HISTORICAL LANDSCAPE CHANGE IN YELLOWSTONE NATIONAL PARK: DEMONSTRATING THE VALUE OF INTENSIVE FIELD OBSERVATION AND REPEAT PHOTOGRAPHY*

JUDITH L. MEYER and YOLONDA YOUNGS

ABSTRACT. Although transportation and outdoor recreation are well-recognized aspects of national parks, few studies have explored these aspects from the perspective of human geography as a means of analyzing historical landscape change. This paper offers an innovative synthesis of methods for studying cultural landscape change over time through a case study of the historical geography of transportation, tourism, and outdoor recreation along the Howard Eaton Trail (HET) in Yellowstone National Park. We conducted research through a field course that combined repeat photography, archival research, Geographic Information Systems (GIS), and traditional field methods. Results indicate that a combination of repeat photography and other methods can create an effective means of evaluating cultural landscape change; even short field courses provide opportunities for students and faculty to conduct collaborative research that provides powerful, multidimensional, situated-learning experiences; and repeat photography creates datasets that may benefit future research and teaching. Keywords: fieldwork, landscape, repeat photography, Yellowstone National Park.

As an academic discipline, geography is inherently interdisciplinary and place-based drawing from a wide variety of methods and approaches that span the physical and social sciences. Field studies, in particular, are deeply rooted in geography, because they take place in physical locations, are informed by the cultural context of “place,” and may use quantitative and qualitative tools and techniques for data gathering, analysis, illustration, and interpretation. This paper describes a one-week-long field course in Yellowstone National Park undertaken by faculty and students from Missouri State University and Idaho State University in June 2014. Its primary goal is to contribute to our understanding of national parks as deeply humanized places whose landscapes record and reveal changing social expectations of and experiences in nature. More specifically, it addresses the historical geography of transportation and outdoor recreation in Yellowstone during the National Park Service’s (NPS) first

*The authors wish to thank their respective universities and departments for supporting this field course. Partial funding for this research project was made possible by the following: an Idaho Humanities Council Major grant (IHC #2013018), the Ozarks Environmental and Water Resources Institute at Missouri State University, the Association of American Geographers’ Anne White Award, and a Missouri State University Summer Faculty Fellowship. The authors would also like to thank the National Park Service for waiving entrance fees and permitting access to archival, museum, and library materials through the NPS Heritage and Research Center (YELL-2014-SCI-6012). Finally, this project would not have been possible without the insight and expertise provided by Leslie Quinn, Lee Whittlesey, Kortney Huffman, and all the students who participated in the field course.

Dr. MEYER is a professor of geography at Missouri State University, Springfield, Missouri 65897; [JudithMeyer@missouristate.edu]. Dr. YOUNGS is an assistant professor of geography and global studies at Idaho State University, Pocatello, Idaho 83209; [younyolo@isu.edu].

Geographical Review 1–23
DOI: 10.1111/geore.12255
Copyright © 2017 by the American Geographical Society of New York
century, 1916 to 2016. To this end, photo-pairs derived using repeat photogra-
phy are used to document landscape change along parts of the Howard Eaton
Trail (HET), a once-famous trail built and maintained by the NPS from 1923
until 1970. This project adds to the numerous repeat-photography studies set in
national parks and is the first to use photo-pairs to examine how different
modes of travel affect the tourist experience in Yellowstone. In addition, it is
the first scholarly work to address the role of saddle-horse tours or “trail rid-
ing” as part of the park experience and includes a map and discussion of the
Howard Eaton Trail as evidence of how the NPS’s recreation policies manifest
themselves on the landscape.

A secondary goal is to use our field course as evidence of the continuing
value of fieldwork as form of research in geography as an academic discipline. At
a time when research data can be accessed easily and quickly from online
sources, and students can upload and download course materials without setting
foot outside, conducting research-based field courses may seem an antiquated
approach to teaching and learning. However, this paper suggests that field
courses allow students a real-world immersion in “place” that may result in a
more intensive, personal, and synergistic learning experience than provided by
classroom, lab, or online learning alone. The processes of site selection, hiking,
observation, and photo-pair analysis required of using rephotography as a field
method encourages students to relive the historical experience of place. Faculty,
too, benefit from the give-and-take as alternative theories and observations are
proposed by students and faculty, each of whom brings fresh eyes and ideas to
the project. Hence, field courses promote faculty-student research through intel-
lectual connections and discussions and the collaborative process of weaving
together archival research, field-based observations, and the visual evidence of
historic and contemporary photographs to better understand cultural landscape
change.

Role of Fieldwork in Geography

Engaging in fieldwork and teaching field courses has a long and rich tradition
in geography (Davis 1954; Platt 1959; Corey 1968; Parsons 1977). Geographers
find fieldwork “a process of investigation, vital for learning,” and we “identify
ourselves in large part through our fieldwork” (DeLyser and Starrs 2001, vi–vii;
see also Parsons 1977). Fieldwork is essential to what geographers do, how we
think, our areas of specialty, and our methodical development both in North
America and around the world (Foskett 1999; Gade 2001; Gomez Mendoza
2001; Mathewson 2001; Rice and Bulman 2001). Yi-Fu Tuan reminds us that
fieldtrips are more than one trip or one project, but instead a way of seeing the
world and that life itself is an extended fieldtrip (Tuan 2001).

In the American tradition dating back to Carl Sauer and the Berkeley
School’s morphological approach to landscape study, geographers have been
keenly interested in human-environment interactions. Recent scholarship has
expanded beyond these traditional approaches (Burrell 2014). Cultural geographers, for example, collect attitudes, opinions, and demographic profiles; reconstruct cityscapes; assess the structure of social power or economic growth in downtowns; and ground-truth historic imagery with contemporary photographs. Increasingly, geographers who use remotely sensed imagery, augmented reality, 3D visualizations, agent-based modeling, and other digital tools also use field methods to better understand the source and quality of their data and to strengthen real-world applications of their work.

Fieldwork provides a venue for geographers-in-training to practice reading the landscape. “Geography is an observational, not experimental science, and its observations must be made ‘in the field’” (Corey 1968, i). The intent of this statement and the practice of fieldwork have shifted over time with the introduction of digital equipment, online data sets, and internet-based research. In light of the digital revolution, some geographers no longer need to go “to the field” to conduct research. Yet, an understanding of field methods and how, when, and under what conditions field data is collected is as vital as ever to assess the value, accuracy, and best uses behind any digital metadata table.

Sometimes, however, the skills, expertise, and pleasures of fieldwork do not transfer to students, especially undergraduates who are beginning their academic careers or are new to geography (Thomas 1978). In the past, many geography departments included field courses in their curricula, but departments now struggle to offer field courses, in part because data is available digitally, but also due to shrinking student-travel budgets. However, there is great intellectual and educational value in field courses that stimulate student learning and engagement. The project described here offers one solution whereby multiple departments and universities share costs, equipment, and expertise. Further, because our field site was a national park, entrance fees were waived as part of the park’s educational mission, and we were able to take advantage of the park’s library and museum holdings.

**Fieldwork in National Parks**

United States national parks are places invested with meanings and values associated with nature that go beyond their serving as physical laboratories for environmental research. National parks commemorate, preserve, and tell the story of people, places, and things deemed noteworthy to the country as a whole, and scholars have studied parks collectively and individually. Geographers and historians have described national park politics (Dilsaver and Wyckoff 1999, 2005), tourism (Dilsaver 1992; Young 2002; Blodgett 2007; Youngs 2014), and the use of imagery in the process of place making (Wyckoff and Dilsaver 1997). Geographers also focus on national parks as case studies for exploring changing ideas about transportation and cultural landscapes (Youngs 2008), hidden landscapes of environmental management (Colten and Dilsaver 2008), and as examples of practicing sustainability (Meyer 2001, 2008; Smith, Karosic,
and Smith 2015). Scholars explore how cultural diversity and social justice reveals different and contested meanings in national parks (Morehouse 1996; Azaryahu and Foote 2008). Researchers offer studies about the role of national parks in creating a national identity (Runte 2010), forging ideas of nature preservation and conservation (Sellars 1997), defining the roles of tourists and tourism in the settlement of the American West (Rothman 1998; Wrobel and Long 2001), managing public lands (Fiege 2011), informing policy decisions (Williams and Stewart 1998), and the “rewilding” of humanized landscapes (Feldman 2011). Much of this scholarship is grounded in case studies of individual parks.

As the oldest and one of the largest U.S. national parks outside of Alaska, Yellowstone provides opportunities for both physical and social scientific research. Geographers and other scholars have highlighted Yellowstone in case studies for understanding contested social landscapes and conservation battles (Smith 2004); the evolution of a unique sense of place (Meyer 1996); the interplay of ecology, park management, and culture (Schullery 2004); the role of science and recreation management (Pritchard 1999; Yochim 2013); and storytelling and tour-guide experiences (Whittlesey 2007).

Yellowstone is a particularly good site for studying the historical geography of transportation in national parks, because its age and large size allowed—and even necessitated—the use of a wide range of transportation modes over time. Each generation of tourists toured the park to see Yellowstone’s must-see sights, but their experiences of seeing those places differed widely depending on their travel choices such as type of conveyance, length of stay, type of accommodation, and expense. At the time of Yellowstone’s establishment in 1872 and for the next four decades, tourists travelled on foot, in the saddle, or by horse-drawn vehicle. Wealthy tourists typically traveled by rail to the park’s gateway communities, where they boarded stagecoaches. Between 1883 and his death in 1922, a Wyoming dude rancher named Howard Eaton led saddle-horse tours through Yellowstone and provided his guests a chance to relive the frontier (Silliman 1979; Ringley 2010). In 1923, the NPS opened the park’s first and only park-encircling saddle-horse and hiking trail, a necessity for riders recently banished from the main road when it became a route for motorized vehicles only. For the next fifty years, the HET, served both trail riders and hikers, reflecting the waxing and waning popularity of these different forms of outdoor recreation.

The mission of the NPS and its management decisions affect the tourist experience. After almost a century of promoting tourism, Yellowstone administrators shifted their stance to embrace policies that emphasized restoring ecological integrity and limiting human impact. As part of this latest management approach, the NPS stopped maintaining the HET because much of it passed through vital wildlife habitat or geologically unstable or sensitive terrain. Yet, as the HET fades from the physical landscape, it lives on as artifacts in
museums and archives, as an outdoor classroom, as the research products from fieldwork, and in the memories of students and faculty involved in the project described below.

**Repeat Photography**

As dynamic cultural and environmental landscapes, national parks are fertile study sites for fieldwork incorporating repeat photography. As federally protected public lands dedicated to both human use and environmental protection, national parks are often well documented through visual records housed in park collections and regional archives, libraries, and museums. Repeat photography is a method that attempts to capture the exact same scene as a historical photograph in a new image as close to the original picture as possible. These before-and-after photographs may then be analyzed individually and together as a photo-pair. Individually, each photograph reveals not only what is visible in the scene, but also the photographer’s purposeful decision to capture one scene as opposed to another in a particular way: framing the scene or shooting it from a certain angle or distance from the subject and at a particular point in time (Hoelscher 1998; Sidaway 2002; Youngs 2012). Hence, it creates a data set in the form of the photographs themselves and the photo-pairs.

Scholars employ repeat photography to study change over time in both physical and cultural landscapes. Scientists measure physical landscape change through a variety of visual indicators, including vegetation cover (Butler and DeChano 2001), debris flows (Bahre 1991; Webb 2010), glaciers in Glacier National Park (Fagre and McKeon 2010), and riparian corridors in the Grand Canyon (Webb 1996), as well assessment of ecosystems more generally (Swetnam, Allen, and Betancourt 1999). To yield good, useful environmental data, rephotography requires a nearly perfect match to the original in terms of location, time of day, season of the year, and even type of camera, film, and focal lengths (Klett 2011). Mark Klett outlines two approaches: “finding the exact location where an original photograph was made, and accurately reoccupying the position and framing the initial view,” or focusing on capturing the historic image location but with less concern for “the exact relocation of the original position or frame,” concentrating instead on the “context surrounding the photograph” to find the “stories associated with those images and location” (2011, 115). The research project described here used the second approach—rephotography as a qualitative tool to better understand landscapes change over time—because many of our research goals were interpretive and observational. Although the quality of some of our resultant photo-pairs did allow for quantitative analysis, ours was primarily a qualitative study as we were more concerned with the cultural and historical context of each image.

Scholars also use repeat photography to study cultural landscape change at a variety of time scales and in a variety of settings. Daniel Arreola and Nick Burkhart (2010) studied urban landscapes of the Mexican-American border,
while Wyckoff (2006) explored road corridors in Montana. Peter Goin’s work employs a broader methodological approach by considering the social context of the photographs equally as important as what is actually visible in the photographs (2001). Similarly, Mark Klett and Byron Wolfe blend art and ethnography and lay out specific guidelines for their methodology (Klett and others 1984; Klett 2011; Klett and others 2004). In national parks, repeat photography has been used to gather cultural and human-environment data in Yosemite (Vale and Vale 1994) and Grand Canyon (Klett and Wolfe 2012), and across the border in Canada’s Jasper National Park (Cronin 2011). In Yellowstone, repeat photography informs the study of land cover (Meagher and Houston 1998), historical surveys, and sense of place (Huber 2016). Our research adds to this literature and expands the work of scholars using repeat photography for field courses (Lemmons, Brannstrom, and Hurd 2014), historical trails (Jonas 2010), and paths (Walker and Leib 2002).

**Methodology**

**THE FIELD COURSE AND REPEAT PHOTOGRAPHY**

The field course described here was one week of two different summer school courses being taught at two different institutions: Missouri State University (MSU) and Idaho State University (ISU), with about half of the dozen students coming from each institution. All students completed at least one college course on some aspect of the geography of national parks, read assignments associated specifically with this field course, and practiced rephotography on campus prior to arriving in Yellowstone. During the week together in Yellowstone, two vans, one from each institution, travelled together, and all students attended daily lectures, repeat-photography sessions, hikes, and other shared activities. After the course, all students completed field journals and provided feedback. The broader purpose of the course was to study the historical tourist experience of different transportation modes (traveling on horseback on a trail rather than by stagecoach on a road) and to understand the history of the HET as a site for outdoor recreation. In addition, the field course had two more explicitly “hands-on” objectives. First was for students to rephotograph scenes from historical photographs, matching them as best they could given our one-week time constraint. Second was to hike a section of the once-heavily-used HET to assess the physical and aesthetic viewshed of the trail, and the extent that it was returning to more natural conditions. In so doing, students learned to read the landscape, look for obvious and not-so-obvious clues that indicated the route of the HET, and consider factors that might have played a role in landscape recovery over the past fifty years.

The MSI-ISU collaborative field course began even before students from Springfield, Missouri, and Pocatello, Idaho, arrived at Yellowstone. As part of a previous GIS course a year earlier, one student made a map of the entire HET, using ArcGIS 10.2 (Figure 1) by digitizing segments of the trail found on seven
Fig. 1—Yellowstone’s Howard Eaton Trail and the Grand Loop Road. The black line indicates the route of the Howard Eaton Trail as it appears on USGS 15’ topographic maps released in 1956 (Old Faithful Quadrangle and West Thumb Quadrangle), 1958 (Madison Junction Quadrangle, Mammoth Quadrangle, and Norris Junction Quadrangle), and 1959 (Canyon Village Quadrangle, Tower Junction Quadrangle, and West Thumb Quadrangle). The red line indicates the location of the Grand Loop Road, the main paved road around the park. With a few minor exceptions, the trail is never more than three miles from the road. (Cartography courtesy of Aaron Pavlowsky and Marc Owen, Missouri State University.)
different USGS topographic maps. This map provided a means of finding and demarcating locations for rephotography sites and illustrating the spatial relationship between the HET and the main road. The latter made possible a comparison of the tourist experience when students hiked the historic trail and walked or drove on the main road at same general location. Further, the map now serves as a valuable research tool for others interested in the HET, and as an example of the value of GIS to many different types of research and especially those working with incomplete or scattered archival and map evidence.

Another piece of the project completed prior to our arrival in Yellowstone was gathering the “original” and historic photographs for the rephotography portion of the course. Earlier visits to the NPS’s Heritage and Research Center (HRC) in Gardiner, Montana, where photographs of both Howard Eaton tour groups and Howard Eaton Trail maintenance records are housed, resulted in the procurement of approximately three-dozen potential “original” photographs for the photo-pairs. An MSU graduate student writing her thesis on the HET then sifted through the photographs and chose ten suitable for use in the field course. She chose photographs based on several criteria, including the physical quality of the photograph itself (no tears or smudges, for example) and clarity of the scene (sharpness, good contrast between dark and light). Naturally, the content of the photograph had to be relevant to this study: scenes showing tourists traveling as part of a Howard Eaton tour group or scenes showing the location or condition of the HET. Students followed the practice of other repeat photographers who used the presence of distinctive landmarks such as mountains, ridgelines, or roads as another important criteria to anchor the rephotograph (see Meagher and Houston 1998; Hendrick and Copenheaver 2009; Webb and others 2010). Other considerations were whether or not the photograph included information indicating its location or date, and whether or not we were able to access the site where the photograph was taken. Given the timing and short duration of the field course and the size of the park, we were limited to using photographs taken in the summer and at sites open to the public that could be reached within a three-hour hike.

The ten “original” photographs were then digitally scanned and enlarged, placed in protective sleeves in three-ring binders, and distributed as field-ready rephotography kits to students. This allowed students to take a copy of an original photograph into the field to scout for the best vantage point for a

---

Fig. 2—Monument Geyser Basin and rephotography field methods. (a) Original photograph, YELL 192993—101, labeled “New Howard Eaton Trail Location. Monument Geyser basin. 9/20/36 Skinner” was provided by Yellowstone’s Heritage and Research Center, National Park Service as are all the other original photographs used for this field study. (b) Enlargement of original photograph placed in protective sleeve for use in the field. Photograph taken by Kortney Huffman on June 8, 2014. (c) Rephotograph taken on June 8, 2014 by MSU students.
HISTORICAL LANDSCAPE CHANGE IN YELLOWSTONE

(a) Photograph of the landscape before the intervention.

(b) Close-up of the original photograph, showing details.

(c) The landscape today, after the changes have occurred.
rephotograph (Figure 2). Because students used digital cameras, they could see their repeat photograph immediately, evaluate it, and take another repeat photograph from a different angle or vantage point if necessary.

Three photo-pairs are discussed below, each chosen to illustrate important outcomes of this study including the wealth of information that may be captured in a single photograph, the effectiveness of rephotography as both a research method and a field course learning tool, the process of “doing” rephotography as evidence of how the tourist experience has changed, and how this predominantly qualitative and contextual study allowed some quantitative analysis of landscape change. In addition, further digital manipulation of the Figure 3 photo-pair created a telling overlay encapsulating past and present in a single image, a process reproduced for several of the students’ photo-pairs we were unable to include in this paper.

**Case Study: Yellowstone National Park’s Howard Eaton Trail**

**Eaton Tour Group at the Roosevelt Arch**

The several images in Figure 3 illustrate different aspects of this research project. The first is to teach students to use rephotography by choosing an effective original photograph and taking/making a good corresponding rephotograph. The second is to derive information about the tourist experience by analyzing each photograph individually for what it reveals about people and place. The third is analyzing the photo-pairs for evidence of change. The final aspect is to provide a new perspective of iconic park features. Using an open-source raster graphic editor called GNU Image Manipulation Program (GIMP), we could magnify, rotate, and create a composite image by superimposing the original on the rephotograph. Figure 3a is the original photograph that depicts a scene at Yellowstone’s north entrance in Gardiner, Montana. There are two important focal points. One is a famous landmark, the Gateway or Roosevelt Arch, visible for miles in any direction and an iconic landmark inside an iconic landscape—a place within a place. The physical structure marks passage from the usual, the mundane, into “Wonderland” (Whittlesey 1988). The arch commemorates a 1903 visit by President Teddy Roosevelt. The words “For the Benefit and Enjoyment of the People” appear near the top and come from the legislation that created Yellowstone as a national park. Hence, the arch symbolizes the very idea of setting aside public lands as national parks, Yellowstone’s role

---

**Fig. 3**—Roosevelt Arch, north entrance to Yellowstone National Park. (a) Original photograph, YELL 161563”, is labeled “At the entrance.” No date is provided for the photograph, but it was probably taken at the time of the other, similar photographs in the collection during Howard Eaton Tours to Yellowstone in 1912, 1913, and 1914. (b) Rephotograph taken on June 10, 2014 by Ryan Houghton, Idaho State University. (c) Overlay. Kortney Huffman, Missouri State University, MS thesis, July 2015.
in making that concept a reality, and a connection with our first conservation
president.

The second focal point is the Eaton tour party. There are at least two-dozen
men and women in fine clothing, riding well-equipped horses, and arranged in
a crowded line behind a leader in western garb. These are people of means
who could afford to travel by stagecoach but chose instead to ride horses and
sleep in tents as part of an Eaton tour. Members of the touring party will pre-
sumably ride around the stonewall on the right and then use the trail partially
visible through the sparse vegetation on the hill above the wall. This is a
Howard Eaton tour, but they are not on the HET. The HET would not be con-
structed for another decade. To the left, the view of Gardiner is blocked by a
thick stand of young trees. The Figure 3a photograph seems to be profession-
ally produced. Its high resolution shows incredible detail: tourists’ facial expres-
sions, ironed shirts and blouses, and no motion-blur around the horses’
hooves. The arch, stone wall, hill in the foreground, and valley side slopes in
the background provide multiple landmarks to anchor the rephotograph.

Figure 3b is the same place almost exactly a century later. In 2014, the road
is paved and a hybrid vehicle occupies the place where Eaton’s riders once
stood, clear evidence of how transportation modes have changed. Gardiner is
now visible in the background. The building bisected by the left margin is the
historic Halls Mercantile, a once-thriving general store that went through a
period of decline only to be renovated and reinvented as the headquarters for
the Yellowstone Association, now known as Yellowstone Forever. Modern traf-
fic signs, infrastructure not needed in Eaton’s day when visitation was much
lower, are visible in the rephotograph. Close inspection of the rephotograph
reveals a group of people standing underneath the arch waiting to be pho-
tographed. Our students realized that it is just this sort of dangerous activity
that initiated the recently completed Gardiner Gateway Project. The main road
no longer passes under the arch, so tourists taking pictures at the arch do not
disrupt traffic.

Figure 3c, an overlay of the photo-pair images, is itself a teaching tool
revealing evidence of change and stability connecting past and present. People,
cultural forces, and historical processes seem to move through the image, yet
the arch remains, attesting to Yellowstone’s continuing role as a crown jewel in
the national park system. As a national park, Yellowstone predates the NPS by
more than forty years, so as the NPS evolved as a federal agency, its changing
management philosophies shaped Yellowstone’s cultural landscape. Over time,
beggar bears and wolf eradication programs gave way to endangered-species
status for the grizzly and a successful wolf-reintroduction program. Fire-sup-
pression practices that supported management for tourism gave way to policies
that allow fires to maintain and restore ecological integrity. Transportation
modes changed as affordable automobiles brought about the demise of the rail-
road, saddle-horse tours, and stagecoaches. The passenger rail service that
brought Eaton’s clients, horses, and camping gear to Yellowstone ended in 1948, and the tracks were removed in 1976 (Whittlesey 2015). The train depot now serves as the Gardiner town library. Despite these changes, there is a visible permanence to the scene. The haunting image of the overlay captures a century of accumulated meanings and experiences rooted in place.

**EATON TOUR GROUP AT BISCUIT BASIN**

The images in Figure 4 were taken at Biscuit Basin, a geothermal area just a few miles from Old Faithful Geyser. Like the previous photo-pair, the Biscuit Basin photo-pair illustrates how the tourist experience has changed over time. In 1914, when the original photograph (Figure 4a) was taken, there was little concern for protecting thermal features, and tourists used the hot springs for bathing, cooking food, and washing clothes (Meyer 1996). Here, Eaton’s clientele stand or kneel at the edge of a hot spring with bundles of laundry. Large camping parties such as Eaton’s set up tents and corralled horses in thermal areas to take advantage of the hot water and generally flat terrain. Eaton’s tents are visible in the left, middle ground, and there are footprints in the white, crumbling geyserite in the foreground.

A series of skyline ridges helped students line up the rephotograph, but new rules keeping visitors on designated paths and boardwalks through thermal areas precluded students from securing a better match with the original photograph. Restricting access protects delicate thermal features from the vandalism and contamination associated with the very tourist practices visible in the original photograph. Today, the notion of unfettered access to and use of hot springs so common during Eaton’s touring days is anathema to the park’s tourist experience. The Figure 4 photo-pair reveals changes in the physical landscape as well. Young, light-green trees in the background are new growth after a forest fire, and grass now grows in the undisturbed area around the hot spring.

**THE NEW HOWARD EATON TRAIL THROUGH THE HOODOOS**

The HET that opened to the public in 1923 underwent a major reconstruction and rerouting in the 1930s. Changes were so extensive that photo captions refer to it as the New Howard Eaton Trail to distinguish it from its predecessor. Figure 5 is a view looking from the main road up to the proposed new route. The first HET passed behind the mountain, and the new route was laid out to provide riders and hikers a more scenic and panoramic view. Someone drew a black, hatched line across the original photograph (Figure 5a), indicating the route of the new trail. The original photograph shows an automobile parked in the curve of the road and a triangular sign just downhill and near a rocky outcrop. Beyond cautioning “SLOW,” the wording on the sign is illegible. The 1930s road is paved, but does not have a painted centerline.
In the rephotograph (Figure 5b), the Grand Loop Road is still a narrow, shoulderless road. However, it is a busy stretch of highway, and students had to work together to safely rephotograph the scene. In addition to practicing effective teamwork, the situation also served as an indication of Yellowstone’s popularity as a tourist destination for motorists today. Analysis of the photo-pair shows that the modern road has clearly painted lines down its center and sides. The guardrail is gone, but there is still a triangular sign more or less where the car was parked in the original photograph.

The condition of the physical landscape plays a greater role in this photo-pair analysis than in the previous examples. Fire swept through this area repeatedly, most notably during Yellowstone’s 1988 Summer of Fire, the first real test of the NPS’s new “let burn” policy. The Summer of Fire was an international news event, with various media suggesting that “Yellowstone had been destroyed” and fire-suppression policies should be reinstated (Effing 1989, 667). This photo-pair, however, shows no dramatic change in vegetation in the seventy-plus years between photographs, at least at the scale visible in the photo-pair. There may be different plant species growing in this area now, but the photo-pair suggests there is generally the same vegetation community of herbaceous and shrubby plants. This site is a rocky, thin-soiled, southern exposure prone to rockslides, so there has probably never been dense forest growth, and the impact of recurrent fire is seen on the mosaic of different-aged stands. There are young trees along the side of the road and filling in bare areas in the middle ground of the image, and some of the older trees in the original photograph are missing, most likely burned. Otherwise, there is little visible environmental change. This particular photo-pair allowed students to compare the impact of natural, environmental factors (such as climate conditions and disturbance events) and cultural factors (such as road construction or fire suppression) in a less-evocative location than the Roosevelt Arch, but the rephotography efforts at both locations created teachable moments.

In addition to the rephotography portion of the field course, students also hiked a five-kilometer segment of the HET to engage in traditional, active-discovery fieldwork (DeLyser and Starrs 2001). This aspect of the course affirmed the benefits of “situated learning” (Semken and Freeman 2008) or the more commonly used phrased “place-based learning” associated with the field
Fig. 5—The New Howard Eaton Trail through the Hoodoos. (a) Original photograph, YELL 192993-1067, is labeled “Trail Location at Golden Gate. November 29, 1936. Photo by Skinner” and shows a hand-drawn, hatched black line indicating the location of the HET crossing the face of the hill approximately half-way between the swath of forest below and the top of the hill above. There is a car parked on the road along the wooden-log guardrail. (b) Rephotograph taken on June 10, 2014 by Ryan Houghton, ISU.
tradition in geography (Spronken-Smith and others 2008). The faculty encouraged students to engage with the complexities of the physical landscape as they were set free in dense lodgepole pine (*pinus contorta*) forest to locate the disappearing route of the historic trail. The trail was most obvious in places where heavy use compacted the soil, slowing vegetation regrowth or creating a linear depression, sometimes containing water. There were long stretches where the trail disappeared entirely or was all but hidden under a jumble of fallen logs (Figure 6a). In other places, students followed old trail markers on tree trunks to find their way. In the early days of the HET, the letter “I” (for Interior

---

**Fig. 6**—Hiking the Howard Eaton Trail. All three photographs were taken by the authors during a 5 kilometer hike through an unmaintained portion of the HET on June 7, 2014. (a) ISU student Chloe Troester-Solbrig retracing the HET through downed timber. (b) ISU’s Dr. Yolonda Youngs points to a Department of Interior blaze on a tree along the trail route. (c) HET through section of lodgepole pine (*pinus contorta*) forest that burned in 2009. (d) View of the Grand Loop Road and Yellowstone Lake from the HET.
Department) was cut or “blazed” into tree trunks (Figure 6b) to indicate the path. Later, the NPS used brightly colored metal flags nailed to the trees instead. Where the trail was completely overgrown, students worked in teams with one group standing where the trail disappeared and another group hiking ahead until a tree with a blaze or flag was spotted. Then, they walked toward one another looking for evidence of the trail between the end points.

A forest fire burned through this section in 2009, so students could see and even smell the effects of a recent fire and early stages of forest regeneration (Figure 6c), which prompted a discussion of Yellowstone’s contentious let-burn fire policy. We expected students to have differences of opinion on the subject, assuming that those from Missouri would perceive Yellowstone was a tourist destination or sacred space located far away from their daily lives and jobs. Similarly, we assumed students from Idaho would perceive Yellowstone as “in their backyard” and a part of their regional economy based on farming, ranching, and timber cutting, as well as tourism. However, despite different backgrounds, there was little disagreement. Students understood the role of fire in ecosystems and that natural processes are integral to the “wildness” purpose of national parks.

Elsewhere, the trail emerged from the forest and followed a ridge, providing a view of Yellowstone Lake and a glimpse of the main road below (Figure 6d). Here, students could compare what riders and hikers on the HET saw with what people in automobiles could see, and they mused over the differences. They noted the open, expansive, and “better” view from the trail compared to the view from the forest-enclosed road below. Further, throughout the hike, students remarked on what it must have been like to ride a horse or hike through these woods when it was a well-kept thoroughfare. The rephotography exercise made them aware not only of past landscapes and tourist experiences, but also how people can experience the same place differently depending on their point in time and their purpose for being in a particular place. Hiking the Howard Eaton was not only a landscape-reading challenge, but also an opportunity feel a part of the long and colorful legacy of the trail.

**DISCUSSION AND RECOMMENDATIONS**

Repeat photography can be a powerful tool for human geographers to evaluate cultural landscape change over time. This paper provides an example of this approach through a study of changes in transportation and outdoor recreation and how they shaped the historic and contemporary landscape of Yellowstone National Park. In the context of a field course, repeat photography facilitates a dynamic research environment for faculty and students that is difficult to mimic on campus and may result in new findings. In the act of creating repeat photography sets in the field, students and faculty must closely observe landscape features, discuss what they see, and actively compare their different ways of “reading” the landscape. In the process, they can better understand subtle
landscape changes that may have eluded them on campus or in the lab. Our results are presented in a series of photo pairs with descriptions of the landscape changes culled from our field observations, analysis of the repeat photos, and comparison with a GIS map showing historic trail routes.

Taken as a whole, this paper provides an innovative blend of methods for human geographers interested in cultural landscape change and encouragement to consider repeat photography in field courses. Understanding place may involve a host of different research methods from objective data gathering to subjective interpretation of data embedded in literary, visual, or other arts. Using a combination of quantitative and qualitative analysis yields a richer, more comprehensive understanding of place than using only one approach. Field courses provide powerful experiences that distinguish geography and geographic research from disciplines not as intuitively rooted in place.

Further, field courses are fun, exhilarating, exhausting, and rewarding; provide service learning and outreach opportunities; provide professional development experiences; and yield products such as maps and photo-pairs that may serve as useful baseline datasets—relevant tools for future field studies. Students in our course, for example, experienced service learning and outreach opportunities by exploring rarely traveled parts of the HET, completing trail work, and represented our universities through their meetings and conversations with U.S. National Park Service cultural resources staff, concessionaire historians, and interpreters who met us for hikes and tours in Yellowstone. Fieldwork experience also provides professional development and skills that increase a student’s employability (Solem, Cheung, and Schlemper 2008).

Digital repeat photography is effective, inexpensive, and adaptable as both a research method and as a teaching tool. The very act of rephotography is a lesson in “doing geography” that fosters active learning and an intimate engagement with the landscape. To complete a successful repeat-photography session, students carefully observed discrete elements in the original photograph such as subtle changes in light or shadow and the scale, frame and angle. Already on the first day of the field course, students mentioned that Yellowstone’s landscape seemed to “open up” to them as they practiced taking rephotographs.

Photo-pairs, too, serve multiple purposes and play more than one role in this field study. The photo-pairs themselves are now cultural artifacts recording the attributes of place at discrete points in time. The photo-pairs are also research and teaching tools that reveal the passage of time, begging explanation of what can be seen, what is missing, and what has changed. In our case, they reveal changes in the Yellowstone landscape and tourist experience in terms of transportation modes as well as the changing popularity of different forms of outdoor recreation, expectations of a national park experience, and the NPS’s evolving role in managing landscapes for preservation and tourism. In this particular case, the collaboration of students and faculty from different institutions allowed us to amass enough rephotographs to create several good photo-pairs
and even a few overlays upon which one Missouri State University student based her Masters thesis (Huffman 2015).

National parks are indeed outdoor classrooms in the broadest interpretation of classrooms as “sites of learning.” Parks are laboratories for studying wildlife, climate change, and the impact of human activities, especially those associated with outdoor recreation and tourism. They are outdoor libraries offering expansive, publically available resources that record and preserve a breadth and depth of human experiences. They are field study sites amenable to a spectrum of research projects that may include geospatial technologies and weave together complex and engaging learning that deepens students’ knowledge of geographic methods and scholarship.

The Howard Eaton Trail may not be a “site of memory” as described by Steven Hoelscher and Derek Alderman (2004), but it is a site that embodies the collective memories of park users as well as manifesting evidence of different eras in park management. During its fifty-year history, the HET served as a transportation corridor, tourism infrastructure, and a recreational rite of passage for hikers wishing to boast of walking the entire 157-mile trail. As physical evidence of the HET disappears, it is kept alive as an artifact of the cultural-historical landscape through field courses such as the one described here and through other learning opportunities. Yellowstone Forever, for example, offers family-oriented, one-day courses on the history of the HET, and participants engage in trail-finding endeavors similar to those of students in our course. In addition, there are numerous websites and blogs where hikers post accounts, photographs, and reminiscences of the trail.

Future research could build on this project to create more photo-pairs and additional documentation and trail mapping of the HET. Data-mining the Internet for photographs and posts might be another means to crowdsource the creation of a memory map or landscape narrative. Photographs posted online through social media outlets such as Instagram or Flickr could be analyzed for evidence of vegetation change, alterations to the cultural landscape, or people’s emotional response to the trail. It would be interesting to know if people who remember the trail are primarily Yellowstone visitors and employees, or if the trail carries regional or national name recognition. Three short segments of the original trail are still open to hikers and each segment is named “Howard Eaton Trail.” Hence, hikers using the remaining HET could be interviewed as to why they chose this particular place to hike. Was it their familiarity with the historic HET or simply a good fit with their travel plans on that particular day?

This combined research project and field course is one example of how to explore the concept of landscape through fieldwork and repeat photography. National parks, and Yellowstone in particular, offer a wide range of opportunities for researchers, teachers, and students, thanks to voluminous, publically available, and well-organized photographic records. This project could also be
replicated in other national parks and protected areas with similarly expansive photo archives, diverse field sites, and a history of tourism development and management.

REFERENCES


