I. FLOOD MANAGEMENT

The floodplain management plan includes management zones, rules and assessment criteria for granting or amending approvals for flood works.

1.1 FLOOD MANAGEMENT SCHEME

Natural Flood Management (NFM) or Working with Natural Processes (WWNP), as it is also known, to reduce flood and coastal erosion risk involves implementing measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast.

1.2 FLOOD FREQUENCY STUDIES

When stream flow peaks are arranged in the descending order of magnitude they constitute a statistical array whose distribution can be expressed in terms of frequency of occurrence. There are two methods of compiling flood peak data—the annual floods and the partial duration series. In the annual floods, only the highest flood in each year is used thus ignoring the next highest in any year, which sometimes may exceed many of the annual maximum. In the partial duration series, all floods above a selected minimum are taken for analysis, regardless of the time-interval, so that in some years there may be a number of floods above the basic stage, while in some other years there may not any such flood at all.

The disadvantage of the partial duration series is that the data do not furnish a proper frequency (true distribution) series and so a reasonable statistical analysis cannot be made. But all the larger floods are used in this analysis, which is an advantage while in annual flood series some big floods are omitted because they were not the highest floods in any year considered. Usually the basic stage is assumed sufficiently low so that as many peaks (4 or 5) as possible each year are above this stage. The two series give very nearly the same recurrence interval for the larger floods, but the partial series indicates higher floods for shorter recurrence intervals. For information about floods of fairly frequent occurrence, as is required during the construction period of a large dam (say, 4-5 years), the partial series are the best, while for the spillway design flood the annual series are preferable, since the flood should not be exceeded in the dam's life time, say 100 years. Annual Flood Series the return period or recurrence interval (T) is the average number of years during which a flood of given magnitude will be equalled or exceeded once and is computed by one of the following methods. California method (1923): n T =m Weilbul method (1939):

T = n /m ...(8.11 b) m

where n = number of events, i.e., years of record

m = order or rank of the event (flood item) when the flood magnitudes (items) are arranged in the descending order (m = 1 for the highest flood,

m = n for the lowest flood)

T = recurrence interval (T = n-yr for the highest flood, T = 1 yr for the lowest flood, by California method) The probability of occurrence of a flood (having a recurrence interval T-yr) in any year, i.e., the probability of exceedance, is 1

P = ...(8.12) T and the probability that it will not occur in a given year, i.e., the probability of non-exceedance (P), is

P = 1 – P ...(8.12 b) One interesting example of the application of statistics to a hydrologic problem (i.e., stochastic hydrology), is Gumbel's theory of extreme values. The probability of an event of magnitude x not being equalled or exceeded (the probability of non-occurrence, P), based on the argumentthat the distribution of floods is unlimited (i.e., for large values of n, say n >

Given below are the methods of Flood management in India:

- Construction of Dams and Reservoirs
- Redirecting the excess water to canals and floodways
- Excess water can be used for groundwater replenishment
- The self-closing flood barrier (SCFB) is a flood defense system designed to protect people and property from inland waterway floods caused by heavy rainfall, gales or rapid melting snow

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