



Valley Flood Committee

08/14/2011

VFC MEMBERS

- Archie Harper (coordinator/chair)
- Howard Begger
- Jeannene Maas
- LaDawn Whiteside
- Les Harris
- Marlys Mattfeldt
- Nikki Peters
- Patty Davidson
- Raymond Read
- **Roger Lavoie**

~ MISSION STATEMENT ~

Promote progress on flood mitigation projects on behalf of valley – Tenmile and Silver Creek—residents whose homes are at risk of flooding and/or rising ground water due to floods by engaging and collaborating with Lewis & Clark County.



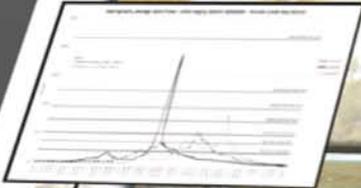
WORKING AGREEMENT



We seek other's viewpoints and capitalize on our differences with a focus on integrating our individual strengths, expertise, and skillsets to strengthen our leadership.



LEWIS AND
CLARK COUNTY



Flood
Mitigation
Master Plan

for the Helena Valley

Prepared By:



April, 2013
FINAL DRAFT

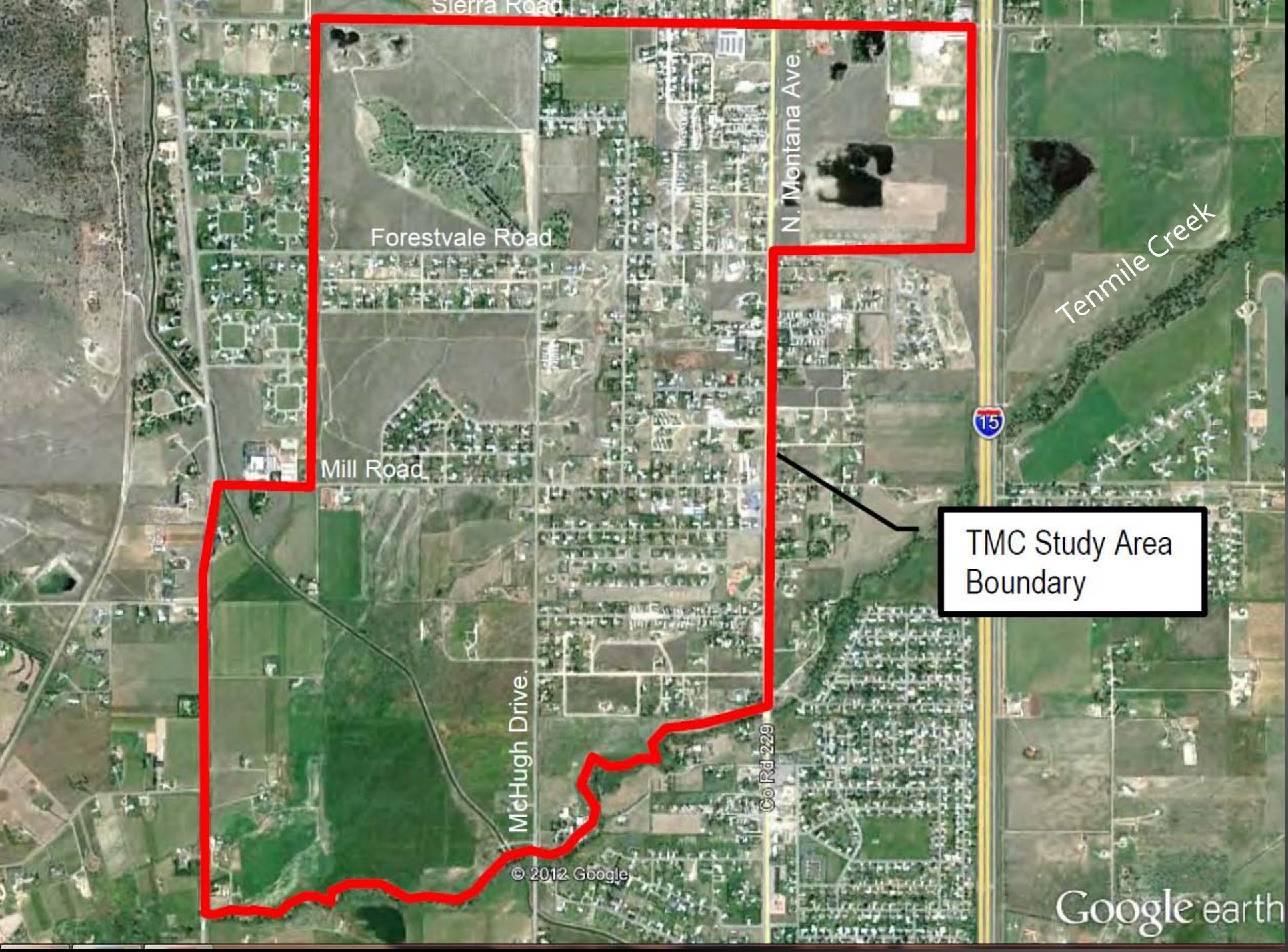
GOAL:

To implement an overall floodwater management system that reduces or eliminates flooding impacts to residents, businesses, and infrastructure and natural resources in the Helena Valley.

Master Plan Identifies Two Key Areas Affected by Flood Valley Floods:

1) Ten Mile Creek Study Area

**2) Silver Creek (Sewell) Study
Area**



Sierra Road

Forestvale Road

Mill Road

McHugh Drive

Co Rd 229

N. Montana Ave.

Tenmile Creek



TMC Study Area Boundary

Findings

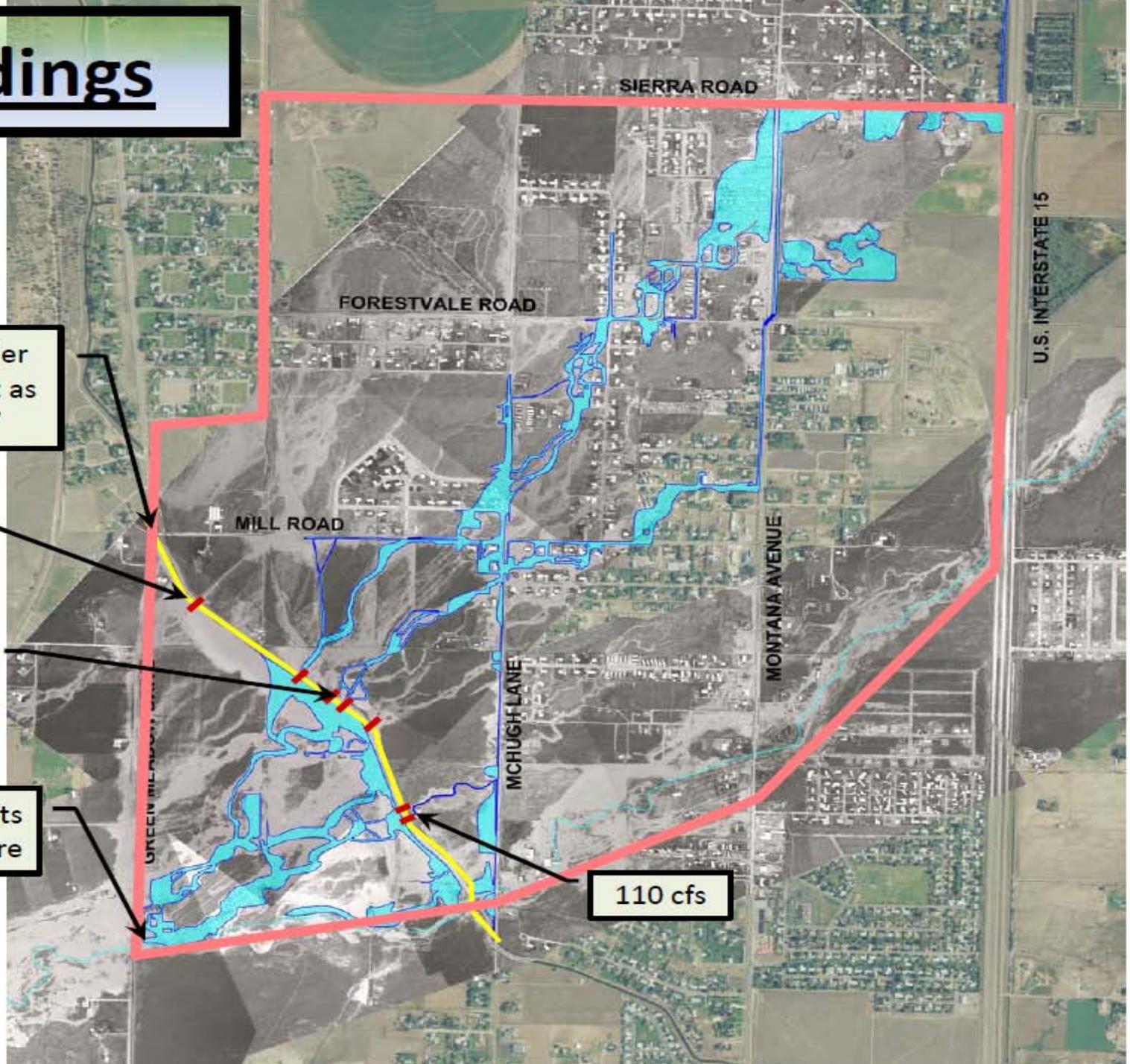
7 culverts under HVID Canal act as "regulators"

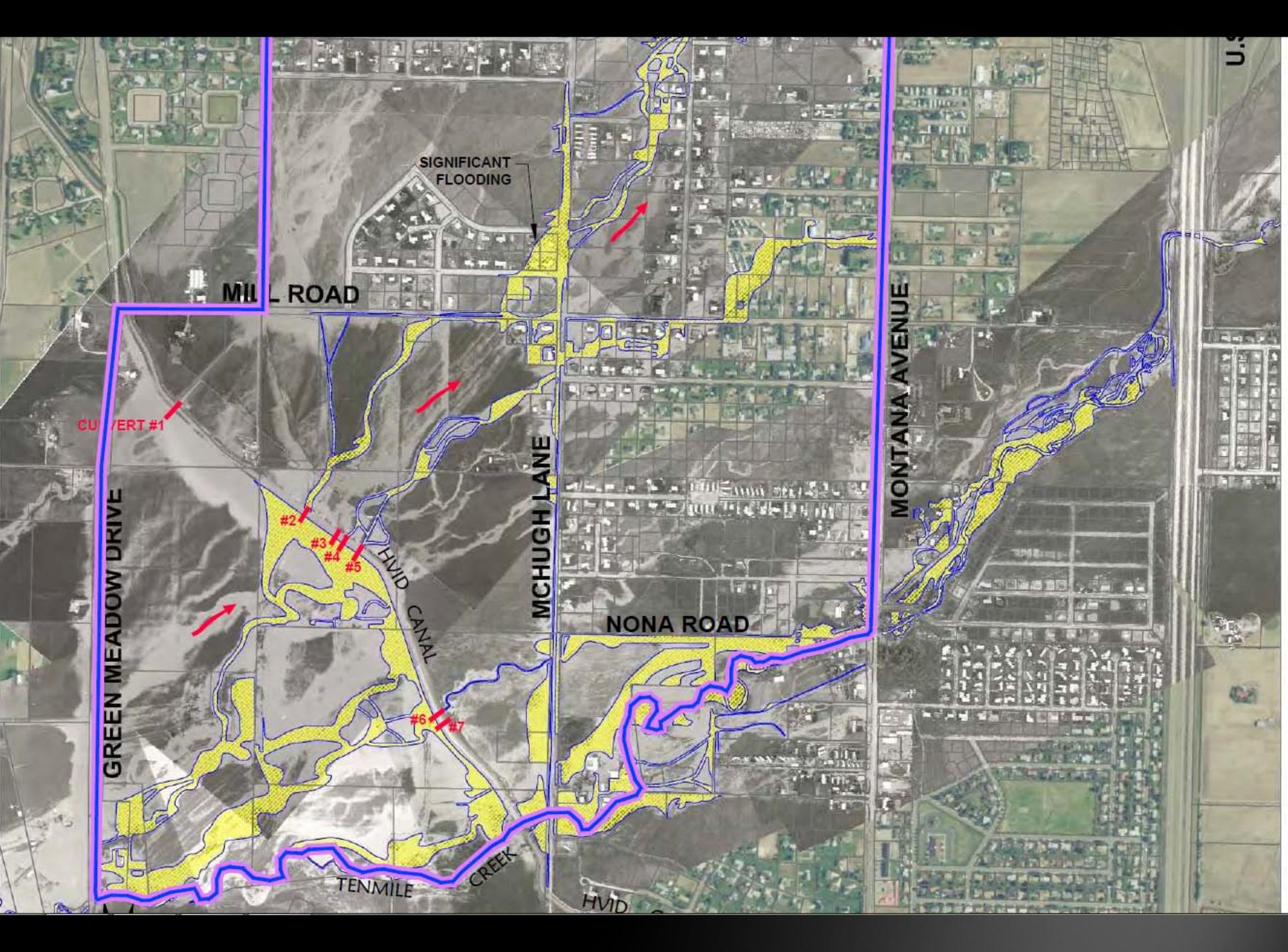
280 cfs

200 cfs
(total for 4)

TMC leaves its banks here

110 cfs





SIGNIFICANT FLOODING

MILL ROAD

MONTANA AVENUE

MCHUGH LANE

NONA ROAD

GREEN MEADOW DRIVE

HVID CANAL

TENMILE CREEK

HVID

CUVERT #1

#2

#3

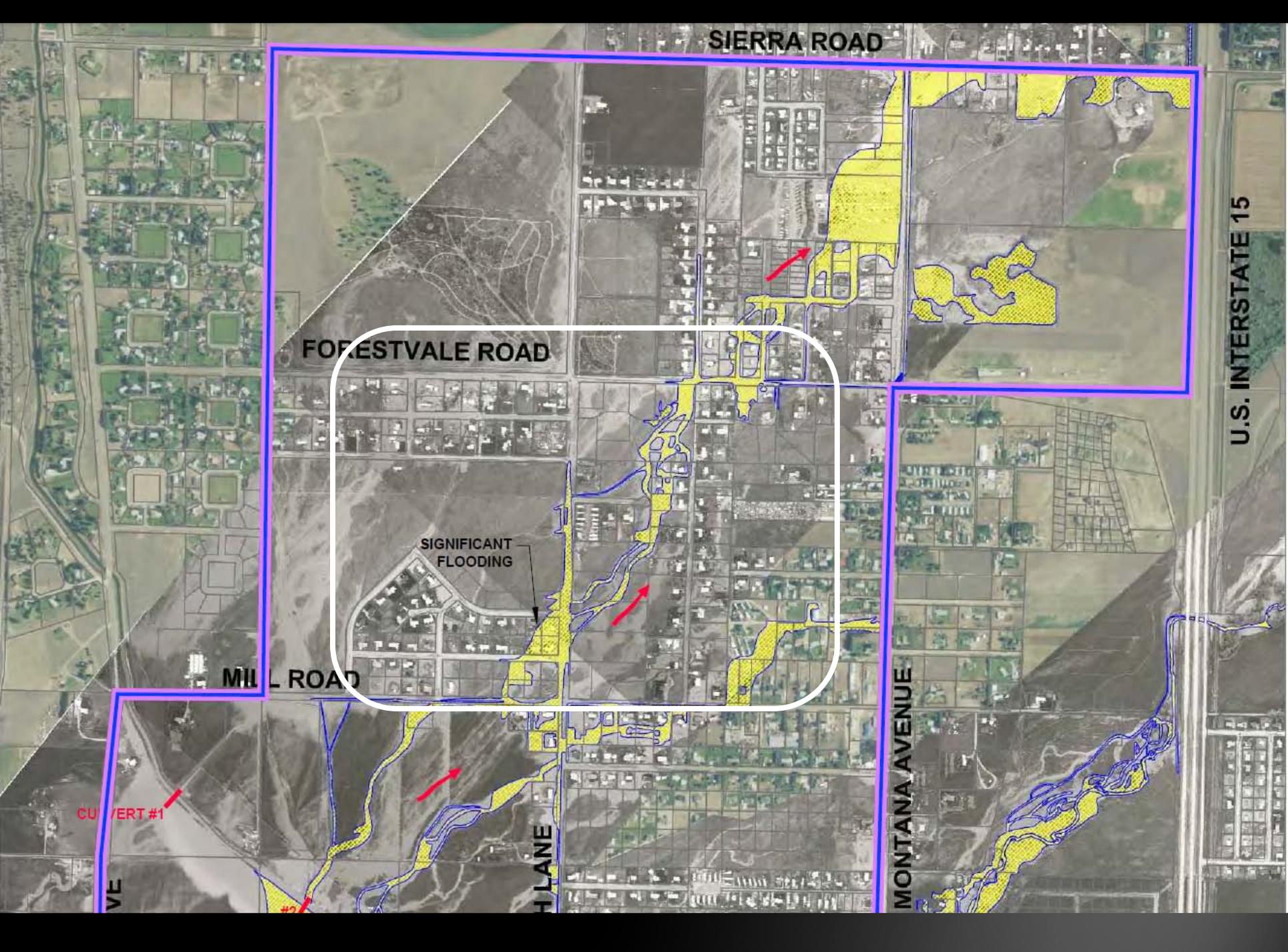
#4

#5

#6

#7

U.S.



SIERRA ROAD

FORESTVALE ROAD

MILL ROAD

H LANE

MONTANA AVENUE

U.S. INTERSTATE 15

SIGNIFICANT FLOODING

CULVERT #1

Tenmile Creek Historical Channel Location

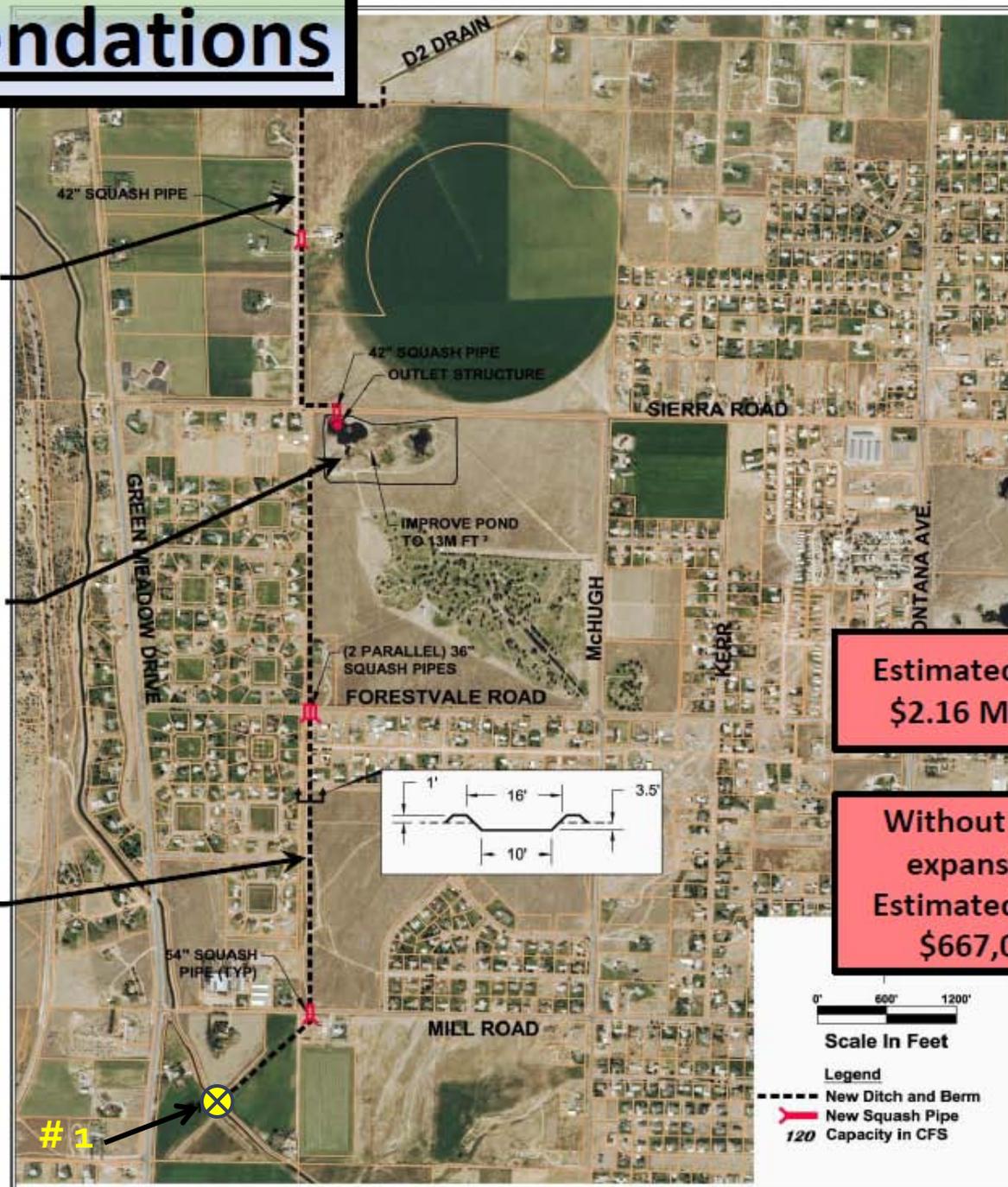


Mill Road

© 2014 Google

810 ft

Recommendations



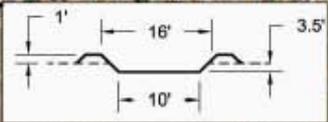
Overflow to D2 Drain

Expand Forestvale Cemetery Retention Pond

Lease & improve Hilger Ditch

Estimated Cost:
\$2.16 Million

Without pond expansion:
Estimated Cost:
\$667,000



Scale In Feet

Legend

- New Ditch and Berm
- New Squash Pipe
- 120 Capacity in CFS

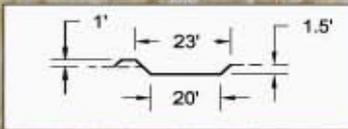
Recommendations

Mill Rd. ditch –
add bridges

45.5'Wx30'L
TRI-DECK
BRIDGE

MILL ROAD

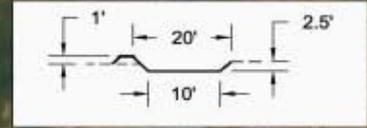
NEW DITCH AND
BERM



120 160 160

(3) 32.5'Wx25'L
TRI-DECK BRIDGES

MOTSIFF RD



36" SQUASH
PIPE (TYP)

MCHUGH ROAD

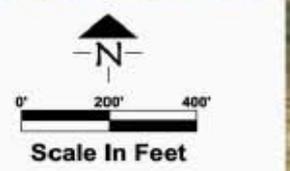
Improve culvert/ditch
capacity on McHugh

Estimated Cost:
\$791,000

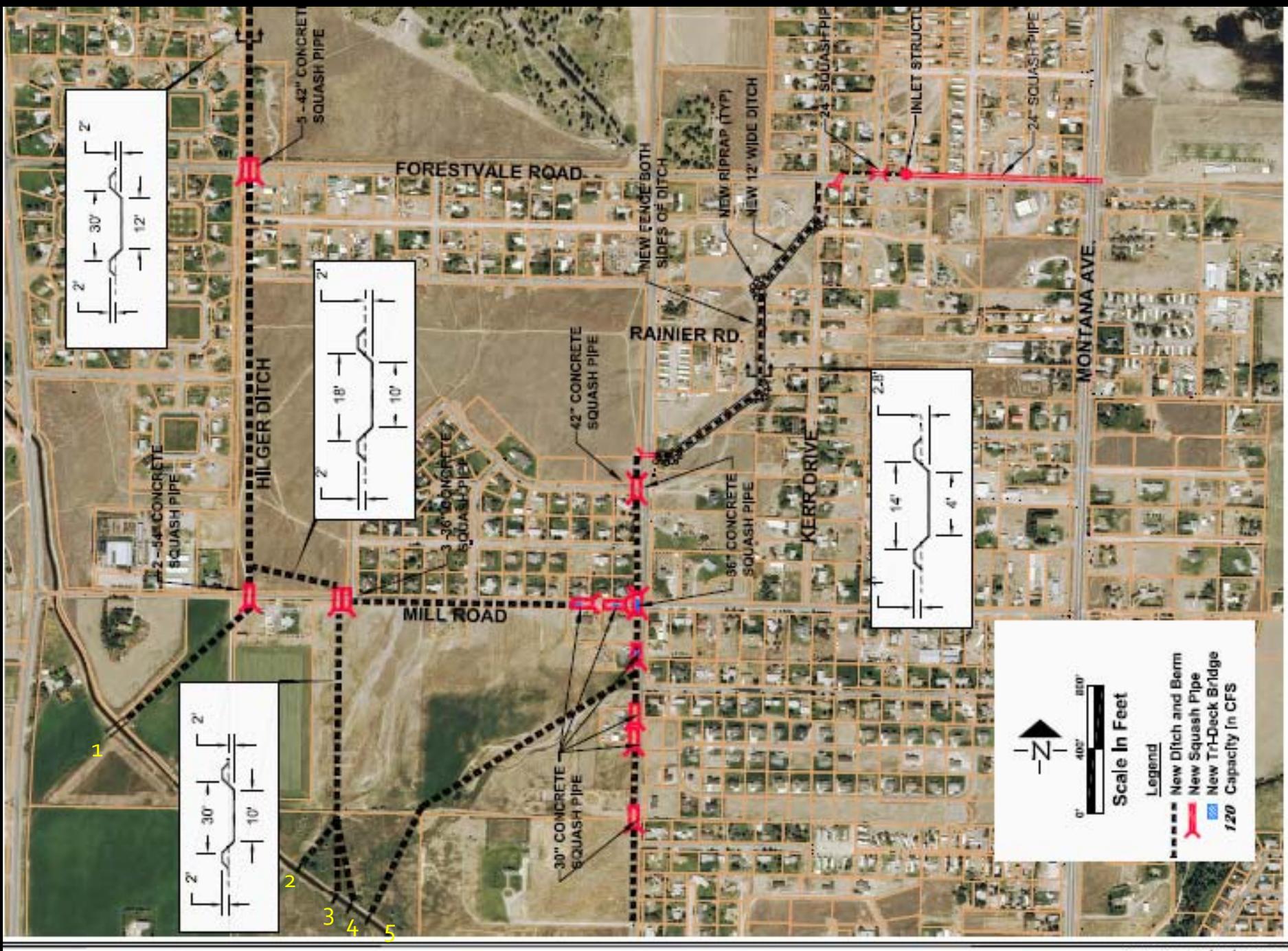
Channelize flow
across field

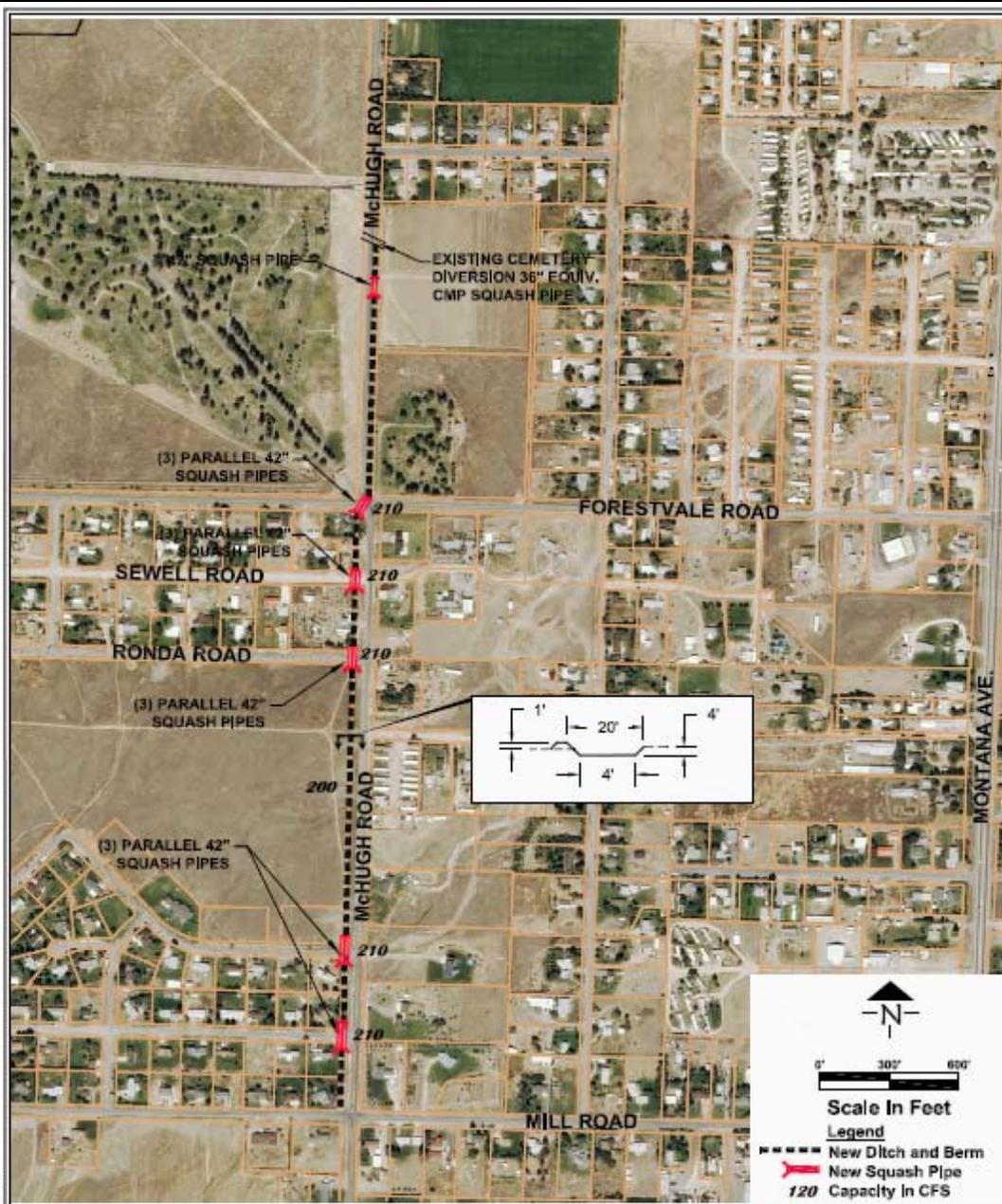
#2
#3
#4
#5

HVID CANAL



- Legend
- New Ditch and Berm
 - New Squash Pipe
 - New Tri-Deck Bridge
 - 120 Capacity in CFS





Project:
**Lewis and Clark
 County - Helena
 Valley Flood
 Mitigation Master Plan**

Figure Title:
**Improved Ditch on McHugh-Mill
 Road to Cemetery Diversion**


 Anderson-Koenigsen
 CONSULTING ENGINEERS
 1004 N. Warren
 Helena, MT 59601
 Phone (406) 444-3303
 Fax (406) 444-3304

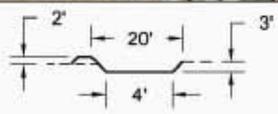
Figure:
6

Recommendations

New ditch, berm and rip-rap south of Nona – flow back into TMC channel

Existing culvert under McHugh

Channelize Flow



#6

#6

#7

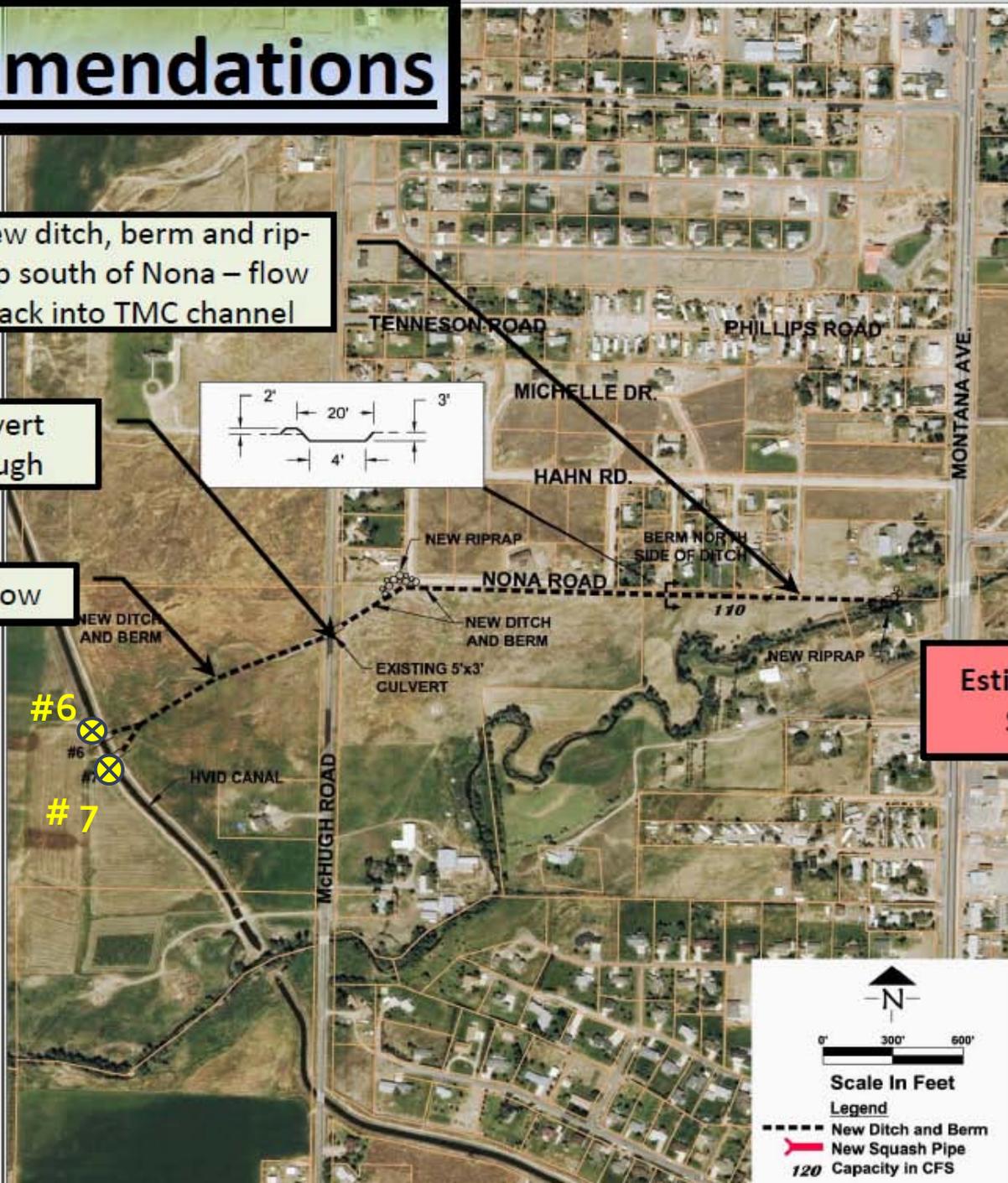
Estimated Cost:
\$116,600



Scale In Feet

Legend

- New Ditch and Berm
- New Squash Pipe
- 120 Capacity in CFS



Mitigation Summary

- Trap Club Retention Pond and outlet to D2 (\$692K)
- Hilger Ditch to retention pond to D2 (\$667K to \$2.16M)
- Improve Mill/McHugh to D2 (\$1.81M)
- McHugh ditch to Nona to TMC (\$116K)
- McHugh/Edgerton to Kerr/Forestvale (\$894K)
- Silver Creek through Sewell to D2 (\$515K)

What am I forgetting?

THE D2 DRAIN

Under extreme flood conditions, the D2 could be receiving another 600 cfs of flood flow from the proposed improvements. Currently much of the D2 infrastructure is at or near capacity. The D2 must be improved in order to accept additional flows.

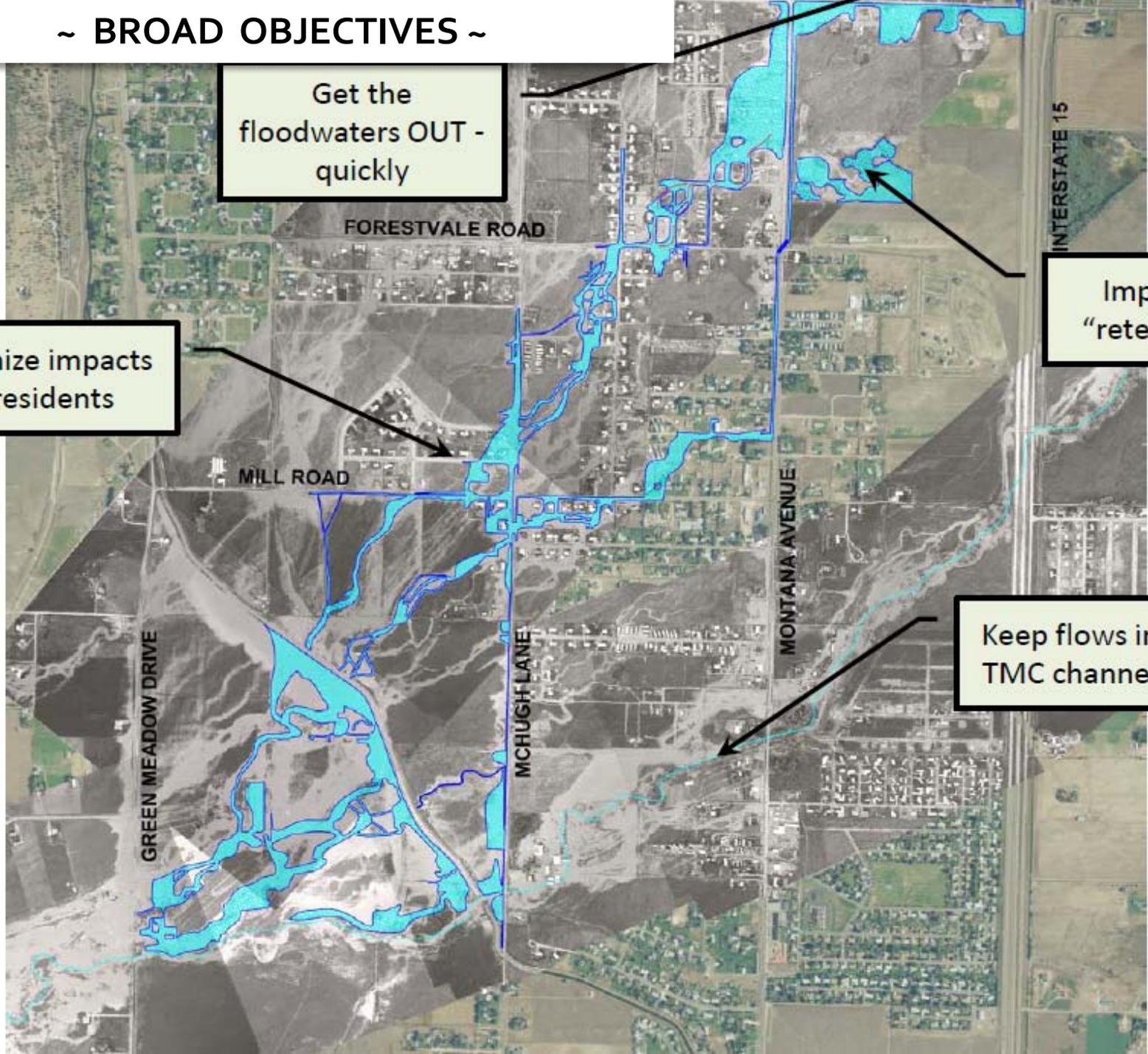
~ BROAD OBJECTIVES ~

Get the floodwaters OUT - quickly

Minimize impacts to residents

Improve "retention"

Keep flows in TMC channel



FORESTVALE ROAD

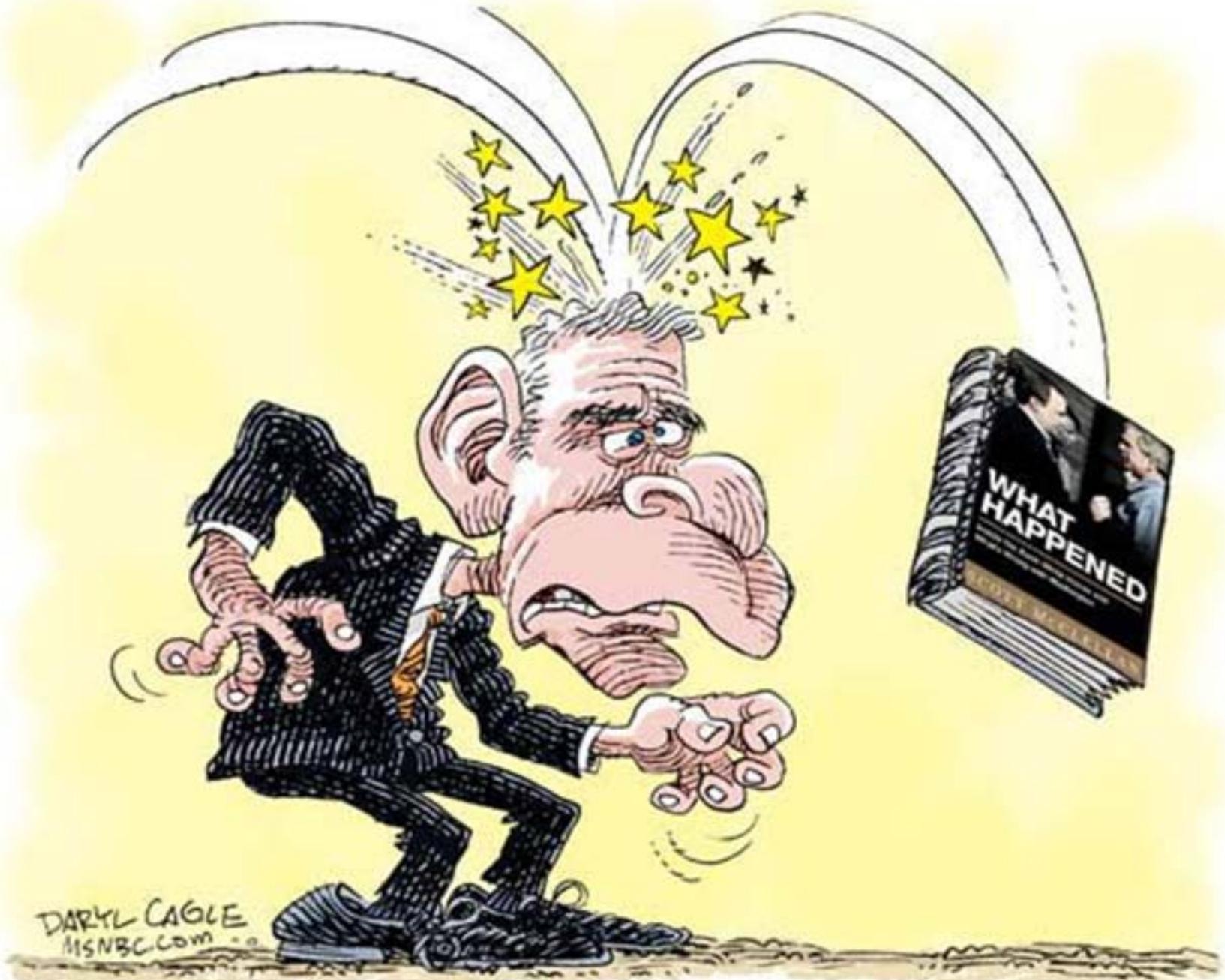
MILL ROAD

GREEN MEADOW DRIVE

MCHUGH LANE

MONTANA AVENUE

INTERSTATE 15



DARYL CAGLE
MSNBC.COM

~The Big Picture ~

- Alluvial Fans / Alluvial Plains.
- Streams transport materials.
- Streams migrate!



The Alluvial Fan

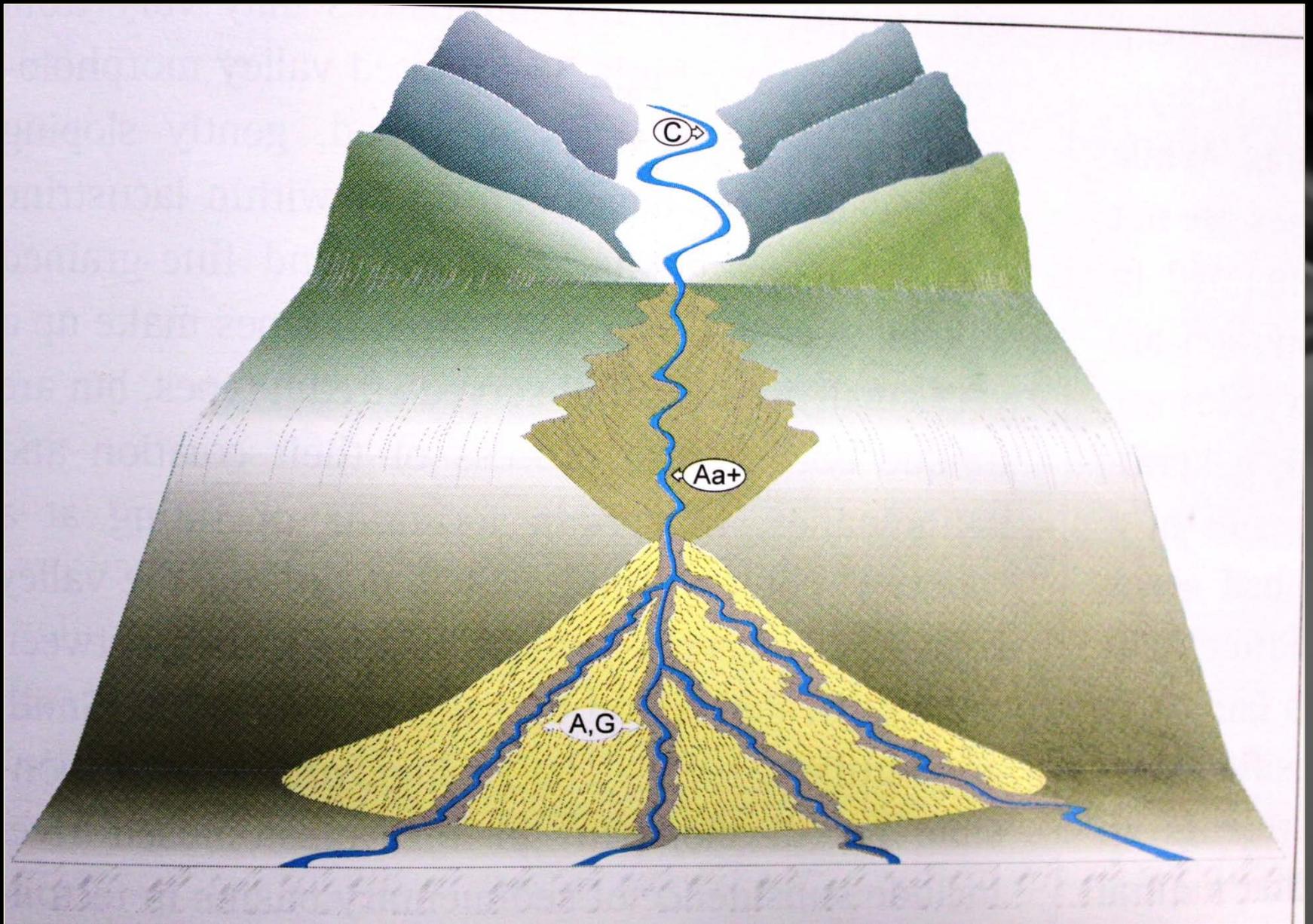




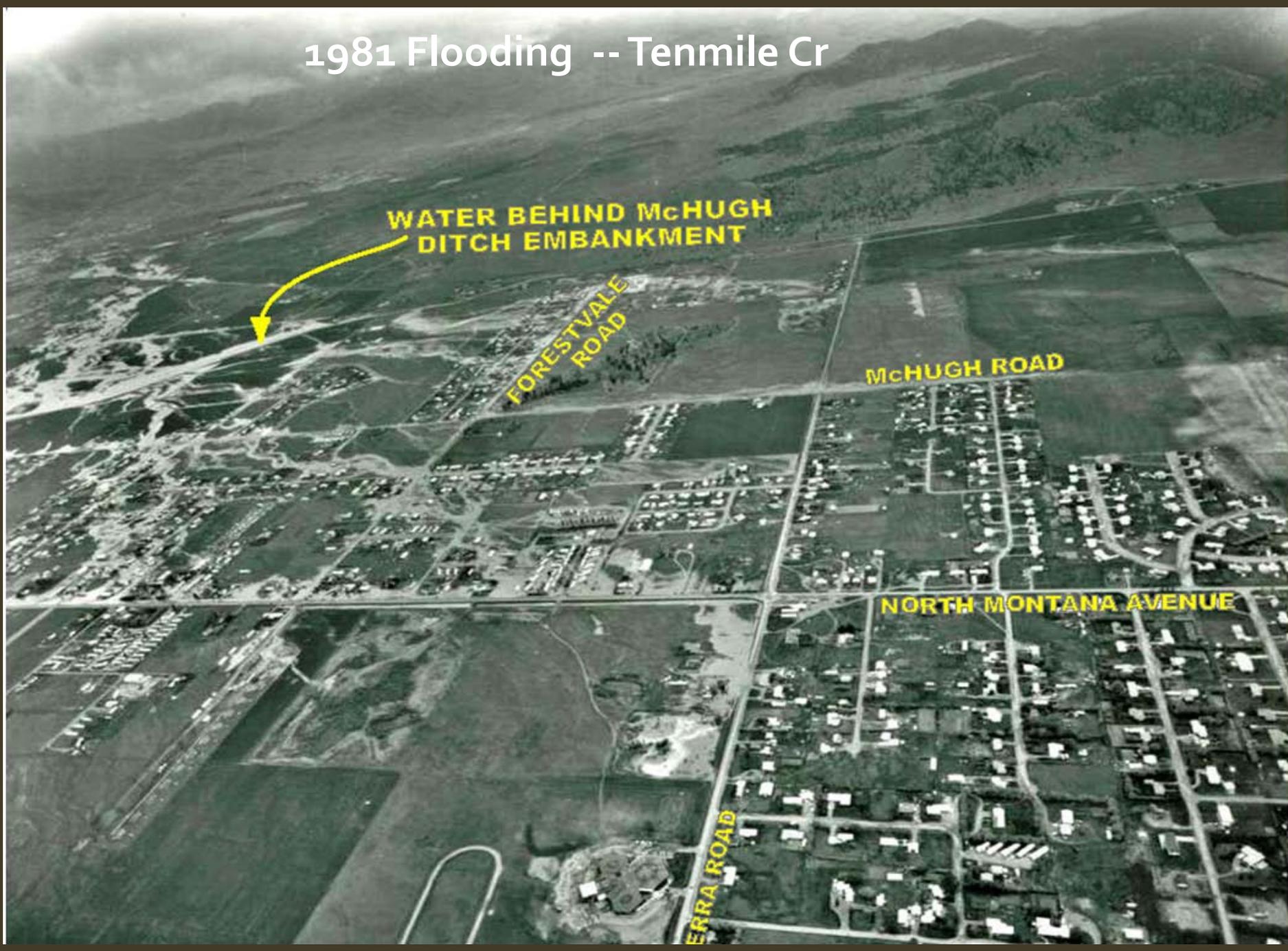
image created by Jesse Allen, using data from NASA/GSFC/METI/ERSDAC/JAROS, and the U.S./Japan

Alluvial Plain (flat)

A plain formed by repeated deposits of alluvium by periodic flooding.



1981 Flooding -- Tenmile Cr



**WATER BEHIND McHUGH
DITCH EMBANKMENT**

**FORESTVALE
ROAD**

McHUGH ROAD

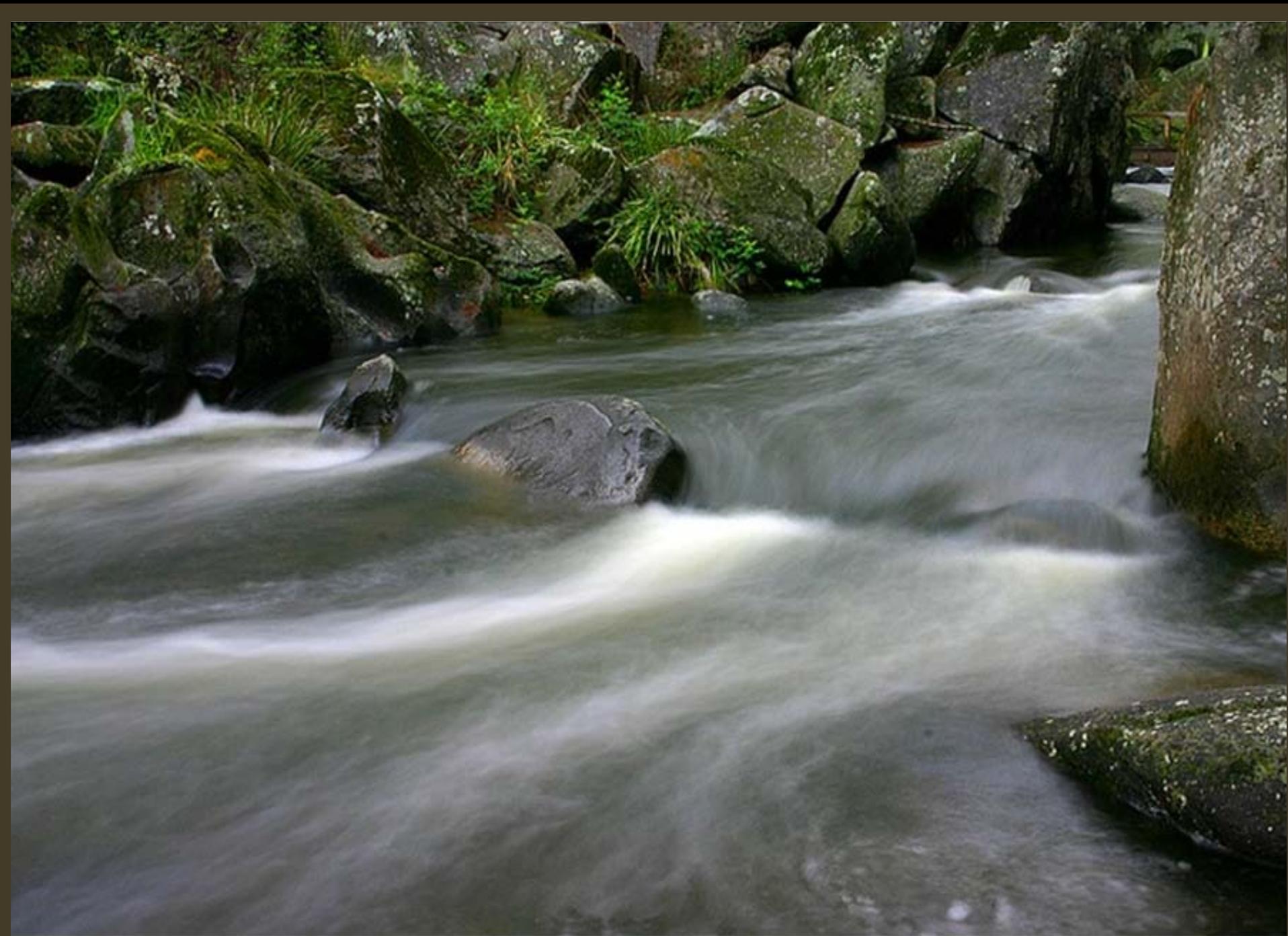
NORTH MONTANA AVENUE

ERRA ROAD

Streams act as conveyor belts



- > **Water (H₂O)**
- > **Organic debris**
- > **Alluvium (bedload)**





Alluvium



Travel Infrastructure at Risk



McHugh Bridge

Streams migrate

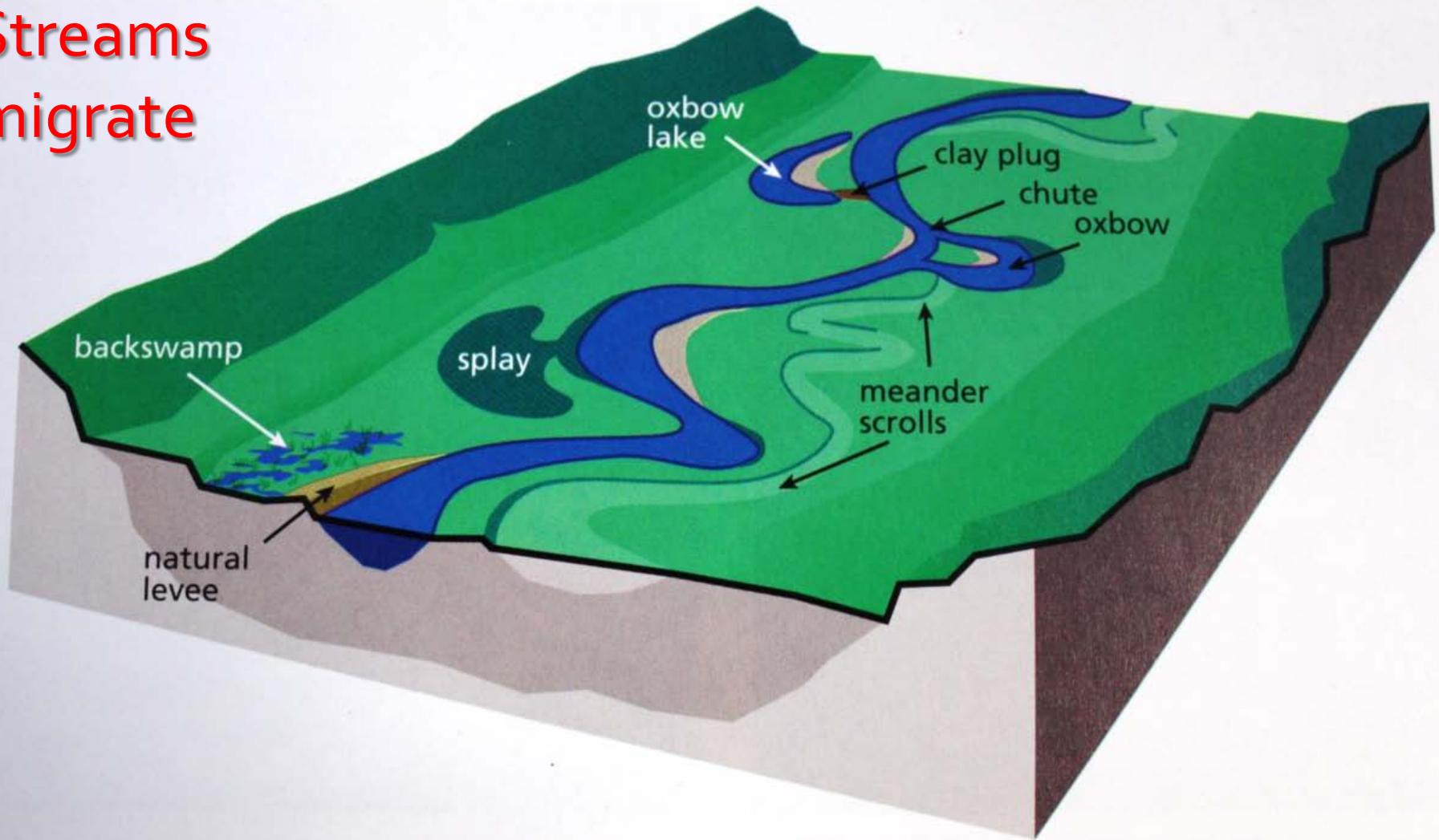
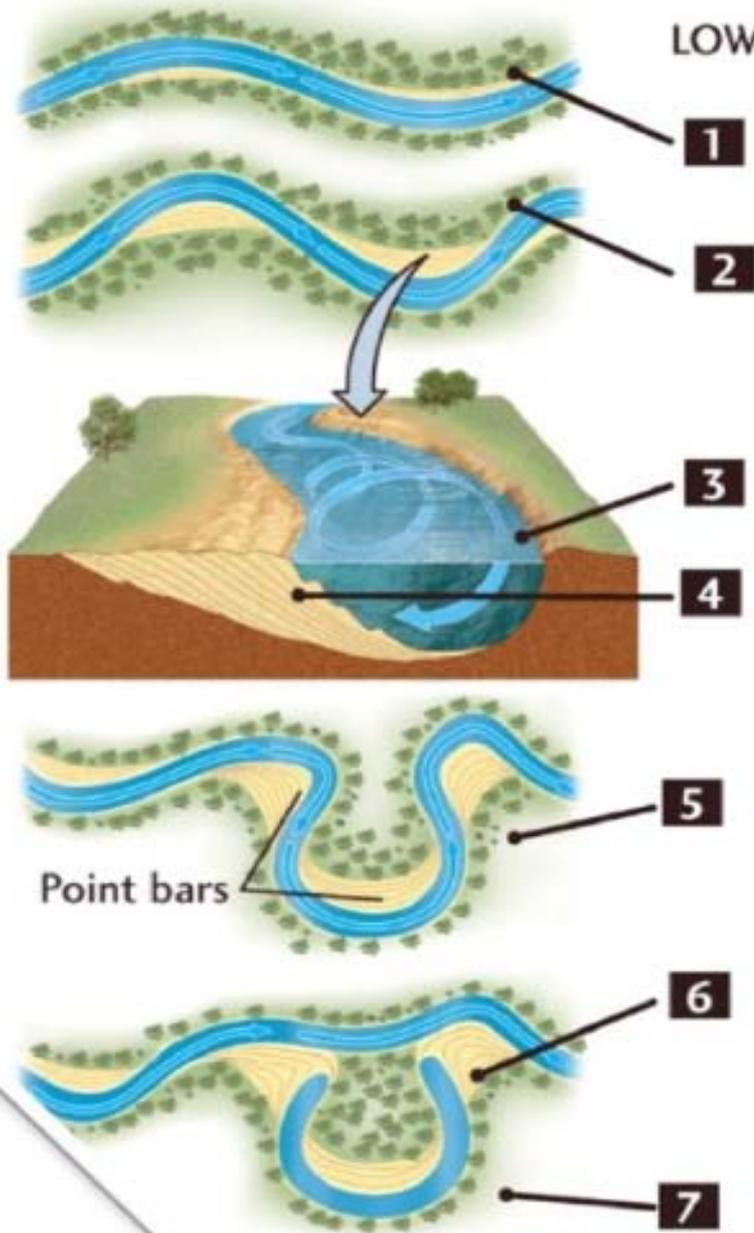


Figure 1.21: Landforms and deposits of a floodplain. Topographic features on the floodplain caused by meandering streams.

CHANNEL PATTERNS DEPEND ON FLOW VELOCITY AND SEDIMENT LOAD

LOW-SEDIMENT LOAD, LOW VELOCITY



Meanders in an Alaskan river



Point bar

High-velocity
flow in channel

Meanders in the Mississippi River delta





© 2014 Google

GOO



1995

Imagery Date: 8/18/2013 46°37'46.79" N 112°03'23.17" W elev 3842 ft



Is there something more than just
the Master Flood Mitigation Plan
needed....?

One Option:



Spot dredging

The Problem:

Most landowners and local officials fail to understand how dredging in an attempt to control flooding can upset the channel hydraulic and the erosion-deposition balance in streams.

Dredging as perceived by the public is removal of sediment/debris to confine “all” flood-flows within the modified channel.

Complex relationships of stream systems such as scour and sediment transport are poorly understood.

In addition:

Disposal of dredged material.

Requires periodic maintenance; otherwise effectiveness is soon lost.

Simple dredging as a **long-term** solution for reducing flood damages, has proven **ineffective** and not cost-efficient.

Each stream needs to be evaluated on a case-by-case basis (including upstream and downstream of proposed dredging.)

Final thoughts -

- Removing sediment only above the level of the original stream bed to re-establish a stable alignment of the stream may be a viable stop-gap measure.
- Spot treat areas prioritizing crossings at risk as a maintenance action.
- Treat only where bedload accumulation or aggradation may risk imminent channel migration.
- Since spot dredging is *short-term*, it requires maintenance.
- *Long-term*: Field reviews of TMC in the valley by professional stream team are essential to evaluate feasibility of redesigning TMC to reduce flood risk.



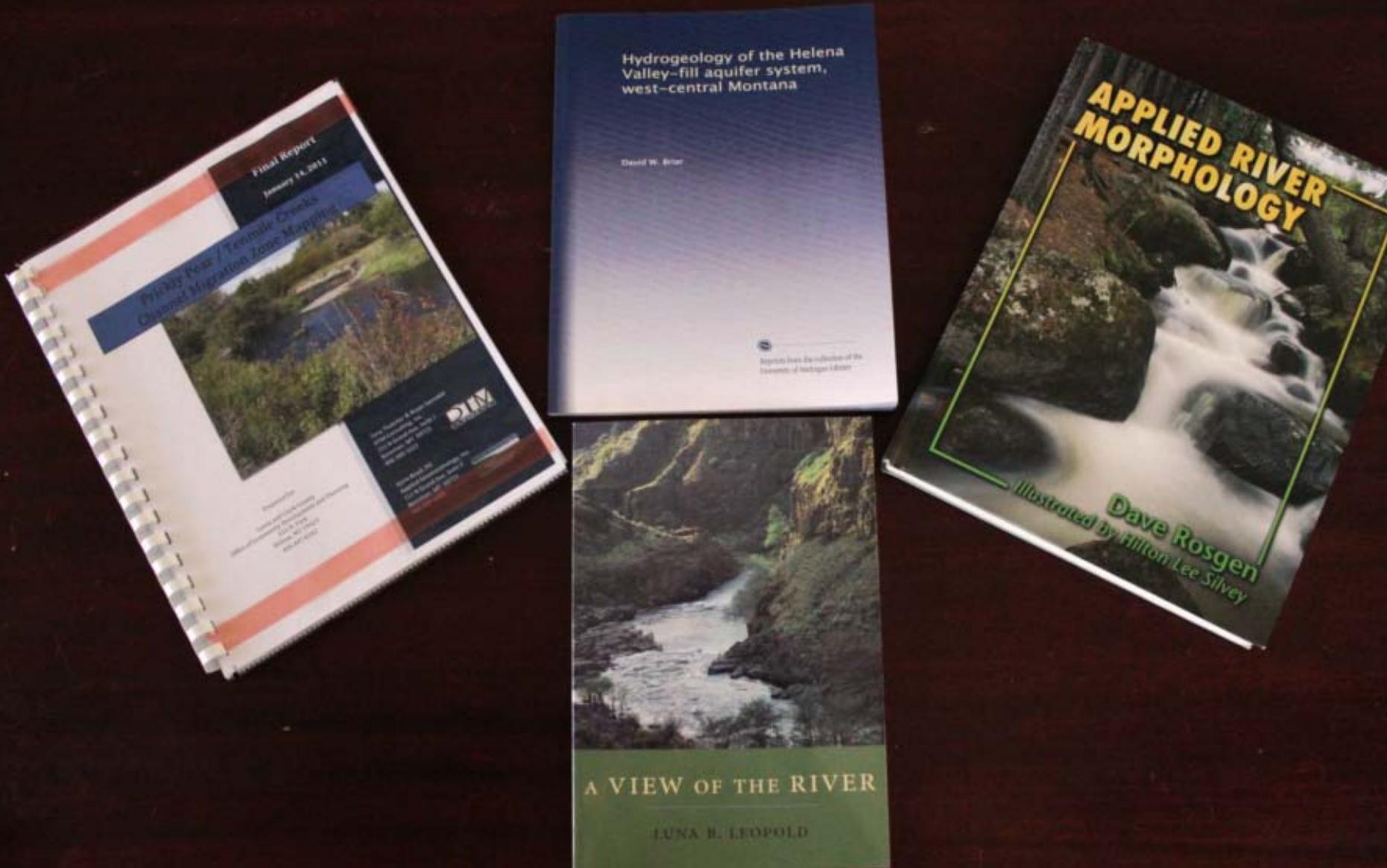
I - 15

N. Montana Ave.

McHugh Lane

Green Meadow Drive

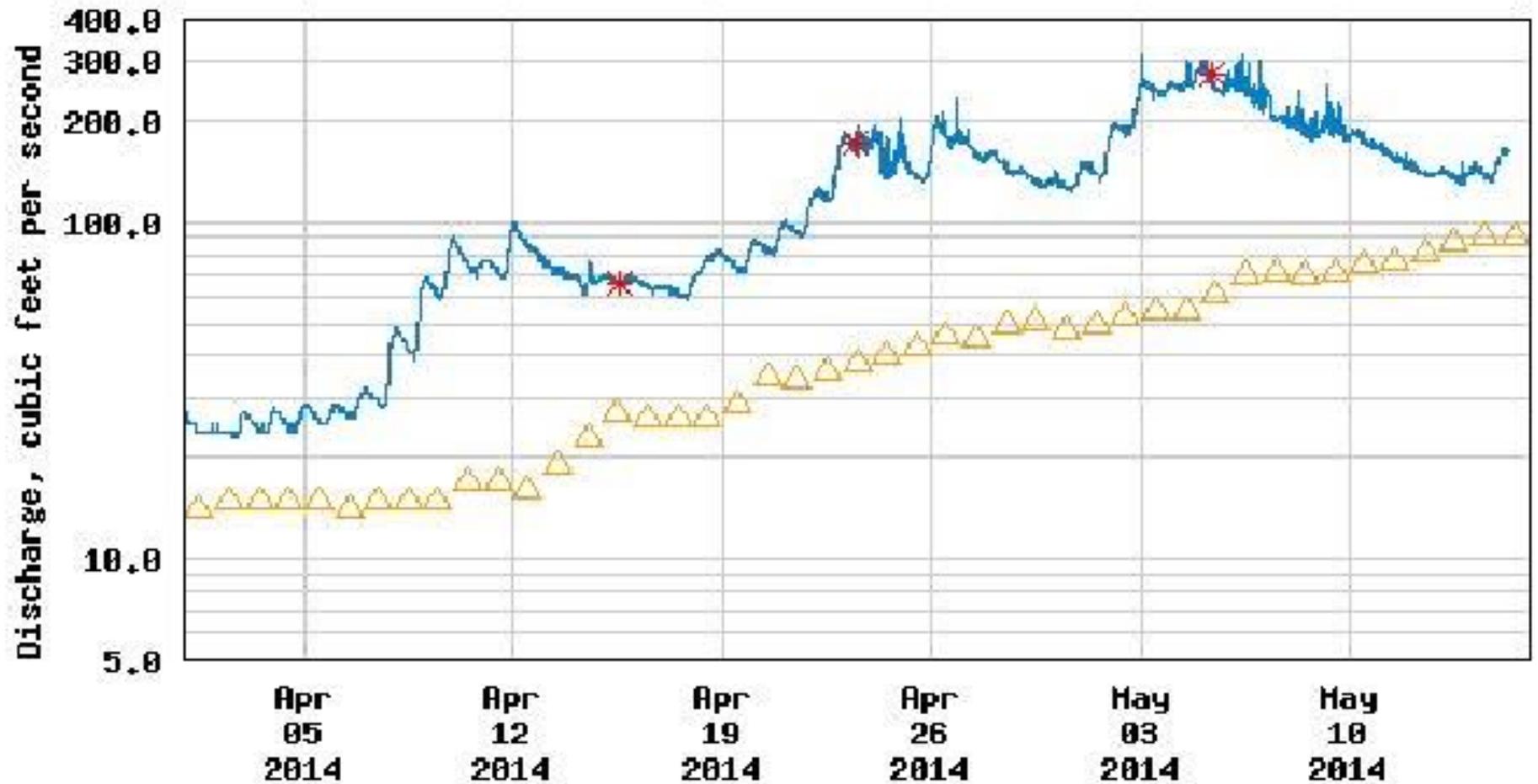
THANK YOU!



“Science affects the way we think together.”

- Lewis Thomas

USGS 06063000 Tennile Creek near Helena MT



---- Provisional Data Subject to Revision ----

- △ Median daily statistic (48 years)
- * Measured discharge
- Discharge

SWE (in)

16
14
12
10
8
6
4
2
0



10/1

7/1