A Drought-Planning Methodology for Ranchers in the Great Plains

By Cody Knutson and Tonya Haigh

On the Ground

- Ranch drought planning is important for identifying management priorities, proactively evaluating management options before a drought occurs, and ultimately reducing the effects of drought on an operation and the grasslands that support it.
- An engagement activity with ranchers and ranch advisors developed a drought planning methodology to help other ranchers develop their own individual ranch drought plans.
- Although the ranchers and advisors who participated differed some on specific approaches, they agreed on the benefits of incorporating drought into overall ranch planning well in advance of drought and acknowledged the reality of having to make adjustments as situations arise.

Keywords: hazards, adaptation, climate, monitoring, management, best management practices, trigger dates, decision making.

Rangelands 35(1):27–33
doi: 10.2111/RANGELANDS-D-12-00075.1

I think you've got to have it [a drought plan] to remove the emotional side of it. It's like the general [having] a game plan before he goes into battle. You can't just make it up as you go because the shells are falling all around you. You've got to have something like that to take the emotion out of it.

(Interviewed Colorado Rancher, 2010)

Severe drought is one of the greatest threats to Great Plains ranchers.[1,2] Many ranchers, however, often fail to respond effectively to drought conditions.[3] To help address this problem, range experts recommend that ranchers develop a drought plan as a strategy for minimizing drought-related losses to financial and natural resources.[3–8] To foster drought planning among ranchers, the National Drought Mitigation Center (NDMC) at the University of Nebraska–Lincoln, engaged ranchers and advisors in a two-stage process to develop a drought-planning methodology for ranch operations in the Great Plains.

Using a purposive sampling technique, we identified 10 ranchers and 11 advisors from seven states (South Dakota, Nebraska, Kansas, Colorado, Wyoming, Texas, and California) who said they had written and/or implemented drought plans. Seven of the 10 ranchers ran cow–calf operations, whereas three ran custom grazing operations. Seven of the 10 had strictly range-based operations, whereas three also had crops, irrigated pasture, or forage ground. The advisor group consisted of seven university and Cooperative Extension specialists, three private consultants, and one Natural Resources Conservation Service (NRCS) employee with combined expertise in business management, economics, and range and forage management. In the first stage of the study, during the summer of 2009 and spring of 2010, we conducted telephone interviews with the ranchers and advisors. We asked the ranchers to tell us about their operation, describe their drought plan, describe how they had put their drought plan together, and share recommendations for others wanting to undertake a drought-planning process. Advisors were asked similar questions about their process for working with ranchers developing a drought plan.

In the second stage, we brought 14 of the ranchers and advisors together for a face-to-face workshop on drought planning in September 2009 (hereafter referred to as the *Lincoln Workshop*). The Lincoln Workshop participants heard presentations on different approaches to drought planning and a summary of the participant interviews and then worked in two groups (ranchers in one group and advisors in the other) to propose components of a drought-planning process. The participants worked with an NDMC facilitator to combine the components produced by the two different groups into one planning methodology (Table 1).

Ranchers and advisors described several unique variants on the implementation of this general methodology, emphasizing that a drought plan is not a one-size-fits-all document or process. Multiple management strategies may be appropriate, depending on the length and severity of the drought, as

Table 1. Ranch drought planning steps identified by ranchers and advisors

Steps
1. Identify planning partners and establish communication
2. Identify ranch vision and objectives
3. Inventory ranch resources
4. Understand drought risks and benefits
5. Define and monitor drought
6. Identify critical dates for making decisions
7. Identify strategies to be implemented before drought
8. Identify strategies to be implemented during drought
9. Identify strategies to be implemented after drought
10. Monitor and evaluate the drought plan

well as on specific ranch objectives.[9] In addition, depending on where a rancher is in their drought-planning process, some of the steps may have already been accomplished or be being done concurrently. However, the planning methodology does provide guidelines to consider when developing a drought plan to better prepare for and respond to drought. In this article, we describe this ranch drought planning methodology and flesh it out with the stories and examples of ranchers and advisors who have experience developing and implementing drought plans.

Step 1: Identify Drought-Planning Partners and Establish Communication

Drought affects many aspects of a ranch operation, and there are many strategies that can be implemented to better prepare for, and respond to, drought. Planning partners can be critical in helping to understand the effects of drought and to identify strategies that would be most appropriate for a particular situation. The ranchers and advisors who were part of this project emphasized the need for identifying relevant planning partners and establishing communication between them early in the drought-planning process to help ensure potential management strategies are evaluated from a range of perspectives and that everyone is "on the same page" before getting too far along in the process. In fact, nine of the 10 ranchers interviewed described working with consultants, advisors, and/or family members to develop some aspect of their drought management plan.

Although only three ranchers reported working with consultants or advisors to develop the entire drought plan, others described going to advisors or consultants for information and help with pieces of the plan, such as goal-setting, evaluating grazing options, implementing conservation projects, record keeping, or to just seek alternative viewpoints. Interviewees identified NRCS personnel, state university specialists, state conservation district personnel, county extension agents, grazing or holistic management organizations, private consultants, and neighbors or other ranchers among those they considered planning partners. Advisors specifically recommended that the drought-planning team should include multiple disciplines, including economists and production specialists. Other partners, such as bankers and insurance agents, can also be included, depending on their relevance to the operation.

Once the plan is in place, two of the ranchers also noted the need to communicate the plan with family members, employees, and contract-grazing customers. One stressed, "If you have the plan, even if it is a plan that's in your head, you need to share it with the people that work with you. Whether it's your children or your employees... it needs to be shared information."

Step 2: Identify Ranch Vision and Objectives

The decisions a rancher makes before, during, and after drought should help them move closer to the vision and objectives they have for their ranch. A vision statement provides clear direction about "where the business is headed."[10] Dealing with drought is one management aspect of the overall ranch business. Developing a ranch vision and strategic plan for the ranch makes it possible for the manager to fit drought planning into this larger plan. Six of the 10 interviewed ranchers described having general or specific visions and objectives for their operations. One rancher shared his written ranch mission statement, which was "to manage all integrated resources to maximize the production of protein, shape a harmonious existence with nature, and maintain economic viability." Another said, "We use a holistic approach to running our operation. Native grass is what we consider the most important aspect of the ranch, but from a management standpoint, it's all important and all interacts. Whether it's with the livestock, the wildlife, us as individuals... we do everything, we hope, because it is a benefit to the operation."

Although a vision statement can be quite broad, the objectives identified to foster that vision should be more specific and could focus on such areas as how the ranch operation will maintain natural resources (e.g., range health, water resources), production, financial health, customer relations, and lifestyle, learning, and growth.[10] It has been recommended that "a strategic objective of every ranch should be to strive for drought resilience,"[2] and that producers must identify their goals for coping with drought, given their particular environment.[8] With this broad understanding, a drought plan can be developed that enhances the likelihood

of building resilience against drought and supporting the ranch vision and objectives.

Step 3: Inventory Ranch Resources

An inventory of resources helps ranchers and all of their partners know what they have to work with in supporting ranch objectives and developing a drought plan. Six of the 10 ranchers interviewed described compiling baseline information about their operations, rainfall history, and potential rangelands production. One rancher recommended working with the NRCS to conduct a whole-ranch inventory, saying that ranchers should "know what [their] livestock numbers are, what [their] feed needs are, and what [they are] capable of producing." All of the advisors also recommended a resource inventory as an important part of drought planning, specifying the categories listed in Table 2.

Table 2. Recommended ranch resource-inventory categories

Resource categories
• Rainfall history/precipitation patterns
• Livestock numbers/stocking rate
• Pasture resources
• Feed availability and needs
• Production potential/stocking capacity
• Financial resources
• Personnel resources

Step 4: Understand Drought Risks and Benefits

Drought can cause a wide range of negative ecological, economic, and social impacts but also provides opportunities for ecological and operational ranch improvements and personal growth. The interviewed advisors recommended that ranchers identify and understand their drought risks and sources of vulnerability early in the drought-planning process to make more informed management decisions. Advisors said they would talk with ranchers about the likelihood of drought occurring, general impacts of drought, the relationship between grazing management and drought impacts, and the effects of drought on different soil types. At the Lincoln Workshop, ranchers expanded the idea slightly, suggesting that ranchers should try to identify the strengths/opportunities, as well as weaknesses/threats, of drought, which can be carried out as part of a SWOT (strengths/weaknesses/opportunities/threats) analysis, described in more detail in the literature.[10,11] They provided examples of potential drought strengths or opportunities, including the input of external energy that may transition rangeland to a new ecological state, the potential for weed control during dry years, and the educational opportunities for the manager. As revealed in similar studies, drought can be an opportunity to learn and become better prepared for the next drought.[12]

Table 3. Key components of a ranch-monitoring program

Monitoring components
• Precipitation
• Range condition
• Forage production
• Livestock production and health
• Feed and livestock markets
• Water resources
• Ranch finances

Step 5: Define and Monitor Drought

As the old management adage goes, "you can't manage it, if you don't measure it." All of the ranchers interviewed said that ongoing monitoring was a component of their drought plan, and all of the advisors concurred with the importance of this step. Table 3 highlights key components ranchers and advisors felt were important for a comprehensive ranch-monitoring program. Similar to recommendations in the literature,[7] ranchers said they monitored what they considered to be the key predictive indicators of drought and used that information to predict forage growth. All of the ranchers said they used that information to determine changes in stocking rates or rotation schedules, and to decide when to take action.

Precipitation and soil moisture were the most commonly used indicators of drought reported. As stated by one rancher, "Basically, our plan is, starting the first of the year, we will monitor our rainfall and [compare] that with historical averages for the counties that we're operating in." Another rancher had, after years of measuring and observing, developed his own calculations for predicting the amount of forage their pastures could produce per inch of precipitation. Another rancher modified winter wheat production calculations to arrive at an approximate formula for grass growth per inch of precipitation.

Ranchers and advisors also recommended monitoring and making decisions based on the observed amount of forage production in their pastures. One rancher said, "I keep a pretty detailed pasture-management book, and I have an idea of the productivity of the different pastures on the ranch...." Other ranchers used forage monitoring tools and products that have been developed by grazing specialists and holistic management companies. Advisors also brought up additional items to monitor, including ranch finances, feed and livestock markets, range condition, and animal body condition.

Monitoring ranch resources was mentioned by one interviewed Nebraska rancher and advisors at the Lincoln Workshop as also important for providing ranch-specific inputs for drought decision-support computer programs. For example, the rancher reported using The Grazing Manager software[i] to track growing conditions, livestock and pasture production, and the effects of management decisions on grazing lands. Advisors also discussed tools such as the Drought Calculator[ii] and the South Dakota Drought Tool,[iii] which use local precipitation data to assess the impacts of drought on forage production. There are a variety of other decision-support tools available that can also use ranch monitoring information for drought management, such as the Forage Risk Assessment Management System[iv] and a host of other drought-related online calculators. The general conclusion was that the more monitoring that takes place, the greater will be the rancher's capacity to understand how their operation functions and make more-informed management decisions.

Step 6: Identify Critical Dates for Making Decisions

Identifying when to make decisions as drought progresses can be very difficult. Monitoring and evaluating ranch resources on an ongoing basis, as well as thinking through the decisions that must be made throughout the year, can help to identify critical decision dates and criteria for making decisions. For example, seven of the interviewed ranchers said that they had specific months or dates throughout the year when they monitored and made decisions. Some of their critical dates were associated with historic patterns of rainfall and snowfall for their ranch and/or peak growth periods for their primary forages. One rancher said that by October, he could make a judgment as what the following year might generally bring. Another relied on conditions in April, saying, "If I go to grass, and I'm out April 1 [or] April 15, and I'm moving [cattle], and we're not getting rain, and I'm not seeing any [forage] growth, and it's my rapid growth time, we're in serious trouble already." Other ranchers identified "critical" dates that were related to economic timelines for marketing or signing grazing contracts. The goal of establishing critical dates is deciding in advance when specific decisions will need to be made or when to reevaluate conditions to help take some of the stress and guesswork out of decision making.

Interviewed ranchers who used critical dates said that having a specific decision-making date was a key strength of their drought-management plan. On the other hand, three ranchers did not have specific critical dates and said they instead monitored on a day-to-day basis or when moving livestock between pastures.

Step 7: Identify Strategies to be Implemented Before Drought

"The best management practices are always on the front-side of a drought."[2] As emphasized by other researchers,[7,13] every interviewed rancher made the point that the management system he or she set up and implemented before drought occurred was critical to their overall success in managing their operation during drought. These ranchers also tended to identify drought-management strategies within the context of the ranch vision and objectives. They all described using grazing-management systems they believed fostered desirable plant species and improved overall pasture health, so they would be in the best condition possible when drought occurs. Five of the ranchers had also invested in water and infrastructure development over the years that would help them graze more effectively. One rancher described the benefits he had seen, saying, "A planned [grazing] system that has multiple pastures is an excellent way to help you through a drought. Your root system of your plants is maintained much better in a planned system than it is in a season-long, continuous grazing system, and so, it gets you further into or through a drought, and as you come out of that drought, your recovery is quicker too."

Eight of the ranchers said they built flexibility into their systems by including yearlings, stockers, or custom-grazed animals in their operations. Others said they maintained a cushion in their forage supply by incorporating hay reserves, stocking conservatively, or having alternative forages or locations. One rancher said, "We custom-graze yearling heifers. It's a way of using our early spring pastures... and how long we keep those heifers around depends on our moisture situation. ... That's a very nice flexibility valve in our cattle numbers." Another added, "We build enough in the good years that we can stand a 2-year drought. We don't try to maximize how many cattle we put on there. In the good years, we build lots of reserve. In the drought years, we take off." Advisors recommended similar practices, and two advisors also suggested building a financial cushion.

In terms of financial safety nets, although relatively new at the time of our interviews, one Colorado rancher did note use of Pasture, Rangeland, and Forage (PRF) insurance developed as a pilot program by the USDA Risk

[i] For information on The Grazing Manager software, see http://www.agren-inc.com/projects.php?proj=5.

[ii] The Drought Calculator can be accessed at http://www.nd.nrcs.usda.gov/technical/Drought_Calculator.html.

[iii] The South Dakota Drought Tool can be accessed at http://www.sd.nrcs.usda.gov/technical/Technical_Tools.html.

[iv] The information on the Forage Risk Assessment Management System, see http://cnrit.tamu.edu/frams.

Management Agency and reinsured by the Federal Crop Insurance Corporation.[v] Since that time, as of 2013, the program has been revised and expanded to cover 29 states. The insurance pays losses when rainfall or vegetation condition in the insured area falls below a percentage of historical average and makes participants eligible for various Farm Service Agency disaster programs. They key in drought risk management is to identify, given the ranch operation's objectives and resources, appropriate measures to enhance resilience to drought.

Step 8: Identify Strategies to be Implemented During Drought

Similar to researchers in the literature,[2,6,7] the ranchers and advisors we interviewed recommended having a drought contingency plan to be implemented when precipitation or forage levels indicate that drought is a concern. Many of the ranchers had already planned steps they would take when they identified the onset of drought. Seven of the ranchers had developed written action plans, including two that were part of grazing contracts, to be implemented when monitoring indicated drought or forage deficiency. Others said their drought plans were in their heads, including actions to take when precipitation or range conditions were met.

The drought contingency plans outlined when decisions should be made, what stocking rate modifications were recommended for different precipitation or forage levels, and how general strategies for destocking or accessing alternative forages could be carried out. Additional range management considerations, such as changes to the burn schedule, were included in two drought plans.

Some of the ranchers emphasized it was important, once conditions trigger the drought plan, to be committed to following the plan without second-guessing or looking back. One gave an example, saying, "Say, ok, I'm going to ship these 50 head of old cows. Now, if it rains the day after I ship them, that's great because I'll have more [forage] left. I've got to go ahead and, on the 15th of June, ship this many cows. I think it's real important to have that discipline, and writing it out is probably as good a way as any to get that discipline." Another rancher added, "You'll only see and find the things to reinforce what you're thinking, rather than truly critical thinking, if you haven't done it ahead of time." One rancher said he specifically wrote in his plan that once actions had been carried out and nothing else could be done but wait for rain, the rancher should take a break or go on a vacation, to lessen personal and family stress.

Advisors took a slightly different approach to recommending actions to be taken during drought. Speaking from the experience of working with ranchers who came to them primarily during drought for advice, advisors were less likely than the ranchers to assume the best strategy could be known ahead of time. One advisor recommended, "That trigger date, [based] on percentage of precipitation, will tell you, you've got to make some decisions, but which decisions? ... I'd rather think about this as, 'here's my trigger date'; let's inventory these conditions and do an if–then thing."

Many of the advisors recommended using the resource inventory to help ranchers identify appropriate strategies during drought. One advisor considered the limitations of the rancher's existing financial and natural resources, saying, "[For ranchers in] a strong financial position, the ranch will make different decisions than one that's weak. [If the stocking rate is] heavy, that's going to generate a different decision than if it's relatively moderate." Another said, "I'd ask them about alternatives. How far away is some country that isn't suffering from drought? How cheap is available feed to buy? If we move some cattle, what's it going to cost, and if we move some cattle, what are the long-term impacts?"

Four advisors recommended using a financial balance sheet or partial budget exercise to help ranchers determine short- and long-term trade-offs. One said, "I do a lot of cost and return analysis with ranchers... and then, we just take a look and see what the numbers show in terms of a 5-year planning horizon beyond the drought." As described previously, in Step 5, there are an increasing number of "drought calculators" and other computer programs that can be used to help evaluate options during drought. In sum, although several ranchers had a good idea of their drought-response options ahead of time and when they should be made, there were alternate views that recommended reevaluating those options as the drought progresses to determine the most appropriate strategy at critical decision-making times.

Step 9: Identify Strategies to be Implemented After Drought

The effects of drought can last long after the rains have returned. To address this issue, four of the interviewed advisors placed emphasis on planning for drought recovery, with the main consideration being when and how to restock livestock after drought. They mentioned considerations, such as the length of time if would take for pastures to recover, livestock market trends, and financial issues such as the balance sheet and cash flow. One advisor stressed, "When you get through the end of year 1 in the drought-management plan, assess the impact. How bad was the drought? The severity absolutely is going to impact forage production the next year." One advisor said he would help ranchers identify where they were in the cattle cycle and what resources they could access. One advisor preferred to look at least 5 years postdrought, saying, "We try to end up with some kind of a 5-year project.... We can see some trends and see some individual actions.... Year 1, I should try to do this; year 2, I should do this; year 3, maybe I'm starting to recover a little; year 4, maybe I'm recovering even better; year 5, I'm back to where I was before the drought hit." One rancher, too, emphasized post-

[v]For information on Pasture, Rangeland, and Forage insurance, see http://www.rma.usda.gov/policies/pasturerangeforage.

drought planning, cautioning, "[We didn't] have a plan for postdrought, we lost 20% of our equity because of that.... We're doing well, but it's amazing what it would have been if we had had a plan and had a clue."

Step 10: Monitor and Evaluate the Drought Plan

Monitoring and evaluating the ranch's drought plan was especially emphasized by advisors at the Lincoln Workshop. Like other researchers in the literature,[14] participants recommended an adaptive-management approach, where ongoing monitoring and evaluation lead to modification of the plan in a cyclical manner. One rancher who experienced extreme drought in 2002 described how, after the drought, she attended management schools and visited other ranch operations looking for ideas. She and her husband ultimately modified their entire business plan as a result of the drought and subsequent evaluation. She said, "I have a new arsenal of knowledge that I didn't have at the time."

Conclusion

This participatory research highlights drought-planning concepts ranchers and advisors are using and produced a methodology for ranchers to use to develop their own drought plans. We found the ranchers we interviewed were developing relatively sophisticated drought monitoring and early warning systems for their ranches, were integrating measures to reduce the potential effects of drought into their overall ranch-management activities, and were creating contingency plans to deal with drought as it occurs. For drought planning, the advisors we interviewed focused more on assessing risk than the ranchers did, either reflecting a reality that ranchers may skip this step or that the ranchers interviewed had assessed risk through their experiences and now took that knowledge as a given. In addition, advisors tended to take a more if–then-based approach to suggesting drought-response strategies, whereas ranchers tended to have prescribed strategies they felt would work for their operation. As a group, participants agreed on the benefits of incorporating drought into overall ranch planning well in advance of drought but also acknowledged the reality of having to make adjustments as situations arise. Some people will only make plans when drought is imminent or occurring, but engaging ranchers and advisors in an examination of multiple planning perspectives resulted in a consensus-based, drought-planning methodology for the ranch that incorporated the most relevant aspects of each perspective.

The planning methodology that resulted from this research reflected the experience and knowledge of both ranchers and advisors who have developed drought plans. Their insights and the planning methodology were also used as the basis for creating the "Managing Drought Risk on the Ranch" Web site,[vi] maintained by the NDMC, which provides more-detailed information about drought, its impacts on ranch operations, possible management options and tools, and the methodology for planning. Because this methodology is put into broader use by ranchers and advisors, additional research will be necessary to evaluate and improve it. Our expectation is that a clear and usable methodology will help foster increased drought planning among ranchers, which will help lessen their drought vulnerability and the vulnerability of the grasslands that support them.

[vi] The "Managing Drought Risk on the Ranch" Web site can be accessed at http://www.drought.unl.edu/ranchplan.

Acknowledgments

The authors would like to express their gratitude to the ranchers and advisors who generously provided their time and knowledge during interviews and the Lincoln Workshop. Without their willingness to share their insights and experiences, this research would not have been possible. These drought-planning innovators are essential for inspiring others and creating a more-resilient rural community that can withstand the often devastating effects of drought in the Great Plains and elsewhere.

References

1. Hall, D. C., T. O. Knight, K. H. Coble, A. E. Baquet, and G. F. Patrick. 2003. Analysis of beef ranchers' risk management perceptions and desire for further risk management education. *Review of Agricultural Economics* 25:430–448.
2. Reece, P. E. 2012. Writing your drought plan. *In:* P. Murray [ed.]. Proceedings of the 12th Annual Nebraska Grazing Conference; 14–15 August 2012; Kearney, NE, USA. Lincoln, NE, USA: University of Nebraska–Lincoln Center for Grassland Studies. p. 74–89.
3. Dunn, B., A. Smart, and R. Gates. 2005. Barriers to successful drought management: why do some ranchers fail to take action? *Rangelands* 27(2):13–16.
4. Clark, R. T., and D. C., Adams. 2002. Planning for beef cattle operations in the face of drought. *Cornhusker Economics*. University of Nebraska Cooperative Extension Paper 75. 3p.
5. Thurow, T. L., and C. A. Taylor, Jr. 1999. Viewpoint: the role of drought in range management. *Journal of Range Management* 52:413–419.
6. Hart, C. R., and B. B. Carpenter. 2001. Planning: the key to surviving the drought, AgriLIFE Extension. College Station, TX, USA: Texas A&M University. Report E-61-04-01. 3 p.
7. Reece, P., J. D. Alexander, and J. R. Johnson. 1991. Drought management on range and pastureland. Lincoln, NE, USA: University of Nebraska–Lincoln Cooperative Extension. Publication EC-91-123. 24 p.
8. Ritten, J. P., C. Hageman, C. Bastian, and W. M. Frasier. 2011. Considerations for preparing a drought management plan for livestock producers. Casper, WY, USA: University of Wyoming Cooperative Extension Service. Publication B-1220. 3 p.
9. Bastian, C., S. Mooney, A. Nagler, J. Hewlett, S. Paisley, M. Smith, V. M. Frasier, and W. Umberger. 2006. Ranchers diverse in their drought management strategies. *Western Economics Forum* 5(2):1–8.

10. Gates, R., B. Dunn, J. Davis, A. Arzeno, and M. Beutler. 2007. Strategic and scenario planning in ranching: managing risk in dynamic times. Brookings, SD, USA: South Dakota State University. Report EC924. 42 p.
11. Stockton, M. C., and S. P. Dhoubhadel. 2011. A good drought plan may save your ranch and improve your bottomline. *Cornhusker Economics*. Paper 490. Available at: http://digitalcommons.unl.edu/agecon_cornhusker/490/. Accessed 5 October 2012.
12. Coppock, D. L. 2011. Ranching and multi-year droughts in Utah: production impacts, risk perceptions, and changes in preparedness. *Rangeland Ecology & Management* 64:607–618.
13. Hamilton, W. T. 2003. Drought: managing for and during the bad years. *In:* C. A. Forgason, F. C. Bryant, and P. C. Genho [eds.]. Ranch management: integrating cattle, wildlife, and range. Kingsville, TX, USA: King Ranch Institute of Ranch Management. p. 133–152.
14. Thorne, M., L. Cox, and G. Fukumoto. 2009. Management of production risk for Hawaii ranchers: pasture and range management. Honolulu, HI, USA: College of Tropical Agriculture and Human Resources, University of Hawaii. Cooperative Extension Service Report PRM-5. 8 p.

Authors are Research Associate Professor, cknutson1@unl.edu (Knutson), and Rural Sociologist (Haigh), National Drought Mitigation Center, School of Natural Resources, University of Nebraska–Lincoln, Lincoln, NE 68583, USA.