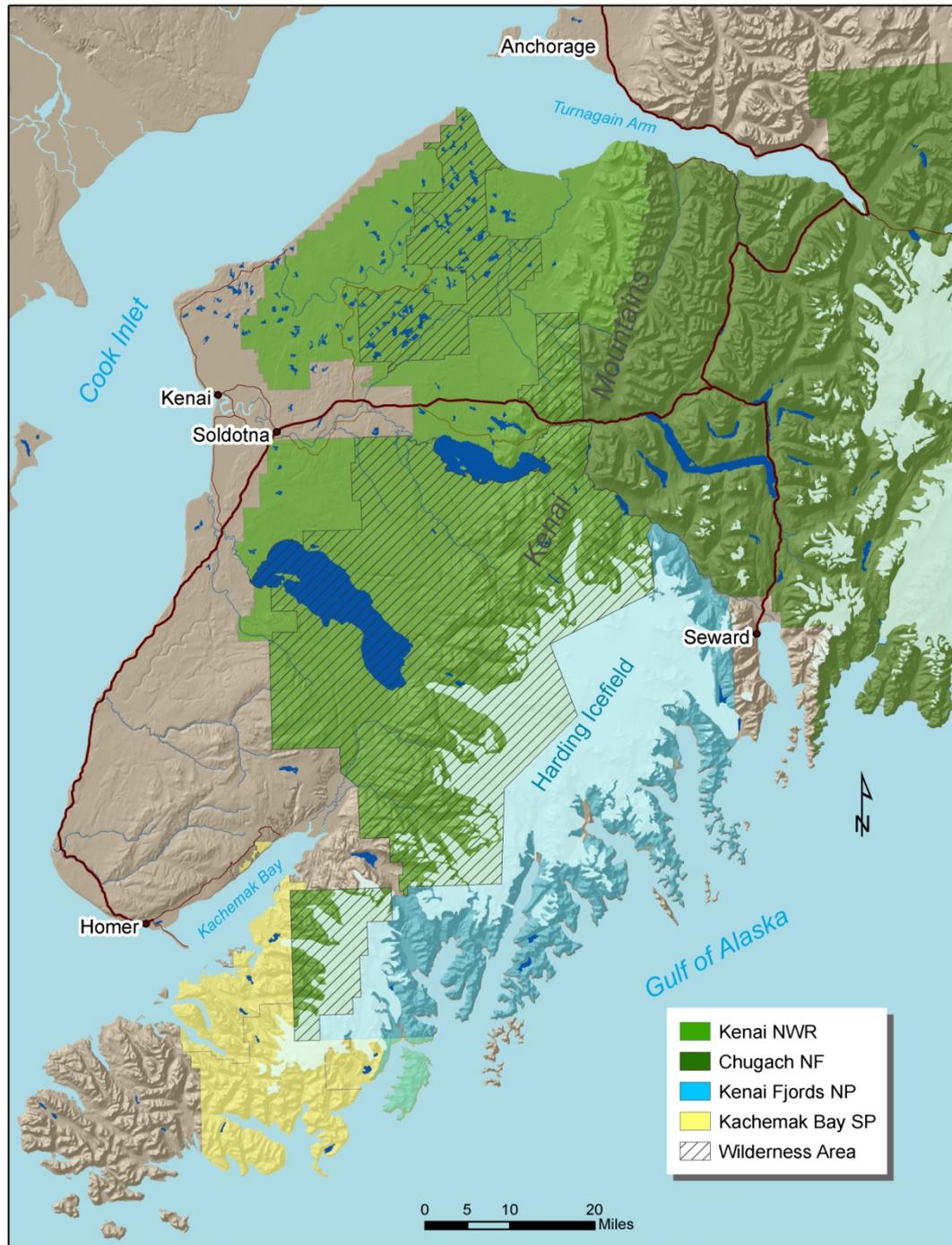


# Why Kenai National Wildlife Refuge closed the Fall 2013 Kenai brown bear hunt



(c) 2010 Stephen Stringham



# REFUGE PURPOSES

## 1980 ANILCA

- conserve fish & wildlife populations and habitats in their *natural diversity* including but not limited to, moose, *bears*, mountain goats, Dall sheep, wolves and other furbearers, salmonids....
- fulfill international fish & wildlife treaty obligations
- and, in a manner consistent with purposes above,
  - ensure water quality and quantity
  - opportunities for scientific research, interpretation, environmental education and land management training
  - *opportunities for compatible fish & wildlife-oriented recreation*

# OTHER REFUGE PURPOSES

## *1964 Wilderness Act*

- secure an enduring resource of wilderness
- protect and preserve wilderness character
- leave them unimpaired for future use as wilderness

## *1997 Refuge Improvement Act*

- ensure biological integrity, diversity and environmental health

# Why we estimated the Kenai brown bear population in 2010....

- ✓ Kenai brown bears designated a *Population of Special Concern* by State of Alaska in 1998 - 2010
- ✓ DNA analysis confirmed Kenai brown bear population is **genetically less diverse** than mainland Alaskan brown bears and not panmictic with Anchorage brown bear population (Talbot & Farley 2009, Jackson et al. 2009)
- ✓ Only estimate of **250-300 brown bears** in 1993 based on multiplying the area of suitable habitat (13,848 km<sup>2</sup>) by mean bear density (20 bears per 1000 km<sup>2</sup>) from other AK studies
- ✓ Based on 1995-1999 data (IBBST 2001), **not clear if population was stable, declining or increasing** ( $\lambda = 0.9364 - 1.0588$ )
- ✓ Low estimates of yearling survivorship and small proportion of subadult (2–6 year olds) females in age distribution suggested **low recruitment** (IBBST 2001)

# DNA-based mark-recapture estimate of the Kenai brown bear population on Kenai National Wildlife Refuge and Chugach National Forest in 2010

Dr. John Morton (Kenai NWR)

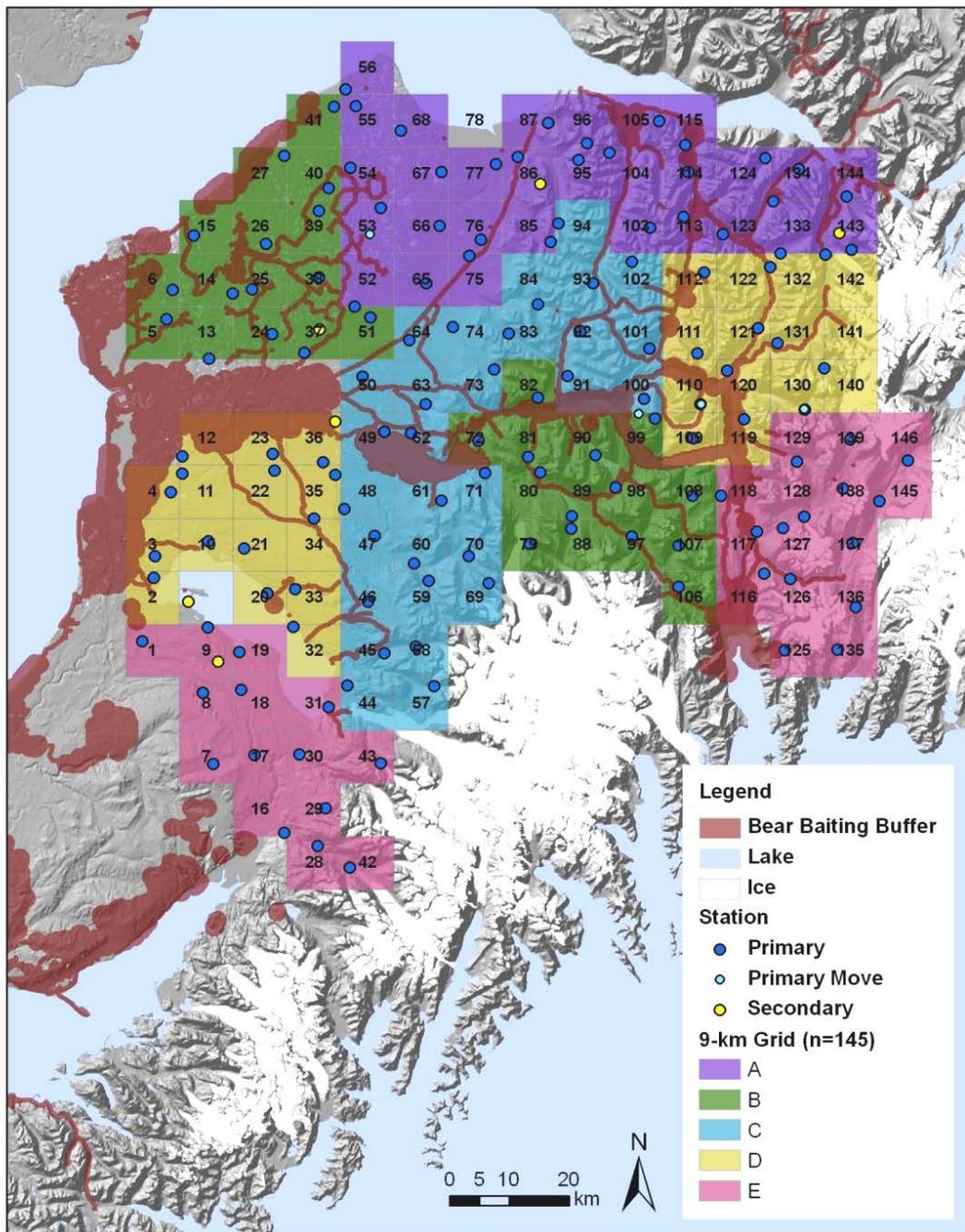
Marty Bray (Chugach National Forest)

Dr. Greg Hayward (USFS Alaska Region)

Dr. Gary White (Colorado State University)

Dr. Dave Paetkau (Wildlife Genetics International)





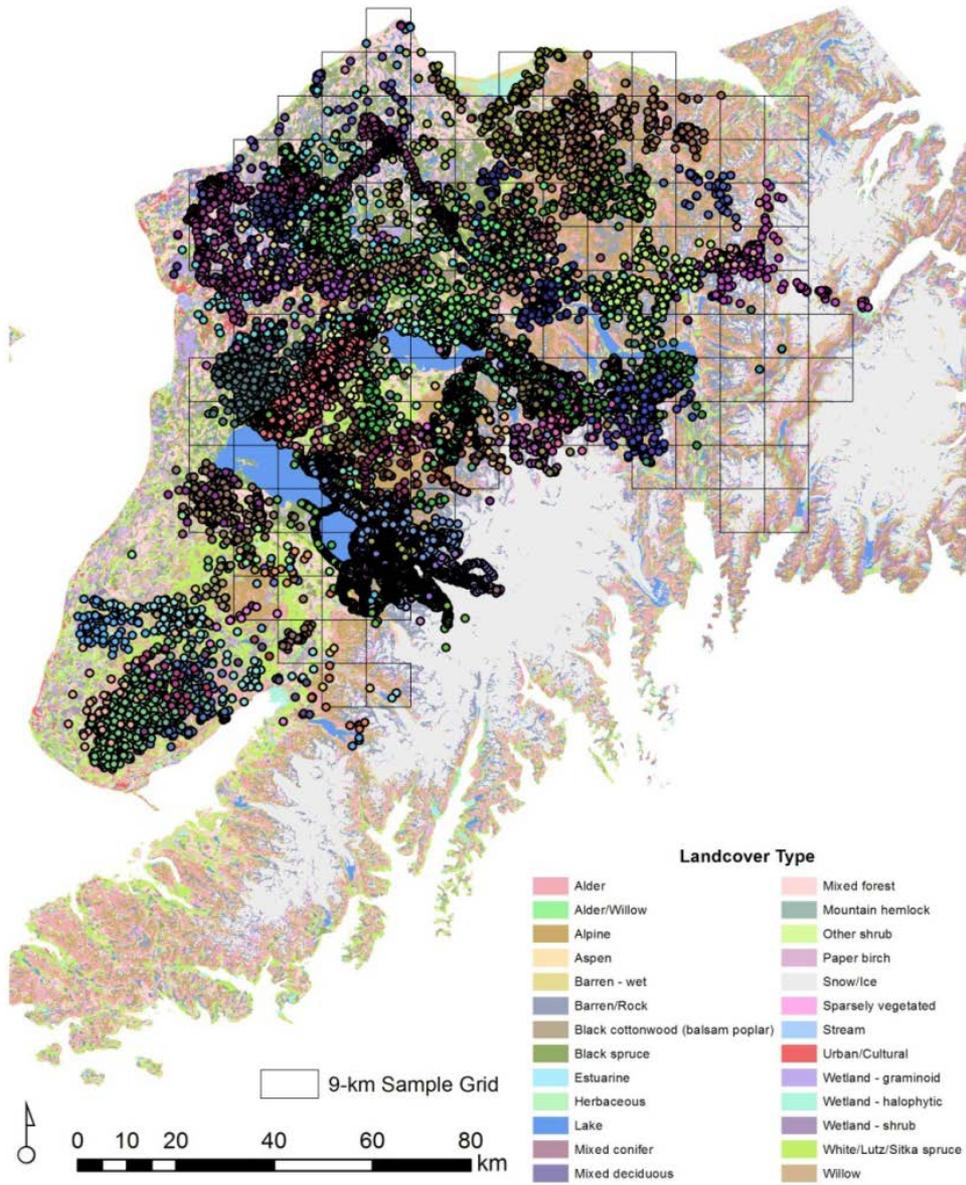
**145 primary hair stations  
subjectively placed within 81-  
km<sup>2</sup> cells systematically  
distributed over 11,500 km<sup>2</sup>  
study area**

**29 stations sampled daily over  
five 5-day trap sessions using  
rotating panel design**

**31 consecutive days of field  
sampling with 4 field crews  
and 2 helicopters**

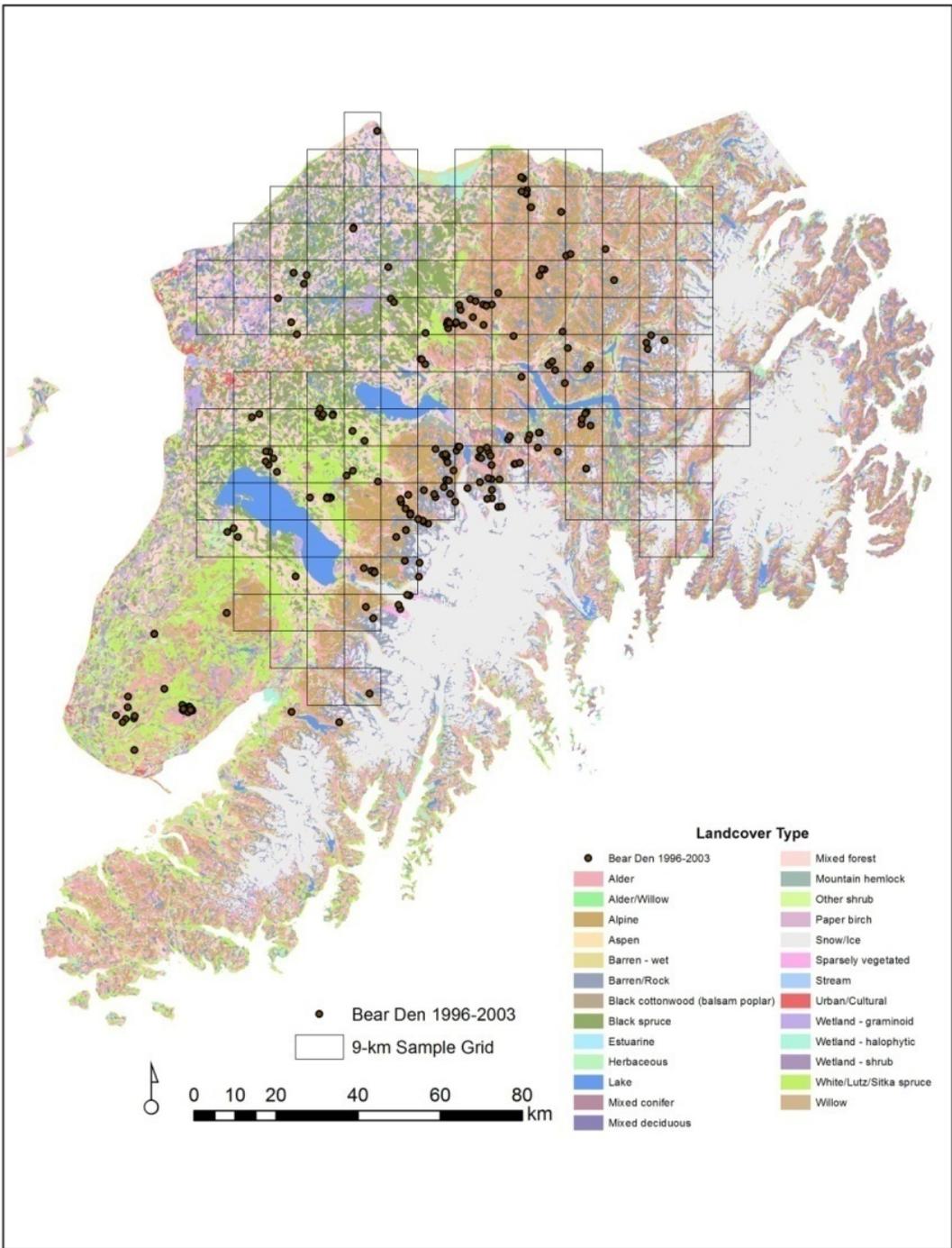
**Collared Bear  
1987-2005**

- 1 ● 68
- 2 ● 69
- 3 ● 70
- 4 ● 71
- 5 ● 72
- 6 ● 73
- 7 ● 74
- 8 ● 75
- 9 ● 76
- 11 ● 77
- 12 ● 78
- 13 ● 79
- 14 ● 81
- 15 ● 82
- 16 ● 83
- 18 ● 84
- 19 ● 85
- 21 ● 86
- 22 ● 87
- 23 ● 88
- 24 ● 89
- 25 ● 90
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- 28 ● 93
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- 31 ● 96
- 32 ● 97
- 33 ● 98
- 34 ● 99
- 35 ● 100
- 36 ● 109
- 37 ● 111
- 38 ● 112
- 39 ● 113
- 40 ● 115
- 41 ● 116
- 42 ● 119
- 44 ● 120
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- 52 ● 128
- 53 ● 129
- 54 ● 130
- 55 ● 131
- 56 ● 132
- 57 ● 133
- 58 ● 134
- 59 ● 135
- 60 ● 137
- 61 ● 148
- 62 ● 149
- 63 ● 300
- 64 ● 301
- 65 ● 400
- 66 ● 997
- 67



**Distribution of 144,024 telemetry locations from 125 female brown bears with GPS and VHF collars (1987-2005)**

**► 87% were on study area**



**Distribution of dens from 74 brown bear sows during (1996-2003)**

**► 84% denned on study area**

# Brown bear population estimate (all ages) on 11,700 km<sup>2</sup> sample frame

Sex	Estimate	SE	$M(t + 1)$	95% Lognormal CI	
				LCI	UCI
Females	214.6	33.7	99	165.0	301.3
Males	213.1	30.9	104	167.2	292.2
<b>Combined</b>	<b>427.6</b>	<b>46.7</b>	<b>203</b>	<b>353.2</b>	<b>539.1</b>

**428 (353-539) brown bears population estimate  
(all ages) on 11,700 km<sup>2</sup> sample frame**

**or 9,500 km<sup>2</sup> available habitat**

**≈ 45.1 bears per 1,000 km<sup>2</sup>**

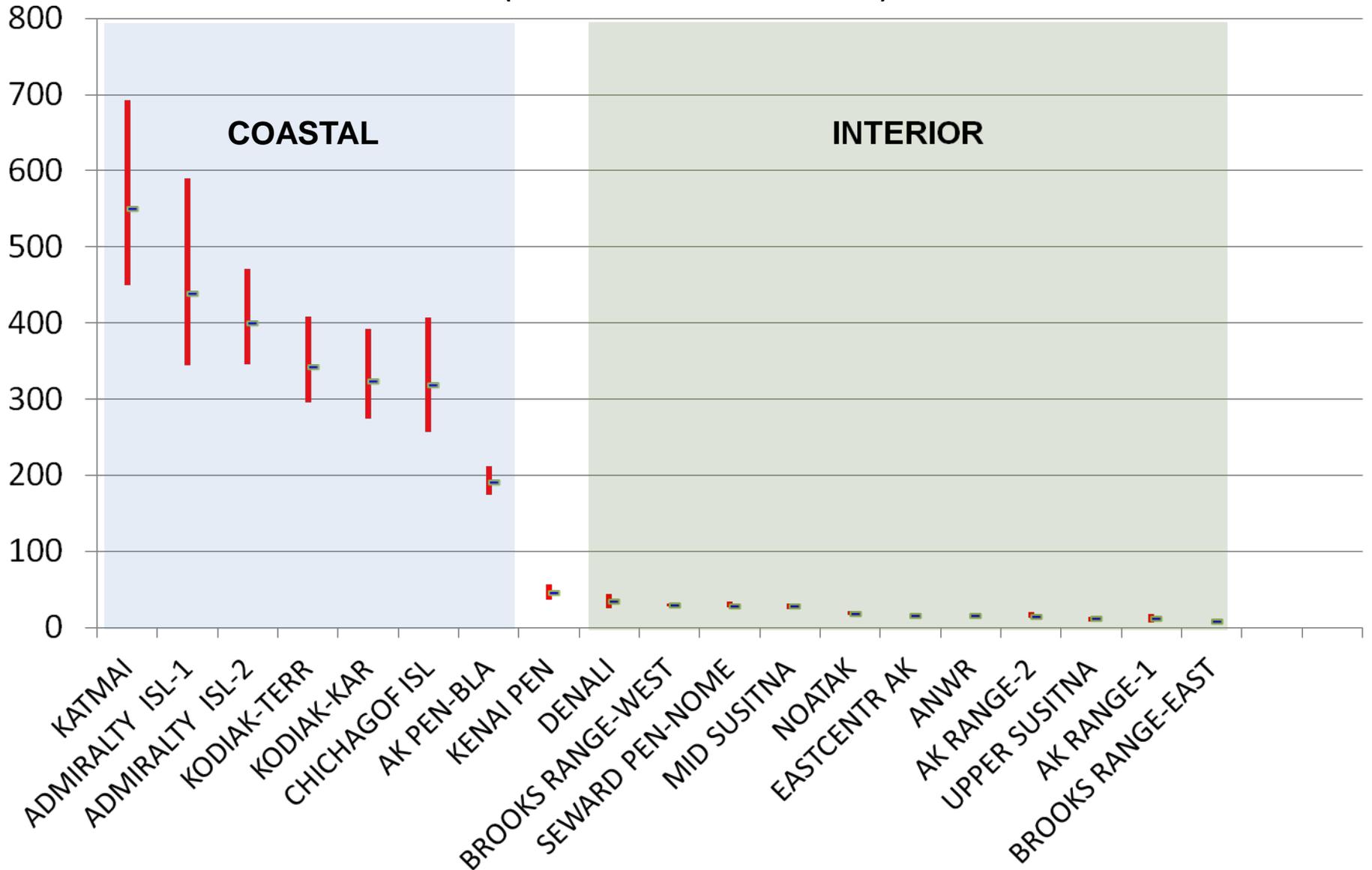
**≈ 624 bears on the KP (504-772)**

**≈ 200 independent females**

**≈ 224 dependent young**

# ALASKA BROWN BEAR DENSITIES (PER 1000 KM<sup>2</sup>)

(after Miller et al. 1997)

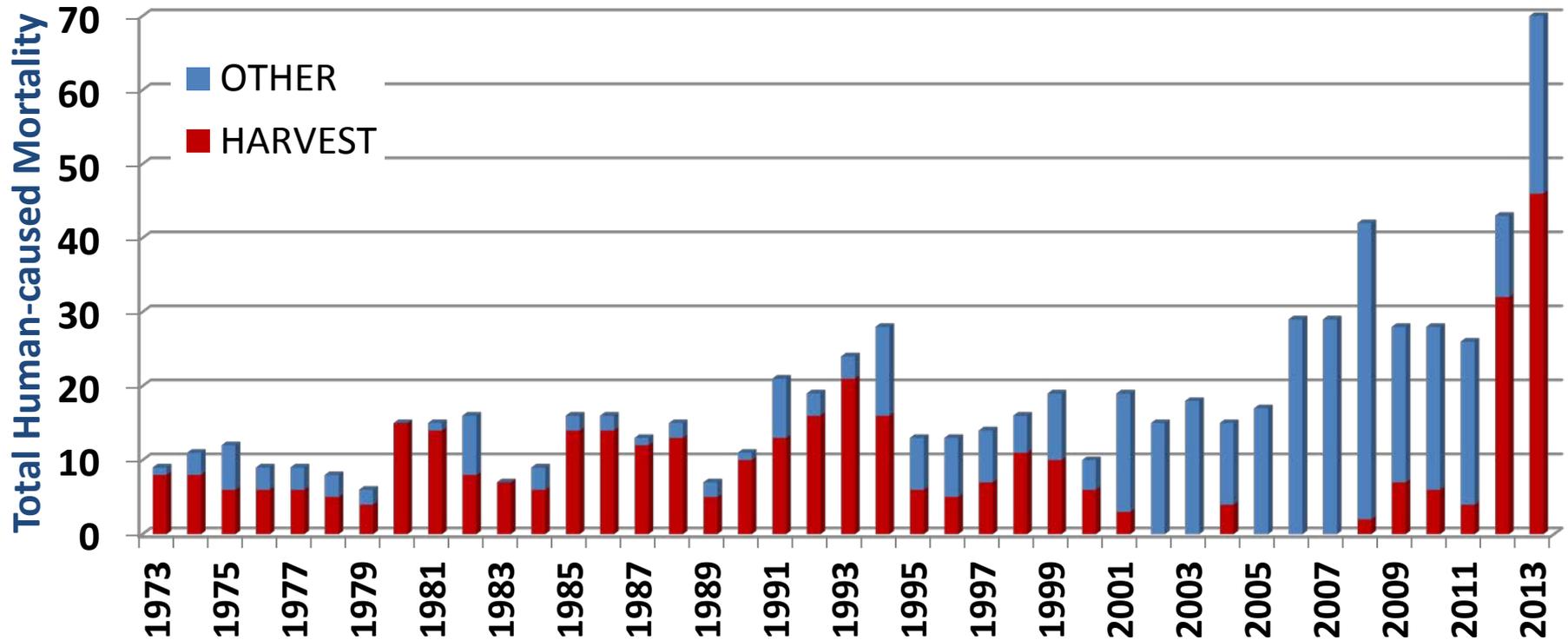


# Kenai brown bear management actions

## HUMAN CAUSED MORTALITY

		Total	Adult Female
1995	population estimate = 250-300 bears (1993) varying spring and fall seasons; 1 bear per 4 regulatory years	13	5
		12	2
		14	1
1998	ADF&G designates Kenai brown bears "population of special concern"	16	3
1999	Registration hunt; cap = 14 HCMs of which ≤ 6 females (any age)	19	3
		9	3
2001	Conservation Assessment of Kenai Brown Bears (IBBST)	17	5
		15	3
2003	cap = 20 HCMs of which ≤ 8 females (> 1 year); COY = 1;	18	6
		15	2
		17	4
		29	6
2007	Federal subsistence harvest authorized; spring drawing hunt	29	6
		42	6
2009	cap ≤ 10 adult females	28	8
2010	population estimate = 624 bears (USFWS-USFS)	28	6
		26	6
2012	general registration hunt	43	14
2013	extended season (1 Sep-May 31), hunt over bait, 1 per regulatory year, no cap	70	24
2014	cap = 70 bears (regardless of sex and age)		

# Contribution of legal harvest to human-caused mortality



Legal harvest varies with hunting regulations, ranging from 0 per year during much of the past decade to 32 individuals in 2012, but averaged **11.3 bears** annually from 1973—2011 during 34 years with open seasons.

# 2013 regulatory changes to Kenai brown bear harvest are unprecedented

- ✓ General registration hunt
- ✓ Sept 1 – May 31
- ✓ Harvest brown bears over bait
- ✓ 1 bear per regulatory year
- ✓ Human-caused mortality cap = 70 regardless of sex or age
- ✓ No cap during 2013



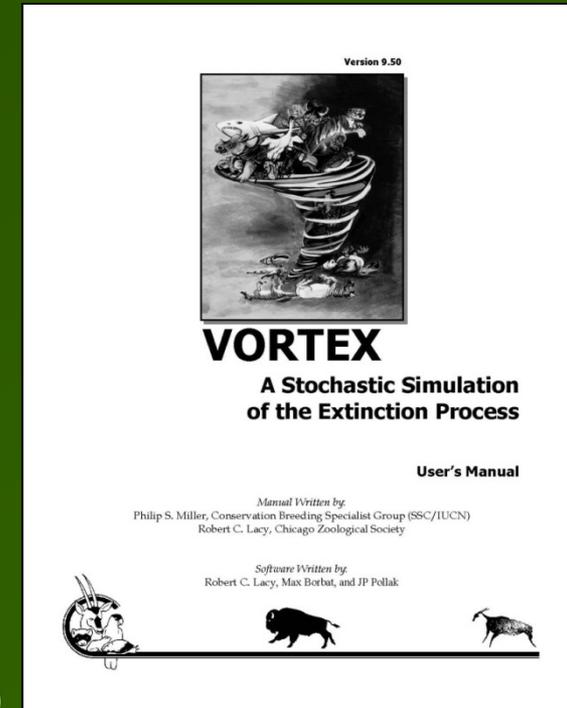
<b>KNOWN KENAI BROWN BEAR MORTALITY IN 2013</b>		<b>FEDERAL LANDS (KENWR)</b>	<b>NONFEDERAL LANDS</b>	<b>TOTAL</b>
MALE	ADULT	<b>6 (5)</b>	<b>8</b>	<b>14</b>
	SUBAD/COY	<b>11 (6)</b>	<b>8</b>	<b>19</b>
FEMALE	ADULT	<b>12 (10)</b>	<b>12</b>	<b>24</b>
	SUBAD/COY	<b>6 (2)</b>	<b>4</b>	<b>10</b>
UNKNOWN SEX	SUBAD/COY	<b>3 (3)</b>		<b>3</b>
<b>TOTAL KILL</b>		<b>38 (26)</b>	<b>32</b>	<b>70</b>

**5 of 26 (19%) collared sows killed**

## Population demographics used in VORTEX

- ✓ Based on data 1995-2012
- ✓ Polygynous system with 100% of adult males breeding
- ✓ Reproductive age female = 6, male = 9
- ✓ Maximum breeding age = 30 years
- ✓ 50% males
- ✓ Adult females breeding = 34%
- ✓ 1-4 year mortality rates derived from average of max and min survival rates for cubs by sex; older age classes based on overall female survivorship
- ✓ Percent females with litter sizes = 21% (1), 48% (2), 30% (3), 1% (4)
- ✓ Initial populations of 428 , 624
- ✓ Assumes stable age distributions, no density-dependent mortality
- ✓ 70-cap HCM assumes 50% females, of which 20 are adults

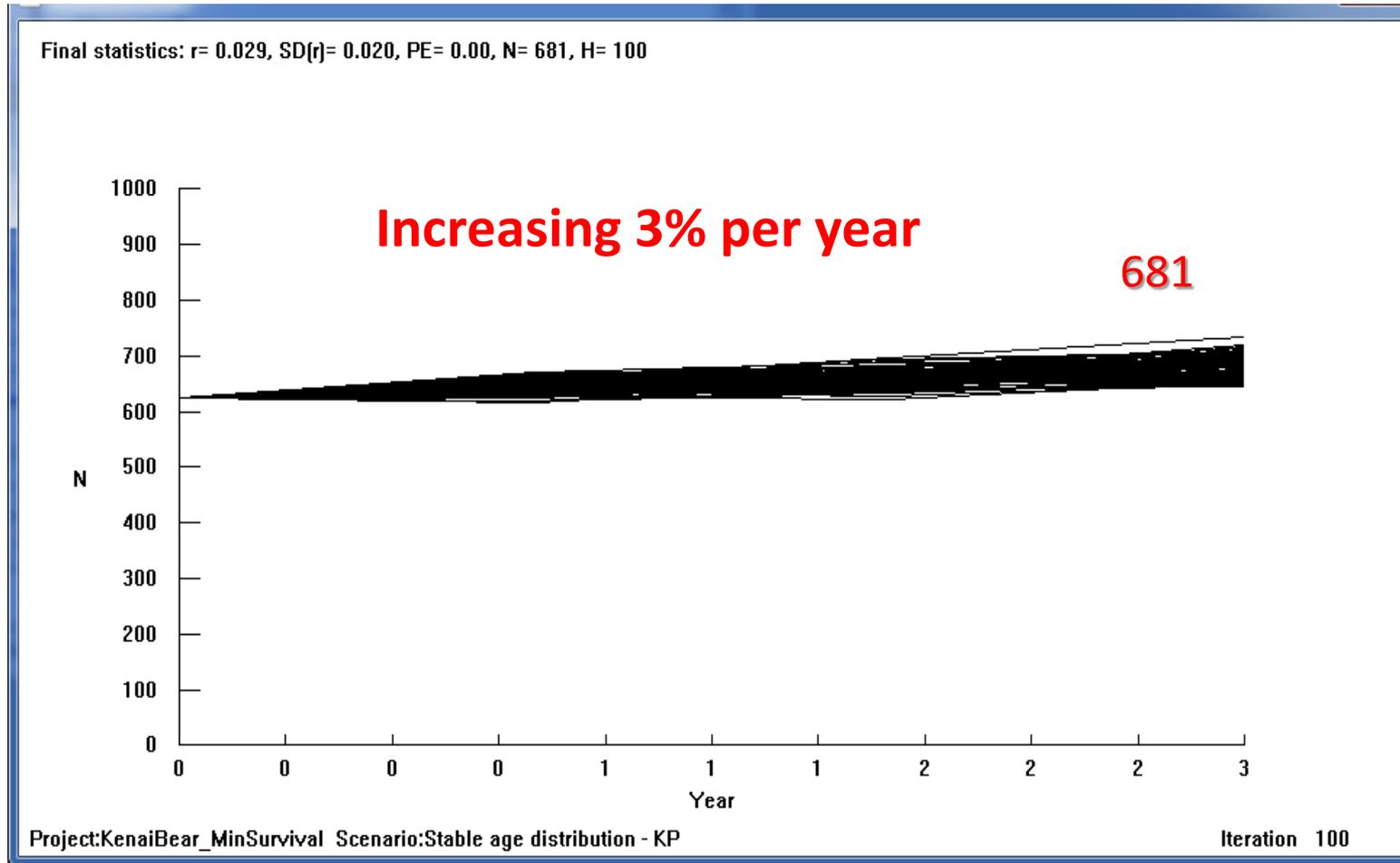
Based on Farley 2013, Morton et al. 2013



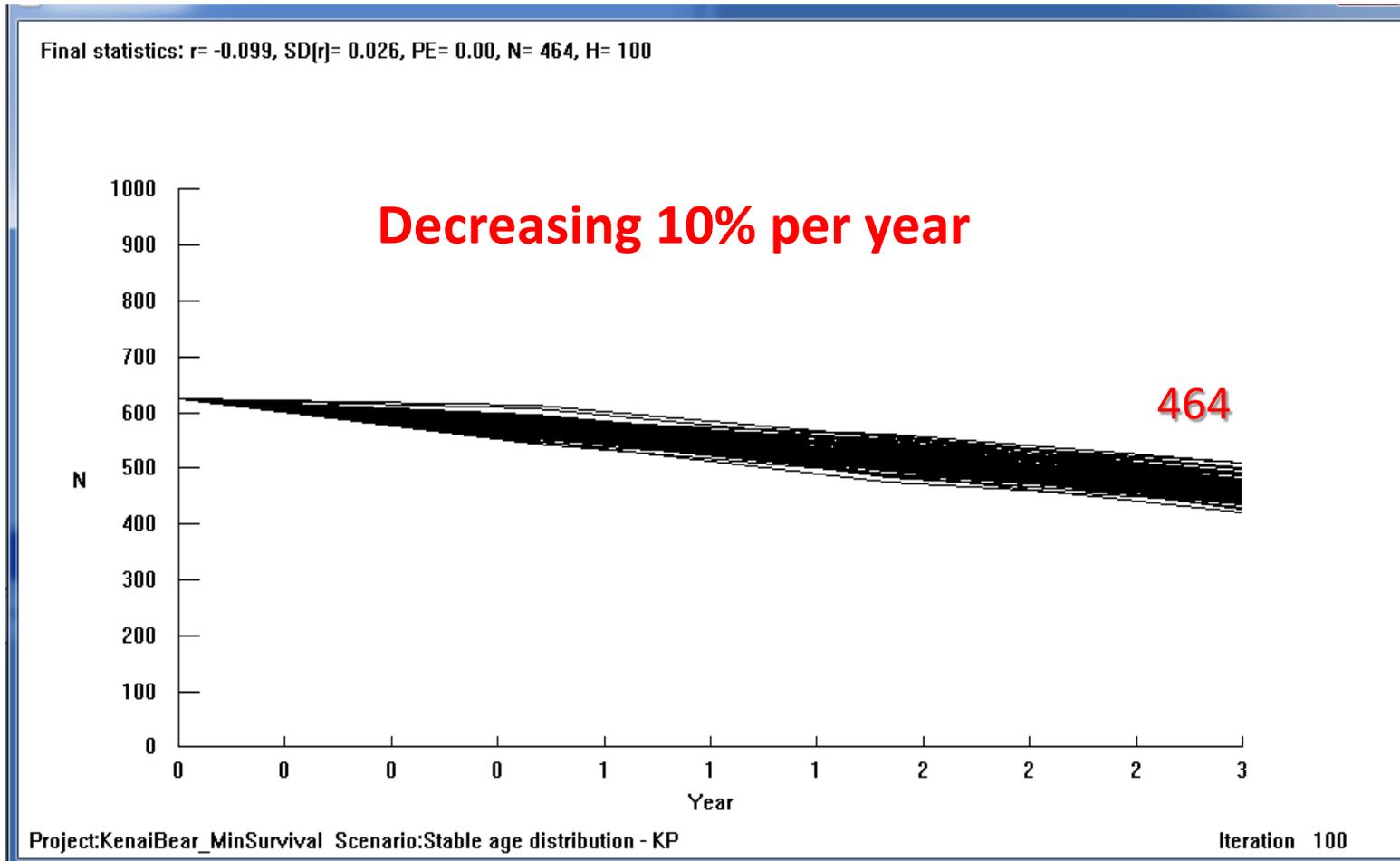
$$N_t = N_0 e^{rt}$$

# Kenai Peninsula brown bear population trajectory (3 years)

Prior to 2013

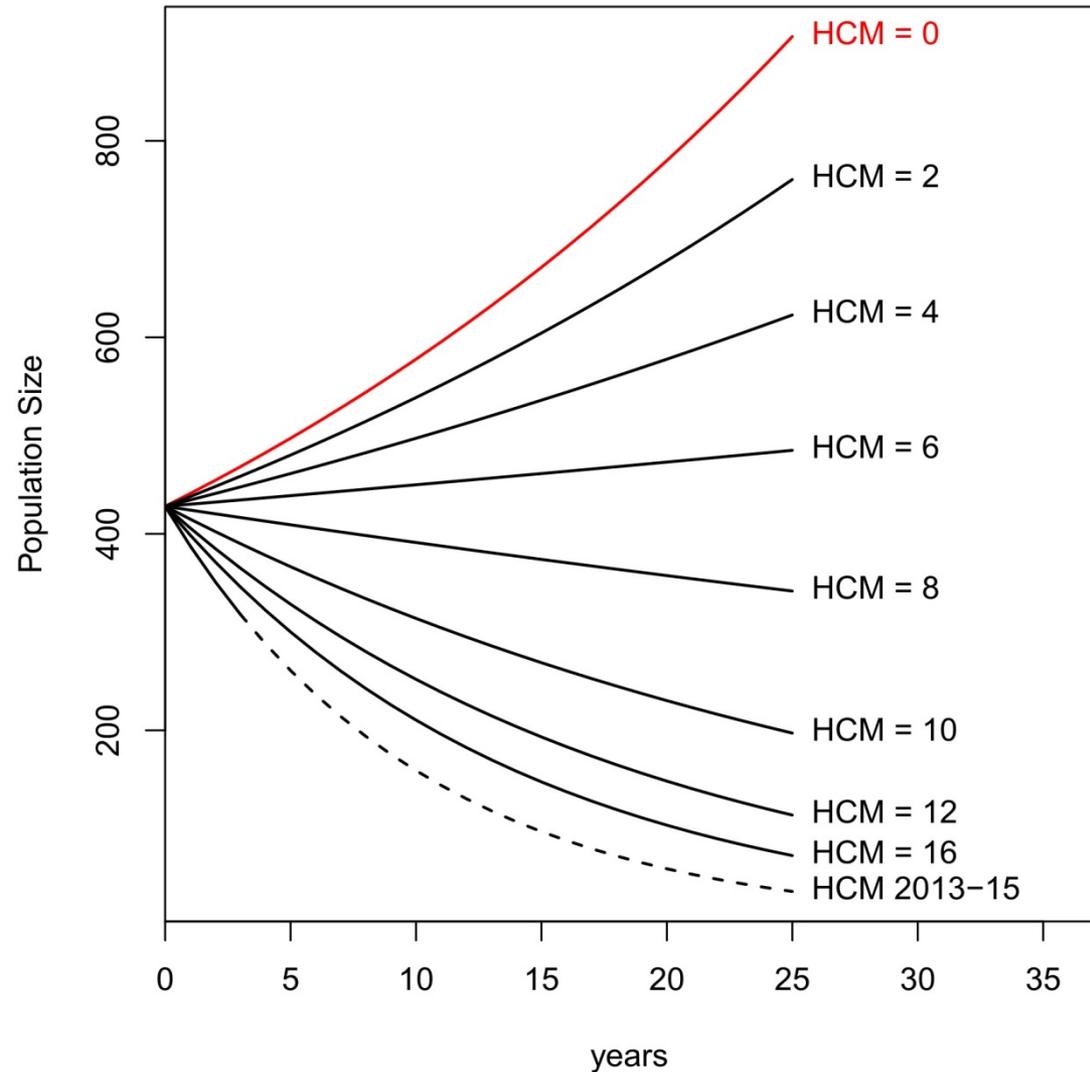


# Kenai Peninsula brown bear population trajectory (3 years) under 2013 regulatory framework



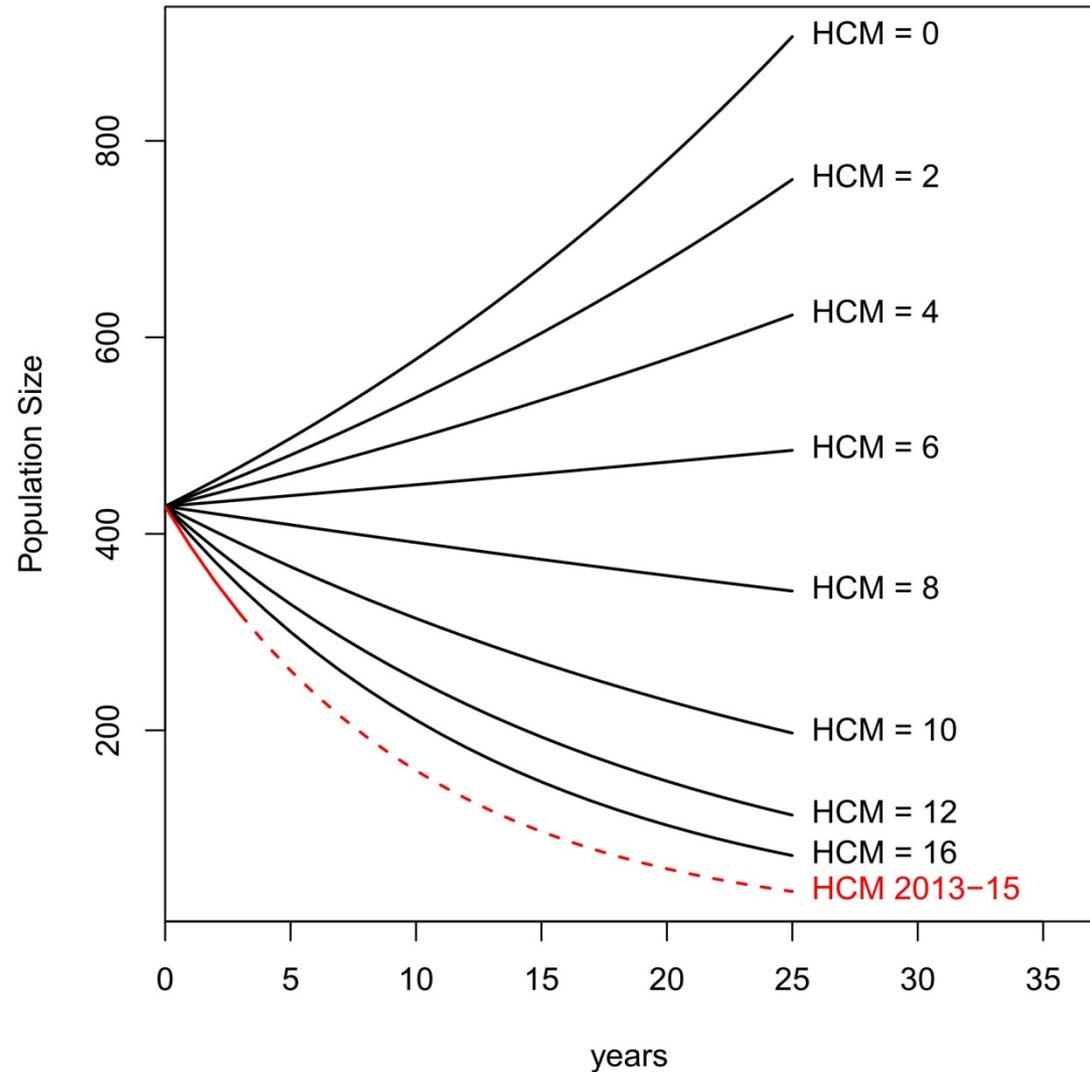
# Sensitivity of brown bear population on Federal lands to human-caused mortality (HCM) of adult females

**HCM = 0**  
**is 1995-2012 growth rate**



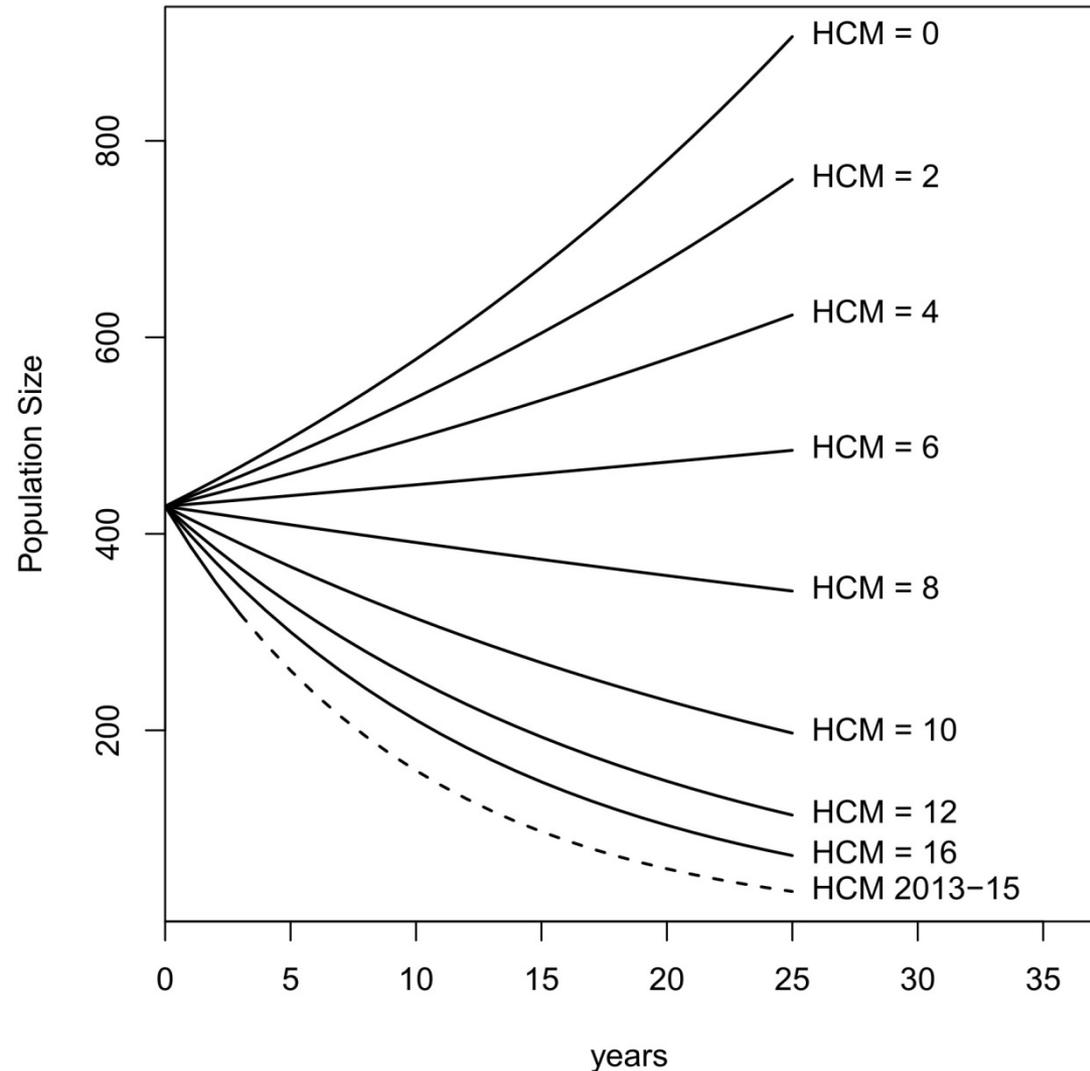
# Sensitivity of brown bear population on Federal lands to human-caused mortality (HCM) of adult females

**Expected HCM 2013-2015 :  
growth rate if current  
regulatory framework  
continues**



## Sensitivity of brown bear population on Federal lands to human-caused mortality (HCM) of adult females

**Incremental changes in adult female mortality rapidly change growth rate**



# Why we closed the fall 2013 season

## Summary

- ✓ 2013 known HCM = 70 brown bears on the Kenai Peninsula, of which 24 were adult females (12% of independent females)
  - 12 of these adult females taken on Federal lands, a harvest level that if sustained raises the probability of extinction over 25 years to 33%
  - 5 of 26 (19%) radio-collared adult females were killed in 2013
- ✓ 2014 season includes take over registered bait stations and an extended spring season
- ✓ Continued harvest at this level through 2015 puts the peninsula-wide population (already with low genetic diversity) below 500 bears, frequently cited as the minimum number to be evolutionary viable
- ✓ Kenai population is still small and highly sensitive to adult female mortality and non-hunting human-caused mortality (both known and undocumented)

“The Refuge provides the largest continuous, homogenous block of brown bear habitat on the Kenai Peninsula and is the only Kenai Peninsula land unit specifically mandated by Congress to conserve bear populations and habitat in their diversity.

When warranted, the Refuge will alter or eliminate expansion of Refuge recreational opportunities to reduce human-bear conflicts.”



**Conservation Assessment of the Kenai Brown Bear  
(IBBST 2001)**

# Next steps for Kenai National Wildlife Refuge....

- ✓ Continued coordination with ADF&G
- ✓ no brown bear harvest over bait
- ✓ regulatory framework with emphasis on protecting adult females
  - ✓ adjust season dates
    - later fall season opening
    - earlier or no spring season
  - ✓ spatial closures





# Questions during break????

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