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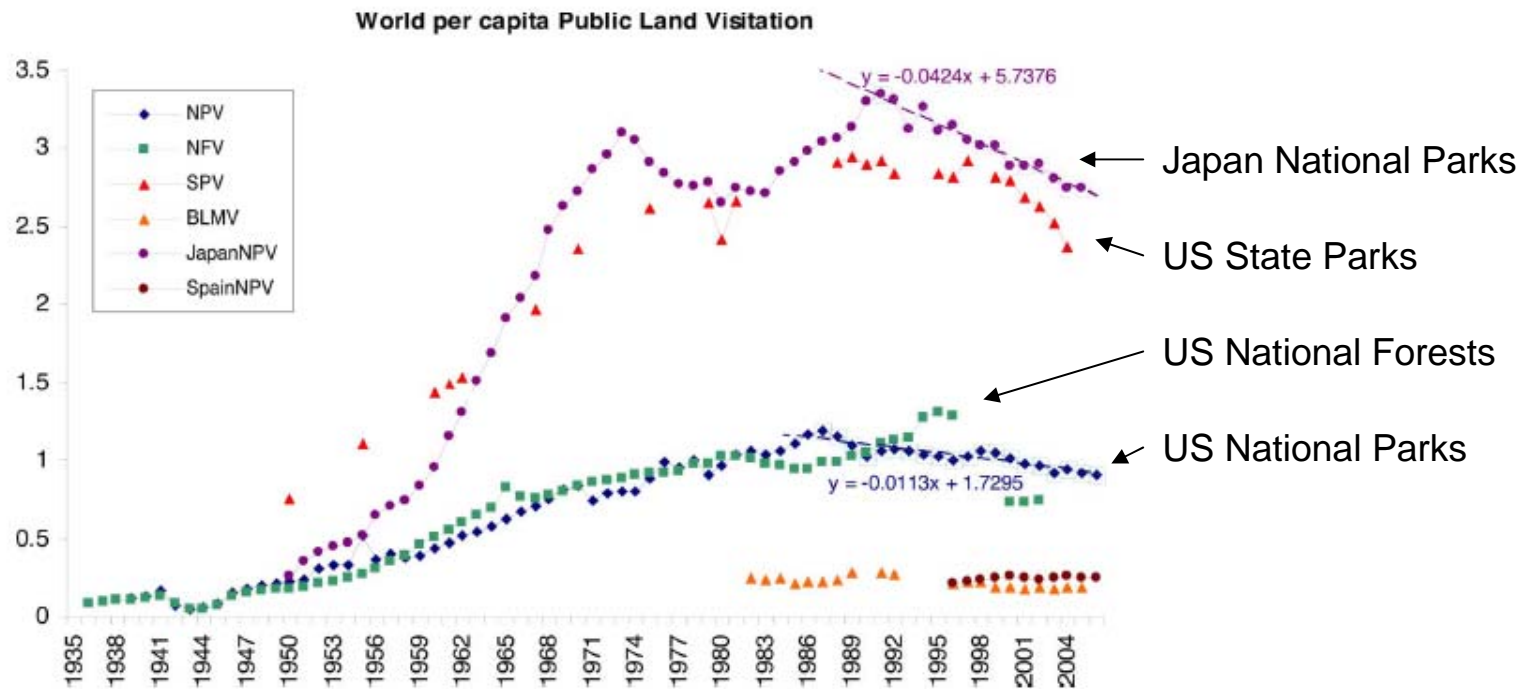
# Good Science Is Hard to Find (and so are good policies)

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Brooke Wilkerson

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# Last slide

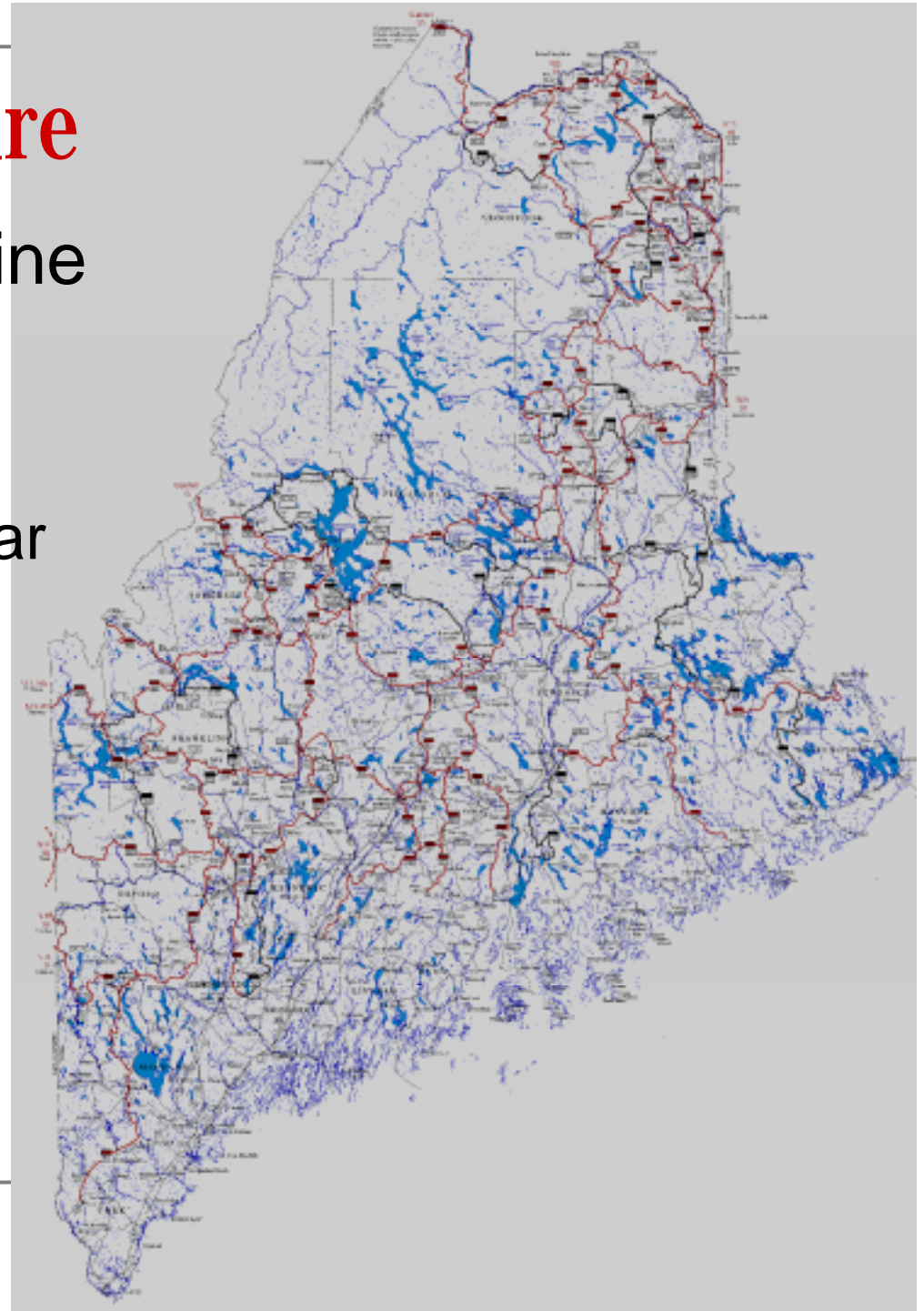
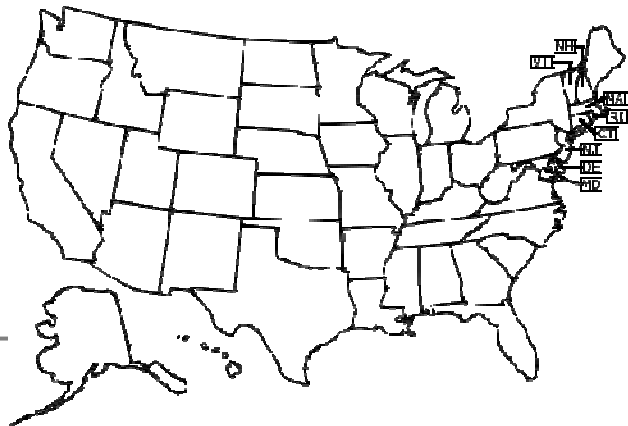


**Fig. 1.** Annual *per capita* visitation to the various U.S. and international public lands in this study. Included were U.S. National Parks (variable NPV, range of time series 1939–2006,  $n = 68$ ), U.S. State Parks (SPV, 1950–2003,  $n = 24$ ), U.S. National Forests (NFV, 1939–2002,  $n = 61$ ), U.S. Bureau of Land Management sites (BLMV, 1982–2005,  $n = 20$ ), Japanese National Parks (JapanNPV, 1950–2005,  $n = 56$ ), and Spanish National Parks (SpainNPV, 1996–2006,  $n = 11$ ). Linear regressions for declines from identifiable peaks in NPV (1987) and JapanNPV (1991) are represented by lines and equations.



# Economy & Culture

- Snowmobiling in Maine
  - 21,700 km of trails
  - 91,000 registrations
  - 241,000,000 Euro/year
  - “Pay your own way”
  - “Traditional use”
  - Family activity



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# Snowmobiles & Distance

- Cover over 200 km in a day
- Entering habitat that was inaccessible
  - Direct harassment: energy costs
  - Indirect harassment: avoiding areas



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# Snowmobiles & Noise

- Audible at several km
  - Environmental stressor
  - Indicator of predator
  - Impairs ability to communicate or hear predators
- How do animals react?
  - Some animals can habituate to noise
  - Others avoid snowmobile areas
  - Example: white-tailed deer
    - Change in home range size and daily movement
    - No reaction
    - Following noise to find vegetation



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# Snowmobile Trails: Corridors

- Packed snow reduces energy costs of movement
- Benefits: deer, moose, predators, and other large animals
- BUT: animals may move out of historic winter range



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# Snowmobile Trails: Barriers

- Decreased snow insulation
- Increased snow density
- Costs: small mammals such as mice, voles, shrews
  - Decrease of 3°C increases the metabolic demand of a 20 gram short-tailed shrew by 25 calories/hour
  - Difficult to burrow, build tunnels
  - Trails often follow bodies of water



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# Skiing

- Skiers are quieter
  - But can sound more like predators
  - And look more like predators
- Ski trails as barriers?
  - Skis have a greater footload (weight/surface area) than snowmobiles
  - May do more damage to the subnivian layer



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# Skiing vs. Snowmobiling: Harassment

- Studies of heart rates, flight distances and stress hormones
  - White-tailed and mule deer, flush further, longer from skiers
  - Reindeer
    - skiers could get closer (370 m vs 534 m)
    - total flight distance was larger (756 m vs 570 m) than for snowmobiles
  - Animals can be disturbed more by people on skis than on snowmobiles

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# Recreation impacts on humans

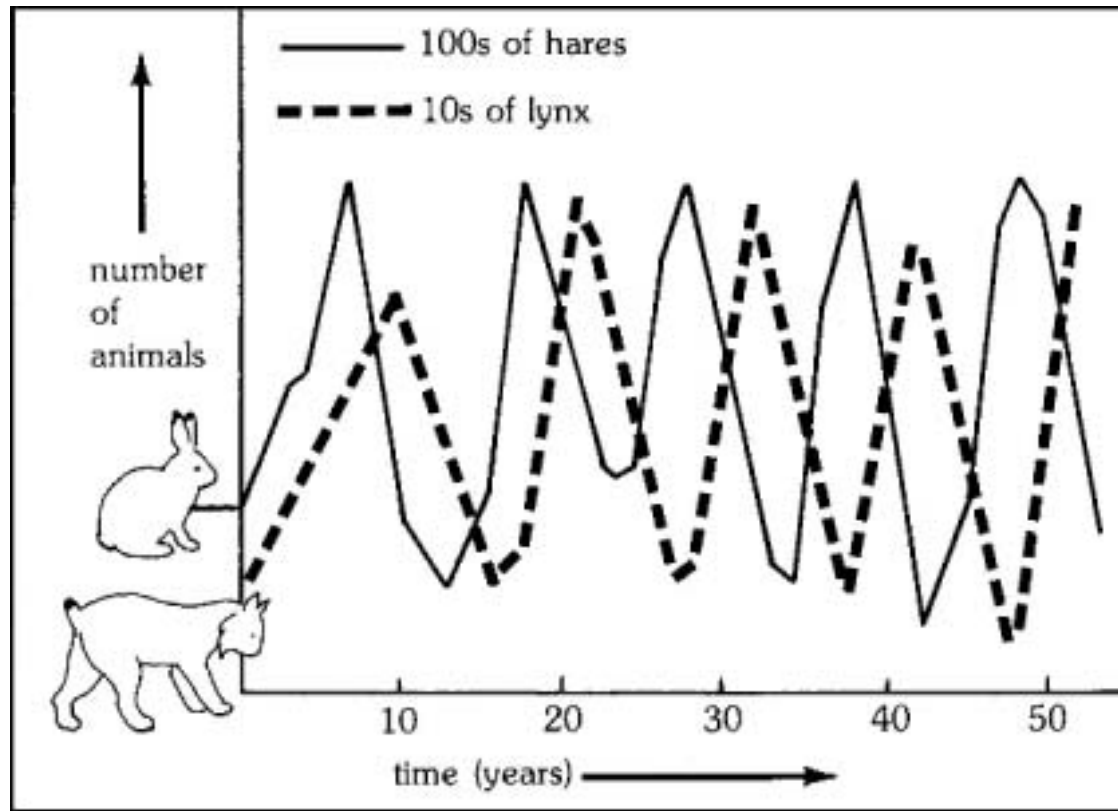
- Ecological impacts are serious
  - But animals may not care if we are skiers or snowmobilers
- Who is impacting whom?
- Perceived impact vs. actual impact

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## To review...

- Snowmobiling is a large economic driver
  - Snowmobiling is culturally important
  - Snowmobiles impact wildlife
    - So do other forms of recreation
  - We impact each other
-

# Lynx, Hare, and Coyote



Lynx - hare cycle, from an illustration by Tom Parker, courtesy of Cooperative Extension, New York.



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# The Conflict

- Lynx = endangered species, special protections
  - Areas where lynx live must be managed for lynx habitat
  - Live in areas valued for recreation and timber, important for culture and economy
-

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# You are the scientist....

- What is an impact?
  - How would you measure it?
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## Two papers...

- **Bunnell**, KD, Flinders, JT, Wolfe, ML. 2006. Potential impacts of coyotes and snowmobiles on lynx conservation in the intermountain west. *Wildlife Society Bulletin* 34(3).
  - **Kolbe**, JA, Squires, JR, Pletscher, DH, Ruggiero, LF. 2007. The effect of snowmobile trails on coyote movements within lynx home ranges. *Journal of Wildlife Management* 71(5).
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# Bunnell impact

- Do snowmobile trails facilitate access to potential lynx habitat during periods of deep snow?



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# Bunnell methods

- Counts of animal tracks from helicopters along snowmobile trails
  - Ground-truthing areas along snowmobile trails to assess use
  - Various environmental variables
-

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# Kolbe impact

- Do coyotes compete with lynx for hares?



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# Kolbe methods

- Radio-collared coyotes to track movements
  - Analyzed scat to determine coyote diet
  - Various environmental variables
-

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# Bunnell Results

- “Over 90% of coyote tracks observed in our study areas associated with a snowmobile trail were within 350 m of the trail....Our results suggest that restrictions placed on snowmobiles in lynx conservation areas...because of the potential impacts of coyotes may be appropriate.”
  - Meaning = snowmobile trails are bad for lynx
-

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# Kolbe Results

- “Coyotes...did not forage closer to snowmobile trails than random expectation. The overall influence of snowmobile trails on coyote movements and foraging success during winter appeared to be minimal in our study area.”
  - Meaning = snowmobile trails have no impact on lynx
-

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# You are the policy maker...

- ...what do you do?
    - Lynx have federal protection
    - Recreation is important to your voters
    - And important to the economy
  - And how do you justify your decision?
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# US Fish and Wildlife Service

- "After evaluating Bunnell *et al.* (2006) and Kolbe *et al.* (2007), we determined that the best information available did not indicate that compacted snow routes increase competition from other species to levels that adversely impact lynx populations."

US Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx; Final Rule

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# US Forest Service

- “Results from this study [Kolbe et al. 2007] have:
  - 1) provided the scientific basis for relaxing restrictions on groomed snowmobile trails as part of lynx conservation standards across millions of acres of federal land;
  - 2) increased understanding of coyote winter ecology relative to lynx management; and
  - 3) provided the scientific template for a second study that is replicating the methods in the dry-snow environment of northwestern Wyoming.”

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# Some thoughts

- One study affecting management of millions of hectares of public lands
  - Can results from one location be applied to other locations?
  - How an impact is defined determines the results
  - Are policy makers being selective about results or careful about defining impact?
  - Precautionary principle may make sense scientifically, but....
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# Partners are important

- Restricting recreation is the easy answer, but
    - Recreation is culturally important
    - May lose important allies
    - People care about the places they know
  - May actually have (some of) the same goals
    - Broad support is important for long term success
-

# Sportsmen

for the **WYOMING RANGE**



Mother Nature's bodyguards.

e Newsletter:

GO



Senator Barrasso supports  
The Wyoming Range



**We're Mother Nature's bodyguards.  
And yes, we are heavily armed.**

- Welcome Video
- Home Page
- WHY Defend The WY Range
- The Wyoming Range at Risk
- Spokespersons & Partners
- Sen. Craig Thomas Memorial
- News From The Range

## Wyoming Range Alert!

January 15, 2009

**The Wyoming Range Legacy act passed out of the Senate today by a vote of 73-21!** Both Senator Barrasso and Enzi voted in support of the package. Please contact both of them today and thank them for their vote on behalf of Wyoming 's Sportsmen and Women.

**The range still needs your help.**  
Click here to find out how.....

Why  
Defend  
The Wyoming Range



in memory of  
Senator  
Craig Thomas  
a friend of the WY Range



What  
You Can Do



= Home

SUPPORT DU

CONSERVATION

HUNTING

NEWS

MEMBERS

MULTIMEDIA

EVENTS



ROBERT FENDELIN

## 10 Shooting Tips for Waterfowl

by [Wade Bourne](#)

Making a good shot is one of the great joys in waterfowl hunting. Indeed, shooting is the pinnacle of this sport. Everything else - scouting, building blinds, setting decoys, calling, everything - is a lead-up to that moment when you shoulder your gun and fire. Making a clean kill gives you an immediate sense of pride in a job well done.

So, how do you become a good shot? How can you convert misses into hits? What can you do to improve your accuracy and hold your own with more seasoned shooters in the blind or pit?

Good shooting is a mix of coordination, concentration and confidence. Good shooting is more instinctive than mechanical. It's a skill that is honed through adept coaching and lots of practice, similar to other athletic endeavors.

Here's a list of 10 tips for becoming a better shot on ducks and geese. Put these suggestions into practice, and you'll shoot better and enjoy your hunting more.

**Tip No. 1:** [Make sure your shotgun fits.](#)

**Tip No. 2:** [Practice shooting in the pre-season.](#)

**Tip No. 3:** [Don't get in a hurry.](#)



Wade Bourne, Host of DU TV

+ HUNTING HOME

= MIGRATION MAP

= WATERFOWL ID GALLERY

= RETRIEVER TRAINING

= VIDEO TIPS

= SHOOTING TIPS

= DECOY STRATEGIES

= HUNTING TIPS

= DUCK CALLING

- ▶ Banding Maps
- ▶ Quizzes & Trivia
- ▶ Seasons & Regulations
- ▶ Weather Forecast
- ▶ Recipes
- ▶ Gearing Up
- ▶ Where to Go
- ▶ Bird Flu FAQ

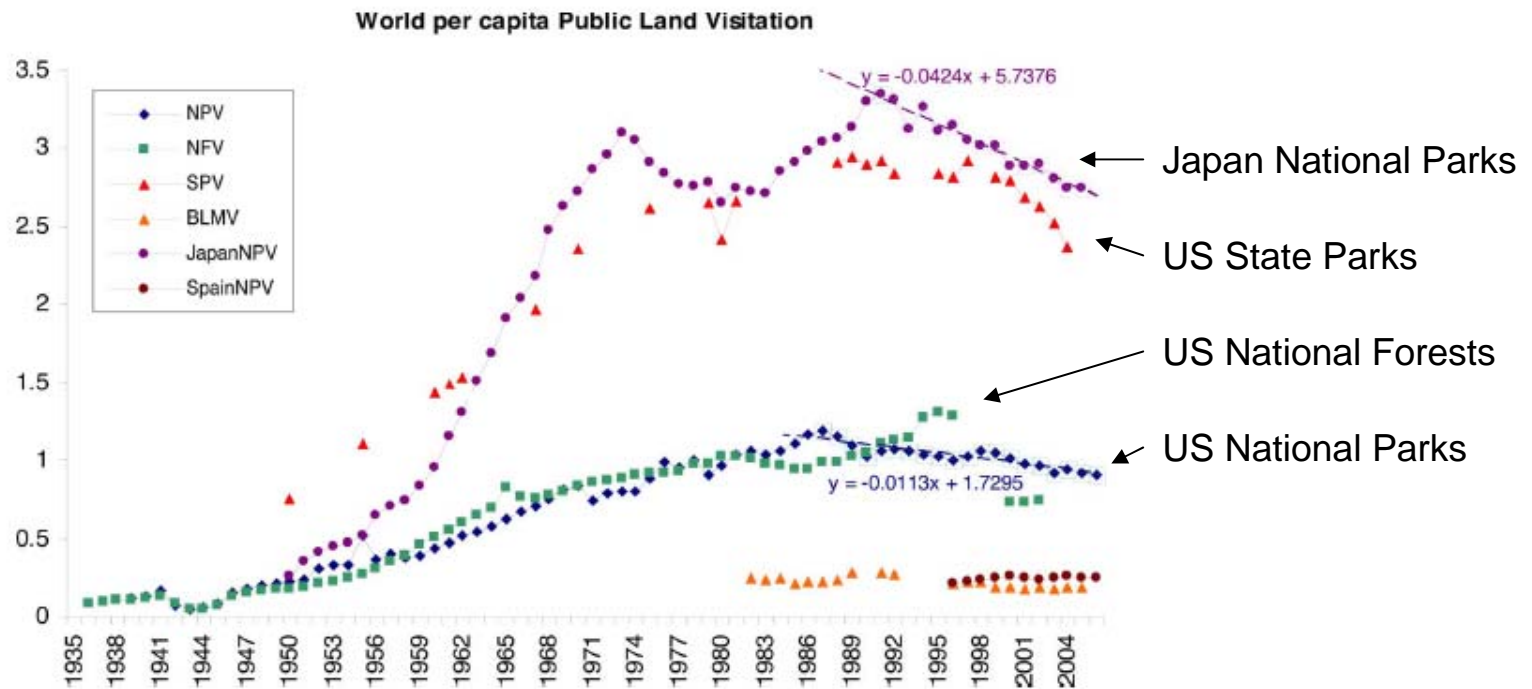
FEATURED

WHEREVER  
ADVENTURE  
DARES,  
THE ARCTIC CAT  
PROWLER  
IS SURE TO  
BE THERE.



ARCTIC CAT  
MORE TO GO ON.

# People care about places they know



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