

Post-1964 Streambank  
Protection Strategy

REPORT ON  
COMPREHENSIVE  
PLANNING STUDY

**SISKIYOU  
SOIL  
CONSERVATION  
DISTRICT**

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and the piling up of floating debris. Due to steep erodible banks in which the stream is entrenched for a large part of its course through the valley, erosion of its banks with the resultant loss of agricultural lands is a continuous process.

The flood problem along Moffett Creek below the canyon mouth consists principally of inadequate channel capacity aggravated by bed and floating debris load. Damage appears nominal except when flooding occurs in the town of Fort Jones.

Kidder Creek below its canyon mouth flows over a fan-like debris cone in an unstable channel which can shift from flood to flood. The town of Greenview is susceptible to catastrophic damage if a major flood should develop a channel in that direction which it has attempted to do in the past. The present channel turns north below the cone and traverses the west side of the valley floor and is joined by Patterson Creek Slough before it joins Scott River. Through this valley reach, frequent overflow and ponding occurs which, with the high water table, limits the agricultural use of this land.

Other west and south side tributaries also have limited channel capacities and overflow their banks. Bank erosion as well as bed load problems are prevalent. However, damage from normal floods, except for damage to bridges and some agricultural land, is nominal under the present and expected future type of land use.

The occurrence of major floods in recent years (1955, 1964) has resulted in

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substantial damages, the severity of which have been more intensely felt - due to the relatively short interval separating them. Comparative data for the floods of December 1955 and 1964 are shown below:

<u>Flood</u>	<u>Peak Flow</u>	<u>Area Inundated</u>	<u>Total Damages</u>
1955	38,500 cfs	6,300 acres	\$ 220,800 *
1964	54,600	26,520	\$5,000,000 **

\* Source: Reference No. 20

\*\*Source: Reference No. 21

#### PRESENT WORKS

Certain flood protection work to alleviate the flood problems has been carried out by both individuals and organized public entities in an awareness of the flood hazard. Such work has involved repair and reconstruction of bridges and utilities, the removal of lodged floating debris and the excavation and reshaping of deteriorated channels after flood occurrences. Aggressive and continuous work in bank protection along the main stream and its problem tributaries involving the placing of quarry rock at bridge abutments and along the banks at locations where erosion of a hazardous nature develops have been carried out with the aid of the Agricultural Conservation program. The success of this treatment received national coverage in an article in the Journal of Soil and Water Conservation (Reference No. 26). Except for the main roads, however, bridge reconstruction in many places is still undertaken in such a manner as to provide insufficient waterway for other than normal floods.

Recent federal work in the study area has been accomplished by contracting channel alignment work, debris clean-up and re-establishing the levees in the case of Kidder Creek following the October 1962 flood and similar clean-up and rehabilitation throughout the valley following the December 1964 flood. The Kidder Creek work was financed through the office of Emergency Planning as a part of the Accelerated Public Works Program to aid depressed counties. Financing of federal costs amounting to \$600,000 was accomplished following the 1964 flood through Public Law 875 as a part of disaster relief. The restoration of the Kidder Creek channel did not fully accomplish the intent of the District as project sponsor due to the limitation of the legislation authorizing the funds which provides that improvements be confined to the re-establishment of pre-flood conditions only. The work has not endured and has subsequently had to be redone. An attempt to establish a zone of benefit within the county flood control district which could preserve by periodic maintenance the work accomplished, failed, due to insufficient local interest.

Of the urban areas is Scott Valley, Etna sustained the most damage from the 1964 flood. In seeking alleviation of the hazard of a future recurrence, the County Flood Control District through the Board of Supervisors, requested a study by the U. S. Corps of Engineers of the possibilities of a channel improvement project for Etna Creek under Section 205 of the Flood Control Act of 1948. Preliminary findings of this study were that economic justification is lacking at this time.

An effort to determine what application the Watershed Protection and Flood Prevention Act (P. L. 566) may have in solving some of the soil and water conservation problems of Scott Valley was made by the board of directors of the District in March 1960. A reconnaissance of the problem areas in the Valley was made by a three man watershed team, but their early conclusion was also that economic justification was not indicated.

Such findings are discouraging to those who seek to find some means of reducing the flood hazard and protect life, property and improvements and the limitation of economic justification is not always fully understood. Economic justification means that the benefit to be derived from protective works must exceed the cost of installing such works. When the property to be protected is agricultural land, the value of that land seldom exceeds the cost of protecting it.

#### STEPS TOWARD IMPROVEMENT

No quantitative information has yet been assembled on flood damages and their frequency of occurrence. Neither has any study yet been made as to the cost and accomplishment of alternative types of flood protection. Until this is done, no realistic estimate can be made of the monetary flood damage and the economic justification for its alleviation. Certain tentative opinions, however, can be expressed, based upon past experience in attempting to develop economical protection projects in land use areas of the type under consideration.

One of the major items of flood damage in both the 1955 and 1964 floods involves roads and bridges. The most practical solution of this problem is to build, or when necessary, rebuild the bridges and their approaches to pass a selected design flood of infrequent occurrence. The County Flood Control District might well be the policing agency to see that such policy is followed.

Floating debris and coarse bed load material will continue to be a problem in the valley streams, both under present conditions and future conditions, whether or not flood protective works are installed. Such materials will be deposited in the stream channels and the overflow areas as at present and will have to be removed. The present practice of removing such material and reshaping the stream channel to its original, or improved section, is the most practical and economical solution.

Erosion of the stream banks both during medium and high river stages is a natural characteristic of alluvial channels. It is uneconomical and impractical to attempt to provide bank protection, by any means, at all localities where such a condition can develop as the actual point of attack cannot be foreseen. The present procedure of providing bank protection when and where needed as indicated by actual experience is a sound approach. Continuous inspection immediately prior to and following the flood season to assure early treatment of such problem area is, however, essential if minor problems are not to develop into major ones. The area is fortunate in having suitable quarry rock available at economical cost to accomplish such work. The overflow problem along Moffett Creek in the Fort

Jones area can be solved by providing increased channel capacity either by channel improvement, levees or a combination thereof. If flood storage were provided upstream at the Highland Reservoir site or an alternate thereto, necessary channel work through the town would be minimized but probably not eliminated completely. Such channel or levee work would require some rights-of-way acquisition and modification of bridges and utilities.

Confinement and stabilization of Kidder Creek in a main channel through its debris cone could probably be accomplished but would be expensive and would require continuous maintenance. Elimination of overflow from Kidder Creek after it reaches the valley floor by means of levees or channel improvements alone appears to be outside the realms of economic feasibility. Storage of debris and flood waters at the mouth of Kidder Creek Canyon and the release of controlled flood flows through a smaller stabilized channel through the debris cone and through the valley flood plain should be the subject of further study. Part of the Kidder Creek problem can be alleviated by a program of land treatment in the upper watershed which would (a) clean up the dead and loose material that has the potential of becoming waterborne debris during heavy runoff and (b) provide native vegetation that would promote greater infiltration and retard runoff. Insofar as the town of Greenview is concerned, flood protection could be accomplished by a horseshoe shaped levee around the town tying into high ground on the north.

The construction of levees along the main stream of Scott River of the development



of storage in the basin for flood control alone, as a single purpose, does not appear to be economical feasible. In this connection, it should be noted that even with the storage of flood waters, a substantial amount of the supplementary channel work discussed herein, such as bank protection and debris removal would still have to be undertaken. If and when storage is developed for irrigation, fish and wildlife, recreation or other purposes, joint operation of such storage for reduction of flood flows should be considered. It is wholly possible that storage for such multiple use at one or more potential reservoir sites in the basin may be justified where it could not be justified for a single purpose alone. Specific reservoir sites that should be considered for such multi-purpose use are discussed in Section III of this report.

In order that flood protection measures may be economical, it is desirable to know what behavior can be expected of a stream which has flooding potential. The magnitude and probable frequency of recurrence of flood is essential to the proper design and location of dams, bridges, levees, etc. Knowledge of flood frequency and magnitude is also useful in establishing protection through flood insurance coverage, and it is vital to proper comprehensive planning in the study area.

As an aid to predicting floods of various recurrence intervals in the study area, a flood frequency analysis was made for the Scott River basin, the results of which can be used to determine the magnitude and frequency of peak flows and 5 day flood hydrographs at any point on any stream in the basin whether a stream

gage is located there or not. The results of this analysis are presented in Appendix C together with an example of the application of the method for determining peak flow at a selected point for a storm of any given recurrence interval. The curves presented in Appendix C will be useful in flood studies of potential projects that may become a part of future study area development.