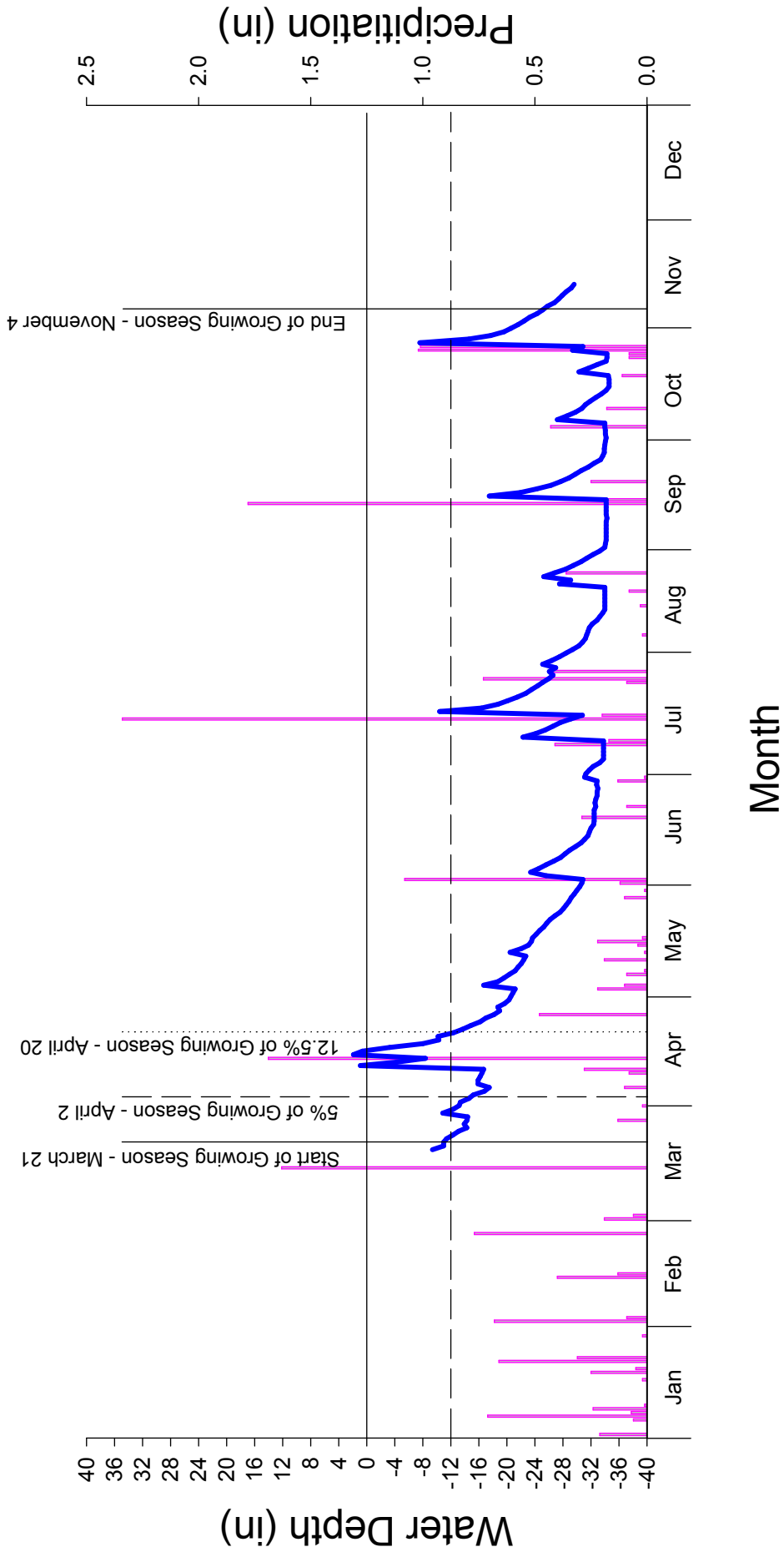
White Oak Creek 2007 Monitoring Gauge 17 - A28765B



White Oak Creek 2007 Monitoring Gauge 18 - 04489A2

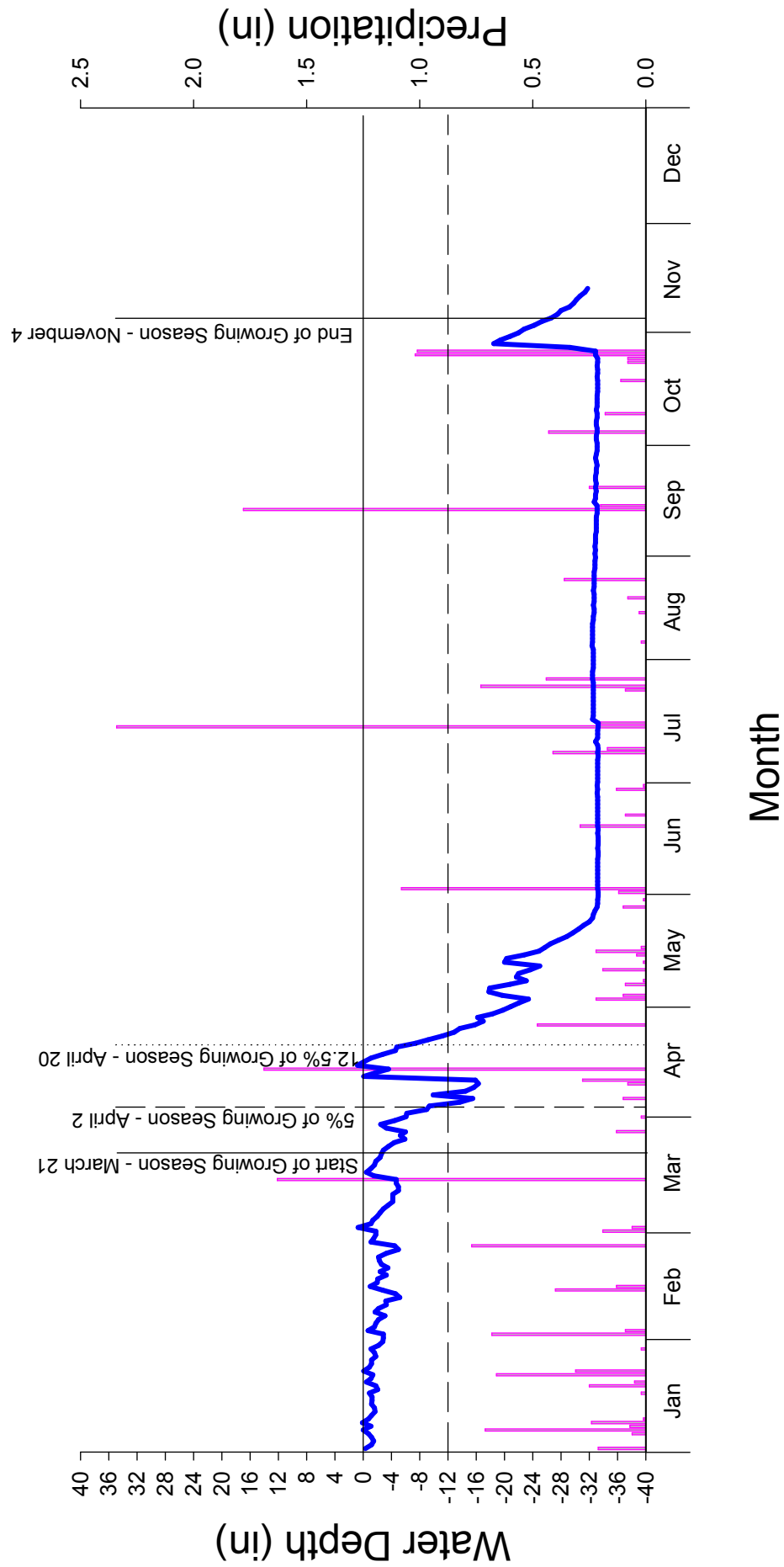


White Oak Creek 2007 Monitoring Gauge 19 - A287D28

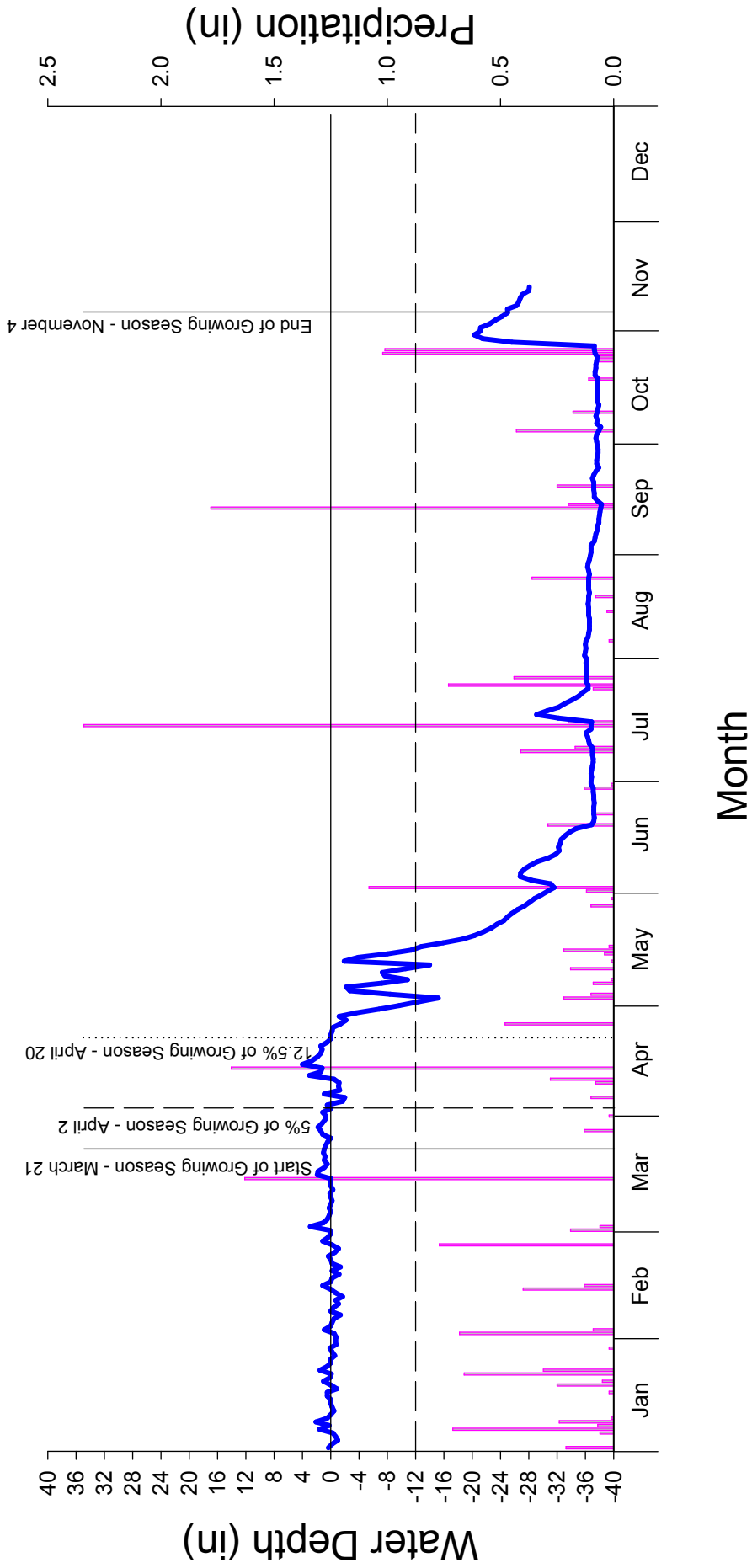


*Gauge installed March 19

White Oak Creek 2007 Monitoring Gauge 20 - 9DE4246



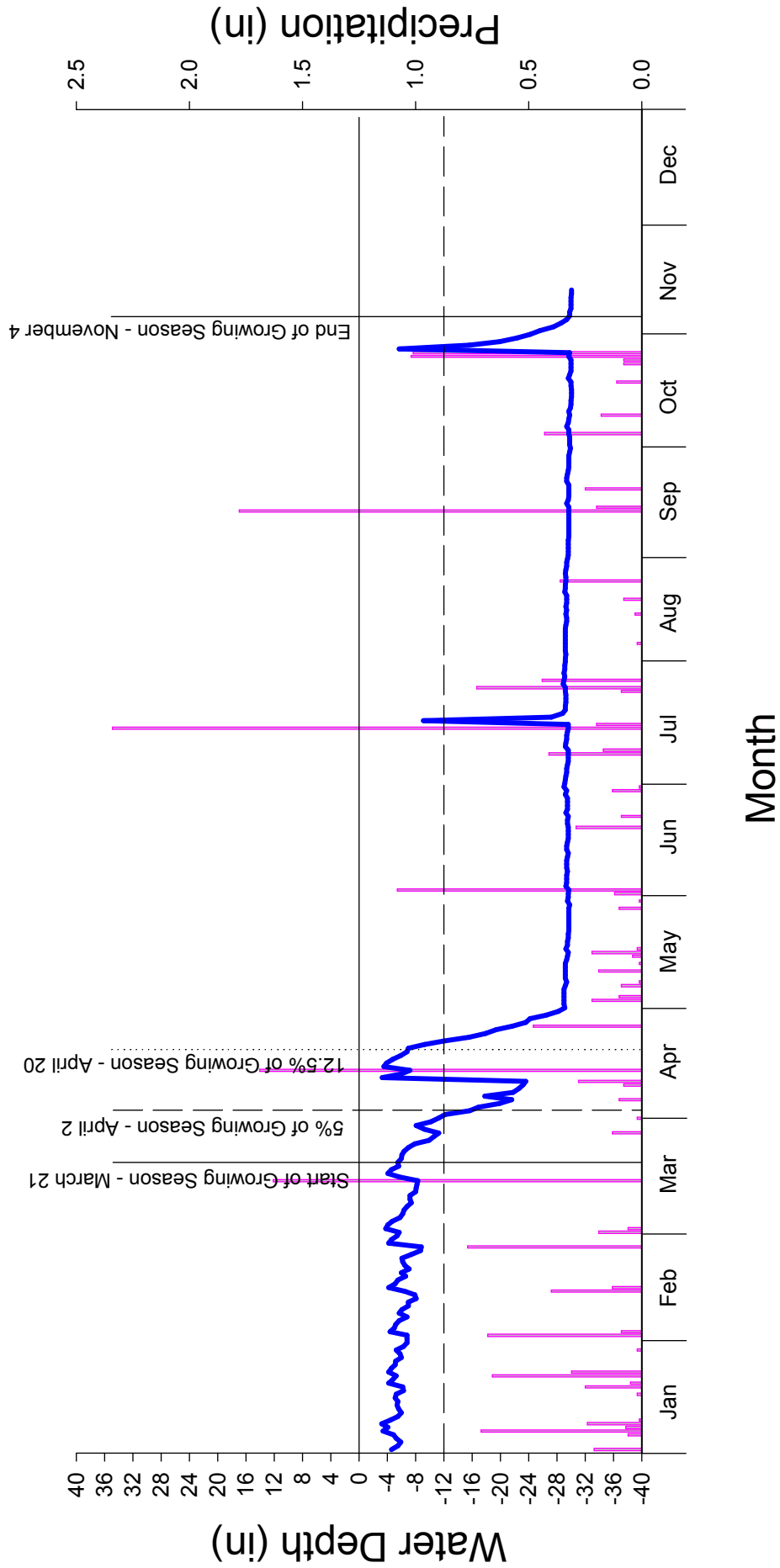
White Oak Creek 2007 Monitoring Gauge 21 - A28A703



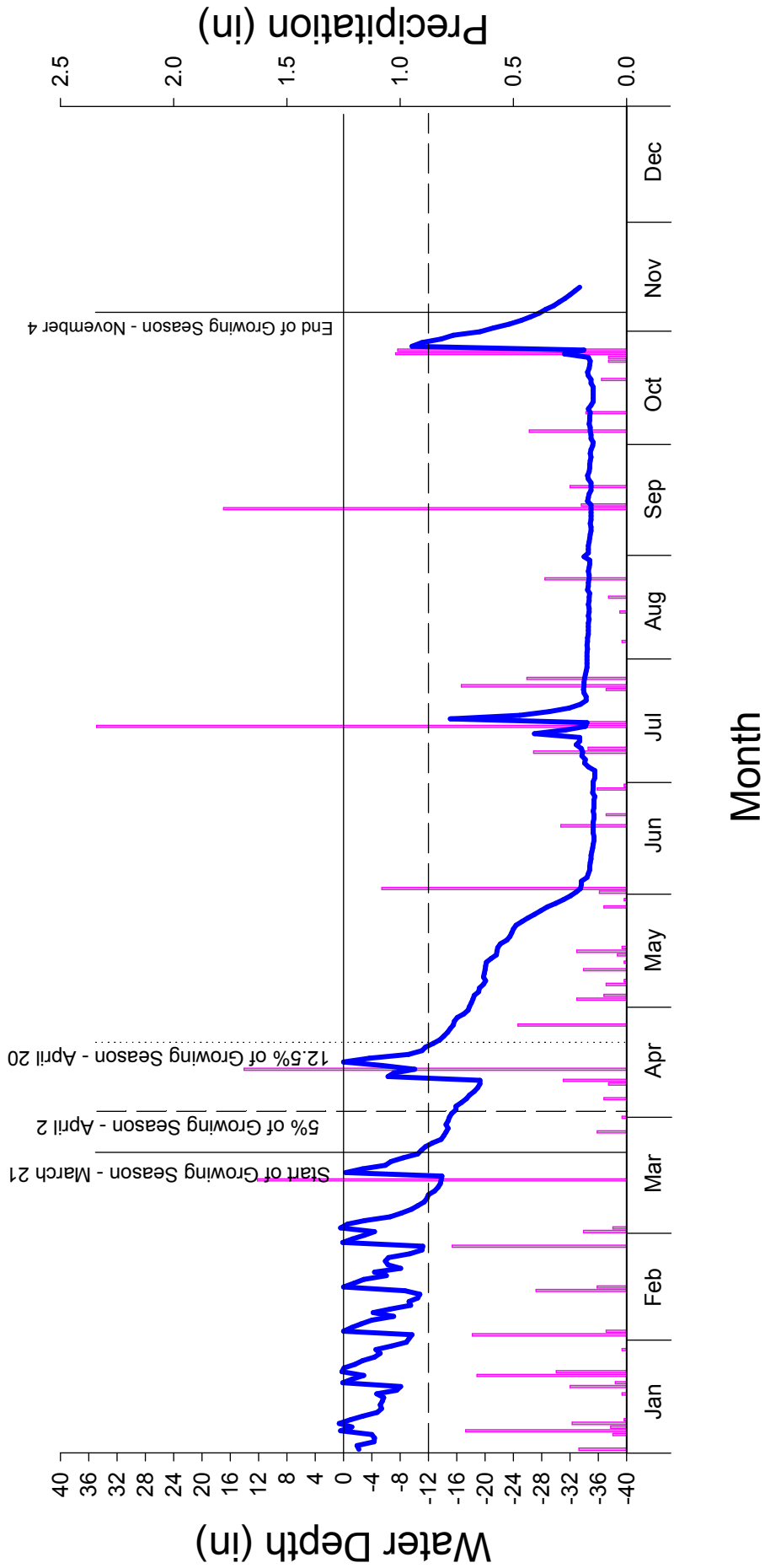
White Oak Creek

2007

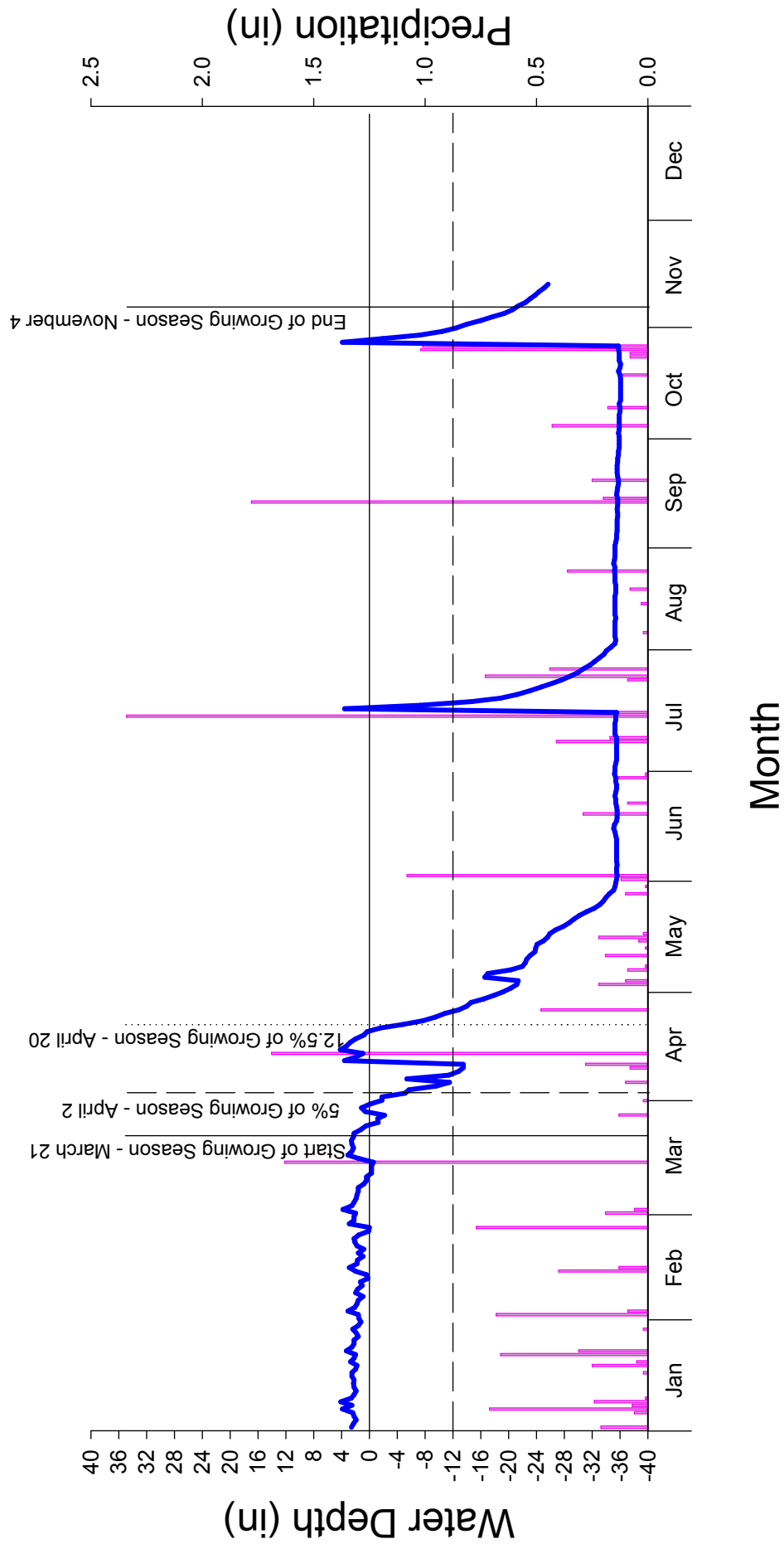
Monitoring Gauge 22 - 9DE4889



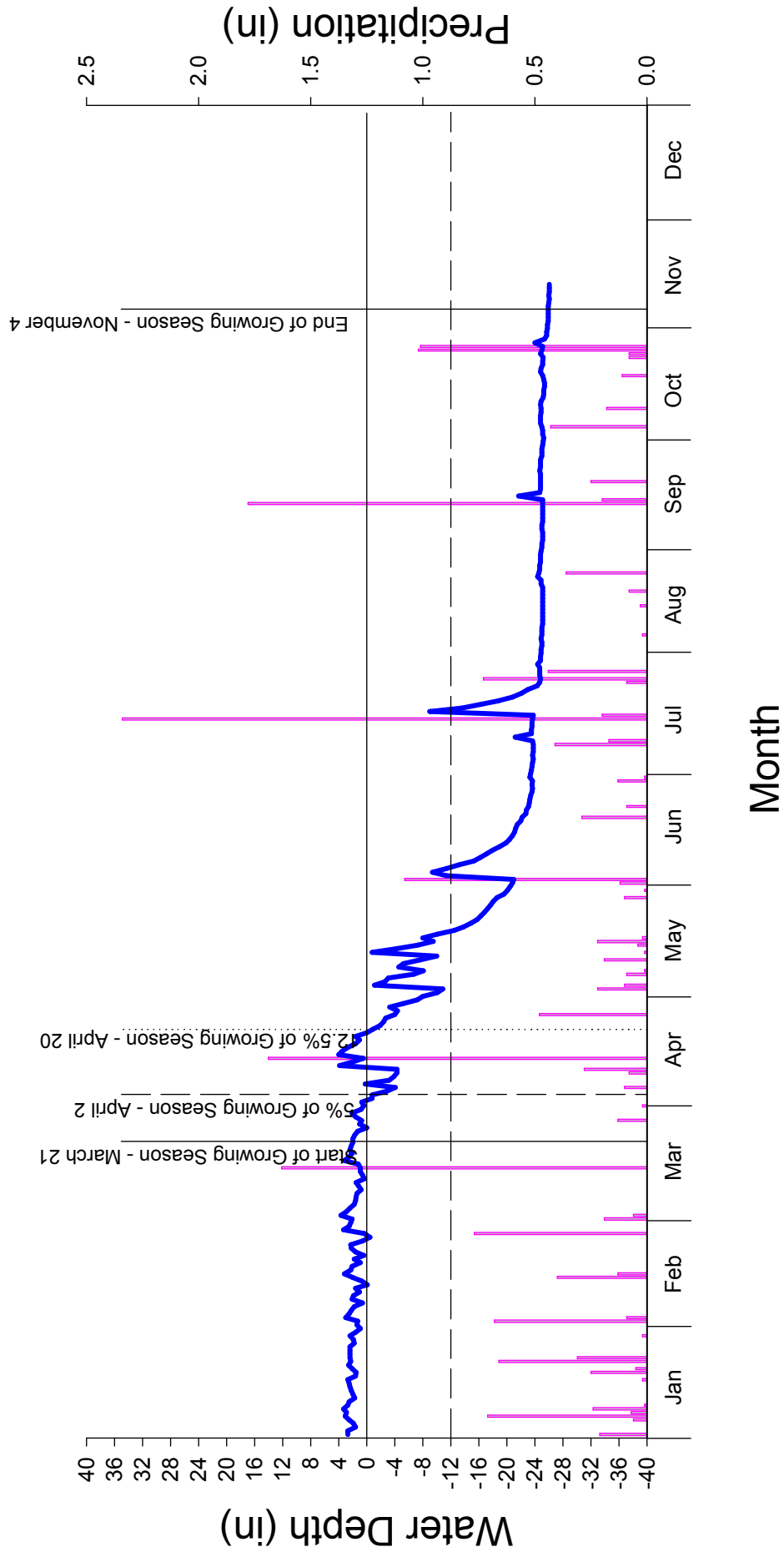
White Oak Creek 2007 Monitoring Gauge 23 - 8E546A7



White Oak Creek 2007 Monitoring Gauge 24 - 9DE55A7

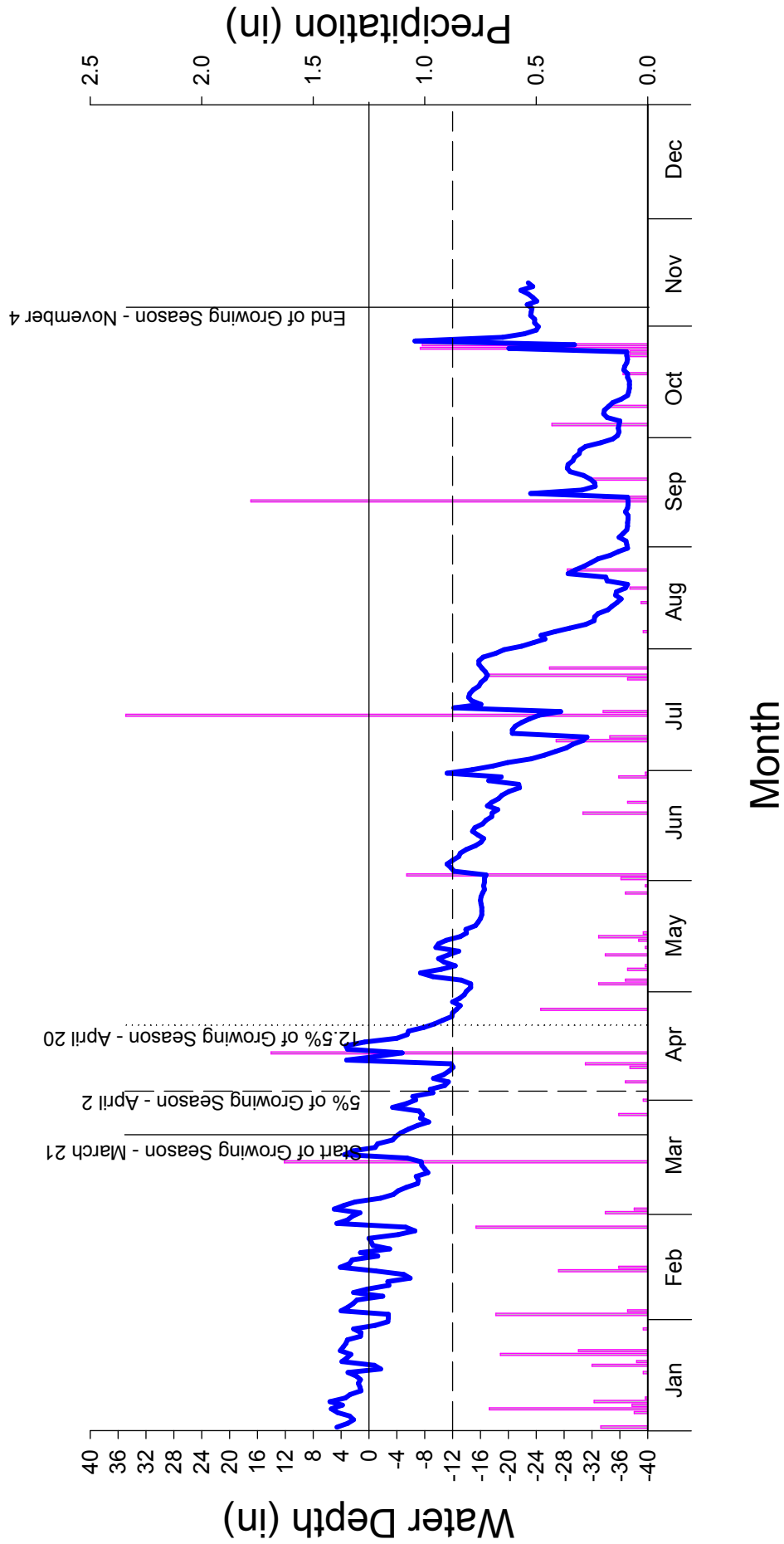


White Oak Creek 2007 Monitoring Gauge 25 - B652202

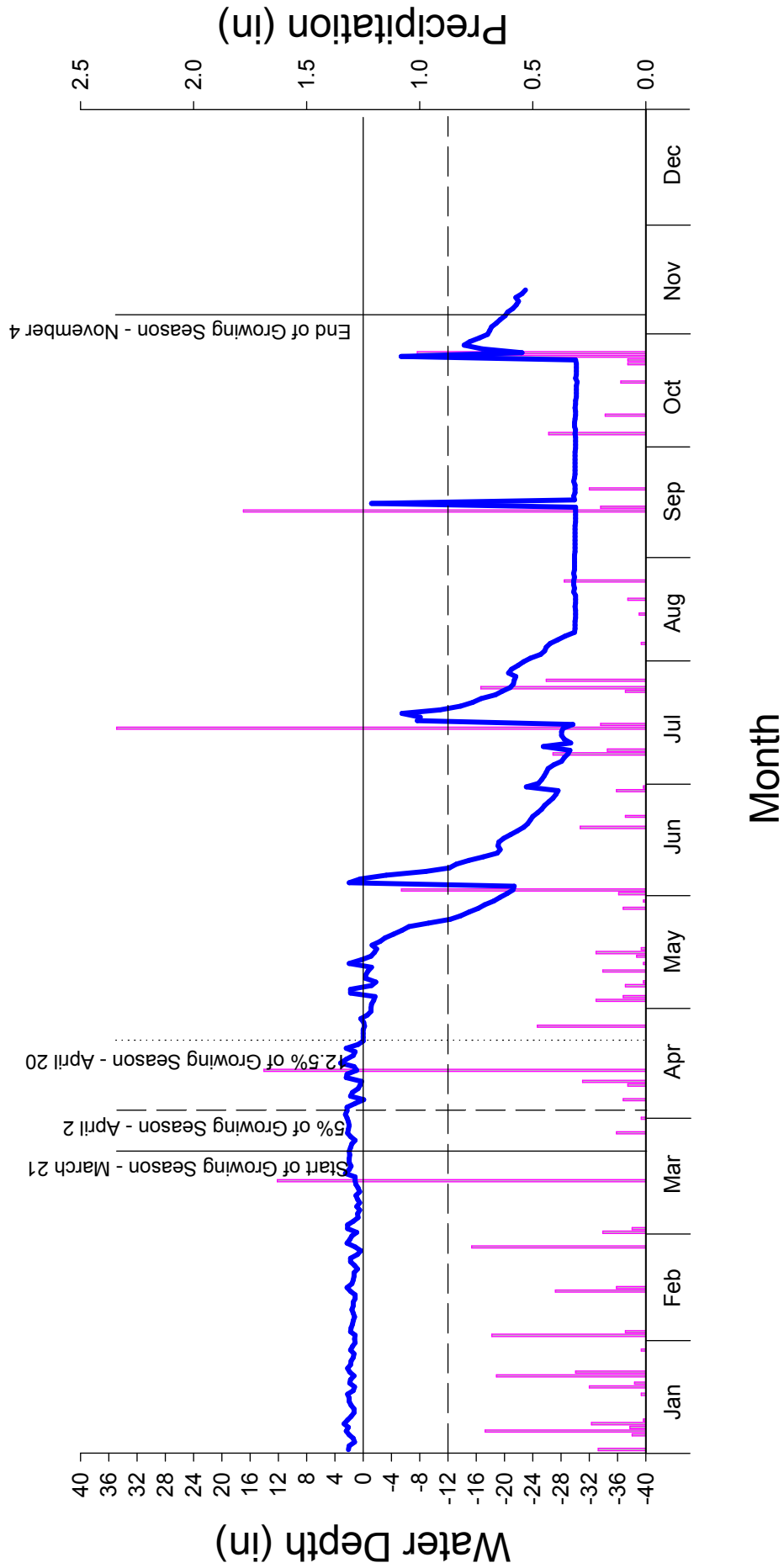


White Oak Creek 2007

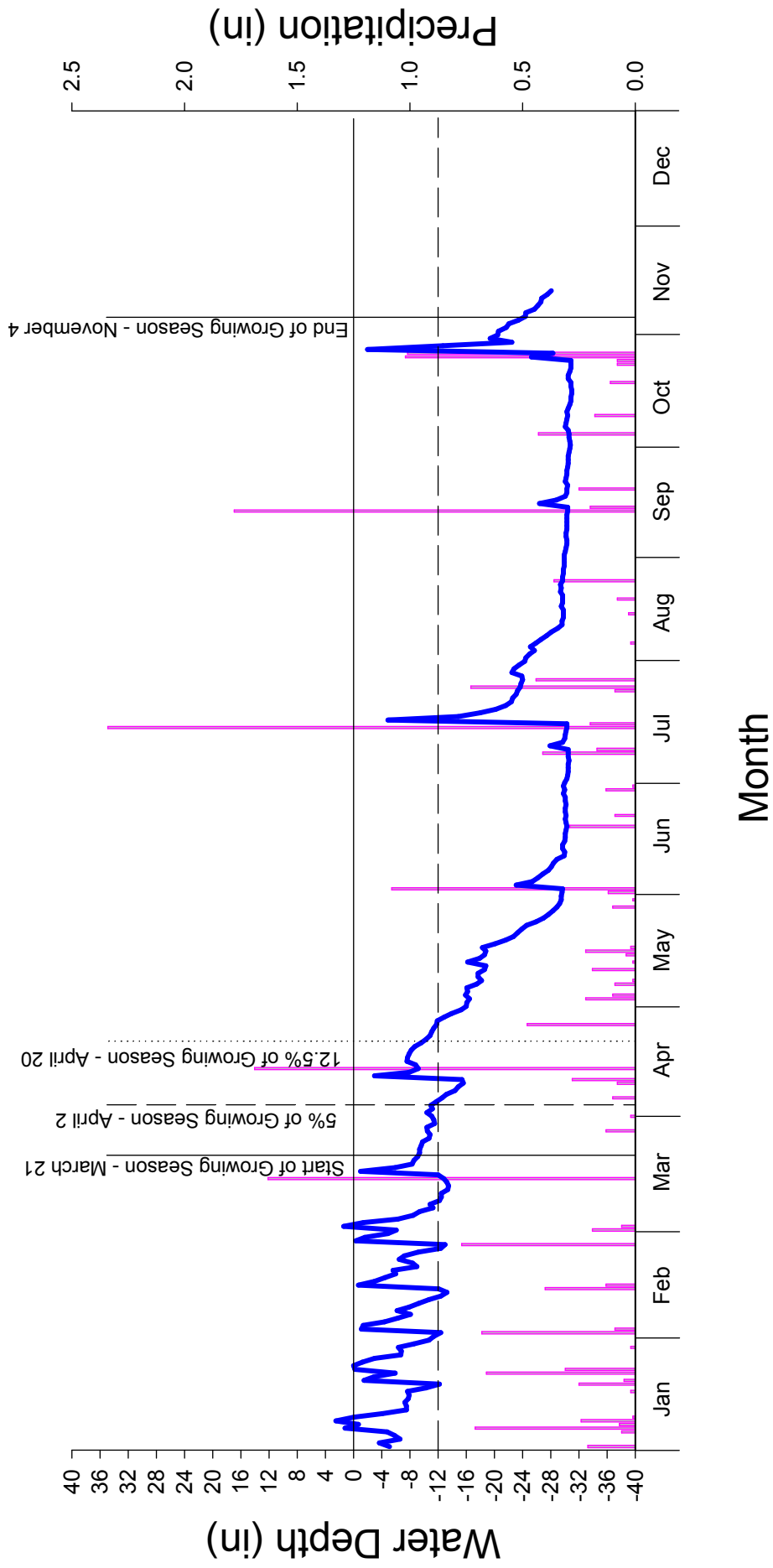
Monitoring Gauge 26 - B651934



White Oak Creek 2007 Monitoring Gauge 27 - AB3548B

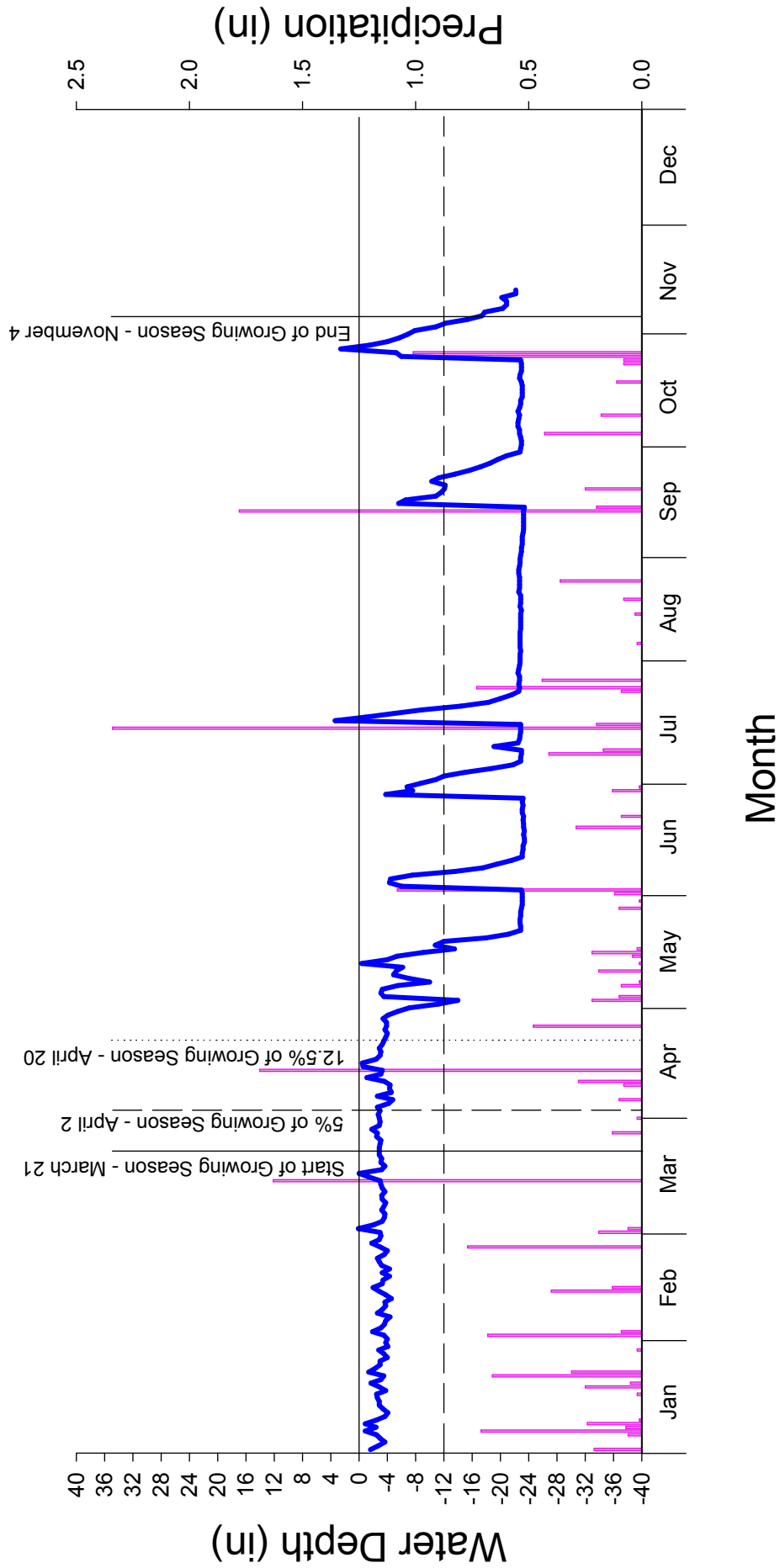


White Oak Creek 2007 Monitoring Gauge 28 - AB3549C

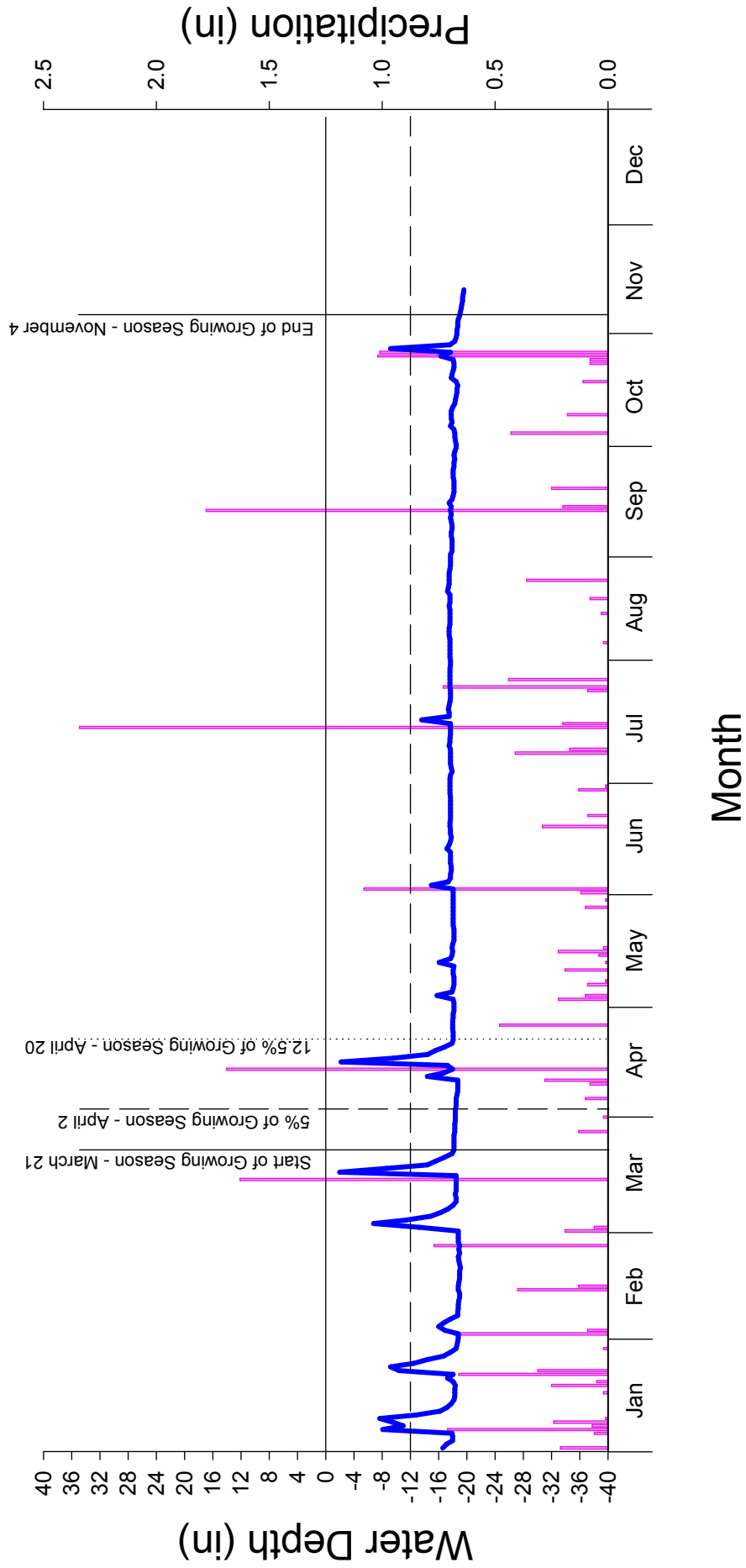


White Oak Creek 2007

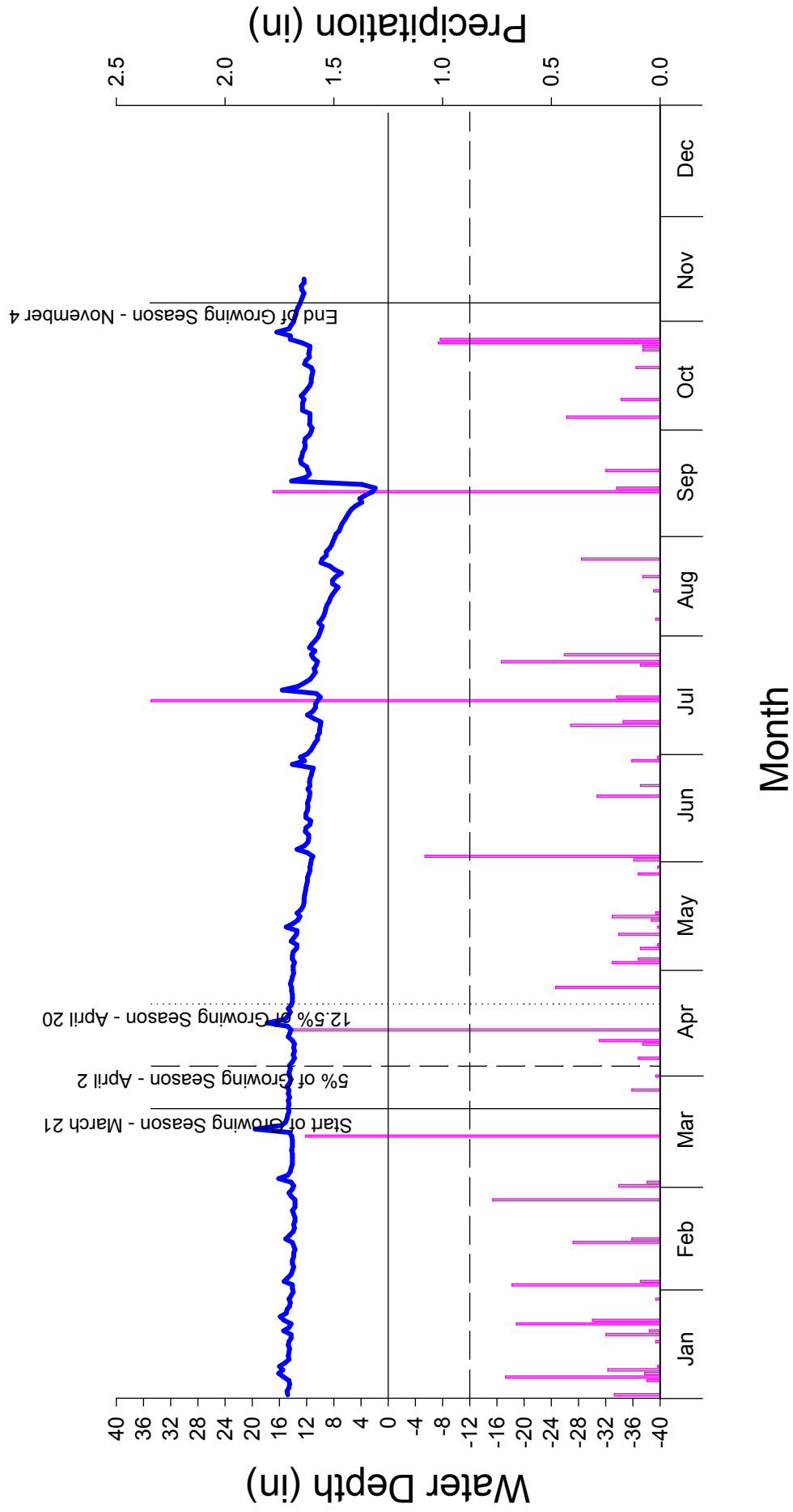
Monitoring Gauge 29 - B65238F



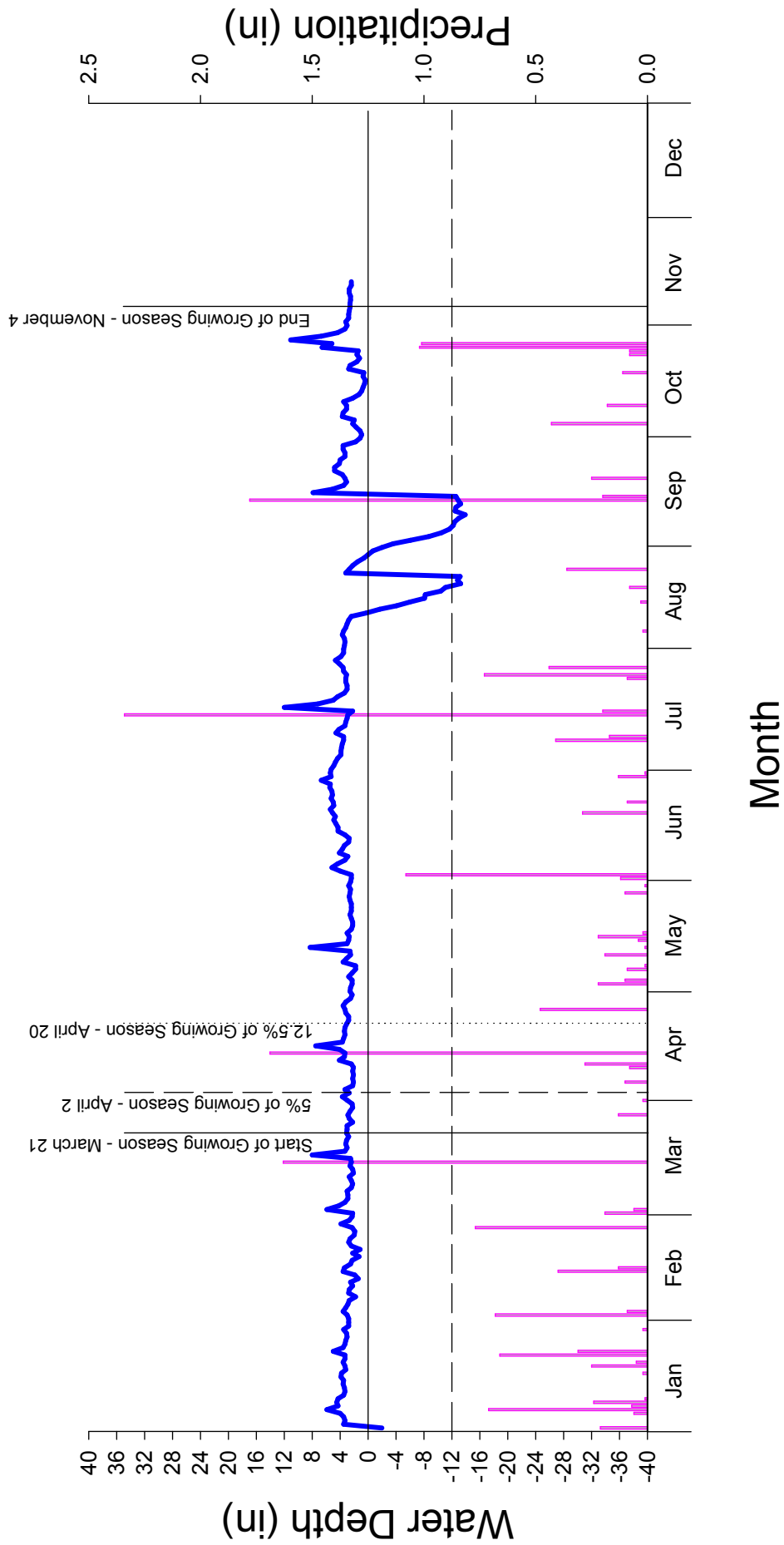
White Oak Creek 2007 Monitoring Gauge 30 - A27AA3E



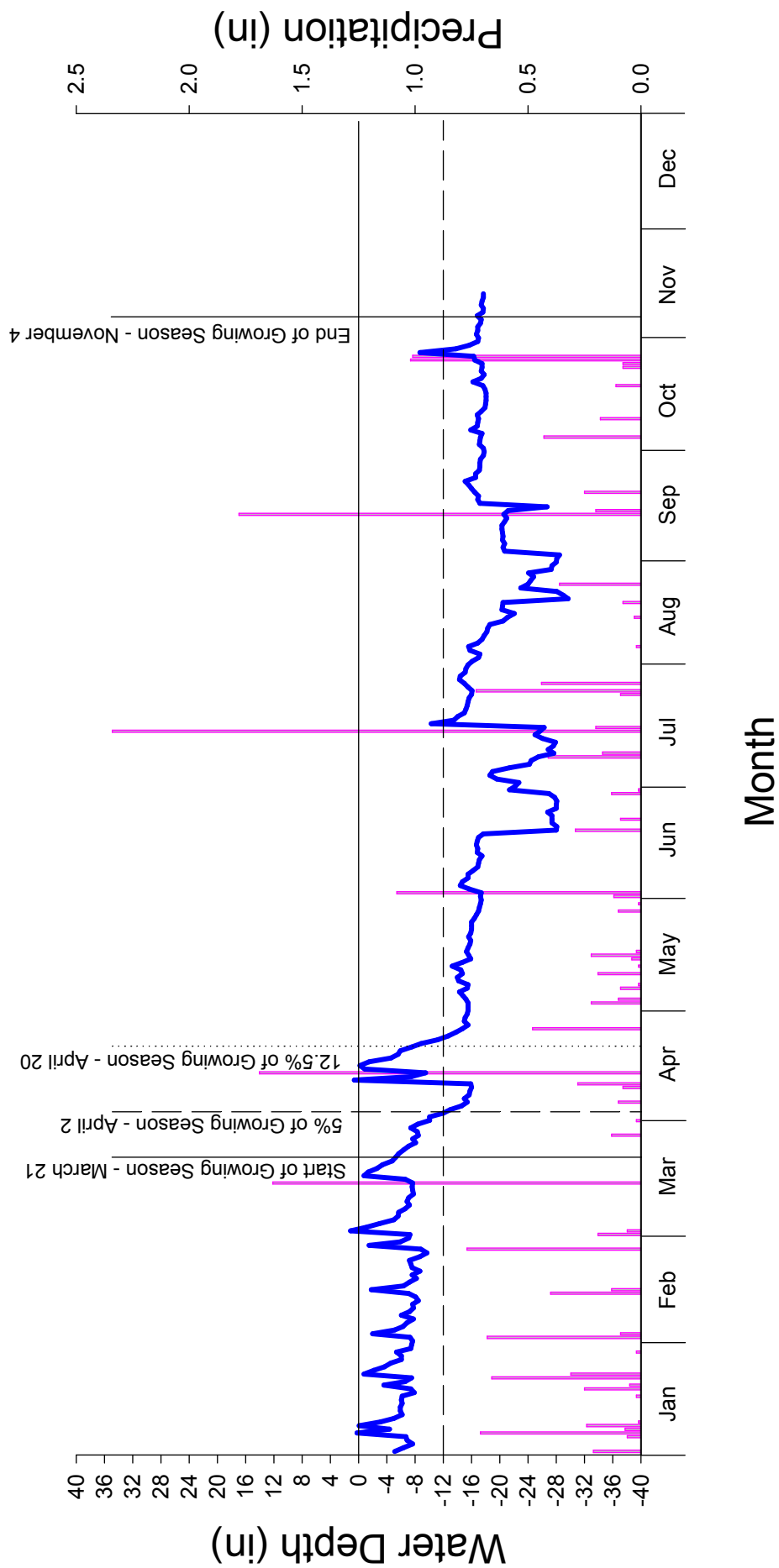
White Oak Creek 2007 Monitoring Gauge 31 - 9DE6990



White Oak Creek 2007 Monitoring Gauge 32 - AB36B47

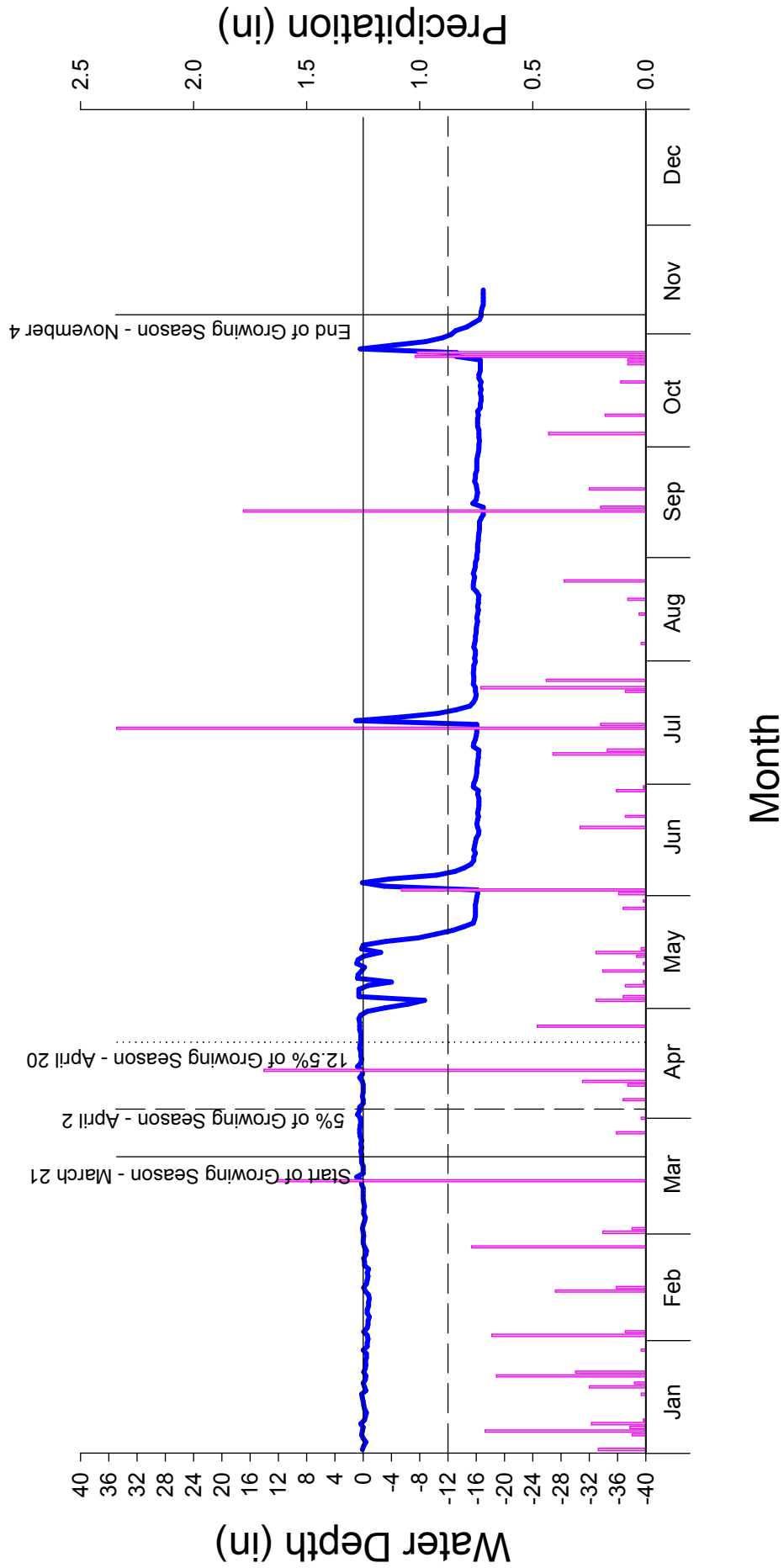


White Oak Creek 2007 Monitoring Gauge 33 - 9BEBE36

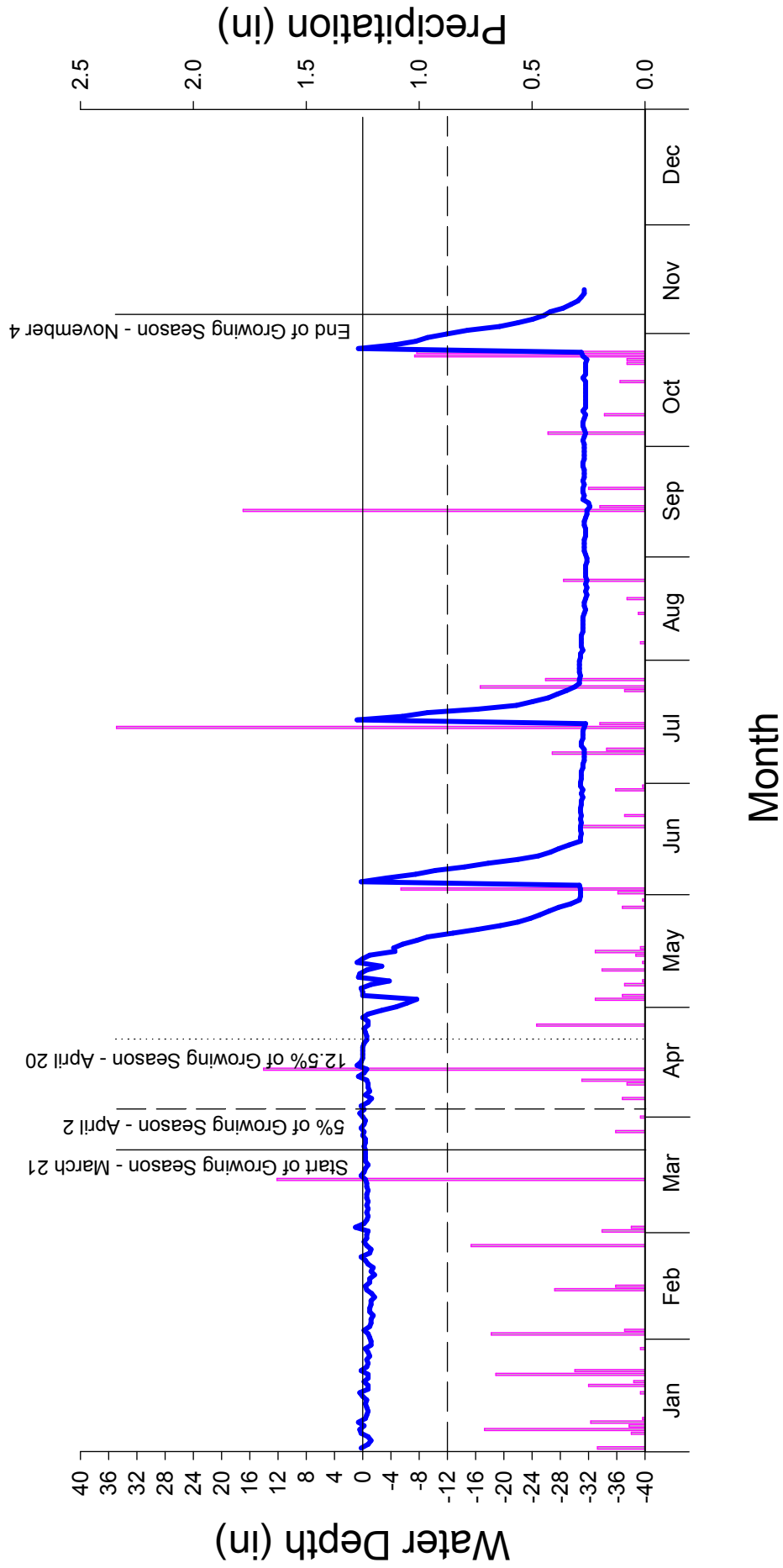


White Oak Creek 2007

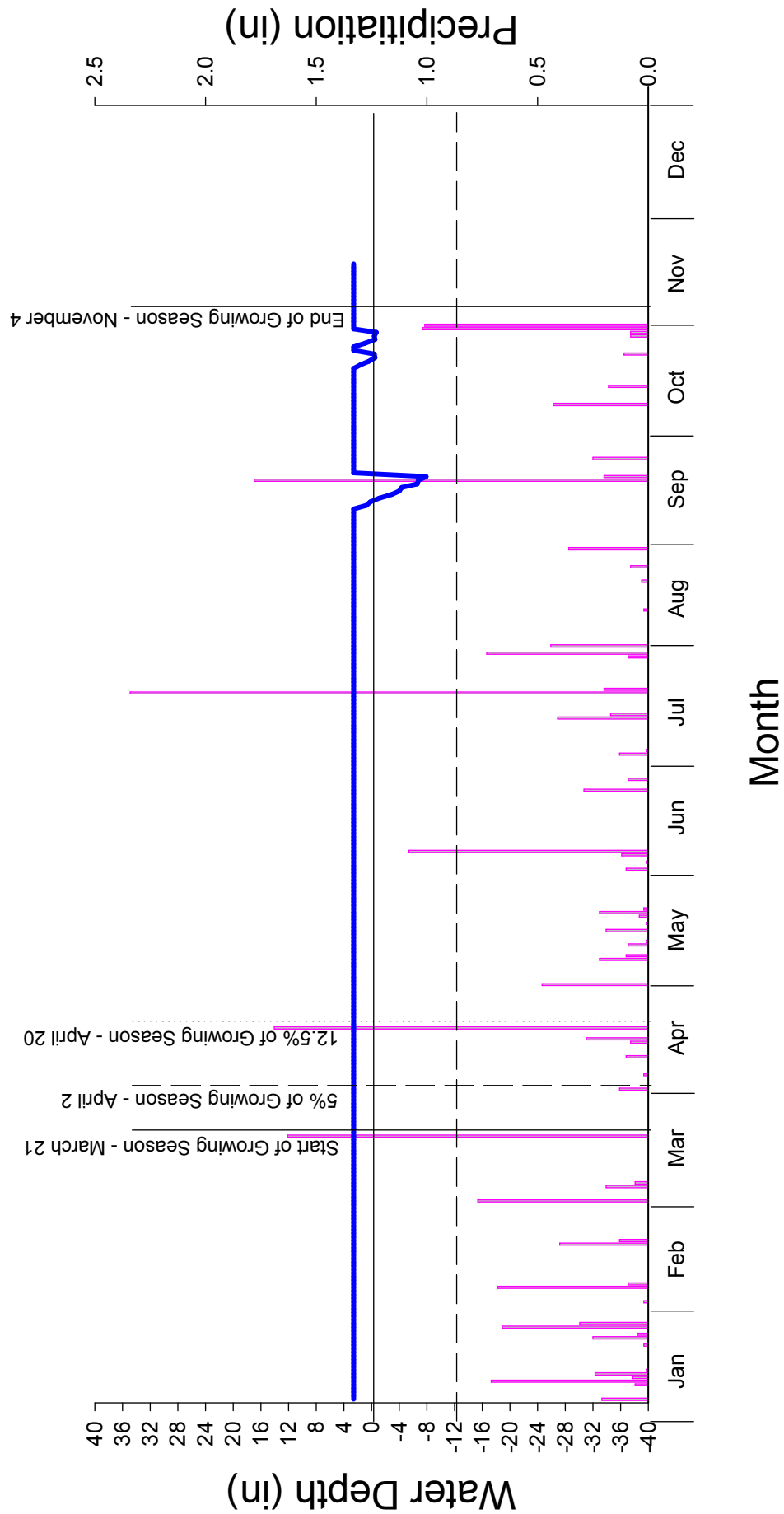
Monitoring Gauge 34 - A285DB5



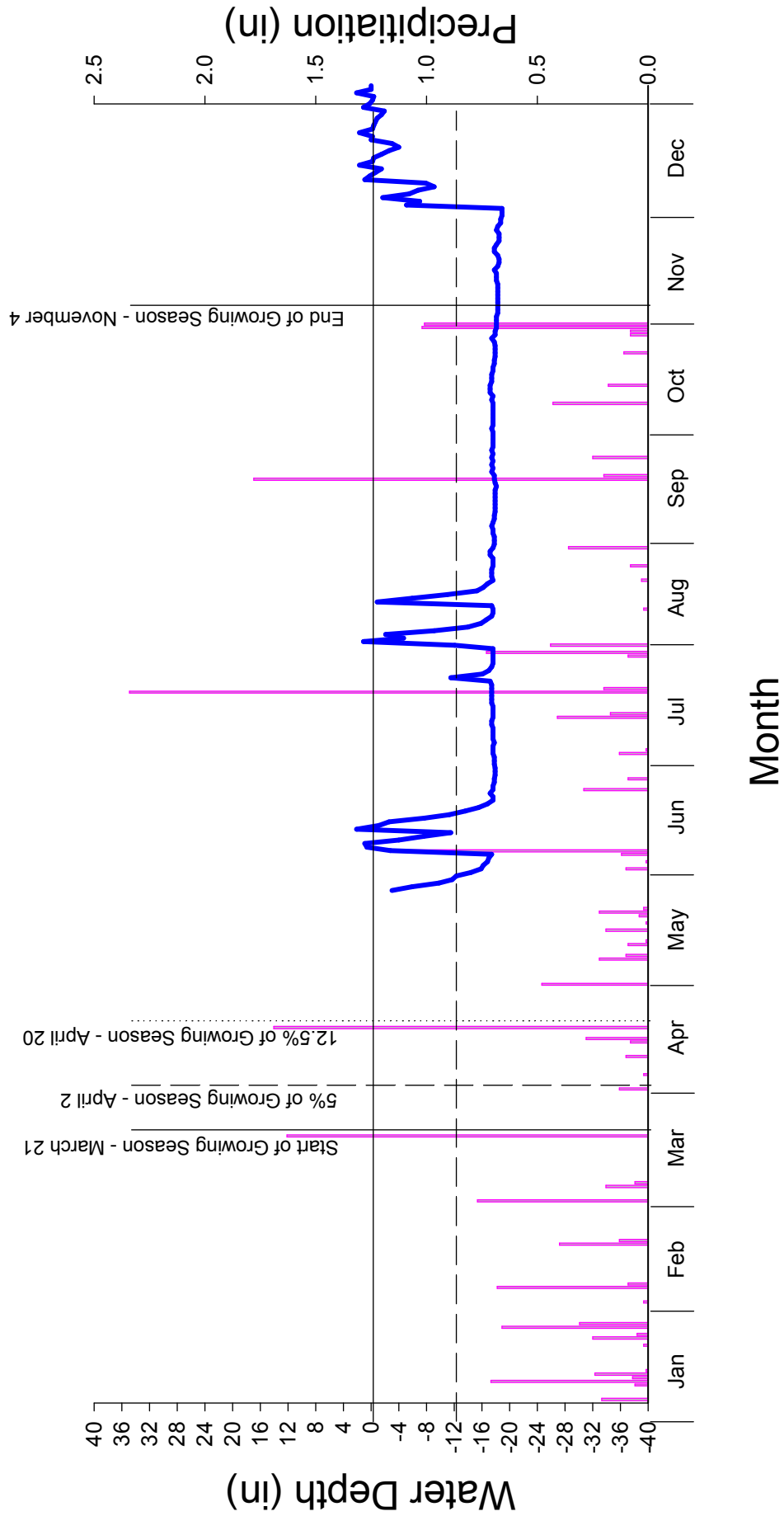
White Oak Creek 2007 Monitoring Gauge 35 - 04CFEA0



White Oak Creek 2007 Monitoring Gauge 36 - 031FA53

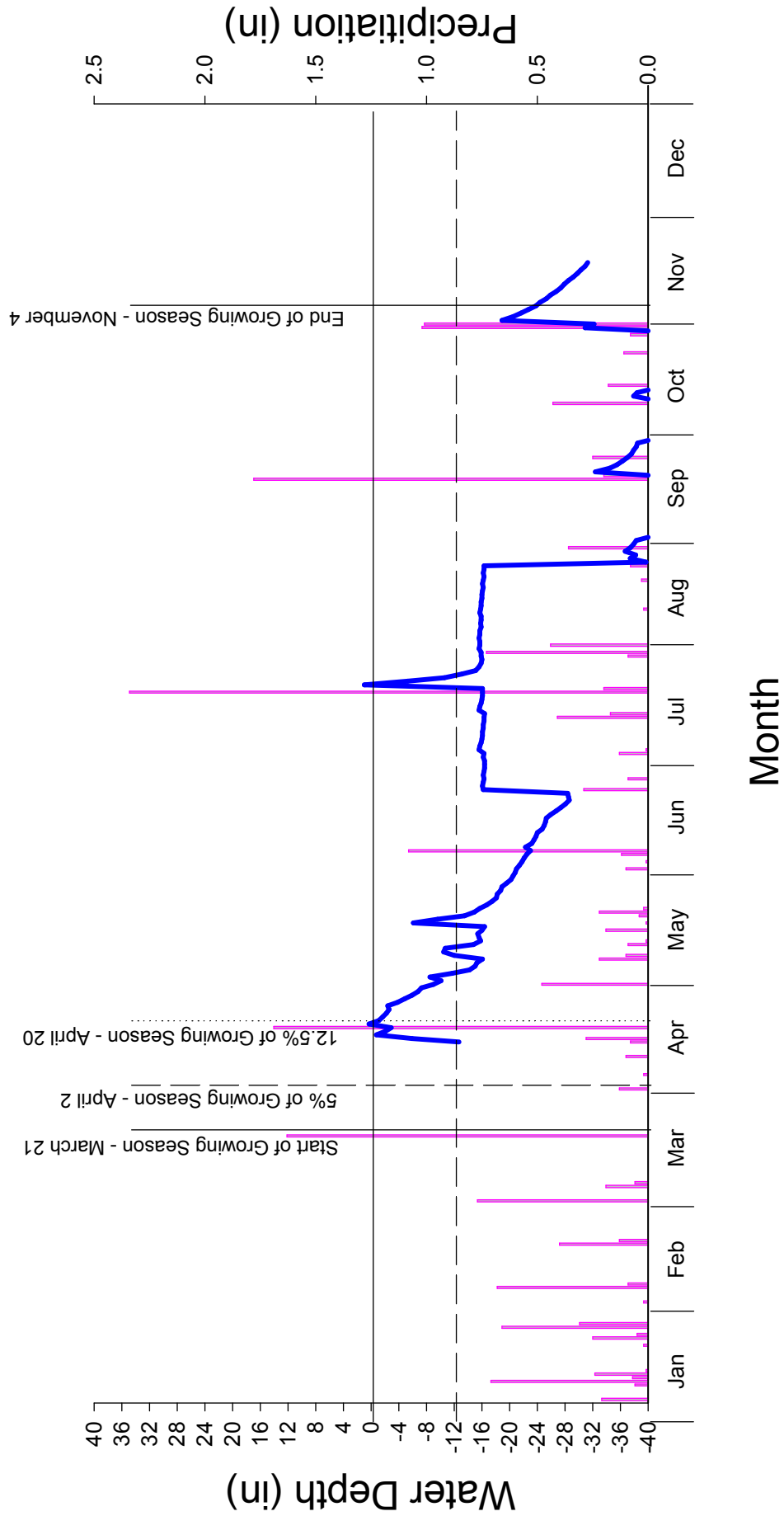


White Oak Creek 2007 Monitoring Gauge 37 - EBD4DB8



*Gauge installed May 22

White Oak Creek 2007 Monitoring Gauge 38 - B65223A



*Gauge installed April 9

APPENDIX C
SITE PHOTOS

White Oak Creek Mitigation Site
Vegetation Plot Photos
Monitoring Year 5



Vegetation Plot 1 looking southeast



Vegetation Plot 2 looking southeast



Vegetation Plot 3 looking south



Vegetation Plot 4 looking southeast

White Oak Creek Mitigation Site
Vegetation Plot Photos
Monitoring Year 5



Vegetation Plot 5 looking southeast



Vegetation Plot 6 looking southeast



Vegetation Plot 7 looking south



Vegetation Plot 8 looking south

White Oak Creek Mitigation Site
Fixed Photo Stations
Monitoring Year 6



Photo Station 1



Photo Station 2



Photo Station 3



Photo Station 4

White Oak Creek Mitigation Site
Fixed Photo Stations
Monitoring Year 6



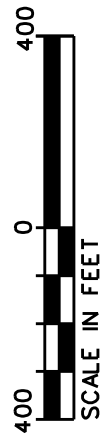
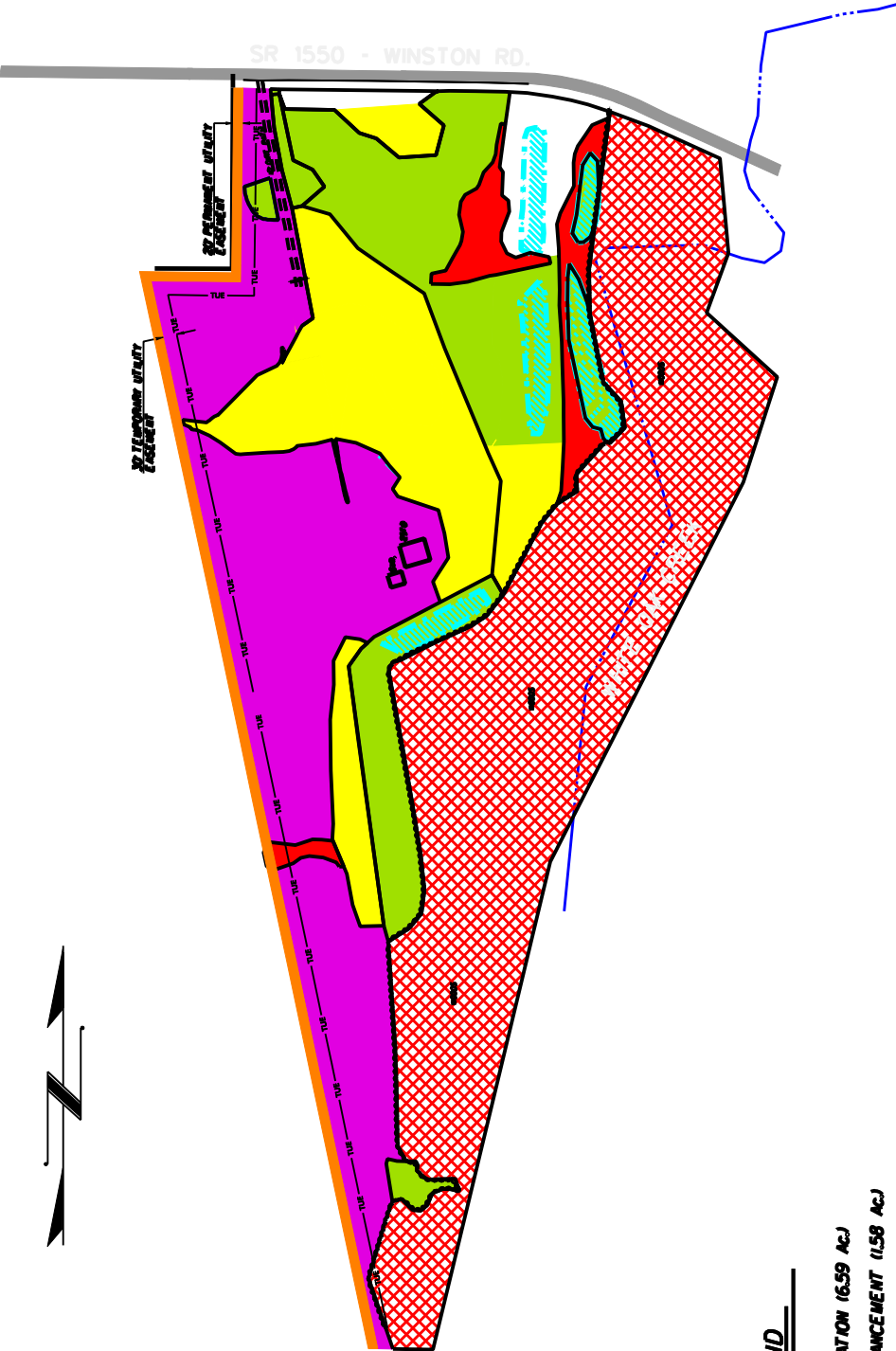
Photo Station 5



Photo Station 6

APPENDIX D
RESTORATION AREA

WHITE OAK CREEK



LEGEND

- WETLAND CREATION (6.59 AC.)
- WETLAND ENHANCEMENT (1.58 AC.)
- RESTORATION (1003 AC.)
- WETLAND PRESERVATION (1908 AC.)
- UPLAND BUFFER RESTORATION (1204 AC.)
- UTILITY EASEMENT EXCLUDING E2 & R1 OVERLAP (1.37 AC.)
- TOTAL EASEMENT - 1.40 AC.**
- TOTAL AREA (5069 AC.)**



RESTORATION PLAN
White Oak Creek Mitigation Site
EEP Project No. 417
 JOHNSTON COUNTY, NORTH CAROLINA

Drawn By:	GWN	Date:	DEC 2006
Checked By:	JWG	Scale:	1" = 400'
ESC Project No.:		06.282.01	

APPENDIX
D