

Mountain Lion Management and Research Updates

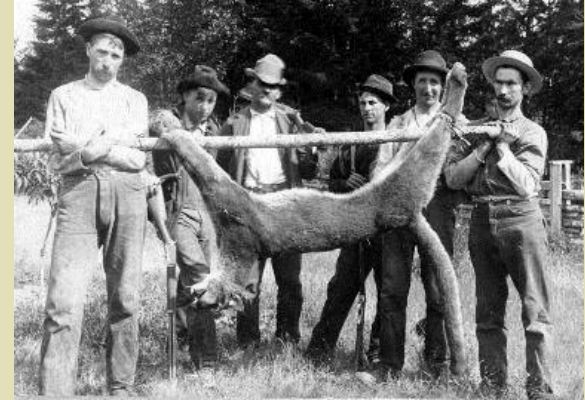
October 2018, Management Plan Stakeholder Group Meeting



Unique Challenges and Opportunities

1. History

- Native to South Dakota
- Extirpated from South Dakota
- Listed as a state threatened species in 1978
- First hunting season 2005



2. Large Predator

- Capable of affecting game populations under certain conditions
- Occasionally prey on domestic livestock and pets
- Present human safety concerns

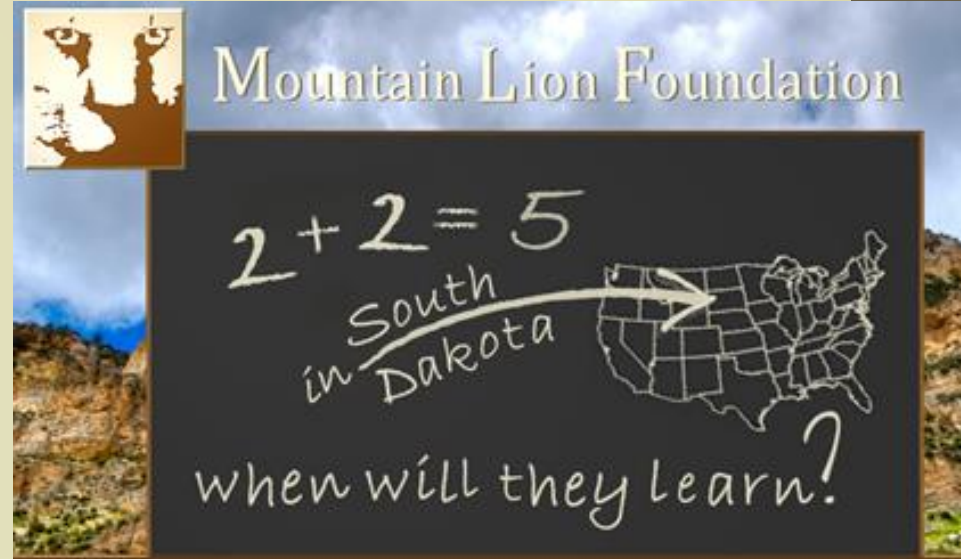




Unique Challenges and Opportunities

3. Strong Public Opinions

- Wide range of public input on how GFP should manage mountain lions
- Both sides are very passionate about mountain lions



Estimating Abundance and Population Trend

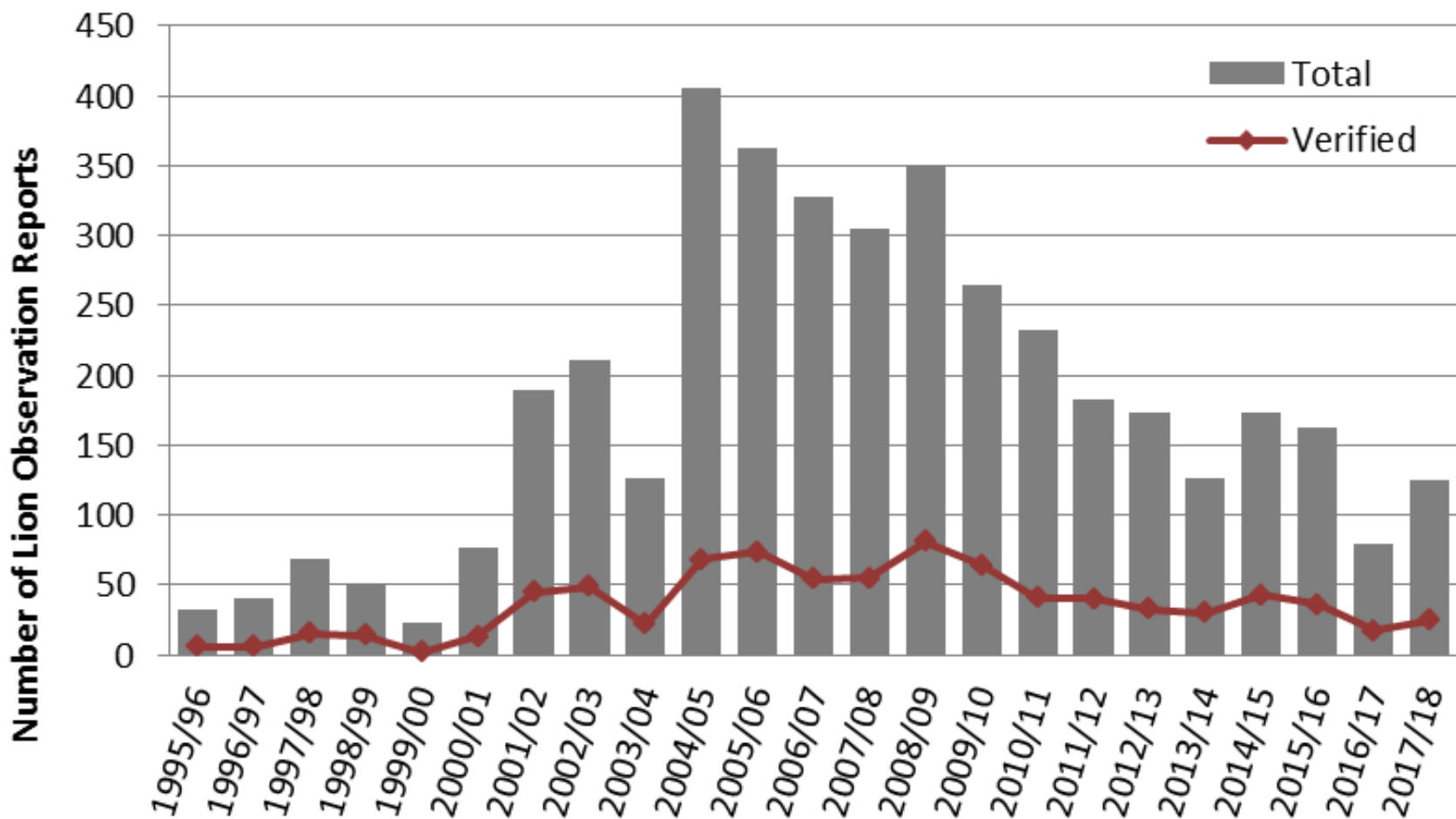


- Observation Reports
- Documented Mortalities
- Mortality density
- Hunter harvest
 - Harvest per unit effort
 - Harvest composition
 - Wyoming harvests
 - Snow fall events
- Biopsy darting DNA analyses
 - Catch per unit effort
 - Population estimates



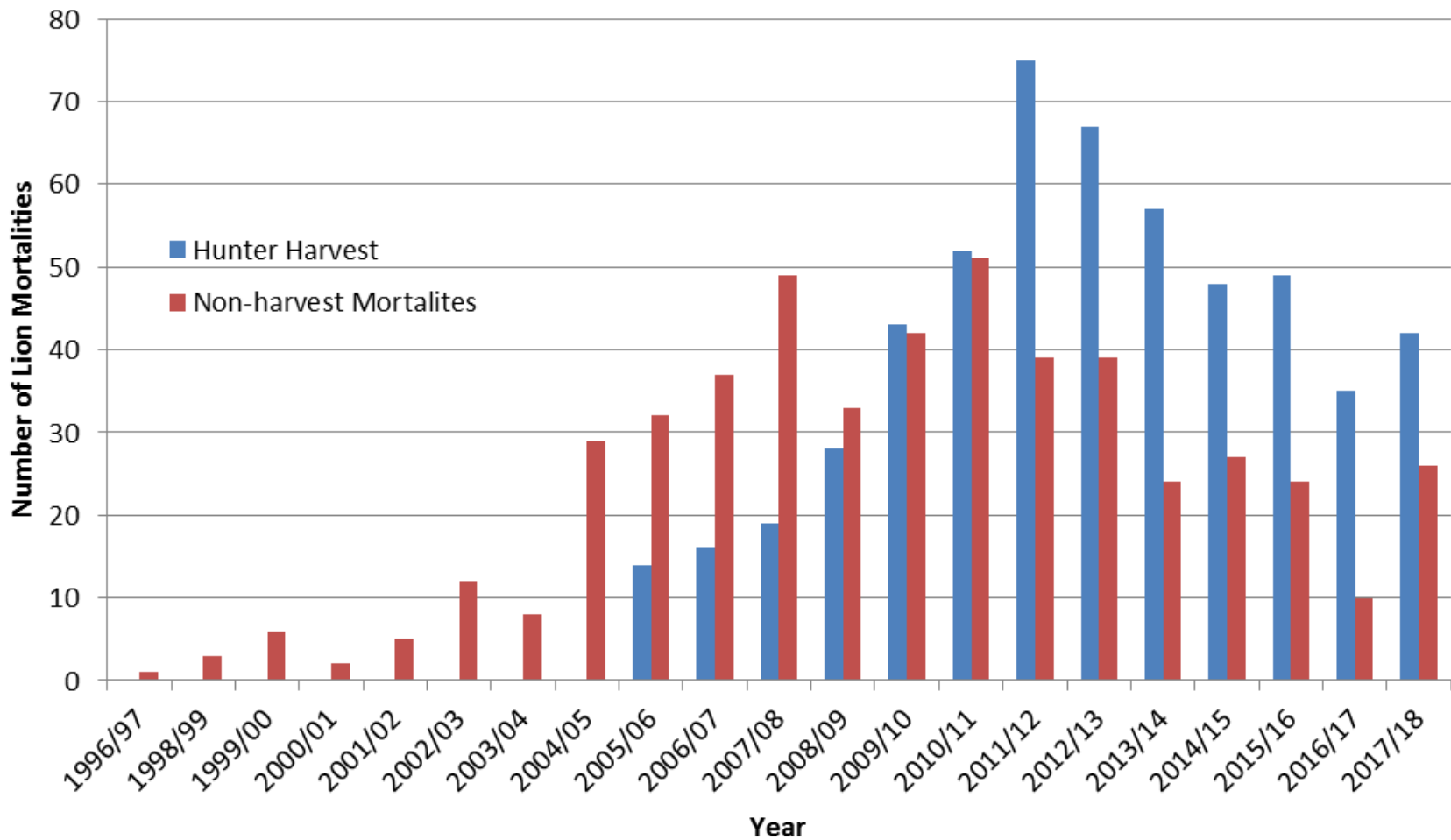
Observation Reports

(April 1 - March 31)



Documented Mortalities

(April 1 – March 31)

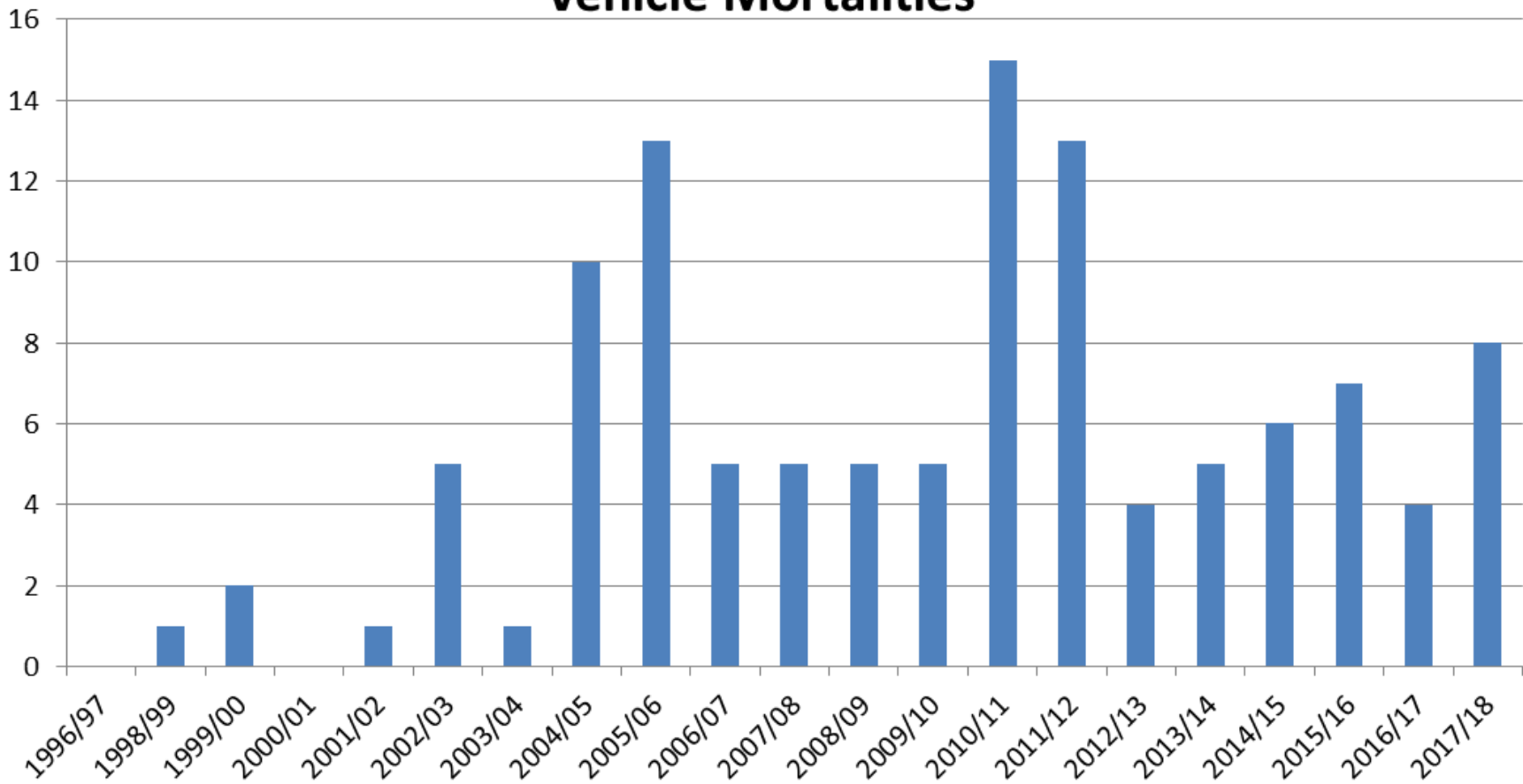


Vehicle-Caused Mortalities

(April 1 – March 31)



Vehicle Mortalities



Removal Mortalities

(April 1 – March 31)

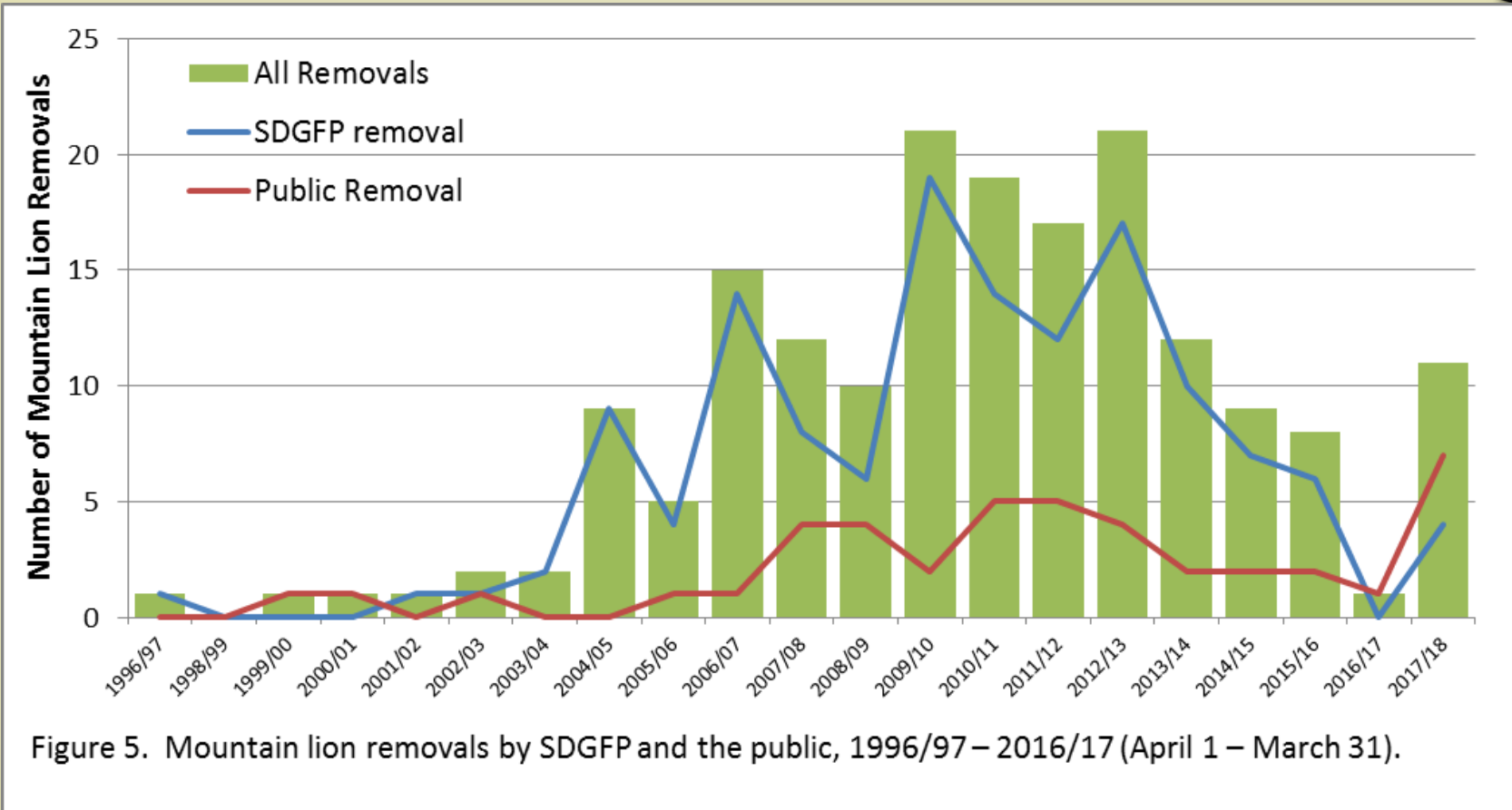
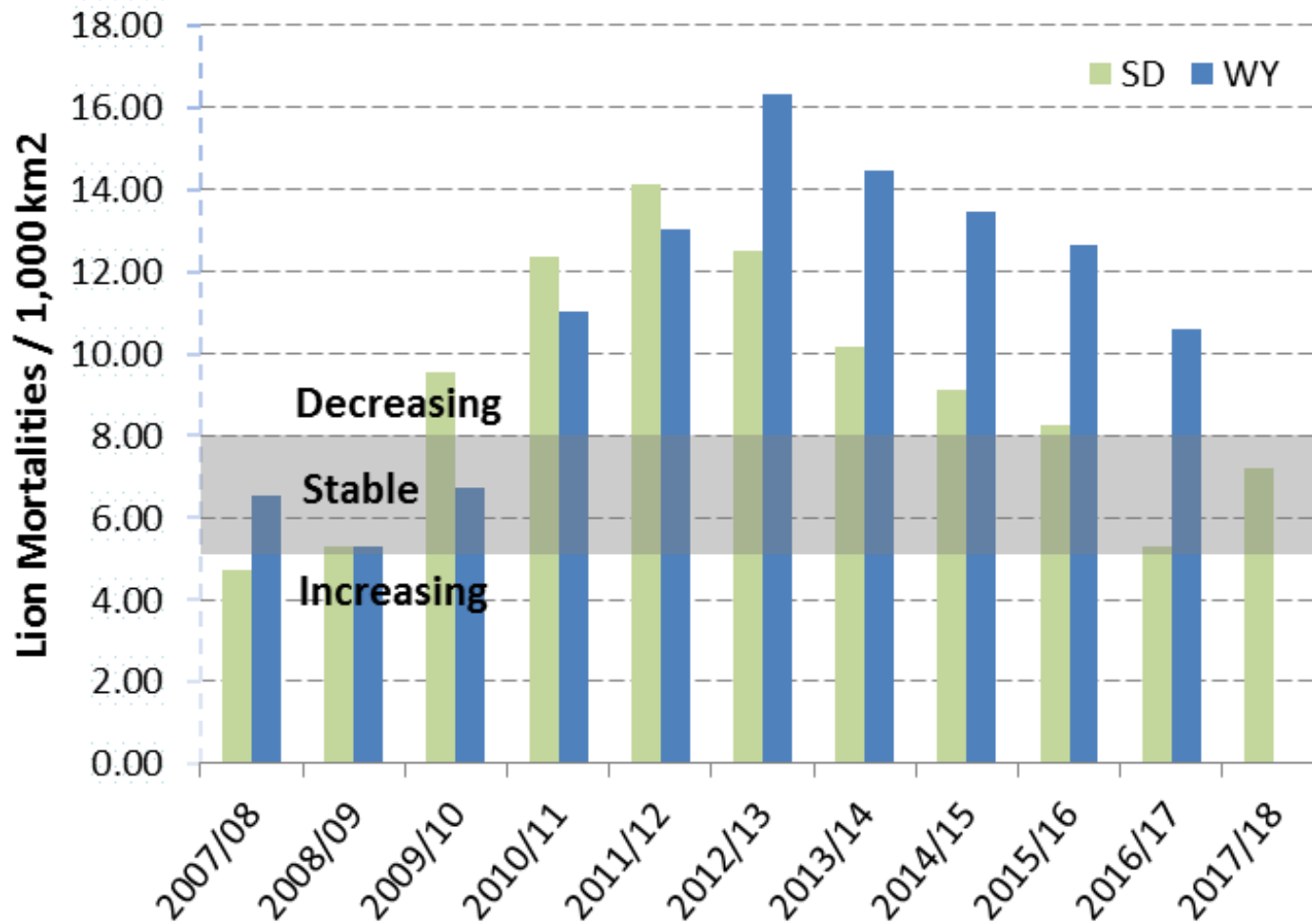


Figure 5. Mountain lion removals by SDGFP and the public, 1996/97 – 2016/17 (April 1 – March 31).

- 0 SDGFP removals in 2016/17

Human-caused Lion Mortalities (Black Hills)



- Sink
- Stable
- Source

Hunting Season Summary

(Black Hills Mountain Lion)



Year	Season Dates	Harvest Limit	Season Closed	Season Length(days)
2005/06	Oct.1 - Dec. 15	25 or 5 females	Female	24
2006/07	Nov. 1 - Dec. 31	25 or 8 females	Female	19
2007/08	Nov. 1 - Dec. 31	35 or 15 females	Female	23
2008/09	Jan.1 - Mar. 31	35 or 15 females	Female	45
2009/10	Jan.1 - Mar. 31	40 or 25 females	Total	41
2010/11	Jan.1 - Mar. 31	45 or 30 females*	Total	52
2011/12	Jan.1 - Mar. 31	70 or 50 females	Total	61
2012/13	Dec.26-Mar. 31	100 or 70 females	Date	96
2013/14	Dec.26-Mar. 31	75 or 50 females	Date	96
2014/15	Dec.26-Mar. 31	75 or 50 females	Date	96
2015/16	Dec.26-Mar. 31	60 or 40 females	Date	97
2016/17	Dec.26-Mar. 31	60 or 40 females	Date	96
2017/18	Dec.26-Mar. 31	60 or 40 females	Date	96

- Harvest Limit, not a quota

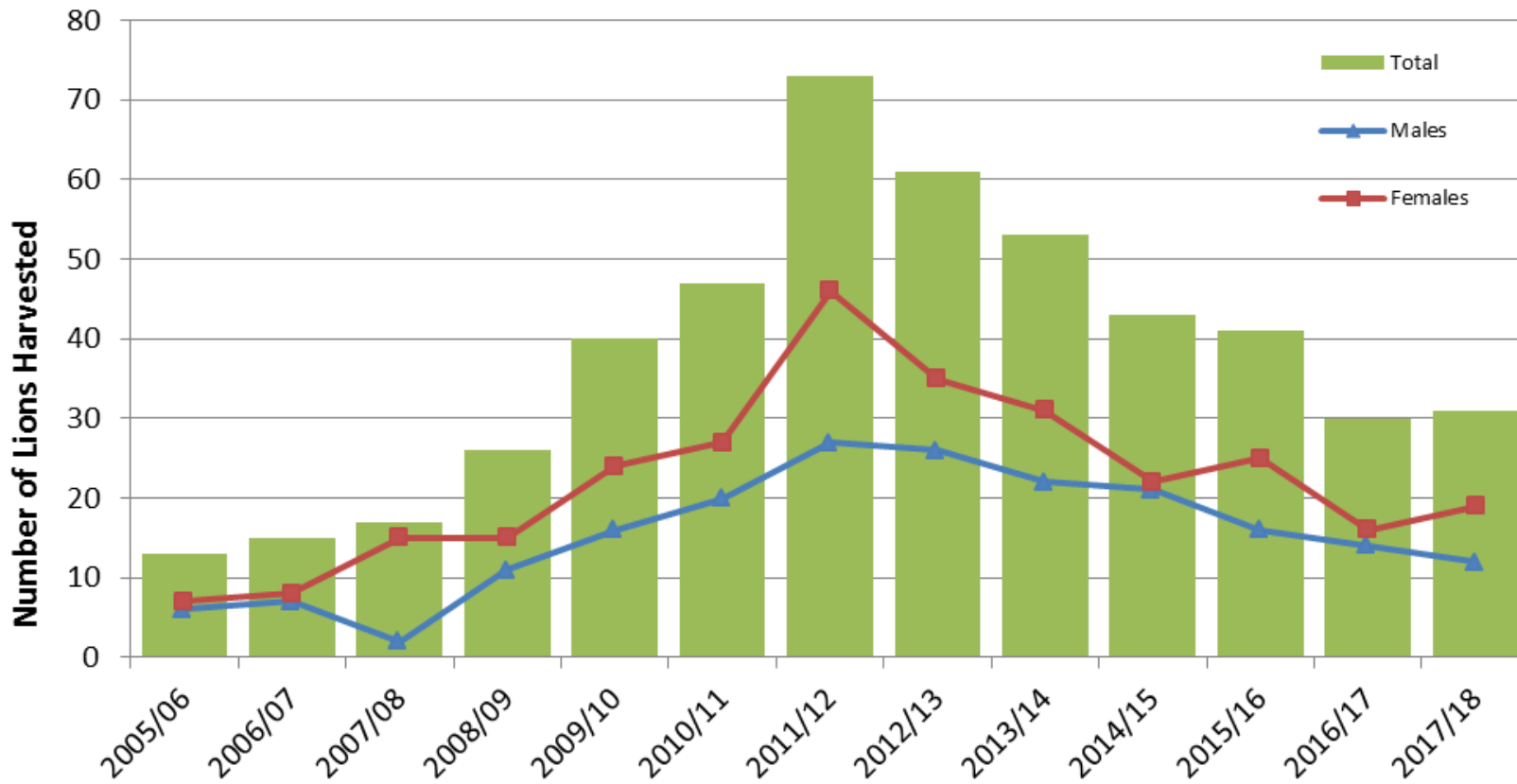
Hunting Season Summary



Year	Licenses Sold *	BLACK HILLS HARVEST			PRAIRIE HARVEST		
		Males	Females	Total	Males	Females	Total
2005/06	2,588	6	7	13	0	1	1
2006/07	3,295	7	8	15	1	0	1
2007/08	4,070	2	15	17	1	1	2
2008/09	2,335	11	15	26	2	0	2
2009/10	2,274	16	24	40	1	2	3
2010/11	2,591	20	27	47	4	1	5
2011/12	3,720	27	46	73	1	1	2
2012/13	4,637	26	35	61	5	1	6
2013/14	3,856	22	31	53	4	0	4
2014/15	3,767	21	22	43	4	1	5
2015/16	3,681	16	25	41	5	3	8
2016/17	3,067	14	16	30	5	0	5
2017/18	3,384	12	19	31	9	2	11

** licenses sold from April 1 to March 31-Adjusted year*

Black Hills Lion Harvest



Custer State Park - 2017/18



- 3 periods with 15 access permits (no hounds)
- 4 periods with 3 access permits (hounds)

HUNTING INTERVAL	PERMITS
December 26 - January 8	3 permits, dogs allowed
January 9-22	15 permits
January 23 - February 5	3 permits, dogs allowed
February 6-19	15 permits
February 20 - March 5	3 permits, dogs allowed
March 6-19	15 permits
March 20-31	3 permits, dogs allowed



2017/18 Harvest Statistics

Black Hills

- 42% of licensed hunters spent time hunting lions
- Black Hills Success per active hunter = 1.9%

Custer State Park

- 72% of licensed hunters spent time hunting lions
 - 64% for boot hunters, 100% for hunters using hounds
- Harvested 9 lions - 4 females and 5 males
- Success per active hunter
 - 75% (with hounds), 0% (boot)

Harvest Method	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Hounds	na	na	6	8	5	6	7	9
Boot	2	4	1	1	0	0	0	0



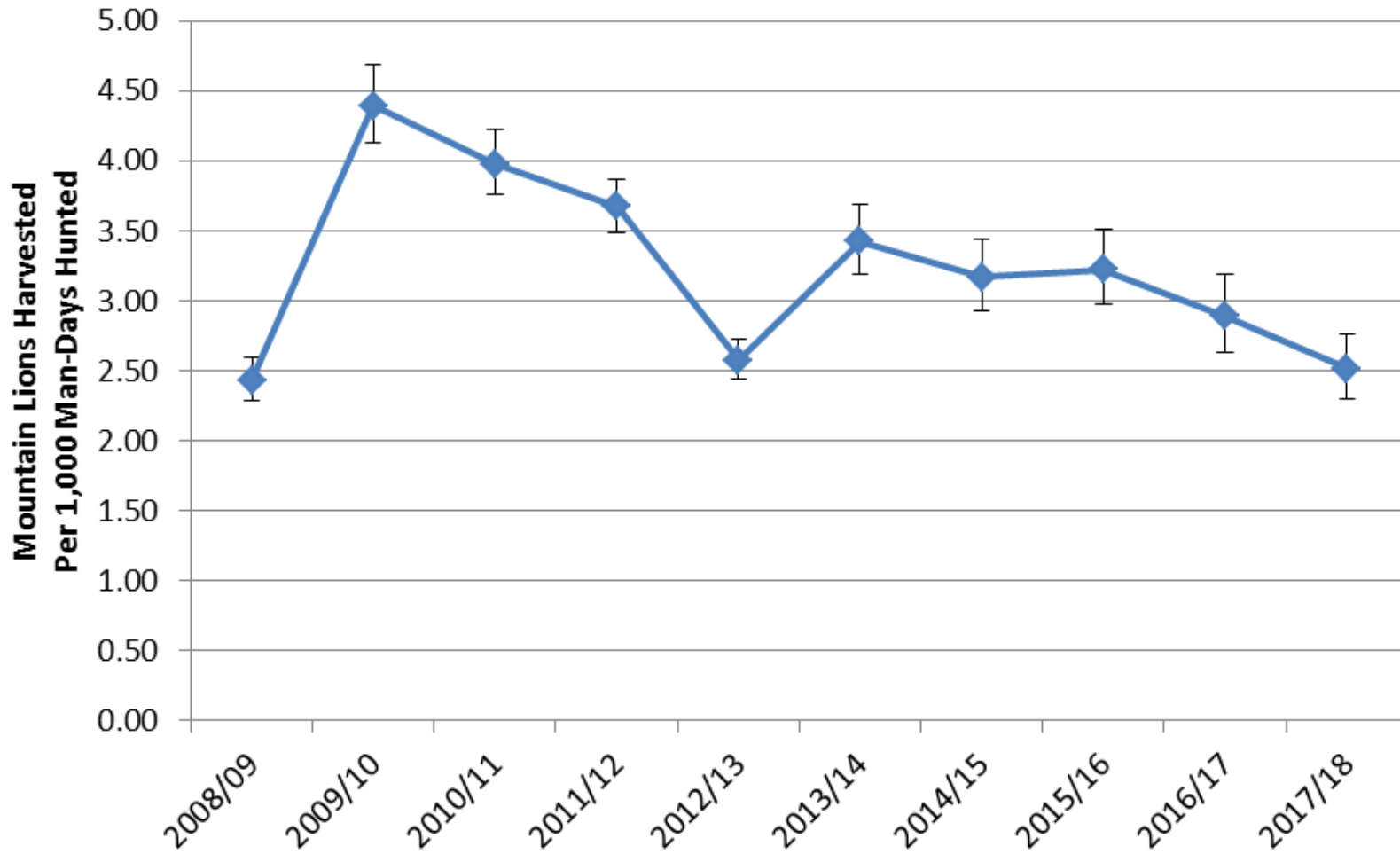
Harvest per unit effort

(Black Hills Season)

Year	Season Length (Days)	Lions Harvested	Licenses	Active Hunters	Average # Days	Man-Days Hunted	Harvest Per 1,000 Man-Days	% Change From Prior Year
2008/2009	45	26	2,428	1,646 (1,594, 1,698)	6.5	10,698 (10,003, 11,404)	2.43 (2.28, 2.60)	-
2009/2010	41	40	2,082	1,468 (1,423, 1,513)	6.2	9,100 (8,535, 9,678)	4.4 (4.13, 4.69)	81%
2010/2011	52	47	2,325	1,790 (1,749, 1,831)	6.6	11,814 (11,128, 12,508)	3.98 (3.76, 4.22)	-9%
2011/2012	61	69	3,482	2,646 (2,591, 2,701)	7.1	18,787 (17,831, 19,749)	3.67 (3.49, 3.87)	-8%
2012/2013	96	54	4,351	2,872 (2,804, 2,940)	7.3	20,966 (19,799, 22,143)	2.58 (2.44, 2.73)	-30%
2013/2014	96	44	3,293	1,861 (1,796, 1,925)	6.9	12,841 (11,920, 13,775)	3.43 (3.19, 3.69)	33%
2014/2015	96	38	3,210	1,689 (1,620, 1,758)	7.1	11,992 (11,053, 12,953)	3.17 (2.93, 3.44)	-8%
2015/2016	97	35	3,102	1,529 (1,462, 1,596)	7.1	10,856 (9,972, 11,759)	3.22 (2.98, 3.51)	2%
2016/2017	96	23	2,561	1,153 (1,093, 1,213)	6.9	7,956 (7,204, 8,727)	2.89 (2.63, 3.19)	-10%
2017/2018	96	22	2,878	1,199 (1,137, 1,261)	7.3	8,743 (7,973, 9,555)	2.52 (2.30, 2.76)	-13%

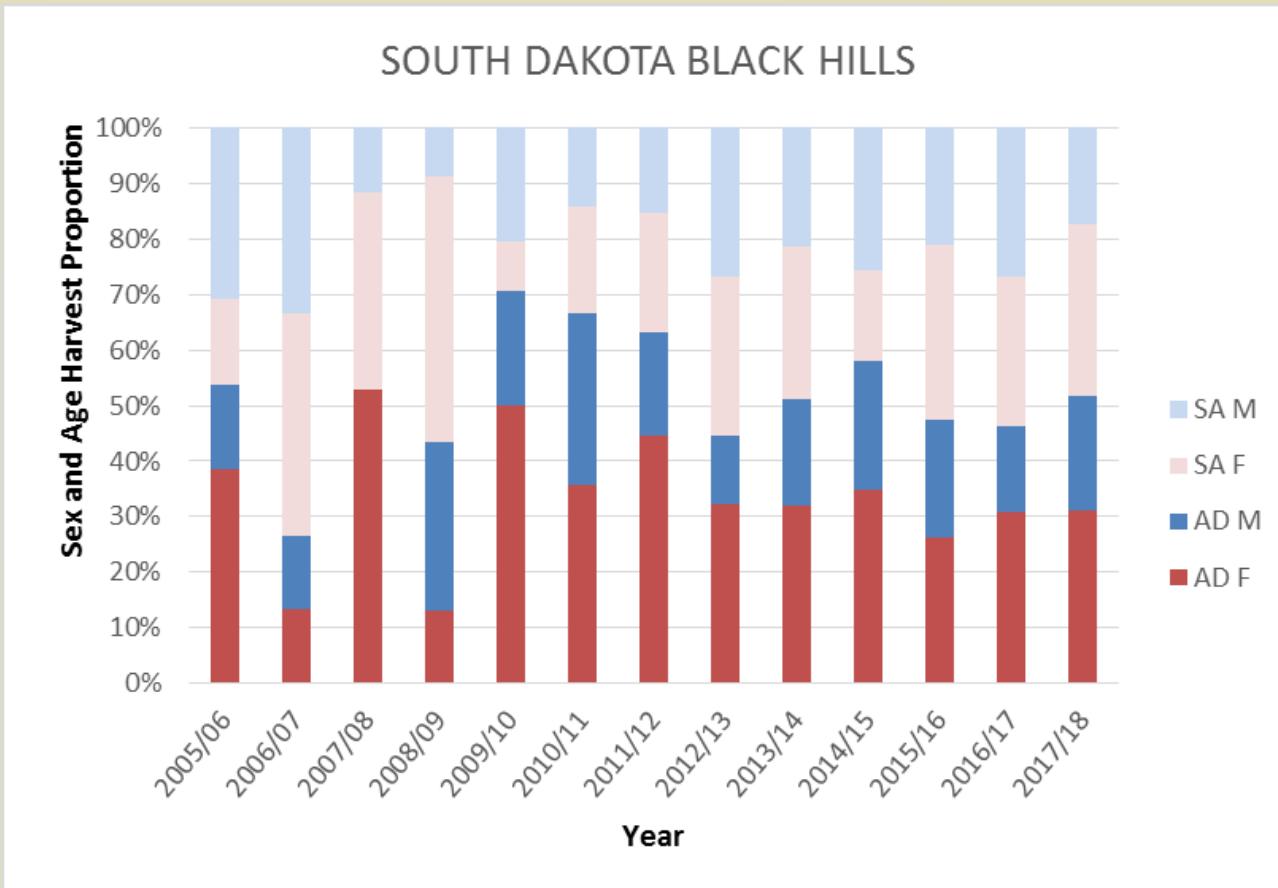
* numbers in parentheses represent 95% confidence intervals

Harvest per unit effort



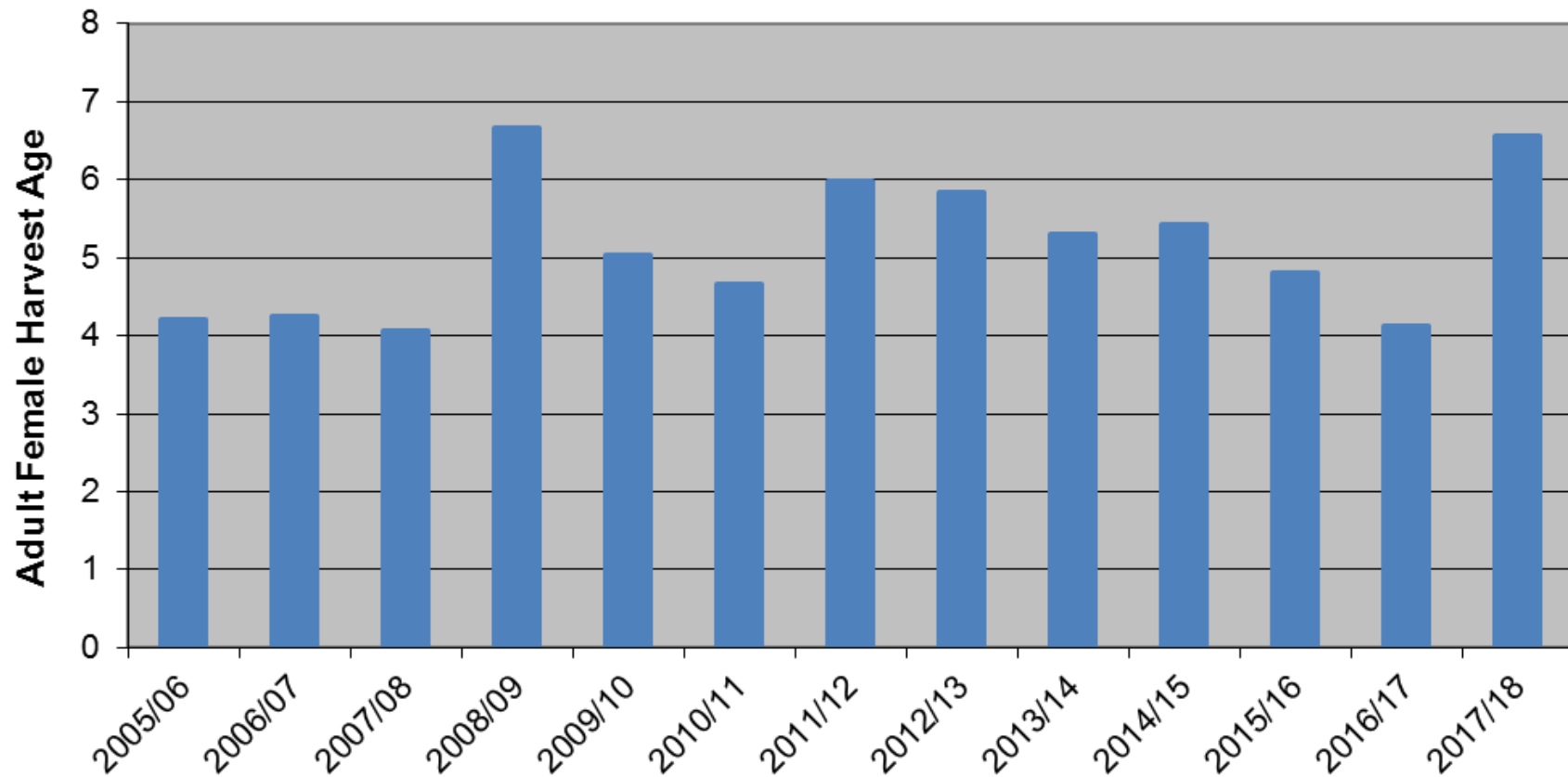
Harvest Composition

Adult Female Harvest %



- Some Western States research suggests lion populations begin to decline when adult females comprise $\geq 25\%$ of the harvest
- SD 2017/18 adult female harvest = 31%

Age of harvested adult lions



Snowfall Events



Number of Snow Fall Events

Weather Station Name	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
HILL CITY SD	5	2	6	7	9	18	7	7	12	18
LEAD SD	13	8	17	13	23	20	12	16	19	28
PACTOLA DAM SD	5	2	4	5	6	11	5	8	9	16
RAPID CITY (WEST)	13	11	19	1	10	14	8	9	10	13
SUNDANCE WY	6	6	14	8	18	14	9	14	2	31
UPTON WY	16	13	22	13	18	19	8	12	16	26
Grand Total	58	42	82	47	84	96	49	66	68	132

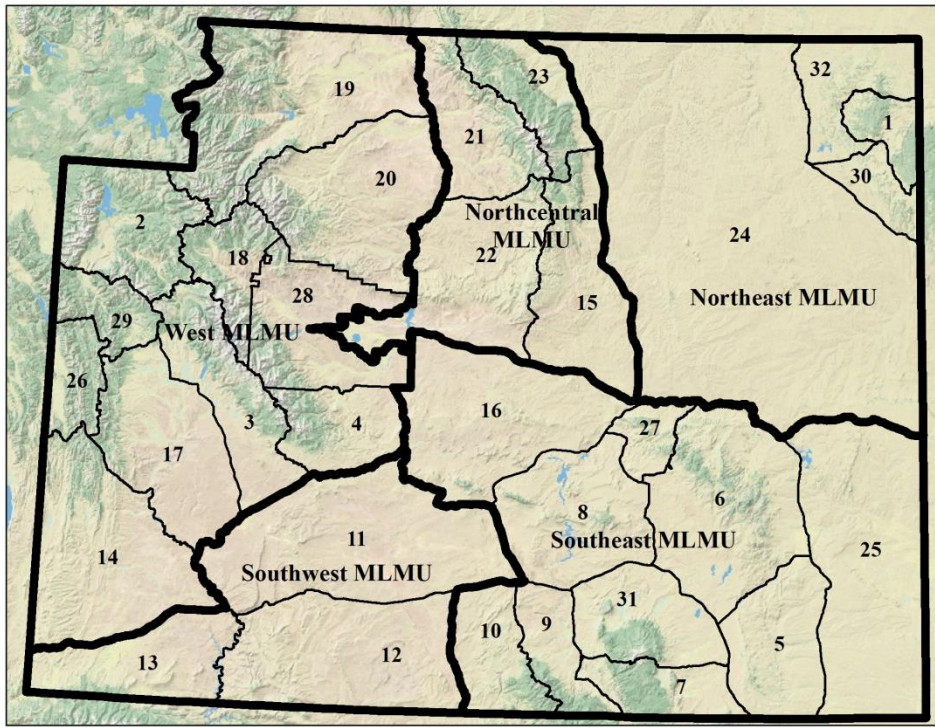
Sundance 2017 only December data

- Data from NOAA weather stations
- 6 stations with consistent data during the season



Wyoming Season

- Current Harvest Limit
 - HA 1 = 24 (4 nonres)
 - HA 24 = Unlimited
 - HA 30 = 12
 - HA 32 = 25
- Season Date Sept.1 – Mar. 31
- Harvest
 - 2010/2011 = 44
 - 2011/2012 = 47
 - 2012/2013 = 70
 - 2013/2014 = 66
 - 2014/2015 = 62
 - 2015/16 = 56
 - 2016/17 = 51
 - 2017/18 = 55





DNA Sampling – Biopsy Darting



- 3 houndsman teams
- Sampling period Nov 23- Dec 24, 2017
- 6 sampling units to ensure all areas sampled and represented
 - Area 1 = 11 Area 4 = 15
 - Area 2 = 14 Area 5 = 3
 - Area 3 = 16 Area 6 = 4
- 63 DNA samples collected (*63 in 2016*)
 - DNA sent to USFS Genetics Lab in Montana

Biopsy Darting

Catch per unit effort

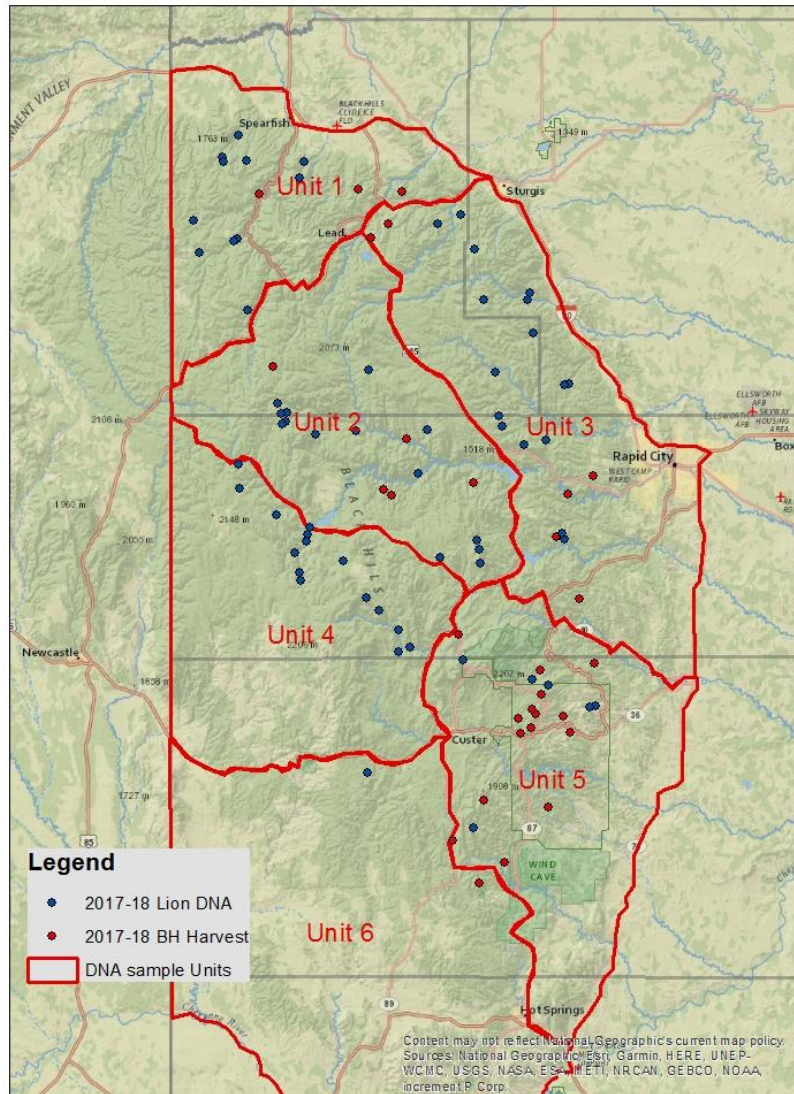


Year	hours	lions	hrs/lion	catch/100 hrs
2013	319	26.0	12.3	8.2
2014	615	31	19.8	5.0
2015	508	56	9.1	11.0
2016	578	63	9.2	10.9
2017	551	63	8.7	11.4

DNA Sampling Results – 2017/18



Black Hills Mountain Lion Harvest Locations and DNA Sampled Lions



- Survey sampling distribution
- 63 DNA samples collected via biopsy darting
 - 11 duplicates
 - 3 kittens biopsied
 - 7 active radio collared lions
 - 2 sampled in biopsy darting sampling; 5 additional collar samples
- 54 total individuals with DNA in mark/recapture analyses

POPULATION ESTIMATE

(~01 Jan 2018)

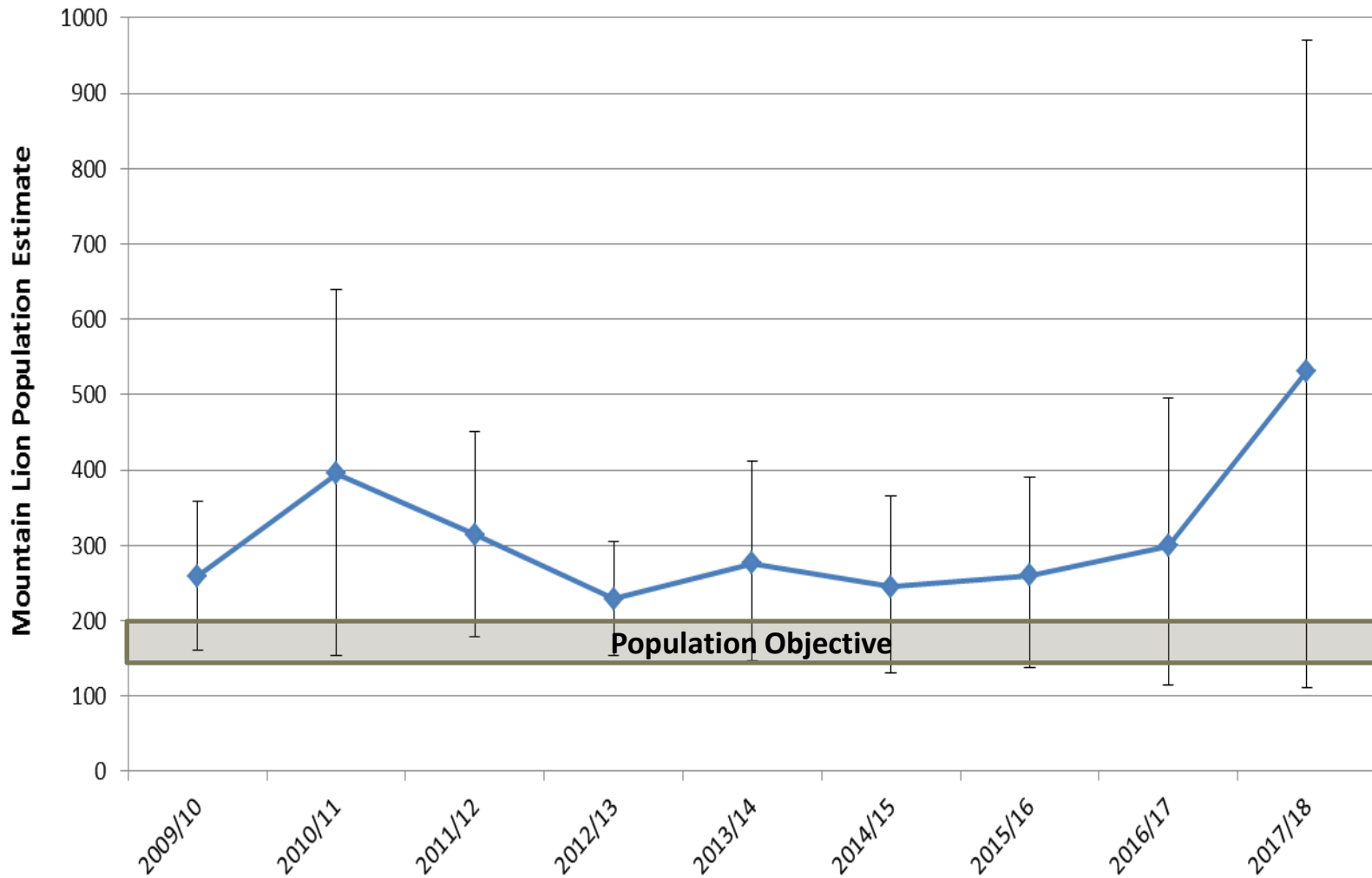


- Using Mark-Recapture Modified Lincoln-Petersen analyses
- Using 54 available DNA marked individual lions
- Estimate of adults and subadults

DNA Marked Adults/Subadults Available	Total AD/SA Harvest	# DNA Marked AD/SA harvest	LP Mod AD/SA Estimate
54	29	3	413

	<u>Total</u>	<u>95% lower</u>	<u>95% upper</u>
Adult/Subadult	413	88	737
Kitten	119	23	233
Total Population	532	111	970

Total Mountain Lion Estimates



2018 and 2019 Recommendations



- **Black Hills and CSP**
 - No change
 - Season dates: December 26 – March 31
 - Harvest limit: 40 females and 60 total
- **CSP Access Permits**
 - No change
 - 3 periods with 15 access permits (no hounds)
 - 4 periods with 3 access permits (hounds)

Summary of Lion Data



- Harvest per unit effort trending still overall downward trend
- Human-caused lion mortalities at approximately stable threshold for some western lion populations
- Adult female harvest above proportions considered stable for some western populations
- Observations trending slightly up (1 year of data)
- Non-harvest mortalities slightly up (1 year of data)
- Age of adult females harvested up (1 year of data)
- Biopsy darting catch/unit effort stable to increasing
- Population estimate increasing

- Consideration and discussion items:
 - Population estimate above objective
 - Some population thresholds established from western populations
 - Small sample sizes = variability in datasets
 - Impacts of combined WY and SD harvests

- Management Plan Revision in process....

Questions?

