Using Remote Detection Technology to Monitor Endangered Fish in the San Juan River

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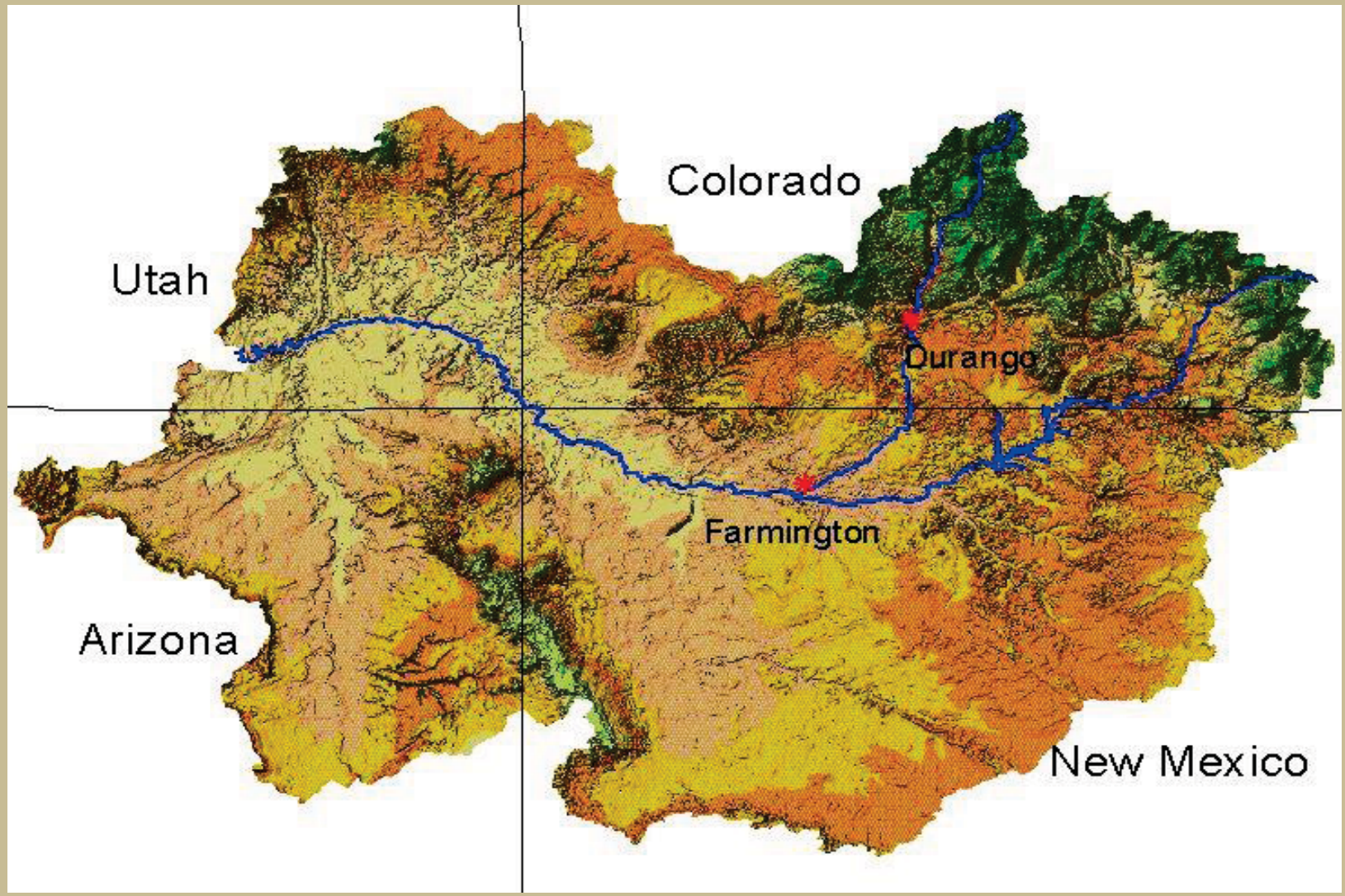
San Juan River



San Juan River Fishes

- Native Fishes
  - Colorado pikeminnow
  - Razorback suckers
  - Flannelmouth sucker
  - Bluehead sucker
  - Speckled dace
  - Roundtail chub
- 10 Non-native species
  - Channel catfish
  - Common carp

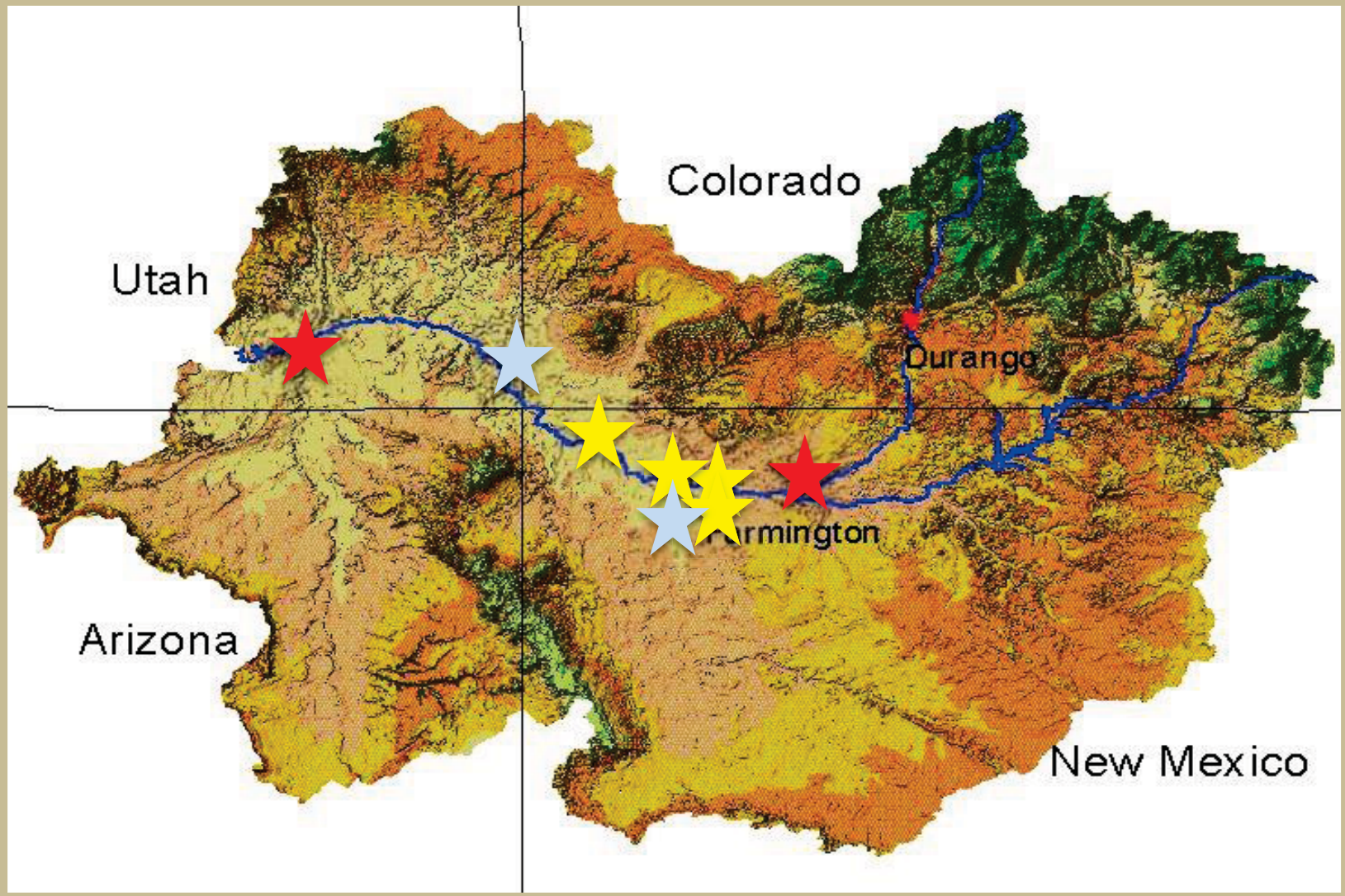
PIT Tag Technology

- Radio Frequency Identification (RFID)
- Uses in many industries
  - Manufacturing
  - Pharmaceuticals
  - Pets
  - Fish!

PIT Tag Technology in SJR

- Objectives:
  - Evaluate movement of Endangered and Non-native fish in the San Juan River
  - Determine tributary use in McElmo Creek, Chaco Wash, and Animas River
  - Monitor populations of endangered fish over time
  - Evaluate PNM Fish Passage Facility
  - Evaluate entrainment of Endangered Fish in Irrigation Canals (Hogback)

San Juan River

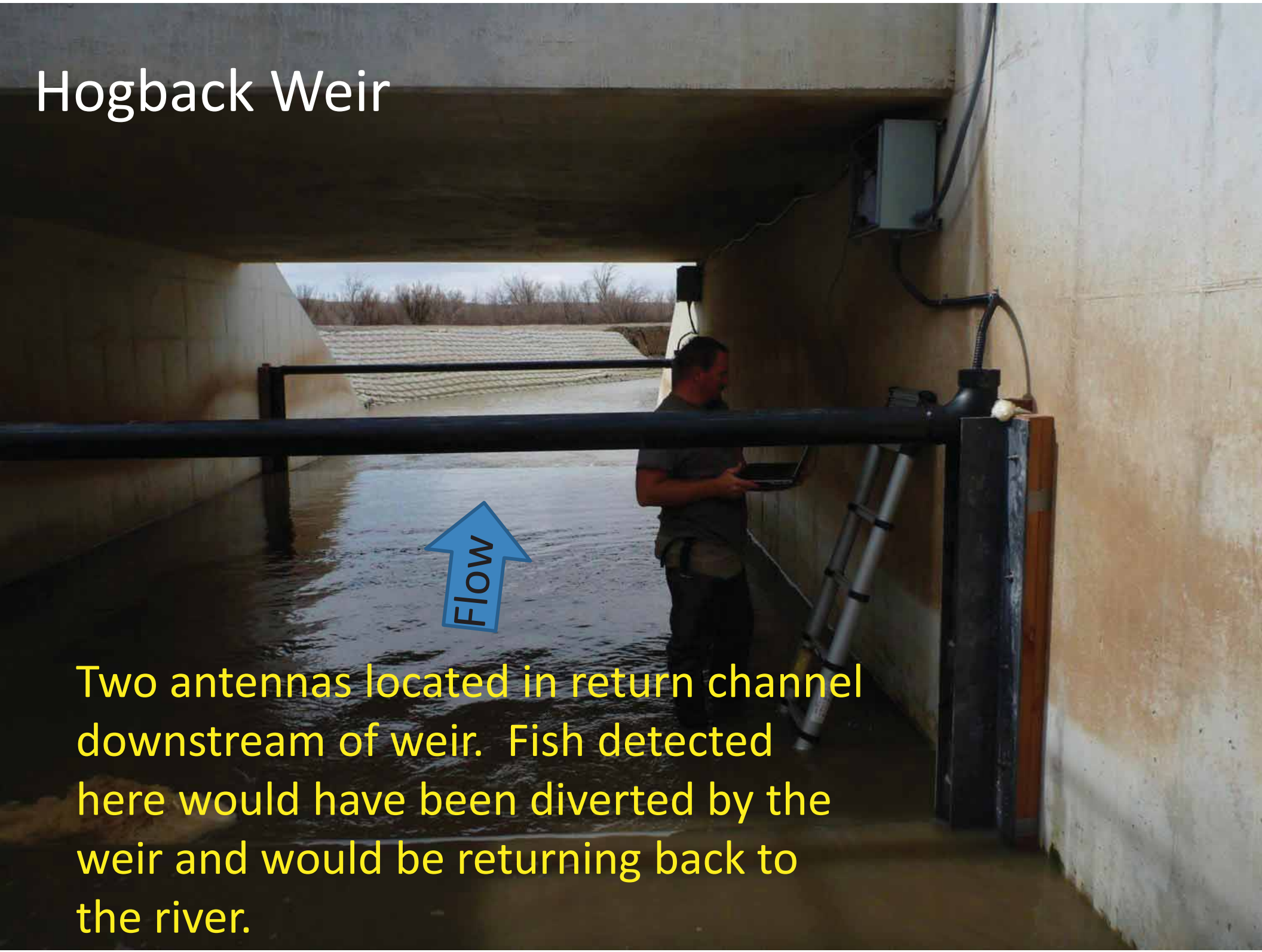



Hogback Weir
Flow
Fish Path
Weir
No antennas upstream!!
NO!!
YES!!
5 antennas total
Canal
Antenna Locations in RED
Return Flow

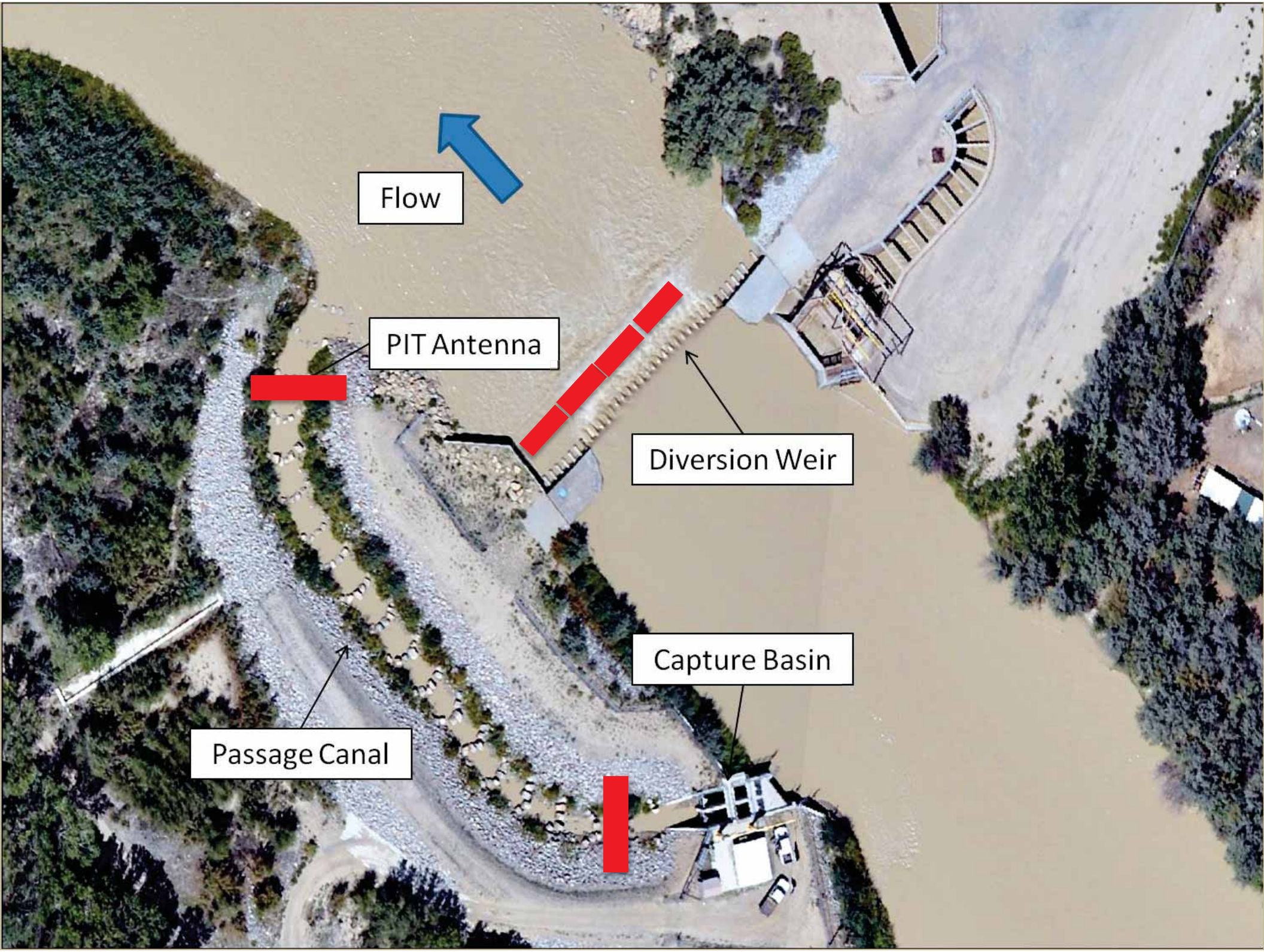
Hogback Weir

Two antennas located at flume in canal downstream of weir. Fish detected here would be entrained.

Hogback Weir



Two antennas located in return channel downstream of weir. Fish detected here would have been diverted by the weir and would be returning back to the river.


Flow
PIT Antenna
Diversion Weir
Capture Basin
Passage Canal


Fish Passage Facility

PNM Weir

PNM Weir

TNC Restoration Channel

McElmo Creek

McElmo Creek

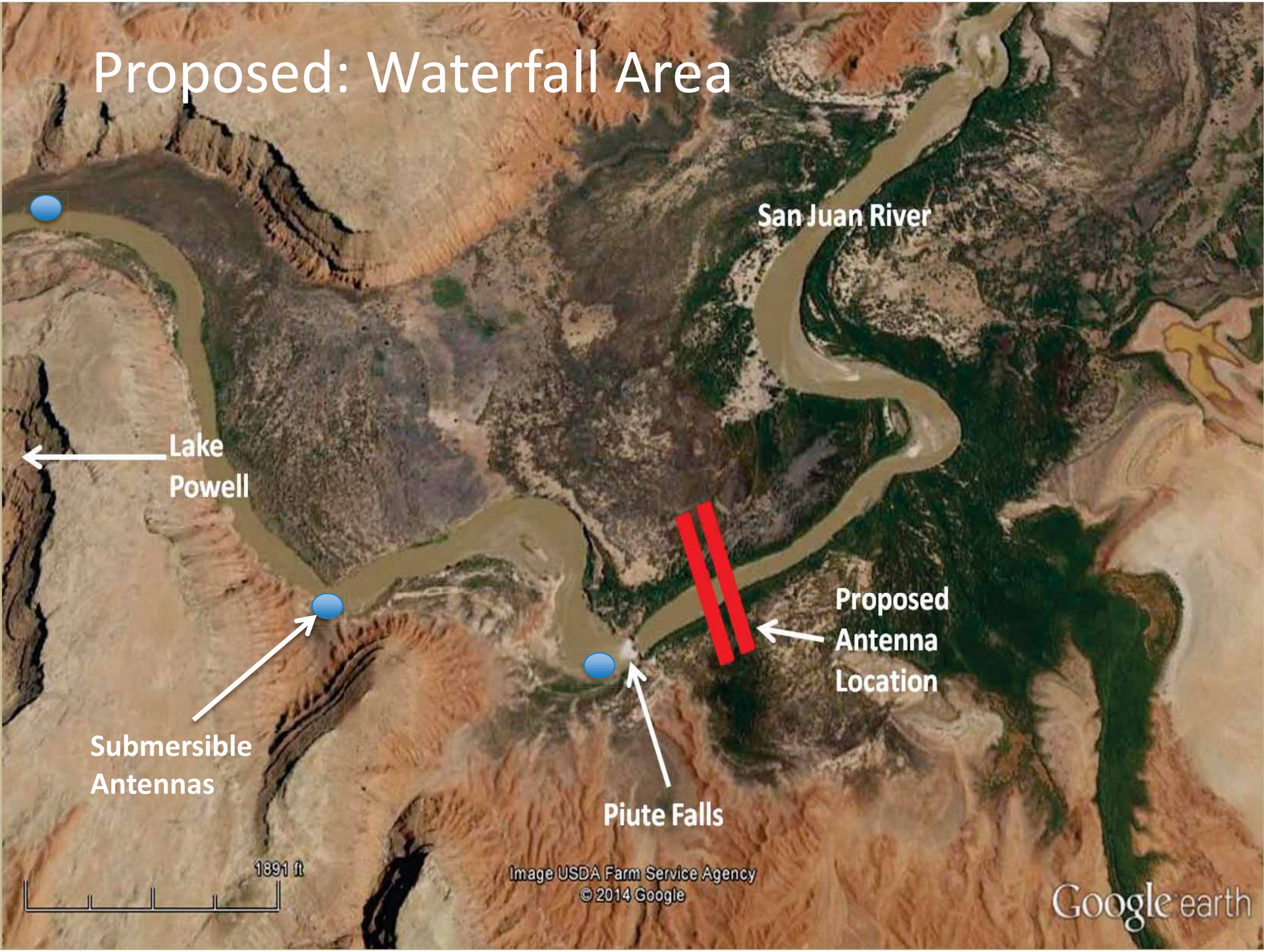
Floating Antenna Array

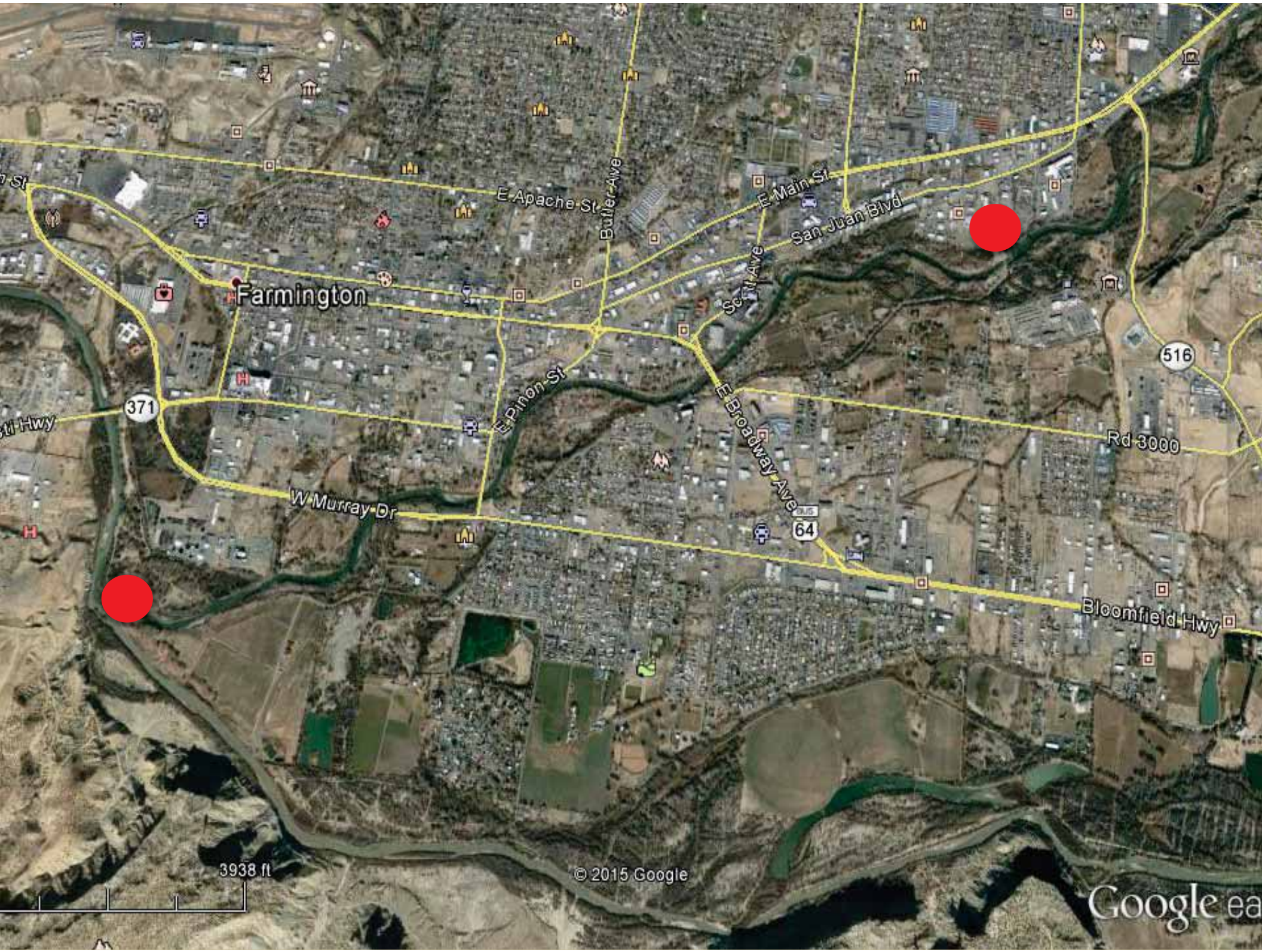
What Have We Learned?

- Installing Antennas is not as simple as it sounds
- Everywhere we put antennas we get detections!
  - 700+ Unique Fish Detected in 2014
  - Data can be overwhelming
- PNM Fish Passage is ineffective
  - Updates to improve efficiency in 2015
  - BIA funded purchase of self cleaning screens
  - Test effectiveness after updates in 2015
- Hogback Fish Diversion was successful in limiting entrainment of endangered fish
  - 3% entrainment in experiment with stocked fish

Proposed Additional Antennas

- Proposed Antenna Objectives:
  - Evaluate endangered fish use of the Animas River
  - Determine loss of endangered fish into Lake Powell
  - Investigate timing of Razorback Sucker movement downstream of Piute Falls


Proposed: Waterfall Area
San Juan River
Lake Powell
Proposed Antenna Location
Submersible Antennas
Piute Falls
1891 ft
Image USDA Farm Service Agency
© 2014 Google
Google earth


E Apache St
Butler Ave
E Main St
San Juan Blvd
Farmington
Sullivan Ave
516
E Pinon St
371
E Broadway Ave
US 64
Rd 3000
W Murray Dr
Bloomfield Hwy
3938 ft
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- Mark McKinstry- Bureau of Reclamation
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