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SKAGIT SOIL CONSERVATION DISTRICT  
Mount Vernon, Washington

February 7, 1961

Sent by Anton F. Hansen  
20 Feb 61

Col. R. P. Young  
U. S. Army, Corps of Engineers  
1519 South Alaskan Way  
Seattle 4, Washington

Dear Col. Young:

Re: Public Hearing on Flood Control - Skagit River Basin, Wash.

The Supervisors of the Skagit Soil Conservation District are extremely interested in any plans which the Corps might develop to control floods on the Skagit. Since the Skagit SCD was formed in 1942, the District Supervisors have received many requests for assistance concerning erosion and flood control problems on the Skagit.

We recognize that during the life of the Skagit SCD there have been substantial land use changes. Additional land has been cleared and crop production has varied materially in accordance with market demands. It has been our observation, and this has been supported by soil surveys carried out by the Soil Conservation Service, that our Skagit River flood plain contains the largest, or one of the largest, bodies of high-quality land to be found West of the Cascades. Much of the area in the lower Skagit Delta is protected by dikes from river and salt water inundation and land owners through their organized drainage and diking districts have expended large sums of money to provide and maintain protective dikes and drainage outlet systems.

A considerable acreage of bottomland in the upper Skagit area above Burlington is still subject to overflow during periods of moderate flood which have recurred periodically during the past 10 years. Much of this non-diked area is capable of more intense use if the flood threat was eliminated or reduced. As urbanization and industrialization continues, the responsibility of the presently non-diked areas to contribute more substantially to the agricultural economy of the county seems likely. We believe, therefore, that flood control measures which would reduce these moderate floods should have consideration in future studies.

Since 1945 substantial engineering assistance has been provided by the Skagit SCD to improve the drainage systems of the Skagit and Samish river deltas. Farmers in turn have invested many thousands of dollars in their drainage works, and the Federal Government through ACP cost-sharing help has provided additional thousands. Any major flood which would top dikes would reduce the effectiveness of the recently installed drainage systems, resulting in substantial crop loss and high costs for rehabilitation.

2/7/61

We are including as a part of our statement the report submitted by Work Unit Conservationist Anton F. Harms, who has been assisting the Skagit SCD since 1945. We concur in this report. Included with Mr. Harms' statement is a report of land damage caused by the 1951 flood, with accompanying photographic documentation.

Very truly yours,

Board of Supervisors  
Skagit Soil Conservation District

Floyd Nelson, Chairman  
Arthur L. Johnson, Vice-Chairman  
W. James Wylie, Sec.-Treas.  
Pete C. Olsen, Member  
Jess A. Knutzen, Member

By \_\_\_\_\_  
Chairman

Attach: Harms' Report,  
Land Damage Report,  
Photographic Documentation

UNITED STATES  
DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Union Block  
Mt. Vernon, Wash.  
February 6, 1961



Board of Supervisors  
Skagit Soil Conservation District  
Mount Vernon, Washington

Attention: Floyd Nelson, Chairman

Gentlemen:

In accordance with the Skagit SCD Supervisors' request and of the officers of the Skagit Flood Control Council, I am submitting herewith a statement relating to Skagit River flooding and related problems of the Skagit. This might be considered in connection with your presentation at the flood control hearing being conducted by the Corps of Engineers at Mt. Vernon on Feb. 8, 1961.

Extent of Flooding

Since the Skagit SCD was organized in 1942 there have been eight or more floods which have inundated substantial areas of Skagit County farmland. Peak floods during these years have occurred in January, February, May, October and November. The floods in November of 1949, in February of 1951 and in October of 1955 broke through dikes and inundated substantial areas of the lower Skagit delta. None of the above floods, however, approached the volume of the 1909 and 1921 floods.

The 1951 flood, for example, caused land damage in the following ways:

1. Serious erosion of top soil.
2. Deposition of coarse sand over otherwise high quality farmland.
3. Logging debris on land.
4. Damage to established drainage systems.
5. Loss of production.
6. Damage to farmsteads and residential property.
7. Damage to livestock through death or lost production.
8. Damage to feed supplies.
9. Damage to communications including roads, power, telephone, etc.

SCS technicians estimated 1951 farm flood losses at \$818,000. A copy of this report is attached.

A substantial land area has been cleared in the Nookachamps and upriver non-diked areas since 1940 and substantial losses occur to crops in these areas from floods of a much lower intensity than the 1951 flood.

**Possible Effects of a Major Flood Which Would Top Present Skagit River Dikes:**

Most acreage in the Skagit and Samish deltas could be substantially inundated by a major flood of the magnitude that would top dikes. Eighty percent or more of Skagit County's agricultural production could be affected by such inundation. Types of damage which could be expected would include the following:

1. **Damage to existing tile and open ditch drainage systems.**
  - a. There are presently approximately 165 miles of open drain ditches on the Skagit and Samish Flats. Investment in these drainage works vary from 30¢ per l. ft. for some farm ditches to \$5 or more per l. ft. on the larger district canals.
  - b. Existing tile under-drainage would become ineffective as open ditch outlets become filled with sand and debris.
2. **Major tidegate outlet structures to salt water would likely be destroyed as flood waters approached salt water.**
3. **Salt water dikes would be broken by flood waters,** permitting inundation of land by salt water during periods of high water. Land damaged by salt water inundation would require one to five or more years for restoration to full crop production.
4. Damage to farm buildings, especially to modern Grade A dairy set-ups, would be higher than in former floods because of mechanization, modern milking parlors, etc.
5. Farm and urban residence losses would be high because of preponderance of modern one-story, low-level homes.
6. Land damage caused by extensive sand deposition and channeling from erosion of top soil would permanently reduce land value.
7. Livestock losses through death and/or loss of production could be expected to be extremely high. Inability to milk a high-producing dairy cow for 24 hours or more could result in disabling her for future milk production. Damage to stored livestock feed including hay and silage could be large.
8. **Loss of crop production for one or more years on many thousands of acres could be expected. Extent of loss would depend on time of year when flood occurred.**
9. Loss of processing crops would affect payrolls in all communities of the county and would also affect ability of processors to meet commitments.

2/6/61

River Bank Erosion Problems:

Since the district's formation in 1942, numerous requests for assistance in controlling river bank erosion, largely in areas above the Great Northern bridge, have come to the attention of the Skagit SCD. For the most part remedial measures are too costly for individual farmers to meet. County and State Flood Control Funds have provided limited assistance in controlling river bank erosion.

A substantial portion of the revetment work installed during the 1930's in the area above Sedro Woolley has now failed.

Aerial flights made in 1941, 1947 and 1956 show substantial channel changes and soil losses during a 15-year period. These photos are available at the Mt. Vernon Soil Conservation Service office for review of the problem. They are regular tools used by SCS personnel in conservation planning, engineering and application work with farmers.

Small Stream Tributaries to the Skagit River

Small stream tributaries to the Skagit are contributing substantial amounts of sand, gravel and logging debris during periods of heavy rainfall. This small stream erosion is most severe on recently logged, non-restocked, steeply sloping areas. Substantial amounts of the finer materials from such stream erosion are carried downstream, contributing to the siltation problem at and near the mouth of the Skagit. This siltation creates an additional outlet problem for drainage districts.

Other Considerations

If dredging is considered as a partial solution to the flooding problem, studies should be made as to the desirability of bank revetment to reduce river bank erosion. Farmers, individually and through their drainage and diking districts, spend large sums for protecting their land and improving their drainage. A major flood would place an undue burden on these farmers.

Farmers have received some assistance through cost-sharing payments of the ACP program of the U. S. Dept. of Agriculture. Approximately \$150,000. in cost-sharing funds have been provided for drainage during the past 10 years in this county.

Attached are photos documenting conditions at the time of the 1951 flood. Damages of this sort might be multiplied manyfold should a major flood occur.

Very truly yours,

Mnton F. Harms  
Work Unit Conservationist

Attach.

REPORT OF LAND DAMAGE IN  
SKAGIT SOIL CONSERVATION DISTRICT  
SKAGIT COUNTY, WASHINGTON

FEBRUARY 9-13, 1951

(Prepared by Soil Conservation Service Technicians)

This flood was caused chiefly by sudden and heavy rainfall on the watersheds of the Skagit and Samish rivers, augmented somewhat by warm winds and temperature of above 60° which caused quick melting of snow on the mountain slopes. During the three or four days previous to the flood moderate rains fell and to this was added a popularly reported six-inch precipitation during the 24-hour period on the 9th and 10th in the upper Skagit River watershed around Ross Dam. This raised the Skagit River to flood stage from Newhalem to the mouth of the stream. This heavy rain which covered most of Northwest Washington also raised the Samish River to flood stage. The resulting flood covered an area of 28,776 acres, which were inundated to depths varying from a few inches to 12 feet or more. More than 24,000 acres of this total was cultivated land or rotation hay and pasture. The remainder was mostly brushland. Of the area flooded approximately 8320 acres were flooded by the Samish River and 20,456 acres by water from the Skagit River.

Actual soil loss was small on lands where ground cover was established at the time; for instance, hay stubble and pasture protected the land well. Some of the bare land and land that was in winter seed crops such as turnips and bulbs washed moderately and in some areas severely. In at least two places a deep scouring occurred on sizeable areas. Generally this occurred where water poured over dikes which gave way, allowing the waters to pour through and wash.

The peak flow of the Skagit River, according to the gauge at Mount Vernon, was 138,000 cubic feet per second. This river reached the height of 28.2 feet, then dropped to 28.15 feet and held there for approximately five hours. This is the highest flood since about 1900 and according to the "old timers" on the lower Skagit Flats, the highest they have seen. ✓

The cause of much of this flood damage is simply that the water rose to a greater height than the farmers had prepared dikes for, and that too many of the dikes were not of sufficient cross section to withstand a flood that remained high on them for any considerable time. The damage to dikes was also augmented by high tides which increased the pressure on the river dikes below Mount Vernon and caused the break at Conway. This was a flood of longer duration than the one in 1949. It took as long for the river to reach the crest this time as it did to come up and go down in November, 1949.

A detailed list of damage items follows:

Topsoil loss, 117 acres completely ruined. (1 acre mature filbert trees, 66 acres pasture, 50 acres in turnips and strawberries.)  
 Very little top soil lost on balance of area flooded.

Deposition -- from 1/4" to 3/4" over 5200 acres.  
 from 2" to 12" over 600 acres.  
 from 12" to 24" plus logs and other debris  
 over 220 acres.

Streambank and gully erosion was moderate -- limited to an area above Lyman and an area west of Dry Slough on the North half of Fir Island where the river started to cut a new channel for Dry Slough across the Noble Lee farm.

Inundation -- widespread, totaling 28,776 acres of which over 24,276 acres were cultivated land and 4500 were brushland.  
 Estimated cost of rehabilitation ... \$24,080.00.

Dike washed out -- 4300 feet, with direct cost of replacement estimated at \$64,500.00.

Miscellaneous Damage:

Farmhouses and buildings washed out or damaged severely:

267 houses, estimated damage .....	\$534,000.00
210 barns and other farm buildings, estimated damage .....	102,000.00
60 labor camps tent houses .....	<u>3,000.00</u>
Total .....	\$639,000.00

Pasture reseeding -- 600 acres @ \$10 per acre .. 6,000.00

Forward ... \$645,000.00

Fences washed out -- 33 miles @ \$320. per mile ..... 10,560.00

Stock losses:

10 head young stock @ \$125. ....	\$1,250.00
73 head mature stock @ \$300. ....	21,900.00
6 ewes @ \$40. ....	240.00
200 hens @ \$1.50 .....	<u>300.00</u>

Total livestock losses, estimated ..... 23,690.00

Bridge damage .....	\$10,000.00
Road repair, 20 miles .....	<u>30,000.00</u> ..... 40,000.00

Drainage ditches silted up or filled by debris, 36,300' ..3,500.00

Tide box for Drainage Dist. 13, washed completely out ... 7,500.00

Total of these miscellaneous items ..... \$730,250.00

Total estimated cost of all damage except crop losses due to extended inundation, automobiles, trucks, and farm equipment, is \$818,830.00.



UNITED STATES  
DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Sedro Woolley, Washington  
May 8, 1951

PHOTOS ON FLOOD OCCURRING IN  
SKAGIT SOIL CONSERVATION DISTRICT  
February 9-13, 1951

The following photos have been compiled to show a cross-section of the scope and damage caused by the flood which occurred in the Skagit Soil Conservation District February 9-13, 1951. This report supplements the narrative and statistical report previously submitted.

All photos were taken by the Soil Conservation Service and the photo numbers identify negatives which are on file in the Cartographic Division of the Soil Conservation Service in Portland.

The flood was of direct or indirect concern to a large segment of the population of the District since it disrupted transportation facilities, school operations, and did much damage to town as well as rural property. The damage was the most severe and widespread of any flood since 1921.

Colored slides corresponding in subject matter to the black and white photos were also obtained and have been used extensively in meetings with civic, farm and school groups in Skagit County during March and April.

Prepared and submitted by Anton F. Harms, Work Unit Conservationist, Soil Conservation Service, Sedro Woolley, Wash.

W-649-9



Looking southeast from Little Mountain near Mount Vernon, showing Highway 99 and adjoining cropland under water to a point one mile south of Mount Vernon. The area of Fir Island west of Dry Slough is under water in center background.



W-649-10

Looking north from high ditch near point one mile east of Conway, showing cropland under water. Little Mountain in right background.



W-649-11

Looking west from point near Conway grade school toward Conway, showing Conway-McMurray highway under water. Farmsteads were accessible to farmers only through use of boats. This section of highway was under water seven days, after which it was used as a detour for Highway 99 traffic.



At Conway the dike on the east side of the South Fork of the Skagit river broke, inundating an area extending from approximately one mile south of Mount Vernon to an area south of Stanwood in Snohomish county. More than 250 Skagit county homes were damaged to an extent of \$500,000 as a result of the high water.



Looking east down main street in Conway showing high water on February 14th. Water remained high in the Conway area for approximately 10 days. Many homes and farmsteads were inaccessible except by boat during this period.



A few small buildings were moved by the flood at Conway. Many older homes in this area had first floors above the water line. Lack of electric power and domestic water supply added to the inconveniences caused by the flood.

W-645-7



Looking north down County highway in Nookachamps area three miles northeast of Mount Vernon. This undiked area provides a flood basin for the Skagit river at high water. Road was inundated to a depth of eight to ten feet.

W-649-3



Looking northeast across Nookachamps creek, showing vast flooded area extending from near Burlington to Clear Lake and Beaver Lake area.

W-649-4



Looking northwest across Nookachamps basin toward Burlington hill. Continuing high water completely filled this storage basin, causing lower river to rise higher than the 1949 flood.



Dikes along the Skagit river from Burlington to the mouth of the river were severely taxed at many points. Emergency sandbagging prevented many breaks. The Moore dike break below the North Fork bridge flooded the west half of Fir Island.



At the Moore farm the water destroyed the house, barn and machine shed. Parts of these buildings were carried away as swirling waters cut into the subsoil.



On February 12th extreme high water on Fir Island had receded, leaving deposits of coarse sand, debris and silt on the land. Water still remained on lower lying areas. Skagit river course is adjacent to trees in right.



Skagit river flood water did extensive damage in the Stanwood area five miles south of the Skagit County line. Looking east toward Stanwood and East Stanwood from Camano Island viaduct, showing extensive damage to farmsteads, business and residential property.



Looking northeast from Camano Island viaduct across fertile bottomland soils toward Mount Baker and up-river watershed which contributed to flood.

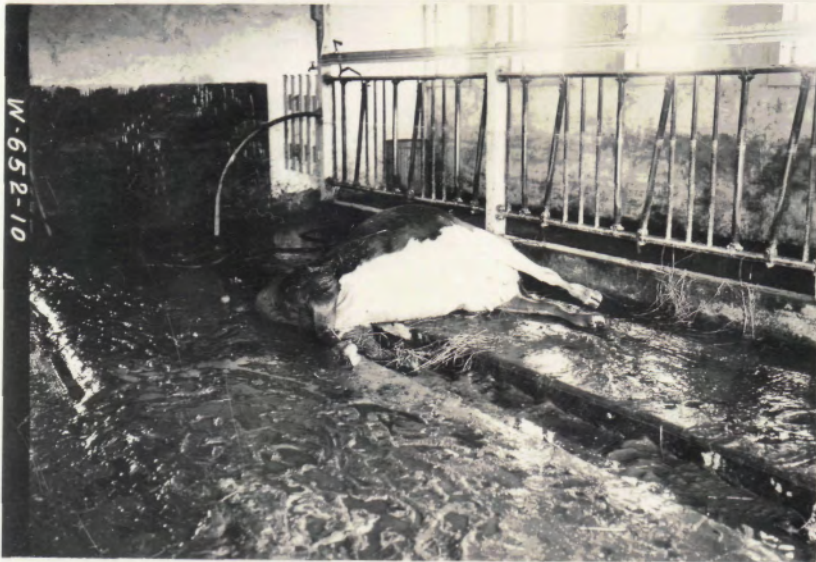


Looking up Stanwood street showing high water.



W-652-9

Livestock with a value of \$25,000 or more was lost. The flood warning system and the cooperation of persons with equipment for moving livestock prevented losses from being higher. On the Van OsenBrugger farm flood waters reached the height of approximately four feet.



W-652-10

Thirty-five Guernsey dairy cattle were lost on the Van OsenBrugger farm which became isolated as a result of dike breaks at the North Fork bridge and Dry Slough.



W-653-1

Looking west from Dry Slough dike toward Claude Davis farm, showing County road grader making first trip to clear debris from road on February 14th. Frame for labor tent house shown in left foreground.



The Dry Slough dike break released Skagit River water to the western part of Fir Island, covering the area between Dry Slough and Deer Slough with many feet of water. The break cut a new channel through the Lee and Tellesbo properties, making many acres unfit for further agricultural use. Deposits of coarse sand caused additional damage.



Looking southwest from point near upper end of Dry Slough break, showing extensive channeling and uprooted trees across Lee farm. Lee farmstead in left background.



Looking west down County road past Noble Lee farm. County equipment is clearing debris including transient labor tent houses from road.





W-649-5

One-half mile east of Burlington. Water was within inches of the top of dike at many points immediately east of Burlington. All day and all night effort with sandbags by volunteers saved the city. 35,000 acre feet of water were stored behind Ross Dam during the critical period which doubtless saved dikes in Burlington, Avon and Mount Vernon areas.



W-655-11

This crew within the city limits of Burlington are emptying sandbags after flood danger had receded. Sandbags saved this dike when water began seeping through it near its base.



W-652-1

Burlington's water supply was interrupted when flood waters poured over the state highway between Burlington and Sedro Woolley, washing out highway and P.U.D. water line.



Most of the land on Cochrehan Island south of the State highway between Lyman and Hamilton was under water. Most severe damage occurred where river broke across Nelson farm. Water breaking over debris caused extreme channeling, exposing gravelly substratum, leaving many acres of land unsuited to further agricultural use.



The importance of vegetative cover as protection against erosion was demonstrated repeatedly during the flood. The graveled farm road in center of this picture was washed down a depth of one foot or more while the adjoining pasture sod held soil in place except where sod mantle was broken as a result of debris deposition.



Light leveling operations on this farm had removed protective sod. As a result severe erosion and channeling took place. Where sod was undisturbed little or no soil was lost.



The Skagit river above Sedro Woolley did extensive stream-bank damage at many places and the deposition of sand and debris resulted in substantial channel changes at many points.



By March 19th the Great Northern Railroad had almost completed revetting the river bank with heavy rock in order to protect the railroad.



The State highway between Hamilton and Concrete was completely washed out at a point two miles east of Hamilton. Access to points up-river was possible through the use of Sound View Logging Company road from Hamilton to Grandy Creek near Birdsview.



N-664-5

Erosion along the small streams tributary to the Skagit river in the upper Skagit area is a major and recurring problem. This small stream channel above Faber Ferry four miles east of Concrete is very inactive. Jams of logging debris have formed small dams which break, cutting out the toe of the slope and carrying loads of debris, rock, gravel and silt. Entire area above bottom of stream channel is generally unstable.



N-664-7

Looking up creek channel toward upper watershed and timber line above Faber Ferry, showing severe erosion and slippage. Logging debris in stream channel piles up to form dams which further cut out toe of slope. Run-off from these areas is very rapid during periods of heavy precipitation or rapid snow melt. This area was logged in 1948 and 49. A clean slash burn was made in November, 1949 and severe slippage and erosion damage resulted in November, 1949 and February, 1951.



N-664-8

View of severely eroding hillside on 60% slope. Area of several acres is very unstable. Slippage and severe erosion begins at timber line.



Many small tributaries of the Skagit river did extensive damage to highways, railroads and farm land. They also contributed largely to debris and silt which the river carried at flood stage. At Faber Ferry four miles east of Concrete the State highway, county approach to the ferry, and Great Northern Railroad were completely covered with debris for the second time in 15 months.



County equipment was quickly on the job to open the highway at Faber Ferry so that mail and other essentials could reach residents south of the river.



The culvert under the State highway at Damnation Creek between Concrete and Rockport was completely plugged and the Great Northern Railroad in the right was washed out as a result of small stream erosion and flooding. It required approximately one month to repair damage to railroad and restore railroad traffic between Sedro Woolley and Rockport.



The Skagit river started a new channel through the Nelson farm on Cockrehan Island three miles southeast of Lyman. The area in foreground was once a cleared cropland field.



Looking northeast from Nelson farmstead toward Skagit river, showing new river channel. Severe erosion was aggravated by debris. Timber adjacent to river bank was removed in land clearing, thereby allowing debris to cross land. Area in left protected by timber had high water and sand deposition but only slight erosion.



Looking at Nelson farmstead, with bulldozer clearing County road in left. Poultry house in right of picture destroyed, with loss of 200 chickens.

W-664-1



County and State work together to restore dike near Moore Slough break at North Fork bridge. Temporary dike in right of picture which is 950 feet long was constructed in 15 days with use of dragline. Temporary dike will be raised and widened to form permanent structure. Moore farmstead in left will be outside new dike.

W-660-12



Looking southwest across temporary dike at Moore break being constructed through cooperation of State and County. Skagit river channel through trees in background.

W-664-2



Looking northeast toward Boswyk farmstead on Fir Island, showing new dike construction. Old dike in left along with granary was completely washed out when flood waters from Dry Slough break swept down to lower end of diking district.



The raising and strengthening of Skagit River dikes received high priority in the activities of farmers in the lower Skagit area as a result of the severe February 1951 flood. Most of the dikes below Mount Vernon were raised through cooperation of the State, Federal Government and local diking districts. Draglines, bulldozers and carryalls were used.



This completed section of dike in the Dry Slough area provides protection for the area which was most severely damaged by the Dry Slough break in the 1951 flood.



Heavy rock has been dumped along many feet of river bank where erosion is most serious. This section of dike on Fir Island above the North Fork bridge has been raised, widened and re-vetted.