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William E. Riebsame
University of Colorado

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THE DUST BOWL

HISTORICAL IMAGE, PSYCHOLOGICAL ANCHOR, AND ECOLOGICAL TABOO

WILLIAM E. RIEBSAME

The Dust Bowl is an enduring image in the collective consciousness of Americans. Experience and intuition suggest that a few historical events and eras, and their symbols, endure as important cultural memories or benchmarks. The concept of collective cultural myths or symbols is difficult to define or even to examine. Nevertheless, there is compelling *prima facie* evidence that the American Dust Bowl is a powerful historical symbol; perhaps not one with the power of Frederick Jackson Turner's frontier, but certainly one that focuses attention whenever issues of Great Plains culture and agriculture arise.

In the light of the stringent theoretical and methodological ideals adopted by contemporary social science, it is hard to argue that powerful myths and symbols shape the collective American consciousness. There exist no widely accepted standards for proving that an

image is enduring, or evidence that knowing about it adds to our understanding of cultural character or behavior. From the perspective of the social scientist, cultural images or collective memories are fuzzy concepts, partly, I think, because we who use them fail to demonstrate how these images translate into environmental attitudes and behaviors. If the myth/symbol is to be regarded as an important concept, we must identify processes by which it affects, for instance, the interactions of nature and society. In this paper I have asked if Dust Bowl symbolism has anything to do with people's use of the Great Plains, if it affects their behavior, or, more telling, if it has played a role in cultural and technological adaptation to the Plains environment. My answer to these questions is yes. I support my conclusion with two behavioral mechanisms through which the image might translate into environmental behavior.

Although researchers disagree sharply on whether or not environmental attitudes and behaviors are firmly linked, one process that connects image and behavior has been described in the psychological literature: the *cognitive anchor*. The historical image of the Dust Bowl might act as an anchor against

William E. Riebsame is director of the Natural Hazards Research and Applications Information Center at the University of Colorado. He is the author of the chapter "Research in Climate/Society Interaction" in Climate Impact Assessment (1985).

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which we compare the magnitude of other events and by which we order the seeming chaos of environmental fluctuation on the Plains. More speculatively, I suggest that the image has evolved into an "ecological taboo" used to prescribe how people should behave in the Plains environment. Perhaps these perspectives can provide additional insight into Great Plains environmental and land use problems by complementing the many other viewpoints (e.g., biological, technological, and sociological) already applied to the Plains.

THE DUST BOWL AS HISTORICAL IMAGE

Scholarly doubt about collective consciousness notwithstanding, the events of the so-called dirty thirties in the central and southern Great Plains have certainly earned a prominent place in American history and historiography. *Dust Bowl* is a popular phrase and symbol, used often by writers, artists, news commentators, and scientists to describe the experience of remarkable drought, soil erosion, and agricultural and social disruption in an ill-defined area of the central United States during the 1930s. But can we distill from historical scholarship a useful definition of a collective image?

SCHOLARSHIP AND COLLECTIVE IMAGES

Dust Bowl appears to be a term that, in Henry Nash Smith's words, "fuses concept and emotion into an image," thus, it acts as a myth or symbol.¹ Symbols and myths reflect fact but are not mirror images. Rather they are "complex mental constructs" that paint an image onto the "collective imagination" of Americans.²

The myth/symbol tradition is far from monolithic, and the very existence of identifiable images in the collective consciousness is debated. Historian Bruce Kuklick points out that scholars in the American Studies movement have set themselves the task of demonstrating the way in which these "collective" images and symbols can be used to

explain the behavior of people in the United States, but he cautions that "the imputation of collective beliefs is an extraordinarily complex empirical procedure which ought not to be undertaken lightly."³ Social historian Robert Berkhofer suggests an even broader purpose of myth/symbol investigation: the illumination of the basic nature of American culture.⁴ He argues that a new variable, which can best be described by the term *perception* (as broadly defined by writers such as the geographers Lowenthal and Tuan), has been injected between social and physical stimuli and people's behavior.⁵ This has changed the progressivist's "easy correlation of social and physical environment, economic interests, and ideology."⁶ Berkhofer argues that "cultural interpretation assume[s] a multifaceted reality in opposition to the single, simple reality presumed common to the historian and his subjects in progressive understanding of the past."⁷

The weighty duty that the concept of myth or symbol is obligated to bear, explicating the nature of culture, leads even its own proponents to question the role or existence of collective images. Other fields using the image concept indulge in less introspection. Geographical writing on environmental perception often implicitly assumes the existence of collective images, assigning them the role of forging people's attitudes and guiding their behavior. Examples include Martyn Bowden's works on easterners' images of the Great American Desert and settlers' images of the Plains margin, as well as Thomas Saarinen's benchmark study of drought hazard perception among Plains farmers.⁸ Saarinen demonstrates that farmers' perceptions of the Plains environment mediate their choice of adjustments to droughts, thus providing evidence for the behavioral effects of mental images. I have introduced the myth/symbol idea to suggest that the Dust Bowl, a complex image which translates into contemporary environmental perception and behavior on the Great Plains, is one of the enduring symbols of American experience.

THE PHRASE AND THE IMAGE

First use of the phrase *Dust Bowl* has been attributed to Robert Geiger, a Denver Associated Press reporter on assignment in Geymon, Oklahoma.⁹ Geiger's story on the extraordinary April 1935 dust storm carried the eponym in its April 17 appearance in the *Washington Evening Star*. But most accounts also suggest that the term first evolved in the region's oral tradition of self-deprecating humor during the first few years of the 1930s. It caught on quickly. Joel provided the term's first "scientific" imprimatur in his 1936 soil conservation reconnaissance of twenty counties that comprised "the heartland of the Dust Bowl."¹⁰ It has since come into regular use in scholarly/scientific writing about Great Plains drought.¹¹

It was, however, the more popular media that firmly implanted the phrase and image in the American consciousness. The written images conveyed in Caroline Henderson's letters in the *Atlantic Monthly* and in John Steinbeck's *The Grapes of Wrath* were enhanced by the Resettlement Administration's 1936 film, "The Plow That Broke the Plains," and by Dorothea Lange and Paul Taylor's photographs in *An American Exodus: Human Erosion in the Thirties*.¹² Words and searing photographs of busted farms and drifts of sand all contributed to an indelible image.¹³ Evidence for the pervasive quality of the Dust Bowl image accumulates daily. It figures in the title of three recent historical works on the Great Plains, and the phrase is frequently used in scholarly and popular writing on the region.¹⁴

To gather more consistent evidence for the enduring quality of the Dust Bowl image, I attempted to collect and analyze all Great Plains drought citations in the *Reader's Guide to Periodical Literature* for 1930–84. For various reasons, roughly ten percent of these citations (about twenty) could not be acquired through standard periodicals holdings or interlibrary loan procedures. I collected a sample of 189 articles, read them, and subjected them to the

content analysis that forms the bulk of this article. Most of the articles appeared in major national news magazines like *Time* and some in more specialized journals like *Business Week*.

First I counted the articles that used the phrase *Dust Bowl*. It appeared in seventy-five (40 percent) of the articles, and was especially common in drought articles appearing in the five-year period 1950–54, during the first major Plains drought following the 1930s. Figure 1 illustrates that the relative frequency of use of the phrase appears to have been greatest in the late 1940s and early 1950s, with some resurgence of use in the early 1970s. Although this may indicate that the image faded, it is worth noting that during the 1970s the term appeared in nine (39 percent) of the twenty-three articles collected, roughly the same relative frequency averaged over the entire sample. The image appears to endure half a century after its inception.

Two characteristics of images like the Dust Bowl ensure their durability. First, the popular media can continually reinforce them. Second, the power of the image is not dependent on personal experience; even those too young to have lived through or heard about at the time the 1930s drought can develop vivid mental images of it. Thus the Dust Bowl image can have continuing impact. But what is the nature of this impact? Two mechanisms not previously linked to the Dust Bowl may provide some insight.

THE DUST BOWL AS COGNITIVE ANCHOR

Besides reflecting human experiences and the nature of the times, the image of the Dust Bowl may also play an important role in our perception of, and adjustment to, the Great Plains environment. It can act as a common psychological measuring stick to which other droughts and "rough times" are compared.

Recent evidence from experimental and environmental psychology suggests that the mind carries enduring images serving as "anchors" or representatives to help sort out the importance of different events, emotions,

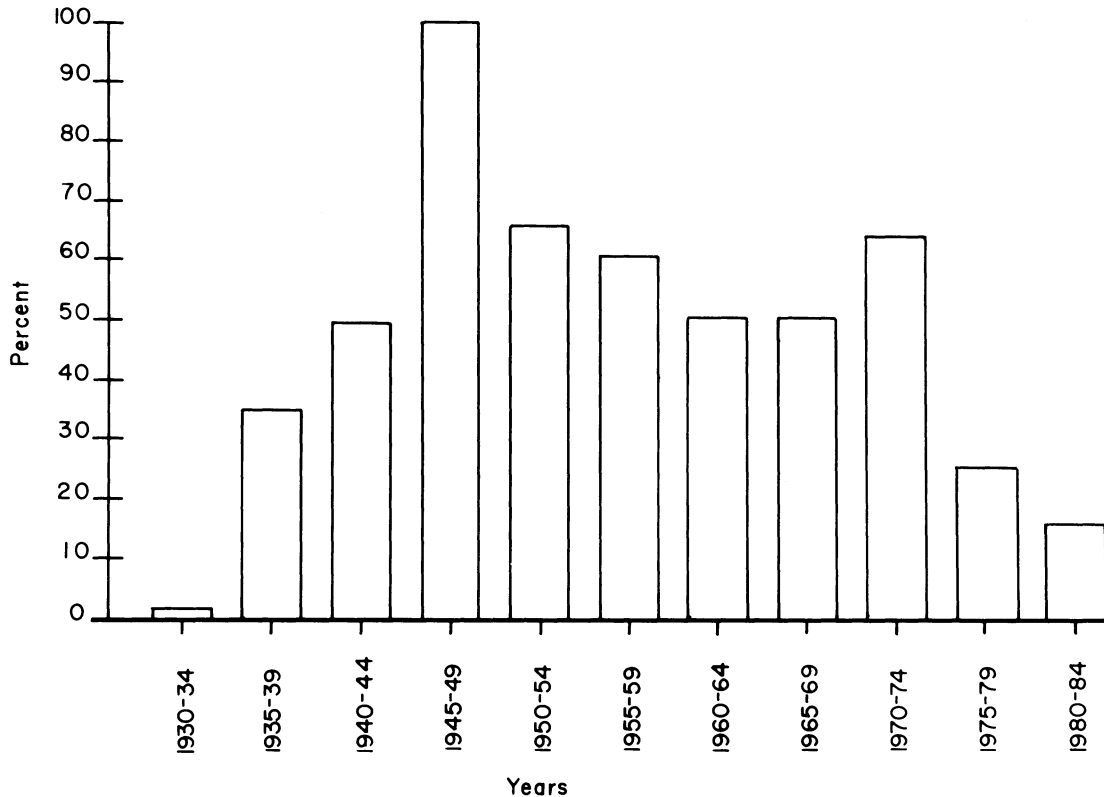


FIG. 1. Percentage of articles using the phrase Dust Bowl.

risks, and ideas.¹⁵ In cognitive psychological research, this tendency is seen as an important source of bias and error in human decision-making, but it may also provide insight into the way images like the Dust Bowl form, survive, and affect behavior.

THE PSYCHOLOGY OF ANCHORING

Anchoring, an idea developed by the psychologists Tversky and Kahneman, refers to a person's tendency to use some starting point or event (e.g., last year's flood) as an anchor for his or her expectations of future similar events.¹⁶ A closely related concept is *representation*, the human tendency to look for similarities in events, and to judge the nature of less well-known events by lumping them together with better-known or imaginable events.

These cognitive tendencies do not, in themselves, make people judge all Great Plains droughts by their image of the Dust Bowl drought of the 1930s. But another bias demonstrated in laboratory research binds anchoring and representation together to form a complex of mechanisms (subsumed here under the title of anchoring) that might affect environmental expectations and behaviors on the Great Plains. That bias is termed *availability* by psychologists, but it is more descriptively called *imageability*.¹⁷ Simply stated, imageability suggests that people assign higher expectations and, in some cases, more importance to events that are more easily called to mind. Even absent personal experience, events that have been made vivid in compelling stories or media images are perceived as being more threatening. For example, although few of us

have had any personal experience of airline accidents, the horrible image of a plane crash is easily conjured up by most people with even limited exposure to contemporary print media and television. Many of us, though, assign rather higher probabilities to harm from an air crash than logic and statistics would dictate.

ANCHORING ON THE 1930S DUST BOWL

Analysis of the 109 articles appearing in the *Reader's Guide* sample after 1939 shows that 74, or 69 percent, of the articles included a comparison of current drought conditions to those of the 1930s. Anchoring is, thus, a common practice in the popular media. Indeed, such comparison has become almost obligatory in writing about modern plains droughts, and was particularly common in the 1970s, a generation after the Dust Bowl. An agricultural meteorologist wrote in 1978 that many aspects of the severe drought of the year before "were reminiscent of the Great Plains drought of the 1930s."¹⁸ National magazines reporting on the 1970s droughts carried such titles as "Return of the Dust Bowl" and "Farming—Back to Dust Bowl Days?"¹⁹ The 7 March 1977 issue of *Time* noted:

In a grimy arc, from Nebraska through the Plains of Kansas and Colorado, on into the panhandles of Oklahoma and Texas, scenes right out of the *Grapes of Wrath* suddenly materialized in the swirl of dust billowing up to 12,000 feet.²⁰

Such comparisons to the 1930s drought also occurred during other droughts. Reemergence of drought on the Plains in the 1950s evoked news accounts that strike a familiar note:

Is [the] Dust Bowl coming back? . . . What is happening here recently seems very familiar to veterans of the early 1930s . . . topsoil on a big scale is blowing away once again Another sign of trouble is the beginning of another exodus of farmers from the drought sections, recalling the migrations of the 1930s.²¹

Or, more ominously:

New Dust Bowl in the West. A Dust bowl worse than that of the 1930s is threatening to develop this year in the Great Plains. [Dry] conditions last year . . . spawned one of the worst dust storms in the history of the Plains.²²

Such references are a key element in maintaining the historical image of the Dust Bowl. Blowing dust is perhaps the most vivid mental picture we carry of the Dust Bowl. Storms in the 1950s evoked an immediate identification with events of two decades earlier, and even the minor dust storms of 1964 again raised fears of a return of the Dust Bowl.²³ Through the 1970s, with every drought and newswire picture of blowing soil, the specter of the Dust Bowl as a continuing threat was made explicit; the Dust Bowl appeared on the verge of return.

The latest episode of widespread drought on the Plains, in the mid-1970s, occurred at just the right time to reinforce anchoring on the 1930s Dust Bowl in another way. It supported the conventional wisdom that major Great Plains droughts, the "Dust Bowl" type of droughts, occur roughly every twenty years. Belief in a twenty-year cycle was a staple of news reports on droughts in the 1970s (which were actually most severe in the western mountains rather than on the Great Plains) and is firmly embedded in the technical and popular literature on Great Plains drought.²⁴ This belief inspired geographer John Borchert in 1970 to predict the imminent reemergence of major Plains drought.²⁵

Although there is some scientific evidence for an approximately twenty-year drought cycle in the West, the same evidence (e.g., tree-ring analysis) indicates that the 1930s drought was by far the most extreme event in over 350 years; it overshadows all other droughts in the record.²⁶ Thus there is little scientific support for lumping together the 1930s Dust Bowl drought with more common Great Plains dry spells like those of the mid-1970s, even if droughts do tend to recur roughly every

twenty years.²⁷ The compelling image of the 1930s drought disaster encourages us to view the minor droughts that regularly affect the Plains as a set of events represented by, and anchored on, the 1930s Dust Bowl. This view enhances expectation of a reemergent Dust Bowl, an expectation with important contemporary implications.

THE DUST BOWL AS ECOLOGICAL TABOO

The contemporary image of the Dust Bowl is flavored by a deeper, philosophical view of our relationship with nature. This emerging image—the Dust Bowl as ecological crisis—provides the seed for a more profound meaning of the Dust Bowl: as symbolic of a prescription for human use of the land, as an ecological taboo.

THE DUST BOWL AS ECOLOGICAL CRISIS

The Dust Bowl can be viewed as an early crisis that helped bring about the environmental movement in the late 1960s. Although such speculation might be belittled as presentist revision of the 1930s experience (i.e., use of the image as a mirror for interpreting our own time), arguments for this view, such as those offered by Donald Worster, reflect not only the environmental awareness of post-Earth Day society but also a long-standing concern for the human ecology of the Great Plains.²⁸

The ecological crisis image of the Dust Bowl comes to fruition in Worster's excellent book, which is now gaining wider acceptance among Great Plains scholars. Yet, it can be argued that the same line of reasoning runs throughout the history of the Dust Bowl image. From the *Reader's Guide* sample of 189 articles on Great Plains droughts, I attempted to extract attributions of blame or culpability. Eighty-seven (46 percent) of the articles collected conveyed explicit causes for the problems being reported. The most obvious of these was the weather, climate, or some other nonhuman force. Surprisingly, though, such factors were cited as the key problem in only

29 (30 percent) of the articles attributing cause. The remaining 58 articles (66 percent) blamed human factors—like bank failures, use of marginal lands, and poor farming practices. The proportion of articles putting the blame for drought problems chiefly on the farming system itself shows no notable trend through time, suggesting that the sense of Great Plains droughts as the result of human-induced ecological imbalance is not just a feature of greater environment awareness in recent years.

The ecological crisis theme is well illustrated in a four-page article on the 1977 drought in *Time* magazine, in which a political scientist pointed out that some South Dakota counties had been declared disaster areas for one reason or another four years in a row. "Are those people in the right line of work?" he asked. "Maybe Mother Nature is trying to tell us something . . . The era of abundance is over."²⁹ The quotation provides a fitting interpretation of the ecological image of the Dust Bowl by including an assortment of the most common environmental concerns: Are we doing things right vis-a-vis the environment? Is "Mother Nature" trying to tell us something by way of environmental degradation? Haven't we been shortsighted in our use of resources?

BROADENING THE IMAGE

Besides linking the Dust Bowl to other environmental concerns, the ecological crisis image also links the Great Plains to the world's other semiarid regions experiencing agricultural problems. During the 1970s, world attention was drawn to the apparent loss of productive capacity in the Sahel of Africa, the Thar desert of Rajasthan, India, and the dry lands of northeastern Brazil.³⁰ Devegetation and blowing soil, in Africa especially, seemed to presage a tragedy for agricultural endeavors in semiarid zones. As the Sahelian drought abated in the early 1970s, disquieting signs began to appear on our own continent. The year 1974 was dry on the Plains, 1975 and 1976 were better, but 1977 was worse. During late February remarkable dust storms developed in

eastern Colorado and western Kansas and Oklahoma. Some were large enough to be seen on weather satellite pictures.³¹ Dust sifted down on eastern cities, much as Sahelian dust settled on Miami; the connections were easily made.

International linkage of drought images injected a new element into Dust Bowl symbolism: the concept of *desertification*. This term implies that climate fluctuation and human activity can interact to destroy the land's productivity. Applied to the Great Plains, as in some recent research, the idea of desertification improves on the oversimplified, man-or-nature arguments about causes of the 1930s Dust Bowl and subsequent droughts.³²

THE DUST BOWL AS TABOO

Because of its ready imageability and our growing concern over man's role in environmental change, the Dust Bowl may be evolving into the symbol of a new ecological taboo—carrying with it a set of guidelines for human use of the Plains.

The application here of the anthropological concept of taboo to such symbols as the Dust Bowl is admittedly quite speculative, although Douglas and Wildavsky have recently explored the role of taboo in environmental management.³³ In traditional anthropology the term *taboo* generally refers to a mechanism for the repression of socially disruptive behavior. It is also seen by some anthropologists as a social mechanism that, among other functions, can help a culture adapt to its surroundings. The term is used here as a cultural guideline that proscribes certain behaviors and promises punishment if not followed.

In the case of the Great Plains, the return of the dreaded Dust Bowl becomes the punishment resulting from poor farming practices and lack of care for a fragile environment. The image may represent a taboo—a transcendent conventional wisdom that if farmers behave in a certain manner bad things will happen, the Dust Bowl will reemerge! Contemporary writing about Plains agriculture often expresses the

belief that farmers are doing something terribly wrong on the Plains. Obstinate failing to learn the "lessons of the Dust Bowl," modern farmers are heading for another ecological catastrophe.

The practices that are taboo are regularly made explicit in popular and technical literature: plowing up marginal land, destroying shelterbelts, breaking the fallow cycle, or going too deeply into debt. Worster transcends this litany, arguing that the entire complex of "business farming" is maladapted to the Plains environment. He points his finger specifically at "fence row to fence row" planting, with its implied plow-up of marginal land, and especially indicts groundwater extraction for irrigation. But are these practices dissimilar from the many abuses targeted by New Deal agricultural adjustment of the Plains? No, yet there are two important innovations in Worster's argument. First, he uses the image of ecological disaster as a general indictment of business farming and of "the aggressive, expansionary, exploitive energies of an agriculture founded on capitalist values and methods."³⁴ Although these criticisms echo New Deal concerns, they are more Marxist in orientation and inculcate a vision of a technological cancer being exported to other countries.

Worster's most marked break with past writing on the Dust Bowl is that he connects it with the global threat of overpopulation. Simply stated, human populations are growing too large, straining the earth's carrying capacity. Growing demand for grain exported from the Plains is a sign of this stress, and our enthusiastic development of export markets is a sign of our economic system's greed. The Dust Bowl symbol is thus further endowed with regional and global implications.

CONTEMPORARY IMPLICATIONS OF THE DUST BOWL IMAGE

By coupling contemporary Great Plains droughts to the disastrous 1930s Dust Bowl and by linking the region to other ecologically sensitive areas, the term *Dust Bowl* brings

powerful symbolism to bear on Great Plains farmers and agricultural policymakers. This Dust Bowl symbolism has implications for environmental management in the Plains.

In the 1970s, the image of continued agricultural maladjustment was quite strong. Scattered droughts that caused little decrease in overall crop yields nevertheless evoked massive government aid.³⁵ This situation was perhaps due to a "band-wagon effect" as public perception of intense drought in the mountain West spilled over onto the Plains, which, except for the northern portion, escaped major drought.³⁶ But the taboo was also supported by numerous references to reemergence of a Great Plains Dust Bowl. In February 1977, while scientists were meeting in Denver to discuss droughts, dust storms on Colorado's eastern plains caught the attention of the news media covering the meeting and the "Dust Bowl in the 1970s" became part of the myth.

Did we overreact to the 1970s droughts because of growing fear that we were on the brink of another Dust Bowl? Recent research indicates that state and federal response to the mid-1970s drought was poorly coordinated and poorly targeted.³⁷ Great Plains states received aid out of proportion to actual drought damage. If this was due, in part, to the perception that major drought blanketed the West, and to political scrambling for a piece of the drought-aid pie, it may also have stemmed from a fear that we had broken a taboo by rapidly increasing crop acreages at just the time in the twenty-year cycle when we should have been most observant of the taboo's strictures.

Price increases in 1972, associated with huge export demand, led to dramatic increases in the number of acres planted to small grains. A near-record high of 48.2 million acres of the Great Plains was planted to wheat in 1975, a 50 percent increase from 1970.³⁸ Several observers warned of the threat of a new Dust Bowl.³⁹ A U.S. Geological Survey report noted that the rapid production increase had been accompanied by plow-up of rangelands, plowing under of crop residues, and destruction of

windbreaks: the litany of practices proscribed by the taboo.⁴⁰

In the midst of this expansion, several weak to moderate dry spells occurred on the Plains. The worst drought emerged late in the winter of 1977, accompanied by dust storms. In response to this drought, the more extreme dry conditions west of the Plains, and growing state demands for assistance, President Carter approved a massive aid bill.⁴¹ Timely rains, however, saved the small grains crop, actually resulting in bumper production.⁴² Indeed, Plains climate and crop yield data indicate that the scattered droughts that occurred in the 1970s had far less severe impact than did those of the 1930s and 1950s.⁴³ The Dust Bowl did not return.

That the Dust Bowl did not reemerge does not necessarily justify current farming practices. A subtle, and perhaps more dangerous, effect of anchoring and of the possible taboo status of the Dust Bowl image may actually be the neglect of continuous, incremental agricultural adjustment needed for long-term productivity in the region. The symbol of the Dust Bowl encourages a focus on the extreme event, reinforcing the myth of invulnerable technology each time a drought occurs without producing a Dust Bowl.

Repetition of the dire situation of the 1930s is unlikely. Although Worster and others are skeptical that technological development has truly lowered the vulnerability of Plains agriculture to disruption by drought, dry spells as severe as those of the 1930s are probably rare enough to be unlikely in the near future.⁴⁴ Thus, we will likely continue to muddle through future dry spells with a sense that farming has overcome the catastrophe of drought. The taboo must, perforce, be inviolate. But what of the other, slowly accumulating, environmental impacts of modern farming: long-term soil erosion, loss of crop genetic diversity, and the need for huge energy and material inputs? While the Dust Bowl image diverts our attention, the basic resources of the Great Plains may be slowly, inexorably frittered away. If this is the case, the powerful

Dust Bowl symbol, regularly invoked by Plains scholars, the popular media, and farmers themselves, may actually hinder long-term social adaptation to the Plains environment.

NOTES

1. H. N. Smith, *Virgin Land: The American West as Symbol and Myth* (Cambridge, Mass.: Harvard University Press, 1950), p. vii.
2. Recent proponents of the myth and symbol school include L. Marx, *Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964), A. Trachtenberg, *Brooklyn Bridge* (New York: Oxford University Press, 1965), and R. Nash, *Wilderness and the American Mind* (New Haven, Conn.: Yale University Press, 1967). Quoted material is from B. Kuklick, "Myth and Symbol in American Studies," *American Quarterly* 24 (1972): 435-50.
3. Kuklick, "Myth and Symbol," p. 445.
4. R. F. Berkhofer, Jr., "Clio and the Culture Concept: Some Impressions of a Changing Relationship in American Historiography," *Social Science Quarterly* 55 (1972): 298-320.
5. D. Lowenthal investigated people's images of the world as combinations of memory, experience, and imagination; see especially "Geography, Experience, and Imagination: Towards a Geographical Epistemology," *Annals of the Association of American Geographers* 51 (1961): 241-60. Y. F. Tuan does for landscapes what the myth/symbol school does for eras and ideas: describes them as symbols having special cultural meaning. See *Topophilia* (Englewood Cliffs, N.J.: Prentice-Hall, 1974).
6. Berkhofer, "Clio and the Culture Concept," p. 310.
7. Ibid.
8. M. J. Bowden, "The Great American Desert and the American Frontier, 1800-1882: Popular Images of the Plains," in T. K. Hareven, ed., *Anonymous Americans: Explorations in Nineteenth Century Social History* (Englewood Cliffs, N.J.: Prentice-Hall, 1971), pp. 48-79; M. J. Bowden, "Desert Wheat Belt, Plains Corn Belt: Environmental Cognition and Behavior of Settlers in the Plains Margin, 1850-99," in B. W. Blouet and M. P. Lawson, eds., *Images of the Plains: The Role of Human Nature in Settlement* (Lincoln: University of Nebraska Press, 1975), pp. 189-201; T. F. Saarinen, "Perception of the Drought Hazard on the Great Plains," Department of Geography Research Paper No. 106, University of Chicago, 1966.
9. See P. Bonnifield, *The Dust Bowl: Men, Dirt and Depression* (Albuquerque: University of New Mexico Press, 1979), and D. Worster, *Dust Bowl: The Southern Great Plains in the 1930s* (New York: Oxford University Press, 1979).
10. A. H. Joel, *Soil Conservation Reconnaissance Survey of the Southern Great Plains Wind-Erosion Area* (U.S. Department of Agriculture Technical Bulletin No. 556, Washington, D.C., 1937).
11. See, for example, J. R. Borchert, "The Dust Bowl in the 1970s," *Annals of the Association of American Geographers* 61 (1970): 1-22, and W. Lockeretz, "The Lessons of the Dust Bowl," *American Scientist* 66 (1978): 560-69.
12. C. A. Henderson, "Letters from the Dust Bowl," *Atlantic Monthly* 159 (1937): 715-17; D. Lange and P. S. Taylor, *An American Exodus* (New York: Reynal and Hitchcock, 1939); rev. and rep. by P. S. Taylor (New Haven, Conn.: Yale University Press, 1969).
13. Of course, the persistence of Dust Bowl imagery is not accidental; it is regularly reinforced. See B. Ganzel's remarkable re-photographic survey, *Dust Bowl Descent* (Lincoln: University of Nebraska Press, 1984).
14. Bonnifield, *The Dust Bowl*, 1979; Worster, *Dust Bowl: The Southern Great Plains*, 1979; and R. D. Hurt, *The Dust Bowl: An Agricultural and Social History* (Chicago: Nelson-Hall, 1981).
15. Recent theories and findings in the cognitive psychology of human judgment are presented in detail in D. Kahneman, P. Slovic, and A. Tversky, eds., *Judgment Under Uncertainty: Heuristics and Biases* (New York: Cambridge University Press, 1982).
16. A. Tversky and D. Kahneman, "Availability: A Heuristic for Judging Frequency and Probability," *Cognitive Psychology* 5 (1973): 207-32.
17. Ibid.
18. N. J. Rosenberg, ed., *North American Droughts* (Boulder, Colo.: Westview Press, 1978), p. 1.
19. *U.S. News and World Report* (3 May 1971): 22; *Time* (12 August 1974): 68.
20. "The Great Western Drought of 1977," *Time* (7 March 1977): 76.
21. "Is Dust Bowl Coming Back?" *U.S. News and World Report* (5 March 1954): 35-36.
22. "New Dust Bowl in the West," *U.S. News and World Report* (21 January 1955): 71-72.
23. "The Big Drought of 1964: Where it Hit, How Much it Hurt," *U.S. News and World Report* (30 November 1964): 52-53.
24. M. J. Bowden, a cultural geographer at Clark University, has shown in an unpublished analysis that mention of western U.S. drought cycles in the popular and technical literature increased dramatically in 1976 and 1977.
25. Borchert, "Dust Bowl in the 1970s," p. 10.
26. J. M. Mitchell, Jr., C. W. Stockton, and

D. M. Meko, "Evidence of a 22-year Rhythm of Drought in the Western United States Related to the Hale Solar Cycle since the 17th Century," in B. M. McCormac and T. A. Seliga, eds., *Solar-Terrestrial Influences on Weather and Climate*, (Dordrecht, Holland: D. Reidel, 1979).

27. A potentially important aspect of the twenty-year spacing of the major droughts of the 1930s and 1950s and the less severe droughts of the 1970s is that the events fall within the range of individual human memory. The Dust Bowl image would probably be much less intense if the intervening period were longer.

28. D. Worster *Dust Bowl: The Southern Great Plains*, especially Part Five; see, for example, Powell's early concerns (W. Stegner, *Beyond the Hundredth Meridian* [Garden City, N.Y.: Doubleday, 1964]) and concern for the Plains as an ecosystem (before the term was popular) displayed by the Great Plains Committee in *The Future of the Great Plains* (Document 114, 75th Congress, 1st Session. Government Printing Office: Washington, D.C., 1935), and J. C. Malin's writings on the ecology of the grassland, samples of which have been collected in *History and Ecology*, ed. R. P. Swierenga (Lincoln: University of Nebraska Press, 1984).

29. "The Great Western Drought of 1977," *Time*, (7 March 1977): 81.

30. Worster (*Dust Bowl: The Southern Great Plains*, pp. 240-42) even refers to a "dust bowl" in the Sahel.

31. Rosenberg, *North American Droughts*, p. 1.

32. See, for example, R. L. Heathcote, "Perception of Desertification on the Southern Great Plains: A Preliminary Enquiry," in *Perception of Desertification*, ed. R. L. Heathcote (Tokyo: The United Nations University, 1980). See also D. Sheridan, *Desertification of the United States* (Washington, D.C.: Council on Environmental Quality, 1981).

33. M. Douglas and A. Wildavsky, *Risk and Culture* (Berkeley: University of California Press, 1982).

34. Worster, *Dust Bowl: The Southern Great Plains*, p. 234.

35. A. B. Crawford, "State and Federal Response to the 1977 Drought," in N. J. Rosenberg, ed., *North American Droughts*, pp. 143-61; see also D. A. Wilhite, "Government Response to Drought in the United States: With Particular Reference to the Great Plains," *Journal of Climate and Applied Meteorology* 22 (1983): 40-50.

36. See D. A. Wilhite, N. J. Rosenberg, and M. H. Glantz, "Government Response to Drought in the United States: Lessons from the Mid-1970s," Progress Report 84-1, Center for Agricultural Meteorology and Climatology, University of Nebraska, Lincoln, 1984.

37. Ibid.

38. W. E. Riebsame, "Managing Drought Impacts on Agriculture: The Great Plains Experience," in R. H. Platt and G. Macinko eds., *Beyond the Urban Fringe: Land Use Issues of Nonmetropolitan America* (Minneapolis: University of Minnesota Press, 1983), pp. 257-70.

39. See, for example, Lockeretz, "Lessons of the Dust Bowl," 1978.

40. J. F. McCauley, "The U.S. Dust Storm of February, 1977," in T. L. Pewe, ed., *Desert Dust: Origin, Characteristics, and Effect on Man* (Boulder, Colo.: Geological Society of America, 1981).

41. Wilhite, et al., "Government Response to Drought," 1984.

42. Rosenberg, *North American Droughts*, p. 2.

43. Wilhite, et al., "Government Response to Drought," p. 17.

44. See S. H. Schneider and W. Bach, "Interactions of Food and Climate: Issues and Policy Considerations," in W. Bach, J. Pankrath, and S. Schneider, eds., *Food-Climate Interactions* (Dordrecht, Holland: D. Reidel, 1981); and R. A. Warrick, "The Possible Impacts on Wheat Production of a Recurrence of the 1930s Drought in the U.S. Great Plains," *Climatic Change* 6 (1984): 5-26.