

Comments prepared by \_\_\_\_\_

Address \_\_\_\_\_

Telephone Number \_\_\_\_\_

# PUBLIC BROCHURE

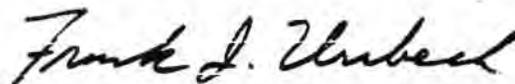
## ALTERNATIVES AND THEIR PROS AND CONS

# ADDITIONAL FLOOD CONTROL AT UPPER BAKER PROJECT

AUTHORITY FOR STUDY: Congress through the Flood Control Act of 1962 authorized a comprehensive water and related land resources study covering the major river basins and island groupings which constitute the Puget Sound region. A comprehensive plan, completed in 1971, called for increasing Skagit River flood control through use of reservoir capacity provided by Puget Sound Power and Light Company's Upper Baker hydro-electric power project in addition to the 16,000 acre-feet of storage space now available during the winter flood season. The detailed feasibility investigation being completed by the Corps of Engineers was in followup to the comprehensive study and undertaken under the same authority.

PURPOSE OF BROCHURE: Results of engineering, economic, and environmental impact studies conducted over the past two years are reflected in this brochure, with information displayed on the alternatives considered. The alternative tentatively recommended for implementation by the Seattle District Corps of Engineers is presented along with the basis for this selection.

METHOD (OPEN FISHBOWL PLANNING): This brochure has been distributed to all known interested parties. Your examination is invited of the information contained herein, regarding its accuracy, and your comments are sought on the tentative study findings. We would appreciate receiving any corrections you have. Corrections can be marked on this brochure and either mailed to the address shown below or turned in at the 8 April 1975 public meeting to be held in the Mount Vernon High School, beginning at 7:30 p.m. Also, the last sheet of this brochure which provides one side for comments, can be torn off, folded and mailed back to our office. All comments received will be considered in preparation of the District Engineer's final report on the study.



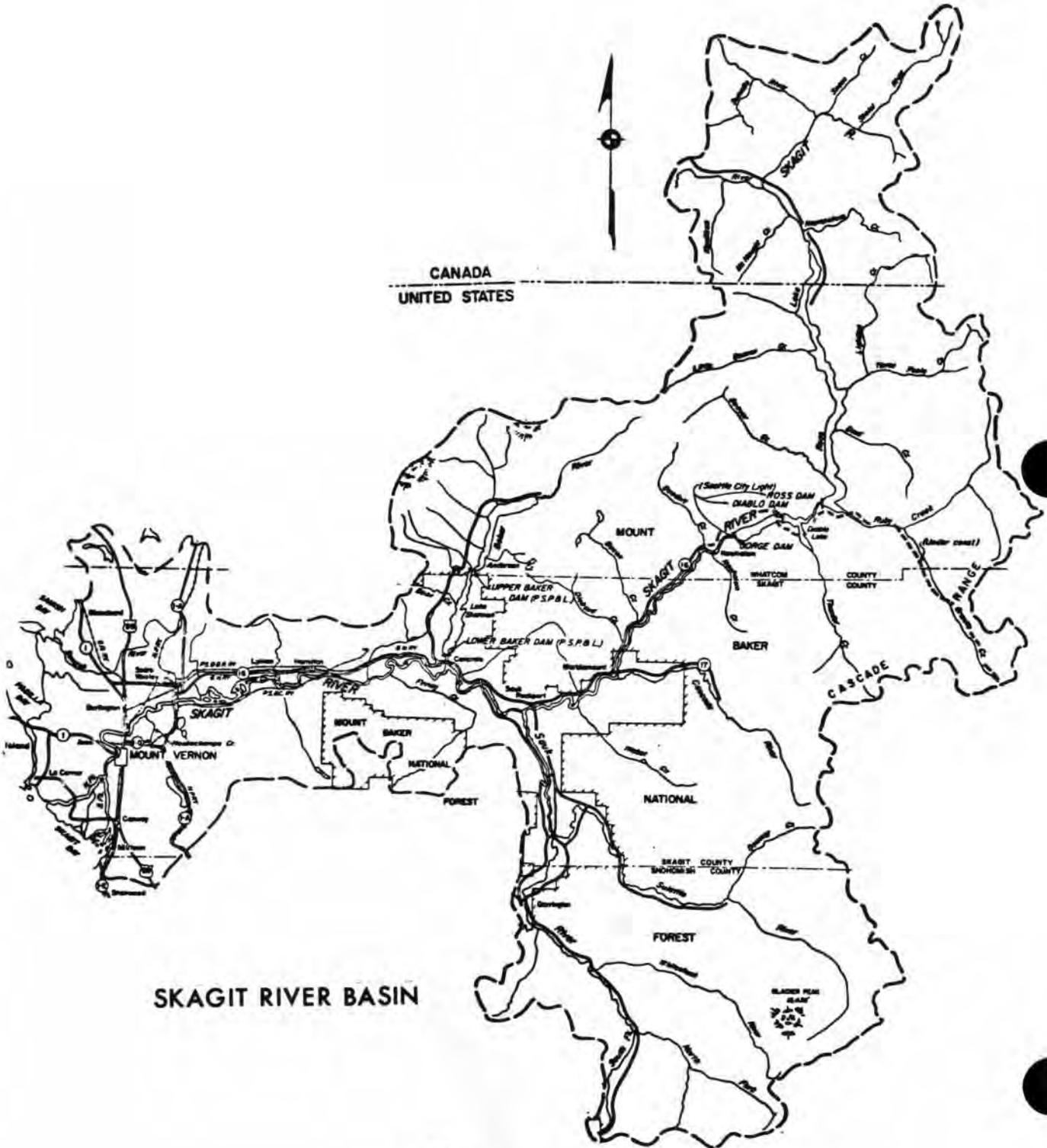
FRANK J. URABECK  
Study Manager  
(Telephone 206-764-3611)

SEATTLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS  
4735 EAST MARGINAL WAY SOUTH, SEATTLE, WASHINGTON 98134

Draft #4, March 1975

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**SKAGIT RIVER BASIN**

## TENTATIVE RECOMMENDATION OF SEATTLE DISTRICT

The Seattle District, Corps of Engineers, tentatively recommends implementation of Alternative 3, **FLOOD PLAIN MANAGEMENT WITH ADDITIONAL FLOOD CONTROL STORAGE AT UPPER BAKER PROJECT**, on the basis that this proposal is responsive to locally expressed Skagit River basin needs and is consistent with comprehensive plans adopted by Skagit County and the Pacific Northwest River Basins Commission.

Land use zoning, development restrictions, flood proofing and early flood warning are flood plain management elements of this alternative which would be continued by Skagit County and the State of Washington. Federally subsidized flood insurance would also remain available to county residents. Improved Skagit River flood control below Concrete, Washington, would be achieved through changing the operation of Puget Sound Power and Light Company's (Puget Power) Upper Baker hydroelectric project (see map, page ii). Baker Lake would be lowered to provide a total of 74,000 acre-feet of flood control storage between 15 November and 1 March each year. This includes 58,000 acre-feet, in addition to the 16,000 acre-feet now provided by Puget Power as compensation for natural valley flood control storage lost by project construction. The level of flood protection would be increased for the nearly 100,000 acres of Skagit River lying below the mouth of the Baker River. Flood control use of additional storage space would begin when Skagit River is forecast to reach 90,000 c.f.s. at Concrete (84,000 c.f.s. at Mount Vernon). (See page 16 for more details on alternative 3.)

### SUMMARY OF ECONOMIC, SOCIAL AND ENVIRONMENTAL EFFECTS OF RECOMMENDED ALTERNATIVE

The proposed increase in flood control at Upper Baker project would require no construction and only a change in project operation. The environmental effects of the proposed action are anticipated to be minor in most respects. In the discussion of impacts which follows, an attempt was made to isolate as many potential effects as possible, even if they seemed to have only low probabilities of occurring.

Population and Community Growth. The proposed action is not expected to have significant effects on population or community growth within the flood plain. New job opportunities would not be created as a direct result of the project, thereby limiting project effects on future population immigration. Although increased flood control capability has the potential of creating increased development pressure on flood plain lands, especially those close to urban areas and those now protected by dikes and levees, this pressure is expected to be minimal. To the extent that any new lands are brought into intensive development because of added flood protection, a potential for greater personal and economic losses would exist when future major floods do occur. However, the application of stringent flood plain management techniques and flood plain zoning by Skagit County, as called for in the recommended plan, should reduce the likelihood and severity of such losses.

Community Services and Facilities. The cost of flood-related community services and facilities should decrease with implementation of the proposal. A portion of local and state funds which would otherwise be appropriated for flood fighting, rescue and repair may become available for the improvement of other community services and facilities.

Housing. With a decrease in the severity of flooding, homes would incur less damage, thereby allowing the homeowner to invest more in home improvements. As a result, the general quality of housing in the areas affected would increase.

Displaced Persons. Because the proposal would not require construction or acquisition of lands, no displacement of citizens would be required for implementation. The probability of persons being displaced by flooding would be decreased.

Recreation. The proposed action should have only minimal effects on recreational use of the Baker Lake area. Fishing and other recreational uses of the reservoir area, such as camping and picnicking, generally conclude shortly after Labor Day of each year. As the increased draw-down will not begin until 1 November, impacts on lakeshore use for recreational purposes will be limited.

Health and Safety. By decreasing the severity of flooding in the lower Skagit Basin, associated public health problems should decrease. The project is aimed at minimizing the occurrence of severe floods which constitute a public health threat.

Employment and Income. Because the proposed action would not require construction, local employment or income levels would not be impacted to an assessable degree. Temporary disruption of employment due to flood repair would decrease slightly.

Property Values and Tax Revenues. The proposed action would have a slight impact on residential and agricultural property values. Permanent residences and farms damaged by past floods or structures now located in the flood plain could increase in value somewhat. The impacts of flood protection on commercial and industrial property values are expected to be moderate. Property tax revenue may rise to the extent that assessed valuation of all affected property increases.

Local Government Finance. There would be no increase in non-Federal costs associated with this proposed plan. Benefits accruing to local governments would occur as a result of decreases in damage to public facilities.

Business and Commercial Activity. A relatively small portion of land within the flood plain is used for industrial purposes. Because there would be only a partial reduction in flooding frequency, industrial expansion in the flood plain as a result of the project is not expected to occur. The project would, however, provide increased protection to existing industry in the flood plain and thereby reduce potential future flood damages.

Agricultural. The agricultural sector of the economy would realize economic benefits as a result of the proposed action. Average annual monetary benefits accruing to farmers over the 100-year study period are estimated at \$338,000. This may induce a minor increase in agricultural development of the study area as lands could be put to more intensive agricultural uses.

Water Quality. Water quality of the Skagit and Baker Rivers is generally regarded as excellent. The Washington State Department of Ecology has classified the Baker River as AA, extraordinary. The Skagit River is classified as A, excellent, from its mouth to river mile 17 (Mount Vernon), and AA, extraordinary, from river mile 17 to the Canadian border. Releases from Baker Lake are expected to increase an average of about 1,900 c.f.s. over existing conditions during the period of additional drawdown between 1 and 15 November of each year. These higher flows would not change the quality of water in the Skagit system now regarded as excellent or extraordinary, and may improve the water quality of the lower reaches of the Skagit through increased flushing and by maintaining the content of dissolved oxygen in river waters.

Flora. Existing vegetation adjacent to the reservoir pool is not expected to be affected by drawdown operations. However, the potential for abrasion of reservoir shoreline may decrease due to the proposed drawdown, and vegetative cover in some areas may then re-establish itself.

Fisheries Resources. Present reservoir drawdown at the Upper Baker Dam results in some sockeye salmon redd losses at higher elevations. Because Baker Lake is nearly full during the start of the spawning season in early fall, some sockeye salmon spawn in lakeshore gravels at elevations above 700 feet and as high as 720 feet. Lakeshore spawning occurs when the artificial spawning beaches are filled to capacity, which happens about once every 2 to 4 years. When lakeshore spawning begins before drawdown, some eggs at higher elevations are left exposed and consequently die. By drafting Baker Lake from elevation 720.6 to elevation 707.8, a rate of about 0.8 feet per day during 1 to 15 November, fish that otherwise might have spawned at the higher elevations would be discouraged from doing so. Because the proposed plan would also result in earlier drawdowns than has been the case in the past, there is a potential for further reductions of present spawning and redd losses. As lake elevations dropped, fish would seek out and spawn in other natural spawning streams.

Fauna. As reservoir levels would not be increased beyond those currently in use, and since no further construction will be needed to implement the proposed drawdown, impacts to wildlife resources are expected to be negligible.

Erosion. Baker Lake will be subject to increased levels of shore erosion due to the exposure of additional land area during the reservoir drawdown period of 1 to 15 November of each year. The drawdown schedule

coincides with the wet season beginning in October and November and lasting from six to seven months. While the climatic and soil conditions of the area will contribute to additional deposition of silt and debris downstream and produce additional scouring of the exposed lakeshore, the overall impacts of these changes in relation to water quality, fish habitat and marine vegetation are expected to be minimal.

Visual Landscape. Earlier reservoir drafting would expose about 13 additional feet of lake bottom consisting of rotting tree stumps, rock outcroppings and mud flats. The recreational experience of those using the reservoir at these times would be diminished. However, this impact is expected to be minor due to the normally low recreational use of the area during months when reservoir drafting is scheduled to occur.

Power Losses. The power generating capacity of the Upper Baker Dam would be reduced by changes in operation necessary to provide increased flood control. Power losses would consist of energy losses and capacity losses. Energy loss would result when water which ordinarily would be passed through the power units is routed over the spillway to make storage space available for flood control. Capacity loss would be realized because flood regulation would require reservoir drawdown which reduces hydraulic head available for power generation and results in reduced operating efficiency for generating units. Average energy loss as a result of provision of additional flood control storage over the five month period has been estimated to be 2.681 megawatts or 1.117 megawatts annually. Capacity power loss during the period of required drawdown has been estimated to range up to 6.3 megawatts. Puget Power would be reimbursed for power losses resulting from the provision of additional flood control storage space through replacement power from the Bonneville Power Administration (BPA). The value of power losses in terms of revenue foregone by the BPA in providing replacement power would cost approximately \$80,000 annually, based on June 1974 rate schedules. Although the proposed operation change would reduce the Northwest's ability to meet projected power demands, this reduction is relatively insignificant.

#### RATIONALE FOR ELIMINATION OF OTHER ALTERNATIVES

Other alternatives, which were considered during the study, are described below and the reasons given for their elimination. These proposals are discussed in more detail on pages 10 and 12.

Alternative 1 - DO NOTHING. This would have involved relying only on existing flood control facilities, including levees and upstream storage at Ross project for flood protection with no effort made to stem the growth of future flood damages through management practices. Alternative 1 was presented in the first three drafts of the public brochure as a possible option. However, as the State of Washington through its Department of Ecology and Skagit County through its Planning Department are actively engaged in implementing existing and recently adopted State laws which control development in flood hazard areas, this alternative was not given further consideration subsequent to the public meeting held in April 1973.

Also, as shown on page 11, the vast majority of those who responded to previous drafts expressed opposition to this proposal.

**Alternative 2 - FLOOD PLAIN MANAGEMENT ALONE.** Reliance would have remained on existing flood control facilities; but in addition, management measures including land use zoning, development restrictions, early flood warning, etc., would continue to be employed to reduce the flood damage growth potential in the Skagit Basin. Flood insurance, while made possible by proper local implementation of land use management practices in flood hazard areas, would not reduce damages but merely provides a means of compensation to the affected property owner. Flood plain management is required, however, in order to qualify for Federally subsidized flood insurance. Alternative 2 would be effective in reducing flood damages to new developments but would not significantly mitigate damages to lands and improvements already located on the flood plain. As Skagit County has strongly expressed a desire for higher level flood control and general support has been indicated by responses to past brochure drafts for additional flood protection, this alternative was deemed to be inadequate in itself and not responsive to basin needs. However, flood plain management has been included as part of the selected alternative 3.

#### SCOPE OF STUDY

Studies were limited to determining the feasibility of providing additional flood control at Upper Baker project consistent with the project's Federal Power Commission (FPC) license. Also considered as an alternative throughout the study was flood plain management alone.

The U.S. Fish and Wildlife Service and the National Marine Fisheries Service late in the study asked that flood control drawdown occur earlier than necessary for flood control in order to benefit Baker Lake salmon production. This earlier drawdown would increase power losses and, therefore, would have to be justified by fishery enhancement benefits. No current provision exists in the FPC license for such a project operation change. Because of this and the lack of data on fish production, the Corps study did not evaluate the early drawdown proposal. However, the Corps of Engineers would support the fish and wildlife agencies in any future studies of their proposal, which must be justified on its own merits.

#### STUDY ACTION TO DATE

Draft brochures were distributed to interested individuals, groups, and local, State, and Federal agencies in November 1972 and April and June 1973, depicting impacts associated with providing additional flood control storage space at Baker Lake. Comments PRO and CON were requested with regard to the alternatives. This is the fourth draft, which is intended to provide further opportunity for public comments. A public meeting was held on 25 April 1973 in Burlington, during which the study objectives were outlined. Detailed engineering, economic and environmental impact studies were conducted over the past 2 years with input and assistance provided by Skagit County and other State and Federal agencies. Several Study Grams

were issued during the course of the study giving information on our progress. Limited distribution of a draft report has been made to the State of Washington, Skagit County and regional offices of interested Federal agencies. Widespread distribution of a draft environmental impact statement took place in February seeking agency and public comments.

#### FUTURE STUDY ACTION

Information contained in this fourth draft brochure and the Seattle District, Corps of Engineers tentative recommendation regarding Alternative 3, FLOOD PLAIN MANAGEMENT WITH ADDITIONAL FLOOD CONTROL STORAGE AT UPPER BAKER PROJECT, will be discussed at the final public meeting to be held on this study. This meeting will be conducted on 8 April 1975 at the Mount Vernon High School, Mount Vernon, Washington, beginning at 7:30 p.m.

Following the 8 April public meeting, the District Engineer's report will be finalized with comments from interested parties considered and incorporated into the report as appropriate. The report, together with a final edition of the brochure (reflecting comments on draft #4) and the environmental impact statement, will be reviewed by the Corps of Engineers Division Engineer in Portland, Oregon, and the Board of Engineers for Rivers and Harbors and the Chief of Engineers in Washington, D.C. Comments on the recommendations contained in the report will be requested from other Federal agencies and from the State of Washington. These comments will be incorporated into the report, which will then be submitted to Congress.

Comments on this brochure may be made at the final public meeting, by letter to Frank Urabeck, Study Manager (address on front page), returning the brochure, or simply by tearing off the last page and mailing it back to us.

#### BACKGROUND

Flood History. The Skagit River valley has a history of winter flooding dating back before 1900. Floodflows have been recorded intermittently since October 1908. Zero damage flow is considered to be 60,000 c.f.s. (measured at Concrete gage). At this discharge, flooding begins between Concrete and Sedro Woolley. However, in the leveed areas below Sedro Woolley, the minimum safe channel capacity is 84,000 c.f.s. Since 1908 this flow has been exceeded 18 times during the winter flood season (October-March). The most recent major flood occurred in February 1951 with a peak discharge of 139,000 c.f.s. at Concrete; 150,000 c.f.s. at Sedro Woolley; and 144,000 c.f.s. at Mount Vernon. The flood remained near its peak for 6 hours at Mount Vernon, a fact which contributed significantly to the severity of the flood damages. During this flood many dikes failed, because they lacked sufficient cross-sectional dimensions to withstand saturation. Tabulated below are flows above 60,000 c.f.s. at the Concrete gage.

30 Nov 1909	260,000	19 Oct 1947	95,200
30 Dec 1917	220,000	27-28 Nov 1949	154,000
13 Dec 1921	240,000	10-11 Feb 1951	139,000
12 Dec 1924	92,500	1 Feb 1953	66,000
16 Oct 1926	88,900	3-4 Nov 1955	106,000
12 Jan 1928	95,500	20 Oct 1956	61,000
9 Oct 1928	74,300	23-24 Nov 1959	89,300
27 Feb 1932	147,000	15 Jan 1961	79,000
13 Nov 1932	116,000	20 Nov 1962	114,000
22 Dec 1933	101,000	22 Oct 1963	73,800
25 Jan 1935	131,000	16 Dec 1966	66,200
28 Oct 1937	89,600	28 Oct 1967	84,200
2 Dec 1941	76,300	1 Nov 1967	64,100
3 Dec 1943	65,200	21 Jan 1968	68,100
8 Feb 1945	70,800	31 Jan 1971	62,200
25 Oct 1945	102,000	16 Jan 1974	79,900
25 Oct 1946	82,200		

Flood Damage Reduction Measures. Existing flood damage reduction measures include a flood forecasting and warning service, flood control storage, levees and flood plain management regulations.

Estimates of impending peak floodflows and expected times of occurrence are prepared by the River Forecast Center in the Portland, Oregon, office of the National Weather Service and disseminated by the Portland River District Office. The River District Office issues emergency and public service teletype bulletins to the National Weather Service office in Mount Vernon, which in turn alerts the county and city officials, newspapers, and transmitting news media. Skagit County Civil Defense Organization is responsible for implementing a flood warning plan.

Ross Dam (see page ii), on the main stem of the Skagit, has 120,000 acre-feet of storage for flood control. This storage was made available in 1949. When flows at Concrete are forecast to reach 90,000 c.f.s., the discharge by Ross Dam is reduced to that required for power generation only. About 16,000 acre-feet of storage space is provided in Baker Lake Reservoir, created by Upper Baker project in June 1959, as replacement for natural valley storage lost when the project was constructed.

Levees extending downstream from Sedro Woolley and sea dikes located on the edge of Puget Sound vary considerably in safe capacity, ranging from discharges expected on the average to recur once every 3 years to discharges expected once every 10 years. The highest level of safe channel capacity is provided along the east bank of Skagit River, protecting Mount Vernon.

A flood plain information report, "Skagit River Basin, Washington," was published by the Corps of Engineers in April 1967. This report has been used by county and State officials to regulate development in flood hazard areas. Legislation providing authority for regulation in these areas

includes the State of Washington Flood Control Zone Act of 1935 and the Shoreline Management Act of 1971. The Skagit River has been designated as Flood Control Zone No. 7 by the Washington Department of Ecology, pursuant to RCW 86.16.

Authorized Corps of Engineers Flood Control Projects.

Levee and channel improvements. The project, authorized by the 1966 Flood Control Act, provides for improving the river channel and raising and strengthening about 34 miles of levees downstream of Burlington. This project is in a deferred status but is expected to be re-examined subsequent to congressional action on the proposed Upper Baker project operation change.

Avon Bypass. This project was authorized by the Flood Control Acts of 1936 and 1966. It includes a diversion channel 8 miles long from near Burlington to Padilla Bay, a 4-mile levee, drainage structures, and widening of the Skagit River for 2 miles. The project is in a deferred status due to Skagit County's inability to assume requirements of local project sponsorship.

Ongoing Related Studies.

Water Pollution Control and Abatement Plan. Under Federal law, Skagit County, like all other parts of the country, is required to submit a water pollution control and abatement plan, in order to qualify for grants for water and sewer improvements. The Department of Ecology is monitoring this study as it is carried out by county and municipal agencies.

National Wild and Scenic River System. The U.S. Forest Service is in the process of finalizing its report on a study of the Skagit River that was undertaken to determine if the Skagit and several of its tributaries meets the requirements for inclusion in the National Wild and Scenic River System. Tentatively, the Forest Service is recommending that the Skagit River from Sedro Woolley to Bacon Creek be classified "recreational" and the entire length of the Cascade, Sauk and Suiattle Rivers be classified "scenic." Alternative 3, as described on page 1, is entirely consistent with these classifications.

Washington Water Resources Program. Under its Water Resources Program, the Department of Ecology is responsible for determining the existing situation, problems, prospective needs, and alternative solutions relative to all water resource matters throughout the State. Much of this activity will be accomplished by meetings with interested citizens and public hearings in the various river basins. Work was initiated in July 1971, and completion of the initial studies is scheduled for 1977.

Land Use Plans.

State Shoreline Management Act of 1971. Skagit County completed an inventory of all affected lands in October 1972, in compliance with the State Shoreline Management Act of 1971. The county shoreline master program is scheduled for publication and submission to the Department of Ecology by September 1975.

Comprehensive Land Use Plans. The Skagit County Planning Department is also reviewing the existing Comprehensive Land Use Plans to determine what changes, if any, are desirable. These plans are available for consultation at the Skagit County Courthouse Annex.

ALTERNATIVE 1

DO NOTHING

DESCRIPTION: Reliance would remain on existing flood control facilities, including levees, dikes and current flood control storage at Ross and Upper Baker projects, with no effort made to stem the growth of future flood damages through management practices (see map, page 15, for flood plain).

EFFECTS:

Plants and animals. Further loss of river habitat.

Water quality. Some degradation.

Recreation. Increased recreation homesite development in flood plain.

Land use. More intensive development expected than would be the case with flood plain regulations.

People. Present population trends would continue.

Flood damage. The approximately 100,000 acres of Skagit River flood plain downstream of the mouth of Baker River, near Concrete, would continue to be subject to the current level of flood risk, with future damages expected to be approximately 17 percent greater over the same economic life as alternative 3 than with an adequate flood plain management program.

ALTERNATIVE 1  
Do Nothing

UPPER BAKER

PROS

CONS

PLANTS AND ANIMALS

1. No impact. Would have no additional impact on fish and wildlife recreation. (Dept. Game, F&WS)

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

2. Siltation and turbidity. Temporary water siltation and turbidity would continue during each successive flooding and runoff condition. (F&WS)

RECREATION

3. \*New recreational or access benefits would violate the spirit or the Scenic Highway and National forest. (BP)

3. No new recreational or access benefits would result. (F&WS)

LAND USE

4. Sediment deposited. Flooding of Skagit and Nookachamps leaves beneficial sediment. (DD#21)

4. Erosion. Erosion upstream would continue to increase. (LPC)

5. Applies to only some lands. This alternative would apply only on lands outside of existing flood control zones. (Dept. Ecol.) Lack of flood management is the easiest way to insure that the flood plain remain in agricultural and open space use. (BP)

5. Uncontrolled development. Does not provide management guidelines and encourages sporadic development. (Sierra)

PEOPLE

6. \_\_\_\_\_  
\_\_\_\_\_

6. Only a matter of time before a major Skagit River flood results in substantial loss of life and property. Presently extensive areas of nondiked lands are inundated periodically. (SWCD)

FLOOD DAMAGE

7. Diking helps. Since diking in diking district No. 17 was raised, trees were removed, and bank riprapped after flood of 1951, there has been no trouble. (SF)

7. Impossible solution. This area is already in a flood control zone, and Alternative 2 is already in effect. (L. St. John)

8. \_\_\_\_\_  
\_\_\_\_\_

8. Studies should be made. Flooding problem is due to the Sauk and Suiattle Rivers. (DD#14) Studies should be made on how to minimize flooding in the Skagit Valley. (SVG) Flood control is a must. (SE)

9. \_\_\_\_\_  
\_\_\_\_\_

9. Lower valley unprotected. Offers no protection to lower valley if damage occurs. (Dept. Ecol., Dept. Game, LPC, F&WS)

ECONOMICS

10. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Costly. Costs of doing nothing would exceed benefits. (DD#21) All that is needed is to clean up the river, especially in the vicinity of the Burlington Northern Bridge between Mt. Vernon and Burlington, and make inexpensive commonsense repairs. (DD#14)

OTHER COMMENTS

11. \_\_\_\_\_  
\_\_\_\_\_

11. \_\_\_\_\_  
\_\_\_\_\_

\* Added, this draft.

NOTE: Sources of comments, together with abbreviations used, are listed at the end of this brochure.

STATEMENTS BOTH PRO AND CON ON EACH ALTERNATIVE ARE ENCOURAGED FROM AGENCIES, GROUPS AND INDIVIDUALS AS FACTUAL COMMENTS ARE DESIRED RATHER THAN VOTES FOR OR AGAINST THE ALTERNATIVE

**ALTERNATIVE 2**

**FLOOD PLAIN MANAGEMENT ALONE**

**DESCRIPTION:** No additional flood control structures would be constructed. Existing levees would be maintained and Ross and Upper Baker storage projects continued to be operated as they have in the past. (See map, page ii.) In addition, the following specific nonstructural measures would be relied upon to lessen the growth in flood damage potential.

a. The existing warning system would continue to provide residents of the Skagit Basin advance notice of impending floods in sufficient time to permit them to evacuate some personal property. Flood forecasts are issued by the U.S. Weather Bureau and broadcast by radio and television stations with Skagit County Civil Defense Office responsible for alerting people to the danger of impending floods.

b. Flood proofing would be applied to all future development in the flood plain. In most cases, this would involve placement of fill and constructing the ground floor of structures above the 100-year flood level. The majority of existing developments in flood hazard areas are not expected to be flood proofed due to the expense involved and the availability of relatively inexpensive subsidized flood insurance.

c. New construction would be severely restricted if not precluded in designated floodway areas.

d. The flood insurance program, established under the Housing and Urban Development Act of 1968, as amended in 1973, would be used to make available Federally subsidized flood insurance. Skagit County is presently qualified for this insurance, which applies to one-to-four family dwellings, properties occupied principally by small business, and to the contents of properties of these types. Cropland, industry, and large businesses are not eligible for flood insurance. Other losses, such as interruptions to transportation, also are not covered.

**ANNUAL COSTS:**

Federal - USCE and HUD	\$248,000 (flood information & insurance)
State of Washington	8,000 (flood plain zoning & permits)
Skagit County	20,000 (flood plain zoning & permits)
Individuals	65,000 (flood proofing & insurance)
Total	\$341,000

**EFFECTS:**

Plants and animals. Existing trends would continue.

Water quality. Existing trends would continue.

Recreation. Existing trends would continue.

Land use. Conversion of agricultural and open space lands to intensive uses would be less than under alternative 1.

Flood damage. Flooding would continue; however, damages to future developments in flood-prone areas would be lessened due to flood proofing, advanced flood warning, and restrictions designed to keep development out of extreme flood hazard areas.

Transportation. Road, highway, and rail traffic would still be subject to disruption during floods.

**ECONOMIC ANALYSIS:**

Average annual benefits	\$1,243,000 (flood damage reduction & flood insurance payouts)
Average annual costs	\$341,000
Benefit-cost ratio	3.6

ALTERNATIVE 2

UPPER BAKER  
Flood Plain Management Alone

PROS

CONS

PLANTS AND ANIMALS

- 1. Good for all. Most favorable and beneficial to fish, wildlife, water quality, and recreation. (F&WS)

- 1. \_\_\_\_\_  
\_\_\_\_\_

WATER QUALITY

- 2. \_\_\_\_\_  
\_\_\_\_\_

- 2. Erosion and sedimentation. The cause of erosion at the upper part of the river and sedimentation at the lower part must be attacked at its source. (LPC)

RECREATION

- 3. Keeps recreational potential. Preserves recreational potential of lower valley (Dept. Game) and has less effect on environment. (Sierra)

- 3. \_\_\_\_\_  
\_\_\_\_\_

LAND USE

- 4. A master basin control plan. There are integral elements of the total basin program and should be continued and expanded where practical (Dept. Ecol.), and incorporated into a master control plan. (LPC) Most realistic plan (DD#12, R. Hammond), and already in effect under current legislation. (L. St. John) It is a supplement to Alternative 3. (MNF)

- 4. \_\_\_\_\_  
\_\_\_\_\_

- 5. Commercial and industrial development. Procludes extensive commercial and industrial developments within flood plain, thus preserving open spaces important for recreation and wildlife (Dept. Game, F&WS), and encourages use of alternative areas above the flood plain. (SWCD, BP) Zoning or outright acquisition of a corridor within the flood plain perimeter for recreational access would allow expansion of fish and wildlife opportunities for benefit of the public (F&WS); also should build more salmon hatcheries so there will be more fish in Skagit River. (DD#21)

- 5. Decreased use of valley land. (BP) Agricultural operations would be discouraged. (F&WS) (DD#21)

- 6. Flood management. Provides management planning for flood plain and encourages land uses compatible with flooding. (Sierra) \*The more secure the flood plain becomes, the more intensive type of land use can be expected, i.e. urban encroachment on farmland. (BP)

- 6. \_\_\_\_\_  
\_\_\_\_\_

PEOPLE

- 7. Investors will be warned. Should serve as a warning to future investors that there is a potential flooding problem. (SWCD)

- 7. \_\_\_\_\_  
\_\_\_\_\_

- 8. \_\_\_\_\_  
\_\_\_\_\_

- 8. Insurance. Insurance should be considered as a precautionary measure (Dept. Ecol.), and should not be expected to replace good judgement in locating structures. (SWCD)

\* Added, this draft.

NOTE: Sources of comments, together with abbreviations used, are listed at the end of this brochure.

STATEMENTS BOTH PRO AND CON ON EACH ALTERNATIVE ARE ENCOURAGED FROM AGENCIES, GROUPS AND INDIVIDUALS AS FACTUAL COMMENTS ARE DESIRED RATHER THAN VOTES FOR OR AGAINST THE ALTERNATIVE

ALTERNATIVE 2 (con.)

UPPER BAKER  
Flood Plain Management Alone

PROS

CONS

PEOPLE (Con.)

- |  |   |
|--|---|
| <p>9. Small governmental subdivisions are subject to pressures, and decisions made under these conditions may not be best in the long run. (SWCD) Involves political decisions difficult to implement. (MBNF)</p> <p>10. _____<br/>_____</p> <p>11. <u>Warning system.</u> An improved warning system is needed. (SECD, #12 SW, #12 MV, #21)</p> | <p>9. _____<br/>_____</p> <p>10. <u>An inadequate solution.</u> (SE) Flood plain use accounts for only a small percentage of the total damage potentials. (Dept. Ecol.)</p> <p>11. <u>May be poor dike case.</u> Might cause less careful dike maintenance, thus increasing potential dangers. (BP)</p> |
|--|---|

ECONOMICS

- |   |   |
|---|---|
| <p>12. Least costly solution. (L. St. John)</p> | <p>12. Costs would exceed benefits. (DD#21)</p> |
|---|---|

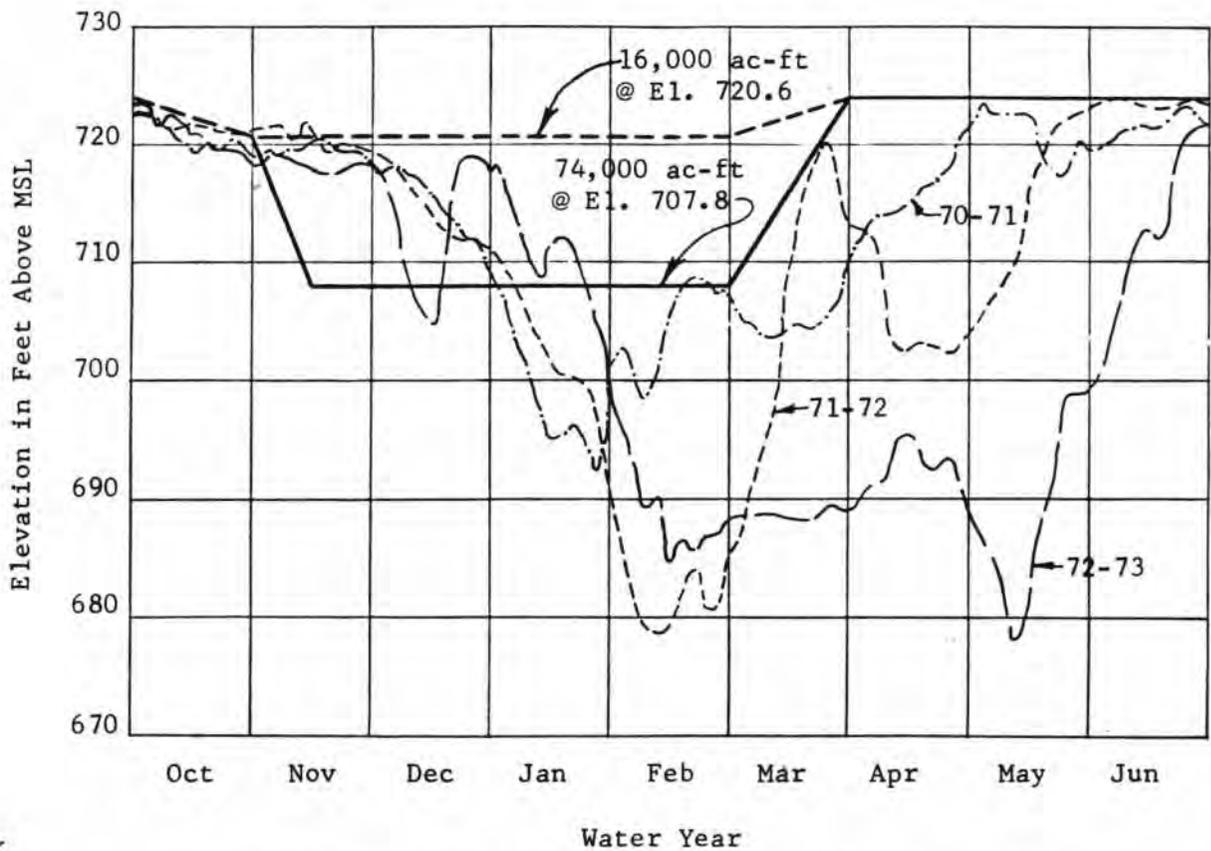
OTHER COMMENTS

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| <p>13. _____<br/>_____<br/>_____</p> | <p>13. _____<br/>_____<br/>_____</p> |
|--------------------------------------|--------------------------------------|

\* Added, this draft.

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## UPPER BAKER PROJECT RESERVOIR (BAKER LAKE)

(HISTORICAL DRAWDOWN AND FLOOD CONTROL  
 RULE CURVES UNDER 16,000 ACRE-FEET (EXISTING)  
 AND 74,000 ACRE-FEET (PROPOSED CONDITIONS)

**ALTERNATIVE 3**

**FLOOD PLAIN MANAGEMENT WITH ADDITIONAL  
FLOOD CONTROL STORAGE AT UPPER BAKER PROJECT**

**DESCRIPTION:** Flood plain management measures defined under alternative 2 are included in this proposal, which calls for a change in operation of the existing Upper Baker hydroelectric project, owned and operated by Puget Sound Power and Light Company. The Upper Baker project currently provides 16,000 acre-feet of flood control storage, as compensation for natural valley storage lost due to construction of the project. The Federal Power Commission project license allows up to an additional 84,000 acre-feet of flood control storage to be utilized at the project, provided that Puget Power is satisfactorily compensated for the attendant reduction in power production capability. The following alternative volumes of increased storage were examined:



Storage Space (acre-feet)		Flood Control Pool Elevation
Additional	Total	
84,000	100,000	701.4
58,000	74,000	707.8
50,000	66,000	709.8
40,000	56,000	712.1

The recommended plan calls for an additional 58,000 acre-feet of storage space to be provided by 15 November. The pool would be kept below elevation 707.8 from 15 November, except during an actual flood event, until 1 March. Use could be made of the reservoir's full capacity for hydroelectric power generation by 1 April. See page 15 for the existing and proposed flood control rule curves, including actual drawdowns for 1970-1973.

**WITHOUT FLOOD PLAIN MANAGEMENT BENEFITS**

**IMPLEMENTATION COSTS:**

Federal - \$25,000 - Preparation of reservoir regulation manual and negotiation of power loss evaluation agreement.

**AVERAGE ANNUAL COSTS:**

Actual

Federal - \$88,000 - Federal power revenues foregone in providing replacement power from the Federal system to Puget Power and allowance for administrative costs associated with Upper Baker project flood control operation.

Economic

Federal - \$301,000 - Alternative cost of replacement power and average annual administrative costs associated with additional flood control at Upper Baker project.

**AVERAGE ANNUAL BENEFITS:** Flood damage reduction - \$1,446,000

**BENEFIT-COST RATIO:** 4.8 (economic)

**WITH FLOOD PLAIN MANAGEMENT BENEFITS**

**AVERAGE ANNUAL COSTS:** \$642,000

**AVERAGE ANNUAL BENEFITS:** \$2,689,000

**BENEFIT-COST RATIO:** 4.2 (economic)

**EFFECTS:**

Plants and animals. Reservoir fishery would not be adversely affected. Additional water, released from the Upper Baker project, during flood control drawdown, would augment Skagit River flows during salmon spawning.

Water quality. Lower reservoir levels during the period of heavy winter rains could increase siltation in Baker Lake and result in higher turbidity downstream.

Recreation. Downstream Skagit River sport fishery could be improved by low-flow augmentation.

Land use. The increased flood protection provided by this alternative would not be sufficient to allow relaxation of current restrictions on intensive developments in flood hazard areas. Therefore, no effect on land use is expected.

Flood damage. Additional flood protection would be provided for nearly 100,000 acres of Skagit River flood plain located below the mouth of Baker River, near Concrete.

Power lost. Hydroelectric power generation capability at the Upper Baker project would be reduced due to the requirement for a lower pool during the winter flood season. This could contribute to power shortages in the Pacific Northwest. However, the relatively small amount of power involved is not expected to significantly impact the overall system. Puget Power would receive replacement power from the Bonneville Power Administration.

ALTERNATIVE 3

Flood Plain Management with Additional Flood Control Storage at Upper Baker Project

PROS

CONS

PLANTS AND ANIMALS

- |   |  |
|---|--|
| <p>1. Field inspection indicates that this is not a problem. (C of E) *Increased flood control storage in Baker Lake will not result in additional impact on the salmon fisheries resource. (Dept. Fish)</p> <p>2. <u>Spawn in Channel Creek.</u> The proposed drawdown might prevent the sockeye from spawning on the subsequently dewatered portion of the beaches where their eggs are killed. As result, the fish will seek out and successfully spawn in Channel Creek. (Dept. Fish, *NMFS) Field inspection indicates that this is not a serious problem. (C of E)</p> <p>3. <u>Drawdown times different.</u> Begin drawdown about <u>October 30, end of fishing season, not October 1.</u> (BRRS) Suggest after Labor Day to October 1. It will help sockeye to spawn somewhere else. (NMFS) Starting after Labor Day will have minimal impact on recreational angling in Baker Lake. (SWCD)</p> | <p>1. <u>Fish will be affected by drawdown.</u> Low drawdown would trap fish fry in pits at upper end of lake, exposing them to predation and other losses. (NMFS) Scheduled pool elevation would result in downstream migrants escaping through turbines (F&amp;WS, NMFS).</p> <p>2. <u>Access to spawning may be a problem.</u> Increased drawdowns could adversely affect accessibility of spawning streams. (F&amp;WS, BRRS) Would eliminate or expose shoreline spawning habitat now used by sockeye salmon. (F&amp;WS)</p> <p>3. _____</p> <p>_____</p> <p>_____</p> |
|---|--|

WATER QUALITY

- |  |  |
|--|--|
| <p>4. <u>*No significant impacts on water quality due to the proposed project.</u> (EPA)</p> | <p>4. <u>Siltation and turbidity problems.</u> Holding the reservoir at a low level, especially during the winter months, would expose the shoreline to heavy rains and create a siltation problem and increased turbidity. (F&amp;WS, NMFS)</p> |
|--|--|

RECREATION

- |   |   |
|---|---|
| <p>5. <u>No effect on recreation.</u> If drawdown occurs in the fall, should not have adverse effect on summer recreation. (MBNF)</p> | <p>5. <u>Drawdown effect on recreation.</u> Need to evaluate recreational impacts due to reservoir drawdown. (Dept. Ecol.) Might affect fishing access in spring. Would decrease recreational and scenic values of Baker Lake (Sierra Club). Further drawdown of the reservoir may cause an adverse effect on recreational potential of the basin. (BRRS)</p> |
|---|---|

LAND USE

- |   |  |
|---|--|
| <p>6. <u>Important for land-use program.</u> Should be considered an integral component of the program for the entire basin. (Dept. Ecol.)</p> <p>7. <u>Due to only partial reduction in flood hazard and restriction of flood plain management, land use should not change.</u> (C of E)</p> <p>8. <u>*Land subject to flooding could eventually be lost due to erosion.</u> (DD#21)</p> | <p>6. _____</p> <p>_____</p> <p>7. _____</p> <p>_____</p> <p>8. _____</p> <p>_____</p> |
|---|--|

\* Added, this draft.

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Flood Plain Management with Additional Flood Control Storage at Upper Baker Project

PROS

CONS

PEOPLE

- |   |   |
|---|---|
| <p>9. Will protect farmlands. Flood control including upriver storage is essential for protection of farmland and existing farm and residential structures in the existing flood plain. This is included in District long-range program. (SWCD)</p> | <p>9. <u>Diking</u>. It would be better to improve dike. (BP)</p>   |
| <p>10. _____</p>  | <p>10. <u>Electric supply reduced</u>. Releases available electric supply at time when need is greatest. (SE)</p> |

FLOOD DAMAGE

- |  |  |
|--|--|
| <p>11. Support flood protection. Strongly support this flood protection. (SE, BPW, #12 MV, #17, #20, DD#13, #15, *DD#21) We would favor even this small amount over nothing. (SWCD) Represents some positive control on flooding. (MBNF) Would provide partial relief. (LPC, Hamilton)</p>   | <p>11. <u>Not enough protection</u>. Only corrects about 8 percent of the total flood damage of the basin. (Dept. Ecol.) Watershed above Upper Baker includes less than 7 percent of area of the Skagit at Mt. Vernon and about 10 percent of runoff volume. This degree of control would be small under severe conditions. (SWCD)</p> |
| <p>12. <u>Storage will increase</u>. The additional flood storage could make the difference between the disaster or high river stage. (PNWMA) Additional flood storage at Upper Baker will not adversely affect the environmental values of Skagit Valley. (EPA) It is only a start on the overall control program for Skagit, and its benefits will more than justify the costs. (SWCD)</p> | <p>12. _____<br/>                 _____<br/>                 _____<br/>                 _____</p>  |
| <p>13. Favor Alternative 3 with improved warning system. (Hamilton)</p>  | <p>13. _____</p>   |
| <p>14. Flood plain development. Flood control storage in Baker Lake, combined with flood plain management, offers the most acceptable plan. (SWCD)</p>   | <p>14. <u>False sense of security</u>. Encourages development of flood plain for uses incompatible with flooding. (Sierra) Would create a false sense of security which could induce continued building in floodprone areas. (R. Hammond, SWCD)</p>  |
| <p>15. Reduces peak flows. Present operation of Baker Dam has already helped to reduce peak flows (SVG), and flood storage in Baker Lake would be of great benefit to the lower valley. (SC)</p>   | <p>15. <u>Impact on environment</u>. Doubtful that changed reservoir operation would provide noticeable flood control benefits, while contributing to substantial environmental damage and degradation. (F&amp;WS)</p>   |
| <p>16. <u>*With the additional flood storage, the authorized levee project will provide adequate protection.</u> (PNWA)</p>  | <p>16. _____<br/>                 _____</p>  |

ECONOMICS

- |  |   |
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| <p>17. No large capital costs. Can be achieved without large capital costs. (Dept. Ecol., Hamilton) Cost in relation to benefits appears favorable. (SWCD)</p> | <p>17. <u>Questionable whether costs would be justified</u>. (SE) A very expensive project (BP), and involves recurring annual cost. (MBNF)</p> |
| <p>18. *Additional flood control at Baker would hold damages to a minimum. (DD#21)</p>   | <p>18. _____</p>  |

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ALTERNATIVE 3 (con.)

Flood Plain Management with Additional Flood Control Storage at Upper Baker Project

PROS

CONS

ECONOMICS (Con.)

- |   |   |
|---|---|
| 19. *Economic analysis has determined benefits derived from additional storage in Baker Lake to be economically justified. (C of E) | 19. *Negative benefits. Reduced available electrical supply, little change in flood occurrence, encourages development of flood plain, trap fish during drawdown. Appears to offset benefits of additional storage. (BPC) |
| 20. _____   | 20. *Flood insurance is available without any increased storage in Baker. (BPC)   |

OTHER COMMENTS

- |   |  |
|---|--|
| 21. Power losses to Puget Sound Power and Light would be replaced in kind from other sources. (Dept. Ecol.) Power loss compensation tentatively worked out between Puget Power, BPA and C of E. No local funding required (C of E). | 21. Would have no influence locally, but would be a minor regional power loss. (Dept. Ecol., SP) Reduction of hydro capability would have to be replaced by thermal generation. (BPA) Problem exists of reimbursement for power loss and method of dividing costs. (LPC) Districts cannot afford costs of this. (#12 SW, #12 MV) |
| 22. Baker Lake will not be lowered until November, long after recreation season is ended. (C of E)  | 22. *Tarrs Baker Lake Resort should be reimbursed for loss due to lowering the Baker Lake.   |

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AGENCIES AND GROUPS CONTRIBUTING FACTS TO THE STUDY

	Organization	Contact	Provided facts for or commented on brochure dated		
			April 73	June 73	March 75
<u>LOCAL</u>					
	Skagit County				
SE	Engineer	L.H. Johnson	X	X	
SP	Planning Dept.	R. Schofield			
SF	Flood Control Council	E. Hanson	X		
SWCD	Soil & Water Conservation District	R.J. Hulbert	X	X	
CES	Cooperative Extension Service	W.V. Gray			X
SFB	Farm Bureau				
SPUD	Public Utility District				
SC	Commissioner	H.A. Miller		X	
	Burlington				
BP	Planning Commission	F. Lubbe	X		X
BPW	Public Works	A. Lucas	X		
	Sedro Woolley				
	Mt. Vernon				
	Lyman				
LPC	Planning Commission	B. Coggins			
PSP&L	Puget Sound Power & Light Co.			X	
	Whatcom County	W.L. McIntyre		X	
	Hamilton	E. Hooper		X	
	<u>Dike Improvement Districts</u>				
#12SW	D.D. #12, Sedro Woolley	G.D. Mapes	X		
#12MV	D.D. #12, Mt. Vernon	L. Ivey	X	X	
#21	D.D. #21	A. Bell	X		
#2	D.D. #2, Mt. Vernon	L. Hughes	X		
#17	D.D. #17	E. Hanson		X	
#15	D.D. #15	R. Reedy, P. Summers, E. Summers		X	
#20	D.D. #20	R.G. Thompson		X	
	<u>Drainage Districts</u>				
DD#21	D.D. #21, Mt. Vernon	P.O. Wilcox	X	X	X
DD#14	D.D. #14	J. Ball, L. Qvenell	X		
DD#13	D.D. #13	G. Dynes		X	
<u>STATE</u>					
	Dept. Ecology, Olympia	F.D. Hahn	X		
	Dept. Fish	Don Moos	X	X	X
	Dept. Game	J. Ward, E. Reade Brown	X		X
DNR	Dept. Natural Resources				
PCA	Planning & Community Affairs				
C&ED	Commerce & Economic Development				
NWAPA	N.W. Air Pollution Authority				
SEC	State Ecology Commission				
<u>FEDERAL</u>					
SCS	Soil Conservation Service, Spokane	L.F. Kehne	X		
MBNF	Mt. Baker National Forest	D.E. Allen	X		
BRRS	Baker River Range Station	R.L. Novy		X	
F&WS	Fish & Wildlife Service	N. Brown	X		X
BuRec	Bureau of Reclamation				
BPA	Bonneville Power Administration	F.G. Gilkey		X	
NMFS	National Marine Fisheries Service	F. Cleaver	X	X	X
NWS	National Weather Service				
FPC	Federal Power Commission	M.F. Thomas	X		
EPA	Environmental Protection Agency	C.E. Veirs Hurlon C. Ray	X		X
<u>MISCELLANEOUS ORGANIZATIONS</u>					
SVG	Skagit Valley Grange #620, Mt. Vernon	N. McRae	X		
Sierra	Sierra Club	D. Osterhold	X		
WEC	Washington Environmental Council				
AS	Audubon Society				
LWV	League of Women Voters				
PNWA	Pacific N.W. Waterways Association	G. Dynes		X	
<u>INDIVIDUALS</u>					
	Hammond, R.K., Tacoma		X		
	Kalt, J.E.			X	
	L. St. John		X		

PLAN FOR PUBLIC INVOLVEMENT  
 ADDITIONAL FLOOD CONTROL AT UPPER BAKER PROJECT

<p>1 JULY - SEPTEMBER 72</p> <p>Original alternatives developed by Corps of Engineers and local interests. Public brochure draft #1 prepared.</p>	<p>2 OCTOBER 72</p> <p>Brochure draft #1 with all alternatives mailed to interested parties with their comments requested.</p>	<p>3 NOV 72 - FEB 73</p> <p>Public comments on alternatives evaluated. Alternative 3, Flood Plain Management with Additional Flood Control Storage at Upper Baker project tentatively selected as best alternative.</p>
<p>4 MARCH</p> <p>Draft #2 of brochure prepared and alternative 3 announced as apparent best alternative. Brochure draft #2 mailed to interested parties and public meeting announced. Began detailed studies of alternative 3.</p>	<p>5 APRIL 73</p> <p>Public meeting by Corps of Engineers. Public comments solicited on brochure draft #2 and selection of alternative 3.</p>	<p>6 MAY - JUNE 73</p> <p>Refined and revised brochure and mailed draft #3 to interested parties, with request for comments.</p>
<p>7 JULY 73 - MARCH 75</p> <p>Continued detailed study of Alternative 3. Study Gram reporting on study status mailed in Nov 73 and June 74. Prepared and distributed draft report for limited review. Brochure draft #4 distributed. Final public meeting announced.</p>	<p>8 APRIL 75</p> <p>Final public meeting by Corps of Engineers, discussing brochure draft #4 and results of detailed studies.</p>	<p>9 MAY - JUNE 75</p> <p>Finalize District Engineer's report. Refine and revise final brochure to reflect public review and comments.</p>

NOTE: All dates noted are tentative.



\_\_\_\_\_  
Telephone No.

\_\_\_\_\_  
Agency or Group Represented

\_\_\_\_\_  
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NAME

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NPSN-PL-BP