Interagency Grizzly Bear Study Team
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Whitebark Pine Cone Production

2012 PROJECT SUMMARY

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Whitebark pine (*Pinus albicaulis*) surveys on established transects indicated good cone production during 2012 (Figure 1). Twenty-one transects were read. Overall, mean cones/tree was 33.0 (Table 1). While cone production on most transects was good (Table 2), once again we observed better cone production (57.7 verses 21.3 mean cones/tree, *Student's t* = -4.830, P < 0.001) on transects established during 2007 (CSA–CAG, Figure 1 and Table 2) that tend to be located on the periphery of the Greater Yellowstone Ecosystem (GYE) outside the Recovery Zone. Differences in mean cones/tree between the 7 transects established in 2007 and older transects were also evident in 2011, 2010 and 2009; while no differences were observed in 2007 and 2008. Cone production among extent trees has been above average during the last 2 consecutive years (Figure 2).

Although we continue to observe mountain pine beetle (*Dendroctonus ponderosae*) caused tree mortality in stands that contain our cone production transects, we observed only 1 additional beetle caused mortality among individual trees surveyed since 2002. Total mortality on these transect trees read since 2002 is now at 73.2% (139/190) with 94.7% (18/19) of transects exhibiting beetle-killed trees. Although tree mortality from mountain pine beetle is still occurring, it appears the rate of loss has slowed (Figure 3). This suggests that at least in the vicinity of these transects, the current beetle outbreak may have run its course. Six (85.7%) of the 7 transects established during 2007 now also exhibit beetle caused mortality among transect trees.

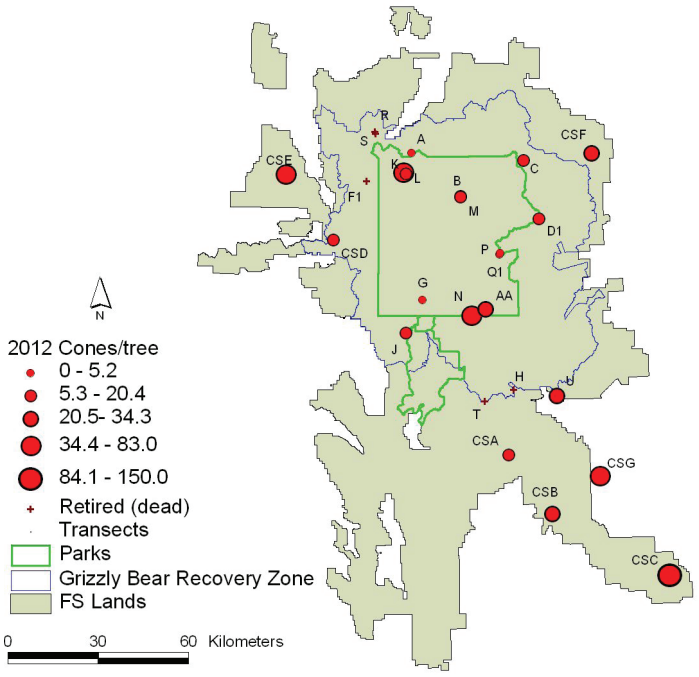

Figure 1. Locations and mean cones/tree for 21 whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 2012.

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 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

Table 1. Summary statistics for whitebark pine (*Pinus albicaulis*) cone production transects surveyed during 2012 in the Greater Yellowstone Ecosystem.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
5,879	178	21	33.0	48.8	0	335	279.9	349.9	25	1,497

Table 2. Whitebark pine (*Pinus albicaulis*) cone production transect results for 2012.

Transect	Cones	Trees	Mean	SD
A	31	6	5.2	9.8
B	166	10	16.6	13.4
C	105	8	13.1	9.0
D1	60	5	12.0	7.7
F1	Retired in 2008			
G	52	10	5.2	8.7
H	Retired in 2008			
J	115	10	11.5	10.6
K	489	9	54.3	30.5
L	174	10	17.4	12.2
M	129	10	12.9	8.7
N	768	10	76.8	48.7
P	37	10	3.7	4.2
Q1	41	10	4.1	5.9
R	Retired in 2009			
S	Retired in 2010			
T	Retired in 2008			
U	25	1	25.0	
AA	343	10	34.3	19.8
CSA	92	9	10.2	12.2
CSB	305	10	30.5	39.8
CSC	1,497	10	149.7	100.5
CSD	184	9	20.4	17.0
CSE	238	3	79.3	77.6
CSF	198	8	24.8	19.2
CSG	830	10	83.0	37.8

of fall conflicts observed during recent years. Simply put, as bear numbers increase, numbers of conflicts increase. However, regardless of increases in range extent, bear numbers, and the availability and abundance of fall foods, recreationists, hunters, and those who live in bear country should learn appropriate measures to avoid encounters with grizzly bears. These included 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. Studies have shown bear spray is effective in self-defense situations.

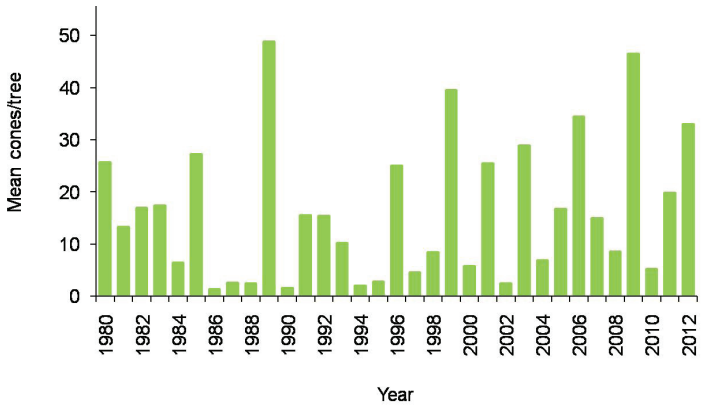

Figure 2. Annual mean cones/tree on whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 1980–2012.

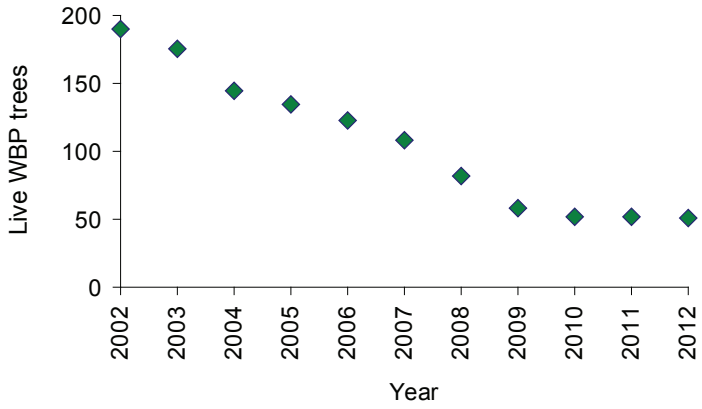

Figure 3. Number of live whitebark pine (Pinus albicaulis) trees on cone production transects among 190 individual tress monitored since 2002.

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