

FORECASTING OUTDOOR RECREATION PARTICIPATION: A COHORT-COMPONENT PROJECTION MODEL FOR ILLINOIS

RESIDENTS ¹

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Population projections for Illinois predicts lower growth, an older population, and increased racial diversity. If percent of the population participating in outdoor recreation activities by age and race remains at present levels, cohort-component projection models suggest that with projected changes in the population between 1990 and 2025, the number of Illinois participants engaging in many outdoor recreation activities will increase at a slow rate or decrease. Future participants will be older and increasingly from non-white groups.

Demographic Trends

In the years ahead the Illinois population is projected to grow more slowly than in the past, become older, and have larger racial minority components (State of Illinois 1990). The Illinois population, which grew 15 percent over the decade of the 1950's and slightly more than 2 percent in the 1980's, is expected to grow at a slower rate in the decades ahead. Accompanying slower population growth and longer life spans will be an older population. Individuals under 30 made up more than half of the population in 1980, but are projected to account for 37 percent of the total in 2025. There will be increased racial diversity in the years ahead as well. Between 1990 and 2025 Illinois is projected to experience a loss of 770,000 White residents, while the number of African American residents increases by 367,000 and the number of other residents increases by 646,000. An older population will be particularly significant with the White population, somewhat less significant with African Americans, and much less significant with other races. Overall, between 1990 and 2025 increases in numbers are projected for Whites age 50 and above, African Americans age 35 and above, and others in all age categories.

Variation in Participation

Surveys of the Illinois population in 1987 and 1989 indicate statistically significant differences in outdoor recreation participation (i.e., percent participating) according to age and racial background (Dwyer 1993a), suggesting that changes in recreation participation could accompany changing age and racial/ethnic structure of the population in the years ahead. The variations in participation that are associated with race and age are summarized below. Subsequent discussion explores their implications for outdoor recreation participation in the years ahead.

Race

The most distinctive pattern across racial groups is that African Americans are significantly less likely than Whites or others to participate in a large portion of the outdoor recreation activities studied, particularly those that take place in a wildland setting or involve water/snow/ice. There is a tendency for African Americans and others to participate at a similar or higher rate than Whites in athletics and activities that take place close to home (Dwyer 1993b).

Age

There are significant differences in participation across age categories for every outdoor recreation activity included in the study. The general trend is a decrease in participation with older individuals, with activities differing as to when that decrease begins and how steep the decline will be. With nearly half of the activities (and particularly sports and athletics) there is a fairly steady decline in percent participating with age starting at fairly young age class (20-24), with nearly all of the other activities starting decline shortly after that age class. A notable exception is nature study where percent participating increases with age class through age 40-44, and then decreases slowly (Dwyer 1993a).

Some Projections for the Future

Murdock et. al. (1990, 1991) developed a cohort-component projection model that uses projections of the population by age and race/ethnicity, together with activity-specific rates of participation by age and race/ethnicity to project number of participants in recreation activities in the years ahead. This approach is discussed by Dwyer (1993a, 1994a, 1994b). With the cohort-component projection model, the population is assigned to groups according to racial/ethnic and age classes (i.e., African Americans age 18-24), and estimates of the number of participants in an activity by the group are derived by multiplying the population by the percent of the group that participates in the activity. Total number of participants in the activity is the sum of the number of participants from each of the groups in the total population. Participation in future years is estimated from projections of the population by race/ethnicity and age. In the absence of projections of activity-specific participation rates by race and age for the years ahead, it is usually assumed that participation rates will remain the same over time. Thus the model provides estimates of future numbers of participants in an activity given expected changes in the population by age and race/ethnicity, assuming there will be no changes in participation rates by age or race/ethnicity. The percent of the total population that participates in an activity may change over time with changing age and racial structure of the population. In sum, the model reflects three components of demographic change that are likely to influence the number of participants in a particular activity in the years ahead; changes in total population, age structure, and racial/ethnic structure. All other factors that influence outdoor recreation participation are assumed to remain the same over time.

Estimation of a cohort-component model is often limited by the availability of data, and in particular the need to have data on population projections match up with activity participation rates. Population estimates are generally taken from the U.S. Bureau of the Census or state agencies. Activity participation rates come from surveys of the general population. It is critical that the age and race categories used in outdoor recreation surveys match up with those used in population estimates. The model can be used to predict the number of days of participation in an activity; but that effort requires more data on recreation participation since there must be a sufficient sample of participants in the activity by age and race/ethnicity to estimate average days of participation for each group.

A cohort-component projection model was used to project future participation in outdoor recreation activities by Illinois residents based on Illinois Bureau of the Budget projections of the future population and its age and racial structure, as well as constant activity participation rates for age and racial groups developed from surveys of the Illinois population in 1987 and 1989. The two surveys were combined since the activity participation rates were similar. There was another survey in 1991 that also had similar participation rates; but age was not included in the questionnaire so it was not possible to use that information in this study. The results of that survey plus an earlier one in 1985 suggest relatively stable activity participation rates for Illinois residents over the period 1985-1991. The models project that growth in number of Illinois participants in 31 outdoor recreation activities during the period 1990-2025 will be lower than expected growth in the Illinois population (Table 1). While the Illinois population

aged 15 and above is expected to grow by 6.6 percent between 1990 and 2025, changes in the number of outdoor recreation participants 15 and older are expected to range from +4 percent to -21 percent, with a median of -10 percent. An older population and increasing numbers of racial minorities are responsible for keeping the projected growth in number of participants below that of the population, and for the projected decreases in the number of participants in 27 of the 31 outdoor activities. Projected decreases in number of participants that were attributable to aging ranged from 1 to 21 percent of the 1990 participation. Changing racial distribution of the population was associated with increases of up to 1 percent in four activities, and decreases of up to 14 percent in 27 activities. Overall, a larger change in number of participants was attributed to aging for 21 activities, while race was associated with a larger change in 10 activities.

The largest projected increases in number of participants are for activities that are relatively popular among older Americans and racial minority groups; and include walking, driving, and picnicking. The largest projected decreases are for activities that are particularly popular with younger White Americans; and include waterskiing, snowmobiling, trapping, and downhill skiing.

Projections suggest changes in the racial background and age of participants. In all 31 activities a decrease is projected in the number of White participants; but the number of African American participants is projected to decrease in only two activities -- downhill skiing and soccer, and numbers of participants from the other racial category are not projected to decrease in any activities (Table 2). Increases in the number of other participants is projected to exceed those of African Americans in 28 out of 31 activities. This is a reflection of greater increases in the other population, the concentration of a larger part of the increased growth of the other population in the younger age classes that have higher participation rates, and the generally higher participation rates for the other population when compared to African Americans. Participants in outdoor recreation activities are projected to be older and increasingly from African American and other racial groups. For example, there is projected to be an increase in White runners/joggers over age 45, African American joggers over age 35, and other joggers over age 15.

The projections of the numbers and characteristics of future participants developed for Illinois must be evaluated in light of two key assumptions of the model: (1) Participation rates by age and race will not change over time, and (2) Variables other than age and race that may influence participation are not explicitly considered. For a discussion of these assumptions and their implications for predicting the number of participants in selected activities in the years ahead, see Dwyer (1993a) who also provides suggestions for improved predictions, such as allowing participation rates to change over time. As the racial and age structure of the population changes over time, there will also be other demographic changes such as income, family structure, and education; as well as changing tastes and preferences and changing availability of opportunities to participate. It is important to recognize that these other factors exist and in some instances may overwhelm some of the forces for change that we are dealing with here. But for now we are focusing our attention on population growth and changing age and race and their possible implications for future participation.

Implications for Management

If participation rates in outdoor recreation activities by age and race remain constant over time, changes in the Illinois population and its age and racial composition are likely to bring significant changes in the outdoor recreation participation patterns of Illinois residents. While projected changes will vary significantly across activities, the number of outdoor recreation participants is projected to decrease or increase at a slow rate, and participants will be increasingly older and from non-white groups. The projected changes in the numbers of participants as well as their ages and racial/ethnic backgrounds will have wide-ranging implications for recreation resource management programs

including design and management of recreation settings, the focus of visitor programs, information and marketing efforts, and the selection and training of those who work with visitors. It may be necessary to review fee structures in the years ahead, given the increasing proportion of participants that will qualify for "senior citizen rates." The selection of staff and the development of training programs must address the needs of increasingly diverse customers. Increased attention will need to be given to communication between managers and planners and the increasingly diverse populations that they will serve. These implications will be especially significant for the management and use of resources in or near urban centers which tend to be heavily used by racial/ethnic minorities and older Americans. Change will be the hallmark of recreation resource management programs even more than in the past, and it will be increasingly important to maintain flexibility and the ability to respond to the changing needs of changing customers.

Implications for Research

If information from recreation surveys is to be used to estimate participation rates for racial/ethnic groups and age categories, it is critical that the racial/ethnic and age variables are defined in a way that is consistent with those used in the population projections. This lack of compatibility is often a problem with cohort-component modeling. In the present analysis, the population estimates for Illinois were reported for three racial groups (White, African American, and other). The outdoor recreation survey of Illinois residents used five categories (White, African American, Hispanic, Asian, and other). Consequently, the participation data had to be aggregated into three groups to match up with the population estimates. There was no problem with age since individuals were asked to provide their year of birth and this made it possible to aggregate age into any desired classes; but it is important that the minimum age of those surveyed for their recreation participation correspond to the lower limit of one of the population categories used in the population projections. Limited observations from minority groups resulted in sketchy information on participation rates for those groups, particularly among older participants. At the national level, the U.S. Bureau of the Census records race as White; African American; American Indian, Eskimo, and Aleut; or Asian and Pacific Islander. The Census also asks if an individual is of Hispanic origin. The Census reports individuals of Hispanic origin across all of the races. This is seldom done in recreation surveys and it makes for problems in compatibility. It is also important that sufficient data are gathered on participation in recreation activities by minority groups of all ages, particularly if estimates of the number of participant days are desired. This might require oversampling those groups. It is also critical that attention be given to estimating future activity participation rates. Among the obvious problems with using current rates to project future participation is that older individuals sampled today grew up in a quite different environment than exists today and is likely to exist in the years ahead. As such, their participation was conditioned by the environment in earlier times, and may not be indicative of the behavior of present or future older citizens. Examples of trends that may make these participation rates change over time include increased availability of resources, increased activity of older Americans, and reduced barriers to use of recreation resources by minority groups. These trends need to be considered in efforts to project future participation rates.

Table 1. Predicted changes in the number of participants on outdoor recreation activities in Illinois, 1990 and 2025, and components of those changes.

Activity	Predicted number of participants age 15 and above (in thousands)		Change 1990-2025 ¹	Components of change in participation 1990-2025 (in thousands)		
	1990	2025		Population growth	Age	Race
Run/jog	2,732	2,516	-216 (-7.9)	+181 (+6.6)	-280 (-10.2)	-118 (-4.3)
Walking	6,433	6,675	+242 (+3.8)	+427 (+6.6)	-65 (-1.0)	-119 (-1.8)
Driving	5,516	5,638	+121 (+2.2)	+366 (+6.6)	-48 (-0.9)	-196 (-3.6)
Picnicking	4,741	4,907	+66 (+1.4)	+315 (+6.6)	-187 (-3.9)	-62 (-1.3)
Nature study	2,490	2,493	+3 (+0.1)	+165 (+6.6)	-50 (-2.0)	-112 (-4.5)
Fishing	2,457	2,395	-61 (-2.5)	+163 (+6.6)	-82 (-3.3)	-142 (-5.8)
Ice fishing	194	176	-18 (-9.3)	+13 (+6.6)	-4 (-1.8)	-27 (-14.1)
X-country skiing	560	476	-84 (-15.1)	+37 (+6.6)	-65 (-11.6)	-56 (-10.1)
Downhill skiing	844	698	-146 (-17.3)	+56 (+6.6)	-132 (-15.6)	-70 (-8.3)
Ice skating	912	766	-146 (-16.0)	+60 (+6.6)	-121 (-13.2)	-86 (-9.3)
Pool swim	3,994	3,642	-352 (-8.8)	+265 (+6.6)	-442 (-11.1)	-175 (-4.4)
Other swim	2,365	2,107	-259 (-10.9)	+157 (+6.6)	-246 (-10.4)	-169 (-7.2)
Water skiing	991	787	-205 (-20.6)	+66 (+6.6)	-177 (-17.8)	-94 (-9.5)
Motor- boating	2,104	1,887	-217 (-10.3)	+140 (+6.6)	-140 (-6.7)	-216 (-10.3)
Sailing	701	645	-56 (-8.0)	+47 (+6.6)	-55 (-7.8)	-48 (-6.8)
Canoeing	845	764	-82 (-9.7)	+56 (+6.6)	-91 (-10.7)	-47 (-5.6)
Backpack- ing	330	295	-35 (-10.6)	+22 (+6.6)	-44 (-13.2)	-13 (-3.9)
Hiking	1181	1066	-115 (-9.7)	+78 (+6.6)	-132 (-11.1)	-62 (-5.2)
Tent camp	1147	1018	-128 (-11.2)	+76 (+6.6)	-153 (-13.3)	-52 (-4.5)
Vehicle camping	616	601	-15 (-2.4)	+41 (+6.6)	-1 (-0.2)	-55 (-8.9)
Golfing	2,036	1,875	-160 (-7.9)	+135 (+6.6)	-138 (-6.8)	-157 (-7.7)
Tennis	1,742	1,629	-114 (-6.5)	+116 (+6.6)	-236 (-13.6)	+7 (+0.4)
Soft/ baseball	2,565	2,304	-261 (-10.2)	+170 (+6.6)	-464 (-18.1)	+33 (+1.3)
Basketball	1,663	1,535	-128 (-7.7)	+110 (+6.6)	-252 (-15.2)	+14 (+0.8)
Soccer	412	345	-66 (-16.0)	+27 (+6.6)	-60 (-14.7)	-33 (-8.0)
Bicycling	3,970	3,715	-255 (-6.4)	+263 (+6.6)	-477 (-12.0)	-42 (-1.1)
Horse riding	859	751	-108 (-12.5)	+57 (+6.6)	-177 (-20.6)	+12 (+1.4)
Snow- mobiling	401	320	-80 (-20.1)	+27 (+6.6)	-66 (-16.5)	-41 (-10.2)
Off-road vehicles	809	706	-103 (-12.7)	+54 (+6.6)	-114 (-14.1)	-42 (-5.2)
Hunting	525	488	-37 (-7.0)	+35 (+6.6)	-34 (-6.4)	-38 (-7.2)
Trapping	49	40	-9 (-17.9)	+3 (+6.6)	-10 (-20.4)	-2 (-4.2)

1. (x.x) = percent of 1990 participation.

Table 2. Predicted changes in the number of participants in outdoor recreation activities in Illinois between 1990 and 2025, by race.

Activity	Predicted change in the number of participants age 15 and above (in thousands) ¹	Components of change in participation 1990-2025 (in thousands)		
		White	Black	Other
Run/jog	-216 (-7.9)	-358	+72	+70
Walking	+242 (+3.8)	-267	+236	+272
Driving	+121 (+2.2)	-282	+149	+254
Picnicking	+66 (+1.4)	-327	+150	+243
Nature study	+3 (+0.1)	-146	+62	+88
Fishing	-61 (-2.5)	-221	+67	+92
Ice fishing	-18 (-9.3)	-30	0	+12
X-country skiing	-84 (-15.1)	-90	+2	+3
Downhill skiing	-146 (-17.3)	-168	-2	+25
Ice skating	-146 (-16.0)	-194	+4	+43
Pool swim	-352 (-8.8)	-539	+40	+148
Other swim	-259 (-10.9)	-372	+21	+93
Water skiing	-205 (-20.6)	-218	+1	+12
Motorboating	-217 (-10.3)	-276	+19	+40
Sailing	-56 (-8.0)	-74	+3	+15
Canoeing	-82 (-9.7)	-136	+1	+53
Backpacking	-35 (-10.6)	-53	+2	+16
Hiking	-115 (-9.7)	-155	+4	+36
Tent camping	-128 (-11.2)	-195	+20	+47
Vehicle camping	-15 (-2.4)	-55	+9	+31
Golfing	-160 (-7.9)	-252	+21	+71
Tennis	-114 (-6.5)	-259	+26	+118
Soft/baseball	-261 (-10.2)	-420	+40	+118
Basketball	-128 (-7.7)	-252	+31	+94
Soccer	-66 (-16.0)	-85	-1	+19
Bicycling	-255 (-6.4)	-481	+86	+140
Horse riding	-108 (-12.5)	-132	+15	+10
Snowmobiling	-80 (-20.1)	-87	0	+7
Off-road vehicle	-103 (-12.7)	-139	+10	+26
Hunting	-37 (-7.0)	-67	+27	+3
Trapping	-9 (-17.9)	-9	0	0

¹ Predictions are made from population projections provided by the Illinois Bureau of the Budget, and per capita participation rates for outdoor recreation activities derived from data provided by the Illinois Department of Conservation. Recreation participation data were available for Hispanic and Asian groups; but population estimates were not available for these groups so they were put in the "other" category.

² (x.x) = percent change in estimated number of participants 1990-2025.

Literature Cited

Dwyer, J.F. 1993a. Customer diversity and the future demand for outdoor recreation experiences. Chicago IL. U.S.D.A. Forest Service, North Central Forest Experiment Station. February. 1993. 36 p.

Dwyer, J.F. 1993b. Outdoor recreation participation: An update on Blacks, Whites, Hispanics, and Asians in Illinois. In: Managing urban and high-use recreation settings. Selected Papers from the Urban Forestry and Ethnic Minorities and the Environment Paper Sessions at the 4th North American Symposium on Society and Resource Management; 1992 May 17-20; General Technical Report NC-163. St. Paul MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station: 119-121.

Dwyer, J.F. 1994a. Customer diversity and the future demand for outdoor recreation. In: Proceedings, 1993 Northeastern Recreation Research Symposium; 1993 April 18-12; Radnor PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station: 59-63.

Dwyer, J.F. 1994b. Customer diversity and the future demand for outdoor recreation. In: Proceedings, 1993 National Convention of the Society of American Foresters; 1993 November 7-10; Bethesda MD: Society of American Foresters: 383-387.

Murdock, S.H.; K. Backman; E. Colberg; N. Hogue and R. Hamm. 1990. Modeling demographic change and characteristics on the analysis of future demand for leisure services. Leisure Sciences, 12: 79-102.

Murdock, S.H.; K. Backman; M. N. Hogue and D. Ellis. 1991. The implications of change in population size and composition on future participation in outdoor recreational activities. Journal of Leisure Research, 23: 238-259.

State of Illinois, Bureau of the Budget. 1990. Illinois Population Trends 1980-2025. 40 p.