



United Nations
Educational, Scientific and
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International Center for Integrated
Water Resources Management
under the auspices of UNESCO

Capacity-Building in Water Resources Management in a Global Context

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Deputy Director
International Center for
Integrated Water Resources Management (ICIWaRM)
“Under the auspices of UNESCO”
Institute for Water Resources,
US Army Corps of Engineers
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3^{er} Encuentro Universitario del Agua, RAUNAM, August 24-25, 2011



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Agreement with the National Autonomous University of Mexico (UNAM)



MEMORANDUM OF UNDERSTANDING BETWEEN INSTITUTE FOR WATER RESOURCES AND THE UNAM'S WATER NETWORK



This Memorandum of Understanding (MOU) is entered into by and between the United States Army Corps of Engineers' (USACE) **Institute for Water Resources (IWR)** and the **UNAM's Water Network (RAUNAM)**, hereinafter referred to as "the Parties".

IWR is a U.S. national center of expertise for integrated water resources management, including analysis of emerging water resources trends and issues; state-of-the-art planning and hydrologic



Red del Agua UNAM



[RAUNAM](#) ▶

[PROYECTOS](#) ▶

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[Encuentro con Agencias Especializadas de los Estados Unidos en materia de Humedales](#)

A A+

Archivo - Eventos

Encuentro con Agencias Especializadas de los Estados Unidos en materia de Humedales

El pasado 3 de noviembre se llevó a cabo el Encuentro con Agencias Especializadas de los Estados Unidos en materia de Humedales, en el Auditorio José Luis Sánchez Bribiesca de la Torre de Ingeniería de la Universidad Nacional Autónoma de México (UNAM). Con motivo de abrir un espacio de análisis y discusión alrededor de temas centrales para la gestión integrada de los humedales.

Fernando González Villarreal, coordinador técnico de la Red del Agua UNAM (RAUNAM), agradeció la asistencia de los especialistas y de los universitarios interesados en el tema. Víctor Franco presentó a la UNAM y al Instituto de Ingeniería; puntualizó de manera estadística las capacidades de la Universidad en la formación de recursos humanos e investigación. Después destacó el papel del Instituto de Ingeniería, mostrando las aportaciones y apoyo que ha otorgado al desarrollo de la infraestructura en México.



Ciudad Universitaria, D.F. a 23 de mayo de 2011

Ing. Sergio Soto Priante

Subdirector General de Infraestructura Hidroagrícola
Comisión Nacional del Agua

Estimado Ing. Sergio Soto,

Como es de su conocimiento, en cumplimiento de nuestro contrato correspondiente a la 3ª etapa del PHIT, integramos un Comité de Consultores expertos en la problemática hidráulica tabasqueña, a quienes llevamos a visitar las obras del 12 al 15 de abril pasado. Como resultado de su visita y los análisis correspondientes, los expertos presentaron el reporte que adjuntamos a la presente, en el que resaltan las siguientes observaciones:



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Outline

- UNESCO-International Hydrological Programme (IHP), ICIWaRM, and other “Category 2 centers”
- Tools for Capacity-Building in IWRM
- Discussion – Role of UNAM?



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ICIWaRM is a “Category 2 UNESCO Center”

- “Under the auspices of UNESCO”
- “Provided and funded by Member States”
- “Committed to engage in support of UNESCO’s strategic programme objectives”
- “Render technical assistance...through capacity-building and training, research, networking, knowledge-sharing and exchange of information”
- “Form a unique network...to complement and expand...implementation of UNESCO’s programmes”
- “Enhance the impact and visibility of UNESCO”
- “A modality without precedence in the UN system”

Source: UNESCO 180 EX/18 (2008)



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International Center for Integrated Water Resources Management



AGREEMENT BETWEEN
THE GOVERNMENT OF THE UNITED STATES OF AMERICA
AND
THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL
ORGANIZATION (UNESCO)

CONCERNING THE ESTABLISHMENT OF THE
INTERNATIONAL CENTRE FOR INTEGRATED WATER RESOURCES
MANAGEMENT

AT THE
U.S. ARMY CORPS OF ENGINEERS INSTITUTE FOR WATER RESOURCES,
ALEXANDRIA, VIRGINIA, USA,
AS A CATEGORY 2 CENTRE UNDER THE AUSPICES OF UNESCO

Whereas at the 18th session of the Intergovernmental Council of the International Hydrological Programme (IHP) of the United Nations Educational, Scientific and Cultural Organization, in 2008, the Member States adopted

For the United States of America
U.S. Army Corps of Engineers

Major General Don T. Riley

Deputy Commanding General

For the United Nations Educational,
Scientific and Cultural Organization

Koïchiro Matsuura

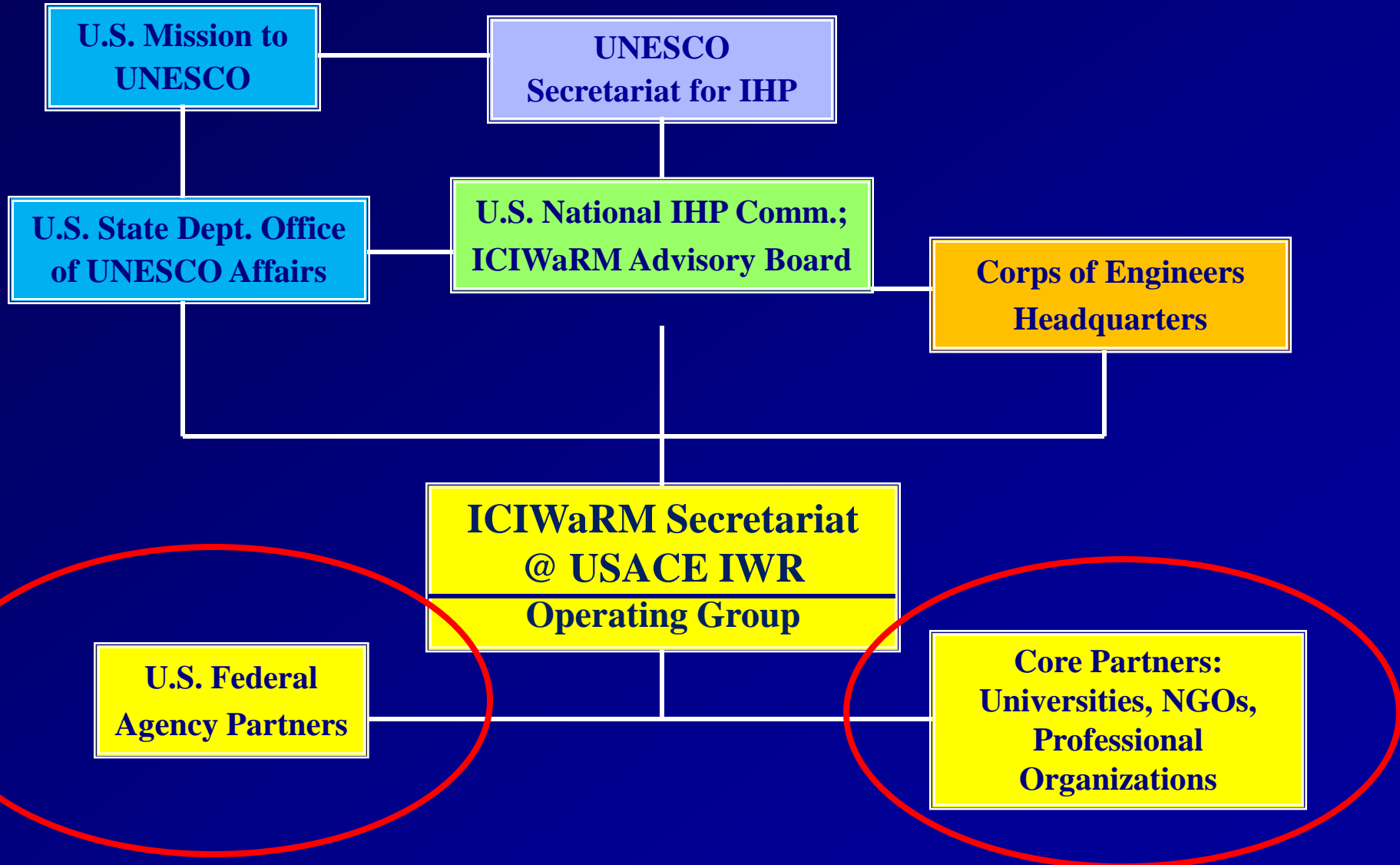
Director-General



ICIWaRM Organizational Structure & Relationships

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ICIWaRM's Focus

- Practical science and technology which can be readily transferred.
- Partner with and support existing UNESCO-IHP programs – GWADI, HELP, “IWRM at River Basin Scale”.
- Collaborate with existing UNESCO Centers on joint applied research, capacity-building and training – CAZALAC, CIH, CEHICA, HidroEx
- Emphasize Latin America/Caribbean, and Africa.



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The Network of UNESCO "Category 2" Water Centers



What is UNESCO-IHP?

Themes A-Z

Français - Español - العربية -

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UNESCO | Education | **Natural Sciences** | Social and Human Sciences | Culture | Communication and Information | Media Services

About us | Science & Technology | **Environment** | IOC Oceans | Priority Areas | Resources



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International Hydrological Programme

UNESCO » Natural Sciences » Environment » Water » IHP

A- A+

Water

IHP

- ▶ About IHP
- ▶ IHP-VII Themes
- ▶ IHP Programmes

WWAP

UNESCO-IHE

Water Centres

Water Chairs

UNESCO's Intergovernmental Scientific Cooperative Programme in Hydrology and Water Resources



The International Hydrological Programme (IHP) is the only intergovernmental programme of the UN system devoted to water research, water resources management, and education and capacity building. The programme, tailored to Member States' needs, is implemented in six-year phases – allowing it to adapt to a rapidly changing world.

IHP-VII: Water Dependencies: Systems under Stress and Societal Responses

This phase of IHP (2008-2013) will continue to promote and lead international hydrological research, facilitate education and capacity development and enhance governance in water resources management. The aim of these efforts is to help meet the UN Millennium Development Goals (MDGs) on environmental sustainability, water supply, sanitation, food security and poverty alleviation.

IHP PROGRAMMES

- ▶ FRIEND
- ▶ GRAPHIC
- ▶ G-WADI
- ▶ HELP
- ▶ IFI
- ▶ ISARM
- ▶ ISI
- ▶ JIHP
- ▶ PCCP
- ▶ UWMP
- ▶ WHYMAP

UNESCO functions at a country level

Relacion de miembros - Windows Internet Explorer

http://www.imta.mx/conamexphi/index.php?option=com_content&view=article&id=7&Itemid=7

File Edit View Favorites Tools Help

Convert Select

Relacion de miembros

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COMITÉ NACIONAL MEXICANO DEL PROGRAMA HIDROLÓGICO INTERNACIONAL

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Inicio / ¿Quiénes somos? / Relación de miembros

Relacion de miembros

Relación de correos electrónicos de miembros del Comité Nacional Mexicano para el Programa Hidrológico Internacional

- Presidente**
Dr. Polioptro Martínez Austria
polloptro@tlaloc.imta.mx
- Vice-Presidente**
M. en C. Alberto Güitron de los Reyes
aguitron@tlaloc.imta.mx
- Secretario**
Dr. Ariosto Águilar Chávez
aaguilar@tlaloc.imta.mx
- Agua y cultura**
Coordinador
Dr. Daniel Murillo Licea
dmurillo@tlaloc.imta.mx
- Agua y Educación**
Coordinador
Marissa Mar Pecero
marissa.mar@conagua.gob.mx
- Desalación**
Coordinador
- Eco Hidrología**
Coordinador

Familia del Agua UNESCO

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- UNESCO-MÉXICO
- UNESCO AGUA
- UNESCO-IHE
- Centros del Agua
- Catedras del Agua
- Cafedra UNESCO-IMTA
- Días mundiales del agua
- El Agua fuente de Vida
- Reunión 46 del PHI

UNESCO-PHI

- PHI-LAC
- PHI-MEX (Conamexphi)
- PHI-Chile

Internet 100%

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Microsoft PowerPo...

Relacion de miemb...

Programa Hidrológi...

Auspices.docx - Mi...

7:38 AM

UNESCO functions at a *regional level*

Windows Internet Explorer browser window showing the UNESCO website (http://ifilac.org/).

The page title is "IFI-LAC-PHI UNESCO". The address bar shows "http://ifilac.org/".

The main navigation menu includes: INICIO, SEDE Y COORD. MUNDIAL, IFI / LAC.

The main heading is: **INICIATIVA INTERNACIONAL SOBRE INUNDACIONES IFI - LAC**

A search bar is present with the placeholder text "keywords here" and a "Search" button.

The "PROYECTOS" section features a large image of a flooded area with damaged wooden roofs. The image includes logos for UNESCO (Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura) and the Programa Hidrológico Internacional (PHI - LAC).

At the bottom of the page, there are three main sections: **za Reunión del Grupo de Trabajo de Aguas Urbanas**, **WATER IN CITIES**, and **MUNDO VERDE / LA NEURONA AMBIENTAL**.

The browser's taskbar at the bottom shows the Start button and several open applications: Inbox - Micro..., Microsoft Pow..., IFI-LAC-PHI ..., Programa Hid..., Auspices.doc..., and Aqua-LAC_Fo... The system clock shows 7:31 AM.



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Technical Secretariat for UNESCO global network "Water and Development Information for Arid Lands," or G-WADI.

- Regional networks:
"GWADI-Arabia"
"GWADI-Africa"
"GWADI-LAC" and
"Asian G-WADI"



Quick Links



News & Announcements



Regional G-WADI Training Workshops on Climate Change Held in Tehran, Iran
Monday, June 20, 2011

www.gwadi.org



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Illustrations of ICIWaRM Activities Related to Capacity Building



Shared Vision Planning

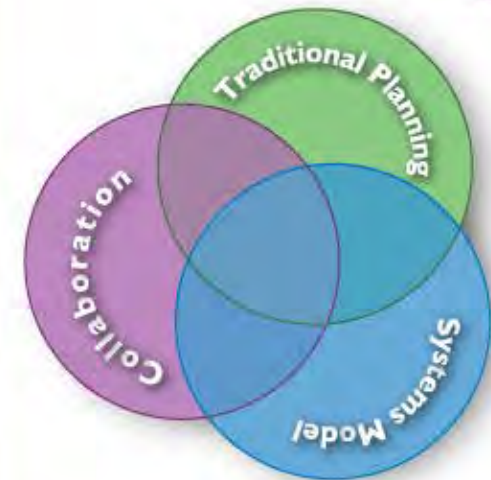
- PLANNING PRINCIPLES
- SYSTEMS MODELING
- COLLABORATION

About Shared Vision Planning

Shared Vision Planning (SVP) is a collaborative approach to formulating water management solutions that combines three disparate practices: 1) traditional water resources planning, 2) structured public participation and 3) collaborative computer modeling. Although each of these elements has been successfully applied, what makes Shared Vision Planning unique is the integration of traditional planning processes with structured public participation and collaborative computer modeling.

Goal

The goal of Shared Vision Planning is to improve the economic, environmental and social outcomes of water management decisions. Shared Vision Planning facilitates a common understanding of a natural resource system and provides a consensus-based forum for stakeholders to identify tradeoffs and new management options. Shared Vision Planning creates user-friendly and understandable computer models that are relevant to stakeholder interests and adaptable to changing conditions.



Shared Vision Planning integrates

- News and Events
- Current Initiatives
- Tools and Techniques
 - Methods
 - Models
- Resources
 - Case Studies
 - References
- Training
- CADRe Partners

Participative Planning with Peru's National Water Authority

- Providing training, guidance, and supervisory assistance in Shared Vision Planning (SVP) for IWRM plans at six pilot basins
- Partners: World Bank, Inter-American Development Bank, ANA (US\$40M)
- Progress to date: A series of 5 workshops for the Peruvian government and at pilot basins

SVP integrates:

- Systems modeling
- Structured participation
- IWRM planning



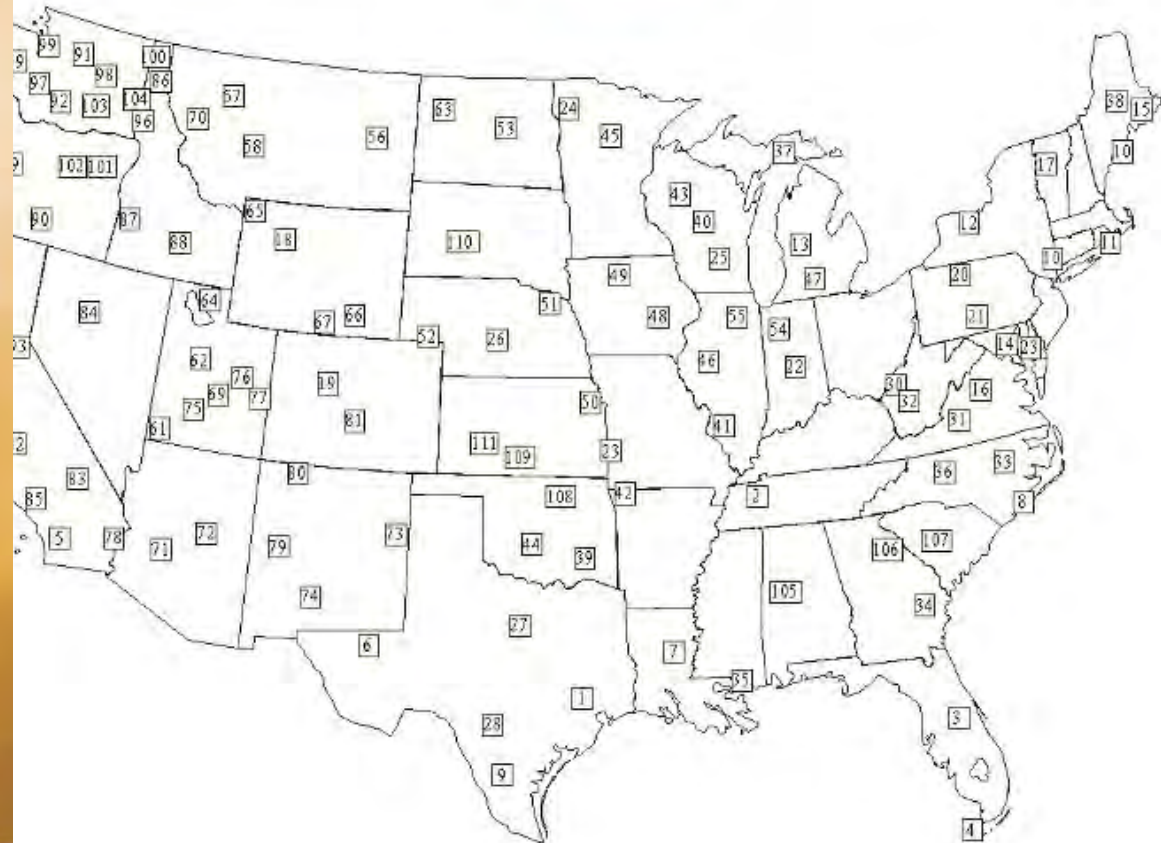
Droughts in 1988 led to a national drought study (1989-1994) led by the Corps of Engineers. This in turn led to statistical methods for regional statistical analysis of hydrometeorological data.

REPORT OF THE NATIONAL DROUGHT POLICY COMMISSION

PREPARING FOR
DROUGHT
IN THE
21ST CENTURY

National Drought Atlas Precipitation Statistics

Clicking on any cluster number will allow you to download an Excel file with precipitation data and statistics for that cluster of precipitation stations. Files are about 200k. [HCN data files](#) are also available from NCDC.





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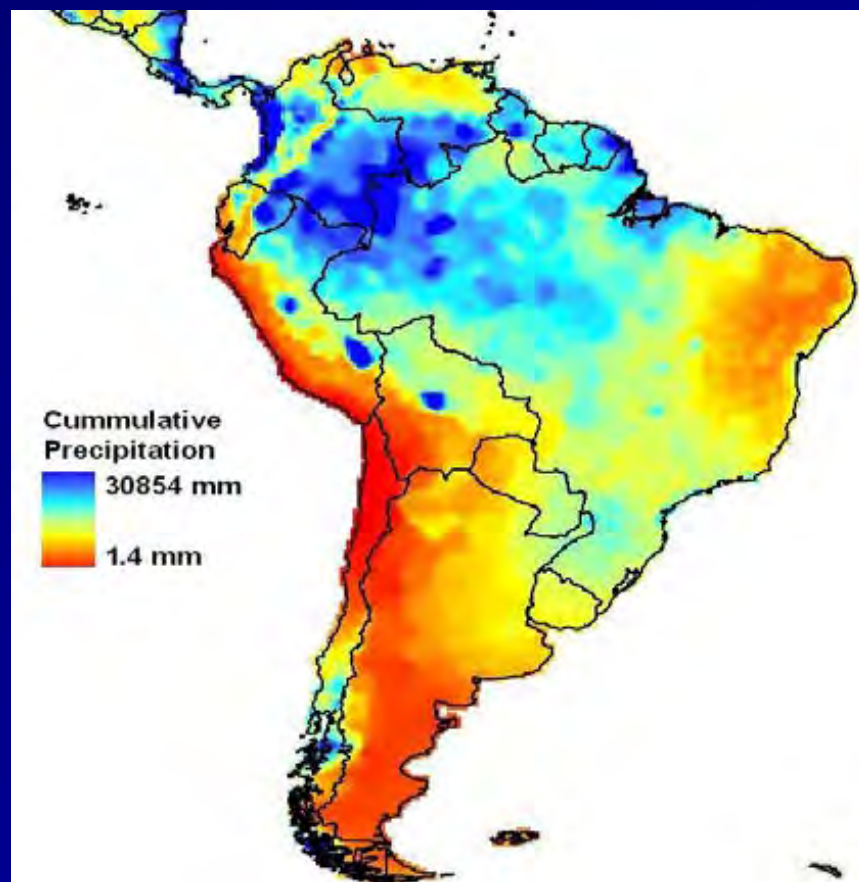
Drought Atlas for Pilot Regions of Latin America (with CAZALAC, Chile)

Even with poor datasets, helps answer questions managers ask:

For example,

- How unusual is the current drought?
- What is the likelihood that the current drought lasts X months?

ICIWaRM is creating a free, non-proprietary program for regional frequency analysis... adaptable to even data-poor regions.



5 yr precipitation total with a 2% likelihood to exceed during a 50yr drought event



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- HEC-GeoEFM 1.0 **NEW**
- HEC-GeoHMS 5.0
- HEC-GeoRAS 4.3
- HEC-SSP 2.0
- SnoTel 1.2 Plugin
- HEC-HMS 3.5
- HEC-FDA 1.2.5a
- HEC-DSSVue 2.0.1
- HEC-RAS 4.1
- HEC-DSS Excel Add-In
- HEC-GeoDozer 1.0
- HEC-EFM 2.0
- HEC-EFM Plotter 1.0
- HEC-GeoRAS 4.2.92
- HEC-GeoHMS 4.2.92
- HEC-ResSim 3.0

The Hydrologic Engineering Center (HEC), an organization within the [Institute for Water Resources](#), is the designated Center of Expertise for the [US Army Corps of Engineers](#) in the technical areas of surface and groundwater hydrology, river hydraulics and sediment transport, hydrologic statistics and risk analysis, reservoir system analysis, planning analysis, real-time water control management and a number of other closely associated technical subjects. HEC supports Corps field offices, headquarters, and laboratories by providing technical methods and guidance, water resources models and associated utilities, training and workshops, accomplishing research and development, and performing technical assistance and special projects. The products that are developed from these activities are for the Corps but are available to the public and may be freely downloaded from this web site.

[Privacy and Security Notice](#)

HEC Telephone:
(530) 756-1104

HEC Fax:
(530) 756-8250

Webmaster E-mail Address:
Webmaster-HEC@usace.army.mil

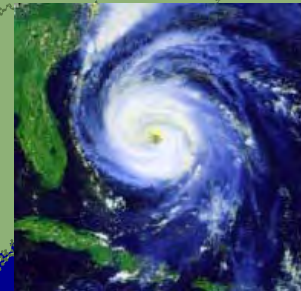
Mailing Address:
Department of The Army
Corps of Engineers
Institute for Water Resources
Hydrologic Engineering Center
609 Second Street
Davis, CA 95616-4687

Hydrologic-Hydraulic Modeling Short Course - UNESCO Hydroinformatics Center (CIH), Asunción, Paraguay

- 7 days of HEC model training in Spanish, March 2011
 - Basic theory, application, tips in hydrology, hydraulics, reservoir operations modeling
 - 2 days problem solving / advice on ongoing modeling projects
 - 40-45 participants (!) - Paraguay, Brazil, Uruguay, Argentina & Chile



Corps of Engineers Mission: IWRM





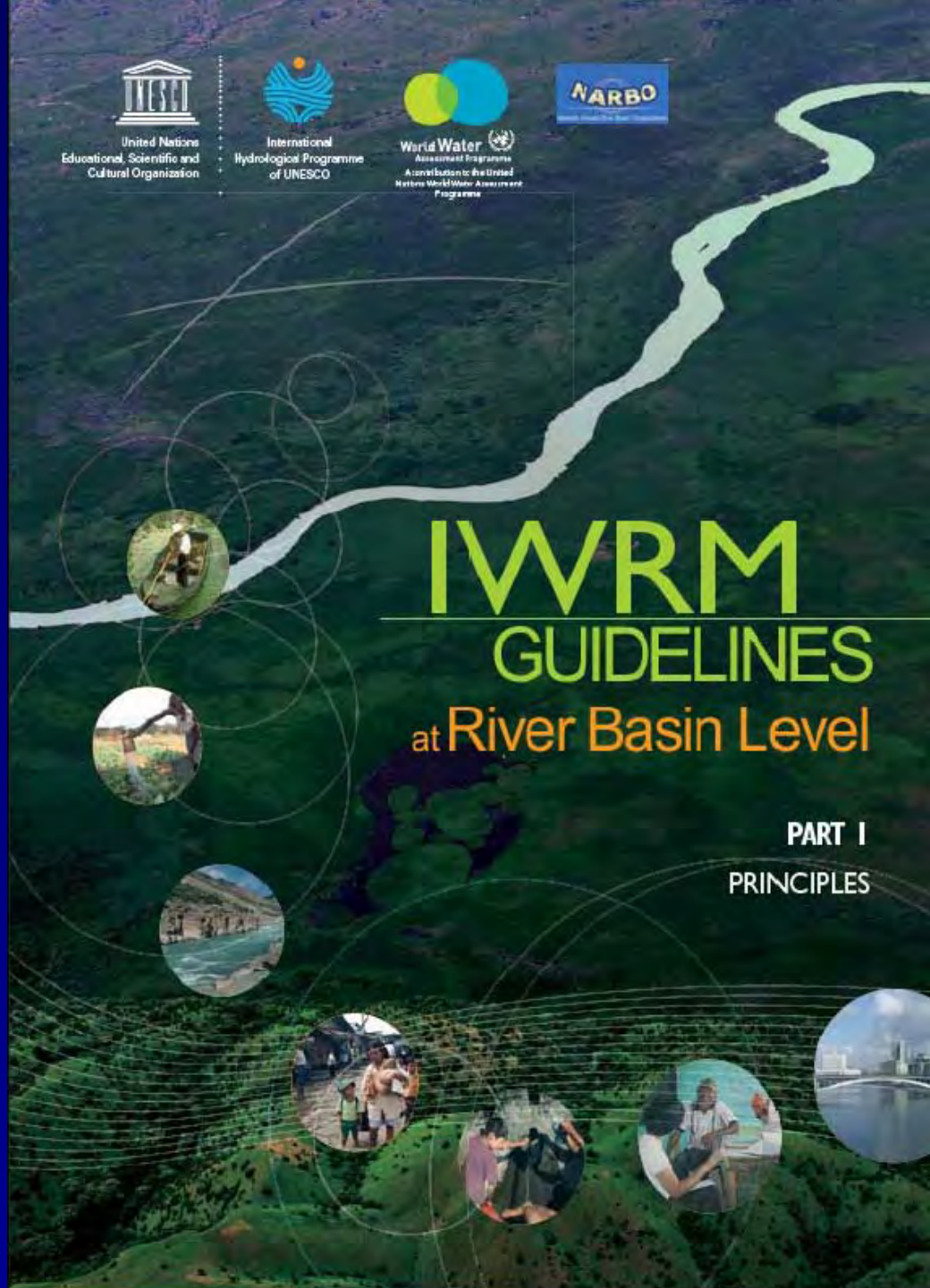
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ICIWaRM Co-Chairs
Steering Committee of
UNESCO IHP/ WWAP/
NARBO publication series
“**Integrated Water
Resources Management
Guidelines at River
Basin Scale**”

Working on translations to
Spanish with IDB and
UNESCO-LAC.





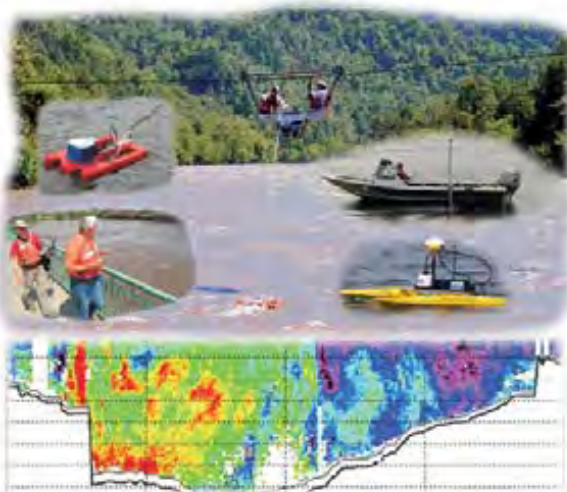
Water Budgets: Foundations for Effective Water-Resources and Environmental Management



Circular 1

Measuring Discharge with Acoustic Doppler Current Profilers from a Moving Boat

Chapter 22 of Book 3, Section A

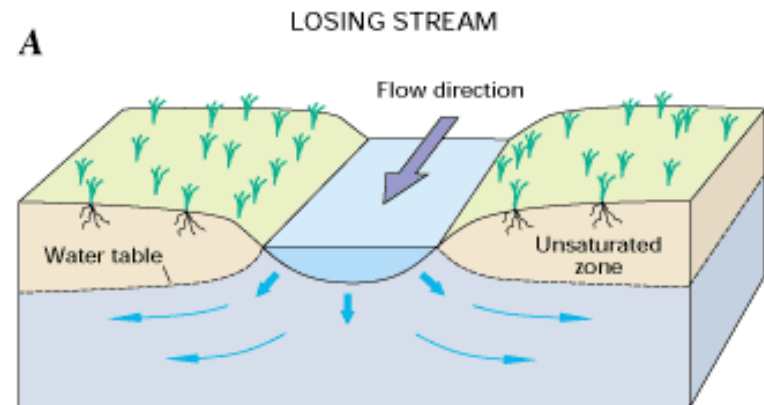


Techniques and Methods 3-A22

U.S. Department of the Interior
U.S. Geological Survey

Water.usgs.gov/pubs

Ground Water and Surface Water: A Single Resource-- USGS Circular 1139





Watershed Academy Web

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Online Training in Watershed Management

This is the Watershed Academy's Distance Learning Program—**Watershed Academy Web**. The Web site offers a variety of self-paced training modules that represent a basic and broad introduction to the watershed management field. The modules are organized by the six themes listed above. Modules vary in the time they take to complete, from ½ hour to 2 hours. Fifteen of them (marked with asterisks * below) are the core modules for the Watershed Academy [Certificate Program](#).

Module Themes

[Introductory/Overview Modules](#)[Watershed Ecology Modules](#)[Watershed Change Modules](#)[Analysis and Planning Modules](#)[Management Practices Modules](#)[Community/Social/Water Law Modules](#)

Introductory/Overview Modules

These modules introduce the principles of the watershed approach and the value of working at a watershed level.

- * [Principles of Watershed Management | Printable Version \(PDF\)](#) (25 pp, 2.1MB)
- * [Sustaining Healthy Aquatic Ecosystems | Printable Version \(PDF\)](#) (18 pp, 278K)
- * [Ecosystem Services: Benefits to Human Societies | Printable Version \(PDF\)](#) (18 pp, 542K)
- [The "Why Watersheds?" Report](#)
- [Ohio's Virtual Watershed Tour](#)



Watershed Ecology Modules

[Watershed Academy Web Home](#)[Basic Information](#)[Certificate Program](#)[Best PC Settings to Use](#)[Special Message for Trainers](#)[Contributing Authors](#)[PDF Print-Friendly Versions](#)



Watershed Academy Web

Rapid Bioassessment Protocols

[Academy Web Home](#) » [Module Home](#)

Introduction

Watershed Academy Web

[Academy Web Home](#)

Biotic Invasions: Causes, Epidemiology, Global Consequences and Control

The Ecological Society of America (ESA), the nation's leading professional society of ecological scientists, is an essential source of information for the many complex tasks associated with watershed management. An occasional publication series, **Issues in Ecology**, is an especially useful resource for resource managers, policymakers, and others designing and implementing watershed approaches to environmental management. Each **Issues in Ecology** is designed to report, in language understandable by non-scientists, the consensus of a panel of scientific experts on issues relevant to the environment.

Number 5 (Spring 2000): Biotic Invasions: Causes, Epidemiology, Global Consequences and Control

- [Full color PDF version](#) (350K, 22 pages, [about PDF](#))
- [Abstract](#)

A full suite of **Issues in Ecology** reports is available on the ESA Web site [\[EXIT Disclaimer\]](#).

Flash Flood Processes: International Edition

Flash Flood Processes



English | Spanish | German | Japanese

Publish Date: 2011-02-22

Skill Level: **1**

Completion Time: 1.00 - 1.25 h

Includes Audio: no

Required Plugins: Flash

Topics:

Hydrology/Flooding

Included in Courses: Basic

Hydrologic Sciences: International Edition

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Module Resources

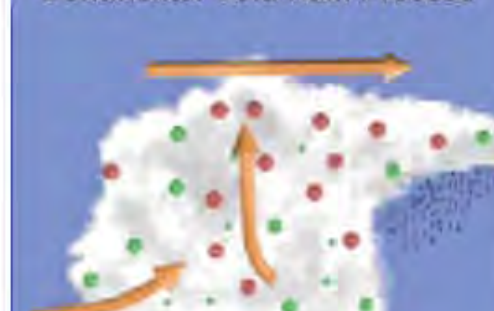
- Download this module
- View the print version

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In order to better serve our users and sponsors, access to our online

In some situations, especially in maritime tropical environments, precipitation can be produced predominately via the warm rain process. Here, precipitation particles mainly grow in the liquid phase at altitudes where the temperature is greater than 0°C . By contrast, the very common cold rain process describes a situation in which precipitation particles grow mainly in the ice and snow phase and then melt on the way to the surface.

Continental Cold Rain Process



Maritime Warm Rain Process





THE NATIONAL ACADEMIES PRESS

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Environment and Environmental Studies : Ecology and Ecosystems



Missouri River Planning: Recognizing and Incorporating Sediment Management

Historically, the flow of sediment in the Missouri River has been as important as the flow of water for a variety of river functions. The sediment has helped form a dynamic network of islands, sandbars, and floodplains, and provided habitats ...

[More](#)



A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta

California's Bay-Delta estuary is a biologically diverse estuarine ecosystem that plays a central role in the distribution of California's water from the state's wetter northern regions to its southern, arid, and populous cities and agricultural areas. Recently, the Fish ...

[More](#)



Ecosystem Concepts for Sustainable Bivalve Mariculture

U.S. mariculture production of bivalve molluscs—those cultivated in the marine environment—has roughly doubled over the last 25 years. Although mariculture operations may expand the production of seafood without additional exploitation of wild populations, they still depend upon and affect natural ...

[More](#)



Progress Toward Restoring the Everglades: The Second Biennial Review, 2008

NEWS: [UCOWR](#) has awarded MOCHA with the 2011 Education and Public Service Award!

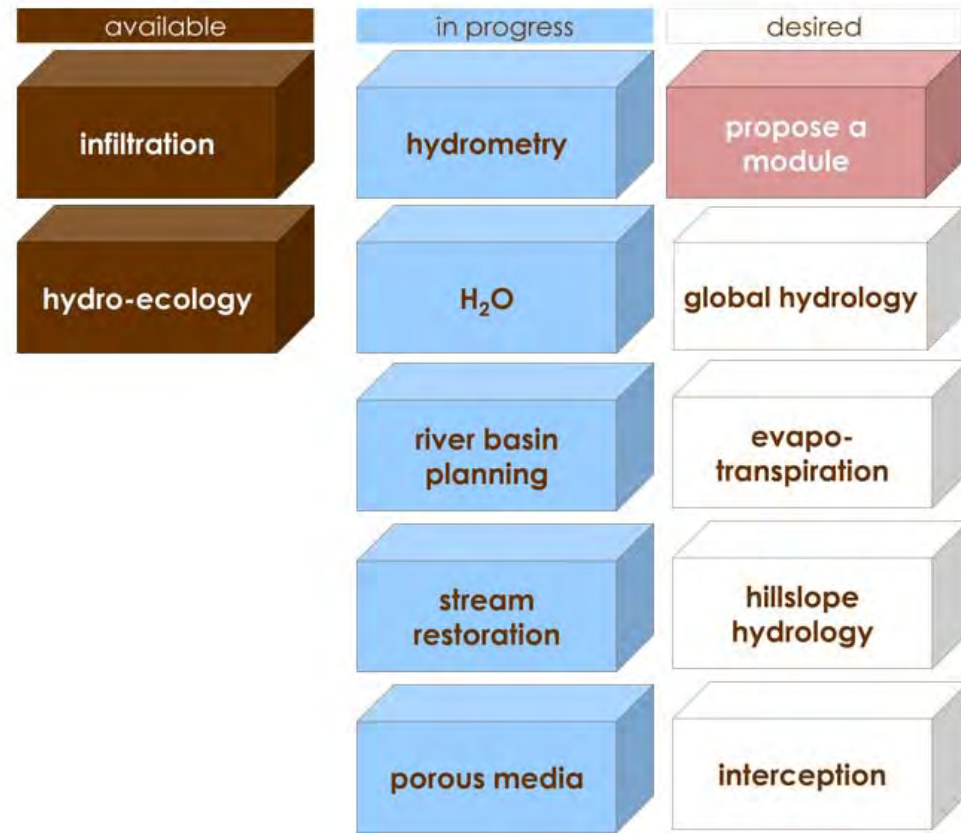
MOCHA ...

... is creating a curriculum for hydrology education based on evolving text modules, developed and reviewed by the [growing MOCHA community](#) and become part of MOCHA today!

use modules for your course

MOCHA modules represent three hours of lecture material on a particular

MOCHA



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Subject: Geoscience

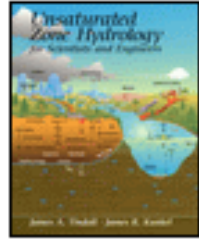
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- Biogeosciences [5 matches](#)
- Geology [1124 matches](#)
- Hydrology [171 matches](#)
- Lunar and Planetary Science [35 matches](#)
- Oceanography [99 matches](#)
- Paleontology [156 matches](#)

Resource Type

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- Datasets and Tools [89 matches](#)
- Audio/Visual [109 matches](#)
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- Scientific Resources [3 matches](#)

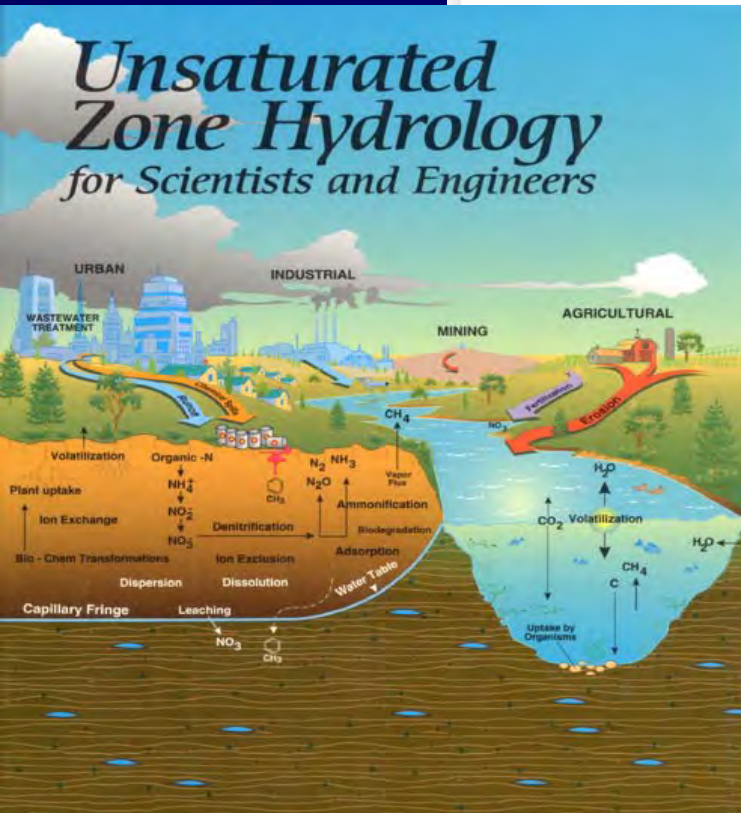
Free
texts

Unsaturated Zone Hydrology for Scientists and Engineers



Download free book "Unsaturated Zone Hydrology for Scientists and Engineers" from U.S. Geological Survey in pdf format. This book presents systematic, integrated A-to-Z coverage of state-of-the-art unsaturated zone hydrology. Multi-disciplinary in approach, it provides both a soil physics and an engineering approach to unsaturated zone hydrology. Coverage begins with the basic physical properties and the laws, and moves on to contaminant transport and other parameters such as permeability, scaling, and fractals in the earth sciences.

book.



James A. Tindall · James R. Kunkel

http://www.brr.cr.usgs.gov/projects/GW_Unsat/Unsat_Zone_Book/

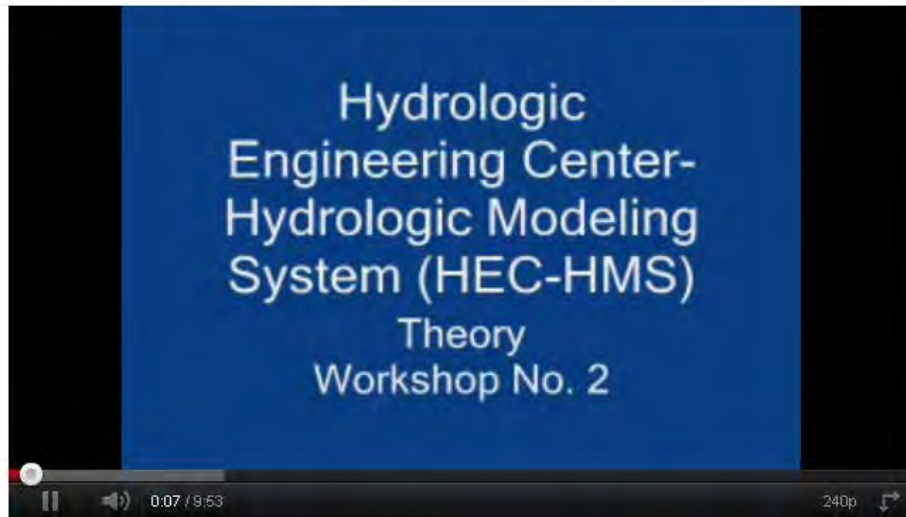
Hydrologic Modeling System (HEC-HMS) Theory

drquek3



40 videos

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Suggestions



HEC HMS Darang
by BossYes1
418 views



HEC-HMS Worked Example
2.1- Parameters Selection
by drquek3
2,675 views



HEC-HMS Worked Example
2.1- Solving From Scratch
by drquek3
1,372 views



HEC-HMS --- Hydrology -
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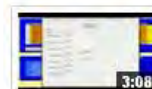
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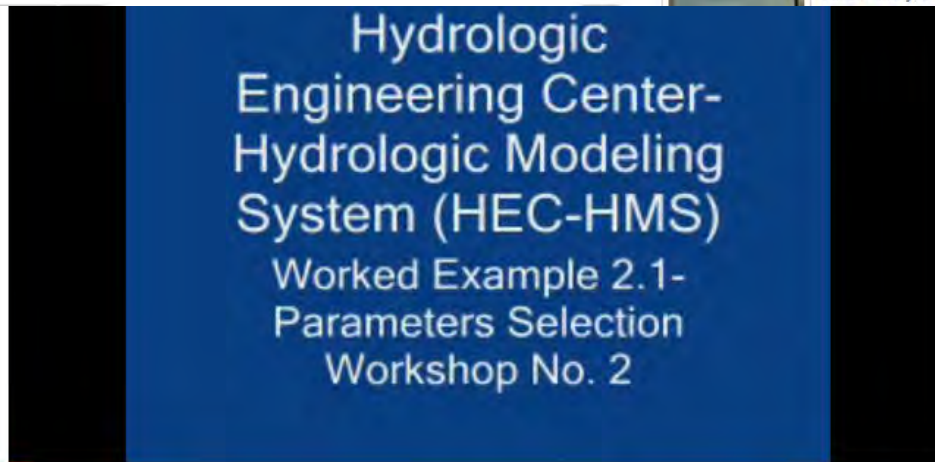
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