

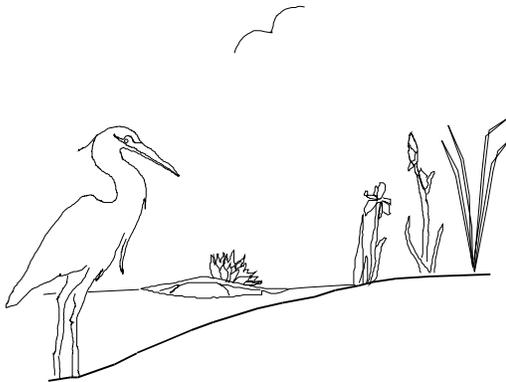
INITIAL SITE EVALUATION
PROPOSED WETLAND COMPENSATION SITE NEAR FAIRMONT CITY, IL
ST. CLAIR COUNTY Site 1 of 2
FAIRMONT CITY GOLF COURSE
(Along Collinsville Rd north of Fairmont City, St. Clair County, Illinois)

Steven E. Benton
Michael V. Miller
Christine Fucciolo

Illinois State Geological Survey
Coastal and Wetlands Geology Unit
615 East Peabody Drive
Champaign, IL 61820-6964

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INTRODUCTION

This Initial Site Evaluation report was prepared by the Illinois State Geological Survey (ISGS) to provide the Illinois Department of Transportation (IDOT) with preliminary information regarding a proposed wetland compensation site near Fairmont City in St. Clair County, Illinois. This report is for screening purposes only. File information (page 7) and field observations (page 9) of the hydrogeomorphic features of the site are the primary focus. Field observations presented here may not reflect long-term conditions at this site. Biological features, such as habitat, are only included as part of a broad analysis of the landscape. This Initial Site Evaluation report and any conclusions contained herein are not a substitute for a hydrogeologic characterization, which may include geologic investigation, well installation, surveying, and long-term monitoring of site conditions.

The Fairmont City site (figure 1) is located in the Southwest ¼, Section 4, T2N, R9W in St. Clair County. The site covers an area of about 50 acres and is operating as a golf course. The site is bordered on the north, west, and east by undeveloped land, and on the south by Collinsville Road. Old Cahokia Creek flows through the northern part of the site.

FAIRMONT CITY GOLF COURSE–Proposed Wetland Compensation Site

Summary

- The hydrogeologic success of future wetland compensation activities on the Fairmont City Golf Course is estimated to be high.
- Wetlands are depicted on NWI maps (USFWS 1988) along the south and east sides of the site and inside the meander bend of Old Cahokia Creek (figure 2). Hydric-soil indicators were observed in soil-probe borings in these areas. The property owner stated that these areas are usually too wet to mow until late in the summer.
- The parcels west, north, and east of the site are depicted on NWI maps as being entirely wetland (figure 2). The primary difference between these areas and the site appears to be land use.
- Soil colors indicate anaerobic conditions in the Karnak silty clay, thus suggesting the duration of saturation is sufficient to satisfy the hydric-soil criteria per the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE 1987).
- The identifiable hydrologic alterations to the site include the drainage ditches along the south and east site boundaries (figure 2) and raised cart paths, tees, and greens. Also, Old Cahokia Creek is lower than the surrounding landscape though it is not leveed. Evidence of drainage tile was not observed. Filling in or blocking the drainage ditches may allow surface water from adjacent wetlands to migrate onto the site.
- Field and file data indicates that wetland hydrology may already exist over most of the site. Water sources for supplying the site include surface-water flooding from Old Cahokia Creek and runoff from adjacent wetlands. At present, surface water in the adjacent wetlands is channeled to Old Cahokia Creek via drainage ditches (figure 2). Comments by the property owner suggest that ground-water discharge may also influence the hydrology of the site. Runoff from the terrace south of the site may be intercepted by Collinsville Road, though the presence of storm drains was not noted during the site visit.

Restoration/Creation Considerations

Topography

The site is nearly level with an average elevation around 400 feet (ft) above sea level. From the base of the terrace along Collinsville Road to Old Cahokia Creek, the gradient across the site is less than 0.01 feet/foot (ft/ft). Land surface generally slopes towards the creek and the drainage ditches. The wetlands adjacent to the site appear to be at about the same elevation.

Hydrology

The site lies in the floodplain of the Mississippi River, and 40% of the site is mapped as Zone A on the Flood Insurance Rate Map (FEMA 1981). Zone A includes areas within the 100-year flood zone, however base flood elevations and hazard factors are not determined. Though Old Cahokia Creek is not leveed, the creek bed is about 4 ft lower than the surrounding landscape. This suggests that the creek may only serve as a source of water in the spring or when precipitation is unusually high.

Drainage ditches along the south and east sides of the site appear to be channeling surface water from adjacent wetlands to Old Cahokia Creek (figure 2). During our site visit, surface water was observed in the forested (PF01A) and emergent (PEMC) wetlands east of the site and in the southwest corner of the site. Filling or blocking the ditches may allow surface water from adjacent wetlands to migrate onto the site.

The property owner (Robert Juengel) stated that there were springs in the drainage ditch along the south side of the site. Though springs were not observed during our site visit, the banks of the drainage ditch showed evidence of undercutting as though by ground-water discharging to the surface along the banks. Along Old Cahokia Creek vegetation-free areas were observed in the creek suggesting the presence of ground-water seeps.

Geology

Sediments on the site are mapped as Cahokia Formation alluvium over outwash sands and gravels of the Henry Formation (Berg and Kempton 1988). The unconsolidated sediments are mapped as being about 100 ft thick (Piskin and Bergstrom 1975). Geologic logs of two water-supply wells near the site (section 1, T2N, R9W) show 10 to 12 ft of clay over 80 to 100 ft of sand and gravel (IEPA 1991). One of the wells is finished in shale at a depth of 108 ft. The uppermost bedrock units are mapped as the Mississippian Warsaw Shale which consists mostly of shale and argillaceous limestone (Willman et al. 1967).

Soils

Two soil types are mapped on site (USDA 1978). They are the Karnak silty clay and the Landes fine sandy loam. The Karnak soil, which covers about 95% of the site, is poorly drained, frequently flooded for long durations in the spring, and has a high water-table is 0.0 to 3.0 ft below ground surface. The Landes soil is moderately well drained, rarely flooded, and has a high water-table 3.0 to 6.0 ft below ground surface. The Karnak soil is on both the state (USDA 1995), and county (USDA 1993) lists of hydric soils in St. Clair County. The Landes soil, which is only present on the terrace, is non-hydric.

Observations of the surface materials confirmed the poorly drained nature of the area mapped as Karnak silty clay. Shallow soil-probe borings revealed that the texture of the soil was silty clay and was uniform to a depth of 2 ft. It was very difficult to push the soil-probe into the ground, indicating that the soil is very compact. Soil colors in all three borings appeared to satisfy the hydric-soil criteria in the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE 1987).

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Wetlands

Six wetlands are mapped on site (figure 2) (USFWS 1988). Three are located along the south drainage ditch, two along the east side of the site, and one on the north side. Three of the wetlands are classified as palustrine, emergent, semipermanently flooded (PEMC), two are classified as palustrine, emergent, temporarily flooded (PEMA), and one as palustrine, forested, temporarily flooded (PF01A). Five of the wetlands appear to be extensions of wetlands from adjacent parcels of land.

In their investigation, the Illinois Natural History Survey (INHS) found hydrophytic vegetation along the drainage ditch west of the clubhouse. This corresponds to the area identified as PEMA on the NWI map (figure 2). The soil boring in this area (B2, figure 2) revealed that the texture was silty clay. The property owner also stated that this area was too wet to mow in the spring. Therefore, this area may meet the USACE three-parameter definition of jurisdictional wetlands (USACE 1987).

The other mapped wetlands on the site appear to lack either vegetation or hydrology. The area along the east side of the site mapped as PEMC (figure 2) was also identified by the property owner as being too wet to mow in the spring. The soil boring in this area (B3, figure 2) revealed that the texture was silty clay. In their report, the INHS did not identify this area as wetland, however, the soil texture and wetness suggest that the only parameter missing is vegetation.

The parcels to the west, north, and east of the site are entirely mapped as wetlands on the NWI (USFWS 1988). These areas include emergent wetlands (PEMA and PEMC) to the west, and forested wetlands (PF01A) to the north and east (figure 2). The presence of these wetlands suggests that most of the site may have been wetland at one time. The primary difference between the adjacent parcels and the site appears to be land use.

Hydrologic Alterations

The only significant hydrologic alterations appear to be the drainage ditches along the south and east sides of the site. The function of the east drainage ditch appears to be to intercept surface water in the forested wetland east of the site and convey it to Old Cahokia Creek. The function of the south drainage ditch appears to be to convey surface water from the emergent wetlands on-site and west of the site to Old Cahokia Creek. This drainage ditch may also be intercepting ground-water discharge and conveying it to the creek.

No evidence of drainage tile was found during the site visit. The fact that the site is used as a golf course suggests that grading and filling probably took place during its construction. However, no direct evidence of grading or filling was found during the site visit. Several of the tees and greens are higher than the surrounding landscape. However, their effect, if any, on the hydrology of the site would probably not be significant.

Restoring/Creating Wetlands

Our investigation suggests that most, if not all, of the site has wetland potential. The INHS identified two areas which may already meet the definition of jurisdictional wetland. They also found that the rest of the site, while lacking hydrophytic vegetation, had both hydric-soils and wetland hydrology. Our investigation confirmed the presence of hydric-soils. Based on file information, wetland hydrology is probably also present. However, this can only be confirmed with a more in-depth investigation.

Restoring wetlands on this site may simply be a matter of replacing the present vegetation. The primary difference between the site and the adjacent parcels appears to be land use. These parcels have the same soil-type as the site and appear to be at about the same elevation.

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The drainage ditches may have an effect on the hydrology of the site. The primary purpose of the ditches appears to be to intercept surface water in the adjacent wetlands and convey it to Old Cahokia Creek. Filling in or blocking these ditches may allow surface water from these wetlands to migrate onto the site.

The role of ground-water discharge in the hydrology of the site cannot be assessed using the information available. There is some evidence that ground-water discharge may affect the hydrology of the site, but without a more in-depth investigation it cannot be positively stated that it does affect the hydrology of the site.

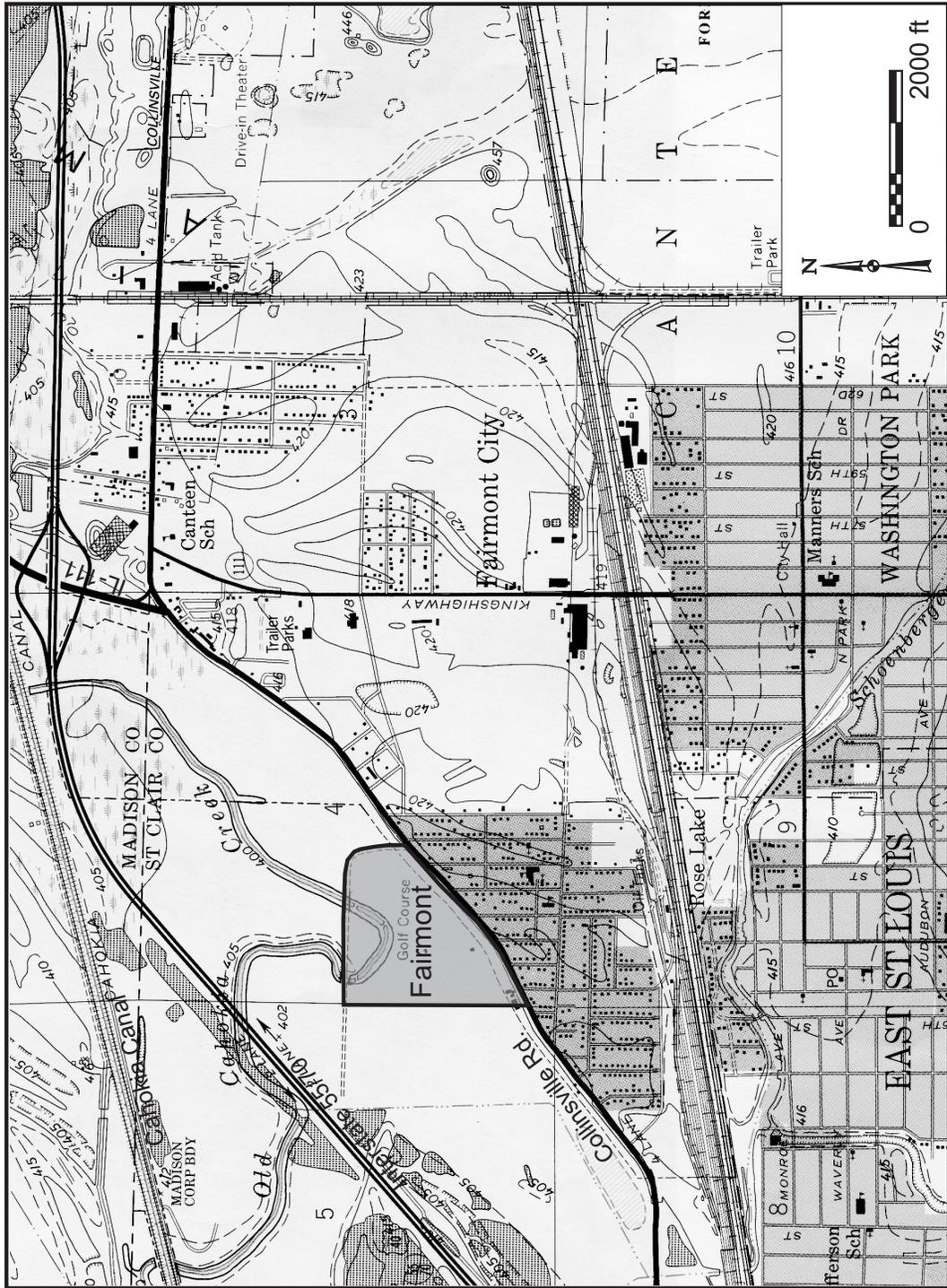


Figure 1: Location of Site 1, Fairmont Golf Course on USGS Monks Mound, IL 7.5 minute topographic quadrangle map (USGS 1993)



Figure 2: Details of the Fairmont Golf Course. Circles marked B1 through B3 indicate shallow borings. Solid arrows represent flow directions. Dashed arrows show inferred flow directions. Mapped wetlands are taken from USFWS 1988. Aerial photography from IDOT, Spring 1998, NAPP 44-469.

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FILE DATA	
Date of site visit	August 19, 1999
Field crew	S. Benton, M. Miller, C. Fucciolo
Location	
Section, Township, Range	section 4, T2N, R9W
County	St Clair
7.5-minute quadrangle	Monks Mound (USGS 1993)
Site size	~50 acres
Major land use of site	Golf Course
Recent weather trends	Below normal for July (Appendix A)
Geomorphic setting	abandoned oxbow in the Mississippi River floodplain
Topography	nearly level
Bedrock geology	
Uppermost Unit (Willman et al. 1967)	Mississippian Warsaw shale
Depth to bedrock (Piskin and Bergstrom 1975)	~100 ft
Structure (Herzog et al. 1994)	located on east flank of Mississippi R. bedrock valley
Quaternary geology	
Drift thickness (Piskin and Bergstrom 1975)	~100 ft
Surface sediments (Lineback 1979)	Cahokia Fm over Henry Fm
Geologic Log (Rec# 12-163-25616-00)	
0 ft to 10 ft	black silty clay to brown clay
10 ft to 65 ft	brown to gray, fine to medium sand
65 ft to 108 ft	fine to medium sand and gravel with boulders
108 ft	shale
Stack-unit sequence to 15 m depth on site (Berg and Kempton 1988)	Cahokia Fm alluvium > 20 ft thick over Henry Fm sand and gravel > 20 ft thick

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FILE DATA		
NW1 Wetland classification (USFWS 1988)		
on site	code	descriptors
small areas on the north and west sides of the site	PEMA	palustrine, emergent, temporarily flooded
small areas on the west, south, and east sides of the site	PEMC	palustrine, emergent, semipermanently flooded
small area on east side of site	PF01A	palustrine, forested, temporarily flooded
Susceptibility to flooding Federal Emergency Management Agency Flood Insurance Rate Map (FEMA 1981)		
40% of site	Zone A	100-yr flooding, flood elevation not determined
Gauging Station(s) in vicinity		
Station name(s)	#	Distance from site
Canteen Creek near Caseyville	05589500	4.5 miles

FILE DATA						
Soils mapped on the site (USDA 1978)						
#	Soil Series	Hydric List		Drainage Class	Landscape Position and Parent Material	Occurrence on Site
		State*	County**			
304B	Landes fine sandy loam	no	no	moderately well	bottom lands alluvium	5%
426	Karnak silty clay	yes	yes	poorly	flood plain alluvium	95%

* USDA 1995

** USDA 1993

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FIELD DATA		
Is site partially nonwetland?	Yes	Most of the site is mapped as nonwetland on the NWI. However, areas adjacent to the site are entirely mapped as wetland on the NWI.
Hydric soil(s)		
mapped on the site?	Yes	About 95% of the site is mapped as Karnak silty clay.
present where wetlands do not occur?	Yes	Hydric-soil indicators were noted in three boreholes.
Hydrology altered?	Yes	Drainage ditches appear to be intercepting water from adjacent wetlands thereby keeping the site dry enough for its present land use.
Hydrologic Alterations Observed		
grading/filling	Yes	Tees and greens are higher than the surrounding landscape.
drainage tile	No	None observed
drainage ditches	Yes	Drainage ditches along the south and east sides of the site appear to be conveying water from wetlands adjacent to the site to Old Cahokia Creek.
culverts	Yes	Spanning the drainage ditches.
downcut river or creek	Yes	Old Cahokia Creek about 4 ft lower than surrounding landscape.
Hydrologic Indicators Observed		
<i>Primary Indicators</i>		
inundated	No	The property owner stated that the site was flooded to a depth of at least 5 ft in 1995.
saturated in upper 12 inches	No	Sediments were moist.
water marks	No	
drift lines	No	
sediment deposits	No	
drainage patterns	No	

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FIELD DATA		
<i>Secondary Indicators</i>		
oxidized root channels in upper 12 inches	No	None observed
water-stained leaves	No	
local Soil Survey data	Yes	Survey shows hydric soils mapped on-site.
Present Hydrogeologic Conditions		
<i>Geology</i>		
Surface sediments are mapped as Cahokia Fm alluvium and were confirmed to be alluvial deposits by hand borings.		
Three soil-probe borings were made during the site visit (figure 2):		
B1 (near northwest corner of site) 0-6 in. Silty Clay ; very dark brown (10YR 2/2) mottled, blocky structure, dry		
B2 (in wet area near clubhouse) 0-24 in. Silty Clay ; black (10YR 2/1), mottled, moist, moisture increases with depth		
B3 (in wet area near forested wetland) 0-8 in. Silty Clay ; very dark gray (10YR 3/1), slightly moist, reddish pockets of organic material 8-24 in. Silty Clay ; dark gray (10YR 4/1), slightly moist, increase in number of pockets of reddish organic material		
<i>Surface water</i>		
Sources		
creeks	Old Cahokia Creek may be a source in the spring.	
overland flow from uplands	Collinsville Road, which marks the edge of the terrace south of the site, probably intercepts most runoff from the terrace.	
direct precipitation	Normal annual precipitation 38.13 inches.	
runoff	The terrace slope, which is on the north side of Collinsville Road, may generate limited amounts of runoff.	
others	The drainage ditch along the south side of the site appears to be channeling surface-water from the wetland west of the site to Old Cahokia Creek.	
Inputs		
Primary inputs appear to be precipitation and flooding from Old Cahokia Creek and wetland areas adjacent to the site.		
Outputs		
Primary outputs appear to be evapotranspiration and drainage into Old Cahokia Creek.		

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FIELD DATA		
<i>Ground water</i>		
likely direction of unconfined flow	north-northwest	
major aquifers	Henry Fm sands and gravels Cahokia Fm alluvium	
major aquitards	bedrock at 80 to 100 feet	
depth to saturated sediments	greater than 24 inches in soil-probe borings.	
depth to water in borehole	none noted in soil-probe borings.	
discharge evident?	Areas in Old Cahokia creek that were free of vegetation, and undercut banks along the south drainage ditch, suggest ground-water discharge.	
confined aquifer evident?	no	
perched water-table evident?	Though ground water was not encountered in the boreholes, the fine-grained nature of the Karnak silty clay makes a perched water-table possible.	
<i>Elevation observations</i>		
Elevation measurements along the south and east drainage ditches indicate that land surface slopes towards the ditches. Measurements along Old Cahokia Creek indicate that the creek slopes from east to west.		
<i>Likely water source(s) that supported past wetland hydrology</i>		
Surface-water flooding and ground-water discharge.		
Reference Wetlands		
mapped by NWI on the site?	Yes	Types include PEMA, PEMC, and PF01A
mapped by INHS on the site?	Yes	Two wetlands were mapped by the INHS. One is about 400 ft west of the clubhouse in the area coded as PEMA and PEMC on the NWI. The other is about 900 ft east of the clubhouse. This area was not coded on the NWI.
present on the site?	Yes	In the southwest corner of the site and along the drainage ditches.
present near or adjacent to site?	Yes	The NWI map shows that the parcels on the west, north, and east sides of the site are entirely wetland.

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FIELD DATA
<i>Apparent water source(s) supplying current wetlands on the site</i>
Surface and/or ground-water flow from areas adjacent to the site.
<i>Differences between wetland and nonwetland areas of the site</i>
The wetland areas on the site are in close proximity to the drainage ditches and slightly lower in elevation than the nonwetland areas.
<i>Possible alterations to produce wetland hydrology on the site</i>
Fill drainage ditches, remove grass, shallow excavation or regrading of the site.

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Willman, H., J. Frye, J. Simon, K. Clegg, D. Swann, E. Atherton, C. Collinson, J. Lineback, and
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APPENDIX A Precipitation Data

Table A1 Total monthly precipitation readings (in inches) for 1998, 1999, the 30-year average for the period between 1961 and 1990, and the 30% above and below normal thresholds at the National Weather Service's Weather Service Office at the Belleville SIU Research Station (Midwestern Climate Information System Station 110137) (Midwestern Climate Information Center 1999 and National Water and Climate Center 1999).

Month	1998	1999***	30% probability above normal*	normal 1961–1990	30% probability below normal**
January	2.21	4.83	2.27	1.86	0.87
February	2.40	4.18	2.65	2.18	1.30
March	5.93	2.56	4.13	3.51	2.57
April	4.41	3.40	4.02	3.38	2.37
May	3.87	3.84	4.84	4.04	2.69
June	7.45	5.42	4.44	3.72	2.56
July	4.18	0.99	4.18	3.44	2.05
August	3.10		4.09	3.37	2.02
September	0.85		3.96	3.25	1.85
October	2.09		3.41	2.80	1.64
November	3.24		4.20	3.44	1.73
December	1.32		3.79	3.10	1.65
Total Annual	41.05	25.22	45.98	38.09	23.30

* 30% chance precipitation amounts will be greater than or equal to the value shown

** 30% chance precipitation amounts will be less than or equal to the value shown

*** through 7/31/99 (August data not available)

