Midwest Drought Early Warning System (DEWS) Partner Meeting/
Drought and Human Health Workshop
November 19-21, 2019
St. Paul, MN
Dick Ehrman

I attended the DEWS partner meeting and a workshop on the human health effects of drought at the beautiful Science Museum of Minnesota in St. Paul. A bulleted summary of the conference follows:

States represented: NE, MN, WI, IL, KY, MO, IN, IA, OH as well as two tribes from MN & WI as well as the province of Albert, Canada. NOTE: DEWS is an effort of the National Oceanic & Atmospheric Administration (NOAA) as well as the National Drought Mitigation Center (NDMC; housed here at UNL) and some other entities. Technically, Nebraska is part of the Missouri Basin DEWS which extends all the way to the headwaters of the Missouri River in Montana. However, since LPSNRD is more climatically similar to the Midwestern states (e.g. MN, IA, etc.), the agenda for this meeting seemed more appropriate.

Tue., Nov. 19, 2019—Midwest DEWS Partner Meeting

Molly Woloszyn, NOAA/National Integrated Drought Information System (NIDIS)

- Welcome & overview of the meeting
- There are 9 DEWS regions in the U.S.; the Midwest has been active since 2016
- A helpful overview of some tools for predicting/managing drought, especially the National Soil Monitoring Network (NSMN) and Environmental Drought Demand Index (EDDI), which gave about a 2-week lead prediction of the 2012 “flash drought”
- Overview of the Mississippi/Ohio Rivers drought study

Doug Kluck, NOAA National Centers for Environmental Information (NCEI)

- Focused mainly on capacity building efforts for states and tribes in the Midwest DEWS

Chip Zimmer, KY Dept. of Water

- KY has a real-time lake monitoring network focused on water supply lakes and Dept. of Homeland Security priority dams
- This network is focused on dam safety & water supply (water supply not significant for LPSNRD but the safety issue could be of interest)
- Each sensor setup is about $1000-1500 and there are about 50 locations statewide

Bob Smail, WI Dept. of Natural Resources

- This was an interesting overview of WI’s ground water level monitoring network and how they’re using it to predict/respond to drought and water shortage
- They’ve gone to a 60 month moving mean with a cumulative deviation (wonky statistical stuff but I need to dig into it a bit more to see if it’s a technique LPSNRD can use)
- He ended with a really cool time lapse map showing deviations of water levels over the past few decades!

Mike Wilson, USDA-NRCS

- Focused on improved soil & climate data for ag/forestry management on tribal lands
- TSCAN—Tribal Soil Climate Analysis Network—integrated systems of instruments and measurements to forward the program goals
- There are 23 of these deployed nationwide

Ann Bannitt, US Army Corps of Engineers

- This was a very good presentation on USACE's measurements of coastal climate change and how they're adapting to changing inland climate hydrology
- This mostly revolves around support from the US Army, particularly as far as reservoir impacts and building a state of the art system for climate information
- Her closing points were REALLY important when thinking about project resiliency:
    - It's WHEN, not IF you'll have to deal with drought and climate change
    - Think LONG term (not just the next year or two)
    - Give a lot of thought to setting trigger points for actions, and the economic impacts of those triggers and actions
    - Seems like good advice to me!!!

Stu Foster, KY Climate Center

- Stu gave a good overview of KY's new website for climatic data (not quite online yet but one of the interesting features is a series of photos from around the state updated every half-hour!)

Manuela Johnson, IN Dept. of Homeland Security

- A description of how IN is adding info to the US Drought Monitor; not particularly pertinent but interesting
- One thing I did learn—IN is the leading duck producer in the US!

Dennis Todey, USDA Midwest Climate Hub

- An overview of the relationship between the various USDA farm programs and drought management; this will be a helpful resource next time farmers are dealing with drought in LPSNRD

Cody Knutson, National Drought Mitigation Center (NDMC)

- Cody is a Nebraska native who now works for the NDMC from Rapid City, SD
- He focused on some examples of statewide drought planning in the west
- CO was used as an example of how they've proceeded from a very basic drought plan in 1981 to a very comprehensive plan today (given population growth, it's essential)
- NM was sort of the opposite—they started off TOO complex w/ too many triggers in the early 2000s but have simplified their plan in 2018
- Three "pillars" of drought management
    - Early warning
    - Impact/vulnerability assessment
    - Mitigation/response
    - NDMC's website has exercises & scenarios to help with this planning

Jennifer Hoggatt, MO Dept. of Natural Resources

- An overview MO's use of drought planning in responding to 2018 drought (seems to be a "flash" drought similar to what LPSNRD experienced in 2012)
- This was a very targeted drought, affecting about 98% of MO
- Plan & response focused on small communities and forage operations

Kelly Smith, National Drought Mitigation Center (NDMC)

- Wrapped up the first day of presentations by overviewing the many definitions of "drought"
- NDMC is continuing its improvement/refinement for reporting droughts (both from professionals and the general public)
- Overview of the step-wise process for reporting drought effects on the NDMC website

Wed., Nov. 20, 2019:

Aaron Wilson, State Climate Office of OH and Trent Ford, Illinois State Climate Office

- Unfortunately, I was on a conference call for most of Aaron and Trent's presentation but I did visit briefly with them—their research focuses on exploring the rapid transitions between hydrological extremes in the Midwest
- This is pretty important stuff given that the Midwest may not be getting a whole lot "drier" on average, but the precipitation we do get seems to be coming in greater bursts with drier periods in between

Sector Perspective Panel:

Agriculture: Virgil Schmitt, IA State Extension

- Virgil is an Extension agent as well as a farmer along the Mississippi River; he gave a great overview of the problems he's had with flooding in the past year

Ecosystems: Leslie Brandt, USDA Forest Service

- This focused on USDA's forest management efforts in Michigan and the Great Lakes area—interesting stuff but not particularly applicable to LPSNRD

Navigation: Lee Nelson, Upper River Services LLC

- Again, not particularly pertinent, but Lee gave a FASCINATING overview of how the navigation service sector manages drought and flooding along the Mississippi between St. Paul and St. Louis. I never realized how complex this system is!

The remainder of the conference consisted of facilitated breakout groups where we circulated between various subject experts and brainstormed on topics of interest. I was busy talking and didn't take very careful notes, but this was still extremely valuable as I made a number of valuable contacts from Nebraska and the other states. This also set the stage for the Drought and Human Health Workshop which started after lunch.

Midwest Drought and Human Health Workshop

Dr. Jesse Bell, University of Nebraska Medical Center

- A really good historical perspective of the health effects of drought from prehistory to modern times
- A statement to remember: **"Floods kill people, but droughts destroy civilizations."**
- From 1900-2013, about 60% of disaster deaths in the US can be traced to drought
- Since 1980--$241 billion/about 3000 deaths related to drought
- Evaluating vulnerability to drought:
    - Exposure
    - Sensitivity
    - Adaptive capacity
- UNMC and others are working on the connections between drought and suicides in the ag sector

Dr. Luigi Romolo, MN State Climatologist

- A recap of the factors influencing "drought" (more than 150 different definitions!)
- Disaster vs. hazard—drought is a disaster, while the socioeconomic impact is the hazard
- Droughts sometime get overlooked—tropical storms average $22.3 billion in damages per event, while drought is about $9.6 billion per event
- Take home message—the THREAT of drought never really goes away!

Dr. Tesfaye Bayleyegn, Center for Disease Control and Prevention (CDC)

- A description of CASPER (Community Assessments for Public Health Emergency Response)—a household survey similar to census surveys but aimed at health issues
- CASPERs are done in clusters—typically 30 clusters of 7 households each
- CASPER was used for drought health evaluation in CA in 2016 and OR in 2017

The remainder of the day was another facilitated discussion (by Keith Hansen & Rachel Lookadoo, UNMC) on prioritizing response actions and public perceptions of drought.

Thur., Nov. 21, 2019

Dr. Jesse Berman, University of Minnesota School of Public Health

- Jesse was one of the founders of drought and health research going back to about 2012
- Drought pathways to risk assessment are very complicated—what is the disease(s) of interes; slow onset; multiple drought indices; broad geographic exposure; and drought can co-occur with other disasters
- Example: West Nile virus can WORSEN during drought: Drought shrinks waterbodies and forces waterfowl into small areas where mosquitoes spread the disease; drought ends and birds disperse, so the disease spreads
- Critical factors to evaluation:
    - Severity
    - Spatial extent
    - Timeframe
- Jesse is beginning research into drought health effects on Midwest farmers (NE included)

Dr. Shubhayu Saha, Center for Disease Control and Prevention

- CDC has been promoting Climate Ready States & Cities since 2010
- This has involved BRACE—Building Resilience Against Climate Effects, which is a 5-step process for identifying, dealing with, and evaluating health effects
- This will plug into the 4th National Climate Assessment which comes out soon
- Overview of the CDC National Health Tracking portal, in which various entities can report and evaluate health effects

Dr. Brenda Hoppe, Minnesota Dept. of Health

- A fascinating description of MN's climate response by region; 2 of MN's 7 regions used recent drought as example exercises
- "Climate migrants" are increasing as drought expands in Central America and East Africa
- About ¾ million people were internally displaced (within their own country) by drought in 2018
- World Bank estimates that 140-200 million people will be displaced by climate change by 2050; for comparison, this is approximately the entire population of Russia!
- In 2018, about 1.2 million Americans were internally displaced by drought, flooding, fire, etc.—this is 4th in the world!
- MN is welcoming climate migrants in part to offset slowing labor force growth

Emily Wilmes, University of Minnesota Extension

- Focusing on mental health issues in the ag sector
- Health is a 3-legged stool: physical health, emotional/social health, and mental health
- Farmer stressors: debt, long hours, weather, isolation, government regulations, etc.
- A recent MN survey showed that 90% of ag responders say they are affected by occupational stress

Marc Pritchard, Moorhead Public Service

- Moorhead MN has a population of about 48,000; water supply is 80% surface and 20% ground water
- 2018 average use 4.52 million gallons/day but well capacity is about 5.5 MGD
- They're using surface water as primary source and mainly preserving ground water as a drought supply
- Overview of public health issues—concentration of pollutants, decreased supplies, algal blooms, invasive species, etc.
- Doing modeling to evaluate risks; if they need a new wellfield estimated cost is $22 million!

Dr. Linda Black Elk, Mille Lacs Band of Ojibwe

- This was a fascinating overview of how traditional healing techniques using native plants are being integrated into more traditional western medicine
- Plants and animals used by Plains tribes are moving north or disappearing due to climate change
- Indigenous societies are very resilient to drought as they can adapt, but plant and animal species may not be able to do so

Betsy Lawton & Jill Krueger, Network for Public Health Law

- Overview of 2018 Farm Bill and conservation programs
- MN Supreme Court is review ground water/surface water interaction cases!
- Description of various actions regarding the Great Lakes Compact

- A discussion of the Safe Drinking Water Act and Clean Water Act especially relative to drought and private wells; NRDs are already dealing with this

The conference ended with another facilitated discussion where we wrapped up our prioritizations and descriptions of public health concerns.

All in all, I have to say that this was absolutely one of the BEST conferences I've attended—ever. I would strongly recommend that anyone with responsibilities in drought planning and management attend DEWS meetings whenever possible (since they're NOAA sponsored, conference registration is free!!). I made a wealth of new contacts which will be very useful as LPSNRD moves forward with its IMP and related drought contingency planning. Thanks very much for the opportunity to attend!