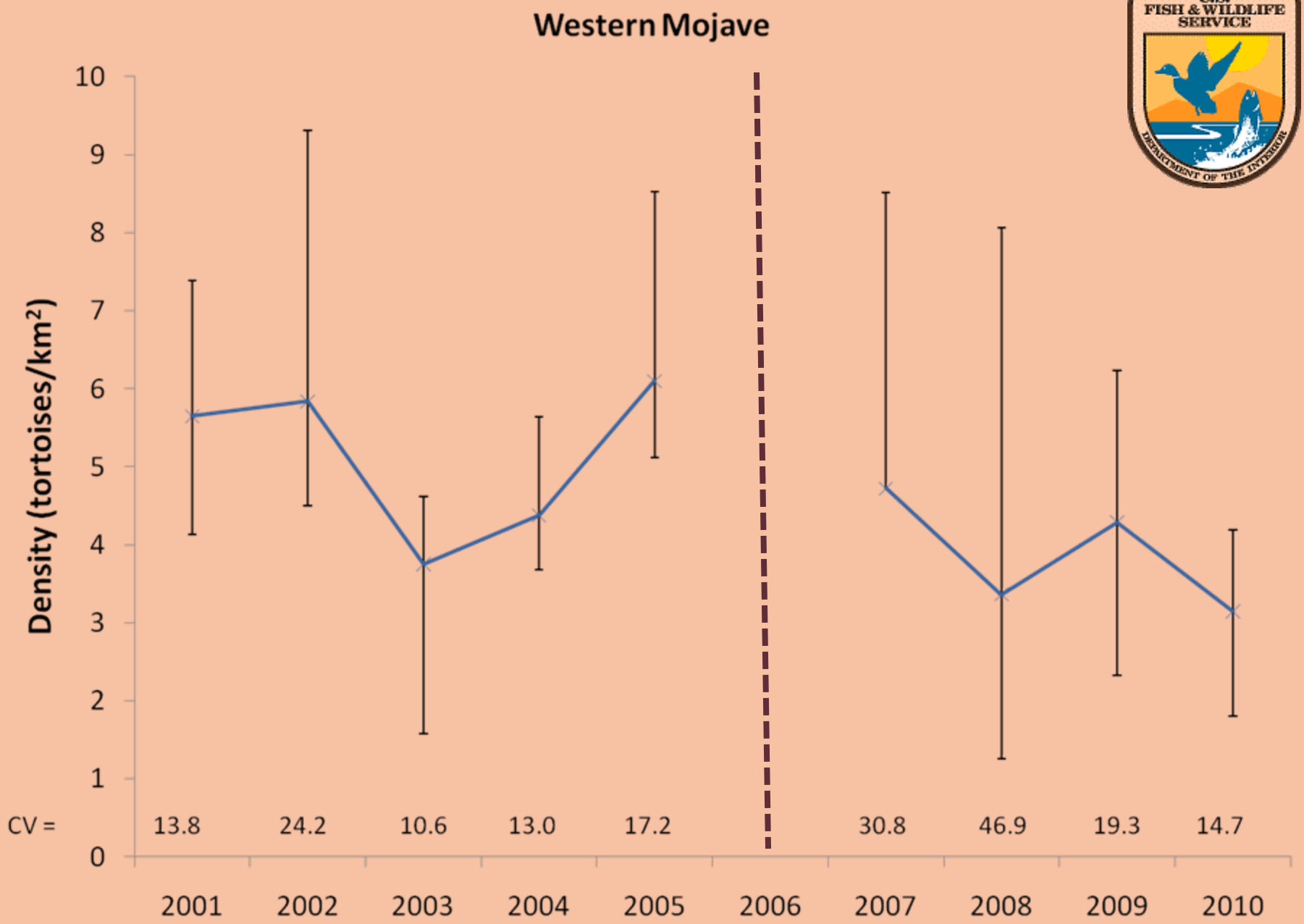
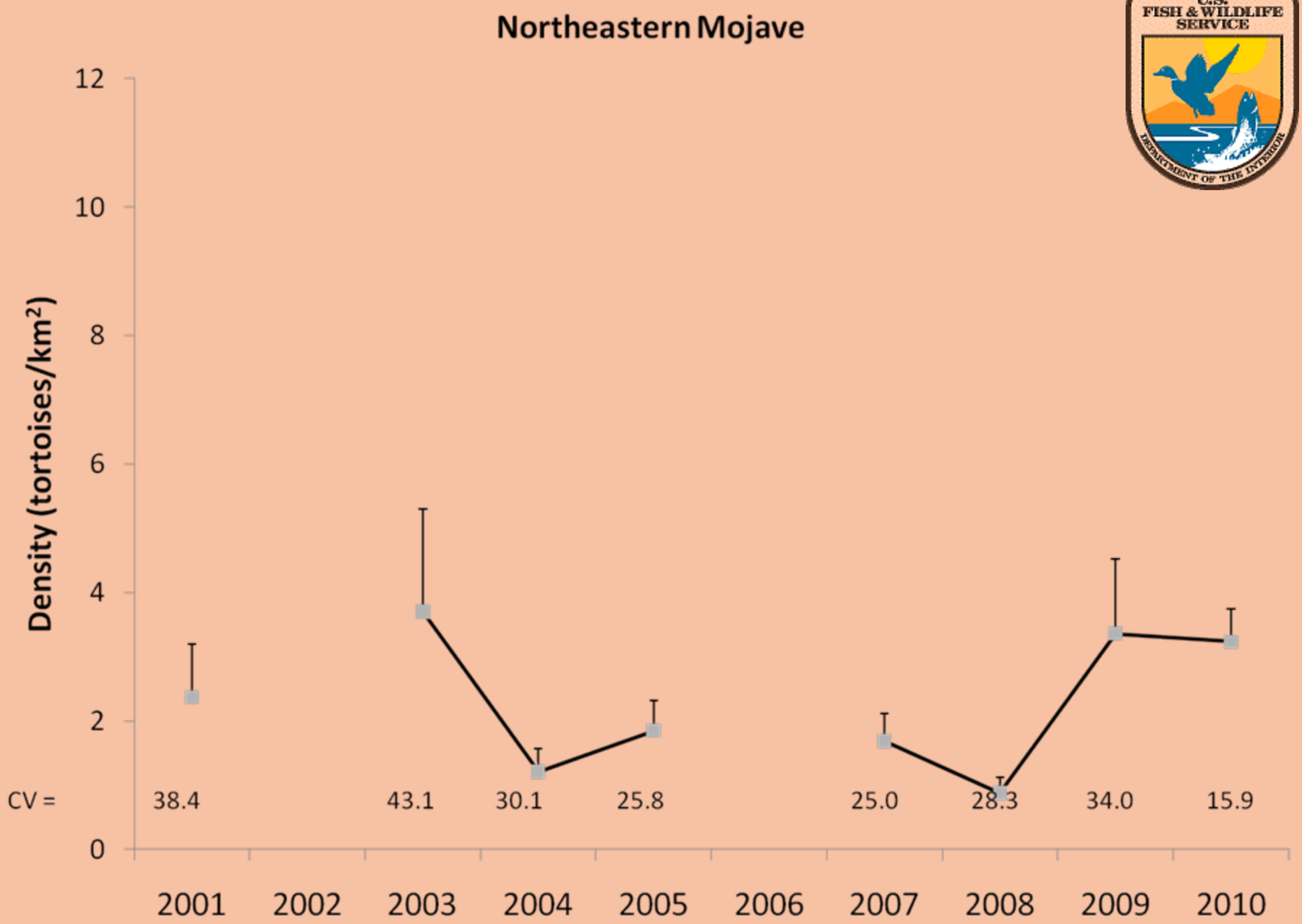
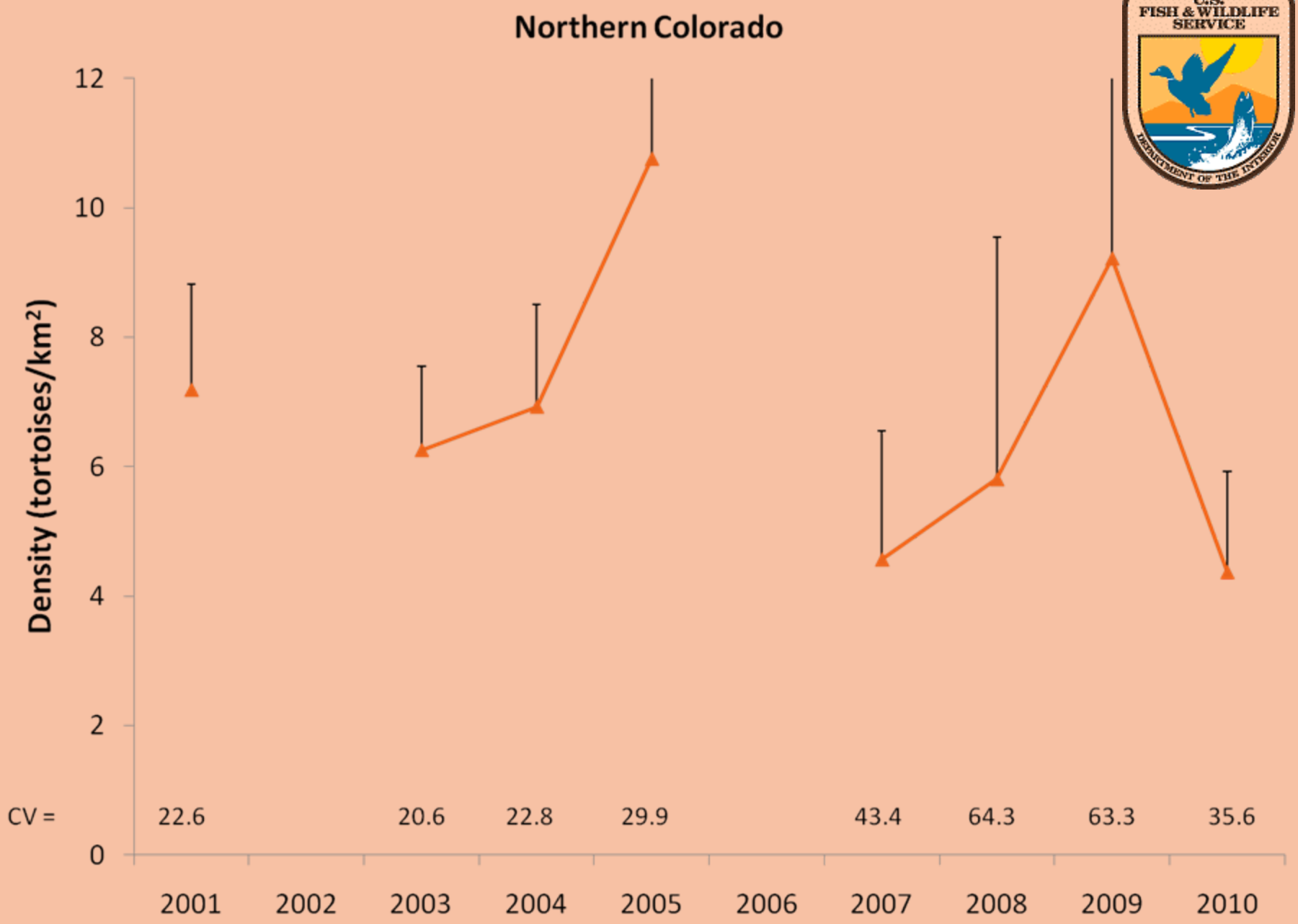
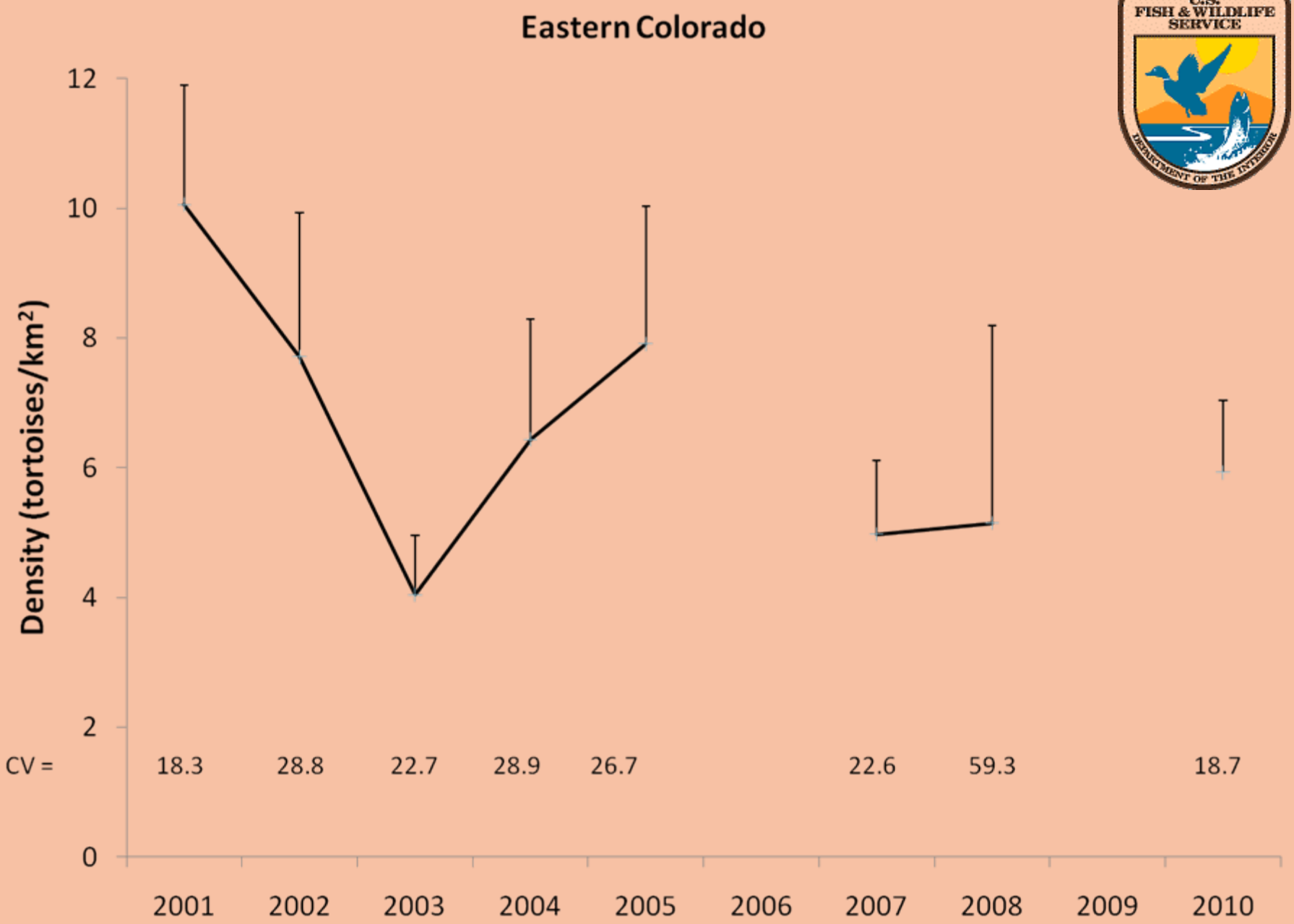

Western Mojave
Density (tortoises/km²)
10
9
8
7
6
5
4
3
2
1
0
CV =
13.8
24.2
10.6
13.0
17.2
30.8
46.9
19.3
14.7
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

Western Mojave
Density (tortoises/km²)
12
10
8
6
4
2
0
CV =
13.8
24.2
10.6
13.0
17.2
30.8
46.9
19.3
14.7
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


Northeastern Mojave
Density (tortoises/km²)
12
10
8
6
4
2
0
CV =
38.4
43.1
30.1
25.8
25.0
28.3
34.0
15.9
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

Eastern Mojave
Density (tortoises/km²)
12
10
8
6
4
2
0
CV =
46.6
22.1
20.0
20.1
25.0
37.5
29.1
30.2
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


Northern Colorado
Density (tortoises/km²)
12
10
8
6
4
2
0
CV =
22.6
20.6
22.8
29.9
43.4
64.3
63.3
35.6
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


Eastern Colorado
Density (tortoises/km²)
12
10
8
6
4
2
0
CV =
18.3
28.8
22.7
28.9
26.7
22.6
59.3
18.7
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

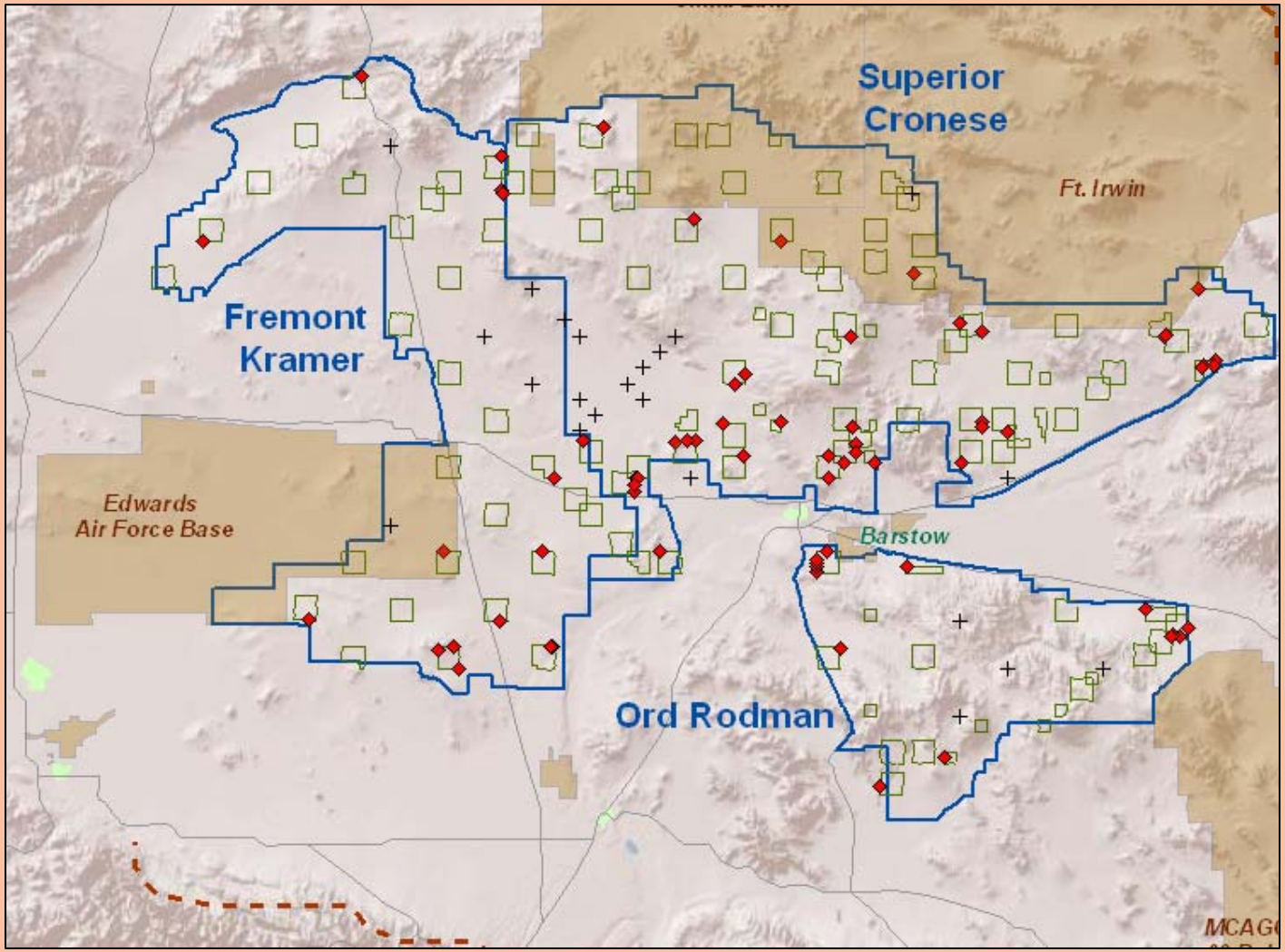
Funding

$Thousands

	2007	2008	2009	2010	2011
DOD					
Ft. Irwin	208	208	208	250	300
Edwards AFB			45		
Choc Mtn AGR	42.3	?	?	39	
BLM					
Arizona Strip	2.5		16	40	20
CA Desert District	54.8			150	(75)
NPS					
Joshua Tree	10		32.4	20	
Mojave Natl Preserve					
Grand Cyn Parashant				15	15
FWS/SNPLMA	645	618.4	611.4	687.4	614.3
Total	**$ 962.6**	**$ 826.4**	**$ 912.8**	**$ 1,201.4**	

Area that is too rugged to sample

West Mojave 2009



Tortoise abundance

2010

Stratum	Area (km^2)	Proportion sampled	SE(Prop. Sampled)	Sampled area	N (number of tortoises)	95% Confidence Interval	
						Lower Limit	Upper Limit
CMAGR	755	0.94	0.026	707	9760	5932.7	16057.5
Beaver Dam Slope	828	0.83	0.030	688	2364	1309.6	4268.2
Chuckwalla	3509	0.79	0.041	2765	10345	5720.7	18708.4
Chemehuevi	4038	0.88	0.048	3572	15613	7875.4	30952.4
Coyote Springs	1117	0.82	0.028	918	3482	2068.7	5860.2
Fenner	1862	0.95	0.037	1761	13162	6461.2	26814.1
Fremont Kramer	2462	0.98	0.000	2410	5963	3713.2	9575.2
Gold Butte-Pakoon	1977	0.74	0.029	1470	2714	1319.0	5583.3
Ivanpah	2567	0.89	0.041	2297	2622	1075.5	6390.5
Joshua Tree	1567	0.76	0.055	1191	3289	1162.9	9300.2
Mormon Mesa	968	0.80	0.027	774	4490	2815.8	7158.5
Ord Rodman	1124	0.77	0.059	868	6474	3923.2	10682.2
Piute-Eldorado	2334	0.84	0.024	1972	6100	3193.2	11654.2
Pinto Mtns	751	0.72	0.069	542	1857	677.5	5088.0
Superior Cronese	3332	0.94	0.017	3141	8256	5732.1	11890.6

Improving trend estimation

- Improved G_0 precision = precision of density estimate
- Encounter rate (n/L) is current source of most variance in the density estimate
  - Some is sampling "error": more transects = lower variance
  - Remainder is real spatial variability in tortoise distribution
- Random (=representative) sampling within DWMAs
- Continued focus on annual and interannual variance
  - What factors contribute to interannual sampling variance? Can we measure or control these?