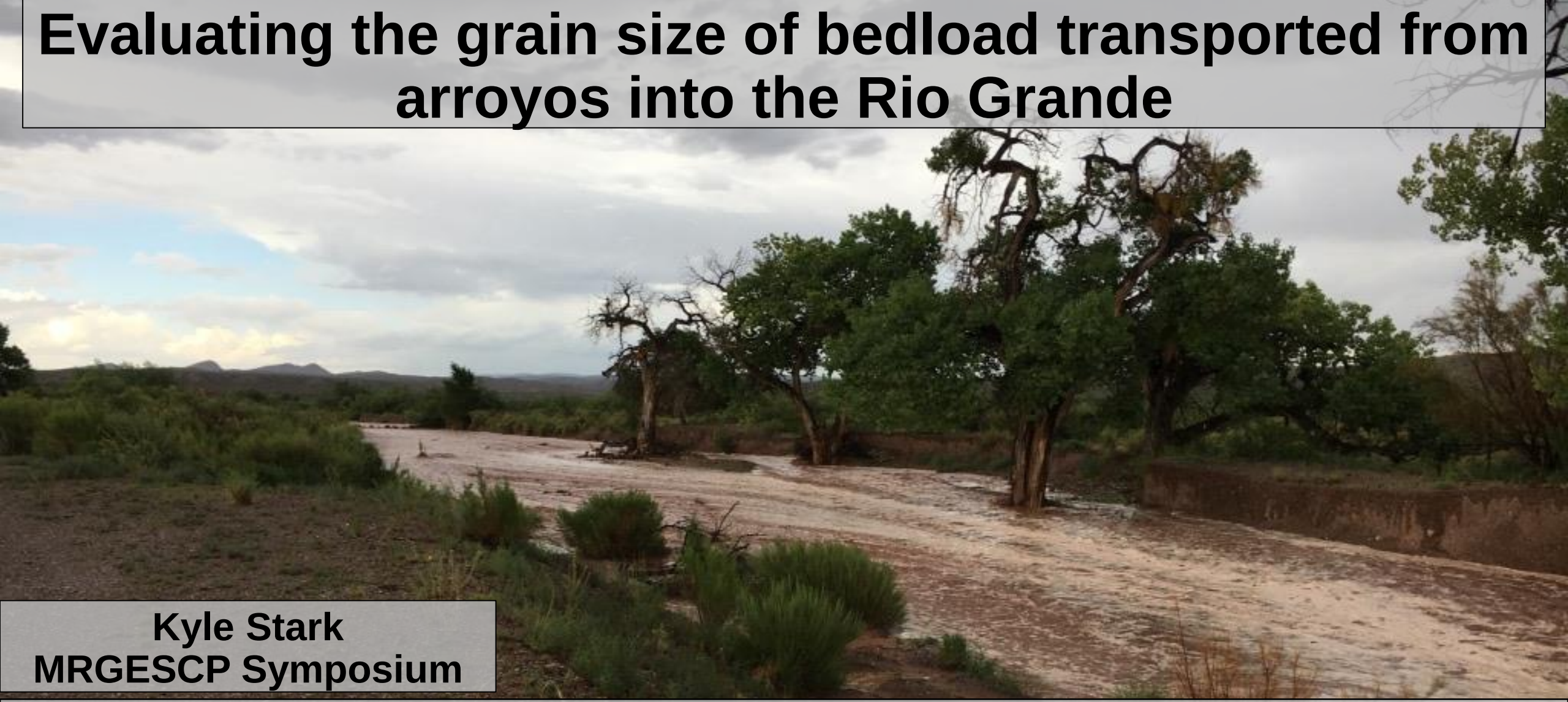
Evaluating the grain size of bedload transported from arroyos into the Rio Grande



Kyle Stark
MRGESCP Symposium

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
Earth Science for the 21st Century

US Army Corps of Engineers®

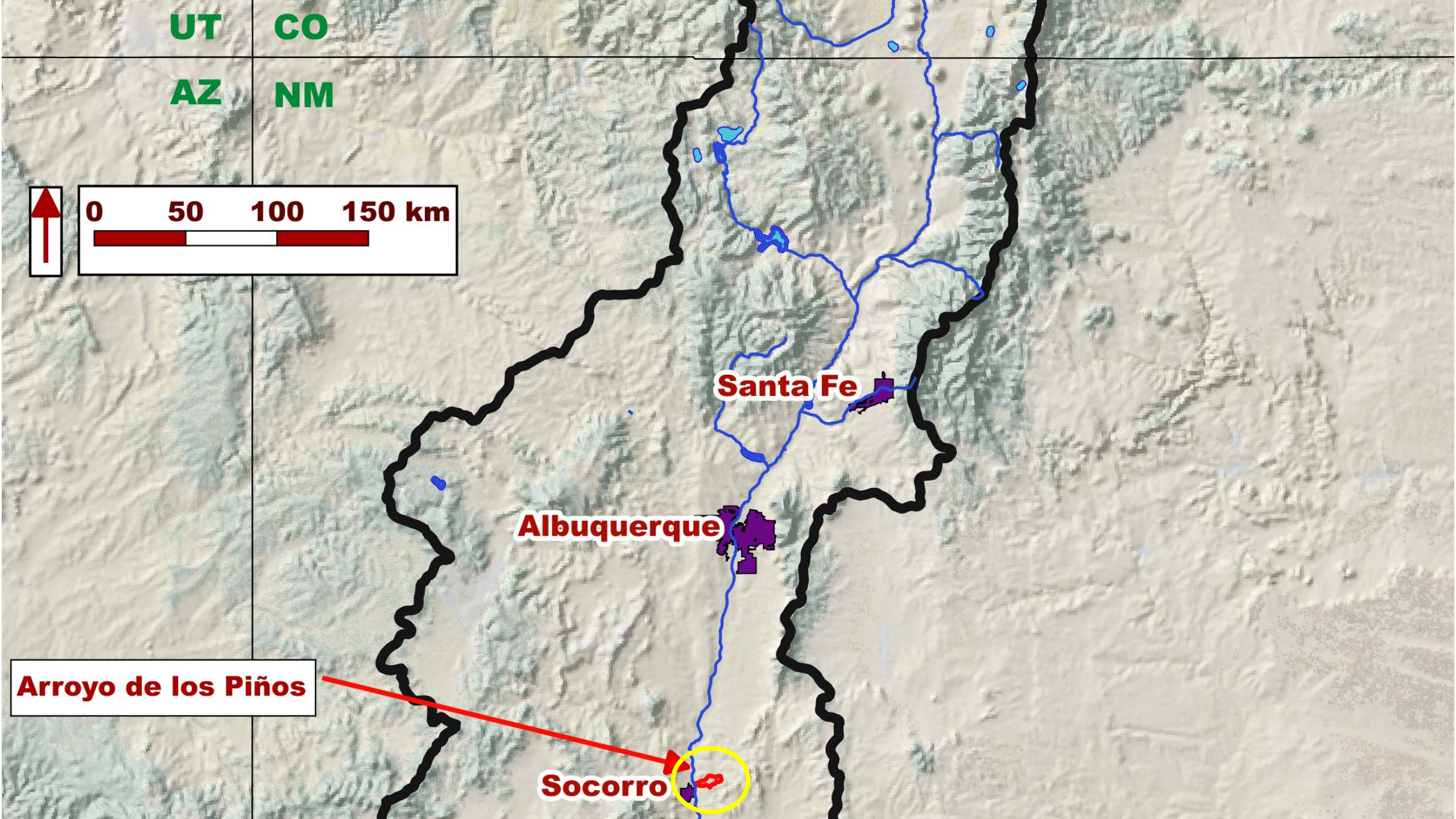
New Mexico Water Resources Research Institute

New Mexico Tech
Science • Engineering • Research University

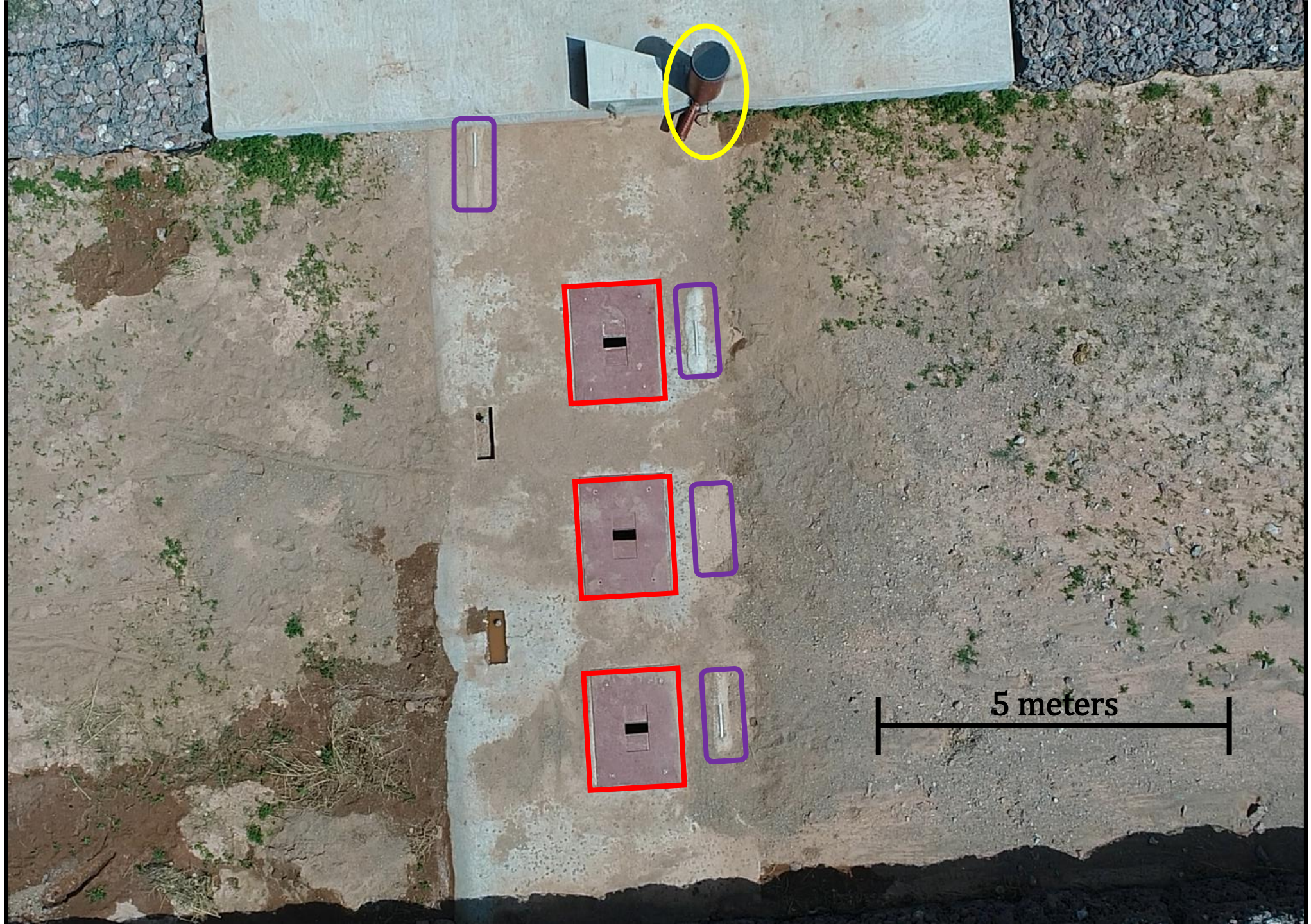
NSF

U.S. Department of the Interior
Bureau of Reclamation

Ben-Gurion University of the Negev

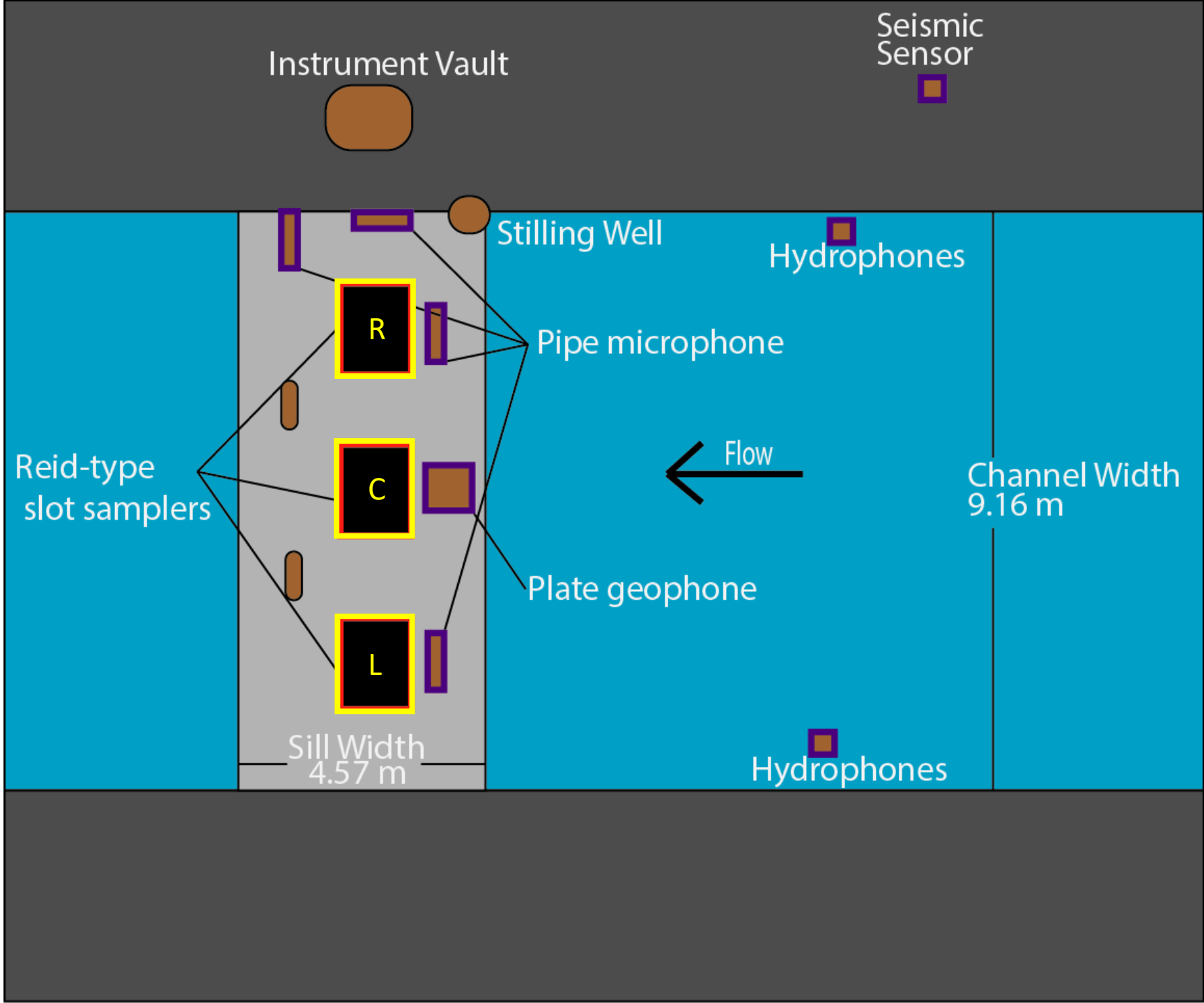

UT
CO
AZ
NM
0
50
100
150 km
Santa Fe
Albuquerque
Arroyo de los Piños
Socorro

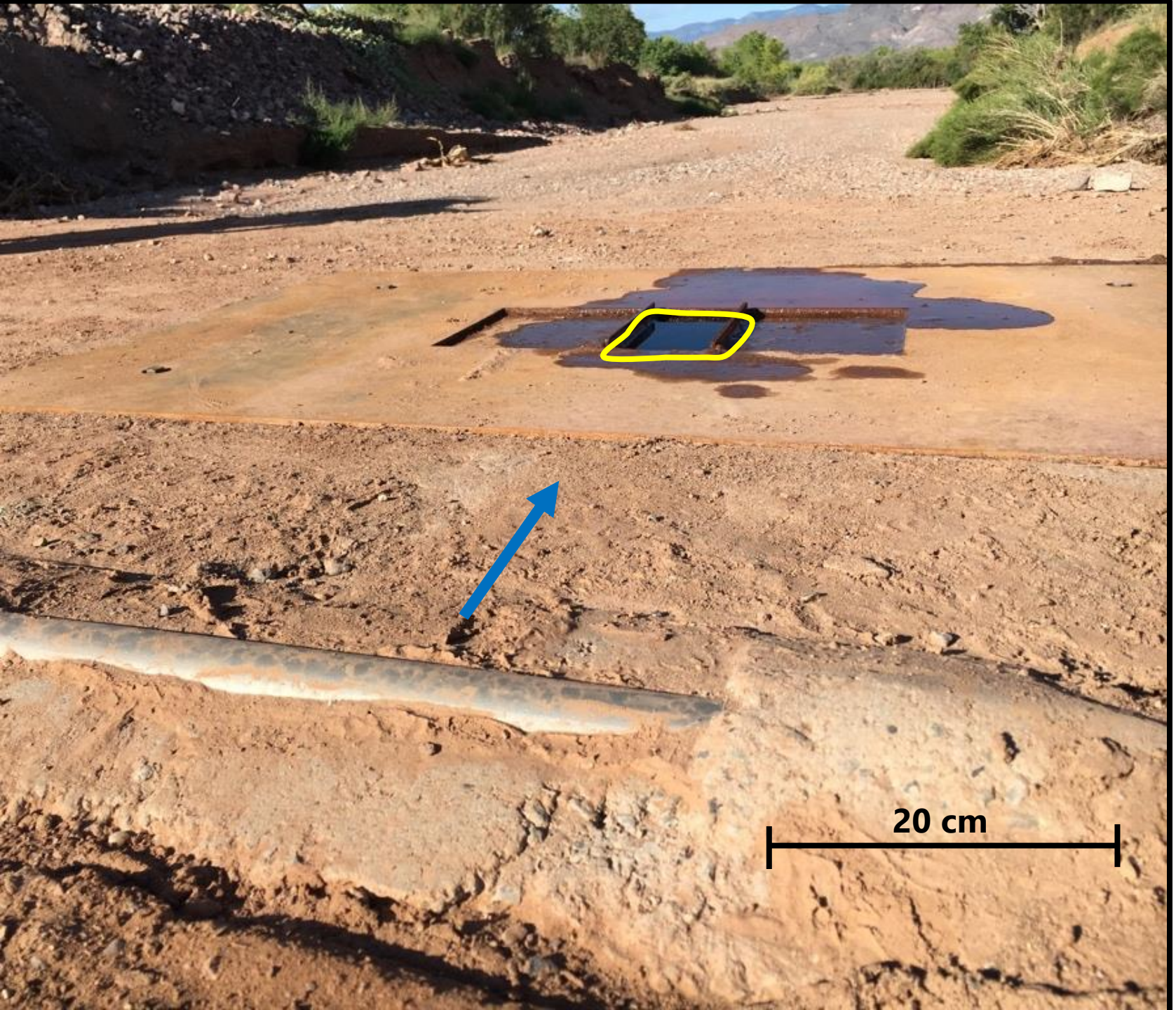

0
50
Arroyo de los


5 meters

New Sediment Monitoring Station

- Three instruments measure bedload directly (red)
- Six styles of surrogate instruments measure bedload indirectly (purple)
- Data are automatically collected and uploaded for analysis by scientists worldwide



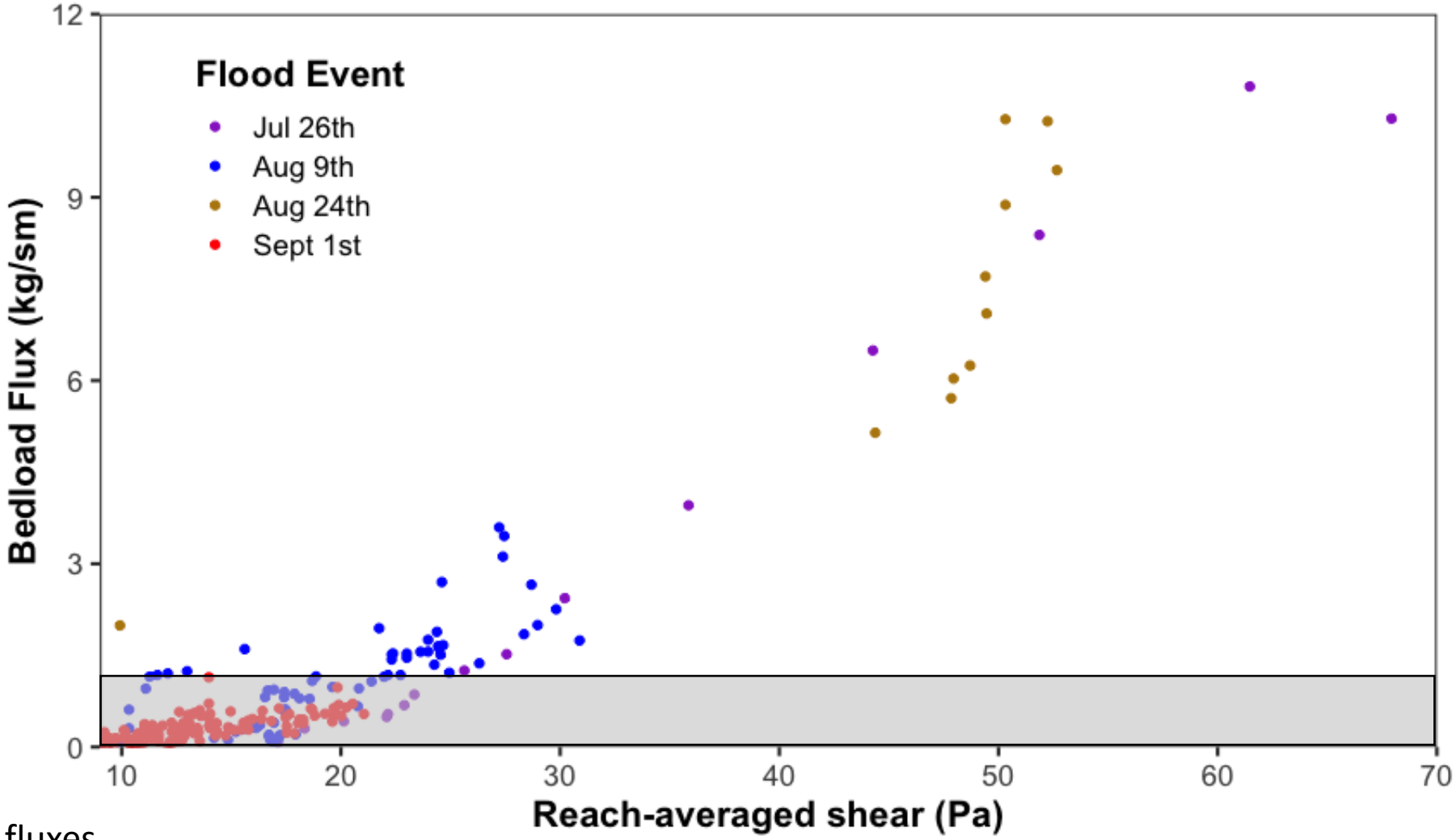


Direct Bedload Measurements

- Bedload moves downstream and falls through the slot into an inner chamber.
- A system of pressure transducers record the accumulation of mass associated inside the chamber.
- The system is designed to interact with the channel as little as possible.

Cross-section averaged bedload fluxes

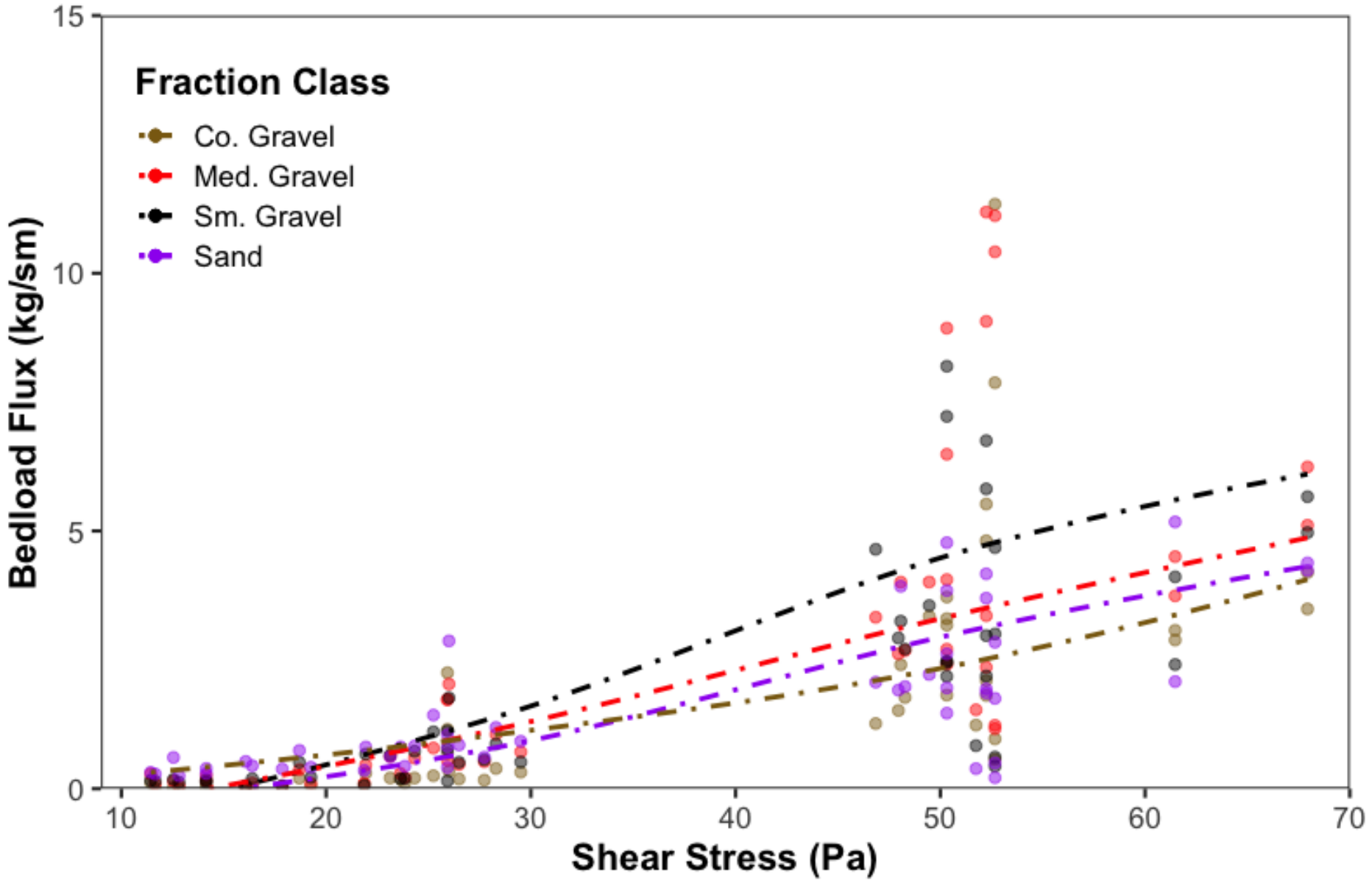
- Early onset of motion (7-10 cm)
- Extremely high rates of bedload flux
- Samplers fill quickly
- Averaged statistics are important, but not the whole story



= typical range of bedload fluxes in perennial rivers (Rio Grande)

Cross-section averaged bedload fluxes

- Large range of bedload fluxes
- Small and Medium sized gravel (2-19 mm) transported at highest rates.
- Coarse sand transported as bedload.
- Indication of cross-stream differences in bedload flux.

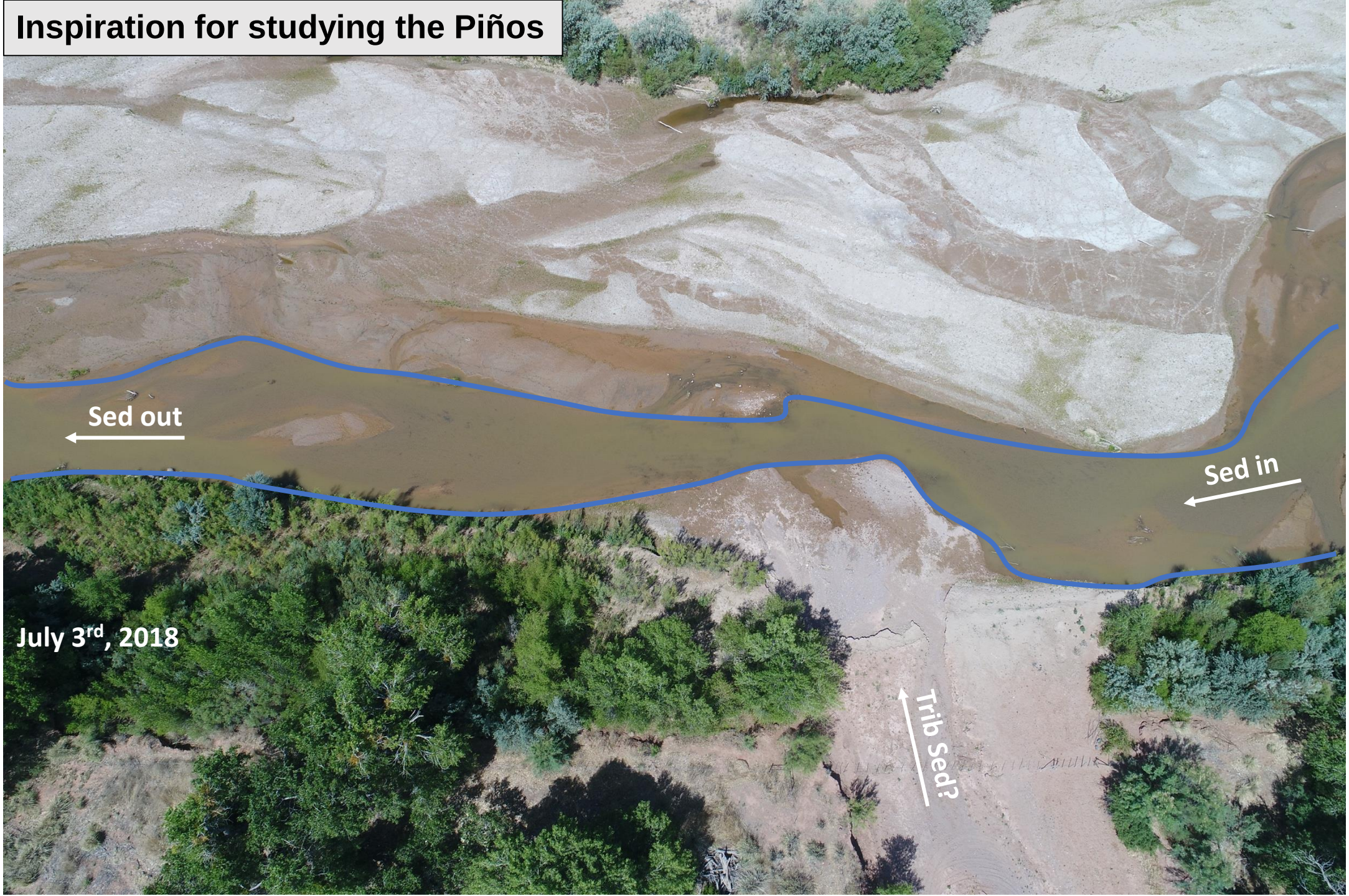


Cross-section averaged bedload fluxes

- Large range of bedload fluxes
- Small and Medium sized gravel (2-19 mm) transported at highest rates.
- Coarse sand transported as bedload.
- Indication of cross-stream differences in bedload flux.

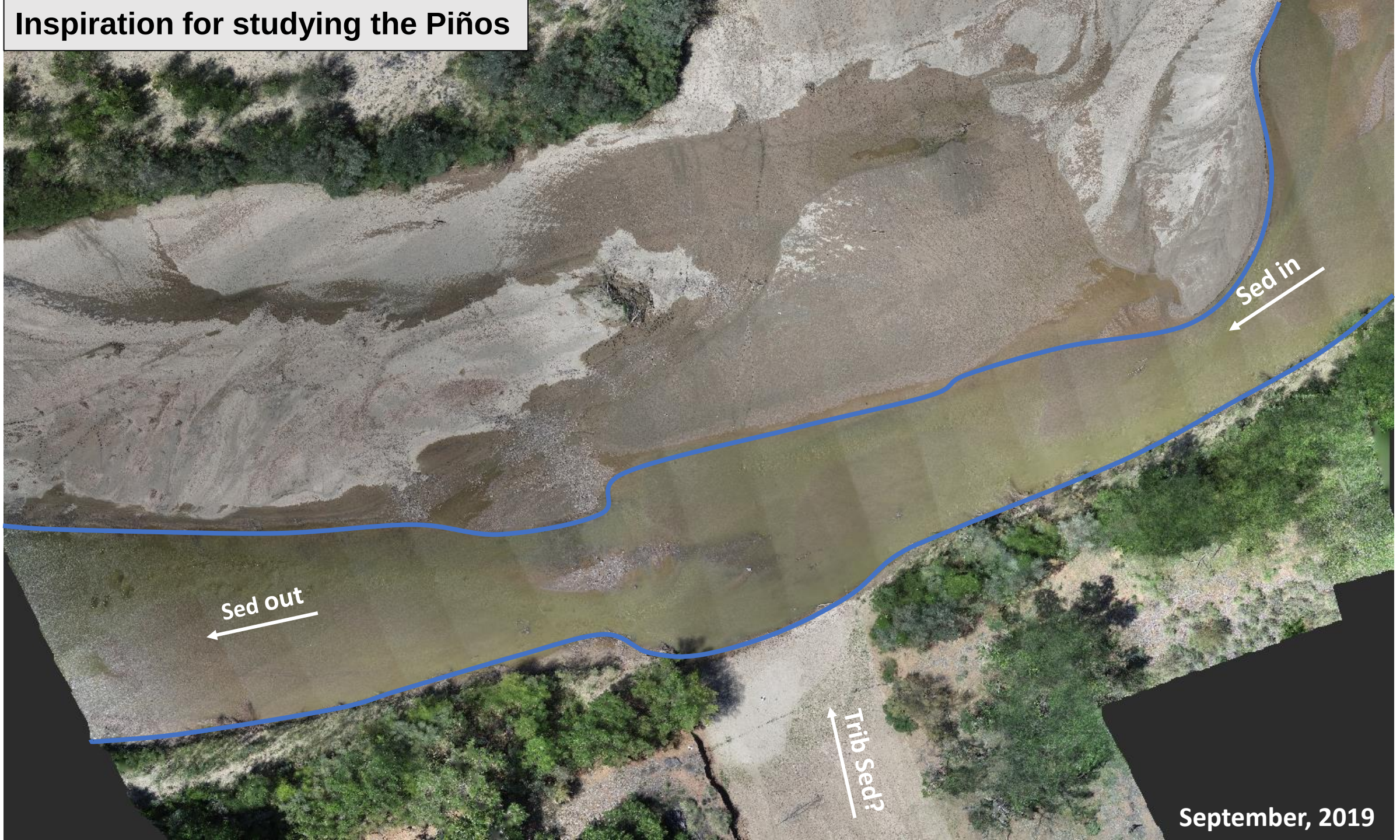

Inspiration for studying the Piños
Sed out
Sed in
August, 2016
Tributary Sed?

Inspiration for studying the Piños



Inspiration for studying the Piños

Inspiration for studying the Piños



Conclusions

- Sediment fluxes are high in ephemeral channels.
- Sediment sizes are all mobile at low shear stresses.
- Individual large events (only hours of flow) can cause large changes at the confluence with the Rio Grande.