

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

May 19, 2004

TO: Deb Snell, Jackson District Office
Water Division

FROM: Dave Fongers, Hydrologic Studies Unit
Geological and Land Management Division

SUBJECT: Unnamed Tributary to Honey Creek

As requested, the Hydrologic Studies Unit (HSU) of the Geological and Land Management Division (GLMD) has completed its hydrologic analysis of the unnamed tributary to Honey Creek at the Pall/Gelman Ponds discharge location.

Our delineation of the drainage area, Figure 1, is based on topography from a USGS quadrangle. The drainage area is 1.4 square miles. The delineation shown in Figure 1 includes a 1998 aerial photo. The calculated time of concentration for the drainage area, also based on the USGS quadrangle, is 2.51 hours. Based on soil and land use data, Figures 2 and 3, we calculated a runoff curve number of 73. Based on wetland and open water data, Figure 4, we calculated ponding adjustments, as shown in Table 1. You have reported that the Pall/Gelman Ponds discharge approximately 1.5 million gallons per day, with a maximum permitted of 1.87 million gallons per day. These values correspond to 2.3 and 2.9 cubic feet per second (cfs), respectively. Using these parameters, we calculated runoff volumes and peak flows for a range of rainfalls. The results are shown in Table 1 and Figure 5.

Flows which determine the channel morphology, or shape, are generally considered to be the 1- to 2-year recurrence flows and are referred to as channel-forming flows. Higher flows, because they are infrequent, generally have little influence on the channel shape. Increases in the channel-forming flows, or in the duration of these flows, can destabilize the channel morphology and result in excessive erosion. Because of land use changes and loss of flood storage, it is not unusual to calculate two- to three-fold increases in these flows as a watershed develops. The 7 percent increase in the peak flow from the 2-year storm that is attributable to the Pall/Gelman Ponds is probably minor compared to other changes in the flow regime attributable to land use and storage changes in this watershed.

Table 1: Calculated Runoff Volumes and Peak Flows

Storm Event	Precipitation (inches)	Ponding Adjustment	Runoff Volume (Acre-ft)	Flow without Pall/Gellman discharge (cfs)	Flow with Maximum Pall/Gellman discharge (cfs)
50% chance, 24-hour (2-year)	2.26	0.60	33	41	44
20% chance, 24-hour (5-year)	2.75	0.61	55	70	73
10% chance, 24-hour (10-year)	3.13	0.63	72	95	98
4% chance, 24-hour (25-year)	3.60	0.67	96	135	138
2% chance, 24-hour (50-year)	3.98	0.70	116	170	173
1% chance, 24-hour (100-year)	4.36	0.73	138	210	213

If you have questions or comments regarding our analysis, please contact me at 517-373-0210.

cc: Alec Malvetis
Ralph Reznick, WD
Ric Sorrell, GLMD



Figure 1: Drainage Area Delineation, with 1998 Aerial Photo

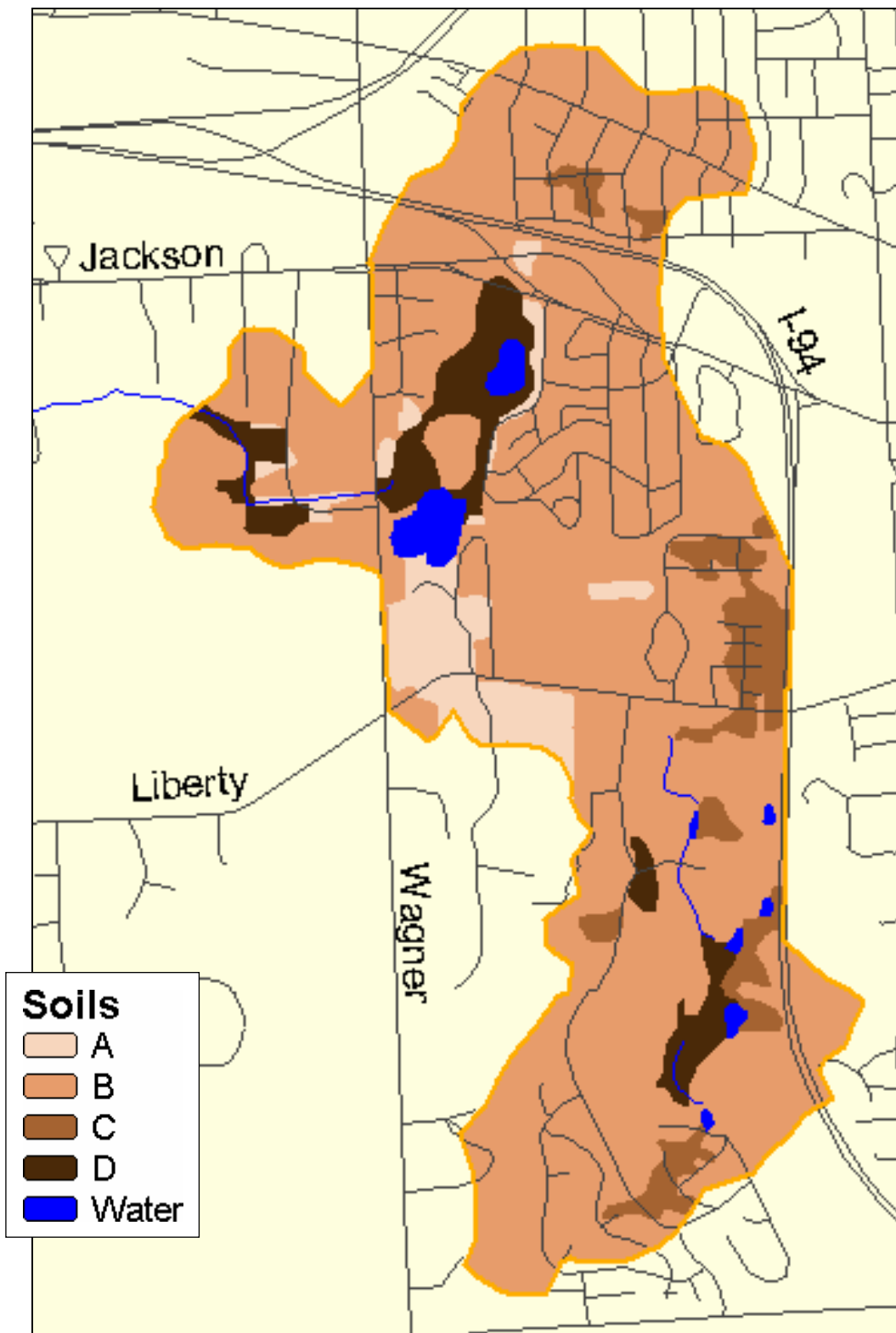


Figure 2: Soils Data

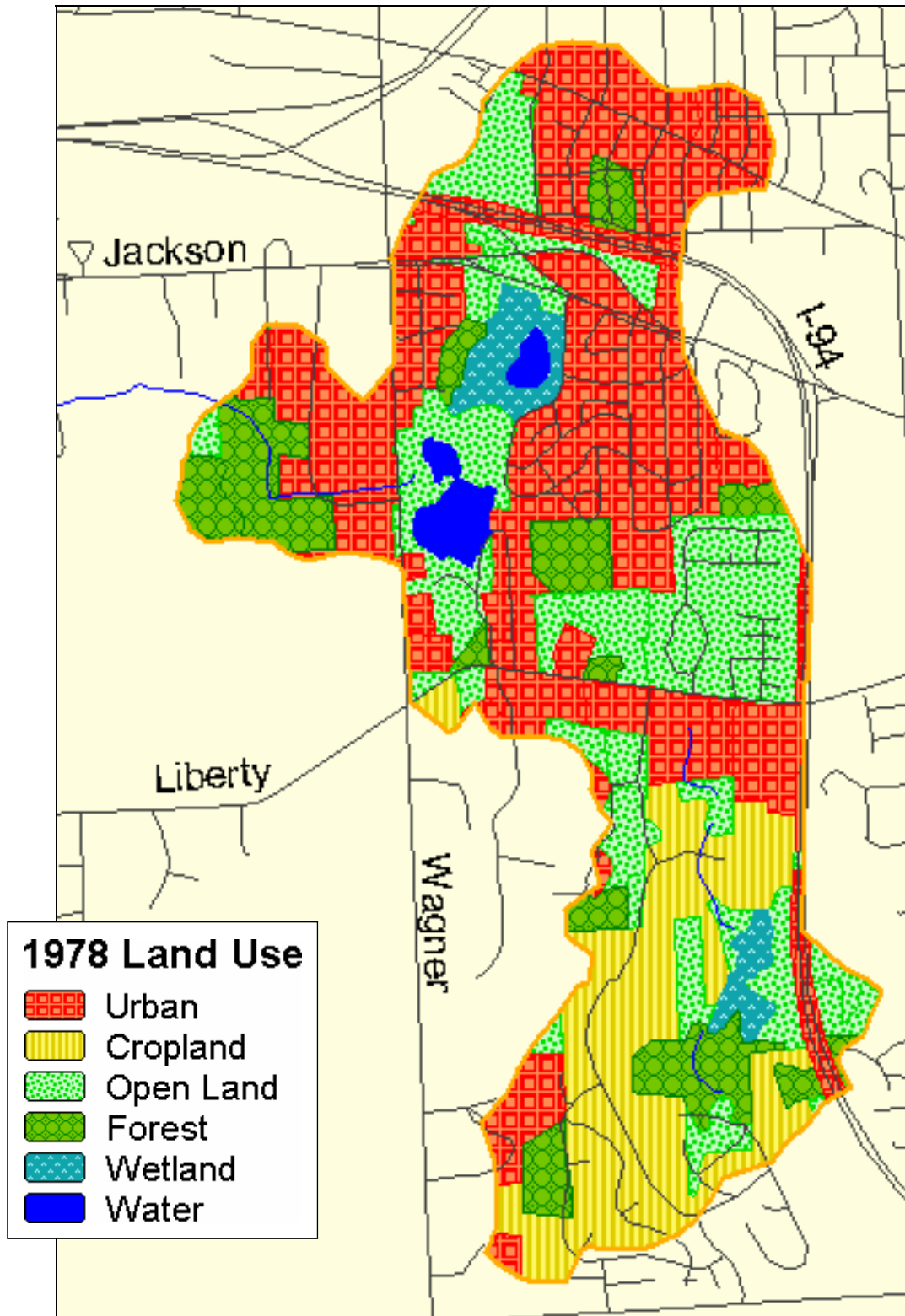


Figure 3: Land Use Data

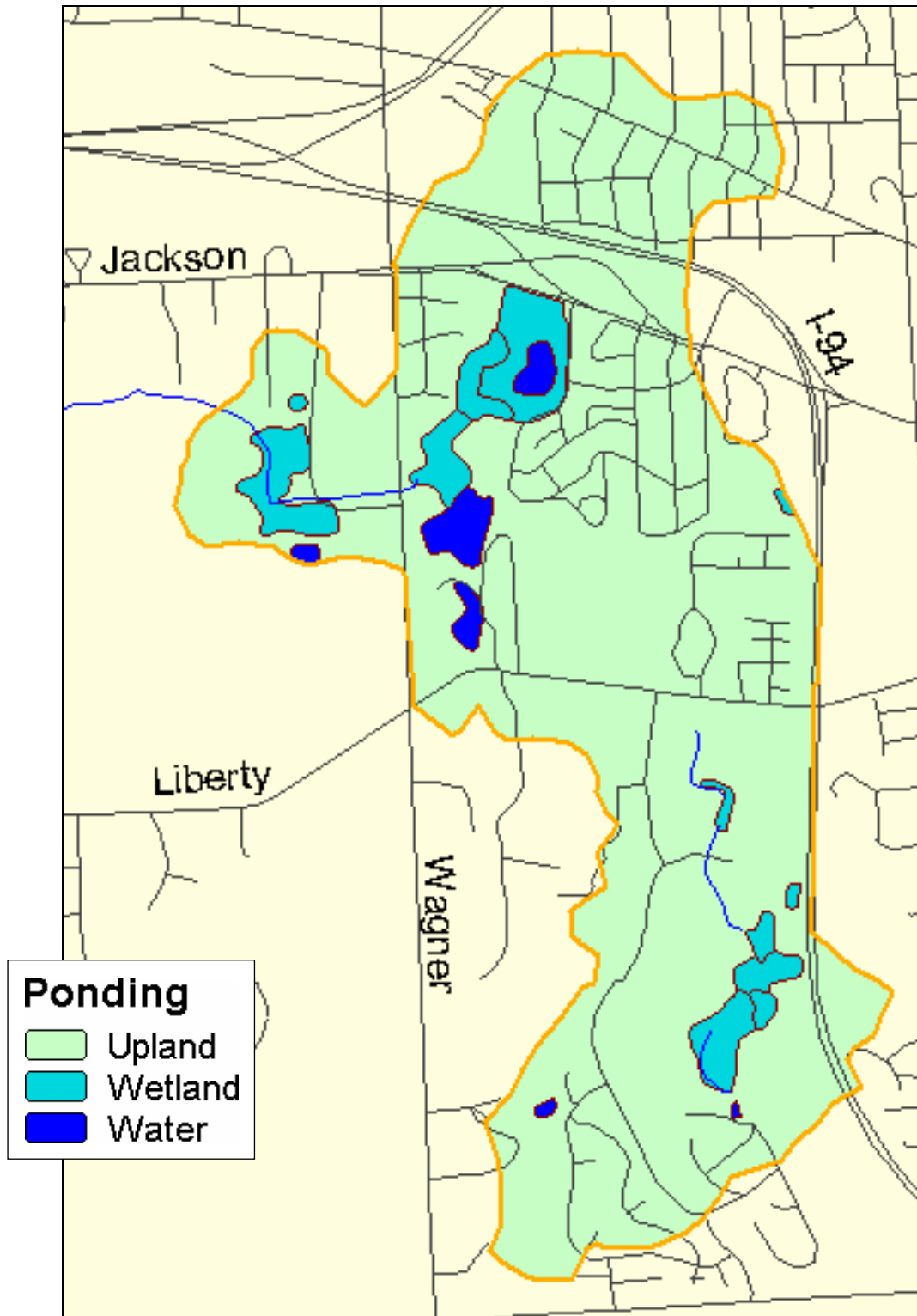


Figure 4: Ponding Adjustment Data

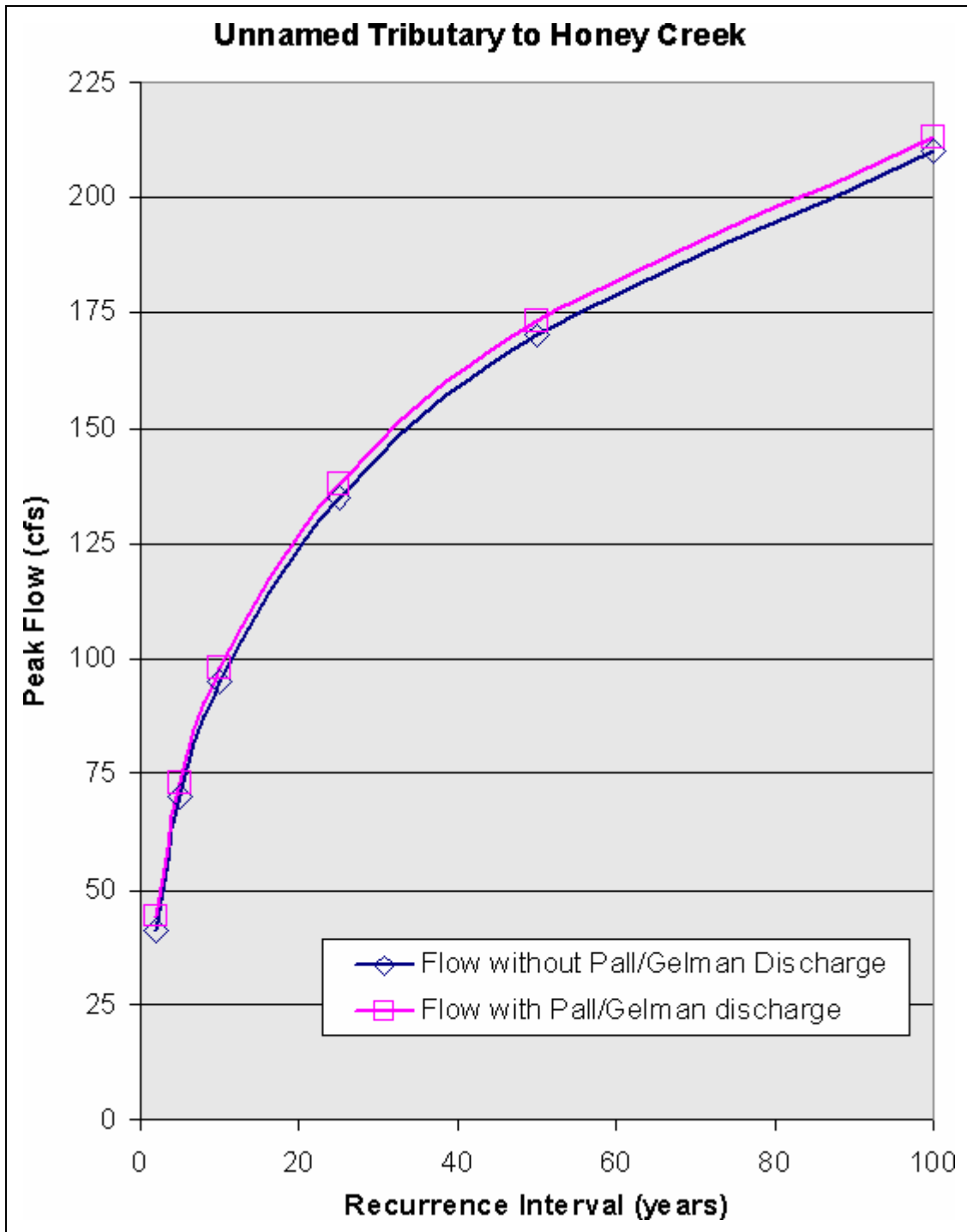


Figure 5: Calculated Peak Flows