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Summary Report

INUNDATION MAPPING
SALT AND VERDE RIVER SYSTEMS

PHOENIX METROPOLITAN AREA

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United States Department of the Interior

Bureau of Reclamation

Lower Colorado Region
Boulder City, Nevada

MARCH 1984

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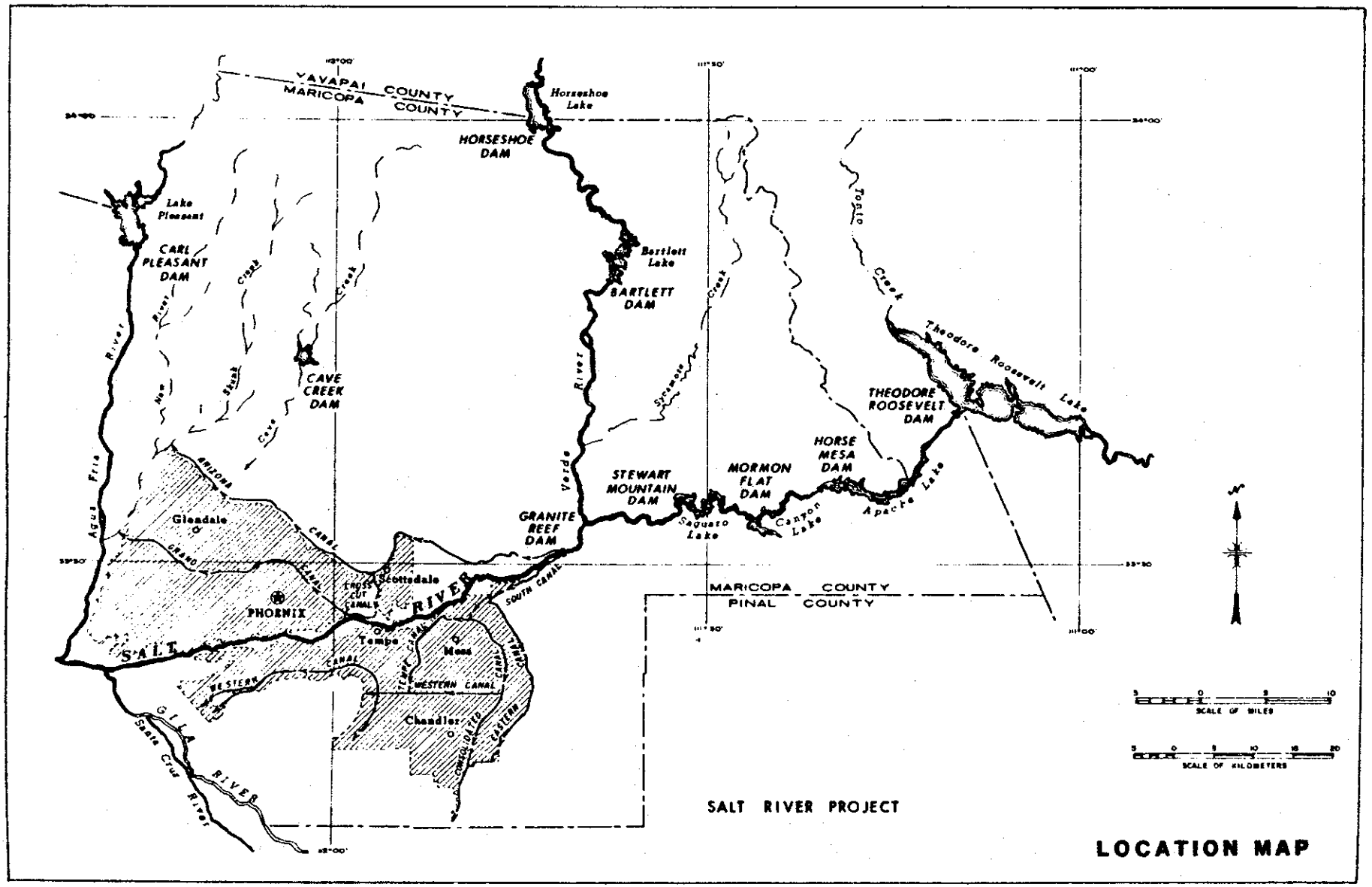
FOREWARD

This report was prepared pursuant to Presidential directive, that inundation maps be prepared as part of Federal emergency preparedness planning for all Federal dams whose failure would endanger human lives or cause substantial property damage. Under this directive, inundation maps for the areas downstream of the six Federal storage dams on the Salt and Verde Rivers, are being furnished to the proper authorities for their use during an emergency situation. The maps depict the population, property, communities and downstream dams that could be directly affected by the failure of any of the six Bureau of Reclamation dams on the Salt and Verde Rivers in Arizona.

This report contains maps of the areas in the Phoenix, Arizona metropolitan area which could be inundated as a result of upstream dam failures. The maps are intended only to provide information for use by local, State, and Federal authorities responsible for warning and evacuation of flood plain residents.

The events upon which the inundation maps are based, the Probable Maximum Flood or the Maximum Credible Earthquake, are extreme conditions having a very small probability of occurring. Similarly, the probability of a failure of any of the six Salt and Verde Rivers dams is small. The publication of these maps is not intended in any way to reflect upon the integrity of these dams.

The study was prepared in cooperation with the Salt River Project, which operates and maintains the six dams which comprise the storage system of the Salt River Project.



Salt River Project

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BACKGROUND

The Salt River Project (SRP) is located in and near Phoenix, Arizona, and includes a water service area of about 250,000 acres. The project furnishes water for municipal, industrial, domestic and irrigation uses from six storage dams on the Salt and Verde Rivers and from groundwater wells.

Regulating a drainage area of about 13,000 square miles of largely mountainous terrain in eastern Arizona, the SRP reservoir system consists of 6 reservoirs having a total storage capacity of 2,019,000 acre-feet. Four of the SRP dams are located on the Salt River. In downstream order, these are: (1) Roosevelt Dam, completed in 1911; (2) Horse Mesa Dam, completed in 1927; (3) Mormon Flat Dam, completed in 1926, and; (4) Stewart Mountain Dam, completed in 1930. The two SRP dams on the Verde are: (1) Horseshoe Dam and; (2) Bartlett Dam, completed in 1946 and 1939, respectively. All are Federally-owned. Bartlett and Roosevelt Dams were also constructed by the Bureau of Reclamation. The dams are operated and maintained by the SRP.

The Salt River flows generally westward through or adjacent to the cities of Mesa, Tempe, Phoenix, and other communities before joining the Gila River, a tributary of the Colorado River. The enclosed inundation maps depict the areas potentially flooded along the Salt, Verde and Gila Rivers upstream of Gillespie Dam should one or more of the SRP dams fail catastrophically, resulting in the sudden release of water stored behind these dams.

MAPPING STUDY SCOPE

In November 1982, the Lower Colorado Region, Bureau of Reclamation (Reclamation), entered into a contract with the SRP to prepare technical studies of the potential downstream effects should one or more of the existing SRP dams fail as a result of either a maximum expected earthquake or a probable maximum flood. In all, 13 different scenarios were evaluated using the National Weather Service Dam-Break Flood Forecasting computer model. The 13 failure scenarios were divided into four groupings which are plotted on the enclosed inundation maps.

The 13 scenarios cover a wide range of failure combinations, varying from an earthquake-induced failure of Stewart Mountain Dam only, up to a flood-induced failure of Roosevelt Dam and the 3 downstream Salt River dams. The National Weather Service model was used to assist in predicting the magnitude of the dam-break floodwave and its downstream progression, including travel times and depths of flow. Flood profiles were computed from the dam which is assumed to initially fail, downstream to Gillespie Dam, on the Gila River southwest of Phoenix. Table 1 summarizes the composition of the 13 failure scenarios, which are described in greater detail on Sheet 1 of the Inundation Maps.

PURPOSE OF STUDY

This contract study was prepared for two basic purposes; satisfaction of Presidential policy regarding emergency planning for existing Federal

storage dams and, to provide public agencies involved in emergency planning and services with the best practicable information that can be used in preparation for, or during, a dam failure emergency.

Reclamation's preliminary "Guide for Preparation of Standing Operating Procedures for Bureau of Reclamation Dams and Reservoirs," May 1980, directs that Emergency Preparedness Plans (EPP) shall be prepared for all dams whose failure would endanger human life or cause substantial property damage. The six SRP dams fall into this catagory. This guide directs that each EPP include inundation maps or descriptions of areas potentially flooded, and local officials should be made aware of the hazard potential a dam failure would present. The Inundation Maps and their dissemination satisfy these objectives.

DESCRIPTION OF INUNDATION MAPS

The inundation maps for SRP dams consist of a set of 12 sheets which show the areas adjacent to the Salt, Verde and Gila Rivers in the Phoenix area which could be flooded should one or more of the upstream SRP dams fail. Four of the 13 scenarios evaluated have been plotted to cover the range of potential inundation.

Sheet 1 is an explanatory sheet including definitions, scenario descriptions, and flood boundary explanations.

Sheet 2 is a key map showing the general study area and indexing the remaining 10 map sheets.

Sheets 3 and 4 are contoured base maps of the Salt River between Roosevelt Dam and the Salt-Verde confluence area, depicting normal reservoir water surfaces and the extent of anticipated flooding under worst-case Salt River conditions (a hypothetical flood-related failure of Roosevelt Dam with subsequent failure of downstream dams). Lesser scenarios were not plotted on these sheets due to the highly compressed contours of the canyon topograph. The lesser scenarios would all plot between the normal and worst-case boundaries, however.

Sheets 5 and 6 are contoured base maps of the Verde River between Horseshoe Dam and Verde-Salt confluence area, and depicting normal reservoir water surfaces and worst-case Verde River conditions (a hypothetical floodrelated failure of Horseshoe Dam with subsequent failure of Bartlett Dam).

Sheets 7 through 10 are a series of continuous contoured maps of the Salt and Gila River drainage areas through the Phoenix urban area overlain with 4 selected inundation levels ranging from a minor flood, the results of an assumed failure of Stewart Mountain Dam during an earthquake, to the worst-case flood, the result of the assumed failure of all 4 Salt River dams during a maximum flood. The location of schools, hospitals, and other major public areas have been highlighted to assist emergency planning.

Sheets 11 and 12 map the area around the southside of the South Mountains depicting worst-case inundation boundaries only. The four scenarios contained in the worse-case boundary, No. 7, 8, 10, and 13, produced water levels in the Mesa-Tempe area high enough to cause floodflows to divide around the South Mountain.

SUMMARY OF STUDY RESULTS

Tables 2 through 14 are summaries of the study results for scenarios 1 through 13, respectively, in terms of maximum discharges, elevations and depths of flow, and travel times of the flood to various locations along the Salt-Verde-Gila River system.

In all scenarios in which an assumed dam failure is induced by the Maximum Credible Earthquake (MCE), the studies assume this event to be independent of local floods. Therefore, only stored reservoir water is released. For MCE scenarios, the resultant floods are shown by the studies to diminish rapidly as the flood progresses downstream.

In all scenarios in which the assumed dam failure is induced by the Inflow Design Flood (IDF), a flood of equal size to the probable maximum flood (PMF), substantial local rainfall in the downstream areas is also assumed. The flood being routed in these scenarios includes major flood inflows to the reservoirs, released reservoir storage, runoff from drainage areas downstream from the dams, and generally wet channel conditions. Floodwave attenuation is much less for the IDF scenarios than for the MCE scenarios for this reason.

Inundation Maps 3 through 12 and Tables 2 through 14 contain travel time information. For this report, travel time is defined as "the time from the start of the initial dam failure to the time of the maximum level of flooding" at the indicated location. The range of travel times shown on the maps for various locations was determined from the scenarios contained within each flood boundary group having the "slowest" and "fastest" travel times.

GENERAL DISCLAIMER

These flood inundation studies portray the potential downstream impacts resulting from a set of dam failure scenarios developed by the Bureau of Reclamation in which the catastrophic failure of certain of the existing SRP dams is assumed for study purposes only. The maps were prepared for emergency planning purposes only. Nothing in these studies is intended to reflect in any way on the integrity of the SRP storage dams on the Salt and Verde Rivers. The events used to determine inundated areas are extreme conditions which have a very small probability of occurance. Therefore, this study is neither a prediction of failure of any of the SRP operated dams as a result of floods or earthquakes, nor that the earthquake and flood events used will actually occur. Rather, these studies and maps represent a technical evaluation, using current technology and reasoned engineering guidelines, of what may happen should one or more of the dams fail.

The Bureau of Reclamation has conducted dam safety reviews of all of the SRP dams and has determined that certain modifications are required to the SRP storage system to ensure the safety of these dams in the event of extreme earthquake or flooding conditions. The evaluations and modification requirements are described in the "Modification Report, Safety of Dams Program, Salt River Project Dams, Salt River Project, Arizona," Bureau of

Reclamation, April 1984, and in the "Regulatory Storage Division Environmental Impact Statement, Central Arizona Project," INT-FES-84-4, Bureau of Reclamation, February 1984.

SUMMARY TABLES

Table 1
Summary Description of 13 Scenarios
Salt River Project Inundation Mapping

Footnotes

Scenario No.	Initial Dam To Fail	Downstream Failures	Cause of Failures	Assumed Mode Of Failure	Channel Condition
1	Stewart Mtn.	None	MCE[1/]	Sudden	Dry
2	Stewart Mtn.	None	IDF[2/]	Sudden	Wet
3	Bartlett	None	MCE	Sudden	Dry
4	Bartlett	None	IDF	Sudden	Wet
5	Mormon Flat		MCE	Sudden	Dry
		Stewart Mtn.	O.T.[3/]	Sudden	- -
6	Horse Mesa		MCE	Sudden	Dry
		Mormon Flat	O.T.	Sudden	- -
		Stewart Mtn.	O.T.	Sudden	- -
7	Horseshoe		IDF	Slow	Wet
		Bartlett	O.T.	Sudden	- -
8	Roosevelt		MCE	Slow	Dry
		Horse Mesa	O.T.	Sudden	- -
		Mormon Flat	O.T.	Sudden	- -
		Stewart Mtn.	O.T.	Sudden	- -
9	Mormon Flat		IDF	Sudden	Wet
		Stewart Mtn.	O.T.	Sudden	- -
10	Horseshoe		IDF	Slow	Wet
		Bartlett	O.T.	Slow	- -
11	Roosevelt		MCE	Slow	Dry
		Horse Mesa	O.T.	Slow	- -
		Mormon Flat	O.T.	Slow	- -
		Stewart Mtn.	O.T.	Slow	- -
12	Roosevelt		IDF	Slow	Wet
		Horse Mesa	O.T.	Slow	- -
		Mormon Flat	O.T.	Slow	- -
		Stewart Mtn.	O.T.	Slow	- -
13	Roosevelt		IDF	Slow	Wet
		Horse Mesa	O.T.	Sudden	- -
		Mormon Flat	O.T.	Sudden	- -
		Stewart Mtn.	O.T.	Sudden	- -

Table 1 (cont'd)
Summary Description of 13 Scenarios
Salt River Project Inundation Mapping

Footnotes

1/ Initial failure is assumed to result from a local Maximum Credible Earthquake (MCE) occurring when all involved reservoirs are full. All MCE scenarios are assumed to occur during dry antecedent conditions for purposes of flood routing and computation of infiltration losses in the downsteam river flood plain.

2/ Initial failure is assumed to result from the Inflow Design Flood (IDF) equal in magnitude to the probable maximum flood (PMF), and occurring when all involved reservoirs are full. All IDF scenarios presume large amounts of local rainfall before and during the flood event. Therefore, for purposes of flood routing, all downstream channels and tributaries are assumed to be wet and flowing.

3/ Failure is caused by the overtopping (O.T.) of the indicated structure resulting from the failure of an upstream dam.

Table 2
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 1

Stewart Mountain Dam fails due to the Maximum Credible Earthquake.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Stewart Mtn. Inflow	Small	--	--	0
50.74	Below Stewart Mtn.	1,125,000	1,472	62	0.5
63.66	Granite Reef Dam	363,000	1,327	17	2.5
77.87	Hayden Road	238,000	1,180	12	6
79.69	Tempe Butte/ASU	224,000	1,164	24	6.5
83.24	40th St./Sky Harbor	214,000	1,121	13	7
85.80	20th Street	198,000	1,097	15	8
87.85	Central Avenue	189,000	1,074	12	9
90.41	27th Avenue	180,000	1,049	16	9.5
98.97	93rd Avenue	151,000	960	10	13
105.18	Goodyear, Az.	122,000	917	14	15.5
119.65	Buckeye, Az.	103,000	833	12	20
137.20	Gillespie Dam	66,000	762	12	27

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 3
Summary of Maximum Flows, Depths, Elevations,
and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 2

Stewart Mountain Dam fails during the summer Inflow Design Flood, without failure of upstream dams.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Stewart Mtn. Inflow	265,000	--	--	0
50.74	Below Stewart Mtn.	1,515,000	1,474	64	0.5
63.66	Granite Reef Dam	887,000	1,341	31	2
77.87	Hayden Road	776,000	1,188	20	4.5
79.69	Tempe Butte/ASU	766,000	1,171	31	5
83.24	40th St./Sky Harbor	751,000	1,130	22	6
85.80	20th Street	736,000	1,105	23	6.5
87.85	Central Avenue	720,000	1,084	22	7
90.41	27th Avenue	709,000	1,057	24	8
98.97	93rd Avenue	680,000	972	22	10.5
105.18	Goodyear, Az.	675,000	931	28	12
119.65	Buckeye, Az.	663,000	847	26	15.5
137.20	Gillespie Dam	584,000	789	39	21

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 4
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 3

Bartlett Dam fails due to the Maximum Credible Earthquake.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Bartlett Inflow	Small	--	--	0
37.38	Below Bartlett	2,464,000	1,731	122	0.5
53.19	Near Ft. McDowell	1,355,000	1,443	33	1.5
63.66	Granite Reef Dam	735,000	1,340	30	4
77.87	Hayden Road	485,000	1,184	16	7.5
79.69	Tempe Butte/ASU	464,000	1,168	28	8
83.24	40th St./Sky Harbor	442,000	1,126	18	9
85.80	20th Street	418,000	1,102	20	10
87.85	Central Avenue	399,000	1,079	17	10.5
90.41	27th Avenue	380,000	1,053	20	11.5
98.97	93rd Avenue	327,000	965	15	14.5
105.18	Goodyear, Az.	268,000	923	20	17
119.65	Buckeye, Az.	224,000	837	16	21
137.20	Gillespie Dam	153,000	768	18	27.5

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 5
Summary of Maximum Flows, Depths, Elevations,
and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 4

Bartlett Dam fails suddenly when the Inflow Design Flood discharge from Horeshoe Dam reaches 300,000 ft^3/s. Horseshoe Dam does not fail.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Bartlett Inflow	675,000	--	--	0
37.38	Below Bartlett	2,820,000	1,739	130	0.5
53.19	Near Ft. McDowell	1,635,000	1,446	36	1.5
63.66	Granite Reef Dam	1,195,000	1,348	38	3.5
77.87	Hayden Road	1,095,000	1,190	22	6
79.69	Tempe Butte/ASU	1,025,000	1,173	33	6
83.24	40th St./Sky Harbor	997,000	1,132	24	7
85.80	20th Street	996,000	1,108	26	8
87.85	Central Avenue	930,000	1,086	24	8.5
90.41	27th Avenue	907,000	1,059	26	9.5
98.97	93rd Avenue	847,000	974	24	12
105.18	Goodyear, Az.	822,000	933	30	13.5
119.65	Buckeye, Az.	774,000	849	28	17
137.20	Gillespie Dam	625,000	790	40	22

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 6
Summary of Maximum Flows, Depths, Elevations,
and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 5

Mormon Flat Dam fails due to the Maximum Credible Earthquake with subsequent failure of Stewart Mountain Dam due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Mormon Flat Inflow	Small	--	--	0
41.61	Below Mormon Flat	1,100,000	1,613	99	0.5
50.74	Below Stewart Mtn.	1,780,000	1,480	70	1
63.66	Granite Reef Dam	644,000	1,335	25	3
77.87	Hayden Road	411,000	1,183	15	6.5
79.69	Tempe Butte/ASU	390,000	1,167	27	7
83.24	40th St./Sky Harbor	366,000	1,125	17	8
85.80	20th Street	341,000	1,100	18	8.5
87.85	Central Avenue	323,000	1,077	15	9.5
90.41	27th Avenue	304,000	1,052	19	10
98.97	93rd Avenue	253,000	963	13	13.5
105.18	Goodyear, Az.	197,000	920	17	16
119.65	Buckeye, Az.	163,000	835	14	20
137.20	Gillespie Dam	107,000	765	15	26.5

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 7
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 6

Horse Mesa Dam fails due to the Maximum Credible Earthquake with subsequent failure of Mormon Flat and Stewart Mountain Dams due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Horse Mesa Inflow	Small	--	--	0
31.47	Below Horse Mesa	3,200,000	1,826	83	0.5
41.61	Below Mormon Flat	2,875,000	1,753	103	1.5
50.74	Below Stewart Mtn.	3,250,000	1,517	106	2.5
63.66	Granite Reef Dam	1,545,000	1,352	42	4
77.87	Hayden Road	1,040,000	1,190	22	6.5
79.69	Tempe Butte/ASU	993,000	1,173	33	7
83.24	40th St./Sky Harbor	918,000	1,132	24	8
85.80	20th Street	853,000	1,106	24	8.5
87.85	Central Avenue	794,000	1,084	22	9.5
90.41	27th Avenue	750,000	1,058	28	10
98.97	93rd Avenue	631,000	970	20	13
105.18	Goodyear, Az.	534,000	929	26	15
119.65	Buckeye, Az.	421,000	842	21	19
137.20	Gillespie Dam	264,000	775	25	25

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 8
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 7

Horseshoe Dam fails due to the Inflow Design Flood with subsequent sudden failure of Bartlett Dam due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Horseshoe Inflow	763,700	--	--	
17.28	Below Horseshoe	1,860,000	1,980	78	1
37.38	Below Bartlett	4,355,000	1,769	160	3
53.19	Near Ft. McDowell	2,965,000	1,456	46	4.5
63.66	Granite Reef Dam	2,175,000	1,359	49	6
77.87	Hayden Road	2,050,000	1,197	29	7.5
79.69	Tempe Butte/ASU	1,990,000	1,179	39	8
83.24	40th St./Sky Harbor	1,915,000	1,139	31	9
85.80	20th Street	1,850,000	1,114	32	9.5
87.85	Central Avenue	1,735,000	1,094	32	10
90.41	27th Avenue	1,690,000	1,065	32	11
98.97	93rd Avenue	1,560,000	982	32	13.5
105.18	Goodyear, Az.	1,460,000	940	37	15
119.65	Buckeye, Az.	1,335,000	852	37	18.5
137.20	Gillespie Dam	1,030,000	804	54	24.5

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 9
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 8

Roosevelt Dam fails due to the Maximum Credible Earthquake with subsequent failure of Horse Mesa, Mormon Flat and Stewart Mountain Dams due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Roosevelt Inflow	Small	--	--	0
14.50	Below Roosevelt Dam	2,950,000	2,087	178	1.5
31.47	Below Horse Mesa	6,730,000	1,899	252	4.5
41.61	Below Mormon Flat	4,095,000	1,775	261	5.5
50.74	Below Stewart Mtn.	3,790,000	1,539	129	6.5
63.66	Granite Reef Dam	3,335,000	1,371	61	7.5
77.87	Hayden Road	3,025,000	1,201	33	9
79.69	Tempe Butte/ASU	2,810,000	1,183	43	9
83.24	40th St./Sky Harbor	2,710,000	1,143	35	10
85.80	20th Street	2,600,000	1,118	36	10.5
87.85	Central Avenue	2,440,000	1,098	36	11
90.41	27th Avenue	2,355,000	1,068	35	11.5
98.97	93rd Avenue	2,040,000	986	36	14.5
105.18	Goodyear, Az.	1,800,000	943	40	15.5
119.65	Buckeye, Az.	1,450,000	859	38	19.4
137.20	Gillespie Dam	917,000	801	51	25.5
Overflow	Guadalupe Rd., Tempe	170,000	1,193	7	9.5

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 10
Summary of Maximum Flows, Depths, Elevations,
and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 9

Mormon Flat Dam fails due to the Inflow Design Flood with subsequent failure of Stewart Mountain Dam due to overtopping. Roosevelt and Horse Mesa Dams do not fail.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time Max. Depth[3/] (hours)
--	Mormon Flat Inflow	382,000	--	--	0
41.61	Below Mormon Flat	1,500,000	1,633	119	0.5
50.74	Below Stewart Mtn.	2,055,000	1,485	74	1
63.66	Granite Reef Dam	1,195,000	1,346	36	2.5
77.87	Hayden Road	1,005,000	1,190	22	5
79.69	Tempe Butte/ASU	988,000	1,173	33	5.5
83.24	40th St./Sky Harbor	957,000	1,132	24	6.5
85.80	20th Street	926,000	1,107	25	7
87.85	Central Avenue	894,000	1,086	24	8
90.41	27th Avenue	873,000	1,059	26	8.5
98.97	93rd Avenue	819,000	974	24	11.5
105.18	Goodyear, Az.	798,000	933	30	12.5
119.65	Buckeye, Az.	762,000	849	28	16
137.20	Gillespie Dam	643,000	791	41	23

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 11
Summary of Maximum Flows, Depths, Elevations,
and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 10

Horseshoe Dam fails due to the Inflow Design Flood with subsequent slow failure of Bartlett Dam due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum[2/] Depth (ft)	Travel Time[3/] Max. Depth (hours)
--	Horseshoe Inflow	763,700	--	--	0
17.28	Below Horseshoe	1,860,000	1,980	78	1.5
37.38	Below Bartlett	2,660,000	1,743	134	5
53.19	Near Ft. McDowell	2,290,000	1,452	42	6
63.66	Granite Reef Dam	2,025,000	1,352	48	7.5
77.87	Hayden Road	1,955,000	1,197	28	9
79.69	Tempe Butte/ASU	1,920,000	1,179	39	9
83.24	40th St./Sky Harbor	1,880,000	1,139	31	10
85.80	20th Street	1,835,000	1,114	32	10.5
87.85	Central Avenue	1,750,000	1,094	32	11
90.41	27th Avenue	1,720,000	1,065	32	12
98.97	93rd Avenue	1,605,000	982	32	14.5
105.18	Goodyear, Az.	1,515,000	940	37	15.5
119.65	Buckeye, Az.	1,395,000	858	37	19
137.20	Gillespie Dam	1,070,000	805	55	25

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 12
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 11

Roosevelt Dam fails due to the Maximum Credible Earthquake with subsequent slow failures of Horse Mesa, Mormon Flat and Stewart Mountains Dams due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time[3/] Max. Depth (hours)
--	Roosevelt Inflow	Small	--	--	0
14.50	Below Roosevelt Dam	705,000	1,995	86	2
31.47	Below Horse Mesa	687,000	1,755	106	9
41.61	Below Mormon Flat	1,140,000	1,654	140	10.5
50.74	Below Stewart Mtn.	1,110,000	1,481	70	15
63.66	Granite Reef Dam	1,005,000	1,345	35	15.5
77.87	Hayden Road	901,000	1,189	21	18
79.69	Tempe Butte/ASU	888,000	1,172	32	18
83.24	40th St./Sky Harbor	864,000	1,131	23	19
85.80	20th Street	843,000	1,106	24	19.5
87.85	Central Avenue	818,000	1,085	23	20
90.41	27th Avenue	798,000	1,058	25	21
98.97	93rd Avenue	734,000	972	22	23.5
105.18	Goodyear, Az.	686,000	931	28	25
119.65	Buckeye, Az.	598,000	846	25	29
137.20	Gillespie Dam	417,000	783	33	35

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

Table 13
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 12

Roosevelt Dam fails due to the Inflow Design Flood with subsequent slow failure of Mormon Flat and Stewart Mountain Dams due to overtopping, followed by slow failure of Horse Mesa Dam due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time[3/] Max. Depth (hours)
--	Roosevelt Inflow	678,000	--	--	--
14.50	Below Roosevelt Dam	407,000	1,975	66	--
31.47	Below Horse Mesa	380,000	1,722	73	--
41.61	Below Mormon Flat	698,000	1,621	107	--
50.74	Below Stewart Mtn.	823,000	1,461	51	1.5[4/]
63.66	Granite Reef Dam	865,000	1,343	33	3.5
77.87	Hayden Road	843,000	1,188	20	6
79.69	Tempe Butte/ASU	839,000	1,172	32	6.5
83.24	40th St./Sky Harbor	832,000	1,131	23	7
85.80	20th Street	824,000	1,106	24	8
87.85	Central Avenue	813,000	1,085	23	8.5
90.41	27th Avenue	805,000	1,058	25	9.5
98.97	93rd Avenue	782,000	973	23	12
105.18	Goodyear, Az.	780,000	933	30	13.5
119.65	Buckeye, Az.	766,000	849	28	17
137.20	Gillespie Dam	672,000	792	42	24

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.

2/ Maximum elevation minus approximate streambed elevation.

3/ Approximate time from the start of initial dam failure to maximum depth of flooding.

4/ Due to the structure of this scenario, the failure of Stewart Mountain Dam controlled the maximum water surface elevations downstream. Thus, "zero hour" for travel time purposes coincides with the onset of failure at Stewart Mountain Dam.

Table 14
Summary of Maximum Flows, Depths, Elevations, and Floodwave Travel Times

Salt River Project Inundation Mapping Study

SCENARIO 13

Roosevelt Dam fails due to the Inflow Design Flood with subsequent sudden failure of Mormon Flat and Stewart Mountain Dams due to overtopping, followed by the sudden failure of Horse Mesa Dam due to overtopping.

River Mile[1/]	Approximate Location	Maximum Discharge (ft^3/s)	Maximum Elevation (ft)	Maximum Depth[2/] (ft)	Travel Time[3/] Max. Depth (hours)
--	Roosevelt Inflow	678,000	--	--	0
14.50	Below Roosevelt Dam	3,710,000	2,109	200	2
31.47	Below Horse Mesa	7,360,000	1,913	264	4.5
41.61	Below Mormon Flat	5,330,000	1,803	289	5
50.74	Below Stewart Mtn.	5,030,000	1,553	142	5.5
63.66	Granite Reef Dam	4,590,000	1,382	72	7
77.87	Hayden Road	4,480,000	1,205	37	8.5
79.69	Tempe Butte/ASU	4,000,000	1,188	48	8.5
83.24	40th St./Sky Harbor	3,950,000	1,148	40	9
85.80	20th Street	3,890,000	1,124	42	9.5
87.85	Central Avenue	3,800,000	1,105	43	10
90.41	27th Avenue	3,740,000	1,074	41	10.5
98.97	93rd Avenue	3,470,000	995	45	12.5
105.18	Goodyear, Az.	3,300,000	954	51	13.5
119.65	Buckeye, Az.	2,950,000	873	52	17
137.20	Gillespie Dam	2,000,000	830	80	23
Overflow	Guadalupe Rd., Tempe	466,000	1,198	12	9

1/ Distance downstream from the headwaters of Theodore Roosevelt Dam. Roosevelt Dam is at River Mile 14.43.
2/ Maximum elevation minus approximate streambed elevation.
3/ Approximate time from the start of initial dam failuire to maximum depth of flooding.

INUNDATION MAPS

MINOR FLOOD BOUNDARY

GENERAL DESCRIPTION

1.) ANY STEWART MOUNTAIN EARTHQUAKE-TYPE FAILURE.

DETAILED STUDY SCENARIO DESCRIPTION

* 1.) SCENARIO #1 - STEWART MOUNTAIN DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 1529.0 MSL. TFH = 0.2 HOURS.

LOWER MODERATE FLOOD BOUNDARY

GENERAL DESCRIPTION

1.) ANY BARTLETT EARTHQUAKE-TYPE FAILURE.

2.) ANY MORMON FLAT EARTHQUAKE-TYPE FAILURE.[1]

DETAILED STUDY SCENARIO DESCRIPTION

* 1.) SCENARIO #3 - BARTLETT DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 1798.0 MSL. TFH = 0.2 HOURS.

2.) SCENARIO #5 - MORMON FLAT DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 1660.5 MSL. STEWART MOUNTAIN FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. TFH = 0.2 HOURS FOR BOTH DAMS.

UPPER MODERATE FLOOD BOUNDARY

GENERAL DESCRIPTION

1.) ANY 'PARTIAL' FAILURE OF ROOSEVELT DAM.[1]

2.) ANY OVERTOPPING FAILURE ON THE SALT RIVER NOT INCLUDING ROOSEVELT.[1]

3.) ANY HORSESHOE OR HORSE MESA EARTHQUAKE-TYPE FAILURE.

4.) ANY BARTLETT OVERTOPPING FAILURE.

DETAILED STUDY SCENARIO DESCRIPTION

1.) SCENARIO #2 - STEWART MOUNTAIN DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE SUMMER IDF. TFH = 0.2 HOURS.

2.) SCENARIO #4 - BARTLETT DAM FAILS AT THE TIME WHEN THE OUTFLOW FROM HORSESHOE DAM REACHES 300,000 CFS. (BARTLETT BREACH ELEVATION - 1806.1 MSL). TFH = 0.2 HOURS.

3.) SCENARIO #6 - HORSE MESA DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 1914.0 MSL. MORMON FLAT AND STEWART MOUNTAIN DAMS FAIL AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. TFH = 0.2 HOURS FOR EACH DAM.

* 4.) SCENARIO #9 - MORMON FLAT FAILS DURING THE IDF WITH FAILURE OCCURRING AT 10 FEET OF OVERTOPPING. STEWART MOUNTAIN DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. TFH = 0.2 HOURS FOR BOTH DAMS.

5.) SCENARIO #11 - ROOSEVELT DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 2136.0. HORSE MESA, MORMON FLAT AND STEWART MOUNTAIN DAMS FAIL AT THE PEAK OVERTOPPING ELEVATIONS CAUSED BY THE FLOOD WAVE. PARTIAL FAILURES AND TFH = 2.0 HOURS FOR EACH DAM.

6.) SCENARIO #12 - ROOSEVELT DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE WINTER IDF. HORSE MESA DAM BREACHS AFTER 10 HOURS OF OVERTOPPING. MORMON FLAT AND STEWART MOUNTAIN DAMS FAIL JUST PRIOR TO HORSE MESA DAM. PARTIAL FAILURES AND TFH = 2.0 HOURS FOR EACH DAM.

WORST CASE FLOOD BOUNDARY

GENERAL DESCRIPTION

1.) ANY 'WORST CASE'[2] FAILURE OF ROOSEVELT[1]

2.) ANY HORSESHOE OVERTOPPING FAILURE[1]

DETAILED STUDY SCENARIO DESCRIPTION

1.) SCENARIO #7 - HORSESHOE DAM FAILS WHILE ROUTING THE WINTER IDF THROUGH THE RESERVOIR, BREACH ELEVATION IS 2038.9 MSL. BARTLETT DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. TFH = 2.0 HOURS FOR HORSESHOE AND 0.2 HOURS FOR BARTLETT.

2.) SCENARIO #8 - ROOSEVELT DAM FAILS DUE TO AN EARTHQUAKE WITH THE WATER SURFACE AT THE NORMAL CONSERVATION POOL - 2136.0 MSL. HORSE MESA, MORMON FLAT AND STEWART MOUNTAIN DAMS FAIL AT 93.4 (PEAK), 60 AND 41.5 FEET OF OVERTOPPING RESPECTIVELY. TFH = 2.0 HOURS FOR ROOSEVELT DAM AND 0.2 HOURS FOR THE THREE DOWNSTREAM DAMS.

3.) SCENARIO #10 - HORSESHOE DAM FAILS WHILE ROUTING THE WINTER IDF THROUGH THE RESERVOIR, BREACH ELEVATION IS 2038.9 MSL. BARTLETT DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. PARTIAL FAILURES AND TFH = 2.0 HOURS FOR EACH DAM.

* 4.) SCENARIO #13 - ROOSEVELT DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE WINTER IDF. HORSE MESA DAM FAILS AT THE PEAK OVERTOPPING ELEVATION CAUSED BY THE FLOOD WAVE. MORMON FLAT AND STEWART MOUNTAIN FAIL JUST PRIOR TO HORSE MESA DAM. TFH = 2.0 HOURS FOR ROOSEVELT AND 0.2 HOURS FOR THE THREE DOWNSTREAM DAMS.

FOOTNOTES:

1. ASSUMES ANY DOWNSTREAM DAMS FAIL.
2. WORST CASE FAILURE MEANS THE ENTIRE STRUCTURE FAILS.

NOTES:

- UNLESS STATED 'PARTIAL FAILURE', ASSUME A 'WORST CASE'[2] FAILURE.
- TFH - TIME REQUIRED FOR BREACH TO ATTAIN ITS MAXIMUM DIMENSIONS.
- IDF - INFLOW DESIGN FLOOD.
- * DENOTES SCENARIOS PLOTTED ON INUNDATION MAPS.

THE TRAVEL TIME SHOWN ON THE INUNDATION MAPS IS DEFINED AS THE TIME FROM THE START OF THE DAM FAILURE TO THE MAXIMUM DEPTH OF FLODDING.

UNITED STATES
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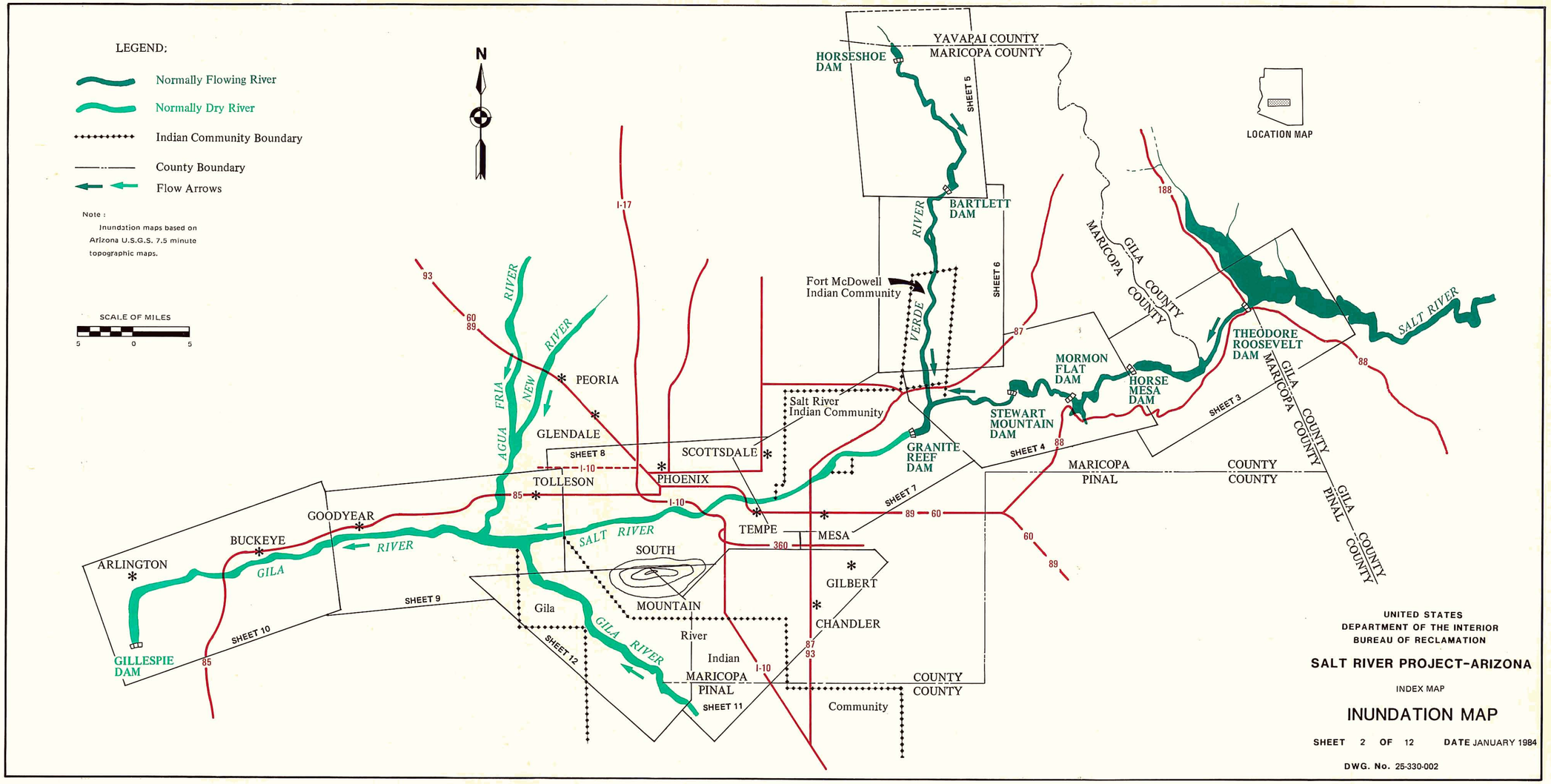
SALT RIVER PROJECT-ARIZONA

FLOOD BOUNDARY - SCENARIO DESCRIPTION

SHEET 1 OF 12 DATE JANUARY 1984

DWG. No. 25-330-001


LEGEND:
Normally Flowing River
Normally Dry River
Indian Community Boundary
County Boundary
Flow Arrows
Note :
Inundation maps based on Arizona U.S.G.S. 7.5 minute topographic maps.
SCALE OF MILES
5 0 5
N
LOCATION MAP
YAVAPAI COUNTY
MARICOPA COUNTY
HORSESHOE DAM
BARTLETT DAM
Fort McDowell Indian Community
Salt River Indian Community
Gila River Indian Community
MORMON FLAT DAM
HORSE MESA DAM
STEWART MOUNTAIN DAM
GRANITE REEF DAM
THEODORE ROOSEVELT DAM
GILLESPIE DAM
PEORIA
GLENDALE
SCOTTSDALE
PHOENIX
TOLLESON
GOODYEAR
BUCKEYE
ARLINGTON
TEMPE
MESA
GILBERT
CHANDLER
SOUTH MOUNTAIN
SALT RIVER
GILA RIVER
VERDE RIVER
NEW RIVER
AGUA FRIA RIVER
MARICOPA COUNTY
PINAL COUNTY
GILA COUNTY
SHEET 3
SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
SHEET 10
SHEET 11
SHEET 12
I-10
I-17
60
85
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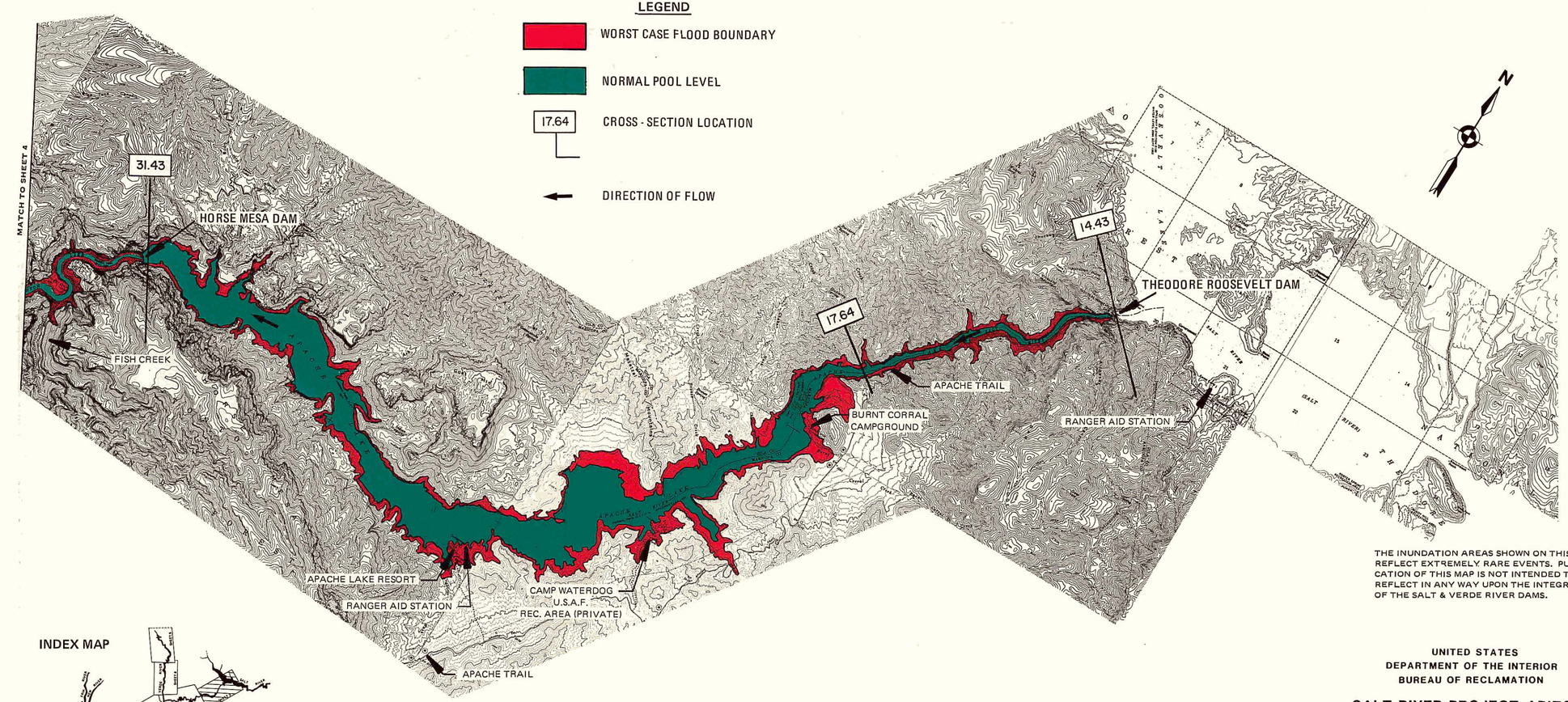
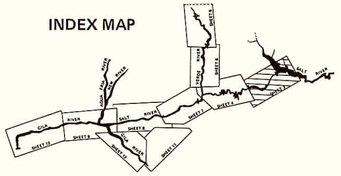
88
89
93
188
360
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
SALT RIVER PROJECT-ARIZONA
INDEX MAP
INUNDATION MAP
SHEET 2 OF 12
DATE JANUARY 1984
DWG. No. 25-330-002



INDEX MAP



1 ½ 0 1 MILE
1 .5 0 1 KILOMETER

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
17.64	3.2 MILES D/S OF ROOSEVELT DAM	2.0
31.43	HORSE MESA DAM	4.0

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

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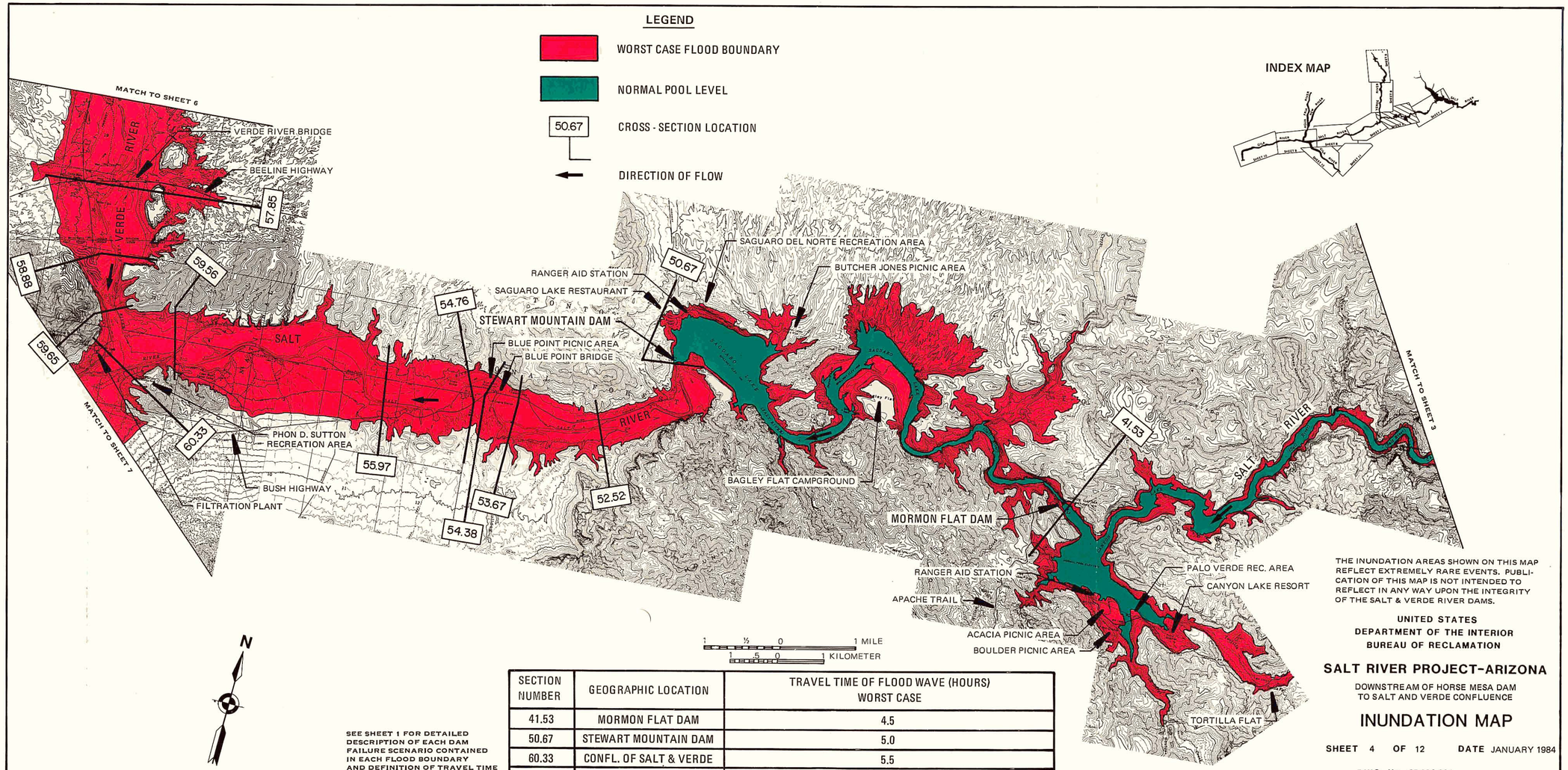
SALT RIVER PROJECT-ARIZONA

ROOSEVELT DAM TO HORSE MESA DAM

INUNDATION MAP

SHEET 3 OF 12 DATE JANUARY 1984

DWG. No. 25-330-003



SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
41.53	MORMON FLAT DAM	4.5
50.67	STEWART MOUNTAIN DAM	5.0
60.33	CONFL. OF SALT & VERDE	5.5

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

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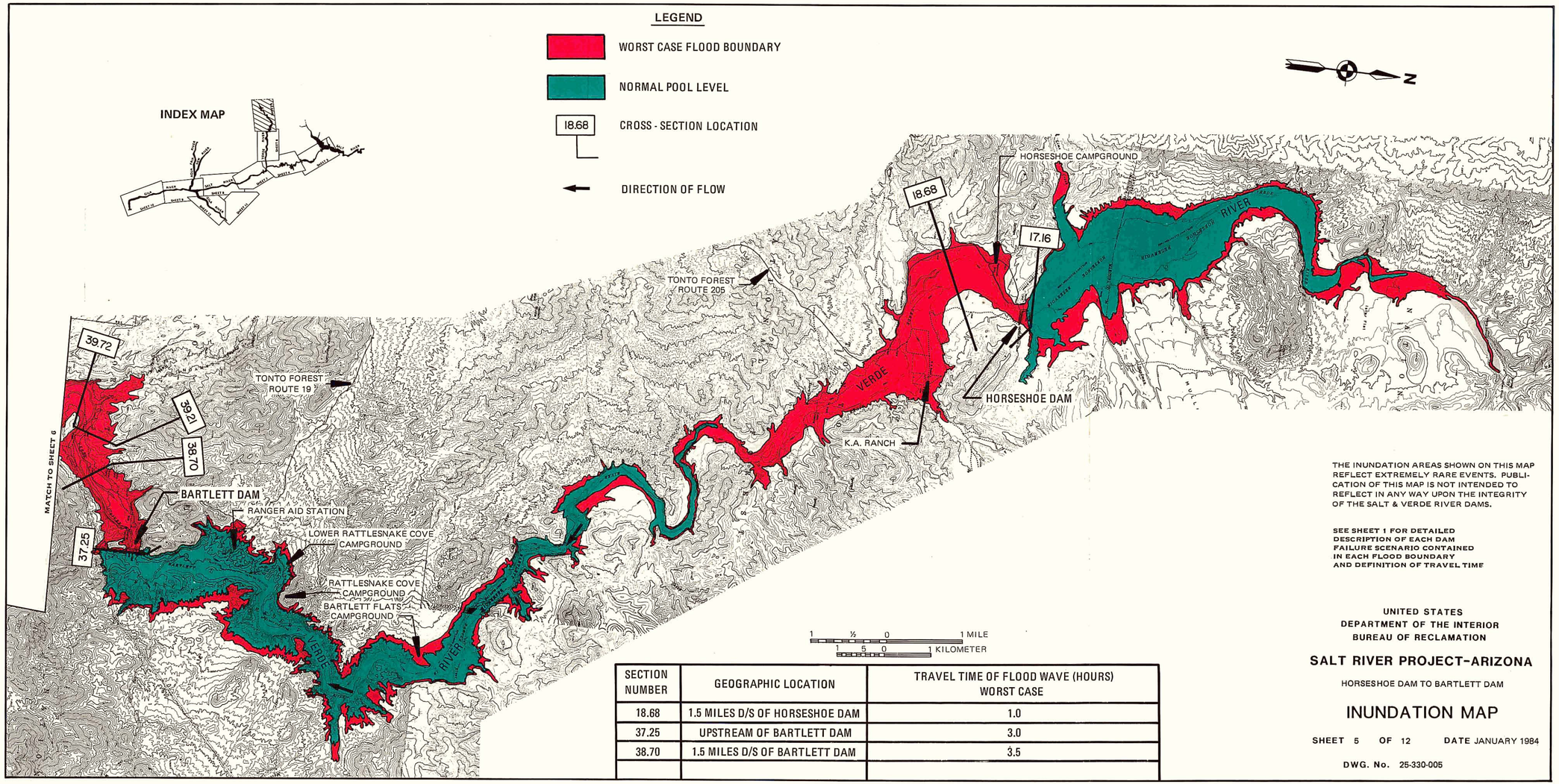
SALT RIVER PROJECT-ARIZONA

DOWNSTREAM OF HORSE MESA DAM TO SALT AND VERDE CONFLUENCE

INUNDATION MAP

SHEET 4 OF 12 DATE JANUARY 1984

DWG. No. 25-330-004



SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
18.68	1.5 MILES D/S OF HORSESHOE DAM	1.0
37.25	UPSTREAM OF BARTLETT DAM	3.0
38.70	1.5 MILES D/S OF BARTLETT DAM	3.5

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

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SALT RIVER PROJECT-ARIZONA

HORSESHOE DAM TO BARTLETT DAM

INUNDATION MAP

SHEET 5 OF 12 DATE JANUARY 1984

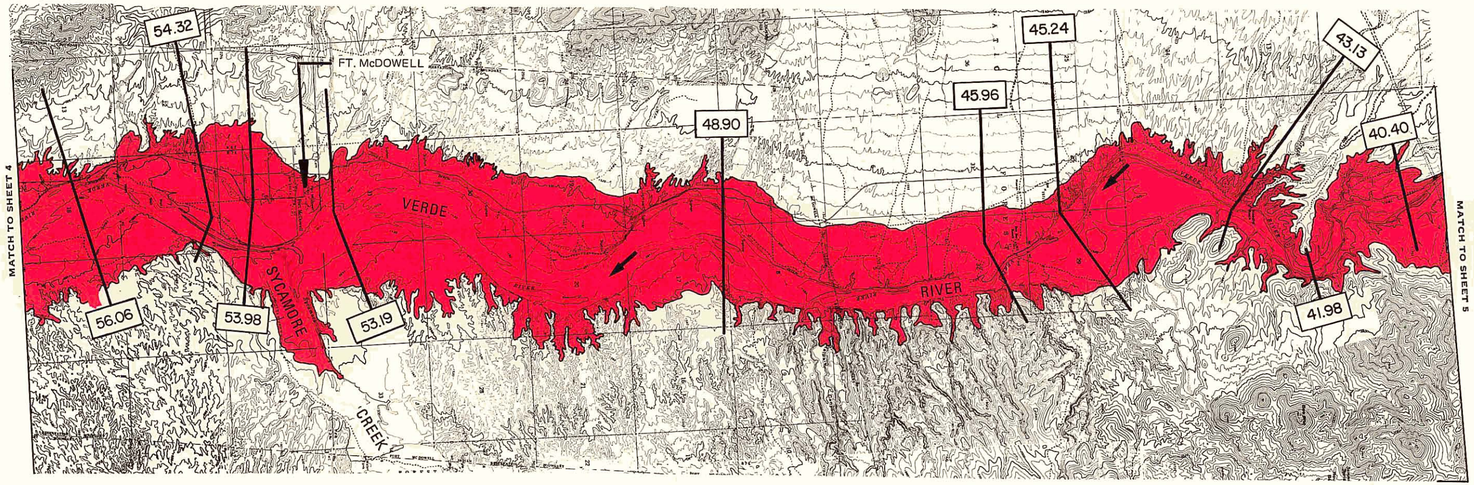
DWG. No. 25-330-005

LEGEND

WORST CASE FLOOD BOUNDARY

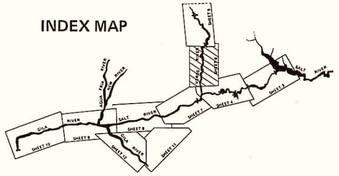
DIRECTION OF FLOW

48.90 CROSS - SECTION LOCATION



THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

INDEX MAP



1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
43.13	5.9 MILES D/S OF BARTLETT DAM	3.5
53.19	UPSTREAM OF FORT MC DOWELL	4.5

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

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DOWNSTREAM OF BARTLETT DAM
TO VERDE AND SALT CONFLUENCE

INUNDATION MAP

SHEET 6 OF 12 DATE JANUARY 1984

DWG. No. 25-330-006

INDEX MAP

LEGEND

FLOOD BOUNDARIES

- MINOR
- LOWER MODERATE
- UPPER MODERATE
- WORST CASE
- DIRECTION OF FLOW
- 68.23 CROSS - SECTION LOCATION
- – SCHOOL
- – HOSPITAL

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS)			
63.66	GRANITE REEF DAM	2.5	3.0-3.5	2.0-4.0	6.0-7.5
77.87	HAYDEN ROAD	6.0	6.5-7.5	4.5-6.5	7.5-9.0

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

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SALT RIVER PROJECT–ARIZONA

GRANITE REEF DAM
TO
GILLESPIE DAM

INUNDATION MAP

TEMPE AREA

SHEET 7 OF 12 DATE JANUARY 1984

DWG. No. 25-330-007

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SALT RIVER PROJECT-ARIZONA

GRANITE REEF DAM
TO
GILLESPIE DAM

INUNDATION MAP

PHOENIX AREA

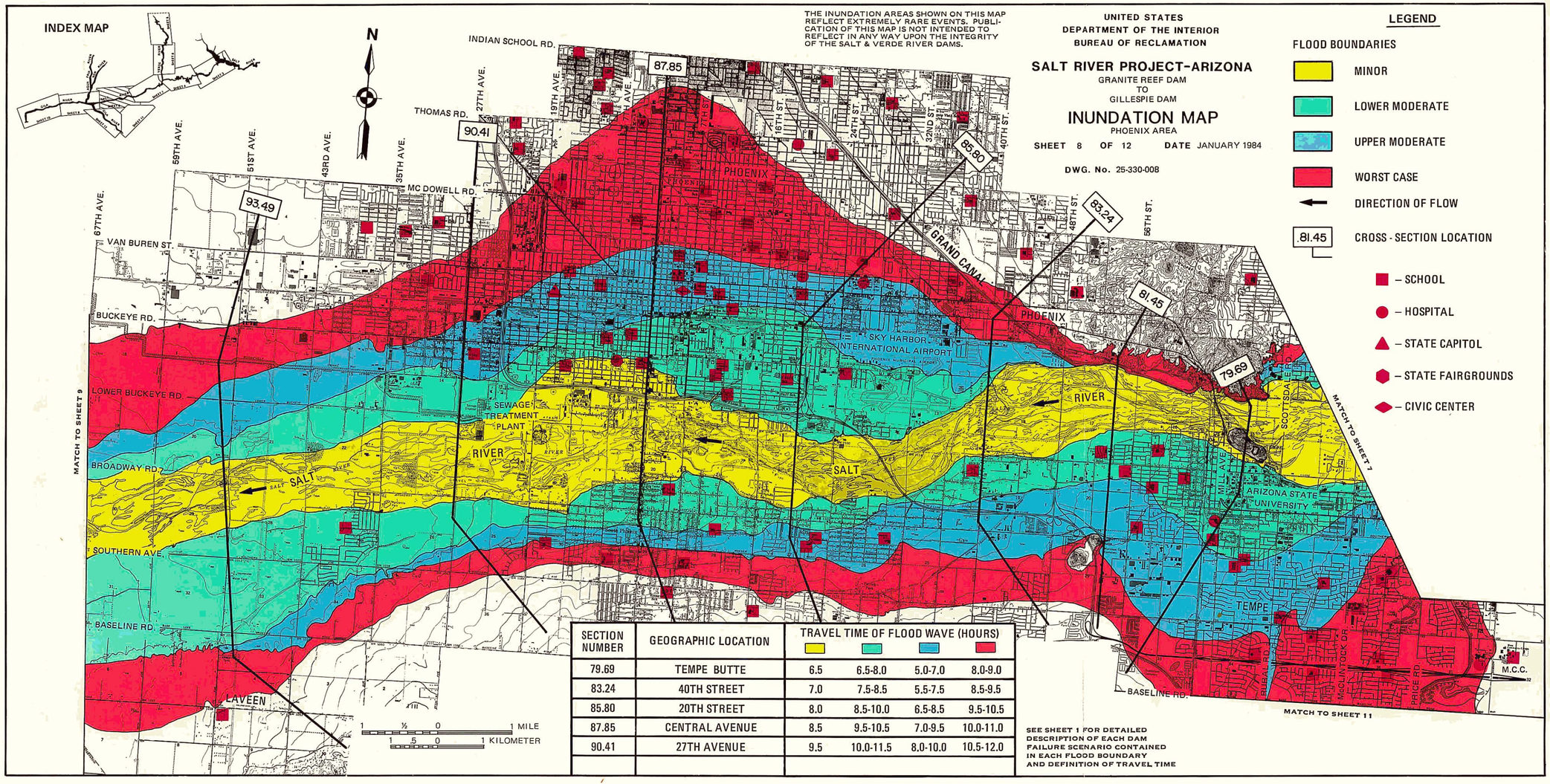
SHEET 8 OF 12 DATE JANUARY 1984

DWG. No. 25-330-008

LEGEND

FLOOD BOUNDARIES

- MINOR
- LOWER MODERATE
- UPPER MODERATE
- WORST CASE
- DIRECTION OF FLOW
- 81.45 CROSS - SECTION LOCATION
- SCHOOL
- HOSPITAL
- STATE CAPITOL
- STATE FAIRGROUNDS
- CIVIC CENTER



SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS)			
79.69	TEMPE BUTTE	6.5	6.5-8.0	5.0-7.0	8.0-9.0
83.24	40TH STREET	7.0	7.5-8.5	5.5-7.5	8.5-9.5
85.80	20TH STREET	8.0	8.5-10.0	6.5-8.5	9.5-10.5
87.85	CENTRAL AVENUE	8.5	9.5-10.5	7.0-9.5	10.0-11.0
90.41	27TH AVENUE	9.5	10.0-11.5	8.0-10.0	10.5-12.0

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

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SALT RIVER PROJECT-ARIZONA

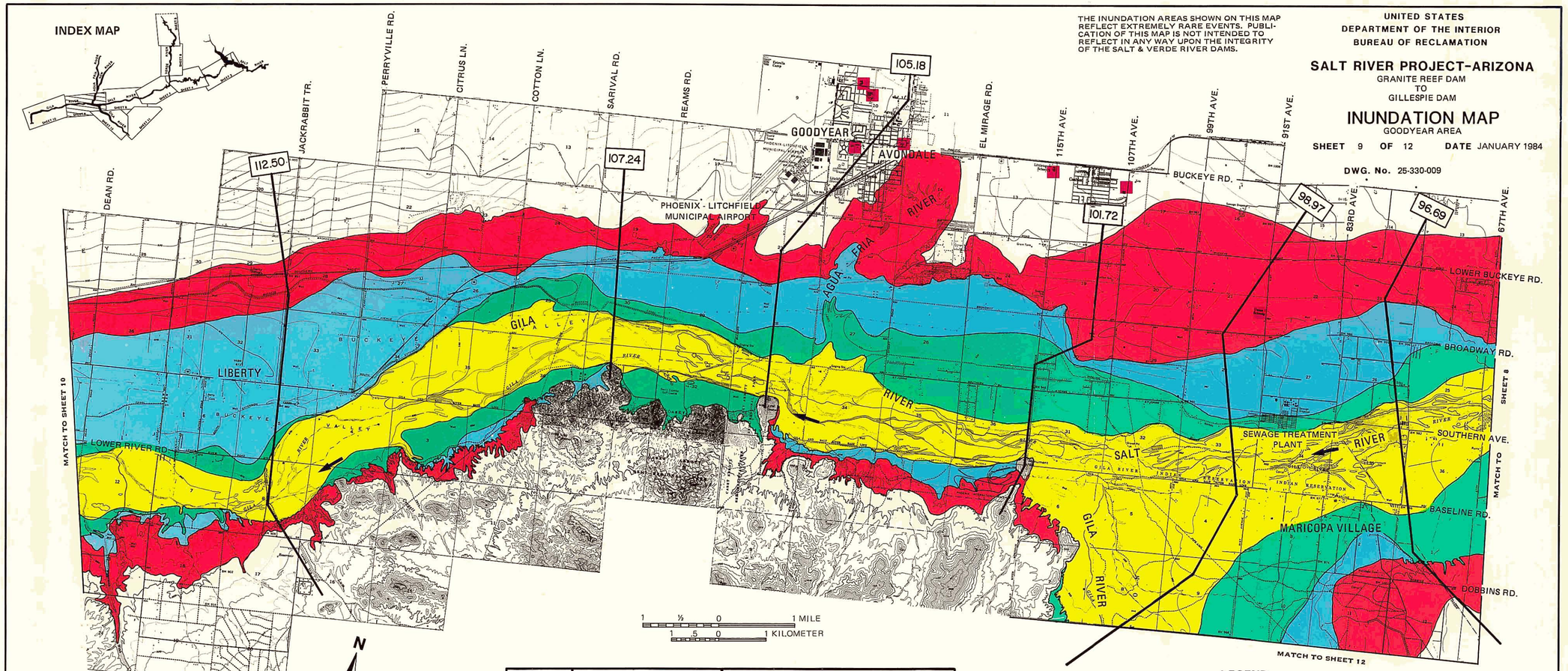
GRANITE REEF DAM
TO
GILLESPIE DAM

INUNDATION MAP

GOODYEAR AREA

SHEET 9 OF 12 DATE JANUARY 1984

DWG. No. 25-330-009



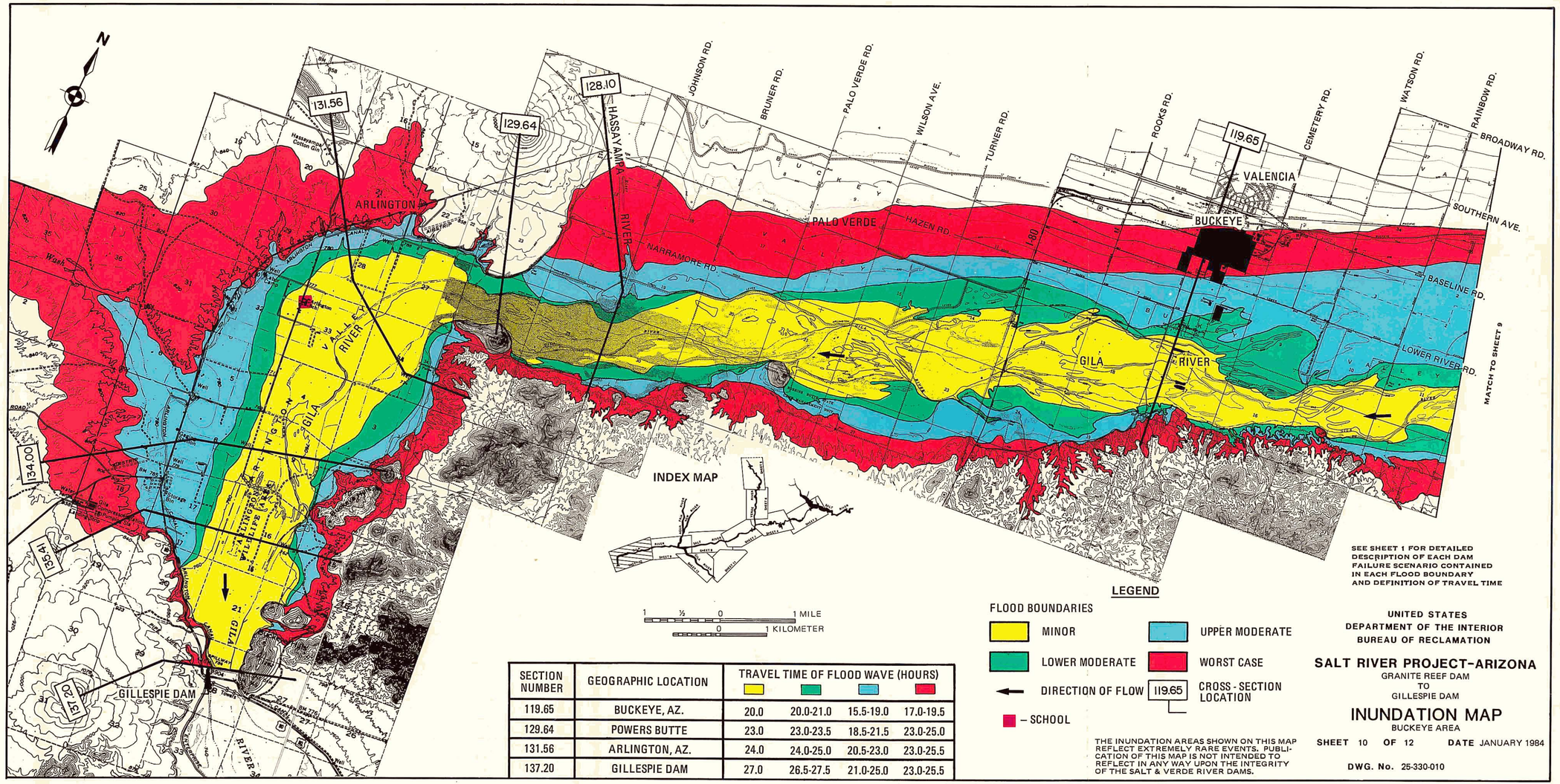
SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY AND DEFINITION OF TRAVEL TIME

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS)			
96.69	76TH AVENUE	11.5	11.5-13.0	9.5-11.5	11.5-13.0
98.97	93RD AVENUE	12.5	13.5-14.5	10.5-13.0	12.5-14.5
105.18	GOODYEAR, AZ.	15.5	16.0-17.0	12.0-15.0	13.5-15.5
112.50	LIBERTY, AZ.	17.5	18.0-19.0	13.5-16.5	15.0-17.0

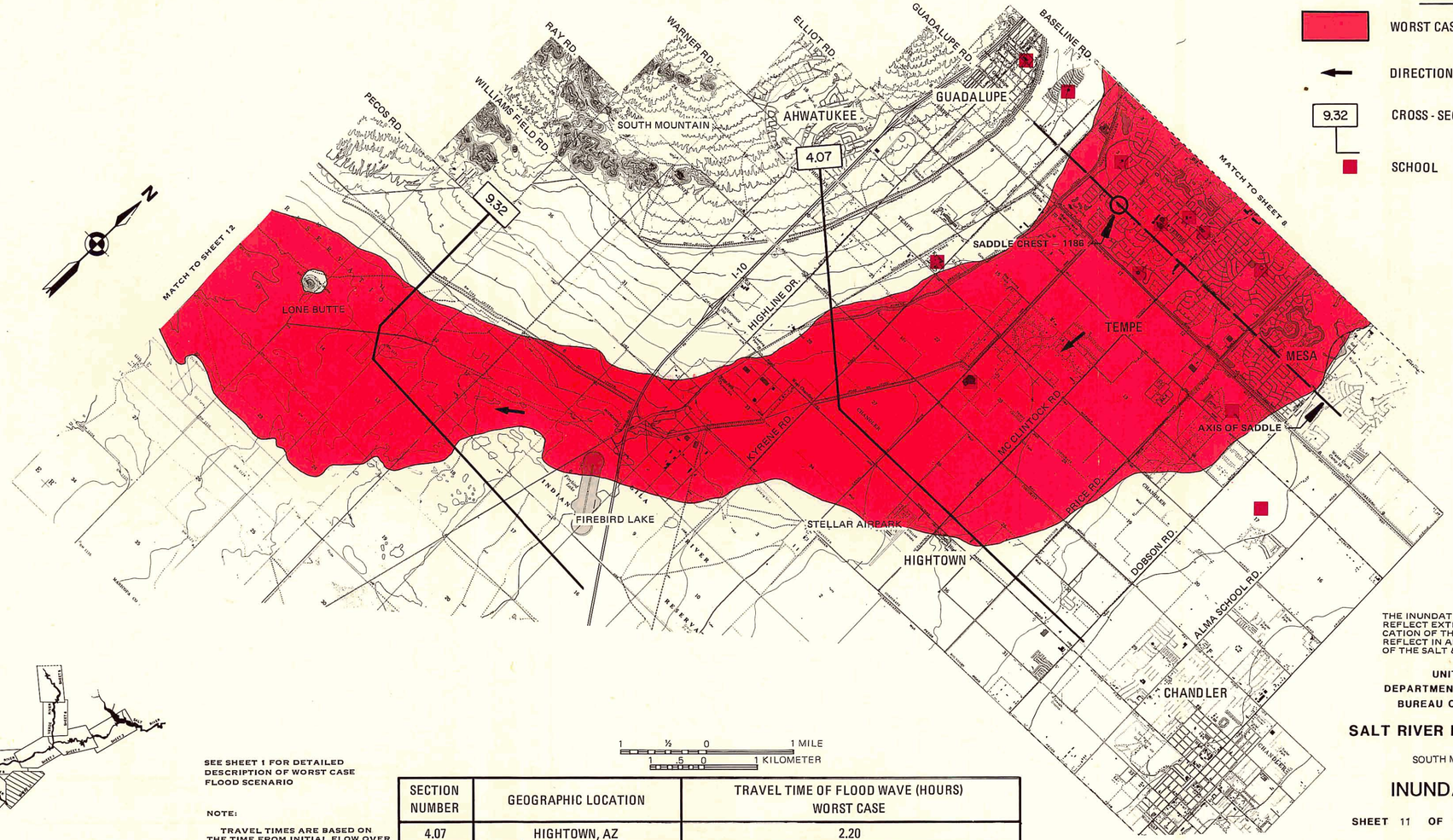
LEGEND

FLOOD BOUNDARIES

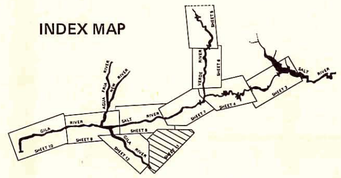
- MINOR
- LOWER MODERATE
- UPPER MODERATE
- WORST CASE
- 96.69 CROSS-SECTION LOCATION
- DIRECTION OF FLOW
- SCHOOL



SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS)			
119.65	BUCKEYE, AZ.	20.0	20.0-21.0	15.5-19.0	17.0-19.5
129.64	POWERS BUTTE	23.0	23.0-23.5	18.5-21.5	23.0-25.0
131.56	ARLINGTON, AZ.	24.0	24.0-25.0	20.5-23.0	23.0-25.5
137.20	GILLESPIE DAM	27.0	26.5-27.5	21.0-25.0	23.0-25.5



INDEX MAP



SEE SHEET 1 FOR DETAILED DESCRIPTION OF WORST CASE FLOOD SCENARIO

NOTE:

TRAVEL TIMES ARE BASED ON THE TIME FROM INITIAL FLOW OVER THE SADDLE TO THE MAXIMUM LEVEL OF FLOODING.

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
4.07	HIGHTOWN, AZ	2.20
9.32	LONE BUTTE	5.80

THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EXTREMELY RARE EVENTS. PUBLICATION OF THIS MAP IS NOT INTENDED TO REFLECT IN ANY WAY UPON THE INTEGRITY OF THE SALT & VERDE RIVER DAMS.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

SALT RIVER PROJECT-ARIZONA

SOUTH MOUNTAIN REACH

INUNDATION MAP

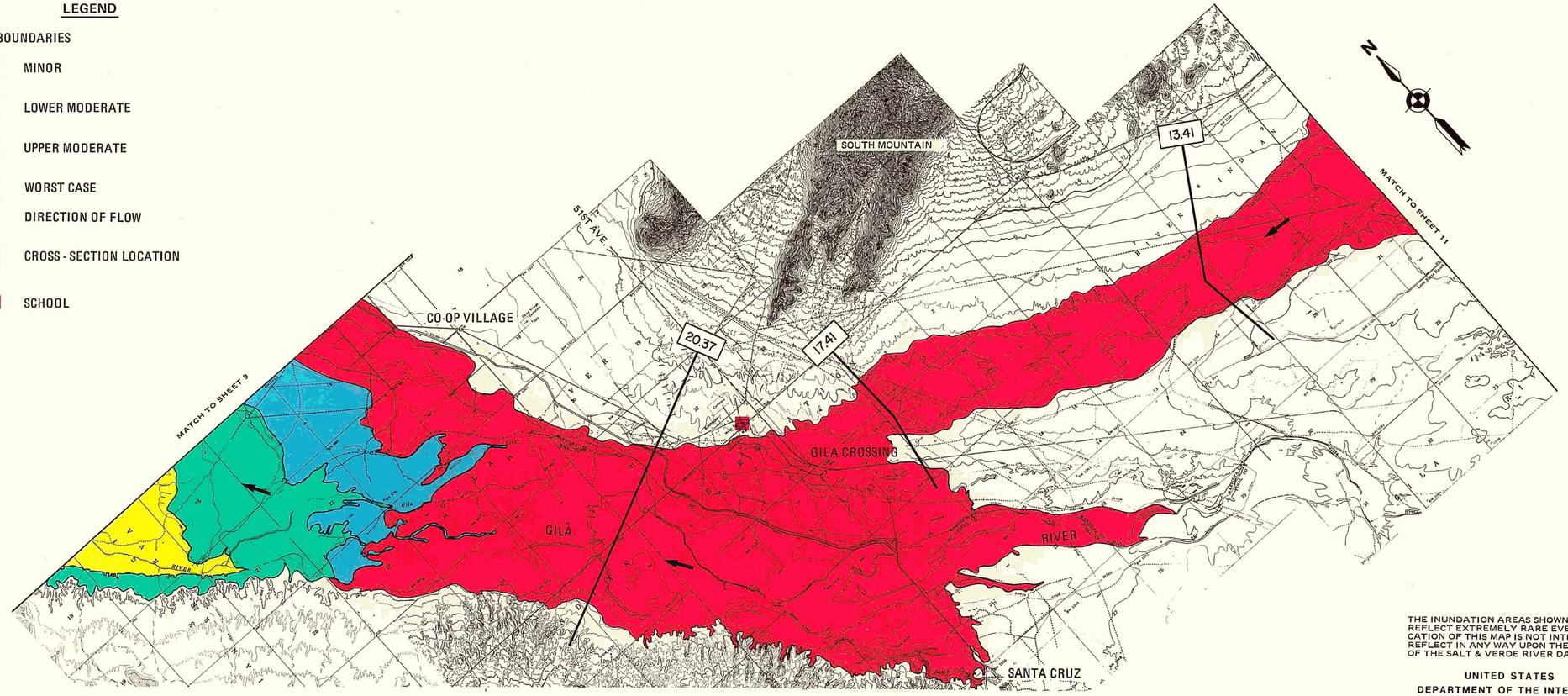
SHEET 11 OF 12 DATE JANUARY 1984

DWG. No. 25-330-011

LEGEND

FLOOD BOUNDARIES

- MINOR
- LOWER MODERATE
- UPPER MODERATE
- WORST CASE
- DIRECTION OF FLOW
- 17.41 CROSS-SECTION LOCATION
- SCHOOL



INDEX MAP

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

SECTION NUMBER	GEOGRAPHIC LOCATION	TRAVEL TIME OF FLOOD WAVE (HOURS) WORST CASE
13.41	——	7.5
17.41	GILA CROSSING	8.5
20.37	KOMATKE	9.6

SEE SHEET 1 FOR DETAILED DESCRIPTION OF EACH DAM FAILURE SCENARIO CONTAINED IN EACH FLOOD BOUNDARY

NOTE:

TRAVEL TIMES ARE BASED ON THE TIME FROM INITIAL FLOW OVER THE SADDLE TO THE MAXIMUM LEVEL OF FLOODING.

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INUNDATION MAP

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