

Whitebark Pine Cone Production

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2011 PROJECT SUMMARY

Whitebark pine (*Pinus albicaulis*) surveys on 21 established transects indicated generally good cone production during 2011 (Figure 1). Overall, mean cones/tree was 19.8 (Table 1). While cone production on most transects was good (Table 2), once again we observed better cone production (25.1 versus 17.4 mean cones/tree, *Student's t* = -1.997, *P* = 0.049) on transects established during 2007 (CSA–CAG, Figure 1 and Table 2) that tend to be located outside the Recovery Zone and on the periphery of the Greater Yellowstone Ecosystem (GYE). Difference in mean cones/tree between the 7 transects established in 2007 and older transects were also evident in 2010 and 2009; while no differences were observed in 2007 and 2008. The long-term pattern of a good cone crop in alternating or every third year has been evident since the mid 1990s (Figure 2).

Although we continue to observe mountain pine beetle (*Dendroctonus ponderosae*) caused tree mortality on our cone production transects, we observed no additional beetle-caused mortality among individual trees surveyed since 2002. Thus total mortality on transect trees read since 2002 remained at 72.6% (138/190) with 94.7% (18/19) of transects exhibiting beetle-killed trees. Five (71.4%) of the 7 new transects exhibited beetle activity.

Grizzly bears (*Ursus arctos*) typically search for this key fall food at elevations above 8,000 ft. However, extensive areas of beetle-killed whitebark pine may reduce cone abundance and availability

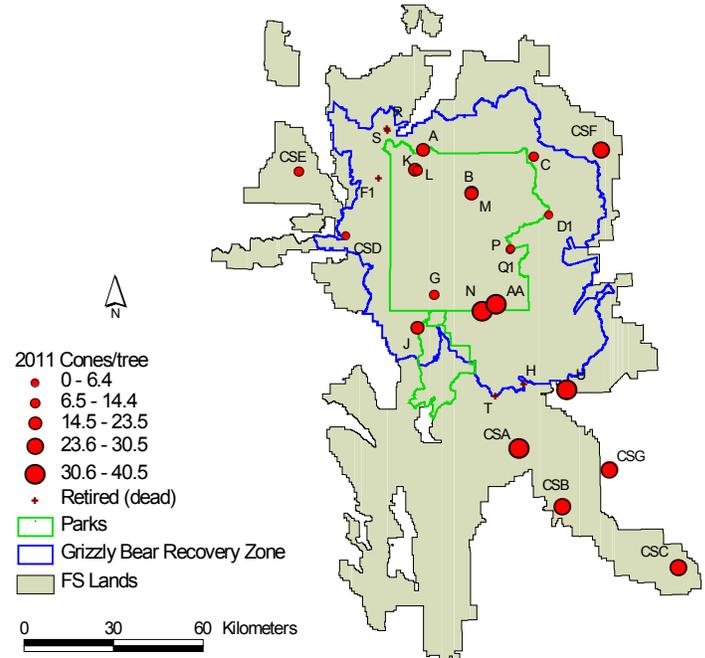


Figure 1. Locations and mean cones/tree for 21 whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 2011.

locally. Historically, numbers of grizzly bear-human conflicts and management actions tend to decrease during years with good cone production but the whitebark pine mortality evident in many areas may dampen or modify this trend. Increases in bear numbers and range expansion during the last 2 decades in the GYE also played a role in the numbers of fall conflicts observed during recent years. Simply put, as bear numbers increase, numbers of conflicts increase. Recreationists, hunters, and those who live in bear country should learn appropriate measures to avoid encounters with grizzly bears, regardless of increases

Table 1. Summary statistics for whitebark pine (*Pinus albicaulis*) cone production transects surveyed during 2011 in the Greater Yellowstone Ecosystem.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
3,562	180	21	19.8	22.2	0	124	169.6	117.4	11	405

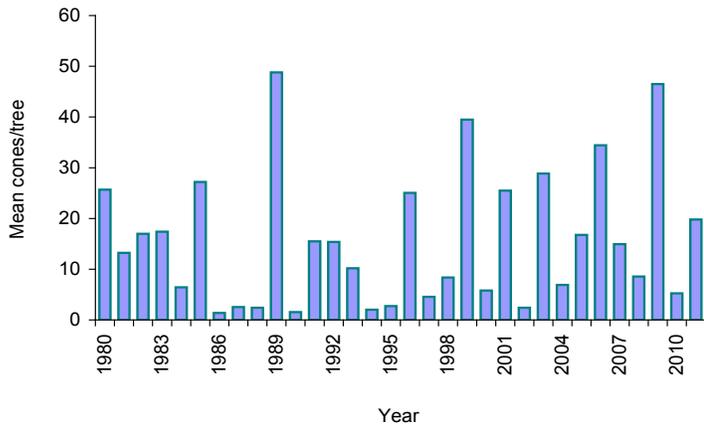


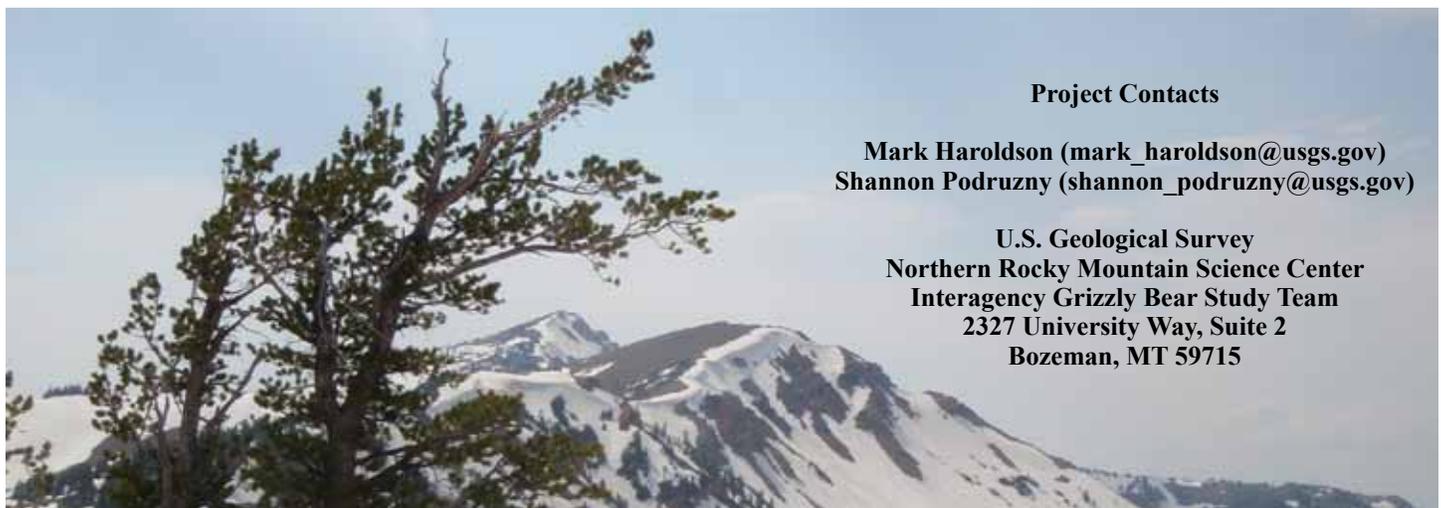
Figure 2. Annual mean cones/tree on whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 1980–2011.

in range extent, bear numbers, and the availability and abundance of fall foods. This includes good food security in both front country and backcountry settings, especially during fall months. Backcountry users are encouraged to carry and know how to use bear pepper spray, which studies have shown is effective in self-defense situations.

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Table 2. Whitebark pine (*Pinus albicaulis*) cone production transect results for 2011.

Transect	Cones	Trees	Mean	SD
A	141	6	23.5	49.4
B	182	10	18.2	11.0
C	94	9	10.4	7.0
D1	32	5	6.4	3.6
F1	Retired in 2008			
G	101	9	11.2	14.3
H	Retired in 2008			
J	187	10	18.7	19.6
K	191	10	19.1	7.6
L	144	10	14.4	11.5
M	188	10	18.8	14.2
N	351	10	35.1	15.0
P	18	10	1.8	2.4
Q1	11	10	1.1	2.0
R	Retired in 2009			
S	Retired in 2010			
T	Retired in 2008			
U	39	1	39.0	
AA	405	10	40.5	26.2
CSA	276	7	39.4	30.6
CSB	249	10	24.9	22.3
CSC	305	10	30.5	18.4
CSD	39	10	3.9	5.1
CSE	25	3	8.3	9.1
CSF	287	10	28.7	17.7
CSG	297	10	29.7	41.8



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