

Wilderness Education: An Updated Review of the Literature and New Directions for Research and Practice

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Abstract—Many scientists, managers and advocates for wilderness consider education key to promoting appreciation and understanding of the cultural, environmental and experiential values of wilderness. Despite the large variety and diversity of wilderness information and education techniques, little research exists on the design and application of wilderness education programs and how effectively they influence levels of knowledge, attitudes and beliefs about wilderness.

Most research conducted on wilderness education programs focuses attention on adult and young adult participants, and only a few have focused on wilderness education programs for school-age children. Wilderness education needs to expand beyond instructing visitors to teaching a shared understanding of the role and value of wilderness to society.

The purpose of this session was to provide an up-to-date review and synthesis of the research in wilderness education, present examples of current wilderness education research, discuss the role of the federal line officer in wilderness education and work with session participants to determine new directions and priorities for research on wilderness education.

Many wilderness managers and researchers consider wilderness education a key component to the long-term survival of wilderness. Wilderness education can inform people about the benefits of wilderness; it can help make them aware and appreciative of the cultural, environmental and experiential values of wilderness; and, it can help shape human behavior within wilderness.

Wilderness education has a number of definitions, depending on the context and the purpose of particular wilderness

education programs. Bachert (1987) stated that wilderness education is “education in the wilderness-implying a place; education about the wilderness-implying a topic; and education for the wilderness-implying a reason.” In the first case, education in the wilderness usually applies to organized programs such as the National Outdoor Leadership School, that conduct educational and development programs in wilderness. The session did not cover this component of wilderness education. Rather, its focus was on education about wilderness and education for wilderness.

There are a number of methods used for education about and for wilderness. These include wilderness management agency and advocacy group publications and videos, website information, Leave No Trace materials and training, brochures and displays at ranger stations, trailhead signs, interpretive displays and programs, personal education on-site by wilderness rangers and school-based wilderness curriculums.

Wilderness management agencies tend to prefer wilderness education that influences wilderness visitor behavior over other management techniques because education maintains elements of personal freedom and choice that other alternatives do not. In the past, much managerial attention has been on visitor training on low-impact camping techniques and user ethics. But managers and researchers are now saying that wilderness education should move beyond instructing visitors, to building a shared understanding of the role of wilderness in a broader societal perspective. The wilderness message must reach a broader spectrum of the American public. One such approach is an effort by the Arthur Carhart National Wilderness Training Center to develop and distribute school-based wilderness education curriculum programs.

An indication of the importance managers and researchers place on wilderness education comes from a study done of 424 participants at the 1994 National Wilderness Conference in Santa Fe, New Mexico (Barns 1997a, 1997b). These participants identified and prioritized strategies for wilderness stewardship in this country. Of the top seven strategies, two dealt with wilderness education, and one specifically dealt with wilderness education to grades kindergarten through twelve (K-12).

Yet, despite the variety of wilderness education approaches now used and the importance placed on wilderness education, there has been little research conducted on the design, application and effectiveness of most wilderness education programs in changing levels of knowledge, attitudes and

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beliefs about wilderness. Many wilderness education methods are effective and have some impact on people's awareness and appreciation of wilderness, as well as how they behave in wilderness. But there are very few studies that actually document those increases in awareness, appreciation or behavioral changes. We need good research to know if we are spending our resources in areas that actually are effective, and how we can improve and change education approaches to make them more effective.

Examples of Evaluative Studies of Wilderness Education With School-Age Children

Most research conducted on wilderness education programs focuses attention on adult participants in adventure/experiential education programs. A few studies have focused on K-8 level wilderness education programs (Beaver and Jacobson 1985; Dowell and McCool 1985; Hendricks 1999; Hendricks and Watson 1999; Knapp 1996; Oye 1984; Tracy 1995). The results of these studies show increases in knowledge (cognitive) and short-term behavioral gains, but no long-term behavior changes.

Oye (1984) looked at cognitive and affective changes resulting from a wilderness education program directed at sixth grade students. The study results indicate that an hour-long wilderness education program significantly increases knowledge scores, but it does not change attitudes toward wilderness. No valid attempt was made to evaluate how long the students retained the newly acquired information.

A study conducted by Dowell and McCool (1985) titled, "Leave No Trace" (LNT) evaluated the cognitive and affective changes as a result of a LNT program for Boy Scouts (10 to 18 years of age). Results indicate an overall improvement in wilderness knowledge, skills and behavioral intentions after exposure to the program. However, retention scores dropped significantly for behavioral intentions within a month after the presentation.

Knapp (1996) evaluated the influence of environmental education programs on students' environmental knowledge, attitudes and/or behaviors. The year-long project provided environmental education to middle-school teachers and students and promoted their involvement in the management of the Charles Deam Wilderness in south central Indiana. Of the three variables (knowledge, attitude and behavior) evaluated, only knowledge questions showed significant increases during the year-long program. The attitude and behavior variables did not reflect a significant increase.

Through support from the Aldo Leopold Wilderness Research Institute, the Arthur Carhart National Wilderness Training Center and the University of Minnesota, one of the authors of this paper (Gunderson) is conducting a research study to determine how effectively the K-8 "Wilderness & Land Ethic" curriculum influences students' and teachers' knowledge, attitudes and beliefs about wilderness. The specific wilderness education format evaluated in this study is the "Wilderness & Land Ethic" curriculum and teacher workshops. The "Wilderness & Land Ethic" curriculum (Arthur Carhart National Wilderness Training Center 1995) was developed for kindergarten through eighth grade (K-8)

children. The curriculum introduces students to the value of wilderness and to appropriate wilderness behaviors.

Little is known about the effectiveness of the K-8 "Wilderness and Land Ethic" curriculum and teacher workshops. The study addresses the following research questions:

1) How does the "Wilderness and Land Ethic" curriculum influence students' and teachers' knowledge, attitudes and beliefs about wilderness?

2) How can the "Wilderness and Land Ethic" curriculum and teacher workshops be improved to better address knowledge, attitudes and beliefs about wilderness?

3) Applying the Model of Responsible Environmental Behavior, what conclusions can be drawn regarding the influence of the "Wilderness & Land Ethic" curriculum on knowledge, attitudes and beliefs about wilderness?

Theoretical Foundations

Due to the broad spectrum of ages and programs that fit within the confines of wilderness education, there are several learning theories involving cognition and behavior, as well as social psychology theories of persuasion, that have been and/or could be applied to wilderness education research: The Elaboration Likelihood Model (Petty and Cacioppo 1981, 1986), The Theory of Reasoned Action (Ajzen and Fishbein 1980), The Model of Reasoned Wilderness Behavior (Hanna 1995), Constructivist Theory (Dewey 1916; Piaget 1952; Vygotsky 1978) and The Model of Responsible Environmental Behavior (Hines and others 1986/87, Hungerford and Volk, 1990). The lead author of this study (Gunderson) proposes using the Environmental Behavior Model (Hungerford and Volk, 1990) as the primary theoretical foundation of the research and will apply its model, and its variables, to the process of wilderness education.

The ultimate goal of environmental education is the development of environmentally responsible and active citizens, and the Model of Responsible Environmental Behavior provides a model to achieve this goal. Responsible environmental behavior (REB) can be defined as ways people can help solve environmental problems. REB is the equivalent to other terms that appear in the environmental education literature: pro-ecological behavior, pro-environmental behavior, environmental action and environmental problem solving. The Model of Responsible Environmental Behavior emerged from a meta-analysis of behavior research literature in environmental education (Hines and others 1986/87).

Over the past two decades, environmental educators have become increasingly aware of the importance of influencing people to behave responsibly toward the environment. Interest in REB research has expanded to academic fields of education, psychology, sociology, engineering, political science, business, forestry and communications. The Responsible Environmental Behavior Model is based on numerous research studies. Its focus is to determine which factors can be shown to predict REB. Predictor variables are: locus of control, intentions to act, knowledge of issues, knowledge of action strategies, attitudes, personality factors and situational factors. Key variables have been organized on a horizontal plane into three categories: entry-level, ownership, and empowerment. Entry-level variables are good

predictors of behavior that appear to be related to responsible citizenship. Ownership variables are environmental issues that are very important at a personal level. Empowerment variables give people a sense that they can make changes and help resolve important issues.

If the goal of environmental education is the development of environmentally responsible and active citizens, the variables identified in *the Responsible Environmental Behavior Model* should be tested, using the "Wilderness and Land Ethic" curriculum as an evaluative study, to determine if the curriculum influences students' and teachers' knowledge, attitudes and beliefs about wilderness.

Summary of a Wilderness Education Research Program

In 1996, two studies were conducted to examine the effectiveness of the impact monster skit, a wilderness education program used primarily by the U.S. Forest Service and other federal wilderness management agencies. This section provides a summary of this research. For complete details of the studies, please refer to Hendricks and Watson (1999) and Hendricks (1999).

The impact monster skit, developed approximately two decades ago by Jim Bradley, is designed to introduce low-impact camping skills and to teach appropriate behavior in wilderness and other wildland areas. Although various versions of the skit have emerged over the years, in most cases an impact monster demonstrates inappropriate wilderness behavior such as harming wildlife, polluting streams, cutting limbs off of trees, hiking in sensitive areas, making a large fire, littering and damaging other resources. Appropriate behavior is then modeled (or the impact monster's behavior is corrected) by a wilderness ranger or wilderness user. A discussion of permanent and nonpermanent impacts usually accompanies the skit.

Most evaluations of the impact monster program have been informal assessments by wilderness educators of the program's effectiveness. One notable exception was a study conducted by Tracy (1995) that determined the skit improved wilderness knowledge of fifth grade students. The research program discussed hereinafter is believed to be the first comprehensive, formal evaluation of the program using multiple research methods and approaches.

Wilderness Educators Evaluation

The purpose of the first study completed as a portion of the research program was to examine wilderness educators' perceived effectiveness of the impact monster skit (see Hendricks and Watson 1999). Following informal discussions with wilderness educators and managers nationwide and a focus group session at the 1995 Wilderness Education Working Group Session in Salt Lake City, a survey was conducted with a mail-back questionnaire. Fifty-five of 83 subjects identified as being familiar with the impact monster program responded to the survey.

Key results of the study indicated that 80% of the subjects rated the program good to excellent as a tool for teaching

wilderness education. The program was considered most effective for fourth, fifth, third and sixth grades audiences respectively. The most serious perceived problems with the skit were children being afraid of a gun, wilderness educators tiring of presenting the program and high school and students in grades 6-8 identifying with the impact monster. Other problems mentioned included difficulties with classroom management and behavior, a lack of funding for props and the purpose of the program being lost in the process of the skit because of its entertainment orientation. It was suggested that behavioral objectives for the skit could be developed to focus on leave-no-trace principles, a land ethic, recognition of impacts and wilderness knowledge. Suggestions for improving the skit included avoiding stereotyping and recognizing cultural differences, improving prop preparation and acquisition, emphasizing positive behavior, developing formal evaluation methods and maintaining flexibility in the presentation of the skit.

Quasi-Experimental Study

A second study was completed with 574 students in 24 first, third, and sixth grade classes on the California Central Coast adjacent to the Los Padres National Forest (see Hendricks 1999). The purpose of the study was to examine whether persuasive communication sources and messages and grade level effected low-impact camping behavioral intentions. The study employed a repeated measures analysis of variance using a pretest and post-test design. Message factors were based on the Elaboration Likelihood Model of persuasive communication, which focuses on peripheral and central routes to persuasion (Petty and Cacioppo 1981, 1986). The source factor had two levels of a positive message source—a good guy dressed as a typical wilderness hiker or as a ranger—and two levels of a negative message source—an impact monster dressed in brightly colored clothing or as a typical wilderness hiker. The message content was varied with a telling version of the skit and an asking version. The dependent variable was short-term, low-impact camping behavioral intentions. An illustration with 11 inappropriate behaviors and six appropriate behaviors was given to the subjects before and after the skit. Each time they were shown the illustration, the subjects were asked to indicate which things they would do the next time they went camping in a wilderness.

An analysis was conducted for the full repeated measures model, using an aggregate score of the behavioral intentions and a chi-square analysis of each of the 17 behavioral intentions, to determine differences in pretest and post-test scores. There was a significant difference in pre and post-test scores of behavioral intentions for the full model, and all levels of the message source, message content, and three grade levels. A significant interaction effect was present for the positive message source (wilderness hiker/ranger) and the pre and post test scores. The hiker was more effective than the ranger when considering this interaction. Furthermore, third and sixth grade levels influenced behavioral intentions more than first grade. Although not statistically significant ($p < .054$), the telling message had a greater difference in mean scores than the asking message for all

grade levels. The chi-square analysis was significant and the expected direction for 15 of the 17 behaviors. For example, washing dishes in a stream (an inappropriate behavior) was selected by 48.1% of the pretest subjects, but only 13.2% of the post-test subjects. Similarly, use of a stove (an appropriate behavior) increased from 59.9% to 79.1% between the pretests and post-tests.

The skit continues to be a popular wilderness education program that exposes children and adults to appropriate wilderness behavior. Many wilderness educators perceive it to be an effective wilderness education program; yet it is not without its problems and critics. It appears to influence short-term behavioral intentions, relying on peripheral cues of persuasive communication. Other persuasive communication variables, including additional sources, message recipients, message involvement, effects on longer-term behavioral intentions and the order of the positive and negative messages, need attention in further research. The skit can also be improved with more formal links to leave-no-trace principles, content changes, standardization of skits, improved funding, awareness of cultural differences and training of presenters in classroom management and behavior techniques.

Wilderness Education Direction for the Future: A Federal Perspective

To celebrate Earth Day on April 22, 1999, three high school English classes in a small, rural New Mexico town devoted primarily to oil and gas production were given Thoreau's quote, "In Wilderness is the preservation of the world", and asked to write a short essay on whether they believed it. Fifty-seven students submitted essays. About 10% of the students were Hispanic, 15% Navajo, and the remainder were of Anglo origin, with the exception of one African American student. While this may not be a statistically valid sample of rural New Mexico, nor even of this high school student population, it is nonetheless interesting to note that of these 57, four students were ambivalent toward wilderness, one opposed the idea, and the remainder—over 90%—wrote variations of "wilderness is important to me." It is perhaps also telling that over one-third of the students didn't bother to write about it. However, one cannot assume that lack of interest indicates a corresponding lack of appreciation for wilderness: Failure rate in these classes averages 40%, and assignments are routinely ignored. Here's what Shannon, the only black student in his senior class had to say:

Personally, I don't really appreciate the wilderness as much as I should. I mean, I think there should be laws protecting it. Because when it's gone, what do we have left? The reason why we don't respect the wilderness is that we don't know anything about how important it is to our society. A lot of young people like myself don't care because we think, "Well, there are other wildernesses out there." Also, most people find these things extremely boring because it does not have their interests. People and the government need to be educated more on the wilderness, and explain the dangers when it's gone.

Many federal employees of the four agencies entrusted with the stewardship of the National Wilderness Preservation System would agree with this student's statement, "People and the government need to be educated more on the wilderness." In preparation for the Sixth National Wilderness Conference in Santa Fe in 1994, registrants were asked to provide a prioritized list of the top ten wilderness issues that they believed should be addressed in the next ten years (Barns and Krumpke 1995). Of the 128 issues identified, the fifth most important issue was "LNT (Leave No Trace) training of the public." Even more important, however, was the issue ranked as the fourth most important, "Educating nontraditional publics (including adversaries) to the complete range of wilderness values and ethics." Tied with LNT training for the fifth most important issue out of 128 was: "The lack of understanding or commitment by (those in the) agency hierarchy (to the wilderness ideal)." This last issue is particularly interesting in that concern for it has greatly increased in the 11 years since the First Wilderness Management Workshop in Moscow, Idaho.

This concern manifested itself in an outcome of the Santa Fe conference. Through a nominal group process in strategic planning groups, attendees generated a list of 49 actions needed to guide wilderness stewardship over the next decade (Barns 1997b). When the priorities of 424 participants were collated, the second most important action to be taken was, "Develop *and commit to* a coordinated national strategy to address nationwide wilderness education, including interagency and external organizations, the public, and the media" (emphasis added). Only slightly lower in importance (fifth and sixth, respectively) were subsets of this action: "Work with national environmental organizations to add wilderness education to grades kindergarten through twelve" and "identify strategies appropriate to diverse audiences (such as cultural, rural, urban, and nontraditional groups)". Variations on these recommended actions were formally adopted by the four agencies (Barns 1997a) in their Interagency Wilderness Strategic Plan of 1995.

A key to these aspects of wilderness education, as it is with any phase of wilderness management, is the understanding and support of the agency line officers who have the final word on how public lands are managed. Many lack even a fundamental appreciation of the wilderness resource and would not comprehend this statement from Crystal, a sophomore in the writing exercise outlined above:

I believe there should be a part of land that is kept all natural. Some people believe that if we could make money off of it, then we should destroy it; but we have enough other land already destroyed, never to be natural again, that could be used for anything people want. Wilderness should be preserved to keep us from getting too involved in technology. Also, sometimes we all need a break to go spend time in nature, without technology. Therefore, wilderness should be preserved to also preserve humankind.

Examples of line officers' lack of comprehension or support for wilderness values abound. There is the line officer who, when confronted with a trespass route and

livestock development, suggested that the wilderness specialist write it up as the proposed action in an Environmental Assessment and prepare a finding of no significant impact. There is the executive management team of a federal wilderness-managing agency in New Mexico that, when deciding on a Strategic Plan to guide the state's priority programs for the next five years, purposefully omitted any mention of wilderness, even though one of the agency's most visited designated wildernesses is in that state. And there is the line officer who stated, "I don't know why we have some of these areas as wilderness. I mean, I can show you places that look just like that you can drive to." Certainly, there are also hopeful, enlightened words and actions from line officers. But, clearly, there is a need for wilderness education in the agencies. Wilderness education should be differentiated from wilderness training, which has to do more with the nuts and bolts of management. Wilderness education is the more philosophical "why" of wilderness.

The Arthur Carhart National Wilderness Training Center offers several line officer training courses, which include an educational component. But it is not known if attendance at these courses makes for difference in the actual management of the National Wilderness Preservation System. Perhaps line officers are being reached too late in their careers, after their concept of wilderness is already set. Perhaps employees should be trained in wilderness earlier in their careers, but that would necessitate the concurrence of their supervising line officers, some of whom believe that wilderness is not important.

Line officers, for the most part, are merely reacting to the world around them. As can be seen throughout this country, support for wilderness may be broad, but it is also shallow; whereas the opposition may be narrow, it is deep. Perhaps the most effective way to change the thinking of line officers is to change the thinking of the general public with regard to wilderness. This can be demoralizing if one gets caught up in the scale of the undertaking. The old adage "think globally, act locally" has been criticized for just that reason — it is often to daunting to consider the global good, and idealists give up in the face of that overwhelming need.

So, should those dedicated to wilderness preservation be content to think locally and act locally? Should agency wilderness education be modeled after the way children's wilderness education is currently conducted — piecemeal, and of a quality ranging from brilliant to mediocre?

Or is this incrementalism enough? Should wilderness preservationists be thinking — and acting — if not globally, at least nationally? Shouldn't there be a Unified National Wilderness Education Plan, that seeks to promote and enhance the preservation of wilderness for present and future generations by increasing awareness, understanding, appreciation and support of the National Wilderness Preservation System among the American people? And shouldn't this plan target not only wilderness visitors, but children — the wilderness advocates of the future? And not only children, but their parents — adults from diverse cultural, geographic and social backgrounds — nurturing wilderness advocates for today? And shouldn't the plan also target the important framers of those adults' opinions—the media—and target members of Congress who hold the power

of life or death over the National Wilderness Preservation System?

Thoreau's sentiment, "In Wilderness is the preservation of the world," must be embraced by agency personnel. Without that passion, can a Unified National Wilderness Education Plan succeed? Without such a comprehensive plan, will the National Wilderness Preservation System survive to the 22nd century? Here's what Ricardo, a high school sophomore in the writing exercise outlined above, had to say in response to those words by Thoreau:

I believe mankind is headed down the wrong path. Except for a very few areas that are protected by law, we are destroying and taking advantage of this planet we live on. There are better ways to take care of our planet. We don't have to give up our way of life, but instead concentrate on how we can make our way of life without hurting our future generations. The things in this paper are easy to write down, but probably won't start to happen until it is too late or until we are on the verge of destroying ourselves. That's why I am glad we have wilderness protected by law, so at least in our future we might still have something to say: "This is how it used to be." I pray and hope I can educate myself and help others realize the best way of life isn't always the easy way, or having so many luxuries, which in turn bring about all our pollution and destroying of this planet. I am not saying we have to return to our Stone Age, but I am saying we must change. Without this planet, all of our advances and discoveries, and the legacy of mankind, will all add up to nothing.

Participant Comments

A combination of wilderness managers, university researchers and students, environmental educators and other wilderness advocates attended the session to discuss the primary challenges facing wilderness education research and what specific research topics in wilderness education should be studied. The following is a summary of the comments offered.

What Are the Primary Challenges Facing Wilderness Education Research?

- Making the abstract (love of wilderness) meaningful in a more concrete (personal) way.
- Teaching young people to think critically about ethical dilemmas in the outdoors.
- Teaching respect for the wilderness in culturally appropriate ways.
- Helping people think more about wilderness and ethics in multiple ways.
- Measuring the effectiveness (behavior change) over the long term. A need for a longitudinal study mechanism.
- Determining the right audience/target group to study. School-age children? Teachers? Adults? Stock users? Hikers? Nonwilderness users?
- Observing good or bad behavior and then determining if the individual/group did or did not benefit from wilderness education.
- Explaining differences between "wildlands" and wilderness.
- The need for more clearly defined objective(s) for wilderness education.

What Are Some Specific Research Topics For Study In Wilderness Education?

- Is actual experience in wilderness a predictor of long-term appreciation of wilderness?
- The effects of wilderness (or merely nature) experiences versus classroom education on behavioral attitudes towards wilderness.
- Which independent variable—environmental sensitivity or knowledge of environmental action strategies—is more in need of enhancement, and for which audiences, in order to increase responsible environmental behavior.
- Exploring the “disconnect” between attitudes and behavior (in the long view, it is the behavior that matters).
- Why do attitudes lead to behavior in the marketplace (as evidenced by consumer research), but not in wilderness (as evidenced in wilderness education research)?
- Would it be better to concentrate limited education time and budgets on adults (the actual users, voters, parents) who are currently using/impacting wilderness, rather than children, for better effectiveness?
- Quality of good presenters—what training they need. How can people with no environmental educational background become better educators and become more effective?
- A measure of the effectiveness of who delivers a wilderness education program.
- Methods of successfully reaching local adults, especially in rural areas, who have generations of experience creating unnecessary impacts on “their” public lands and are resistant to any kind of message from “the government.”
- Regarding wilderness education in the schools, how do you accommodate children with various levels of disabilities?
- For school-age education—are there ways to effectively incorporate programs such as the “Wilderness & Land Ethic” curriculum into school curriculums? Teachers have so much required curriculum that they are reluctant or unable to include wilderness curriculum or add to their workload. Does the curriculum meet national and state educational guidelines?
- There is a need to examine the “fit” of wilderness education with other content (biology, environmental education, physical education)
- Measuring the effectiveness of interactive video tools or web-based sites that might alter pre-trip attitudes and understanding of wilderness.
- Should wilderness be “advertised” in the same way Dodge Caravans are?

Concluding Remarks

Wilderness managers have prioritized wilderness education as a strategy to increase wilderness knowledge for the public, agency and external organizations, politicians and media. A Unified Wilderness Education Plan could increase understanding, appreciation and support for wilderness. Despite the importance wilderness managers place on wilderness education, there is little research on wilderness

education program effectiveness in changing levels of knowledge, attitudes and beliefs about wilderness.

At present the K-8 “Wilderness & Land Ethic” curriculum is being evaluated to determine its effectiveness to influence students’ and teachers’ knowledge, attitudes and beliefs about wilderness. If the goal of environmental education is to develop environmentally responsible and active citizens, then entry-level, ownership, and empowerment variables from the Model of Responsible Environmental Behavior should be tested using the “Wilderness & Land Ethic” curriculum.

Another wilderness education research program for school-age children on low-impact camping determined how persuasive communication sources and messages and grade level influence behavior intentions. Wilderness educators who evaluated the low-impact camping program felt that the program is an effective tool for teaching wilderness education.

Although wilderness education programs reach diverse audiences, the wilderness message needs to reach a much broader spectrum of the American public. Wilderness education research examples were provided in this session and participants offered additional suggestions to determine new directions and priorities for research. The overall goal and direction of wilderness education practices and research should influence knowledge, attitudes, beliefs and behaviors that will ensure the preservation of the National Wilderness Preservation System for present and future generations.

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