

FORMULATION OF ALTERNATIVES

The preliminary alternatives which were developed for the public meeting last March included the following:

- Alternative 1 - Continue Existing Conditions (Do Nothing)
- Alternative 2 - Levee and Channel Improvements
- Alternative 3 - Levee and Channel Improvements and Urban Levees
- Alternative 4 - Levee and Channel Improvements, Urban Levees and Upstream Storage
- Alternative 5 - Levee and Channel Improvements, Urban Levees, and Avon Bypass
- Alternative 6 - Levee and Channel Improvements, Avon Bypass and Upstream Storage

Public input received at the public meeting was almost entirely in favor of detailed studies being undertaken for alternative 3. We have proceeded with these studies and divided alternative 3 into 4 separate alternatives:

- 3A - Ring Dike for Burlington, Mount Vernon and West Mount Vernon (Avon & Samish low)
- 3B - Ring Dike for Burlington - West Mount Vernon and Mount Vernon (Avon high, Samish low)
- 3C - Ring Dike for Burlington - Sedro Woolley and West Mount Vernon (Avon low, Samish high)

This handed out at
25 August 78 meeting

3D - Dikes for Mount Vernon and West
Mount Vernon - Burlington - Sedro Woolley
(Avon & Samish high)

The following pages provide preliminary cost estimates for each of these alternatives. These cost estimates do not include land costs or pumping plants. The sketches also show the discharge values at Sedro Woolley, at Mount Vernon, in the North and the South Forks at their head, and the overflows to the Samish basin and at Avon. This scoping analysis is based on the 100 year event. The table on a following page summarizes the costs and lineal feet of levees that are under consideration.

We will proceed with alternative 3B as our most probable project. This alternative is the second cheapest of the urban levee measures, provides protection to the Anacortes Water Supply System that supplies the refineries that supply the Northwest with petroleum products.

There is great local interest in protecting
this water supply. Much of the counties.
Taxing base relies on this water.

Alternative	ESTIMATED COST	URBAN LEVEE PORTION ³	
		ALONG RIVER	SET BACK
2	\$ 11,449,000	2/	-
3A	25,347,000	65,700' ↓	55,030'
3B	28,323,000	75,500'	46,930'
3C	27,956,000	65,700' ↓	44,030'
3D	30,814,000	75,500'	33,530'

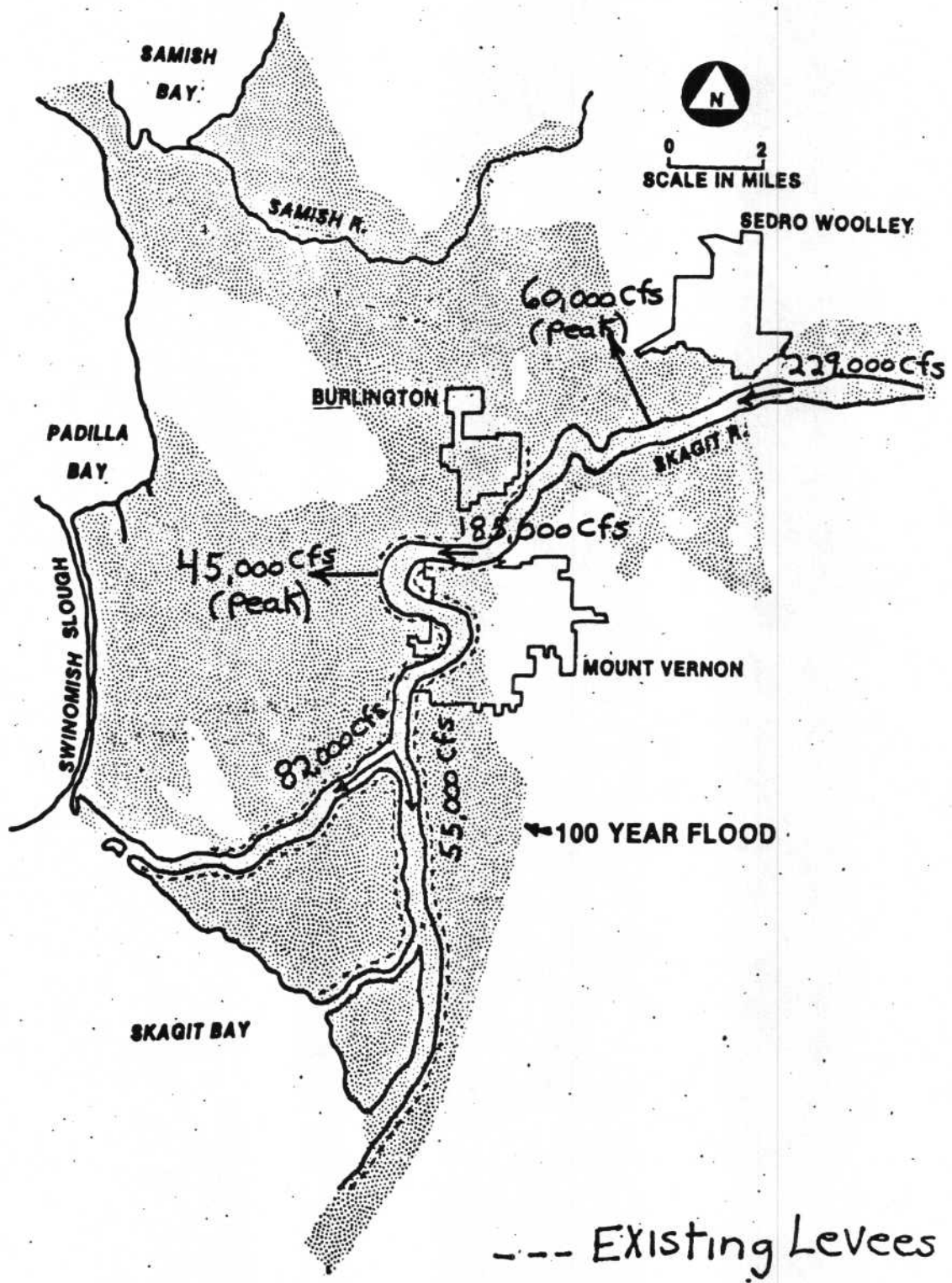
- ↓ 9800' around Avon bend not included
 2/ 60,900' of low levees in urban levee area
 3/ 158,500' of low downstream levees (A/E) not included

The amount of land that would be protected by certain combinations of levee segments is listed on the following page.

AREAS PROTECTED

<u>Levee Segments</u>	<u>Area</u>	<u>Acres</u>
27, 28, 29 25, 23, 22	South and North Mt Vernon	1115
23, 24	Big Bend	515
14, 13	West Mt Vernon	410
12, 13	West Mt Vernon	92
9, 8, 6, 11, 10	Burlington	2830
7, 2, 4	Sterling	92
3, 7, 5, 8	South of Sterling	315

EXISTING CONDITIONS - 100 year



--- Existing Levees

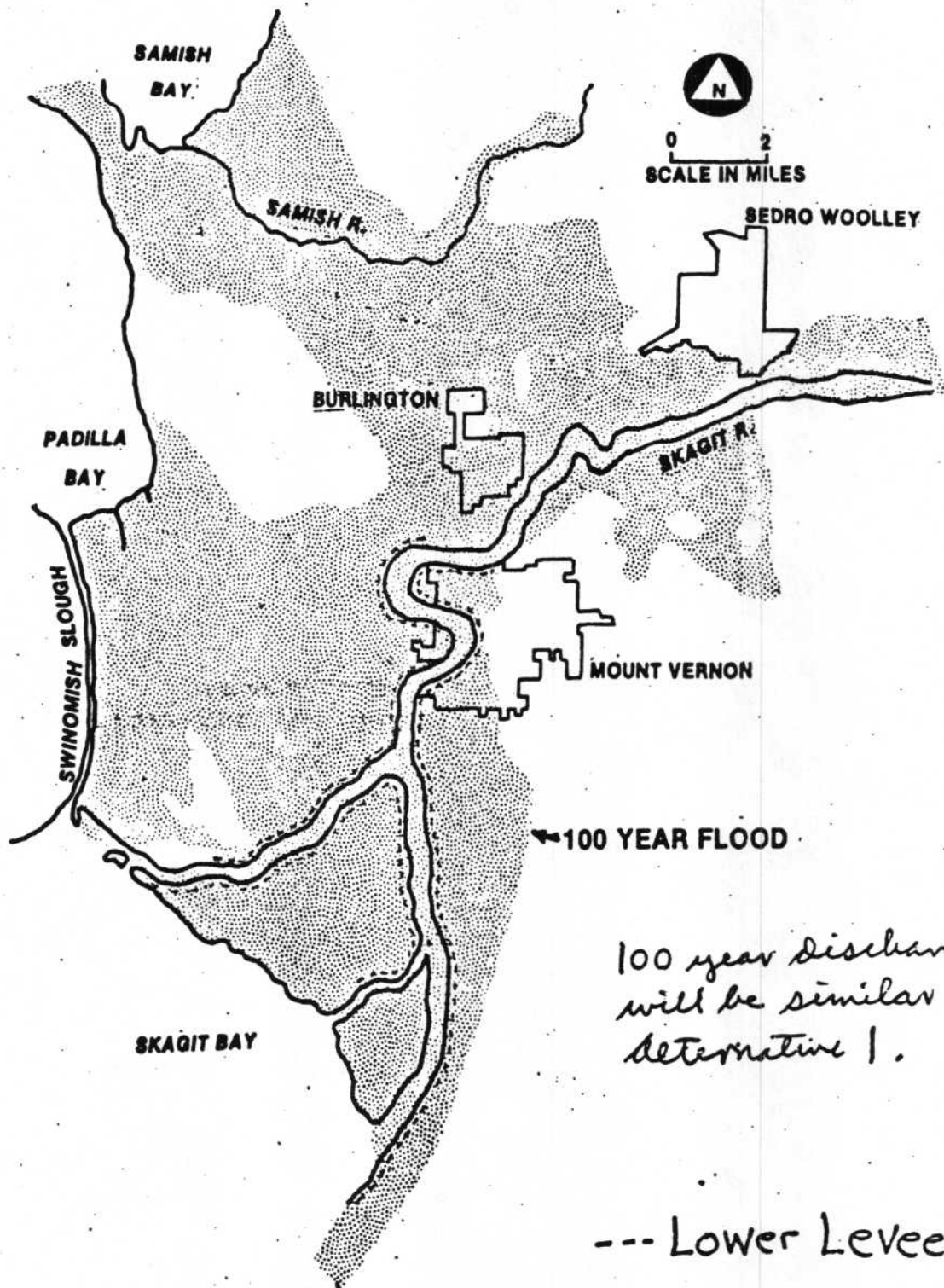
Alternative 2 - Authorized Project

This cost estimate was prepared by combining the A/E scoping analysis for the 120,000 cfs + **3' case** with the preliminary cost estimates for the other segments. (2' friezeboard + 1' sedimentation)

A/E analysis		\$ 11,082,000
segment 13		16,000
15		18,000
25		16,000
24		281,000
22		28,000
9W		8,000
		<hr/>
		\$ 11,449,000

9W is portion on 9 west of railroad bridge

Alternative 2 - Authorized Plan



100 year discharges
will be similar to
Alternative 1.

--- Lower Levees

Alternative 3A: Samish and Dam Low

South Mount Vernon 27 \$ 862,000

28 907,000

29 1,147,000

Mount Vernon 25 911,000

24 2,664,000

22 62,000

\$ 6,553,000

West Mount Vernon 13 \$ 122,000

14 2,415,000

\$ 2,537,000

Burlington Ring 6 } \$ 505,000

8 }

9 182,000

10 1,882,000

11 478,000

(6.1)

\$ 3,047,000

\$ 12,137,000

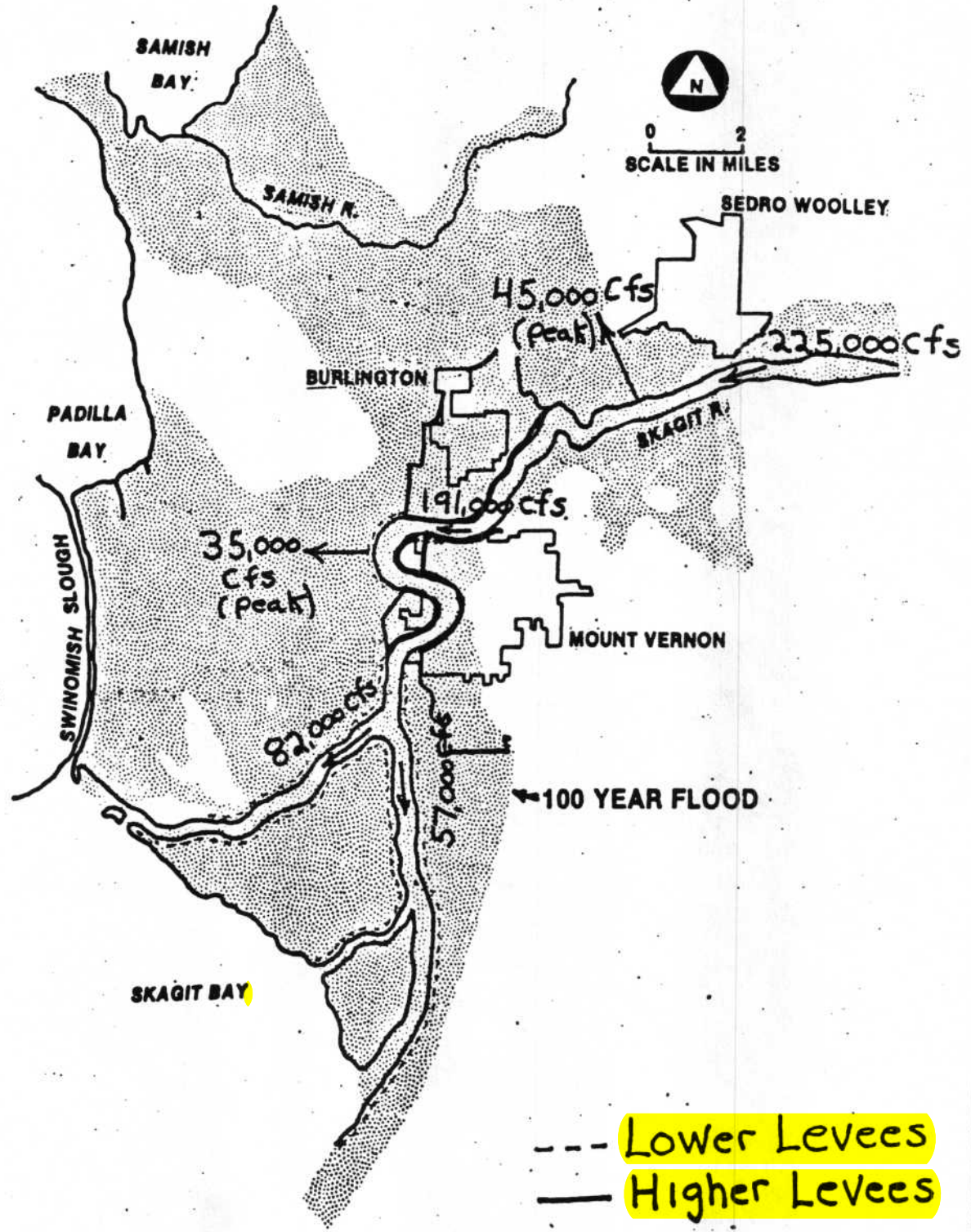
DIS Levees 130 + 3'

13,210,000

P004566

\$ 25,347,000

ALTERNATIVE 3A - 100 year



--- Lower Levees
— Higher Levees

Alternative 3B: Samish Low - Avon High

South Mount Vernon	27	\$ 862,000	
	28	907,000	
	29	1,147,000	
Mount Vernon	25'	1,361,000	
	24'	2,935,000	
	22'	89,000	
			<u>\$ 7,301,000</u>

West Mount Vernon	13'	\$ 238,000	
	14	2,415,000	
Avon	15'	159,000	
Burlington Ring	9'	285,000	
	6' }	609,000	6.0
	8' }		
	10A	1,104,000	
	11	478,000	
			<u>\$ 5,288,000</u>

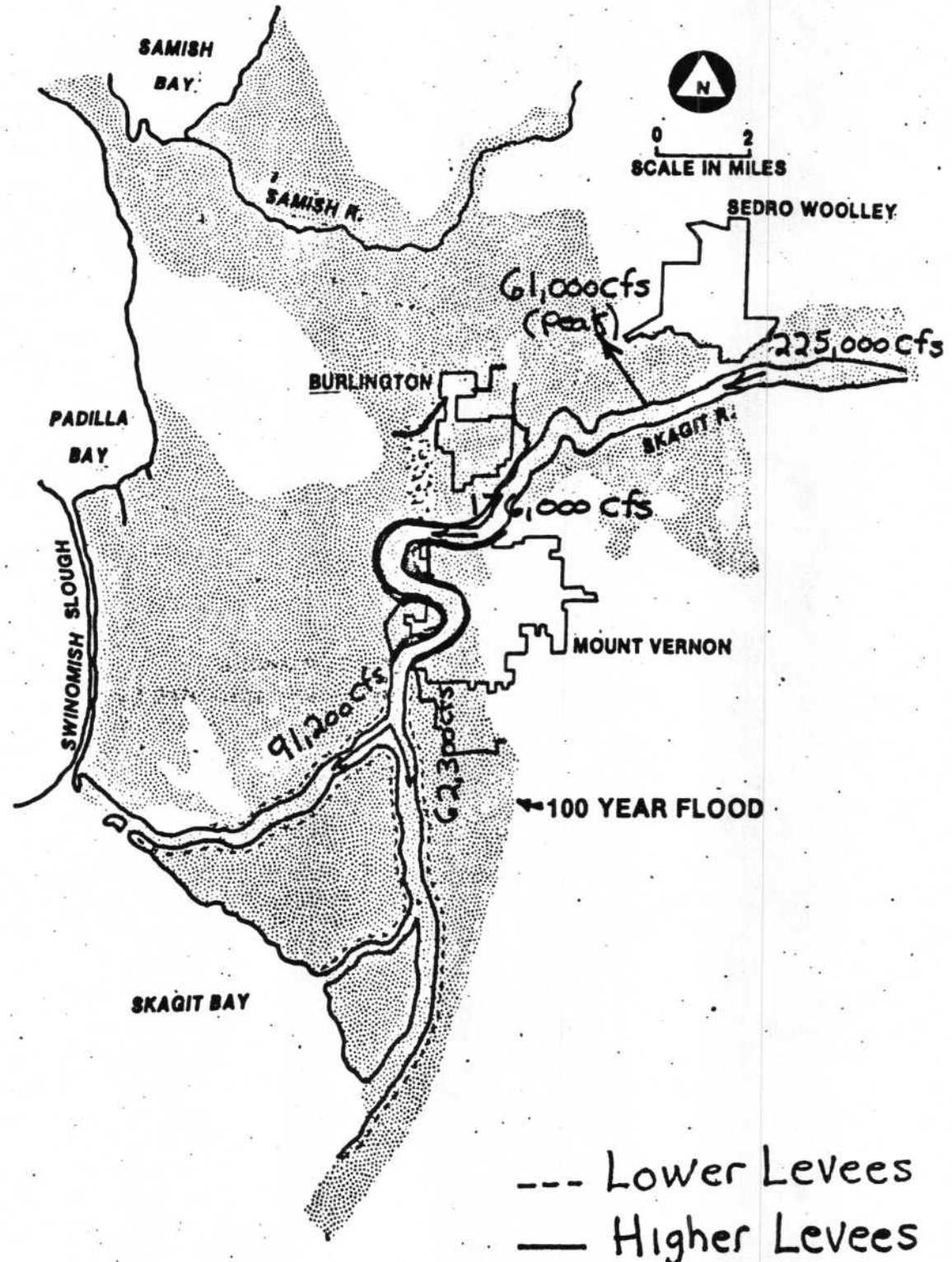
\$ 12,589,000

D/S Levels 130 + 4' 15,743,000

P004568

\$ 28,323,000

Alternative 3B - 100 year



--- Lower Levees
— Higher Levees

Alternative 3C: Samish High - Avon Low

South Mount Vernon	27	\$ 862,000	
	28	907,000	
	29	1,147,000	
Mount Vernon	25'	1,361,000	
	24'	2,935,000	
	22'	89,000	
			<u>\$ 7,301,000</u>

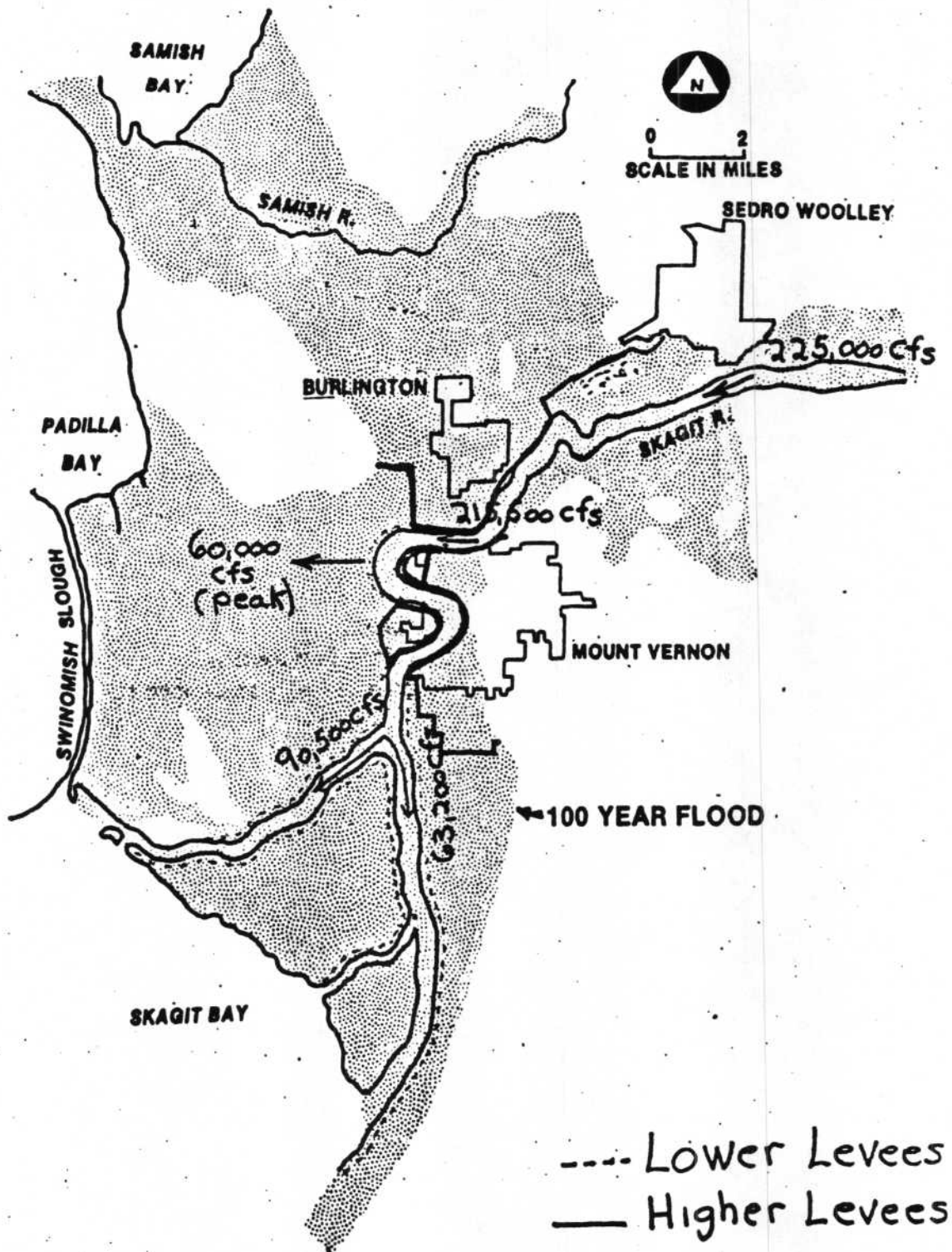
West Mount Vernon	13'	\$ 238,000	
	14'	2,415,000	
			<u>\$ 2,653,000</u>

Burlington - Sedoo Woolley	9'	\$ 285,000	
	8'	193,000	
	5	185,000	
	4	368,000	
	1	94,000	
10B		1,104,000	
			<u>\$ 2,229,000</u>

(5.9)

DIS levels	130 + 4'		\$ 12,183,000
			<u>15,743,000</u>
			<u>\$ 27,956,000</u>

Alternative 3C - 100 year



Alternative 3D : Samish and Avon high

South Mount Vernon : 27 \$ 862,000

28 907,000

29 1,147,000

Mount Vernon 25" 1,901,000

~~24" 3,221,000~~

~~22" 158,000~~

\$ 8,196,000

West Mount Vernon

13" \$ 394,000

14 2,415,000

15" 282,000

9" 410,000

8' 193,000

5 185,000

4 368,000

1 94,000

\$ 4,341,000

\$ 12,537,000

D/S Levees

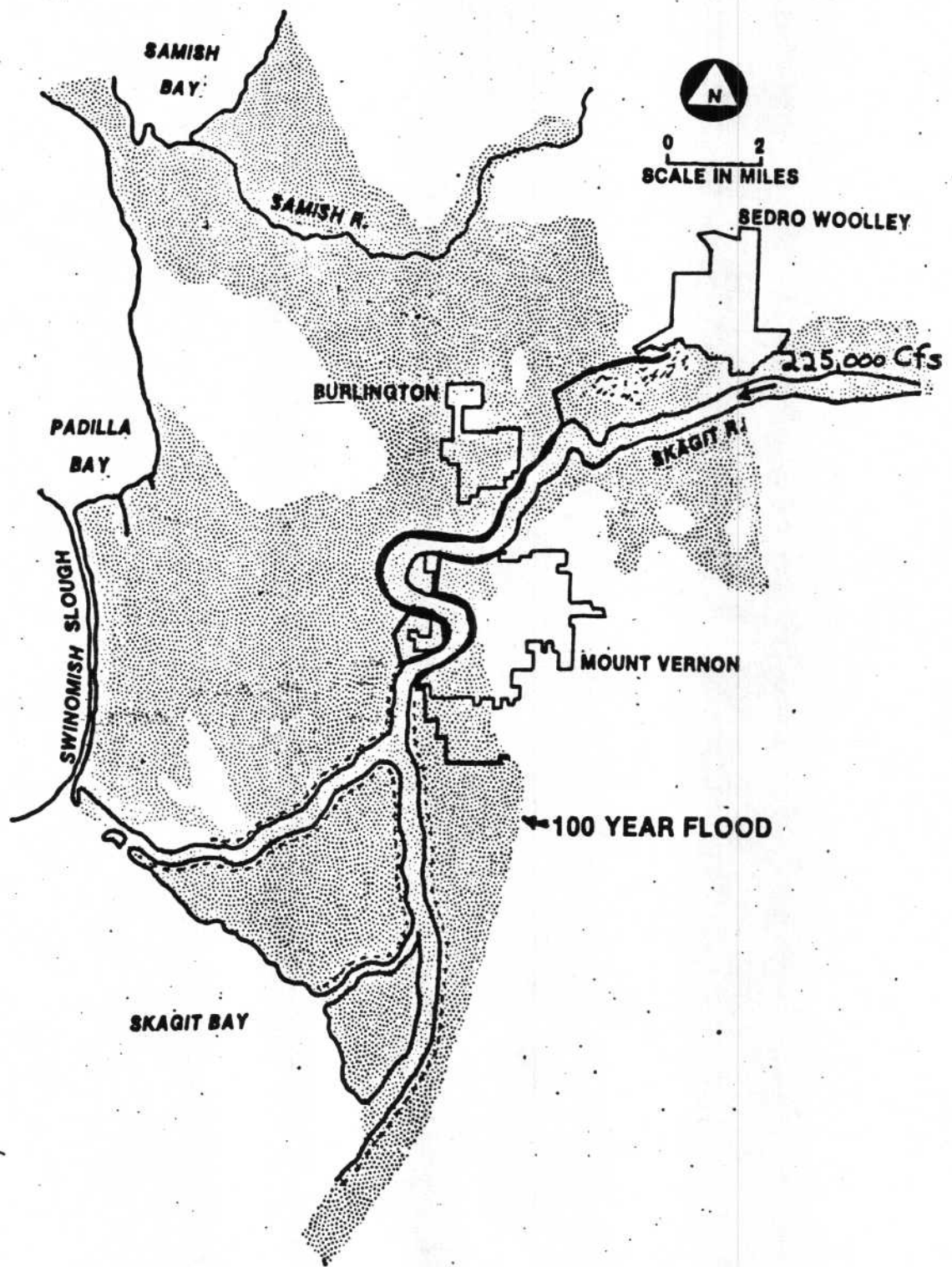
130 + 5'

18,277,000

P004572

\$ 30,814,000

Alternative 3U - 100 year



From UAH (Boule) on 28 Aug 78

For Case III (alternative 3B - Avon high & dammed)

Max Sediment is 1.8 feet

\therefore freeboard is 3.8 feet

Red profile protects for 96,000 cfs @
mt. Vernon (120,000 cfs profile + 2')
96,000 cfs ~ 5 year recurrence Int.

Green profile protects for 122,000 cfs @
mt. Vernon (120,000 cfs profile + 4')
122,000 cfs ~ 10 year recurrence Int.

Orange profile protects for 165,000 cfs @
mt. Vernon. (120,000 cfs profile + 6')
165,000 cfs ~ 70 year recurrence Int

Note:

Recurrence intervals added
30 Aug 78. Larry Markle

P004603