

# Outdoor Recreation Data, Trends & Projections—Planning for the Future



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**Other Partners---OF, FWS, PSW, Wild Found., TPL, PNW, RMRS, ....**



## JEKYLL ISLAND

**But first.....**

### **An Application of the NARRP Planning Principles**

# conservation plan

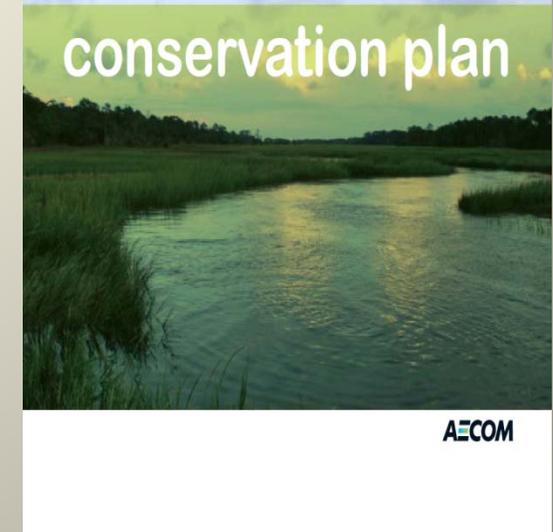
Jekyll Island is a state park managed by an Authority

- **Initiated conservation planning through consultant in 2010**
- **But, no one outside the Authority or its consultant was allowed to see, or help with it**
- **Public comment was invited in Nov./Dec. of 2010, but, no document provided for review, only a short PP presentation**
- **In Feb., a draft was released & public comment poured in (JISP is a favorite destination for Georgians +)**
- **NARRP principles used as a framework for my critique**

- **NARRP Principles Brought Structure to my Critique. Kudos NARRP!**



- **Synopsis---** ...it is clear that Jekyll Island State Park management through its JISP Authority needs to make a commitment to recreation management that takes into account both protection of the conditions of the natural resources of the island & of recreation experiential conditions. To make such a commitment, implementation of state-of-the-art planning principles in visualizing & analytically



comparing alternative management futures, including visitor capacity analysis, is needed. Planning that omits any alternatives & presents no cost-benefit comparisons could lead to decisions that are based on predisposition, bias, inadequate analysis, group-think, insular perspectives, & resistance to change. The planning process thus far has not been open & inclusive of all parties. It is highly recommended that all future planning be comprehensive (not compartmentalized) & be publicly inclusive & open.

# Forest Service RPA Regions of the U. S.

Presentation is based on the Forest Service 2010 RPA National Assessment & is original research



Group's data & published research for the 2010 Assessment include:

- [Recreation Demand Trends & Futures in the U.S. to 2060](#)
- Recreation & Protected Land [Resource Trends & Futures](#)
- Natural Amenity Effects on [Future Population Migration](#)
- [U.S. & County Population Projections to 2060](#)

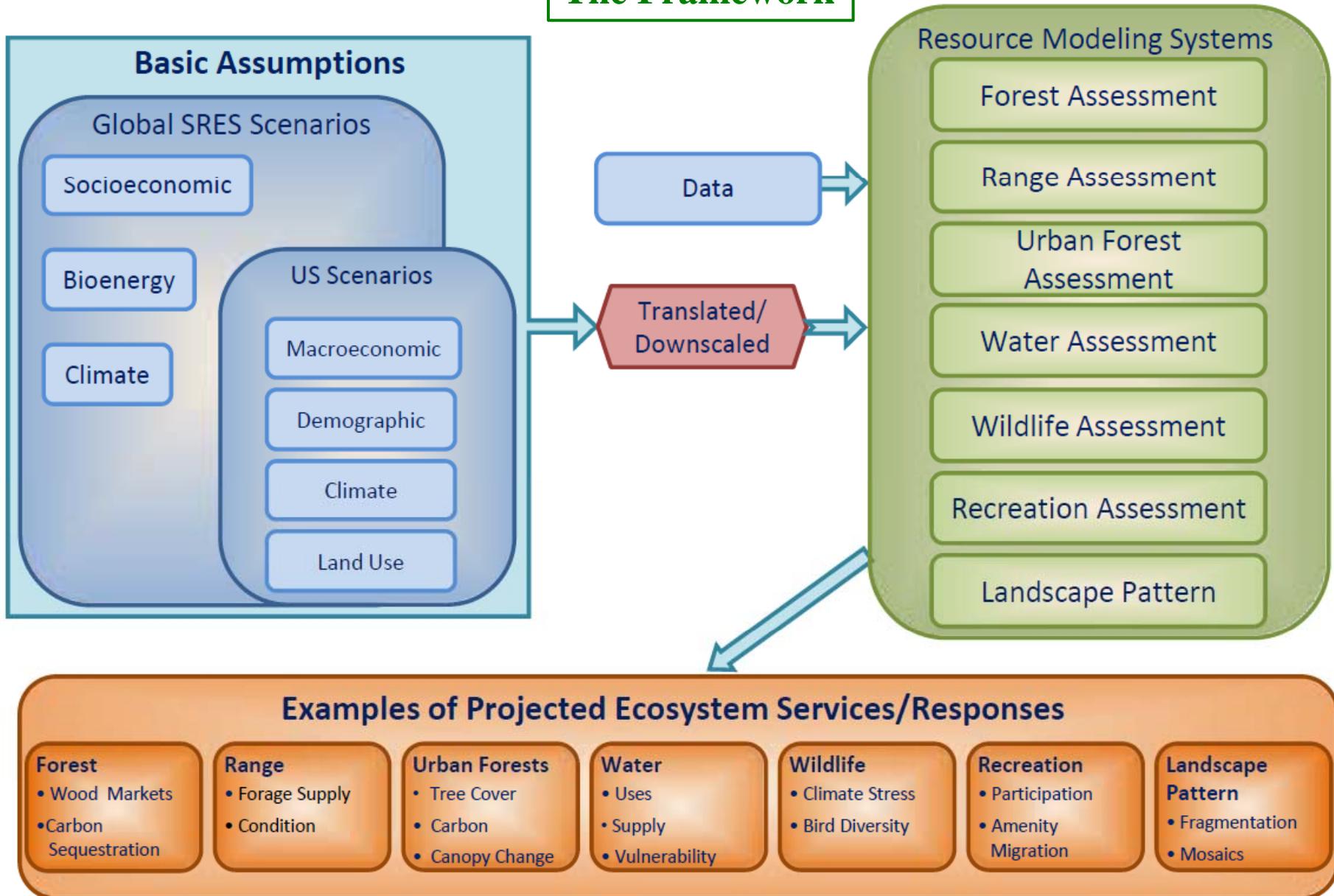




# 2010 RPA Scenario Analysis and Modeling Systems



## The Framework



# Applying NSRE & RPA in Recreation Planning?



- Consider the notion of creating a process for accessing NSRE & RPA recreation publications, data, & forecasts for planning (e.g., SCORP)
- What would a Framework for NSRE/RPA Applications look like?
- What would an effectively designed system for easy access to data & trends look like?
- Are there projects about to be launched that could provide beta testing?

# This Presentation is about Trends & Data Under the Analysis

- The data--- NSRE , RPA & other sources
- The Trends
  - Population & demographics
  - How demographic change affects OR participation
  - Outdoor recreation participation trends
  - Kids time outdoors (source, **National Kids Survey**)
  - Forecasts of future outdoor recreation demand
  - Natural amenities, current & forecast
  - The draw of natural amenities & forecast of rural population growth



# Trends---Population & Demographic Change

- **What is happening with population growth & are there increasing concentrations in some places (persons per square mile)?**
- **How is the age distribution of the U.S. population changing?**
- **How has the race/ethnic make-up of the U.S. population been changing over the last 20 years?**

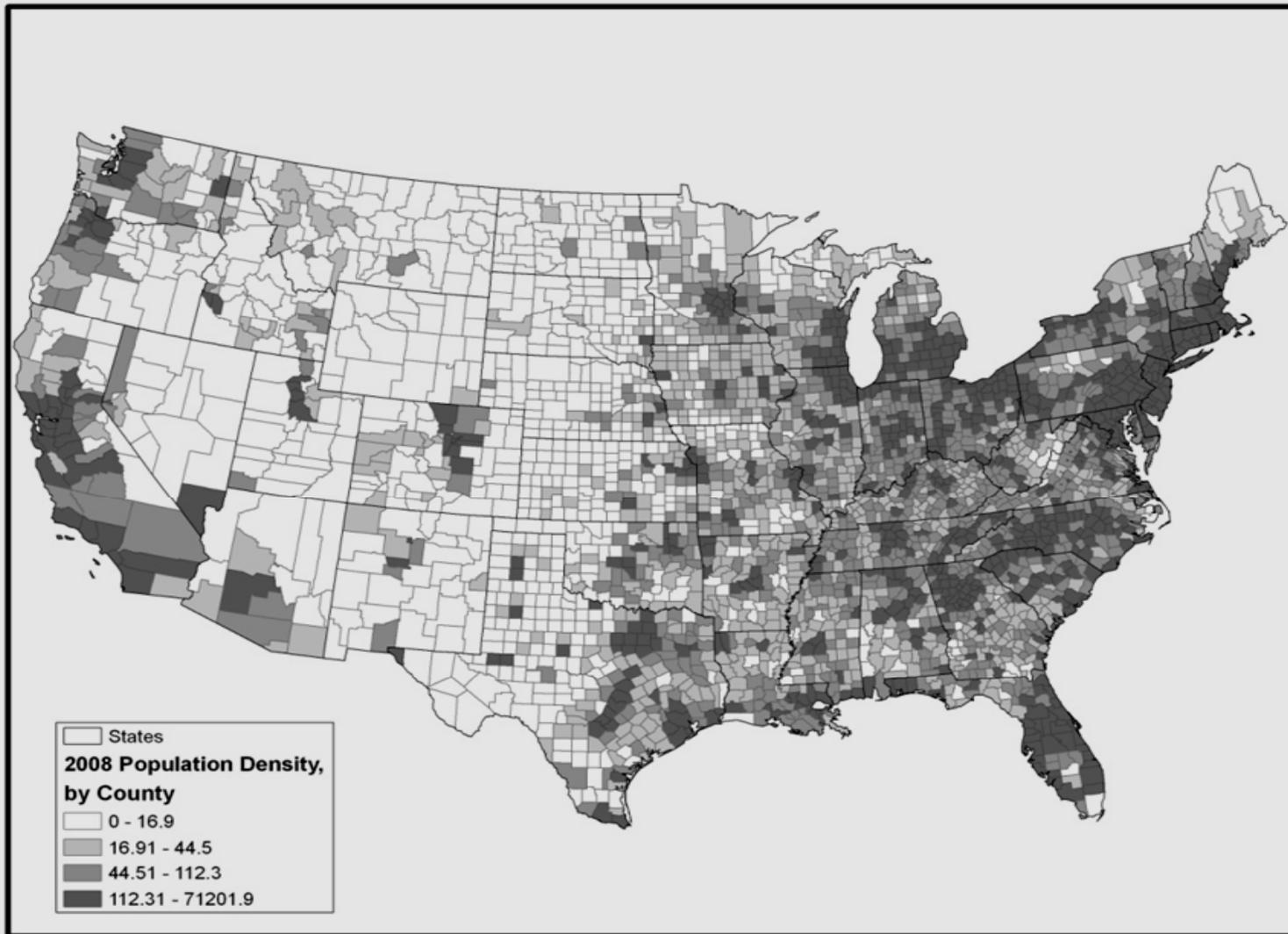


**RPA is unique in that it Tracks Trends and Forecasts Futures**

**Total population**

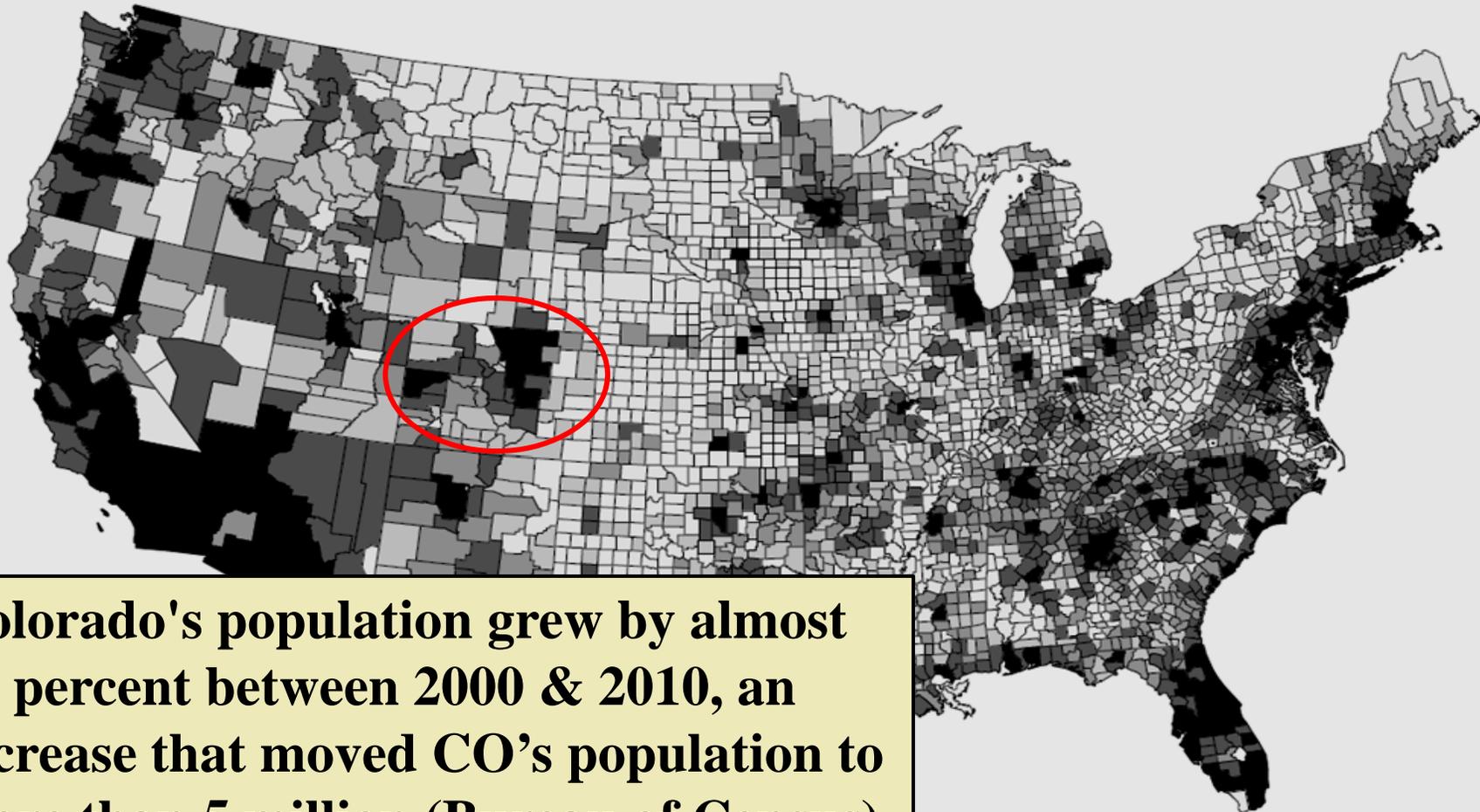
<b>Region &amp; Sub-Region</b>	<b>Population</b>	<b>Percent of National</b>
Northeast	63,245.9	20.8
North Central	61,122.0	20.1
<b>North Total</b>	<b>124,368.0</b>	<b>40.9</b>
Southeast	49,485.4	16.3
South Central	53,320.2	17.5
<b>South Total</b>	<b>102,805.6</b>	<b>33.8</b>
Great Plains	6,031.2	2.0
Intermountain	21,729.6	7.1
<b>Rocky Mountains Total</b>	<b>27,760.9</b>	<b>9.1</b>
Alaska	683.2	0.2
Pacific Northwest	10,339.3	3.4
Pacific Southwest	38,044.9	12.5
<b>Pacific Coast Total</b>	<b>49,067.4</b>	<b>16.1</b>

# Persons per Square Mile (current)



# Population Growth by County Since 1990

Change in population by county, 1990 to 2008



**Colorado's population grew by almost 17 percent between 2000 & 2010, an increase that moved CO's population to more than 5 million (Bureau of Census)**

Pop. change     Less than 0     0 to 2,500     2,501 to 7,500     7,500 to 50,000     More than 50,000

Source: U. S. Census Bureau.

## 2008 Population by Region & Age Group with Percent Change Since 1990 (Population is in 1,000s)

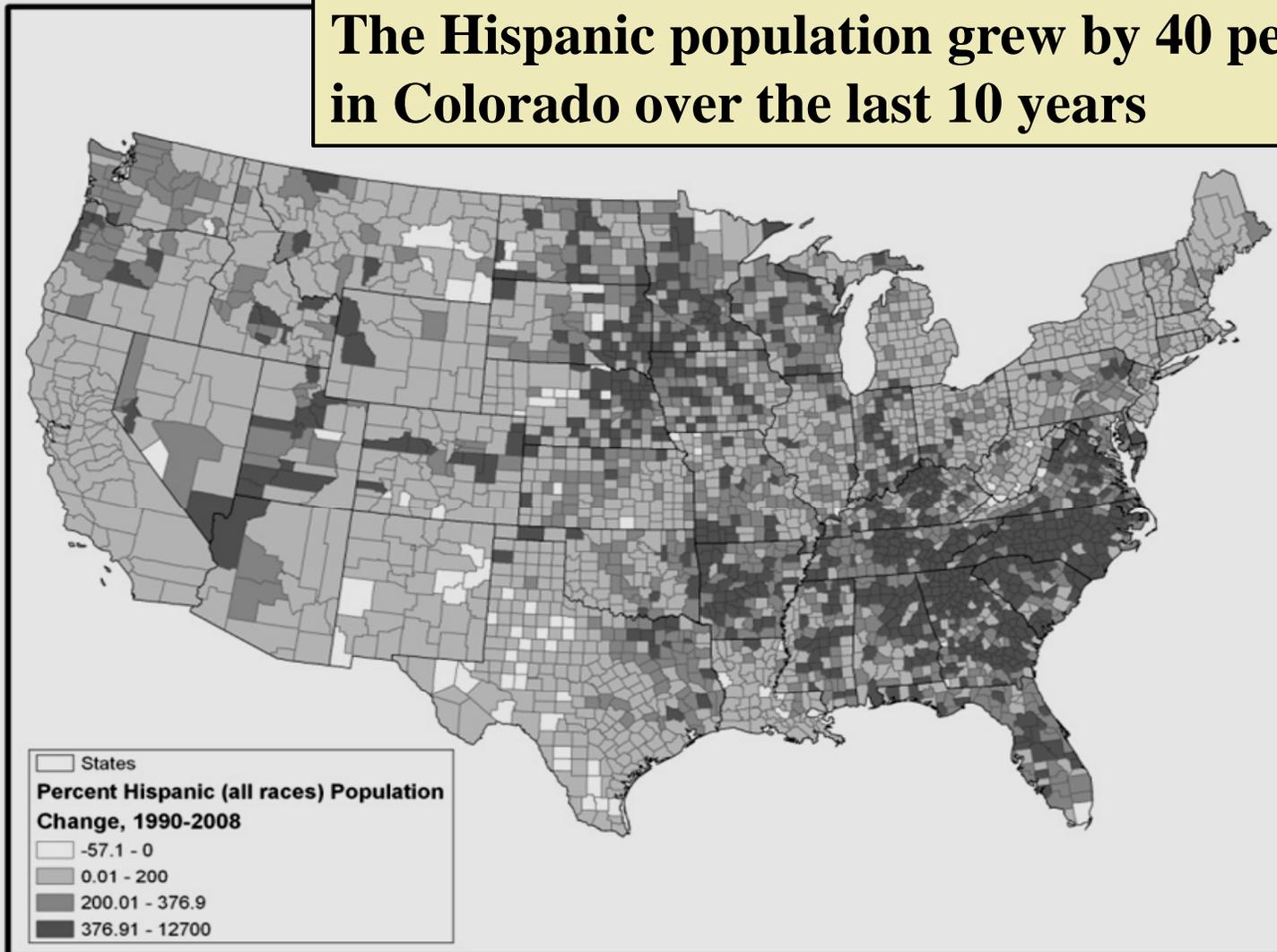
Age Group	Rocky Mountains	% change	United States	% change
Under 6	2,555.8	37.7	25,082.3	12.0
Age 6-10	1,941.7	24.1	19,897.3	10.2
Age 11-15	1,897.9	34.5	20,346.1	21.5
Age 16-24	3,544.3	41.8	38,373.4	13.8
Age 25-34	3,965.7	22.7	40,931.6	-5.2
Age 35-44	3,679.9	28.7	42,501.1	13.5
Age 44-54	3,861.1	111.2	44,372.1	77.0
Age 55-64	2,989.5	96.1	33,686.2	59.5
Age 65+	3,379.6	48.6	38,869.7	25.0
<b>Total</b>	<b>27,815.7</b>	<b>46.0</b>	<b>← 304,059 →</b>	<b>22.2</b>

## Current Population by Region & Race/ethnicity with Percent Change Since 1990 (population is in 1,000s)

Race/ Ethnicity	Rocky Mountains	% change	United States	% change
White	19,479.6	25.3	199,491.5	5.9
African American	952.9	69.4	37,171.8	26.8
American Indian	768.9	38.3	2,329.0	29.6
Asian or Pacific Islander	690.5	171.1	13,672.3	95.4
Hispanic	5,497.2	157.8	46,943.6	109.8
U. S. All Races	27,815.7	46.0	304,059.7	22.2
2 or more races	426.6	.	4,451.7	.

# Percent Change in Hispanic Population Since 1990

**The Hispanic population grew by 40 percent in Colorado over the last 10 years**



# Population & Demographic Change

- **Growth (population per square mile) has occurred almost everywhere, especially Northeast coast, Southern Appalachians, Atlanta, Chicago, Denver, Salt Lake City, Southwest, Portland & Seattle**
- **Fastest growing age has been ages 44-54 & 55-64, with next fastest being 65 or older. Decline in age group 25-34**
- **Growing especially fast is the Hispanic population in the Southeastern states, states bordering the Mississippi River, upper Mid-West, Arizona, Utah, Wyoming, coastal Oregon & Washington, & Idaho**
- **Changing population & its demographics have affected outdoor recreation trends**

# How Demographic Change Can Affect Outdoor Recreation Participation? (Our Current Research)

## ➤ Models developed for forecasting for 2010 RPA

➤ Native American (**pos**)

➤ Black (**neg**)

➤ Asian (**neg**)

➤ Hisp (**neg**) – except for Day Hiking

➤ White (generally **pos**)

➤ Educ (**neg**) – consumptive & motor activities

➤ Educ (**pos**) – nonconsumptive

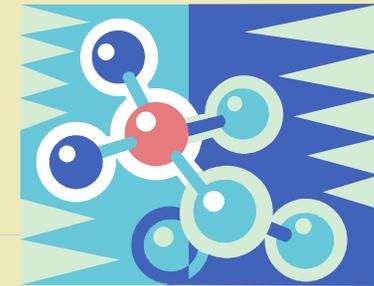
➤ Income (**pos**) – most activities

➤ Gender – (**pos**) boys still play more outside

➤ Population density (**neg**) – crowding or urban

➤ Resource availability (**positive**)

➤ Land, forests, open space, water, etc.



# ***NSRE***

FS  
UT  
UGA  
NOAA

- **National RDD survey**
  - **Started 1960**
  - **Continuous since 1999**
  - **Last birthday**
  - **140,000+**
- **Survey's contain:**
  - **Core modules (recreation & demographics)**
  - **2-3 others modules**
- **Data is weighted (using Census)**
- **National, regional, state & within state strata**

# SCORP's

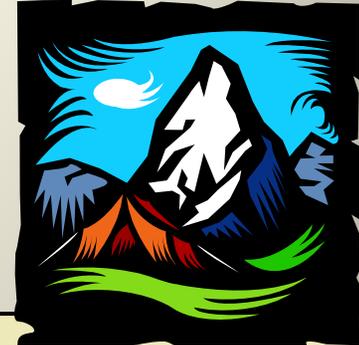
- **Consistent methodology & questions**
- **22 state reports completed**
- **Use NSRE as core demand data**
- **Ability to examine trends**
  - **Spatially (national to within state)**
  - **Temporally (between different years)**
- **Add modules/questions to NSRE**
  - **Specific to a state**
- **Relate state results to RPA findings**
- **Create state surveys to correlate with NSRE**

# Outdoor Recreation Participation Trends



- Is use of public land up, down?
- How do peoples' choices for outdoor recreation compare with previous generations, & is there an **overriding trend**
- What is the general trend for nature-based recreation, is it **growth**?
- Have any traditional activities shown **decline** (e.g., hunting).
- If nature-based outdoor recreation is growing, are there **activities & interests** that stand out?

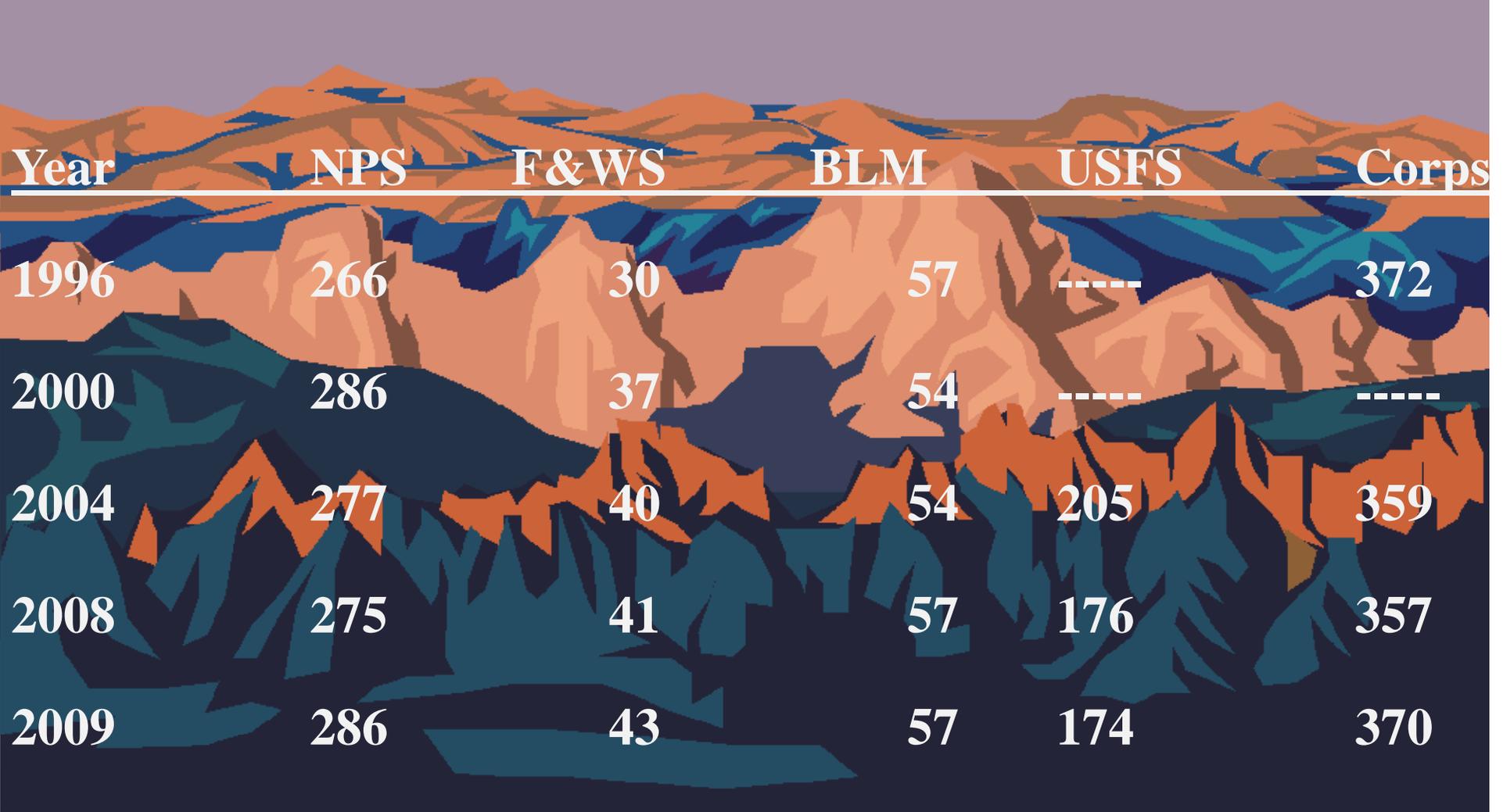
# Outdoor Recreation Participation Trends



- **Primary source---NSRE**
- **Visitation to public lands**
- **Overall trends in OR & nature based recreation**
- **Fastest growing & declining**
- **Trends in the first decade of the 21<sup>st</sup> Century**
- **Kids time outdoors & upcoming national study**

# Visitation to Public Lands?

Federal Lands (3 UP, 1 Steady, 1 Down)

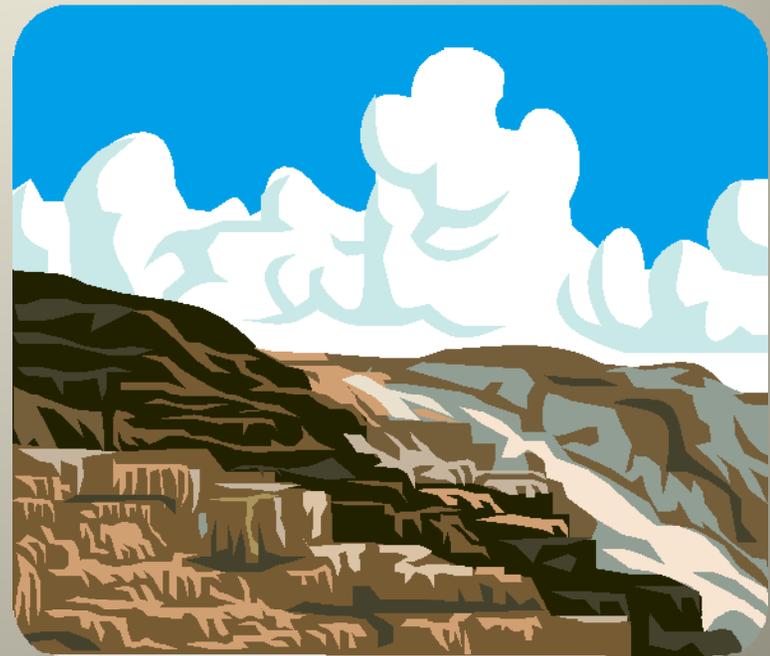


Year	NPS	F&WS	BLM	USFS	Corps
1996	266	30	57	-----	372
2000	286	37	54	-----	-----
2004	277	40	54	205	359
2008	275	41	57	176	357
2009	286	43	57	174	370

# Visitation to public lands?

## State Park Systems/ Rocky Mountain Region

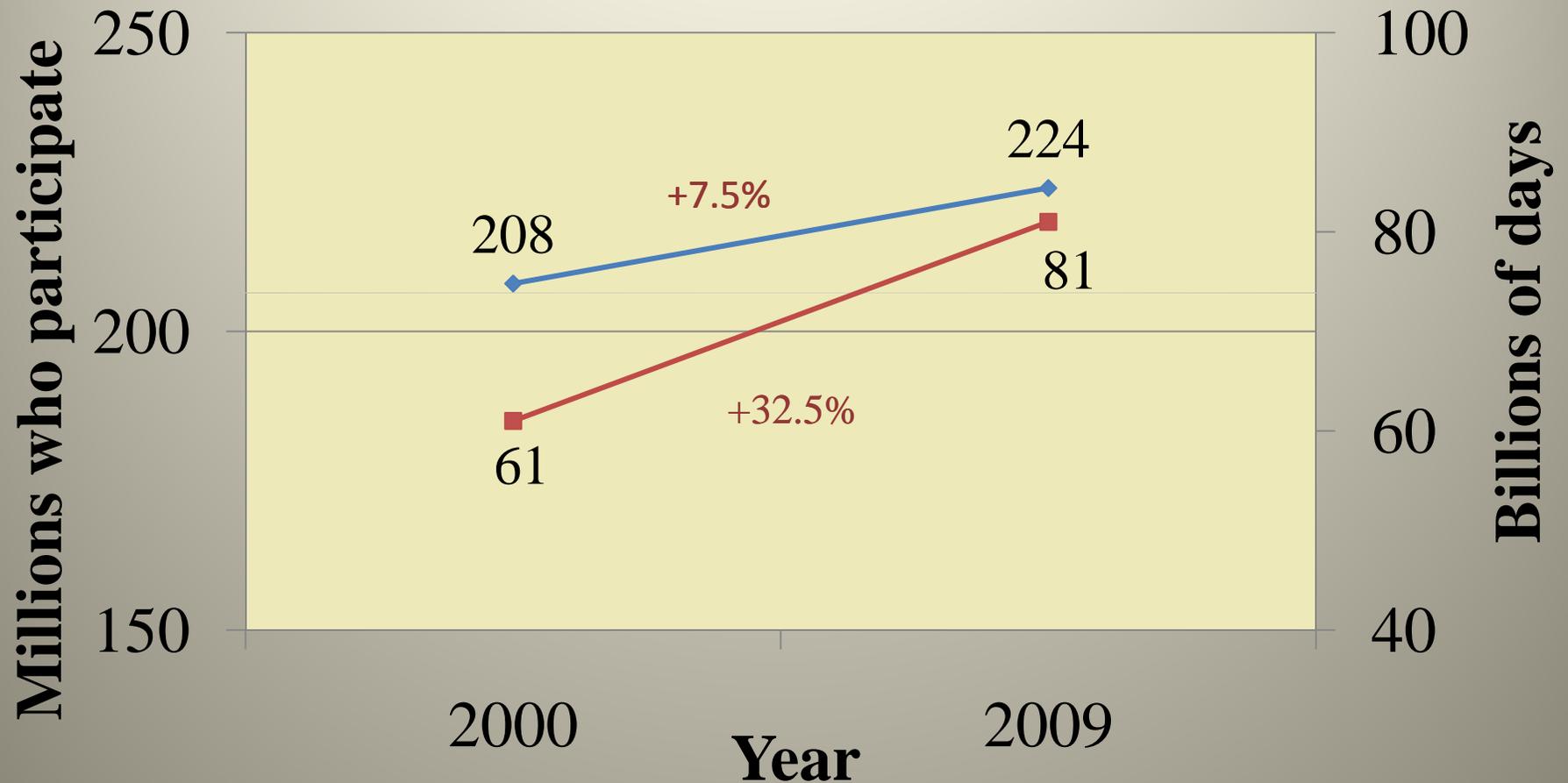
- 1992 49.0
- 1995 58.9
- 2000 58.9
- 2005 62.9
- 2009 64.3



**Other regions have seen some declines.**

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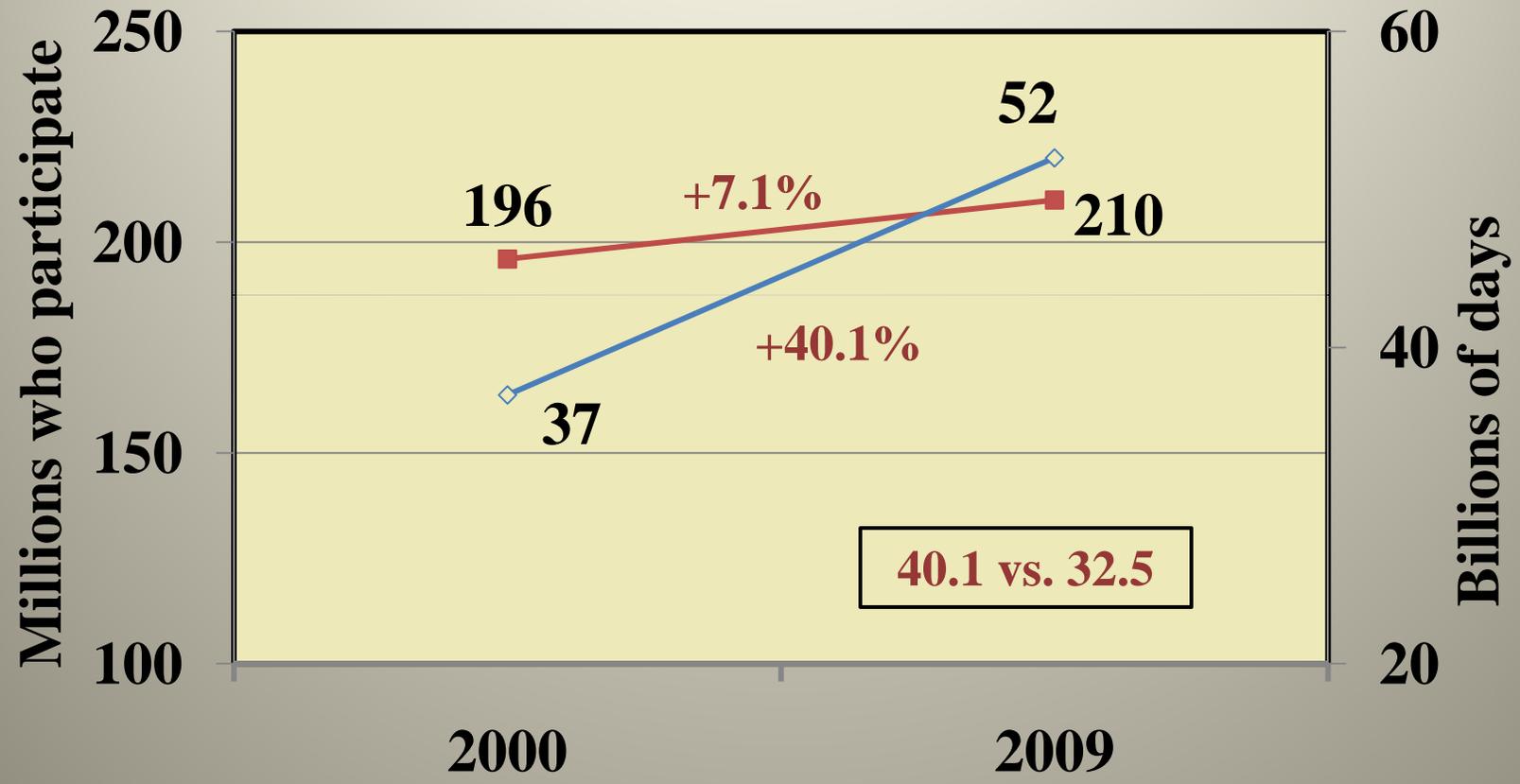
## General Outdoor Recreation Demand Growth by People 16+ (number of people & annual participation days), 2000–2009.



—◆— Number Who Participate (million) —■— Number of Activity Days (billion)

Source: National Survey on Recreation & the Environment (NSRE)

# Nature-based Outdoor Recreation Growth (number of people & annual participation days, 2000–2009)

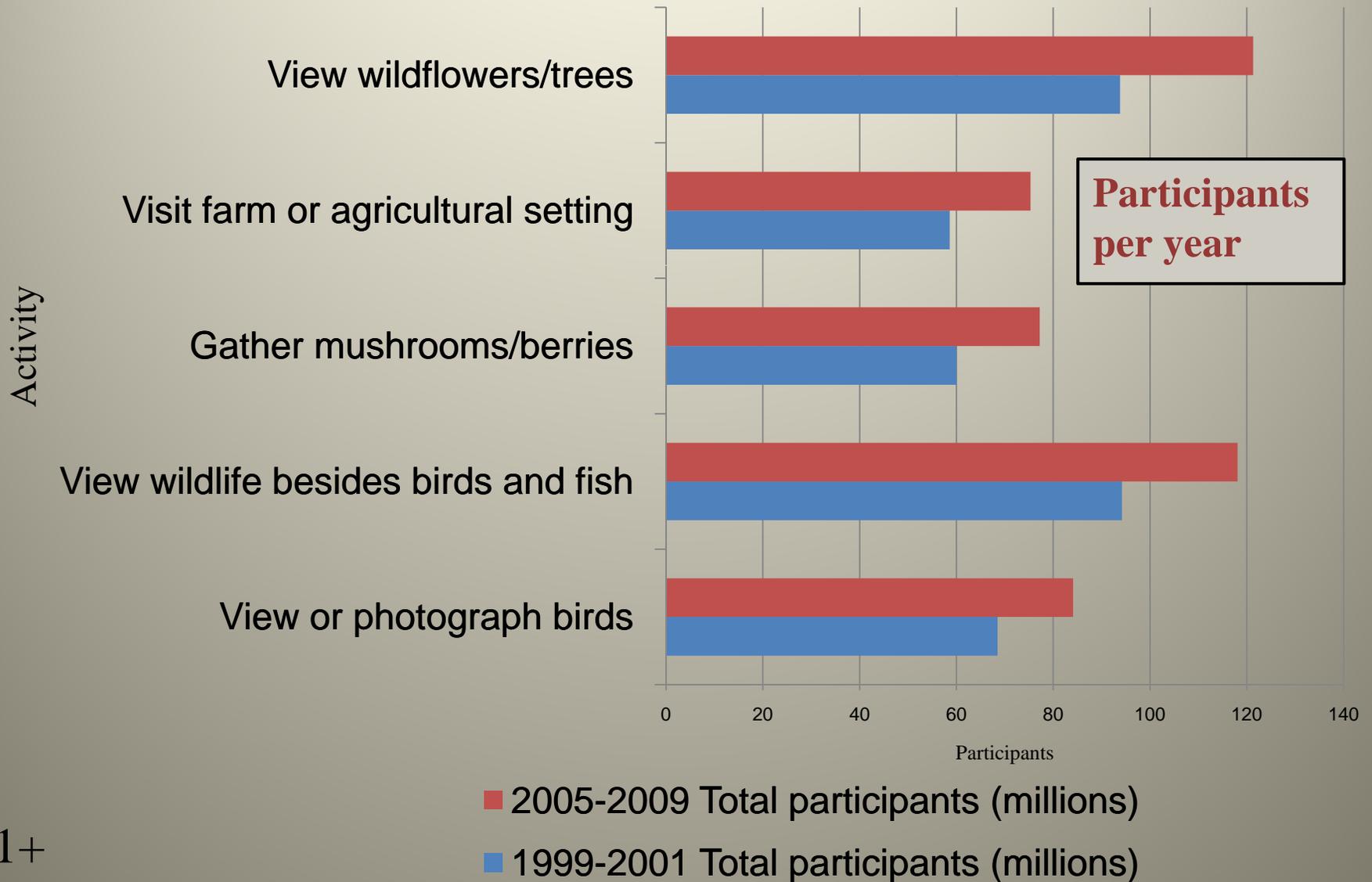


Year

- Number Who Participate (million)
- ◆ Number of Activity Days (billion)

<b>Activity</b>	<b>1994-1995</b>	<b>1999- 2001</b>	<b>2005-2009</b>	<b>Percent Participating 2005-2009</b>	<b>Percent change 1999-2009</b>
Walk for pleasure	.....	175.6	200.0	85.0	13.9
Gathering of family/friends	128.2	157.6	174.2	74.0	10.5
Gardening/landscaping for pleasure	--	140.8	157.9	67.1	12.1
View natural scenery	--	127.1	149.8	63.7	17.9
Visit outdoor nature center/zoo	110.9	121.0	133.3	56.6	10.2
Sightseeing	117.5	109.0	123.9	52.7	13.7
Picnicking	112.1	118.3	121.6	51.7	2.8
View wildflowers/trees	--	93.8	121.3	51.6	29.4
Driving for pleasure	--	107.9	120.5	51.2	11.6
View wildlife besides birds/fish	62.8	94.2	118.1	50.2	25.4
Visit historic sites/monuments	91.6	96.1	103.9	44.1	8.1
Visit a beach	128.8	84.4	102.0	43.3	20.7
Swimming in lakes, streams, etc.	87.4	85.5	97.5	41.5	14.0
Bicycling	77.8	81.9	88.3	37.5	7.8
View or photograph birds	54.3	68.5	84.1	35.7	22.8
Day hiking	53.5	69.1	79.7	33.9	15.4
Visit a wilderness	--	67.2	79.1	33.6	17.7
Gather mushrooms/berries	--	60.0	77.2	32.8	28.6
Visit farm or agricultural setting	--	58.6	75.3	32.0	28.6
View salt/freshwater fish	27.6	52.3	63.5	27.0	21.4
Developed camping	46.5	55.3	56.0	23.8	1.1
Warmwater fishing	49.3	47.6	55.7	23.7	17.1
Motorboating	59.5	50.7	55.0	23.4	8.6

# Four of the Top Five Fastest Growing Activities Between 1999-2001 & 2005-09 were Nature Based



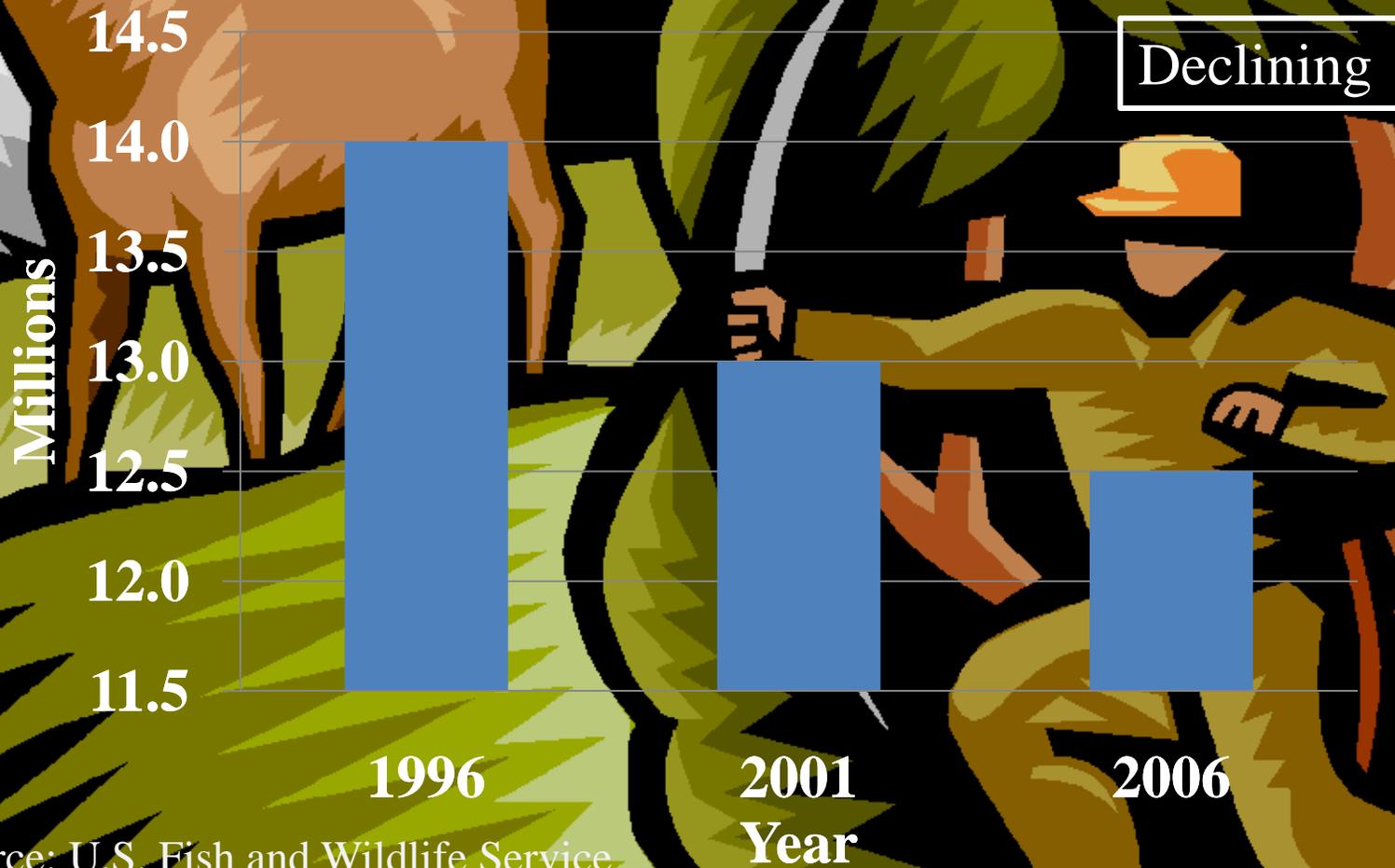
# Fishing Participation: 1996 to 2006 (population 16 years of age or older, numbers in millions)



Source: U.S. Fish and Wildlife Service

Declining

# Hunting Participation 1996-2006 (population 16 years of age or older, numbers in millions)



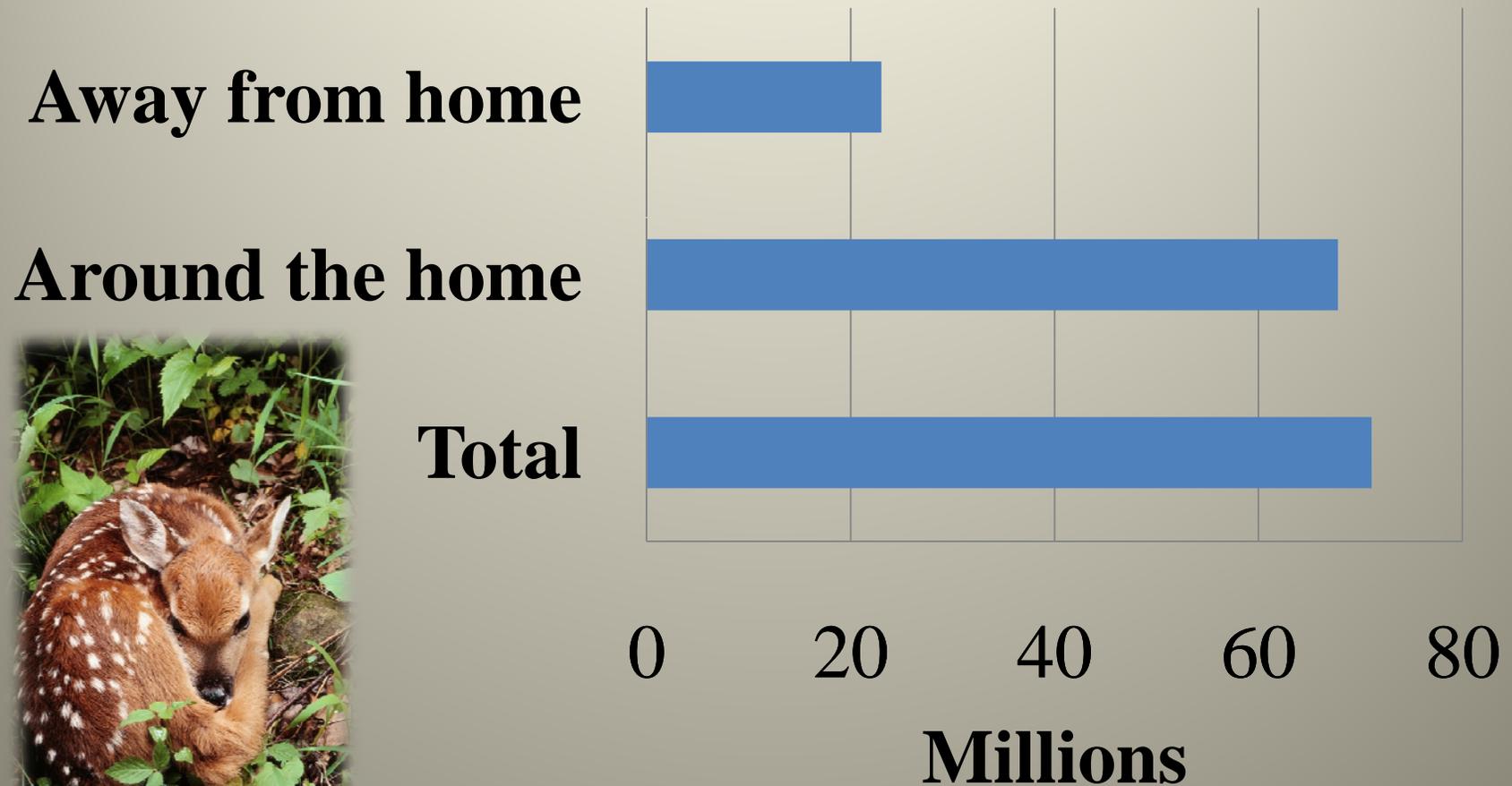
Source: U.S. Fish and Wildlife Service

# Wildlife Watching 1996-2006 (population 16 years or older, numbers in millions)



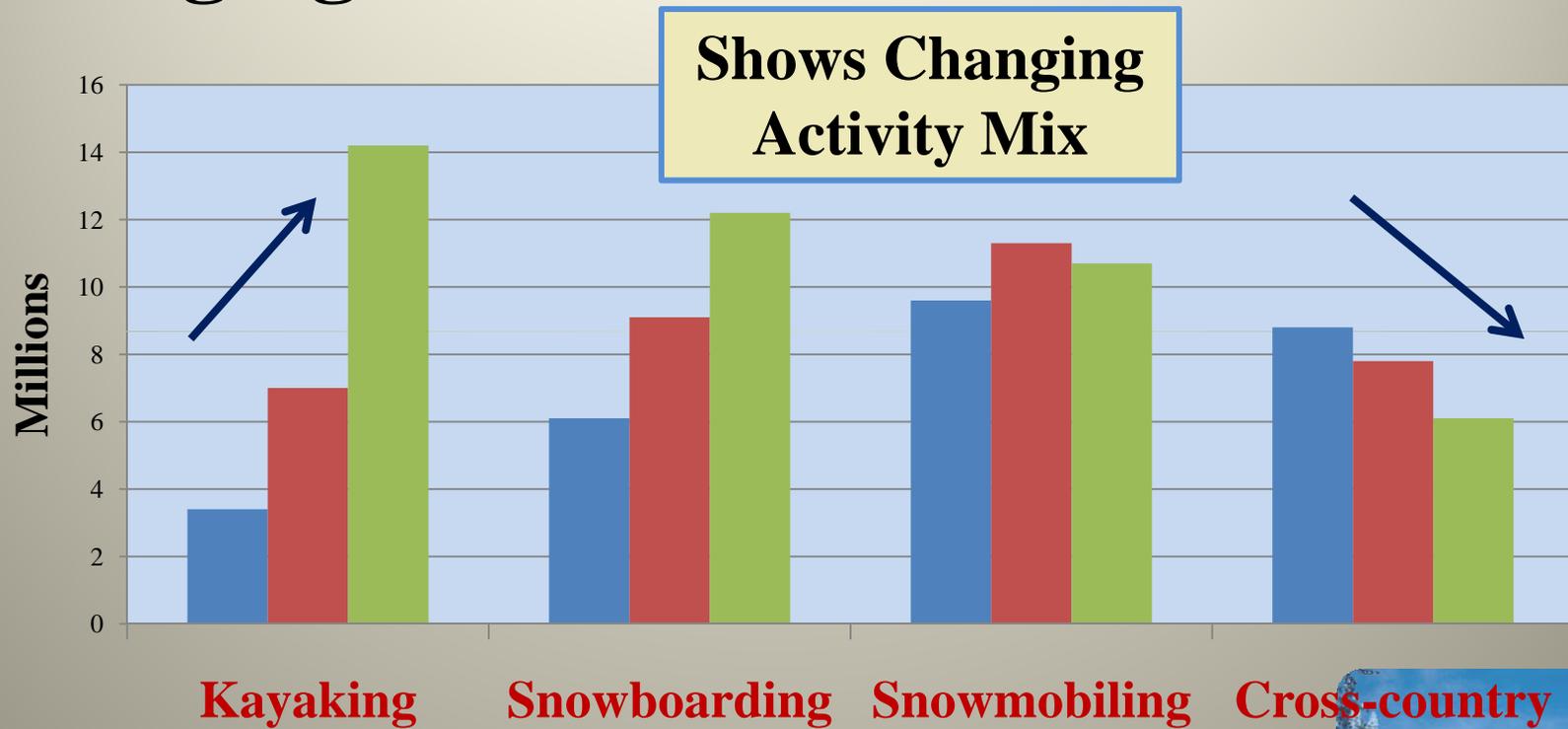
Source: U.S. Fish and Wildlife Service

# Wildlife Watching in 2006 (population 16 years of age or older, numbers in millions)



Source: U.S. Fish and Wildlife Service

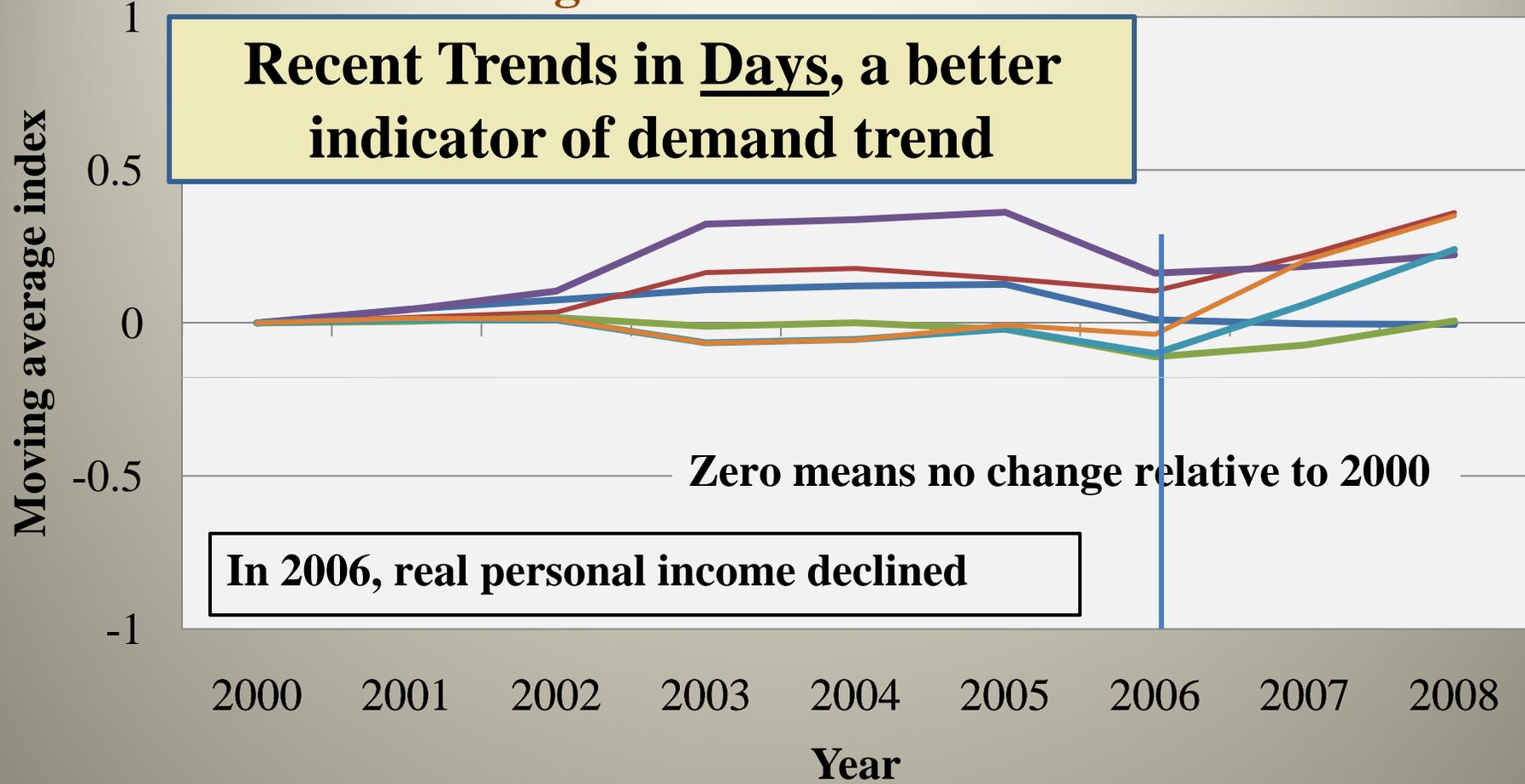
# Trend for Four Activities Illustrate Changing Outdoor Recreation Choices



## Activity

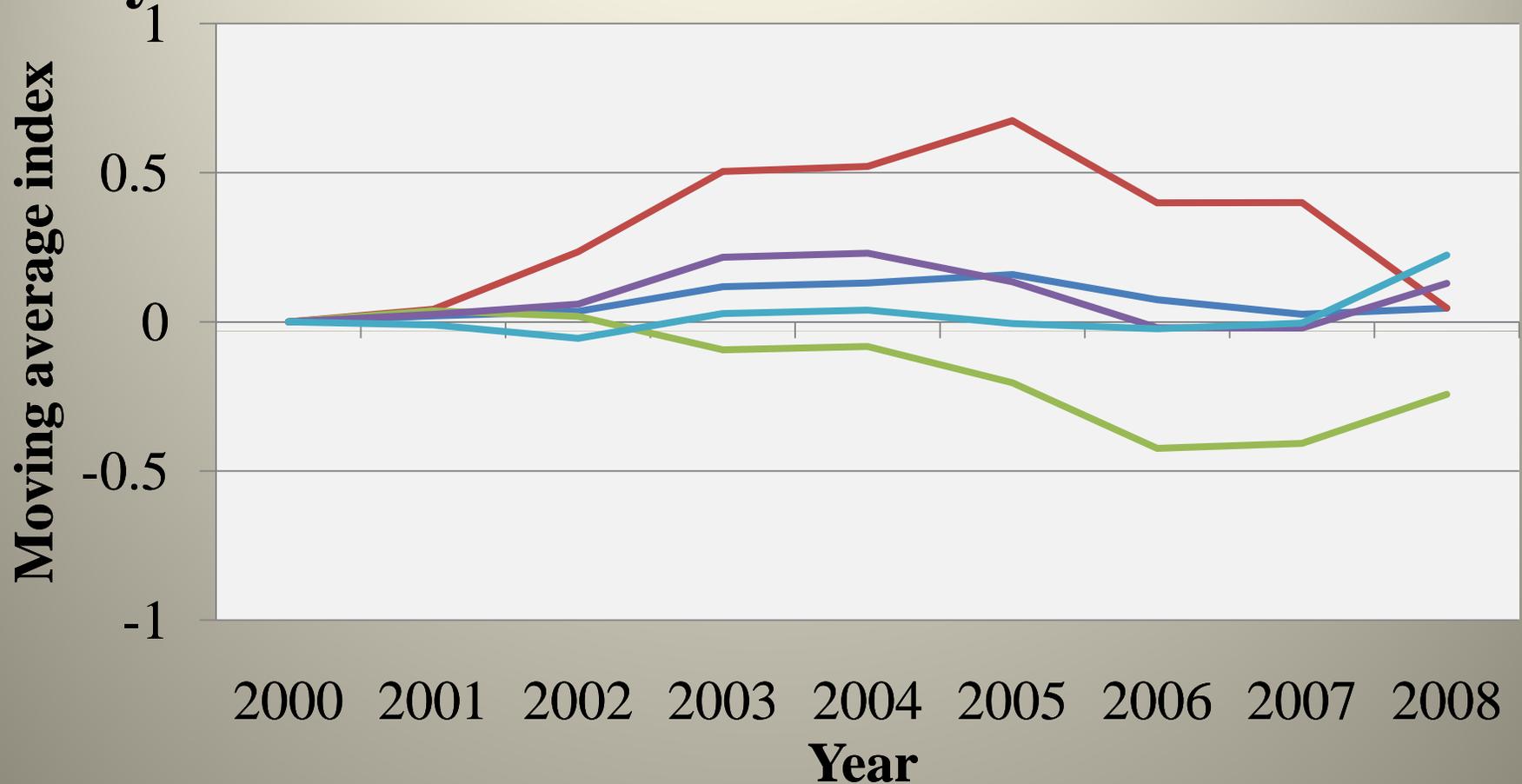
■ 1994-1995   ■ 1999-2001   ■ 2005-2009

# Indexed Moving Average of Total Activity Days for Activities Associated with Visiting Recreation or Historic Sites 2000 to 2008



- Developed camping
- Picnicking
- Visit historic sites
- Family gathering
- Visit a beach
- Visit prehistoric/archeological sites

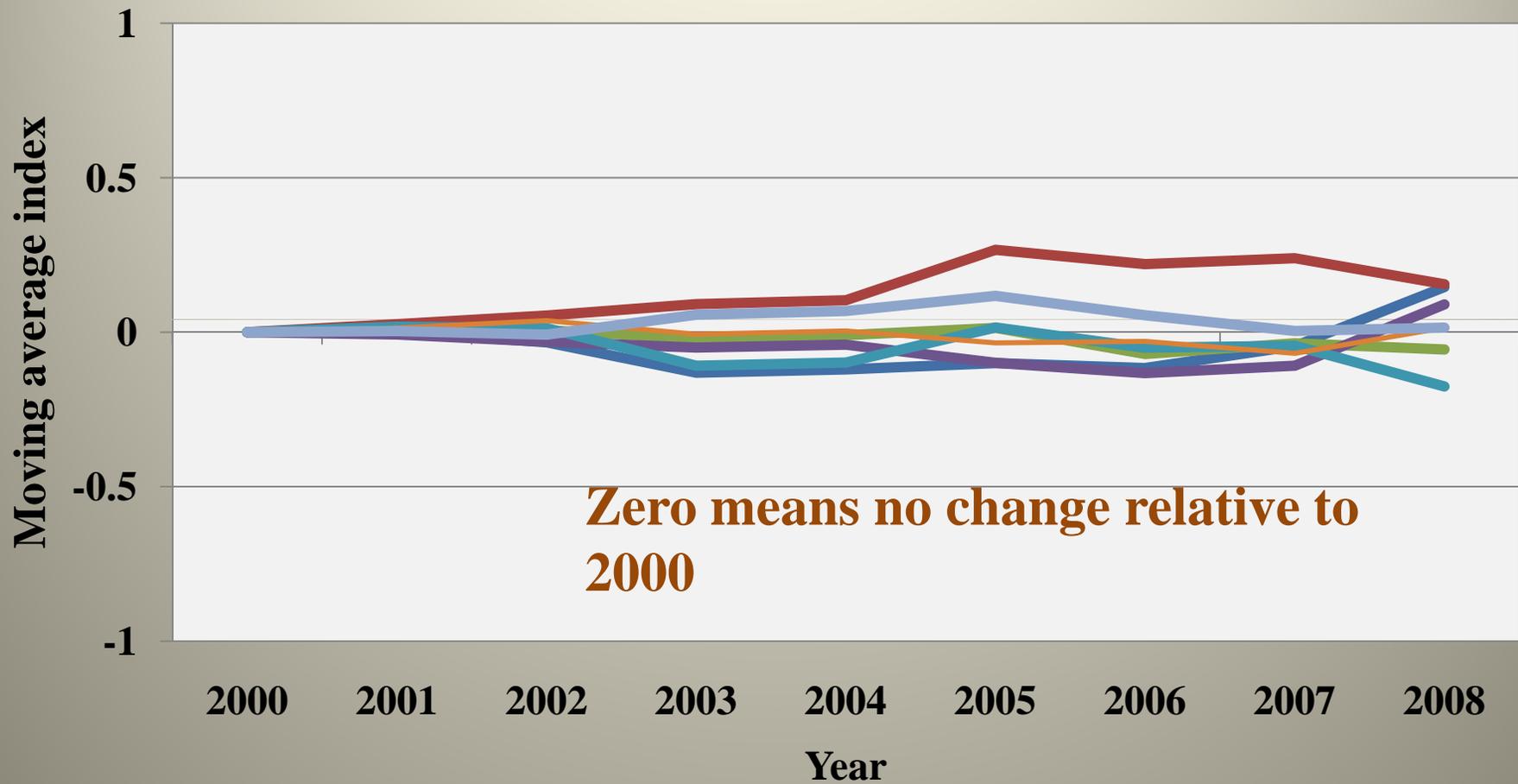
# Indexed Moving Average of Total Activity Days for Motorized Activities for 2000 to 2008



— Motorboating  
— Snowmobiling  
— Waterskiing

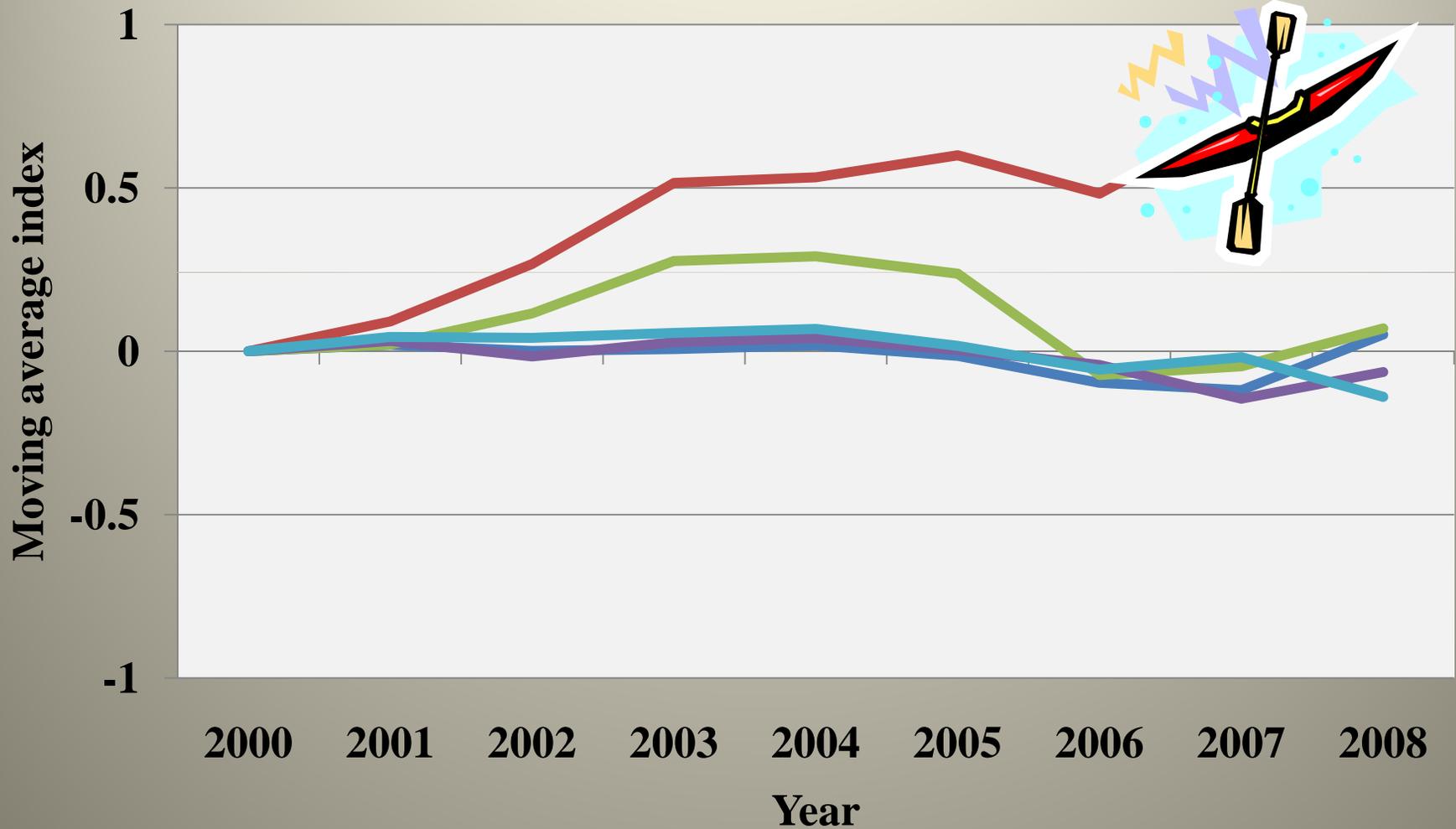
— Off-highway vehicle driving  
— Use personal watercraft

# Indexed Moving Average of Total Activity Days for **Hunting & Fishing** Activities for 2000 to 2008



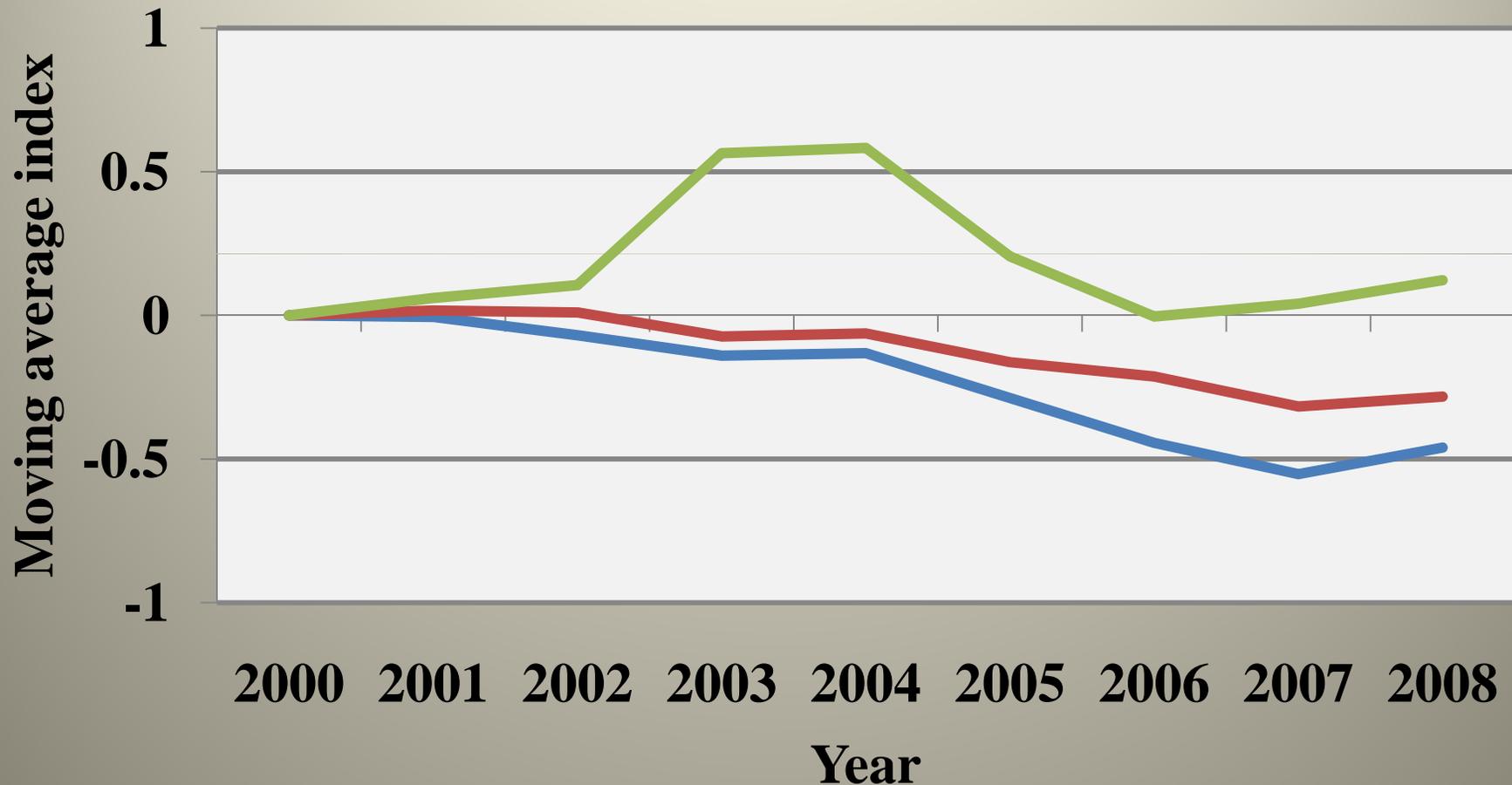
- Anadromous fishing
- Coldwater fishing
- Saltwater fishing
- Warmwater fishing
- Big game hunting
- Migratory bird hunting
- Small Game hunting

# Indexed Moving Average of Total Activity Days for **Non-motorized Boating** Activities for 2000 to 2008



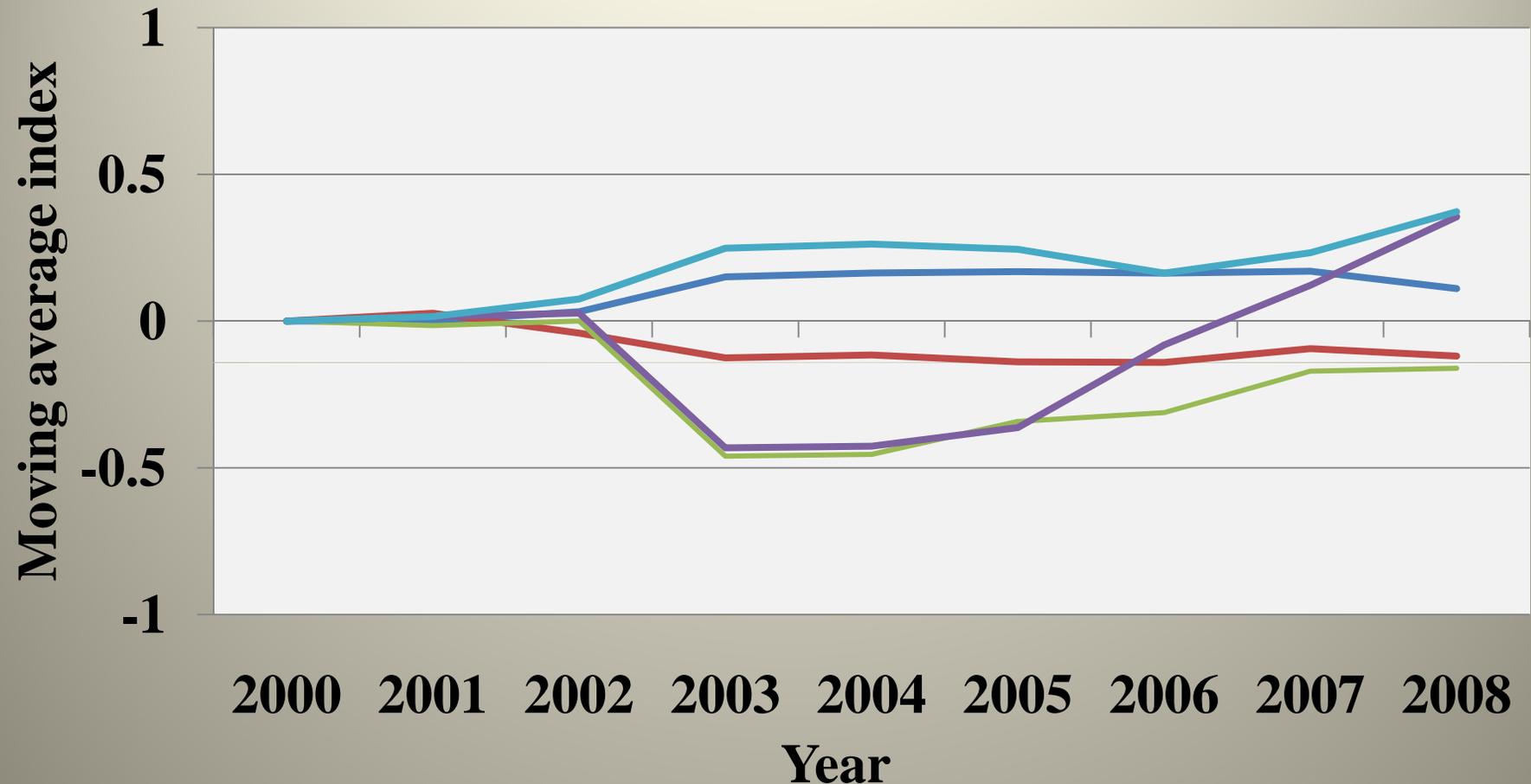
— Canoeing — Kayaking — Rafting — Rowing — Sailing

# Indexed Moving Average of Total Activity Days for Snow Skiing & Boarding Activities for 2000 to 2008



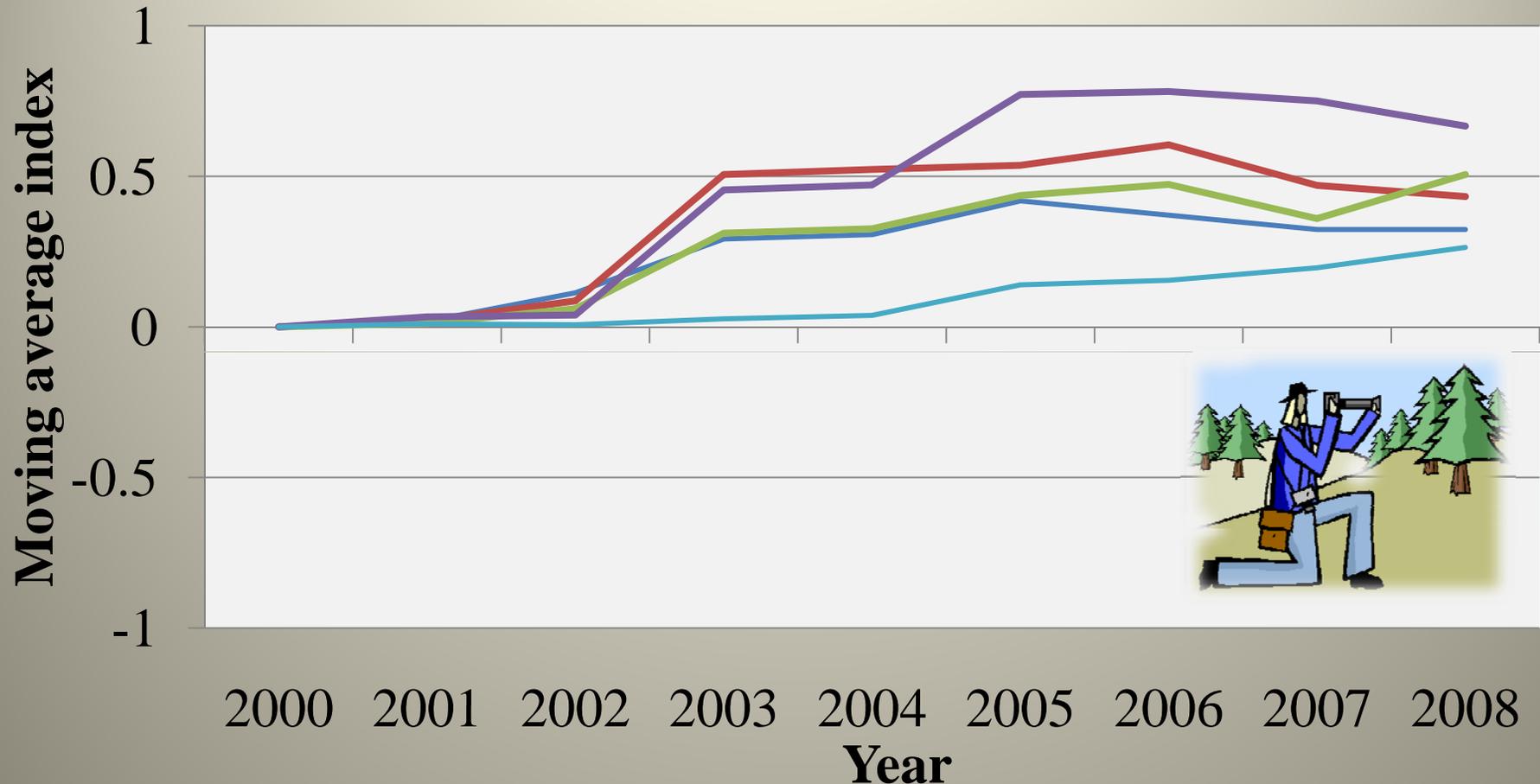
— Cross country skiing — Downhill skiing — Snowboarding

# Indexed Moving Average of Total Activity Days for **Backcountry Activities** 2000 to 2008



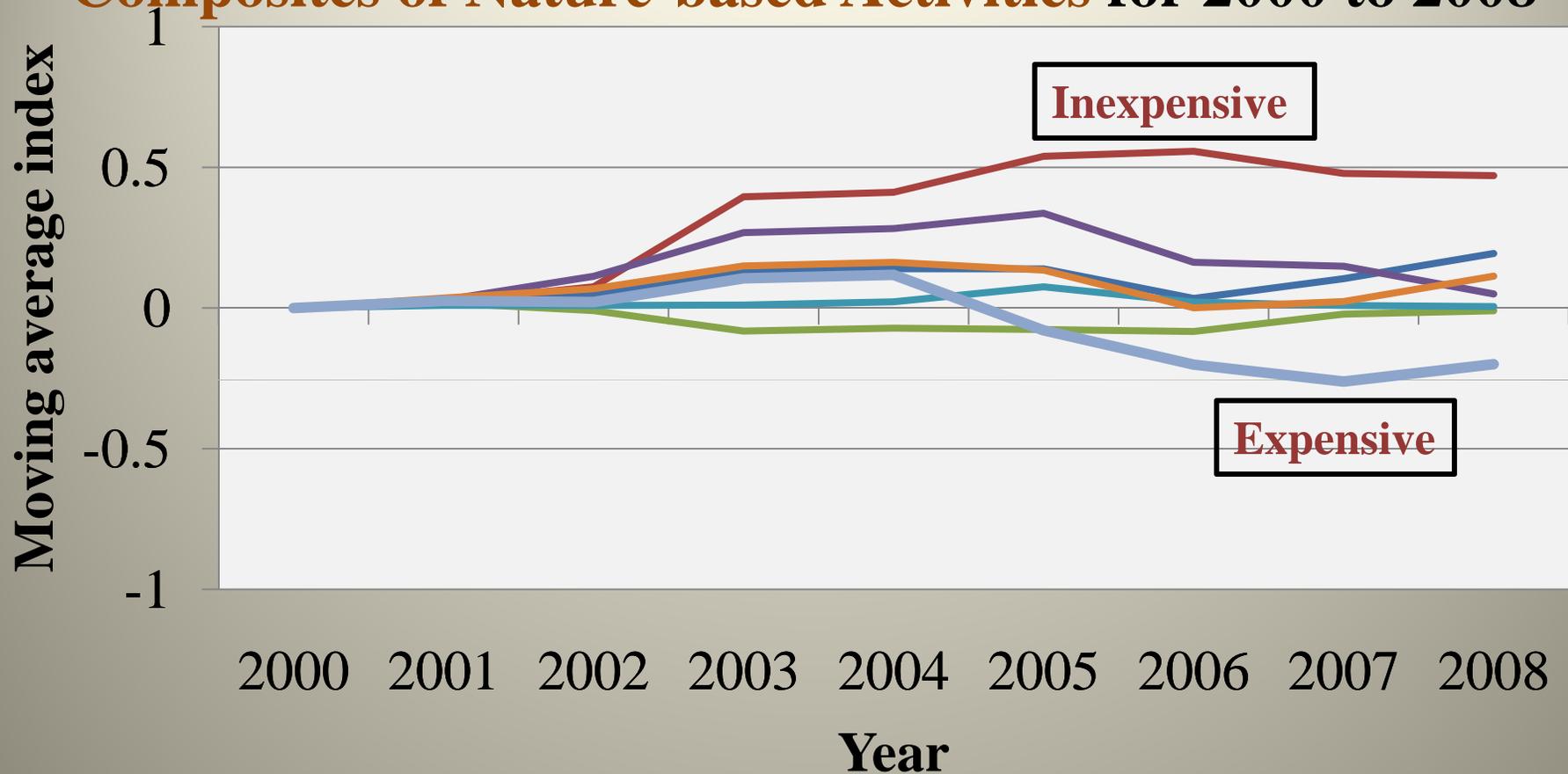
- Backpacking
- Day hiking
- Horseback riding on trails

# Indexed Moving Average of Total Activity Days for **Viewing & Photographing Nature** Activities for 2000 to 2008

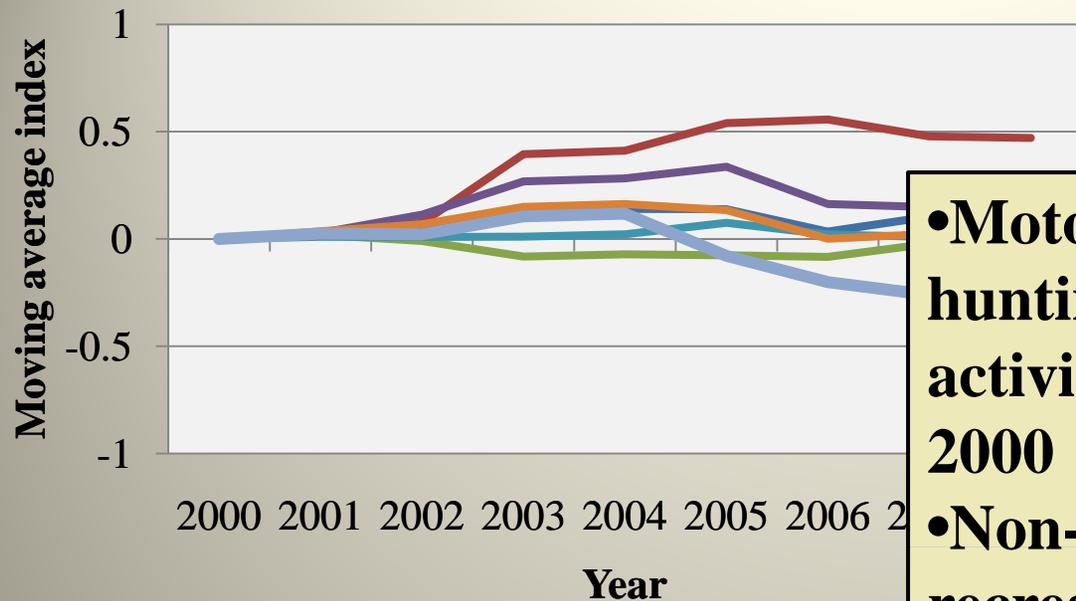


- View/photograph birds
- View/photograph natural scenery
- View/photograph other wildlife
- View/photograph wildflowers, trees, etc.
- Visit nature centers, etc.

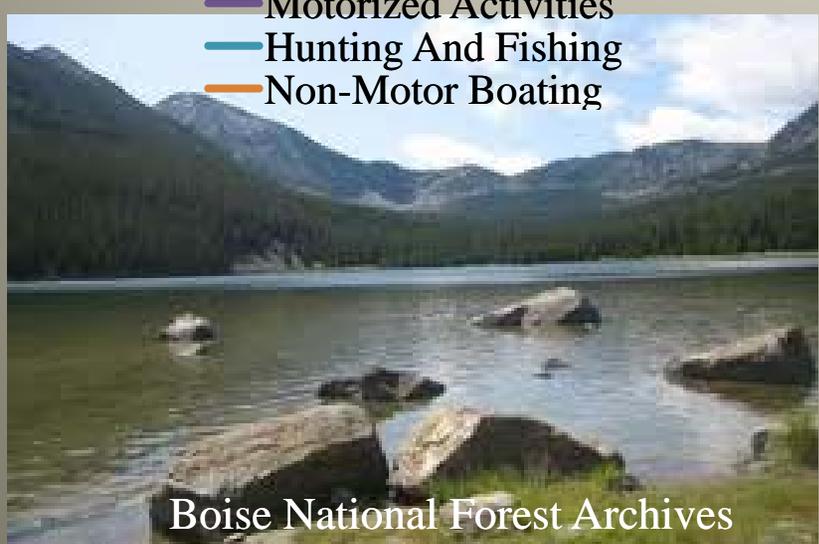
# Indexed Moving Average of Total Activity Days for 7 Composites of Nature-based Activities for 2000 to 2008



- Visit Recreation And Historic Sites
- Backcountry Activities
- Hunting And Fishing
- Snow Skiing And Boarding
- Viewing/Photographing Nature
- Motorized Activities
- Non-Motor Boating



- Visit Recreation And Historic Sites
- Viewing/Photographing Nature
- Backcountry Activities
- Motorized Activities
- Hunting And Fishing
- Non-Motor Boating



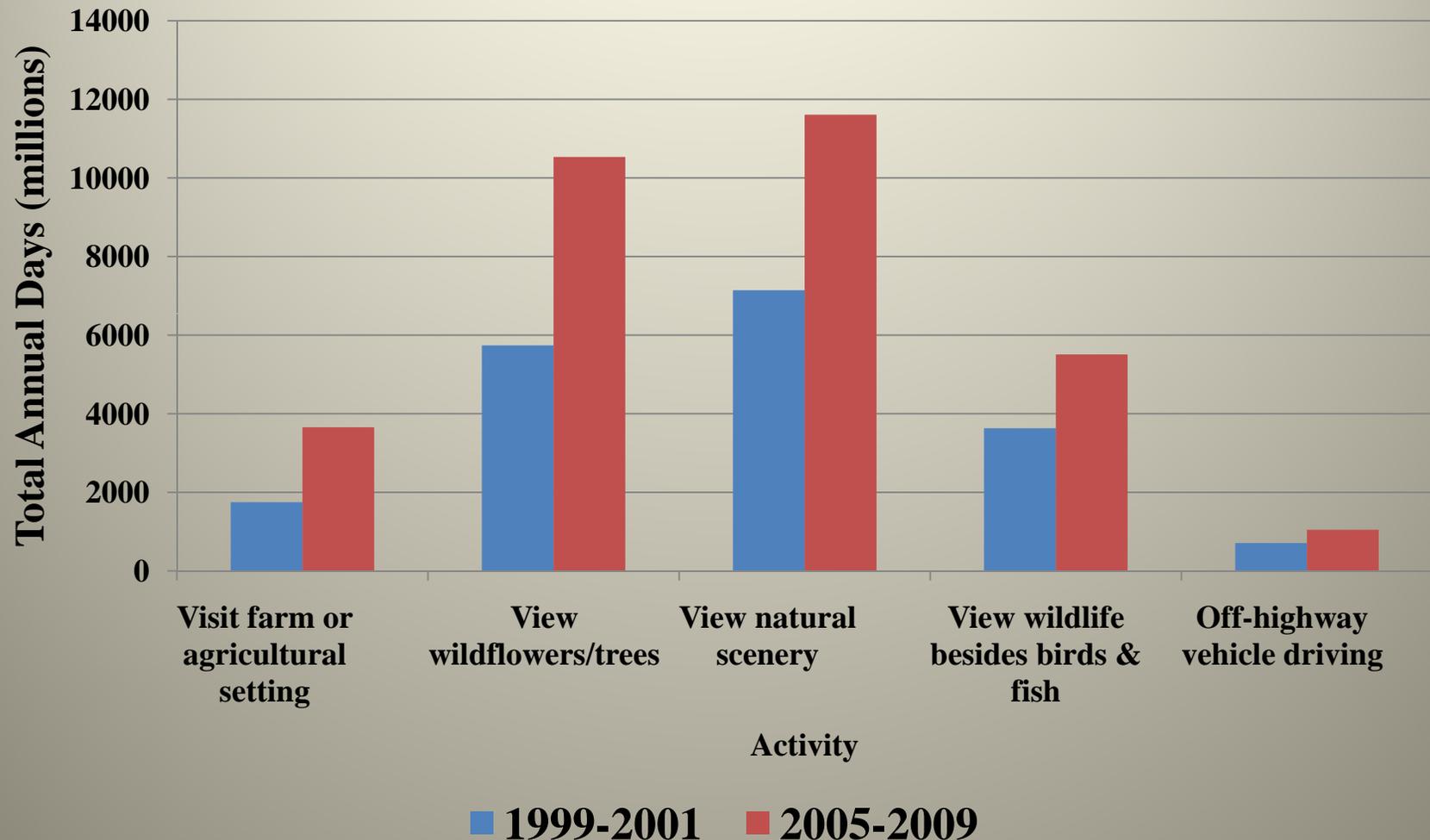
Boise National Forest Archives

- **Motorized activities, along with hunting, fishing, & backcountry activities, approx same level as 2000**
- **Non-motor boating & visiting recreation & historic sites grew modestly**
- **Various forms of skiing, including snowboarding, declined**
- **Clear leader was the overall group of activities named “viewing & photographing nature”**

## Different Segments Chose Different Outdoor Activities

- **Visiting recreation or historic sites** higher among non-Hispanic Whites, late teenagers, middle-aged people, people with college, higher income people, & foreign born
- **Viewing & photographing nature** higher among higher education, higher incomes, non-Hispanic Whites, people 35 to 54, with college, & earning more than \$50,000
- **Backcountry activities** highest among males, Whites, Native Americans, people under 55, well-educated, higher incomes, & rural residents
- **Hunting, fishing & motorized outdoor activities** was higher among rural, non-Hispanic White males, middle-to-high incomes
- **Non-motorized boating activities & skiing/snowboarding** participation tended to be greater for younger, non-Hispanic White urban males with higher incomes & education levels

# Keeping Numbers in Perspective (NSRE)

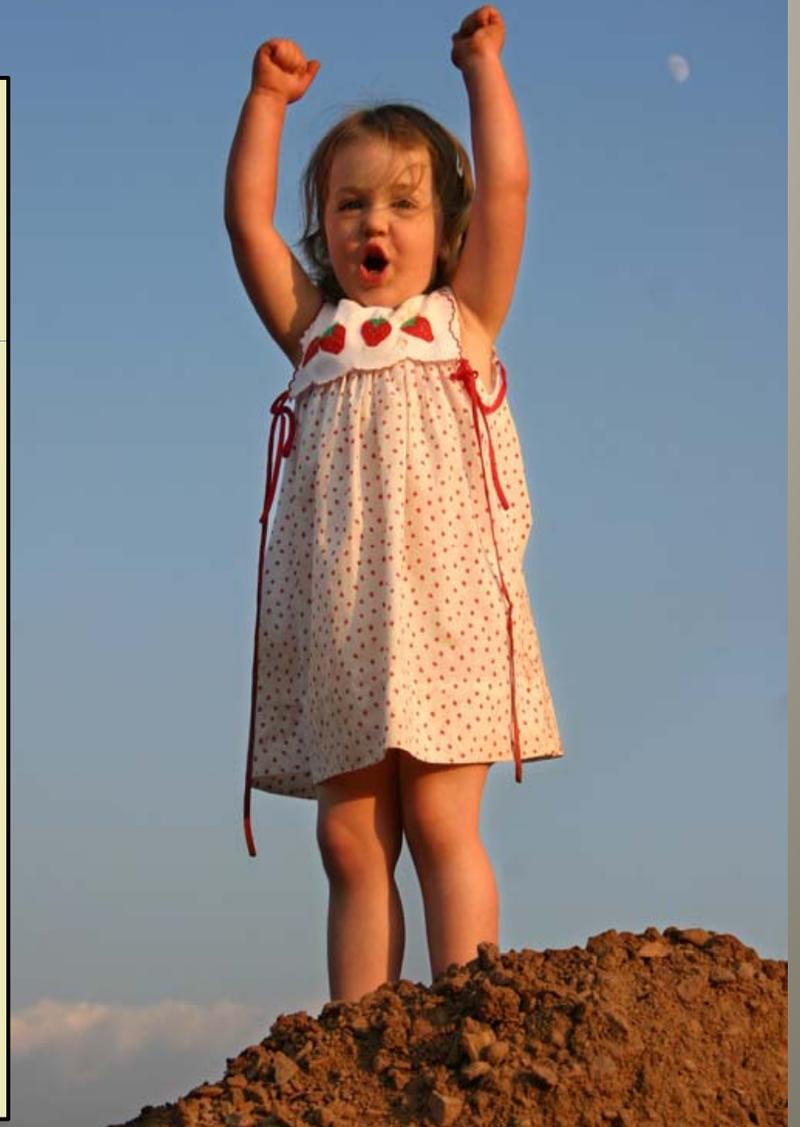


**Viewing natural scenery attracts 12 to 13 times the number of participation days as does OHV driving**

# Do Kids Spend Time Outdoors?

## *National Kids Survey*

- What does research show about kids being & spending **time outdoors**?
- *Is there a trend?*
- **What activities** do youth prefer & participate in?
- **What research** is needed to help understand kids outdoors, & kids & nature?



# National Kids Survey Results

Amount of time  
/day outside



	Weekday %	Weekend %
• <b>None</b>	2.3	3.8
• <b>Less than 1/2 hour a day</b>	4.2	2.2
• <b>About 1/2 hour a day</b>	8.1	3.5
• <b>About 1 hour</b>	23.0	13.3
• <b>2-3 hours</b>	33.9	27.4
• <b>4 or more hours</b>	28.5	49.8

Source: National Kids Survey, NSRE 2007-2011. N=1,945.

# Youth Time Trend on Typical Weekdays & Weekend Days During the Past Week by Interview Time Period

Consistent results across three identical national surveys. Results in refereed journal--- JPra.  
Results presented at three conferences this year.

	Weekday %			Weekend Day %		
	September '07 to July '08	August '08 to April '09	May '09 to February '11	September '07 to July '08	August '08 to April '09	May '09 to February '11
None	4.5	1.2	1.8	6.1	3.2	2.8
Less than 1/2 hour a day	5.2	4.3	3.3	1.9	2.3	2.2
About 1/2 hour a day	9.1	8.2	7.3	3.9	4.3	2.3
About 1 hour	18.5	26.4	23.0	12.7	11.7	15.3
2-3 hours	32.8	30.5	38.0	27.6	27.6	27.1
4 or more hours	29.9	29.5	26.6	47.7	50.8	50.3

# Amount of Time Spent Outdoors by Youth on a Typical WEEKEND DAY During the Past Week, by Age & Gender

Time	Age 6-9		Age 10-12		Age 13-15		Age 16-19	
	Male %	Female %	Male %	Female %	Male %	Female %	Male %	Female %
• < 1/2 hour	4.9	<b>3.4</b>	3.0	8.5	1.6	5.3	7.9	<b>11.7</b>
• 1/2 to 1 hour	12.5	12.4	12.8	15.1	12.0	20.0	25.0	23.9
• 2-3 hours	27.0	30.9	24.5	26.3	31.4	32.0	18.4	31.0
• 4 + hours	55.6	53.3	<b>59.7</b>	<b>50.0</b>	<b>55.0</b>	<b>42.8</b>	<b>48.7</b>	<b>33.4</b>



# Outdoor Activities

Percent of Kids 6 - 19 Participating in Outdoor Activities  
During Past Week (N=1,450)

<b>Outdoor Activity</b>	<b>Part. (%)</b>	<b>Gender Diff?</b>	<b>Age Diff?</b>	<b>Ethnic Diff?</b>
<b>Just playing or hanging out</b>	<b>84.0</b>	<b>^M</b>	<b>^6-9, 10-12</b>	
<b>Biking, jogging, walking, skate boarding, etc.</b>	<b>79.9</b>		<b>^6-9, 10-12</b>	<b>^H</b>
<b>Listen to music, watch movies, or use e-devices</b>	<b>65.3</b>		<b>^16-19, 13-15</b>	<b>^B, H</b>
<b>Playing or practicing team sports</b>	<b>49.8</b>	<b>^M</b>	<b>^13-15, 10-12</b>	<b>^H, B, O</b>

# Proportion of Time Kids Spend Outdoors in Mostly Natural Places

Proportion of outdoor time in natural places	Percent of Kids		
	Male	Female	Total
None of it	41.0	50.3	44.7
About 1/4 of it	14.7	17.0	15.6
About 1/3 of it	4.1	5.7	5.0
About half of it	7.7	14.6	10.6
More than half of it	32.6	12.4	24.1

# CHILDREN'S TIME OUTDOORS AND IN NATURE: A National and State Study

Current Research Partners:

National Wildlife Federation

The University of Tennessee

Texas AgriLife Extension Services (Texas A&M)

US Forest Service (Southern Research Station)



# Trends in Children's Activities

- Steep decline in amount of time children are outdoors in natural settings.
- Increase in time spent on indoor-related activities including electronic media and games.
- Increase in serious physical and mental health issues in children.
- Loss of imagination, creativity, and innovation in the U.S.

## Assumptions



# Reality

- The actual trend in the amount of time kids spend outdoors and in nature is unclear.
- Very little scientific research has been conducted on kids' time and activities outdoors.



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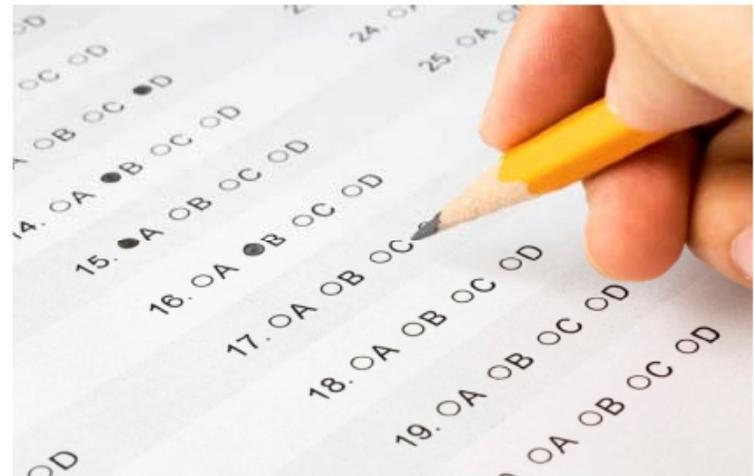


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# Research Objectives

- Time and activities in nature (Degree, extent, and type)
- Natural settings used (including access)
- Lifespan and adult influences
- Preferences and constraints
- Demographic characteristics (socio-economic, age, family structure, geographic area, etc.)



# Outdoor Recreation Participation Summary

- Visitation to public lands varies by agency, some up, some down
- Overriding trends = very **different activities** now, growth of nature-based recreation, especially **viewing & photographing nature**
- Different segments of society chose different types & levels of outdoor activities
- Evidence that America's youth do spend time outdoors & for some it is substantial

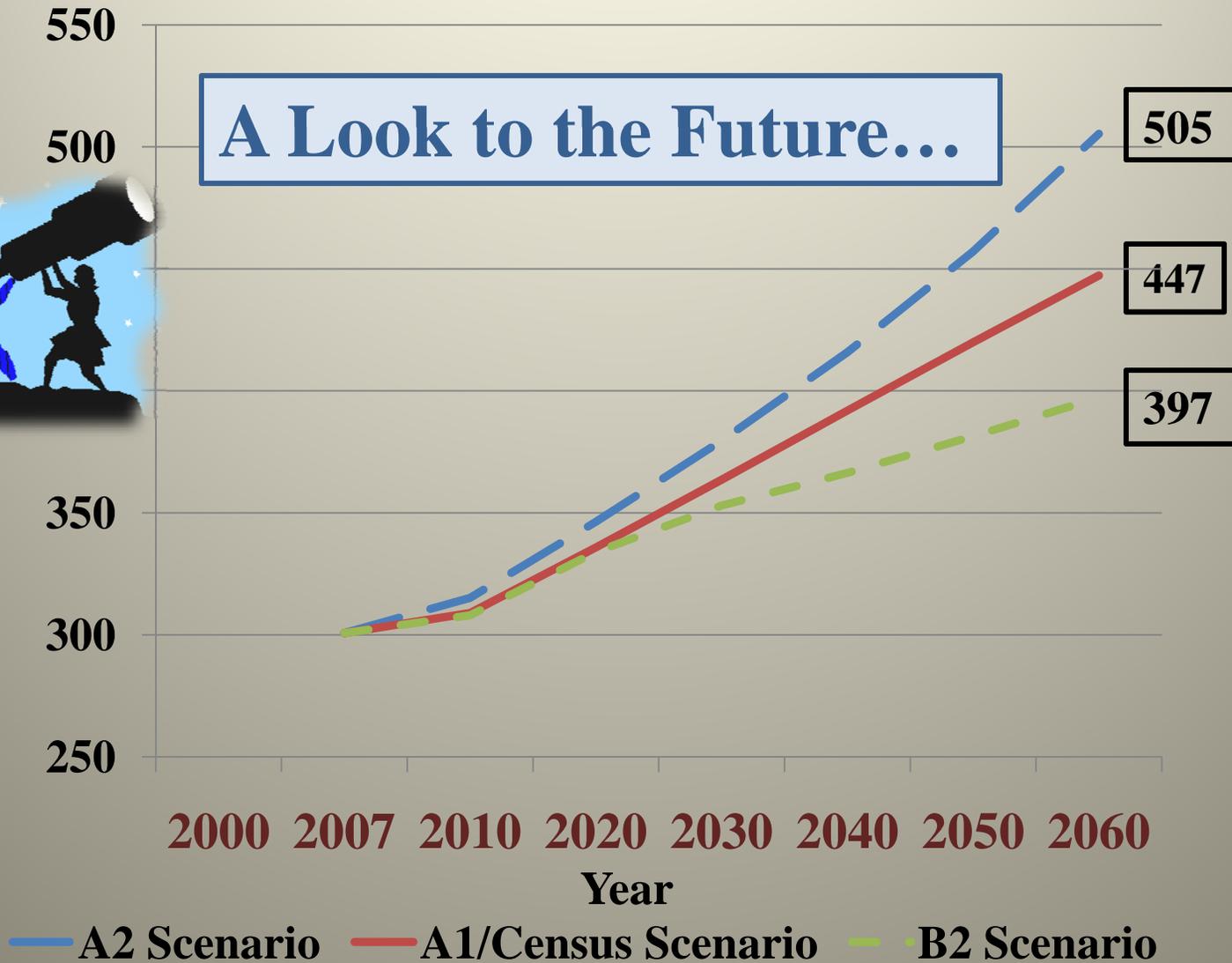


- Public lands continue to be highly important due to the recreation opportunities they offer
- What about **Future Trends?** Increases for some activities & declines for others?

# National Population Projection---RPA Forecasts



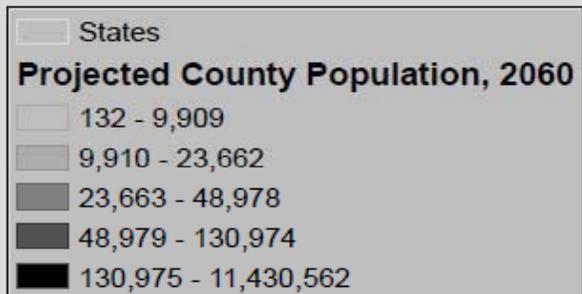
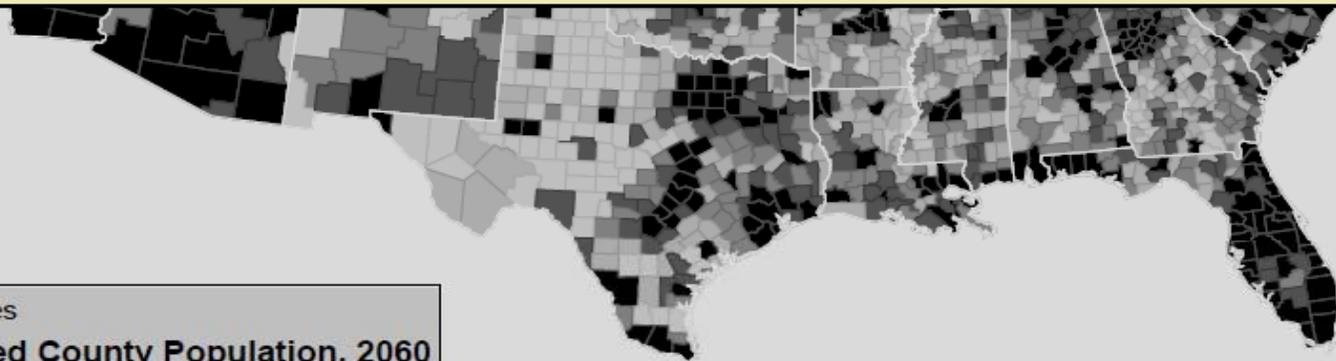
A Look to the Future...



**Worked from national & regional forecasts to county level for population, income, climate, & land use change for all counties in U.S. (including AK & HI)**



**Population forecasts are important because they tend to be the primary driver for recreation futures?**



## **Availability of Recreation Opportunities---Location of Resources Relative to Location of Potential Recreation Users**

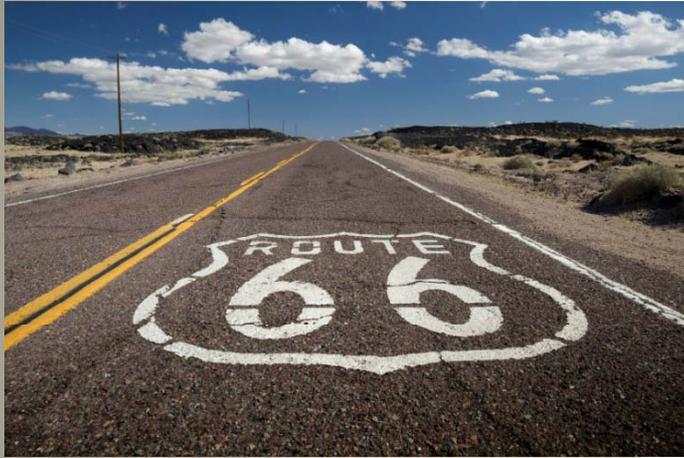
**Nine basic resources that form the foundation for nature-based outdoor recreation & tourism:**

- **Federal & state park land**
- **Water**
- **Forest**
- **Open range & pasture**
- **Ocean & Great Lakes coast**
- **Mountains**
- **Snow cover**
- **Specially designated federal lands**
- **Private recreation businesses**

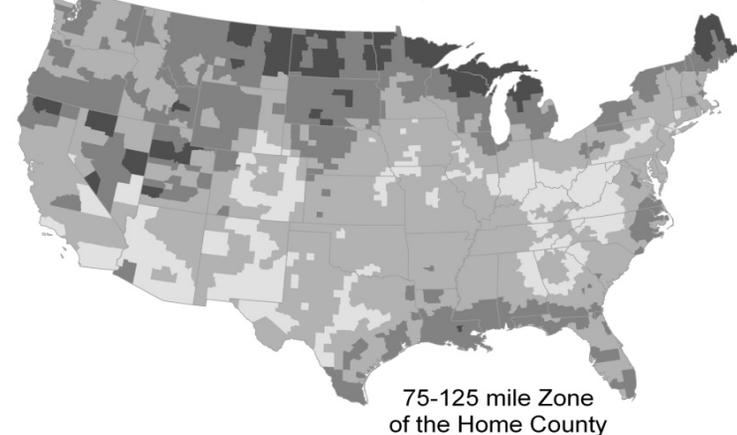
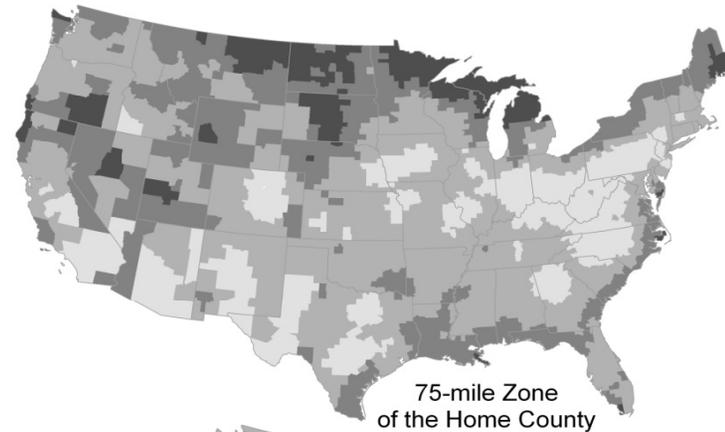
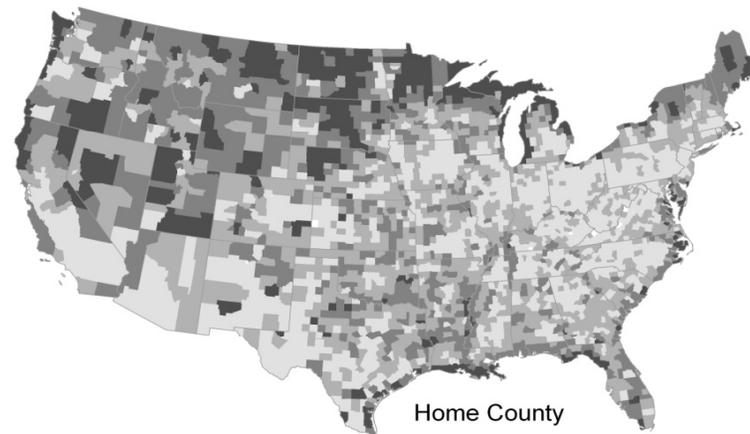
## **Availability---Location of Resources Relative to Location of Potential Recreation Users (population)**

**For spatially mapping & analyzing the nine basic resources, three distance zones were asserted from the center of each county:**

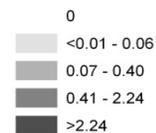
- Home county**—Quantity of the resource within the boundaries of each U. S. county. (percent of county land surface area & per-capita area)—**local resources**
- 75-mile Zone**—Resources within the home county & in nearby counties whose centroids are within 75 miles--**day trip zone**
- 75- 125 Mile Zone**—Resources across counties whose centroids are between 75-to-125 miles, outer ring or ‘donut’ within a 2-to-4 hour drive--**overnight trips**



**Three travel distance zones were asserted relative to the center of each U. S. county....  
(Current picture)**

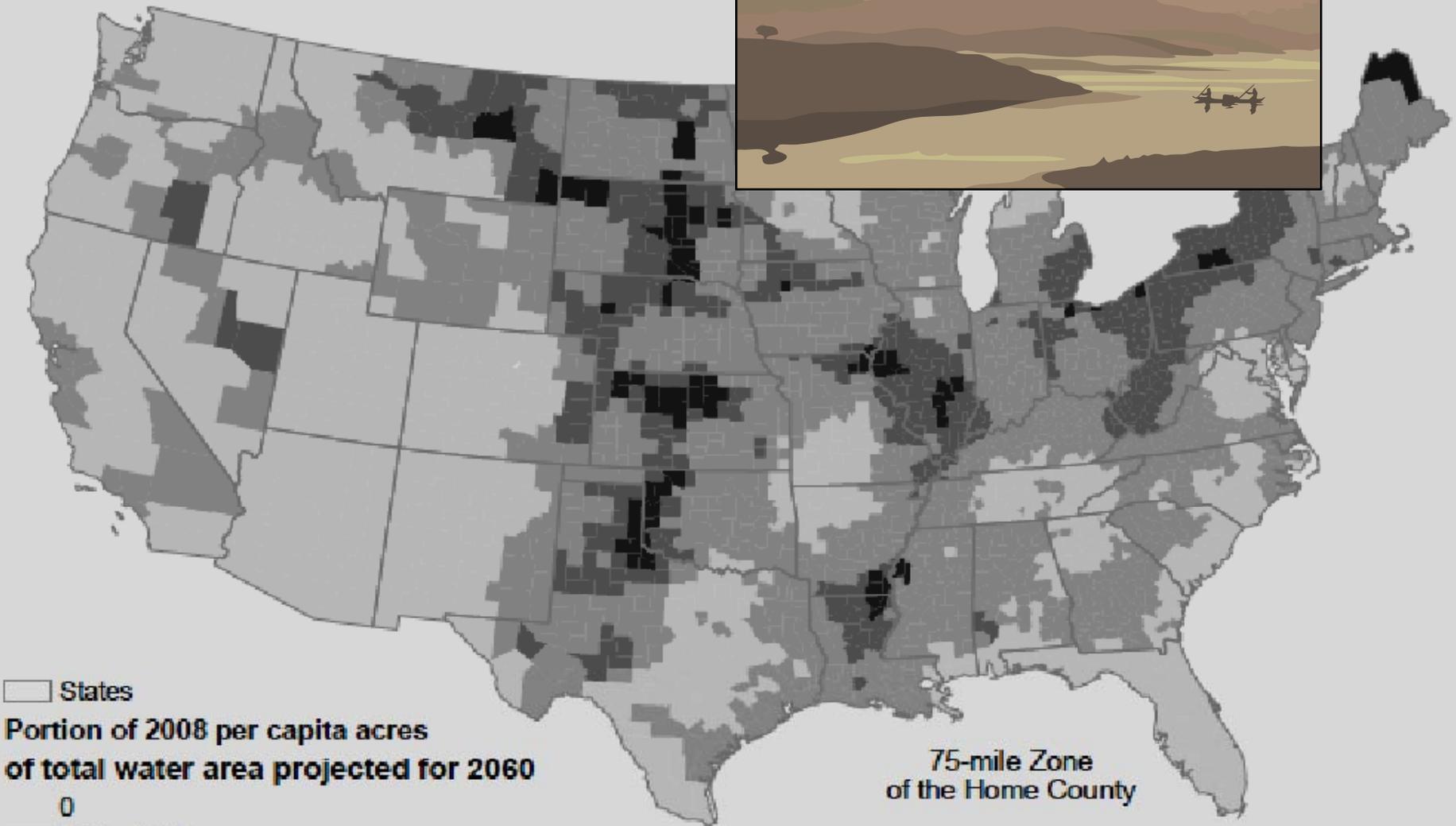


**Acres of total water area per capita by county, 2008**



**Current Patterns & Forecast Futures were developed, e.g., water area per capita 2060**

<b>Sub-region &amp; region</b>	<b>Total acres, 2008</b>	<b>Per capita acres, 2008</b>	<b>per capita acres, 2060</b>	<b>Proportion of 2008 acres projected for 2060</b>
<b>Northeast</b>	<b>14,328.5</b>	<b>0.23</b>	<b>0.18</b>	<b>0.79</b>
<b>North Central</b>	<b>42,505.3</b>	<b>0.70</b>	<b>0.55</b>	<b>0.79</b>
<b>North Region</b>	<b>56,833.8</b>	<b>0.46</b>	<b>0.36</b>	<b>0.79</b>
<b>Southeast</b>	<b>15,068.8</b>	<b>0.30</b>	<b>0.18</b>	<b>0.60</b>
<b>South Central</b>	<b>14,213.4</b>	<b>0.27</b>	<b>0.18</b>	<b>0.66</b>
<b>South Region</b>	<b>29,282.1</b>	<b>0.28</b>	<b>0.18</b>	<b>0.63</b>
<b>Great Plains</b>	<b>2,495.3</b>	<b>0.41</b>	<b>0.32</b>	<b>0.76</b>
<b>Intermountain</b>	<b>4,793.4</b>	<b>0.22</b>	<b>0.11</b>	<b>0.52</b>
<b>Rocky Mountains Region</b>	<b>7,288.8</b>	<b>0.26</b>	<b>0.15</b>	<b>0.56</b>
<b>Alaska</b>	<b>58,442.2</b>	<b>85.54</b>	<b>50.43</b>	<b>0.59</b>
<b>Pacific Northwest</b>	<b>4,569.2</b>	<b>0.44</b>	<b>0.27</b>	<b>0.61</b>
<b>Pacific Southwest</b>	<b>7,836.5</b>	<b>0.21</b>	<b>0.13</b>	<b>0.65</b>
<b>Pacific Coast Region</b>	<b>70,848.0</b>	<b>1.44</b>	<b>0.93</b>	<b>0.64</b>
<b>U. S. Total</b>	<b>164,252.7</b>	<b>0.54</b>	<b>0.37</b>	<b>0.68</b>



**Projected for all U.S. counties**

**Simultaneously, Projections were being Developed for  
“Demand”**

## **U.S. Outdoor Recreation Participation: Projections 2010 to 2060**

**J.M. Bowker and H. Ken Cordell - USDA Forest Service  
Ashley Askew and Gary T. Green - University of Georgia**



**33rd Annual  
Southeastern Recreation Research Conference  
February 27th – March 1st 2011  
Boone, NC**

# 10 Primary Activities

- **Birding**
- **Equestrian**
- **Hiking/backpacking**
- **Canoeing/kayaking/rafting**
- **Fishing**
- **Hunting**
- **Snow skiing/snow boarding**
- **Motorized off-road use**
- **Motorized water use**
- **Motorized snow use**

## 7 Activity Composites

- **Viewing**, photographing, studying, gathering nature (birds, scenery, flowers/trees, wildlife, fish, gathering natural products)
- **Visiting interpretive sites** (nature centers, zoos, historic sites, prehistoric sites)
- **Using developed sites** (family gatherings, picnicking, developed camping)
- **Winter activities** (ice skating, cross country, sledding, snow shoeing)
- **Swimming** (swimming, visit a beach, visit another waterside, surfing, snorkeling, diving)
- **Challenge activities** (mountain biking, mountain climbing, rock climbing, caving)
- **Visiting primitive areas**, primitive camping, backpacking

# Data

- **NSRE (1999-2009)**

- **90,000+ potential observations**

- **Household-based**

- **Post-sample weighted**

- **Demographic variables**

- **Supply variables**

- **Recreation variables (various sources FS, NPS, Norsis)**

- **Forest Service (Wear's) land use projections for **scenarios****

- **Woods & Poole**

- **Economic data**

- **Population density**

# Forecast Highlights

- **Per capita participation generally drops**
- **Number of participants generally rises**
  - Forecasts are population driven
  - Forecasts also income driven
  - Scenario A1B (high income, moderate pop) highest growth
- **Fastest Growing in Participants**
  - Developed Skiing (68-147%) ... climate??
  - Undeveloped Skiing (55-106%) ... climate??
  - Challenge Activities (50-86%)
- **Slowest Growing in Participants**
  - Motorized off-road (29-56%)
  - Fishing (27-56%)
  - Hunting (8-23%)

# Forecast Index of Per-capita Participation, 2060

- Developed site use 1.026
- Visiting interpretive site 1.089
- Birding 1.075
- Viewing nature 1.035
- Challenge activities 1.176
- Equestrian activities 1.186
- Day hiking 1.097

**Declining**

Slight growth

**Fastest growing**



## Forecast Index of Per-capita Participation, 2060

- **Visiting primitive areas** 0.995
- **Motorized off-road activities** 0.995
- **Motorized water use** 1.154
- **Motorized snow use** 1.026
- **Hunting** 0.781
- **Fishing** 0.970
- **Developed skiing** 1.570
- **Undeveloped skiing** 1.309
- **Swimming** 1.109
- **Canoeing, kayaking, or rafting** 1.031

# Simultaneous, Modeling & Forecasting **Rural Population Migration** as Influenced by Natural Amenities

- Data project population shift from Midwest
- Shift to Inter-Mountain & Pacific Northwest Regions, Southern Appalachian & Ozark Mountains, & northern New England.
- Results suggest a direct impact of changing natural amenities & climate change on rural population migration

H. Ken Cordell  
Vahé Heboyan  
Florence Santos  
John C. Bergstrom



# Model and Method

$$\begin{aligned} RInternalMig = & \alpha_0 + \beta_1 pcemp_{it} + \beta_2 meansummr_{it-1} + \beta_3 ppt_{it-1} + \beta_4 pcrop_{it-1} + \beta_5 pcrop^2_{it-1} + \\ & \beta_6 lnpcy_{it-1} + \eta_1 meanwintr_{it-1} + \eta_2 pforest_{it-1} + \eta_3 pforest^2_{it-1} + \\ & \eta_4 ppasture_{it-1} + \eta_5 ppasture^2_{it-1} + \eta_6 prange_{it-1} + \eta_7 prange^2_{it-1} + \eta_8 lnpcfd100_i + \\ & \eta_9 lnwater_i + \eta_{10} percmount_i + \eta_{11} coast_i + \eta_{12} snowmed_i + \eta_{13} pwetland_i + \\ & \eta_{14} lnpd_{it-1} + \eta_{15} lnpd^2_{it-1} + \eta_{16} TER_i + c_i + \varepsilon_{it} \end{aligned}$$

- ▶ **Method:** Fixed Effects Vector Decomposition (FEVD) econometric estimation method
  - ▶ Based on Plümper and Troeger, 2007 technique for estimating time invariant and rarely changing variables.
  - ▶ Estimated model is used to assess static effects of natural amenities on rural migration, and project effects of changes in natural amenities on rural population migration rates to 2060.

# Key Findings

- **People prefer rural areas with mild winters & cooler summers**
- **Preference is for varied landscapes that feature a mix of forest land & open space**
- **Effect of changes in natural amenities on rural population migration (2010-2060)**
  - **Positive effects**
    - **Inter-mountain & Pacific Northwest regions**
    - **Parts of the Southeastern, South Central, & Northeastern U.S. (e.g., Southern Appalachian Mountains, Ozark Mountains, northern New England.**
  - **Negative effects**
    - **Midwestern regions (e.g., Great Plains & North Central)**

# Average Effects of Natural Amenities on Rural Population Net Migration

1 unit increase in per capita **federal designated land** area will cause rural population to increase by 360.

1 unit increase in average number of days with **snowfall**  $\geq 1$  inch will cause rural population to increase by 59.

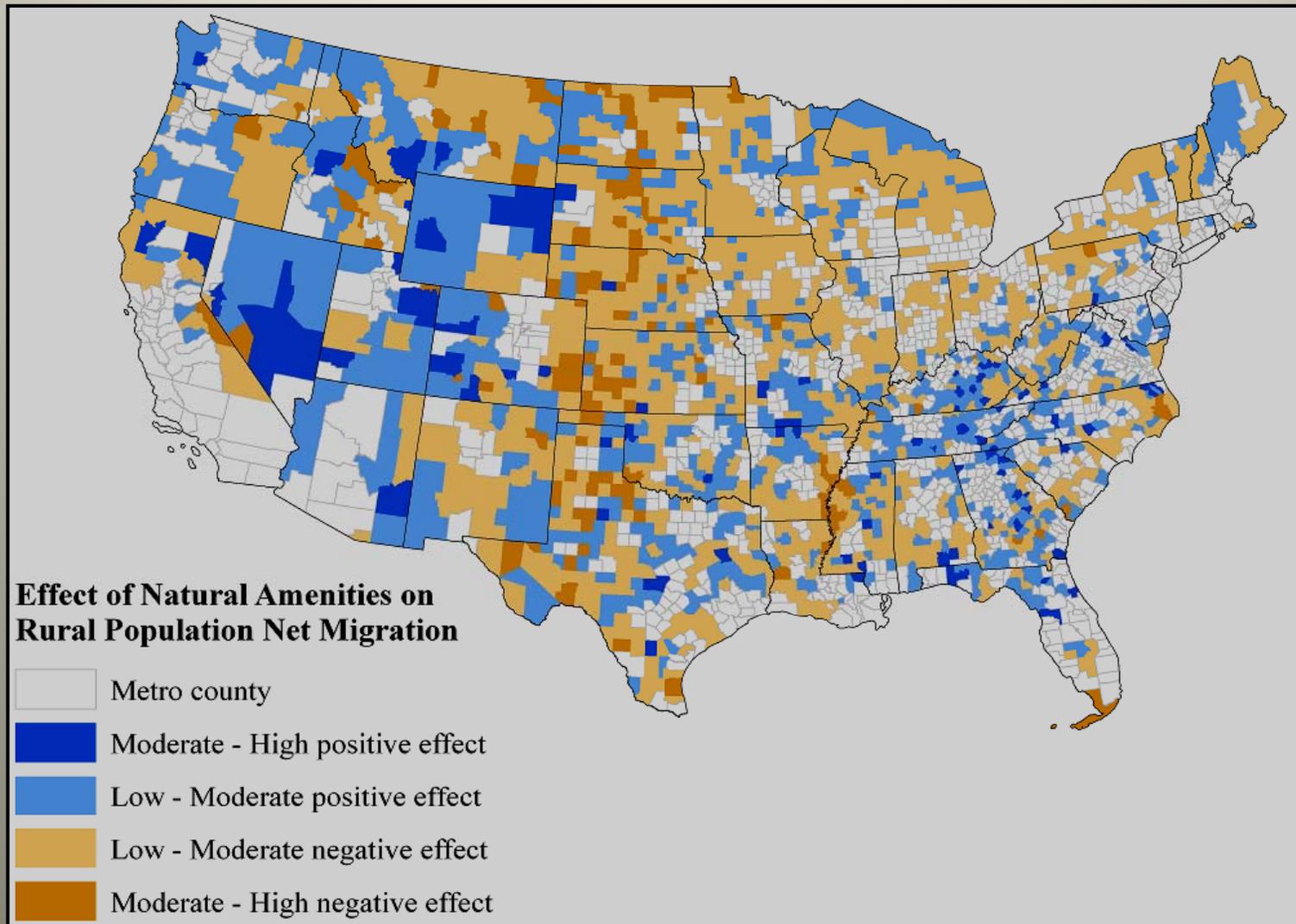
1 degree (Celsius) increase in average **winter temperature** will cause rural population to increase by 110.

1% increase in **range land** will cause rural population to increase by 67.

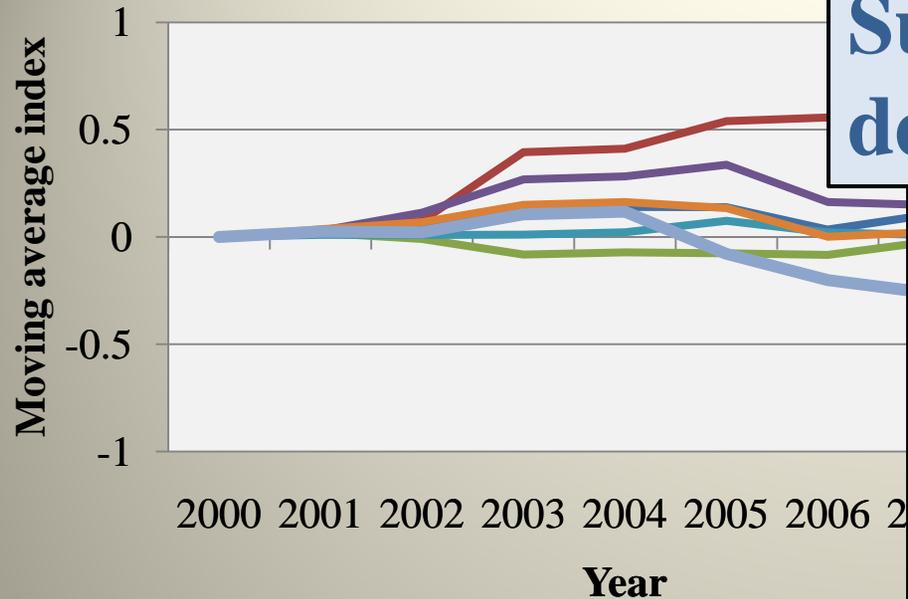
1% increase in **forest land** will cause rural population to increase by 215.

1% increase in **pasture land** will increase rural population by 148.

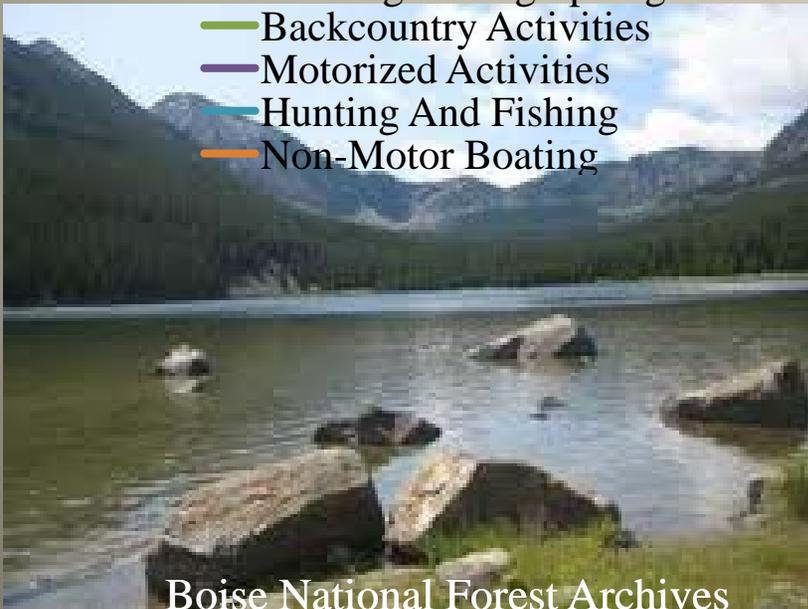
# Forecasted Effect of Natural Amenities on Rural Population Change, 2007-2020, 2010 RPA Climate Scenario A1B, Projection CGCM 3.1



## Summary of this decade's trends



- Visit Recreation And Historic Sites
- Viewing/Photographing Nature
- Backcountry Activities
- Motorized Activities
- Hunting And Fishing
- Non-Motor Boating



Boise National Forest Archives

- **Motorized activities, along with hunting, fishing, & backcountry activities, same level as 2000**
- **Non-motor boating & visiting recreation & historic sites grew modestly**
- **Various forms of skiing, including snowboarding, declined**
- **Clear leader was the overall group of activities named “viewing & photographing nature”**

# Forecast Summary---Participation Rate

- **Five outdoor recreation activities are projected for fastest growth in per capita participation:**
  - Developed skiing (20 to 50 percent)
  - Undeveloped skiing (9 to 31 percent)
  - Challenge activities (6 to 18 percent increase)
  - Equestrian activities (3 to 19 percent)
  - Motorized water activities (-3 to 15 percent).
- **A number of activities are projected to decline:**
  - Visiting primitive areas (0 to -5 percent)
  - Motorized off-road activities (0 to -18 percent)
  - Motorized snow activities (2 to -11 percent)
  - Hunting (-22 to -31 percent)
  - Fishing (-3 to -10 percent)
  - Floating activities (3 to -11 percent).



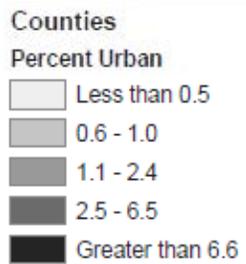
# Natural Amenity Migration Forecast Summary

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  - **Positive effect**
    - **Inter-mountain & Pacific Northwest regions**
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  - **Negative effects**
    - **Midwestern regions (e.g., Great Plains & North Central).**

# RPA Social & Resource Data & Projections

## 15 Spreadsheets with 180+ variables

- |                |  |
|----------------|--|
| 1. AMENITIES   | Climate and natural features, housing units  |
| 2. AIRPORTS    | Database of U. S. airports and heliports   |
| 3. LANDAREA    | Total land and water area, federal agency acreage, NRI land cover/use, wilderness, state parks |
| 4. RECGOV      | Federal recreation sites/facilities  |
| 5. CBP07       | Census Bureau, 2007 County Business Patterns for recreation businesses                         |
| 6. LOCALGOVT   | Census Bureau, 2007 Census of Governments, local government recreation and park agencies       |
| 7. POP_A1      | Population projections to 2060, IPCC A1 scenario   |
| 8. DPI_A1      | Disposable personal income based on IPCC A1 scenario   |
| 9. LANDUSE_A1  | Land cover/use projections to 2062, based on IPCC A1 scenario                                  |
| 10. POP_A2     | Population projections to 2060, IPCC A2 scenario   |
| 11. DPI_A2     | Disposable personal income based on IPCC A2 scenario   |
| 12. LANDUSE_A2 | Land cover/use projections to 2062, based on IPCC A2 scenario                                  |
| 13. POP_A1     | Population projections to 2060, IPCC A1 scenario   |
| 14. DPI_A1     | Disposable personal income based on IPCC A1 scenario   |
| 15. LANDUSE_A1 | Land cover/use projections to 2062, based on IPCC A1 scenario                                  |

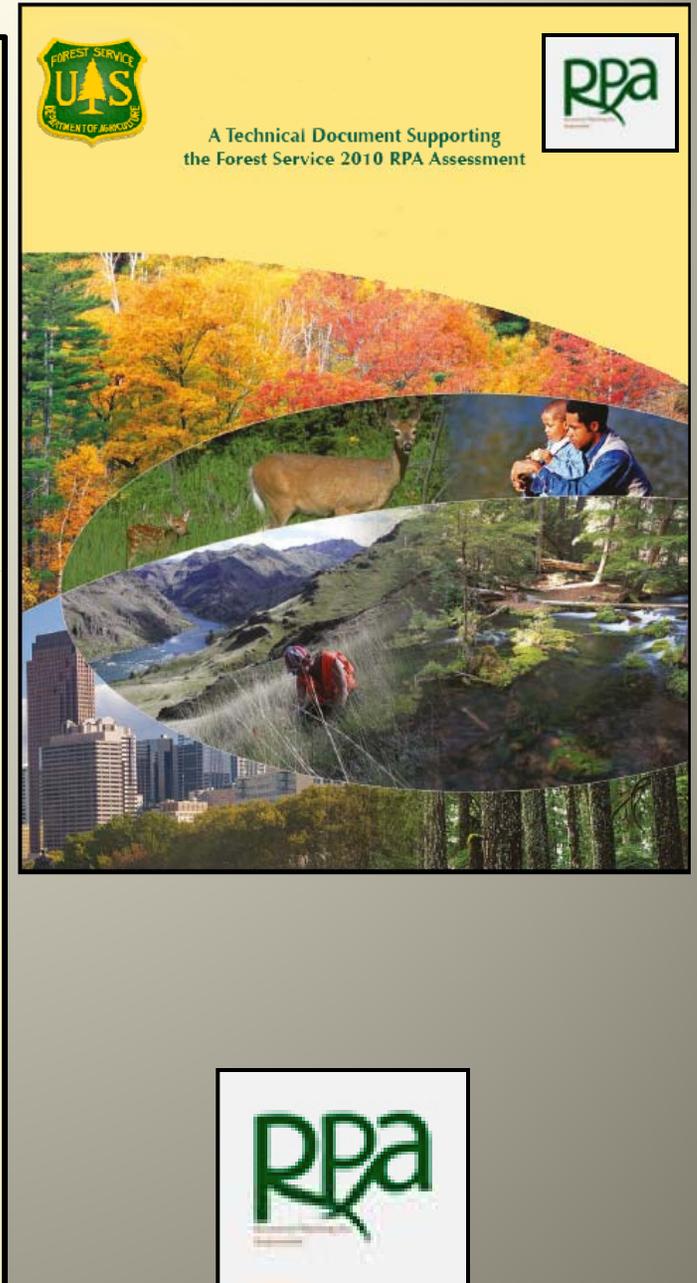


# Colorado

Current and forecast population, land use, per-capita supply, climate, ....., for all counties in the U. S.

Accessing RPA Data  
<http://warnell.forestry.uga.edu/nrrt/nsre/index.html>

- **Published research for the 2010 Assessment includes:**
- National to County Population Projections
- Recreation Demand Trends & Futures in the U.S. to 2060
- Recreation & Protected Land Resource Trends & Futures
- Natural Amenity Effects on Population Migration in the U.S.



# **Outdoor Recreation Trends & Futures in the United States**

**Introduction, Objectives, & Organization of this Report**

**Methods & Data**

**Recreation Participation Trends (National & Regional)**

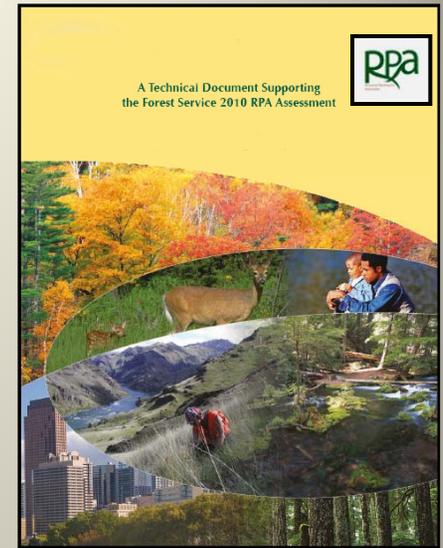
**Comparison of Recreation Participation Patterns Across Demographic, Region & Natural Settings**

**Youth Time & Activities Outdoors**

**Recreation Use of Public & Private Properties**

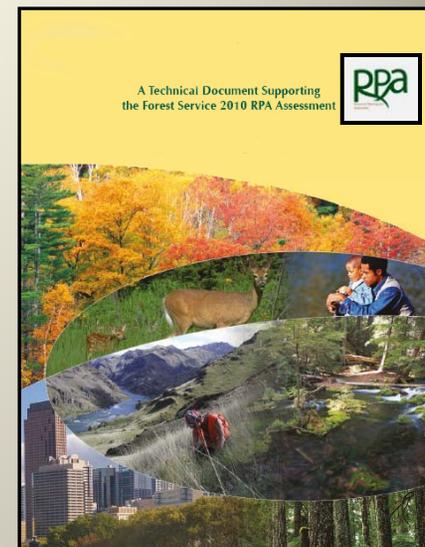
**Outdoor Recreation Projection to 2060**

**Summary**



# **Recreation & Protected Land Resources in the United States**

**Land & Water Resources in the U.S.**  
**Protected Land: Private Lands & Federal Parks, Refuges, & Wilderness**  
**Recreation through the private sector**  
**Public Outdoor Recreation Resources**  
**Geospatial Patterns of Recreation Resources**  
**Projections of Future Recreation Resources**  
**Summary: Recreation & Protected Land Resources in the United States**



# **Rural Population Migration Trends & Patterns in the United States & Relationship to Natural Amenities**

## **Review of Amenity Migration Concepts & Studies**

**Defining Natural Amenity Migration**

**Measuring Natural Amenities**

**Impacts of Climate Change on Natural Amenities**

**Rural Population & Natural Amenities**

## **Estimation of the Influence of Natural Amenities on Population Migration**

**Empirical Model Specification & Estimation**

**Data Description**

**Empirical Results**

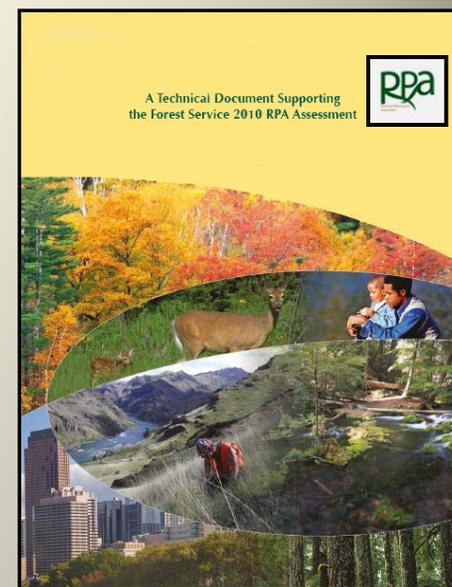
## **Forecasting Effects of Natural Amenities on Rural Population**

**2010 RPA Climate & Amenity Effect Projections**

**Rural Population Forecasts**

**Effects of Projected Climate Change on Rural Migration**

## **Summary & Implications for Planning and Resource Mgt.**



End