

GUADALUPE-BLANCO RIVER AUTHORITY

Interim Flood Preparedness Plan

Revised August 2005

Interim Flood Preparedness Plan

Lake Dunlap, Lake McQueeney, Lake Placid and Meadow Lake (Nolte)

Prepared by the Guadalupe-Blanco River Authority in cooperation with Preserve Lake Dunlap Association, Friends of Lake McQueeney, Citizens United for Lake Placid, Meadow Lake Homeowners, the City of Seguin, Guadalupe County, Comal County, and KWED Radio Station

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It is recommended that this plan be reviewed annually, in February.

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Understanding Local Flood Events

Background

This plan is being prepared as an interim measure while additional education and research can be completed toward an improved plan for flood warning, awareness, and preparedness. The areas included in this plan include the reach of the Guadalupe River from the City of New Braunfels to just downstream of the City of Seguin. This area includes a number of small lakes created in the early 1930's for hydroelectric generation. (Map of Area Lakes *Plat 1*)

Intervening Flows

In addition to readings from USGS gages upstream flows through area lakes are read at gages located at each of the hydroelectric dam sites. Residents should be aware that intervening flows from area creeks may cause a rapid increase in flows and elevations that would not be identified by an upstream gage. (See Plat 1 for Intervening Tributaries)

Flash Floods

It should be realized that this area is subject to flooding typical of hill country "flash floods". These areas typically provide fast run-off and high peaks of short duration. Additionally, these storms develop very rapidly. These combined conditions result in storms that provide minimum lead-time for prediction of flow rates and flood elevation.



Typical Hydrograph vs. Hill Country Hydrograph - "Flash Flood"



Area Lakes

It should also be recognized that the hydroelectric lakes, which were constructed in the 1920's and 1930's, do not contain flood protection benefits. These lakes impound a relatively small volume of water in comparison to large flood events. Due to the relatively "flat" topography (very little change in elevation) this area is not suited for large, deep flood control reservoirs. Instead, management of the flood plain by local government entities in cooperation with the Federal Emergency Management Administration and the Federal Flood Plain Act is the primary method for protection of life and property.

Terminology

- *CFS (cubic foot per second)* is a term used to describe a rate of flow and is considered a velocity. Since most of this area involves the impoundment of waters in the small lakes, the rate of flow is hard for the observer to distinguish in normal conditions. The local hydroelectric lakes can pass approximately 1,000 to 1,300 cfs though the generators with little noticeable difference in the velocity of the lake.
- *Foot in Rise* should not be used to define flood flows unless referring to a specific location with a known base elevation (datum). Many flood-monitoring gauges are read in cfs, and in feet above an established datum.
- *The County EMC* is the Emergency Management Coordinator for the county, appointed by the respective County Commissioners Court as the point of contact and "manager" during any disaster, including a flood. A city may also appoint a city co-ordinator.
- *The National Weather Service (NWS)* is the federal agency with primary responsibility to issue weather advisories and alerts.
- *The United States Geological Survey (USGS)* is the federal agency that provides stream flow gauging, analysis and reporting.

Significant Flood Events

Historical data is presented in this report as a point of reference and to help understand relative relationships during a flood event. A flood frequency is a statistical chance that at any given site, an event may occur, or return. A flood of the same frequency may occur in the same year. As an example:

100 year flood	1% chance
50 year flood	
25 year flood	4% chance
10 year flood	10% chance
5 year flood	

A listing of historic floods in cubic feet per second (cfs) and in feet above established datum is included at *Plat 2/2A*







Plat 2A

Canyon Dam and Reservoir

Canyon Reservoir, located on the Guadalupe River, upstream in Comal County is the only flood control reservoir in the Guadalupe River Basin. It is operated by the U. S. Army Corps of Engineers for flood control purposes, with the Guadalupe-Blanco River Authority operating the water supply portion of the reservoir for water supply purposes under permits issued by the Texas Natural Resource Conservation Commission.

Other Flood Management Structures

Several smaller flood retarding structures have also been constructed upstream on tributaries of the Guadalupe River, and several more are under consideration. These small structures may reduce the peak flows of some floods, however, they store only small volumes of water that is passed downstream or recharged slowly into the Edwards Aquifer.

While these structures provide substantial flood protection benefits, major rainfall events have occurred below these structures in 1972 and 1998. High rainfall and flood conditions also occurred in 1973 and 1991. <u>Additionally, increased development has resulted in increased run-off from roof tops, parking lots, and other conversions of pastureland to hard-surface uses.</u>

Rainfall Patterns

Rainfall patterns of flood events of 1972, 1998, 2002 and 2004 are illustrated on *Plats 3*, *4*, *4A and 4B*.





Rainfall Patterns in October 1998-Plat 4



Rainfall Pattern in 2002 – Plat 4A



Rainfall Pattern in 2004 - Plat 4B

Components of a Flood Preparedness Plan

Preparedness

Knowledge of impacts of flooding on specific areas, review of historic flood events, and **the development of a personal or family action plan is an important activity** that must take place before an event. This Interim Plan is intended to provide education regarding flood events and assist the individual and the local EMC in developing community flood plans. This manual should be reviewed each year in February.

Gathering of data

During a flood event, gathering of data regarding local rainfall as well as upstream rainfall and flows is vital. Gathering of this information is accomplished by the following entities:

The National Weather Service (NWS) uses weather radar and input from local gauges and observers. The NWS is the agency which makes predictions of flow levels based on weather radar and other inputs. This information is distributed to the EMC.

Plat 5 illustrates the flow of information during a flood event.

- United States Geological Survey (USGS) stream gauges are read via satellite, phone or radio wave communication links. These readings provide flow information at specific intervals, (usually 2-4 hour intervals during a rainfall event.) These gauges are useful in predicting flows with a travel time of several hours or days. *Plat 6*
- **GBRA** has the ability to monitor the USGS New Braunfels stream gauge. It must be recognized that this gauge is only 13 miles from Seguin, with a travel time for water of only 2-8 hours.
- **The City of Seguin** provides regular visual readings of water elevations at the Seguin Water Treatment Plant.
- Local water utilities including the Guadalupe-Blanco River Authority (GBRA) operate facilities such as the local hydroelectric dams, which provide a source of information on local rainfall and water levels of lakes at specific locations.

During any event you should be aware of runoff from un-gauged tributaries along the river. These tributaries can cause sudden rises in elevation. Some of the tributaries are shown on Plat 1.

Flood Emergency Communications Flow Chart





Predictions and Evacuation

The <u>National Weather Service</u> performs analysis and prediction of flows and has the primary responsibility for the preparation and execution of preparedness activities. The county <u>Emergency Management Coordinator (EMC)</u> coordinates for public notices, alerts, and instructions for evacuation of the county. A city may designate a City EMC, or other county or city officials may also issue directives.

Dissemination of Information

The National Weather Service distributes flood warnings and predictions. Reports of current conditions and technical assistance can be provided by GBRA from readings at each of the hydroelectric dams to 32,000 cfs.

The County EMC coordinates public notices, alerts, and instructions for evacuation. Trigger mechanisms and resulting planned and known actions are vital to the success of a plan. The primary sources for notification by the EMC are KWED (1580 A M) and NOAA Weather Radio.

The Interim Flood Preparedness Plan tracking chart has been developed to communicate flood levels directly to the individual by use of common, recognized terminology. The tracking chart is an insert in this booklet. The transfer of data to the public will remain the responsibility of the EMC.

The tracking chart provides a flow status that compares to four trigger levels:

color by graduated flow historic comparative event cubic feet per second comparison to known datum points referenced in feet

Community and Public Awareness and Response

Community awareness and response is developed through education and practice. The public must be able to translate a notice into an appropriate action. It must be recognized that the conditions of an event vary from location to location.

Flood Hazard Areas—Individuals should familiarize themselves with the local flood plain map as well as conditions in previous flood events within their neighborhoods. <u>Remember that run-off increases with the development of roads and the construction</u> <u>of homes or other structures</u>. As agricultural land is converted to residential or commercial use, it increases the volume and rate of run-off. *Plats 7A, 7B, 7C, and 7D.* Know your Flood Hazard Area. **Flood Hydrograph on Each Lake**---It is important that you familiarize yourself with the area of the river or lake you live on. As water flows "downhill" in a flood event, it may be higher in elevation at the upper end of a lake than at the dam location. Flow characteristics for various frequency floods have been developed for each area lake. Arbitrary "zones" have been designed by dividing each lake into approximate 1/3's by length. You should review these Flood Profiles. If you are given an elevation reading at a point downstream, it is important to know what it means at your specific location. **Lake Profile -** *Plats 8, 8A, 8B, 8C, 8D*











Lake Dunlap - Profile





GDKA

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This chart includes Arbitrary Area Designations. Elevations are based only on flood elevation points at each dam.

Lake Placid - Profile



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Meadow Lake - Profile



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based only on flood elevation points at each dam.

Time of Year

The following is a list of the times of year that **major flood** events have occurred in the area between New Braunfels and Seguin:

January	N/A
February	N/A
March	
April	N/A
May	
June	1900, 1935, 1987, 1997
July 1869, 1900, 1	1932, 1936, 1987, 2002
August	
September 1936,	1952, 1958, 1967, 1973, 1981
October	1913, 1921, 1998
November	
December	1913, 1991
1 · · · · · · · · · · · · · · · · · · ·	

Travel Time

Travel Time varies with the intensity of the rainfall and runoff and also with the topography of the area. Heavy runoff from intervening creeks can also slow the time of travel.

Preparing to Evacuate

In advance a "Personal Evacuation Plan" should be prepared. This plan should provide trigger points and actions to be taken during a flood event. A sample "planner" is attached for use in developing an individual or family plan.

Preliminary Evacuation Sites

During an actual event, sites will be announced by the EMC or other local officials. These sites may change based on actual events and availability.

Agency Phone Numbers

1.	TXDOT Web Page for Road Closures:	www.dot.state.tx.us/hcr/main.htm
2.	KWED (Seguin)	
3.	GBRA	
4.	Guadalupe County	
5.	Guadalupe County Road & Bridge	
6.	Guadalupe County Sheriff's Office	
7.	City of Seguin	
8.	City of Seguin Police	

Personal Evacuation Plan

Name:					
Yes					
	I have a portable radio and batteries and flash light.				
	I have bottled water.				
	My gas and electric cut off switches are located		·		
	I have purchased my evacuation boxes for important personal items and my n				
	and address is on them.				
	I will secure my boat when				
	I will remove my boat from the boat house when		and move it to		
	I will remove my boat from the lake when		-		
	I will move my cat/ dog when				
	I will move non-essential vehicles when		and move them		
	to				
	I will remove my cd's from my computer and audio	o discs when			
	I will prepare my valuable box (photos, etc.) when				
	It will include:				
	I will place it:				
	I will elevate furniture or remove personal items where	hen			
	I will notify family and neighbors when:				
List:	Nama	Dhono Number			
	Name	none Number			
	Name	Phone Number			
	Name	Phone Number			
My evacu	ation route is:				
I will go t When I le	to:				
I will call	l				
I will tell:	:				