

**Haws Run Wetland Mitigation Site
Haws Run
County, North Carolina**

*2005 Annual Monitoring Report
Year 6/7 of 7*



NCEEP Project Number: .00042
BLWI Project Number: 050034
NCDENR contract: D05056S

Original Design Firm: unavailable

Submitted to: NCDENR Ecosystem Enhancement Program
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17 February 2006



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1. Vegetative Problem Area Photos
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3. Site Photos

Appendix B – Wetland Graphs

1. Precipitation Water Level Plots for Each Functioning Well

I. Executive Summary

The Haws Run Mitigation Site is located on the Pender-Onslow County line approximately 28 miles northeast of Wilmington, North Carolina. The Haws Run Mitigation Site was designed to provide compensatory mitigation for unavoidable impacts to wetlands in the nearby area, TIP Number R-2405WM. The site consists of riverine swamp forests on the north and south ends and an interior of former wet flats and savannahs. Hydrology was altered by a central canal and lateral ditches.

The mitigation site is approximately 348 acres in size. It is composed of two areas for restoration and/or enhancement, the savannah and the swamp forest. Construction began in summer 1998 by the excavation of the site to designed elevation and the filling/plugging of the central canal and the lateral ditches. The site was planted in early spring 1999 and completed in spring 2000.

Reliability of the monitoring wells was the greatest problem. BLWI was not provided with sufficient information to start collecting well data until August, 2005. Some of the wells were malfunctioning and provided inconsistent data. Data was not collected from all of the wells originally installed after project construction.

The 2004 monitoring report considered the site a success in meeting both vegetative and hydrologic criteria. The monitoring year 2005 was year 6 for hydrologic monitoring and year 7 for vegetative monitoring. One plot in the savannah and two plots in the swamp forest area did not meet the success criteria. Four of the twelve ground water monitoring wells downloaded did not attain the 12.5% wetland status.

II. Project Background

a. Location and Setting

The Haws Run Mitigation Site is located on the Pender-Onslow County line approximately 28 miles northeast of Wilmington, North Carolina.

Directions from Raleigh: Take I-40 East to the Highway 53/Burgaw exit. Turn left towards Jacksonville. Turn right on Highway 50, near Maple Hill. Follow Highway 50, turning right (on 50) at the intersection with Haws Run Road. The entrance to the site is on the right, through a yellow, locked pole gate.

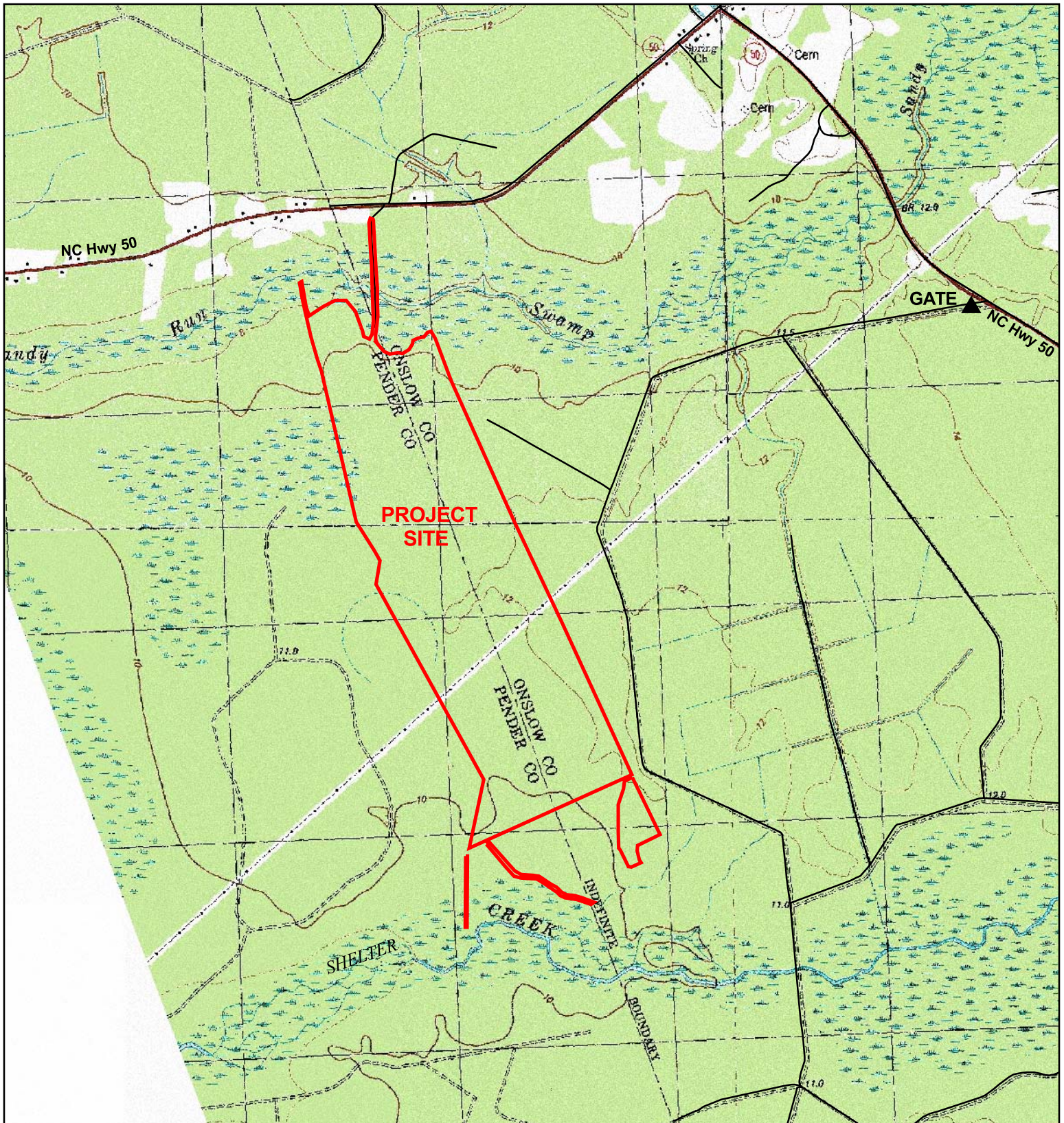
b. Structure and Objectives

The Haws Run Mitigation Site was designed to provide compensatory mitigation for unavoidable impacts to wetlands in the nearby area, TIP Number R-2405WM. The site consists of riverine swamp forests on the north and south ends and an interior of former wet flats and savannahs. Hydrology was altered by a central canal and lateral ditches.

Construction began in summer 1998 by the excavation of the site to designed elevation and the filling/plugging of the central canal and the lateral ditches. The site was planted in early spring 1999 and completed in spring 2000.

Table I. Project Structure Table	
Project Number and Name: 050042 Haws Run Wetland	
Area	Acreage
Wet savannah area	202 acres
Dry savannah area	113 acres
Swamp forest area	33 acres

Table II. Project Objectives Table			
Project Number and Name: 050042 Haws Run Wetland			
Area	Objectives	Acreage	Comment
Wet savannah area	restoration and enhancement	202	restore/enhance hydrology and vegetation
Dry savannah area	enhancement	113	Plant vegetation
Swamp forest area	restoration	33	restore hydrology and vegetation



**Figure 1. Vicinity Map
Haws Run Mitigation Site**

Pender and Onslow Counties, NC
 2005 Annual Monitoring - Year 6 (Veg) / Year 7 (Hydro)
 EEP Project Number: .00042
 BLWI Project Number: 050034



BLUE Land
Water
Infrastructure

2000 0 2000 Feet

Scale: 1" = 2000' November 2005

c. Project History and Background

Table III. Project Activity and Reporting History		
Project Number and Name: 050042 Haws Run Wetland		
Activity or Report	Calendar Year of Completion or Planned Completion	Actual Completion Date
Restoration Plan	unknown	unknown
Mitigation Plan	unknown	unknown
Construction	1999	February 1999
Temporary S&E mix applied to entire project area	unknown	unknown
As-Built Report	unknown	unknown
Permanent seed mix applied to wetland areas	unknown	unknown
Containerized and bare root plantings for wetland areas	1999	1999/2000
Monitoring Gauges Installed	1999	1999/ Spring 2000
Year 1 Hydrologic Monitoring (NCDOT)	1999	Mar-Nov 1999
Year 1 Vegetation Monitoring (NCDOT)	1999	Oct 1999/Oct 2000
Year 2 Hydrologic Monitoring (NCDOT)	2000	Mar-Nov 2000
Year 2 Vegetation Monitoring (NCDOT)	2001	October 2001
Year 3 Hydrologic Monitoring (NCDOT)	2001	Mar-Nov 2001
Year 3 Vegetation Monitoring (NCDOT)	2002	July 2002
Year 4 Hydrologic Monitoring (NCDOT)	2002	Mar-Nov 2002
Year 4 Vegetation Monitoring (NCDOT)	2003	Sep 2003
Year 5 Hydrologic Monitoring (NCDOT)	2002	Mar-Nov 2003
Year 5 Vegetation Monitoring (NCDOT)	2004	Aug 2004
Year 6 Vegetation Monitoring (NCDOT)	2004	Mar-Nov 2004
Project Handed Over to NCEEP	2005	June 2005
Year 6 Hydrologic Monitoring (BLUE)	2005	Aug-Nov 2005
Year 7 Vegetation Monitoring (BLUE)	2005	Sep 2005

Table IV. Project Contact Table	
Project Number and Name: 050042 Haws Run Wetland	
Designer	
Property Contact	NC Ecosystem Enhancement Program Mac Haupt 1652 Mail Service Center Raleigh, NC 27699-1652
Construction Contractor	unavailable
Planting Contractor	unavailable
Seeding Contractor	unavailable
Seed Mix Sources	unavailable
Nursery Stock Suppliers	unavailable
Monitoring Performers	(previously NCDOT Roadside Environmental)
Monitoring POC	BLUE: Land, Water, Infrastructure, PA 1271 Old US Highway #1 South Southern Pines, NC 28387 Larry Hobbs (919) 306-2410

Table V. Project Background Table	
Project Number and Name: : 050042 Haws Run Wetland	
Project county	Pender and Onslow counties
Drainage area	unknown
Drainage impervious cover estimate (%)	Not applicable
Stream order	Not applicable
Physiographic region	Coastal plain
Ecoregion	63 middle Atlantic coastal plain
Rosgen classification of as-built	Not applicable
Cowardin classification	Palustrine
Dominant soil types	Foreston, Torhunta, Woodington
Reference site ID	unknown
USGS HUC (project and reference)	0303005
NCDWQ subbasin (project and reference)	030623
NCDWQ classification (project and reference)	Not applicable
Any portion of the project area 303d listed?	no
Any upstream portion 303d listed?	no
Reasons for 303d listing or stressor	Not applicable
% of project easement fenced	none

d. Monitoring Plan View (see Figure 2)

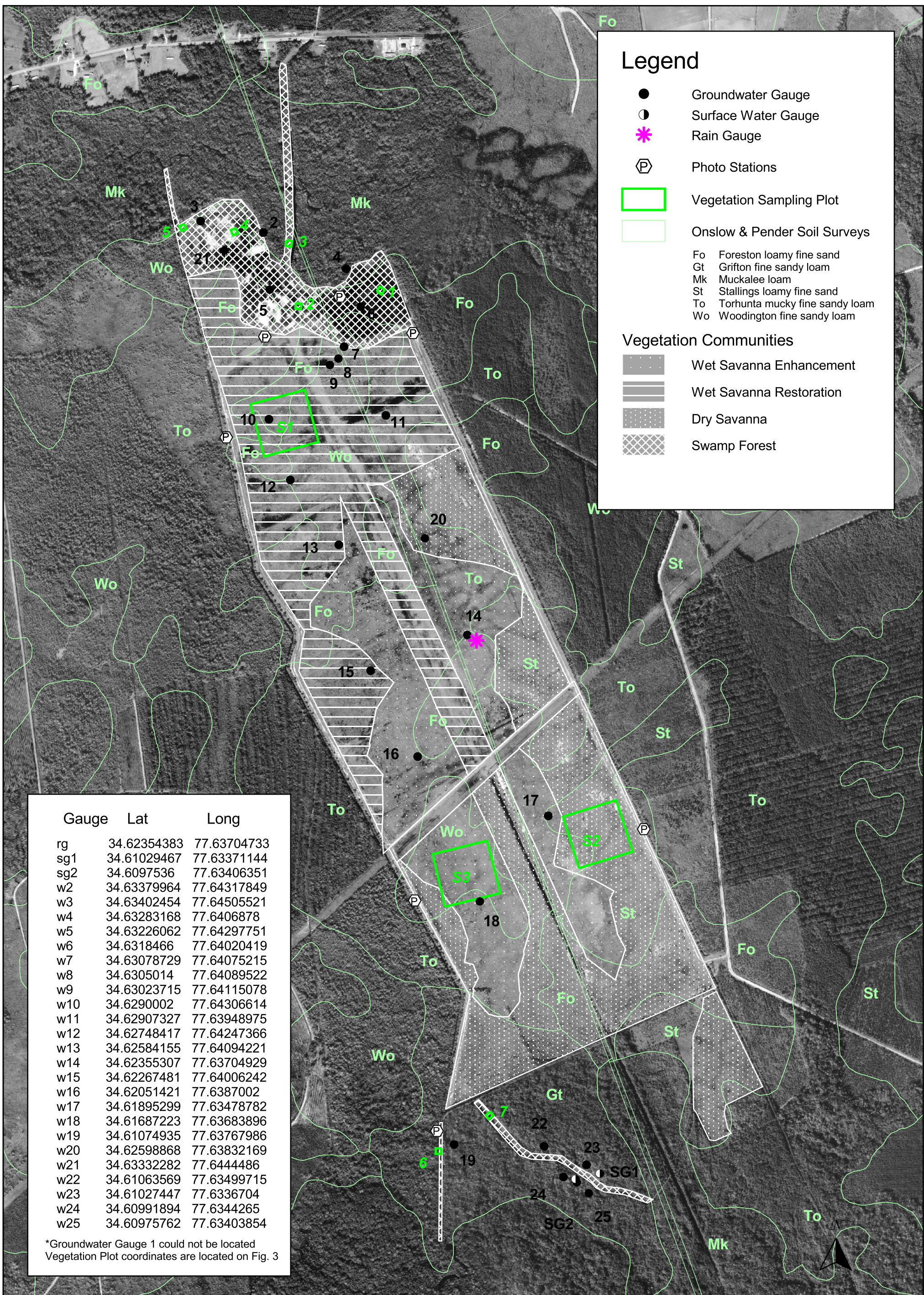


Figure 2. Monitoring Plan View
 Haws Run Mitigation Site
 Pender and Onslow Counties, NC
 2005 Annual Monitoring - Year 6 (Veg) / Year 7 (Hydro)

800 0 800 1600 Feet

Scale: 1" = 800'
 November 2005

EEP Project Number: .00042
 BLWI Project Number: 050034

III. Project Condition and Monitoring Results

a. Vegetation Assessment

i. Soil Data

According to the NRCS soil survey for Pender and Onslow counties, there are 6 main soil series within the mitigation site. They are Foreston, Grifton, Muckelee, Stallings, Torhunta and Woodington. Foreston, Torhunta and Woodington appear to be the dominant types. The soils present are either fine sandy loam, loamy fine sand or loam in nature.

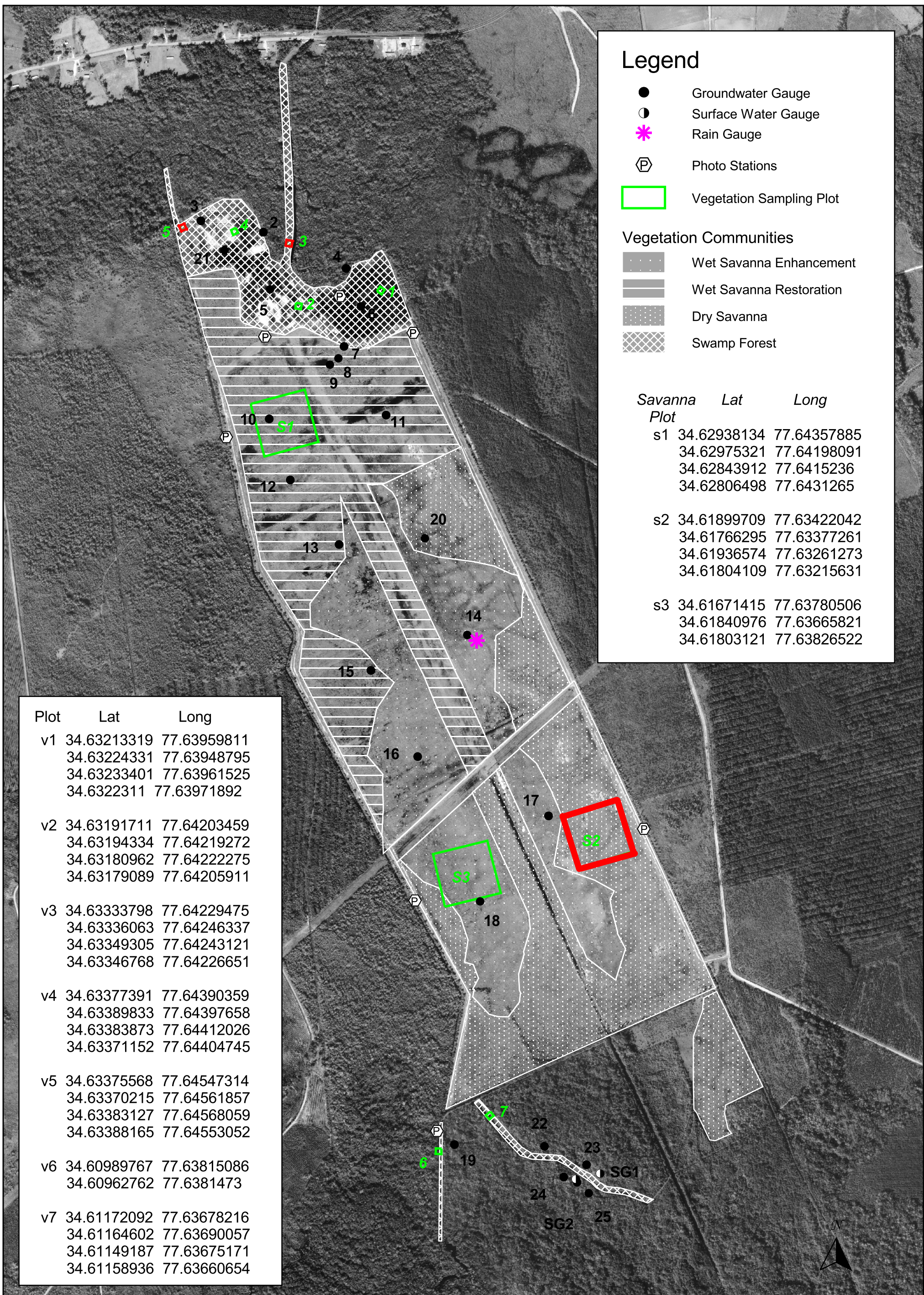
Table VI. Preliminary Soil Data					
Project Number and Name: 050042 Haws Run Wetland					
Series	Max Depth (in)	% Clay on Surface	K	T	OM %
Torhunta	80	5-18			10-15
Woodington	85	2-10			2-4
Foreston	85	2=8			.5-2

ii. Vegetative Problem Areas

There were no specific vegetative problem areas identified while monitoring the Haws Run Mitigation Site. General observation was that tree growth (height) was considered poor for the length of time planted.

Table VII. Vegetative Problem Areas			
Project Number and Name: 050042 Haws Run Wetland			
Feature/Issue	Area	Probable Cause	Photo #
n/a	n/a	n/a	n/a

iii. Problem Area Plan View (see Figure 3)



Legend

- Groundwater Gauge
- Surface Water Gauge
- ✱ Rain Gauge
- Ⓟ Photo Stations
- Vegetation Sampling Plot

Vegetation Communities

- Wet Savanna Enhancement
- Wet Savanna Restoration
- Dry Savanna
- Swamp Forest

Savanna Plot	Lat	Long
s1	34.62938134	77.64357885
	34.62975321	77.64198091
	34.62843912	77.6415236
	34.62806498	77.6431265
s2	34.61899709	77.63422042
	34.61766295	77.63377261
	34.61936574	77.63261273
	34.61804109	77.63215631
s3	34.61671415	77.63780506
	34.61840976	77.63665821
	34.61803121	77.63826522

Plot	Lat	Long
v1	34.63213319	77.63959811
	34.63224331	77.63948795
	34.63233401	77.63961525
	34.6322311	77.63971892
v2	34.63191711	77.64203459
	34.63194334	77.64219272
	34.63180962	77.64222275
	34.63179089	77.64205911
v3	34.63333798	77.64229475
	34.63336063	77.64246337
	34.63349305	77.64243121
	34.63346768	77.64226651
v4	34.63377391	77.64390359
	34.63389833	77.64397658
	34.63383873	77.64412026
	34.63371152	77.64404745
v5	34.63375568	77.64547314
	34.63370215	77.64561857
	34.63383127	77.64568059
	34.63388165	77.64553052
v6	34.60989767	77.63815086
	34.60962762	77.6381473
v7	34.61172092	77.63678216
	34.61164602	77.63690057
	34.61149187	77.63675171
	34.61158936	77.63660654

800 0 800 1600 Feet

Scale: 1" = 800'
November 2005

EEP Project Number: .00042
BLWI Project Number: 050034



Figure 3. Vegetative Problem Area Plan View
Haws Run Mitigation Site
Pender and Onslow Counties, NC
2005 Annual Monitoring - Year 6 (Veg) / Year 7 (Hydro)

iv. Success Criteria (Savannah Areas)

The savannah areas will meet the success criteria once there is a minimum of 20 trees/acre survive for five consecutive years.

v. Success Criteria (Swamp Forest Area)

Planting success will be achieved if a 320-stem count/acre survival for the first three years is met. Afterwards, survival can decrease by 10% for each year over the next two years to where the stem count could be 260/acre at monitoring year 5. No one species can exceed 20% of the total number of species planted.

vi. Stem Counts (Savannah Area)

A total of three sample plots were established – two in Zone 1, the wet savannah restoration and enhancement areas and one in Zone 2, the dry savannah enhancement area. *Pinus palustris*, longleaf pine, *Pinus serotina*, pond pine and *Taxodium ascendens*, pond cypress was planted in Zone 1. Only *Pinus palustris*, longleaf pine was planted in Zone 2. All plots were 500' X 500' in size.

Table VIII. Stem Counts (Savannah Area)						
Project Number and Name: 050042 Haws Run Wetland						
Plot #	Longleaf Pine	Pond Pine	Pond Cypress	Total (Year 7)	Total Planted	Density (Trees/Acre)
S1 Zone 1	23	152	25	200	unknown	35
S3 Zone 1	22	116	1	139	unknown	24
S2 Zone 2	73			73	unknown	13

At the end of year 7, the success criteria of 20 trees/acre were met in 2 of the 3 zones. S2 Zone, a planting of longleaf pines only had a survival rate of 13 trees/acre.

vii. Stem Counts (Swamp Forest Area)

Seven permanent plots were established in the swamp forest area. Sample plot size was 50 X 50 foot plots. Species were identified and counts were made.

Table IX. Stem Counts (Swamp Forest Area)											
Project Number and Name: 050042 Haws Run Wetland											
Species	Plots							Initial Totals	Year 7 Totals	Survival %	
	1	2	3	4	5	6	7				
<i>Nyssa sylvatica</i> var. <i>biflora</i>	8	11	1	8	1	4	1	unknown	34	n/a	
<i>Taxodium distichum</i>	38	10	2	3			3	unknown	56	n/a	
<i>Quercus laurifolia</i>						7	1	unknown	8	n/a	
<i>Quercus lyrata</i>	1			3	3	2	4	unknown	13	n/a	
<i>Quercus michauxii</i>			1	5	1			unknown	7	n/a	
<i>Quercus falcate</i> var. <i>pagodaefolia</i>	2				1	5		unknown	8	n/a	
<i>Liriodendron tulipifera</i>							5	unknown	5	n/a	
<i>Fraxinus pennsylvanica</i>	3	5	5	2		3	4	unknown	22	n/a	
<i>Platanus occidentalis</i>							13	unknown	13	n/a	
TOTAL	52	26	9	21	6	21	31				

At the end of this growing season, survival should be a minimum of 260 trees/acre. Plots 1, 2, 4, 5, 6 and 7 exceeded these criteria with 906, 453, 366, 366 and 450 stems/acre, respectively. Plots 3 and 5 did not meet the criteria with counts of 156 and 106.

viii. Vegetation Plot Photos (see Appendix A)

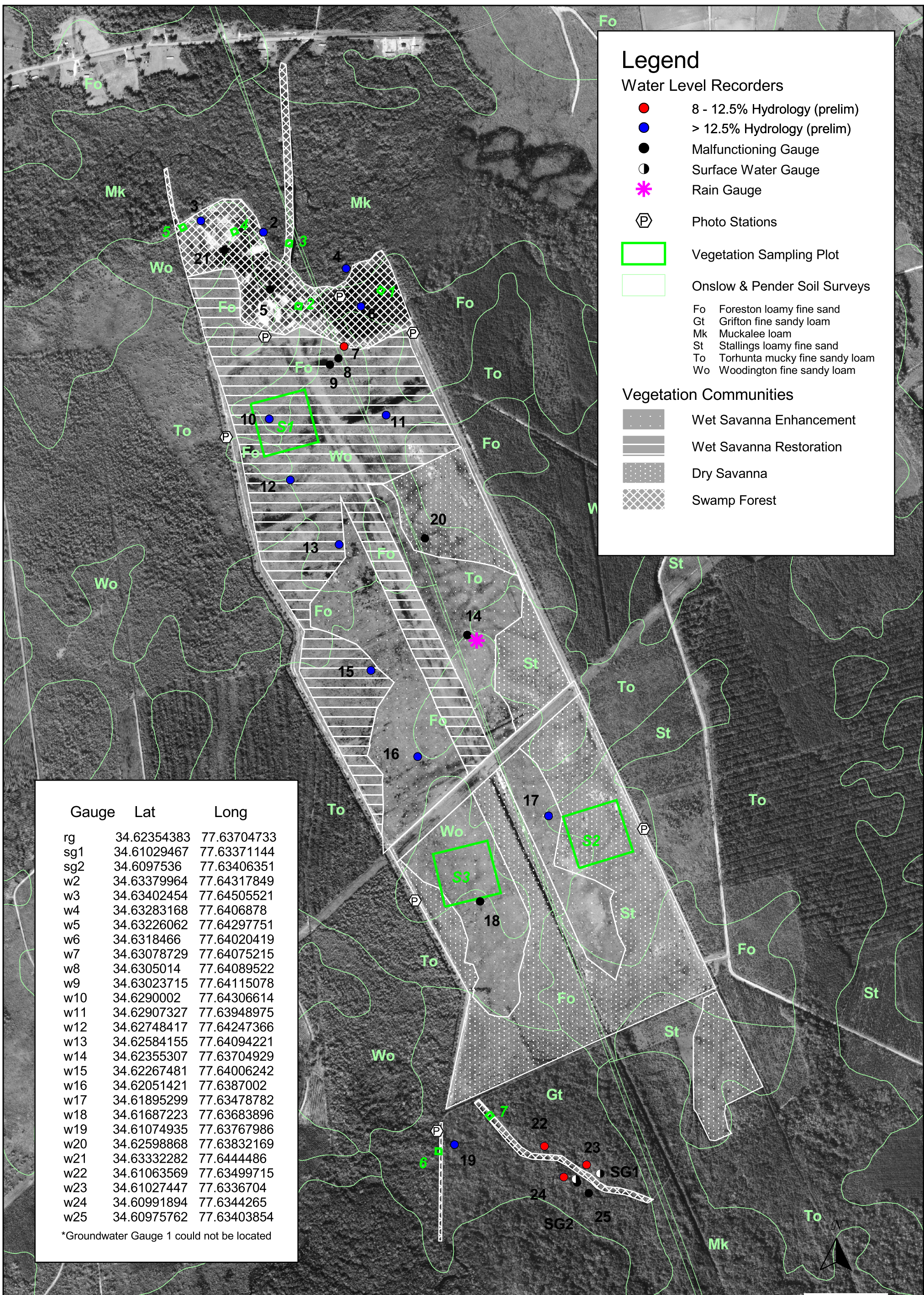


Figure 4. Wetland Problem Area Plan View
 Haws Run Mitigation Site
 Pender and Onslow Counties, NC
 2005 Annual Monitoring - Year 6 (Veg) / Year 7 (Hydro)

800 0 800 1600 Feet

Scale: 1" = 800'
 November 2005

EEP Project Number: .00042
 BLWI Project Number: 050034

b. Wetland Assessment and Recommendations

i. Wetland Problem Areas Plan View (see Figure 4)

Reliability of the monitoring wells was the greatest problem. Blue was not provided with sufficient information (access to site) to start collecting well data until August, 2005. Some of the wells appeared to be malfunctioning. Data was not collected from all of the wells installed after construction.

ii. Wetland Criteria Attainment

Wetland criteria were met if the hydrologic regime was maintained for 12.5% of the growing season. The 2004 monitoring report considered the site a success in meeting both vegetative and hydrologic criteria. Of the twelve monitoring wells that were able to be downloaded at the end of the 2005 monitoring period, four, HR-7, HR-22, HR-23 and HR-24, did not attain this criteria. The year 2005 was relatively dry with January, February, March and July being below the 30-70% rainfall percentile. High rainfall in September and October was the result of hurricane Ophelia and tropical storms. The surface water gauge only showed increased standing water during the October event.

IV. Methodology Section

The vegetative plots were located and individual species were tagged and counted. GPS points were taken for the corner of the vegetative plots and for the monitoring well locations.

V. References

NCDOT. "Annual Report for 2004, Haws Run Mitigation Site, Pender and Onslow Counties, Project No. 6.259002T, TIP No. R-2405WM", Office of Natural Environment & Roadside Environmental Unit, December 2004.

NCDOT. "Annual Report for 2003, Run Mitigation Site, Pender and Onslow Counties, Project No. 6.259002T, TIP No. R-2405WM", Office of Natural Environment & Roadside Environmental Unit, December 2003.

NCDOT. "Annual Report for 2002, Run Mitigation Site, Pender and Onslow Counties, Project No. 6.259002T, TIP No. R-2405WM", Office of Natural Environment & Roadside Environmental Unit, December 2002.

NCDOT. "Annual Report for 2001, Run Mitigation Site, Pender and Onslow Counties, Project No. 6.259002T, TIP No. R-2405WM", Office of Natural Environment & Roadside Environmental Unit, December 2001.

NCDOT. "Annual Report for 2000, Run Mitigation Site, Pender and Onslow Counties, Project No. 6.259002T, TIP No. R-2405WM", Office of Natural Environment & Roadside Environmental Unit, December 2000.

APPENDIX A

Vegetative Photos

Vegetative Problem Area Photos (none)

Vegetation Monitoring Plot Photos

Plot 1



Plot 2



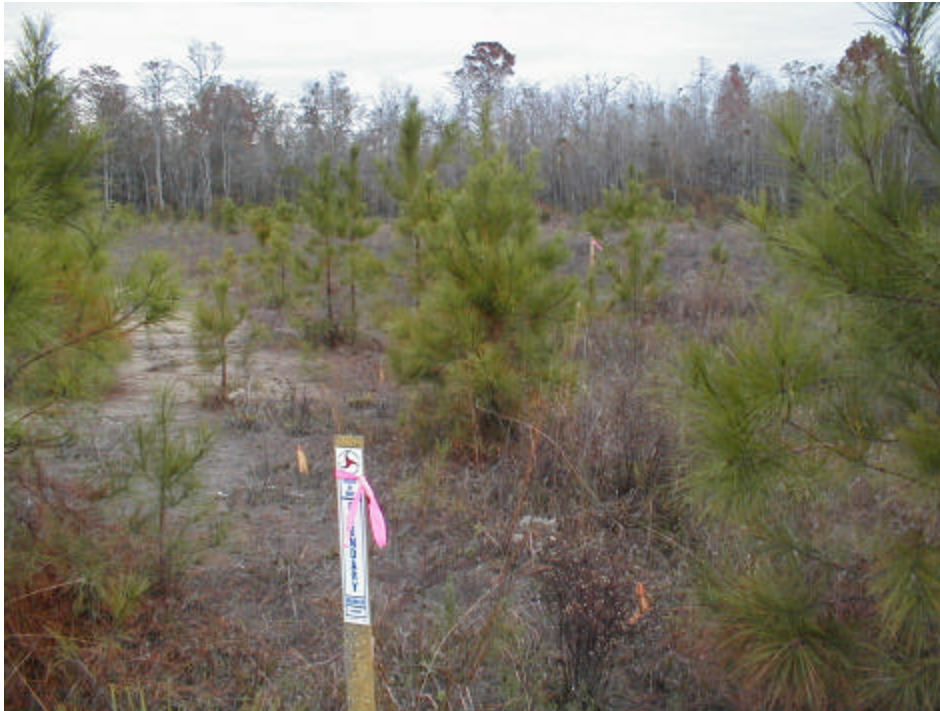
Plot 3



Plot 4



Plot 5



Plot 6



Plot 7



Site photos (associated with established photo points)

W-1



W-2



W-3



W-4



W-5



W-6



APPENDIX B

Wetland Graphs

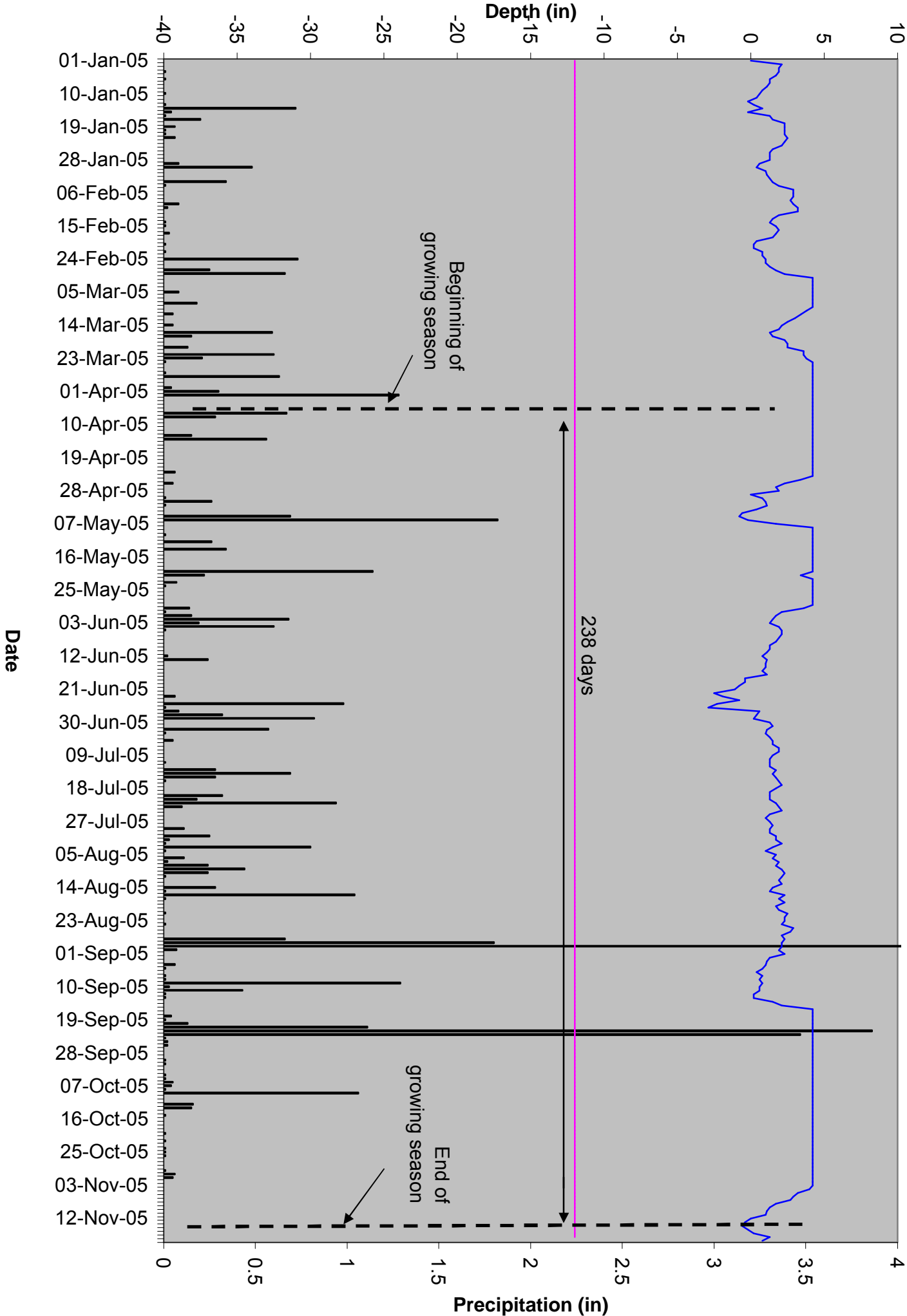


Figure 5
Haws Run HR-2
RDS WL-40 (S31F82D)

Figure 6
Haws Run HR-4
RDS WL-40 (S31F875)

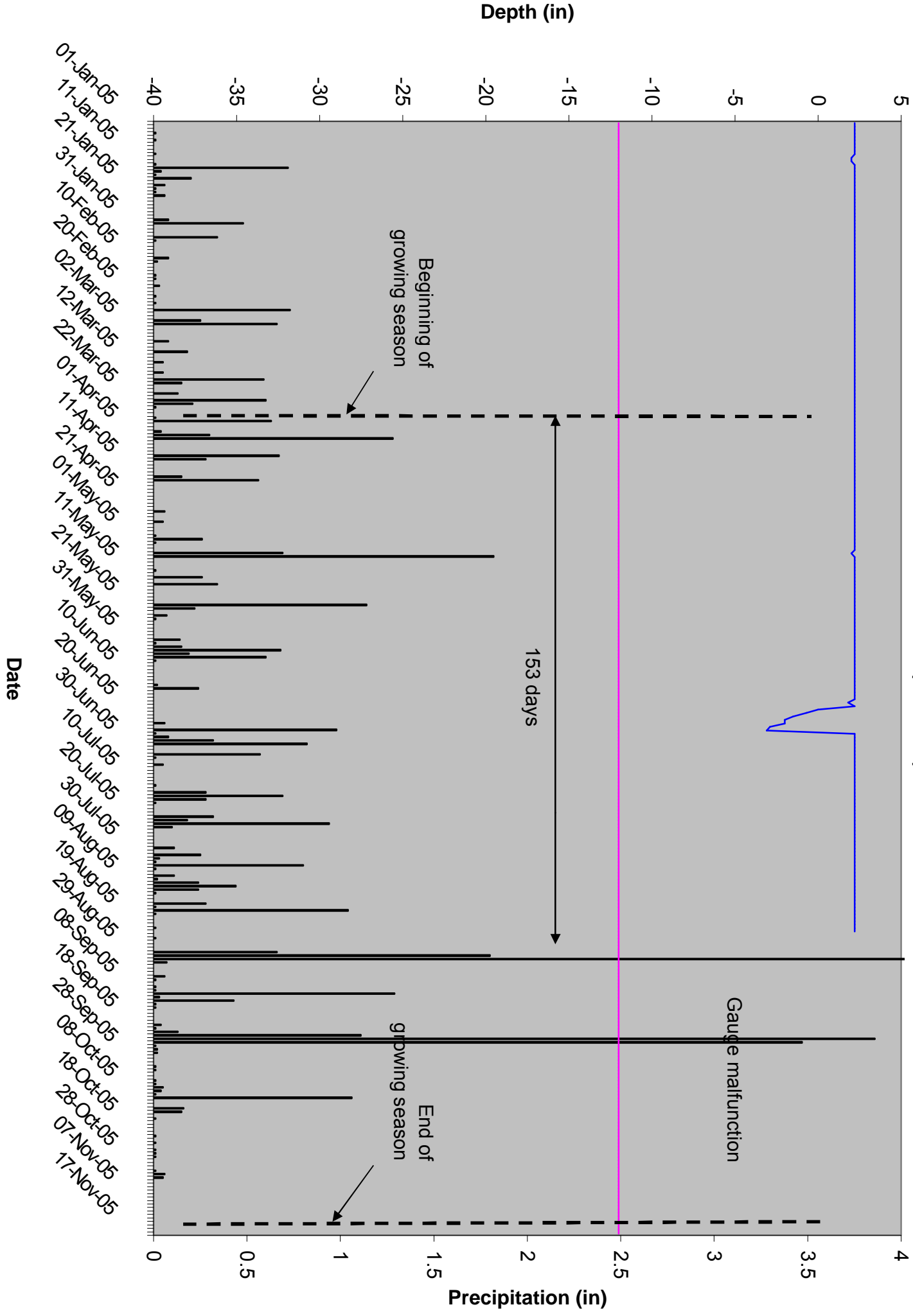


Figure 7
Haws Run HR-7
RDS WL-40 (S31671D)

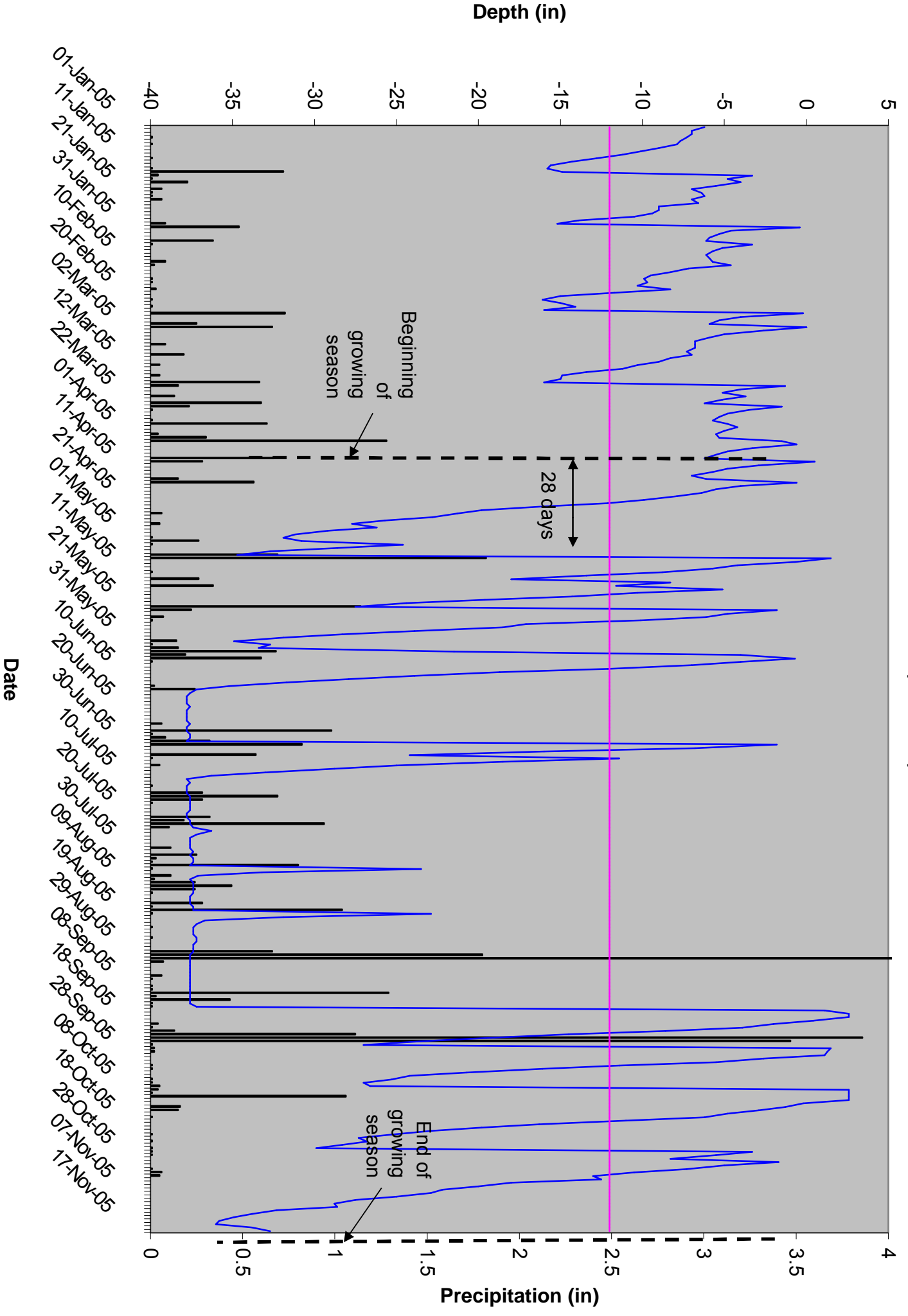


Figure 8
Haws Run HR-10
RDS WL-40 (S31F867)

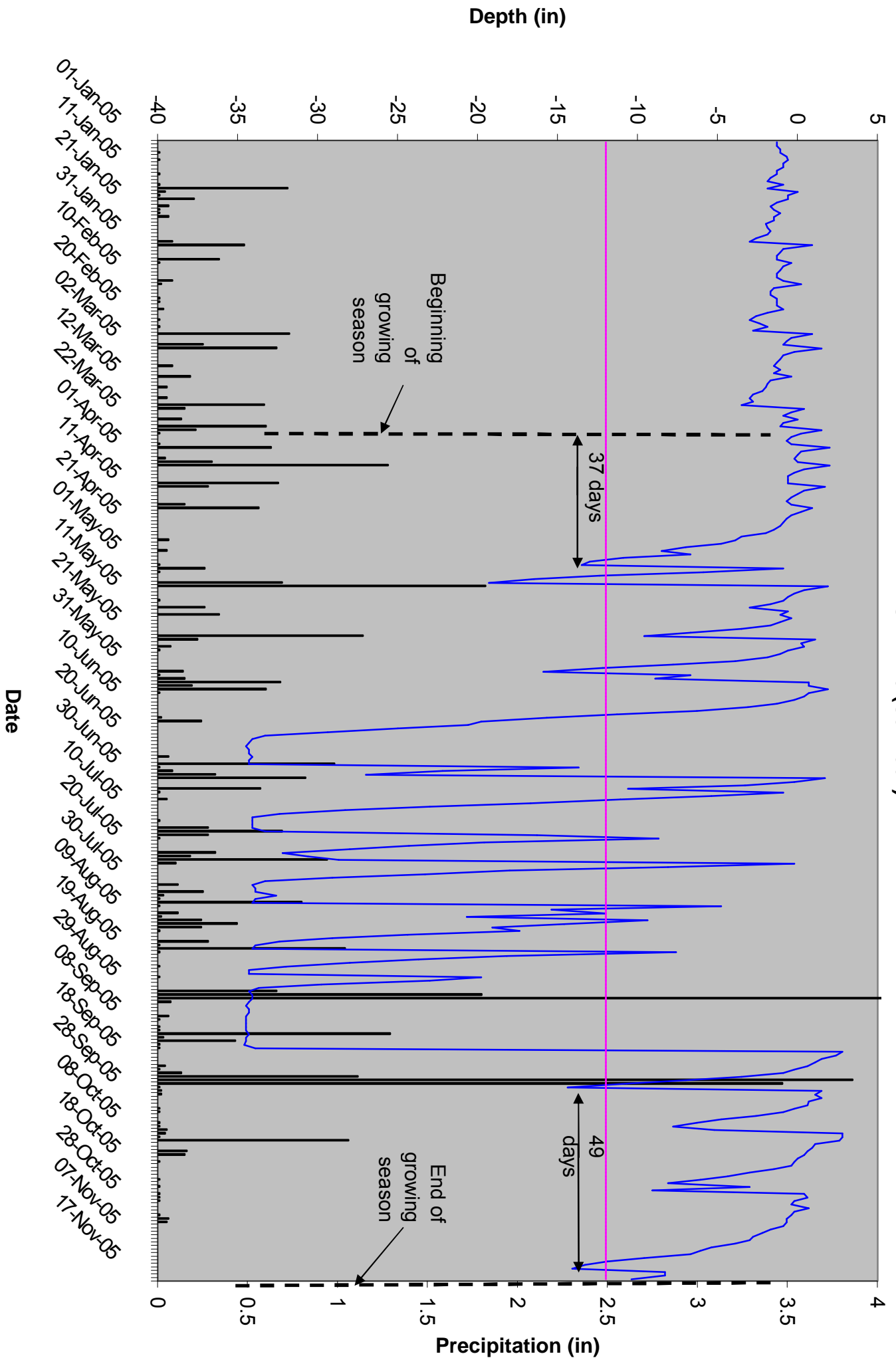


Figure 9
Haws Run HR-11
RDS WL-40 (S31F9D3)

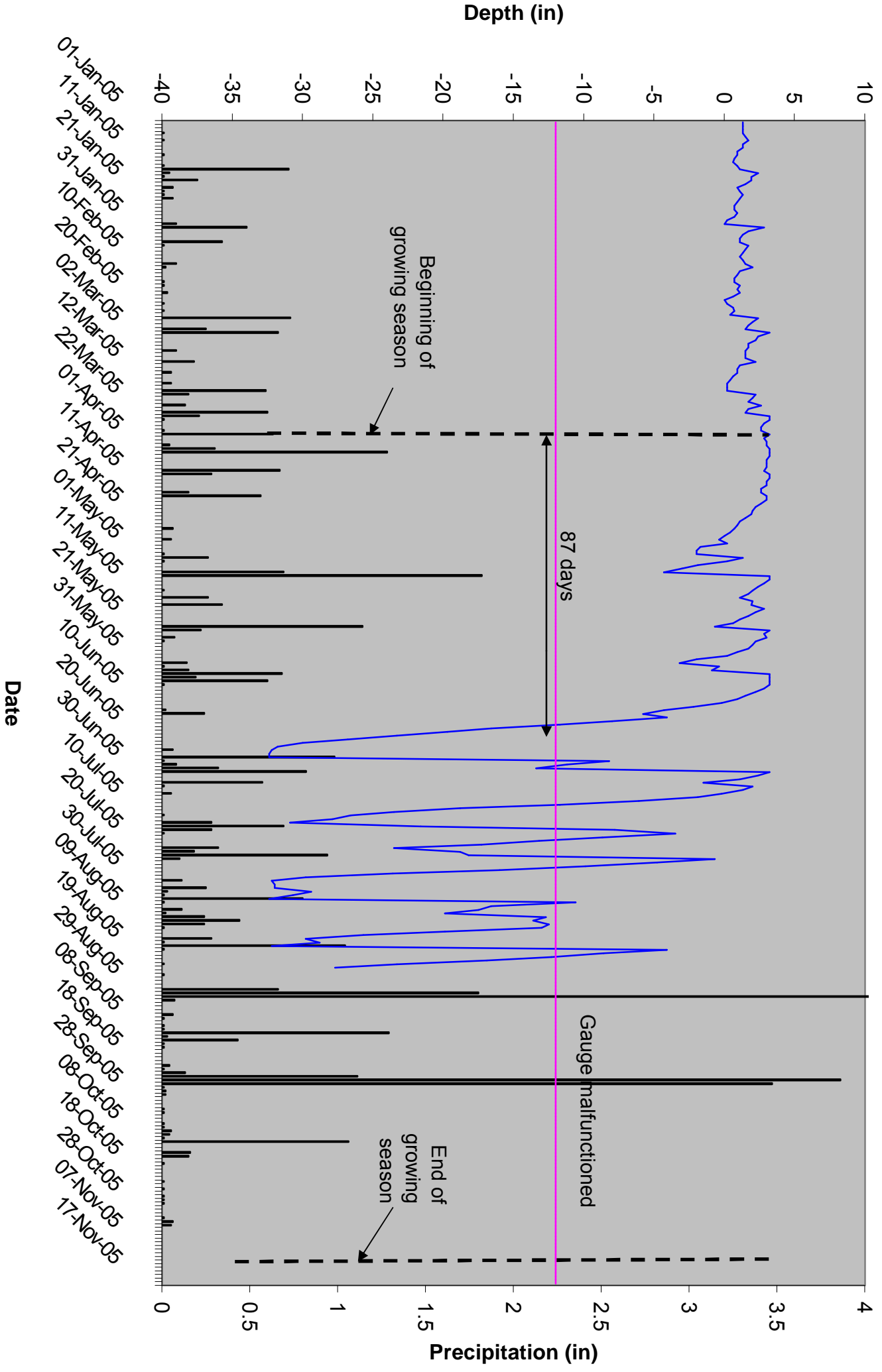


Figure 10
Haws Run HR-12
RDS WL-40 (S317538)

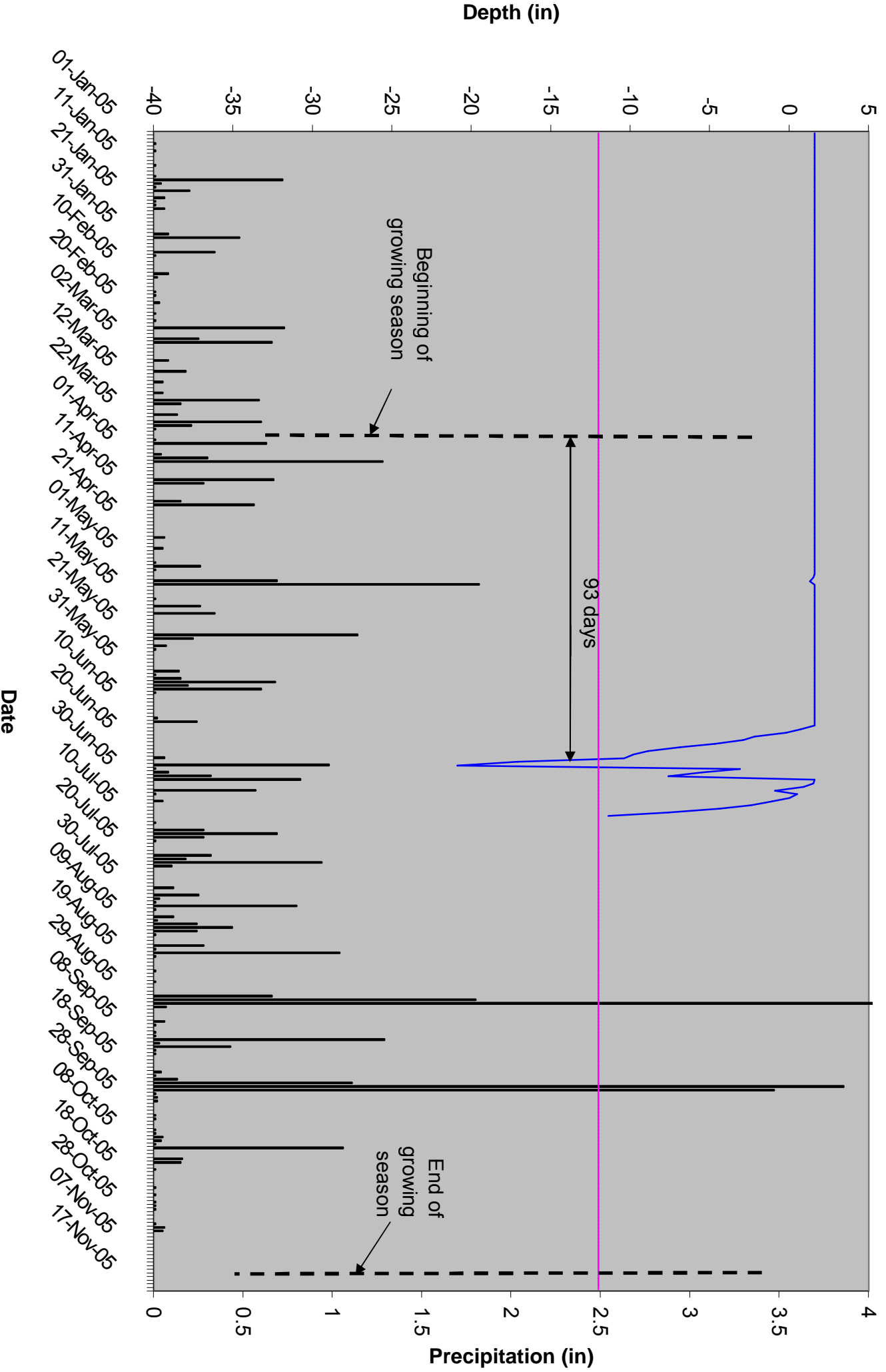


Figure 11
Haws Run HR-13
RDS WL-40 (S317482)

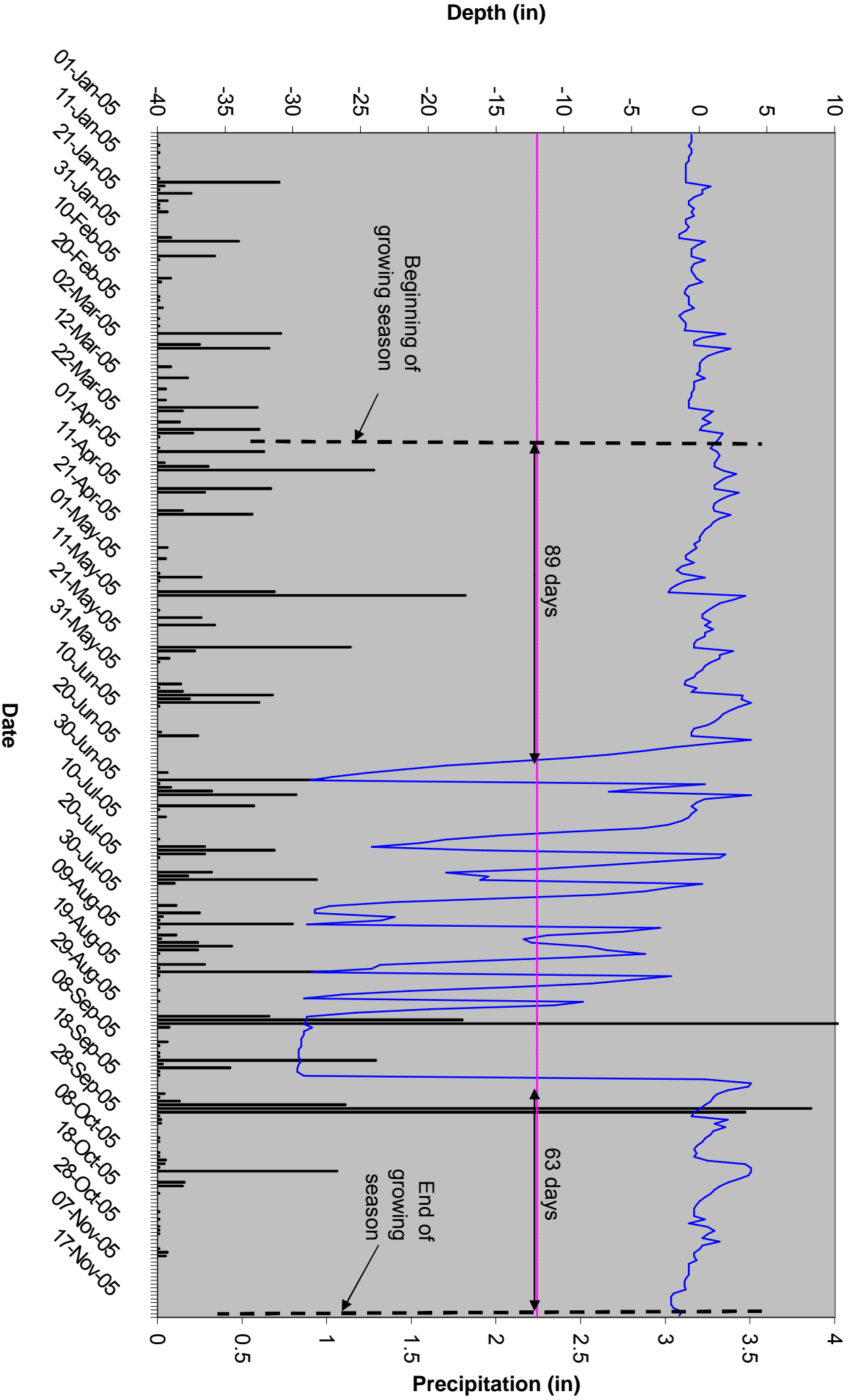


Figure 12
Haws Run HR-15
RDS WL-40 (S316989)

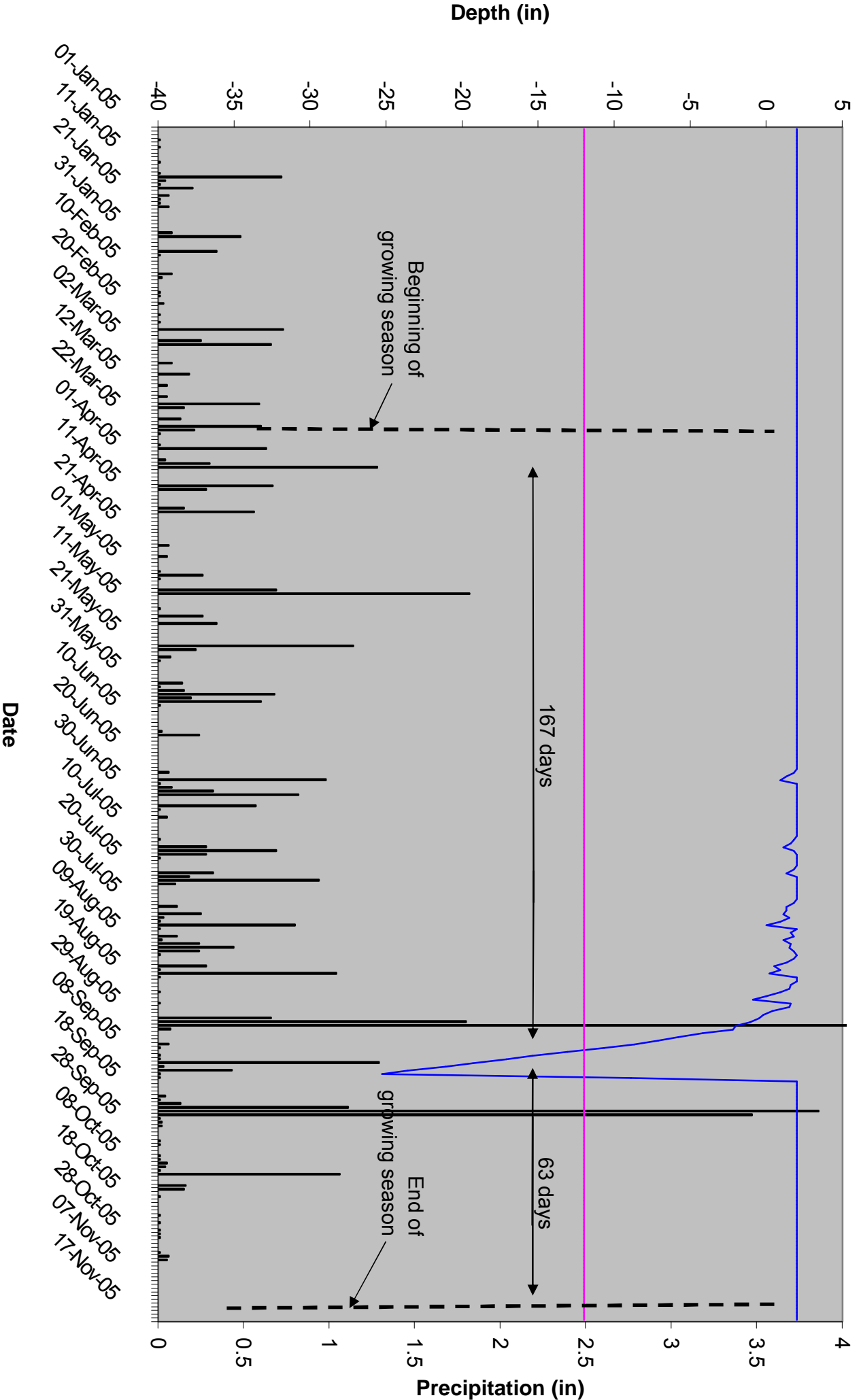


Figure 13
Haws Run HR-19
RDS WL-40 (S31755B)

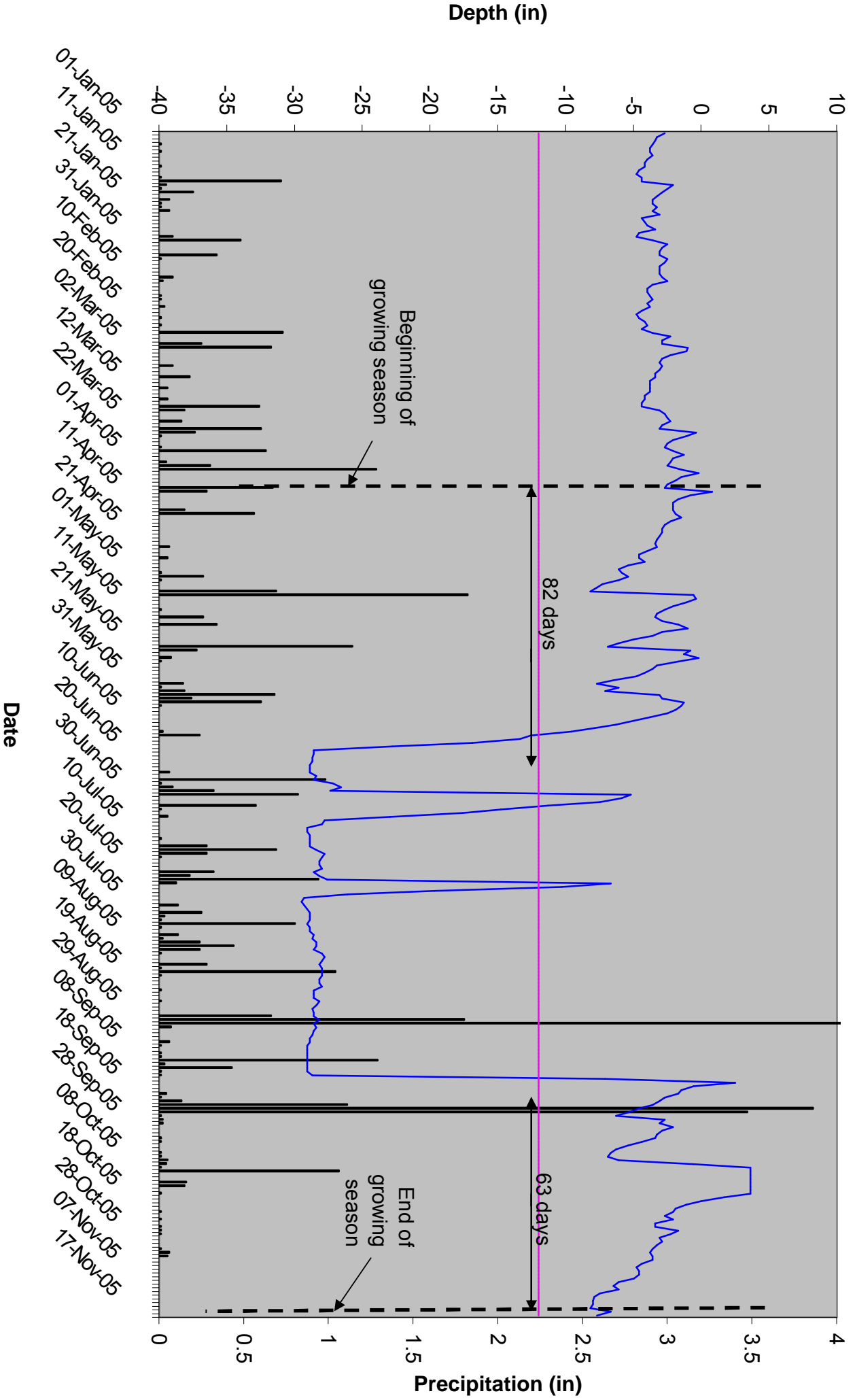


Figure 14
Haws Run HR-22
RDS WL-20 (S213959)

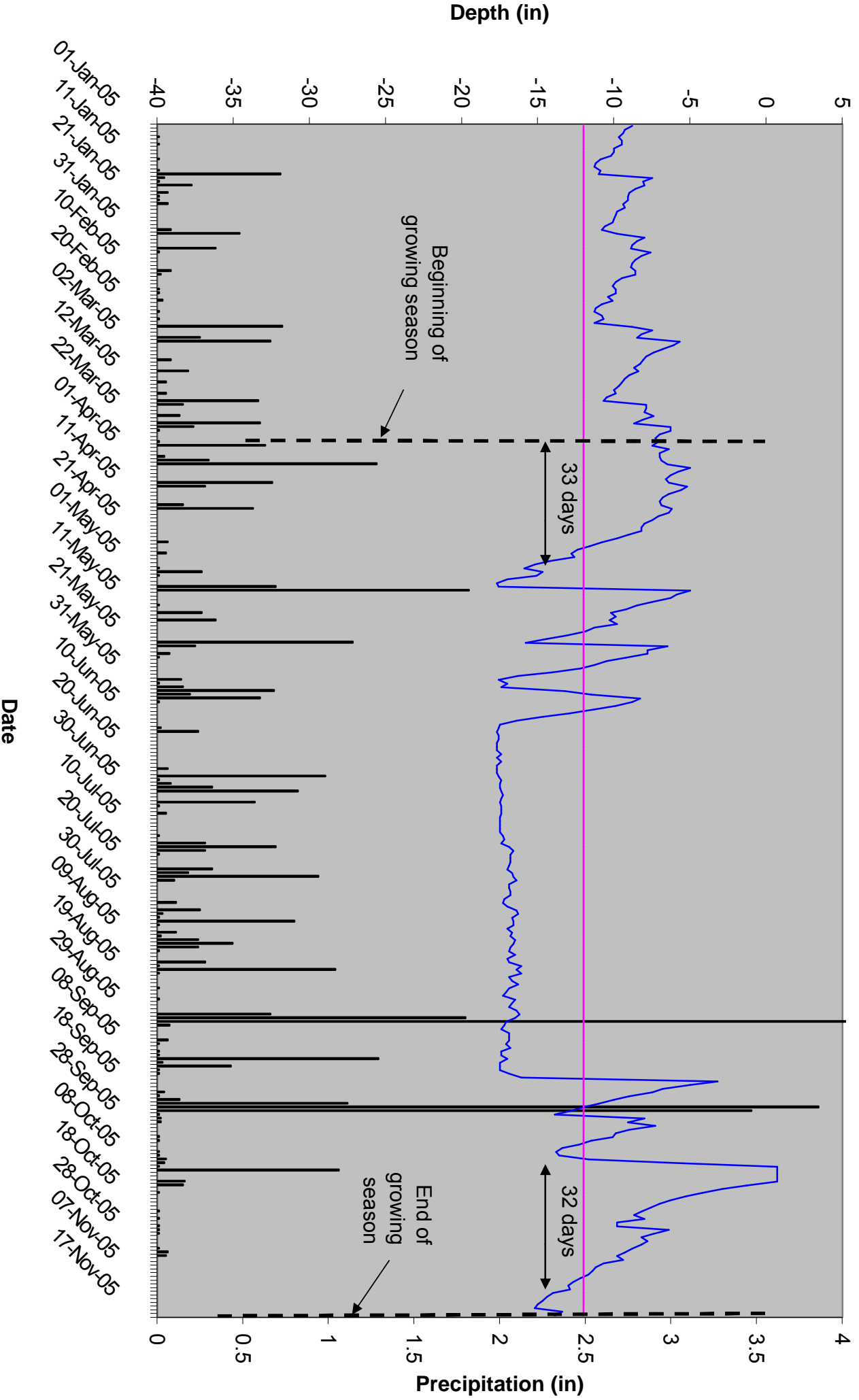


Figure 15
Haws Run HR-23
RDS WL-20 (S21393B)

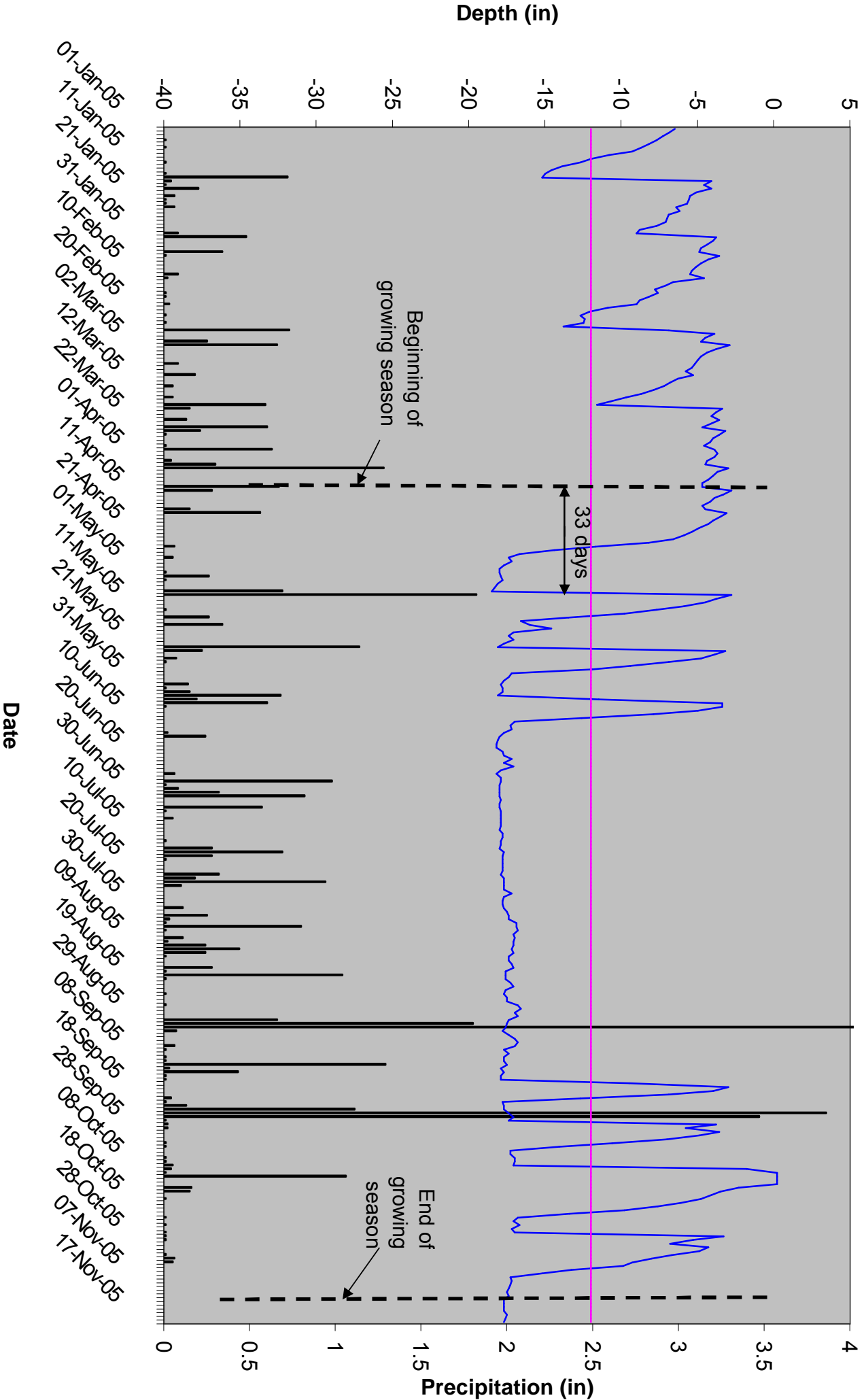


Figure 16
Haws Run HR-24
RDS WL-20 (S1EC84B)

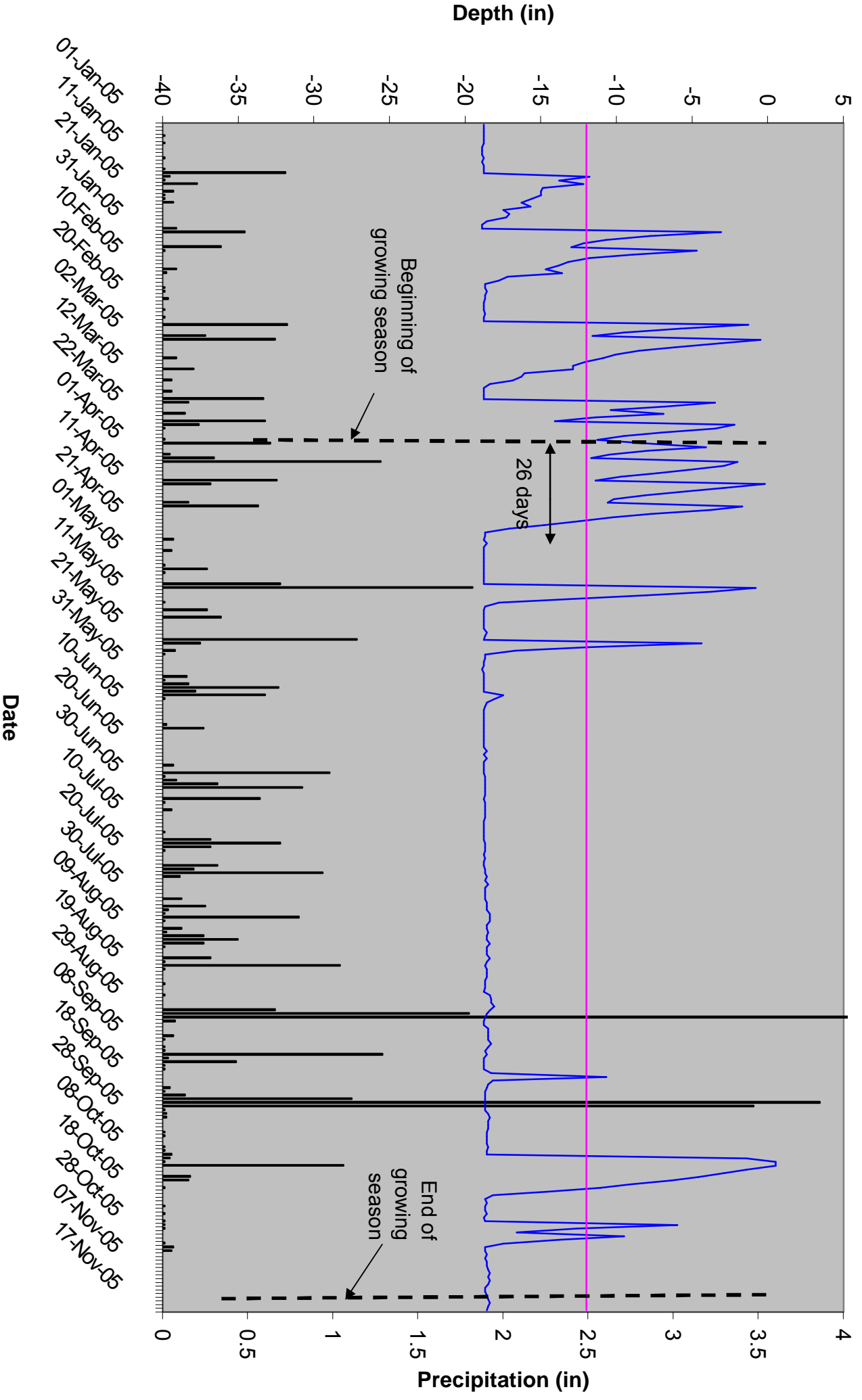


Figure 17
Haw's Run HRSG-2
40" Surface Gauge

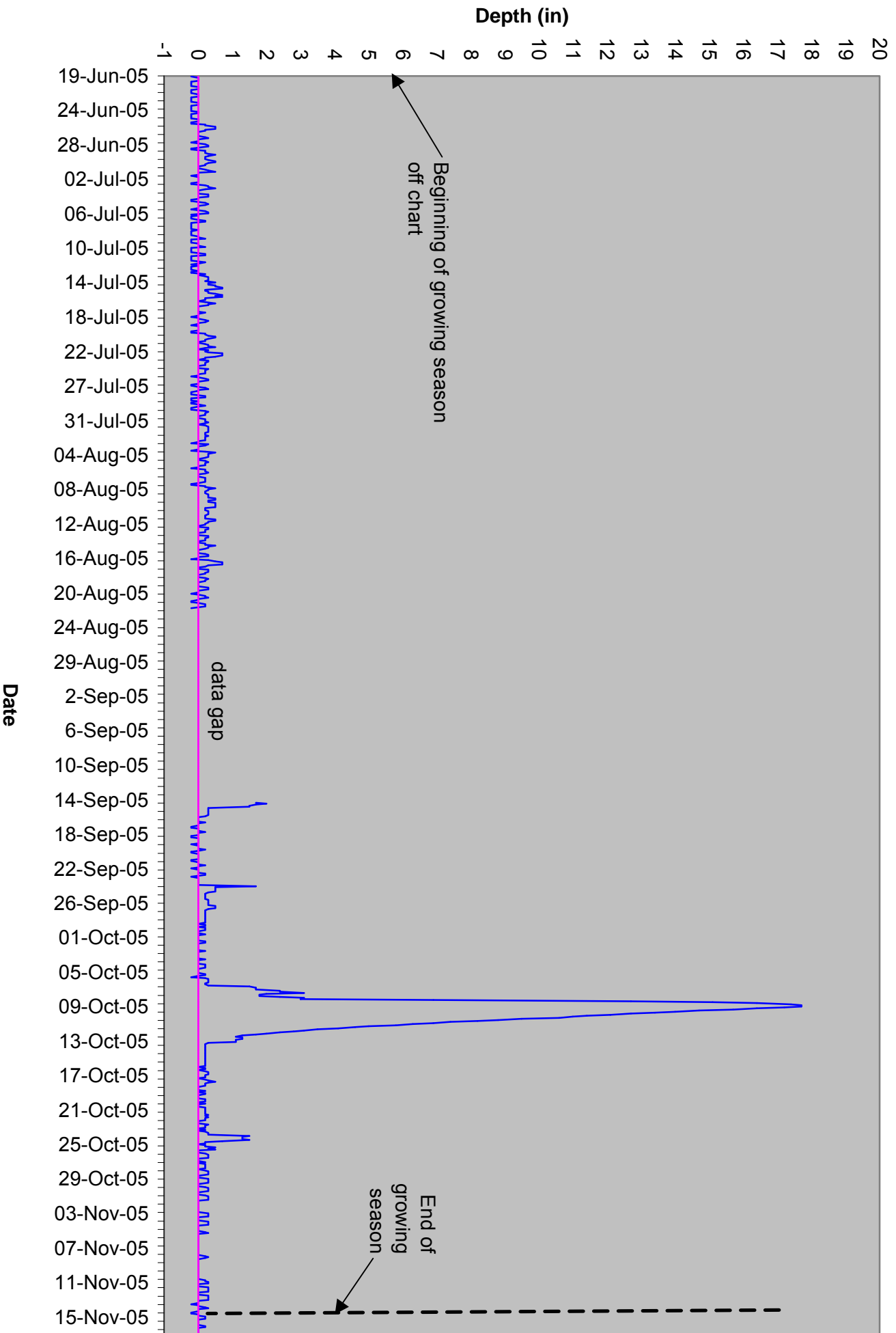


Figure 18
Haws Run 30-70 Percentile Graph

