



**COLORADO**

Department of  
Transportation

## Connecting Communities and Lives After a Disaster

Johnny Olson, CDOT Region 4 RTD

CML - June 19, 2014



# CDOT's Response to Disaster

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- September 11, 2013 Event
- Flood Recovery Scope and Impacts
- Connecting Communities and Lives
- Lessons Learned
- Opportunities and Innovation
- Risk and Resiliency
- Stream Teams





# September 11, 2013 Flood Event

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# Unimaginable Destruction

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# Flood Recovery Scope and Impacts

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- \$535 million estimated damage to facilities
  - \$153 million local agency impact
- 486 Miles of state highway closed
- 200+ Bridges and culverts damaged
- 120,000 cubic yards of debris removed







# CDOT Incident Command Center

- Coordinate emergency response and communications
- Damage Assessment Teams
- Contracting and procurement for repairs
- Colorado National Guard SPACE Team and GIS Mapping





**Closures**  
September 17,  
2013





# Connecting Communities

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# Reconnecting Lives

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# Opened October 11, 2013



## COAL CREEK CANYON

Closed September 13<sup>th</sup>, 2013 | Opened October 11<sup>th</sup>, 2013



COLORADO  
**United**

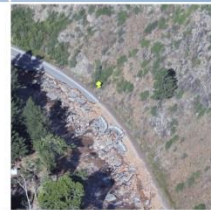


# Opened November 4, 2013



## NORTH SAINT VRAIN

Closed September 12<sup>th</sup>, 2013 | Opened November 4<sup>th</sup>, 2013



COLORADO  
**United**







# Opened November 21, 2013

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## BIG THOMPSON CANYON

Closed September 13<sup>th</sup>, 2013 | Opened November 21<sup>st</sup>, 2013





# Opened November 26, 2013



## SOUTH SAINT VRAIN

Closed September 12<sup>th</sup>, 2013 | Opened November 26<sup>th</sup>, 2013



COLORADO  
**United**







# Flood Recovery

100%  
**Reopen**

November 26,  
2013



Thank you for building our road home!

Love

## The Children of Lyons

Hannah Duse





# Lessons Learned

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## Leadership and Expertise

- Draw from within CDOT and from industry
- Bring strength to the ICC without destabilizing the Regions
- One CDOT collaborative effort
- Importance of partnership and collaboration
- Emergency Preparedness





# Partnership and Collaboration

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Office of Emergency Management  
Federal Emergency Management Agency (FEMA)  
Central Federal Lands  
Federal Highway Administration (FHWA)  
Colorado Water Conservation Board (DNR)  
US Forest Service  
Army National Guard  
Cultural Resource Agencies  
Local Agencies  
Contractors  
Consultants







# Collaboration with Contractors

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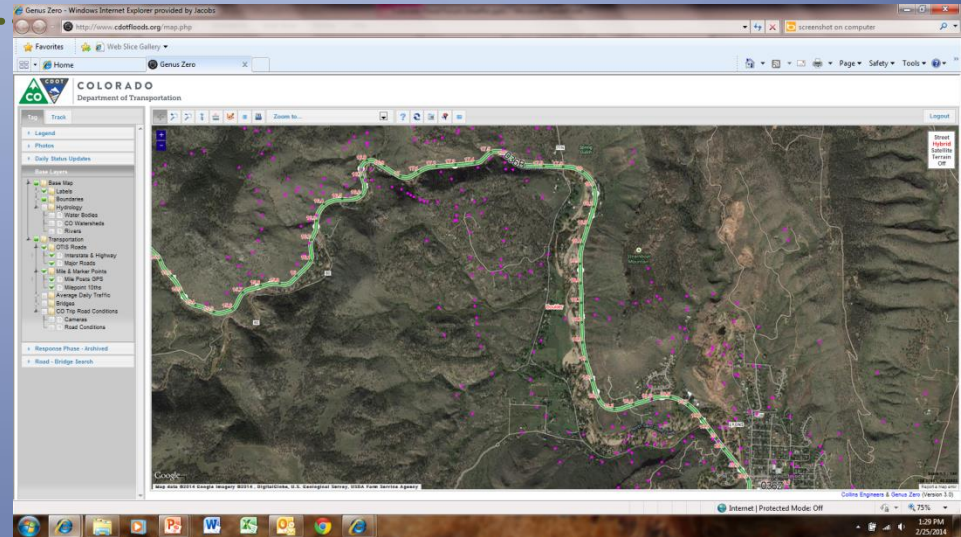
- Skanska
- Kraemer
- Kiewit
- Lawrence
- URS
- NCTC
- Agg Industries
- Sema
- ACC
- Mountain Constructors
- Coulson
- TLM
- Concrete Specialties
- Zak Dirt
- Castle Rock
- Connell Resources
- Structures Inc.
- American West
- Allenspark Excavation
- Concrete Works
- Altus Traffic
- American Signs
- Jalisco
- Rocky Mountain Signing
- Traffic Masters
- Warning Lights
- Work Zone TC
- Your Way
- Blochowicz Ditching
- Phillips and Jordan
- Ames/Granite





# Process Improvements

- ICC GIS Platform  
<http://cdotfloods.org>
- External website launch in June – full flood project tracking
- Data Management/Document Control
  - Essential for audit purposes and reimbursement from FEMA and FHWA







# More Process Improvements

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- Program Management –
  - I-3 project approach
  - Individual project workflow
  - Cumulative Program of Projects workflow
  - ICC projects are leading effort for CDOT



# Risk and Resiliency

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# Risk and Resiliency Analysis

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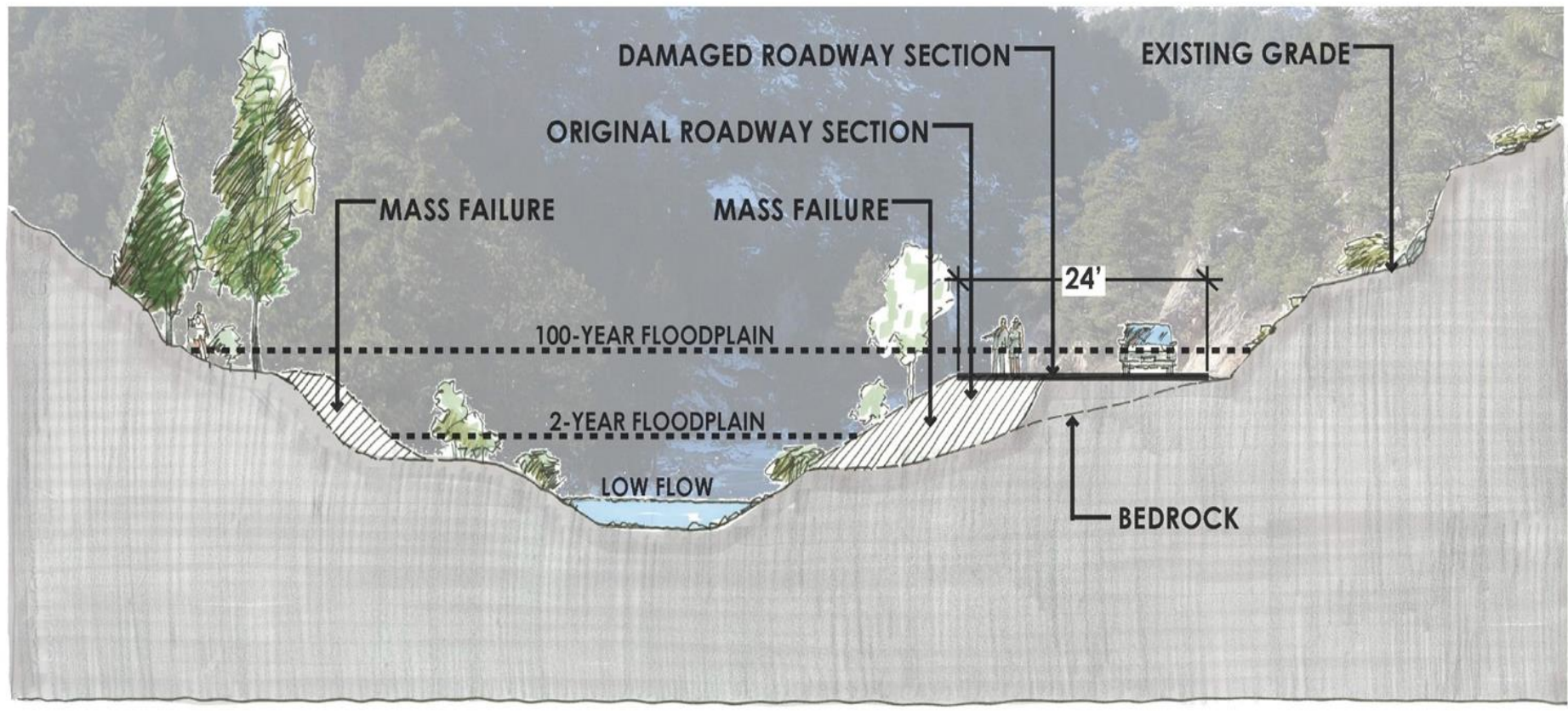
- FHWA requires a risk-based analysis for designing repairs to ensure they are cost effective and reduce the potential for future loss.
- Currently FHWA has not adopted a risk based model for analyzing resiliencies for infrastructure projects
- CDOT & FHWA Piloting an infrastructure model including peer reviews, sensitivity analysis and comparison to FEMA model
- Model considers
  - vulnerability of the asset
  - treat likelihood
  - probability of a successful failure.

*“Resilience: Capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and environment.”*



# Philosophy of Repairs – US 36 Example 1

## ORIGINAL & DAMAGED TYPICAL SECTION



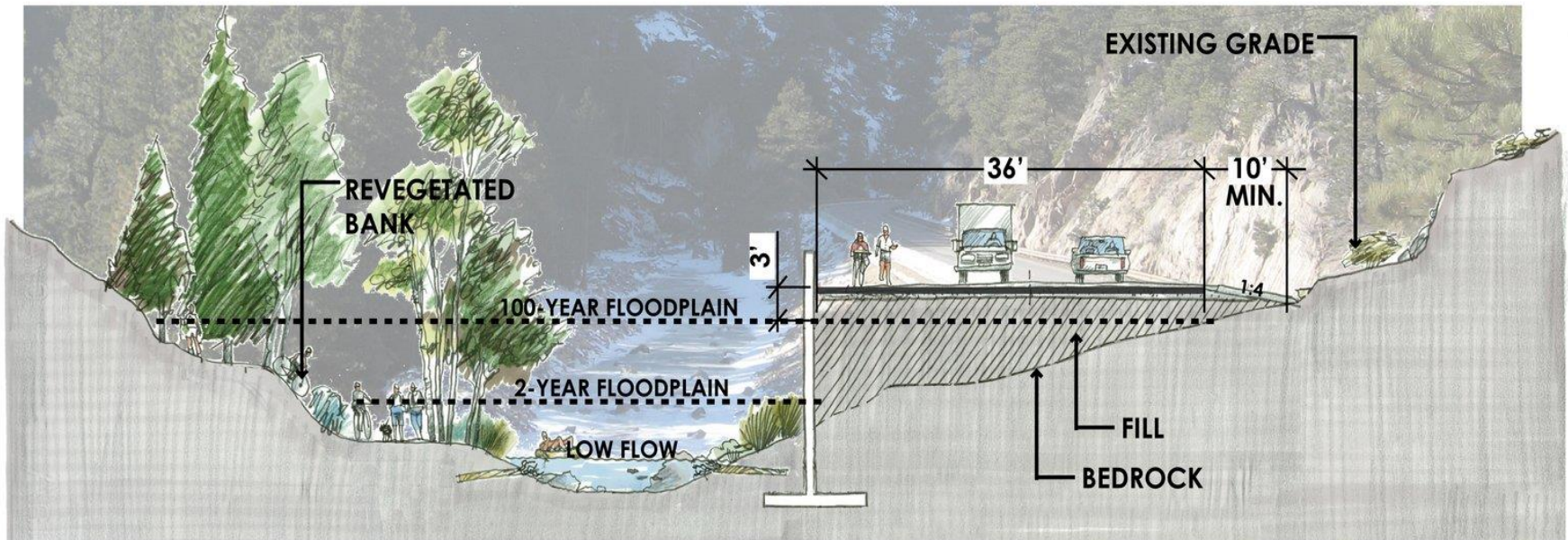




# Philosophy of Repairs – US 36

## Example 2

### CONVENTIONAL REPAIR TYPICAL SECTION

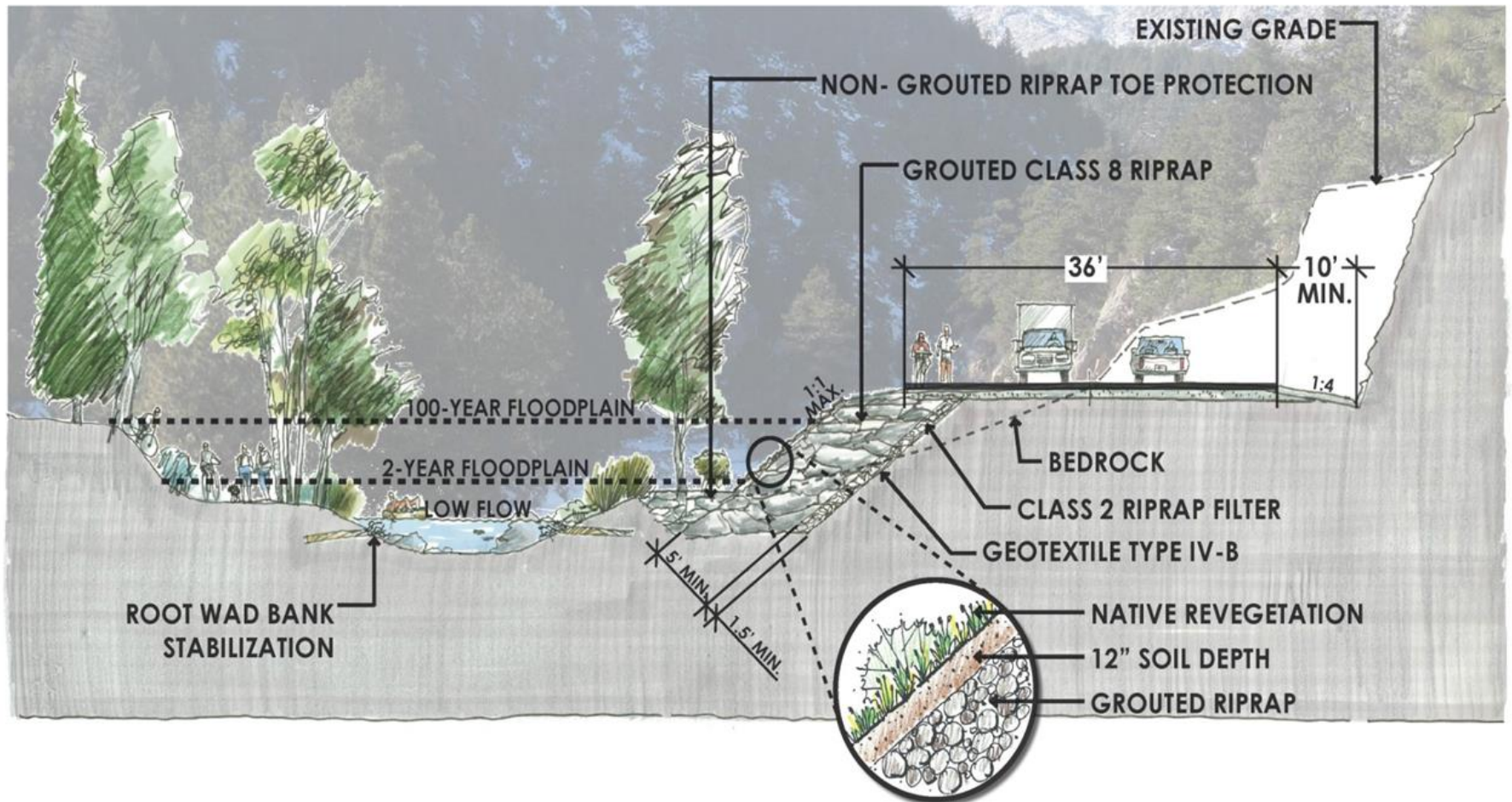




# Philosophy of Repairs – US 36

## Example 3

### PROPOSED REPAIR TYPICAL SECTION







# CDOT/CWCB Hydrologic Evaluation

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- Collaborating to determine peak flood estimates and revised hydrologic modeling for watersheds below:

County and Flooding Source Name	Highways	Location and Drainage Area
Larimer, Big Thompson River	US 34	Big Thompson River Below Lake Estes to West Loveland
Larimer, Little Thompson River	US 36	Little Thompson River Headwaters to Pinewood Springs
Boulder, St. Vrain River	SH 7 and US 36	St. Vrain Creek Headwaters (North, Middle, and South) to I25
Boulder, Boulder creek	SH 119	Boulder Creek below Barker Reservoir to West Boulder
Weld, South Platte River	US 85 and US 34	Big Thompson River confluence to Cache la Poudre River Confluence
Jefferson, Coal Creek	SH 72	Coal Creek Headwaters to Jefferson/Boulder County Line

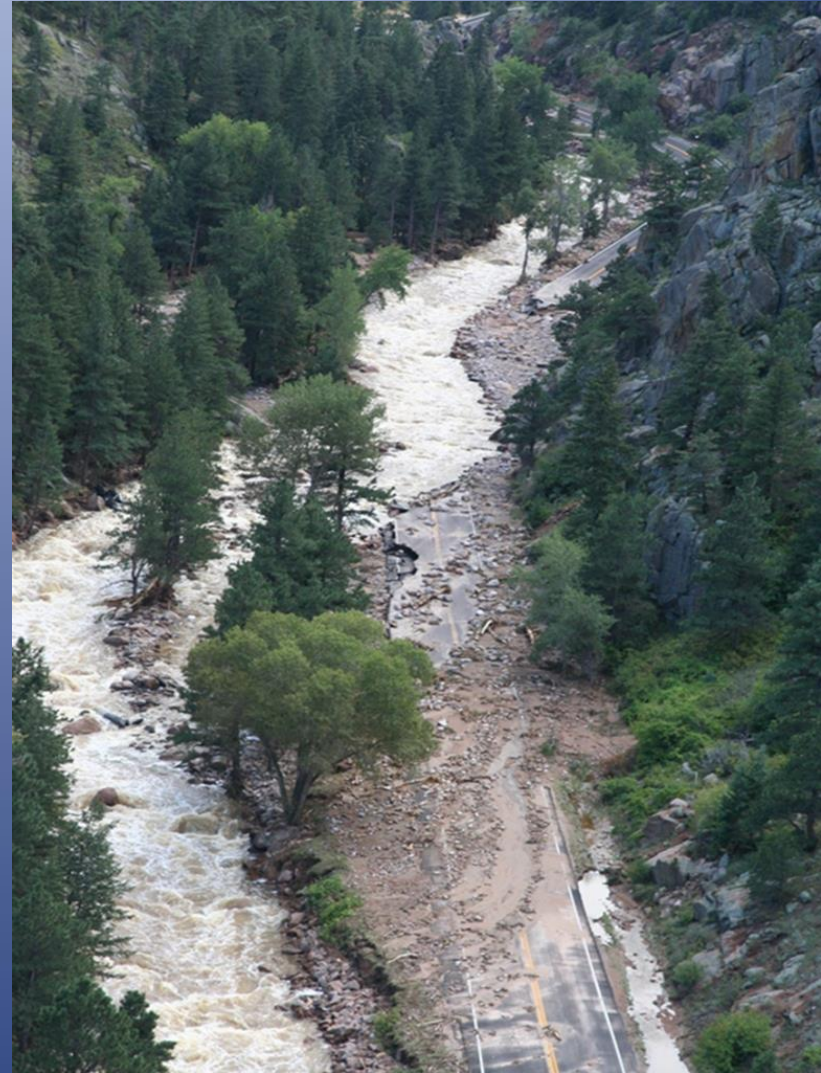


# Stream Teams

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CWCB working with Local Communities to establish Coalitions to develop Watershed Master Plans

CDOT will provide Hydrologic Evaluations for the various watersheds







# Stream Team Involvement

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- CDOT Resident Engineers, Environmental Groups and Hydraulics Unit will be involved in the Master Planning efforts.
- Coalitions/Master Plans are in the beginning stages for:
  - Big Thompson
  - St. Vrain
  - Coal Creek
  - Boulder Creek
  - Little Thompson





# Transition from ICC to CDOT Regions

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- April 1, 2014 - the Incident Command Center in Loveland shut down
- Flood Recovery Office opens in Greeley
- Flood Recovery Business Office in Denver at CDOT Headquarters
- Flood project development and design work to follow CDOT's normal project process with minor modifications
- All debris issues, local agency projects, and final project documentation will be coordinated through the Flood Recovery Office
- All payments will be made through the Flood Recovery Business Office.

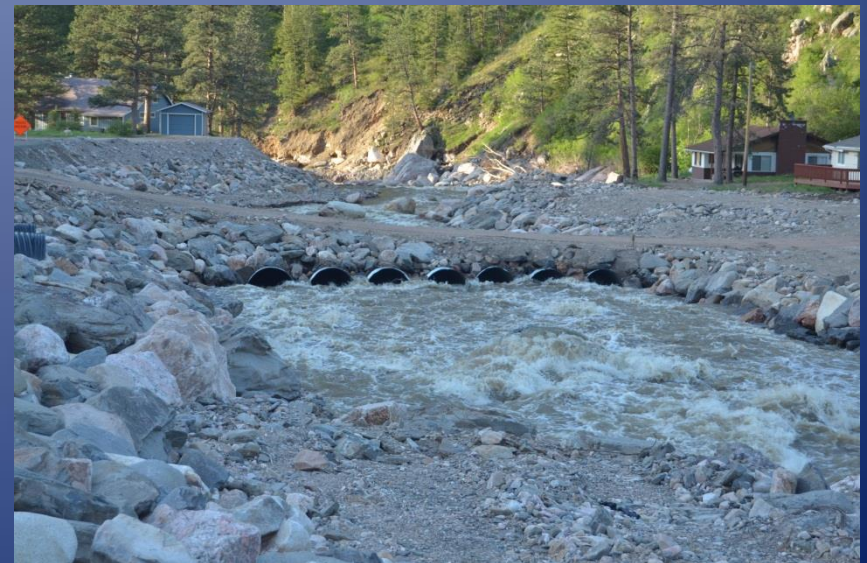
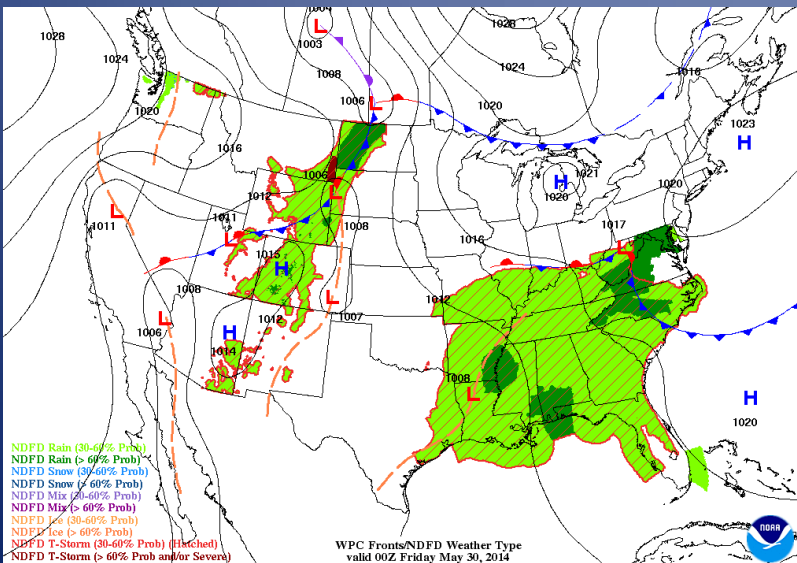




# Where are we today

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- Monitoring temporary Emergency Repairs during Spring runoff
- Permanent Repair projects moving to design
- US 36 PR project moving to Phase 2





## Where are we today

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- Scour Bridge Repairs armored for spring runoff
- 411 On-System Bridge inspections
- Emergency Fence Repairs
  - » I-25 bridge scour repair Big Thompson







## CDOT Video

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- [http://www.youtube.com/watch?v=Vd-vI\\_a2bnk](http://www.youtube.com/watch?v=Vd-vI_a2bnk)



# QUESTIONS

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