

Interagency Grizzly Bear Study Team

www.nrmcs.usgs.gov/research/igbst-home.htm

Whitebark Pine Cone Production

Mark A. Haroldson

U.S. Geological Survey
Northern Rocky Mountain Science Center
Interagency Grizzly Bear Study Team

2013 PROJECT SUMMARY

Whitebark pine (*Pinus albicaulis*) surveys on established transects indicated generally poor cone production during 2013 (Figure 1). Twenty-one transects were read. Overall, mean cones/tree was 5.2 (Table 1). Cone production on most transects was poor but there was one exception; transect N on the southern boundary of Yellowstone National Park averaged 27.2 cones/tree (Table 2). Cone production among extant trees during 2013 was poor for the first time since 2010 (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 2 additional beetle-caused mortalities among individual trees surveyed since 2002. Total mortality on these transect trees since 2002 is 74.2% (141/190) with 94.7% (18/19) of transects containing beetle-killed trees. Although tree mortality from mountain pine beetle is still occurring, it appears the rate of loss among our cone production transects 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 also exhibit beetle-caused mortality among transect trees.

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-

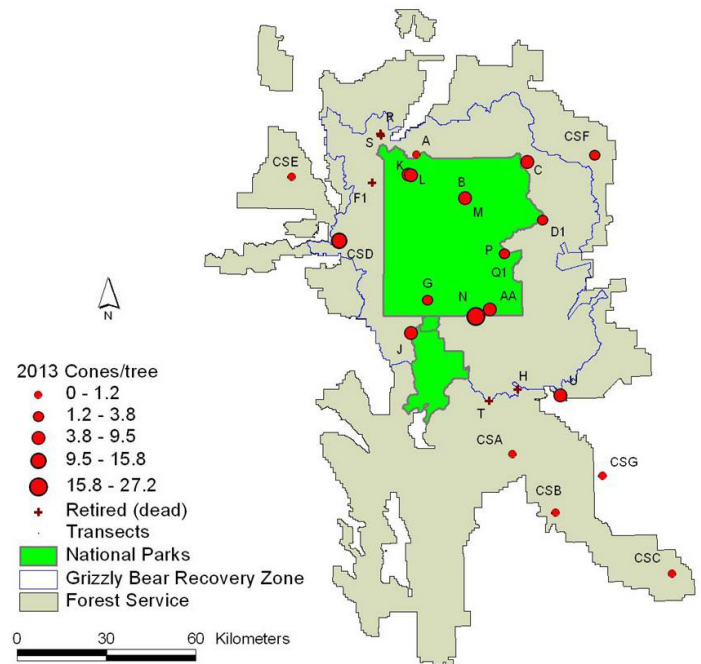


Figure 1. Locations and mean cones/tree for 21 whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 2013.

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 Greater Yellowstone Ecosystem also played a role in the numbers of fall bear-human 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

Table 1. Summary statistics for whitebark pine (*Pinus albicaulis*) cone production transects surveyed during 2013 in the Greater Yellowstone Ecosystem.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
937	179	21	5.2	11.4	0	91	44.6	62.6	0	272

Table 2. Whitebark pine (*Pinus albicaulis*) cone production transect results for 2013.

Transect	Cones	Trees	Mean	SD
A	7	6	1.2	2.0
B	15	10	1.5	1.5
C	95	10	9.5	5.6
D1	15	5	3.0	4.1
F1	Retired in 2008			
G	31	10	3.1	4.9
H	Retired in 2008			
J	64	10	6.4	7.0
K	40	7	5.7	5.1
L	67	10	6.7	6.3
M	51	10	5.1	6.1
N	272	10	27.2	30.6
P	7	10	0.7	1.3
Q1	21	10	2.1	2.5
R	Retired in 2009			
S	Retired in 2010			
T	Retired in 2008			
U	6	1	6.0	
AA	73	10	7.3	13.7
CSA	0	10	0.0	0.0
CSB	0	10	0.0	0.0
CSC	0	10	0.0	0.0
CSD	142	9	15.8	17.1
CSE	0	3	0.0	0.0
CSF	30	8	3.8	9.8
CSG	1	10	0.1	0.3

foods, recreationists, hunters, and those who live in bear country are urged to use appropriate measures to avoid encounters with grizzly bears. These include food security in front country and backcountry settings, especially during fall months. Backcountry users are strongly encouraged to carry and know how to use bear pepper spray. Studies have shown bear spray is effective in self-defense situations.

We thank all the personnel and agencies that contributed to this year's effort. They are: A. Bramblett, D. Bergum, N. Bowersock, K. Gunther, E. Johnston, K. Legg, J. Nicholson, M. Olson, and T. Wyman from the National Park Service; B. Davis,

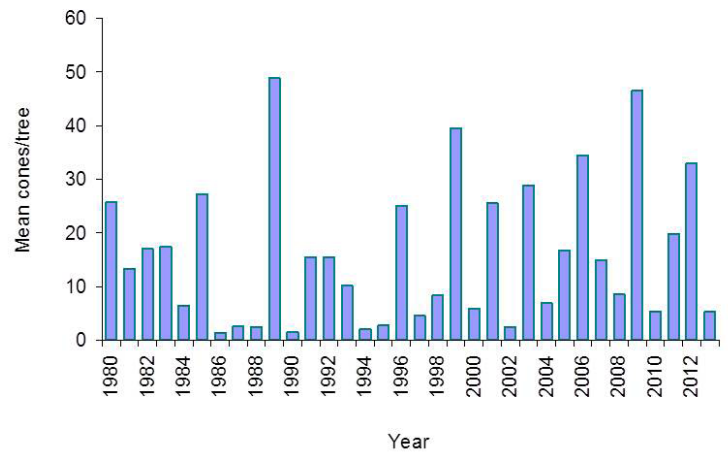


Figure 2. Annual mean cones/tree on whitebark pine (*Pinus albicaulis*) cone production transects surveyed in the Greater Yellowstone Ecosystem during 1980–2013.

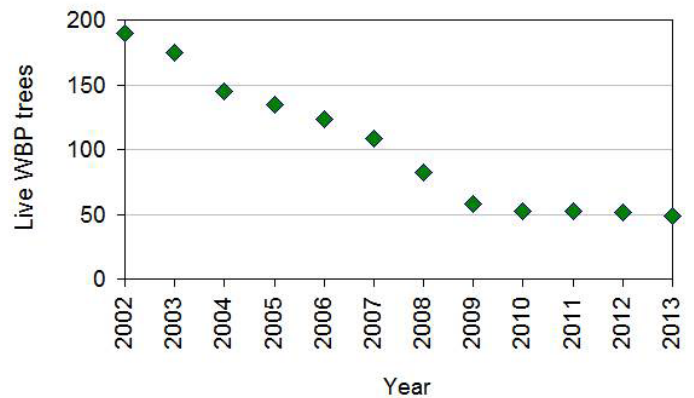


Figure 3. Number of live whitebark pine (WBP) trees on cone production transects among 190 individual trees monitored since 2002.

T. Fletcher, J. Harper, A. Pils, and D. Probasco from the U.S. Forest Service; C. Hockenbary, K. Irvine, and T. Ritter from the USGS; C. Grantham and P. Hnilicaka from the U.S. Fish and Wildlife Service; K. Smith and P. Fessler from Eastern Shoshone and Northern Arapaho Tribal Fish and Game Department; C. Atkinson, D. Bjornlie, C. Clark, Z. Gregory, C. Thompson, D. Thompson, and Z. Turnbull from Wyoming Game and Fish.

Project Contacts
Frank T. van Manen (fvanmanen@usgs.gov)
Mark A. Haroldson (mark_haroldson@usgs.gov)
 U.S. Geological Survey
 Northern Rocky Mountain Science Center
 Interagency Grizzly Bear Study Team
 2327 University Way, Suite 2
 Bozeman, MT 59715