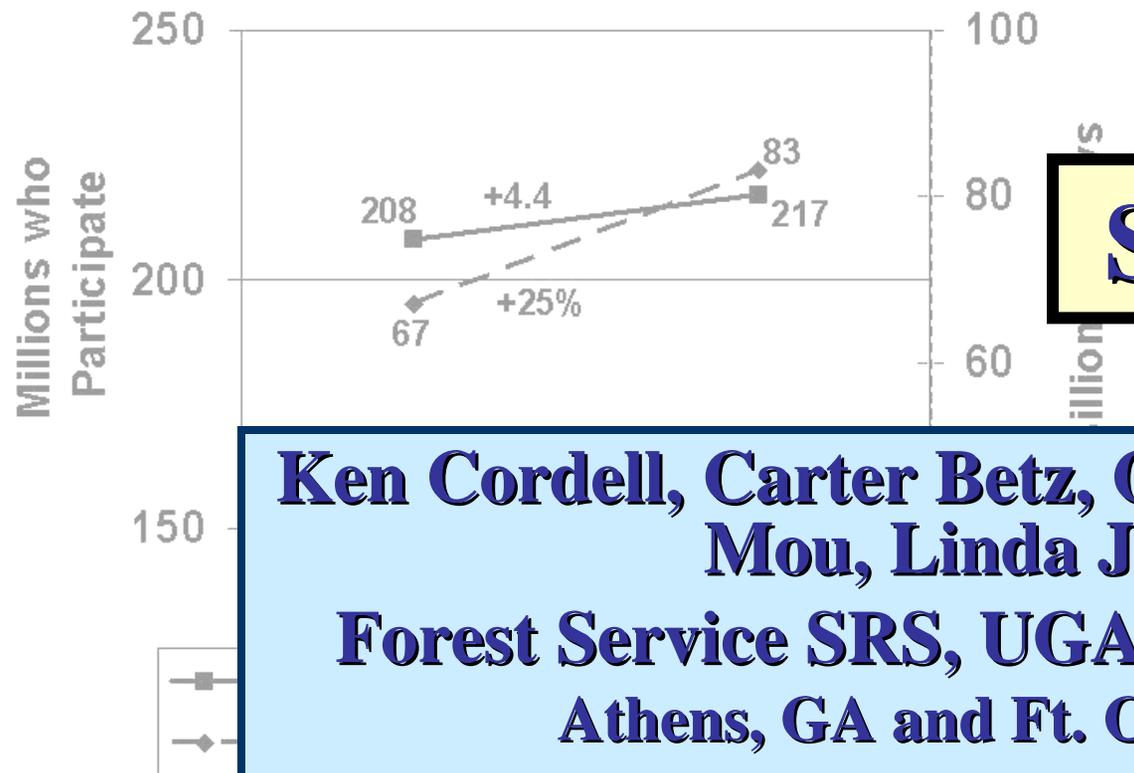


# Recreation Demand Trends---An Update



**SERR 2009**

**Ken Cordell, Carter Betz, Gary Green, Shela Mou, Linda Joyce**

**Forest Service SRS, UGA, and FS RMRS  
Athens, GA and Ft. Collins, CO**

February 23, 2009

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# Outline

- **Drivers of Trends**
- **Some recently reported outdoor recreation trends**
  - **Outdoor recreation generally**
  - **Nature-based recreation specifically**
  - **Forest recreation especially**
  - **Visitation to public land**
- **Recent changes in drivers of trends**
  - **Gasoline, the economy, ....., Others**
- **Updated trends to include 2008**
- **Reflections**



# **What got us started looking at recent trends--**

## **The Pergams/Zaradic article February, 2008**

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- **Postulated that NP visits is a good proxy for how much people are visiting nature in general**
- **“If we are also seeing declines in the majority of other nature-related activities, it becomes quite likely that we are seeing a fundamental shift away from people’s interest in nature.”**
- **“...as today’s adult role models spend less time in nature, this generation of children is also likely to follow suit.**
- **They argue (and I agree) that less nature experience may be associated with less support for conservation**
- **The authors report declines in NP, SP, NF and BLM visits (PER CAPITA)**
- **The research question was: “Is there a general and fundamental shift away from people’s participation in nature-based recreation and interest in nature?”**

USDA Forest Service  
Research and Development

Source

RPA Assessment



- **The Forest Service's Resources Planning Act (RPA) Assessment examines the status and futures of the Nation's renewable resources on all forest and rangelands.**
- **Renewable resources evaluated include fish and wildlife, water, forests, range, wilderness, as well as the demand for and ability of these resources to provide outdoor recreation opportunities.**

[www.fs.fed.us/research/rpa/pubs-supporting-interim-update-of-2000-rpa-assessment.shtml](http://www.fs.fed.us/research/rpa/pubs-supporting-interim-update-of-2000-rpa-assessment.shtml)

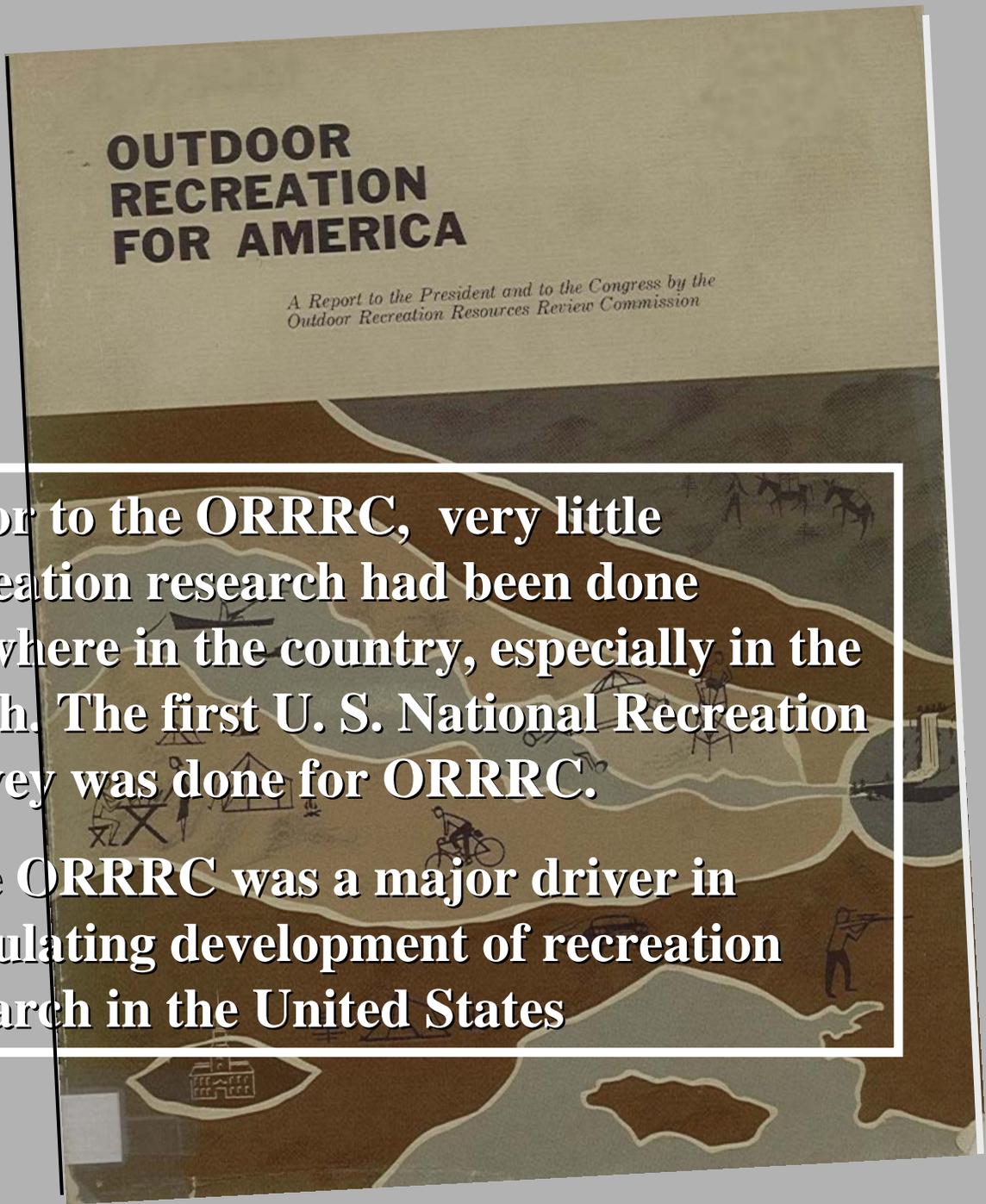
# A primary Data Source for Demand Trends: National Survey on Recreation and the Environment---NSRE

- The **Athens Research Group** has been collecting data about recreation activities, attitudes, and natural resource values since the 1980s.
- The core of the **NSRE survey** covers outdoor activity participation and personal demographics. It originated in 1960 with the ORRRC.
- NSRE is a random-digit-dialed survey of a **cross section of non-institutionalized residents** 16 years or older. Been going here since 1994.
- Since 1999, the annual sample has been 5,000, or more, per year.
- Respondents are asked about more than **80 outdoor activities** and the sampling runs throughout the year.
- NSRE now includes a ***National Kids Survey***
- The NSRE is conducted by the Forest Service research group in Athens, Georgia, with two primary partners, the University of Georgia and the University of Tennessee.
- NSRE is the demand data base for **half the states' SCORPs**

A little history.....

*The first major national assessment in the United States—The Outdoor Recreation Resources Review Commission (1960)*

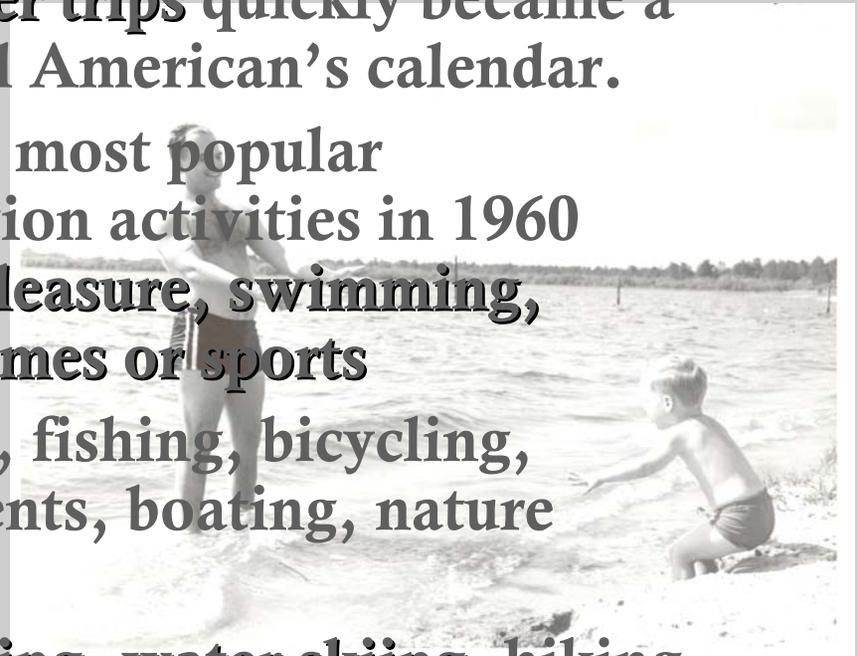
- Prior to the ORRRC, very little recreation research had been done anywhere in the country, especially in the South. The first U. S. National Recreation Survey was done for ORRRC.
- The ORRRC was a major driver in stimulating development of recreation research in the United States



## A Quick Recreation History

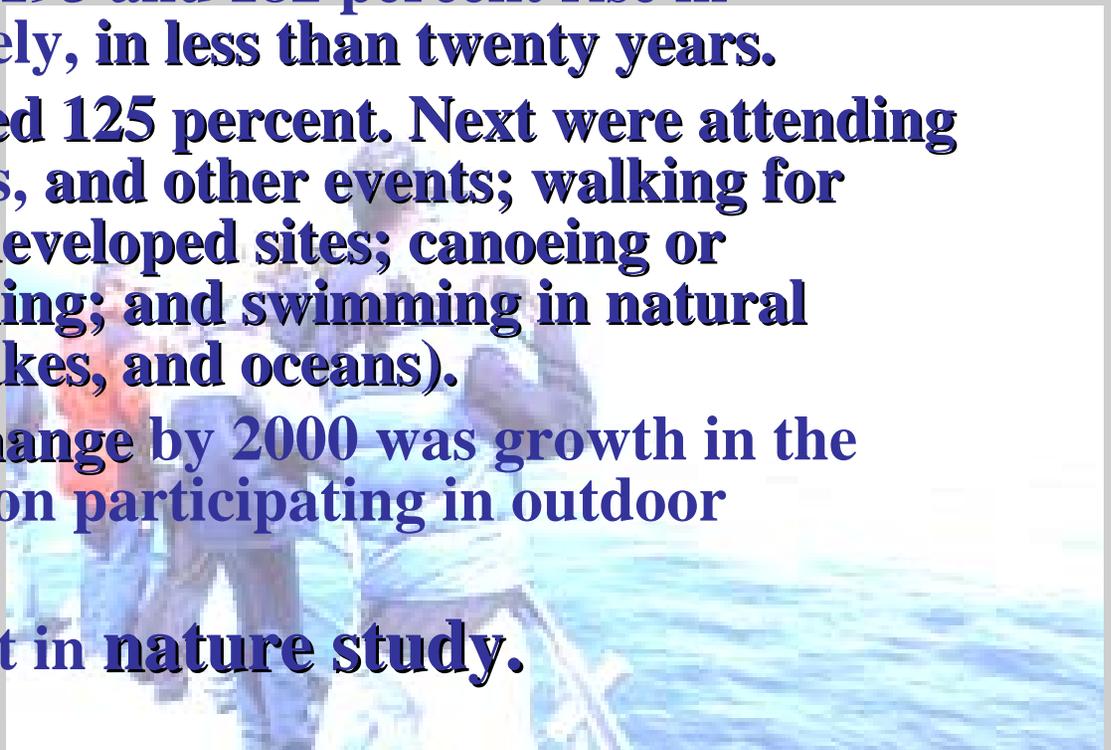
## THEN

- In 1960, the U.S. population reached about 180 million. Along with increasing affluence, population growth boosted demand for outdoor recreation.
- **Family vacations and summer trips** quickly became a significant part of the typical American's calendar.
- As reported by ORRRC, the most popular summertime outdoor recreation activities in 1960 were, in order, **driving for pleasure, swimming, walking, playing outdoor games or sports**
- Also sightseeing, picnicking, fishing, bicycling, attending outdoor sports events, boating, nature walks, and hunting
- And camping, **horseback riding, water skiing, hiking,** and attending concerts or other outdoor events.



## **By the Year 2000**

- **By 2000, the population had risen to around 281 million (growing about 3 million per year)**
- **Viewing and photographing birds had become the fastest-growing activity in the country.**
- **Closely following birding were day hiking and backpacking, growing 193 and 182 percent rise in participants, respectively, in less than twenty years.**
- **Snowmobiling increased 125 percent. Next were attending outdoor concerts, plays, and other events; walking for pleasure; camping in developed sites; canoeing or kayaking; downhill skiing; and swimming in natural waters (i.e., streams, lakes, and oceans).**
- **The most noticeable change by 2000 was growth in the proportion of population participating in outdoor activities.**
- **Also, growth in interest in nature study.**



- **Though the technology of outdoor equipment and clothing has evolved dramatically over the years, all of the activities popular in the 1950s, 1960s and 1970s are still popular.**
- **However, many other key aspects of society and of outdoor recreation have been changing, not just the technology.**

**The equipment used now is quite different, relative to the 1960s. The Nyman family portaging on the Superior National Forest in Minnesota in 1965. (Forest History Society Photo Archives)**

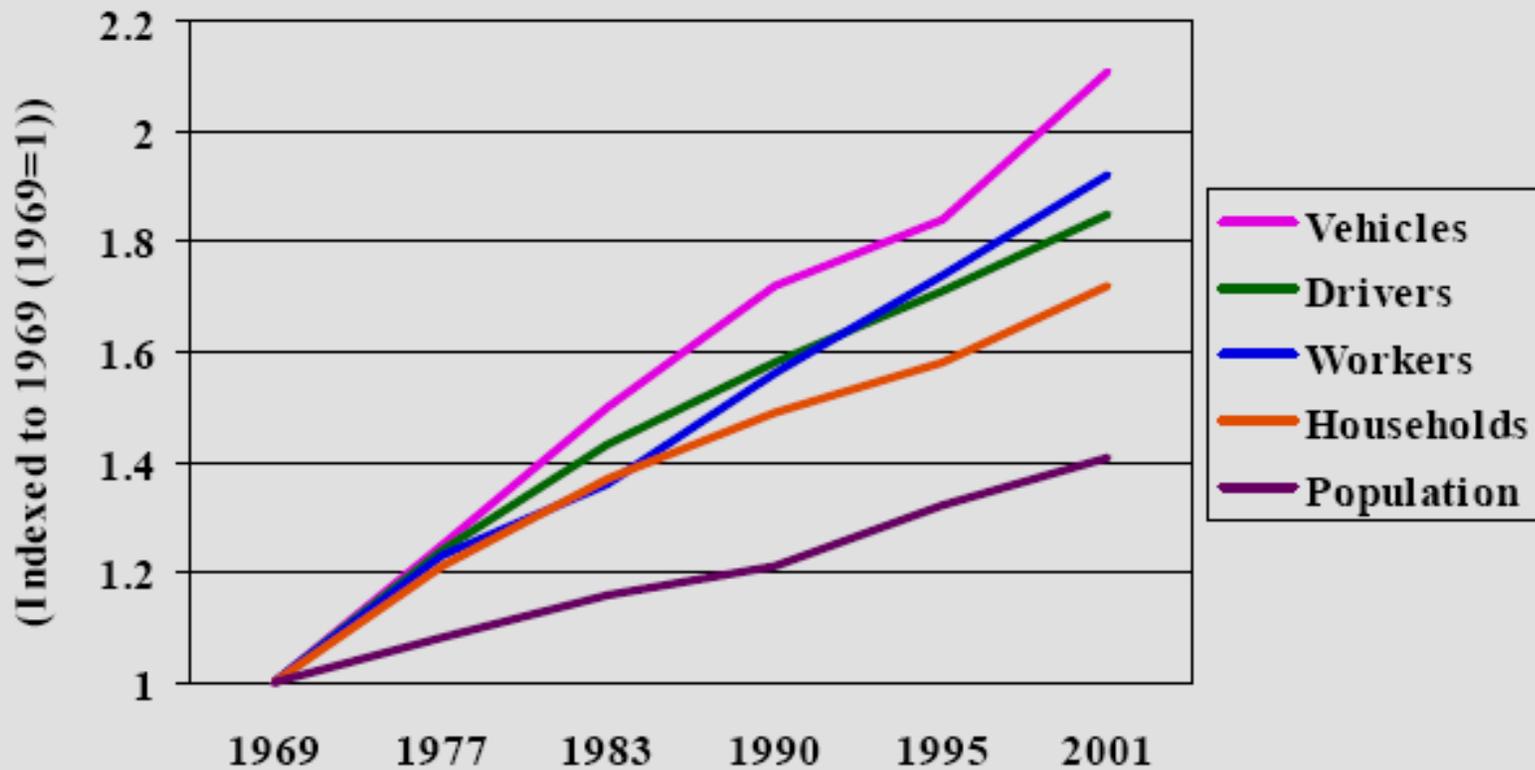


Photo source, Forest History Society

# Drivers of change up to last year

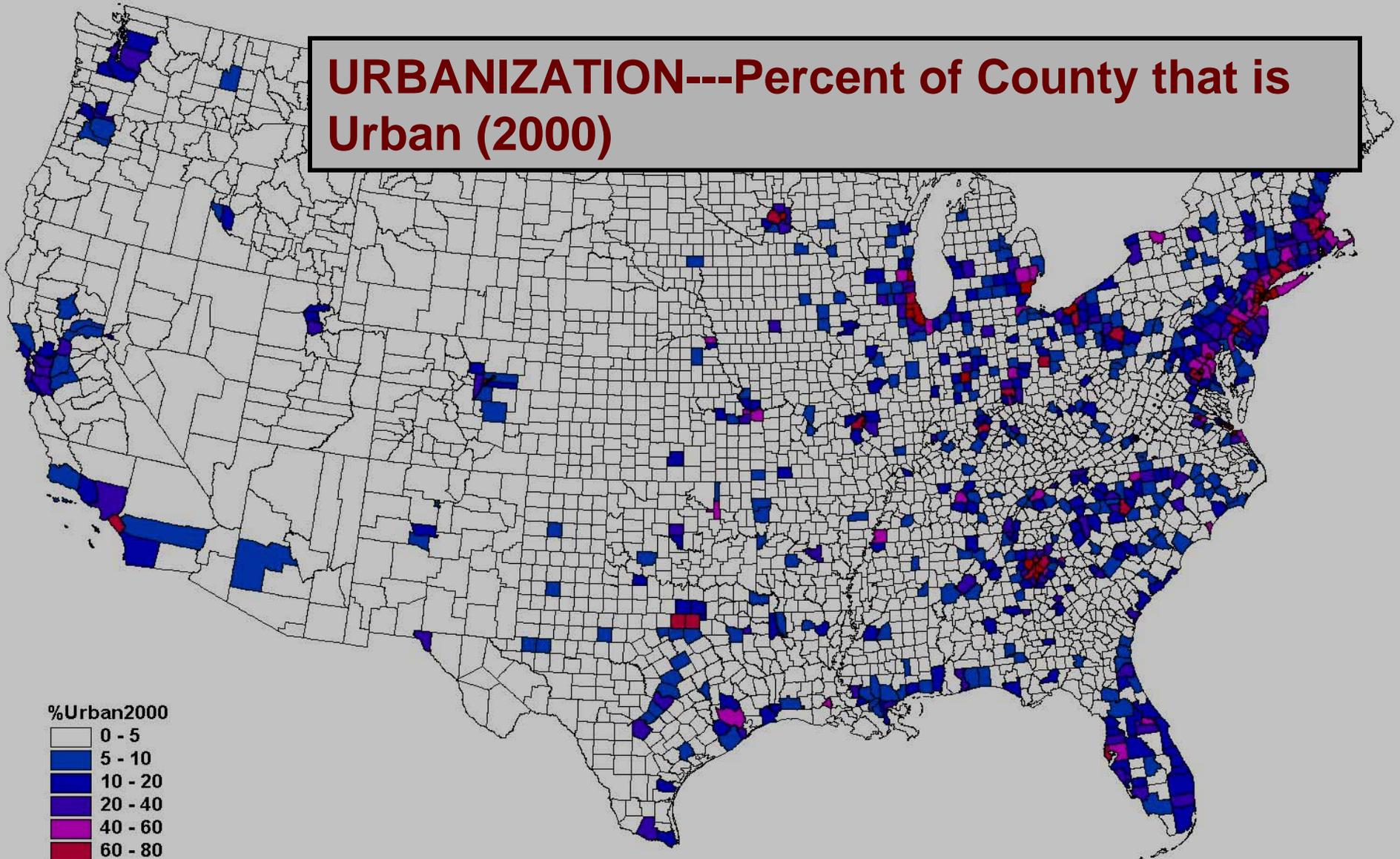
Changes in Summary Demographics  
1969<sup>1</sup>, 1977, 1983, 1990, 1995 NPTS, and 2001 NHTS

U. S. Department of Transportation





# URBANIZATION---Percent of County that is Urban (2000)



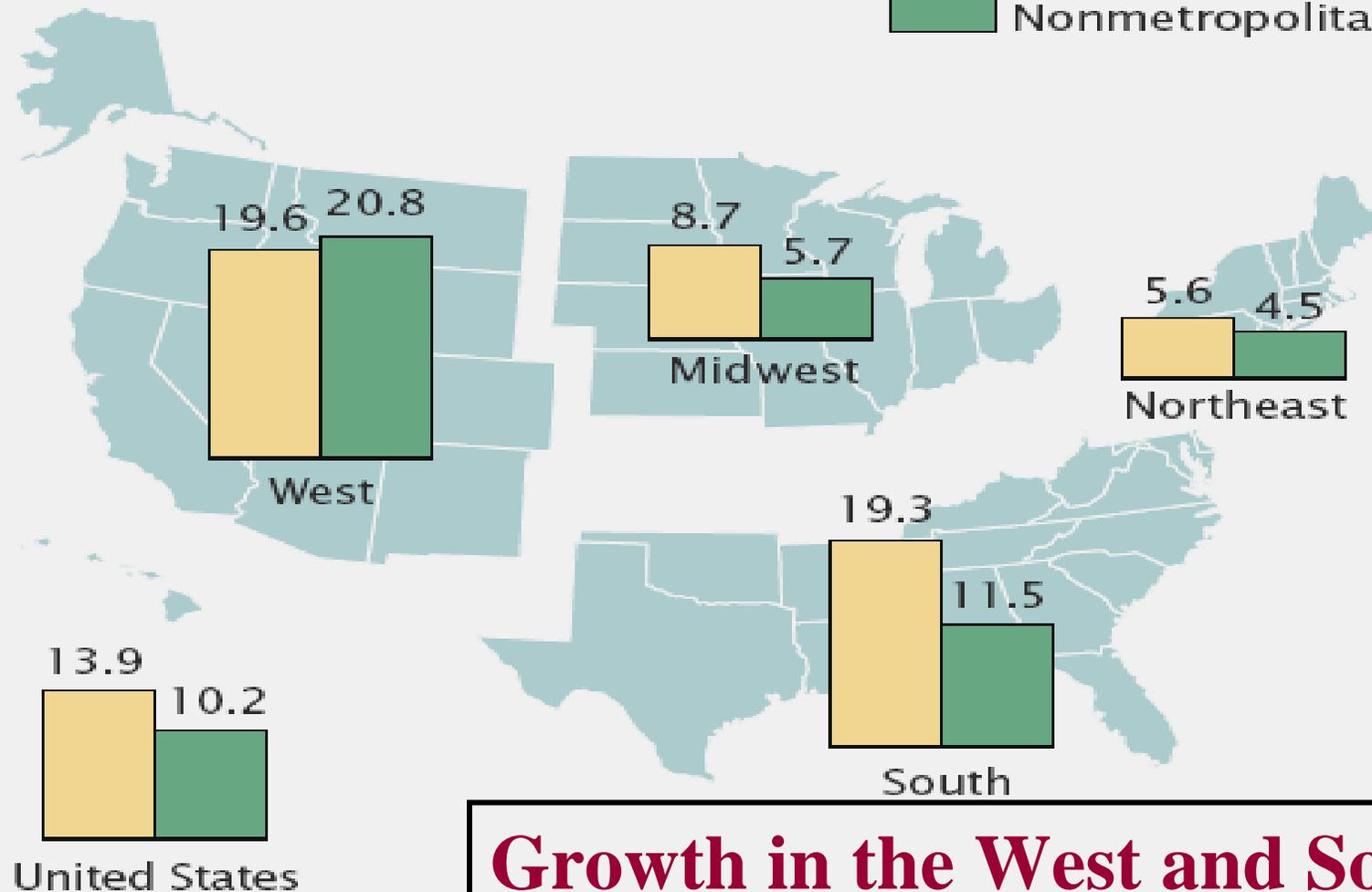
**%Urban2000**

White	0 - 5
Light Blue	5 - 10
Blue	10 - 20
Dark Blue	20 - 40
Purple	40 - 60
Magenta	40 - 60
Red	60 - 80
Dark Red	80 - 100

**Urban = 500 persons per square mile**

# Percentage Change in Metropolitan and Nonmetropolitan Populations by Region: 1990 to 2000

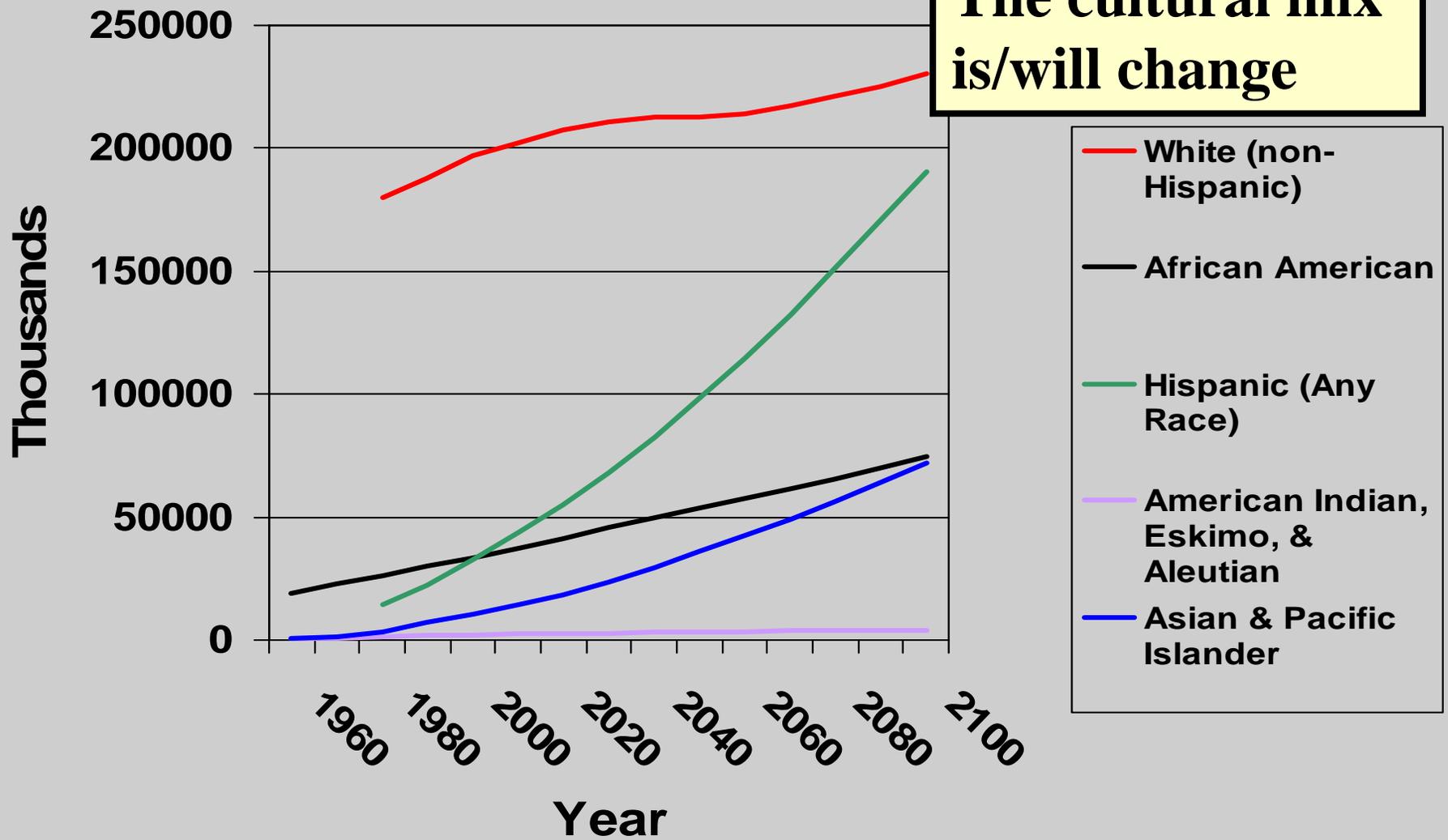
Metropolitan  
Nonmetropolitan



**Growth in the West and South**

Source: U.S. Census Bureau, Census 2000 and 1990 census.

# Historic and Projected Population by Ethnicity



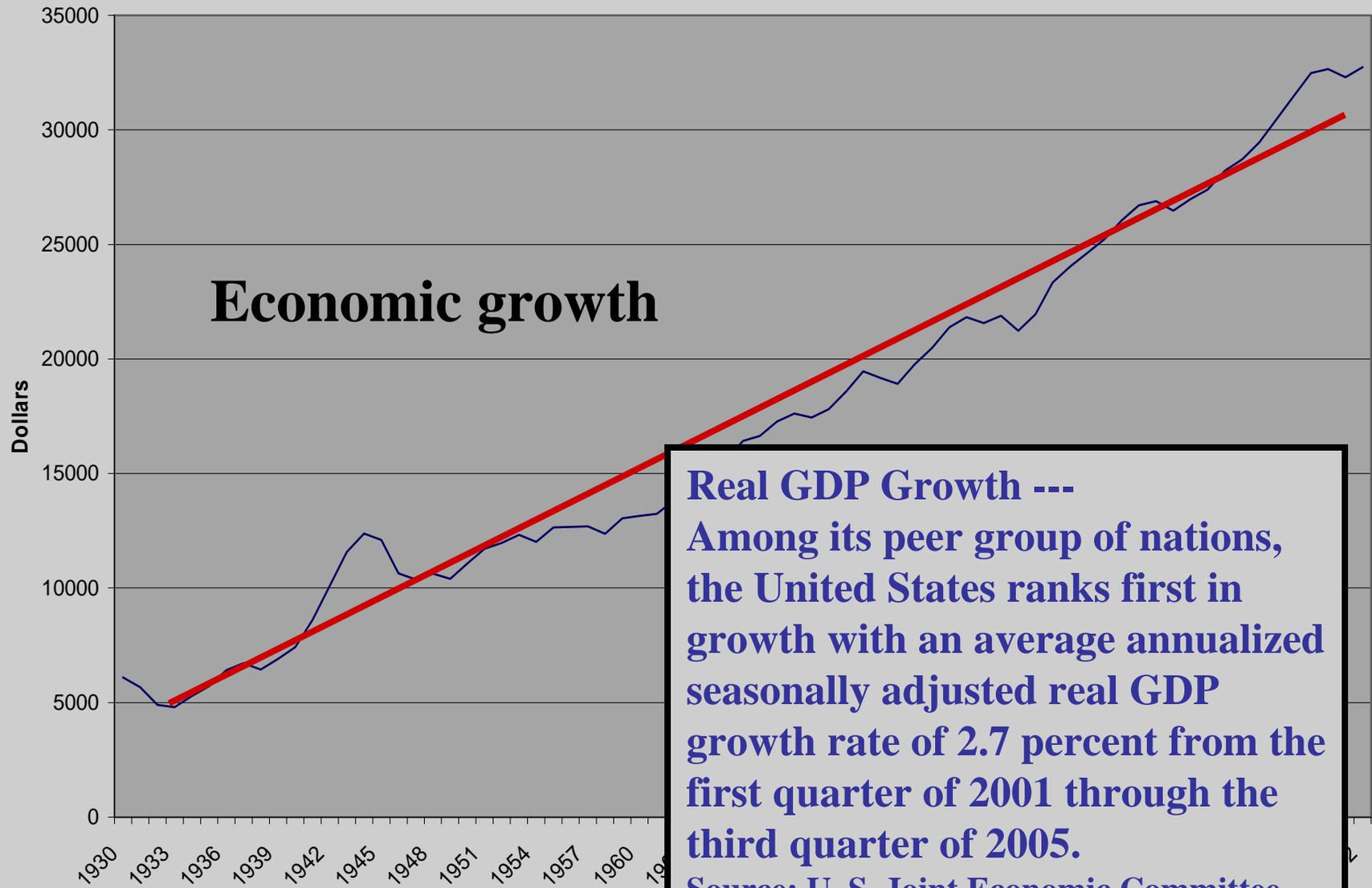
# **MILLIONS OF IMMIGRANTS LIVING** **IN THE U.S. BY YEAR OF ENTRY**

<b>Since 2000</b>	<b>1990-2000</b>	<b>1980-89</b>	<b>1970-79</b>	<b>Before 1970</b>
<b>&gt;8.0 (?&gt;12)</b>	<b>5.1</b>	<b>3.5</b>	<b>2.4</b>	<b>2.4</b>

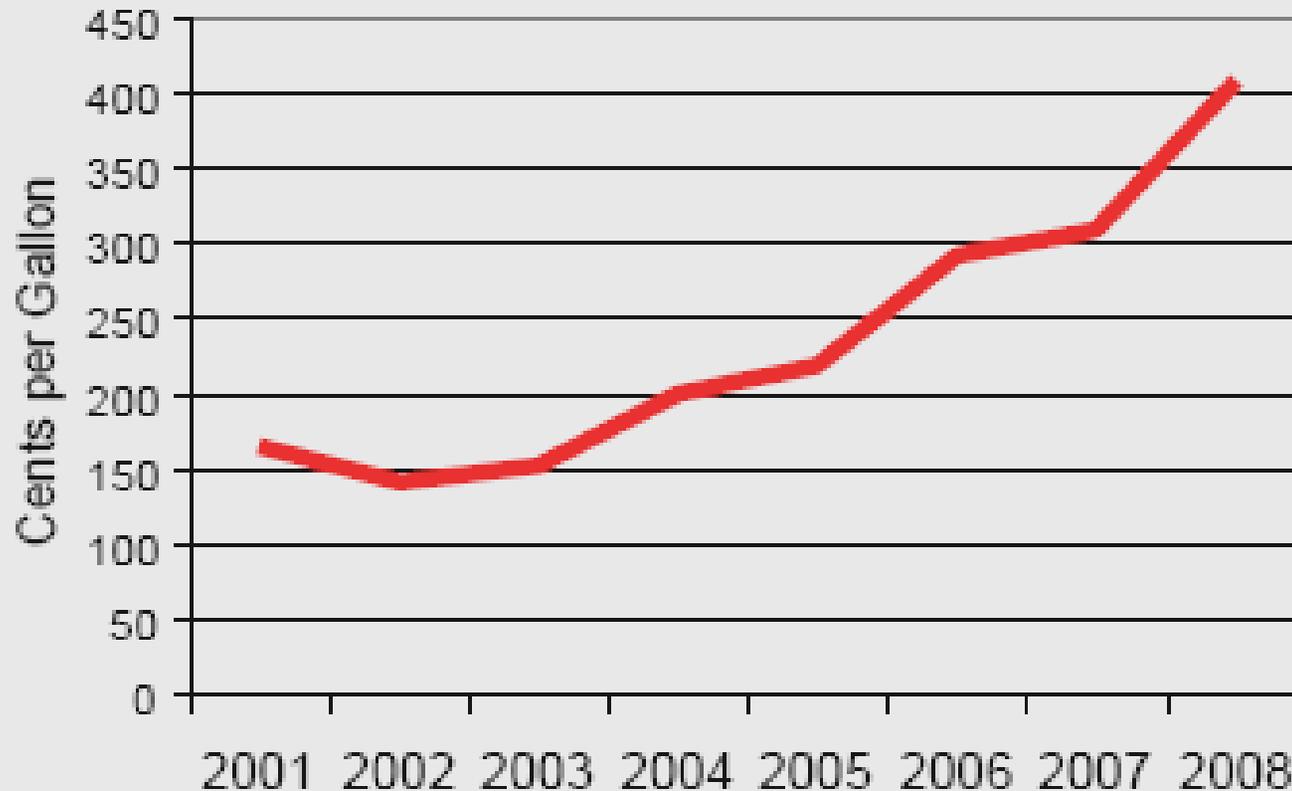
**Immigration has been exceeding 1 million per year**

**Source: United States Bureau of Census**

Figure 3. Real GDP Per Capita Over Time



## Average cost of a gallon of gasoline, all grades averaged, as of June 2008, still rising

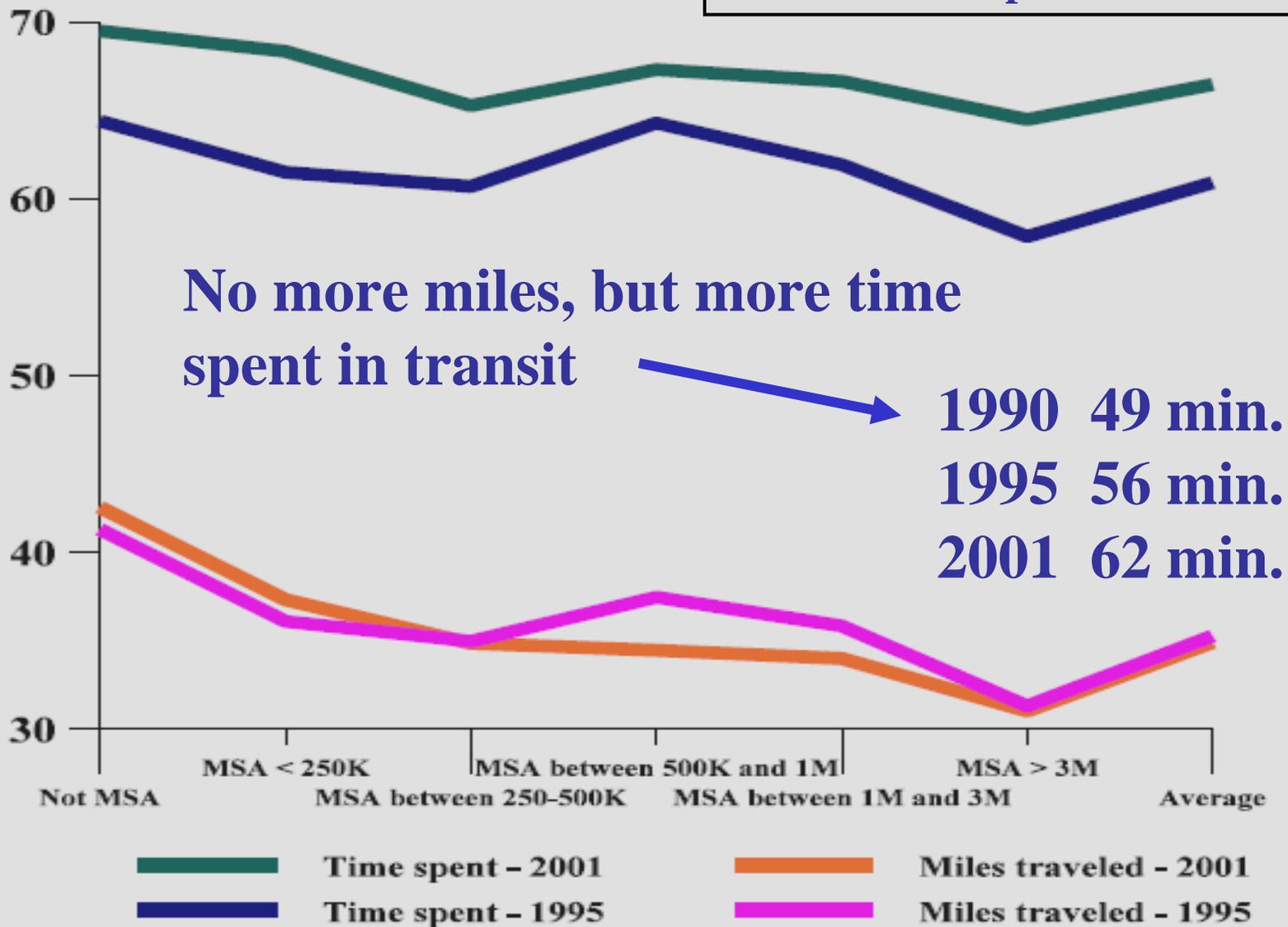


Source: Energy Information Agency historic tables

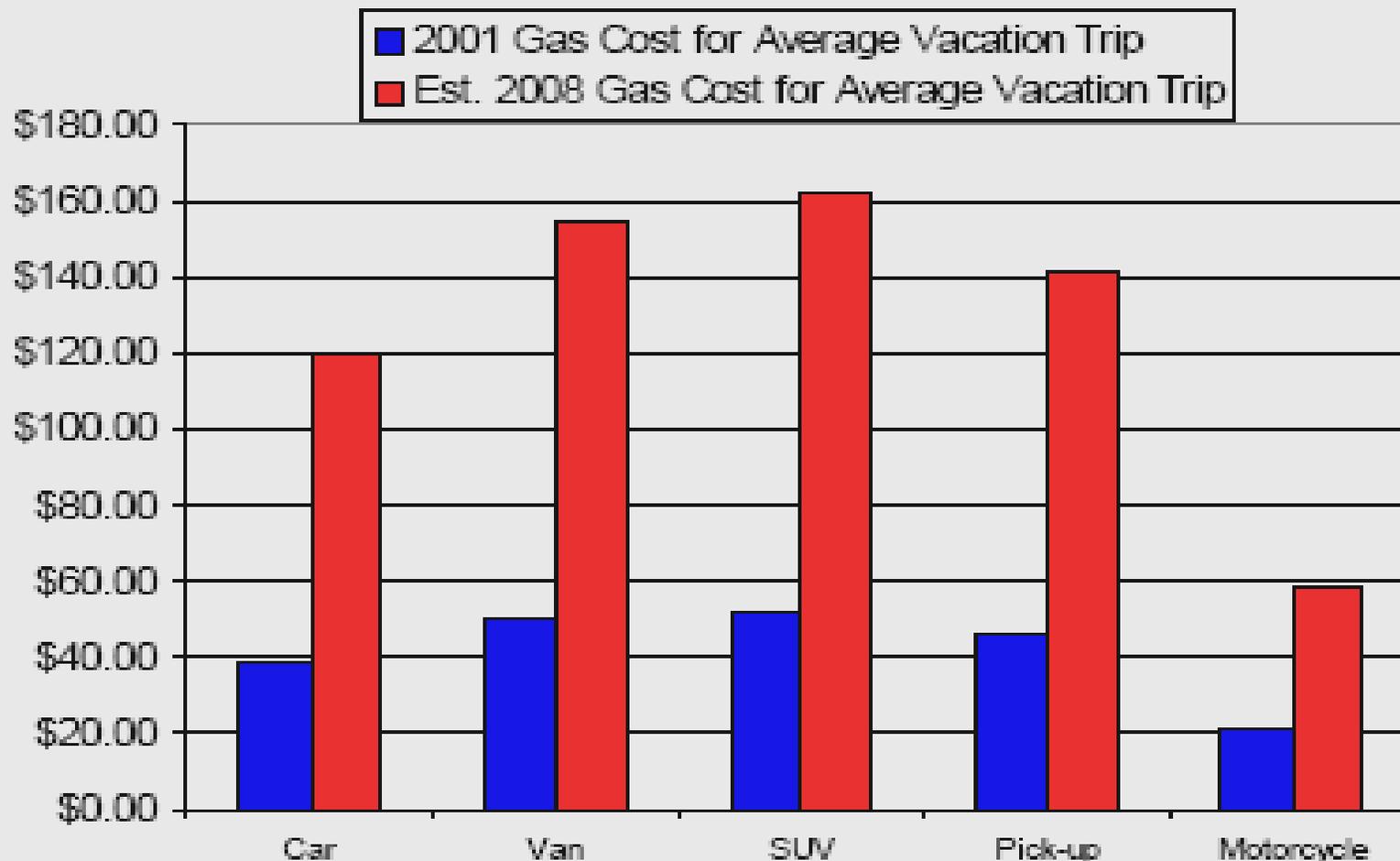
<http://tonot.eia.doe.gov> US All Grades All Formulations

Average Time Spent in Vehicle and Miles Traveled  
1995 NPTS and 2001 NHTS

National Transportation Survey



## Fuel Cost for Average Vacation Round Trip, 2001 – 2008

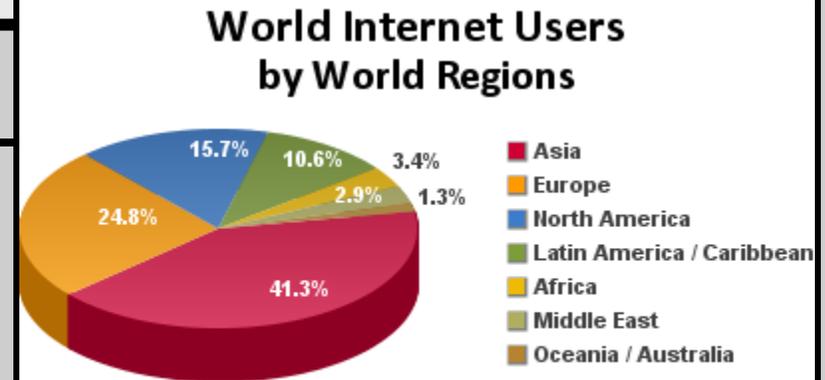


National Household Travel Survey--NHA

Website: <http://nhts.ornl.gov>

# GROWTH OF INTERNET USERS WORLD-WIDE

- Dec. 1995 16 Million
- Dec. 1997 70 Million
- Dec. 1999 248 Million
- Dec. 2000 451 Million
- Dec. 2003 719 Million
- April 2004 757 Million
- April 2005 934 Million
- Now Approaching 1.6 Billion

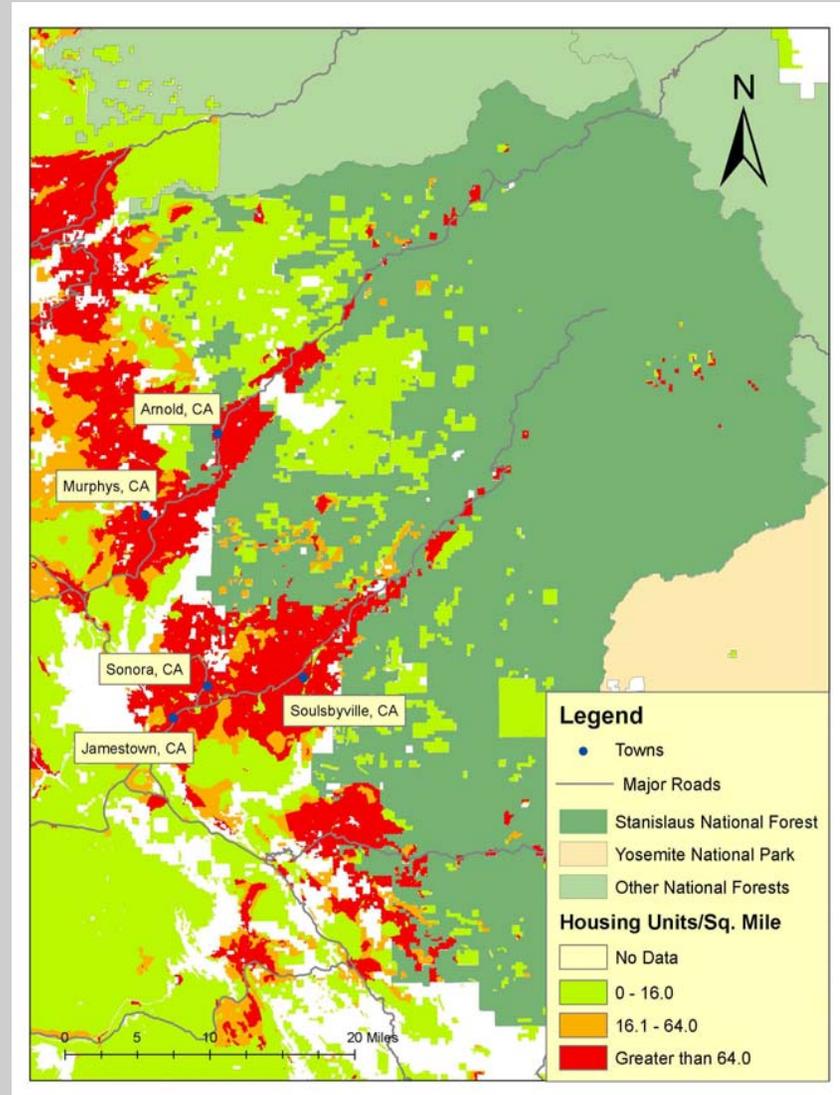
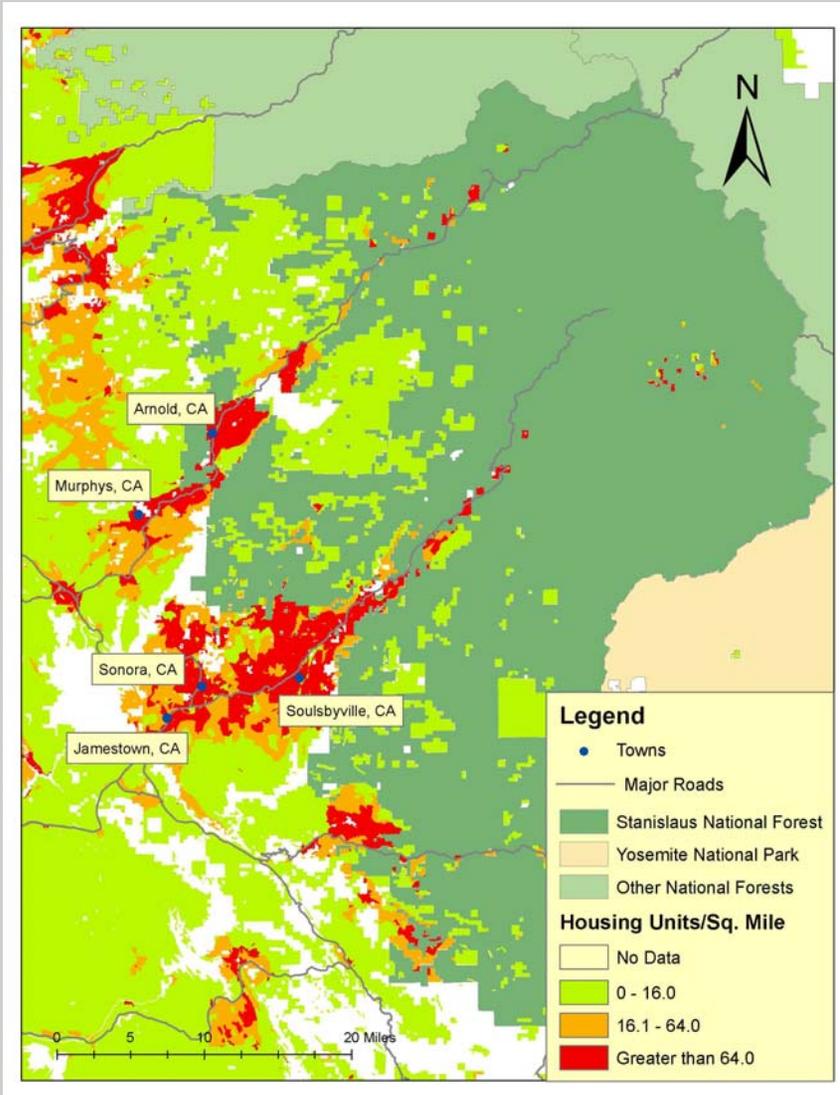


Source: Internet World Stats - [www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)  
1,574,313,184 Internet users for December 31, 2008  
Copyright © 2009, Miniwatts Marketing Group

**It is estimated that as many as 60% of internet users also play video games**

**Approaching 1/4 of world population**

Source: Internet World Stats



**Housing unit density around the Stanislaus National Forest, Year 2000 and 2030. Housing density data source: D. Theobald, 2005**

**Outdoor recreation deeply rooted in the U. S.  
Is there a fundamental change?**

# **Outdoor Recreation Trends up Through 2007**



## How did all this change affect recreation participation?

### *Trends in outdoor recreation generally*

- Between 2000 and through 2007 the total number of people who participated in one or more activities grew by 4.4 percent
- At the same time, the sum total number of days of participation increased from 67 billion to 84 billion, approximately +25 percent

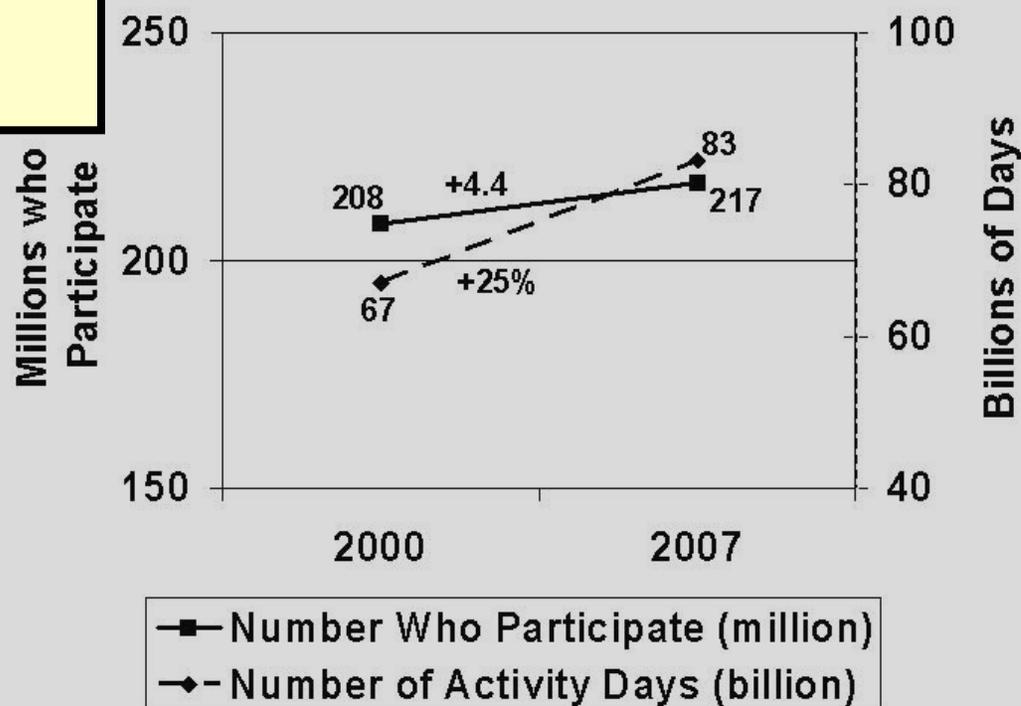
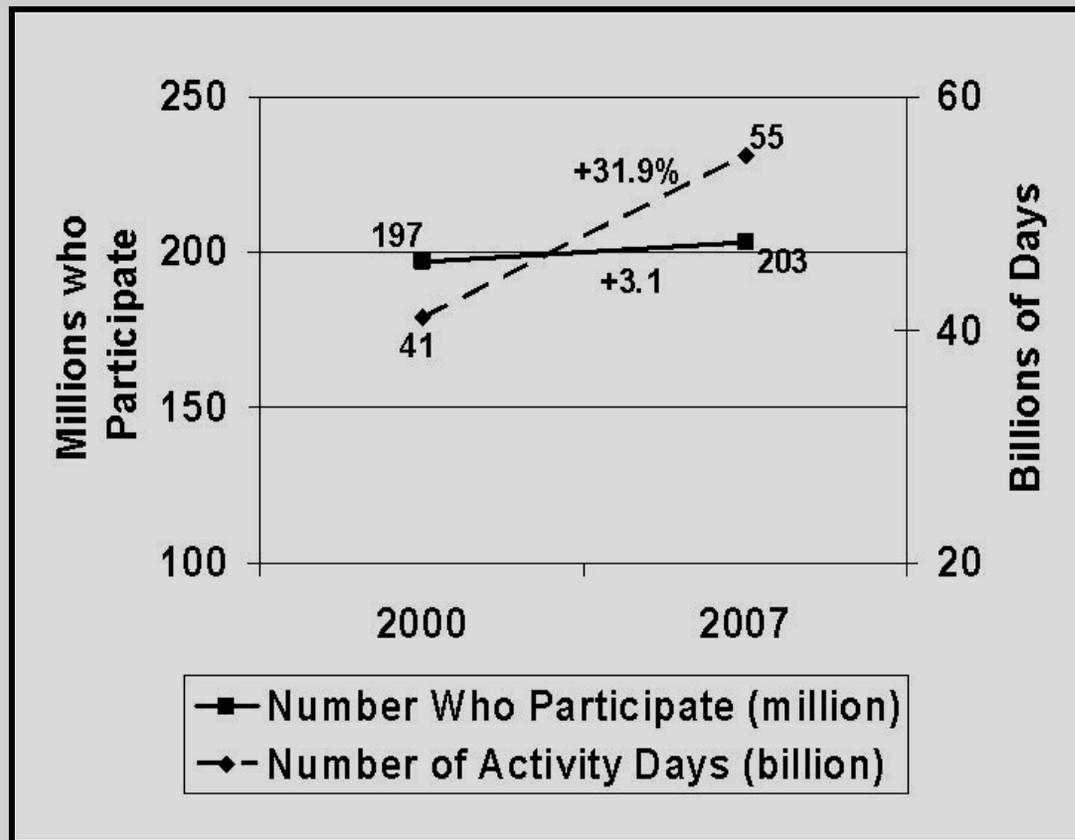


Figure 1.—Growth in number of people and number of activity days in 60 outdoor recreation activities in the United States, 2000–2007.

Source: National Survey on Recreation and the Environment

## ***Trends in nature-based outdoor recreation specifically thru 2007***

- **Some growth activities near home (e.g., wildlife watching or swimming); others remote (such as backpacking or climbing).**
- **Between 2000 and 2007, the total people participating in nature-based activities grew by 3.1 percent.**
- **Number of days of participation grew about 32 percent.**
- **Over all 50 nature-based activities, per capita days of participation increased by more than 22 percent.**



**Figure 2.—Growth in number of people and number of participation days in 50 nature-based outdoor recreation activities in the United States, 2000–2007.**



## Interest in visiting, viewing, photographing **nature** is growing

<b><i>Fastest Growing Nature-Based Activities</i></b>	<b><i>Total participants (millions), 2007</i></b>	<b><i>Percentage change in participants, 2000–2007</i></b>	<b><i>Total days of participation (billions), 2007</i></b>	<b><i>Percentage change in total days, 2000–2007</i></b>
Viewing or photographing flowers and trees	118.4	25.8	10.2	77.8
Viewing or photographing natural scenery	145.5	14.1	11.5	60.5
Driving off-road	44.2	18.6	1.3	56.1
Viewing or photographing other wildlife	114.8	21.3	5.3	46.9
Viewing or photographing birds	81.1	19.3	8.0	37.6
Kayaking	12.5	63.1	0.1	29.4
Visiting water (other than ocean beach)	55.5	1.6	1.1	28.1
Backpacking	22.1	-0.6	0.3	24.0
Snowboarding	11.3	7.3	0.1	23.9
Rock climbing	8.7	-5.5	0.1	23.8
Visiting nature centers, etc.	127.4	5.0	1.0	23.2
Big-game hunting	20.2	12.8	0.3	21.2
Mountain climbing	11.8	-12.5	0.1	20.5
Visiting ocean beach	96.0	10.5	1.4	16.3
Sightseeing	113.2	4.1	2.3	14.0
Visiting wilderness	70.6	3.0	1.1	12.8

## Driving ATVs, off-road motorcycles, other OHVs growing rapidly

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## Technical, risk-oriented activities showing growth, mostly in dedication

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Visited farm or agric. setting	+101.9
View/photograph flowers, etc.	76.2
View/photograph natural scenery	58.7
Drive off-road	50.0
View/photograph other wildlife	46.0
View or photograph birds	36.0
Rock climbing	35.1
Kayaking	32.8
Visit waterside besides beach	29.4
Family gatherings outdoors	24.0
Snowboarding	23.0
Backpacking	20.6
Visit nature centers, etc	20.0
Big game hunting	19.6

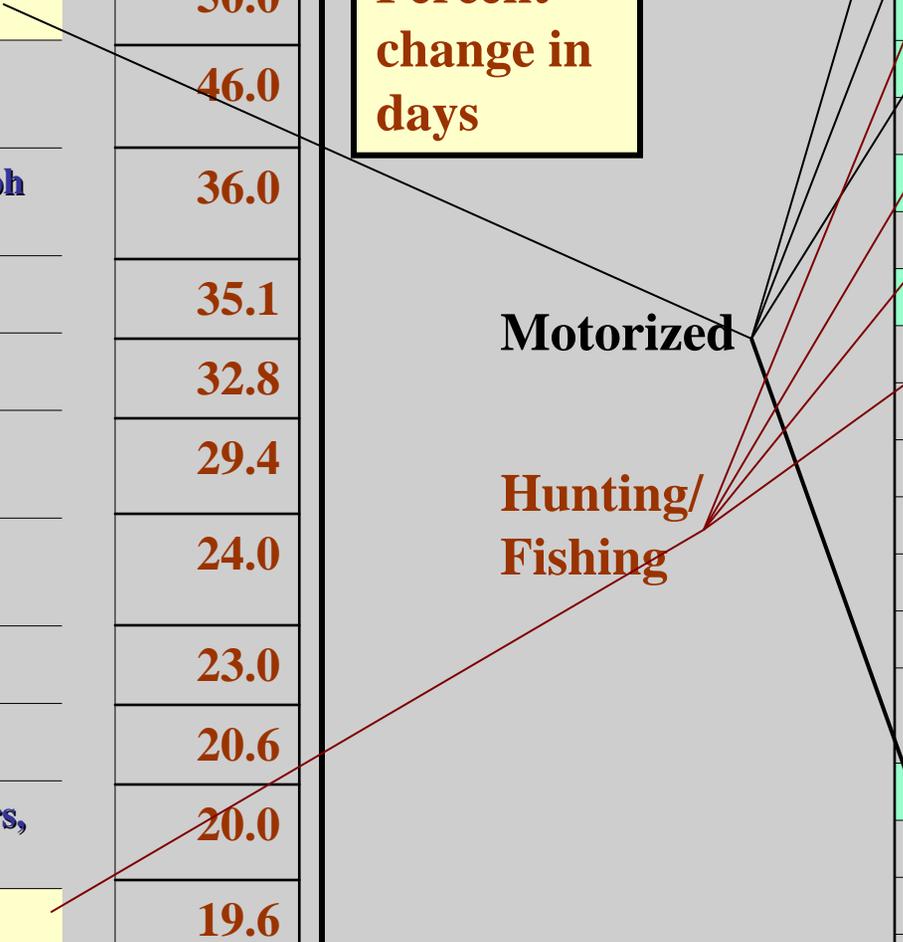
**Fastest Growing Activities 2000 to 2007 and Percent change in days**

**Activities losing participation**

Use personal watercraft
Waterskiing
<b>Small game hunting</b>
Visit historic sites
<b>Coldwater fishing</b>
Driving for pleasure
Rowing
<b>Saltwater fishing</b>
Snorkeling
<b>Migratory bird hunting</b>
Cross-country skiing
Sailing
Picnicking
Canoeing
Day hiking
Downhill skiing
Horseback riding on trails
<b>Snowmobiling</b>
Snowshoeing
Scuba diving
Mountain biking

**Motorized**

**Hunting/  
Fishing**



# Activity Mix is Changing

- A few of the nature-based activities experienced **decreases in both** the number of people who participated and total days of participation
- Primitive camping (not in developed campgrounds), backpacking, and mountain climbing showed **decreases in the number of people who participated, but increases in the number of days of participation**
- Visiting prehistoric sites, saltwater fishing, and snorkeling showed **increases in number of people who participated, but decreases in total days**
- For a sizable number of nature-based activities, however, **both** the number of people participating and the summed days of participation increased
  - **Net effect, growth**

## A few other activities highlighted--**Decreasing**

$\Delta$  = Change 2000 - 2007

<u>Activity</u>	<u>Percent <math>\Delta</math> Participants</u>	<u>Percent <math>\Delta</math> Days</u>
<b>Picnicking</b>	<b>-1.4</b>	<b>-17.2</b>
<b>Visiting Historic Sites</b>	<b>-4.5</b>	<b>-15.2</b>
<b>Day Hiking</b>	<b>6.8</b>	<b>-20.9</b>
<b>Visiting Prehistoric sites</b>	<b>2.4</b>	<b>-7.3</b>
<b>Mountain Biking</b>	<b>-8.0</b>	<b>-32.7</b>
<b>Cold Water Fishing</b>	<b>-2.1</b>	<b>-7.0</b>
<b>Canoeing</b>	<b>2.3</b>	<b>-17.9</b>
<b>Rafting</b>	<b>-16.8</b>	<b>-1.0</b>
<b>Downhill Skiing</b>	<b>-14.8</b>	<b>-15.7</b>

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## A few other activities highlighted--**Increasing**

$\Delta$  = Change 2000 - 2007

<u>Activity</u>	<u>Percent <math>\Delta</math> Participants</u>	<u>Percent <math>\Delta</math> Days</u>
Walking	9.6	13.9
Family gatherings outdoors	4.2	13.7
Swimming (not pools)	4.0	2.2
Gathering mushrooms/berries	16.1	1.9
Developed Camping	2.7	9.3
Warmwater fishing	7.3	5.6

---

# Within Nature-Based Recreation lays *Forest Recreation*

*Top 7 activities*

Millions of activity days

Walk for pleasure	7,493.3
View/photograph natural scenery	6,170.6
View/photograph wildflowers, trees, other wild plants species	4,858.9
View/photograph birds	3,738.3
View/photograph other wildlife	3,086.8
Day hiking on trails	1,234.8
Visit a wilderness/primitive area	947.6

**Nearly 60 percent of nature-based recreation occurs in forested settings--- self reported**

Forest Recreation Activity	Number of Activity Days	% Public Forest	% in Urban Forests
Walk for pleasure	7,493.303	53.8	44.5
View/photograph natural scenery	6,170.597	61.9	31.8
View/photograph wildflowers, trees, etc.	4,858.941	55.4	36.3
View/photograph birds	3,738.274	51.3	37.6
View/photograph other wildlife	3,086.848	57.7	32.2
Day hiking	1,234.823	76.2	34.0
Visit a wilderness or primitive area	947.559	76.4	24.6
Off-highway driving	837.541	50.4	23.2
Family gathering	805.291	55.9	43.5
Visit nature centers, etc.	683.850	77.6	45.2
Gather mushrooms, berries, etc.	623.372	47.9	32.3
Mountain biking	463.324	60.2	32.1
Canoeing	455.942	68.4	44.4
Developed camping	355.966	72.8	21.3
Big game hunting	279.781	45.7	16.5
Primitive camping	211.448	75.8	21.4
Backpacking	198.787	78.5	22.1
Visit historic Sites	182.755	60.0	39.1
Horseback riding on trails	177.453	50.8	34.4
Small Game hunting	161.488	46.8	17.4
Visit prehistoric/ archeological sites	138.932	70.0	41.6
Snowmobiling	62.111	55.1	27.4
Mountain climbing	57.091	78.6	20.5
Cross country skiing	41.874	60.5	33.7
Rock climbing	34.088	68.8	26.9
Snowshoeing	19.938	60.2	27.6

# Forest Recreation

**Urban forests are important resources for recreation**

- As urban sprawl continues, **more forest land becomes urban forest** and is a mixture of public and private ownership
- Urban land is projected to rise from **3.1%** of total U. S. land area to **8.1%** by **2050**
- Forest-based recreation activities where **1/3 or more occurs in urban forests** include walking, photographing flowers, hiking, family gatherings outdoors, visiting nature centers, picnicking, visiting historic sites, horseback riding on trails, and visiting archeological sites

**•Roughly one-third of forest recreation occurs in urban forests (public and private)**

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# Forest Recreation

**Public lands and forests are also important for recreation**

- Almost 44 percent of the 751 million acres of forest in the U. S. is publicly owned and managed and is pretty much open to everyone
- Forest-based recreation activities where 1/2 or more occurs on public lands include visiting wilderness, day hiking, visiting nature centers, and backpacking
- Forest-based recreation activities where more than 1/2 occurs on private lands include, for example, small-game hunting, horseback riding, off-road driving, and gathering mushrooms and berries

**• Roughly 60 percent of forest recreation occurs on public lands, and of course the other 40 percent is on private forest lands**

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Visit a wilderness or primitive area	947.559	76.4	24.6
Off-highway driving	837.541	50.4	23.2
Family gathering	805.291	55.9	43.5
Visit nature centers, etc.	683.850	77.6	45.2
Gather mushrooms, berries, etc.	623.372	47.9	32.3
Mountain biking	463.324	60.2	32.1
Picnicking	455.942	68.4	44.4
Developed camping	355.966	72.8	21.3
Big game hunting	279.781	45.7	16.5
Primitive camping	211.448	75.8	21.4
Backpacking	198.787	78.5	22.1
Visit historic Sites	182.755	60.0	39.1
Horseback riding on trails	177.453	50.8	34.4
Small Game hunting	161.488	46.8	17.4
Visit prehistoric/ archeological sites	138.932	70.0	41.6
Snowmobiling	62.111	55.1	27.4
Mountain climbing	57.091	78.6	20.5
Cross country skiing	41.874	60.5	33.7
Rock climbing	34.088	68.8	26.9
Snowshoeing	19.938	60.2	27.6

## *Visitation to Public Lands Level to Increasing*

- A paper back in February in the PNAS said that **public land visitation was in steep decline**. But, that was per-capita, not total.
- Agency data showed that state park, national park, and national wildlife refuge visitation **stable or increasing** since the 90s.
- State park visitation in 2007 **rose** back above the former level reported in 2001 (a 0.7% increase) (National Association of State Park Directors, 2007). 2008 numbers coming.
- National Park visitation had been **stable** since 2001, but in 2007, visitation rose by almost three million. 2008 numbers coming.
- National wildlife refuge visitation has **grown** from 33 million in 1998 to over 40 million in 2007, growth of 21 percent
- The NF trend not available earlier, but now shows **-13% 2004 - 2007**

Year	Millions of Visits
1975	471
1985	660
1995	746
2000	767
2001	735
2003	735
2005	715
2006	711
2007	740

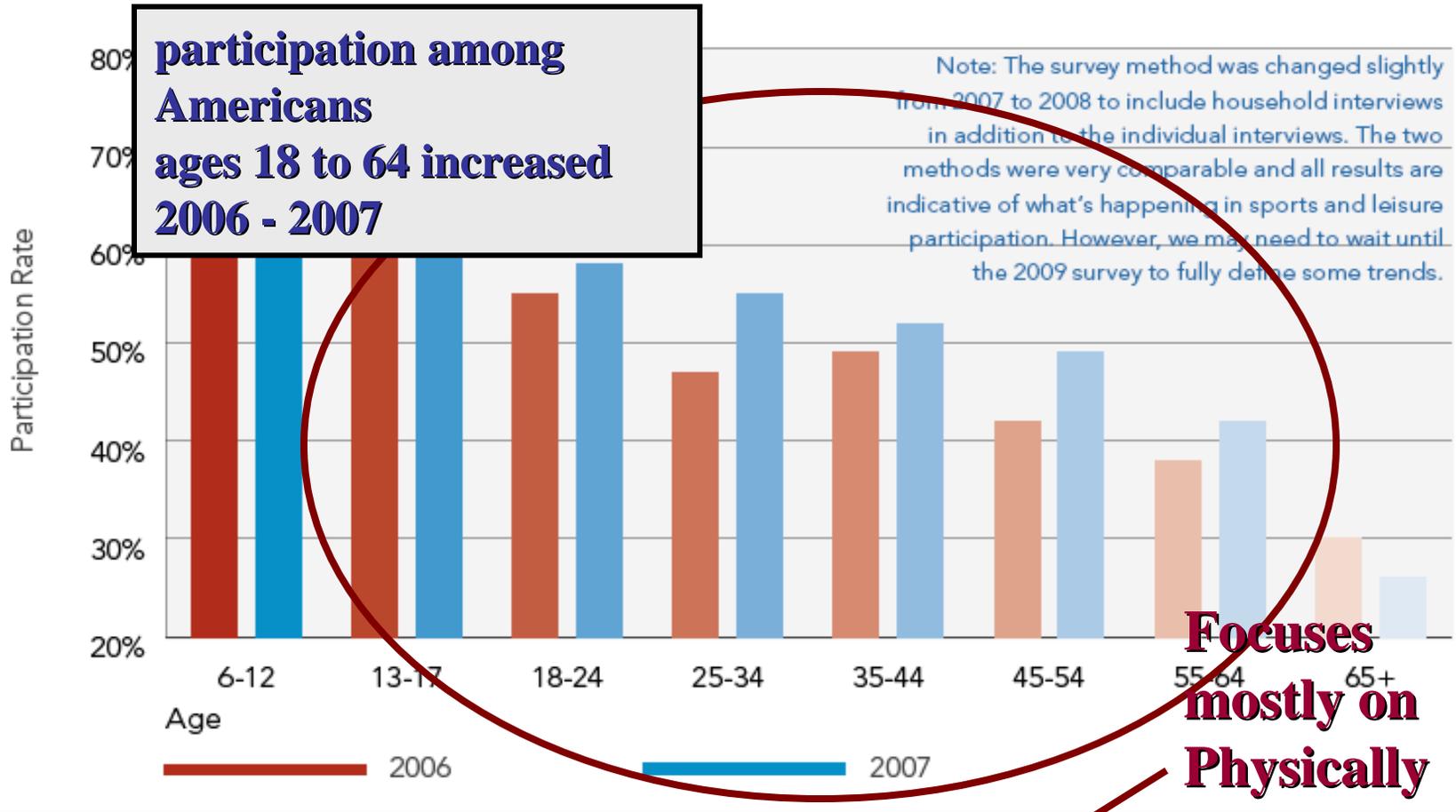
**State  
Park  
Trend**



# Any Validation out there?



Participation in Outdoor Activities by Age  
A 2006 and 2007 Comparison



participation among Americans ages 18 to 64 increased 2006 - 2007

Focuses mostly on Physically Challenging

Measured outdoor activities include: Backpacking, BMX Bicycling, Mountain Bicycling, Road Bicycling, Bird Watching Outdoors, Camping, RV Camping, Canoeing, Sport Climbing, Bouldering, Indoor Climbing, Ice Climbing, Traditional Climbing, Mountaineering, Fly Fishing, Freshwater Fishing, Saltwater Fishing, Hiking, Hunting, Kayaking, Whitewater Kayaking, Adventure Racing, Triathlon, Rafting, Running/Jogging, Skateboarding, Trail Running, Wildlife Viewing, Downhill Skiing, Telemark Skiing, Cross-Country Skiing, Snowboarding, Snowshoeing, Windsurfing, Sailing, Scuba Diving, Snorkeling, Surfing and Wake Boarding.

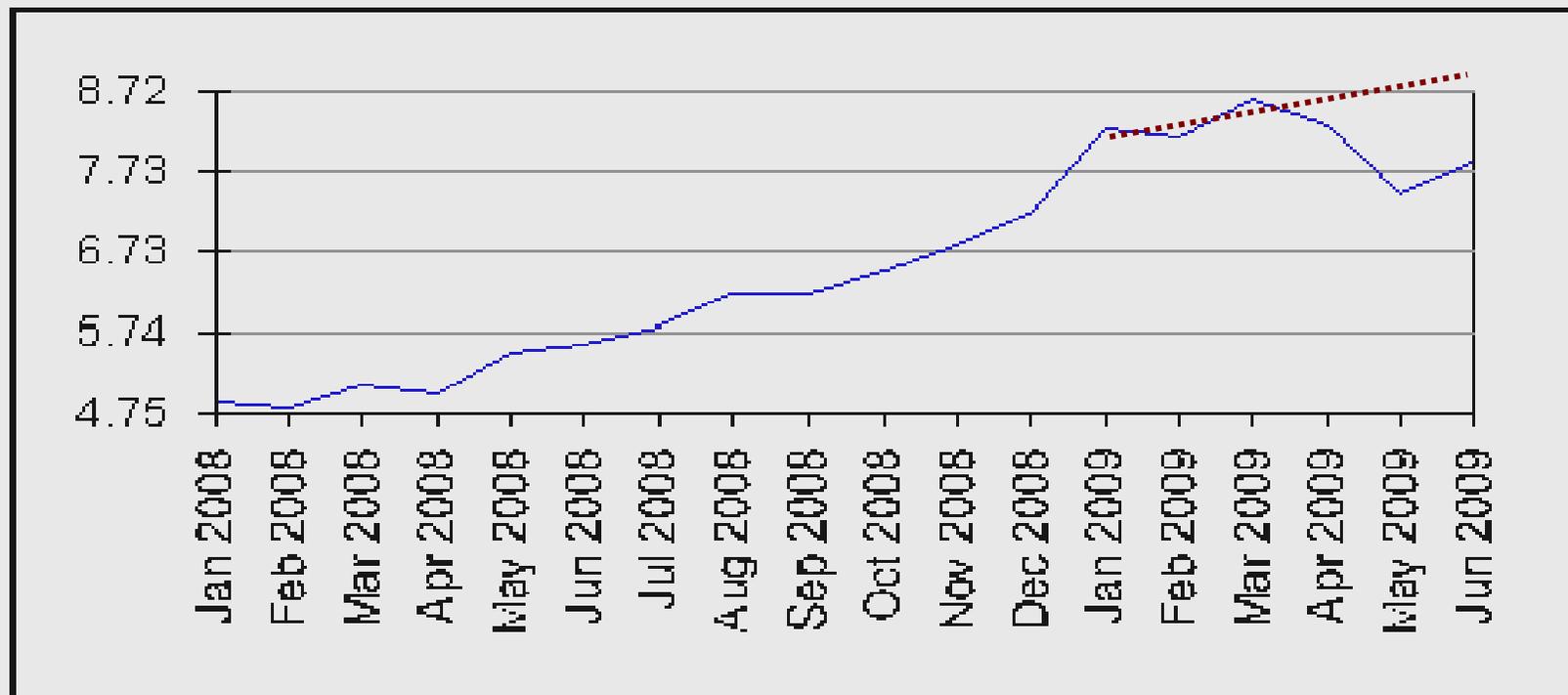
**BUT, What happens to Recreation Trends when we add data from 2008 and consider the vast changes in the drivers of demand that were occurring then?**

---

- **The economy---recession actually began Jan. 2007 (recession = reduced growth in real GDP in 2 successive quarters)**
- **Gasoline**
- **Climate change**
- **Etc.**

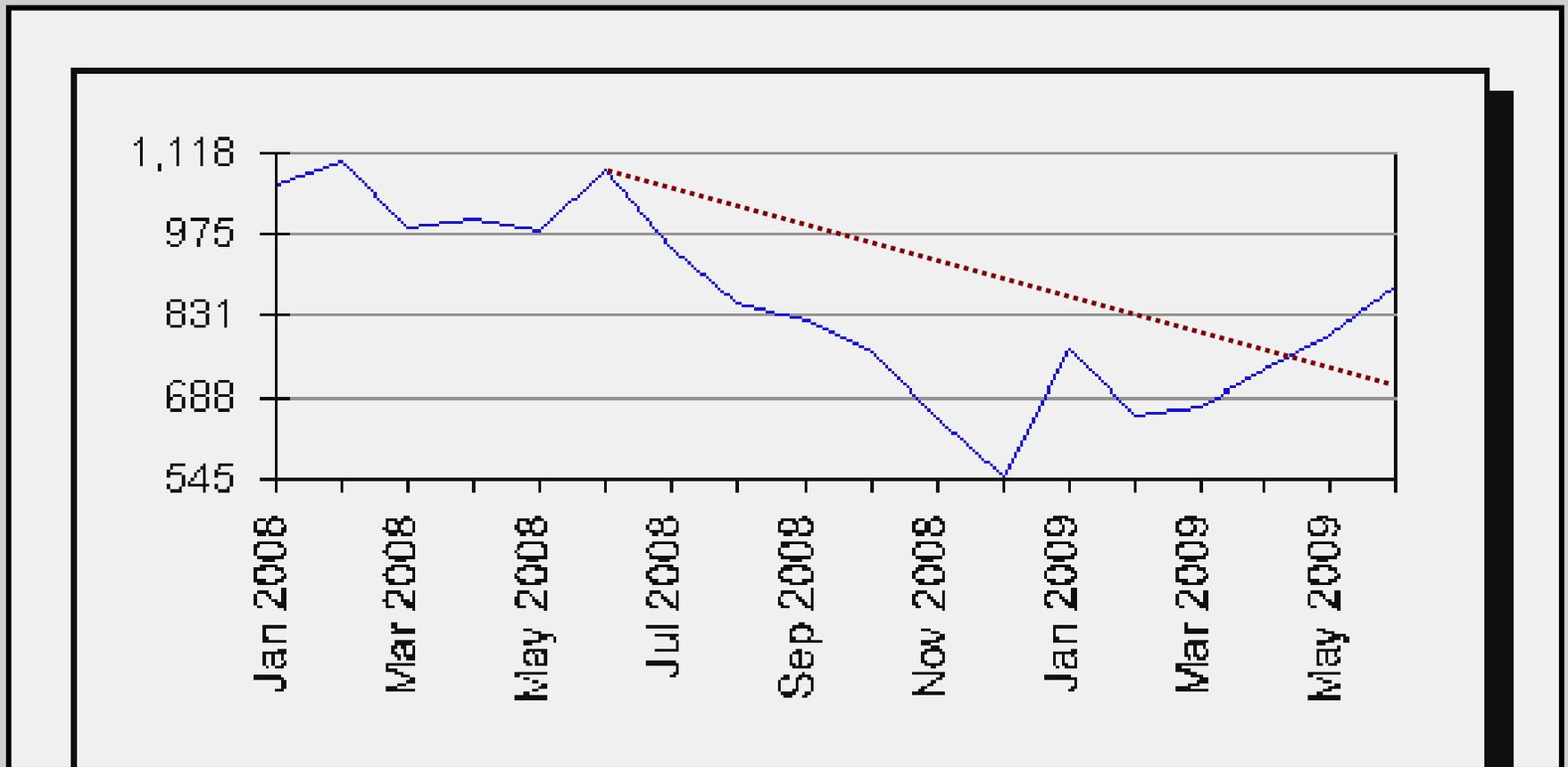
*Marketvector.com*

## US Unemployment Rate---Past Present and Future



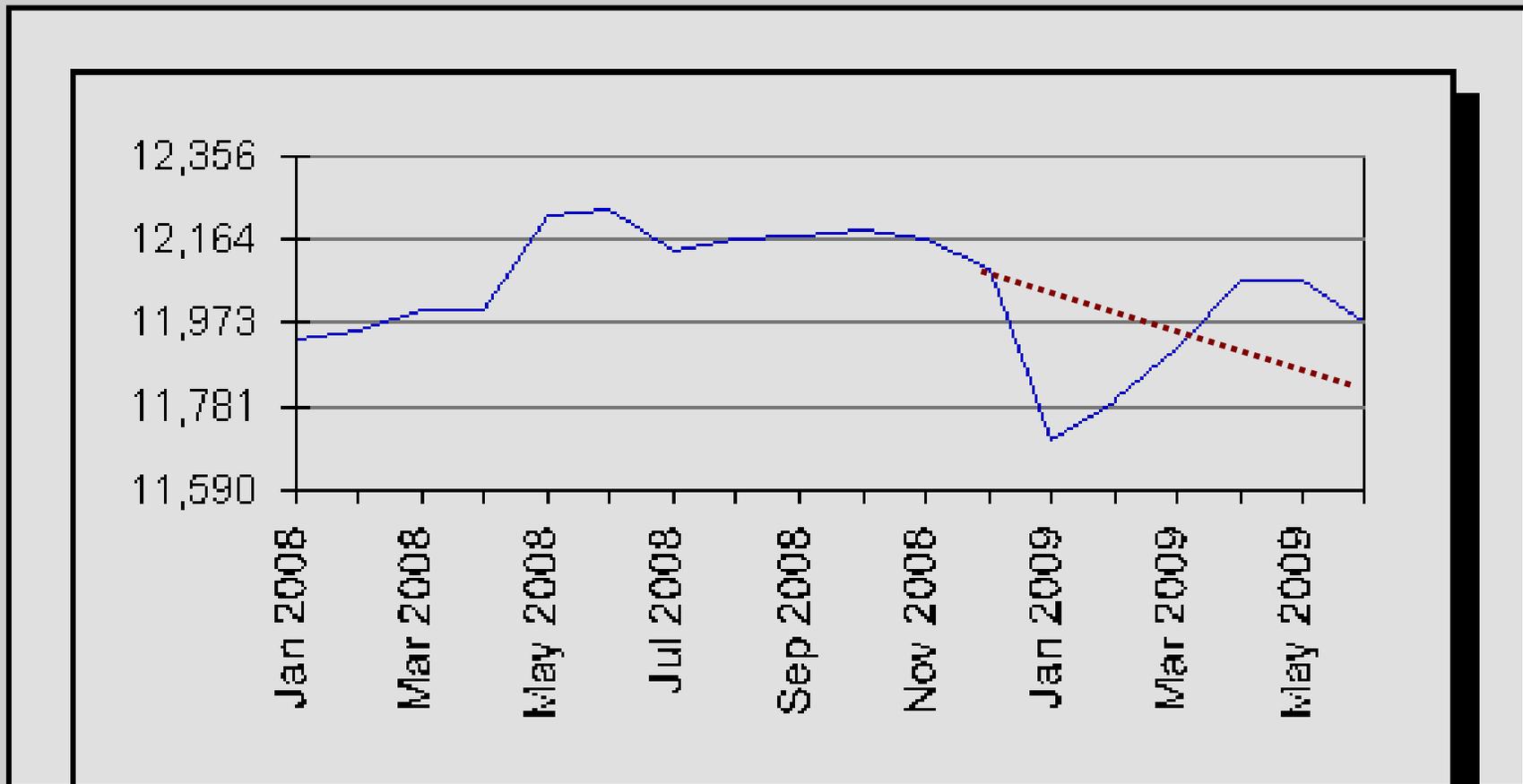
*Marketvector.com*

## US Housing Starts---Past Present and Future



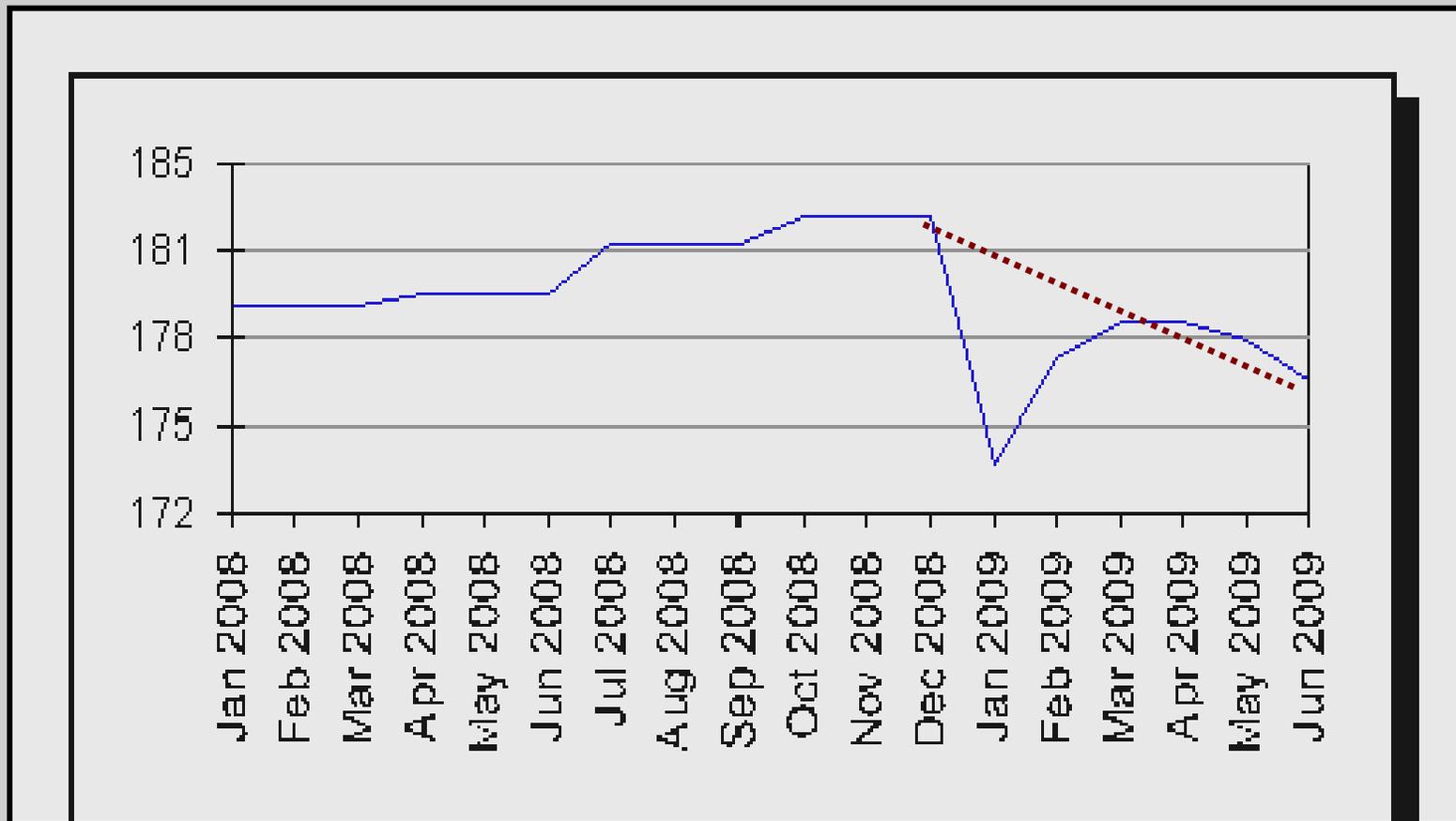
*Marketvector.com*

## US Personal Income---Past Present and Future



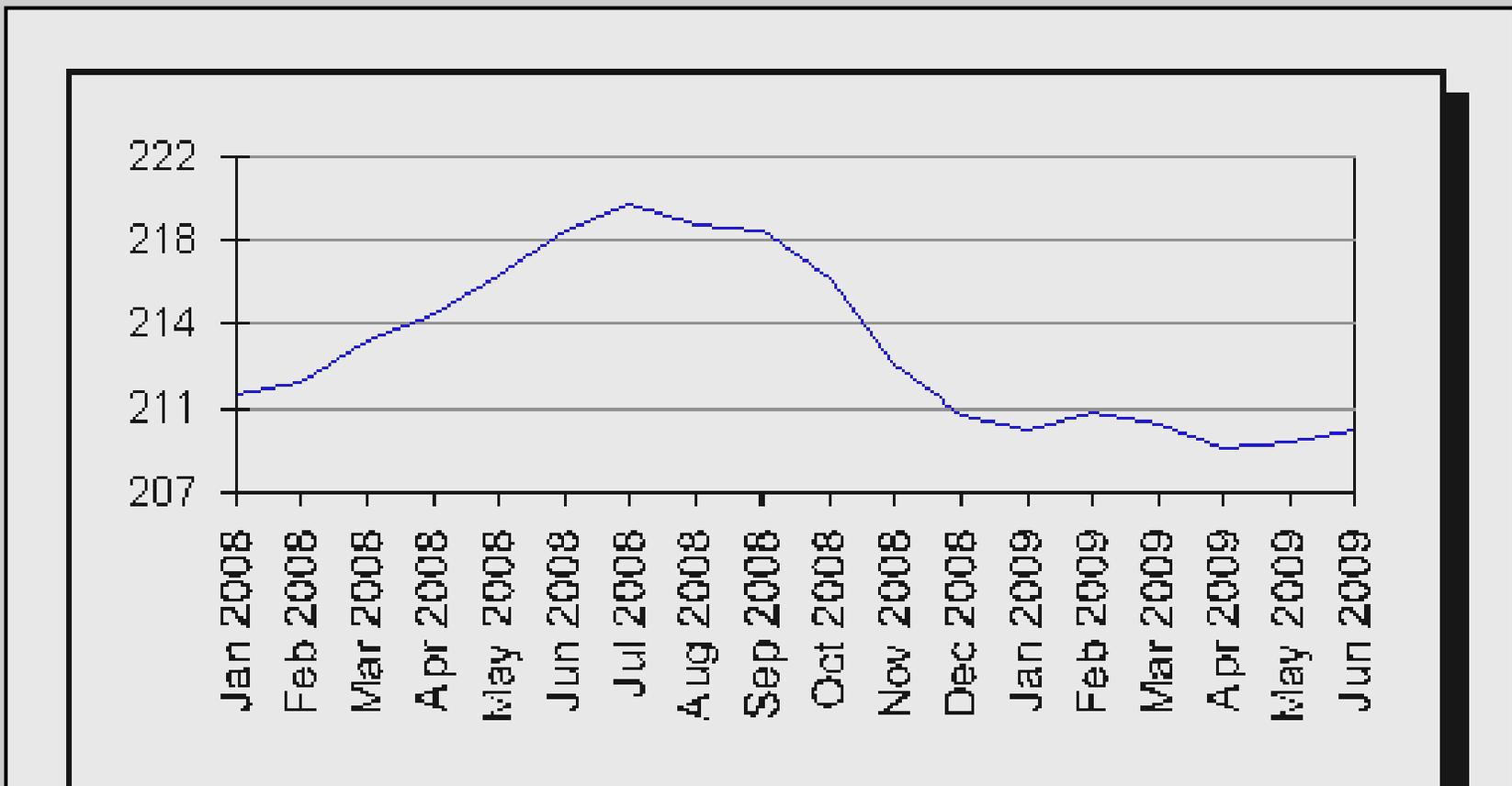
*Marketvector.com*

## US Employment Compensation---Past Present and Future

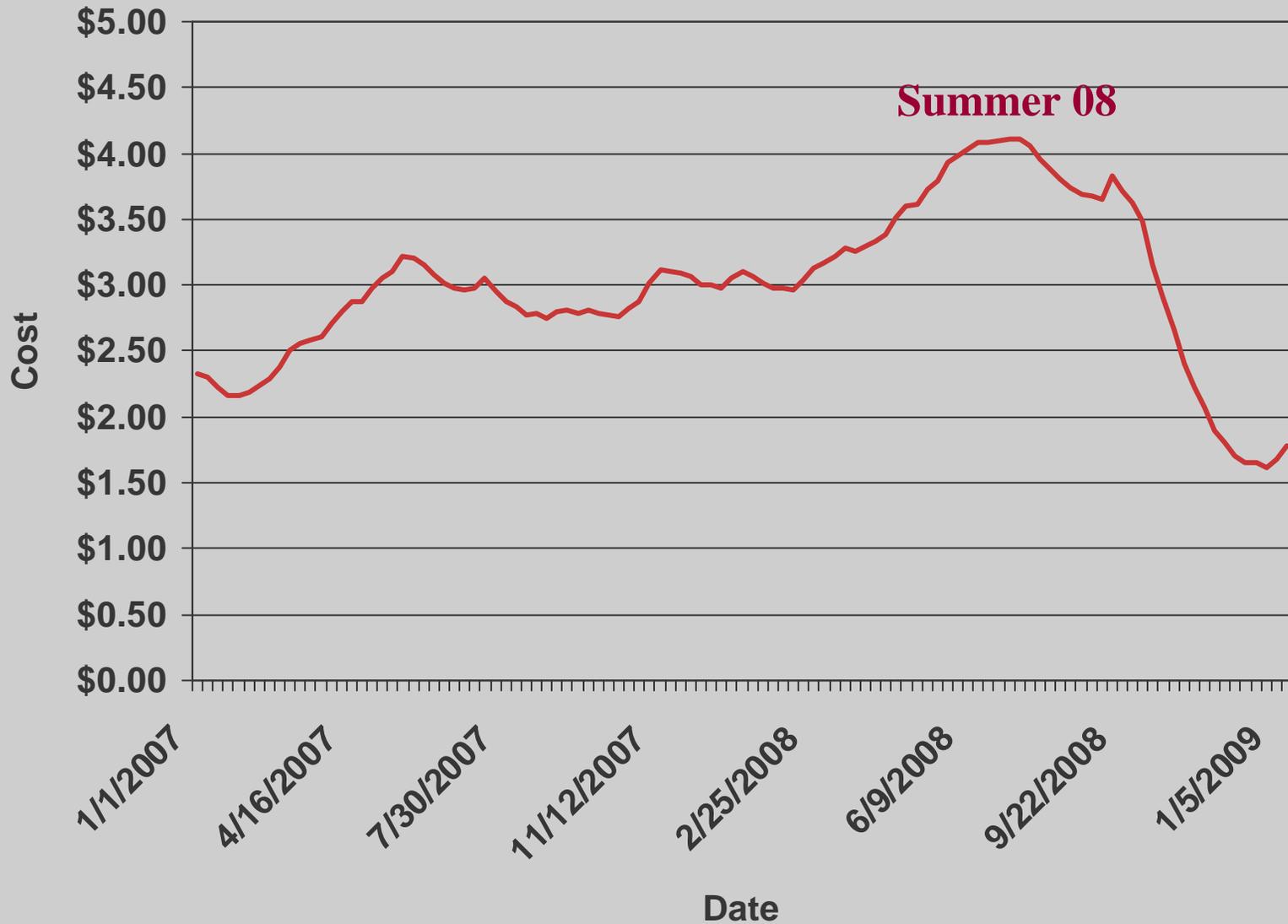


*Marketvector.com*

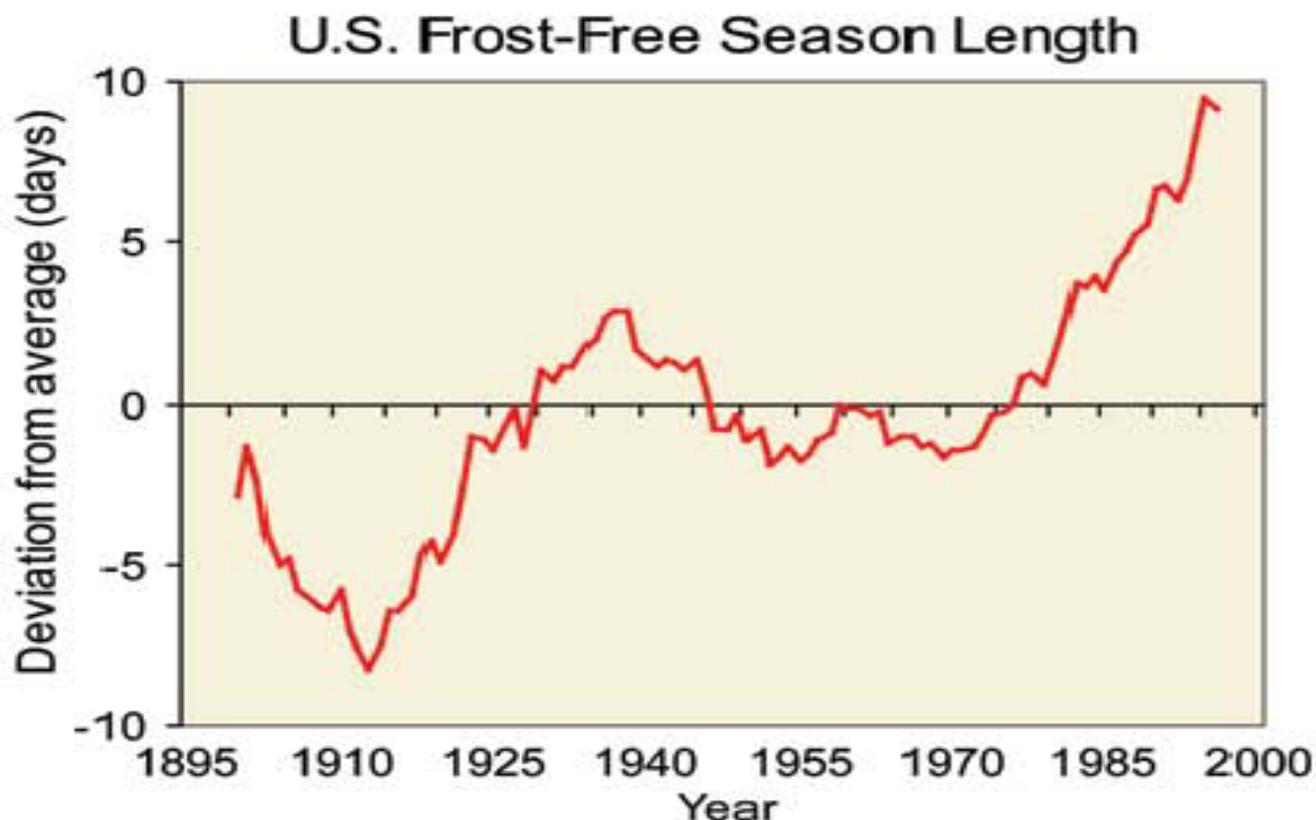
## US Consumer Price Index---Past Present and Future



# Average Price of Gasoline



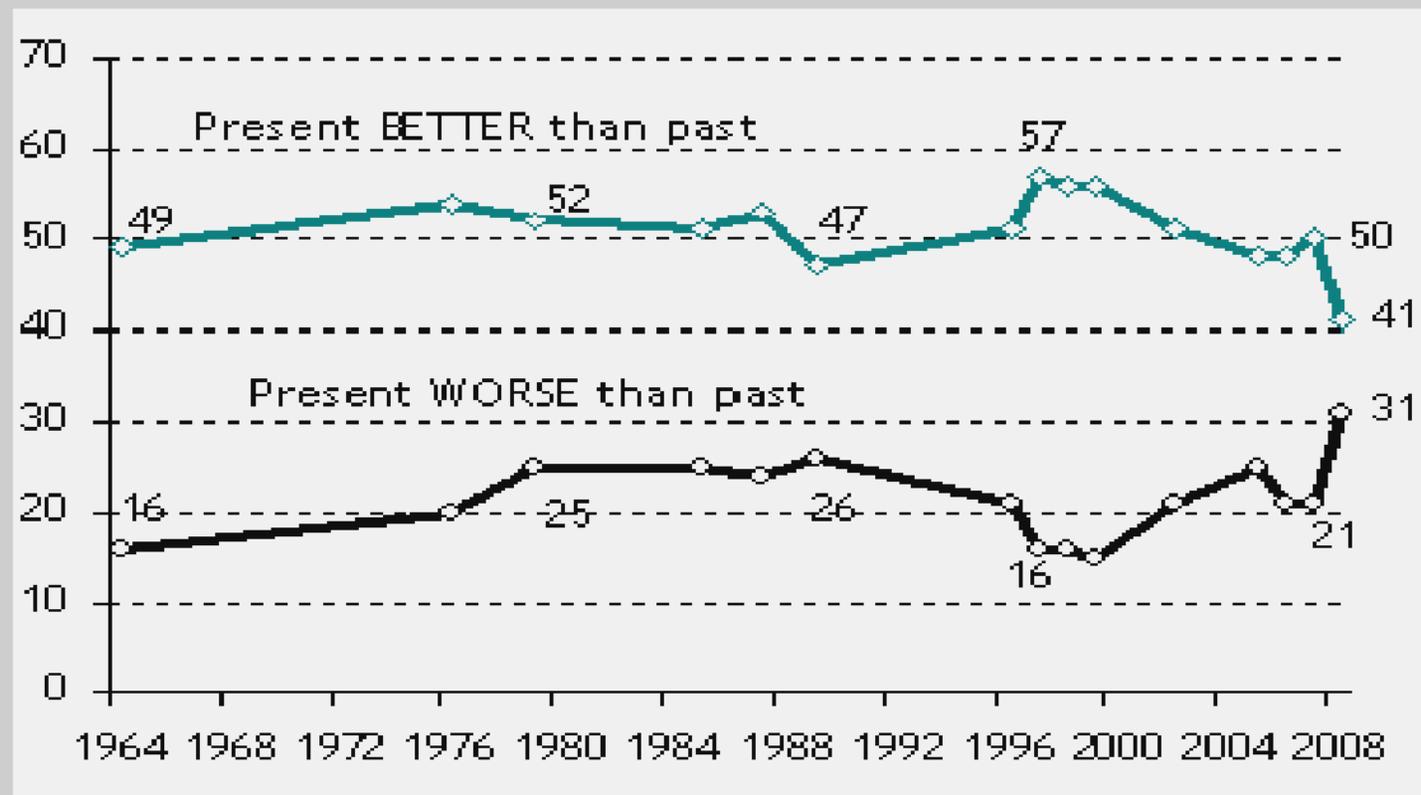
# Frost-Free Days Are Increasing



**Figure 2.4** Change in the length of the frost-free season averaged over the United States (from Kunkel *et al.*, 2003). The frost-free season is at least ten days longer on average than the long-term average.

## Are You Better Off Now Than You Were Five Years Ago? The Trend Since 1964.

Percentage rating...



Note: Based on ratings of your life *today* compared with your life *five years ago*. "Same" responses not shown.

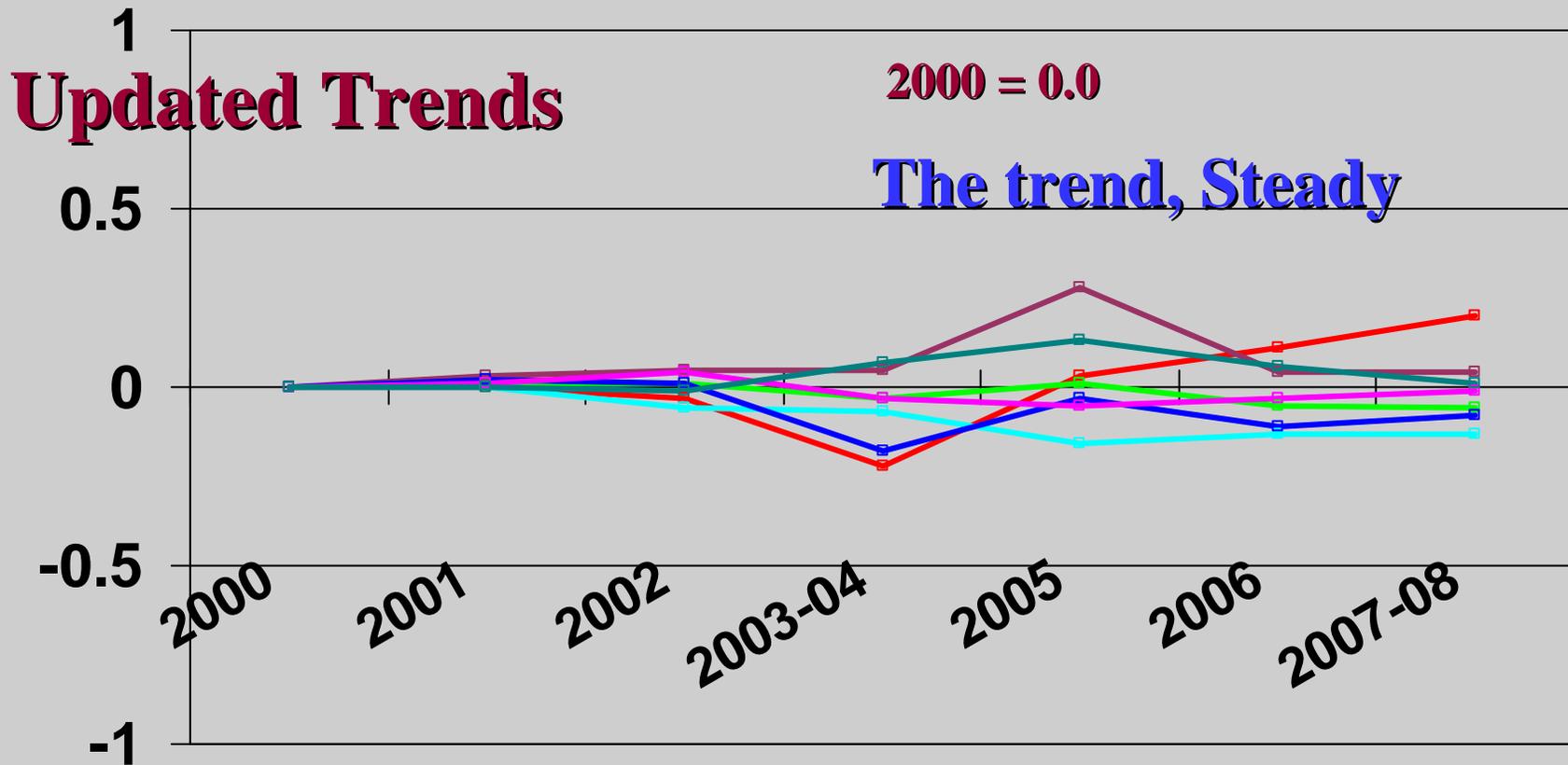
Source: Surveys from 1964 to 1985 by Gallup.

PewResearchCenter

# Updating the trends

- **2000 to 2007 trends in recreation participation were mixed across activities**
- **Net effect was increases in both number of people and days of participation**
- **NSRE runs continuously and provided participation data throughout 2008**
- **Has the trend changed in response to gas prices, the economy, other changes during 2008?**

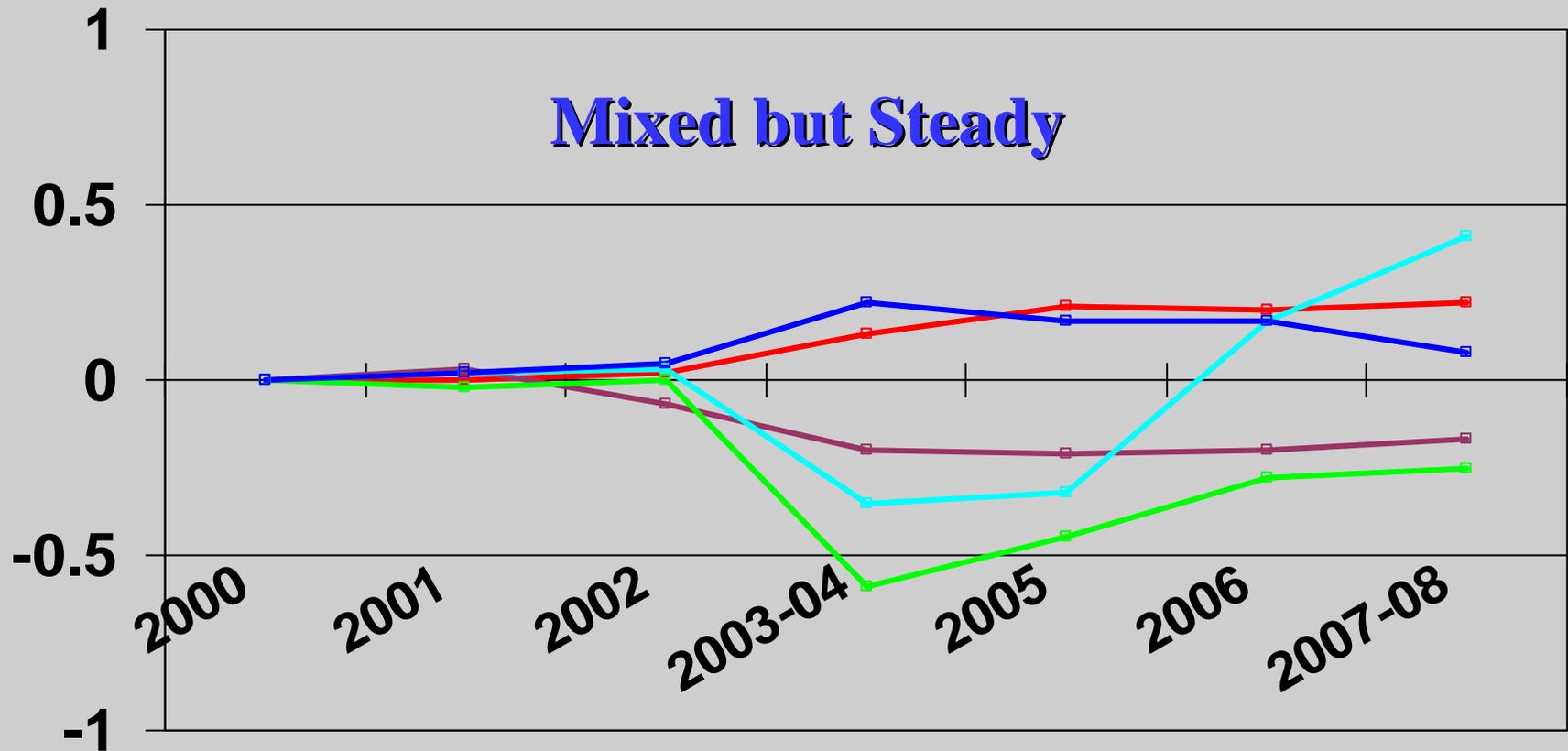
# Total annual recreation activity days, moving 3-year averages



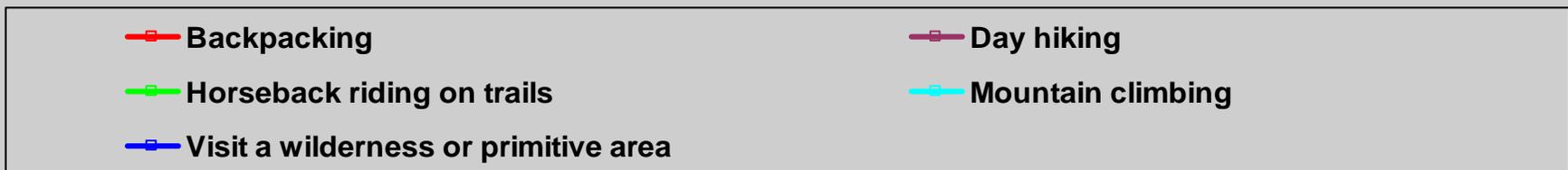
## Hunting and Fishing



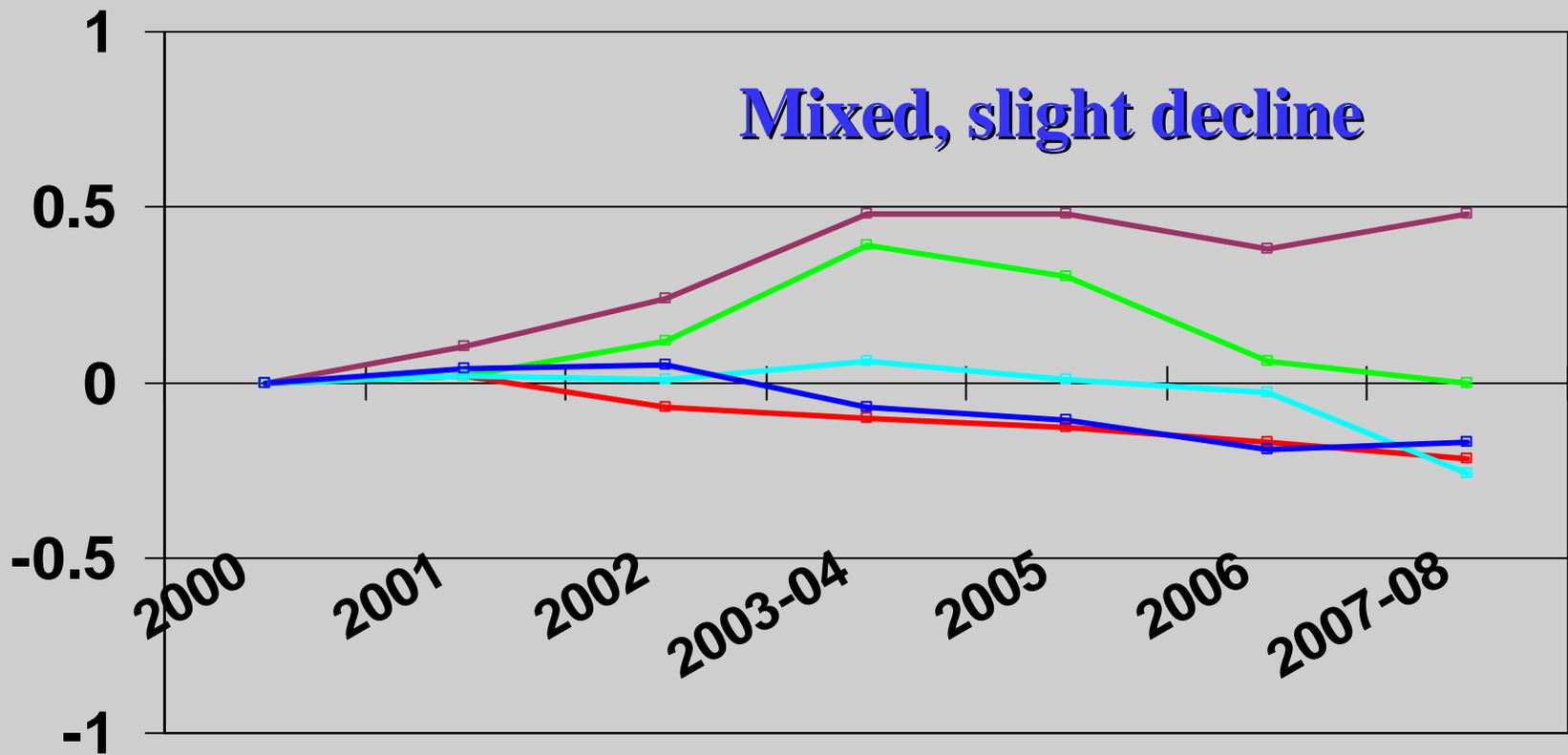
# Total annual recreation activity days, moving 3-year averages



## Backcountry Activities



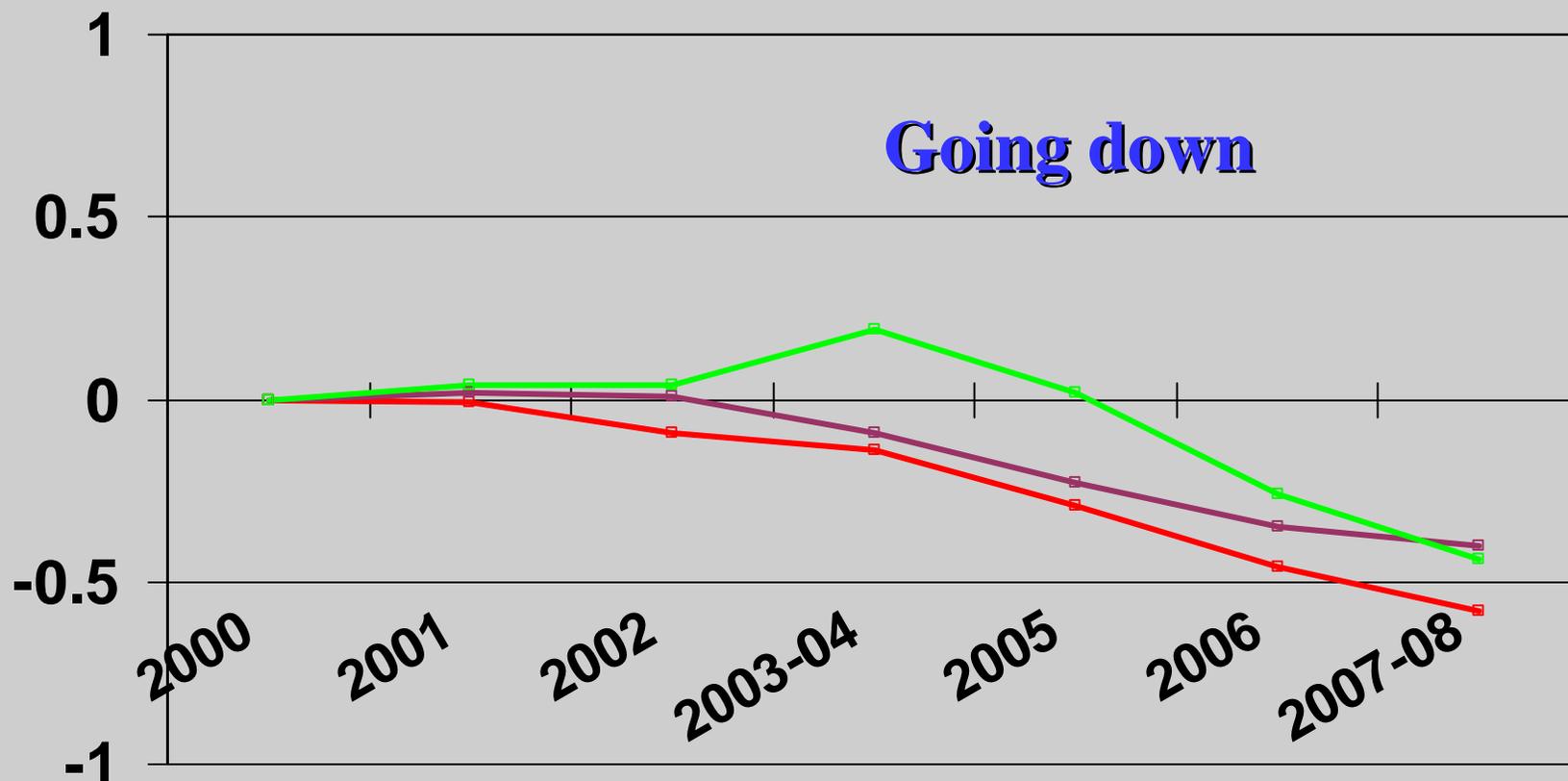
# Total annual recreation activity days, moving 3-year averages



## Non-Motor Boating Activities



## Total annual recreation activity days, moving 3-year averages



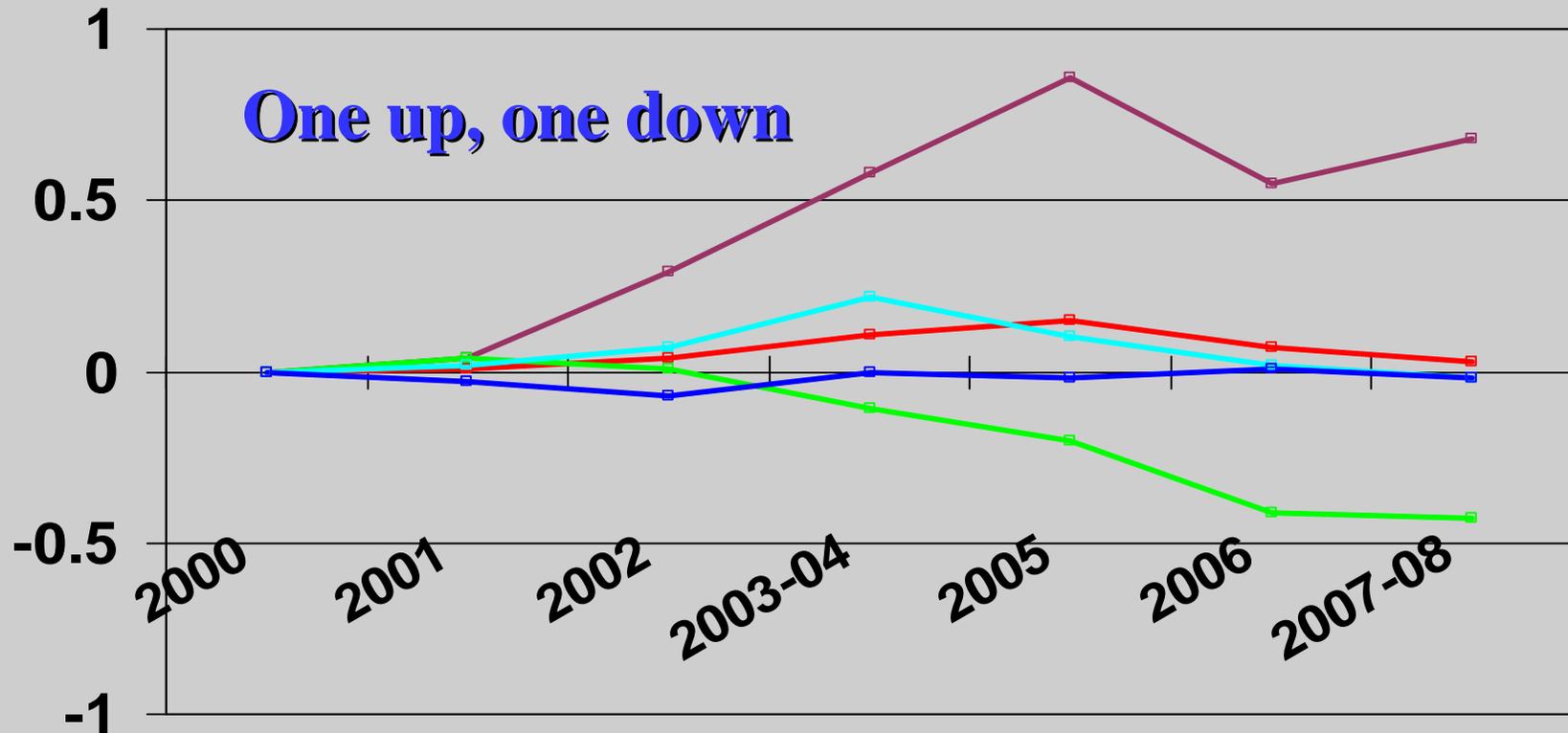
Going down

## Snow Skiing and Boarding

— Cross country skiing      — Downhill skiing      — Snowboarding

NSRE – National Survey on Recreation and the Environment

## Total annual recreation activity days, moving 3-year averages

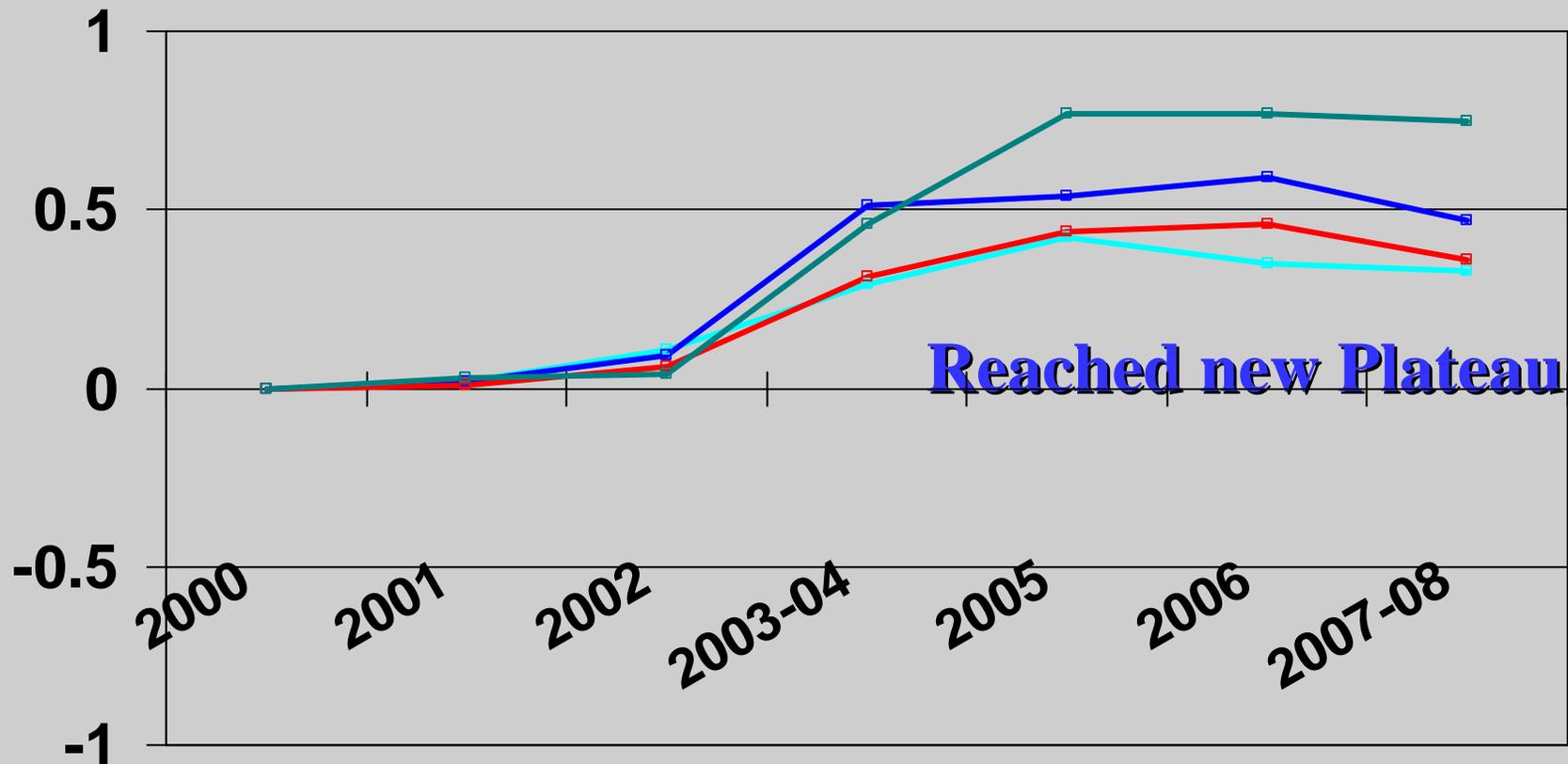


### Motorized Activities



NSRE – National Survey on Recreation and the Environment

# Total annual recreation activity days, moving 3-year averages

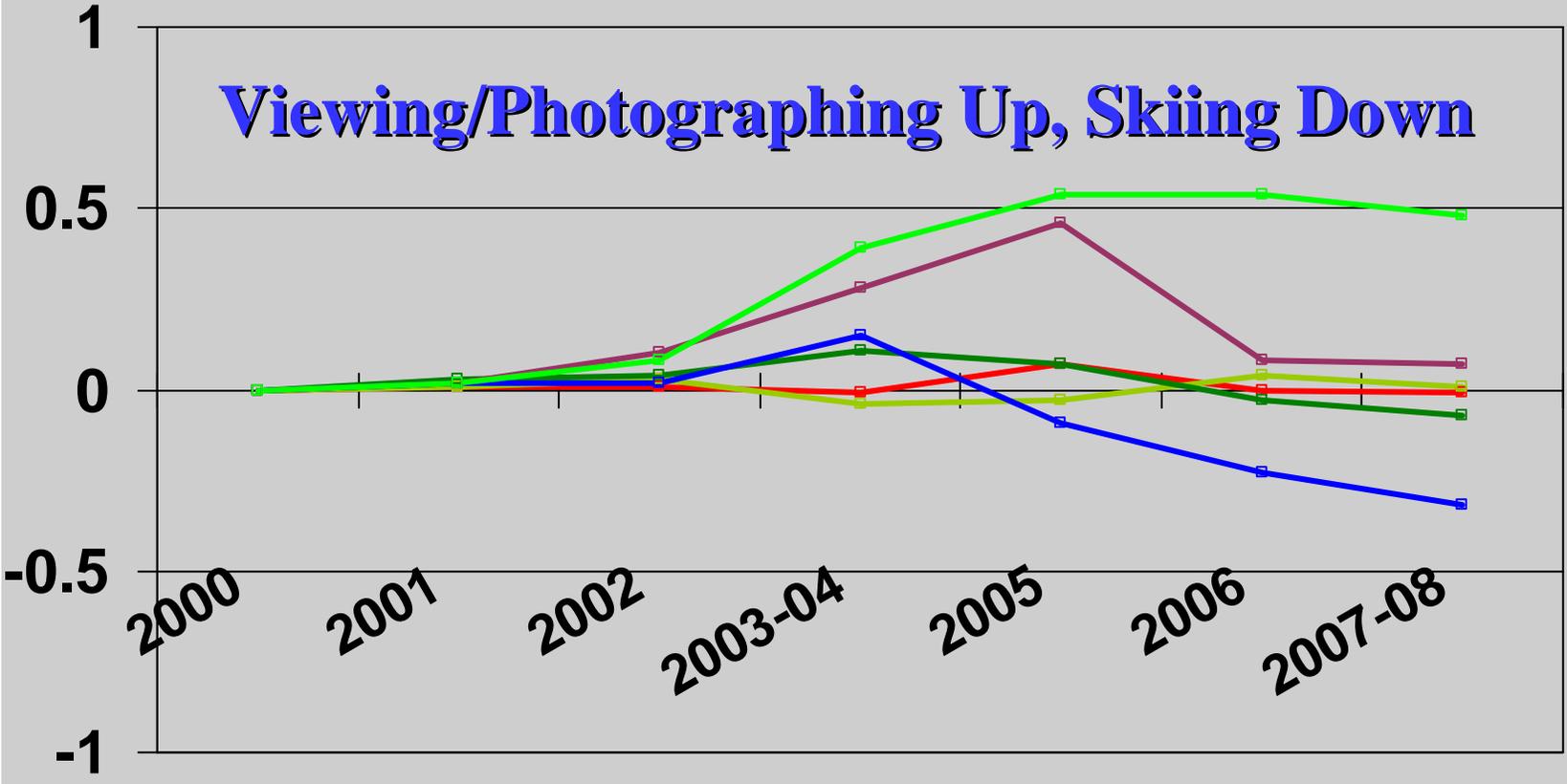


## Viewing/Photographing Nature

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

NSRE – National Survey on Recreation and the Environment

**Total annual recreation activity days, moving 3-year averages**



**Indexing for Groupings of Activities**



# Some additional interesting stuff, NSRE

Percent who visited selected outdoor places over last 12 months for their favorite activity (n=982)

Outdoor place	Percent
Own yard or other places in neighborhood	57.2
Places w/in a 15 min walk but outside neighborhood	32.7
Places more than 15 min walk but w/in 30 min ride	52.0
Places more than 30 min ride by car	66.6

Miles to the outdoor place more than a 30-minute ride from your residence where you go most often (n=749)

# miles to outdoor places	Percent
1-10	6.4
11-25	10.0
26-50	27.6

51-100	20.5
101-200	14.3
201-400	12.0
401-600	2.6
>600	6.5

1/3

# Some more interesting stuff from NSRE

When considering rising gasoline and transportation prices, percent who said they took fewer, about the same number, or more trips for their favorite activity compared with 12 months ago (n=982)

Percent who cited selected reasons for taking **fewer trips** for their favorite activity compared to a year ago (n=431)

**Over  
1/2**

Trips taken compared to last year	Percent
Fewer	44.5
About the same	43.2
More	8.6
Refused	2.0
Don't know	1.7
	100.0

Reason for taking fewer trips	Percent
Reduced number of trips anywhere	52.9
Found places closer to home	41.4
Found other outdoor activities to do	46.2
Spend more time indoors	55.6
Other reasons why you are now taking fewer trips	73.9

# **Do we know what the trend is, or will be?**

**The future is uncertain.**

- **Some dramatic long-term changes are underway**

- **Population**

- **Migration**

- **Climate change**

- **Technology**

- **Land development**

- **Culture**

# Fed downgrades economic forecast for this year

By JEANNINE AVERSA – 4 days ago

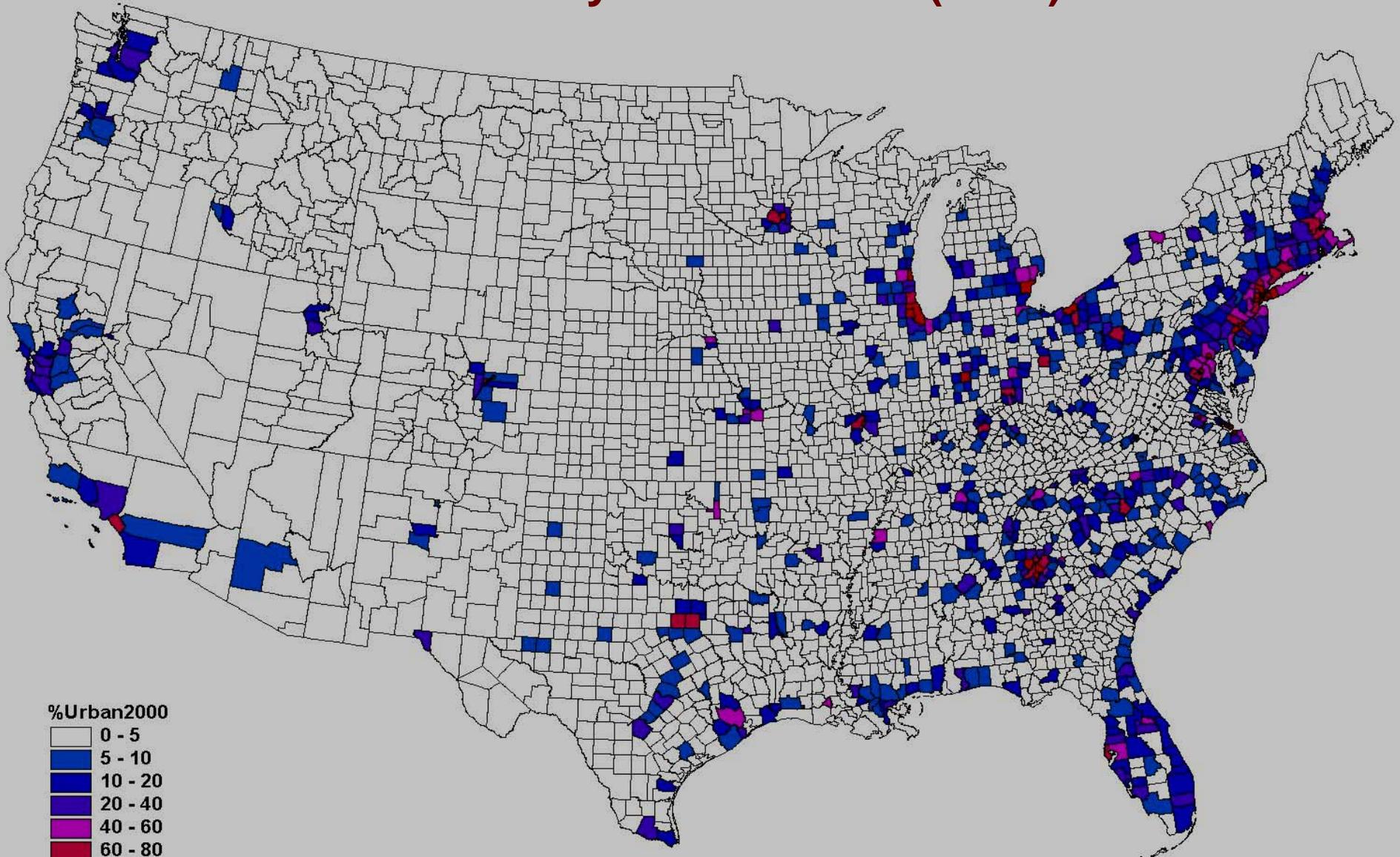
WASHINGTON (AP) — The Federal Reserve on Wednesday sharply downgraded its projections for the country's economic performance this year, predicting the **economy will actually shrink and unemployment will rise higher.**

Under the new projections, the **unemployment** rate will rise to between **8.5 and 8.8** percent this year. The old forecasts, issued in mid-November, predicted the jobless rate would rise to between 7.1 and 7.6 percent.

The Fed also believes the **economy will contract** this year between 0.5 and 1.3 percent. The old forecast said the economy could shrink by 0.2 percent or expand by 1.1 percent.



# Percent of County that is Urban (2000)

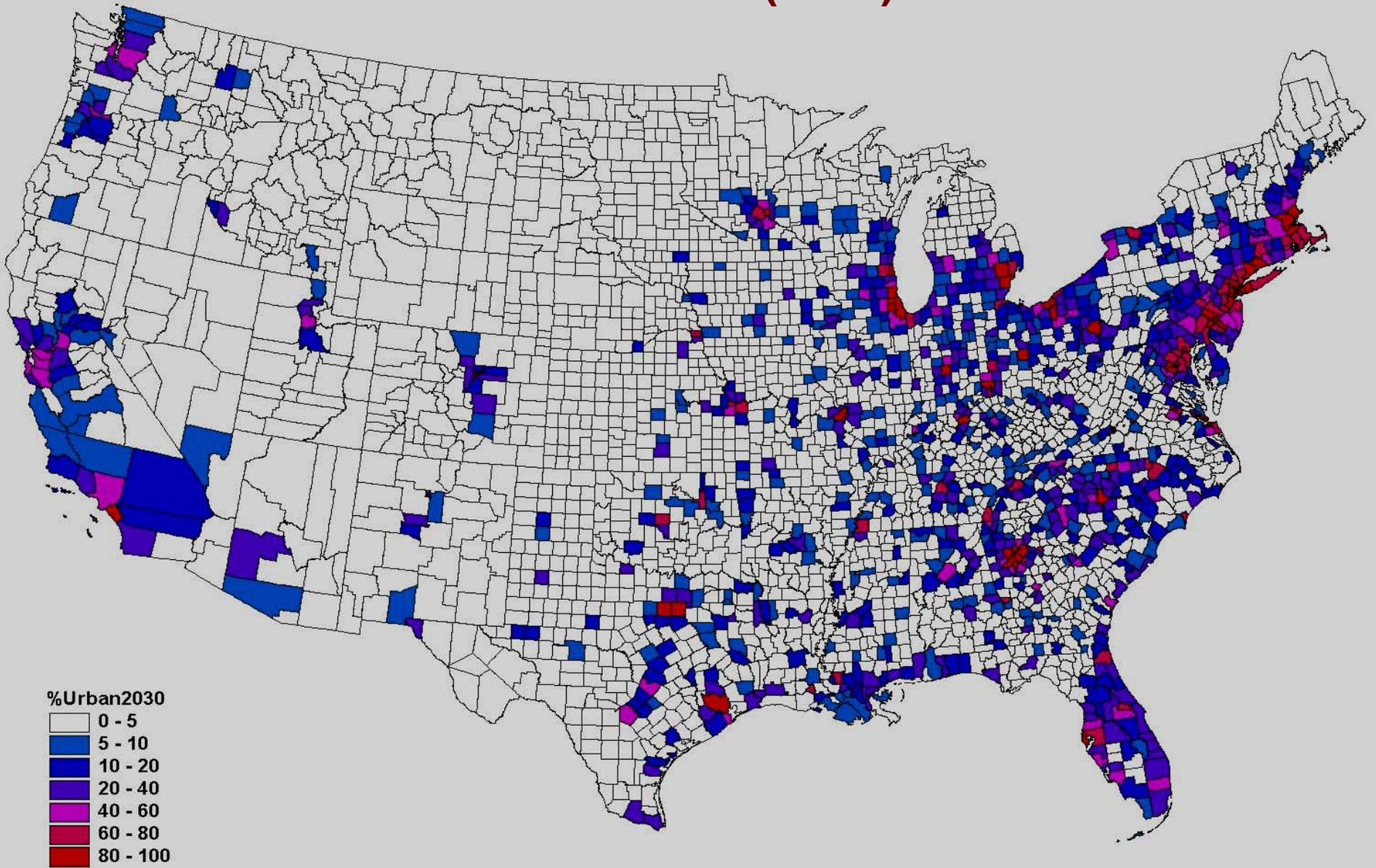


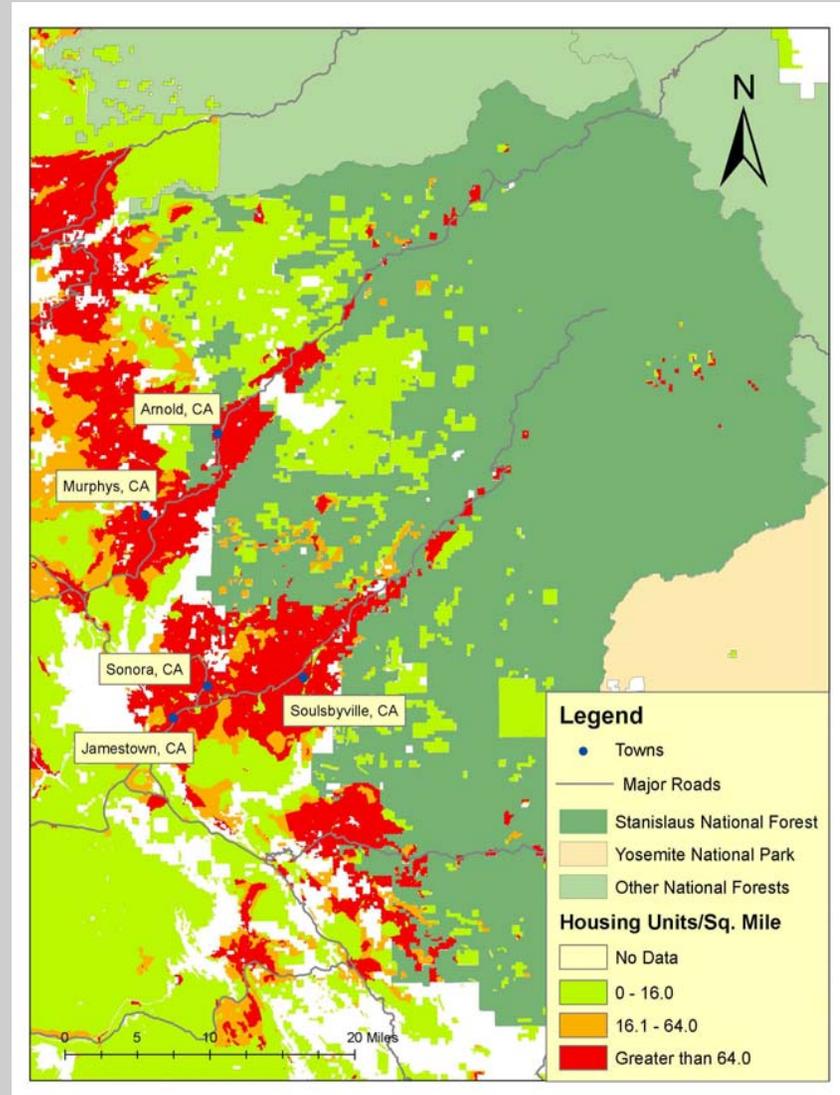
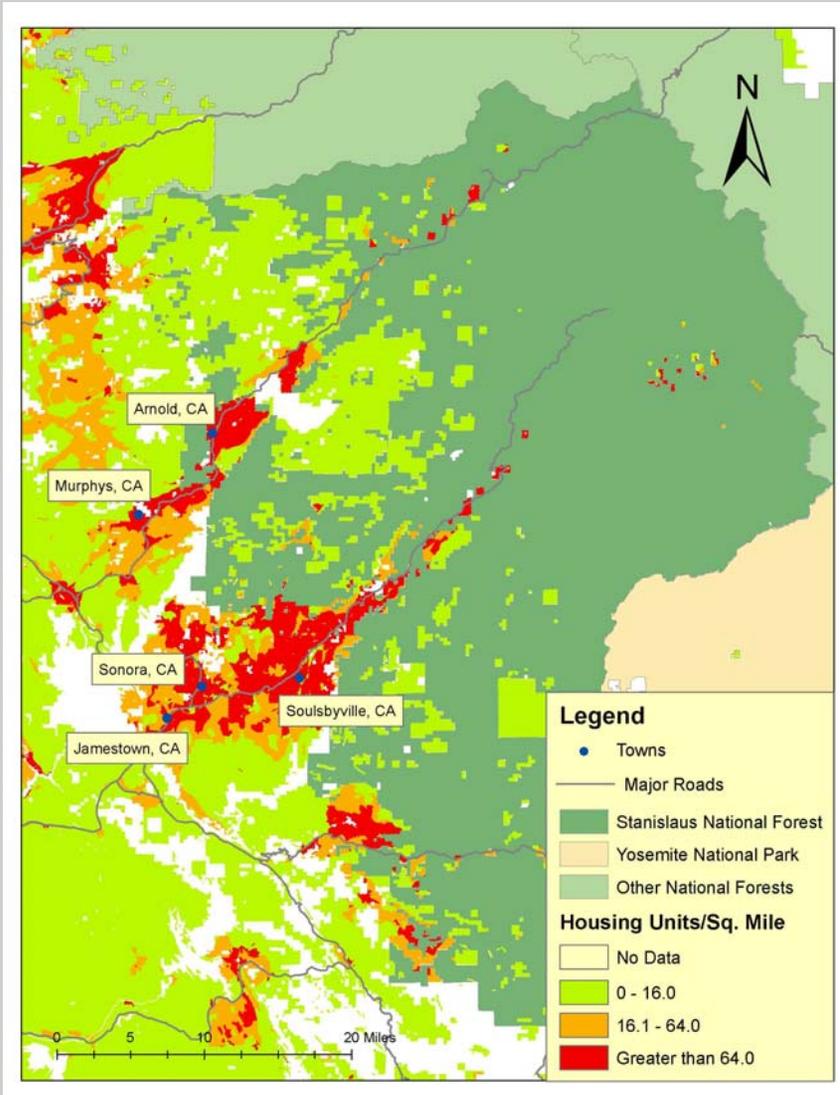
**%Urban2000**  
0 - 5  
5 - 10  
10 - 20  
20 - 40  
40 - 60  
60 - 80  
80 - 100

**Urban = 500 persons per square mile**



# Percent Urban (2030)





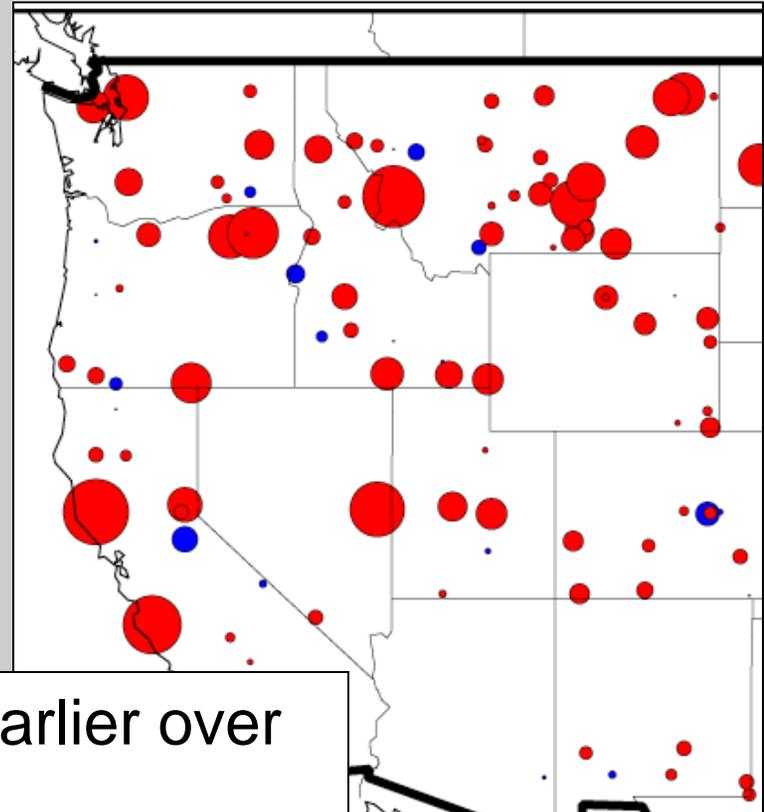
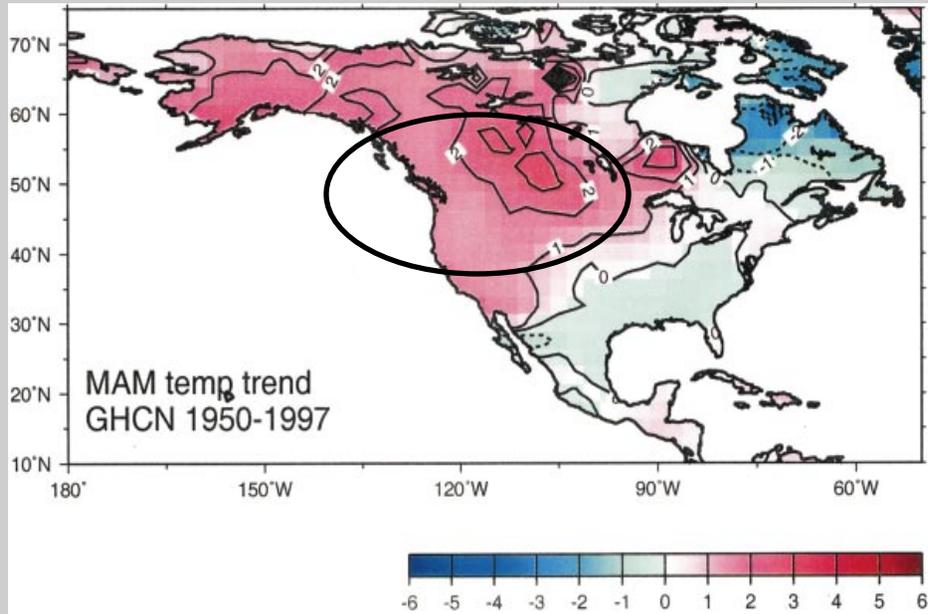
**Housing unit density around the Stanislaus National Forest, Year 2000 and 2030. Housing density data source: D. Theobald, 2005**

Climate: mean and variability of weather— temperature & precipitation— over a period of time in a particular geographic region

***Observed changes in US over past 100 years***

- Temperature
  - Annual vs. seasonal
  - Mean, max., min., range
- Precipitation
  - Annual vs. seasonal
  - Form (snow vs. rain)
  - Intensity
- Hydrology
- Sea level rise
- Ecological impacts
  - Altered disturbance regimes
  - Altered species distributions
  - Altered phenologies

# Earlier Greenup of Vegetation

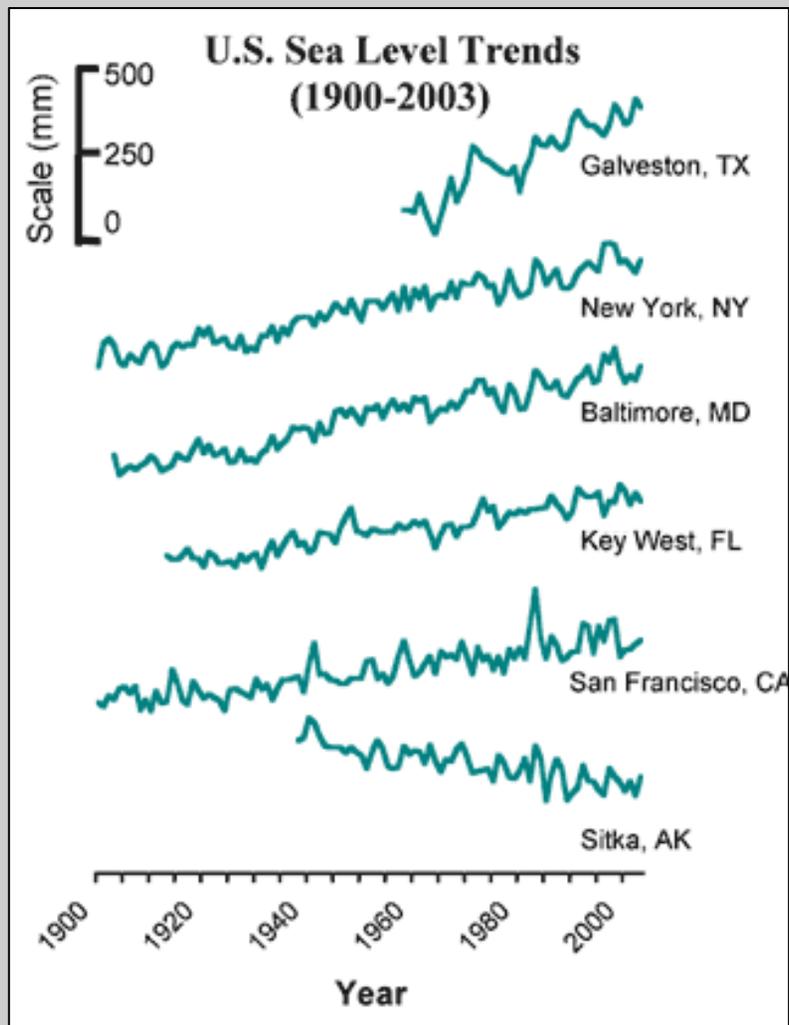


- First-bloom on lilacs, 7.5 days earlier over 1957-94
- First bloom on honeysuckle, 10 days earlier over 27 years
- Correlated with warming March-April-May temperatures

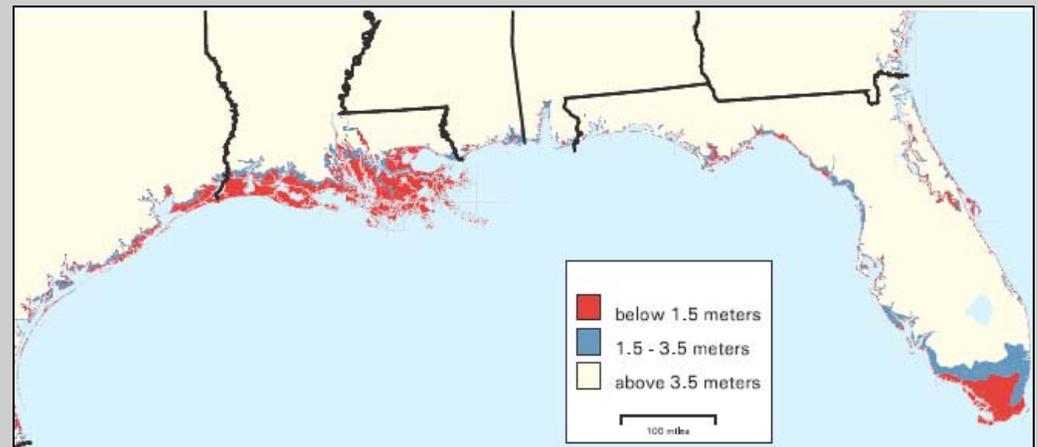


Cayan et al., 2001

# Sea Levels Are Rising Along Most US Coasts



## Gulf Coast lands vulnerable to sea level rise



Source: [www.epa.gov/climatechange/effects/coastal/slmap](http://www.epa.gov/climatechange/effects/coastal/slmap)

Source: [www.epa.gov/climatechange/science/recentstlc](http://www.epa.gov/climatechange/science/recentstlc)

# Altered Species Distributions

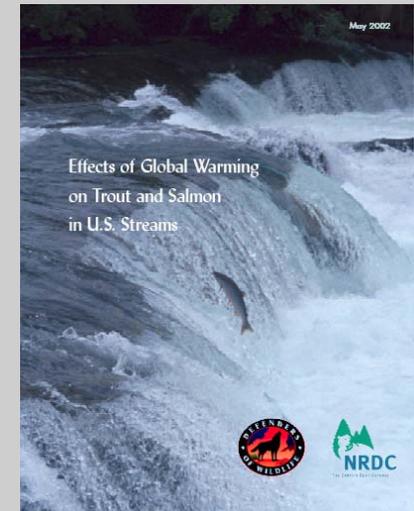
90% decline in pop.  
of Sooty Shearwater  
(1987 – 1994) (Veit et  
al. 1997)



CA shoreline  
species  
shifting  
northwards  
(Barry et al.  
1995)



Habitat  
loss for  
cold-water  
fishes  
(NRDC &  
Defenders of  
Wildlife  
2002)



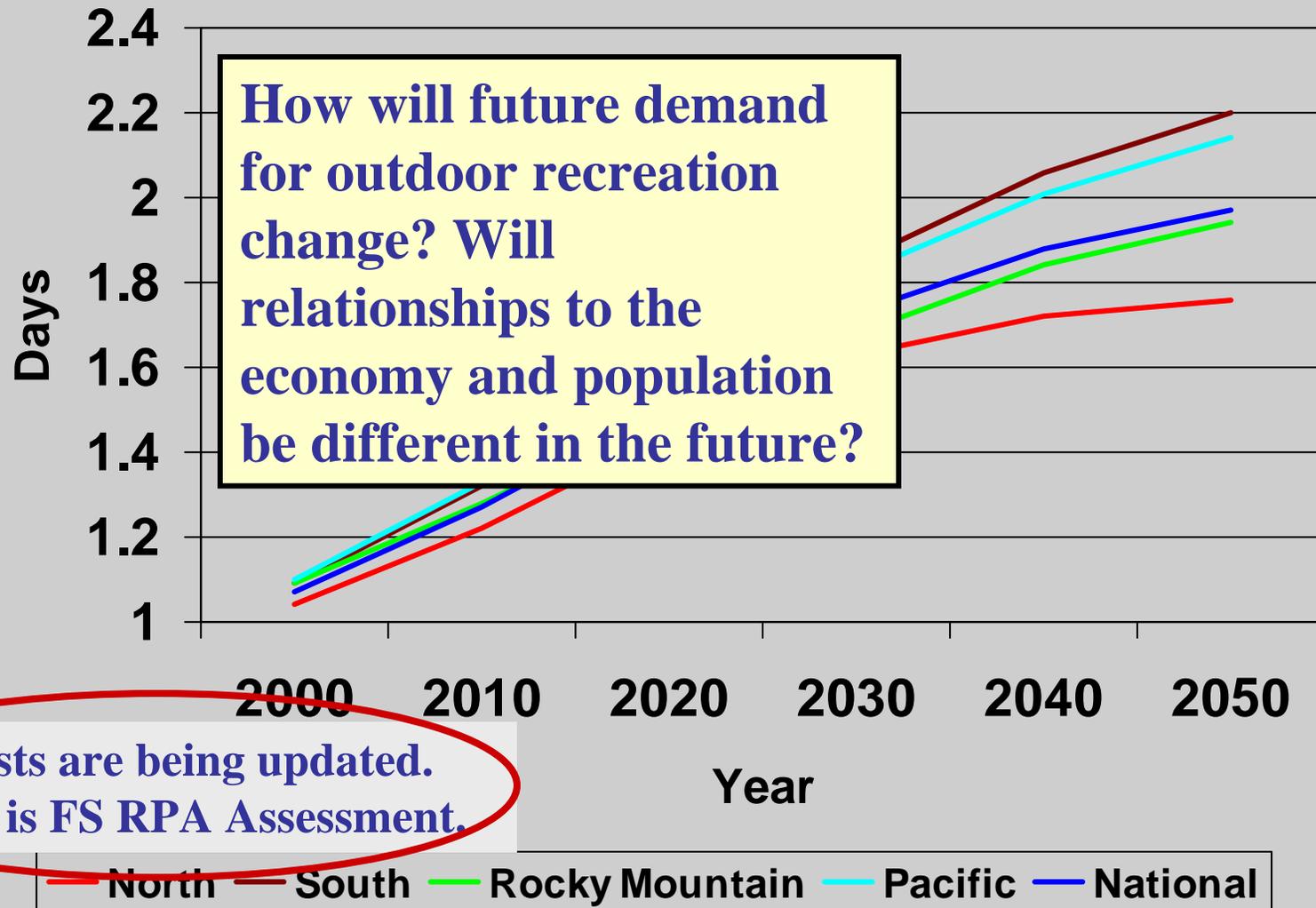
Edith's checkerspot butterfly  
shifted range northward  
(Parmesan 1996, McLaughlin et al.  
2002)



Polar bears  
increasingly using  
coastal areas as sea  
ice melts and sea  
freezes later  
(Gleason et al. 2006,  
Schliebe et al. 2006)



## Projected Indexes of Change in Days of Participation for Nonconsumptive Wildlife Activities, by Region & Decade 1995-2050



Forecasts are being updated.  
Source is FS RPA Assessment.

Note: Baseline estimate of days in 1995 for National (7057.1), North (3319.3), South (2322.1), Rocky Mountain (578.9), and Pacific (838.5).

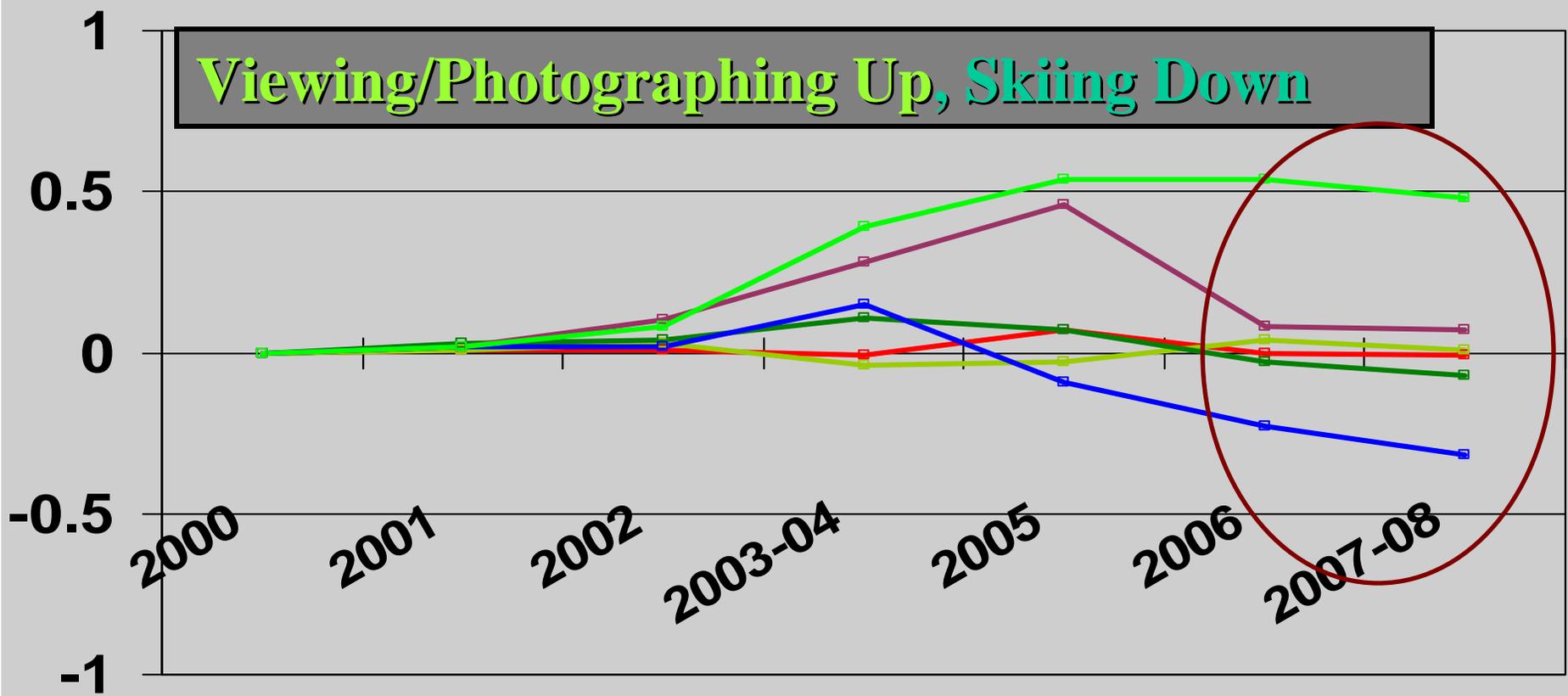
## Summary of Trends

- **Recreation activities widely popular in the 1950s through the 1980s are still popular**
- **However, there have been many profound changes over the last 50 years that affect what people choose to do (or not do) for their outdoor recreation**
- **The popularity of outdoor recreation continued to grow up to 2000, and change, e.g., popularity of birding and motorized forms of activity.**
- **By 2000, interest in observing and studying/learning about nature emerging strong**
- **The most noticeable change by 2000 was growth in the proportion of the total population that participated in outdoor activities.**

## Summary of Trends

- Outdoor recreation generally, and **nature-based recreation especially**, were still growing through 2007.
- The mix of Americans' activities, however, was **changing** over time, noticeably (e.g., viewing/photographing nature and motorized off-highway riding growing)
- Some traditional activities were declining, like picnicking, visiting historic sites, canoeing, rafting
- **BUT**, there have been enormous changes since 2007---gas prices, finance industry, recession, ....., and they continue
- Gas prices did affect trips and activity selection

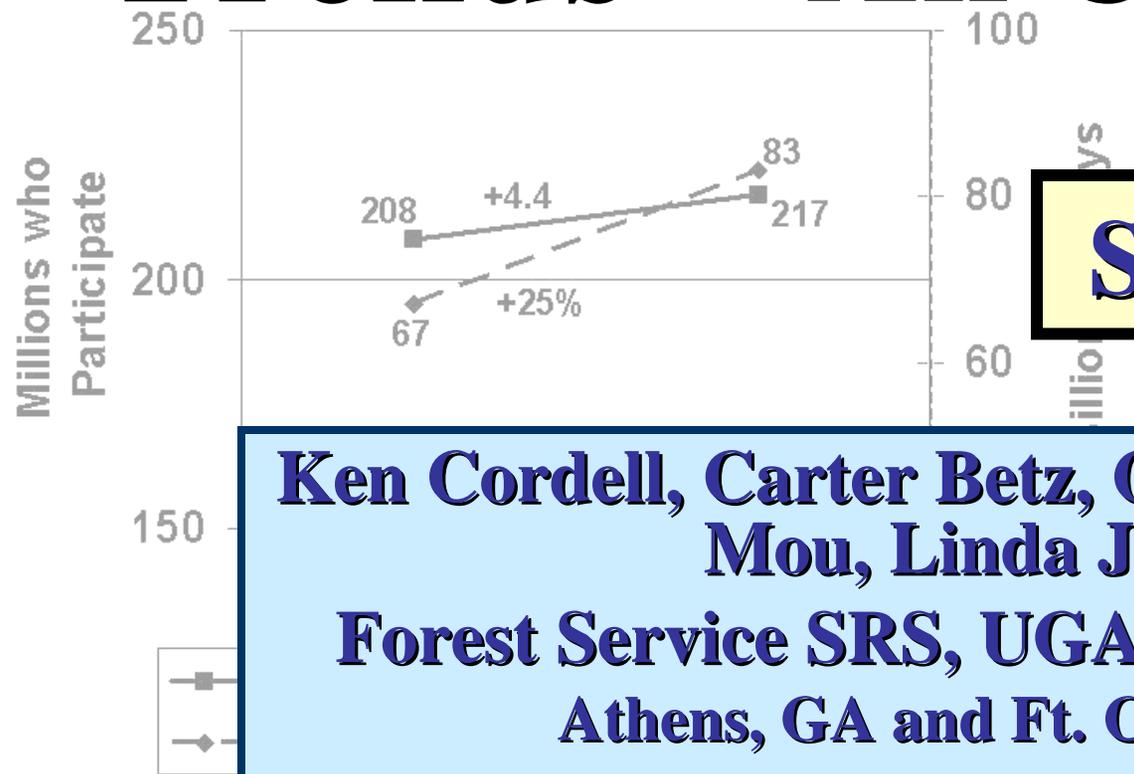
# Total annual recreation activity days, moving 3-year averages



## Indexing for Groupings of Activities

- Hunting /Fishing
- Backcountry Activities
- Non-Motor Boating
- Snow Skiing
- Motorized Activities
- Viewing Activities

# Recreation Demand Trends---An Update



**SERR 2009**

**Ken Cordell, Carter Betz, Gary Green, Shela Mou, Linda Joyce**  
**Forest Service SRS, UGA, and FS RMRS**  
**Athens, GA and Ft. Collins, CO**

February 23, 2009

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