

Design Flood

- Represents a critical storm over the Martin basin.
 - (100 year or 1% recurrence)
- Compare Impacts of changes in flood control operations.

100 Year or 1% Flood

- Specific Definition:
 - Based on annual instantaneous peak flows.
 - FEMA primary interest is flood elevations.
 - Has legal and economic significance.
 - 1% probably of recurrence each year.

Flood Frequency Analysis

- Corps' Unsmoothed Unimpaired flow database.
- HEC-FFA package (based on Bulletin 17B).
- 1, 3, & 5 day average flows.
- Reflects peaks and volume.
- Completed Nov. 2005.
- Reviewed by USGS & COE.

Figure 6-4: Exceedence Curve for Unregulated 1 Day Average Flow at Martin
(1030 2005)

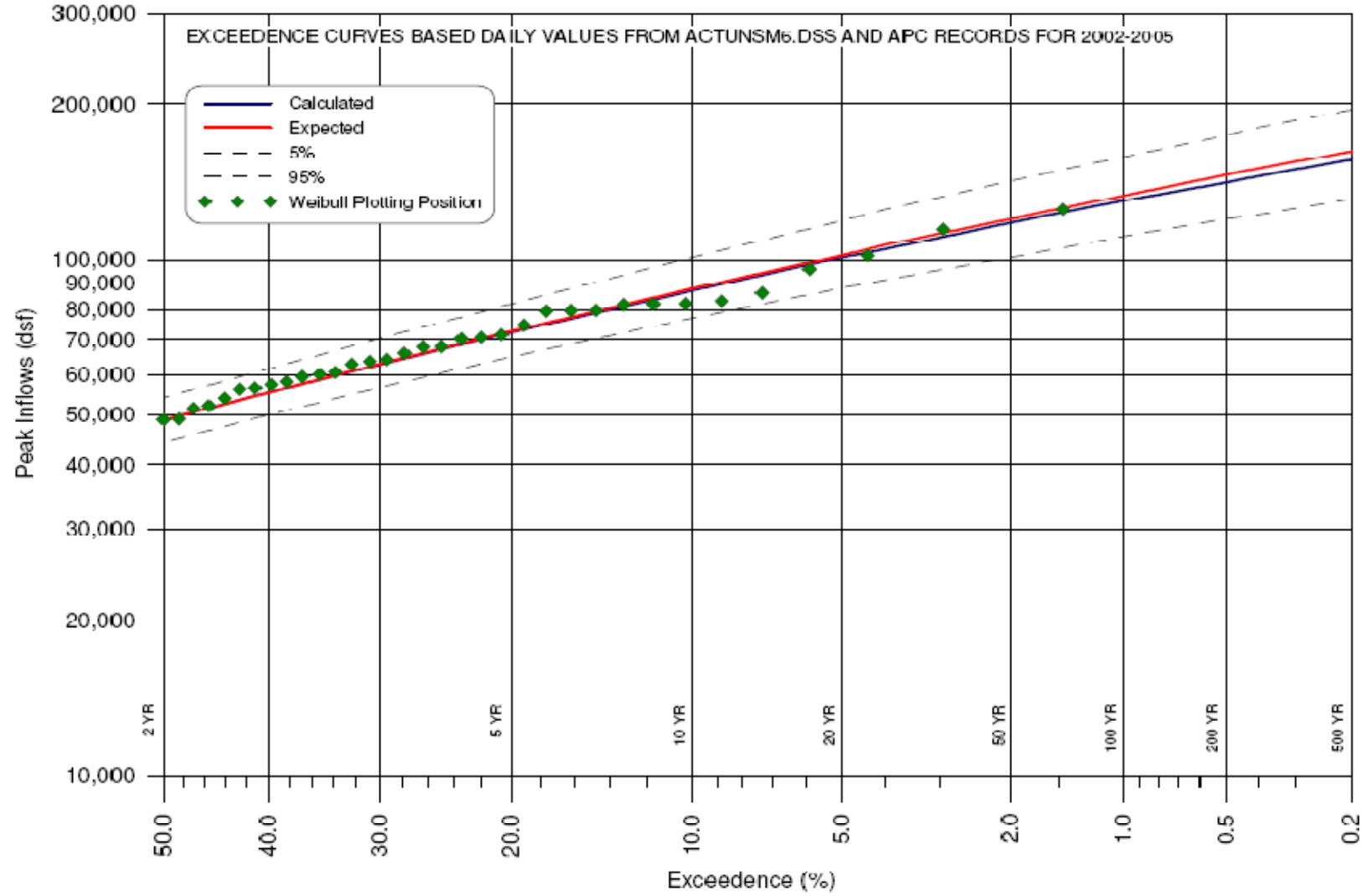
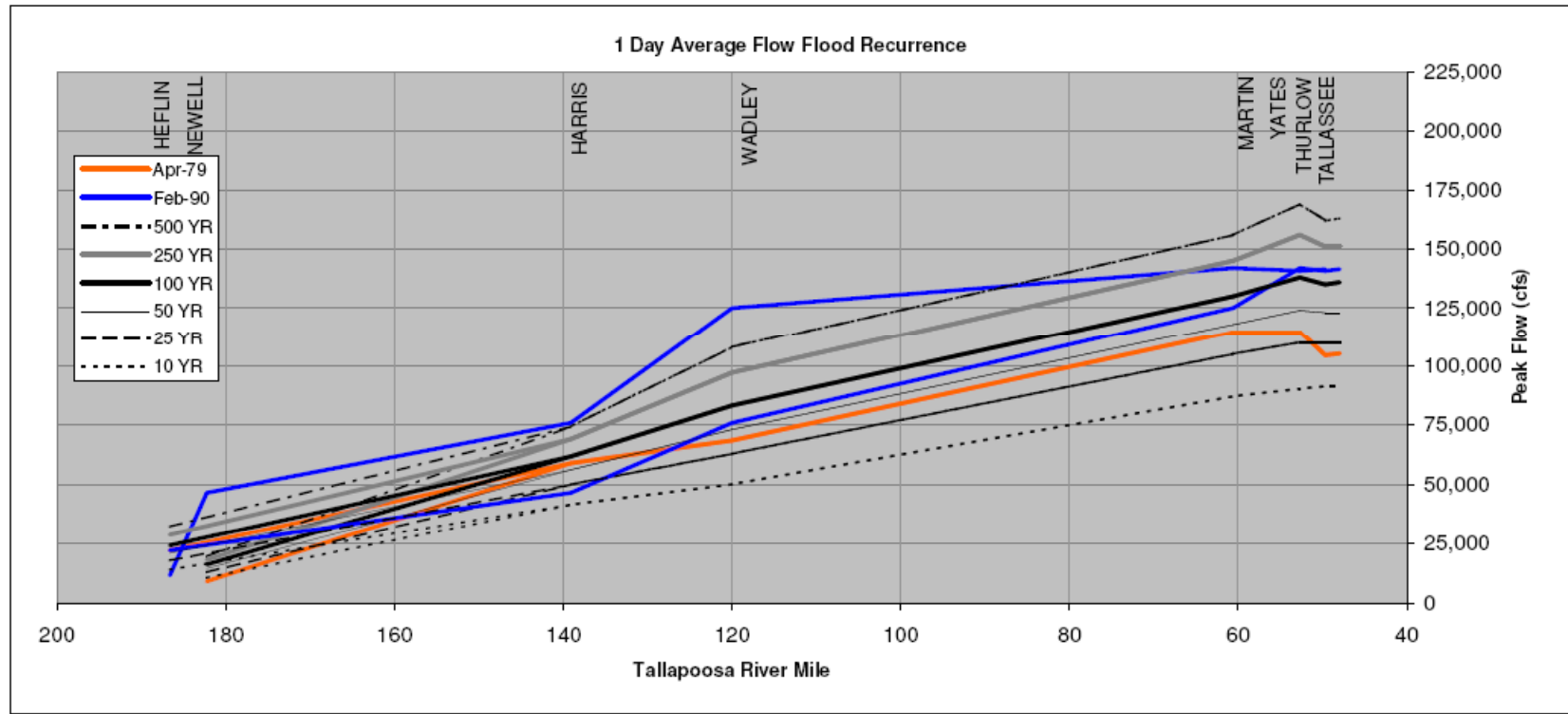


Figure 3: Unregulated 1 Day Average Flow Flood Recurrence

Location	RM	10YR	25YR	50YR	100YR	250 YR	500 YR	Apr-79	Feb-90		Modify Apr-79	Modify Feb-90
Heflin	186.62	14,100	18,000	21,100	24,300	28,800	32,400	22,202	22,202		9%	9%
Newell	182.27	10,700	13,000	14,600	16,200	18,200	19,700	9,137	11,613		77%	39%
Harris	139.10	41,600	50,100	56,200	61,900	69,200	74,500	59,002	46,604		5%	33%
Wadley	120.00	50,200	63,100	73,100	83,300	97,200	108,000	68,567	75,976		21%	10%
Martin	60.60	87,200	105,000	118,000	130,000	145,000	156,000	114,551	125,019		13%	4%
Yates	52.70	90,300	110,000	124,000	138,000	156,000	169,000	114,552	141,920		20%	-3%
Thurlow	49.70	91,400	110,000	123,000	135,000	151,000	162,000	104,491	140,790		29%	-4%
Tallassee	47.98	91,600	110,000	123,000	136,000	151,000	163,000	105,151	141,539		29%	-4%



Design Flood Hydrograph

1. Scale the March 1990 flood hydrograph.
2. Use 1% recurrence value of the 1, 3 and 5 day average flows from FFA Study.
3. Scale the intervening flows to produce the 1, 3, and 5 day average.
4. Center the bulk of the storm over the DA between Harris and Martin

Design Flood

Average flow	Martin Inflow	
	1% FFA	March 1990
1 Day	130,000	116,644
3 Day	102,000	88,945
5 Day	80,100	67,837

Design Flood

- Peak is based on 1% recurrence from the frequency analysis of the average daily flows.
- Volumes – 1% recurrence of 3 and 5 day average flows.
- Storm parameters:
 - Intensity (in/hr)
 - Duration (hrs)
 - Spatial distribution
 - Temporal distribution

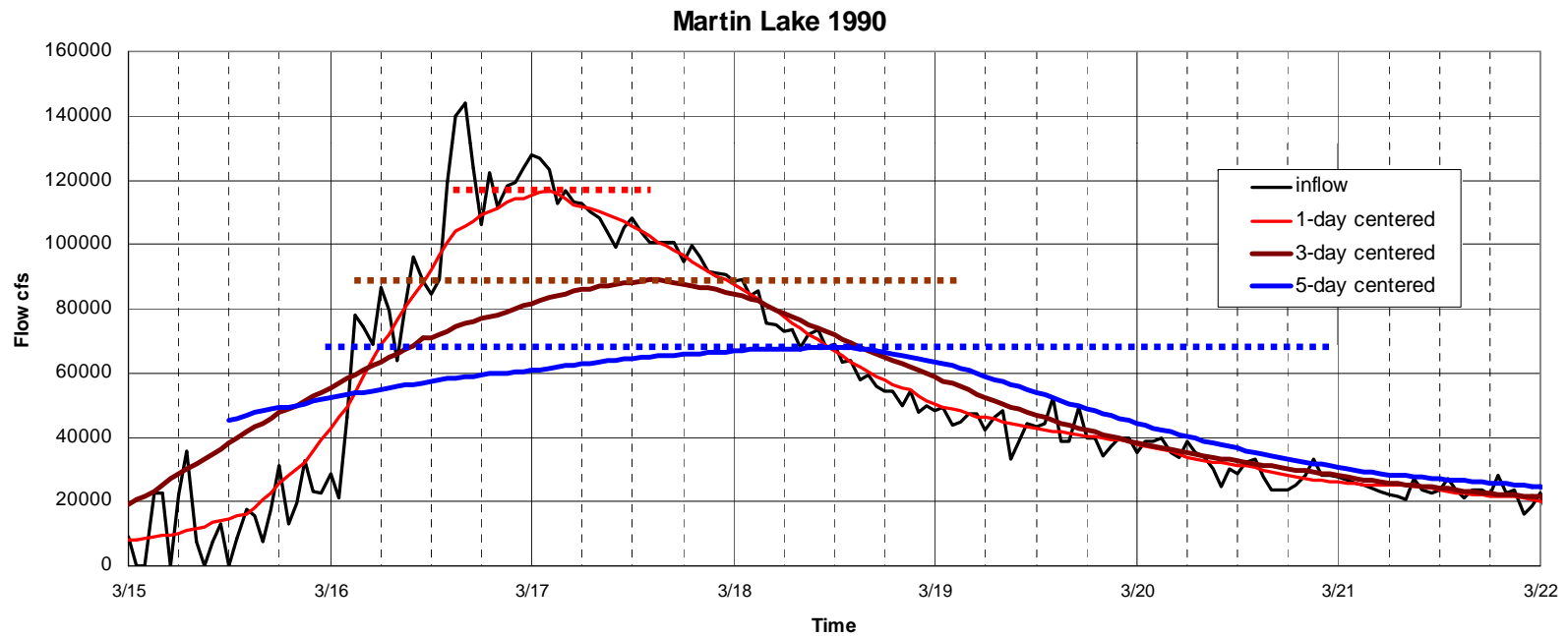
Design Flood

- Intensity & duration
 - Reflected in historical stream flow data.
- Spatial & Temporal Distribution
 - Verify spatial with TP-40
 - Historical rainfall data (limited)
 - Temporal distribution reflected in historical hydrograph shape.

Design Flood

- Position center of 1, 3 & 5 day flows to match peaks in March 1990 flood.
- Derive the scale factor.
 - Initially by ratio
 - Then adjusted to match FFA values
- Multiply each element of the 1990 hydrograph by the appropriate scale factor.

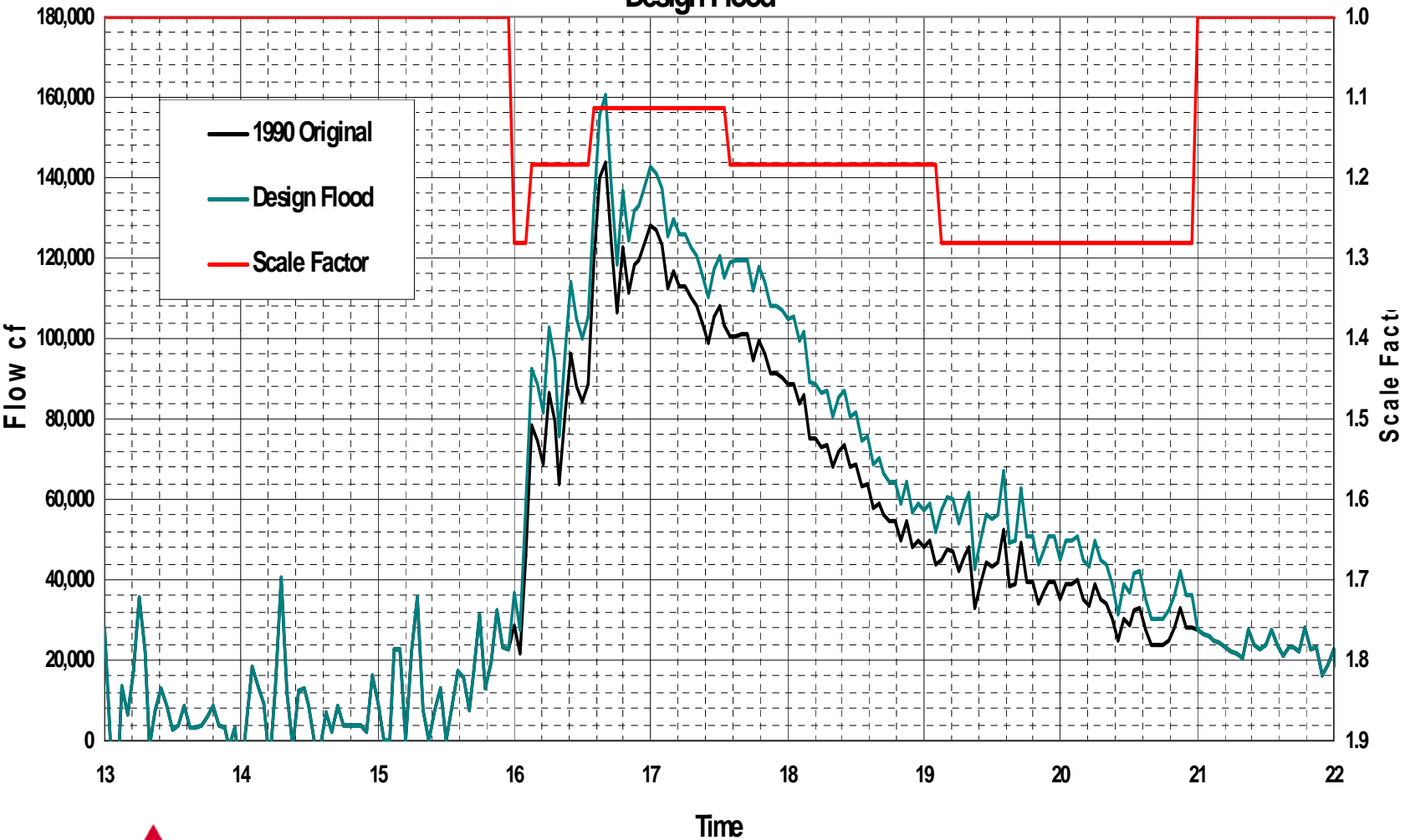
Design Flood



Design Flood

	Scale Factor	1990 Flood	FFA (cfs)	Design Flood (cfs)	
1-day	1.1145	116,644	130,000	130,000	
3-day	1.185	88,945	102,000	102,024	
5-day	1.28	67,837	80,100	80,076	

Martin Inflow Design Flood



Spatial Distribution

- Based on TP-40: 100 yr – 24hr rainfall:
 - **9.5 inches.**
- DA (Harris to Martin) = 1532 sq. mi.
- 5-day average flow represents volume
 - **80,100 cfs → 9.72 inches Runoff.**
 - Includes base flow.
 - Reflects losses.

Harris contribution

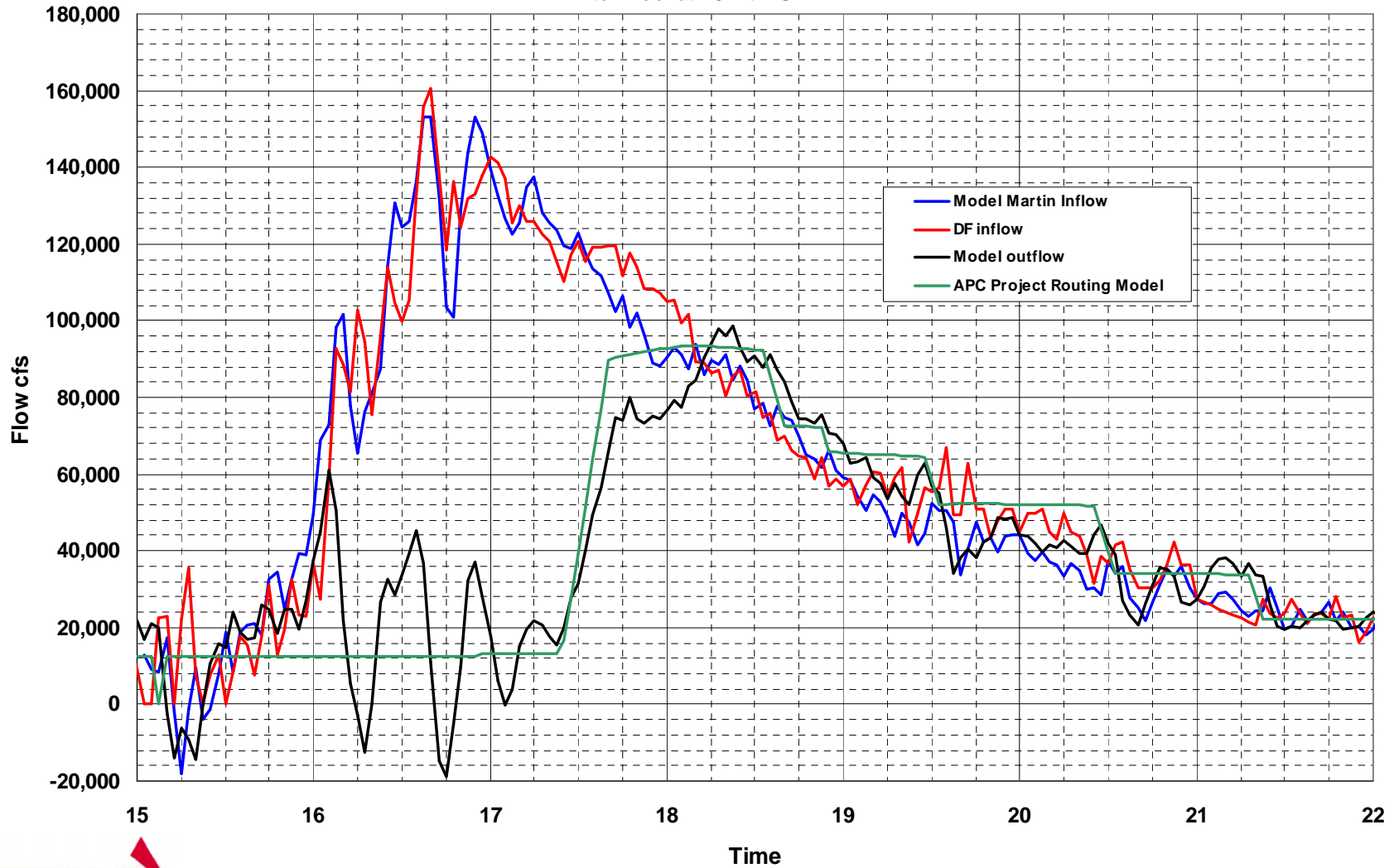
- March 1990 - 5-day average flow released from Harris:
 - 25,395 cfs
- Represents approximately 32% of the Design Flood's total inflow to Martin.

RAS Simulation

- How well does the RAS model replicate the Design flood?
- Intervening flows adjusted by scale factors

Design Flood

Winter Pool at 481 ft NGVD



Design Flood

Max EL Profiles

