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DroughtScape- Summer 2014

Kelly Smith

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DROUGHTSCAPE

The Newsletter of the National Drought Mitigation Center

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DIRECTOR'S REPORT



Michael J. Hayes

This issue of DroughtScape features a collection of drought-related activities taking place around the world. Highlights include an

update on the International Drought Management Programme (IDMP) being led by WMO and the Global Water Partnership, and on the workshops taking place in multiple regions on developing national drought policies. The NDMC is also involved in multiple international projects and has continued to host a variety of international scientists here in Lincoln.

I just returned from spending three weeks with colleagues at Mendel University in Brno, Czech Republic, where I also spent 10 weeks last year. It is particularly exciting to see the advancements of the drought monitoring system being established in that country (online at <http://www.intersucho.cz/en/>). The weekly updates illustrating the current drought situation for the Czech Republic occur on Mondays. The country's experience of dryness and

drought during the 2013-14 winter, and into the 2014 spring and summer months, has provided the "InterDrought" team with tremendous visibility, particularly among farmers' associations and the media. It reminds me of the U.S. Drought Monitor in its early stages. The Czech team is also attempting to collect related agricultural impacts via feedback on an 11-question form.

The Czech InterDrought team also hosted a multiple-day "Summer School" for young Czech scientists that brought in some of the top scientists from around Europe and the United States investigating drought and climate change issues. It was a tremendous honor for me to be an invited presenter during the summer school and to listen to the other invited scientists' various perspectives and research topics. I marvel at the opportunity presented to the young Czech scientists during this project, with two additional "schools" planned: one next February specifically on drought monitoring and one during the early summer next year.

About the photo

The photo at the top of the page, by Terry Lucas, shows tumbleweed against a fence on the Carrizo Plain, in San Luis Obispo County, California, on May 3, 2014. That area has been in exceptional drought, D4 on the U.S. Drought Monitor, since Feb. 4, 2014.

Second-quarter drought and climate summary:

By Brian Fuchs, Climatologist,
National Drought Mitigation Center

Drought classifications are based on the U.S. Drought Monitor. Details on the extent and severity of drought are online at <http://droughtmonitor.unl.edu/archive.html>. The outlook integrates existing conditions with forecasts from the National Oceanic and Atmospheric Administration's Climate Prediction Center: <http://www.cpc.ncep.noaa.gov/>

Drought Summary

Drought conditions improved overall during the second quarter of the year. By July 1, 34.01 percent of the country was in drought, compared to 38.37 percent at the beginning of April. Even though the total area in drought got smaller, drought intensified. The categories of severe, extreme, and exceptional drought all worsened during the period, with extreme drought conditions showing the largest increase, from 9.80 to 11.98 percent.

Temperatures

Temperatures during the April-May-June period were quite variable over the United States. The north-

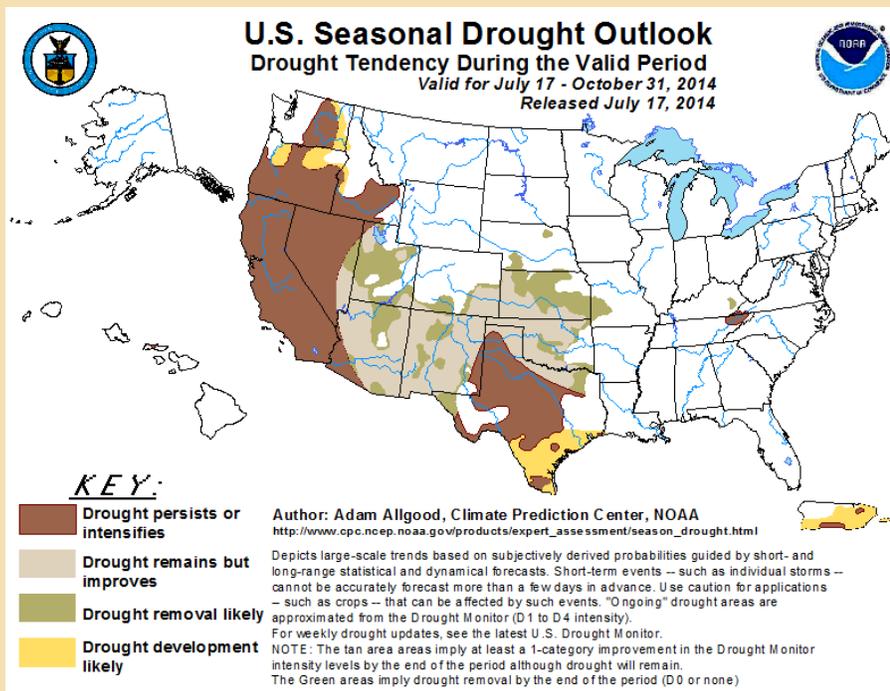
ern Rocky Mountains, northern Plains, and upper Midwest were all cooler than normal, often by 2-4 degrees Fahrenheit. Another area with temperatures 1-3 degrees below normal was in east Texas and the lower Mississippi Valley. Most other locations were normal or slightly warmer than normal during the period. The warmest temperatures, 2-5 degrees above normal, were in the Mid-Atlantic and in California.

Precipitation

Many regions experienced a wet quarter, especially those areas east of the Continental Divide. The upper Midwest and Gulf Coast regions were the wettest, with some areas recording 8-16 inches of precipitation above normal for the quarter. Many locations in the central Plains and Midwest were very wet in June, which offset the dryness from earlier in the year. Almost all areas east of the Missouri River were above normal for the period as well. However, portions of north Texas, eastern Oklahoma, and southwest Missouri were dry, as much as 4 inches below normal for the period. Almost all other locations in the western United States were normal to slightly below normal for the quarter.

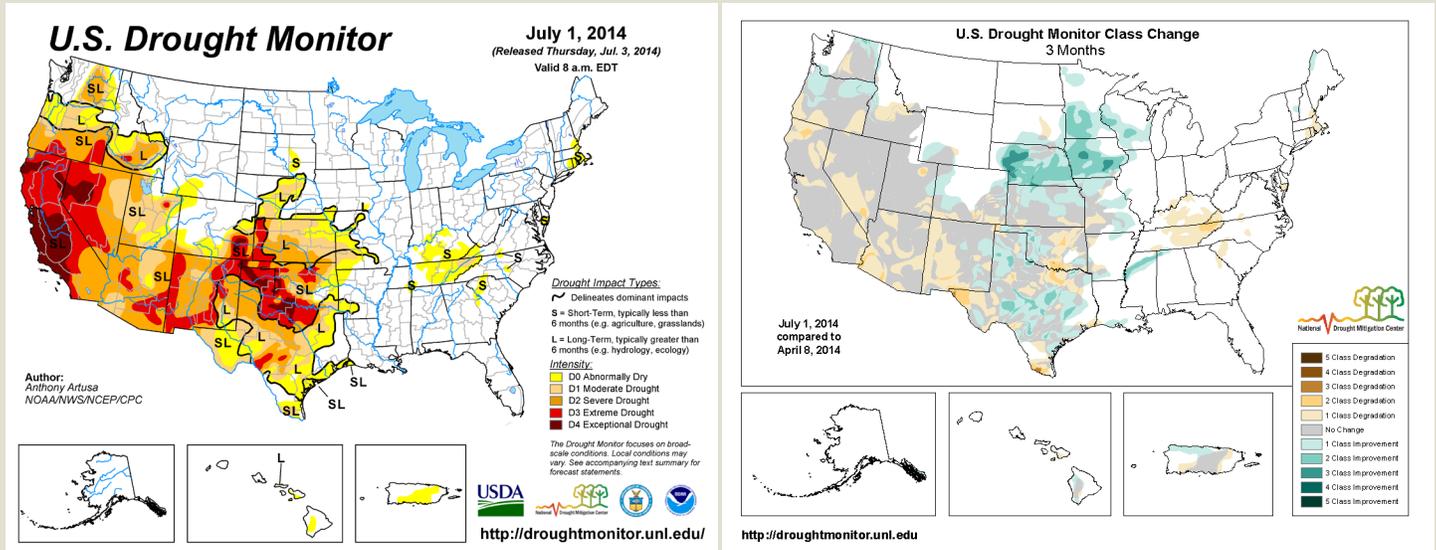
For a detailed review of monthly drought and climate conditions, please refer to the NDMC's monthly Drought and Impact Summaries, <http://drought.unl.edu/NewsOutreach/MonthlySummary.aspx>

Outlook: Dry in the West and in Texas

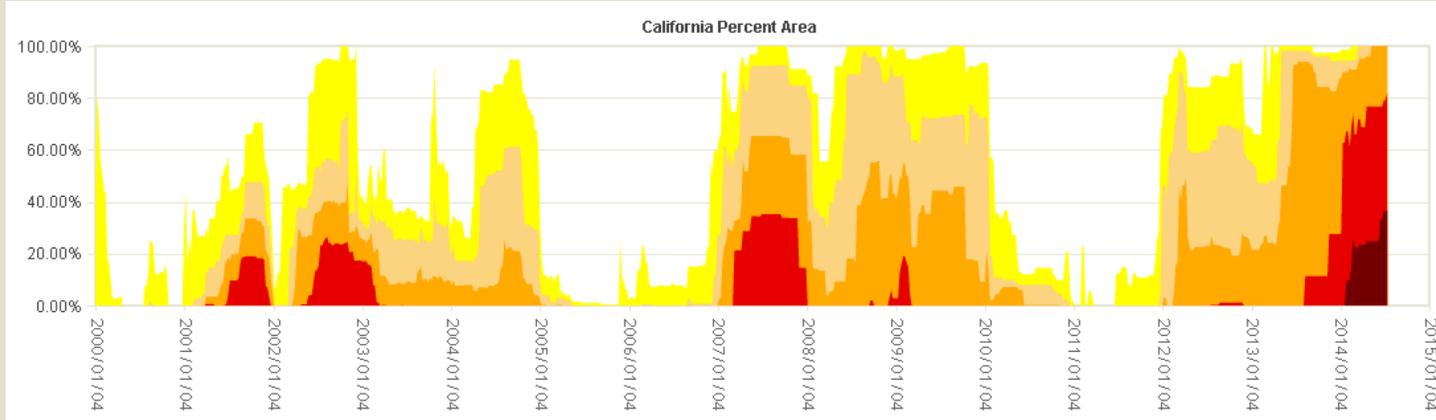


Outlook: The U.S. Seasonal Drought Outlook through the end of October shows drought improving from the Southwest into the central Plains. The western United States drought will persist because the dry season lasts until October. The outlook shows drought remaining in Texas and possibly developing in the southern portions of the state.

Drought shrinks in Plains but intensifies in West



As of July 1, 34.01 percent of the contiguous United States was in moderate drought or worse, a net decline in drought coverage for the quarter (top left). Most of the improvement was in the central United States, while the West got drier (top right). The time series below shows California drought coverage from 2000. Exceptional drought first appeared there in January 2014.



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Second quarter impacts summary: Drought across West

By Denise Gutzmer, Drought Impact Specialist, NDMC

The NDMC added 374 impacts to the Drought Impact Reporter as drought intensified in California and receded in the central U.S. during the second quarter of 2014. Most of the impacts documented ongoing concerns in California about water supplies as reservoirs, rivers and streams ran lower, groundwater levels fell and water quality declined. Years of drought have drained Texas' and New Mexico's water supplies, and while some rain has begun to refill reservoirs, much more was needed. Many small communities were carefully monitoring water supplies. Parts of Oregon, too, were facing a water shortage with orders for reductions in pumping to allow senior water rights holders to get their share.

Food prices

Beef

The price of beef increased dramatically in the spring, hitting a new high of \$5.48 per pound in April 2014. Beef prices set new records as the nation's cattle herd slid to its smallest in 63 years.

"Beef prices hit all-time high in U.S.," by David Pierson and Tiffany Hsu, *Los Angeles Times*, April 8, 2014.

Meat Price Spreads, from USDA's Economic Research Service, updated June 17, 2014

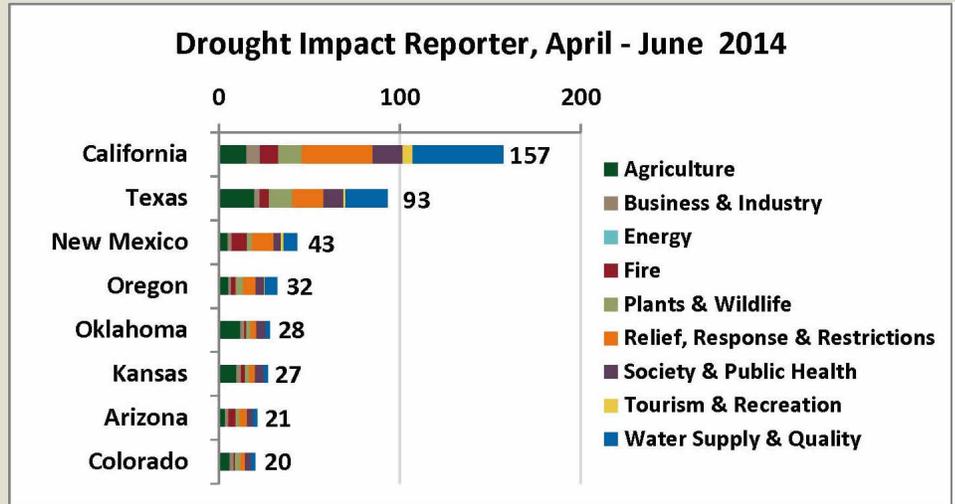
Produce

Fresh produce prices have not yet risen in response to drought in California as expected, according to the USDA.

Food Price Outlook, Economic Research Service, June 25, 2014

Winter wheat

Expectations for the winter wheat crop dimmed through the spring as freezing temperatures contributed to damage from a dry,



This chart color-codes drought impacts by category for the eight states with the most impacts in the second quarter of 2014.

cold winter lacking enough snow to insulate crops from the bitter temperatures.

The U.S. Department of Agriculture's June 30 Crop Progress report said that in Texas, 63 percent of the winter wheat was in poor to very poor condition, in Oklahoma, 76 percent, and in Kansas, 61 percent. In parts of Kansas and West Central Texas, farmers have used wheat for grazing because it was not worth harvesting.

At 51 million bushels, the Oklahoma wheat crop was the

smallest since 1957.

"Oklahoma wheat crop worst in nearly half century," Associated Press, KGOU, Oklahoma, July 18, 2014

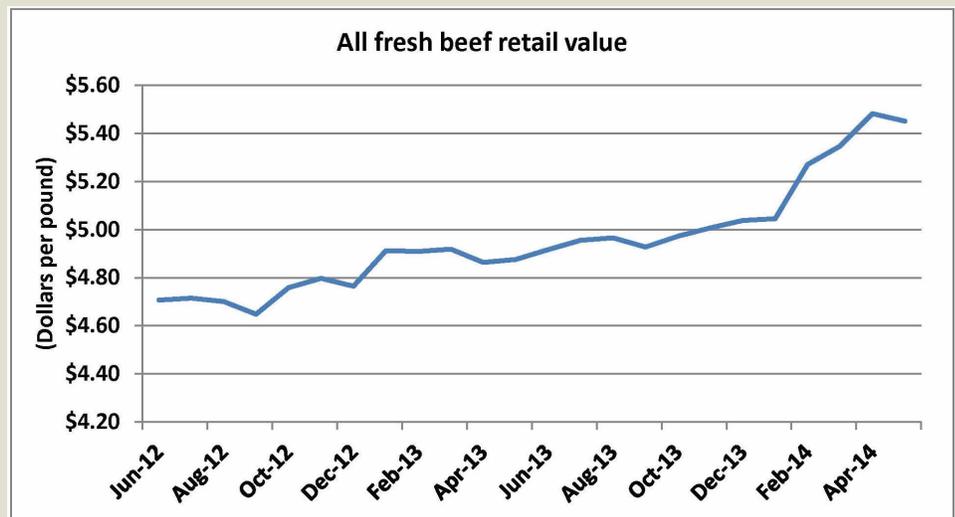
"Kansas wheat condition declines as drought endures," Associated Press, *Topeka (Kansas) Capital-Journal*, May 20

"USDA: Drought cuts wheat crop; corn, soybeans good," by David Pitt, Associated Press, Yahoo! Finance, June 11.

USDA Crop Progress Report, June 30, 2014

Western U.S. wildfire

Fire season forecasts have warned that the West could expect another difficult fire season because drought left fuels dry.



Statistics from the U.S. Department of Agriculture's Economic Research Service show a steady rise in beef prices as widespread drought took a toll on the nation's beef herd.

intensifies concerns for water supply, fire, wildlife, agriculture

California has had an especially challenging fire season, with fires burning through the winter and spring, prompting Cal Fire officials to keep firefighters on staff through the winter months and hire seasonal firefighters early to respond to the unusually high fire activity through early 2014 and into the summer months. From Jan. 1 through July 12, the state saw 3,198 fires affecting 27,770 acres, according to Cal Fire, in comparison with the five-year average of 2,315 fires charring 23,434 acres.

"Incident Information," Cal Fire, July 12, 2014.

A spate of wildfires plagued San Diego and Santa Barbara counties in May, burning at least 42 square miles, driving thousands of people from their homes and closing a college campus and Legoland California. The fire chief of Carlsbad said, "This is May, this is unbelievable. This is something we should see in October. I haven't seen it this hot, this dry, this long in May."

"9 wildfires burn across San Diego County,"

Associated Press, *The (Palm Springs, Calif.) Desert Sun*, May 14, 2014.

"Fires in North County closer to being out," by Teri Figueroa and Lyndsay Winkley, *The San Diego Union-Tribune*, May 18, 2014.

Washington, Oregon, Nevada, Arizona and New Mexico also endured large wildfires that have been difficult to contain, and restrictions on fire and fireworks were in place to limit the number of new fires.

Dust

Dust storms were reported in New Mexico, Arizona, Colorado, Oklahoma, Kansas, and Texas.

California

Snowpack thin; water allocation announced

The final snow survey of the snowpack in the Sierra Nevada dropped to 18 percent of normal on May 1 as warm temperatures melted the snow rapidly. Despite the thin snowpack, the State Water Project announced water allocations of 5 percent, and

the U.S. Bureau of Reclamation bumped up allocations for water agencies in the Sacramento Valley from 40 percent to 75 percent. Those south of the Delta will receive no water from Reclamation.

"California drought: Sierra snowpack is barely there," by Peter Fimrite, *San Francisco Chronicle*, May 2.

"California Farmers to Get More Water," by Scott Smith, Associated Press, April 18, 2014

Groundwater levels declining

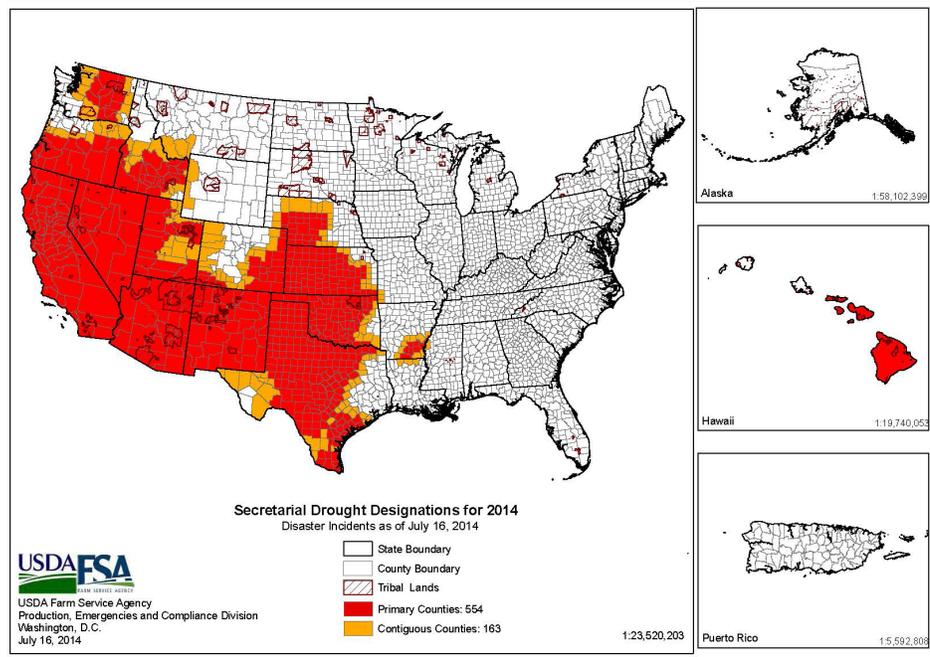
The drought in California has dropped water levels to historic lows in thousands of wells surveyed across the state, according to the California Department of Water Resources. About half of the 5,400 wells assessed have dropped since 2008 to points lower than they have been in the previous century. The San Joaquin Valley was in the worst shape, with groundwater levels declining up to 100 feet below historical norms, while in the Sacramento Valley, the Sonoma Valley and the Los Angeles basin, levels fell up to 50 feet.

"Report: Well water under strain across California," by Matt Weiser, *Sacramento Bee*, May 1, 2014.

State of California bolsters local water restrictions

Lackluster water conservation efforts led California's State Water Resources Control Board to adopt more severe water conservation measures limiting outdoor watering to two days per week, and prohibiting car washing without a shutoff nozzle. Violators may be fined up to \$500 per day. These new measures were needed because the public did not conserve up to 20 percent, as the governor requested, and during May, used 1 percent more water than usual. Most of the state's 10 hydraulic regions curbed their

2014 Secretarial Drought Designations - All Drought



Nearly all of the Southwest and much of the southern Great Plains received disaster declarations due to drought in the first half of 2014.

continued on page 6

California impacts, continued

water use by 5 percent in May, but residents of the South Coast region, including Los Angeles, San Diego and Orange County, used 8 percent more water than normal. The new water restrictions will take effect sometime around Aug. 1.

“California approves big fines for wasting water during drought,” by Bettina Boxall, *Los Angeles Times*, July 15, 2014.

River flows boosted to keep salty water out of Sacramento-San Joaquin Delta

The U.S. Bureau of Reclamation began releasing more water from Nimbus Dam to push salty water from the San Francisco Bay out of the Sacramento-San Joaquin Delta because the Delta

provides water to 23 million Californians and 3 million acres of cultivated land. The flow was ramped up from 2,000 cubic feet per second to 2,500 cfs. Unusually high tides in the mid-June forecast increased the likelihood of salinity intrusion. Keeping salinity within acceptable standards in the Delta was urgent because it takes weeks to months to flush the salt out and return the salinity to acceptable levels. State law also requires that salinity be controlled for the benefit of water users who take water straight from the Delta.

The California Department of Water Resources began releasing more water from Oroville Reservoir on the Feather River and the U.S. Bureau of Reclamation also increased releases from Keswick Reservoir on the Sacramento River to reduce Delta salinity.

“Water flows boosted in American River to block salty incursion to Delta,” by Matt Weiser, *Sacramento Bee*, June 17.

Drought threatens endangered animal, plant species

The ongoing drought in California was threatening the survival of already endangered fish, trees and birds. The state is home to 37 endangered fish. The 47 endangered and 36 threatened animals in the state were also having a difficult time during the drought.

“Scientists: California drought threatens animals,” Associated Press, April 27, 2014

For more information on these and many more impacts, please visit the Drought Impact Reporter, <http://droughtreporter.unl.edu>

Submit a report about drought's effects: <http://public.droughtreporter.unl.edu/submitreport/>

UC Davis study tallies drought's impacts on California agriculture

A study of drought's effects on farm production in the Central Valley, conducted by the University of California, Davis, Center for Watershed Sciences, found that drought cut the amount of river water to the Central Valley by one-third, making this the greatest water loss ever experienced by California agriculture. Farmers were compensating for the loss by increasing groundwater pumping, and in some areas, pumping more than twice as much water as last year. Groundwater has been essential in helping the state get through this drought without larger economic losses. The California Department of Food and Agriculture's Office of Public Relations summarized the study's findings as follows:

- Direct costs to agriculture total \$1.5 billion (revenue losses of \$1 billion and \$0.5 billion in additional pumping costs). This net revenue loss is about 3 percent of the state's total agricultural value.
- The total statewide economic cost of the 2014 drought is \$2.2 billion.
- The loss of 17,100 seasonal and part-time jobs related to agriculture represents 3.8

percent of farm unemployment.

- 428,000 acres, or 5 percent, of irrigated cropland is going out of production in the Central Valley, Central Coast and Southern California due to the drought.

- The Central Valley is hardest hit, particularly the Tulare Basin, with projected losses of \$810 million, or 2.3 percent, in crop revenue; \$203 million in dairy and livestock value; and \$453 million in additional well-pumping costs.

- Agriculture on the Central Coast and in Southern California will be less affected by this year's drought, with about 19,150 acres fallowed, \$10 million in lost crop revenue and \$6.3 million in additional pumping costs.

- Overdraft of groundwater is expected to cause additional wells in the Tulare Basin to run dry if the drought continues.

- The drought is likely to continue through 2015, regardless of El Niño conditions.

- Consumer food prices will be largely unaffected. Higher prices at the grocery store of high-value California crops such as nuts, wine grapes and dairy foods are driven more by market demand than by the drought.

“UC Davis drought study assesses current losses and potential future impacts,” California Department of Food and Agriculture, July 15

Impacts, continued

Texas

Wichita Falls, Texas

Stage 5 Drought Catastrophe

Wichita Falls officially moved into Stage 5 Drought Catastrophe on May 17 after the combined levels of lakes Arrowhead and Kickapoo fell to 24.8 percent of capacity, just below the stage 5 trigger of 25 percent. The more stringent water restrictions brought double the surcharges that accompany stage 4 restrictions when customers use more water than the monthly allowable usage rate.

"City hits Stage 5 drought catastrophe," by John Ingle, *Times Record News*, May 16, Wichita Falls, Texas

Reusing water

Wichita Falls got the go-ahead from the Texas Commission on Environmental Quality to begin processing its wastewater in July. The city of 104,000 missed out on 34 inches of precipitation during the last three years, and its water supply lakes were becoming depleted. The wastewater will go through a four-step recycling process, blending effluent and reservoir water in equal parts, using a higher percentage of effluent than has been used in the past. The wastewater reuse program would conserve about one-third of residents' current daily usage.

"North Texas city awaits word on wastewater re-use," *Fort Worth Star-Telegram*, April 13

"Texas city using treated wastewater for drinking," by Emily Schmall, *Associated Press*, July 9

New Mexico

Irrigators receiving a fraction of usual allotment

The Elephant Butte Irrigation District began releasing water from the Caballo Reservoir on May 25 to deliver six acre-inches of water per irrigable acre to Doña Ana County farmers. This year's allotment was far below normal, but still more than the 3.5 acre-inches that

irrigators received in 2013.

"Water flowing in the Rio Grande in Doña Ana County," *Las Cruces Sun-News*, May 27

Growers in the Arch Hurley Conservancy District in eastern New Mexico have not received any water from the 2011 through the 2013 growing seasons, due to drought. Rainfall from the autumn of 2013 is allowing irrigators to receive one-fifth of a full allocation this year.

"Rains helped, but NM still in drought," by John Fleck, *Albuquerque Journal*, May 29

Oregon

Water shortage in Klamath Basin in Oregon, California

Oregon water masters were considering demands from Klamath Basin farmers and the Klamath Tribes in enforcing senior water rights as drought limited the availability of water. The city of Klamath Falls was ordered to shut down two municipal drinking water wells to leave more water for the Klamath Reclamation Project, serving 1,200 farmers along the Oregon-California border. But the city of Klamath Falls intended to fight the well closure order because state law holds human consumption needs at a higher priority than irrigation, according to the city manager. The call concerns water use on stretches of the Sprague, Wood and Sycan rivers and several creeks.

"11th-hour pause to water limits," by Jeff Barnard, *Associated Press*, *The Bend Bulletin* (Oregon), June 13

Shutoff notices were sent by Oregon Water Resources Department because two Klamath Falls wells and 10 private wells were having "timely and effective" impacts on surface water. One Klamath Falls well that may be shut down serves a medical center, and hospital officials were nervous about reduced water supplies and the prospect of losing water service.

"Council mulls options for drought response," by Lacey Jarrell, *Herald and News*,

Klamath Falls, Oregon, June 18

Oklahoma

State of emergency in Pawnee, Oklahoma

Strict water rationing began in Pawnee in June because Pawnee Lake was drying up amid continued drought. The Pawnee City Council declared a state of emergency because the prospect of running out of water before the end of the summer jeopardized the town's health and safety. The council also approved the drilling of two new wells at a cost of \$270,000. A construction company will begin drilling in mid-June and be finished in late July or early August.

"Green Country Town's Low Water Supply Leads To State Of Emergency," by Tess Maune, *News On 6*, Tulsa, Oklahoma, June 10

Lake Powell, Utah-Arizona border

Lake Powell was at 42 percent of capacity on May 21 after 14 years of drought. Boat ramps were still useable, but were shallow with some sudden drop-offs. Low water levels revealed landmarks submerged since the construction of the Glen Canyon Dam, such as the Cathedral in the Desert and the Rock Creek Canyon. A quagga mussel infestation was also discovered, due to receding water levels.

"New Photos Show Lake Powell Half Full," by Stephani Pappas, *Livescience*, May 23.

Lake Mead at historic low



Bureau of Reclamation (photo): In July 2014 Lake Mead reached its lowest level since it was first filled in the 1930's.

International drought monitoring is on the rise, with a new

Work on drought monitoring and early warning is gaining momentum in countries all over the world. Some countries are also taking the next steps, making short-term plans for how to respond to the next drought, and implementing long-term measures to reduce exposure to drought risk.

“This is by far a higher level of activity and awareness than in the past,” said Don Wilhite, drought expert and professor at the University of Nebraska-Lincoln’s School of Natural Resources. “Several key United Nations organizations are all putting their stamp of approval on the development of national drought policies. Even though the missions of the agencies differ, all are looking at climate change, food security and development for the future. They’re all pushing the national drought policy because it fits their agenda, for different reasons – food security, development, environmental monitoring.”

Many key international non-profits are also taking an interest in drought, such as the Global Water Partnership, and development banks such as the World Bank are also increasing their involvement, Wilhite said. He added that the science community is also showing “a much higher recognition of the importance of drought in building resilience, and understanding of the complexity of drought and drought management compared to other hazards.”

“Ten or 15 years ago this just didn’t exist,” Wilhite said. “It represents a growing recognition by scientists and policymakers and governments, like the EU, of the importance of drought and improved management.” Wilhite was the founding director of the National Drought Mitigation Center.

Mark Svoboda, leader of the NDMC’s Monitoring program area, noted that the National Integrated Drought Information System in the U.S. is providing a model as scientists around the world develop global drought monitoring, and that the work of NIDIS and its pilot projects in the U.S. have also raised the prominence of integrated drought planning and monitoring.

Once people buy into the idea of monitoring – recognizing an emerging drought before it is too late to take action – it raises the question of what to do when a Drought Early Warning System detects an emerging drought.

“We are seeing a groundswell of drought early warning systems (DEWS) being developed under the context of water and food security around the globe,” Svoboda said. “Now people are asking how that piece fits into an overarching drought plan, or it illustrates the

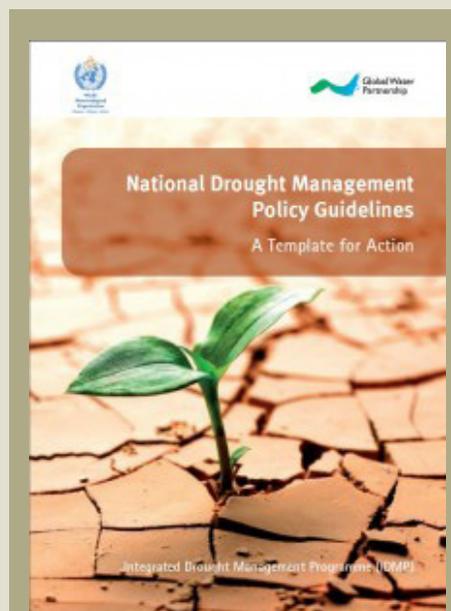
need for a drought plan. It is the classic pattern -- we have this info, now what do we do with it? What actions does it trigger? Who does what and when?”

Programs & Initiatives *UN High Level Meeting on National Drought Policy*

The United Nations High Level Meeting on National Drought Policy (HMNDP) in March 2013 in Geneva brought together the World Meteorological Organization (WMO), the UN Convention to Combat Desertification (UNCCD), and the Food and Agricultural Organization (FAO) as main sponsors, with many other organizations co-sponsoring it. Since then the UN Convention on Biological Diversity has also signed on as a supporter of national drought policy.

One of the outcomes of that meeting is a series of regional workshops that are being held around the world. Wilhite gave the keynote talk and facilitated a National Drought Policy Capacity Building Workshop for the Asia/Pacific region, held in Hanoi in May 6-9. Wilhite is also involved in similar capacity building workshops in Addis Ababa, Ethiopia, Aug. 5-8, for East Africa, and another for West Africa that will probably be in November. Still to be scheduled is one for North Africa and the Near East. One for Central and Eastern Europe was held in July 2013, and another for Latin America and the Caribbean was held in Brazil in December 2013.

The NDMC’s Tsegaye Tadesse will also be at the meeting in Addis Ababa. Tadesse is leading a NASA-funded project, Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa under Evolving Climate Conditions to Support Adaptation



Wilhite developed the National Drought Management Policy Guidelines: A Template for Action, just published by the International Drought Management Programme.

emphasis on drought planning

Strategies. (See the Spring 2014 edition of DroughtScape for more information.)

In addition, Cody Knutson, leader of the NDMC's Planning and Social Science program area, gave the keynote talk and provided training at the associated regional workshop for Central Asia, held in Izmir, Turkey, Nov. 4-8, 2013. At the same time, FAO commissioned regional studies on drought characterization and management in different parts of the world (i.e., Southern Africa, Eastern Africa, Central Asia, Latin America, China and India) to assess drought-related activities and capacities and support pro-active drought policy formulation. Knutson used some of this information to co-author the paper "Towards Risk-Based Drought Management in Europe and Central Asia" with FAO, which was presented by FAO to the European Commission on Agriculture in Bucharest, Romania, April 1-2. FAO's regional studies are expected to be published in early 2015.

Integrated Drought Management Programme

Wilhite is also involved with the Integrated Drought Management Programme, a joint initiative of the World Meteorological Organization and the Global Water Partnership, an NGO. Wilhite developed the *National Drought Management Policy Guidelines: A Template for Action*, just published by the IDMP, and chairs the initiative's advisory and management committees. The IDMP maintains a list of drought strategies on its website, and is sponsoring regional pilot programs for Central and Eastern Europe, for the Horn of Africa, and for West Africa.

"The efforts of the agencies behind the IDMP are providing a

forum for discussions promoting all aspects of drought risk management," said Mike Hayes, NDMC director and a member of the IDMP Advisory Committee.

World Bank

The World Bank is also backing efforts to develop drought monitoring and eventually a drought plan in Brazil. Mark Svoboda, Brian Fuchs and others at the NDMC have been working to establish a drought monitor prototype for the nine northeastern states and Sao Paulo in Brazil. Wilhite gave the keynote talk May 16 at a workshop on national drought policy in Fortaleza, Brazil, that was sponsored by the World Bank, Brazil's National Ministry of Integration, and the Centro de Gestao e Estudo Estrategicos (Center for Strategic Studies), based in Brazil.

Svoboda and Chris Poulson, NDMC geospatial analyst, also traveled to Rabat, Morocco, May 20-22, as part of a World Bank effort to establish drought monitoring in that country. Under the leadership of the Centre Royal de Teledetection Spatiale (Royal Center for Remote Sensing), that country is developing a composite drought index.

International Research Projects & Collaborations Drought Research and Science Policy Interface (R&SPI)

Svoboda and Wilhite are on the external advisory team for the European Union's Drought Research and Science Policy Interface. As part of the Drought R&SPI, Wilhite spent a week in June in Syros, Greece, lecturing at a summer school on drought.

InterDrought Summer School, Czech Republic

Hayes was one of the co-organizers of the InterDrought Summer School held in Mikoluv, Czech Republic, July 1-4. InterDrought is a European Union-funded project to help Czech scientists foster interdisciplinary drought research and train young researchers. The NDMC has a long-time collaboration with Czech drought researchers. This partnership has been especially fruitful in 2014. The Czech Republic has been experiencing a drought, and Czechs can now go to the InterDrought website weekly to track current drought conditions, much like the U.S. Drought Monitor product is used. Both agricultural producers and the media are following the InterDrought website, which is generating significant attention and providing a focus for drought-related communication in the country. Much of the progress in the Czech Republic has resulted from the NDMC partnership with scientists at Mendel University in Brno.

Sustainable Water Action (SWAN)

Brian Fuchs gave a presentation about the NDMC, "Bringing Science to the Citizens," at the SWAN conference, June 9-11 in Seville, Spain. SWAN is a joint European Union-United States project, creating a joint water research center.

Managing the Risks, Impacts and Uncertainties of drought and water Scarcity (MaRIUS)

Wilhite will make a presentation at the first meeting and symposium of the MaRIUS project in Oxford, U.K., Sept. 22-24. MaRIUS is led by Jim Hall, professor and director of Oxford's Environmental Change Institute. MaRIUS will use scenario modelling in case studies at a

continued on page 10

NDMC hosts visiting scholars from all over the world



**Yared Ashenafi
Bayissa**

I am a Ph.D. candidate in the department of Hydroinformatics and Knowledge Management at the

UNESCO-IHE Institute of Water Education, Delft, The Netherlands. The Ph.D. program is a joint effort between Ethiopia and the Netherlands. My research focuses on developing drought assessment and forecasting models for the Upper Blue Nile of Ethiopia by assimilating data to produce better spatial and temporal representation of remote sensing estimations of evapotranspiration (ET) and soil moisture with the SWAT hydrological model. The main purpose of my visit to NDMC is to focus on developing a drought index for the Upper Blue Nile Basin of Ethiopia. The development of a new drought index, or improving an existing drought index, will be based on critical evaluation of the existing drought indices through monitoring drought events in the past. Drought

indices such as Standard Precipitation Index (SPI), Standard Precipitation Evaporation Index (SPEI), Deciles, Percent of Normal, Palmer Drought Severity Index (PDSI), the Vegetation Drought Response Index (VegDRI) and the Aggregate Drought Index (ADI) are considered for the evaluation. Currently I am working on drought assessment using some of the above-listed drought indices and trying to get written scripts or executable files for some of the indices such as ADI. The UNESCO-IHE Institute for Water Education is sponsoring my Ph.D. program, including my three-month stay at the NDMC as a visiting scientist. Finally, I want to acknowledge all the NDMC staff members for all their support and for making my stay so comfortable. Special appreciation goes to Michael J. Hayes, director of the NDMC and professor at UNL's School of Natural Resources, and to Ann Fiedler, administrative assistant, for facilitating my visit and organizing expert talks for myself and other visitors. Last but not least, my appreciation also goes to Dr. Tsegaye Tadesse, NDMC climatologist, for his guidance and advice.



Jaroslav Vido

My name is Jaroslav Vido. I am from Slovakia, where I work at the Department of Natural

Environment at the Technical University in Zvolen (Slovakia). I deal professionally with evaluation of drought impacts on ecosystems and on landscape structures. My professional aims evolved from concerns about future climate change in Central Europe, especially in the west Carpathian region. We need to prepare our socio-economic and ecological structures for possible problems in the future. Therefore I came to the NDMC to study the possibility of use and application of the VegDRI (Vegetation Drought Response Index) in drought monitoring and early warning in Slovakia. In my opinion, cooperation with colleagues from the center was highly productive. However that is logical, because the NDMC is one of the best institutions dealing with basic and applied drought research around the globe.

International monitoring and planning, continued from page 9

number of scales, from household to national, to understand both local drought impacts and decision making by governments and water companies, according to a project description on Oxford's website. The project should enhance understanding of drought's impacts on water quality, agriculture and biodiversity, as well as economic

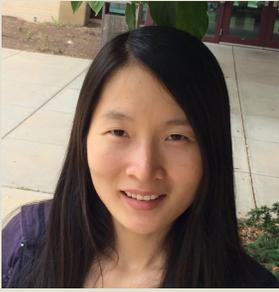
losses. Funding is from several agencies.

Drought Impacts: Vulnerability thresholds in monitoring and Early-warning Research (DrIVER)

Researchers at the NDMC in the U.S. and colleagues in the European Union and Australia are working to improve our understanding of how drought affects communities, the environment and the economy, and how people can prepare.

Researchers from the NDMC, the Hydrology department at the University of Freiburg, the Centre for Ecology and Hydrology in Wallingford, England, the Open University in Milton Keynes, England, and the Commonwealth Scientific and Industrial Research organization in Australia jointly received one of the inaugural grants in 2013 from the Belmont Forum, a recently formed international consortium of agencies that fund environmental change research.

NDMC International Activities:
[http://drought.unl.edu/
International/
InternationalActivities.aspx](http://drought.unl.edu/International/InternationalActivities.aspx)



Linglin Zeng

Linglin Zeng, a visiting scholar from Wuhan University, China, is working with Mike Hayes,

Natural Resources. She has been working in remote sensing topical areas, including estimating air temperature from satellite data across the Corn Belt, and combining environmental factors (e.g. air temperature, photoperiod) and vegetation index time series data to estimate crop phenology dates from satellites. Zeng also plans to conduct phenology-based drought detecting and yield prediction.

Not pictured

The NDMC also hosted Yiping Li and Sha Sha, both research scientists at the Institute of Arid Meteorology, part of the China Meteorological Administration in Lanzhou, China. They visited for four weeks in late May and early June.

Tsegaye Tadesse and Brian Wardlow at the University of Nebraska-Lincoln's School of

North American Drought Monitor Forum in Toronto stresses impacts, networking



Richard Heim, a U.S. Drought Monitor author with the National Climatic Data Center, listens to a presentation at the North American Drought Monitor Forum. Heim and Trevor Hadwen teamed up to present an overview of the NADM.



Veva DeHeza, NIDIS program office, and the NDMC's Mark Svoboda provided a status update on the current drought and impacts in the United States.

The North American Drought Monitor Forum, June 17-19, Toronto, Ontario, Canada, was the most recent bi-annual chance for scientists, stakeholders and contributors to confer on advancing the continent-wide product. Impacts and networking emerged as notable themes, said Mark Svoboda, NDMC climatologist and head of the NDMC's monitoring program area.

Agriculture and AgriFood Canada's National Agroclimate Information Service organized and hosted the meeting. The Canadian delegation provided updates on several fronts, including the new

Agroclimate Impact Reporter and CoCoRaHS Canada. Reynaldo Pascual Ramirez of Conagua described how the 26 water basin councils use the Mexican drought monitor, in accord with the country's national drought policy.

Svoboda presented on the NDMC's Drought Impact Reporter and Drought Risk Atlas, and Tsegaye Tadesse made a presentation on the Canadian Vegetation Drought Response Index Pilot Study.

Find NADM Forum presentations online:
<http://drought.gov/nadm/content/2014-nadm-workshop>

Retired teacher's dedicated effort makes primary source on

By Kelly Helm Smith, NDMC

Three quarters of a century ago, a man named Don Hartwell and his wife, Verna, were enduring the Dust Bowl in the town of Inavale, on the Nebraska-Kansas border. Hartwell, who had an eighth-grade education, was a life-long diarist. Hartwell's one surviving diary, with daily entries from 1936 through 1940, doesn't tell a happy story – they lost the farm and everything but each other. But it does provide a clear description of life in that time and place, and how long-term drought erased the hard-won holdings and hopes of a family and a community.

Hartwell's years of daily observations are now accessible, thanks to the efforts of Marsha Davis, a retired French teacher from Greeley, Colorado, with a passion for history. She has just published *One Man's Voice*, currently available at The Tattered Cover bookstore in Denver and at the Willa Cather Foundation in Red Cloud, Nebraska.

Davis first heard of Hartwell's diary when her book group read *The Worst Hard Time*, by Timothy Egan, a 2006 account of Dust Bowl survivors' experiences. When Davis visited the newly opened Quilt Museum at the University of Nebraska-Lincoln, she couldn't resist making a side trip to the Nebraska State Historical Society, where the diary is on microfilm. What she thought would be a 30-minute glimpse into the past turned into four hours, and then into five years of transcription, research and editing.

"The way he writes, I found to be fascinating, and there are cultural references to events from the 30s and 40s, the national events that were happening, and the international events," Davis

Sometimes, during hard times, there is nothing to do but try again the next day. Each morning, Donald Hartwell got up, checked his fields, cared for his livestock, tended his flowers, and occasionally treated himself to an ice cream cone.

Courage comes with small acts and resilience with memory.

This is the story of one man's efforts to hang on to a way of life that he knew was slipping through his fingers.



Marsha Davis lives in Greeley, Colorado.



DAVIS

ONE MAN'S VOICE

ONE MAN'S VOICE



Edited by Marsha Davis

One Man's Voice is available from the Tattered Cover Press in Denver.

said. "This was a person who had an eighth-grade education. These were just regular people. They didn't save the farm. They were pretty much bankrupt. They just kept going. It really touched me. Here were two people who kept trying, and everything went wrong. I just wanted their story out there in a readable form."

Hartwell's father had been a successful cheese manufacturer who turned to raising pigs and crops. Besides farming his family's property, Don Hartwell played the piano for local events, and Verna Hartwell was a seamstress.

Hartwell reminisces wistfully about the fertile summers of his younger years, but views his current circumstances much less optimistically. Oddly, he comments a few times on brides and how they tend to disappear after the wedding, perhaps seeing a reflection of his own diminishing prospects. Along with the loss of crops, livestock and land, he chronicles the loss of friends and social ties.

Davis says in the Introduction that she omitted some of the repetitive weather and crop observations and retained passages that kept the story moving. Contemporary readers may appreciate Hartwell's brevity. "It reads very quickly," Davis said. "He didn't have a lot of physical space to write. He wrote five or six lines every day, if that."

The unrelenting drought years were a constant stress for the Hartwells. "He mentions the dust," Davis said. "He has six or seven crop failures in a row. Verna moved to Denver in 1938 to get a job because there was no money. He talks about people having to leave Inavale. He keeps talking about his love of the land, his love of livestock. He talks about the weather, and government programs that were there to help. He talks about the loss of crops, the lack of rain, and stock prices. By 1940 they had lost the farm."

"It is a sad tale," she said. "It didn't turn out the way they had hoped. It turned out the way it

Dust Bowl accessible

turned out, like most of our lives.”

The Hartwells lived their final years in Denver. “He was a yard man; she was a maid. They worked for a very wealthy woman. From what I can gather, she was a lovely person,” Davis said. “I’m hoping they had time to take walks and go to the mountains, which they loved. And they were together, they weren’t separated anymore, which was good.”

The diary would be excellent supplemental material for anyone studying the Dust Bowl or Plains history, including secondary school students. The daily observations convey a sense of how people earned a living, what they did for fun (or wished they could do for fun), and how they viewed national and international events in the years leading up to and at the beginning of World War II. Hartwell’s honest, matter-of-fact language and observations about remembering better times and enduring constant loss speak across the decades and evoke the tragedy of those years.

After about a year of attempts to get a university press interested in the transcribed diary, Davis worked with The Tattered Cover Press in Denver to create a printed book. She is also looking into ebook options. For more information, please visit The Tattered Cover Press, <http://www.tatteredcover.com/tcpress/one-mans-voice>, or contact Davis, mardavis@comcast.net.

Excerpts From Don Hartwell’s Diary

Note: DroughtScape went further than Davis in cleaning up Hartwell’s punctuation. Hartwell, like others of his time, consistently

spelled drought as “drouth.”

Sunday, July 26, 1936

This country is rapidly reverting to an actual desert.

Friday, May 14, 1937

Well, Ralph Stickneys (& Roberta) left today for California. By judicious management they should do well.

Friday, August 20, 1937

Verna is busy at the M.E. church today at a W.C.T.U. convention. Although I don’t see how they apply to Inavale. Inavale has no liquor store & not even beer is sold here. In fact, Inavale has degenerated into a strictly “moral” condition.

Thursday, August 26, 1937

The drouth, heat etc. still drag on. Although drouth can do very little damage anymore, as nearly everything is destroyed. The Bladen Fair is on but I haven’t heard of anyone going. People just don’t seem to patronize those things anymore. Verna & I walked up to the hotel & got an ice cream cone in the evening.

Sunday, November 14, 1937

We swept & dusted in the forenoon – Verna is very much discouraged over the way things have gone & as to what lies before us. – I don’t blame her. Failure is not attractive, either collectively or individually. – Mildred Bennett is in Lincoln now. Dorothy A. “isn’t going out much” now – with us, anyway.

Friday, September 30, 1938

Fair, pleasant, warm, little wind. I stayed in Denver last night. Verna & I went up to Boulder, we got our dinner at the “Colorado” & drove up to Boulder Falls as we used to so many times in past years, & I took one picture. I couldn’t help feeling a little sad ... then – we went back to Denver, we went out to Humbolt St. and I left Verna there and

started for Inavale, (I can hardly call it home anymore) alone. I can’t write how I really felt about that, never could.

Saturday, November 5, 1938

I found a bearing in the left front wheel of the car about gone, I wonder what next? ... I went over to Tophams & got a load of wood in the afternoon. I wrote to Verna & mailed it on the train. Nebr. won this first football game from Kans. Their first win this fall.

Friday, May 10, 1940

I started planting corn in the field N. of the feed yard. – Germany went into Holland & Belgium. The war in Europe goes on. Germany (Hitler) takes (& does) what he pleases & the rest “retreat to better positions” – but maybe they think War is better than a never-ending Depression, such as is fostered in this country.

Sunday, December 29, 1940

Well, Verna packed her things, did some cooking & we started for home (Inavale) at 3 p.m. It was just dark as we left Brush, we got our supper in Wray & then came on. It was a nice evening to ride – hardly freezing, no wind. So we rode through the night, with the stars for company & the mysterious lights in the distant houses.

Tuesday, December 31, 1940

A heavy fog all day. Almost rain. Not cold. Verna & I were over to W. Tophams place for dinner. We didn’t go anywhere to celebrate New Year’s Eve & so ends 1940. I haven’t the least idea what we will do next year. Our place, which I have worked since 1909, is gone. Verna is here, but will have to go back to Denver & I will be alone, facing the New Year, & what? 1/8 in. rain.

Latest webinars archived online

Using NASA Tools to Manage Drought, June 4, 2014

Organized by the National Integrated Drought Information System Engaging Preparedness Communities Working Group.

Recording: <http://drought.unl.edu/AboutUs/CurrentProjects/EngagingPreparednessCommunities.aspx>

NASA's Soil Moisture Mission (SMAP)

Applications Program and Early Adopters

Please contact Vanessa M. Escobar
vanessa.escobar@nasa.gov

NASA Soil Moisture Active Passive Data Program: Mission Imperative for Drought, by Vanessa Escobar

Overview of NASA Applied Remote Sensing Training Program on Water Resources and Disaster Management



ARSET
 Applied Remote Sensing Training
 A project of NASA Applied Sciences



NASA Applied Remote Sensing Training for Water Resources and Disaster Management, by Amita Mehta

Tracking Drought Impacts on Rangeland, May 15 and 22, 2014

Julie Elliott, USDA-NRCS,
 Rangeland Management Specialist, Wray, CO

Why Monitor Rangeland?

2012/10/03

Benefits of monitoring during and after a drought, by Julie Elliott, Colorado Natural Resources Conservation Service



Setting up a photo point, by Pat Reece, Prairie Montaine Enterprises

Find archived webinars and presentations online at <http://drought.unl.edu/ranchplan/Overview/TrackingDroughtImpacts.aspx>

GrassSnap

- Photo-stamp pictures
- Stores data
- GPS coordinates

Easy, fast
 Repeatable
 Flexible for most systems
 Nebraska CPS (PLT-02)

GrassSnap: making monitoring easier, by Bethany Johnston, UNL Extension

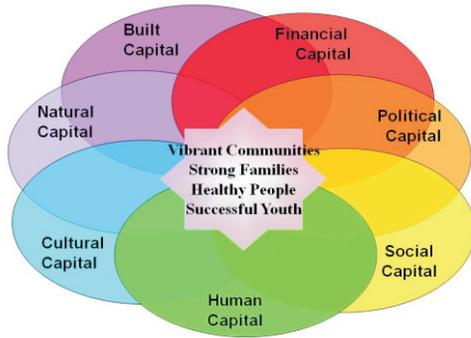
Adding Photos of Range Conditions to the Drought Impact Reporter

Kelly Helm Smith
 Communications and Planning Specialist
 National Drought Mitigation Center
 University of Nebraska-Lincoln

Photo by Pat Reece,
 Prairie and Montane Enterprises

May 22, 2014
 Part II in the
 Tracking Drought Impacts on Rangelands
 webinar series

Uploading ranch impact photos to the Drought Impact Reporter, by Kelly Helm Smith, NDMC



Community Capitals Framework Institute:

Applications of the Community Capitals Framework in Natural Resource Planning, the Environment and Community Vitality

November 5-7, 2014 • Lincoln, Nebraska

The 2014 Community Capitals Framework (CCF) Institute, sponsored by the Heartland Center for Leadership Development, the National Drought Mitigation Center at the University of Nebraska-Lincoln, South Dakota State University, and the National Integrated Drought Information System, will focus on employment of the CCF on issues related to water management, drought planning, evaluation processes, and rural and community development. Drs. Cornelia and Jan Flora, emeritus faculty from Iowa State, will be the keynote speakers. The Floras are actively involved in global community issues related to climate change. They are the co-creators of the CCF.

Who should attend?

We invite those using the CCF in their practice, research, and evaluation work as well as those who want to know more about the framework and how they might use it. Those who attend will have an opportunity to share their work and experiences with others and to develop strategies for applying the CCF to current research, practice, and evaluation efforts.

Abstract information

We are looking for case studies or applications of the CCF process. Abstracts should be brief (250 words or less). Please submit as soon as possible, and no later than September 5, 2014, to allow us to organize the speaker list and frame the breakout sessions accordingly. Send abstracts to Kurt Mantonya (kmantonya@heartlandcenter.info) at the Heartland Center for Leadership Development. Submission of abstracts is not required for attendance.

Location & registration information

The 2014 Community Capitals Framework Institute will be held at the University of Nebraska-Lincoln East Campus, starting at 1:00 pm on Wednesday, November 5, and ending at noon on Friday, November 7. The registration fee of \$150 (\$75 for students) includes activities and materials, a networking reception, breaks, and lunch on Thursday. We will make every effort to accommodate special dietary or accessibility requirements. Register online at <http://go.unl.edu/ccfregistration>.

The conference hotel is the Comfort Suites, located at 331 N. Cotner Blvd. Participants are responsible for making their own hotel reservations. A block of lodging rooms is being held under the name "Community Capitals" until October 5 at \$79 per night. To make reservations, contact Comfort Suites at (402) 325-8800 or <http://www.comfortsuites.com/hotel-lincoln-nebraska-ne118>.

Important Dates!

September 5: Abstracts due
October 5: Hotel reservation deadline
November 5-7: CCF Institute

