



Flood Management: An Introduction

Speaker Profile: Thomas M. Donaldson

Thomas M. Donaldson earned a B.A. degree in Mathematics from University of Texas at Arlington, Arlington, TX, August 1975.

His present position is Hydrologist in Charge (HIC) at National Weather Service (NWS), Forth Worth, Texas, whose responsibility is to provide the essential management of the technical aspects of the hydrologic service program that are based on River Forecast Center (RFC) products and services. As the RFC also provides hydrologic and hydrometeorologic forecast and guidance products to an increasing number of users outside the NWS, especially water management agencies and, in doing so, the RFC serves as a major reference point for these users.

Accordingly, Mr. Donaldson serves as the principal spokesperson with regard to RFC forecast operations and products.

His career as the hydrologist started in 1969 in which he served at the U.S Army Corps of Engineers, Forth Worth, Texas as Hydrologic Technician, Lake Control Unit (1969-1975); Hydrologist, Lake Control Unit (1975-1979); Supervisory Hydrologist, Chief of Lake Control Unit (1979-1981); Supervisory Hydrologist, Chief of Reservoir Control Section (1981-1982).

From 1989 to 1995, Mr. Donaldson worked in Flood Control District of Maricopa County, Phoenix Arizona as a hydrologist in surface water gaging.

In 1995, he started working at Lower Colorado River Authority in Austin, Texas as a Supervisory Hydrologist, Chief of River Operations Center (1995 to 2001) then becoming a Senior Hydrologist/ Program Manager (2001 to 2002).

From 2002, prior joining the NSW in 2007, Mr. Donaldson was a hydrologist at National Weather Service, in Silver Spring, Maryland. His roles were serving as the National WFO Hydrologic Services Program; Conducting outreach activities to ensure operational services

meet the needs of NWS partners and customers; Serving as the National Services Hydrologist and Hydrologic Focal Point Coordinator.

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Mission Statement**

Based on mutual respect and shared values, the U.S Mission works with Indonesia to strengthen democracy, sustain the environment, promote prosperity, enhance understanding and ensure security for our people, our nations, and our region.

Floods in the United States

Floods are one of the most common hazards in the United States. Flood effects can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

However, all floods are not alike. Some floods develop slowly, sometimes over a period of days. But flash floods can develop quickly, sometimes in just a few minutes and without any

visible signs of rain. Flash floods often have a dangerous wall of roaring water that carries rocks, mud, and other debris and can sweep away most things in its path. Overland flooding occurs outside a defined river or stream, such as when a levee is breached, but still can be destructive. Flooding can also occur when a dam breaks, producing effects similar to flash floods.

Be aware of flood hazards no matter where you live, but especially if you live in a low-lying area, near water or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds, or low-lying ground that appear harmless in dry weather can flood. Every state is at risk from this hazard.

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A New Approach to Flood Management

Records of loss of life and damage caused by floods worldwide show that these have continued to rise steadily during recent years. Understandably, the response has been to call for increased efforts to protect life and property. However, given the density of population and level of investment on flood plains, such protection can only be achieved at great cost and often at the expense of denying the productive use of flood-prone land. Furthermore, small and medium sized floods can be a vital source of freshwater and can bring other benefits to the community and the natural environment.

At the same time, the sustainable and effective management of water resources demands a holistic approach - linking socio-economic development with the protection of natural ecosystems and appropriate management links between land and water uses. It is recognized that a river basin is a dynamic system in which there are many interactions between land and water bodies. In the light of this, attempts are needed and should be tried to improve the functioning of the river basin as a whole rather than simply fixing local problems.

This has called for the Integrated Flood Management (IFM), a new approach in which consideration is given to the positive as well as the negative aspects of flood waters and to the valuable resource that is represented by the flood

plains that these waters occupy on occasions.

Integrated flood management calls for a paradigm shift from the traditional, fragmented and localized approach, and encourages the use of the resources of a river basin as a whole, employing strategies to maintain or augment the productivity of floodplains, while at the same time providing protective measures against losses due to flooding.

Traditional Flood Management Measures

Notwithstanding positive impacts of traditional flood management measures in the past, deficiencies of traditional flood management approaches can be characterized as follows as they:

- Address only negative aspects of flooding
- Focus on reducing flooding and reducing the susceptibility to flood damage
- Provide ad-hoc reactions and are carried out in isolation
- Express the risk of flooding simply as the "Exceedance probability of a flood of a given magnitude on a particular stretch of river" leading to the setting of design standards for protection.

Challenges of Flood Management:

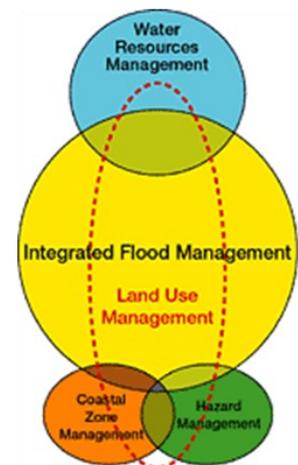
Key challenges of flood management that need to be addressed in an integrated approach include:

- Population growth and economic growth exert considerable pressure on the natural resources system.
- Increased population and enhanced economic activities in floodplains further increase the risk of flooding
- Designing for large floods must account of the likelihood of failure in cases of floods of magnitude below the notional design standard.
- Riverine aquatic ecosystems provide such benefits as clean drinking water, food, materials, water purification, flood mitigation and recreational opportunities.
- The magnitude and variability of the flow regime needed within a basin to maximize the benefits to society and to maintain a healthy riverine ecosystem must strike a balance between competing interests in the river basin.
- Intensity and duration of precipitation events are likely to increase due to climate change, resulting in an increase of the frequency of major floods in many regions.

Integrated Flood Management: A New Approach

There is a need for an approach to flood management that improves the functioning of the river basin as a whole, recognizing that floods have beneficial impacts and can never be fully controlled. Such an approach seeks to maximize the net benefits from the use of floodplains and

to minimize loss of life, subordinating flood loss reduction to the overall goal of maximizing the efficient use of the floodplain. Therefore, Integrated Flood Management (IFM) is a process that promotes an integrated, rather than fragmented, approach to flood management. It integrates land and water resources development in a river basin, within the context of Integrated Water Resources Management (IWRM), with a view to maximizing the efficient use of floodplains and to minimizing loss of life.



Elements of Integrated Flood Management are:

- Manage the water cycle as a whole
 - Integrate land and water
 - Manage risk and uncertainty
 - Adopt a best-mix of strategies
 - Ensure a participatory approach
 - Adopt integrated hazard management approach.
- Read the complete concept of IFM at:
<http://goo.gl/53Hy3>

MORE ONLINE RESOURCES

FLOOD PREPAREDNESS

Floods: The Awesome Power/U.S. Department of Commerce, National Weather Service, 2005.

This preparedness guide explains flood-related hazards and suggests lifesaving actions people can take. With this information people can recognize a flood potential, develop a plan, and be ready when threatening weather approaches.

Link: <http://goo.gl/Audd0>

FLOOD SAFETY

Flood Safety Checklist/ American Red Cross, 2009.

Floods are among the most frequent and costly natural disasters. Conditions that cause floods include heavy or steady rain for several hours or days that saturates the ground. This brochure

provides information to help people preparing for flood disaster, including the preparation of supplies.

Link: <http://goo.gl/L5W6o>

Turn Around, Don't Drown/ U.S. Department of Commerce, National Weather Service, 2005

A safety brochure to help people to understand the danger of crossing the flooding road.

Link: <http://goo.gl/62LvU>

AFTER FLOOD

Returning Home After a Hurricane or Flood/ American Red Cross, 2009

A brochure to help people preparing to return home after evacuating while inspecting and cleaning up the damage to the home.

Link: <http://goo.gl/0mmsS>

After a Flood: The First Steps/American Red Cross, 1992

Your home has been flooded. Although floodwaters may be down in some areas, many dangers still exist. Here are things to remember in the days ahead.

Link: <http://goo.gl/Ku5cg>

WATER MANAGEMENT

Global Water Issue: A Compendium of Articles/U.S.

Department of States: Bureau of IIP, 2011

Global Water Issues explores the political, social and economic challenges presented by threats to Earth's most vital natural resource. With a foreword by U.S. Under Secretary of State for Democracy and Global Affairs Maria Otero, *Global Water Issues* de-

scribes how this ecological emergency affects population centers, human health, climate and food security.

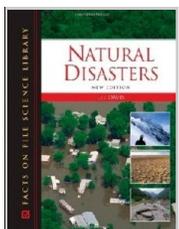
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IRC RESOURCES



Natural Disasters/Lee Davis. New York: Facts on File, 2008.

A reference resource covers 500 entries on a wide range of natural disasters: avalanches and landslides, earthquakes, famines and droughts, floods, hurricanes, storms, volcanic eruptions, etc.

Natural Hazards: Earth's

Processes as Hazards, Disasters, and Catastrophes/ Edward A. Keller & Robert H. Blodgett. New Jersey: Prentice Hall, 2008.

The book uses real-life examples of hazards and disasters to explore how and why they happen—and what we can do to limit their effects

Atlas of Climate Change: Mapping The World's Greatest challenge/Kristin Dow and Thomas E. Downing. California: University of California Press, 2007

The book is an essential

resource for policy makers, environmentalists, students and everyone concerned with the climate change-related topics.



Inconvenient Truth, An /Al Gore. New York: Rodale, 2006.

Our climate crisis may at times appear to be happening slowly, but in fact it is happening very quickly-and has become a true planetary emergency.

Organize for Disaster/ Judith Kolberg. Squall Press, 2005.

The book tells the reader on how to get organized for disaster. The reader will find essential, simple-to-implement information, inspirational stories from people who have experienced disaster firsthand.

Check more of IRC books collection at:
<http://69.63.217.22/U10086Staff/OPAC/index.asp>

Contact Info

Information Resource Center
Public Affairs Section
U.S. Embassy Jakarta

Jl. Medan Merdeka Selatan
4-5, Jakarta 10110,
Indonesia

Tel.: (021) 350-8467
Fax.:(021) 350-8466
Email: ircjakarta@state.gov
Website: [http://
jakarta.usembassy.gov/
irc.html](http://jakarta.usembassy.gov/irc.html)

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For all IRC information products, including this info package are available online at: [http://
jakarta.usembassy.gov/infoproduct.html](http://jakarta.usembassy.gov/infoproduct.html)

Information queries may be submitted to us by phone, fax, mail, and e-mail. You are also welcome to visit us by appointment for personal research assistance.

Flood in the United States

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Causes of Flooding

Tropical Storms and Hurricanes - Hurricanes pack a triple punch: high winds, soaking rain, and flying debris. They can cause storm surges to coastal areas, as well as create heavy rainfall which in turn causes flooding hundreds of miles inland. While all coastal areas are at risk, certain cities are particularly vulnerable and could have losses similar to or even greater than those caused by the 2005 hurricane, Katrina, in New Orleans and Mississippi.

When hurricanes weaken into tropical storms, they generate rainfall and flooding that can be especially damaging since the rain collects in one place. In 2001, Tropical Storm Allison produced more than 30 inches of rainfall in Houston in just a few days, flooding over 70,000 houses and destroying 2,744 homes.

Spring Thaw - During the spring, frozen land prevents melting snow or rain-

fall from seeping into the ground. Each cubic foot of compacted snow contains gallons of water and once the snow melts, it can result in the overflow of streams, rivers, and lakes. Add spring storms to that and the result is often serious spring flooding.

Heavy Rains - Several areas of the country are at heightened risk for flooding due to heavy rains. The Northwest is at high risk due to La Niña conditions, which include snowmelts and heavy rains. And the Northeast is at high risk due to heavy rains produced from Nor'easters. This excessive amount of rainfall can happen throughout the year, putting your property at risk.

West Coast Threats - Although floods can occur throughout the year, the West Coast rainy season usually lasts from November to April. This window increases the chance of heavy flooding and flash flood risks.

Wildfires have dramatically changed the landscape and

ground conditions on the West Coast, causing fire-scorched land to develop in to mudflows under heavy rain. Experts believe it will take years for the vegetation to be fully restored, which in turn will help stabilize these areas.

In addition to the heavy rains and wildfires, the West Coast has thousands of miles of levees, which were constructed to help protect homes and land in case of a flood. However, levees are not fail-proof and can, weaken, or overtop when waters rise, often causing catastrophic results.

Levees & Dams - Levees are designed to protect hold back a certain level of water. However, levees can and do fail; and when they fail, they can fail catastrophically. Weakening of levees over time, or as a result of weather events exceeding the levee's level of support, can cause the levee to be overtopped or breached, thus increasing the chance for flooding. Homeowners and renters insurance policies usually do not cover

flood loss, therefore FEMA strongly encourages those who live and work behind levees to consider flood insurance as a dependable financial security from a flood event

Flash Floods - Flash floods are the #1 weather-related killer in the U.S. since they can roll boulders, tear out trees, and destroy buildings and bridges. A flash flood is a rapid flooding of low-lying areas in less than six hours, which is caused by intense rainfall from a thunderstorm or several thunderstorms. Flash floods can also occur from the collapse of a man-made structure or ice dam.

New Development - Construction and development can change the natural drainage and create brand new flood risks. That's because new buildings, parking lots, and roads mean less land to absorb excess precipitation from heavy rains, hurricanes, and tropical storms.

Source:
[http://www.ready.gov/
floodawareness](http://www.ready.gov/floodawareness)