Mason County Skokomish River Comprehensive Flood Hazard Management Plan

Volume 3: Appendices
February 1997

KCM

KCM, Inc.
1917 First Avenue, Seattle, WA 98101-1027

Mason County
Skokomish River Comprehensive Flood Hazard Management Plan

Volume III: Appendices

February 1997

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1917 First Avenue, Seattle, WA 98101-1027

SKOKOMISH RIVER
COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN

VOLUME III: APPENDICES

FEBRUARY 1997

Prepared for:
Mason County Department of Community Development
411 North Fifth Street
Shelton, WA 98584

Prepared by:

KCM

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KCM Project #2540037/Ecology Grant #G9400224

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Skokomish River Comprehensive Flood Hazard Management Plan
Volume III: Appendices
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APPENDIX AA.
SKOKOMISH TRIBE CORRESPONDENCE ON BUYOUT/RELOCATION AND HIGH HAZARD AREAS

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Skokomish Indian Tribe

2540037 (2-1)

Tribal Center (360) 426-4232
N. 80 Tribal Center Road FAX: (360) 877-5943 Shelton, WA 98584

RECEIVED
MAR 20 1996
KCM, INC.
SEATTLE, WA 98101

To: Phil Noppe

From: Skokomish Tribe Natural Resoureces

Date: March 18, 1996

Subj: Buyout/Relocation and High Hazard areas

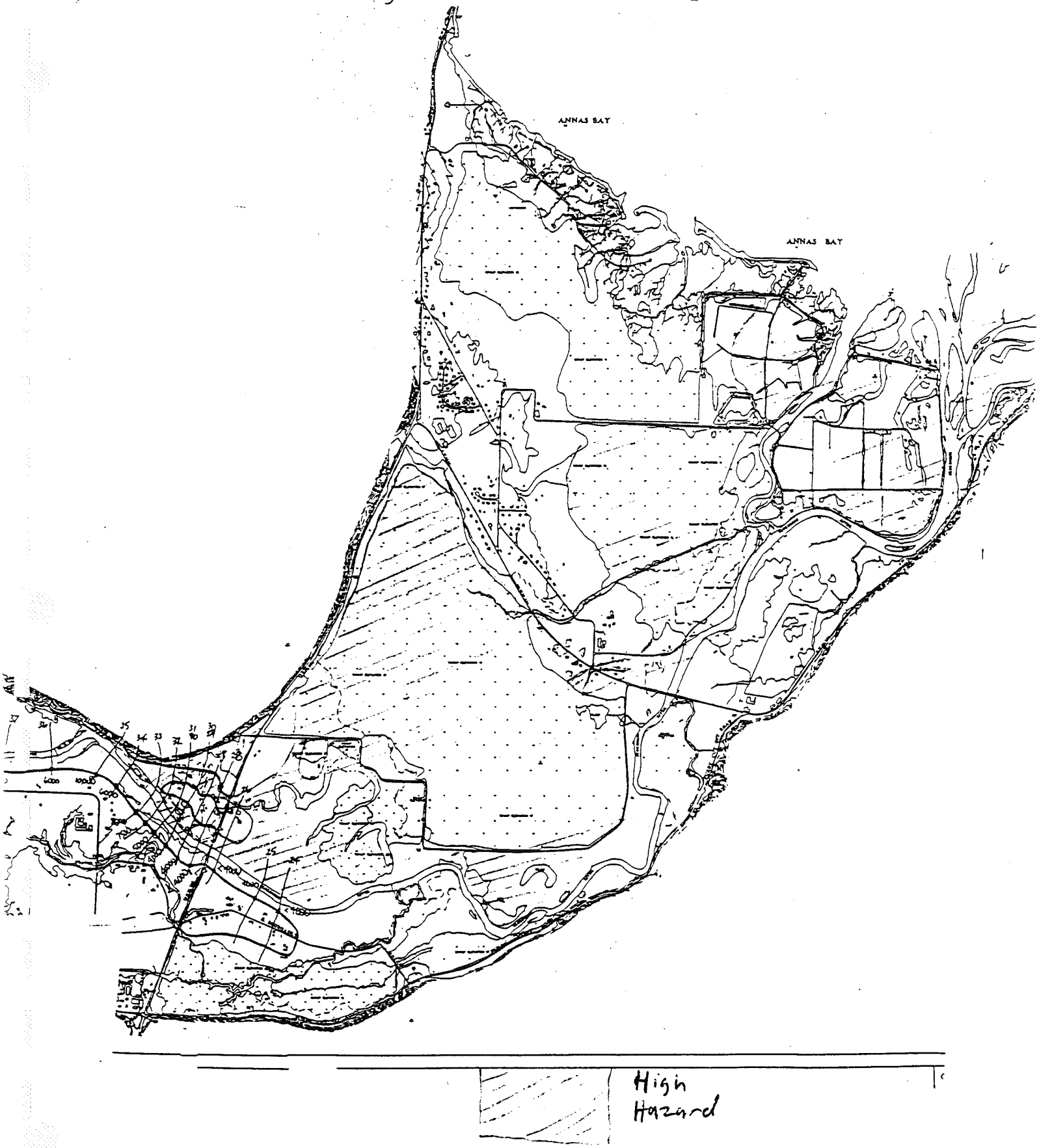
Included with this letter is the information requested from Gary Cooper for KCM as asked in his letter to the tribe (included).

On the buyout/ reloction map we would like all structures listed considered.

Thank you,

for Jim Park
Director

High Hazard map



GARY YANDO, DIRECTOR

COUNTY OF MASON - STATE OF WASHINGTON
MASON COUNTY
1864

DEPARTMENT OF COMMUNITY DEVELOPMENT
PLANNING - SOLID WASTE - UTILITIES
BLDG. I • 411 N. 5TH ST. • P.O. BOX 578
SHELTON, WA 98584 • (360) 427-9670

March 8, 1996

Jim Park, Biologist
Skokomish Indian Tribe
N. 80 Tribal Center Road
Shelton, WA 98584

Dear Jim:

Mason County is in the final stages of completing its Skokomish River Comprehensive Flood Hazard Management Plan, which is due toward the end of April. Several sections of the Plan require Tribal input and assistance, particularly the sections relating to the Buyout/Relocation Chapter and the high hazard areas of the Valley.

Some time ago we met at the Tribal Center to discuss the structures that had been identified for acquisition in the draft Buyout/Relocation chapter. At that meeting the Tribe identified other structures that they want to have included for acquisition. Were these recommendations forwarded to KCM, the County's consultant? If not, we need to have them to the consultant within 10 days to ensure that they can be incorporated into the final draft of the CFHMP.

Another important part of the CFHMP has been the creation of a map showing the most hazardous areas of the Valley. KCM completed the High Hazard map using the boundaries established by the FEMA Federal Insurance Rate Map. Unfortunately, this map did not include much of the Reservation. Victor Martino has informed me that you are going to be completing the High Hazard map for the Reservation for inclusion in the CFHMP. Again, we need to have this information to our consultant within 10 days to ensure that it can be incorporated into the work that they are doing.

These materials should be sent to Phil Noppe at the following address:

KCM
1917 First Avenue
Seattle, WA 98101-1027

Thanks in advance for your assistance. If you have any questions, please call me at 427-9670 x275.

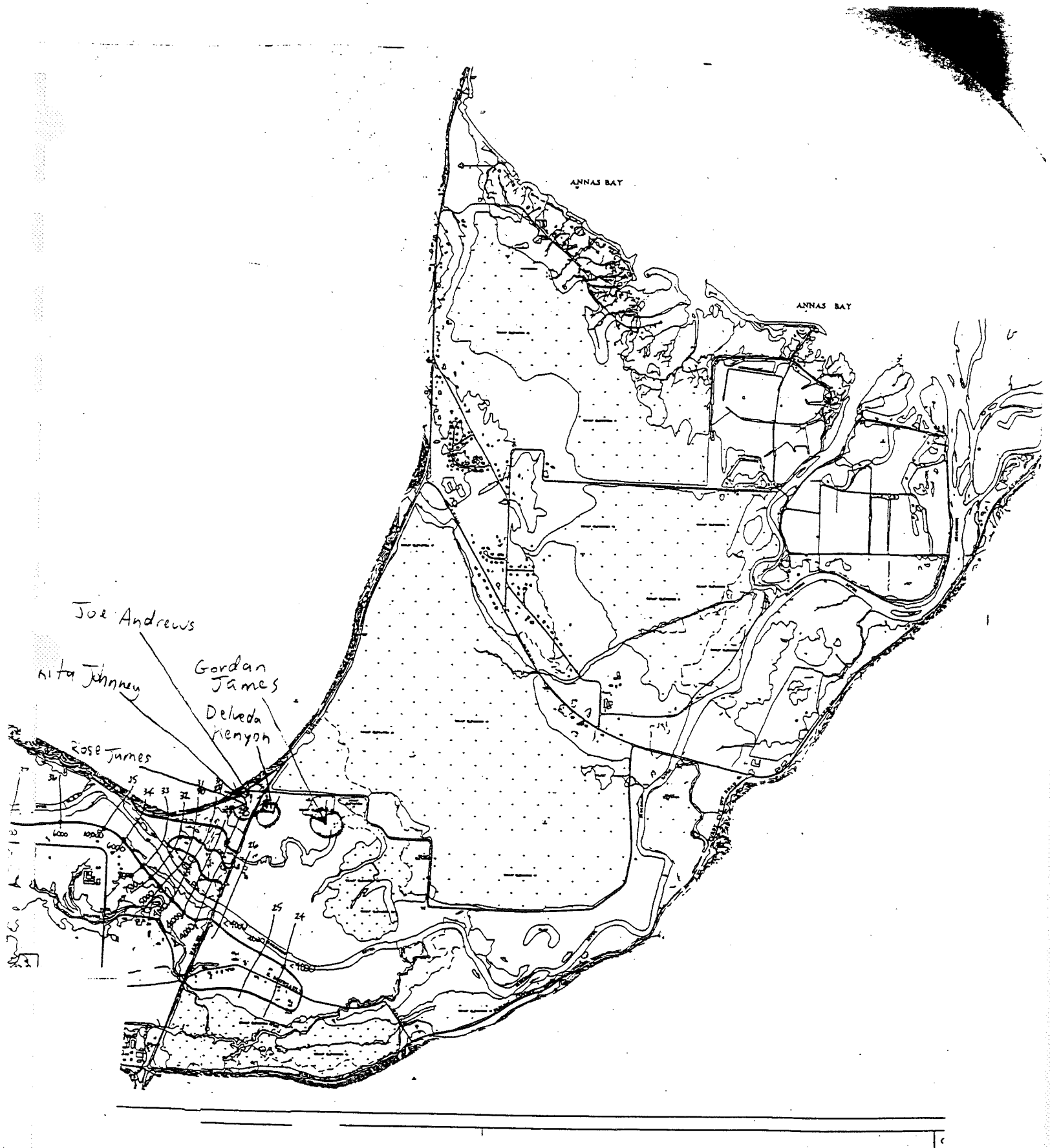
Sincerely,

Gary Cooper

Gary Cooper, Project Coordinator

cc: Vic Martino
Phil Noppe

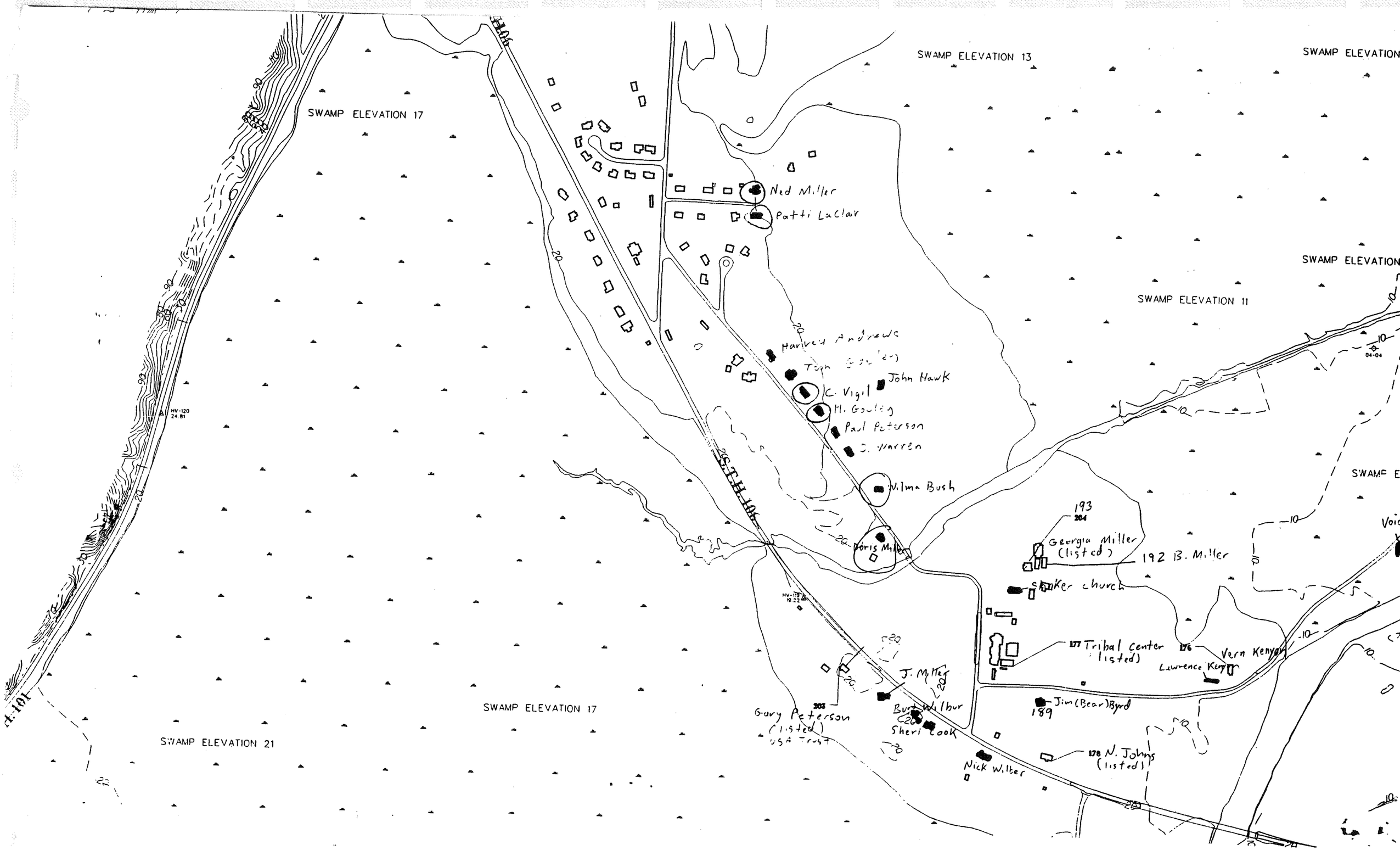
Recycled



Buyout Relocation Map

A1

Buyout / Relocation map



Buy out/ Relocation map
all houses named

APPENDIX BB.
1991 MASON COUNTY FLOOD DAMAGE PREVENTION ORDINANCE

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

ORDINANCE NO. 59-91

IN THE MATTER OF:

AN ORDINANCE TO PROMOTE THE PUBLIC HEALTH, SAFETY, AND GENERAL WELFARE, AND TO MINIMIZE PUBLIC AND PRIVATE LOSSES BY REGULATING DEVELOPMENT IN FLOOD HAZARD AREAS OF MASON COUNTY.

WHEREAS, specific areas in the County of Mason are subject to periodic flooding from streams and rivers resulting in serious damages to properties within these areas; and

WHEREAS, financial assistance is available through the National Flood Insurance Program for damages resulting from flooding; and

WHEREAS, Mason County shall be reinstated into the National Flood Insurance Program upon the adoption of this ordinance; and

WHEREAS, The Skokomish River Valley Flood Control Advisory Committee and residents concerns were recognized through public meetings and incorporated into this ordinance; and

WHEREAS, a comprehensive planning process for the development of a Skokomish River Watershed Flood Control Comprehensive Plan shall begin following the adoption of this ordinance; and

WHEREAS, The Planning Commission of Mason County held a public hearing on May 3, 1991 continued to May 9, 1991 to consider all testimony and exhibits filed regarding flood damage prevention regulations; and

WHEREAS, The Planning Commission of Mason County has reviewed all testimony and exhibits and hereby recommends adoption of the ordinance; and

WHEREAS, The Board of Mason County Commissioners held a public hearing on May 23, 1991, for the purpose taking public testimony, reviewing the Planning Commission recommendation, and to deliberate on action to be taken;

NOW, THEREFORE, BE IT HEREBY ORDAINED, that the Board of Mason County hereby ADOPTS the Flood Damage Prevention Ordinance of Mason County as follows:

This ordinance shall be in full force and effective this date.

DATED this 23RD day of MAY, 1991.

Board of Mason County Commissioners
Mason County, Washington

Chairman

Commissioner

Commissioner

ATTEST:

Clerk of the Board

APPROVED AS TO FORM:

, D.P.A.

Prosecuting Attorney

FLOOD DAMAGE PREVENTION ORDINANCE

Mason County

SECTION 1.0

STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE, AND OBJECTIVES

1.1 STATUTORY AUTHORIZATION

The legislature of the State of Washington has delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Regulations for the Skokomish River Valley set forth in section 5.4 are interim pending on the completion of a Skokomish River Watershed Flood Control Comprehensive Plan. Therefore, The Board of Mason County Commissioners, Washington does ordain as follows:

1.2 FINDINGS OF FACT

(1) The flood hazard areas of Mason County are subject to periodic inundation which results in the loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base; all of which adversely affect the public health, safety, and general welfare.

(2) These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.

(3) Current methods of flood control, particularly in the Skokomish Valley, have proven unsatisfactory to local residents and governmental agencies. Comprehensive flood control measures are necessary to satisfy governmental concerns but which will at the same time allow property owners to protect their property.

1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

*Required for approval by FEMA/Washington Department of Ecology

(1) To protect human life, health, and property,
(2) To minimize expenditure of public money and costly flood control projects;
(3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
(4) To minimize prolonged business interruptions;
(5) To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets, and bridges located in areas of special flood hazard;
(6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
(7) To ensure that potential buyers are notified that property is in an area of special flood hazard; and,
(8) To ensure that those who occupy the areas of special flood hazard participate, along with government, in assuming responsibility for their actions, while at the same time permitting those who occupy such areas the ability to responsibly protect their property without arbitrary and recriminating governmental action.
(9) To allow individuals to protect their life, health, and property when it is done in accordance with all applicable laws and regulations.

1.4 METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance includes methods and provisions for:

(1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
(2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
(3) Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
(4) Controlling filling, grading, and other development which may increase flood damage; and
(5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.
(6) Controlling excessive erosion by constructing sound erosion control structures and obtaining appropriate permits and exemptions from all applicable local, state, and federal jurisdictions.

SECTION 2.0
DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

"A-ZONES" means those areas shown on the Federal Insurance Rate Maps (FIRM) as that area of land within the flood plain which would be inundated by the 100-year flood.

"ACCESSORY STRUCTURE" means nonresidential structures such as detached garages, sheds, garden buildings, pole buildings, and barns which are considered normal for farming and ranching activities

"APPEAL" means a request for a review of the Director of General Services interpretation of any provision of this ordinance or a request for a variance.

"AREA OF SHALLOW FLOODING" means a designated AO or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; a clearly defined channel does not exist; the path of flooding is unpredictable and indeterminate; and velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

"AREA OF SPECIAL FLOOD HAZARD" means the land in the flood plain within a community subject to a one percent or greater chance of flooding at any given year. Designation on maps always includes the letters A or V.

"BASE FLOOD" means the flood having a (1) percent chance of being equalled or exceeded in any given year.

"CRITICAL FACILITY" means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, installations which produce, use, or store hazardous materials or hazardous waste.

"DEVELOPMENT" means any man-made change to improved or unimproved real estate including, but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations located within the area of special flood hazard.

"FLOOD or FLOODING" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters and/or
(2) The unusual and rapid accumulation of runoff of surface waters from any source.

"FLOOD INSURANCE RATE MAP (FIRM)" means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

"FLOOD INSURANCE STUDY" means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.

"FLOOD PROTECTION ELEVATION" means one foot above the base flood elevation.

"FLOODWAY" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

"LOWEST FLOOR" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a builder's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance found at Section 5.2-1(2).

"MANUFACTURED HOME" means a residential structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For flood plain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.

"MANUFACTURED HOME PARK OR SUBDIVISION" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"NEW CONSTRUCTION" means structures for which the "start of construction" commenced on or after the effective date of this ordinance.

"PERMIT" means a written authorization from the Mason County Department of General Services for any construction activity on all lands regulated by this ordinance. Such permits shall include but are not limited to excavation and grading permits for fills and excavations under Chapter 70 of the Uniform Building Code, shoreline permits for developments regulated by the Mason County Shoreline Master Program, and building permits for all structures

under the Uniform Building Code.

"PERSON" means any individual, partnership, corporation, association, organization, cooperative, public or municipal corporation, or any agency of the state or local government unit however designated.

"SPECIAL FLOOD HAZARD AREA" means an area subject to a base or 100 year flood; areas of special flood hazard are shown on the flood insurance rate map as Zone A, AO, A1-30, AE, A99, AH, VO, V1-30, VE, or V.

"SPECIAL FLOOD RISK ZONE" means that area of the Skokomish River Valley identified by the Federal Emergency Management Agency in the scientific study entitled "The Flood Insurance Study for Unincorporated Areas Mason", Community Panel Number 530115 0180, Detailed Study Area.

"START OF CONSTRUCTION" includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundation or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

"STRUCTURE" means a walled or roofed building including a gas or liquid storage tank that is principally above ground.

"SUBSTANTIAL IMPROVEMENT" means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:

(1) Before the improvement or repair is started, or
(2) If the structure has been damaged and is being restored, before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences whether or not that alteration affects the external dimension of the structure.

The term does not, however, include either:

(1) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code

specifications which are solely necessary to assure safe living conditions, or

(2) Any alteration of structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

"VARIANCES" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

"WATER DEPENDENT" means a structure for commerce or industry which cannot exist in any other location and is dependent on the water by reason of the intrinsic nature of its operations.

"WETLANDS" means those lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands have the following three characteristics:

(1) at least periodically, the land supports predominately hydrophytes; and
(2) the substrate is predominately undrained hydric soil; and
(3) the substrate is nonsoil and is saturated with water or covered by shallow water for some time during the growing season of each year.

SECTION 3.0
GENERAL PROVISIONS

3.1 LANDS TO WHICH THIS ORDINANCE APPLIES

This ordinance shall apply to all areas of special flood hazards and special flood risk zones within the jurisdiction of Mason County.

•3.2 BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD

The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitle "The Flood Insurance Study for Mason County" dated February 5, 1987, with accompanying Flood Insurance Maps is hereby adopted by reference and declared to be part of this ordinance. The Flood Insurance Study is on file at Mason County Planning Department.

3.3 PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violation of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions

and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than $1,000 or imprisoned for not more than 60 days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent Mason County from taking such other lawful action as is necessary to prevent or remedy any violation.

3.4 ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

3.5 INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

(1) Considered as minimum requirements;
(2) Deemed neither to limit nor repeal any other powers granted under State statutes.

3.6 WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Mason County, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

SECTION 4.0
ADMINISTRATION

4.1 ESTABLISHMENT OF DEVELOPMENT PERMIT

*4.1-1 Development Permit Required

A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 3.2 and special flood risk zones. The permit shall be for all structures including manufactured homes, as set forth in the "DEFINITIONS", and for all development

including fill and other activities, also as set forth in the "DEFINITIONS".

4.1-2 Application for Development Permit

Application for a development permit shall be made on forms furnished by the Director of General Services and may include but not be limited to plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question and existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:

(1) Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures;
(2) Elevation in relation to mean sea level to which any structure has been floodproofed;
(3) Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 5.2-2; and
(4) Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.

4.2 DESIGNATION OF THE DIRECTOR OF GENERAL SERVICES

The Director of General Services is hereby appointed to administer and implement this ordinance by granting or denying development permit applications in accordance with its provisions.

4.3 DUTIES AND RESPONSIBILITIES OF THE DIRECTOR OF GENERAL SERVICES

Duties of the Director of General Services shall include, but not be limited to:

4.3-1 Permit Review

(1) Review all development permits to determine that the permit requirements of this ordinance have been satisfied.
*(2) Review all development permits to determine that all necessary permits have been obtained from those Federal, State, or local governmental agencies from which prior approval is required.
(3) Review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the provisions of Section 5.3 are met.

*4.3-2 Use of Other Base Flood Data

When base flood elevation data has not been provided in accordance with Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD, the Director of General Services shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other

source, in order to administer Sections 5.2, SPECIFIC STANDARDS, and 5.3, FLOODWAYS.

*4.3-3 Information to be Obtained and Maintained

(1) Where base flood elevation data is provided through the Flood Insurance Study or required as in Section 4.3-2, obtain and record the actual (as-built) elevation (in relation to mean sea level) of the lowest floor, including basement, of all new or substantially improved structures, and whether or not the structure contains a basement.
(2) For all new or substantially improved floodproofed structures:
    (i) verify and record the actual elevation (in relation to mean sea level), and
    (ii) maintain the floodproofing certifications required in Section 4.1-2 (3).
(3) Maintain for public inspection all records pertaining to the provisions of this ordinance.

*4.3-4 Alteration of Watercourses

(1) Notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.
(2) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

4.3-5 Interpretation of FIRM Boundaries

Make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided by Section 4.4.

4.4 VARIANCE PROCEDURE

4.4-1 Appeal Board

(1) The Board of County Commissioners shall act as the Board of Appeals to hear and decide appeals and requests for variances from the requirements of this ordinance.
(2) The Board of Appeals shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Director of General Services in the enforcement or administration of this ordinance.

(3) Those aggrieved by the decision of the Board of Appeals, or any taxpayer, may appeal such decision to the Superior Court, as provided in RCW Chapter 36.70.

(4) In passing upon such applications, the Board of Appeals shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and;

i. the danger that materials may be swept onto other lands to the injury of others;

ii. the danger to life and property due to flooding or erosion damage;

iii. the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

iv. the importance of the services provided by the proposed facility to the community;

v. the necessity to the facility of a waterfront location, where applicable;

vi. the availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

vii. the compatibility of the proposed use with existing and anticipated development;

viii. the relationship of the proposed use to the comprehensive plan and flood plain management program for that area;

ix. the safety of access to the property in times of flood for ordinary and emergency vehicles;

x. the expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and

xi. the costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas electrical, and water systems, and streets and bridges.

(5) Upon consideration of the factors of Section 4.4-1(4) and the purposes of this ordinance, the Board of Appeals may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

(6) The Director of General Services shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request.

4.4-2 Conditions of Variances

(1) Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to

and surrounded by lots with existing structures constructed below the base flood level, providing items (i-xi) in Section 4.4-1(4) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.

(2) Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in this section.

(3) Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.

(4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

(5) Variances shall only be issued upon:

i. a showing of good and sufficient cause;

ii. a determination that failure to grant the variance would result in exceptional hardship to the applicant;

iii. a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in Section 4.1-4(4), or conflict with existing local laws or ordinances.

(6) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.

(7) Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except 4.4-2(1), and otherwise complies with Sections 5.1-1 and 5.1-2 of the GENERAL STANDARDS.

(8) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

SECTION 5.0
PROVISIONS FOR FLOOD HAZARD REDUCTION

*5.1 GENERAL STANDARDS

In all areas of special flood hazards as shown on the Federal Insurance Rate Maps (FIRM) and as defined in section 2.0, the following standards are required:

*5.1-1 Anchoring

(1) All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

(2) All manufactured homes must likewise be anchored to prevent flotation, collapse, or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors. (Reference FEMA's Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques.)

*5.1-2 Construction Materials and Methods

(1) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

(2) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

(3) Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

*5.1-3 Utilities

(1) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

(2) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and

(3) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

*5.1-4 Subdivision Proposals

(1) All subdivision proposals shall be consistent with the need to minimize flood damage;
(2) All subdivision proposals shall have public utilities and facilities such as sewer, gas electrical, and water systems located and constructed to minimize flood damage;
(3) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and
(4) Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

*5.1-5 Review of Building Permits

Where elevation data is not available either through the Flood Insurance Study or from another authoritative source (Section 4.3-2), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgement and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

5.2 SPECIFIC STANDARDS

In all areas of special flood hazards and special flood risk zones where base flood elevation data has been provided as set forth in Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD or Section Use of Other Base Flood Data, the following provisions are required:

*5.2-1 Residential Construction

(1) New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one foot or more above base flood elevation.
(2) Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer architect or must meet or exceed the following minimum criteria:
   i. a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to

flooding shall be provided.

ii. The bottom of all openings shall be no higher than one foot above grade.

iii. openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

5.2-2 Nonresidential Construction

New construction and substantial improvement of any commercial, industrial or other nonresidential structure, except those defined as an accessory structure, shall either have the lowest floor, including basement, elevated one foot or more above the level of the base flood elevation; or, together with attendant utility and sanitary facilities, shall;

(1) Be floodproofed so that below one foot above the base flood level, the structure is watertight with walls substantially impermeable to the passage of water.

(2) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

(3) Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 4.3-3(2).

(4) Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in 5.2-1(2).

(5) Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building floodproofed to one foot above the base flood level will be rated as at the base flood level).

5.2-3 Accessory Structures

Construction or substantial improvement of accessory structures, as defined in section 2.0, shall either have the lowest floor elevated one foot or more above the level of the base flood elevation; or must meet the following criteria:

(1) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

(2) The bottom of all openings shall be no higher than one foot above grade.

(3) Openings may be equipped with screens, louvers, or other

coverings provided they may permit the automatic entry and exit of flood waters.

(4) Structures shall not be designed for human habitation.

(5) Structures shall be firmly anchored to prevent flotation which may result in damage to other structures.

(6) Service facilities such as electrical and heating equipment shall be elevated or floodproofed.

5.2-4 Critical Facility

Construction of new critical facilities shall be, to the extent possible, located outside the limits of the base flood plain. Construction of new critical facilities shall be permissible within the base flood plain if no feasible alternative site is available. Critical facilities constructed within the base flood plain shall have the lowest floor elevated to three feet or more above the level of the base flood elevation at the site. Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into flood waters. Access routes elevated to or above the level of the base flood plain shall be provided to all critical facilities to the extent possible.

5.2-5 Manufactured Homes

All manufactured homes to be placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is one foot or more above the Base Flood Elevation; and is securely anchored to an adequately anchored foundation system in accordance with the provisions of section 5.1-1(2).

•5.3 FLOODWAYS

Located within areas of special flood hazard established in Section 3.2 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply except to that zone of special flood risk, Skokomish River Valley as defined in section 2.0.

(1) Encroachments are prohibited including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(2) Construction or reconstruction of residential structures is prohibited within designated floodways, except for (i) repairs, reconstruction, or improvements to a structure

which do not increase the ground floor area; and (ii) repairs, reconstruction, or improvements to a structure, the cost of which does not exceed 50 percent of the market value of the structure either, (A) before the repair, reconstruction, or repair is started, or (B) if the structure has been damaged, and is being restored, before the damage occurred. Work done on structures to comply with existing health, sanitary, or safety codes or to structures identified as historic places shall not be included in the 50 percent determination.

(3) If Section 5.3(1) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Sections 5.0, PROVISIONS FOR FLOOD HAZARD REDUCTION.

5.4 SPECIAL FLOOD RISK ZONE - SKOKOMISH RIVER VALLEY INTERIM REGULATIONS

This section shall apply to that area of the Skokomish River Valley identified by the Federal Emergency Management Agency in the scientific study entitled "The Flood Insurance Study for unincorporated areas Mason County, Community Panel number 530115 0180, Detailed Study Area. It sets forth <u>INTERIM REGULATIONS</u> that shall apply to this designated area. These interim regulations shall be replaced using a comprehensive planning process which recognizes the role of diking in flood control management efforts. Interim shall be defined as that period of time between the adoption of this ordinance and the adoption of a Skokomish River Watershed Flood Control Comprehensive Plan and subsequent amendments to these regulations. The following regulations and construction standards shall apply to the special flood risk zone:

(1) New construction and substantial improvements of residential and nonresidential structures within the special flood risk zone shall have the lowest floor elevated one foot or more above the base flood elevation and shall be constructed according to the standards provided in subsections 5.1, 1-5, and 5.2, 1-4.

(2) Areas where flood water releases and overflows from the main Skokomish River channel shall not be modified, meaning levied or diked, in any manner which would result in increased stream flow in the main channel until these regulations are amended in accordance with an adopted Skokomish Watershed Flood Control Comprehensive Plan.

(3) Maintenance to existing levees, dikes, and other water flow modification structures shall be permitted with appropriate approvals from all affected agencies provided that the maintenance does not result in increased stream flow within the main channel. Emergency alterations to dikes and levees necessary for the protection of human life and property shall be permitted.

(4) Alterations to dikes and levees, and bank stabilization efforts that would prevent legitimate potential emergency

situations shall be permitted, PROVIDED; that all affected agencies have been notified and appropriate approvals have been acquired.

(5) Any fill that is allowed in the special flood risk zone shall be confined to the actual building site, other means of elevating structures shall be encouraged such as posts, piles, and stem walls.

(6) Solid road fills perpendicular to the flow of water are prohibited in the special flood risk zone. The graveling of driveways and other access roads is exempt.

(7) To the extent feasible fills shall be compensated by cuts or extraction of like amounts of materials to alleviate the effect of the fill.

(8) The highest portion of any lot shall be utilized as the building site. Lots partially in the special flood risk zone must comply with the regulations for the special flood risk zone.

(9) Whenever feasible, new structures shall be located in the hydraulic shadow of the existing structures.

SECTION 6.0
COUNTYWIDE WETLANDS MANAGEMENT FOR FLOOD DAMAGE PREVENTION

To the maximum extent possible, developments shall be reviewed to avoid the short and long term adverse impacts associated with the destruction or modification of natural wetlands, especially those activities which limit or disrupt the ability of the wetland to alleviate flooding impacts. For this section the following processes shall be implemented:

(1) Review proposals for development within base flood plains for their possible impacts on wetlands located within the flood plain.

(2) Ensure that development activities in or around wetlands do not negatively affect public safety, health, and welfare by disrupting the wetlands' ability to reduce flood and storm drainage.

(3) Ensure areas accustomed to or previously used for agriculture, silviculture, and ranching activities such as plowing, seeding, cultivating, minor drainage, or upland soil and conservation practices where proven feasible are exempted from the this section.

(4) Request technical assistance from The Department of Ecology and The Army Corps of Engineers in identifying wetland areas. Existing wetland map information from the National Wetlands Inventory (NWI) can be used in conjunction with the community's FIRM to prepare an overlay zone indicating critical wetland areas deserving special attention.

ADDENDUM

GOALS AND OBJECTIVES OF THE SKOKOMISH RIVER VALLEY RESIDENTS

Residents and property owners of the Skokomish River Valley have meet in numerous community meetings and by majority agreement have identified the following goals and objectives that are to be adequately addressed in the Skokomish River Watershed Flood Control Comprehensive Plan. These goals and objectives as well as other comments and concerns have been recognized and incorporated into this ordinance.

(1) To maintain the river in its present channel in a way as to alleviate flooding conditions throughout the valley resulting in reduced flood damages to all existing structures.

(2) To protect stream banks with approved stabilization methods that control excessive erosion resulting in decreased sediment and gravel accumulation within the river channel.

(3) To perform proper river channel maintenance including the maintenance of dikes, drainage ditches, and potential flow obstructions resulting in reduced flood damages.

(4) To maintain and enhance fish and wildlife habitat.

APPENDIX CC.
DENSITY FOODWAY ANALYSIS

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Density Floodway Analysis
Skokomish River CFHMP

Table 3: Analysis for Sections 24 - 38
(East Bourgalt Rd. to Hunter Creek/Skokomish River Confluence)

Section Number	Overbank Topwidth (ft)	Total Overbank Area (square ft)	**Hydraulic Depth (ft)**	**Slope of Energy Gradeline (ft/ft)**	Average Manning's "n" for overbank (Calc'd)	**Average Overbank Velocity (ft/s)**
24	5268	31194	**5.9**	**0.00103**	0.17	**0.96**
25	5609	29815	**5.3**	**0.00170**	0.20	**1.00**
26	5605	30576	**5.5**	**0.00112**	0.20	**0.84**
31	4859	27548	**5.7**	**0.00020**	0.12	**0.61**
32	4646	21348	**4.6**	**0.00035**	0.11	**0.73**
33	4498	19830	**4.4**	**0.00035**	0.11	**0.74**
34	3411	12756	**3.7**	**0.00106**	0.03	**3.77**
35	3531	15016	**4.3**	**0.00079**	0.09	**1.26**
36	3664	13463	**3.7**	**0.00151**	0.11	**1.33**
37	3980	15466	**3.9**	**0.00107**	0.11	**1.14**
38	4721	18455	**3.9**	**0.00187**	0.13	**1.34**
Maximum			**5.9**	**0.00187**		**3.77**
Average			**4.6**	**0.00100**		**1.25**
Standard Deviation			**0.8**	**0.00055**		**0.88**
.30 x Average			**1.4**	**0.00030**		**0.37**

Analysis based on "Approximate Method" in COE publication "Hydraulic Methods for Evaluating Density Floodways"
HEC-2 data used for table are from existing conditions simulation for 100-year flood

Density Floodway Analysis
Skokomish River CFHMP

Table 4: Analysis for Sections 39 - 46
(Hunter Creek /Skokomish River Confluence to Church)

Section Number	Overbank Topwidth (ft)	Total Overbank Area (square ft)	**Hydraulic Depth (ft)**	**Slope of Energy Gradeline (ft/ft)**	Average Manning's "n" for overbank (Calc'd)	**Average Overbank Velocity (ft/s)**
39	4399	12861	**2.9**	**0.00244**	0.13	**1.32**
40	4232	9841	**2.3**	**0.00295**	0.11	**1.45**
41	4339	12333	**2.8**	**0.00167**	0.04	**3.83**
42	4395	13928	**3.2**	**0.00106**	0.10	**1.17**
43	4332	12056	**2.8**	**0.00265**	0.11	**1.55**
44	4145	12626	**3.0**	**0.00214**	0.12	**1.30**
45	3919	9874	**2.5**	**0.00268**	0.12	**1.31**
46	4335	13237	**3.1**	**0.00109**	0.07	**1.69**
Maximum			**3.2**	**0.00295**		**3.83**
Average			**2.8**	**0.00208**		**1.70**
Standard Deviation			**0.3**	**0.00073**		**0.87**
.30 x Average			**0.8**	**0.00063**		**0.51**

Analysis based on "Approximate Method" in COE publication "Hydraulic Methods for Evaluating Density Floodways"
HEC-2 data used for table are from existing conditions simulation for 100-year flood

Density Floodway Analysis
Skokomish River CFHMP

Table 1: Analysis for Whole River Reach
(Highway 106 to confluence of North and South Forks Skokomish River)

Section Number	Overbank Topwidth (ft)	Total Overbank Area (square ft)	**Hydraulic Depth (ft)**	**Slope of Energy Gradeline (ft/ft)**	Average Manning's "n" for overbank (Calc'd)	**Average Overbank Velocity (ft/s)**
13	2929	18091	**6.2**	**0.00106**	0.13	**1.37**
14	8020	45795	**5.7**	**0.00022**	0.11	**0.66**
15	8405	45989	**5.5**	**0.00026**	0.12	**0.68**
16	8112	41388	**5.1**	**0.00022**	0.17	**0.40**
17	7939	39185	**4.9**	**0.00070**	0.20	**0.61**
18	7894	36116	**4.6**	**0.00090**	0.21	**0.63**
19	7180	31402	**4.4**	**0.00057**	0.07	**1.43**
20	7560	33354	**4.4**	**0.00139**	0.18	**0.87**
21	6530	26353	**4.0**	**0.00135**	0.14	**1.05**
22	4618	20022	**4.3**	**0.00227**	0.15	**1.39**
23	5292	31348	**5.9**	**0.00124**	0.17	**1.05**
24	5268	31194	**5.9**	**0.00103**	0.17	**0.96**
25	5609	29815	**5.3**	**0.00170**	0.20	**1.00**
26	5605	30576	**5.5**	**0.00112**	0.20	**0.84**
31	4859	27548	**5.7**	**0.00020**	0.12	**0.61**
32	4646	21348	**4.6**	**0.00035**	0.11	**0.73**
33	4498	19830	**4.4**	**0.00035**	0.11	**0.74**
34	3411	12756	**3.7**	**0.00106**	0.03	**3.77**
35	3531	15016	**4.3**	**0.00079**	0.09	**1.26**
36	3664	13463	**3.7**	**0.00151**	0.11	**1.33**
37	3980	15466	**3.9**	**0.00107**	0.11	**1.14**
38	4721	18455	**3.9**	**0.00187**	0.13	**1.34**
39	4399	12861	**2.9**	**0.00244**	0.13	**1.32**
40	4232	9841	**2.3**	**0.00295**	0.11	**1.45**
41	4339	12333	**2.8**	**0.00167**	0.04	**3.83**
42	4395	13928	**3.2**	**0.00106**	0.10	**1.17**
43	4332	12056	**2.8**	**0.00265**	0.11	**1.55**
44	4145	12626	**3.0**	**0.00214**	0.12	**1.30**
45	3919	9874	**2.5**	**0.00268**	0.12	**1.31**
46	4335	13237	**3.1**	**0.00109**	0.07	**1.69**
47	4295	14059	**3.3**	**0.00141**	0.07	**2.08**
48	4067	14025	**3.4**	**0.00110**	0.06	**1.94**
49	3892	11946	**3.1**	**0.00180**	0.07	**2.12**
50	3255	9309	**2.9**	**0.00371**	0.07	**2.80**
51	3748	10263	**2.7**	**0.00167**	0.05	**2.61**
52	3138	7128	**2.3**	**0.00304**	0.06	**2.89**
53	3309	9260	**2.8**	**0.00464**	0.09	**2.41**
54	3178	10028	**3.2**	**0.00277**	0.07	**2.63**
Maximum			**6.2**	**0.00464**		**3.83**
Average			**4.0**	**0.00153**		**1.50**
Standard Deviation			**1.1**	**0.00102**		**0.85**
.30 x Average			**1.2**	**0.00046**		**0.45**

Analysis based on "Approximate Method" in COE publication "Hydraulic Methods for Evaluating Density Floodways"
HEC-2 data used for table are from existing conditions simulation for 100-year flood

Density Floodway Analysis
Skokomish River CFHMP

Table 2: Analysis for Sections 13-23 (Highway 106 to East Bourgault Rd.)

Section Number	Overbank Topwidth (ft)	Total Overbank Area (square ft)	**Hydraulic Depth (ft)**	**Slope of Energy Gradeline (ft/ft)**	Average Manning's "n" for overbank (Calc'd)	**Average Overbank Velocity (ft/s)**
13	2929	18091	**6.2**	**0.00106**	0.13	**1.37**
14	8020	45795	**5.7**	**0.00022**	0.11	**0.66**
15	8405	45989	**5.5**	**0.00026**	0.12	**0.68**
16	8112	41388	**5.1**	**0.00022**	0.17	**0.40**
17	7939	39185	**4.9**	**0.00070**	0.20	**0.61**
18	7894	36116	**4.6**	**0.00090**	0.21	**0.63**
19	7180	31402	**4.4**	**0.00057**	0.07	**1.43**
20	7560	33354	**4.4**	**0.00139**	0.18	**0.87**
21	6530	26353	**4.0**	**0.00135**	0.14	**1.05**
22	4618	20022	**4.3**	**0.00227**	0.15	**1.39**
23	5292	31348	**5.9**	**0.00124**	0.17	**1.05**
Maximum			**6.2**	**0.00227**		**1.43**
Average			**5.0**	**0.00093**		**0.92**
Standard Deviation			**0.7**	**0.00063**		**0.36**
.30 x Average			**1.5**	**0.00028**		**0.28**

Analysis based on "Approximate Method" in COE publication "Hydraulic Methods for Evaluating Density Floodways"
HEC-2 data used for table are from existing conditions simulation for 100-year flood

Density Floodway Analysis
Skokomish River CFHMP

Table 5: Analysis for Sections 47 -54
(Church to confluence of North and South Forks Skokomish River)

Section Number	Overbank Topwidth (ft)	Total Overbank Area (square ft)	**Hydraulic Depth (ft)**	**Slope of Energy Gradeline (ft/ft)**	Average Manning's "n" for overbank (Calc'd)	**Average Overbank Velocity (ft/s)**
47	4295	14059	**3.3**	**0.00141**	0.07	**2.08**
48	4067	14025	**3.4**	**0.00110**	0.06	**1.94**
49	3892	11946	**3.1**	**0.00180**	0.07	**2.12**
50	3255	9309	**2.9**	**0.00371**	0.07	**2.80**
51	3748	10263	**2.7**	**0.00167**	0.05	**2.61**
52	3138	7128	**2.3**	**0.00304**	0.06	**2.89**
53	3309	9260	**2.8**	**0.00464**	0.09	**2.41**
54	3178	10028	**3.2**	**0.00277**	0.07	**2.63**
Maximum			**3.4**	**0.00464**		**2.89**
Average			**3.0**	**0.00252**		**2.43**
Standard Deviation			**0.4**	**0.00124**		**0.35**
.30 x Average			**0.9**	**0.00075**		**0.73**

Analysis based on "Approximate Method" in COE publication "Hydraulic Methods for Evaluating Density Floodways"
HEC-2 data used for table are from existing conditions simulation for 100-year flood

APPENDIX DD.
PROPOSED DRAFT FLOOD DAMAGE PREVENTION ORDINANCE

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

FLOOD DAMAGE PREVENTION ORDINANCE

SECTION 1.0
STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE, AND OBJECTIVES

1.1 STATUTORY AUTHORIZATION

The Legislature of the State of Washington has delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the Board of Mason County Commissioners, Washington does ordain as follows:

1.2 FINDINGS OF FACT

(1) The flood hazard areas of Mason County are subject to periodic inundation which results in loss of life and property, health, and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

(2) These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities, and when inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.

1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

(1) To protect human life and health;

(2) To minimize expenditure of public money and costly flood control projects;

(3) To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

(4) To minimize prolonged business interruptions;

(5) To minimize damage to public facilities and utilities such as water and gas mains, electric telephone and sewer lines, streets, and bridges located in areas of special flood hazard;

(6) To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;

(7) To ensure that potential buyers are notified that property is in an area of special flood hazard; and

(8) To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

1.4 METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance includes methods and provisions for:

(1) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

(2) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(3) Controlling the alteration of natural flood plains, stream channels, and natural protection barriers, which help accommodate or channel flood waters;

(4) Controlling filling, grading, and other development which may increase flood damage; and

(5) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

SECTION 2.0
DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

"APPEAL" means a request for a review of the (local administrator's) interpretation of any provision of this ordinance or a request for a variance.

"AREA OF SHALLOW FLOODING" means a designated AO or AH Zone on the Flood Insurance Rate Map (FIRM). The base flood depths range from one to three feet; ca clearly defined channel does not exist; the path of flooding us unpredictable and indeterminate; and, velocity flow may be evident. AO is characterized as sheet flow and AH indicates ponding.

"AREA OF SPECIAL FLOOD HAZARD" means the land in the flood plain within a community subject to a one percent or greater chance of flooding on any given year. Designation on maps always includes the letters A or V.

"CRITICAL FACILITY" means a facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, installations which produce, use, or store hazardous materials or hazardous waste.

"DENSITY FLOODWAY" - means an alternative approach to regulating floodplain development whereby the *density* of development is restricted so that when ultimate development occurs, an insignificant increase in flood stage above that of natural conditions occurs. Within this ordinance, the density floodway approach is applied to the Skokomish River and Floodplain.

"DEVELOPMENT" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations located within the area of special flood hazard.

"FLOOD" or "FLOODING" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) The overflow of inland or tidal waters and/or
(2) The unusual and rapid accumulation of runoff of surface waters from any source.

"FLOOD INSURANCE RATE MAP (FIRM)" means the official map on which the Federal Insurance Administration has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

"FLOOD INSURANCE STUDY" means the official report provided by the Federal Insurance Administration that includes flood profiles, the Flood Boundary-Floodway Map, and the water surface elevation of the base flood.

"FLOODWAY" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

"LOWEST FLOOR" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance found at Section 5.2-1(2).

"MANUFACTURED HOME" means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For flood plain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.

"MANUFACTURED HOME PARK OR SUBDIVISION" means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

"MAXIMUM ALLOWABLE DENSITY" means the percentage of the total area of any lot located in a density floodway, regardless of the size of the lot, which all new development and substantial improvements shall not exceed.

"MAXIMUM ALLOWABLE WIDTH" means the maximum width of a structure allowable in a density floodway, to be calculated as described herein.

"MINIMUM SPACING BETWEEN STRUCTURES" means the minimum spacing between structures allowable in a density floodway, to be calculated as described herein.

"NEW CONSTRUCTION" means structures for which the "start of construction' commenced on or after the effective date of this ordinance.

"NO-NEW FOOTPRINT ZONE" means an area within a density floodway where new construction following the effective date of this ordinance is restricted due to the occurrence of high flood hazards. Reconstruction shall be allowed contingent on conditions described herein.

"START OF CONSTRUCTION" includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundation or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

"STRUCTURE" means a walled and roofed building including a gas or liquid storage tank that is principally above ground.

"SUBSTANTIAL IMPROVEMENT" means any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either:

(1) before the improvement or repair is started, or
(2) if the structure has been damaged and is being restored, before the damage occurred. For the purpose of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

The term does not, however, include either:

(1) any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications which are solely necessary to assure safe living conditions, or
(2) any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

"VARIANCE" means a grant of relief from the requirements of this ordinance which permits construction in a manner that would otherwise be prohibited by this ordinance.

"WATER DEPENDENT" means a structure for commerce or industry which cannot exist in any other location and is dependent on the water by reason of the intrinsic nature of its operations.

SECTION 3.0
GENERAL PROVISIONS

3.1 LANDS TO WHICH THIS ORDINANCE APPLIES

This ordinance shall apply to all areas of special flood hazards within the jurisdiction of Mason County.

3.2 BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD

The areas of special flood hazard identified by the Federal Insurance Administration in a specific and engineering report entitled "The Flood Insurance Study for Mason County, Washington, Unincorporated Areas dated May 17, 1988, as revised in 19**, with accompanying Flood Insurance Maps is hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study is on file at the Mason County Department of Community Development, 411 N. 5th St., Shelton, Washington.

3.3 PENALTIES FOR NONCOMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violation of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute a misdemeanor. Any person who violates this ordinance or fails to comply with any of its requirements shall upon conviction thereof be fined not more than _____ _____ or imprisoned for not more than _____ days, or both, for each violation, and in addition shall pay all costs and expenses involved in the case. Nothing herein contained shall prevent the Mason County Prosecuting Attorney from taking such other lawful action as is necessary to prevent or remedy any violation.

3.4 ABROGATION AND GREATER RESTRICTIONS

This ordinance is not intended to repeal, abrogate, or impair any existing easements, convenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

3.5 INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be:

(1) Considered as a minimum requirements;
(2) Liberally construed in favor of the governing body; and,
(3) Deemed neither to limit nor repeal any other powers granted under State statutes.

3.6 WARNING AND DISCLAIMER OF LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Mason County, any officer or employee thereof, or the Federal Insurance Administration, for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

SECTION 4.0
ADMINISTRATION

4.1 ESTABLISHMENT OF DEVELOPMENT PERMIT

4.1-1 Development Permit Required

A development permit shall be obtained before construction or development begins within any area of special flood hazard established in Section 3.2. The permit shall be for all structures including manufactured homes, as set forth in the "DEFINITIONS," and for all development including fill and other activities, also as set forth in the "DEFINITIONS."

4.1-2 Application for Development Permit

Application for a development permit shall be made on forms furnished by the Mason County Department of Community Development and may include but not be limited to; plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information is required:

(1) Elevation in relation to mean sea level, of the lowest floor (including basement) of all structures;
(2) Elevation in relation to mean sea level to which any structure has been floodproofed;
(3) Certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Section 5.2-2; and

(4) Description of the extent to which a watercourse will be altered or relocated as a result of proposed development.

4.2 DESIGNATION OF THE DIRECTOR OF COMMUNITY DEVELOPMENT

The Director of Community Development is hereby appointed to administer and implement this ordinance by granting or denying development permit applications in accordance with its provisions.

4.3 DUTIES AND RESPONSIBILITIES OF THE DIRECTOR OF COMMUNITY DEVELOPMENT

Duties of the Director of Community Development shall include, but not be limited to:

4.3-1 Permit Review

(1) Review all development permits to determine that the permit requirements of this ordinance have been satisfied.
(2) Review all development permits to determine that all necessary permits have been obtained from those Federal, State, or local governmental agencies from which prior approval is required.
(3) Review all development permits to determine if the proposed development is located in the floodway. If located in the floodway, assure that the provisions of Section 5.3 are met.

4.3-2 Use of Other Base Flood Data

When base flood elevation data has not been provided in accordance with Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD, the Director of Community Development shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, State or other source, in order to administer Section 5.2, SPECIFIC STANDARDS, and 5.3 FLOODWAYS.

4.3-3 Information to be Obtained and Maintained

(1) When base flood elevation data is provided through the Flood Insurance Study or required as in Section 4.3-2, obtain and record the actual (as-built) elevation (in relation to mean sea level) of the lowest floor, including basement, of all new or substantially improved structures, and whether or not the structure contains a basement.
(2) For all new or substantially improved floodproofed structures:

    (i) verify and record the actual elevation (in relation to mean sea level), and
    (ii) maintain the floodproofing certifications required in Section 4.1(3).

(3) Maintain for public inspection all records pertaining to the provisions of this ordinance.

4.3-4 Alteration of Watercourses

(1) Notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.

(2) Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished.

4.3-5 Interpretation of FIRM Boundaries

Make interpretations where needed, as to exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions). The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in Section 4.4.

4.4 VARIANCE PROCEDURE

4.4-1 Appeal Board

(1) The __(appeal board)__ as established by __(local unit)_____ shall hear and decide appeals and requests for variances from the requirements of this ordinance.

(2) The __(appeal board)__ shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Mason County Director of Community Development in the enforcement or administration of this ordinance.

(3) Those aggrieved by the decision of the __(appeal board)____, or any taxpayer, may appeal such decision to the __(name of appropriate court)_____, as provided in __(statute)__.

(4) In passing upon such applications, the __(appeal board)____ shall consider all technical evaluations, all relevant factors, standards specified in other sections of this ordinance, and:

(i) the danger that materials may be swept onto other lands to the injury of others;
(ii) the danger to life and property due to flooding or erosion damage;
(iii) the susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

(iv) the importance of the services provided by the proposed facility to the community;

(v) the necessity to the facility of a waterfront location, where applicable;

(vi) the availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;

(vii) the relationship of the proposed use to the comprehensive plan and flood plain management program for that area;

(viii) the relationship of the proposed use to the comprehensive plan and flood plan management program for that area;

(ix) the safety of access to the property in times of flood for ordinary and emergency vehicles;

(x) the expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and

(xi) the costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.

(5) Upon consideration of the factors of Section 4.4-1(4) and the purposes of this ordinance, the (appeal board) may attach such conditions to the granting of variances as it deems necessary to further the purposes of this ordinance.

(6) The Mason County Director of Community Development shall maintain the records of all appeal actions and report any variances to the Federal Insurance Administration upon request.

4.4-2 Conditions for Variances

(1) Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing items (i-xi) in Section 4.4-1(4) have been fully considered.

(2) Variances maybe issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in this section.

(3) Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.

(4) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

(5) Variances shall only be issued upon:

(i) a showing of good and sufficient cause;

(ii) a determination that failure to grant the variance would result in exceptional hardship to the applicant;

(iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in Section 4.1-4(4), or conflict with existing local laws or ordinances.

(6) Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.

(7) Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except 4.4-2(1), and otherwise complies with Sections 5.1-1 and 5.1-2 of the GENERAL STANDARDS.

(8) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

SECTION 5.0
PROVISIONS FOR FLOOD HAZARD REDUCTION

5.1 GENERAL STANDARDS

In all areas of special flood hazards, the following standards are required:

5.1-1 Anchoring

(1) All new construction and substantial improvements shall be anchored to prevent flotation collapse, or lateral movement of the structure.

(2) All manufactured homes must likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques).

5.1-2 Construction Materials and Methods

(1) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

(2) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

(3) Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

5.1-3 Utilities

(1) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
(2) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and,
(3) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

5.1-4 Subdivision Proposals

(1) All subdivision proposals shall be consistent with the need to minimize flood damage;
(2) All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;
(3) All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage; and,
(4) Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision proposals and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).

5.1-5 Review of Building Permits

Where elevation data is not available either through the Flood Insurance Study or from another authoritative source (Section 4.3-2), applications for building permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

5.2 SPECIFIC STANDARDS

In all areas of special flood hazards where base flood elevation data has been provided as set forth in Section 3.2, BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD or Section Use of Other Base Flood Data, the following provisions are required:

5.2-1 Residential Construction

(1) New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one foot or more above base flood elevation.

(2) Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designated to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:

(i) A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.

(ii) The bottom of all openings shall be no higher than one foot above grade.

(iii) Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

5.2-2 Nonresidential Construction

New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated one foot or more above the level of the base flood elevation; or, together with attendant utility and sanitary facilities, shall:

(1) be floodproofed so that below one foot above the base flood level the structure is watertight with walls substantially impermeable to the passage of water;

(2) have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

(3) be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the official as set forth in Section 4.3-3(2).

(4) Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in 5.2-1(2).

(5) Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g., a building floodproofed to one foot above the base flood level will be rated as the base flood level).

5.2-3 Critical Facility

Construction of new critical facilities shall be, to the extent possible, located outside the limits of the base flood plain. Construction of new critical facilities

shall be permissible within the base flood plain if no feasible alternative site is available. Critical facilities constructed within the base flood plain shall have the lowest floor elevated to three feet or more above the level of the base flood elevation at the site. Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced y o released into flood waters. Access routes elevated to or above the level of the base flood plain shall be provided to all critical facilities to the extent possible.

5-2-4 Manufactured Homes

All manufactured homes to be placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is one foot or more above the Base Flood Elevation; and be securely anchored to an adequately anchored foundation system in accordance with the provisions of section 5.1-1(2).

5.3 FLOODWAYS

Located within areas of special flood hazard established in Section 3.2 are the areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

(1) Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(2) Construction or reconstruction of residential structures is prohibited within designated floodways, except for (I) repairs, reconstruction, or improvements to a structure which do not increase the ground floor area; and (ii) repairs, reconstruction or improvements to a structure, the cost of which does not exceed 50 percent of the market value of the structure either, (A) before the repair, reconstruction, or repair is started, or (B) if the structure has been damaged, and is being restored, before the damage occurred. Work done on structures to comply with existing health, sanitary, or safety codes or to structures identified as historic places shall not be included in the 50 percent requirement.

(3) If Section 5.3(1) is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Section 5.0, PROVISIONS FOR FLOOD HAZARD REDUCTION.

5.4 DENSITY FLOODWAYS

A Density Floodway is hereby established for the Skokomish River and floodplain as shown on the Flood Insurance Rate Maps for this area. All

development within the Density Floodway shall comply with the following provisions:

(1) Location: All new construction and substantial improvements are required to be located on the highest existing ground available.

(2) Maximum Allowable Density: To assure that new construction and substantial improvements, combined with any existing development will not cause a cumulative increase in the base flood of more than one half (0.5) foot, all such new construction and substantial improvements shall be limited as follows:

All new development and substantial improvements shall not exceed three (3) percent of the total area of any lot, regardless of the size of the lot.

(3) Maximum Allowable Obstruction: All new construction and substantial improvements, including filling associated with new construction and existing development, cannot exceed a maximum allowable percent blockage of 17 percent. This standard is to be achieved as follows:

(i) Construct a line across the parcel that is perpendicular to the direction of overbank floodflow through the valley at that location. The direction of overbank floodflow through the valley generally corresponds to the direction of flow in the channel.

(ii) The maximum allowable width of the structure as measured along the line drawn in 5.4(3)(i) should be 80 feet for a five acre lot and 36 feet for a one acre lot. The maximum width for lot sizes between one and five acres should be calculated through linear interpolation of the above values.

(iii) Where structures are to be constructed on adjacent parcels, the minimum spacing between structures should be determined according to the 17 percent blockage criteria. For example, for two adjacent five acre square parcels, the minimum spacing between structures would be 387 feet with the maximum allowable width of 80 feet.

(4) No new footprint zones: A map of no new footprint zones, which were delineated in the Skokomish River Comprehensive Flood Hazard Management Plan and correspond to areas of high flood hazards, is attached hereto as Exhibit "A" and made a part of this code by reference. New construction shall not be allowed in these areas. Reconstruction shall be allowed, providing that the following conditions are achieved:

(a) The area of the footprint of the structure following reconstruction shall be no greater than the area of the footprint prior to reconstruction.

(b) Any substantial improvement of the structure shall meet the general standards presented in Section 5.1 and the specific standards presented in Sections 5.2-1 through 5.2-4 of this ordinance.

(5) Orientation: All new construction and substantial improvements are required to be oriented parallel to known floodwater patterns. Determination of such orientation shall be based upon topographical and historical flood data on file with the administrative official. When such information is not available, such orientation shall be in an upstream-downstream direction at a right angle to a line drawn along the shortest distance from the midpoint of the river channel through the midpoint of the lot.

5.5 WETLANDS MANAGEMENT

To the maximum extent possible, avoid the short and long term adverse impacts associated with the destruction or modification of wetlands, especially those activities which limit or disrupt the ability of the wetland to alleviate flooding impacts. The following process should be implemented:

(1) Review proposals for development within base flood plains for their possible impacts on wetlands located within the flood plain.

(2) Ensure that development activities sin or around wetlands do not negatively affect public safety, health, and welfare by disrupting the wetlands' ability to reduce flood and storm drainage.

(3) Request technical assistance from the Department of Ecology in identifying wetland areas. Existing wetland map information from the National Wetlands Inventory (NWI) can be used in conjunction with the community's FIRM to prepare an overlay zone indicating critical wetland areas deserving special attention.

APPENDIX EE.
PETITIONS RELATING TO DIKING

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Presented to PAC at Sept. 14, 1995 meeting

THE AGRICULTURAL COMMUNITY IN THE SKOKOMISH VALLEY

Mr Gary Cooper
Mason County Department of Community Development
P.O. Box 578
Shelton, WA 985684

RE: Draft Comprehensive Flood Hazard Management Plan

Dear Gary,

The Skokomish Valley has a very long history of being an agriculture community. We the undersigned wish to convey our agricultural interest and share with you our concerns that the Mason County Skokomish River Comprehensive Flood Hazard Management Plan (CFHMP) when completed may not satisfy our needs.

1) We support all efforts to redefine an "Emergency" as it would relate to the farmers in the community.

> "Emergency" is presently defined as an immediate threat to life or public or private property, or an immediate threat to serious environmental degradation due to weather, stream flow conditions, or other natural conditions.
>
> To the farmer this definition does not provide adequate latitude. The term immediate excludes the farmer's emergencies. The farmer's emergency may be his need to protect his crops from imminent flood waters or his land from floating debris, or his need to plant and harvest at the proper time of the year.

In all the history of the Skokomish Valley, the Agricultural Community has always responded to the need to protect their lands and their crops and their neighbors lands and crops. We understand that it is generally accepted that flood water on land is not necessarily damage, but debris that the flood water carries is damaging to the integrity of the farm land, and flood waters on crops is damaging.

a. When flood waters deposit road pavement, gravel, remnants of fences, lumber, logs and other woody debris in a farmer's fields, these materials must be removed, so that the farming operation can continue.

b. When the river erodes into a portion of a productive field or washes away the top soil from that field, that is loss of productivity and that effects the farmer's financial stability.

c. If the flood waters breach an existing agricultural dike, the debris that is carried onto the farmer's fields must be removed. The agricultural dike must be repaired so that the cost of debris removal is not repeated when the next flood reaches the breach in the agricultural dike.

For just the 1994-1995 winter floods, one farmer's estimate of damage, loss, and cost to repair exceeds $300,000.

These kinds of losses materially effect the economic livelihood of the farmer. The farmer must have the ability to protect himself. The farmer cannot sustain these kinds of costs year after year.

After the flood has passed, the farmer's emergency is to clean his fields, repair his agricultural dikes and prepare for the next planting or harvest.

For the farmers the existing definition of an "Emergency" is not adequate. The farmer is not allowed to protect the health, safety and welfare until the floodwaters are rising. The farmer needs the ability to protect themselves from an emergency before it occurs. To the farmer, an emergency is more than protecting one's home or buildings. Land to the farmer is as important or more important than a structure.

2) The agricultural community supports the removal of logs, log jams, and root wads and other woody debris from the river.

The river at flood stage carries log debris. There has been case after case of a log jam or root wad changing the forces of the river and aggravating river bank erosion. The County and the people of the Valley over many years have invested much time and materials to the hardening of certain river banks, the "dips" and the "church" to only

name two. As long as the erosive forces of the river continue to flow against these hardened banks, the bank erosion, siltation and aggravation are kept to a minimum. However, when a log jam or root wads divert the rivers erosive force off these hardened banks, unnecessary loss of land, erosion, siltation and aggravation start again. Removing the jams and root wads from the river would allow the erosive forces of the river to continue to flow against the existing hardened banks.

We support removal of the logs, log jams and root wads from the river channel so the existing hardened banks can continue to function and to protect against unnecessary erosion and aggravation and siltation.

Log and wood debris removal from the river must remain as a river maintenance alternative and should be included as allowable under the definition of an Emergency.

3) We support the river bank hardening (River Bank stabilization).

When the erosive forces of the river are allowed to move from hardened river banks to unprotected areas, gravels and silts are eroded into the river unnecessarily. If erosion is not stopped, the river damages private property, ie. crop lands or public facilities. The agricultural community cannot support the loss of public or private property.

River bank hardening must remain a river maintenance alternative. The use of suitable, low cost, materials is encouraged

4) We support gravel removal - mining - dredging from the river.

Because of the gravel build up, each year the river loses more of its carrying capacity, and each year the flooding in the Valley becomes more of a burden for all valley residences. A gravel removal program that would increase the river's flood carrying capacity is strongly supported.

We support a river maintenance program that would give the river back a river bed.

5) We support the stockpiling of river gravel within the floodplain.

The Agricultural Community recognizes that 100 percent of the gravel removed from the river or river bars has a positive effect on the carrying capacity of the river. Only the bottom 2 or 3 feet or 25% of the same gravel when stockpiled in the floodplain would effect the carrying capacity of the floodplain. The lost storage in the floodplain is compensated 400% by the gravel removed from the river. (Stockpile 80' bottom; 20' top; 20' high; 1.5:1 side slopes). It is understood that this gravel would be processed, screened and/or crushed to manufacture an aggregate material that can be economically moved out of the Valley's floodplain.

To preserve the economics of agriculture in the valley, gravel removal and agricultural dikes must remain viable tools for River Management.

6) We support the maintenance, improvement and construction of Agricultural dikes. The problem is not the agricultural dikes but the build-up of gravel in the river bed.

The Agricultural Community believes that the river bed is rising in elevation and the quantity of out-of-bank flooding is increasing. This out-of-bank flooding brings to the valley residences flooding and unwanted debris. If the bed of the river cannot be lowered, to protect the farmers from unwanted debris the banks of the river need to be raised at certain points. In the past Agricultural dikes have performed the function of keeping flood waters and debris away from areas where they were not wanted.

Agricultural dikes have at least two beneficial functions:

First - Agricultural dikes will keep debris from the farmer's fields.

Second - Agricultural dikes create quiet water on the river side of the agricultural dikes. Quiet water keeps the erosive forces for the flood waters away from river banks. A well placed agricultural dike can protect an unprotected river bank from erosion and damage.

To preserve the economics of agriculture in the valley, agricultural dikes and gravel removal must remain viable tools for River Management. If the river bed is lowered the need for diking is reduced.

7) We support the buy-out.

We would find no reason to object to a voluntary Buy out program. Apparently FEMA is desirous of having a Buy out plan included in the Draft.

8) We support the Shoreline Master Plan's designation for the Skokomish River as Rural.

The Skokomish River shoreline is designated as Rural from Hood Canal to the confluence of the North and South Forks, and is designated Conservancy on both forks upstream from the confluence.

The Agricultural Community supports a change in the Shoreline Master Plan that would continue the Rural designation along the Valley Floor westward to the Vance Creek canyon and the South Fork Canyon.

A Rural designation is intended to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines, serve as a buffer between urban areas, and maintain open spaces and opportunities for recreation compatible with agricultural activities (SMP, p. 10). The Rural designation also encourages farm management practices that prevent erosion and siltation of water bodies and minimize the flow of waste materials into water courses.

9) We support the floodplain without the floodway designation.

The Valley has a long history of agriculture. The Valley also has a long history of flooding. The definition used for floodway in the Shoreline Management Program has the potential for extending shorelines development jurisdiction over a large area of the Valley. This can complicate the permit process, and impair property owners' ability to undertake activities that involve legitimate efforts to protect their property.

10) We support the CFHMP's recommendation to work for the removal of the designation of navigable waters of the State for the Skokomish River.

The River by definition is navigable waters of the state, but as a practical matter the river is not nor has it been in any recent history been used as navigable.

11) We support all efforts not to identify the floodplain as wet lands.

The Valley has a long history of agriculture. Almost all the productive farm land lies in the floodplain. A wetland designation can complicate and impair the owners' ability to continue their farming operations.

We wish to thank you for the opportunity to submit comments regarding the draft Mason County Skokomish River Comprehensive Flood Hazard Management Plan.

People in agriculture need to be placed on an equal footing with fish and riparian habitat management.

The Agricultural Community has suffered because of the actions of governmental agency, and continue to be negatively effected.

Government should mitigate with Mason County to rectify the damages that the Agricultural Community has suffered as a result of the following actions:

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Barbara Keely
Ray Keely
Jerry Ford
Gerald Ford
Tracy L. Ford
Jose C. Kvarnstrom
Carl Kvarnstrom
Kimberly Wegner
Tricia R. Keely
Dennis A. Allen

Carol J. Hunter
Dale Costa
William O. Hunter
Carl Mease
Robert K. Fry
Bob Veach
Lee Baskin
Deborah M. Baskin
Almar B. Silverwood
W. Kelly Ryan
Bonnie K. Ryan
John Spencer
Janice Golden

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Carl L Ramsbottom	Ivan A Leith
Blase D Gorny	
Kelly Pierson	
Rick Vitry	
[illegible]	
Virgina Hills	
James ~~Steven~~ Hills	
Gary Sytsma	
Kristen Sytsma	
Wayne Stenberg	
Alan Ragan	
Karen Ragan	
[illegible]	
Anita Dugger	
Franklin Donald Ragan	

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Jim Hunter	W 1870 SKOK Vly Rd
Dale Sorensen	W. 301 Deyette Rd.
[illegible]	W 263 Dayton Rd
Rick Parsons	W1440 SKOK Valley RD
Colleen K. Kallappa	W1391 Skok Val. Rd.
Steve Cook	W. 1391 Skok Val Rd
[illegible]	W1391 Skok Valley Rd.
Jim Roe	W1361 SKOK Valley Rd
[illegible]	W1281 SKOK Vly. Rd.
[illegible]	W 301 DEYETTE
Dan Minton	W 411 Deyette Rd.
Connie Minton	W 411 Deyette Rd
Bill Stafford	SKOK Vly. Rd.

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

[illegible]	Skoke Valley Rd
[illegible]	SKOK Valley RD
Judy Mikesell	Skok Valley / Duyette Rd
Roger Mikesell	SKOK VALLEY DUYETTE Rd.
[illegible]	SKok Valley Duyette Rd
Patricia L. Rose	Skok Vly Rd.
Donald [illegible]	SKOK VALLEY
Betty L. Corey	SKOK VALLEY
Curt Hunter	SKok Valley
Dave Kamin	E 261 Duyette Rd.
Richard F. Corey	W. 1361 SKOK VALLEY.
Fred Hunter	
Tamara Hunter	
Sunil Cancel	W 250 Bank Farm Rd
Mark - Linda Martinez	SKOK Valley

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

~~Jeffrey M. Ingell-Bailey~~	W-247 Deyette Rd - Shelton
Nancy a Connell-Brady	W. 241 Deyette Rd Shelton
Jaipi Kamin	Skok Valley
Joan R Zhunter	W1870 Skok Vly Rd Shelton

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Leslie L. Hunter

Colleen C. Cohen

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Paul B. Hunter	W 881 Skokomish Vly
MARIO HERNÁNDEZ	E1921 Hwy 106
[illegible]	E1921 Hwy 106
Bill Hunter	W2221 Skok VA Rd
Gordon Gerbing	
Marilyn Gerbing	
Jami Hunter	
Lynne Hunter	
Richard D. Conant	SE 100 Somers DR.
Bob Pearson	W 4091 Skok Valley Rd
CHAS E HUNTER	
Vicente Antonio Cuttes	
Christine Keith	~~[illegible]~~

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Pamela Schauberger	
Steve Morris	
Marianne Glass	
Rita Freeman	
Edward Nelson	
Jerry W. Finney	
Albina Daily	
Jeff W. Cook	W 1280 Skok Valley Rd.

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Rae Whitten	W. 4880 Skok V. Rd Shelton
Robert E. Whitten	W. 4880 Skok. Vly. Rd., Shelton
Ginny Johnson	W. 4760 Skok Vly Rd. Shelton
Steve Raymond	"
Kenneth E. Lawrence	Skok Valley
Betty L. Lawrence	Skok Valley
Willard Bressie	W 5285 Skok Valley
Ann V Bressie	" "
David Carroll	W. 250 Bambi Farms Rd.
Deerdra Talley	W251 Bambi Farms Rd.
Patty Dymont	W270 Bambi Farms Rd
Melissa Donaldson	

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

[illegible] W5010 SKOKVLY RD

[illegible] K. Baze [illegible]

[illegible] W5101 Skok Vly Rd.

Hub Baze W5101 Skok Vly Rd.

Kim Hollins W5141 Skok Vly Rd.

Anita Vickery W-5040 SKOK VLY RD.

[illegible] W5040-121 Skok. Vly. rd

[illegible] W5040-121 Skok Vly rd.

Rick Vickery W-5040-121 Skok Vly Rd

Georgia G. Beam W5040-161 Skok Vly Rd.

Roger L. Beam Same

Mike Dragoo 5211-Skok Vly

Diane Dragoo W 5211 Skok Vly

Chad Timm W5811 SKOK VLY

R. Donaldson W2000 BAMBI FARMS

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Anthony George West 270 Lobi farms RD

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

D. L. Miller	W171 Bambi Farm Rd
Bettie J. Miller	W171 Bambi Farm Rd
John L. Lax	W110 Bambi Farms Rd.
Bernice A. Lax	W110 Bambi Farms Rd.
Antonio Sunseri	W-3011 Skok Vly Rd, Shelton 98584
Mary Sunseri	W3011 Skok Vly Rd Shelton 98584
Konrad J. Larson	3250 Sunnyside Rd Shelton Wa 98584
Monita J. Larson	3250 Sunnyside Rd, Shelton 98584
Ruth Nelson	N2881 Sunnyside Rd, She 98584
Richard Nelson	N 2881 Sunnyside Rd, Shelton 98584
Robert R. Bedwell	SUNNYSIDE RD SHELTON
George Hardwell	3530 Skokomish Vly
Guin C. Fritz	W3640 Skokomish Vly Rd Shelton, WA.

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

[illegible]	206 Colorado Shelton WA
Julie A Richert	206 Colorado, Shelton Wa
[illegible]	W. 3731 SKOKOMISH VLY. RD. / SHELTON WA
[illegible]	W3731 Skokomish VLY RD / Shelton, Wa.
Peggy Drake	E6351 MCREAVY RD - Shelton, WA
Gail Harbison	W 1200 SKOK Valley Rd. Wa
Gerald L Richert	W. SKOK Valley Rd.
[illegible] Drake	1200 W SKOK VLY
Talitha K. Bennett	2813 Montclair Ct Lacey 98503
Bruce G. Bennett	Lacey, WA 98503
Shirley M. Richert	W. 2631 Skok Valley Rd.
[illegible]	W 5673 SKOK VLY RD
Alan Richert	Steamboat Island

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Ed R Ward	1320 W SKO Valley RD Shelton Wa.

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Lan Rice

Stephanie Poole

Michelle M. Richert

Deanna K. Richert

Tom Richert

Jason Richert

Denaire Richert

Mark Richert

Linda Sue Johnston

Shawn Johnston

Holdane Johnson

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Patricia M. Johnson	W.2933 Skok. Vly. Rd, Shelton, Wa. 98
[illegible]	W Skokomish Valley Shelton Wa.
Frank Johnson	W2935 Skok valley
Shelley R Johnson	W2935 Skok Valley Rd. Shelton
Roy [illegible]	W3440 Skok. Vly Shelton Wa
Jo Ann [illegible]	W 3440 Skok Vly
[illegible]	3415 [illegible]
Russell [illegible]	E.5680 Pickering RD. Shel WA.
Marie Ragan Churchill	W3517 Shelton Matlock Rd, Shelt WA 98584
Mary Simmons	N22670 Hwy 101 Shelton Wa 98584
Neil Simmons	N22670 Hwy 101 Shelton 98584
Robert Reeves	W3240 Skok V. Rd. Shelton Wa
Chuck Bayless	W 5674 Skokvly Rd Shelton

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Manuel E. Martinez		Skokomish Valley
Francisco Ortiz T.		" "
Jorge Ortiz T		" "
Melquiades Ortiz		" "
Domingo Gonzalez		" "
Alejandro A. Martinez		" "
Virgil Freshour		W3276 SKOKOMISH VLY RD SHELTON WA
Kimberly Osborne		W3340 Skokomish Valley Rd Shelton WA 98584
Margaret Van Cleave		W3490 Skok Vly Rd
Maurine Sorrell		W3490 SKOK VALLY RD
Lin Van Cleave	F.X	* W-3490 Skok. Val Rd.
Gina Bailey		W. 3440 SKOK. Vly Rd
Matthew Cooper		W 3660 SKOK VALLY RD
James Bailey		W3660 SKOK. VALLEY RD
Sheila Samstallen		W7750 Ellis Hill Rd.

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Sandra J Hunter	W1621 Skokomish Vly Rd
Cindi Carow	W. 5811-150 Skok Vlly
[illegible]	" " " "
Dave Carow Jr.	" " "
Gail Harbison	W. 1500 Skok. Valley
Linda Hanson	W 1200 Skok Valley Rd
Bert Thomas	west 405 Skok. V. Rd
Mary E. Andrews	W. 405 Skok Valley Rd.
George M King	
Theresa L Johnson	PO Box 1052 Shelton
Shannon Johnson	" "

March 13, 1995

Gary Cooper, Subdivision/Environmental Planner
Department of Community Developement
Bldg. III, 426 W. Cedar, P.O. Box 578
Shelton, WA 98584

Dear Mr. Cooper,

The enclosed petition has been signed by 129 Skokomish Valley residents who feel diking is not an acceptable method of flood control for the valley.

This is not about tearing down existing dikes nor is it a personal vendetta against anyone. We are merely making a statement which we feel would not be heard unless we take an approach such as this.

Sincerely,

Moirya Dehe

Moirya Dehe, Skokomish Valley resident

128 signatures

Skokomish Dikes

Diking: Most residents are aware that dikes have been used in many areas in the U.S.A. including the Skokomish Basin. There are pro's and con's on the usage of these structures and the benefits that they do or do not provide. While they may provide protection for those people that live behind these structures their impacts to land and people upstream and downstream are very real.

In the past the construction of these structures in the Skokomish Valley was done usually with the existing materials provided by the river, Woody debris and river rock with some cable. Nature and time work together on these structures. Wood rots out leaving gaps or pockets for erosion to get a foot hold, velocity of the water, changes in stream all have adverse effects on dikes. The ability for dikes to provide protection decreases as the river bed rises. This rising of the river bed becomes more of a problem as ground water rises behind the dikes causing more impact to the surrounding land.

When a flood event does occur and the dike is breached or opened up for whatever reasons it is often impossible to close up. At this stage usually all one can do is stand helplessly and watch or run.

The time for a decision has come for Skokomish residents to say yes or no to this approach to flood prevention. Are these structures what "all" people in the basin want to have and maintain?

Please sign the petition below if you feel diking is not the answer to the flooding problem.

Sincerely,

Guy L. Parsons 426-6713

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Bob Pearson	W 4091 Skok Valley Rd.
[illegible]	W 7600 Eells Hill Rd
Alexander P. Hayden	" " "
[illegible] Johnson	W 7690 Eells Hill Rd
Janis Golden	" "
Sheila Ramsbottom	W. 7730 Eells Hill Rd.
[illegible]	W. 7732 Eells Hill Rd
Tom & Kelly Pierson	W. 3891 Skok Valley Rd.
Mark [illegible]	W 3923 Skok. Valley Rd
Kathy Scott	W5811-220 Skok Valley Rd. * Dikes not only alternative
[illegible]	W-5811-220 Skok Valley Rd
Blase [illegible]	W3810 Skok Valley Rd S
Douglas [illegible]	W 5811-222 Skok Val Rd.
Linda Carow	W. 5811-150 Skokomish Vly Rd.
Dave Carow Jr	"
Victor Feist	W 5671 Skokomish Vly Rd, Shelton
[redacted]	

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Jerome Widwell	W331 Bourgault Rd
Dorthy A Mullen	630 Skok Rd.
Vicky B. York	W 401 Skokomish Valley Rd
J. Thrasher	W405 SKOKOMISH Vly Rd
Willie L. Howard	W. 980 Skokomish Vly Rd.
Donald R. Howard	W 90 SKOKOMISH RD.
Bob Veach	W 940 Skok Vly.
Marilyn Ledbetter	W-407 Skok Vly Rd.
Deborah M. Boston	W. 1010 Skok Valley
Lynda L. Lawrence	W2400 Skok. Valley Rd. Shelton
Marion [illegible]	W. 2460 Skok. Vly. Rd
Gerald Ford	W. 2840 SKOK. VLY. Rd
Jerry Rose	W. 2981 Skok Vly. Rd
Andrea L Rose	W2981 Skokomish Vly. Rd.
Brad Frison	W6931 Skokomish Vly. Rd.
Yolanda C Moreno	W 3180 Skokomish Vly R.D.
Abel Hernandez	W. 3180 SKOKOMISH VLY. RD.
Virginia Frachuf	W 3240 Skokomish Vly RD
Lisa L Vaig	W 3340 SKOKOmish vly rd
Jim Van Cleave	W3490 Skok. Val Rd
Ruth Wilber	W. 3510 Skok Va Rd
[illegible]	W. 3510 SKOKOMISH Valley, W 3955

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Duane Edwards	N.21 Salish Ct Shelton
Raymond J Johns Sr	N 800, Ros Rd Shelton Wa
Karla Johnson	N.42 SALISH CT, SHELTON 98584
Heather Oerhy	E 4941 HWY 106 UNION 98592
Beverly [illegible]	E 200 Bourgault Rd Shelto
Jennifer [illegible]	E 200 Bourgault Rd Shelto
Jone M [illegible]	E 140 Bourgault Rd "
Pat [illegible]	E 421 Bourgault Rd She
Lenie S. Dillon	E-430 Bourgault Rd - Shelt
Jenny Dillon	E 430 Bourgault rd Shelton Wa
Mark [illegible]	E-201 Bourgault Rd. Shelton WA
Paulina Harrison	E 500 Bourgault Rd Shelton Wa
[illegible]	E 500 Bourgault rd Shelton
[illegible]	E. 365 Bourgault Rd Shelton
Melody Lynch	E 310 Bourgault Rd Shelton
[illegible]	E 241 Bourgault Shelton, Wa.
[illegible]	W 300 Bambi Rd - She
[illegible]	W - 300 Bambi Fa. Rd - She
[illegible]	W 251 Bambi Farms Rd - Shelton
[illegible]	W 151 Bambi Farm Rd Shelton
Beth Hendricks	W 512 Bambi Farms Rd Shelton

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Alan Graham	E 1090 McGravy Rd Unit 2
Richard Graham	Same

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Jim Hellman	W. 0052 Skokomish Valley Rd.

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME*	ADDRESS
Leslie Dolan	W6870 Skokomish Vly Rd Shelton
Vicki Simm	W5311-190 Skok. Vly. Rd Shelton
Karl Pearson	W4091 Skok Vly Rd Shelton.
Barbara Kraly	W2780 Skok Vly Rd Shelton
Jeff Heinis	W5341 Skok Vly rd. Shelton
Marya Hehe	W401 Bambi Farm Rd Shelton
Pat Heinis	W. 5341 Skok V. Rd. Shelton
Jan Heinis	W 5341 Skok. V. Rd. Shelton
Joseph W. Bourgault	E 100 Bourgault Rd Shelton
Norma J. Bourgault	E 100 Bourgault Rd Shelton
[illegible]	5560 W. SKOK. VAL. SHELTON
James ~~Steve~~ Hills	W-5811-90 SKOK VLY Rd Shelton WA
Lucia L. Kraly	W5811-110 Skok Vly Rd Shelton
Paul Carow	W 5811-150 SKOK VLY RD SHELTON
Tom [illegible]	W401 Bambi Farm Rd
[illegible]	W 6610 SKOK VLY RD SHELTON
Jim Meson	W 6170 Skokomish Vly SHELTON
Sherry Mayor	W5360 Skok Vly Shelton
Martha A. Pauser	W530 Bambi Farm Rd Shelton
Myra Hills	W5811-90 Skok Vly Rd

not given

I agree with the statement below!

Linda Dittmar W 5350 Skokomish Valley Rd. Shelton, WA 98584
A river system is very complex and requires more than one approach to flooding problems. I am not totally opposed to all diking, but it is not the solution. Ind

* ROGER DITTMAR W5350 SKOKOMISH VALLEY RD. SHELTON (I AM NOT COMPLETELY OPPOSED TO DIKING - MY CONCERN IS THAT EXISTING AND FUTURE DIKES NOT SIMPLY PUSH PROBLEMS UP OR DOWN RIVER) RD

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
E Lorraine Jones	
E. LORRAINE JONES	W1281 SKOK. VLY RD Shelton Wa
[illegible]	
[illegible]	
Mike Rose	W 1461 Skokomish Vly Rd. Shelton
[illegible]	[illegible] Vly Rd Shelton
[illegible]	W. [illegible] Vly Rd. Shelton
[illegible]	[illegible] Shelton, WA
[illegible]	[illegible] Skokomish Vly Rd. SHELTON, WA
Richard O. Cook	W1281 Skokomish Vly Rd Shelton Wa
Jeff W. Cook	W1280 Skok Vly Rd Shelton Wa.
Colleen Kalleppa	W1391 Skok. Vly. Rd. Shelton, Wa
Kim Dolan	W1320 Skok. Vly Rd Shelton Wa
David K Rose	W 1461 Skok Valley Rd Shelton
Patricia Rose	" " " "
Gene D Lim	W 263 Deyette Rd, Shelton.
Lorraine Martinez	261 Deyette Shelton
[illegible]	W261 Deyette Shelton
Roger Mikesell	W 251 Deyette Shelton
Henry Rogers	W191 Deyette Shelton
Bob Rogers	" " "
Gleen Lindsell	W291 Bourgault Rd Shelton
Gerald S. Lindsell	W291 Bourgault Rd Shelton

BELOW IS A LIST OF SKOKOMISH BASIN RESIDENTS WHOM DO NOT FEEL THAT DIKES ARE THE PROPER FLOOD PREVENTION ALTERNATIVE FOR THE SKOKOMISH BASIN.

NAME	ADDRESS
Soren W. Sampley	W. 350 BAMBI FARMS Rd, Shelton
Paulette McKinney	W. 350 Bambi Farms Rd Shelton
Silas Sampley	W. 350 Bambi Farms rd Shelton
Rebecca Zehnung	E 241 Bourgault rd. Shelton.
John Smith	5291 Skokomish Rd
Candi Kuhr	W. 5741 Skokomish Vly. Rd.
Diane Tirm	W 5211 Skokomish Valley Rd.
Mike Dragoo	W 5211 Skokomish Valley Rd.
Wendy A Fait	W 5671 Skok Valley Rd
Frank D. Ragan	W 6051 Skok Vally Rd.
Anita Ragan	W 5951 SKOK. VAL, SHELTON
[illegible] Mason	W 5960 " " "
Scott Messer	W 6174
Edward [illegible]	W. 514 Bambi Farms [illegible]
Stephen E. De Mieri	W 6087 SKOK Vly RD, SHELTON
S. McGuire.	SK. Vly RD.
David M Covert	W 6870 Skok Vly. Rd.
Allan Schmidt	W 6[illegible] Skok Valley Rd.
Craig R Sigmon	W 5040-231 SKOK valley Rd
Mary Ann Sigmon	W 5040-231 Skok Valley Rd
[illegible]	W 150 [illegible]
[illegible]	W 150 [illegible]

APPENDIX FF.
AGREEMENT BETWEEN ECOLOGY AND MASON COUNTY REGARDING DENSITY FLOODWAY, ETC.

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

CHRISTINE O. GREGOIRE
ANDREA BEATTY RIEMKER
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

January 6, 1989

RECEIVED
JAN 11 1989
GENERAL SERVICES

To: Interested Parties E. Hammermeister, for

From: Jerry Louthain, Department of Ecology

Subject: Skokomish River Dike Construction

This is to bring everyone up to date on this subject which you will recall, we had several meetings on within the last year or so. Since our efforts to reach a resolution on this issue bogged down, we initiated litigation against Mason County and the property owners who owned land where the dikes were constructed in 1987. Mason County was also suspended from the National Flood Insurance Program (NFIP) on March 4, 1988 for failure to adopt a floodplain ordinance. Concern was also expressed by those agencies responsible for fisheries resources of the impact of diking activity on the fishery resource.

We issued orders to remove the dikes and to restore the area. When these orders were not complied with, we issued penalties of $1,000 to each of the parties. This action was appealed to the Shorelines Hearings Board and was scheduled for a hearing beginning on January 4, 1989. We also filed a lawsuit in Thurston County Superior Court against the involved parties, asking that the court issue an order to declare the dikes a public nuisance and be abated.

On December 19, just prior to a hearing before a Thurston County judge on the lawsuit, attorneys for the defendants and our Assistant Attorney General discussed the merits and timing of the various legal actions and agreed that a settlement was possible. The concept of the settlement would be to allow a low level dike to be designed and constructed in such a manner that it could be overtopped without failure during major floods.

We evaluated this concept along with the adoption of a floodplain ordinance by Mason County which would control development based on a density concept instead of a floodway - floodway fringe concept. The primary criteria that must be complied with for floodplain management purposes is that the base flood (100-year frequency flood) levels not be increased more than one foot from the levels shown on the flood insurance maps provided by the Federal Emergency Management Agency. Using the density concept in combination with a low level diking system, base flood levels could be raised a certain amount with low level dikes and a certain amount

with development in the floodplain as long as the total rise in base flood levels did not exceed one foot. One option would be to design the dikes such that they not raise base flood levels more than 0.5 foot.

Timing of any construction work is also an important issue due to the potential for increased sediment on recently disturbed soils during our rainy - flood season from November to March.

The above issues were incorporated into terms for a proposed settlement and presented to some of the property owners, their attorney and Mason County at a meeting on December 27. A copy of our proposed settlement terms is attached. These terms and other issues were discussed at the meeting and there was at least conceptual agreement to all terms except No. 6 at the meeting. Mason County will review the concept and do a preliminary evaluation of the level of protection desired, the estimated cost of design and construction and the potential funding sources. It was also pointed out that the design must be approvable such that the appropriate permits or approvals can be obtained. Mason County will respond to us by January 13, 1989. In response to a question, I stated that funds from our Flood Control Assistance Account Program (FCAAP) would not be available for this work. This was because our FCAAP funds can not be used for construction of new levees or for maintenance of what we consider to be an illegally constructed levee. In addition, the county must be enrolled in the NFIP to be eligible for FCAAP funds.

As a result of the potential for settlement, the hearing scheduled by the Shorelines Hearings Board for January 4-6, 1989 was deferred to mid-July, 1989. County Superior Court action was scheduled for a trial date in March, 1989. While we are seeking a potential settlement, this matter can be litigated if the proposal settlement fails.

JL:aw

Attachment

cc: Allen Miller
Rod Mack
Rick Hoss
Gary Burleson, Mason County
Marley Young, Mason County
Eric Fairchild, Mason County
Joe Blum, Department of Fisheries
Steve Keller, Department of Fisheries
Steve Ralph, Point No Point Treaty Council
Chuck Steele, Federal Emergency Management Agency
Barry Jenkins, Trout Unlimited

PROPOSED SETTLEMENT TERMS

1. County and Skokomish Valley property owners will design and construct a levee that would not raise 100-year flood level more than .5 feet and meet soil erosion standards. All work completed by September 1, 1989.

2. Plans and specifications and source of funding of levee will be drafted and will be subject to Ecology approval. Document submitted by March 1, 1989.

3. Levee project must have a shoreline permit under current Mason County Master Program.

4. Ecology will remit penalty from property owners if above conditions met.

5. Mason County will adopt floodplain ordinance under density fringe concept pursuant to FEMA standards by September 1, 1989. Ordinance subject to Ecology approval.

6. Penalty will be paid by Mason County.

APPENDIX GG.
COSTS AND FUNDING FOR LEVEE SYSTEM MANAGEMENT

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

APPENDIX GG COSTS AND FUNDING FOR LEVEE SYSTEM MANAGEMENT

The following sections describe cost and funding information relating to Issue 8: The current system of levees are substandard and do not meet FEMA standards, as described in the CFHMP. Information if presented on the following topics

- Funding Sources for a Levee System Reconnaissance Report: The CFHMP recommends that ****$10,000**** be allocated to complete a levee system reconnaissance report. Potential sources for funding this report are described

- Construction and Repair of Levees: It is likely that the results of the reconnaissance report will require construction and repair of some sections of levee. General design criteria and costs associated with construction of new dikes based on these criteria are presented.

- Dike Maintenance Costs: One of the most frequently overlooked costs associated with implementation of a levee system for flood control is recurrent maintenance costs. Order-of-magnitude estimates for this cost are presented.

- Indirect Costs: Indirect costs are also frequently overlooked and generally relate to impacts that result from the alteration of river hydraulics. Specific impacts are described.

- Allocation of Costs: Since dikes can be either publicly or privately constructed and owned and, likewise, can provide public and private benefits, the allocation of costs is a critical question that must be answered in development and management of any levee system. A proposed distribution of responsibilities for assumption of such costs is presented in this section.

<u>Funding Sources for a Reconnaissance Report</u>

- **Mason County** - Work could be completed by the Mason County Public Works Department using money from Public Works' budget.

- **Grants and Loans** - Work could be completed by an engineering consultant using a combination of Mason County funds and grant or loan monies from one of the following sources:

    - Flood Control Assistance Account Program - Department of Ecology

    - State Revolving Loan Fund - Department of Community, Trade, and Economic Development

    - Centennial Clean Water Fund - Department of Ecology

    - Public Works Trust Fund - Department of Community, Trade and Economic Development

    - Planning Assistance to the States - U.S. Army Corps of Engineers

- **Upper Watershed Contributors** - There is substantial documentation that suggests that activities in the upper watershed have had impacts on the Valley as a whole. These upper watershed contributors, principally timber interests and the Tacoma City Light's Lake Cushman Hydroelectric Project, are potential sources of assistance in providing funds or professional expertise in completing the Reconnaissance Report.

Construction and Repair of Dikes

The cost of dike construction or repair is highly variable. Each dike project will have unique characteristics that will determine costs. Among the variables that must be considered are the following:

- New construction or repair
- Containment or overtopping design
- Type and availability of construction materials
- Hydroseeding/vegetation
- Design report, plans, specifications, and surveys
- Impacts to other properties
- Mitigation for environmental impacts
- Permit costs
- Contingencies

Until the above recommended reconnaissance is completed it is impossible to predict exactly what the costs of dike projects in the Skokomish Valley will be. However, a planning level estimate of dike construction is possible that can provide some insight into the economic scale of diking projects.

Using the dike construction guidelines from the Diking Policy, the following dimensions can be considered representative for the type of dike that would be permitted for the Skokomish Valley:

6 foot top width

6 foot height

2:1 horizontal to vertical riverside slope

5:1 horizontal to vertical landside slope

48 foot base

The above dimensions assume a design that follows the design standards for overtopping at the 5 year return period event. There will of course be cases where height, top width and base vary according to the predicted flood levels for a given area. Also, there may be cases where a variance on the riverside and/or landside slope is allowed. A dike with the above dimensions would appear as follows:

The cross-sectional area of the above dike would be 162 sq.ft. [Top+Bottom*Height/2]. A dike with the above dimensions that is a mile long would contain 855,360 sq.ft. of earth, or 31,680 cu.yds.

To construct a dike one mile long with the above dimensions, the following range of costs is possible. These estimates are derived from the experiences of Snohomish County and the Mason County Department of Public Works:

TABLE 1. Low Cost Estimate for New Dike Construction[1]

ITEM	UNIT PRICE	**TOTAL**
Design	5% of Construction	$7,920
Clearing/Scarifying	$2500 per acre	$14,500
Construction	$5 per cubic yard	$158,400
Compaction/Placement	$1 per cubic yard	$31,680
Hydroseeding	$850 per acre	$4,930
Construction Inspection	10% of Construction	$15,840
Contingency	10% of Construction	$15,840
Subtotal		$249,110
Mobilization	7% of Subtotal	$17,438
TOTAL		**$266,548**

[1] Both the "Low End" and "High End" estimates assume that a dike one mile in length is being constructed.

TABLE 2. High Cost Estimate for New Dike Construction

ITEM	UNIT PRICE	TOTAL
Design	40% of Construction	$158,400
Clearing/Scarifying	$2500 per acre	$14,500
Construction	$10 per cubic yard	$316,800
Compaction/Placement	$1 per cubic yard	$31,680
Hydroseeding	$850 per acre	$4,930
Construction Inspection	10% of Construction	$31,680
Contingency	10% 0f Construction	$31,680
Subtotal		$589,670
Mobilization	7% of Subtotal	$41,277
TOTAL		**$630,947**

The above cost estimates can be summarized by noting that the cost per cubic yard ranges from $8.40 for the "Low End" to $19.90 for the "High End."

Maps of the existing dikes in the Skokomish Valley indicate that there are appromimately 3 miles of dikes between Swift Creek and the Highway 101 Bridge. Assuming that all of these dikes were in need of significant repair -- enough to be considered new construction -- to meet the criteria adopted in the policy on diking, cost estimates for rebuilding these dikes range from a low estimate of $800,000 to a high estimate of $1,893,000.

Again, cost estimates for new construction are quite imperfect for predicting the costs that will be involved with bringing existing dikes in the Skokomish River Valley into compliance with the diking policy. It is quite possible that some of the existing dikes will meet diking policy standards or will qualify for a variance from those standards. It is also possible that some dikes will be removed. In both instances the cost of coming into compliance with the new policy will be much less than the new construction estimates. One can safely assume, however, that at least a portion of the existing dikes will require a significant amount of reconstruction. Even if only a third of the existing alignment required such reconstruction, the "Low End" estimate for completing those repairs would be approximately $267,000.

Dike Maintenance Costs

Dike maintenance is an associated cost of dike ownership that must be considered when determining the benefits versus the costs of using dikes for flood control. Once a dike is constructed it must be maintained forever, and the costs associated with such maintenance can far outweigh its original construction costs over the lifetime of the structure.

The experiences of Snohomish County indicate that a minimum of 5% of the construction costs for a dike should be allocated for maintenance activities each year. Using the above figures for the cost of new dike construction yields annual dike maintenance expenses ranging from approximately $13,300 for the "Low End" to $31,500 for the "High End."

The policy on diking that was approved by the Planning Advisory Committee requires that those who seek a permit to construct or reconstruct a dike in the Skokomish Valley must show "intent and ability to meet anticipated maintenance costs."

Indirect Costs / Impacts

Until the reconnaissance report is completed, the indirect costs that are caused by diking are not possible to quantify. However, these costs are real and should be considered whenever a diking project is considered. These costs are related to the impacts that dikes have to reaches of river both up and downstream from the levee and to the river channel adjacent to the levee. A summary of the potential impacts is as follows:

- Riverbed Aggradation - By restricting overbank flows dikes prevent the river from depositing its sediment load throughout the floodplain. This can result in greater amounts of sediment remaining in the channel. As sediment accumulates in the channel the flood protection provided by the dikes decreases. Thus, an indirect cost relating to the impacts of sediment accumulation caused by dikes is the need to either 1) raise the dikes to provide greater flood protection, or 2) lower the channel with dredging.

- Channel Scouring - While dikes may result in an overall increase in sediment deposits within the river channel, there may be some areas where the channelized flow of the river that is the result of diking will cause localized scour of the riverbed. The scouring of the riverbed can reduce salmon habitat and have an adverse economic impact on the fisheries resource.

- Bank Erosion - Channelization of the river can create hydraulic forces that tear away at river banks. In many cases these are banks that would otherwise remain stable if dikes were not creating an unnatural situation. The costs associated with restabilizing a bank that has eroded can be very high.

- Effects on Adjacent Property - Often, dikes are constructed for the purpose of protecting a property owner's river bank and lands, but this often comes at the expense of another property owner, who suffers the increased flows and/or backwater that can result. By increasing flood depths on adjacent property owners, the costs associated with damage to surrounding land and homes can be quite high.

Allocation of Costs

The majority of dikes in the Skokomish Valley are privately owned. The degree to which public monies can be allocated to the construction, repair and maintenance of these structures will depend on the degree to which they provide public benefits. The determination of whether a particular dike provides public benefits should be completed in the Reconnaisance Report that has been recommended above. Public monies should be allocated in accordance with the degree to which the public benefits from the structure. Otherwise, expenses for the construction, repair and maintenance of dikes should be borne by the property owner.

TABLE 3. Cost Summary

PROJECT	AMOUNT	POTENTIAL FUNDING SOURCE(S)
Reconnaissance Report	$10,000	Mason County Dept. of Ecology Corps of Engineers Upper Watershed - Contributors
Dike Construction, Reconstruction, Alteration, Repair	$8.40 - $19.90 per cubic yard	Private Landowners Mason County Dept. of Ecology Corps of Engineers
Maintenance	5% of total construction costs	Private Landowners Mason County
Indirect Costs	UNKNOWN	UNKNOWN

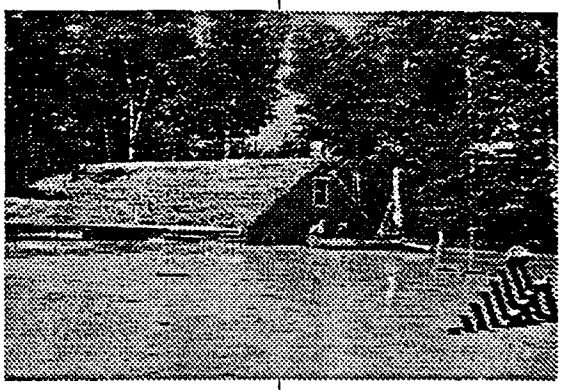
APPENDIX HH.
CORPS OF ENGINEERS FLOOD AUDIT MATERIALS

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

FLOOD DAMAGE REDUCTION AUDIT PROGRAM

U.S. Army Corps of Engineers, Seattle April 1995

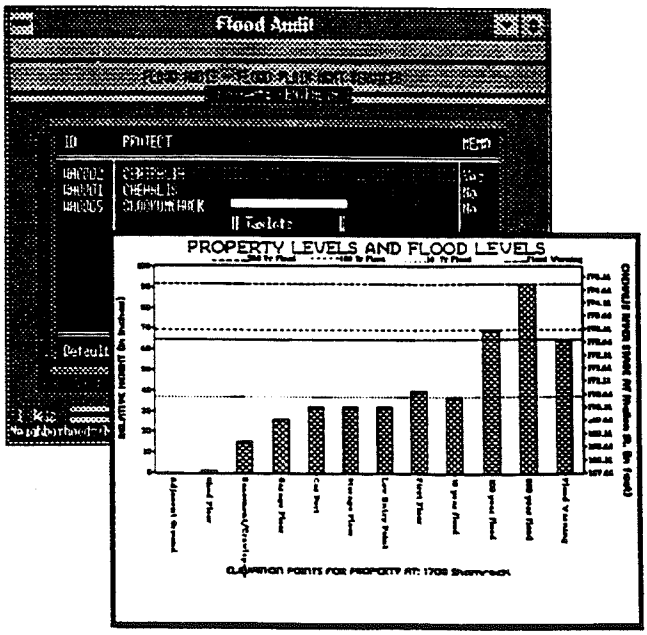
The Corps of Engineers Floodplain Management Services Section, Seattle District, provides flood related technical and planning products guidance to state and local governments for making decisions related to flood hazards, flood damage reduction, and flood warning and preparedness to promote the prudent use of the Nation's flood plains.



Seattle District has developed for FEMA an "automated" flood damage reduction audit (flood audit) program that provides individualized flood damage prevention, reduction, and safety information with charts and graphs for each residence in the floodplain. The information includes site specific flood warning data, and personalized flood preparedness, alert, and evacuation plans. There is also a sub-routine for evaluating floodproofing alternatives (Sacramento District Corps of Engineers). The program has an internal database that stores and correlates the property and flood data. Public emergency service providers, as well as flood plain residents, can use this information to prepare specific flood response plans. The information can also be used to assist FEMA in evaluating mitigation actions to reduce future flood damage losses. A sample packet showing some of the information that is provided to the individual residents (or landlords) and to the community officials is attached.

Contact:
Mr. Joseph T. Weber, Jr.
Program Manager, Floodplain Management Services
US Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, Washington 98124-2255

(206) 764-3661
(206) 764-6678 (fax)



Sample

Individual Homeowner's Packet

1. Transmittal Letter

2. Individual Action Plans
    a. Actions Prior to Next Flood
    b. Actions During a Flood
    c. Actions After the Flood

3. Flood Warning Graphs (Without Flood Warning Line)
    a. Property and Flood levels
    b. Evac Route and Flood levels

4. Floodproofing/Nonstructural Evaluation

5. Flood Warning and Evacuation Map

6. FEMA Fact Sheets (Not included here)

May 13, 1995

(Letter Head)

[LANDLORD]
[LANDLORD ADDRESS]
[LANDLORDCITYSTATEZIP]

Dear [LANDLORD]

This letter is to transmit **FLOOD DAMAGE REDUCTION INFORMATION** related to your apartment building and property at [PROPADDRESSCITYSTATE]. A similar letter was sent to each of your occupants.

The Federal Emergency Management Agency (FEMA) has identified this property as being in a neighborhood of potential flooding. Although severe residential structural damage from major flooding is rare in this area, the cumulative cost of repeatedly repairing minor structural damage and replacing contents from smaller floods is significant. The burden for repair cost is carried by the floodplain landlord/resident and by State and Federal disaster aid programs and the National Flood Insurance Program. In an effort to reduce the cost of these damages, FEMA has funded the U.S. Army Corps of Engineers (Corps) to complete a **FLOOD DAMAGE REDUCTION ASSESSMENT** (flood audit) of your area/neighborhood in cooperation with the city of [PROPCITY].

The primary product of the flood audit is a **FLOOD ACTION PLAN** which provides specific information on actions to take prior, during, and after a flood. This information will be valuable to you and your occupants in preparing for the next flood. Some properties evaluated in the flood audits are not subject to flooding; the data provided will indicate this. However, since all properties evaluated are within a designated floodplain, i.e, they will at some point be surrounded by flood waters, it is imperative to heed and follow the specific flood warning and response guidance provided.

The packet also contains **SUPPLEMENTAL INFORMATION** provided by FEMA on flood damage reduction measures as retrofitting and floodproofing buildings and appurtenant structures, and

how to protect household items and valuables. By applying some of these retrofitting and floodproofing ideas, you can greatly help to lessen the future impacts and cost of flooding on your property, your tenants possesions and well being, as well as possibly reduce your flood insurance rates.

If you have questions concerning the FLOOD ACTION PLAN or need additional copies of this material, please contact the city of [PROPCITY] planning office at _____. If you need further assistance on retrofitting, floodproofing, etc. contact either the [PROPCITY] planning office or the Corps' Floodplain Management Services office at _____.

Sincerely,

City Signature

Individual Action Plans

Address: 1709 Shamrock

Neighborhood: 07

Resident: Sherwood Crane

FORM 1

ACTIONS TO TAKE PRIOR TO THE NEXT FLOOD

The list below contains recommendations to help reduce the chance of damage to any of your property and belongings currently below the 100-year flood level. You should carefully examine the list and select those actions that apply to you. Prioritize the selected actions by considering 1) the value of the item(s) being protected, 2) the cost to implement the measure, and 3) the difficulty (or ease) of implementing the measure. Elevating or floodproofing should be done to a height that is at least 1-foot above the 100-year flood level (See the enclosed "property Levels and Flood Levels Chart).

100-yr flood level plus 1 foot is [41] inches above your dwelling's first floor.

Additional information on specific flood protection topics has been cross referenced with the FEMA information sheets in the enclosed supplemental material. These information sheets are identified with a banner called "Hazard Mitigation, Flood Damage Control, #000 subject title," and will be referenced below as (HM #000).

— Obtain or continue flood insurance coverage (HM #103)

— Set up a neighborhood notification network that will be activated as soon as any neighbor becomes aware of a potential flood. Establish a strategy for assisting each other in safeguarding your property and in evacuating during a flood.

— Prepare an emergency flood survival kit. Consider including; flood evacuation map, first aid book and kit, medication, drinking water, flashlight, lantern, candles, canned foods and drinks, foods that don't require cooking, portable camp stove with fuel, camera and film to record damages, tools, radio, rainwear, change of clothes, bedding or sleeping bags, and toiletries (HM #105).

— Establish a safe location outside the flood plain (outside your neighborhood) where you can park your extra vehicles, recreational vehicles, boats, etc.

— Obtain cinder blocks and/or saw horses with boards to be used for elevating furniture and appliances during a flood (HM #104).

— Purchase a watertight box for valuable papers (will, insurance policies, deeds, savings bonds, family records and letters, etc.), emergency phone numbers, and your household inventory with photographs and store it in a safe, dry, and accessible place.

— Obtain and have readily available sandbagging materials (bags, sand, and plastic). Become familiar with the sandbagging process (HM #102). For additional sand bagging information call 736-8210 in Centralia, 748-0238 in Chehalis, and 748-9121, ext. 151 in greater Lewis County.

— Permanently elevate TV, stereo, books, artwork, heirlooms, family albums and photos, etc.

— Modify items with motors, transformers, or other electronic devices to allow for quick disconnect and removal OR permanently elevate these items (heating system burners, power tools, compressors, computers, security systems, switches, stereos, instruments, etc. (HM #364, #365).

— When replacing carpeting do not use wall-to-wall installation. Purchase rugs and carpets that can be rolled up and removed to a high and dry location. Also purchase carpets made of materials that can hold up when wet.

— To prevent backflow from waste/drain lines obtain the correct size backflow plugs for installation in the lines or install backflow or check valves (HM #328).

— Move outdoor, lawn, and patio equipment to a higher storage location or secure them so the equipment will not float around or away. Floating Objects can damage other property.

— Anchor fuel tank(s) and other buoyant objects (HM #366).

— Raise intake and vent of secured or underground fuel tank(s).

— Install door and window shields and seal base of house (HM #333, #334, #335).

— Hire an electrician to permanently raise the fuse or circuit breaker box, and electrical outlets and switches (HM #309, #320, #362, #363).

— Consider waterproof construction materials for flood prone locations at your residence. Concrete wallboard and closed cell insulation are available. (HM #309, #326, #331, #332).

— Design and construct a new utility room and permanently relocate your appliances to it (HM #365).

— Hire a professional engineer to design a relief drainage system consisting of pump(s) and subsurface drains around the perimeter of your foundation. Install a relief drainage system (HM #330, #329).

— If your residence has a basement consider installing a sump pump (minimum of 1 1/2" diameter discharge) and emergency generator. Put on/off switch in a dry location and obtain floatable on/off switch (HM #327).

Address: 1709 Shamrock

Resident: Sherwood Crane

FORM 2

ACTIONS TO TAKE DURING A FLOOD

In the event of a flood, beginning with the warning and progressing to evacuation, you will need to act quickly and decisively. Flood warnings are not always accurate. Some may underestimate and others may overestimate the actual flood. Both the size and timing of the actual floods can vary from the forecast values. You should always prepare for the worst likely flood. Base your decisions on protecting life and health first, and property second.

Actions to take during a flood[1] are categorized into three stages: 1)Evaluation, 2) Preparation, and 3) Evacuation. You should follow these stages in the order given except when immediate evacuation is required.

I. EVALUATION. Take stock of what you need to do when a flood is eminent, and determine how much time you have to accomplish flood protection measures before you evacuate.

   A. As soon as you become aware of a declared flood warning you should briefly review the "Evaluation," "Preparation," and "Evacuation" stages outlined here in and the enclosed "Flood Warning and Evacuation Map," and the "Evacuation Route (low point) and Flood Levels" chart. Keep a copy of each with you.

   B. Activate/continue your neighborhood notification network.

   C. Stay informed of flooding conditions throughout the flood by:

      1. Tuning your battery powered radio to one of your local stations:

         KELA, 1470 AM KMNT, 103 FM KITI, 1420 AM

         Or to NOAA weather radio at 162.475 megahertz.

      2. Phoning (360) 357-MILD, National Weather Service recorded info-line.

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[1] Many of the actions listed here are also listed in the "Flood Information For the Chehalis and Centralia Area" brochure, pages 4-7 available through your county Planning Office. The information given here in this Form provides additional details specific to your property.

D. Call the following flood information phone lines if you have important flood related questions or if you want to provide important flood related information. These numbers tend to get swamped with calls during emergencies so please use them sparingly and with discretion.

1. Centralia flood Number: 736-8210
2. Chehalis flood number: 748-8101
3. Lewis County flood number 748-9121, ext 151
4. Use 911 ONLY during life threatening situations.

E. Prepare to evacuate if the flood warning level is forecast to rise to your house or to your evacuation low point. YOU MUST BE ENROUTE BEFORE THE RIVER REACHES 167.2 FEET ON THE CHEHALIS RIVER AT MELLON ST. GAGE. This corresponds to the river stage for the lowest point along your evacuation route, 167.2 feet, or the lowest adjacent ground by your house, 167.6 feet, whichever is lower.

F. The following formula is to help you roughly estimate the number of hours remaining before you must evacuate. It is only a rough estimate and will generally under estimate the number of hours you have. Fill in the first blank with the current elevation of the Chehalis River At Mellon St river gage and compute the time. Fill in the second blank with the answer.

(167.2 – current stage) X 2.5 = number of hours until evacuation

(167.2 – _____) X 2.5 = _____ hours until evacuation

Example: (167.2 – 164) x 2.5 = 8 hrs

If the time indicated is after sunset adjust it so that you evacuate a half hour or more BEFORE DARK. Driving at night during a flood can be extremely hazardous. As the flood progresses reevaluate your expected time of evacuation by monitoring the radio, etc., for the latest river stages.

G. Determine what you can accomplish in the "Preparation Stage" with the time remaining before you must evacuate.

II. PREPARATION. The following list of activities is to be done, if possible, before you evacuate. The actual order in which you do the activities is up to you. The order given suggests the priority we recommend.

A. Pack your get-away vehicle with your emergency flood survival kit, non-perishable food, drinking water, bedding, and changes of clothes. Secure any pets to go with you.

B. Move livestock and other pets to high ground out of the flood plain.

C. Roll up and store rugs and removable carpets in a safe dry location.

D. Elevate your furniture, appliances, and other valuables onto cinder blocks, saw horses and boards, or tables. Move all other valuables to a high and safe location.

E. Raise draperies and curtains so they won't hang into flood waters.

F. Elevate electrical devices and removable furnace burner if possible.

G. Relocate extra vehicles, recreational vehicles, trailers, etc. to safe high ground.

H. Anchor any buoyant objects that are not firmly anchored; indoors and out.

I. Turn off water, electric, and gas utilities.

J. Close drain and waste lines with backflow plugs or valves.

K. Close door and window shields and/or prepare sandbags and stack them in front of building openings to prevent flood waters from entering your house.

L. Move any food and other household goods on low selves to higher selves.

M. If possible document progression of the flood and your activities by taking photographs and by recording a brief log of events.

III. EVACUATION. At this stage your objective is to protect the lives and safety of yourself and those under your care! In all your decisions it is better to err on the safe side.

A. Reevaluate your flood condition again. Prepare to evacuate if the flood warning level is forecast to rise to your house or to your evacuation low point. YOU MUST BE ENROUTE BEFORE THE RIVER REACHES 167.2 FEET. This corresponds to the river stage for the lowest point along your evacuation route, 167.2 feet, or the lowest adjacent ground by your house, 167.6 feet, whichever is lower.

B. Be sure all those under your care are accounted for and are evacuating. Don't forget your pets but don't jeopardize your own safety if they can't be found.

C. Follow the enclosed evacuation route map to an emergency shelter or temporary housing.

D. We do not recommend that you drive or walk through flood waters, particularly if you cannot see the roadway through the water, or the water is flowing swiftly, or the area is widely flooded.

- Do not violate road signs and/or barricades.
- Most drownings during floods occur while the victims are in a car or truck.
- Abandon your car if it stalls.
- If you must drive through water, drive slowly. Driving too fast can cause waves that may increase damage to other property and can also force water up into the engine compartment and cause the vehicle to stall out.
- For highway information call State Patrol in Vancouver, WA, (360) 696-6162 or call 748-2181 in Chehalis.

E. Return home after the danger of flooding has past. Follow guidance on form 3, "Actions to take After the Next Flood."

Address: 1709 Shamrock

Resident: Sherwood Crane

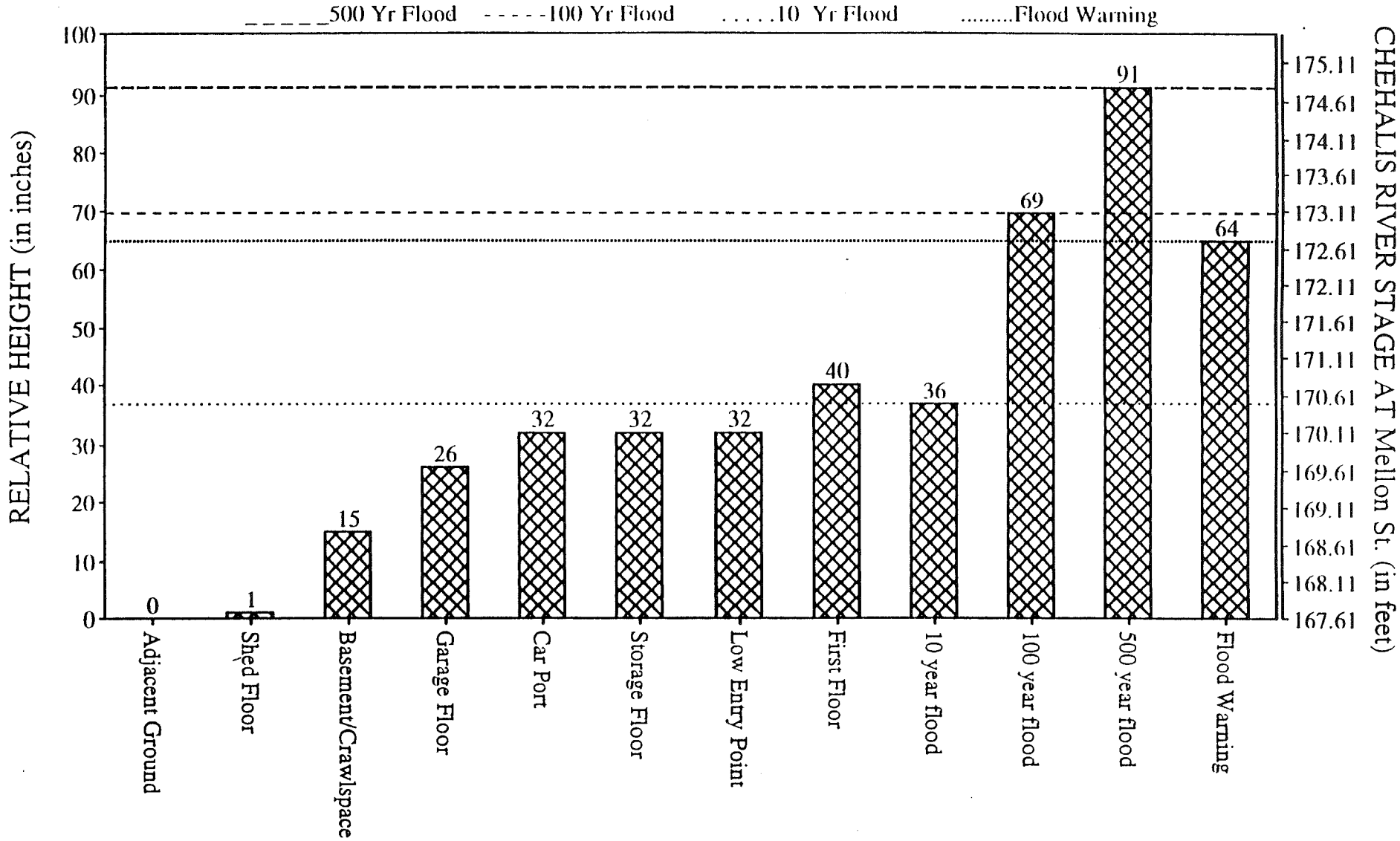
FORM 3
ACTIONS THAT SHOULD BE TAKEN AFTER THE FLOOD

1. Personal Safety
   - Inspect your house and other buildings for structural damage before entering them. Don't enter them if they appear unsafe.
   - Be cautious of possible gas leaks in and around your house. Do not strike a match or cause a flame or spark before inspecting your house for gas leaks. You should be able to detect it by it's distinctive odor (rotten egg smell).
   - Be cautious of potential electrical shorts, live wires, etc. Inspect your home for these potential electrical hazards before turning on the main power.
   - Do not consume food or water that has been in contact with flood waters. Assume all flood waters are contaminated.
   - Test tap water for potability. Wells and/or municipal water supplies could have been contaminated by the flood. Contact Lewis County Environmental Health Office at 748-9121, ext 277 for assistance. Filter and/or boil water as needed.

2. Clean-up
   - Do not pump a basement or crawl space before the surrounding water table drops (FHM # 202). Unequal pressure could cause Structural damage to the foundation.
   - Allow water to drain from walls by opening small holes near baseboards.
   - Remove any deteriorated wallboard or plaster, wash interior of wall, and replace wallboard with waterproof type.
   - Disinfect floors and walls to remove floodwater born bacteria.
   - Wash and dry thoroughly any flood soaked carpets or rugs (HM #201).
   - Hose out heating and cooling ductwork to remove mud and bacteria.
   - Check for backed-up drains.
   - Dry your house slowly but thoroughly.
   - Call the Health Dept. at 748-9121, ext. 277 for information if needed.

3. Evaluating Your Losses.
   - Document your flood losses and contact your insurance agent for flood loss claims.
   - Read form I, "Actions Before Floods Occur," of this packet to determine preventative measures that apply to you and consider incorporating damage prevention measures as part of your recovery effort.

PROPERTY LEVELS AND FLOOD LEVELS

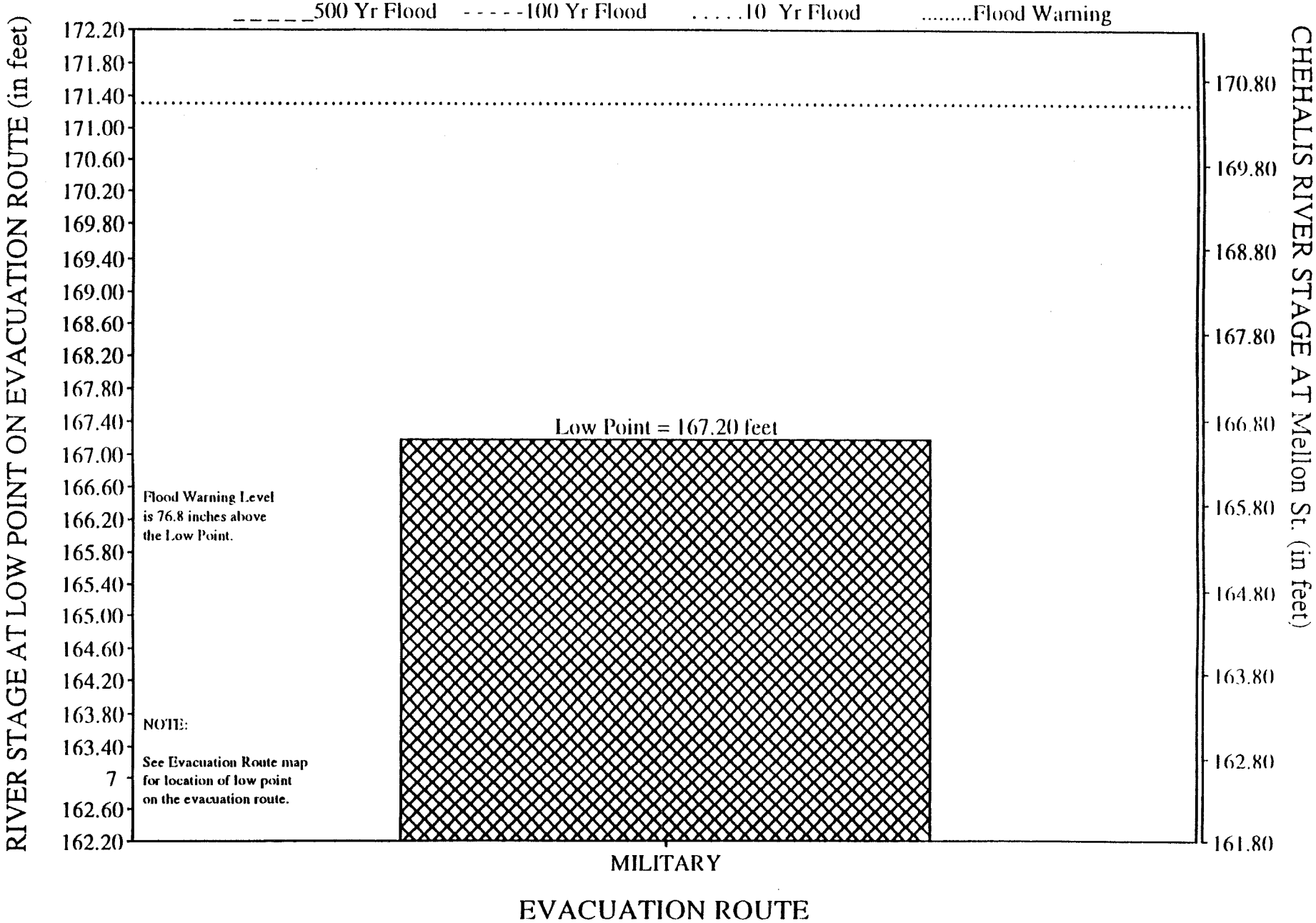


ELEVATION POINTS FOR PROPERTY AT: 1709 Shamrock

NOTES:

1. The zero on the left hand scale corresponds to the lowest value recorded from your property. The value at the end of each bar is the relative distance from the zero level.
2. To protect your possessions, they should be elevated 1 foot above the level of the 100 year flood which is 41 inches above the level of your first floor.
3. The flood forecast you hear over the radio can be plotted here by putting an X (use pencil) at the corresponding value on the right hand scale. Then sketch a line across the plot with a strait-edge horizontally through the X. The point of intersection with the left hand scale gives you the relative height at your property.

EVACUATION ROUTE AND FLOOD LEVELS



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*****************************************************************************
*  COE                        ---  11 MAY 1995  ---  NONSTRUCTURAL EVALUATION  *
*****************************************************************************
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EVALUATION CONTROLS

```
TOTAL STRUCTURE VALUE          -  125000. Dollars
TOTAL CONTENTS VALUE           -   30000. Dollars
PROJECTED STRUCTURE LIFE       -      50  Years

STRUCTURE SELECTED      DATA SOURCE    : WALLA WALLA DISTRICT, C of E
   CURVE NO.  1         STRUCTURE TYPE: 1S, NB, WF, WW
CONTENTS SELECTED       DATA SOURCE    : WALLA WALLA DISTRICT, C of E
   CURVE NO.  1         CONTENTS TYPE : 1S, NB

MAIN BUILDING FLOOR AREA       -    3000 Square Feet
GARAGE FLOOR AREA              -     200 Square Feet

VALUE RATIO PER SQUARE FOOT, GARAGE VERSUS MAIN BUILDING -35.0 Percent
PERCENT OF TOTAL CONTENTS IN GARAGE                      -35.0 Percent

GRADE ELEVATION                -  168.13 Feet
FIRST FLOOR ELEVATION          -  171.47 Feet
LENGTH FOR LEVEE AND/OR WALLS  -     200 Feet
AVERAGE ANNUAL INTEREST RATE   -    4.00 Percent
LEVEL OF PROTECTION            -     100 Years
COST ADJUSTMENT RATIO          -    1.00

COSTS FOR PROTECTING - COMPUTED WITH FREEBOARD AT 3 FEET
BENEFITS FOR PROTECTING - COMPUTED WITH 0.0 FEECROACHMENT INTO FREEBOARD
COSTS & BENEFITS FOR RAISING - EVALUATED WITH PCTION LEVEL SET AT GRADE
```

ELEVATION - FREQUENCY

ELEV	FREQ	ELEV	FREQ	ELEV	FREQ	ELEV	FREQ	ELEV	FREQ
171.19	10	172.51	25	173.31	50	173.92	100	174.74	200
175.74	500								

DESCRIPTIVE COMMENTS

SITE ADDRESS: 1709 Shamrock
Centralia, WA 985319020

OWNER: Sherwood Crane

SUMMARY	*** LEVEL OF PROTECTION ***		SUMMARY
	ELEVATION	FREQUENCY	
	173.92	100	

NONSTRUCTURAL MEASURES	COSTS	BENEFITS
Temporary Closures	54187.	107704.
Levees	30205.	107704.
Walls	118036.	107704.
Fill for Future Construction	31508.	118438.
Raising Existing Structure	86646.	118438.
Relocation	67300.	122081.

QUALIFIERS

Temporary closures will have some cleanup costs which have not been considered. It is assumed that the owner will be present before flooding to install closures. Although it may be computed, temporary closures are not applicable for more than 3 feet above the first floor. Modification of the structure will be required for anything above this level.

Even though computed, not all nonstructural measures may be appropriate. Example: Levees will not apply for most urban conditions due to limited space.

All input data is subject to revision pending better quality.

Internal Depth-Frequency interpolations are made using logarithmic-linear relationships.

Relocation benefits are computed assuming total protection.

In assessing damages (benefits) anything over 14 feet above the first floor is not considered in the analysis.

Site specific design and cost computations must be made for each structure. The data provided in this analysis must be considered only an estimate providing approximate cost comparisons.

SPECIFIC QUALIFIERS

ELEVATION=FREQUENCY DATA APPROXIMATED FROM A 1974 BACKWATER ANALYSIS AND THE CURRENT SACRAMENTO FIS

Sample

Flood Audit Program Output
Community Packet

1. Neighborhood Flood Warning Information Graph (With Flood Warning Line)

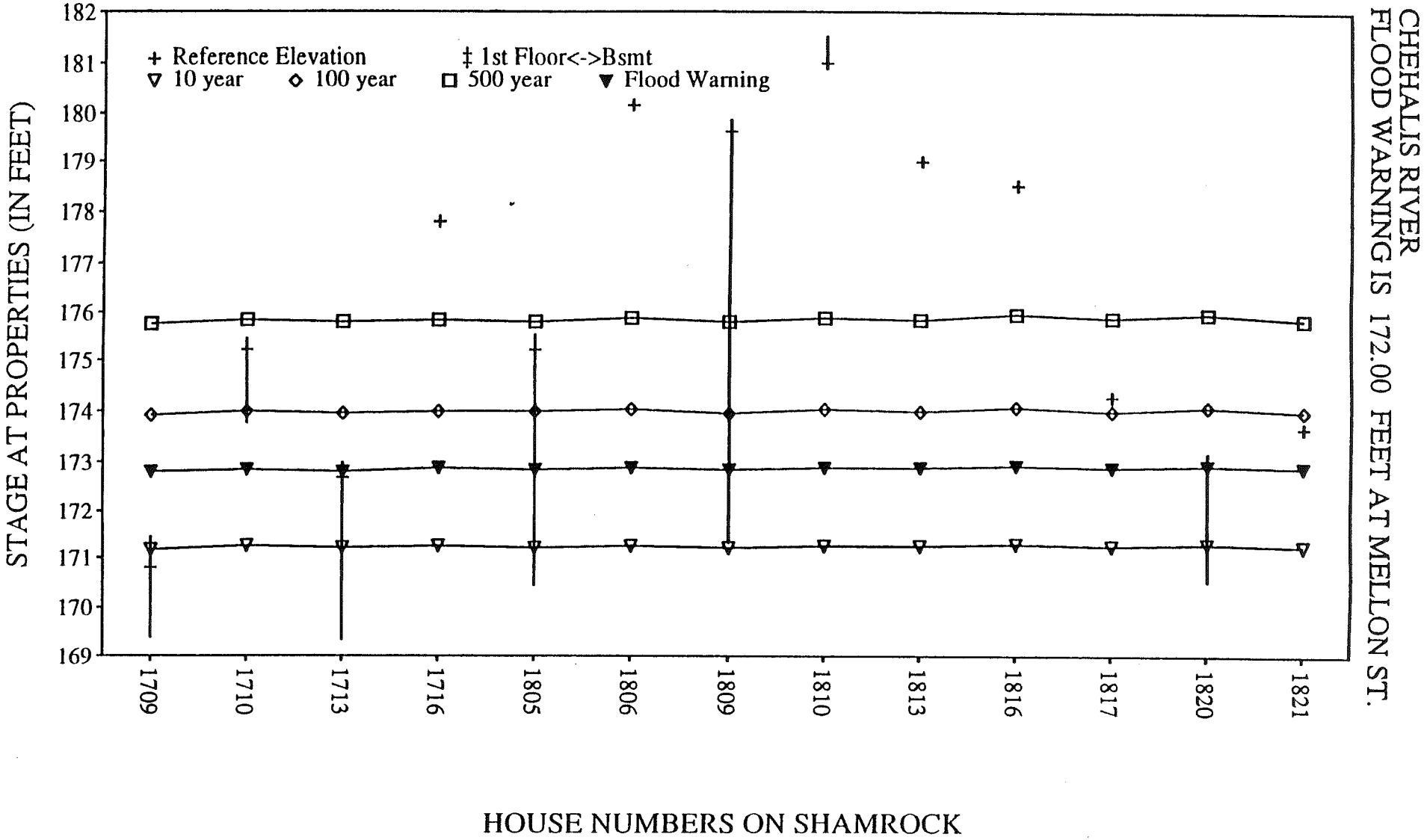
2. Call-Down List for properties below flood warning line on Neighborhood Graph

3. Floodproofing/Nonstructural Evaluation Graphs, 5 charts available (1 enclosed)

4. Flood Warning and Evacuation Map, 1 sheet (Not enclosed)

5. Flood Damage Reduction Audit program and their Manual, (Not enclosed)
   a. All individual property packet information is contained in the flood audit data base.
   b. The evacuation map is a separate product at this time.

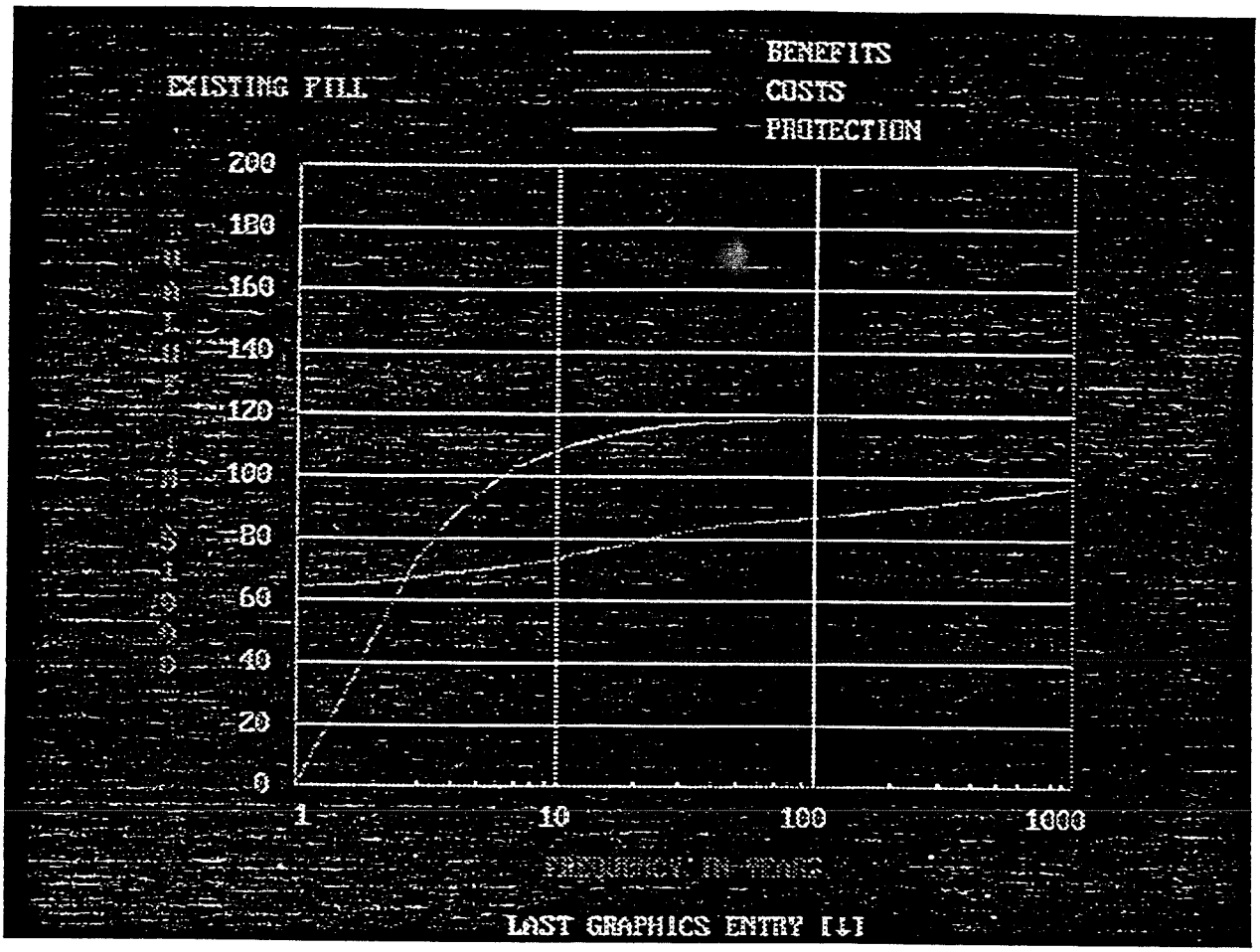
NEIGHBORHOOD: 07 FLOOD WARNING INFORMATION

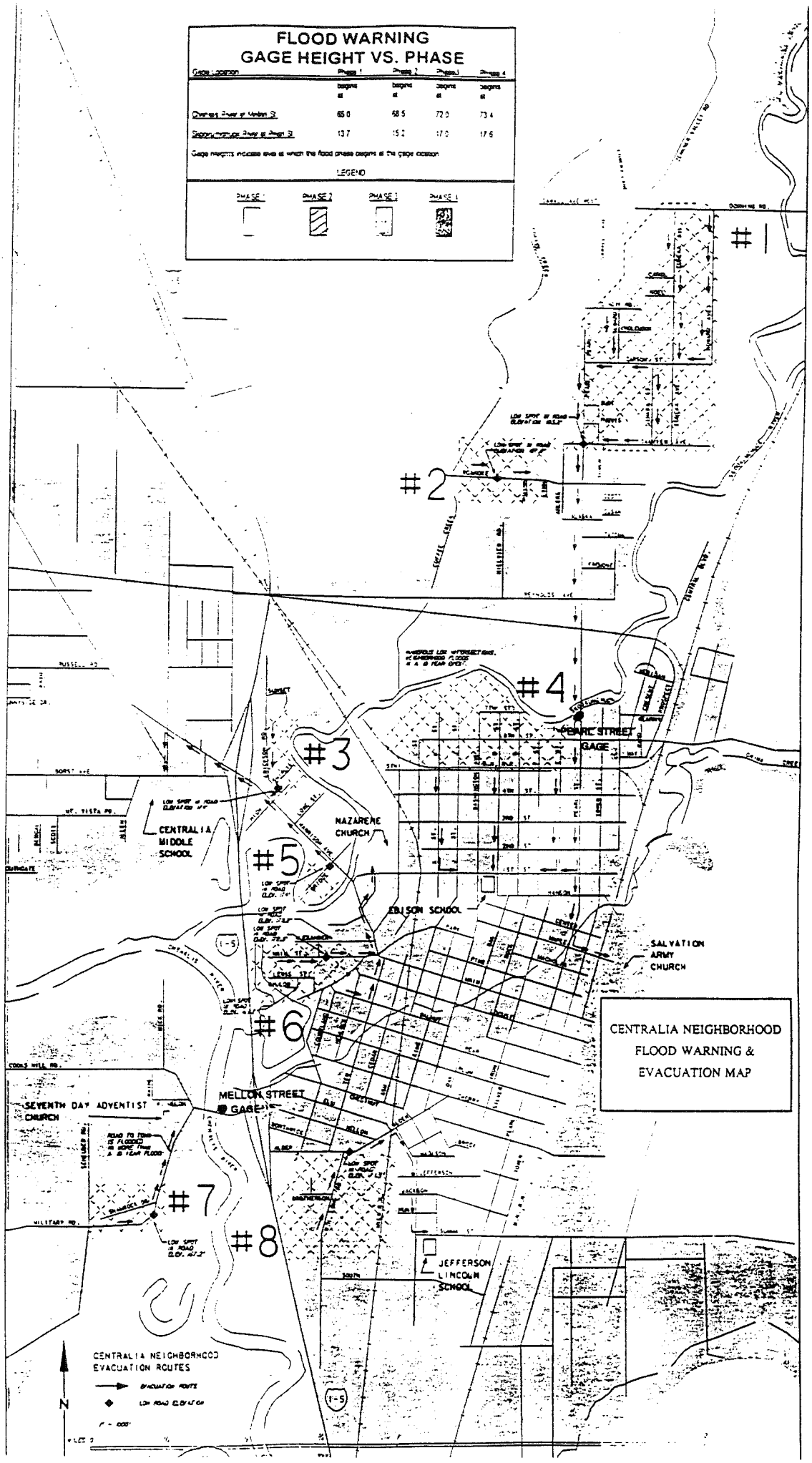


0 /16/95 HOUSES BELOW FLOOD WARNING LEVEL 14:29:07

(172.00 feet at Mellon St. gauge)

C lled	Name/Address	Phone
	Sherwood Crane 1709 Shamrock Centralia WA	(360) 736-1736
	James Volk 1713 Shamrock Centralia WA	(360) 736-9550
	Donald Ringel 1805 Shamrock Centralia WA	(360) 736-5202
	James E. Shore 1809 Shamrock Centralia WA	(360) 736-4944
	Eileen Huddleston 1820 Shamrock Centralia WA	(360) 736-6503


EXISTING FILL
BENEFITS
COSTS
PROTECTION
200
180
160
140
120
100
80
60
40
20
0
1
10
100
1000
LAST GRAPHICS ENTRY [↓]


FLOOD WARNING
GAGE HEIGHT VS. PHASE
Gage Location
Phase 1 begins at
Phase 2 begins at
Phase 3 begins at
Phase 4 begins at
Chehalis River at Walton St
65.0
68.5
72.0
73.4
Skookumchuck River at Pearl St
13.7
15.2
17.0
17.6
Gage heights indicate level at which the flood phase begins at the gage location.
LEGEND
PHASE 1
PHASE 2
PHASE 3
PHASE 4
#1
#2
#3
#4
#5
#6
#7
#8
PEARL STREET GAGE
MELLON STREET GAGE
CENTRALIA MIDDLE SCHOOL
NAZARENE CHURCH
EDISON SCHOOL
SALVATION ARMY CHURCH
SEVENTH DAY ADVENTIST CHURCH
JEFFERSON LINCOLN SCHOOL
CENTRALIA NEIGHBORHOOD FLOOD WARNING & EVACUATION MAP
CENTRALIA NEIGHBORHOOD EVACUATION ROUTES
EVACUATION ROUTE
LOW ROAD ELEVATION
N

APPENDIX II.
FLOOD NOTIFICATION SYSTEM

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

WATER RELEASE NOTIFICATION PLAN

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SEATTLE, WA 98101

383-2471 — *24 hour business number*
383-5271 — *alternate unlisted number*

WATER RELEASE NOTIFICATION PLAN

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INTRODUCTION

This manual establishes procedures for the Tacoma Light Division's routine and orderly notification of essential agencies or persons when unusual weather or other conditions require release of water from the utility's hydroelectric dams which could result in greater than normal river flows downstream.

NOTE: In the event of, or the imminence of, structural failure of any portion of a dam or powerhouse equipment that has or could result in the uncontrolled release of water, refer to the project's Emergency Action Plan for procedures to follow.

The Tacoma Light Division owns and operates six hydroelectric dams:

- Alder and LaGrande Dams on the Nisqually River on the Thurston-Pierce County line

- Mayfield and Mossyrock Dams on the Cowlitz River in Lewis County

- Cushman Dam No. 1 and Cushman Dam No. 2 on the North Fork Skokomish River in Mason County

These dams collectively generate approximately 2.8 billion kilowatt-hours of electricity annually, facilitate flood control to the extent possible, and provide a variety of recreational opportunities.

FLOOD CONTROL

The Tacoma Light Division uses up-to-date weather data and snowpack information in determining the regulation of the reservoirs behind its hydroelectric dams and the discharge of the water past those projects. During unusual weather conditions, the Tacoma Light Division works very closely with the U.S. Geological Survey, the U.S. Army Corps of Engineers, the River Forecast Center and the National Weather Service in assessing potential river conditions which could cause possible downstream flooding.

The Tacoma Light Division endeavors to maximize the flood control capabilities of each of its dams to minimize damage caused by heavy river flows. In addition to reducing a flood crest, or preventing a flood from occurring, the dams also prevent the trash and debris associated with flood waters from passing downstream and otherwise adding to the high water damage.

While the Tacoma Light Division exercises regulation of those streams flowing into the reservoirs behind its dams at the hydroelectric project sites, it cannot exercise any control over streams emptying into the river systems downstream from these projects.

WATER RELEASE NOTIFICATION PLAN

General

Existing and forecast weather information and snowpack data are considered in the responsible operation of the Tacoma Light Division's hydroelectric projects. When unusual weather conditions persist, and it becomes apparent that greater than normal amounts of water must be released at the hydroelectric projects to ensure safety and prevent overtopping of the dam, the following notification procedures will be conducted:

1. The Tacoma Light Division will notify:

   A. County Emergency Management Offices or the designated alternate listed by county in this manual.

   B. Indian Tribes and other agencies as identified in this document.

   C. Washington State Emergency Management.

   D. Tacoma Public Utilities Community Media Services.

2. After receiving notification of increased flows from Tacoma, the Emergency Management Director or designated alternate will:

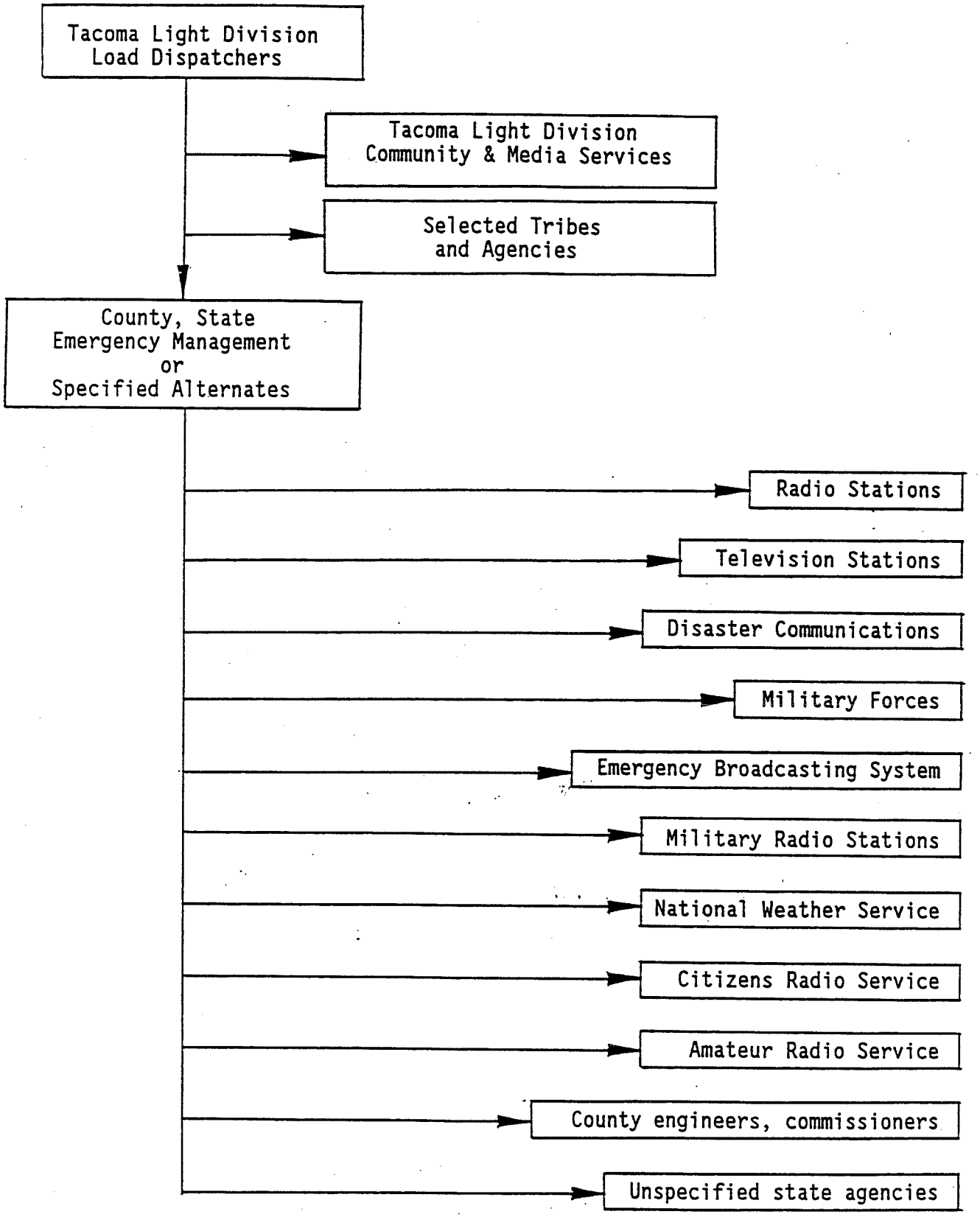
   A. Assume all responsibility for alerting people in the downstream flood plain within the county of jurisdiction of potential flooding.

   B. Be responsible for issuing such additional advisories as necessary and appropriate during the entire high water period.

   C. Be responsible for relaying pertinent information to all interested persons in the county such as county engineers, county commissioners or any state agencies not specified in this manual.

The chart on the following page is a schematic of the notification procedures.

WATER RELEASE NOTIFICATION PROCEDURES



The Tacoma Light Division Power Management section will supply available plant discharge information upon request and will be responsible for the verification, revision, and issuance of this document. Revisions will be made as needed.

ADDITIONAL INFORMATION SOURCES

U.S. DEPARTMENT OF COMMERCE

National Weather Service
7600 Sandpoint Way NE
Seattle, Washington 98115
(206) 526-6086

U.S. DEPARTMENT OF INTERIOR

U.S..Geological Survey
Water Resource Division
1305 Tacoma Avenue South
Tacoma, Washington 98407
(206) 593-6510

U.S. DEPARTMENT OF THE ARMY

U.S. Army Corps of Engineers
4735 East Marginal Way South
Seattle, Washington 98134
(206) 764-3406

River Forecast Center
121 Custom House
Portland, Oregon 97209
(503) 326-2914

Reservoir Control Center
121 Custom House
Portland, Oregon 97209
(206) 326-3741

Mason County

CUSHMAN DAMS NO. 1 & 2

Skokomish River (North Fork)

WHEN TO INITIATE NOTIFICATION:

To allow sufficient time for emergency notification of people located downstream from the Tacoma Light Division's (Light Division) Cushman Dams No. 1 and No. 2 on the North Fork of the Skokomish River, Tacoma Light Division will telephone the agencies listed below in the following instances:

- INITIAL NOTIFICATION: when the possibility of spill at Cushman No. 2 exists.

- SECOND NOTIFICATION: when discharge or conditions reach the limit agreed upon by the Light Division and the Mason County Sheriff or the Mason County Emergency Management official at the time of the first notification.*

- THIRD NOTIFICATION: when total discharge reaches 12,000 cfs.

- SUBSEQUENT NOTIFICATION: when total discharge reaches amount agreed upon by Light Division and agencies at third notification.*

- when the river recedes.

NOTE 1: Light Division Load Dispatcher Office: 383-5271.

NOTE 2: Since Cushman Dam No. 2 is downstream from Cushman Dam No. 1, Cushman Dam No. 2 data is used.

*This does not mean the agencies will assume a regulatory role in determining the rate of discharge. The Light Division will make these determinations as conditions dictate.

WHOM TO NOTIFY

1) **Mason County Sheriff (Shelton Dispatch), Duty Officer: 1-800-562-0911 or 1-360-426-4441**

2) **Skokomish Indian Tribe**

During normal business hours:
Tribal Manager: 1-~~306~~ 360-426-4232 (Denese LaClair)
Natural Resource Director: 1-360-426-4232 or 1-360-490-2000 (Jim Park)
If not available, contact Ken Filak, Fisheries Biologist: 1-360-877-5213.

Outside normal business hours:
Tribal Manager: 1-360-877-5090 (Denese LaClair)

3) **Washington State Emergency Management Duty Officer: 1-800-258-5990 or 923-4938**

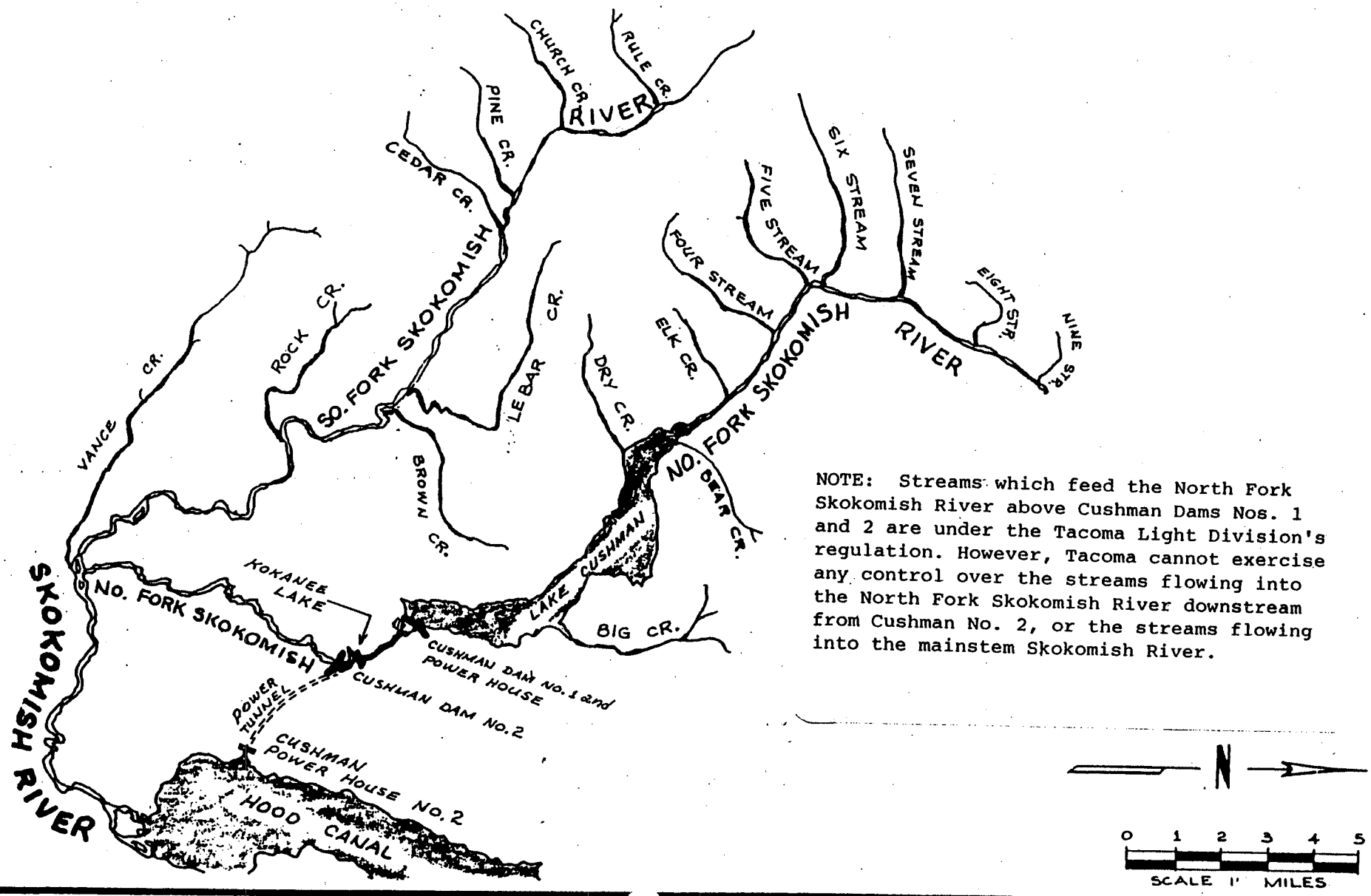
4) **Tacoma Public Utilities Community Media Services**
Notify when spill is initiated and terminated only, during normal business hours.
Sue Veseth, Community Relations Officer: (206) 502-8223
1st Alternate: Korte Brueckmann, Community Relations Specialist, (206) 502-8754
2nd Alternate: June Summerville, CMS Manager, (206) 502-8222

HYDROELECTRIC PROJECT STATISTICS

	CUSH NO 1	CUSH NO 2
Year Completed (First Power Generation)	1926	1930
River System	North Fork Skokomish	North Fork Skokomish
Type of Dam	Concrete Arch	Concrete Arch
Height: Above Riverbed (feet) Above Bedrock	235 275	175 235
Width of Spillway	80	120
Lake Level Control	2 Radial Gates	3 Drum Gates (Floating Type)
Drainage Area (Square Miles)	94	100
Reservoir Name	Lake Cushman	Kokanee Lake
Reservoir Length (Miles)	9.6	2
Reservoir Area at Maximum Elevation (Acres)	4,010	150
Reservoir Elevation: (Feet Above Sea Level) Full Lowest Allowable	 738 615	 480 460
Average Annual Generation (kilowatt-hours)	127,000,000	233,000,000
Number of Generators & Nameplate Capacity of Each (kilowatts)	Two - 21,600	Three - 27,000

Revised 11/93

SKOKOMISH RIVER DRAINAGE MAP



NOTE: Streams which feed the North Fork Skokomish River above Cushman Dams Nos. 1 and 2 are under the Tacoma Light Division's regulation. However, Tacoma cannot exercise any control over the streams flowing into the North Fork Skokomish River downstream from Cushman No. 2, or the streams flowing into the mainstem Skokomish River.

WATER RELEASE NOTIFICATION PLAN
Distribution List

Number of Copies	
3	Mr. William Lokey, Manager Pierce County Emergency Management County-City Building, Room B-36 930 Tacoma Avenue South Tacoma, Washington 98402-2102
3	Mr. Mike Karl, Manager Emergency Management Coordinator Thurston County Emergency Management 9605 Tilley Road SW Olympia, Washington 98512-9140
3	Ms. Jeanne Massingham, Director Lewis County Emergency Management 350 North Market Blvd. Chehalis, Washington 98532-2626
4	Mr. Richard L. Bullock, Director Cowlitz County Emergency Services Hall of Justice 312 South First, West Kelso, Washington 98626
3	Mr. Joe Murray, Director Mason County Emergency Management P.O. Box 1476 Shelton, Washington 98584
2	Mr. Ed Small, Director Department of Community Development Emergency Management Division P.O. Box 48346 Olympia, Washington 98504-8346
3	Mr. Larry Sanchez Nisqually Indian Tribe 4820 She-Nah-Nam Drive S.E. Olympia, Washington 98503

WATER RELEASE NOTIFICATION PLAN
Distribution List

Number of Copies	
3	Ms. Denese LaClair Skokomish Indian Tribe Route 5, Box 432 Shelton, Washington 98584
1	Mr. Walter S. Boyle P.E., Chief-Project Supervision Federal Energy Regulatory Commission 1120 SW Fifth Street, Suite 1340 Portland, Oregon 97204
1	George Whitener, Power Manager
1	Pat Tolar, Assistant Power Manager
1	Todd Lloyd, Project Engineer
1	Dispatch, No. 1 Desk
	Hydro Project Managers
3	Cowlitz Project, Verne Hunter
2	Cushman Project, Dennis Koehn
2	Nisqually Project, Bill Jones
2	Sue Veseth, Community Relations Officer Community Media Services

APPENDIX JJ.
TACOMA LIGHT DIVISION NOTIFICATION PLANS FOR CUSHMAN DAMS NO. 1 AND NO. 2

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

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SEATTLE, WA 98101

EMERGENCY ACTION PLAN

CUSHMAN PROJECT

PROJECT NO. OHL-PRO-460-WA

City of Tacoma
Department of Public Utilities
3628 South 35th Street
P.O. Box 11007
Tacoma, Washington 98411

Revised 3/95

Verification:

State of Washington)
) ss
County of Pierce)

The undersigned, being first duly sworn, states that he has read the following document and knows the contents of it, and that all of the statements contained in that document are true and correct, to the best of his knowledge and belief.

George Whitener

George Whitener

Power Manager

Title

Sworn to and subscribed before me this 13th day of December 1993.

Veronica J. Rollins

(Signature of Notary Public)

VERONICA J. ROLLINS
COMMISSION EXPIRES
NOTARY
PUBLIC
5-6-96
STATE OF WASHINGTON

EMERGENCY ACTION PLAN
CUSHMAN PROJECT

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CHAPTER I
NOTIFICATION FLOWCHARTS

FAILURE IMMINENT OR HAS OCCURRED
CUSHMAN HYDRO PROJECT
FERC Project No. 460

Tacoma Power Dispatcher
Ext. 8401 or (206) 383-3241 or (206) 383-5271

1. Cushman Project Manager, Dennis Koehn
   Ext. 8141
   Home: 1-360-877-9902
   Alternate: Dave Stier
   Ext. 8453
   Home: 1-360-877-5953
2. Shelton Police Communications
   1-360-426-4441
   VHF Radio Secondarily, 158.25 MHz
3. Washington State Emergency Management
   Duty Officer: 1-800-258-5990 or 1-360-923-4938
4. National Weather Service
   Lead Forecaster: 1-206-526-6083 or 1-206-526-6168
5. Assistant Power Manager, Pat Tolar
   Ext. 8342
   Home: 1-360-871-3754
   Alternate: Todd Lloyd
   Ext. 8220
   Home: (206) 874-4309
   1. Power Manager, George Whitener
      Ext. 8294
      Home: (206) 265-6468
   2. Light Division Superintendent, Steve Klein
      Ext. 8203
      Home: (206) 564-4621
   3. Federal Energy Regulatory Commision
      Chief, Project Supervision: Walter S. Boyle
      Office: 1-503-326-5842
      Home: 1-503-223-3479
      Alternate:
      Arthur Martin
      Office: 1-503-326-5840
      Home: 1-503-635-1472
   4. Community Media Service, Sue Veseth
      Ext. 8223
      Home: (206) 752-5828
      Alternate: Korte Brueckmann
      Ext. 8754
      Home: (206) 759-7844
   5. Light Engineering
      Steve Fischer
      Ext. 8316
      Home: (206) 857-3179
      Alternate:
      Kim Moore
      Ext. 8261
      Home: (206) 857-2290

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FAILURE IMMINENT OR HAS OCCURRED
CUSHMAN HYDRO PROJECT
FERC Project No. 460

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   Home: 1-360-877-5953

2. **Shelton Police Communications**
   1-360-426-4441
   VHF Radio Secondarily, 158.25 MHz

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POTENTIALLY HAZARDOUS SITUATION DEVELOPING
CUSHMAN HYDRO PROJECT
FERC Project No. 460

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      Home: 1-503-635-1472

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      Alternate:
      Kim Moore
      Ext. 8261
      Home: (206) 857-2290

POTENTIALLY HAZARDOUS SITUATION DEVELOPING
CUSHMAN HYDRO PROJECT
FERC Project No. 460

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CHAPTER II
GENERAL RESPONSIBILITIES UNDER THE EMERGENCY ACTION PLAN

CHAPTER II
GENERAL RESPONSIBILITIES UNDER THE EMERGENCY ACTION PLAN

Purpose of Emergency Action Plan

The Emergency Action Plan (EAP) is intended to minimize the threat to public safety and to minimize response time to an impending or actual sudden release of water caused by an accident to, or failure of, a dam.

General Procedures

The Tacoma Power Dispatchers will initiate the EAP. Their responsibility is to notify the parties listed in Chapter III - NOTIFICATION PROCEDURES. It will be the responsibility of Mason County Emergency Management to initiate evacuation and contingency plans. The Cushman Project Manager will be responsible for operating any spillgates or other equipment as necessary, and for apprising the Tacoma Power Dispatcher of developments at the Project. The Assistant Power Manager shall be responsible for informing the Federal Energy Regulatory Commission, the Tacoma Public Utilities Community Media Services, and Light Engineering of the situation.

The sequence of notification is shown in the NOTIFICATION FLOWCHARTS (Chapter I), for both types of dam failures, for both Cushman No. 1 and Cushman No. 2 dams. The Tacoma Dispatcher is to contact each agency via the listed method, notifying them that there is a dam failure emergency, and stating which of the two following types of failure it is:

A. Failure is imminent or has occurred.
B. Potentially hazardous situation is developing.

Typical communications would be as follows:

> "This is the Tacoma Power Dispatcher calling _____. We have a potentially hazardous situation developing at Cushman No. 1 Dam."

> "This is the Tacoma Power Dispatcher calling _____. We have had a dam failure at Cushman No. 2 Dam."

The Tacoma Power Dispatcher is to receive confirmation that the message has been received and understood by all parties. It will be the responsibility of the Tacoma Power Dispatcher to keep all agencies advised of conditions at the dam.

EAP Non-Emergency Coordinator

The City of Tacoma EAP Non-Emergency Coordinator will be responsible for preparing revisions to the EAP, establishing training seminars, coordinating tests, and arranging meetings of involved agencies. The coordinator is the Tacoma EAP contact for answering questions and making corrections to an EAP, thereby ensuring that an up-to-date EAP is possessed at all times by all parties.

The City of Tacoma EAP Non-Emergency Coordinator is Todd Lloyd, phone number (206) 502-8220.

In a dam failure emergency, contact the Tacoma Power Dispatcher, phone number (206) 383-3241; this number is to be used only in emergencies and must be kept open otherwise.

CHAPTER III
NOTIFICATION PROCEDURES

CHAPTER III
NOTIFICATION PROCEDURES

CUSHMAN NO.1
DAM FAILURE IMMINENT OR HAS OCCURRED

Power Operations Personnel (in Tacoma):

1. Tacoma Power Dispatcher: Upon receiving a dam failure emergency alarm, the Tacoma Power Dispatcher (emergency telephone number (206) 383-3241) shall confirm the dam failure with loss of SCADA data or other alarm conditions from the powerhouse.

2. The Tacoma Load Dispatcher shall notify the following services and personnel, stating name, nature and extent of the emergency:

   A. Cushman Project Manager, Dennis Koehn:
      Ext. 8141
      Home: 1-360-877-9902

      Alternate: Dave Stier:
      Ext. 8453
      Home: 1-360-877-5953

   B. Shelton Police Communications:
      Telephone number: 1-360-426-4441
      OR VHF Radio, 158.25 MHz.

   C. Washington State Emergency Management:
      Duty Officer: 1-800-258-5990 or 1-360-923-4938

   D. National Weather Service:
      Lead Forecaster: 1-206- 526-6083 or: 1-206-526-6168

   E. Assistant Power Manager, Pat Tolar:
      Ext. 8342
      Home: 1-360-871-3754

      Alternate: Todd Lloyd
      Ext. 8220
      Home: (206) 874-4309

3. The Assistant Power Manager shall notify the following individuals:

A. Power Manager, George Whitener:
Ext. 8294
Home: (206) 265-6468

B. Light Division Superintendent, Steve Klein:
Ext. 8203
Home: (206) 564-4621

C. Federal Energy Regulatory Commission:
Chief, Project Supervision, Walter S. Boyle:
Office: 1-503-326-5842
Home: 1-503-223-3479

Alternate: Regional Director, Arthur Martin:
Office: 1-503-326-5840
Home: 1-503-635-1472

D. Community Media Services, Sue Veseth:
Ext. 8223
Home: (206) 752-5828

Alternate: Korte Brueckmann:
Ext. 8754
Home: (206) 759-7844

E. Light Engineering, Steve Fischer:
Ext. 8316
Home: (206) 857-3179

CUSHMAN NO. 2
DAM FAILURE IMMINENT OR HAS OCCURRED

Power Operations Personnel (in Tacoma):

1. Tacoma Power Dispatcher: Upon receiving a dam failure emergency alarm, the Tacoma Power Dispatcher (emergency telephone number (206) 383-3241) shall confirm the dam failure with loss of SCADA data or other alarm conditions from the powerhouse.

2. The Tacoma Load Dispatcher shall notify the following services and personnel, stating name, nature and extent of the emergency:

   A. Cushman Project Manager, Dennis Koehn:
      Ext. 8141
      Home: 1-360-877-9902

      Alternate: Dave Stier:
      Ext. 8453
      Home: 1-360-877-5953

   B. Shelton Police Communications:
      Telephone number: 1-360-426-4441
      OR VHF Radio, 158.25 MHz.

   C. Washington State Emergency Management:
      Duty Officer: 1-800-258-5990 or 1-360-923-4938

   D. National Weather Service:
      Lead Forecaster: 1-206- 526-6083 or 1-206-526-6168

   E. Assistant Power Manager, Pat Tolar:
      Ext. 8342
      Home: 1-360-871-3754

      Alternate: Todd Lloyd
      Ext. 8220
      Home: (206) 874-4309

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Ext. 8294
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Ext. 8203
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Chief, Project Supervision, Walter S. Boyle:
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D. Community Media Services, Sue Veseth:
Ext. 8223
Home: (206) 752-5828

Alternate: Korte Brueckmann:
Ext. 8754
Home: (206) 759-7844

E. Light Engineering, Steve Fischer:
Ext. 8316
Home: (206) 857-3179

CUSHMAN NO. 1 DAM
POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING

Power Operations Personnel (in Tacoma):

1. Tacoma Power Dispatcher: Upon receiving a hazardous dam condition alarm, the Tacoma Power Dispatcher (emergency telephone number (206) 383-3241) shall verify the following:

   * Verify which elevation, Headwater (HW) or Tailwater (TW), is changing excessively.

   * Check HW and TW elevations against maximum detection range.

2. The Tacoma Load Dispatcher shall notify the following services and personnel, stating name, nature and extent of the emergency:

   A. Cushman Project Manager, Dennis Koehn:
      Ext. 8141
      Home: 1-360-877-9902

      Alternate: Dave Stier:
      Ext. 8453
      Home: 1-360-877-5953

   B. Shelton Police Communications:
      Telephone number: 1-360-426-4441
      OR VHF Radio, 158.25 MHz.

   C. National Weather Service:
      Lead Forecaster: 1-206- 526-6083 or 1-206-526-6168

   D. Assistant Power Manager, Pat Tolar:
      Ext. 8342
      Home: 1-360-871-3754

      Alternate: Todd Lloyd
      Ext. 8220
      Home: (206) 874-4309

3. The Assistant Power Manager shall notify the following individuals:

A. Power Manager, George Whitener:
   Ext. 8294
   Home: (206) 265-6468

B. Light Division Superintendent, Steve Klein:
   Ext. 8203
   Home: (206) 564-4621

C. Federal Energy Regulatory Commission:
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   Office: 1-503-326-5842
   Home: 1-503-223-3479

   Alternate: Regional Director, Arthur Martin:
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   Home: 1-503-635-1472

D. Community Media Services, Sue Veseth:
   Ext. 8223
   Home: (206) 752-5828

   Alternate: Korte Brueckmann:
   Ext. 8754
   Home: (206) 759-7844

E. Light Engineering, Steve Fischer:
   Ext. 8316
   Home: (206) 857-3179

CUSHMAN NO. 2 DAM
POTENTIALLY HAZARDOUS SITUATION IS DEVELOPING

Power Operations Personnel (in Tacoma):

1. Tacoma Power Dispatcher: Upon receiving a hazardous dam condition alarm, the Tacoma Power Dispatcher (emergency telephone number (206) 383-3241) shall verify the following:

   * Verify which elevation, Headwater (HW) or Tailwater (TW), is changing excessively.

   * Check HW and TW elevations. If HW elevations reads 480 feet or TW 9 feet, water levels are at maximum detection range.

2. The Tacoma Load Dispatcher shall notify the following services and personnel, stating name, nature and extent of the emergency:

   A. Cushman Project Manager, Dennis Koehn:
      Ext. 8141
      Home: 1-360-877-9902

      Alternate: Dave Stier:
      Ext. 8453
      Home: 1-360-877-5953

   B. Shelton Police Communications:
      Telephone number: 1-360-426-4441
      OR VHF Radio, 158.25 MHz.

   C. National Weather Service:
      Lead Forecaster: 1-206- 526-6083 or 1-206-526-6168

   D. Assistant Power Manager, Pat Tolar:
      Ext. 8342
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E. Light Engineering, Steve Fischer:
Ext. 8316
Home: 857-3179

PREVENTIVE ACTIONS

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General Provisions for Surveillance

Cushman No. 1 powerhouse and Cushman No. 2 powerhouse are remotely controlled from the Energy Control Center in Tacoma. Remote sensing and telemetry equipment allow the Tacoma Power Dispatcher to monitor and regulate generation. Maintenance personnel are at the sites during the normal week-day work schedule. The Cushman Project Manager lives in the immediate vicinity and oversees daily visual inspections. He or a designee is available 24 hours per day, if needed.

Project Surveillance - Remote

The Cushman No. 1 Dam and Cushman No. 2 Dam failure sensing systems each consist of a programmable logic controller (PLC) which monitors headwater (HW) elevation and tailwater (TW) elevation. The PLCs, located in each powerhouse, continually monitor the headwater and tailwater sensors. Twenty second rolling averages updated every second are performed on the HW and TW levels. Rate of change of the HW and TW levels is calculated over a five minute period, updated every minute. When an emergency condition is detected, one of three alarms (Dam Monitoring System Failure, Hazardous Dam Condition, Dam Failure Emergency) is sent to the Energy Control Center.

A radio communications path from the powerhouse to the switchyard is normally used, however, should the radio communications link fail, the monitoring system failure alarm will be transmitted through the hardwire communications path to the switchyard. From the switchyard, all alarm conditions are transmitted by microwave to the Energy Control Center by SCADA.

The system will take at least one minute and at most take five minutes to detect an alarm condition. Each minute, the change in water levels in the previous five-minute interval is compared with a preset threshold for the tailwater and the headwater.

The following alarms (which are audible and also are displayed on the Power Dispatcher's work station) will be sent to the ECC via SCADA:

1. Dam Monitoring System Failure Alarm - A component of the dam monitoring system has failed. Possible causes are:

   * Sensor failure

   * PLC failure

   * Communications link failure

2. Hazardous Dam Condition Alarm - A potentially hazardous situation is developing. Possible causes are:

   * HW level has reached the upper level of sensing range

* TW level is below minimum level of sensing range

* Hillslide

* Crack developing

* Defective HW or TW sensor

3. Dam Failure Emergency Alarm - Dam failure is imminent or has already occurred. Discharge from reservoir into tailrace is greater than discharge when spillgates are open. Possible causes are:

   * A breach in the dam

   * Defective HW or TW sensors

The cause of the alarm condition can be pinpointed by the dispatcher by monitoring HW and TW changes and other related data as indicated on the SCADA terminal.

CUSHMAN NO. 1 EMERGENCY SITUATION DETECTION ALGORITHM

1. A HAZARDOUS DAM CONDITION ALARM will be sent to the Energy Control Center (ECC) if one of the following occur:

   A. Headwater Elevation falls 0.5 feet in five minutes

   B. Tailwater Elevation raises 3.75 feet in five minutes

   C. Headwater Elevation is above 738.0 feet (upper level of sensing range)

   D. Tailwater Elevation is above 483.0 feet (upper level of sensing range)

2. A DAM FAILURE EMERGENCY CONDITION ALARM will be sent to the ECC if both of the following occur:

   Headwater Elevation falls 0.5 feet is 5 minutes

   AND Tailwater Elevation raises 3.75 feet in 5 minutes

   AND Tailwater Elevation is above 482.0 feet

3. A DAM MONITORING SYSTEM FAILURE ALARM will be sent to the ECC if any one of the following occur:

   A. Any component of the system fails (processor, headwater or tailwater sensor)

   B. Headwater Elevation is 738.0 feet or above

   C. Headwater Elevation is 615.0 feet or below

   D. Tailwater Elevation is 508.0 feet or above

   E. Tailwater Elevation is 475.0 feet or below

CUSHMAN NO. 2 EMERGENCY SITUATION DETECTION ALGORITHM

1. A HAZARDOUS DAM CONDITION ALARM will be sent to the Energy Control Center (ECC) if one of the following occur:

   A. Headwater Elevation falls 0.5 feet in five minutes

   B. Tailwater Elevation raises 0.5 feet in five minutes

   C. Headwater Elevation is above 480.0 feet (upper level of sensing range)

   D. Tailwater Elevation is above 8.0 feet (upper level of sensing range)

2. A DAM FAILURE EMERGENCY CONDITION ALARM will be sent to the ECC if both of the following occur:

   Headwater Elevation falls 0.5 feet is 5 minutes

   AND Tailwater Elevation raises 0.5 feet in 5 minutes

3. A DAM MONITORING SYSTEM FAILURE ALARM will be sent to the ECC if any one of the following occur:

   A. Any component of the system fails (processor, headwater or tailwater sensor)

   B. Headwater Elevation is 480.0 feet or above

   C. Headwater Elevation is 460.0 feet or below

   D. Tailwater Elevation is 9.0 feet or above

   E. Tailwater Elevation is 0.5 feet or below

Response During Periods of Darkness

Substantial area lighting is available in the event that the Project Manager, who resides in the immediate area, had to investigate or perform action on one of the dams during darkness. In the event of a loss of power, a backup generator is available.

Response During Periods of Adverse Weather

Response time would be immediate under any weather conditions. In the event that the Project Manager and/or an Assistant Project Manager (both of whom live in the vicinity) had to travel to one of the dams, the response time to Cushman No. 2 Dam would be five minutes and to Cushman No. 1 Dam would be fifteen minutes. They would have at their disposal automobiles, four-wheel drive vehicles, a road grader, boats, chain saws, and additional equipment. A paved roadway connects the dam access roads. In the event the access road to Cushman No. 1 Dam is blocked, the remaining distance from the roadway (one half mile) to the dam could be walked in minutes. The main access roads to Cushman No. 2 Dam are very short (approximately one mile each) and could be walked in minutes if necessary. Maps detailing the roads and the alternate routes are not necessary since they are very short, well-known, and well-traveled by those who could be called upon in an emergency.

During periods of actual or forecasted high flows, the reservoir elevations will be monitored and controlled at the site by the Project Manager, Assistant Project Manager, and other personnel assigned as deemed necessary by the Assistant Power Manager. The coordination of flows will be performed solely by the Assistant Power Manager since there are no other projects on the Skokomish River.

Communication Facilities

Three communication paths exist between both Cushman No. 1 and Cushman No. 2 powerhouses and the Tacoma Dispatch Center located in Tacoma, Washington, thus insuring a back-up path in the event of the loss of primary communications.

1. A microwave link is the primary path of communication with the Tacoma Power Dispatchers.

2. A radio system provides two-way communication with the Tacoma Power Dispatcher and mobile vehicle units.

3. Telephone communication is available over U. S. West Communications circuits.

A plant telephone system provides communication to all levels, offices, and the control rooms.

Tacoma has a highband VHF radio system connection between the Tacoma Dispatch Center and Shelton Police Communications. The radio system enables confirmation of all messages, regardless of who initiated the notification.

Emergency Power Sources - Cushman No. 1

With one of the two generating units supplying the plant stations service system, no outside or separate source of power is required to supply essential station service loads. If neither of the generating units are on line, the plant station service is supplied from the 115 kV transmission system connecting it with the rest of the Tacoma System. The spillway at Cushman No. 1 is presently an ungated structure with three feet of flash board and therefore requires no station service or station service back-up.

Emergency Power Sources - Cushman No. 2

With one of the three generating units supplying the plant station service system, no outside or separate source of power is required to supply essential station service loads. All three spillway gates are float operated by valves and require no station service. If none of the three units are available for service, the plant stations service is supplied from the 115 kV transmission system connecting it with the Tacoma System.

Emergency Supplies and Resources:

The Project Manager and Cushman Personnel have at their disposal emergency generators, four wheel drive vehicles, trucks, boats, cranes, chain saws, automobiles, power tools, hand tools, and other equipment which would enable them to make immediate emergency repairs if necessary. The majority of the equipment is stored at the Cushman Project garage. Other than the above, there is no need for stockpiling of additional equipment, materials, or supplies.

APPENDIX A
PROJECT DESCRIPTION

General

The development designated as "The Cushman Hydroelectric Project" by the City of Tacoma and as Project 460 by the Federal Energy Regulatory Commission consists of two dams, Cushman Dams No. 1 and No. 2, located at river miles 19.6 and 17.3, respectively on the Skokomish River in western Washington. Figure 1 shows the locations of the dams and reservoirs. Photographs of both dams are included in Appendix C.

The Cushman No. 1 development is composed of a 275-foot high concrete arch dam, chute spillway, intake structure, power tunnel and powerhouse of 43,200 kW installed capacity. The Cushman No. 2 development consists of a 235-foot high concrete arch dam, chute spillway, intake structure, power tunnel, and powerhouse with installed capacity of 81,000 kW.

Cushman No. 1 Dam and Reservoir

Cushman Dam No. 1, completed in 1926, is a concrete structure rising an overall height of 275 feet above bedrock. Its central portion consists of a single curvature arch with a crest 400 feet long. A 62-inch diameter low level, by-pass valve is provided near the center of the arch dam. The maximum discharge capacity of the by-pass is about 1600 cfs. At each end of the arch are concrete gravity thrust blocks about 45 feet high. Gravity non-overflow wings flank the arch on both sides. A low earth fill dam 180 feet long, with a concrete core wall, adjoins the gravity section on the left bank. The total length of the dam is about 1110 feet. The drainage area above Cushman Dam No. 1 is 94 square miles.

The spillway is located approximately one half mile south of the dam. Reconstructed in 1991, it consists of an orifice type headworks structure founded on bedrock featuring two 40 foot wide by 20 foot high submerged radial gates. a 32.5 foot headwall prevents flow from overtopping the gates.

The power intake is a separate structure upstream from the arch dam to the left of the river channel. A 17-foot diameter tunnel about 540 feet long leading from the intake is connected to two 10-foot diameter penstocks which in turn lead to the powerhouse on the left bank downstream of the dam. The powerhouse contains two 21,600 kW generating units. The maximum discharge capacity is about 1,200 cfs for each turbine.

The Cushman Reservoir No. 1 provides a total storage of 453,350 acre-feet at the maximum normal reservoir elevation 738. The minimum operating level is elevation 615. A usable storage of 372,350 acre-feet is provided between the maximum and minimum pools. The reservoir area at the normal maximum pool is 4,200 acres.

Cushman No. 2 Dam and Reservoir

Cushman No. 2 Dam is 2.3 miles downstream from Cushman Dam No. 1. At full reservoir level water is backed up to the powerhouse of Cushman No. 1.

The dam, completed in 1929, is a concrete structure about 235 feet above the bedrock. It consists of a central arch dam flanked by a low, gravity abutment on the left side and a thrust block on the right side. A converging chute gated spillway adjoins the thrust block. The central arch is of single curvature, constant radius type with a 320-foot long crest. Two 78-inch diameter butterfly valves are located at the center of the arch. The discharge capacity at pool elevation 485 is 2,250 cfs for each valve. The top of the dam is at elevation 485 (top of parapets).The total length of the crest is 460 feet. The drainage area above Cushman No. 2 Dam including that of Cushman No. 1 Dam is about 100 square miles. The spillway is 120 feet long consisting of three drum gates. The crest of the spillway is at elevation 465.5. The discharge capacity of the spillway is about 35,000 cfs with reservoir surcharged to the top to the parapets at elevation 485. The power intake is a separate structure on the left abutment, leading to a pressure tunnel, surge tank, and penstocks which feed the powerhouse. The power tunnel is a 17-foot diameter concrete-lined tunnel about two and a half miles long. The powerhouse contains three 27,000 kW generating units. The maximum discharge capacity is about 1,200 cfs for each turbine.

The Cushman No. 2 reservoir provides a total storage of 7,375 acre-feet at the maximum normal reservoir elevation 480. The minimum operating level is elevation 460. A usable storage of 2,124 acre-feet is provided between the maximum and minimum levels. The reservoir area at the normal maximum pool is 150 acres.

APPENDIX B
FAILURE MODE AND FLOOD ANALYSIS STUDY

Mode of Failure

Both Cushman Dams No. 1 and No. 2 are concrete dams. The failure of a concrete dam no matter how it originates, is assumed to be a complete and instantaneous or rapid failure in order to make an "extreme case" estimate of flood effects. Earthquake, rapid foundation failure and nuclear bombing are examples to possibly cause such types of failure. In this analysis, a failure time of 15 minutes from initial start to complete failure was assumed. This failure could be considered instantaneous and represents the extreme of conservatism. Other failure times ranging from 10 minutes to 30 minutes were also analyzed. Rapid attenuation of the peak flood wave in the immediate downstream channel insured that variation of the selected failure time would have negligible effects. For all cases, the shape and size of the ultimate breach openings were assumed as shown in Appendix C, Fig. 3.

Two situations were analyzed for the hypothetical failures of the two dams, both individually and cumulatively. These are:

1. Cumulative failure of both Cushman No. 1 and No. 2 Dams. Cushman No. 1 Dam begins to fail with a water surface in the reservoir at the maximum normal pool elevation of 738 and a constant 2,000 cfs inflow. While starting with a water level in the reservoir at the maximum normal pool elevation of 480, Cushman No. 2 begins to fail by an overtopping of 25 feet of water released from the failure of Cushman No. 1 Dam.

2. Individual failure of Cushman Dam No. 2. With a water surface in the reservoir at the maximum normal pool elevation of 480 and a constant 2,000 cfs inflow, Cushman Dam No. 2 begins to fail.

The situation for individual failure of Cushman Dam No. 1 was also analyzed. Results for this case indicated an overtopping of 117 feet above Cushman Dam No. 2. This magnitude of overtopping is judged to be severe enough to cause Dam No. 2 to fail. Also, the failure of just Dam No. 1 would not result in more severe flooding downstream than the failure of both dams. Therefore, the case of individual failure of Dam No. 1 was eliminated from further consideration.

The cumulative failure of Cushman Dam No. 2 beginning at a higher overtopping of 50 feet of water was also studied. Results for this case showed insignificant differences from results for the case of failure beginning at a 25-foot overtopping of the dam as described in the first situation above.

The height of the water immediately downstream of a dam affects the outflow hydrograph in a failure analysis. It determines the effective head of failure. It also affects the formation of a bore in front of the flood wave. However, in computing the outflow hydrographs, the tailwater effects and bore propagation were neglected for a simplified, conservative approach.

The peak outflows resulting from the hypothetical failures of the dams as described above were computed to be 1,734,000 cfs and 2,230,000 cfs at Dam No. 1 and Dam No. 2, respectively, for the case of both dams failure and 486,000 cfs at Dam No. 2 for the case of just Dam No. 2 failure. These computations together with the outflow hydrographs were done by using the "Flood Hydrograph Package (HEC-1) - Dam Safety Investigations" computer program developed by the Hydrologic Engineering Center, US Army Corps of Engineers. For the cascading failure of both dams, the outflow at the upper dam was used directly as the inflow to the low reservoir since the lower reservoir level would be backed up to the toe of the upper dam and no channel storage would be available to attenuate or delay the outflow flowing into the reservoir.

Method of Flood Analysis

The hydrographs of the flow through the breached dams and the subsequent downstream channel of the North Fork and the mainstem of the Skokomish River were computed by two flood routing methods individually applied on two separate reaches of the channel. These two routing methods are the hydrologic and hydraulic routings. Because of complication of the natural river channel characteristics and the associated hydraulics, the entire channel was divided into two reaches. The upper reach is comprised of the dams and reservoirs and a channel segment of hydraulically steep slope within the narrow gorge of the North Fork Skokomish River. This reach is extended downstream approximately two and a half miles below Cushman No. 2 Dam. Below this point the lower reach of river consists of a mildly sloping channel and bridges. Flood routing on the upper reach utilized the hydrologic, or storage routing method called the Modified Puls. The US Army Corps HEC-1 Dam Safety Investigations computer program was used for the routing computations. Input data for reservoir routing consisted of the reservoir storage elevation curves as shown in Fig. 2 and the turbine discharges and the discharge ratings for the spillways and low level outlets assumed at full gate opening conditions. Input data for channel routing included the river cross sections from the USGS topographical maps and the Manning's roughness coefficients approximately determined to represent ground coverings and vegetation. The HEC-1 program computed the storage-outflow function required in the channel. Since the upper reach channel is narrow and steep and is only about 2.5 miles long below the lower dam, use of the normal flow routing would have insignificant effects on the accuracy of the downstream flood routing. Use of the more accurate hydraulic routing on the steep upper reach was impractical because of the complication of frequent supercritical flow conditions occurring in the channel.

The hydraulic, or dynamic routing method, was applied in flood routing on the lower reach of the Skokomish River. The lower reach included 5 miles of the North Fork and 10 miles of the mainstem Skokomish River. The National Weather Service Dam Break Flood Forecasting Model computer program was used for the routing computations. This program utilizes an implicit finite difference scheme to solve the one-dimensional equations of unsteady flow. It would be able to simulate more accurately the flood hydrographs and the wave traveling times in a natural channel. The analysis included provision of off-channel storage to account for wave peak attenuation as it traveled downstream. Essential data required in the Skokomish River routing consisted of:

1. A total of 15 river cross sections taken from the USGS 15 minute quadrangle sheets.

2. The bridge openings information supplied by the State Highway Department and the railroad companies.

3. The Manning's roughness coefficients ranging from 0.04 to 0.10 approximately determined by field inspection.

4. The upstream end inflow hydrographs resulting from the HEC-1 routing for the upper reach of the river.

5. The downstream discharge rating curve developed at the exit of the river to Hood Canal, assuming infinite water body for Hood Canal.

6. The initial conditions of the river discharges, assumed at 10,000 cfs and 5,000 cfs for cumulative and individual failures, respectively, to facilitate the dynamic routing.

For the magnitude of floods encountered and the accuracy of the computations expected in this study, slight variations of the various assumptions described above were found to have negligible effects. Results of the flood routing for cases of cumulative and individual failures as described in Subsection B are presented in Figs. B2-B10 and B11-B19, respectively. These figures consist of hydrographs, a peak discharge profile, a peak elevation profile, a time to peak elevation profile, and an inundation map for each case of failure.

The inundation maps are not sensitive to base flows greater than 2,000 cfs, as the peak outflows resulting from the hypothetical failures of the dams as described above were computed to be 1,734,000 cfs and 2,230,000 cfs at Cushman No. 1 and No. 2 Dams, respectively, for the case of both dams failure, and 486,000 cfs for the case of just Cushman No. 2 failure. A PMF of 105,000 cfs at Cushman No. 1 during a dam failure would result in an increased cfs of 6.1%, and would attenuate rapidly. At Cushman No. 2 Dam, a PMF of 105,000 would result in some prior flooding downstream, with subsequent hypothetical dam failure at only Cushman No. 2 Dam resulting in an increase of 4.7% cfs, which would attenuate and not result in amounts significantly above those indicated in the inundation maps. As indicated in Figure 9, a dam failure at Cushman No. 2 Dam results in a flood wave which attenuates from 486,000 cfs to less than 30,000 cfs within three miles.

FRONTAL WAVE AND PEAK FLOW TRAVEL TIMES
HYPOTHETICAL TOTAL FAILURE OF CUSHMAN NO. 1 & NO. 2 DAMS

LOCATION	DISTANCE (RIVER MILES)	FRONTAL WAVE TIME (HRS:MIN)	PEAK WAVE TIME (HRS:MIN)
Cushman No. 2 Dam	2.3	0:06	0:24
U.S.G.S. Gage #0595	9.5	0:30	1:06
Mainstem confluence	10.6	0:48	1:54
Highway 101 Bridge	14.3	1:36	3:06
Hood Canal	19.6	2:36	3:48

FRONTAL WAVE AND PEAK FLOW TRAVEL TIMES
HYPOTHETICAL TOTAL FAILURE OF CUSHMAN NO. 2 DAM

LOCATION	DISTANCE (RIVER MILES)	FRONTAL WAVE TIME (HRS:MIN)	PEAK WAVE TIME (HRS:MIN)
U.S.G.S. Gage #0595	7.2	0:36	1:06
Mainstem confluence	8.3	1:00	1:36
Highway 101 Bridge	12.0	4:00	5:00
Hood Canal	17.3	6:54	NONE

APPENDIX D
TRAINING, REVIEW, AND TESTING

1. All personnel will be familiar with the Emergency Action Plan and all emergency procedures. An up-to-date copy of the emergency action plan shall be posted in a prominent location accessible to operating and supervisory personnel.

2. All hydro project personnel, power dispatchers, and appropriate supervisory personnel will be trained in emergency procedures to assure adequate and timely assessments of developing situations and performance of their duties in the event of an emergency.

3. The adequacy of the plan will be reviewed in December of each year, and updated and revised as necessary. (Changes to names of responsible persons, telephone numbers, or information critical in providing notification will be updated immediately, rather than waiting for the December review.)

4. An emergency simulation and test of the plan will be conducted annually. Verification of telephone procedures will be conducted quarterly, thereby allowing all City of Tacoma personnel involved in the plan to be involved in a minimum of one test per year. All phases of the plan will be monitored for proper response and completion.

5. The Power Manager will be responsible for determining the success of the annual tests.

TEST PROCEDURES

The EAP Coordinator and the Project Manager will set a date and time for a test session. Either the "potentially hazardous" situation or the "failure is imminent" situation will be selected for the test. Simulation of a failure will include interaction with the agencies included in this plan that are responsible for emergency planning.

(a) The Project Manager or his designated Supervisor will initiate the selected plan by informing a randomly selected employee at the Project that a test run of the Project Emergency Action Plan is being initiated. That employee will call the Power Dispatcher in the Energy Control Center, informing him that this is a test of the EAP for the plant selected, and will have the receiving party state, "I understand that this is a test".

(b) The Power Dispatcher will start the step-by-step procedures of the plan called for, logging each step.

(c) Operational steps that require physical operation of equipment will not actually take place, but instead will be logged on a sheet of paper, as to the step sequence number and the hypothetical operation, such as all electrically operated spillgates to their full open position, or all in-service generators to full load.

(d) The Project Manager will monitor all phases of the plan for proper response and completion. The Project Manager will write a performance review, which will be filed in the EAP file.

FLOWCHART AND EAP LOCATIONS:

The EAPs are located in the Energy Control Center: in the Dispatch Center, the EAP Coordinator's office, the Assistant Power Manager's office, and the Power Manager's office. The EAPs shall be located at the Cushman Project at the Cushman No. 1 Powerhouse in the control room, at the service area at Cushman No. 1 Dam, at the Cushman No. 2 Powerhouse in the control room, and at the Project Manager's desk at the Project Office at Cushman No. 2 Powerhouse.

APPENDIX E

DOCUMENTATION

Documentation is on file stating that the following agencies possess the most recent Emergency Action Plan for the Cushman Hydroelectric Project:

Mason County Department of Emergency Services
Ms. Mary Farley, Director

Washington State Emergency Management Division
Ms. Joseph R. Murray, Assistant Director

National Weather Service
Mr. Douglas McDonnal

Federal Energy Regulatory Commission
Mr. Walter S. Boyle, Chief, Project Supervision - West

APPENDIX F
DAM FAILURE EMERGENCY ACTION PLAN

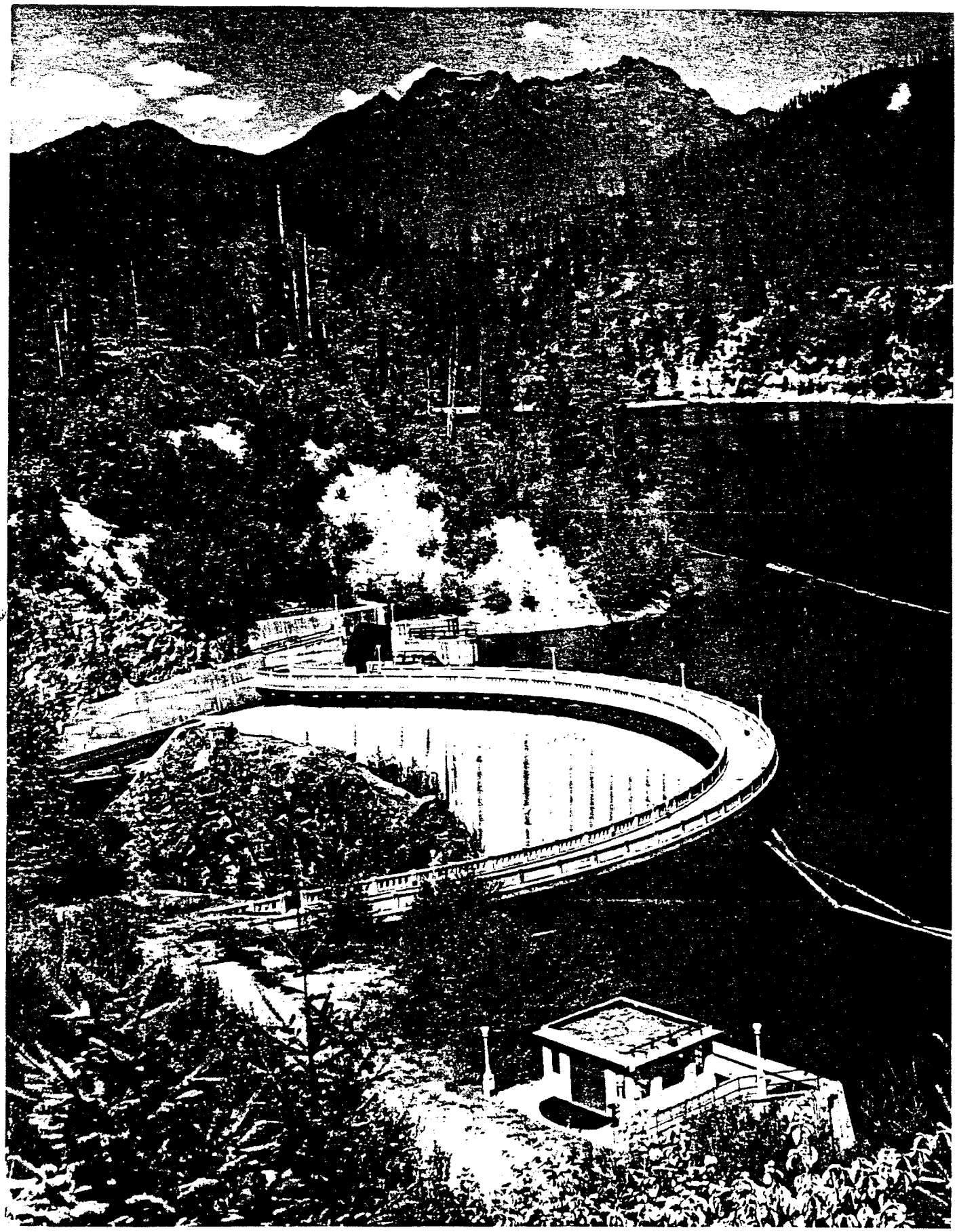
DISTRIBUTION LIST

No. of Copies		Book Number Cowlitz	Cushman	Nisqually
3	Cowlitz Project Manager, Verne Hunter	1, 2, 3		
3	Cushman Project Manager, Dennis Koehn		1, 2, 3	
3	Nisqually Project. Manager., Bill Jones			1, 2, 3
2	Power Manager - George Whitener	21, 22	21, 22	21, 22
2	Assistant Power Manager - Pat Tolar	4, 23	4, 23	4, 23
1	EAP Coordinator - Todd Lloyd	9	9	9
2	Dispatchers	6, 7	6, 7	6, 7
2	Community & Media Services	8	8	8
1	Light Engineering - Steve Fischer	5	5	5
2	Mr. William (Bill) Lokey, Manager Pierce County Emergency Management County-City Building, Room B-36 930 Tacoma Avenue South Tacoma, Washington 98402-2102			12,13
3	Mr. Mike Karl Thurston County Emergency Management 9605 Tilley Road SW Olympia, Washington 98512-9140			15,16,17
3	Ms. Jeanne Massingham, Director Lewis County Emergency Management 350 North Market Blvd Chehalis, Washington 98532-2626	12,13,14		

No. of Copies		Book Number Cowlitz	Cushman	Nisqually
3	Mr. Richard L. Bullock, Director Cowlitz County Emergency Services Hall of Justice 312 South First West Kelso, Washington 98626	15,16,17		
3	Mr. Joseph Murray, Director Mason County Department of Emergency Services P.O. Box 1476 Shelton, Washington 98584		12,13,14	
1	Mr. Ed Small, Director Department of Community Development Emergency Management Division P.O. Box 48346 Olympia, Washington 98504-8346	10	10	10
3	Walter S. Boyle, P. E. Chief, Project Supervision Federal Energy Regulatory Commission 1120 S. W. Fifth Street, Suite 1340 Portland, Oregon 97204	11,18,19	11,18,19	11,18,19
1	Mr. Douglas J. McDonnal National Weather Service 7600 Sand Point Way N.E. Seattle, Washington 98115	20	20	20

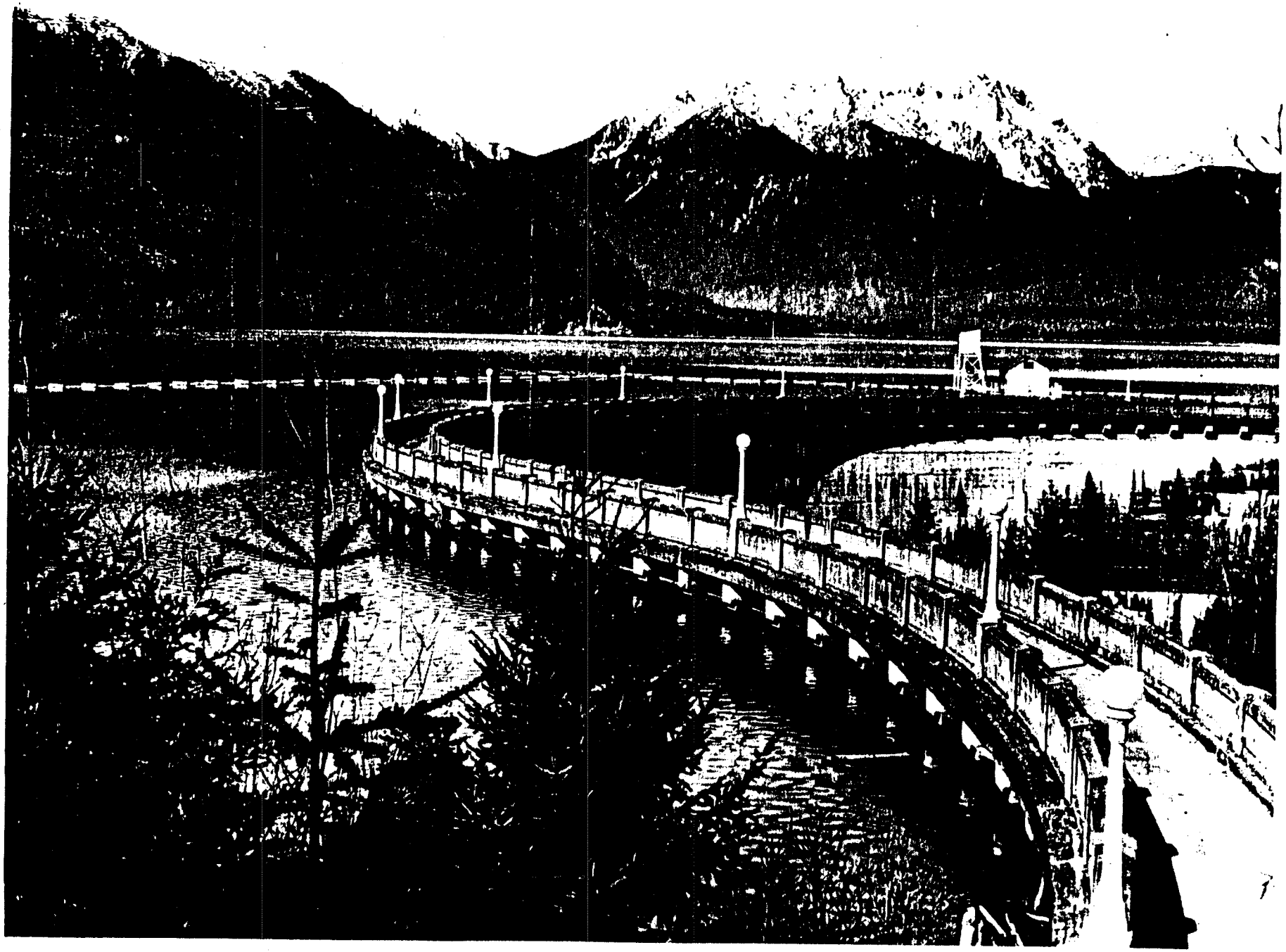
APPENDIX C

MAPS AND CHARTS



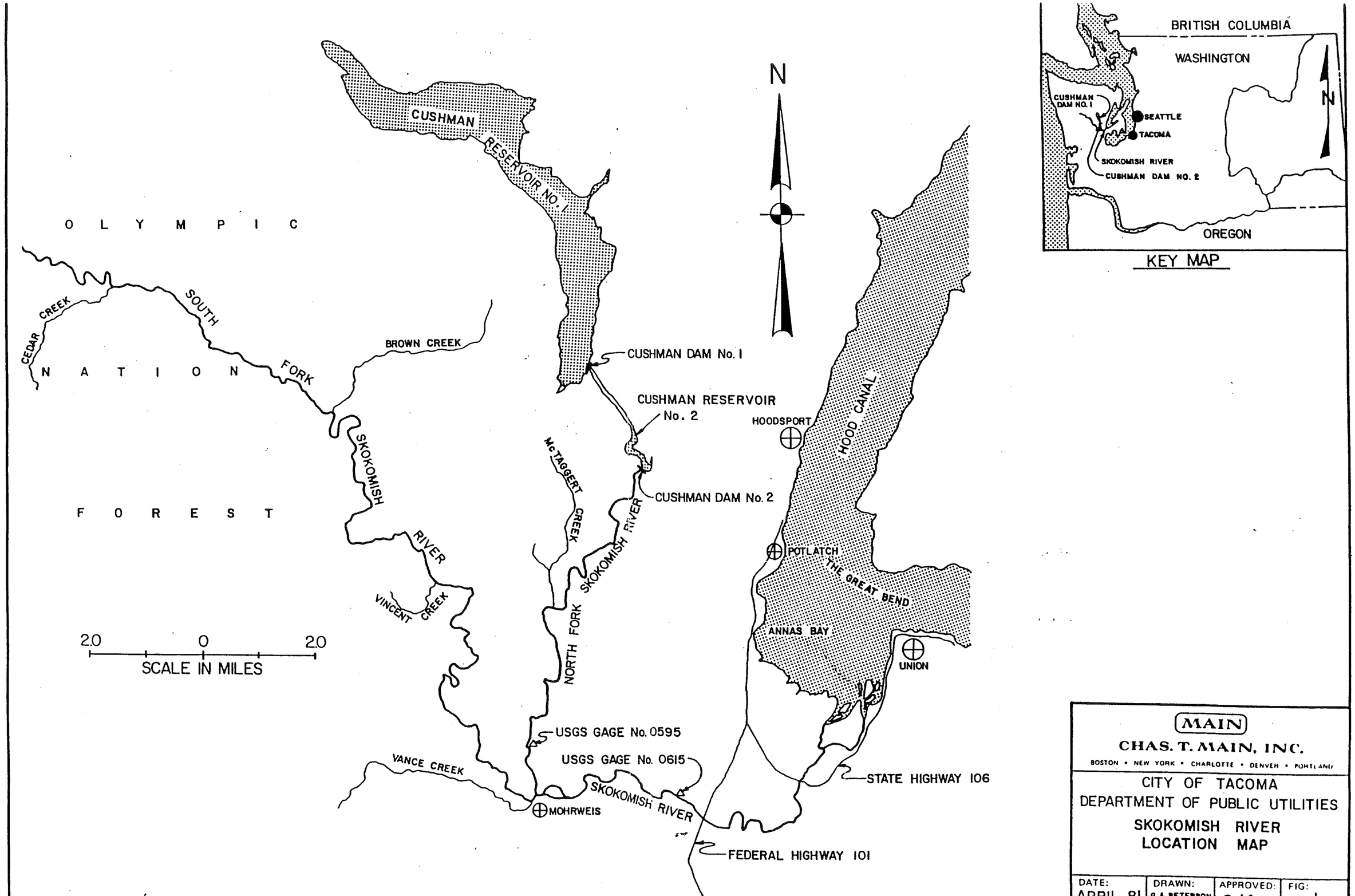
CUSHMAN DAM #2

1117 DPU 12/81

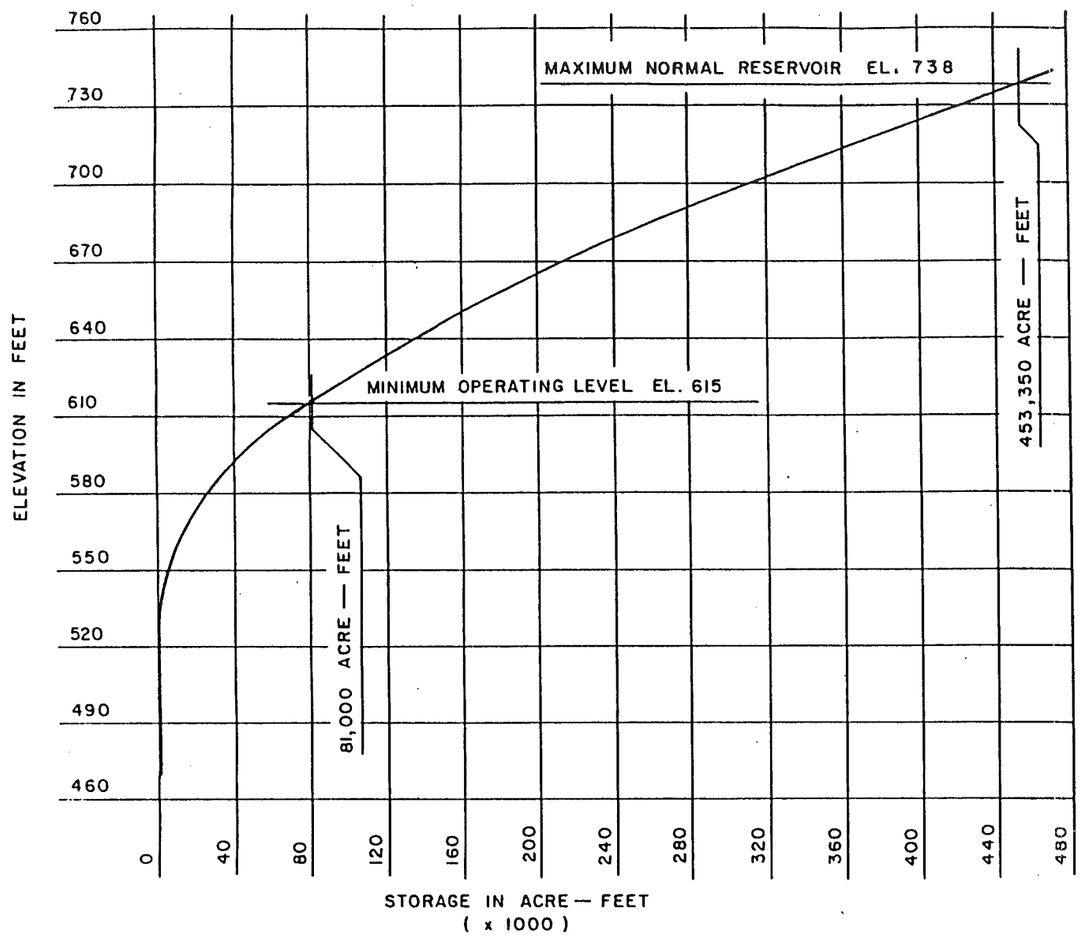


1116 DPU 12/81

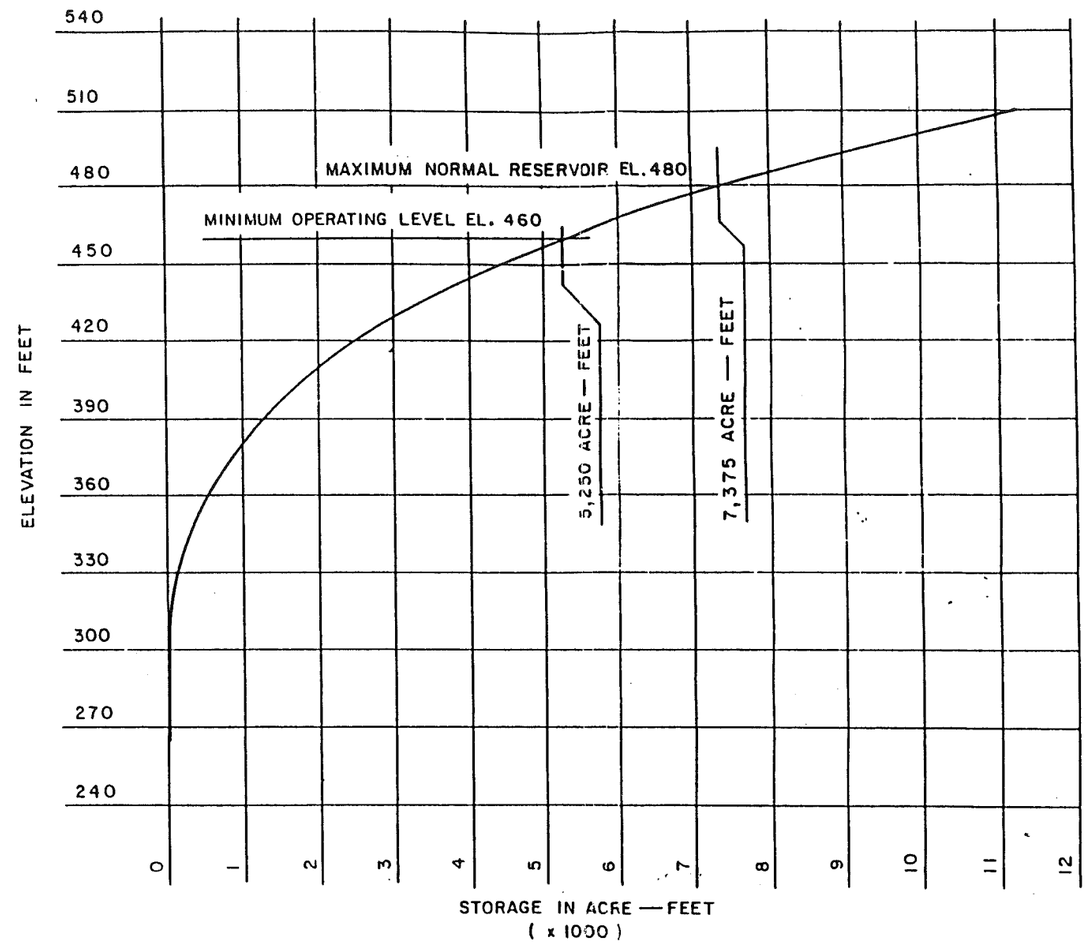
CUSHMAN DAM #1


CUSHMAN RESERVOIR No. 1
OLYMPIC
NATION
FOREST
CEDAR CREEK
SOUTH FORK
BROWN CREEK
SKOKOMISH RIVER
VINCENT CREEK
McTAGGERT CREEK
NORTH FORK SKOKOMISH RIVER
CUSHMAN DAM No. 1
CUSHMAN RESERVOIR No. 2
CUSHMAN DAM No. 2
HOODSPORT
HOOD CANAL
POTLATCH
THE GREAT BEND
ANNAS BAY
UNION
STATE HIGHWAY 106
FEDERAL HIGHWAY 101
USGS GAGE No. 0595
USGS GAGE No. 0615
VANCE CREEK
MOHRWEIS
SKOKOMISH RIVER
N
2.0 0 2.0
SCALE IN MILES
BRITISH COLUMBIA
WASHINGTON
OREGON
CUSHMAN DAM NO. 1
SEATTLE
TACOMA
SKOKOMISH RIVER
CUSHMAN DAM NO. 2
KEY MAP
MAIN
CHAS. T. MAIN, INC.
BOSTON • NEW YORK • CHARLOTTE • DENVER • PORTLAND
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
LOCATION MAP
DATE: APRIL 81
DRAWN: G. A. PETERSON
APPROVED: GAB
FIG: 1

C-1



CUSHMAN DAM NO. 1



CUSHMAN DAM NO. 2

MAIN

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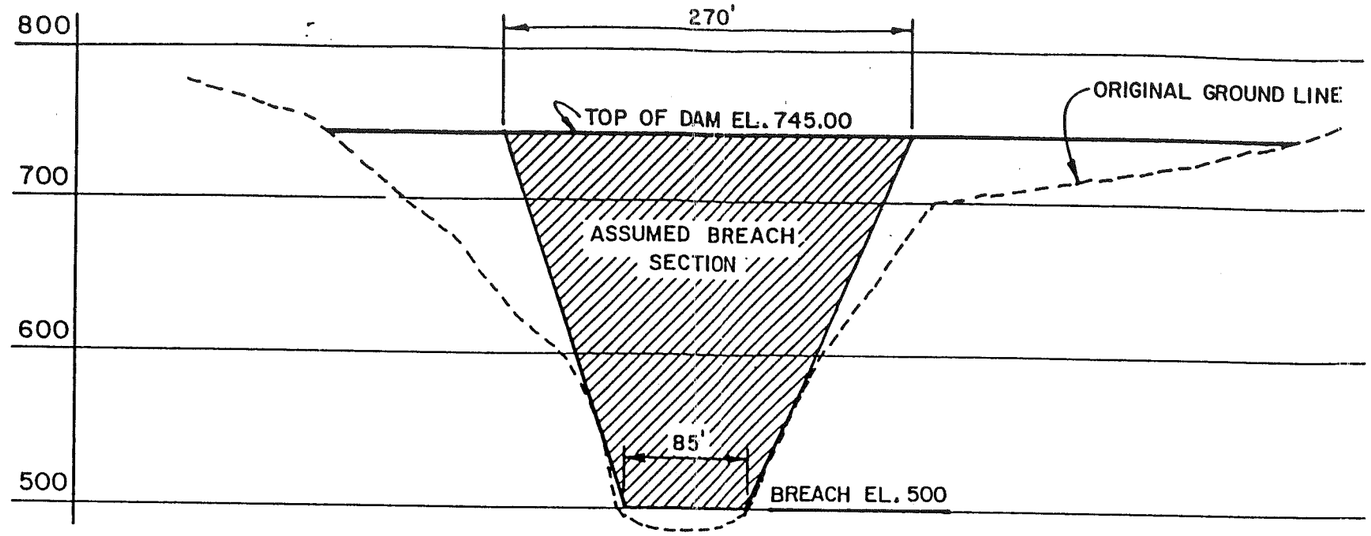
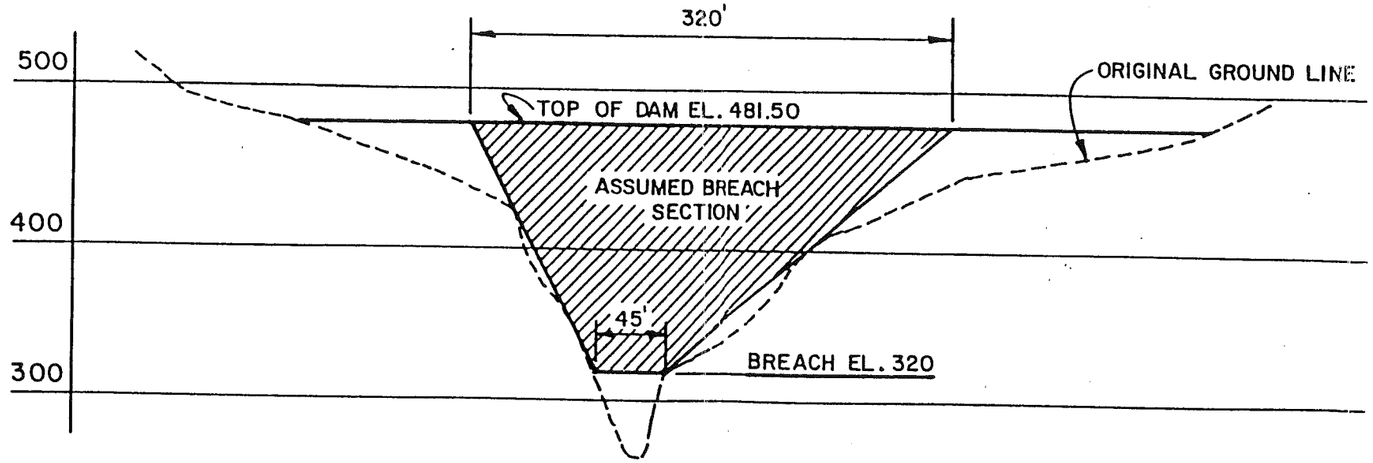
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
RESERVOIR STORAGE-ELEVATION
CURVES

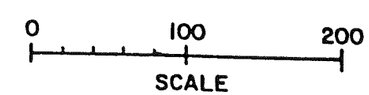
DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	2



CUSHMAN DAM NO. 1



CUSHMAN DAM NO. 2



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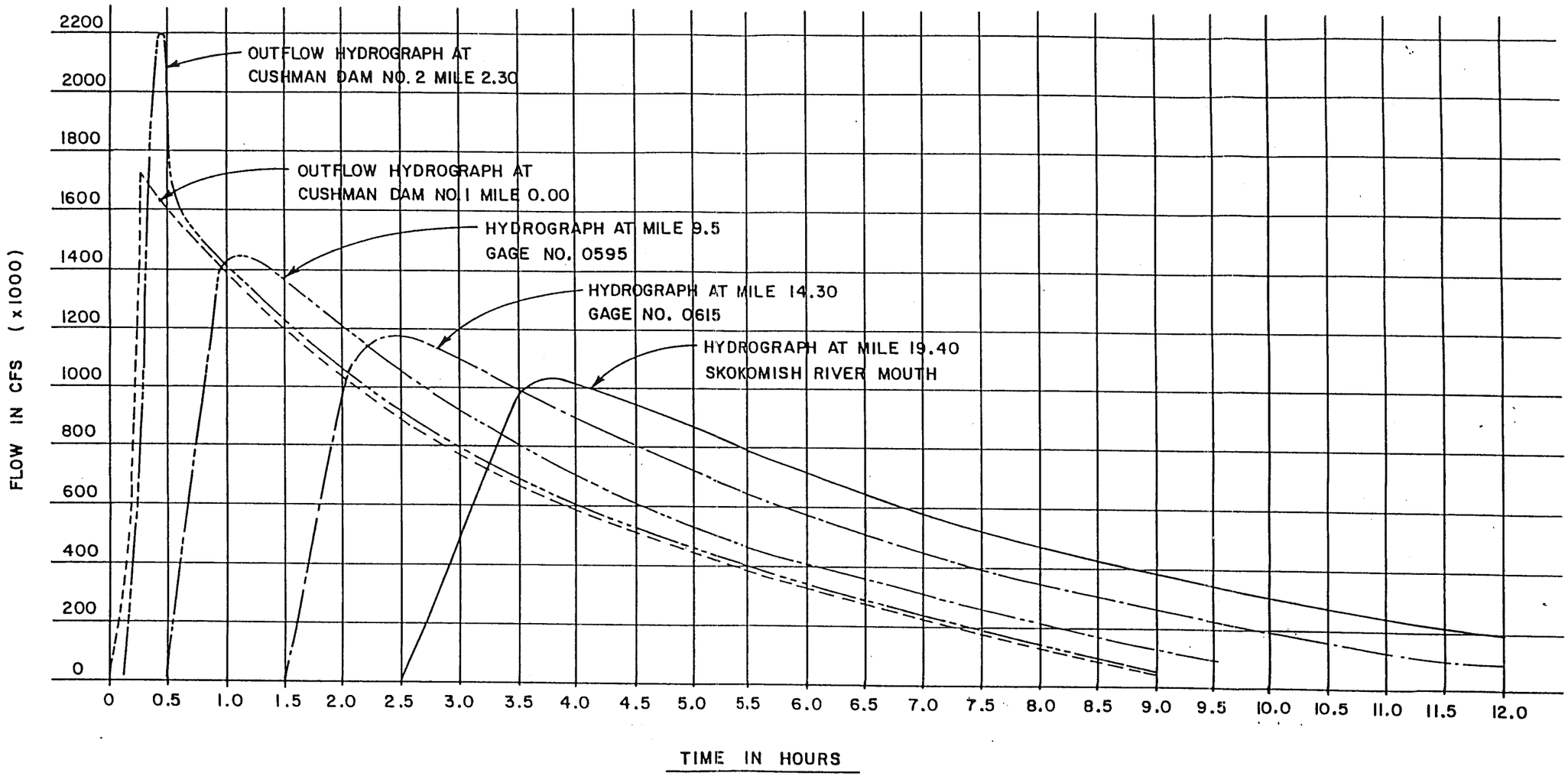
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
ASSUMED BREACH SECTION OF
CUSHMAN DAMS NO. 1 & 2

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	gsB	3

CASCADE



NOTE

MILE SHOWN FOR EACH HYDROGRAPH IS RIVER MILE MEASURED DOWNSTREAM FROM CUSHMAN DAM NO. 1

C-4

MAIN

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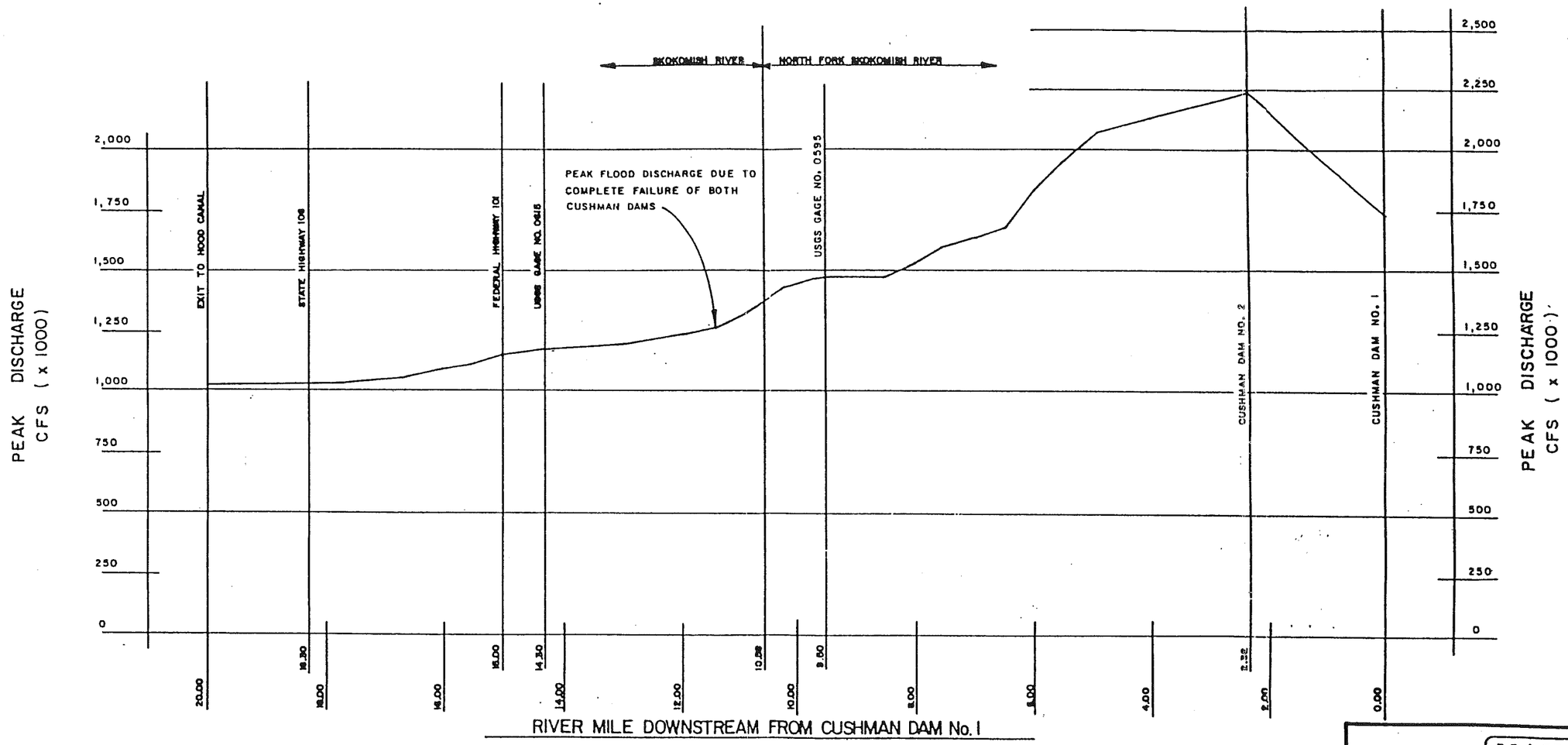
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAMS NO. 1 & 2 FAILURE
HYDROGRAPHS

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E. G.	GAB	4

CASCADE A. & E. SUPPLIES CO

APPENDIX KK.
WATER QUALITY DATA

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997



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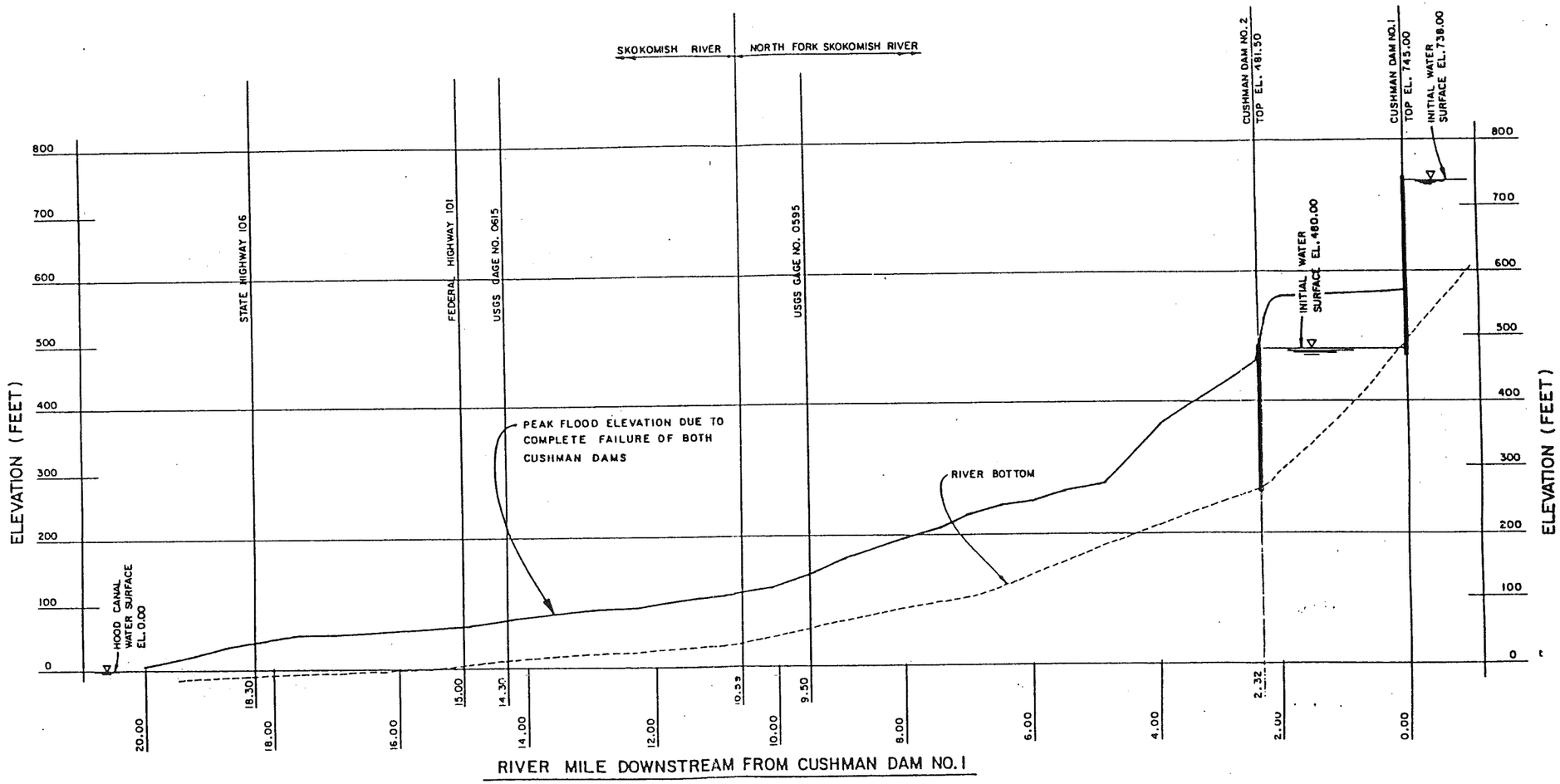
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAMS NO. 1 & 2 FAILURE
PEAK DISCHARGE PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	5



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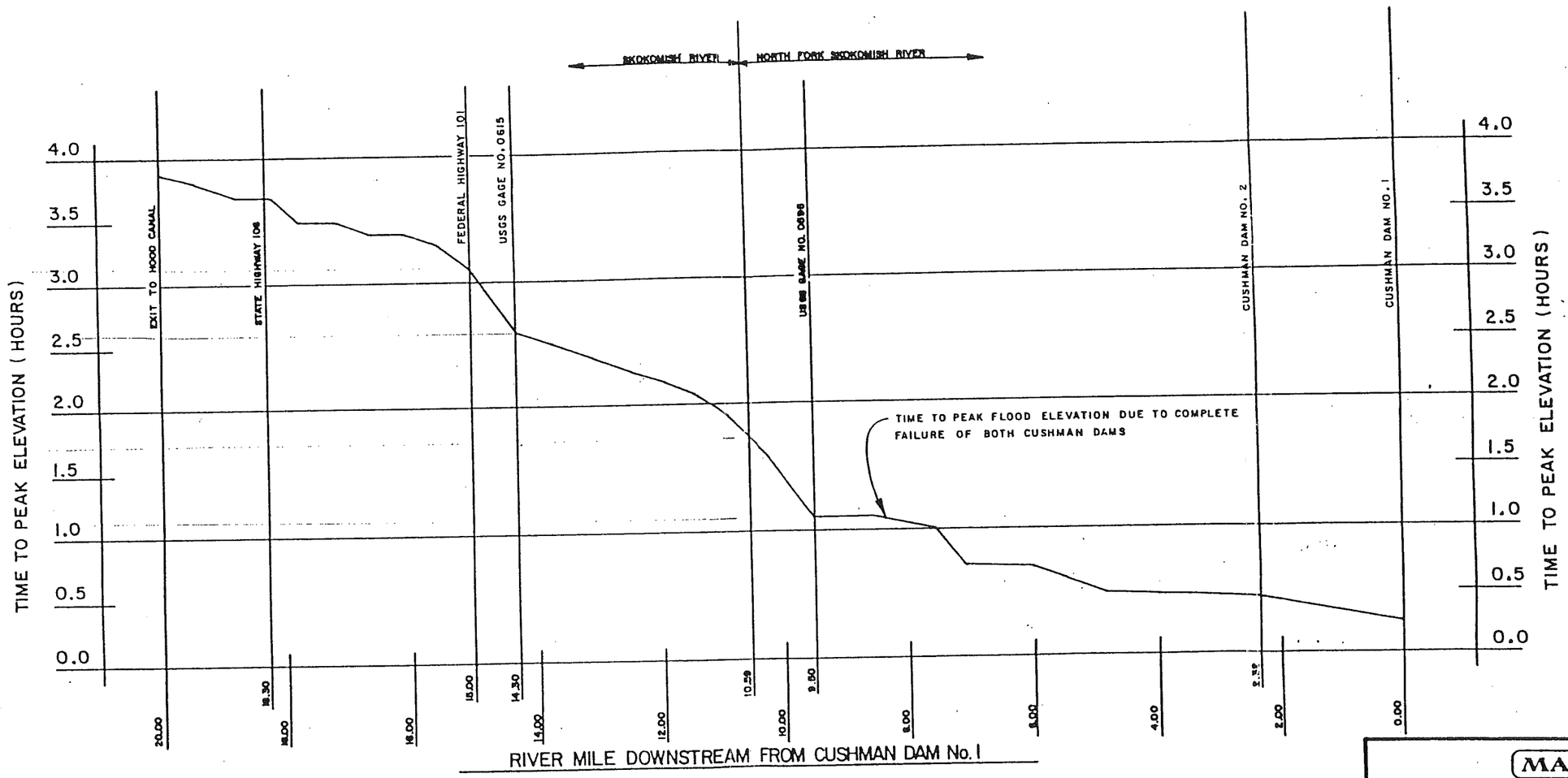
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAMS NO. 1 & 2 FAILURE
PEAK ELEVATION PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	6

C-6



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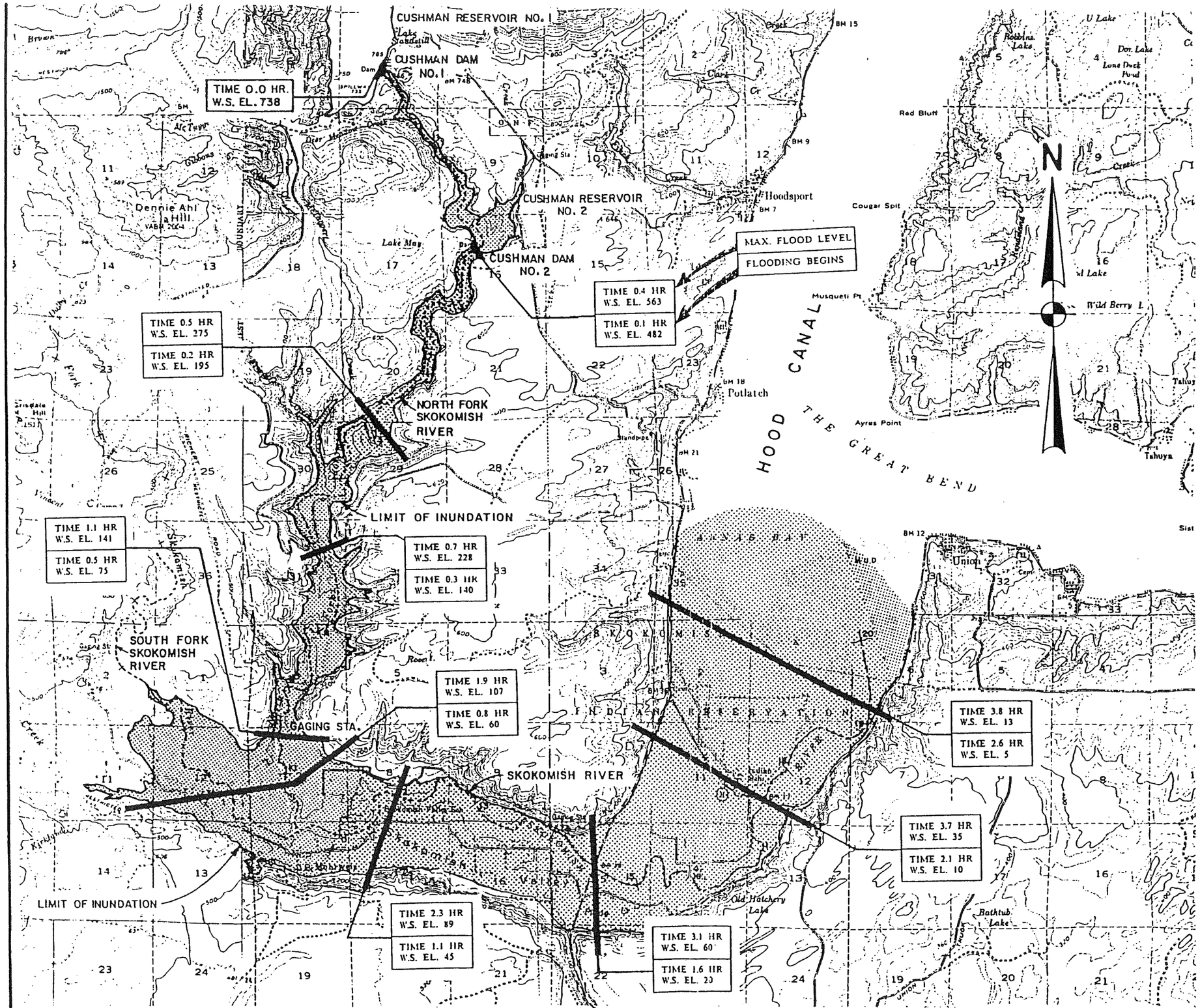
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAMS NO. 1 & 2 FAILURE
TIME TO PEAK ELEVATION PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	JRB	7



1. THE RESULTS PRESENTED HEREIN DO NOT REFLECT IN ANY WAY ON THE STRUCTURAL INTEGRITY OF THE DAM AND ARE NOT TO BE CONSTRUED AS SUCH. THE ANALYSES PRESENTED ARE BASED ON THE HYPOTHESIS OF DAM FAILURES.

2. THE LIMITS OF FLOODING SHOWN AND FLOOD WAVE TRAVEL TIMES ARE APPROXIMATE AND SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

3. TOPOGRAPHY IS FROM USGS 7.5 MINUTE QUADRANGLE SHEETS.

0 1 2

SCALE IN MILES

MAIN

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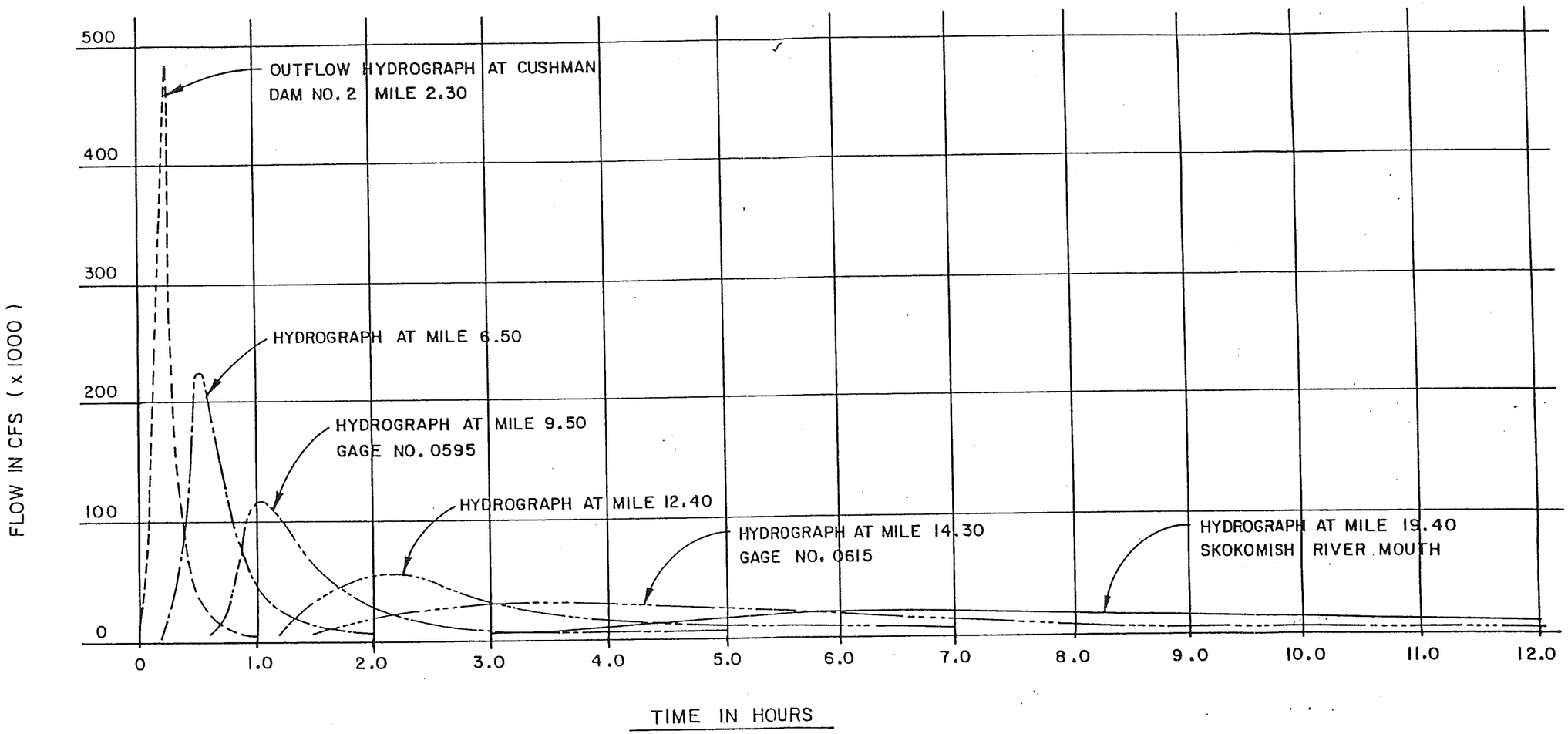
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAMS NO. 1 & 2 FAILURE
INUNDATION MAP

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GJB	8



NOTE

MILE SHOWN FOR EACH HYDROGRAPH IS RIVER MILE MEASURED DOWNSTREAM FROM CUSHMAN DAM No. 1

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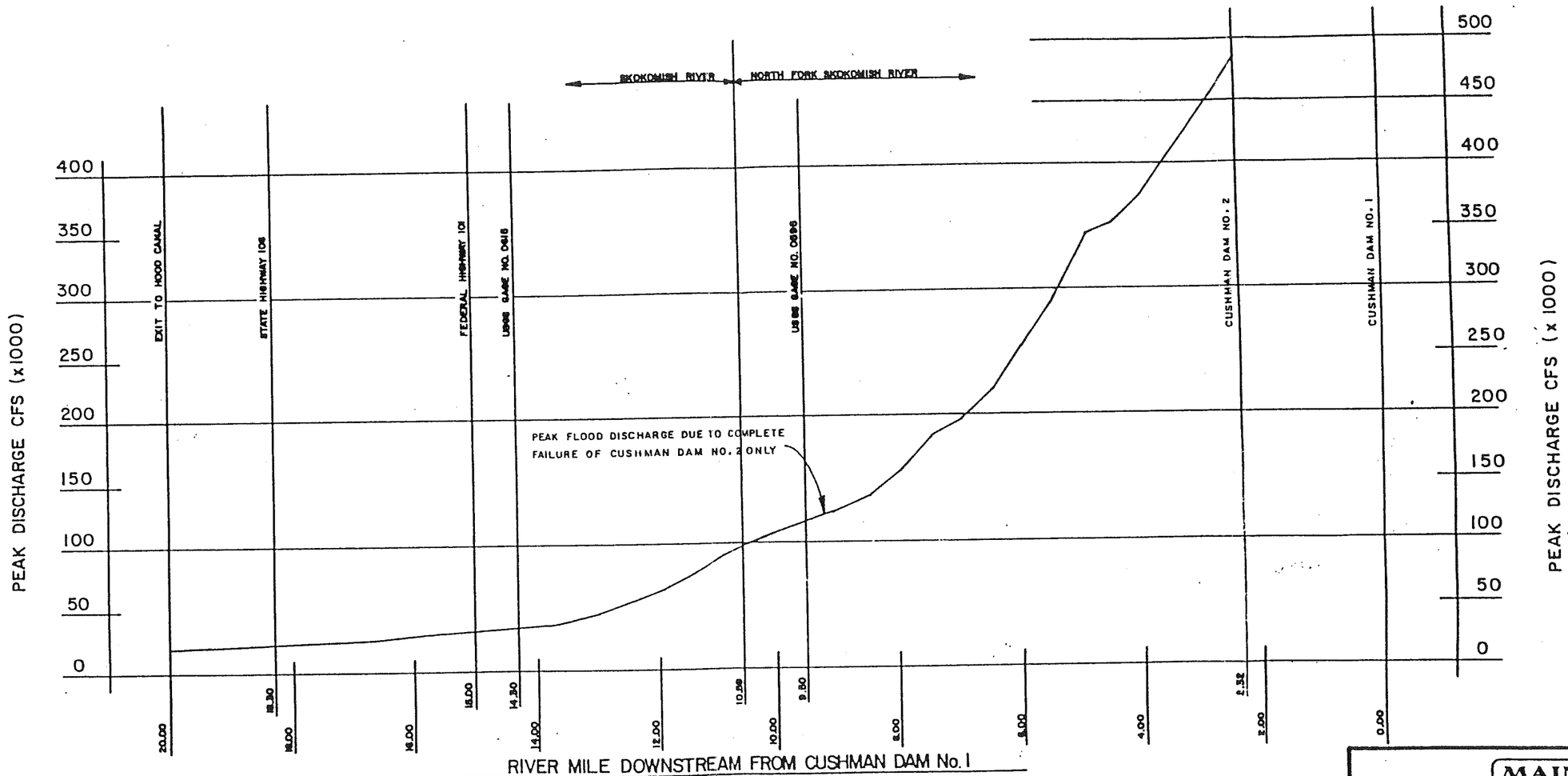
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAM NO.2 FAILURE
HYDROGRAPHS

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	gsb	9

C-9



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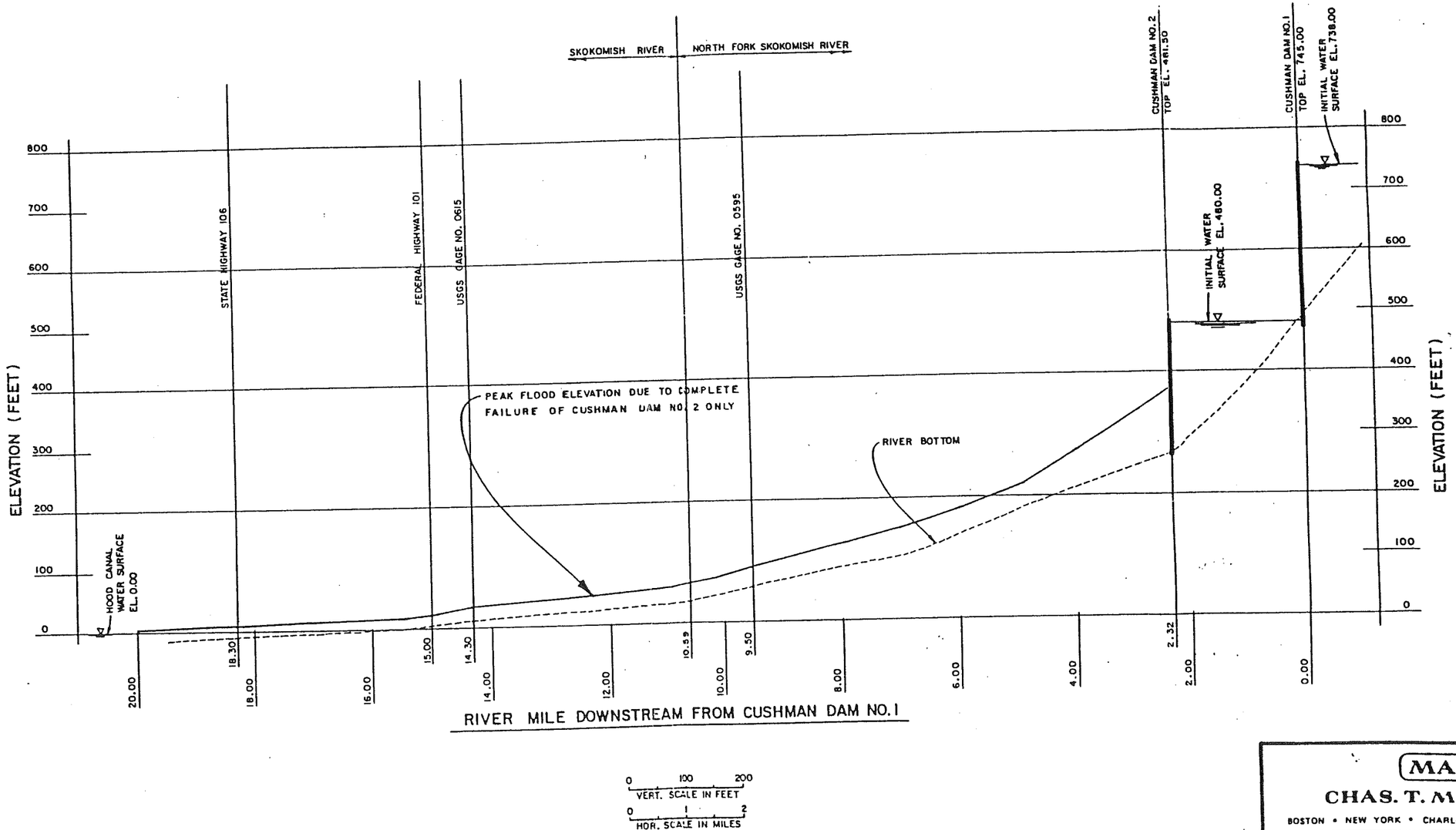
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAM NO.2 FAILURE
PEAK DISCHARGE PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GAB	10

C-10



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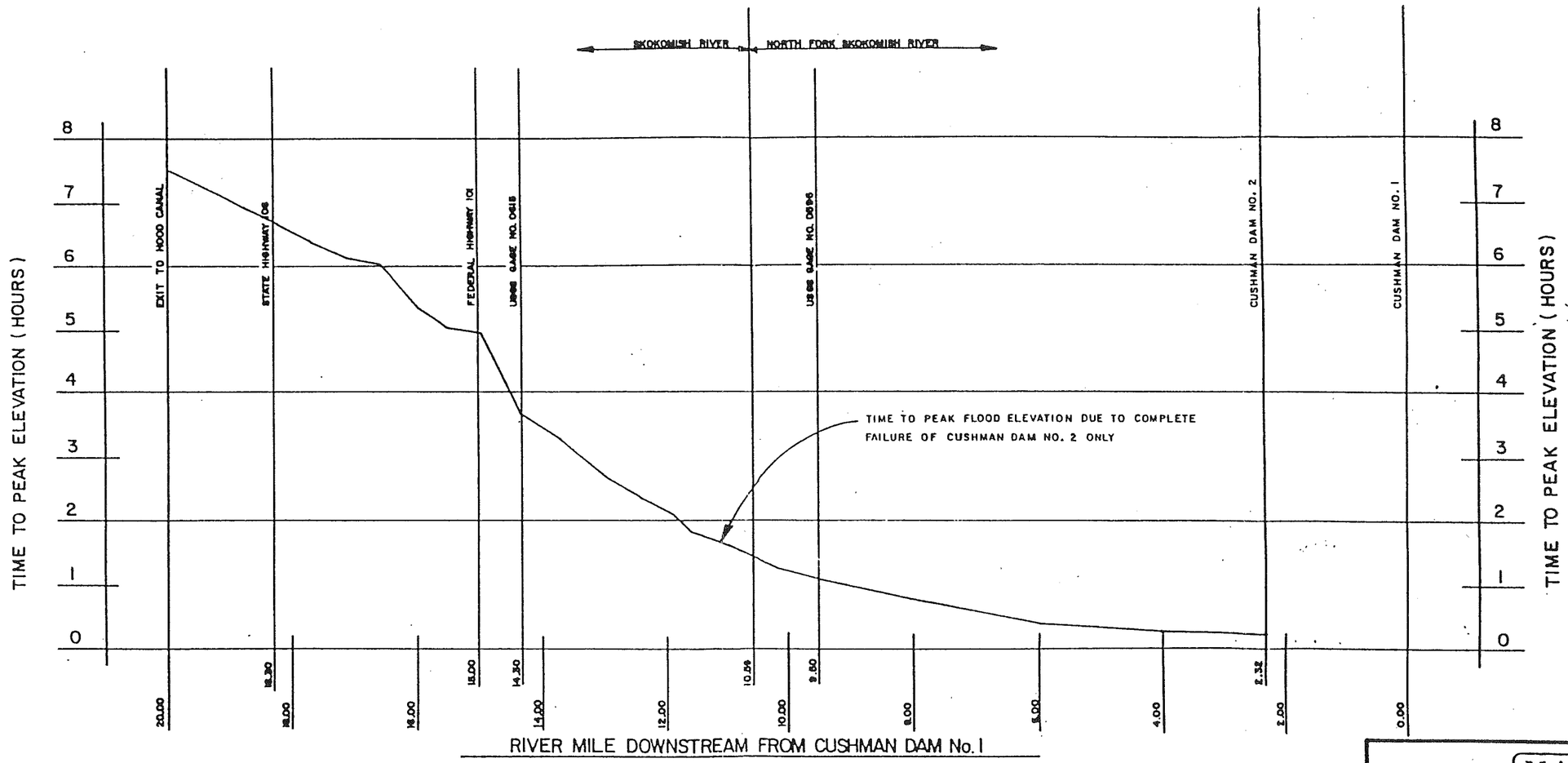
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAM NO.2 FAILURE
PEAK ELEVATION PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	11



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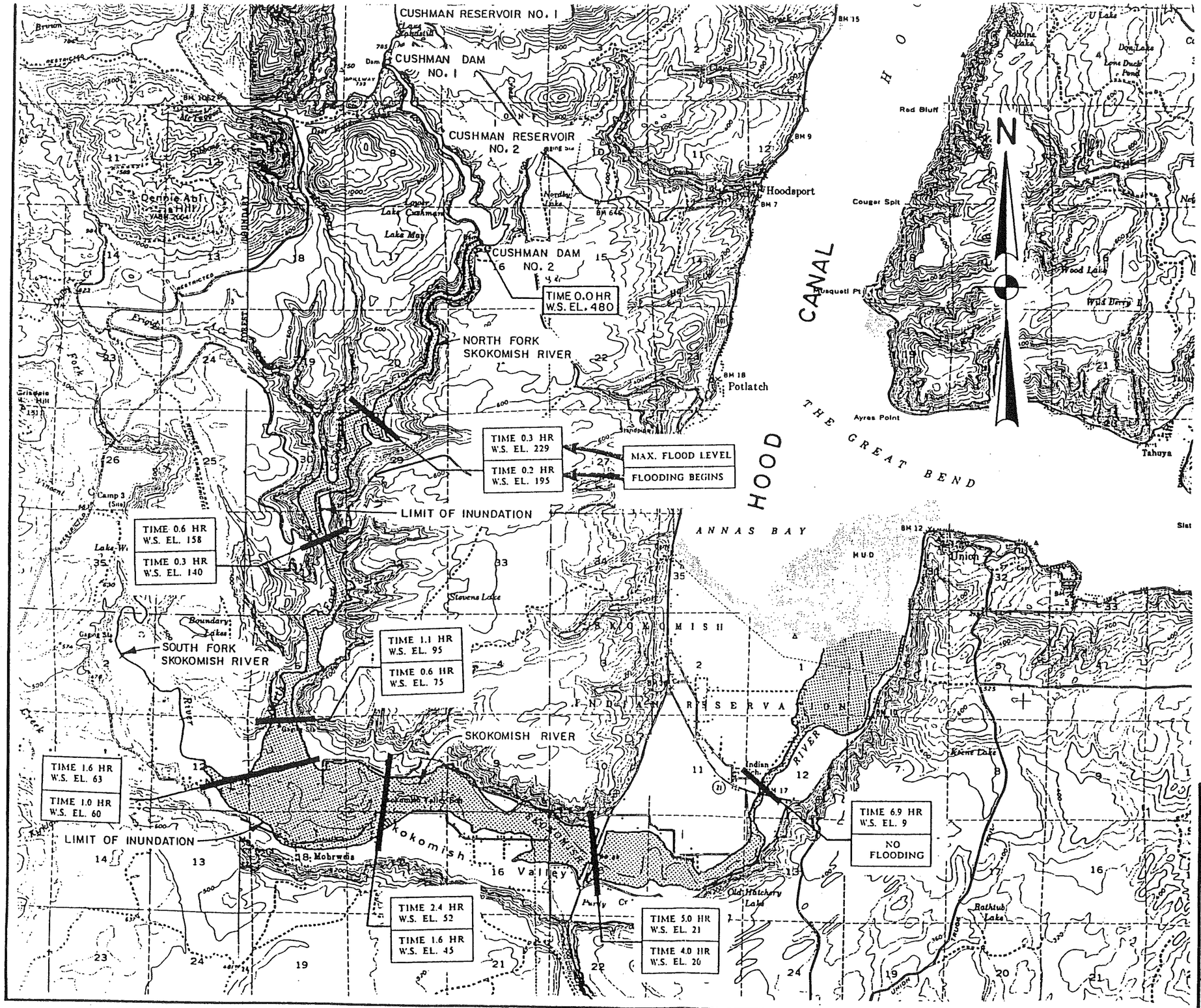
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAM NO.2 FAILURE
TIME TO PEAK ELEVATION PROFILE

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	12



1. THE RESULTS PRESENTED HEREIN DO NOT REFLECT IN ANY WAY ON THE STRUCTURAL INTEGRITY OF THE DAM AND ARE NOT TO BE CONSTRUED AS SUCH. THE ANALYSES PRESENTED ARE BASED ON THE HYPOTHESIS OF DAM FAILURES.

2. THE LIMITS OF FLOODING SHOWN AND FLOOD WAVE TRAVEL TIMES ARE APPROXIMATE AND SHOULD BE USED ONLY AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.

3. TOPOGRAPHY IS FROM USGS 7.5 MINUTE QUADRANGLE SHEETS.

0 1 2

SCALE IN MILES

MAIN

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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
SKOKOMISH RIVER
CUSHMAN DAM NO.2 FAILURE
INUNDATION MAP

DATE:	DRAWN:	APPROVED:	FIG:
APRIL 81	E.G.	GSB	13

Station No.: 16A070 SKOKOMISH R NR POTLATCH Water Class: AA Latitude: 47 18 36.0
Water Body No.: WA-16-1010 River Mile: 5.30 Longitude: 123 10 33.0

Date	Time	Temp (C)	Flow (CFS)	Color (Pt-Co)	Conductivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)
80/01/17	1200	5.5	1760.0		52	11.7	92.8	7.3			0.000			0.010	0.000
80/02/07	1215	6.1	2500.0		46	12.1	97.5	7.1			0.080			0.030	0.000
80/03/19	1010	6.4	1380.0		55			7.2			0.000			0.010	0.010
80/04/10	1010	7.6	2230.0		46			7.3			0.000			0.040	0.000
80/05/15	1010		462.0								0.010			0.010	0.010
80/06/13	0800		320.0								0.000			0.010	0.000
80/07/10	0800		300.0												
80/08/21	0745		159.0												
80/09/18	0800		147.0												
83/10/03	0935	10.0	290.0	8	73	10.5	91.6	6.7	2.0		0.020	0.010 K	0.040	0.010	0.010
83/11/01	0945	9.4		8	78	10.4	90.9	7.2	3.0		0.010 K	0.010 K	0.080	0.010	0.010 K
83/12/05	0935	6.4	1130.0	4	72	10.4	83.6	7.3	2.0		0.020	0.010 K	0.090	0.030	0.010 K
84/01/03	0930	6.2	6560.0	54	50	13.5	107.1	7.3	360.0		0.030	0.010 K	0.040	0.060	0.010
84/02/21	0900	5.9	2720.0	17	51	12.7	100.7	7.2	28.0		0.010	0.010 K	0.090	0.020	0.010 K
84/03/26	0905	6.8	1430.0	17	58	12.5	101.6	7.1	1.0 K		0.050	0.010 K	0.070	0.020	0.010 K
84/04/23	0905	7.1		4	59	12.1	97.6	7.4	1.0 K		0.020	0.010 K	0.050	0.060	0.040
84/05/21	0850	7.2		8	60	12.2	100.1	7.3	4.0		0.010	0.010 K	0.060	0.020	0.010
84/06/25	0910	10.6		4	68	11.0	97.1	7.4	1.0 K		0.040	0.010 K	0.020	0.040	0.040
84/07/23	0905	10.8		4	77	10.3	91.6	7.3	5.0		0.050	0.010 K	0.040	0.080	0.040
84/08/27	0915	10.6		8	76	9.0	80.0	7.2	1.0 K		0.030	0.010 K	0.050	0.060	
84/09/25	0925	9.2		4	75	9.6	82.0	7.2	13.0		0.020	0.010 K	0.060	0.020	0.010
84/10/29	0855	6.9	486.0	4	70	11.5	92.8	7.5	1.0 K		0.020	0.010 K	0.080	0.050	0.010 K
84/11/27	0905	4.9	1510.0	13	57	11.9	94.6	7.1	2.0		0.010 K	0.010 K	0.080	0.020	0.010 K
84/12/17	1000	6.0	1630.0	29	64			7.2	7.0		0.020	0.010 K	0.110	0.030	0.010 K
85/01/21	0940	5.7	720.0	4	68	12.2	95.0	7.0	1.0 K		0.010	0.010 K	0.080	0.040	0.010
85/02/27	0945	5.6	799.0	8	66	12.8	99.1	7.2	4.0		0.010 K	0.010 K	0.050	0.020	0.010 K
85/03/25	1005	5.2	1160.0	4	59	12.8	99.5	7.3	1.0 K		0.010	0.010 K	0.070	0.010	0.010 K
85/04/22	1100	7.6	628.0		67	11.7	96.8	7.4	2.0		0.020	0.010 K	0.070	0.020	0.010 K
85/05/28	1030	9.4	508.0	4	68	10.5	91.0	7.4	1.0 K		0.020	0.010 K	0.040	0.020	0.010
85/06/24	1120	9.1	353.0		104	10.6	90.0	7.2			0.010	0.010 K	0.040	0.080	0.010 K
85/07/29	1030	9.8	194.0		80	10.1	88.5	7.3			0.010	0.010 K	0.030	0.050	0.020
85/08/26	0940	9.8	159.0		76	10.0	87.1	7.4	1.0						
85/09/23	0940	9.4	233.0		84	9.7	83.1	7.4							
85/10/28	0935	7.8	5040.0		55	11.4	93.6	7.2	51.0						
85/11/18	0955	5.6	1050.0		64			7.8	6.0						

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MASON CO. PLANNING DEPT.

Remarks codes: U,K - Below reporting limits; B - analyte found in blank; X - many background organisms; J - Estimate; S - Spreader colony.

16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Temp (C)	Flow (CFS)	Color (Pt-Co)	Conduc-tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)
85/12/16	1000	5.4	628.0		72	11.6	88.9	6.9	2.0		0.030	0.010 K	0.140	0.020	0.010 K
86/01/27	0905	5.6	1620.0		61	11.7	92.5	7.2	11.0		0.050	0.010 K	0.120	0.010	0.010 K
86/02/24	1000	6.5	9320.0		41	9.8	79.0	6.9	260.0		0.030	0.010 K	0.060	0.180	0.020
86/03/24	0840	6.7	1490.0		57	12.1	98.1	7.1	11.0						
86/04/28	0940	6.8	971.0		58	12.0	96.8	6.8	4.0						
86/05/27	1030	9.9	834.0	21	71	10.9	95.2	7.3	3.0			0.010 K			0.020
86/06/23	0855	11.1	335.0		75	10.1	90.4	6.8	1.0 K		0.030	0.010 K	0.030	0.010	0.010
86/07/28	0845	10.2	200.0	4	76	10.2	89.4	7.1	1.0		0.010	0.010 K	0.040	0.010	0.010 K
86/08/25	0850	9.5	154.0	13	78	9.7	83.8	6.8			0.010 K	0.010	0.040		0.010
86/09/22	0940	9.5	145.0	8	75	9.7	83.2	7.0	2.0			0.010 K			0.040
86/10/27	0920	11.0	1790.0		64	10.9	97.6	6.9	26.0		0.010	0.010 K	0.210	0.040	0.020
86/11/17	0920	7.4	388.0		78	10.9	90.5	7.4	1.0 K		0.030	0.010 K	0.070	0.020	0.010
86/12/15	0920	6.7	1820.0		56	12.2	98.5	7.7	50.0		0.010	0.010 K	0.110	0.030	
87/01/26	0850	6.1	1640.0		58	11.8	94.0	6.8	11.0		0.020	0.010 K	0.100	0.010 K	0.010
87/02/16	0845	6.6	2510.0		55	11.9	95.9	7.5	15.0		0.660	0.010 K	0.050	0.030	0.010
87/03/16	0900	6.6	2280.0		59	11.9	95.8	7.5	4.0		0.070	0.010 K	0.070	0.020	0.030
87/04/27	0820	8.6	587.0		72	10.8	91.3	7.4	1.0		0.020	0.010	0.040	0.010 K	0.010
87/05/26	0905	9.5	440.0		66	10.4	90.1	6.6	1.0		0.010 K	0.010 K	0.040	0.020	0.020
87/06/23	1000	10.4	417.0		74	10.4	91.6	8.2	4.0			0.010 K			0.010
87/07/27	1045	11.2	227.0		77	10.4	93.6	7.0	1.0 K		0.020	0.010 K	0.040	0.020	0.010 K
87/08/24	1030	10.4	169.0		79	10.8	94.7	7.4	2.0		0.010	0.010 K	0.040	0.020	0.010
87/09/28	0830	8.4	136.0		79	10.0	83.0	6.6	2.0		0.010	0.010 K	0.060	0.070	0.010
87/10/26	0955	8.6	107.0		112	8.9	74.3	7.7	1.0		0.020	0.010 K		0.020	0.020
87/11/16	0950	7.8	447.0		74	11.1	92.2	7.6	6.0		0.010	0.010 K		0.010	0.010
87/12/28	1035	6.4	485.0		77	11.5	92.4	8.3	6.0		0.020			0.010	0.010
88/01/25	0945	6.2	807.0		67	12.5	98.4	7.1	1.0		0.030			0.020	0.010
88/02/22	0910	6.6	764.0		75	12.3	98.7	7.1	1.0 K		0.010			0.020	0.010
88/03/28	0910	5.6	2130.0		56	12.3	95.2	7.5	17.0		0.010			0.010	0.010
88/04/25	1010	7.7	587.0		74	12.8	104.9	8.0	2.0		0.010 K			0.010	0.010 K
88/05/23	0925	8.9	729.0		68	12.8	108.1	6.6	1.0		0.010				0.020
88/06/27	1000	10.5	403.0		78	11.6	102.2	6.7	1.0						0.010
88/07/25	1000	11.7	244.0		76	10.6	95.7	7.7	1.0 K		0.020			0.010	0.010
88/08/22	0940	10.0	194.0		78	10.7	93.5	6.9	1.0		0.010			0.010	0.010
88/09/26	0855	10.1	493.0		71	10.4	90.9	7.9	7.0		0.010			0.010	0.010
88/10/24	0950	9.0	410.0		74			7.4	2.0		0.010			0.010	0.010
88/11/28	0930	6.4	2230.0		57	11.9	94.6	6.7	10.0		0.010			0.090	0.010

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16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Temp (C)	Flow (CFS)	Color (Pt-Co)	Conduc-tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)
88/12/26	0935	5.1	890.0		69	12.1	93.3	6.6	1.0 K		0.020			0.080	0.010
89/01/23	0945	5.3	1330.0		63	11.8	92.0	6.9	8.0		0.010			0.090	0.010 K
89/02/26	0840	5.2	1590.0		56	12.8	98.5	7.6	5.0		0.010 K			0.020	0.010
89/03/27	0930	6.2	2000.0		57	12.2	98.2	6.6	10.0		0.010			0.020	0.010
89/04/24	0930	7.5	1253.0		62	11.6	96.1	6.5	41.0		0.010 K			0.020	0.010 K
89/05/22	0925	8.7	628.0		70	11.3	96.3	6.9	13.0		0.010 K			0.010 K	0.010 K
89/06/26	0825	10.7	346.0		79	10.3		6.8	2.0		0.020			0.010	0.010 K
89/07/24	0950	11.0	346.0		71	10.2		7.1	2.0		0.010 K			0.010	0.010 K
89/08/28	0915	10.5	216.0		80	10.2	90.1	7.3	1.0 K		0.010 K			0.020	0.010 K
89/09/25	0850	9.7	132.0		77	9.7	85.2	7.7	1.0 K		0.020			0.030	0.010
89/10/23	0850	9.1	3400.0		52	12.0	104.7	7.6	74.0		0.030			0.050	0.010 K
89/11/27	0945	6.8	1240.0		67	11.7	93.9	7.7	57.0		0.010 K			0.020	0.010 K
89/12/18	0840	6.4	653.0		67	11.4	91.7	6.5	6.0		0.010			0.010	0.010 K
90/01/29	0900	5.5	4290.0		59	12.1	95.3	7.1	54.0		0.020			0.040	0.010 K
90/02/26	0815	4.8	1610.0		60	12.5	94.9	8.3	5.0		0.010			0.010 K	0.010 K
90/03/26	0920	6.2	1100.0		74	12.4	98.0	6.9	5.0		0.010			0.020	0.010 K
90/04/23	0840	8.0	1260.0		60	11.3	95.7	7.1	17.0		0.010			0.020	0.010 K
90/05/29	0835	9.4	563.0		66	10.9	94.5	8.2	2.0		0.010 K			0.010 K	0.010 K
90/06/25	0930	11.4	447.0		76	10.5	94.4	7.1	1.0		0.010 K			0.010 K	0.010 K
90/07/29	0945	11.9	250.0		110	10.0	91.5	7.5	1.0		0.010 K				
90/08/27	0820	10.2	200.0		82	10.1	88.4	7.3	2.0		0.010 K			0.010	0.010 K
90/09/24	0815	10.4	164.0		86	9.7	85.3	7.7	3.4		0.025			0.012	0.011
90/10/29	0950	8.1	1240.0		66	11.2	94.1	8.3	5.0		0.019			0.008	0.004
90/11/26	0915	7.0	4500.0 J		57	12.1	98.2	6.9	90.0		0.010 K			0.070	0.010 K
90/12/17	0800	7.0	1110.0		64	13.3	107.7	7.7	6.0		0.010 K			0.020	
91/01/28	0730	5.3	551.0		65			6.8	2.0		0.010 K			0.020	0.010
91/02/25	0810	5.9	1390.0		58	11.7	91.7	6.6	8.0		0.010 K			0.040	0.010 K
91/03/25	0820	6.9	738.0		75	11.2	92.3	6.3	4.0		0.029			0.010	0.009
91/04/22	0800	8.7	888.0		53	10.8	91.4	7.4	3.0		0.010 K			0.010 K	0.010 K
91/05/27	0810	8.9	485.0		80	11.2	94.9	7.7	4.0		0.010 K			0.010 K	0.010 K
91/06/24	0805	10.2	346.0		56	9.9	87.1	7.1	2.0		0.010 K			0.010 K	0.010 K
91/07/29	0735	10.4	216.0		81	9.9	87.0	7.5	2.0		0.013			0.010 K	0.010
91/08/26	0820	9.8	174.0		95	10.0	87.1	7.6	1.0		0.016			0.018	0.010 K
91/09/23	0830	9.1	256.0		82	9.9	83.7	7.4	1.0		0.012			0.018	0.011
91/10/30	1300	6.2	200.0		75	11.5	90.3	7.6	1.0		0.012			0.012	0.014
91/11/20	1145	7.9	9440.0		52	11.1	92.3	7.2	168.0		0.020			0.101	0.013

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16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Temp (C)	Flow (CFS)	Color (Pt-Co)	Conduc-tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)
91/12/18	1135	6.4	1130.0		59	11.6	94.6	7.4	6.0		0.020			0.011	0.010 K
92/01/29	1240	7.6	11300.0		43	11.2	92.3	6.7	137.0		0.029			0.112	0.010 K
92/02/26	1200	7.9	1560.0		52	11.6	95.9	7.3	9.0		0.010 K			0.019	0.010 K
92/03/25	1205	8.6	516.0		58	11.5	97.4	7.5	2.0		0.010 K			0.010 K	0.010 K
92/04/29	1220	9.4	2580.0		87	11.0	96.2	7.5	84.0		0.010 K			0.011	0.010 K
92/05/27	1215	11.7	371.0		65	11.0	99.7	7.4	1.0		0.010 K			0.018	0.012
92/06/24	1140	12.8	230.0		73	10.2	96.6	7.5	4.0		0.020			0.010 K	0.010 K
92/07/29	1240	12.4	185.0		74	10.2	94.9	7.5	5.0		0.022			0.018	0.010 K
92/08/26	1200	11.2	159.0		79	11.0	98.8	7.4	1.0		0.015			0.012	0.010 K
92/09/30	1205	11.5	208.0		74	9.6	87.9	7.5	1.0		0.014			0.010 K	0.014
92/10/28	0915	9.0	324.0		71	10.0	85.8	7.6	1.0		0.010			0.010 K	0.010 K
92/11/23	0820	6.5	1500.0		51	11.5	91.8	7.5	9.0		0.012			0.013	0.010 K
92/12/22	0935	6.5	881.0		61	11.1	88.8	7.3	2.0		0.010 K			0.010 K	0.010 K
93/01/27	0915	6.8	2420.0		43	11.7	95.0	7.1	25.0		0.010 K			0.034	0.010 K
93/02/24	0945	4.5	444.0		62	12.1	92.4	7.2	2.0		0.016			0.012	0.010 K
93/03/24	0905	5.9	2740.0		44	12.3	97.5	7.4	28.0		0.015			0.023	0.010 K
93/04/28	0830	7.4	2250.0		48	11.6	94.8	7.4	25.0		0.014			0.021	0.010 K
93/05/26	0835	9.8	684.0		62	10.8	94.1	7.2	2.0		0.010 K			0.010 K	0.010 K
93/06/30	0900	10.4	384.0		68	10.5	92.5	7.2	2.0		0.013			0.010 K	0.010 K
93/07/28	0830	12.9	285.0		71	10.0	94.2	7.3	4.0		0.010 K			0.011	0.010 K
93/08/25	0750	10.3	230.0		72	9.6	83.7		3.0		0.013			0.016	0.010 K
93/09/29	0915	9.4	159.0		74	9.8	85.0	7.2	2.0		0.010 K			0.010 K	0.011
93/10/25	0930	8.8	431.0		65	10.6	88.7	7.1	4.0	0.242	0.010 K			0.010 K	0.010 K
93/11/21	0850	8.4	296.0		72	10.1	86.3	7.5	5.0	0.158	0.010			0.014	0.010 K
93/12/19	0850	6.2	1290.0		51	11.8	93.3	7.1	12.0	0.231	0.018			0.016	0.010 K
94/01/24	0910	7.0	1960.0		49	11.6	95.4	7.0	24.0	0.188	0.016			0.021	0.010 K
94/02/21	0840	5.7	1620.0		57	11.9	94.6	7.4	10.0	0.147	0.010 K			0.014	0.010 K
94/03/28	0900	5.8	975.0		58	11.7	92.6	7.5	4.0	0.099	0.010 K			0.010 K	0.010 K
94/04/25	0950	7.4	618.0		56	11.2	93.3	7.7	2.0	0.068	0.010 K			0.013	0.010 K
94/05/23	0930	10.0	431.0		67	11.3	98.8	7.4	1.0	0.085	0.010 K			0.010 K	0.010 K
94/06/27	0840	10.5	402.0		70	10.3	90.8	7.9	2.0	0.095	0.013			0.010 K	0.010 K
94/07/25	1025	12.4	252.0		64	10.1	93.2	7.3	1.0	0.090	0.010 K			0.010 K	0.010 K
94/08/22	1030	10.8	180.0 J		74	11.2	100.2	7.2	1.0 K	0.117 J	0.010 KJ			0.030 J	0.014
94/09/26	1050	10.7	180.0		78	9.9	87.9	7.4	2.0						0.010 K
94/10/24	1110	8.8	257.0		71	10.3	87.6	7.4	2.0	0.103	0.076			0.023	0.006
94/11/28	1135	6.2	684.0		64	11.6	92.2	7.5	2.0	0.142	0.010 U			0.012	0.005 U

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16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Temp (C)	Flow (CFS)	Color (Pt-Co)	Conduc-tivity (umhos)	Oxygen (mg/L)	Oxygen Satur. (%)	pH (units)	Suspend Solids (mg/L)	TPN (mg/L)	NH3+NH4 Nitrog. (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)	Total Phosph. (mg/L)	Dissol. Ortho P (mg/L)
95/01/24	1055	5.8	1100.0		58	12.2	97.4	7.2	15.0	0.106	0.010 U			0.010 U	0.005 U
95/02/27	1130	6.2	1190.0		51	12.0	95.1	7.6	10.0	0.095	0.010 U			0.015	0.005
95/03/28	1100	7.2	1070.0		55	11.7	95.2	7.6	5.0	0.067	0.010 U			0.010 U	0.005 U
95/04/25	1150	9.2	768.0		63	11.3	97.5	7.8	2.0	0.024	0.010 U			0.021	0.005 U
95/05/22	1055	10.3	485.0		70	11.0	97.4	7.4	2.0	0.103	0.013			0.010 U	0.005 U
95/06/27	1120	12.0	313.0		68	10.5	95.9	7.5	2.0	0.082	0.010 U			0.010 U	0.005 U
95/07/25	0730	10.1	236.0		70	10.2	89.4	7.6	2.0	0.126	0.027			0.010 U	0.005
95/08/29	1030	10.6	208.0		76	10.0	87.6	7.6	1.0	0.085	0.010 U			0.010 U	0.005 U
95/09/26	1235	12.0	180.0		82	10.8	98.7	7.2	1.0	0.082	0.011			0.010 U	0.005 U
95/10/24	1040	8.4			68	10.7	90.1	7.9	4.0	0.112	0.010 U			0.013	0.005 U
95/11/28	1040	8.8			60	11.3	95.6	7.4	40.0	0.095	0.010 U			0.039	0.005 U
95/12/19	1040	7.8			62	11.7	95.7	7.4	76.0	0.103	0.010 U			0.036	0.005 U
96/01/30	1130	3.8			65	12.0	89.5	7.4	12.0	0.122	0.010 U			0.017	0.012
96/02/27	1110	5.5			60	12.1	95.2	7.5	7.0	0.091	0.010 U			0.012	0.005 U
96/03/26	1005	6.9			69	11.6	94.8	7.4	3.0	0.073	0.010 U			0.010 U	0.005 U
96/04/29	1035	8.5			54	11.3	94.7	7.6	14.0	0.069	0.010 U			0.013	0.005 U
96/05/28	1055	10.1			65	11.1	97.7	7.6	3.0	0.025	0.050			0.010 U	0.006
96/06/24	1035	10.9			70	10.7	96.6	7.6	2.0	0.059	0.010 U			0.011	0.005 U
96/07/30	1115	11.8			76	10.0	91.5	7.8	1.0 U	0.058	0.010 U			0.014	0.008
96/08/27	1155	15.8			76	10.0	100.2	7.6	1.0 U	0.085	0.010 U			0.019	0.006
96/09/24	1135	9.1			75	10.3	87.9	7.5	1.0	0.091	0.010 U			0.010 U	0.006
96/10/29	1005	8.0			61	10.5	87.6	7.5							

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16A070 Skokomish R nr Potlatch continued: more parameters.

Date	Time	Turbid-ity (NTU)	Fecal Colif. (#/100ml)	Unioniz Ammonia (mg/L)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
80/01/17	1200	2.0			0.110	
80/02/07	1215	7.0			0.130	
80/03/19	1010				0.070	
80/04/10	1010				0.070	
80/05/15	1010				0.030	
80/06/13	0800				0.040	
80/07/10	0800					
80/08/21	0745					
80/09/18	0800					
83/10/03	0935	1.0	10 J	0.000		
83/11/01	0945	1.0	53	0.000		
83/12/05	0935	2.0	1 J	0.000		
84/01/03	0930	190.0	20	0.000		
84/02/21	0900	28.0	3 J	0.000		
84/03/26	0905	4.0	3 J	0.000		
84/04/23	0905	1.0		0.000		
84/05/21	0850	2.0	4 J	0.000		
84/06/25	0910	4.0	3 J	0.000		
84/07/23	0905	1.0	11 J	0.000		
84/08/27	0915	6.0	17 J	0.000		
84/09/25	0925	2.0	13 J	0.000		
84/10/29	0855	1.0	15 J	0.000		
84/11/27	0905	5.0	5 J	0.000		
84/12/17	1000	6.0	6 J	0.000		
85/01/21	0940	2.0	1 J	0.000		
85/02/27	0945	4.0	1 K	0.000		
85/03/25	1005	3.0	1 K	0.000		
85/04/22	1100	1.0	1 K	0.000		
85/05/28	1030	1.0	6 J	0.000		
85/06/24	1120	1.0 K	1 J	0.000		
85/07/29	1030		7 J	0.000		
85/08/26	0940		22			
85/09/23	0940		3 J			
85/10/28	0935		10 J			
85/11/18	0955		3 J			
85/12/16	1000		6 J	0.000		

Remarks codes: U,K - Below reporting limits; B - analyte found in blank; X - m[illegible] background organisms; J - Estimate; S - Spreader colony.

16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Turbid-ity (NTU)	Fecal Colif. (#/100ml)	Unioniz Ammonia (mg/L)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
89/01/23	0945	3.0	4	.1E-4	0.120	0.010 K
89/02/26	0840	5.0	4	0.000 K	0.110	0.010 K
89/03/27	0930	3.0	13	0.000	0.090	0.010 K
89/04/24	0930	1.0	3	0.000 K	0.060	0.010 K
89/05/22	0925	1.0	30	0.000 K	0.040	0.010 K
89/06/26	0825	2.5	10	.2E-4	0.050	0.010 K
89/07/24	0950	0.4	8	.2E-4 K	0.050	0.010 K
89/08/28	0915	0.4	39	.3E-4 K	0.050	0.010 K
89/09/25	0850	0.5	26	.1E-3	0.090	0.010 K
89/10/23	0850	28.0	35	.2E-3	0.150	0.010 K
89/11/27	0945	4.1	4	.7E-4 K	0.140	0.010 K
89/12/18	0840	1.8	5	.4E-5	0.140	0.010 K
90/01/29	0900	22.0	6	.3E-4	0.120	0.010 K
90/02/26	0815	2.9	2	.2E-3	0.100	0.010 K
90/03/26	0920	1.7	2	.1E-4	0.070	0.010 K
90/04/23	0840	2.8	49	.1E-4	0.050	0.010 K
90/05/29	0835	1.2	20	.2E-3 K	0.050	0.010 K
90/06/25	0930	1.0 K	29	.2E-4 K	0.050	0.010 K
90/07/29	0945	1.0 K	28	.6E-4 K	0.060	0.010 K
90/08/27	0820	1.0 K	29	.3E-4 K	0.050	0.010 K
90/09/24	0815	2.3	35	.2E-3	0.074 J	0.003
90/10/29	0950	3.9	15		0.121	0.010 K
90/11/26	0915	37.5	4	.1E-4 K	0.120	0.010 K
90/12/17	0800	2.5		.7E-4 K	0.140	
91/01/28	0730		15	.7E-5 K	0.140	0.010 K
91/02/25	0810	3.1	1	.5E-5 K	0.110	0.010 K
91/03/25	0820	4.6	3		0.062	0.010 K
91/04/22	0800	1.5	1 K	.4E-4 K	0.069	0.010 K
91/05/27	0810	1.0	10		0.043	0.010 K
91/06/24	0805	1.1	22		0.070	0.010 K
91/07/29	0735	2.2	28		0.086	0.010 K
91/08/26	0820	0.8	25		0.091	0.010 K
91/09/23	0830	1.0 K	6		0.086	0.010 K
91/10/30	1300	1.5	12		0.080	0.010 K
91/11/20	1145	54.0	46		0.209	0.010 K
91/12/18	1135	3.0	11		0.156	0.010 K

Remarks codes: U,K - Below reporting limits; B - analyte found in blank; X - many background organisms; J - Estimate; S - Spreader colony.

16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Turbid-ity (NTU)	Fecal Colif. (#/100ml)	Unioniz Ammonia (mg/L)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
92/01/29	1240	58.0	3 K		0.088	0.010 K
92/02/26	1200	5.9	1 K		0.100	0.010 K
92/03/25	1205	1.1	2		0.093	0.010 K
92/04/29	1220	31.0	77		0.062	0.010 K
92/05/27	1215	0.3	110		0.047	0.010 K
92/06/24	1140	0.3	7		0.086	0.010 K
92/07/29	1240	1.3	6		0.086	0.010 K
92/08/26	1200	1.6	22		0.070	0.010 K
92/09/30	1205	0.7	9		0.102	0.010 K
92/10/28	0915	0.3	9		0.091	0.010 K
92/11/23	0820	5.2	4		0.154	0.010 K
92/12/22	0935	0.6	7		0.154	0.010 K
93/01/27	0915	17.0	7		0.139	0.010 K
93/02/24	0945	0.5	5		0.135	0.010 K
93/03/24	0905	19.0	3		0.098	0.010 K
93/04/28	0830	14.0	6		0.076	0.010 K
93/05/26	0835	0.7	9		0.057	0.010 K
93/06/30	0900	0.3	18		0.053	0.010 K
93/07/28	0830	0.3	270 J		0.070	0.010 K
93/08/25	0750	1.5	29		0.084	0.010 K
93/09/29	0915	0.8	23		0.089	0.010 K
93/10/25	0930	2.0	31		0.158	
93/11/21	0850	1.6	110 J		0.091	
93/12/19	0850	6.5	6		0.184	
94/01/24	0910	14.0	2		0.107	
94/02/21	0840	6.1	2		0.122	
94/03/28	0900	1.7	1		0.076	
94/04/25	0950	1.1	2		0.065	
94/05/23	0930	0.5	17		0.031	
94/06/27	0840	0.6	18		0.050	
94/07/25	1025	0.5	18		0.052	
94/08/22	1030	0.7	74		0.054 J	
94/09/26	1050	0.5 K	15		0.072	
94/10/24	1110	0.5	20		0.085	
94/11/28	1135	1.4	3		0.127	
95/01/24	1055	8.7	2		0.083	

Remarks codes: U,K - Below reporting limits; B - analyte found in blank; X - m[illegible] background organisms; J - Estimate; S - Spreader colony.

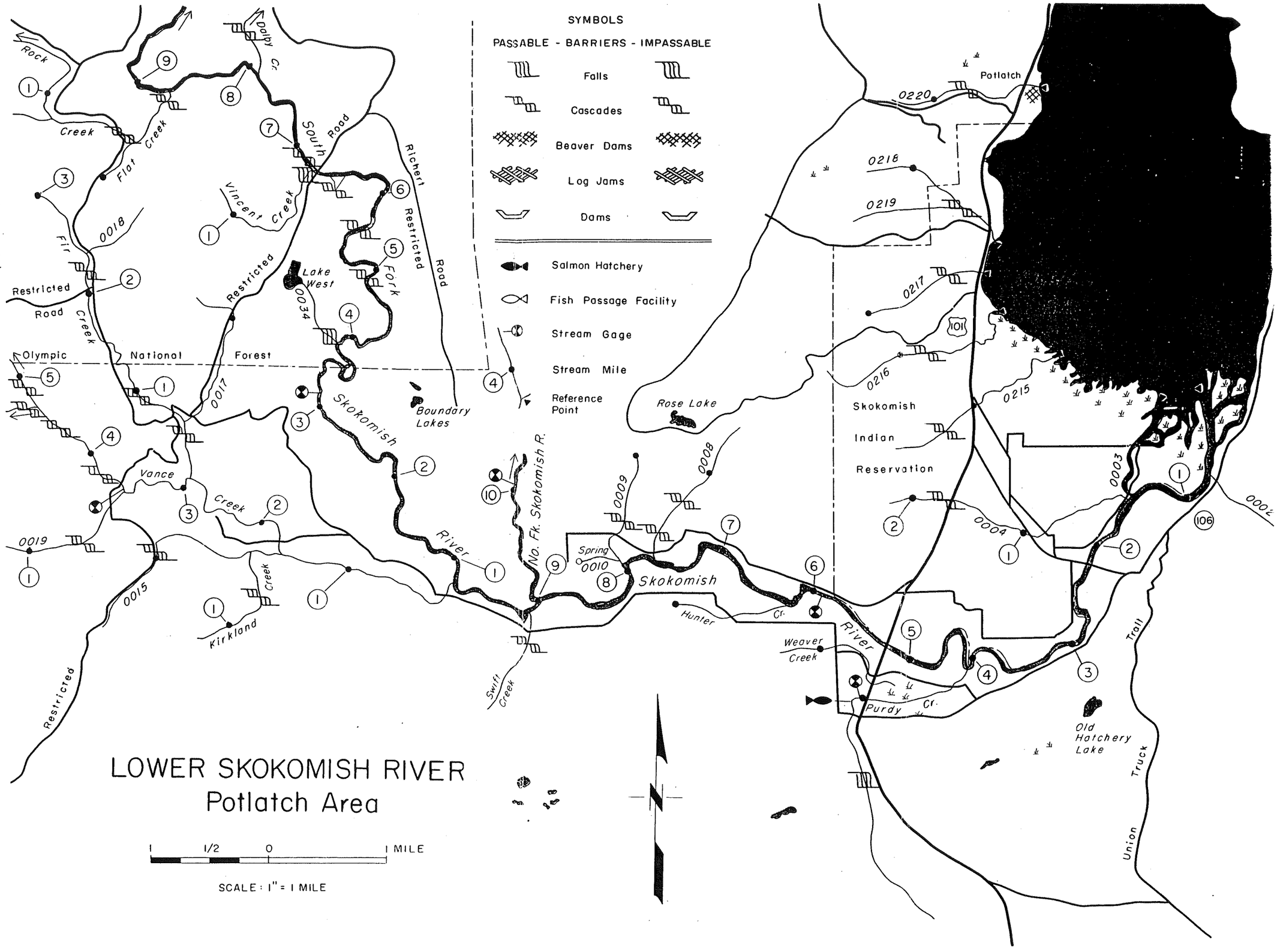
16A070 Skokomish R nr Potlatch continued: more dates.

Date	Time	Turbid-ity (NTU)	Fecal Colif. (#/100ml)	Unioniz Ammonia (mg/L)	NO2+NO3 Nitrog. (mg/L)	Dissol. Nitrite (mg/L)
95/02/27	1130	6.1	24		0.061	
95/03/28	1100	4.9	1 U		0.042	
95/04/25	1150	1.4	1 U		0.022	
95/05/22	1055	0.8	5		0.032	
95/06/27	1120	0.7	7		0.032	
95/07/25	0730	0.8	36		0.052	
95/08/29	1030	0.5 U	19		0.047	
95/09/26	1235	0.6	46		0.036	
95/10/24	1040	1.6	12		0.085	
95/11/28	1040	45.0	9		0.075	
95/12/19	1040	40.0	5		0.033	
96/01/30	1130	6.3	4		0.083	
96/02/27	1110	7.8	2		0.072	
96/03/26	1005	1.6	18		0.057	
96/04/29	1035	18.0	3		0.057	
96/05/28	1055	1.6	5		0.043	
96/06/24	1035	2.3	8		0.038	
96/07/30	1115	1.3	6		0.062	
96/08/27	1155	1.3	21		0.060	
96/09/24	1135	0.7	3		0.070	
96/10/29	1005					

Remarks codes: U,K - Below reporting limits; B - analyte found in blank; X - many background organisms; J - Estimate; S - Spreader colony.

APPENDIX LL.
RIVER MILE MAP

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997


SYMBOLS
PASSABLE - BARRIERS - IMPASSABLE
Falls
Cascades
Beaver Dams
Log Jams
Dams
Salmon Hatchery
Fish Passage Facility
Stream Gage
Stream Mile
Reference Point
Rock Creek
Flat Creek
Dalby Cr.
South Road
Richert Road
Restricted Road
Vincent Creek
Fir Creek
Restricted Road
Lake West
Fork
Olympic National Forest
Skokomish River
Boundary Lakes
Vance Creek
Kirkland Creek
No. Fk. Skokomish R.
Spring
Swift Creek
Hunter Cr.
Weaver Creek
Purdy Cr.
Rose Lake
Skokomish Indian Reservation
Potlatch
Old Hatchery Lake
Truck Trail
Union
0018
0017
0034
0019
0015
0220
0218
0219
0217
0216
0215
0009
0008
0010
0004
0003
0002
101
106
LOWER SKOKOMISH RIVER
Potlatch Area
1 1/2 0 1 MILE
SCALE: 1" = 1 MILE

APPENDIX MM.
LETTER FROM FEMA REGARDING DENSITY FLOODWAY

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Federal Emergency Management Agency
Region X
130 228th Street, Southwest
Bothell, WA 98021-9796

RECEIVED
NOV 19 1996
MASON CO. PLANNING DEPT.

November 14, 1996

Gary Yando, Director
Department of Community Development
Building 1, 411 North 5th Street
P.O. Box 578
Shelton, WA 98584

Dear Mr. Yando:

This letter responds to your request for additional guidance on how to submit the restudy of the Skokomish River to FEMA for approval. The County needs to complete the highlighted pages on the enclosed application for Revisions To National Flood Insurance Program Maps.

As proposed by Mason County, the revised study will not have a designated floodway. Therefore, on Form 4, "Riverine Hydraulic Analysis Form" you do not need to complete any of the information referring to a floodway.

Because there will not be a designated floodway on FEMA's map, the County is actually submitting a revised study with just flood elevations and no floodway data. The final FEMA maps will probably carry a note alerting the reader that Mason County has a density floodway and to contact the County concerning development requirements.

We have agreed in concept to a density floodway. However, we can not grant final approval until the revised study has been reviewed and approved by Washington D.C. Once they have reviewed and approved the flood elevations we will be able to further review the density floodway requirements and hopefully give final approval to the density floodway concept.

Please complete the enclosed application and submit it to this office. We will make every effort to expedite the review and approval process. If you have specific question regarding the completion of this form please contact Larry Basich our Regional Engineer at (206) 487-4703 or myself at (206) 487-4679.

Sincerely,

George M. Currin

George M. Currin
Mitigation Division

Enclosure
cc: Tim D'Acci, Department of Ecology

APPENDIX NN.
SEPA DETERMINATION

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

SEP96-0123

MASON COUNTY
DEPARTMENT OF COMMUNITY DEVELOPMENT

Planning-Landfill-Utilities

DETERMINATION OF NONSIGNIFICANCE
(WAC 197-11-340)

Description of Proposal:
Mason County Skokomish River Comprehensive Flood Hazard Management Plan.

Proponent: **MASON CO. DEPT. OF COMMUNITY DEVELOPMENT**

Location of Proposal: **SKOKOMISH VALLEY**

PARCEL#:SKOFLOODPLAN
The lower Skokomish River Valley from the confluance of the North and South Forks to it's mouth at the Hood Canal. The following sections are included:

Sections 1,2,7,8,9,10,11,12,13,14,15,16,17,18,22 ,35 of Township 21N, Ranges 3W, 4W, & 5W. Approximately 5,628 acres.

Lead Agency: **MASON COUNTY**

The Lead Agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed Environmental Checklist and other information on file with the Lead Agency. This information is available to the public upon request.

This DNS is issued under 197-11-340(2), the Lead Agency will not act on this proposal for **15** days from the date below. Comments must be submitted by **06/12/96**.

DATE: **05/28/96**

Gary Yando
Signature of responsible official

5-28-96
Date

Responsible Official: **Gary Yando**
Director of Community Development
426 W. Cedar,
PO BOX 578
Shelton, WA 98584
(360)427-9670

NON_SIG, rev: 10/30/92

APPENDIX OO.
AGENCY AND SKOKOMISH TRIBE COMMENTS ON DRAFT CFHMP

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Skokomish Indian Tribe
Victor Martino · Project Manager

8424 NE Beck Road, Bainbridge Island, Washington 98110
Phone 206-842-5386 Fax 206-780-5332 martino@interserv.com

MEMORANDUM
June 13, 1996

TO: Gary Yando, Director, Mason County Department of Community Development & Skokomish River Flood Planning Advisory Committee members

FR: Vic Martino, Project Manager, Skokomish Indian Tribe

RE: Upcoming Skokomish River Flood Planning Advisory Committee meeting to discuss April 1996 Skokomish River Comprehensive Flood Hazard Management Plan

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I have reviewed Volume I of the Flood Plan and think that our hard work over the last few years has paid off. The Flood Plan includes most of the elements of a sound plan.[1] With some additional work by the Planning Advisory Committee we should be able to quickly prepare the plan for presentation to the Planning Commission and public.

I am pleased you have scheduled a meeting of the Planning Advisory Committee for June 27 to review the Flood Plan prior to presenting it to the Planning Commission and public. This is the first time any of the PAC members have seen a complete draft of the Flood Plan—discussion among PAC members would be useful to plan strategy for readying the Flood Plan for presentation to the Planning Commission and public.

Based on preliminary review of the Volume I of the Flood Plan, many sections of the Plan appear to be ready[2] for immediate presentation to the Planning Commission and public. The remaining sections will require some relatively minor revisions.[3] In addition there is a need to acknowledge that the Flood Plan covers parts of the Skokomish River Basin in two governmental jurisdictions—Mason County and the Skokomish Indian Reservation—and that certain critical sections of the plan will require adoption by both government units. This will be very important to obtain approval of the Plan or parts of the plan from FEMA, and to facilitate implementation of projects. Some additions will also be necessary to include priority projects[4] on the Reservation not presently mentioned in the Plan.

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[1] Perhaps the most important thing missing from the Plan is a sense of priorities necessary to integrate recommendations for each major issue with overall goals and objectives and provide a clear direction for implementation of action plans. Many of the policy decisions on priorities have already been made, and simply need to be clarified in the Flood Plan.

[2] Recommendations for Issues 6, 7, 9 and 10 appear ready for presentation to the County Planning Commission and to the Skokomish Tribal Council for immediate review and adoption, with recommendations that their implementation be given high priority.

[3] Recommendations for Issues 1-5 & 8 will require some revisions prior to being presented to the Planning Commission and public for review and adoption.These changes are necessary to reconcile apparent internal inconsistencies and to ensure consistency of the Flood Plan with policy decisions of the PAC and relevant supporting evidence.

[4] For example, improvement of drainage along the River Road and at road crossings of Skabob

I would like to suggest a basic approach and strategy for the proposed Planning Advisory Committee meeting, and propose a couple of specific agenda items on the assumption that the objective is to get a Flood Plan adopted as soon as practicable.

I propose that the main purpose of the PAC meeting be to reach consensus on how best to get speedy review and approval for parts of the Flood Plan that require little or no revision, to identify places where revisions are needed, and to discuss proposed revisions for certain critical sections. Using this approach an *annotated* Flood Plan—showing deletions, additions, revisions and any deferrals for additional work—could be presented to the Planning Commission for adoption as a working document.

I believe that necessary revisions to the Flood Plan can be quickly accomplished by County and Tribal staff and other PAC members. I am presently working on proposed revisions to the Plan language for consideration by the PAC at our June 27 meeting, and plan to provide them for review prior to the meeting.

An example of where the Flood Plan fails to clearly present adopted policy is its ambiguous treatment of recommendations for flushing flows from the Cushman Project in combination with dredging to restore and maintain channel capacity. Contrary to County and Tribal policy, the Flood Plan fails to recommend substantial flushing flow releases from the Cushman Project [not to exceed bankfull on the mainstem] which County and Tribal consulting experts, resource agencies and the Federal Energy Regulatory Commission agree would have maximum effect in producing substantial and long-lasting flood reduction benefits by reducing or eliminating the Cushman Project's contribution to channel aggradation. The Flood Plan also appears to recommend against dredging to restore capacity of the main stem Skokomish River channel. The rationale for these recommendations is counter to existing knowledge and policy.

At the meeting, I would like to reserve time on the agenda for review of proposed changes that would make the Plan consistent with policy of the PAC, Flood Advisory Board, County and Tribe regarding provision of flushing flows from the Cushman Project, and the related need for and desirability of dredging.[5] Consistent with statements by Commissioner Hunter and members of the Flood Advisory Committee, I would like to propose initial dredging to restore capacity of the main stem channel be accomplished in conjunction with providing flushing flows from the Cushman Project designed to provide maximum sediment transport capabilities for the main stem.

Creek on the Skokomish Reservation.

[5] The Tribe has documented a decrease in channel capacity at the 101 bridge from 18,000 cfs to 5,000 cfs, an average rise in the bed of the main stem Skokomish River of 4.5 feet and concomitant rise in groundwater elevations extending nearly two miles from the river. The Mason County Board of Commissioners identified as an important goal of the Flood Plan "to restore and maintain the water and sediment carrying capabilities of the River system"—"...necessary to reduce flood hazard to life and property and to restore natural watershed/ecosystem functions in the Skokomish River and Hood Canal."

There is agreement by the Tribe, County, Department of Ecology, Valley residents, and consulting scientists and planners of the County and Tribe that progressively more frequent and severe flooding problems stem from unnatural filling of the river channel contributed to by forest practices in the South Fork and by the Cushman Project's diversion of the North Fork Skokomish out of the watershed. There is also agreement that if this root problem is not reduced or eliminated, all other flood protection measures except for abandoning large portions of the Valley will be rendered ineffective. If the root causes of unnatural channel aggradation are effectively addressed, the need for measures designed to treat symptoms of the problem will be reduced or eliminated.

Skokomish Indian Tribe
Victor Martino · Project Manager

8424 NE Beck Road, Bainbridge Island, Washington 98110
Phone 206-842-5386 Fax 206-780-5332 martino@interserv.com

MEMORANDUM
July 8, 1996

TO: Gary Yando, Mason County Department Community Development, and Skokomish River Flood Planning Advisory Committee

FR: Vic Martino, Skokomish River Flood Planning Advisory Committee member

RE: Suggested revisions to the April 1996 Skokomish River Flood Plan

The purpose of this memo is to provide for your review and comment work completed to date on proposed revisions to the Skokomish River Flood Plan. The revisions, which are acceptable to the Tribe, are intended to facilitate the greatest degree of consensus possible by the Planning Advisory Committee in preparation for presenting the Plan to the Planning Commission and public.

Consistent with the purposes of the Planning Advisory Committee and with my previous memo,[1] these proposed revisions are intended to help identify areas where consensus can be quickly reached and those where more work will be required. We need not and should not let absence of total unanimity on all aspects of the Plan block its implementation. Areas of the Plan where there is consensus can be immediately implemented, and work can continue to resolve remaining areas of disagreement.

The following suggested changes and rationale do not cover the entire Plan—they cover the Executive Summary and diking issues discussed in Chapter 6. It required a considerable amount of time to decide on a conceptual approach for modifying the plan to promote consensus with the minimum amount of changes to existing language. This task was made more difficult by the need to correct errors and omissions. Not surprisingly, this first complete draft of the Plan is flawed by internal inconsistencies, and misinterpretations by KCM of the PAC's work and certain past studies.

Revisions to the Executive Summary have addressed virtually all outstanding issues on a conceptual level—this will guide and greatlly simplify revisions to the body of the report. If PAC members find these suggested revisions helpful, I will complete the remaining sections of the Plan. Please give me your comments as soon as practicable so I can make necessary adjustments.

---

[1] See Memo from Victor Martino, Skokomish Indian Tribe, to Gary Yando, Mason County, and members of Skokomish River Flood Planning Advisory Committee, June 13, 1996.

DETAILED COMMENTS/PROPOSED REVISIONS (Covering` Executive Summary and Chapter 6 Diking Issues)

—EXECUTIVE SUMMARY, ES-1, INTRODUCTION. Make the following additions to third paragraph from bottom (fifth from top) to briefly identify and characterize adverse effects on flooding from upper watershed activities:

Two major resource development activities have been practiced in the upper subbasins of the Skokomish River watershed, dramatically altering environmental conditions in the upper and lower subbasins *and affecting flooding in the Skokomish Valley. These activities—logging in the South Fork and diversion of the North Fork out of the watershed by the Cushman hydroelectric project—have contributed to unnatural filling of the river channel, resulting in rising elevation of the river bed, diminished channel capacity, progressively more frequent and severe flooding, accelerated risk of channel migration, and higher ground water levels. The high rate of channel aggradation has been identified as a root cause of progressively more severe Skokomish River flooding problems.*

—EXECUTIVE SUMMARY, ES-2. Change the first new paragraph from top of page to clearly identify the Cushman Project's contribution to channel aggradation and correct misinterpretations of existing studies:

The reduction in flow from the North Fork Skokomish River *reduces sediment carrying capabilities of the mainstem and contributes to unnatural* ~~has been theorized to cause~~ aggradation in the mainstem Skokomish. ~~While there is still considerable uncertainty regarding this phenomenon, the river reach between the mouth and the confluence of the North and South Fork is indeed a depositional area.~~ The result is that *more* sediment transported from the upper watershed is ~~naturally~~ deposited in *the mainstem*~~this reach~~, raising its bed and decreasing its capacity to convey floodwaters *and sediment*, thus increasing flooding in the Valley.

—EXECUTIVE SUMMARY, ES-2. Add following language preceding and following last sentence of second new paragraph from top to describe purpose and membership of the Planning Advisory Committee, operation by consensus decision making, and briefly identify areas of consensus reached by the PAC. [These changes could be made into a new paragraph]:

The Planning Advisory Committee established by the Mason County Board of Commissioners included representatives from Mason County departments of Public Works and Community Development, Washington Department of Ecology, Washington Department of Fish & Wildlife, Skokomish Indian Tribe, the Skokomish Flood Control Advisory Board and Valley residents. The goal of the Planning Advisory Committee is to reach consensus that resolves the complex outstanding flood control issues in the Skokomish River Basin—where consensus cannot be reached areas of agreement and disagreement will be identified. The merits of potential alternatives were debated at length during regularly scheduled planning advisory committee meetings, *and decisions made by consensus. Consensus was reached on key goals and objectives and on actions appropriate to address several flood issues, including a basic method for regulating floodplain development consistent with FEMA regulations, policy for diking, and policy for reducing adverse effects of the Cushman Project.*

—EXECUTIVE SUMMARY, ES-2. It would be helpful to present Key Elements adopted by the Planning Advisory Committee for overall direction of the flood plan immediately before the ISSUES AND RECOMMENDATIONS section on page ES-2 [See pages 1-7 to 1-8].

—EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations. The following three items included under Issue 1—Lower Watershed Gravel Removal Recommendations, Mainstem Widening and Side-Channel Clearing Recommendations, and River Bank Stabilization Recommendations—do not fit well in this section because they go beyond addressing South Fork logging impacts. It would be better to include these sections as a separate issue that could be called "Lower Watershed Recommendations," and could be inserted following Issue 2 or following Issue 10. Regardless of how these sections are presented in the plan, they will require changes to make clear how they fit with other recommendations of the plan. and to make clear policy recommendations reached by the PAC, Mason County and the Skokomish Tribe.

The Skokomish Tribe supports restoration an integrated program of managed flushing flows from the Cushman Project combined with dredging of accumulated bedload as required to restore and maintain capacity of the channel to carry water and sediment. As we have previously stated, the Tribe believes that mechanical removal of accumulated bedload will be required in addition to managed flushing flow releases from the Cushman hydroelectric project to expeditiously achieve Tribal/County objectives of restoring and maintaining channel capacity. The Tribe's recommended integrated approach received consensus approval by the PAC.

The Tribe reiterates[2] its concern that pursuit of gravel removal projects that are not part of a comprehensive approach—that would increase the river's natural flushing capabilities—would jeopardize opportunity to use gravel removal as part of an integrated program to restore and maintain the river's natural sediment carrying capabilities. Piecemeal gravel removal proposals are generally held in disfavor by permitting agencies because of high environmental and financial costs and unproven flood reduction benefits. The Tribe has worked hard over the past several years to develop a comprehensive approach for restoring and maintaining channel capacity of the Skokomish River that would produce complementary flood reduction and environmental benefits, and receive resource agencies' approval for any necessary dredging.

The Tribe has serious concerns that piecemeal gravel removal projects would be ineffective in producing beneficial results, and would have high recurring economic and environmental costs that would render them infeasible. However, the Tribe would not object to initiating feasibility-level designs for these alternatives as part of a comprehensive plan to restore and maintain channel capacity and watershed functions. Integration with overall planning is necessary to guard against adverse effects and wasted effort. To facilitate consensus on as many elements of the Plan as possible, we have modified language of various recommendations for

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[2] See for example: Letter from Victor Martino, Skokomish Tribe, to Jerry Hauth, Mason County Director of Public Works, July 1, 1996; letter from Gordon James, Skokomish Tribal Council Chairman, to William O. Hunter, Mason County Commissioner, March 4, 1996; and letter from Victor Martino, Skokomish Tribe, to Jerry Hauth, Mason County Direetor of Public Works, January 24, 1995.

gravel removal to call for feasibility design studies—a necessary next step—rather than immediate implementation of these measures. We have also revised bank stabilization recommendations with the same objective.

—EXECUTIVE SUMMARY, ES-3, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Gravel Removal Recommendations. Insert the heading Lower Watershed Recommendations prior to Lower Watershed Gravel Removal Recommendations heading. Add additional language to make clear that Lower Watershed Recommendations are intended to complement recommendations to reduce or eliminate contributions to increased mainstem channel aggradation by upper watershed activities—including South Fork logging and Cushman hydroelectric project.[3] The following recommended changes would also describe PAC, Tribe and County recommendations for use of dredging as necessary in combination with flushing flow releases to restore mainstem channel capacity, and prioritize initiation of a feasibility-level study for an integrated flow augmentation/dredging program.

Lower Watershed Recommendations

A principal goal of this CFHMP is to restore and maintain the water and sediment carrying capabilities of the Skokomish River system. This will require addressing the root problems of channel aggradation by 1] reducing or eliminating unnatural sediment contributions from South Fork forest lands using methods identified in South Fork Watershed Recommendations, above; and 2] reducing or eliminating the Cushman Project's contribution to the river's reduced sediment carrying capabilities with managed flushing flow releases for the mainstem [See Issue 2, Cushman Project].

Lower Watershed Gravel Removal Recommendations

In addition to direct mitigation measures that address the root causes of increased mainstem channel aggradation, several *complementary* actions are recommended to mitigate sediment-related flood damages, further quantify sedimentation processes, and investigate innovative approaches to sediment management.

~~This CFHMP supports gravel management, but not extensive dredging of the river at this time, since initial analyses completed by the U.S. Army Corps of Engineers (COE) indicate that dredging would, on average, reduce flood levels only 0.35 feet for the 100year event. In addition, dredging of the low-water channel is likely to have a devastating effect on fisheries.~~

Consistent with adopted policy of the Planning Advisory Committee, Skokomish River Flood Advisory Control Board, Mason County Board of Commissioners and Skokomish Tribal Council, mechanical dredging is recommended—in combination with managed flushing flow releases from the Cushman Project—to the extent required to expeditiously restore mainstem channel capacity to carry water and sediment. Mason County and the Tribe have prioritized initiation of

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[3] Please see previous comments: EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations, which apply to Lower Watershed Gravel Removal Recommendations, Mainstem Widening and Side-Channel Clearing Recommendations, and River Bank Stabilization Recommendations.

a feasibility-level design for a dredging/flow augmentation program designed to effectively treat unnaturally high rates of channel aggradation in the mainstem Skokomish River, necessary to reduce flooding problems and restore natural watershed functions of the Skokomish River and estuary. The optimum flow/dredging combination would be determined through a program of testing and monitoring of managed flow releases and pilot removal of accumulated bedload.

—EXECUTIVE SUMMARY, ES-3, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Gravel Bar Scalping Projects to Increase Channel Capacity. The Tribe has serious concerns that piecemeal gravel removal projects would be ineffective in producing beneficial results, and would have high recurring economic and environmental costs that would render them infeasible. However, the Tribe would not object to initiating feasibility-level designs for these alternatives as part of a comprehensive plan to restore and maintain channel capacity and watershed functions. Integration with overall planning is necessary to guard against adverse effects and wasted effort. To facilitate consensus on as many elements of the Plan as possible, we have modified language of this recommendation for gravel removal to call for feasibility design studies rather than immediate implementation of gravel bar scalping.[4]

A *detailed feasibility-level design is recommended for a* program of gravel bar scalping ~~should be initiated~~ to increase channel capacity in river reaches where insufficient capacity has been documented. *The feasibility-level design would identify priority locations, estimate expected benefits, costs, and environmental impacts, and identify fit with overall plans for channel restoration.*

—EXECUTIVE SUMMARY, ES-3, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Feasibility Analysis of Sediment Exclusion and Ejection. To facilitate consensus on as many elements of the Plan as possible, we have modified language of the recommendations for gravel removal to call for feasibility design studies rather than immediate implementation of a sediment exclusion and ejection project.[5]

The feasibility of sediment exclusion and ejection alternatives should be determined through a detailed feasibility analysis. The feasibility analysis should include development of conceptual designs for the facility, collection of geotechnical information from potential sites, ~~and~~ *estimates of costs of implementation and operation, benefits for flooding, and environmental impacts. If the feasibility analysis is favorable, design and implementation of* ~~completion of~~ a pilot project of sediment removal and associated monitoring *should be accomplished. The feasibility analysis and any pilot project should be coordinated with overall plans for channel restoration.*

—EXECUTIVE SUMMARY, ES-3, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Mainstem Widening and Side-Channel Clearing Recommendations. To facilitate consensus on as many elements of the Plan as possible, we have modified language of the recommendations for mainstem widening and side-channel clearing to call for feasibility design studies rather than immediate implementation of this project.[6] Make the following changes to the first and last

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[4] Please see previous comments: EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations.

[5] Please see previous comments: EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations.

paragraphs of this section and add a new paragraph at the end of the section to clarify purpose of recommendation and need for integration with PAC approved flow restoration/dredging plans:

The purpose of this suggested project would be to reduce mainstem flooding and provide additional fish habitat. Detailed engineering, cost-benefit and environmental investigations are required to assess the feasibility of this proposal.

The following recommendations were developed *by the consultant* based on HEC-2 modeling results. The *modeling* results indicated that conveyance capacities could be increased by approximately 3,500 cfs in the reach of the river between US 101 and a point approximately two miles upstream of US 101.

Implementation of recommended actions relating to mainstem widening and *side* channel *restoration*~~clearing~~ will require the *consent* ~~cooperation~~ of the Skokomish Tribe, *and integration with planning for the PAC, County/Tribe recommended flow restoration/dredging program.* In addition, as is the case with any of the actions that may use, divert, obstruct, or change the natural flow or bed of the river, the Washington State Department of Fish and Wildlife (WDFW) *must* ~~should~~ be consulted prior to design and construction. ~~about any potential impact to fisheries and possible mitigation.~~

—EXECUTIVE SUMMARY, ES-4 to ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, River Bank Stabilization Recommendations. To facilitate consensus on as many elements of the Plan as possible, we have modified language of the recommendations for bank stabilization [last sentence of second paragraph in section] to call for a feasibility-level design rather than immediate implementation of these bank stabilization projects.[7] We recommend deleting discussion of the Church Dike on page ES-5 as a bank stabilization project—this section on Bank Stabilization should not include discussion a dike that is covered by adopted diking policy and is addressed with diking issues as part of Issue 8.

Completion of a feasibility-level design for bank protection using rock rip-rap *or bioengineering techniques—including design drawings, estimate of cost, description of expected benefits, identification of environmental effects, and fit with overall flood plan policies and plans*—is recommended in the following locations:

—EXECUTIVE SUMMARY, ES-5, ISSUE 2, CUSHMAN PROJECT. In second sentence of first paragraph in this section, replace "relicensing" with "licensing," which is more inclusive and accurate. [FERC has formally acknowledged that project facilities have never been licensed.]

Modifications to the operation of the Cushman Project are being considered as part of the *licensing* ~~relicensing~~ procedures being conducted by FERC.

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[6] Please see previous comments: EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations.

[7] Please see previous comments: EXECUTIVE SUMMARY, ES-3 TO ES-5, ISSUE 1, SOUTH FORK FOREST MANAGEMENT, Lower Watershed Recommendations.

OR Alternatively, any reference to relicensing or licensing could be omitted and the sentence changed to read:

Modifications to the operation of the Cushman Project are being considered ~~as part of the licensing procedures being conducted~~ by FERC *as part of proceedings to evaluate Tacoma Public Utilities' application for major license.*

—EXECUTIVE SUMMARY, ES-5, ISSUE 2, CUSHMAN PROJECT. Insert a new paragraph after the first paragraph in this section and make changes in last two paragraphs of this section to acknowledge consensus reached by the PAC, County and Tribe on treating Cushman impacts.

The Skokomish Tribe and Federal and State resource agencies have recommended to the Federal Energy Regulatory Commission that North Fork streamflow be restored in a way that substantially restores natural watershed functions and the mainstem's sediment carrying capabilities. Sediment transport capabilities of the mainstem would be optimized through managed flow releases from the Cushman Project, not to exceed bankfull levels on the mainstem. The Planning Advisory Committee endorsed this strategy as essential to reduce or eliminate Cushman Project contributions to future channel aggradation, consistent with maintaining flood storage provided by the Cushman Project and high summer recreational pool levels in Cushman Reservoir.

There is *uncertainty about* ~~disagreement on~~ the effect that *managed flushing flow releases* ~~partial or full restoration of flows~~ to the North Fork will have on flushing *accumulated bedload from* ~~sediments in~~ the mainstem river. Therefore, this CFHMP supports ~~pilot~~ testing of enhanced sediment transport through controlled releases from *the Cushman Project*~~Lake Cushman~~ *to determine optimum flushing flows and the extent that mechanical removal of accumulated bedload will be necessary to restore channel capacity. Mason County and the Skokomish Tribe believe that mechanical removal of accumulated bedload will be required—in combination with managed flushing flows—to fully restore mainstem channel capacity.*

The project should continue to provide flood hazard management benefits by limiting releases so that flows in the mainstem near US 101 do not exceed *bankfull levels, presently about* ~~approximately~~ 5,000 cfs. Mitigation for flood damages resulting from *Cushman Project-related* channel aggradation in the Lower Mainstem should be provided by Tacoma Public Utilities in the form of funding for flood hazard management projects recommended in this CFHMP.

—EXECUTIVE SUMMARY, ES-5, ISSUE 3, HIGHWAY 101 BRIDGE. Make following changes to last sentence of second paragraph in this section, necessary to integrate plans for improving highway 101 bridge with mainstem channel restoration plans and accomplish the necessary design study as an essential next step towards implementation.

~~The following actions should be completed:~~ *A feasibility-level design should be completed—in coordination with mainstem channel restoration proposals—to evaluate alternative methods and their costs and benefits for the following highway 101 modifications:*

—EXECUTIVE SUMMARY, ES-6, ISSUE 4, HIGHWAY 106 BRIDGE. Make the following changes to the last sentence of this section's first paragraph, necessary to integrate plans for

improving highway 106 bridge with mainstem channel restoration plans, and call for the design study necessary for implementation.

A feasibility-level design should be completed—in coordination with mainstem channel restoration proposals— to evaluate the costs, benefits and environmental effects of the following two alternatives *for increasing* ~~should be considered to increase~~ the effective area through which floodwaters can be conveyed:

—EXECUTIVE SUMMARY, ES-6, ISSUE 5. Make following changes to the last sentence of this section to make clear that :

It is critical that *the nature and extent of expected reductions in flood damages and* the impact on fisheries and riparian areas be *identified and evaluated* ~~considered~~ prior to implementation of any recommendations described above. *The Skokomish Tribe would require substantial proof of flood reduction benefits and lack of damage to fish habitat for proposals to remove streambank vegetation—streambank vegetation is generally acknowledged to provide natural protection from bank erosion and critical habitat for fish and* wildlife. The *Tribe would also require substantial proof of any expected reductions in flood damage expected from proposals to remove natural woody debris.*

EXECUTIVE SUMMARY, ES-8, ISSUE 8, DIKES. Make following additions to the last three paragraphs of this section to highlight direction provided by consensus diking policy recommendations of the Planning Advisory Committee and eliminate any inadvertent implication that low-level set-back levees were recommended for implementation by the PAC:

On October 24, 1995 the Planning Advisory Committee adopted a policy on dikes. *Agreement was reached that: "Diking is not a preferred alternative for addressing flooding in the Valley, but there are instances where dikes can provide legitimate flood protection." The Planning Advisory Committee recommended as a priority completion of a reconnaissance analysis of existing dikes to "to develop recommendations for removal, abandonment, or approval for maintenance and upgrading" to meet its approved minimum standards for dike construction, alteration and maintenance. Under the PAC's recommended diking policy, "Applications for construction, alteration and maintenance of dikes shall be considered on a case-by-case basis."* The *full* policy is presented in Chapter 6 and its adoption is recommended in this report.

The CFHMP includes design guidelines for construction of a low-level berm and a tabulation of maximum berm heights allowable under FEMA regulations. This information is provided so that it can be used *for any future planning concerning dikes.* ~~if the result of the process described in the policy indicates that a setback dike is the appropriate approach~~.

Prior to modification of the existing levee system, ~~or detailed design of any section of the low-level berm~~ a detailed reconnaissance report *on existing dikes* is recommended *as proposed by the Planning Advisory Committee*. The report would serve the following purposes:

—CHAPTER 6, PAGE 6-83, ISSUE 8, DIKES, BACKGROUND. Add a new paragraph at the beginning of this section on dikes to highlight and briefly describe diking policy adopted by the Planning Advisory Committee:

After considering technical analyses and modeling, historical experience, FEMA regulations and public opinion—the Planning Advisory Committee adopted a policy on the contentious issue of dikes. Agreement was reached that: "Diking is not a preferred alternative for addressing flooding in the Valley, but there are instances where dikes can provide legitimate flood protection." The Planning Advisory Committee recommended completion of a reconnaissance analysis of existing dikes to "to develop recommendations for removal, abandonment, or approval for maintenance and upgrading," consistent with its approved minimum standards for dike construction, alteration and maintenance. Under the PAC's recommended diking policy, "Applications for construction, alteration and maintenance of dikes shall be considered on a case-by-case basis." The full policy adopted by the Planning Advisory Committee on October 24, 1995 is presented near the end of this section. Immediate implementation of the diking reconnaissance study—necessary to carry out diking policies—is strongly recommended.

—CHAPTER 6, PAGE 6-84, ISSUE 8, DIKES, BACKGROUND. Modify following paragraphs to eliminate the misleading implication that the PAC recommended development of a low-level, set-back berm as an immediate measure to reduce flood hazards and briefly describe findings of analyses of the low-level, set-back berm alternative.

The Planning Advisory Committee for this CFHMP supports recommendations for watershed restoration, but also recognizes that the effects of *some of* these *restoration* activities—*e.g., measures to reduce sediment contributed from logged off lands in the South Fork*—will probably not be seen in the lower valley for many years. Therefore, the PAC recommended consideration *in the planning process* of interim measures that could be put in place immediately *to reduce flood hazard.* One of these measures is a low-level set back berm. This alternative had been discussed for some time but had not been investigated using a rigorous engineering approach as part of any comprehensive flood hazard management plan for the river.

During its March 30, 1995, meeting, the PAC unanimously recommended that the alternative of a low-level set-back berm be investigated and considered in the Final CFHMP. The rationale for considering a low-level berm was to contain *relatively low level floods* ~~flows~~ in the river corridor. ~~as they were in the past.~~ Therefore, a low-level berm for a relatively low return period, such as a 5-year flood, was to be considered.

In selecting a low return period flood for the berm height, the PAC recognized that most of the Valley bottom is floodplain and is inundated during extreme floods. Therefore, the PAC did not recommend high levees to prevent Valley flooding during extreme floods. For flows greater than a 5-year flood, the berm would overflow and the area outside of the low-level berms would be flooded.

Hydraulic modeling of the low-level, set-back levee alternative disclosed that the maximum flood that could be contained by a set-back levee allowable under FEMA regulations for the Skokomish River Basin was a flood that would be expected to occur on average about once every year, and would require a set-back levee an average of 2.5 in height to contain it.

Throughout the period of development and analysis of the low-level berm alternative, discussion also focused on potential alternatives dealing with the existing levee system in the valley. The

following sections provide a detailed discussion of *existing levees,* ~~both the new~~ *analyses and findings for the* low-level, *set-back* berms *alternative*, and the *PAC's adopted policy for existing* ~~levee system~~ and future levees.

—CHAPTER 6, PAGE 6-86, ISSUE 8, DIKES, EXISTING LEVEES. Modify the last sentence of the paragraph beginning on page 6-85 and the first sentence of the first new paragraph on page 6-86 to make clear that the extensive expansion and alterations made to the levee system in 1987 included the "Church Dike."

The levee was constructed—*or rather rebuilt and expanded at the approximate location of the "Church Dike,"*—of soils bulldozed from the surrounding property.

A geotechnical investigation of the existing levees, *including the "Church Dike,"* was completed in August, 1989.

—CHAPTER 6, PAGE 6-86, ISSUE 8, DIKES, EXISTING LEVEES. Delete the last sentence of the third new paragraph on this page and the delete following paragraph regarding the Church Dike.

~~This section of levee currently acts to prevent the river from changing course and flowing to the south side of the Valley.~~

~~If the Church Dike was removed, or failed during a flood event, floodwaters would flow toward the south side of the Valley from this location, possibly forming a new main channel. This sudden migration of the main channel during a flood could cause loss of life, extensive damage to existing property and roads, require reconstruction of bridges on US 101 to accommodate the new channel location, and damage or destroy all three fish hatcheries located on the south side of the~~ Valley~~. The consequences of a shift of the main channel of the Skokomish River to the south side of the Valley would clearly be catastrophic.~~

The Department of Ecology [with assistance of the Corps of Engineers and independent consulting engineers] determined that required permits were never obtained for original construction and subsequent modification and expansion of the Church Dike, that the dike is not structurally sound, that it blocks the natural floodway and causes increased flood hazard for others in violation of FEMA standards and other established policies and laws. The unauthorized Church Dike violates all of the policies and standards of the PAC's diking policy, and its illegal construction was a principal reason for exclusion of the County from the flood insurance program.

In addition to these adverse effects, there is no scientific or engineering evidence to support the assertion that the Church Dike—even if it were rebuilt or somehow made structurally sound—could effectively prevent a channel change to the south of the Valley. In fact a professional engineer consulted by Mason County about plans to expand and refurbish the Church Dike advised that diking this area, and diking in general would accelerate potential for channel change. Valley residents, the Tribe and Mason County agree that the threat of channel migration is aggravated by the unnaturally high rate of channel aggradation.

If the plan says anything specific about the Church Dike, we suggest the following language:

The Church Dike does not meet any of the PAC's basic standards for dikes and conflicts with other policies and laws. It has been demonstrated to be of sub-standard construction and to cause increased flood hazard for others. This dike and alternative ways to achieve the purposes it was intended to serve should be assessed as part of the recommended reconnaissance analysis of existing dikes, planning for relocation of high-hazard structures, and overall channel restoration planning.

It might also be useful to present additional quotes from assessments of the Church Dike by professional engineers, for example:

On February 22, 1985, consulting Engineer Wolf Bauer advised County Engineer Marley Young that a proposal to expand the Church Dike was a stop-gap measure that would actually <u>*increase*</u> *potential for a channel change:*

"In the final analysis, all of these measures are stop-gap in the long term issues. In the normal set of events, an accreting streamway will periodically cut out or split into low floodplain areas where eventually it will again raise itself to swing back and forth across the valley or delta. The longer the rising river bed is held in its present course with levees *and dikes, the faster will it elevate above the adjacent floodplain. Without access to a secondary relief channel, this river will saddle future taxpayers with the cost of ever higher levees and dikes along both mainstem and tributaries; possible pump stations; and/or continuous channel dredging at the expense of fisheries and recreation...." (Letter from Wolf Bauer, Consulting Engineer, to Marley Young, Mason County Engineer, February 22, 1985).*

On December 18, 1987, Department of Ecology Engineer Jerry Louthain reported to State Representative Doug Sayan regarding hazards caused by the expanded Church Dike:

"In summary, our concern with this construction activity, in addition to the fact that it was done without obtaining authorization under the Shoreline Management Act, the NFIP, or the Hydraulics Code, is the following:

1] The work results in an obstruction to flood flow within a designated floodway which tends to increase flood levels elsewhere.

2] The construction is substandard in that the material was not compacted and is not protected from erosion by any surfacing material which can result in adverse effects to water quality and fish habitat.

3] The substandard construction could result in a "blow-out" of the material during a major flood which could cause major damage to property and endanger the public.

4] The work done is inconsistent with the provisions of the Mason County Shoreline Master Program." (MEMO from Jerry Louthain, Department of Ecology, to Representative Doug Sayan, December 18, 1987).

Excerpts from Affidavit of Department of Ecology Engineer Jerry Louthan, December 2, 1988:

"8. Portions of the levee are inadequate even to contain a five-year flood event due to the lack of proper construction methods and materials, making it extremely susceptible to erosion from flood events of this magnitude. The height of the levee, however, is higher than a 100-year flood profile. A hydraulic study of this levee shows that its existence increases flood levels in the Skokomish Valley, thereby increasing the danger to lives and property in the event of a flood.

...

12. The Department of Ecology cannot support this levee project because it will encourage residential development in undeveloped floodplain land and the levee is an obstruction in the hydraulic floodway. The levee adversely influences the regimen of the Skokomish River and it increases the danger to life, health, and property from flood damages in the floodplain." (Affidavit of Jerry Louthain, December 2, 1988).

Letter from Leon K. Moraski, Corps of Engineers District Engineer, to Annette S. McGee, Chair of Mason County Commissioners, May 11, 1981:

":a. Site 2. Gravel Earth Dike West of Community Church. Our regulations which govern rehabilitation of damaged flood control facilities state in part, 'Any non-Federal flood control works constructed without having the necessary permit (s) will not be rehabilitated by the Corps under PL 84-99.' We have received a letter (copy inclosed) from the State of Washington Department of Ecology stating that they can find no permits for the dike's construction, reconstruction, or modification. Therefore, the Corps of Engineers will not be able to participate in any rehabilitation in this facility."

—CHAPTER 6, PAGES 6-86 to 6-87, ISSUE 8, DIKES, EXISTING LEVEES, Hydraulic Performance of Existing Levee System and The Sequencing Effect sections. These sections need to be revised by the consultant to objectively identify adverse effects of existing dikes as briefly described in FEMA's March 17, 1995 letter to Mason County and by Valley residents. As written, they contain assertions that are counter to existing knowledge and experience with dikes nationwide and in the Skokomish River Valley, and appear on their face to contradict rationale for the PAC's adopted policy on dikes and other technical analyses presented in the Plan that illustrate limitations associated with existing dikes. The rewritten sections should include FEMA's brief description of the inherent perils of dikes:

"...Whether they are called flood-control berms, dikes or levees they all basically have the same effect and problems. While they may offer a certain level of protection for one individual, at the same time the water is being detoured to someone else who does not have the benefit of a berm. Berms also offer a false sense of security, often being overtopped or breaking, flooding those they were supposed to protect. This has been seen in recent flooding events." (Letter from Federal Emergency Management Agency to Mason County Board of Commissioners, March 17, 1995, attached in Volume II).

Skokomish Indian Tribe
Victor Martino · Project Manager

8424 NE Beck Road, Bainbridge Island, Washington 98110
Phone 206-842-5386 Fax 206-780-5332 martino@interserv.com

MEMORANDUM
October 4, 1996

TO: Gary Yando and Ryan Windish, Mason County Planning

FR: Vic Martino

RE: Revised Executive Summary for Skokomish River Comprehensive Flood Hazard Management Plan incorporating additional changes recommended by Planning Advisory Committee at September 26, 1996 meeting

As directed by the Planning Advisory Committee, County Engineer Jerry Hauth and I worked out mutually acceptable language for the last few additional changes to the Executive Summary which were identified at our September 26, 1996 meeting. These changes were incorporated with other approved changes into a revised Executive Summary for the Skokomish River CFHMP, which is attached for your final review. I double-checked the revised version to make sure it accurately reflects changes approved by the PAC. I have marked places where additional changes were requested by the PAC and made by Jerry Hauth/me.

I understand that Ryan Windish will work with other PAC members [I will help] to make changes in the body of the CFHMP necessary to ensure consistency with approved changes in the Executive Summary and to correct some inadvertent errors. These changes will be kept to the absolute minimum necessary for these purposes. The revised CFHMP would then be forwarded to the Planning Commission for final public review and adoption.

RECEIVED
OCT 0 4 1996
MASON CO. PLANNING DEPT.

JUN 14 1996
MASON CO. DCD

WASHINGTON STATE DEPARTMENT OF
Natural Resources

JENNIFER M. BELCHER
Commissioner of Public Lands
KALEEN COTTINGHAM
Supervisor

June 7, 1996

Mason County
Department of Community Development
Attn: Mr. Gary Yando
426 W Cedar
PO Box 578
Shelton, WA 98584

Subject: Skokomish River Comprehensive Flood Hazard Management Plan (DNR SEPA File No. 10332)

Dear Mr. Yando:

I reviewed the Mason County Skokomish River Comprehensive Flood Hazard Management Plan (Plan) on behalf of the Department of Natural Resources (DNR), Aquatic Resources Division. There are a number of issues discussed in the Plan that impact or could potentially impact state-owned aquatic lands (SOAL). These include the recommendations for lower watershed gravel removal, mainstem widening, side channel clearing, and river bank stabilization.

Any project on or directly impacting state-owned aquatic lands will need a use authorization from DNR. Please contact Terry Roswell at (360)825-1631 for information.

DNR supports gravel removal projects which, with a positive benefit to cost ratio, directly reduces flood hazards to present infrastructure. However, any gravel removal from SOAL must be in accordance with Chapter 332-30 WAC. For example, DNR will not consider sand and gravel removal when that removal "will cause unstable hydraulic conditions detrimental to fish, wildlife, public health, and safety" (WAC 332-30-163(12)(c)). In addition, DNR must condition sand and gravel removal leases to allow removal of only that amount which is naturally replenished on an annual basis (WAC 332-30-163(14)).

Any gravel removal, mainstem widening, side-channel clearing, and river bank stabilization project should help promote the stream channel complexity sub-goal of the April 30, 1996, Draft Model Wild Salmonid Policy of the State and Tribes of Washington State. This sub-goal is "to maintain natural stream channel characteristics for: channel sinuosity; gravel quality; diversity and stability; instream cover; large woody debris; pool depth and frequency; and, bank stability." Please contact Steve Keller from the Washington State Department of Fish and Wildlife at (360) 902-2565 for additional information.

Any economic analysis of the cost/benefit of specific projects to reduce the hazards of flooding

in the lower Skokomish River valley should include the costs of maintenance. For example, it would take many years of sediment source control in the upper watersheds before reaching sediment equilibrium. Any plan for gravel scalping or mainstem widening as a method of flood hazard management should factor in the costs of years of maintenance. The only options without significant long-term maintenance costs appear to be acquisition, flood plain development regulations, and the warning and response program.

If you have any questions or if I can help in any way, please call me at (360) 902-1281.

Sincerely,

Lee Stilson

Lee Stilson, Environmental Planner
Aquatic Resources Division
PO Box 47027
Olympia, WA 98504-7027

c: Steve Keller, Washington Department of Fish and Wildlife
Chris Parsons, CTED
Dave Dietzman, SEPA Center
Dave Kiehle, South Puget Sound Region
Rick Cardoza, South Puget Sound Region
Terry Roswell, South Puget Sound Region
Lisa Randlette, Aquatic Resources Division

kw/stilson/alea2/yando.ltr

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

August 20, 1996 Fax

Mr. Gary Yando, Director
Mason County Department of
Community Development
P. O. Box 578
Shelton, WA 98584

RE: Comments on the Skokomish River Comprehensive Flood Hazard Management Plan, April 1996 Version - FCAAP Grant No. G9400224

Dear ~~Mr. Yando:~~ Gary

This letter will provide you with a status report on the Department of Ecology's coordinated review of the above-referenced plan. It represents comments from many of the various areas of interest within Ecology, including the Shorelands and Water Resources Program, Water Quality Program, and SEPA. Further review steps need to be completed, including the compilation and coordination of comments from the Washington Department of Fish and Wildlife, the Skokomish Tribe, the Federal Emergency Management Agency (FEMA), and other interested parties. The issues and concerns noted by Ecology and these other parties must be addressed and resolved to some mutually acceptable degree before approval of this plan can be finalized.

In general, the plan is well done and analytically sound. All of the requirements as established under WAC 173-145-040 have been addressed and adequately documented. The plan provides very comprehensive and intensive analyses on many mandatory and additional issues, but some of the alternatives would require further study to ensure sufficient documentation before they could be considered for implementation. Ecology comments focus on concerns that deal with the future implementation of the plan regarding environmental impacts, regulatory issues, and to assist in assuring that flood hazard reduction benefits are maximized to the extent possible.

We would like to comment initially on a general issue. The plan contains several measures that have varying environmental impacts and varying utility in terms of flood hazard reduction effectiveness. We encourage the County to prioritize these measures or develop some methodology and rationale for prioritization that includes: cost-effectiveness, technical feasibility, degree of flood protection (hazard reduction) provided, and environmental impacts. Also, some evaluation of which combinations of measures best

meet these criteria should be developed, which specify the degree of coordination and integration among them. Ecology suggests that Mason County's prioritization of alternatives place the highest emphasis on:

A) Elevation, acquisition, and relocation of repetitive loss structures.
B) Implementation of development regulations commensurate with flood hazard risks.
C) Flood warning and emergency response system improvements.
D) Measures addressing the overflow conditions at the Highway 101 bridge.

or specific rojects plementation ms could be eveloped that clude these nalyses & take into account permitting requirements

Another general comment is directed to any alternatives regarding diking, gravel removal, vegetation removal, and channel modifications. Further analysis of the environmental and hydrological impacts of any such projects would be required before implementation. This would be necessary in order to determine the true costs associated with these actions and the need for any concomitant mitigation and to assure that any such project will achieve its intended purpose(s) in a cost-effective manner.

A final general comment is directed to any recommendations that require action by an entity other than Mason County, e.g., Simpson Inc., Tacoma Public Utilities (TPU), U.S. Forest Service, or Washington State DOT (WSDOT). Such recommendations should include provision for written agreements with that entity stipulating their concurrence with the proposed actions and identifying the responsibilities of both the County and that party.

Specific comments are as follows:

statement referencing commitment to value of

1. In the Executive Summary some description of the activities and contributions of the various parties participating in the planning process should be provided, including discussion of the key elements adopted by the Planning Advisory Committee (PAC).

2. Issue 1 in the Executive Summary and in Chapter 6 (pp 6-14 to 6-45) seems to range very far afield in terms of topics and proposed actions. The relationships between the sub-issues and specific actions noted within this issue to the other related major issues should be clarified and referenced.

Q concerns specific projects will be addressed in implementation plans using most recent data.

3. Chapter 3, pages 3- 7 to 3-10, water quality data cited here is ten years old and does not accurately reflect present conditions. While Mason County must address water quality standards through other venues, development regulations, including the floodplain management ordinance, must take into account water quality concerns.

Development permits will address this issue

4. Chapter 4, page 4-11, the third bulleted item questions the effectiveness of on-site sewage systems in the Skokomish Valley. While the county must address this problem

through a separate but related venue, development regulations, including the floodplain management ordinance, must identify how this issue will be addressed.

5. Chapter 6, Issue 1, any recommendations that call for action on the part of the Simpson Timber Company or the U.S. Forest Service should provide for formal concurrence from those organizations, perhaps with written memoranda of understanding executed between the county and those parties.

6. Chapter 6, Issue 1 (pp 6-20 to 6-38), discusses gravel removal in the context of the lower watershed. A comprehensive approach to sediment management that looks at the entire watershed and promotes a systematic rationale that prioritizes methods and projects is needed. This may be accomplished by the development of a sediment management plan. Our technical review suggests that specific attention should be given to the area just upstream of the Highway 101 bridge.

7. Chapter 6, Issue 1 (pp 6-38 to 6-41), discusses Side Channel Clearing /Mainstem Widening measures that would have significant impacts on riparian habitat and on specific local residents, especially on the Skokomish Tribal Lands for the Skokomish River Slough project. These measures would have to be carefully studied in terms of environmental/hydrological analysis and the human safety issue on a site and project basis. Again, our technical review suggests that specific attention be given to the area just upstream of the Highway 101 bridge.

8. Chapter 6, Issue 2 (pp 6-45 to 6-54) Ecology supports the proposal to explore the utility of increasing flows in the North Fork as a way to increase the river's capacity to carry sediment and bedload. The increased flows must be managed and could include volumes up to and including full flows. An implementation plan that identifies flow volumes and durations, schedules, and a system for monitoring effects should be developed, including a written agreement with TPU.

9. Chapter 6, Issue 3 (pp 6-54 to 6-60) Any proposal dealing with modifications to bridges on Highway 101 should be thoroughly reviewed and analyzed by WSDOT, including costing out and potential for implementation. The removal of overbank vegetation and widening of bridge openings would necessarily have impacts on fish and wildlife habitat, so these measures would have to be coordinated with the Washington Department of Fish and Wildlife with the hope of stabilizing the overall fish and wildlife habitat. On page 6-53 it is stated that wider bridge on Purdy and Weaver Creeks would help drain the valley faster, which brings into question the benefits from clearing the north overflow, the Skokomish River Slough. This illustrates the need to coordinate combinations of measures to maximize effectiveness.

The impacts on existing structures and downstream effects resulting from these action should be specified.

Identify where his stands priority wise

10. Chapter 6, Issue 4 (page 6-61) further analysis is needed on the benefits and impacts of modifications to Highway 106. The County should identify its plans in regard to this.

Same as 6 + address range of standards

11. Chapter 6, Issue 5 (pp 6-62 to 6-67) the scope and concomitant impacts of removal of overbank vegetation and debris blockages needs to be defined. For example, when does a debris blockage become excessive? Also, earlier findings indicated that flood waters go overbank before they reach Highway 101; this needs to be addressed in the context of efforts to increase conveyance along the 101 corridor.

OK

12. Chapter 6, Issue 5 (page 6-67) the recommendation that property owners should implement onsite drainage projects should note the need for permits and the potential impact on wetlands.

Prioritization method

13. Chapter 6, Issue 6 (pp 6-67 to 6-73) should include an implementation plan for acquisition of flood-prone structures. Also, "no new footprint" stipulations should identify the inclusion of agricultural buildings as well as residential.

OK

14. Chapter 6, Issue 7 (pp 6-73 to 6-83) and Appendix DD the density floodway concept and implementation of it by ordinance has to be judged acceptable by the Federal Emergency Management Agency (FEMA). The clarity and enforceability of the density floodway provisions must be assured. If the County believes the citizens may reasonably appeal any of the specific limitations, the flexibility and range of any legitimate adjustment must be documented.

OK

15. Chapter 6, Issue 8 (pp 6-83 to 6-100) the implementation of the low level berm measure seems unlikely. The County needs to complete the establishment of its diking policy and reference it in the ordinance. A timetable for implementation should be identified. When regulations are cited, that regulation should be specifically identified and referenced, as is needed on page 6-90, third paragraph under the subheading. Dike standard No. 3b on page 6-96 needs to be firmly established regarding height in relation to level of protection. Also, on page 6-98 item 3, second paragraph, the last sentence should read "... should not create such a risk." Ecology strongly supports the recommendation for the completion and implementation of a dike reconnaissance report using the noted criteria.

OK

16. Chapter 6, Issue 9 (pp 6-100 to 6-108) Ecology concurs with the recommendation on page 6-106 calling for the County to use the available information to develop a prioritized program of floodproofing projects.

17. Issue 10 (pp 6-108 to 6-118) the County should address the benefits of the telephone notification system and gauging improvements installed in late 1995. Ecology strongly supports the proposal on page 6-117 to formally request the Federal Energy Regulatory Commission (FERC) to require TPU to install a warning system for dam failure. Any improvements to gauging and warning that would improve the level of protection for Skokomish River basin residents should be aggressively pursued, including the on-line computer capability for the Flood Control Zone District.

OK

A written response to these comments is requested, which can be included as an addendum to the adopted plan.

Please call Dan Sokol at (360) 407-7253, if you have any questions. Thank you for your attention and cooperation.

Sincerely,

Sue Mauermann

Sue Mauermann, Director
Southwest Regional Office

SM/DS:cl

cc: Tony Melone, KCM Inc.
George Currin, FEMA Region X
Jim Fraser, WDFW
Carol Jolly, Governor's Office
Victor Martino, Skokomish Tribe
Carol Fleskes, Manager, Shorelands and Water Resources Program
Mel Schaefer, Dam Safety/Floodplain Management
Gale Blomstrom, SWRO
Jeannette Barreca, Water Quality
Bonnie Shorin, Central Programs

APPENDIX PP.
CITIZEN COMMENTS ON DRAFT CFHMP

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

Guy L. Parsons
Chairman, Skokomish Flood Control Zone District Advisory Committee
Mason County, Skokomish River
Comprehensive Flood Hazard Management
PLAN
W-530 Bambi Farms Rd. Shelton, Washington 98584
427-3208

August 22, 1996

RE: Comments on the (CFHMP) *Due to the unclarity of the content of the "Public Notice" comment period, and the possible lack of understanding my concerns at the previous PAC meeting, my written comments are as follows:*

1. *ES-1 PARA. 3 The overall goal of the CFHMP...* Although a broad based goal exists for the plan. A mission statement, prioritized recommendations or key elements/goals of the (PAC) should be added in the ES.

2. *ES-2 PARA. 2 The reduction from the North Fork River has been "theorized" to cause aggradation in the mainstem Skokomish.*
Strike-out (has been theorized) ADD: (Does)
refer. ES-5 PARA. 1 Sentence 1 [extreme conflict]
{Simple hydrology principle: more water volume increases velocity and also transports more sediment. Lack of flow reduces this action and aggradation is evident, to what percent is another issue.}
Strike-out (While there is still considerable uncertainty regarding this phenomenon) Change to: The river reach between the mouth and the confluence of the North and South Fork is indeed a depositional area. The result is that sediment transported from the upper watershed is naturally deposited in this reach, raising its bed and decreasing its capacity to convey floodwater, thus ADD: (the accumulative effects of these two actions increase) flooding in the valley.

3. *ES-3 PARA. 1* The "other" major landowner in the South-Fork Skokomish watershed whose actions have affected flooding in the valley....
Strike-out (other) It seems inappropriate to say "other" when the U.S.F.S. on page ES-2 is not identified as a contributor to flooding through forest practices to include road building, road densities which exceed their own standards. To simply support recommendations is incomplete, this should include the U.S.F.S. as one of the contributors.

ES-3 3rd bullet Simpson should complete a watershed analysis for lands it owns in the Skokomish Watershed. DNR should be included in this sentence Simpson is not doing the current analysis alone. Also this is too broad a statement as no time frame is evident. Historical and current volume estimates...provided for use in a mainstem sediment balance.
Strike-out this sentence as estimates lead to biased conclusions, and this CFHMP should not be biased.

ES-3 PARA. 3 This CFHMP supports gravel management,...
Strike-out (but not extensive dredging of the river at this time, since initial analysis completed by the U.S. Army Corps of Engineers... In addition, dredging of the low-water channel is likely to have a devastating effect on fisheries.)
The Skokomish Tribe & (J.R.P.'s), valley residents, agriculture community and the S.F.G.Z.D.A.C. support dredging (removal of sediment below the wetted part of the channel). Immediate reduction of flood levels are a short term, short sighted analysis. Long term benefits could result in improving river hydrology, thereby improving capacities and fisheries.
The last sentence of this paragraph referencing to the devastating effect on fisheries is not acceptable. A dredging alternative must be developed with mitigating standards or procedures before this remark can be qualified. No one has suggested to just dig and sidecast material!

ES-4 PARA. 5 Last Sentence Bank protection using rip-rap is recommended in the following locations: In the paragraph proceeding this statement it is mentioned "Improperly designed bank stabilization projects can cause adverse effects to fisheries, promote erosion in the bank targeted for protection or other nearby riverbanks..." Bulleted is Five Mile corner for rip-rap. What sense does rip-raping this turn make when it could promote erosion downstream? Just rip-rap can increase stream velocity and cause adverse effects. How can this CFHMP support this? I suggest a rip-rap toe, L.W.D.and rock face with a bioengineered crest be an alternative. In other words a combination approach should be considered for these rip-rap recommendations. This recommendation of river bank stabilization is too either/or and may not be consistent with permits.

ES-9 PARA. 1 Individual property owners... Flood Audit for the Skokomish Valley. A complete Flood Audit for the Skokomish Valley was never done. The control point at the end of the valley is just beyond the Vance Creek confluence. This information is false and misleading.

ES-9 PARA. 7 Dam Failure? Can the CFHMP request a warning system from FERC or TCL? This looks good on paper, but what is the reality?

ADD:
ES-9 1/2 Issue 11 Dredging Recommendation and Engineering Standards

1-12 PARA. 4 South-Fork Watershed Analysis This section is incorrect, it has U.S.F.S. and D.N.R. Mixed up!

1-14 PARA. 2 DEIS- Cushman Hydroelectric Project. Strike-out this paragraph entirely. This is a draft document, Alternative 4 was never fully developed, this DEIS has no bearing on the CFHMP until a Alternative is approved and is only filler!

2-5 PARA. 6 No river mile map to reference this para.

2-12 EROSION erosion sites (Mass Wasting) historical before logging rates and after are not included. Another example of a biased report. (see mast wasting module in U.S.F.S. Analysis)

2-19 PARA. 5 Correction: Elk are found in the Skokomish Valley and a adjacent plateau.

3-7 Water Quality This data is too old to be usable. Conditions referenced could be misused. Especially when coupled with environmental concerns on specific alternatives/projects.

4-9 Roads and Bridges: This section is incomplete. No mention of roads, culvert failings, densities, in the upper-watershed or the loss of the 800 line bridge due to flooding.

4-10 Chronic Problem Areas: Nothing mentioned in the upper watershed. The reader must have a definite understanding to where the sediment is coming from when referring to *ES-2 Para. 2*

4-11 Has references regarding river miles again, no map for reference. I am bothered in all the monies spent in mapping and not a single simple river mile map is entered in the CFHMP!

5-28 & 5-29 Should include the Buy-Out option as a nonstructural measure. Also *5-9 first bullet* should be reworded or stuck out. Are these counties going to change their prevention ordinances to achieve consistency with the valley?

6-1 Issue 2 Diversion of the flow from the Cushman Hydroelectric Project has changed the hydraulic regime of the river, reducing its sediment-carrying capacity, ADD: (therefor contributing to aggradation), and causing increased flooding.

6-14 PARA 2 2nd Sentence. Strike out (The relationship between...remains unclear) It is clear that these activities relate to aggradation to the mainstem. Also the accumulated effects should be recognized and not always treated separately. As mentioned in the next sentence.

6-15 PARA. 3 The Simpson Timber Co. also plans to complete a watershed analysis for land it owns and manages. (This is a deception to the reader. State watershed analysis is done in Watershed Administrative Units WAU's, Thereby segmenting the watershed into manageable units and segmenting the ownership of lands. It will take more than (A) single analysis to do a watershed analysis for the lands this timber company owns.

6-20 Last PARA. Gravel bar scalping and "dredging" are mentioned as alternatives. Both of these options, need to be included in the CFHMP at this time!

6-22 Para. 4 2nd Sentence One of the goals of the CFHMP is to develop flood hazard management strategies that are, "to the greatest extent possible" consistent with tribal efforts and tribal values. The Skokomish Tribe, National Marine Fisheries Service, U.S. Environmental Protection Agency and others support mechanical dredging. It appears that "to the greatest extent possible is not being *exercised* when regarding dredging.

6-27 Dredging Analysis Approach 2nd PARA. 3rd PARA. An additional discussion of fisheries considerations ....is included below. (There is nothing included here by fisheries)
Also this Analysis is biased using only the C.O.E input, without mitigating possibilities to cost and environmental concerns from other agencies or groups.

6-67 Repetitive damages To Structures Located in High Hazard Areas. ADD to bulleted section: (Acquisition of structures to include a buy-out option are alternatives for those structures in the highest hazard areas and receive repetitive damages.)

6-118 First Bullet Vance Creek- Unsuccessful attempts were made...
Any gauging improvements and warning systems installed to improve conditions in the valley or help with ongoing studies or future modeling should be prioritized in alternatives or actively pursued.

Volume 2 Appendices Page 1 refer PARA. 6: Implementation of flood control measures set back berms, DREDGING, bank stabilization, gravel bar scalping and flood-proofing of individual structures.
Appendices Page 1 refer PARA. 2: Channel widening or deepening through Dredging operations.
{Referance that Dredging was considered by the SFCZDAC}

Closing Comment:

It concerns me that Dredging is not included as an alternative. I believe this needs to be included and work out the mitigating impacts if and when this alternative is utilized. This is a very common ground approach with the Skokomish Tribe, National Marine Fisheries Service, U.S. Environmental Protection Agency, and other JRP's, valley residents, agricultural community, all in agreement. One or two agencies standing alone does not constitute a rejection or majority opinion.

The Buy-Out Option needs to be included in the plan. The use of the left over $90,000 from the Ecology Grant should be applied towards the County's portion of matching funds to assure the FEMA Buy-Out.

My priorities as Chairman of the SFCZDAC *are:*

1. *Buy-Outs for East Bourgault residents.*
2. *Flood proofing of homes.*
3. *Riverine Projects after priorities have been made by the PAC.*

Thank-You,

Guy L. Parsons

A Skok Valley Resident Responds to the Agricultural Community's Review of the CFHMP

August 22, 1996

To: The PAC Board, the Planning Dept., the Commissioners, the Flood Advisory Committee, residents of the Skok and Mason County, the Journal, and all involved agencies.

From: Mark Sleeper, resident of the Skok Valley, E. Bourgault Road, the flood capital of the State.

(*I will be using agcom as an abbreviation for the Agricultural Community.*)

After receiving a copy of the agcom's review of the CFHMP and reading it through a couple of times, I felt it necessary to respond to a few key parts of it. The need to respond is further heightened by the large amount of influence the agcom wields in the Skok Valley as well as in the county. (They are heavily represented on the PAC Board, the Flood Advisory Board, and the Commissioners.) They also represent one of the oldest group of residents in the Skok Valley with lots of great insights into the history of the valley and the flooding issues. On the other hand, the agcom represents one of the most active groups of residents working in the river and manipulating it for their own benefit. For all these reasons, I hope others will also respond publicly to the agcom's review to help clarify any unclear issues and correct any inaccuracies so that the Flood Plan can go forward with everyone supporting it as close to 100% as we can.

I. Response to the Agcom's General Areas of Concern.

1) I agree that a "one stop shopping" permit process would be a good thing, not just for working n the river, but with all areas of city, county, state, and federal government regulations.

2) The agcom's wish to be exempt from Shoreline Regulations is a real puzzler.

a. Why? What is it about Shoreline regulations that seems so restrictive? Why not wish to be exempt from WDFW or COE or some other agencies? Or do you want to be exempt from all restrictions, and Shoreline is just the first to be mentioned? Or is it the 200 foot set back that is the main problem? If so, can that just be avoided by asking for an exemption?

These are important questions that we need the agcom to answer for themselves and the various agencies to answer for their agencies.

b. What does "maintenance to existing structures" mean to the agcom? Is it dikes? Or houses?

c. My understanding of the reason there is an inter-agency overlap of permits is because of the complexity of the eco-systems and spheres in which the work is to be done. River work is one of the most complex and we are discovering more interconnectedness every day.

d. My understanding of the Shoreline regulations is that they defer to whichever is the most restrictive. If our CFHMP says dikes are to be set back 300 feet from the river, then the Shoreline restriction of 200 feet is not enforced. Or if the Plan says 100 feet, then the Plan would be not enforced while the Shorelines 200 foot set back would be. My question again is: If the 200 foot set back is a state requirement, aren't all the agencies going to require that as a minimum? Can we avoid it by just asking to be exempt from Shorelines regulations? Plus its in our own Plan now...do we need to change it there too?

3) My recollection is that the PAC Board actually rejected the 5 year berm just like the Plan did.

More on this later.

a. The two events that the agcom are trying to connect in this concern (Cushman spillage & the .5 foot height for a 100 year flood event) are not connected at all. To connect them confuses the whole issue unnecessarily. The City of Tacoma, FERC, and the Tribe have assured us over and over again that the spillage is to occur only at non-flood times. That means the spillage has no effect whatsoever on the 100 year flood event, because there won't be any spillage at that time.

b. The height of the berm is connected to the height of a 2 year flood event due to modeling calculations done by the consultant, KCM, not the Cushman spillage. A 2 year flood event will occur quite often in the Skok valley, maybe 5 or 10 times, and when it does, Tacoma is supposed to turn the spillage off. So the problem the 2 year berm is trying to contain is the water from run off, not the spillage from the dam.

c. The amount of spillage, again, according to Tacoma, FERC, and the Tribe, is not to exceed the lowest bank full flow in the valley (approx. 4,000-5,000 cfs). That means the spillage in non-flood times will never even get close to approaching the 16,000 cfs flows of a 2 year flood event, or the predicted berm height.

Let me say it again: The two events have nothing to do with each other.

It makes me wonder, does the Agcom think it should work the other way too? Because the County has plans for gravel trapping and gravel bar scalping, should we reduce the .5 foot rise of water restriction to .25 foot rise? Should the berm height be lowered by that amount since the gravel trapping should provide some benefits in the river? No! Why? Because the two events are not connected in that way. Both are attempts to bring the river back into balance, not continue the cycle of imbalance added to imbalance that has gotten us to the problem stage we are in now.

d. At the top of page 2, the agcom seems to be grasping at straws.

1. The storage capacity question was addressed at the FERC hearings as a confusion over procedure. The storage capacity would still be the same amount as it is now and could be utilized in flood situations the same as now. It was more in reference to the fish needs, as I recall it, than for the flood protection. All the agencies agreed that food storage protection should not be sacrificed.

2. Neither the dam spillage or the dam storage should increase the flood hazard in the valley or jeopardize this Plan in any way. The spillage is for non-flood times and the storage is for flood times at the same level as it used to be, so everything should be just as the Plan was predicting these factors would be. The only people to be affected to any degree will be those of us on East Bourgault Road who hope to be bought out — not anyone upstream from 101.

The Plan will not be obsolete because of these events.

4) I will share more details on the aggradation problem when the agcom brings it up again, but a few general thoughts are needed here.

a. When the agcom talks about the 5 year berm alternative they continually forget 3 negative factors: its high costs, the difficulty in getting permissions from all the landowners, and the small amount of benefits it produces.

b. They also forget that they will have to convince Tacoma to double or triple their spillage (Even more than that if you calculate it from Tacoma's current 30 cfs!) to use this new agcom berm height. Would Tacoma agree to double or triple the lost power generation that that amount of water would represent? I doubt it! The Tribe and all the agencies can't get Tacoma or FERC to increase it from 240 cfs to 700, how is the PAC going to swing that deal? And what

will those flows mean to East Bourgault?? Or the Richert Ranch? Not likely, I would say.

c. If the increased flows do not scour the bed, then the 5 year berms have added to the problem by giving the river a new chance to aggradate higher than the banks. That gives the river even more of a chance to jump channel and create an even greater hazard to all the residents.

d. In addition to the costs, permissions, lack of benefits, the finished size of a 5 year berm seems almost monstrous. The agcom should have shared some of these dimensions so that every one could grasp how big it really would be. I think there is something in the Plan about this, buried in an appendix, but I can't put my fingers on it right now. Hopefully the agcom has already figured it out for us.

5) I wonder why the agcom is at this late point objecting to the "No New Footprint Zones"? Why didn't they bring them up last year when the consultants were here to answer their questions and help us work through the difficulties? Where was the agcom last year? Are they not adequately represented on the PAC Board virtually to the exclusion of everyone else— save a token citizen at large that we had to squawk about or it too would have been another member of the agcom.

By mentioning that the agcom can not endorse the "No New Footprint Zones" is the agcom tacitly declaring the inadequacy of the representatives on the PAC Board? If so, many of us complained of the same thing over a year ago to the commissioners, but with no corrective action taken to reappoint the representatives. Many of us are still disappointed with the choice of our representatives, the confusion of who our representatives really are, and most of all the course our representatives have taken on most issues. We are surprised the agcom feels the same way.

Now for the more detailed stuff!

II. NATURAL HAZARD?

(I would like to know who the "we" is that is speaking here for the agcom. Are Bill Hunter, the Johnsons, and Evan Tozier included as part of the agcom? How are we to know? I would also like to know why they didn't comment through the Flood Advisory Committee like they did on the last draft of the Plan. Why are they not identifying who they are?)

> *"We would not and could not define the Skokomish River Floodplain as an area of great natural hazards."*

1. If the agcom does not recognize the Skok River Floodplain as a natural hazard area, why do they want 5 year berms instead of 2 year berms? Why be worried about the loss of storage capacity at Lake Cushman? Or returned flows to the N. Fork? Or want exemptions from Shoreline to maintain existing structures (dikes?) or do erosion control or gravel removal? Or the need for a dike at the Church Corner? Or the fears that the river might jump its channel expressed by farmers like Joe Bourgault? Or why install a flood warning system like Joe Murray did?

The answer to all of these questions is the same: Because there is a natural hazard of living on a floodplain along a river...a natural hazard that has been increased to an unnatural level due to extreme changes in the environment; primarily clearcutting the forests, leaving unmaintained side casts roads, and the diversion of the North Fork.

2. The agcom's previous paper, the petition known by many as the "Pro-diking Petition", spent the first 3 or 4 pages proving that the situation in the valley should be defined as an "emergency" from an agricultural standpoint. An "emergency" situation sounds like an "area of great natural hazard" to me. On page 3 of the petition, the agcom says "...each year the flooding in the Valley becomes more of a burden for all valley residences." That also sounds like a hazardous situation to me, but maybe I'm missing something in the translation.

3. Many of us valley residents would agree that the Plan's documentation of the hazards could

newscasts would probably show the hazards quite graphically! The fact that a commissioner drowned in a flood shows there's a hazard...the agcom should remember that!

4. If anyone should be aware of the "great natural hazards" of the Skok Valley it should be the multi-generational families of the agcom. If they don't, something serious is wrong. Why haven't these agcom members expressed this belief in the last 4 years as members of the PAC Board? And if any members of the PAC Board do share this view of the agcom, they have no place working on a Comprehensive Flood Hazard Management Plan. They should be replaced immediately with someone who does see a hazard problem here and is actively seeking to solve it.

Hey! Maybe this is why the county has been working on this problem for 20 years with little success: the agcom has been in charge of it for all these years and they don't think there is a hazard that needs solving! How can you solve a problem if you don't even believe it exists? How can anyone solve a problem of drugs if they don't believe drugs are a problem?

The same would be true of flood hazards. Until we have a PAC Board who recognizes the hazard problems, we will never come to grips with solving it. Maybe all that is needed is for all the agcom members to come down to East Bourgault and spend one flood season. Then they might have a whole different perspective on the flood hazards. Then again if they missed it for all these generations after generations, maybe even coming to East Bourgault might not convince them. Hopefully if the Plan documents the damages a little more extensively then the agcom might be convinced...I'm not holding my breath, though.

5. I brought up the same issue of the lack of documentation in the Plan for damages 2 months ago on page 3 and 4 of my comments to the Plan. I'm glad both of us saw the same lack. In fact, I brought this problem up over a year and a half ago at the public meetings we had at the Hood Canal School. Maybe now it has a chance to get remedied since the agcom sees the same lack. But then, on the other hand, if the agcom with its large representation on both the PAC Board and the Flood Advisory Comm. is not able to express its wishes or get them reflected in the Plan, maybe this lack will still not be remedied.

I also stand by the fact that the damage amounts if documented will show a substantial increase in damages over the last few years. This documentation should also prove that the Skok indeed is an area of "great natural hazard."

III. CATASTROPHIC FLOODS

"The catastrophic flood event is not definitive. However, further study of the Plan leads us to believe that a catastrophic flood is any flood above a 2 year storm event."

Two major misunderstandings seem to be communicated by the agcom's comments in this section: one is the meaning of catastrophic, and the other is with the meaning of lessening the impact of floods on people and property.

1. As I read the Plan, the meaning of "catastrophic" seemed to be something on the magnitude of a 100 year flood or close to it...not a 2 year event or a 5 year event. The point is not "What size of floods are the Plan trying to prevent?" but rather "How can we lessen the impact of floods on people and their property?" All floods — 100 year ones, 50 year ones and 10 year ones — are out of the Plan's power to directly prevent...they have no "anti-flood dance" they can do anymore than the Tribe. There are no magic bullets. That is one reason I think they changed the name of the Plan. The name "Flood Control Plan" sounds like you can turn the floods on or off with a flick of a switch. (The only one who has that direct power is the City of Tacoma. With a flick of their spill-gate switch, they can directly produce a flood! But no one else has that direct power.) "Hazard Management", on the other hand, is the goal of "lessening the impact of floods on the people and their property."

The way to lessen impacts is by removing people from harms way (in the worst areas), flood proofing where feasible (in the next worst areas), and restricting construction throughout the valley — to keep people and property out of this great hazard area.

2. If the agcom is revising the definition of catastrophic to mean a 2 year event, then it would appear to go against their objection to the valley being a great natural hazard area. Catastrophic by definition means a great hazard or danger. If the agcom revises the Plan to define catastrophic as a 2 year event instead of a 100 year event, then the agcom is increasing the perception (even if not the reality) that the valley is a great natural hazard area. They are making things worse for themselves if they go forward with this wish.

If the valley was a non-hazardous area, they should be seeking to increase the definition of catastrophic to a 500 year event or 1,000 year event —everything smaller than that would be a safe amount from the agcom viewpoint.

3. The agcom comments failed to document why they think the Plan leads them to believe that a catastrophic flood is any flood above a 2 year storm event. Their reasoning from the quote on page 84 of the Plan was insufficent to prove to anyone that the Plan defines "any flood above a 2 year storm event" as catastrophic.

All of this is nonsense if there is no hazard in the valley. Looking at the Plan on Page 6-84 the agcom should have noted that it came from Issue #8 "Engineering Standards & Regulatory Compliance for Levees," not exactly the area you would expect to find a definition of a catastrophic flood. Page 1-11 of the "Introduction" uses "catastrophic" twice, both referring to events out of the ordinary.

"The Agricultural Community supported the 5 year low level set back berm."

4. Not only did the agcom support the low level set back berms, they were the ones recommending dikes all the way through the planning process! They even support building berms to encircle East Bourgault Road, making it a new lake, Lake Bourgault!

It makes one wonder if this was not an attempt to justify the berms — formerly called dikes and levees — already in place that were at the root of the 1987 DOE vs. Dikes controversy.

For the agcom to object to the Plan's diking recommendations makes me wonder who gave the newspaper the impression that the Plan was in alignment with those who signed the agcom's "Pro-diking Petition." Was it the Planning Dept. or the agcom? It seems like it would have to have been one or the other...or both! Whoever gave the newspaper that impression was obviously wrong, just like my letter to the paper pointed out. At least everyone now seems to be singing out of the same songbook.

Did the agrom switch its mind after reading the Plan in more detail? Why did they switch? Maybe they can run a follow up article or letter in the paper to clarify their change of mind.

"The elimination of the nuisance floods would be of great benefit to all the residents of the valley."

6. In the above sentence, which is the very next sentence in the agcom paper, they use the word the Plan & the PAC meetings & consultants always used to describe 5 year flood events and 2 year flood events: nuisance floods. Not catastrophic, but nuisance. It is unfortunate they didn't let the right word correct their wrong thinking after all the discussions and advice from the paid expert consultants.

Not all residents think they would benefit from more dikes. 130 residents signed a petition that said exactly that. And 130 is roughly half of all the petition signing valley residents — if non-residents and minors are eliminated from the "Pro-Diking Petition." For many of us on East Bourgault, the nuisance berms are a poor way to fight nuisance floods...just adding nuisance upon nuisance.

7. In the same sentence the agcom state that the elimination of the nuisance floods would be of great benefit to all the residents of the valley." What is this "great benefit to all the residents of the

valley"? If there is no "great natural hazard" to protect all of us residents from, what's "the great benefit"? The agcom needs more supporting documentation here.

In the same light, the next agcom sentence states ***"It is unfortunate that a 5 year low level set back berm will not be realized."*** Why is it unfortunate if there is no great hazard to be protected from in the valley? Something is really confused here.

8. Next the agcom states that the reason a 5 year berm was not realized in the Plan was ***"because of existing restrictions put in place by legislation and bureaucrats."*** The agcom failed again to substantiate or identify who or what they are talking about. Who are these evil legislators and bureaucrats, and what is this evil legislation they have passed? Is this another denial by the agcom that hazards exist in the valley...that the only problem is the law, the restrictions they don't like?

9. The agcom missed the point of its own quote from the Plan in the middle of the page. They bemoan the fact that a 5 year berm will not be realized and imply that a 5 year berm was recommended by the PAC Board. The quote said the opposite...as does my remembrance of the PAC meetings. The quote says that the PAC Board" recommended that the alternative of a low-level set-back berm be investigated and considered in the Final CFHMP." It was investigated and considered. And it was rejected.

What legislation caused it to be rejected? Was it the 1 foot rise restrictions ? Or the .5 foot restriction we adopted? Or was it the sub-standard construction and materials that were used on the existing dikes? Or was it because of the berms lack of benefit? Or because of their expense? Or was it because of the lack of universal support, since roughly half of the valley was for it and half against it?

Well, we do not have to guess on this one. The meeting notes of Sept. 14, 1995 tell us the answer. On page 3 of those meeting notes it says a "discussion paper explained the rationale behind the following key points of the proposal:

"1. Abandoning the 5 year continuous berm:

a. it lacks public support.

b. because it lacks public support, obtaining the easements to construct it would be difficult.

c. in selected areas it has been shown to violate FEMA standards.

d. the cost of construction would limit capabilitites to pursue other projects."

This quote also brings up 2 issues I let slide in my comments to the Plan dated June 12, 1996, but see the need to address now. I'm glad the agcom made note of this situation so that hopefully they can be corrected.

The first one is the quote itself that came from page 6-84 of the Plan. It communicates a misunderstanding of earlier PAC meeting and meeting notes that should have been corrected before they were published as meeting notes and even more before they were inadvertently recorded as fact in the Plan. Many of us residents brought this to the attention of Gary Cooper, Tony Melone, and Jay Smith on a number of different occasions but due to various reasons — one main one being personnel changes — the corrections were never made. I even communicated directly with KCM by phone trying to track down the corrections so they could be put into the Plan, but to no avail. The corrections were all lost in the shuffle.

This quote from page 6-84 was an especially glaring one. The meeting of March 30, 1995, from which the quote was taken, actually demonstrated that there was not unanimous agreement that the alternative of a low level set back berm be even investigated! Somehow Jay Smith recorded the exact opposite of what went on. PAC Board members Gary Cooper & Vic Martino were sitting on each side of Tony Melone and both spent considerable time trying to get Tony to clarify where this recommendation came from. Tony kept going around and around but never was able to say why it was chosen when all of us remembered that it was deliberately rejected as being one of the first 3 modeling scenarios to be studied by Tony. But here it was back again on the table of discussion at the meeting, even though no

one had recommended it. In fact, it was not just back, it was back with a vengence pushing its way onto the agenda, even though it had been rejected at the previous meeting. It was like it had a life of its own.

The quote in the Plan page 6-84 makes it sound like the PAC was all behind it, when it wasn't. It wasn't even supposed to be investigated at that time, but was pursued by Tony because of some unidentified background pressure. Jay's misrepresentation of the meeting needs to be corrected and clarified in the Plan so the wrong conclusions are not drawn from it like the agcom did in this most recent paper. We were afraid of this a year ago when we mentioned it to Tony Melone and Gary Cooper...and now it has come true.

I still recommend going back through all the meeting notes and correcting the various misleading statements, but it is now compounded further by having those inaccurate notes incorporated in the Plan itself. Our corrections may still be on a computer up there at KCM and Jay Smith might be able to locate them if needed. Otherwise a disclaimer in the Plan may be necessary.

The second confusion that needs to be cleared up in the Plan is on page 6-40 that I noticed as I was rereading it looking up the quotes the agcom supplied. **"Side-channel clearing and mainstem widening increases river conveyance capacity in the vicinity of US 101."** When I look at all the maps and tables in which this data is tabulated, I fail to discern any measurable increase in capacity in the vicinity of 101. The tables all show cross sections 24-30 as staying at less than 4,000 cfs with either dredging or side-channel clearing/widening. So where is this stated benefit of increased capacity? Is this another case of the consultants mis-informing us or mis-concluding for us? The data from the table seems to prove the point I made in my recent one page paper entitled **"The Enormity of the Problem of Flooding on East Bourgault"**.

This needs to be corrected or clarified in the Plan.

Back to the agcom comments on page 3 again.

9. The agcom concludes this section by saying:

> ***"Therefore a catastrophic flood now can be defined as all flood events greater than a two year event."***

"Therefore" because of what? The Plan and the meeting notes consistently defined a 2 year flood as a nuisance, not a catastrophe. (See March 30, 1995 meeting notes page 5.) Does this "therefore" mean "because the Plan is not recommending a 5 year berm therefore a 2 year blood event is now considered a catastrophic flood event to the agcom"? Is it catastrophic because they can't finish making their dikes all up and down the valley? Or because they can't justify keeping the dikes they already built?

If the agcom now thinks that a 2 year flood event is catastrophic, does this mean they have reconsidered their statement that there are no great natural hazards in the valley?? I hope so, otherwise it is questionable whether they should even participate in Comprehensive Flood Hazard Management Plans. The agcom definitely needs to support is conclusions better.

10. The next statement a little later by the agcom is even less substantiated.

> ***"Because the Plan will not reduce the damages caused by floods greater than the two year storm event, all the valley residences will not have flood protection but will only have structural damage prevention through restrictions."***

Whoa! Where did the agcom get that from?? Just because the Plan doesn't allow a 5 year berm are there no lessening of impacts on people and property in the Plan? What about the early warning system? What about floodproofing? What about buy-outs? What about gravel trapping or scalping? What about bank stabilization? What about scouring with N. fork water? Don't all of these lessen impacts on people and property even for a 2 year nuisance flood? Why throw the baby out with the bath? Just because they didn't get more dikes shouldn't mean the agcom throws out all help to the valley...but then again, maybe it does mean that for them. It sure sounds like it.

And even if it was "only" structural damage prevention through restrictions doesn't the agcom want to prevent structural damage as much as the rest of us?

Again I must ask a question I keep asking: Since the agcom wants to prevent damages caused by floods greater than 2 year storm events, does that mean they have changed their minds on the valley being of great natural hazards? I hope that is the last time I have to ask that same question...but you never know!

IV. GRAVEL & AGGRADATION

"The Agricultural Community does not endure this theory that the Cushman Dam is the inherent cause of aggradation."

1. The agcom's statement here is quite glaring. As I recall, this is the 8th Key Element adopted by the PAC Board for the Plan. Either the agcom members were not part of that PAC Board or they changed their minds after a year of thinking about it, which is another big problem. What are they going to change their minds on next? Especially now that Gary Cooper and Tony Melone are not here to correct them. We may have to rewrite the whole Plan again if they keep changing their minds on such key elements.

Or maybe we just need to replace the PAC Board members who can't remember what they agreed to...or don't want to remember...or don't voice their concerns when the experts are available to refute them. All three reasons are good reasons to replace them with better valley representatives.

2. This is even more amazing since the agcom paper is dated August 12...about 3 weeks after the last Flood Advisory Comm. meeting on July 25th and about 5 or 6 weeks after a meeting with the COE and Dr. Simons that many of the agcom PAC Board members attended. One of the significant things that came out of those meetings was Dr. Simons, the expert hired gun for Tacoma, argued that gravel & sediment free water after trapping was proved to lower river channel bedload! His data has always supported this conclusion, but his verbalized conclusions were always 180° opposite this when talking about the N. Fork. Now he has finally confirmed it about the S. Fork and by implication the N. Fork. In other words, "the theory that the Cushman Dam is the (or an) inherent cause of the aggradation" on the Skok is no longer a theory. Tacoma's own hired expert has confirmed it! And representatives of our agcom were there to hear it firsthand over a month before they wrote this paper...and they still missed it! Something serious is wrong here.

"If the real goal is to flush the mainstem and recapture river flow capacity, then any water would satisfy the need."

3. The agcom misses the point of all of KCM's discussions & Dr. Simons on flushing the mainstem with water when it makes this statement. The whole point is that just any water will not satisfy the need of flushing! It takes a special kind of water — water that I call sediment free! And where can we get sediment free water?? Only on the N. Fork at the present and only on the S. Fork once all the sediments and gravel have been trapped out of it.

Otherwise the water is sediment loaded, and can't pick up any more sediment to flush out. Instead it drops sediment, creating more aggradation. S. Fork water can never work until after it is "cleaned." Flood water can never work unless it is "cleaned" first, too. The waters that now flood the valley will not work — that's the whole point: the water we have now is dumping sediment in the valley instead of picking it up.

To make it simple for the agcom, let me use an illustration. If your goal is to pick up hay bales from your hay field, do you use a truck that is already loaded with hay to its fullest capacity or one that is empty? The correct answer is an empty one. That way you have room to stack hay from the field onto the truck. If it is already loaded to its capacity, it would drive back and forth through the field uselessly.

The mainstem is like the hay field full of hay waiting to be picked up. S. Fork flood water is like a full truck with no room to pick up more hay — a few might even bounce off and add to the bales on the ground. N. Fork water is like an empty truck — it is sediment free, willing and waiting to pick up some from the mainstem.

So where the water comes from makes all the difference in the world...and the Skok!

5. If you build higher berms but continue using sediment loaded water (like the S. Fork) then we end up exactly where we are now: the river will continue to aggradate and soon will not even contain an 8,000 cfs average...only 4,000 cfs! That's what has happened to the River Road below 101 and now is happening to the E. Bourgault side. Soon it will be up that way above 101. You will be causing the very thing you are trying to prevent.

If we can scour the river down so that it can contain a 5 year or even a 2 year event, we will have made some impressive improvement. But my guestimates in my paper The Enormity of the Problem..." suggest it may take 20 to 50 years under the best fairy tale scenario to gain that much. In the meantime, some of us are under water and can't wait for it to scour. We envy those who can wait. We hope the improvements do work, but they will not improve things for us for a long, long time.

6. There is no need to get a waiver from FEMA for the maximum height that the berms can be since the PAC Board and the consultants agreed to use a more restrictive maximum standard — .5 foot rise instead of a full foot like FEMA requires.

Plus the berms will not help aggradation. It's complicated, but just remember the hay field illustration: Do you really want to give the farm boy helper permission to add sideboards on top of a full load just so he doesn't have to unload the load that is already on the truck? Do you want to risk a broken down truck? Unloading it is the real solution. Let's unload the S. Fork and unleash the N. Fork before we ask for waivers to build higher sideboards on the overloaded mainstem. Let's not push the river to jump its channel by boxing it in even more. Let's deal with the real causes, not the symptoms.

"A cubic yard removed equals a cubic yard of increased capacity."

7. Mathematically that sounds good. Theoretically it sounds real good. I admit that I believed it until I got involved in all these flood matters. The problem with this equation — 1 cubic yard removed = 1 cubic yard of increased capacity — is that a very important part of the real life equation has been left out. On the "removal" side of the equation is an unlimited supply of gravel & sediment that has been left out of the agcom's version of the equation. When you figure that unlimited supply into the equation, then the removal side never equals the increased capacity side...Never! The real life equation should look more like this: ∞ supply + 1 cubic yard removed $\neq$ 1 cubic yard of increased capacity.

Take a sandy beach as an example of this principle or equation. Does each shovelful of sand that I remove from the beach below the waterline equal a shovelful of gravel gained for a hole or empty spot? No! Because I can't usually remove it fast enough to make a hole that doesn't fill immediately back in. And if I deposit the sand I am removing back into the ocean again, then it really gets hopeless. That would be like trying to stockpile removed gravel and sediments in the floodplain itself. Not a good idea.

Or take air. Does a cubic yard of air removed from a spot within the atmosphere of earth equal the same emptiness found out in space or a vacuum? No. The air fills right back in from its inexhaustible supply. You can't make a vacuum or empty spot in the middle of the atmosphere. You can only do it in a closed container that keeps out the incoming air.

Let me try one more time with a hay bale conveyor belt system going into a barn. If the conveyor is positioned so that the bales are all falling into your main walkway inside the barn, does a bale removed from the walkway equal a bale of increased walking room? No, not as long as the conveyor is filling the walkway with more bales. First turn off the conveyor, then each bale removed from the walkway will do some good. As long as the conveyor is on, dumping more bales in the walkway, one bale

removed is not gaining you a thing. It only helps when the supply is cut off.

The same is true on the river. Until our inexhaustible supply of gravel is cut off, digging it out will not keep up with the new material coming in. So we need to turn off the conveyor belt before attempting an exercise in futility. And to this end all the experts have agreed: from FEMA to Dr. Simons to KCM to the Tribe's consultants to the COE. Apparently the only ones who do not agree with this is the agcom, but hopefully this illustration using hay that they are familiar with will win them over.

> ***"...the COE indicate(s) that dredging would, on average, reduce flood levels by only 0.35 feet for the 100 year event."***

8. Sounds exactly like my guestimates in the paper "The Enormity of the Problem..."

> ***"Who is CFHMP?"***

9. In this instance it is probably KCM, our paid expert consultants who wrote the Plan for us. The COE figure of .35 feet reduction of flood levels for a 100 year event is confirmed by KCM's calculations on page 6-27 & 6-39. It is further confirmed by my own non-expert guesstimates.

> ***"Doe PAC agree?"***

One place to look in the Plan to find out is on page 1-7 bullet #9:

> **"Promote and seek funding for gravel removal strategies to improve the hydraulic performance of the River."**

As one of the Key Elements, this was agreed to by all the PAC Board members including the agcom members. What is easy to miss in this key element is the phrase "to improve the hydraulic performance of the River." Dredging the river just for the fun of dredging the river is not something most river experts or fish experts recommend. There may be some of the agcom who do like to dig in the river for the fun of it, but the experts frown on it.

What is needed for gravel removal to be accepted by the CFHMP and the PAC is that it "improve the hydraulic capacity of the river." The dredging needs to planned in conjunction with a broader perspective than just gravel removal. It needs to be part of a plan that improves the imbalances that have gotten us into the predicament we are in today...not just add to it more imbalances. If the dredging isn't part of a bigger plan to improve the hydraulic capacity of the river, it is not to be recommended. That's the course the key elements set for the Plan. Improving the hydraulic capacity is the key. The Tribe has some good plans that do this, but they are tied to restoring flows and other improvements.

Most dredging is not going to improve the hydraulic capacity — its too clogged up with too much material still coming in to clog it back up. In many ways its a frustrating catch 22: the only way it to unclog it, it seems, is to dredge, but dredging won't really do it because it is clogged too much. Its sort of like trying to plunger out a clogged drain when the real problem is a full septic tank. All the plungering in the world is not going to drain the full septic tank. It is just an exercise in futility. The same is true for the river —just a little more complicated and less obvious.

Maybe it is just hard for the agcom to grasp the enormity and complexity of the problem since they have lived with it for so long. If so, they need to admit it and let others who can grasp it move in to take their place. Then we can stop beating a dead horse — or dredging a dead river — and concentrate on the things we can do.

10. The lack of support in the Plan for dredging is for lots of reasons. One is the minimal amount of reduction it will provide. This maybe a hard concept to grasp, but the numbers prove it over and over again: nothing, nothing you do in the river channel is going to reduce a 100 year flood event by very much. There is just too much water coming down the hills now. The only thing that would help would

be to dig a Grand Canyon that was a mile deep — that's the only thing that can help a 100 year flood event. Lots of luck getting one dug.

Another reason the Plan did not support it was the negative effect on fishing. I admit this one is too complex for me and maybe it is for the agcom. The Tribe even seems to be locking horns with WDFW over this aspect of dredging. IT is mostly, I think, over exactly how bad the degradation of the fish population has gotten, and what is needed to bring it back. One group sees drastic measures as being hopeful, the other sees drastic measures as being too drastic. My non-expert opinion is to side with the Tribe since they are proposing this in the context of other improvements. I hope the agcom will side with the Tribe also to try to bring about the fullest range of improvements...not just dredging for dredging's sake.

> ***"When flooding begins at 4,000-5,000 cfs, the addition of 3,700 cfs river capacity is a large percentage."***

11. What the agcom misses here again is the mathematics of it. Adding 3,700 cfs to the capacity of the river seems like a large percentage...but in reality it isn't. Why? Because the COE was speaking of reducing a 100 year flood event (35,000 cfs) which is 10 times bigger than the capacity that was gained (3,700 cfs). And as the valley fills up higher and higher with water in each higher level of flooding the channel is wider and wider making gains appear less and less. So doubling the river's capacity from 4,00 to 8,000 as good as it sounds, doesn't even get half way to containing a 2 year event —which is an even longer way away from a 100 year event!

The amount of gain (3,700 cfs) is 1/10th of the amount of a 100 year event (35,000), but compared as events, the 3,700 cfs gain (less than a 1 year event) is less than 1/100th of the gain needed for a 100 event (1 year is 1/100th of 100 years). Only 1/100th! That's the COE's perspective on it...not exactly intuitive for the rest of us, but it makes sense when you think about it. Even someone who has lived near the river for 2 or 3 generations may not find it intuitive. That's why we call in the experts.

> **'We do applaud the Skokomish Indian Tribe statements on page 6-22, when they said "---mainstem salmon habitat has been so seriously degraded by channel aggradation and dewatering that dredging can only be considered a significant enhancement for salmon, as well as essential to restore channel hydraulic capacity, lower elevated water tables, reduce incidence of overbank flooding."'**

12. I also applaud the Tribe's statement on Page 6-22 of the Plan, quoted on page 5 of the agcom's comments. But the Tribe's statement seems worlds apart from the agcom's attitude of "Salmon? What salmon? We don't need to be concerned about fish at all!" The Tribe recognizes the river as being in a terrible condition — a threatened condition —like the American Rivers has declared. When the agcom says the "The U.S. River systems must be in very good shape if there are only fourteen Rivers in the entire USA that are worse than the Skokomish" (page 9 of the agcom comments), the reader wonders if the agcom sees any problems with the river at all. They don't see any hazards (page 2 of their comments) nor any problems (page 9)...what next? Are they going to say they don't see any river?? They are beginning to sound like the 3 monkeys that see no evil and hear no evil...hmmm...we're still waiting for the agcom to speak no evil!

The Tribe are concerned about fish as are many of these agencies. I have not gotten the impression in any communications with the agcom that they are equally concerned. There is always time to turn over a new leaf...and I'll applaud it when it happens...but this agcom paper does little to convince me that they are as concerned about the fish degradation as much as the Tribe is.

13. There is no need to pit one reason for rejecting dredging against another reason for rejecting dredging, like the agcom comments seem to be doing. Normally dredging's effect on fish is a very

normal recovery by the Simpson clearcutting and the Tacoma diversion, that dredging may not disturb the fish that are left. But the fish are not to be forgotten.

There really are plenty of reasons to reject dredging besides the negative effect on the fish population. Besides the fish reason, and the lack of real benefit for 100 year flood events, page 6-33 of the Plan lists 3 others:

1). the effect of the upper basin inputs (the unlimited supply we talked about earlier);
2). the cost of gravel removal; and
3). the problems associated with access to the river.

That gives us at least 5 reasons why dredging may not be "supported by the Plan at this time."

Not that I want to make it sound too hopeless for the Tribe to use dredging as part of a bigger plan to restore the flow to the mainstem...I don't. I just want us all to be realistic about the uphill climb dredging represents. It's going to be extremely slow, hard, and expensive to convince all the agencies that dredging is a viable solution. It will take some super- salesmanship to pull it off...and communications like this one from the agcom are going to doom it before it gets started. This is a critical opportunity for the agcom to grasp the bigger picture, get behind the bigger solutions, and hopefully then some gravel removal will be permitted and funded as part of these bigger packages. If they don't get behind these bigger solutions, it will be doomed for sure. They have a big part in it. They can sink the ship or help keep it floating. The choice is theirs.

V. THE PROTECTION OF STRUCTURES

1. Here again I agree with the agcom: There was not enough damage info in the Plan. Much more could easily have been supplied. We hope with the agcom's support this lack will be remedied soon.

2. It is very disappointing to hear or read that the agcom wants the Government to recognize that a ***"Farmer must be able to protect his land from erosion and flood damage,"*** when the agcom does not even recognize there is a problem with flood hazards in the valley (page 2 of their comments). Why do they want to protect their land from erosion and flood damage if these are not hazards? The history of the agcom's efforts in the valley is like a ping pong match with one farmer pushing the flood hazards onto another farmer's property, back & forth, back & forth. It is time for the agcom to recognize that they can not protect their assets at the expense of someone else's assets. And that is the same lesson Simpson & Tacoma are needing to learn. The rest of us hope they learn it soon.

VI. CUSHMAN - FERC

"One of the unresolved issues is the minimum winter lake level. FERC is negotiating with TPU to raise the minimum winter lake level. The raising of the minimum winter lake level directly reduces the flood storage capacity."

1. For this one I'll defer to Vic Martino of the Tribe to try to set the agcom straight on it in detail. All I know is that this minimum storage level thing is just a scare tactic with no basis in reality. It was not for flood protection but fish needs...and all the agencies agreed that they would not demand Tacoma dump water in the middle of a flood storm. It just won't happen. I have to wonder why the agcom wants to be responsible for spreading false information. I hope the agcom PAC Board members will do their part to get the facts straight and stop the spread of false information in the valley. Its a real shame.

"If FERC is...successful in increasing the continual discharge into North Fork, all of the flood elevations and flood models shown and referred to in this Plan are obsolete."

2. The other bit of false information in this quote from the very top of page 6 is that FERC is not demanding anymore than 240 cfs to be continually spilled (except in flood times when it is turned off) and this is up from 30 cfs already being spilled and 100 cfs Tacoma wants to spill. This amount will not make everything in the Plan obsolete and will not elevate all of the residents to a new and higher hazard

situation. The valley will not be flooded by FERC's action [illegible]
essary and inappropriate to lobby FERC or FEMA for a chance to raise dikes even higher than they are now. There is no need and they have already said they won't do it. (Why does everything always seem to go back to higher dikes for the agcom??)

The agcom needs to get its facts straight and keep them straight so that valley residents who listen to them will not be totally confused.

VII. EXISTING DIKES

1. Here again I would defer to someone else with more specific knowledge than I have : Dick Doaks. He knows where the various existing dikes end so that he can give you a fuller description of how the water levels and velocities are increased by the dikes. One story I remember is about an older lady's house near the Hunter's dike, at the lower end of them. It sounded like she had to move out because the water from the Hunter's dike just about wiped her out. I'm sure Dick would love to bring the agcom up to speed on this effect. If we want to see this effect with our own eyes, we can probably set up a school project to watch it work right inside of a sand box. I hope the agcom is not going to play "see-no-evil" with this fact too!

It would be great to include Dick's information in the Plan to help substantiate this effect that the Plan makes note of.

> ***"Wouldn't flood control be more successful if the flood waters above the 2 year storm be directed to the existing overflow swales?"***

2. It seems I recall Dick saying that many of these overflow swales were not there when he was younger — they came after the dikes were built!

Ooops! The agcom used the words "flood control" instead of "hazard management."

I think maybe the agcom is missing the point of the quote from 6-87. Dikes produce this increased problem of greater damage. Removal of the dikes removes the problem of increased levels of energy. The water overflows along a greater stretch in a shallow, less forceful way than when the dikes exists. It would return to the swales of yesteryear before the dikes existed if the dikes were removed.

3. The only problem I can see with the agcom endorsement of the Uniform Crest-Height Berm concept is that it benefits the current beneficiary of dikes to the detriment of someone whose property is in the new path of water that did not exist prior to diking. If the current residents are all happy with the current overflow path, it sounds fine...that is, if the dikes are brought up to the Plan's new codes and are legal, of course. If the residents in the swales aren't happy with their new hazards, the only fair solution is to remove the dikes and let everyone have the same natural overflow hazard. No favorites here. Only "justice for all."

VIII. FLOOD PROOFING STRUCTURES

> ***"The Agricultural Community has bonded with the land."***

1. It sounds like they have the same dilemma the Tribe has:"That's my land and I'm sticking to it — come hell or high water!" The Tribe's claim to it seems even more realistic than the agcom's, but I won't go into that. If the agcom is here to stay, they need to work a lot harder at influencing the long term causes of the flooding — the timber cutting and the diversion —than they do. Always focusing their efforts on dredging, dikes, levies and berms is a loosing proposition since it is dealing with the symptoms, not the causes. And the sooner the agcom realizes this, the sooner the solutions will start coming through. The Tribe seems to work a lot harder at the long term issues and so I hope this "bonding to the land" will help the agcom to make a new change by following the Tribe's example.

> ***"The Plan states that flood hazards exist, that we face danger, that we must be aware of the hazards and that we must respond appropriately. To the Agricultural Community***

hazards and want to protect their lands. That's an improvement from page 2 where they did not recognize hazards.

The problem with this statement from the agcom is with the word "appropriately." Historically the agcom has responded with inappropriate actions: like building illegal dikes and illegally changing the river's course. That's that "river ping - pong" I mentioned earlier. Those actions need to stop because as appropriate as they seem to the person doing them, they are in reality inappropriate since they cause more hazard or damage to others.

No one objects to the agcom rebuilding or replacing fences, barns, and homes. Its the building of new ones without permits that becomes the problem. Yes, some can get waivers, but it sure doesn't sound like "justice for all" as Bev Godwin likes to remind us. Especially in an election year.

> ***"The Plan is not oriented to the landowner who is not concerned about selling, who is not concerned about mortgage ability, who is not concerned about government assistance."***

3. Why isn't the Plan "oriented to the landowner who is not concerned about selling, who is not concerned about mortgage ability"? More supporting evidence is needed from the agcom to support this conclusion.

Actually, the Plan does seem to be oriented to this type of landowner: ie.; the Tribe. They don't want to sell and they are not concerned about mortgage ability. And they seem to be happier than the agcom with the current draft of the Plan. So where do they, the Tribe, fit into the agcom's scheme of things?

How does not wanting to be bought out affect the agcom in relation to the Plan? One of the rules of buy out is that it is voluntary. Agcom people do not have to accept any offers if they don't want to. If their ox is not being gored, don't sweat it. And if your ox is gored and you do not want to be compensated for it, fine. You can mount your gored ox on the wall of your bedroom if you want. No one will force you to sell it. It's totally voluntary!

4. The agcom has already told us in their "Pro-Diking Petition" that they are for the buy out. We hope they haven't changed their mind or forgotten what they said last year. And if the agcom is still in favor of buy outs for those who want it, why the negative tone used here? Its as if the agcom doesn't want people to be helped out of a dangerous predicament. Either they still don't recognize the danger or they don't want the buy out people to get any help. My question is "How bad does it have to get till they recognize the danger and think it's okay to be helped out?"

> ***"We offer a suggestion for those landowners whose appropriate response is to follow the rules let them reap the benefits. For those landowners whose appropriate response does not allow them to follow the rules, they should not look to the government for assistance."***

5. Thanks for the suggestion! I must be pretty dense because I didn't understand what your suggestion meant. Was this an encouragement to do civil disobedience...like have a dike "sit-in" on someone's private property whenever we think the dike is illegal? Is that what you mean by "landowners whose appropriate response does not allow them to follow the rules?" Or was the agcom recommending actions even more drastic — like burning down a barn or something? Either one sounds pretty serious...I can't believe the agcom is endorsing such drastic actions against themselves as having people not following the rules. The agcom needs to be a little more specific for us dense people about what rules they were recommending to be followed or not followed.

Another question is: Which category are the agcom in? Are they the rule followers or the non-followers? Which rules are you talking about? You need to clarify this a lot more for us dummies.

And what are the benefits you are suggesting are out there for the rule followers to reap? Lower

tax rates? Or what? [illegible]
warnings? Are they only for rule followers? How about repaired State roads like 101? Are we going to erect a checkpoint and only let rule followers use 101? This suggestion is really getting me confused.

Or are you trying to say "those who work in the river illegally are not eligible for the buy out?" That's fine since the buy out is voluntary. Those who work in the river probably do not want the buy out. Illegal residents do not have to accept any offers of the buy out. But if they are caught in their illegal activity, whether it is working in the river or building a new barn, they still should face the consequences, reap the negative rewards like a confiscated bulldozer or monetary fine or whatever. If that's what you mean, I think most people would agree with your suggestion. If this is not what you mean, then you need to do some serious clarifying.

> ***"The Agricultural Community feels that earth berms can also be used as a method of flood proofing. We also feel that the flood proofing berm that protects buildings would not require the same high standards as a berm along the river."***

6. Whoops! The agcom forgot to support their claim that berms are a good method of floodproofing a home. How would you do it? Give us some details. And why would they not need to be to the same high engineering standards as a river berm? Lots more documentation is needed by the agcom here.

7. Why is the agcom objecting to "No New Footprint Zones" a year after agreeing to them? Were their representatives asleep or on vacation last year? What hazard areas do they want to build in? Purdy Swamp? Along the river channel? Do they not want any building restrictions in the valley to protect people against flood hazards?

The agcom needs to be specific so we know which areas are troubling them. The writers of the agcom comments elaborate a little bit more on their aversion to "No New Footprint Zones" on page 9, but nothing concrete...just some unsubstantiated statement about it degenerating into no new roads or bridges.

8. Yes, the proposed buy out could cost $1,000,000. No, the grants are not interchangeable. George Currin from FEMA and Tim D'acci from DOE have told us this over and over again. A grant from FEMA for acquisition can not be used for dredging since they are for 2 different purposes. They are not like a credit card loan or signature loan that you can use any way you want. It's more like trying to mix up a car loan with a college loan — they can't be interchanged. FEMA does not give money to work in the river. Period. And DOE doesn't give money for house elevations as I understand it because of some RCW against using public money for private good. All grants are not created equal.

9. **Density:**

It sounds like the agcom is against every part of the density concept. And we already know they are against the Traditional Floodway concept that was proposed ten years ago. So which is it going to be? Why do you think those restrictions are too conservative? You failed to say. 6,500 sq. foot first floor sounds like a castle! There is room for a garage and pump house inside! So what's the hang up? Are you just against restrictions and rules in general? Or do you want to make all the rules?

Maybe you are against having rules, for your paper says on the top of page 9:

> ***"It is our belief that if a resident of the valley wishes to add on to his structure or wishes to remodel his structure that he should be allowed to do so and also allowed to accept he risk and assume the responsibility."***

What responsibility are you assuming if you add on to your house whenever you wish? Do you accept the responsibility to pay a percentage of the insurance claim for all the people in the valley that have any damage since your house add on raised the level of flood waters? Hey! FEMA might go for this! It's obviously impossible to figure the exact amount of displacement each square foot of your house addition creates (Oh, okay, maybe it can be figured out with computer modeling!) so FEMA would just assign a number, like say 1% to each 1,000 sq. ft. section of house. So if there are $100,000 of reported

claims in the valley in a particular year, the house builder/owner would pay 1% or $1,000 of those damages.

The purpose for doing this is so that the landowner doing the add on can assume the responsibility that you wanted to accept for your new additions. Like many of the factors we are dealing with in the Flood Plan (clearcutting, N. Fork diversion, dikes, etc.) the costs or effects are not readily obvious or borne by the person doing the activity. So the Tribe ends up paying for it in lost fish habitat or E. Bourgault in greater flood depths. By adding this percentage to the people doing the add ons, a new level of responsibility is assumed...like requiring a utility company to create a fund for removing the structure of the dam, for some day the dam will have to come down and the sooner they start paying for it the better.

VIII. CONSERVATION GROUP

"Who are the American Rivers group? What criteria do they use to prioritize Rivers?"

I'll let someone else more knowledgeable handle this one. All I know is at one of the last PAC meetings a water tester said the SKOK was looking pretty poor. I hope he includes his data in with the Plan to update its outdated data. Just like with the dollar damage chart ending with 1986, so the water data ends too early. We might be surprised at how poor it has become in the last 10 years.

IX. DIKE AT CHURCH

"An avulsion (change of channel) at this location could damage or destroy the church, several homes and private property, and the Skokomish Valley Road."

Sounds like a great natural hazard to me!

What standards was the Church Dike built to? On page 6-86 of the Plan it states that "the current levee was not built according to generally accepted engineering practices." That one didn't say "today's standards" but seems to say it didn't ever meet the generally accepted engineering practices of 1977. Have the Soil Conservation Standards changed very much in 20 years? Maybe the agcom could document this further for us.

X. FLOOD FUTURE

"This Plan is not designed to control flood waters above a two year storm; therefore, these problems will remain a concern of all the residents of the Valley."

Yes, "This Plan is not designed to control flood waters above a two year storm," or at two years or even below it. The Plan is not designed to control floods at all, but to manage the hazards. The agcom's perspective is probably still at odds with the real purpose of the Plan.

Yes, "these problems will remain..." as long as the agcom keeps barking up the wrong tree. The agcom needs to begin to address the real causes of the floods with as much zeal as they address dredging and diking. If the agcom does begin to address the real causes instead of the symptoms, we might in 40 to 50 years find the problems and the symptoms finally solved. Until then, the problems are here to stay and the agcom bears some of the responsibility.

Hoping for a change in the agcom,

Mark Sleeper
E. 201 Bourgault Rd.
Shelton, WA 98584

Roger Dittmar
P. O. Box 61
W. 5350 Skokomish Valley Road
Shelton, WA 98584

June 11, 1996

Gary Yando
Director of Community Development
426 West Cedar
P. O. Box 578
Shelton, WA 98584

Mr. Yando:

I submit the the following comments regarding the Mason County Skokomish River Comprehensive Flood Hazard Management Plan, April 1996.

I would like to see the plan recommend a watershed analysis for the North Fork. Ideally this would simply represent an expansion of Simpson Timber Company's South Fork watershed analysis currently in progress.

It would be logical to ensure that buyout locations are included in "no new footprint zones".

Our residence is listed as number 29 in the Flood Hazard Database, Appendix Z. I believe the Ground Surface Elevation of 123.6 feet is correct. This also happens to be the highest elevation listed in the database. My point: our residence is not going to receive any direct flooding, much less 1.6 feet requiring flood proofing because of medium flood hazard. I phoned this correction in to the Community Development Office previously but see that the database has not been updated. I would appreciate the correction being made.

In this period of cost consciousness it would have been helpful to have a clearly delineated list of prioritized action recommendations and associated costs. I would suggest that such a list be prepared in several versions. The versions would represent priority actions listed within cost-limited plan implementation scenarios from least to most expensive.

It also would have been helpful to have had a 30 day public comment period for this lengthy (two volumes) and complex document.

Sincerely,

Roger R. Dittmar

Roger R. Dittmar

RECEIVED
JUN 1 2 1996
MASON CO. PLANNING DEPT.

My comments on Mason County's response to the DOE comments to the CFHMP Priorities:

1. Acquisition elevation and relocation of repetitive loss structures.
2. Develop flood ordinance that is in compliance with FEMA, DOE, state growth management criteria, and the federal shorelines act.
3. Flood Warning and emergency response system improvements.
4. Dike reconnaissance, this should include **all** projects done to control the river, (i.e., car bodies, concrete chunks, plywood deflectors etc.)
5. Enforce regulations and follow permitting process.

Response to specific comments:

1. Agreement with County.
2. I like what Gary Yando wrote, I'm not sure what the DOE wants.
3. New water quality data needed - fecal coliform counts high in some areas.
4. Agreement with County.
5. Agreement with County.
6. Agreement with County, except 101 project, we need to see technical review done by DOE. Concerns about dumping more water on high hazard area.
7. Concerns on effects on residents downstream of 101. Also concerns about erosion and environmental damage
8. Agreement with County.
9. Concerns about people downstream in high hazard area.
10. Modifications on 106 bridge and highway should be looked at before 101 projects are looked at to allow drainage.
11. These blockages seem very minor and I can't believe any of them are flood hazards, but they do create excellent fish habitat.
12. Agreement with County.

Jeff Hanson

13. Agreement with DOE.
14. A density floodway map has to be acceptable to FEMA and DOE, and has to be enforced.
15. Dike reconnaissance report first.
16. Agreement with DOE.
17. Agreement with both.

Jeff Heinis

Jeff Heinis

THE AGRICULTURAL COMMUNITY IN THE SKOKOMISH VALLEY

August 12, 1996

To: The Planning Advisory Committee for the Skokomish River Comprehensive Flood Hazard Management Plan

The Agricultural Community has reviewed the CFHMP.

The Agricultural Community have several areas of concern:

1) Multi-Agency approvals of a single project:

With all the changes and all the up-dates that are taking place with the County's existing Plans and Acts, we would hope that the authors and rewriters are not perpetuating the multi-agency approvals for projects. We would hope that the permit procedures could be more efficient and permit approval time greatly reduced if the applicants could work with one agency.

2) Exemptions from Shoreline Permits:

If selected activities alone the river were exempt from a Shoreline Permit, that would not automatically exempt them from securing a Hydraulic Project Approval from the Washington State Department of Fish and Wildlife.

Activities which we feel need to be exempt:

a) Maintenance to existing structures
b) Bio-Engineering Projects - Erosion Control Projects
c) Gravel Removal by Gravel Bar Scalping

3) The restrictions on maximum dike heights:.

The Agricultural Community supports the PAC's recommendation of low-berms which would contain a 5-year storm event. When the Plan considered the restrictions, a the low-berm could only be raised to an elevation sufficient to contain a 2 year storm.

It seems reasonable that the restrictions on the maximum dike heights (0.5 above the calculated 100 storm event) could be waived because with the uncertainty of the Cushman Dam spillage flood elevations can not accurately be determined.

The issues of the Cushman Dam relicensing with regards to: a) reducing the amount of storm water storage capacity at the Lake, and 2) increasing the amount of minimum discharge to the Northfork; have not been finalized. These proposed changes by FERC increase the flood hazard to the residences of the Valley and jeopardize this plan. By adding more flood waters to the system, and raising flood elevations, the flood modeling and elevations included in this Plan are obsolete.

4) The Plan incudes concern for the aggradation in the mainstem. A 5-year low-berm would increase the Rivers carrying capacity by over 5000 cfs and complement the theory that adding water in the river channel is needed to move the gravel out of the mainstem.

5) The proposed "No New Footprint Zones" can not be endorsed by the Agricultural Community.

Review comments:
We have reviewed the Plan. To aid the readers, we have reproduced those portions of the Plan included in our review in standard type and our comments are shown in italics.

FLOODPLAIN - NATURAL HAZARD?
Executive Summary: Page ES-1 (Starting at the first paragraph - second sentence)-"---the Skokomish River floodplain is also an area of great natural hazards. Inundation of property, erosion of land, and threat to personal health and safety occur on a frequent basis in the Valley as a result of flooding from the Skokomish River.

Extreme events that appear to occur with increasing frequency have devastating effects. The largest flood event of record occurred recently, in December 1994. ---- While the exact discharge and related flood frequency are not known for the event, it is likely that the event was equal to or greater than the 100-year event. Damages from the flood were severe and widespread throughout the valley, including extensive damages to US 101."

This Plan lacks the necessary documentation that would allow the reader to accept the statements as written. The Agricultural Community has lived in the Valley for many generations, and the River and its flooding activity are well know to us. We would not and could not define the Skokomish River floodplain as an area of great natural hazards.. The Plan does not support its claim of severe and widespread damages, caused during the December 1994 flood. No photographs or news articles, or damage reports are included to give the reader a sense of how extensive were the damages.

In fact, the Plan tends to contradict itself, - on page 4-10 is reprinted a tabulation of damage costs, (Table 4-2). The last two years listed in this Table are 1975 and 1986. The damage worth listing in 1975 was $6,924. The last entry was 1986, $110,000 and no entry for December 1994 which was supposed to have severe and widespread damages.

If the Skokomish River is a great natural hazard that inundates the valley and erodes land and threatens personal health and safety on a frequent basis, the Plan doesn't include sufficient supporting information.

Page ES-1 (Third paragraph- second sentence) " The plan was developed with the understanding that catastrophic flood events have occurred repeatedly in the past and will continue to occur. The recommended actions are not designed to prevent catastrophic floods, but to lessen the impact of floods on people and their property. "

The catastrophic flood event is not definitive. However, further study of the Plan leads us to believe that a catastrophic flood is any flood above a 2 year storm event. It is also our understanding that rivers are expected to carry a two year storm event without flooding. A two year storm event for the Skokomish mainstem is 16,200 cfs.

On page 84 the Plan states: "During its March 30, 1995, meeting, the PAC unanimously recommended that the alternative of a low-level set-back berm be investigated and considered in the Final CFHMP. ——— a 5-year flood, was to be considered." *The Agricultural Community supported the 5-year low level set-back berm. The elimination of the nuisance floods would be of great benefit to all the residents of the valley. It is unfortunate that a 5-year low level set-back berm will not be realized.*

Because of existing restrictions put in place by legislation and bureaucrats, the maximum allowable berm height can protect the valley from floods only to a magnitude of a two year storm, not the 5 year storm event as recommended by PAC.

Therefore, a <u>catastrophic flood</u> now can be defined as all flood events greater than a two year flood event. The Plan clearly states that its recommended actions are not designed to prevent catastrophic floods, but to lessen the impact of floods on people and their property. Because the Plan will not reduce the damages caused by floods greater than the two year storm event, all the valley residences will not to have flood protection but will only have structural damage prevention through restrictions.

GRAVEL AND AGGRADATION:
Executive Summary: Page ES-2 (First full paragraph)-"The reduction in flow from the North Fork Skokomish River [caused by the Cushman Dam operation] has been theorized to cause aggradation in the mainstem Skokomish. While there is still considerable uncertainty regarding this phenomenon, the river reach between the mouth and the confluence of the North and South Fork is indeed a depositional area. The result is that sediment transported from the upper watershed is naturally deposited in this reach, raising its bed and decreasing its capacity to convey floodwater, thus increasing flooding in the valley."

The Agricultural Community does not endure this theory that the Cushman Dam is the inherent cause of the aggradation. The Agricultural Community will concur that our river has aggregated and that our river cannot contain a normal two year winter storm without flooding.

On page ES-3 the Plan states: The average channel capacity between US 101 and the confluence of the North and South Fork Skokomish Rivers is approximately 8000 cfs. *Although the average of 8000 cfs falls far short of a two year storm event, it is also a misleading statement because overbank flooding along this stretch of river occurs at 4000-5000 cfs.*

In order to improve river flow capacity, strong recommendation have been to remove the gravel by flushing the mainstem with water. The recommendations have suggested that the North Fork drainage basin supply the water, via Cushman Dam. If the real goal is to flush the mainstem and recapture river flow capacity, then any water would satisfy the need. It would seem that a logical alternative would be to use the waters that now flood the valley. Under the existing conditions flooding at 4000-5000 cfs, if a five year storm event could be contained in the river channel, the flushing action of 21,500 cfs would be realized, (5 Yr. Storm Flow Rate 21,500 cfs).

Is it possible that the County could receive a waiver regarding the maximum elevations of low level set-back berm. if the berm were to serve a vital part of an overall plan to increase the carrying capacity of the river by removing the aggradation through a program of flushing?

Executive Summary: Page ES-3 Lower Watershed Gravel Removal Recommendations (Second paragraph) - "This CFHMP supports gravel management, but not extensive dredging of the river at this time, since initial analyses completed by the U.S. Army Corps of Engineers (COE) indicate that dredging would, on average, reduce flood levels only 0.35 feet for the 100- year event. In addition, dredging of the low-water channel is likely to have a devastating effect on fisheries.

The Agricultural Community supports gravel removal. A cubic yard removed equals a cubic yard of increased capacity.

Page 6-30 Gravel Removal: Recommended Action (First Paragraph, Second Sentence)

> However, this CFHMP does not support dredging the river at this time, since initial analyses completed by the COE indicate that dredging would, on average, reduce flood levels by only 0.35 feet for the 100-year event.

Who is CFHMP? Does PAC agree? Is the lack of support because of only a 0.35 feet reduction of the flood level or the negative effect on fisheries. The Plan contains two references that can lead the reader to two different conclusions.

On Page ES-3, last paragraph states: 'Removal of gravel through gravel bar scalping at recommended locations would increase channel capacity by an average of approximately 3,700 cfs. *We must conclude that if the removal of gravel bars will increase the river capacity 3,700 cfs, then the increased capacity realized by dredging would be much higher.*

When flooding begins at 4000 - 5000 cfs, the addition of 3,700 cfs river capacity is a large percentage.

The Agricultural Community is inclined to disagree with the COE when they say that dredging would have a devastating effect on fisheries. We do applaud the Skokomish Indian Tribe statements on Page 6-22, when they said "—mainstem salmon habitat has been so seriously degraded by channel aggradation and dewatering that dredging can only be considered a significant enhancement for salmon, as well as essential to restore channel hydraulic capacity, lower elevated water tables, reduce incidence of overbank flooding(Marino, V.,4 April 1994, personal communication)"

PROTECTION OF STRUCTURES:
Executive Summary: Page ES-7 (Issue 6: first paragraph) "Structures in the valley located in the highest hazard areas receive repetitive damages, resulting in a cycle of damages, disbursement of state and federal monies, and repairs. This cycle is costly to the property owner and the public.

The Plan does not include supporting data to support this statement. The County Road Department has experienced erosive damage to the road system over the last 17 years but has not received any federal or state funds to help repair flood damage.

Executive Summary: Page ES-9 (Issue 9: first sentence) "Individual property owners should have flood protection through flood proofing.

It is very disappointing to the Agricultural Community that Government only recognize flood proofing structures and do not recognize that:
1) The Farmer's land is his non-renewable resource.
2) The Farmer's land is his asset.
3) The land is the farmer's livelihood.
The farmer must be able to protect his livelihood, his asset, his non-renewable resource.
The farmer must be able to protect his land from erosion and flood damage.

CUSHMAN DAM - TACOMA POWER UTILITIES- FERC:
The Tacoma Power Utilities (TPU) is attempting to get the Cushman Dam relicensed. One of the unresolved issues is the minimum winter lake level. FERC is negotiating with TPU to raise the minimum winter lake level. The raising of the minimum winter lake level directly reduces the flood storage capacity. During the past 17 years TPU has had to release water into the North Fork once in each of the following years 1990, 1991, and 1992. Note that TPU did not spill during the December 1994 100 year flood event. The TPU has done a very good job of providing the valley with winter flood control and using the lake as flood storage. If TPU loses the ability to draw down the lake to it previous levels, a very large volume of storage will be lost. If the flood storage capacity had not been available in December 1994, TPU, would have had no other option but to release large quantities of water (18,000 - 28,000 cfs) into the North Fork. This flood flow would have been new water to the valley and would have been added to the flood flows from the remaining basins when they were at flood stage.

The Mason County Commissioners should be very interested in what FERC is intending to do. If FERC is successful in raising the winter minimum lake level and successful in increasing the

continual discharge into North Fork, all of the flood elevations and flood models shown and referred to in this Plan are obsolete.

It is our opinion that, if FERC is successful in raising the winter minimum lake levels, all of the residents of the Valley will be elevated to a new and higher hazard situation. In order for the Valley to guard against being flooded because of FERC's action, it seams very appropriate to lobby a raise in the maximum height of the low berms. Removing the restrictions and raising the maximum level of the berms to a 10 year storm may still give only a 2 year flood protection level, (if the North Fork additional discharge becomes an issue).

EXISTING DIKES AND PROPOSED ALTERNATIVES - BERM:
Page 6-87 Existing Levees (Second full paragraph last sentence) "Where the river is no longer constrained by the levees, the increased volumes of water in the channel flow over the natural riverbank, releasing increased levels of energy and causing greater damage to floodplain property."

The Plan has not provided any foundation to support this statement. Although in theory it may be true, we feel that for the Skokomish it may be overstated. Wouldn't flood control be more successful if the flood waters above the 2 year storm be directed to the existing overflow swales? The existing swales have served as overflow flood channels for many years and are hardened and more able to withstand the flooding impacts with little or no erosion.

Page 6-94 Uniform Crest-Height Berm (Second Paragraph) "A variation is to construct the berms at a uniform height. ————This alternative, however, maintains the initial flood overflow locations as they would occur with natural ground elevations. Low points along the river will continue to be the low points and the first areas for overflow in the valley."

The Agricultural Community endorses this proposal.
We do not endorse the construction of berms that would overflow evenly, would discharge flood waters onto lands that are not normally subjected to floods as frequently as low as a 2 year events. Those non-seasoned grounds may be vulnerable to greater erosion than directing more discharge to existing natural overflow swales.

FLOOD PROOFING STRUCTURES:
Page 6-67 ISSUE 6. REPETITIVE DAMAGES TO STRUCTURES LOCATED IN HIGH HAZARD AREAS: (Last two sentences on the page)

That is, flood hazards exist throughout the lower Skokomish Valley floodplain, and all residents and property in the Valley face some danger. All residents should be aware of the specific hazards they face and respond appropriately.

The Agricultural Community has bonded with the land. Our Grandfathers and Great Grandfathers worked this land. Our ancestry goes so deep into this valley that we could never leave. We are here to stay.

The Plan states that flood hazards exist, that we face danger, that we must be aware of the hazards and that we must respond appropriately. To the Agricultural Community our appropriate response would be to protect our land. If our fences, barns and homes are damaged by floods, we would replace and rebuild. The Agricultural Community is here to stay and we will rebuild and replace even if our Federal Government doesn't help.

The Agricultural Community knows that the Federal Government is requiring Flood Hazard Management Plans in order to reduce its liability. The Plan in not oriented to the landowner who is not concerned about selling, who is not concerned about mortgage ability, who is not concerned about government assistance.

We offer a suggestion for those landowners whose appropriate response is to follow the rules let them reap the benefits. For those landowners whose appropriate response does not allow them to follow the rules, they should not look to the government for assistance.

The Agricultural Community feels that earth berms can also be used as a method of flood proofing. We also feel that the flood proofing berm that protects buildings would not require the same high standards as a berm along the river.

Page 6-70 Flood Hazard Map (Structures in the Floodway; Listing in middle of page.)
Of the 198 structures in the database, exact locations were known for 170.

It is unclear as to the kinds of structures that are counted. Are all structures residences or does the count include pump houses, barns, sheds, etc.

The Agricultural Community is very aware of the flooding history of the river. Our personal experience does not agree with your computer model for the No-New Footprint Zones.. Our personal experience is based on dikes in place. This Plan needs to clearly state the conditions used to model these floods. For the computer modeling, have the dikes been removed or are they in place?

We also recommend that the category of 0.5 and 4 feet of water be divided into two categories: 0.5 to 2.0 feet and greater then 2.0 feet to 4.0 feet. We expect that the majority of structures would be included in the 0.5 to 2.0 feet.

Page 6-72 Recommendations (First paragraph, last sentence)
Acquisition should occur only if the property owner is willing to relocate outside of the floodplain.

To the Agricultural Community, the floodplain is the Skokomish Valley. Is the Recommendation of this Plan that the condition of 'buy-out' be that the property owner must move away from the Valley?

It is our understanding that the proposed buy-out program would cost $1,000,000. Wouldn't it be more beneficial to more residence of the valley to use only a portion of the $1,000,000 to elevate the houses above the 100 year flood event, and then use the remaining funds to finance the River gravel removal projects.

Page 6-80 Density Floodway (Top of page 4 bullets):

- The maximum allowable percentage development is 3 percent. For example, for a minimum lot size of 5 acres, the maximum building footprint allowed is 6,534 square fee
- The maximum allowable width of a structure parallel and perpendicular to the flow is 80 feet
- The minimum allowable space between structures parallel and perpendicular to low is 387 feet
- The maximum blockage allowed is 17 percent.

The Agricultural Community feels that:

Bullet #1- *the maximum allowable 3% for building foot print is too conservative.*

Bullet #2- *the maximum allowable width or length of a structure is reasonable.*

Bullet #3- *the minimum allowable space between structures is unacceptable. The bullet can be interpreted that regardless of the size of a structure it must be located 387 feet from the next structure. A 12 x 10 foot pump house must be located 387 feet away from the 26 x 45 foot single family home which must be located 387 ft away from the 24 x 23 foot detached garage. We can not support Bullet #3.*

The Valley floor is not uniform, there is some high ground. The Skokomish Valley Road and the homes that align it do occupy high ground. By requiring that structures be 387 feet apart, if forces the building footprints into lower ground and increases the damage potential.

If Bullet #3 could be restated:

Bullet #3- *the summation of all the buildings foot prints shall not exceed 6400 square feet in a 387 ft square.*

Bullet #4 *A maximum of 17% blockage is too conservative.*

Solid foundations, usually concrete, is today's standard for construction. If construction proposals included open foundations such as pilings and piers, minimizing the obstruction to the flood flow, would the governing agencies be able to adapt to the changes and would the rules and ordinances permit these kinds of structures?

NO-NEW-FOOTPRINT:

The Plan proposes a No-New-Footprint Zones: We can not endorse this proposal because of our concern that the No-New-Footprint Zone will extend to no new roads, bridges, utilities, farm out-buildings and etc. It is our belief that if a resident of the valley wishes to add on to his structure or wishes to remodel his structure that he should be allowed to do so and also allowed to accept the risk and assume the responsibility.

CONSERVATION GROUP:

Chapter 1, Introduction, Page I-1 (Second Paragraph; second sentence) "Watershed problems have become so severe that the conservation group American Rivers has identified the Skokomish River as one of the 15 most threatened rivers in the United States".

The Plan does not provide any foundation that would give this conservation group credibility. Who are the American Rivers group? What criteria do they use to prioritize Rivers. Other information included in the Plan tends to contradict the American Rivers conclusion.

On Page 3-7 of the Plan, under Water Quality - the Skokomish River and its tributaries are described as Class AA waters. Class AA water quality standards are summarized in Table 3-4 on page 3-10. Between October 1983 and September 1986, Ecology established a water quality monitoring station. The results were impressive.

Fecal coliform values consistently meet the Class AA water Quality Standards. The fecal coliform data shows no correlation with season or any other factor.
Dissolved oxygen meet the Class AA water quality standards.
Temperature values consistently meet the Class AA water quality standards.
Hydrogen ion (pH) values consistently meet the Class AA water quality standards.

This Data also shows that the activities of the Agricultural Community, (raising animals and raising crops), are not having a negative effect on the River system.

The United States river systems must be in very good shape if there are only fourteen Rivers in the entire USA that are worse than the Skokomish.

THE DIKE AT THE CHURCH:

Executive Summary: Page ES-5 (Top of page second bullet

- "Skokomish Community Church: The dike that currently deflects water away from the bank at this location was not built to current engineering standards and is in danger of failing. An avulsion at this location could damage or destroy the church, several homes and private property, and the Skokomish Valley Road."

This "church dike" has been built in sections over a long period of time. The oldest part, which is closest to the County Road, was built over 20 years ago. It starts at the church and follows the west side of the County Road going north for several hundred feet. In 1977 the River was 100 to 150 feet away from the County Road. During flood stage slake or quiet water would rest against the dike, the quiet water would keep the erosive forces of the river away from the dike and no

erosion occurred. The Plan statement on page 6-86 that, "the dike at the church was constructed directly on the River bank", is not correct. The River has eroded its way to the roadway during the past 20 years. The Plan on page 6-30 top of page gives an excellent description as how the river has moved toward the road. "When a river flows around a bend, the higher velocity water moves along the outside of the bend while the flow carrying the major portion of the bedload is deflected inwards." As the inside of the bend is filled with gravel the outside of the bend is forced to move outward. The results of the maintenance prohibition along the inside of the river bend is now apparent, when the Plan contains a statement like, "An avulsion at this location could damage or destroy the church, several homes and private property, and the Skokomish Valley Road."

The Plan has never answered the question, "was the dike built to standards relevant at that time of construction?". The Plan always makes the statement that the dikes do not meet today's standards. Standards and codes change over time. Look at the changes that have taken place during the last 20 years regarding residential construction standards and building codes. Are he homes built 20 years ago built to the current standards and codes?

FLOOD FUTURE:

Page 4-10 HISTORICAL FLOOD MANAGES - Chronic Problems Areas: (the six bullets)

- The pattern of discontinuous diking along the mainstem has mitigated the problem of chronic low-level flooding in some areas of the Valley.——
- Soil erosion is a problem for operators of Christmas tree plantations who use clean-cropping methods. ———
- Roadways covered by flood waters impede or prevent travel by Valley residents.—
- Structures, both residential and agricultural, are subject to water damage, ————
- Agricultural fencing may be damaged by debris ————————
- Sewage disposal throughout the Valley is by on site drain fields. ————————
- The South Fork and mainstem ———————— are aggrading.

This Plan is not designed to control flood waters above a two year storm; therefore, these problems will remain a concern of all the residents of the Valley.

Sincere Thanks
from the
Agricultural Community

Linda Dittmar
P. O. Box 61
W. 5350 Skokomish Valley Road
Shelton, WA 98584

June 11, 1996

Gary Yando
Director of Community Development
426 West Cedar
P. O. Box 578
Shelton, WA 98584

Mr. Yando:

I am enclosing my comments regarding the Skokomish River Comprehensive Flood Control Management Plan. While I could write reams of comments, I must be content to reiterate comments I submitted to the Flood Advisory Board (which interestingly enough I cannot find in Volume II of the plan) due to recent illness.

Enclosed you will find:

1. Copy of 2/5/95 letter with attachments to the Flood Advisory Board

2. Deletions that I wish to see restored in the plan

3. My own "mini-plan" (this may seem laughable, but it was the easiest way for me to understand the scope of the problems in the Skokomish Watershed)

I would also like to state that the watershed must be addressed as a whole. The effects of logging activities in the North Fork and West Fork (Vance Creek) sub-basins should be identified and included in the CFHMP.

Sincerely,

Linda R. Dittmar
Linda R. Dittmar

RECEIVED
JUN 12 1996
PLANNING DEPT.

Linda Dittmar
P. O. Box 61
W. 5350 Skokomish Valley Road
Shelton, WA 98584

February 5, 1995

To: Members of the Skokomish River Flood Advisory Board
Mr. Wes Johnson
Mr. Evan Tozier
Mr. Guy Parsons
Ms. Alice Crossan
Mr. Bill Hunter Jr.

Gentlemen and Lady:

I have been doing some research on the alternative of diking and flood walls regarding our flooding in the Valley. Please let me share with you some of the information I found. I typed information I particularly want you to note by printing it with **bold** type.

"The purpose of flood control is to eliminate or to reduce damage caused by the flooding of areas adjacent to rivers or by overtopping engineering structures like dams, embankments or bridges. Two basic engineering means of flood control are:

(a) Reservoirs where part of the flood waters can be temporarily retained, and thus the flood peak reduced and the passage of water masses stretched over a longer period of time at a reduced flow rate;

(b) Levees built along rivers to protect the adjacent territory by confining the flood to a particular channel; **in this case the flood peak may be increased because of the elimination of storage of the former inundation area.**

It has to be borne in mind that in both cases the original travel time of a flood will be changed and this may have serious consequences in down-stream parts of the river. It may well happen that, for instance, by reducing flood peaks on a tributary, flood peaks on the main river down-stream from the confluence are increased due to a change in the time which will cause the floods on the tributary and the main stream to coincide."
-from Application of Hydrology. . . page 93

"**Another concern regarding dike fields is their propensity to induce opposite-bank erosion and accelerate the natural tendency of the river to migrate.** Lidstone and Anderson (1989) assessed the impact of 14 dike fields on river-induced opposite-bank erosion and found that, in four cases, the rate of such

erosion increased subsequent to the construction of a dike or dike field. No increase in the rate of erosion occurred in the other sites examined. As noted above, the tendency of dike fields to accelerate river migration is counter-balanced by within-bank disposal practices, which reduces this tendency." - regarding the Apalachicola River
- from The Rivers of Florida page 235

"Dikes and floodwalls [sic] have adverse as well as beneficial uses. While protecting one specific area from flooding, **they usually aggravate flooding in other areas by increasing the height of flooding immediately upstream, across the stream, and downstream, by reducing the amount of floodplain available for floodwater storage. By concentrating floodwaters in a smaller channel, they increase water velocities and thus aggravate nearby stream bank erosion if protection is not provided.**

In the majority of situations, dikes and floodwalls [sic] cannot economically be built high enough to protect against all flooding, and as a result, a design flood is used such as the 100-year frequency flood. Therefore, there is always the potential for a flood greater than the structure is designed for and the consequences of overtopping or failure is [sic] severe. Additionally, the cost of pumping storm water collected behind them is expensive both in capital costs and operations and maintenance costs. Finally dikes and levees require periodic increases in height to maintain their original level of protection if the river bed is aggrading, unless the river is regularly dredged.
In the Skokomish basin, dikes were evaluated in the past by the US Army Corps of Engineers (1942), the US Soil Conservation Service (1964), and the Puget Sound and Adjacent Waters Study (1970) as discussed in detail in Chapter 5. **Dikes were rejected as viable flood control alternatives because of adverse benefit cost ratios.** the level of protection evaluated in these studies was against the base flood, that is, the 100 year flood. Neither study addressed the high rate of erosion form the South Fork basin and the resultant river bed aggradation (see Chapter 4) which would severely limit the useful life of dikes.

Dikes protecting against the 100 year flood are therefore judged not to be a viable option for flood control management in the Skokomish Valley, and their further consideration as an alternative is not recommended.

However, diking against low level annual flooding has been practiced in the Valley for decades, and a discontinuous system of low dikes is in place along the south (right) band of the river as mapped in Figure 4.5; the resultant low level flooding patterns are described in Chapter 4. These public and private diking projects have been unplanned and uncoordinated, and have had mixed results. **Certain areas of the Valley have been protected against low level, low velocity sheet flooding, while floodwaters have concentrated in other areas, with the low velocity sheet flooding likely converted to greater velocities.** Further consideration of diking is recommended for localized problems when no other floodproofing [sic] alternatives provide relief.
- from Skokomish River . . . page 107

As a fourth-generation Floridian, I have long been concerned with the degradation of habitat around that state and the loss of the Everglades due to mismanagement of the watersheds of Florida. Dredging and diking on the Kissimmee River began in 1882. A formerly meandering natural water purifier 172 km in length has over the years been reduced to a canal of 12 km and small isolated ox-bow lakes. Approximately 80% of the Kissimmee's wetlands have been lost. The Kissimmee River was the primary river system contributing to the Everglades. The last time I checked, it was estimated that $20 Billion would be required to return the Kissimmee to its original state. It is hoped that such restoration will nurture the Everglades and assist Florida in its fresh water crisis.

I am no longer a resident of Florida but I still have many family members living there. Quite a few of my relatives are engaged in agricultural concerns: cattle, potatoes, strawberries, chicken farms, etc. Now I live in Skokomish Valley, Washington, an area in many ways similar to the area where I grew up. While I still am concerned about activities in Florida, my focus has shifted to this Valley. Though I may be a newcomer, I have as much right to care about what happens in my home as people who are fourth-generation (or more) here.

As an area that has been impacted by European settlement longer than the Pacific Northwest, Florida offers lessons to us regarding mismanagement of water systems. I think it would be wise to learn from the mistakes on the Kissimmee and other river systems when plans are being made for the Skokomish.

Thank you for your attention to this concern.

Sincerely,

Linda R. Dittmar

MEMO
To: Lisa Randlette, Wahsington Dept. of Ecology
From: Dr. Donald R. Reichmuth
Re: Skokomish River Investigation

June 25, 1987

"It should be clear from the above discussion that a solution to the erosion and increased flooding problems occurring in the lower agricultural area requires more than a localized "band-aid" approach to the problem. It is therefore recommended that an integrated drainage-wide program be established, which simultaneously considers the upper drainage affected by logging with the middle agricultural area and the lower tidal area. If such a program is not established, it is my feeling that there will be continuous conflict between the logging and agricultural interests in the lower areas. It is equally clear that if work is only attempted in the agricultural area, the money will be largely wasted, because these efforts are only dealing with symptoms and not the root cause of the instability which has been observed on the river."

Skokomish 1988

"The purpose of flood control is to eliminate or to reduce damage caused by the flooding of areas adjacent to rivers or by overtopping engineering structures like dams embankments or bridges. Two basic engineering means of flood control are:

(a) Reservoirs where part of the flood waters can be temporarily retained, and thus the flood peak reduced and the passage of water masses stretched over a longer period of time at a reduced flow rate;

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It has to be borne in mind that in both cases the original travel time of a flood will be changed and this may have serious consequences in down-stream parts of the river. It may well happen that, for instance, by reducing flood peaks on a tributary, flood peaks on the main river down-stream form the confluence are increased due to a change in the time which will cause the floods on the tributary and the main stream to coincide."

Applications of Hydrology page 93

Excerpt from Memo by Dr. Donald R. Reichmuth
President, Geomax Professional Engineers & Surveyors
to
Lisa Randlette, Washington Dept. of Ecology
Re: Skokomish River Investigation

June 25, 1987

"It should be clear from the above discussion that a solution to the erosion and increased flooding problems occurring in the lower agricultural area requires more than a localized "band-aid" approach to the problem. It is therefore recommended that an integrated drainage-wide program be established, which simultaneously considers the upper drainage affected by logging with the middle agricultural area and the lower tidal area. If such a program is not established, it is my feeling that there will be continuous conflict between the logging and agricultural interests in the lower areas. It is equally clear that if work is only attempted in the agricultural area, the money will be largely wasted, because these efforts are only dealing with symptoms and not the root cause of the instability which has been observed on the river."

- from Skokomish River . . . (no page number)

Skokomish River Comprehensive Flood Control Management Plan
Preliminary Draft Plan
March 1988
Department of Ecology
87-24

Applications of Hydrology to Water Resources Management
World Meteorological Organization
Operational Hydrology Report No. 4
1973

"Dikes and floodwalls [sic] have adverse as well as beneficial uses. While protecting one specific area from flooding, they usually aggravate flooding in other areas by increasing the height of flooding immediately upstream, across the stream, and downstream, by reducing the amount of floodplain available for floodwater storage. By concentrating floodwaters in a smaller channel, they increase water velocities and thus aggravate nearby stream bank erosion if protection is not provided.

In the majority of situations, dikes and flood walls [sic] cannot economically be built high enough to protect against all flooding, and as a result, a design flood is used such as the 100-year frequency flood. Therefore, there is always the potential for a flood greater than the structure is designed for and the consequences of overtopping or failure is [sic] severe. Additionally, the cost of pumping storm water collected behind them is expensive both in capital costs and operations and maintenance costs. Finally dikes and levees require periodic increases in height to maintain their original level of protection if the river bed is aggrading, unless the river is regularly dredged.

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REFERENCES

1. Skokomish River Comprehensive Flood Control Management Plan
Preliminary Draft Plan
March 1988
87-24
Douglas J. Canning
Lisa Randlette
William A. Hashim
Floodplain Management Section
Shorelands and Coastal Zone Management Program
Washington Department of Ecology
Olympia, WA 98504

2. Applications of Hydrology to Water Resources Management
World Meteorological Organization
Operational Hydrology Report No. 4
Secretariat of the World Meteorological Organization
Geneva, Switzerland
1973

3. The Rivers of Florida
Robert J. Livingston, Editor
Professor and Director Center for Aquatic Research and Resource Development
Florida State University
Tallahassee, Florida
1991

Deletions that should be restored to Flood Plan

"The guiding principle for the CFHMP is to allow for natural river processes, such as sediment deposition in flatter gradient sections of the river, channel shifting and meander migration, and local bank erosion as the river adjusts to hydrologic conditions from year to year, while providing a framework for Valley residents and the Skokomish Tribe to undertake a flood hazard management program that mitigates the adverse impacts in the Valley of activities controlled by others.
-6-1

"However, riprap armoring can have detrimental effects on fish habitats. Because all channel armoring projects require a Department of Fisheries Hydraulic Permit Approval (HPA), it would be prudent to consider using other bank stabilization methods that are more favored by the Department of Fisheries."
-6-4

"This CFHMP does not support extensive dredging efforts along the river, but does recommend removal of local sediment deposits that worsen the impacts of a flood."
-6-4

Pages 6-5 through 6-8

"a few"
-6-9

"Clearing of growth along this section of the river would negatively impact riparian habitat and the fisheries resource. However, in this instance it is necessary to reduce the flood level increase caused by the Highway 101 embankment across the Valley. This minor clearing will help to mitigate the flooding caused by the embankment. Reduction in the area of shaded fish habitat is one concern with clearing of growth along a river's bank. Any loss of shade for fish habitat at this location will be more than offset by the new habitat created in the 'reestablished side channel' described later in this section.
-6-9

"However, of all availabel methods, riprap is probably the most detrimental to riparian and fish habitat. Therefore, more environmentally beneficial band protection measures, commonly categorized as bioengineering, are recommended as the first consideration for all bank stabilization efforts. Rip rap should only be used at very selected locations where high velocity flood flows occur and where significant bank erosion would create a serious flood hazard."
-6-12

"Recent demonstration projects by the Department of Ecology using bioengineering techniques have been very successful."
-6-12

"and designating the main flood flow corridors across the Valley as floodways to prevent possible future obstruction of these flow paths."

-6-13

"Each maintenance alternative for the Valley drainage network must be undertaken in a manner that also enhances riparian and fisheries habitat. The creek network of the Skokomish River plays an integral role in the abundance and diversity of aquatic habitat in the system. According to published data on the abundance of fish stocks utilizing the tributary systems of the main stem, (FishPro 1992), tributaries throughout the system serve a vital function in terms of spawning, rearing, and feeding habitat."

-6-13

The remainder of 6-13

"the riparian zone by establishing the hydrologic regime and delivering a variety of sediments, organic matter, and food to the riparian ecosystem. Each system has a direct effect on the other, and by altering once component of each system, changes can be seen in both."

-6-14

"Along much of Hunter Creek, Weaver Creek and unnamed tributaries in the Valley, the existing riparian zone is degraded and altered by past pasturing and farming practices. Much of the existing riparian zone is a remnant of what once comprised a Valley-wide riparian complex. Despite these changes to the riparian zone, good fisheries stocks remain. Although supplemented by three hatcheries located in the Valley, wild stocks have not completely disappeared (FishPro 1992).

-6-14

"no"

-6-17

Skokomish River (2)

Problem	Solution	Funding Source(s)
- poor planning in building of hatcheries resulting in diking or damming effects	- reconstruct or relocate hatcheries	- Environmental Protection Agency
- restriction of flows by U. S. Hwy 101 Bridge	- reconstruct	- Dept. of Transportation
- restriction of flows by county road bridges	- reconstruct	- County Public Works
Flooding of Residences		
- homes in floodways	- flood proof	- homeowners
	- removal / buy out	- FEMA
Other		
Build up of gravel and sediment due to the above problems	- gravel removal	- Dept. of Transportation - U. S. Forest Service - Dept. of Natural Resources - Simpson Timber Co. - City of Tacoma

Skokomish River

Problem	Solution	Funding Source(s)
Logging Practices		
Soil erosion and build up in river due to:		
- Clear cut / slash burning	- selective cutting	- U. S. Forestry Service
- insufficient buffer zones	- larger buffer zones	- WA. Dept. of Natural Resources
- steep slope logging	- no steep slope logging	
- abundance and failure of logging roads	- careful engineering, repair and restoration of failed roads	- Simpson Timber - Dept. of Ecology
- failure to pursue reforestation and restoration of logged watershed	- bio-engineering / restoration	- City of Tacoma (logged in 1950's)
- loss of absorption of precipitation due to lack of vegetation	- reforestation / restoration	
	- sediment trap in upper watershed	
Cushman Hydroelectric Project		
Increased aggradation from North Fork:		
- restricted flows have "doubled" or more rate of aggradation	- periodic bank-full flows as described in Skokomish Tribe Watershed Plan	- City of Tacoma - FERC - FEMA
Manipulation of River Channel / Man-made Obstructions		
Increased flood depth in adjacent areas:		
- dikes/berms not built to specifications and without proper permits	- repair or remove dikes	- Army Corps of Engineers - private citizens who are responsible for "illegal" dike building
- dikes placed that create problems for residents downstream, upstream, and across the stream	- remove or reconstruct these dikes	
- attempts to force river into unnatural channels	- allow natural processes	- Dept. of Ecology
- lack of enforcement of permit system	- regulatory agencies enforce	- WA. Fish and Wildlife

CITIZEN RESPONSE TO THE MASON COUNTY FLOOD HAZARD MANAGEMENT PLAN
(Draft 3)

Comments from Mark Sleeper
Resident of One of the Lowest Parts of the Skok Valley
201 East Bourgault Rd.
Shelton, WA 98584
(360) 427-7173

June 12, 1996

RECEIVED
JUN 13 1996
MASON CO. PLANNING DEPT.

To: Gary Yando (and SEPA)
Mason County
Dept. of Community Dev.
PO Box 578
Shelton, WA 98584

Dear Gary:

Thanks for the opportunity to share my thoughts on Draft 3 of the Skokomish Flood Plan. It is hard to believe it has been just over 1 year since we commented on Draft 2! Much good has happened in that year, but it still seems we are a long way from solving the problems or even having a consensus on how to solve the problems. Such is life. Thanks for all your efforts in helping this process along, especially by moderating the final PAC Board meetings. That helped a whole lot. I also realize your efforts and responsibilities have increased in the absence of Gary Cooper. For all of this and more, we thank you.

First, let me offer some congratulations for some good points about the flood plan. Its readability was much better. It seemed more "user friendly" as they say in the computer world. Not only was the language easy flowing in style, but including things like graphs of the flood flows (2-12ff) helped to visualize how the different flood events compare to one another. That was tons better than just lists and rows of numbers. We also liked the inclusion of so much data in the Appendix...even though it is a little overwhelming.

Another good point was that the plan this time addressed the bigger issues of the logging and North Fork diversion in much better detail. They even gave some recommendations to both these activities that were quite an improvement. They could have been a little stronger, but I think they got the point. One really strong recommendation that came out of the USFS Watershed analysis that I hope will also be reflected in Simpson's is on page 6-19: "use stragegies such as delayed thinning, smaller harvests, etc." The problem with it is that it is only a recommendation with out any enforcement teeth. We need to find some way to get every in the watershed to sign on to that one and we might begin to see some return to "normalacy" in , say, 50 years or 60. "A journey of a 1000 miles always begins with the first step."

I also liked the repetition of the recommendations from FERC to the City of Tacoma to participate in the implemetation process of correcting flood hazards on page 6-49. It is so hard to assign the correct amount of responsibility for these impacts, but this is sure a good start.

Another good point addressed to Tacoma are the **Recommendations for Notification in Event of Dam Failure.** We have been begging for sirens for years and this is the first time that I know of that our pleas have been included in any "official" document. Another first for the Skok valley! Even FERC has never acknoledged our request, so I congratulate your responsiveness at this point.

I was really happy to see the "Key Elements" having such a prominent position in the plan on

page 1-7 as well as throughout chapter 6. We seem to need a constant reminder like this list provides that the PAC Board and commissioners have committed themselves to meeting "FEMA's requirements for flood hazard management." That one especially seems to get lost in the shuffle of the heated discussions about property rights in the valley. And I fully recognize the nature of its contentiousness, but without this element, I think all of our plans and hopes are guaranteed to failure.

On page 2-11 at the bottom is a good short description of the high water table problem in the valley. I wasn't quite sure what the next to the last sentence meant though: "Extreme high water tables at the ground surface are a *temprary*, [emphasis mine] natural effect of flooding." This section could be developed and explained a little more in detail. Does it mean "temporary" in the sense that when a flood event is over the extreme high water tabes recede? Or is it meaning that the general extreme high water tabe that we experience even in the summer months is "temporary" in the sense that when the river channel is lowered to a more "natural" depth, then the extreme high water table will recede along with it? The latter case is the more generally accepted residents version of the situation and points out the increasing difficulty associated with living in these worsening conditions.

I also really liked the inclusion of the short summarizing chronology of flood events on page 4-1. This summary has helped many of us in the valley finnally put all the events into a more proper and accurate historical perspective than many spokespersons were giving us. It also demonstrates how often the state and federal agencies have been bending over backwards to help Mason County out of this dilemma...and how Mason County continously drops the ball that is handed to them. Unfortunately, Mason County's pattern has not changed much over the past 20 years...and it continues even at the present time as I type this as witnessed by the recent buy out fiasco.

Another good description appears on pages 4-3 and 4-4. It concerns a generalized description of how often flooding occurs and where it occurs first. It is from 2 earlier studies in the early 1970's, one of the authors of which was the same in both studies. I appreciated the reference information that was provided in this case. Everything in their description sounds amazingly accurate to how it is still happening down here below 101. The only changes would be a lowering slightly of the capacity of the channel due to further agradation and the increase in frequency of the events: instead of averaging 1 or 2 flood events per year, we are now averaging 5 to 7 events every year for the past 3 or so years. That makes a total per water year of approx. 30 to 35 flooding events impacting us down here! No wonder everyone in the upper sections of the river don't understand our plight down here! I have supplied the County with detailed data on these events and I would be more than happy to supply it again along with an updated description like Wes Johnson's 1988 one that follows these two 1970 ones.

I also appreciated the description from PSAW on page 4-7 about the Cushman Project. It was good to see in print their record of the events surrounding the permissions to dam the North Fork. Of particular interest was their request in 1954 to dam the South Fork and divert it over to Cushman. What was left out was a description of what happen to all the trees on the proposed reservoir site: I still haven't been able to track down exactly who gave the go ahead for Simpson to log all the trees from that site and never replant. That was a large source of our gravel and sediment bedload that has worked its way down to us in the mainstem 20 to 30 years later. I am still trying to find out who is responsible and I was hoping this draft of the plan would shed more light on it. Back to the drawing board, I guess.

(Another relevant comment here concerning the dam since I am on that subject is in regard to Tacoma's voluntary winter time flood storage at the reservoir. I won't go into all the details that I sent to FERC regarding this aspect, but all of it relates to why this hope is a false security as proved by Tacoma's recent dumping **extra** flood waters on us this past December, on the Cowlitze in November, and the grandaddy of them all, the Nisqually. Each of these dumping events demonstrates that in the flood event that you need the most protection, Tacoma may (or will!?!) add to your disaster rather than help prevent it. Instead of being a safety net they end up being a greater problem. This area of their poor

management record was not even mentioned or touched on in the Plan, but should be since so many of us are living in the shadow of their mistakes. More accountability from Tacoma is our main concern.)

I liked the inclusion of relevant points from King County and Snoqualmie City Plans (pages 5-26 and 27 — even though a little more could have been added, like priorities. I especially appreciated the fact that they had to pay **fair market appraised value** for the homes that would be bought out. In some of my conversations with the County I have been told we would be paid at **assessed** value which is less than half of the appraised value. In other conversations with the State Hazard Mitigation Office I have been assured that State Law mandates that fair market value be used, so I am getting more and more relieved.

The only thing missing was a following of the King and Snoqualimie examples which any reader would expect. But there was none. The recommendation at the end of this chapter (page 5-28) just do not go far enough. In fact, now that I look at it more closely, I see that the CFHMP mentioned at the bottom of the page is not even for Mason County; **its for Lewis County!** That's even more shocking: it appears Mason County has no specif recommendations or prioritizations! Where are they?? Why were they completely left out? You dutifully included recommendations for King and Lewis, but forgot about us! What good are recommendations for these other two counties, but none for us?**It is like only half the job being completed...or less. You had 2 or 3 good examples; all you need to do is follow them...and let us lknow what you decide so we can comment further on it! I think this is another one of those glaring mistakes that needs to be corrected before the rounds of public hearings begin.** (The other discussion about acquisition where you would expect mention of things like fair market value and that sort of thing like those in the King County Plan is on page 6-69. But again there is not the specific type of language that the King Plan had. There is a list of houses but they are not prioritised or evaluated. There is a mention of how the choices were made, but, as I will discuss in a few more pages, the choices do not match the "No New Footprint Zones" like you would expect.)

Now for some more developed criticisms.

Let me mention a couple that concern those flood graphs I was just referring to. Designating them by their "official" USGS location like "Near Union" or "Near Potlatch" are still very confusing even for those of us who live down here and are slightly familiar with those designations. Better designations would be "Near 101 Bridge" or "Near the Richert Ranch", designations that mean something to all of us in the valley. Even a minature map insert could have been tucked away in a lower corner of each of the graphs (4-12ff) to help orient the reader to which spot on the river was being graphed. It would have slso been a help to us curious-type people if you had included a footnote or reference to where the data or graph actually came from. The graphs looked like those the Forest Service had used in their South Fork Analysis, and they in turn may have taken it from USGS files. **The need for more referencing or footnoting is a need throughout the plan.**

Another confusion with the graphs is a perrenial problem with rainfall and flood data: water years and calendar years get very confusing when mixed together...like they always end up being in these type of studies and plans. In the case of our flood plan the graph on page 4-15 ends with the water year that would, at first glance, appear to be the flood year of the worst flood of record, 1994. But in actuality the flood of 1994 is designated by the water year **1995**. That confusion explains why the bar line for 1994 is not as high as the 1991 flood year. If it had been included, and I believe I left a record of that data with the County in time to be so included, it would have dramatically increased the visual effect of the clustering of multiple high bar lines since 1991. That cluster shows to every reader that the river is overflowing more often and at higher cfs amounts in these last 5 years. Without it, the picture is a little incomplete.

A similar incomplete picture emerges on page 4-10 in Table 4-2 of Estimated Flood Damages.

have to do that ourselves. And that explains why it has not been done up until this point; and why it still hasn't been done at present. Choosing which designation we want is frought with political, emotional, and personal tensions and difficulties. The computer can not solve these for us. Community workshops can.

I would propose a series of weekly public workshops for the month of May to deal with this decision before the June 30 deadline of FCAAP funding. That would allow us time to have a final month to justify other proposals with the last month on KCM's contract.

If there is any technical way to squeeze the 100-year floodway width to a 200 foot wide floodway instead of the mile wide one that FEMA or Ecology came up with, then I would recommend using a split floodway designation. Half could be on the north side of the Valley like it is at present and the other half could be on the south side of the Valley. The south side floodway would demand opening a channel from Vance Creek back to its old channel and then connecting that over to Weaver Creek and then through the Purdy bridge which would probably need to be widened. This proposal would split the sedementation and the flooding and hopefully lessen the problem on the south side and buy the valley some time to solve the long term problems. It also involves quite an expense and lots of permits and maybe even the purchase of some property, all of which might cause it not to become a reality.

A second proposal is the density designation, a proposal that has been talked about at least from October 27, 1988 in a phone conversation between Marley Young, the County Engineer at that time, and Chuck Steele from FEMA. The density option was offered at that time as the most flexible, least costly, and very acceptable to FEMA. But in the ensuing 7 years, nothing has been done. Draft II still did not address itself to this issue. FEMA is still not satisfied that the County has settled the floodway question. And the committee members understand the positive and negative qualities of density about the same as they did 7 years ago. Let's take the month of May to decide once and for all, one way or the other. And we can all understand it together before it is too late.

My proposal in the density category is to take the Valley either as a whole or in 3 zones or in many little zones that match the cross sectional data we have already collected. Then we either use a density figure or number that Tony supplies us with or we calculate the square footage obstruction that each house represents in its zone or the valley as a whole. Then we calculate what amount of additional obstructions would raise the 100-year flood levels one foot and make that our density cap or max. Then we figure the difference between the cap and the current level of density to arrive at an amount for new construction. And last of all, we divide that amount by the number of acres in the Valley or in the zone to give us a per acre amount of density.

This first of all eliminates any incentive to land grab or density grab or development grab. No one can jump the gun and "steal" anyone else's chance to develop by being the first to fill up the density of their zone. Everyone would have a fair stake in it. Secondly, it should make it easier for the County to regulate it, rather than a phantom density that changes each time a house is built. This way it is very straight forward. Thirdly, it means that if everyone built on their property, the valley would only be at the density cap, not beyond it.

It could also be augmented by other restrictions to new development like only flow through foundations, higher septic elevations, and minimum heights above the 100-year flood levels of maybe 2 feet instead of one. All of these precautions will further assure us that the floodway density will never be over built even accidently. It also will allow for further in filling of gravel in the channel.

It also means the mapping is not so critical, once we opt for a density designation. The shape of the valley and the exact elevations which are always subject to change by floods and other natural forces are no longer critical questions. Almost any map will do, because density will allow development throughout the Valley. This should avoid the strong reaction of the public to the inaccuracies of the earlier maps. But density can only work with a strong commitment to zoning.

I just mentioned the figure of $300, 000 worth of damages to the homes reported in just the last 5 years!), but on the other hand, this section of lthe valley in not designated a "No New Footprint High Hazard Zone"! Hmmm...something seems a little fishy about that.

Not only fishy, it could turn into a major fiasco. Let me try to explain what I see happening here.

The river corridor is rightly designated as a "no build zone" (or "No New Footprint Zone"), and the Purdy Swamp on the south side is rightly desginated. But the area in between is not. This at first seems fair, especially from a "property rights -no government takings" standpoint. If the County tells me I can't build on my property that I think is suitable or I bought with the plans in mind to subdivide, then I have been unfairly deprived of my property's value or its potential value, all of which I recognize as a very volitile issue across the state, especially with GMA. I do not have a good solution to propose, all I want to do is so the similarity that is going to be produced with these "no build zones" scattered thoughout the valley without enough thought as to what will be the consequences.

The consequences in our case of East Bourgault Road is the situation where the last 7 houses are slated to be bought out and the land turned into a "*virtual* no build zone". (Oh, Wow! We've had virtual reality, and virtual memory, and now...virtual no build zones! We are on the cutting edge down here in Mason County!) This classification will be ``` by virtue of the fact that buildings will be forbidden by state law after state acquistion for disaster purposes. Now the zoning map will be chopped up even more: we will have the river corridor and the swamp still, but we will have a new band joining the other two zones right smack in the middle of the road. That in itself is not entirely unique:Zone 1 begins by joining the river corridor zone at its western most end and then wiggles back and forth toward the corridor and back again before ending on Hunter Creek at the zone's eastern most end.

What is unique is that this new "virtual no build zone" for the buy out will strand at least 2 worse properties that will still be zoned "permissable for new construction"! The fields just east of the last of the 7 homes slated to be bought out and the swamp forest just west of that last home all could potentially be bought by a developer who could build a 1,200 square foot on every acre of a 5 acre plot (Or even 1 6,400 sq. ft. house on the whole acreage!) and conceiveably **not** be in violation of any new density regulations! That would be great for the developer if they all sold the first summer when everything looks reasonably dry and beautiful. He could probably make a million dollars. But as soon as the first rainy season hit, those homes would be in a worse flood condition that the 7 that were bought out: deeper water, swifter water, and retention of water longer than the land of the "virtual no build zone." That doesn't make any sense to me. Unless the developer is going to bring in a mountain of fill like they've done on the property at the corner of 101 and Purdy Cut Off Road. Anything less than that would be crazy...and even that is probably crazy!

That's the dilemma. To allow building or not allow building. That is the question. Part of the problem might have been the consultants' definition of High Hazard Areas. He seems to have included water depth and velocity, but **not** lenght of time the water stays on the ground, septic drainage problems and real life hazards to life. The last is anecdotal but very real: In the middle of the big Nov. 1994 flood, the sheriff refused to send a the Count's rescue boat out to rescue a 2 year old girl from one ;of these 7 houses because he said it was too dangerous! Now that sounds like a High Hazard Area to me...but somehow it did not get included in the "No New Footpring Zones" like you would expect. Not that the buy out is a sure thing or a done deal. And not that I want the government to take the value of people's property away. I don't. But how can the County buy out homes and turn around and let someone build new ones right beside them in even worse areas. The reason no homes exist on those other acres today is because people had the good sense **not** to build in the low land. If a greedy developer comes in, he may not have the good sense not to build there and desperate city folk like myself might be crazy enough to buy one...and then I would have to be bought out again! This is ridiculous!

But what is the County to do?

I'm not sure. It really is a predicament. If the County gets too all inclusive with their "no build zones" we could have virually the whole valley becoming a no build zone...and that almost started a civil war back in 1987 when the first FEMA map proposed such a thing! But what can they so just short of that? Maybe the consultants or the staff could tighten up the boundaries of these "no build zones" a little tighter. That could be a starting place, but it still may end up with being too restrictive for the residents.

Another wild idea might be to have Simpson provide a land swap and Tacoma to provide the house movers and the County provide the improvements necessary to relocate the entire valley full of homes to higher ground! Hmmm...I don't think so, but it is worth a try. The town of Hamilton is apparently attempting a version of this up north of here.

Another option would be to make the "no build " status contingent upon solving the flooding and aggradation problems. If we get the river problems under control, etc. and have either no floods reported for 5 years or no flood damage claims or reports for that period, then the area would be reclassified as a "build" zone. The problem is that it may take 50 years to get this river back to some semblance of "normal". Who can wait 50 years to develop their property? Not exactly encouraging, I know. It is a tough one. I don't envy you decision makers on this one!

Another problem with the density zoning model is found on page 6-80. It states there that by using the "maximum allowable percentage for development as 3 percent", residents would be allowed to build a monstrous 6,534 square foot house! That seems awful large to me. What's the restriction here? Is it just that you can not subdivide smaller than 5 acres?It seems like a smaller size would be more appropriate in this hazardous valley until conditions change.

Another question is why say all the verbage of 80 feet parallel and perpendicular to the flow, when you could just say 80 feet in all directions? That still calculates out to a house 6,400 sq. ft., probably related approximately to the house size in the above paragraph. Something still seems way to large for this valley. If these amount to restrictions for hazardous conditions, what would restrictions be like for less hazardous conditions?

Now let me express some less critical concerns.

The map designated Figure 2-6 has a flaw that is duplicated on most of the other maps that follow: It shows Purdy and Weaver creek s coming together down in the lower middle just east of 101. What it doesn't show is Purdy creek coming back out of that union and flowing toward the main stem. It flows out right at the end of that swampy area the map shows crossing East Bourgault Road. Since the Weaver creek fork that is shown above this swampy area is actually obstructed and blocked up to any and all fish passage, this lower Purdy Fork is the primary passageway for all the salmon returning to the hatchery. So it would seem to be pretty significant to accurately depict it on our working maps so that the salmon don't get lost in the shuffle.

Figure 2-7, Land Ownership in the Skokomish River, also shows some slightly misleading linformation that is dupicated throughout the other maps. The Skokomish Indian Reservation boundary is depicted as going all the way to the Skok River. In many places it does, but in the region just east of the 101 bridge it follows the **old** river channel, **not** the present one. Again, accuracy is important on these maps for working purposes and clearly understanding the ownerships involved. There are also two little sections of state ownership that are scattered along the river corridor that could be noted if interested.

If you are correcting typo's there is one on page 4-8 at the bottom of the *St ate Flood Control Zone Permits*. The sentence "Ecology suspened the issuance of flood control zone permits was sus-

pended in 1976..." the words was suspended need to be scratched. I also looked back to the short history on page 4-1 and did not see any mention of this suspension only the 1988 suspension from NFIP. This would seem to be a fairly important event/date establishing the county's pattern of non-compliance. You may want to add it to the chronlolgy that is provided on page 4-1.

The gauge information and explanation on page 4-16 was good...but it also brought back all the confusions that have plagued me since I started studying this issue over a year ago. Even multiple conversations with USGS experts fail to shed very much light on the subject of the accuracy of the gauges (or more correctly, the interpretation and traslation of the gauge height into a meaningful number). On page 4-16 it says towards the end of the second paragraph that "The largest stage and associated discharge on the curve are 16.7 feet and 32,500 cfs, respectively." Something doesn't quite jive here and its probably only me. A few sentences earlier the paragraph states that the Dec. 19/20th flood measured 17.91 feet on the gauge. Well, it doesn't take a rocket scientist, unless I am really missing something, to figure out that if the 1991 flood measured 36,600 cfs at gauge ht. 16.8 feet (page 4-11 at the bottom of the page of the plan) and the 1994 measured 17.9 feet on the gauge but calculated to be only 34,500 cfs, somthing doesn't quite fit. Either the numbers for 1991 need to be scaled down, or 1994 need to be scaled up —which is the option I would opt for.

The volume of water represented by this 1 foot difference in flood gauge height could actually be quite large. When the river rises out of its banks it is generally filling a wider and wider section of the top of the "V" shaped configuration of the valley. That means it could be twice or 10 times the volume that is represented by a foot rise just below this one. But that "guesstimate I will gladly leave for the experts to figure out. My observation is that the cfs volume estimate of the higher gauged flood should not be lower than the lower gauged flood. Plus by experience we know lthe 1991 flood was higher because we measured at least a foot to a foot and a half difference in flood height at our home. Add to this the Consultants own description of only a third of the water was actually going past the gauge we should have had a whopper of flood calculated here. But somehow, nothing seems to add up. Any further help out of this confusion would be appreciated. (Compare all of this to the discussion of cfs on page 6-6 and the confusion will be magnified, not lessened.)

On page 6-11 I found a statement that I questioned or wondered about. It is in the middle of the page (the third bullet) and says "As the flow tops the levees, the water on the two sides of the levees approaches the same level. At the peak of the flood event, the water levels are roughly equal and the displacement effect is so minimal that the levees can be said to have no effect on increasing flood levels.

I must be missing something important here. My perception of water flowing ;over a dike or a dam is that it will always be lower on the side away from the river source. If the dike is holding 10 feet of water behind I and then overtops it by a few inches, only a few inches of water will be flooding the previously dry side of the dike. And even that water will be flowing away as fast as it can so it will not be accumulating like it is in the banks or dikes of the river. Only if it was being overtopped by a monumental amount of water (like in a dam failure or sunami) would the two sides ever be close to equal. Now there was a large amount of water coming down in the 1994 flood, but I doubt it was monumental on this scale we are talking about. Something needs clarifying there or corrected.

On page 6-15 it states how many miles of roads were being abandoned by Simpson, but none of them mentioned or matched the 15 miles per year figure that they gave in one meeting. How do these correlate?

Two final questions and then I am done. Please forgive all the typo's — I'm rushing this to press and did not have time to do a good proof reading job.

I notice thoughout the plan whenever gravel removal was being analyzed, that it always ended just above 101. Were those of us below 101 being slighted for some reason I don't know of?

I saw the high cost of building dikes buried in the Appendices, but I think at least of summary of those costs should be included as part of the evaluation presented in the main volume of the plan. That is another example of a less than thorough presentation in the main volume. Evaluation is one of the most critical contributions the consultants have to offer us lay people so that we can properly digest the mountains of data that floods us in these situations.

Well, that is all for this installment.

Sincerely,

Mark Sleeper

The damages are recorded for sporadic years scattered throughout the last 7 decades, but they end abruptly at 1986. It is after 1986 that the office of Emergency Services should have much more complete damage records for the costs of the various floods from that point on, better than all the years previous. But they are not included in the table, so there is no real picture of how the costs associated with floods are increasing dramatically during the last decade. According to the numbers the County submitted for the "Slow Track" grants, East Bourgault, I believe, has reported over $300,000 worth of damages in just the last 5 years! That's approximately $60,000 per year, not including the rest of the valley or work on 101. That is pretty significant data in my opinion that should have been included.

Before I go any farther into the specifics of the plan, let me offer a more general comment. Like I mentioned at the very beginning of the letter, I felt this draft was a vast improvement over draft #2, and I stand by those feelings. My critical comment is comparing it to other plans, ours still doesn't do as good as it could have, especially since we had the other plans to use as examples. And I don't think it is in the fact that these others like King County and Pierce spent more money on theirs. No, what I sense is a difference of approach. Their plans seemed to procede in a much more systematic fashion, taking each alternative or option, and showing why it was either good or bad depending on factors such as cost vs. benefits or county approved goals or whatever. And they prioritized things more.

Our plan, on the otherhand, seemed to dump a lot of miscelaneous facts into our lap and expected someone, somewhere to make more sense of it in terms of implementing it and doing something practical with it. All the alternatives put forward are not created equal. Each needs to be evaluated according to its practical and realistic relevance to this valley and this situation. And they each need to be prioritized. Again, as I mentioned about the 1995 flood depth data, examples of prioitization schemes from King County's plan were given to the County in plenty of time to be included in this draft. The fact that they weren't leaves us all up in the air as to how and when each of the various alternatives will be implemented.

This area of evaluation and prioritization would seem to me to be one of the most important and critical aspects of this plan, or any plan, and without it, it is fatally flawed. The simple remedy for this is to have the County staff or the consultants provide a more thorough evaluation and prioritization plan before the Planning Dept.'s public hearings begin so that public response to that prioritization could be heard. To wait and tack it on after the final set of public hearings for the Commissioners would be extremely foolish and way too late to do any good. It needs to be done immediately and included as an extra set of loose papers to be attached to each copy of volume 1 as well as being available separately for the less daring to read, those that are a little scarred to tackle the whole plan. In fact, these extra sheets may turn out to be the most central and most interesting part of the whole plan, so much so that everyone may want and need to read only those pages. They will be a summary of what the County plans to do and when — at least in the sense of what order — the County plans to do it all in. That could be some really good reading. Whatever you do, please, I beg of you, don't bury in in the appendices as appendix KK! That we definitely do not need.

Another very important issue that was left hanging in the plan, but one that is not so easily solved as the last one, concerns the "No New Footprint Zones". (Their maps are included as Figures 6-13a-d and discussed on page 6-71&72.) The problem is one that was asked at many PAC Board meetings, but no satisfactory answers were ever given that I can recall. It specifically revolves around the acquision plans for East Bourgault Road homes and its affect on the surrounding properties. On the one hand, the last 7 homes on the road are impacted so often (We were surrounded with water close to a foot deep to 3 feet or more for 35 days this rather uneventful water year 1996!) and so devatatingly (I believe

I notice thoughout the plan whenever gravel removal was being analyzed, that it always ended just above 101. Were those of us below 101 being slighted for some reason I don't know of?

I saw the high cost of building dikes buried in the Appendices, but I think at least of summary of those costs should be included as part of the evaluation presented in the main volume of the plan. That is another example of a less than thorough presentation in the main volume. Evaluation is one of the most critical contributions the consultants have to offer us lay people so that we can properly digest the mountains of data that floods us in these situations.

Well, that is all for this installment.

Sincerely,

Mark Sleeper

THE AGRICULTURAL COMMUNITY IN THE SKOKOMISH VALLEY

December 5, 1996

Sylvia to Comm 12-18-96

To: The Mason County Planning Commission:

Re: Review comments from the
Skokomish River Comprehensive Flood Hazard Management Plan

The Agricultural Community has previously submitted concerns, comments and recommendations regarding this PLAN to Department of Community Development, to the PAC Board, and now to the Planning Commission.

When the PAC Board was first formed and the PLAN was started, it was the hope of the Agricultural Committee that this PLAN would be a Flood Prevention Plan. The PLAN as written is a Damage Prevention Plan focusing of preventing Structural damage. The farmers priority is to prevent damage to the land because the land is the farmers non-renewable resource. This PLAN does not protect land.

We firmly believe that our input is of benefit to all the residents of the Valley. The County has seen fit not to incorporate many of our priority issues in the PLAN.

We now submit to the Planning Commission four (4) priority concerns.

1) **Maintenance:** Maintenance activities have been exempt from Permit requirements. An in-depth definition of maintenance must be added to the PLAN.

   Even though, the authors of this PLAN point out that the Valley is a very sensitive and delicate floodplain - '*Skokomish River floodplain is an area of great natural hazards. Inundation of property, erosion of land, and threats to personal health and safety occur on a frequent basis in the Valley as a result of flooding from the Skokomish River.*'

The Plan does not explain what kind of maintenance in the floodplain will continue to be exempt from the permit requirements and what kind of maintenance has become so sensitive and delicate that a permit will be required. The lack of clear definition will lead to unnecessary controversy.

Please consider clarifying what activities will continue to be exempt from the permit

requirements.

2) **Emergency:** The Plan also does not adequately explain or define 'Emergency'.

The PLAN is silent regarding the resident's rights under an emergency.

The residents of the Valley deserve a clear affirmation that this PLAN retains and preserves the resident's right as given by State law to respond to river-caused emergencies.

It is necessary to the Agricultural Community that all Emergencies continue to be exempt form the Permit requirements.

3) **The No New Foot Print Zone:**

We believe that the definition of the 'No New Foot Print Zone' is quite clear: No new construction of any kind. We would ask that this section be revisited and reviewed, because no new construction of any kind means no flood control construction, new fences, no road widening, no bridge widening, no additions to residences, no new barns or sheds, no buildings supported on piles.

Zones 1 through 4 'No New Foot Print' do not allow for any alternative construction methods such as buildings on pilings or other flood compatible construction designs. We interpret 'No New Foot Print' as causing land values to be greatly reduced.

ZONE 1 has been delineated on Figure 6-13c and the PLAN. The text leads us to believe that ZONE 1 could become the new corridor for the South Fork Skokomish River. If this is correct, the construction of Roads and Bridges would be prohibited.

The Zone 2 is generally a 200 ft wide strip of land landward of the OHWM. However, when Zone 2 gets to the Richert Ranch on the north bank of the river, the width of Zone 2 expands to 600 feet into the fields.

We would ask that the Zone 2 boundary be reduced to a maximum of 200 ft in width and that flood control work and farming activities be an allowed.

It is our understanding that the Buy-Out program includes the residences in the East Bourgault Road corridor. This area isn't included in any 'No New Foot Print Zone'. Wouldn't the Buy-out program be less subject to ridicule if the East Bourgault Road corridor qualified and were included in a 'No New Foot Print Zone'?

4) **Density Floodway:** We have read the four bullets at the top of page 6-80 which set out the criteria for the building in the Valley. Bullet #3 states 'The minimum allowable space between structures parallel and perpendicular to flow is 387 feet'.

The Agricultural Community is extremely concerned that the County's administration of this Bullet will be "all structures, regardless of the size, must be 387 feet from the next structure." It is feared that this listed condition will severely restrict farming activities in the Valley and can stop future farming.

Bullet #3 must be revisited and revised. Bullet #3 could be restated to read: "the summation of all the foot prints shall not exceed 6400 square feet in a 387 ft square".

This plan must include a definition for flood compatible structures and their net foot print. Recommended definition of foot print, "That land area that is permanently taken out of surface for flooding." e.g. for flood compatible structures such as a building supported by piling, the foot print is only the piling area at ground level. For a buildings that will allow flood water to flow though it, only the area of its foundation that is stationary is the foot print.

CONCLUSION: It is the Agricultural Community's recommendation that the Planning Commission not submit this PLAN as written to the Board of County Commissioners for adoption.

Thank you for allowing us to once again express our concerns. For your convenience, we are attaching previous communications.

Sincerely,

Agricultural Community

THE AGRICULTURAL COMMUNITY IN THE SKOKOMISH VALLEY

Mr Gary Cooper
Mason County Department of Community Development
P.O. Box 578
Shelton, WA 985684

RE: Draft Comprehensive Flood Hazard Management Plan

Dear Gary,

The Skokomish Valley has a very long history of being an agriculture community. We the undersigned wish to convey our agricultural interest and share with you our concerns that the Mason County Skokomish River Comprehensive Flood Hazard Management Plan (CFHMP) when completed may not satisfy our needs.

1) We support all efforts to redefine an "Emergency" as it would relate to the farmers in the community.

> "Emergency" is presently defined as an immediate threat to life or public or private property, or an immediate threat to serious environmental degradation due to weather, stream flow conditions, or other natural conditions.
>
> To the farmer this definition does not provide adequate latitude. The term immediate excludes the farmer's emergencies. The farmer's emergency may be his need to protect his crops from imminent flood waters or his land from floating debris, or his need to plant and harvest at the proper time of the year.

In all the history of the Skokomish Valley, the Agricultural Community has always responded to the need to protect their lands and their crops and their neighbors lands and crops. We understand that it is generally accepted that flood water on land is not necessarily damage, but debris that the flood water carries is damaging to the integrity of the farm land, and flood waters on crops is damaging.

a. When flood waters deposit road pavement, gravel, remnants of fences, lumber, logs and other woody debris in a farmer's fields, these materials must be removed, so that the farming operation can continue.

b. When the river erodes into a portion of a productive field or washes away the top soil from that field, that is loss of productivity and that effects the farmer's financial stability.

c. If the flood waters breach an existing agricultural dike, the debris that is carried onto the farmer's fields must be removed. The agricultural dike must be repaired so that the cost of debris removal is not repeated when the next flood reaches the breach in the agricultural dike.

For just the 1994-1995 winter floods, one farmer's estimate of damage, loss, and cost to repair exceeds $300,000.

These kinds of losses materially effect the economic livelihood of the farmer. The farmer must have the ability to protect himself. The farmer cannot sustain these kinds of costs year after year.

After the flood has passed, the farmer's emergency is to clean his fields, repair his agricultural dikes and prepare for the next planting or harvest.

For the farmers the existing definition of an "Emergency" is not adequate. The farmer is not allowed to protect the health, safety and welfare until the floodwaters are rising. The farmer needs the ability to protect themselves from an emergency before it occurs. To the farmer, an emergency is more than protecting one's home or buildings. Land to the farmer is as important or more important than a structure.

2) The agricultural community supports the removal of logs, log jams, and root wads and other woody debris from the river.

The river at flood stage carries log debris. There has been case after case of a log jam or root wad changing the forces of the river and aggravating river bank erosion. The County and the people of the Valley over many years have invested much time and materials to the hardening of certain river banks, the "dips" and the "church" to only

name two. As long as the erosive forces of the river continue to flow against these hardened banks, the bank erosion, siltation and aggravation are kept to a minimum. However, when a log jam or root wads divert the rivers erosive force off these hardened banks, unnecessary loss of land, erosion, siltation and aggravation start again. Removing the jams and root wads from the river would allow the erosive forces of the river to continue to flow against the existing hardened banks.

We support removal of the logs, log jams and root wads from the river channel so the existing hardened banks can continue to function and to protect against unnecessary erosion and aggravation and siltation.

Log and wood debris removal from the river must remain as a river maintenance alternative and should be included as allowable under the definition of an Emergency.

3) We support the river bank hardening (River Bank stabilization).

When the erosive forces of the river are allowed to move from hardened river banks to unprotected areas, gravels and silts are eroded into the river unnecessarily. If erosion is not stopped, the river damages private property, ie. crop lands or public facilities. The agricultural community cannot support the loss of public or private property.

River bank hardening must remain a river maintenance alternative. The use of suitable, low cost, materials is encouraged

4) We support gravel removal - mining - dredging from the river.

Because of the gravel build up, each year the river loses more of its carrying capacity, and each year the flooding in the Valley becomes more of a burden for all valley residences. A gravel removal program that would increase the river's flood carrying capacity is strongly supported.

We support a river maintenance program that would give the river back a river bed.

5) We support the stockpiling of river gravel within the floodplain.

The Agricultural Community recognizes that 100 percent of the gravel removed from the river or river bars has a positive effect on the carrying capacity of the river. Only the bottom 2 or 3 feet or 25% of the same gravel when stockpiled in the floodplain would effect the carrying capacity of the floodplain. The lost storage in the floodplain is compensated 400% by the gravel removed from the river. (Stockpile 80' bottom; 20' top; 20' high; 1.5:1 side slopes). It is understood that this gravel would be processed, screened and/or crushed to manufacture an aggregate material that can be economically moved out of the Valley's floodplain.

To preserve the economics of agriculture in the valley, gravel removal and agricultural dikes must remain viable tools for River Management.

6) We support the maintenance, improvement and construction of Agricultural dikes. The problem is not the agricultural dikes but the build-up of gravel in the river bed.

The Agricultural Community believes that the river bed is rising in elevation and the quantity of out-of-bank flooding is increasing. This out-of-bank flooding brings to the valley residences flooding and unwanted debris. If the bed of the river cannot be lowered, to protect the farmers from unwanted debris the banks of the river need to be raised at certain points. In the past Agricultural dikes have performed the function of keeping flood waters and debris away from areas where they were not wanted.

Agricultural dikes have at least two beneficial functions:

First - Agricultural dikes will keep debris from the farmer's fields.

Second - Agricultural dikes create quiet water on the river side of the agricultural dikes. Quiet water keeps the erosive forces for the flood waters away from river banks. A well placed agricultural dike can protect an unprotected river bank from erosion and damage.

To preserve the economics of agriculture in the valley, agricultural dikes and gravel removal must remain viable tools for River Management. If the river bed is lowered the need for diking is reduced.

7) We support the buy-out.

We would find no reason to object to a voluntary Buy out program. Apparently FEMA is desirous of having a Buy out plan included in the Draft.

8) We support the Shoreline Master Plan's designation for the Skokomish River as Rural.

The Skokomish River shoreline is designated as Rural from Hood Canal to the confluence of the North and South Forks, and is designated Conservancy on both forks upstream from the confluence.

The Agricultural Community supports a change in the Shoreline Master Plan that would continue the Rural designation along the Valley Floor westward to the Vance Creek canyon and the South Fork Canyon.

A Rural designation is intended to protect agricultural land from urban expansion, restrict intensive development along undeveloped shorelines, serve as a buffer between urban areas, and maintain open spaces and opportunities for recreation compatible with agricultural activities (SMP, p. 10). The Rural designation also encourages farm management practices that prevent erosion and siltation of water bodies and minimize the flow of waste materials into water courses.

9) We support the floodplain without the floodway designation.

The Valley has a long history of agriculture. The Valley also has a long history of flooding. The definition used for floodway in the Shoreline Management Program has the potential for extending shorelines development jurisdiction over a large area of the Valley. This can complicate the permit process, and impair property owners' ability to undertake activities that involve legitimate efforts to protect their property.

10) We support the CFHMP's recommendation to work for the removal of the designation of navigable waters of the State for the Skokomish River.

The River by definition is navigable waters of the state, but as a practical matter the river is not nor has it been in any recent history been used as navigable.

11) We support all efforts not to identify the floodplain as wet lands.

The Valley has a long history of agriculture. Almost all the productive farm land lies in the floodplain. A wetland designation can complicate and impair the owners' ability to continue their farming operations.

We wish to thank you for the opportunity to submit comments regarding the draft Mason County Skokomish River Comprehensive Flood Hazard Management Plan.

People in agriculture need to be placed on an equal footing with fish and riparian habitat management.

The Agricultural Community has suffered because of the actions of governmental agency, and continue to be negatively effected.

Government should mitigate with Mason County to rectify the damages that the Agricultural Community has suffered as a result of the following actions:

1)	Department of Fish and Wildlife	Eells Hill Hatchery, Diversion of Swift Cr.
2)	Department of Transportation	Highway 101, old highway 101 and the Sunnyside Bridge.
3)	U.S. Forest Service	Accelerated Gravel Movement.

Sincerely,

Barbara Keely
Ray Keely
Joey Robinson
Gerald Ford
[illegible]
Tracy L. Ford
[illegible]
Rose C. Kvarnstrom
Carl Kvarnstrom
Kimberly Wegner
[illegible]
Tricia R. Keely
Bruce A. Allen

Carol J. Hunter
Dale Crosby
William O. Hunter
Carl Moore
Robert K. Fry
Bob Veach
Ken Baskin
Deborah M. Baskin
Alma B. Silverwood
W. Lilly Ryan
Bonnie K. Ryan
John Spencer
Janice Golden

(Continued)
Mr Gary Cooper
Mason County Department of Community Development

RE: Draft Comprehensive Flood Hazard Management Plan
The Agricultural Community in the Skokomish Valley

Carl L Ramsdale
Blase S Gorny
Kelly Peirson
Bill Vuty
[illegible]
Virna Hills
James Hills
Gary Sytsma
Kirsten Sytsma
Wayne Stenberg
Dan Ragan
Karen Ragan
[illegible]
Anita Dugger
Franklin Donald Ragan
Ivan A Leith

To Mason County Commissioners

300 West Boardman R
Shelton Wa 98584

Total Customer Service

(1)

I want to thank each of you for the appointment and the opportunity to serve. It has been educational for me to be involved, a true learning experiance

Our plan is in deed comprehensive it encompasses deep and some dividing issues that I believe the county and its citizens inherited but are not responsible for creating.

Management of the publics resources have played a significant roll in the way the Skokomish River runs through the valley today

Our plan has developed new regulation that I take exception too.
The No NEW Foot Print zone in the Falls area and designating it a Flood Hazzard Zone brings significant changes and impacts

This area is one of the older settlements in Skokomish valley. Historically it has NOT been a flood hazard zone.

The Plan does not go far enough in proving why this area has become a flood hazard zone Nor do we create solutions to it.

Given to Board on 12-18-96

MTD
YARD MACHINES

YARD-MAN
Power to Perform

Total Customer Service

(2)

Designating this valuable area of Skokomish Valley as high hazzard will reduce the values of citizens property, does nothing to protect resources of crops, protect business, protect life styles, or protect the states fish hatchery investment.

It simply leaves us regulating the small guy that has no recourse or a way to change regulation. The solution is to remove the source of the problem Gravel!
A world renowned sedimentologist at a recent meeting stated the solution was simple. He stated "Trap the sediment thats comming in to the system and then begin to systematicly remove it"

I urge the commissioners to take action on this issue, look at it not as a way to regulate Skokomish Valleys flood plain citizens further.

Take a forward step, and clarify that this area will not be designated a high hazzard and lets fix the problem not regulate it.

If you don't do this your only other option is to designate it the highest priority area in the valley to receive federal buy out funding.

YMD
YARD MACHINES

YARD-MAN
Power to Perform

Total Customer Service

(3)

I emphasize that we need to fix the river and not sign on to mass exodus out of the Skok Valley

Other regulation that I don't agree with that came out of the planning debate is the issue of distance between buildings on a tract of land. It is far too intrusive towards citizen property rights and needs to be changed.

There has been some discussion from the Planning Commission regarding appointment of an ad hoc committee to review the plan and set priorities. I think it is imperative if this is your choice that the committee be given a clear mission with a strict deadline to accomplish the task assigned them.

YARD MACHINES

YARD-MAN
Power to Perform

Total Customer Service

4

although I am not in 100% agreement with the Comprehensive Flood Hazard Management Plan I do believe it is a document that's time has come to be acted upon. The Committee that you appointed have put a tremendous amount of energy + time in the process reaching consensus on many issues

The testimony that you are receiving should be carefully analyzed and compared to the findings of our plan. Some of my neighbors still feel that the cause of severe flooding in Shickshinny Valley is the result of what some one did years ago. The reality is that the root cause of our problem is aggradation of a river channel that none of us can now see over.

Today we stand to get a grasp on control. The plan has statements of solutions that require local leadership to move forward with. Our town [illegible] has [illegible] problems that have always [illegible] [illegible] of the [illegible] in the Valley. [illegible] did [illegible] and must [illegible] [illegible] [illegible] [illegible] [illegible]

MTD YARD MACHINES

YARD-MAN
Power to Perform

Total Customer Service

(3)

The task tonight is to stamp approval on this plan. But, do so only after you are satisfied that it truely represents your view point and are comfortable that it will be one step further towards Flood Hazzard Management

Respectfully Submitted

Evan Tyler

MTD
YARD MACHINES

YARD-MAN
Power to Perform

APPENDIX QQ.
MASON COUNTY RESPONSE TO ECOLOGY COMMENTS ON DRAFT CFHMP

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

DEPARTMENT OF COMMUNITY DEVELOPMENT
PLANNING - SOLID WASTE - UTILITIES
BLDG. I • 411 N. 5TH ST. • P.O. BOX 578
SHELTON, WA 98584 • (360) 427-9670

December 20, 1996

Sue Maurermann, Director
Southwest Regional Office
State of Washington Department of Ecology
P.O. Box 47775
Olympia, WA 98405-7775

RE: Response to comments on the Skokomish River Comprehensive Flood Hazard Management Plan, April 1996

Dear Ms. Maurermann:

Over the last few months we have made considerable progress in moving towards final adoption of the Skokomish River Comprehensive Flood Hazard Management Plan (CFHMP). Since our first correspondence in August, we have been working with Dan Sokol to develop responses to Ecology's comments on the CFHMP. We have reviewed the comments from the Department of Ecology and would like to provide the following responses.

We acknowledge that the comments presented by DOE, to a large extent, reflect the future implementation of the plan. The County recognizes that prior to implementation of certain elements of the plan, further study may need to be completed. Especially with regard to environmental impacts and regulatory issues. This is important to assure that the plan is implemented in a cost-effective manner and provides the maximum flood hazard reduction possible.

Prioritization of Flood Hazard Reduction Measures
After plan adoption, as a step toward implementation, there will be a need to develop a methodology and rationale for prioritizing flood reduction measures to determine what will be the most effective combination of alternatives. The criteria listed by Ecology will be taken into consideration. These are: cost-effectiveness, technical feasibility, degree of flood protection (hazard reduction) provided, and environmental impacts. An unranked listing of alternatives with priority emphasis are presented on page 2 and were agreed to by the Planning Advisory Committee (PAC).

The principal goal of the plan is to reduce flood hazards. Therefore, an acceptable method for measuring degree of flood protection and hazard reduction will need to be determined. This criteria may be developed in terms of the number of persons protected, reduction in flood water levels, increased capacity of the river channel, or even the reduction in miles of roads

impacted by floods. These types of issues would have to be weighed out, discussed, and established as criteria for measuring the effectiveness of flood reduction measures. Only after this is established can we determine what measures or combination of alternatives, will be the most cost-effective. The proposed Implementation Strategy presented herein is proposed as a method for evaluating alternatives and there effectiveness.

IMPLEMENTATION STRATEGY FOR THE SKOKOMISH RIVER CFHMP

Introduction

The Skokomish River Comprehensive Flood Hazard Management Plan (CFHMP) covers a broad range of flood hazard issues that can be addressed through various actions both structural and non-structural in nature. Recommended actions in the plan include, but are not limited to, relocation or acquisition of repetitive loss structures, gravel removal, diking, and floodplain development regulations.

The following is a discussion of the criteria that could be utilized to determine a listing of alternatives and actions that will have a priority emphasis and should be implemented as soon as possible. When actions or alternatives are considered for this priority listing they should be evaluated according to the established criteria. The criteria, for example, should examine the alternative's consistency with the CFHMP, its cost effectiveness, availability of funding, technical feasibility, and environmental impacts.

Alternatives With Priority Emphasis

The Planning Advisory Committee (PAC) for the CFHMP has identified the following as an unranked listing of alternatives to be given priority emphasis **[As revised September 26, 1996]**:

a) elevation, acquisition, and relocation of repetitive loss structures;
b) implementation of development regulations commensurate with flood hazard risks and completion of a dike reconnaissance study;
c) flood warning emergency response system improvements; and completion of the Flood Audit by Army Corps of Engineers; and
d) implementation of a sedimentation management plan (pilot projects).

The PAC recognized that these priority alternatives, utilized individually and in combination, help to alleviate and reduce the flood hazards in the Skokomish Valley. The alternatives may be implemented to provide a Valley wide benefit (flood damage regulation) or benefits in more site specific locations (buy-out and relocation). These alternatives were not ranked in terms of priority to avoid locking available funding and resources on a single project and precluding action or attention on other alternatives. By using a group of alternatives, the intent is to allow flexibility in choosing between projects depending upon

available funding, immediate needs and circumstances.

Priority Criteria
The following criteria could be used to maintain the above list of alternatives that have a priority emphasis. The use of this criteria will provide guidelines for modifying the priority listing as new demands arise. Given the unique nature of circumstances that might influence the decision to chose one alternative over another, the criteria is somewhat subjective. Alternatives will have to be weighed against each other and criteria will likely be given different preference depending on special attributes of an issue. Ultimately, the decisionmakers will be responsible for weighing out criteria and deciding between alternatives. The criteria is as follows:

Goals and Key Elements
Is the alternative consistent with the goals and key elements of the Plan? When considering alternatives and courses of action, it is paramount that the courses of action be consistent with the goals and key elements of the CFHMP. If it is determined that they are not consistent, they should not be considered for implementation.

On the first page of the Plan it states: "The overall goal of this Comprehensive Flood Hazard Management Plan is to reduce hazards from frequent and infrequent events using actions that are appropriate to conditions in the Skokomish Valley." (p. ES-1) The alternative must be consistent with the Key Elements that are listed on page 1-7 of the CFHMP and are divided into three categories: objectives, issues, and actions. The alternative should also be consistent with recommended actions as proposed under each Issue in Chapter 6.

Immediate Threat to Life or Property
Does the project or alternative prevent or substantially reduce immediate threat to life or property? Not all the projects will clearly provide immediate relief from a potential flood hazard, those that do should be given high priority.

Cost and Available Funding
What is the cost of the project and is there funding available or obtainable in the foreseeable future? The cost of an alternative or combination of alternatives must be determined prior to implementation. One of the most important driving factors behind any alternative is the availability of funding. Granted, the alternative needs to be consistent with the other criteria, however, funding and financing is an important determining factor when it comes to actual implementation. Without appropriate funding implementation becomes very difficult if not impossible. Because funding may be available for one project, and not another, it is important for the priority listing to be flexible. The priority list should avoid focusing on one alternative and forgo possibilities to implement other alternatives where funding is available.

Technical Feasibility
Is the alternative technically feasible? The alternatives have varying degrees of technical feasibility and should be examined to determine what costs, regulations, or physical limitations are present. Only those projects that have been determined to be technically feasible at this time will be given further consideration. Pilot projects and feasibility reports should also be considered.

Alternative Is Required
Is the alternative required under federal, state, or local laws? Not every alternative will be required, but those that are will be given top consideration. The County must implement these as funding allows. For the most part, those actions immediately required are the adoption of the Density Floodway Map and the Flood Damage Prevention Ordinance.

Alternatives and Actions Already Being Implemented
Is the alternative or action currently being implemented? The problem of flooding in the Skokomish Valley has gone on for many years and there are already programs in place to address some of these issues. Those actions currently being undertaken should continue if it is determined that they meet established criteria for priority projects, particularly funding availability.

Permanent vs. Temporary
Is the alternative a permanent solution? Preference should be given to solutions that are permanent solutions versus temporary or those that require continuing maintenance or operation costs. One example of this is the acquisition of property versus the dredging of the riverbed. Acquisition is a permanent solution that requires a minimal expenditure of funds after the property is acquired. The dredging alternative, however, is a temporary solution in that it requires annual maintenance to sustain capacity benefits. Therefore, if the cost of acquiring property is similar to the cost of dredging the preferred option would be to acquire the property.

Pilot Projects
Is the alternative a pilot project? Pilot projects are important to analyze feasibility, environmental impacts, and potential effectiveness of more extensive actions in the future. The results of analysis of pilot projects will provide the background for demonstrating effectiveness and increase success in obtaining funding for more extensive projects. In particular, pilot projects and testing are being recommended for gravel bar scalping and sediment trapping. Pilot projects may not reduce flood hazards directly, but would provide data necessary to demonstrate the effectiveness and importance of proposed techniques in reducing flood hazards.

Flood Hazard Reduction
Does the alternative eliminate or substantially reduce the flood hazard? How does this reduction compare to other alternatives? What is the level of reduction when combined with other

alternatives? If the alternative does not provide a solution to the flooding hazard, or substantial reduction, it may not be reasonable and should be dropped from consideration. As noted above, pilot projects may not present an immediate or measurable reduction in flood hazards but may be important in determining the degree a more extensive alternative would have in reducing flood hazards.

The following measurements may be considered when determining the level of flood hazard reduction for a given alternative:

a. How many people will be protected from threats to health and life by the recommended action? Those flood hazards that threaten human life should be given top priority. Alternatives that provide protection from life threatening hazards for the greatest number of people should be considered a greater priority.

b. What is the value of property that would be protected from flood damage through this recommended action? Protection of property is another important goal of the CFHMP.

c. How many miles of road will be left open if this alternative is used? It has been expressed that some of the greatest hazards relate to the closure of roads and restricted access to areas outside the Valley during a flood. With this criteria, the greater number of road miles left open would make the recommended action more desirable.

d. How many feet will the flood water levels be reduced with this action (if it can be determined)? The greater amount of flood level reduction would equal greater benefit.

e. How many cubic yards of increased river channel capacity will be obtained? This criteria would be associated with gravel removal and dredging actions. Increasing river channel capacity through gravel removal would decrease the flood level. Therefore, the greater amount removed the greater benefit to flood hazard reduction.

Environmental Impacts

What are the environmental benefits or costs associated with the alternative? One of the key elements of this plan is to promote programs and strategies that are, to the greatest extent possible, consistent with the Skokomish Tribe's goal of restoring the River's watershed. Therefore, preference should be given to alternatives which enhance the natural environment over alternatives that have little impact on the environment. Preference is also given to projects that have few or no negative impacts over projects that negatively impact the environment. Different alternatives will have varying degrees of impacts on the environment from highly positive to highly negative. Impacts

to fisheries, water quality, and wildlife habitat will need to be considered.

Alternatives Regarding Diking, Gravel Removal, etc.
A general comment by DOE addresses a need for further analysis prior to diking, gravel removal, and channel modifications. The Plan notes that further analysis of the environmental and hydrological impacts would be required before implementation. The CFHMP states the need for further studies for alternatives relating to dredging and gravel removal (p. 6-32); channel widening and clearing of overflow area (p. 6-41); and diking (p. 6-97).

Action By Other Entities
The County acknowledges that any recommendations requiring action by an entity other than Mason County may need to include written agreements with that entity. In the past we have used a memorandum of understanding which stipulated concurrence with the proposed actions and identified the responsibilities of both the County and that party. The entities mentioned in the plan include Simpson, Inc., Tacoma Public Utilities (TPU), U.S. Forest Service, and Washington State Department of Transportation (WSDOT).

Response to specific comments are as follows:

1. The Executive Summary will be revised to contain a synopsis of the purpose of the Planning Advisory Committee and provide the reader with a clearer understanding of their key points and recommendations. There is a listing of the Key Elements in Chapter 1 (p. 1-7 to 1-8) and reference to this list will also be provided in the revised Executive Summary.

2. Discussion of Issue 1 in the Executive Summary and in the introduction of Chapter 6 (pages 6-14 to 6-15) should be clarified as follows:

~~Alternative in this section focus on both~~ Given the relationship between logging activities in the South Fork Watershed and the sedimentation in the lower Skokomish Valley, alternatives in this section focus on both areas of the watershed. The increased aggradation is partially due to road building and logging practices in the South Fork Watershed on both U.S. Forest Service land (roughly 50 percent of the watershed) and Simpson property.

First, a discussion of South Fork Watershed restoration recommendations based on the recently completed South Fork Watershed Analysis, done by the USFS, is presented ~~first~~. These recommendations focus on restoration and protection strategies for road building and logging that relate to reducing sedimentation. Based on correspondence with Simpson, actions are recommended such as completing a watershed study and taking measures similar to those presented in the USFS Watershed Analysis.

Alternatives for the Skokomish Valley follow, and include two categories of action, gravel removal and riverbank stabilization to deal with the effects of aggradation in the mainstem. Gravel removal and side channel clearing/mainstem widening responds to the need to increase channel capacity and includes dredging, gravel bar scalping, and sediment exclusion and ejection. HEC-2 modeling was done for these alternatives to determine increased capacity of the channel and to calculate the reduction in the flood level. Gravel removal impacts to the fisheries is presented by the WDFW. It is apparent that the analysis of these alternatives is not complete and further analysis of environmental impacts, costs, and feasibility need to be completed prior to implementation. Throughout the analysis of gravel removal actions the concerns of the Skokomish Tribe have been taken into consideration. The Tribe supports dredging of the mainstem Skokomish River.

Increased sedimentation in the lower watershed contributes to higher flood levels and increased flood frequency which causes greater potential for erosion of the river bank. Therefore, river bank stabilization measures such as rip-rap armoring is recommended to address these impacts. Three locations are suggested for immediate stabilization due to bank erosion and the presents of extreme flood hazards.

3. Chapter 3, pages 3-7 to 3-10. The water quality data cited is ten years old, and was taken from the Skokomish River Comprehensive Flood Control Management Plan Preliminary Draft done by DOE in 1988. Currently, more recent water quality data has been obtained from DOE. This data will be further incorporated into the final revisions of the CFHMP.

   In the future, do to the elimination of the Water Quality Program of Mason County, it is unlikely that water quality data for the Skokomish River will be obtained by the county. Potential sources for this information are DOE, the Skokomish Tribe, Washington State University Cooperative Extension, and possibly the Mason County Conservation District.

   Analysis of specific projects may require additional water quality testing. Projects that have the potential to have significant adverse impacts on water quality of the Skokomish River will likely be required to provide water quality analysis through an EIS or mitigated determination of significance. Requirements for collection and analysis of water quality will be identified in the development regulations and flood plain management ordinance.

4. The discussion in the CFHMP makes it clear that in areas with high water tables and frequent flooding, septic drainfields may not function properly. Future development regulations, including the flood damage prevention ordinance, need to address the issue of the effectiveness of on-site sewage systems in the Skokomish Valley. A program of

monitoring septic systems and there function may need to be coordinated with the Mason County Department of Environmental Health and incorporated into the permit process.

5. Addressed previously in comments. A memorandum of understanding could be used to provide a formal agreement and ensure concurrence between the County and other entities requiring action in the CFHMP.

6. The County acknowledges that, a sediment management plan may need to be done that provides a comprehensive approach and systematic rationale that prioritizes methods and projects. In Chapter 6, page 6-31, there is an initial ranked list of cross-sections where adjacent gravel bar scalping should be completed. This ranked list was developed based on the examination of channel capacities upstream and downstream from the constricted reaches. Any work to be done on the area just upstream of the Highway 101 bridge would be included in the sediment management plan and prioritized accordingly.

   A time frame and estimated costs are presented in the Skokomish River Flood Management Activity Flow Chart as produced by Pubic Works. This flow chart illustrates projects and their proposed timelines and estimated costs (Enclosed).

7. The County acknowledges that the measures for Side Channel Clearing/Mainstem widening will need to be carefully studied prior to implementation. This is pointed out in the CFHMP: "Detailed engineering and environmental investigations are necessary to assess the feasibility of this proposal. For example, the entrance to the side-channel during a flood. Hydraulic modeling should be conducted to assess flow patterns, velocities, and distribution through this section of the side and main channels. In addition, the physical characteristics of the reopened channel must enhance the fisheries resource of the Skokomish River (p. 6-41)."

   See the enclosed Skokomish River Flood Management Activity Flow Chart as produced by Pubic Works.

8. The County acknowledges that, following adoption of the plan, and prior to increasing flows in the North Fork that an implementation plan may need to be in place. The implementation plan would identify flow volumes and durations, schedules, and a system for monitoring effects. The plan would also include a written agreement with TPU. The implementation plan would be a part of a comprehensive sediment management plan.

   At this time increasing flows from the Cushman Project has not been identified as a priority alternative as listed on page 2. This is largely due to the lack of funding and the

need for future studies. A timeline will be developed if the alternative becomes part of the priority listing.

9. The County recognizes that any proposal dealing with modifications to bridges on Highway 101 be thoroughly reviewed and analyzed by WSDOT. Furthermore, there will need to be coordination between various entities and agencies when any implementation is proposed. This will include extensive coordination with WSDOT on determining cost estimates and with the Washington Department of Fish and Wildlife given the potential impact on fish and wildlife habitat. We agree that there is a need to coordinate combinations of measurements to maximize effectiveness. This will be examined as part of an overall implementation strategy to be developed after adoption of the plan.

   At this time it is difficult to establish an implementation timeline with any degree of accuracy. A timeline on projects relating to modification to the Highway 101 bridge will be contingent upon funding availability and plans proposed by WSDOT. Though there is some uncertainty as to the exact schedule for improvement of this section of Highway 101, it is apparent that action will be taken at some time in the future.

10. The County acknowledges that further analysis may be needed on the benefits and impacts of modifications to the Highway 106 bridge. In Chapter 6, page 6-61, it is recommended that further analysis be completed to determine to what extent SR 106 exacerbates flooding. This analysis should be done using the calibrated HEC-2 model and a range of flood frequencies. A study of the Highway 106 bridge is not an alternative of priority emphasis as listed on page 2. Therefore, at this time, there is no timeline proposed or funding available for this study. In the event that this becomes a priority alternative and funding is available, a timeline will be developed.

11. We acknowledge that there is a need to better define the scope and concomitant impacts of removal of overbank vegetation and the term "debris blockage" needs to be defined. These issues and the concerns with the Highway 101 bridge will need to be addressed prior to implementation of an overbank vegetation removal project. Refer to comments in item 9 regarding a timeline for improvements at the Highway 101 bridge.

12. Chapter 6, Issue 6 (page 6-67) will be edited to include a note that property owners implementing on-site drainage projects will need permits and also note the potential impacts on wetlands.

13. Chapter 6, Issue 6 (6-67 to 6-73) will be edited to include discussion of an implementation plan for acquisition of flood prone structures. Regulation for the development of non-residential structures is addressed in the plan (p. 6-74) and in the draft Flood Damage Prevention Ordinance (Appendix DD).

A grant from the Washington State Department of the Military was signed by the Board of County Commissioners on October 22, 1996. A second grant from the Department of Ecology was signed by the Board of County Commissioners on November 19, 1996. The grant from DOE will be used as a local match for the grant mentioned above.

One of the first steps in the acquisition process is to obtain a professional appraisal of the property to determine its value. An appraiser has been selected and a contract is being negotiated for there services. Once the appraisals have been completed negotiation for the purchase of eligible properties will begin.

Table 1 illustrates a tentative timeline that may change depending on circumstances that arise through the implementation of the buy-out process. The dates are general and should not be interpreted as being permanent or definite.

TABLE 1
TENTATIVE SCHEDULE FOR IMPLEMENTATION OF BUY-OUT PROGRAM

Approximate Dates	Actions
December 1996 to February 1997	• Establish funding sources and amounts. • Rank listing of flood prone properties for acquisition. • Notify property-owners that they are eligible for the buy-out. • Begin plan for demolition, removal, etc. for acquired properties
January 1997 to March 1997	• Complete appraisals of properties to be acquired. • Begin negotiations for purchasing property. • Continue planning for demolition and removal by determining cost of work, permits, etc.
March 1997 to June 1997	• Execute buy-out of flood damaged properties.
June 1997 to September 1997	• Demolition, removal, or relocation of purchased property.

14. A Density Floodway Map was created using a hydraulic analysis as described in Hydraulic Methods for Evaluating Density Floodways (COE, 1981). The steps are outlined on page 6-79. Appendix DD contains a draft Flood Damage Prevention Ordinance based on the density floodway concept. The County has been communicating with FEMA and compiling information necessary for FEMA to review the density floodway map and ordinance. At the time of plan adoption it is only necessary for FEMA to approve of the concept and that the analysis for developing the Density Floodway Map and regulations is satisfactory. Through the FEMA map revision process more in-depth analysis of the density floodway will be conducted.

Details of the timeline for the map revision process are illustrated in Table 2. As with Table 1, these are approximate dates and may change as circumstances warrant.

TABLE 2
TIMELINE FOR THE FEMA MAP REVISION PROCESS

Approximate Dates	Actions
January 1997	• Provide FEMA with necessary information: 1. Computer disk containing the computer runs and hydraulic analysis using a HEC-2 Model 2. Maps of the proposed density floodway 3. Graphs showing the elevation profiles of cross-sections 4. Relevant sections from the Map Revision MT-2 Form 5. Fees: $1,000 to $1,500 6. Flood Damage Prevention Ordinance • Make revisions to Flood Damage Prevention Ordinance
February 1997 (Within 10 days of receiving application packet)	FEMA will determine if the application is complete and request additional information if necessary.
February 1997 to May 1997	Within 90 days of receiving a completed application FEMA, will do one of the following: 1. Approve the changes and begin the process of revising and printing new flood maps. 2. Use an additional 90 days to evaluate the scientific or technical data submitted. 3. Determine that effective maps shall not be modified
May 1997 to July 1997 (optional)	Additional 90 days that may be necessary to further analyze technical data.
July 1997 to January 1998	FEMA prints maps and Flood Damage Prevention Ordinance adopted.

15. The County acknowledges that the diking policy needs to be completed and properly referenced in the Flood Damage Prevention Ordinance. The development of the diking policy will begin following plan adoption which is likely to occur in December 1996 or January 1997. It is probable that the diking policy will be adopted within the first year following adoption of the CFHMP. The need to include references, and correct typographical errors has been noted.

16. Noted.

17. The County will address the benefits of the telephone notification system and gauging improvements installed in late 1995. We agree that improvements to gauging and warning systems should be aggressively pursued to improve the level of protection for Skokomish River basin residents. These measures should include the on-line computer capability for the Flood Control Zone District.

Thank you for the opportunity to respond to your comments. The process of developing the CFHMP has been a complex and at times a difficult task. We are looking forward to final adoption of the plan.

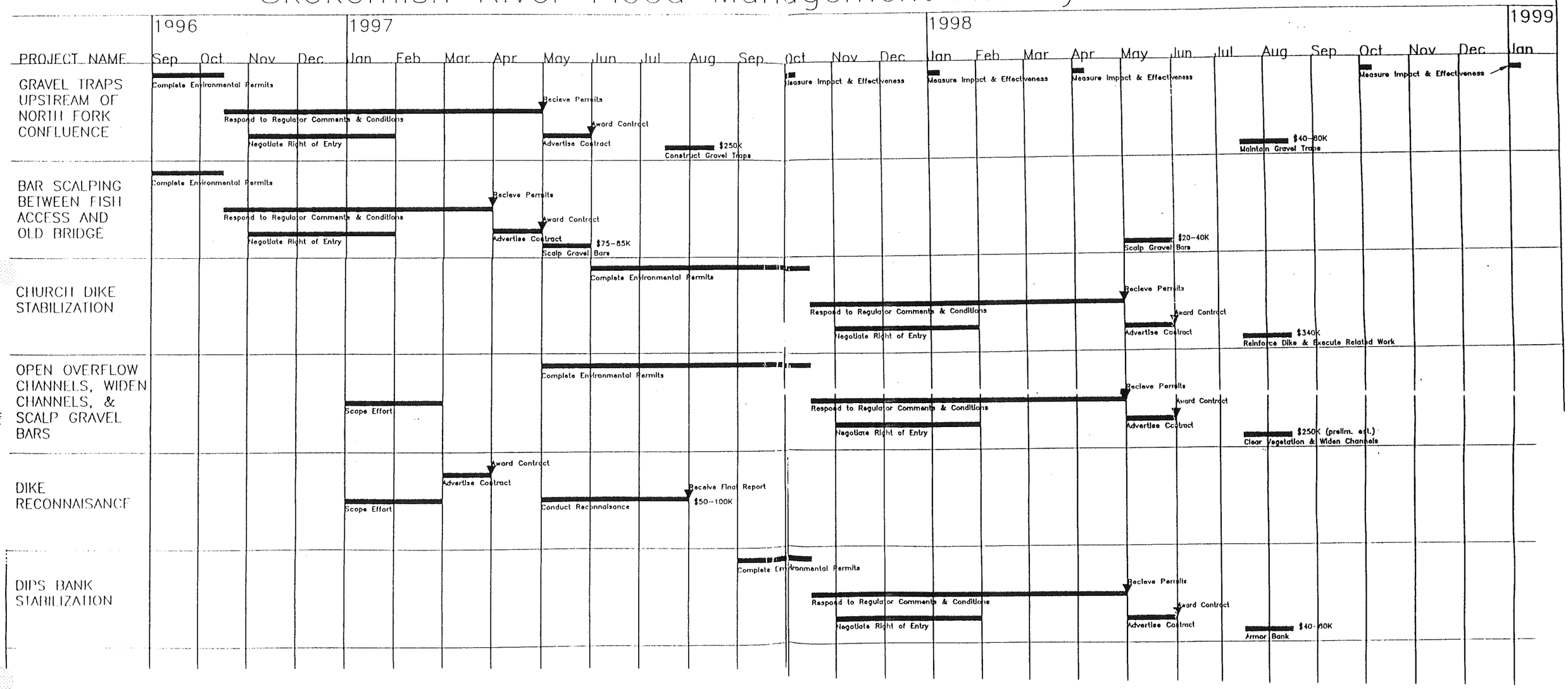
Please call Ryan Windish at (360) 427-9670, ext. 275 if you have any questions.

Sincerely,

Gary J. Yando, Director

cc: Dan Sokol
Tim D'acci

Skokomish River Flood Management Activity Flow Chart



APPENDIX RR.
ADOPTION RESOLUTION AND COUNTY COMMISSIONERS' HEARING MATERIALS

Skokomish River Comprehensive Flood Hazard Management Plan
February 1997

RESOLUTION NO. 146-96

A RESOLUTION adopting the Mason County Skokomish River Comprehensive Flood Hazard Management Plan

WHEREAS, the Skokomish River Valley is an area of great natural beauty and rich agricultural land that has attracted people to live and work in the floodplain for hundreds of years; and

WHEREAS, residents of the Skokomish River Valley, including members of the Skokomish Tribe, have been effected by human activities in the watershed during the past decades; and

WHEREAS, extreme events, that appear to occur with increasing frequency, have devastating effects; and

WHEREAS, the overall goal of this Comprehensive Flood Hazard Management Plan (CFHMP) is to reduce hazards from frequent and infrequent events using actions that are appropriate to conditions in the Skokomish Valley; and

WHEREAS, the CFHMP is a combination of previous efforts and plans that have been developed over the last several years; and

WHEREAS, in April, 1992, the Mason County Board of Commissioners formed the Planning Advisory Committee to promote the overall goals of the project; and

WHEREAS, the Planning Advisory Committee conducted numerous public workshops wherein the Plan was discussed and public input was heard; and

WHEREAS, the Board of County Commissioners and Planning Commission held a public workshop on November 18, 1996 wherein they heard input from the public, KCM, Inc, (Consultant) and County staff; and

WHEREAS, on December 9, 1996 the Planning Commission held a public hearing wherein staff presented a status report and the public provided testimony and recommended to the Board of County Commissioners that they adopt the Skokomish River Comprehensive Flood Hazard Management Plan, Volumes I and II, along with the amended Executive Summary and corresponding revisions to the main body of the plan, as presented as Addendums 1 and 2 of the staff report dated December 9, 1996; and

WHEREAS, the Planning Commission also recommended that the Board of County Commissioners address three issues following the adoption of the CFHMP which included consideration to; (1) placing the diking reconnaissance study and levy analysis as a first priority in the list of unprioritized flood management alternatives recommended by the Planning Advisory Committee; (2) examining the accuracy and implications of the No-New-Footprint-Zones as set forth in the CFHMP and proposed Flood Damage Prevention Ordinance; (3) take into consideration the fact that the East Bourgault Road is a priority area for the acquisition of flood damaged properties, and that this area should be designated as a No-New-Footprint-Zone to prevent future construction; and

WHEREAS, on December 18, 1996 the Board of County Commissioners held a public hearing. They were given a staff report that presented a background on the development of the proposed CFHMP, informed that the Planning Commission recommended adoption of the CFHMP along with the creation of an ad-hoc committee to review three areas of concern;

WHEREAS, after receiving public testimony the Board elected to continue the hearing to December 30, 1996; and

WHEREAS, on December 30, 1996 the Board of County Commissioners received additional information from staff and the public and elected to adopt the April, 1996 draft of the Skokomish River Comprehensive Flood Hazard Management Plan which includes both Volume I and II per the following:

1. Include the amended Executive Summary (Addendum 1-Executive Summary) and corresponding revisions (Addendum 2-Changes To The Main Body Of The Plan Consistent With Changes In The Executive Summary) to the main body of the CFHMP.

2. Include the East Bourgault Road area in the no new footprint zone.

3. On Page ES-4, Issue 1, Bottom of page. Last Paragraph before bullet:

   RIVER BANK STABILIZATION RECOMMENDATIONS

   Add what is highlighted.

   This Plan promotes the use of bioengineered riverbank stabilization whenever possible. Emplacement of rock rip-rap is recommended in locations where no other solution is feasible and the potential for flood damage is great. **AS AN EXAMPLE**, bank protection using rock rip-rap is recommended in the following locations:

which is not intended to provide a means to eliminate flooding but implementing recommendations within the plan to reduce flood hazards given the inevitability of flooding.

DATED this 30th day of ~~January~~ December, ~~1997~~ 1996. MJC MLF

ATTEST:

Rebecca J. Rogers

CLERK OF THE BOARD

APPROVED AS TO FORM:

Deputy

PROSECUTING ATTORNEY

BOARD OF COUNTY COMMISSIONERS
MASON COUNTY, WASHINGTON

Mary Jo Cady

CHAIRPERSON, MARY JO CADY

M. L. Faughender

COMMISSIONER M.L. FAUGHENDER

Abstain

COMMISSIONER WILLIAM O. HUNTER

(valley)

4. On Page 5-13, Chapter 5

   PERMIT PROCESS

   (INSERT BEFORE FIRST PARAGRAPH)

   No person shall be stopped from responding to any emergency per WAC 220.110.020 (7) and RCW 75.20.103.

5. On Page 6-74, Chapter 6, Issue 7, top of page, second bullet

   NEED FOR FLOODPLAIN DEVELOPMENT REGULATIONS

   Remove the word **RECONSTRUCTION.**

6. On Page 6-80, Chapter 6, Density Floodway, Top of Page, Third bullet

   Take out the third bullet and add: The sum total of all the structures footprint shall not exceed 6534 square feet in a five acre area or to FEMA standards in this adoption and is open for further review.

7. The boundary lines for Zone 2 will remain as they are for this adoption and are open for further review,

8. Delete Zone 1 from the no-new-footprint-zones for this adoption and is subject to being opened for further review.

9. Refer to Issue 7, on Page ES-8 and rewrite the third bullet to read: The minimum allowable space between structures parallel and perpendicular to flow is subject to the Mason County Comprehensive Plan and FEMA standards and further review is requested.

10. Add the following definition for **MAINTENANCE** - The work necessary to preserve or restore the natural condition or to restore man-made flood control facilities to their former condition using in-kind replacement materials or acceptable alternatives. This work is necessary due to anticipated or actual damage or destruction from flooding by action of erosion, stream flow, sheet runoff, or other damages by the sea or other bodies of water.

NOW, THEREFORE, BE IT RESOLVED THAT:

The Mason County Board of Commissioners hereby adopts the Mason County Skokomish River Comprehensive Flood Hazard Management Plan

DECEMBER 30, 1996

TO: BOARD OF COUNTY COMMISSIONERS

FROM: DIRECTOR OF COMMUNITY DEVELOPMENT

RE: SKOKOMISH RIVER COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN

At the December 18, 1996 Public Hearing you the Board of County Commissioners were given a staff report that presented a background on the development of the proposed Skokomish River Comprehensive Flood Hazard Management Plan. In it we also pointed out that the Mason County Planning Commission had conducted a Public Hearing and after hearing public testimony made the following recommendation:

> The Planning Commission hereby recommends to the Board of County Commissioners that they adopt the Skokomish River Flood Hazard Management Plan, Volumes I and II, along with the amended Executive Summary and corresponding revisions to the main body of the plan. Furthermore, the Planning Commission recommends that, based on public testimony, the following areas of the plan be given particular attention by the Board. These issues could be addressed, following adoption of the plan, through the creation of an ad-hoc committee. They would:
>
> 1. consider placing the diking reconnaissance study and levy analysis as a first priority in the list of unprioritized flood managment alternatives recommended by the Planning Advisory Committee.
>
> 2. consider examining the accuracy and implications of the no-new-footprint-zones as set forth in the plan and proposed flood damage prevention ordinance.
>
> 3. take into consideration the fact that the East Bourgault Road is a priority area for the acquisition of flood damaged properties, and that this area should be designated as a no-new-footprint-zone to prevent future consderation.

After hearing public testimony and responses to concerns by both staff and the county's confultant Tony Melone, from KCM, Inc. the Board of County Commissioners continued the hearing to today, December 30, 1996.

Based on input received the Department of Community Development is herein respectfully requesting that the Board of County Commissioners take the necessary action to adopt the Mason County Skokomish River Comprehensive Flood Hazard Management Plan with the following changes:

1. Include the East Bourgault Road area in the no new footprint zone.

2. On Page ES-4, Issue 1, Bottom of page: Last paragraph before bullet:

   RIVER BANK STABILIZATION RECOMMENDATIONS

   (ADD WHAT IS HIGHLIGHTED)

   This Plan promotes the use of bioengineered riverbank stabilization whenever possible. Emplacement of rock rip-rap is recommended in locations where not

other solution is feasible and the potential for flood damage is great. **AS AN EXAMPLE,** bank protection using rock rip-rap is recommended in the following locations:

3. On Page 5-13, Chapter 5

PERMIT PROCESS (INSERT BEFORE FIRST PARAGRAPH)

NO PERSON SHALL BE STOPPED FROM RESPONDING TO ANY EMERGENCY PER WAC 220.110.020 (7) AND RCW 75.20.103.

4. On Page 6-74, Chapter 6, Issue 7, Regulatory Background, Top of page, second bullet.

NEED FOR FLOODPLAIN DEVELOPMENT REGULATIONS

Remove the work **RECONSTRUCTION**

5. On Page 6-80, Chapter 6, Density Floodway, Top of page, third bullet.

THE STATEMENT
The sum total of all the structures foot print shall not exceed 6534 square feet in a 5 acre area is included in this adoption and is open for further review or to Zone 2 Stands

6. The boundary lines for Zone 2 will remain as they are for this adoption and are open for futher review.

7. Delete Zone 1 from the no-new-footprint-zones for this adoption subject to it being open for further review.

8. Insert the following definition: **MAINTENANCE -**

RECEIVED
JAN 24 1990

Chapter 173–145 WAC
ADMINISTRATION OF THE FLOOD CONTROL ASSISTANCE ACCOUNT PROGRAM

WAC

173–145–010	Authority and purpose.
173–145–020	Definitions.
173–145–030	Eligibility criteria for FCAAP funds.
173–145–040	Comprehensive flood control management plan (CFCMP).
173–145–050	Flood plain management activities.
173–145–060	FCAAP project application process.
173–145–070	FCAAP project approval process.
173–145–080	Criteria for allocation of funds.
173–145–090	Flood control assistance account funding and matching requirements.
173–145–100	Emergency fund administration.
173–145–110	Multiyear projects.
173–145–120	Work standards for all FCAAP projects.
173–145–130	Project construction monitoring.
173–145–140	Written agreements.
173–145–155	Approval of changes to written agreements.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

173–145–150 Equipment rental. [Statutory Authority: Chapter 86.26 RCW. 85–14–002 (Order DE 85–10), § 173–145–150, filed 6/21/85.] Repealed by 87–04–022 (Order 86–36), filed 1/28/87. Statutory Authority: Chapter 86.26 RCW.

WAC 173–145–010 Authority and purpose. RCW 86.26.050 provides that counties and other municipal corporations responsible for flood control maintenance may apply to the department of ecology for financial assistance for the preparation of comprehensive flood control management plans and for flood control maintenance projects. The purpose of such plans is described in RCW 86.26.105. The department shall determine priorities and allocate available funds from the flood control assistance account program (FCAAP) among those counties applying for assistance, and shall adopt regulations establishing the criteria by which such allocations shall be made. Such criteria shall be based upon proposals which are likely to bring about public benefits commensurate with the amount of state funds allocated thereto. This chapter describes the manner in which ecology will implement the provisions of the act. [Statutory Authority: Chapter 86.26 RCW. 87–04–022 (Order 86–36), § 173–145–010, filed 1/28/87; 85–14–002 (Order DE 85–10), § 173–145–010, filed 6/21/85.]

WAC 173–145–020 Definitions. For the purposes of this chapter, the following definitions shall be used:

(1) "Applicant." An eligible municipal corporation seeking matching funds for flood control maintenance work.

(2) "Appropriate local authority." A county, city, or town having planning and land use jurisdiction within a given area which is covered by the comprehensive flood control management plan.

(3) "Certification." Certification is the written confirmation between ecology and the appropriate local authority and the county engineer which verifies the understanding as to what the comprehensive flood control management plan will contain, the timing and anticipated product, and a reporting schedule that will allow for ecology review and input during the plan development.

(4) "Comprehensive flood control management plan (CFCMP)." A document which determines the need for flood control work, considers alternatives to in–stream flood control work, identifies and considers potential impacts of in–stream flood control work on the state's in–stream resources, and identifies the river's meander belt or floodway, as described in WAC 173–145–040.

(5) "County engineer." The appointed public works director, county engineer, or the person designated to act for the county engineer.

(6) "Eligible municipal corporation." Counties, cities, towns, conservation districts, flood control zone districts, or any special districts subject to flood conditions.

(7) "Emergency fund." That portion of the biennial appropriation allocated to the flood control assistance account which is set aside for emergency projects.

(8) "Emergency project." Flood control work necessary for reasons declared by the appropriate local authority and as authorized and approved by ecology which must be done immediately to protect lives or property.

(9) "Flood compatible land uses." Those uses of the land within the river's meander belt or floodway which comply with the minimum state, federal, and local flood plain management regulation requirements.

(10) "Flood plain management activities." Activities described in WAC 173–145–050 performed by local governments through ordinances or other means to reduce the damaging effects of flooding.

(11) "Floodway." The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base (one hundred year frequency) flood without cumulatively increasing the water surface elevation more than a designated height.

(12) "Maintenance project." The work necessary to preserve or restore the natural condition or to restore man–made flood control facilities to their former condition using in–kind replacement materials or acceptable alternatives. This work is necessary due to anticipated or actual damage or destruction from flooding by action of erosion, stream flow, sheet runoff, or other damages by the sea or other bodies of water.

Prevention Ordinance; (3) take into consideration the fact that the East Bourgault Road is a priority area for the acquisition of flood damaged properties, and that this area should be designated as a No-New-Footprint-Zone to prevent future construction; and

WHEREAS, on December 18, 1996 the Board of County Commissioners held a public hearing. They were given a staff report that presented a background on the development of the proposed CFHMP, informed that the Planning Commission recommended adoption of the CFHMP along with the creation of an ad-hoc committee to review three areas of concern;

WHEREAS, after receiving public testimony the Board elected to continue the hearing to December 30, 1996; and

WHEREAS, on December 30, 1996 the Board of County Commissioners received additional information from staff and the public and elected to adopt the April, 1996 draft of the Skokomish River Comprehensive Flood Hazard Management Plan which includes both Volume I and II per the following:

1. Include the amended Executive Summary (Addendum 1-Executive Summary) and corresponding revisions (Addendum 2-Changes To The Main Body Of The Plan Consistent With Changes In The Executive Summary) to the main body of the CFHMP.

2. Include the East Bourgault Road area in the no new footprint zone.

3. On Page ES-4, Issue 1, Bottom of page. Last Paragraph before bullet:

   RIVER BANK STABILIZATION RECOMMENDATIONS

   Add what is highlighted.

   This Plan promotes the use of bioengineered riverbank stabilization whenever possible. Emplacement of rock rip-rap is recommended in locations where no other solution is feasible and the potential for flood damage is great. **AS AN EXAMPLE**, bank protection using rock rip-rap is recommended in the following locations:

4. On Page 5-13, Chapter 5

   PERMIT PROCESS

   (INSERT BEFORE FIRST PARAGRAPH)

   No person shall be stopped from responding to any emergency per WAC 220.110.020 (7) and RCW 75.20.103.

5. On Page 6-74, Chapter 6, Issue 7, top of page, second

bullet

NEED FOR FLOODPLAIN DEVELOPMENT REGULATIONS

Remove the word **RECONSTRUCTION.**

6. On Page 6-80, Chapter 6, Density Floodway, Top of Page, Third bullet

   Take out the third bullet and add: The sum total of all the structures footprint shall not exceed 6534 square feet in a five acre area or to FEMA standards in this adoption and is open for further review.

7. The boundary lines for Zone 2 will remain as they are for this adoption and are open for further review,

8. Delete Zone 1 from the no-new-footprint-zones for this adoption and is subject to being opened for further review.

9. Refer to Issue 7, on Page ES-8 and rewrite the third bullet to read: The minimum allowable space between structures parallel and perpendicular to flow is subject to the Mason County Comprehensive Plan and FEMA standards and further review is requested.

10. Add the following definition for **MAINTENANCE** - The work necessary to preserve or restore the natural condition or to restore man-made flood control facilities to their former condition using in-kind replacement materials or acceptable alternatives. This work is necessary due to anticipated or actual damage or destruction from flooding by action of erosion, stream flow, sheet runoff, or other damages by the sea or other bodies of water.

HEARING CONTINUED - SKOKOMISH RIVER COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN

The clerk read into the record, a letter from Moirya Dehe requesting Cmmr. Hunter decline from voting on the adoption of the Skokomish River Comp. Flood Hazard Management Plan.

Cmmr. Hunter spoke to the letter. He has not participated in the ad-hoc meetings. He has always encouraged his children to speak their mind and he doesn't intend to stop them. He doesn't intend to disqualify himself at this point.

Mr. Yando presented the staff report. On December 18, 1996 a public hearing was held to consider adoption of the Skokomish River Comprehensive Flood Hazard Management Plan, Volumes I and II along with the amended Executive Summary and corresponding revisions to the main body of the plan.

Based on input received DCD is requesting the Board adopt the Plan with the following changes: 1. Include the East Bourgault Road area in the no new footprint zone; 2. On page ES-4, Issue 1, bottom of page, last paragraph before bullet: River Bank Stabilization Recommendations. This Plan promotes the use of bioengineered riverbank stabilization whenever possible. Emplacement of rock rip-rap is recommended in locations where no other solution is feasible and the potential for flood damage is great. As an example, bank protection using rock rip-rap is recommended in the following locations:; On page 5-13, Chapter 5, Permit Process, No person shall be stopped from responding to any emergency per WAC 220.110.020 (7) and RCW 765.20.103.; 4. On page 6-74, Chapter 6, Issue 7, Regulatory Background, top of page, second bullet, Need for Floodplain Development Regulations, Remove the word reconstruction; 5. On Page 6-80, Chapter 6, Density Floodway, top of page, third bullet, The Statement, The sum total of all the structures foot print shall not exceed 6,534 square feet in a 5 acre area is included in this adoption and is open for further review. 6. The boundary lines for Zone 2 will remain as they are for this adoption and are open for further review. 7. Delete Zone 1 from the no-new-footprint-zones for this adoption subject to it being open for further review. 8. Insert the following definition: Maintenance Project. The work necessary to preserve or restore the natural condition or to restore manmade flood control facilities to their former condition using in-kind replacement materials or acceptable alternatives. This work is necessary due to anticipated or actual damage or destruction from flooding by the action of erosion, stream flow, sheet run-off or other damages by the sea or other bodies of water.

Mr. Yando pointed out the maintenance definition given in #8 is from WAC173-145.

Cmmr. Hunter asked what is the plan of the dike reconnaissance study.

Mr. Yando stated if anyone wants to undertake a dike repair an analysis would have to be done to determine the impact on the area.

Mr. Hauth added comprehensive mapping would be needed and right of entry to all

parcels.

Cmmr. Hunter referred to the Nalley Dikes and believes there are more dikes on that one piece of property than the rest of the valley, he asked if they are included in a diking study.

Mr. Hauth is not aware of any definitive limits to what would be looked at in a diking study. He suggested the study start at Hood Canal and go all the way up the valley.

Cmmr. Hunter clarified there was a letter from the Board about six years ago which was due to a lawsuit which was later dropped by DOE. It is those specific dikes in the lawsuit that were the ones the Board at that time were considering.
Cmmr. Cady announced she will take testimony on new issues today.

Bev Godwin stated the tribe has done a dike reconnaissance and all the dikes are out of compliance.

Cmmr. Cady replied she doesn't know and the dike reconnaissance is a issue that will be discussed at a later date.

Cmmr. Hunter interjected that he is not aware of any in-depth dike reconnaissance completed by the tribe.

Ms. Godwin asked why is Zone 1 being deleted.

Cmmr. Cady replied this is as a result of the testimony from the previous hearing.

Cmmr. Hunter answered he understands the lines were originally determined without information to back it up.

Wes Johnson what is the concern expressed by DOE.

Mr. Yando replied the main concern was to remove the word reconstruction in #4.

Cmmr. Faughender stated the Board believes leaving the word reconstruction is contradictory to the intent.

Mr. Johnson referred to Zone 2 boundaries, asked if they can be revised so the line doesn't run through the middle of houses.

Mr. Yando - per consultant, they suggested not eliminating Zone 2. He believes the boundaries can be revised at a later date before the maps are sent to FEMA.

Mark Sleeper asked what is the cap of new houses that can be built in the valley, he believes in the plan there are several ways the growth can be determined. He has determined, depending on what criteria in the plan a person uses, 320 to 1,280 new

houses could be added. He believes 50 new houses should be the maximum allowed.

Cmmr. Hunter noted the Indians have added 150 houses on the Reservation in the last 10 years and he has been involved in 150 acres of stump clearing so the land is farmable. From the fish hatchery to Highway 101 there are 25 to 35 houses less than 30 years ago.

Ryan Windish, Department of Community Development, referred to page 680, comparison between the alternatives that were examined for the flood way -- conventional flood way, split floodway, density floodway. In the density floodway a total area of 48 acres could be covered by buildings; conventional floodway it would allow 52 acres and approximately 36 acres for the split floodway.

Cmmr. Hunter asked if it is known how the consultant came up with the 6,534 square foot figure.

Mr. Yando answered he has not been able to discuss this with the consultant but asked the Board to remember the only calculations they have is for the 6,534 figure. He cautioned the Board to not go above that until they have additional information to review.

Cmmr. Hunter understands that is for the 6" allowed under FEMA. He pointed out there is 12" allowed under FEMA, 6" for diking and 6" for density.

Mr. Yando stated he couldn't confirm that at this point.

Mr. Sleeper again brought up the issue of how many houses can be added. He believes the main objective of FEMA and DOE is to limit how people are put in harms way. He referred to the Nalley Dikes, believes the City of Tacoma did a study a few years ago.

Jim Hunter stated he doesn't see the economics of agriculture being addressed if the dikes are torn down or altered and would like that issue reviewed. He believes flood compatible buildings should be allowed in the no new footprint zone. He would like private recreational facilities addressed. He asked what will happen to land values in the valley. With regard to density, from Highway 101 and Eels Hill Road, there are about four abandoned home sites for every new one built, he doesn't believe there is a demand for building in the valley due to the added expenses because of the flood danger.

Evan Tozier addressed the 6,534 square foot in a five acre area. He addressed the 6% figure which allows the flood height to raise one foot. It is a key element and it is allowed under federal law. He stressed it is important to allow what the federal law allows. He doesn't believe the 6,534 figure is in the federal law and this adds more restrictions. He wants the ability to rebuild homes he has torn down in the footprints. He stated there is no scientific evidence that the dikes in the valley raise the water level more than the one foot allowed.

There was discussion about the 6,534 figure and the one foot level and how it was determined.

Mr. Windish stated he believes the 6" rise was followed due to a DOE letter stating 6" to dikes and 6" to development.

Mr. Hauth stated he understands the 6" and 6" allocation between the dikes and the structures was an arbitrary figure. He believes if there was a consensus to remove the dikes the one foot allocation could be distributed strictly to structures but it is understood there it is likely that all the dikes are going to come out, as such they felt they needed to retain some of the overall one foot impoundment for the diking structures that are in place. He stated the Board could modify that figure as long as the total net residual is kept at one foot cumulative between whatever structures are there.

Cmmr. Hunter stated he understands that at the beginning it was 6" for new diking, 6" for density and the existing diking was vested.

Mr. Hauth answered he understands the entire diking is being considered and bringing it into compliance. There is a meeting scheduled with FEMA on January 9, 1997.

Mr. Johnson addressed the 6,534 figure - this is based on the assumption that every 5 acre tract would build to the 6,534 amount which is unlikely. Agreed that flood compatible buildings should be allowed in the no new footprint zones.

Jerry Richert stated 75% to 80% of the valley is owned by the agriculture community and they have repeatedly stated they are not being addressed. Concerned that what is good for the county be good for the private industry.

Bill Hunter, Jr. addressed the density criteria. He believes clustering is a better alternative, requiring 300 feet between buildings is not practical.

Cmmr. Hunter stated he will abstain from voting. He stated the Plan is one more nail in the coffin to the agriculture community, Skokomish Valley in particular.

Cmmr. Cady commented that all the requirements due to the state and federal laws, she hasn't seen any that require economic impact statements which she believes are just as viable as environmental impact statements. She believes they are forgetting the people.

Gary Yando addressed the 387 feet minimum allowable space required between buildings, there was a request to change it to the sum total of all structures footprints shall not exceed 12,800 square feet. DOE recommended no to the change but there needs to be some criteria for a minimum space between structures, it doesn't have to be 387 feet. He suggested the following language: minimal allowable space between structures parallel and perpendicular will be determined by further analysis and specified in the ordinance.

Mr. Johnson asked why DOE objected to eliminating the 387 feet between the buildings and why they objected to a designated number of square feet per five acre tract.

Mr. Yando read in the record the response from DOE. They are concerned there be criteria for a minimum space between structures, though it doesn't have to be the 387 feet. There is concern with the 12,800 square feet total because that could mean ten 1,200 square foot houses on each five acre parcel.

Representative Peggy Johnson stated she doesn't agree with the response and would be happy to call DOE.

Cmmr. Faughender suggested language changes to ES-8, Chpt 7, structures shall be 387 feet apart or clustering allowed on higher ground, subject to review.

Cmmr. Cady suggested language changes on page 6-80, Chapter 6, Density Floodway, top of page, third bullet, The Statement, ...shall not exceed 6,534 square feet, <u>or to FEMA standards</u>,... .

Mr. Tozier would like it left at FEMA standards, no mention of the 387 feet apart.

Mr. Johnson stated their concern is that they are in compliance with FEMA regulations and not impose additional regulations. They want to reduce flood hazards.

Cmmr. Faughender suggested eliminating the 387 figure and revise the language to state the space between structures shall conform to FEMA standards, subject to review.

Bill Hunter, Jr. state the density program is not used often and doesn't believe there are FEMA standards as far as distances between houses. His main concern is that structures be allowed to cluster on high ground.

Rep. Johnson cautioned the Board to not give FEMA any ideas for new areas to regulate, such as allowing a certain distance between buildings.

Mr. Hauth believes the most efficient way is adopt an ordinance that is on a cross-sectional basis of the valley.

Cmmr. Hunter asked what the intent is of having a distance between the buildings.

Mr. Hauth replied the intent is based on a cross-section of the valley, there needs to be some separation between buildings.

Cmmr. Faughender/Cady moved and seconded to adopt the April, 1996 draft of the Skokomish River Comprehensive Flood Hazard Management Plan with the following changes: Director of Community Development's memo dated 12-30-96, bullets 1 though 8 with changes to #5, The Statement, ...shall not exceed 6,534 square feet, add "or to FEMA standards";, #9 refer back to the third bullet on ES-8, the minimum allowable space between structures parallel and perpendicular to flow is subject to Mason County Comprehensive Plan and FEMA standards and further review is requested; add the definition of maintenance from WAC173-145. Motion carried

unanimously. F-aye; H-abstain; C-aye. Resolution No. 146-96 (Exhibit)

ADDENDUM 1

MODIFIED EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Skokomish River Comprehensive Flood Hazard Management Plan
Mason County
Skokomish River Flood Planning Advisory Committee
October 1996

The Skokomish River Valley is an area of great natural beauty and rich agricultural land that has attracted people to live and work in the floodplain for hundreds of years. However, the Skokomish River floodplain is also an area of great natural hazards. Inundation of property, erosion of land, and threats to personal health and safety occur on a frequent basis in the Valley as a result of flooding from the Skokomish River.

Extreme events that appear to occur with increasing frequency have devastating effects. The largest flood event of record occurred recently, in December 1994. The Skokomish at Potlatch gauge operated by the USGS recorded a stage of 17.91 feet, 2.8 feet above the official flood stage at this location. While the exact discharge and related flood frequency are not known for this event, it is likely that the event was equal to or greater than the 100-year event. Damages from the flood were severe and widespread throughout the valley, including extensive damages to US 101.

The overall goal of this Comprehensive Flood Hazard Management Plan is to reduce hazards from frequent and infrequent events using actions that are appropriate to conditions in the Skokomish Valley. The plan was developed with the understanding that catastrophic flood events have occurred repeatedly in the past and will continue to occur. The recommended actions are not designed to prevent catastrophic floods, but to lessen the impact of floods on people and their property.

This plan integrates the following three previously published documents relating to flood hazard management planning for the Skokomish Valley:

- 1988 Skokomish River Comprehensive Flood Control Management Plan—Preliminary Draft Plan, prepared by the Washington State Department of Ecology (Ecology)
- 1993 Skokomish River Comprehensive Flood Hazard Management Plan—Volume II Draft, prepared by KCM, Inc.
- 1995 Skokomish River Comprehensive Flood Hazard Management Plan—Draft Chapters, prepared by KCM, Inc.

Two major resource development activities have been practiced in the upper subbasins of the Skokomish River watershed, dramatically altering environmental conditions in the upper and lower subbasins and affecting flooding in the Skokomish Valley. These activities—logging in the South Fork and diversion of the North Fork out of the watershed by the Cushman hydroelectric project—have contributed to unnatural filling of the river channel, resulting in rising elevation of

the river bed, diminished channel capacity, progressively more frequent and severe flooding, accelerated risk of channel migration, and higher ground water levels. Additionally, some channelization features on the valley landscape, such as state bridges, county roads, and natural bank features, have contributed to observed aggradation upstream of these features. The high rate of channel aggradation has been identified as a root cause of progressively more severe Skokomish River flooding problems.

Extensive clearcut logging in the South Fork subbasin has occurred over several decades on federal forest and private lands. The result of this practice has been a drastic alteration of the natural hydrologic regime. Removal of forest vegetation in the South Fork causes increases in flood magnitudes and frequencies, and increases sediment input to the Skokomish River.

The North Fork subbasin has been changed by a different kind of human intervention. The Cushman Hydroelectric Project diverts about 90 percent of the natural North Fork flow, or 45 percent of the total mainstem flow, directly into Hood Canal. This alteration of the hydrologic regime has had both positive and negative impact on flooding in the lower valley.

Lake Cushman, created by a dam on the North Fork of the Skokomish River, stores floodwaters and significantly reduces peak discharges that would otherwise cause extensive downstream damages. The reduction in flow from the North Fork Skokomish River reduces sediment carrying capabilities of the mainstem and contributes to unnatural aggradation in the mainstem Skokomish. Although there is uncertainty regarding the exact amount the aggradation has increased, there is a general consensus that the rate has increased. The result is that sediment transported from the upper watershed is deposited at a faster rate in the mainstem, raising its bed and decreasing its capacity to convey floodwaters and sediment, thus increasing flooding in the Valley.

The effects of upper basin resource development activities on flooding in the lower valley are discussed in detail in this report. Valley land management activities, such as farming and diking, have also affected flooding, and are also discussed. Issues related to these and a wide range of other relevant flood hazard management topics were developed out of a review of past records, discussions with Valley residents, and meetings with a planning advisory committee established for the planning effort.

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The Planning Advisory Committee established by the Mason County Board of Commissioners included representatives from Mason County departments of Public Works and Community Development, Washington Department of Ecology, Washington Department of Fish & Wildlife, Skokomish Indian Tribe, the Skokomish Flood Control Advisory Board and Valley residents. The goal of the Planning Advisory Committee is to reach consensus that resolves the complex outstanding flood control issues in the Skokomish River Basin—where consensus cannot be reached areas of agreement and disagreement will be identified. The merits of potential alternatives were debated at length during regularly scheduled planning advisory committee meetings, and decisions made by consensus. Consensus was reached on key goals and objectives and on actions appropriate to address several flood issues, including a basic method for

regulating floodplain development consistent with FEMA regulations, policy for diking, and policy for reducing adverse effects of the Cushman Project.

The Planning Advisory Committee adopted a number of "Key Elements" to provide overall guidance for the Skokomish Valley Comprehensive Flood Hazard Management Plan. The Key Elements are presented in the Introduction section of the Plan.

ISSUES AND RECOMMENDATIONS

Ten major issues were identified during the planning effort and the recommended actions were proposed in this plan to address them.

Issue 1: Forest Practices in the South Fork Watershed

Forest practices in the South Fork Watershed have contributed to sedimentation in the lower mainstem, causing increased flooding. Recommendations to address this problem include restoration activities and changes in forest practices in the South Fork Watershed; and mainstem widening and side-channel clearing, gravel removal, and river bank stabilization in the lower watershed.

South Fork Watershed Recommendations

The U.S. Forest Service (USFS) owns roughly 50 percent of the Skokomish Watershed. This CFHMP fully supports recommendations presented in the USFS Watershed Analysis. They are as follows:

- Create riparian reserves along streams and rivers according to the maximum widths recommended in federal standards
- Continue implementation of sediment input reduction actions with project priority based on potential for site to deliver sediment to streams or sustain vegetative cover
- Evaluate road management objectives and maintenance strategies to address sediment reduction on high sediment roads
- Eliminate unstable sidecast areas and mass wasting hazards with a high risk of delivery to streams.
- Use strategies such as delayed thinning, smaller harvest units with longer periods between harvests, and reduction of road construction to promote hydrologic balance
- Continue successful watershed restoration projects such as road decommissioning and bioengineering of eroding slopes.

The other major landholder in the South Fork Skokomish Watershed whose actions have affected flooding in the Valley is the Simpson Timber Company. The following recommendations for actions on Simpson lands are based on their communications during development of this CFHMP.

- Simpson should complete a watershed analysis for lands it owns in the Skokomish Watershed. Historical and current volume estimates of mass erosion rates, sediment delivery to streams, and transport to the mainstem should be provided for use in a mainstem sediment balance.

- Simpson should make copies of its Road Maintenance, Rehabilitation, and Abandonment Plan available to all members of the PAC and Skokomish Valley residents and provide periodic status presentations.

Lower Watershed Recommendations

A principal goal of this CFHMP is to restore and maintain the water and sediment carrying capabilities of the Skokomish River system. This will require addressing the root problems of channel aggradation by 1] reducing or eliminating unnatural sediment contributions from South Fork forest lands using methods identified in South Fork Watershed Recommendations, above; and 2] reducing or eliminating the Cushman Project's contribution to the river's reduced sediment carrying capabilities with managed flushing flow releases for the mainstem [See Issue 2, Cushman Project].

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Lower Watershed Gravel Removal Recommendations

In addition to direct mitigation measures that address the root causes of increased mainstem channel aggradation, several complementary actions are recommended to mitigate sediment-related flood damages, further quantify sedimentation processes, and investigate innovative approaches to sediment management.

Gravel removal proposals should be coordinated with overall plans for restoring and maintaining channel capacity. However, it is not the intent of the Plan to make gravel removal projects contingent upon prior implementation of managed flows designed to increase the mainstem's sediment transport capabilities.

This CFHMP supports recommendations to the Federal Energy Regulatory Commission by the Skokomish Tribe and state and federal resource agencies that managed flow releases from the Cushman Project be required that will substantially restore river and estuary fish habitat conditions and the mainstem's natural sediment carrying capabilities. Managed flow releases would be designed to effectively treat unnaturally high rates of channel aggradation in the mainstem Skokomish River and restore to the maximum extent practicable the natural sediment carrying capabilities of the mainstem. Managed flow releases from the Cushman Project—not to exceed bankfull levels on the mainstem—should be determined by a program of testing and monitoring, which would also identify the extent to which mechanical removal of accumulated

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bedload, including gravel bar removal and instream dredging, may be necessary to restore mainstem channel capacity. Any instream dredging project should be supported by good science, shown to be beneficial for fish life and habitat, and be supported by a consensus of local, tribal, state and federal regulatory and concerned agencies and community.

Based on existing information, Mason County and the Skokomish Tribe believe that mechanical removal of accumulated bedload will be required—in combination with managed flushing flows—to fully and expeditiously restore the mainstem's capabilities to carry water and sediment.

Monitoring

The recommended sediment monitoring program consist of two components:

- Monitoring sediment movement at key locations, including locations where historical data is available
- Surveying channel cross-sections annually and taking aerial photos every 2-3 years to determine changes in response to sediment movement.

Gravel Bar Scalping Projects to Increase Channel Capacity

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Pre-engineering design analysis is recommended for a program of gravel bar scalping to increase channel capacity in river reaches where insufficient capacity has been documented. This analysis would identify priority locations, estimate expected benefits, costs, and environmental impacts, and identify relationship with overall plans for channel restoration. The average channel capacity between US 101 and the confluence of the North and South Fork Skokomish Rivers is approximately 8,000 cfs. Removal of gravel through gravel bar scalping at recommended locations would increase channel capacity by an average of approximately 3,700 cfs.

Feasibility Analysis of Sediment Exclusion and Ejection

The feasibility of sediment exclusion and ejection alternatives should be determined through a detailed feasibility analysis. The feasibility analysis should include development of conceptual designs for the facility, collection of geotechnical information from potential sites, estimates of costs of implementation and operation, benefits for flooding, and environmental impacts. If the feasibility analysis is favorable, design and implementation of a pilot project of sediment removal and associated monitoring should be accomplished. The pre-engineering design analysis and any pilot project should be coordinated with overall plans for channel restoration.

Mainstem Widening and Side-Channel Clearing Recommendations

The purpose of this project would be to reduce mainstem flooding and provide additional fish habitat. Detailed engineering, cost, flood benefit, and environmental investigations are required to assess and develop this proposal.

The following recommendations were developed by the consultant based on HEC-2 modeling results. The modeling results indicated that conveyance capacities could be increased by approximately 3,500 cfs in the reach of the river between US 101 and a point approximately two miles upstream of US 101.

- Selectively clear trees and brush in the North Overflow from the US 101 bridge to a distance approximately 1,500 feet upstream
- Double the width of the mainstem channel of the river between US 101 and a location approximately 1,500 feet upstream of US 101
- Remove a forested gravel bar on the north side of the channel approximately two miles upstream of US 101
- Widen by 100 feet the downstream end of a meander bend located approximately 1.5 miles upstream of US 101.

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Implementation of recommended actions relating to mainstem widening and side channel restoration will require the collaboration with the Skokomish Tribe, and integration with overall planning for channel restoration and improvement of natural sediment transport through managed restoration of flows. In addition, as is the case with any of the actions that may use, divert, obstruct, or change the natural flow or bed of the river, the Washington State Department of Fish and Wildlife (WDFW) would be consulted prior to design and construction.

River Bank Stabilization Recommendations

River bank stabilization, if carefully designed, can mitigate the impact of erosion caused by flood flows. Improperly designed bank stabilization projects can cause adverse effects to fisheries, promote erosion in the bank targeted for protection or other nearby riverbanks, and increase flood damage.

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This plan promotes the use of bioengineered riverbank stabilization whenever possible. Emplacement of rock rip-rap is recommended in locations where no other solution is feasible and the potential for flood damage is great. Completion of a pre-engineering design for bank protection using rock rip-rap or bioengineering techniques—including rough drawings, estimate of cost, description of expected benefits, identification of environmental effects, and fit with overall flood plan policies and plans—is recommended in the following locations:

- Five Mile Corner: The force of the river in this area is directed at the southern bank. Four homes located within 200 feet of the southern bank are threatened by a potential channel avulsion.
- The Dips: Water flows over the road in this location during flood events and is conveyed through the floodplain towards Swift Creek, Eels Road and the Shelton Trout Hatchery.

Fells

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- The Dips: Water flows over the road in this location during flood events and is conveyed through the floodplain towards Swift Creek, Eels Road and the Shelton Trout Hatchery.

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- Skokomish Community Church: The dike in the County road right of way at the sharp bend in the river near the church was not built to current engineering standards and is in danger of failing. An avulsion at this location could damage or destroy the church, several homes and private property, and the Skokomish Valley Road. Stabilization of the river bank at this location will be planned in conjunction with evaluation of the existing dike in the County road right of way consistent with adopted diking policy.

Issue 2: Diversion of North Fork Flow by the Cushman Hydroelectric Project

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Diversion of flow by the Cushman Hydroelectric Project has changed the hydrologic regime of the river, reducing its sediment carrying capacity and causing increased flooding. Modifications to the operation of the Cushman Project are being considered as part of procedures being conducted by FERC to evaluate Tacoma Public Utilities' application for major license. These modifications involve changing the amount of water released from Lake Cushman to the North Fork.

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The Skokomish Tribe and Federal and State resource agencies have recommended to the Federal Energy Regulatory Commission that North Fork streamflow be restored in a way that substantially restores river and estuary fish habitat conditions and the mainstem's sediment carrying capabilities. Sediment transport capabilities of the mainstem would be optimized through managed flow releases from the Cushman Project, not to exceed bankfull levels on the mainstem. The Planning Advisory Committee endorsed this strategy as essential to reduce or eliminate Cushman Project contributions to future channel aggradation, consistent with maintaining flood storage provided by the Cushman Project and high summer recreational pool levels in Cushman Reservoir.

There is uncertainty about the effect that managed flushing flow releases to the North Fork will have on flushing accumulated bedload from the mainstem river. Therefore, this CFHMP supports pilot testing of enhanced sediment transport through controlled releases from the Cushman Project to determine optimum flushing flows and the extent that mechanical removal of accumulated bedload will be necessary to restore channel capacity and the related objective of lowering groundwater levels. Mason County and the Skokomish Tribe believe that mechanical removal of accumulated bedload will be required—in combination with managed flushing flows—to fully restore mainstem channel capacity.

The project should continue to provide flood hazard management benefits by limiting releases so that flows in the mainstem near US 101 do not exceed bankfull levels, presently about 5,000 cfs. Mitigation for flood damages resulting from Cushman Project-related channel aggradation in the Lower Mainstem should be provided by Tacoma Public Utilities in the form of funding for flood hazard management projects recommended in this CFHMP.

Issue 3: Increase in Flood Levels Caused by US 101

US 101 causes localized increases in flood levels. During extreme events most of the flow is not conveyed through the main bridge opening due to the topography in the vicinity of the highway. Under current conditions, only 36 percent of the 100-year flood flow is contained within the main channel; approximately the same amount flows towards the Purdy Creek bridge.

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Modification of the US 101 embankment and bridges will provide local reductions in flood depths and associated damages. A pre-engineering design should be completed—in coordination with mainstem channel restoration proposals—to evaluate alternative methods and their costs and flood benefits for the following highway 101 modifications:

- Increase the capacity of the north overflow by selective removal of woody debris and brush near the bridge opening and in the slough
- Raise the roadway near Purdy Creek to an elevation of 35 feet and increase the area of the opening under Purdy Creek by a factor of three
- Increase the area of the main channel bridge opening by a factor of 1.5.

These recommendations are contingent on the following:

- The roadway adjacent to the Purdy Creek Bridge should not be raised without enlarging the bridge opening
- Any enlarged bridge opening at Purdy Creek should have at least the same hydraulic capacity as the combined flows at the existing Purdy Creek bridge and the adjacent US 101 overflow
- Any enlarged bridge opening at Purdy Creek should not be made so large that it will result in a significant redistribution of flows through openings at US 101
- The area within 1,000 to 2,000 feet of the Purdy Creek Bridge should be kept as open as possible to allow for conveyance of floodwaters during extreme events
- Modification of openings in the US 101 embankment should be implemented only after careful consideration and mitigation of potential impact to downstream property.

Issue 4: Increased Flood Levels Caused by SR 106

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SR 106 causes localized increases in flood levels during extreme events. Development and analysis of alternatives to mitigate potential flood effects of SR 106 were not completed for this CFHMP since it was beyond the scope of the plan. A pre-engineering design should be completed—in coordination with mainstem channel restoration proposals— to evaluate the costs,

flood benefits and environmental effects of the following two alternatives for increasing the effective area through which floodwaters can be conveyed:

- Remove the entire embankment east of the intersection of Skokomish River Road and SR 106 in the area of deepest flooding. Replace the embankment with an elevated causeway.

- Enlarge the bridge opening.

These alternatives should be analyzed using the calibrated HEC-2 model prepared for-this CFHMP.

Issue 5: Conveyance of Floodwaters Back into the River Following Floods

Floodwaters are not adequately conveyed back into the river following flood events. The following recommendations were developed to enhance conveyance of floodwaters from the floodplain to the river during and following flood events. These recommendations are complemented by hydraulic improvements recommended for Issue 3 and regulatory approaches recommended for Issue 7.

- Overbank Vegetation Removal: Overbank vegetation should be selectively removed from Weaver and Purdy Creeks between US 101 and a location approximately 300 feet upstream. The Washington State Department of Transportation (WSDOT) should complete this maintenance activity at least annually. The WDFW should be consulted regarding an ongoing maintenance program at this location to streamline permitting requirements.

- Debris Blockage Removal: Debris blockages to be targeted for removal were identified at eight locations as part of the 1993 Draft CFHMP. Debris blockages that remain at these locations should be removed. The County should implement an ongoing maintenance program in coordination with the WDFW and the Skokomish Tribe to remove blockages that recur at these locations and blockages that develop at other locations. The program should include annual inspections and record keeping elements.

- Drainage Improvements: The County should implement a program for local property owners to develop and implement on-site drainage projects. These Projects would benefit the public since floodwaters would be conveyed back to the river more rapidly during flood events, reducing the length of time roadways and other public facilities are inundated. Funding should be developed on a cost share basis between the County and the local property owner. FCAAP maintenance grants should be considered as a potential funding source.

It is critical that the nature and extent of expected reductions in flood damages and the impact on fisheries and riparian areas be identified and evaluated prior to implementation of any recommendations described above.

Issue 6: Repetitive Damages to Structures in High Hazard Areas

Structures in the valley located in the highest hazard areas receive repetitive damages, resulting in a cycle of damages, disbursement of state and federal monies, and repairs. This cycle is costly to the property owner and the public.

A five-step hazard analysis was completed to recommend habitable structures located in the Skokomish Valley for acquisition. The steps included mapping of flood inundation and flood hazards, and compiling of databases of property ownership and habitable structures.

Following recommendations for acquisition, public comment was solicited. Input from the Skokomish Tribe was also requested and obtained.

A total of 82 structures are recommended for acquisition of which 38 are located on tribal land. The 38 tribal-owned structures were recommended by the Tribe for acquisition. The County, in coordination with Ecology, should pursue potential sources of funding for acquisition of all structures recommended for acquisition. Descriptions of potential sources of funding are included in Chapters 5 and 7 of the CFHMP.

The results of the flood hazard analysis were also used to develop a no-new-footprint zone map. No-new-footprint zones were based on identification of the highest hazard areas in the valley as depicted on the hazard maps.

The objective of the establishment of no-new-footprint zones is to provide a regulatory mechanism for preventing new development in the highest hazard areas in the Valley. Redevelopment would be allowed to occur only if the area of the new footprint is equal to or less than the old footprint of the structure. The map of no-new-footprint zones and regulatory text to achieve these objectives should be incorporated into the new flood damage prevention ordinance recommended in Issue 7.

Issue 7: Potential for Flood Damages to Future New Development

Future construction of homes and businesses in the Skokomish Valley will result in additional hazards to people and property. Floodplain development regulations are needed to both limit development and provide guidance on new development to minimize future flood hazards.

The County should adopt a flood damage prevention ordinance and Flood Insurance Rate Map (FIRM) based on the density floodway approach, where no distinction is made between floodway and floodway fringe. The effect of development on floodplain hydraulics is controlled by

limiting the allowable percent development on each parcel throughout the floodplain. Development criteria produced during a density floodway analysis are integrated into the flood damage prevention ordinance to limit future increases in water surface elevations resulting from development.

A draft flood damage prevention ordinance was prepared based on the results of the density floodway analysis and is included in Appendix DD. The following development criteria are included in the ordinance:

- The maximum allowable percentage development is 3 percent
- The maximum allowable width of a structure parallel and perpendicular to flow is 80 feet
- ~~The minimum allowable space between structures parallel and perpendicular to flow is 387 feet~~ The minimum allowable space between structures parallel and perpendicular to flow is subject to the Mass County Comprehensive Plan and FEMA standards and further review is requested
- The maximum blockage that should be allowed is 17 percent

The draft ordinance also incorporates provisions to ensure that no new construction occurs in high hazard areas and redevelopment occurs only if the area of the new footprint is equal to or less than the old footprint of the structure (see Issue 6). In order to adopt the ordinance, the County process for development and adoption of regulations should be followed. The County should also initiate a process of map revision with FEMA.

Issue 8: Engineering Standards and Regulatory Compliance for Levees

The current system of riverbank levees are discontinuous and the construction methods used to build them were not up to current engineering standards for levee construction. In addition, they do not meet FEMA regulations. Any dikes that are constructed should meet basic structural standards and FEMA regulations, not cause increased flood hazards, and be set back from the natural stream channel and stream bank.

On October 24, 1995 the Planning Advisory Committee adopted a policy on dikes. Agreement was reached that: "Diking is not a preferred alternative for addressing flooding in the Valley, but there are instances where dikes can provide legitimate flood protection." The Planning Advisory Committee recommended as a priority completion of a reconnaissance analysis of existing dikes to "to develop recommendations for removal, abandonment, or approval for maintenance and upgrading" to meet its approved minimum standards for dike construction, alteration and maintenance. Under the PAC's recommended diking policy, "Applications for construction, alteration and maintenance of dikes shall be considered on a case-by-case basis." The full policy is presented in Chapter 6 and its adoption is recommended in this report.

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The CFHMP includes design guidelines for construction of a low-level berm and a tabulation of maximum berm heights allowable under FEMA regulations. This information is provided so that it can be used for any future planning concerning dikes.

Prior to modification of the existing levee system, a detailed reconnaissance report on existing dikes is recommended as proposed by the Planning Advisory Committee. The report would serve the following purposes:

- Prioritizing future projects
- Establishing a realistic budget for bringing the dikes into compliance with the existing policy
- Making future permitting decisions on private dike repair requests
- Determining the degree to which each dike provides private versus public benefits.

Issue 9: Flood Protection for Individual Property Owners

Individual property owners should have flood protection through floodproofing. The Army Corps of Engineers is currently completing a Flood Audit for the Skokomish Valley. Information will be provided to residents on specific actions that they can take prior to, during, and after a flood. Detailed recommendations will be provided for appropriate floodproofing methods for each structure. Recommendations will be based on costs and benefits of actions to protect structures from site-specific hazards. The Flood Audit should be completed as soon as possible, and not later than the start of the 1996-1997 flood season.

Individual property owners should review recommendations for their property contained in the Flood Audit. In the interim, common floodproofing approaches presented in this report should be considered on an individual basis so that residents can achieve personally acceptable levels of protection as soon as possible.

The County should pursue funding through the National Mitigation Fund and other programs to assist local property owners in financing floodproofing projects. Prior to pursuing funding, the County should use information presented in the Flood Audit and the flood hazard analysis completed in this CFHMP to develop a prioritized program of floodpoofing projects.

Issue 10: Flood Warning and Emergency Response Program

The current flood warning and emergency response program needs enhancement. Residents need to know when a flood is occurring or is likely to occur and its projected magnitude and duration in order to take appropriate measures to protect their property and to evacuate to safe locations. Recommendations for this issue relate to actions that will enhance flood warning and emergency response during dam releases and flood warning and emergency response during dam failure.

Flood Warning and Emergency Response during Dam Releases

Make it easier for Valley residents and the Tribe to obtain information about flood conditions directly. Obtain access for the Skokomish Tribe and the Skokomish River Flood Control Zone District to U.S. Geological Survey (USGS) gauge data. Designate an emergency control center during flood conditions and a contact person who will be responsible for contacting Tacoma Light Division's Energy Control Center. Establish a computer link to obtain USGS flow data.

Provide information directly to Valley residents about releases. This can be facilitated by designating a person from the Valley for the Tacoma Light Division to contact in the event of a release. A procedure should also be established to notify the rest of the residents in the Valley.

Flood Warning and Emergency Response During Dam Failure

Establish a more direct way to warn residents. Sirens should be installed in the Valley to warn residents of a dam failure. Local television and radio stations, especially those included in the emergency broadcast system, should be notified immediately.

IMPLEMENTATION CONSIDERATIONS

Funding will be required to implement the recommended actions. Potential funding sources include state and federal grant and loan programs and local revenues generated through the use of special purpose districts. This plan recommends that parties involved in upper watershed resource development activities that have had negative effects on flooding in the valley should contribute to implementation of the CFHMP recommendations. These parties include the U.S. Forest Service, Simpson Timber, and Tacoma Public Utilities.

Comprehensive Flood Hazard Management Planning is an ongoing process. This plan should be periodically updated to reflect the changing conditions in the valley and the new issues and potential actions that may result. The provisions of this plan should be incorporated into any other related planning efforts, such as the watershed planning effort being led by the Skokomish Tribe, to ensure that the flood hazard management objectives contained in this CFHMP are achieved.

in the Plan that illustrate limitations associated with existing dikes. The rewritten sections should include FEMA's brief description of the inherent perils of dikes, which could be inserted at the end of the Alternatives section on page 6-89:

~~UNRESOLVED (9)~~ OK JERRY HAMM & VIC MARTINO

The Federal Emergency Management Agency has identified inherent limitations associated with the existing dikes in the Skokomish Valley:

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"...Whether they are called flood-control berms, dikes or levees they all basically have the same effect and problems. While they may offer a certain level of protection for one individual, at the same time the water is being detoured to someone else who does not have the benefit of a berm. Berms also offer a false sense of security, often being overtopped or breaking, flooding those they were supposed to protect. This has been seen in recent flooding events." (Letter from Federal Emergency Management Agency to Mason County Board of Commissioners, March 17, 1995, see Volume II).

ADDENDUM 2

CHANGES TO THE MAIN BODY OF THE PLAN CONSISTENT WITH CHANGES IN THE EXECUTIVE SUMMARY

Funding for the enhancement of flood control facilities was authorized by Engrossed Senate Substitute Bill (ESSB) 5411, enacted in July 1991. This expands FCAAP project eligibility to include purchase of flood-prone properties or land to be used for flood storage, but only if these measures were identified in the applicable CFHMP (Ecology 1991).

Permits such as the Hydraulic Project Approval (HPA), Shoreline Substantial Development, and Conditional Use must be obtained before the project is funded by Ecology. All project plans and designs must be consistent with applicable SMPs and CFHMPs, and the projects must benefit the public, as opposed to strictly private interests.

Emergency Projects

A portion of the available FCAAP funding is reserved by law for emergency use. Projects considered emergencies are those that must be done immediately to protect life and property from "unusual, unforeseeable, and emergent flood conditions" (WAC173-145-100). Release of emergency funds is contingent upon an emergency declaration by the appropriate authority. Depending on the emergency measure, a shoreline permit or HPA may be required.

Consultation with Other Agencies

A variety of state and federal agencies are involved in key river issues, such as fisheries resources, wildlife habitat, and public use. The presence of fisheries resources, primarily salmon and steelhead, is a key consideration in performing any flood hazard management activities in and around the waters of the State of Washington. The potential loss of fish habitat resulting from construction in and beside rivers has been a major concern for fisheries agencies, sports fishermen, and Native American groups.

To ensure that fisheries resources are maintained, the Washington State Department of Fish and Wildlife (WDFW) has review authority for most phases of the FCAAP. Ecology is required to consult WDFW before approving any CFHMPs. Applicants for FCAAP project funds must review their proposals with WDFW, the Washington State Department of Natural Resources (DNR), and the tribes with jurisdiction.

Construction work to be performed in or adjacent to navigable waters of the United States, including wetlands, must be approved by the U.S. Army Corps of Engineers (COE). The COE permit process ensures that all federal, state, and local regulatory agencies with jurisdiction over the project are properly notified and approve the project. The COE will not approve a project that has been rejected by another permitting agency.

Advisory Committee

The planning advisory committee for the Skokomish Comprehensive Flood Hazard Management Plan was established on April 14, 1992, by the Board of Mason County Commissioners. The committee members were selected to include representatives from Mason County departemens of and Community Development, Washington Departement of Fish & Wildlife, Skokomish Indian Tribe, the Skokomish Flood Control Board and Valley residents ~~of all interests in the Skokomish~~

Basin. Table 1-1 identifies the original and current advisory committee members.

TABLE 1-1.

PLANNING ADVISORY COMMITTEE FOR THE SKOKOMISH RIVER COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN

Name	Affiliation/Representation	Original (1992) Member?	Current (1996) Member?
Gary Cooper	Mason County Department of Community Development	no	yes
Jim Fraser	WDFW	yes	yes
Chuck Gale	Ecology	yes	no
Jerry Hauth	Mason County Public Works Department	no	yes
John Hawk	Skokomish Indian Nation resident or local resident with key interest	yes	no
Jeff Heinis	Citizen at Large	no	yes
Bill Hunter Jr.	Skokomish Flood Control Advisory Board - Middle Skokomish Valley	yes	yes
Wes Johnson	Skokomish Flood Control Advisory Board - Upper Skokomish Valley	yes	yes
Victor Martino	Skokomish Indian Nation	no	yes
Margie Schirato	Skokomish Indian Nation	yes	no
Dan Sokol	Ecology	no	yes
Evan Tozier	Skokomish Flood Control Advisory Board - Lower Skokomish Valley	yes	yes
Marley Young	Mason County Public Works Department	yes	no

A set of ground rules was established during formation of the advisory committee, a copy of which is included with this report as Appendix B. Characteristics and responsibilities of the advisory committee are described both in the declaration by the Board of Commissioners establishing the committee and within the ground rules as follows:

- Provide information on important issues in the basin regarding each member's respective interests
- Provide direction to the consulting team
- Build a consensus that balances competing objectives
- Comment on recommendations for flood hazard management included in the CFHMP.

BOARD OF MASON COUNTY COMMISSIONERS' PROCEEDINGS

SPECIAL MEETING

DECEMBER 18, 1996

Chairperson Mary Jo Cady called the public hearing to order at 7:00 p.m. at the Mason County Fairgrounds, Building 17. Commissioners M.L. Faughender and William O. Hunter were in attendance.

BUSINESS

HEARING - SKOKOMISH RIVER COMPREHENSIVE FLOOD HAZARD MANAGEMENT PLAN
The Clerk read aloud the notice of hearing to consider adoption of the Mason County Skokomish River Comprehensive Flood Hazard Management Plan.

Ryan Windish, Planner, presented a summary of the staff report recommending adoption of the proposed Skokomish River Comprehensive Flood Hazard Management Plan, Volume I & II with Addendum 1 (modified executive summary; Addendum 2 (Changes to the main body of the plan consistent with changes in the executive summary); Addendum 3 (correspondence between Department of Ecology and Mason County on the Skokomish River CFHMP); and Addendum 4 (Citizen comments on the CFHMP). Copies of the report were circulated to those in attendance. Mr. Windish noted the staff report was very similar to the report presented at the Planning Commission and public workshop on November 18, 1996.

The Board questioned if a variance procedure is included in the plan for any permitting required.

Gary Yando, Community Development Director, responded there is not a variance procedure included in the plan; however there would be a process included in the flood ordinance to be completed.

It was noted regulations for permitting would be included in the flood ordinance.

Cmmr. Faughender referred to page 6 of the staff report and asked if there is some reason why there is no new footprint area in the East Bourgault Road.

Tony Malone, Consultant, responded the criteria applied for defining no new footprint is high velocity and depth flow. If frequency of flooding was considered then it probably would have been included.

Mr. Malone presented a summary using slides. The report was outlined by ten issues and recommendations to those issues. One of the major recommendations was to establish "no new footprint zones" which are identified as a structure in place that cannot be replaced with anything bigger than current structure. It was noted a flow through structure is not a footprint. A footprint would be something that blocks flow of water. The reason for this was to recognize there are some high hazard areas. They want to make sure the best decisions are made for the future to prevent flooding problems. Most of the designated high hazard areas are known and there is no one that lives there.

He stressed this process started in 1988 when Federal Emergency Management Agency (FEMA) created a flood plain map which the Skokomish Valley residents and County rejected. The County was left with the task of a replacement flood plain map. The original map showed almost the entire Skokomish Valley as a floodway which prohibits building of any kind. The alternative was the density approach. They want to keep the area open for flood waters to move through but still allow a set amount of building. There are two other areas in Washington (Yakima and Snohomish County) that have adopted the density flood plain.

He explained the flood plain states there is to be a density and the flood ordinance regulates how it is to be accomplished. The variance procedure would be in the ordinance.

The Board questioned if any of the plan could be used county-wide as a management plan for frequently flooded areas.

Phil Nonne responded there are policy type recommendations which could be used in other areas

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The Board questioned if any of the plan could be used county-wide as a management plan for frequently flooded areas.

Phil Noppe responded there are policy type recommendations which could be used in other areas throughout the County.

Peggy Johnson, State Representative, recommended the Commissioners accept the proposed plan with caveat of additional ideas presented for an ad hoc committee. She stressed there are many things which are contingent on adoption of the plan. In the legislature there are two individuals (Senator Anderson & Representative Johnson) which are working the issue of flooding since 1991. They have served on the statewide flood hazard reduction committee and have heard a lot of the same testimony around the state as heard locally. It is a very complex plan. In 1995 they were able to include in the budget $250,000 for a pilot program on the Skokomish River. Mason County is only jurisdiction which received these type of funds. The purpose was to determine if there is something which could be done in a local river to accommodate the needs of the residents. Also, they were able to obtain one million from Department of Transportation; however, they lost this money because it had to be used for other counties which

body of the plan as presented in Addendums 1 & 2 of the staff report dated December 9, 1996 which failed for lack of second.

Cmmr. Hunter stated he would like a few days to analyze the information received before acting on the document.

Cmmr. Hunter made a motion to close the public hearing which died for lack of second.

Cmmr. Hunter expressed he planned on voting in favor of passing a plan. However, he would like to review the criteria received to see if any changes need made.

Cmmr. Faughender commented in sitting in on meetings he has seen individuals with a range of emotions and this is the closest to agreement he has seen the plan. He believed the plan is workable, moldable, changeable and needs to be passed.

Cmmr. Hunter concurred the plan needs to be passed. He added the people in the Skokomish Valley are victims of logging in the upper reaches of the Valley through the last 40 years through the sustained yield, national forest. He did not feel the government has addressed the problems in the Valley. Also, they have not been able to address the problem due to regulatory problems. He concluded he has no intention of voting against the plan.

Cmmr. Cady commented she also would like to review the notes from the public comments.

Cmmr. Hunter/Cady moved and seconded to continue the hearing to December 30, 1996 at 10:30 a.m. Motion carried. C-aye; F-nay; H-aye.

WARRANTS APPROVED

The following warrants are approved for payment:

FUND NAME	WARRANT NUMBER	AMOUNT
Auditor's O & M	234	116.75
Combined Sewer & Water	5753-5774	12,558.46
Convention Center/Fair	4090-4095	520.08
County Road	14841-14891	309,921.33
Cumulative Reserve Deductible Insurance	163	500.00
Current Expense	65499 65500-65593 65594-65673	3,972.00 173,727.62 50,162.09
Election Equipment Holding	76	211.04
Environmental Health	1834-1847	28,375.61
Equipment Rental & Revolving	18107-18192	77,816.98
Health Services Administration	855-859	1,889.29
Landfill Administration	4212-4237	117,031.06
Memorial Hall	487-488	822.93
Personal Health	8165-8183	19,761.01
Salary Clearing	75765-75964 75965-75966 75967-75973	106,149.00 400.00 763.22

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Treasurer's M & O	350-351	406.13
Veteran's Assistance	480	3,539.58
Wastewater North Bay/Case Inlet	146	36,254.05
Water Quality Grant	3312-3225	12,001.34

had suffered more damages. Recently $150,000 was found and it is being accessed. The $400,000 is contingent on the plan being adopted. She stated it is not perfect, but there is a lot of support for moving ahead.

There was support for adoption of the plan from those in attendance and some wanted to see some areas addressed before adoption since it has taken a long time to get to its current stage.

Some of the issues brought out by individuals residents and groups at the hearing:

* Concerned about adopting and then fixing problems later.
* East Bourgault Road area should be included in the no new footprint due to the frequency of flooding. They are being recognized and assisted with a buy-out option.
* Residents want to live in the valley and not sell property. The buy-out only addresses a few concerns and is not the solution.
* There should be exceptions for 387' setback within an area which is primarily agriculture as it seems to be impractical. They don't want to block waters, but still want facilities.
* Should remove the source of the problem (gravel).
* Agreed with ad hoc committee, but should have a clear mission and strict deadline; also recommended representation from tribal member; agriculture member and 3 other representatives, 1 lower valley, 1 middle valley and 1 upper valley.
* Concerns about how ad hoc recommendations would fit into the plan if it would go back to the Planning Commission.
* Question as to who owns the gravel which will be removed at Mile Post 5; also what will be done with it; and who will own it once it is in pile; who will get the money for it; if there is money it should go back into restoring the river.
* Don't want gravel processing plants.
* Request to place moratorium for building in valley.
* Concern that Skokomish Valley is not listed as agriculture area.
* A letter from the agriculture group in the valley was received who had retained the services of Marley Young to prepare their report. It was requested that their comments be read and addressed.
* It was suggested there is a possibility of taking gravel on upper watershed to lower watershed. It has been proposed by Simpson Timber Company (STC) to take materials out in the upper Vance Creek Valley area. Also, in the Holman flats (steel bridge). The restoration projects by STC should be enhanced and USFS.
* Doesn't seem to be anything that absolutely stops the gravel from coming in the area.
* The dike reconnaissance is what should be moved on immediately.
* There is a rising aquifer in the valley. Many fields are no longer tillable.
* Would like to see the density go to footage. The 387' will lead to more driveways; clustering would be better and would be easier for driveways.
* Clarification is wanted on monitoring which needs to be done.
* Buy out dollars should be used to fix problem.
* Half foot rise for structures should go to 1' if no berm is allowed to 6% buildable.
* All dikes to be analyzed including the Nalley dikes.

The Board commented if the gravel is suitable it would be used by Public Works for crushing.

Dan Sokol, Department of Ecology, expressed appreciation for efforts, this plan has a greater degree of citizen involvement. It is just a plan (framework) and is the closest to consensus that he has seen it.

Mr. Malone commented the designation of no new footprint was from technical modeling and some was from citizens drawing on map. To date it is the best attempt at finding areas. Some places are high enough hazard that there should be no building.

The Board discussed the best method of addressing the changes which need to be made with the designation lines.

Mr. Malone recommended the Board make the changes prior to submittal to FEMA which Department of Ecology concurred.

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It was noted zone 1 and the Richert farm are the areas of main concern with the anecdotal information.

There was discussion on the placement of a 100' building which would not affect the flow if located perpendicular to the flow.

It was noted it could be up to one year before information is back from FEMA.

Cmmr. Faughender made a motion to adopt the Skokomish River Comprehensive Flood Hazard Management Plan, Volume 1 & 2, along with the amended executive summary and corresponding revisions to the main

breached and failed and some overtopped. Once this occurred, flood water inundated the entire Valley much as if the levees were not in place.

While the peak flood levels were similar to what they would have been without levees, the sequence of flooding was affected by the levees. As flow in the river increased, and prior to any levee breaks, more flow was contained within the channel corridor than would have occurred with no levees in place. This initially prevented overflow across the Valley and provided temporary flood protection to some residents located behind the levees.

At the downstream end of the existing levees, river water overflowed and traveled to the south side of the Valley toward Purdy Creek. The overflow across the Valley was more concentrated from the locations at the downstream end of the levees than they would have been without the levees in place. Without levees, overflow from the river would have occurred at more locations, but would still have flowed across the Valley to the south side.

As the flood continued to increase, the some levees overtopped or breached and flood waters flowed south across the Valley. The multiple overflow paths across the Valley following the levee breaches and overtopping diminished any effects of the levees on flood levels.

Comparison of Low-Level Berm to Existing Levees

The low-level berm alternative was developed through identification of high ground along the river and hydraulic modeling. Details of the analysis approach and analytical conclusions are presented below. The following list compares the low-level berm alternative to the existing levee network:

- The crest elevation of the low-level berms would be lower in most instances than the existing levees.
- The location of the low-level berms would be similar to the existing levees from about Swift Creek to the church. This alignment follows the natural high ground.
- From the Church downstream to the end of the existing levees, the berms would be set farther back from the river than are the levees. Existing levees would be removed or breached so that they would not function as levees.
- The low-level berm would be extended downstream to US 101, with a similar low-level ring berm around the properties along East Bourgault Road.

Alternatives

Alternatives developed for this CFHMP address both the existing levees and a new low-level berm. Alternatives addressing the existing levees focus primarily on how to maintain or modify the levees and on developing policies to guide these actions. Alternatives involving the low-level berm focus on the height and configuration of the berm. Hydraulic modeling of the existing levees was discussed above; therefore, most of the analytical work reported here concerns the low-level berm.

Dredge the River and Use the Dredged Material to Construct a Continuous Berm

This alternative is not feasible for several reasons, already discussed in connection with the existing levee system and the proposed low-level berms.. Material dredged from the river would not be suitable for direct use in construction of levees. Experience with the current levee system has shown that appropriate materials must be used and engineering standards followed if a levee is to provide dependable protection for an extended period of time.

Levees constructed along the riverbank are unlikely to meet FEMA standards while providing any significant level of protection. As shown in the analysis for the low-level set-back berm, the greatest level of protection that can be accomplished while still meeting FEMA standards is protection from a 2- to 5-year event. A levee constructed closer to the bank of the river will cause river stages to increase, thereby reducing the levee height that is allowable.

Providing Gaps in Existing Dikes

Providing gaps in the current dike system would result in more frequent inundation of floodplain land adjacent to the gaps due to the lower discharges necessary to cause flooding. More severe damage would occur to property adjacent to the gaps by more frequent inundation and higher velocity flows through these areas.

The higher velocity flows caused by gaps in the current dike system could bring about a catastrophic change in river alignment. As described previously, overbank flows tend to be conveyed to the south across the floodplain. There are currently several preferred pathways for overbank flow toward the south Valley, determined by topographic depressions in the floodplain. Construction of gaps in the current dike system may exacerbate this problem, with high-velocity flows potentially eroding a new channel across the floodplain.

Adjust Crest Elevation of Current Levees to Same Level of Protection

Adjusting the crest elevations of the existing levees to a uniform level of protection would provide some limited benefits to a limited area of the floodplain. As described above, because the levees are not continuous, they do not prevent inundation of the floodplain. This would remain the case if the crest elevations of the levees were increased.

Increasing the crest elevations of the existing levees would provide additional protection from high velocity flows for property adjacent to the levees. By increasing crest elevations, more water will stay in the channel along the reach protected by the levees, and the smaller amounts of water that do flow over the levee will have less energy to cause damage. However, by increasing the amount of water in the channel along the protected reach, damage will be exacerbated in areas downstream of the end of the levee. The additional force of the increased flows is more likely to cause a channel avulsion where the river is not constrained by the levee.

ADJOURNED
The special meeting adjourned at 9:50 p.m.

BOARD OF COUNTY COMMISSIONERS
MASON COUNTY, WASHINGTON

Mary Jo Cady, Chairperson

M. L. Faughender

M.L. Faughender, Commissioner

ATTEST:

Rebecca S. Rogers

Rebecca S. Rogers, Clerk of the Board

William O. Hunter

William O. Hunter, Commissioner

The goal of the Planning Advisory Committee is to reach consensus that resolves the complex outstanding flood control issues in the Skokomish River Basin.--where consensus cannot be reached in areas of agreement and disagreement will be identified. The merits of potential alternatives were debated at length during regularly scheduled planning advisory committee meetings, and decisions made by consensus. Consensus was reached on key goals and objectives and on actions appropriate to address several flood issues.

Two policy statements have been published by the Advisory Committee. The first, "Key Elements of the Skokomish Valley Comprehensive Flood Hazard Management Plan," was adopted by the Planning Committee on May 18, 1995. The second, "Final Policy Statement on Dikes," was not adopted by the Advisory Committee. Its contents are discussed in Chapter 6.

The Key Elements to be included in the CFHMP either as objectives, issues, or actions, are as follows:

- Promote programs and strategies to reduce the risk of flood damage to life, health, and property for all citizens of the Skokomish Valley (objective).

- Promote flood control strategies that will be effective in reducing the degree and severity of floods in the Skokomish Valley (objective).

- Promote programs and strategies that are, to the greatest extent possible, consistent with the Tribe's goal of restoring the Skokomish River watershed through its watershed plan (objective).

- Incorporate existing information from other plans to provide direction in completing a plan for the Skokomish Valley, including the Skokomish Tribes Watershed Restoration Plan (when completed), the watershed plan of the Hood Canal Ranger District (when completed), Ecology's 1988 Draft, Skokomish River Comprehensive Flood Hazard Management Plan, and other documents that may prove relevant (objective).

- Remain eligible for all the benefits and assistance available through the Federal Emergency Management Agency (FEMA) by adopting a floodplain map and Comprehensive Plan that meet FEMA's requirements for flood hazard management (objective).

- Remain eligible for flood control for flood control assistance grants (objective) by meeting the minimum requirements for approval by Ecology of a Comprehensive Flood Plan.

- Address the issue of logging practices and the accumulation of bedload in the Skokomish River, and recommend a process for investigating those practices in an effort to reduce rates of bedload deposition (issue).

- Address the impact that diversion of North Fork flows out of the basin has had on the bedload transport capacity of the mainstem Skokomish River (issue).

- Promote and seek funding for gravel removal strategies to improve the hydraulic

Aquatic Land Lease or Authorization—RCW 79.90

An Aquatic Lands Lease or Authorization is required for any project undertaken within navigable waters of the state. Rules governing the lease or use of state aquatic lands are found in WAC 332-30 and RCW 79.90. "Navigable" is defined in RCW 88.40 as "waters of the state and their adjoining shorelines that are subject to the ebb and flow of the tide and/or are presently used, have been in the past, or may be susceptible for use to transport intrastate, interstate, or foreign commerce." The Skokomish River is considered navigable from Hood Canal to the confluence of the North and South Forks.

Aquatic land use authorization treats such lands as a limited natural resource, providing for their environmental protection and sound management. Application for use or lease of state aquatic lands is made to DNR. Aquatic land activities that interfere with the general public use of an area require agreement, lease or permit. All other applicable permits must be acquired for aquatic land projects, but if authorization from DNR is required in order to first receive another permit, it may be given conditioned upon receipt of that permit.

In the Skokomish River basin, Aquatic Lands Authorization is necessary for dredging, mining, and gravel removal in the main channel. If gravel is removed for the purpose of re-sale, DNR will charge a fee and a lease will be required. If gravel removal and dredging are part of a project in the public interest and undertaken by a public entity, then no fee will be charged. Presumably, this includes coordinated flood control projects. Dredging and gravel spoils may be used as fill or in the construction of public projects.

PERMIT PROCESS

NO PERSON SHALL BE STOPPED FROM RESPONDING TO ANY EMERGENCY PER WAC 220-110-020(7) AND RCW 75.20.103.

The previous section identified the general regulatory requirements and the organizations responsible for their implementation. Many development activities will require permission or permits from multiple levels of government. Activities identified as associated with existing land uses and flood control measures recommended in this CFHMP include the following:

- Bank stabilization for prevention of continued erosion
- Bank restoration in a pre-flood event location
- Dredging
- Gravel removal or bar scalping for purposes of flood control
- Log and debris removal from main channel, creeks, and drainage corridors
- Diking, including use of levees and berms
- Construction of residential structures
- Construction of accessory structures
- Construction of piers and pilings
- New construction and maintenance of drainage channels
- Drainage improvements, such as culverts and swales
- Preservation and enhancement of natural flood flow corridors
- Tree removal; stream or channel blockage prevention
- Mining, including gravel harvesting
- Landfill, including use of dredging spoils in flood control or repair.

The permits and authorizations required for these activities are shown in Table 5-1.

- Simpson should complete a watershed analysis for lands it owns in the Skokomish Watershed, as planned. Historical and current volume estimates of mass erosion rates, sediment delivery to streams, and transport to the mainstem should be provided for use in a mainstem sediment balance. Recommendations resulting from the analysis should equal or exceed those presented in the Watershed Analysis in terms of watershed restoration, especially in the area of sediment control.

- Simpson should make copies of its *Road Maintenance, Rehabilitation, and Abandonment Plan* available to all members of the PAC and Skokomish Valley Residents. Periodic presentations to the PAC and valley residents on the status of implementation of the plan and the Watershed Analysis are recommended.

South Fork Watershed: Key Elements

The following key elements are addressed either through preparation of the material in this section or future implementation of the recommended actions:

Promote programs and strategies to reduce the risk of flood damage to life, health, and property for all citizens of the Skokomish Valley (objective)□

- Promote flood control strategies that will be effective in reducing the degree and severity of floods in the Skokomish Valley (objective).

- Promote programs and strategies that are, to the greatest extent possible, consistent with the Tribe's goal of restoring the Skokomish River watershed through its watershed plan (objective)

- Incorporate existing information from other plans to provide direction in completing a plan for the Skokomish Valley, including the Skokomish Tribes Watershed Restoration Plan (when completed), the watershed plan of the Hood Canal Ranger District (when completed), Ecology's 1988 Draft, Skokomish River Comprehensive Flood Hazard Management Plan, and other documents that may prove relevant (objective).

- Address the issue of logging practices and the accumulation of bedload in the Skokomish River, and recommend a process for investigating those practices in an effort to reduce rates of bedload deposition (issue).

~~**Lower Watershed**~~

~~Gravel removal and bank stabilization are two general categories of alternatives that can be implemented to reduce flooding impacts due to sedimentation of the mainstem Skokomish River. Each of these alternatives is discussed below.~~

Lower Watershed Recommendations

A principal goal of this CFHMP is to restore and maintain the water and sediment carrying capabilities of the Skokomish River system. This will require addressing the root problems of channel aggradation by 1) reducing or eliminating unnatural sediment contributions from South Fork forest lands using methods identified in South Fork Watershed Recommendations, above; and 2) reducing or eliminating the Cushman Project's contribution to the river's reduced sediment carrying capabilities with managed flushing flow releases for the mainstem (See Issue 2, Cushman Project).

Lower Watershed Gravel Removal Recommendations

In addition to direct mitigation measures that address the root causes of increased mainstem channel aggradation, several complementary actions are recommended to mitigate sediment-related flood damages, further quantify sedimentation processes, and investigate innovative approaches to sediment management.

Gravel removal proposals should be coordinated with overall plans for restoring and maintaining channel capacity. However, it is not the intent of the Plan to make gravel removal projects contingent upon prior implementation of managed flows designed to increase the mainstem's sediment transport capabilities.

Gravel Removal: Alternatives

Gravel removal alternatives for the mainstem generally fall into two categories, gravel bar scalping and dredging. Different alternatives may be developed within each of these categories depending on the amount of material removed. Gravel bar scalping differs from dredging in the location from which gravel is removed (see Figure 6-4).

[Figure 6-4]

Each of these approaches was analyzed. The gravel bar scalping analysis was completed for this CFHMP using the previously described HEC-2 model. Analysis of the dredging alternative was completed by the COE under a separate project for the Skokomish Tribe. While the analytical approaches differ, both used the HEC-2 model, and the results can be compared in terms of the relative reductions in flood hazards.

A third option for gravel management is removal of sediment from the river prior to its transport and deposition in the mainstem. Several mechanisms can achieve this, including sediment exclusion and ejection. While this option has been discussed by a variety of Skokomish River stakeholders, its cost and feasibility have not been analyzed. Additional details are provided below.

The analysis approach and analytical conclusions for the dredging and gravel bar scalping alternatives are presented separately. These two alternatives are addressed, together with the sediment exclusion and ejection alternative, in the recommended actions and relevant objective

- Monitoring sediment movement at key locations, including locations where historical data is available

- Surveying channel cross-sections annually and taking aerial photos every two to three years to determine how the channel geometry and plan form has changed in response to sediment movement.

Simons and Associates measured suspended sediment, bedload, and discharge for a range of flows at the following locations:

- US 101 bridge
- SR 106 bridge
- One station on the South Fork Skokomish
- Two stations on the North Fork Skokomish.

A monitoring program should be implemented for the same variables for at least the same locations. The program should be designed to collect data both for a uniform time interval and for a range of flow events. The monitoring program should be geared toward collection of sufficient data to produce a mass balance of sediment movement in the watershed.

WDFW requirements for gravel removal programs is to determine the volume of sediment that can be removed without causing an adverse impact on fish. Just as available information is not adequate to quantitatively document long-term changes in riverbed elevations in the Valley, so too are there no long-term records of specific areas of gravel deposition. Two approaches should be taken to remedy this problem and generate a database for sediment deposition in the Valley.

Permanent sections should be established along the river and surveyed at the same time each year. The river sections should be surveyed at the locations used in the 1980 and 1989 surveys. Comparison of surveyed river cross-sections from year to year will document where sediment deposition is occurring and assess whether gravel removal in previous years has had any adverse effect on riverbed stability.

Aerial photographs should be taken and used to generate topographic mapping of the valley every 2-3 years. Gravel bars should be mapped on the topographic maps and compared with topographic mapping from previous years to assess changes in gravel bar volume and location.

Gravel Bar Scalping Projects to Increase Channel Capacity

~~A program of gravel bar scalping should be initiated to increase channel capacity in river reaches where insufficient capacity has been documented.~~ Pre-engineering design analysis is recommended for a program of gravel bar scalping to increase channel capacity in river reaches where insufficient capacity has been documented. This analysis would identify priority locations, estimate expected benefits, costs, and environmental impacts, and identify relationship with overall plans for channel restoration. The ~~These~~ locations where there is insufficient capacity are shown on Figures 6-6a through 6-6c. The following ranked list of cross-sections where adjacent gravel bar scalping should be completed was developed based on the examination of channel capacities upstream and downstream from constricted reaches:

sections.

1. Sections 57, 58, 59, and 60
2. Sections 45, 46, 47, 48, and 49
3. Sections 63 and 64
4. Section 66.

Gravel bar scalping is not recommended for locations below Section 43, as actions associated with mainstem widening will increase channel capacity below that section (see below).

Sediment Exclusion and Ejection

The feasibility of sediment exclusion and ejection alternatives should be determined through a detailed feasibility analysis, which was beyond the scope of this plan. The feasibility analysis should include development of conceptual designs for the facility, collection of geotechnical information from potential sites, and completion of a pilot project in which sediment is removed and monitoring is conducted to document localized changes in hydraulics, sediment transport, fisheries, and fish habitat.

Two of the sites proposed by the Mason County Department of Public Works for excavation as settling basins should be selected for pilot projects. Since exclusion and ejection removes sediment before it reaches the flatter valley floor, the sites should be selected from those proposed on the South Fork. Fisheries considerations and access are two criteria that should be used to select the sites (see discussion below).

While the South Fork is the source of the sediments in the mainstem, constructing sediment exclusion and ejection facilities on the South Fork ultimately represents treating the symptoms instead of the problem. In the long run, it will be necessary to modify forest practices and rehabilitate damaged areas within the watershed to adequately protect the South Fork and reduce sediment deposition in the mainstem. As indicated in the recently completed Watershed Analysis for the South Fork Skokomish Watershed, initial steps have been taken to achieve this goal.

Consistency with Tribe

The proposed gravel removal project is consistent with current efforts spearheaded by the Tribe to formulate a watershed plan that includes the possibility of future gravel removal projects in conjunction with the restoration of North Fork flows. The proposed actions in this CFHMP include removal of gravel within the context of a comprehensive plan to reduce flood hazards and to restore natural watershed and ecosystem functions.

Gravel Removal: Key Elements

The following key elements are addressed either through preparation of the material in this section or future implementation of the recommended actions:

- Promote programs and strategies to reduce the risk of flood damage to life, health,

and property for all citizens of the Skokomish Valley (objective).

- Promote flood control strategies that will be effective in reducing the degree and severity of floods in the Skokomish Valley (objective).

- Promote programs and strategies that are, to the greatest extent possible, consistent with the Tribe's goal of restoring the Skokomish River watershed through its watershed plan (objective).

widened portion of the channel was reduced. These changes were made to HEC-2 Cross Sections 36 through 40.

These changes are shown in the cross-sections contained in Appendix X and in Figure 6-8.

Implementation of recommended actions relating to mainstem widening and side channel restoration will require the collaboration with the Skokomish Tribe, and integration with overall planning for channel restoration and improvement of natural sediment transport through managed restoration of flows. In addition, as is the case with any of the actions that may use, divert, obstruct, or change the natural flow or bed of the river, the Washington State Department of Fish and Wildlife (WDFW) would be consulted prior to design and construction.

Analytical Conclusions

Predicted water surface elevations after gravel removal, side-channel clearing, and mainstem widening are presented in Table 6-13. A comparison of the conveyance capacity of the mainstem channel before and after gravel removal, mainstem widening, and side-channel clearing is presented in Table 6-14. Anticipated decreases in water surface elevations during a 5-year event and the expected increase in channel capacity are shown in Figure 6-8.

[Table 6-13]

degradation needs to be evaluated in relation to aquatic life and habitat effects. If a relationship exists, additional mitigation (such as transporting gravel to the estuary) may be necessary.

Side Channel Clearing / Mainstem Widening

The northernmost bridge in the valley along US 101 crosses an old, abandoned side-channel sometimes referred to as the Skokomish River Slough. The side-channel originates just upstream of US 101 and re-enters the main channel about 4,200 feet downstream of the bridge. The meandering side-channel is approximately 1.5 miles long. A gravel bar on the main channel currently cuts this side channel off at its entrance and, except during extremely large flood events, the side-channel does not carry any river flow. There are blockages to flow in a few locations, but much of the side channel remains open and collects local drainage from the hillside to the north. Reopening this channel to flow was proposed in the 1993 CFHMP to decrease flooding on the mainstem and provide additional fish habitat.

Several areas upstream of the bridge are overgrown with brush, and flow is restricted during flood events. Removal of overbank vegetation in the area was recommended in the 1993 draft CFHMP to increase the hydraulic performance of the overflow once it is re-established. However, clearing of growth along this section of the river may adversely affect riparian habitat and the fisheries resource. The loss of shade for fish habitat at this location can be partially offset by the new habitat created in the re-established side-channel.

Following the identification of the alternatives described above, a more detailed scenario was developed for analysis. The alternatives were analyzed with the gravel bar scalping alternative to determine how the combination would affect water levels.

Analysis Approach

The HEC-2 model used in the gravel removal analysis was altered to simulate the hydraulic effect of side-channel clearing and mainstem widening. It was assumed that floodwaters were conveyed only through the mainstem bridge and overflow channel north of the bridge. The following is a description of the specific actions included in the alternative and the changes that were made to the model in order to simulate the actions:

- Selective clearing of trees and brush in the North Overflow from the US 101 bridge to a distance approximately 1,500 feet upstream; Manning's roughness coefficient was reduced to promote more flow in this area. These changes were made to HEC-2 Cross-Sections 27 through 33

- Widening of the mainstem channel of the river; the width of the mainstem of the river was doubled and Manning's roughness coefficient in the widened portion of the channel was reduced. These changes were made to HEC-2 Cross-Sections 27 through 33

- Removal of a forested gravel bar on the north side of the channel; half the gravel bar, above the low water elevation, was removed. Manning's roughness coefficient in the

One of the most common methods of bank stabilization is the placement of rock riprap on riverbank slopes. However, of all available methods, riprap is probably the least beneficial to riparian and fish habitat. Therefore, more environmentally beneficial bank protection measures, commonly categorized as bioengineering, are generally recommended as the first consideration for bank stabilization efforts. Riprap should be used only where high-velocity flood flows occur and where significant bank erosion creates a serious flood hazard.

Emplacement of rock riprap is recommended in locations where no other solution is feasible and the potential for flood damage is great. Completion of a pre-engineering design for bank protection using rock riprap or bioengineering techniques--including rough drawings, estimate cost, description of expected benefits, identification of environmental effects, and fit with overall flood plan policies and plans--is recommended in ~~T~~the following locations ~~The following locations are currently exposed to extreme flood hazards due to bank erosion~~ (shown in Figure 6-9):

- Five Mile Corner: The alignment of the river in this area directs the force of the river at the southern bank. Four homes located within 200 feet of the southern bank are threatened by movement of the river during a channel avulsion.

- The Dips: The Skokomish Valley road is located parallel to the river at a distance of 50 feet and less in this area. Water flows over the road in this location during flood events, and is conveyed through the floodplain toward Swift Creek, Eels Road, and the Shelton Trout Hatchery.

- Skokomish Community Church: The dike in the County road right of way at the sharp bend in the river near the church ~~threat of a river avulsion is extreme at this location. A dike currently deflects water away from the bank; however, the dike~~ was not built according to current engineering standards and is in danger of failing. An avulsion at this location ~~would~~ could damage or ~~potentially~~ destroy the church, several homes and private property, and the Skokomish Valley Road. Stabilization of the river bank at this location will be planned in conjunction with evaluation of the existing dike in the County road right of way consistent with adopted diking policy.

Properly constructed bank protection projects at these locations can reduce the potential for the river to change course. Therefore, bank stabilization can be used instead of or in addition to construction of dikes in areas where there is a potential for avulsion. Installation of bank protection is not a guarantee that an avulsion will not take place, at the project location or elsewhere. In addition, bank hardening will not prevent overbank flows and creation of new channels some distance from the main channel. Rivers such as the Skokomish are dynamic systems in which changes in alignment are to be expected.

Alternatives

Modification to the operation of the Cushman ~~Hydroelectric~~ Project are being considered as part of procedures being conducted by FERC to evaluate Tacoma Public Utilities' application for a major license. ~~was analyzed in detail by a number of parties during the FERC proceedings for re-licensing the facility.~~ These modifications involve changing the amount of water released from Lake Cushman to the North Fork.

As discussed in Chapter 1, the DEIS for the Cushman Hydroelectric Project presents a proposal from Tacoma Public Utilities and four alternatives. Since it is unlikely that two of the alternatives, the no-action and the decommissioning alternatives, will be selected for implementation, three remain. They are the proposal from Tacoma Public Utilities, the Joint Resource Parties alternative (#2), and the Staff Recommendation (#3).

The following is a description of the elements of the three alternatives relating to flood hazard management and the impact expected from implementation of each. The material presented here is based entirely on the DEIS, as it was the most up-to-date and concise source of information available.

Tacoma's Proposal:

- Reservoir Operations: Current operation of project reservoirs would remain unchanged. Between Memorial Day and Labor Day, Lake Cushman would be maintained near the full pool elevation of 738 feet. During the fall, Lake Cushman would be drawn down to its lowest level, typically 712 feet, by the end of November. During severe floods, Lake Cushman can be operated up to elevation 742 feet

- Out-of-Basin Diversion: All flows except those required as minimum instream flow under agreement with Ecology in Section 401 Water Quality certificate

- Minimum Instream Flows: Increased from current 30 cfs to 100 cfs year-round

- Average flow below Dam 2: 100 cfs

- Release flows for silt removal: 48 hours at 300 cfs every third year

- Improvements to mainstem's in-channel conveyance capacity: None

- Nalley Ranch Dikes: No change

- Additional Study: None.

Impact

- Mainstem Channel Morphometry: No noticeable changes in channel morphometry

or sediment transport expected since dominant discharge in mainstem generally unchanged. Aggradation and loss of conveyance capacity would continue. Mainstem channel improvement, which would result from USFS watershed restoration efforts in the South Fork Watershed, would be slow to occur and slight

- Water Quantity: Average discharge to the lower North Fork would be 100 cfs and average mainstem flows would be 1,218 cfs. A high degree of flood protection during the high-flow fall and winter period would be provided since Lake Cushman would continue to operate

County and PAC Communications on the Cushman Project

Recommendations for the future operation of the Cushman Project and mitigation of flood-related impacts presented below are based on communications prepared by the PAC and the County Commissioners.

A draft letter addressed to FERC was prepared by the Skokomish Tribe and presented to the PAC for comment during the May 18, 1995, PAC meeting. The draft letter was prepared for the County Commissioners to consider signing and sending to FERC as their own comments. A copy of the draft is included with this report as Appendix Y ~~W~~. The draft letter states that a goal of the CFHMP is to:

> restore and maintain the water and sediment carrying capacity of the Skokomish River system. This is necessary to reduce flood hazard to life and property and to restore natural watershed/ecosystem functions in the Skokomish River and Hood Canal. Consistent with this goal, objectives of the Plan include: 1) Change Cushman Project operations to enhance flood control, including elimination of the Project's contribution to main stem channel aggradation; and 2) reduce unnatural contribution of sediment to the river system from forest management activities.
>
> The Skokomish Tribe and Federal and State resource agencies have recommended to FERC that North Fork streamflow be restored in a way that substantially restores watershed/ecosystem functions, and reduces channel aggradation, concomitant flooding problems and risk of accelerated channel migration. The County supports this strategy for substantial restoration of North Fork flow as essential to reduce or eliminate Cushman Project contributions to future channel aggradation. The County recommends that substantial restoration of North Fork flow retain/enhance flood storage provided by the Cushman Project and tha thigh summer recreational pool levels be maintained in Cushman Reservoir as recommended by the Skokomish Tribe. Operational testing/monitoring necessary to implement the restored North Fork flows should identify additional measures that may be needed to restore water and sediment carrying capacity of the channel, including dredging (Martino, 1995).

The PAC had several comments following presentation of the letter. A copy of relevant sections of the minutes from the meeting is included in Appendix W. It was agreed at the meeting that the letter would be changed to make it clear that flow releases should be provided in a way that would maintain or enhance the present level of flood control provided by the Cushman Project ~~according to the comments~~ and that Mason County staff would present the finalized letter to the County Commissioners. Changes made to the proposed letter are shown in square brackets. ~~A copy of the revised letter was not available at the time of preparation of this plan.~~

On June 2, 1995, the Skokomish Tribe sent a letter to FERC concerning to the Skokomish River CFHMP preliminary goals and objectives. The letter indicates that "the Planning Advisory Committee unanimously approved for incorporation in the Flood Plan specific goals and objectives related to upstream activities, including operation of the Cushman Hydroelectric Project." Two paragraphs from the Tribe's letter of March 18 (see above) are then presented. The letter also describes and includes as an attachment the "Key Elements" adopted by the Planning Advisory

Committee (see Chapter 1).

On June 13, 1995, the Mason County Board of Commissioners sent a letter to FERC describing the status of the CFHMP. A copy of the complete letter is included with this report as Appendix Y. The letter states that the CFHMP

recognizes the link between upstream watershed activities, including the Cushman Hydroelectric Project, past forest land management, and flooding problems in the Valley.

> An important goal in the Plan is to restore and maintain the water and sediment carrying capabilities of the River system. This is necessary to reduce flood hazard to life and property and to restore natural watershed/ecosystem functions in the Skokomish River and Hood Canal. The plan will include recommended strategies for addressing upstream watershed activities.
>
> The Board has included a list of elements that have been adopted by the Skokomish Valley Comprehensive Flood Hazard Management Plan Planning Committee. These elements will be included as either objectives or actions. We request that these be given full consideration in the Federal Energy Regulatory Commission's environmental review and licensing process (Mason County Board of Commissioners 1995).

At the June 15, 1995, meeting, Mason County staff indicated to the PAC that the Board of Mason County Commissioners had sent a letter to FERC, notifying FERC of the County's work on the CFHMP. It was reported that the list of Key Elements was attached, and that the letter sent by the Commissioners was a revision of the letter that the PAC had agreed to and asked the Commissioners to sign.

Recommendations

This CFHMP supports recommendations to the Federal Energy Regulatory Commission by the Skokomish Tribe and state and federal resource agencies that managed flow releases from the Cushman Project be required that will substantially restore river and estuary fish habitat conditions and the mainstem's natural sediment carrying capabilities. Managed flow releases would be designed to effectively treat unnaturally high rates of channel aggradation in the mainstem Skokomish River and restore to the maximum extent practicable the natural sediment carrying capabilities of the mainstem. Managed flow releases from the Cushman Project—not to exceed bankfull levels on the mainstem—should be determined by a program of testing and monitoring, which would also identify the extent to which mechanical removal of accumulated bedload, including gravel bar removal and instream dredging, may be necessary to restore mainstem channel capacity. Any instream dredging project should be supported by good science, shown to be beneficial for fish life and habitat, and be supported by a consensus of local, tribal, state and federal regulatory and concerned agencies and community.

Based on existing information, Mason County and the Skokomish Tribe believe that mechanical removal of accumulated bedload will be required—in combination with managed flushing flows—to fully and expeditiously restore the mainstem's capabilities to carry water and sediment.

~~As stated above, there is disagreement regarding the effect that partial or full restoration of flows~~

~~to the North Fork River will have on flushing of sediments in the mainstem river. As a result, this CFHMP supports pilot testing of enhanced sediment transport due to controlled releases from the Cushman Project. Prior to testing, analysis should be completed to determine the appropriate magnitude and duration of releases necessary to test the flushing hypothesis.~~ There is uncertainty about the effect that managed flushing flow releases to the North Fork will have on flushing accumulated bedload from the mainstem river. Therefore, this CFHMP supports pilot testing of enhanced sediment transport through controlled releases from the Cushman Project to determine optimum flushing flows and the extent that mechanical removal of accumulated bedload will be necessary to restore channel capacity and the related objective of lowering groundwater levels. Mason County and the Skokomish Tribe believe that mechanical removal of accumulated bedload will be required--in combination with managed flushing flows-- to fully restore mainstem channel capacity. Careful monitoring should be an integral part of the testing ~~pilot project during and after~~ the controlled releases to evaluate effects on sediment transport, bed elevation, channel capacity and groundwater levels.. Results should be made available to the PAC and all valley residents. ~~Until such time as this data becomes available, it is not possible to determine whether enhanced flows can increase channel capacity and reduce flooding.~~

The Cushman Project has historically provided substantial flood hazard management benefits (see Chapter 4). This CFHMP strongly recommends that, regardless of the changes made to the operation of the facility to enhance sediment transport or fisheries habitat, the project continue to provide flood protection from extreme events. This protection should be achieved by limiting releases to the North Fork so that flows in the lower mainstem do not exceed 5,000 cfs, the approximate channel capacity in the vicinity of US 101.

Since the operation of the Cushman Project has adversely affected flooding in the Skokomish Valley, this CFHMP supports allocation of a portion of mitigation funding for completion of County-sponsored flood hazard management projects. The County should work with FERC and TPU to develop an appropriate program of projects and level of funding. Priority should be given to projects recommended in this CFHMP.

The recommendations presented above, or in the DEIS, will not, by themselves, eliminate flood hazards in the Skokomish Valley. Neither will coupling any of these actions with any level of

Recommended Action

While the benefits of the alternatives are limited, they do produce a localized reduction in flood depths. Reductions in upstream flood depths resulting from these alternatives are expected to be permanent. This localized reduction in flood depths, when combined with benefits from other alternatives, will provide a reduction in flood damage. Therefore, modification to the US 101 embankment and bridges are recommended according to the scenario presented in Alternative 3D. A pre-engineering design should be completed--in coordination with mainstem channel restoration proposals--to evaluate alternative methods and their costs and flood benefits for the following US101 modifications:

- Increase capacity in the north overflow by selective removal of woody debris and brush near the bridge opening and in the slough
- Raise the roadway near Purdy Creek to an elevation of 35 feet and increase the opening under the Purdy Creek bridge by a factor of three
- Increase the main channel bridge opening by a factor of 1.5.

This alternative should be implemented by WSDOT, which maintains jurisdiction over US 101. Mason County should provide project coordination, involve any other relevant parties, and coordinate funding.

The recommendation is predicated on the following:

- The roadway adjacent to the Purdy Creek Bridge should not be raised without enlarging the bridge opening.
- Any enlarged bridge opening at Purdy Creek should have at least the same hydraulic capacity as the combined flows at the existing Purdy Creek bridge and the adjacent US 101 overflow (a total of approximately 12,900 cfs).
- Any enlarged bridge opening at Purdy Creek should not be made so large that it will result in a dramatic re-distribution of flows through the openings at US 101.
- The area within approximately 1,000 to 2,000 feet of the Purdy Creek Bridge should be kept as open as possible to allow conveyance of floodwaters during extreme events.
- Modification of the openings in the US 101 embankment should be implemented only after careful consideration and mitigation of potential impact downstream property.

Key Elements

The following key elements are addressed either through preparation of the material in this section or future implementation of the recommended actions.

- **Promote programs and strategies to reduce the risk of flood damage to life, health, and property for all citizens of the Skokomish Valley (objective).**

- **Promote flood control strategies that will be effective in reducing the degree and severity of floods in the Skokomish Valley (objective).**

ISSUE 4: SR 106 CAUSES LOCALIZED INCREASES IN FLOOD LEVELS

SR 106 crosses the Skokomish River and floodplain approximately 1.5 miles upstream of the mouth of the river. The highway is located on Tribal land between US 101 and the west bank of the river. Tribal land along the highway is elevated relative to the floodplain within 1,000 feet of the channel. The alignment of the road, across the floodplain perpendicular to the direction of flow of the river, suggests that it may exacerbate the effects of flooding.

Development and analysis of alternatives to mitigate potential flood effects of SR 106 was beyond the current scope of this CFHMP. However, the following is a brief summary of alternatives that might be considered in the future and the procedure that should be followed to analyze the alternatives.

Alternatives

Alternatives that should be considered to mitigate increases in flood levels all include increasing the effective area through which floodwaters can be conveyed. A pre-engineering design should be completed—in coordination with mainstem channel restoration proposals— to evaluate the costs, flood benefits and environmental effects of the following two alternatives ~~that can achieve that objective~~:

- Remove the entire embankment east of the intersection of Skokomish River Road and SR 106, in the area of deepest flooding. Replace the embankment with an elevated causeway

- Enlarge the bridge opening.

Alternative Analysis

No analysis was completed.

Analytical Conclusions

No analysis was completed.
Recommended Action

Further analysis should be completed to determine to what extent SR 106 exacerbates flooding. The analysis should be completed using the calibrated HEC-2 model and a range of flood frequencies. Changes in flood levels resulting from each alternative should be analyzed to determine which of the above alternatives can reduce flooding.

received from Mason County residents and the Mason County Department of Community Services during and after the June 15, 1995, public meeting.

A total of 44 structures are recommended for acquisition, located in the following 8 areas:

- Two near Five Mile Corner
- Eight in the vicinity of the Skokomish Valley Road crossing over Swift Creek and along Eells Hill Road
- Three near the Church
- Two near the Kealy dike
- Five in the vicinity of Weaver Creek and Deyette Road
- Three on the south bank of the Skokomish River near Weaver Creek
- Three along West Bourgalt Road
- One along US 101
- Sixteen along East Bourgalt Road
- One downstream of SR 106.

The general locations of all of the recommended acquisitions are presented on Plates 1 and 2. Specific locations of all structures recommended for acquisition are presented on the oversized Flood Hazard and Recommended Acquisition Map also included in the back pocket of this report.

Following completion of the above analysis, the Skokomish Tribe requested that it be included in the hazard database and recommended acquisition program. Correspondence was received from the Skokomish Tribe on March 20, 1996, providing information to be included in the database (see Appendix AA). A total of 38 structures were recommended for acquisition. These structures were added to the map of flood hazards and recommended acquisitions and the related database.

Map of No-New-Footprint Zones

Following delineation of areas of highest hazards on the hazard and acquisition map, several areas were identified as having relatively higher hazards than other areas in the Valley. More stringent land use regulations are justified for these areas due to these relatively higher hazards. It should be emphasized again that differences in flood hazards in the Skokomish Valley are relative. That is, flood hazards exist throughout the Lower Skokomish Valley floodplain, and all residents and property in the Valley face some danger. The areas identified as higher hazard areas were those where, based on engineering judgment and flood hazard management principles, imminent threats to life and property due to flood hazards exist. New construction should therefore be prohibited in these areas, shown on Figures 6-13a through 6-13d, and described in the following:

- ~~No-New-Footprint Zone 1: The alignment of the river through the reach known as the Dips is such that the river changes direction from approximately north-south to approximately east-west. This causes floodwaters to leave the~~

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river and flow south to the south valley wall. From there, overbank flows are conveyed to the east along a corridor formed by Swift and Hunter Creeks. This area was designated for the following reasons: 1) Anecdotal information and initial results from two-dimensional hydraulic modeling indicate that the area is subject to relatively high overbank flow velocities, and 2) Flood depths predicted to occur during the 100-year flood event in this area range from 2 to 6 feet, with the greater depths of inundation predicted for the area between the Skokomish Valley Road and the Shelton Trout Hatchery.

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- No-New-Footprint Zone 2: This area was delineated based on the corridor formed by 200foot buffers on either side of the current riverbanks and the historical flow corridor based on 1936 air photos. The boundaries of the area were determined by using that line farther from the river.
- No-New-Footprint Zone 3: This large area is expected to be inundated to depths greater than 8 feet during the 100-year flood event. As discussed in Issue 3, it is important that this area remain as open as possible to allow floodwaters to be conveyed through the US 101 bridge openings for Weaver and Purdy Creeks.
- No-New-Footprint Zone 4: This area was established based on input received from the Skokomish Tribe (18 March 1995, personal communication). Depths of floodwater expected over most of this area during the 100-year flood are greater than 4 feet. Much of the area is wetland, which serves an important function in storing floodwaters. Preferential flow paths exist in the vicinity of the US 101 and SR 106 embankment openings where there are hazards due to higher velocities.

Recommendations

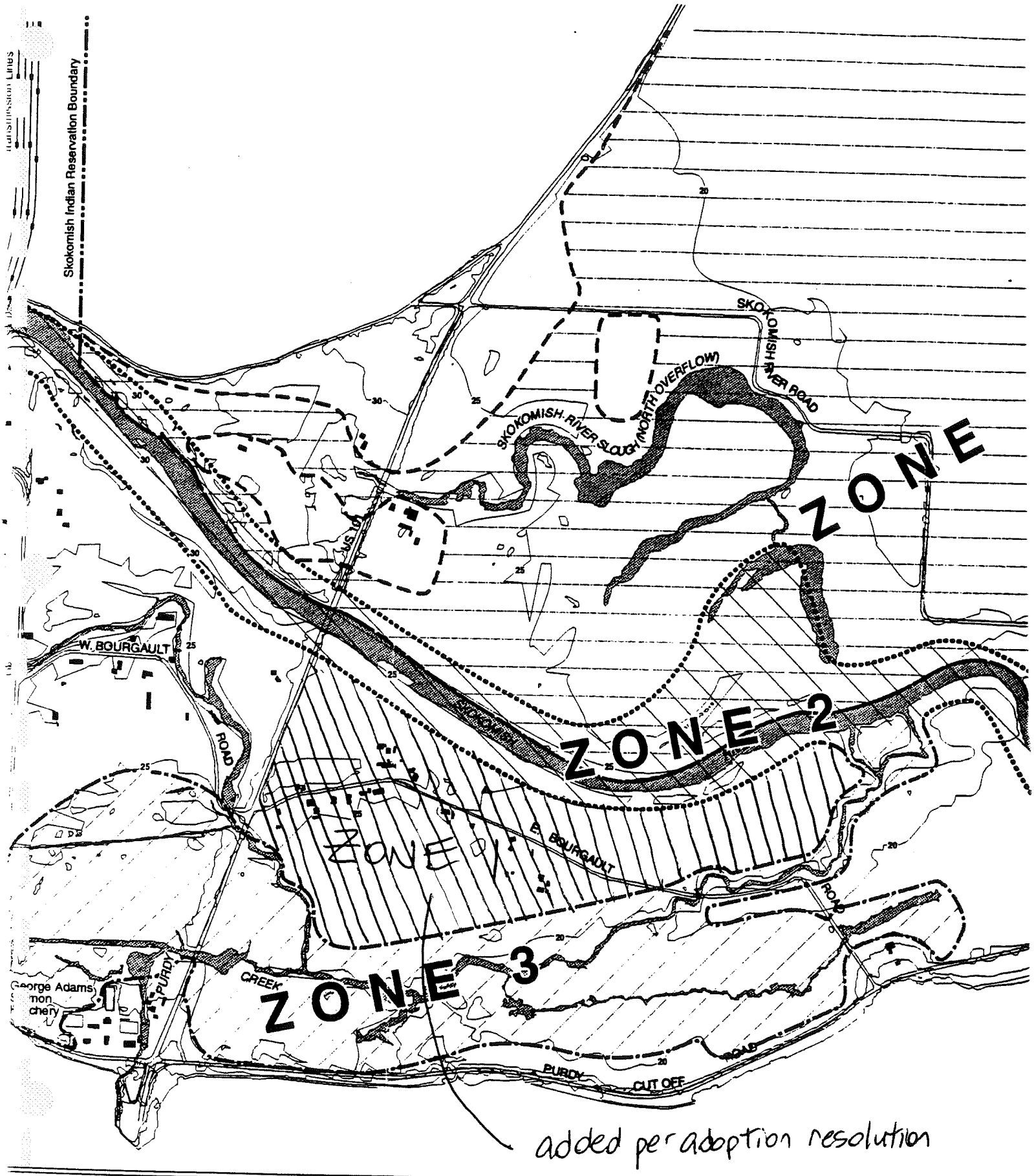
The County, in coordination with Ecology, should pursue all potential sources of funding for acquisition of the 82 structures recommended for acquisition. As described in Chapter 5, funding sources include the National Flood Mitigation Fund, the State Hazard Mitigation Program, and the State Flood Control Assistance Account Program. Acquisition should occur only if the property owner is willing to relocate outside of the floodplain.

Mason County submitted an application in March 1996 to fund acquisitions in the East Bourgalt Area under the "Fast Track" Hazard Mitigation Grant Program. This "fast track" was set up in response to winter storms of 1995. The application was under review by the State at the time of preparation of this plan.

The County should incorporate the No-New-Footprint Zone map into a flood damage prevention ordinance. Details relating to development of the ordinance are presented under Issue 7.

Key Elements

The following key elements are addressed either through preparation of the material in this section or future implementation of the recommended actions:



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Mason County
SH RIVER COMPREHENSIVE FLOOD
AZARD MANAGEMENT PLAN

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- Repairs, construction, or improvements to a structure that do not increase the ground floor area TAKE OUT
- Repairs, reconstruction, or improvements to a structure that do not cost more than 50 percent of the market value of the structure either before the repair or reconstruction is started, or, if the structure has been damaged and is being restored, before the damage occurred.

Work done on structures to comply with existing health, sanitary, or safety codes or to structures identified through local, state, or federal historic preservation programs are not restricted by the 50 percent threshold for allowable repairs.

Development is allowed in flood fringe areas if the following standards are followed:

- New construction and substantial improvements are to be anchored to prevent flotation, collapse, or lateral movement. Special anchoring methods are required for manufactured homes
- Construction materials, methods, and practices that minimize flood damages should be used. Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities should be designed, and located or elevated, to prevent water entry and accumulation
- Water supply, sanitary sewage and onsite waste disposal systems are to be designed and located so that damages to and discharges from these systems do not occur during flooding
- New construction or substantial improvement of any residential structure is required to have the lowest floor, including the basement, elevated to or above the water level resulting from the 100-year flood (the base flood elevation)
- Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize flood forces on exterior walls by allowing for the entry and exit of floodwaters through openings in the structure
- Two options are possible for new construction or substantial improvement of any commercial, industrial, or other non-residential structure. The first is to elevate the lowest floor, including the basement, to or above the water level resulting from the 100-year flood. The second option is to floodproof the structure so that all areas below an elevation one foot above the base flood elevation are watertight
- New or substantially improved manufactured homes must be elevated on a permanent foundation such that the lowest floor is elevated to or above the base flood elevation.

A Flood Boundary and Floodway Map was issued by FEMA in May 1988 for portions of the Skokomish River (see Figures 6-14a through 6-14c). As noted on the floodway map, much of the Skokomish River valley was designated by FEMA to be a floodway. As described above, development restrictions for floodways mean that activities such as new construction or substantial improvements would not be allowed in much of the Valley.

- The maximum allowable percentage development is 3 percent. For example, for a minimum lot size of 5 acres, the maximum building footprint allowed is 6,534 square feet
- The maximum allowable width of a structure parallel and perpendicular to flow is 80 feet
- ~~The minimum allowable space between structures parallel and perpendicular to flow is 387 feet~~
- The maximum blockage allowed is 17 percent.

TAKE OUT AND ADD

Comparison of Alternative Approaches

There are similarities and differences in the regulations that would result from the three different approaches to floodway regulation presented above. The summary presented in Table 6-18 illustrates how well each of the alternatives meets a range of floodplain management objectives. The following is a brief summary of the locations where development would be allowed and the total acreage included for each alternative:

- Conventional floodway: Development would be allowed in flood fringe areas on either side of the river, with a total area of approximately 355 acres
- Split floodway: Development would be allowed in an island between two floodways. The island would be located on the high ground along the valley, with a total area of 244 acres
- Density floodway: Development would be allowed throughout the floodplain, with the possible exception of the areas of highest flood hazards. Given a total floodplain area of approximately 1,600 acres and the 3 percent allowable development, a total area of 48 acres could be filled or covered by buildings.

The following assumptions made in calculating the developable acreages should be kept in mind when comparing the alternatives:

- Preservation of open space and isolated high hazard areas within flood-fringe areas outside the conventional and split floodways is not included
- It is unlikely that all the area within the flood fringe and the developable island would be completely filled under the conventional and split floodway approaches. If it is assumed that approximately 15 percent of each 5-acre lot was either filled or covered by a structure, the total area that would actually become filled or covered would be approximately 52 acres for the conventional approach and 36 for the split floodway
- Parcels where development has already taken place are included in the above estimates. Since most of the development has taken place along the Skokomish Valley Road and the conventional and split floodway approaches treat this area quite differently, there would be a differential reduction in the amount of new development allowed under the three alternatives.

THE SUM TOTAL OF ALL THE STRUCTURES FOOTPRINT SHALL NOT EXCEED 6534 SQUARE FEET IN A FIVE ACRE AREA OR TO FEMA STANDARDS IN THIS ADAPTION AND IS OPEN FOR FURTHER REVIEW.

Washington for the County of Thurston). The levee was constructed of soils bulldozed from the surrounding property.

A geotechnical investigation of the existing levees, including the "Church Dike," was completed in August, 1989. The investigation included an evaluation of the material types and engineering properties and the foundation of the levee:

> The foundation soils in the area of the levee are fluvial sediments of recent origin. The surficial three to five feet are generally fine sands and silts with occasional lenses of gravel and would be easily eroded by hydraulic action. The groundwater table is expected to be very close to the level of the Skokomish River.
>
> The materials used to construct the levee appear to have been borrowed from areas immediately adjacent to the levee. The gradational analyses that were completed indicate that the levee fill is very similar to the soils in the top two to three feet of the foundation. The densities noted during the logging of the test pits were similar for both the fill and the in-situ soils [indicating no compaction]
>
> The existing levee varies in height from three to ten feet, in crest width from zero to twelve feet, and in side slopes from 1:1 to 3:1.
>
> The one section of the levee that differs significantly from this assessment is a section of levee just upstream of the Keeley property. In this area, the levee is constructed from sand and gravel and appears to have been end-dumped in place (Klohn Leonoff, 1989).

These results suggest that the current levee was not built according to generally accepted engineering practices and is therefore not suitable for long-term flood protection. This must be considered in developing any alternative involving the current structures.

In many locations the levees are set back from the river with a forested or vegetative buffer between the river and the levee. One exception is the levee along the south bank of the Skokomish River at a sharp bend in the river near the Skokomish Community Church—part of what is called the Church Dike. The levee at this location was constructed directly on the river bank in the right of way for the County Road. This approximately 700 feet long section of levee was intended ~~currently acts~~ to discourage ~~prevent~~ the river from changing course and flowing to the south side of the Valley.

~~If the Church Dike was removed, or failed during a flood event, floodwaters would flow toward the south side of the Valley from this location, possibly forming a new main channel. This~~ A sudden migration of the main channel during a flood could cause loss of life, extensive damage to existing property and roads, require reconstruction of bridges on US 101 to accommodate the new channel location, and damage or destroy all three fish hatcheries located on the south side of the Valley. The consequences of a shift of the main channel of the Skokomish River to the south side of the Valley would clearly be catastrophic. Alternative ways to discourage a channel change at the sharp bend near the Church should be assessed as part of the recommended reconnaissance analysis of existing dikes, proposed bank stabilization projects, and planning for relocation of high-hazard structures and restoration of channel capacity.

Hydraulic Performance of Existing Levee System

The existing levee system changes the hydraulics of flooding in the Valley in the following ways:

- Prevents direct inundation of floodplain areas by overbank flows, but allows inundation indirectly as a result of floodwaters conveyed through the Swift Creek/Hunter Creek corridor and backwater from downstream flooded areas
- Controls the sequencing of flooding
- In areas protected by levees, limits erosion from high-velocity floodwaters moving over the riverbank and onto the floodplain
- Increases overbank flow velocities and depths in floodplain areas just downstream of the end of the levee.

The hydraulic performance of the current levee system is limited since it is not continuous and therefore does not isolate the floodplain from the river. During flood events, floodwaters flow onto the floodplain through the Swift and Hunter Creek corridor along the south valley wall. Floodwaters also flow across the floodplain east of the end of the levee, tending toward the lower southern Valley. In addition, backwater from downstream causes flooding of the floodplain adjacent to the levees.

While the current levee system does not eliminate inundation, it does provide protection against high-velocity flows that can cause erosion and channel realignment. This function was described above for the Church Dike. Other areas on the floodplain side of the levee system also receive protection from potentially damaging high-velocity flows. However, while the levee protects some areas from high-velocity flows, the negative impact on areas directly downstream of the end of the dike is exacerbated. Where the river is no longer constrained by the levees, the increased volumes of water in the channel flow over the natural riverbank, releasing increased levels of energy and causing greater damage to floodplain property.

The Federal Emergency Management Agency has identified inherent limitations associated with the existing dikes in the Skokomish Valley:

"... Whether they are called flood-control berms, dikes or levees they all basically have the same effect and problems. While they may offer a certain level of protection for one individual, at the same time the water is being detoured to someone else who does not have the benefits of a berm. Berms also offer a false sense of security, often being overtopped or breaking, flooding those they were supposed to protect. This has been seen in recent flooding events."(Letter from Federal Emergency Management Agency to Mason County Board of Commissioners, March 17, 1996, see Appendix C).

The Sequencing Effect

The effect of the levee system on flood sequencing was evident during the December 20, 1994, flood. The existing levees did not increase peak flood levels during the flood, as many levees were

Develop a Policy on Modifications to the Current Levee System and Construction of Set-Back Berms

The PAC devoted a great deal of effort to developing a proposal that would provide balance between those in favor of using dikes to protect agricultural land and homes and those who believe the protection afforded by dikes is outweighed by their impact on the environment and adjacent property. ~~The Committee was not able to reach consensus on every detail of a policy statement on dikes but, there was unanimity that dikes should be built to acceptable standards of safety and that no dike should be approved if it affords protection to one area or group of property owners at the expense of another. To this end, the following policy on dikes was adopted by the Planning Advisory Committee on October 24, 1995:~~ On October 24, 1995 the Planning Advisory Committee adopted a policy on dikes. Agreement was reached that: "Diking is not a preferred alternative for addressing flooding in the Valley, but there are instances where dikes can provide legitimate flood protection." The Planning Advisory Committee recommended as a priority completion of a reconnaissance analysis of existing dikes "to develop recommendations for removal, abandonment, or approval for maintenance and upgrading" to meet its approved minimum standards for dike construction, alteration and maintenance. Under the PAC's recommended diking policy, "Applications for construction, alteration and maintenance of dikes shall be considered on a case-by-case basis." The full policy is as follows and its adoption is recommended in this report.

1. Diking is not a preferred alternative for addressing flooding in the Valley, but there are instances where dikes can provide legitimate flood protection.

2. Though dikes were originally constructed in the Valley with the intention of providing protection and safety, existing dikes generally do not meet standards adopted in this plan.

3. Construction, alteration and maintenance of dikes shall meet the following design and construction standards. The intent of these standards is to ensure that dikes meet basic structural standards, do not cause increased flood hazard, meet FEMA requirements[1] and are distanced from the natural stream channel and stream bank.

    a. Dikes shall be constructed to meet Soil Conservation Service Class II standards for compaction.

    b. Dikes shall be designed and constructed to overtop at the 5-year return period flood or lesser event and shall comply with FEMA standards[2].

    c. Dikes in designated overflow zones shall be required to overflow at lesser flood events than the maximum established in b above.

    d. Dikes shall be set back from the channel at least 200 feet. Variance criteria will be established at the time these policies are enacted through an ordinance.