



# CO-DESIGNING OFF-GRID WATER SYSTEMS TO ADDRESS AMPLIFIED WATER INSECURITIES DURING A PANDEMIC

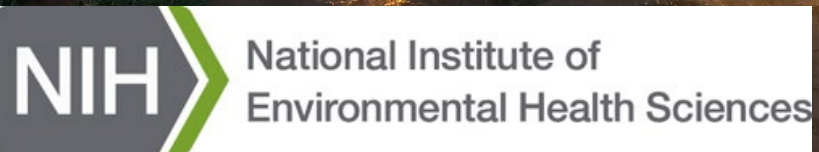


BY KARLETTA CHIEF

ASSOCIATE PROFESSOR & EXTENSION SPECIALIST

DIRECTOR OF INDIGENOUS RESILIENCE CENTER

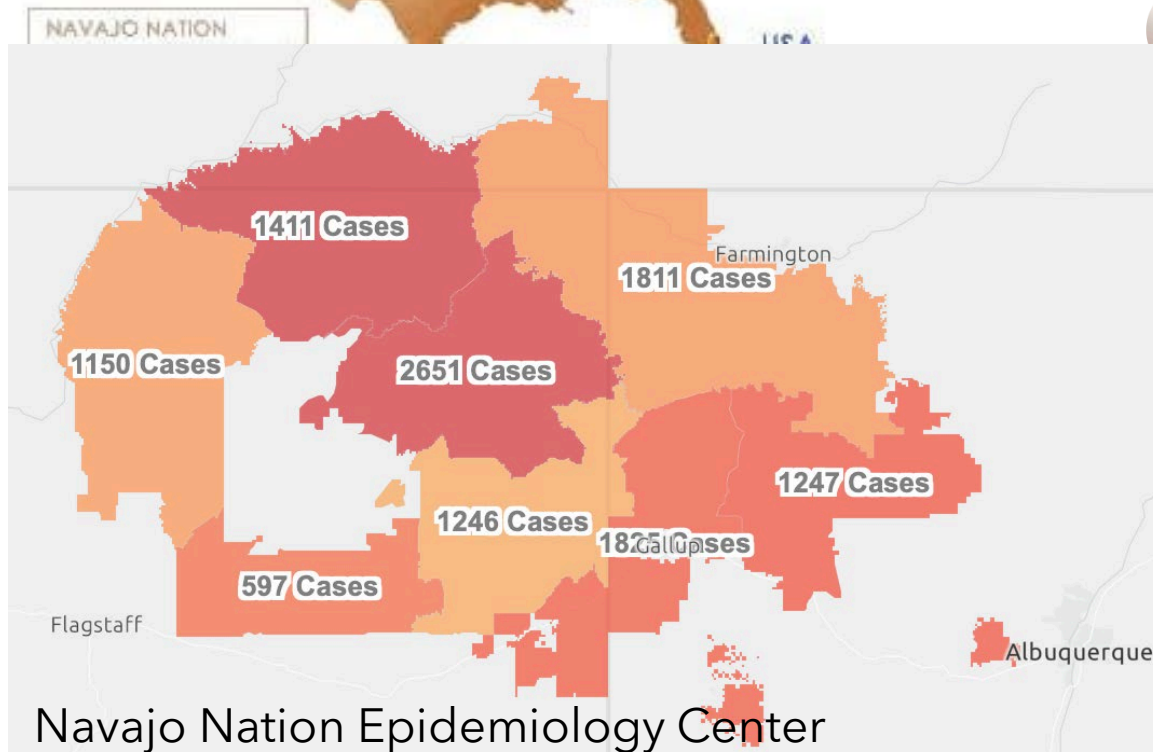
MARCH 1, 2022



Panel 3: Emerging Environmental Health Issues -  
Climate Change & Disasters

# COVID-19 RAMPANT ON NAVAJO NATION

CHALLENGE



POLITICS MAY 5, 2020

## Navajo Nation Is Behind Only New York and New Jersey in Rates of COVID-19 Infection. What Happened?

*"Tribes have been chronically neglected and underfunded for decades and decades."*



**DELILAH FRIEDLER**

Fellow  
[Bio](#)

Navajo Nation COVID-19 Cases

11,938

...includes positive cases, not including border-town cases.

9 cases are pending locations

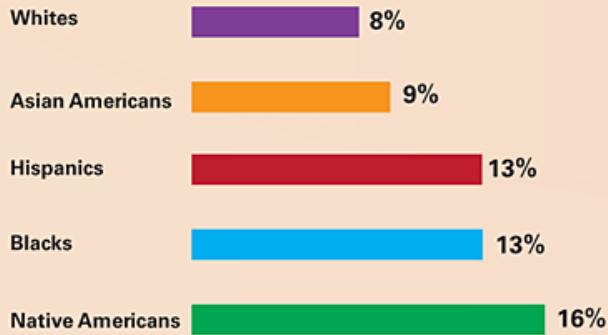
*(Data presented is for November 2, 2020)*

Navajo Nation Epidemiology Center

# CORMORBIDITIES & ENVIRON EXPOSURE

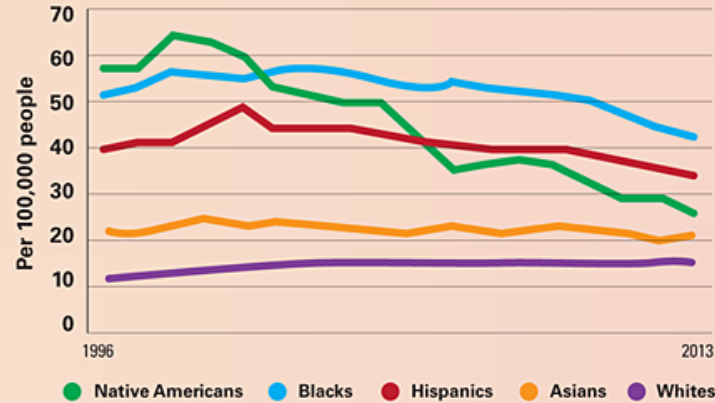
CHALLENGE

Native American adults have more diabetes than any other race or ethnicity.



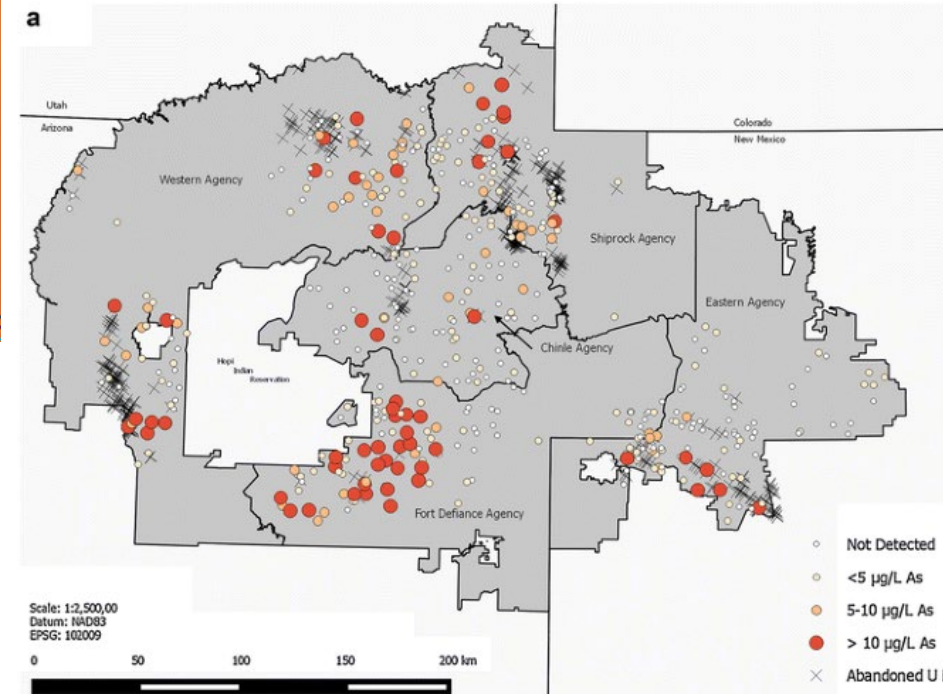
SOURCE: National Health Interview Survey and Indian Health Service, 2010-2012.

Kidney failure from diabetes in Native Americans has dropped more than any other race or ethnicity.



SOURCE: United States Renal Data System (USRDS), 1996-2013, adults 18 and older.

## Arsenic in unregulated water sources on Navajo Nation



## 500 abandoned uranium mines

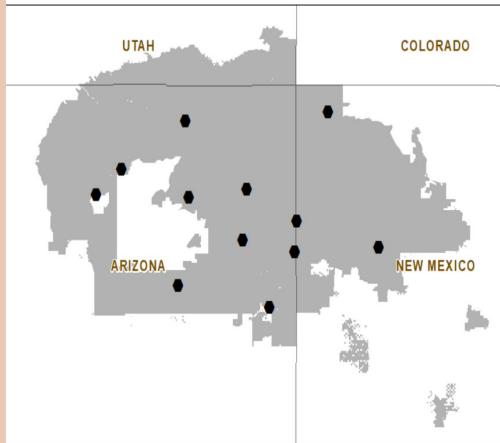


Hoover et al., 2016

# WATER INSECURITIES AMPLIFIED

The Navajo Nation is roughly the SIZE of Massachusetts, New Hampshire and Vermont COMBINED. In that area, there are just **13** grocery stores

Photo: ABC News  
**Navajo Nation a Food Desert.**



end Hoover, 2020

Cost of hauling water: **\$13.3/100 gal** (NNDWR, 2011) vs **\$0.40/100** in Flagstaff, AZ



Photo: Navajo Nation



**30% lack running water**  
**40% lack electricity**



Photo: ABC News

INEQUITIES

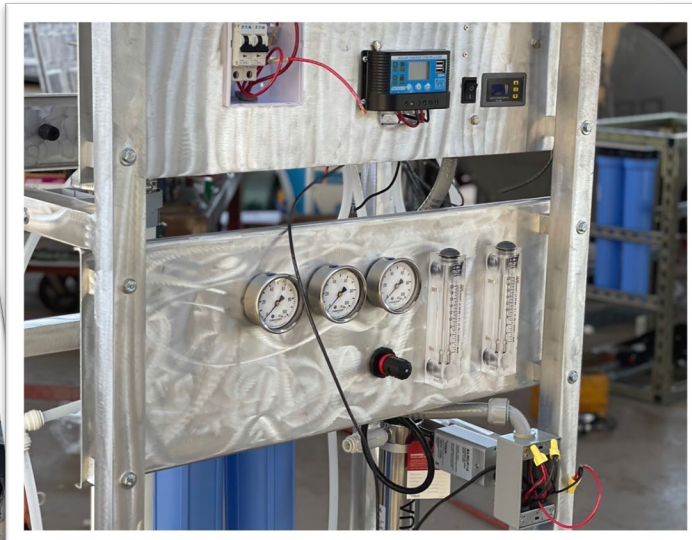
# CO-DESIGN OF LARGE WATER SYSTEMS -2018

IMPLEMENTATION SCI



# CO-DESIGN & TRAINING TO BUILD HOUSEHOLD WATER SYSTEMS - MAY 2021

IMPLEMENTATION SCI



# COMMUNITY ENGAGEMENT & IRB APPROVAL

RESEARCH APPROVAL



kpcc.org



Photo by Kern Collymore on 10/4/21



Photo by JWalker on 10/4/21



Photo by Tommie B... on 6/17/21

**RESOLUTION NO: 074-20-075**  
**SUPPORTING STUDY**

**WHEREAS:**

- The Navajo conferred
- The Navajo Nation
- The Navajo Nation has had one of the health messages...

**WHEREAS:**

- Pursuant to 26 N.N.C Section 3(A) the Dilkon Chapter of the Navajo Nation Government, as listed at 11N.N.C, part 1, Section 10, and review all matters affecting the community; and
- Dilkon Chapter is vested with the authority to make appropriate actions; and
- The Dilkon Chapter is requested to support a project "Assessing Navajo COVID-19 Risks and Increasing Indigenous Resilience;"
- The Dilkon Chapter is committed to supporting projects oriented toward increasing resilience through increased off-grid access to power;
- In May 2020, The Navajo Nation had one of the health messages...
- The Navajo Nation has had one of the health messages...

**THE NAVAJO NATION  
 THOREAU CHAPTER**  
 P.O. Box 899 Thoreau, New Mexico 87323  
 Office (505) 905-0139 Fax (505) 905-0140  
[thoreau@navajochapters.org](http://thoreau@navajochapters.org)

President of the Navajo Nation: Jonathan Nez  
 Vice President of the Navajo Nation: Myron Lizer

Awita Bonally - PRESIDENT • Herman Yellowhorse - VICE PRESIDENT • Judy K. Pistoro - SECRETARY / TREASURER  
 Vivinta Bennett - COMMUNITY SERVICE COORDINATOR • Olivia Anderson - ADMINISTRATIVE MAINTENANCE SPECIALIST • Robert Delgado - LANDBOARD • Edmund Yazzie - COUNCIL DELEGATE

**THOREAU CHAPTER  
 RESOLUTION TCH-074-20-075**

Supporting Arizona State University study assessing Navajo COVID-19 risk and increasing indigenous resilience.

**Approved by the Navajo IRB April 2021 (after 1 yr)**

# PERCEPTION OF WATER TECHNOLOGIES

## COMMUNITY INPUT

### **Example Questions:**

- What are your day-to-day challenges getting access to food-energy and water?
- What concerns do you have about the quality of food, energy and water?
- Do you think off-grid technologies would be helpful to increase access to food, energy and water during the COVID-19 pandemic?

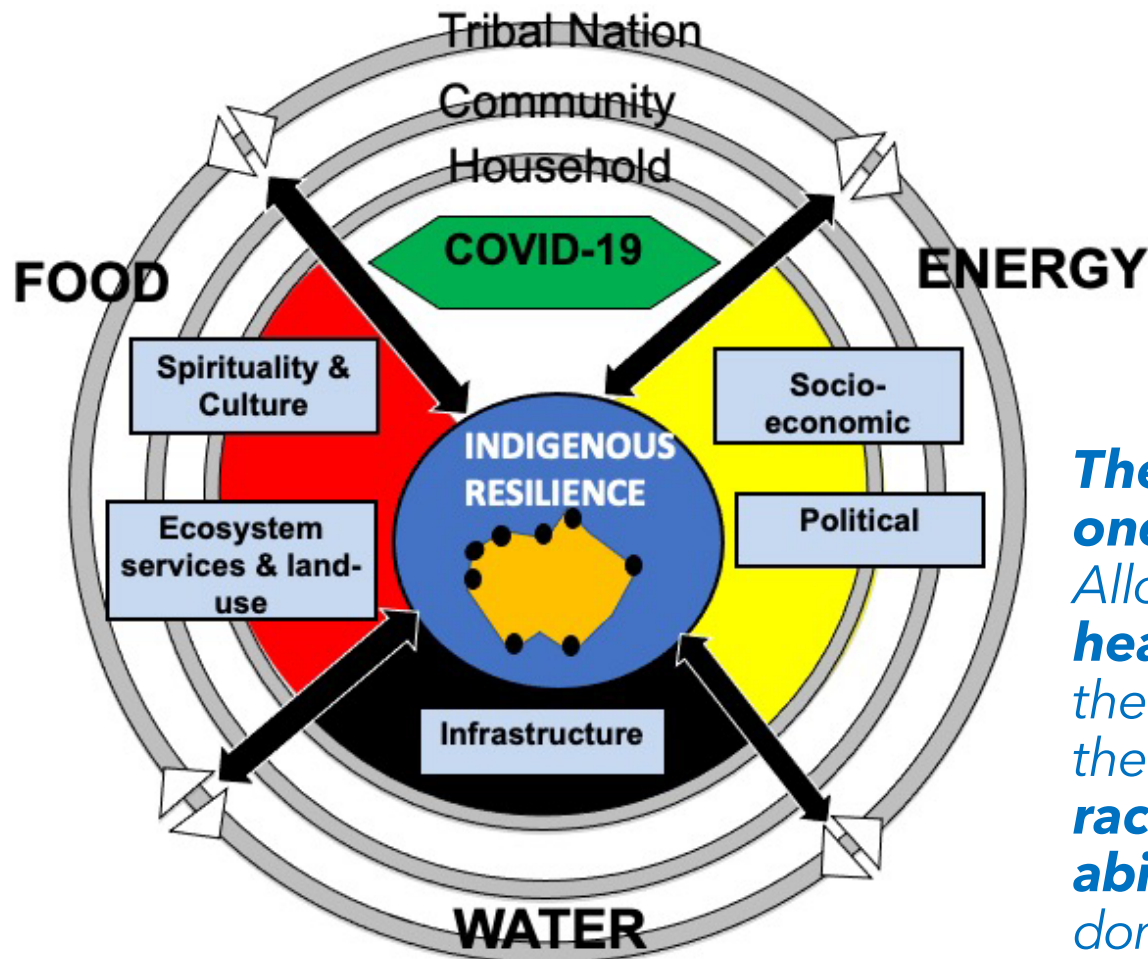
EMPOWERING COMMUNITIES FOR  
SUSTAINABLE FUTURES





# FRAMEWORKS FOR INDIGENOUS RESILIENCE

IMPLEMENTATION SCI



## LEGEND:



● Performance Level for Component



Resilience Indicator



Desired structure or function



Inadequate structure or function

*The ability to have a connection and belonging to one's land, family and culture, therefore an identity. Allowing pain and suffering caused from adversities to heal. Having a dreaming, where the past is brought to the present and the present and the past are taken into the future. A strong spirit that confronts and conquers racism and oppression, strengthening the spirit. The ability not just to survive but to thrive in today's dominant culture. Aboriginal scholar and educator Marion Kickett, 2011*



Source: "Lifeline - Sqilxw Resilience" was raised at Highway 3 and Cawston Avenue on July 1, 2019. (submitted).  
<https://www.pentictonwesternnews.com/news/indigenous-mural-raised-on-in-the-okanagan-on-canada-day-were-still-here/>