United States Geological Survey Mission to Central America: Response to Hurricane Mitch

- *Stream Gage Networks*
- *Hydrologic Databases*

Program Review - Lafayette, LA
December 7-8, 2000

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Project Staff

- *Mark Smith – Project chief (CO)*
- *Felipe Hernandez – Gage installation (PR)*
- *George Arroyo – Gage installation (PR)*
- *Rod Murray – Gage installation (AK)*
- *John Parks – Database Development (PR)*
- *Dane Ohe – Database Development (PR)*

Stream Gage Budget

Country	*Funding*
• *Honduras:*	*$749K*
• *Nicaragua:*	*$112K*
• *El Salvador:*	*$88K*
• *Guatemala:*	*$89K*
• *Rio Lempa:*	*$310K*
Total	*$1,348K*

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Database Budget

Country	*Funding*
•*Honduras:*	*$485K*
• *Nicaragua:*	*$175K*
•*El Salvador:*	*$65K*
•*Guatemala:*	*$65K*
•*Rio Lempa:*	*$210K*
Total	*$1,000K*

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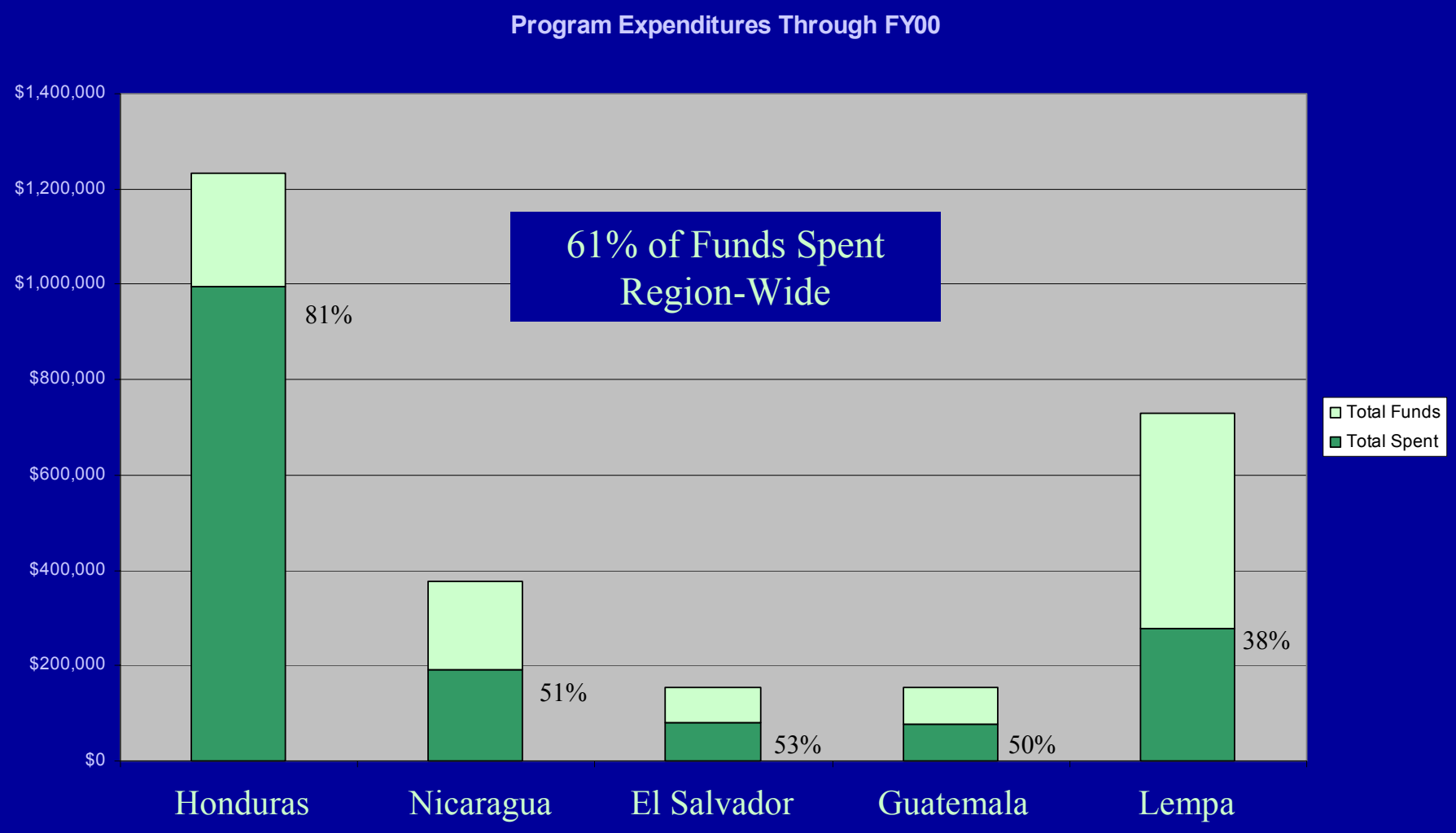
Program Expenditures



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Stream Gages – Supplemental Funding

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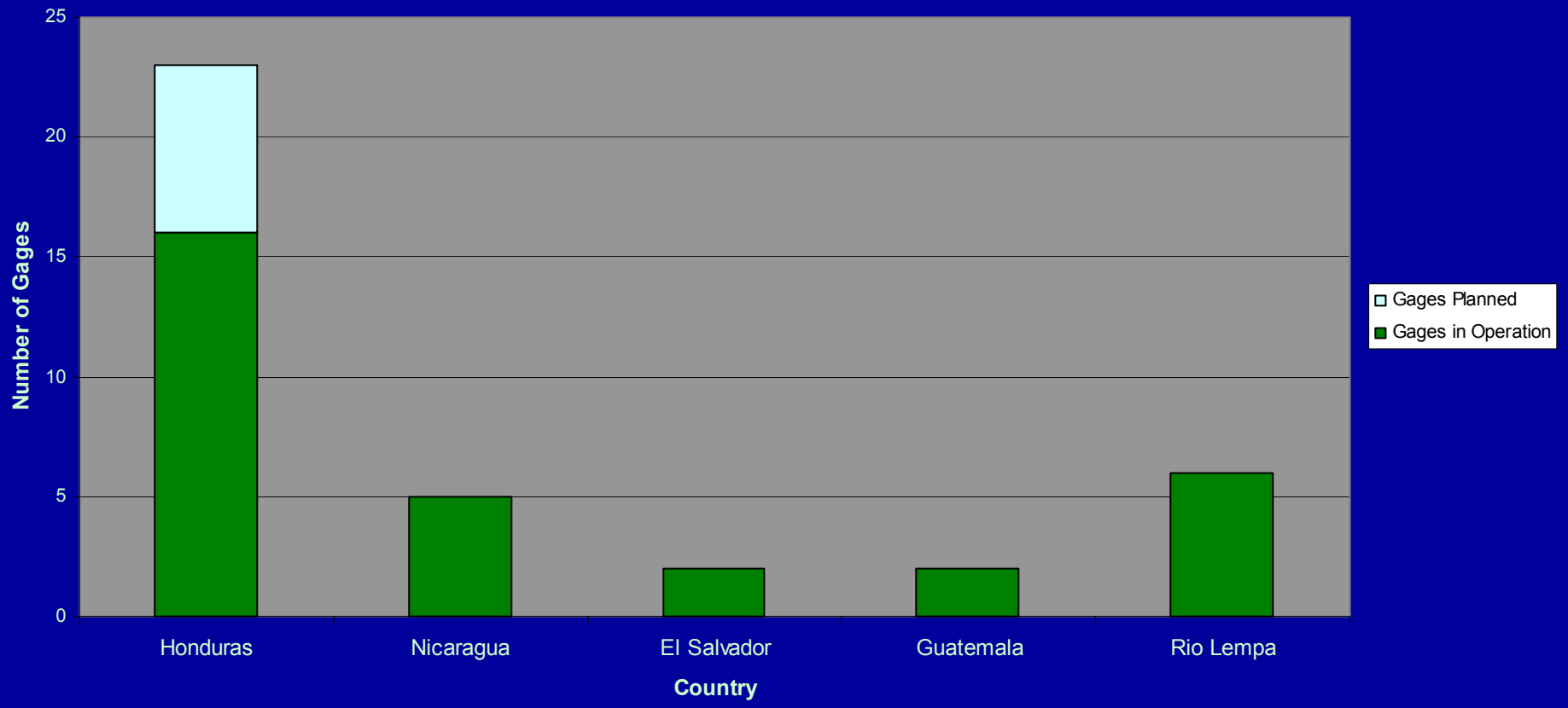
Supplemental Program



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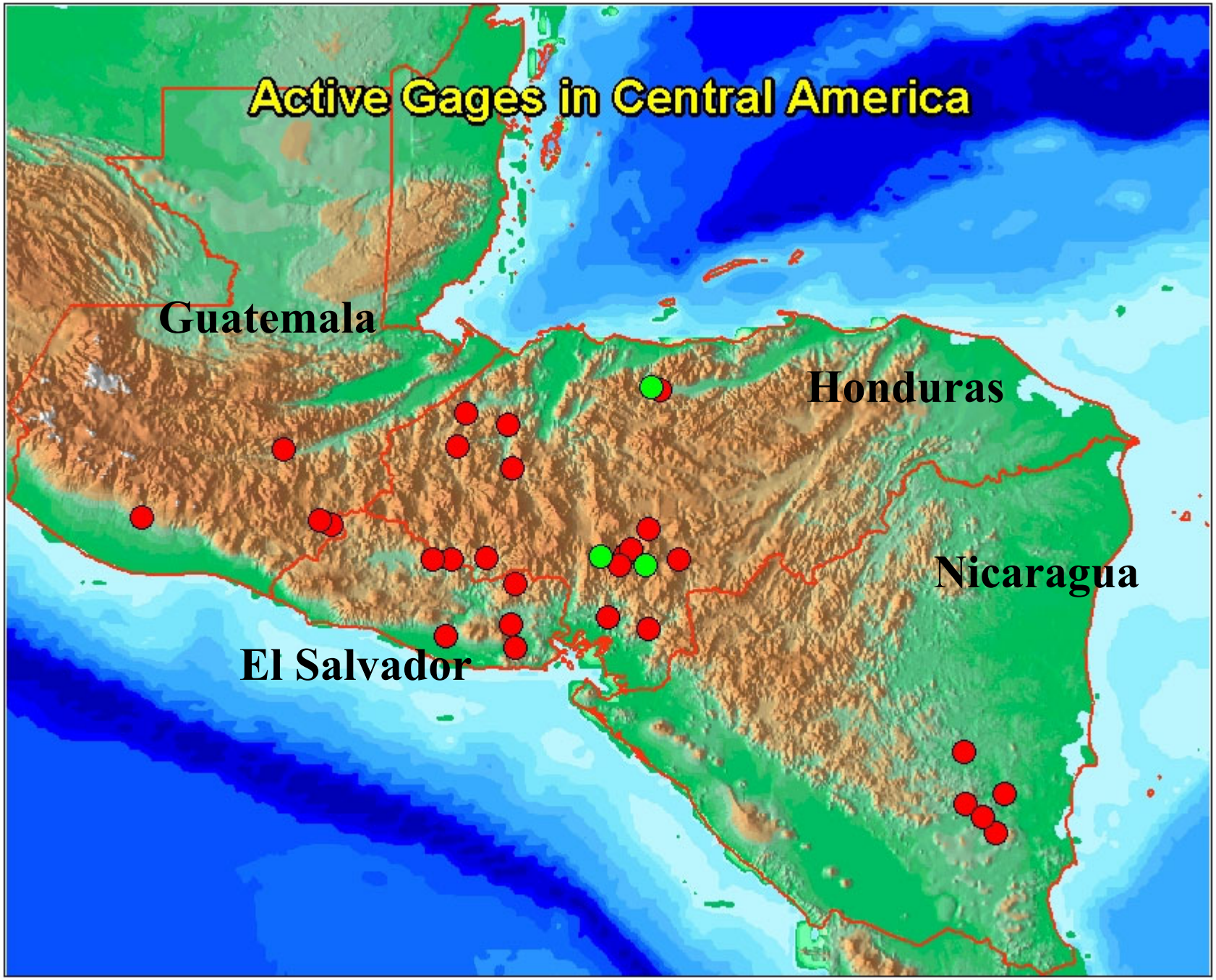
Active Gages in Central America
Guatemala
Honduras
Nicaragua
El Salvador

Honduras

INSTALLATIONS HONDURAS	**1999**							
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHOLUTECA RIVER BASIN								
Rio Guacerique above Los Laureles								
Rio Grande above Concepcion								
Rio Choluteca near Tegucigalpa								
Rio Choluteca at Paso la Ceiba								
Rio Choluteca at Ojo de Agua								
Rio Choluteca at Col. Apacilagua								
Linaca Rain Gage								
ULUA RIVER BASIN								
Rio Ulua at Chinda								
Rio Chamelecon at La Vegona								
Rio Jicatuyo at S. de Posta								
Rio Ulua at S. Fco. de Ojueras								
AGUAN RIVER BASIN								
Rio Aguan at Sabana Larga								
Agua Caliente Rain Gage								
NACAOME RIVER BASIN								
Rio Nacaome at Las Mercedes								
Lepaterique Rain Gage								

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Honduras

INSTALLATIONS HONDURAS	**2000**											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHOLUTECA RIVER BASIN												
Rio Guacerique above Los Laureles												
Rio Grande above Concepcion												
Rio Choluteca near Tegucigalpa												
Rio Choluteca at Paso la Ceiba												
Rio Choluteca at Ojo de Agua												
Rio Choluteca at Col. Apacilagua												
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Agua Caliente Rain Gage												
NACAOME RIVER BASIN												
Rio Nacaome at Las Mercedes												
Lepaterique Rain Gage												

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Tegucigalpa
Tegucigalpa
Rio Choluteca
La Libertad
San Jose
Pespire
Liure
Orocuina
Choluteca
Marcovia
Streamflow Gage

USGS - Hydrograph and station description for 50805005 - Microsoft Internet Explorer

File Edit View Go Favorites Help

Back Address http://dprsj35.er.usgs.gov/rt-cgi/gen_stn_pg?station=50805005

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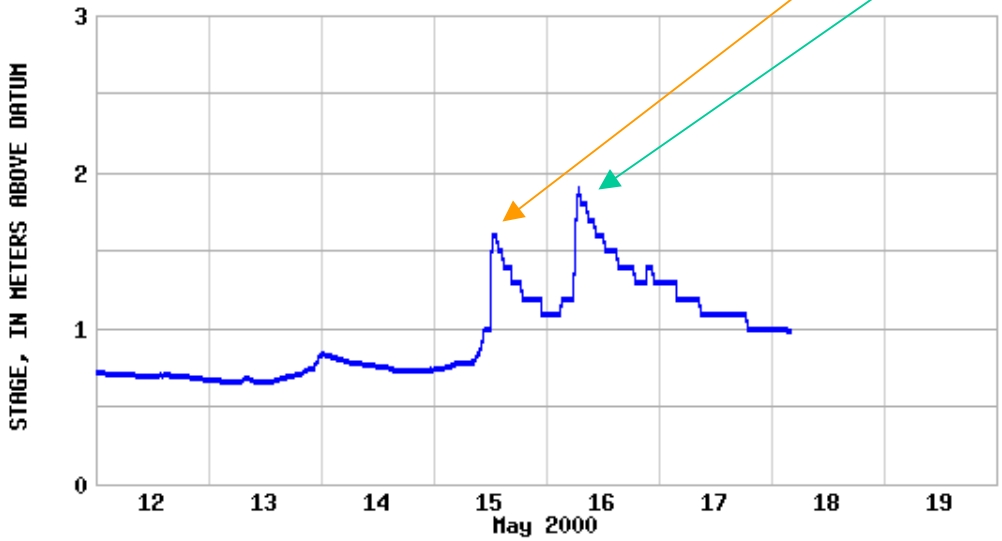
PROVISIONAL DATA SUBJECT TO REVISION

50805005 -- Rio Choluteca at Paso de la Ceiba, Honduras

Latest Conditions

Flow	Stage	Date	Time
-- m³/s	0.99 m	05/18	04:15

Stage -- updated Thu May 18 04:15 2000 -- download presentation-quality graph



Peaks occurred at approximately 1:00 PM and 6:00 am on May 15th and 16th, respectively

Done Internet zone

Start Microsoft Word - Doc... USGS - Hydrogra... Exploring - Landslides Microsoft PowerPoint... 2:32 AM

USGS - Hydrograph and station description for 50805006 - Microsoft Internet Explorer

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Back Address http://dprsj35.er.usgs.gov/rt-cgi/gen_stn_pg?station=50805006

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PROVISIONAL DATA SUBJECT TO REVISION

50805006 -- Rio Choluteca nr Ojo de Agua, Honduras

Latest Conditions

Flow	Stage	Date	Time
-- m³/s	1.70 m	05/18	03:30

Stage -- updated Thu May 18 03:30 2000 -- download presentation-quality graph

Peaks occurred at approximately Midnight and 2:00 PM on May 15th and 16th, respectively

Done Internet zone

Start Microsoft Word - Doc... USGS - Hydrogra... Exploring - Landslides Microsoft PowerPoint... 2:30 AM

USGS - Hydrograph and station description for 50805003 - Microsoft Internet Explorer

File Edit View Go Favorites Help

Back Address http://dprsj35.er.usgs.gov/rt-cgi/gen_stn_pg?station=50805003

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PROVISIONAL DATA SUBJECT TO REVISION

50805003 -- Rio Choluteca at Colonia Apacilagua, Honduras

Latest Conditions

Flow	Stage	Date	Time
-- m³/s	4.01 m	05/18	02:45

Stage -- updated Thu May 18 02:45 2000 -- download presentation-quality graph

Peaks occurred at approximately 4:00 PM and 9:00 am on May 16th and 17th, respectively

Done Internet zone

Start Microsoft Word - Document3 USGS - Hydrograph a... Exploring - Landslides 2:28 AM

Nicaragua:
Hydrologic Data

▲ Rio Escondido Stream Gages

Managua

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Nicaragua

INSTALLATIONS NICARAGUA	**2000**											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ESCONDIDO RIVER BASIN												
Rio Escondido at Rama II												
Rio Siquia at Salto Grande												
Rio Mico at Muelle de los Buelles												
Rio Rama at Valentin												
Rio Plata at Piedra Fina (NOAA)												

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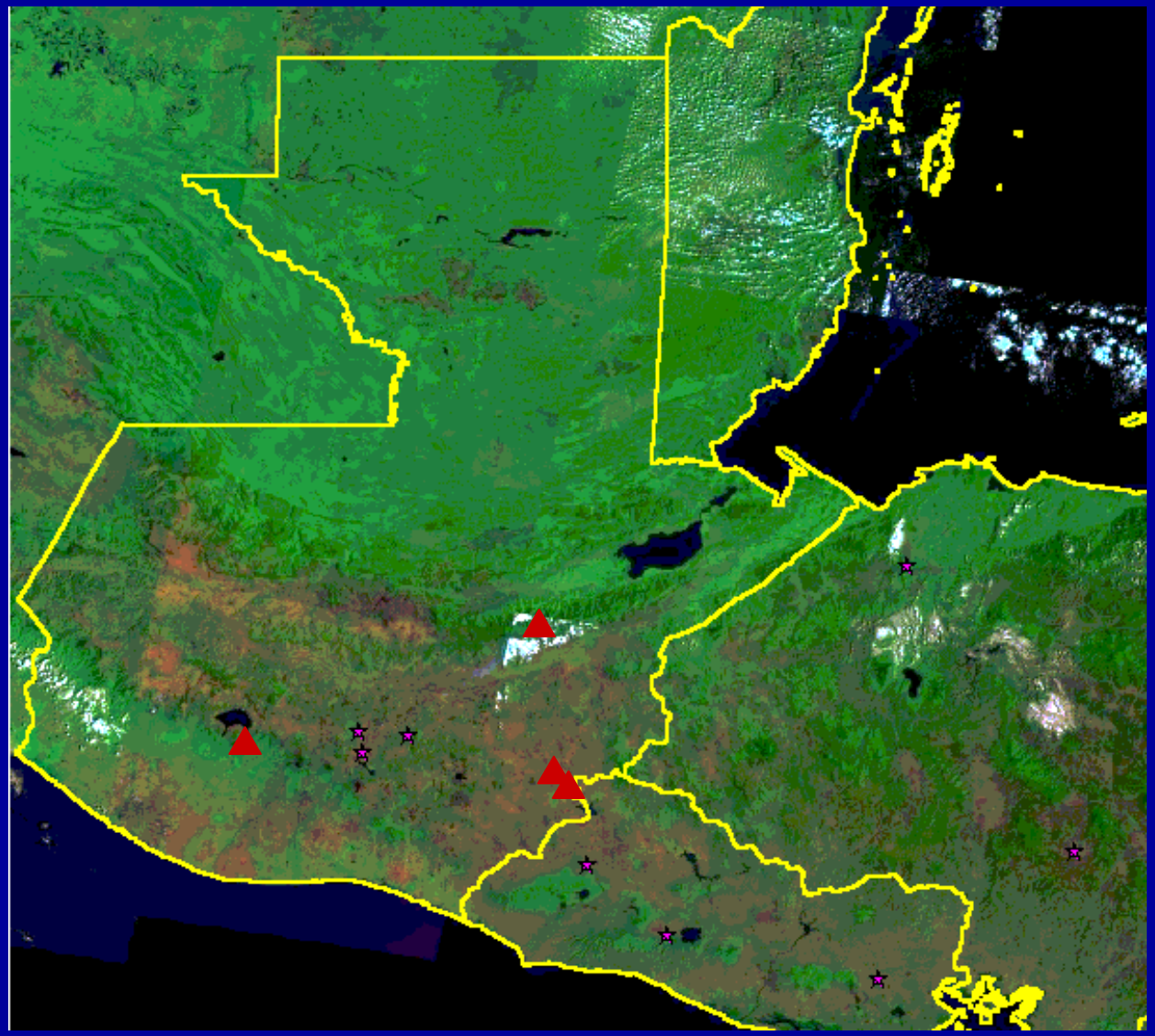
Estación Hidrométrica via Satélite: Río Siquia en Salto Grande, Nicaragua

Lat N 12.4903º; Long O 84.5412º

Estaciones Hidrométricas Via Satélite En Guatemala



Cooperación: INSIVUMEH, USAID, USGS, NOAA

Río Coyolate en Puente Coyolate, Guatemala
Estación Hidrométrica via Satélite

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Estaciones Hidrométricas Via Satélite En La Cuenca Del Río Lempa

Cooperación: SMHN, PAES, CEL, USAID, USGS, NOAA

Sistema de Pronóstico en la Cuenca del Río Lempa
Red de Estaciones Hidrométricas

Río Lempa en San Marcos Lempa, El Salvador
Estación Hidrométrica via Satélite

Lat N 13.4258^0; Lon O 88.6977^0

Rio Lempa

INSTALLATIONS - RIO LEMPA	**2000**											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EL SALVADOR												
Rio Sumpul at Las Flores												
Rio Torola near Osicala												
Rio Lempa at San Marcos Lempa												
HONDURAS												
Rio Mocal												
Rio Guarajambala												
GUATEMALA												
Rio Ostua at Las Cruces												
Rio Ostua at Las Lechuzas												

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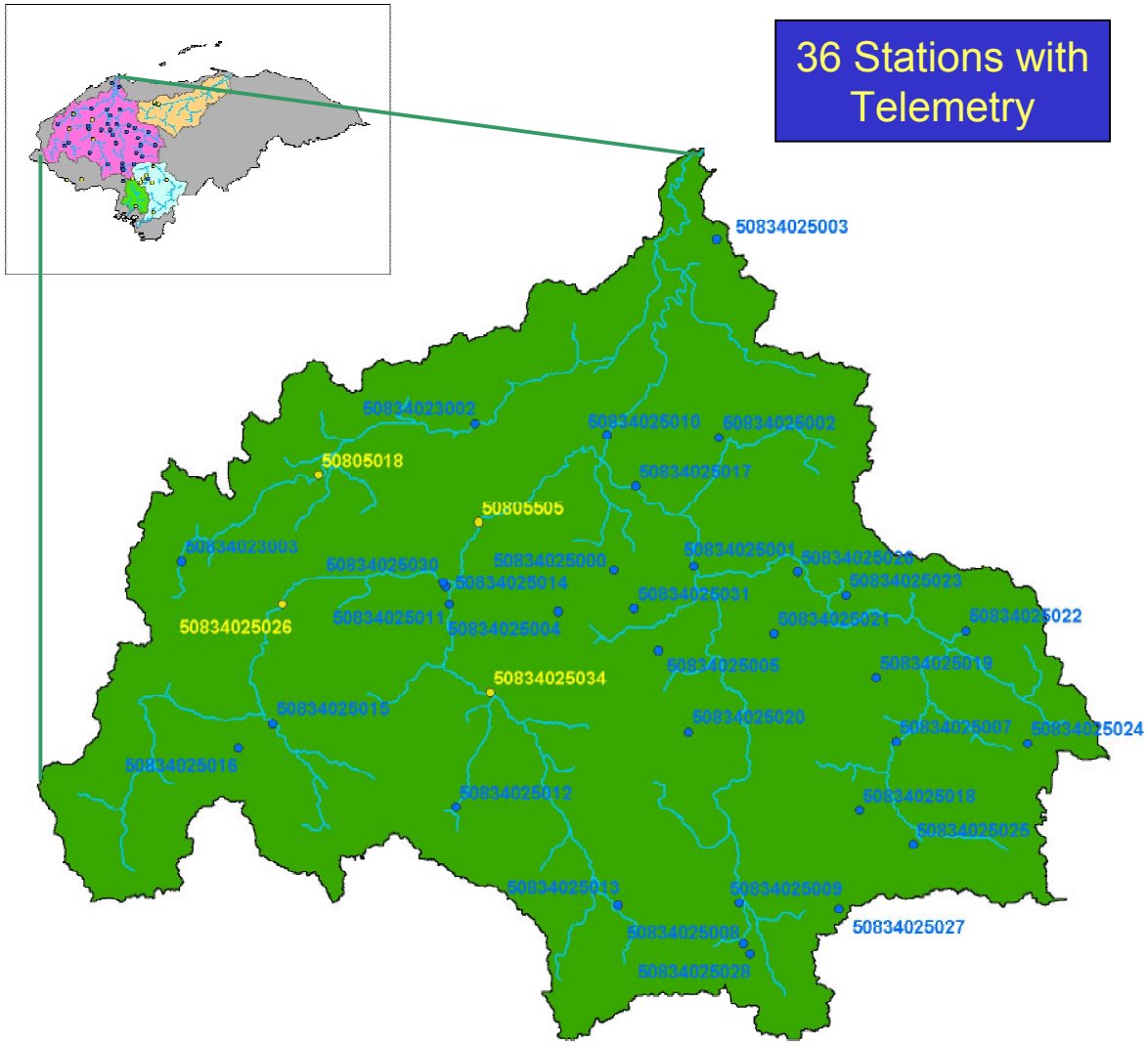
Complementary Stream Gage Programs

Stream Gages – Ulua Basin, Honduras (ENEE)



Stream Gages – CAMI Funding

Telemetric Stream Gage Network In Central America

- *Supplemental:* *38 Gages*
  - *End Date 12/01*
- *Honduras/ENEE:* *36 Gages*
  - *End Date 01/00*
- *OFDA/CAMI:* *10 Gages*
  - *End Date 12/02*

Total *84 Gages*

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Coordination with NWS

- *Stream Gage Networks to support NWSRFS in the following river basins:*
  - *Rio Choluteca (Honduras)*
  - *Rio Escondido (Nicaragua)*
  - *Rio Lempa (El Salvador, Honduras, Guatemala)*

Hydrologic Databases

- NWIS/ADAPS - historic (long-term) database

  Daily records of river stage, discharge, and precipitation data for hydrologic studies and planning.

- EMWIN – Direct reception of satellite data

  Real-time precipitation and river data for flood response. Coordination with NOAA/NWS.

NWIS/ADAPS

- Historic (long-term) database
- Daily records of river stage, discharge, and precipitation data for hydrologic studies and planning
- Statistical analysis of hydrologic data
- UNIX Platform (Sun Workstations)
- INGRES Database

NWIS/ADAPS

- Nicaragua – System installed 10/00
- El Salvador – System installed 11/00
- Honduras – System delivery pending
- Guatemala – Installation planned 02/00

- Training ongoing region-wide

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Counterpart Training: Honduras

- Tegucigalpa June 8-9, 1999
  - DCP Installation and Troubleshooting
- Tegucigalpa, August 27, 1999
  - Current Meter Workshop
- Sula Valley, September 1999
  - High-flow (bridge) measurements during 1999 flooding (SERNA, ENEE, CEVS)
- Tegucigalpa/UNITEC, November 8-12, 1999
  - Hydrologic Records Computation using ADAPS
- Tegucigalpa/UNITEC, May 15-16, 2000
  - Basic analysis and computation of surface-water records
- Tegucigalpa/UNITEC, October 27, 2000
  - Hydraulic Concepts of Indirect Discharge Measurements

Counterpart Training: Nicaragua

- Managua, June 5-6, 2000
  - DCP Installation and Troubleshooting
- Managua, September 7-8, 2000
  - DCP Operation and Surveying Techniques at Gaging Stations
- Managua, November 27 – December 1, 2000
  - Concepts of Surface-water Hydraulics and Hydrology

Counterpart Training: Regional

- Puerto Rico/USGS, July 31 – August 11, 2000
  - Hydrologic Records Computation using ADAPS
- San Salvador, December 11-15, 2000
  - Hydrologic Records Computation using ADAPS

Counterpart Training: Puerto Rico August 2000

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