

SUMMARY OF DATA FOR COMPLETED IMPOUNDMENTS

	Site I	Site II	Site V	Site VI
Area Flooded (Ac.).....	81	32	4	8
Maximum Water Depth (Ft.)....	4	3	3	3
Length Dike (Ft.).....	4,700	3,650	1,000	1,100
Embankment (Cu. Yd.).....	17,500	13,500	2,180	2,030
Cost for Earth Work.....	\$6,484.00	\$4,700.00		\$2,974.00*
Cost Per Cubic Yard.....	\$ .37	\$ .35		\$ .71*
Clearing Cost Per Acre.....	\$ 150.00	\$ 200.00		
Cost of Structure and Pipe.....	\$ 600.00	\$ 650.00		\$ 426.00†
Total Cost‡.....	\$8,584.00	\$6,750.00		\$3,400.00
Cost Per Acre.....	\$ 106.00	\$ 211.00		\$ 283.00

\* Includes clearing 1.5 acres.

† Two structures, does not include State labor, form lumber, or reinforcing steel.

‡ Does not include cost of seeding and mulching.

## WILDLIFE APPURTENANCES FOR FLOODWATER RETARDING STRUCTURES

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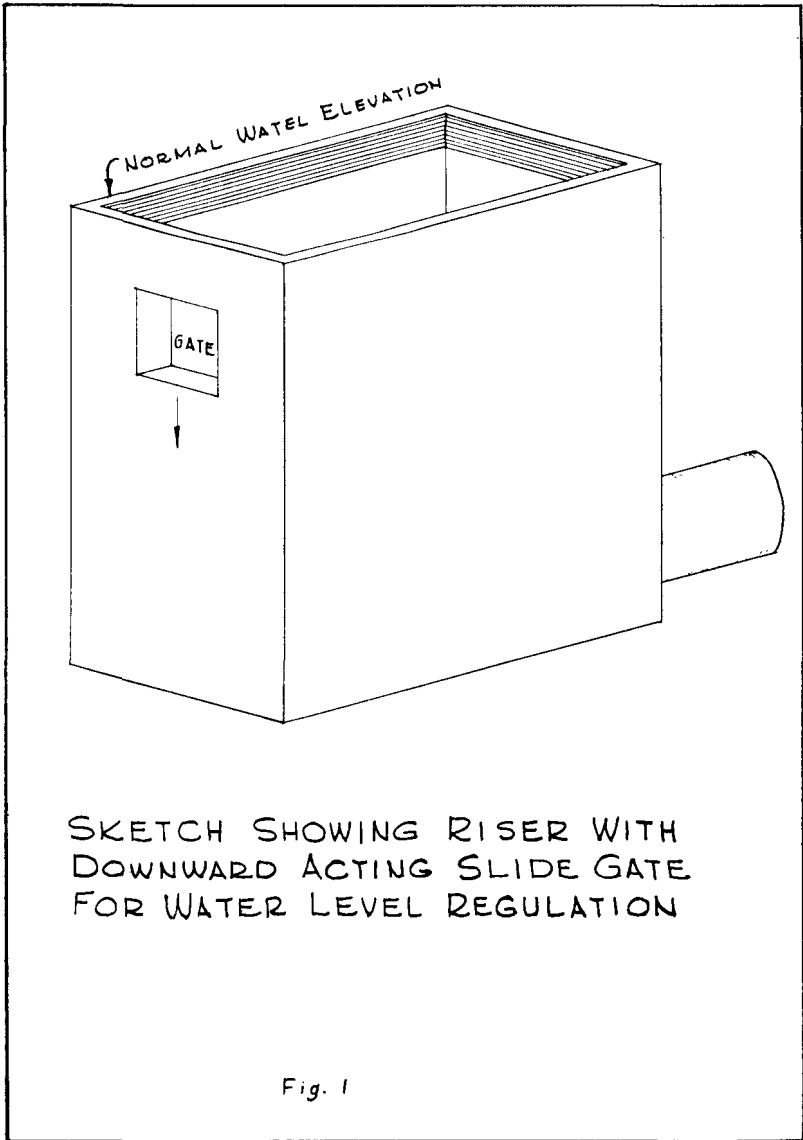
Spartanburg, South Carolina

In 1954, the Congress of the United States enacted Public Law 566, the Watershed Protection and Flood Prevention Act, in recognition of the need for a project-type approach to soil and water resource development, use, and conservation. This enactment also showed that Congress recognized that a means was needed to accomplish project-type programs not covered by those which are for development and flood protection of major river basins such as those handled by the Corps of Engineers and the small projects that local people can accomplish with their own resources.

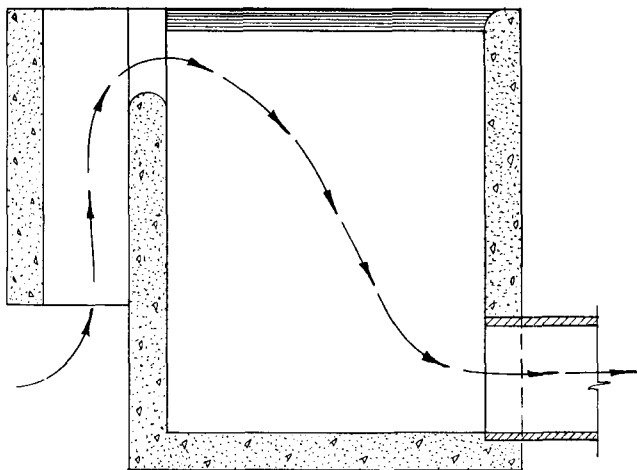
It was the intent of the congress that Public Law 566 projects should be local undertakings with Federal assistance. The Act also encourages the close cooperation and assistance of State agencies.

Responsibility for the administration of the Act was given to the Department of Agriculture through the Soil Conservation Service. Since watershed protection and flood prevention are national problems concerning the welfare of all, Federal funds are used in the planning and application of necessary and justifiable measures. Financial or credit assistance on non-Federal lands is limited to those measures which (a) are primarily for flood prevention, drainage, irrigation, fish and wildlife development, municipal or industrial water supply, or other water management; (b) produce substantial benefits to groups of landowners, to communities, and to the general public; and (c) cannot generally be installed by individual landowners or small groups of landowners with the aid of available Agricultural Conservation Program or other cost sharing.

Public Law 566 is an expeditious tool for the intensive application of soil and water conservation on a small watershed basis. The conservation of our soil and water resources has many facets. Not only may certain problems be remedied by more than one measure either singly or in combination but, conversely, some single remedial measures may be used for other than one purpose. This multiple-use is to be encouraged wherever possible. Generally speaking, the more uses served by a project, the better the project. In general, it is felt that floodwater damages should be reduced by floodwater retarding structures wherever sites are available. Full exploitation of these sites for multiple-use is desirable, since the ratio of cost to purpose can usually be lowered and also once a site is used for a single purpose, it is difficult to modify it for other purposes.



To give further impetus to an intensive soil and water conservation program through Public Law 566 and promote multiple use, in 1960 the Congress passed an Amendment to allow Federal funds to be used to pay up to 50 percent of the cost of structural measures for fish and wildlife development in Public Law 566 watersheds. As an example of this cost sharing, in a floodwater retarding structure with permanent storage for fish and wildlife, Federal funds would be used to pay for that part of the structure cost allocated to the purpose of flood prevention and up to 50 percent of the cost allocated to fish and wildlife. Another example would be the case of regulating the water level in the sediment pool of a floodwater retarding structure for fish and wildlife man-



SKETCH SHOWING COLD WATER RETURN.

Fig. 2

agement purposes. Federal funds would be used to pay for the cost of the structure and up to 50 percent of the cost of the water control gate.

Ordinarily, either of these structure changes—enlargement for storage of additional water for fish and wildlife, or modification of riser for management purposes—can be incorporated in a flood prevention structure. The cost allocated to the fish and wildlife purpose is usually much less than if a single purpose facility were constructed to provide the same opportunities for fish and wildlife development. To obtain Federal cost sharing under Public Law 566 for fish and wildlife purposes, the sponsoring local organization must present satisfactory assurance that public access and use will be provided. Public access

and use are not required if the local sponsors bear the entire cost allocation to the fish and wildlife purpose.

Most floodwater retarding structures built under Public Law 566 consist of an earth fill dam with a conduit through it to carry the designed release rate. A concrete riser on the upstream end of the conduit determines the elevation of the sediment, or permanent pool. Flood storage capacity is provided between the top of the riser and the emergency spillway near the top of the dam. To control water levels below the crest of the riser, some type of regulated opening is needed. Flashboards have not proven satisfactory because of difficulty of manual operation and tampering by unauthorized persons. Our design section presently uses a downward acting slide gate as shown in Figure 1. The downward as opposed to the upward acting gate gives the best control of the desired water level. There are cases where a two-stage riser is necessary in a floodwater retarding structure to achieve the desired flood prevention benefits. A two-stage riser consists of a riser which allows a small discharge to occur through the structure at low stages and when the stage builds up above the crest of the riser, a high discharge takes place. The low stage elevation is set by the depth required for the sediment pool. When it is desired to regulate the pool in this case, it is necessary to use in effect a double riser with the slide gate on low stage part of the riser.

On certain streams, floodwater retarding structures have an undesirable effect in that the sediment pool allows normal stream flow temperatures to be raised. Where necessary to mitigate damages to downstream fish habitat, it may be desirable to install a cold water return on the riser as shown in Figure 2. This allows normal discharge to be drawn from the bottom of the pool where water temperatures are lower. The cost of adding a cold water return to a floodwater retarding structure for the mitigation of downstream damages is a cost allocated to flood prevention and therefore paid by Federal funds.

This paper has not dealt with all the phases and interpretations of Public Law 566 and possible solutions to the problems involved. It is hoped that it will engender further interest in the application of a thorough program of soil and water conservation in its many phases.