

DISPOSITION FORM

(AR 340-15)

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OFFICE SYMBOL OR FILE REFERENCE

SUBJECT

NPSEN-PP-C

Flood Damages, Skagit River-Avon Bypass

TO
C, Basin Png Br

FROM
C, Con & Econ Sec

DATE
7 Oct 63

CMT 1

1. Differences between 1963 and 1951 flood damage appraisals. - Several major factors contribute to the large spread in the amount of flood damages between the damage appraisals of 1963 and 1951. The following critical features had the greatest effect.
2. Discharge-damage relationship. - Areas downstream from Sedro Woolley lying in the flood plain are mainly protected by levees. The determination of the point at which levee failures will occur in the various diking districts as related to discharge was significantly different in the two appraisals. In the 1951 appraisal the levee data were meager. Levee failures were assumed to occur in a few of the districts at 120,000 c.f.s. and major breaks were not assumed to occur until the river discharges were between 160,000 and 180,000 c.f.s. In the 1963 appraisal, the levees were surveyed in detail and the critical low sections in each leveed area were located and the river discharge that would cause failure at the low sections was determined. From these data, major levee breaks can occur at discharges around 100,000 c.f.s. The greater frequency of occurrence of floods ranging between 100,000 and 120,000 c.f.s., as compared to floods ranging between 160,000 and 180,000 c.f.s., results in a much higher annual damage figure. A discharge-damage curve has been prepared placing both the 1963 and the 1951 appraisals on the same 1951 price level and state of development which illustrates the levee failure differences as related to discharges and is bound with this brief.
3. Frequency of flooding. - The flood frequency data used in the 1951 appraisal was based on preliminary hydrologic data of insufficient scope. Frequency data used in the 1963 appraisal was based on an exhaustive study and analysis of extensive hydrologic data. The higher frequency of occurrence of flooding found in the 1963 study materially increased the annual damages resulting from any flood. A cumulative frequency graph is bound in this brief which shows both the 1963 and the 1951 flood frequency curves. The following table illustrates the differences in the frequency of occurrence of flooding shown by the two curves.

Discharge-frequency relationship
(Sedro-Woolley gage)

Discharge (c.f.s.)	% change of occurrence		Frequency of occurrence in years	
	1963 study	1951 study	1963 study	1951 study
87,000	46.0	32.0	2.2	3.1
100,000	32.5	21.5	3.1	4.7
110,000	24.0	15.5	4.2	6.5
120,000	19.0	11.3	5.3	8.8
140,000	12.0	5.9	8.3	16.7
160,000	8.0	3.0	12.5	33.3
180,000	5.5	1.6	18.2	62.5
200,000	3.8	0.8	26.3	-12.5
240,000	1.9	0.2	52.6	-50.0
278,000	1.0	0.05	100.0	-200.0

GUESSAGE