Interagency Grizzly Bear Study Team

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2020 PROJECT SUMMARY

Whitebark Pine Cone Production

Whitebark pine (*Pinus albicaulis*) surveys on 21 established transects indicated slightly above average cone production for 2020 (Fig. 1). Overall, the mean cones/tree of 19.4 (Table 1) was similar to the long-term average of 17 cones/tree for the period 1980–2019 (Fig. 2). Cone production was generally higher on the northern transect and lower on the southern (Fig. 1, Table 2). The southern exception was transect CSG with an average of 54.9 cones/tree (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 2020 we did not observe additional beetle-caused mortality among individual trees that have been surveyed since 2002. Total mortality on 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 within their

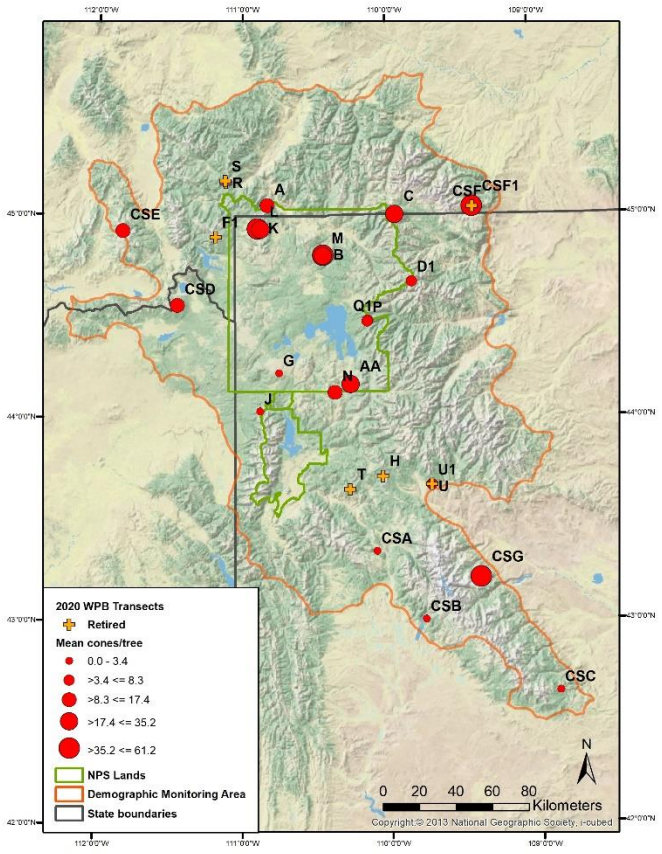

Fig. 1. Locations and mean number of cones/tree for 21 whitebark pine cone production transects surveyed in the Greater Yellowstone Ecosystem, 2020. Labels reflect transect identifiers (see Table 2).

fall home ranges, bears are now using these stands in proportion to their availability. 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, 2020.

Total			Trees				Transect			
Cones	Trees	Transects	Mean cones	SD	Min	Max	Mean cones	SD	Min	Max
3,727	192	21	19.4	25	0	136	177.5	168	0	549

Table 2. Results of whitebark pine cone production surveys, Greater Yellowstone Ecosystem, 2020.

Transect	No. of cones	No. of trees	Mean no. cones/tree	SD
A	58	4	14.5	25.7
B	416	10	41.6	13.0
C	287	10	28.7	15.3
D1	83	10	8.3	6.7
F1	-----Transect retired in 2008-----			
G	34	10	3.4	4.8
H	-----Transect retired in 2008-----			
J	28	10	2.8	3.2
K	428	7	61.1	35.2
L	352	10	35.2	23.2
M	239	10	23.9	17.7
N	143	10	14.3	13.0
P	47	10	4.7	6.2
Q1	59	10	5.9	5.2
R	-----Transect retired in 2009-----			
S	-----Transect retired in 2010-----			
T	-----Transect retired in 2008-----			
U	-----Transect retired in 2016-----			
U1	69	10	6.9	5.3
AA	250	10	25.0	24.9
CSA	16	10	1.6	2.0
CSB	22	10	2.2	2.8
CSC	11	10	1.1	1.0
CSD	157	9	17.4	15.6
CSE	33	2	16.5	12.0
CSF	----Transect retired in 2019----			
CSF1[a]	446	10	44.6	43.9
CSG	549	10	54.9	39.1

[a]Retired transect CSF replaced with CSF1 in 2020.

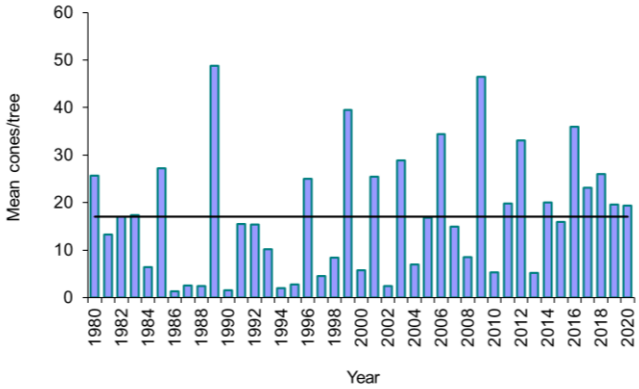

Fig. 2. Annual mean number of cones/tree observed along whitebark pine cone production transects, Greater Yellowstone Ecosystem, 1980–2020. The long-term average of 17 cones/tree is shown as a solid horizontal line.

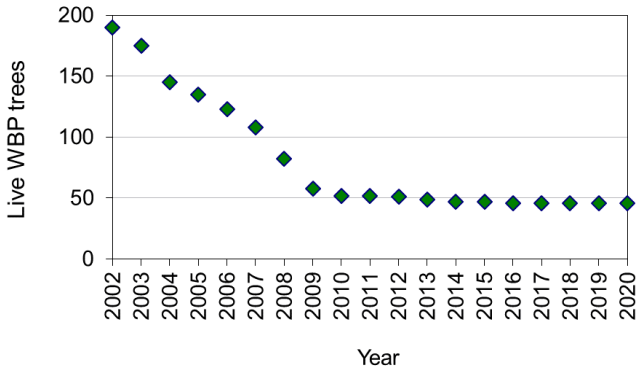

Fig. 3. Number of live whitebark pine (WBP) trees on cone production transects among 190 individual trees monitored since 2002 in the Greater Yellowstone Ecosystem, 2002–2020.

Regardless of increases in occupied range, 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 at all times, and 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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