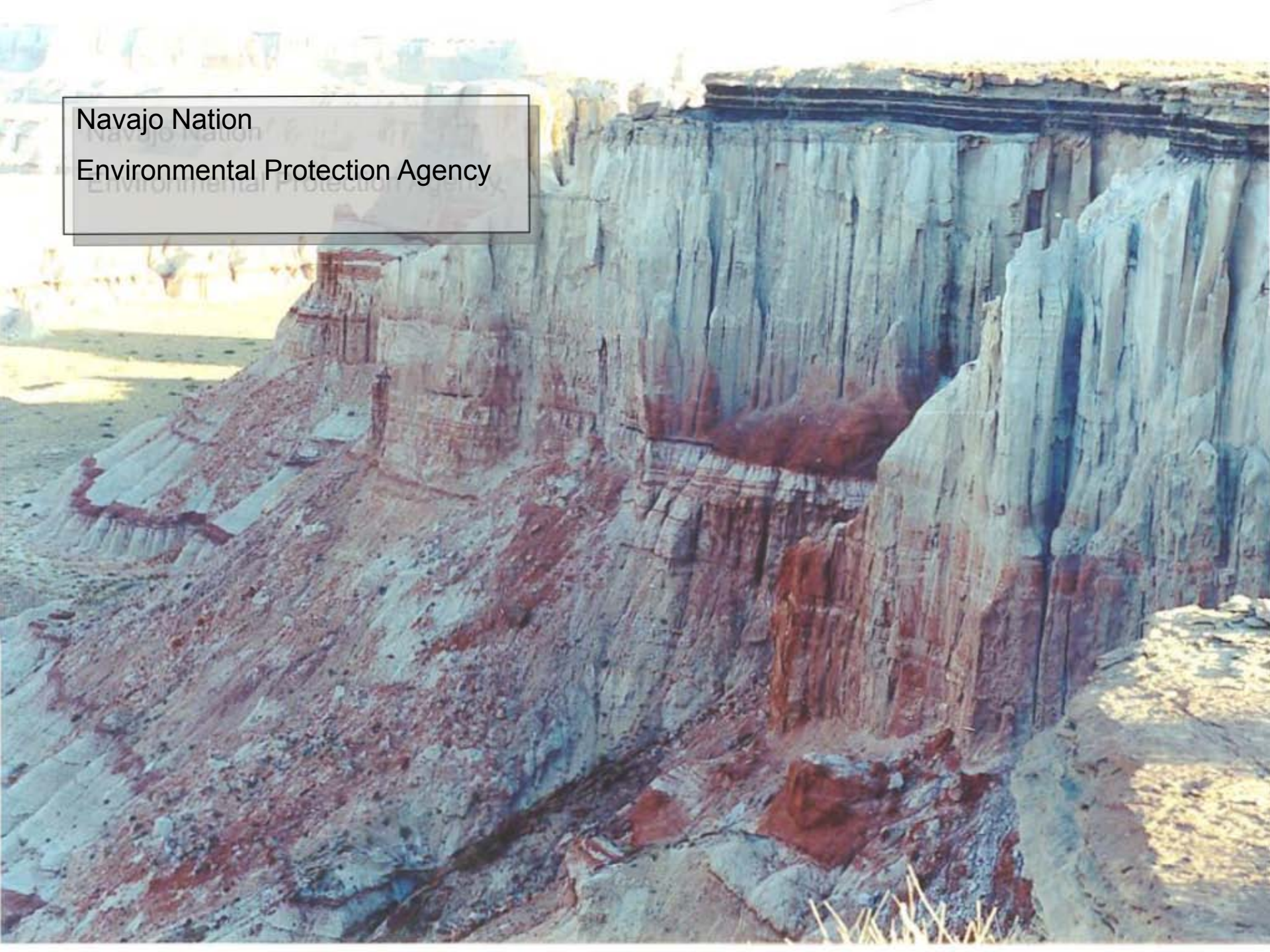


Navajo Nation  
Environmental Protection Agency

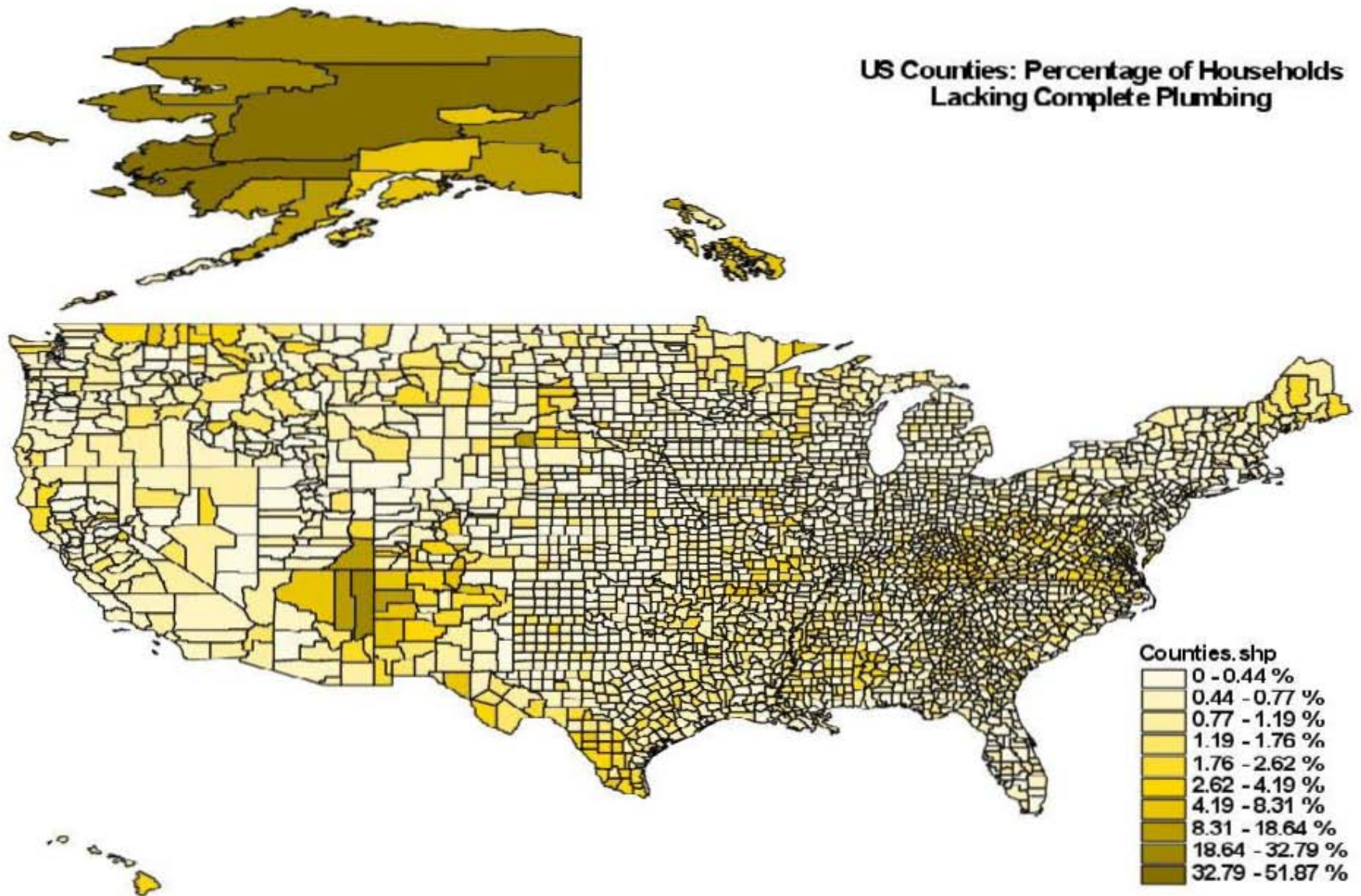


# Navajo Nation Environmental Protection Agency

- ◆ Public Water Systems Supervision Program within the:
  - ◆ Surface and Ground Water Protection Department
- ◆ (928) 871-7755
- ◆ Email: [ybarney@navajopublicwater.org](mailto:ybarney@navajopublicwater.org)
- ◆ [www.navajopublicwater.org](http://www.navajopublicwater.org)



# US Hot Spots Lacking Plumbing Facilities



# Water Hauling on Navajo Nation

- 91% public water systems (PWS) are compliant with SDWA
- 30% households are not connected to a PWS
  - ~ 14,347 households and 54,000 people without potable water
- Many connected households haul water
  - Cost or taste of treated





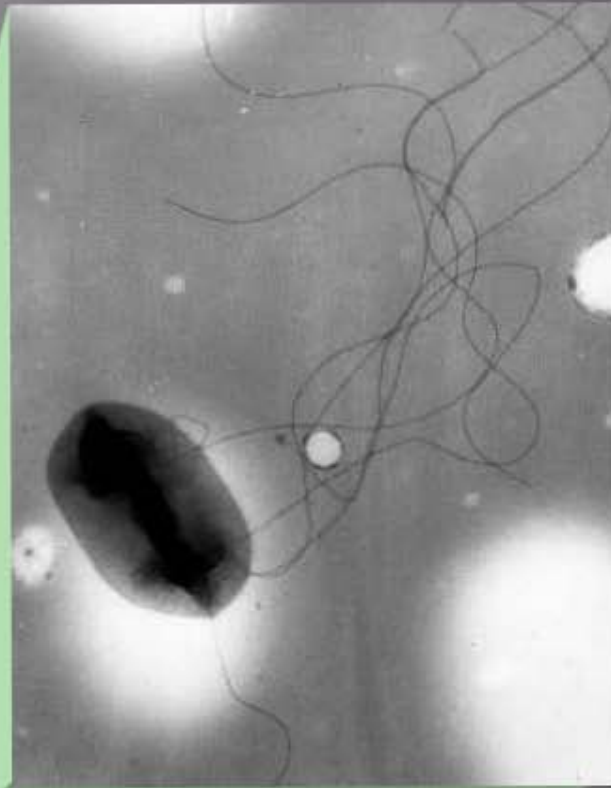
# Public Health Concerns Related to Water Hauling

- Use of unregulated, untreated source water
  - Mainly livestock wells and natural springs
  - Not approved for human consumption
  - May contain bacteria and chemicals (natural arsenic and uranium)
- Unsafe storage and handling

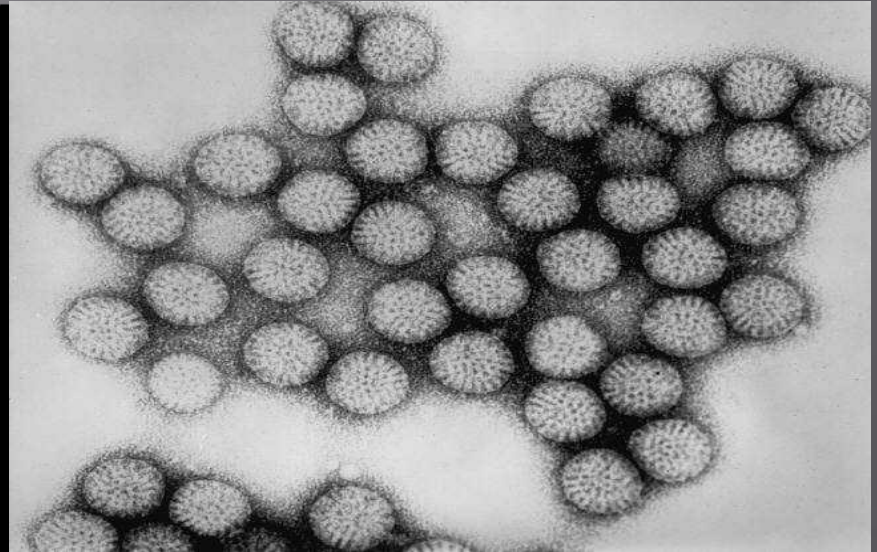


What contaminants are people  
exposed to when drinking  
unregulated water on Navajo  
Nation?

# Bacteria



# Viruses





# Protozoa



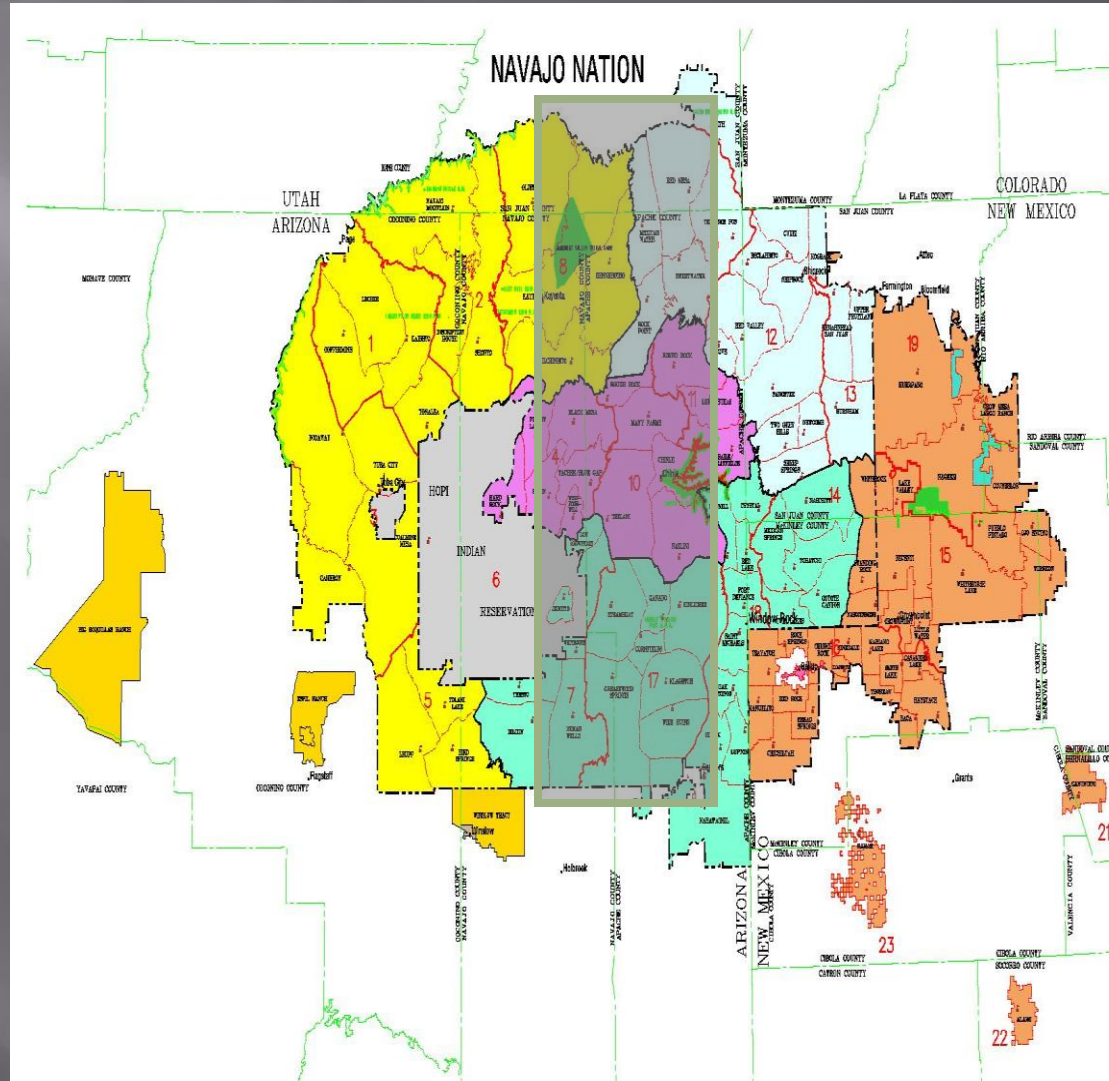
*Giardia*



*Cryptosporidium*

# Survey of Unregulated Drinking Water 2006-2007

- Targeted risk area for natural contaminants
- Surveyed 229 water sources
- Tested water from 199 sources
- All water samples tested for chemicals
- 188 (94%) samples tested for bacteria



# Bacterial Analysis

Total # of samples tested for bacteria	Samples positive for <i>E. coli</i>	Samples positive for total coliforms
188	40 (21%)	144 (77%)

- ▣ Results high compared to bacterial contamination seen in non-Navajo domestic wells
  - 11% *E. coli* and 41% total coliforms
- ▣ No relationship between bacterial contamination and well characteristics



# Arsenic and Uranium Analysis

TOTAL # SAMPLES = 199

EPA drinking water standards	N (%) sources exceeding standard	Maximum level
Arsenic $\geq$ 10ug/L	24 (12%)	Max = 190 ug/L
Uranium $\geq$ 30ug/L	9 (5%)	Max = 260 ug/L

# Survey of Unregulated Drinking Water

- ▣ Widespread bacteria found
- ▣ 24 wells (12%) exceeded the arsenic standard
- ▣ 9 (5%) exceeded the uranium standard
- ▣ High contamination in Red Mesa, Dennehotso, Ganado, Steamboat, Greasewood

To what extent does  
contamination of unregulated  
water sources impact human  
health?



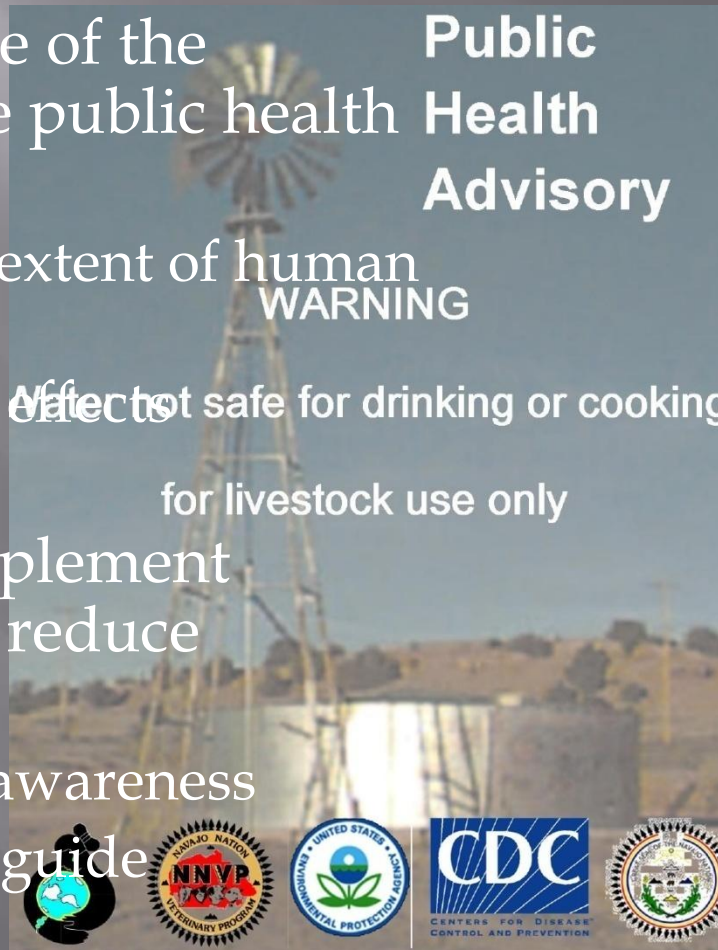
# Household Investigation of Drinking Water Exposures

- ▣ Target highest risk chapters
  - Red Mesa, Dennehotso, Steamboat, Greasewood, Ganado
- ▣ Assess human exposure to arsenic, uranium and bacteria in drinking water
- ▣ Collaboration Navajo EPA, Navajo Division of Health, Navajo Epidemiology Center, IHS, CDC



# Goals and Objectives

- ▣ Asses magnitude of the problem and the public health impact
  - Determine the extent of human exposure
  - Identify health effects
- ▣ Develop and implement interventions to reduce exposure
  - Initiate public awareness
  - Collect data to guide interventions
  - Collect data to justify resources



# Benefits to Communities

- ▣ Identify additional contaminated wells in the community
  - Public Awareness
  - Interventions to limit exposure
  
- ▣ Characterize barriers to safe water in community
  - Address those barriers and improve access to safe water





# US Standards (EPA)

## Water

Uranium – 30 ug/L, as of 2003

Gross alpha radioactivity – 15 pCi/L

Radium 226/228 – 5 pCi/L

## Air

Uranium 10 mrem/year

Total Radionuclides – 10 mrem/year

Radon (indoor) – 4 pCi/L



# **WATER FROM THIS WELL IS NOT SAFE TO DRINK**

This water has been tested and found to exceed Navajo EPA and U.S.EPA human drinking water standards for uranium or other contaminants.

Navajo Nation policy is that livestock-use-only wells are not to be used for human drinking water.

# Public Health Advisory

## WARNING

Water not safe for drinking or cooking  
for livestock use only





# Recommended Watering Points

