



# How citizen science and crowdsourced data aid in drought early warning

---

Joel Lisonbee

WERA 1012 17 May 2022



# What Is NIDIS?

---



- First authorized by Congress in 2006; reauthorized in 2014 and 2018.
- Interagency mandate to develop and provide a **national drought early warning information system**
- Enable the Nation to move **from a reactive to a more proactive** approach to managing drought risks and impacts
- Authorizes NIDIS to **engage in partnerships** with federal, state, tribal, and local partners, as well as the private sector, academic institutions, and citizen scientists

## NIDIS DROUGHT + Citizen Science

Public Law No: 115-423 (01/07/2019)

National Integrated Drought Information System Reauthorization Act of 2018

“NIDIS may

- engage with the private sector to improve drought monitoring, forecast, and communication if the National Oceanic and Atmospheric Administration (NOAA) determines such partnership is appropriate, cost-effective, and beneficial to the public and certain decision-makers;
- facilitate the development of academic cooperative partnerships to assist with NIDIS functions; and
- utilize and support monitoring by citizen scientists, including by developing best practices to facilitate maximum integration of data.”



# How can NIDIS utilize and expand the reach of crowdsourced data?

1

## Convening and Coordination

Partnerships, consultations, networks, workshops, etc.



2

## Delivering Information

Drought.gov, condition monitoring, communications, etc.



3

## Advancing and Integrating Research Into Action

Applied research, product development, assessments



Interagency collaboration and partnerships are key to all we do!

# How can NIDIS utilize and expand the reach of crowdsourced data?

1

## Convening and Coordination

Partnerships, consultations, networks, workshops, etc.



How?

Partner with regional  
Drought Early Warning  
Systems to collaborate  
upcoming on meetings  
or projects.



# How can NIDIS utilize and expand the reach of crowdsourced data?

**How?** { Ask us to help spread the word about anything you are working on. }

2

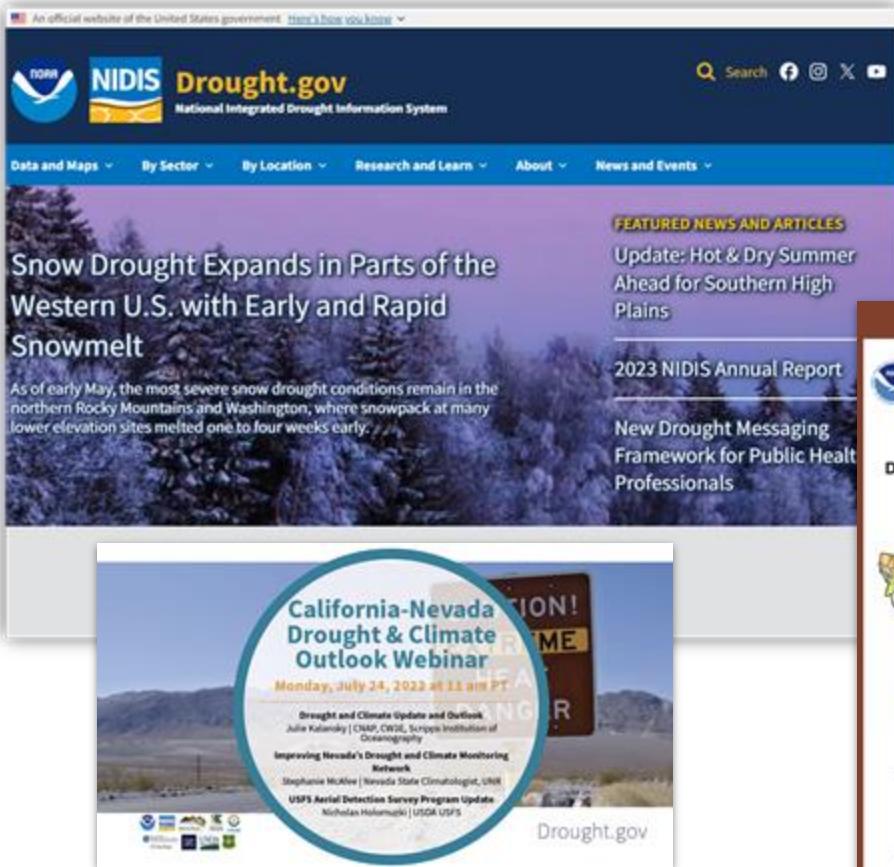
## Delivering Information

Drought.gov, condition monitoring, communications, etc.



@NOAADrought

# Delivering Information



An official website of the United States government. Here's how you know.

**NIDIS** Drought.gov  
National Integrated Drought Information System

**Data and Maps** **By Sector** **By Location** **Research and Learn** **About** **News and Events**

**FEATURED NEWS AND ARTICLES**

Update: Hot & Dry Summer Ahead for Southern High Plains

2023 NIDIS Annual Report

New Drought Messaging Framework for Public Health Professionals

California-Nevada Drought & Climate Outlook Webinar

Monday, July 24, 2023 at 11 am PT

Drought and Climate Update and Outlook  
Julie Katesky | OSU, CIRES, Colorado Institute of Geophysics

Improving Nevada's Drought and Climate Monitoring Network  
Stephanie McAfee | Nevada State Climatologist, UNR

USFS Aerial Detection Survey Program Update  
Nicholas Holomka | USDA USFS

Drought.gov

Sign up for NIDIS emails here:



21.5K Email subscribers

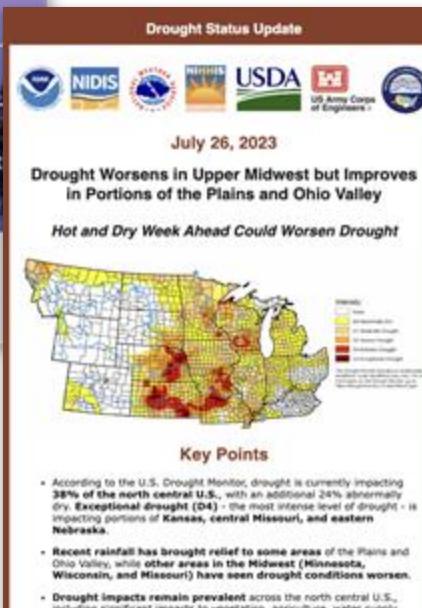
@NOAADrought

X 14.2K Twitter Followers

f 3.6K Facebook Followers

1.1K YouTube Subscribers

320 Instagram Followers



Drought Status Update

NIDIS NOAA NHC USDA US Army Corps of Engineers

July 26, 2023

Drought Worsens in Upper Midwest but Improves in Portions of the Plains and Ohio Valley

Hot and Dry Week Ahead Could Worsen Drought

Key Points

- According to the U.S. Drought Monitor, drought is currently impacting 38% of the north central U.S., with an additional 24% abnormally dry. **Exceptional drought (D4)** - the most intense level of drought - is impacting portions of Kansas, central Missouri, and eastern Nebraska.
- Recent rainfall has brought relief to some areas of the Plains and Ohio Valley, while other areas in the Midwest (Minnesota, Wisconsin, and Missouri) have seen drought conditions worsen.
- Drought impacts remain prevalent across the north central U.S., including significant impacts to vegetation, agriculture, water supply, and more.

# How can NIDIS utilize and expand the reach of crowdsourced data?

How? { Learn from ***business*** how they work to meet their customers' needs. }

## *Operational-informed research*

3

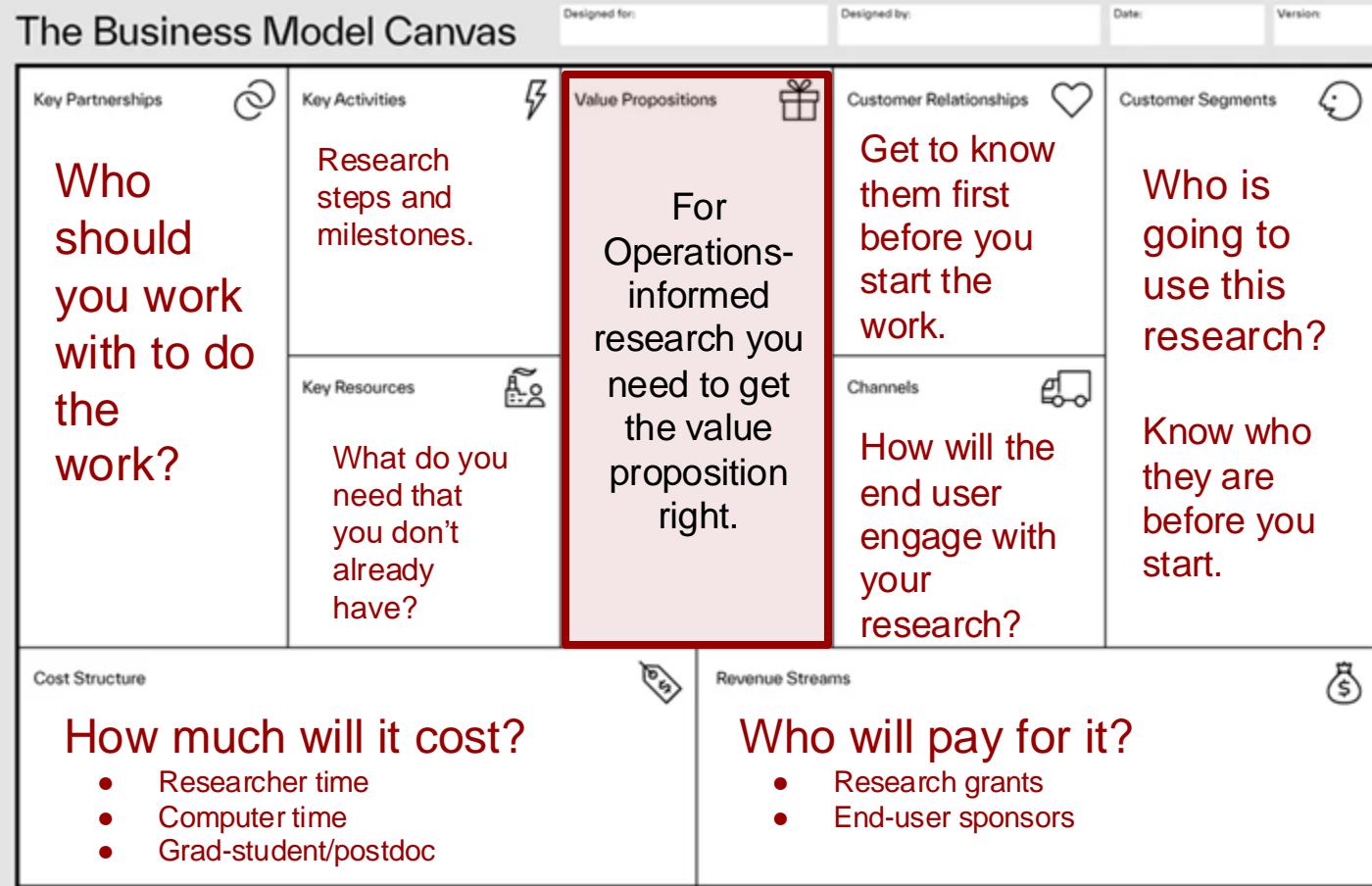
**Advancing and Integrating Research Into Action**  
Applied research, product development, assessments



# Do you have a research idea?

To this point, these are also key components of a good applied research proposal.

## The Business Model Canvas



# Value Proposition

## Why would anyone apply your research?

### The Value Proposition Canvas

Value Proposition:

Title of the research proposal

Customer Segment:

Who is the customer or customer group (stakeholder/end-user)?

Be specific.

How will your project help your customer succeed?  
Be specific.  
Be exhaustive



What are the tangible takeaways of your project. Much more than a research paper...this is anything that could lead to a behavior change: datasets, tools, apps, programs or other products or services your project can provide.



How will your project eliminate or reduce/minimize the customer's pain points?  
Be specific.  
Be exhaustive



What are the customer's measures of success? How do they know they've done their jobs well?



The tasks your customer does when they show up to work everyday.



What makes their jobs hard? Expensive? Dangerous? Inefficient? Annoying?

# Value Proposition

Why would anyone apply your research?

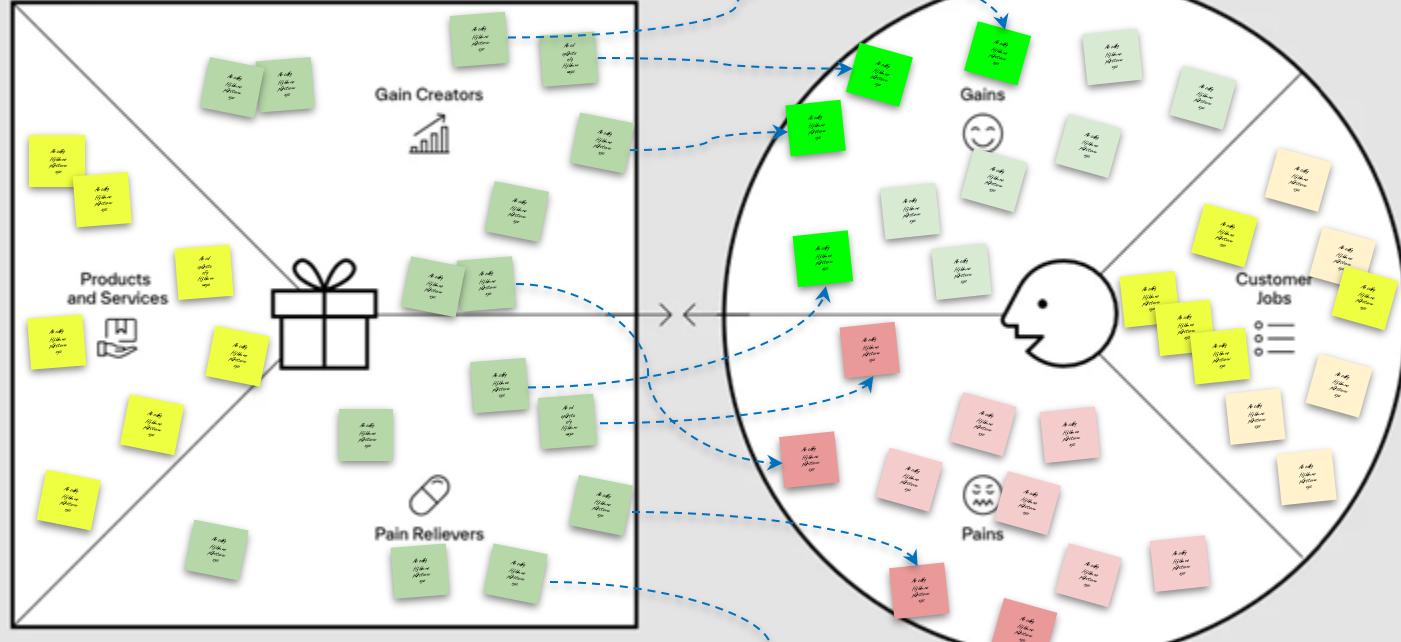
## The Value Proposition Canvas

Value Proposition:

Research project to provide climate analysis of CoCoRaHS data

Customer Segment:

State Climatologist for the Great State of Franklin



# NOAA Service delivery model



Why do you do what you do?  
(As an organization or individual)

How do you do your job?

What do you do when you show up to work everyday?  
Can I come and see what you do?

What makes your job hard?

How do you know if/when you are doing your job well?



# Ask **WHY** at least 5 times

The goal is to really drill down to the fundamental core of the problem you are trying to solve.

1. **Why** aren't new observations, such as CoCoRaHS being included as initial conditions to initialize weather models?
  - a. Some models require data that is a specific format, quality controlled, and the uncertainty is known. There may also be some other roadblocks with current data infrastructure that you'd need to navigate and there would need to be buy in from the modeling community.
1. **Why** would there be pushback from the modeling community?
  - a. They are skeptical of the quality and reliability of CoCoRaHS Data
1. **Why** does crowdsourced engender skepticism when compared to traditional observations?
  - a. Because crowdsourced data can be prone to errors, e.g site selection, gauge reading, reporting
1. **Why** do we assume that crowdsourced data is more error prone than traditional observations?
  - a. Because quality assurance protocols cannot be implemented at scale like with MesoNet sites, for example
1. **Why** can't post-observation quality control algorithms automatically flag observations that may have lacked pre-observation quality assurance, or that are different from what's expected.
  - a. Post-observation processing could provide that level of control, but the algorithm hasn't been written yet. ML/AI would probably do this really well. But even the, you would need to be able to demonstrate statistically that the data is of the same calibre as traditional observations.
1. **What if...**



# NOAA Funding for Drought Research



## Competitive Research Opportunities

### Coping with Drought Research Competition

**60+** *Projects since 2007*

**\$9M** *Funding provided for FY20 & FY22*

**FY22** *Tribal Resilience & Ecological Drought*

*Next competitive research opportunity in **FY25***

### Regional and State Research Projects

Support **co-production of applied research** to address stakeholder needs.

### Modeling, Analysis, Predictions, and Projections (MAPP) Program

**50+** *Drought projects since 2011*

*For every **\$1** of NIDIS funds, MAPP funds an add'l **\$1.55** in research advancing NIDIS goals*

---

**RESEARCH to ACTION**

---

# Take home messages:

- **NIDIS** can utilize and expand the reach of crowdsourced data in the following ways:
  - Convening potential users for your projects.
  - Delivering information through:
    - Drought.gov, emails, newsletters, etc.
    - Promoting already-complete low-flow, or other drought-related projects
  - Advancing and Integrating Research Into Action
- **NIDIS** support for citizen science efforts, such as CoCoRaHS, requires...
  - A clear, and very strong research proposal focusing on applied drought science
  - Identified impact and value
  - Ties to the NIDIS or Regional DEWS Strategic Plans or Public Law.

# Thank You

Joel Lisonbee

[joel.lisonbee@noaa.gov](mailto:joel.lisonbee@noaa.gov)

X @Joel\_Lisonbee

For more information, email  
[nidis.program@noaa.gov](mailto:nidis.program@noaa.gov)



[www.drought.gov](http://www.drought.gov)



@NOAADrought

The U.S. Drought  
Portal



[Drought.gov](http://www.drought.gov)

Sign up for Drought  
Information



[www.drought.gov/drought-alerts/signup](http://www.drought.gov/drought-alerts/signup)

ACF Watershed  
Drought Dashbo



[www.drought.gov/watersheds/acf-dash](http://www.drought.gov/watersheds/acf-dash)

Business Model  
Canvas



[www.strategyzer.com/library/the-business-model-canvas](http://www.strategyzer.com/library/the-business-model-canvas)

Value Proposition  
Canvas



[www.strategyzer.com/library/the-value-proposition-canvas](http://www.strategyzer.com/library/the-value-proposition-canvas)

Simon Sinek's  
Ted talk



[www.ted.com/talks/simon\\_sinek\\_how-leaders-inspire-action?language=en](http://www.ted.com/talks/simon_sinek_how-leaders-inspire-action?language=en)

