



# When the Flood Waters are Rising, Who'll Do the Maps?

*The Development of Standard Operating Guidelines for GIS  
Specialists in Flood Response*



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California Department of Water Resources

# Overview

- Introduction (Jaime)
- Purpose and Development History (CB)
- Incident Command Team Environment (Jane)
- Data Needs (Jane)
- Answering Questions (Jon)
- Mapping (Jon)
- Future Resources (Jaime)
- Conclusion (Jaime)



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# Nothing Ever Happens

- Fall 2007  
Southern California Wildfires
- July 2008  
Inyo County Mud Flow
- January 2009  
Medford Island Levee Repair
- August 2009  
Ship Soft Grounding – Bradford Island
- October 12-13, 2009  
Columbus Day Storms
- Golden Guardian Exercise 2010/2011
- F-CO Exercise 2009/2010/2011



I need 4 maps in the next hour and someone needs to know what County Hamilton City is in.



# Purpose

- We all work differently, standardizing is good.
- We have a need.



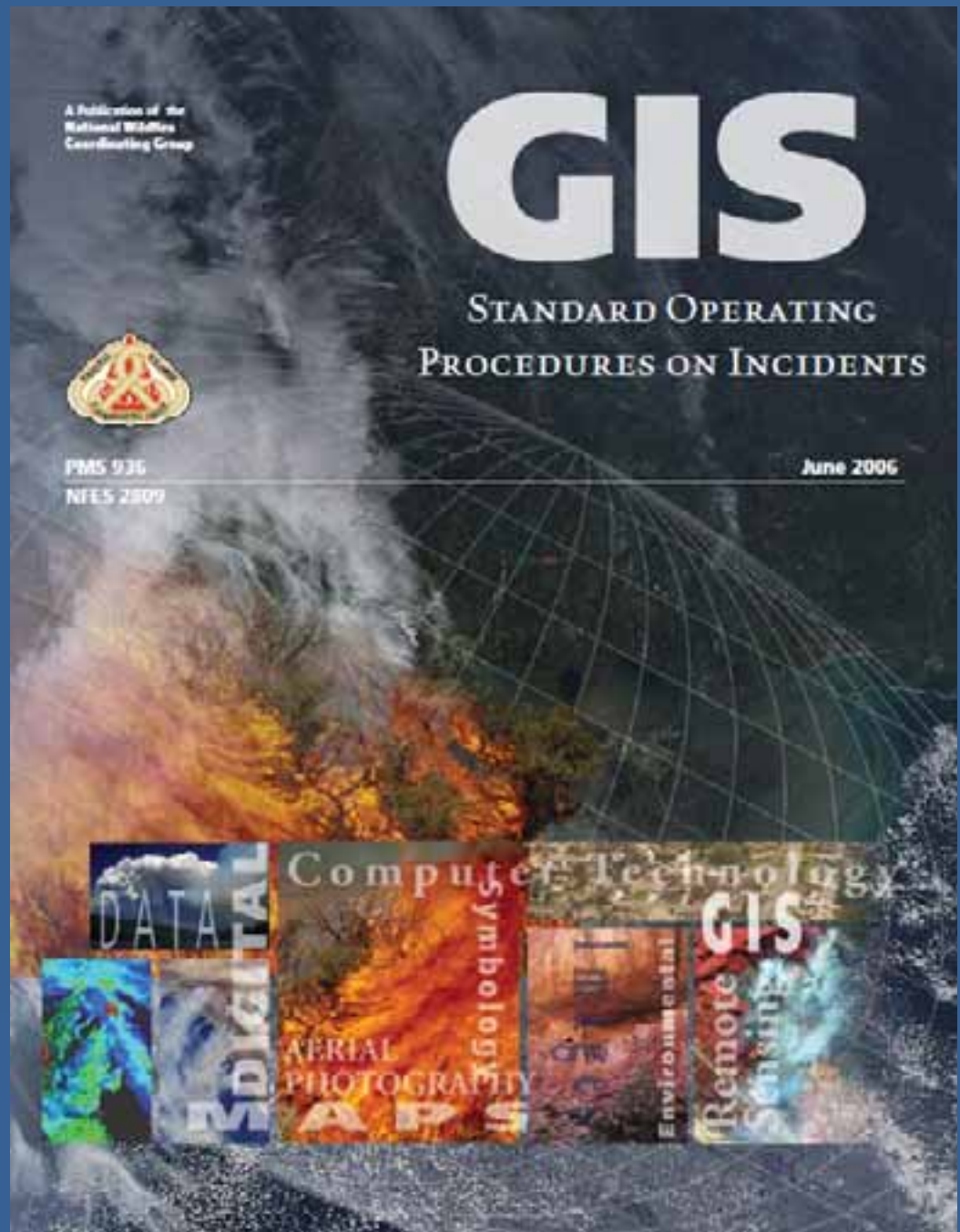
# Development History and Process

- Take something awesome
- Make it fit us
- Keep fixing
- Repeat





# Imagine Angels Singing



# Handy Dandy Toolbox

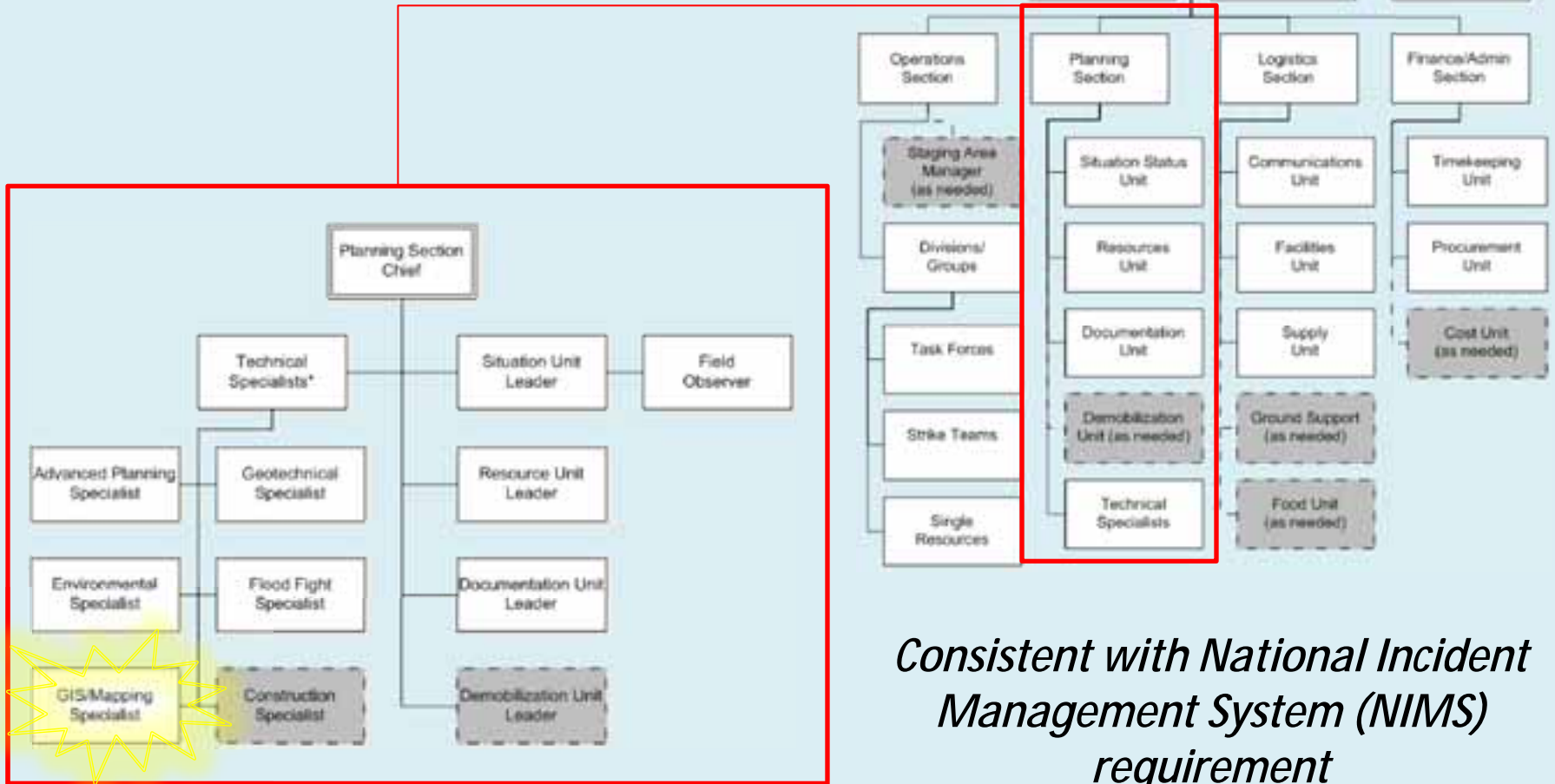


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# DWR Incident Command Structure





Bacon Island Road Incident  
June 2004  
*(Jones Tract Flood)*





# Incident Response Activity

Incident Command Center



ICC Planning Meeting



California Conservation Corps  
Crew Reinforces At-Risk Levee



BACON  
ISLAND

HHHH  
SHERIFF CLOSURE

McDONALD ISLAND

6/5/04

6/4/04

LOWER JONES

6/10/04

6/10/04

BA SF

WOODWARD  
ISLAND

UPPER JONES

ROBERTS STREET

BACON ISLAND ROAD

MAIN BRANCH  
NOR 65 783  
WIL 31 033

6/5/04

FIRST BRANCH  
TRIPLE SHOTS

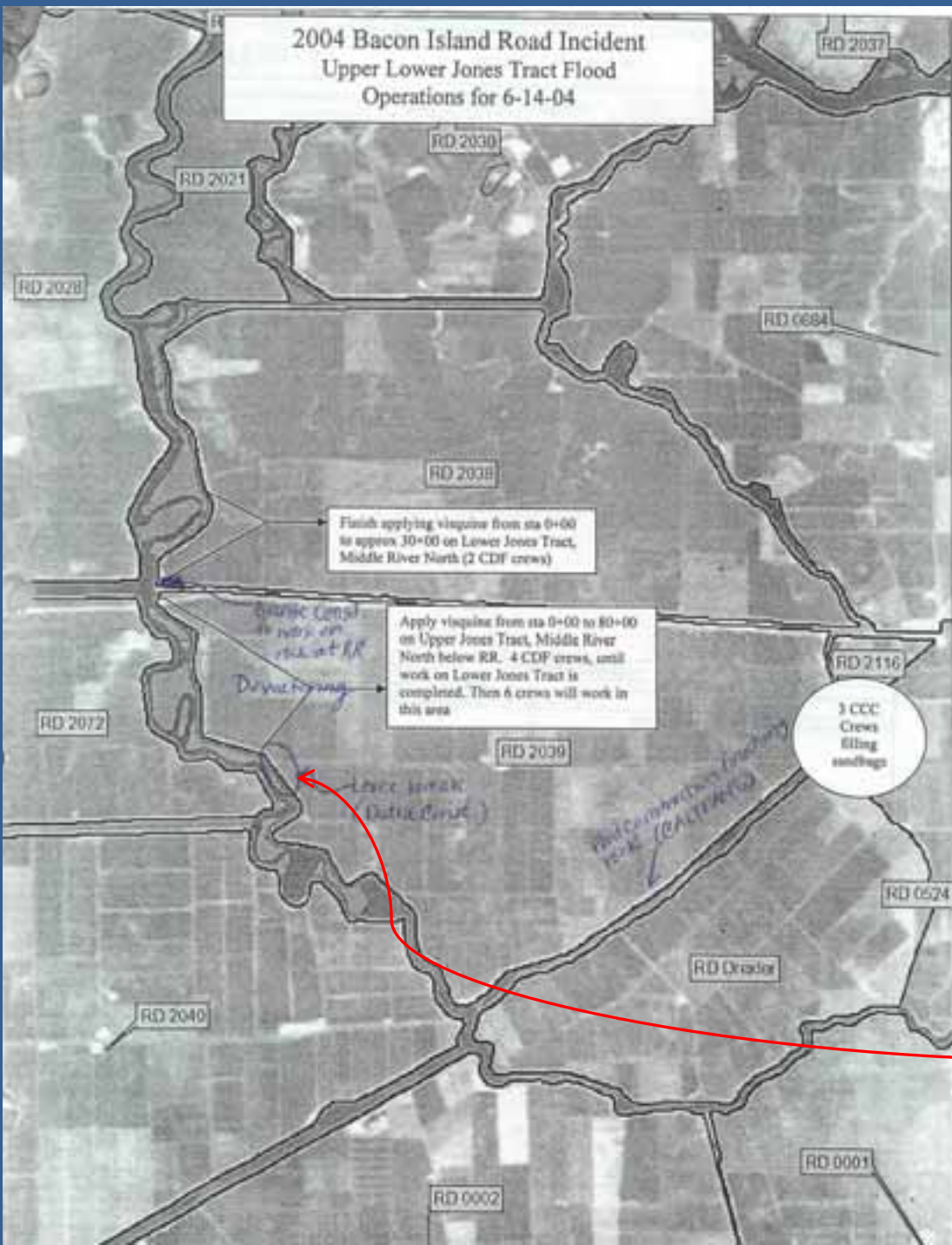
DREYLER TRACT

PTA

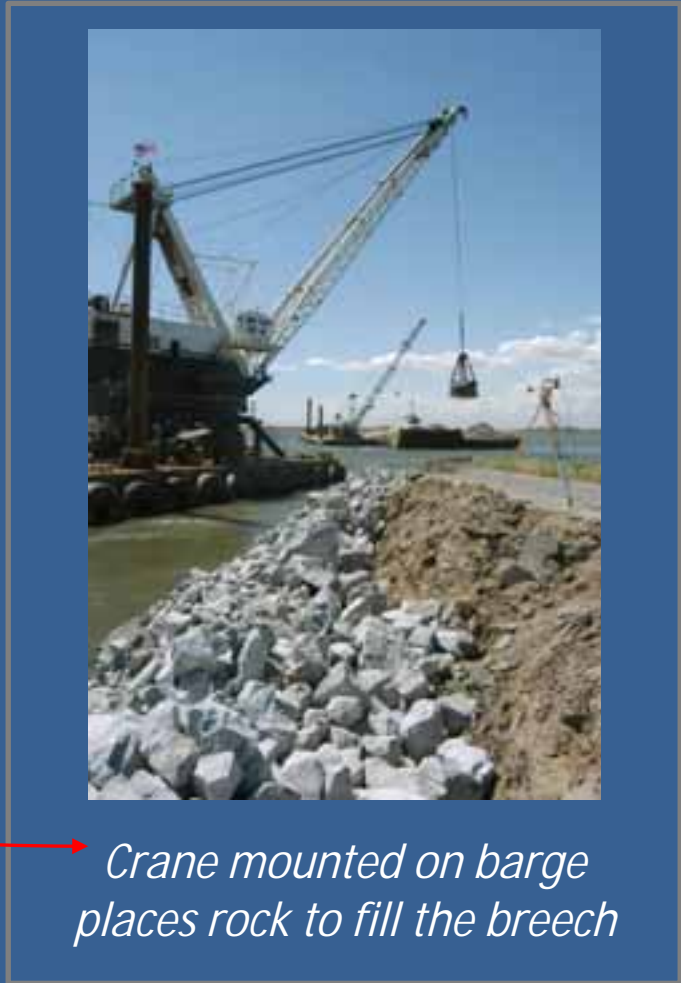




2004 Bacon Island Road Incident  
Upper Lower Jones Tract Flood  
Operations for 6-14-04



Incident Action Plan map created from background image and MS Word graphics



# Then (2004)

- No internet connectivity
- Limited cell phone coverage
- Limited computer hardware
- No GIS software available
- Data acquired via CD, flashdrive, paper, and phone calls
- IC planning staff recruited on-the-fly, no advance training
- Planning Section staff worked 14+ hour shifts to produce daily Incident Action Plan



# Now (2012)

- 3 communication trailers staged to provide instant connectivity
- ArcGIS pre-installed on dedicated laptops
- GIS data pre-loaded on hard drives
- 6 Incident Command Teams formed
- Periodic readiness exercises
- Annual GISS training course established
- DWR Field Operations Guide map symbology updated
- GISS Standard Operating Guidelines written
- GISS are ready for the next flood





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# Flood Fight Data Needs

- Hydrography
- California Levee Database
- Civil boundaries
- Transportation and Infrastructure
- Elevation (high resolution)
- Environmental (sensitive habitats)
- USGS Topo Maps and NAIP Imagery for basemaps
- Weather Reports and Tide Tables




# Emergency Response GIS Subcommittee meets throughout the year with staff of DWR's Division of Flood Management



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“I know what GIS can do. I don't just want maps; I want answers.”

**DWR Plans/Intel Chief**





# Where is the water going?

Where is the water going?

Meigs

1:63,360

1 inch = 1 mile

0 0.5 1 2






An aerial photograph showing a residential area completely inundated with floodwater. Numerous houses with various roof colors (grey, brown, white) are visible, with only their roofs and upper parts above the water level. Some boats are floating in the water. The background shows a road and some trees. The text "Who are at risk?" is overlaid in the upper portion of the image.

Who are at risk?

Vulnerable Populations



An aerial photograph showing a large body of water that has flooded a surrounding area. A multi-lane highway bridge spans across the water in the lower right. In the center, a road and some buildings are partially submerged. The water is dark, and the surrounding land is green with trees. The text "What is at risk?" is overlaid at the top in a large, black, sans-serif font.

What is at risk?

Critical Infrastructure

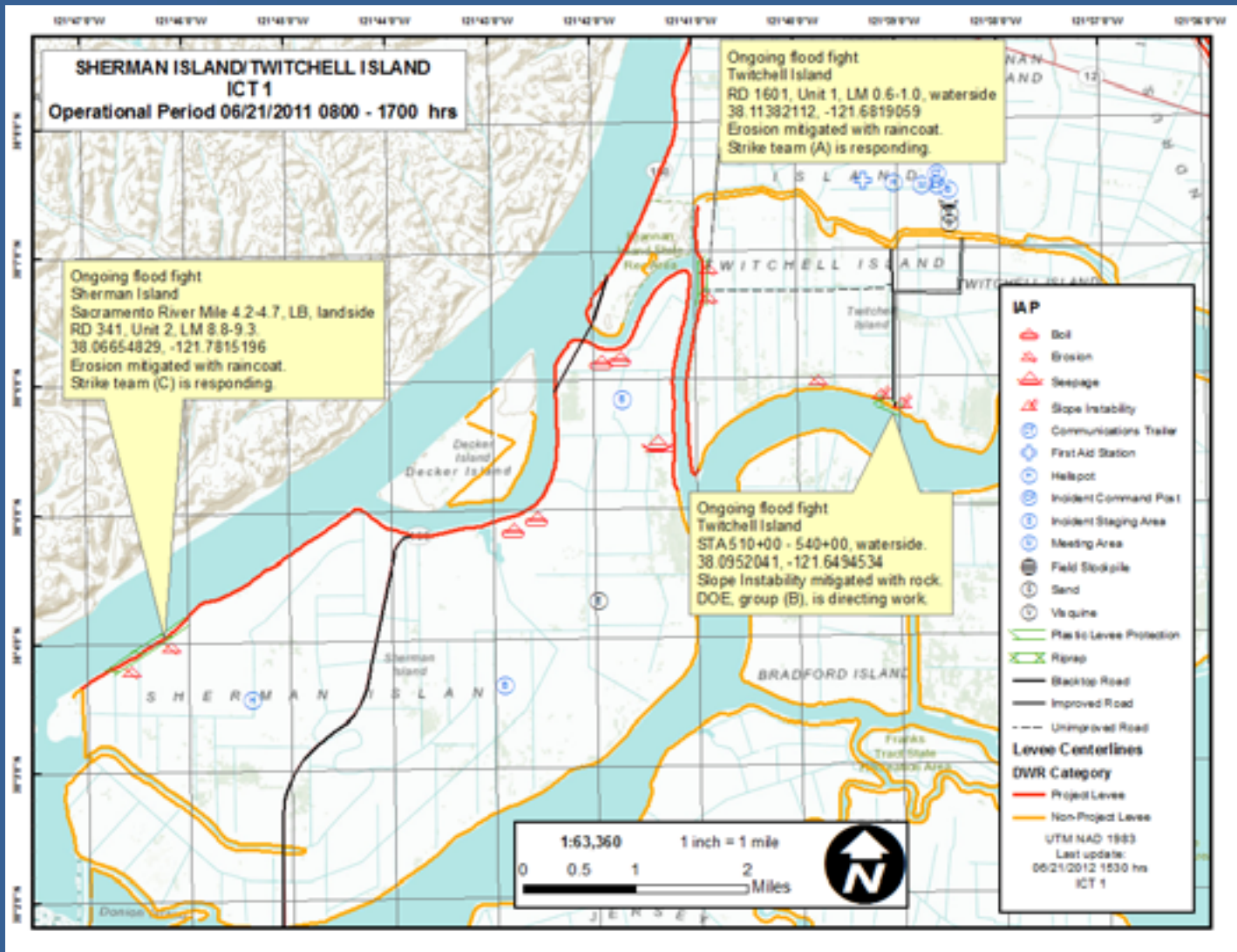
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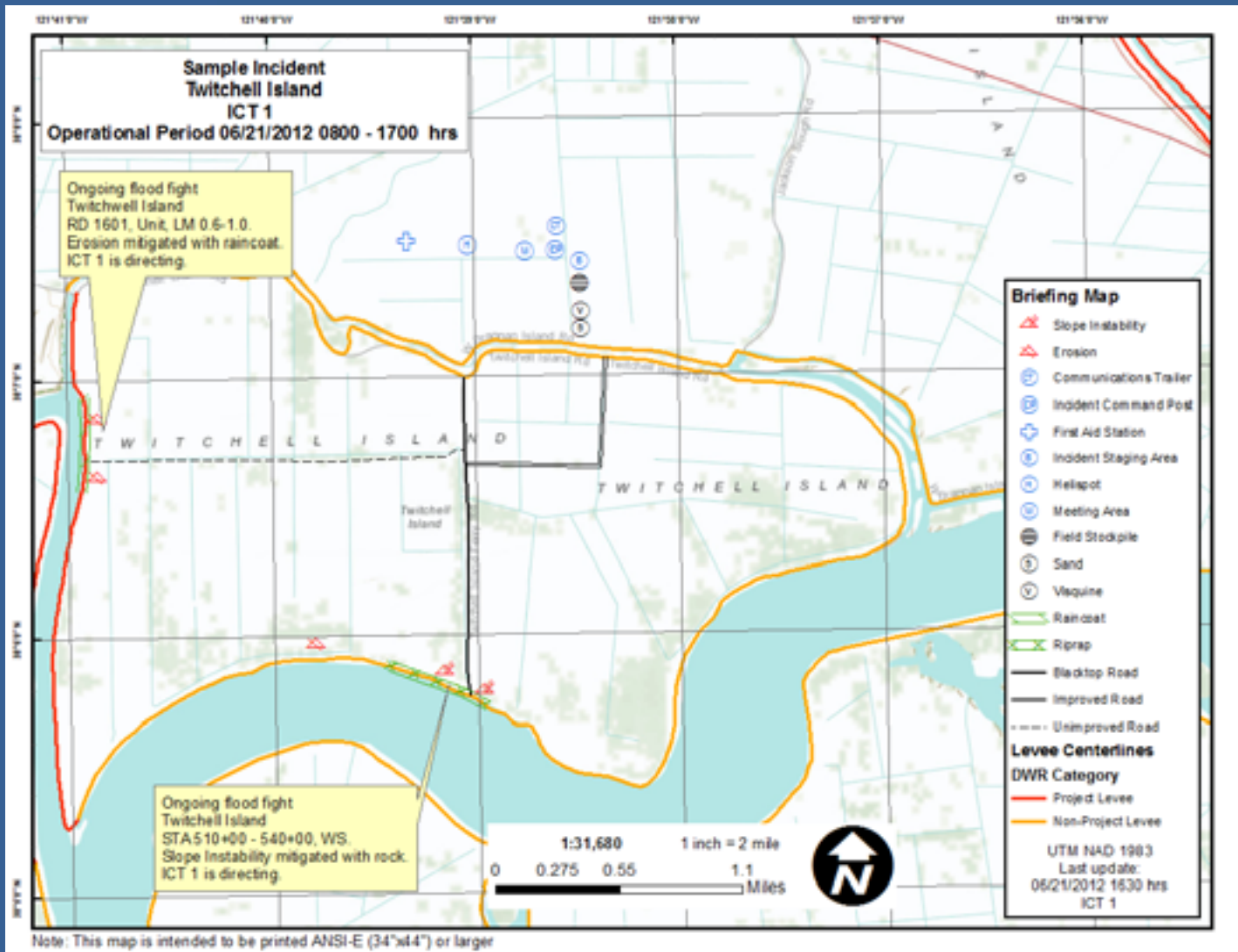


# Incident Action Plan Map

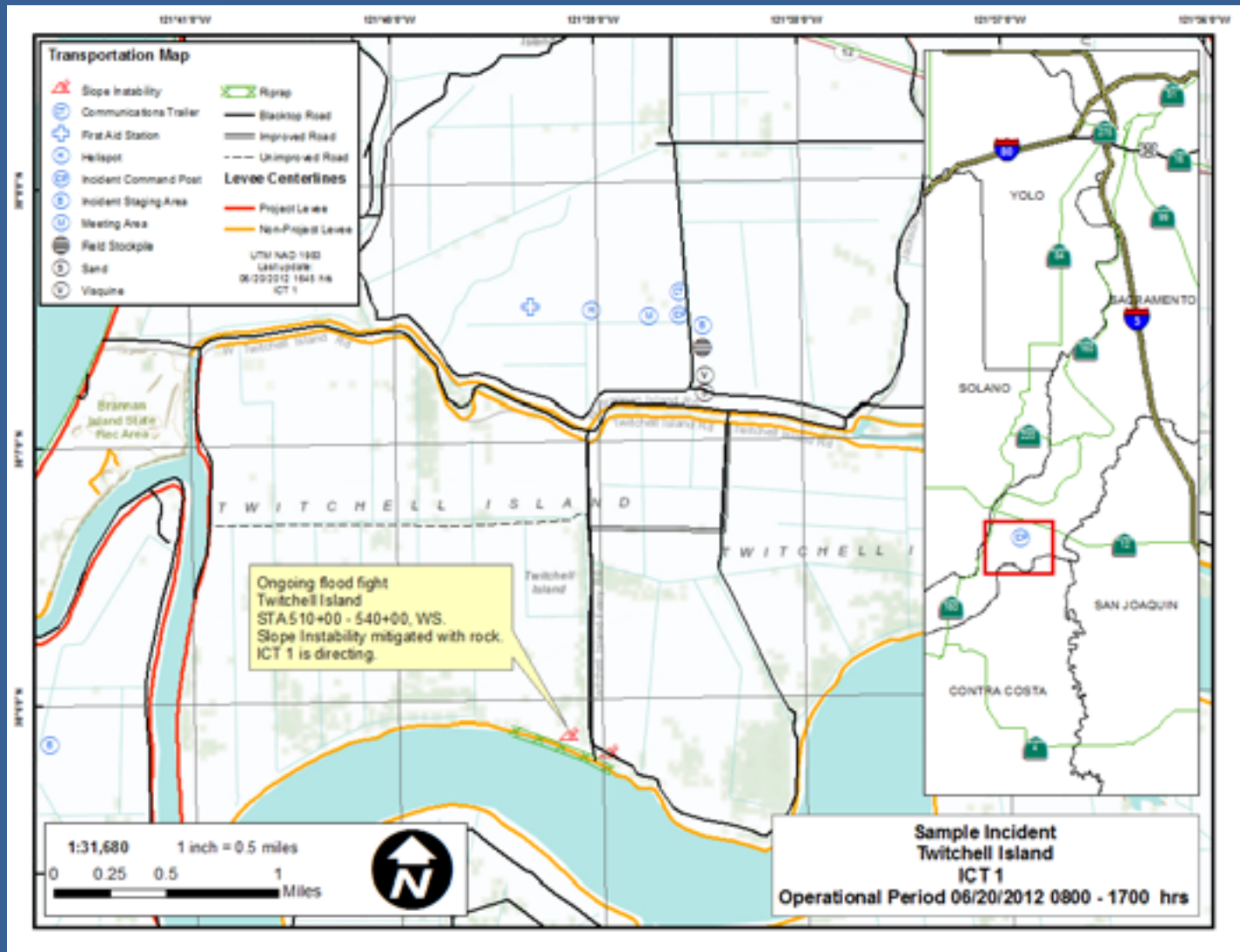




# Briefing Map



# Transportation Map



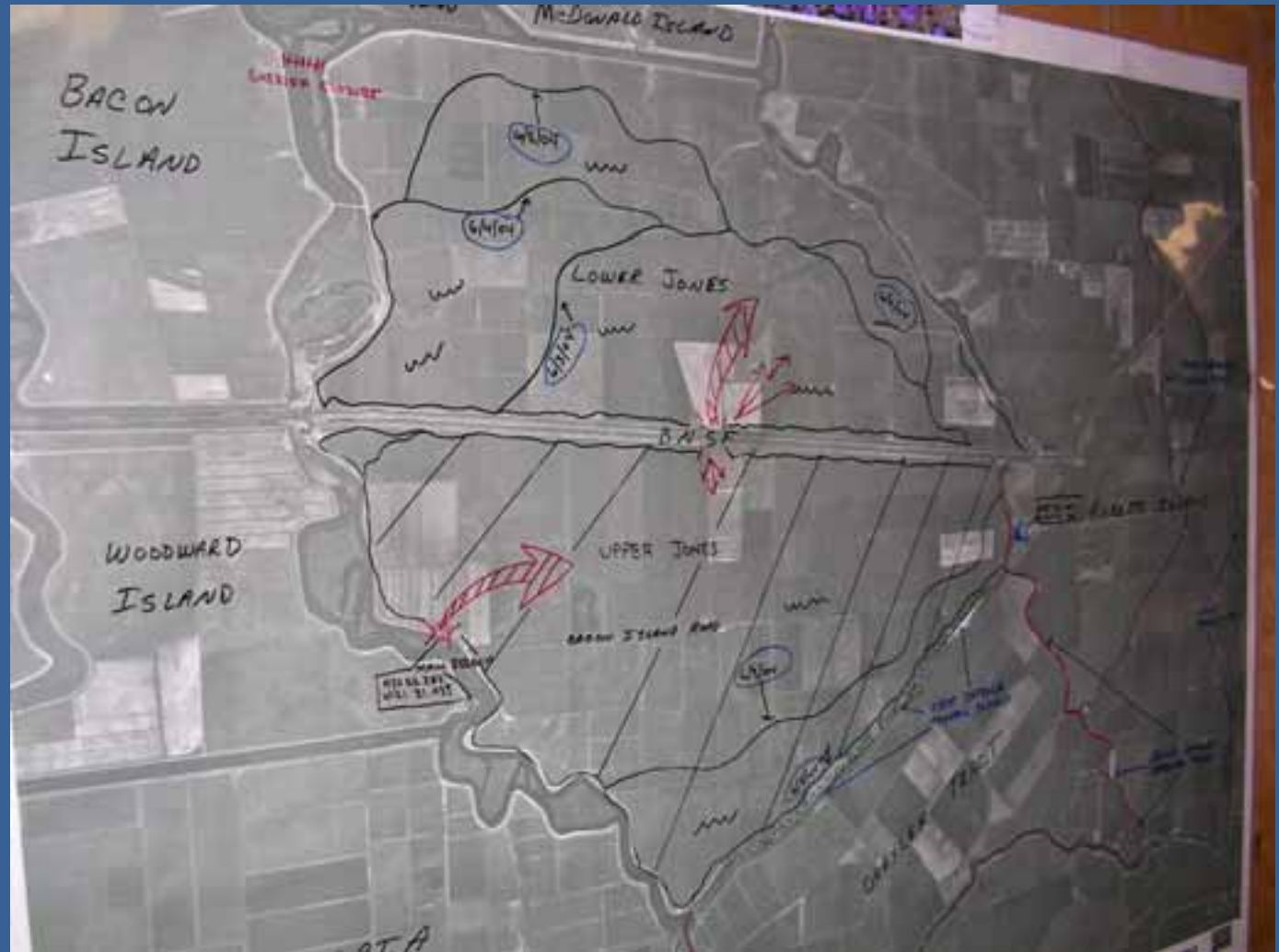
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# Common Operating Picture





# Incident Geodatabase

## Administrative Symbols

	Incident Command Post
	Incident Staging Area
	Helispot
	Telephone
	Cellular Telephone
	Meeting Area
	Wind Direction and Speed
	First Aid Station

## Access Route Symbols

	Unimproved Road
	Improved Road
	Blacktop Road

## Problem Symbols

	Levee
	Levee Break
	Boil
	Overtopping
	Subsidence
	Erosion
	Seepage

## Solution Symbols

	Groups
	Riprap
	Visqueen
	Sandbag Wall
	Temporary Levee
	Relief Levee Cut

## Supply Symbols

	Field Stockpile
	Empty Sandbags
	Filled Sandbags
	Sand
	Visqueen



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Questions?



# Shameless NHD Plug from Christina



\*The National Hydrography dataset is always relevant and important. You should support it!

