



Region 9 Water Quality Project of Rural Unregulated Water Sources NNR-08-229

**Diné College
Diné Environmental Institute**

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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

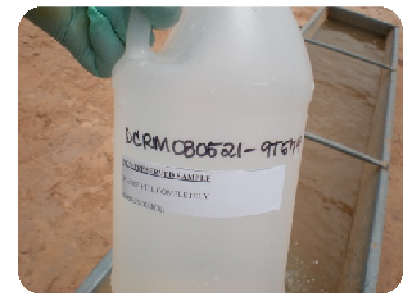


E. Coli

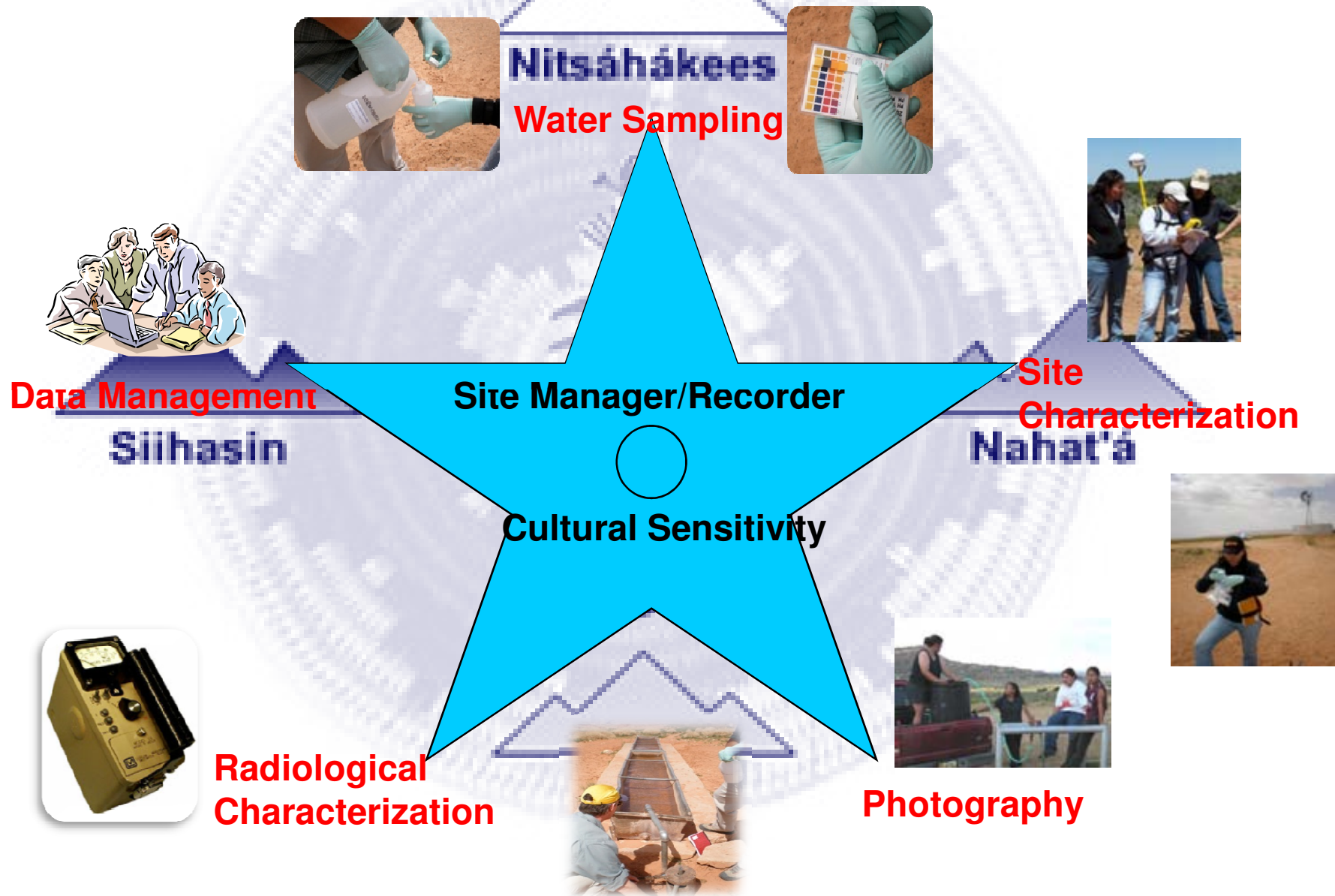
Metals: Arsenic, Uranium and Lead

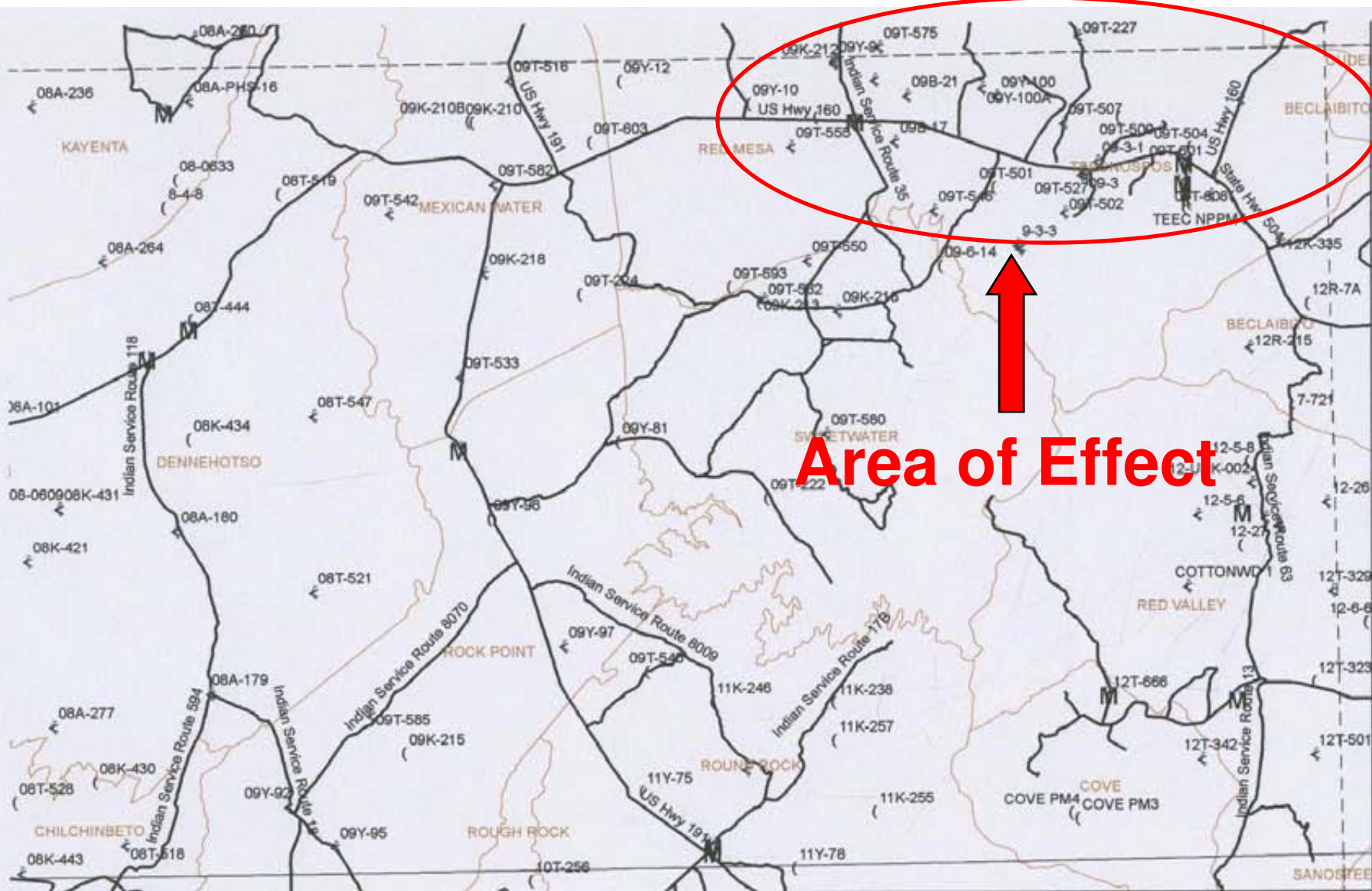
Site specific radiological surveys

- Community survey (pending)
- Optional Voluntary Community Monitoring



Field Protocol





Area of Effect

- ← Active Livestock Wells
- (Active Domestic Wells
- M NTUA wells
- - - USGS 1:100,000 map boundary

0 5 10 20 Miles

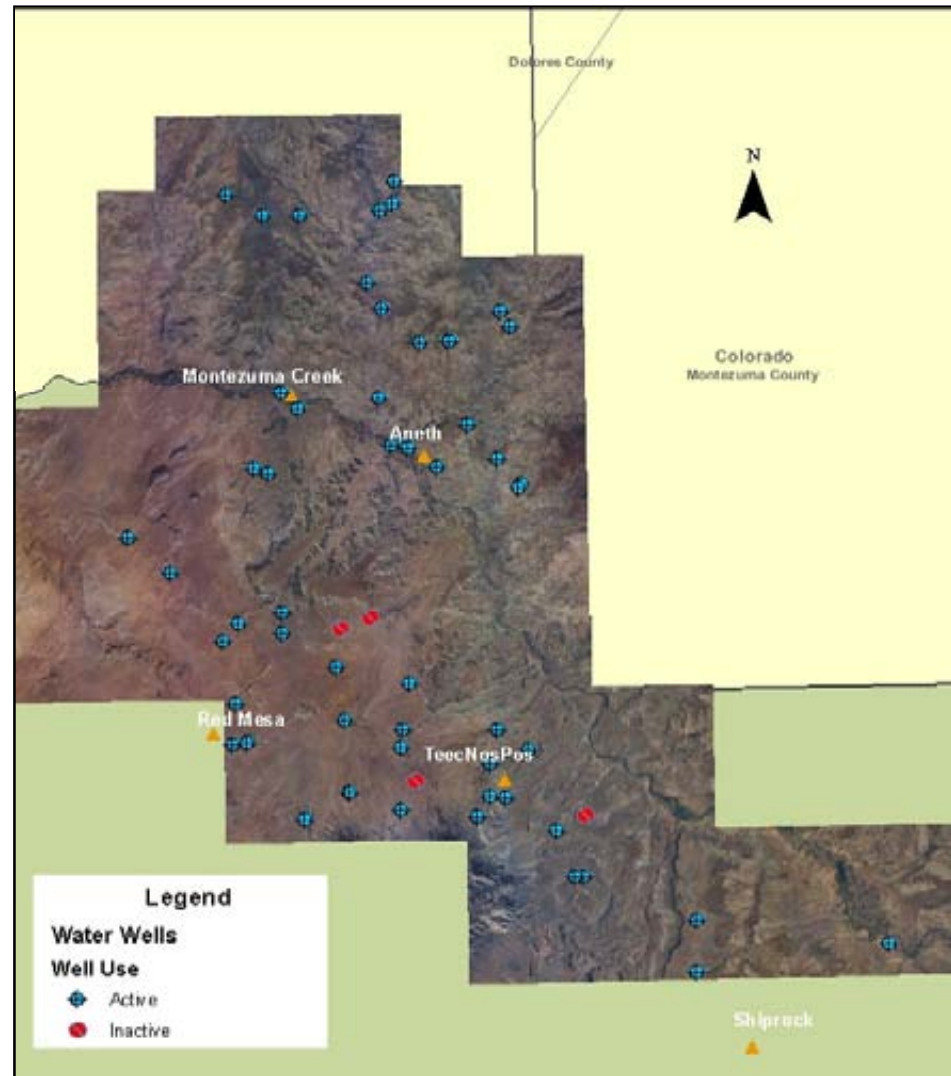
Well Location Map
USGS 1:100,000 Rock Point Quadrangle

Water Management Branch of
Navajo Department of Water Resources
May 13, 2008



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).



Public Health Advisory

WARNING

WATER NOT SAFE FOR DRINKING OR COOKING

Livestock wells are for livestock use only.

Two (2) livestock wells in the Sweetwater Chapter were found to contain arsenic that may cause health problems

(Wells #9T-546, 9T-592).

For more information call 1-888-643-7692



www.navajopublicwater.org

Impacted Wells

Public Health Advisory

WARNING

WATER NOT SAFE FOR DRINKING OR COOKING

Livestock wells are for livestock use only.

Five (5) of the livestock wells in the Red Mesa Chapter were found to contain arsenic and uranium that may cause health problems (Wells

#9T-574, 9T-559, 9T-538, 9T-555, and 9Y-32).

For more information call 1-888-643-7692



www.navajopublicwater.org



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
DCRM080521-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 <u>not</u> 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).



Well 547:
Arsenic: 17 μ g/L
E. Coli: 27.2



Well # 100
(E.Coli 1.0)

Impacted Wells



Well# 100A
Arsenic: 21 μ g/L
Uranium: 260 μ g/L

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





Well 538
Arsenic: 50 μ g/L

Well 559:
Arsenic: 21 μ g/L
E.Coli: 1.0



Impacted Wells

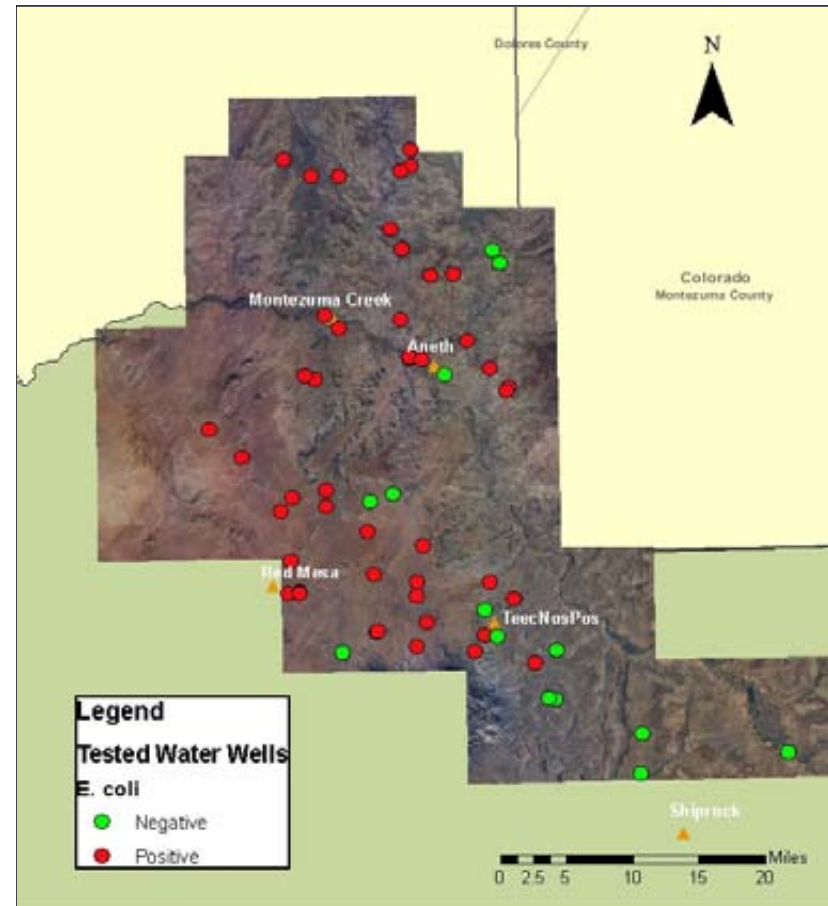


Well 212 (AM02):
Arsenic: 12 μ g/L
Uranium: 59 μ g/L
E. Coli: 74.4



Wells with Escherichia coli (E. coli)-Contamination

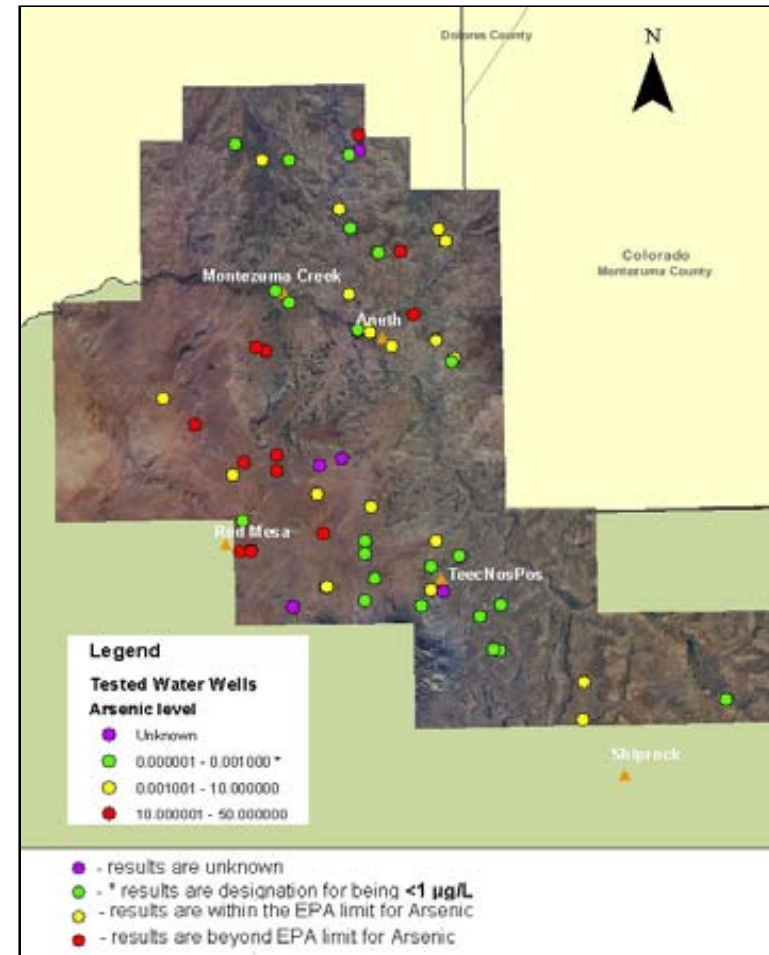
- 12 of 53 water sources identified positive for *E. coli*
- 5 of 12 water sources positive for *E. coli* in Red Mesa area
- 4 of 12 water sources positive for *E. coli* in Aneth/Montezuma Creek areas
- 1 site positive at Tse Tah
- 2 sites at Teec Nos Pos were positive





Wells with Arsenic Contamination

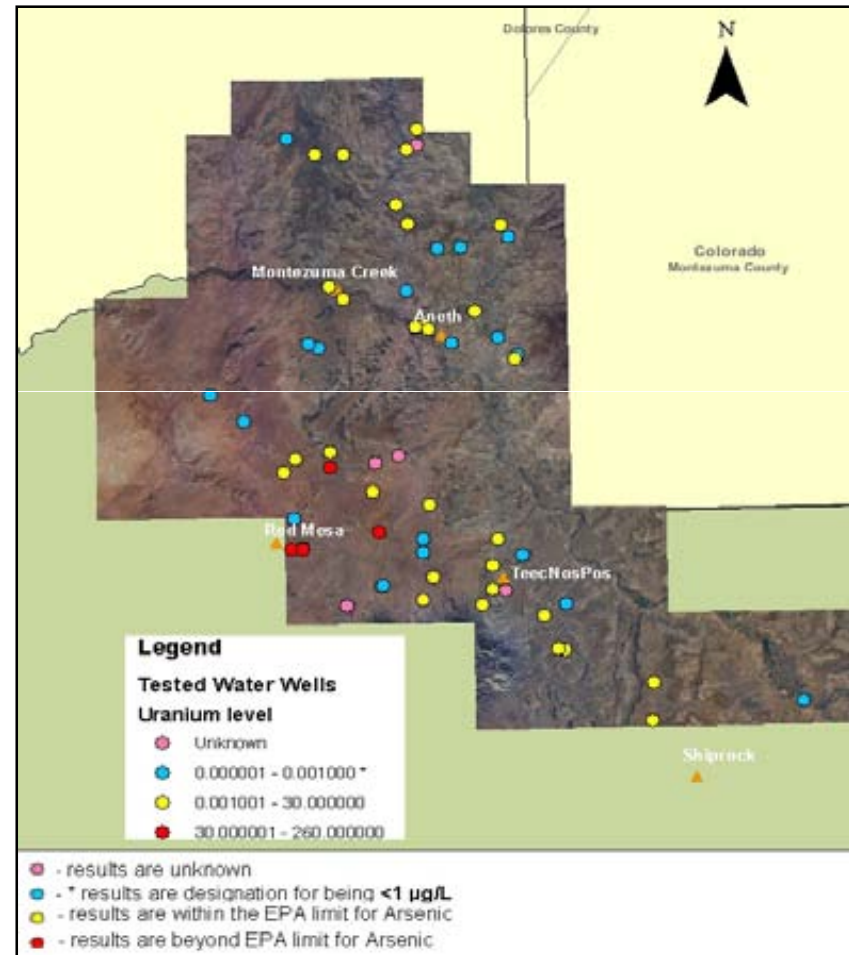
- 10 of 22 water sources above MCL
- 9 of 22 water sources above MCL in Red Mesa area
- Remaining 2 of 10 above MCL in Aneth area





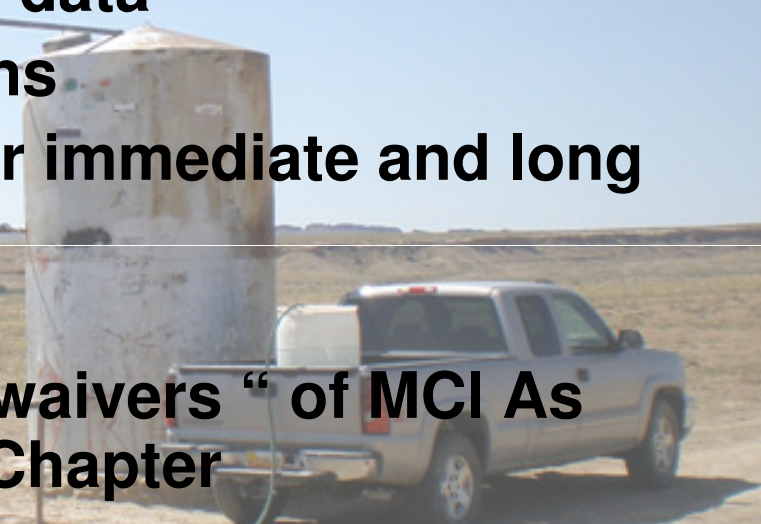
Wells with Uranium Contamination

- 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 MCI 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



Graffiti



Vandalism

Trash in reservoirs

Half filled reservoirs

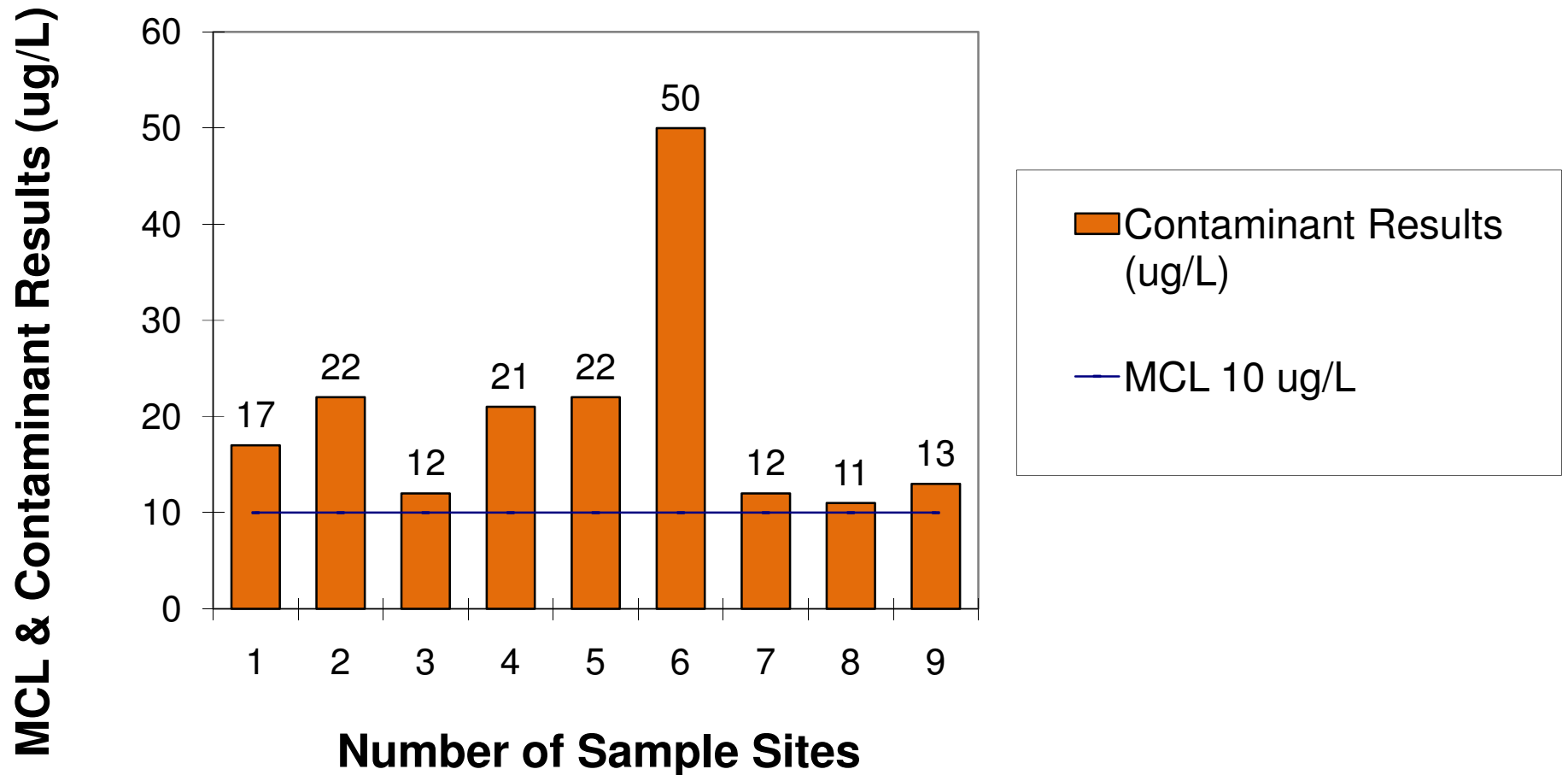


Axhe'hee doo Ha'gone'

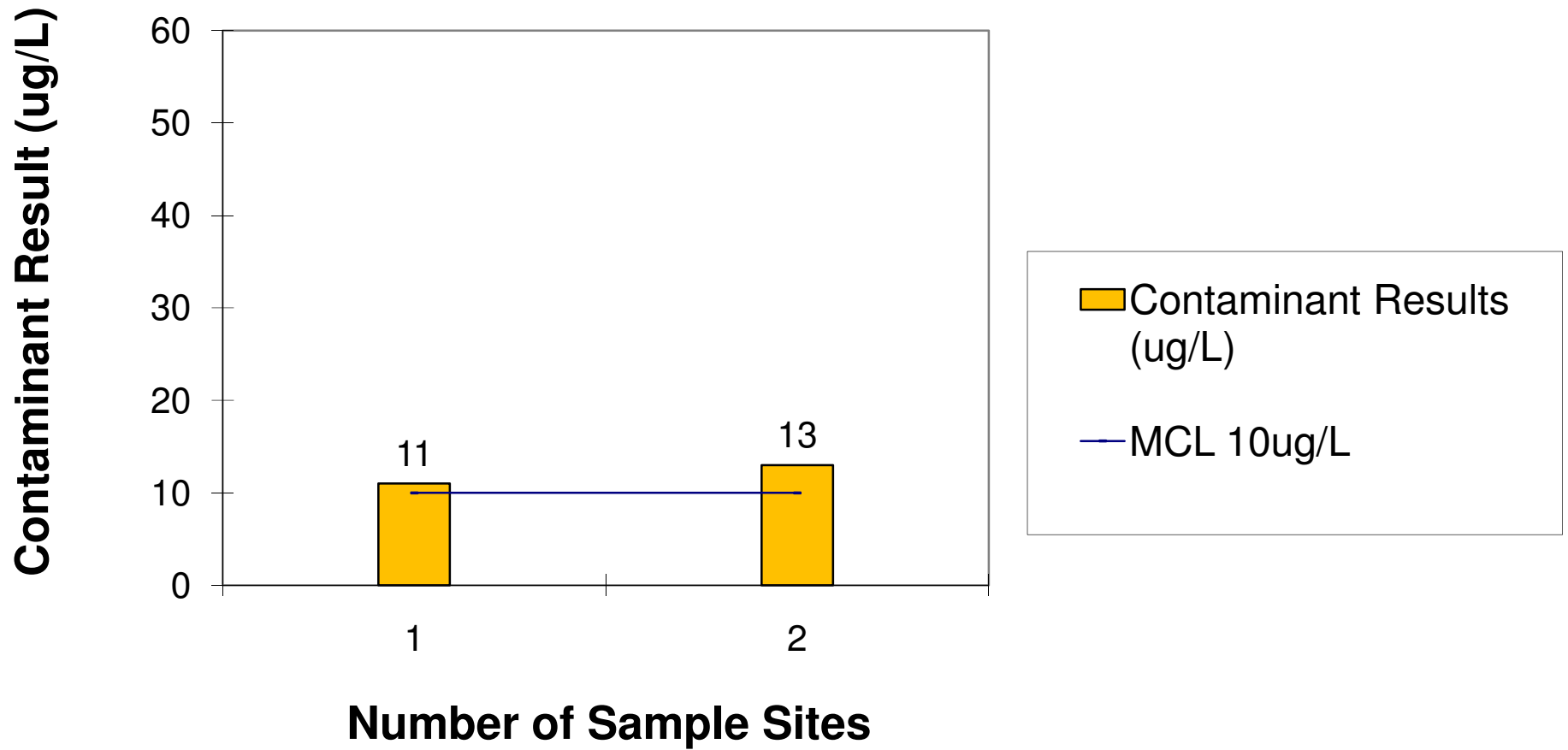


Dine' College – Dine' Environmental Institution

Arsenic (As) - Red Mesa & Aneth Areas



Arsenic (As) - Aneth Area



(U) Uranium ICP-MS : Red Mesa Area

