

SPECIES: Scientific [common]	<i>Ovis canadensis</i> [Rocky Mountain Bighorn Sheep]
Forest:	Bridger-Teton National Forest
Forest Reviewer:	Randall Griebel, James Wilder
Date of Review:	08/6/2018; updated 4/17/2025
Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)	NO

FOREST REVIEW RESULTS:

1. The Forest concurs or recommends the species for inclusion on the list of potential SCC:
Yes ___ No X
2. Rationale for not concurring is based on (check all that apply):
Species is not native to the plan area _____
Species is not known to occur in the plan area _____
Species persistence in the plan area is not of substantial concern X

FOREST REVIEW INFORMATION:

1. Is the Species Native to the Plan Area? Yes X No ___

If no, provide explanation and stop assessment.
2. Is the Species Known to Occur within the Planning Area? Yes X No ___

If no, stop assessment.

Table 1. All Known Occurrences, Years, and Frequency within the Planning Area

Year Observed	Number of Individuals	Location of Observations	Source of Information
1979-1998	94	Greys River Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1999-2015	268		
1999	9	Kemmerer Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1978-1998	1254	Pinedale Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1999-2015	1832		
1979-1998	2497	Big Piney Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1999-2015	796		
1979-1998	806	Blackrock Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1999-2015	962		
1977-1998	8366	Jackson Ranger District	Wyoming Game & Fish Department WOS Data (2014); Wyoming Natural Diversity Database (2017)
1999-2015	7474		

a. Are all Species Occurrences Only Accidental or Transient?

Yes ___ No X ___

If yes, document source for determination and stop assessment.

b. For species with known occurrences on the Forest since 1990, based on the number of observations and/or year of last observation, can the species be presumed to be established or becoming established in the plan area?

Yes X ___ No ___

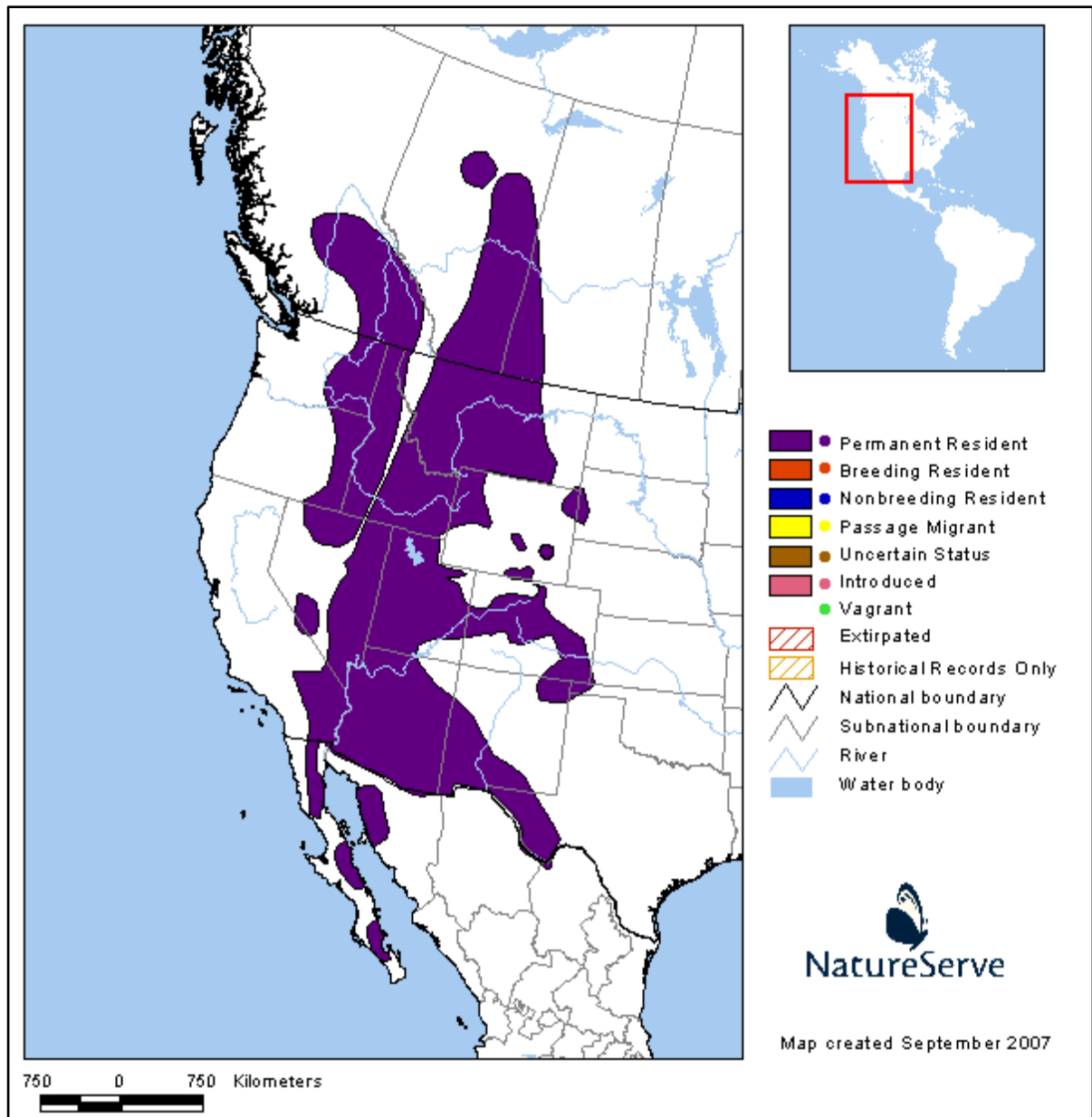
If no, provide explanation and stop assessment.

c. For species with known occurrences on the Forest predating 1990, does the weight of evidence suggest the species still occurs in the plan area?

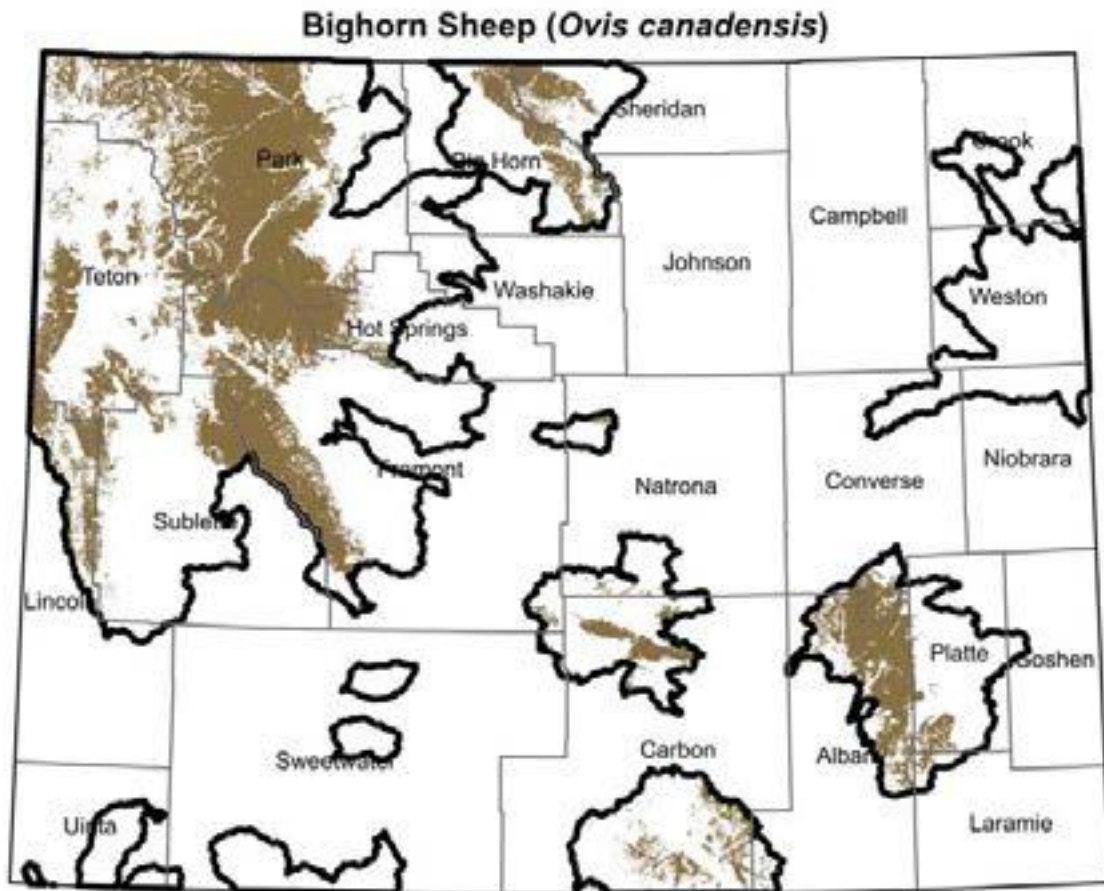
Yes X ___ No ___

If no, provide explanation and stop assessment.

d. **Map 1**, Bighorn sheep range map (Nature Serve, Accessed June 2018).



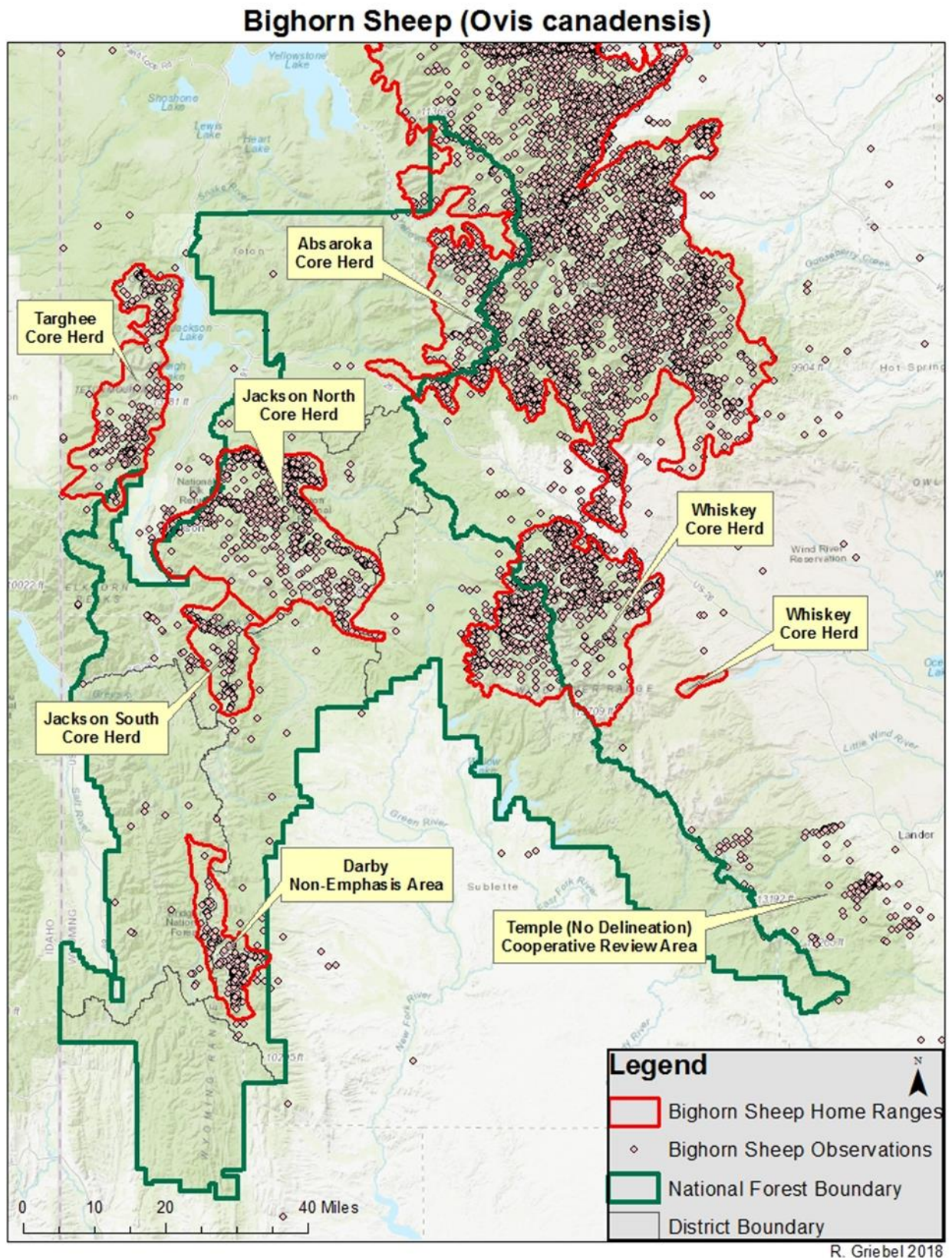
- e. **Map 2**, Range and predicted distribution of bighorn sheep in Wyoming.



SOURCE: Digital maps of ranges for Wyoming Species of Greatest Conservation Need: Sept. 2016. Wyoming Game and Fish Department and Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.
Note that brown indicates the predicted distribution of the species; heavy black lines indicate outermost boundaries of possible occurrence.

Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (*Ovis canadensis*).

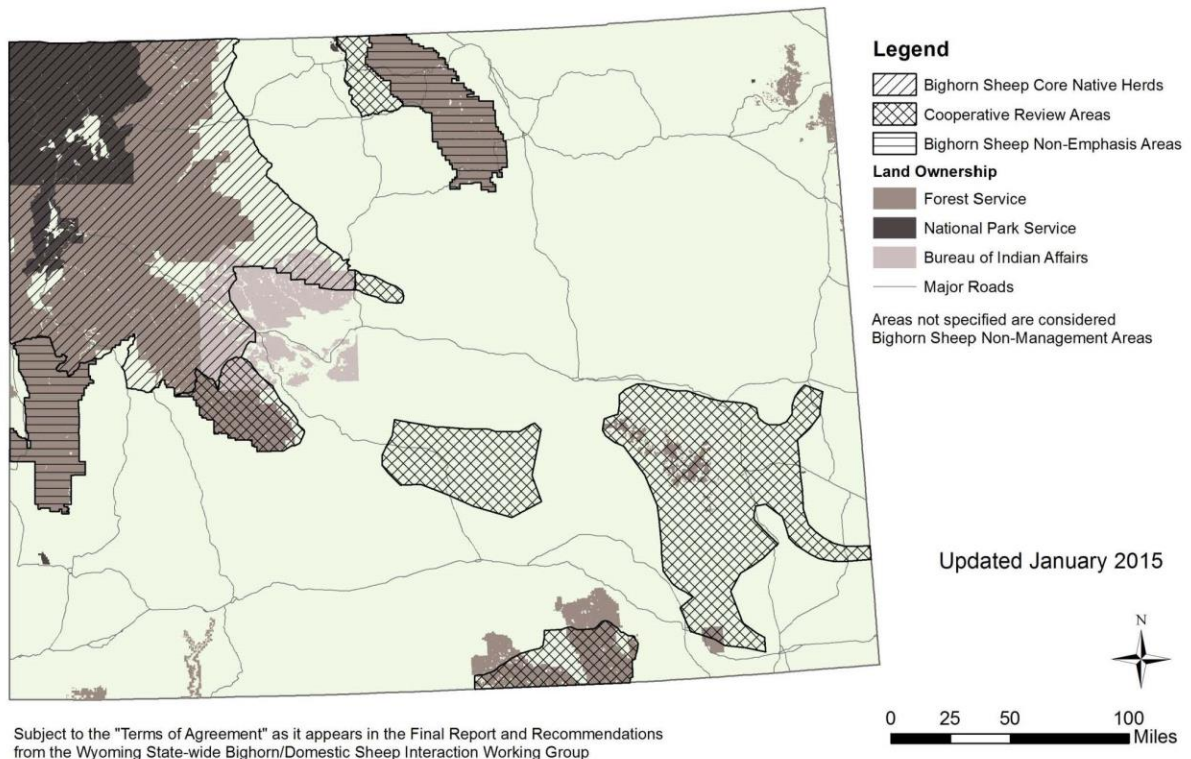
- f. **Map 3**, Map of bighorn sheep observations and home ranges on the Bridger-Teton National Forest and vicinity (Wyoming Natural Diversity Database, USFS Natural Resource Information System, Wyoming Game & Fish Department).



**Single occurrence locations may have groups of individuals observed.*

g. **Map 4**, Map of bighorn sheep management areas in Wyoming.

Wyoming Bighorn Sheep Management Areas



DEFINITIONS – BIGHORN SHEEP MANAGEMENT AREAS

Bighorn Sheep Core, Native Herds

- These are Wyoming's largest bighorn sheep populations.
- These are the highest priority areas for bighorn sheep management in Wyoming.
- These herds have never been extirpated, then reestablished via transplants. They include the Clarks Fork, Trout Peak, Wapiti Ridge, Younts Peak, Francs Peak, Targhee, Jackson and whiskey Mountain Herds.
- These sheep herds occur in the Teton, Absaroka, Gros Ventre and Wind River Ranges.
- Domestic sheep may occur within the boundaries of the core, native bighorn sheep herds. All efforts will be made to prevent contact between bighorn and domestic sheep, as agreed to by the Statewide Bighorn/Domestic Sheep Interaction Working Group.

Cooperative Review Areas

- These are the areas of suitable bighorn sheep range where proposed changes in bighorn sheep management or domestic sheep use will be cooperatively evaluated.
- This includes most suitable bighorn sheep range in Wyoming not addressed in the core, native herds or non-emphasis areas.

Bighorn Sheep Non-Emphasis Areas

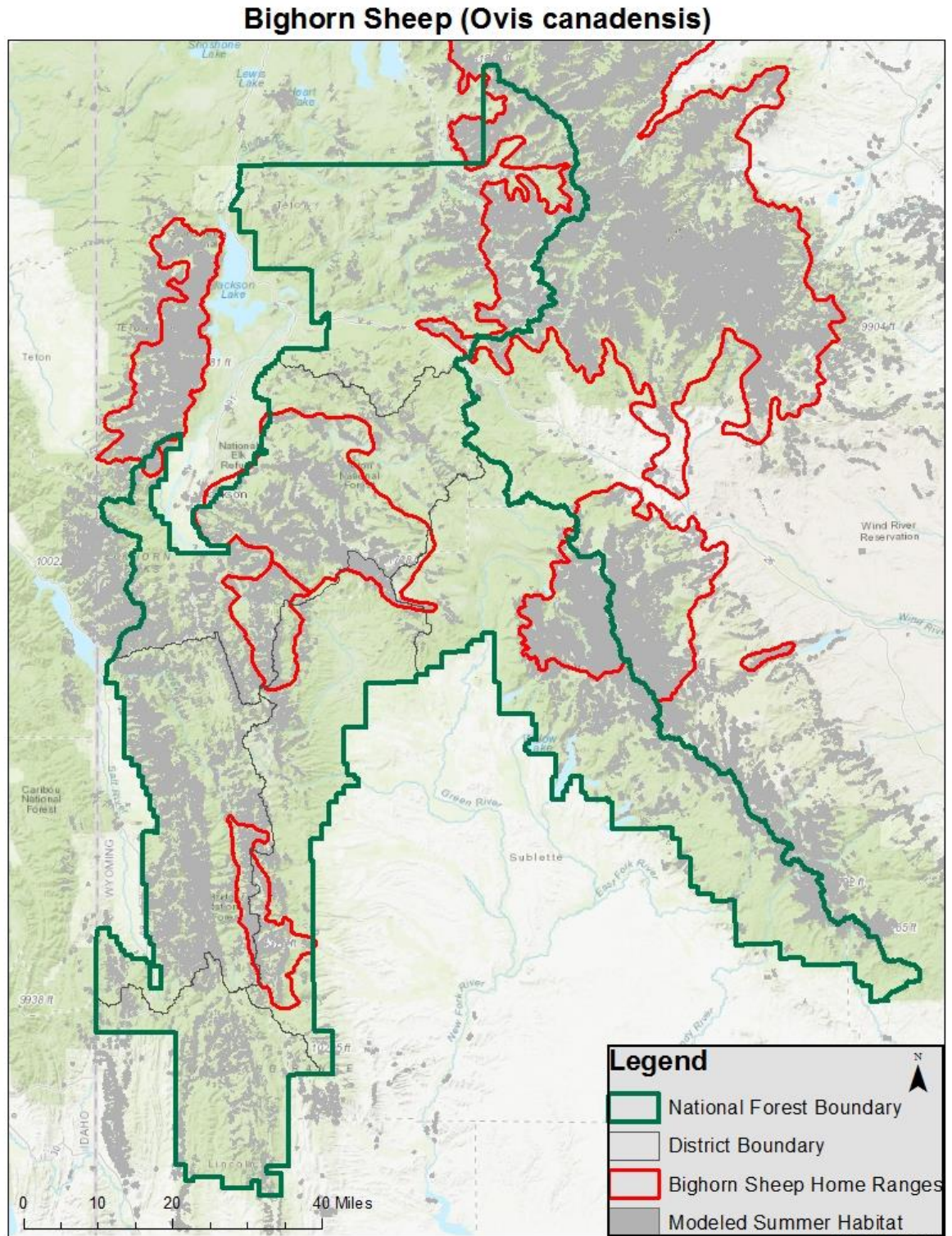
- These are the lowest priority areas for bighorn sheep management.

- These include the Wyoming, Salt River and Bighorn Ranges on National Forest.
- No effort will be made to prioritize/emphasize bighorn sheep unless agreed to by the statewide Domestic/Bighorn Sheep Interaction/Working Group.
- Any existing bighorn sheep populations will not be protected at the expense of domestic sheep grazing.

Wyoming Game and Fish Department. 2018. Statewide Bighorn/Domestic Sheep Interaction Working Group, Maps - Statewide Bighorn Sheep Management Areas.

<https://wgfd.wyo.gov/Wildlife-in-Wyoming/More-Wildlife/Bighorn-Sheep>.

- h. **Map 5**, Modeled bighorn sheep summer habitat, most winter habitat overlaps summer habitat (*Preferred habitat includes those areas with slopes between 31–85 degrees, <30% forest cover, have ruggedness features, or connective habitat; those within 300m of preferred habitat*).



3. Is There Substantial Concern for the Species' Capability to persist Over the Long-term in the Plan Area Based on Best Available Scientific Information?

Table 3. Status summary based on existing conservation assessments

Entity	Status/Rank (include definition if Other)
<p>NatureServe Global Status</p>	<p>G4—Apparently Secure</p> <p><i>Apparently Secure: At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.</i></p> <p><i>“Still widespread in western North America from Canada to Mexico, although populations are much smaller than in the past. In some areas threatened by habitat changes resulting from fire suppression, interactions with feral and domestic livestock, and human encroachment; protected in some areas through adequate management.” [Nature Serve 2018]</i></p>
<p>NatureServe State Status</p>	<p>S2— Imperiled</p> <p><i>Imperiled: At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.</i></p> <p>[Nature Serve 2025]</p>
<p>WGFD</p>	<p>NSS4 (Bc), Tier II</p> <p><i><u>Population Status:</u> Population size or distribution is restricted or declining but extirpation is not imminent.</i></p> <p><i><u>Limiting Factors:</u> Limiting factors are moderate and appear likely to increase in severity.</i></p> <p><i><u>Tier II:</u> Moderate priority.</i></p> <p><i>[The WGFD’s Species of Greater Conservation Need (SGCN) designation process is based upon its Native Species Status (NSS) classification system that compares population and limiting factor variables using a 16 cell matrix. As a species moves from a placement closest to the upper left corner of the matrix (Aa/NSS1) toward the lower right corner (Dd/NSS7) the species’ population status in Wyoming is considered more secure. Numerical scores were assigned to each of these variables and summed to provide a total score (i.e. NSS3). SGCN were placed into one of three tiers based on their total score: Tier I – highest priority, Tier II – moderate priority, and Tier III – lowest priority.]</i></p> <p>(WGFD - Wyoming Species of Greatest Conservation Need)</p>

WYNDD	<p>Species of Potential Concern</p> <p><i>Species that appear to be secure at present, but because they have limited distribution as regional or state endemics they could become vulnerable under large-scale changes. Species with this status warrant periodic checks.</i></p> <p>(Wyoming Natural Diversity Database - Species of Potential Concern; http://www.uwyo.edu/wyndd/species-of-concern/)</p>
USDA Forest Service	<p>Region 4: Sensitive Species</p> <p><i>Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by</i></p> <ul style="list-style-type: none"> <i>a. Significant current or predicted downward trends in population numbers or density.</i> <i>b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.</i> <p>(FSM 2670.5 – Threatened, Endangered & Sensitive Species)</p>
USDI FWS	No Special Status; Listing Not Warranted
WY BLM	No Special Status
IUCN	<p>LC - Least Concern</p> <p><i>A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.</i></p> <p>(IUCN – Red List Categories and Criteria)</p>
State of Wyoming	<p>Big Game Animal</p> <p><i>Big game species include antelope, whitetail deer and mule deer, elk, bighorn sheep, moose and mountain goats.</i></p> <p>{WGFD. 2018. https://accessyes.wyo.gov/regulations#Big-Game}</p>

Table 4. Status summary based on best available scientific information.

Species (Scientific and Common Name): <i>Ovis canadensis</i> [Rocky Mountain Bighorn Sheep]		
Criteria	Rationale	Literature Citations
Distribution on the Bridger-Teton National Forest	<p>The bighorn sheep is a year-round resident of Wyoming (Maps 1 and 2) and the core herds of northwest Wyoming exhibit a variety of migratory strategies, from regular seasonal movements between high elevation summer ranges and lower winter ranges to year-round occupation of high elevation ranges, and from simple altitudinal shifts to long distance (>50 mi) circuitous migrations (WGFD 2017). Bighorn sheep occur in four core herds, which are all located to some extent on the Bridger-Teton National Forest (BTNF). These herds are located in the Absaroka (Absoraka Herd), Teton (Targhee Herd), Gros Ventre (Jackson Herds), and Wind River (Whiskey Herd) mountain ranges (Map 3) (WGFD 2017). There is ongoing research to help answer that question but for now, they are considered separate core herds. Additionally, there are ten smaller herds which have been augmented or re-established via transplants that occur in the Wyoming (Darby Herd), Snowy, Sierra Madre, and Laramie mountain ranges, as well as the Seminoe and Ferris Mountains, southern end of the Wind River Mountains (Temple Herd), west slope of the Bighorn Mountains, the Black Hills, and Wind River Canyon (Maps 2 and 3) (WGFD 2017). The Darby herd is located on the BTNF in a bighorn sheep non-emphasis management area (Maps 3 and 4); the herd was established through translocations from the Whiskey Basin (near Dubois) to Fish Creek Mountain in 1981 and 1987 (Beecham et al. 2007). The Temple Peak herd is located primarily east of the continental divide in a bighorn sheep cooperative review management area (Maps 3 and 4). The WGFD is currently collecting additional data using radio-marked bighorn sheep to understand the status of the population and eventually delineate a home range. This herd spends nearly all of their time on the Shoshone National Forest and Wind River Reservation, with the occasional move to the west side of the continental divide onto the BTNF by individuals, but these excursions are short-lived and they return back east of the divide relatively quickly (WGFD, personal communication).</p>	<p>Beecham, J.J. Jr., C.P. Collins, and T.D. Reynolds. 2007. Rocky Mountain Bighorn Sheep (<i>Ovis canadensis</i>): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5200308.</p> <p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>).</p>
Abundance on the Bridger-Teton National Forest	<p>In 2024 it was estimated there were about 6,987 bighorn sheep in Wyoming (WAFWA 2024). The large core herds in the northwest corner of the state account for over 85% of Wyoming’s statewide total, and represent some of the largest</p>	<p>Western Association of Fish and Wildlife Agencies. 2024. 2024 RANGE-WIDE STATUS OF BIGHORN AND THINHORN</p>

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	<p>meta-populations of Bighorn Sheep throughout its range. Wyoming has approximately 20% of the total number of <i>O. c. canadensis</i> in the contiguous United States and 15% of the total range-wide estimate of sheep (including Canada) (WGFD 2017). Although the exact population size on the forest is unknown, individual herd size is variable and ranges from ~60 to ~900 animals. Some of the larger BTNF herds such as the Whiskey and Younts Peak Herd (Sub-herd of the Absaroka meta-population) are located on both the BTNF and the Shoshone NF (Map 3; WGFD 2016).</p>	<p>SHEEP IN NORTH AMERICA. https://wafwa.org/wp-content/uploads/2024/07/2024-Rangewide-Status-of-Wild-Sheep_07082024.pdf. 67 pp.</p> <p>Wyoming Game and Fish Department. 2016. 2016 Big Game Job Completion Reports, Bighorn Sheep. https://wgfd.wyo.gov/Hunting/Job-Completion-Reports/2016-Big-Game-Job-Completion-Reports.</p> <p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>). . 67 pp.</p>
<p>Population Trend on the Bridger-Teton National Forest</p>	<p>Prior to European settlement, bighorn sheep lived in suitable habitats throughout Wyoming. While historic numbers were almost certainly greater than current populations, there are no precise estimates of previous abundance. In 1960 there were estimated to be 2,000 bighorn sheep in Wyoming, restricted entirely to the northwest corner of the state (Buechner 1960; <i>in</i> WGFD 2017). By 1990, this estimate had risen to over 7,000 and it has ranged between 6,000 and 7,000 since that time, with populations established in central, eastern, and southern Wyoming. Range-wide population trends appear to be downward, but not significantly (WGFD 2017).</p> <p><u>BTNF Herd Population Trends (WGFD 2023)</u></p> <p>Absaroka</p>	<p>Buechner, H. K. 1960. The Bighorn Sheep in the United States: its past, present, and future, Wildlife Monographs, No. 4, 174.</p> <p>Wyoming Game and Fish Department. 2016. 2016 Big Game Job Completion Reports, Bighorn Sheep. .</p> <p>Wyoming Game and Fish Department. 2023. 2023 Big Game Job Completion Reports, Bighorn Sheep. https://wgfd.wyo.gov/hunting-trapping/job-completion-reports.</p> <p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>).</p>

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Criteria	Rationale	Literature Citations																																																								
	<p style="text-align: center;">2023 - JCR Evaluation Form</p> <hr/> <p>SPECIES: Bighorn Sheep PERIOD: 6/1/2023 - 5/31/2024 HERD: BS200 - ABSAROKA HUNT AREAS: 1-5, 22, 999 PREPARED BY: TONY MONG</p> <hr/> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="text-align: center;"><u>2018 - 2022 Average</u></th> <th style="text-align: center;"><u>2023</u></th> <th style="text-align: center;"><u>2024 Proposed</u></th> </tr> </thead> <tbody> <tr><td>Population:</td><td style="text-align: center;">3,960</td><td style="text-align: center;">4,700</td><td style="text-align: center;">4,800</td></tr> <tr><td>Harvest:</td><td style="text-align: center;">103</td><td style="text-align: center;">104</td><td style="text-align: center;">107</td></tr> <tr><td>Hunters:</td><td style="text-align: center;">131</td><td style="text-align: center;">130</td><td style="text-align: center;">135</td></tr> <tr><td>Hunter Success:</td><td style="text-align: center;">79%</td><td style="text-align: center;">80%</td><td style="text-align: center;">79%</td></tr> <tr><td>Active Licenses:</td><td style="text-align: center;">131</td><td style="text-align: center;">130</td><td style="text-align: center;">135</td></tr> <tr><td>Active License Success:</td><td style="text-align: center;">79%</td><td style="text-align: center;">80%</td><td style="text-align: center;">79%</td></tr> <tr><td>Recreation Days:</td><td style="text-align: center;">1,135</td><td style="text-align: center;">1,180</td><td style="text-align: center;">1,200</td></tr> <tr><td>Days Per Animal:</td><td style="text-align: center;">11.0</td><td style="text-align: center;">11.3</td><td style="text-align: center;">11.2</td></tr> <tr><td>Males per 100 Females</td><td style="text-align: center;">35</td><td style="text-align: center;">34</td><td></td></tr> <tr><td>Juveniles per 100 Females</td><td style="text-align: center;">36</td><td style="text-align: center;">33</td><td></td></tr> </tbody> </table> <hr/> <p>Population Objective (± 20%) : 4500 (3600 - 5400)</p> <p>Management Strategy: Special</p> <p>Percent population is above (+) or below (-) objective: 4%</p> <p>Number of years population has been + or - objective in recent trend: 0</p> <p>Model Date: 02/28/2024</p> <hr/> <p>Proposed harvest rates (percent of pre-season estimate for each sex/age group):</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="text-align: center;"><u>JCR Year</u></th> <th style="text-align: center;"><u>Proposed</u></th> </tr> </thead> <tbody> <tr><td>Females ≥ 1 year old:</td><td style="text-align: center;">n/a%</td><td style="text-align: center;">0%</td></tr> <tr><td>Males ≥ 1 year old:</td><td style="text-align: center;">n/a%</td><td style="text-align: center;">10%</td></tr> <tr><td>Proposed change in post-season population:</td><td style="text-align: center;">0%</td><td style="text-align: center;">1.02%</td></tr> </tbody> </table> <hr/>		<u>2018 - 2022 Average</u>	<u>2023</u>	<u>2024 Proposed</u>	Population:	3,960	4,700	4,800	Harvest:	103	104	107	Hunters:	131	130	135	Hunter Success:	79%	80%	79%	Active Licenses:	131	130	135	Active License Success:	79%	80%	79%	Recreation Days:	1,135	1,180	1,200	Days Per Animal:	11.0	11.3	11.2	Males per 100 Females	35	34		Juveniles per 100 Females	36	33			<u>JCR Year</u>	<u>Proposed</u>	Females ≥ 1 year old:	n/a%	0%	Males ≥ 1 year old:	n/a%	10%	Proposed change in post-season population:	0%	1.02%	
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	<p>Population Status - The herd has been below objective following a catastrophic, all-age pneumonia die-off in 1991 and continues to struggle, primarily due to low recruitment associated with persistent lamb pneumonia. However, despite low recruitment for much of the last 20 years, the ram/ewe ratio has remained fairly stable over that time period. Since 2018 there has been insufficient demographic data collected in this herd to produce an accurate population estimate. Regardless, it appears the population continued to decline in 2023. Personnel classified a historically low number of sheep within the herd unit in 2023 with a sample of 200 due, in part, to weather conditions and the inability to fly area 8. Due to the low classification sample, age:sex ratios should be viewed with caution. That said, the lamb:ewe ratio was the highest it has been in the last 10 years at 51:100.</p>	

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	<p>Jackson</p> <p style="text-align: center;"><u>2023 - JCR Evaluation Form</u></p> <hr/> <p>SPECIES: Bighorn Sheep PERIOD: 6/1/2023 - 5/31/2024 HERD: BS107 - JACKSON HUNT AREAS: 7 PREPARED BY: ALYSON COURTEMANCH</p> <hr/> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="text-align: center;"><u>2018 - 2022 Average</u></th> <th style="text-align: center;"><u>2023</u></th> <th style="text-align: center;"><u>2024 Proposed</u></th> </tr> </thead> <tbody> <tr><td>Trend Count:</td><td style="text-align: center;">433</td><td style="text-align: center;">350</td><td style="text-align: center;">400</td></tr> <tr><td>Harvest:</td><td style="text-align: center;">10</td><td style="text-align: center;">21</td><td style="text-align: center;">22</td></tr> <tr><td>Hunters:</td><td style="text-align: center;">15</td><td style="text-align: center;">35</td><td style="text-align: center;">22</td></tr> <tr><td>Hunter Success:</td><td style="text-align: center;">67%</td><td style="text-align: center;">60%</td><td style="text-align: center;">100%</td></tr> <tr><td>Active Licenses:</td><td style="text-align: center;">15</td><td style="text-align: center;">35</td><td style="text-align: center;">22</td></tr> <tr><td>Active License Success</td><td style="text-align: center;">67%</td><td style="text-align: center;">60%</td><td style="text-align: center;">100%</td></tr> <tr><td>Recreation Days:</td><td style="text-align: center;">154</td><td style="text-align: center;">295</td><td style="text-align: center;">300</td></tr> <tr><td>Days Per Animal:</td><td style="text-align: center;">15.4</td><td style="text-align: center;">14.0</td><td style="text-align: center;">13.6</td></tr> <tr><td>Males per 100 Females:</td><td style="text-align: center;">41</td><td style="text-align: center;">47</td><td></td></tr> <tr><td>Juveniles per 100 Females</td><td style="text-align: center;">39</td><td style="text-align: center;">40</td><td></td></tr> <tr><td colspan="3">Trend Based Objective (± 20%)</td><td style="text-align: center;">400 (320 - 480)</td></tr> <tr><td colspan="3">Management Strategy:</td><td style="text-align: center;">Special</td></tr> <tr><td colspan="3">Percent population is above (+) or (-) objective:</td><td style="text-align: center;">-12.5%</td></tr> <tr><td colspan="3">Number of years population has been + or - objective in recent trend:</td><td style="text-align: center;">3</td></tr> </tbody> </table>		<u>2018 - 2022 Average</u>	<u>2023</u>	<u>2024 Proposed</u>	Trend Count:	433	350	400	Harvest:	10	21	22	Hunters:	15	35	22	Hunter Success:	67%	60%	100%	Active Licenses:	15	35	22	Active License Success	67%	60%	100%	Recreation Days:	154	295	300	Days Per Animal:	15.4	14.0	13.6	Males per 100 Females:	41	47		Juveniles per 100 Females	39	40		Trend Based Objective (± 20%)			400 (320 - 480)	Management Strategy:			Special	Percent population is above (+) or (-) objective:			-12.5%	Number of years population has been + or - objective in recent trend:			3	
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Species (Scientific and Common Name): <i>Ovis canadensis</i> [Rocky Mountain Bighorn Sheep]		
Criteria	Rationale	Literature Citations
	<p>Population Status - This herd is managed using a 3-year average mid-winter trend count objective of 400 sheep (+/-20%). The herd increased from 2012-2022 after its last pneumonia die-off. In winters 2020/2021 and 2021/2022, the herd surpassed its objective of 400 sheep and its upper +20% buffer. In those years, 491 and 505 sheep were counted, respectively. In 2022, 407 sheep were counted during the mid-winter trend count, and in 2023 350 sheep were counted. However, due to windy conditions during helicopter count in 2023, we were unable to survey all bighorn sheep winter range that are normally flown. These winter ranges that were missed typically hold at least 50 sheep, but perhaps more this year due to the mild winter conditions. In 2023, WGFD estimated that there were a minimum of 400 sheep in the herd.</p> <p>Targhee</p>	

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	<p>also impacts available winter habitat for bighorn sheep. Recent research from the Wyoming Cooperative Research Unit indicates that Targhee bighorn sheep avoid backcountry ski routes, even if they are in otherwise high quality habitat. This population has been stable around 100-125 individuals since periodic aerial surveys began in the 1990s. However, fewer sheep have been observed during aerial surveys in the past three years, indicating that the herd has declined. The herd was estimated to be approximately 80 animals in 2016.</p> <p>Darby</p>	

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<p>Habitat Trend on the Bridger-Teton National Forest</p>	<p>Bighorn sheep evolved in semi-open, high visibility habitats near rocky escape terrain that allow efficient foraging, enhanced detection of predators, and opportunities to evade them. In northwest Wyoming, alpine tundra and areas of associated rocky escape terrain are used during summer. In winter, lower elevation, grassy benches and southerly slopes are used, with some herds or</p>	<p>Helmbrecht, D., M. Williamson, and D. Abendroth. 2012. Bridger-Teton National Forest Vegetation Condition Assessment.</p> <p>Risenhoover, K., J. Bailey, and L. Wakelyn. 1988. Assessing the Rocky</p>																																																												

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	<p>population segments wintering on wind-swept ridges at high elevations (WGFD 2017). Open areas with high visibility for predator detection and communication among individuals are typically used as foraging habitat, and ideal habitat typically includes a juxtaposition of visibility, escape terrain, and abundant, continuous forage (Risenhoover et al. 1988).</p> <p>Nearly 40% of the BTNF is considered non-forested and summer habitat is well distributed throughout the forest (Map 5). Recent large wildfires as well as management actions such as thinning and utilizing prescribed fire have also contributed towards providing desirable habitat conditions for the species. However, fire suppression has enabled some conifer encroachment into bighorn sheep habitat. Overall, the vegetation composition and structure is moderately departed from the reference condition across most of the forest for the biophysical settings (BpS) analyzed in the 2012 Vegetation Condition Assessment. The exceptions were the Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland BpS—in the Absaroka and Teton landscapes—and the Middle Rocky Mountain Montane Douglas-fir Forest and Woodland BpS, where S-Class distributions were calculated to be within the Historic Range of Variability (HRV) of the reference condition.</p> <p>The characteristics leading to this departure are variable by BpS and landscape but there are some general trends worth noting. First, there is a surplus of late development and deficit of mid- development S-Classes across the forested BpSs. This trend may be in part due to minimal disturbance events occurring in the mid-to late 1900's. There is a surplus of early development, S-Class A among many of the BpSs (this would benefit bighorn sheep). However, this trend may in part be due to limitations of the geospatial data used for the assessment. LANDFIRE version 1.0.5 data were used for this assessment. These data are based on circa 2000 imagery and were not adjusted for growth and development. In the case of the 1988 Yellowstone Fires in the Absaroka landscape, thousands of acres within the Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland BpS that burned 25 years ago are now on the cusp between S-Class A and S-Class B,</p>	<p>Mountain Bighorn Sheep Management Problem. Wildlife Society Bulletin, 16(3): 346-352.</p> <p>USDA. 1990. Bridger-Teton National Forest, Land and Resource Management Plan with Amendments. https://www.fs.usda.gov/detail/btnf/landmanagement/planning/?cid=stelprdb5446670.</p> <p>USDA. 2018a. National Agricultural Statistics Service. https://www.nass.usda.gov/Statistics_by_State/Wyoming/index.php.</p> <p>USDA. 2018b. Bridger-Teton National Forest, Grazing Allotment Disposition Map. https://www.fs.usda.gov/resources/btnf/landmanagement/resourcemanagement/.</p> <p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>).</p>

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	<p>however, this is not reflected in the data or results of this assessment. However, wildfires since 2000 have undoubtedly created more S-Class A; which would result in better habitat conditions for bighorn sheep. Since 2001, there have been 83 wildfires totaling 265,240 acres on or adjacent to the BTNF.</p> <p>Bighorn sheep are highly susceptible to disease; in particular, pneumonia. Pneumonia is easily transmitted from domestic sheep and goats to bighorn sheep and can result in population declines (WGFD 2017). Thus, one measure of habitat quality is the number of active sheep grazing allotments Forest-wide. Sheep grazing on the Forest was once extensive, but today is only a small fraction of what it once was. There were over 3.78 million sheep grazing in Wyoming in 1940; today, that number is around 345,000 state-wide (USDA 2018a). In 1990, there were 81 sheep allotments and approximately 60,000 sheep grazing on the BTNF (USDA 1990). Since then, many of these allotments have been closed, vacated or put into a forage reserve status through collaborative efforts with NGO's and permittees, primarily due to concerns over conflicts with grizzly bears and/or threats to bighorn sheep herds. Currently, there are now 33 active domestic sheep allotments that are authorized 24,500 sheep. All are located in the southern part of the forest, within the Greys River, Kemmerer and Pinedale Ranger Districts (USDA 2018b). Thus, the potential for spread of pneumonia from domestic sheep on the Forest to bighorn sheep has declined substantially.</p>	
Threats to the Species and its Habitat on the Bridger-Teton National Forest	<p><u>Forest Management</u></p> <p>Continued fire suppression would degrade bighorn sheep habitat by furthering conifer encroachment. This could further fragment bighorn sheep subpopulations and degrade escape terrain. Conversely, widespread conifer mortality from mountain pine beetle infestations may open and improve new habitat (WGFD 2017). Thinning, prescribed fire, timber harvest, and noxious weed control on the forest will continue and potentially increase the quantity and/or quality of available habitat.</p> <p><u>Mountain Goats</u></p>	<p>Beecham, J.J. Jr., C.P. Collins, and T.D. Reynolds. 2007. Rocky Mountain Bighorn Sheep (<i>Ovis canadensis</i>): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5200308.</p> <p>Courtemanch, A.B. 2014. Seasonal Habitat Selection and Impacts of Backcountry Recreation on a Formerly Migratory Bighorn Sheep Population in</p>

Species (Scientific and Common Name): <i>Ovis canadensis</i> [Rocky Mountain Bighorn Sheep]		
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	<p>The expansion of non-native mountain goats (<i>Oreamnos americanus</i>) on the BTNF and nearby Grand Teton National Park has the potential to adversely affect sheep in core herds, particularly through competition for forage and space on high elevation winter ranges and the transmission of disease such as pneumonia (WGFD 2017).</p> <p><u>Livestock Grazing</u></p> <p>As mentioned in the previous section, bighorn sheep are highly susceptible to diseases that can be carried and transmitted through contact with domestic sheep and goats. The BTNF has significantly reduced the number of active sheep allotments over the last 20 years. As part of the Bighorn Sheep/Domestic Sheep-Risk Management Strategy (USDA 2018c), the BTNF conducted a risk assessment of sheep allotments in relation to bighorn sheep herd home ranges. There are currently no active sheep allotments with a “high” risk of contact, those are all considered vacant, closed or forage reserve. There are only four allotments with a “moderately high” risk of contact, all located on the Greys River Ranger District and have associated mitigation measure to reduce that risk (USDA 2018c). There is one allotment with a “medium” risk and the rest of the allotments are all considered “low”. However, it should be noted that a “low” risk category is assigned for a modeled risk of contact that only relates to the Darby herd, regardless of number, which is within a bighorn sheep non-emphasis area (USDA 2018c).</p> <p><u>Human Disturbance</u></p> <p>In many areas, bighorn sheep have habituated to human activity where the activity is somewhat predictable temporally and spatially. However, human disturbance (e.g., snowmobiling, backcountry skiing, and heli-skiing on and near winter ranges) and human presence near lambing sites may be detrimental (Beecham et al. 2007, WGFD 2017). Human disturbance is not considered a major issue on the BTNF except for the Targhee herd, which is mostly located in Grand Teton National Park. Backcountry skiing, snowboarding, and mountaineering are popular winter pursuits in the Teton Range; both visitor numbers and the spatial</p>	<p>Northwest Wyoming, USA. Thesis. University of Wyoming, Laramie, WY.</p> <p>Halofsky, Jessica E.; Peterson, David L.; Ho, Joanne J.; Little, Natalie, J.; Joyce, Linda A., eds. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 2. pp. 199–513.</p> <p>USDA. 2018c. Bridger-Teton National Forest, Bighorn Sheep/Domestic Sheep-Risk Management Strategy https://www.fs.usda.gov/resources/btnf/landmanagement/resourcemanagemen t.</p> <p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>).</p>

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	<p>extent of their footprint has increased over time during the winter. Human activity now frequently extends into habitats that are critical to wintering bighorn sheep in this area.</p> <p>Recent research aimed at understanding the effects of winter recreation on bighorn sheep (Courtemanch 2014) found that: (1) Sheep avoided backcountry skiing areas, even if those areas were otherwise good habitat (and connected to habitat that sheep were using). In some cases, sheep were effectively losing up to 30% of the available habitat in their home range because of displacement by skiers, and (2) Sheep wintering in areas with high backcountry skiing activity had higher daily movement rates than sheep in areas with lower skier use, which translates into unnecessary expenditure of calories and may result in reduced reproductive success and overwinter survival. Currently, a working group made up of biologists, conservationists and land managers are developing a strategy to address these issues, which are unique to this particular bighorn sheep herd on the BTNF.</p> <p><u>Climate Change</u></p> <p>Although the impact of climate change is uncertain; the loss of conifers from persistent insect infestations could increase sight-lines and forage production, but warming could also negatively influence forage quantity and quality on existing ranges. The effects of warming on the distribution and abundance of invasive species such as Cheatgrass (<i>Bromus tectorum</i>) may also negatively impact bighorn sheep habitat (WGFD 2017). Increasing temperature and drought may increase the frequency and severity of wildfires, and invasive plant infestations. Fluctuations in precipitation may affect the availability and timing of spring forage. Bighorn sheep on the Forest may be more resilient to reduced forage availability because the landscape provides various land types and fewer barriers (Halofsky 2018). Additionally, climate warming may facilitate the transmission of parasites and diseases to which bighorn sheep are highly susceptible (Halofsky et al. 2018).</p>	

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	<p><u>Hunting</u></p> <p>Although hunting poses a direct threat to individual animals, most herds can support some level of harvest. Hunting quotas are generally applied at a level that has little, if any, significant effect on the conservation of the species relative to the threats of disease and habitat loss or alteration (Beecham et al. 2007).</p>	
<p>Summary and recommendations:</p> <p>The bighorn sheep core herds in the northwest corner of the state, including the BTNF, account for over 85% of Wyoming's statewide total, and represent some of the largest meta-populations of bighorn sheep throughout its range. Wyoming has approximately 20% of the total number of <i>O. c. canadensis</i> in the contiguous United States and 15% of the total range-wide estimate of sheep (including Canada) (WGFD 2017).</p> <p>Habitat is abundant on the Forest, but threats such as a changing climate, fire suppression, and invasive plants may affect the suitability of existing habitat. Bighorn sheep are highly susceptible to disease and disease transmission from domestic sheep can play a major role in the population dynamics of a particular herd. However, the population of bighorn sheep on the Forest appears to have sufficient numbers and distribution in multiple herds to ensure continued persistence. Also, despite much higher rates of historic domestic sheep grazing, core native herds and translocated bighorn sheep herds on the Forest have persisted.</p> <p>Given the overall bighorn sheep population size, the apparent stable (recent) to increasing (historical) trend for most herds, the reduced threat of disease transmission from domestic sheep from historic levels, and the abundance of suitable habitat there is not substantial concern for the capability of bighorn sheep to persist over the long-term on the Bridger-Teton National Forest, and the bighorn sheep is not recommended as a species of conservation concern.</p> <p>Evaluator(s): Randall Griebel</p>		<p>Wyoming Game and Fish Department. 2017. State Wildlife Action Plan. Bighorn Sheep (<i>Ovis canadensis</i>).</p> <p>Date: August 6, 2018</p>