Transition to an Oracle Based Data System (Corps Water Management System, CWMS)

Joel Asunskis, P.E.

by

Hydraulic Engineer/Data Manager Water Control Management St. Louis District U.S Army Corps of Engineers

August 4, 2005

Legacy Data System



HEC – DSS

 A database system which enables efficient storage and retrieval of time series data developed to meet the needs for water resource projects and studies.





One Corps Serving the Armed Forces and the Nation



US Army Corps of Engineers

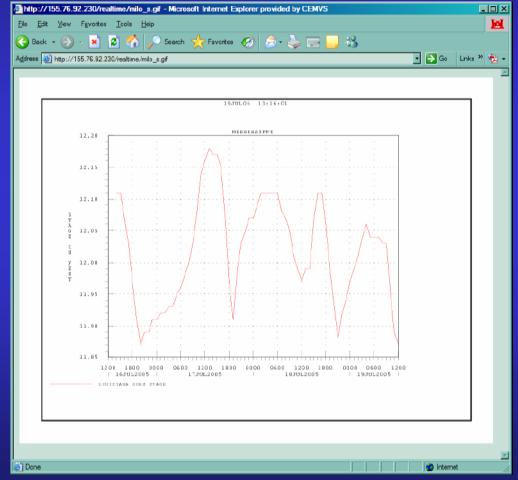


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Legacy System Web Dissemination



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Reservoir Operation Records

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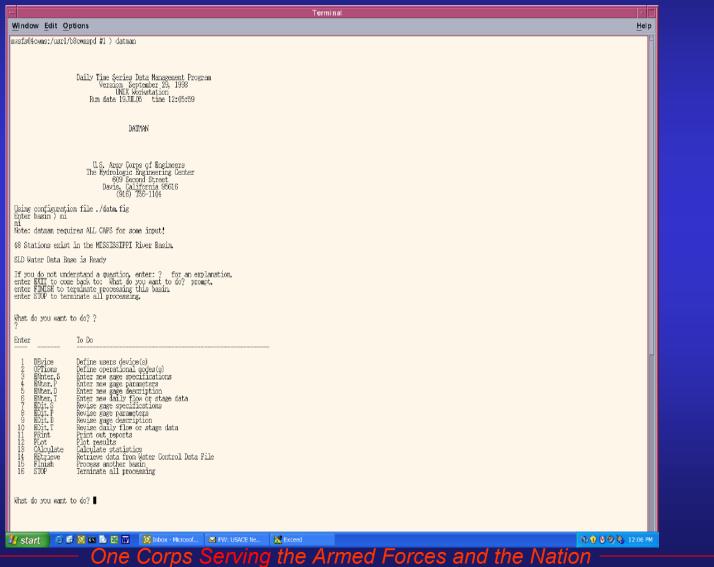


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Historical Records





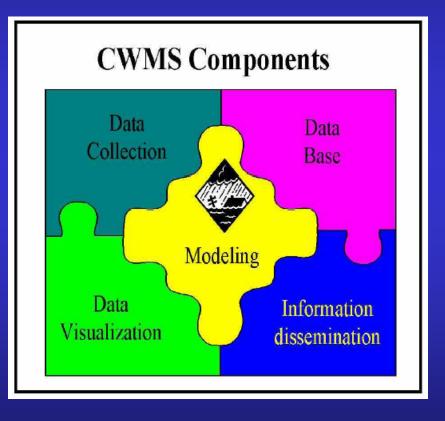


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Corps Water Management System (CWMS)



- USACE corporate AIS for water control decision support. Real-time 24/7 dedicated system.
- Provides management of hydromet data and forecasting models through a single interface.
- Modernized Technology
 - Oracle Database
 - Client-server architecture for network implementation



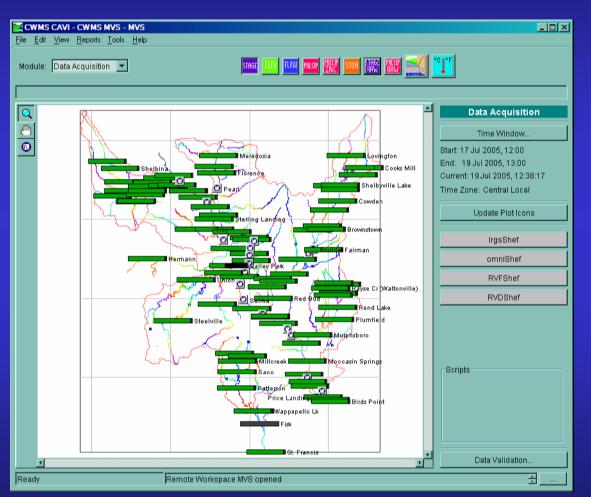


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Data Acquisition



- Socket Connections
- File Transfer
- Goes (DCP) Format
- SHEF Format
- Data Validation
- Derive Parameters
- Data Status

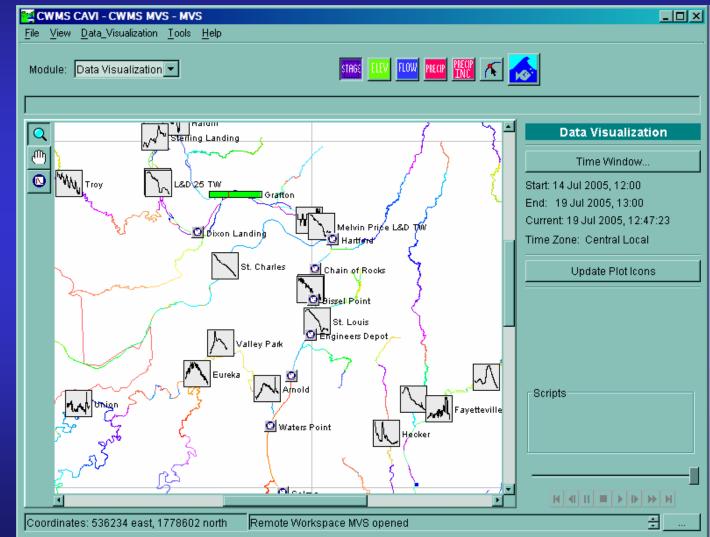


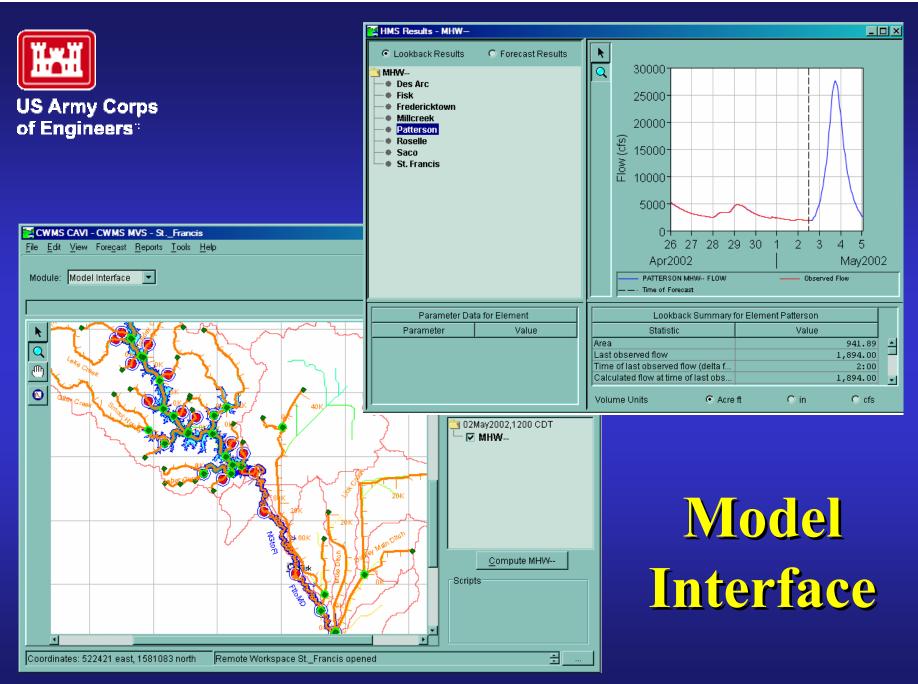


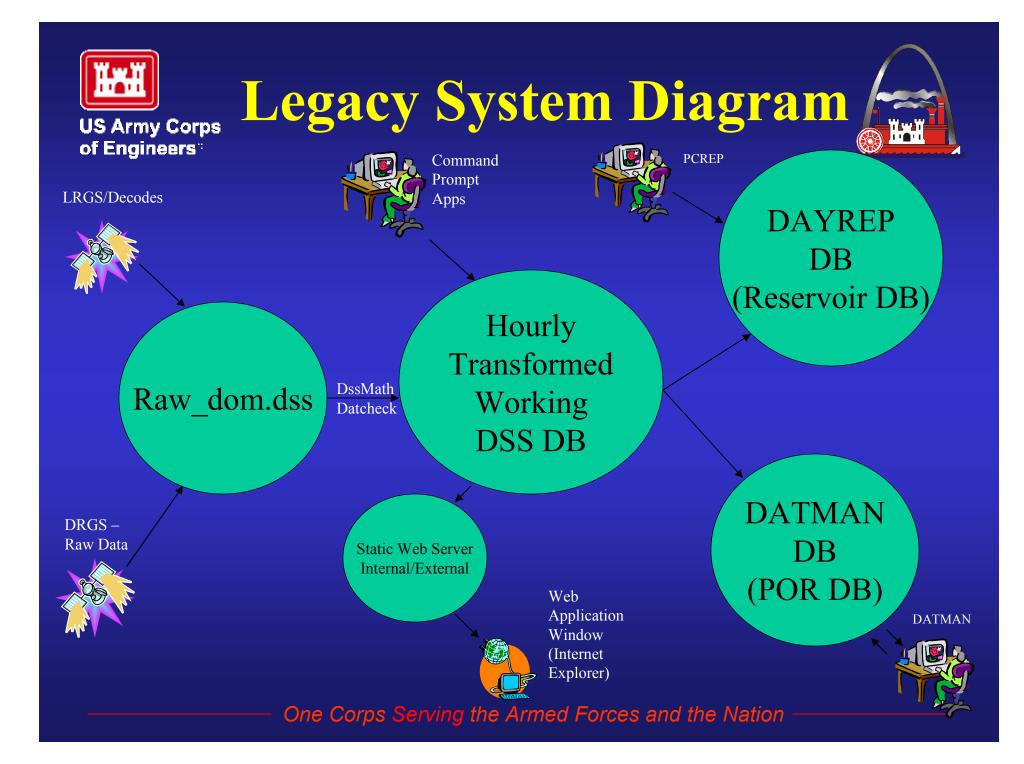
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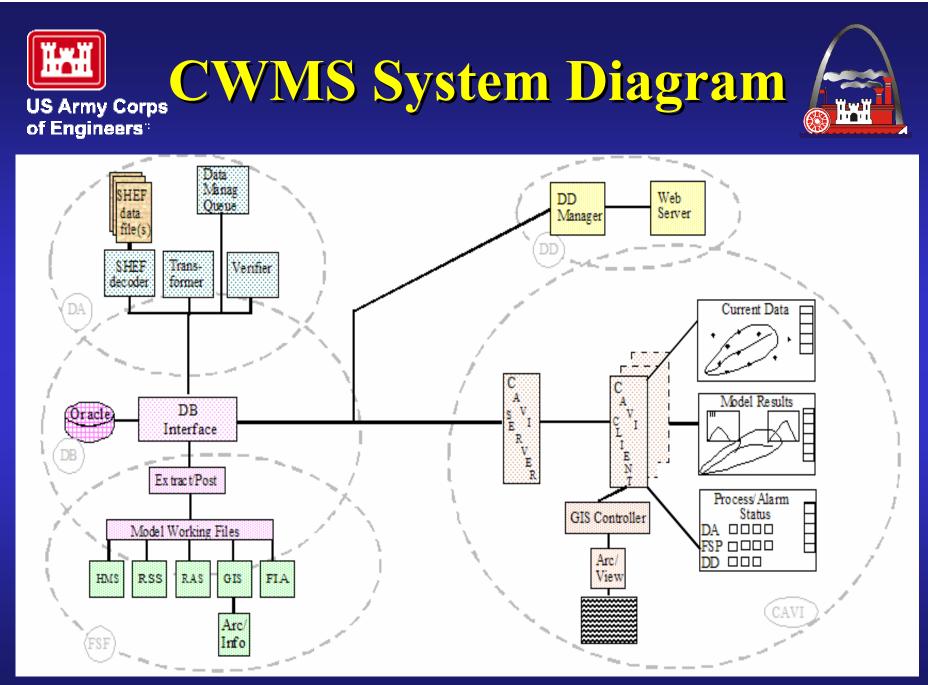
Data Visualization

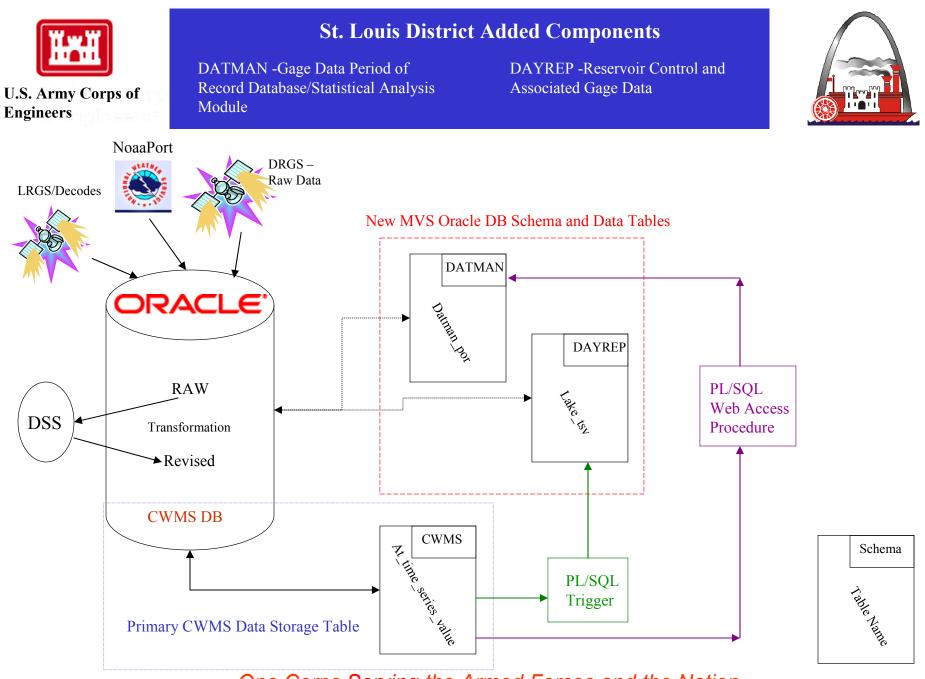


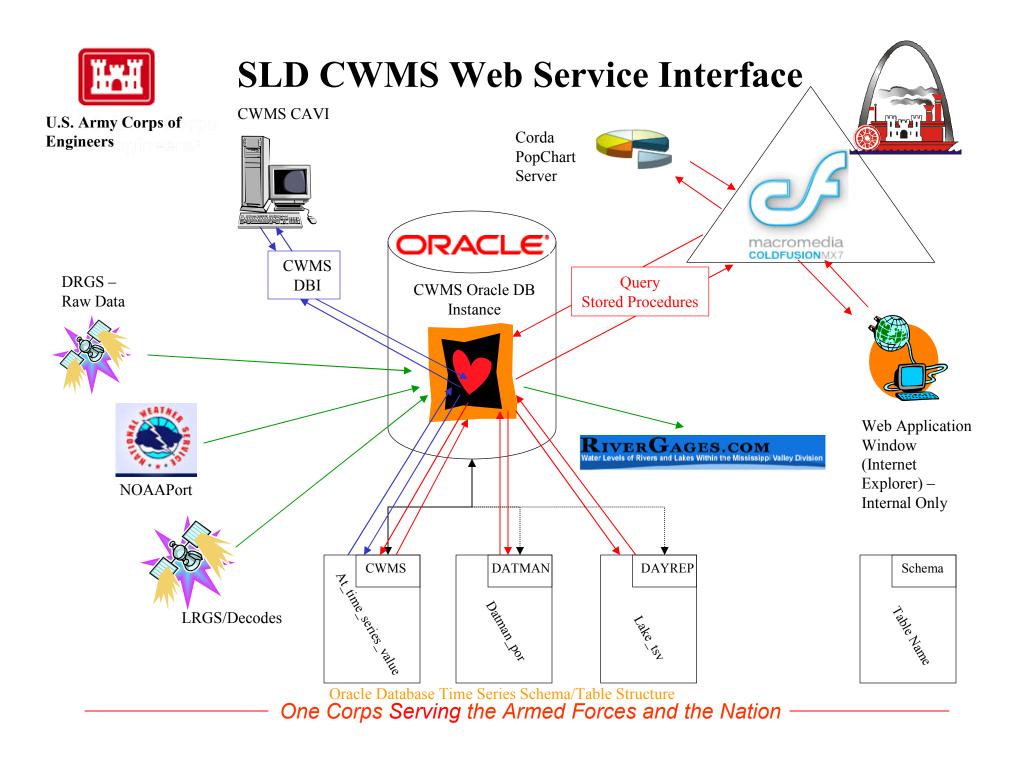












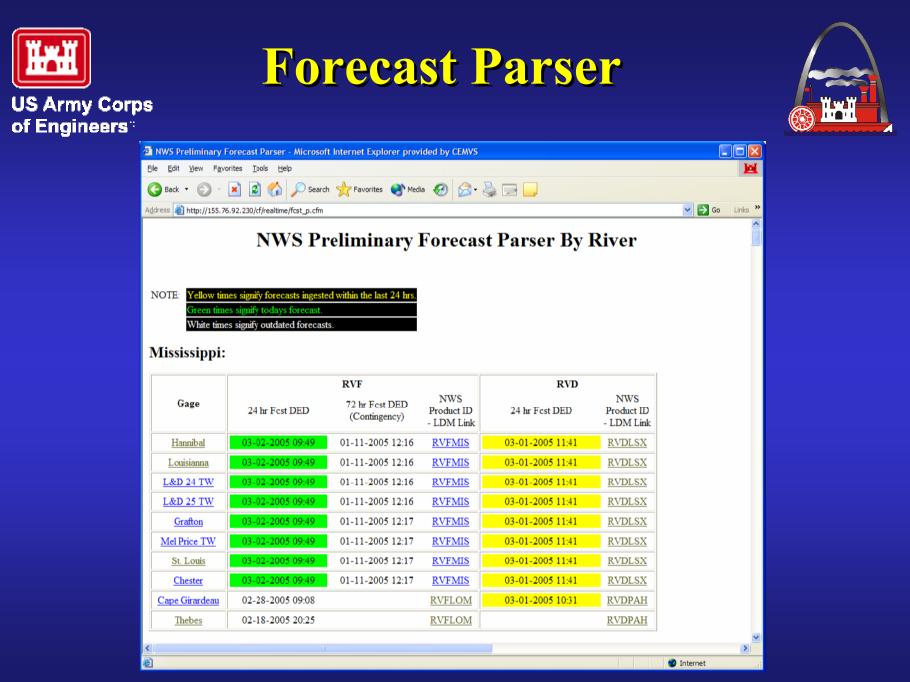


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Lake Reports (PCREP)



CARLYLE Data Sheet -	ARLYLE Data Sheet - Microsoft Internet Explorer provided by CEMVS								et - Micr	osoft Int	ernet Ex	plorer pro	ovided by CE	MVS					
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DATE: 07-20-2005	submit	previous day	next day pr	int page print	U	00:00 💌	2.70	2.90	2.70	2.70	9930	Day	(dsf)	(dsf)	w/ Evap (dsf)	(dsf)	Flag		
						NONE 💌						02-24-2005	-5400	9930	4557	4950	Y 💙		
			Upstream G	ages			NONE 💌						02-25-2005	-5000	9850	4877	4870	Y 💙	
				-		0600 hr	NONE 💙						02-26-2005	-4900	9820	4947	4560	Y 💙	
Station		0600 hrs	1200 hrs	1800 hrs	2400 hrs	today	NONE 💌						02-27-2005	-5330	9910	4607	4610	Y 💙	
Ramsey, IL	STAGE: STAGE:	81.93 2.91	81.91 2.87	81.91 2.86	2.83	81.89	NONE 💙	Ē					02-28-2005	-6200	9890	3717	4400	N 💙	
Vandalia, IL	FLOW:	180	2.87	2.80	2.85	166	NONE 💙						03-01-2005	-4990	9890	4968	4970	N 🗸	
Brownstown, IL - Hickory Cr.	STAGE:	3.34	3.33	3.33	3.32	3.32							Signifies es	timated va	ilue	Save Inflow	Reset Is	nflow	
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Mullberry Grove, IL - Hurricane Cr.	STAGE:	3.09	3.09	3.12	3.18	3.16			e Office - 24-1	hour Precipita		_			Sum	of Computed			
Humane Cr.	FLOW:	7	7	8	10	9	0.0				Precipitation	_	Date of Las			Inflow	Sum of Conc	ensus	
Fairman, IL - East Fork	STAGE:	2.74	2.64	2.57	2.52	2.48			==== Crest F Crest	'orecast ==== Date	_		02-27-		1	8685	4400		
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LAKE CARLYLE	ELEV:	444.40	444.44	444	.44	444.41						200000							
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Webrep Bulletin



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NOTE:	U.S. ARMY CORPS OF ENGINEERS, ST. LOUIS DISTRICT, RIVER & RESERVOIR DAILY REPORT (PHONE: 800-432-1208) NOTE: ALL WATER LEVELS GIVEN IN STAGE, UNLESS INDICATED (GAGE ZERO + STAGE = ELEVATION {el} FORECASTS INCLUDE OBSERVED PRECIP UP TO 6AM TODAY + EXPECTED PRECIP TO 6AM TOMORROW ONLY. LAST MODIFIED: Wednesday - March 2, 2005 10:00 AM														
River	Gage	6am	24hr		Nation	al Weat	her Service River For	rcast	Flood			Record			
Mile	Station	Levels	Chg	Ne	xt 3 days	1	Forecast Time	Crest/Date	Level	Zero	Level	Date			
MISS	ISSIPPI RIVER														
309.0	Hannibal	-M-		11.1	11.0	11.0	03/01/05 11:41		16.0	449.43	31.80	7-16-93			
301.2	L&D 22 TW	7.2	0.1	6.7	6.5	6.2	03/01/05 11:41		16.0	446.10	29.58	7-25-93			
282.9	Louisiana	12.2	0.1	12.1	12.1	12.1	03/01/05 11:41		15.0	437.33	28.40	7-28-93			
273.5	L&D 24 HW (elev)	448.6	-0.1							421.81					
273.2	L&D 24 TW	17.2	0.4	16.4	16.0	15.7	03/01/05 11:41		25.0	421.81	37.70	7-29-93			
260.3	Mosier Landing (elev)	436.1	0.2						441.0	400.00	454.30	7-29-93			
241.5	L&D 25 HW (elev)	433.5	0.2							407.00					
241.2	L&D 25 TW	17.0	0.1	16.5	16.3	16.1	03/01/05 11:41		433.0	407.00	39.60	8-1-93			
218.6	Grafton	15.8	0.2	15.7	15.9	15.9	03/01/05 11:41		18.0	403.79	38.20	8-1-93			
	Mel Price L&D HW (elev)	418.0	0.1							395.48					
200.5	Mel Price L&D TW	9.3	0.0	8.9	8.6	8.3	03/01/05 11:41		21.0	395.48	42.70	8-1-93			
180.0	St. Louis	11.2	-0.4	11.0	10.4	9.9	03/01/05 11:41		30.0	379.94	49.60	8-1-93			
136.0	Brickeys Landing	12.6	-1.0						26.0	357.78	47.00	8-5-93			
109.9	Chester	14.6	-1.1	14.2	13.9	13.4	03/01/05 11:41		27.0	341.05	49.70	8-7-93			
52.1	Cape Girardeau	21.3	-1.0	20.7	20.3	-901.0	03/01/05 10:31		32.0	304.65	47.90	8-8-93			
43.7	Thebes	21.1	-0.8						33.0	300.00	45.50	8-7-93			
20.2	Thompson Landing	31.4	-1.1						319.0	280.00	51.95	5-28-95			
2.0	Birds Point	33.1	-0.9						38.0	274.53					
ILLIN	OIS RIVER														
-	Morris	7.4		7.0	6.8	6.7	03/01/05 21:03		13.0	478.50	24.60	2-24-85			
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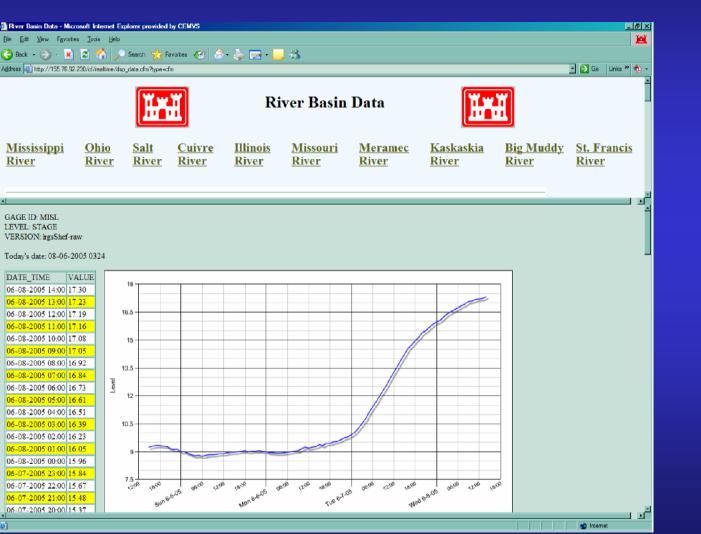


River Basin Data - Microsoft Internet Explorer provided by CEMVS					
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Station		Water Level	(ft.) Increment	ntal Precip (in.)	<u>i</u>
	Time of Value (CDT)	eve	ast 24hr change	Last 24hr	30 Day Data
HANNIBAL, MO	03-02-2005 09:00	11.5	<u>0.15</u> <u>0</u>	<u>0</u>	STAGE ELEV
LOCK AND DAM 22 (LOWER) SAVERTON, MO	03-02-2005 10:00	7.17	<u>0.1</u> <u>0</u>	<u>0</u>	STAGE ELEV
MUNDY'S LANDING, MO Manually Read Gage		-		-	-
LOUISIANA, MO	03-02-2005 10:00	12.11	0.02	-	STAGE ELEV
LOCK AND DAM 24 (IDDED) CLADKSVILLE MO		140 56	0.1		STACE FIEU



Real-time Oracle Data Reports

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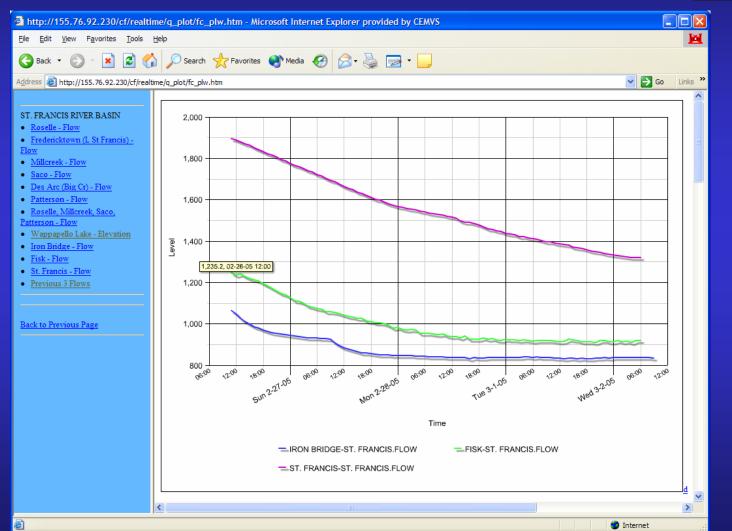




Plot Macros









US Army Corps of Engineers

Precipitation Tables



Cumalative Precip - Microsoft Internet Explorer provided by CEMVS															
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Way Y	St. Louis District														
	Cumulative Precipitation Table														
The St	Gage Lo	cation		R	liver	6 hr	12 hr	24 hr	48 hr	72 hr	Zero hr	1 121.52			
100.00	ROLI	.A		MER	AMEC	0	0	0	0	0.12	03-02 09:45	L <u>200</u>			
	STEELV	ILLE		MER	AMEC	0	0	0	0	0.10	03-02 09:30				
Www.Y	SULLIV	AN		MER	AMEC	0	0	0	0	0.03	03-02 09:45	1 11 11			
1987.33	UNIC	N		BOUI	RBEUSE	0	0	0	0	0.05	03-02 09:30	L <u>200</u>			
	PACIF	IC		MER	AMEC	0	0	0	0.01	0.06	03-02 09:45				
191-5-1	EUREI	KA		MER	AMEC	0	0	0	0	0.05	03-02 09:30	1 191-00			
198CM	RICHWO	OODS		H	BIG	0	0	0	0	0.10	03-02 09:45	1 1900			
11xJ	VALLEY	PARK		MER	AMEC	0	0	0	0	0.05	03-02 09:45				
81-5-8	ARNO	LD		MER	AMEC	0	0	0	0	0.12	03-02 09:45	1 191-00			
<u>incut</u>			1	VOTE: Zero	o hour refe	ers to time	of most cu	rrent prec	ipitation a	lata		1 1900			
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Historic Data Management DatRep

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Gage: General Info Records Ava Mean Level: Extreme Lev Zero Gage D ALL VALU Day 1 2 3 4 5	A C B B B C C C C C C C C C C C C C C C C	IOUTH OF IOMBINED Y THE ST. DATA COLI RIDGE. OV IOOPERAT LOOD STA LOOD STA UVIDE BAS TAGE, JAN VEATHER DATA AFTI ERIOD OF FERIOD OF FERIOD OF 79.94 ft NC IDED AT 8 February 7.73 8.62 9.69 9.77 9.77	THE MISS SLOPE AL LOUIS DI LECTION VNED & O ION WITH GE 30 FT INN ARE N I 1861 TO SERVICE & ER 1979 PI RECORD, RECORD, WD. NOTH AM. STAG March 6.42 6.27 6.67 7.37	SOURI RIV ND VERTI STRICT (C PLATFOR PERATED H THE US (DRAINAG OT INCUE DATE. NC & USCS. DI UBLISHED 11.23 FEE HIGHEST: E: ADD DA E IN FT: April 8.15 8.15 8.15 8.15 8.15	ER AND A CAL STAF ORPS OF E M WITH P D BY ST. L GEOLOGIC E AREA, 6 DED. TTE: STAG SCHARGE, PBY USGS. T 49.50 FEF TUM TO S May 18.40 17.40 16.57 15.82 15.30	T MILE 1 F GAGE A' NGINEER' PRESSURE DUIS DIST CAL SURVE 97,013 SQ ES FOR GA JAN 1861 ET ON AUG STAGE TO MO June 9,31 9,10 8,89 8,72 8,85	79.6 ABOV 17.17427 17.17427 17.17427 17.17427 17.17427 17.17427 17.17427 17.17427 17.17427 10.1993 10.0057417 11.52 11.81 11.35 10.88 10.42	E THE M IIILES 179 UVXILLAJ SER AT R PS OF EN ES. NOTE ADS BRIDO ALSO IN & LOWF ELEVATI August 7.57 7.37 7.15 6.94 6.73	OUTH OF T 6. OWNED, Y GAGE IS IVER MILE GINEERS. M 3: 4,000 SQU 3: 5,000 SQU 3: 5,0	HE OHIO OPERAT G.O.E.S. 1 IAINTAIN ARE MIL UBL ISHED DF USGS. 1 ET ON JAU ET ON JAU October 3.32 3.19 3.05 2.92 2.92	RIVER. ED & MAI FELEMETT ELEMETT ES IN GREJ D BY NATIC ALL DISCH N 16, 1940 November 2.35 2.35 2.35 2.61 2.61	NTAINED ERED ON EADS AT ONAL IARGE 2.81 2.81 2.81 3.38 3.94		
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US Army Corps of Engineers[®]

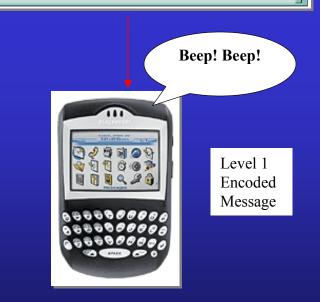
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MISSISSIPPI - ST. LOUIS (MISL)													
MISSISSIETT - 51, E0015 (MISE)													
Location: LAT. 38-37-44, LONG. 90-10-47, AT THE FOOT OF MARKET STREET, 15 MIL OF THE MISSOURI RIVER AND AT MILE 179.6 ABOVE THE MOUTH OF THE		AM FROM THE MOUT	H										
Gage: COMBINED SLOPE AND VERTICAL STAFF GAGE AT RIVER MILES 179.6. OW	NED, OPERATE												
THE ST. LOUIS DISTRICT CORPS OF ENGINEERS. NOTE: AUXILLARY GAGE COLLECTION PLATFORM WITH PRESSURE TRANDUCER AT RIVER MILE 1													
OWNED & OPERATED BY ST. LOUIS DISTRICT CORPS OF ENGINEERS. MAIN THE US GEOLOGICAL SURVEY (USGS).	NTAINED IN COO	PERATION WITH											
General Information: FLOOD STAGE 30 FT DRAINAGE AREA, 697,013 SQUARE MILES. NOTE: 4,00	0 SQUARE MILES	IN GREAT DIVIDE											
BASIN ARE NOT INCUDED. Records Available: STAGE, JAN 1861 TO DATE. NOTE: STAGES FOR GAGE AT EADS BRIDGE AL	SO PUBLISHED E	Y NATIONAL											
WEATHER SERVICE & USGS. DISCHARGE, JAN 1861 TO DATE ALSO IN REPO AFTER 1979 PUBLISHED BY USGS.	ORTS OF USGS. AI	L DISCHARGE DATA											
Mean Level: PERIOD OF RECORD, 11.23 FEET													
Extreme Level: PERIOD OF RECORD, HIGHEST: 49.50 FEET ON AUG. 01, 1993 & LOWEST: -6 Zero Gage Datum: 379.94 ft NGVD. NOTE: ADD DATUM TO STAGE TO OBTAIN ELEVATION.	.2 FEET ON JAN	16, 1940											
ATT VALUE PECODDED AT CANCETACE DIET.													
ALL VALUES RECORDED AT SAM. STAGE IN FT:			_										
Frequency	Duration												
Interval Total Precent Level WS >= 39 86 0.16 >= 39	Total 86	Precent 0.16											
34 >= WS < 39 14 0.03 >= 34	100	0.19											
29 >= W8 < 34 79 0.15 >= 29	179	0.34											
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🛛 UB	Alan	n was a	tivate	d for the g	jage S	T. LOUIS	MISSISS	PPI - Mea	sage (HT	ML)	
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From: To: Cc:	As	unskis, Jo	el P MN	s			ce.army.mi]			Sent:	Wed
Subject	: UB	Alarm w	as activ	ated for the	gage S	T. LOUIS-	ISSISSIPPI				
was ST. MIS ::: U 06- 06- 06-	acti LO SL, S B A 08-2 08-2 08-2	LARM 2005 14 2005 13 2005 12 2005 11	or the (ISSIS (S) ::: :00 1 ::00 1 ::00 1	gage SIPPI hef-raw 7.30 7.23 7.19 7.16							
		2005-10 heck lin		7.08 see if mit	igation	is neces	sary!				



	Gage	Level	Up bnd	Up off set	Ovr up	Lw bnd	Lw off set	Ovr Iw	Chg	Ovr chg
	MISL	STAGE	30.00	0		0	0		1.00	
	MI2T	STAGE			V				1.00	
	MI4P	ELEV	449.00	0.20		445.50	0.10			
	MI4T	STAGE	25.00	0		12.30	0			
	MILO	STAGE	12.20	0.05		11.50	0.05		0.50	
	MI5P	ELEV	434.00	0.20		429.70	0.10			
	MI5T	STAGE	26.00	0		11.50	0			
	MIML	ELEV	437.00	0.05		434.00	0.05		1.00	
	MI6P	ELEV	419.00	0.20		412.50	0.10			V
)	MI6T	STAGE	21.00	0		0.82	0			
	MIAL	ELEV				414.00	0			
2	KANP	ELEV	368.80	0.20		363.00	0.10			
}	KARB	ELEV	370.00	0.20		368.00	0.10		1.00	
ļ.	SARR	ELEV				520.20	0			N
j –	MIGR	STAGE	16.20	0.05		14.20	0.05		1.00	
	mit Change Gage:	s								

Gage ID	Level	UP BND	UP off set	OVR UP	LW BND	LW off set	OVR LW	Int chg	OVR CHG

Add Gage

Email Management:

	First Name	Last Name	Email	Alarm
1	Joan	Stemler	joan.m.stemler@mvs02.usace.army.mil	
2	Mary	Miles	mary.m.miles@mvs02.usace.army.mil	
3	Joel	Asunskis	joel.p.asunskis@mvs02.usace.army.mil	
4	David	Busse	david.r.busse@mvs02.usace.army.mil	
5	Don	Coleman	donald.m.coleman@mvs02.usace.army.mil	
6	Jerry	Rapp	robert.j.rapp@mvs02.usace.army.mil	
7	Leonard	Hopkins	leonard.1.hopkins@mvs02.usace.army.mil	
7		Hopkins	leonard.l.hopkins@mvs02.usace.army.mil	
7 Submit Change		Hopkins	leonard.l.hopkins@mvs02.usace.army.mil	
7 Submit Change		Hopkins	leonard.l.hopkins@mvs02.usace.army.mil	



of Engineers*

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- U.S. Army Corps of Engineers
 St. Louis District