The Best(est) BMP Stream Stabilization

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Green Infrastructure includes Stream Restoration?

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How did the Clean Water Act become an obstacle to addressing water quality?

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Don’t get us wrong – The CWA is good and necessary…

- Enormous good has been done since the Clean Water Act amendments were enacted in 1972.

- Initial work that was done as a federal/local partnership resulted in immediate improvement

It is Not so Obvious Any More

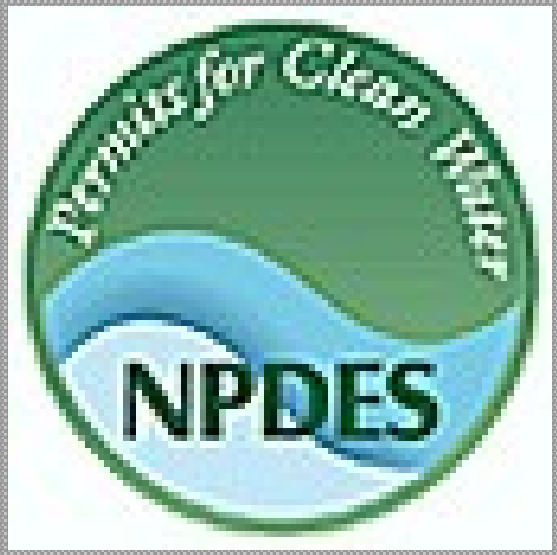
GOAL: Stream Health

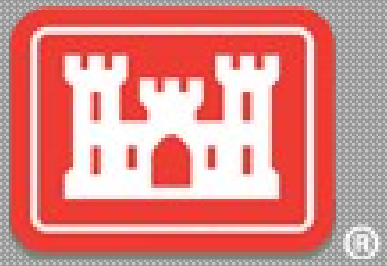
"Restore and maintain the chemical, physical, and biological integrity of the nation's water"

Clean Water Act

Assumption - Untouched streams are healthy and would remain healthy if runoff flowing in is "clean"

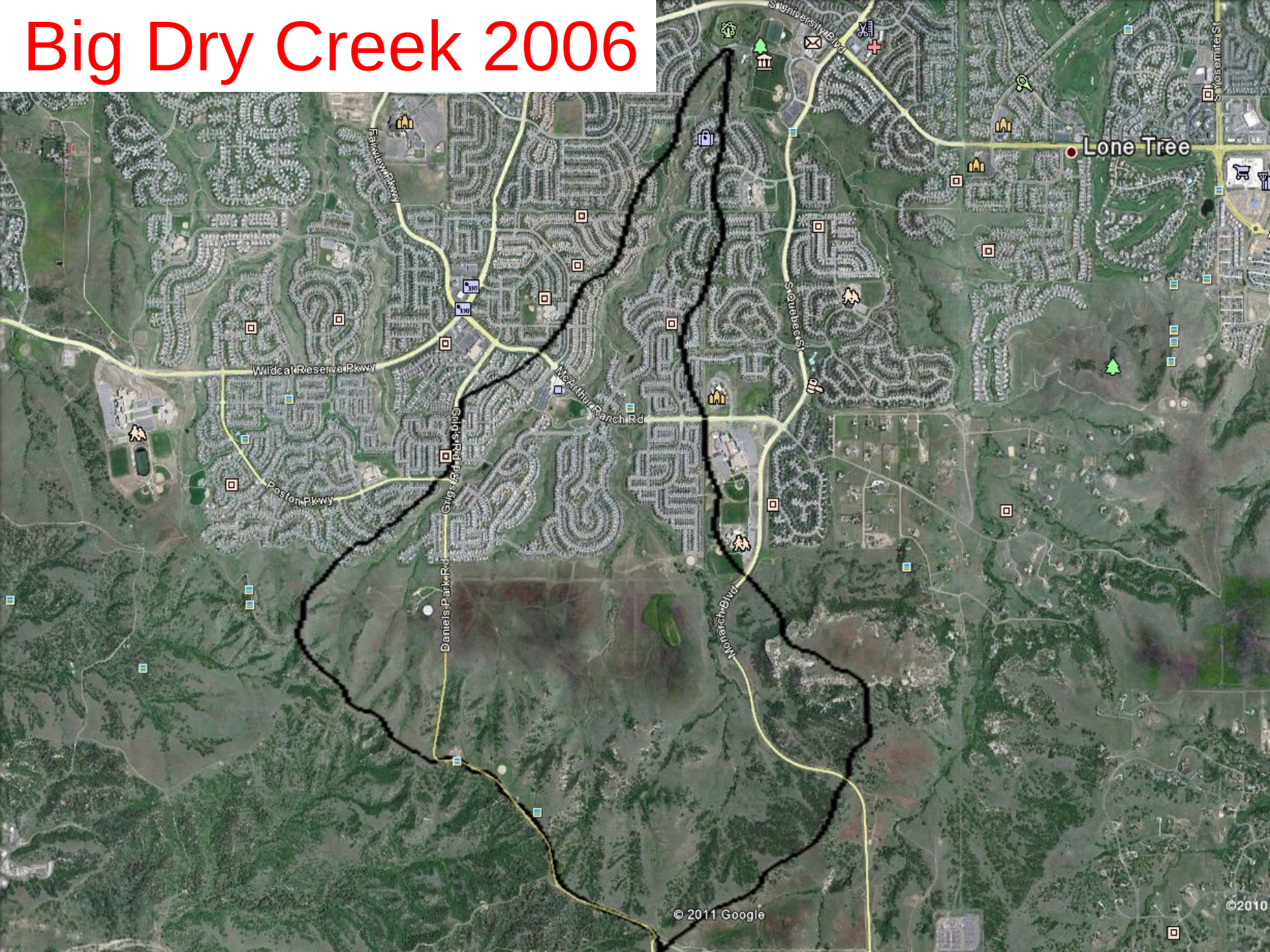
Permits:





US Army Corps of Engineers

Big Dry Creek 2006




Click to edit M
Second level
Third level
Fourth level
Fifth level
Big Dry Creek 2004
Rock
Check
Dam

Big Dry Creek 2007


Big Dry Creek 2004


Big Dry Creek 2007


Big Dry Creek 2007

Big Dry Creek 2009

Project Length = 2,400 LF
Brought invert up on average 5 feet
8,500 CY of Material lost in 3-yrs
Construction Cost = $438,000

How are we doing?

National Research Council 2009 Report:
"*Urban Stormwater Management in the United States*"

- Committee on Reducing Stormwater Discharge Contributions to Water Pollution
- NPDES program has not produce desired results
- Recognizes that "*The sediment released by channel expansion and channel incision due to changes in flow regime and discharge can be the largest component of the overall sediment load delivered to downstream water bodies*."
- The report makes no recommendation regarding receiving stream stabilization; recommends rather that nonstructural stormwater control measures (green infrastructure) be considered first before structural practices, because their use reduces the reliance on and need for structural measures.

IMPLEMENT: Clean Water Act

Assumption - Untouched streams are healthy and would remain healthy if runoff flowing in is "clean"

National standard for stream health is measured by

1) Robust Vegetation and Aquatic Habitat
2) Absence of sediment and other pollutants

And runoff matches pre-developed conditions, volume control (Green Infrastructure)

Untouched and Unhealthy

IMPLEMENT: Clean Water Act

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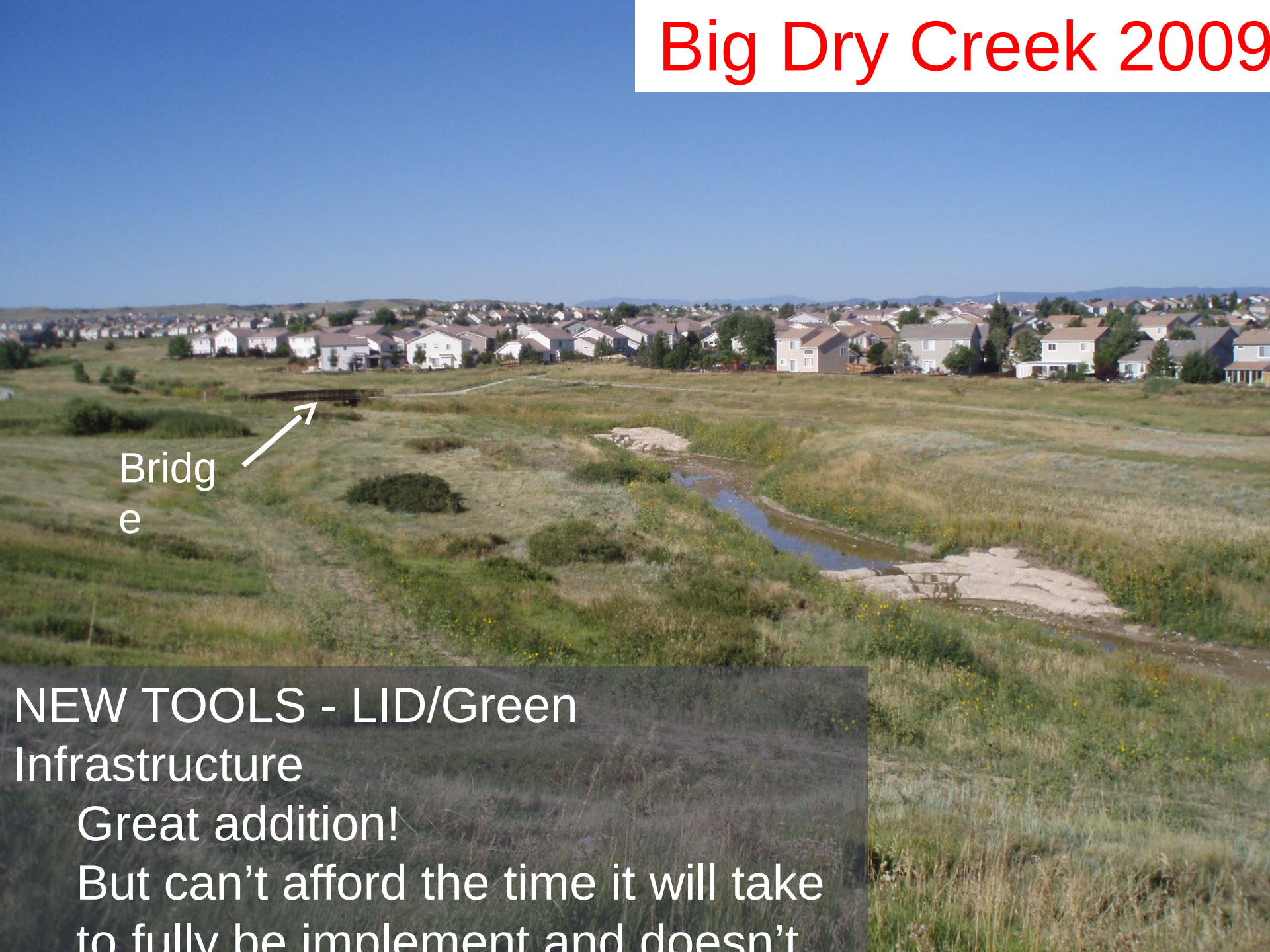


NEW TOOLS - LID/Green Infrastructure

- Great addition!
- But can’t afford the time it will take to fully be implement and doesn’t

The UDFCD "Toolbox". We've been advocating this since 1992

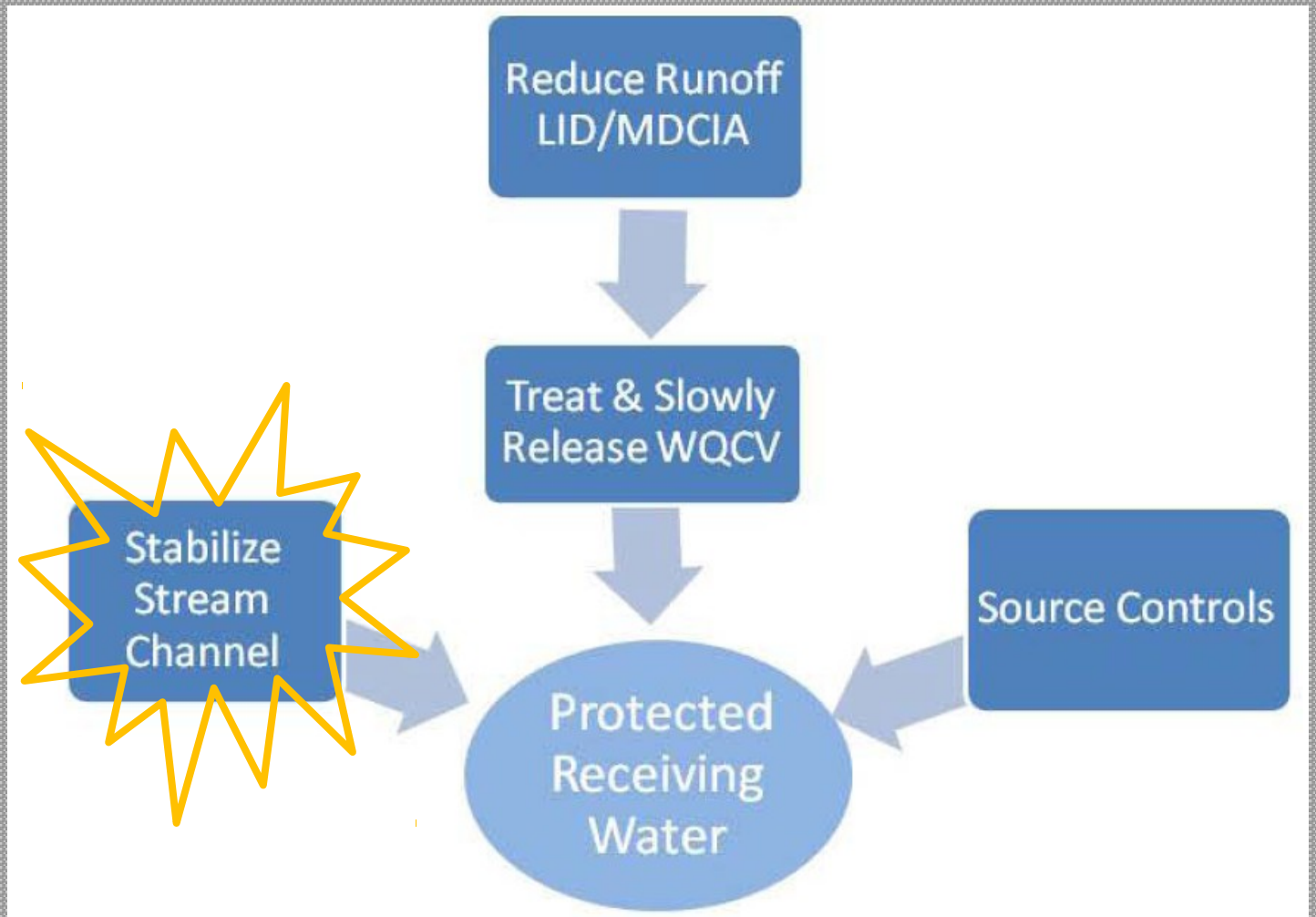


Figure 1-2. The Four Step Process for Stormwater Quality Management

Stream Stabilization:

Stream Stabilization to Restore Natural Beneficial Functions of the Floodplain:

PROBLEM: CWA Regulations Don't Account for Stream Stabilization!

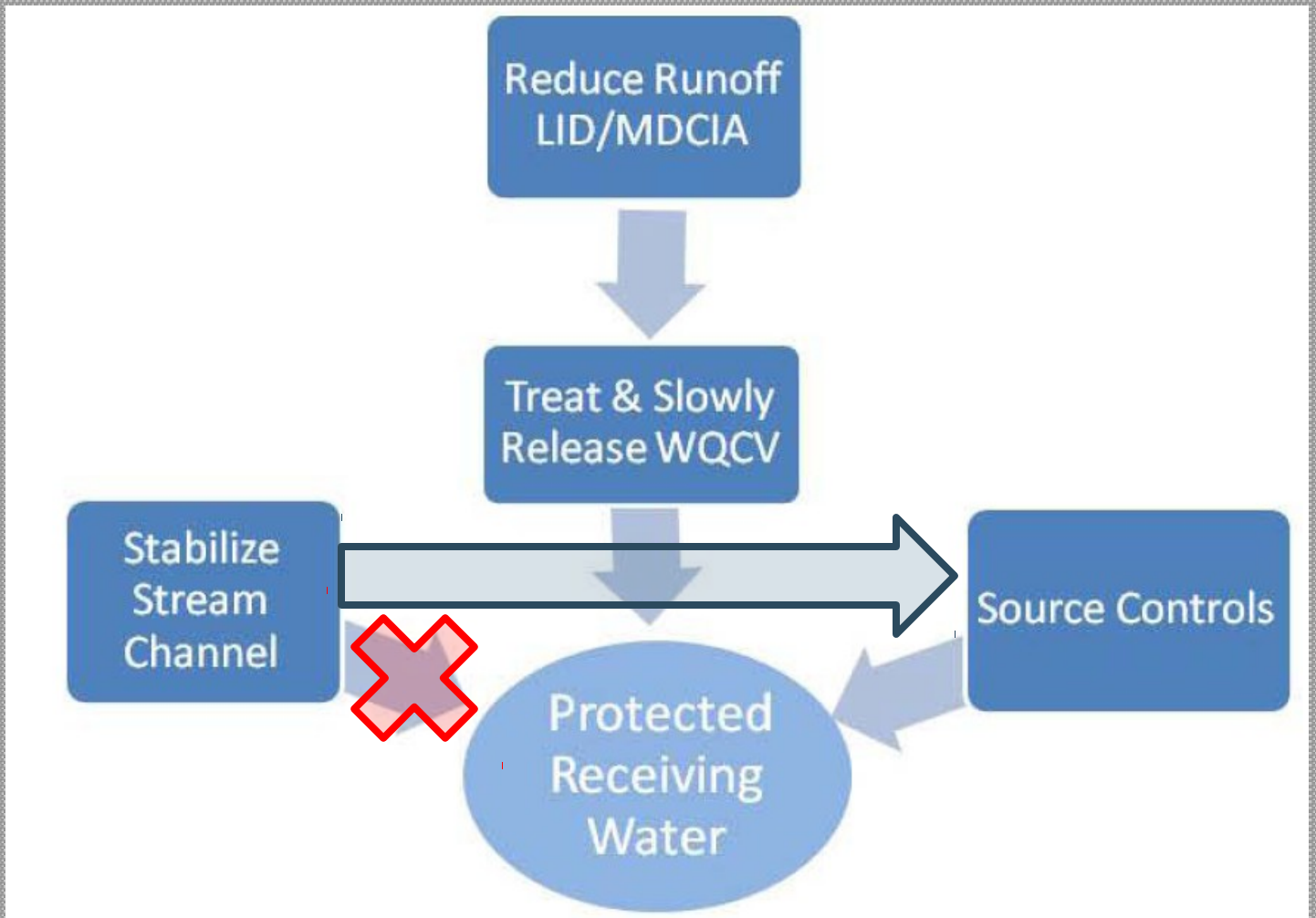


Figure 1-2. The Four Step Process for Stormwater Quality Management

Which MCM Calls for Stream Stabilization?

Six Minimum Control Measures

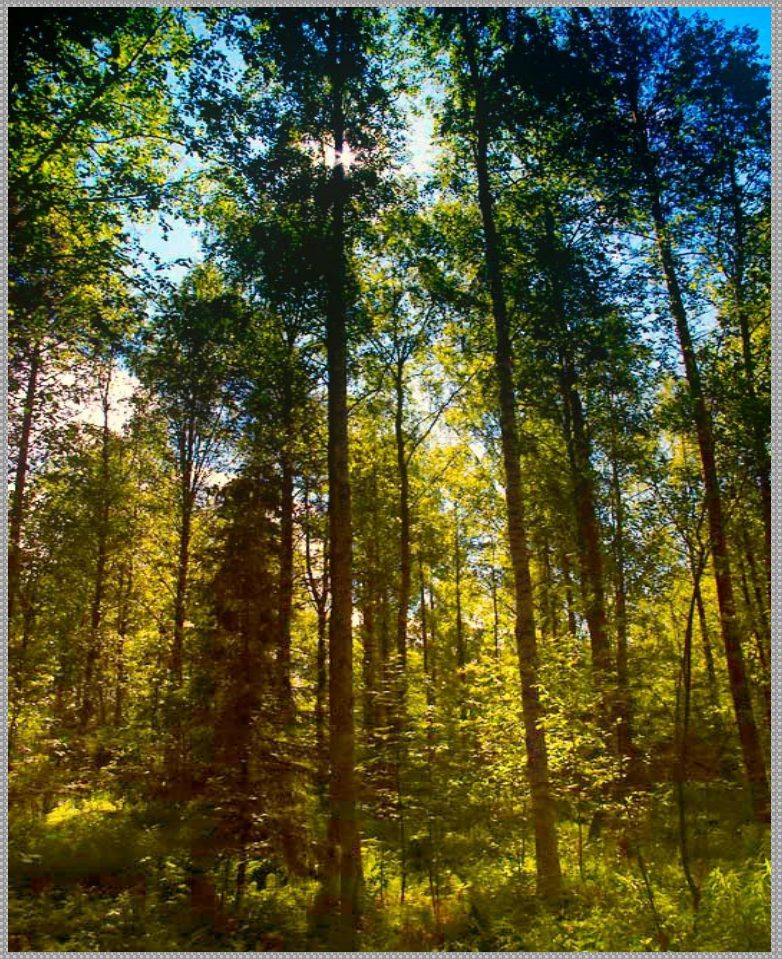
1. Public Education and Outreach
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Storm Water Runoff Control
5. Post-Construction Storm Water Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Challenge Stream Stabilization viewed as a Construction Activity:

"Land Disturbance" viewed as a negative?

Permit implementation narrow view, lose sight of big picture

Temporary construction BMP's drive process



Green Infrastructure

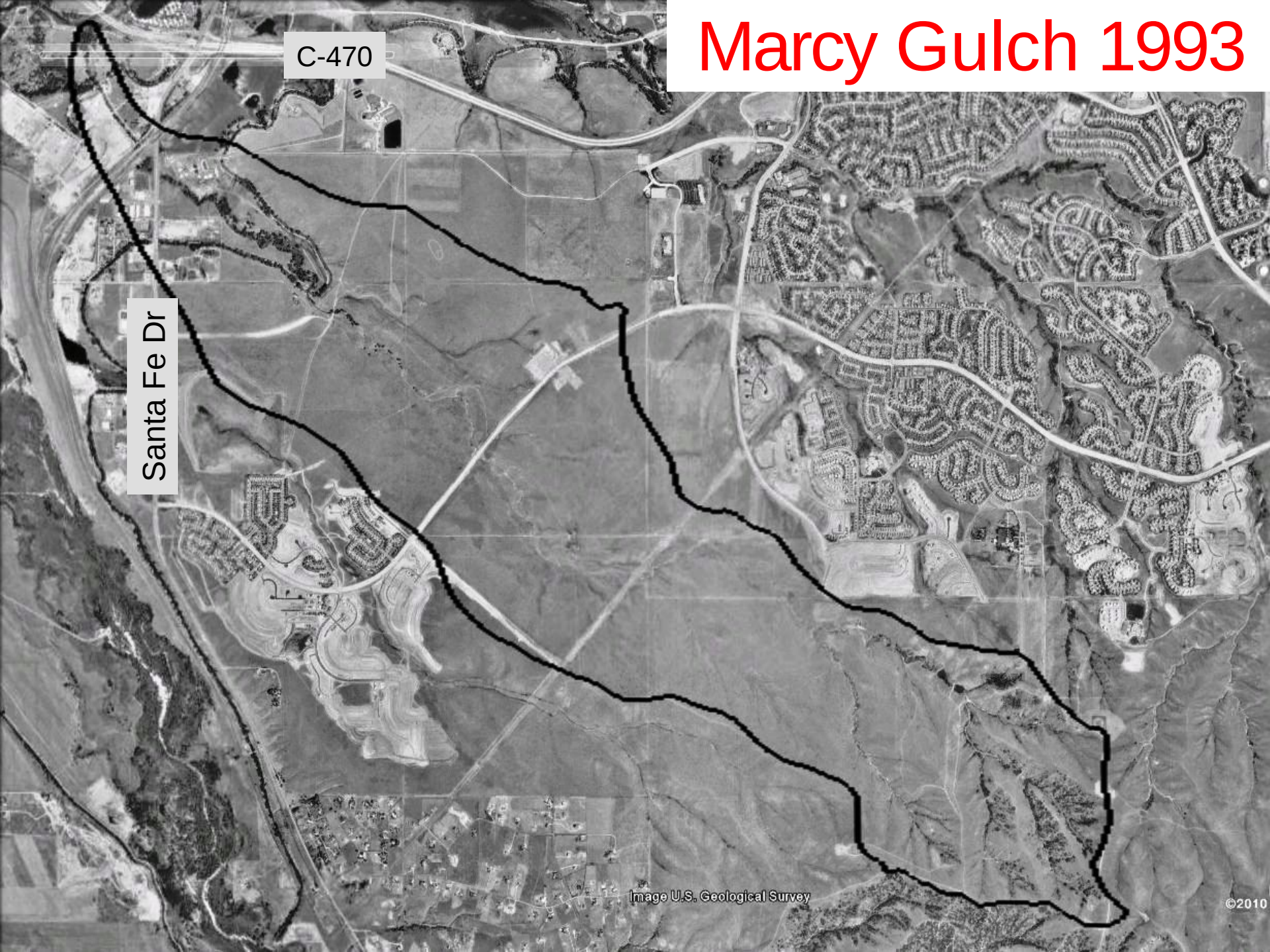
GI refers to planning and design of systems intended to benefit from the valuable services and functions provided in the natural environment. In regard to wet weather management, and on a regional scale, preservation of riparian floodplains and channel stabilization that allows for vital habitat and animal passage through techniques similar to those found in nature, preserves ecological function and creates balance between built and natural environments. On an urban level, wet weather management practices that include infiltration, evapotranspiration, and reuse help to restore natural hydrology.

Green Infrastructure (short version)

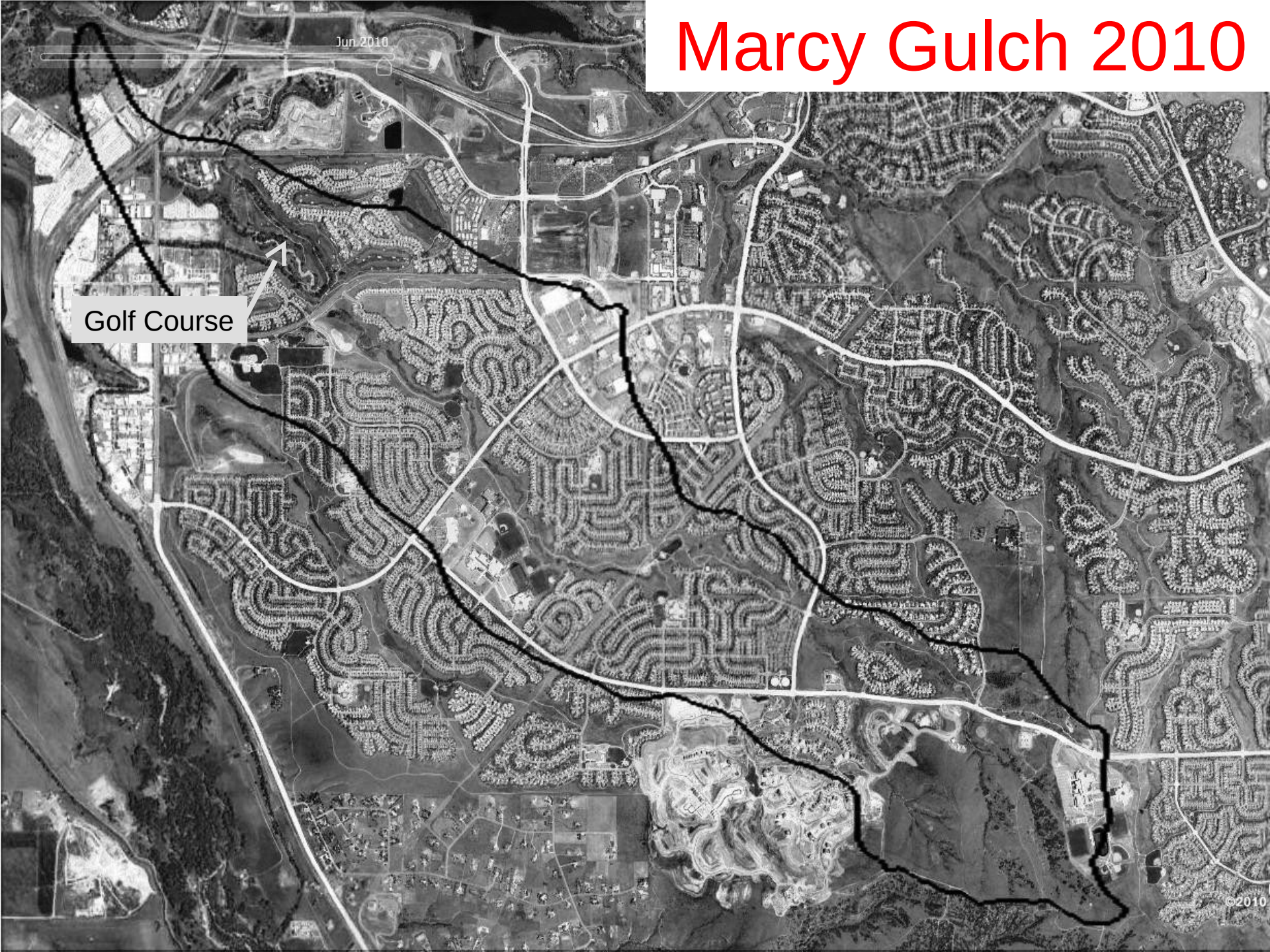
Green Infrastructure utilizes processes found in the natural environment to deliver services and functions required by the built environment.

Stream Stabilization most Bang for the Buck:

Marcy Gulch 1993

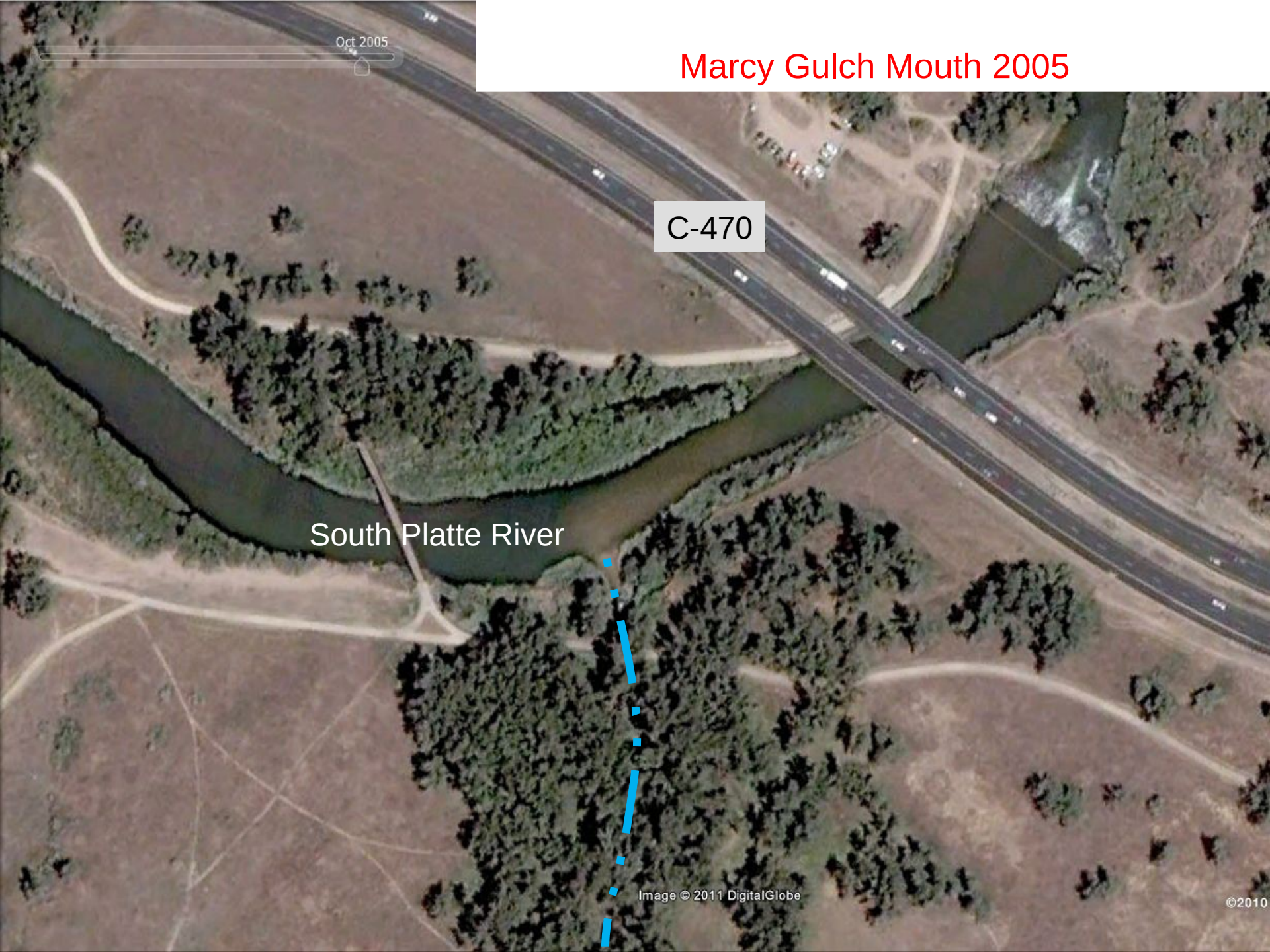


Marcy Gulch 2010



Highlands Ranch Golf Club 2005

Marcy Gulch Mouth 2005



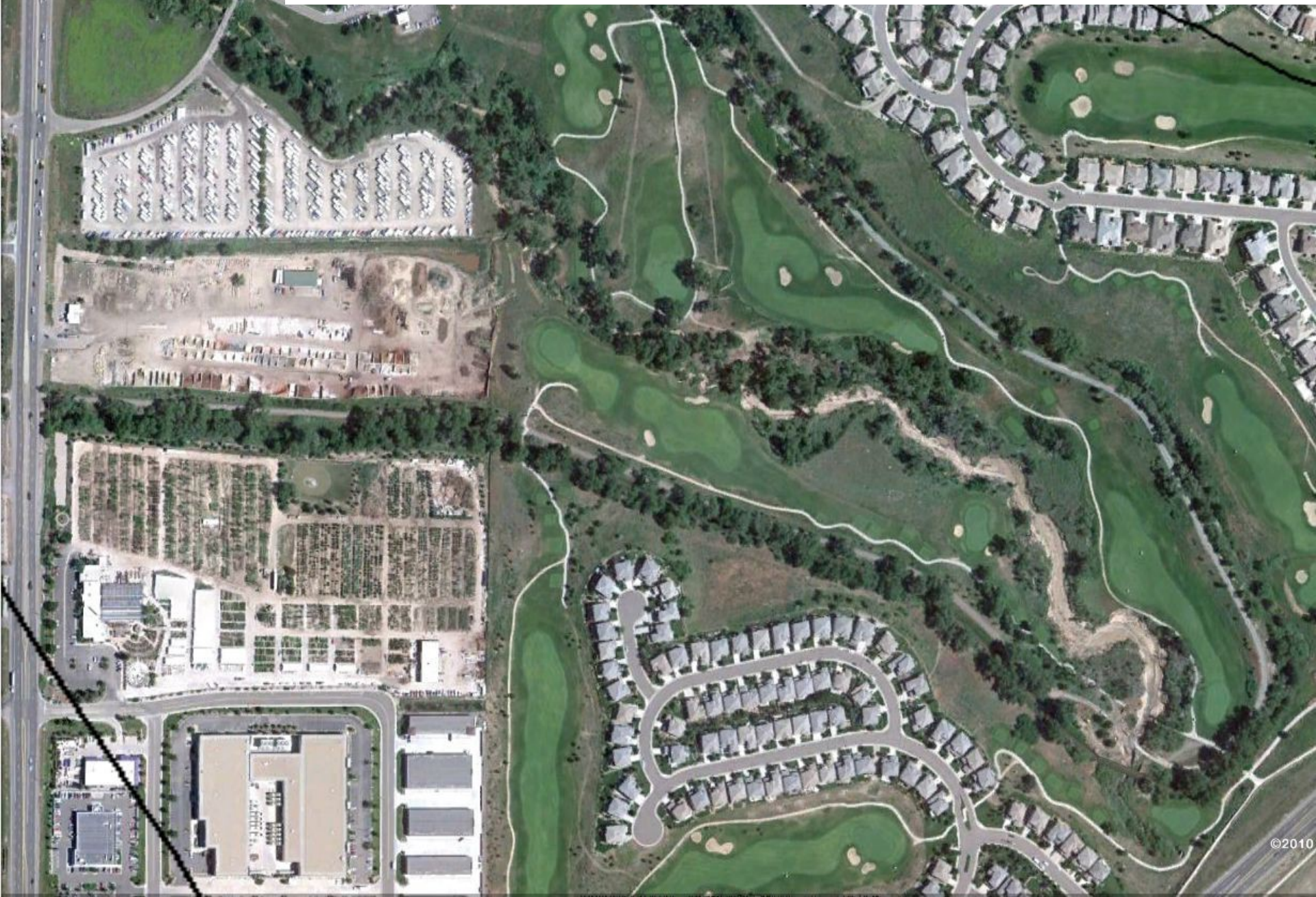
Highlands Ranch Golf Club 2006

Marcy Gulch Mouth 2006

Highlands Ranch Golf Club 2007

Marcy Gulch Mouth 2008

Highlands Ranch Golf Club 2010



Damage to Infrastructure

MULLER

- Click to edit Master text styles
  - Second level
    - Third level
      - Fourth level
        - Fifth level

Stream Invert (Before)

MULLER

- Click to edit Master text styles
  - Second level
    - Third level
      - Fourth level
        - Fifth level

Restored Stream Invert
(Right after construction)

MULLER

Click to edit Master text styles

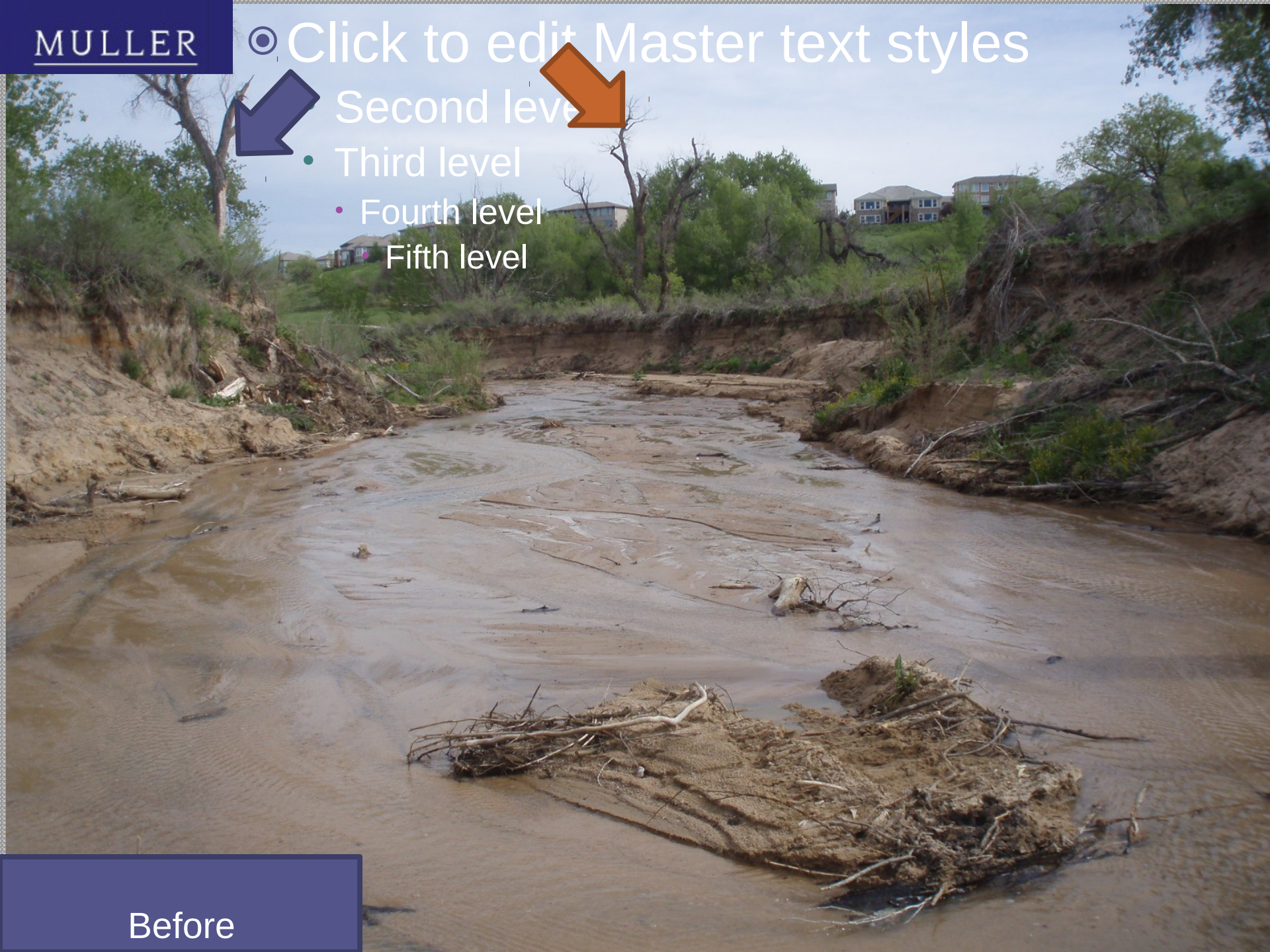
- Second level
- Third level
  - Fourth level
    - Fifth level

Restored Stream Invert
(a few months later)

MULLER

- Click to edit Master text styles
  - Second level
    - Third level
      - Fourth level
        - Fifth level

Restored Stream Invert (current)


MULLER
Click to edit Master text styles
Second level
Third level
Fourth level
Fifth level
Before

MULLER

After


MULLER

Marcy Gulch Summary:

Length = 3,000 LF

Invert of channel raised 7-8 feet u/s reach and 4-5 feet d/s reach

Fill to bring channel back to grade before erosion = 35,600 CY

Construction Cost = $1,680,000

Stream Restoration is Water Quality

Questions?