DESIGN OF EMERGENCY SPILLWAY

Exhibit 11-8 has been prepared from a large number of reservoir routings to show the effect of storage above the principal spillway elevation and the ratio of DA/PA (drainage area divided by pool area) on reduction of peak outflow. These curves can be used to modify outflow for the emergency spillway design for ponds which would cause little hazard if failure occurred.

For example:

Given: watershed = 100 acres

25-year peak inflow = 190 cfs

crest of emergency spillway (ES) is 1.5 feet above principal spillway (PS)

pond area at PS elevation = 2 acres

PS has design capacity of 45 cfs with water surface at ES crest

Determine: dimensions of emergency spillway

peak inflow minus principal spillway design capacity

$$190 - 45 = 145 \text{ cfs}$$

$$DA/PA = \frac{100}{2} = 50$$

from A, exhibit 11-8, and H_p = 1.7 feet
percent of peak = 67.5, and
from B, percent of peak = 54.5

For 1.5 feet between PS and ES, percent of peak discharge, by interpolation, is $\frac{67.5 + 54.5}{2} = 61.$

Required ES capacity = 145 x 0.61 = 88 cfs

A vegetated spillway with 3:1 side slopes and

H_p = 1.7 feet, and
b = 14 feet, will discharge
Q = 90 cfs, with
V = 5.3 fps, when
S = 2.5 percent (slope of exit section)

Spillway is satisfactory.

EMERG. SPILLWAY DISCHARGE IN PERCENT OF THE 25-YEAR PEAK INFLOW

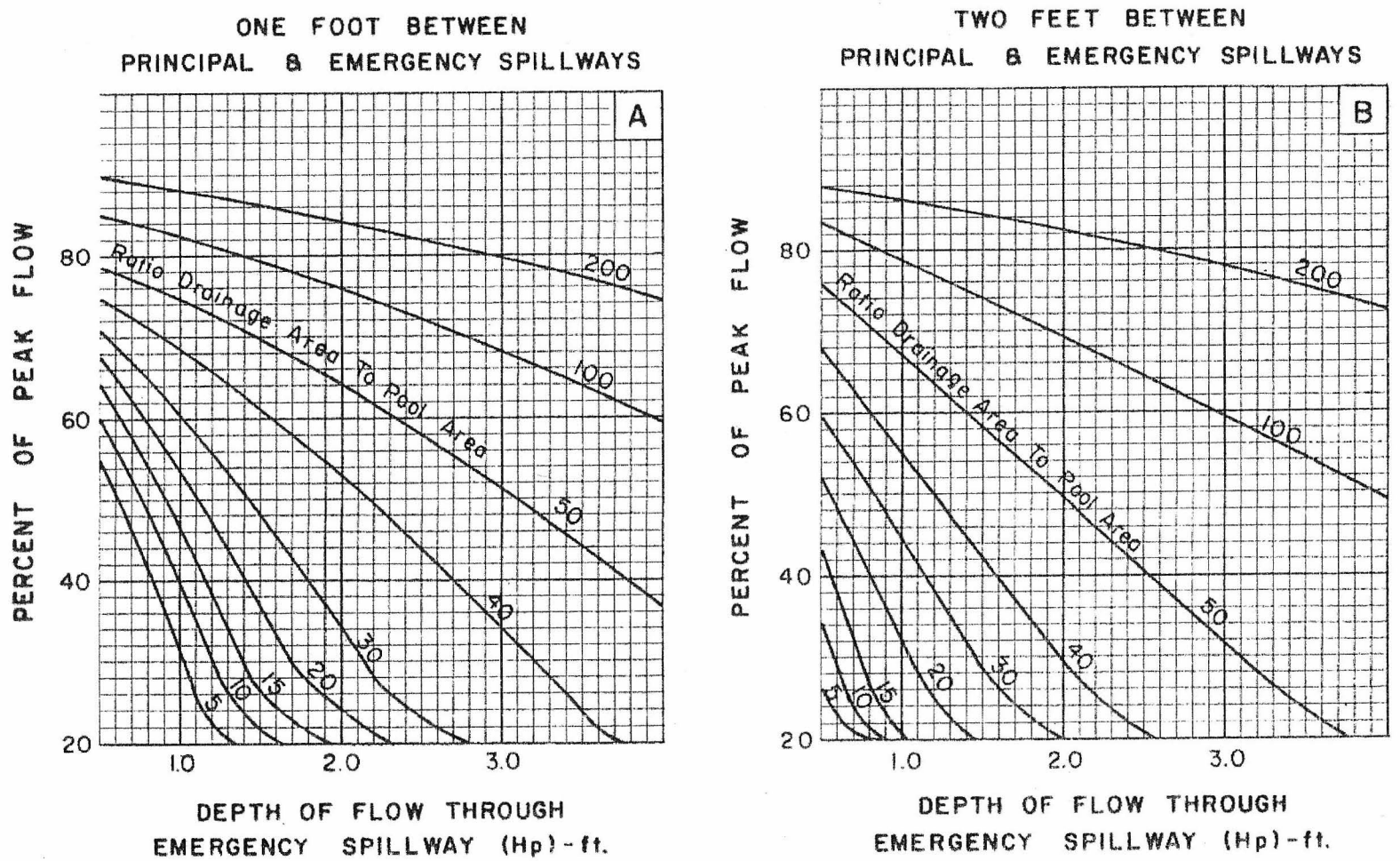
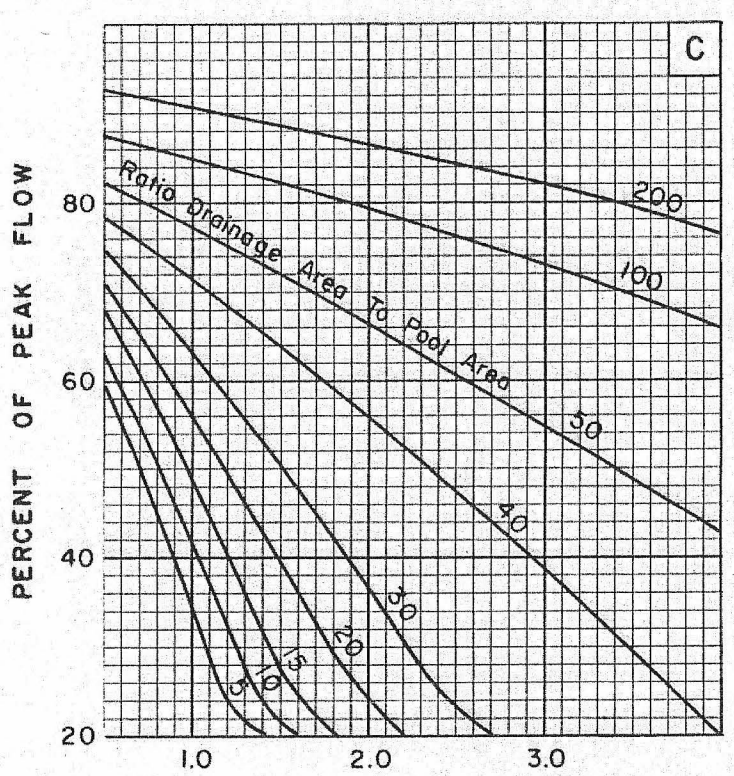


Exhibit 11-8

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	RTSC - NE - ENG. 1120 SHEET 1 OF 3

EMERG. SPILLWAY DISCHARGE IN PERCENT OF THE 50-YEAR PEAK INFLOW

ONE FOOT BETWEEN
PRINCIPAL & EMERGENCY SPILLWAYS



TWO FEET BETWEEN
PRINCIPAL & EMERGENCY SPILLWAYS

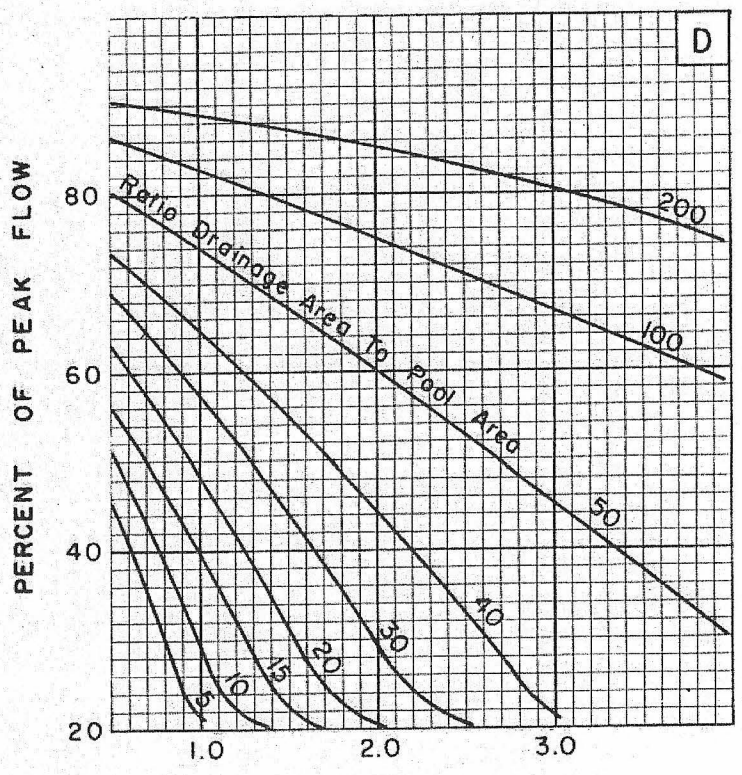
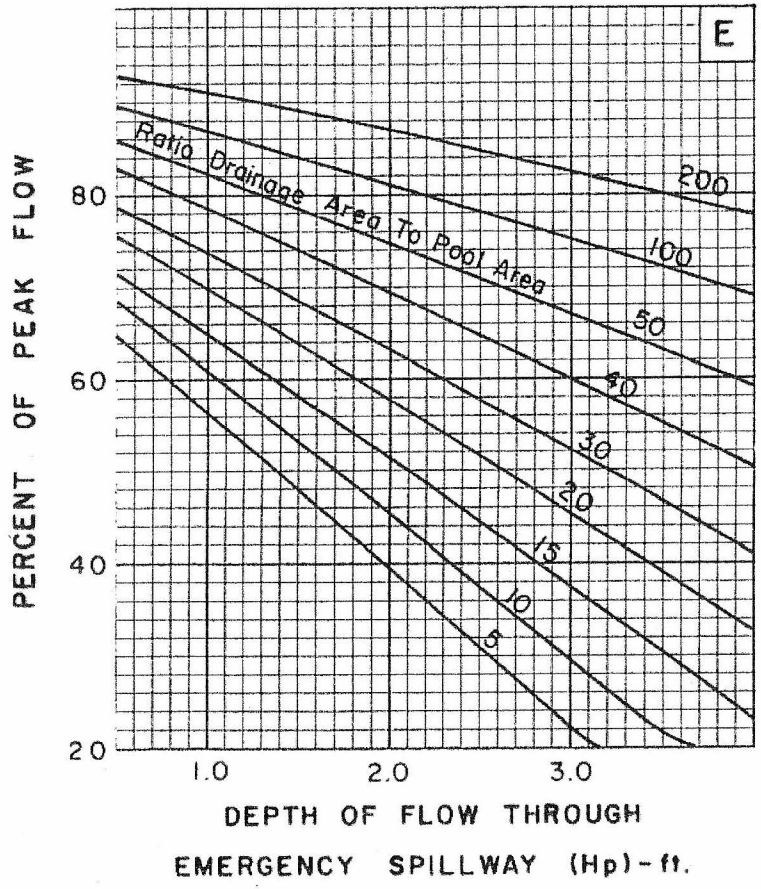


Exhibit 11-8

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	RTSC - NE - ENG. 1120 SHEET 2 OF 3

EMERG. SPILLWAY DISCHARGE IN PERCENT OF THE 100-YEAR PEAK INFLOW

ONE FOOT BETWEEN
PRINCIPAL & EMERGENCY SPILLWAYS



TWO FEET BETWEEN
PRINCIPAL & EMERGENCY SPILLWAYS

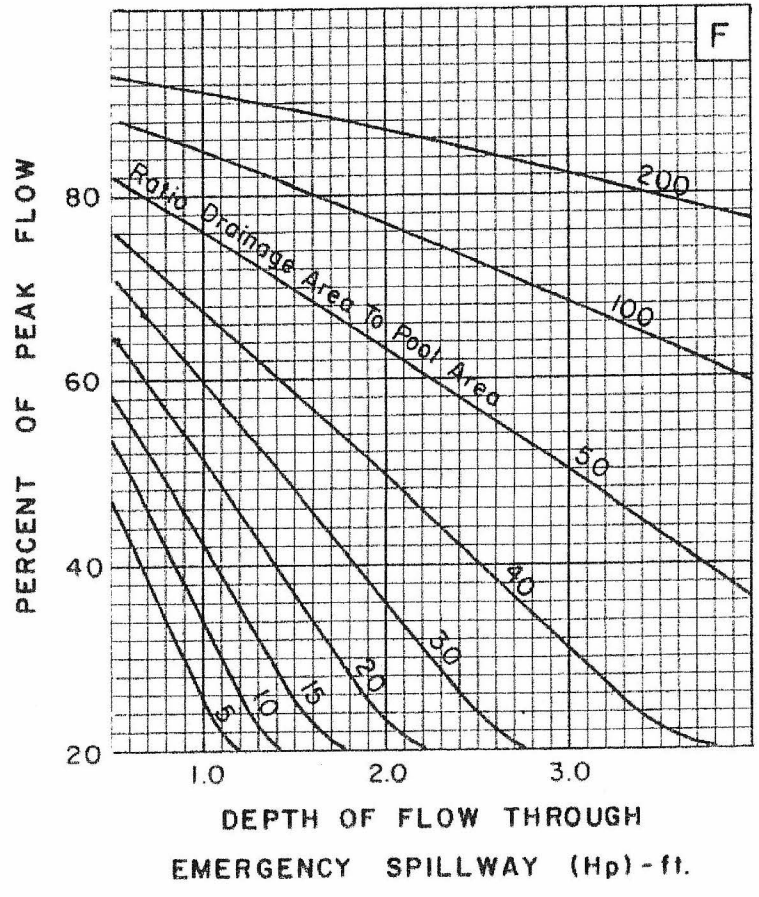


Exhibit 11-8

REFERENCE	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ENGINEERING & WATERSHED PLANNING UNIT UPPER DARBY, PENNSYLVANIA	RTSC - NE - ENG. 1120 SHEET 3 OF 3