Status and Trends of Land Change in the Western United States—1973 to 2000
Edited by Benjamin M. Sleeter, Tamara S. Wilson, and William Acevedo
U.S. Geological Survey Professional Paper 1794–A, 2012

Chapter 21
Colorado Plateaus Ecoregion

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Ecoregion Description

The Colorado Plateaus Ecoregion covers approximately 129,617 km^2 (50,045 mi^2) within southern and eastern Utah, western Colorado, and the extreme northern part of Arizona (fig. 1). The terrain of this ecoregion is characterized by broad plateaus, ancient volcanoes, and deeply dissected canyons (Booth and others, 1999; fig. 2). The ecoregion is bounded on the east by the Wyoming Basin and Southern Rockies Ecoregions in Colorado and on the northwest by the Wasatch and Uinta Mountains Ecoregion in northern and central Utah. To the south, the ecoregion borders the Arizona/New Mexico Plateau Ecoregion, which has a higher elevation and more grasslands than the Colorado Plateaus Ecoregion (Omernik, 1987; U.S. Environmental Protection Agency, 1997).

The climate in the ecoregion is arid to semiarid, with only 15 to 40 cm of annual precipitation. Higher elevation areas such as the La Sal Mountains receive more precipitation and support a mixed forest of ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), quaking aspen (*Populus tremuloides*), and Engelmann spruce (*Picea engelmannii*). Most other locations of the ecoregion are covered by an extensive woodland zone, which is dominated by a "pygmy forest" of pinyon pine (*Pinus edulis*) and several species of juniper (*Juniperus* spp.; fig. 3). The ground between these trees is sparsely covered by blue grama (*Bouteloua gracilis*), shrubs such as big sagebrush (*Artemisia tridentata*) and alderleaf cercocarpus (*Cercocarpus montanus*), and various herbs (McGinley, 2007). Grassland/shrubland land cover accounts for approximately 63 percent of the

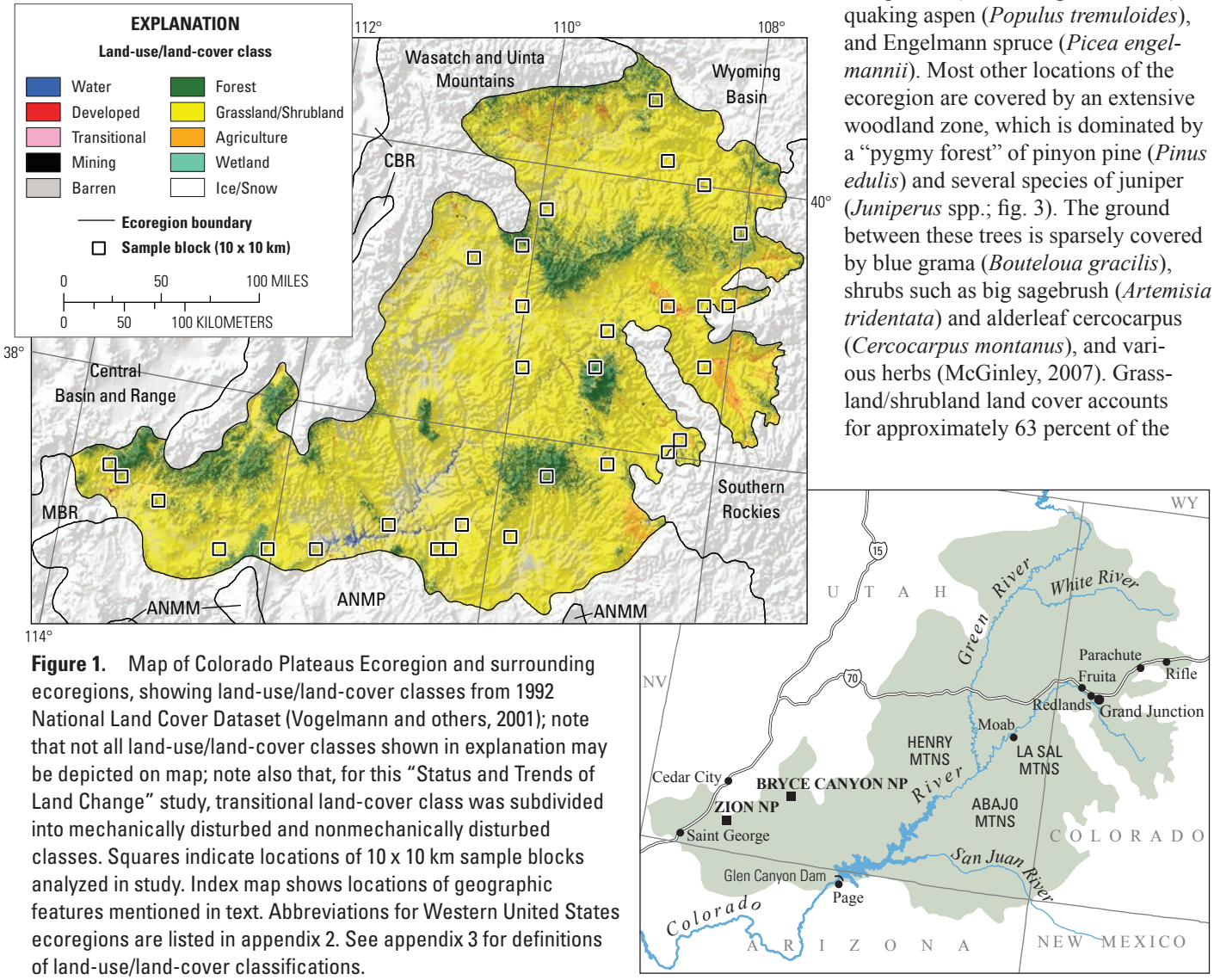

Figure 1. Map of Colorado Plateaus Ecoregion and surrounding ecoregions, showing land-use/land-cover classes from 1992 National Land Cover Dataset (Vogelmann and others, 2001); note that not all land-use/land-cover classes shown in explanation may be depicted on map; note also that, for this "Status and Trends of Land Change" study, transitional land-cover class was subdivided into mechanically disturbed and nonmechanically disturbed classes. Squares indicate locations of 10 x 10 km sample blocks analyzed in study. Index map shows locations of geographic features mentioned in text. Abbreviations for Western United States ecoregions are listed in appendix 2. See appendix 3 for definitions of land-use/land-cover classifications.

Figure 2. Shrubland plateau dissected by canyons in Colorado Plateaus Ecoregion.

Figure 3. Mix of junipers and pinyon pine in eastern part of Colorado Plateaus Ecoregion.

ecoregion, whereas the remainder is covered by forest (25 percent), agriculture (6 percent), barren (4 percent), developed (1 percent), water (0.5 percent), wetland (0.4 percent), and mining (0.1 percent). The land-cover makeup of the ecoregion is summarized in table 3, which shows the percent land cover by type in the year 2000 (see appendix 3 for definitions of land-cover classifications).

From the Paleozoic into the Mesozoic era (600 to 300 million years ago), thick layers of limestone, sandstone, siltstone, and shale were deposited in shallow marine waters and then overlain by eolian deposits. Layers of sediment accumulated for millions of years on a thick crustal block that became the foundation of the Colorado Plateaus Ecoregion. As the plateau started to rise because of tectonic activity about 10 million years ago, streams that would become the present-day Colorado and Green Rivers carved down through the colorful (reds, purples, and oranges, stained by iron and other minerals) sedimentary rocks (Booth and others, 1999). Erosional processes created the arroyos, canyons, mesas, buttes, monuments, towers, and cliffs that make up the dramatic landscape we see today (fig. 4).

Because the Colorado Plateaus Ecoregion has been stable geologically (in other words, little rock deformation by faulting and folding) within the last 500 million years, conditions were ideal to create, preserve, and then reveal the unique rock formations and landforms (Wheeler, 1990). As a result of extensive conservation efforts, numerous U.S. National Parks, Forests, and Monuments have been established to protect, and preserve access to, these unique features. These extensive federal lands, coupled with Bureau of Land Management rangelands, account for nearly 55 percent of the ecoregion area. The remaining public land in the ecoregion is tribal land (24 percent) or held by state and local governments (6 percent). Private lands account for an estimated 15 percent of the entire ecoregion (Booth and others, 1999).

Today (2012), with the easy access provided by Interstate Highways 15 and 70 and secondary roads through the ecoregion to numerous wilderness areas and National Parks and Monuments, the area has become a tourist mecca. National Park visits increased 94 percent between 1981 and 1994, and recreation and tourism has become one of the ecoregion's largest industries (Hecox and Ack, 1996). Other major economic activities include ranching, farming, timber harvesting, and mining. From the late 1800s to the 1950s, gold, silver, and uranium mining were the major economic drivers in the region. Since the 1970s, increased demands have made coal, oil, and

Figure 4. Mesas, towers, and monuments just east of Moab, Utah.

Figure 5. Coal power plant in eastern part of Colorado Plateaus Ecoregion near Grand Junction, Colorado.

gas the primary targets of mining and energy exploration in the Colorado Plateaus Ecoregion (fig. 5).

As the tourism and energy-exploration industries grew, the number of new jobs increased 225 percent between 1970 and 2000, 140 percent faster than the national average (van Riper and Mattson, 2005). Approximately 95 percent of all new jobs were service based. Resource-based employment in farming and mining only made up 2 percent of this growth (8,728 jobs), whereas manufacturing provided the remaining 3 percent (14,038 jobs) during this period (van Riper and Mattson, 2005). Service-based employment accounted for nearly 90 percent of all jobs within the Colorado Plateaus Ecoregion by 2000. All these factors indicate a rapid conversion from resource-extractive to service-based industries in the ecoregion during the study period.

Contemporary Land-Cover Change (1973 to 2000)

An estimated 2.6 percent of the land cover in the Colorado Plateaus Ecoregion changed at least once between 1973 and 2000 (table 1). Overall, the ecoregion experienced a low amount of land-cover conversion when compared to other western ecoregions (fig. 6). An estimated 0.6 percent of the ecoregion experienced change in more than one of the four time periods analyzed (table 2). Much of the land-cover change involved the expansion of developed land that accompanied employment increases and population growth. Change within the four individual time periods ranged from a low of 0.6 percent between 1980 and 1986 to a high of 1.1 percent between 1973 and 1980 (table 2). When the estimates are normalized to an annual average, accounting for varying lengths of study periods, the period between 1973 and 1980 experienced the highest normalized annual rate of change, at 0.15 percent (196 km^2; fig. 7). The other three time periods were relatively stable, at approximately 0.1 percent change per year.

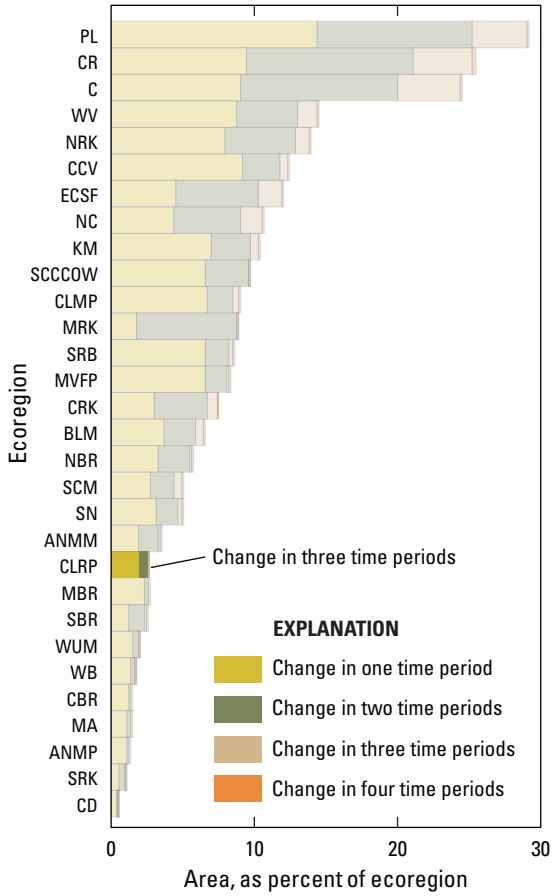

Figure 6. Overall spatial change in Colorado Plateaus Ecoregion (CLRP; darker bars) compared with that of all 30 Western United States ecoregions (lighter bars). Each horizontal set of bars shows proportions of ecoregion that changed during one, two, three, or four time periods; highest level of spatial change in Colorado Plateaus Ecoregion (three time periods) labeled for clarity. See table 2 for years covered by each time period. See appendix 2 for key to ecoregion abbreviations.

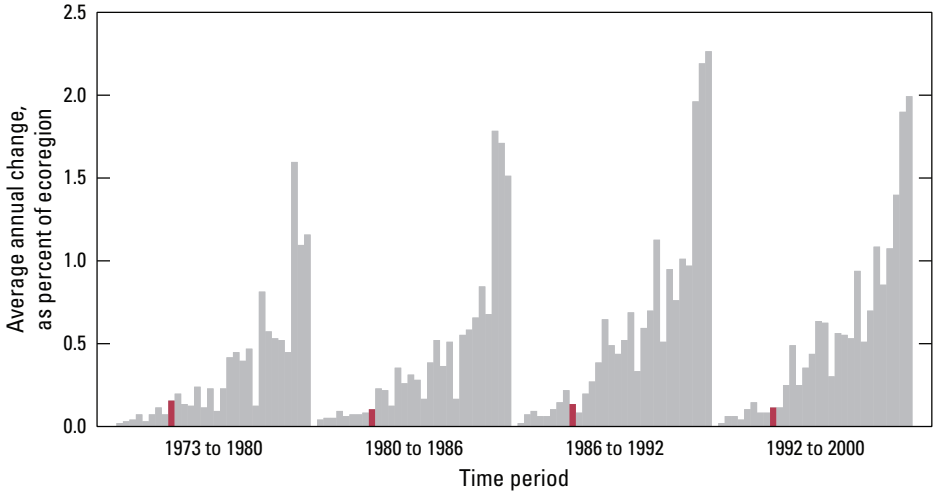

Figure 7. Estimates of land-cover change per time period, normalized to annual rates of change for all 30 Western United States ecoregions (gray bars). Estimates of change for Colorado Plateaus Ecoregion are represented by red bars in each time period.

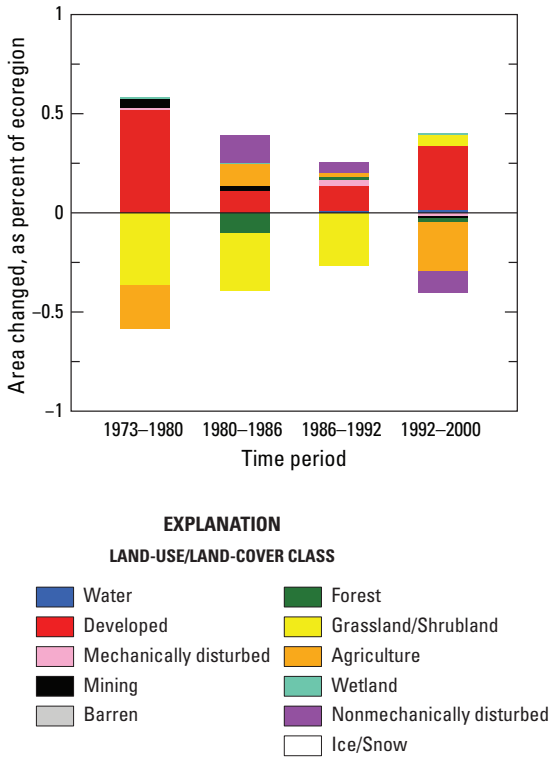

Figure 8. Normalized average net change in Colorado Plateaus Ecoregion by time period for each land-cover class. Bars above zero axis represent net gain, whereas bars below zero represent net loss. Note that not all land-cover classes shown in explanation may be represented in figure. See appendix 3 for definitions of land-use/land-cover classifications.

The largest amounts of net change that occurred over the entire study period (1973–2000) were an estimated 430 percent (1,408 km^2) increase in developed land and a 1.3 percent (1,121 km^2) decrease in grassland/shrubland (table 3). The largest net change in developed land occurred between 1973 and 1980 (fig. 8), almost all new developed land resulting from losses in either agriculture (756 km^2) or grassland/shrubland (644 km^2; table 4).

Although developed land only accounted for a small percentage of the ecoregion, nearly 43 percent of the land that changed became new developed land. Developed land is estimated to account for 0.3 percent (326 km^2) of the ecoregion in 1973, increasing to just over 1.3 percent (1,735 km^2) by 2000 (table 3). New developed land primarily was found near the ecoregion's urban centers of Saint George, Utah, and Grand Junction, Colorado, which had respective population estimates of 49,663 and 41,986 in 2000 (U.S. Census Bureau, 2000). Both of these cities have seen substantial population increases because of flourishing tourism and energy-mining industries. For example, Saint George's population increased 600 percent, from 7,097 in 1970 to 49,728 in 2000, whereas Grand Junction's increased 108 percent, from 20,170 in 1970 to 41,986 in 2000 (U.S. Census Bureau, 2000). The Interstate 15 and 70 corridors near these two cities also attracted new development, especially north from Saint George along Interstate 15 to Cedar City, Utah, and west from Grand Junction along Interstate 70 to Fruita, Colorado (fig. 9).

The grassland/shrubland land-cover class had the largest net loss in the ecoregion, decreasing by approximately 1,121 km^2. New developed land accounted for most of this decline, but land-cover conversions between agriculture and grassland/shrubland between 1973 and 2000 also affected the net change of grassland/shrubland. Considerable areas of land fluctuated between these two classes in all time periods between 1973 and 2000 (table 4). The overall trend from 1973 to 1992 indicated that more grassland/shrubland converted to agriculture than agriculture to grassland/shrubland. As a result, a net loss of grassland/shrubland to agriculture of approximately 327 km^2 occurred between 1973 and 1992. Irrigation needed to grow crops in the Colorado Plateaus Ecoregion's arid and relatively warm climate expanded in the counties of southeastern Utah and southwestern Colorado, causing agricultural lands to increase at the expense of grassland/shrubland. Irrigation water was drawn from the Dakota–Glen Canyon aquifer and the Colorado, White, San Juan, and Green Rivers to grow corn, wheat, barley, dry beans, hay, and alfalfa (U.S. Department of Agriculture, 2002). From 1992 to 2000, the exchange between grassland/shrubland and agricultural lands was balanced.

Even though agricultural lands increased at the expense of grassland/shrubland, the increase was not enough to offset agricultural lands lost to new developed land and mining between 1973 and 2000. As a result, agricultural lands in the Colorado Plateaus Ecoregion had a net decrease of 5.6 percent. Agricultural lands were estimated to account for 6.2 percent (8,004 km^2) of the ecoregion in 1973, decreasing to 5.8 percent (7,555 km^2) by 2000 (table 3). The largest net loss in agricultural lands occurred between 1992 and 2000, at 321 km^2, most of which went to developed land and grassland/shrubland (table 3). Increased municipal-water demands, as well as water scarcity in the arid Colorado Plateaus Ecoregion, may leave limited water available to farmers growing irrigated

Figure 9. Development in Redlands, between Fruita and Grand Junction, Colorado.

crops, further contributing to this decline. Additionally, because of cyclic changes in the extent of grassland/shrubland and agricultural lands, the gross land-cover change for agriculture and grassland/shrubland were the greatest among the other land-cover categories, totaling 1.2 percent (1,606 km^2) and 1.7 percent (2,204 km^2) of the ecoregion, respectively (table 3).

Periodic wildfires (classified as nonmechanically disturbed) affected nearly 1 percent (983 km^2) of the ecoregion's land between from 1973 and 2000 (table 3). These fires created common land-cover conversions involving forest and grassland/shrubland categories, especially between 1980 and 1986 and between 1986 and 1992. Between 1980 and 1986, conversion from forest to nonmechanically disturbed was the second greatest land change, whereas conversion from grassland/shrubland to nonmechanically disturbed was the top land-cover change between 1986 and 1992 (table 4). As burned areas recovered, land-cover conversion from nonmechanically disturbed to grassland/shrubland was common. For example, between 1986 and 1992, approximately 253 km^2 of grassland/shrubland burned, becoming nonmechanically disturbed, and then, by 2000, returned to grassland/shrubland. Because of this sequence of events, the return of nonmechanically disturbed lands to grassland/shrubland was the fifth most common conversion between 1973 and 2000, at 434 km^2 (table 4). As some burned areas have recovered by 2000, nonmechanically disturbed lands covered an estimated 115 km^2 of the ecoregion in 2000 (table 3).

Forest, the second most common land-cover class at approximately 25 percent of the Colorado Plateaus Ecoregion, generally was confined to the higher elevations of the ecoregion in the La Sal, Abajo, and Henry Mountains. Changes associated with forests were relatively small in the Colorado Plateaus Ecoregion. Forests had a small net decrease of 132 km^2 between 1973 and 2000 (table 3). Much of the forest loss is attributed to wildfires that occurred between 1980 and 1986, which caused an estimated loss of 178 km^2 in forest land to nonmechanically disturbed. Forest areas did expand in some locations of the ecoregion between 1980 and 1986 but not enough to make up for losses caused by wildfires. Slight forest gains in the ecoregion may be a result of the forest-management practice of fire suppression, as well as the dissemination of juniper seeds by grazing cattle while they simultaneously remove the competing grasses that inhibit juniper expansion (Allen, 1998). Both factors caused grasses to decline, whereas dense woodlands of pinyon pine and juniper expanded.

Other land-cover classes that changed very little are water, mining, and mechanically disturbed. Gross and net land change between 1973 and 2000 for each of these land categories affected no more than 0.1 percent (approximately 100 km^2) of the ecoregion. Mining lands had a net increase of 91 km^2 between 1973 and 2000 (table 3).

In Grand Junction and in many locations of the western slope of Colorado, new development expanded at a brisk pace, especially between 1973 and the early 1980s as people came to work in the energy-exploration business. An economic boom occurred during this time as major oil companies began investing large sums of money in the oil-shale industry (Gulliford, 2003). Grand Junction had its largest population increase (approximately 39 percent) between 1970 and 1980 (U.S. Census Bureau, 2000). This increase likely contributed to the large expansion of developed land in Colorado Plateaus Ecoregion between 1973 and 1980 (table 2).

As oil and gas exploration increased in the eastern part of the Colorado Plateaus Ecoregion during the energy crisis of the mid-1970s, the amount of new mining land increased between 1973 and 1992 (71 km^2 to 175 km^2, respectively; table 3). Mining of aggregate for the new Interstate 70 also accelerated mining land expansion in the 1970s. Nearly 78 percent of all new mining land was converted from grassland/shrubland. After 1982, however, the energy industry declined dramatically as the value of oil, coal, and uranium decreased, causing a "bust" economic condition in many small communities (notably, the towns of Rifle and Parachute, Colorado) that relied on the energy industry in the Colorado Plateaus Ecoregion (Gulliford, 2003). Mining land stabilized between 1986 and 1992 before decreasing from 175 km^2 in 1992 to 162 km^2 in 2000 (table 3).

Population gains continued in the Grand Junction area following the departure of major oil companies, causing a continuation of new developed lands. The economy in this part of the ecoregion became more diversified as a stable health care industry, tourism, agriculture (orchards and vineyards), livestock, and oil-and-gas extraction became major economic contributors. As oil and natural-gas prices increased in the 1990s, major energy companies once again invested large amounts of money into the area (van Riper and Mattson, 2005). In the 1990s, many Americans, especially well-educated retirees, were attracted to the western slope area of Colorado near Grand Junction because of outdoor amenities such as access to public lands and high mountain meadows. New developed land expanded as numerous second homes were built for the retirees (Gulliford, 2003).

The Saint George, Utah, area (known informally as "Utah's Dixie") also expanded for similar reasons. Outdoor recreational areas and nearby Zion and Bryce Canyon National Parks helped the tourism and recreation industry to grow there, attracting workers. The mild climate, access to high-quality health care, and natural amenities in the Saint George area attracted numerous retirees from other parts of the country. In addition, some large corporations such as SkyWest Airlines and Intermountain Health Care made their home in Saint George (Hecox and Ack, 1996). All these factors played an important role in expanding developed lands within the Colorado Plateaus Ecoregion.

Consequences of land change within the Colorado Plateaus Ecoregion became especially apparent between 1973 and 2000. Many agents of change are related to population growth in the ecoregion. As new development, tourism, mining, and heavy grazing increased, habitats that support wildlife and native plants have been greatly degraded. Approximately 85 percent of the ecoregion's habitat has been altered by human activity

(McGinley, 2007). Hardest-hit areas include riparian ecosystems and areas where mineral resources have been extracted. Habitat destruction caused by dam building (fig. 10) and other forms of development threaten native fish, including the humpback chub (*Gila cypha*), bluehead sucker (*Catostomus discobolus*), and the Colorado pikeminnow (*Ptychocheilus lucius*) (McGinley, 2007). Demand for water by growing municipalities also is having an effect on riparian areas as the water needs of wildlife, vegetation, and riparian systems become secondary (Booth and others, 1999). Today (2012), land managers are charged with accommodating land uses that can be sustained without degrading the health of the land and water. As a result, timber harvesting, mining, and livestock grazing all have been reduced in the ecoregion (Booth and others, 1999). Land managers increasingly are relying on science to balance commodity extraction and public recreation use while, at the same time, protecting ecosystem health within the Colorado Plateaus Ecoregion.

Figure 10. Glen Canyon Dam in southwestern part of Colorado Plateaus Ecoregion, near Page, Arizona.

Table 1. Percentage of Colorado Plateaus Ecoregion land cover that changed at least one time during study period (1973–2000) and associated statistical error.

[Most sample pixels remained unchanged (97.4 percent), whereas 2.6 percent changed at least once throughout study period. Two dashes (--) indicate that, because zero pixels changed four times during study period, relative error is not calculable]

Number of changes	Percent of ecoregion	Margin of error (+/– %)	Lower bound (%)	Upper bound (%)	Standard error (%)	Relative error (%)
1	2.0	1.7	0.2	3.7	1.2	59.2
2	0.6	0.4	0.2	1.1	0.3	47.6
3	0.0	0.0	0.0	0.0	0.0	82.3
4	0.0	0.0	0.0	0.0	0.0	--
Overall spatial change	2.6	2.1	0.6	4.7	1.4	53.2

Table 2. Raw estimates of change in Colorado Plateaus Ecoregion land cover, computed for each of four time periods between 1973 and 2000, and associated error at 85-percent confidence level.

[Estimates of change per period normalized to annual rate of change for each period]

Period	Total change (% of ecoregion)	Margin of error (+/– %)	Lower bound (%)	Upper bound (%)	Standard error (%)	Relative error (%)	Average rate (% per year)
Estimate of change, in percent stratum							
1973–1980	1.1	1.2	−0.2	2.3	0.8	78.4	0.2
1980–1986	0.6	0.3	0.3	0.9	0.2	37.0	0.1
1986–1992	0.8	0.5	0.4	1.3	0.3	37.5	0.1
1992–2000	0.9	0.7	0.1	1.6	0.5	56.2	0.1
Estimate of change, in square kilometers							
1973–1980	1,369	1,589	−219	2,958	1,074	78.4	196
1980–1986	738	404	334	1,142	273	37.0	123
1986–1992	1,053	584	469	1,637	395	37.5	175
1992–2000	1,135	943	191	2,078	638	56.2	142

Table 3. Estimated area (and margin of error) of each land-cover class in Colorado Plateaus Ecoregion, calculated five times between 1973 and 2000. See appendix 3 for definitions of land-cover classifications.

	Water		Developed		Mechanically disturbed		Mining		Barren		Forest		Grassland/ Shrubland		Agriculture		Wetland		Non-mechanically disturbed	
	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–	%	+/–
Area, in percent stratum																				
1973	0.4	0.3	0.3	0.3	0.0	0.0	0.1	0.1	4.3	2.5	24.9	6.8	63.5	7.5	6.2	3.7	0.4	0.2	0.0	0.0
1980	0.4	0.3	0.8	1.0	0.0	0.0	0.1	0.1	4.3	2.5	24.9	6.8	63.1	7.5	6.0	3.5	0.4	0.2	0.0	0.0
1986	0.4	0.3	0.9	1.1	0.0	0.0	0.1	0.1	4.3	2.5	24.8	6.7	62.8	7.6	6.1	3.6	0.4	0.2	0.1	0.2
1992	0.4	0.3	1.0	1.2	0.0	0.0	0.1	0.1	4.3	2.5	24.8	6.7	62.6	7.6	6.1	3.6	0.4	0.2	0.2	0.3
2000	0.5	0.3	1.3	1.7	0.0	0.0	0.1	0.1	4.3	2.5	24.8	6.7	62.6	7.7	5.8	3.5	0.4	0.2	0.1	0.1
Net Change	0.0	0.0	1.1	1.4	0.0	0.0	0.1	0.1	0.0	0.0	−0.1	0.3	-0.9	0.6	−0.3	1.2	0.0	0.0	0.1	0.1
Gross Change	0.1	0.1	1.1	1.4	0.1	0.1	0.1	0.1	0.0	0.0	0.3	0.2	1.7	0.8	1.2	1.1	0.0	0.0	0.8	0.8
Area, in square kilometers																				
1973	547	389	326	394	0	0	71	72	5,545	3,186	32,302	8,771	82,281	9,680	8,004	4,750	541	268	0	0
1980	547	387	1,011	1,360	2	3	135	127	5,542	3,186	32,306	8,767	81,815	9,754	7,718	4,524	541	271	0	0
1986	546	386	1,155	1,450	2	3	175	163	5,544	3,186	32,173	8,702	81,437	9,837	7,859	4,650	546	275	181	265
1992	561	390	1,319	1,612	43	40	175	188	5,544	3,186	32,194	8,698	81,097	9,888	7,876	4,696	555	281	253	370
2000	589	409	1,735	2,189	18	27	162	169	5,544	3,186	32,170	8,689	81,161	9,928	7,555	4,599	568	281	115	168
Net Change	42	54	1,408	1,795	18	27	91	97	−1	5	−132	328	−1,121	840	−449	1,513	27	23	115	168
Gross Change	69	71	1,408	1,795	112	82	168	148	9	8	332	318	2,204	1,091	1,606	1,456	42	22	983	999

Table 4. Principal land-cover conversions in Colorado Plateaus Ecoregion, showing amount of area changed (and margin of error, calculated at 85-percent confidence level) for each conversion during each of four time periods and also during overall study period. See appendix 3 for definitions of land-cover classifications.

[Values given for "other" class are combined totals of values for other land-cover classes not listed in that time period. Abbreviations: n/a, not applicable]

Period	From class	To class	Area changed (km^2)	Margin of error (+/– km^2)	Standard error (km^2)	Percent of ecoregion	Percent of all changes
1973–1980	Grassland/Shrubland	Developed	343	478	323	0.3	25.0
	Agriculture	Developed	342	489	331	0.3	24.9
	Grassland/Shrubland	Agriculture	305	198	134	0.2	22.3
	Agriculture	Grassland/Shrubland	246	349	236	0.2	18.0
	Grassland/Shrubland	Mining	57	52	35	0.0	4.1
	Other	Other	77	n/a	n/a	0.1	5.7
		Totals	1,369			1.1	100.0
1980–1986	Grassland/Shrubland	Agriculture	235	202	136	0.2	31.8
	Forest	Nonmechanically disturbed	178	0	0	0.1	24.1
	Grassland/Shrubland	Developed	92	82	56	0.1	12.4
	Grassland/Shrubland	Forest	50	69	47	0.0	6.7
	Agriculture	Developed	50	65	44	0.0	6.7
	Other	Other	138	n/a	n/a	0.1	18.8
		Totals	738			0.6	100.0
1986–1992	Grassland/Shrubland	Nonmechanically disturbed	253	266	180	0.2	24.1
	Nonmechanically disturbed	Grassland/Shrubland	181	265	179	0.1	17.2
	Grassland/Shrubland	Agriculture	162	153	103	0.1	15.4
	Grassland/Shrubland	Developed	102	95	65	0.1	9.7
	Agriculture	Grassland/Shrubland	76	71	48	0.1	7.3
	Other	Other	278	n/a	n/a	0.2	26.4
		Totals	1,053			0.8	100.0
1992–2000	Agriculture	Developed	305	445	301	0.2	26.9
	Nonmechanically disturbed	Grassland/Shrubland	253	370	250	0.2	22.3
	Grassland/Shrubland	Developed	108	130	88	0.1	9.5
	Agriculture	Grassland/Shrubland	98	103	70	0.1	8.6
	Grassland/Shrubland	Agriculture	90	83	56	0.1	8.0
	Other	Other	280	n/a	n/a	0.2	24.7
		Totals	1,135			0.9	100.0
1973–2000 (overall)	Grassland/Shrubland	Agriculture	793	534	361	0.6	18.5
	Agriculture	Developed	756	1,085	733	0.6	17.6
	Grassland/Shrubland	Developed	644	711	481	0.5	15.0
	Agriculture	Grassland/Shrubland	466	533	360	0.4	10.9
	Nonmechanically disturbed	Grassland/Shrubland	434	448	303	0.3	10.1
	Other	Other	1,201	n/a	n/a	0.9	28.0
		Totals	4,295			3.3	100.0

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