

Interagency Grizzly Bear Study Team

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Whitebark Pine Cone Production



Whitebark pine (*Pinus albicaulis*) surveys on 21 established transects indicated slightly above average cone production during 2019 (Figure 1). Overall, the mean number of observed cones/tree was 19.6 (Table 1), similar to the overall average of 17 for the period 1980–2019 (Fig. 2). Cone production was above average on the southern transects in the Wind River Range (Fig. 1, Table 2).

Occasional tree mortality caused by mountain pine beetle (*Dendroctonus ponderosae*) may still occur in stands that contain our cone production transects. However, during 2019 we did not observe additional beetle-caused mortality among individual trees that have been surveyed since 2002. Total mortality on these transect trees since 2002 remains at 75.8% (144/190) with 100% (19/19) of transects containing beetle-killed trees. Cumulative loss among the original 190 trees has not changed in almost a decade (Fig. 3). Similar to findings reported by the Greater Yellowstone Whitebark Pine Monitoring Working Group, these data support the interpretation that the mountain pine beetle outbreak has run its course.

Grizzly bears (*Ursus arctos*) typically search for whitebark pine seeds at elevations above 8,000 ft. However, extensive areas of beetle-killed whitebark pine and fire events may reduce local cone abundance and availability. A recent study indicated that grizzly bear selection for whitebark pine stands has declined since the early 2000s and is now in proportion to stand availability within fall ranges of

2019 PROJECT SUMMARY

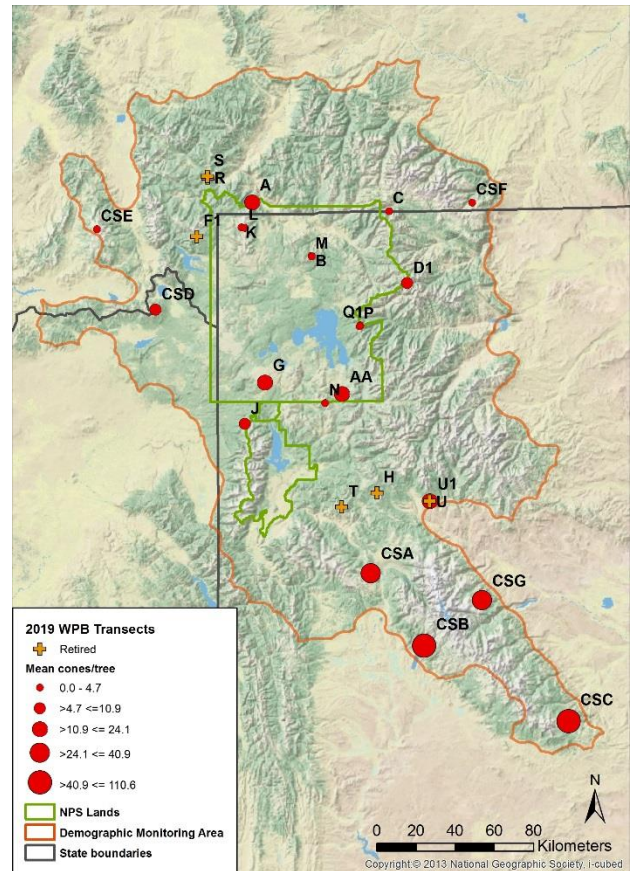


Fig. 1. Locations and mean number of cones/tree for 21 whitebark pine cone production transects surveyed in the Greater Yellowstone Ecosystem, 2019. Labels reflect transect identifiers (see Table 2).

grizzly bears. Human-grizzly bear conflicts and management actions tend to be lower during years with abundant natural food production, including whitebark pine. Increases in bear numbers and range expansion beyond the Demographic Monitoring Area during the last 2 decades likely influences the frequency of fall conflicts as well.

Table 1. Summary statistics for whitebark pine cone production surveys, Greater Yellowstone Ecosystem, 2019.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
3,644	186	21	19.6	44	0	409	173.5	266	0	1,106

Table 2. Results of whitebark pine cone production surveys, Greater Yellowstone Ecosystem, 2019.

Transect	No. of cones	No. of trees	Mean no. cones/tree	SD
A	65	4	16.3	30.5
B	47	10	4.7	5.3
C	20	10	2.0	3.0
D1	109	10	10.9	10.1
F1	-----Transect retired in 2008-----			
G	165	10	16.5	16.7
H	-----Transect retired in 2008-----			
J	75	10	7.5	8.9
K	18	7	2.6	3.3
L	15	10	1.5	2.0
M	3	10	0.3	0.5
N	24	10	2.4	3.6
P	38	10	3.8	3.7
Q1	40	10	4.0	4.7
R	-----Transect retired in 2009-----			
S	-----Transect retired in 2010-----			
T	-----Transect retired in 2008-----			
U	-----Transect retired in 2016-----			
U1	241	10	24.1	18.9
AA	169	10	16.9	10.3
CSA	368	9	40.9	31.5
CSB	718	10	71.8	56.7
CSC	1106	10	110.6	129.0
CSD	105	10	10.5	8.9
CSE	0	2	0.0	0.0
CSF	13	4	3.3	4.3
CSG	305	10	30.5	34.4

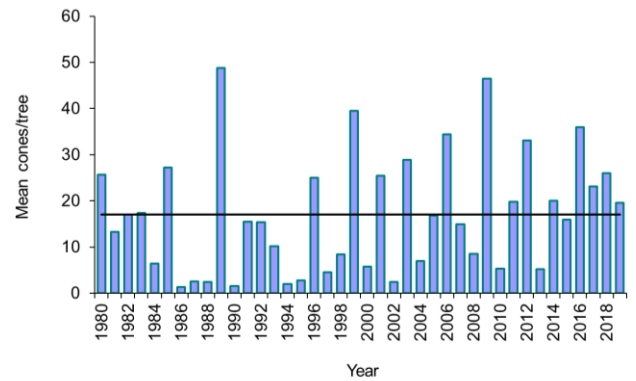


Fig. 2. Annual mean number of cones/tree observed along whitebark pine cone production transects, Greater Yellowstone Ecosystem, 1980–2019. The overall average of 17 cones/tree is shown as a solid horizontal line.

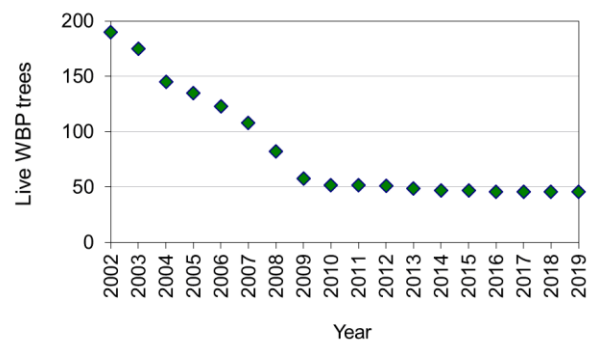


Fig. 3. Number of live whitebark pine (WBP) trees on cone production transects among 190 individual trees monitored since 2002 in the Greater Yellowstone Ecosystem, 2002–2019.

Regardless of increases in range extent, bear numbers, or the availability and abundance of fall foods, recreationists, hunters, and those who live in bear country are urged to use appropriate measures to avoid encounters with grizzly bears. These include securing attractants and foods in frontcountry and backcountry settings, particularly during fall months. Backcountry users are strongly encouraged to carry and know how to use bear spray. Studies have shown bear spray is effective in self-defense situations.

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