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Guest Editors
Gerard Kyle and Yi-Chung Hsu
Editorial

Special Issue: “Issues Confronting the Management of the World’s National Parks: Commentaries from Scholars across the Globe”

Issues confronting the management of the world’s national parks are as many as they are diverse. This special issue is aimed at providing a snapshot of this complexity by inviting scholars and managers from around the globe to contribute to our understanding of the broad theme of “issues confronting the management of the world’s national parks”.

The concept of a formal park or protected area was born over one hundred years ago on the frontier of the North American West at a time when the indigenous population was being displaced by predominantly European immigrants. While Europe had been thoroughly occupied for thousands of years by a diverse array of ethnic groups, North America’s European immigrants were captured by the frontier’s “virgin” landscape and aimed to preserve a fragment of the “tamed” landscape in pristine condition. A key element in the establishment of Yellowstone National Park in 1872 – an area formally occupied by Shoshone, Crow and Blackfoot Indians – was that people (except for park staff) – were not permitted to permanently reside within park boundaries. This model for national parks which purposively excluded human habitation grew slowly at first but quickly gained momentum with a number of countries adopting the North American framework (UICN, 1992). Experience has showed, however, that most parts of the world have had people inhabiting the landscape – or at least having people with legitimate historical claims to the land. In recognition of the reality that conserving nature required a more flexible approach to management, many countries have augmented the “Yellowstone model” and developed a broad array of management plans to accommodate traditional ties (and uses) to the land. A snapshot of this diversity in management policy and the complex issues tied to policy is captured in the submissions to this special issue. While far from an exhaustive inventory of the issues confronting the world national parks, the submissions to this special issue are diverse featuring studies/analyses of national park systems across six countries.

Within this special issue, we have 10 papers that address three broad themes relating to issues confronting the world’s national parks; 1) management and policy, 2) parks and community, and 3) applied insights. Within the first section on management and policy, Dr. Paul Wilkinson provides a review of Canada’s National Parks Act. In 2000 a panel was
convened to review the extent to which the act was preserving the ecological integrity of national parks across Canada. This panel offered 127 recommendations for action. Dr. Wilkinson’s analysis focuses on monitoring the progress of efforts to implement the panel’s recommendations from 2000 through 2010. His analysis suggests that, while room for improvement, Parks Canada has made considerable progress toward implementing key initiatives such as funding for ecological integrity, the establishment of new national parks, the provision of visitor information, and the implementation of park management practices. In the second paper falling in this theme, contributed by Dr. Robert Manning, the focus turns to the issue of managing visitor capacity with national parks. Dr. Manning provides an overview of several management capacity frameworks that rely on the formulation of indicators and standards of quality for park resources and visitor experience. In addition to providing insight on the data requirements for effectively implementing and managing visitor capacity frameworks, Dr. Manning provides examples drawn from his work and that of his colleagues conducted within the context of U.S. national parks. These examples provide illustrations for how to implement various capacity frameworks across a diverse range of national park contexts. In the third paper, Drs. David Newsome and Carol Lacroix discuss other potential uses for national parks and protected areas that challenge traditional perspectives on national park priorities. Drs. Newsome and Lacroix, drawing from trends evidenced within Australian national parks, highlight the growth of non-traditional uses of park resources (e.g., adventure races and running events) that attract large numbers of people into parks and stress park resources. They argue for increased dialogue on the "appropriate use" of parks and protected area resources. Their discussion highlights the tension surrounding the discourse on what is appropriate and the fundamental purposes served by park and protected areas. Finally, the fourth paper by Drs. Tianqing Luo and Gill Lawson contrasts western national park agency structure and policy with that of China’s National Historic Relics and Scenic Sites (NHRSS). In some respect similar to their western counterpart, China’s NHRSS comprise a nation-wide system of nature reserves, cultural and natural heritage sites, and tourist resorts. Drawing from more than 370 Chinese academic sources, Drs. Luo and Lawson’s analysis identified six challenges for the future management of NHRSS. In a time of dramatic political and social change, their discussion highlights the difficulty in responding to these challenges owing to uncertainty surrounding policy development and support.

The second theme addressed in our special issue explores issues related community-park relationships. This theme acknowledges that parks do not exist as an island
independent of the broader community in which they are situated. The first paper by Dr. Robert Pahre explores conflicts of interest among political entities within the Great Yellowstone Area (GWA). Because the GWA straddles the jurisdiction of a complex web of government authority, area management is complicated by the competing demands of the agencies’ mandates. Finding common ground can be challenging in such contexts. Dr. Pahre’s case analysis provides insight that can be applied to other resource contexts impacted by competing political agenda. In the second paper, Drs. Eick von Ruschkoswki and Marius Mayer examine conflicts between national park management, local communities, and tourism industry operatives at two German national parks. The focal issue of concern centers on the tension between conservation objectives and maintaining traditional land use practices. Given that these tensions are played out in national park contexts the world over, Drs. von Ruschkoswki and Mayer’s recommendations and insights have the potential to inform policy on park-community relationships well beyond their own study contexts. The final paper relating to the theme of park-community relationships examines community attitudes toward ecotourism development within a Taiwanese national park. Drs. Tsuen-Ho Hsu and Ling-Zhong Lin provide insight on community attitudes toward tourism development in a relatively new national park established in 1995. The establishment of national parks in Taiwan has been somewhat controversial due to issues associated with the displacement of indigenous communities. Drs. Hsu and Lin provide insight on how the integration of indigenous perspectives in the design and operation of tourism-related industries dependent on the park can produce mutual benefit.

The final theme of our special issue provides insight on specific management issues impacting park operations. In the first paper within this theme, Drs. Jeffrey Marion and Yu-Fai Leung provide an overview of assessment protocols for monitoring the condition of trails. Given that trails are a common and important part of park infrastructure, their condition can impact both the quality of the resource and visitor experience. Drs. Marion and Leung’s presentation includes methods and data drawn from their work within U.S. national park units. In the second paper, Dr. Laurlyn Harmon and colleagues explore visitors’ perceptions of what is important about a large urban national park in Washington DC. Beyond the key finding that national parks play an important role within urban contexts for the provision of green space, Dr. Harmon and colleagues work highlights the importance of engaging the public and seeking their input in the design and implementation of management plans. Last, Drs. Michael Hughes and Jack Carlsen address the issue of fees for access to national parks in Australia. Fees have long been a concern for national park systems charged with
managing resources with stagnant or declining budgets. Drs. Hughes and Carlsen explore the balance between implementing cost recovery fee programs and maintaining access to the public good from the perspective of land management agencies. Their analysis of interviews conducted with staff from national park units across the country revealed concern that a market-driven approach would have limited success and would potentially discriminate against low-income sectors. They also noted that current cost-recovery programs were ineffective in recouping all costs given a pricing strategy that intentionally under values the product in consideration of social equity.

Guest Editors
Gerard Kyle and Yi-Chung Hsu

References

Political Opposition to Transboundary Cooperation in the Greater Yellowstone Area

Robert Pahre *

Abstract

Many environmental problems straddle political boundaries and require transboundary coordination (TBC) among political leaders—but successful, deep cooperation is rare. Most of the literature attributes such failures to weaknesses in the political process, without examining how the process may itself be politicized. This study examines the conflicts of interest over changes in the transboundary policy process in the Greater Yellowstone Area. TBC effectively brings together two or more smaller units into a larger unit. Larger units will internalize some externalities, such as environmental values. This advantages stakeholders who care the most about negative externalities, and disadvantages those who produce them. TBC will also encompass a more heterogeneous set of players, which tends to reduce the importance of local economic interests. The changing political process also affects agencies differently, depending on their own mandates. National park concerns for preservation and tourism will be privileged. Preservationist elements of the US Forest Service mandate will also be privileged, while other parts of that mandate will be disadvantaged. Finally, alongside this general pattern, certain forms of TBC can succeed because they achieve at lower cost goals on which everyone agrees. There is no conflict of interest in these cases, such as data collection, visitor education, and noxious weed control.

Keywords: ecosystem management, externalities, transboundary cooperation, Yellowstone National Park

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Overview

The Greater Yellowstone Area (GYA) represents one of the planet’s environmental treasures. It is the world’s largest intact temperate zone ecosystem. It holds more than half of the world’s geysers, and a wealth of other thermal features. The center of the region is Yellowstone National Park (YNP), but it includes two other park units (Grand Teton National Park and the John D. Rockefeller, Jr., Memorial Parkway), three wildlife refuges, six national forests organized in three different Forest Service regions, the Wind River Indian Reservation, and various state and local public lands. These public lands include federally-designated wildernesses, or de facto wildernesses such as YNP’s backcountry.

The region’s environmental resources do not recognize the political boundaries. The elk herd of the Northern Range regularly migrates north out of YNP into Montana, while many bison wander north, west, and east out of the park. To the south, both elk and bison move among Grand Teton NP (GTNP), the Bridger-Teton National Forest, and the Thorofare region of YNP. Pronghorn antelope and bighorn sheep have their own long-distance migration routes in and along the Wind River Range. Even the thermal resources cross boundaries, with the underground “plumbing” connected across substantial distances. One land manager’s actions can easily have negative consequences for other land units.

Tourism represents the largest industry in the region, though logging, ranching, oil and gas development, and minerals extraction remain important (see Barringer, 2002; Bartlett, 1985; Jobes, 1991; Power & Barrett, 2001; Preston, 2005; Rasker, 1993). The recreation sector is far from monolithic, catering to auto tourists and wilderness elk hunters, RV campers and backpackers, snowmobilers and mountaineers, among many others. The outfitter industry, with extensive hunting, fishing, and horsepacking activities, has one foot each in the consumptive and non-consumptive sides of the economy (Mealey, 1988; Parker & Avant, 2000). The real estate sector uses substantial lands when it provides retirement and second homes. Gateway communities dependent on both real estate and tourism to varying degrees include Cody, Cooke City, Gardiner, Jackson, and West Yellowstone. All these sectors vary in their impact on the environment, and may be more or less compatible with other human activities.

One way to address management challenges across boundaries would be to change
the boundaries themselves. Failing that, many of the GYA’s land managers have chosen to coordinate with one another to achieve their individual management goals, often on an issue-by-issue basis. Another option is to pursue transboundary cooperation (TBC) at the level of whole management units such as a national park and a national forest. This paper examines a set of such efforts, considering both policy substance and the choice of decision-making process implicit in such large-scale coordination. Changing the process will normally change the outcomes across many issues, raising the stakes and creating a significant conflict of interest over decision-making procedures among interested actors.

By bringing several decision-making units together into a single decision-making unit, TBC internalizes some externalities, improving policy outcomes where actors agree on reducing negative externalities. Bringing several units or agencies together also makes the decision-making unit more heterogenous, which may increase conflict by including new stakeholders with different concerns. These changes also affect the political balance. Decision-making in smaller units often privileges local activities that impose externalities on adjacent units, while larger units tend to favor interests concerned about externalities that affect several smaller units. Environmentalists concerned about externalities usually favor TBC while extractive sectors that produce negative externalities generally do not.

In these ways, changes in process advantage some groups at the expense of others, making TBC processes inherently controversial. To illustrate this point, I examine TBC in the Greater Yellowstone Area (GYA) in the late 1980s and early 1990s. This study is the first to make extensive use of the Yellowstone archives from this period, which include the archives of the Greater Yellowstone Coordinating Committee (GYCC). The key event is the unsuccessful Vision project, which mobilized groups around a process debate with strong zero-sum effects. Though they recognized that the Vision did not change any substantive policy, opponents killed the project on process grounds.

Explaining how such a change in process could become so controversial, without changing policy, constitutes the central puzzle of this study. The solution to this puzzle highlights how moving to TBC decision-making processes can have zero-sum consequences, a point not sufficiently appreciated in the TBC literature. For those interested in Greater Yellowstone, examining the Vision failure against subsequent successes shows the need to consider both de jure and de facto boundaries and administrative mandates when considering management choices at the regional level.
Transboundary Issues in the GYA

The GYA, like most ecosystems, is characterized by essentially-arbitrary boundaries that are a legacy of past land-management decisions and legislation (see Chester, 2006, Chapter 1; Haines, 1997, Chapter 20). To manage wildlife populations, ecosystem processes and other values across these boundaries, it is commonly argued that land managers must communicate better and coordinate their activities in some way (Patten, 1991).

One might change the boundaries to internalize transboundary externalities of concern. According to park historian Aubrey Haines (1977, p. 318; contrast Chase, 1986, Chapter 20), the “Greater Yellowstone” idea originally reflected this vision of park expansion. As some park advocates came to appreciate the park’s wildlife resources, they grew concerned about the effects of winter management on private lands outside the park. One response, the 1898 Wallace-Brandegee report, recommended extending YNP southward to encompass elk migratory routes; Stephen T. Mather made a similar proposal in 1919. Though these large extensions failed, adjustments in 1929, 1930 and 1932 made YNP’s eastern boundary follow watersheds, and also adjusted the northeastern and northwestern boundaries (Haines, 1977, pp. 331-334). Nearby parts of the GYA received protection as national forests, a state game preserve, and the National Elk Refuge in 1912.

Discussions over park extension also led to creation of GTNP in 1929, as a unit separate from YNP (Haines, 1977, pp. 323-325; Righter, 1982, Chapter 3; Runte, 1979, pp. 118-128). Originally covering only the high-elevation country, it gained support from the area’s dude ranches without attracting opposition from hunting guides or irrigation interests. More controversially, much of Jackson Hole’s lower-lying areas became a distinct Jackson Hole NM in 1943, thanks to significant donations by John D. Rockefeller, Jr. GTNP took its present form in 1950, in a merger of the park and monument.

Park enlargement always attracted controversy. Opposition reflected locals’ desire to preserve access to public lands for their own customary uses, including grazing, hunting, and personal wood gathering (Runte, 1979, pp. 119-128). Others sought larger-scale projects such as mining or irrigation (Bartlett, 1985, pp. 351-353; Schullery, 2004, Chapter 11). Foreshadowing the contentious public meetings on the Vision, Senator Kendrick, YNP Superintendent Horace Albright, and the local land commissioner were hooted off the platform at a public meeting on YNP expansion in August 1919. Thus, tensions between
intact wildlife habitat and local “multiple use” advocates predated the Vision by almost a century, and did not require the involvement of those large extractive corporations that became more visible in the 1980s debates.

Most interesting for the argument here, the tourism sector saw a conflict between its economic interests and its political interests. At the height of the discussion over the Albright plan, the editor of the Livingston Enterprise noted that his community would benefit from park expansion into Jackson Hole because of the greater tourism the park would attract. He was nonetheless concerned that a larger park would strengthen the ability of national interests to harm local stockmen in Jackson Hole and mining projects in nearby Jardine (Haines, 1977, pp. 323-324). With greater national support, a larger park could better influence those lands that might inflict externalities upon its recreational and wildlife values.

Boundary changes represent a de jure enlargement of the national park, prohibiting some uses that were once allowed. As we will see, the Vision project offered a form of de facto enlargement by introducing a decision-making process that would extend park standards onto some national forest and other lands. In a way that would have been familiar to the editor of the Livingston Enterprise, TBC also strengthened national interests in preservation at the expense of local extractive industries with externalities affecting the parks.

**TBC in the Aggregation and Vision Projects**

Aside from wilderness designations, GYA administrative boundaries have remained largely unchanged since 1950. These lines leave in place many negative externalities that one actor inflicts on others in the region. In the late 1980s, for example, USFS agency planners saw a need to coordinate management activities that had implications across national forest boundaries, including noxious weed control, mineral leasing stipulations, wildfire suppression, use of motorized vehicles, management of sheep grazing, timber harvest, mineral leasing in grizzly bear habitat, and management in elk winter range (YA Box A-369, Folder, “Region 1 Planners Mtg 9/16/87,” M. Phillips, “Two Staged Approach to Resolving GYA Issues,” May 11, 1987).¹

¹ Yellowstone’s archives in Gardiner, Montana, are organized by numbered box, each with many folders. The folders are usually named, though many are simply named “Untitled.” The archives records name the boxes and may place them in series, e.g., Box A-369 is Box 1 of “GYCC (Greater Yellowstone Coordinating Committee) records.” Within that series each box may have a subtitle; Box A-369 is subtitled, “Aggregation.” Because the box titles are superfluous information for finding sources, I have omitted them here; the folder titles are included.
The various land managers used ad hoc transboundary approaches to address such problems. Concrete actions took the forms found in Zbicz’s (2003) typology and elsewhere in the TBC literature, including information sharing, notification of actions, more or less frequent meetings, and coordinated actions. For example, the National Park Service (NPS) and U.S. Forest Service (USFS) were sharing some wildlife data at least as early as 1943, and notifying one another of wildfire actions at that time (YA Box A-141, Folder, “U.S. Forest Service Part 2, January 1, 1940 to Dec. 31, 1943”). The deepest form of TBC is integrated planning with joint decision-making, which served as the declared goal of the GYCC’s *Aggregation* (GYCC, 1987) and *Vision* (GYCC, 1990) projects.

The NPS and USFS had created the GYCC in 1964 as an umbrella for ongoing coordination efforts (YA Box A-369, “Folder: Historical Overview and Bibliographic Information”; see also Clark, 2008; Clark, Amato, Whittemore, & Harvey, 1991). Its original members were the heads of seven (now six) national forests, two national parks, and their respective regional supervisors (one from the NPS and three from the USFS). It now also represents three national wildlife refuges, with GTNP also representing the John D. Rockefeller Jr. Memorial Parkway. BLM lands, Indian Reservations, the Bureau of Mines, Conservation Districts, and state land managers may be included in consultations from time to time but they are not members (YA Boxes A-392 and A-393). Claimed successes include work on endangered species such as bald eagles, grizzly bears, and trumpeter swans, as well as a 1985 Greater Yellowstone Area Outfitter Policy.

Environmental groups, such as the Greater Yellowstone Coalition (GYC), wanted more extensive coordination on regional problems. In the 1980s, the GYC was particularly concerned about geothermal developments in Island Park, Idaho, oil and gas exploration throughout the region, expansions in hardrock mining in Jardine, and developers’ plan to build a “Ski Yellowstone” resort near Hebgen Lake, Montana. Each of these activities, the GYC believed, would impose externalities on national park and wilderness lands nearby (Chase, 1986, Chapter 20; YA Box A-396, Folder, “Hearings,” Greater Yellowstone Coalition, “Greater Yellowstone Tomorrow Project,” ca. September, 1985).

Responding to environmentalists’ pressure, the House Subcommittees on Public Lands and National Parks and Recreation held joint hearings on the GYA in October 1985. The resulting Congressional Research Service (1986) report was critical of GYCC efforts. It saw existing coordination as piecemeal, failing to take an ecosystem-level approach to the region and its wildlife and wilderness values.
The agencies responded with the two major projects. The first project, the 
*Aggregation*, mostly collected data in a common format. Its interagency work concerned map scale, standardized methods for counting wildlife, and similar technical matters.

The second project, the *Vision*, would have both changed procedures and reprioritized goals. The GYCC (1990, p. 3) stated that the *Vision’s* overarching goal was “to conserve the sense of naturalness and maintain ecosystem integrity in the GYA through respect for ecological and geological processes and features that cross administrative boundaries.” Second, and more important for this study, the *Vision* changed the policy process. It would have established an interagency process that would have privileged transboundary issues in future policy making. This process, even without any changes to policy substance, attracted strong political criticism in the region.

Decision-makers seem to have been surprised by this opposition, since they weren’t changing policy. Jack Stark, then Superintendent of Grand Teton National Park, thought the problem was “people thinking that there might be things that are not said in the document that might be implemented” (cited in Lichtman & Clark, 1994, p. 470). Wyoming Governor Mike Sullivan was one of those people (Box A-391, Folder, “Draft Goals–Sample Comments,” M. Sullivan to J. Troyer, February 28, 1990). Sullivan admitted, “I do not disagree with any of the expressed goals, but I am concerned that when taken together and when considering what is left unsaid, there could be a significant change in policy.” Many stakeholders mobilized, fearing that “what is left unsaid” would negatively affect their interests. Regional governors, national legislators, and some industry groups then killed the *Vision* project by lobbying top officials in Washington, D.C. (*Interference in Environmental Programs*, 1993; Mintzmyer, 1992)

After the *Vision’s* demise, the GYCC developed a short, face-saving document, the *Framework* (GYCC, 1991). This was apparently drafted by Brian Stout, Supervisor of the Bridger-Teton National Forest, at the direction of political appointees (*Interference in Environmental Programs*, 1993, pp. 7-9). The GYCC’s staff and other resources were significantly reduced, setting back attempts at TBC in the area for most of the ensuing decade (Clark, 2008; Freemuth & Cawley, 1998; Goldstein, 1992; Lichtman & Clark, 1994; Primm & Clark, 1996). Despite failure of the overall project, some forms of TBC survived, including information gathering, public education, and weed control.

Politically, the mobilization against the *Vision* was also a major success of the Wise Use Movement (WUM), a backlash against environmentalism that united local residents
defending traditional economies with national corporations in the extractive sectors (Echeverria & Eby, 1995; McCarthy, 2002; Stapleton, 1992, 1993a, 1993b; Wilson, 1997). The WUM defended the right of locals to engage in activities on multiple-use public lands that inflicted environmental externalities on national parks and some other preserved lands. The WUM coalition was not powerful enough to stop piecemeal TBC on grizzly bear management, coordinated wildfire policy, or even the highly controversial wolf reintroduction of 1995. It fiercely fought a decision-making process that, according to both sides, did not change any of those policies. Thus, Its greatest success in the GYA was the Vision’s defeat, an outcome that left the status quo in place.

**Explaining TBC: Process and Interest**

Accounts of the battle over the Vision reflect the leading traditions in the study of TBC. Simplifying considerably, one may see two broad approaches to understanding the challenges of TBC, a process-based approach and an interest-based approach. A few scholars combine the two, but these combinations are more likely to be taxonomic than synthetic (e.g., Yaffee, 1998).

Interest-based approaches argue that agencies and other stakeholders can achieve TBC when their interests coincide but they cannot succeed when conflicts of interest exist. For example, Charles Preston (2005) offers a diagnosis of failed TBC in Yellowstone that rests on the lingering influence of an “Old West” coalition. More generally, Lanfer, Stern, Margoluis, and Goodale’s (2003) analysis of many cases concluded that shared interests are essential foundations for successful TBC, and that careful cost-benefit analysis can effectively uncover these interests. Other scholars find a range of social, cultural and political factors that contribute to TBC failures (Agee & Johnson, 1988).

Process-oriented studies are most common among policy-oriented scholars, land managers, and natural scientists who are engaged directly in these efforts. For example, a major study attributes failures of TBC over watersheds to poor decision-making, a failure to involve stakeholders, a lack of communication, and too little trust among people on different sides (Sabatier et al., 2005). Others suggest that TBC would be possible if participants could exhibit greater goodwill, less divisiveness, more efforts to develop a shared vision, and/or greater political will (i.e., Bergin, West, Keating, & Russell, 2005; Cortner & Moote, 1999; Fall, 2003; Maehr, 2004; Sax & Keiter, 1987; Wondolleck & Yaffee, 2000, Chapter 3). Similarly, Dorothy Zbicz’s (2003) study of 136 international
transboundary areas finds that human relationships among stakeholders and local constituents explain successes.

A focus on the policy process also characterizes almost all of the Yellowstone literature (Agee & Johnson, 1988; Knight & Landres, 1998; Varley, 1988), and dominates Clark’s extensive writings with many coauthors (e.g., Clark, 2008; Clark, Amato, Whittemore, & Harvey, 1991; Clark & Minto, 1994; Glick & Clark, 1998). The interagency process behind the Vision relied on having agencies develop a document that was only released for public reaction when it was largely finished. This closed-door process, a common feature of the mandatory plan-and-comment procedures governing public lands (see most recently Nie, 2008), has led most observers to conclude that an open-door process would have fared better by including more stakeholders in design of the project (i.e., Clark, 2008).

These process-based studies sometimes struggle to explain variation. In cases of failure, analysts may not explain why policy leaders failed to exercise greater political will, build better relationships, or involve stakeholders in TBC. In the case of transparency, it does not logically follow that a more open procedure would have succeeded just because a closed procedure failed.

We must remember that the policy-making process was equally flawed in both the successful Aggregation and the failed Vision, and equally flawed in successful issue areas such as wildfire coordination, outfitter policies, and management of transboundary bison or elk herds. Similarly, a powerful WUM could have killed the Aggregation before the Vision was ever begun, or could have prevented wolf reintroduction. Instead of looking just at the failures of the Vision, this study compares the failure of the Vision with the previous Aggregation and with the subsequent, smaller forms of cooperation that survived. This comparative case study concludes that the conflict of interest inherent in any choice of decision-making process explains the controversy. Using elements of both the interests and process approaches illuminates the interests behind this struggle over process.

**Interests and Externalities**

We begin with interests conceived as preferences over externalities, which are defined as benefits or costs to third parties from an economic transaction. For example, removing noxious weeds or fighting wildfire generates positive externalities because these actions will generally benefit your neighbor. TBC on such problems simply reduces the
costs of carrying out existing policies on which there is broad agreement—after all, there is no pro-weed lobby. Similarly, information gathering and public education do not spark political opposition.

Negative externalities generate more political heat. Mining or timber harvest often impose negative externalities on nearby lands. Reducing those externalities normally reduces profits, creating an obvious conflict between the industry and those who prefer more undeveloped lands.

Users of less-developed lands include the recreation sector, which can itself generate negative externalities. Recreation can be subject to crowding effects, and some user conflicts exist—hikers may object to horses or mountain bikes, and canoeists often dislike motorized boats. Some wilderness areas border high-use non-wilderness area, so that “in some wilderness areas, visitor use is conflicting with one reason people visit wilderness—solitude” (YA Box A-369, Folder, “Salt Lake Mtg. Apr,” no author, “Coordination Challenges—Recreation,” ca. January, 1987). The heterogeneity of such interests increases as the size of the management region increases, since not all forms of recreation are found in all locations.

Some potential conflicts were muted because recreation in the Yellowstone region is subject to some interesting features that may not be found elsewhere. In the GYA parks, 95 percent of the recreation occurs at developed sites, while only 25 percent of the recreation in national forests does so (Clark & Minta, 1994, p. 29). Because developed sites such as lodging, restaurants, stores, and marinas generate profit, the national parks produce an important economic interest in recreation. Indirectly, this creates an interest in the preservationist goals on which that economic activity relies—as long as high-impact developed areas are permitted.

The more dispersed, less-developed recreation in the national forests does not support the same kind of economic activity in the GYA. In both parks and forests, wilderness backpackers do not have these kinds of links to local economies, and the wilderness resources they enjoy may be harmed by the externalities produced by more intensive tourism sectors. Though wilderness users will spend money in town at gas stations and grocery stores, their recreational activity does not have the same economic interests behind it, leading to a more direct conflict of interest with the multiple-use community. These lower-impact users also tend not to benefit from construction projects that generate their own political coalitions. For example, construction of new centers such
as Grant Village relies mostly on regional contractors and construction unions, both of which tend to have strong ties to state legislators and other politicians (see Barringer, 2002, Chapters 6-7).

Finally, some recreation can also yield conflicts of interest with local taxing authority. For example, Madison County Commissioners pointed out that their county doesn’t get much revenue from hunters even though it has to pay for associated garbage cleanup and search and rescue operations. Their county also has to pay for seasonally-used roads but gets road money only in proportion to its year-round population (YA Box A-391, “Correspondence, Meeting Minutes, Etc. 1988-1991,” Internal memo on meeting with Madison County Commissioners re Vision, January 8, 1990). Such recreation on national forests has negative externalities for Madison County taxpayers.

In short, the GYA is characterized by a complex mosaic of interests. Individuals’ positions depend in significant part on whether they are an externality producer or the victim of someone else’s externalities. This shapes their interest in TBC, which only makes sense among two or more units that seek to reduce negative externalities. People who favor fewer negative externalities will support this TBC while externalities producers will not.

**Stakeholders, Agencies, and the Political Process**

Having laid out stakeholder interests we now turn to how TBC processes affect those interests. First, transboundary cooperation increases the geographic size of the decision-making unit. This wider scale better internalizes negative externalities, though people who benefit from whatever activity causes the externality will oppose this increase in the size of the unit. Second, by increasing heterogeneity, TBC reduces the political importance of any one interest. This will make purely local concerns less salient. Third, this change resonates with some agency mandates better than others. In the GYA, increasing the size of the decision-making unit tended to increase the importance of the NPS mandate relative to the USFS, though also increasing the importance of wildlife, wilderness and recreation within the USFS multiple-use mandate.

**Transboundary cooperation as a larger political unit**

We normally think of politics as a struggle over process, but it also a struggle over policy. To see abstractly how size affects the political process, imagine a region that
consists of five or ten localities as well as the wider region, which is itself embedded in a larger national unit. Suppose that each citizen has a local interest in some activity that produces negative externalities for other units (and also in her own). If the political unit coincides with each locality, suppose that the local activity is sufficiently important that voters will desire it despite its externalities. If the localities are organized into larger units, everyone may vote to reduce the externalities somewhat. This mid-size unit has “internalized” the externality.

As the decision-making unit gets larger, each local activity is less important for politicians—it becomes a minority interest in a large unit instead of a majority interest in a small unit. This would be true even though people may disagree about how bad the externality is, or have different preferences over the externality-producing activity (for analysis of some of those differences, see Borrie, Freimund, & Davenport, 2002). With size, externality reduction will get relatively more important than the local activity, even in the face of any differences in preferences (see Harstad, 2007, for a preference-signaling problem in a similar setting).

In other words, decision-making at larger scales tends to bias outcomes toward externality-reduction, while decision-making at lower scales tends to bias outcomes toward externality-production. In the concrete case of the TBC in the GYA, this occurs through interactions between the agencies. Since the agencies only coordinate when their actions affect one another, their TBC is limited to cases of externalities, both positive (weed control) and negative (extractive sectors). TBC to increase negative externalities would be irrational, serving neither agency’s interests, so all TBC seeks to reduce negative externalities. Moving from one land manager to two or more units makes the reduction of negative externalities more salient in the interagency TBC case, paralleling the more abstract analysis.

That result affects political mobilization on TBC. Some people will like the outcome in the larger unit more than they liked the original, local outcome. Those who benefit particularly from the local activity, or who care relatively little about the externality, will prefer local decision-making. As a result, one does not see extractive industries arguing that their problems cross political boundaries and require coordination at higher political levels.

Sometimes access to a key lever of power at the national level, such as the energy sector’s ties to Dick Cheney, provides an exception to this rule. The strategy in such
cases is to impose a national policy, not to develop an alternative TBC process at the regional level.

Greens have noted the challenges of this strategic setting, the difficulties of organizing economic interests locally (McCloskey, 1990; Stapleton, 1992, 1993a, 1993b; compare also McCarthy, 2002). They see it as a rhetorical and organizational problem. The analysis here highlights the structural challenges instead. Though most locals enjoy the region’s recreational amenities, many also benefit economically from activities that inflict negative externalities on nearby lands. Those economic benefits, such as an annual salary, outweigh the amenity values. Organizing local residents around environmental goals that reduce externalities will be inherently more difficult than organizing people who value the region only for its amenities, whether those people are professional environmentalists or seasonal visitors. For such reasons, the WUM could deliver 700 people to a public hearing in Bozeman while environmentalists could not—despite polls showing widespread support for the Vision (Lewis, 1995). As Wilson (1997) notes in the case of wolf reintroduction, people without a local economic stake provide key support for environmental measures in the GYA.

Transboundary cooperation and agency mandates

Different administrative agencies serve different goals, or mandates (see Goldstein, 1992, inter alia, for the GYA, and Lockhart, 1991, for the USFS). As discussed in the previous subsection, larger political units make negative externalities more salient, while smaller units make local economic interests more important politically, even if they also generate externalities. As decisions are made on a wider scale, agencies whose mandates include environmental protection, recreation, and tourism will become more important. For example, these goals resonate well with the NPS mandate to preserve parks for future generations while managing for use by today’s citizens.

By highlighting those goals across administrative boundaries, many local residents saw the Vision process as serving the NPS at the expense of other agencies—though much of the original impetus for the GYCC had come from the national forests. The national forests saw the GYCC as a way to coordinate with one another across USFS regional boundaries, and communications among the national forests dominate the archives. Despite this history, the public identified the NPS most closely with the Vision. Its mandate lay most at odds with the interests of externality producers, whether industry
or off-road enthusiasts, and certain elements of its mandate were likely to receive greater emphasis as a result of the Vision process.

Cost-saving transboundary cooperation

The analysis of unit size and agency mandates in the previous sections applies only when we examine policy change, and when people disagree over what an agency should do. However, not all TBC changes policy. Some TBC projects simply achieve cost savings by taking advantage of economies of scale. Noxious weed control in the GYA provides a good example. Everyone wants to remove these plants, but it makes little sense to do so unless you know that your neighbor will do the same.

Coordinated bearproofing recommendations are similar, since each manager wants to affect bear behavior on adjacent lands as well as their own. Like weed control, it does not involve policy change. Backpackers, horsepackers and outfitters also benefit from standardization, which makes compliance easier for them (YA Box A-391, Folder, “Jackson Meeting,” H. Turner Comments at Public Meeting, Jackson, Wyoming, December 5, 1990).

Data collection presents another such issue. Information has some features of public goods, for it can be more expensive to keep it secret than to share it. As a result, a given quantity of data can be collected more cheaply by two agencies that agree to share the result than by each agency working on its own. Because it reduces costs without changing policy, transboundary data collection should not spark political opposition (see also Zbicz, 2003).

Summary

This section has analyzed the political environment of TBC based on how coordination changes the relative importance of negative externalities in decision-making. This biases outcomes toward externalities reduction and away from the activities that generate those externalities. The changing weight of these interests will shape the politics of TBC because some government agencies are more closely associated with local interests than others.

The analysis accounts for several key features of the GYA debates: (1) why local economic interests opposed decision-making at the ecosystem level, even though economic interests were including among the planning goals; (2) why opponents focused
their anger at the national parks and not the national forests, though the US Forest Service had provided the initiative for TBC; and (3) why all stakeholders nonetheless supported forms of TBC that lowered the costs of certain policies but did not change the decision-making processes for future problems. The analysis does not explain the success or failure of TBC directly, but it does illuminate the political battle lines by issue and by agency.

**External Politics and the Aggregation**

The *Aggregation* project, begun in late 1985 and completed in September 1987, attracted little political controversy among stakeholders. After the federal agencies in the GYA collated standardized data, the GYCC trumpeted the *Aggregation*’s “key findings” to the public. The first finding was that nearly 8.3 million acres of the GYA were designated as “wilderness” or the equivalent. Other findings reported that old growth trees covered 6.5 million acres of the GYA, or that more than half of the GYA was closed to livestock grazing (GYCC 1987; YA Box A-374, Folder, “Summaries,” Greater Yellowstone Coordinating Committee, The greater Yellowstone area: A briefing guide, September, 1987). Perhaps surprisingly, land managers had not previously known such information, nor the size of grazing leases, the approximate size of grizzly bear populations, or the total acreage that Congress had designated as wilderness.

As befits a process that responded to Congress, the GYCC’s efforts in the *Aggregation* project targeted national environmental concerns, the lands preserved from externalities instead of the resources extracted from public lands. Extractive industries noticed this “spin” in the report, which Chevron USA saw as “a defensive measure by the Forest Service to diffuse criticism from certain publics” (YA Box A-375, Folder, “Jack Troyer-Early Background-Public Input Received for the Aggregation,” L. Mercier to J. Troyer, April 18, 1988).

In response, the GYCC emphasized that it had not changed policy but had merely collated information. In a presentation to an American Petroleum Institute Congressional Staff Tour in August 1987, for example, GYCC staff emphasized that “the Aggregation is not a new plan. It’s simply an aggregation or compilation of existing plans. It is not a decision document” (YA, Box A-369, Folder, “API Talk,” no author [ca. August, 1987]). By not being a plan, the *Aggregation* was not subject to the National Environmental Planning Act (NEPA) rules for planning documents.
Local industries mostly yielded to this staff view, concluding that the *Aggregation* was unobjectionable. President George Reynolds of the Wind River Multiple Use Advocates, an eager correspondent throughout the *Aggregation* and *Vision* processes, conceded the value of such informational efforts (YA Box A-375, Folder, “Untitled,” G. Reynolds to F. D. Robertson, January 25, 1988). Environmentalists also supported the data collection effort, while remaining critical of the lack of policy coordination in the GYA to resolve policy inconsistencies (YA Box A-369, Folder, “Yellowstone Comments,” L. Wilcox to J. Burns, February 12, 1986).

**External Politics and the Vision**

After the *Aggregation*, the GYCC began work to go beyond information collection. The draft *Vision* attracted immediate controversy when released in August, 1990. The GYCC’s eight public meetings attracted 2000 participants, more than 450 of whom spoke (Clark et al., 1991). The GYCC also received thousands of written comments on both sides of the issue.

The politics around the *Vision* proved to be much different than that of the *Aggregation* had been, largely because the *Vision* entailed a small but important change of procedure. While the *Aggregation* collected information about differences in management across units, the *Vision* made such information part of the process of revising management plans. For example, if Gallatin and Targhee NFs imposed different conditions on oil and gas lessees, the *Vision* envisioned a conversation over whether these conditions should be harmonized (*Yellowstone’s Future*, 1987). Because each unit in the GYA had a management plan already in place, the conversations coming out of the *Vision* project could require amendments to existing plans or larger-scale revisions of future plans.

We can see this process at work in Targhee National Forest’s 1991 decision to amend its Forest Plan, based in part on the existing multiple-use plan not being fully compatible with the “naturalness” standard of the *Vision* document (YA Box A-392, Folder, “1500-External Relations-Bureau of Mines,” Director, Bureau of Mines, to Director, NPS, and Chief, USFS, January 31, 1991). George Reynolds noted that the process for a revised Bridger-Teton Forest Plan also invoked GYA coordination as a reason for restricting traditional multiple use (YA Box A-391, Folder, “Comments on Aggregation,” G. Reynolds to J. S. Tixier, February 24, 1988). From the start, such plan revisions had been a goal of
the Vision process for both the USFS and the NPS (YA Box A-369, Folder, “Region 1 Planners Mtg 9/16/87,” M. Phillips, “Two Staged Approach to Resolving GYA Issues,” May 11, 1987). By initiating lower-level plan amendments at the higher level of regional TBC, the Vision illustrates how decision-making at a different scale will emphasize different values.

Almost by definition, amendments to forest plans and other harmonization could occur only when externalities existed, when one unit’s actions harmed another’s values. By setting up a process to reduce them, the Vision disadvantaged those stakeholders whose activities generated more externalities—notably the extractive sectors. Fearing this result, 39 multiple-use groups formed the Yellowstone Regional Citizens Coalition to oppose the Vision (Clark et al., 1991). This coalition included agricultural, livestock, timber, and mining trade associations, and off-road vehicle (ORV) enthusiasts. These critics argued that the Vision process would necessarily be one-sided: the national parks might request changes in national forest management in the interests of preservation because wildlife, wilderness, and recreational values fall within the multiple-use mandate of the national forests. In contrast, the national forests could not request changes in national park management, since Congress mandates that parks be managed for the enjoyment of present and future generations, not for extractive industries.

This asymmetry led economic interests to fear the greater influence of preservationist goals, represented by the NPS. These fears could be found among local groups, state groups and politicians, and national corporations. At the local level, George Reynolds (YA Box A-375, Folder “Untitled..,” G. Reynolds, to F. D. Robertson, January 25, 1988), President of the Wind River Multiple Use Advocates, noted that

Under the Park Service’s restrictive use management philosophy, multiple use solutions to common problems cannot be imposed upon the parks. However, restrictive use solutions typical of the parks can be imposed upon the national forests. A coordinator trying to find common solutions between the national parks and the national forests can only encourage greater deterioration of the Forest Service’s multiple use philosophy.

Similarly, both snowmobilers and ORV enthusiasts objected to the Vision because it would lead to “uniform management prescriptions” reflecting NPS policy (YA Box A-391, Folder, “Draft Goals–Sample Comments.” R. W. Muth to J. Troyer, December 13, 1989;

The larger businesses found in the Montana Mining Association also found this change in process objectionable “because it attempted to set forth a land-use plan that takes the preservation philosophy that the National Park Service has toward Yellowstone Park and apply it to nonmanagement areas outside the park” (cited in Alper, 1992, p. 686). Reflecting these various groups’ concerns, Wyoming Senator Alan K. Simpson wrote NPS Director James M. Ridenour that he did not understand why the Service was concerned about many transboundary processes “on lands which lie outside of the park system, especially if the affected forests are all in agreement on the present policies and tools used to determine land management in these areas” (YA Box A-393, Folder “1500-External Relations-Legislative Affairs,” A. K. Simpson to J. M. Ridenour, February 27, 1991).

Given this view of both TBC and the NPS, economic groups defended conventional USFS planning processes against the Vision. For example, the Rocky Mountain Oil & Gas Association wanted to maintain existing land-use plans in the national forests, without considering the impact on the plans for adjacent lands (YA Box A-375, Folder, “Jack Troyer-Early Background-Public Input Received for the Aggregation,” Alice Freel Benitez to J. S. Tixier, April 18, 1988). This objection makes clear how a larger scale considers externalities not considered at the lower scale of the forest plan.

From this point it was a small step to defend the USFS mandate as well its planning process. Exxon’s Fernando Blackgoat wondered why it was necessary to address dissimilarities in land management plans at all, since the NPS and USFS had different legislative mandates (YA Box A-369, Folder, “Salt Lake Mtg. Apr,” F. Blackgoat to J. Burns, May 4, 1987). His colleague L. Bryant Williams, Jr. argued that Congress had given the various agencies distinct mandates for good reason, and “has adequately considered the rich aesthetic and natural resources evident in the Yellowstone area and has established the national park and national forest systems and their boundaries in full recognition of these values” (YA Box A-375, Folder, “Jack Troyer-Early Background-Public Input Received for the Aggregation,” L. B. Williams, Jr., to G. Cargill, May 18, 1988). The most colorful statement of this difference in mandates came from People for the West!, a group funded by the mining industry. It warned supporters that “The National Park Service plans to marry the U.S. Forest Service in the Greater Yellowstone Area. But the Park service doesn’t care about the Forest Service’s children, she only wants his riches. If anyone objects to this marriage, speak now or forever hold your peace” (YA Box A-393, Folder
One interesting example of how the Vision would raise the standards in national forests comes from an economic group that was otherwise predisposed to favor TBC. Unlike many other economic interests, outfitters supported the Vision’s wildlife and wilderness goals, since these amenities provide the lifeblood for their industry. Outfitter Harold Turner (1990) spoke at length on their behalf at one very large public hearing in Jackson, stating that his colleagues had long desired harmonization of regulations among the various national forests and parks in the area. Unfortunately for them, the harmonization process had consistently ratcheted upwards the level of protection in line with the preservationist goals of Yellowstone NP. He said that this result reflected the greater political influence of national interests over Yellowstone as opposed to the NFs, and the way that this interest has influenced the GYCC (YA Box A-391, Folder, “Jackson Meeting,” Harold T. Comments at Public Meeting, Jackson, Wyoming, December 5, 1990). In his experience TBC effectively moved USFS management in the GYA toward NPS standards, as the analysis here would expect.

Tellingly, environmentalists viewed the issue in a similar way. The Greater Yellowstone Coalition supported the Vision as “giving the National Park Service more say in how decisions are made on all the public lands of the Greater Yellowstone Ecosystem” (YA Box A-391, Folder, “Correspondence, Meeting Minutes, Etc. 1988-1991,” Greater Yellowstone Coalition, Be ‘visionary’, 1990; see also Chase, 1986, pp. 365-368). Eight national environmental groups wrote a joint letter supporting the draft Vision “if it recognizes and contributes to the resolution of serious environmental problems and increases the protection of Greater Yellowstone” (YA Box A-391, Folder, “Draft Goals–Sample Comments,” National Parks Conservation Association, et al. letter to Jack Troyer, February 28, 1990). Other national environmental groups also supported the Vision though they were skeptical about administrators’ ability to follow through (Barbee, Varley, & Schullery, 1991; Freemuth & Cawley, 1998).

The importance of the political process is particularly evident when we examine the reactions of various state and local government bodies to both the Aggregation and the Vision. For example, Commissioner Don Rolston of the Wyoming Department of Agriculture called himself a “staunch supporter” of the GYCC. Even so, he didn’t like the Vision because it engages in goal-setting by committee instead of using the goal-setting
process around management plans (YA Box A-391, Folder, “Draft Goals–Sample Comments,” D. Rolston to J. Troyer, February 28, 1990). Similarly, Director Karen L. Barclay of the Montana Department of Natural Resources and Conservation was generally supportive but opposed the change in process. She thought the Vision did not have an adequate procedure for evaluating trade-offs among economic and environmental goals when approving activities such as mineral leases or timber sales (YA Box A-391, Folder, “Draft Goals–Sample Comments,” K. L. Barclay to G. Marx, February 22, 1990). Madison County’s Commissioners also objected to the process, but not to the Vision’s “bland” goals (YA Box A-391, Folder, “Correspondence, Meeting Minutes, Etc. 1988-1991,” Internal memo on meeting with Madison County Commissioners re Vision, January 8, 1990).

The effect of the Vision’s interagency decision-making process on smaller-scale planning also lay at the heart of the concerns among regional conservation districts. The Greater Yellowstone Association of Conservation Districts (GYACD) supported the goals in the Vision, but wanted them reorganized to make only three goals primary: “naturalness” (Vision goal 1), “sustainable economic activities” (goal 2), and “improve mechanisms to cooperate” (goal 13) (YA Box A-391, Folder, “Draft Goals–Sample Comments,” GYACD to GYCC, February 28, 1990). Both environmental goals and sustainable economic activities are understandable priorities for conservation districts—as is the development of improved coordination with the conservation districts, which had been left out of the GYCC’s interagency coordination.

The reasoning behind their view of the Vision is developed more fully in the Meeteetse Conservation District’s (2010) strategic plan, which recounts the history of citizen workshops and retreats in the early 1990s. It argues that too many regional plans are developed between federal agencies, without legislative approval, and without consultation with local bodies such as themselves. The result of such TBC has been “incrementally imposed restrictions has led to the systematic reduction in the ability of the community as a whole to prosper through utilization of resources previously available from the public lands” (Meeteetse Conservation District, 2010, p. 51). This steady ratcheting-up of protection through interagency coordination, its implications for local multiple-use activities, and the importance of customary uses of federal lands, are major themes in opposition to the Vision. The Meeteetse Conservation District believes that local decision-making would better protect their traditional multiple-use values while assuring a sustainable water cycle, mineral cycle, and energy flow.
In the face of opposition, the GYCC retreated from any implied policy concerns in the Vision debate. Regional Forester Gary Cargill wrote that a new GYCC Coordinator position “would, in its temporary role, collect and focus information to help the existing policy-making machinery work better”—without having any policy-making authority (YA Box A-375, Folder, “Untitled,” G. E. Cargill to G. Reynolds, ca. February, 1988). In making such arguments, the USFS had to walk a narrow line. The Vision process was not an official plan or planning process and, as such, was not subject to the provisions of NEPA. The Vision process did include public comments and hearings, but the GYCC wanted to avoid an environmental assessment or impact statement.

This caution left the Vision without a strong statement of goals, and without any changes in policy (Clark & Minta 1994, pp. 96-102), but with a significant change in decision-making process. Opposition to that change in process killed the Vision. The final document released in September 1991 consisted of only nine pages, down from 72, and was renamed A Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area (see YA Box A-391). The GYCC barely survived. Its proposed Coordinator position was not created and its interagency office in Billings was closed down. The GYCC continues to function as a forum for communication, and it now includes a much wider circle of liaisons, advisors and lists of contacts. However, it no longer attempts to set goals or influence management plans in the participating units (see Clark, 2008).

TBC outside the Vision

Controversial as the Vision was, opponents did not reject every form of TBC. Instead, they accepted those elements involving exhibiting economies of scale, such as information collection, noxious weed control, and—with some reservations when adjacent lands had different fire policies—wildfire control (Knight, 1991). The Wyoming Multiple Use Coalition conceded that data collection such as the Aggregation was appropriate and desirable (YA Box A-393, Folder “1500-External Relations-Wyoming Multiple Use Coalition,” Wyoming Multiple Use Coalition, Review of vision for the future document, 1991). Wyoming Senator Simpson also praised the information-gathering successes of the Aggregation (YA Box A-393, Folder “1500-External Relations-Legislative Affairs,” A. K. Simpson to J. M. Ridenour, February 27, 1991).

Information exchange, and not procedural harmonization among federal agencies,
provided the foundation for future collaboration with such local bodies. For example, an agreement covering Gallatin County, Montana, provides for regular meetings and information exchange among federal, state and local agencies in that county (Memorandum of Understanding, 1995).

Coordinated control of noxious weeds proceeded at the same time as the Vision failure. All three states and all relevant federal agencies reached a Memorandum of Understanding for Noxious Weed Management, coordinating their efforts in this area (YA Box A-392, Folder, “1360-Meetings”). These agencies made financial contributions to the effort, recognizing economies of scale in this area, and worked together to train employees. This document received endorsement from many of the same multiple-use groups that had opposed the Vision. State agencies suspicious of the Vision such as the state of Wyoming and the Montana Department of Agriculture were supporters (YA Box A-391, Folder, “Draft Goals–Sample Comments,” Memo to E. M. Snortlan, 14 February, 1990; and Folder, “External Meetings/Contacts,” Noxious Weed Management/Greater Yellowstone Area: GYCC/State Meeting Summary, May 3, 1989). Wyoming Representative Simons, who had been an outspoken opponent of the Vision, held up the noxious weed MOU as an example of how TBC should work (YA Box A-393, “Folder 1500-External Relations-Legislative Affairs,” Wyoming House Joint Resolution No. 0016, 1991). Environmentalists could also accept this agreement if the “noxious weeds” were non-native species, as they generally are.

The variation in outcomes across issue areas depending on the nature of the cooperation problem adds credence to the analysis here. While cooperation on noxious weeds and information collection simply helps agencies achieve existing goals more effectively, the Vision process had zero-sum elements in privileging some interests over others. This change in process, not policy, attracted the opposition.

Conclusions

Congress did not design national forests, parks, and wildlife refuges around ecosystem boundaries. As a result, ecosystem-level management has always required coordination by two or more land management agencies. This article has focused on a relatively understudied aspect of these challenges, the political debates over TBC policy processes. By bringing several decision-making units together into a coordinated
decision-making unit, TBC internalizes some externalities but also affects the political balance. This privileges externality reduction at the expense of many local economic interests.

Changing the decision-making process therefore has zero-sum elements, favoring some interests over others. This makes moves toward TBC inherently controversial, no matter what the particular setting or policy problem. In addition, as the Vision exercise shows, changes in the decision-making process will privilege not only some stakeholders but also some agencies. This adds to the polarization as stakeholders side with one agency or another.

The Vision project produced one of many salient conflicts in the region and elsewhere. A battle over wolves has continued to rage since they were reintroduced to Yellowstone in 1995 (Wilson, 1997). Outside the GYA, the Interior Columbia Basin Ecosystem Management Project spawned significant political opposition from local politicians and the communities they represent. They successfully stopped a watershed- and ecosystem-based approach serving national and multistate regional concerns.

In other cases, the battles have occurred at the highest levels of national politics. The Northwest Forests Initiative, which resolved the Northern spotted owl controversy, required the direct intervention of the president, vice president, and several cabinet officials to force through national interests against opposition from timber and other industries. Though the outcome was different than the Vision process, the underlying political cleavages were similar, with local economic interests in extractive sectors and recreation, regional and national environmental groups, and agencies such as the NPS, USFS, and USFWS playing familiar roles.

The variation in outcome between Yellowstone and the spotted owl cases remind us that political battles over “local” or “national” control take place in a wider political context. The WUM had important allies in the G. H. W. Bush administration that they would not have had under Clinton. One imaginable option would be to fight all such battles in Washington—though it is difficult to imagine either side liking the overall results.

The challenges of purely governmental coordination have helped lead to newer approaches, including public-private partnerships such as the Quincy Library Group in California (Keiter, 2003). Further analysis of such cases lies outside the study here because private citizens and corporations lack direct control over policy, while the federal managers who control policy cannot legally treat partnerships’ solutions as binding. Still, it
is suggestive that these collaborative efforts tend to be initiated by environmentalists concerned about transboundary externalities, and not by private landowners arguing for greater political coordination on a larger scale.

TBC advocates should recognize its policy bias, and ask themselves how to compensate the people it disadvantages. The Quincy Library Group offers participating timber companies some concessions for their participation, enough to attract significant criticism from national environmentalists. In the GYA, offering some policy reforms in exchange for the change in process might have attracted support from some groups, such as outfitters or the developed tourism sector in gateway communities. By avoiding the NEPA process, however, the GYCC was unable to offer changes in any of the park or forest plans in the Vision.

Alternatively, the difficulties of TBC suggest that we might better improve management by changing strategies. For example, Congress could change the mandates of some units (or zones within units) so as to make them more compatible with their neighbors. Such changes would be controversial among the groups whose interests are harmed, as wilderness designations have been. Alternatively, Congress might overlay land management mandates with resource-management goals such as the Endangered Species Act, Wilderness Act, or might fund better information systems (Lynch, Hodge, Albert, & Dunham, 2008; Sax, 1993). The similar approaches to wildfire in USFS wildernesses and YNP backcountry zones provides a good example of how overlays and shared mandates can manage natural processes across boundaries.

Another approach would look beyond the United States for models. The literature on TBC in developing countries tends to emphasize the use of buffer zones and other transitional protected areas within a regional planning environment (McCarthy, 2002). The Vision project conceptualized its task as harmonization. It might instead have seen the GYA as consisting of strictly protected areas (wildernesses, most of national parks, and parts of wildlife refuges) alongside transition zones (national forests, state lands, and other parts of wildlife refuges). In a world of core and buffer regions, differences in management are part of the solution at the landscape scale. This might make use of changes in boundaries and mandates, or greater use of public-private partnerships, adapting elements of the other strategies above.

The Vision saw management differences as part of the problem, and harmonization as part of the solution. While this harmonization works for information collection and a few
problems such as wildfire, it did not work in the larger Vision project. Its political failure was grounded in conflicts of interest over the harmonization process, a problem that has not gone away. Future transboundary approaches will require processes more attuned to the diversity of interests, mandates, and issues in the region.

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National Park User Pays Systems in Australia.  
Cost Recovery vs Access for All?

Michael Hughes *  
Jack Carlsen **

Abstract

This paper discusses the tension between user pays systems as a means of cost recovery and equity of public access using the example of Australian national parks. Six Australian state based national park management agencies were interviewed about their user pays systems. Australian national parks are managed as a public good, for biodiversity conservation, and to provide for recreation and tourism opportunities. Legislated social equity requirements result in discounted user pays systems that are generally not cost effective. This raises the question of whether user pays systems for cost recovery are compatible with access management based on social equity. 

Keywords: national park, park entry fee, social equity, good practice, access management

Introduction

Most countries have protected natural areas set aside primarily for conservation, often in the form of publically owned and government managed national parks (Alpizar, 2005). It is recognized that national parks can play an important role in preserving biodiversity and ecological processes for the greater benefit of society (Turpie, 2003). National parks are also significant points of focus for tourism and recreation activity (Eagles, 2002; Kuo, 2002; Laarman & Gregersen, 1996; Nyaupane, Morais, & Graefe, 2004). As a consequence, national park managers are required to actively conserve and protect these areas as well as provide a range of tourism related amenities and services (Athanas, Vorhies, Gbersi, Shadie, & Shultis, 2001; Pigram & Jenkins, 1999). Further to this, Font et al. (2004a) noted that national parks are increasingly expected to pay their way due to limited or diminishing government funding for public parks and/or increasing demand from users. This paper presents findings from a research project that examined issues regarding policy

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and management of user pays systems in Australian national parks and the application of a user pays system for government managed parks established as a public good based on equity of access.

Given that publically funded national parks are managed by governments on behalf of the wider community, it is argued that the public has a right to access the land as a stakeholder. This is reflected in the conceptualisation of national parks as a public good, despite the rationale for declaration, since they were first established in the late 19th century. This paper presents findings from a study of eight Australian state government agencies that manage the respective state based national parks systems in Australia. National parks in Australia are managed based on the concept of parks as a public good where access for all is mandated. However, national park management in Australia also incorporates a cost recovery component into the legislative framework. In this context, cost recovery includes park visitor entry fees and this element of user pays was the focus of this study. The issue of simultaneously implementing a user pays based cost recovery system while managing parks as a public good with a mandate of access for all is discussed.

Rationale for National Park Declaration

The reasons for declaration of national parks have changed over time since their first inception in the late 19th century. Yellowstone, as the first national park in the United States, was declared in 1872 in recognition of the unique and spectacular landscapes it encompassed. This was not an ecological conservation imperative, but rather a reservation of a landscape as part of “...a museum of American sublimity” (Hughes, 1997, p. 200). Interestingly, the first official expedition to survey Yellowstone had the “enthusiastic backing” of the Northern Pacific Railroad who reportedly recognised the region’s potential value as a tourist destination, with associated profitable new railroad line (Hughes, 1997, p. 199). Runte (1997) commented that encouraging tourism to national parks in America was considered important for the promotion of national identity. Yellowstone was thus established to preserve and promote national identity, represented by the rugged wilderness landscapes, for the public good (Runte, 1997).

In contrast to the US rationale, Herath (2002) cited sources demonstrating that Australian governments did not consider creation of national parks for nature conservation as a high priority until the 1970s. Until this point, national parks in Australia were established mainly for management of timber resources and provision of recreation and
tourism opportunities. Eagles (2002) noted a growth in focus on parks for use as nature based tourism and recreation resources in the second half of the 20th century. However, Kellert (1979) had earlier asserted the growth in number of parks during the late 20th century was the result of a widespread acceptance of the ecological ethic. While reasons for declaration of national parks have changed over time, the underlying rationale appears to have consistently been a focus on national parks serving as a public good.

The contemporary view of national parks, including those in Australia, considers their highest value is in conservation of biodiversity and associated ecosystem services that support human survival (Buckley, 2003a). This is considered the main contribution of national parks to the greater public good, justifying expenditure of public money from tax revenue for maintenance and management. Eagles (2002) and Buckley (2003a) claimed that, given the world’s national parks are now managed primarily for nature conservation, those who access national parks for recreational and nature based tourism pursuits are viewed by managers as a subgroup accessing parks for a secondary function. Consequently, Eagles argues that managers consider it difficult to justify public expenditure to subsidise park facilities and management for a use that can degrade the conservation value of a park, by a subset of the population. Indeed, Athanas et al. (2001) suggested publically owned national parks accessed for tourism and recreation could be seen as an operation providing goods (natural environment) and services (facilities and experiences) that may be consumed by users for a fee. The range of facilities and experiences provided for park users might include those relating to picnicking, sightseeing and hiking through to adventure activities such as rock climbing and abseiling (Pigram & Jenkins, 1999). Services provided can include toilets, drinking water and roads as well as information, education and guided activities. In addition, tourists expect to be generally satisfied with their overall experience, as with any tourism product. Implementing management strategies that maintain the natural resource and ensure adequate services, experiences and facilities requires adequate funding (Leal & Fretwell, 1997; Newsome, Moore, & Dowling, 2002; Pigram & Jenkins, 1999). A user pays system is considered one means of recovering costs for provision of services and amenities secondary to the nature conservation function of national parks (Buckley, 2003a, 2003b; Pigram & Jenkins, 1999). As a result, legislation relating to Australian government managed national parks commonly includes a requirement for cost recovery through a user pays system (Buckley, 2003a).
National Park User-Pays Systems

While national park user pays systems are implemented as a means of cost recovery, the systems are often not cost effective (Buckley, 2003a; Font, et al., 2004a; Hughes et al., 2008). Cost effectiveness is defined as when the national park user pays revenue generated equals or exceeds the system costs incurred (Font, Cochrane, & Tapper, 2004b). However, in Australia, cost effectiveness is difficult to measure as most agencies do not have adequate monitoring in place for accurately estimating costs of their user pays systems (Queensland Parks & Wildlife Service, 2000). Cost effectiveness is seen to be a function of several elements including: fee structure, compliance rate, and effectiveness of monitoring and enforcement. Fee structure relates to the range in dollar values at which national park user fees are set within a given parks management system. A fee structure may range from a single flat rate for all parks and users through to variable rates according to factors such as park location, type of activity and socio-economic status of users. It is considered that setting fees according to the total cost of managing parks and providing visitor services and amenities would result in prohibitively high fees for segments of the community with limited financial resources (Buckley, 2003a; Font, et al., 2004a). This could exclude some segments of the community from access and the associated benefits of experiencing publically owned national parks (Font, et al., 2004b; List, 2006). Consequently, concerns for equity of public access to national parks as public open space commonly result in fee structures that include exemptions or discounts for specific economically disadvantaged groups, such as the unemployed or those on a pension (Richer & Christensen, 1999). While considered socially responsible, user fee discounts potentially reduce the cost effectiveness of the system, resulting in a reduced capacity to supplement park management budgets. Together with a lack of adequate measurement of system costs, this may undermine the cost recovery function of the user pays system.

The compliance rate can be a significant factor determining the cost effectiveness of a park user pays system. In this sense, compliance rate refers to the proportion of national park users who pay the required access fee. Debate in developed nations regarding the right to a clean healthy environment and access to publically owned land has led to public resistance to park user pays fees, often resulting in reduced compliance (Lee, 2000; Lee & Pearce, 2002). Paying a fee to access public land raises the issue of double taxation where park visitors pay for management of parks through their government taxes and are then required to pay again when accessing the park. Conversely, compliance rates tend
to be higher when a park user pays system has public support. Public support for a user pays system is likely to be higher when the revenue is demonstrated to improve national park management, facilities and services (Bengston & Fan, 2002; Bowker, Cordell, & Johnson, 1999). Public support may be boosted further when tangible improvements to the specific park from which fees are collected are evident (Fretwell & Podolsky, 2003; Queensland Parks & Wildlife Service, 2000; Rivera-Planter & Munoz-Pina, 2005). Although public support plays a role, monitoring and enforcement is considered an important element in managing park user pays system compliance (Athanas, et al., 2001; Inamdar & de Merode, 1999). This can include establishment of collection stations, monitoring of visitors and policing by park rangers among other actions. The staff time and resources required to carry out these activities can potentially also reduce cost effectiveness unless efficiently implemented and managed (Winter, 2004). Thus there seems to be a conflict between designing a user pays system with fees acceptable to the taxpaying public that also delivers enough revenue to enable tangible improvements to parks to ensure public support.

**Australian National Parks**

All Australian national parks are located on publically owned land and are primarily funded by tax revenue. Australia is a federated nation with a national Commonwealth Government, six separate state governments and various territories managed by territorial administrations, each with defined government responsibilities. In this government structure, management of national parks within each state is the responsibility of the respective state governments. Each state government has an agency or agencies responsible for conservation and protected area management including national parks. National parks in a given state are funded using taxes raised by that state government. A state government assigns a budget allocation of funds to national park and protected area management within the given state. National parks located in the various Australian territories are managed and funded by the national Commonwealth Government. The individual states have independently developed policy and legislative frameworks under which the various parks management agencies operate. This strongly influences all aspects of parks management, including how user pays systems are designed, implemented and managed.

All national parks management in Australia is based on the legislated notion that national parks are provided for the greater social and environmental good. Consequently,
each state based national park management system has common threads of policy and legislation including mandates for conservation of wildlife and ecosystems, provision of equitable public access and opportunities for recreation. All but one of the state government legislative frameworks for national park management also includes a cost recovery element and consequently, a requirement for implementation of a park user pays system. The user pays system requirements are also based on the requirement for competitive neutrality. This is a legal requirement that government managed operations cannot undercut the business of private operations in the same sector. Allowing free access to national parks and facilities could be deemed to be unfairly competing with commercial operators of nature based tour businesses and private nature reserves. The user pays systems in each state are structured and managed differently based on the social and political history and geographical context of each state. This includes varying fee structures and varying methods of monitoring and enforcement. Thus, the various state based national park management systems in Australia, founded on common elements of public good and cost recovery, provide an opportunity for comparison and analysis of different systems.

Method

In order to investigate user pays systems and the effectiveness of cost recovery measures, a three stage method was used:

1. A comprehensive review of the relevant literature on user-pays systems.
2. Interviews with representatives of all national park agencies regarding user pays systems across Australia
3. Analysis of the rationale, cost-effectiveness and management of current user-pays systems in Australian national parks.

A review of the literature on user-pays systems was carried out to identify the key components of existing and ideal systems. The review included a model for investigating best practice in user-pays systems in Australia identified by the Australian and New Zealand Environment and Conservation Council [ANZECC] in the report on benchmarking user pays systems (Queensland Parks & Wildlife Service, 2000). The ANZECC model (Fig. 1) included three dimensions:

- cost effectiveness,
• positive public attitude to agency conservation, and
• improved park management and better client services and facilities.

Figure 1. Model for Investigating Good Practice in User-Pays
Source: Adapted from Queensland Parks & Wildlife Service (2000)

Based on this review of the relevant literature and modelling the key issues to be identified were: the rationale for the establishment and management of user pays systems; the cost effectiveness and compliance costs of those systems; and the retention of park fee revenue for management of national parks. An interview schedule was developed in order to facilitate the comparison of responses and identify commonality and diversity across the key issues identified in stage one. Table one provides a summary of the
interview questions that were developed by the researchers based on the literature review.

Table 1. Summary of Parks Management Interview Questions

<table>
<thead>
<tr>
<th>User pays system rationale</th>
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<tbody>
<tr>
<td>What are your main reasons for collecting fees?</td>
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<tr>
<td>Has your agency set any measurable objectives for the user pays system?</td>
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<td>Is there a relationship between the fee level and level of park visitation?</td>
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<tr>
<th>Cost effectiveness</th>
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<tbody>
<tr>
<td>What is the approximate figure for annual fee revenue?</td>
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<tr>
<td>How does cost of fee collection compare with revenue received by parks?</td>
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<tr>
<td>How much of the total maintenance budget does fee revenue represent?</td>
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<tr>
<td>Are you applying new technologies in fee collection?</td>
<td></td>
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<tr>
<td>What are your main methods for enforcing compliance?</td>
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<tr>
<td>What are your views on applying profit based models to user pays systems?</td>
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<th>Evidence of improved park management</th>
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<tbody>
<tr>
<td>Is revenue from user fees retained by the parks?</td>
<td></td>
</tr>
<tr>
<td>How is distribution of funding to parks determined?</td>
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</table>

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<tr>
<th>Other issues?</th>
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In stage two, a series of interviews with conservation and other relevant state government agency representatives with responsibilities in managing national parks was carried out across all Australian states in 2006. A total of 13 senior managers and directors from eight government agencies were initially contacted via email or telephone and agreed to be interviewed face to face at a time and place convenient for them (in all cases this was their head office). Government agencies represented in the survey framework included the following:

- Great Barrier Reef Marine Park Authority (Qld GBR MPA)
- Queensland Parks and Wildlife Service (Qld PWS)
- Tourism Queensland (do not collect fees but influence policy)
- Tasmanian Parks and Wildlife Service (Tas)
- New South Wales Parks and Wildlife Service (now Department of Environment and Climate Change) (NSW)
- Parks Victoria (Vic)
- South Australian Department of Environment and Heritage (SA)
- Western Australian Department of Environment and Conservation (WA)

Seven of the agencies interviewed were directly responsible for managing national parks and protected areas in their respective states. Two agencies, Great Barrier Reef Marine Park Authority and Queensland Parks and Wildlife Service, were located in the
same state but were responsible for separate protected areas, a marine park and all remaining national parks and protected areas respectively. One government agency, Tourism Queensland, was not a parks management organisation, but influenced policy regarding parks management in that state and hence was included in the survey frame. The inclusion of all relevant government agencies ensured that all views of Australian national park managers were represented and that bias towards specific user pays systems was avoided.

Researchers recorded information by taking detailed notes during the interviews. Park managers also provided documentation or additional information forwarded by email. The interviews provided information on the structure and efficiency of specific user-pays systems in an applied context. Interviews provided information relating to the rationale for implementation, details regarding fee structures and revenue, and management of compliance and enforcement. Information was also gathered regarding links between revenue from user pays systems and links to improved park management, services and facilities and support for user pays systems. Information provided included documented data relating to the user-pays system, knowledge gained through experience with the system and opinions on aspects of the system such as its efficiency and potential areas for improvement. Data from interviews in each parks system were collated such that similarities and differences in information provided could be directly compared.

For stage three, the rationale, cost-effectiveness and management of current user-pays systems in Australian national parks and other issues documented in the transcript of 13 interviews were analysed. NUD*ist 6 software was used to conduct text analysis and identify common and unique themes within the interviews and information provided by each agency. Collation of data in this way facilitated the identification of commonality and diversity across user pays systems in Australia.

Findings

Findings are presented under the key headings of rationale, cost-effectiveness, compliance costs and revenue retention and demonstrate a diversity of responses across these key issues.

Rationale

The main stated rationale for implementation of national park user pays systems in all
Australian states was a legislated requirement for implementation of these systems (Table 2). That is, park management representatives indicated that user pays systems were a statutory requirement of the various stated based parks management frameworks. Recovery of costs for service provision was a secondary reason for implementation of user pays systems. Elements such as budget supplementation, funds for conservation and control of visitor numbers were less commonly stated. Two agencies in the state of Queensland did not have a statutory requirement to implement user pays systems. One considered their user pays systems a means of controlling visitor numbers and access while the second considered it a means of supplementing their operating budget and furthering the conservation effort.

<table>
<thead>
<tr>
<th>Main reasons given</th>
<th>Parks Management Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qld PWS Qld GBR MPA WA SA NSW Vic Tas</td>
</tr>
<tr>
<td>Statutory requirement</td>
<td></td>
</tr>
<tr>
<td>Means for achieving competitive neutrality</td>
<td></td>
</tr>
<tr>
<td>Control of visitor numbers and access</td>
<td></td>
</tr>
<tr>
<td>Means for furthering conservation effort</td>
<td></td>
</tr>
<tr>
<td>Supplement park operating budget</td>
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</table>

NSW noted that the implementation of their user pays system was ad hoc based on short term politically motivated decision making processes. It was perceived by the parks managers that the lack of a commercially justified approach to application of fees meant when and where they were applied within the given state was seemingly random.

Interviews carried out for this project again highlighted that the approach to user pays systems at the state park agency level was more influenced by access and equity issues than by economic rationalism (Buckley, 2003a). It was commonly considered by those interviewed in this study that user pays systems based entirely on market forces and a profit motive would result in very high, publically unacceptable and exclusive user fees. This was attributed to the significant investments in infrastructure and services and the complex administrative system required for managing parks and the user pays system itself. Determining user pays fee levels based only on the costs of the user pays system was seen as not taking the social and political ‘overlay’ into account. As one agency representative mentioned, ‘…we are in the business of conservation, not the conservation business’. This was considered an important element in enabling public access to parks.
It also runs counter to the concepts put forward by Athanas et al. (2001), Eagles (2002) and Buckley (2003a) who suggested parks were a collection of facilities and services that users should pay for in the context of a rationalist free market economy. However, providing for equity of access tempers the capacity to recover costs owing to limitations on fee level to ensure equity of public access for the community socio-economic spectrum. Table 3 summarizes the annual user pays revenue data for 2006 by agency and what proportion of total parks management costs and user pays system costs this represents.

**Cost Effectiveness**

Table 3 demonstrates that the park user pays systems were not effective at recovering the costs of maintaining national parks, meaning all state government agencies are reliant on public tax revenue allocations for continued management of national parks. In all but one state, it was unknown whether the user pays systems itself was actually cost effective to operate. The state agency with detailed data had a relatively small area to manage (Tasmania) and had implemented a centralized online fee management and reporting system. The entry fee system had a significant outsourced component were park users could buy park passes at retail outlets in nearby towns. This functioned to reduce the number of park agency staff required to sell entry passes, reducing the costs of system management for the parks agency. The agency also adopted a policy of limited enforcement coupled with ensuring a convenient user payment system. This was based on the observation by the agency that three types of user visited national parks in Tasmania. These were: visitors who would actively seek to pay for entry, visitors who would pay if convenient to do so and those who would actively avoid payment. The active avoidance types were estimated at about 20% of all Tasmanian park visitors. The agency considered that the cost of pursuing the 20% of park visitors actively avoiding payment would not justify the additional revenue gained. Concentrating resources on development of an efficient and accessible user pays system appeared to counter balance revenue lost through active noncompliance with the system.

As noted by an earlier report on user pays systems in Australia and New Zealand, most agencies interviewed were not able to accurately measure or estimate the costs of their systems (Queensland Parks & Wildlife Service, 2000). This was partly owing to inadequate, inaccurate and inconsistent monitoring and reporting associated with system costs. It was also partly due to the difficulty of measuring costs. For example, several agencies pointed out that assigning a portion of parks staff salary costs (a primary
component) to the user pays system was difficult given the many tasks staff undertake. In addition, duties associated with users pays systems, such as collecting fees and enforcement had dual roles, such as public relations (provision of information and positive social interaction) or maintenance tasks. Consequently, it was often very difficult to apportion staff time to specific tasks directly related to the user pays system. One agency stated it had no knowledge of how much their user pays system costs. Most of the remaining agencies interviewed indicated they had only approximate estimates of cost and were not willing to provide a definite figure. The common inability to measure costs of the system means its effectiveness as a cost recovery instrument is difficult to assess.

Table 3. Australian National Park Entry Fee Revenue per State Agency and Proportion of Management Costs

<table>
<thead>
<tr>
<th>Agency</th>
<th>Park entry fee revenue for 2006 (AU$million)</th>
<th>User pays revenue as a proportion of:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total park management costs</td>
</tr>
<tr>
<td>Tas</td>
<td>7.6</td>
<td>25%</td>
</tr>
<tr>
<td>WA</td>
<td>5.7</td>
<td>20%</td>
</tr>
<tr>
<td>Qld (collective)</td>
<td>10.4</td>
<td>8%</td>
</tr>
<tr>
<td>Vic</td>
<td>5.3</td>
<td>4%</td>
</tr>
<tr>
<td>SA</td>
<td>7.8</td>
<td>No data available</td>
</tr>
<tr>
<td>NSW</td>
<td>No data available at time of interview</td>
<td></td>
</tr>
</tbody>
</table>

Despite the difficulties in estimating costs, park agencies commonly implemented management approaches design to minimize costs based on the limited budgets allocated by state government. For example, most agencies charged fees for selected parks, not all parks in their state, based on practicality and cost of user fees enforcement. Most Australian states had some national parks located in remote areas away from population centres. These parks often had multiple access points and a minimal staff presence making collection and enforcement of user pays fees difficult. Large travelling distances and the resources required to base staff in these remote locations resulted in high management costs that outstripped any revenue collected from park visitors. In parks where user fees were applied, some agencies had a cost minimization policy of issuing warnings to visitors found to have not paid entry fees rather than legal infringement notices. Issuing warnings avoided costly formal legal processes and was found to be effective in encouraging compliance during subsequent visits. In contrast, one state agency (NSW) routinely patrolled their parks and issued infringements for non-compliance that triggered legal processes for which the expense to the agency far outstripped the seven dollar entry
fee that had not been paid by the visitor. This contrasted with the Tasmanian agency that focussed on designing an efficient, easy to use system and did not actively pursue non-compliant visitors. The result being that Tasmania had the most cost effective user pays system of all state agencies.

**Compliance**

In addition to efficient application of user pays systems and managing public compliance, most agencies noted that staff compliance with managing the system could be problematic. Most park agencies reported they had an ‘old guard’ of staff whose priorities revolved around traditional park ranger concepts of conservation and related park management activities. The ‘old guard’ was seen to include staff who had worked as park rangers and managers for a considerable period of time and had backgrounds in either a trade or in environmental conservation related areas. These staff were considered philosophically opposed to the collection of park user fees or placed it as a lower priority to other duties. Agencies also noted that many new staff members were university graduates with qualifications in biology, the environmental sciences, or natural resource management. Consequently, they generally lacked financial management and business related motivation and skills. As a solution, one agency noted that they would simply prefer recruitment of business qualified staff to administer user pays systems as, “... you can’t easily teach all conservation trained staff business skills. [It is] ... easier to teach business trained staff conservation skills”. In this instance, the reluctant staff culture could be born of the ‘modern’ conceptualisation of national parks as a means for biodiversity conservation for the greater good based on a growing ecological ethic (Buckley, 2003a; Kellert, 1979). This is reinforced by the laws governing park management that have a first priority relating to conservation while cost recovery is a lower priority.

While the conservation for the greater good ethic may drive staff noncompliance in many cases, some agencies also noted that rangers who live in smaller rural communities were reluctant to enforce user pays systems. As national parks in Australia are often primary recreation areas for the adjacent small local communities, lack of enforcement is considered by some rangers to be necessary in order to maintain a positive standing in the community. This can be difficult to manage when state government agencies often have limited central control over day to day management actions at the park level, especially in remote areas (Hughes & Ingram, 2009).
**Revenue Retention**

As indicated in the literature, retaining revenue at the park level can function to encourage positive public attitudes and support for user pays systems where the revenue is seen to improve park facilities and management (Bengston & Fan, 2002; Bowker, et al., 1999). Interviews with agencies also indicated this to be true for staff motivation to implement and enforce users pays systems. Revenue retention at the park level was considered to motivate staff to collect fees as a means of supplementing limited government allocated budgets. However, in NSW the park management budget allocated to the parks agency was reduced in proportion to the level of revenue collected from fees, removing the motivation of staff to enforce the system. It is apparent that, in addition to public compliance, park user pays systems rely on adequate staff motivation, training and skills to apply the system effectively. Staff non-compliance appears to be strongly influenced not only by the concept of equity of access and parks as a public good, but also the extent of revenue retention that was allocated by each agency.

**Conclusion**

The results of this study raise the issue of whether a user pays system is appropriate for publically owned national parks. Equity of access is enshrined in the laws governing park management in all states of Australia and is integral to the general culture of Australian park management agencies. There seems to be a paradox between the legislated requirement to recover costs and the requirement to ensure equitable public access to parks. This was highlighted in this research by all agencies rejecting the notion that a user pays system should be driven by market forces. This rejection was based on the primary concern that regarding exclusion of a broad section of the public from access to national parks because of their lower socio-economic status. In most cases in Australia, it was apparent that the user pays systems were not cost effective because the fees were set based on social equity issues and ‘the political context’ rather than the true costs of park management.

Based on these findings, it is apparent that a "one size fits all" approach to user pays systems is not a viable option. This is primarily owing to the diversity of legislative frameworks, revenue and cost structures that were identified in the interviews. However, there are some general principles that park managers may consider when establishing and/or reviewing user pays systems, as follows (Hughes, et al., 2008):
ensure staff are competent in financial management and motivated to actively management the system, this may require training or hiring of appropriately skilled staff;
retain revenue for parks or districts where fees are collected
adopt a simple user fees structure and easy access to related passes and payment of fees;
employ a business management approach to user pays systems; and
use a discretionary approach to enforcement of compliance with acceptance of a certain level of non-compliance.

As a cost recovery mechanism, national park user pays systems are a reasonable approach only when they are cost effective, when the revenue raised equals or exceeds the costs of the system itself and ideally, the total costs of park management. Because of the restrictions of the equity of access laws under which Australian park management agencies function, agencies encounter significant difficulties in achieving a profitable park user pays system. In all cases the user pays system revenue is far less than the cost of park management, in many cases the cost of managing the user pays system itself exceeded the revenue it raised. Thus it seems that having a dual purpose of cost recovery and access for all linked to publically owned and government managed parks is not effective. However, adopting the principles identified in this paper will function to minimise system costs and encourage public and staff compliance, improving the efficiency and effectiveness of user pays systems in circumstances where they are required by law.

References


Abstract

Conflicts of interest between conservation objectives and the continuation of conventional land uses have accompanied national parks in Germany since the first park’s designation in 1970. This is not surprising as most of Central Europe is densely populated and landscapes have been used intensively for agriculture, forestry, resource extraction, and recreational purposes over several centuries. Hence, unaltered landscapes and unimpaired wilderness hardly exist. These combined features distinguish German national parks from their counterparts in the Americas, Africa or Asia. Against this background, parks-people relationships have occupied researchers in Germany for more than twenty years. Whereas international research has focused mostly on testing various social theories to explain resistance among locals, research in Germany has for many years focused on a more practitioner-oriented approach in order to solve most pressing conflicts that arose after national park designations. This paper combines two independent case studies from Harz and Bayerischer Wald National Parks in order to illustrate the setting of parks-people research in Germany and to identify links to approaches used in other countries. In Harz National Park, the case study (n = 205) focused on local communities in general, whereas the Bayerischer Wald study (n = 197) put an emphasis on tourism operators as a potential ally for park managers. Results proved that the reasons to support or object protected areas are manifold, but in both cases could be associated with national park management policies (e.g. forest management) that contradicted the locals’ traditional attitudes and values. This general dissent is fostered by a lack of clear communication with relevant stakeholder groups and a lack of participation. Thus, the...
paper also provides suggestions that could help to enhance park–people relationships not only in a German, but also an international context.

Keywords: national park, Germany, park-people relationship, conflict; acceptance, Harz, Bayerischer Wald

Introduction

The designation of protected areas and their management often leads to conflicts between local communities and the area’s administration. This phenomenon is known worldwide (Pretty & Pimbert, 1995; Zube, 1986) and as old as the national park idea itself. As national parks and surrounding communities are highly dependent on each other (Hough, 1988; Jarvis, 2000; Weixelbaumer & Mose, 2002), the task of managing stakeholder interests and potential use conflicts should be of high priority for park managers. Parallel to the continuing expansion of protected areas around the world, the growing importance of these “park-people relationships” for protected area managers and politicians has put them on the agenda of various researchers since the mid 1980s (Southworth, Nagendra, & Munroe, 2006; West, Igoe, & Brockington, 2006; Zube, 1990; Zube & Busch, 1990) – with a notable emphasis on developing countries compared to industrialized areas like Central Europe (Fortin & Gagnon, 1999; Gillingham & Lee, 2003; McCleave, Espiner, & Booth, 2006).

Germany serves a prime example for a different setting: Its 14 national parks were not established before 1970, with the majority designated post-1990 (Succow, 2000). Their size varies between 30 km² (Jasmund) and 4,500 km² (Schleswig-Holsteinisches Wattenmeer), covering only about 0.54% of the landmass (marine areas and shoreline excluded) (Bundesamt für Naturschutz [BfN], 2010; Scherfose, 2009). Most parks are either located in the outer periphery along the national border or in the inner periphery of the low mountain ranges in the sparsely populated former borderlands of the divided Germany (Job, 2008).

Although mandated for in the German Federal Nature Conservation Act (BNatSchG), the legal designation, funding and administration is actually executed on federal state level, thus lacking a large protected area strategy on a national level. Another notable difference to other countries is that German national parks provide free access with no entry fees.

As areas that allow undisturbed natural dynamics (often referred to as “wilderness” in Germany) are very scarce in Central Europe, one major goal of Germany’s large protected
area management is to allow these processes to prevail (also in order to fulfill IUCN criteria; BfN, 2010). Hence, conflicts between nature conservation on one hand and the continuation of conventional land uses such as logging, hunting, fishing, and future (economic) development – and thus the preservation of traditional cultural landscape images - of these areas on the other hand arise easily and have occurred during virtually all national park designation processes in Germany. Many of these conflicts about conservation vs. use issues seem to be based on different (environmental) attitudes between local people and the park authorities (see Sieberath, 2007). The two parks addressed in this paper provide empirical evidence for these conflicts, mostly related to forest management issues (Flint, McFarlane, & Müller, 2009; Job, 1996; Liebecke, Wagner, & Suda, 2008; SRU, 2002). The vulnerability to such conflicts generally weakens the parks’ reputation, puts them under pressure in the political arena, and often fuels further debates about management issues (local vs. state vs. federal) (Stoll-Kleemann, 2001a, 2001b, 2001c). Thus, the management of stakeholder issues in order to increase support among local communities remains one of the most important sociological challenges for German park managers, also in order to achieve biodiversity conservation objectives.

As existing studies suggest, one potential factor leading to a positive attitude towards the parks might be regional economic benefits through national park-induced tourism (Fiallo & Jacobson, 1995; Fortin & Gagnon, 1999; McCleave et al., 2006; Stern, 2008a). These benefits are unlikely to be realized without successful tourism marketing and a clear protected area orientation of tourism businesses (Selby & Petäjistö, 2009). In Germany, recent research suggests that the national parks serve as considerable sources of regional income, with a total gross tourist spending estimated at EUR 2.1 billion generated by an estimated amount of nearly 51 million visitors a year (Job, Woltering, & Harrer, 2009). At the same time, economic benefits are regarded as a moderating tool by German researchers when trying to reduce local resilience: “Local acceptance is maintained best through mechanisms that also support local economies, such as tourism” (Stoll-Kleemann & Job, 2008). However, even when taking in account that tourism was already prevalent in more than 70% of Germany’s national park regions before the designation of the protected area (see Job et al., 2009) the question arises whether these economic benefits are in fact recognized by the locals living near the parks and whether these benefits have a measurable influence on the locals’ attitude towards the parks.

Thus, the main research questions addressed in this paper are: (1) Which factors influence the overall attitude towards the national parks in Germany? and (2) Do economic
benefits derived from national park tourism foster local support for national parks?

While the Harz National Park study focused on the population in local communities adjacent to the protected area, the case study in Bayerischer Wald concentrated on the operators of tourism businesses in the surroundings of the park. Despite the differing methodological approaches, this allows the identification of differences and similarities between tourism professionals and the general public in regards to their attitudes towards national parks and the discussion of target group-tailored management approaches.

**Parks-People Relationships**

*Putting Germany into Perspective*

As parks, people and their relationships are largely influenced by ecological, economical, social and cultural circumstances, it is impossible to trivialize all findings on an abstract level that applies to all regions of the world. Nevertheless, a general consensus about the importance of socio-cultural issues related to protected areas being a decisive precondition for successful nature and biodiversity protection exists (Beltrán, 2000; Hough, 1988; Zube & Busch, 1990). Research has often focused on park-people relationships in developing countries, especially densely populated areas in Asia (Fortin & Gagnon, 1999; McCleave et al., 2006), or indigenous rights (see Beltrán, 2000). The context for park-people relationship research in Germany varies considerably from the international level.

With regards to the most pressing conflicts, the parks mainly struggle with disagreements about the (dis-)continuation of different uses or activities, access restrictions and nature conservation objectives that contradict common attitudes and values (Stoll-Kleemann, 2001a, 2001b) in a society that is not based on self-sustaining farming (compared to indigenous people affected in developing countries). As the parks were only recently founded and are somewhat less considered part of the national heritage (compared to the U.S. national parks), the research focus and terminology varies notably as well. While “parks-people relationships” now seems to be a common term in the international discussion, German studies continue to focus most commonly on the “acceptance” of protected areas by local people and thus concentrate on opposition and resistance against nature conservation measures (see Mose, 2009; Schenk, Hunziker, & Kienast, 2007). Methodologically, “acceptance” is usually equated with the sociological term “(positive) attitude” (Beckmann, 2003; Stoll, 1999). The first study of this kind was published by Rentsch in 1988 and focused on Bayerischer Wald National Park. Its most
significant finding was the so-called “crater of acceptance”, meaning that the park’s acceptance rose the further away people lived from it. This discovery equals the NIMBY (Not In My Back Yard) syndrome commonly used in the English language. Since this pilot study, similar studies have been carried out in most of Germany’s national parks and other large protected areas as well (Mose, 2009; von Ruschkowski, 2010b). Although there is most likely at least one case study on “acceptance problems” for each national park in Austria, Switzerland, and Germany, several factors have resulted in a rather minor contribution of the German-speaking research community to the international debate of parks-people relationships: (a) most studies were published in German only (exceptions: Bachert, 1991; Schenk et al., 2007; Stoll-Kleemann, 2001a, 2001b, 2001c), thus restricting the potential audience; (b) most of the studies were also published as grey literature only (graduate theses and dissertations) in the 1990ies and are difficult to access as they are not found in public domains (overviews in Beckmann, 2003; von Ruschkowski, 2010b); and (c) the research was mostly practitioner-oriented and thus lacked links to international debates. Additionally, park managers today still continue to focus research activities on natural resource management. Out of the 14 national parks, only three of them had assigned local communities relations a high priority in their management (von Ruschkowski, 2010b). Given the additional lack of social scientists on park staff, the concern is that socio-economic issues are often being managed by “gut feeling”, if at all.

**Parks-people Relationship Research: State of the Art**

During the last 25 years, considerable progress in the field of parks-people relationship research has been achieved worldwide. Nevertheless, no overall model or theory explaining all interactions between protected areas and the people living in their surroundings has been developed (see Schenk et al., 2007). However, several sociological, socio-psychological and communication theories have been used so far to better understand local opposition to protected areas. These include the Theory of Psychological Reactance (Brehm, 1966, referred to by Stoll, 1999; Schenk et al., 2007; Stoll, 1999; Stoll-Kleemann, 2001a, 2001b), the Social Identity Theory (Stoll, 1999; Tajfel, 1978, 1981, referred to by Stoll, 1999), the Theory of Planned Behavior (Ajzen, 1988, 2002), most recently used by Stern (2008a, 2008b), and the Theory of Communicative Behavior and Theory of Symbolic Interaction (tested by Schenk et al., 2007).

The German Advisory Council on the Environment (SRU) introduced an explanatory framework in 2002 for the “lack of support for nature conservation” which may also be
applied to protected areas. It was based on a review of existing case studies. The five categories provided to explain “acceptance deficits” are (a) economic disadvantages, (b) lacking familiarity with nature conservation objectives, (c) contrary attitudes and values, (d) dissatisfying means of communication, and (e) feared restrictions and heteronomy (SRU, 2002). The research conducted by Stern (2008a, 2008b) shows similar ideas, as he identified two dominating explanatory paradigms in the global conservation community in explaining public resistance against parks: first, and most important, economic rationalism suggesting that local residents respond primarily to economic stimuli; second, reflecting themes of democracy and human rights, suggesting that local participation in park management processes is of central importance for defusing park-people conflicts.

Furthermore, Stern suggested that local distrust for park managers is the most consistent predictor of active opposition towards national parks, overshadowing rational assessments of the benefits and disadvantages associated with park presence among other factors like environmental values or local peer attitudes (Stern, 2008a, 2008b).

For this paper, the authors have chosen an explanatory framework (Figure 1) based on SRU (2002), Stoll (1999) and Schenk et al. (2007), which contains (a) economic impacts, (b) communication processes, (c) local participation, (d) attitudes towards nature (nature conservation and national parks in particular), and (e) reactance as the main influential drivers for attitudes towards large protected areas in Germany. Although attitudes do not necessarily result in actual behavior, they serve as meaningful predictors of behavior (Ajzen, 1988, 2002). In order to address the discrepancy between attitudes and behavior, both studies included the measurement of behavioral components as well (Stern, 2008a).

Whereas the “general” public is often in the center of attention when it comes to measuring attitudes towards protected areas, only few studies have dealt with the attitudes and the professional behavior of selected important stakeholder groups such as the operators of tourism enterprises adjacent to protected areas (Selby & Petäjistö, 2008, 2009). It is them who play an important role in the economy of gateway communities relying heavily on tourism. Thus, it could be assumed that the attitudes of a hotel owner towards the national park have quite some weight and influence on his fellow citizens, taking into consideration his role as employer and possible role as a local opinion leader or decision-maker. If these people neither share the ideas and ideals nor do they promote the national park convincingly to their guests, customers and employees, it is very likely that the region will not be able to profit from the unique selling proposition in nature-based
tourism offered by the national park (Reinius & Fredman, 2007). Furthermore, as the operators of tourism businesses rely existentially on tourism, they should have a vital interest in a protected area as functioning attraction – given that the premise of economic rationalism holds true for them. Thus, the second case study extends current research ideas by allowing a comparison of the importance of the economic argument for the general public and tourism professionals whereas the latter should presumably act more rationally than the former.

![Diagram](image)

**Figure 1. Explanatory Framework for Attitudes Towards Large Protected Areas in Germany**

Source: own draft based on SRU(2002); Stoll, (1999); Schenk et al. (2007)

**Study Areas**

**Harz National Park Study Area**

Harz National Park is located along the border between the federal states of Lower Saxony and Saxony-Anhalt which also marks the former borderline between East and West Germany (see fig. 2). The mountain range forms the first major elevation (up to 1,141 meters asl) inland from the North Sea coast and is a traditional, year-round tourism destination. The most popular recreational activities include hiking, nordic skiing, and mountain biking. Access to the region is mostly by car, with several major metropolitan regions (Hannover, Bremen, Hamburg, Berlin) within less of three hours driving distance.
The region's economy relies heavily on tourism. In 2007, the region's hotel industry registered a total of 5.78 million overnight stays (HVV, 2009) with 1.77 million arrivals. Combined with day visitors, the annual visitation in the Harz Region is estimated to be beyond 10 million of which more than 3 million visit the national park (Job et al., 2009; von Ruschkowski, 2010a, 2010b). Currently, demographic, economic and climate change (ageing population, outdate tourism infrastructure, fading snow reliability) pose new challenges for the region, contributing to an already difficult regional setting.

Harz National Park was originally established as two separate parks in 1990 and 1994 in Saxony-Anhalt and Lower Saxony respectively. In 2006, a merger between the two units created Germany's first cross-state national park which now covers 247 km² or 10% of the mountain range's area, including major tourism destinations and attractions. The park
comprises six vegetation zones (colin to subalpine). Nearly all (96%) of this area is forest, of which about 60% is currently being managed to accelerate the transition from spruce monocultures into natural oak-beech communities and partially also to control bark beetle infestation (Nationalpark Harz, 2009).

Whereas the Eastern section (89 km²) of the current park was practically established overnight during the last session of the Eastern German government shortly before German reunification in 1990, the Western section was designated after a multi-year consultation process by January, 1994.

As early as 1995, a first study on the locals’ perception of the park was done and indicated high support of the park among locals (Job, 1996). Nevertheless, the first couple of years after the parks’ designation led to various conflicts with local interests, most notably the termination of alpine skiing on the Brocken’s eastern slope and the ban on mushroom and berry picking. The parks’ first annual scientific conference in 1991 was accompanied by locals trying to shut out participants from the conference site (Job, 1996). Park opponents also founded an anti-park organization, but it was eventually dissolved in 2006 (von Ruschkowski, 2010b).

**Bayerischer Wald National Park**

The first German national park, Bayerischer Wald, was originally designated on the mid-mountain range at the German/Czechoslovakian border (up to 1,453 m asl) in 1970 with the purpose to enforce regional economic development through a stimulation of tourism in the peripheral and structural weak region isolated through the iron curtain at that time (Fehn, 1966, Haug, 1993; Vangerow, 1974). In 1997, the park was nearly doubled in its size (from 13,200 up to 24,300 ha, >96% forest cover) by an extension to the North (Fig. 3). The national park is divided into four zones. Due to the different history of the two parts of the park the distribution of the zones is quite unequal: in the original park area 70% are strictly protected core zones but even 12 years after its designation the extension area does not comprise more than 30% strictly protected core zone (Nationalparkverwaltung Bayerischer Wald, 2009). As a consequence of the long-term opposition against the park a compromise influenced by local and regional politics as well as a critical citizens’ movement was found which postpones the fulfillment of the IUCN category II-goal of 75% strictly protected core zone in the extension area to the year 2027.

During the first two decades of the park’s existence, the area experienced a rapid rise of inbound tourism, putting the region on the domestic tourist map. Although the tourism
boom has petered out since the mid-1990s, the national park serves as the primary attraction in the region with an estimated visitor number of more than 750,000 generating a regional income of EUR 13.5 million in 2007 (Mayer, Müller, Woltering, Arnegger, & Job, 2010). Tourism plays an important role for the economy of the national park region with a total of nearly 4.3 million overnight-stays in the counties Freyung-Grafenau and Regen respectively 1.5 million overnight-stays in the gateway-communities in 2007 (Job, Mayer, & Woltering, 2008).

Since its designation the attitude of the local population towards the protected area has undergone profound changes which are closely related to political decisions and park management policies and their consequences on the landscape in the park (Flint et al., 2009; Liebecke et al., 2008; Rentsch, 1988). At its beginnings the national park was presented and managed primarily as a tourist attraction. In this first phase of the national park history the local support for the protected area was high (Haug, 1993). It was only in 1983 when the national park authority decided to not fight the bark beetle-breakouts after storm damages (Bibelriether, 2007; Rall, 1999). This change in the management was justified by the new concept of developing the mainly cultivated forestry landscapes into more unspoiled nature-like areas by just letting things develop, a policy which was concentrated in the sentence “letting nature follow its course” (Natur Natur sein lassen) (Flint et al., 2009; Rall, 1999). 25 years later, more than 95% of the mountain spruce forests in the original park area have been destroyed by uncontrolled bark beetle infestations resulting in extensive areas of standing and lying dead wood covering nearly 6,000 ha (see Fig. 3) – causing a complete change of the landscape character which deeply affected the local population’s perception of the park.

The once supportive majority did not accept that fundamental shift in “their” home region. Besides that emotional turmoil, the anger on lacking participation and information as well as fears for the, in their eyes, destroyed landscape attractiveness which could affect the tourism development, led to a vibrant opposition movement against the national park and fuelled the resistance against its extension in the mid-1990s (Flint et al., 2009; Liebecke et al., 2008; Müller & Job, 2009; Rentsch, 1988; Weiß, 1998). Several citizens’ movements were established, the local and regional newspapers were full of angry letters to the editors, officials of the Park Authority were insulted and threatened and even a ranger post was set on fire (Köck, 2001).
Study Design and Methods

Harz Case Study

Based on preliminary thoughts and frameworks considered, the scope of the study was to identify and analyze existing and potential conflicts between park management and the local population. A specific focus was put on local gateway communities directly affected by the park in order to (a) measure the attitude towards the park, (b) to identify latent and manifest conflicts, (c) to monitor changes in attitude since the park’s original designation, and (d) to determine local communication patterns. An additional objective
was to use the results later on to develop an outreach strategy for the park’s administration to foster better relations with local communities.

To address the research questions, a study design based on a quantitative survey was chosen. The sample size was set to be at least 200 households, taken as a stratified random sample (see fig. 2 for the communities selected). The extensive questionnaire contained 41 questions with a total of 139 items, using a mix of closed and open questions. The general attitude towards the park as the dependent variable was measured through a five-point Likert scale question “How was your attitude towards the park upon its designation” combined with a second question that included a time-component (“How has your attitude changed since?”). The independent variables from the explanatory framework (see Parks-people relationship Research: State of the Art) were operationalized through statements in an item battery, also using a five-point Likert scale for measurement (1 = totally agree to 5 = totally disagree). Overall, 25 statements were developed to reflect the explanatory framework: For example, “I personally consider the national park important” was used as a statement to determine the respondents’ identification with the park. To identify potential reactance, the statement “I feel personally constrained from the national park’s existence” was used. Participation was operationalized as “My personal opinion is not taken into account” and as “I was satisfied with the participation process during park designation” whereas communication was covered by the statement “I feel well-informed about the national park.” Environmental attitudes of the Harz locals were among others operationalized as, “Dead trees should be immediately removed from the park” and “Nature conservation is being exaggerated in the national park.” A behavioral component was also included by using the statement “I would like to get involved with the national park.”

The survey was carried out in February and March of 2005 and benefited from highly motivated participants. The personal door-to-door approach resulted in a 75.6% participation rate and a very high 97.2% response rate. The final sample size was n = 205. The data was coded and analyzed, using the statistical software package SPSS. Besides using descriptive statistics, the results were also used to test correlations between individual statements and also the general attitude towards the park, using Spearman’s rho ranking correlation coefficient.

Bayerischer Wald Case Study

In order to assess the attitudes and the behavior of tourism business operators
towards the Bayerischer Wald National Park, a postal survey was run. Numbers, names and addresses of enterprises in the national park region (the counties Freyung-Grafenau and Regen) had to be compiled from different sources: the tourism associations of Eastern Bavaria and the two counties, tourism websites and catalogues, as well as the Chamber of Industry and Commerce of Lower Bavaria and the Chamber of crafts of Lower Bavaria and Upper Palatinate. A stratified sample of tourism and non-tourism enterprises was used to obtain a representative sample for the two counties as well as for the gateway-communities (directly adjacent to the park). Different questionnaires were sent out to address the different sectors adequately: accommodation, gastronomy/catering, culture/sports/leisure and industry/crafts/services.

The survey took place in two steps in summer and fall 2007. In total, 1832 questionnaires were mailed out, 197 received completed, which constitutes an overall responding rate of 10.8%. The obtained data set was weighted. In this paper only tourism enterprises are regarded. For details on the data collection process see Mayer and Woltering (2008).

The questionnaire contained 46 questions about type, size and structure of the enterprises, numbers of employees, their turnover and profits, their intermediate input linkages, using a mix of closed and open questions that ranged from nominal to interval scale to allow multivariate analysis. The attitudes towards the national park, tourism, regional development and the bark beetle infestations were operationalized through statements in an item battery and measured on six-point Likert scales ranging from 1 (agree totally) to 6 (disagree totally).

The data was coded and analyzed, using the statistical software package SPSS. The results of three statements were combined to an dependent overall attitude variable consisting of the statements “The tourism offer of the national park is a big advantage for the region”, “Mostly positive feedback to the national park from the visitors” and “All in all, the enterprise profits from the presence of the national park”. The resulting variable measures the overall attitude towards the national park on an ordinal scale ranging from three (very positive attitude) to eighteen (very negative attitude) and shows acceptable reliability (Cronbach’s alpha 0.852). The behavioral component is operationalized through the statement “The national park plays an important role in my marketing” based on the assumption that only operators more or less in favor of the protected area chose to use its label in their marketing mix. The other independent variables of the explanatory framework
(see Parks-people relationship Research: State of the Art) included were the attitude towards nature (conservation) expressed through the statement “Bark beetle infestations in the national park have a negative influence on the tourism development” and economic impact measured through the statement “Without the national park more tourists would visit the region” respectively the estimated share of turnover directly or indirectly related to the national park. Due to the original scope of the survey, the other three components of the explanatory framework could not be included in the quantitative analysis.

Results

Harz Case Study

Due to the extensiveness of the study, only parts of the results are presented here. The most important findings from the correlation analysis are found in Table 1 and will be further discussed in the following paragraphs, in accordance with the explanatory framework as outlined in chapter 2.

Sociodemographics

From all 205 returned questionnaires, 56.1% of the respondents were male and 43.4% were female. Compared with the average population, the sample was biased as the age group between 46 and 65 years was overrepresented (43.5% of the sample compared 27.8% of the overall population) and the age group below 25 years was underrepresented (7.3% instead of 22.8%). This is mainly due to the fact that the park’s 15+ years of history required respondents to be of a certain age in order to be able to properly answer questions about the park’s initial designation. 86.7% of the respondents were either born in the Harz region or had lived here for more than 20 years, suggesting a high place-attachment of the people to this region. 45% were not part of the labor force; most of these people had already retired (28.3%) or were “housewives” (10.2%). None of the sociodemographic variables had a significant impact on the attitude towards the park.

Locals’ Attitude towards Harz National Park

From both a scientific and a management perspective, two questions were of general significance: First of all, the locals’ attitude towards the park and secondly, attitude changes over time as about fifteen years since the park’s establishment had passed at the time of the survey.
As figure 4 illustrates, 40.5% of the 184 participants who responded to this question had an at least rather positive attitude towards the park at the time of designation in the 1990s, whereas the fraction of people with a rather negative attitude was about half the size (22.0%). Notably, more than a quarter (27.3%) were neutral. Only little variance existed between the partial samples in the Eastern and Western section of the park’s area. In a second question, 80% of the respondents stated that their attitude towards the park had not changed since the initial designation while 5.9% indicated it was more positive and for 7.3% it was more negative now. Therefore, the initial attitude was prevalent for the vast majority even over a long period of time. Subsample sizes were too small to determine whether certain occupations that involved land use (such as foresters or farmers) had a significant impact on the attitude or attitude changes. A positive attitude towards the park correlated on a highly significant level when respondents considered the park personally important ($r_s = 0.642^{***}; n = 166$; see Table 1).

**Participation and communication**

Of those people who actually had lived in the area and participated in the initial designation process (97 valid answers; an additional 61 people stated they had never heard about a public involvement process), only 19.6% of the respondents ranked the level of participation as satisfactory; 66.0% were rather unsatisfied to very unsatisfied. The correlation coefficient (Spearman’s rho) between satisfaction level and attitude towards the park was highly significant ($r_s = 0.567^{***}; n = 95$). Additionally, 41.9% of the sample supported the statement “My personal opinion was not sufficiently taken into consideration” whereas 21.7% did object to it.
Table 1. Selected Correlations of Overall Attitude Towards Harz National Park with Statements from Item Battery

<table>
<thead>
<tr>
<th>Spearman’s rank correlation coefficient (Spearman’s Rho)</th>
<th>Positive general attitude towards the national park</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I personally consider the national park important</td>
<td>0.642*** (n = 166)</td>
<td>0.332*** (n = 166)</td>
<td>-0.519*** (n = 160)</td>
<td>-0.410*** (n = 158)</td>
<td>-0.296*** (n = 144)</td>
<td>0.573*** (n = 84)</td>
<td>0.345*** (n = 164)</td>
<td>0.426*** (n = 156)</td>
<td>-0.182* (n = 161)</td>
<td></td>
</tr>
<tr>
<td>B. I would like to get involved with the national park</td>
<td>0.419*** (n = 165)</td>
<td>0.332*** (n = 166)</td>
<td>-0.174* (n = 169)</td>
<td>-0.103 (n.s.) (n = 169)</td>
<td>-0.163* (n = 151)</td>
<td>0.377*** (n = 95)</td>
<td>0.106 (n.s.) (n = 175)</td>
<td>-0.241** (n = 163)</td>
<td>-0.224** (n = 172)</td>
<td></td>
</tr>
<tr>
<td>C. I feel personally constrained from the national park’s existence</td>
<td>-0.591*** (n = 169)</td>
<td>-0.519*** (n = 160)</td>
<td>-0.174* (n = 169)</td>
<td>0.622*** (n = 164)</td>
<td>0.365*** (n = 146)</td>
<td>-0.430*** (n = 146)</td>
<td>-0.237** (n = 162)</td>
<td>0.613*** (n = 159)</td>
<td>0.309*** (n = 164)</td>
<td></td>
</tr>
<tr>
<td>D. There should be less restrictions for locals than for tourists</td>
<td>-0.395*** (n = 148)</td>
<td>-0.410*** (n = 158)</td>
<td>-0.103 (n.s.) (n = 169)</td>
<td>0.622*** (n = 164)</td>
<td>- (n = 148)</td>
<td>0.261** (n = 87)</td>
<td>-0.337** (n = 162)</td>
<td>-0.205** (n = 158)</td>
<td>0.377*** (n = 165)</td>
<td>0.187* (n = 165)</td>
</tr>
<tr>
<td>E. My personal opinion is not taken into account</td>
<td>-0.298*** (n = 151)</td>
<td>-0.296*** (n = 144)</td>
<td>-0.163* (n = 151)</td>
<td>0.365*** (n = 146)</td>
<td>0.261** (n = 148)</td>
<td>- (n = 148)</td>
<td>-0.195 (n.s.) (n = 78)</td>
<td>-0.132 (n.s.) (n = 144)</td>
<td>0.422*** (n = 147)</td>
<td>0.179* (n = 149)</td>
</tr>
<tr>
<td>F. I was satisfied with the participation process during park designation</td>
<td>0.567*** (n = 95)</td>
<td>0.573*** (n = 84)</td>
<td>0.377*** (n = 95)</td>
<td>-0.430*** (n = 85)</td>
<td>-0.337** (n = 87)</td>
<td>-0.195 (n.s.) (n = 78)</td>
<td>- (n = 78)</td>
<td>0.505*** (n = 85)</td>
<td>-0.396*** (n = 90)</td>
<td>-0.309** (n = 90)</td>
</tr>
<tr>
<td>G. I feel well-informed about the national park</td>
<td>0.324*** (n = 175)</td>
<td>0.345*** (n = 164)</td>
<td>0.106 (n.s.) (n = 175)</td>
<td>-0.237** (n = 167)</td>
<td>-0.205** (n = 162)</td>
<td>-0.132 (n.s.) (n = 144)</td>
<td>0.505*** (n = 93)</td>
<td>- (n = 93)</td>
<td>-0.327*** (n = 157)</td>
<td>-0.059 (n.s.) (n = 170)</td>
</tr>
<tr>
<td>H. Nature conservation is being exaggerated in the national park</td>
<td>-0.494*** (n = 163)</td>
<td>-0.426*** (n = 156)</td>
<td>-0.241** (n = 163)</td>
<td>0.613*** (n = 159)</td>
<td>0.377*** (n = 158)</td>
<td>0.422*** (n = 147)</td>
<td>-0.396*** (n = 85)</td>
<td>-0.327*** (n = 157)</td>
<td>0.379*** (n = 158)</td>
<td></td>
</tr>
<tr>
<td>I. Dead trees should be removed immediately from the park</td>
<td>-0.347*** (n = 172)</td>
<td>-0.182* (n = 161)</td>
<td>-0.224** (n = 172)</td>
<td>0.309*** (n = 164)</td>
<td>0.162* (n = 169)</td>
<td>0.179* (n = 149)</td>
<td>-0.309** (n = 90)</td>
<td>-0.059 (n.s.) (n = 170)</td>
<td>0.379*** (n = 158)</td>
<td>-</td>
</tr>
</tbody>
</table>

The national park’s existence promotes tourism in the region | 0.509*** (n = 173) | 0.476*** (n = 161) | 0.074 (n.s.) (n = 173) | -0.473*** (n = 162) | -0.253** (n = 164) | -0.304*** (n = 147) | 0.412*** (n = 89) | 0.237** (n = 165) | -0.366*** (n = 160) | -0.120 (n.s.) (n = 164) |

Level of significance: *p<0.05, **p<0.01, ***p<0.001; Significant variables in bold letters; Items used to operationalize: 1identification with park; 2reactance; 3participation; 4communication; 5(contradictory) environmental attitudes; 6economic impacts
Also, 37.1% of the respondents ranked their level of information as good or very good, whereas 57.1% ranked themselves as mediocre or worse. At the same time, 64.9% of the respondents also stated they did not need any additional information. Cross-tables showed that the less informed people were about the park, the higher their desire for additional information (Cramérs $V = 0.407^{***}$). The correlation between level of information and the attitude towards the park was also highly significant ($r_s = 0.324^{***}; n = 175$). Publications by the park administration aimed at locals found little circulation among survey participants, who also hardly used the park’s website to retrieve information. Overall, the specific outreach efforts on national park issues did not even reach five percent of the respondents.

**Reactance**

Several items in the questionnaire were used to test potential reactance, such as the statement “I feel personally constricted from the national park’s existence”. More than a quarter (27.3%) of the respondents did at least slightly agree to this statement, showing a potential for reactance. The correlation between this statement and the attitude towards the park was highly significant ($r_s = -0.591^{***}, n = 169$) with greater (perceived) constraints resulting in a more negative attitude. Additionally, the survey inquired about actual constraints or restrictions. While most laws in effect were widely accepted by the respondents, there was one noticeable exception: mushroom and berry picking was and still is an activity carried out by many locals. Therefore, the ban on this activity within park boundaries was unacceptable for 56.5% of the respondents. This was by far the most unpopular regulation and also caused most comments throughout the survey.

**Economic impacts**

53.6% of the respondents stated that the existence of the national park supports tourism in the region, and there was a highly significant correlation with the general attitude towards the park ($r_s = 0.509^{***}, n = 173$). 63.4% said the recreational opportunities and infrastructure in the region need to be improved. The rating of the statement that the national park creates jobs was dispersed across the scale. Overall, 73.6% of the respondents said they (themselves or members of their families) were not economically affected at all by the park. For the rest of the sample, positive and negative effects were about balanced out evenly: While 11.2% were positively affected (e.g. through the creation of jobs, stated directly by five respondents), 13.7% stated they were negatively affected (none cited employment as a reason here). Overall, it can be stated that the park is being
regarded as a positive factor for tourism in the region.

_Environmental attitudes of the Harz locals_

With about 60% of the Harz National Park’s forests still being managed, one of the most significant changes locals will see over the next generations is the transition from a conifer-dominated to a mostly deciduous forest type. Additionally, the German public generally perceives forests as being managed with hardly any dead wood standing or lying on the ground. Thus, the current development in Harz National Park is contradictory to general attitudes, which was greatly reflected in the survey. Despite extensive outreach by the park administration, locals still show a low acceptance of the forest management objective to let natural processes prevail and sometimes even contradicting attitudes. The most dominant conflict is the management of bark beetle infestations – 76.6% of the respondents stated that the national park should fight all bark beetles instead of using their occurrence to speed up changes within the forest. 45.8% were in favor of the park management removing dead trees from the forest immediately. The correlation between the statement on dead trees and the attitude towards the park was highly significant ($r_s = -0.347^{***}$, $n = 172$).

_Bayerischer Wald Case Study_

_Socio-economic characteristics of tourism businesses_

The national park region in the Bavarian Forest is characterized by typical tourism SMEs (Getz & Carlsen, 2000): only 11.2% of the responding tourism businesses have more than ten year-round employees. The structure of accommodation services is dominated by non-commercial accommodations: 62.4% are cottages/holiday-flats, apartments, private guest rooms etc., only 5.3% are hotels, 16.1% pensions and 8.5% inns. The size of businesses varies significantly between the types of businesses: on average, hotels offer 67.4 beds, other commercial accommodations 33.1 beds, non-commercial accommodations 18 beds (median 6 beds). The gross turnover is an important indicator of the firm size. Two thirds of the respondents answered that question. Hotels realize a turnover of EUR 0.63 million per year ($\sigma = EUR \ 728,510$), other commercial accommodation and gastronomy businesses reach EUR 0.21 million ($\sigma = EUR \ 262,048$) and cottages have a yearly turnover of EUR 61,300 on average ($\sigma = EUR \ 246,304$; median EUR 6,300). Since 2005 the national park offers the so-called “partnership program”: tourism enterprises which promote the park and its ideas to customers are
allowed to use the label “national park partner” for their marketing. 7% of the respondents are partner enterprises, 42% know the program. There are significant differences between the two counties: In Regen only 2% are members, 2% think that the program would be relevant for their business and 66% claim to not know the program compared to 46% in Freyung-Grafenau.

**Attitudes towards the National Park**

The overall attitudes towards the national park among the operators of tourism businesses are quite balanced (arithmetic mean $M = 9.78$, $\sigma = 4.61$). More than half of the respondents (56%) have a very positive or rather positive attitude, whereas 44% have a rather negative or very negative attitude. Fig. 5 shows the statistically significant differences between the attitudes of tourism operators in communities adjacent to the original park area and the extension area. In the county Freyung-Grafenau 65% of the operators think positively about the national park ($M = 8.45$, $\sigma = 3.93$), in the county Regen only 50% ($M = 10.97$, $\sigma = 4.87$). The strongest differences show gateway communities in the original and the extension area. In the old part, more than 70% of the respondents have a positive overall attitude towards the park ($M = 6.85$, $\sigma = 4.30$), in the extension area only 40% ($M = 11.15$, $\sigma = 5.15$). It is not surprising that partner businesses have overwhelmingly positive attitudes towards the national park ($M = 4.06$, $\sigma = 1.76$). Partly due to small subsample size, no significant differences could be revealed between the different types of tourism businesses. Neither the quality level of accommodation nor the firm size (turnover, number of employees) seem to influence the attitude towards the national park.

If we correlate the attitude towards the national park with other statements (Table 2) and geographical and organisational variables (Table 3) we receive highly significant results.
Table 2. Correlations of Overall Attitude Towards Bayerischer Wald National Park with Selected Statements from the Item Battery and Other Framework Components

<table>
<thead>
<tr>
<th>Kendall tau-b</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Attitude towards the national park (inverted scale)b</td>
<td>/</td>
<td>-0.408***</td>
<td>-0.377***</td>
<td>-0.438***</td>
<td>0.466***</td>
</tr>
<tr>
<td>(n = 109)</td>
<td>(n = 51)</td>
<td>(n = 114)</td>
<td>(n = 113)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Without national park more tourists would visit the regiona</td>
<td>-0.408***</td>
<td>/</td>
<td>0.327**</td>
<td>0.263***</td>
<td>-0.156*</td>
</tr>
<tr>
<td>(n = 109)</td>
<td>(n = 51)</td>
<td>(n = 112)</td>
<td>(n = 114)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Share of turnover directly or indirectly related to the national park1</td>
<td>-0.377***</td>
<td>0.327**</td>
<td>/</td>
<td>0.194 (n.s.)</td>
<td>-0.504***</td>
</tr>
<tr>
<td>(n = 51)</td>
<td>(n = 51)</td>
<td>(n = 53)</td>
<td>(n = 52)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Bark beetle infestations in the national park have a negative influence on the tourism developmenta</td>
<td>-0.438***</td>
<td>0.263***</td>
<td>0.194 (n.s.)</td>
<td>/</td>
<td>-0.243**</td>
</tr>
<tr>
<td>(n = 114)</td>
<td>(n = 112)</td>
<td>(n = 53)</td>
<td>(n = 116)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. National park plays an important role in marketinga</td>
<td>0.466***</td>
<td>-0.156*</td>
<td>-0.504***</td>
<td>-0.243**</td>
<td>/</td>
</tr>
<tr>
<td>(n = 113)</td>
<td>(n = 114)</td>
<td>(n = 52)</td>
<td>(n = 116)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a 1: agree totally; 6: disagree totally 
b 3: very positive attitude; 18: very negative attitude 
Items used to operationalize: 1economic impacts; 2(contradictory) environmental attitudes; 3actual behavior 
Level of significance: *p<0.05; **p<0.01; ***p<0.001 
Significant variables in bold letters
Table 3: Correlations of Overall Attitude towards Bayerischer Wald National Park with Spatial and Organizational Variables

<table>
<thead>
<tr>
<th>Cramér's V</th>
<th>National park is of direct or indirect relevance for the business (yes/no)¹</th>
<th>Original vs. extension area (County Freyung-Grafenau vs. County Regen)</th>
<th>Gateway communities vs. non Gateway communities</th>
<th>Gateway communities original and extension area</th>
<th>Partner enterprises vs. Non partner enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude towards the national park (inverted scale)</td>
<td>0.723*** (n = 118)</td>
<td>0.456* (n = 129)</td>
<td>0.400 (n.s.)</td>
<td>0.835* (n = 32)</td>
<td>0.472 (n.s.)</td>
</tr>
<tr>
<td>Without the national park more tourists would visit the region¹</td>
<td>0.386** (n = 116)</td>
<td>0.296* (n = 131)</td>
<td>0.265 (p&lt;0.06)</td>
<td>0.414 (n.s.)</td>
<td>0.235 (n.s.)</td>
</tr>
<tr>
<td>Bark beetle infestations in the national park have negative influence on the tourism development²</td>
<td>0.492*** (n = 122)</td>
<td>0.167 (n.s.)</td>
<td>0.150 (n.s.)</td>
<td>0.366 (n.s.)</td>
<td>0.420** (n = 94)</td>
</tr>
<tr>
<td>National park plays important role in marketing³</td>
<td>0.796*** (n = 123)</td>
<td>0.348** (n = 138)</td>
<td>0.378** (n = 139)</td>
<td>0.554 (p&lt;0.06)</td>
<td>0.515*** (n = 97)</td>
</tr>
</tbody>
</table>

Level of significance: *p<0.05; **p<0.01; ***p<0.001; Significant variables in bold letters; Items used to operationalize: ¹economic impacts; ²(contradictory) environmental attitudes; ³actual behavior

Economic benefits

Only 5.6% of the respondents agree totally with the statement “Without the national park more tourists would visit the region”, whereas 60% disagree totally (M = 5.1) and thus believe in the attractiveness of the national parks for tourists. The negative correlation between overall attitude and the statement “Without the national park more tourists would visit the region” (kendall tau-b -0.408***, see Table 2) proves that a belief in the attractiveness of the protected area for nature-based tourism is related to a positive attitude towards the park.

The share of turnover directly or indirectly related to the national park differs between 39.5% in gateway-communities in the original park area and 2.8% in the non-gateway communities in the extension area (overall mean 18.8%). The negative correlation between attitude and the importance of direct and indirect business relations with the national park (kendall tau-b = -0.377***, see Table 2) indicates a possible connection between acceptance and economic benefits from the park: The more important the business contacts, the more positive the attitude towards the protected area.

Attitude towards nature (conservation)

The statement “Bark beetle infestations have a negative impact on tourism” shows a U-shaped dispersion of answers which indicates the polarizing effects of bark beetle infestations serving as a proxy-variable for the attitude towards nature (conservation) in
the survey area: 32.5% of the respondents agree totally, 23% in turn do not agree at all, only 15% are indifferent. This means that about one third of the operators share a conventional attitude towards nature in which natural disturbances should be controlled and a cultivated, traditional forest image should prevail. A differentiation between the two counties does not provide significant variations (see Table 3). In contrast, a close look at the gateway-communities which are directly confronted with the dead wood areas in the park reveals strong differences at a high level of significance. In the extension area nearly 50% of the respondents agree totally ($M = 2.4, \sigma = 1.8$), but in the original park area only 25.9% ($M = 3.7, \sigma = 2.1$). On the contrary only 7.3% of the respondents reject the hypothesis in the extension area, compared to 33.1% in the original area. This result is astonishing because it is the original park area where the dead wood areas are – the extension area has not changed much since the designation in 1997.

The results of the correlation analysis prove the hypothesis that the attitude of tourism operators towards the national park is closely related to their opinion about the bark beetle infestations (kendall tau-b -0.438**, see Table 2). The more negative the respondents’ attitude towards the national park, the more the operators tend to believe in a negative impact of bark beetle infestations on tourism and vice versa. This fact is underlined by the highly significant negative correlation between the statements “Mostly positive feedback to the national park from the visitors” and “Bark beetle infestations have a negative impact on tourism” (Kendall tau-b -0.457***). However, either the perception of the national park is heavily influenced by the controversial debate about the bark beetle or the operators seek to confirm their attitudes with the help of their guests through selective perception – some operators might even try to influence their guests negatively to the disfavor of the national park.

**Behavioral component: the role of the national park in the marketing**

More than one fifth (21.6%) of the responding tourism operators agree totally with the statement “The national park plays an important role in my marketing”, a slight majority of 51% agrees at least to some extent, but 49% disagree consequently to some extent and even 22% disagree totally. This result indicates that the national park does not play the dominant role in the tourism marketing of the survey region. The results of the behavioral component variable differ regionally very strongly on a high level of significance. The arithmetic mean in the gateway-communities of the original park area is 1.7, in the extension area 3.6 and for the other communities in the county Regen even 4.2. That means the national park plays an important role in the tourism marketing of the original
park area (County Freyung-Grafenau $M = 2.9$) but only a minor role in the communities of the extension area (County Regen $M = 4.1$, ANOVA $F = 15.53^{***}$). As Tab. 2 shows, operators of tourism businesses with a positive attitude towards the national park are highly likely to promote the protected area in their marketing mix (kendall tau-b 0.466***). As expected the attitude towards the park seems to work as a predictor for the actual behaviour. One explanation could be that nearly none of the operators can bare the cognitive dissonance between rejection of the park and a positive use of the park label in their professional life which would lead to severe credibility problems in the daily life and communication with the guests and other locals.

**Discussion**

*Harz and Bayerischer Wald: Differences and Similarities*

Overall, the attitude towards the individual national park showed differences in both studies. In Harz National Park, there was a 2:1 ratio between positive and negative attitude among local people with a rather large group showing a neutral attitude. On the contrary, the attitude towards Bayerischer Wald National Park among tourism operators seemed to be more polarized (55% positive, 45% negative) compared to the local population as a whole (Liebecke et al., 2008), but also to the local population in the Harz region. People who identify with their national park (measured as the personal importance of the park or the willingness to get involved with the park) are more likely to show a positive attitude.

Both studies clearly show that many statements assigned to the categories of the explanatory framework have a very significant correlation to the general attitude towards the park, especially at Harz National Park. The highest correlations could be observed when the national park was assigned by the respondents to have an actual or perceived impact on them (defined as “reactance” in the explanatory framework). Secondly, deficits in participation, perceived or actual economic impacts and differing environmental attitudes also were highly significant in regards to the general attitude. Communication, although still a significant contributor, was the variable with the weakest correlations.

Overall, attitudes seem to be very stable over the course of time, as the Harz data show: 80% of the respondents still had the same attitude as when the park was founded. These findings are supported by Cihar and Stankova (2006) as they reported similar results from the Czech Republic. Nevertheless, Zube and Busch (1990) stress the importance of the temporal variability of attitudes and the man-nature relationships. This
variability may pose a potential risk for park managers as catastrophic events (e.g. a massive bark beetle outbreak, wildfires, etc.) may trigger reactant behavior as these events might impact locals on an attitudinal or economic level. Especially with a large “neutral” group as it exists in the Harz, the variability of attitudes may reverse the support-resilience ratio to the negative. On the contrary, when it comes to tourism, Selby and Petajistö (2008, 2009) state that the longer a national park exists in a region the better tourism businesses adjust to this new opportunity – a fact also proven in the Bayerischer Wald case study.

Both studies indicate that the idea of letting natural dynamics prevail in national parks is rather controversial and contradicts traditional attitudes and values. In both cases, forest management is the bone of contention and leads to polarizing effects among the respondents. Results from Bayerischer Wald National Park though indicate that the negative view on bark beetle infestations, leading to dead trees, may change over time as there were notable differences between the park’s original area and the extension area. As Harz National Park is closer in age to the Bayerischer Wald extension area, it is not surprising that the population there is only showing little sympathy for the bark beetle as symbol of an ecological integrity park management philosophy. Although the correlation between communication and the general attitude towards the park was lower than that of other variables, communication is still being considered a backbone of park management as all other variables – reactance, participation, perception of economic benefits and environmental attitudes – can only be addressed by means of communication. The Harz study results also support this approach as people with little knowledge about the park are more likely to request additional information. Thus, the parks need to better communicate the process of forest dynamics and changing landscapes.

The second research question concerning the role of national park-induced tourism as a tool to foster a positive attitude towards the park proved positive answers in both studies. However, it seems to have a stronger effect for the tourism operators in Bayerischer Wald as for the general population asked in the surroundings of Harz National Park. This is not surprising given the direct dependence of the tourism operators from a prospering national park tourism whereas the locals in the Harz are mostly not directly involved in tourism activities. From a destination management point of view the low support for the Bayerischer Wald national park from operators of tourism businesses is surprising. Especially if one considers that nearly 46% of the national park visitors state that their visit is primarily motivated by the protected area. The national park only plays a relatively small
role in the marketing mix of the responding businesses, despite the fact that the national park has existed in the region for almost four decades now (Job, Mayer, Müller, & Woltering, 2008; Mayer et al., 2010). As the results show the affinity to use the label “national park” in the marketing is related to the operators’ attitudes towards the park and vice versa. However, in a kind of vicious circle it is impossible to market the national park offensively on the one hand if one rejects the protected area and its forest management policy on the other hand – a credible and consistent national park tourism package is still missing (Job et al., 2008b). These findings lead to the conclusion that more often than not tourism operators in the Bavarian Forest are unable to distinguish between their attitudes as locals and a professional attitude towards the main tourist attraction in their destination. It is not unlikely that the emotional point of view that many locals share – and operators of tourism businesses are locals in most cases – determine their willingness to cooperate with the park in terms of business relations or their tendency to use the label “national park” as a unique-selling-proposition in their marketing.

But the role of economic benefits should not be overestimated. Support by locals can only be achieved when they discover the true value of the protected area both for themselves and the region. This is in accordance with findings from Schenk et al. (2007) and Stern (2008a, 2008b) who conclude that favorable attitudes towards protected areas are not likely to be achieved in the long run if they are just based on economic rationalism or financial compensations like subsidies. As both studies proved, a certain potential among these stakeholder groups exists, but the interest needs to be triggered by specific campaigns.

Methodological Issues and Limitations of the Studies

In conclusion, the explanatory framework of categories that influence attitudes towards protected areas could be confirmed for Harz National Park. The framework – representing a synthesis of existing partial frameworks based on different social-psychological theories – encompasses nearly all relevant groups of variables theoretically influencing attitudes towards protected areas. In future studies, further analysis (such as regression modeling, cluster analysis), based on refined statements (also on a Likert scale), should allow for the weighting of driving factors and the identification of characteristics of supporters and opponents.

Furthermore, the fact that both studies show a high variation of opinions and attitudes underlines the suggestion by Liebecke et al. (2008) that the acceptance as such does not exist: attitudes of locals and tourism operators towards different issues like forest
management or tourism development vary highly and are not necessarily related. For example in the Harz region, people who expressed their rejection of current forest management policies stated their fondness of the park’s attractiveness for tourism at the same time. The conclusions found in Liebecke et al. (2008) that a high percentage of people may have no fixed general opinion on the neighboring protected area and that these people react spontaneously to different stimuli could be seen in both studies as well. Additionally, this problem of a potential overlap of sudden unexpected events versus long-term, stable attitudes and values and its measurement poses a methodical challenge.

Consequently, we suggest that the reliability of conceptualizing park-people relationships through just one overall attitude variable seems questionable. Alternatively, the research focus could be moved from the explanation of the different attitudes (and a possibly aggregated overall “acceptance” factor) to the explanation of actual behavior with the attitude framework categories as independent variables – an approach similar to the methodology applied by Stern (2008a) who used a binary logistic regression model to determine whether or not locals obeyed the park regulations.

As both studies were independently designed, they did show similarities, but were not simultaneously based on the explanatory framework. This partially hampered the comparability – especially when it comes to answer the first research question for the tourism operators in Bayerischer Wald where additional research is clearly required -, but nevertheless, important conclusions can be drawn from both case studies. For future studies, several methodological suggestions can be made. First, the sample size should be bigger in order to allow a better assessment of sociodemographic factors like professional groups (foresters, farmers), accommodation types (hotels vs. private accommodation) or special interest groups (mushroom and berry pickers, outdoor enthusiasts, ecologists etc.). Second, further research should also consider “trust” (towards the protected area administration). Although the Harz study had one statement about whether the park administration serves as contact point included, the question whether people actually trusted the managers was asked in neither of the studies. Recent studies by Stern (2008a, 2008b) indicate that trust serves as an additional variable in order to explain locals’ behavior towards protected areas.

Additionally, there is a need for qualitative research to assess in detail the psychological processes of attitude formation and behavioral intention not observable on item scales. Here, the personal history of respondents and factors like place attachment or peer/pressure groups etc. may play a role as well.
Conclusions: Consequences for Park Management

Conflicts between conservation objectives and neighboring local populations have been a constant companion of national parks throughout Germany. The two case studies in Harz National Park and Bayerischer Wald National Park reveal that a complex mixture of factors conceptualized in an explanatory framework shapes the general attitude towards the protected areas. The components showing the strongest correlations with the general attitude are reactance, (lack of) participation, economic benefits, environmental attitudes and communication. In the surroundings of Harz National Park about 40% of the respondents stated to have a positive or rather positive attitude towards the park, whereas 27% were neutral and 22% negative or rather negative. In the communities adjacent to Bayerischer Wald National Park 56% of the tourism operators had positive or rather positive attitudes towards the park, compared to 44% who show negative or rather negative attitudes. The results in the Bavarian forest indicate the need for spatial differentiation when it comes to investigate locals’ attitudes towards protected areas. Between the original park surroundings and the extension area as well as between gateway communities and non-gateway communities significant differences were revealed, with the gateway communities in the extension culminating at 60% negative or rather negative attitudes. The NIMBY-effect can be confirmed for the extension area but has to be falsified for the original park area. However, the influence of spatial proximity on attitudes towards protected areas needs further research efforts. The intraregional differences between the two parts of the surroundings of Bayerischer Wald National Park confirm the crucial role of time. The local population and the operators of tourism businesses, which are to an overwhelming proportion part of the first group, need time to adjust to park regulations (reducing reactance), to forget about the state government’s top-down approach of the park extension process (lack of participation), to become aware of the marketing opportunities related to the protected area label (economic benefits), to get used to a changing face of traditional cultural landscape (environmental attitude) and last but not least to establish constructive patterns of communication with the park management. In contrast, results from the Harz National Park case study show quite stable attitudes towards the protected area since its designation which may be due to the absence of complete turnarounds in the management policy compared to Bayerischer Wald National Park.

As in many other European countries, the conflicts between local populations and
national park management in Germany often seem to arise over the discontinuation of uses or activities – leading to reactance - that are being considered “traditional”. Nevertheless, these specific conflicts may require case-specific solutions such as issuing special use permits to local people (e.g. for berry and mushroom picking or firewood gathering) on a temporary basis.

The attitude of tourism operators towards Bayerischer Wald National Park seems to be significantly influenced by the park’s importance in terms of marketing and attractiveness for guests. Therefore the relationship between the parks and local tourism operators could be enhanced by the implementation of a partner program following the successful example of the surroundings of Bayerischer Wald National Park. The program does not only offer a park-specific marketing campaign and privileged access to the park management and information in the form of regular meetings and field-trips but also forces the operators to show commitment towards the protected area and to deal with it and its underlying ideas. Furthermore, the national park partner program tries to enhance the quality level of accommodation and gastronomy facilities in the national park region and thus the economic benefits through park-induced tourism by imposing a continually rising level of requirements on the businesses willing to take part.

The revealed major information deficits lead to the question of how to properly tailor information to local communities or relevant stakeholder groups as strategic allies. As most of the communities surrounding parks are rather small and found in rural settings, addressing local decision makers and opinion leaders is a key aspect, as these people may have more influence and higher credibility than park managers coming from outside. Opportunities to improve community relations do exist as the Harz study indicates by training employees adequately so they can help to transfer information to the gateway communities. This seems reasonable because more than half of the respondents knew at least one national park employee personally. Additionally, approaches to involve local people should be based on hands-on opportunities for them to learn about and understand the basics of park management. Such events may help local people to establish a personal connection to the park and understand the complexity of management decisions.

Both surveys indicate that communication on emotionally sensitive issues in park management continues to be a major challenge in Germany, especially when these issues have a physical influence on the local, more or less “natural” environment. In many German national parks, new conservation policies will allow natural processes to prevail
which in consequence will lead to significant changes in the perceived “traditional” landscape in the next decades to come. Most notably, this will change conifer-dominated forests to deciduous forests. The experience from both national parks addressed in this paper shows that such processes – mainly because they outlast more than one generation until they are complete – have a tendency to create a feeling of unease (or even stronger feelings like a loss of identification object) among locals. In order to address this, park managers need to familiarize with communication management techniques (e.g. pro-active crisis management, Mitroff, 1994) – even before a crisis occurs. Such standard tools from the related field of environmental and stakeholder management would clearly help to improve the current situation. Interestingly, semantics again might be an indicator to what actually needs to be achieved: Within the German scientific and practitioners’ debates, “acceptance” is often determined as the overall objective for outreach campaigns. We suggest that the rather negative connotation of this terminology undermines nature conservation goals (because a national park is regarded as something a region has to bear) and thus, in order to redefine park management objectives, the (passive) term “acceptance” should be replaced by including the idea of (active) stewardship into the parks’ missions more prominently. This should be accompanied by a shift of research, monitoring and management priorities of most German national parks towards addressing more socio-economic and social-psychological issues in order to improve the interactions with the neighboring local population from conflict over indifference to a real partnership over a period of time.

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Defining and Managing Visitor Capacity in National Parks: A Program of Research in the U.S. National Park System

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Abstract

How much visitor use can be accommodated in national parks without unacceptable impacts to park resources and the quality of the visitor experience? Visitor capacity is a long-standing and increasingly urgent issue in national parks. Several management frameworks have been developed to help define and manage visitor capacity, and all of these frameworks rely on formulation of indicators and standards of quality for park resources and the visitor experience. Application of these frameworks can be informed by a program of research, including stakeholder surveys, normative theory and methods, visual research methods, analysis of tradeoffs in outdoor recreation, and computer-based simulation modeling. These methods have been applied in a program of research on visitor capacity in the U.S. National Park System.

Keywords: visitor capacity, carrying capacity, outdoor recreation, national parks

An Introduction to Visitor Capacity

Historical expansion of recreational use in national parks and related areas, along with the growing popularity of outdoor recreation more generally, has created a tradition of concern about appropriate use levels of parks. Most parks and related areas have been established for public use and appreciation. However, they must also be protected. The two-fold mission of the U.S. national parks stated in the National Park Service Organic Act of 1916 offers a classic expression of this inherent tension as it states that national parks are to be managed “to conserve the scenery and the natural historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (16 U.S.C. Section 1 (1916)).” Most national park systems around the world have been patterned after

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this legislation (IUCN, 1994).

Recreational use can cause impacts to park resources in the form of soil compaction and erosion, trampling of vegetation, water pollution, and wildlife disturbance, and can also degrade the quality of the visitor experience through crowding, conflicting uses, and aesthetic implications of resource impacts (Hammit & Cole, 1998; Manning, 2011). How much recreational use can be accommodated in national parks before there is unacceptable impact to park resources and the quality of the visitor experience? This issue is often addressed under the rubric of “carrying capacity” or more recently “visitor capacity”, has become an important component of the scientific and professional literature on parks and outdoor recreation in the United States and internationally, and has taken on added urgency in recent years (Arnberger & Brandenburg, 2007; Buckley, 2004; Legare & Haider, 2008; Manning, 2007).

The first rigorous scientific application of visitor capacity to parks and related areas came in the early 1960s with a conceptual monograph (Wagar, 1964) and a preliminary empirical treatment (Lucas, 1964). Perhaps the major contribution of Wagar’s conceptual analysis was the expansion of visitor capacity from its dominant emphasis on environmental concerns to a dual focus including social or experiential considerations: “The study reported here was initiated with the view that the carrying capacity of recreation lands could be determined primarily in terms of ecology and the deterioration of areas. However, it soon became obvious that the resource-oriented point of view must be augmented by consideration of human values (Wagar, 1964, preface).”

Wagar’s point was that as more people visit a park or related outdoor recreation area, not only are the environmental resources of the area affected, but also the quality of the recreation experience. Thus, visitor capacity was expanded to include consideration of the social environment as well as the ecological environment. The effects of increasing use on recreation quality were illustrated by Wagar by means of hypothetical relationships between increasing use level and visitor satisfaction.

A preliminary attempt to estimate the visitor carrying capacity of the Boundary Waters Canoe Area, Minnesota, followed shortly, and researchers found that perceptions of crowding varied by different user groups (Lucas, 1964). Paddling canoeists were found to be more sensitive to crowding than motor canoeists, who were in turn, more sensitive to crowding than other motor boaters. A range of visitor capacities was estimated depending upon these different relationships.
Visitor capacity has attracted intensive focus as a research and management issue in parks and outdoor recreation. A number of authoritative bibliographies, books, and review papers have been published on visitor capacity and closely related issues over the past several decades (Stankey & Lime, 1973; Graefe, Vaske, & Kuss, 1984; Shelby & Heberlein, 1986; Stankey & Manning, 1986; Kuss, Graefe, & Vaske, 1990; Haas, 2000; Manning, 2007), and these publications include hundreds of citations.

**Frameworks for Defining and Managing Visitor Capacity**

Based on the growing scientific and professional literature described above, a number of contemporary visitor capacity management frameworks have been developed and applied. Prominent examples include Limits of Acceptable Change (LAC) (Stankey, Cole, Lucas, Peterson, Frissell, & Washburne, 1985), Visitor Impact Management (VIM) (Graefe, Kuss, & Vaske, 1990), and Visitor Experience and Resource Protection (VERP) (National Park Service, 1997; Manning, 2001). All of these frameworks rely on formulation of management objectives and associated indicators and standards of quality for park resources and the visitor experience. Management objectives are descriptive statements of the desired level of resource protection and the desired type and quality of the visitor experience. Indicators of quality are measurable, manageable variables that are used to help define management objectives, and standards of quality specify the minimum acceptable condition of indicator variables (Manning, 2007). Once indicators and standards of quality have been formulated, indicators are monitored and management actions taken to ensure that standards of quality are maintained.

**Research to Support Defining and Managing Visitor Capacity**

Defining and managing visitor capacity inevitably requires some professional judgment by park managers. However, such judgment should be as “informed” as possible (Manning & Lawson, 2002). Research can help inform this process through identification of potential indicators and standards of quality, development of monitoring programs, and testing the potential effectiveness of management actions.

Several research approaches have been developed and applied to support application of visitor capacity. This paper describes this program of research. Emphasis is placed on research conducted in the U.S. National Park System. This section of the paper describes five basic research approaches and their application in a diverse array of national parks. This program of research was conducted in the context of the U.S. National Park Service’s
VERP framework noted above.

**Stakeholder Surveys**

Survey research is a traditional social science method and, in the context of visitor capacity, can be especially useful in identifying potential indicators of quality for park resources and the visitor experience. As defined above, indicators of quality are measurable, manageable variables that are used to help define management objectives. A conventional characteristic of indicator variables is that they should be important to park visitors and other stakeholders in determining the quality of the visitor experience (Manning, 2007). Thus, surveys of park visitors and other stakeholders can be especially useful in identifying indicators of quality. Survey research can generally be characterized as either qualitative or quantitative.

Qualitative surveys are open-ended, in-depth discussions with respondents; they are generally characterized by a series of questions that encourage respondents to think about and discuss their opinions or experiences (Tashakkori & Teddlie, 1998; Patton, 2002). Surveys are guided by a structured series of questions, but interviewers are permitted to ask other clarifying or exploratory questions. This survey method is termed qualitative because study findings are designed to describe the range of opinions or experiences in a population as opposed to estimating their quantitative distribution throughout that population. Qualitative surveys are often conducted using purposive rather than representative sampling to help ensure that as full a range of responses as possible is derived. Purposive sampling might be designed on the basis of type of respondent or diversity of activities or sites within a park. Interviews are usually recorded, transcribed and coded to identify important themes and, ultimately, indicators of quality (Patton, 2002; Miles & Huberman, 1994; Coffey & Atkinson, 1996).

As an example of the qualitative approach, interviews were conducted with visitors and other stakeholders at Arches National Park, Utah (Manning, 2001). The purpose of the interviews was to help identify indicators of the quality of the visitor experience, including the ways in which the condition of park resources affected the visitor experience. A semi-structured interview script was developed that asked a series of probing, open-ended questions about what respondents felt were the most important qualities or characteristics of the visitor experience at the park. Interviews were conducted in the park with 112 visitors at seven sites. In addition, ten focus group sessions were also conducted with a total of eighty-three participants. Participants included park staff, visitors who participated...
in the park’s interpretive programs, and residents of the local community.

Responses were initially coded into ninety-one categories and then grouped into several major themes or subject matter classes. Themes that emerged as good indicators of quality included crowding at attraction sites and along trails, visitors walking off trails and damaging soils and vegetation, and vehicle traffic on park roads.

Quantitative surveys are generally characterized by a series of close-ended questions with defined response scales. This survey method is termed quantitative because it is designed to measure the distribution of responses throughout a population. Quantitative surveys are conducted using representative sampling methods incorporating an element of randomness. Study findings are coded, analyzed, and reported using mathematical and statistical procedures.

As an example, the program of research at Arches National Park described above conducted a second visitor survey that incorporated a battery of close-ended questions addressing fourteen potential indicator variables (Manning, 2001). These potential indicators were developed from the initial qualitative survey, literature review, and the judgment of park staff. The survey was administered to representative samples of visitors at seven sites within the park. Respondents were asked to rate the importance of each potential indicator on a five-point scale that ranged from one (“very unimportant”) to five (“very important”). For park visitors as a whole, the most important indicators of quality were vandalism, litter, inappropriate behavior of visitors (including walking off trails), damage to soils and vegetation, visitor-caused noise, and crowding at attraction sites and along trails. However, there were some differences among study sites. For example, visitors to developed areas in the park rated the indicator of visitors walking off trails as more important than did visitors to the backcountry.

Qualitative and quantitative survey approaches can be employed in a complementary way. As with the example at Arches National Park, qualitative interviews can be used to help identify the range of potential indicators, and follow-up quantitative surveys can help determine the relative importance of those indicators across representative samples of park visitors or other relevant publics.

Normative Theory and Methods

Perhaps the most challenging component of the management frameworks outlined above is formulating standards of quality. How much impact to park resources and the quality of the visitor experience is acceptable? What are the minimum acceptable
Formulation of standards of quality can be guided by normative theory and related empirical methods. Norms are a theoretical construct that have a long tradition and are widely used in the discipline of sociology and the social sciences more broadly. As the word suggests, norms represent what is considered “normal” or generally accepted within a cultural context. In a more technical sense, norms are cultural rules that guide behavior. Moreover, such behavior is a function of a sense of obligation to abide by the norm and a belief that sanctions (rewards or punishments) may be forthcoming, depending on whether or not norms are followed (Grasmick, Blackwell, & Barsik, 1993; Heywood, 2002; Vaske & Whittaker, 2004). It is this sense of obligation and associated sanctions that make norms different from, and potentially more powerful than, attitudes. Attitudes are positive or negative evaluations of behavior, while norms define what behavior should be. Sanctions associated with norms can range from informal and internally imposed (e.g., feeling good or guilty) to formal and externally imposed (e.g., public recognition or being publicly ostracized). When norms apply to behaviors that are important to society and for which there is wide agreement, they can ultimately be codified into administrative rules and regulations, public policy, or even law.

Normative theory has developed along three basic lines (Vaske & Whittaker, 2004). One branch of normative theory addresses the variables that activate norms or bring them into focus (Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990). A second branch of theory deals with how completely attitudes and norms ultimately direct behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). A third branch of normative theory and methods – structural characteristics models – has special application to park management and formulation of standards of quality in particular. This work has been based largely on development of the return potential model (Jackson, 1965). In the context of park management this model works by asking survey respondents (e.g., park visitors, residents of surrounding communities, the general public) to evaluate the acceptability of a range of recreation-related impacts to park resources or the quality of the visitor experience. Resulting data are generally graphed so that impacts are displayed on the horizontal axis and evaluations are displayed on the vertical axis. The resulting line connecting the evaluation scores is often called an impact acceptability curve or simply a norm curve. A hypothetical norm curve is shown in Figure 1. In this case, a sample of park visitors might have been asked to rate the acceptability (using a nine-point response scale) of encountering a range of other groups per day while hiking along a park trail.
Norms can be measured for both individuals (personal norms) and groups (social norms). As the terms suggest, personal norms are measures of the standards or evaluations of individuals, while social norms represent shared standards or the evaluations of a group. Social norms are measured by aggregating the evaluation data for members of a group. The resulting line (as illustrated in Figure 1) is often called a social norm curve.

![Hypothetical Social Norm Curve](image)

**Figure 1. Hypothetical Social Norm Curve**

Structural characteristics models of norms can be especially useful in helping to formulate standards of quality for national parks. If park visitors or other interest groups have shared norms for the condition of park resources and/or the visitor experience, then such norms can be studied and used as a basis for formulating standards of quality. This approach to normative theory and methods has been increasingly applied to parks and protected areas (Shelby & Heberlein, 1986; Vaske, Graefe, Shelby, & Heberlein, 1986; Whittaker & Shelby, 1988; Shelby, Vaske, & Harris, 1988; Patterson & Hammitt, 1990; Williams, Roggenbuck, & Bange, 1991; Vaske, Donnelly, & Petrucci, 1996; Manning, Lime, Freimund, & Pitt, 1996; Manning, Lime, & Hof, 1996; Manning, 1997; Manning, Jacobi, Valliere, & Wang, 1998; Jacobi & Manning, 1999; Manning, 2007).

Application of normative theory and methods to parks involves extension of normative theory and methods as originally conceived (Roggenbuck, Williams, & Bange, 1991; Shelby & Vaske, 1991; Vaske & Whittaker, 2004). Many of these applications address resource and social conditions, not behavior. Moreover, unlike behavior, resource and
social conditions do not appear to be subject to sanctions, nor do they entail an explicit notion of obligation on the part of individuals. However, visitor-caused impacts to park resources and the quality of the recreation experience are a direct *consequence* of visitor behavior. Moreover, the decision to manage such impacts in relation to socially acceptable levels represents institutional behavior of management agencies such as the U.S. National Park Service. These agencies have an obligation to manage parks and related areas to meet the needs of society, and these agencies are ultimately subject to sanctions (e.g., public disapproval, legal challenge) if they are perceived to fail to live up to this obligation.

As outlined earlier, the hypothetical social norm curve illustrated in Figure 1 is derived from a series of questions that might ask respondents to judge the acceptability of meeting a range of other groups along a trail in a day. The social norm curve is constructed from the mean (or median) acceptability ratings for the sample as a whole and can simply connect these points with a series of straight lines or, as represented in the illustration, can be a regression line, which serves to interpolate between points and “smooth” the curve. A “real” social norm curve is shown in Figure 2. In this example, a representative sample of wilderness hikers in Zion National Park, Utah, were asked to rate the acceptability (on a nine-point response scale) of encountering between zero and sixteen groups of hikers per day along park trails (Manning, Freimund, & Marion, 2004). Average (mean) acceptability ratings were used to construct the resulting social norm curve.

![Figure 2. Social Norm Curve for Groups Encountered per Day for Wilderness Hikers in Zion National Park, Utah](image-url)
Social norm curves have several potentially important features or characteristics that can contribute to their interpretation and usefulness, as illustrated in Figure 1. First, all points along the curve above the neutral point on the acceptability scale – the point on the vertical axis where aggregate evaluation ratings fall out of the acceptable range and into the unacceptable range – define the range of acceptable conditions. All of the conditions represented in this range are judged to meet some aggregate level of acceptability. The optimum or preferred condition is defined by the highest point on the norm curve. This is the condition that received the highest rating of acceptability from the sample as a whole. The minimum acceptable condition is defined as the point at which the norm curve crosses the neutral point of the acceptability scale. This is the point at which aggregate ratings of the condition of the indicator variable fall out of the acceptable range and into the unacceptable range. Norm intensity or norm salience – the strength of respondents’ feelings about the importance of a potential indicator – is suggested by the amplitude of the curve or the distance of the norm curve above and below the neutral point of the evaluation scale. The greater this distance, the more strongly respondents feel about the indicator or the condition being measured. High measures of norm intensity or salience suggest that a variable may be a good indicator because respondents feel it is important in defining the quality of park resources or the recreation experience. Crystallization of the norm concerns the amount of agreement or consensus about the norm (Krymkowski, Manning, & Valliere, 2009). The less variance or dispersion of data about the points defining the social norm curve, the more consensus there is about social norms.

Norms can also be measured using a shorter, open-ended question format by asking respondents to report the maximum level of impact that is acceptable or preferable. For example, a representative sample of backpackers in Yosemite National Park, California, was asked to report the maximum number of groups per day they preferred to encounter along park trails (Newman, Manning, & Dennis, 2005). The resulting frequency distribution of responses is shown in Table 1 and Figure 3. A plurality of respondents reported that they preferred to encounter no more than five groups per day, and the vast majority of respondents agreed that it was preferable to encounter no more than ten groups per day. This open-ended question format is designed to be less burdensome to respondents, but it also yields less information.
Table 1. Frequency Distribution of Preferred Number of Encounters per Day on Trails in the Wilderness Portion of Yosemite National Park, California

<table>
<thead>
<tr>
<th>Number of trail encounters</th>
<th>Frequency</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or less</td>
<td>265</td>
<td>36.9</td>
</tr>
<tr>
<td>6-10</td>
<td>192</td>
<td>63.6</td>
</tr>
<tr>
<td>11-15</td>
<td>76</td>
<td>74.2</td>
</tr>
<tr>
<td>16-20</td>
<td>73</td>
<td>84.4</td>
</tr>
<tr>
<td>21-25</td>
<td>37</td>
<td>89.6</td>
</tr>
<tr>
<td>26-30</td>
<td>25</td>
<td>93.1</td>
</tr>
<tr>
<td>&gt;30</td>
<td>8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 3. Frequency Distribution of Preferred Number of Encounters per Day on the Trails in the Wilderness Portion of Yosemite National Park, California

**Visual Research Methods**

Normative research as described above relies on an effective means of communication between researchers and respondents. For example, researchers may wish to present a range of visitor-caused impacts (e.g., increasing levels of use, increasing levels of trail impacts) to respondents for their evaluation, or respondents may simply be asked to report the minimum social and environmental conditions they find acceptable in parks and related areas. In many cases, this communication can be conducted in conventional numerical and/or narrative formats. For example, in parks where visitor-use levels are low, it may be reasonable to ask respondents to report the maximum number of
other hiking groups per day it would be acceptable to see along trails. However, where use levels are relatively high, or when the impacts of visitor use are more complex and can be verbally described only in technical terms (e.g., level of trail erosion), visual approaches may be useful.

Visual simulations constructed by using computer-based photo editing programs offer a potentially important research approach that can be applied to measuring standards of quality for parks and related areas, and they offer several potential advantages to narrative/numerical descriptions of certain park and outdoor recreation conditions (Manning & Freimund, 2004). For example, visually based studies can provide pertinent information to respondents that would be difficult or awkward to communicate through conventional narrative/numerical approaches. For instance, in visual studies of crowding, all respondents see not only the same number of visitors encountered, but also potentially important characteristics of those encountered, including recreation activity engaged in, mode of travel, and group size. This is potentially important because perceived crowding has been found to be mediated by such variables (Manning, 1986; Manning, 1999; Manning, Valliere, Minteer, Wang, & Jacobi, 2000). In more conventional narrative/numerical approaches, respondents may have to make assumptions about such characteristics and these assumptions are likely to vary among respondents. Visual research methods also focus directly and exclusively on the variables under study. For example, in visual studies of crowding, the number and type of visitors encountered is the only “treatment” allowed to vary, with all other variables held constant. Visual research methods can be especially useful in studying standards of quality for indicator variables that are difficult or awkward to describe in narrative/numerical terms. For example, visual images of trail and campsite impacts may represent a more powerful and elegant means of communication with respondents than detailed and technical narrative descriptions. Finally, visual images can be edited to present conditions that are difficult to find in the field or that do not currently exist. For example, visual studies of crowding and resource impacts have incorporated images of conditions that do not now exist but will occur in the future as a function of continuing use trends.

Visual simulations have been used increasingly in normative research on standards of quality. For example, in a study at Grand Canyon National Park, Arizona, hikers were asked to rate the acceptability of a series of six computer-edited photographs illustrating a range of use levels on the park’s famous Bright Angel Trail (manifested by persons-per-viewscape or PPV) (Manning, Lawson, Newman, Laven, & Valliere, 2002). Study
photographs are shown in Figure 4. The social norm curve derived from resulting data found that most visitors prefer very low use levels and that aggregate ratings of acceptability fell out of the acceptable range (i.e., crossed the neutral or “0” point on the response scale) at about 8.2 PPV (Figure 5).

![Representative Photographs of a Range of Visitor Use Levels on the Bright Angel Trail, Grand Canyon National Park, Arizona](image)

**Figure 4.** Representative Photographs of a Range of Visitor Use Levels on the Bright Angel Trail, Grand Canyon National Park, Arizona

![Social Norm Curve for the Number of Hikers on the Bright Angel Trail, Grand Canyon National Park, Arizona](image)

**Figure 5.** Social Norm Curve for the Number of Hikers on the Bright Angel Trail, Grand Canyon National Park, Arizona
Visual simulations have also been used to quantify the effect of recreation conflict on visitor capacity. For example, in a study of a multiple use trail system at Acadia National Park, Maine, a series of computer-edited photographs illustrated a range of use levels and alternative proportions of the two principal user groups – hikers and bicyclists (Manning et al. 2000). Respondents included representative samples of both hikers and bicyclists who were asked to rate the acceptability of each of the study photographs. A series of social norm curves were derived from resulting data as shown in Figure 6. These four social norm curves suggest the ways in which visitor capacity of this multiple use trail system varies depending upon the recreation activities accommodated.

Figure 6. Alternative social norm curves for use level on the Carriage Roads of Acadia National Park, Maine.
As noted earlier, visual research methods have also been applied to selected resource-related impacts of outdoor recreation (Manning et al., 2004; Martin, McCool, & Lucas, 1989; Shelby & Shindler, 1992). For example, ecological research suggests that one of the principal impacts of recreation in wilderness is degradation of campsites through destruction of groundcover vegetation, soil compaction and erosion, injury to trees, and construction of multiple fire rings (Hammit & Cole, 1998; Leung & Marion, 2000). To measure visitor-based standards of quality for these impacts, a series of five computer-edited photographs was prepared illustrating a range of impacts to campsites in the wilderness portion of Yosemite National Park, California. Study photographs are shown in
Figure 7. The photographs were constructed on the basis of data from the park’s long-term Wilderness Impact Monitoring System (Boyers, Cincher, & van Wagendonk, 1999). As part of a larger survey, a representative sample of wilderness visitors was asked to indicate which photograph was most like the campsite conditions they preferred to find, and a frequency distribution of preferred campsite conditions is shown in Figure 8. A strong plurality of respondents (40.8%) preferred to see no more impact than that represented in study photograph 7(a), and a large majority of respondents (67.8%) preferred to see no more impact than that represented in study photograph 7(b). These data provide an empirical basis for helping to formulate standards of quality for resource conditions (at least their aesthetic dimensions) at this park.

![Study Photographs](image)

Figure 8. Frequency Distribution of the Preferred Level of Campsite Impacts in the Wilderness of Yosemite National Park, California

**Tradeoffs in Park and Outdoor Recreation Management**

Tradeoffs are an inherent and challenging element of park and outdoor recreation management. Indeed, tradeoffs are at the heart of the concept of visitor capacity: How much and in what ways can we use national parks and related areas while protecting their ecological integrity and social value?
This generic question gives rise to a number of more specific manifestations. Park and outdoor recreation experiences are conventionally thought of as having three basic components: resource conditions (e.g., the amount of human impact at camping sites); social conditions (e.g., the number of other groups camped within sight and sound), and management conditions (e.g., the number of camping permits allowed) (Hendee & Dawson, 2002; Manning, 2011). Visitors to national parks and related areas are often thought to prefer a relatively pristine, natural environment, relatively few encounters with other groups, and a high degree of freedom from management control. While this is the ideal, attempts on the part of park managers to provide ideal conditions along one dimension of the park experience typically involve having to make concessions along one or both of the other dimensions of the park experience. As a result, decisions about how to manage parks involve inherent tradeoffs among the conditions of resource, social, and managerial attributes of the park experience. For example, the number of permits issued for recreational use of a national park could be increased to allow more public access, but this might result in more resource impacts and encounters among groups within the park. Conversely, limiting the number of recreational-use permits issued might reduce resource impacts and encounters among groups but would allow fewer people to use and enjoy the park.

Stated choice modeling has been developed as a survey and related statistical technique to explore tradeoffs among multiple attributes of a good or service and is often applied in several types of consumer research (Green & Srinivasan, 1978). In stated choice modeling, respondents are asked to make choices among alternative configurations of a multi-attribute good (Louviere & Timmermans, 1990). Each alternative configuration is called a profile and is defined by varying levels of selected attributes of the good (or varying standards of quality for relevant indicator variables in the terminology of visitor capacity) (Mackenzie, 1993). For example, in the context of parks and outdoor recreation, respondents might be asked to choose between alternative park settings that vary in the quality of the natural environment, the number of other groups encountered, and the intensity of management regulations imposed on visitors. Respondents’ choices among the alternatives are evaluated to estimate the relative importance of each indicator to the overall utility derived from the park setting. Further, stated choice analysis models are used to estimate public preferences or support for alternative combinations of the standards of quality (Dennis, 1998).

Stated choice modeling was applied to study wilderness use in Denali National Park,
Alaska (Lawson & Manning, 2001c; Lawson & Manning, 2002a; Lawson & Manning, 2002b; Lawson & Manning, 2002c). Based on review of the wilderness recreation literature and consultation with park staff, six wilderness indicators were selected to define the resource, social, and management conditions in the wilderness portion of the park. Each of these indicators was further defined by a range of three standards of quality. Indicators and standards used in the study are shown in Table 2. Given three standards for each of the six study indicators, a full factorial design would produce a total of $3^6$ (729) hypothetical Denali wilderness settings. This number of alternatives is far too large for survey respondents to reasonably consider. Therefore, an orthogonal fractional factorial design was constructed containing nine pairwise comparisons (Seiden, 1954). An example of a representative Denali wilderness setting comparison is presented in Figure 9. Questionnaires were administered to a representative sample of overnight visitors to the wilderness portion of Denali. In each of the nine choice questions included in each version of the questionnaire respondents were asked to read each of the two wilderness-setting descriptions ($A$ and $B$) and indicate which they preferred.

### Table 2. Indicators and Standards of Quality Used in Wilderness Study at Denali National Park, Alaska.

<table>
<thead>
<tr>
<th>Resource conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extent and character of hiking trails:</td>
</tr>
<tr>
<td>Hiking is along intermittent, animal like trails</td>
</tr>
<tr>
<td>Hiking is along continuous single track trails developed from prior human use</td>
</tr>
<tr>
<td>Hiking is along continuous trails with multiple tracks developed from prior human use</td>
</tr>
<tr>
<td>Signs of human use at camping sites:</td>
</tr>
<tr>
<td>Camping sites have little or no signs of human use</td>
</tr>
<tr>
<td>Camping sites have some signs of human use-light vegetation damage, a few moved rocks</td>
</tr>
<tr>
<td>Camping sites have extensive signs of human use-bare soil, many rocks moved for wind protection and cooking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of other groups encountered per day while hiking:</td>
</tr>
<tr>
<td>Encounter 0 other groups per day while hiking</td>
</tr>
<tr>
<td>Encounter 2 other groups per day while hiking</td>
</tr>
<tr>
<td>Encounter 4 other groups per day while hiking</td>
</tr>
<tr>
<td>Opportunity to camp out of sight and sound of other groups:</td>
</tr>
<tr>
<td>Able to camp out of sight and sound of other groups all nights</td>
</tr>
<tr>
<td>Able to camp out of sight and sound of other groups most nights</td>
</tr>
<tr>
<td>Able to camp out of sight and sound of other groups a minority of nights</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation of camping:</td>
</tr>
<tr>
<td>Allowed to camp in any zone on any night</td>
</tr>
<tr>
<td>Required to camp in specified zones</td>
</tr>
<tr>
<td>Required to camp in designated sites</td>
</tr>
<tr>
<td>Chance of receiving an overnight backcountry permit:</td>
</tr>
<tr>
<td>Most visitors are able to get a permit for their preferred trip</td>
</tr>
<tr>
<td>Most visitors are able to get a permit for at least their second choice trip</td>
</tr>
<tr>
<td>Only a minority of visitors are able to get a backcountry permit</td>
</tr>
</tbody>
</table>
Responses to the stated choice questions were analyzed using logistic regression analysis to estimate a linear utility-difference model (Hosmer & Lemeshow, 2000; Opaluch, Swallow, Weaver, Wessells, & Wichelns, 1993). The coefficients of the model, together with their standard errors, Wald Chi-Square values, and P values are presented in Table 3. All coefficients are significantly different than zero at the < .001% level, except the coefficients on “up to 2 other groups” and “intermittent animal like trails.” The overall fit of the model is supported by the results of the Hosmer and Lemeshow goodness of fit test ($\chi^2 = 3.49, p = 0.836$).

The magnitude of significant coefficients reflects the relative importance of the corresponding standard of quality of the indicator to Denali overnight wilderness visitors. The values of the coefficients in Table 3 imply that signs of human use at campsites influence Denali overnight wilderness visitors’ utility or satisfaction more than any other wilderness-setting indicator considered in this study. Specifically, campsite conditions characterized as having “extensive signs of human use” are evaluated less favorably by Denali overnight wilderness visitors than any other standard of the six wilderness-setting indicators studied. Additionally, campsite conditions characterized by “little or no signs of human use” are preferred more than any standard of any other wilderness-setting indicator.

### Figure 9. Example Wilderness Setting Paired Comparison Question for Denali National Park, Alaska

<table>
<thead>
<tr>
<th>Wilderness Setting A</th>
<th>Wilderness Setting B</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Encounter up to 2 other groups per day while hiking.</td>
<td>• Encounter up to 4 other groups per day while hiking.</td>
</tr>
<tr>
<td>• Able to camp out of sight and sound of other groups all nights.</td>
<td>• Able to camp out of sight and sound of other groups most nights.</td>
</tr>
<tr>
<td>• Hiking is along continuous, <em>single track</em> trails developed from prior human use.</td>
<td>• Hiking is along intermittent, animal-like trails.</td>
</tr>
<tr>
<td>• Camping sites have <em>some</em> signs of human use – light vegetation damage, a few moved rocks.</td>
<td>• Camping sites have <em>some</em> signs of human use – light vegetation damage, a few moved rocks.</td>
</tr>
<tr>
<td>• Required to camp at <em>designated sites</em>.</td>
<td>• Required to camp at <em>designated sites</em>.</td>
</tr>
<tr>
<td>• Only a minority of visitors are able to get a backcountry permit.</td>
<td>• Most visitors are able to get a backcountry permit for their preferred trip.</td>
</tr>
</tbody>
</table>
Table 3. Coefficient Estimates for Wilderness-setting Indicators of Quality at Denali National Park, Alaska.

<table>
<thead>
<tr>
<th>Indicators/Standards</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Wald Chi-Square</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encounters with other groups per day while hiking:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 other groups</td>
<td>0.440*</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Up to 2 other groups</td>
<td>0.065</td>
<td>0.043</td>
<td>2.246</td>
<td>0.134</td>
</tr>
<tr>
<td>Up to 4 other groups</td>
<td>-0.504</td>
<td>0.044</td>
<td>132.826</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Able to camp out of sight and sound of other groups:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All nights</td>
<td>0.295*</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Most nights</td>
<td>0.145</td>
<td>0.044</td>
<td>11.148</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>A minority of nights</td>
<td>-0.440</td>
<td>0.045</td>
<td>94.814</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Hiking is along:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermittent, animal like trails</td>
<td>0.319*</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Single track trails developed from human use</td>
<td>-0.028</td>
<td>0.044</td>
<td>0.403</td>
<td>0.526</td>
</tr>
<tr>
<td>Multiple track trails developed from human use</td>
<td>-0.291</td>
<td>0.043</td>
<td>46.340</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Camping sites have:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little or no signs of human use</td>
<td>0.582*</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Some signs of human use</td>
<td>0.207</td>
<td>0.044</td>
<td>22.151</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Extensive signs of human use</td>
<td>-0.790</td>
<td>0.049</td>
<td>264.972</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Regulation of camping:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowed to camp in any zone on any night</td>
<td>0.072</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Required to camp in specified zones</td>
<td>0.140</td>
<td>0.048</td>
<td>8.620</td>
<td>0.003</td>
</tr>
<tr>
<td>Required to camp in designated sites</td>
<td>-0.212</td>
<td>0.045</td>
<td>21.948</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Chance visitors have of receiving a permit:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most get a permit for their preferred trip</td>
<td>0.073*</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Most get a permit for at least their second choice</td>
<td>0.143</td>
<td>0.044</td>
<td>10.424</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Only a minority get a permit</td>
<td>-0.216</td>
<td>0.043</td>
<td>24.656</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Coefficients for the excluded standard of the indicator were not estimated by the statistical model. They were calculated as the negative sum of the coefficients on the other two standards of the corresponding indicator.

The magnitude of the coefficient estimates in Table 3 suggest that solitude-related indicators represent a second tier of importance to Denali wilderness visitors. That is, while the number of encounters with other groups per day while hiking and opportunities to camp out of sight and sound of other groups are less important wilderness-setting indicators than campsite impacts, they demonstrate a relatively large influence on Denali overnight wilderness visitors’ utility. The extent and character of trails, regulations concerning where visitors are allowed to camp in the Denali wilderness, and the availability of backcountry permits are less important to Denali overnight wilderness visitors relative to campsite impacts and solitude-related indicators of the Denali wilderness.

Analysis of tradeoffs among competing goods using stated choice modeling and other research approaches such as indifference curve analysis can help inform management of
visitor capacity (Lawson & Manning, 2000; Lawson & Manning, 2001a; Lawson & Manning, 2001b; Lawson & Manning, 2002d; Manning, Lawson, & Valliere, 2009). Examples of such applications include insights into the relative importance of potentially competing indicators of quality in national parks and the public acceptability of potentially obtrusive management actions designed to control the resource and/or social impacts of visitor use.

**Computer-based Simulation Modeling**

Simulation modeling is the imitation of the operation of a real-world process or system over time (Banks & Carson, 1984; Law & Kelton, 1991; Pidd, 1992; Wang & Manning, 1999). Simulation modeling enables the study of, and experimentation with, the internal workings of a complex system (e.g., a dispersed recreation setting, such as a national park). This approach is especially suited to tasks that are too complex for direct observation, manipulation, or even mathematical analysis.

The first generation of computer simulation modeling applications to parks and outdoor recreation, which came to be known as the *Wilderness Travel Simulation Model (WTSM)*, was introduced in the 1970s and continued through the mid-1980s (Borkan & Underhill, 1989; Manning & Potter, 1984; McCool, Lime, & Anderson, 1977; Potter & Manning, 1984; Schechter & Lucas, 1978; Smith & Headly, 1975; Smith & Krutilla, 1976; Underhill, Xaba, & Borkan, 1986; van Wagetndonk & Cole, 2005). The WTSM was designed to provide estimates of the number of encounters between recreation groups in a park or wilderness area, including their type (e.g., meeting, overtaking, encounters among different types of user groups), and location. Despite the early success of the WTSM, it fell into disuse largely due to the cost and technical difficulty of running computer simulations (Cole, 2002).

Recent advances in computing technology have made computer simulation modeling more accessible and affordable (Pidd, 1992). With improved computer simulation capabilities, a second generation of applications of computer simulation modeling to park and outdoor recreation management has emerged (Wang & Manning, 1999; Cole, 2005; Gimblett & Skov-Peterson, 2008). This new generation of simulation modeling has been applied in several national parks and related areas to track visitor-use patterns and to assist managers in monitoring and managing visitor capacity and related issues (Daniel & Gimblett, 2000; Gimblett, Richards, & Itami, 2000; Manning et al., 1998; Wang & Manning, 1999; Wang, Manning, Lawson, & Valliere, 2001; Cole, 2005; Gimblett & Skov-Peterson, 2008).
Simulation modeling has many potential applications in park and outdoor recreation planning and management. For example, simulation models of visitor use can provide detailed estimates of the amount and type of visitor use in a park, modeling its spatial and temporal distribution. In parks where visitor use is often dispersed over relatively large areas, and where visitor use can be difficult to observe directly, this type of information can be helpful in planning and managing such use (Cole, Cahill, & Hof, 2005). However, in the context of visitor capacity, simulation modeling can be especially helpful in three ways: monitoring indicator variables, estimating maximum visitor-use levels without violating standards of quality, and testing the effectiveness of management actions designed to maintain standards of quality.

Monitoring indicator variables can be time consuming and costly. Moreover, some indicators, such as trail and campsite encounters, can be inherently difficult to observe. For these reasons, simulation models offer a potentially attractive alternative to on-the-ground monitoring. Once a simulation model is developed, it can be used to estimate the condition of indicator variables.

For example, a simulation model of visitor use of the carriage roads in Acadia National Park, Maine, was developed to help monitor the indicator variable of persons-per-viewscape (PPV) (the number of people at any one time on a typical hundred-meter section of the carriage road system) (Manning et al., 1998; Wang & Manning, 1999; Jacobi & Manning, 1999; Manning & Wang, 2005). The model was constructed using diary reports by visitors of their travel routes and times along the carriage roads, and counts of the number of visitors entering each of the eleven major access points into the carriage road system. These and related data were processed using the commercially available, general purpose, simulation software, Extend. The model was designed to estimate PPV levels along the carriage roads and can be run at any total daily-use level of the carriage road system. The park’s monitoring program measures total daily use of the carriage roads through an electronic trail counter and uses the simulation model to estimate PPV levels (the crowding-related indicator variable) to ensure that crowding-related standards of quality are not violated. (Research to support formulation of crowding-related standards of quality at this area was described earlier in the section on visual research methods.)

Visitor capacity frameworks such as VERP might be described as “reactive” in nature, at least in terms of monitoring and the management implications of resulting data. That is, management actions are taken only when monitoring data suggest that standards
of quality for indicator variables have been violated or are in danger of being violated. Visitor capacity frameworks could be applied more “proactively” by estimating the level of visitor use that will ultimately cause standards of quality to be violated. Simulation modeling of visitor use can be used to make such estimates.

For example, a simulation model of visitor use at Arches National Park, Utah, was developed as part of a research program to help support application of the VERP framework (Lawson, Manning, Valliere, & Wang, 2003; Wang et al., 2001). Initial phases of this research program were used to help formulate a suite of crowding-related indicators and standards of quality throughout the park. For example, at Delicate Arch, an iconic feature of the park, a crowding-related standard of thirty people-at-one-time (PAOT) was set based on findings from a study of visitor-based crowding norms. To account for occasional random surges in visitation, the standard was stated so that PAOT at Delicate Arch should not exceed thirty more than 10% of the time (National Park Service, 1995).

A variety of methods were used to gather data needed to develop the simulation model, including an automobile traffic counter placed at the park entrance and surveys of park visitors which traced their routes of travel through the park. The simulation model was designed to estimate PAOT at Delicate Arch based on the number of cars entering the park. Based on multiple runs, the model estimated that a maximum of 750 vehicles can enter the park each day without violating the crowding-related standard of quality of 30 PAOT at Delicate Arch more than 10% of the time, and this estimate can serve as a visitor capacity.

Simulation modeling can also be used to test the potential effectiveness of management actions designed to maintain standards of quality. For example, the simulation model of visitor use at Arches National Park described above was used to test the potential effect of implementing a mandatory shuttle bus system for hikers to Delicate Arch (Lawson & Manning, 2002d). Public transit systems can be used to control the number and timing of visits to park attraction sites to help ensure that crowding-related standards of quality are maintained.

To test the potential effectiveness of a shuttle bus system, the simulation model was modified to deliver visitors to the Delicate Arch trailhead at regularly scheduled time intervals. Separate model runs were conducted to simulate alternative shuttle bus schedules designed to arrive at the Delicate Arch trailhead every fifteen, thirty, and sixty minutes. For each shuttle bus system simulated, the number of visitors riding the shuttle
bus and hiking to the arch was varied to estimate the maximum number of visitors that
could be allowed to hike to Delicate Arch without exceeding the crowding-related standard
of quality (no more than thirty PAOT more than 10% of the time) for the arch.

Results of simulation runs conducted to test the effect of implementing a mandatory
shuttle bus system to Delicate Arch are reported in Table 4. The data in the third and
fourth columns suggest that the daily visitor capacity of the arch could be increased by
29% to 68% if visitors were required to ride shuttle buses to Delicate Arch. For example,
the model estimates that a shuttle bus system designed to deliver visitors to Delicate Arch
every sixty minutes would increase the daily visitor capacity of the Arch from 315 hikers to
407 hikers. Further, the results suggest that smaller, more frequent shuttle buses would
increase the daily visitor capacity of Delicate Arch to an even greater extent. These
increases in visitor capacity are due to a more even distribution of visitors over the day.

Table 4. Estimates of Daily Visitor Capacity of Delicate Arch
with Mandatory Shuttle System

<table>
<thead>
<tr>
<th>Arrival interval (min)</th>
<th>Passengers</th>
<th>Estimated daily carrying capacity</th>
<th>Percent increase in carrying capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>37</td>
<td>407</td>
<td>29</td>
</tr>
<tr>
<td>30</td>
<td>21</td>
<td>462</td>
<td>47</td>
</tr>
<tr>
<td>15</td>
<td>12</td>
<td>528</td>
<td>68</td>
</tr>
</tbody>
</table>

Conclusion

Visitor capacity is a long-standing, fundamental, and increasingly urgent issue in
national parks. How much and what types of recreation can be accommodated in national
parks without unacceptable impacts to park resources and the quality of the visitor
experience? A growing body of scientific and professional literature has provided the
conceptual foundation for a management framework that can guide definition and
management of visitor capacity. This framework relies on formulation of management
objectives and associated indicators and standards of quality, monitoring indicator
variables, and application of management actions designed to maintain standards of
quality.

A number of research approaches have been adapted to help inform and support
application of visitor capacity. Qualitative and quantitative surveys of visitors and other
stakeholders can be used to help identify indicators of quality. Normative theory and
methods can be applied to guide formulation of standards of quality for indicator variables, and visual research methods can be used to add clarity and validity to this process. Stated choice modeling can be used to analyze public preferences for tradeoffs inherent in managing visitor capacity. And simulation modeling can be used to help monitor indicators of quality, estimate visitor capacity, and test the effectiveness of alternative management practices. The studies outlined in this paper illustrate the ways in which these research approaches can and are being used to support management of visitor capacity in the U.S. National Park System.

Armed with a growing body of scientific and professional literature, a related conceptual foundation, an associated management framework, a growing set of supporting research approaches, and a number of hopeful case studies, we are ready to engage the visitor capacity of national parks more aggressively. Of course, this will be challenging and sometimes even contentious. But failure to do so will be even more painful in the long run. Do we want to manage national parks – the crown jewels of our natural and cultural heritage – by design or by default? If we choose not to manage the visitor capacity of national parks, we are implicitly deciding that their current conditions are acceptable and that trends in use and related impacts are not worrisome. We should find comfort and courage in the democratic and civic character of the substance and process outlined in this paper. Management of parks and protected areas should be based on societal values and related norms, not on privilege bestowed by power or even scientific knowledge. Engaging the public in decisions about managing national parks builds trust, ownership, and the “social capital” that engenders public enthusiasm and support (Minteer & Manning, 2003; LaChappelle & McCool, 2005; Manning & Ginger, 2007).

Despite advances in theory and related empirical methods, some measure of management judgment will remain inescapable in defining and managing the visitor capacity of national parks. However, when this judgment is rendered in the context of a rational conceptual foundation and associated management framework, and when it is supported by informed research and related public engagement, it will lead to a program of management that protects both national parks and the public good.

References


Manning, R., Freimund, W., & Marion, J. (2004). *Research to support application of the visitor experience and resource protection (VERP) framework to backcountry planning at Zion National Park*. Burlington: University of Vermont, Park Studies Laboratory.


Indicators and Protocols for Monitoring Impacts of Formal and Informal Trails in Protected Areas

Jeffrey L. Marion* Yu-Fai Leung**

Abstract

Trails are a common recreation infrastructure in protected areas and their conditions affect the quality of natural resources and visitor experiences. Various trail impact indicators and assessment protocols have been developed in support of monitoring programs, which are often used for management decision-making or as part of visitor capacity management frameworks. This paper reviews common indicators and assessment protocols for three types of trails, surfaced formal trails, unsurfaced formal trails, and informal (visitor-created) trails. Monitoring methods and selected data from three U.S. National Park Service units are presented to illustrate some common trail impact indicators and assessment options.

Keywords: trail impacts, visitor impacts, trail monitoring, indicators, informal trails

Introduction

Virtually every protected natural area has trails to provide visitor access within developed, road-accessible “frontcountry” areas, and within less developed, remote “backcountry” areas. As a core component of the recreation infrastructure for protected areas, many trail networks must accommodate a growing diversity of recreational visitors, activities, and modes of travel while also protecting natural resources from visitor impacts (Marion & Leung, 2001). Adding to the challenge, the types of trail uses have expanded substantially in recent decades, ranging from foot traffic (e.g., walking/hiking, backpacking, jogging), to hoofed traffic (e.g., horseback riding and pack stock such as horses, donkeys, or llamas), to a rapidly expanding array of wheeled traffic (bicycles, wheelchairs, all-terrain-vehicles, motorcycles, scooters, roller skates, in-line skates, skateboards, strollers and Segways) (Pickering, Hill, Newsome, & Leung, 2010). Indeed, how well a trail network

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sustains visitor use without undue degradation is a commonly used indicator of the overall sustainability of protected areas (World Tourism Organization [WTO], 2004).

To accommodate and professionally manage this increasing diversity of users, activities, and modes of travel, protected area managers need to develop more specialized trail management programs that target different types of trails. Trails can be classified in many different ways based on their intended purposes, desired mode(s) of traffic and their physical/environmental attributes. From a resource management perspective, trails are often conceived in three general categories. In developed frontcountry settings, managers frequently provide surfaced formal trails that support intensive foot and wheeled traffic. Examples of surfaced trails include those with any type of pavement, gravel, stonework or wood/plastic tread materials (Hesselbarth, Vachowski, & Davies, 2007; Minnesota Department of Natural Resources [MNDNR], 2007). Another common category is unsurfaced formal trails, or natural-surfaced trails provided in both frontcountry and backcountry settings. Formal trails rarely provide access to all locations that visitors want to see, so informal trails, unplanned and unmaintained trail networks created by visitors, comprise a third category of trails occurring in protected natural areas (Grabherr, 1982; Leung, Shaw, Johnson, & Duhaime, 2002; Marion, Leung, & Nepal, 2006). We suggest that these three general categories of trails require differing programs of management, though we also recognize that within a single group, management may vary based on the intended type or amount of use and environmental attributes. For example, an unsurfaced formal hiking trail may traverse steeper terrain and incorporate native rock steps, while a horse trail may be restricted to a lower grade and routed through areas with high native rock substrates.

Trail impacts and management concerns also vary by type and frequency of occurrence across these three categories of trails (Table 1). Resource impacts that are common management problems on unsurfaced trails, such as widening, muddiness, and soil loss, are often less common on surfaced trails or informal trails. Stable dry substrates and use of trail borders or fencing often limits these problems on surfaced trails, and low levels of use often limit them on informal trail networks. Erosion of tread substrates into water resources is also substantially limited by the hardened substrates on surfaced trails, but more frequently occurs on intensively used unsurfaced formal trails (Olive & Marion, 2009). While informal trails are frequently poorly designed (Cole, 2008; Wimpey & Marion 2011), their use is often sufficiently low to limit water quality impacts. Litter and vandalism/graffiti is a common impact along formal trails close to roads, but less common
in backcountry settings, particularly along less-used informal trails (Table 1). However, informal trails are uniquely prone to proliferation or extension in length over time, responding to the changing motives of those who create and use them (Marion et al., 2006). Landscape fragmentation, dissection of natural environments by trail networks, can impact both wildlife and plants (Knight, 2000). Concern is often greatest for informal trail networks because duplicative routes are frequently created in close proximity to one another (Wimpey & Marion, 2011) (Table 1).

Table 1. Types of Trail Impacts and Management Concerns by Trail Type

<table>
<thead>
<tr>
<th>Trail Impacts and Management Concerns</th>
<th>Surfaced Formal Trails</th>
<th>Unsurfaced Formal Trails</th>
<th>Informal Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail Widening</td>
<td>+¹</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Muddiness</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Soil Loss</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Vegetation Loss</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Water Quality</td>
<td>-</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Litter</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Vandalism/Graffiti</td>
<td>++</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Trail Proliferation</td>
<td></td>
<td></td>
<td>++</td>
</tr>
<tr>
<td>Landscape Fragmentation</td>
<td>-</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

¹ – Impact or concern is common (++), uncommon (+), rare (-), not applicable ( ). Based on a review of literature, research presented in this paper, and the authors’ judgment.

Protected area legal mandates and management policies frequently require planning and decision-making that address carrying capacity, and management of recreation infrastructure and visitors, including trails and associated resource impacts. Each of these planning and decision-making activities can benefit from objective assessments of trail-related impacts and conditions, such as those introduced in Table 1. Historically, most research has focused on unsurfaced formal trails, resulting in a large body of literature and well-tested indicators (Cole, 2008; Leung & Marion, 2000). In recent years, more research effort has been devoted to informal trails (Leung, Newburger, Jones, Kuhn, & Woiderski, 2011; Marion et al., 2006; Wimpey & Marion, 2011) and surfaced formal trails (Hill & Pickering, 2006; Lin, Leung, Hsu, & Sheu, 2009), the latter are far more common in Taiwan and much of East Asia (Leung, 2006). In this paper we describe some trail condition assessment options for collecting data relevant to the three categories of trails in support of these management activities. Our presentation includes discussion regarding the selection of appropriate indicators and monitoring protocols, and presentation of representative data to illustrate the types of information available for management decision-making.
Literature Review

Trail Assessment Surveys

Trail assessment surveys offer managers information useful for both planning and management decision-making. These data are used to document changing trail conditions, evaluate the acceptability of existing resource conditions, analyze relationships between trail impacts and influential factors, identify and select appropriate management actions, and evaluate the effectiveness of implemented actions. A variety of efficient methods for evaluating trails and their resource conditions have been developed and described in the literature, as reviewed and compared by Cole (1983), Leung and Marion (2000), and Marion et al. (2006). These trail survey protocols can also be integrated in a combined survey (Bayfield & Lloyd, 1973; Olive & Marion, 2009).

At the most basic level, trails can be inventoried and mapped with the use of Global Positioning System (GPS) devices, using either recreational grade (about 3-8m accuracy), or survey grade (about 1-3m accuracy) units. Higher accuracy units are beneficial when mapping dense networks of informal trails. Such inventory/mapping surveys (Table 2) provide data that are input to Geographic Information System (GIS) software to generate maps of trail networks and for further analysis of trail impact attributes (Wimpey & Marion 2010; Wing & Shelby, 1999; Wolper, Mohamed, Burt, & Young, 1994). Increasing availability of high-resolution spatial data, such as LIDAR, may enable accurate trail inventory and mapping by trail feature extraction from spatial data in a GIS environment instead of field surveys (Kincey & Challis, 2010). Aggregate lineal extent, area of disturbance, and landscape fragmentation indices are some examples of informal trail impact indicators that GPS-based and GIS-based trail mapping can provide. Inventory information, such as type of use, segment lengths, hiking difficulty, and trail maintenance features, such as the number or location of tread drainage features or trail signs, are also often assessed during basic trail surveys.

Table 2. Ratings for Applicability of Alternative Trail Impact Monitoring Protocols by Trail Type

<table>
<thead>
<tr>
<th>Type of Monitoring Protocol</th>
<th>Trail Type</th>
<th>Surfaed Formal Trails</th>
<th>Unsurfaced Formal Trails</th>
<th>Informal Trails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory/Mapping</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Sectional Evaluation</td>
<td>+</td>
<td>+</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Point Sampling</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Problem Assessment</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

1 – Protocol is ideal (++) or useful (+).
Sectional evaluations can be applied to segments of formal or informal trails to characterize attributes such as hiking difficulty or resource condition (Table 2). For example, condition class ratings that characterize increasing levels of resource impact can be applied to trail segments within a network to characterize its overall condition. These qualitative ratings provide a useful summary of resource conditions but no quantitative data, and their application can be subjective. Alternatively, trail segments can be characterized in terms of their general width, soil loss, or muddiness (Bratton, Hickler, & Graves, 1979). This approach is generally applied to a complete census of the selected trails and trail segments can be defined by a fixed distance or by pronounced changes in the attribute being assessed. However, condition assessments must characterize each entire segment.

Point sampling is a trail condition assessment method commonly applied to formal trails. Assessments are made at transects, generally spaced a fixed interval with a random start (Cole, 1983; Cole, 1991), or in accordance with various strata such as level of use or vegetation type (Hall & Kuss, 1989). Trail condition variables, including trail width, depth, muddiness, or substrate type, are assessed at transects and used to characterize the surveyed trail.

Problem assessment or census surveys are another common method, where continuous assessments record every occurrence of pre-defined impact problems (Cole, 1983; Leung & Marion, 1999). Generally applied to formal trails (Table 2), field staff record the starting and ending points for trail sections that are excessively eroded, wide, or muddy (Marion, 1994). An evaluation by Marion and Leung (2001) concluded that the point sampling method provides more accurate and precise measures of trail characteristics that are continuous or frequent (e.g., tread width or exposed soil). The problem assessment method is a preferred approach for monitoring trail characteristics that are easily defined or infrequent (e.g., excessive width or secondary treads), particularly when information on the location of specific trail impact problems is needed.

Trail Condition Indicators

Trail condition indicators are measurable variables of trail condition used to characterize resource conditions so that progress in achieving or sustaining desired conditions can be evaluated. Managers typically select a small number of indicators that provide meaningful measures of trail conditions and that can be assessed accurately and efficiently (Marion & Leung, 2001). When assessed as part of monitoring programs,
indicator data can reveal changing resource conditions and allow periodic comparison to standards of trail quality. Standards reflect management objectives and the acceptability of trail impacts and can vary by type of trail (Table 1) or management zone.

Cole (1989), Marion (1991), and Merigliano (1990) reviewed criteria for the selection of indicators. Preferred indicators should reflect attributes that have ecological, managerial, and/or aesthetic relevance and significance. Trail soil loss, for example, can cause secondary impacts to trailside vegetation or aquatic environments. Eroded trails channel water and alter the hydrology of adjacent land, are unsightly and potentially unsafe to trail users, and are expensive to repair. Preferred indicators should also be measurable, preferably at an interval or ratio scale that allow greater flexibility in relational analyses or statistical testing. Indicators that can be efficiently and accurately assessed through objective measurements are generally preferred over indicators that require time-consuming protocols, specialized equipment, or involve subjective judgments that reduce reliability when evaluated by different individuals. Finally, indicators should be sensitive to deteriorating conditions, providing early warning to managers.

Trail condition indicators frequently vary by trail type (Table 1). For example, trail soil loss is most prevalent for higher use formal trails, rarely occurs on surfaced trails (except for gravel), and is a problem on some informal trails that are poorly aligned or heavily used. For surfaced formal trails, preferred indicators might include litter, vandalism, graffiti, and expanded trail width (beyond the hardened surfaces) (Table 1). However, indicators that reflect depreciative behavior (e.g., vandalism/graffiti) can present difficulties because the impacts are often attributable to a small number of visitors, and behaviors that are less responsive to traditional management actions. For unsurfaced formal trails, preferred indicators commonly include trail widening, soil loss, and muddiness (Cole, 1991; Marion & Leung, 2001; Newsome, Moore, & Dowling, 2001). For informal trails, the total lineal extent, aggregate area of disturbance, trail width, and landscape fragmentation are preferred indicators (Leung et al., 2011; Marion et al., 2006).

Depending on the assessment protocols employed, managers must also consider measurement units and the management zone for which standards are applied. For example soil loss can be assessed at sample points by measuring maximum incision or cross sectional area, with standards specifying maximum allowable values (Cole, 1983; Marion et al., 2006). The standard could also be expressed as a value per unit length or as a running average per unit length. Alternatively, if soil loss was evaluated with the problem
assessment method the field staff would only assess soil loss occurrences at or above this level. Alternate standard measures include a length per unit area, percent of trail length, or length per unit length along a subset of trails.

In summary, managers must consider and integrate a diverse array of issues and criteria in selecting indicators for monitoring trail impacts. Indicators will rarely rate high on all criteria, requiring good judgment and area-specific field trials. Indicators that score high on some criteria but low on others may be retained in some instances when managerial significance is high.

In the following sections we present several case studies in which trail condition indicators were selected and assessment protocols were developed and applied to yield data for management planning and decision-making. These case studies highlight trail research conducted in three U.S. National Park Service units, including Zion National Park in Utah, Great Falls Park in Virginia, and Boston Harbor Islands in Massachusetts. The case studies were chosen to illustrate how the selection of indicators and monitoring protocols vary by type of trail (formal and informal) and surfacing (surfaced and unsurfaced). Monitoring protocols and the data yielded by these protocols are presented to illustrate the range of options managers have for quantifying trail condition variables potentially useful for a variety of management purposes. For example, the data from Zion National Park and Boston Harbor Islands were collected to support the implementation of the Visitor Experience and Resource Protection (VERP) planning and management decision-making framework (Manning, Leung, & Budruk, 2005).

**Study Areas**

The 59,905 ha Zion National Park (ZNP) is located in Utah on the southwestern edge of the Colorado Plateau. The park is characterized by red rock cliffs and mesas, and narrow, deep sandstone slot canyons. The park is mostly backcountry (58,705 ha, 98%). ZNP has over 145 km of designated trails and over 145 km of non-designated popular routes (ZNP, 2007). Park visitation for 2006 was 2,567,350.

Great Falls Park, Virginia (GFP), a subunit of the George Washington Memorial Parkway, is a 325 ha park located along the Potomac River 15 km upstream from Washington, DC, the national capital of the U.S. Popular attraction features include the scenic Great Falls and the downstream Mather Gorge with tall cliff walls. The park has several rare and unique ecosystems that are home to more than two-hundred local,
national and global rare threatened and endangered plant and animal species (National Park Service [NPS], 2007). Off-trail traffic by visitors exploring and accessing a variety of locations not reached by the 16 km formal trail system has led to the development of extensive informal trail networks. In 2007, the NPS estimated annual visitation at just more than 500,000 visitors (NPS, 2007).

Boston Harbor Islands National Recreation Area (BHI) is a relatively new urban park established in 1996. The 690 ha park consists of 34 islands and peninsulas within Boston Harbor, Massachusetts. This island complex possesses an outstanding assemblage of land, archeological resources, historic sites, open space, wildlife habitats, and 56 km of relatively undeveloped shoreline (NPS, 2002). The park is known to provide habitat for nesting seabirds, harbor seals, more than 70 species of terrestrial birds and state-listed plants. Ample opportunities for solitude and land- and water-based education and recreation are available in proximity to a major metropolitan area. Recreation facilities include surfaced and unsurfaced trails, campsites, and picnic sites. The park is managed by a 13-member partnership that includes the National Park Service, Federal, state, and municipal agencies, and non-profit organizations. Visitation was 300,000 in 2008 and it is expected to increase by 50% to 450,000 in 2016 (BOHA, 2009).

Methods

Zion NP

The purpose of this study was to develop visitor impact assessment protocols for monitoring the condition of formal, native-surfaced trails. These procedures were developed, field tested, refined, and applied to a selection of four park trails (29.2 km).

A detailed description of all trail condition assessment procedures can be found in Marion and Hockett (2008), which are summarized here. Elements of two trail condition assessment methodologies, the point sampling and problem assessment methods, were integrated in developing the procedures applied to assess selected impact indicators for the sampled formal trails. A point sampling method with a fixed interval of 91.4 m, following a randomized start, was the primary method employed (Marion & Leung, 2001). At each sample point, a transect was established perpendicular to the trail tread for assessing indicator conditions.

Temporary stakes were placed at tread boundaries and the distance between was measured as tread width; maximum depth from a taut string tied to the base of these
stakes to the trail surface was measured as maximum incision, an indicator of soil erosion (Farrell & Marion, 2002). The cross sectional area (CSA) of soil loss (cm$^2$), from the taut string to the tread surface, was also measured, providing a trail soil loss measure that was extrapolated to provide an estimate of total soil loss, displacement, and compaction from each trail (Olive & Marion 2009). Trail tread condition characteristics, including vegetation cover, organic litter, exposed soil, muddy soil, water, rock, gravel, and roots, were defined as mutually exclusive categories and assessed across each transect. These indicators were evaluated as a proportion of tread width in 10% categories (5% where necessary).

A problem assessment method integrated into the formal trail monitoring procedures provided census information on two trail impact problems: excessive erosion and multiple treads. Excessive erosion was defined as sections of tread ($\geq$3 m in length) with tread incision exceeding 12.7 cm. Multiple treads are when the main tread separates into two or more parallel treads. As they hiked, field staff looked for and recorded the beginning and ending distances from the starting point for all occurrences of these problems. In contrast to the point sampling, this method provides census data on the extent and location of specific pre-defined problems, facilitating management efforts to rectify such impacts.

**Great Falls Park**

Informal trails were collected as linear features using a Trimble GeoXT GPS with external Hurricane antenna. Use of trade, product, or firm names does not imply endorsement by the U.S. Government. All GPS data were post-processed to improve positional accuracy using Trimble’s Pathfinder Office 4.0 and base station data. Two informal trail condition attributes were assessed during field collection: condition class (CC), as previously implemented in rapid assessment surveys of formal trails (Marion et al., 2006), and an estimate of the average tread width (TW) of the informal trail segment. Condition class ranges from 1-5 with an increase in value associated with greater departures from natural conditions.

1. Trail distinguishable; slight loss of vegetation cover and/or minimal disturbance of organic litter.
2. Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use areas.
3. Vegetation cover lost and/or organic litter pulverized within the center of the tread, some bare soil exposed.
4. Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil widespread.

5. Soil erosion obvious, as indicated by exposed roots and rocks and/or gullyning.

A new informal trail segment was assessed when a change in condition class was noted in the field. Point data were collected at trail junctions and endpoints to aid in the GIS editing process. Formal trails were also assessed with point sampling protocols similar to those described for Zion NP.

To analyze landscape fragmentation within GFP by formal and informal trails we implemented methods similar to those described by Leung et al. (2011). The park boundary polygon was used as a base layer and one-half trail width buffers on formal and informal trail segments were created. The buffered trail segments were intersected with and removed from the base layer to create two shapefiles: one representing the park’s fragmentation by only formal trails and one both formal and informal trails. These shapefiles were used to calculate landscape fragmentation metrics, including number of patches and Mean Patch Size (MPS) (Reed, Johnson-Bernard, & Baker, 1996).

**Boston Harbor Islands**

For surfaced and unsurfaced formal trails, an integrated approach was adopted by combining the point sampling (61 m interval) and problem-based assessment approaches (Marion & Leung, 2001). Two field staff applied the procedures: one pushed a measuring wheel and stopped at each sampling point and recorded measurements taken by the second, including trail width, maximum incision depth, and tread surface composition and condition. In particular, surface condition at each sampling point was assessed using a 4-point condition class rating based on level of deterioration and walking condition (Leung & Meyer, 2004):

1. Excellent -- very smooth surface and no cracks
2. Good -- smooth surface and minor existence of cracks
3. Fair -- somewhat irregular surface due to minor existence of disintegrated pavement
4. Poor -- Very irregular surface due to extensive occurrence of disintegrated pavement. Walking on trails with poor condition rating is unsafe.

Similar to ZNP, problem assessment protocols were also included. Field staff recorded all occurrences of excessive impact incidents extending more than 3 m, including
erosion, wet soil, running water, multiple treads, and excessive grades.

With respect to informal trails, a rapid assessment approach was adopted. All informal trails were mapped using a GPS unit as described previously for Great Falls Park, with each informal trail segment assigned to one of the four condition classes (Leung et al., 2002), similar to those applied to GFP. Spatial proximity of informal trails to sensitive habitats was evaluated using GIS-based buffer analysis (Manning et al., 2005).

**Results**

**Informal Trails**

At BHI, 36 km of visitor-created informal trails were identified and assessed. The density of informal trails was highest on Worlds End peninsula, with 209 m/ha, followed by Georges (170 m/ha) and Raccoon (154 m/ha) Islands (Manning et al., 2005). High densities of informal trails may suggest proliferation of unmanaged recreational trampling with potential threats to sensitive habitats. Based on the GIS analysis, 141 m of informal trails were found within 50 m of known habitats of rare, threatened and endangered species, including the seabeach dock plant (*Rumex pallidus*, Lesson), Least Tern (*Sterna antillarum*, Bigelow), and Barn Owl (*Tyto alba*, L.).

At GFP, field staff located and mapped 13.5 km of informal (visitor-created) trails (Table 3). Great Falls and the adjacent downstream cliffs and river vistas are strong attraction features that draw visitors off of formal trails (see Figure 1). The high density of informal trails in areas close to the river are of great concern to park managers because of the large number of rare plants in these areas. Condition class ratings assigned to informal trail segments during the GPS mapping reveal that nearly half (48%) are in the more highly impacted classes (4 and 5), where soil erosion is beginning or prevalent (Table 3).

<table>
<thead>
<tr>
<th>Condition Class</th>
<th>(m)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>82</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1107</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>5880</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>3472</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>2929</td>
<td>22</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>13,471</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 3. Summary of Informal Trail Lineal Extent by Condition Class for Great Falls Park, Virginia.
The prevalence of informal trails within GFP is underscored by their substantial aggregate length, 13.5 km, nearly equaling the aggregate length of formal trails (17.5 km) (Table 4). While substantial, the aggregate disturbance area and disturbance density measures associated with the informal trails are only one-fourth that of the formal trails. A number of the formal trails within the park are wide woods roads while most informal trails are quite narrow. The fragmentation of landscapes and flora/fauna habitats by trails is reflected by the number of patches subdivided by informal trails and the mean patch size (Reed et al., 1996). The number of discrete patches increases from 70 for the formal trail network, to 443 when the informal trail network is added (Table 4). Similarly, mean patch size is substantially reduced from 40,239 m² for formal trails to 6273 m² for all trails. Such fragmentation has potentially deleterious effects to both flora and fauna, such as management concerns regarding further introduction and dispersal of invasive plants (Reed et al., 1996; Saunders, Hobbs, & Margules, 1991).
Table 4. Summary of Formal and Informal Trail Impact Indicators for the 293 ha Great Falls Park, Virginia.

<table>
<thead>
<tr>
<th>Impact Indicators</th>
<th>Aggregate Length (m)</th>
<th>Disturbance Area (m²)</th>
<th>Disturbance Density (m²/ha)</th>
<th>Number of Patches (#)</th>
<th>Mean Patch Size (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Trails</td>
<td>17,452</td>
<td>43,161</td>
<td>147</td>
<td>70</td>
<td>40,239</td>
</tr>
<tr>
<td>Informal Trails</td>
<td>13,471</td>
<td>10,673</td>
<td>36</td>
<td></td>
<td>6273 (-84%)</td>
</tr>
<tr>
<td>All Trails (% change)</td>
<td>443 (533%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unsurfaced Formal Trails

Formal natural-surfaced trails in ZNP were surveyed with point sampling and problem assessment protocols. Representative point sampling data provide a characterization of mean tread substrates for each of the four formal trails (Table 5). If trails degrade they have higher percentages of exposed soil or rock and lower vegetation and organic litter cover, like the LaVerkin Trail.

Table 5. Mean trail Substrate Cover as a Proportion of Transect (Tread) width by Formal Trail, Zion National Park, Utah.

<table>
<thead>
<tr>
<th>Trail</th>
<th>n</th>
<th>Exposed Soil (%)</th>
<th>Litter (%)</th>
<th>Vegetation Cover (%)</th>
<th>Rock (%)</th>
<th>Mud (%)</th>
<th>Roots (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Rim</td>
<td>171</td>
<td>64.2</td>
<td>8.8</td>
<td>3.3</td>
<td>20.2</td>
<td>3.5</td>
<td>0.0</td>
</tr>
<tr>
<td>LaVerkin</td>
<td>86</td>
<td>88.3</td>
<td>4.4</td>
<td>1.5</td>
<td>5.8</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Willis Creek</td>
<td>37</td>
<td>72.4</td>
<td>17.7</td>
<td>4.1</td>
<td>5.5</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>Hop Valley</td>
<td>28</td>
<td>71.6</td>
<td>14.3</td>
<td>7.9</td>
<td>3.0</td>
<td>3.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>72.2</td>
<td>9.1</td>
<td>3.3</td>
<td>13.2</td>
<td>2.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Similarly, mean values for trail width and depth, or measures of disturbance area can also aid ZNP planners and managers (Table 6). These data allow quantitative comparisons between trails for different indicators. Two measures of soil loss were included in the survey, a rapidly assessed maximum tread incision and CSA, which involves repetitive incision measurements along transects. An advantage of the CSA method is that the representative transect measures can be extrapolated to provide an
estimate of cubic soil loss, displacement, and compaction per kilometer or for the entire trail.

Table 6. Mean Trail Width, Maximum Incision, and Cross Sectional Area by Formal Trail, Zion National Park, Utah.

<table>
<thead>
<tr>
<th>Trail Name</th>
<th>n</th>
<th>Trail Width (Mean: cm)</th>
<th>Maximum Incision (Mean: cm)</th>
<th>Cross Sectional Area (Mean: cm²)</th>
<th>(m³/km)</th>
<th>(Sum: m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Rim</td>
<td>171</td>
<td>107</td>
<td>4.9</td>
<td>233</td>
<td>23</td>
<td>362</td>
</tr>
<tr>
<td>LaVerkin</td>
<td>86</td>
<td>117</td>
<td>8.2</td>
<td>596</td>
<td>59</td>
<td>466</td>
</tr>
<tr>
<td>Willis Creek</td>
<td>37</td>
<td>93</td>
<td>5.1</td>
<td>295</td>
<td>29</td>
<td>99</td>
</tr>
<tr>
<td>Hop Valley</td>
<td>28</td>
<td>107</td>
<td>8.5</td>
<td>501</td>
<td>51</td>
<td>128</td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>108</td>
<td>6.2</td>
<td>360</td>
<td>163</td>
<td>1054</td>
</tr>
</tbody>
</table>

Data from the continuous problem assessment protocols provides a more comprehensive perspective of conditions for the multiple tread and tread incision indicators that were assessed (Table 7). These data provide a census of all problems, including the number of incidences, aggregate lineal extent, and standardized measures such as m/km and percent of trail affected.

Table 7. Number of occurrences and lineal distance for multiple treads and tread incision greater than 12.7 cm from problem assessment procedures.

<table>
<thead>
<tr>
<th>Trail Name</th>
<th>Occurrences</th>
<th>Lineal Distance</th>
<th>Total (m)</th>
<th>Mean (m)</th>
<th>(m/km)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Treads</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Rim (15.56 km)</td>
<td>8</td>
<td>0.5</td>
<td>335</td>
<td>42</td>
<td>22</td>
<td>2.2</td>
</tr>
<tr>
<td>LaVerkin (7.82 km)</td>
<td>7</td>
<td>0.9</td>
<td>109</td>
<td>16</td>
<td>14</td>
<td>1.4</td>
</tr>
<tr>
<td>Willis Creek (3.35 km)</td>
<td>1</td>
<td>0.3</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>Hop Valley (2.52 km)</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All trails (29.24 km)</td>
<td>16</td>
<td>0.5</td>
<td>452</td>
<td>28</td>
<td>16</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>223</td>
<td>7.6</td>
<td>3030</td>
<td>14</td>
<td>104</td>
<td>10.4</td>
</tr>
</tbody>
</table>

In BHI, a total of 19.4 km of unsurfaced formal trails were assessed. Results suggest that soil erosion, root exposure, and other resource impacts existed on unpaved park trails, but the extent of these problems was limited (Table 8). For example, the cumulative length of eroded trail treads amounted to 372 m, which was only 1.9% of the total length of trails surveyed. Despite this, several segments of soil erosion and root exposure were rather long and may compromise the trail’s transportation function and visitor experience.
Table 8. Problem Assessment Results of Unsurfaced Formal Trails on the Boston Harbor Islands

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Occurrences (#)</th>
<th>Trail Length (%)</th>
<th>Problem Segment Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Soil Erosion*</td>
<td>15</td>
<td>1.92</td>
<td>24.8</td>
</tr>
<tr>
<td>Root Exposure</td>
<td>10</td>
<td>0.56</td>
<td>10.8</td>
</tr>
<tr>
<td>Muddy Soil</td>
<td>12</td>
<td>0.28</td>
<td>4.5</td>
</tr>
</tbody>
</table>

* Recordable incidents are defined as trail segments that are incised more than 0.3 m (1 ft) for at least 3 m (10 ft) in length.
** Total length of unpaved formal trails surveyed was 19422 m.
(Source: adapted from Manning et al., 2005)

**Surfaced Formal Trails**

About 10.6 km of surfaced formal trails were assessed on BHI using the point-sampling method (Table 9). The surfacing types included concrete/asphalt (113 sample points) and natural stones (11 sample points). For the surfaced trails with concrete/asphalt, the pavement condition was good for the majority of the segments, while 17.7% (approximately 1.2 km) fell into the fair category, indicative of the common presence of cracks and uncomfortable walking conditions (Table 9). These conditions may influence the willingness of visitors to stay on paved surfaces, especially where there is no barrier for lateral expansion, as is often the case at BHI. For the paths hardened with natural stones, the condition was generally good (> 90%) (Table 9).

Table 9. Summary of Formal Paved Trails by Pavement Condition Rating on Boston Harbor Islands.

<table>
<thead>
<tr>
<th>Pavement Condition Rating</th>
<th>Concrete/Asphalt</th>
<th>Natural Stones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>30 (26.5%)*</td>
<td>10 (90.9%)</td>
</tr>
<tr>
<td>Good</td>
<td>63 (55.8%)</td>
<td>1 (9.1%)</td>
</tr>
<tr>
<td>Fair</td>
<td>20 (17.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Poor</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Sum</td>
<td>113 (100%)</td>
<td>11 (100%)</td>
</tr>
</tbody>
</table>

* Number of sampling points (percent of the sample)

**Discussion and Conclusions**

Protected area managers can benefit from accurate information on the condition of their trail systems and changes over time. These benefits are as useful to protected area managers in North America as to their counterparts in Asia or other regions where sustainable tourism and ecotourism is actively promoted (Eagles, Bowman, & Tao, 2001). There is a common need for valid, reliable and efficient trail inventory and monitoring procedures within most protected area systems, though the specific indicators and
monitoring approaches vary across parks due to differences in ecosystems, management practices and needs, use patterns and visitor characteristics, and the availability of human and financial resources for monitoring. Despite these differences, experiences gained from one region can inform the development of indicators elsewhere not just on the specific measures/techniques, but also, and perhaps more importantly, the scientific process behind indicator development.

In this paper we provide examples from three U.S. parks of trail survey protocols applicable to three generic types of trail systems. Surfaced formal trails were assessed with point sampling protocols at BHI, which included development and application of pavement condition ratings. Lin et al. (2009) provides another relevant example from research in Yangmingshan National Park, Taiwan. They assessed six trail surfacing types, including concrete, gravel, rock slabs, wooden framed turnpike, rock steps and wooden framed steps, and evaluated their effectiveness in containing foot traffic to the surfaced tread. Of particularly interest was their development of a Surfacing Effectiveness Index (SEI) (0-100%), based on the ratio between surfaced trail width and actual trail width. Graveled trails and rock steps had the highest SEI values, while the turnpike was the least effective surfacing type (Lin et al., 2009).

Unsurfaced formal trail assessments in the backcountry of ZNP used point sampling and problem assessment protocols. Trail substrates were characterized with proportional evaluations along trail transects at sample points to provide a characterization of trail tread substrates. Substrate cover percentages are generally sensitive to changes in the amount and type of trail use, and can be examined to evaluate the efficacy of corrective management actions. Measures of trail width and depth provide summary data on trail widening and soil loss that were used in a new Backcountry Management Plan and as indicators for a Visitor Experience and Resource Protection (VERP) management framework (NPS, 1997). Numerical standards of quality were set for these indicators by backcountry zone for comparison to periodic monitoring data. Substandard conditions will be addressed through management actions, with subsequent monitoring used to evaluate management success. Problem assessment data provide park managers with information on the location and severity of trail segments that are braided or deeply incised to guide maintenance crews in correcting these problems.

At BHI, point sampling and problem assessment data were used to support a VERP planning and decision-making process for a frontcountry trail system. Such data are useful
to managers when initiating such processes because they can characterize the range of current conditions. They can also help facilitate the selection of prospective indicators and revealing both the frequency and location of trail segments that would violate prospective standards.

Informal trail assessments at GFP and BHI provided park managers with spatial data documenting extensive networks of visitor-created trails. Park managers can modify formal trail networks to provide access and eliminate the need for some of these informal trails, ignore them, or implement actions to actively discourage and restore these trails. Managers at both parks were particularly concerned with informal trail impacts to rare plants and sensitive plant communities, and the potential for the introduction and dispersal of non-native plants.

The data provided by trail surveys allow protected area managers to be more proactive and professional in managing their formal and informal trail systems. While past research and management experience has yielded useful trail assessment survey options and indicators, further improvements in field protocols are needed to improve measurement accuracy, precision (consistency), and efficiency. More research is obviously needed for regions beyond North America to identify indicator measures that are most relevant to individual regions and ecosystems enduring different extents and nature of trail impacts. For example, surfaced formal trails are far more common in Taiwan and much of East Asia where high levels of visitation have to be accommodated with trail and site hardening actions (Leung, 2006). Research on surfaced trails in North America thus far has been focused mostly on their accessibility to visitors with special needs and visitor preference and experience on them (Cahill, Marion, & Lawson, 2008). Recent research on the ecological ramifications of surfaced trails (Hill & Pickering, 2006) and their actual effectiveness in reducing trail impacts (Lin et al., 2009) may add to our understanding of this type of trail, resulting in better knowledge and more effective management of them in all regions.

Regardless of their type, surfacing, and length, trails are essential facilities for supporting recreation/tourism, conservation and education goals common to most, if not all, protected areas and heritage sites. Proactive, effective management of trails informed by dedicated monitoring effort will offer the best hope in perpetuating trails’ most important function, connecting humans and nature in a sustainable and harmonious way.
References


Community’s Attitudes toward Ecotourism Development in Kinmen National Park—A Systematic Management Perspective

Tsuen-Ho Hsu* Ling-Zhong Lin**

Abstract

The paper examines community responses to potential ecotourism development in the Kinmen national park. Ecotourism management has become an economic issue for the tourism industry in some conservation and development projects. Traditional approaches to biodiversity conservation in protected areas or national parks have been criticized to be ineffective and unethical due to externally imposed rules and regulations on community people. The creation of national parks and other forms of protected areas in Taiwan in the past has regarded human activities in such areas as being incompatible to the goals of natural resource conservation. Conflicts between the national park authority and indigenous peoples were reported during the establishment of national parks in Taiwan. The aim of this study is to propose a systematic management perspective for both indigenous communities and local government ecotourism management issue based on the framework of Fuzzy Quality Function Deployment (FQFD), which has been adopted in analyzing community’s attitudes and intentions.

Keywords: ecotourism development, systematic management, national park

Introduction

Research on ecotourism has had several studies that investigate biodiversity conservation (Brandon, 2001; Hackel, 1999; Nepal & Weber, 1995; Well & Brandon, 1993). However, studies show that only a few incentive-driven programs have met the goals of balancing biodiversity conservation with the provision of livelihood needs for local communities (Newmark & Hough, 2000; Spiteri & Nepal, 2006; Walpole & Goodwin, 2001).

Critics have argued that generating local support for conservation is challenging

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because of the highly complex and heterogeneous characteristics of any community, and variable interests in issues related to conservation and development (Heinen, 1996). According to Gibson and Marks (1995), one of the factors adding to the difficulty of incentive-driven programs is that the same incentive or benefit is valued differently by different groups of a community. The situation becomes more complicated when it involves indigenous communities, and their cultural identity and sovereignty (Nepal, 2002; Ryan, 2000). Although most research programs have focused on measuring tourist perceptions and attitudes of indigenous residents toward tourism development (Allen, Long, Perdue, & Kieselbach, 1988; Getz, 1994; Liu & Var, 1986; Long, Perdue, & Allen, 1990; Mason & Cheyne, 2000; Smith & Krannich, 1998), few have provided guidelines and principles of ecotourism for how to provide the design of conservation to meet the type of ecotourism development expected by indigenous peoples.

The purpose of this paper is to propose for the ecotourism development a systematic, structured approach called Fuzzy Quality Function Deployment (FQFD) adopting an analysis based on fuzzy logic, to provide new extant guidelines and principles of ecotourism development in the national park with a focus on both community members’ attitude requirements and the national park authority management requirements. QFD offers us a linear and structured guideline for converting the community members’ wants into specifications for, and characteristics of guidelines of ecotourism development. In this paper, the selection of fuzzy logic as a means to represent a QFD methodology seems natural, in particular when we review Hisdal’s (1988) proposition: “Fuzzy logic can handle inexact information and verbal variables in a mathematically well-defined way which simulates the processing of information in natural-language communication. For example, expressions such as: ‘high competition’, ‘low interference’, ‘low impact’, or ‘high collaboration’ are imprecise”. These sentences in a natural or synthetic language are the values of verbal variables which represent linguistic concepts such as very low, low, medium, and so on.

**Literature Review**

**Fuzzy Logic and Fuzzy QFD**

**A. Fuzzy logic**

In dealing with a decision process, the decision-maker is often faced with doubts, problems and uncertainties. To cope with and “handle” such uncertainties and inaccuracies,
she/he generally relies on tools provided by probability theory, accepting the principle that an inaccuracy, whatever its nature, is governed by random law. In a real decision-making situation, the decision-makers could be uncertain about their own level of preference, due to incomplete information or knowledge, complexity and uncertainty within the decision environment, each of which needs to be treated with the aid of a specific tool.

Probability theory is fine for representing the stochastic nature of decisional analysis, but is unable to measure the inaccuracies or uncertainty that stem from human behavior, which is neither stochastic nor random. The fundamental role of the decision-maker or other parties involved in the decisional process poses a number of problems that cannot be handled appropriately by probability theory. Referring specifically to a multi-criterion analysis, this means that the values of a certain alternative concerning a given attribute often cannot be precisely defined, the decision-maker is unable (or unwilling) to express her/his preferences precisely, the evaluations or opinions are expressed in linguistic terms, and so on. To deal with this type of uncertainty correctly we can resort to fuzzy logic (Zadeh, 1965). The logical tools that people can rely on are generally considered the outcome of a bivalent logic (yes/no, true/false), but the problems posed by real-life situations and human thought processes and approaches to problem-solving are by no means bivalent (Tong & Bonissone, 1980). Just as conventional, bivalent logic is based on classic sets, fuzzy logic is based on fuzzy sets. A fuzzy set is a set of objects in which there is no clear-cut or predefined boundary between the objects that are or are not members of the set. The key concept behind this definition is that of “membership”: each element in a set is associated with a value indicating to what degree the element is a member of the set.

The value comes within the range [0, 1], where 0 and 1, respectively, indicate the minimum and maximum degree of membership, while all the intermediate values indicate degrees of “partial” membership. Fuzzy set theory is regarded as a powerful mathematical tool to help make planning decisions and has been widely used in any research fields, not only in science and engineering but in social and tourism areas as well (Benítez, Martín, & Román, 2007; Tsaur, Tzeng, & Wang, 1997). However, from the viewpoint of readership, part of the journal readers might not be interested in the mathematical details of while part of the journal readers would like to know the mathematic foundations of fuzzy algorithm used in this study. Taking the readability of this article into consideration for all journal readers, we elaborate the theoretical details on the definitions and mathematical operations of fuzzy set theory in Appendix A.
B. Fuzzy QFD

QFD was developed in 1972 at Mitsubishi’s Kobe shipyard and is now widely used in both Japan and the United States (Akao, 1990). The central theme of this planning framework is its identification of the voice of the customer and its translation into the product design and manufacturing processes. QFD uses four “houses of quality” (HoQ) that integrate the customer requirements, design specifications, product characteristics, manufacturing processes and operations conditions or control. The reader interested in details of QFD and corresponding calculations is referred to Cohen (1995), Griffin and Hauser (1993), Hauser and Clausing (1988), and Shillito (1994).

QFD methodology has introduced a twofold innovation in traditional product development processes. First, the application of QFD requires the careful consideration of the customer during the development process (Akao, 1990). Second, the QFD approach has introduced the collaboration among different business areas as a prerequisite for product and service design (Akao & Mazur, 2003; Bevilacqua, Ciarapica, & Giacchetta, 2006; Chan & Wu, 2005; Kwong & Bai, 2003). Although the concept of QFD was originally developed and widely adopted by manufacturing companies for product development purposes, QFD researchers have argued that the frame work can be applied in non-manufacturing environments such as airlines, hotels, and utilities (Partovi, 2006; Partovi & Corredoira, 2002). For example, in a tourism service design, the design team needs to create or improve tourism service by incorporating the service attributes recognized in the QFD planning process into tourism service development. However, it is not possible to consider all service attributes during service development because of constraints in time, budget or feasible facilities and so on (Poon, 1993). A tourism service design team needs to be able to make trade-offs while selecting the service attributes based on the order of their relative importance ranking to achieve more tourist satisfaction (Ryan, 1995). That is to say, the service design priority is key result of QFD since it guides the tourism service design team in decision-making, resource allocation, and the QFD analysis.

A house of quality (HoQ) involves the collection and analysis of the “voice of the customer” which includes human beings’ perception and linguistic assessments that are quite subjective and vague. The vagueness and imprecision in QFD are also due to other reasons: (1) Formal mechanisms for translating WHATs (voice of the customer) into HOWs (designs of characteristics) are lacking. There are normally many WHATs for perceptions, each WHAT can be translated into multiple HOWs, and conversely a certain HOW may
affect multiple WHATs. In general, these WHATs tend to be translated into HOWs in a subjective, qualitative and non-technical way, which should be expressed in more quantitative and technical terms. Hence, the relationships between WHATs and HOWs are often vague or imprecise (Kim, Moskowitz, Dhingra, & Evans, 2000); (2) Owing to the uncertainties in the selection process, the data available for design of characteristic is often limited and may be inaccurate and a certain degree of vagueness is often inevitable (Fung, Tang, Tu, & Wang, 2002). In traditional QFD, most of the input variables are assumed to be precise and are treated as crisp numerical data. However, linguistic variables expressed in fuzzy numbers seem more appropriate for describing those inputs in QFD.

There is various type of fuzzy number, each of which may be more suitable than others for analyzing a given ambiguous QFD structure; the present analysis uses triangular fuzzy numbers. These numbers are represented by triplets of the type \( A = (x^L, x^a, x^R) \), where \( x^L \) and \( x^R \) are respectively the lower and upper limits of the fuzzy number considered, while \( x^a \) is the element the denotes the closest fit. Triangular fuzzy numbers are often used to quantify linguistic data. The use of triangular fitness functions is fairly common in the literature (Chan & Wu, 2005; Karsak, 2004), because triangular fuzzy numbers are among the few fuzzy number forms that are easy to manage from the computational point of view.

**The Evaluation of Ecotourism Development**

An examination of local citizens' attitudes toward the key dimensions of ecotourism development helps planners or project managers understand how community members feel about utilizing ecotourism as a means to balance conservation and development. However, measuring community attitude on the design of conservation in the national park is sometimes highly complex, since it incorporates a great variety of uncontrollable and unpredictable factors that affect the local people involved (Heinen, 1996; Lin & Wu, 2008; Newmark & Hough, 2000). Especially, attitude is an individual’s favorable or unfavorable disposition toward an object, action, or event of interest (Ajzen & Fishbein, 1980; Fishbein & Manfredo, 1992). It is “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993). Several factors that may complicate the local residents’ attitude and preference process, such as incomplete information, additional qualitative criteria and imprecise preferences, are often not taken into account (Ajzen & Fishbein, 1980).

Additionally, conflicts between local people and national park authorities are often the
consequence of externally imposed park regulations. It is suggested that successful national park management will not be achieved without the cooperation and support from local communities and that local communities must be empowered and involved in making important conservation decision (Chi & Wang, 1996). That is, the extant community attitude and community intension were developed primarily as a tool to diagnose an ecotourism development performance and to understand indigenous peoples’ behavior, but they have not considered actively the incentive-driven programs that can support the guidelines and principles of ecotourism development.

However, the inherent vagueness or impreciseness in QFD presents a special challenge to the effective calculation of the importance of conservation designs. In this paper, a further step has been provided respect to a linguistic model. Selection of fuzzy logic as a means to represent a QFD methodology called systematic perspective in locals’ attitudes toward ecotourism development seems natural. Specifically, this paper addresses the issue of how to deploy the house of quality (HoQ) to effectively and efficiently toward key dimensions of ecotourism and tourism guidelines. Fuzzy logic is also adopted to deal with the ill-defined nature of the local residents’ attitude preference required in the proposed HoQ. The case of Kinmen national park is presented to demonstrate the implementation of the proposed FQFD in ecotourism development. The effective and appropriate management directions for ecotourism development acquired by applying the proposed FQFD, thus, should be able to help the national park authority to achieve an environmental, social, and politico-economic condition.

The Proposed Systematic Management Perspective: Fuzzy QFD

The systematic approach is based on the translation of “houses of quality” (HoQ) principles from community attitudes in dimensions of ecotourism development to guidelines of ecotourism design/management requirements. The central theme of the “houses of quality” is its identification of the “voice of the local people” in ecotourism attributes and its translation into the ecotourism design and processes. QFD use HoQ matrices that integrate the customer requirements, design specifications, and operations conditions or control. The methodology begins with the local residents’ requirements (see Fig. 1). The HoQ correlates residents’ requirements (“whats”) with characteristics of ecotourism attributes under ecotourism development (“hows”), in our approach, community members’ requirements in terms of dimensions of ecotourism preference (“whats”) are crossed over
with viable ecotourism characteristics of the design of conservation management ("hows"). The resulting ecotourism development HoQ is shown in Fig. 1.

Figure 1. The House of Quality for the Management of the Conservation Design

As can be seen from the Fig. 1, "whats" elements express dimensions of ecotourism attributes $EA_i$, $i=1, 2, 3, \ldots, n$ affecting the design of conservation management perception. The factors have been extensively described by tourism and environmental management literature. Once dimensions of ecotourism have been asserted, via the design of conservation $CD_j$, $j=1, 2, \ldots, m$ the management authority of the national park can undertake in the conservation field to improve guidelines and principles of ecotourism performances have to be identified and ranked in terms of both effectiveness and efficiency. Those the design of conservation corresponds to "hows" in the proposed ecotourism development HoQ. Community attitude toward ecotourism requirements are specified on the basis of the tourism development on managerial resource allocation plans in order to satisfy the community members.

The roof of correlations, the weights $W_i [n \times 1]$, the relationship matrix $R_i [n \times m]$ and the relative importance of $CDs$ vector $R' [1 \times m]$ complete the HoQ. It is worth stressing that the weight vector, the correlations matrix and the relationships matrix translate local residents’ attitude and linguistic preference process given by human beings. Therefore, an effective mean to deal with them would appear to be fuzzy logic. Fuzzy logic allows to take
into account the different meaning that we may give to the same linguistic expression. This is why the fuzzy approach has been so widely adopted in different research fields.

**Fuzzy Weighted Evaluation of Ecotourism Development**

The fuzzy weighted importance $\tilde{W}^*_i$ of EAs is a $[n \times 1]$ vector which expresses the real importance of each EA. The introduction of $\tilde{W}^*_i$ is required to weight each dimension of ecotourism considering not only the importance the local residents give it, which is expressed by the fuzzy value $\tilde{W}_i$, but also the preference delivered by the communities for that dimensions. To corresponding with community response, the national park authority must provide sustainable community development and protected area conservation to the local people on critical dimensions of ecotourism, that are either those that are perceived as the most important ones or where ecotourism perceived as inferior.

The fuzzy weighted importance $\tilde{W}^*_i$ is computed by assessing the distance $d_i$ between residents’ attitudes toward the diversity of opinions regarding ecotourism development. Both the attitudes delivered and the target superior attitude value of dimensions of ecotourism could be conducted from fieldwork surveys by asking the local residents directly. Since both attitude values are fuzzy, a distance between fuzzy numbers has to be assessed. To this extent, the hamming procedure is suggested to be adopted (Chien & Tsai, 2000). From a mathematical point of view, given two fuzzy sets $\tilde{A}$ and $\tilde{B}$, the Hamming distance $d(u_\tilde{A}(x), u_\tilde{B}(x))$ between two fuzzy numbers belonging to $\tilde{A}$ and $\tilde{B}$ respectively, can be computed as

$$d(u_\tilde{A}(x), u_\tilde{B}(x)) = \int_X |u_\tilde{A}(x) - u_\tilde{B}(x)|$$

Where $X$ is the universe of discourse. Due to the calculation method, the resulting Hamming distance is a crisp value.

The $d_i$ parameters are them calculated according to equation (1). Then, the fuzzy weighted importance $\tilde{W}^*_i$ of EAs can be derived as equation (2).

$$\tilde{W}^*_i = d_i \otimes \tilde{W}_i$$

**Fuzzy Relationship matrix between Ecotourism Development**

The element strives to determine which the design of conservation has the highest impact on local people satisfaction in ecotourism development. It takes into account the fuzzy weighted importance of dimensions of ecotourism, the fuzzy relationships matrix and
the correlation matrix.

As already detailed, the position $\tilde{R}_{ij}$ in the relationships matrix expresses the fuzzy relationship between the $j$th CD with the $i$th EA. Again, a fuzzy linguistic scale may be usefully adopted by national park authority to interpret the vagueness and incomplete understanding of the relationships between “hows” and “whats”.

The fuzzy importance $\tilde{R}_{lj}$ of each design of conservation can be calculated applying equation (3).

$$\tilde{R}_{lj} = \sum_{i=1}^{n} \tilde{W}_{i} \otimes \tilde{R}_{ij}, \quad j = 1, 2, \ldots, m. \quad (3)$$

Where $\tilde{W}_{i}$ is the fuzzy weighted importance of $i$th dimension of ecotourism, while $\tilde{R}_{ij}$ is the fuzzy number expressing the impact of the $j$th CD versus the $i$th EA.

In a similar manner, the position $\tilde{R}_{kj}$, $j, k = 1, 2, \ldots, m$, $k \neq j$, in the correlations matrix expresses the fuzzy correlation between the $k$th and $j$th “hows”. In order to quantitatively ponder the fuzzy correlation between “hows”, we adopt the $\tilde{R}_{kj}$ which can be interpreted as the incremented changes of the degree of attainment of the $j$th “how” when the attainment of the $k$th one is unitary increased. Thus, the fuzzy weighted importance $\tilde{R}_{lj}$ can be computed as equation (4).

$$\tilde{R}_{lj} = \tilde{R}_{lj} \otimes \sum_{k=j}^{m} \tilde{R}_{kj} \otimes \tilde{R}_{lk}, \quad j = 1, 2, \ldots, m. \quad (4)$$

**Put into the Supermatrix**

In this step, this study adopts the ANP method, which Partovi and Corredoira (2002) and Partovi (2006) proposed with the concept of fuzzy theory. The modified QFD approach requires the creation of a supermatrix $M$, with the solution given by $\lim_{k \to \infty} M^{2k+1}$, where $M$ is given as follows:

$$M = \begin{pmatrix}
Objective & EA & CD \\
Objective & 0 & 0 & 0 \\
EA & w_{21} & 0 & 0 \\
CD & 0 & w_{32} & w_{33}
\end{pmatrix}$$

The initial supermatrix is used to calculate the importance of conservation designs. If the initial supermatrix is irreducible, primitive and stochastic (Saaty, 1996), when elevated
to the $k+1$ power it converges if $k \to \infty$. The formula is shown as bellow:

$$M^{2k+1} = \frac{1}{k} (I - M^k)(I - M)^{-1}(M^k)$$ (5)

Put the defuzzied importance values of ecotourism attributes, the defuzzied numbers of relationship between conservation designs and ecotourism attributes, the defuzzied numbers of correlation among conservation designs attributes into supermatrix to calculate the final relative weights for conservation designs. Figure 2 reveals the integration of systematic method and the concept of supermatrix into FQFD model.

In this paper, the methodology developed is applied to a ecotourism development, which refers to a major environmental operation in the design of conservation and tourism of Kinmen national park. The main objective of the application is twofold. On the one hand, it is aimed at assessing its robustness and consistency, where robustness and consistency are respectively understood to be related to the applicability of the methodology and to the reliability of the result obtained. On the other hand, the application strives to consider practical implications in managing guidelines and principles of ecotourism development a FQFD approach.
Research Setting in Kinmen

Kinmen national park, the sixth established national park in October 1995 with total area 3,720 ha, is involved in ecological conservation and protection of the natural landscape, in addition to historically and culturally important sites and battlefield monuments. Kinmen is located off the southeastern coast of Fujian Province in Xiamen Bay at the outlet to the Jiulong River. This area includes Kinmen Island, Liehyu (also known as Little Kinmen), DaDan, and ErDan, of a total of 12 islands and islets. These islands and islets cover an area of 150 square kilometers. To the west, at a distance of about 10 kilometers, is the Xiamen outport. To the east, at a distance of 277 kilometers, is Taiwan.

Kinmen national park is home to many endangered species, such as Eurasian otter, magpie robin, blue-tailed bee eater, lesser pied kingfisher, black-collared starling, black-winged hawk, Dicrurus hottentottus (Falcated teal), Litsea glutinosa, Pyrus betulifolia, Abelia chowii Hoo and the evening primrose species Oenothera drummondii, etc (Forestry Bureau, 2009). From survey data and a review of the literature, Kinmen National Park is home to at least 8 species of mammals, 283 species of birds, 13 species of reptiles, 5 species of amphibians, 45 species of butterflies, 32 species of mollusks and 6 species of crustaceans (Kinmen County Government, 2009).

Kinmen is not only rich in its biodiversity but also in the cultural heritage of recording the footsteps and the endeavors of Chinese ancestors over the past hundreds of years. Most of the early inhabitants came from the Zhangzhou and Quanzhou areas of Fujian Province. The architectural style of the dwellings and local customs follow in the old traditions. Forty years of military control have slowed the pace of Kinmen’s urbanization, enabling its historical heritage to be preserved. Thus, it can be said that Kinmen National Park possesses a rich culture and history, expressed in historical sites and traditional architecture. Inside the park are 11 registered historical monuments. Traditional villages and architecture are the richest cultural assets of Kinmen National Park. The seven representative traditional settlements of Oucuo, Jhushan, Shueitou, Cyonglin, Shanhou, Nanshan and Beishan have mostly retained their southern Fujian architecture in the Zhangzhou and Quanzhou styles.

KinSha and ShanHo, the villages under study, are two primary communities at the periphery of the Kinmen national park. KinSha is suited next to the check point of the Kinsha Reservoir and ShanHo little further away. Zhangzhou and Quanzhou people make up 75% of the resident population in KinSha and 80% in ShanHo. Since the 1980s, tourism
has become one of the main economic and social activities in KinSha and ShanHo. Out-migration combined with aging of the resident population, has compelled the local government to search for better livelihood opportunities. Hence, a tourism development project in and around the Yangshan Bay, which is located within the reserve near the Kinsha Reservoir, was proposed to help augment the local economy.

Yangshan Bay has been a tourist attraction since 1980s. After the establishment of the reserve, many of tourist activities were declared illegal but have not been completely stopped. The unique and pristine environment of the area as well as the mythical meanings attached to it as a sacred place for the Zhangzhou and Quanzhou people have invited illegal visits to continue, especially between November and March when the water level of Tiandun Beach remains low. Littering and other ecological impacts caused by tourist activities became a concern to the local communities, especially to tribal group of Zhangzhou and Quanzhou now residing in KinSha, whose traditional territory once included the area where the reserve is located. The proposed ecotourism project was planned and established by the locals. It ensured locals' authority and that economic benefits were all returned to them. It was conceived not only as an economic catalyst but also as a way to strengthen conservation by involving and empowering local people in then management of the Kinmen national park.

**Data Collection**

According to the Kinmen County Government census data of 2009, KinSha consisted of 1258 residents and 298 households, and ShanHo 611 residents and 156 households. Most of the local residents are between the ages of 20 and 55 were either studying or working outside the villages and returned only occasionally. Therefore, a quota sampling of local residents was implemented to equally represent different age and gender groups from both communities. The sample size for each community was proportional to its population, therefore, the number of respondents in KinSha was two times that of ShanHo.

The snowball method was applied to interview local residents, and interviews were guided by a survey questionnaire. The questionnaire was designed through the collaboration of three experts, including the scholar, the government official, and the representative by Taiwan Ecotourism Association. The study participants were asked the question, “What is your feeling about the following statements (Table 1) if tourism is to be implemented in Kinsha Nature Reserve?” In total, 75 face-to-face interviews were completed, 49 in KinSha and 26 in ShanHo. To overcome the language barrier, a local
resident volunteered to help in interviews with some respondents, mostly over 70 years old, who could not read Chinese characters or did not speak fluent Mandarin, the official language of Taiwan, since they grew up speaking their native language (Bbânlâm wê). Besides, in order to evaluate various designs of conservation of Kinmen national park and the relationship between dimensions of ecotourism and guidelines of ecotourism design/management requirements, eight officials of the national park come from Kinmen County Government were asked to fill out the questionnaire.

Three measurement scales, included in the questionnaire, were developed to explore local residents’ attitudes and local officials’ intentions toward ecotourism development. Firstly, the information of “WHAT” in QFD comes from local residents; thus, those who offer “WHAT” information should realize residents’ wants on ecotourism development. After the local people reveal their wants for the ecotourism development, the planners or project officials of the national park should develop a set of “HOW”s to capture the local members’ wants in measurable and operable technical terms. Our group of three experts was presented with various designs of conservation “HOW”s that had emerged from a careful review of the ecotourism management literature. In general terms, we could conclude from this selection of conservation designs that local people are showing a growing interest in the ecotourism development. Finally, this is an important work in HoQ/QFD which is performed carefully and collectively by researchers. The relationship between the design of conservation (HOW) and the requirements of ecotourism development (WHAT) is usually determined by analyzing to what extent the HOW could technically relate to and influence the WHAT. The data were analyzed by fuzzy linguistic scale responses to there categories to facilitate data interpretation. The fuzzy linguistic attitudes are very unfavorable to very favorable toward ecotourism development and the intentions with the wording to reflect the likelihood of engaging in supportive behaviors of ecotourism are highly unlikely to highly likely.

The Ecotourism Development Delivers

A. Identifying the dimensions of ecotourism development and the designs of conservation

This study adopts three general dimensions identified from selected literature of ecotourism guidelines and principles to encompass the areas of socially appropriate tourism (Cooke, 1982), environmentally sustainable tourism (Wight, 1994), ecotourism (Honey, 1999; Wallace, 1996), and community based ecotourism (Sproule & Suhandi, 1998). The three dimensions identified include conservation of natural resources,
preservation of cultural tradition, sustainable community development.

When applying the proposed HoQ to the ecotourism development, appropriate “whats” have to be identified. The main ecotourism development attributes “whats” to be considered in the Kinmen national park application have emerged from a preliminary survey phase, which has been performed through direct interviews carried out by academicians with 75 local residents visited in KinSha and ShanHo. The relevant ecotourism development attributes “whats” are shown in Table 1, together with a brief description.

Table 1 List of Viable Indicators (“Whats”) for the Dimensions of Ecotourism Development

<table>
<thead>
<tr>
<th>Dimensions of Ecotourism</th>
<th>Ecotourism Development Attributes (Whats)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension 1:</td>
<td>Capacity</td>
<td>Specifying carry in capacity for tourist activities in Kinmen national park reserve.</td>
</tr>
<tr>
<td></td>
<td>Reserve Regulations</td>
<td>Relaxing the reserve regulations to facilitate tourism development</td>
</tr>
<tr>
<td></td>
<td>Natural Heritage</td>
<td>Learning about the natural heritage of the area.</td>
</tr>
<tr>
<td>Dimension 2:</td>
<td>Traditional Ceremonies</td>
<td>Preserving the spirit and content of the traditional ceremonies from any change induced by tourism development.</td>
</tr>
<tr>
<td></td>
<td>Original Economic</td>
<td>Replacing the original economic activities by tourism.</td>
</tr>
<tr>
<td>Dimension 3:</td>
<td>Crowds</td>
<td>Crowds of tourist in the community.</td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td>Maximizing non-local tourism investment.</td>
</tr>
<tr>
<td></td>
<td>Tourism Impacts</td>
<td>Preventing negative tourism impacts.</td>
</tr>
</tbody>
</table>

The second part of this study was to establish the design of conservation. This study distinguishes three conservation designs on the basis of a literature review and shows in a qualitative study that these conservation designs are relevant for local residents and are sufficient to describe the influence of ecotourism conservation in local people’s choice. Another, we collect the relational variables by the depth-interview with eight officials of the national park come from Kinmen County Government. The conservation designs “hows” were identified based on literature analysis and the ecotourism development characteristics. The key question to ask in this step is “how” the national park authority delivers the design of conservation. A list of possible “hows” when local members’ wants related to ecotourism design/management requirements have to be improved is shown in Table 2.

Through the classification process of Table 2, this study obtains the design of
conservation “hows” and constructs the 3 conservation dimensions and 11 items of conservation designs. While “Conservation of natural resources” includes three items of conservation designs: regulation, illegal activities, and relaxation of regulations. “Preservation of cultural tradition” includes three kinds of conservation designs: traditional events, economic activities, and cultural heritage. “Sustainable community development” includes five items of conservation designs: environmental education, crowds of tourists, tourist destination, non-local tourism investment, and negative tourism impacts.

<table>
<thead>
<tr>
<th>Conservation dimensions</th>
<th>Conservation designs (Hows)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation of natural resources</td>
<td>Regulation</td>
<td>Encouraging the management authority to have no regulation on tourist number in Kinmen national park reserve.</td>
</tr>
<tr>
<td></td>
<td>Illegal Activities</td>
<td>Assisting reserve managers to prevent illegal activities.</td>
</tr>
<tr>
<td></td>
<td>Relaxation of Regulations</td>
<td>Encouraging the relaxation of the reserve regulations for tourism development.</td>
</tr>
<tr>
<td>Preservation of cultural tradition</td>
<td>Traditional Events</td>
<td>Suggesting the local government to reschedule the traditional events to attract more tourists.</td>
</tr>
<tr>
<td></td>
<td>Economic Activities</td>
<td>Encouraging the local government to replace the original economic activities by tourism.</td>
</tr>
<tr>
<td></td>
<td>Cultural Heritage</td>
<td>Learning about the cultural heritage of the area.</td>
</tr>
<tr>
<td>Sustainable community development</td>
<td>Environmental Education</td>
<td>Providing environmental education for tourists.</td>
</tr>
<tr>
<td></td>
<td>Crowds of Tourists</td>
<td>Welcoming crowds of tourists to the community regardless how many of them.</td>
</tr>
<tr>
<td></td>
<td>Tourist Destination</td>
<td>Suggesting the local government to develop popular tourist destination.</td>
</tr>
<tr>
<td></td>
<td>Non-local Tourism Investment</td>
<td>Encouraging the local government to maximize non-local tourism investment</td>
</tr>
<tr>
<td></td>
<td>Negative Tourism Impacts</td>
<td>Assisting local government to prevent negative tourism impacts as necessary for local development</td>
</tr>
</tbody>
</table>

The third part of application focused on the assessment of viable conservation designs “hows”, their mutual correlations, as well as of the relationships judgments between ecotourism attributes and the design of conservation. The planners or project officials of the national park adopt a linguistic scale approach, therefore, a first instructive phase was required to introduce the conservation design members to fuzzy set concepts. In a similar
manner, appropriate linguistic scales were set up for the evaluation of relative and weighted
importance of SAs, the relative and weighted importance of CDs, together with values in
the relationships and correlations matrixes.

B. Development of an overall priority ranking using FQFD

The importance given by each resident to each variable has been expressed with a
fuzzy importance judgment using the same 9-point linguistic scale, ranging from VL (Very
Low) to VH (Very High). The fuzzy scale is in Fig. 3. The resulting fuzzy numbers have
been used in the computation of $\tilde{w}_i$. Results are shown in Table 3. Compare the spread of
fuzzy number among the ecotourism attributes in last row of Table 3; there is not a
considerable overlap in the triangular areas between the “Natural Heritage” and “Traditional
Ceremonies”. This shows local residents have a wide gap between their recognitions in
these two ecotourism attributes (see Fig. 4). Besides, the triangular areas in ecotourism
attribute of “Capacity” and “Original Economic” are relatively small, meaning local residents
are unanimous in their recognition to the importance of two ecotourism attributes (see Fig.
4). Further, the triangular area is more similar in “Investment” and “Crowds” with a
considerable overlap between the two ecotourism attributes (see Fig. 4). This shows that
the preference difference is not large between the two ecotourism attributes. By all
accounts, the local residents consider that Tourism Impacts, Natural Heritage, Investment
and Crowds have played an important part in carrying through the ecotourism development
projects.

Figure 3. The Local Residents’ Linguistic Importance Terms
Table 3. Fuzzy Importance $\tilde{w}_{i,x}$ Assigned to Ecotourism Attributes by Local Residents and the Relative Importance of Ecotourism Attributes $\tilde{W}_i$

<table>
<thead>
<tr>
<th>Importance Judgment</th>
<th>Capacity</th>
<th>Reserve Regulations</th>
<th>Natural Heritage</th>
<th>Traditional Ceremonies</th>
<th>Original Economic</th>
<th>Crowds</th>
<th>Investment</th>
<th>Tourism Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_1$</td>
<td>Low</td>
<td>Low</td>
<td>Some high</td>
<td>Low</td>
<td>Medium</td>
<td>A little high</td>
<td>High</td>
<td>Very high</td>
</tr>
<tr>
<td>$L_2$</td>
<td>Some low</td>
<td>Some low</td>
<td>Very high</td>
<td>Medium</td>
<td>A little high</td>
<td>High</td>
<td>Some High</td>
<td>Very High</td>
</tr>
<tr>
<td>$L_3$</td>
<td>A little low</td>
<td>Medium</td>
<td>A little high</td>
<td>A little low</td>
<td>A little low</td>
<td>High</td>
<td>Some High</td>
<td>Some high</td>
</tr>
<tr>
<td>$L_{75}$</td>
<td>Very low</td>
<td>Low</td>
<td>A little high</td>
<td>Medium</td>
<td>Medium</td>
<td>Very high</td>
<td>Very high</td>
<td>High</td>
</tr>
<tr>
<td>Relative Importance</td>
<td>$L_1$</td>
<td>(0.2,0.3,0.4)</td>
<td>(0.7,0.8,0.9)</td>
<td>(0.2,0.3,0.4)</td>
<td>(0.4,0.5,0.6)</td>
<td>(0.5,0.6,0.7)</td>
<td>(0.6,0.7,0.8)</td>
<td>(0.8,0.9,0.9)</td>
</tr>
<tr>
<td>$L_2$</td>
<td>(0.1,0.2,0.3)</td>
<td>(0.8,0.9,0.9)</td>
<td>(0.4,0.5,0.6)</td>
<td>(0.5,0.6,0.7)</td>
<td>(0.6,0.7,0.8)</td>
<td>(0.7,0.8,0.9)</td>
<td>(0.8,0.9,0.9)</td>
<td></td>
</tr>
<tr>
<td>$L_3$</td>
<td>(0.3,0.4,0.5)</td>
<td>(0.5,0.6,0.7)</td>
<td>(0.3,0.4,0.5)</td>
<td>(0.6,0.7,0.8)</td>
<td>(0.7,0.8,0.9)</td>
<td>(0.7,0.8,0.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{75}$</td>
<td>(0.1,0.1,0.2)</td>
<td>(0.5,0.6,0.7)</td>
<td>(0.4,0.5,0.6)</td>
<td>(0.8,0.9,0.9)</td>
<td>(0.8,0.9,0.9)</td>
<td>(0.6,0.7,0.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Relative Importance of Ecotourism Attributes $\tilde{W}_i$

<table>
<thead>
<tr>
<th>Importance of Ecotourism Attributes $\tilde{W}_i$</th>
<th>$L_1$</th>
<th>$L_2$</th>
<th>$L_3$</th>
<th>$L_{75}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.19, 0.22, 0.67, 0.30, 0.40, 0.48, 0.52, 0.70)</td>
<td>(0.21,0.28)</td>
<td>(0.31,0.43)</td>
<td>(0.79,0.86)</td>
<td>(0.40,0.50)</td>
</tr>
</tbody>
</table>
Once $\tilde{\mathbf{W}}_i$ were calculated, the weighted preference $\tilde{\mathbf{W}}_i^*[n \times 1]$ of EAs was computed in accordance with equation (2). As regards to the crisp distance $d_i$ between the ecotourism attributes' performance and the one that is perceived by local residents as superior, the parameter has been computed as the average of crisp distances $d_{i,x}$, the generic $x$th local resident perceives against $i$th ecotourism attribute.

Parameters $d_{i,x}$ have been obtained basing on the survey results and by applying equation (1). To this extent, a section of the survey was dedicated to importance judgments about the ecotourism attribute delivered by the national park authority to its local members. The local residents were asked to judge the ecotourism development level they perceived for each ecotourism attribute, using the linguistic scale, such as very high, a little high. Moreover, for each EA, the local residents had to indicate the judgment which best matched their perception of a superior ecotourism attribute. $d_{i,x}$ parameters, $d_i$ values, and the corresponding weighted preference $\tilde{\mathbf{W}}_i^*$ are shown in Table 4. From outcomes analysis of Table 4, it emerges that local residents perceive a significant difference between the ecotourism attribute performance and optimum one they feel will present best in terms of “Traditional Ceremonies”, “Natural Heritage”, “Investment” and “Tourism Impacts”. As can be seen from last column of Table 4, “Tourism Impacts”, “Investment” and “Natural Heritage” are considered as the most three important ecotourism attributes from local residents’ point of view, but since the performance delivered is far from meeting local people requirements, they should be considered as the key ecotourism attributes to refine in the future.
<table>
<thead>
<tr>
<th>Ecotourism Attribute:</th>
<th>Performance judgments</th>
<th>Optimum performance</th>
<th>Distance $d_{i,x}$</th>
<th>Distance $d_i$</th>
<th>Relative importance</th>
<th>Weighted importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L_1$     $L_2$     $L_3$</td>
<td>$L_{75}$</td>
<td>$L_1$     $L_2$     $L_3$</td>
<td>$L_{75}$</td>
<td>$L_1$     $L_2$     $L_3$</td>
<td>$L_{75}$</td>
</tr>
<tr>
<td>Capacity</td>
<td>H         SH        AH</td>
<td>...</td>
<td>H         H         VH</td>
<td>SH</td>
<td>...</td>
<td>H</td>
</tr>
<tr>
<td>Reserve Regulations</td>
<td>M         AH        H</td>
<td>...</td>
<td>AH</td>
<td>M         H         H</td>
<td>...</td>
<td>VH</td>
</tr>
<tr>
<td>Natural Heritage</td>
<td>AL        M         M</td>
<td>...</td>
<td>L</td>
<td>H         SH        H</td>
<td>...</td>
<td>SH</td>
</tr>
<tr>
<td>Traditional Ceremonies</td>
<td>M         AH        AL</td>
<td>...</td>
<td>H</td>
<td>AH        AH        H</td>
<td>...</td>
<td>SH</td>
</tr>
<tr>
<td>Original Economic</td>
<td>H         AH        SH</td>
<td>...</td>
<td>AH</td>
<td>H         H         SH</td>
<td>...</td>
<td>AH</td>
</tr>
<tr>
<td>Crowds</td>
<td>AH        AH        M</td>
<td>...</td>
<td>AH</td>
<td>AH        AH        VH</td>
<td>...</td>
<td>AH</td>
</tr>
<tr>
<td>Investment</td>
<td>AH        H         M</td>
<td>...</td>
<td>H</td>
<td>AH        H         VH</td>
<td>...</td>
<td>H</td>
</tr>
<tr>
<td>Tourism Impacts</td>
<td>AL        SL        M</td>
<td>...</td>
<td>L</td>
<td>H         H         VH</td>
<td>...</td>
<td>SH</td>
</tr>
</tbody>
</table>

Figure 5. The Supermatrix of the Interdependency of Conservation Designs in Convergence ($M^{33}$)
Once the relationship matrix and the roof of correlations were compiled, the fuzzy relative importance $\tilde{R}_{ij}$ and the fuzzy weighted importance $\tilde{R}^*_{ij}$ of each conservation design were computed in accordance with equation (3) and (4) respectively. Then put the evaluated results, including weighted preference values ($w_2$), relation matrix values ($w_3$) and the roof of correlation values ($w_4$), which have been defuzzied into supermatrix (see Fig. 5). The supermatrix allows for a resolution of the effects of interdependence that exists among the ecotourism elements of the systems. This paper set the $K$ as 16, and the final convergence is 33. The final supermatrix and the converged value are transported to provide the results for the FQFD model to become the final importance weights of conservation designs. The analysis results are shown in Fig. 6.

Figure 6. The Fuzzy Weighted Importance Evaluation of Conservation Designs in HoQ
From Fig. 6, the “Illegal Activities” emerged as the conservation action with the highest implementation priority, since, despite the very high cost for implementation, it makes it possible to improve the important ecotourism attributes, such as “Reserve regulations”, “Natural heritage”, “Traditional ceremonies” and “Original economic”. In addition, the “Illegal Activities” has positive interdependence against other conservation designs (see Fig. 6, the roof of HOQ). In particular, a strong positive relationship can be found between the “Environmental Education” implementation and there is a positive relationship between the “Negative tourism impacts” (see Fig. 6, the roof of HOQ). It should be remarked that fuzzy logic was found to be a very flexible to use tool to handle such a vague, imprecise and ill-defined issue as costs estimation for conservation designs.

C. The linguistic satisfaction of conservation design

The local residents expressed their satisfaction of new conservation design alternatives of the ecotourism development with the linguistic scale can be shown in Fig. 7. As a result, new conservation designs are quantitatively evaluated by the fuzzy quality function deployment management. The local resident’s satisfaction of the new conservation design is higher than the local resident’s satisfaction of the existing conservation designs of Kinmen national park in Fig. 7. For example in the “Conservation of Natural Resources”, the original conservation designs include “Regulation” and “Illegal Activities”, as to local residents, the linguistic spreads of satisfaction to conservation designs are “some unsatisfied” and “unsatisfied” respectively (See Fig.7 on the left). But once joining the new conservation designs, “Relaxation of Regulations”, the local residents have the extent difference for “Regulation” form “some unsatisfied” to “some satisfied” (See Fig.7 on the right). Besides, the “Illegel Activities” is promoted from “unsatisfied” to “a little satisfied” and “Relaxation of Regulations” presents the state of “satisfied”, too (See Fig.7 on the right). Therefore, in the items of original conservation designs, once joining the new conservation designs, the whole satisfaction preference of local residents had a partiality for changed from “unsatisfied” into “some satisfied”, namely local resident satisfaction (See Fig.7).
Figure 7. FQFD for Evaluating Conservation Design Alternatives
Discussion and Conclusion

This study has addressed the applicability of a systematic perspective in the dimensions of ecotourism and guidelines of ecotourism design/management requirements. The proposed methodology developed could be rightly considered as a useful tool for selecting the efficient and effective ecotourism development to reach local peoples’ satisfaction. In particular, the methodology allows the identification of dimensions of ecotourism attributes that are perceived to affect conservation designs performances from the local residents’ point of view, enabling the assessment of possible gaps between local residents and the management authority of Kinmen national park with the perception of ecotourism development. As a matter of fact, this is why the perception of the management authority should not be considered as the starting point (may be a view of the overarching national park law) in developing ecotourism strategies, while direct interviews with local residents are required. In our approach, such an issue is addressed through the computation of the distance between ecotourism development performance in terms of ecotourism attributes and that which is perceived by local residents as superior.

Basing on the importance of local residents, the importance of ecotourism attributes allows the national park authority to identify the key factors of intervention in order to improve the perceived ecotourism development. For example, “Tourism Impacts” emerges as the most important ecotourism attribute from local residents’ point of view, while, based on the difference between the local residents give on the performance and optimum, then, “Investment” and “Natural Heritage” should be considered as the key ecotourism attributes to tune.

In order to assess viable conservation designs, in the approach proposed we have introduced a utility factor, which considers the costs of implementation for each “how”. The utility factor can be directly adopted as a synthesis parameter to select the suitable conservation action to implement. In addition, the FQFD approach proposed has made it possible to appraise the beneficial impact of strategic leverages over dimensions of ecotourism attributes in the ecotourism development as well as the positive correlations with other conservation designs.

Since personal judgments are required when building the conservation designs of Kinmen
national park in HoQ, fuzzy logic has been adopted as a useful tool. Through fuzzy logic linguistic judgments, local residents and project officials give to weights, relationships and correlations have been appropriately translated into triangular fuzzy numbers. Moreover, fuzzy logic has allowed coping well with uncertainties and incomplete understanding of the relationships between “hows” and between “hows” and “whats”. In addition, fuzzy logic becomes fundamental to dealing with several parameters that seem difficult to express in a quantitative measure. For example, detailed information about costs of implementation for conservation designs are usually not available, while linguistic judgments on costs can be easily obtained.

Finally, with local residents’ satisfaction to the design of conservation contents, it can utilize the concept of fuzzy linguistic inference to compare the original and new added conservation designs that the management authority offered in the transition situation of local residents’ cognitive satisfaction. Through measuring local residents’ perceptions of ecotourism development in national park authority allows management to better tailor marketing efforts to ensure that local residents’ wants are met. Besides, the matrix of conservation designs provides the information about the satisfaction local residents perceived.

As a result, the management authority of Kinmen national park can recognize, prioritize and improve areas of ecotourism development weakness and allocate important resources to the most effective conservation areas. Thus, the results from this research may have some significant implications for managers of ecotourism.

It should be mentioned that this work was directed only at the local population of the study area, without looking into the attitudes and perceptions of other groups involved in the implementation of the ecotourism venture. Thus, in order to draw reliable general conclusions for ecotourism in the study area, comparative studies should be carried out involving different target groups (tourists themselves and various authorities, agencies and local bodies). Furthermore for generalizations concerning any ecotourism destination, similar studies should be implemented involving different populations and places with a variety of characteristics.

Despite the reservations generated by the study’s limitations, our findings serve to confirm the study’s basic assumption, namely that the local population in Kinmen, want the environment to be protected and are favorably disposed to ecotourism development in their area. Since environmental awareness is already in place, the local community sees the
undertaking of ecotourism initiatives for conservation of natural resources, preservation of cultural tradition and sustainable community development as feasible and desirable.

As for further work on the theoretical part, it is worthwhile to focus on the interrelationships among the three dimensions which are certainly more complicated than what is discussed in this study. To the extent that the investigation turns to be fruitful, the FQFD ecotourism framework proposed here could serve as an initial path that can potentially lead to the structure of an ecotourism development model.

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**Appendix A. Fuzzy sets and fuzzy numbers**

A fuzzy set is defined by its membership function. Let $X$ denote a universal set. The membership function $u_A$ by which a fuzzy set $A$ can be defined and expressed as follows (Klir & Folger, 1988):

$$u_A : X \to [0, 1],$$  \hfill (A.1)

where $[0, 1]$ denotes the interval of real number from 0 to 1, inclusive.

As shown in Fig. A1, a fuzzy set $A$ in the observed space $X$ is characterized by a triangular membership function that associated each element $x$ of $X$ with a real number, $u_A(x)$, in the interval $[0,1]$. The value of membership grade, $u_A(x)$, indicates the degree of the element $x$ belonging to fuzzy set $A$, which is defined as a collection of ordered pairs and can be expressed by the following notations:

$$A = \{(x_1, \ u_A(x_1)), \ (x_2, \ u_A(x_2)), \ldots, \ (x_n, \ u_A(x_n))\}$$

$$= \{x_i, \ u_A(x_i)\,|\,i = 1, 2, \ldots, n\}$$

$$= \frac{u_A(x_1)}{x_1} + \frac{u_A(x_2)}{x_2} + \ldots + \frac{u_A(x_n)}{x_n} = \sum_{i=1}^{n} \frac{u_A(x_i)}{x_i}.$$  \hfill (A.2)

The definitions of normalization and convexity play a vital role in fuzzy set theory. A fuzzy set $A$ is called normalized when at least one of its elements attains the maximum possible membership grade (i.e., $\max_{x \in X} u_A(x) = 1$), and if the membership function $u_A(x)$ is a monotone increasing function for $x < m$ and a monotone decreasing function for $x > m$, where $u_A(m) = 1$ , it can be considered as a convex fuzzy set (i.e., $u_A(\lambda x_1 + (1-\lambda)x_2) \geq \min(u_A(x_1), u_A(x_2))$, $\forall x_1, x_2 \in X$, $\lambda \in [0, 1]$). If a convex and
normalized fuzzy set whose membership function is piecewise continuous is defined on $\mathbb{R}$, it can be classified as a fuzzy number. A fuzzy number is a special case of a fuzzy set, which can be though of as containing the real numbers within some interval to varying degrees. The example in Fig. A1 is a classification of fuzzy numbers.

Figure A1. A Triangular Membership Function of a Fuzzy Set of Real Numbers Close to 8
Is a Nation's Front Yard Becoming a Dumping Ground? A Critical Analysis of Greenspace within the United States National Mall & Memorial Parks

Laurlyn K. Harmon* Margaret J. Daniels** Minkyung Park*** Russell E. Brayley****

Abstract

The National Mall & Memorial Parks in Washington, D.C. is an iconic and frequently visited National Park Service unit in the United States; as such, management is under constant scrutiny. In 2007, multiple scoping questions were posed to generate public input regarding perceptions, concerns, and suggestions for future planning of the National Mall. Constant comparison analysis of 778 comments revealed greenspace is a salient and important facet of this urban park as is preservation and use of open and wooded areas. Results suggest the importance of gathering public perceptions of greenspace relative to purpose, function, and management of the National Mall and illustrate a cost effective method of procuring results.

Keywords: greenspace, stakeholder perceptions, urban park, public process

Introduction

The National Mall & Memorial Parks (National Mall) is the iconic “front yard” of the United States and is managed by the National Park Service (NPS). Its international political profile dictates the need for a range of visitor feedback opportunities and high levels of public engagement during planning processes. In preparation for impending design and maintenance planning, the NPS implemented a series of public input processes in 2007 to assess perceptions of existing conditions, identify use issues, and clarify public concerns. As an integral component of the study, particular attention was given to natural resource-based components of the National Mall such as public recreation
areas, open-spaces, and the riverfront.

The conversation will be framed within the summary findings of public input obtained during the course of studying National Mall perceptions, particularly those specific to natural resource-based opportunities. Perceptions and meanings study participants attributed to the park will be defined and discussed, as will the impact stakeholder expressed meanings have on the strategies NPS managers are developing to manage these urban public lands over time.

**Design Evolution of the National Mall**

Unlike other prominent national park units with expansive open and natural resource based spaces such as Yellowstone, Grand Canyon, and Glacier, the National Mall is an urban parkland. However, it is not as one would traditionally conceive of an urban park. “It hovers between a national and civic space; it is both a ‘national front lawn’ and a popular place to play soccer” (Luria, 2006, p. 144). Comprised of a variety of public spaces, many areas within the National Mall are sacred sites for memorials and monuments while others, such as Constitution Gardens, are a combination of open and wooded greenspaces.

Located in Washington D.C., the National Mall offers residents and commuters highly valued greenspace for recreation and respite within the surrounding federal and concrete jungle. These open spaces provide the tourism and recreation base for local, regional, national, and international visitors. Places such as the Tidal Basin, surrounded by over 2,100 Japanese cherry trees; the central avenue of the National Mall, lined with close to 600 historic American elms; and the Potomac River, defining the southwest border, provide the foundation of this urban National Park unit (NPS, 2009).

The National Mall, conceived by Pierre L'Enfant in 1791 as part of the greater plan for the nation’s capital city, has evolved as a result of input from various designers and public embracing of various landscape design movements (Penczer, 2007). The entirety of the National Mall and immediate surrounds were designed as formal, rectilinear spaces with multiple view-lines radiating from the United States Capitol Building. As part of the design, the Mall proper was originally conceived to function as a greenspace amidst the surrounding built environment. It includes the area bounded on the west by 14th Avenue, the east by 1st Street, the north by Constitution and Pennsylvania Avenues, and the south by Independence and Maryland Avenues.

While several naturalistic design features by Andrew Jackson Downing were
implemented in the 1850s (Penczer, 2007), no other significant design changes occurred until the 1960s, when the Skidmore, Owings, and Merrill (SOM) plan was endorsed which restored the National Mall to the formal design of Pierre L’Enfant. Since then, the design has remained relatively unchanged, although monuments and memorials are periodically added, e.g. the Vietnam Veteran’s War Memorial, and the World War II Memorial, and management of the National Mall has been under the purview of the NPS since 1933.

**The National Mall as a Managed Urban Park**

In 2003, the U.S. Congress decreed the National Mall a “substantially completed work of civic art,” (U.S. Congress, 2003) meaning only monuments, memorials or visitor centers that had already received authorization would be added to the built environment. Simultaneously, the NPS was directed to begin the planning process of the future of the National Mall, in order to protect and sustain the parklands. Support for this mandate came in large part due to restricted space availability and the desire to protect remaining greenspace in the Washington D.C. area.

Urban parks provide opportunities for individuals to participate in recreation and physical activities (Kaczynski & Henderson, 2007; Kyle, Mowen, & Tarrant, 2004), reduce urban heat island effects (Environmental Protection Agency, 2009), and may even increase longevity for local residents (Maas et al., 2009). Consequently, the significance of the National Mall as an urban greenspace should not be overlooked.

The National Mall covers approximately 684 acres (see Figure 1) and hosts roughly 24 million visitors annually (NPS, 2009). In addition to the high visitation, there is the added pressure of an additional 600,000+ commuters (U.S. Census Bureau, 2010). Commuting patterns radiate beyond the perimeter counties in Virginia and Maryland extending into Pennsylvania and West Virginia. Similar to other urban cores, this commuting influence means the citizens in regional communities use, appreciate, and impact greenspace areas as much or more than District residents (Tajima, 2010).
Intensive use has resulted in degradation of the historic landscape’s health and appearance. Specific concerns include: soil quality, erosion and compaction; turf damage; substantial loss of tree cover and additional projected loss due to root damage; vegetative losses; view-shed protection; water quality and flooding; aquatic ecosystem protection; urban wildlife control; and, air quality (NPS, 2009). However, limiting the number of visitors or excessively controlling access is not an option for National Mall managers. First Amendment rights embedded within the numerous demonstrations that take place on the National Mall are paramount to natural resource protection; therefore, any management strategy specific to limiting access must uphold these rights (Daniels, Harmon, Park & Brayley, 2009).

Due to budget restrictions, National Mall park managers are unable to keep up with the increasing demand for substantial and complex maintenance tasks. Currently, deferred maintenance totals approximately $400 million (NPS, 2009). Short-term maintenance operations, e.g. trash removal after large events, take precedence, while damaged natural resources are often ignored due to funding constraints. The long term effect is apparent to even the most casual observer; consequently, the NPS was charged with creating a 50-year vision plan, i.e. the National Mall Plan, with a primary focus on environmental sustainability. As part of this plan, the current study focused on public perceptions of greenspaces and associated natural resources on the National Mall, including perceived importance, observations of current problems and improvement suggestions.

Visitor Perceptions

Gaining a better sense of visitor perceptions is not only an inclusive endeavor, but a pragmatic one. While researchers have been documenting tourism experiences for some time, only recently has a meanings-based approach been introduced to offer depth to the analysis of experiences (Andereck, Bricker, Kerstetter, & Nickerson, 2006). Understanding the meanings visitors attach to specific natural resources and cultural artifacts allows for development decisions that maximize user satisfaction (Kyle et al., 2004) and for potential economic return while remaining cognizant of the potential damaging effects of growth, e.g. natural resource depletion, cultural resource degradation (Daniels & Pennington-Gray, 2006). Urban cores must be particularly sensitive to striking a balance between growth and sustainable development. Unmanaged growth can result in unguided expansion of limited resources and lead to high collective costs (Russo, 2002). Taking a sustainable approach,
however, allows managers to balance natural resources, labor, investment technology, export market, capacity, spending and support systems to maximize a community’s long term competitive advantage (Blakely & Bradshaw, 2002).

From a resource management perspective, the goal becomes aligning user perceptions with stakeholder objectives which can be messy, particularly when public goals differ conflict with management abilities to respond (McCool & Guthrie, 2001). Funding constraints are partially to blame, as seeking broad based visitor feedback can be time and labor intensive. The current research endeavor illustrates a readily replicable method of involving the public in planning processes that encourages open and thorough feedback. Use of this procedure allowed us to identify, categorize and interpret public views of greenspace and natural resources within the National Mall in order to reveal visitor perceptions that can inform planning processes.

**Methods**

From November 1, 2006 to March 16, 2007, a series of open-ended scoping questions designed by NPS managers regarding the National Mall were posted for public comment on the National Mall Plan website (see Table 1). Numerous local and national media channels were used to encourage public comment. Respondents did not answer in any defined patterns. Some systematically addressed each of the items, while most posted their general thoughts and feelings about the National Mall and changes they hoped to see implemented without responding to individual scoping items.

**Table 1. Scoping Questions Posted to National Park Service Website**

- What is most important to you about the National Mall?
- What, if any, improvements to the appearance of the National Mall are needed?
- What types and amount of facilities do visitors need? Where should they be located?
- What should visitor facilities and sidewalk furnishings look like, or what character should they have?
- What programs, activities, educational, and recreational opportunities do you want on the National Mall?
- What kinds of information would help you get around more easily?
- What kinds of events and recreational opportunities do you feel can be accommodated in addition to First Amendment demonstrations and open public access?
- Do you have any other comments you would like to share about the National Mall?
When assessing visitor perceptions and experiences, the “voice” can be analyzed quantitatively and qualitatively; counts give an overarching sense of importance attributed to content areas while narrative reflects the substance underscoring the categorizations (Daniels, Rodgers, & Wiggins, 2005). This balance was sought in summarizing results by identifying frequently noted content areas which were interpreted to imply visitors deemed these critical for managing the National Mall while simultaneously identifying representative quotes.

Four investigators reviewed, summarized, and analyzed the data set, individually and collectively. Each investigator approached this task from a unique perspective, i.e. one female researcher's background focused on event management and tourism development issues, and included her perspectives as international traveler. A second female researcher had several years of experience visiting urban parks, including the National Mall, and approached the research from the lens of economic development and tourism. The male researcher had many years of experience both with the National Park Service as a visitor and with urban parks, in general, and focused on the meaning ascribed to sacred spaces. And, the fourth researcher, female, had extensive National Park Service experience as a visitor, though primarily to wilderness-based parks, and primarily approached the study from the perspective of understanding how individuals relate to and connect with natural resource based facets of outdoor spaces. These varied backgrounds, experiences, and research agendas of the investigators allowed for cross-comparison of data interpretations and results throughout the analysis process.

The data were analyzed holistically using the constant comparison technique (Henderson, 2006). For the first stage of analysis, the four researchers independently reviewed and coded a sample of the data to identify predominant themes and sub-themes using open coding (Maxwell, 1996). This was followed by a group comparison of the preliminary results in which categories were integrated and confirmed within data subsets. Categories were then reduced to agreed upon primary and secondary themes for final assignment of comments within the complete data set (Marshall & Rossman, 1999). This process of investigator triangulation was used to improve validity of the qualitative analysis and interpretation of comments (Golafshani, 2003; Johnson, 1997). Following the constant comparison analysis, three of the researchers independently coded one-third of the complete data set using NVivo (Version 7). Each piece of correspondence was assessed for distinct comments, thus portions of respondent comments could be categorized into more than one theme.
Results

During the public comment period, 4,833 respondents posted comments on the National Mall Plan website, while an additional 183 pieces of correspondence were sent via e-mail, postal mail, or fax, for a total of 5,016 pieces of correspondence. Of these, 4,039 pieces of correspondence were identified as replications of various agency stakeholder form letters. The National Parks Conservation Association (NPCA), National Coalition to Save Our Mall (NCSOM), American Society of Landscape Architects (ASLA), and Tour Guild of Washington, D.C. (TGW) each mobilized their members and provided form letters for them to submit as individuals. Each piece of correspondence received in this category was either a replication or close replication of the agency form letter and each agency's letter focused on issues relevant to that organization's mission. NPCS letters identified the need for memorial, monument, and museum expansion location options, increased use of sustainable actions such as native plant use and water efficient technology, and more convenient and affordable transportation options. NCSOM member letters focused primarily on inquiring about strategies for mall planning which allowed for participant engagement, a reminder of the need for an environmental impact study associated with proposed changes, and the importance of the National Mall as an urban park, including options for public recreation. ASLA representatives spoke with National Park Service personnel about the need for historic preservation and land planning, but did not submit form letters. Finally, TGW members shared comments regarding the continued need for tour guides and supporting services.

Table 2. National Level Geographic Distribution of Online and E-mail Respondents

<table>
<thead>
<tr>
<th>State</th>
<th>Responses</th>
<th>State</th>
<th>Responses</th>
<th>State</th>
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<td>2</td>
<td>PA</td>
<td>36</td>
<td>Other</td>
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</table>
Individual responses not affiliated with a specific agency comprised the primary data set. Of the 977 individual pieces of correspondence, 784 individuals provided some indication of residence, i.e. postal code or city of residence (residential postal code was the only demographic information collected). Respondents were primarily (44%) from states in relative close proximity to the National Mall, i.e. Virginia (19%), Maryland (13%), and D.C. (12%) (see Table 2). However, with the exception of West Virginia, all states with the United States were represented. For the purpose of this study, no attempt was made to connect responses with residence.

In the overall assessment of comments regarding greenspace management, three primary themes were evident: 1) Purpose/Function of Greenspace; 2) Landscape Maintenance; and, 3) Sustainability. Using frequency of comments as the suggestion of importance to respondents (see Table 3), concerns relative to the purpose and function of greenspace (411 comments) were slightly more important than landscape maintenance issues (322 comments). Within Purpose/Function of Greenspace, 297 comments were specific to the sub-theme of Aesthetics and 114 comments to the Recreation sub-theme. Landscape Maintenance thematic comments were relatively equally distributed and represented three sub-themes: 1) Grass/Soil (127 comments); 2) Debris (101 comments); and, 3) Vegetation (97 comments). Sustainability responses were represented by two sub-themes: 1) Best Practices (30 comments); and, 2) Recycling (15 comments).

<table>
<thead>
<tr>
<th>THEME</th>
<th>Count</th>
<th>Sub-theme</th>
<th>Count</th>
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<tr>
<td>PURPOSE/FUNCTION OF GREENSPACE ON THE NATIONAL MALL</td>
<td>411</td>
<td>Aesthetics (design, beauty, open-space quality)</td>
<td>297</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recreation (allowable activities)</td>
<td>114</td>
</tr>
<tr>
<td>LANDSCAPE MAINTENANCE ISSUES FOR GREENSPACES ON THE NATIONAL MALL</td>
<td>322</td>
<td>Grass &amp; Soil (overuse, inadequate, availability)</td>
<td>127</td>
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<tr>
<td></td>
<td></td>
<td>Debris (type, quantity, impact on surrounds)</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vegetation (purpose, type appropriate)</td>
<td>94</td>
</tr>
<tr>
<td>SUSTAINABILITY RELATED PRACTICES ON THE NATIONAL MALL</td>
<td>45</td>
<td>Best Practices (general need, importance of exemplary practices)</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recycling (general need, availability)</td>
<td>15</td>
</tr>
<tr>
<td>TOTAL</td>
<td>778</td>
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</table>
Purpose/Function of National Mall Greenspace

Purpose/Function of Greenspace, the first and most frequently addressed primary theme, related to greenspace management on the National Mall and captured viewpoints from respondents regarding their understanding of how greenspaces within the National Mall should function and what purposes they should serve to visitors as well as residents. The two sub-themes of Aesthetics and Recreation were identified as specific purposes.

Aesthetics

Individuals commenting as a purpose of greenspace on the National Mall spoke to formal and informal design components, the value of beauty, and the importance of an open quality to the spaces within this urban park. Associated with the physical qualities of unobstructed vistas and natural informality, individuals suggested the National Mall greenspace symbolized accessibility to and unity in the functions of surrounding public enterprises.

Multiple comments suggested a valuation of the openness and organic character of greenspace on the National Mall and of how it provides a welcome contrast to the surrounding geometric and chronologically synchronized human environment. For example, several respondents stated:

“…the most important thing about the National mall is its openness, its informality, and its expansive access.”

“The beauty of the open space in the middle of the Mall is priceless, sometimes less is better.”

“To me, the most important part about the Mall is the green space.”

“It is a unique and wonderful public green space that provides perspective and breathing room for everything around it. Its simplicity and lack of structure are its primary aspects.”

Responses specific to aesthetics also reflected a desire to improve the general look and feel of the National Mall within the context of the natural resources. While clearly expressing a desire for greenspace, in several cases comments suggested a deep concern about the “front yard” appearance of the National Mall. For example, statements similar to the following were frequently noted:
“I took my children to the National Mall last summer. All I thought of was ‘wow, this 
place is run down. People are coming here from all over the world, all over the 
country and they see this. It’s just not right’.”

“It makes a bad first impression when the first thing you notice is how messy the 
entire area is.”

Others made even more impassioned statements such as:

“This (public input and planning process) is absolutely necessary. The National Mall 
is a National Disgrace.”

“The maintenance and upkeep, the planning and design, of the National Mall (as 
well as most of the NPS facilities, in addition to other public lands) should be a 
priority of the national government. On a scale of 1 to 10, where 1 is the least and 
10 the most, the resources provided to these facilities should be a 15!”

And, another respondent fervently expressed that s/he was:

“…stunned by the lack of care applied to the greenspace within the mall…poorly 
tended and weed infested. An eyesore!!! Rather than serving to accent the 
monuments and memorials, the greenspace was a detracting element of the Mall.”

Several respondents alluded to what was an integral component of L’Enfant’s original 
design, i.e. maintaining a clean and open view line from the Capitol radiating outward and 
including views of the Potomac. For example, one respondent noted rather ardently:

“Leave the Mall open, green and alone! The National Mall’s charm is that fact that 
you can stand at almost any point and see from the center of the City to the River 
and beyond.”

Several individuals also referred to the importance of retaining the natural 
characteristics of the Mall. Responses reflecting this perspective were evident in the 
following statements:

“I think it is essential to recognize the trees, greenspace, and water fountains, 
ponds as essential parts of the character of the mall”

“…the landscape was picturesque (especially the pond next to the Vietnam 
Memorial) and it was great to see the geese taking a break from their southward 
migration”.
Recreation

The ability for individuals to recreate within the National Mall greenspace was the second sub-theme identified relative to Purpose/Function. In this case, however, respondents were not necessarily in agreement about whether the National Mall should be a space in which recreation is an acceptable activity. And, individuals supporting recreation were not in agreement as to the specific types of recreation that should be allowed.

Perceptions of how the space should be used often reflected the meaning individual respondents attach to a particular space. In the case of the National Mall, some respondents felt that free play on the Mall should be permitted, and some specifically indicated support for infrastructure development such as playgrounds to facilitate a variety of play activities. Others felt free play should be limited, or a limited amount of recreational infrastructure should be available. Permitting leagues or other forms of organized recreation was supported by some respondents, while others supported only limited league or organized recreation. And, several individuals felt any recreation or play activity should not be at all permissible.

For those who supported recreational use of National Mall greenspace, comments reflected its role as a spatial representation of freedom to engage in life activities. For example, several respondents shared:

“The present recreational use of certain areas of the National Mall is a special feature that should be retained as much as possible.”

“I always appreciate having the open space to run, bike, people watch, make friends, be exposed to new ideas.”

“Be sure to leave a couple of the plots of land open. People will come to play a game of Frisbee, soccer, catch – or maybe just to lounge for a picnic.”

Among those who supported recreational activities, structured or otherwise, several suggested the allowance of recreation made the National Mall:

“...a people place.”

“...a casual area.”

“...a place for families to enjoy.”

Respondents also supported non-active recreation by expressing how they view
natural spaces within the National Mall as being restful and restorative. In particular, one respondent stated:

“I think you need to keep a large area of greenspace and open areas where people can sit, and mingle and feel at peace after touring some of the monuments and buildings.”

Another respondent further expressed the need to provide:

“...places for quiet contemplation.”

In addition to non-structured play, there was evidence for support of at least some organized recreation as seen in these perspectives:

“The NPS should continue to encourage and allow recreational and sporting activities such as volleyball, softball, soccer etc on the Mall and especially the Ellipse (President’s Park). I think the presence of these sporting activities throughout the Mall gives tourists a positive impression of the residents of the Washington area while providing residents an important venue for physical exercise through sports.”

“I've been playing sports on the Mall for many years. In a city full of concrete, this is often the only place to play sports with teams. There’s something pretty incredible to pause the game and look up and see the Lincoln Memorial.”

Among individuals who suggested limiting or forbidding recreational use of greenspace, they appeared to do so because they felt such use detracted from the dignity of the resource. This is evidenced in multiple responses such as:

“Soon parents will be bringing the kids’ Big Wheel bikes, scooters, skates, bathing suits, etc. and the area will become a big play park. It will lose its dignity and definitely suffer more physical damage. This space cannot be all things to all people.”

“The Mall is not an appropriate place for recreational activities.”

The prevailing sentiment of respondents, however, was neither fully supportive nor fully restrictive. While few wanted National Mall managers to prohibit all play activities, there was very little interest in allowing the Mall to become, as one individual stated:

“...just another ballfield at a county recreation facility.”
**Landscape Maintenance on the National Mall**

The second primary theme identified among responses was that of Landscape Maintenance. Of the 322 comments specific to the need for planning and development strategies to address Landscape Maintenance within the National Mall, three categories emerged: 1) Grass and Soil (127 comments); 2) Debris (101 comments); and, 3) Vegetation (94 comments).

**Grass and Soil**

When discussing issues relative to Grass and Soil, most visitors noted that the grass areas tended to be worn, dead or infested with weeds. Comments primarily referenced issues such as overuse, inadequate soil structure, and availability of grassy areas. In conjunction with such observations, respondents routinely ascribed cause or suggested solutions. For example, two respondents indicated:

“I have always found the threadbare appearance of the lawns to be a detraction.”

“Congress needs to allocate more money to maintain the soil and turf.”

Respondents shared that poor grass conditions made the Mall appear:

“...ragged and worn down…”

“...an eyesore…”

“...unkempt and tacky…”, and,

“...not much more than a patchy and pebble lot”.

Only the rare individual acknowledged the maintenance efforts of the NPS, as noted here:

“I have seen tens of thousands of people enjoy themselves on the National Mall. And while this does regularly destroy lawns, I am always amazed at the National Park Service and their ability to successfully replant new grasses each year.”

**Debris**

Most responses in specific to debris addressed the basic need for increasing the number of trash receptacles available, emptying the existing receptacles, and picking up items not deposited in receptacles. Respondents were consistent in the language they used and suggested visitors would comply if opportunities were convenient, as observed in the following statements:
“As we were walking around the Mall we noticed some litter around the bushes, and with some more maintenance crew that problem could be fixed.”

“On no less than two visits to the Mall in the past three years, I have witnessed overflowing garbage cans. People would lay their garbage next to the can. If personnel removed the garbage more often or simply monitored it more often, this unsightly mess could be avoided. I got the impression that the public wanted to do the right thing but was limited because the trash cans were full.”

“Piles of overflowing trash! If we can’t empty them more often, put out more trash cans.”

Vegetation

Vegetation on the National Mall serves to portray life, energy and natural beauty and was, therefore, considered to be important in establishing meaning for the National Mall visitor. Individuals addressed the need for improvements to multiple types of vegetation including trees, flowers, shrubs, and forbs, i.e. non-grasslike herbaceous flowering plants. Trees, in particular, were valued for the shade they provide, the beauty of their form and color, the animal life they sustain, and the separation of spaces in this large tract of land. National Mall tree panels, i.e. grassy areas lined with trees, are frequently cordoned off by NPS management to restrict pedestrian access and were addressed on multiple occasions with comments such as:

“I’d rather see the trees replaced as needed, than see the treed panels fenced off so that no tree shade is available to the public.”

“I think the rows of trees which frame the mall are of primary importance. These should be continuously replanted as a high priority to maintain the long term continuity of this element. The trees provide the walls to the space, shade in the summer, home for wildlife within the city and improve the air quality.”

The use and re-establishment of indigenous species, informal gardens, planting clusters, and colorful floral features were considered by respondents to be important for responsible landscaping and education, as seen in these responses:

“Plantings around the Mall should be native to the area. Historic trees or shrubs in the area should be labeled.”

“Small islands of shrubbery, or mixing up the landscaping would make a pleasing visual difference.”
“Flowers would be a nice addition as well. Maybe take some space and have mass plantings of flowers.”

“Create a showcase of native trees, plants and flowers from each of the 50 states.”

“…use of native plants would save on costs of pesticides and watering while educating the public about the native landscape.”

**Sustainability on the National Mall**

The final primary thematic category identified was Sustainability. Associated comments primarily reflected a desire for environmental stewardship practices, as noted in the following comments:

“I would like to see a more sustainable approach to our National Mall.”

“I would like to see a commitment to environmentally sound grounds maintenance.”

Among Sustainability comments, individuals addressed their concerns from two perspectives. The first perspective addressed management best practices, i.e. actions that could allow the National Mall to emerge as an exemplar of sustainability. The second perspective captured visitor requests for improved recycling capabilities at the National Mall. While receiving the least number of comments, the depth of responses suggested high importance among those who addressed this category of issues.

**Best practices**

Responses in the Best Practices sub-theme often reflected an ecopsychological perspective (Winter, 1996), i.e. individuals who engage in stewardship activities for nature do so in order to be stewards to their own person. An example of this perspective can be seen in the words of one individual, who shared the importance of incorporating:

“…energy-efficient and water-efficient technologies, landscaping using native plants (as a horticulturist, this is important to my husband), and other strategies for natural resource stewardship (as a couple committed to environmental concerns this whole area is critical).”

A global perspective was also shared among some respondents. Specifically, numerous comments contained references to the need for the National Mall to act as a model for sustainable practices as evidenced by these statements:
“There is no better way to set an example than by adhering to sustainable practices at the one place in the country that can be seen as the entire nation’s park.”

“A ‘green’ Mall would certainly be a credit to our country”, and,

“The Mall should be a national showcase for alternative energy and conservation.”

Further expression of the need for sustainable practices to be used in management of the National Mall were evidenced by suggestions from respondents who suggested:

“Incorporating renewable energy and other sound environmental ideas into new and existing monuments”, and,

“Eco-friendly, sustainable options should be integrated.”

One individual expressed the need for preserving the natural landscape as a tool for assisting in sustainability of wildlife species:

“The wooded areas of the Mall are a magnet for migrating birds in the spring and fall. Areas that are particularly rich in numbers and diversity of species are Constitution Gardens (both the lake and nearby trees), the ridge just north of and parallel to the Reflecting Pool, and the wooded areas on both sides of the District of Columbia World War I Memorial. These areas provide food and serve as a critical rest stop for long-distance migrants, some species of which are in steep decline. I respectfully request that the plan for the Mall take into specific consideration the importance of these areas and the need to preserve them.”

**Recycling**

The final sub-theme of Recycling primarily addressed the belief that managers of the National Mall should provide opportunities for visitors to display the sustainable behavior of recycling. While temporary recycling bins are regularly available at large events, no permanent recycling receptacles are available. Support for recycling is evidenced within the following representative comments:

“I am surprised and disappointed that no recycling receptacles are available in the Mall area.”

“Please install recycling options at your parks. Recycling for paper, plastic, glass, and cans would be ideal.”
Discussion

Public comments about the meaning of the National Mall clearly establish its role as America’s front yard by the way it visually and physically separates “the street”, i.e. corporate America, from “the house”, i.e. the people’s representatives, and how it offers natural aesthetics while making nobody a trespasser. Just as the United States, when growing as a nation, had to embrace its landscape, visitors viewing the American-focused icons throughout the National Mall are surrounded by greenspace.

Regardless of the lens from which they viewed the National Mall, an overarching value for greenspace was evidenced. Similar to Korpela, Hartig, Kaiser, & Fuhrer’s (2001) findings in their study of natural characteristics of favorite places, some individuals spoke to the ability of greenspace to be psychologically restorative. Others hinted at the physiological benefits of spending time in the National Mall greenspace, not unlike benefits found in a recent Netherlands greenspace study (Maas et al., 2009).

The concern for sustainability observed in many comments is consistent with the recent and ongoing “green” movement and accompanying activism. For example, the Sustainable Sites Initiative Guidelines & Benchmarks, released to the public in 2009, has prompted new conversations among park planning managers. This, coupled with the Obama Administration’s announcement regarding the need for implementing federal sustainable projects and actions (Council on Environmental Quality, 2009), will continue to put sustainability issues at the forefront of park management decision making processes.

Consistent with previous research, this study found actions and behaviors towards a place are based not only on its physical characteristics, but also the social and political meanings the public ascribes to it (Cheng, Kruger, & Daniels, 2003). The National Mall is sacred space to some individuals, while to others it is a national treasure worthy of full protection in perpetuity. Consequently, managers of prominent public urban parks, such as the National Mall must continue to work to embrace the diversity of perspectives while maintaining the integrity of the space as well as the integrity of place meanings.

When considering the issues facing the management of the world’s national parks, the protection of greenspace is one of the most pressing. Population growth, climate change and a consumptive mentality without regard to long-term repercussions combine to encroach upon protected spaces. These issues are particularly relevant for urban parks threatened by dense population, commuter patterns and poor air quality.

With the overarching appreciation of greenspace in mind, the identification of specific
greenspace issues salient to national park visitors are critical, as the considerations most relevant to visitors may or may not dovetail with the most pressing managerial concerns. For example, visitors in this study who identified the unhealthy grassy areas as problematic may not have been able to look beyond that immediately observable concern and recognize that cost prohibitive irrigation systems must be replaced in order to ensure the longevity of lawns. While the end goal for visitors and managers may be similar, i.e. healthy turf, it falls to management to educate the public about issues such as deferred maintenance in order to ensure a broader public appreciation of greenspace maintenance constraints is achieved.

An additional challenge for managers is merging best practices with public behaviors, as evidenced in an analysis of a major National Mall event that revealed that the mere presence of recycling containers did not ensure individuals used them (Park, Daniels, Brayley, & Harmon, 2010). Therefore, desired changes such as consistent suggestion for recycling bins in the current study, while desirable, do not guarantee that sustainable behaviors will regularly occur.

When considering the breadth of responses in this study with respect to geographical diversity, i.e. there were no international visitor responses, this suggests the data collected may be framed within the context of homeland attachment. Homeland has been defined at multiple levels, e.g. neighborhood, region, and country, and has also been identified as rootedness (Hammitt, Backlund, & Bixler, 2004; Tuan, 1977). In most cases, relationships with a place grounded in rootedness are intense and long lasting. Managers of prominent parks need to consider the implications of intense reactions to implementation of management strategies that may reflect nationalistic concerns. Specifically, the study questions elicited comments illustrating high levels of engagement and protective attitudes from individuals nationwide, suggesting a deep emotional connection to the National Mall. Iconic urban parks in other nations are equally likely to elicit similar connections, though responses are likely to differ depending on each nation's core cultural values. Therefore, it is necessary to mindfully and directly engage with stakeholders across the nation when considering broad change. Although resources for gathering public perceptions are often limited, web-based data collection, can greatly facilitate the process.

**Limitations**

Data for this study were collected objectively, i.e. respondents were offered a series of
guiding questions to which they could respond via some form of written correspondence without prompting or feedback from the data collectors. No attempt was made to confirm or clarify any submissions. As such, meanings ascribed to punctuation and verbiage were not verified beyond inter-rater agreement. The benefit of this approach is that raw data were not influenced by researcher input, thereby increasing the validity of results.

Because respondents were self-selected, the sample was non-random. While not ideal, this approach allowed for national representation in a cost-effective manner. This data collection method could be easily replicated to confirm results. Further, it could be used to focus future data collection efforts on particular states or worldwide, allowing NPS to provide confirming evidence for current findings.

Finally, the sample was limited to U.S. residents. While anyone could access the National Mall Plan website, marketing efforts for involvement were restricted to the U.S. The patriotic overtones permeating the comments can be attributed in part to the fact that no international visitors responded to NPS query. Additionally, research suggests an increase in the tendency for individuals in the U.S. to express protective responses toward icons representing the country following the events that occurred on September 11, 2001 (Skitka, 2006).

**Conclusion**

Enduring places are those “…which speak to humanity” (Tuan, 1977, p.107). For this NPS unit, as well as national parks representing countries around the globe, meanings are integral to understanding perspectives, impacts of management strategies, and visitor behaviors. Hallmark and historical events, held or commemorated on the National Mall imbue these parklands with a sense of place, allowing both the locale and the events to be “…recognized to be part of an ongoing tradition” (Tuan, 1977, p.174). The symbolic significance of the National Mall was repeatedly stressed by respondents, many passionately imploring managers to improve the maintenance of the area to reflect its national honor and heritage.

The process of seeking and interpreting public comments about roles, meanings and problems facing national parks allows managers to better articulate and address visitor needs. Long-term planning should not occur without giving thorough consideration to a diversity of perspectives. When considering parkland planning and development, managers must not only consider core design and maintenance issues, but also illustrate a
Is a Nation's Front Yard Becoming a Dumping Ground? A Critical Analysis of Greenspace within the United States National Mall & Memorial Parks
Harmon, L. K., Daniels, M. J., Park, M., & Brayley, E. R.

clear appreciation of the meaning and integrity of the greenspace.

References


Tianqing Luo*  Gill Lawson**

Abstract

National Historic Relics and Scenic Sites (NHRSSs) in China are the equivalent of National Parks in the West but have contrasting features and broader roles when compared to their Western counterparts. By reviewing and analyzing more than 370 academic sources, this paper identifies 6 major issue clusters and future challenges that will influence the management of NHRSSs over time. It also provides a number of cases to illustrate the particular features of NHRSSs. Identifying the hot issues and important challenges in Chinese NHRSSs will provide valuable insights into priorities now being discussed in highly populated areas of the world.

Keywords: national parks, China, historic relics, scenic sites, tourism development, landscape planning

Introduction

Thirty years ago the Chinese Central Government established a program of National Historic Relics and Scenic Sites (NHRSSs) and declared that they would be the equivalent of National Parks in the West (Xie, 2002). In 1982, the first group of 44 NHRSSs was approved by the General Office of the State Council of the People’s Republic of China. Since then, there have been 7 groups of NHRSSs established in 3 municipalities and 27 provinces. An entire system of 208 NHRSSs has now been developed and organized throughout China. The type and density of NHRSSs vary as the natural environment, ethnic diversity and level of socio-economic development changes from eastern to western parts of the country (Ding, Wu, & Ding, 2008). Both natural and cultural features play an important role in the evolution of each NHRSS, giving each site a unique charm that attracts visitors. In accordance with the increasing numbers of visitors from 3,980,000 per

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year in the north-west to 110,780,000 per year in the east\(^1\) (Song, Bai, & Wu, 2009), a balance is being struck between the spatial distribution of NHRSSs and visitation demands of regional population.

There has been a great deal of academic debate over how these sites should be developed and managed. The lack of planning laws during their establishment phase to regulate decision-making has led to a protracted period of public discussion. The various definitions of a NHRSS (Hao, 2007) have contributed to the evolution of a complex and confusing system of goals in relation to scenic resource protection, tourism development and research work (Ding et al., 2008). Consequently, NHRSSs are now part of a nation-wide system of nature reserves (Sun, 1982), cultural and natural heritage sites (Xie, 2005; Yue, Hou, Qiu, 2005) as well as tourist resorts (Wang & Zhao, 2004). Among these multiple roles, the most important one is to act as a local economic development driver by stimulating tourism development (Huang & Zhao, 2005; Liu & Pu, 2004; Zhang, Li, & Cheng, 2007). Considerable debate has been focused on discussing how to develop tourism in NHRSSs. For instance, sustainable tourism was proposed under the pressure of touring destruction (Chen, Wang, Liu, Wang, & Niu, 2001; Dong, Yang, & Shu, 2004; Dong, Zhou, & Yang, 2006; Dong, Yang, & Chen, 2008; Song, 1997; Wang & Yang, 1999; Yang, Yan, Yang, & Xu, 1997; Yu, Li, Hu, & Zhang, 2001); touring product design and competitiveness improvement were explored to attract more visitors (Huang, 2007; Li, 2007; Yuan & Han, 2007; Zhu, Zhu, & Cui, 2008); resource packages and managing cooperation were pursued from a regional perspective (Lv & Liu, 2005; Meng & Yang, 2003; Tang & Ge, 2007); other debates covered issues of tourism planning (Chen, Gao, Yu, & Peng, 1990), dynamic mechanism of tourism (Liu, Wu, & Lu, 2008), harmony between visitors and local residents (Liu, 2009) and the construction of tourism circular economy (Yang & Wang, 2009). This makes Chinese NHRSSs somewhat different from their Western counterparts.

The types of roles that NHRSSs must perform in China give them particular characteristics that may not be features of Western National Parks. For instance, most NHRSSs have dual scenic resources (natural and cultural) that require more complicated categorization schemes (Sun, 1982) and management models (Cai, 2004). Almost all of them must adopt tourism development-oriented guidelines. The requirements of such guidelines generally result in unplanned urban expansion (Chai, 2003; Dong et al, 2004; Feng, 2005; Li, 2002; Wang & Hu, 2002; Yang & Luo, 2004; Zhou, Dong, Yang, & Tu, 2007)
and excessive construction for new developments (Lu, 2005; Tang, 2007). Therefore, the natural systems in such areas are facing far greater pressures from both tourists and local residents than their Western counterparts. Thus, the NHRSS system is really a focus of various conflicting interests and power struggles.

This paper reviews and analyzes a cross-section of published sources that frame academic debates about NHRSSs in China to reveal the major issues that have been influencing the management of these sites over time. It provides a number of cases of NHRSSs to illustrate some particular features of these sites that correlate with these issues. Finally it outlines the potential challenges facing NHRSSs in the future.

**Method**

The academic literature provides a record of up-to-date research that may in turn influence actual planning and managing practices in NHRSSs. An analysis of keywords in NHRSS research publications can be used to frame clusters of issues and their changes over time in relation to decision-making processes affecting these sites. Such analytical tools are however of little use in selecting issue-related case studies. It is necessary to return to the documents themselves and to select sample case studies from reading the contents of the articles.

**Sources of Academic Publications**

It was found that almost all the academic publications about NHRSSs were published in the People’s Republic of China and so two important academic databases containing thousands of China’s core journals (Wanfang Data and Vip Information) were selected as search tools. Searches using Chinese characters of NHRSS in the title, abstract and keyword fields for both academic journals and conference proceedings produced a total of 377 papers published before July 2009. Each paper was downloaded and scanned by the author to verify the theme as related to NHRSSs. These 377 papers formed the statistical population for further analysis.

**Co-word Analysis**

Co-word analysis is a relatively accurate tool for content analysis that uses statistical frequencies of pairs of words to reveal different research areas and interests (Feng & Leng, 2006). Developed for the analysis and visualization of the dynamics of problem networks (Turner, Chartron, Laville, & Michelet, 1988), the methodological foundation of co-word
analysis is the idea that the co-occurrence of keywords describes the contents of the documents more exactly than frequency ranking of keywords. By measuring the relative intensity of these co-occurrences with one (or more) index (or indices) and achieving simplified representation of problem networks with co-keyword clusters, the most common issues and direction of relevant research can be identified. The reliability of results depends largely on the selection and representativeness of keywords in relation to the research outlined in the publications. So a pretreatment of keywords is necessary to reduce errors.

In this study, keywords from different documents were modified to avoid phraseological or redundant error that would influence the accuracy of analysis. Different expressions for the same meaning were recorded. Repeated words and place names were omitted from the analysis. The special word frequency statistic software ROST was used to calculate the frequency of modified keywords. The occurrences of the most common words were used to construct a co-word matrix that in turn was used for clustering calculations.

The co-word matrix was firstly constructed from the co-occurrences of each pair of keywords. The matrix was then translated into an equivalence index matrix to avoid the bias between those words used frequently and those used less often. The translation from one matrix to the other was done according to the following equation (Callon, Courtial, & Laville, 1991):

\[ E_{ij} = \frac{(C_{ij})^2}{C_i \times C_j} \]

Here \( E_{ij} \) is the equivalence index of the words i and j; \( C_{ij} \) is the number of co-occurrences of the words i and j; while \( C_i \) and \( C_j \) are the number of occurrences of the word i and j respectively. The equivalence index matrix was then used with the statistical software SPSS 10.0 and clustered with a Hierarchical Cluster Analysis using the Nearest Neighbor Method. Each cluster of keywords thus reflected the research focus of publications from the past three decades.

**Temporal Analysis**

Temporal analysis was the process used to identify the changes over time of document clusters that reflected divisions in research issues over time as well as the hot issues of a certain period. All the documents were firstly categorized according to the co-word clusters. The publications with the same keywords of a certain co-word cluster were collected together. Where a publication contained two or more keyword clusters, the publication was included in more than one cluster simultaneously.
The number of documents in each cluster was then counted for each year, reflecting the number of publications for each cluster and in turn, the level of importance of the relevant issue. Finally, a graphical representation was used to present the yearly changes in publication numbers in each cluster. To minimize the impact of variation in yearly publication numbers, figures were converted into yearly percentages. The pattern of occurrence for each cluster was then considered to reflect the changes in importance of relevant issues for NHRSSs over time.

**Results**

**Frequencies of Associated Keywords in NHRSS Documents**

A total of 452 keywords in 377 documents were found with frequencies varying from 1 to 79 after phraseological or redundant errors were corrected. The top 21 keywords with frequencies above 10 were selected for the further co-word analysis (see Table 1).

The co-occurrence matrix and the equivalence index matrix are shown in Table 2 and Table 3 respectively. The co-occurrences of keyword pairs varied between 0 and 79 (the maximum frequency of keywords), while the equivalence indices varied from 0 to 1. Both matrices were symmetrical with a diagonal axis. The axis in the co-occurrence matrix was formed by the frequencies of 21 selected keywords and the one in the equivalence index matrix was formed by the constant 1. This provided a comparative analysis for the frequencies of associated keywords.

The results of the co-word cluster analysis are shown as a tree chart in Figure 1. The shorter the distance between keywords, the closer the relationship between them. The most tightly associated keyword pair was number 5 and 11 or ‘development’ and ‘sustainable’ respectively, followed by number 6 and 14 or ‘environment’ and ‘capacity’, and number 3 and 21 or ‘landscape’ and ‘pattern’ (see Table 1).

**Clustering of associated keywords into major NHRSS issues**

Using a proximity threshold of 23 as a reference (the vertical dashed line in Figure 2), the selected keywords were divided into 6 clusters with 5 horizontal dashed lines. The proximity value of 23 was a cut-off value used to identify the number of clusters before a total aggregation under one cluster. Major issues related to NHRSS research were then interpreted from the 6 clusters of selected keywords (see Figure 2).

The first cluster involved 4 keywords, ‘sustainable’ ‘development’ and ‘tourist’
‘economy’, reflecting the importance of debates over the issue of development of NHRSSs. The second cluster involved 2 keywords, ‘construction’ and ‘culture’, suggesting concern over the issue of construction within NHRSSs, specifically regarding cultural construction. The third cluster involved 3 keywords, ‘landscape’, ‘pattern’ and ‘analysis’, indicating some interest in the issue of landscape (studies) related to landscape analysis and landscape pattern. The fourth cluster involved 9 keywords that indicated mixed debates over the issue of ‘conservation’ relative to ‘use’, ‘environmental’ ‘capacity’, ‘tourist’ ‘occupation’, ‘resource’ ‘evaluation’ and ‘ecology’. The fifth cluster involved only 1 keyword, ‘privatization’, which may be an issue in itself and the sixth involved 2 keywords, ‘administration’ and ‘system’, suggesting an issue with regard to the administrative system of NHRSSs.

Table 1. Top Keywords for Co-word Analysis

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Table 2. The Co-occurrence Matrix

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Table 3. The Equivalence Index Matrix
Figure 1. Co-word Cluster Tree, the Horizontal Axis Indicates the Distances between Pairs of Keywords, while the Vertical Numbers Show the Frequency Rank of Keywords

Figure 2. Keyword Clusters, which can Indicate the Major Issues about NHRSS Research
Clustering of Issues from 1982 to 2009

Following the co-word cluster analysis, research papers were categorized into the 6 clusters and sorted into years of publication. The temporal distribution of clusters was illustrated by yearly publication percentages in Figure 3. A division in the documentary evidence occurred between the years 1998 and 1999. Before this time, random distributions of clusters were found but after this time, there was a consistently high frequency of cluster 4 coinciding with lower frequencies of the other five clusters that alternated in importance each year.

![Figure 3. Distribution Patterns of Yearly Document Percentages in Clusters](image)

Discussion

Literature reviews of published papers on particular topics provide researchers with considerable data for the development of theoretical frameworks related to landscape planning. For instance, Tvet, Ode, and Fry (2006) reviewed approximately 130 documentary sources about European scenic sites to describe visual qualities of landscapes from 1960 to 2003. They argued that concepts derived from such an analysis could then be used to develop a theory-based framework for further practical work in European landscapes. In this work, statistical results were obtained from analyzing relationships between keywords in 377 documents about Chinese NHRSSs from 1982 to 2008 to identify unique challenges in NHRSSs.

Few studies have provided a chronological picture of topics and issues of concern to researchers of national parks. This has made identifying the evolution of trends in national park research difficult. This situation is similar to other fields, such as education where changes in technology and practice have dramatically shifted issues of concern to
researchers. Co-word analysis is a powerful technique to enable comparisons of large document sets across knowledge domains. Ritzhaupt, Stewart, Smith, and Barron (2010) used co-word analysis to objectively identify trends and themes in North American education literature. However, co-word analysis of topics and trends in Chinese literature, particularly on Chinese heritage sites, has yet to receive attention compared to literature in English. Until recently, Chinese texts could not be studied using co-word analysis because words are not separated by spaces in texts in Chinese characters (Leydesdorff and Zhou, 2008). In this work, issues clustering as co-words from 1982 to 2009 were used to identify main issues, relative themes and challenges in NHRSSs.

**Six Major NHRSS Issues**

Documents with keywords in the first cluster (see Figure 2) revealed debates over the importance of sustainable development of tourist economies in relation to these sites. The second cluster of documents showed concern over cultural resource construction occurring within NHRSSs. The third cluster illustrated an interest in studying landscapes through landscape analysis and landscape pattern. The fourth cluster indicated mixed debates over the most frequently raised issue of conservation relative to use, environmental capacity, tourist occupation, resource evaluation and ecology. The fifth cluster involved the issue of privatization and the sixth cluster discussed the administrative systems of NHRSSs. Clustering of keyword pairs was then interpreted to identify the most important planning and management issues related to NHRSSs over the past ten years and future challenges for these sites in China.

**Conservation’ as a Main Issue from 1998 to 2008**

In China, co-analysis results showed a dominance of cluster 4 in the documentary evidence from 1998 to 2008 (see Figure 3). This suggested that conservation has been the main issue concerning researchers throughout the recent history of NHRSSs. It is a fundamental issue because most NHRSSs are sites where natural and cultural heritage elements co-exist in the physical landscape. Chinese cultural resources, including ancient architecture, traditional villages and cultural practices, are important components of NHRSSs that increase the popularity of these places. Therefore, the pressure of local urbanization, tourism expansion and destructive construction activities point to the need for more sustainable uses of NHRSSs. In addition, the other five documentary clusters (clusters 1, 2, 3, 5 and 6) showed the same relatively low percentages of papers related to
other issues over the past ten years. Research work during this period has then added a number of issues to debates about NHRSSs but none in equal importance to conservation as the central concern.

**Four other Significant Issues in NHRSSs**

Clustering of keywords revealed insights into particular themes related to issues of concern to Chinese researchers in the literature on NHRSSs from 1998 to 2008. Despite a few phraseological differences four other significant themes emerged: tourist occupation, cultural resource construction, environmental capacity and privatization. They illustrate how the Chinese system of NHRSSs has developed in relation to significant population and financial pressures.

**Tourist Occupation**

Tourist occupation is among the most important issues in NHRSSs to ease financial pressures. With limited funding from local governments, NHRSSs in China must generate their own income to supplement investment in their management every fiscal year (Fei, 2003). Therefore expanding local tourist industries becomes the easiest way to generate revenue. Many types of tourist developments have been introduced to these sites. Tourist attractions in NHRSSs are not only a means of drawing more visitors into the sites but the parks themselves have become commodities designed to promote an entire local area through tour packages, advertising and marketing. Both natural and cultural resources are then designed to attract more visitors with leaflets and short videos distributed to enhance their fame. Furthermore, their competitiveness within the Chinese tourism industry is analyzed to expand their market share.

West Lake National Historic Relics and Scenic Sites in Hangzhou City, Zhejiang Province, illustrates how this issue has been addressed in eastern China. It was the first NHRSS that promoted free public access to the Lake. Rather than general ticket sales for entry to the entire site like most NHRSSs, it provided free access to most scenic spots, especially those around the central part of the Lake and aimed to generate greater revenues from a comprehensive approach to tourism across the city. The free access became the best advertisement for attracting more local citizens and travelers, ultimately creating nearly a 25% increase in visitors during the first three years of the trial period after 2002. At the same time, the average length of stay for visitors also increased to 2.8 days, bringing new development opportunities to accommodation and hospitality industries along
with transportation, entertainment and retail enterprises. Although the income from ticket sales was sacrificed and investment in new management strategies increased, the accelerating increase in revenues from related industries have made both these worthwhile. In addition, free public access fostered greater interest in community values in relation to NHRSSs and the overflow effect of travelling tour groups produced substantial benefits for neighboring destinations. Hangzhou and its region are now one of the leading recreational destinations in China (Hangzhou Price Bureau, 2005).

The demand for site tours by so many domestic tourists from a large Chinese population is already enormous. Further tour promotions will undoubtedly intensify tourist impacts. At the same time, there is increasing support through investment for conservation practices. In this contradictory situation, the only way to reconcile both recreational and conservation goals is the planning of site development within reasonably strict limitations on tourist occupation (Chen & Pen, 2003).

*Cultural Resource Construction*

The long history and diverse culture of China provides abundant cultural resources in NHRSSs. However, cultural construction in these sites is far more complex than the conservation of historical sites in most Western National Parks. Although one of the core beliefs of all conservation efforts is to retain the original and authentic nature of cultural resources, this is actually very difficult in China because of historical events and the material culture of many local communities. An innovative solution to the dilemma of conservation and public presentation is to extract cultural meanings from cultural resources and present them in a new way in other sites. This transfer of cultural meaning through new construction of other sites does not then damage the original resources themselves (Wang, 2002).

In this way, culture is one of the most important components of designing tour packages in China. Cultural meanings are often extracted from related resources and combined into corresponding tourist facilities and local residential areas (Liu, Jiang, Bao, Xie, & Zhou, 1997). Thus a whole chain of local cultural industries can be established that provide a comprehensive set of visitor experiences from sightseeing, souvenir hunting, participating in local customs to experiencing new adventures.

West Lake Historic Relics and Scenic Sites in Hangzhou City again illustrates the development of a chain of cultural industries. In 2002, the Meijiawu Valley in the mountains to the west of West Lake was proposed as a supporting tourist destination to Hangzhou
based on tea culture. This valley has produced the famous Longjing Tea only from its fields for as long as anyone can remember. A comprehensive plan for cultural construction was supported to attract visitors and capitalize on this fame. Tea fields scattered among the natural valleys were strictly preserved to construct the scenic cultural environment. Tea producing activities were combined with seasonal festivals to involve visitors in the celebrations. Local families were encouraged to accommodate visitors, serving fresh tea and teaching them about the production of Longjing Tea. New drinks and new dishes that incorporated Longjing Tea were invented to impress visitors in restaurants. Thus the whole chain of local tea culture was established to provide scenic sightseeing, festival participation, product sampling and public education. Tour companies, local government agencies and local residents all participated in this process and received benefits from it, thus ensuring a successful economic outcome for the area (Huang & Wang, 2005).

Environmental Capacity

Environmental capacity is an issue that aims to minimize negative impacts from recreational use while protecting the local environment in both Western countries and Chinese NHRSSs. However, with a large population and relatively meager areas of parkland in China, NHRSSs are forced to pursue quantitative control measures of environmental capacity rather than qualitative management models such as limits of acceptable change (LAC), visitor impact management (VIM) and visitor experience resource protection (VERP) used in Western National Parks (Luo, 2006a). An ideal quantitative control method can reduce the costs of recovery from unacceptable environmental damage and ensure a better match between visitor numbers and resource capacity. These are significant for NHRSSs because of the limited public funding for restoration of environmental damage, shortages of well-trained personnel for monitoring sites and powerful land use controls for facility development. Unfortunately all existing scientific methods for quantitative analysis of recreational impacts have some difficulties at the local level (Luo, 2006b). Thus innovation in research methods for assessing environment capacities remains an important challenge for NHRSSs in China. These methods include finding control indices, estimating potential tourist populations, determining environmental limits and balancing market demands with accommodation facilities.

A case that illustrates the measures used to manage population pressures is Gu-lang Island, the core area of Gu-lang Island & Wanshi Mountain National Historic Relics and
Scenic Sites in Xiamen City, Fujian Province in southeast China. This island of less than 200 ha became a foreign enclave after the Treaty of Nanjing in 1842. It is now a historic residential area of high quality and high density, popular with both Western and Chinese sightseers alike. In 2000, the local population of more than 21,000 was concentrated in an area of 74.9 ha. Apart from local residents, nearly 5,000 visitors per day required the provision of 30.2 ha of public facilities. The residential area and visitor facilities then occupied 72.4% of the built environment of the island. Building heights on the island were strictly limited in order to preserve the scenic landscape. There was limited space to accommodate further population growth and new developments without threatening the scenic values of the island. Visitor numbers and the proportion of visitors to local residents became the focus for investigating how to balance future development with the limited capacity of the site. Researchers selected construction intensity and the ratio of settlement to habitation (RSH) as the control indices, calculated from the percentage of floor areas over construction areas and the ratio of visitors to local residents. The higher the RSH values, the more public facilities and the higher the occupation efficiency. RSH values were increased from 0.23 to 3.17 by keeping the population number constant but reducing the land occupied by buildings and increasing green space by 30%. The measures included a proportion of necessary emigration based on evaluations of building quality, reclamation of buildings with low usage efficiency and support for greater local family accommodation (Liu & Song, 2004).

Privatization

Privatization is another issue commonly discussed in relation to managing both Western National Parks and Chinese NHRSSs. However in comparison with the limited privatization of park accommodation and other business concessions in Western counterparts, privatization in NHRSSs goes much further in integrating the market economy with park management by entrusting companies with full management rights over NHRSSs to trade their shares on the stock market and auction their management rights in futures trading (Liang, 2002).

Huang Shan (Yellow Mountain) National Historic Relics and Scenic Sites in southern Anhui Province in central China, was one of the first NHRSSs to entrust companies with trading on the Shengzhen and Shanghai stock exchange. As one of the most beautiful and famous scenic sites in China, it has been listed as a double UNESCO World Natural Heritage and World Cultural Heritage site as well as a World Geological Park. However, it
had been in debt for a long period under the centralized management system of the Chinese Government. In 1996, the Huang Shan Tourism Development Co. Ltd was established not only to charge entrance fees to the area, but also to manage its scenic areas, to run restaurants and tour agencies as well as to construct and maintain the cableways. By the end of 2000, the company had paid off the debt of 190 million RMB and expanded its total capital by 5.38 times with the help of money invested from the stock market. Considerable financial investment in the park enabled conservation work to be undertaken (Wang, 2002). In 1999, Huang Shan National Historic Relics and Scenic Sites were awarded the Melina Mercouri Award for Conservation and Management of Cultural Scenery.

Strong counter opinions to this approach however have been voiced in China. They cast doubt on the required continuation of NHRSSs as public assets and the legitimacy of how the considerable profits from NHRSSs are being allocated. Therefore it is necessary that authorities address the fundamental rights and responsibilities for scenic resources, the necessary functions of such sites and the accurate evaluation of these resources to resolve these conflicts (Xu, 2000).

**Unique Challenges in NHRSSs**

The fundamental issue of conservation and the specific issues of tourist occupation, cultural construction, environmental capacity and privatization in NHRSSs suggest a series of unique conflicts and problems in China. These in turn point to innovation in addressing particular management challenges in NHRSSs. As Tvet et al. (2006) argued, these concepts derived from a co-analysis of keywords from a large document set in the Chinese literature, could be used to develop a theory-based framework for further practical work in Chinese landscapes. Research is far more effective when a unifying body of theory frames it. Researchers are more likely to identify the larger problems and ask the important questions. Furthermore, their findings are more likely to have a broader impact (Ritzhaupt et al, 2010). Given the importance of the Chinese contribution to the field of landscape planning, a theoretical framework for national park management that includes the issues of concern to Chinese researchers, found in this work, is now highly desirable.
Conclusion

This study found six major issue clusters in published works on NHRSSs. These were issues related to development, construction, landscape (studies), conservation, privatization and administration. There were also specific sub-issues aligned with certain issue clusters, including sustainable development and tourist economy under development, cultural construction under construction, landscape analysis and landscape pattern under landscape (studies), use, environmental capacity, tourist occupation, resource evaluation and ecology under conservation as well as administrative system under administration.

Among these major issues and sub-issues, conservation was frequently presented as the most fundamental issue because of its dominance in debates on NHRSSs over a ten-year period. In addition to this, tourist occupation, cultural construction, environmental capacity and privatization were specific issues that varied in conception, operation and model when NHRSSs were managed under Chinese system. Examples of three NHRSSs were presented to illustrate these four specific issues. The West Lake National Historic Relics and Scenic Sites in Hangzhou City was a case where entry ticket income was sacrificed for a more comprehensive tourist planning approach based on free public access. The Meijiawu Valley in the West Lake NHRSS illustrated a whole chain of local tea culture enterprises formed from the participation of multiple stakeholders. Gu-lang Island, the core island of Gu-lang Island & Wanshi Mountain National Historic Relics and Scenic Sites in Xiamen City was an example of how selected construction intensity and the ratio of settlement to habitation (RSH) can be used as quantitative control indices to provide balanced development within environmental capacity limits. Finally Huang Shan (Yellow Mountain) National Historic Relics and Scenic Sites in south Anhui Province paid off substantial debts and completed significant conservation works by transferring park management to a commercial company that trades on the Chinese stock market.

Although all three NHRSSs have made significant investments in conservation practices with income from innovative commercial approaches and development models, the fundamental conflicts between conservation and tourist occupation, cultural construction and privatization still offer great challenges for NHRSSs. Quantitative control of habitation within environmental capacity limits still lacks reliable methods. Insufficient support for scientific approaches to conservation under enormous development pressure continues. These challenges are consequences of the social situation in China that can be characterized by a large population, limited funding and a lag in legal regulations covering
NHRSSs. Therefore, these are not just challenges for NHRSSs in China but are also of concern in other regions of the world, particularly those with a similar social context.

References


Changing Recreational Emphasis and the Loss of ‘Natural Experiences’ in Protected Areas: An Issue that Deserves Consideration, Dialogue, and Investigation

David Newsome*  Carol Lacroix**

Abstract

Protected areas provide an escape from oppressive urban environments and provide opportunities for people to enjoy and learn about nature that has not been exploited or dominated by human activity. The value of natural landscape and protected areas in terms of their authenticity, natural soundscapes and visual amenity is being increasingly compromised by overcrowding, the impacts of normal and traditional use, inappropriate and non-approved activities and the rise of protected area use for events and sporting activities.

Arguably the most significant development in recent years is the rise of approved sporting activity and events in protected areas. These activities include adventure races and running events. They often involve intensive use of a protected area and large numbers of people and constitute an increasing trend under the guise of health promotion and outdoor appreciation. People visit natural areas for visual amenity, to be free from noise, pollution and overcrowding. Many such events are not consistent with these values.

We need an increasing dialogue on the appropriate use of protected areas. Do we need to re-visit the original purpose of protected area designation? What message are we giving the general public and protected area visitors if the trend towards increasing use of natural areas for adventure racing and competitive sporting events continues? It is important that we evaluate the appropriateness of uses that do not promote a sense of the wild, authentic and unspoiled natural experiences.

Keywords: natural experiences, adventure tourism, sporting events, environmental impacts, protected areas

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Introduction

During last 30 years there has been a massive and increasing interest in nature, wildlife viewing and visits to national parks and other protected areas. Parallel to this trend has been a greening of the general community and growing concerns about damage to and loss of natural environments (Newsome, Dowling, & Moore, 2005; Page & Dowling, 2002; Wight, 2001). During the last 10 years there has been an increasing trend for natural and protected areas to also be used for more action-based, endurance-style activities. Adventure activities may be undertaken by individuals or may occur in the form of mass competitive events comprising multiple activities that are becoming increasingly popular. Adventure activities stand in contrast to more passive, contemplative activities associated with the more ‘traditional’ or mainstream uses, or ecotourism activities that emphasise “nature-based attractions and educational or appreciative motivations” (Weaver, 2006).

Some commentators may see the rise in popularity of adventure activities as positive: for example, economic benefits associated with events. However, such events also have the potential for significant negative impacts. In particular, it should be noted that:

- the activities have the potential to impact, not only on the biophysical environment, but on the ‘natural experience’ of other users – especially those who are interested in enjoying the natural values of the area in a quieter or more contemplative fashion (enjoying wildlife and natural landscapes);
- the activities cause additional and significant problems for management in a context where management capacity is already limited; and
- the problems are exacerbated in a context where more natural areas are being targeted for events.

This paper highlights the rising interest in adventure activities. Its primary aim is to initiate a discussion about how these activities should be managed in protected areas and, indeed, whether they constitute appropriate uses of protected areas. In doing so it outlines key aspects of the adventure activity phenomenon and the natural experience of other users that are impacted by adventure activities, and options for management.

The New Interest in Adventure Activities

In association with the traditional or mainstream spectrum of visitation such as hiking, camping, boating and watching wildlife in the past decade there has seen an increasing interest in new forms of activity, including orchestras and weddings, which are seeking...
Changing Recreational Emphasis and the Loss of ‘Natural Experiences’ in Protected Areas: An Issue that Deserves Consideration, Dialogue, and Investigation

Newsome, D. & Lacroix, C.

natural area venues. Importantly, there has been an increase in the use of protected areas for more action-based, endurance-style activities. These differ substantially from the more traditional or mainstream recreational activities that could be considered as passive or contemplative.

There is a wide range of activities that come under the umbrella of adventure activities. Adventure activities – sometimes referred to as ‘extreme’ or ‘fringe’ sports (Kay & Laberge, 2002), include mountain biking, hiking, off road-vehicle expeditions, rock and mountain climbing, horse riding, kayaking, diving and white water rafting. They also include locating and viewing rare and/or potentially dangerous wildlife. Many of the adventure activities mentioned have been a potential problem for protected area managers for a long time but some activities, such as mountain biking, have increased dramatically in recent years (Newsome & Davies, 2009; Pickering, Castley, Hill, & Newsome, 2010; Pickering, Hill, Newsome, & Leung, 2010).

Perhaps the most significant development in recent years is the rise of approved sporting activity and events in protected areas. These activities include adventure races and running events. They often involve intensive use of a protected area and large numbers of people, and may be seen as the extreme end of the adventure activity spectrum. These are sporting activities and competitive events that are increasing rapidly around the world in terms of demand and the desire for new locations. Such events may comprise many different activities and involve substantial organisation, control points and spectator attendance. Table 1 indicates some of the most common events and provides a sense of these activities and their characteristics.

Table 1. Examples of Organised Sporting Activities and Competitive Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Rogaining/orienteering</td>
<td>Long distance cross-country navigation. Can involve large numbers of participants. Often a continuous 24 hour activity in which participants have to locate set check-points within a set time period. Involves day and night navigation and the use of a central base camp. Orienteering activities may be conducted cross-country, on trails, via mountain bike or via horse. Can be part of an adventure race</td>
</tr>
<tr>
<td>Mountain runs/funs runs</td>
<td>Involves a targeted course with the intention of completing the run in a certain time or simply completing the run. Can occur in a variety of environments but usually focused on hilly terrain and or a peak. Can involve large numbers of participants</td>
</tr>
<tr>
<td>Mountain biking</td>
<td>Race events and activities that cater for all riding styles. A common feature is the desire for physical and technical challenge. Can involve large numbers of participants and spectators</td>
</tr>
</tbody>
</table>
Table 1. Examples of Organised Sporting Activities and Competitive Events (continued)

<table>
<thead>
<tr>
<th>Event</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Abseiling and rock climbing</td>
<td>Commercial operations can involve large numbers of beginners undergoing instruction and training</td>
</tr>
<tr>
<td>Canoe racing/canyon rafting</td>
<td>Whitewater races can involve up to 800 contestants. Reliant of boat launching and exit control points. May be large numbers of spectators</td>
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<tr>
<td>Geocaching</td>
<td>Participants use a GPS to locate hidden containers. Containers may be hidden in caves and in situations which require off-trail access</td>
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<tr>
<td>Horse riding</td>
<td>Competitive riding and endurance events. Events may take place over distances of up to 300km and occur over 3 days. Control points and tethering sites may be employed</td>
</tr>
<tr>
<td>Adventure racing</td>
<td>Commercially sponsored combinations of mountain biking, running, use of canoes, rock climbing, roping activities, use of a ‘flying fox’ and abseiling in association with orienteering and navigation</td>
</tr>
</tbody>
</table>

Note: Derived from Adrenalin (2010a, 2010b); Australian Mountain-Running Association (2010); Cabella (2010); Geocaching.com (2010); Global Endurance Training Centre (2010); International Canoe Federation (2010); International Orienteering Federation (2010); International Rogaining Federation (2010); Mountain Bike Australia (2010).

Car rallies and motorcycling events could also be considered as sporting or adventure racing events, although it is unlikely that such events would be approved in a protected area. But there are other activities that could emerge in the future. For example, although dog sledding traditionally occurs in cold, snowy environments the activity has emerged as a sport in dry environments where instead of pulling a sled the dogs pull a wheeled cart. Moreover, a significant development, which is of concern to managers and passive natural area users and conservationists, has been a trend towards more organised events over time. A key characteristic of the more organised events is that there is often a retail/commercial aspect involving the promotion and sale of vehicles, clothing and equipment.

**Increased Impacts of Recreational Activity in Natural and Protected Areas**

Some commentators may see the rise in popularity of adventure activities as positive. Events can gain legitimacy through their promotion as adventure tourism, sporting activities, via fitness benefits, healthy lifestyles and as local community income generators. There is also the argument that an event can showcase the natural attributes of a region or country. Competitive sporting events are often supported by local businesses and if successful at the local and regional level they may be marketed globally as international competitive events on the Internet. Regional tourism agencies often promote and support such events, which may also have the financial backing of international companies that
sell sports clothing and equipment.

However, these events also have the potential for significant negative impacts. In considering impacts of adventure activities, it is important to put aside any suggestion that adventure activities are benign. Some commentators may view activities such as these as a form of ‘alternative tourism’ (Newsome, Moore, & Dowling, 2002). For that reason they are sometimes party to the claim by organisers that they have minimal negative environmental and social impacts. This suggestion arises from the idea, found in the tourism literature, that alternative forms of tourism is more consistent with natural values (Wearing & Neil, 1999). However, in discussing the lesser impacts of alternative tourism, Wearing and Neal were focused on the nature based, wildlife and ecotourism categories. It is well established that even these, along with many of the alternative forms of tourism and general leisure activities, pose the risk of negative environmental impact if not properly managed (Buckley, 2004; Buckley, 2009; Hammitt & Cole, 1998; Higham & Luck, 2007; Newsome et al., 2002).

The biophysical impacts of visitation are well documented. Our interest here is on the impacts on the experience of other users, especially those who are interested in more contemplative experiences. That there may be conflict between users seeking different experiences, (for example between horse riders, mountain bikers, hikers and off road vehicle users occupying the same trails), has been described to some extent (Carothers, Vaske, & Donnelly, 2001; Kerr, 2003; Landsberg, Logan, & Shorthouse, 2001; Schuett, 1997; Watson, Niccolucci, & Williams, 1993). However, the particular aim of this paper is to investigate the potential impacts of adventure activities on (other) users’ experience of the natural environment.

**The Experience of Visiting a Natural Area**

What constitutes a ‘natural experience’ is not well defined in the literature. Unfortunately this particular aspect of leisure, tourism and social psychology is a subject area in which it is easy to get ‘bogged down’ and seemingly lost in attempting to define a natural area and also in understanding human perceptions of nature and ideas of naturalness (for example see, Gómez-Pompa & Kaus, 1992; Holdgate & Phillips, 1999). This is due to a combination of the complexities of human personality, an individual’s educational background, their role in society as a professional or otherwise, a person’s experience of life, hobbies and interests, cultural leanings and religion. It is thus possible to argue for hours on what is natural, the nature of a feeling and what ‘being in nature’
means to a particular person. This apparent conundrum is most importantly due to what might be regarded as the subjective nature of human experience. Furthermore, because of the many attitudes that humans hold about how a natural area might be used, there is a complex mix of conservation and use ethics that range from idealistic views on observing nature and appreciating solitude through to those individuals who maintain that nature is to be used for human pleasure and enjoyment. Such views often conflict with one another and it is also possible to have a mix of views based on a person’s pragmatic view of how humans should relate to nature.

Bearing this complexity in mind, commonsense suggests that it is possible to define the fundamental characteristics of a natural experience as three main perceptions: visual amenity (landscapes comprising natural vegetation and wildlife, authentic nature), natural soundscape (minimal human caused noise) and purity of olfaction (absence of human sourced odours). However, the centrality of a natural experience is a combination of all these things – the sights, sounds and smells – and the state of mind it induces. Table 2 (below) outlines the key characteristics of a natural experience along with factors that could be considered to detract from this experience.

<table>
<thead>
<tr>
<th>Perception of the natural environment</th>
<th>Characteristic of a natural experience</th>
<th>Detracting features and activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>Natural vegetation</td>
<td>Obtrusive buildings and structures, cleared areas, plantations, pipelines, electricity pylons, wind turbines, eroded areas, presence and spread of exotic species, presence of domestic animals, nutrient enriched algal blooms, litter, road kill, bright lights, lighting from buildings</td>
</tr>
<tr>
<td></td>
<td>Native wildlife</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unmodified streams, rivers and wetlands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural coastlines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wilderness landscapes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night sky</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aurora</td>
<td></td>
</tr>
<tr>
<td>Auditory</td>
<td>Bird song, dawn chorus, frogs during their breeding season, calls at bird colonies, cicadas, communication amongst mammals (lions, gibbons, lemurs, wolves)</td>
<td>Excessive vehicle noise, motorised boats, aircraft, generators, loud talking at hides, loudspeakers/shouting, music, machinery (chain saws), car alarms, dogs barking</td>
</tr>
<tr>
<td>Olfactory</td>
<td>Natural ecological processes: vegetation, wildflowers, humus, seashores</td>
<td>Decay from nutrient enriched algal blooms/polluted water, exhaust fumes from vehicles</td>
</tr>
</tbody>
</table>

Note: Perceptions of the natural world are primarily visual and auditory. Some stimuli are more significant in some settings than others. For example, the sound of gibbons in an Asian rainforest, (auditory), wildflowers in Western Australia (visual and olfactory) or landscapes in Antarctica (visual). In volcanic landscapes the olfactory and auditory stimulus of a fumerole can mirror that of an urban environment except that it is the combined experience of landscape and the sense of wilderness and authenticity of the volcanic landscape (environmental context) that combines to provide a natural experience.
The natural experience is often heightened if the natural experience involves a learning component. Knowing about nature is a vital component in visitor satisfaction, with environmental education and interpretation being recognised as vital components of best practice ecotourism (for example, Buckley, 2009; Fennell, 2008; Lewis & Newsome, 2003; Newsome et al., 2005; Newsome et al., 2002; Orsini & Newsome, 2005).

Bechtel (1997), Kellert (1993), and Wilson (1984) have discussed the human preference for, and interest in natural environments. Further confidence in advancing this view is indicated by surveys of natural area visitors carried out in Australia where Smith (2003), Smith and Newcombe (2005), and Smith, Newcombe, Lee, and Stoeckl (2005) found that in the southwest forests and along the northwest coastline in Western Australia, greater than 90% of survey respondents stated that their reason for visiting a natural area was to be in and enjoy natural environment. Smith (2003) found that visitors to the southwest forests wished to get away from the city (87%), enjoy outdoor activities (89%) and expressed a desire for solitude (77%). Smith and Newcombe (2005) also reported that 63% of visitors to the northwest coast stated their preferred natural area experience was a very natural to totally natural landscape with limited or no facilities.

Chin, Moore, Dowling, and Wallington (2000). in visitor surveys conducted in Bako National Park in Malaysia found that being close to nature (78%), viewing wildlife (72%), learning about nature (70%) and viewing scenery (71%) were all rated as being important/extremely important aspects of their park experience. There are examples from all over the world of the value that humans place on a natural experience and the benefits from the restorative effects of experiencing nature. When in a natural area people often seek solitude, expect to see native flora and fauna, enjoy learning about nature, do not wish to see litter and desire to be substantially free from human made noise and the visual impact of urban settings (for example, Ankre, 2009; Bentrupperbäumer & Reser, 2001, 2002, 2003; Deming, 1996; Eagles, 1992; Grau & Freimund, 2007; Hvenegaard & Dearden, 1998; O’Brien, 2005a, 2005b; Schanzel & McIntosh, 2000; Tao, Eagles, & Smith, 2004).

The Degradation of Natural Experiences as a Result of Leisure and Tourism

There is a range of activities that can degrade a natural experience to varying degrees. These include normal patterns of visitation and ecotourism, unauthorized leisure activities and sporting events and adventure races.
Normal Visitation and Ecotourism

The first group of activities that can degrade a natural experience relate to the impacts and development associated with traditional types of visitation such as sightseeing, picnicking, camping, hiking, swimming, boating and viewing wildlife. Potential problems include: crowding, excessive levels of motorised traffic, inappropriate behaviour, degradation of the site/destination, over development of tourism facilities, disturbance to wildlife, littering, trampling, erosion, damaged trees and graffiti (Buckley, 2004; Hammitt & Cole, 1998; Higham & Luck, 2007; Newsome et al., 2005; Newsome et al., 2002). Many of these impacts vary in time and space but many impacts that relate to visitor access and activity are prominent at weekends and during school and public holidays. Some of these impacts, such as trampling and erosion, are connected with legitimate activities such as hiking, mountain biking or horse riding but occur when participants do not adhere to park regulations, codes of conduct and leave trails to take photographs, collect firewood or create short cuts to access water bodies or viewing areas. Problems can also arise due to visitor conflicts on multiple use trails where, off-road vehicles, cyclists, walkers and sometimes horse riders all use the same trail facility/access network. The containment of these potential impact problems is dependent on recreation planning, visitor management, hardening of intensively used areas, visitor education, assessment and monitoring of infrastructure (for example, hiking trails), facility maintenance and the availability of resources for staffing and to undertake management programmes (Mende & Newsome, 2006; Newsome et al., 2002; Newsome, Smith, & Moore, 2008; Randall & Newsome, 2008).

Visitor surveys generally identify three main social impact problems that detract from a natural experience at the area or site people are visiting. These are crowding, noise and littering. Perhaps the most significant of these social issues is crowding which is an increasing and on-going problem in many protected areas worldwide. Crowding has been particularly studied in the North American context (for example, Manning, Freimund, Lime, & Pitt, 1996; Vaske, Donnelly, & Petruzzzi, 1996; Vaske & Shelby, 2008). Frequently associated with crowding is excessive noise, littering, damage to trees, soil erosion on paths and crowding at campsites, view-points and day use areas (for example, Ceballos-Lascurain, 1996; Clark & Stankey, 1979; Prosser, 1986). Such impacts are particularly evident in many Asian national parks where heavy visitation and mass tourism create a number of problems particularly littering in the form of paper, discarded cigarette butts,
plastic bags and bottles, tin cans and their pull-rings, food and polystyrene. Chin et al. (2000) found visitors (69% of respondents) were concerned about littering in Bako National Park, in Malaysia, a concern reported some 10 years earlier by Lucas (1990) and Watson, Williams, Roggenbuck, and Daigle (1992). in the USA. A survey conducted by Cochrane (2006) at Mt Bromo in Indonesia noted that litter was a significant detraction from a natural experience. The problem with litter is that besides the visual impact of reducing naturalness of an area the extended perceptive aspect is in that it can remind a thoughtful visitor of wastage and consumption. It may indicate a public's lack of concern for the environment and by extension give the visitor a negative impression about management concerns for the environment.

Noise can be a paradoxical situation for the protected area visitor as in many cases it is necessary to experience vehicle noise in order to access a natural area, but continual mechanised sound and traffic noise in the form of cars, off-road vehicles, buses and sightseeing aircraft, such as helicopters and fixed wing aircraft, will impact on the natural values of an area. In addition non bona-fide visitors may be using leisure craft such as jet skis and speedboats and this will pose a problem for visitors seeking a tranquil experience. The disruption of natural soundscape by noise is being increasingly recognized as a problem for those people seeking tranquility and solitude and where quiet is necessary for successful wildlife observation and a 'full' natural experience (Ankre, 2009; Cessford, 2000; Kariel, 1990; Mace, Bell, & Loomis, 1999; Newsome et al., 2005; Schwer, Gazel, & Daneshvary, 2000).

Unauthorized Activities

The second group of activities that detract from a natural experience involve unauthorized or non-approved activities such as non-approved camping, uncontrolled vehicle and horse access and the modification of existing trail networks by mountain bikers (Newsome et al., 2008; Pickering, Castley, et al., 2010; Pickering, Hill, et al., 2010; Smith & Newsome, 2002). In addition the non-approved use of road and trail networks by off-road vehicles and trail bikes (off-road motorcycles) is an on-going problem for many protected area managers around the world. Off-road motorcycles can pose a significant impact on natural values via noise, odour from exhaust fumes and trail damage. By far the biggest issue, however, has been the rapid rise of mountain bike activity especially in Europe, North America, Australia and New Zealand (see Newsome & Davies, 2009). Because of the complex nature of the mountain biking demographic and a lack of
dedicated mountain biking trails, problems have arisen with mountain bikers using hiking trails, creating informal trails and modifying existing trail networks (Newsome & Davies, 2009; Pickering, Castley, et al., 2010; Pickering, Hill, et al., 2010). The key to controlling these non-approved activities resides in two main areas. The first involves working with clubs and promoting codes of conduct and the provision of designated areas and facilities for these activities. The second involves policing and enforcement of regulations, which is dependent on funding and management capacity.

**Sporting Events and Adventure Races**

Crowding arising from the heavy patronage of a site and the operation of an event has the capacity to significantly degrade visual and auditory related natural values. The potential impacts of an organised competitive event include damage to park infrastructure such as trails, soil erosion, trampling of vegetation, disturbance of wildlife and crowding at control points, finish lines, spectator viewing sites and car parks. Such crowding may result in the extended emission of fumes from spectator support vehicles, littering and noise. It is apparent that this list of potential impacts mirrors that of all the problems recognised earlier that can arise as a result of heavy visitation and overcrowding at popular recreation and tourism sites and as a consequence of non-approved activities in protected areas.

In some locations (for example, Australia) competitive events may be required to operate according to protected area management plans and planning frameworks designed to mitigate the negative social and environmental impacts of human activity in natural areas. The event organisers usually submit an event plan or environmental management plan designed to mitigate any negative social and environmental impacts arising from the event activities. However, the incidence, severity and frequency of environmental impacts is dependent on management capacity and related issues such as staffing, staff expertise and funding to carry out necessary operations and visitor management. Activities arising from an organized event can cause additional and significant problems for management in a context where management capacity is already limited.

**A Call for Consideration, Dialogue, and Investigation**

The World’s protected areas seek to conserve natural values, ecosystem integrity and biodiversity. Protected areas also serve to mitigate land degradation and climate change, provide watershed protection and are important ecotourism destinations. Many protected
areas around the world are under some degree of stress in the form of alterations in climate, illegal hunting, introduced pathogens, feral flora and fauna and other sources of stress such as pollution and usage of water from rivers sourced in the landscape (for example, Lockwood, Worboys, & Kothari, 2006; Newsome et al., 2002).

In addition to these pressures, and the pressures brought about by a multitude of recreational activities (including opportunities for passive recreation use, wildlife observation and contemplative activities) protected areas are now faced with pressures of crowding and other problems associated with the spectrum of adventure activities that are becoming increasingly common. At the same time, these activities compromise the ability of protected areas to provide for natural experiences.

**Policy Responses**

Given existing stress, the potential for high levels of visitation and the recent rise in adventure and sporting events targeting natural areas it would be timely to consider how the suite of these activities should be managed and in particular, whether they should be encouraged. Issues for discussion should include the extent which the trend towards adventure activities will impact on destinations like in the South-East Asian region, where the number and availability of popular magazines dedicated to cars, motorcycles and mountain biking, suggest a context ripe for the expansion of the adventure tourism market. For example, Kuala Lumpur Airport is a major gateway into Asia and especially East Malaysia. Although Malaysia has many important protected areas the magazines available at airport bookshops may reflect a global trend in recreational interests that may impinge upon natural and protected areas in South-East Asia and beyond. In December 2009 in one retail outlet there were 45 magazines dedicated to cars, with cover words like four-wheel action, power, extreme, brawler and ultimate. There were 8 magazines dedicated to motorcycles and 6 to mountain biking. By contrast there were 5 magazines dedicated to travel and tourism but some of these contained material on off-road driving and mountain biking. There was a magazine titled *Action Asia* and only one magazine available that was dedicated to wildlife and the appreciation of nature.

Furthermore, the question should be posed as to whether activities such as these should be encouraged, or whether activities that foster a more passive or contemplative recreational use be strongly promoted instead. What is the consequence for protected areas of promoting socio-cultural attitudes and behaviours that foster views of the natural environment and protected areas as adventure playgrounds and de-facto sporting venues?
Will decision makers be encouraging a demographic that views the natural environment as a backdrop for activities that are indifferent to the natural values described earlier, as a place to compete rather than a place to engage in more contemplative and nature appreciation activities?

Practical responses could include the following. Firstly, permission for such activities in protected areas be declined, with passive and appropriate use - with a focus on natural soundscape, visual amenity, education and conservation – fostered instead. At the same time, alternative locations for events, such as production forest, plantations and less valuable natural areas, could be explored. This response could be presented to the public in terms of the risks of negative impacts (crowding, user displacement) in a context where only 10-15% of most countries is protected and natural values must be preserved.

Alternatively, areas within parks might be designated for adventure use as part of a recreational opportunity spectrum. A key point for consideration could be the likely displacement of natural experience users and the possibility that such a decision ‘opening the door’ for a plethora of activities that are not respectful of natural values. In the case of this second scenario, the use environmental impact assessment (EIA reporting) and auditing could be considered. Part of the environmental assessment could explore the management capacity to control impacts and the social implications of hosting a the number of events in a specific area per year. In addition to this, an exploration of the idea of event organisers having to bid for approval on the basis of the quality of their environmental management programs and an analysis of the influence of profits on decision-making. It is also possible that event organisers might target locations around the world that may have less rigorous environmental approvals programs if local controls are perceived as too stringent and restrictive. Moreover, discussion should include the possible value of compulsory education, for organisers and participants, that would focus on why we designate protected area and on why we need to protect natural values; the possibility that event organizers be required to fund conservation projects, ranger positions, trail maintenance and rare species recovery projects.  

Research questions

A number of social research questions arise from this discussion that would aid in the decision-making process and formulation of an events policy. For example:

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1 Information could be mailed out to participants before an event in addition to the targeted use of on-site interpretive programs.
1. What attitudes do event organisers and competitors hold towards the natural environment? What impressions does the traditional contemplative user have on an event taking place in the area that they visit?

2. Where existing adventure and sporting activities already take place in a protected area what is the quality of management undertaken by event organisers?

3. To what extent do people who compete in such events undertake their training in local natural settings in order to gain experience of future field conditions?

4. What is the capacity to manage events in protected areas, especially in relation to defining a baseline for social and biophysical conditions that can then be effectively audited? What key performance indicators can be used to assess whether a particular protected area can absorb the impacts of a particular event.

**Conclusion**

The increase in interest in the use of protected areas for more action-based, endurance-style activities is a cause for concern as such recreational activities and organised events have the potential for significant negative impacts. In particular, the activities have the potential to impact on the experience of other users who are interested in enjoying the natural values of the area and they cause additional and significant problems for management especially in a context where management capacity is already limited. The increasing popularity and pressures of adventure-style activities, and their impacts, requires a discussion about how these activities should be managed and whether they should be encouraged in protected areas. Underscoring this discussion is the question of the appropriate use of protected areas and the possibility of excluding adventure activities in favour of the promotion of more passive, contemplative uses.

**References**


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Changing Recreational Emphasis and the Loss of ‘Natural Experiences’ in Protected Areas: An Issue that deserves Consideration, Dialogue, and Investigation

Newsome, D. & Lacroix, C.


The Panel on the Ecological Integrity of Canada’s National Parks: Ten Years Later

Paul F. Wilkinson*

Abstract

In 1988, Canada’s National Parks Act was amended to require that “maintenance of ecological integrity through the protection of natural resources shall be the first priority when considering park zoning and visitor use in a management plan” for Canada’s national parks. Ten years later, the Minister of Canadian Heritage formed the Panel on the Ecological Integrity of Canada’s National Parks (PEICNP) to examine the extent to which that mandate had been implemented and to make recommendations on how that mandate could be furthered. In March 2000, the Panel’s report was released by the Minister with a promise to implement each of its 127 recommendations if they were legally and financially feasible. This paper focuses on monitoring the implementation of those recommendations and the events and public literature of Parks Canada in the ten years following the report’s release, including the strengthening of the ecological integrity mandate in a new Canada National Parks Act (2001). It demonstrates that, while not all of the Panel’s recommendations have been implemented, there has been considerable progress, despite serious geopolitical and economic problems and changing governments, in such areas as funding for ecological integrity, establishment of new national parks, visitor information, and park management procedures. The impact on legislation in Ontario dealing with provincial parks will also be examined.

Keywords: ecological integrity, state of the park report, management plan, national park, provincial park, Canada, Ontario

The Mandate and Operation of the Panel

In November 1998, the (then) Minister of Canadian Heritage, the Hon. Sheila Copps, appointed the Panel on the Ecological Integrity of Canada’s National Parks. The impetus arose from 1988 amendments to the National Parks Act which specified that “maintenance

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of ecological integrity through the protection of natural resources shall be the first priority when considering park zoning and visitor use in a management plan.” Previously, some people mistakenly argued that Parks Canada\(^2\) had a dual mandate for national parks: visitor use and keeping the parks unimpaired for future generations of “presumably” humans. This debate was statutorily ended by the amended Act’s legislative requirements that ecological integrity and resource protection are the first considerations when managing a park.

Despite this mandate, only one of the (then) 38 national parks\(^3\) was considered to be in pristine condition (i.e., Vuntut National Park), while 31 parks reported ecological stresses ranging from significant to severe and 13 parks reported increased stress intensity since 1992 (Parks Canada, 1998). In an earlier performance audit of Parks Canada, the Auditor General of Canada (1996) expressed concern about Parks Canada’s implementation of the ecological integrity mandate resulting from the 1988 amendments and stated that Parks Canada needed to demonstrate that it had indeed put ecological integrity as the first priority.

In 1997, the governing Liberal Party of Canada (1997) announced in its election platform that, in response to the Auditor General’s concerns, it was committed to establish an expert panel to monitor whether Parks Canada had put ecological integrity as the first priority and to provide advice on maintaining the ecological integrity of Canada’s national parks. In November 1998, the Minister appointed an 11-member panel with expertise related to various aspects of the theory and practice of protected area management, in general, and national parks, in particular. This expertise included conservation, environmental policy, ecology, Aboriginal peoples\(^4\), forestry, landscape architecture, regional planning, and tourism and recreation planning in academic, civil service, private...

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1. The author gratefully acknowledges that the first two sections of this paper are based on the work of all of the members of the Panel on the Ecological Integrity of Canada’s National Parks, including the author. Any errors or omissions are, however, solely the fault of the author.

2. Under the Parks Canada Agency Act (1998), the Parks Canada Agency is a Crown Corporation reporting to a federal minister (now the Minister of the Environment). It has three operating sections: National Parks, National Historic Sites, and National Marine Conservation Areas.

3. As of February 2011, there were 44 national parks, with several new parks in various stages of planning and implementation. Parks Canada (2009a) provides a map of the 39 terrestrial ecoregions into which Parks Canada has divided the land base of Canada, and shows the then 42 national parks and several proposed national parks.
The Panel’s objectives were “to identify issues, examine Parks Canada’s approach for maintaining ecological integrity, and provide recommendations for improvement” (PEICNP, 2000a, p. 2). The Panel proposed to define ecological integrity as follows: “an ecosystem has integrity when it is deemed characteristic for its natural region, including the composition and abundance of native species and biological communities, rates of change and supporting processes” (PEICNP, 2000b, pp. 1-15).

The Panel members travelled to nine representative national parks (i.e., Riding Mountain, St. Lawrence Islands, La Mauricie, Fundy, Pacific Rim, Waterton Lakes, Wood Buffalo, Georgian Bay Islands, and GrosMorne) to speak with park staff, other government officials, representatives of Aboriginal groups, non-governmental organizations, representatives of industry, and other interested Canadians, in order to see first-hand the problems and stresses that threaten Canada’s national parks and to develop a sense of how to address these problems. The Panel’s operations were monitored by a team from the Office of the Auditor General. The Panel’s report (PEICNP, 2000a, 2000b) was submitted to the Minister in February 2000 and made public by her on March 23, 2000. In releasing the report, she stated that she had accepted all 127 recommendations made by the Panel and would see that they were implemented if they were legally and financially feasible. Subsequently, members of the Panel had a number of follow-up meetings and made presentations to various organizations.

The Panel’s Recommendations

The Panel’s recommendations dealt with a wide range of issues related to Parks

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4 In Canada, the term “Aboriginal peoples” refers to three officially recognized groups of people. First Nations peoples are the indigenous peoples of Canada who are not Métis or Inuit; they are recognized constitutionally by The Constitution Act (1982) as nations. Métis are descendants of mixed ancestry of First Nations persons and Europeans involved in the fur trade in the 17th to 19th centuries. Inuit are a group of culturally similar indigenous peoples inhabiting the Arctic region of Canada. While the word “Indian” is still a legal term, its use is erratic and in decline in Canada; the term may be regarded as being offensive.

5 Wilkinson and Eagles (2000) argue that the concept of biodiversity is consistent with that of ecological integrity and may be considered to be synonymous to a high degree. Ecological integrity, like biodiversity, is a fundamental concept to maintaining and supporting species, ecosystems, and landscapes. It is arguably a cornerstone concept linking both the phenomenological and analytical aspects of the ecological sciences (Regier, 1993.)
Canada’s organizational culture, learning capacity, planning, moving from parks as islands to parks as parts of networks, working with partners, Aboriginal peoples, visitor use and the minimization of negative impacts on ecological integrity, interpretation and marketing, and reducing the ecological footprint of park facilities and operations. The Panel also presented a number of pre-conditions that needed to be undertaken before the Panel would support increased funding for the preservation and maintenance of ecological integrity by Parks Canada, including:

- the appointment of a national Director-General of Ecological Integrity
- development of an Agency Charter centring on ecological integrity
- a training program for all Parks Canada employees on ecological integrity
- revised planning guidelines to make ecological integrity the first priority in management plans
- re-orienting the public relations (marketing) department away from promoting mass tourism marketing to social marketing, policy marketing, and demarketing with messages focussing on ecological integrity
- increasing budget transparency
- development of a long-term strategic plan to strengthen re-orientation of Parks Canada towards the ecological integrity objective (PEICNP, 2008b).

The Panel recommended increased funding for Parks Canada to undertake its recommendations over a five-year period. (see Table 1.) In contrast to past practice in which the establishment of new national parks did not necessarily mean an increase in Parks Canada’s budget, the Panel also recommended that separate and adequate funding be provided for the establishment of new national parks.

<table>
<thead>
<tr>
<th>Investment Area</th>
<th>Five Year Total ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and Planning Capacity</td>
<td>136.8</td>
</tr>
<tr>
<td>Active Management</td>
<td>37.0</td>
</tr>
<tr>
<td>Ecological Monitoring</td>
<td>15.5</td>
</tr>
<tr>
<td>Interpretation and Education</td>
<td>35.0</td>
</tr>
<tr>
<td>Aboriginal Peoples</td>
<td>19.0</td>
</tr>
<tr>
<td>Partnerships</td>
<td>85.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>328.3</strong></td>
</tr>
</tbody>
</table>


In addition, the Panel recommended changes in the internal profile of park staffing for three reasons: personnel loss due to past budget cuts, the pending retirement of a large
proportion of current staff, and the need for additional professional staff in natural sciences, social sciences, planning, ecological design, Geographic Information Systems and data management in order to meet the ecological integrity mandate. (see Table 2.)

Table 2. Professional Staff Needed to Meet the Ecological Mandate

<table>
<thead>
<tr>
<th>Organizational Area</th>
<th>Natural Science</th>
<th>Social Science</th>
<th>Other Disciplines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PhD  Masters</td>
<td>PhD  Masters</td>
<td>Planner</td>
</tr>
<tr>
<td>Small parks, minor to moderate ecological and social issues&lt;sup&gt;1&lt;/sup&gt;</td>
<td>at least 2</td>
<td>at least 3</td>
<td>at least 1</td>
</tr>
<tr>
<td>Large parks with minor to moderate issues&lt;sup&gt;2&lt;/sup&gt;</td>
<td>at least 1</td>
<td>at least 3</td>
<td>at least 1</td>
</tr>
<tr>
<td>Small parks with difficult internal and external issues&lt;sup&gt;3&lt;/sup&gt;</td>
<td>at least 1</td>
<td>at least 4</td>
<td>at least 1</td>
</tr>
<tr>
<td>Large parks with difficult internal and external issues&lt;sup&gt;4&lt;/sup&gt;</td>
<td>at least 1</td>
<td>at least 12</td>
<td>at least 2</td>
</tr>
<tr>
<td>Regional Service Centres&lt;sup&gt;5&lt;/sup&gt;</td>
<td>at least 3</td>
<td>at least 6</td>
<td>at least 1</td>
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<td>National Office&lt;sup&gt;6&lt;/sup&gt;</td>
<td>at least 4</td>
<td>at least 10</td>
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Note: <sup>1</sup> such as Waterton, Terra Nova, Fundy; <sup>2</sup> such as Prince Albert, Wapusk, Nahanni; <sup>3</sup> such as Revelstoke, Georgian Bay, Point Pelee; <sup>4</sup> such as Banff, Jasper, Riding Mountain; <sup>5</sup> Regional Service Centres also require at least one senior negotiator for federal-provincial issues; <sup>6</sup> National Office also requires one person in the role of Chief Scientist or Director of Ecological Integrity, plus one Chief Social Scientist.

Parks Canada's Response

In response to the Panel's report, Parks Canada (2000) issued an action plan which in effect accepted the Panel's recommendations, including its pre-conditions for additional funding, and stated how it would follow up on the recommendations. In January 2001, the former members of the Panel wrote to the Minister indicating that Parks Canada had met its pre-conditions (as noted above). Parks Canada subsequently initiated the request for the funds recommended by the Panel from the Government of Canada.

On February 19, 2001, the new Canada National Parks Act was proclaimed. It included a much stronger commitment to ecological integrity than in the 1988 amendments:
“maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks.” The Act’s definition of ecological integrity was similar to that proposed by the Panel: “with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.” Parks Canada recognizes that the characteristics of ecological integrity will be unique for each national park, an issue which is to be addressed in individual park management plans through suites of indicators of ecological integrity (see Table 3) that will be monitored and evaluated over time through adaptive management (S. Woodley, personal communication, 2010).6

In March 2001, Parks Canada (2001) released First Priority: Progress Report on Implementation of the Recommendations of the Panel on the Ecological Integrity of Canada’s National Parks, which provided detailed information on its progress to date on each of the recommendations and plans for next steps.

Unfortunately, the events of September 11, 2001, in the United States and the subsequent international upheaval threw all Government planning into a state of chaos. For some time, virtually all new activities were put on hold while the Government dealt with internal security and international issues. It was not until March 24, 2003, that the Minister (Copps, 2003) announced in a Press Release as follows:

Close to $220 million over 5 years has been secured to create 10 new national parks and 5 new national marine conservation areas (NMCAs) and to improve the ecological integrity in Canada’s 39 existing national parks. Furthermore, an additional $54 million has been secured in ongoing funding.

More specifically, over 5 years, Parks Canada will receive $144 million for the establishment of 10 new national parks and 5 new NMCAs and $75 million to improve ecological integrity. The Minister also reconfirmed the one-time supplementary funding of $138 million between 2001/2002 and 2004/2005 provided to Parks Canada to renew its heritage and visitor facilities. (Emphasis added)

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6 With most national parks now having post-Panel management plans, a content analysis of those plans is currently being undertaken by the author to examine whether such monitoring and evaluation has been proposed.
### Table 3. State of Ecological Integrity in National Parks

<table>
<thead>
<tr>
<th>National Park</th>
<th>Land Species Diversity</th>
<th>Predator-Prey Species Loss</th>
<th>Plant Growth</th>
<th>Forest Fires</th>
<th>Developed Area</th>
<th>Population Density</th>
<th>Internal Roads</th>
<th>Water Quality Stress or Water Quality Stressors</th>
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<td>P</td>
<td>F</td>
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<td>G</td>
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<td>P</td>
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<td>P</td>
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<td>G</td>
<td>G</td>
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</tr>
</tbody>
</table>

Source: Parks Canada (2007)

Legend: G = Good; F = Fair; P = Poor; I = an improvement in ecological integrity; D = a decline in ecological integrity; U = a previously un-rated aspect of ecological integrity; R = a revised assessment based on previously unavailable information; n/a = measure is not applicable
The Minister also promised $25 million/year after these five years for ecological integrity. This announcement, therefore, not only provided funding for ecological integrity, but also dealt with the Panel’s recommendation about additional funding for the establishment of new parks.

Plans for new national parks proceeded, with Gulf Islands National Park Reserve\(^7\) and Ukkusiksalik National Park being declared in May 2003, followed by Torngat Mountains National Park Reserve in January 2005. In December 2003, Parks Canada was moved from the Department of Canadian Heritage to the Department of Environment.

As recommended by the Panel, Parks Canada began to hire park planners\(^8\) (see Table 2) and to support more of its staff to return to university for graduate education.

In early 2004, there was a federal government hiring freeze and budget cuts were threatened (Scratch, 2010). The Federal Budget of January 25, 2005, however, was extremely positive for Parks Canada (Department of Finance, 2005). It promised $209M over five years and $75M per year thereafter to protect National Historic Sites and to rehabilitate visitor facilities and interpretive assets in National Parks and National Marine Conservation Areas; while the existing budget for these matters had been $40M annually, the long-term annual permanent funding would be expanded to $115M. There was to be an additional increase of $60M over five years and $15M per year thereafter to implement the Parks Canada Action Plan in response to the EI Panel Report. This was in addition to the $75M over five years and $25M per year thereafter allocated in 2003. Overall, since 2002, Parks Canada had secured an increase of more than half a billion dollars over five years to its budget and an annual permanent increase of $155M or 42% of its 2002/2003 budget. The Budget also announced the results of an Expenditure Review Exercise for the entire federal government: Parks Canada was one of the very few organizations that were exempted from any further expenditure reductions (which averaged 5% for other organizations) in this budget period.

Parks Canada and its ecological integrity mandate continued to be monitored by the Auditor General: on October 3, 2005, the Commissioner of the Environment and

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\(^7\) In Canada, a national park is designated as a “National Park Reserve” if there are outstanding Aboriginal land claims on all or part of the park that have not been resolved.

\(^8\) At the time of the founding of the Panel, Parks Canada had only one employee who held the designation of “Registered Professional Planner” with the Canadian Institute of Planners.
Sustainable Development\(^9\) (CESD, 2005) reported to Parliament on a performance audit of 12 national parks. The report noted that significant ecological integrity issues were being addressed through monitoring and restoration, but that there were gaps in how these activities are planned and managed. For example, six of the 12 park management plans examined were not up-to-date and annual reports on the implementation of plans were not being produced on a regular basis by all parks. Moreover, objectives for enhancing public education were lacking at the park level. For example, results of monitoring and restoration were not being used to full advantage in communications. On the other hand, the new funding announced in 2003 was evaluated as allowing implementation to improve monitoring and restoration and their use in enhancing public education and visitor experiences. Finally, the State of the Parks Reports (which had been recommended by the Panel) needed to report more consistently on changes and trends in the state of parks over time.

By mid-2005, Parks Canada’s hiring program was having visible signs of effect. For example, a Chief Social Scientist was hired, as were other social science staff.

In the November 2005, Parks Canada published a follow-up report to its *First Priority* (Parks Canada, 2001), which had reported on actions taken in the first year after the Panel made its recommendations. *Action on the Ground: Ecological Integrity in Canada’s National Parks* (Parks Canada, 2005) presented 22 case studies of projects related to the Panel’s recommendations, e.g., restoring the integrity of aquatic ecosystems in the Mountain Parks,\(^{10}\) battling invasive species in Garry oak ecosystems, a new “ecoscape” learning centre in Fundy National Park, and working with regional partners on wood turtle recovery in La Mauricie National Park. Alan Latourelle, Chief Executive Officer of the Parks Canada Agency, stated that

“We now have the resources we need to build on the success described in these projects, and to employ the lessons we have learned from them across our national parks, national marine conservation areas, and to some extent, the national historic sites system. The projects describe some of the significant milestones we have

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\(^9\) Amendments to the federal *Auditor General Act* in 1995 created the CESD within the Office of the Auditor General, with a mandate to report on matters related to the environment and sustainable development. The CESD, therefore, is now the unit responsible for doing performance audits on Parks Canada with respect to ecological integrity, in particular.

\(^{10}\) This is the official name for the seven national parks in Alberta and British Columbia that are located in the Rocky Mountains.
reached on our ecological integrity journey, including: making ecological integrity central to park management; collaborating with Aboriginal peoples and allowing them to practice traditional activities in national parks; developing ecological integrity training programs for employees; increasing dialogue with other levels of government and federal agencies to promote cooperative ecological integrity activities; raising awareness of the ecological integrity challenges facing national parks to engage Canadians in their conservation; and initiating public education projects. **We also set new standards for park management plans, which now include long-term ecological integrity visions, as well as ecological integrity objectives and indicators (Parks Canada, 2005, p. 1) (emphasis added).***

Despite the wording of the title of the report, however, it did not present an overall analysis of how management for ecological integrity had been implemented to date on either a system-wide basis or an individual park basis.

Soon after, the Liberal Government was defeated in the federal election on January 26, 2006; the minority Conservative Government was sworn in on February 23, 2006. One might have predicted that the Conservative Government, which has come to be regarded as not being strong on environmental issues, would not pay much attention to national parks, in general, let alone ecological integrity. On the contrary, new national parks and new NMCAs have been established and proposals for additional parks and NMCAs have been developed at an almost unprecedented rate. Similarly, Parks Canada itself continues to stress its focus on ecological integrity in numerous plans and policy statements.

For example, in its **Corporate Plan 2006/07 - 2010/11**, Parks Canada (2006) stated its objectives for the medium-term future as follows. **First**, a majority of parks were expected to produce their first State of the Park Report\(^{11}\) between April 2006 and March 2008. In fact, only 11 had completed a State of the Park Report by December 2009 (Banff, Glacier, Grasslands, Jasper, Kluane, Kootenay, Mt. Revelstoke, Pacific Rim, Point Pelee, Waterton Lakes, and Yoho [Parks Canada, 2009b]) and no more have been completed since then. Each of these reports judged the level of ecological integrity in that particular park to be

\(^{11}\) Each park is required to produce a State of the Park Report every five years, prior to the production of a new (or revised) park management plan. This was a recommendation of the Panel that was implemented, the first report being produced in 2006 by Point Pelee National Park (2006).
“fair.” (See Table 4.)

Table 4. Parks Canada Documents Available on the Internet or Received

<table>
<thead>
<tr>
<th>Park</th>
<th>Management Plan</th>
<th>State of the Park Report</th>
<th>2009 Visitor Information Received (Y) (EI Mentioned?)</th>
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<td></td>
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<tr>
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</tr>
<tr>
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<tr>
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<td>Ukkusiksallik NP</td>
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<td>Wapusk NP</td>
<td>2007</td>
<td></td>
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<tr>
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<td>2010</td>
<td>2008 (EI fair)</td>
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<tr>
<td>Wood Buffalo NP</td>
<td>2010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yoho NP</td>
<td>2010</td>
<td>2008 (EI fair)</td>
<td></td>
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</tbody>
</table>

Note: * There is a joint State of the Park Report for Glacier NP and Mt. Revelstoke NP.
The State of the Park Reports have a more or less standardized format, although their length and level of detail vary greatly, apparently due to such factors as size of the park, staffing levels, and availability of data. For example, the Banff report (Banff National Park, 2008) is 54 pages long, while the Grasslands report (Grasslands National Park, 2007) is only seven pages; this range fairly represents the difference between a relatively large park with complex ecosystems and a large number of visitors and a relatively small park with basically one ecosystem and few visitors. As an example of the contents of these reports, the Banff report provides chapters on an introduction to the vision for the park and its setting; assessment and evaluation methods for resource protection indicators and connection to place indicators; an assessment of ecological integrity, cultural resource management, heritage resources, visitor experience, public education, and connection to place; common Mountain Park issues; evaluation of management action; and issues for consideration in the management plan review.

Second, there were to be fully functioning monitoring and reporting systems for ecological integrity for all national parks by March 2009. In fact, this did not happen, but preliminary ecological integrity ratings are available (Parks Canada, 2007). (See Table 3.) A suite of nine indicators in four areas of stress are rated as “good”, “fair” or “poor”: land species (diversity, predator-prey, species loss), land processes (plant growth, forest fires), land stressors (developed area, population density, internal roads), and water stressor (water quality). Given the vast differences among the parks in terms of such variables as size, geographic location, proximity to large human populations, etc. and the imprecise rating categories, it is difficult to draw meaningful conclusions from these ratings. Of the 318 individual ratings in the matrix, 193 (60.7%) were “good”, 92 (28.9%) “fair”, and only 33 (10.4%) “poor” — giving the subjective impression that ecological integrity was “good” in the national park system as a whole and in most individual parks.

If the picture presented in Table 3 were indeed accurate, there would have to have been a remarkable decline in the levels of stress being suffered by Canada’s national parks since 1996. Only one of the (then) 36 national parks was considered by the staff of the individual parks to be in pristine condition in 1996, while 31 reported ecological stresses ranging from significant to severe and 13 reported increased stress intensity.

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12 Note that some of the indicators have not yet been studied in relatively new national parks (e.g., land species diversity in Gulf Islands National Park), while other indicators do not apply to specific national parks (e.g., the forest fire indicator is not relevant to parks in the High Arctic because they are tree-less).
since 1992 (Parks Canada, 1998). The suite of indicators used in those ratings was much more extensive, involving 29 stressors split into three categories: internal sources (park infrastructure, park management practices), external and internal sources (heavy metal pollution, ground level ozone, exotic micro-organisms, acidic precipitation, vehicle/animal collisions, exotic vertebrates, climate change, poaching, commercial fishing, exotic fish, exotic birds, exotic mammals, sewage, pesticides, human disturbance, solid waste, petrochemical pollution, dams, sport fishing, exotic vegetation, urbanization, visitor/tourism facilities, transport/utility corridors), and external sources (sport hunting, mining, agriculture, forestry).

Moreover, the preliminary ecological integrity ratings in Parks Canada (2007) are not consistent with the conclusions of the 11 individual State of the Park Reports which were available as of December 2009: each of these reports concluded that the ecological integrity of that particular park was “fair.” Clearly, a detailed analysis of each park’s State of the Park Report and management plan is warranted to reach a meaningful conclusion on the level of ecological integrity in each park.

Third, park management plans that are up-to-date and consistent with Park Canada’s latest management plan guidelines were to be in place for each park by March 2010. In fact, by December 2009, only 32 had been completed or revised after the Panel’s Report was released: Aulavik, Auyuittuq, Banff, Cape Breton Highlands, Elk Island, Fundy, Georgian Bay Islands, Glacier, Grasslands, GwaiiHanaas, Ivvavik, Jasper, Kejimkujik, Kluane, Kootenay, Kouchibouguac, La Mauricie, Mingan Archipelago, Mt. Revelstoke, Nahanni, Pacific Rim, Point Pelee, Prince Albert, Prince Edward Island, Riding Mountain, St. Lawrence Islands, TuktutNogait, Vuntut, Wapusk, Waterton Lakes, Wood Buffalo, and Yoho. Another four parks state that a management plan is under development, but give no schedule. Finally, three parks have recently been declared and no schedule for developing a plan is available.

Parks Canada, therefore, might appear to be on track to meet this objective; however, a State of the Park Report for each park is supposed to be published (every five years) prior to the development of a new or revised management plan:

*The “state of” report is a fact-based document. It provides a synopsis of the current condition of a NP ... and assesses performance in meeting established objectives for indicators associated with the Agency’s mandate. It is the responsibility of the FUS [Field Unit Superintendent] to produce these reports every*
The “state of” reports and the internal analysis are the basis for the scoping document and five-year management plan review.

The purpose of the “state of” report is to:

- portray the state of ... ecological integrity or ... ecological sustainability, and connection to place;
- report on what we have done to maintain or improve that state. This includes the results of management actions in respect of resource protection for natural and cultural resources, visitor experience and public education;
- serve as a tool for informed decision-making with respect to issues associated with each of the mandate elements and their inter-connection; report back to the CEO on the state of the heritage place every five years; and
- communicate the state of the protected heritage place to a wide public audience. (Parks Canada, 2008a, p. 20)

Twenty-four parks have a post-2000 management plan in place, but no State of the Park Report. Four parks state that they are developing a new or revised management plan, but do not have a State of the Park Report. Only 11 parks have a management plan pre-dated by a State of the Park Report. (See Table 4.) This situation seems to be largely a cart-before-the-horse scenario and is contrary to Parks Canada’s stated policy.

As with the State of the Park Reports, management plans have a more or less standardized format, although their length and level of detail varies greatly, apparently due to such factors as size of the park, staffing levels, and availability of data. For example, Grasslands National Park’s (2010) management plan is a 67-page document that provides information on the plan review process and public participation, park themes, the planning context, the State of the Park in 2007, park purpose and vision, key strategies, area management approaches, partnering and public engagement, zoning and other park land classifications, park administration and operations, monitoring and reporting on the State of the Park, management plan implementation, and strategic environmental assessment.

Fourth, aspects of the state of ecological integrity are to be improved in each national park by March 2014. Only time will tell if this rather ephemeral objective will be achieved.

Expansion of the national park system continued. In 2008, Nahanni National Park Reserve was increased in size to approximately six times its original area. An additional $10M was budgeted in September 2008 to expand the boundaries of the Gulf Islands
National Park Reserve through land acquisition. Mealy Mountains and Sable Island National Parks were declared in 2010. Public discussions are currently taking place on the addition of part of Bowen Island to Gulf Islands National Park and on proposed new national parks at Wolf Lake in the Yukon, Thaydene Nene and Nááts’ihch’oh in the Northwest Territories, South Okanagan-Lower Similkameen in British Columbia, and the Manitoba Lowlands (Parks Canada, 2010). Similarly, the hiring of new and increased staff is apparent. For example, in February 2010, 25 new jobs in external relations and visitor experience were posted on the Parks Canada website; similar postings are expected for 2011.

In response to the Commissioner of the Environment and Sustainable Development’s (2005) call for Parks Canada to periodically produce public-interest documents that report on improving or maintaining ecological integrity, Parks Canada (2008a) published *Action on the Ground II* in December 2008. Several of the stories in the report deal with progress since they were initially presented in the 2005 *Action on the Ground*, but the majority of the stories are new. Chapter 1 sets the context for these actions by discussing the mandate of Parks Canada with respect to ecological integrity. Chapter 2 presents actions in various parks to establish an ecological integrity monitoring and reporting program through the State of the Park Reports that are required of each national park every five years. Chapters 3 and 4 present stories of efforts to actively manage for the protection and recovery of floral and faunal species at risk (e.g., Blanding’s turtle at Kejimkujik National Park) and the restoration of ecological integrity (e.g., prescribed fire in Kootenay National Park, re-introduction of plains bison in Grasslands National Park). Finally, Chapter 5 summarizes some of the lessons learned from actions to date (e.g., the importance of using Western ecological knowledge, social science, and Aboriginal Traditional Knowledge) and invites Canadians to partner with Parks Canada in expanding the scope and reach of these activities. As with the 2005 report, however, this report does not present an overall analysis of how management for ecological integrity had been implemented to date on either a system-wide basis or an individual park basis.

Moreover, the purported intention of Parks Canada’s (2005, 2008a) two *Action on the Ground* reports to provide Canadians with information about the maintenance and preservation of ecological integrity does not match their commitment on the ground to provide visitors to particular parks with such information. Of the (hard-copy or e-copy) material prepared for visitors in 2009 to 39 individual national parks that were available to
the author following a written request to each national park, only 11 included material that mentioned ecological integrity and few provided more than a cursory statement of its importance. (See Table 4.) A summary of the results of a content analysis (Krippendorff, 2004) of this material is discussed below.

### 2009 Visitor Information Material

As noted above, visitor information for only 11 of 39 parks actually mentioned ecological integrity, despite Parks Canada’s stated commitment to inform visitors about its primacy. In fact, at least one park got the message totally wrong. Brief summaries of some of the findings for individual parks are as follows.

- Despite including a copy of the Parks Canada Charter which clearly states “Our Commitments” to “To protect, as a first priority, the natural and cultural heritage of our special places and ensure that they remain healthy and whole” (Wood Buffalo National Park, 2009, p. 16), Wood Buffalo National Park’s information booklet includes an introductory article entitled “Integrated mandate: education, visitor experience and protection” (Keizer, 2009, p. 3) which states that “To assist Parks Canada’s management of its responsibilities the mandate was organized into three key integrated areas: Education ... Visitor Experience ... Protection.” The term “ecological integrity” is not included in the section on “Protection”:

  Parks Canada is required to leave the areas it manages for Canadians unimpaired for future generation to use and enjoy. This is a significant challenge with environmental changes, growth and changing needs of visitors.

  These statements are a re-statement of the “myth of the dual mandate” of use and preservation that was formally de-bunked by the 1988 amendments; in fact, they directly contradict the clear legal requirement in the Canada National Parks Act that ecological integrity is the first priority.

- Similarly, Yoho National Park (2009) repeats the dual mandate—but it at least clarifies that ecological integrity is “first”:

  Parks are here for two things: use and preservation. Stiffer provisions contained in 1988 amendments to the National Parks act give priority to the “maintenance of ecological integrity through the protection of natural
resources,” emphasizing the fact that Canada's national parks need protection first.

It is unclear why the 1988 amendments and not the 2001 Canada National Parks Act which strengthens ecological integrity as the first priority are quoted.

- Quttinirpaaq National Park (2009) also uses the 1988 amendments, stating that “Maintenance of ecological integrity will be the first consideration in management planning.” Both Quttinirpaaq and Auyuittuq National Park (2009) state that “Parks Canada will ensure the Preservation and protection of the unique and significant natural and cultural resources and the ecological and cultural integrity” of the park.

- In contrast, some parks do present the correct message, usually in simple terms that can be easily understood by visitors.

- TuktutNogait National Park (2009) quotes the relevant section of the Canada National Parks Act and then discusses the meaning of ecological integrity in the context of the park.

- The introductory statement of Robert Sheldon, the Superintendent of Kouchibouguac National Park (2009, p. 2), is as follows:

  At Parks Canada, our goal is to preserve and protect the health of the ecosystems in National Parks. This is called ecological integrity. In Kouchibouguac, through science, protection and education, we are committed to reach this goal. (emphasis added)

- La Mauricie National Park (2009) states that “the objective of a national park is to ensure or to restore the ecological integrity of the different ecosystems present” and goes on to detail actions taken as a result of its “From Log to Canoe” ecological integrity restoration program.

- Prince Edward Island National Park (2009, p. 11), in a section on “Ecosystems and Ecological Integrity”, states as follows:

  Maintaining ecological integrity: To ensure sustainability of our Park, we must view the natural environment as a whole, and consider the interactions and changing nature of ecosystems as well as their ability to withstand human
It then describes the importance of its ecological monitoring program.

- Similarly, Gulf Islands National Park Reserve\textsuperscript{13}(2009) states the importance of ecological integrity and monitoring.
- After providing a lay definition of ecological integrity, Kluane National Park Reserve (2009) stresses the importance of partnering with First Nations to fulfil its responsibilities.
- Wapusk National Park provides a detailed statement of the importance ecological integrity monitoring and reporting (Stewart, 2008, p. 15).
- Waterton Lakes National Park has several fact sheets that discuss such topics as ecological initiatives, transboundary challenges (including a reference to the new \textit{Act}), and history highlights. The latter fact sheet (Waterton Lakes National Park, 2009, p. 24) contains the only reference to the Panel of all the visitor material examined.
- Ironically, the best and most voluminous information on ecological integrity issues is provided by St. Lawrence Islands National Park—the smallest national park (8.7 km\textsuperscript{2}). Although the term itself is mentioned in several publications, there are no definitions of it or references to the \textit{Act}. For example, the seasonal newspaper, \textit{The Pine Pitch Post}, mentions the term only once (St. Lawrence Islands National Park, 2009a, p. 2), but contains numerous related articles, e.g., on road-kill, fire, the park management plan, education programs, First Nations, Lyme disease, deer over-population, regional land management, turtles, bird census, invasive species, species at risk, feeding wildlife, composting toilets, etc. There are also separate broadsheets on species at risk, particularly turtles and plants (St. Lawrence Islands National Park, 2009b, 2009c).

With these results and the absence of ecological integrity in the material of the other 28 parks that provided visitor information material, the conclusion is both obvious and simple: with a few exceptions, most Canadian national parks are not communicating the ecological integrity message to visitors.

\textsuperscript{13}With the settlement of land claims in 2010, Gulf Islands is now a National Park.
Ecological Integrity in Ontario Parks

The strengthening of Parks Canada’s ecological integrity mandate did have a direct impact on at least one other jurisdiction. After much lobbying for new legislation to mirror the national park priority on ecological integrity, including by the Wildlands League (the Southern Ontario branch of the Canadian Parks and Wilderness Society), the Province of Ontario replaced its *Provincial Parks Act*, which was enacted in 1954 when Ontario had only eight provincial parks; that act emphasised the tourism and recreation function of parks and, not surprisingly given the state of ecological knowledge of the time, virtually ignored natural systems and processes (Wilkinson & Wilkinson, 2005). With 315 provincial parks, the Provincial Legislature passed the *Provincial Parks and Conservation Reserves Act* in 2006, which states that “Maintenance of ecological integrity shall be the first priority and the restoration of ecological integrity shall be considered” in “all aspects of the planning and management of Ontario’s system of provincial parks and conservation reserves.”

The Environmental Commissioner of Ontario (2009) has praised this new law, although he stated that it is not without its flaws. Concerns included: not always giving ecological integrity top priority, managing the system on a cost-recovery basis, inadequate funding for Ontario Parks, failure of the provincial government to take a greater ecosystem approach to their management, and the need to systematically address/phase-out non-conforming activities.

While the Province of Ontario is to be commended for following the lead of Parks Canada in making ecological integrity the first priority in the planning and management of the province’s provincial parks and conservation reserves, it should be noted that no funding to meet this mandate has been allocated to Ontario Parks, an agency which clearly suffers from constraints on both personnel and funding, much more so, in both absolute and relative terms, in comparison with Parks Canada. Without such funding, Ontario Parks will not be able to meets its new mandate.

Conclusion

Clearly, Parks Canada is demonstrating its commitment to the ongoing growth in the number of national parks and the continuing emphasis on ecological integrity – in theory at least, in policy statements and various documents; only time will tell whether park
management plans will focus on ecological integrity as the first priority in practice. Future content analysis on the place of ecological integrity in those plans may give a better indication of the path that Parks Canada is taking on the ground.

Specific conclusions concerning three particular matters discussed above are possible. First, progress on publishing State of the Park reports is surprisingly slow, even more so when it is considered that such reports are supposed to be completed before park management plans. Second, while progress is being made on publishing park management plans, deadlines are frequently either not met or not even stated. Target dates for system-wide completion of these two documents have not been met. Third, Parks Canada is failing to inform Canadians—both visitors and non-visitors—about ecological integrity, the problems related to it, and actions being taken to deal with those problems. The fact that 28 of 39 parks that provided visitor information material with no mention of ecological integrity is an indictment of this failure; this is compounded by the fact that the other 11 packages ranged from being incorrect to just more than satisfactory.

Parks Canada cannot argue that it provides adequate information on its Internet site (www.pc.gc.ca). For example, while Action on the Ground II (Parks Canada, 2008a) is in the library section of the site, the original Action on the Ground (Parks Canada, 2005) can only be accessed using the “Search” function. Documents which cannot be found using the “Search” function, however, include the Panel’s report. Why? Because it is not there. It was on Parks Canada’s Internet site for some time after it was made public, but it was then removed. Why? Because, as the author was told, the report was in .html format and not .pdf format “as required by federal policy”—a policy which the author was unable to find in a search of the entire website of the Government of Canada (www.gc.ca).

The author tried for several years to persuade Parks Canada to post the report—in whatever format—but failed. The URL for the Report found in this paper’s bibliography is for the National Library of Canada. It is interesting that the National Library can contravene “federal policy,” but Parks Canada cannot. It is also interesting that Parks Canada apparently cannot find the funds to purchase software to convert .html files to .pdf files; several inexpensive software packages are available for purchase.

In strict accounting terms, the Panel failed to persuade the Government of Canada to meet its recommended level of increased funding to Parks Canada to implement its ecological integrity mandate. (See Table 5.) The Panel argued for $328.3M over five years to implement its recommendations concerning ecological integrity. In fact, the 2003
Budget allocated only $30M for ecological integrity in total in the last two years of those five years; between 2003 and 2010, this budget allocated $138M for ecological integrity matters. Another of its recommendations, however, was met, with $144M being allocated for the establishment of ten new national parks and five new national marine conservation areas. Moreover, that budget allocated $54M in added ongoing funding and $138M for heritage and visitor facility renewal; it is likely that some unknown proportion of those funds covered the cost of some of the Panel’s other recommendations.

### Table 5. Panel Recommendation re EI Expenditures and Actual Government Budgeting

<table>
<thead>
<tr>
<th>Year</th>
<th>Panel Recommendation</th>
<th>2003</th>
<th>2005</th>
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<tr>
<td>2000</td>
<td>$328.3M</td>
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<tr>
<td>2001</td>
<td>+ funding for the establishment of new national parks &amp; national marine conservation areas</td>
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<td>2002</td>
<td>$144M</td>
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<td>2010</td>
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<tr>
<td>Total to date</td>
<td>$135M $144M $54M $138M $85M $284M $10M</td>
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</table>

Note: 1It is unclear whether this amount is “one time only” or an addition to base

The 2005 Budget allocated an additional $85M between 2005 and 2010 for ecological integrity. Moreover, a further $284M was allocated for National Historic Sites and to rehabilitate visitor facilities and interpretive assets; again, some unknown proportion of that amount could have covered the cost of some of the Panel's other recommendations.

With the addition of $10M in 2008 to purchase land to expand the Gulf Islands National Park Reserve, the total amount of additional funding received by Parks Canada from 2002 to 2010 was at least $630M (and much more if the $54M of “added ongoing funding” in the 2003 Budget was an addition to base rather than “one time only”).

Unfortunately, it is not possible to track which of the Panel's recommendations assuming they were “legally and financially feasible” were implemented using these funds; Parks Canada's financial data are not presented in such a way as to enable such an analysis. Nor is it clear whether the total of $50M/year promised in the 2003 and 2005
Budgets will continue. No further funding announcements concerning any aspect of Parks Canada were made in the Budgets of 2004, 2006, 2007, 2008, 2009, and 2010. The two Action on the Ground documents (Parks Canada, 2005, 2008a) provide only snapshots of particular “stories” about ecological integrity. A complete progress report would be needed which lists each recommendation and related actions taken; such information was provided one year after the Panel’s report in the First Priority report (Parks Canada, 2001), so presumably it could be done again.

The fact that Parks Canada continues to at least be interested in its legal mandate concerning ecological integrity provides some degree of promise for the future and the eventual implementation of most, if not all, of the Panel’s recommendations. One can have a sense of guarded optimism, even though it is now five years after all of the recommendations were supposed to have been implemented. After all, in the words of Jacques Gérin, the Chair of the Panel, “It is the law, so just do it!”

Postscript

In November 2010, the Canadian Parks and Wilderness Society (CPAWS) awarded the J. B. Harkin Conservation Medal to the Panel on the Ecological Integrity of Canada’s National Parks, stating that the Panel was “recognized for its success in integrating the science of ecological integrity into the legislative and management framework of parks in Canada and its guidance in instituting fundamental changes in how all parks should be stewarded” (CPAWS, 2010).

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c. 32.


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University of Waterloo, Waterloo, Canada.


觀光休閒學報 投稿須知

一、觀光休閒學報係為中華觀光管理學會發行之學術性刊物。本學報發行之目的，係為促進觀光學術研究，提供獨立公正之學術發表園地，並冀望透過學術之研究引領觀光相關產業之發展。因此，舉凡探討觀光事業、休閒遊憩，以及餐旅等相關領域之論文，中、英文不限，均為本學報刊登之對象。

二、本學報每年共計發行三期，分別於四月、八月與十二月各出版一期，全年皆接受投稿。

三、本學報投稿之文章全文係以一萬五千字為限(含圖表與中、英文摘要)。中、英文之摘要以三百字為限。中、英文關鍵詞以五個為限。

四、投稿稿件之首頁須載明下列資訊：
   (一) 中、英文論文標題。
   (二) 中、英文作者姓名。
   (三) 中、英文任職機構與職稱。倘若作者不僅只一位，敬請於作者姓名之後與任職機構之前加註*、**、***等對應符號，以俾利識別。
   (四)通訊地址、聯絡電話號碼、傳真電話號碼與電子郵件地址，並敬請註明通訊作者。
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   (一) 中、英文論文標題。
   (二)中文摘要、中文關鍵詞、英文摘要、英文關鍵詞。
   (三)本文(諸如：引言、研究方法、研究結果、討論、管理意涵與建議)。
   (四)參考文獻及附錄。

五、稿件書寫格式：
   (一)文字敘述之編號順序，中文為：壹、一、(一)、1、(1)，英文為：I、(I)、A、(A)、a、(a)。內文段落間文字敘述之數字，敬請利用阿拉伯數字表示。
   (二)表格標題在表格之上，圖片標題在圖片之下。編排順序以圖1(Figure 1)、表1(Table 1)，圖2(Figure 2)、表2(Table 2)等順序為之。
   (三)內文引用之文獻，以確與本文相關者為限，並須於內文引用之處，予以標示。同時引用多篇文獻者，以中文、西文之順序排列。同為中文或西文文獻者，以作者姓氏筆劃或姓氏字母順序先後排列。
   (四)參考文獻之排列順序，以中文、西文之順序為之。同為中文或西文文獻者，以作者姓氏筆劃或姓氏字母順序先後排列。引用文獻書寫之方式如下：
   1. 期刊：作者姓名，(出版年)、題目，發表刊物名稱，卷(期)，頁數。
   2. 書籍：作者姓名，(出版年)，書名，出版地：出版者。
   3. 書籍專章與研討會論文：作者姓名，(出版年)，專章名稱或論文之名稱，書名或論文集之名稱，頁數，出版地：出版者。
   4. 學位論文：作者姓名，(出版年)，論文名稱，學校系所與學位。
   5. 翻譯書籍：原著作者姓名，(出版年)，書名(譯者姓名)，出版地：出版者(原著出版年份)。
   6. 報紙文章：作者姓名，(出版年)，標題，報紙名稱，刊行日期，刊行版面。
   7. 網路文章：作者姓名，(出版年)，標題，[線上資料]：搜尋網址[搜尋日期]。
   8. 中文參考文獻之刊物名稱、書名、論文集之名稱與論文名稱，敬請以底線表示之；英文參考文獻之刊物名稱、書名、論文集之名稱與論文名稱，敬請以斜體表示之。
六、為提昇投稿稿件作業之效率，本學報採取電子郵件投稿與審稿之方式。投稿稿件之格式必須為 Microsoft Word 檔案或 PDF 檔。本學報將盡力加速審稿之作業，目標設定為百分之八十之稿件於十週內給予作者第一次審查結果之回覆。

七、為提昇本學報論文品質，經中華觀光管理學會第七屆第五次理監事聯席會議於民國九十七年三月六日通過，自即日起投稿之稿件，作者需於投稿之同時，以匯款方式繳交投稿費新台幣 1,000 元。初次審查時間若超過六個月，將於提供審查結果時退回投稿費。另外，經本學報審查通過並接受刊登，即酌收行政處理費用新台幣 2,000 元整。相關費用請匯至以下帳戶：

郵政劃撥帳戶戶名：中華觀光管理學會
劃撥帳號：19073272（請註明費用項目及姓名）

匯款後，亦須將匯款收據以圖檔方式以電子郵件方式寄送至學報信箱（jts@tourism.org.tw），以利後續審查。

八、請將投稿之稿件與作者相關之資訊（諸如：作者姓名、服務單位、職稱、地址、聯絡電話、傳真電話與電子郵件地址，並敬請註明通訊作者），利用電子郵件之方式，郵寄至總編輯曹勝雄教授（shenght@mail.ncyu.edu.tw），另將副本郵寄至執行主編王志宏（jts@tourism.org.tw）。作者應會於投稿稿件郵寄出後一週之內收到收稿確認之電子郵件，若未於一週之內收到收稿確認之電子郵件，敬請重新將投稿稿件寄出，或與總編輯或執行主編聯繫。

九、為維持本學報刊載論文之品質，投稿之稿件必須經過至少兩位相關領域學者之匿名審查。

十、為維護學術倫理，投稿稿件應未刊登於其他刊物或書籍。此外，投稿之稿件一經刊載，其版權歸本學報所有，唯文責自負。非經本學報同意，亦不得另行發表於其他刊物或書籍。
Guide for Authors

I. Journal of Tourism and Leisure Studies is an academic journal which published by Chinese Tourism Management Association. Journal of Tourism and Leisure Studies publishes original research in tourism, leisure, recreation and hospitality both in Chinese and English to promote tourism academic research and provides a independent and just space for academic publication.

II. A total of three issues will be published each year which refer to in April, August and December. We accept the manuscripts over the year.

III. The main article should not exceed 15,000 wards (including tables, figures and abstract). Both Chinese and English abstracts should not exceed 300 words. The amounts of Chinese and English keywords should not exceed 5.

IV. The first page of each manuscript has to provide the following information. Those are:
   (I) Chinese and English titles of the manuscript.
   (II) Chinese and English names of the author(s).
   (III) Chinese and English affiliations and titles of the author(s). In case of the authors are two or more, please make corresponding notes on the names and affiliations of the author(s) for identification.
   (IV) Address, telephone number, fax number and email address of corresponding author and please make a note on the corresponding author.

Manuscripts should be arranged in the following order of presentation.
   (I) Chinese and English titles of the manuscript.
   (II) Chinese abstract, Chinese keywords, English abstract and English keywords.
   (III) Main article (including introduction, methodology, results, discussion, implication and suggestions).
   (IV) References and Appendixes.

V. Format
   (I) Order for titles of sections should be arranged as I, (I), A, (A), a, (a). The titles of descriptions in the main text should be numbered as Arabic numbers.
   (II) Titles of tables should be placed above the tables. Titles of the figures should be placed under the figures on the contrary. The editorial order is numbered as Arabic numbers.
   (III) The references should include only the most relevant papers. References should appear in the main article with notes. The order of Chinese references is ranked by stroke numbers and the order of English references is ranked by alphabetical order.
   (IV) Order of the references is initiated by Chinese references and followed by English. The consideration for order of Chinese references is stroke numbers and the consideration for order of English references is the rank of alphabetical order. The example of references as following:
   1. Periodical Journal: Author(s), (Year), Title. Journal, Volume(Issue), Page(s).
   2. Monograph: Author(s), (Year), Title. City, State or Province of the Publisher: Publisher.
3. Collective Works and Proceeding: Author(s), (Year), Title, Title of Collective Works or Proceeding, Page(s). City, State or Province of the Publisher: Publisher.


5. Translated Monograph: Original Author(s), (Year), Title(Translator(s)). City, State or Province of the Publisher: Publisher (Year of Original).

6. Newspaper Article: Author(s), (Year), Title. Newspaper, Date, Sheet(s).

7. Internet Article: Author(s), (Year), Title. [Online Available]: Web Site [Date].

8. Titles of publications, monographs, proceedings and dissertations of Chinese references should be edited as underline. Titles of publications, monographs, proceedings and dissertations of English references should be edited as italic.

VI. For the purpose of enhancing the efficiency of submission procedure, we employ the means of electronic submission and reviewing process. The manuscripts should be prepared in Microsoft Word or PDF format. We will try our best to accelerate the process of reviewing. Our goal is 80 percent of submissions will receive our first response about their manuscripts within 10 weeks.

VII. In order to improve the quality of publication, it was resolved at the joint meeting of boards of directors and supervisors of Chinese Tourism Management Association on March 6, 2008 that an submission fee of NT$ 1,000, and an administrative fee of NT$ 2,000 will be charged after publish starting from March 7, 2008.

To write for a publication

VIII. Please mail the manuscript and information about the author(s) (e.g., name(s), affiliation(s), title(s), and address, telephone number, fax number and email address of the corresponding author) to Editor-in-Chief Professor Sheng-Hshiung Tsaur (shenght@mail.ncyu.edu.tw) and Executive Editor- Chih-Hung Wang (jts@tourism.org.tw). An email of confirmation letter could be expected within a week after the manuscript has been submitted. Please resend the manuscript again or contact with Editor-in-Chief or Executive Editor in case of the author(s) have not receive confirmation letter within a week.

IX. A submitted manuscript is reviewed anonymously under at least two scholars with a similar research background to maintain the quality of our publications.

X. It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere for the reason of academic ethics. Furthermore, the copyright belongs to Journal of Tourism and Leisure Studies once the manuscript has been published. It is not allowed to present in other publication without our agreement.
觀光休閒學報 評審程序

一、本學報投稿稿件之評審，係由本學報編輯委員與相關研究領域之專家學者擔任。

二、本學報總編輯針對投稿稿件之性質與其研究領域，諮詢本學報該研究領域之編輯委員，並且決定該稿件之審稿者。

三、投稿稿件至少應經過兩位(含)以上之專家學者進行匿名審查，每位審稿者應於評審意見表上針對該稿件陳述相關意見，並應於下述四項評審結果中，針對該稿件之品質進行勾選。其選項如下：

(一)無須任何修改，可直接逕行接受刊登。
(二)修改後接受(審稿者應提出相關修改之建議)。
(三)修改後再審(審稿者應提出相關修改之建議)。
(四)不推薦(審稿者應提出相關修改之建議)。

四、本學報針對前述審稿者之評審意見，處理稿件之方式如下：

<table>
<thead>
<tr>
<th>审查意見</th>
<th>處理方式</th>
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<tbody>
<tr>
<td>第一位審稿者意見</td>
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<td>第三審稿者建議不推薦</td>
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五、投稿稿件刊登與否，事關投稿者之權益重大。審稿者應提出相關修改之建議，提供投稿者參考，並說明針對該投稿稿件處理方式之建議。

六、送交作者修改之時間若逾二個月，本學報即發出逾期提示並告知作者應於二個星期之內進行覆。若修改時間逾三個月，本學報即逕行退稿。

七、投稿稿件經本學報刊登發表之後，本學報將致贈作者無封面之抽印本二十份。若作者欲加印封面或增印份數，請於校稿時逕告本學報，其費用由作者負擔。
The Process of Reviewing

I. The submitted manuscript is reviewed by the members of editorial board committee and scholars with a similar research background.

II. Referees will be selected after the Editor-in-Chief has consulted with the members of editorial board committee who specialized in the same field as the manuscript.

III. Each manuscript has to be reviewed under at least two selected referees. Referees are asked to express their suggestions and comments and to select one of the four following categories to decide whether a manuscript is acceptable. The categories are depicted as following:

(Ⅰ) Acceptance without revision.
(Ⅱ) Accept after revision (referee has to express their suggestions and comments).
(Ⅲ) Review after revision (referee has to express their suggestions and comments).
(Ⅳ) Poor recommendation (referee has to express their suggestions and comments).

IV. We process the manuscript according to the opinions of referees as following:

<table>
<thead>
<tr>
<th>Opinions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Referee</td>
<td>Second Referee</td>
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<tr>
<td>Acceptance</td>
<td>Acceptance</td>
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<tr>
<td>Acceptance</td>
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<td>Acceptance</td>
<td>Review after revision</td>
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<tr>
<td>Acceptance</td>
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<td>Accept after revision</td>
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<td>Poor recommendation</td>
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</tr>
<tr>
<td>Third Referee: Acceptance</td>
<td>Acceptance</td>
</tr>
<tr>
<td>Third Referee: Accept after revision</td>
<td>Accept after revision</td>
</tr>
<tr>
<td>Third Referee: Review after revision</td>
<td>Reviewed by third referee after revision</td>
</tr>
<tr>
<td>Third Referee: Poor recommendation</td>
<td>Rejection</td>
</tr>
</tbody>
</table>

V. Whether a manuscript is acceptable is a critical issue for the author(s). Author(s) will be informed about the suggestions and comments of the manuscript when the reviewing process has been completed. The suggestions and comments of referees and the way which the manuscript be processed will be written on the informing letter.

VI. A warning notice of over time will be sent out in case of the time of revision is over two months and informs the author(s) have to reply within two weeks. We will reject the manuscript directly in case of the time of revision is over three months.

VII. Twenty reprints without the cover of each paper are supplied to the author(s) free of charge once the manuscript has been accepted. In case of the author(s) would like to add covers or amounts of the reprints, author(s) have to inform us during the process of proofing and bear the extra expense.