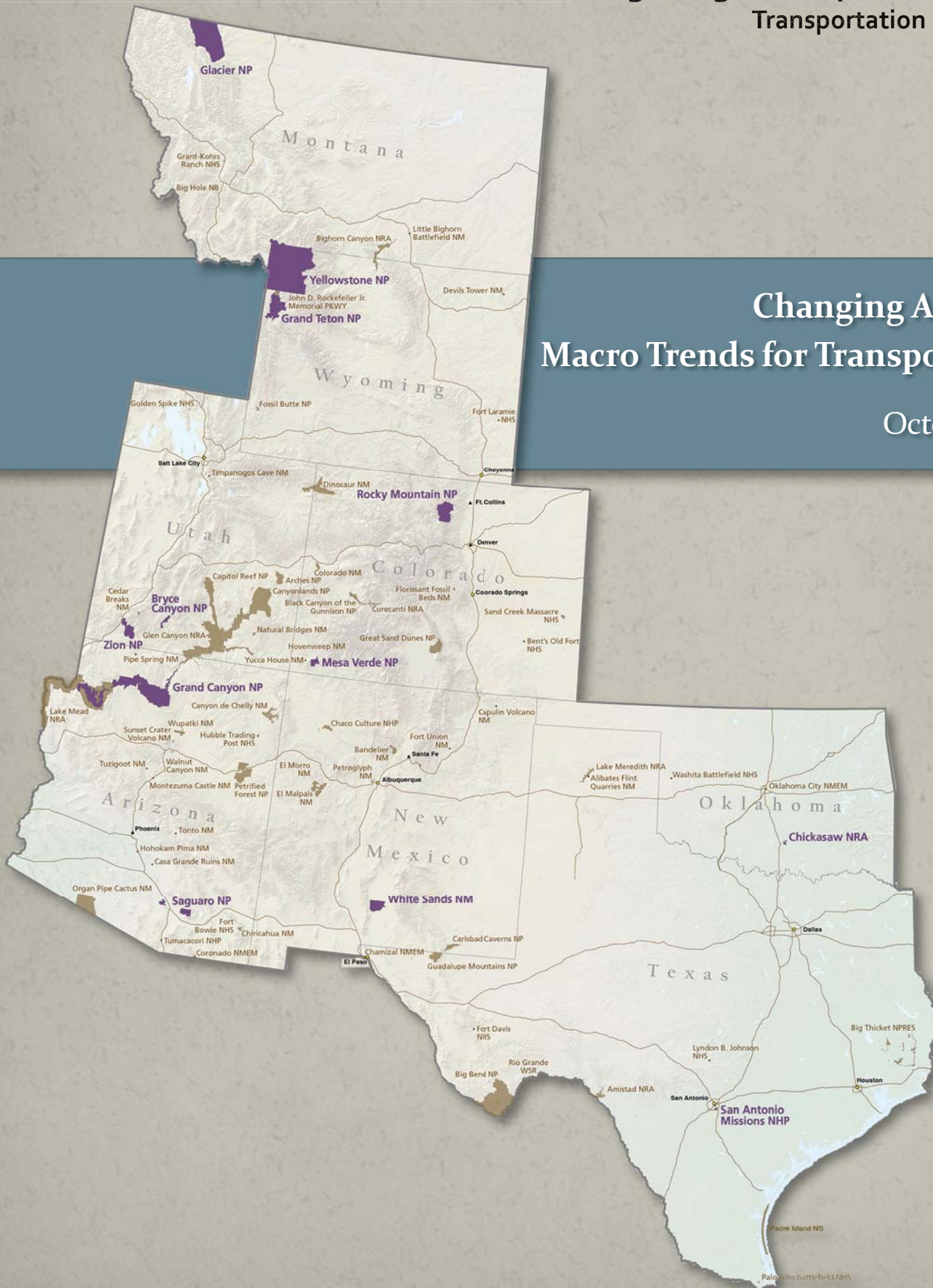




Long Range Transportation Plan Transportation in Context

Changing America: Macro Trends for Transportation

October 2012



Macro Trends

CHANGING AMERICA

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CHANGING AMERICA: MACRO TRENDS FOR TRANSPORTATION IN THE NATIONAL PARKS

INTRODUCTION

The purpose of this report is to examine emerging trends related to transportation in the national parks, especially within the Intermountain Region (IMR). The National Park Service (NPS), the IMR, and individual parks, as well as research institutes, universities, and other federal agencies have long been interested in what affects park visitation, the relationship of visitor access (transportation) to resource management, and what can be expected over the mid- to long-term. The very real question about how to pay for it all rises above all else. The Macro Trends for Transportation in the National Parks report identifies long term trends, without a specific horizon. It explores these subjects and attempts to draw out those issues most critical to the NPS mission.

The report explores three interrelated areas of investigation:

- **The Relationship of Population Changes to Recreation, Leisure, and Visitation** – The population is aging and becoming more diverse, changing the profile of the “typical” park visitor. The new visitor has a different set of expectations regarding comfort, communication, and choices. The National Park Service either must adapt to its visitor pool, or risk becoming unresponsive and isolated.
- **Adapting to a New Landscape** – Undeniable changes to the natural environment have already occurred and will likely accelerate into the future. The huge impact of the growing population and how it chooses to use the Earth’s resources have a powerful effect on the parks, their supporting ecosystems, and the survival of species.
- **Preserving Visitor Access and National Park Service Leadership** – The costs to maintain and operate a transportation system that provides access to the parks have grown out of proportion to funding allocations. This is not to say that funds are not available to support national priorities, but that new partnerships must be nurtured to support a shared and sustainable future.

The conclusions of the report are expressed as Key Messages, outlined at the end of each section. These messages, or trends, form a bridge between the analysis of existing conditions and the determination of future needs. Future needs are rightfully based on deficiencies in condition and operations, but must also anticipate other inputs with which the National Park Service has little experience. In other words, what is coming around the corner and what preparations are needed?

Definition of “Need”

The IMR Long Range Transportation Plan (LRTP) defines “need” as a deficiency in performance as measured against a goal or target. The reader is encouraged to look beyond standard definitions of need, which may or may not satisfy an established goal. The old way of thinking allowed managers to create long lists of things that “should” be done, along with a cost to accomplish the list. The new paradigm utilizes performance-based planning to firmly link strategic goals with actions. In the current era of tight budgets and escalating costs, the LRTP will help ensure that expenditures, whether for hard infrastructure, or for planning or partnering or operations all move toward acknowledged mission-critical goals. Performance-based planning provides a level of accountability in the use of public funds that has not always been transparent. This report further explores these trends in Section Three and will be fully realized in the upcoming Needs Assessment phase of the LRTP.

SECTION ONE: THE RELATIONSHIP OF POPULATION CHANGES TO RECREATION, LEISURE, AND VISITATION

Time spent in outdoor recreation throughout the country continues to grow, although at a much slower pace since the mid-1990s. However, the ways people choose to recreate have changed more dramatically. This section examines the IMR demographic and socio-economic profile and draws some conclusions about recent and future visitation. The visitor profile is clearly changing across the region. The IMR Long Range Transportation Plan strives to understand these trends and to adapt management practices when appropriate.

The decline in outdoor recreation participation rates is particularly noticeable among certain subgroups. The decline is attributable in part to decreases in leisure time, aging of the population, suburban encroachment on nearby recreation lands, habituation to TV and computer use by children, and other lifestyle choices. The decline is mirrored by visitation to IMR parks, which has seen little growth over the last two decades (Walls 2009).

DEMOGRAPHIC AND SOCIOECONOMIC TRENDS

The nation at large, as well as the IMR, is experiencing significant growth in total population as well as shifts in the socioeconomic makeup of the population and the general economy.

General Population Trends

The U.S. Census forecasts that the population of the nation will grow from 281 million to 363 million in the thirty-year period from 2000 to 2030, a total growth of 29%. However, the eight states making up the IMR will grow from 39 million to 70 million during the same period, a total growth of 55%. Arizona will far outpace the rest of the region with a total growth of 109% (Census 2010). Figure 1 presents population trends for the eight states included in the IMR.



Figure 1: Total Population and Projected Growth of States in IMR, 2000 to 2030

State	2000 Total Population	2010 Total Population	2020 Total Population	2030 Total Population	Percent Growth 2000 - 2030
United States	281,421,906	308,935,581	335,804,546	363,584,435	29%
IMR	39,182,559	46,694,230	52,734,019	60,888,701	55%
Arizona	5,130,632	6,392,017	8,456,448	10,712,397	109%
Colorado	4,301,261	5,029,196	5,278,867	5,792,357	35%
Montana	902,195	989,415	1,022,735	1,044,898	16%
New Mexico	1,819,046	2,059,179	2,084,341	2,099,708	15%
Oklahoma	3,450,654	3,751,351	3,735,690	3,913,251	13%
Texas	20,851,820	25,145,561	28,634,896	33,317,744	60%
Utah	2,233,169	2,763,885	2,990,094	3,485,367	56%
Wyoming	493,782	563,626	530,948	522,979	6%

(Census 2010)

Figures 2 and 3 show the distribution of current and projected population throughout the Intermountain Region for 2010 and 2030 by county. The maps clearly show that most of the region is, and will continue to be, sparsely populated. Long distances between western parks require longer travel time and reduce the likelihood of visiting multiple parks in one trip. In difficult economic times, such trips are not always possible. However, major population centers do exist in the region and will continue to become more dense over time. Notable major metropolitan areas include the Phoenix-Tucson complex, Salt Lake City, Colorado's Front Range, Albuquerque, Dallas-Ft. Worth, San Antonio, and Houston. These cities' proximity to some national parks highlights the trend toward urbanization and signals the need to strengthen access and education opportunities for urban residents.



Photo by National Park Service

INTERMOUNTAIN REGION
LONG RANGE TRANSPORTATION PLAN: TRANSPORTATION IN CONTEXT

Figure 2: IMR Population, 2010

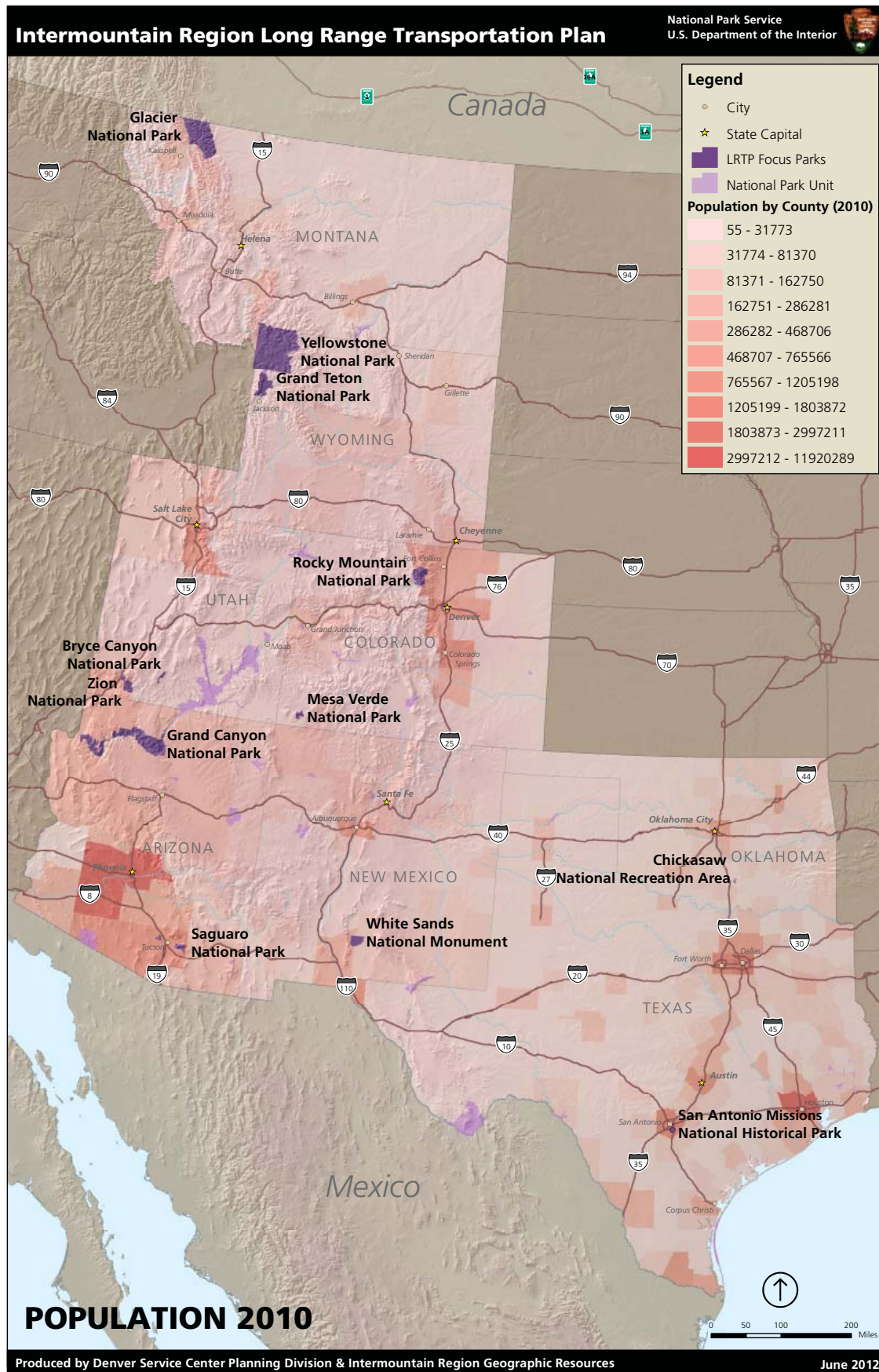
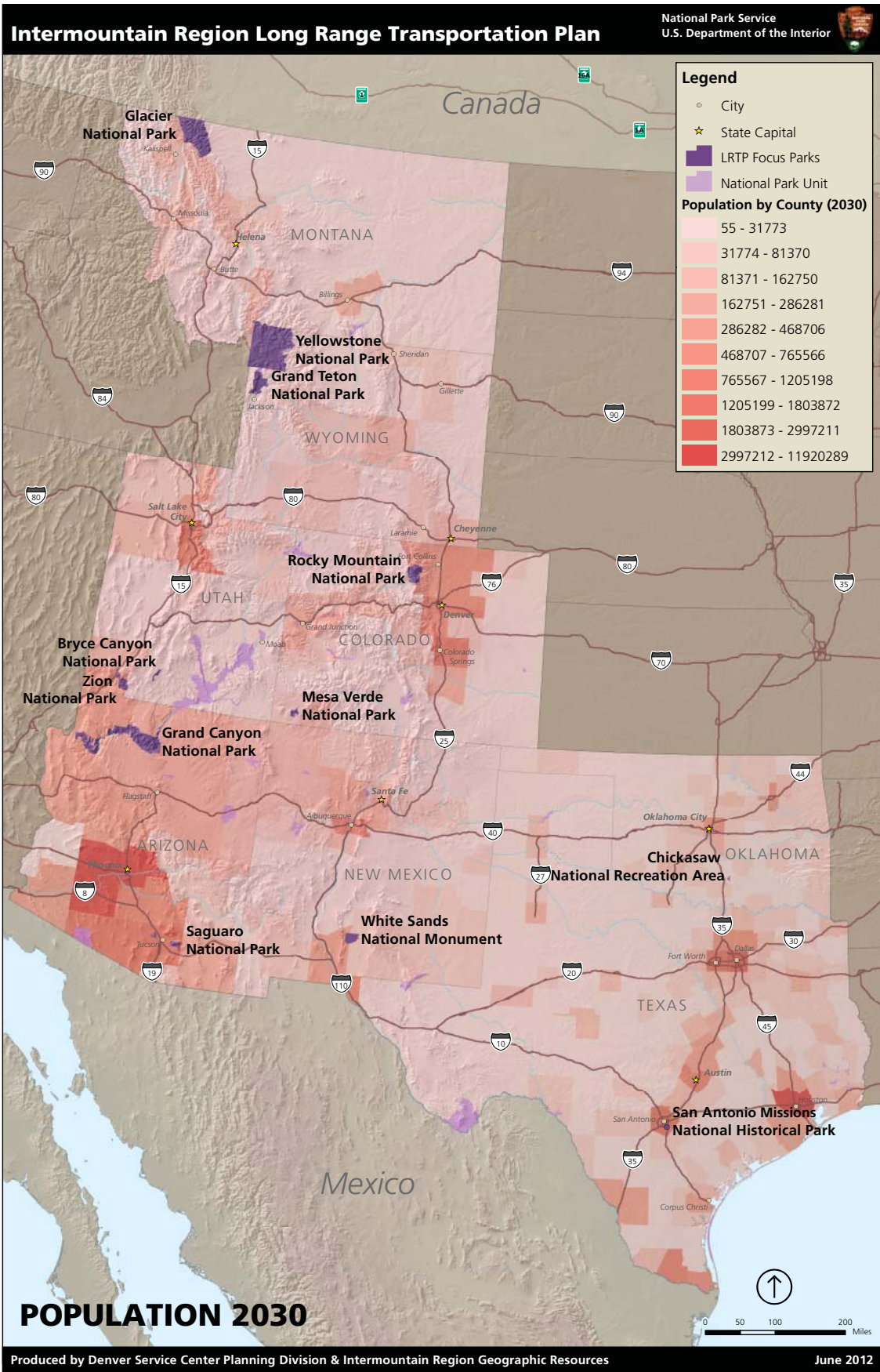


Figure 3: IMR Population, 2030

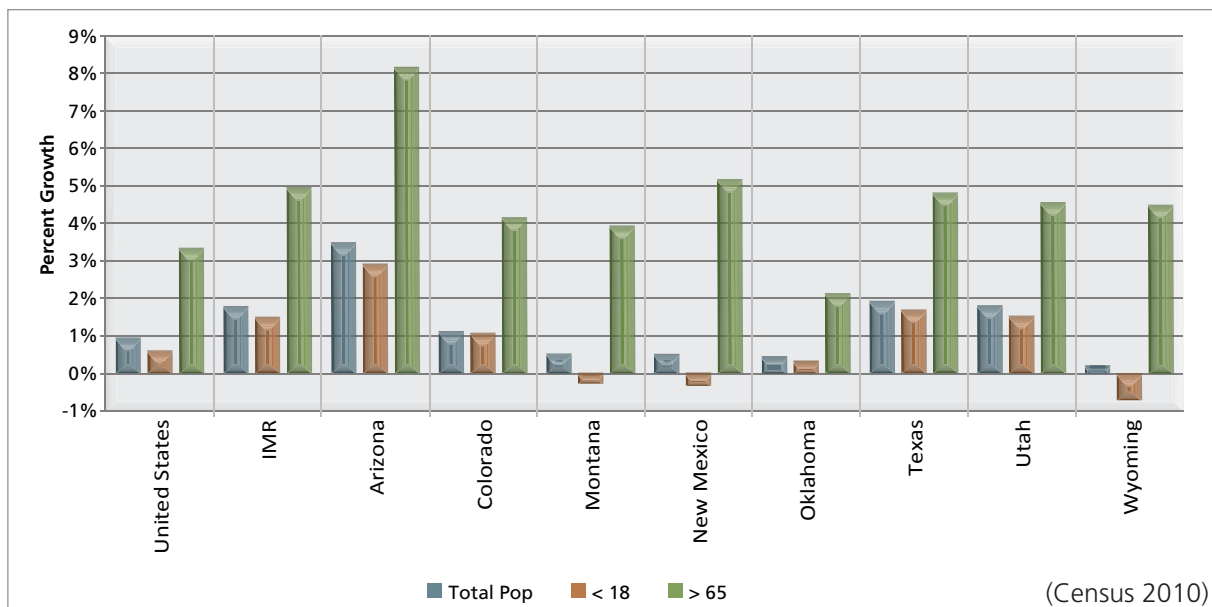


Aging Visitors

Figure 4 shows the median age of the region's population by county for 2010. In general, the population of the more urbanized areas is and will continue to be younger than in more rural areas. This points to the possibility for increased opportunities in urban areas, with their younger populations. Figure 5 displays median age distributions within the Intermountain Region.

While families with children have historically made up a large component of NPS visitors, the much-discussed aging of the baby boom generation will continue to have a dramatic effect on the makeup of the general population and especially of the intermountain west. Figure 4 shows the relationship of growth rates of the over 65 age group compared to growth rates of those under 18 and the general population. Experts expect a multi-faceted outcome in terms of visitation. First, the older generation no longer has children in the household, subtracting from those storied "family vacations" of memory. However, people in their golden years typically have more leisure time, and possibly disposable income, some of which will be spent in parks.

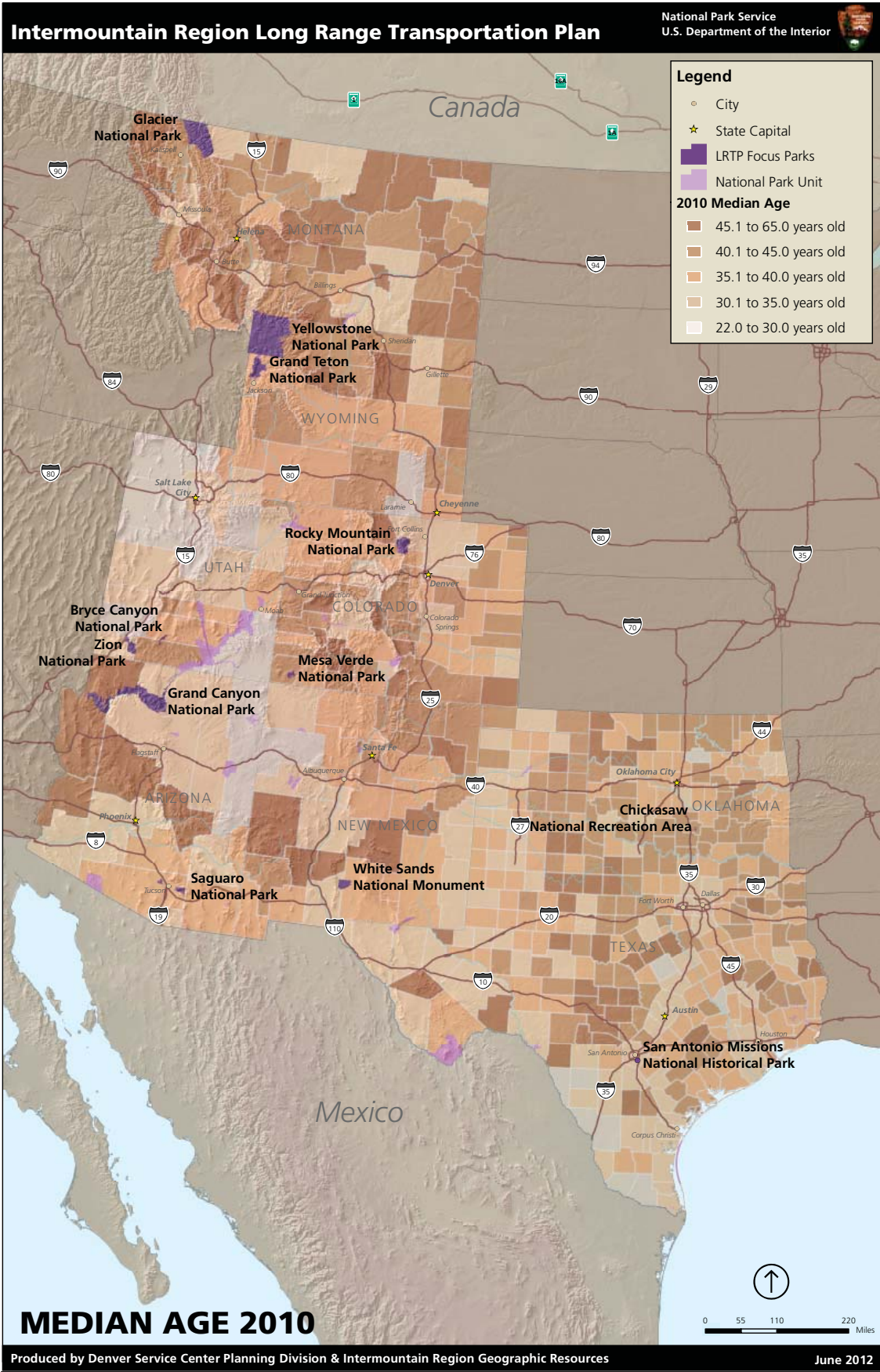
Figure 4: Average Annual Growth Rate of Children and Seniors, 2000-2030, Total Population, Age <18 & Age >65



The growth rate in children lags that of the total population in the IMR. Children are less likely than in the past to play a major role in park visitor demographics. Today's younger generation is simply not as engaged in the outdoors, opting for competitive sports, and with increasing wealth, other faster paced types of recreation, motorized sports, and travel to other destinations that attract large numbers.

Trends for park visitation are mixed, but policy makers require a better understanding of evolving population dynamics to meet the needs of the population. If the National Park Service and individual parks expect to continue efforts to enhance the visitor experience for aging visitors, additional strategies may need to be employed, such as: more visible and readable wayfinding and roadway signage, better accessibility to transit/shuttle vehicles, and better accessibility on multimodal paths and greenways.

Figure 5: IMR Median Age, 2010



Ethnic Diversity

Figure 8 shows the Diversity Index for the Intermountain Region by county. The Diversity Index represents the likelihood that two persons, chosen at random from the same area, belong to different race or ethnic groups. The diversity calculations accommodate up to seven race groups: six single-race groups (White, Black, American Indian, Asian, Pacific Islander, Some Other Race) and one multiple-race group (two or more races). Each race group is divided into two ethnic origins, Hispanic and non-Hispanic.

The Diversity Index ranges from 0 (no diversity) to 100 (complete diversity). If an area's entire population belongs to one race group and one ethnic group, then an area has zero diversity. An area's diversity index increases to 100 when the population is evenly divided into two or more race/ethnic groups.

The Diversity Index for the United States is 60.59, based on counts from Census 2010. A Diversity Index of 60.59 translates to a probability of 60.59% that two people randomly chosen from the US population would belong to different race or ethnic groups. The Diversity Index varies widely by geography, as can be seen in the map, with more diversity represented in the southern tier of states than in the northern tier (ESRI 2012).

As a percentage of the total U.S. population, non-Hispanic whites, now a 66% majority, are projected to decrease to 46% by 2050. The Hispanic population is expected to triple in numbers before 2050, growing from 15% to 30% of the total U.S. population, and constitute nearly one-third of the population. African-American populations will increase from 14% to 15%. Native populations are expected to grow from 1.6% to 2% of the U.S. population. The Asian-American population will grow from 5% to 9% of the national population (Second Century 2009).

A recent survey, conducted in 2001 and repeated in 2008-09, queried a nationwide sample about ethnicity and recent park visits. The results (as displayed in Figure 6) show a surprisingly diverse group of visitors. Spanish-only speaking visitors had a much more negative response than Hispanics speaking English and visitation rates fell even as the percentage of total population rose.

The survey revealed several obstacles (listed in Figure 7) to park visitation by ethnic minorities. Also, more recent immigrants have had less time to culturally integrate and develop an understanding of the historic and natural history that fueled the surge in park visitation during the 20th Century.

The National Park Service must relate directly to these communities as they become a larger part of the national fabric and of visitors. The National Park Service will depend on its ability to meet the needs of all its visitors to uphold the visitor experience, or risk irrelevancy.

Figure 6: Percent of Population, Recent Visitors, by Race and Ethnicity, 2001 - 2008/09

Race/Ethnicity	2000 %	2008-09 %
White, non-Hispanic	83%	78%
Hispanic, any race	10%	9%
Black or African American	4%	7%
Asian	2%	3%
American Indian or Alaska Native	<1%	1%

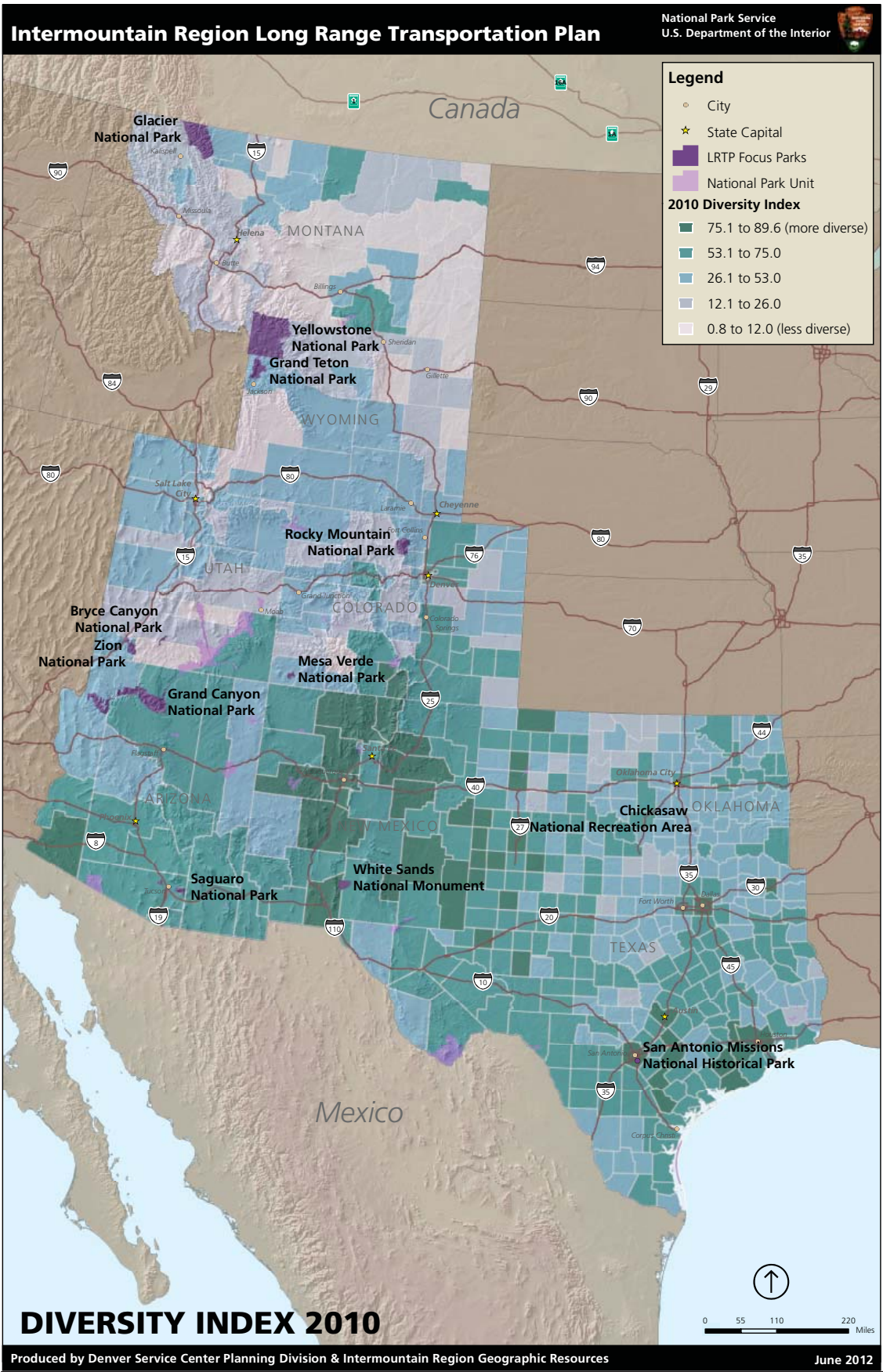
(Taylor 2011)

Figure 7: Obstacles to Park Visitation

Obstacles to Ethnic Minority Park Visitation
Costs
Distance
Lack of Information
ADA/ABA accessibility
Electronic activities
Poor service

(Taylor 2011)

Figure 8: Diversity Index



Accessibility Standards

Several access laws and regulations govern the design and construction of NPS facilities. Many parks already address the physical barriers to accessibility and are making progress in addressing programmatic and media barriers as well. For example, providing lifts for shuttle busses and reserving spaces for wheelchairs may be part of the required compliance. The programmatic and media aspects would also include interpretive and informational signs that are accessible to visual, hearing, and cognitive impaired visitors. Key governing documents include:

Architectural Barriers Act of 1968 (ABA) – The ABA states that buildings and facilities covered under the law must be designed, constructed, and altered to insure, whenever possible, that people with disabilities will have ready access to, and use of, such buildings. It should be noted that the standards do not address outdoor sites such as camping facilities and trails.

Rehabilitation Act of 1973, Section 504 – Section 504 states in part that: “No otherwise qualified individual with a disability . . . be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance or under any program or activity conducted by any Executive agency . . .”

These, and other implementing policies and Director’s Orders of the National Park Service, provide direct assurance that the National Park Service will comply fully with the intent to provide access to the national parks for persons with disabilities. The implications run from the design of facilities and interpretive displays to accessible information about transportation. Long range and specific project plans should continue to move this initiative forward with the sense of urgency it deserves. Costs for implementation should be considered and included at all levels.

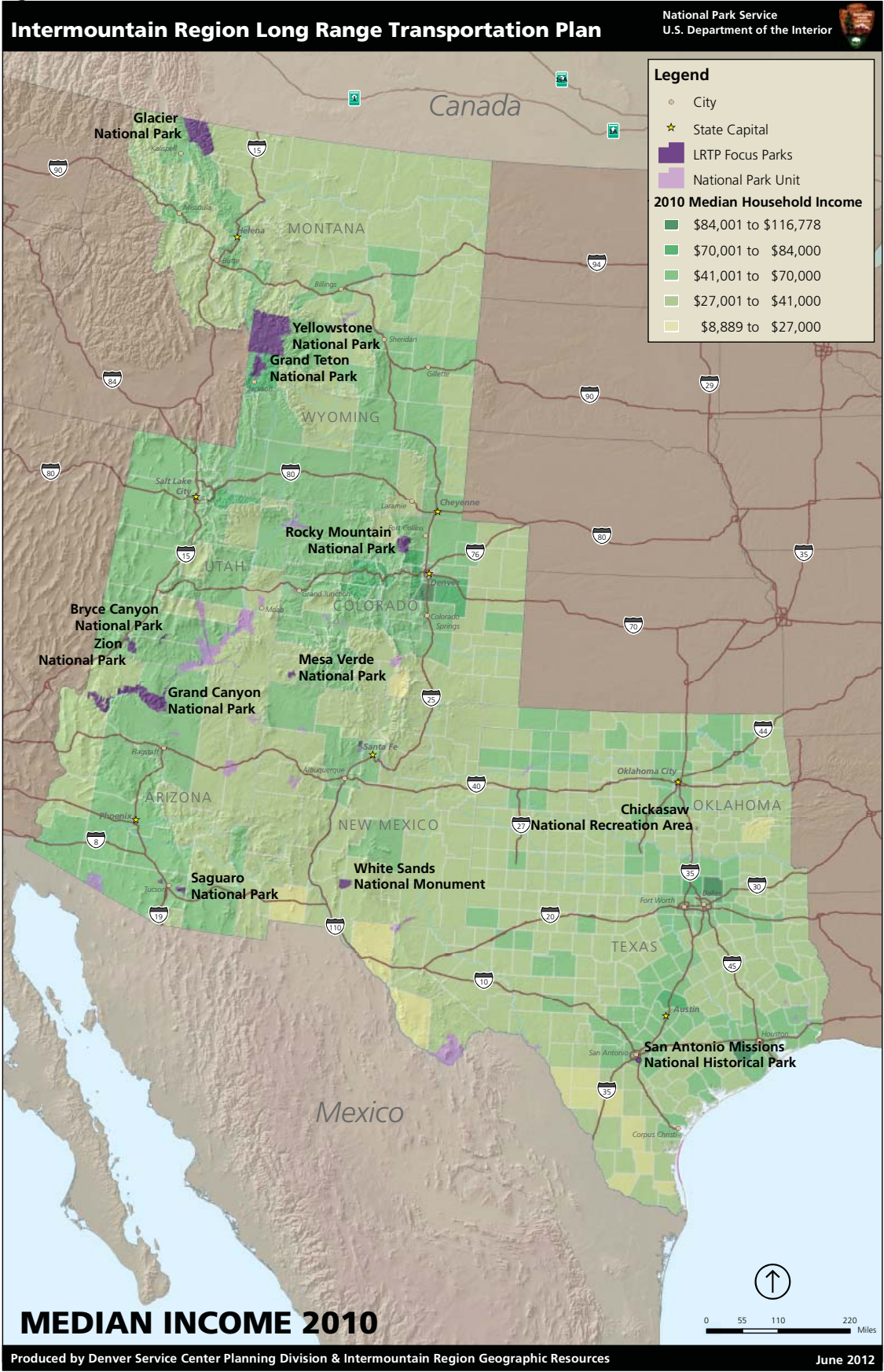
Visitor Spending and Economic Contributions

Visitor spending in and around national parks has a tremendous impact on local and regional economies. In fact, every dollar of taxpayer funds spent on the national parks generates four dollars in additional economic benefit through tourism and private sector spending (Hardner and Gullison 2006). In many cases, gateway communities are partially or even wholly dependent on expenditures associated with visitor services such as restaurants, lodging, tours, and outfitting. Park payrolls also provide money for the local community as families support the business of everyday life. Much of the value added to the economy comes not only from direct expenses, but through a multiplier effect that ripples through secondary economic effects. Recent declines in tourism and spending mirror the national economy, as families choose closer to home activities and less expensive outings. Discretionary spending, such as for vacations, is directly correlated with the cost of living. The actual cost of travel, through increased fuel prices, has increased and may present continuing downward pressure over the long term.

Median Income

The map in Figure 9 provides a county-level look at the distribution of income throughout the region. While it is notable that major urban areas and corridors are generally associated with higher income, it is even more apparent that farming, ranching, and other rural areas are associated with lower incomes.

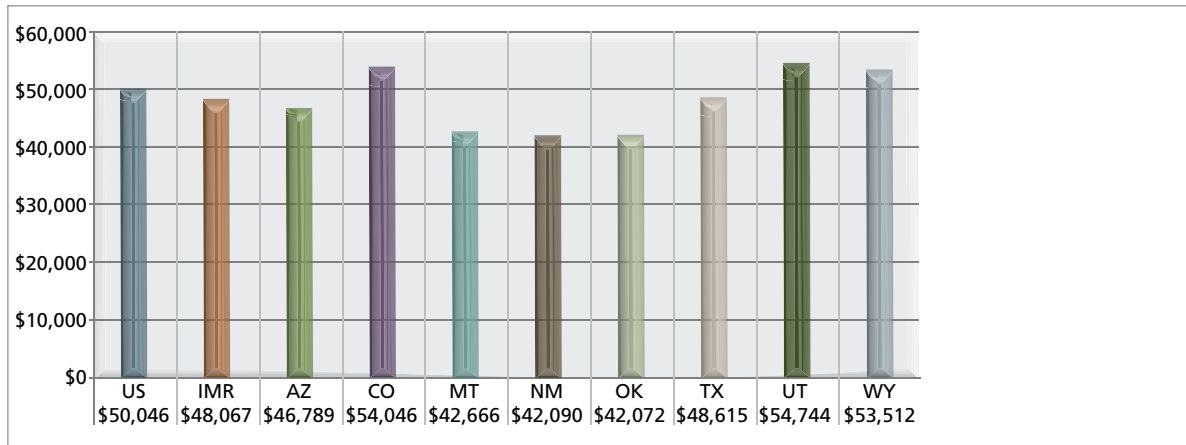
Figure 9: IMR Median Income, 2010



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LONG RANGE TRANSPORTATION PLAN: TRANSPORTATION IN CONTEXT

As depicted in Figure 10, the IMR 2010 median household income of the combined states in the IMR (\$48,067) trails the nation at large (\$50,046) by 4.0%. Three states in the IMR – Colorado, Utah, and Wyoming – exceed both the U.S. and IMR average. Colorado and Utah are becoming more urbanized, with major metropolitan areas drawing most of the growth in these once rural states. The associated incomes in metropolitan areas drive the median incomes upward. The situation is different in Wyoming, with its enormous energy industry and associated high wages. The remainder of the states in the region lag the average. Incomes in rural states have not risen as fast as more urbanized states. The effect of individual states' average incomes probably plays a role in keeping visitation low to smaller parks, which tend to attract local visitors, as opposed to large parks which draw from a national and international pool of visitors.

Figure 10: Median Household Income by State, 2010



(Census 2010)



Economic Impacts

The IMR, with its eight large states and 92 park units, accounts for the largest share of jobs, payroll, and spending when compared to other NPS regions (Figure 11). Total visitation across the IMR's expansive area (nearly 43 million visits in 2009) trails coastal regions with nearby access from the nation's largest metropolitan areas. As the nation continues to concentrate population in the largest urban areas, this trend will continue.

Figure 11: Impacts of National Park Service Visitor Spending and Payroll on Local Economies by Region, 2009

Region	Recreation Visits	Non-Local Spending (\$000)	Jobs from Non-Local Visitor Spending*	Payroll-Related Jobs*	Total Jobs
Alaska	2,278,474	\$216,224	3,039	1,072	4,110
Intermountain	42,882,594	\$2,647,522	38,816	7,018	45,834
Midwest	20,644,870	\$773,839	12,250	2,684	14,935
National Capital	47,717,757	\$1,166,805	13,682	2,173	15,856
Northeast	54,240,906	\$1,674,460	22,857	4,556	27,413
Pacific West	56,357,028	\$1,833,863	23,602	6,504	30,105
Southeast	61,157,391	\$2,428,072	35,459	3,975	39,434
Washington Office	NA	NA	NA	3,868	3,868
Total	285,279,020	\$10,740,784	149,705	32,056	181,762

*Note: Payroll-related jobs include NPS jobs and the induced effects of the NPS payroll on the local economy. This covers parks with visit counts as well as administrative units and parks without visit counts. Total job impacts include those supported by non-local visitor spending and the NPS payroll.

(Stynes 2011)



A closer look at the 12 focus parks listed in Figure 12 shows a diverse range of spending and economic impacts. Understandably, the largest parks with correspondingly large staff have a greater total overall contribution to local economies, ranging from 662 total jobs in Yellowstone NP and \$41.4 million labor income to 32 total jobs and \$1.5 million labor income in White Sands NM.

Figure 12: Spending and Economic Impacts of National Park Visitors on Local Economies, IMR Focus Parks, FY 2009

Park Unit	Park Payroll (\$000s)		Impacts of Park Payroll (\$000s)			
	Salary	Payroll Benefits	NPS Jobs	Total Jobs	Labor Income	Value Added
Bryce Canyon NP	\$3,231	\$885	89	99	\$4,365	\$4,908
Chickasaw NRA	\$2,833	\$822	73	86	\$4,038	\$4,800
Glacier NP	\$12,522	\$2,873	310	387	\$17,757	\$22,343
Grand Canyon NP	\$26,844	\$7,311	584	671	\$37,069	\$42,919
Grand Teton NP	\$11,483	\$2,950	264	310	\$15,862	\$18,850
Mesa Verde NP	\$5,449	\$1,315	130	152	\$7,521	\$9,005
Rocky Mountain NP	\$13,724	\$3,443	324	394	\$19,713	\$24,615
Saguaro NP	\$3,170	\$893	82	96	\$4,519	\$5,387
San Antonio Missions NHP	\$2,297	\$735	53	67	\$3,567	\$4,560
White Sands NM	\$1,124	\$301	28	32	\$1,522	\$1,730
Yellowstone NP	\$29,735	\$7,863	662	786	\$41,461	\$49,474
Zion NP	\$8,419	\$2,270	211	265	\$12,203	\$15,059

(Stynes 2011)

Visitor Spending

Total NPS visitor spending in 2009 was nearly \$12 billion (Figure 13); by far the largest amount of spending by segment was for lodging outside the park, highlighting the large contribution to local economies and tax revenues for local and state governments. Over \$6.6 billion dollars was spent on out-of-park lodging alone (Stynes 2011). Since not all visitors can lodge or camp within the park, and with this enormous input to the economy, parks and gateway communities are clearly interdependent. As the National Park Service struggles to provide services for the new century, gateways will play an expanded role. Mutually beneficial partnerships are increasingly necessary to meeting evolving park needs.

Value of Partnerships

Partnerships are encouraged throughout the government as a way of leveraging resources and accomplishing more than any one group could do on its own. Partnerships can include individual contributions, volunteers, corporate contributions, and foundations. These shared responsibilities are becoming ever more critical in this era of constrained financial resources.

Partnerships have become an important way to get things done both within and beyond park boundaries. Some NPS parks and programs operate almost exclusively through partnerships. Many of the parks established in the last 25 years have clear mandates to foster these relationships.

The National Park Service endeavors to build strong public support, awareness of parks, and conservation values. A strong sense of stewardship is necessary more than ever with America's changing demographics and landscape. See the Baseline Conditions Technical Report for a description of partnership activities in each of the focus parks.

Partnerships Lead To:

- Involvement
- Awareness
- Action
- Stewardship

Economic Benefits

Visitor spending and economic benefits to communities relates strongly to local, regional, and macro transportation systems and services. Remote parks like Grand Canyon and Yellowstone have high numbers of international visitors who arrive by plane at a major hub, rent cars, and drive roads to get to parks. In addition, regional linkages from major urban areas within a day's drive to a park enhance the "staycation" concept. The implications for these trending economic issues results in a need to recognize the interrelationships among the local, regional, and macro systems/networks and infrastructure. Regional linkages are important to parks, to regional and local communities, and to the nation. Spending by non-local visitors amounts to over \$2.6 billion annually and supports nearly 40,000 jobs within the IMR. Such spending relies heavily on linked and coordinated transportation systems and routes.

Figure 13: National Park Spending Benefits to the National Economy – By the Numbers

The Number	Benefit
285.6 Million	Number of recreation visits nationwide in 2009
\$11.89 Billion	How much park visitors spent in local gateway regions
56%	Amount spent on lodging
247,000	Number of related jobs (induced effects)
\$9.15 Billion	Labor income in local economies (induced effects)
\$15.58 Billion	Value added to local economies (induced effects)
26,121	Total NPS Employment
\$1.6 Billion	NPS wages, salaries, and benefits

(Stynes 2011)

VISITATION

Total Visitation

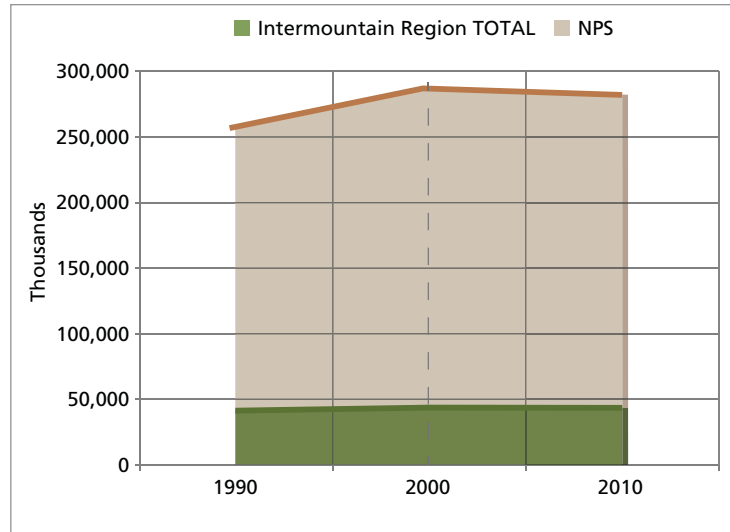
Overall visitation to IMR parks was 41.3 million in 1990 and increased only marginally to 42.7 million in 2010, closely reflecting national trends (Figure 14). The often repeated mantra that the parks are being loved to death is not universal. Visitation is not universally distributed across the IMR as can be seen in Figures 17 and 18, depicting changes in park visitation across states (NPS Statistical Abstract 2009).

In the IMR, the overall trend has stayed relatively flat, but a few of the “major destination” parks continue to experience growth (Figure 15), exacerbating issues related to congestion, lack of parking, and associated effects on both visitor experience and resources.

Other parks are experiencing decline, relieving pressures on existing facilities and resources. For those major parks, transportation infrastructure is largely built out, requiring alternative strategies to address continued growth in visitation.

Potential strategies include ways to optimize the existing systems/ infrastructure first (Travel Demand Management (TDM) for example), increase or expand alternative/mass transportation options, or manage visitor use (an enhanced form of TDM), possibly establishing visitor use capacities and management systems.

Figure 14: Total Visitation, IMR & NPS, 1990-2010



(NPS Statistical Abstract 2010)

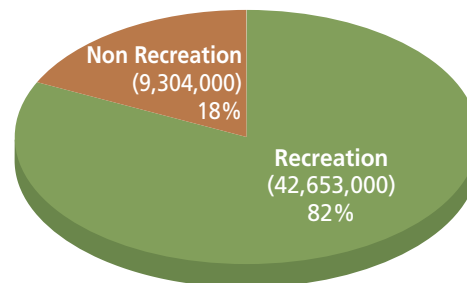
Figure 15: Total Visitation by Park Size Typology, IMR, 1990 - 2010

Park Visits	% Change
Small Parks (<0.5 M Visits)	-17%
Medium Parks (0.5 – 2.0 M Visits)	6%
Large Parks (>2.0 M Visits)	15%
IMR	3.4%
NPS	10%

(NPS Statistical Abstract 2010)

Figure 16: Total Visitation, IMR, 2010

TOTAL VISITORS = 51,957,000



(NPS Statistical Abstract 2010)

Recreation Visits

The reasons for the variable nature of changes in park visitation (Figure 17) are not universal. Notably, many parks located along the U.S./Mexico border have seen decreases in visitation, possibly related to fear of visiting an area that may have more documented incidences of illegal activity, increased crime in certain areas, etc.

Trends in recreational visitation are related to the size of the park. Larger parks (based on visitation) have sustained visitor rates over time and will continue to see some growth. One reason may be that more expensive international vacations have been replaced to some extent by more inexpensive stateside trips as a result of the less robust economy. While visitation in the largest iconic parks is expected to remain high, the current rate of growth is not expected to be sustained. Medium-sized parks are expected to remain relatively flat in visitation growth, while small parks may continue to see a fall-off in visitation. This may be related to the smaller “catchment area” and fewer repeat visits in smaller parks since the range of experiences is smaller.

One other item is worthy of consideration. As some parks reach capacity, either in terms of crowding, congestion on the transportation system, a degraded visitor experience, impacts to resources, or funding limits, the National Park Service must ask, “Is a decline in visitation a bad thing?” As parks struggle to provide a positive visitor experience and protect natural resources, the National Park Service may have to come to terms with diminishing demand in lower visitation parks and aggressive demand management in the most intensively used parks.

Of the 12 focus parks in IMR, the two largest parks by acreage (Yellowstone and Grand Canyon), each rural and a destination park, accounted for 29.1% of total visitation in 2010 (Figure 19). However, the two smallest acreage parks, San Antonio Missions in an urban setting and Chickasaw as a National Recreation Area, also hosted millions of visitors (1,305,000 and 2,856,000, respectively) in 2010. Obviously, travel demand and relative congestion will feel different in a large, medium, or small park hosting large, medium, or small volumes of people and management techniques will vary.

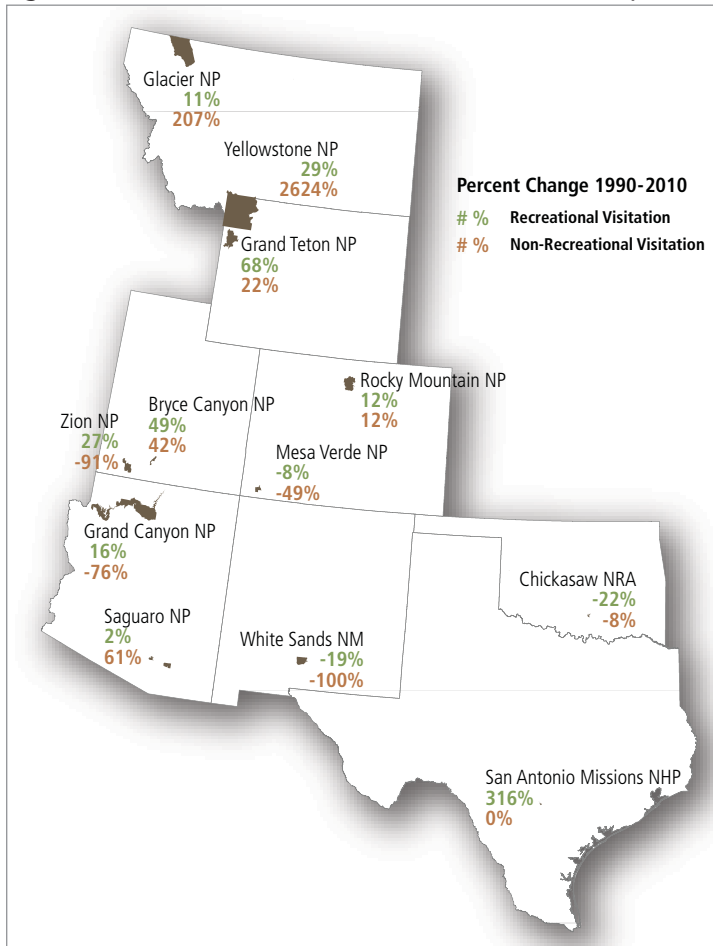
Universal assumptions of visitation growth do not necessarily apply. The National Park Service can assume, though, that the large destination parks and those easily accessible from urban areas will continue to attract large numbers, at least from those groups with the means, time, and cultural associations to take advantage of the “park experience.”



Photo by National Park Service

Yellowstone and Grand Canyon National Parks
accounted for 29.1% of total visitation in 2010.

Figure 17: Visitation Growth in IMR Focus Parks, Map, 1990-2010



Visitation in most parks is modeled based on vehicle counts and assumed vehicle occupancy. Vehicle occupancy rates are not consistently updated at all IMR parks. Therefore, some anomalies in visitation data may exist. See Data/Information Gaps at the conclusion of this section.

(NPS Statistical Abstract 2010)

Figure 18: Visitation Growth in IMR Focus Parks, Table, 1990-2010

Park Unit	Recreation Visits			Non-Recreation Visits		
	1990	2010	% Growth 1990-2010	1990	2010	% Growth 1990-2010
Bryce Canyon NP	862,659	1,285,492	49%	350,800	496,845	42%
Chickasaw NRA	1,600,628	1,253,637	-22%	1,444,500	1,331,940	-8%
Glacier NP	1,986,737	2,200,048	11%	6,000	18,445	207%
Grand Canyon NP	3,776,685	4,388,386	16%	339,600	81,881	-76%
Grand Teton NP	1,588,253	2,669,374	68%	1,092,500	1,332,651	22%
Mesa Verde NP	611,375	559,712	-8%	13,500	6,907	-49%
Rocky Mountain NP	2,647,323	2,955,821	12%	153,900	172,626	12%
Saguaro NP	702,328	717,614	2%	1,416,200	2,282,663	61%
San Antonio Missions NHP	313,443	1,304,690	316%	0	0	0%
White Sands NM	582,487	470,921	-19%	500	0	-100%
Yellowstone NP	2,823,572	3,640,185	29%	33,500	912,663	2624%
Zion NP	2,102,400	2,665,972	27%	240,200	21,900	-91%

(NPS Statistical Abstract 2010)

Figure 19: IMR Focus Park Acreage and 2010 Total Visitation

Park Unit	Total Visitation (2010) ¹	Gross Area (Acres) ¹	% of Focus Parks' Total Visitation (2010)	Recreation Visitation Category ²	Population Center
Yellowstone	4,553,000	2,219,791	14.7	High	Rural
Grand Canyon	4,470,000	1,217,403	14.4	High	Rural
Grand Teton	4,002,000	310,044	12.9	High	Rural
Rocky Mountain	3,128,000	265,758	10.1	High	Outlying
Saguaro	3,000,000	91,440	9.7	Medium	Outlying
Chickasaw	2,856,000	9,899	9.2	Medium	Rural
Zion	2,688,000	146,597	8.7	High	Rural
Glacier	2,218,000	1,013,322	7.1	High	Rural
Bryce Canyon	1,780,000	35,835	5.7	Medium	Rural
San Antonio Missions	1,305,000	826	4.2	Medium	Suburban
Mesa Verde	567,000	52,485	1.8	Medium	Rural
White Sands	471,000	143,733	1.5	Low	Rural
Total	31,038,000		100		

¹(NPS Statistical Abstract 2010)

²Recreation Visitation Category: High (>2 million visitors per year), Medium (500 thousand – 2 million visitors per year), Low (<500 thousand visitors per year)

Non-Recreational Visits

Impacts from non-recreational traffic include parks in urban, rural and suburban settings and is a growing trend in many parks in the region. Non-recreational visits in the Intermountain Region have continued a steady rise during the 20-year period from 1990 to 2010, at an annual rate of 1.4%, compared to about 0.6% annual growth for total visitation.

The overwhelming number of non-recreation visits are from pass through trips for travelers/commuters that do not have a pass of any kind. They typically do not pass the entrance station. These trips are not typically subject to entrance or other fees and present significant challenges for maintenance costs, resource impacts, safety, animal-vehicle impacts, and conflicts with the experience of recreational visitors. Others with business in the park – vendors, government personnel, contractors, citizens using NPS buildings, etc. – do not pay fees and may or may not receive a pass, depending on the park and the nature of the business.

IMR parks saw a dramatic increase in non-recreational visits during the 1990s (81% growth) as the economy boomed and jobs were plentiful. Much of the growth in non-recreation visits can be attributed to everyday commuting across parks to and from employment centers or other non-park-related destinations. This issue will continue to be of concern to parks near major metropolitan areas for the foreseeable future.

Non-recreation visits that are reported as public use:

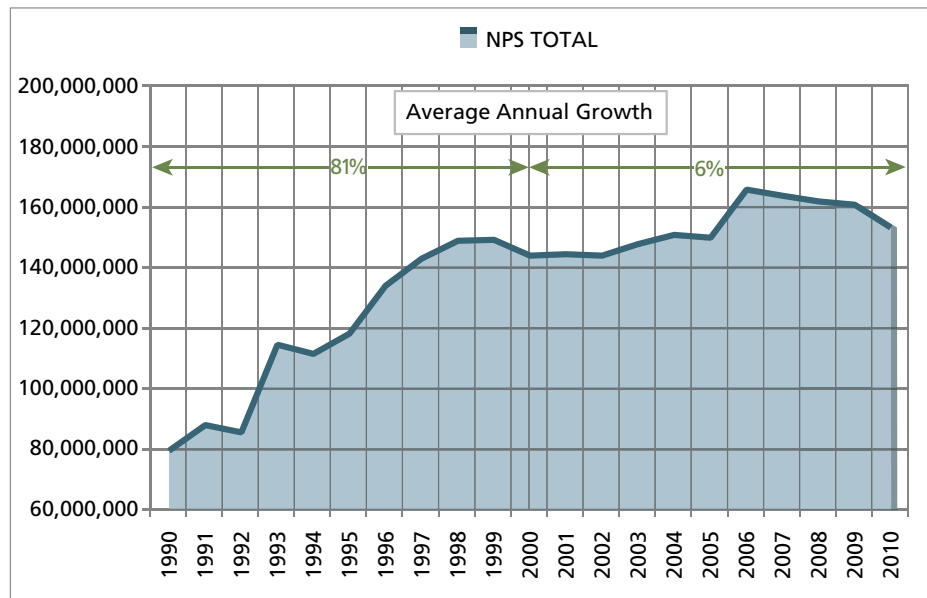
1. Commuter and other through traffic.
2. Persons going to and from inholdings across significant parts of park land.
3. Trades-people with business in the park.
4. Any civilian activity a part of or incidental to the pursuit of a gainful occupation.
5. Government personnel (other than NPS employees) with business in the park.
6. Citizens using NPS buildings for civic or local government business, or attending public hearings.
7. Research activities if independent of NPS' legislated interests and conducted on behalf of the National Park Service.

Since 1999, the average annual rate of growth has diminished to 6%. In a time of economic prosperity, and as employment recharges, the number of non-recreational trips can be expected to rise proportionally.

Many park units have added keys (like employee, vendor, etc.) to their fee booth registers to better quantify the number of non-recreational trips. National Park Service statistics are starting to more accurately reflect this (i.e. deduct them from the recreation count). So in general, better count methods are contributing to higher non-recreational counts, and more accurate counts of recreational and non-recreational across the board (Figure 20).

Figure 20: Non-Recreation Visitation, NPS, 1990 to 2010

Non-recreational traffic is a key trend for parks with state highways or major arterials within their boundaries, or next to growing areas. Many problems result from the sometimes high volumes on these roadways including safety, congestion, speeds that are not consistent with the park experience, impacts to visitor experience, and maintenance costs.



(NPS Statistical Abstract 2010)

The trend raises questions about how to address the issue. For instance:

- Are there appropriate limits to the through traffic?
- Are alternate routes available?
- Can the National Park Service recover some costs through the use of pre-pay or electronic passes?
- Are expanded partnerships with regional agencies a fruitful option?

Figure 21 shows the percent and number of non-recreational visits for the focus parks. From this sample of parks, it is clear that this problem is greatest in parks that are traversed by major roads that provide access to destinations other than the park. Travelers may have few other options for those destinations. See Baseline Conditions for more detailed park-by-park information. Specific strategies will be addressed in the Needs Assessment phase.

Figure 21: Non-Recreation Visits, IMR Focus Parks, 2009

Focus Park	Non Rec Visits	Percent
Saguaro	2,283,000	76%
Grand Teton	1,333,000	33%
Chickasaw	1,332,000	52%
Yellowstone	913,000	20%
Bryce Canyon	497,000	28%
Rocky Mountain	173,000	6%
Grand Canyon	82,000	2%
Zion	22,000	1%
Glacier	18,000	1%
Mesa Verde	7,000	1%
San Antonio Missions	0	0%
White Sands	0	0%
Intermountain Region	9,304,000	18%

(NPS Statistical Abstract 2010)

Changes in IMR Visit Characteristics 1990 to 2010

Recently available data confirms what NPS managers have suspected - the ways visitors use the parks have changed. Notably, non-recreational use has skyrocketed, with non-recreational visits up 92% from 1990 to 2010 (Figure 22). Non-recreation hours are up 86% and overnight stays are up 45%.

Recreational use has a very different look. While total recreation visits are up 10%, people are staying shorter times and doing less camping. Though backcountry camping is up about 7%, tent camping is down almost 19% and RV camping is down 40%. Recreation hours per visit are down a total of 4.4%, having decreased from 5.1 to 4.4 hours over the 20-year period. Non-recreation hours per visit have held steady at 0.5 hours from 1990 to 2010, lending strength to the argument that this time is spent on a quick drive through the park, without stops. These changes clearly indicate a different approach to visits, especially overnight visits.

Figure 22: Changes in IMR Visitation Characteristics, 1990 - 2010

Type of Visit	Percent
Backcountry Campers	6.9%
Concessioner Campers	55.3%
Concessioner Lodging	-12.6%
Miscellaneous Overnight Stays	-29.5%
Non-Recreational Overnight Stays	-45.4%
Non-Recreation Visits	92.5%
Non-Recreation Hours	86.4%
Recreation Visits	10.1%
Recreation Hours	-4.4%
RV Campers	-40.3%
Tent Campers	-18.7%

(NPS Statistical Abstract 2010)

International Visitors

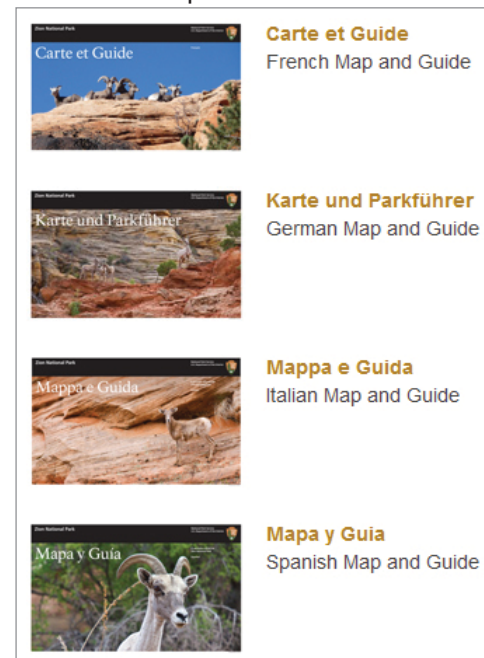
Many foreign visitors come to national parks each year, often expecting services that make their visit more enjoyable – or even possible. At Grand Canyon, 30-40% of visitors are from international locations. Different parks have employed several strategies to accommodate international visitors, including:

- Spanish translation of the website homepage by selecting the “Espanol” toggle button (all 12 focus parks)
- The park newspaper, *The Hoodoo*, in eight languages (Bryce Canyon)
- Abbreviated newspapers with information about activities, places to go and safety tips, printed quarterly in four languages (Yellowstone & Zion)
- Standard pictorial signs (Grand Canyon)

The funding, and desire, to produce information in languages other than English, may discourage efforts to develop better services for international visitors. Costs to maintain multilingual websites and other information have proven to be a barrier to implementation.

Enjoying the American outdoors and other park sites intrigues and exhilarates visitors from around the world. The idea of translating brochures, map guides, newspapers, and video presentations has and will continue to draw the attention of foreign visitors more and more each year.

Figure 23: Zion NP Foreign Language Maps and Guides



(www.nps.gov/zion)

Accessibility for Visitors with Disabilities

According to Director's Order 42 and National Park Service Management Policies (see <http://www.nps.gov/policy/DOrders/DOrder42.html>), NPS transportation systems are required to have a sufficient percentage of fully accessible vehicles or watercraft to provide effective services to persons with disabilities and make interpretive materials available to individuals with impairments (e.g. sign-language interpreters for visitors with hearing impairments, and providing audio, Braille, and large- print versions of printed interpretive materials) on transportation tours. A large range of minimum guidelines for accessibility standards are provided by the Architectural Barriers Act (ABA), for example, design requirements/standards for docks and ramps, platforms, vehicle lifts, lighting and numerous other facilities/systems). The ABA is essentially the corollary to the more familiar Americans with Disabilities Act of 1990. The ABA applies directly to activities of the Government.

Director's Order 42 indicates a growing percentage of the population that is 65 and older; those with "invisible disabilities" (such as cardiac and respiratory issues); and others having special needs. It also points out the families and friends who travel with individuals with disabilities and their needs as visitors.

The special needs community and their advocates visit the national parks on a regular basis and report on park accessibility. The National Park Service is being proactive in addressing the issue of accessibility. Projects that have an accessibility component may receive a higher priority for funding. Accessibility is addressed on a comprehensive scale, rather than just on a project by project basis.

RECREATION AND LEISURE

The trends reported in the previous section appear to have multiple causes. One trend with the most potential impact for the National Park Service is the decline in nature-based outdoor recreation among young adults and their children. While the baby boomers fueled enormous growth in outdoor recreation beginning in the 1960s, that activity seems to have peaked in the mid-1990s as the boomers' families left the nest and parents began aging and opting for other activities.

Another sector of society prefers motorized recreation such as off-road vehicles, snowmobiles, jet skis – activities largely excluded from the parks or controlled to minimize negative impacts. The National Park Service can expect a continuing decline in participation rates, especially of children, since parents typically introduce children to the outdoors. This lack of mentorship is documented across a wide range of outdoor activities including camping, hiking, fishing, and hunting. These once-popular activities are losing the next generation.

The data suggest that the average person is making fewer trips to national parks than in the past. Additional factors may include increasing urbanization of the population and less leisure time, particularly in large blocks, combined with time and fuel costs associated with visiting sites that are relatively distant from home (Walls 2009).

Unlike the Forest Service and other FLMAs, NPS is not required to provide a full range of recreational opportunities as an agency or for each unit. The NPS mission is to balance visitor access and preservation; such a balance may limit visitation in some circumstances. Other FLMAs and state and local parks provide high-impact recreational opportunities throughout the region.

Mechanized Recreation Activities

In addition to driving, motorcycling, and biking for pleasure, the emerging definition of an outdoor experience now includes snowmobiles, mountain bikes, jet skis, ATVs, and jet boats — high impact activities that often contradict with resource preservation missions (and the legislation of the park) unless these uses are properly managed. Therefore, a growing segment of the outdoor recreation user group has migrated to areas where they can engage in these high-impact activities. These generally disallowed uses may be contributing to declining visitation rates among those under age 55. The IMR will continue to monitor these issues within the context of how visitors want to travel to or within the parks and the relationship to the visitor experience and resource protection.

Driving for Pleasure

Scenic driving, or driving for pleasure, is a popular activity at many park units. It frequently ranks at the top of the “most common activities” lists in the Visitor Services Project polling results for various parks. The natural beauty of many park units is appealing enough to attract both local and non-local visitors. Pullouts for scenic vistas, proper road maintenance, and wayfinding can all enhance the scenic drive experience. Congestion, narrow roads with bicyclists, wildlife, and even the scenery itself can be a distraction to the driver. Care must be taken when considering improvements such as wayfinding or other signage, road widening, or shuttle stops to enhance, rather than detract from, the visitor experience. Park units with in-park transit service may include onboard interpretation services to offer an alternative to scenic driving, one that would enable the driver of a personal vehicle to instead enjoy the views as a passenger.

Recreational Vehicles

As a popular means of travel, with home in tow, recreational vehicles (RVs) provide a comfortable base for exploring parks. RVs, including trailers and motorhomes, are of particular concern to a number of parks from a transportation management standpoint. Many park road and parking areas predate the widespread popularity of such larger vehicles. Issues related to RV use include narrow roads, parking lots with inadequate turning areas, longer vehicles occupying more than a single parking space, and collisions during backing maneuvers. The accompanying congestion presents an expensive problem to correct with larger facilities. Some parks limit vehicles over a designated length to certain areas that are better able to accommodate them.

Commercial Tour Overflights in Grand Canyon NP

Recreationists, commercial tour operators, the Federal Aviation Administration, the National Park Service, and others have wrangled for years about the appropriateness and impacts of commercial tour overflights in the Grand Canyon. Many tours originate in the Las Vegas area where tour companies promote the flights in casinos, picking up passengers at their hotel in shuttles for quick trips over the Grand Canyon, mostly by helicopter. The tours peaked at 80,000 flights annually in the 1990s, then declined to around 48,000-57,000 annual flights in recent years.

While a final decision on overflight management is some time away, some see the possible result as the best achievable compromise; others view it as either unnecessary regulation or desecration of a priceless resource. Either way, the NPS must find the path to future visitor management that serves both the Park and its resources.

(HCN 2011)

Update: The recent (June 2012) passage of the Moving Ahead for Progress in the 21st Century (MAP-21) law included provisions seen as favorable by tour flight operators, which essentially maintains the status quo, allowing aircraft to fly over an area equal to about one-half of the park no more than 75 percent of the day. Aerial tour operators claim more than 1,200 employees and \$120 million in tourism revenue.

(Examiner June 30, 2012)

Bicycle Use

Recreational bicycling on park roads and paved or gravel pathways is available in and around many national parks. Restrictions are noted on park maps, in park newspapers, and on park websites, along with cautionary statements reminding cyclists of the common nature of park roads, e.g., narrow, little or no shoulders, steep slopes, and/or tight turns. Reduced gate fees (as compared to vehicle fees) are offered to cyclists at some parks.

However, another on-going debate within the National Park Service considers whether the allowed use of mountain bikes should be increased in national parks. Mountain biking enthusiasts continue to advocate the use of bikes on single-track trails in the backcountry. From the preservation standpoint, biking on backcountry trails can dramatically change the experience for non-mechanized visitors and contribute to resource degradation in certain areas, especially erodible soils. An advantage worth considering is that allowing increased trail use may be a way to help the younger generation enjoy the parks as a relevant part of their recreational activities and perhaps to encourage life-long stewardship (Walls 2009). Currently, designating a trail as a bike or multi-use trail requires promulgation of a special regulation to allow for off-road cycling, a process Saguaro NP conducted in 2012 to change the designation of Hope Camp Trail to a bicycle route.

Snowmobiles

Debate about whether to allow or restrict snowmobile use has been focused on Yellowstone and other nearby units, although the implications extend to others. The debates have extended to the courts. In May 2011, the National Park Service released the Winter Use Plan Draft Environmental Impact Statement. It identified a preferred alternative that took a new approach by varying the maximum number of oversnow vehicles allowed in the park for certain days and periods during the winter season. The National Park Service intended to have a final EIS, a Record of Decision, and a final rule guiding winter use in place before the start of the 2011-2012 winter season. However, the public filed more than 58,000 responses during the 60-day comment period, prompting further analysis of the issues and publication of a Final Rule that allowed for a “transition year” during the 2011-2012 winter season. A Supplemental EIS and long-term regulation is anticipated before the start of the 2012-2013 season.

Off Highway Vehicles

Off highway vehicle (OHV) use on NPS lands has fueled ongoing debate arising from the agency’s dual mission to provide recreational opportunities while preserving and protecting park resources. Only 12 park units servicerwide are open to public OHV use, including two in the Intermountain Region: Lake Mead and Lake Meredith. However, the extent of unauthorized OHV use is under investigation and may be extensive in some park units. Ten additional units are developing education and deterrence programs to address unauthorized use, which could serve as models at other NPS sites.

Personal Watercraft

Since 2003, the National Park Service has completed regulations to open designated motorized personal watercraft (PWC) areas at 13 units. Seven of the park units are National Recreation Areas within the IMR: Amistad (TX), Bighorn Canyon (MT), Chickasaw (OK), Curecanti (CO), Glen Canyon (AZ/NM), Lake Mead (NV), and Lake Meredith (TX). As National Recreation Areas, water-related recreation is a primary purpose of the park and those parks have Park Designated PWC Use. A federal judge ordered in 2010 that the National Park Service re-examine environmental assessments justifying PWC use at two park units (outside the IMR) but did not overturn existing regulations. One additional unit (outside the IMR) has proposed allowing PWC use. As with mountain bikes, there are implications for PWC use regarding future stewardship, including noise and fuel emission impacts (Calvert 2010).

Bicycle Sharing and Rental Creates New Opportunities for Visitors and Employees

Public lands agencies, including the National Park Service, are increasingly turning to cycling as a tool to improve transportation and visitor experience. An emerging “Fourth Generation” of programs are beginning to use modular/portable bicycle stations. These stations may be battery or solar powered, reducing the need for expensive and invasive infrastructure. Bicycle programs can be adapted for visitors and employee and have a number of attractive benefits:

- Reducing transportation-related pollution and impacts on the environment
- Providing better access to remote/sensitive areas
- Enhancing the quality of visitor experiences
- Dispersing visitors away from heavily used developed areas
- Reducing automobile-related congestion and parking shortages
- Promoting good health and increased physical activity among the participants
- Creating a more balanced transportation and recreation network to preserve the landscape for future generations

Public bicycle programs may either be of the “shared” or the “rental” variety. The differences are illustrated in the following table.

Public Bicycle Sharing	Traditional Bicycle Rentals
Shorter term encouraged by pricing strategy	Longer term recreation use is typical
Dispersed network of unattended stations for bicycle pick up and drop off, enabling one-way use of bicycles	Single location that is staffed for bicycle pick up and drop off
Targets bicycle use for public transportation; typically encourages short trips	Targets bicycle use for recreation
Subsidized by various sponsors, similar to other public transportation	Traditional for-profit business model
Technology used to track bike location and use	Traditional bicycles do not incorporate tracking capabilities.
Designed for adults (Europe and Canada typically allow riders 14 years and older while U.S. typically allow 16 years and older)	May accommodate families by providing children’s bicycles and/or trailers. Also may accommodate people with disabilities with specialty bikes (3-wheels, hand cycles, etc.)

Intermountain Region Examples:

Bright Angel Bicycle Rentals, Grand Canyon National Park

This bike rental facility, with 85 bikes, opened in May 2010. A guided bicycle tour can be purchased by users, who can also make use of bike-on-bus options. The program helps meet Park goals of providing access without needing a personal vehicle and to improve visitor experience.

Glacier National Park Red Bikes

This fleet of 27 bicycles is available for use by employees within the park. Bicycles are located in areas where employees frequently travel between facilities, and provide them an alternative to driving a vehicle for short trips. This is a Climate Friendly Park initiative to help reduce emissions.

(Bicycle Options 2012)

COMMUNICATIONS TECHNOLOGY / ITS

Many new ways of recreating have emerged that affect not only what people choose to do in national parks, or elsewhere, but how they plan for and experience the natural world. The revolution in technological communication is prominent among these. The society at-large has very quickly become accustomed to a wide range of technologies, and wants to be “connected” all the time. The parks have not historically been at the cutting edge of new technology and have been slow to make the connections. Some parks have ventured into the field, with varying levels of success.

“Although some believed that use of some technologies may be degrading park experiences, the Committee found a growing realization that such technologies and the expectations and habits of those who use them (especially younger populations), can increase connectivity with parks and the values they contain, and create conditions for more meaningful park experiences.”

(Second Century - Connecting People 2009)

New Technologies

A recent report by the National Parks Second Century Commission, *Connecting People and Parks*, explored the ways people are communicating today and found that the parks come up somewhat short in accommodating new technologies. There is certainly not universal agreement on adopting new technologies in parks, as some may conflict with a desirable park experience. The Commission found that these innovations have a largely unknown effect on the park experience even though both users and park managers are increasingly anxious to put new technologies to use as an improvement to the visitor experience and to widen the base of potential visitors.

Three broad issues were identified in the *Connecting People and Parks* report:

1. Parks and the Park Service are generally not allowed to use new communication and social networking technologies on government-supported websites because of security concerns. These regulations severely dampen the ability of the Park Service to benefit from the new communication processes that visitors may access to make decisions about what to do, where to go, or what services are worthwhile for their social group. This condition is especially acute for young, “hip” users of web-based communication technologies.
2. Visitor centers and other locations where visitors gain information in parks are more and more often viewed as out-of-date and old fashioned. They are not friendly to the ways in which more and more tech-savvy visitors gain information once in a park, or to increasing amounts of information that is available to visitors before they come to a park.
3. Websites and in-park information are not usually available in languages other than English. “Best practices” adopted by the Office of Management and Budget (OMB) strongly encourage parallel websites for each language used rather than using auto-translation programs, and current mythology within the Service indicates that such programs are unreliable and inaccurate in translation. Maintaining one website for a system as large as the National Park System, with nearly 400 parks and a myriad of other subdivisions, takes massive resources. Replicating such information for millions of Americans who communicate most easily in languages other than English is untenable financially, and single-page substitutions are unfair for people whose right it is to access their national parks. The Park Service and the OMB need to reassess current dogma.

(Second Century 2009)

Developments in communication technologies in the past twenty years have changed the manner in which people can plan their park visits. With internet access and cell phones now standard household fixtures for many demographic groups, information is becoming more available to guide visitors in advance (pre-trip planning), en-route, and upon arrival at the park unit.

Internet and Social Media

Each park unit has its own website, www.nps.gov/ABCD, where ABCD represents the park's four letter alpha code. The park websites are an excellent source of information. The standard format includes a "Plan Your Visit" section that identifies available forms of social media.

While visiting park websites, the public can subscribe to Really Simple Syndication (RSS) feeds and receive news releases via email. Yellowstone National Park transmits transportation related news via RSS feeds, including recent announcements of a road closure due to washout and the spring season opening date of various park roads. RSS feeds are one-time news releases.

The National Park Service published a guide in December 2011 that describes strategies and outreach tools available with social media. The National Park Service is exploring expansion of its use to communicate with park visitors.

Twitter offers news releases but with much less detail as "tweets" are limited to 140 characters per message. Yellowstone National Park tweeted road openings and road update telephone numbers this past spring. Lake Mead National Recreation Area's Climate Friendly Park Action Plan lists the use of Twitter and Facebook as a tool to notify the public of boat launch ramp waiting times to allow the incoming boater to select the launch area with the shortest wait and thus reduce vehicle idling time.

The *ITS in NPS and Other Federal Public Lands – 2011 Update* report notes that social media is an untapped resource for disseminating travel and visit information. While park units are restricted in their ability to host, for example, a Facebook page, friends groups are able to do so (Volpe 2011).



Figure 24: Social Media in Use by the 12 Focus Parks

Focus Park	Facebook	RSS Feeds	Twitter	Flickr	Park Ranger Blogs	YouTube	Podcasts
Bryce Canyon	◆		◆				
Chickasaw							
Glacier	◆	◆	◆	◆	◆		
Grand Canyon	◆	◆	◆	◆		◆	◆
Grand Teton	◆				◆	◆	◆
Mesa Verde		◆					
Rocky Mountain	◆		◆				
Saguaro	◆						
San Antonio Missions	◆	◆					
White Sands							◆
Yellowstone		◆	◆				
Zion		◆	◆				

(URS survey of park websites, June 2012)

Cell Phones and Smartphone Applications (Apps)

The use of cell phones continues to be a hot topic of discussion within the National Park Service and among park visitors. Many visitors request cell phone access wherever they go. Others are satisfied with a more primitive experience. Whatever the case, the issue is prevalent and remains unsettled. The advantages or disadvantages are many.

No longer just a matter of whether cell tower coverage is adequate to make or receive phone calls, some users desire coverage to receive email or Twitter feeds and to use their smartphone apps. As stated earlier, while many park users want to visit a park unit to get away from it all, there are many who want to stay “plugged in” with their electronics.

Oh, Ranger! is a free smartphone app, though commercially sponsored, that allows the user to identify federal, state, and local parks in a geographic area by searching for activities (auto touring, camping, caving history & culture, etc.) that are available in the park. This app is in its first generation of development and will evolve.

The Federal Highway Administration, the National Park Service, and other Federal land management and tribal agencies partnered to develop a mobile app, *Byways to Battlefields*, to promote the 150-year anniversary of the American Civil War. By offering user friendly travel tours, a calendar of events, and links to related sites, the app provides an opportunity to encourage America’s Byways® travelers, both new and existing, to get out and explore our nation’s byways and public lands.

At the time of this writing, the National Park Service has published two park specific apps, one for the National Mall and Memorial Parks (National Capitol Region) and one for Boston National Historical Park (Northeast Region). The apps, available for free, provide wayfinding, interpretive, and event information to the user and allow the creation of a custom walking tour. A successful reception of these apps, determined perhaps by the number of downloads and user feedback ratings, could lead to the development of additional park specific apps.

Worth noting is that unofficial non-National Park Service apps are also available for free or a fee by private developers, which provides a source of unofficial communications. Some offer trip planning information while others claim to offer pertinent real-time information for the visitor who is in-park. For example, visitors to Yellowstone may have downloaded *Where’s a Bear?* or *Yellowstone Wildlife*, apps which allow users to post pictures, time, and location of wildlife sightings so others in the vicinity can hurry over and also see the animal(s). Wildlife sightings are a significant draw to certain national parks and visitors are eager to see various species; however, roadside sightings may cause congestion despite signage directing drivers to keep moving until they can safely park in a designated area.

Figure 25: Advantages and Disadvantages of Cell Phone Use in National Parks

Advantages	Disadvantages
The Telecommunications Act of 1996 allowed cell towers to be built on federal lands	Most large national parks are open spaces and in remote locations, making the delivery of cellular service expensive and spotty
About 30 national parks have cell towers providing at least partial coverage in the most-visited areas	Considered to be intrusive on the visitor experience by some
Many national parks are trying to camouflage the towers so they don’t take away from the scenery	Cell towers can be a visual intrusion in national parks
Visitors are at times hesitant to use trails out of fear of getting lost and not being in contact	Security concerns create limitations on the use of social networking tools

(URS summary)

Intelligent Transportation Systems (ITS)

A key objective of the Alternative Transportation Program is to seek solutions to transportation problems that alleviate the need for additional roadway facilities. ITS holds the promise to accomplish this objective. ITS is the application of advanced information and communications technologies to improve transportation safety and efficiency and represents a means by which the National Park Service can devise sustainable solutions to current and future transportation challenges (Plosky 2001).

As an integral part of park road and alternative transportation system improvements, ITS can effectively address many of the challenges associated with increasing park visitation. The National Park Service is considering upgrading its communications infrastructure as one means to address some of its problems. Restrictive issues surround the installation and use of technologies such as fiber optics (cost and disruptive underground burial of lines) and radio transmission (requires clear line of sight or adds visually intrusive repeater stations).

A well-defined set of transportation problems has been successfully addressed with ITS and communication technologies:

- Overcrowding
- Congestion
- Parking
- Public safety
- General visitor information

The 2011 update report on *ITS in the National Parks System and Other Federal Public Lands* documents the use of ITS in public land units, notes little expansion of ITS technologies in recent years, and outlines steps to further deploy ITS. The report identified 19 technologies in use throughout various federal lands and categorized them into Travel & Traffic Management, Incident Management, Entry Management, Public Transportation Management, and Other. Figure 26 shows ITS technologies in use in the IMR focus parks as reported by the 2011 update. (Volpe 2011)

Dynamic message signs (DMS), Highway Advisory Radio (HAR), 511 system integration, traffic counters and loop detectors, and social media tools have been used effectively. DMS and HAR, though not new technology, are useful tools that fit with the needs and limitations of certain park units. Integration with 511 systems, typically operated by a statewide entity, is a beneficial service available at low-cost to public lands units. Expanded use of social media tools, as discussed previously, is likely to develop as the public's expectation of access to information in this manner continues to increase.



As shown in this graphic simulation, Variable Message Signs can blend with the park environment. Images from Zion Canyon Transportation System Technical Analysis, 2011

The need for ITS varies from park unit to park unit. Technologies can be tailored to fit the needs of the individual parks units. A 2001 Volpe report examined ITS technologies and offered some examples (listed in Figures 26 and 27) of technologies and tools that could be applied to National Park Service needs.

Figure 26: ITS Technologies in Place in National Park Service Intermountain Region Focus Parks

Park Unit	Travel & Traffic Management							Incident Management	Entry Mgmt	Public Transportation Management				Other					
	Dynamic Message Signs	511 System Integration	Highway Advisory Radio	Trip Planning Tools (Innovative)	Loop Detectors/ Traffic Counters	Integrated Traffic Monitoring System	Parking Management/ Availability	Automated Road Weather Information System	Road Surveillance	Work Zone Management	Incident Management System	Automated Entry System	Automated Fee/ Fare Payment	In-Vehicle Electronic Information	Vehicle Tracking System	Automated Passenger Counters	Operations & Fleet Management	Coordinate with Other Agencies	ITS Needs Assessment/ITS Architecture (Year)
Bryce Canyon	◆	◆	◆		◆							◆						◆	
Glacier		◆		◆	◆			◆		◆					◆				◆
Grand Canyon	◆	◆	◆	◆	◆				◆			◆		◆				◆	
Grand Teton	◆	◆			◆				◆									◆	◆
Rocky Mountain	◆	◆	◆	◆								◆	◆					◆	
Yellowstone	◆	◆	◆		◆							◆						◆	◆
Zion	◆		◆															◆	'06

(Volpe 2011)

Figure 27: Key ITS Tools

Electronic Payment	Automating fee payments using toll-tag or smart-card technology greatly reduces congestion at park entrances. To the extent electronic payment can be integrated across all available visitor transportation services, visitors will have the convenience of a seamless payment mechanism. The system can provide information about park usage and visitation patterns whether a fee is collected or not.
Incident Management	An incident is anything that disrupts the safe and efficient operation of a transportation system. Early detection and assessment of incidents can allow timely and measured responses to restore safe and efficient transportation operations – thus minimizing the adverse impact of incidents on the visitor experience and/or park resources.
Transportation Data Collection	A wide variety of pavement, bridge, and traffic sensors, motor vehicle classification technologies, and automated passenger counting systems are available to help agencies collect and optimize transportation operations and investment decisions.
Parking Management	ITS can monitor parking area use and transmit information about parking availability or closures to any location or to the web.

(Plosky 2001)

However, as with many types of solutions, this is not a one-size-fits-all application. Multiple hurdles need to be overcome to be successful.

Advanced Technologies

Major past technological shifts (e.g., from railroad to auto, from dirt to pavement, from low-speed to high-speed autos, etc.) have had significant influence on transportation infrastructure development and its relationship to and deployment in national parks. With continued research and development in clean fuel technologies, materials technologies, computerized management systems, pavement technologies, lightweight bicycles, electric cars, and devices such as Segways, to name a few, there is the potential for a very different future in the national parks. Look back just 20 years to when no electric cars were available to consumers; GPS-based auto navigation systems were not available; the internet had not developed commercially; and cell phones—big, bulky, and without texting capabilities and smartphone applications—were just beginning to emerge on the market. Now look ahead 20 years. What will signs look like in 20 years? Multi-modal options? Cars? Will there be solar charging stations located conveniently to recharge some vehicle we have yet to imagine?

Accepting and embracing an improved future in transportation systems, infrastructure, and management of the national parks will be critical. Upfront costs of technology can be steep and require a big infrastructure cost. Major questions are now on the table:

- Will the National Park Service have the capital to implement all or some the upcoming great ideas and technologies?
- Should the National Park Service only adopt emerging technologies in select locations?
- Are there corresponding costs to the visitor experience or natural resources?

ITS Implementation Hurdles

- Lack of fiber optic and other information transmission media in remote locations, including electric power
- Coordination required with regional and state ITS architecture and initiatives
- ITS alone not likely to fully mitigate parking or congestion problems
- Electronics equipment intrusion into natural settings
- Lack of funding and resources for ongoing ITS operations and maintenance
- Regulations limit use of social networking on NPS systems
- Visitor centers often technologically obsolete (Calvert, Vincent, Gorte 2010) and (Plosky 2001)

SUMMARY OF THE EFFECTS OF DEMOGRAPHIC CHANGES ON PARK TRANSPORTATION MANAGEMENT

The previous section outlined a series of sometimes revolutionary changes in the makeup of visitors, their demands, and the way they interact with parks. If the National Park Service chooses to meet this evolving transportation demand, it will have to similarly evolve its management and facilities. The ability – or the need – to evolve toward the fulfillment of growing pressures to accommodate greater visitation and visitor expectations is a question yet to be answered. The National Park Service must examine the costs in dollars, depletion of natural resources, and the historical understanding of the visitor experience, and then weigh the trade-offs to determine its best path.

Key Messages: Relationship of Population Changes to Recreation, Leisure, and Visitation

General Growth Pressures

Population growth across the Intermountain Region does not appear to correlate well to growth in park visitation. Current trends show marked visitation increases in larger, iconic parks, while smaller parks and those more difficult or costly to access are actually losing visitors to a variety of causes. The Intermountain Region may choose to redistribute visitation across the system, but other pressures may counter such marketing or information campaigns. Absent increased funding, the Intermountain Region may need to consider whether higher levels of congestion in the most visited parks is acceptable, while allowing smaller, less visited parks to manage the best they can with a declining state of repair.

Aging Visitors

Services for aging visitors are associated with wayfinding and signage, RV accommodations for parking, transit and shuttle use, and accessibility. The costs of such accommodations for this growing population segment will have to be weighed against funding, resource impacts, and the evolving understanding of the NPS Mission. Must visitor access be provided to all, and at what cost?

Ethnic Diversity

Visitor participation by ethnic minorities is historically low and presents an ongoing challenge. The region's minority population will grow even higher as a percentage of population even as ethnic visitation rates trend downward. Newly emigrated groups face a series of obstacles to the National Park Service experience through language, cultural, and historical barriers. The National Park Service may choose to evolve its image and practices to become more attractive to diverse groups. This evolution will include decisions about how educational efforts and better transit links to parks, especially in urban areas, might overcome the deficit.

Recreational Visits

Recreation visits are up only 3.0% in the Intermountain Region since 1990. However, the distribution of visitation and its growth is not equal across the region. Dominant factors in visitation growth rates include the size of the park and its location. Larger parks and those in close proximity to urban areas attract the most visitors. Transportation operations in congested parks, negative visitor experience, and costs stemming from increased visitation stimulate conversations about potential limits based on the capacity of the park and its budget to support additional growth.

Non-Recreational Visits

Non-recreational visits are increasing at a faster rate than recreational visits, although the longer term trend has moderated in the current economic slowdown. This trend also is not common to all parks, but is a significant problem to several focus parks. The vast majority of non-recreational visits are from those passing through the park for work-related trips on a regional or urban arterial. These trips are not typically subject to entrance or other fees and present significant challenges for maintenance costs, resource impacts, safety, animal-vehicle impacts, and conflicts with the experience of recreational visitors. Some parks are seeking stronger planning and funding partnerships to lessen the burden of significant impacts to roadways and congestion.

Visitation Characteristics

Visitors are spending less time in parks per visit and trending toward a less primitive experience. These characteristics imply a heavier demand on developed facilities, such as visitor centers, parking areas, and at popular locations. Attempts to mitigate some of the effects of short-term, concentrated uses such as redistribution of visitors to under-utilized areas may introduce other unwanted impacts. Redirecting visitors may create congestion at previously uncongested points, require additional infrastructure development, and spread environmental impacts to lightly-used areas.

Key Messages: Relationship of Population Changes to Recreation, Leisure, and Visitation
continued

Economic Contributions

The Intermountain Region, with its eight large states and 92 park units, accounts for the largest share of jobs, payroll, and spending when compared to other National Park Service regions. The economic contributions represent a significant proportion of the national, regional, and local economies. The National Park Service, gateway communities, and other partners are interdependent and continue to leverage the strengths of each for mutual success. Economic sustainability depends, in part, on transporting visitors to and within parks.

Mechanized Recreation Activities

Researchers have documented a general decline in nature-based outdoor recreation among young adults and their children. Some sectors prefer a more mechanized recreation experience that is often off limits in parks. The many forms of mechanized transportation desired or expected by a new generation of outdoor enthusiasts present significant management challenges in parks where they are allowed or contemplated. Impacts from noise, air, and visual pollution, as well as water quality and soil disturbance, are very real concerns. Limits on high impact recreation may redirect visitors elsewhere while simultaneously raising demands for more access to previously restricted opportunities. This presents a very real challenge to park managers as they seek to balance visitor access with resource protection, both components of a complex visitor experience. Each park will need to proactively determine if additional recreation opportunities are integral to that park's experience, and then adjust management strategies as necessary.

Communications Technology

The revolution in electronic communications will accelerate over time. Some population groups see new technologies such as social networking as intrusive, while others fully expect that the instant communication they rely on daily is available in parks. The call for the National Park Service to upgrade its use of advanced communications of all types, from the Internet to cell phone applications to real time traffic information, has significant implications. Many benefits are available both for the traveling public and park managers. The costs to install and manage such systems are not small. Park managers, with regional and national oversight, must determine which strategies are appropriate in each location, given the costs and benefits to the visitor experience and natural resources.

Intelligent Transportation Systems (ITS)

With only a limited ability to add transportation capacity in congested parks, ITS holds promise to assist in managing congestion through traveler information, traffic, and visitor reporting systems. Regulatory, technological, and funding obstacles often prevent full implementation, although some parks such as Grand Canyon have had a great deal of success in the arena.

SECTION TWO: ADAPTING TO A NEW LANDSCAPE

The National Park Service is adapting policies and management to meet the evolving challenges of the landscape. The world of three billion people of a generation ago has now broken the seven billion person barrier and may be headed for nine billion by mid-century. The new paradigm of more crowding, more resource consumption, more atmospheric carbon, and more demands on the national parks has revealed a new landscape. While some activities can be mitigated within the NPS jurisdiction, it is also prudent to adapt management philosophies, plans, and programs to face these evolutionary developments in ways that preserve the NPS mission to protect the resources and foster access by visitors.

The country's unparalleled growth spurt has reconfigured the landscape. Many of the old standards are gone; the new ones are in developmental stages. While NPS domains have always faced threats, their management has been generally successful in creating a satisfying equilibrium. Historical resources have been identified, preserved, and interpreted. Forest fires have been managed, often to the benefit of the local forest. Invasive species have nipped at the edges for generations. Threatened and endangered species have found refuge within the parks. Visitors came to camp and hike, engage with the interpretive exhibits, and experience the parks' offerings, all in relative seclusion and leisure. However, the sheer scale and breadth of emerging threats to the landscape is unparalleled in National Park Service history.

The sheer numbers of people living and recreating in the Intermountain Region has an undeniable effect, even if visitation is relatively flat across the region. Population growth and development near parks threatens to disrupt ecosystems and contribute to growing environmental threats to water and air quality, noise pollution, and bright night skies. Energy development in all forms, green or not so green, is an ever present force in nearly every part of the region. Finally, the transformation of climate threatens to overwhelm the system with insect infestations, wildfires, severe weather, damage to critical infrastructure, and animal and plant migrations – or extinctions.

This section examines some of the most urgent trends emergent today, especially in their relationships to transportation, and begins to point toward some decision points for managing such dramatic changes.

NATURAL HAZARDS RISK ASSESSMENT

The natural hazards risk assessment for the IMR LRTP defines a framework to determine risks that are present in the region and the level of vulnerability to park transportation facilities and services. While such risks can be broadly identified at the regional level, specific vulnerabilities are unique to each park dependent on elevation, climate, and other factors. Each park should seek to further establish its own risks and vulnerabilities so as to plan for and adopt implementation strategies to prevent, mitigate, or prepare for future events (CO Hazard Mitigation 2004).

Several issues rise quickly to the top when considering the risks posed by natural hazards. These risks are outside the possibility of elimination by the National Park Service. What the National Park Service can do is manage the effects and pro-actively adapt to present or anticipated changes. The first step is to identify the risks faced by IMR parks. Figure 28 outlines the most prevalent natural hazards risks in the IMR by state. Each of these risks has implications for the transportation system, its management, and for planning.

Figure 28: Natural Hazard Risks by State

Natural Hazard Risks by State	Intensified by Climate Change	Arizona	Colorado	Montana	New Mexico	Oklahoma	Texas	Utah	Wyoming	Effects on Transportation (Examples)
Avalanche	◆		◆	◆				◆	◆	Visitor safety; Pre-emptive mitigation costs; Infrastructure damage; Road closures.
Drought	◆	◆	◆		◆	◆	◆	◆		Species migration or changes may affect visitation patterns, i.e., wildflower viewing).
Earthquake									◆	Infrastructure damage; Visitor safety.
Extreme Weather Events	◆	◆	◆	◆	◆	◆	◆	◆	◆	Frequency/duration storms; Extreme precipitation.
Flash Floods/ Floods/Streamflow Changes	◆	◆	◆	◆	◆	◆	◆	◆	◆	Erosion of stream channels; Sedimentation; Bridge pier scour; Loss of wetlands; Damage to riparian systems; Visitor safety.
Hail	◆		◆			◆	◆			Vehicle damage; Flooding of low lying areas; Road closures.
High Winds	◆						◆		◆	Additional stress to infrastructure (bridges, buildings); Visitor experience.
Hurricane	◆						◆			Flooding/wind damage to roadways; Erosion of roads and bridges.
Invasive Species	◆	◆	◆	◆	◆	◆	◆	◆	◆	Competition with other natural resources; Visitor experience
Landscape & Habitat Connectivity/ Fragmentation	◆	◆	◆	◆	◆	◆	◆	◆	◆	Impacts to wildlife; Visitor experience.
Landslide		◆	◆	◆	◆			◆	◆	Infrastructure damage; Area closures.
Sea Level Rise	◆						◆			Flooding damage to roadways; Erosion of roads and bridges; Infrastructure relocation.
Snow Cover	◆		◆	◆					◆	Changes in spring run-off dates and volume affect high altitude road openings/closures; Drainage management
Temperature Extremes	◆	◆	◆	◆	◆	◆	◆	◆	◆	Construction materials choices (paving, paint, signage); Increased streamflow (bridge and road scouring).
Tornados	◆					◆	◆			Wind damage to facilities.
Wildfire	◆	◆	◆	◆	◆	◆	◆	◆	◆	Habitat and viewshed damage affects visitor experience; Area closures.

(URS summary)

All risks identified in Figure 28 are inherent to the IMR under historical circumstances. However, each risk, and its effects on transportation, is intensified by the prospect of climate change. Climate change is a key factor in future natural hazard risks. The reader is encouraged to consult the Resources section at the conclusion of this report and the many other widely available documents and reports discussing the issue. The remainder of this section will discuss several inter-related hazards that have captured the interest of many park managers and planners.

Climate Change

Climate change and the implications for transportation infrastructure and management have captured the attention of decision makers, planners, and managers across the nation, including the National Park Service. According to a Natural Resources Defense Council (NRDC) report, 7 of the 12 Western National Parks most at risk as a result of climate change are found in the Intermountain Region (NRDC 2009).

While many argue about the causes of climate change, few scientists deny that it is happening. The measureable proportion of carbon dioxide (CO₂) in the atmosphere has increased dramatically and the modeled effects of the increase are observable. Nine of the ten hottest years on record since 1900 have occurred in the last 10 years; the tenth hottest year was 1997.

Warmer temperatures are accelerating the melting of mountain glaciers, reducing snow pack, and changing the timing, temperature, and amount of streamflow. These changes are expected to result in the loss or relocation of native species, altered vegetation patterns, and reduced water availability in some regions. Wildfire seasons have expanded, and fires have increased in severity, frequency, and size. Conditions that favor outbreaks of pests, pathogens, disease, and nonnative species invasion occur more frequently than in the recent past.

Rising sea levels, ocean warming, and acidification affect wildlife habitat, cultural and historic features, coastal archeological sites, and park infrastructure, resulting in damage to and the loss of some coastal resources. Some studies suggest that extreme weather events such as thunderstorms, hurricanes, and windstorms that damage park infrastructure and habitat are increasing in frequency and intensity.

"Most scientists agree that the continuing growth in both the rate and total amount of GHG emissions will likely increase the magnitude of climate change effects and thus the exposure of the transportation system to corresponding environmental threats. The nature of these climate threats will vary from region to region, generally depending upon an area's geographic layout, typical climate conditions, and latitude, among other factors. In response, there is now discussion among the transportation community about the need to develop adaptive strategies to increase the resilience of the transportation system to likely climate change threats."

(Schmidt and Meyer 2008)

Figure 29: Climate Change at a Glance

Effects of Climate Change	Impacts on Transportation	Possible Areas of Adaptation/ Mitigation
• Migration of plant, insect, and disease vectors northward (very likely, 90%) • Increased intensity of precipitation, except in the Southwest (very likely, 90%) • Sea level rise (virtually certain, 99%) • More very hot days with concomitant heat waves and fewer cold days (very likely, 90%) • Rise in Arctic temperatures (virtually certain, 99%) • Changes in precipitation patterns (very likely, 90%) • Increase in the intensity of strong hurricanes (likely, 67%)	• Softening and buckling of pavements • Erosion of road base and bridge supports (scouring) • Thermal expansion of bridge expansion joints • Limits on construction or maintenance activities due to altered habitats or life cycles of endangered species • Vehicle overheating (resulting in roadway incidents) • Flooding of coastal roads, tunnels, and rail lines • Rail-track deformities • Increases in weather-related delays and traffic disruptions • Increased susceptibility to wildfires, reduced visibility, and damage to road and other transportation facilities • More frequent and potentially more extensive emergency evacuations	• Develop a detailed climate vulnerability assessment and adaptation plan for transportation infrastructure • Incorporate climate change vulnerability assessment planning tools, policies, and strategies into existing transportation and investment decisions • Develop transportation design and engineering standards to minimize climate change risks to vulnerable transportation infrastructure • Incorporate climate change impact considerations into disaster preparedness planning for all transportation modes

(Schmidt and Meyer 2008)

Vehicle Emissions and Transportation

The transportation sector accounts for about two-thirds of fossil fuels consumed each year in the United States. Cars and light trucks account for 85% of all passenger miles. Projections assume that cars and light trucks will remain the dominant means of personal transportation in the United States, although the total amount of energy used by these vehicles is expected to remain relatively stable, increasing by only 10% from 2010 to 2035 (TRB Energy 2011).

By 2030, only about two-thirds of all new vehicles are expected to be solely gasoline powered. Transportation's share of national energy consumption will therefore remain fairly stable due to increased use of greener fuels. Even stabilization of emissions at current levels for the next four decades will add to the toxic overhead if increases in population and economic growth continue as expected.

Nearly all of the fuel savings from the anticipated annual 1.8% increase in vehicle efficiency will be countered by increased vehicle use (TRB Energy 2011).

Air quality compliance in non-attainment and maintenance areas identified under the Clean Air Act Amendments of 1990 is integrally related to emissions reductions. The primary source of criteria pollutants from mobile sources is automobiles and trucks. The criteria pollutants include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and sulfur dioxide (SO₂). The reduction of emissions and the role of transportation in national parks are closely related topics that deserve close attention in collaboration with partner agencies such as metropolitan planning organizations, state departments of transportation, and the Environmental Protection Agency.

National Park Service Climate Change Response Strategy

The National Park Service Climate Change Response Strategy provides agency direction to address the impacts of climate change. It describes goals and objectives to guide National Park Service actions under four integrated components: science, adaptation, mitigation, and communication.

Many national parks and regional offices began several years ago to reduce their carbon footprint and communicate the consequences of climate change through interpretive programs and educational materials. More than 70 parks, 11 in the IMR, are now participating in the “Climate Friendly Parks Program,” which the National Park Service initiated in collaboration with the Environmental Protection Agency in 2002. The branch for Sustainable Operations and Climate Change (SOCC) was subsequently created in the Park Planning, Facilities, and Lands Directorate, emphasizing the National Park Service commitment to reducing its carbon footprint and promoting effective adaptation response for facilities and infrastructure (NPS Climate Change 2010).

Figure 30: National Park Service Integrated Climate Response Strategy

Science Goals
Use the best available scientific data and knowledge to inform decision making about climate change.
Collaborate with partners to develop, test, and appropriately apply climate change models to National Park Service activities.
Inventory and monitor key attributes of the natural systems, cultural resources, and visitor experiences likely to be affected by climate change.
Use best available science to evaluate and manage greenhouse gas storage and emissions in national parks.
Adaptation Goals
Incorporate climate change considerations and responses in all levels of National Park Service planning.
Implement adaptation strategies that promote ecosystem resilience and enhance restoration, conservation, and preservation of park resources.
Develop, prioritize, and implement management strategies to preserve climate-sensitive cultural resources.
Enhance the sustainable design, construction, and maintenance of park infrastructure.
Mitigation Goals
Substantially reduce the National Park System’s carbon footprint from 2008 levels by 2016 through aggressive commitment to environmentally preferable operations.
Integrate climate change mitigation into National Park Service business practices.
Promote biological carbon sequestration as a function of healthy ecosystems.
Communication Goals
Increase climate change knowledge and understanding within the National Park Service.
Provide external communications about the implications of climate change and the National Park Service response.
Model and communicate sustainable practices that lead by example.

(NPS Climate Change 2010)

Climate Friendly Parks Program

Founded in 2003, the Climate Friendly Parks (CFP) program represents a partnership between the SOCC branch of Park Facility Management Division and the Air Resources Division. The CFP program provides the tools and technical and financial support for parks to assess and decrease their emissions and to educate staff and visitors about climate change. Through the program, parks develop sustainability/climate action plans that involve improving energy efficiency, using renewable energy resources, reducing waste, and managing wastewater and runoff. They also begin envisioning how to adapt to future climatic scenarios. These actions help preserve America's treasures for future generations by demonstrating environmentally sound behavior to the National Park Service's more than two hundred and seventy-five million annual park visitors.

Figure 31 shows which IMR parks are certified Climate Friendly Parks or in the certification process, and which IMR parks have completed their Climate Change Action Plan. Transportation-related strategies from the completed CC Action Plans are included in Chapters 4 and 5 of the Baseline Conditions report.

Figure 31: Climate Friendly Certification in IMR Parks

Park	Status	CC Action Plan
Bandelier NM	Certified	Complete
Big Hole NB	Certified	Complete
Bryce Canyon NP	In Process	-
Devils Tower NM	In Process	-
Flagstaff Area NMs (Walnut Canyon, Sunset Crater, Wupatki)	Certified	Complete
Glacier NP	Certified	Complete
Grand Canyon NP	Certified	Complete
Grand Canyon-Parashant NM	Certified	Complete
Grand Teton NP	In Process	-
Lake Mead NRA	Certified	Complete
Rocky Mountain NP	Certified	Complete
Yellowstone NP	In Process	-
Zion NP	Certified	Complete

(URS Summary of www.nps.gov/climatefriendlyparks, accessed August 2012)

This report outlines the long-term trends associated with greenhouse gas, climate change, and the effects on the NPS transportation system. Strategies to address climate change will be developed in later portions of this LRTP and will be designed around science, adaptation, mitigation, and communication goals as outlined in the NPS *Climate Change Response Framework*.

Wildfire

Major wildfires, always a concern for national parks, have become more and more urgent since the great Yellowstone fire in 1988. Other parks have had more recent fires, including the devastating Las Conchas Fire in Bandelier National Monument in 2011. Wildfires have complex causes, including either natural or human, but no matter the cause, there is little doubt that wildfire severity across the IMR has increased due to fuels buildup. One of the most problematic issues has been the well-documented die-off of forests due to drought, making them more susceptible to fire and insect infestations. While low-intensity fires can have some benefits in some ecosystems, the large scale effects of high-intensity fire across the west can be devastating to some species, ecosystems, and even

landscapes. If the drought cycle continues throughout the intermountain west as climate change models suggest, some burned forests may not be able to regenerate and their dependent species must adapt, migrate, or fail (Stein 2010).

Wildfire has a beneficial role in the rejuvenation of landscapes. However, the catastrophic fires of the last several decades have sometimes burned hotter and been more destructive than in the past. Some of these fires have resulted in long-term damage. In addition to altered viewsheds and potential impacts on the visitor experience (wildlife viewing, driving for pleasure, safety), fires have direct effects on transportation, particularly roads. Roads provide emergency access for wildfire fighting and can be damaged by the heavy run-off, landslides, and mudflows that often follow major events. Backcountry roads not maintained in adequate condition may compromise emergency access. Expenses for maintenance or reconstruction may have unexpected budget impacts and may require improved contingency planning at the regional level.

LANDSCAPE AND HABITAT CONNECTIVITY/ FRAGMENTATION

National parks have historically been seen as “banks” that preserve the landscape in its natural state and serve to provide a refuge for wildlife and at-risk species. Recent work in the practice of landscape-level conservation has shown that even the largest parks may not be adequate to maintain intact ecosystems. The fragmentation of systems outside parks may have significant consequences for resources actually within park boundaries.

One of the chief problems in preserving connected landscapes has been in measuring the suspected changes, which may be happening on a timescale not noticeable to the casual – or even trained – observer. A 2010 study performed at Rocky Mountain National Park (ROMO), *A Natural Resource Condition Assessment for Rocky Mountain National Park*, provides a methodology for analysts to measure these changes over time. The report identifies a Natural Landscape (NL) index that can be applied in other parks and outside parks to measure changes over time and provide a basis to develop strategies to address decreases in the index (Theobald 2010).

Public Lands in the Intermountain Region

Extensive public lands in the IMR provide both a challenge and an opportunity to preserve landscape and prevent habitat fragmentation. The challenge resides in the fact that vast landholdings are under control of multiple owners (Figure 32); the opportunity resides in the fact that the multiple owners are agents of the U.S. government. There is a groundswell of coordination among these agencies to coordinate planning and management of their respective lands. This will present growing opportunities to recognize and protect interrelated ecosystems at the landscape level, rather than by jurisdiction, which fragment ecosystems.

Development in Nearby Areas

As the country grows, development in areas adjacent to parks continues to impact resources in the parks themselves. The interrelated nature of ecosystems including watersheds, forests, air sheds, and habitats becomes clearer when examining systems from a broader perspective. The effects of growth and development will continue to affect park function and quality.

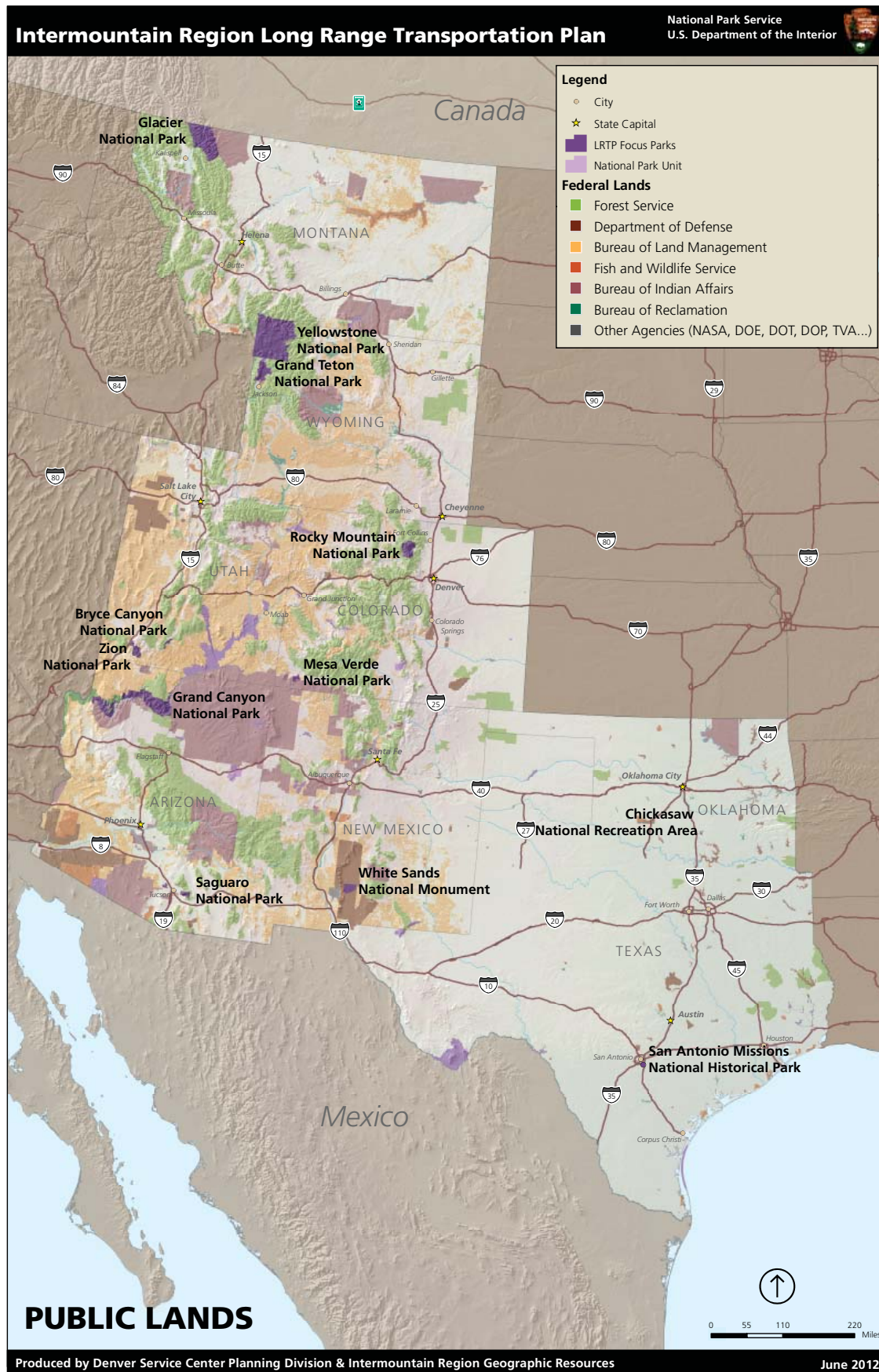
Components of Landscape Risk in the ROMO Example

The NL index includes: 1) land cover; 2) housing density; 3) roads; and 4) highway traffic volume. In ROMO the NL metric declined somewhat from 1992 to 2001, but was considered relatively stable. However, there was a more pronounced decline in the overall ecoregional score. The conclusion is that areas outside the park are being impacted at a faster rate than the park itself, potentially making the park an eco-island where ever more pressure is brought to bear on internal resources. A second conclusion drawn by the report is that the NPS should seek to minimize internal effects due to the magnitude of external effects.

(Theobald 2010)

INTERMOUNTAIN REGION
LONG RANGE TRANSPORTATION PLAN: TRANSPORTATION IN CONTEXT

Figure 32: IMR Public Lands



A 2001 report, *Increasing Development in the Surroundings of U.S. National Park Service Holdings Jeopardizes Park Effectiveness* in the *Journal of Environmental Management* uses building and road density to measure development. This approach could be useful to individual parks that are just beginning to grapple with the problem. The report results showed that park establishment was effective in reducing and stopping the fragmenting impact of development within park boundaries. However, increased amenity levels following park establishment led to enhanced development in the surrounding area. In other words, highly desirable protected areas like national parks tend to attract residents as well as outdoor-related businesses and activities. The report notes “a general migration trend in the last few decades to non-urban regions with especially high levels of natural amenity such as mountain areas.” (Gimmi 2011)

Figure 33: The Inter-related and Unintended Effects of Development

Unintended Effects	Why It's a Problem
Increased amenity levels and expectations	Increased roadbuilding, traffic, congestion
Increased vacation homes and associated access roads	Disruption of animal movements, stormwater run-off, sedimentation
Road and building density	Disruption of animal movements, stormwater run-off, sedimentation, increased potential for social trailing
Landscape and habitat fragmentation	Degradation of viewsheds, disruption of animal movements
Erosion of external characteristics that are attractive to visitors such as historic resources and open space	Loss of opportunities for solitude, crowding impacts to visitor experience
Forest cover change	Introduction of exotic species, stormwater run-off, erosion
Reduced habitat connectivity and increased human-related animal mortality	Genetic diversity, reductions in animal populations
Increased potential for non-recreational visitation	Congestion, increased human-related animal mortality

While parks are generally effective at restraining resource impacts within their borders, they are less effective at influencing outside impacts. For instance, reducing development inside a park may leak development of support services to immediately adjacent areas.

The problem points to the need for conservation planning and partnerships that look at the broader landscape beyond the boundaries of well-defined protected areas. Nongovernmental institutions such as land trust and conservation easements can offer the potential for cooperative agreements that also help protect the larger landscape. The National Park Service is actively pursuing efforts to limit fragmentation of ecosystems, including proactive management strategies to address the growing problem of development in the areas surrounding protected zones.

“Proximity to protected areas has been related to higher development rates in general and increased population growth in particular. Recreational and aesthetic amenities are important factors in peoples’ lifestyle and living choices. For example, the counties around Yellowstone National Park are among the fastest growing in the United States. In another example, Boulder and Larimer Counties serve as gateways to Rocky Mountain National Park, and are widely seen as premier places to live, with abundant access to the resources of the Park. The City of Phoenix continues to encroach on Saguaro National Park. This growth places new challenges on park transportation infrastructure and services including commuter traffic on park roads, bicycle use growth/demand, “local” recreational use via hiking/ biking that often increases demand on parking and parking turnover, and increased demand for transit or shuttles between parks and surrounding communities.”

(Gimmi 2011)

Effects of Roadbuilding on Habitat and Ecology

Population growth is usually accompanied by road development; both roads and buildings have negative ecological impacts and are regarded as a major conservation threat. Habitat loss, increased mortality, altered hydrology, and landscape fragmentation are the most prominent ecological effects from the construction of roads and buildings.

"Roads produce long-term legacies on the landscape."

(Gucinski 2001)

Specific effects of roadbuilding are well documented in Hermann Gucinski's report for the U.S. Forest Service (USFS). These concerns raise many questions for National Park Service managers regarding impacts to roadside ecology and to the landscape at large. While new roads within parks are relatively rare, impacts from roadway and parking expansion also carry risks and are carefully scrutinized. The National Park Service has much less control over roadbuilding activities outside the parks, which also may have dramatic long-term effects at the regional scale. The Gucinski report considers the full range of effects and makes clear that roads have both beneficial effects as well as negative impacts. Specifically, roads have the beneficial effect of providing access to parks and their attractions. Negative impacts range from direct impacts to the footprint of roads to larger, sometimes cumulative effects, on soils, plants, animals, and water. The total effects can be extensive and complex, presenting a difficult challenge for the National Park Service attempting to provide for visitor access to a sustainable environment. The type and severity of the negative impacts are dependent on topography, climate, grade, and location.

Even removing a road (or any facility) also has its environmental effects. While the concept of "decommissioning" underutilized, under-maintained, or overly impactful roads has attracted attention as a potential method to both balance budgets and restore environmentally damaged areas, a careful assessment should be made. In some locations, an older road has achieved a new environmental balance, the disruption of which may be more severe than leaving in place.

Some of the most important effects are listed in Figure 34.

Figure 34: Environmental Effects of Roads

Environmental Effects of Roads
Longitudinal nature of a road is inherently disruptive to the landscape and to viewsheds
Soil compaction on shoulders and near parking areas
Sedimentation in downslope riparian systems and wetlands
Accelerated erosion
Concentrated stormwater runoff contains contaminants and affects channel flow
Impediments to animal movements
Roadkill
Mobility for predators
Invasion by exotic species
Biological invasions of disturbed habitat

(Gucinski 2001)

Cultural Resources

Assessment of emerging trends related to transportation in the national parks, especially within the NPS Intermountain Region, is informed by a consideration of the extant cultural resources in those parks. Cultural resources are defined as the “collective evidence of the past activities and accomplishments of people. Buildings, objects, features, locations, and structures with scientific, historic, and cultural value are all examples of cultural resources. Cultural resources are finite and non-renewable resources that once destroyed cannot be returned to their original state.” (New York State Museum accessed 2012). Such resources can be determinate and confined to a limited geographic area (e.g., a “site”), or they can be expansive and cover a larger area (e.g., a “cultural landscape”). A cultural landscape is defined as relatively large areas where significant events in prehistory or history occurred, which left behind physical evidence of those events (NPS accessed 2012). In contrast, a site is more spatially limited and representative of perhaps a single activity, such as a prehistoric campsite or a historic homestead.

Identification and evaluation of the historic significance of these resources is clearly the first step in the process, which the National Park Service is obliged to complete, as mandated by Section 110 of the National Historic Preservation Act (NHPA) of 1966, as amended 2006 (16 U.S.C. 470 et seq.), as well as Section C of DOT 5610.1. The significance of cultural resources in the parks is assessed against the criteria for evaluation listed at 36 CFR 60.4:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

- (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) that are associated with the lives of persons significant in our past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Once the resource has been evaluated for inclusion in or eligibility for listing in the National Register of Historic Places (NRHP), then the effect of construction or maintenance activities in the parks on those resources must be assessed. Effect is defined at 36 CFR 800.16(i) as an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the NRHP. A historic property is defined at 36 CFR 800.16(l)(1) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. It is important to distinguish between direct, indirect, and cumulative effects. The National Environmental Policy Act (NEPA) defines direct effects as those that are caused by the action and occur at the same time and place (40 CFR § 1508.8). Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR § 1508.8). Cumulative impact results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

The mission and focus of some of the parks in the IMR is explicitly related to the cultural heritage of those parks; Mesa Verde NP and San Antonio Missions National Historic Park (NHP) are examples. Many of the parks are noted for their scenic grandeur, but even those parks contain sizable numbers of cultural resources. In addition, many of the roads in these parks, as well as associated structures (e.g., bridges, guard walls, and culverts) are historic properties. Decommissioning or removing an underutilized, under-maintained, or overly impactful road, even if considered environmentally advantageous, could be problematic if that road is a historic property. For many reasons, it may be better to leave the older road in place and not disrupt the environmental balance.

Visits to the 92 park units in eight states in the IMR have increased dramatically in the last decade, especially in the larger, iconic parks, such as San Antonio Missions NHP (316%), Grand Teton NP (68%), Bryce Canyon NP (49%), Zion NP (27%), and Yellowstone NP (29%). However, visitation has declined in some of the smaller parks; for example, Chickasaw NRA has witnessed a decline in recreational visitation of 22%, while visitation at White Sands NM has declined 19%. Both outcomes can adversely affect cultural resources in the respective parks. Increased visitation results in an intensification of recreational activities with personal vehicles, recreational vehicles, bicycles, snowmobiles, off-highway vehicles, personal watercraft, and even pedestrian traffic. These activities can adversely affect historic properties in a park, especially those that are near the activity areas. Conversely, a decrease in visitation could impact park budgets, affecting the maintenance of historic properties, which could accelerate their deterioration.

Preservation of cultural resources that may be impacted by transportation activities continues to grow in importance for two reasons, 1) increasing visitation in some parks is prompting the development or expansion of services and infrastructure, and 2) many assets have or will soon reach the end of their design life and require significant maintenance or reconstruction. Planners and designers must be aware of all listed assets and be prepared to rigorously address potential impacts with avoidance or mitigation activities. The associated costs in selecting, locating, and procuring appropriate materials and construction techniques must be considered an integral part of each project's cost.

Key Messages: Adapting to a New Landscape

Natural Hazard Risks

Trending risks in the Intermountain Region include habitat fragmentation, development, drought, wildfire, sea level rise, extreme weather events, and others. Natural hazards pose a variety of problems, from infrastructure to the visitor experience that demand investment or adaptation. Many natural hazard risks are associated with, and made worse by, climate change.

Climate Change

Climate change may impose significant costs to the planning, construction, maintenance, and management of many elements of the transportation system. Park-specific risk models from climate change are in development in some parks. National Park Service and park managers should extend the knowledge of climate change transportation risks to the micro-scale. Mitigation strategies (and costs) will be location-specific and must account for the resources and infrastructure of the local unit.

Contingency Planning

Wildfire, as a consequence of climate change and the associated cycle of drought and insect attacks, looms as one of the most visible and radical changes to all forests in the Intermountain Region. The potential for damage to transportation infrastructure and the visitor experience is high, indicating that contingency planning efforts should become a focus..

Habitat Fragmentation

Landscape and habitat fragmentation both within and outside of park boundaries threaten to reduce at-risk species to island populations. Increased fragmentation is expected as a result of continued growth, development, and road building. Residents relocating near national parks (a well-documented trend) to enjoy an outdoor recreation lifestyle sometimes bring with them the demand for other services, which has its own fragmenting effect. The National Park Service seeks to limit its own impacts and protect larger landscapes through active leadership at the regional level.

Cultural and Historic Resources

Many parks in the Intermountain Region oversee a rich collection of culturally and historically invaluable artifacts, structures, and landscapes. Their preservation during construction and on-going maintenance presents a challenge in terms of correct materials application, protection during construction, interpretation, and even the awareness that the resource may be at risk. The proper treatment of cultural and historic resources must be considered at all stages of transportation management, including cost analysis..

Resource Planning and Partnerships

Parks in the Intermountain Region both contribute to and are severely impacted by the changing landscape. The National Park Service has a responsibility to adapt its programs and mitigate the damage to resources under its stewardship. However, changes within the parks' boundaries will not alone alter the course of change. The National Park Service role is anticipated to include increasingly active membership in the regional community. Direct involvement with parks by volunteers and partner organizations is one of the time-tested paths to increased visitation, financial support, and better resource management at the landscape scale.

SECTION THREE: SUSTAINING VISITOR ACCESS THROUGH NATIONAL PARK SERVICE LEADERSHIP

Backlogs in maintenance, critical capital improvements, uncertain funding, evolution in visitor patterns and demographics, climate change and a host of emerging issues threaten to undermine the National Park Service's ability to maintain its leadership role in managing the natural, historic, and cultural gems in its care. The challenge is daunting, but feasible. Meeting this test will establish the National Park Service as a trailblazer on the path to sustainable relevance in the 21st Century.

Strengthening Federal Environmental, Energy, and Transportation Management

The President made this executive order that directs the NPS toward a sustainable future: "...conduct environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner."

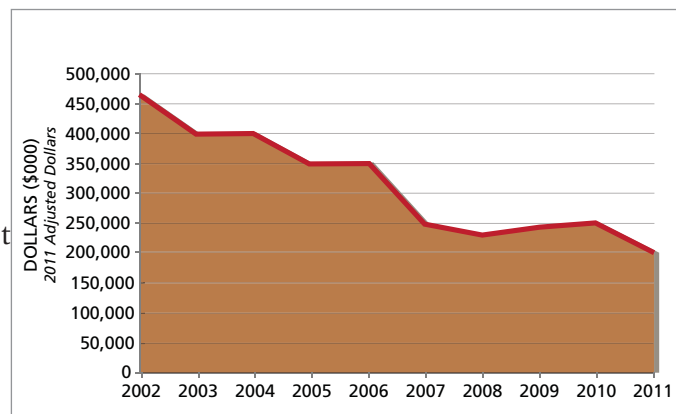
(E.O. 13423)

FUNDING CHALLENGES AHEAD

The federal funding trend is an important part of the economic pillar of sustainability, and a cornerstone of the NPS investment strategy. The long anticipated reauthorization of the Federal transportation bill was signed into law in July 2012. The new bill, *Moving Ahead for Progress in the 21st Century: Transforming the Way We Build, Manage, and Maintain Our Nation's Transit Systems (MAP-21)* overhauls transportation funding. While analysis of the effects on the National Park System are not yet complete, it is clear that the NPS share will not see significant increases. Many programs have been eliminated or realigned into fewer, but larger programs. Some 108 federal funding programs have been "collapsed" into about ten programs. The Federal Lands Highway Program, one of the NPS' principal resources, is one of the ten. The popular Paul S. Sarbanes Transit in the Parks grant program, a significant input into alternative transportation projects, was a casualty of the legislation.

NPS funding for transportation infrastructure construction, services, operations, and maintenance, are separate programs and have been largely stagnant for a number of years. Funding growth has not kept pace with inflation; Operation of the National Parks Service (ONPS) funding in parks for day-to-day facility operations, Operations and Maintenance (O &M), hasn't been increased in many years, for some large parks. The overall appropriation for the NPS in 2011 was nearly \$400 million less per year (13%) than it was 10 years ago.

Figure 35: NPS Construction Funding, 2002 - 2011



The NPS construction budget has declined 60% since 2002.
(NPCA 2011)

ONPS budgets, and those of other state and local agencies, have not kept pace with inflation, have remained static over time, and allocations devoted to transportation operations compete with other facility priorities.

Fee funding puts pressure on parks to increase visitation to increase revenues, but visitation increases also exacerbate roadway and parking congestion, add pressure to shuttle and other services, and require maintenance to keep up with the demand. Partnerships, once more robust, have seen negative growth in funding, requiring the National Park Service to fill partnership gaps via fees.

In total, all major funding sources for transportation in the National Park Service are seeing tight times ahead; coordinating those major funding sources will continue to be a challenge. Given the large backlog in identified transportation needs, the National Park Service is challenged to find the right balance of visitor access with the provision of transportation services. Absent significant increases in funding through the Federal government, Public Private Partnerships, or other innovative means the National Park Service may have to reconsider the feasibility of costly services.

Options to Address Funding Shortfall

- Identify significant future funding to maintain park operations at historically high operational and condition levels
- Adopt lower standards and goals that are balanced with available funding. This may mean living with, and managing to, degraded pavement conditions, crowding at parking lots and viewpoints, and lower levels of transit/shuttle service
- Limit visitation to levels that can be accommodated at acceptable levels. While this option is not necessarily commensurate with the current understanding of the Mission, it must, unfortunately become part of the discussion. The quickly growing list of needs may simply outpace the agency's ability to provide unfettered access. Some options already on the table include:
 - Reservation systems or "metered visitation"
 - Closing some facilities or park areas
 - Establishing a "transportation carrying capacity for highly used parks"
 - Re-examining marketing campaigns designed to attract new visitors

(URS)

ASSET MANAGEMENT

The National Park Service cares for over 70,000 assets of all types in 394 park units nationwide. Transportation assets include roads, parking areas, signs, trail, bridges, retaining walls, drainage structures, tunnels marinas, transit systems, and other items. The replacement value of all IMR transportation assets is about \$6.5 billion. National Park Service asset management initiatives include new directives to incorporate the total cost of facility ownership (TCFO) in the planning, design, construction, operations, maintenance, recapitalization, and disposal processes. While providing proper maintenance for NPS assets on a timely schedule lengthens the usable life and saves money in the long run, managers are being asked to incorporate these long-term costs in their plans. This trend will continue to gather steam as part of overall sustainability goals.

Adaptive Management

While the National Park Service mission is somewhat different than other transportation agencies like state DOTs and MPOs, there are striking similarities. Virtually all transportation management agencies face severe funding shortages, seemingly insurmountable maintenance backlogs, congestion threats to mobility, and a growing dependence on multi-modal solutions. Some agencies are beginning to document successes, not in “building their way out,” but by promoting better management through realistic goal setting, performance-based planning, demand management, and adopting a strategy of multi-layered solutions. Overall, the strategy may be termed “adaptive management,” essentially a reprogramming approach that seeks to maximize efficiency by adopting smaller scale strategies first. The IMR is planning to move now toward a sustainable management model that supports the future and protects its resources.

One promising tool under discussion in many parks is re-scripting or creating new messages and stories to draw visitors from highly publicized, and sometimes congested, areas to lesser visited areas. Such redistribution of visitors has its advantages: less congestion, more opportunities for visitors, an effective increase in capacity. These benefits must be balanced with potential costs for roadways, parking, or trail access and potential resource impacts like social trailing, disturbance of cultural or historic sites, and creating additional congested areas.

The Maintenance Problem

One of the most telling statistics relative to the condition of the asset portfolio is the \$10 billion in accumulated deferred maintenance (DM) identified by the National Park Service for all types of assets agency wide, which greatly exceeds available funds. This figure is expected to grow to \$20 billion by 2020 unless steps are taken to address the problem.

The current IMR portion of DM has a price tag of \$2.443 billion and rises every year due to increasing construction costs and the cumulative cost of putting off minor repairs until they become more costly major repairs. The backlog in other needed capital improvements and code compliance (Americans with Disabilities Act, Architectural Barriers Act, Clean Air Act, etc.) adds another \$10 billion servicewide for all assets (\$2.44 billion for IMR) to estimated needs. These costs will be explored in more detail in the Financial analysis portion of the plan.

Asset Management Policy Guidance

The National Park Service Asset Management Policy outlines specific guidance for the agency to help close the gap between previously identified needs and the ability to secure the funding adequate to address them. The Policy represents a significant change in how the National Park Service approaches its mission as it transitions from building facilities to managing what it has, and even reducing its asset responsibilities. These objectives provide clear instructions and are incorporated in the IMR LRTP as methods to achieve fiscal responsibility and sustainability (NPS Asset 2011).

Require Financial Sustainability

The IMR budget is not sufficient to meet the requirements of its entire collection of assets. Each park should determine what it can properly maintain within projected budgets and prioritize the maintenance of those assets. Full lifecycle costs, or the Total Cost of Facility Ownership, must be part of the metric to determine the long term affordability of any facility improvements.

Accelerate Disposition

Over 1,200 assets servicewide are candidates for disposition. The National Park Service needs to identify additional, non-mission critical assets for disposal. Criteria to select assets for decommissioning, or repurposing, are being developed based on cross-referencing facility condition with the level of use. Assets that are not being maintained to standards, are not likely to receive needed maintenance appropriations, or are little used should be targeted for removal. Benefits accrue to both financial management and resource protection through restoration of previously developed areas.

A recent guidance paper from the NPS Facility Management Program, Reinventing NPS Asset Management, describes the problem:

“Traditional methods of managing and investing in our facilities are no longer sufficient. We must fundamentally reconsider the stewardship of NPS facilities or risk the debilitation of critical park infrastructure and the cultural treasures under our care. The Service needs to reinvent its asset management to emphasize the proper care of those facilities that are both mission critical and financially sustainable.

Traditional methods of managing and investing in our facilities are no longer sufficient. We must fundamentally reconsider the stewardship of NPS facilities or risk the debilitation of critical park infrastructure and the cultural treasures under our care.”

(NPS Asset 2011)

Allow No Net Gain

Existing parks should hold the line on the count, size, and maintenance requirements of their current asset base. They should be instructed to adopt a policy of “no net gain” of assets. The National Park Service is no longer in the business of increasing its inventory, rather it is developing new structures to effectively manage what is in place.

Shrink the Facility Footprint

The National Park Service has acquired an overabundance of facilities which in some cases detract from natural aesthetics or negatively impact resources. The National Park Service needs alternatives to constructed assets that are low maintenance and easy to replace but that still provide essential services. Parks should leverage leased facilities outside the gates and clear parks of non-essential facilities.

Leverage Partnerships

The National Park Service should require partners who provide construction funds or land donations to also provide adequate funds for operations and maintenance. Recognition of the interrelated nature of the parks and the wider community will help institutionalize these relationships for the long term.

Integrate the Management of Facilities

Funding challenges require facility staff to manage in partnership with colleagues across the agency. The NPS should better formalize the structure of FMSS support for each Region, especially to collect and manage data that is responsive to National Park Service long range transportation planning needs.

Make Strategic Investments

The National Park Service is losing ground every year to the deferred maintenance backlog and must focus its dollars on those assets that represent the National Park Service’s highest mission priorities. The concept of environmental sustainability should become a standard for all investments. The LRTP should seek to identify the highest priorities at the regional level in anticipation of a national capital investment strategy beginning in 2014.

Leveraging Partnerships

Gateway communities and federal lands are interdependent. The communities rely heavily on the visitors that are drawn to the area for its natural beauty or historic significance; the national parks and forests depend upon the gateway communities to provide visitors with basic services and amenities to make travel easy and enjoyable. The transportation linkages between the parks and the surrounding area are crucial to supporting this critical relationship. The transportation system is often an integral part of the experience of visiting a federal land site. Railroads and motor coach tours provided the initial access to many national parks. Park roads, scenic overlooks, hiking trails, and bicycle paths are the focal points of many visits. Consequently, traffic congestion, vehicle-generated noise and air pollution, and deteriorating roadways are concerns at many national parks and public lands. These issues may also spill over to adjacent gateway communities.

Zion National Park Partners for Success

Zion National Park successfully expanded transit service by leveraging the resources of multiple partners. Due to increasing visitation and congestion on the shuttle bus system (the only means of visitor access since 2000), an active partnership was fostered by the park to focus on improving the visitor experience through improved service. As a result of a concerted planning effort, the partnership enlisted the aid of stakeholders, each with an interest in the park:

- Zion National Park – Planning and implementation lead
- National Park Service, Denver Service Center – Technical assistance
- Town of Springdale – Provided some local match funds for Transportation Enhancement grant
- Utah Department of Transportation – administered Transportation Enhancement grant funds for shuttle bus stops and streetscape improvements
- Federal Highway Administration – Source of Transportation Enhancement grant funds
- Zion National History Association – Provides the Park \$600,000 in aid annually, contributed to local match, website information
- Local Businesses – Private funds utilized to terminal, store, restaurant, and tour bus parking area

The project has assembled funds from a variety of sources to enhance operations and the visitor experience – to the benefit of all stakeholders:

- National Park Service Capital Funds
- Park Entrance Fees
- Federal Transit Programs
- Federal Enhancement Program
- Town of Springdale
- Zion National History Association
- Local Businesses

(Turnbull 2009)

Stakeholder Outreach

The LRTP pilot process includes an outreach program to explore the planning process and leveraging potential with NPS partners. This initiative includes state departments of transportation, metropolitan planning organizations, federal lands agencies, and other existing and potential transportation stakeholders. The NPS future will continue to build on the efficiencies of the partnering process, building community strengths into the agency.

The planning team identified several promising areas of collaboration:

- Transit shuttle partnerships with gateway communities
- Enhanced coordination with the state and metropolitan Transportation Improvement Programs (TIP)
- Environmental coordination with state DOTs and regional planning organizations at the project and program levels
- Opportunities of scale regarding the development and implementation of electronic and wireless communications

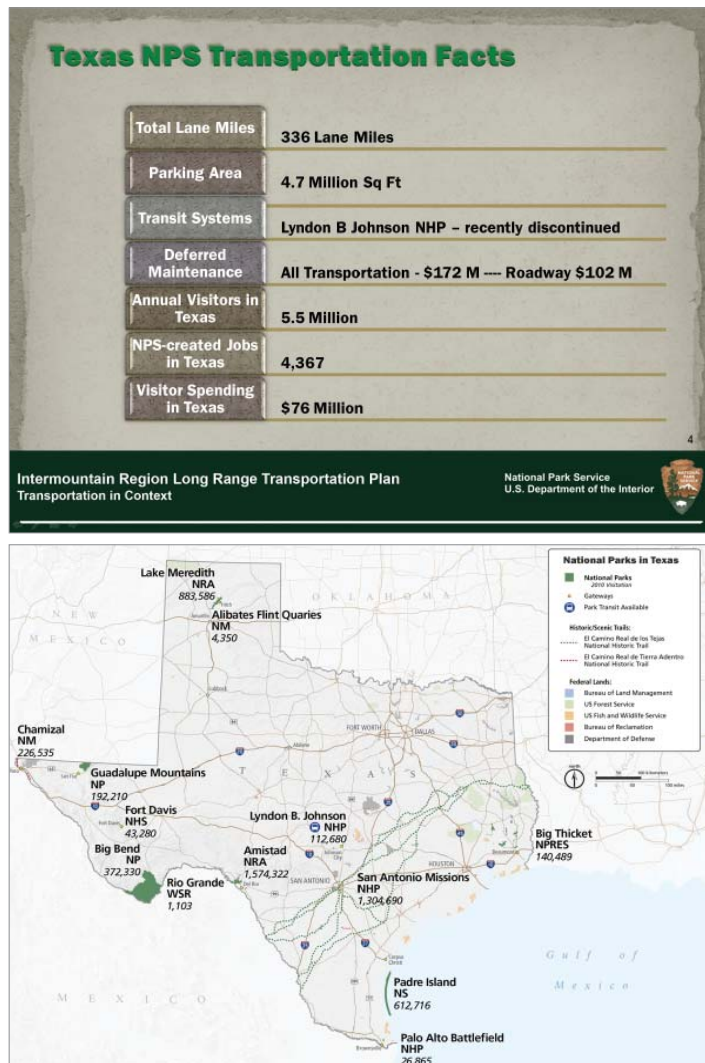
Performance Measurement

In response to recent economic, political, and social trends that place greater emphasis on public-sector accountability and cost-effectiveness, transportation agencies across the country have increasingly embraced performance management and performance-based planning and programming as a way to ensure that transportation resources are spent on projects and strategies that best serve communities' needs.

Creating and monitoring useful transportation-related performance measures has become an essential tool for agencies at all levels who are challenged to provide the best value for their investments. The National Park Service is no exception.

Performance management is a strategic approach that uses system information to make investment and policy decisions to achieve performance goals. Performance management typically includes both the management of the transportation system and management of the organizations with responsibility for the transportation system. It applies performance management principles to transportation system policy and investment decisions, providing a link between management and long-range decisions about policies and investments that an agency makes in its transportation system.

Figure 36: Stakeholder Outreach - Example

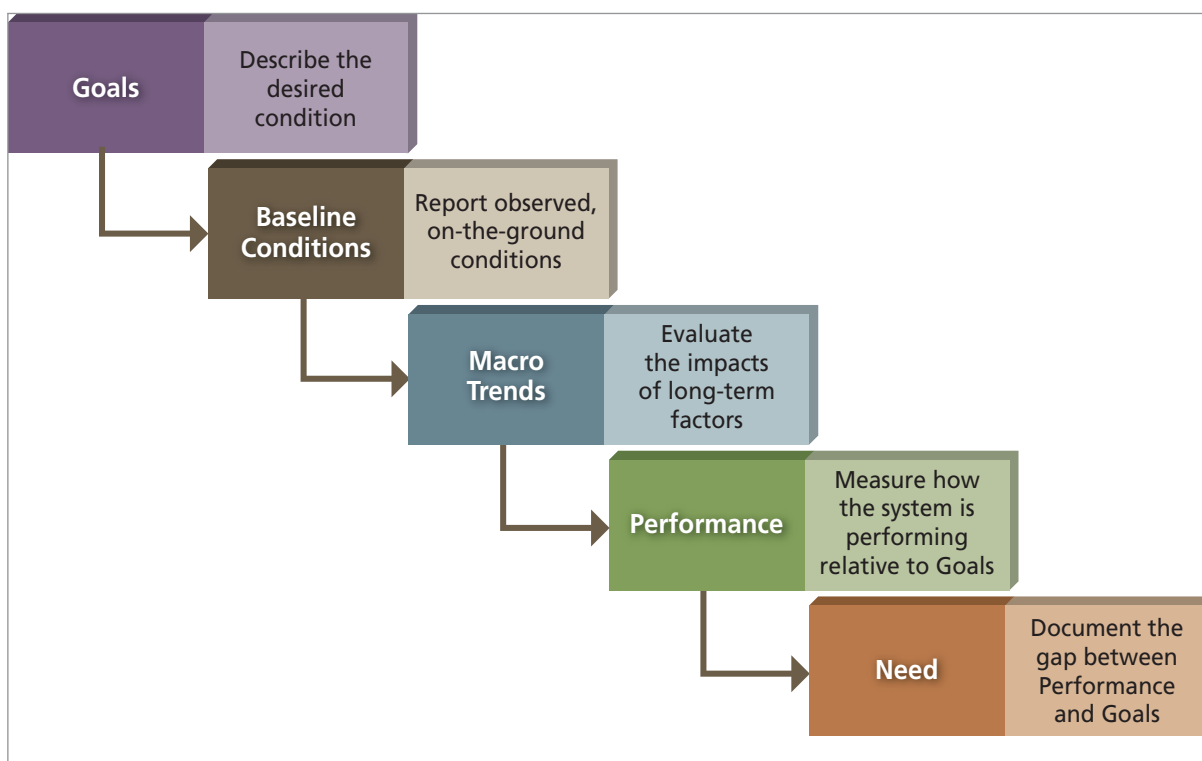


National parks in Texas received over 5.5 million visitors in 2010 and contributed over \$76 million to the economy.

Performance Measurement in Five LRTP Goal Areas

The IMR LRTP has identified a series of goals in five areas: asset management; mobility, access, and connectivity; visitor experience; resource protection; and sustainable operations. Future steps in the planning process will identify objectives and strategies to achieve the LRTP goal, as well as measurements and feedback mechanisms to determine the degree of success of implemented strategies. A blueprint for these successive components has been established that helps assure that strategies are tied directly to a measured or otherwise documentable deficiency in achieving the goal. Part of the effort will entail establishing system level performance indicators to measure progress over time in goal achievement.

Figure 37: Relationship of System Performance to Need



(URS)

As the IMR moves to adopt a performance-based planning framework, this LRTP will help establish a mechanism to assure the agency creates a direct link and a communication tool to simply reflect how well the transportation system is functioning and to identify areas of improvement, i.e., needs. The LRTP will help ensure that the agency remains accountable for its investments by making logical, informed decisions and maximizing the use of financial resources.

NATIONAL PARK SERVICE RELEVANCY

The National Park Service must fulfill its mission in a changing America. Its success in reinventing itself to remain relevant for future generations will be measured by a demonstrated ability to match operations with the NPS mission. The much anticipated Centennial Anniversary of the national park system will occur in 2016. As the National Park Service prepares for the next 100 years, it confronts both difficult challenges and distinct opportunities.

NPS Mission

"... to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations."

The challenge to maintain and operate this enormous system at a satisfactory level at a time of increasingly competitive federal funding means the agency has to rethink how it does business. At the same time, the next steps in a successful future may also lie in its deepest challenges: how to attract future stewards from the diverse population; how to incorporate technology in appropriate, money-saving ways; and how to become a leader in demonstrating methods to assist species' adaptation and survival during a period of climate change, in short, how to sustain itself. The NPS Second Century Commission provides us with some great examples of how to think outside the park boundaries and outside ourselves.

NPS Second Century

The National Parks Conservation Association provided an inspiring example of partnership, leadership, and vision when they convened the National Parks Second Century Commission. The Commission, chaired by two former U.S. senators—J. Bennett Johnston from Louisiana and Howard H. Baker from Tennessee, brought together an impressive panel of high profile leaders with a passion for the Parks, including several former governors, a former Supreme Court justice, retired National Park Service management, the National Geographic Society, the National Oceanic and Atmospheric Administration, and others. Over a year's time the group examined in detail the big issues facing the park system (Second Century 2009).

The Commission believes this is the time to create a new plan for the parks of the next century. The new plan differs from the first century paradigm in that it is more encompassing. It realizes how interconnected the National Park Service is with the planet and enthusiastically invites the world, not to a sanctuary, but to a place we can live, learn, work, and enjoy. The new vision has an even stronger educational component, requiring closer relationships with other institutions of learning so that the teaching can be shared. It also sees that a required component is to financially sustain this institution of promise.

To fulfill this vision, the National Park Service will have to reassess how it addresses transportation to include even wider community support. The National Park Service must reinforce cultural pluralism by connecting urban areas and minority populations to parks, thereby building strong constituencies across the full spectrum of the population. These corridors of conservation that connect parks and recreational facilities, historic sites, and cultural landscapes can be the building blocks to create a perpetual funding stream that supports the perpetual dream. Current regulatory encumbrances that prohibit concessioners from contributing capital funds to upgrade or maintain public assets present on-going frustrations for park managers and private entities.

"In order to fulfill this vision, the NPS will have to reassess how it addresses transportation to include even wider community support. The NPS must reinforce cultural pluralism by connecting urban areas and minority populations to parks, thereby building strong constituencies across the full spectrum of the population. These corridors of conservation that connect parks and recreational facilities, historic sites, and cultural landscapes can be the building blocks to create a perpetual funding stream that supports the perpetual dream."

(Second Century 2009)

These are big shoes that the National Park Service of the Second Century must fill and encompass the issues and trends discussed in this technical report. These far-thinking people have captured the best of the park system. Their optimistic view is the only one that will serve the generations well; the current stewards of the system will be called on to implement it.

National Park Service Director's Call to Action As a Sustainable Agency

A more expansive, and inclusive, National Park System, stronger educational outreach, and a revised approach for managing today's natural and cultural resource challenges are among the goals laid out in a blueprint for leading the National Park Service into its second century. The 24-page *A Call To Action*, delivered by Park Service Director Jon Jarvis in 2011, is built around four themes: Connecting People to Parks, Advancing the NPS Education Mission, Preserving America's Special Places, and Enhancing Professional and Organizational Excellence. By the Park Service centennial in 2016 the document calls for an analytic approach to creating "a national system of parks and protected sites (rivers, heritage areas, trails, and landmarks) that fully represents our natural resources and the nation's cultural experience" (Call to Action 2011).

The theme *Connecting People to the Parks* has special resonance with the long range plan. This theme has four goals. To connect people to parks in the next century, the National Park Service must:

- DEVELOP and nurture life-long connections between the public and parks—especially for young people—through a continuum of engaging recreational, educational, volunteer, and work experiences.
- CONNECT urban communities to parks, trails, waterways, and community green spaces that give people access to fun outdoor experiences close to home.
- EXPAND the use of parks as places for healthy outdoor recreation that contributes to people's physical, mental, and social well-being.
- WELCOME and engage diverse communities through culturally relevant park stories and experiences that are accessible to all.

The Second Century Vision (excerpt)

Connect People to the Parks

- Connect urban communities to parks, trails, waterways, and community green spaces that give people access to fun outdoor experiences close to home.
- Welcome and engage diverse communities through culturally relevant park stories and experiences that are accessible to all.

Ensure Sustainable Funding Structures

- Increase appropriations supplemented by new revenue sources.
- Create a national parks endowment, a robust, tax-exempt, permanent source of funding beyond the vagaries of the annual budget cycle.
- Establish a commission of leading citizens to broaden fund-raising for the parks, and engage the public anew on behalf of the parks' mission.

The Call to Action expresses some of the core tenets of sustainability. The National Park Service has wisely taken the position that sustainability must become a part of everyday business that spans economic, social, and environmental issues. Sustainable development originally concentrated on resource consumption issues, so called “green” initiatives starting with recycling and eventually extending to non-carbon based fuels. The term is increasingly defined more broadly to include economic and social welfare, equity, human health and ecological integrity. A narrow definition of sustainable transportation tends to favor individual technological solutions, while the broader definition tends to favor more integrated solutions, including improved travel choices, economic incentives, institutional reforms, land use changes, and technological innovation like the continued development of green materials for infrastructure. Sustainability planning requires changing the way people think about and solve transportation problems (Litman & Burwell 2006).

The goal of sustainable transportation is to ensure that economic, social, and environmental considerations are factored into decisions affecting transportation activity. Sustainable decision making can therefore be described as planning that considers goals and impacts regardless of how difficult they are to measure.

Figure 38: Transportation Relationships to Sustainability

	Economic	Social	Environmental
IMPACTS	• Traffic congestion • Mobility barriers • Accident damages • Facility costs • Consumer costs	• Inequity of impacts • Mobility disadvantaged • Human health impacts	• Air and water pollution • Habitat loss • Hydrologic impacts • Depletion of non-renewable resources • Climate change
BENEFITS	• Add jobs • Connects communities to parks • Balanced budgets • Regional economic integration	• Improves accessibility • Promotes mobility • Community interaction • Community livability • Aesthetics	• Habitat preservation • Air and water quality improvements • Increased use of green energy technologies • Reduction in risks of climate change

(URS summary)

Overall, the financial sustainability of the National Park Service asset portfolio is a shared responsibility among park, regional and WASO program managers and support staffs. It requires coordination and collaboration among all disciplines with primary responsibility falling on park leadership and regional and servicewide planning, construction and facility managers. Through this holistic approach, decisions to eliminate excess facilities, streamline functions and identify improved or less costly alternatives will result in more universal application. Ultimately, the objective is clear: direct limited resources to the most valuable, mission critical assets, right-size the portfolio and reduce costs while continuing to meet core National Park Service mission requirements.

The role of the IMR LRTP is to set the stage for how sustainable transportation operations within the National Park Service will be assisted by the incorporation of sustainable goals in all programs over the long run.

National Park Service Green Parks Plan

The NPS *Green Parks Plan*, a collaborative product developed by staff from parks, regions, and national support offices, establishes the direction for the agency as it seeks to incorporate sustainable principles throughout all activities. It endorses a set of primary goals to improve environmental performance across the parks and takes into account the facility management life cycle—from planning, design, and construction, to operations, maintenance, and disposition. Each of the following nine strategic goals has a direct relationship in how the National Park Service plans for and implements transportation and stands as a complement to the Asset Management Strategy.

Figure 39: Green Parks Plan Goals

Goal	Goal Statement
Continuously Improve Environmental Performance	The National Park Service will meet and exceed the requirements of all applicable environmental laws.
Be Climate Friendly and Climate Ready	The National Park Service will reduce GHG emissions and adapt facilities at risk from climate change.
Be Energy Smart	The National Park Service will improve facility energy performance and increase reliance on renewable energy.
Be Water Wise	The National Park Service will improve facility water use efficiency.
Green Our Rides	The National Park Service will transform our fleet and adopt greener transportation methods.
Buy Green and Reduce, Reuse, and Recycle	The National Park Service will purchase environmentally friendly products and increase waste diversion and recycling.
Preserve Outdoor Values	The National Park Service will minimize the impact of facility operations on the external environment.
Adopt Best Practices	The National Park Service will adopt sustainable best practices in all facility operations.
Foster Sustainability Beyond National Park Service Boundaries	The National Park Service will engage visitors about sustainability and invite their participation.

(NPS Green Parks 2012)

Key Messages: Sustaining Visitor Access Through National Park Service Leadership

Shrinking Transportation Budgets

Traditional National Park Service transportation budgets are not keeping pace with either the maintenance backlog or the need to upgrade or increase services in many parks. While all transportation needs for construction and operations are increasing, funding has decreased due to inflation, materials costs, the aging of the system, and competition for scarce funds. The scale of deferred maintenance alone presents an enormous challenge to other needs.

Managing the Gap

The National Park Service seeks to manage its transportation asset portfolio in balance between expenditures and funding (including non-traditional sources such as participation in partnerships). Options include identifying additional funds, reducing operational and condition expectations, and limiting visitation to levels that can be supported with available funding.

Adaptive Management

Not all transportation problems will have a successful infrastructure solution. Promoting better management through realistic goal setting, performance-based planning, demand management, and adopting a strategy of multi-layered solutions promises a more cost-effective approach. Rather than building for maximum capacity, parks may be more successful by incrementally increasing travel demand management applications and reassigning existing employees to emerging or critical problems.

Make Strategic Investments

Strategic investments may focus on those assets that represent mission-critical priorities – providing access to visitors, protecting resources, preserving assets, and becoming more sustainable in all ways. The developing Capital Investment Strategy will influence future funding scenarios selected for more intense analysis during subsequent phases of the Intermountain Region Long Range Transportation Plan. Tough choices in the planning process will clarify what is affordable over the long run and what level of goal achievement is realistic.

Performance Measurement

Measuring transportation system performance against realistic goals will help support good decision-making at all levels of park management. The long range transportation plan will develop measures in each of the five goal areas described in the Foundation Report. The careful application of performance measures will assist the Intermountain Region in telling a clear, accurate story about the condition of its transportation system given a range of future funding scenarios. One key to the process will be to define “transportation need” as the gap between observed performance and the long range goals.

A Stable Funding Stream

The funding stream has not been stable for years and significant improvements are not likely to develop in the near future. Ups and downs in the budget make it difficult for managers to plan for and implement long term plans. The mission to provide perpetual stewardship of resources for the enjoyment of people should be supported by an equally perpetual funding base. New, or strengthened, players will need to be engaged in order to supplement traditional funding.

National Park Service as a Sustainable Agency

A sustainable National Park Service will fully develop its economic, social, and environmental potential in recognition of its stewardship goals. While transportation can impact natural resources in a negative way, mitigation or avoidance of those impacts through careful action will help achieve broader sustainability goals. By definition, a sustainable future is the only one that meets the National Park Service mission.

Building Solid Relationships

Successful self-sustaining strategies include strengthened connections to the wider community through transportation, education, and mutual support. The sustainable future recognizes the inter-dependency of national parks with gateway communities, regional economies, and planning at the landscape level. The future will be built on a solid base of partnerships with communities and regional planning.

CONCLUSION

The background over which the National Park Service mission rests has changed, leaving it with a new array of challenges and opportunities. The mission itself, to conserve resources for the enjoyment of the people – forever – has not changed. Given the transformations in the people who visit or perhaps do not or cannot visit the parks and the revolutionary modifications to the natural environment of the current and next centuries, the park service must adjust how it approaches the management of the system. Just as transportation played a substantial role in the establishment and popularity of the parks a hundred years ago, the success of the agency and its trust will be tied to a new transportation experience.

VISITORS

The visitor base has changed in many ways. The population is aging and many are unable or unwilling to spend as much time in rugged conditions, preferring their outdoor experience with an accustomed level of comfort. The population is also more diverse, with a greater proportion of newly emigrated ethnic groups and international populations. Each group faces language and cultural barriers to visitation.

The price of accommodating visitors with upgraded lodging or parking for recreational vehicles and trailers and of providing translated information and signage must be weighed with the costs of not doing so. The historic National Park Service policy of encouraging and welcoming all in an effort to build a constituency of stewards has a downside in financial costs and impacts of development on the natural environment.

Other groups have made known their desire for better electronic communications and extended use of motorized vehicles in parks. Each of these have the same attendant financial and environmental costs.

Finally, while some parks, especially smaller and more remote units, appear to be underutilized, larger parks and those within reach of metropolitan areas are in danger of being appreciated perhaps a bit too much. The unthinkable is now on the table. The National Park Service and individual parks are increasingly called on to manage congestion or even to limit visitation to the capacity of park facilities and of the resources. Such actions beg the question: Can the National Park Service limit access to protect resources and still be in compliance with the mission?

The answers to this question, and certainly there are several, are only now evolving. Park-specific approaches seem appropriate, depending on visitation levels, threats to resources, and financial means.

RESOURCES

Many natural, cultural, and historic resources are under siege. Threats to vegetation from erosion, compaction, invasive species, and wildfire are acute. Threats to carefully managed wildlife come from all sides – degraded habitat, broken migration corridors, development at the gates, and unsustainably small populations. Where the National Park Service once protected ecosystems in tightly controlled sanctuaries, it has become clear that island parks will be insufficient in the long run to guarantee the survival of at risk species.

Climate change is shown to be a common denominator in virtually every threat. If not the only cause, the warming climate accentuates all of the above risks. As the landscape evolves to warmer and drier, or stormier, or becomes unpredictable, plants and animals are expected to migrate with their long-evolved comfort zones, or if trapped, to face extinction. Transportation, one of the key sources of greenhouse gases and a contributor to climate change, must become cleaner. While the emissions input from park assets, fleets, and visitors is small on the global scale, the National Park Service can provide leadership to the community at large as a scientific and best practices repository. The National Park Service will need to collaborate with surrounding communities, agencies, and organizations to succeed at this goal.

LEADERSHIP

National Park Service transportation assets are out of balance. The huge backlog of deferred maintenance far outweighs probable funding from traditional sources. Like an out of balance checkbook, there are only two ways to find equilibrium –increase income or reduce spending. The likelihood of increasing income to the degree required to eliminate the backlog is small. At least that seems to be the best thinking for the foreseeable future. There are simply too many competing demands for federal dollars. The National Park Service has begun to strategically restructure programs to meet the other side of the equation.

The Asset Management Policy clearly describes what must be done. Spend only on mission critical needs. Reduce the inventory. Consider adjusting standards and expectations. Establish realistic goals. Measure how investments move toward the goal. Include the Total Cost of Investment in all needs assessments. Clearly, some cherished and perhaps needed investments will not be made. The National Park Service must assess the impact of non-investment to all components of the mission and can no longer operate in “stovepiped” seclusion without considering the impacts of all decisions on all programs.

To prepare for the second 100 years of service, the agency is called to act in sustainable ways. The *Green Parks Plan* lays the comprehensive groundwork to manage all aspects of a complex system. Built on the three principles of sustainability – economic, social, and environmental – the plan identifies specific actions that will keep the park service on course. Many of these relate to transportation, including building green infrastructure when possible, reducing the footprint on the landscape, utilizing non-carbon fuels, encouraging transit and non-motorized transportation modes. Whether this means new types of paint for steel bridges that can withstand pronounced expansion and contraction, recycled paving materials, or improving stormwater management with better infiltration techniques there are, again, costs. Can the National Park Service support higher upfront costs to achieve lower lifecycle costs?

The National Park Service must be careful to not simply relocate its dumps and polluting activities, as could be the case with using coal generated electricity to replace dirty tailpipes. It is up to park and regional managers to make the best choices within the overall fabric of operations. The value of each alternative will have to be weighed for its fiscal, visitor experience, and resource benefits and costs. The skill to properly cross-evaluate these things could be a whole new field for the National Park Service.

Finally, a different investment strategy is called for, one that takes full advantage of the notion that the national parks are the Nation’s parks. Roadblocks to non-traditional funding sources from the wider community must be reconsidered so that those who love the parks and work for their future can be allowed to help fill the gap. The wider net, of visitors, of communities, and of parks connected to the people is the trend of the future.

DATA GAPS AND INFORMATION NEEDS

The following list describes data gaps or other information needs that are incomplete, inconsistent, or otherwise not available to support this report. Filling in these gaps during future iterations of the IMR LRTP will assist in better identification of long-term needs. This knowledge will help the IMR plan for and adjust to long term trends as they develop. Care should be taken not to simply collect data so as to have more data. Data collection and management is expensive and time consuming, particularly for an agency such as the National Park Service which manages large holdings throughout the country or for the Intermountain Region. Each data point should be evaluated for its cost and its potential contribution to decision-making. The goal should be to make actionable information available, not unlimited data points.

Figure 40: Data Gaps and Information Needs

Data Gaps and Information Needs		
Data Gap	Description	Examples and Questions
The Relationship of Population Changes to Recreation, Leisure, and Visitation		
Demographic Trends	A better understanding of the relationship of demographic changes and visitor needs to park use and management could improve visitor experience. The costs of adaptation are not fully understood. • Age – Specific factors should include the age of visitors and a more comprehensive assessment of which recreational activities are chosen. What are the fiscal and experiential costs to management decisions to better attract and accommodate the young and the aging? • Ethnicity - More information about the ethnic characteristics and preferences of visitors could influence management decisions at all levels (park, regional, national). • International Visitors – Language is a significant barrier in some parks.	• Urban-accessible parks may be losing younger visitors to other activities. Signage, wayfinding, and lodging needs of aging baby boomers represent a potentially significant investment. • The southern tier of states are witness to large ethnic shifts, while diversity of participation remains flat. • Does a significant investment in language services translate to better visitor experience?
Visitor Counts	Consistent and updated visitor counts, including vehicle occupancy rates. Methodology changes over time and equipment failures provide an array of statistics that delivers a contradictory or anomalous assessment of visitation.	The relationship of visitation to demand for services is not clearly understood. Certain focus parks exhibit anomalies in counts making it difficult to understand long term trends. Short-term changes in visitation at the regional level and at individual parks are probably much less meaningful than long term trends, which are less clearly understood. Significant changes in rates at Grand Teton, San Antonio Missions, Chickasaw, and parks along the Mexico border are not well understood.

Data Gaps and Information Needs, continued

Data Gap	Description	Examples and Questions
The Relationship of Population Changes to Recreation, Leisure, and Visitation, continued		
Non-Rec Visitation Type of Use	Non-recreation visitation should focus on the type of use (include vehicle occupancy rates).	Focus parks including Saguaro, Grand Teton, and Chickasaw with high (variable) non-recreation rates do not clearly identify vehicle throughput for commuting or other local uses that are distinctly non-park related.
Camping and Lodging in Concessioner-managed Facilities	The transition from fewer NPS-managed camping and lodging facilities to more concessioner-managed facilities, both inside and outside parks, is accompanied by a lack of full understanding of visitor preferences and needs.	The effect of the transition to RVs and non-camping lodging from tent camping is unclear, given the divestment of some facilities to concessioners. Is a further transition of facilities in the best interests of the parks and of visitors?
Transportation Carrying Capacity	Transportation Carrying Capacity of congested parks should be defined within the context of financial/cultural/natural resources and visitor experience.	An upcoming study at Sequoia and Kings Canyon National Parks will explore this subject. It may provide a basis to develop and manage a quantifiable, scientifically based, legally defensible standard to address carrying capacity and provide for quality visitor experiences.
Non-Traditional Entrance Fee Collection	The effects of "pre-pay" or electronic admissions systems should be analyzed for the effect on visitation, revenues, and congestion at park entrances.	Some form of automated entry is either planned or implemented at Bryce, Grand Canyon, Grand Teton, Rocky Mountain, Yellowstone, and Zion. Other parks with congested entrance roads or stations such as Glacier and Saguaro may benefit the most from technology applications.
Intelligent Transportation Systems	A better understanding of the cost-benefit ratio of ITS applications, with respect to congestion management and resource impacts, will assist the Intermountain Region in making cost-effective investments	ITS has been implemented in some form at Bryce, Glacier, Grand Canyon, Grand Teton, Rocky Mountain, Yellowstone, and Zion. A composite analysis of the effectiveness will assist in determining the future investments.

Adapting to a New Landscape

Risk Analyses	The Intermountain Region requires more detailed risk analysis at the park level based on a national framework for climate change related subjects, including: • Wildfire • Extreme weather events • Climate change – other effects to natural, cultural, and historic resources as well as visitor use patterns	• Fire - Extent of risks, effects of altered landscapes on visitor experience, management costs. • Weather - Locational risks by type, management costs, planning and design implications. • Climate change – micro-scale analyses extended to regional scale.
Cultural and Historic Resources	A comprehensive regional database of transportation-related cultural/historic resources would assist project planners in assessing implementation costs and impacts.	A comprehensive regional database of transportation-related cultural/historic resources would assist project planners in assessing implementation costs and impacts.

Data Gaps and Information Needs, continued		
Data Gap	Description	Examples and Questions
Sustaining Visitor Access Through NPS Leadership		
Alternative Funding	Comprehensive information regarding the application of alternative funding mechanisms to NPS transportation operations, maintenance, and capital expenses will assist program managers in identifying realistic funding opportunities.	• Database - IMR contributing partners with value of contribution, limits on expenditures, agency contacts. • Guidelines – Local funding mechanisms including special districts, bonds.
Costs and Benefits of Decommissioning Transportation Facilities	An agency-wide investigation of the reasonableness and costs-benefits from the decommissioning of under-utilized or under-maintained transportation facilities will assist parks in designating appropriate facilities for removal or restoration.	Policy-level guidance on selection of facilities, with case studies.

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