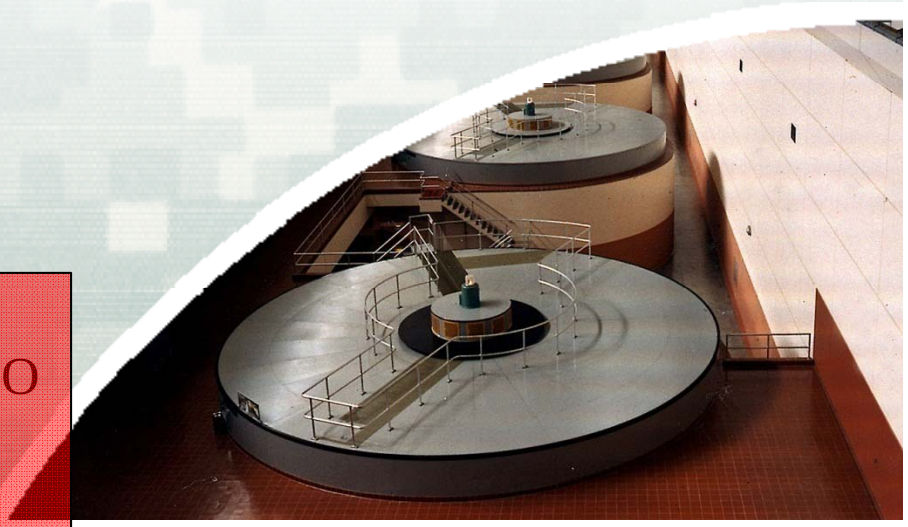
Missouri River Flood Task Force Team
River Management

April 16th	11:00 a.m.	Fort Peck, MT
April 16th	7:00 p.m.	Bismarck, ND
April 17th	11:00 a.m.	Pierre, SD
April 18th	7:00 p.m.	Omaha, NE
April 19th	1:00 p.m.	Jefferson City, MO
April 19th	7:00 p.m.	St. Joseph, MO
April 20th	11:00 a.m.	Sioux City, IA



Tickets still available!!!

US Army Corps of Engineers
BUILDING STRONG®

Independent External Review Panel

Panel Recommendations

1. Support a program of infrastructure enhancement.
2. Update hydrologic studies to include 2011.
3. **Review of System storage allocations.**
4. Improved cooperation/collaboration with NWS, USGS and NRCS.
5. Studies to enhance data collection and forecasting (especially plains snow).
6. Implement modern interactive, graphics decision support system.

Analysis of Missouri River Mainstem Flood Control Storage

- **Two Step Process**
  - ► **Determine the potential effect of additional flood control storage on 2011 releases.**
  - ► **Evaluate potential economic impacts of alternative flood control scenarios.**

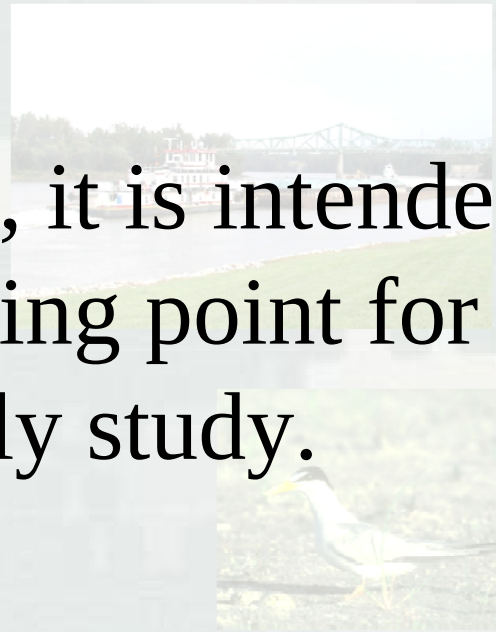
- **Report available at:**

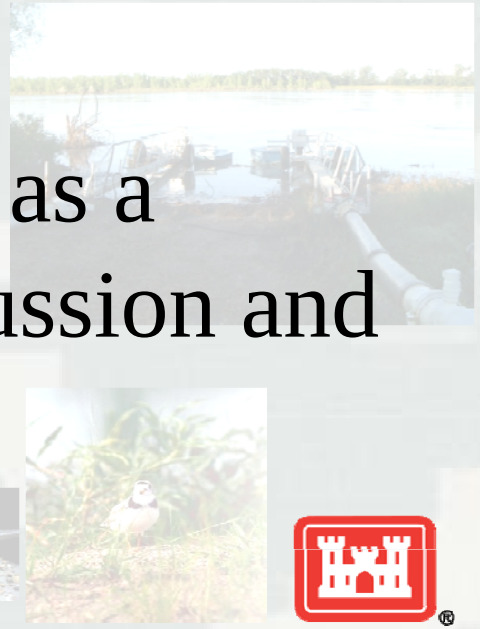
http://www.nwd-mr.usace.army.mil/rcc/

Analysis of Missouri River Mainstem Flood Control Storage



- This is **not** intended to be a decision document



- Rather, it is intended to be used as a launching point for further discussion and possibly study.

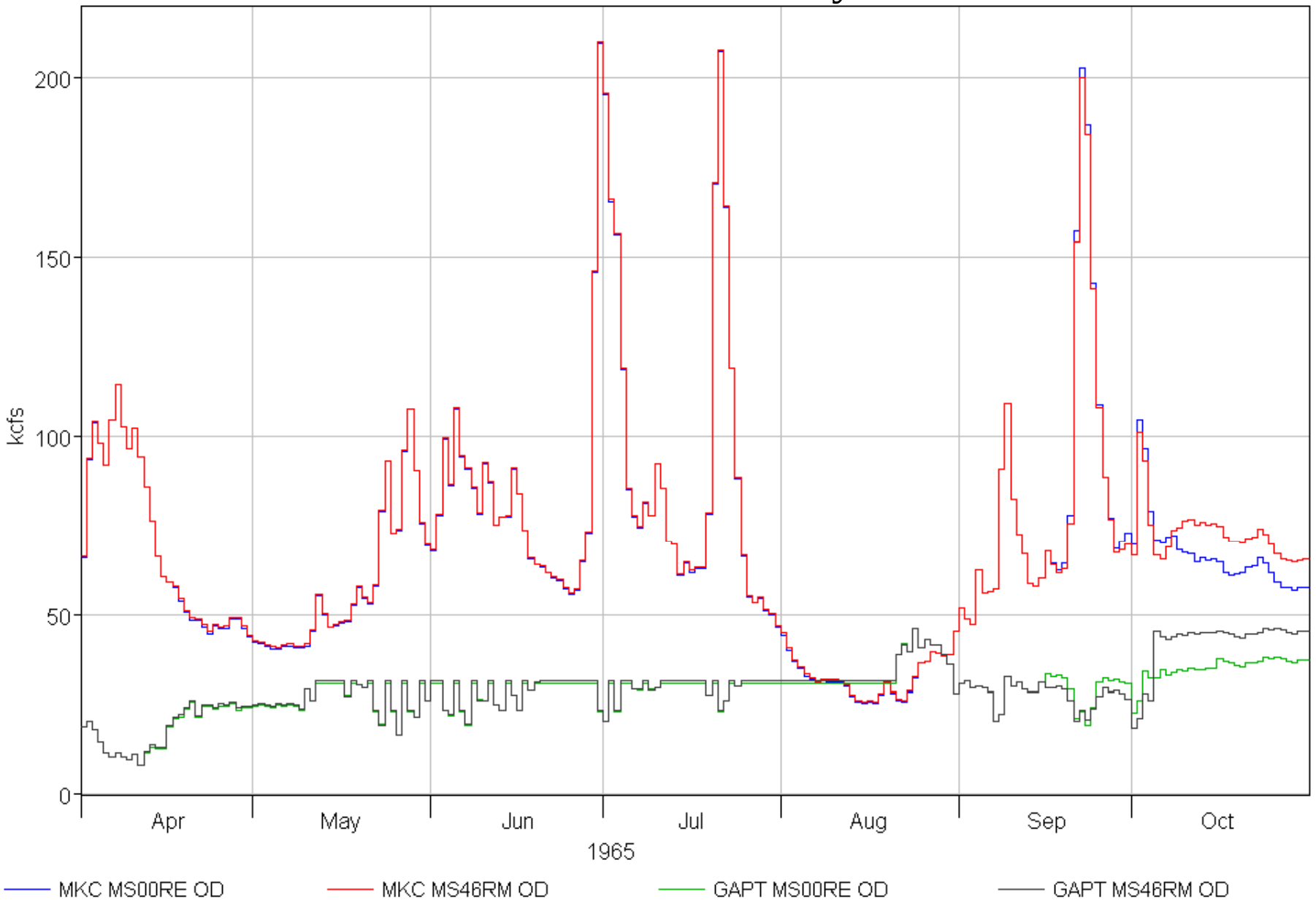
Analysis of Missouri River Mainstem Flood Control Storage

- **Limitations**
  - ► **A very quick analysis using existing tools.**
  - ► **Does not include climate change.**
  - ► **Does not include alternatives that incorporate multi-year flood control regulation or new projects.**
  - ► **Does not include updated stage-damage curves.**
  - ► **Does not include environmental or cultural resource impacts.**

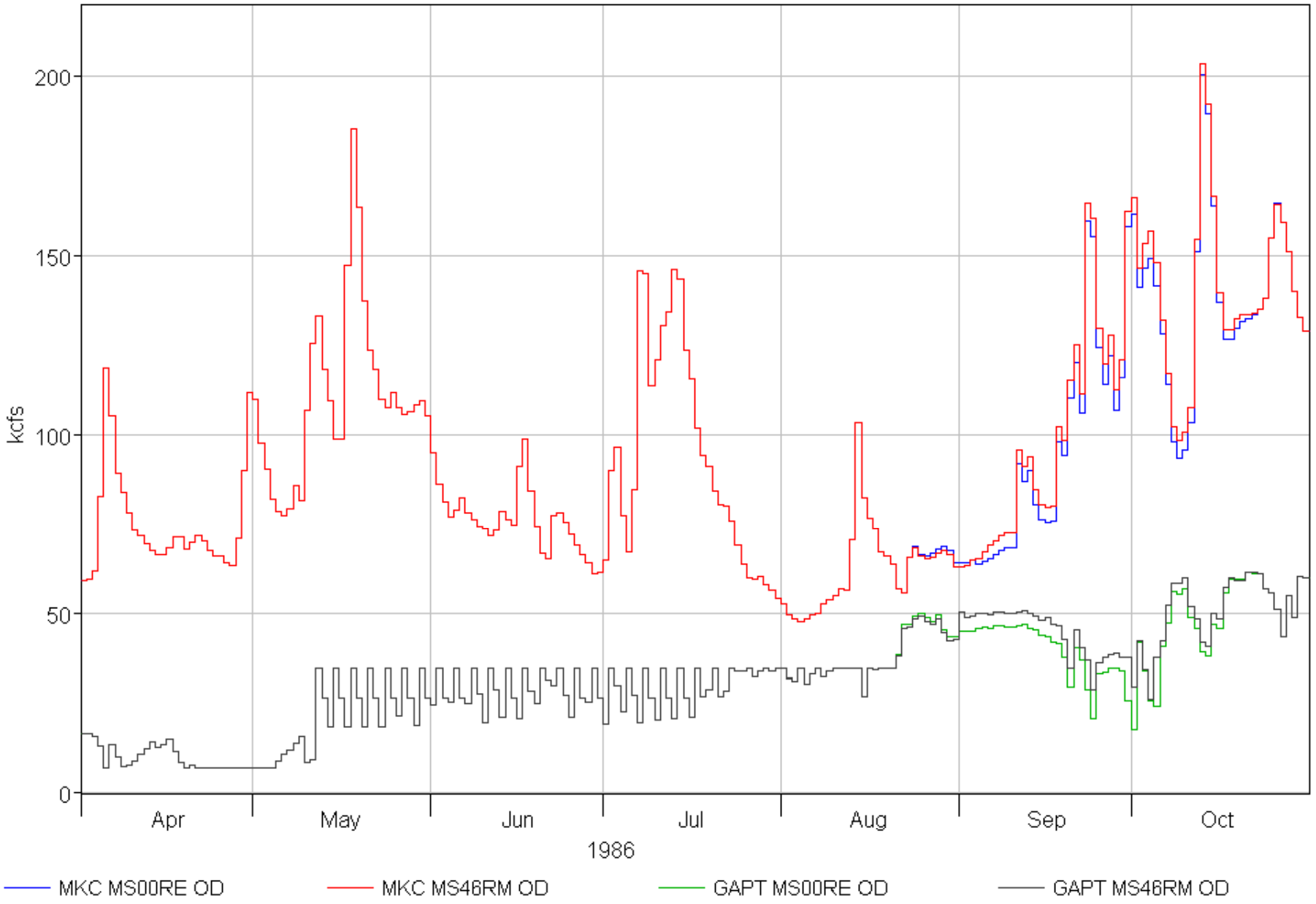
Analysis of Missouri River Mainstem Flood Control Storage

- Why only 3% increase in FC benefits for 2011?
  - Tremendous damages occurred with historical releases throughout the system – 66 kcfs @ Fort Peck; 150 kcfs @ Garrison; and 160 kcfs from lower 4.
  - With additional 4.6 MAF of storage, tremendous damages still would have occurred with releases of 100 kcfs from lower 4, 70 to 90 kcfs from Garrison and 24 kcfs from Fort Peck.
  - For example, L-575 levee breach and Interstate closings occurred when Gavins releases were at 77 kcfs and 100 kcfs, respectively (page 19) and reaches between reservoirs would have been inundated.

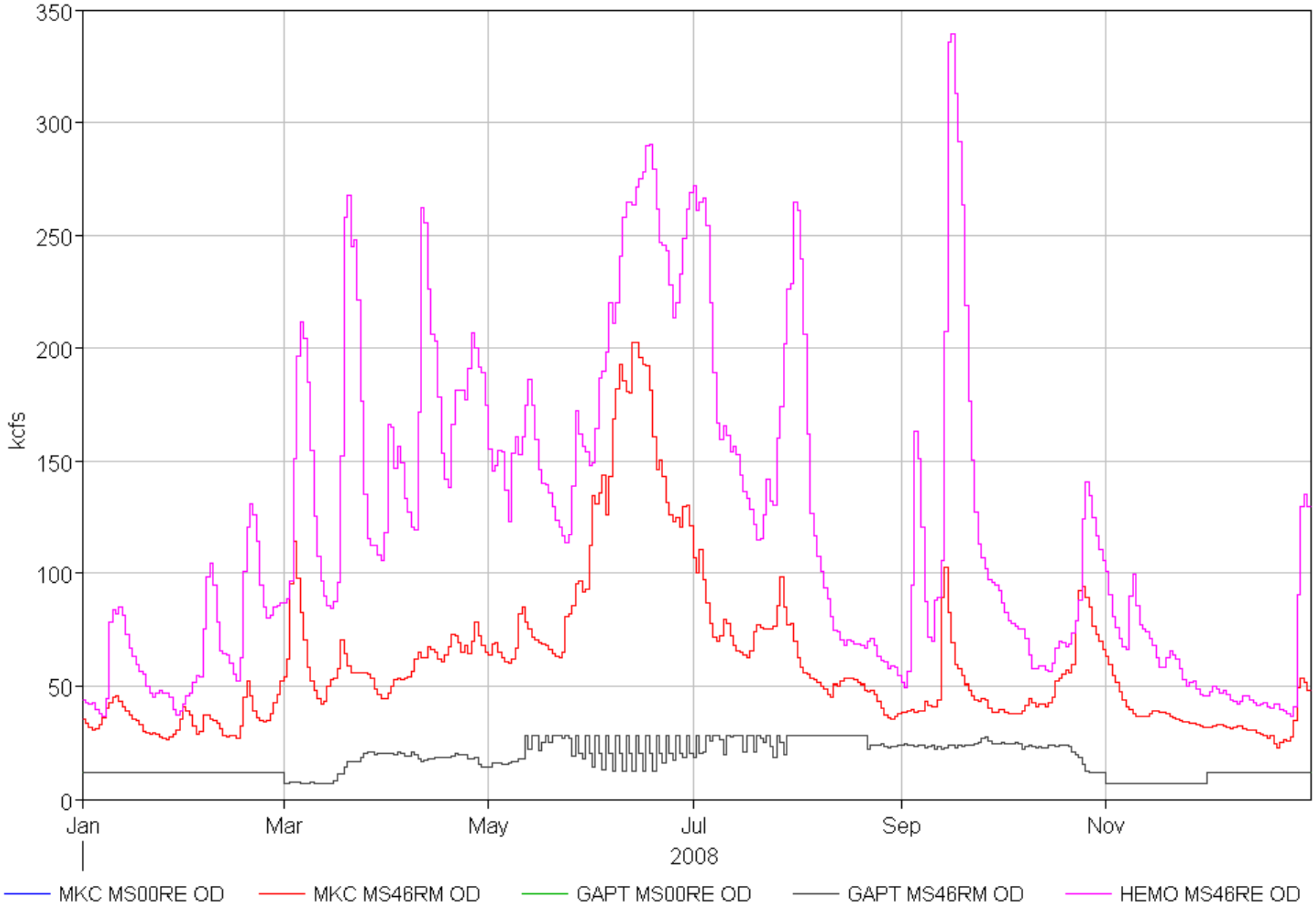
Missouri River at Kansas City - 1965



Missouri River at Kansas City - 1986



Missouri River at Hermann - 2008



How much is 61.0 MAF?

Flow vs. Volume

1 cubic foot per second (cfs) for 1 day = 1.9835 acre-feet

[(60 * 60 * 24) / 43,560 = 1.9835]

61,004,000 acre-feet* over 1 year (365 days) equals an average daily flow of **84,300 cfs**

50,754,000 acre-feet** over 1 year (365 days) equals an average daily release of **71,100 cfs**

* Missouri River at Sioux City, IA (includes James and Big Sioux River basins)

** Missouri River at Gavins Point Dam

Releasing 61.0 MAF

In order to start the next runoff season at the base of FC, we must release all runoff received in that runoff season.

Above Gavins Point: 50,754,000 acre-feet

- Winter Release: 30,000 cfs (3 months)
- Open Channel Release: 83,000 cfs (9 months)

Tributary flows downstream of Gavins needs to be considered.

Major Tributary Runoff

Average Monthly Flow (cfs) during 2011

Tributary	Mar	Apr	May	Jun	Jul
James	8,000	16,300	12,300	7,500	9,200
Big Sioux	9,600	12,000	8,300	9,400	7,800
Little Sioux	3,900	3,700	4,100	6,700	6,800
Platte	11,700	13,700	16,000	20,700	16,300
Nishnabotna	1,500	1,800	2,500	4,500	2,900
Total	34,700	47,500	43,200	48,800	43,000

Source: USGS

Analysis of Missouri River Mainstem Flood Control Storage

- Conclusions
  - Additional flood control storage would enhance flood risk reduction in a repeat of the 2011 flood, but would not have prevented record releases in 2011.
  - Additional flood control storage would have a negative impact on other authorized purposes.
  - Additional flood control storage would have little impact on lower basin rainfall driven flood events such as 2010.
  - Flood control storage is one piece of the solution; increasing channel capacity and reducing encroachment in the flood plain would further enhance flood risk reduction.

Analysis of Missouri River Mainstem Flood Control Storage

- What's Our Next Step?
  - ►This study is a launching point for additional discussion.
  - ►Flood control storage requires empty space; the other seven authorized purposes require water-in-storage.
  - ►What goes in, must come out, unless it stays in. (L. Cieslik)
  - ►Do we size the church for Easter Sunday? (R. Hargrave)
  - ►What provides the best economical and environmental benefit for the entire basin for every year – wet, dry or normal?