
Suncook River Watershed
Merrimack River Basin
New Hampshire

Crystal Lake Dam - Break Flood Delineations

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US Army Corps
of Engineers
New England Division

CRYSTAL LAKE DAM
DAM-BREAK FLOOD ANALYSIS

TABLE OF CONTENTS

<u>PARAGRAPH</u>	<u>SUBJECT</u>	<u>PAGE</u>
1	PURPOSE AND SCOPE	1
2	AUTHORITY	1
3	DAM DESCRIPTION	1
4	PERTINENT DATA	2
5	DOWNSTREAM COMMUNITY INFORMATION	4
6	DESCRIPTION OF INUNDATION AREA	4

<u>PLATE</u>	
1	LOCATION MAP
2	INUNDATION MAP FOR EMERGENCY ACTION PLAN

CRYSTAL LAKE DAM
DAM-BREAK FLOOD ANALYSIS

1. PURPOSE AND SCOPE

This report is a continuation of a dam-break flood analysis, on the Crystal Lake Dam, completed by the U.S. Army Corps of Engineers, dated January, 1989. The study's objective is to delineate and quantify the extent of the probable inundation flood area in the event of a dam-break failure, so that such information is available for use in emergency planning. This study was not performed because of any known likelihood of a dam-break at Crystal Lake Dam. Crystal Lake Dam is located in Gilmanton, New Hampshire, on the Suncook River which is fed by Crystal Lake. The dam is owned, operated and maintained by the Water Resources Board of New Hampshire. This study is limited to the accuracy of twenty-foot-contour mapping.

Delineations were continued downstream to a point at which the inundation from a dam-break approximates that of a one-hundred year storm event. The limits of the study are as shown in Plate 2.

2. AUTHORITY

Authority for U.S. Army Corps of Engineers participation in this effort is sanctioned by Section 206 of the 1960 Flood Control Act (Public Law 86-645) which states:

"... The Secretary of the Army, through the Chief of Engineers, Department of the Army, is hereby authorized to compile and disseminate information on floods and flood damages, including identification of areas subject to inundation by floods of various magnitudes and frequencies, and general criteria for guidance in the use of floodplain areas and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard..."

3. DAM DESCRIPTION

Identification No.	NH00018
Name of Dam:	Crystal Lake Dam
Town:	Gilmanton
County and State:	Bellknapp County, New Hampshire
Stream:	Suncook River
Watershed:	Suncook River
Basin:	Merrimack River

Crystal Lake Dam is located in the Town of Gilmanton, New Hampshire, on the upper reach of the Suncook River (Plate 1). The Suncook River flows in a generally southerly direction for a distance of approximately 28 miles to its confluence with the Merrimack River in Suncook, New Hampshire.

Crystal Lake Dam is an earth embankment structure with a concrete spillway located about halfway between the left and the right abutment. The upstream face of the dam consists of a concrete retaining wall extending approximately 86 feet to the left of the spillway structure. The downstream face of the dam consists of vertical stone walls and an earth fill section sloping two feet horizontal to one foot vertical. Alton Mt. Road is located on top of the dam embankment. The structure is approximately 188 feet in length. The maximum structural height of the dam, according to the existing plans and Phase 1 inspection report of the National Dam Safety Program, dated November, 1978, is approximately 16 feet. Maximum storage is 3,800 acre-feet.

The appurtenant structures consist of a pentagonal concrete spillway, a spillway channel and an outlet works consisting of a sluiceway with stoplogs. The outlet works stoplogs extend down to the original Suncook River bed.

4. PERTINENT DATA

Data is taken from "Phase I Inspection Report" for Crystal Lake Dam, dated November, 1978.

a. Drainage Area The drainage area consists of 27.0 square miles (17,280 acres) of rolling, heavily wooded hills.

b. Elevation (ft. above MSL)

(1) Top of Dam:	629.0 (lowpoint in the embankment)
(2) Recreation pool:	623.3
(3) Spillway crest:	623.3
(4) Spillway crest (ungated):	623.3
(5) Stream bed at centerline of dam downstream toe):	616.8
(6) Maximum tailwater:	Unknown

c. Spillway

(1) Type:	Concrete, pentagonal with vertical downstream face.
(2) Length of weir:	115.5 ft.
(3) Crest elevation:	623.3 ft.
(4) U/S channel:	Crystal Lake

- (5) Downstream channel: 13 foot reach approximately 30 feet wide downstream of the spillway leading to a roadway bridge, about 20 feet wide. Below the bridge, the downstream channel consists of a natural, rock bottom streambed with only a few overhanging trees.
- d. Reservoir (miles)
- (1) Length of maximum pool: 2.3 ±
- (2) Length of recreation pool: 2.3
- e. Storage (acre-feet)
- (1) Recreation pool: 1400
- (2) Top of dam: 3800
- f. Reservoir Surface (acres)
- (1) Top of dam: 458
- (2) Recreation pool: 441
- (3) Spillway crest: 441
- g. Discharge at Dam Site
- (1) The outlet works for the Crystal Lake Dam consists of a 6 foot wide sluiceway. The reservoir behind the dam can be lowered 6.5 feet below the spillway crest elevation 623.3 by the removal of the stoplogs in the sluiceway. Removal of all stoplogs will lower the reservoir level to the original river bed elevation of 616.8.
- (2) Spillway capacity with water at top of dam and stoplogs in sluiceway set to height of spillway crest: 2450 cfs (elev. 629.0)
- (3) Maximum tailwater: unknown
- h. Dam
- (1) Type: stone, earth, concrete
- (2) Length: 188 ft. (overall)
- (3) Height: 16 ft. (maximum)
- (4) Top width: 35 ± ft. (Alton Mt. Road on top of dam)

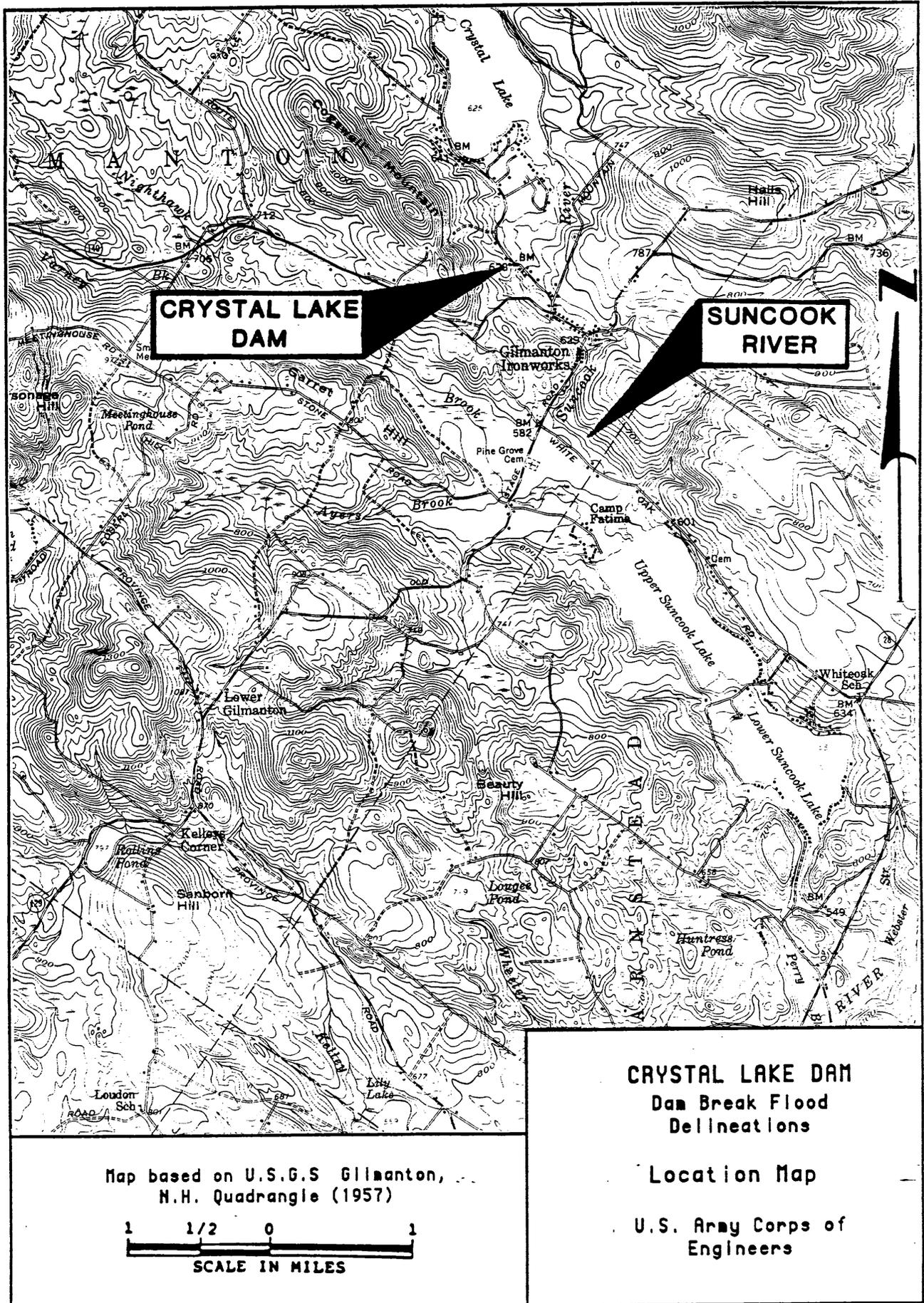
- i. Diversion and Regulating Tunnel: None.
- j. Regulating Outlets. The regulating outlets consist of a 6-foot-wide stoplog sluiceway which was designed to lower the reservoir to the original river bed elevation (616.8) by the removal of all stoplogs.

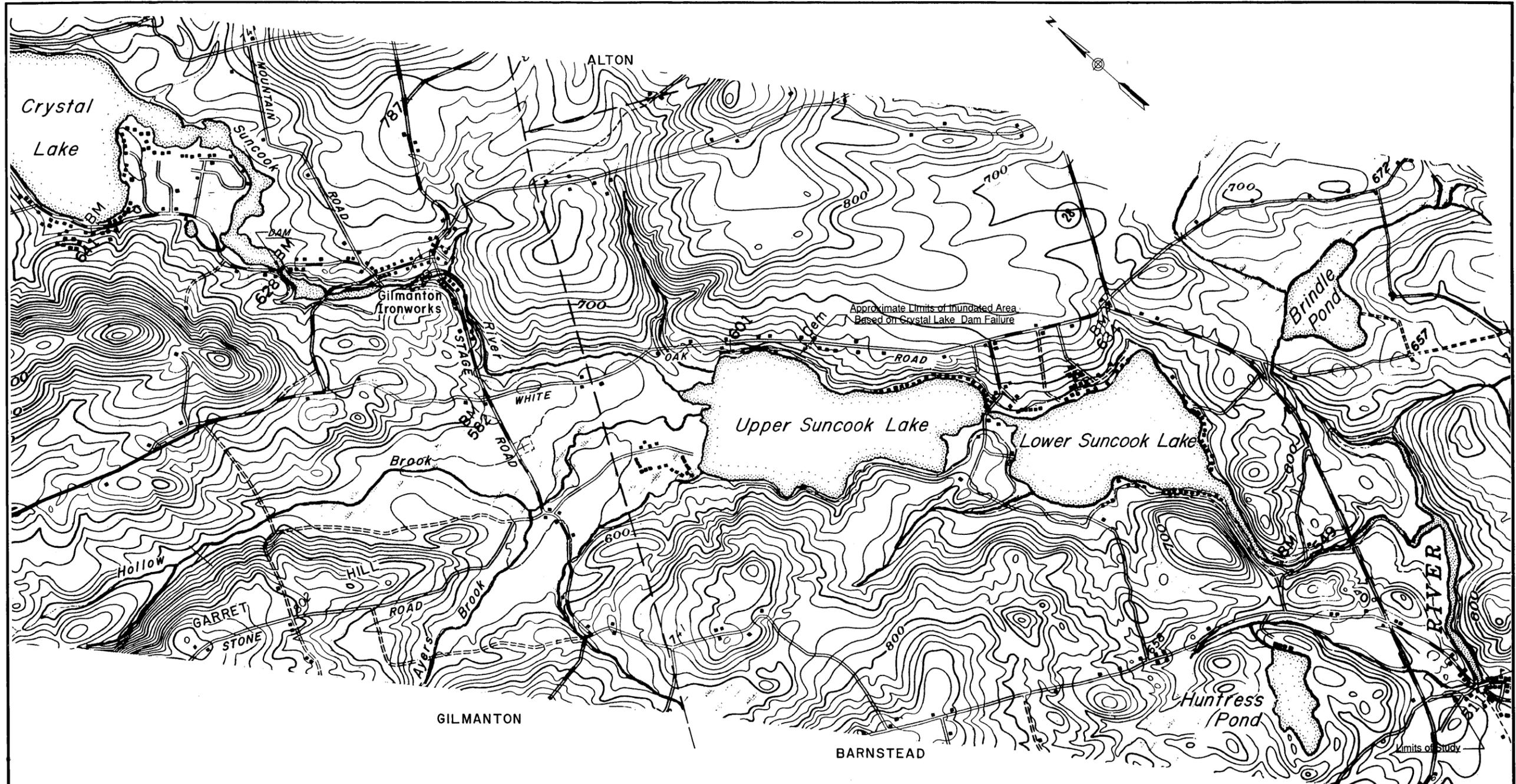
5. DOWNSTREAM COMMUNITY INFORMATION

Gilmanton Iron Works is a rural community, with a small village center downstream of the Crystal Lake Dam. The Town of Gilmanton (which contains the village of Gilmanton Iron Works) had a 1980 population of 1,941 persons according to U.S. Census Bureau data. This is an increase of almost 93 % over the 1970 population. Gilmanton is located in Belknap County, in eastern New Hampshire. It features steep hills with a scattered population. The community is residential and agricultural, with quite a bit of recreational activity at Crystal Lake.

6. DESCRIPTION OF INUNDATED AREAS

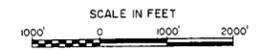
- a. REFERENCES. The inundation map for emergency action plan (Plate 2) is developed from the January 1989 Crystal Lake Dam-Break Analysis, using an enlargement of the 15 minute (1:62500) Gilmanton Quadrangle map as revised, by the USGS, in 1957.
- b. DESCRIPTION OF IMPACTED AREA. The dam is located in Gilmanton on the upper reach of the Suncook River. The Suncook River Valley is a rural partially wooded area. In the immediate area of the dam at Crystal Lake, there are no structures which would be inundated in the event of a dam break. Downstream from the dam, along Old Stage Road, are a dozen scattered homes and two bridges. There is a small concentrated area within a mile of the Crystal Lake Dam. Farther downstream, there is a small bridge on Stone Road. There are clusters of approximately two dozen homes at Upper Suncook Lake and another two dozen homes at Lower Suncook Lake. Two additional bridges; one between Upper and Lower Suncook Lakes, and the other on Route 28, are located in the area of a potential flood inundation in the event of a dam break at Crystal Lake Dam.





NOTE:

Mapping is a photographic enlargement of the U. S. G. S. 15 minute (1:62,500) Gilmanton Quadrangle map, as revised in 1957.



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**INUNDATION MAP
FOR
EMERGENCY ACTION PLAN (EAP)**

**CRYSTAL LAKE DAM
SUNCOOK RIVER - N. H. NO. 91.11**