WATERLINES

News affecting the management and use of Indiana's water resources

DIVISION OF WATER
INDIANA DEPARTMENT OF NATURAL RESOURCES
SPRING-SUMMER 1999

FLASH FLOODS – HOW DO THEY OCCUR?

Several factors contribute to flash flooding. The two key elements are rainfall intensity and duration. Intensity is the rate of rainfall, and duration is how long the rain lasts. Topography, soil conditions, and ground cover also play an important role.

Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or sudden release of water held by an ice jam. Flash floods can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Rapidly rising water can reach heights of 30 feet or more. Furthermore, flash flood-producing rains can also trigger catastrophic mud slides. You will not always have a warning that these deadly, sudden floods are coming. Most flood deaths are due to flash floods.

Most flash flooding is caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains from hurricanes and tropical storms. Occasionally, floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice jam or debris dam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction should suddenly release.

Historical National Weather Service Data:

•May 31, 1889…dam break in Johnstown, Pennsylvania…worst flood in United States history…36-40 foot wall of water…2,200 fatalities.

•June 9, 1972…flash flood in Black Hills, Rapid City, South Dakota…15 inches of rain in 5 hours…238 fatalities…$164 million in damages.

•August 1, 1985…flash flood in Cheyenne, Wyoming…6 inches of rain in 3 hours…12 fatalities…damages $61 million.

•June 14, 1990…flash flood in Shadyside, Ohio…4 inches of rain in less than 2 hours produced a 30-foot high wall of water…26 fatalities…damages $6-8 million.

**reprinted from internet 1/4/99, www.nws.noaa.gov.*

Also in this issue

Conference Corner 2
Weather Trendwatch 2
Property Aquisition Handbook 2
New Look for LOMAs 3
Did You Know? 3
Hydrology 101 4
Water Well Records 5
Trends in Indiana's Water Use 5
Precipitation 7

LARRY D. MACKLIN
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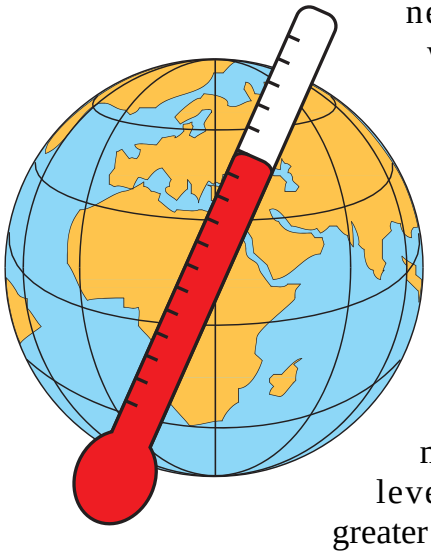
CONFERENCE CORNER

INAFSM 3rd ANNUAL CONFERENCE

The 3rd Annual Conference of the Indiana Association of Floodplain and Stormwater Management (INAFSM) will be held October 20-22, 1999. The site for this year's conference is Pokagon State Park located near Angola in Steuben County, Indiana. Lodging will be available at the Potawatomi Inn. Sessions will include topics on floodplain and stormwater management, as well as a look at the flood insurance aspect of the National Flood Insurance Program. For more information on the conference contact Donna Price at (317)327-5459. Hope to see you there!

WEATHER TRENDWATCH



Global warming won't neccessarily cause warmer and wetter conditions to exist everywhere, but climatologists tend to agree that two effects will be universal: 1) melting snow-fields and polar ice-caps (causing more runoff and sea-level rise) and 2) greater climatic variability and more extreme events. For example, the June 1997 Yangtze river floods in China reportedly killed 200, swamped 200,000 homes, and cost $500 million. In addition, meteorologists noted increased snowmelt in the Tibet-Qinghai plateau. With these climatic changes in mind, we can expect more tornadoes, tsunami, storm surges, and coastal and river-delta floods.

**adapted from internet 2/23/99, "Developing Ideas Digest", 192.197.196.1/diddigest/nov 97.*

PROPERTY ACQUISITION HANDBOOK FOR LOCAL COMMUNITIES

The Federal Emergency Management Agency's (FEMA) Property Acquisition Handbook for Local Communities is a "how to" guide to help communities work through one specific hazard mitigation alternative known as property acquisition (also referred to as a "buyout").

The handbook contains four parts, representing the four phases of the property acquisition process. In addition, a glossary, a list of acronyms, and an index are included. Components of the handbook include:

•Phase I – To Buy or Not to Buy
Enables communities to determine if property acquisition is the most viable mitigation alternative for them before they invest too much time and too many resources.

•Phase II – Application
Enables communities to complete and submit applications that are right the first time, precluding the need for revision cycles that can slow the process.

•Phase III – Implementation
Leads communities through the actual acquisition of property and administration of FEMA funds precluding the need for revision cycles that can slow the process.

•Phase IV – Open Space Management
Helps communities use and maintain acquired properties as open space in ways that make sense for them.

The handbook can be downloaded from the FEMA website at www.fema.gov/mit/handbook/index.htm.

**adapted from internet 3/3/99, www.fema.gov.*

THE NEW LOOK FOR LOMAs

FEMA has designed new LOMA determination products. The new product is a tabular document that is property-specific and does not contain any references to private individuals, thus eliminating the need to sanitize letters for public distribution.

Page 1 of 2 | **Date**: February 10, 1999 | **Case No.**: 99-05-2322A LOMR-F

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	Village of Oak Lawn, Cook County, Illinois	Unit 101, Concorde Green Condominiums, as described and recorded in Warranty Deed Document No. 92144215, filed on March 5, 1992, in the Cook County Recorder's Office
	COMMUNITY NO: 170137	
MAP PANEL AFFECTED	NUMBER: 170137	
	NAME: Village of Oak Lawn, Cook County, Illinois	
	DATE: January 2, 1981	
FLOODING SOURCE: Stony Creek		LATITUDE & LONGITUDE: 87°45'36" & 41°42'18" SOURCE OF LATITUDE & LONGITUDE: OFF THE SHELF SOFTWARE

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET ADDRESS	OUTCOME WHAT IS REMOVED FROM THE SFHA	NEW FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD	LOWEST ADJACENT GRADE ELEVATION (NGVD	LOWEST FLOOR ELEVATION (NGVD	LOWEST LOT ELEVATION (DATUM)
101	N/A	Concorde Green Condominiums	10320 Central Ave	Structure	B	594.8	695.4	595.4	N/A

Special Flood Hazard Area (SFHA) – The **SFHA** is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (if the appropriate box is checked, please refer to the appropriate section on Attachment No. 1)

- ☐ 1. LEGAL PROPERTY DESCRIPTION (CONTINUED)
- ☐ 2. DETERMINATION TABLE (CONTINUED)
- ☐ 3. PORTIONS REMAIN IN THE FLOODWAY
- ☐ 4. INADVERTENT INCLUSION IN THE FLOODWAY
- ☐ 5. V ZONE
- X 6. STUDY UNDERWAY
- ☐ 7. FILL RECOMMENDATION
- X 8. PORTIONS REMAIN IN THE SFHA

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the structure on the property is not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, P.O. Box 2210, Merrifield, VA 22116-2210.

Signature:

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Version 1.0 MX1720220054100130000311 1

This new property-specific document has been developed so that determinations can eventually be placed on the FEMA Web-site and be easily retrieved by the end users of the product.

In addition to the new property-specific LOMA document, a transmittal letter has been developed that will accompany the new document. This transmittal letter will contain all references to private individuals that are involved with the request, thus enabling FEMA to maintain the customer service approach with the new property-specific document. In addition, the letter will also provide the requester with a brief description of the LOMA document he or she is receiving and FEMA contacts for any additional questions regarding the determination that was issued. The new document and transmittal letter have recently been implemented for issuing LOMA, CLOMA, LOMR-F, and CLOMR-F determinations.

**reprinted from Work in Progress, November 1998.*

DID YOU KNOW?

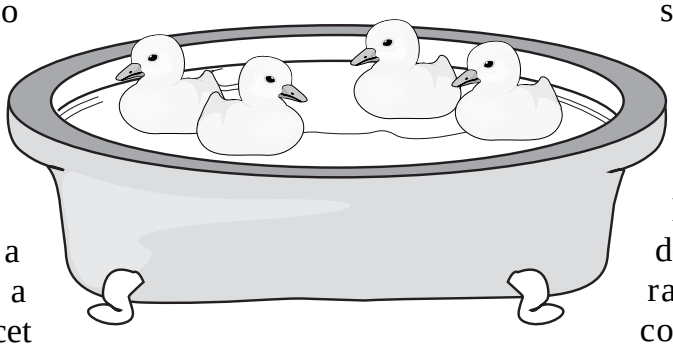
Nearly half of all flash flood fatalities are auto related?

- Water weighs 62.4 lbs. per cubic foot and typically flows downstream at 6 to 12 miles an hour.
- When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.
- The biggest factor is buoyancy. For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water. In effect, the car weighs 1,500 lbs. less for each foot the water rises.
- Two feet of water will carry away most automobiles.

HYDROLOGY 101: THE BATHTUB THEORY OF FLOODING

Water may be an essential part of our planet's biosphere, but it is possible to have too much of a good thing. Too much water in one place, at one time, has spelled disaster for millions of people throughout history who found themselves or their property far from high ground.

Frank Richards, Chief of the National Weather Service's Hydrologic Information Center, part of the National Oceanographic and Atmospheric Administration, has studied water and its effects for more than 20 years. According to Richards, when it comes to flooding, the problem is that people just don't understand the power of water.



"Think of hydrology as a bathtub with a faucet and a drain," he explains. "The faucet is very much like the input of water from rain and snowmelt into a hydrologic system. And just like the bathtub, you've got an outflow of river systems draining into the ocean. In most cases, the bathtub's drain is open." But, just as bathtubs overflow when water flows in faster than it can drain, floods occur when the hydrological system cannot absorb rainwater or melting snow faster than it is delivered.

Hydrologists define two primary types of flooding. "Flash flooding is a quick event," says Richards. "Typically, there is a deluge: the sky opens up and it rains cats and dogs. The surface of the earth simply can't deal with the water coming down that fast. Usually the earth acts like a sponge and absorbs water if it comes down slowly. If you had a pitcher of water dripping on a sponge, the sponge could absorb most of it. But if you dump the pitcher upside down, the sponge can absorb only a fraction of the water. When rain comes down heavily, you can have flooding in almost any low spot. You don't have to be near a river to have flood deaths or flood damages. Flash flooding comes on so quick that people are unprepared."

The other end of the spectrum is river flooding. "Large rivers like the Mississippi, Missouri, Colorado, and Ohio carry so much water that a small flash flood is unlikely to cause one of these major rivers to flood," says Richards. "To cause major river flooding, you need widespread, heavy rainfall that covers a broad area. We often find that river flooding causes much more damage because it is a more massive event and the area it encompasses is so large. Probably one of the most dramatic floods we've had in the last century was in 1993 when major portions of nine states in the Midwest were flooded for two to six months as the result of continuous, intense rainfall over a broad area." Melting snow, although it doesn't melt as fast as intense rain can fall, also can contribute to river flooding because it melts uniformly over an entire basin.

"It is important for people to recognize that floods can happen at any time and in any state," Richards continues. "Certainly there are some states that are more prone to flooding than others and certainly there are some seasons that are more likely to cause flooding. One of the things that we are concerned about at the National Weather Service is people becoming complacent."

Richards cites the example of the devastating 1997 flooding in the Red River Valley in the Dakotas in which the conditions leading to flooding were apparent several months ahead of time. The National Weather Service warned area residents to expect record flooding, the Governor issued statements in the media urging people to buy flood insurance, and FIA conducted a special advertising effort explaining the threat and encouraging people to buy flood insurance. While many people responded and purchased flood insurance, the majority of flood victims were uninsured when the Red River crested and caused hundreds of

millions of dollars in damage. "People just didn't believe it was going to happen to them," explains Richards.

Although some portions of the country are more flood-prone than others, according to Richards no one should be complacent about flooding. "Mother Nature can do things that are unpredictable and capricious, and even those areas that seem most likely to flood are susceptible. It becomes a matter of what sort of odds do you want to play? What is your tolerance for risk? If your tolerance is low, then you ought to have flood insurance no matter where you are. If you want peace of mind, if you want to be sure that you are not going to have to deal with that calamity in your life, there is almost no place in this country where you can go without buying flood insurance."

According to Richards, mitigation efforts can help minimize losses caused by flooding, but no system is guaranteed to prevent them. "In terms of hydrology, it is unlikely that we are ever going to engineer structures that provide complete safety from flooding," he asserts. "We have to be a little more astute in terms of how we manage that risk. You can build levees and dams and waterways that kick in when there is extreme flow, but I will guarantee that over our lifetime we will see parts of this country where – whatever engineered structures we have in place – we will be overwhelmed by nature. In those high-risk areas, it almost is irrational to believe that we are going to be able to prevent the impacts of floods. In high-risk areas, we need to respect nature and simply not build infrastructures that we can't tolerate to lose when the flooding does come. Mother Nature is going to do what she is going to do." ≈

**reprinted from Watermark, Fall/Winter 1998.*

WATER WELL RECORDS ONLINE

Access to the Division of Water's water well record database is now available on the Internet at www.state.in.us/dnr/water. The Ground Water Section currently maintains, in original paper and digital form, the records of nearly 300,000 water wells drilled in Indiana. The online database is provided to help Indiana citizens, and others access this information quickly and easily.

Access is available free of charge 24-hours a day. Users can view and print individually selected records on their personal computer.

The only fees involved are for downloading records in digital form (tab-delimited format). Information about this service is available through the Access Indiana Information Network premium services page at www.ai.org/premium or by phone at 1-800-236-5446.

For more information contact the IDNR Ground Water Section at (317) 232-4160.≈

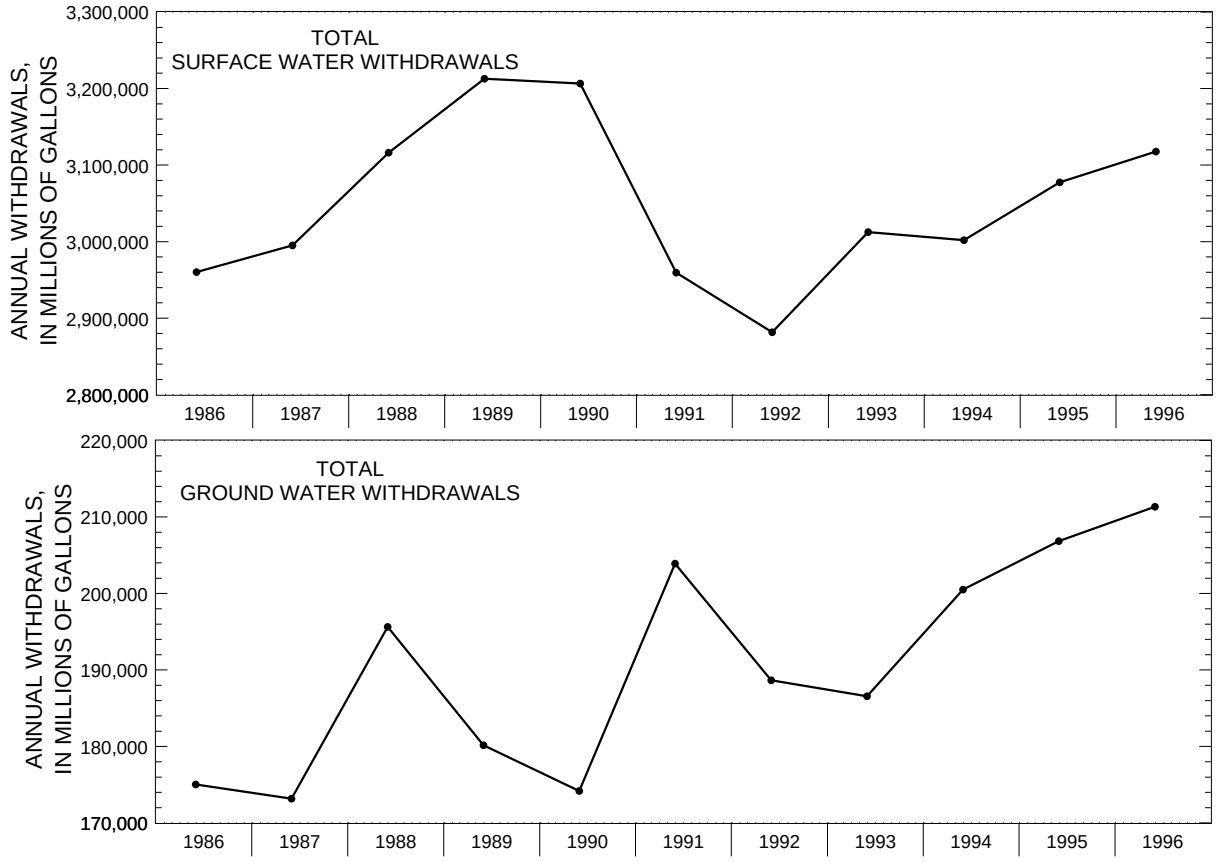
TRENDS IN INDIANA'S WATER USE 1986-1996

The DNR Division of Water has been conducting an inventory of the state's significant water withdrawal facilities (those capable of pumping 100,000 gallons or more per day) since 1985. The Division of Water, in conjunction with the local office of the U.S. Geological Survey's Water Resources Division, conducted an investigation that included a trend analysis using the 1986-1996 water use data. The data are grouped into six major water use categories: Energy Production, Industry, Agriculture, Public Supply, Rural Use & Miscellaneous. Some of the major findings are as follows:

•Statewide, surface water withdrawals are much greater than ground water withdrawals. Ground water withdrawals each year were less than 7% of the amount withdrawn by surface water sources.

•Total surface water withdrawals for the state showed neither an upward nor a downward trend over time, although relatively large fluctuations occurred from one year to the next. Total ground water withdrawals increased over time.

•Two water use categories, when combined,



Statewide reported annual total surface water withdrawals and total ground water withdrawals, 1986-96

accounted for more than 94% of statewide surface water withdrawals each year. Energy Production accounted for 67-69%, while Industry accounted for 26-28%.

•The Public Supply category ranked highest in ground water withdrawals, accounting for 55-61% of all groundwater withdrawals each year. The Industry category ranked 2nd, accounting for 20-28%.

•From 1986-1996, there was more than a 45% increase in ground water withdrawal capacity. Nearly 65% of this increased groundwater withdrawal capacity was associated with the Agriculture category, and nearly 20% of the increase was associated with the Public Supply category.

•Withdrawals for the Agriculture category, both surface water and ground water, increased over time.

•For the Public Supply category, surface water withdrawals neither increased nor decreased over time, whereas ground water withdrawals increased over time. In 1996, for the first time, ground water withdrawals exceeded surface water withdrawals for this category.

The publication "Trends in Indiana's Water Use, 1986-1996", depicting the findings of this investigation, is currently available free of charge (other than mailing costs) from the DNR Division of Water in hard copy format. By Fall, it will also be available on the DNR web site, along with the subsidiary publication "Water Use in Indiana, Graphs by County & Water Management Basin", which will be available on the web site only.

PRECIPITATION REPORT FOR JANUARY THROUGH JUNE 1999

1999 began with a blast as cold weather developed into a storm producing snowfall ranging from 1 inch in southern Indiana to nearly 30 inches in LaPorte County by January 2nd. This was the biggest snowfall since the blizzard of January 1978 for much of central and northern Indiana.

A second major event in January occurred on the 22nd. A warm air storm dropped 1 to 1½ inches of rain over much of northern Indiana and 2 to 5 inches over central and southern Indiana. Rain combined with a general rise in temperatures caused significant flooding as the snowpack melted along the White River, Wildcat Creek, Wabash River, Tippecanoe River, and Maumee River Valley.

February rainfall levels were below normal totaling only 2 to 4 inches across the state. The heaviest rain event in February occurred on the 6th when 1 to 2 inches of rain fell. This amount of precipitation caused lowland flooding along the Wabash, White, and East Fork White Rivers in southern Indiana.

March was unseasonably cold with above normal snowfall amounts for almost all of Indiana. Liquid precipitation was 1 to 4½ inches, while snowfall ranged from 1 to 15 inches across the state. A snowstorm on the 5th and 6th dropped nearly 8 inches of snow over northern Indiana.

April was a very wet month for Indiana with rain falling on a total of 19 days over much of the state. Five different rain events in the latter half of April caused substantial flooding along the Wabash River. The rain was spread over most of Indiana with the bulk of the rain, 6 to 10 inches, affecting northern and central Indiana.

May was a dry month for most of Indiana. The first half of May was dry enough to allow the Tippecanoe, Kanakakee, and Wabash Rivers to drop below flood stage. The largest amount of precipitation occurred on the 17th when 2 to 4 inches fell in small areas of central Indiana.

During the month of June, substantial amounts of precipitation continued to fall over central and southern Indiana. On the 2nd, 2 to 3 inches of rain fell causing lowland flooding along the White River in addition to lowland and agricultural flooding along the Wabash River. The last two big storms of the month occurred on the 6th and 9th when ½ to 1½ inches of rain fell over the north central part of the state.

KEY: ACTUAL (INCHES) / **NORMAL (INCHES)**

Airport Locations	January	February	March	April	May	June	Totals
CHICAGO	4.47	1.64	1.25	7.46	4.43	4.92	24.17
IL	**1.52**	**1.35**	**2.68**	**3.63**	**3.32**	**3.78**	**16.28**
SOUTH BEND	2.50	1.30	1.44	7.35	1.55	2.29	16.43
IN	**2.23**	**1.90**	**3.10**	**3.82**	**3.22**	**4.11**	**18.38**
FORT WAYNE	2.78	2.51	1.16	6.28	3.88	1.04	17.65
IN	**1.87**	**1.91**	**2.90**	**3.37**	**3.43**	**3.59**	**17.07**
INDIANAPOLIS	6.35	3.57	1.47	4.13	3.81	2.55	21.88
IN	**2.32**	**2.45**	**3.79**	**3.69**	**4.00**	**3.49**	**19.74**
EVANSVILLE	3.08	2.69	2.79	3.11	3.53	4.13	19.33
IN	**2.66**	**3.12**	**4.71**	**4.02**	**4.75**	**3.49**	**22.75**
LOUISVILLE	7.23	2.20	2.82	3.49	3.10	4.76	23.60
KY	**2.85**	**3.30**	**4.66**	**4.23**	**4.62**	**3.46**	**23.12**
CINCINNATI	4.76	3.66	2.00	2.93	1.98	3.12	18.45
OH	**2.59**	**2.69**	**4.23**	**3.75**	**4.27**	**3.84**	**21.37**

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Editor - Nicole Peters

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Waterlines is available free of charge to interested parties upon request. Call or write:

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