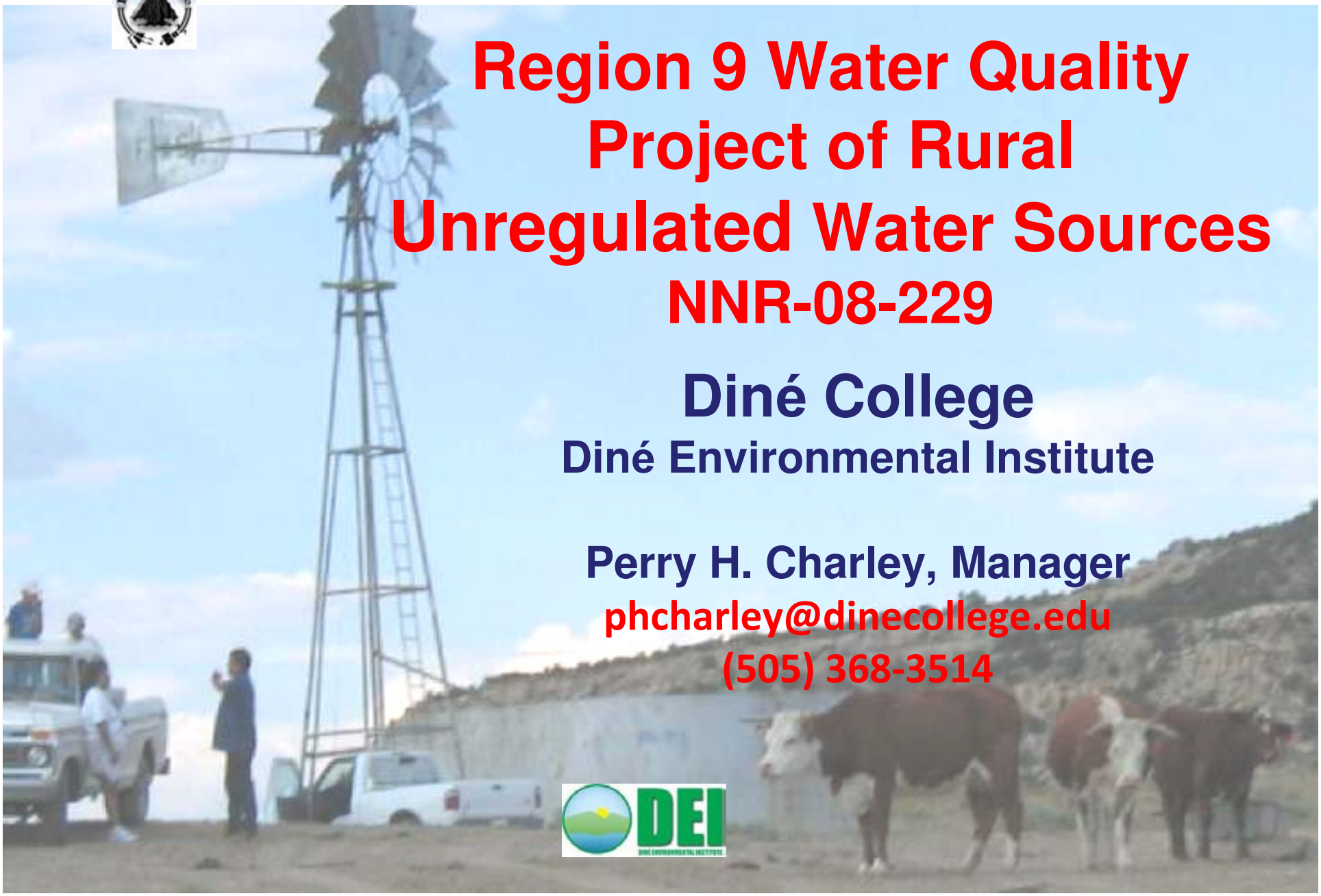

Region 9 Water Quality Project of Rural Unregulated Water Sources

NNR-08-229

Diné College

Diné Environmental Institute

Perry H. Charley, Manager

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(505) 368-3514

Partnership

- US – EPA Region IX: Funding
- NN Water Resources: Maps and data
- Navajo IRB: Human Health protection & oversight
- Din4 College: interns, staff & faculty
- University of Nevada: Technical assistance & analysis
- Student Association for International Water Issues (SAIWI)
  - Graduate volunteer students to assist DEI interns in obtaining field data & water samples

Water Quality Project Objectives

- Document unregulated water sources
- Identify extent of domestic usage
- Analyze parameters to determine public health risks from potential contaminants

  - E. Coli
  - Metals: Arsenic, Uranium and Lead
  - Site specific radiological surveys

- Community survey (pending)
- Optional Voluntary Community Monitoring

Field Protocol

Nitsáhákees

Water Sampling

Data Management

Siihasin

Site Manager/Recorder

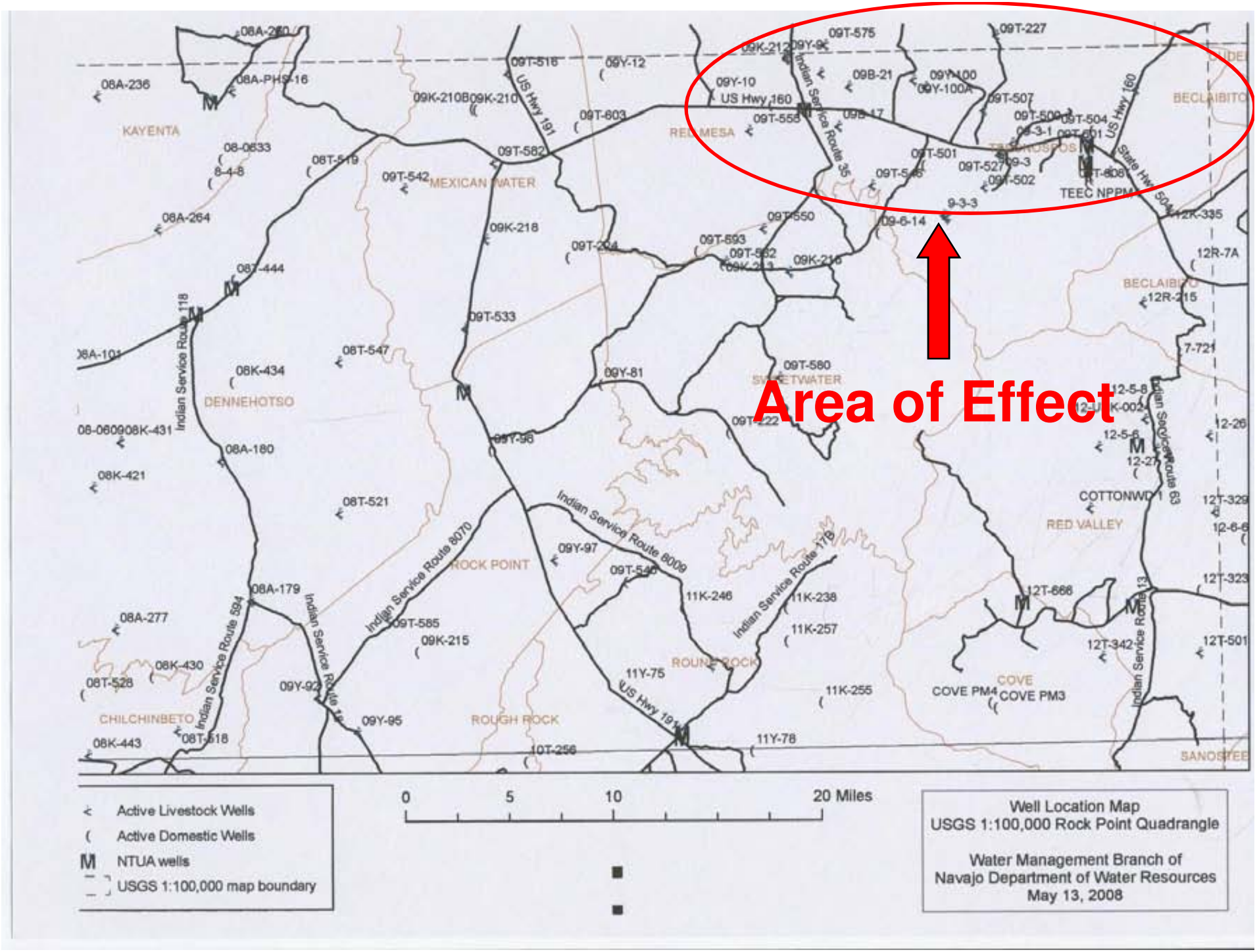
Site Characterization

Nahat'á

Cultural Sensitivity

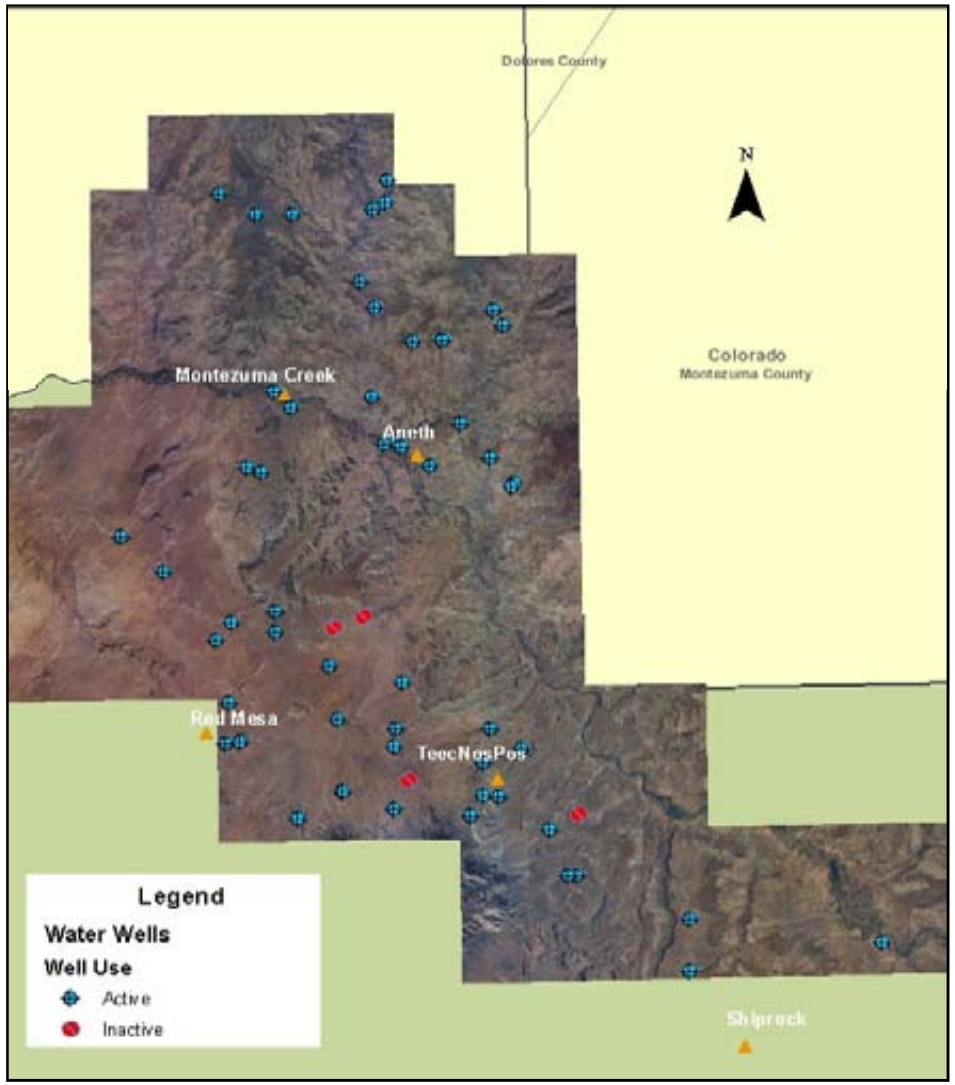
Radiological Characterization

Photography

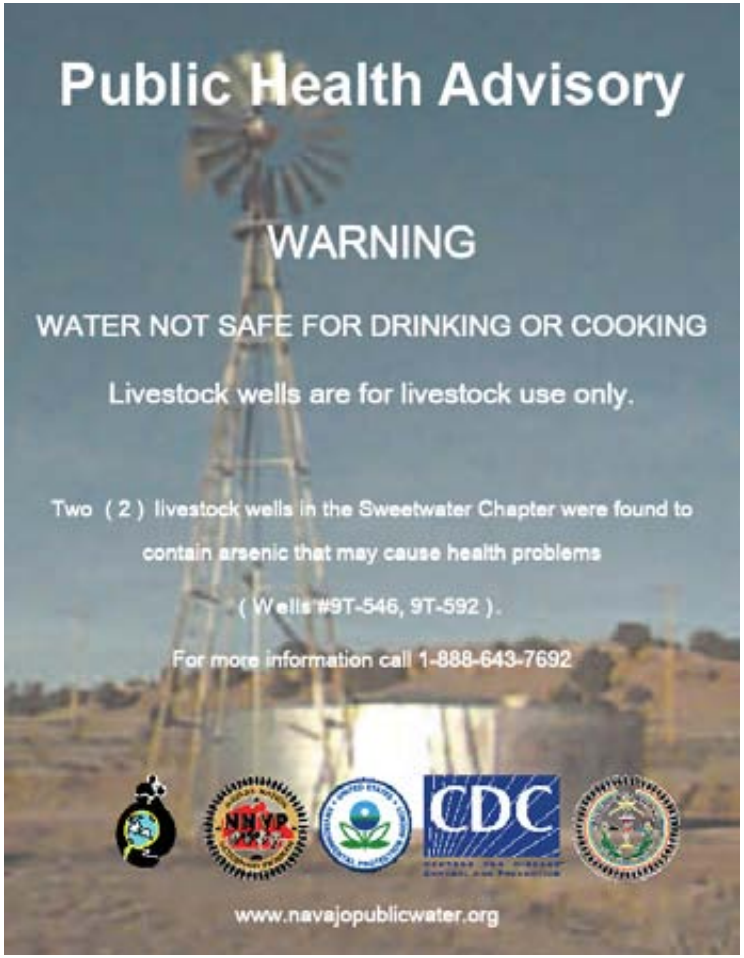


Active & Inactive Water Sites

- 53 unregulated wells & 5 controls were documented/sampled
- 18 sites determined “areas of concern” due to certain tests exceeding Maximum Contaminate Level (MCL).



Impacted Wells



REGION 9 WATER QUALITY
LISTS OF WELLS
POSITIVE E.COLI & EXCEEDING As & U MCLs

ANALYTICAL RESULTS

SAMPLE NAME	CHAPTER	ARSENIC MCL:10 µg/L	URANIUM ICP-MS MCL: 30 µg/L	E. COLI I DEXX Colisure®	Notes/Comments
DCRM080521-9T547 4108038E 639327N	Red Mesa (windmill)	17 **3**	0 **3**	27.2 **88.4**	Windmill: north of Red Mesa buttes
DCRMO8O521-AM02	Red Mesa (windmill)	22	59	74.4	AM= Aero-Motor, designating a windmill blade type, near church
DCRM080521-100 655931E 4086912N	Red Mesa (windmill)			1.0	Windmill: west of Goldtooth camp, east Red Mesa buttes
DCRM080521-100A 655434E 4093896N	Red Mesa (windmill) **Well** **Windmill**	12 **13** **5**	260 **270** **>2**	 **8.5**	Windmill: ½ mile west of windmill 09Y- 100 (above).
DCRM080528- 0559 4118115E 647039N	Red Mesa (windmill)	21		1.0	windmill
DCRM080528- RMSW01 644126E 4101457N	Red Mesa (windmill)			4.1	windmill
DCRM080521-PCW01	Red Mesa	22	36		Needs verification: A Duplicate w/-PWS01, results used for graph.
DCRM080521-9T538 4104193E 649600N	Red Mesa (windmill)	50			Windmill – east of chapter house
DCRM080528-CH 4103125E 645539N	Red Mesa Chapter House (public water supply)	12 **12**			NTUA jurisdiction - referral
DCRM080521-PWS01 4091588E 646381N	Red Mesa Store (Well)	21 **20**	36 **34**		Active well heavily used by community for drinking – closure (?) *Appears as Duplicate sample w/-PCW01 above. Result not used in graph.

Black: 2008 sampling results Red: 2009 sampling results

(Con't) REGION 9 WATER QUALITY LISTS OF WELLS POSITIVE E.COLI & EXCEEDING As – U MCL

		ANALYTICAL RESULTS			
SAMPLE NAME	**CHAPTER**	**ARSENIC** MCL: 10 ug/L	**URANIUM** MCL: 30 ug/L	**E.COLI IDEXX**	**RECOMMENDATION**
DCTT080521-09B-17 649491E 4090354N	Tse Tah (windmill)			<1.0	Windmill; not -0913, but 09B-17. Also has two sets GPS coordinates
DCTC080522-9T227 4097409E 661475N	Teec Nos Pos			21.6	Might be 9T-227: needs verification; Verified 3/27/09 by BMaxwell
DCTNP080522-502 4085192E 660685N	TeecNosPos (windmill)			1	Windmill ;along Carrizo Mtn. road.
DCAN080526-0531 4130476E 665113N	Aneth (windmill), North Aneth past Lansing's	11		1.0	Windmill: near Lansing's camp, west of junction of Hovenweep turnoff. Appears a Duplicate, used results in graph.
DCAN080522-531	Aneth			1.0	Most likely the same windmill as above (0531). Appears a Duplicate, This result not used in graph.
DCAN080526-0513 4135843E 666086N	Aneth (windmill)	13			Windmill, south of Hovenweep Nat'l Monument
DCMM080527-0710	Aneth (windmill)			2.0	MM = McCracken Mesa @ North Aneth
DCMC080528-559 4117606E 648258N	Montezuma Creek	21		1.0	0559 at Red Mesa, but this looks to be a different well. Needs verification due to differing analytical data.

Summary

- Note: Comparison between 2008 **(black)** and 2009 **(red)** sampling.
- 1. In most cases, contaminant levels appear very similar between 2008 and 2009 in 5 unregulated wells re-sampled in the Red Mesa area.
- 2. E. Coli at well 9T547 was elevated compared to 2008 analysis: 27.2 to 88.4
- 3. Red Mesa Chapter House was sampled as a Control in both years. Still shows Arsenic exceedances at 21 and 20 µg/L for 2008 and 2009 respectively.
- 4. PWS01, a heavily used well at Red Mesa Store, also shows exceedances: 21 & 20 µg/L (Arsenic) and 36 & 34 µg/L (total Uranium).

Impacted Wells

Well 547:
Arsenic: 17µg/L
E. Coli: 27.2

Well # 100
(E.Coli 1.0)

Well# 100A
Arsenic: 21µg/L
Uranium: 260µg/L

PSW01-Red Mesa Store
Arsenic (21µg/L)
Uranium (36µg/L)

Well 538
Arsenic: 50µg/L

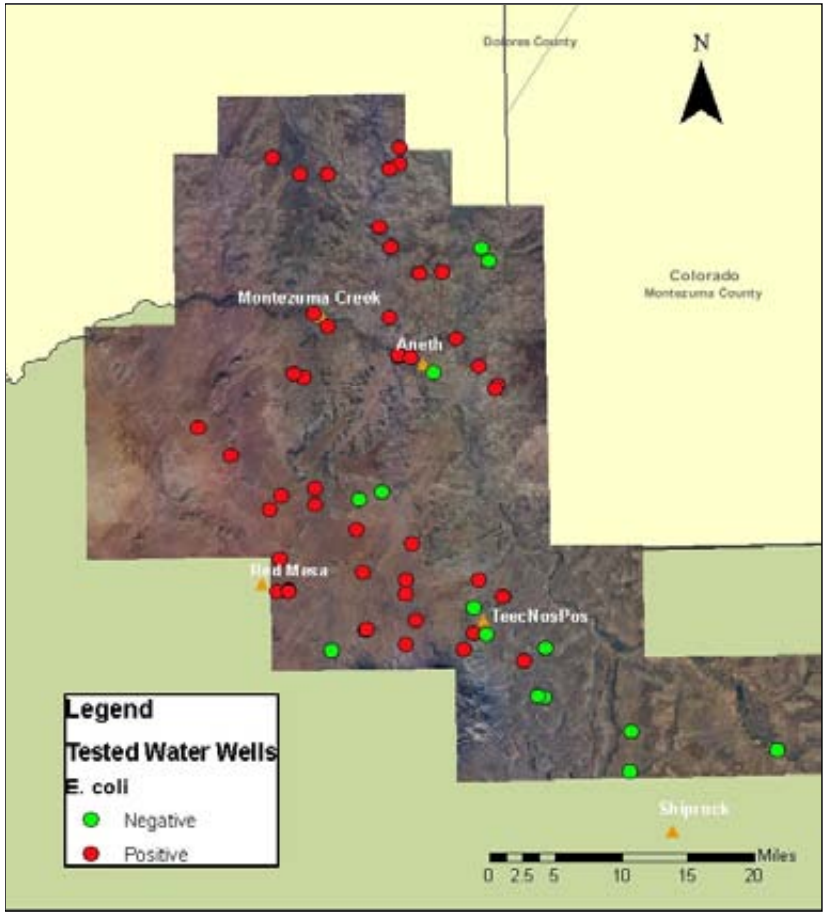
Impacted Wells

Well 559:
Arsenic: 21 µg/L
E.Coli: 1.0

Well 212 (AM02):
Arsenic: 12µg/L
Uranium: 59 µg/L
E. Coli: 74.4

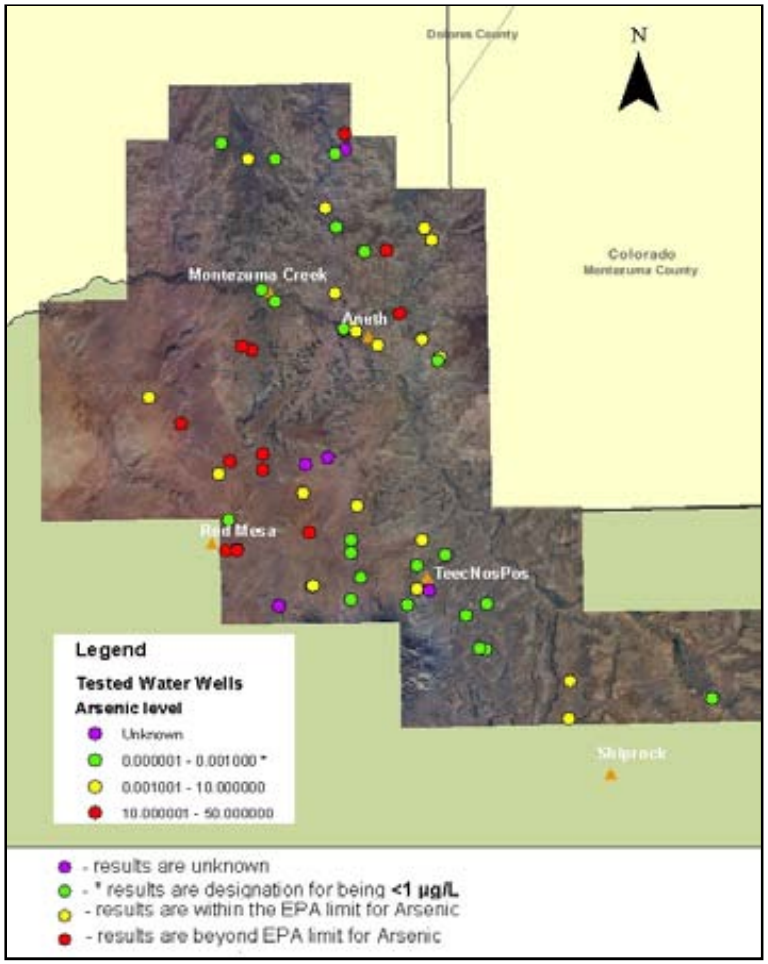
Wells with Escherichia coli (E. coli)-Contamination

- 12 of 53 water sources identified positive for *E. coli*
- 5 of 12 water sources positive for E. coli in Red Mesa area
- 4 of 12 water sources positive for E. coli in Aneth/Montezuma Creek areas
- 1 site positive at Tse Tah
- 2 sites at Teec Nos Pos were positive



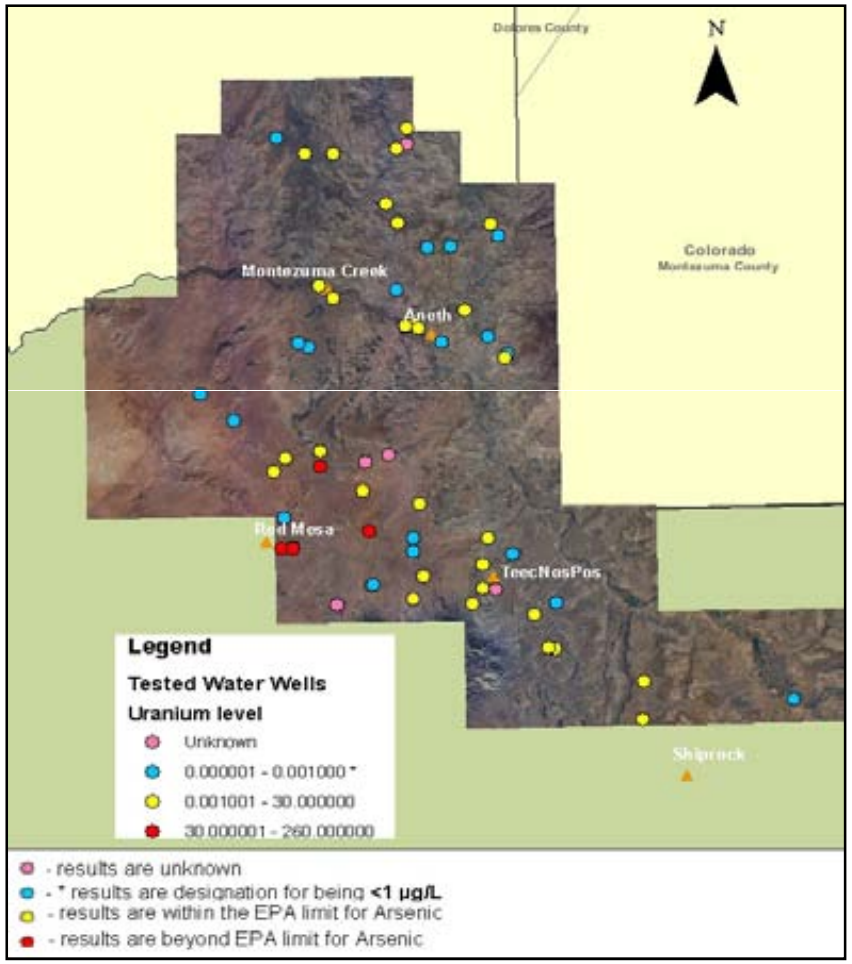
Wells with Arsenic Contamination

- 10 of 22 water sources above MCL
- 9 of 22 water sources above MCL in Red Mesa area
- Remaining 2 of 10 above MCL in Aneth area

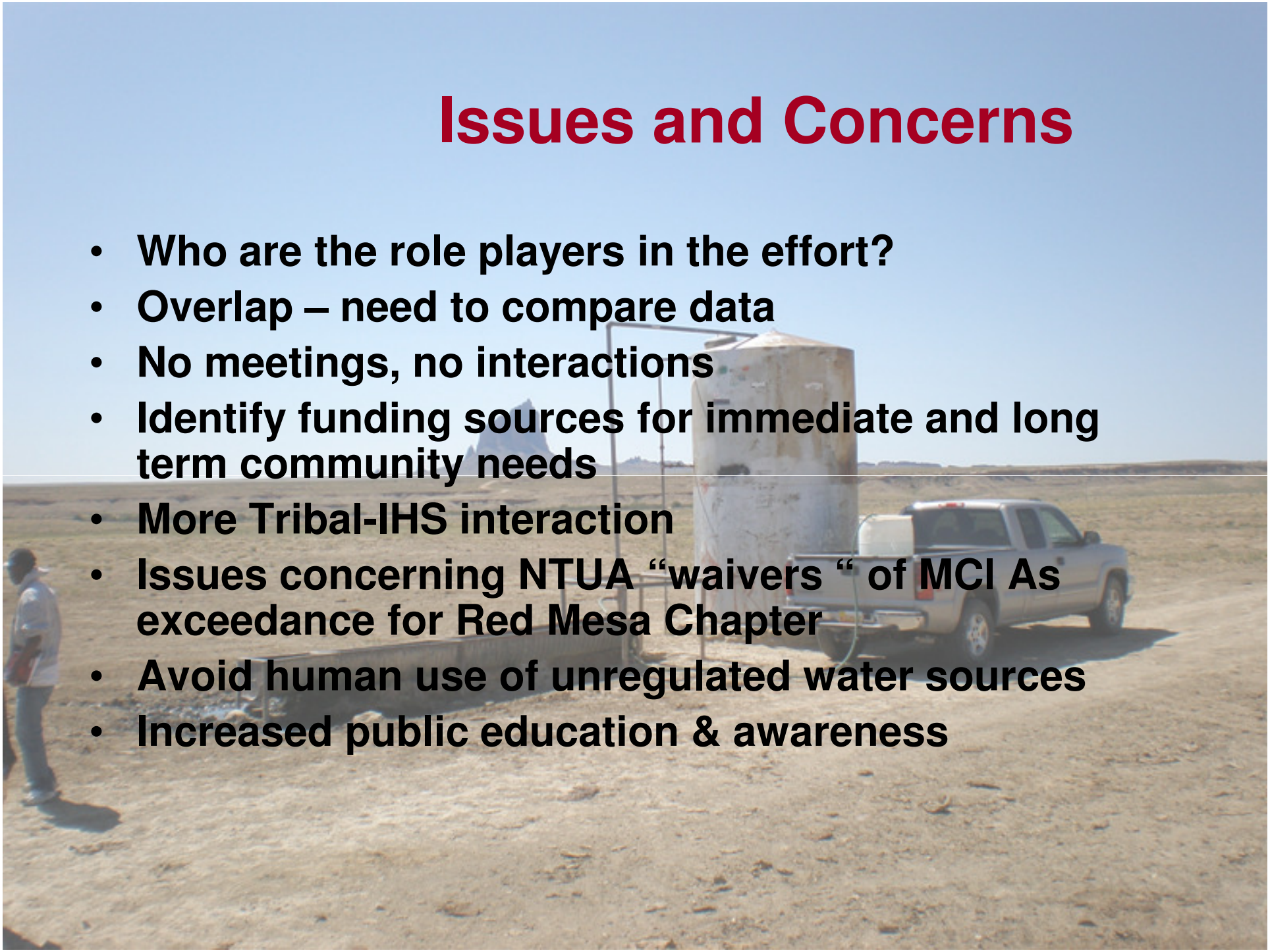


Wells with Uranium Contamination

- 4 of 53 wells tested positive for Total Uranium
- All 4 sampled sites in Red Mesa area



Issues and Concerns



- Who are the role players in the effort?
- Overlap – need to compare data
- No meetings, no interactions
- Identify funding sources for immediate and long term community needs
- More Tribal-IHS interaction
- Issues concerning NTUA “waivers “ of MCl As exceedance for Red Mesa Chapter
- Avoid human use of unregulated water sources
- Increased public education & awareness

Other Problems

Dead cattle near pond and windmill

Inactive well

Graffito

Vandalism

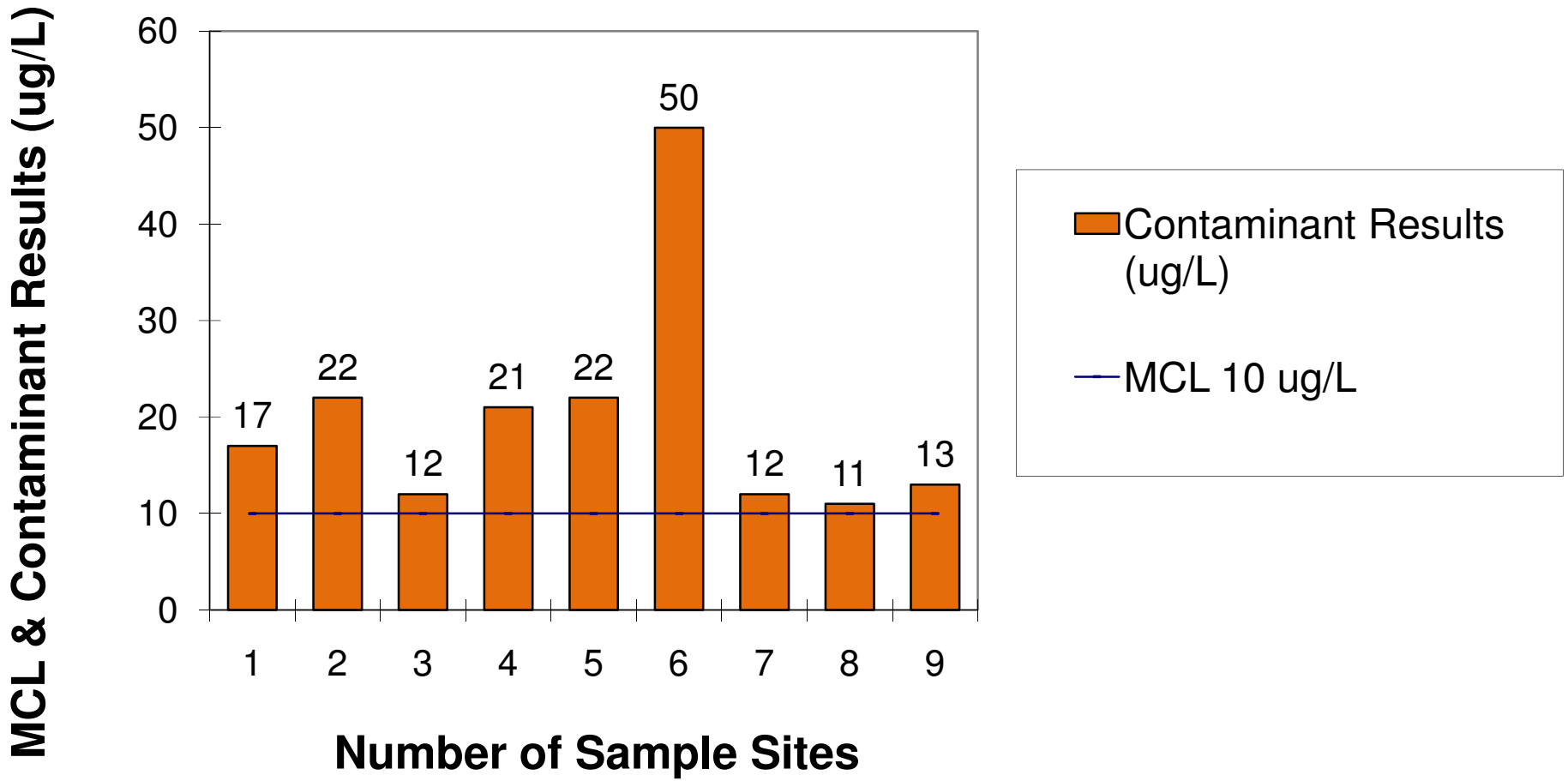
Trash in reservoirs

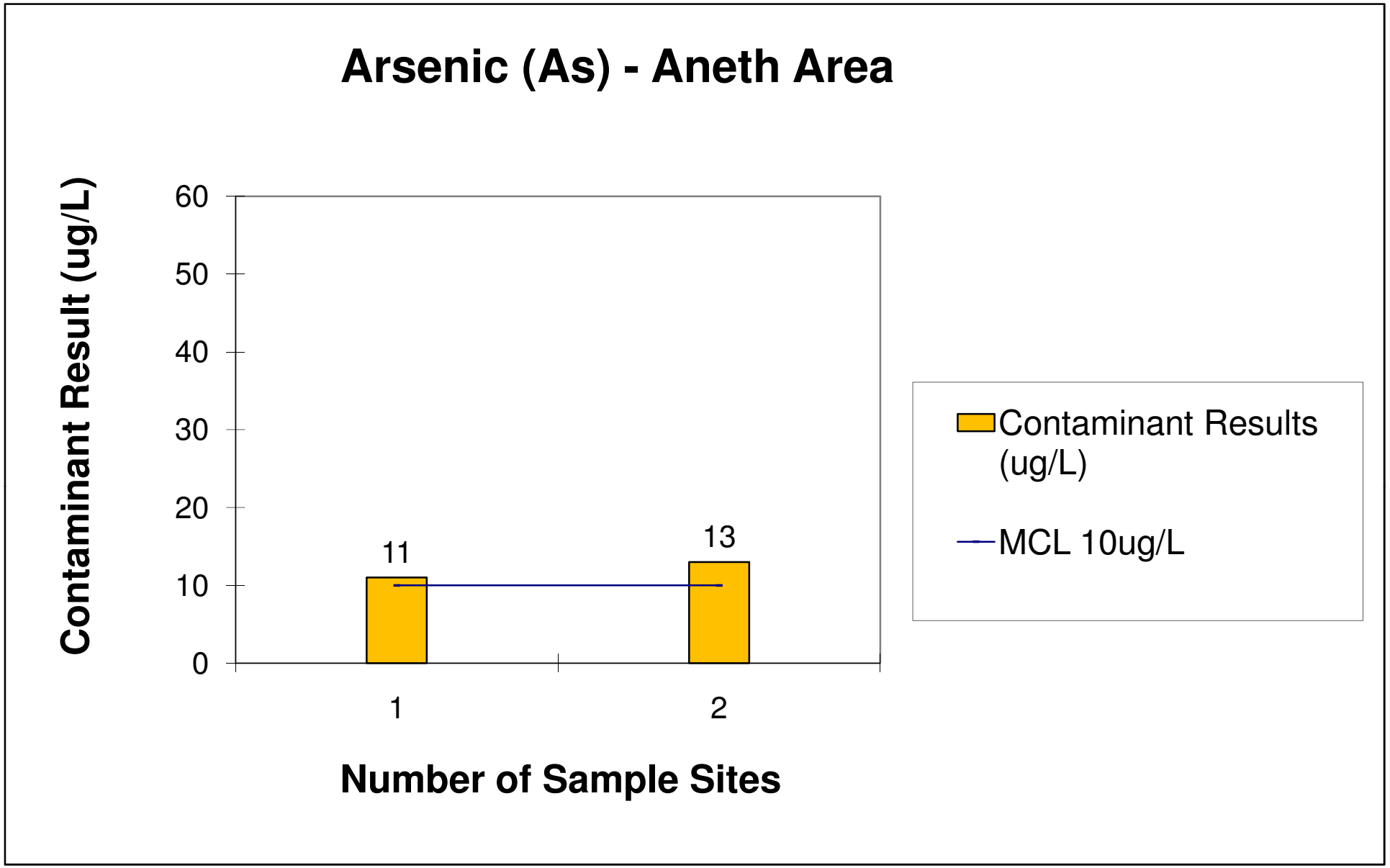
Half filled reservoirs

Axhe'hee doo Ha'gone'

Dine' College – Dine' Environmental Institution

Arsenic (As) - Red Mesa & Aneth Areas





(U) Uranium ICP-MS : Red Mesa Area