

# Appendices





# **APPENDIX A: COMPARABILITY ASSESSMENT OF SNOWMOBILE AND SNOWCOACH TRANSPORTATION EVENT IMPACTS TO PARK RESOURCES AND VALUES AND THE VISITOR EXPERIENCE**

## **EXECUTIVE SUMMARY**

This appendix was prepared in response to requests made during the public comment period on the Draft Winter Use Plan / Supplemental Environmental Impact Statement (plan/SEIS) that a stand-alone section of the final plan/SEIS be dedicated to discussing the comparability of snowmobile and snowcoach transportation events in terms of their relative impacts to park resources and values and visitor experience.

A transportation event is defined as one best available technology (BAT) snowcoach or a group of seven to ten New BAT snowmobiles traveling together through the park.

The purpose of this appendix is to assess the comparability of transportation event impacts to park resources and values and the visitor experience for the following five impact topics: (1) Wildlife and Wildlife Habitat, including Rare, Unique, Threatened, or Endangered Species, and Species of Concern, (2) Air Quality, (3) Soundscapes and the Acoustic Experience, (4) Visitor Use, Experience, and Accessibility, and (5) Health and Safety. Given best available data, for each of these impact topics it was feasible to meaningfully assess comparability of the two types of transportation events at either the “per person” or “per transportation event” levels for one or more metrics. The existing data did not permit meaningful assessment of comparability for impact topics Socioeconomic Values and Park Operations and Management. These impact topics are reviewed in-depth in chapter 4 of the plan/SEIS.

By “comparable,” the National Park Service (NPS) explains how the impacts from the two types of transportation events are relatively close to one another and that neither mode of transportation consistently results in less adverse impacts to park resources and values or provides a more beneficial visitor experience. The NPS does not state the two types of oversnow vehicle (OSV) transportation are *equivalent*; rather, the comparability analysis reveals that:

- One mode of transportation is not conclusively cleaner, quieter, or less harmful to wildlife than the other;
- One mode of transportation does not provide for higher quality visitor experiences than the other;
- One mode of transportation is not conclusively more harmful to health and safety of visitors and employees than the other; and
- At the levels prescribed under the preferred alternative, neither form of oversnow transportation will result in a level of adverse impacts on park resources that would necessitate an outright ban on that type of transportation.

Due to the unique situation in Yellowstone in winter, whenever possible the analyses rely on monitoring and modeling data from peer-reviewed publications and technical reports specific to Yellowstone, and are limited to the “managed use” era (December 2004 through present).

For Wildlife and Wildlife Habitat, Including Rare, Unique, Threatened, or Endangered Species, and Species of Concern:

- White et al. (2009) found that probabilities of movement were greater for bison exposed to snowcoaches than for those exposed to snowmobiles; “the odds of observing a movement response were 1.1 times greater for each additional snowmobile, 1.5 times greater for each additional coach” (p. 587).
- For bison, there are mixed results in terms of percentage of “active” movement responses generated by the two different types of events. In 2006/2007, snowmobiles caused an “active” movement response 3.1 percent of the time versus snowcoaches which caused an “active” movement response 0.7 percent of the time. In 2008, snowmobiles caused an “active” movement response 8 percent of the time to snowcoaches 8.8 percent. In 2009, the percentages were almost even (3.5 percent to 3.5 percent, snowmobiles to snowcoaches).
- For elk, during the winter seasons of 2006/2007 and 2008/2009, no “active” behavioral response (travel, alarm-attention, or flight) was observed from either snowmobile or snowcoach transportation events. During the winter season of 2007/2008, snowmobile transportation events caused an “active” behavioral response 11.4 percent of the time and snowcoaches caused an “active” behavioral response 20.5 percent of the time.
- For trumpeter swans, the results are mixed in terms of percentage of “active” movement responses caused by the two different types of transportation events. For the three years of reporting summarized in this appendix, snowmobiles caused an “active” movement response 3.4 to 4.8 percent of the time while snowcoaches caused swans to exhibit an “active” movement response zero to 13.8 percent of the time.
- The best available evidence strongly indicates that OSV use during the managed use era has had no discernible effect on population dynamics or distribution for the five species (bison, elk, trumpeter swans, wolves, and bald eagles) that have been studied extensively and that other ecosystem stressors, not OSV use, are dominant influences on these wildlife species.

For Air Quality:

- Snowmobile transportation events and snowcoach transportation events both offer some benefits and some drawbacks relative to each other in terms of tailpipe emissions and that there is no universally “cleaner” (less polluting) mode of oversnow transportation.
- During a representative roundtrip from West Yellowstone to Old Faithful, a New BAT snowmobile transportation event produces less carbon monoxide (CO) than a BAT snowcoach event. However, a BAT snowcoach transportation event produces considerably less hydrocarbons (HC) and nitrogen oxides (NO<sub>x</sub>) than a New BAT snowmobile transportation event during the same representative roundtrip.
- At the SEIS alternative level, SEIS alternatives 4a–4d are as clean as or cleaner than the other two SEIS alternatives (2b and 3b) at the “per person” level for a maximum use day.

For Soundscapes and the Acoustic Experience:

- Across 10 sites, snowcoach transportation events were audible for, on average, 2 minutes and 21 seconds (2:21) and snowmobile transportation events were audible, on average, for 2 minutes and 36 seconds (2:36), a difference of, on average, 15 seconds.



Appendix A: Comparability Assessment of Snowmobile and Snowcoach Transportation Event Impacts to Park Resources and Values and the Visitor Experience

- When measured at 50 feet at cruising speed, a group of ten New BAT snowmobiles (each producing 67 dBA), measure 3 dBA lower than a single BAT snowcoach at cruising speed (approximately half of the noise energy). The two types of transportation events would have similar noise energy levels at more distant locations.
- At a distance, if vehicles are not visible, trained acousticians, as well as people with less experience, typically cannot differentiate between the noise produced by snowmobile and snowcoach transportation events.
- Once BAT is in place for snowcoaches and New BAT in place for snowmobiles, there is no evidence to support a compelling advantage for one type of OSV transportation event over another in terms of preservation of the natural soundscape.

For Visitor Use, Experience, and Accessibility:

- Visitors, regardless of their chosen mode of transportation, are highly satisfied with their overall experience.
- Given established OSV travel patterns and routes, visitors have comparable opportunities to experience wildlife and other features of interest and to experience natural soundscapes, whether they are on a snowmobile or riding in a snowcoach.

For Health and Safety:

- Employee and visitor exposure levels to air pollutants and elevated noise produced by OSVs do not exceed U.S. Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) or National Institute for Occupational Safety and Health (NIOSH) standards.
- On February 15, 2009, at the West Entrance, snowcoaches were separated from snowmobiles into two different lanes to determine if employee exposure levels to CO varied by transportation event type. CO readings were slightly higher over the sampling period in the snowmobile lane; however, peak readings for CO were higher in the snowcoach lane. Neither lane reached the NIOSH ceiling of 200 ppm in either entrance lane.

For many of the topics evaluated, the environmental impacts were similar and for other topics the impacts are different. However, in summary for the five impact topics for which assessing comparability at the person or event levels was possible, data indicates that impacts for both modes of transportation are low and that no one mode of transportation is clearly better, in terms of limiting environmental impacts and providing high quality visitor experiences, than the other.

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## INTRODUCTION AND PURPOSE

The National Park Service (NPS) preferred alternative for winter use in Yellowstone National Park is to manage oversnow vehicles (OSVs) by transportation events (alternative 4). This Final Winter Use Plan / Supplemental Environmental Impact (plan/SEIS) allows the NPS to conclude that snowmobiles and snowcoaches (collectively “oversnow vehicles” or OSVs) are appropriate means of oversnow transportation in the park and that adverse impacts to park resources and values caused by snowmobile and snowcoach transportation events, at the levels prescribed in the preferred alternative, are acceptable (levels of impact at the SEIS alternative level is provided in chapter 4 of the final plan/SEIS).

This appendix was prepared in response to requests made during the public comment period on the draft plan/SEIS that a standalone section of the final plan/SEIS be dedicated to describing and discussing the comparability of snowmobile and snowcoach transportation event impacts to park resources and values and the visitor experience.

The purpose of this appendix is to assess the comparability (relative effects) of snowmobile and snowcoach transportation events to park resources and values and the visitor experience for the following five impact topics: (1) Wildlife and Wildlife Habitat, including Rare, Unique, Threatened, or Endangered Species, and Species of Concern, (2) Air Quality, (3) Soundscapes and the Acoustic Experience, (4) Visitor Use, Experience, and Accessibility, and (5) Health and Safety. For each of these impact topics it is feasible to meaningfully assess comparability of the two types of transportation events at the “per person” or “per transportation event” levels. The existing data does not allow for meaningful assessments of comparability for impact topics Socioeconomic Values and Park Operations and Management at the “per person” or “per transportation event” levels. These impact topics are reviewed in-depth in chapter 4 of the plan/SEIS.

By “comparable,” the NPS explains how the impacts from the two types of transportation events are often close to one another, and that where differences exist, they are not consistent between one transportation event type of another, such that eliminating one type of transportation mode in favor of the other would not result in significant improvements to the park’s resources and values and the visitor experience. The NPS does not state the two types of OSV transportation are *equivalent*; rather, the comparability analysis reveals that:

- One mode of transportation is not conclusively cleaner, quieter, or less harmful to wildlife than the other;
- One mode of transportation does not provide for higher quality visitor experiences than the other;
- One mode of transportation is not conclusively more harmful to health and safety of visitors and employees than the other; and
- At the levels prescribed under the preferred alternative, neither form of oversnow transportation will result in a level of adverse impacts on park resources that would necessitate an outright ban on that type of transportation.

## MANAGING BY TRANSPORTATION EVENTS

The preferred alternative in the plan/SEIS requires OSVs to be managed by transportation events, or discrete groups of OSVs entering the park. This management framework is impact-centric rather than vehicle number-centric and is more consistent with the science of winter use, particularly the science related to natural soundscape preservation and wildlife disturbance than managing by total or absolute numbers of OSVs. By grouping OSVs together into discrete groups and by setting a maximum number of

transportation events allowed entry each day into the park, the NPS is able to limit and control disturbance to wildlife and increase the time that natural quiet predominates the winter landscape. Managing OSVs by transportation events is practical and advantageous for the following reasons, which are expanded upon in later subsections of this appendix:

1. Managing by transportation events is better aligned with the best available science of winter use rather than managing by absolute numbers of vehicles, and therefore provides the best possible protection for park resources while providing for appropriate visitor experiences. In the past, the NPS and interested parties have focused on the total number of vehicles authorized to access the park. However, this emphasis is misleading because impacts to wildlife and soundscapes stem from groups of vehicles, not individual vehicles. By packaging traffic into transportation events and capping the total daily number of transportation events, the park proactively reduces the amount of time vehicles are audible, therefore reducing impacts to natural soundscapes. By limiting the number of daily transportation events in the park, wildlife would be disrupted fewer times. These steps, in combination with continued 100 percent guiding requirements, best available technology (BAT) standards for snowcoaches, and New BAT standards for snowmobiles, will limit impacts on the park's flora, fauna, soundscape, and air quality into the future.
2. Managing by transportation events provides OSV manufacturers and commercial tour operators with incentives to produce and use cleaner and quieter OSVs. In return, more visitors can visit Yellowstone while impacts to park resources are further reduced through OSV environmental performance improvement incentives.

## **DATA SOURCES AND LEVELS OF ANALYSES**

All information contained in this appendix was obtained from the final plan/SEIS, the Scientific Assessment of Yellowstone National Park Winter Use (March 2011), and other applicable documents and studies such as the Air Quality Modeling Report (ARS 2012) and Yellowstone Over-snow Vehicle Emissions Tests Report (Ray 2012, version 7.0). Data used to assess the comparability of snowcoach and snowmobile transportation events are presented in tables, figures, graphs, and other easily understandable formats. All assumptions and calculations used to support analyses are provided. In some cases, qualitative or expert opinion data were used if quantitative data were nonexistent or inconclusive. These analyses rely on both monitoring and modeling data sources. Data are taken only from Yellowstone-specific literature whenever possible due to the unique situation in the park in winter, and are bound to the "managed use" era (December 2004 through present) in most cases. These studies were considered valid and appropriate for this appendix because they reflect the current and future conditions of the park under which OSVs would operate. For additional information and background studies, the reader is encouraged to review the Scientific Assessment of Winter Use in Yellowstone (2011).

Whenever possible, analyses are at the "per person" and "per transportation event" (defined as a single BAT snowcoach or a group of 7 to 10 New BAT snowmobiles) levels. For some impact topics such as air quality, comparability can be assessed at both the "per person" and "per transportation event" levels. For other impact topics such as Soundscapes and the Acoustic Environment, analyses were only possible at the transportation event level. In a few rare instances, the analyses rely on forecasted impacts at the SEIS alternative level (such as pounds of tailpipe pollutants per person on a maximum use day). All analyses in this appendix disclose if comparability is assessed for a group of seven or ten snowmobiles to one snowcoach (table 1).

**TABLE 1: CONSTANTS USED IN COMPARABILITY ASSESSMENTS**

	<b>Vehicles / Event</b>	<b>Persons / Vehicle</b>	<b>Persons / Event</b>
Snowmobiles	7 or 10* (depending on metric)	1.4**	9.5**
Snowcoaches	1	9.0**	9.0**

\*The three-year average (2009/2010 through 2011/2012 seasons) was 6.7 snowmobiles per group. However, in these analyses either 7.0 or 10.0 snowmobiles per event are used to represent the maximum daily average or maximum number of snowmobiles per transportation event.

\*\*Three-year average (2009/2010 through 2011/2012 seasons).

Not all metrics discussed in the plan/SEIS are used to assess transportation event comparability and not all metrics discussed in this section are discussed in the plan/SEIS. For example, to assess the comparability of tailpipe emissions (under impact topic Air Quality), emission levels are assessed at the “per person” and “per transportation event” levels for a representative roundtrip from West Yellowstone to Old Faithful. This type of assessment is not part of chapter 4 of the plan/SEIS because it addresses the comparability of tailpipe emissions between the two types of events rather than overall levels of emissions at the SEIS alternative level.

## **WILDLIFE AND WILDLIFE HABITAT, INCLUDING RARE, UNIQUE, THREATENED, OR ENDANGERED SPECIES, AND SPECIES OF CONCERN**

### **INTRODUCTION**

Advancing our understanding of impacts to wildlife from OSVs and mitigating adverse impacts has been a topic of interest at Yellowstone for decades (Borkowski et al. 2006; White et al. 2009). Areas of inquiry have focused on (1) whether OSVs have caused population level changes; (2) the behavioral and physiological responses of wildlife to OSVs; (3) whether impacts associated with OSV use have resulted in increased stress for wintering animals; and (4) whether OSV use lowers the ability of wildlife to survive and reproduce. A synopsis of relevant literature can be found in chapter 3 of the plan/SEIS and in the Scientific Assessment of Winter Use at Yellowstone National Park Report (2011).

### **METRICS**

The relative effects of snowmobile and snowcoach transportation events are assessed for bison, elk, gray wolves, trumpeter swans, and bald eagles in this comparability assessment. Insufficient data exists to meaningfully assess the relative impacts of transportation events on lynx and wolverines. The following metrics were deemed suitable for assessing comparability of snowmobile and snowcoach transportation events in terms of their relative impacts to the five wildlife species listed above:

- Behavioral responses
- Physiological responses
- Acoustical interference and masking
- Direct mortality
- Population dynamics and distribution
- Habituation and tolerance.

## COMPARABILITY ASSESSMENT

### Behavioral Responses

When evaluating the comparability of wildlife behavioral responses to OSVs, it is important to recognize that wildlife responses to disturbance are highly variable, ranging from no response, to increased vigilance, to movement away from stimuli, and that they may vary as much within a species as between species (Scientific Assessment of Yellowstone National Park, 2011). Wildlife in Yellowstone may respond behaviorally to OSVs by increasing their level of vigilance or moving away from the disturbance (White et al. 2009). Displacement through repeated OSV disturbance may be related to the intensity of the disturbance event(s) and levels of habituation and tolerance. Studies of the behavioral responses of five species (bison, elk, trumpeter swans, wolves, and bald eagles) to oversnow traffic in Yellowstone National Park showed these animals rarely showed high-intensity responses (movement or alertness for extended periods of time) to approaching OSVs (White et al. 2009; Borkowski et al. 2006). Although these studies were not designed to assess the comparability of snowmobiles versus snowcoaches, the data can be used to draw certain inferences. Borkowski et al. (2006) observed a total of 6,508 encounters between park wildlife and OSVs (or humans dismounting or exiting) between 1999 and 2004, whereas White et al. (2009) observed 5,688 such encounters between 2002 and 2006. Collectively, all species exhibited non-travel responses (no response, look/resume, or alert response) to human activities at least 90 percent of the time (table 2). All species fled or took flight less than 6 percent of the time. Defensive reactions of wildlife to human activities were rare. For individual animals, 8 to 10 percent of elk and bison show a movement response to snowmobiles and snowcoaches. Approximately 90 percent of elk or bison either show no apparent response or a “look and resume” response. White et al. (2009) reported that human disturbance did not appear to be a primary factor influencing the movement of wildlife species they studied (bison, elk, trumpeter swans, and bald eagles) and concluded that individual responses that resulted in flight or other active behavior were apparently short-term behavioral responses without lasting influence on species distribution patterns. This level of reaction was consistent for a wide range of daily average OSV use (ranging from 156 to 593 vehicles per day). Visitors have been required to travel in groups with guides since the 2004/2005 winter season, which is believed to be the primary factor in reducing the occurrence of inappropriate encounters with wildlife.

**TABLE 2: WILDLIFE— BEHAVIORAL RESPONSES TO SNOWMOBILE AND SNOWCOACH TRANSPORTATION EVENTS**

Observed Response	Bison		Elk		Trumpeter Swans	Bald Eagles
	Borkowski et al. 2006	White et al. 2009	Borkowski et al. 2006	White et al. 2009	White et al. 2009	White et al. 2009
No Apparent Responses	81%	80%	48%	48%	57%	17%
Look-Resume	8%	9%	32%	27%	21%	64%
Alert	2%	3%	12%	17%	12%	9%
Travel	7%	5%	6%	5%	9%	4%
Flight	1%	2%	2%	2%	1%	6%
Defensive	<1%	<1%	<1%	<1%	0%	0%

Regarding comparability of behavioral responses of wildlife to snowmobile and snowcoach transportation events, White et al. (2009, p. 12) found that probabilities of movement were greater for bison exposed to snowcoaches than for those exposed to snowmobiles; “the odds of observing a movement response were 1.1 times greater for each additional snowmobile, 1.5 times greater for each additional coach.” The maximum probability of movement was reached at the threshold of 1 to 3 snowcoaches depending upon

the wildlife species under consideration. There was no threshold in the numbers of snowmobiles eliciting a movement by elk or swans, but the probability of movement response reached an asymptote (i.e., adding another vehicle produced no additional effect in terms of behavioral response) at 7 snowmobiles for bison and 18 snowmobiles for bald eagles (White et al. 2009).

In addition, a number of annual wildlife reports (McClure et al. 2009; McClure et al. 2008; Davis et al. 2007) analyzed differences in behavioral responses of bison, elk, and swans to snowmobile and snowcoach transportation events. These findings are summarized below in tables 3, 4 and 5. The reader should note that in the original annual monitoring reports, the authors utilized five categories of potential responses of wildlife to OSVs: (1) no apparent response; (2) look-resume; (3) travel; (4) alarm-attention; and (5) flight. For this assessment, categories travel, alarm-attention, and flight were collapsed (added together) to facilitate comparison by the reader.

For elk (table 3), during the winter seasons of 2006/2007 and 2008/2009, no “active” behavioral response (travel, alarm-attention, or flight) was observed as a result of either type of transportation event. During the winter season of 2007/2008, snowmobiles caused an “active” behavioral response 11.4 percent of the time and snowcoaches caused an “active” behavioral response 20.5 percent of the time.

**TABLE 3: ELK – BEHAVIORAL RESPONSES TO SNOWMOBILE AND SNOWCOACH TRANSPORTATION EVENTS**

	Guided Snowmobile Transportation Events			Snowcoach Transportation Events		
	2007 Annual Report (N=69)	2008 Annual Report (N=61)	2009 Annual Report (N=23)	2007 Annual Report (N=58)	2008 Annual Report (N=44)	2009 Annual Report (N=35)
No apparent response	55.1%	49.2%	80.4%	67.2%	56.8%	80.0%
Look-Resume	44.9%	39.4%	19.6%	32.8%	22.7%	20.0%
Movement Response (sum of Travel, Alarm-Attention, or Flight)	.0%	11.4%	.0%	.0%	20.5%	.0%

Data are from the 2007, 2008, and 2009 “Wildlife Responses to Motorized Winter Recreation in Yellowstone” Reports (available via the Yellowstone National Park website)

For bison (table 4), the results are mixed in terms of percentages of movement responses generated by the two different types of transportation events. For instance, in 2006/2007, snowmobiles caused a movement response from bison in 3.1 percent of the observed instances versus snowcoaches, which caused a movement response 0.7 percent of the time. In 2008 snowmobiles caused a movement response 8.0 percent of the time to snowcoaches 8.8 percent. In 2009, the percentages were almost even (3.5 to 3.7 percent, snowmobiles to snowcoaches). Look-resume responses of bison were similar between transportation event types across the three years.

**TABLE 4: BISON – BEHAVIORAL RESPONSES TO SNOWMOBILE AND SNOWCOACH TRANSPORTATION EVENTS**

	Guided Snowmobile Transportation Events			Snowcoach Transportation Events		
	2007 Annual Report (N=133)	2008 Annual Report (N=150)	2009 Annual Report (N=72)	2007 Annual Report (N=145)	2008 Annual Report (N=126)	2009 Annual Report (N=82)
No apparent response	90.2%	80.7%	89.4%	92.4%	82.5%	90.2%
Look-Resume	6.7%	11.3%	7.0%	6.9%	8.7%	6.1%
Movement Response (sum of Travel, Alarm-Attention, or Flight)	3.1%	8%	3.5%	.7%	8.8%	3.7%

Data are from the 2007, 2008, and 2009 "Wildlife Responses to Motorized Winter Recreation in Yellowstone" Reports (available via the Yellowstone National Park website)

For trumpeter swans (table 5), the results are mixed in terms of percentage of active movement response caused by the two different types of events. For the three years of reporting summarized in this assessment, snowmobiles caused a movement response in swans 3.4 to 4.8 percent of the time while snowcoaches caused swans to exhibit a movement response zero to 13.8 percent of the time.

**TABLE 5: TRUMPETER SWANS – BEHAVIORAL RESPONSES TO SNOWMOBILE AND SNOWCOACH TRANSPORTATION EVENTS**

	Guided Snowmobile Transportation Events			Snowcoach Transportation Events		
	2007 Annual Report (N=62)	2008 Annual Report (N=58)	2009 Annual Report (N=58)	2007 Annual Report (N=43)	2008 Annual Report (N=27)	2009 Annual Report (N=58)
No apparent response (none)	93.5%	91.4%	91.4%	93.0%	96.3%	72.4%
Look-Resume	1.6%	5.2%	5.2%	7.0%	3.7%	13.8%
Movement Response (sum of Travel, Alarm-Attention, or Flight)	4.8%	3.4%	3.4%	.0%	.0%	13.8%

Data are from the 2007, 2008, and 2009 "Wildlife Responses to Motorized Winter Recreation in Yellowstone" Reports (available at [http://www.nps.gov/yell/parkmgmt/winter\\_monitoring.htm](http://www.nps.gov/yell/parkmgmt/winter_monitoring.htm)).

## Physiological Responses

Studies conducted to date suggest effects of OSVs on individual animals have not had measurable detrimental effects on physiological stress responses (Scientific Assessment of Yellowstone National Park Winter Use, 2011). Observations of bison, elk, trumpeter swans, and bald eagles, which demonstrate awareness of passing OSVs but typically not displaced, may suggest there are no substantial energetic costs from OSV impacts. Elk and bison near roadways do not appear to exhibit elevated levels of stress hormones attributable to OSV traffic. Chronic elevated glucocorticoid levels may result in long-term adverse effects on immune function and body condition, decreasing survival and reproductive rates. Analysis by Creel and others (2002) from one winter (1999) showed that glucocorticoid levels in elk were significantly higher during the snowmobile season than during wheeled vehicle season, after controlling for the effects of age and snow depth (Creel et al. 2002). However, Hardy (2001) found that data from winter 2000 showed no obvious trends between daily OSV traffic and glucocorticoid levels in elk. Hardy



(2001) also did not detect any significant links between OSV usage and bison glucocorticoid levels during these two winters (winter 1999 and winter 2000). The studies conducted to date suggest OSV impacts on individual animals have not had measurable detrimental effects and that the effects of OSV use on the dynamics of intensively studied species clearly are subsidiary to effects of ecological processes; hence, effects on individuals are either very slight or affect small proportions of populations such that effects were not detected. In any case, the relative impacts of snowmobile transportation events to snowcoach transportation events appear comparable in that neither has resulted in a detectable level of physiological response in studied wildlife.

### **Acoustical Interference and Masking**

Noise generated by OSVs can interfere with wildlife's auditory perceptions, which may disrupt communications used to advertise reproductive and territorial status, choose mates, warn of potential dangers, or maintain group cohesion (Bowles 1995; Barber et al. 2010). OSV noise may also interfere with natural sounds that animals use for foraging, habitat selection, or avoiding predation (Bowles 1995; Barber et al. 2010). Available monitoring data indicate that the length of time snowmobile and snowcoach transportation events can be heard differs, on average, by only 15 seconds (approximately a 10 percent difference). Soundscape modeling data indicates that snowmobile and snowcoach transportation events generate approximately the same amount of noise energy at distances greater than several hundred feet from the road. Lastly, at a distance, and if the vehicles are not visible, trained acousticians as well as people with less experience typically cannot differentiate between the noise of snowmobile and snowcoach transportation events (S. Burson, personal observation). Based on these similarities, the NPS has concluded that snowmobile and snowcoach transportation events are comparable in terms their likelihood of causing acoustical interference and masking.

### **Direct Mortality**

OSVs can affect wildlife directly through collisions; however, there have been no known instances of OSV-caused animal mortality since institution of the 100 percent guiding requirement in December 2004. Under the preferred alternative, OSV use would continue to be 100 percent guided and the park-wide speed limit would be reduced from 45 to 35. Based on the data from the managed use era (2004 to present), there is no reason to suspect that direct mortalities from OSV strikes would occur from either snowmobile or snowcoach transportation events and that historically (2004-present), both have been comparable in that neither has caused any direct mortality of park wildlife.

### **Population Dynamics and Distribution**

Estimated bison abundance increased exponentially from 1965-1994 despite a 20-fold increase in cumulative OSV use during the same period. Bison population growth was not related to cumulative visitation from 1965-2006 after removing the effect of management culls (White et al. 2009). Bison calf ratios were not significantly correlated with cumulative visitation and survival rates of adult female bison were generally high (mean = 96 percent) from 1995-2001. Likewise, there is little evidence that OSVs and winter use have affected elk populations in Yellowstone National Park. Calf ratios in the Madison headwaters population were not correlated with cumulative OSV use in the period 1991-2006 after the effects of snow water equivalent on calf recruitment were removed (White et al. 2009). Annual survival rates of adult female elk were higher than 90 percent and the population fluctuated around a dynamic equilibrium of about 550 elk during the period 1968-2004, despite increasing OSV use over that time period (White et al. 2009). The prevailing evidence suggests that winter snow pack conditions and heterogeneity of the population is the primary factor influencing winter distribution of elk in central Yellowstone National Park (Messer et al. 2009). Such factors as weather, predators, and plant succession, and not winter recreation, are clearly responsible for most variation in vital rates and abundance of elk

and bison. There is no evidence that OSV use has negatively affected bald eagle populations in Yellowstone. The numbers of nesting and fledgling bald eagles in Yellowstone National Park increased incrementally from 1987-2005 and were not correlated with cumulative winter visitation (White et al. 2009). The number of residents adult and sub adult and cygnet trumpeter swans decreased during 1966-2005 and was negatively correlated with cumulative visitation; however, the decline was likely spurious because numbers of swans decreased regionally throughout the Greater Yellowstone Area during the past several decades (Proffitt et al. 2009; White et al. 2009). Annual population estimates for the reintroduced population of wolves in Yellowstone National Park indicates that the founding population of 31 wolves released during winters 1995 and 1996 increased to more than 160 individuals by 2003 (Smith et al. 2007), a period of high winter use by humans.

Data collected and presented in peer reviewed studies between 1999 and 2006, both before and during the managed use era, indicate that there is no evidence to suggest that OSVs have had population level impacts among studied wildlife species in the park (Borkowski et al. 2006; White et al. 2009). Recreational use of OSVs in Yellowstone increased from <5000 vehicle-use days per annum during the mid-1960s to >100,000 during the late 1990s, then declined to ~30,000 vehicles per annum during recent years (NPS 2012; NPS 2000). Notwithstanding the magnitude of these changes, existing evidence does not suggest any associated changes in vital rates or abundances of key wildlife species stemming from OSV use. Given that more than thirty years of study and more than 50 years of OSV use have failed to change core wintering areas for wildlife in Yellowstone National Park or have any discernible effects on population dynamics or distribution, there is no evidence to suggest that either snowcoach or snowmobile transportation events at the levels prescribed under the preferred alternative would have any impacts to population dynamics and distribution for species studied.

## **Habituation and Tolerance**

Habituation is the process by which animals learn to minimize their response to a potential disturbance through repeated neutral or non-threatening exposures to the stimulus. Habituation may result in energetic savings to animals not inclined to flee from neutral stimuli, but may also increase vulnerability to disease, natural predators, or increased mortality risks from vehicle collisions (Boyle and Samson 1985; Bejder et al. 2009). Habituation is more likely to occur in areas subject to predictable noise and disturbance patterns. Habituation should not be confused with tolerance, which is defined as the acceptance of disturbance; whereby animals reduce their reaction to a disturbance to prevent the disturbance from affecting them. An animal may tolerate disturbance stimuli for a variety of ecological reasons separate from the behavioral process of habituation. Studies of ungulate physiology suggest habituation to predictable disturbances like those associated with OSV use in Yellowstone. Some evidence suggests that certain wildlife species in Yellowstone National Park were habituated to OSVs and other human disturbances during winter. Bison were less likely to demonstrate vigilance behavior as cumulative visitation increased during winter, and were less likely to move from OSV-induced disturbances during winters with greatest visitation (White et al. 2009). Similarly, the probabilities of swans responding to OSV use decreased as cumulative visitation increased over winters (White et al. 2009). In contrast, the probabilities of elk responses to OSVs did not change as cumulative visitation increased (White et al. 2009), and elk did not appear to habituate to repeated disturbance by skiers in Mammoth, Lamar, and Stephen's Creek areas (Cassirer et al. 1992). There is no evidence to suggest that one type of transportation event is more or less likely to cause habituation and tolerance of wildlife in Yellowstone, however, this question may be explored more through the adaptive management and monitoring program detailed in this plan/SEIS.

## CONCLUSION

While the studies relied upon were not specifically designed to determine the comparability of relative impacts to wildlife from snowmobile and snowcoach transportation events, the data can be used to draw certain inference. The evidence is clear that OSV use during the managed use era has had no discernible effect on population dynamics, distribution, or physiological responses for the five species that have been studied extensively. The available data indicate that ecological processes, not OSV use, are the dominant influences on wildlife vital rates and rates of increase. The best available data contrasting behavioral effects to trumpeter swans, bison, and elk is inconclusive in terms of one type of event being more harmful than the other. The NPS concludes that in regard to impacts to wildlife species across the various metrics evaluated, there is no clear advantage for one type of transportation versus another. The NPS intends to conduct additional research regarding the relative impacts of the two transportation events to the parks' wildlife as part of the winter use adaptive management and monitoring program.

## AIR QUALITY

### INTRODUCTION

All internal combustion engines, including those that power snowmobiles and snowcoaches, emit air pollutants such as carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO<sub>x</sub>), benzene, butadiene, formaldehyde, and acetaldehyde. These pollutants have the potential to adversely affect the air quality of Yellowstone National Park and are human health concerns (human health and safety are discussed in a subsequent section). Air quality is an important resource that is protected under NPS policy and several provisions of the Clean Air Act. These regulatory requirements are discussed in greater detail in the Air Quality section of chapter 3 of the plan/SEIS.

### METRICS

The metrics below were considered suitable for assessing comparability of impacts to air quality from OSV tailpipe emissions:

- Tailpipe emission levels for a representative roundtrip from West Yellowstone to Old Faithful (“per person” and “per transportation event”)
- Pounds of tailpipe pollutants “per person” and by SEIS alternative level (maximum use day).

In general, there are three primary methods for obtaining emission measurements from OSVs (Frey et al. 2003), including (1) dynamometer testing, which occurs in a laboratory in a highly controlled environment; (2) remote sensing, which occurs along the roadside and captures place-in-time data as an OSV moves past a pollutant measuring device; and (3) in-use testing via a portable emission measurement (PEM) device, which collects emission measurements while the OSV is in operation. The NPS has determined that both remote sensing and dynamometer (laboratory) collected data are not suitable for comparability assessment purposes. Neither method produces results that can be used for comparability purposes for the following reasons.

**The Five-Mode Dynamometer Test is not Representative of Actual Conditions in Yellowstone National Park**—To measure snowmobile tailpipe emissions, a five-mode dynamometer test was developed in the 1990s. The test was developed using real-time operating data for five riding styles that ranged from aggressive trail to off-trail freestyle and lake riding (Wright and White 1998). These driving styles do not reflect typical operating practices in Yellowstone where the observed average cruise speed for snowmobiles is approximately 30 to 35 mph and touring only occurs on hard-packed groomed roads.

Yellowstone does not permit any type of aggressive or freestyle riding. The U.S. Environmental Protection Agency (EPA)-approved five-mode duty cycle test for snowmobiles assumes a much more aggressive driving style than occurs in the park. For example, modes one (full throttle), two (85 percent top speed, 51 percent torque) and three (75 percent top speed, 33 percent torque) combined represent 64 percent of total weight in the model (0.64). However, snowmobile operating conditions and driving styles in Yellowstone are most closely represented by mode 4 (65 percent speed and 19 percent torque), yet this mode is only weighted at 0.31 (31 percent) for the five-mode test (table 6).

**TABLE 6: FIVE-MODE DUTY CYCLE FOR SNOWMOBILES (40 CFR 1051.501)**

Mode	Speed (percent)*	Torque (percent)**	Weighting factors
1	100	100	0.12
2	85	51	0.27
3	75	33	0.25
4	65	19	0.31
5	Idle	0	0.05

\* Percent speed is percent of maximum test speed

\*\* Percent torque is percent of maximum torque at maximum test speed

**Engine Load Variability**—Dynamometer testing does not reliably control low engine loadings (i.e., engine loads much closer to “idle” than “full throttle” and “low” torque rather than “high” torque) because “snowmobile engines can be difficult to run on a dynamometer because engine torque increases sharply as the speed of the engine approaches its power band” (Wright and White 1998). Given this problem, Lela and White eliminated mode 4 of the five-mode test from their analyses (2002).

**The Continuously Variable Transmission and Drive Track of a Snowmobile are not Factored into most Laboratory Testing of Snowmobiles**—Dynamometer test results can be further called into question for approximating conditions in the park because under the EPA emissions test, snowmobile engines are not tested with the continuously variable transmission or drive track in place. Integrating the continuously variable transmission and rubber track into testing introduces significant variability from transmission belt slippage at low speeds and track inefficiencies (Wright and White 1998).

**Conversion Issues between Grams per Horsepower Hour and Grams per Mile**—Dynamometer test results are reported in grams per horsepower hour (g/horsepower hour) (alternatively kilowatt hour). This value refers to engine shaft output which cannot be measured directly using a PEM device during in-use measurements of the entire vehicle chassis. A number of highly significant assumptions need to be made when converting from grams per horsepower hour (g/horsepower hour) to grams per mile (g/mile), and therefore conversion of PEM test results cannot be relied upon. These assumptions call into question the legitimacy of any converted data (see Scientific Assessment of Yellowstone National Park Winter Use, 2011).

**Weather and Elevation Considerations**—Laboratory emission testing for the five-mode test is typically conducted at elevation levels that are unrepresentative of the elevation at Yellowstone National Park. Given that most of the interior of the park is higher than 7,000 feet in elevation and that daytime temperatures are well below freezing on most days, laboratory tests do not reflect typical operating conditions encountered in the park.

**Tracks and Rolling Resistance from Snow**—EPA on-road vehicle certification is based on road testing in which vehicles are fitted with tires. However, when wheeled vehicles are fitted with tracks, converted

into snowcoaches, and operated on snow, they encounter significant rolling resistance from snow surface and tracks. In addition, track systems add considerable weight to a vehicle. Some converted snowcoaches are also converted to four-wheel drive, which further changes performance characteristics from those reported by manufacturers. In a letter to the NPS dated July 15, 2011, the EPA cautioned that “an original-equipment-manufactured on-road-use 2010 vehicle would likely not be able to achieve the same level of required certified emissions after modification to run with tracks, instead of wheels, in an oversnow operations configuration.” Research in Yellowstone on emissions of snowcoaches has validated this statement, showing that road and snow conditions can contribute to large increases in tailpipe pollutants when comparing similar OSVs configured for highway use (Bishop et al. 2009). Lela and White, when discussing this situation, noted that, “running in snow on tracks generates tremendously higher engine loads than on highway operation” and that, “simulation of this (high load) on the chassis dynamometer provides a second emission value (open loop, rich), which may be more typical of real snowcoach operation” (Lela and White 2002, p. 27). The authors concluded that “snowcoach emissions data should be based on in-field measurement” (Lela and White, p. 28). For snowmobiles, dynamometer testing does not include the continuously variable transmission or belt nor does it account for rolling resistance or friction from the snow surface.

**Necessity of Snowcoaches needing to Operate at Full Power**—Many converted snowcoaches need to be operated at or near full throttle for significant portions of their duty cycle to overcome impediments such as rolling resistance from tracks and snow, elevation, and air temperature (Bishop 2006; Bishop et al. 2006; Bishop et al. 2009; Lela and White 2002). Modern vehicle design tends to emphasize smaller engines to reduce emissions and improve fuel economy. These modern vehicles, when converted into snowcoaches, may not have the power to move a tracked vehicle at a reasonable speed. As a result, converted snowcoach fuel economy is low – typically less than 3 miles per gallon (Bishop et al. 2009).

**Remote Sensing Only Collects Place-in-Time Data**—Remote sensing devices used previously in Yellowstone to collect emission data (Bishop 2005) are on-the-ground data collections that can only capture “place-in-time” data as a vehicle passes by a stationary device. These types of devices cannot capture the range or levels of pollutants as a vehicle moves through the park experiencing varying engine loads and duty cycles.

For the reasons outlined above, the NPS has concluded that tailpipe pollutants collected via PEM device from in-use OSVs operating in Yellowstone National Park are most valid data source for assessing comparability of OSV transportation event emission levels. Testing OSVs in this fashion involves fitting vehicles with a PEM device and operating those vehicles on a standardized route with equal passenger loading (Bishop et al. 2009; Bishop et al. 2006 and 2007; Ray et al. 2012). PEM devices are composed of a five-gas analyzer (CO, CO<sub>2</sub>, HC, NO<sub>x</sub>, and O<sub>2</sub>), onboard computer, and engine diagnostic scanner (Frey et al. 2003). Bishop, Stadtmuller, and Steadman stated that, PEM are, “the only avenue that can lead one to a meaningful emissions picture” (2007, p. 1). Lela and White concluded that, “chassis-based emission result(s) provide a more real-world emission factor” (2002, p. 26-27). Such testing obtains “real-world, on-road microscale measurements of vehicle emissions during actual vehicle use,” and provides representative real-world emission measurements at any location under any weather conditions (Frey et al. 2003, p. 992). This is particularly important because, “vehicle emissions are episodic in nature, indicating that average emissions for a trip are often dominated by short-term events,” such as power excursions and open-loop rich fuel cycles, among others. Additionally, “standard driving cycles may not adequately represent real-world driving for a particular location because of failure to represent the influence of real world traffic” (Frey et al. 2003, p. 992). PEM testing has occurred in Yellowstone on three occasions; 2005, 2006, and 2012 (Bishop et al. 2006 and 2007; Ray et al. 2012) and has typically collected the following three tailpipe pollutants:

- Carbon monoxide (CO), a colorless, odorless, and poisonous gas produced primarily by the incomplete combustion of gasoline and other fossil fuels;

- Hydrocarbons (HC), which result from partially burned fuel emitted through the tailpipe and from fuel evaporations from the crankcase, carburetor, and gas tank. When exposed to sunlight, HC or volatile organic compounds contribute to formation of harmful ground level ozone, also known as smog; and
- Nitrogen oxides (NO<sub>x</sub>), precursors to the formation of photochemical oxidants such as ozone.

Particulate matter and hazardous air pollutants cannot be used for assessing comparability of OSV transportation events because the PEM devices used to measure emission output of OSVs in Yellowstone do not collect data on these pollutants.

## COMPARABILITY ASSESSMENT

### **Air Quality Impacts at the Person and Event Level for a Representative Roundtrip from West Yellowstone to Old Faithful**

All per person and per transportation event levels are based on emissions post-implementation of BAT for snowcoaches and New BAT standard for snowmobiles (described in the plan/SEIS under alternative 4 and appendix B, see also Ray 2012, Table 17, for specific emission factors for each SEIS alternative). Where applicable, averages are based on the 2009/2010 through 2011/2012 winter seasons (a three-year average). The following constants were used in addition to those presented in table 1 of this appendix:

- A standard 65 mile roundtrip from West Yellowstone to Old Faithful includes:
  - 30 minutes of idling;
  - 12.2 miles at low speed (less than 15 mph); and,
  - 52.8 miles at “cruising speed” (~35 mph for snowmobiles and ~25 mph for snowcoaches).
- One gram is equal to 0.00220462 pounds.

Based on PEM testing of snowmobiles conducted in Yellowstone in March 2012, an average New BAT snowmobile was calculated to produce 4.0 grams of CO per mile at cruising speed, 25 grams of CO at low speed, and 216 grams of CO per hour at idle. For HC, an average New BAT snowmobile was calculated to produce 0.10 grams of HC per mile at cruise speed, 1.30 grams of HC at low speed, and 13.32 grams of HC per hour at idle. For NO<sub>x</sub>, an average New BAT snowmobile was calculated to produce 11.00 grams of NO<sub>x</sub> of per mile at cruise speed, 5.20 grams of NO<sub>x</sub> at low speed, and 0.61 grams of NO<sub>x</sub> per hour at idle (see Ray 2012, Table 17). Based on PEM testing of snowcoaches conducted in Yellowstone in March 2012, an average BAT snowcoach was calculated to produce 84.0 grams of CO per mile at cruise speed, 10.9 grams of CO at low speed, and 10.6 grams of CO per hour at idle (Ray 2012, Table 17). For HC, an average BAT snowcoach was calculated to produce 0.30 grams of HC per mile at cruise speed, 0.40 grams of HC at low speed, and 1.00 grams of HC per hour at idle. For NO<sub>x</sub>, an average BAT snowcoach was calculated to produce 4.98 grams of NO<sub>x</sub> per mile at cruise speed, 5.31 grams of NO<sub>x</sub> at low speed, and 4.14 grams of NO<sub>x</sub> per hour at idle (see Ray 2012, Table 17).

Using the emission values above and constants described earlier, a standard roundtrip from West Yellowstone, MT, to Old Faithful was calculated in terms of pounds of CO, HC, and NO<sub>x</sub> per one vehicle, one person, and one event (table 7).

**TABLE 7: POUNDS OF TAILPIPE POLLUTANTS PER STANDARD ROUNTRIP FROM WEST YELLOWSTONE TO OLD FAITHFUL**

Pollutant	Event Type	Per Vehicle	Per Person	Per Event
Carbon Monoxide	New BAT Snowmobiles	1.38	0.98	9.63
	BAT Snowcoach	10.08	1.12	10.08
Hydrocarbons	New BAT Snowmobiles	0.06	0.04	0.43
	BAT Snowcoach	0.05	0.01	0.05
Nitrogen Oxides	New BAT Snowmobiles	1.42	1.01	9.95
	BAT Snowcoach	0.73	0.08	0.73

At the “per person” level for a standard roundtrip from West Yellowstone to Old Faithful, a snowmobile transportation event would produce 0.98 pounds of CO per person and a snowcoach transportation event would produce 1.12 pounds of CO per person. At the “transportation event” level for the same roundtrip, a snowmobile event comprised of seven New BAT snowmobiles would produce 9.63 pounds of CO and a snowcoach event would produce 10.08 pounds of CO.

At the “per person” level for the standard roundtrip described above, a snowmobile transportation event would produce 0.04 pounds of HC per person and a snowcoach would produce 0.01 pounds of HC per person. At the “transportation event” level, a snowmobile event comprised of seven New BAT snowmobiles would produce 0.43 pounds of HC per event and a snowcoach event would produce 0.05 pounds of HC per event.

At the “per person” level for the standard roundtrip described above, a snowmobile transportation event would produce 1.01 pounds of NO<sub>x</sub> per person and a snowcoach would produce 0.08 pounds of NO<sub>x</sub> per person. At the “transportation event” level, a snowmobile event comprised of seven New BAT snowmobiles would produce 9.95 pounds of NO<sub>x</sub> and a snowcoach event would produce 0.73 pounds of NO<sub>x</sub>.

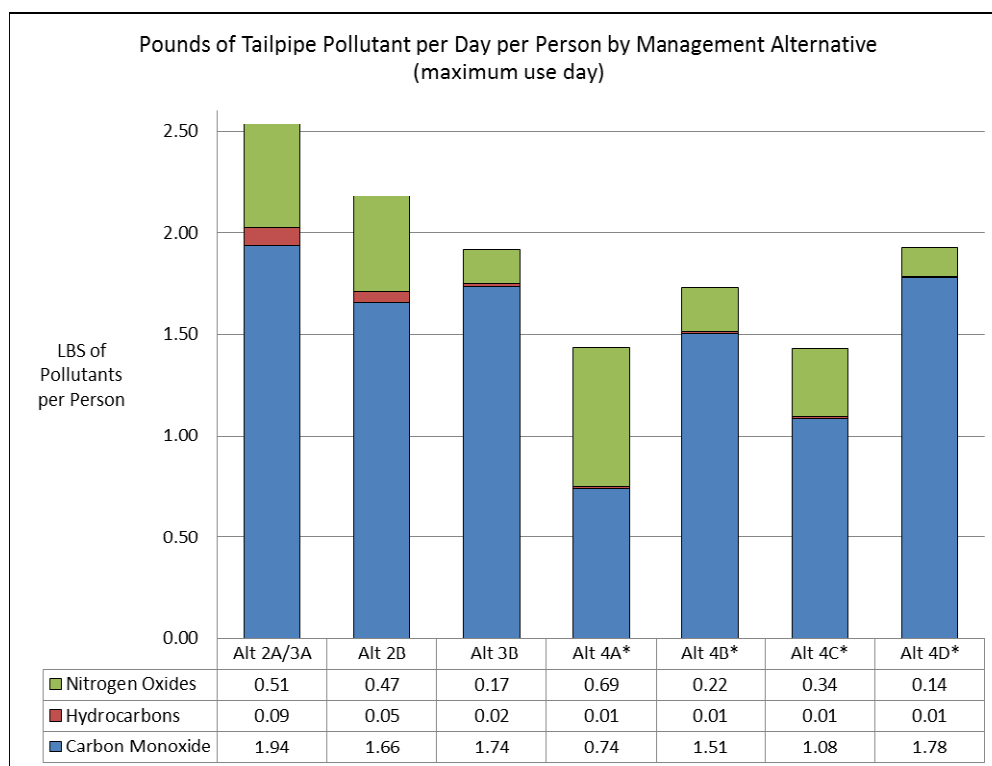
### **Air Quality Impacts at the SEIS Alternative Level on a Maximum Use Day**

Using data from ARS (2012) and estimates of maximum number of people per day (table 1 from chapter 2 of the plan/SEIS), total pounds of tailpipe pollutants per day per person by SEIS alternative estimation was calculated. Data are presented in table 8 with a visual presentation in figure 1. Alternative 3a was not included because it is identical to alternative 2a. All values are for a maximum use day (maximum number of people and OSVs in the park).

Alternative 2a (prior to the implementation of BAT for snowcoaches) produces the most pollutants per person at 2.54 pounds. Alternative 4 is the cleanest with a range of 1.43 to 1.92 pounds per day (average of 1.63 pounds per person). Alternative 3b produces 1.92 pounds of pollutants per person.

**TABLE 8: POUNDS OF TAILPIPE POLLUTANTS PER DAY PER PERSON BY SEIS ALTERNATIVE (MAX USE DAY)**

Alternative	Max N People per Day	Carbon Monoxide		Hydrocarbons		Nitrogen Oxides		TOTAL LBS of Pollution per Person
		LBS / Day	LBS / Person	LBS / Day	LBS / Person	LBS / Day	LBS / Person	
Alt 2A	1705	3,299	1.94	150	0.09	873	0.51	2.54
Alt 2B	1705	2,827	1.66	90	0.05	805	0.47	2.18
Alt 3B	1644	2,852	1.74	28	0.02	272	0.17	1.92
Alt 4A*	1782	1,311	0.74	20	0.01	1,227	0.69	1.44
Alt 4B*	1492	2,247	1.51	13	0.01	326	0.22	1.73
Alt 4C*	2640	2,861	1.08	20	0.01	891	0.34	1.43
Alt 4D*	2944	5,233	1.78	18	0.01	413	0.14	1.92
*NPS Preferred Alternative								



**FIGURE 1: POUNDS OF TAILPIPE POLLUTANT PER DAY PER PERSON BY SEIS ALTERNATIVE**

## CONCLUSION

To assess relative levels of tailpipe pollutants emitted from snowmobile and snowcoach transportation events, the NPS utilized data collected via PEM device to evaluate pollution levels at the “per person” and “per transportation event” levels for three primary pollutants: CO, HC, and NO<sub>x</sub>. These analyses indicate that snowmobile transportation events and snowcoach transportation events both offer some benefits and some drawbacks relative to each other and that there is no universally “cleaner” (less polluting) mode of oversnow transportation. New BAT snowmobiles are cleaner than snowcoaches in terms of CO emissions. However, snowcoaches emit less HC and NO<sub>x</sub> than snowmobiles. Overall, the suite of



scenarios that encompass alternatives 4a–4d are as clean as or cleaner than the other alternatives at the “per person” level on a maximum use day. Without making a value judgment as to which pollutants warrant more concern relative to others, it is not possible to ascertain that one mode of transportation is cleaner or more desirable than the other or more protective of the park’s air quality.

## **SOUNDSCAPES AND THE ACOUSTIC ENVIRONMENT**

### **INTRODUCTION**

Park natural soundscapes, also called acoustic resources, encompass all of the natural sounds that occur in parks. In Yellowstone National Park during winter, OSVs are the most prominent source of anthropogenic (human-made) noise. Substantial efforts have been undertaken to advance the understanding of acoustic resources, the impact of OSVs on these resources and visitor experience, and to devise management strategies and technological solutions to minimize the effects of anthropogenic noise. Acoustical monitoring has been conducted every winter since the 2002/2003 season with the primary purpose of describing the park’s natural acoustical environment and measuring the impacts of OSV noise on Yellowstone’s acoustic resources. Additional measurements of various OSVs have been made under a variety of operating conditions. Acoustical modeling activities have been undertaken in conjunction with various winter use planning efforts to characterize the noise output of OSVs and to model the effects of various SEIS alternatives on natural soundscape conditions.

### **The Effect of Grouping Vehicles on OSV Noise Output**

By packaging traffic into transportation events and capping the total daily number of transportation events, the park proactively reduces the amount of time vehicles are audible within a day, reducing impacts to natural soundscapes. By limiting the number of daily transportation events in the park, wildlife would be disrupted fewer times. There are however, tradeoffs to packaging OSV traffic into events. The higher the numbers of OSVs in the park, the more noise energy there will be if the total noise energy emitted per vehicle remains constant. The total noise energy emitted by OSVs remains the same so long as the number of vehicles, the routes traveled, and travel speeds remain the same. For this reason, grouping vehicles has no effect on the total amount of noise energy radiated in the park. However, the way that noise energy is packaged into discrete events influences the distance at which OSV noise can be heard, the percentage of time OSVs are audible, and how loud those OSVs seem to observers. Further, dividing a fixed number of vehicles into fewer, larger groups reduces the number of noise disturbance events experienced by visitors and wildlife, increases the duration of noise-free intervals, and limits to 3 dBA or less the increase in the expanded areas in which OSVs can be heard as a result of grouping traffic. Grouping vehicles does cause OSV noise to propagate greater distances from road corridors. However, each time the number of OSVs doubles, the maximum distance at which they can be heard increases by less than 40 percent, creating efficiency. The speed at which OSVs operate also influences how long vehicles can be heard. Generally, slower vehicles radiate less noise, but also take longer to travel the same distance; thereby increasing the length of time audible (duration) the event can be heard.

## METRICS

The following metrics were utilized for assessing the comparability of OSV transportation events on natural soundscapes. These metrics were selected because they represent relatively simple, easy to understand measures for assessing comparability, and allow direct comparisons of the relative effects of the two types of OSV events on natural soundscapes:

- Length of time a discrete transportation event is audible (how long can an average person hear an OSV transportation event?);
- Noise energy emitted by a snowmobile transportation event compared to the noise energy emitted by a snowcoach transportation event;
- Tonal qualities produced by the two types of OSV transportation events (are the noise produced by both types of OSVs similar?).

The percentage of time OSVs are audible (percent time audible) at a given location is not suitable for assessing the comparability of transportation events because it measures the proportion of a defined period of time that OSVs can be heard, and cannot easily be separated by noise source or attributed to one OSV type or another. Percent time audible is influenced by the noise level of the vehicle and the number of vehicles and groups on the road during a given time. Wind affects the propagation of noise, interacts with vegetation and terrain to elevate background natural sound levels, and wind flowing around the ears generates additional sound that makes it harder to hear OSV noise. In the 2008 Interim Winter Use Plan/Environmental Assessment (NPS 2008), Figure 3-1 in NPS 2008 shows a general positive relationship between snowmobile traffic levels and the percent time audible for all OSVs. However, there is substantial scatter in the data. Less than 9 percent of the overall variation is explained by the fitted straight line, meaning that the relationship between snowmobile traffic levels and the percent time audible for all OSVs is weak. On one date, approximately 260 snowmobiles had nearly 10 percent less audibility than another date that only had 140 snowmobiles. The total percent time OSVs are audible can be lowered by clustering vehicles so that audible events overlap (NPS 2008). Snowmobiles travel in groups, and several groups may overlap with each other (in audibility) during high traffic intervals and routes such as morning travel to Old Faithful or afternoon travel back to the entrance gates. For these reasons, percent time audible is a highly variable metric that is not suitable for assessing comparability of noise from the two types of transportation events.

## COMPARABILITY ASSESSMENT

### Length of Time a Discrete Transportation Event is Audible

The length of time a discrete transportation event is audible is a direct measure of how long a transportation event can be heard as the event moves past a fixed location, from when the event is first audible to when it can no longer be heard. Length of time a discrete event is audible is a valuable measure because it allows a direct, linear comparison of how long, on average from multiple locations, the discrete OSV transportation events are audible. Between 2005 and 2011, observers documented noise emissions near the road at 14 different locations throughout Yellowstone National Park. Observers recorded start times when OSVs were first heard and stop times when they could no longer be heard. Nearly all measurements were for discrete guided snowcoach or snowmobile events. That is, only one OSV tour was audible during the measurement. For a few measurements, other OSVs may have overlapped slightly with the beginning or end of an event, yielding a shorter duration than would have been measured without overlap. These abbreviated measurements are unlikely to bias comparison of the durations of snowcoach

and snowmobile noise events (Burson pers. comm. 2012). On average, there were 6.7 snowmobiles per event and one snowcoach per event.

Results for all locations are shown in table 9. A total of 1,127 events were recorded, however, locations with fewer than 10 events recorded for a specific OSV transportation event type were excluded from these analyses due to limited sample size leaving 1,012 events for analyses. Snowmobile transportation events were heard, on average, for 2 minutes and 36 seconds, while snowcoach transportation events were heard for an average of 2 minutes and 21 seconds. The overall difference in elapsed time between snowmobile and snowcoach transportation events averaged 15 seconds (approximately 10 percent).

**TABLE 9: AVERAGE ELAPSED TIME AUDIBLE PER OSV PASSBY IN MINUTES: SECONDS (2005-2011)**

Location	Guided Snowmobiles	n	Guided Snowcoaches	n	Difference
West Yellowstone	1:22	56	1:00	24	0:22
Madison Junction	2:52	106	2:20	128	0:32
Mallard Lake	1:40	12	2:13	10	-0:33
Daisy	1:47	44	1:33	51	0:14
Mary Mountain Trailhead	2:30	44	2:20	30	0:10
Kepler Falls	2:00	41	1:52	15	0:08
Tuff Cliff	3:03	68	2:03	51	1:00
Spring Creek	3:09	79	3:38	60	-0:29
Lewis Lake	3:00	67	2:29	45	0:31
Cygnnet Lake	4:44	50	4:05	31	0:39
Average	2:36		2:21		0:15
Total Sample Size		567		445	

Average time audible, sample size n, and difference in time audible for guided snowmobiles and guided snowcoaches in Yellowstone National Park. Average time audible and sample size n is for groups of guided snowmobiles and for individual guided snowcoaches.

### Noise Energy Impacts (Transportation Event Level)

A second way to compare the relative effects of the two types of transportation events is to examine the noise energy emitted by both under controlled conditions. The noise energy generated from individual OSVs has been measured many times in Yellowstone National Park, most notably by the John A. Volpe National Transportation System Center in February 2008 and January 2009 as well as by NPS acoustical specialists in 2010 and 2012. These measurements focus on A-weighted noise level – a commonly used filter used to approximate how humans hear noise – measured at a standard distance of 50 feet (15 meters). Although acoustical specialists attempted to measure snowmobiles and snowcoaches at standardized speeds, the actual speeds during the measurements varied slightly as did environmental conditions. As a result, raw measurements required some additional processing to extract standardized measurements for each vehicle. This processing estimated the effect of vehicle speed on noise output for snowcoaches and snowmobiles, corrected the noise increment due to differences in testing procedures for snowmobiles – some measured at full throttle – and snowcoaches – measured at cruising speed, and estimated differences between the 2008 and 2009 measurement conditions. After controlling for these

factors<sup>1</sup>, standardized noise output levels for each OSV were estimated through a soundscape model that is representative of operating conditions. A compilation of these data is presented in table 10, ordered by dBA at 25 mph.

For the three snowmobile models shown in table 10 (which represent three of the most popular snowmobiles in the park) at typical cruising speed of 35 mph, the model predicts a 5-6 dBA difference between the Arctic Cat T660, measured at 69 dBA, and Arctic Cat TZ1, measured at 74 dBA. These differences reflect aggregated measurements for the snowmobiles across all model years. A three dBA increase represents a doubling of noise energy. Snowcoaches, on the other hand, exhibited a much more dramatic range of noise output; the *quietest* and *noisiest* OSVs in the park were snowcoaches. The quietest snowcoach, a 1994 Dodge Van with Snowbuster Tracks, produced 64 dBA at cruising speed. The loudest snowcoach, a 1988 Prinoth Powder Cat TR, produced 83 dBA at cruising speed. To put this range in perspective, it would take 79 of the 1994 Dodge Van snowcoaches fitted with Snowbuster Tracks to radiate as much noise as a single 1988 Prinoth TR.

This analysis, which accounts for differences in environmental conditions and testing procedures, documents meaningful differences in noise output among snowmobiles, and dramatic differences among snowcoaches. Further evidence of differences among snowmobiles in noise output is provided by the SAE J192 noise levels reported to Yellowstone National Park by snowmobile manufacturers, as shown in figure 2. SAE J192 is a full throttle test designed to represent the maximum noise output of a snowmobile (SAE, 1985). As part of Yellowstone’s BAT certification requirements for snowmobiles in effect since 2004, manufacturers Arctic Cat (A), Bombardier (B), Polaris (P), and Yamaha (Y) all reported noise emissions for BAT-compliant models manufactured between 2003 and 2012. In addition to manufacturer reported noise outputs, Yellowstone also conducted controlled experiments to measure snowmobile noise emissions within the park under typical operating conditions. Measurements made at Yellowstone during this monitoring reveal a noise emission level difference between two snowmobiles – the Arctic Cat T660 (model years 2004, 2006, 2008) and the Arctic Cat TZ1 (model year 2010) – that spans the entire range of emissions reported by manufacturers. In figure 2, single letters represent cases in which manufacturers reported a single value. When the manufacturer reported a range of values, the vehicle is represented by a vertical line segment with letters on each end. The solid horizontal line represents the current snowmobile noise BAT standard, and the dotted horizontal line represents the BAT standard plus the 2 dBA tolerance specified by SAE J192.

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<sup>1</sup> The method that was used was a Generalized Additive Model, abbreviated as GAM (T. J. Hastie and R. J. Tibshirani 1990. Generalized Additive Models. Chapman and Hall/CRC, Boca Raton, FL. 335 pages.). A GAM is an extension of the concept of a regression, which in this case allowed the contribution of speed to have a nonlinear relationship with noise output. Separate nonlinear relationships were modeled for snowmobiles and snowcoaches.

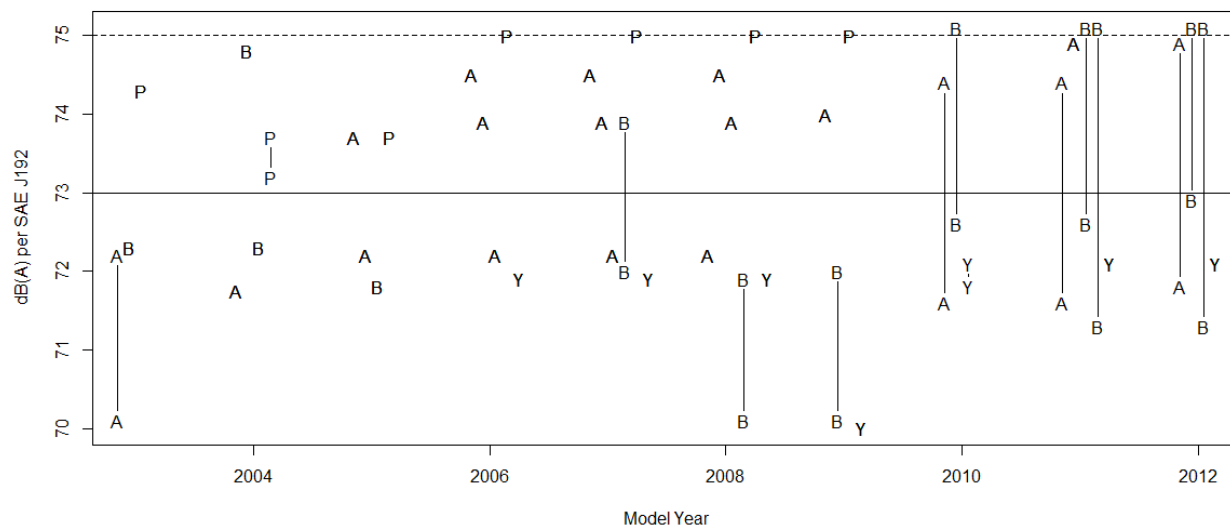
**TABLE 10: STANDARDIZED NOISE OUTPUT LEVELS BY OSV**

Vehicle Study Name	Vehicle Type	Vehicle Description	Engine	Fuel	Drive System	dBA at:		Source(s)
						25 mph	35 mph	
YSExp	Snowcoach	1994 Dodge B-350 Van	318ci V8	Gasoline	Snowbusters	64	--	Volpe 2010
T660	Snowmobile	Arctic Cat T660	660cc	Gasoline	Track	66	69	Volpe 2008* & 2010
Ski Doo 600 Ace	Snowmobile	2011 Ski Doo 600 Ace	600cc	Gasoline	Track	--	70	Burson 2012
AlpineGuide (Kitty)	Snowcoach	1956 Bombardier B-12	5.3L V8 ("02)	Gasoline	Bombardiers	67	--	Volpe 2010
YellowstoneExpedition_Hayden	Snowcoach	1997 Dodge B-350 Van	5.2L V8	Gasoline	Snowbusters	69	--	Volpe 2010
Xanterra165	Snowcoach	2001 Chevy Van	5.7L V8	Gasoline	Snowbusters	70	--	Volpe 2008*
YSSC	Snowcoach	2002 Ford Van	6.8L V10	Gasoline	Mattracks	71	--	Volpe 2008*
SeeYellowstoneTours_#4	Snowcoach	2000 Ford E-350 Van	6.8L V10	Gasoline	Mattracks	71	--	Volpe 2010
RockyMt	Snowcoach	1999 Ford Econoline	6.8L V10	Gasoline	Mattracks	71	--	Volpe 2008*
YellowstoneExpedition_Eleanor	Snowcoach	1999 Ford E-150 Van	4.6L V8	Gasoline	Snowbusters	71	--	Volpe 2010
TZ1	Snowmobile	Arctic Cat TZ1	1056cc	Gasoline	Track	72	73-74	Volpe 2008* & 2010, Burson 2012
GooseWing	Snowcoach	2006 Ford Van	6.0L V8	Diesel	Mattracks	72	--	Volpe 2008*
XanteraMattTrack_430	Snowcoach	2008 Chevy Express Van	6.0L V8	Gasoline	Mattracks	73	--	Volpe 2010
YellowstoneSnowcoach_SNOVAN5	Snowcoach	2001 Ford E-350 Van	6.8L V10	Gasoline	Mattracks	73	--	Volpe 2010
YellowstoneSnowcoach_SNOVAN4	Snowcoach	2001 Ford E-350 Van	6.8L V10	Gasoline	Mattracks	73	--	Volpe 2010
Xantera431	Snowcoach	2006 Chevy Express Van	6.0L V8	Gasoline	Mattracks	73	--	Volpe 2008*
BuffaloBusTouring_#4	Snowcoach	2009 Ford F-550 Krystal	6.4L V8	Diesel	Griptracks	73	--	Volpe 2010
Xantera_Bombardier_710	Snowcoach	1966 Bombardier B-12	5.7L V8	Gasoline	Bombardier	74	--	Volpe 2010
BuffaloBusTouring_#T2	Snowcoach	2005 Ford E-350 Vanterra	6.8L V10	Gasoline	Mattracks	75	--	Volpe 2010
BuffaloBusTouringCo_#3	Snowcoach	2006 Ford E-350 Vanterra	6.8L V10	Gasoline	Mattracks	75	--	Volpe 2010
Xantera_713	Snowcoach	1968 Bombardier R-12	5.7L V8	Gasoline	Bombardier	75	--	Volpe 2010
NPSSC	Snowcoach	2003 International Bus	6.0L V8	Diesel	Griptracks	76	--	Volpe 2008*

## Appendices

Vehicle Study Name	Vehicle Type	Vehicle Description	Engine	Fuel	Drive System	dBA at:		Source(s)
						25 mph	35 mph	
SeeYellowstoneTours_#6	Snowcoach	2005 Ford E-350 Van	6.8L V10	Gasoline	Mattracks	76	--	Volpe 2010
Xantera707	Snowcoach	1966 Bombardier B-12	5.7L V8 ("90)	Gasoline	Bombardier	77	--	Volpe 2008*
Xantera_709	Snowcoach	1966 Bombardier B-12	5.7L V8	Gasoline	Bombardier	78	--	Volpe 2010
SeeYellowstoneTours_#9	Snowcoach	2006 Ford Odyssey	6.0L V8	Diesel	Tank Tracks	80	--	Volpe 2010
Prinoth_537	Snowcoach	1988 Prinoth Powder Cat TR	350ci V8 ("08)	Gasoline	Pirnoth	83	--	Volpe 2010

\*Vehicles measured by Volpe in 2008 were on average 6 dBA quieter than corresponding vehicles reported in Volpe 2010. This 6 dBA difference is believed to be a function of a high snowberm present during measurements in 2008 that dampened noise output of OSVs. Those rows that contain data from 2008 were shaded gray for illustrative purposes.



**FIGURE 2: MANUFACTURE REPORTED NOISE EMISSIONS FOR BAT-COMPLIANT MODELS**

As shown, the quietest BAT snowmobiles generated about 5 dBA less noise than the loudest (the quietest snowmobile presented in figure 2 (Arctic Cat T660) was last manufactured in 2008). At a 35 mph cruising speed, the Arctic Cat T660 (model years 2004, 2006, 2008) had an average noise level of 69 dBA at 50 feet, and the Arctic Cat TZ1 (model year 2010) had a noise level of 73 dBA (Hastings et al. 2008; Volpe 2010; Burson 2012 unpublished). This means that three of the quietest snowmobiles running in a compact group would generate less noise than one of the loudest snowmobiles. For this reason, all BAT snowmobiles cannot be considered the same. In many cases earlier BAT snowmobile models were considerably quieter than later models. The NPS has also conducted multiple studies of the noise output of OSVs at typical cruising speeds. The NPS demonstrated that snowmobile noise output ranges from 69 to 73 dBA at 35 mph and snowcoach noise output ranges from 64 to 83 dBA at 25 mph (see table 10).

To determine whether transportation events have comparable noise energy emissions, the park compared the noise energy generated by an average snowcoach transportation event against the average noise energy generated by both seven and ten snowmobile transportation event at typical operating speeds, 25 mph and 35 mph, respectively. However, prior to undertaking these analyses, two adjustments had to be made to snowmobile noise data. The first is the effect of having seven vehicles in the group. The second adjustment involves the speed of the vehicles. In general, a group of N vehicles produces a noise level that is equal to  $10 \cdot \log_{10}(N)$  dBA greater than the output of a single vehicle. Consider for example a single snowmobile producing 67 dBA at 35 mph (the New BAT standard maximum at cruising speed). Two identical snowmobiles traveling side by side would emit 70.0 dBA total – a result of the multiplying factor shown below in table 11. Seven of these identical vehicles, if it were possible to stack them on top of each other, would be approximately 8.5 dBA higher (75.5 dBA) than a single snowmobile (table 12). The second factor that influences noise energy output for transportation events is the speed of travel. If two vehicles radiate the same noise, and one travels faster than the other, then the total received noise (Sound Equivalent Level or SEL) will be smaller for the faster vehicle. If we account for this difference in vehicle speed by assuming an average snowmobile speed of 35 mph and an average snowcoach speed of 25 mph, the difference in vehicle speed results in an adjustment of about -0.8 dBA for groups of snowmobiles. This is true from any vantage point alongside the route, or for the route as a whole. In other words, because they operate faster, snowmobile transportation events are heard for less time and sound about 0.8 dBA quieter than snowcoach transportation events.

**TABLE 11: TOTAL dBA BY NUMBER OF SNOWMOBILES PER TRANSPORTATION EVENT**

Snowmobile(s) in Transportation Event	Formula	dBA Increase above 67 dBA	Total Noise Energy (dBA) of Snowmobile Transportation Event
1	$=10*\log_{10}(1)$	--	67.00
2	$=10*\log_{10}(2)$	3.01	70.01*
3	$=10*\log_{10}(3)$	4.77	71.77*
4	$=10*\log_{10}(4)$	6.02	73.02*
5	$=10*\log_{10}(5)$	6.99	73.99*
6	$=10*\log_{10}(6)$	7.78	74.78*
7	$=10*\log_{10}(7)$	8.45	75.45*
8	$=10*\log_{10}(8)$	9.03	76.03*
9	$=10*\log_{10}(9)$	9.54	76.54*
10	$=10*\log_{10}(10)$	10.00	77.00*

\*Assumes no spacing between vehicles.

By taking both the group multiplier and the speed adjustment together, if the future maximum noise limit for snowcoaches at cruising speed is 75 dBA, a group of 7 snowmobiles will have comparable noise output if *each* machine radiates 8 dBA less than a single snowcoach, or 67 dBA at typical cruising speeds of each respective vehicle, as envisioned under the preferred alternative.

Within the soundscape modeling data set, several vehicles can be found that meet or nearly meet the proposed BAT standards under the preferred alternative; snowcoaches at a maximum of 75 dBA noise output limit and snowmobiles at a maximum of 67 dBA noise output limit (both measured at cruising speed). By comparing these vehicles, the NPS can model transportation events comprised of vehicles at proposed levels to determine the comparability between transportation events, as well as comparability between individual vehicles. For snowcoaches, the NPS modeled one of the most popular fleet snowcoaches for which Yellowstone has acoustical data: a Ford Vanterra with a 6.8L V10 gasoline motor and a large raised roof with large windows. Other snowcoaches, such as the Dodge Vans with Snowbuster Tracks or converted Bombardiers were not used because these vehicles do not meet the proposed snowcoach BAT standard for emissions under the preferred alternative. These vehicles are also unable to operate on bare pavement sections of snowroads because they have metal tracks. As such, they were not viewed as sufficiently representative of snowcoaches that would operate under the transportation event framework once BAT is implemented for snowcoaches. As evident in table 10, the Ford Vanterra (Buffalo Bus T2) produced approximately 75 dBA at 50 feet.

The soundscape modeling data indicate that seven snowmobiles traveling together, each producing the maximum allowable (under New BAT standards) noise output of 67 dBA at 35 mph, will produce a maximum noise energy level of 75.5 dBA (for the transportation event, see table 12). A group of ten snowmobiles traveling together, each producing the maximum allowable noise output of 67 dBA at 35 mph, will produce a maximum noise energy level of 77 dBA (for the transportation event). However, because snowmobiles do not travel within the park side-by-side, but with a several second gap between each machine for safety purposes, at 50 feet from the road the maximum noise created both a seven and ten snowmobile transportation events traveling at 35 mph is approximately 72 dBA, or 3 dBA less than a snowcoach. Because a 3 dBA increase is a doubling of noise energy, a snowcoach event at the maximum allowable BAT noise level of 75 dBA generates two times the noise energy of a snowmobile transportation event comprised of ten snowmobiles when measured at 50 feet, but the two types of transportation events would have similar noise levels at distant locations.



## **Tonal Qualities of Snowmobile and Snowcoach Transportation Events**

At a distance, if the vehicles are not visible, trained acousticians as well as people with less experience typically cannot differentiate between the noise of snowmobile and snowcoach transportation events (S. Burson, personal observation). This is likely because current BAT compliant snowmobiles have lower frequency noise emissions than two stroke snowmobiles and are similar to the tonal qualities of snowcoaches. Snowmobiles and snowcoaches both have 4- stroke engines, fuel injected motors, mufflers, and similar propulsion and steering mechanisms which further reduces the likelihood that a listener can differentiate between the two transportation events.

## **CONCLUSION**

The best available data regarding noise emissions of New BAT snowmobiles and BAT snowcoaches indicate that:

- The length of time snowmobile and snowcoach transportation events can be heard is similar and differs, on average, by only 15 seconds (approximately 10 percent);
- A group of ten New BAT snowmobiles, when grouped together with space between vehicles for safety, measure 3 dBA lower than a single BAT snowcoach when measured from 50 feet but noise energy levels are similar at greater distances;
- And that at a distance if the vehicles are not visible, trained acousticians as well as people with less experience typically cannot differentiate between the noise of snowmobile and snowcoach transportation events (S. Burson, personal observation).

In conclusion, once BAT is in place for snowcoaches and New BAT in place for snowmobiles, there is no evidence to support a compelling advantage for one type of OSV transportation event over another in terms of preservation of the natural soundscape. Therefore, based on these data and assessments, the NPS has concluded that snowmobile and snowcoach transportation events are comparable in terms impacts to soundscape resources.

## **VISITOR USE, EXPERIENCE, AND ACCESSIBILITY**

### **INTRODUCTION**

For many, a wintertime trip into the interior of Yellowstone National Park is an once-in-a-lifetime experience (Nickerson et al. 2006). Visitors who plan a trip intending to travel by OSVs have the choice to travel by snowmobile or snowcoach under the preferred alternative. This section assesses the comparability of the snowmobile and snowcoach transportation events as they relate to the visitor experience. This includes evaluating opportunities for visitors to view wildlife, experience natural soundscapes, and their expectations for the different types of transportation.

### **METRICS**

The following metrics were deemed suitable for assessing the comparability of snowmobile and snowcoach transportation events in regards to the visitor experience:

- Experience satisfaction
- Opportunities to view wildlife and other features of interest

- Opportunities to experience natural soundscapes
- Expectations regarding the OSV transportation event experience
- Trends in visitor use during the managed use era (2004/2005 to present).

## **COMPARABILITY ASSESSMENT**

### **Experience Satisfaction**

As demonstrated repeatedly in numerous studies of wintertime visitors, visitors are highly satisfied with their experience in Yellowstone National Park in winter (Borrie et al. 1999; Davenport 1999; Freimund et al. 2009). Freimund et al. (2011) states, “One hundred percent of visitors stated that they were either very satisfied (87 percent) or somewhat satisfied (13 percent),” with their experience and, “no visitor registered even the slightest “dissatisfaction” with their experience” (Freimund et al. 2011, p. 12). Because overall levels of experience satisfaction are so high, one can infer that there is no difference in the experience satisfaction of visitors by snowmobile versus a snowcoach.

### **Opportunities to View Wildlife and Other Features of Interest**

The opportunity to view wildlife and other features of interest is an important component of the Yellowstone winter visitor experience (Freimund et al. 2009). The NPS concludes that regardless of the chosen mode of transportation, visitors have similar opportunities to view wildlife and other features of interest. This is because snowcoaches and snowmobiles share the same roads in Yellowstone and visitors would see the same wildlife on a given day regardless of the OSV type they were transported by. Snowmobiles and snowcoaches frequently congregate at features of interest and at wildlife viewing areas and are led by guides. Because of this, the NPS concludes snowcoach and snowmobile visitors have comparable opportunities to view wildlife and other features of interest in the park.

### **Opportunities to Experience Natural Soundscapes**

Natural soundscapes are a valued resource in Yellowstone National Park. A study conducted in 2008 found that 99 percent of respondents stated that opportunities to experience natural sounds were important components of their experience, and 81 percent of respondents indicated that natural sounds have a positive effect on their experience (Freimund et al. 2009, 2011). Both types of OSVs frequently congregate at the same points of interest to observe and experience the natural phenomena of Yellowstone, including natural soundscapes. Because of this, the NPS concludes snowcoach and snowmobile visitors have comparable opportunities to experience natural soundscapes in the park.

### **Expectations Regarding OSV Transportation Event Experience**

The noise produced by an OSV while a visitor is on or in the vehicle touring the park has the potential to negatively affect the visitor experience. Noise can obscure the human voice by masking the sound of the voice, making it difficult to hear and increasing the likelihood of speech interference (listeners missing portions of what is being said in conversation). People with average voice strengths in open air conversation discussing unfamiliar material face-to-face raise their voices when background noise reaches approximately 50 to 60 dBA (i.e., the point at which background noise causes speech interference). In telephone conversations, speech interference has been found to begin at background noise levels as low as 60 dBA.

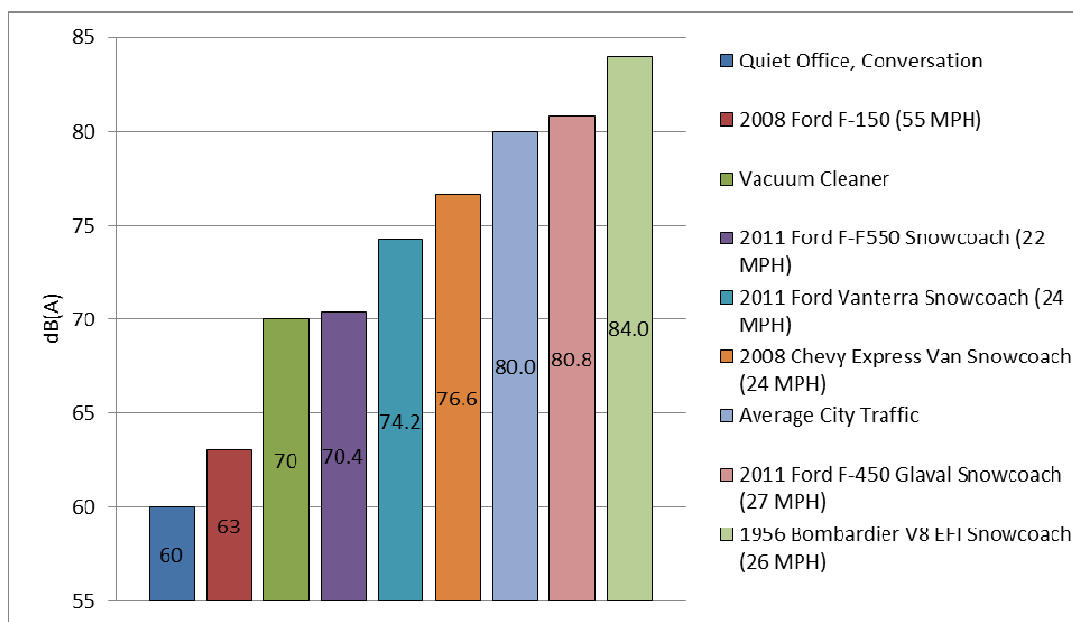
Research on Yellowstone BAT-compliant snowmobiles indicates that machines produce from 69 dBA at idle to 93 dBA at 35 mph at the operator’s ear while at cruising speed (these tests did not account for the

muffling effect of the helmet or ear plugs). However, it is likely that visitors via snowmobile do not expect to be able to communicate verbally while the vehicles are under power and traveling through the park. Instead, snowmobiles stop frequently at attractions within the park and turn off their engines in order to communicate verbally with each other.

Research on six different Yellowstone snowcoaches indicates that these machines produce from 70 dBA to 86 dBA inside the passenger cabin while at cruising speed (22 to 28 mph) on snow-covered groomed roads in the interior of Yellowstone National Park. Measurements were taken using a calibrated Larson Davis Type 1 sound level meter and microphone in the front seat and the back seat of each snowcoach at approximate ear level as the snowcoach traveled at typical cruising speed on a snow-covered road. Average dBA was calculated as the logarithmic mean of the front and back seat measurements (figure 3).

**TABLE 12: AVERAGE SNOWCOACH INTERIOR NOISE LEVELS**

Snowcoach Model	Average Interior Noise Level (dBA)	Cruising Speed (mph)	Measured
2011 Ford F-F550 32 Passenger, Grip Tracks	70.4	22	March 2012
2011 Ford Vanterra, Mattracks	74.2	24	March 2012
2008 Chevy Express Van, Mattracks	76.6	24	March 2012
2011 Ford F-450 Glaval	80.8	21	March 2012
1956 Bombardier B-12, 2002 V8 EFI Motor	84.0	26	March 2012



**FIGURE 3: INTERIOR NOISE LEVELS OF POPULAR SNOWCOACHES WITH PROXIES**

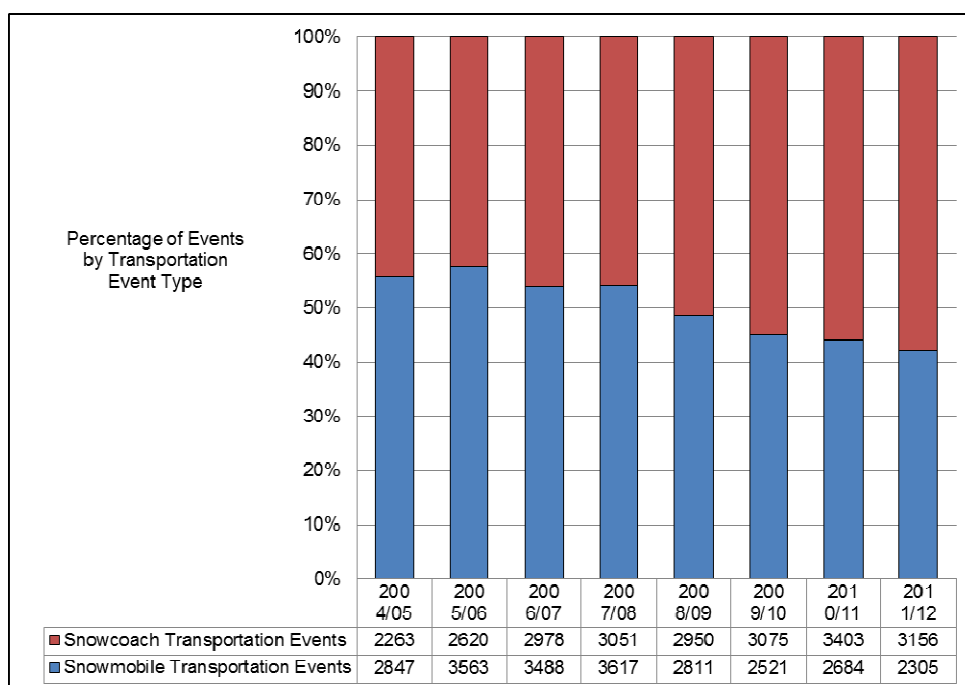
The available data indicate that speech interference, as a result of interior snowcoach noise, is highly likely while the vehicle is at cruising speed and that observed interior noise levels would interfere with spoken communication. That is, without amplification or raising of voices, operators and passengers would likely only be able to successfully communicate with one another when the OSV is traveling slower than typical cruising speed or stopped. The average snowcoach interior noise of the quietest snowcoach was 70 dBA, levels similar to those of a room with a running vacuum cleaner. Two of five were louder than

average city traffic. The bar chart in figure 3 shows dBA measurements for reference sounds (quiet office, vacuum cleaner, Ford truck at 55 mph) and the measured interior noise of five measured snowcoaches.

Unlike visitors traveling via snowmobiles, visitors traveling via snowcoach may expect to be able to communicate while vehicles are under power and traveling through the park. That is, visitors may purposefully select a snowcoach because they expect to be able to talk with one another and their guide but their expectation may be unmet given the high interior noise levels of snowcoaches.

### Trends in Visitor Use and Preferences for Transportation Modalities during the Managed Use Era (2004-present)

Visitor use statistics show relatively even distribution patterns between the types of transportation events used in the park across the 2004/2005 to 2011/2012 winter seasons. For example the eight-year average has been 2,980 snowmobile transportation events per season and 2,937 snowcoach transportation events per season, a 50.4 percent to 49.6 percent split, respectively. Within individual years, percentage of transportation events has ranged from 58 percent snowmobile events to 42 percent snowmobile events (2005/06) and from 42 percent snowmobile events to 58 percent snowcoach events (2011/12). Over the past eight years, there has been a general trend towards more snowcoach events than snowmobile events (figure 4).



**FIGURE 4: PERCENTAGE OF EVENTS BY TRANSPORTATION EVENT TYPE**

Table 13 provides the average daily number of snowmobiles and snowcoaches in the park during the previous eight seasons as well as each season's peak numbers of OSVs. During the winters of 2004/2005 through 2008/2009, the maximum number of snowmobiles permitted in the park was 720. The daily average during this period ranged from 213 snowmobiles to 303, an average daily utilization rate of 30 percent to 42 percent. Peak use during this period ranged from 429 to 560 snowmobiles for a peak utilization rate of 59 percent to 77 percent. From the 2009/2010 season to the 2011/2012 season, the daily limit for snowmobiles was 318 and the daily average ranged from 187 to 197 snowmobiles, an average daily utilization rate of 59 percent to 62 percent. Peak use of snowmobiles during these years ranged from

258 to 294 for a peak utilization rate of 81 percent to 92 percent. Snowcoach daily limits remained at 78 throughout the managed use era, until the 2011/2012 winter season when they dropped to 76 due to termination of a snowcoach contract with 2 snowcoach allocations at the South Entrance. The daily average ranged from 26 to 39 snowcoaches, an average daily utilization rate of 33 percent to 50 percent. Peak us of snowcoaches during these years ranged from 56 to 63, for a peak daily utilization rate of 72 percent and 81 percent. Overall, these measures of average and peak day utilization rates illustrate that visitors to Yellowstone appear to value having both modes of transportation available to them.

**TABLE 13: AVERAGE DAILY NUMBER OF OSVs (WINTER SEASONS 2004/2005 TO 2011/2012, THE MANAGED USE ERA)**

Winter Season	Snowmobiles					Snowcoaches				
	Daily Limit	Daily Average	Daily Average Utilization Rate	Peak	Peak Utilization Rate	Daily Limit	Daily Average	Daily Average Utilization Rate	Peak	Peak Utilization Rate
2004/2005	720	243	34%	430	60%	78	26	33%	58	74%
2005/2006	720	279	39%	494	69%	78	33	42%	60	77%
2006/2007	720	290	40%	552	77%	78	37	47%	58	74%
2007/2008	720	303	42%	560	78%	78	38	49%	63	81%
2008/2009	720 (540)*	213	30% (39%)	429	60% (79%)	78	33	43%	55	71%
2009/2010	318	188	59%	294	92%	78	35	44%	59	76%
2010/2011	318	197	62%	281	88%	78	39	49%	59	76%
2011/2012	318	188	59%	261	82%	76	35	46%	56	74%
Managed-Use Era Average	569	238	46% (47%)	413	76% (78%)	78	34	44%	58	75%
720-Snowmobile Era Average	720	266	37% (39%)	493	68% (73%)	78	33	43%	59	75%
318-Snowmobile Era Average	318	191	60%	279	88%	77	36	47%	58	75%

Source: MN Spreadsheet (concessions data except for peak numbers, which are Visitor Service Office).

\*Although the daily limit was 720, guides and outfitters had planned for a 540 snowmobile limit, based on a winter plan that was overturned in late 2008.

## CONCLUSION

Based on the analyses described above, the NPS concludes that snowcoach and snowmobile transportation events are comparable in terms of contributing to positive visitor experiences in Yellowstone in winter and that both offer uniquely different ways to see the park. Visitors, regardless of whether they were transported via snowmobile or snowcoach, are highly satisfied with their visit to the park in winter. Given established travel patterns and routes, visitors have comparable opportunities to experience wildlife and natural soundscapes. For visitors travelling via snowmobile, there is likely little expectation to be able to communicate while moving through the park. For snowcoaches, it is possible that visitor expectations are not met given the interior noise levels of snowcoaches and the difficulty this presents for spoken communication.

While some stakeholders have expressed a desire to eliminate snowmobiles as a mode of transportation within Yellowstone, visitor surveys have found strong opposition to such a management action (Borrie et al. 1999). Freimund found that prohibiting snowmobiles in Yellowstone was “opposed” or “strongly opposed” by a majority of respondents. Nearly 70 percent of those respondents *transported by snowcoach* were either neutral or indicated they were opposed to closing the roads to snowmobiles (Freimund et al. 2011). The park supports two different yet appropriate modes of travel within the interior of the park. Given that both forms of transportation both have resulted in satisfactory visitor experience, the park’s winter use rules and policies are designed to ensure long-term resource protection while providing a choice for opportunities for the visiting public to experience and to be inspired by Yellowstone’s unique winter resources and values.

## **HEALTH AND SAFETY**

### **INTRODUCTION**

This section focuses on assessing the comparability of snowmobile and snowcoach transportation events on the health and safety of NPS employees, visitors, and other duly authorized parties. It is important to note that this examination does not evaluate the health and safety impacts of avalanche mitigation through Sylvan Pass. These issues were addressed in Occupational Risk Management Assessments conducted in 2007 and 2010. Additionally, Sylvan Pass is closed to all OSV traffic during periods of inclement weather and during avalanche mitigation missions.

### **METRICS**

This analysis utilizes personnel exposure assessments conducted at Yellowstone National Park between 2004 and 2009. The following metrics were used to assess comparability between snowmobile and snowcoach transportation events in regard to their impact to the health and safety of visitors and employees. These metrics were selected because they represent relatively simple, easy to understand measures for assessing the comparability of snowmobile and snowcoach transportation events on human health and safety.

- Exhaust emission exposure levels
- Noise emission exposure levels.

The Occupational Safety and Health Administration (OSHA) sets enforceable permissible exposure limits to protect workers against the health effects of exposure to hazardous substances; this includes those in exhaust emissions from OSVs. In addition to these standards, studies at Yellowstone also consider the limits of the American Conference of Industrial Hygienists, which is an industry standard-setting organization. A list of these standards for each air contaminant can be found in table 58 of the plan/SEIS and a list of the air quality intensity definitions can be found in table 38, and some are detailed in the analysis below.

Various standards also exist for occupational exposure to noise, including the OSHA permissible exposure limits, EPA standards, and the National Institute for Occupational Safety and Health (NIOSH) standards. The permissible exposure limit for noise exposure as identified by OSHA is 90 dBA. Noise levels necessary to protect public health and welfare against hearing loss, annoyance, and activity interference have been identified and published by the EPA. Full discussion of the various standards can be found in chapter 4 of the plan/SEIS.

## COMPARABILITY ASSESSMENT

### Exhaust Emission Exposure Levels

Measurements of exposure levels to air pollutants CO, volatile organic compounds, particulate matter, and aldehydes have been taken at entrance stations over several winters and summer periods to evaluate human exposure to several air pollutants (Spear and Stephenson 2005; Jensen and Meyer 2006). In the winter of 1997, when park entrance station staff was exposed to substantially greater amounts of pollutants due to significantly higher snowmobile numbers without BAT standards in place, CO exposure was not found to be above workplace health standards set by OSHA (Radtke 1997). This finding was upheld in subsequent studies that found that after implementation of BAT snowmobiles, concentrations of all airborne contaminants measured well below current standards.

Another exhaust emission exposure assessment of the entrance station employees was conducted during President's Day weekends of 2008 and 2009, typically one of the busiest weekends of the winter seasons. The survey included personal exposure measurements of CO, HC, aldehydes and noise levels (Radtke 2008; Radtke 2009). Entrance station employees' exposures to contaminants in exhaust emissions and to noise were well below accepted occupational exposure limits for both years of monitoring, even though the kiosk ventilation system was not operating at the time of the study. Results for all volatile organic compounds, aldehydes, and CO were well below the occupational exposure limits and in most cases were below the detection limits of the analytical method. Results of volatile organic compounds measurements showed most were below detection limit. As a sub-study of the 2009 study, researchers separated snowmobiles from snowcoaches on February 15th, 2009 to determine if there were any differences in exhaust emission exposure levels for gate personnel. Nineteen snowcoaches entered lane B and 241 snowmobiles entered lane A. The exposure results indicated that CO was slightly higher over the sampling period for the snowmobile lane, however, peak readings for CO was higher for the snowcoaches (table 14). The CO peak readings never reached the NIOSH ceiling of 200 ppm (Radtke 2009).

**TABLE 14: 2009 CARBON MONOXIDE EXPOSURE RESULTS AT SELECTED GATE KIOSKS (ALL IN PPM)**

Date/Kiosk	CO time-weighted average for time sampled	CO 8-hr time-weighted average	Peak Reading
2/14 Kiosk A	2	1.6	48
2/14 Kiosk B	2	0.5	42
2/15 Kiosk A (snowmobiles only)	10	2.3	91
2/15 Kiosk B (snowcoaches only)	6	1.3	126
2/16 Kiosk A	4	1.3	48
2/16 Kiosk B	2	0.6	22
OSHA permissible exposure limit / Short-term Exposure Limits		50	--
American Conference of Industrial Hygienists threshold limit value		25	--
NIOSH Recommended Exposure Limit		35	200

## Noise Emission Exposure Levels

Noise exposure was measured for both snowmobile riders and employees working at the West Entrance in studies conducted between the years 1997 and 2005. The exposure measured included noise from all sources, including snowmobiles, snowcoaches, and other equipment. During the winter season 2004/2005, after BAT limits and commercial guiding were in place, occupational exposure to noise was evaluated with the conclusion that noise emission exposure levels were below OSHA permissible limits and other recommended maximum exposure levels (Spear and Stephenson 2005). This study found that employee noise exposures averaged 60.6 dBA for the winter 2004/2005 and 65.2 for the winter 2005/2006, or 3.5 percent and 5.5 percent of the allowable noise exposure, respectively. Peak 8-hour time-weighted averages for those two winters were 75 and 80 dBA, or 12.5 percent and 26.0 percent of the allowable exposure, respectively (Jensen and Meyer 2006). Clearly, although employees are exposed to some noise, those exposures are well within applicable standards.

Operators and passengers in OSVs can also be exposed to elevated noise levels. A variety of snowcoaches have been tested for average interior noise levels (see chapter 3). Five snowcoaches were tested for interior noise levels in March 2012 (results above in table 13). On February 20, 2006, noise levels were measured on a 2006 Arctic Cat T660 4-stroke machine on packed (groomed snow) at the West Entrance to Yellowstone. Results are presented below in table 15. These noise levels were measured at the operator's ear and for snowmobiles, do not account for wind, wearing a helmet, or other similar factors. In actuality, the actual level of noise the snowmobile operator is exposed to is likely significantly less given the rider wears a helmet and other coverings and may wear ear plugs. Noise exposure while riding on or in OSVs can be controlled with standard ear plugs, which are provided by snowmobile and snowcoach operators to users entering the park. All commercially available NIOSH-rated foam plugs provide enough attenuation to protect employee hearing. An estimated exposure of 77 dBA for 8 hours when wearing earplugs falls within acceptable exposure limits set forth by OSHA, NIOSH, and American Conference of Industrial Hygienists.

**TABLE 15: NOISE LEVEL MEASUREMENTS IN DBA MEASURED AT OPERATOR'S EAR**

Speed (mph)	dBA 2006 Arctic Cat T660 packed snow	dBA 2004 Arctic Cat T660 unpacked snow
0 (Idle)	69	67
15	87	84
20		85
25	91	89
30		97
35	92	92
40		91
45	97	92

## CONCLUSION

The best available data indicate that personnel exposure to exhaust emission contaminants and to elevated noise levels do not exceed established EPA, OSHA or NIOSH standards for either snowmobiles or snowcoaches. One of the few places where data are available to directly compare snowmobile and snowcoach transportation events for human health and safety is gate personnel exposure to CO. When snowmobiles and snowcoaches were separated into different lines at the West Entrance to measure for



CO, the exposure results indicated that while CO was slightly higher over the sampling period for the snowmobile lane, peak readings were higher in the snowcoach lane (Radtke 2009). Data show that employee and visitor exposure levels are at or below acceptable limits and that mitigation strategies such as ear plugs, kiosk ventilation systems, and other mitigation strategies are available to address these concerns. Based on the best available data for this subject, the NPS has concluded that snowmobile and snowcoach operations have comparable impacts in regards to health and human safety in that neither create unsafe or levels of impact that exceed established standards.

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## **APPENDIX B: BEST AVAILABLE TECHNOLOGY STANDARDS FOR SNOWCOACHES**

### **Executive Summary**

By no later than the 2017/2018 season, all snowcoaches must meet National Park Service (NPS) established best available technology (BAT) standards (described as sound and air emission requirements in the proposed rule), as applicable to the snowcoach type and fuel type. Snowcoach BAT requirements would apply to all new snowcoaches brought into service starting in the 2014-2015 winter season.

For air emissions:

- A diesel-fueled snowcoach with a gross vehicle weight rating (GVWR) less than 8,500 pounds must meet the functional equivalent of 2010 (or newer) U.S. Environmental Protection Agency (EPA) Tier 2 model year engine and emission control technology requirements.
- A diesel-fueled snowcoach with a GVWR greater than or equal to 8,500 pounds must meet the EPA model year 2010 “engine configuration certified” diesel air emission requirements. Alternately, a snowcoach in this category may be certified under the functional equivalent of 2010 (or newer) EPA Tier 2 model year engine and emission control technology requirements if the snowcoach: (1) has a GVWR between 8,500 and 10,000 pounds; and (2) would achieve better emission results with a configuration that meets the Tier 2 requirements.
- A gasoline-fueled snowcoach greater than or equal to 10,000 GVWR must meet the functional equivalent of 2008 (or newer) EPA Tier 2 model year engine and emission control technology requirements.
- A gasoline-fueled snowcoach less than 10,000 GVWR must meet the functional equivalent of 2007 (or newer) EPA Tier 2 model year engine and emission control technology requirements.
- All emission-related exhaust components (as listed in 40 CFR 86.004-25(b)(3)(iii) through (v)) must function properly. These emission-related components must be replaced with the original equipment manufacturer (OEM) component, if possible. If OEM parts are not available, aftermarket parts may be used if they are certified not to adversely affect emission and sound characteristics. Catalysts that have exceeded their useful life must be replaced unless the commercial tour operator can demonstrate that the catalyst is functioning properly. Operating a snowcoach that has its original pollution control equipment modified or disabled would be prohibited.

For noise emissions:

- A snowcoach may not exceed a sound level of 75 dB(A) (A-weighted decibel) when measured by operating the snowcoach at cruising speed in accordance with the SAE J1161 test procedures.

The NPS would test and approve all snowcoaches for operation in Yellowstone National Park and maintain a list of approved snowcoaches that meet the BAT air and sound emissions requirements. Once approved, a snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach with a model year 2010 engine could

operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and re-tested. Individual snowcoaches may be subject to periodic and random inspections to determine compliance with BAT requirements.

## **Background on Tier 2 Standards**

The Tier 2 Rule (65 FR 6697, February 10, 2000) instituted a comprehensive regulatory program designed to significantly reduce the emissions from new passenger cars and light trucks, including pickup trucks, vans, minivans, and sport-utility vehicles. These reductions provide for cleaner air and greater public health protection, primarily by reducing ozone and particulate matter pollution. The program treats vehicles and fuels as a system, combining requirements for much cleaner vehicles with requirements for much lower levels of sulfur in gasoline. The program phases in a single set of tailpipe emission standards that apply to all passenger cars, light trucks, and larger passenger vehicles operated on any fuel. In 2004, EPA began phasing in Tier 2 emissions standards for light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles, and in 2008 for heavy duty spark and compression ignition vehicles (the vehicle classes most converted snowcoaches meet). Implementation of these standards was completed in 2010 (65 FR 6697, February 10, 2000). Tier 2 engines and emission control equipment include vehicle computers, full complement of sensors including engine control module (ECM) computers, be onboard diagnostics system (OBD) equipped, and have exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines.

## **BAT Air Emission Standards**

Snowcoach BAT requirements would apply to all new snowcoaches brought into service starting in the 2014-2015 winter season. By no later than the 2017/2018 winter season, every snowcoach would be required to have Tier 2 compliant engines and exhaust emission controls in order to be authorized for use in Yellowstone National Park. The BAT emissions standard specification would differ depending on whether the vehicle was gasoline or diesel powered and the GVWR of the vehicle.

- All emission-related exhaust components originally installed by the manufacturer must be in place and functioning properly. These emission-related components must be replaced with the OEM component, if possible. If OEM parts are not available, aftermarket parts may be used if they are certified not to adversely affect emission and sound characteristics.
- Modifying or disabling original pollution control equipment is prohibited except for maintenance purposes.
- All snowcoaches operating in Yellowstone National Park would be subject to unannounced periodic inspections by the NPS to ensure that snowcoaches are meeting the NPS BAT requirements. These unannounced inspections may involve the visual inspection of the Malfunction Indicator Light otherwise known as the “Check Engine” light. If the “Check Engine” light is illuminated, the operator /owner of the snowcoach would need to have the vehicle scanned by a trained technician to determine the issue identified by the Diagnostic Trouble Code. Inspections may also include noise output as measured via the SAE J1161 test. Necessary repairs and/or equipment replacement would need to be performed within 10 business days of the inspection by the NPS and documented to the NPS<sup>1</sup>.

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<sup>1</sup> Additional time may be granted on a case-by-case basis, at the discretion of the NPS, depending on replacement parts availability and/or corrective work scheduling.

**For all gasoline powered snowcoaches less than 10,000 GVWR**

The BAT emission technology standard for gasoline powered snowcoaches less than 10,000 lbs GVWR would be the functional equivalent of meeting 2007 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and having all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. A snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and exhaust emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach less than 10,000 lbs GVWR with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and re-tested.

If a used gasoline powered vehicle<sup>2</sup> is being converted into a snowcoach, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2007 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. A snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and exhaust emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and re-tested. A replacement engine older than 10 years old would not be acceptable.

If it is the operator's intention to repower a gasoline vehicle or convert a diesel vehicle to gasoline, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2007 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. The replacement engine could be no older than 10 years past the manufacturing date. A replacement engine more than 10 years past the manufacturing date would not be acceptable for use in Yellowstone National Park. For example, a snowcoach with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested. A snowcoach with a model year 2007 engine could operate through the 2017-2018 winter season and would cease to be allowed to operate in the park as of March 15, 2018, if it is not retrofitted with a new engine and re-tested.

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<sup>2</sup> "Used" vehicle in this case is defined as any chassis/frame/body of an on-road vehicle older than Model Year 2017.

**For all gasoline powered snowcoaches greater than 10,000 GVWR (heavy duty applications)**

The BAT emission technology standard for gasoline powered snowcoaches greater than 10,000 lbs GVWR would be the functional equivalent of meeting 2008 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and having all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. A snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and exhaust emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach greater than 10,000 lbs GVWR with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

If a used gasoline powered vehicle<sup>3</sup> greater than 10,000 lbs GVWR is being converted into a snowcoach, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2008 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. A snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and exhaust emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach greater than 10,000 lbs GVWR with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

If it is the operator's intention to repower a gasoline vehicle or convert a diesel vehicle to gasoline greater than 10,000 lbs GVWR, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2008 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines. The replacement engine could be no older than 10 years past the manufacturing date. A replacement engine more than 10 years past the manufacturing date would not be acceptable for use in Yellowstone National Park. For example, a snowcoach greater than 10,000 lbs GVWR with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

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<sup>3</sup> "Used" vehicle in this case is defined as any chassis/frame/body of an on-road vehicle older than Model Year 2017.



### **For all diesel powered snowcoaches**

The BAT emission standards would be the functional equivalent of meeting 2010 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and having related emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road diesel powered vehicles. Diesel-powered vehicles must be equipped with applicable operational ceramic particulate filters and afterburners. A diesel snowcoach may operate in the park through the winter season that begins no more than 10 years following its engine manufacture date. To continue to operate in the park during future winter seasons, a snowcoach must be retrofitted with a new engine and exhaust emissions control equipment, and be recertified for air and sound emissions. For example, a snowcoach with a model year 2010 diesel engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

If a used diesel powered vehicle<sup>4</sup> is being converted into a snowcoach, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2010 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after-treatment equipment that is standard OEM equipment included with on-road vehicles or engines such as operational ceramic particulate filters and afterburners. The engine could be no older than 10 years past the manufacturing date. A replacement engine older than 10 years old would not be acceptable. For example, a snowcoach with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

If it is the operator's intention to repower a diesel vehicle or convert a gasoline vehicle to diesel, the NPS would require the operator to confirm that the vehicle meets the functional equivalent of 2010 (or newer) EPA Tier 2 Model Year engine and emission control technology requirements and has all associated emissions control equipment incorporated into the engine and drive train for the vehicle class as an on-road wheeled vehicle (size and weight). This would include items such as ECM computers, OBD, sensors, and exhaust after treatment equipment that is standard OEM equipment included with on-road vehicles or engines such as operational ceramic particulate filters and afterburners. The replacement engine could be no older than 10 years past the manufacturing date. A replacement engine more than 10 years past the manufacturing date would not be acceptable for use in Yellowstone National Park. For example, a snowcoach with a model year 2010 engine could operate through the 2020-2021 winter season and would cease to be allowed to operate in the park as of March 15, 2021, if it is not retrofitted with a new engine and exhaust emission control equipment and re-tested.

The NPS requires diesel vehicles with a GVWR of 8,500 pounds or more meet, at a minimum, the EPA 2010 "engine configuration certified" diesel air emission standards. However, if the diesel vehicle has a GVWR between 8,500 and 10,000 pounds, there may be a configuration that meets the technology standards for an EPA Light Duty Tier 2 on-road vehicle which would achieve the best results from an emissions perspective. This particular type of BAT configuration requires review and approval by the NPS.

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<sup>4</sup> "Used" vehicle in this case is defined as a chassis/frame/body of an on-road vehicle older than Model Year 2017.

If the EPA promulgates more restrictive emission technology requirements for any class of vehicle that may be considered for conversion to oversnow use, the NPS would evaluate these new emission technology requirements and may update the NPS BAT provisions through the concession contract process.

### **BAT Noise Emission Standards**

- Snowcoach BAT requirements would apply to all new snowcoaches brought into service starting in the 2014-2015 winter season. By no later than the 2017/2018 season, all snowcoaches must meet a noise emissions requirement of no greater than 75 dBA (performance specification) when measured at typical cruising speed following the SAE J1161 test procedures (typically approximately 22–25 mph). The test procedures for measuring noise output would follow those used by Volpe 2010 (Exterior Sound Level Measurements of Snowcoaches at Yellowstone National Park, U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, April 2010).

Through contract and permit, the NPS would encourage snowcoach guides and operators to equip their snowcoaches with devices to further minimize noise emissions.

### **Administrative Exceptions**

An exception to these requirements would be for limited numbers of snowcoaches that are used for specific administrative functions, such as in emergency and towing situations. These snowcoaches would not be required to meet snowcoach BAT requirements.

## APPENDIX C: NON-COMMERCIALLY GUIDED SNOWMOBILE ACCESS PROGRAM

### Executive Summary

- A non-commercially guided snowmobile access program was selected as an element of the preferred alternative in the Winter Use Plan / Supplemental Environmental Impact Statement (plan/SEIS). The non-commercially guided snowmobile access program allows up to four non-commercially guided snowmobile transportation events – with up to 5 snowmobiles per event – to enter the park daily, one transportation event per entrance.
- Access to Yellowstone National Park would continue to remain 100 percent guided. The park would continue to prohibit unguided snowmobile access.
- Each non-commercial guide may lead no more than two trips per winter season, and must be at least 18 years of age by the first day of the trip. Non-commercial guides would be required to possess a non-commercial snowmobile access permit which would be awarded annually through an online lottery system and have successfully completed the Yellowstone Snowmobile Education Certification training course.
- Each non-commercial snowmobile operator in a non-commercially guided snowmobile transportation event would be required to have successfully completed the to-be-developed Yellowstone Snowmobile Education Certification training course and be in possession of a valid state-issued motor vehicle driver's license before the first day of the trip.
- Trip members without a state-issued driver's license or those who had not successfully completed the Yellowstone Snowmobile Education Certification training course would not be permitted to operate a snowmobile in the park.
- The non-commercially guided snowmobile access program would begin on the first day of the 2014/2015 winter season.
- The decision to continue or terminate the non-commercially guided snowmobile access program or to make significant changes to it would be based upon stakeholder input into predetermined metrics with fixed standards (triggers) to ensure continued protection of park resources and visitor experiences. These standards would be made available to the public prior to implementation of the non-commercially guided snowmobile access program.

### Definitions

**Commercial Guide**—A person who operates as a snowmobile or snowcoach guide for a fee or compensation and is authorized to operate in the park under a concession contract or a commercial use authorization.

**Oversnow vehicle or OSV**—A snowmobile, snowcoach, or other motorized vehicle that is intended for travel primarily on snow and has been authorized by the superintendent to operate in the park. An OSV that does not meet the definition of a snowcoach must comply with all requirements applicable to snowmobiles.

**Snowmobile**—A self-propelled vehicle intended for travel solely on snow, with a curb weight of not more than 1,000 pounds (450 kg), driven by a track or tracks in contact with the snow, and which may be

steered by a ski or skis in contact with the snow. All-terrain vehicles and utility-type vehicles are not snowmobiles, even if they have been modified for use on snow with track and ski systems.

**Non-commercially Guided Snowmobile Access Program**—An access program that permits duly authorized parties to enter Yellowstone National Park without the requirements of a commercial snowmobile guide. All non-commercial snowmobile operators would be required to have successfully completed a Yellowstone-specific education certification process and one member of the party (the non-commercial snowmobile guide) would need to be in possession of a non-commercially guided snowmobile access permit. The non-commercially guided snowmobile access program may be adjusted or terminated based on impacts to park resources and visitor experiences.

**Non-commercially Guided Snowmobile Trip**—A trip that is led by a non-commercial guide and is not for profit; to the extent possible costs are evenly shared among all participants and no trip member may pay less than other participants. No trip member may be paid to participate on the trip. Trip preparation, costs, and conduct of the trip must be shared by all members of the group, including all logistics, food, fuel, equipment, transportation, vehicle shuttle, and other costs. Non-commercially guided snowmobile trips must be self-guided and may not hire commercial guides. Non-commercially guided snowmobile trips may not be used by any person or organization in any way to obtain a profit and doing so would result in the revocation of the permit and may jeopardize future non-commercially guided access to Yellowstone National Park by the non-commercial snowmobile guide and other trip members.

**Non-commercial Snowmobile Access Permit**—A permit that allows access to Yellowstone National Park for a single group of up to five snowmobiles for a specific date range. These permits would be awarded through an annual lottery system.

**Non-commercial Snowmobile Operator**—A person who has successfully completed the Yellowstone Snowmobile Education Certification Program (explained below) and is certified as having the requisite knowledge and skills to operate a snowmobile in Yellowstone National Park. All non-commercial snowmobile operators must be in possession of a valid state-issued motor vehicle driver's license before entering the park.

**Non-commercial Snowmobile Guide**—In addition to stipulations outlined above under non-commercial snowmobile operator, a non-commercial snowmobile guide must obtain and be in possession of a non-commercial snowmobile access permit as awarded and obtained through the lottery system. Non-commercial snowmobile guides are directly responsible for the actions of their group. Each non-commercial guide may lead no more than two trips per winter season, and must be at least 18 years of age by the first day of the trip. Non-commercial guides must have working knowledge of snowmobile safety, general first aid, snowmobile repair, and navigational technique. It is preferable that non-commercial guides, or another member of the trip, be familiar with Yellowstone National Park. Non-commercial snowmobile guides may not advertise for profit and may not accept a fee or any type of compensation for organizing or leading a trip. Collecting a fee (monetary compensation), payable to an individual, group, or organization for conducting, leading, or guiding a non-commercially guided snowmobile trip is not allowed. Non-commercial guides will be able to help their group travel safely through the park, and will be familiar with daily weather conditions and hand signals to warn group members about wildlife and other road hazards, indicate turns, and indicate when to turn the snowmobile on or off. They will have knowledge of basic first aid, and are equipped with similar supplies. They will employ a single file “follow-the leader” approach and communicate frequently with group members.

**Unguided Snowmobile Access**—A visitor or group of visitors who enter the park by snowmobile without obtaining certification through the Yellowstone Snowmobile Education Certification Program,

who do not possess the necessary entrance permits, or who are not accompanied by a commercial or non-commercial guide.

**Yellowstone Snowmobile Education Certification Program**—A to-be-developed online snowmobile education program that all non-commercial snowmobile operators must complete before entering the park via snowmobile. Individuals who successfully complete the Yellowstone Snowmobile Certification Program (details below) would receive a certificate of completion, valid for the duration of the season.

### **Non-commercially Guided Snowmobile Access Program**

The non-commercially guided snowmobile access program would be overseen and administered by the Superintendent's Office, Yellowstone National Park. Yellowstone National Park commits to working with interested parties and stakeholders to develop the non-commercially guided snowmobile access program and supporting Yellowstone Snowmobile Education Certification Program.

All individuals who wish to operate a snowmobile in Yellowstone National Park as part of a non-commercially guided snowmobile transportation event will be required to have successfully completed the Yellowstone Snowmobile Education Certification Program prior to the trip, be in possession of the certificate of completion on the day of the trip, and possess a valid state-issued motor vehicle driver's license. Individuals who successfully complete the program would receive a certificate of completion allowing them to operate a non-commercially guided snowmobile as part of a non-commercially guided snowmobile trip. The certificate of completion would be valid for the duration of the winter season, and for one year immediately following completion of the course.

Non-commercially guided snowmobile entrance permits would be allocated via an online lottery system. Visitors would be able to apply for specific entry dates in advance of the winter season. Lottery system requirements are as follows:

- A. The non-commercial snowmobile guide must register for the non-commercial lottery at a to-be-determined website and meet all of the requirements of a non-commercial guide listed above. Should a non-commercial guide fail to meet these requirements, any trip won through the lottery would be cancelled. The applicant may list an alternate non-commercial guide, but to qualify as a potential replacement for the original non-commercial guide, the alternate non-commercial guide must be listed on the lottery application and be prepared to complete all duties required of a non-commercial guide.
- B. Non-commercial trips are not transferable except to an alternate non-commercial guide listed on the lottery application that resulted in the trip.
- C. Individuals can have only one profile in the online lottery system. Once a profile is established, an individual can apply for multiple entrance dates.
- D. By the first day of the trip, non-commercial guides and alternate non-commercial guides must be 18 years or older and be in possession of a valid state-issued motor vehicle driver's license and certificate of completion for the Yellowstone Snowmobile Education Certification Program.
- E. By the first day of the trip, all non-commercial snowmobile operators must be in possession of a valid state-issued motor vehicle driver's license and certificate of completion for the Yellowstone Snowmobile Education Certification Program.
- F. The annual lottery would open on approximately July 1 for the for the following winter season. Lottery results are only valid for the following season and are not transferable between seasons.
- G. Successful lottery winners would be sent an electronic trip preparation packet.

Visitors may bring their own snowmobile or rent from an authorized provider, but all snowmobiles must meet the best available technology (BAT) standard in place at the time of their trip. Specific BAT requirements are described below under program rules and regulations.

All non-commercial snowmobilers would be required to check in with a National Park Service (NPS) ranger at the entrance station prior to entering the park in order to receive their entrance permit and on-site orientation. An NPS ranger would provide an orientation session reinforcing the components of the education program detailed above and brief party members on current park road and weather conditions. The NPS ranger would ensure:

- Non-commercial guides have not led more than one previous non-commercially guided trip into the park that winter season.
- All group members who intend to operate a snowmobile as part of the non-commercially guided event possess the necessary documentation (certificate of completion of the Yellowstone Snowmobile Education Certification Program, entrance permit, valid state-issued motor vehicle driver's license, and snowmobile registration and insurance).
- An itinerary is on file with emergency contact information, and that the non-commercial guide's snowmobile has markings making it easily distinguishable from commercial snowmobiles.

Rangers would ensure that snowmobiles are BAT compliant, and the non-commercial guides possess the necessary safety equipment, including but not limited to a radio, tow rope, map, and first aid kit. In the event that a rented snowmobile must be abandoned within the park, the owner is responsible for retrieval within 24 hours. If a private snowmobile is abandoned within the park, the non-commercially guided group is responsible for removal of the snowmobile within 24 hours.

### **Yellowstone's Commitment to Working with Stakeholders**

Yellowstone National Park commits to working with all interested parties and stakeholders on the development of the Non-commercially Guided Snowmobile Access Program and Yellowstone Snowmobile Education Certification Program within the parameters prescribed in this appendix.

Yellowstone National Park envisions the Yellowstone Snowmobile Education Certification Program would be based on an existing snowmobile education program, such as International Snowmobilers Manufacturing Association SafeRider! Program ([www.snowmobilers.org](http://www.snowmobilers.org)), but would be tailored with information specific to Yellowstone National Park. Participants would be charged a per person course fee. The Yellowstone Snowmobile Education Certification Program would emphasize that operating a snowmobile in Yellowstone National Park is a privilege, and that compliance with park rules and regulations and responsible and safe ridership are the responsibility of the snowmobile operator. Other components of the program would likely include rules and regulations of the park, park values and environmental education, required documentation (documentation of course completion, entrance permit, valid state-issued motor vehicle driver's license, and snowmobile registration and insurance), courtesy and ethics when encountering wildlife and other visitors, safety and emergency protocol, accident causes and mitigation techniques, road conditions, snowmobile operations, and mechanical repair. Education components would be reinforced during the onsite orientation session on the day of the trip, and hands-on snowmobile operating training would be provided to all trip participants.

## Non-commercially Guided Snowmobile Access Program Rules and Regulations

- A. All park rules and regulations are in effect for non-commercial trips.
- B. All snowmobiles must be registered and insured and must meet BAT requirements in place at the time of the trip.
- C. All non-commercial snowmobile operators must possess and carry a valid state-issued driver's license.
- D. All non-commercial snowmobile operators must be in possession of a valid state-issued driver's license and must have successfully completed the Yellowstone Snowmobile Education Certification Program and be in possession of a Yellowstone Snowmobile Education Certificate Card.
- E. All group members must be present for the on-site orientation on the morning of the trip. Trips are required to check-in with NPS staff by a predetermined time the morning of the trip.
- F. Non-commercial guides must be at least 18 years of age by the first day of their trip.
- G. Each non-commercial guide can lead up to two trips per winter season. In the event that an alternate non-commercial guide replaces a non-commercial guide, all non-commercial guide requirements would be transferred to the alternate non-commercial guide.
- H. Non-commercial Snowmobile Access Permits are nontransferable except as provided for alternate non-commercial guides as explained above. Non-commercial guides or their alternates must be present for the duration of their scheduled trip.
- I. Non-commercial guides would be allowed to start their trips as planned, pass their trips to the alternate non-commercial guide, or cancel a given trip. Deferment and/or swapping of entrance gate or dates is not allowed. It is the non-commercial guide's responsibility to notify Yellowstone National Park if unable to use his or her scheduled date(s). The non-commercial guide must have their successful lottery paperwork in their possession the morning of the trip.
- J. Fees and deposits are due at the time specified below and are non-refundable.
- K. Non-commercial guides may allow for changes in their group on the day of a trip provided that all snowmobile operators have successfully completed the Yellowstone Snowmobile Education Certification Program and are in possession of their certificate of completion, possess a valid state-issued driver's license, and are listed on the trip participant sheet turned into the NPS ranger at the gate.

## Estimated Non-commercially Guided Snowmobile Trip Expenditures

Component	Cost	Payment Due
Lottery Application Fee	Anticipated to be ~\$10.00/season	At time of lottery application
Lottery Selection Fee	Anticipated to be ~\$10.00/group/trip	At time of lottery award (permit awarded)
Yellowstone Snowmobile Education Certificate Program	Anticipated to be ~\$10.00/operator	At time of course initiation
Gate Entrance Fee	Consistent with standard park entrance fee structure	At the entrance gate

### **Non-commercially Guided Snowmobile Access Program Trip Requirements**

- A. **Non-commercial Guide Responsibilities**—Non-commercial guides must comply with all portions of the permit application procedure and are directly responsible for the actions of his/her party. Failure to adhere to any of these trip requirements or program rules and regulations, either by a non-commercial guide or a member of his or her party, may result in revocation of the permit and/or future eligibility as a non-commercial guide, citation of the non-commercial guide and/or members of the group, and possible administrative decision that may affect future access to Yellowstone National Park in the winter by non-commercially guided snowmobiles.
- B. **Accessible Documentation**—An NPS ranger may, on occasion, travel with non-commercial groups in order to ensure compliance with permit conditions. Rangers may contact a given party and request information such as a copy of a non-commercial guide's permit and passenger list.
- C. **Trip Size**—Individual non-commercial trips shall carry no more than 10 persons on a maximum of five snowmobiles. It is not permissible to split up the trip at any point other than in an emergency.
- D. **Check In**—Each group must check in at the assigned entrance station by a specified time.
- E. **Maximum Stay**—To be determined during development of the program with interested stakeholders.
- F. **Accidents**—Accidents must be reported to the contract holder and involving groups operating private snowmobiles must be reported directly to the NPS.
- G. **Pets**—No cats, dogs, or other pets are permitted on a non-commercially guided snowmobile trips.
- H. **Resource Protection**—Natural or historical features such as rocks, old mining artifacts, fossils, flowers, or Indian artifacts may not be removed or disturbed (36 CFR 2.1).
- I. **Non-commercial guides and all members of their group must adhere to all park rules and regulations.**

### **Hypothetical Scenario for Individuals Wishing to Enter Yellowstone National Park in winter via Non-commercially Guided Snowmobile (without a commercial snowmobile guide)**

1. Individuals create a profile on to-be-determined website and apply for a specific gate and entry date range. Once the annual lottery is open, it would be continuously open through the last day of the winter season (typically March 15). Post-lottery, the website would electronically notify all applicants of their selection and send trip information to NPS. Non-commercial guides are responsible for confirming their trip with park personnel responsible for oversight of the program. If desirable, individuals can specify an alternative non-commercial guide.
2. When selected for their chosen gate and dates, all snowmobile operators in the group must successfully complete the Yellowstone Snowmobile Education Certification Program prior to the first day of the trip.
3. Upon successful completion of the Yellowstone Snowmobile Education Certificate Program, the NPS would send group members certification of successful completion and an electronic pre-trip orientation package. The NPS would work with lottery winners to ensure that all necessary paperwork is in place prior to the day of the trip.



4. On the day of the trip, the non-commercial guide would ensure that all snowmobiles in their trip are BAT compliant and that all snowmobile operators are in possession of a valid state-issued driver's license and a Yellowstone Snowmobile Education Certification Card.
5. At the park entrance gate, an NPS ranger would check that snowmobiles are BAT compliant and that all members possess the necessary safety equipment and required documentation. The NPS ranger would conduct an on-site orientation session for all members of the group to reinforce components of the Yellowstone Snowmobile Education Program and familiarize all members of the group with operating a snowmobile.
6. Non-commercial guides /alternate non-commercial guides and their group, in possession of all required documentation and safety materials, may enter the park.



## **APPENDIX D: WINTER USE COLLABORATIVE ADAPTIVE MANAGEMENT AND MONITORING FRAMEWORK**

This appendix provides additional detail to the discussion in chapter 2 regarding adaptive management. It describes the final Winter Use Plan / Supplemental Environmental Impact Statement (plan/SEIS) collaborative adaptive management framework and how new information collected over time may result in changes to future winter use management. This framework will be applied to the selected alternative. For this discussion, the adaptive management framework assumes the selected alternative will be alternative 4, the preferred alternative identified in the plan/SEIS.

The long-term adaptive management strategy described in this appendix will provide a structured process, involving the public and interested stakeholders, to continually evaluate the effectiveness of the winter use plan and seek to provide information to inform uncertainties and improve management over time. Engagement of the public in the development of the winter use adaptive management plan is necessary for the ultimate success of the program.

The National Park Service (NPS) has identified three main objectives for long-term adaptive management:

1. To ensure that the impacts of oversnow vehicles (OSVs) use remain within the range predicted under the preferred alternative in this plan/SEIS.
2. To gather additional data regarding the comparability of impacts from a group of snowmobiles versus a snowcoach.
3. To reduce impacts on park resources after implementation of the selected alternative, by gathering additional data regarding the overall impacts of winter use and using those data to guide future management decisions.

As described briefly in chapter 2, adaptive management is a management tool. It allows decision-makers to acknowledge the uncertainties surrounding the management of natural systems and helps natural resource managers respond to resource or system conditions over time through the collection and evaluation of additional information. The knowledge that uncertainties exist provides managers the ability to consider them in their planning and allows for the latitude to modify actions to progress towards desired outcomes. Adaptive management has the potential to improve a manager's understanding of ecological systems to better achieve management objectives.

The focus of this program is on learning with the ultimate goal of the effort to continuously improve management. In order for adaptive management to be successful, stakeholders need to be engaged during the formulation of the initial problem and remain engaged throughout implementation (Williams et al. 2009). The collaborative adaptive management and monitoring framework described in this appendix includes an initial outreach in the summer of 2013, during which the NPS will work with stakeholders in developing a long-term, sustainable adaptive management plan for winter use management in Yellowstone National Park.

### **INITIAL YELLOWSTONE WINTER USE ADAPTIVE MANAGEMENT MONITORING PROCESS**

The NPS recognizes that despite eight seasons of managed use there are still uncertainties surrounding how resources will respond to OSV use management and the effects to the visitor experience and

continual room to improve management in a manner that considers visitor experience and seeks to reduce environmental impacts. Table 1 below identifies some of the affected resources, indicators, and monitoring methods that may be used to collect baseline, or pre-project, data during the first two seasons of implementation (the transition year between the use levels allowed for the past three seasons and implementation of the new transportation event management framework, and the first year of implementation of transportation event management). Before this initial approach is implemented, the park will convene meetings with stakeholders to begin development of a long-term stakeholder-driven adaptive management plan for winter use in Yellowstone National Park. The approach for developing the long-term plan is described below.

Table 1 outlines an example monitoring framework that may be implemented during the 2013/2014 and 2014/2015 seasons. Several affected resources are identified, as well as potential indicators that would be used to assess changes in those resources. Information collected during these seasons, in combination with data collected over the previous four seasons which allowed use at the 2009-2013 Interim Regulation level will allow a baseline to be established and can be used to help refine monitoring methods for the long-term plan through understanding of natural variability.

**TABLE 1: EXAMPLES OF ADAPTIVE MANAGEMENT MONITORING AFFECTED RESOURCE, INDICATOR, AND MONITORING METHOD IDENTIFICATION**

Affected Resource	Indicator	Preliminary Monitoring Methods
Air Quality at the West Entrance and Old Faithful	Levels of: CO, PM <sub>10</sub> , and NO <sub>2</sub>	Fixed site monitoring for CO, PM <sub>10</sub> , and NO <sub>2</sub>
Soundscape directly adjacent to park roads	Audibility: decibel levels (dBA) in terms of magnitude and duration (constant sound level or L <sub>eq</sub> ) sound is audible over an 8-hour period.	Could include audibility logging, digital recordings, and sound pressure level measurement
Visitor Experience	Satisfaction	Visitor survey (pending OMB approval)
Wildlife on or near roads	Wildlife behavioral responses to OSV use	Observational studies
Health and Safety of OSV travelers	Number and severity of reported incidents	Incident reports regarding OSV use

## **FUTURE LONG-TERM ADAPTIVE MANAGEMENT STRATEGY**

A focused, stakeholder-involved, collaborative approach will help to refine and set long-term adaptive management objectives to guide future winter use actions. As part of this process, stakeholders and the public will be engaged to ensure the park fully understands key issues and concerns and to work collaboratively on developing a suite of appropriate metrics to monitor impacts and reduce key uncertainties. Although there is often a desire to monitor many resource indicators, the adaptive management plan will focus on key uncertainties that if reduced, would allow for improved winter use management. The NPS is committed to implementing this adaptive management strategy, and plans to hire a position, stationed at the park, to oversee development and initial implementation of the long-term adaptive management strategy.

Based on the results of the initial collaborative workshops, a monitoring plan will be developed to evaluate the conditions of identified resources and associated metrics. The results would be analyzed on an annual basis. Based on the results, the NPS may adjust winter use management in order to better protect park resources and improve visitor experiences. Monitoring results may also suggest that other metrics may need to be evaluated, or alterations to the way resources are monitored should be made. If such situations arise, the NPS will seek additional stakeholder input.

The NPS proposes to convene an adaptive management working group during the summer of 2013, present a draft adaptive management plan in the fall of 2013 with pilot projects to develop/refine sampling protocols, and implement a preliminary final adaptive management plan in the winter of 2014/2015. All interested parties will be encouraged to join the collaborative adaptive management meetings. Upon completion of the long-term adaptive management plan, the park will hold regularly scheduled stakeholder meetings to discuss data and findings, and obtain feedback from stakeholders on recommendations. The NPS will also develop a website to serve as an information portal for the winter use adaptive management and monitoring program.

## **Future Management Actions**

Results of monitoring may influence future changes in management. As park resources respond to OSV use levels and associated impacts, the NPS may find it advisable or necessary to reduce OSV use levels or the manner in which OSVs are managed (such as locations, timing, guiding requirements, non-commercial guiding, temporal spacing, etc.). These potential decisions will be based on the monitoring data and the progress of meeting specific adaptive management decision-making triggers that will be refined with stakeholder input. While the park may take any of the actions listed below in response to the monitoring data collected, the park could not, under any scenario, authorize more than 110 transportation events (the maximum number of events evaluated under the preferred alternative in the EIS) through adaptive management, unless additional National Environmental Policy Act (NEPA) compliance is completed and changes to the winter use regulation for the park are made. Potential future actions could include

- Requiring lower-emission (noise or air) technologies for OSVs;
- Reducing sum numbers of daily OSV events permitted;
- Reducing average of maximum number of OSVs per transportation event;
- Adjusting the ration of snowcoach and snowmobile transportation events (however, no more than 50 transportation events would be allocated to snowmobiles under any scenario as described under the preferred alternative);
- Establishing timed-entry requirements or staging at the entrance gates for OSVs;
- Adjusting speed limits;
- Adjusting OSV speed limits in travel corridors or developed areas;
- Adjusting OSV entry protocols at entrance stations;
- Phasing out the use of specific technologies or models, which could include limits on the sizes/widths of snow coaches;
- Increasing recreational and educational opportunities for visitors;
- Increasing or decreasing event allowances for non-commercial guiding or discontinuing the non-commercially guided snowmobile access program entirely;
- Closing certain OSV areas, routes, or entrances; and
- Modifying the time periods during which OSVs are allowed to be used on certain segments of roads.

As noted above, the NPS has identified three main objectives for long-term adaptive management. For two of those objectives—continuing to assess the comparability of impacts from a group of snowmobiles

versus a snowcoach and continuing to improve the condition of park resources—the NPS would have discretion as to when changes to management are undertaken. However, for the first objective—ensuring impacts are within the range predicted in under the preferred alternative in the EIS—a change to management would be mandatory; actions would be taken if monitoring indicates an impact has exceeded the intensity level (minor, moderate, major) predicted under the preferred alternative in the EIS. For example, if the EIS predicts that OSV use would have a minor effect for a given resource, as defined by the intensity definitions, and monitoring data indicates that the effects are actually crossing into what the intensity definitions define as a moderate effect, the park would act as soon as practicable to adjust use so that the impacts are reduced to minor. The NPS notes that for the preferred alternative, all impacts have been assessed at the minor level, except for impacts to wildlife, which are expected to be moderate, and air quality, where NO<sub>2</sub> emissions are expected to be moderate. No major adverse impacts are predicted under the preferred alternative. The mandatory portion of the adaptive management framework would ensure that over the long-term, no major adverse impacts to park resources would be allowed from OSV use.

Furthermore, for impacts to soundscapes and air quality, where there are quantitative modeling data, the NPS would strive to keep actual levels at or near the specific levels predicted under the preferred alternative in the EIS. For example, for air quality, the intensity definitions define a moderate impact as a pollutant reaching between 51 and 79 percent of the National Ambient Air Quality Standards (NAAQS). If a given pollutant is predicted under the preferred alternative in the EIS to reach 52 percent of the NAAQS, and monitoring indicates it is actually reaching a higher level but not exceeding 79 percent, NPS could take action at that point to reduce the level of that pollutant to the level predicted under the preferred alternative in the EIS.

The management actions listed above have been described and their potential impacts have been analyzed in this plan/SEIS and previous NEPA documents that have been incorporated by reference. Therefore, only a streamlined environmental review may be necessary if the park determines it necessary to adjust its management in the future. Management changes that would conflict with the associated Record of Decision (ROD) for this plan/SEIS may necessitate the need for a new NEPA review and potentially, changes to the associated rule.

## **NEPA Review**

Once it is determined that a potential future management action is necessary or desirable to better achieve adaptive management objectives, an initial environmental screening process will be conducted to determine what, if any, additional environmental compliance may be required. Through this screening process, the NPS will document whether adaptive management adjustments, both individually and cumulatively, are (1) within the range of management actions described for the selected alternative, and (2) fully analyzed in the environmental effects section of this NEPA analysis or those incorporated by reference. The following questions will be used to evaluate if the winter use plan/SEIS and documents incorporated by reference have adequately analyzed impacts for proposed adjustments to winter use management:

- Is the change to the selected action in the ROD a feature of, or essentially similar to, an action or alternative analyzed in the existing NEPA documents? Is the action within the same analysis area, or if the project location is different, are the geographic and resource conditions sufficiently similar to those analyzed in the existing NEPA documents? If there are differences, are they substantial?
- Is the range of alternatives analyzed in the existing NEPA documents appropriate with respect to the new proposed actions, given current environmental concerns, interests, and resource values?

- Is the existing analysis valid in light of any new information or circumstances? Can it be concluded that new information and new circumstances would not be significant as they relate to environmental concerns?
- Are the direct, indirect, and cumulative effects that would result from implementation of the new proposed actions similar (both quantitatively and qualitatively) to those analyzed in the existing NEPA document?
- Does the proposed action alter the conclusions of the no impairment analysis accompanying the Record of Decision?

Some management changes could be implemented quickly, as they would be within the scope of the selected alternative and their impacts will have been adequately assessed. However, other actions may require additional environmental review and/or rulemaking prior to implementation.

In addition to the stakeholder involvement as part of the adaptive management framework, the appropriate level of public and stakeholder involvement and notification of any proposed changes would occur based on the level of environmental analysis required.





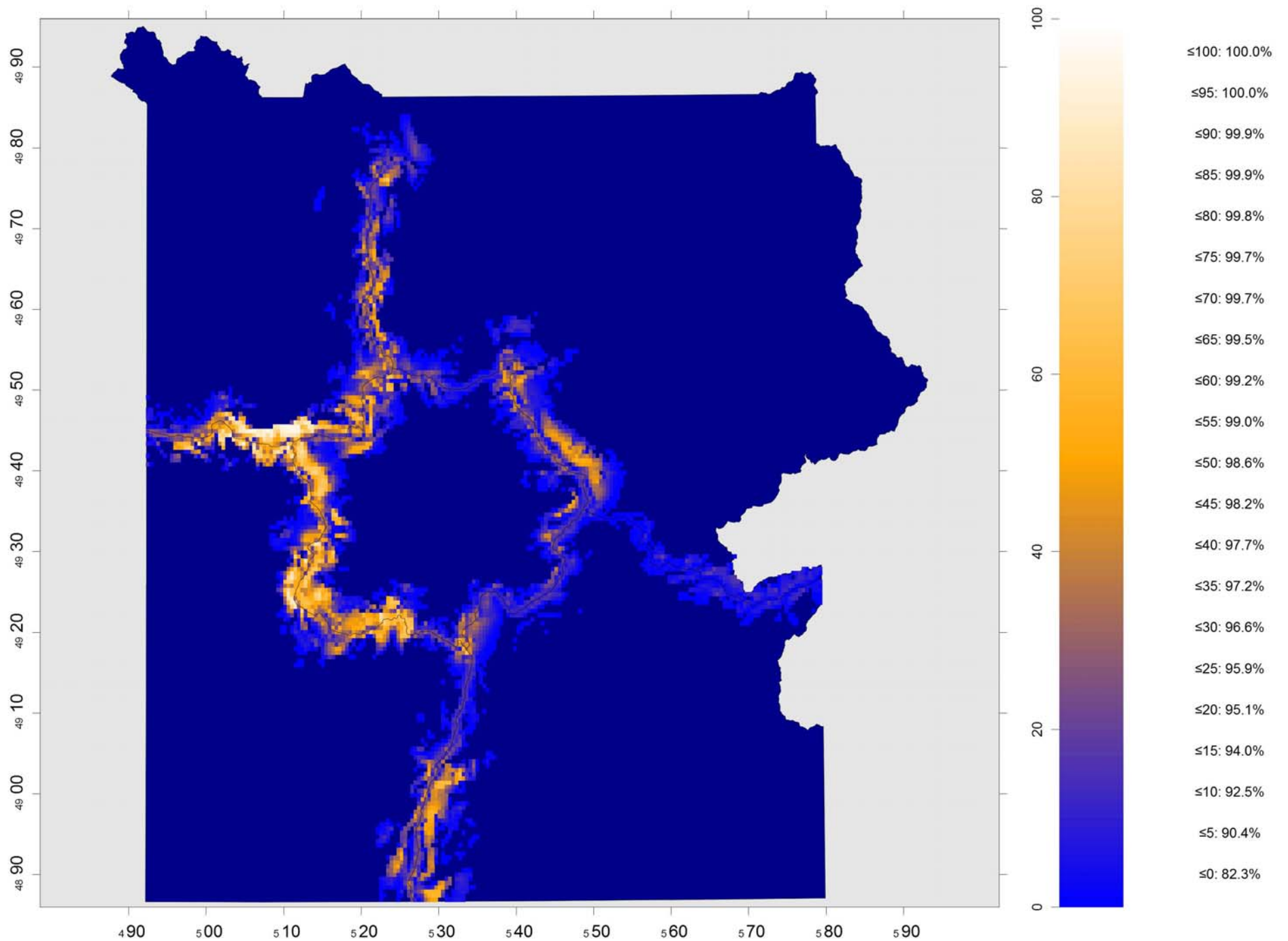
## APPENDIX E: SOUNDSCAPES MODELING MAPS

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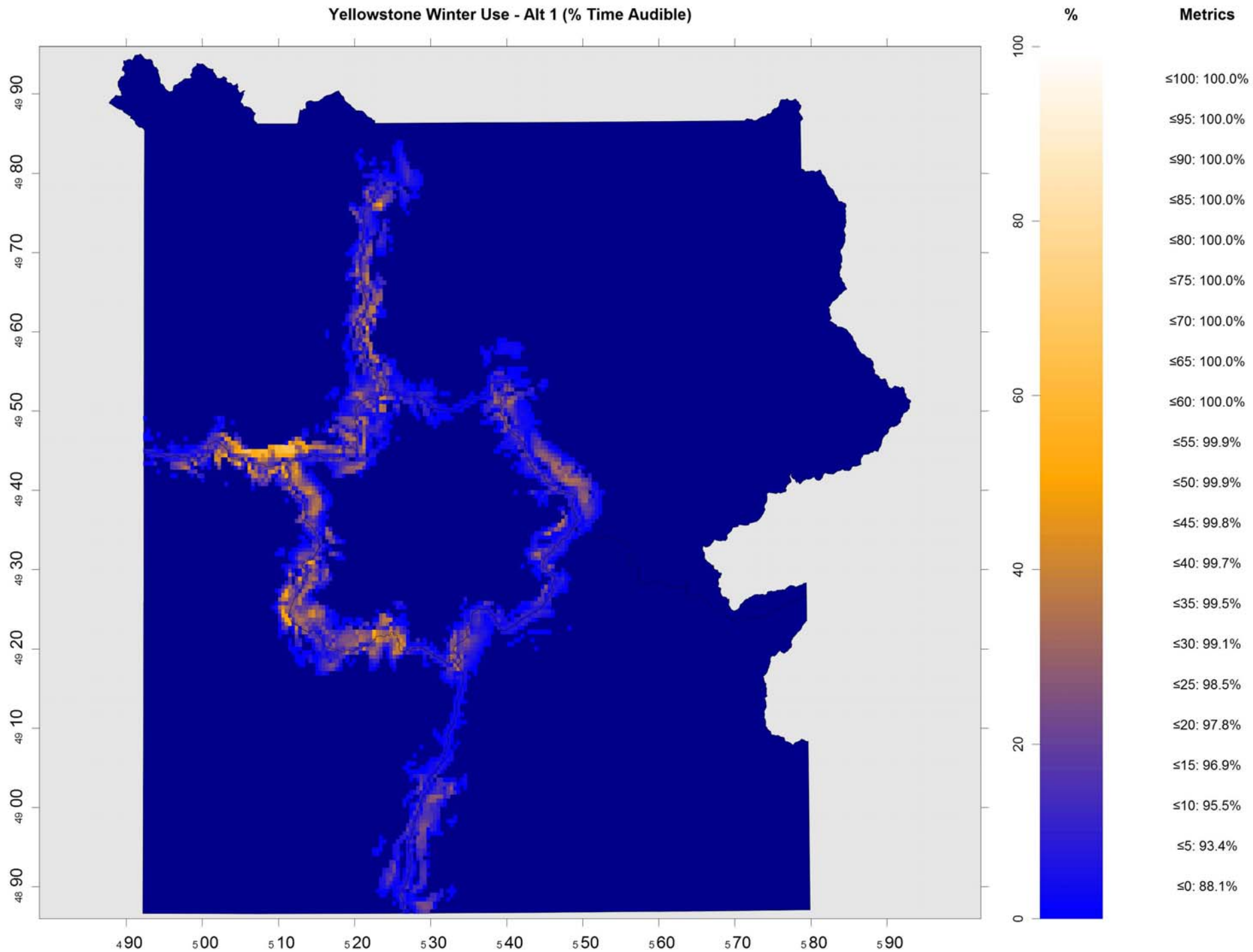
- Percent Time Audible (TAUD) maps
- Audible  $L_{eq}$  maps
- Peak 4 maps
- All metrics (composite of TAUD, audible  $L_{eq}$  and peak 4) maps
- 8-hour  $L_{eq}$ —mapping of 8-hour  $L_{eq}$  using the travel corridor and backcountry intensity definition categories

SEIS Alternative	Fleet Assumption	Soundscapes Modeling Run Name
Existing Average Conditions (2009-2011)	Current Fleet	Recent
Alternative 1: No Snowmobile/Snowcoach Use	Administrative Use, Current Fleet	Alt1
Alternative 2: Continue Snowmobile/Snowcoach Use at 2012/2013 Winter Season Interim Regulation Limits	Current Fleet	Alt2r1
	BAT Snowcoaches	Alt2r2
Alternative 3: Transition to Best Available Technology (BAT) Snowcoaches Only	BAT Snowcoaches, No Snowmobiles	Alt3
Alternative 4a: Manage OSV Use by Transportation Events (480 snowmobiles/60 snowcoaches)	Current Fleet	Alt4Ar1
	BAT Snowcoaches and Snowmobiles (new smb BAT 67 dBA and BAT sc 75 dBA)	Alt4Ar2
Alternative 4b: Manage OSV Use by Transportation Events (0 snowmobiles/110 snowcoaches)	Current Fleet	Alt4Br1
	BAT Snowcoaches and Snowmobiles (new smb BAT 67dBA and BAT sc 75dBA)	Alt4Br2
Alternative 4c: Manage OSV Use by Transportation Events (480 snowmobiles, 120 snowcoaches)	Enhanced BAT for Snowcoaches (71 dBA) and New BAT for Snowmobiles (67 dBA)	Alt4Cr1
	Enhanced BAT for Snowcoaches (71 dBA) and Snowmobiles Voluntarily Quieter than BAT (65 dBA)	Alt4Cr2
Alternative 4d: Manage OSV Use by Transportation Events (0 snowmobiles/220 snowcoaches)	Enhanced BAT for Snowcoaches (71 dBA) and New BAT for Snowmobiles (67 dBA)	Alt4Dr1
	Enhanced BAT for Snowcoaches (71 dBA) and Snowmobiles Voluntarily Quieter than BAT (65 dBA)	Alt4Dr2

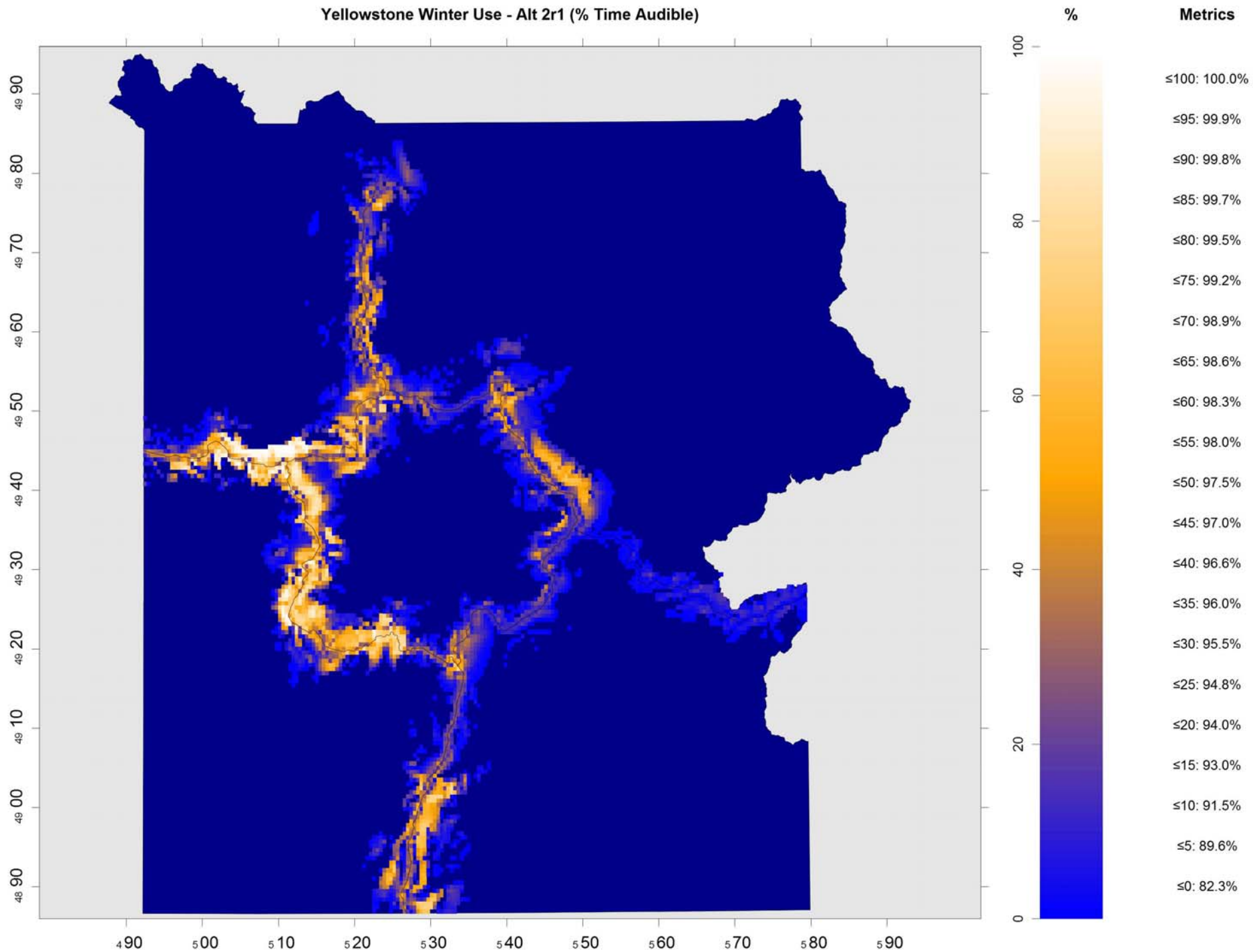
Yellowstone Winter Use - Recent (% Time Audible)



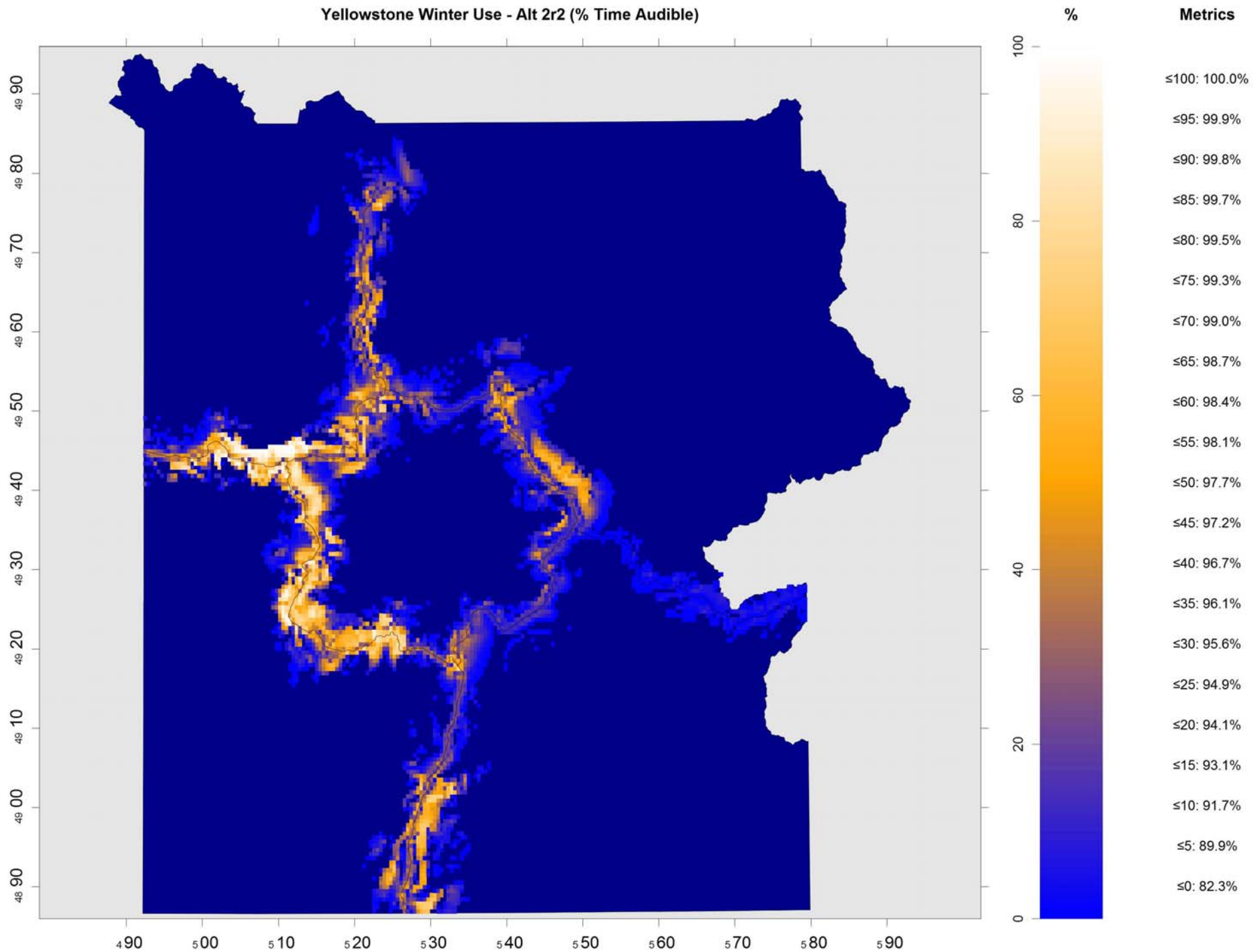
Yellowstone Winter Use - Alt 1 (% Time Audible)



Yellowstone Winter Use - Alt 2r1 (% Time Audible)

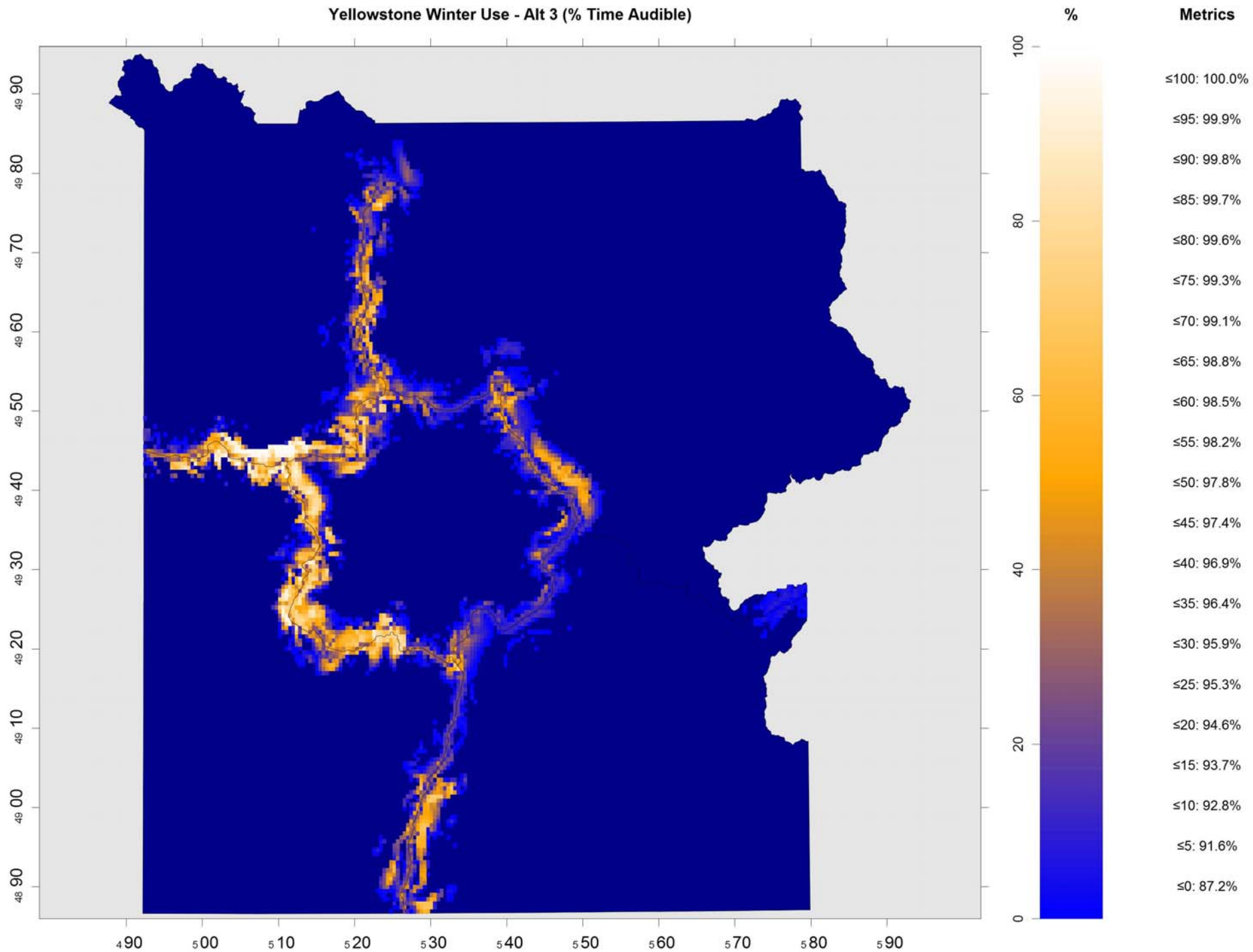


Yellowstone Winter Use - Alt 2r2 (% Time Audible)

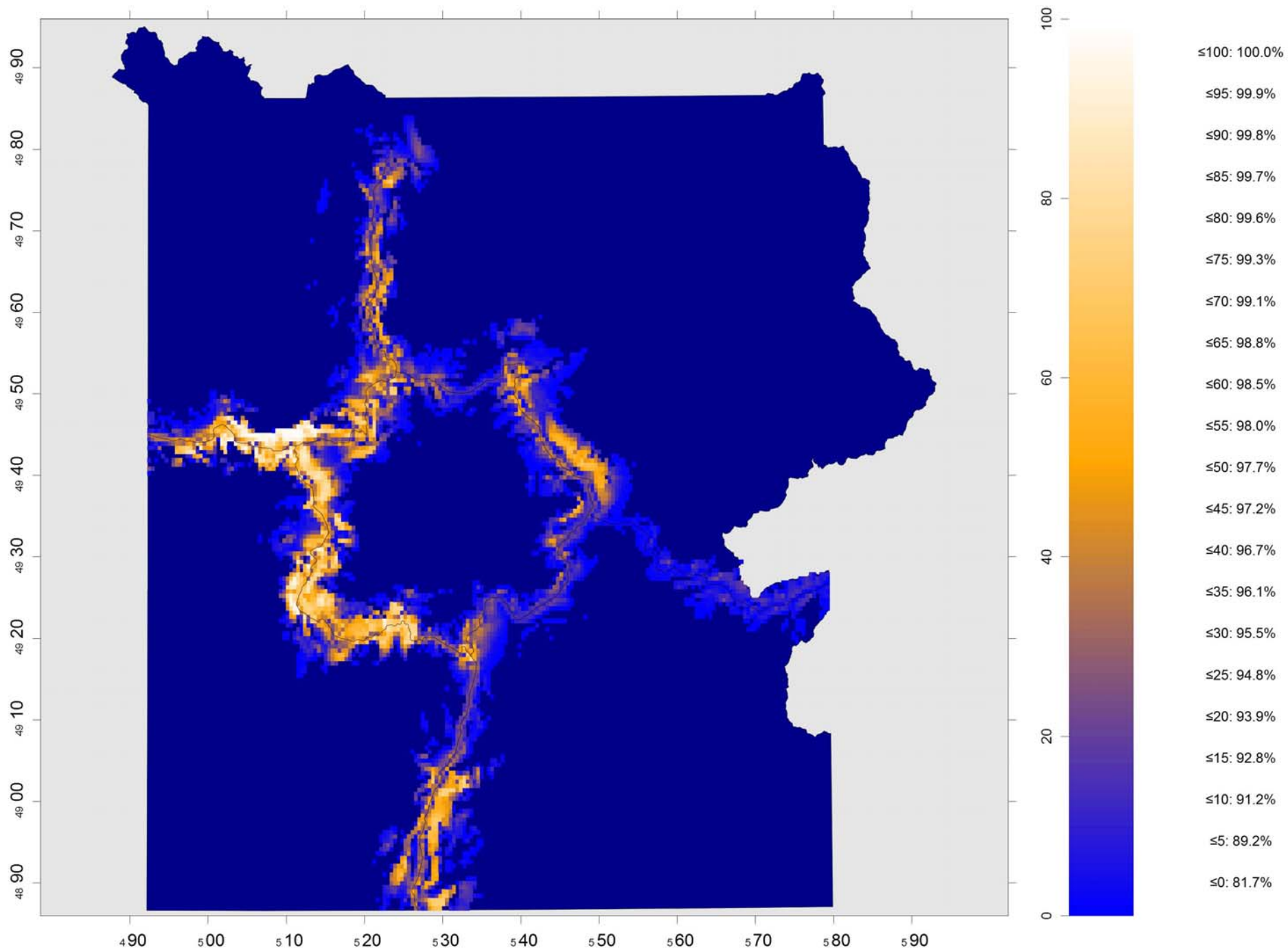




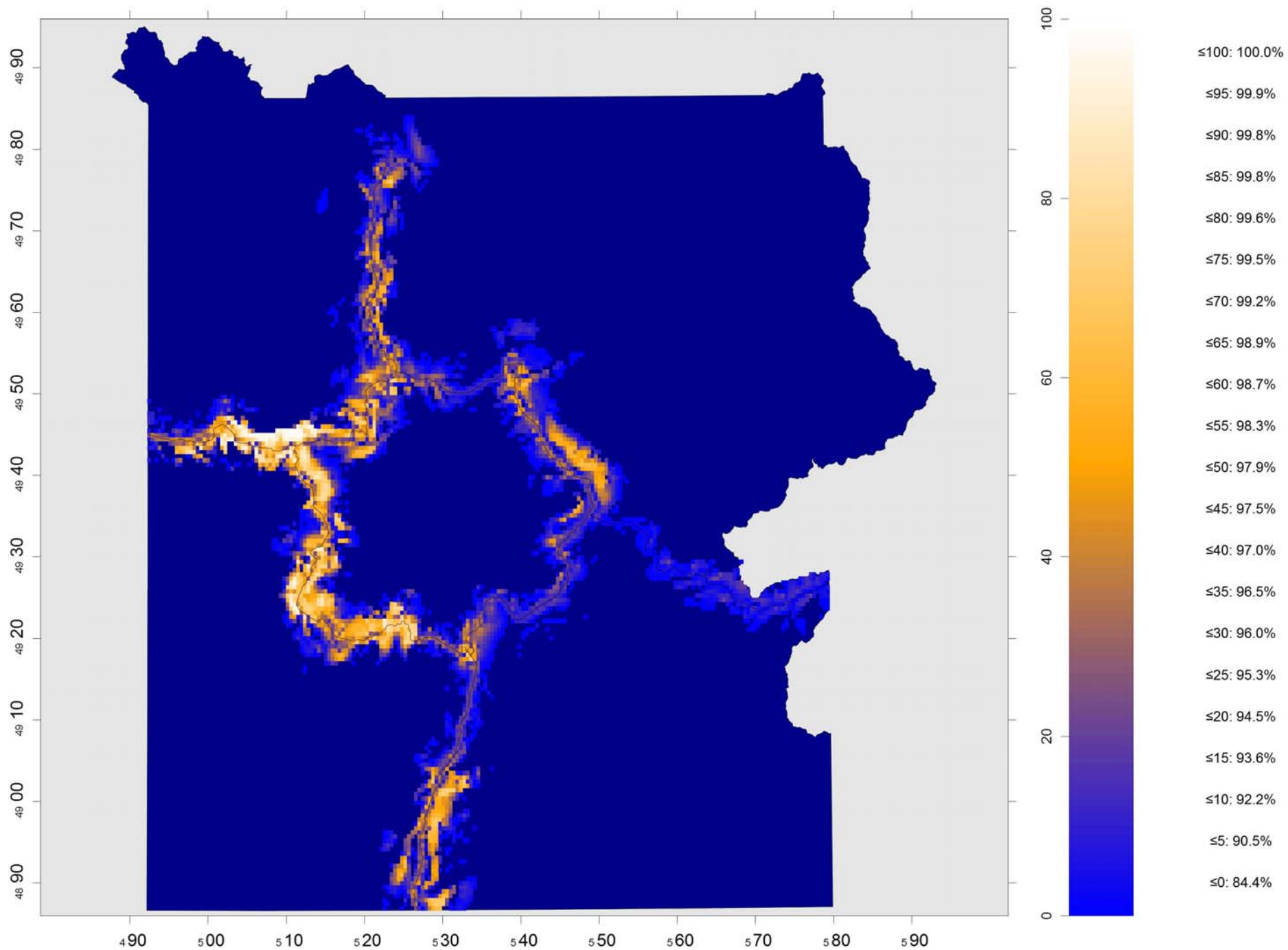
Yellowstone Winter Use - Alt 3 (% Time Audible)



Yellowstone Winter Use - Alt 4Ar1 (% Time Audible)

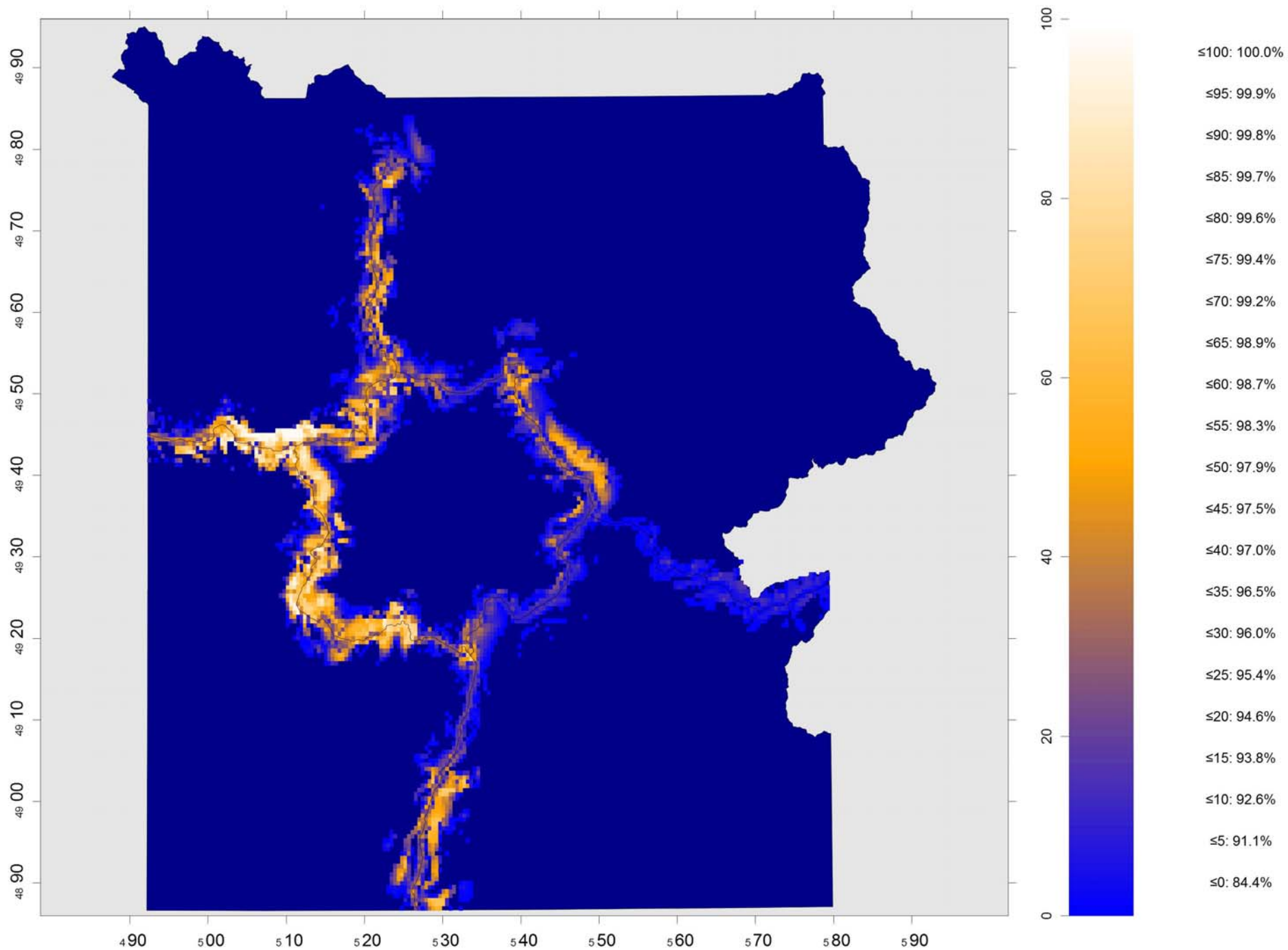


Yellowstone Winter Use - Alt 4Ar2 (% Time Audible)

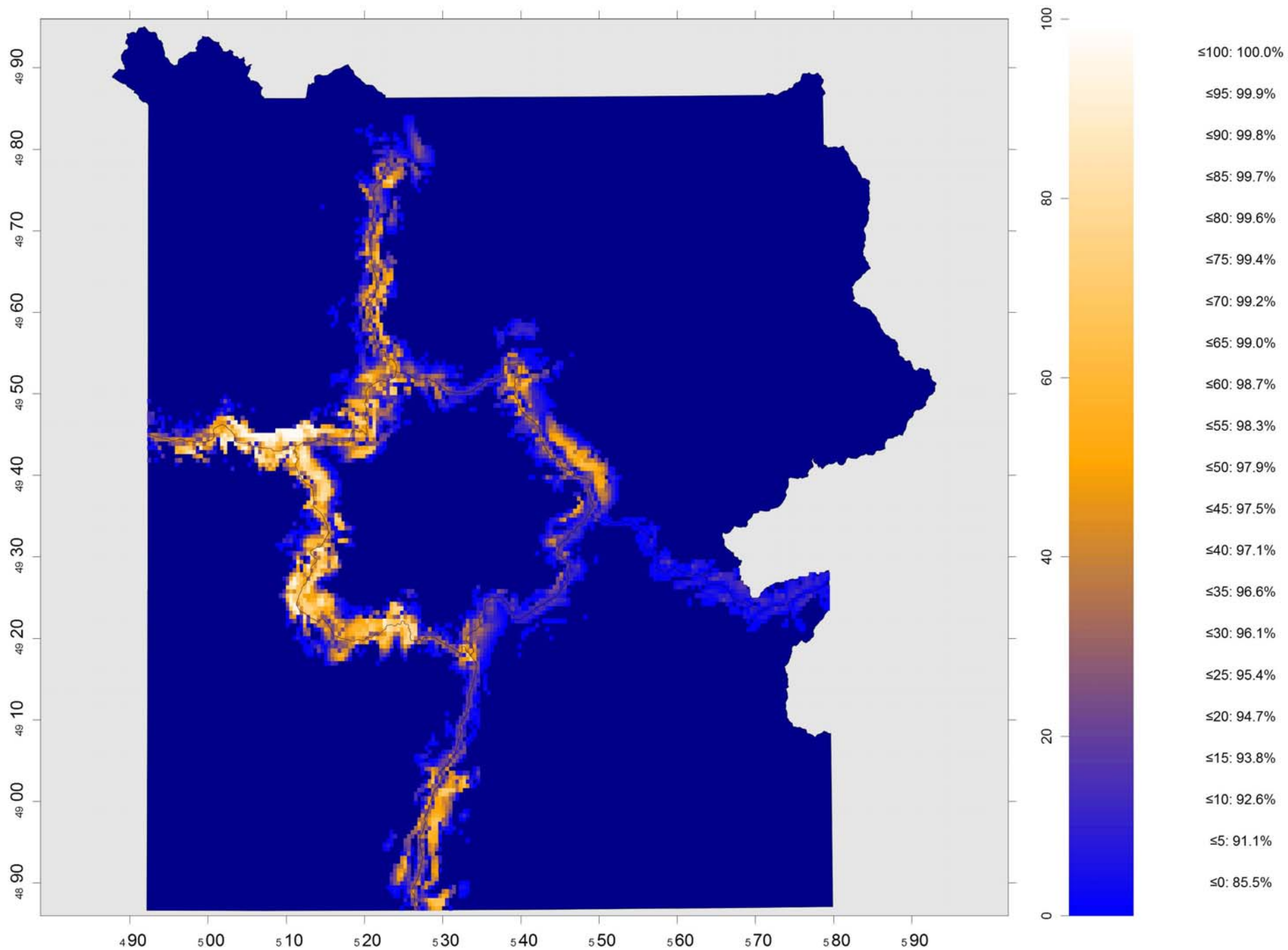




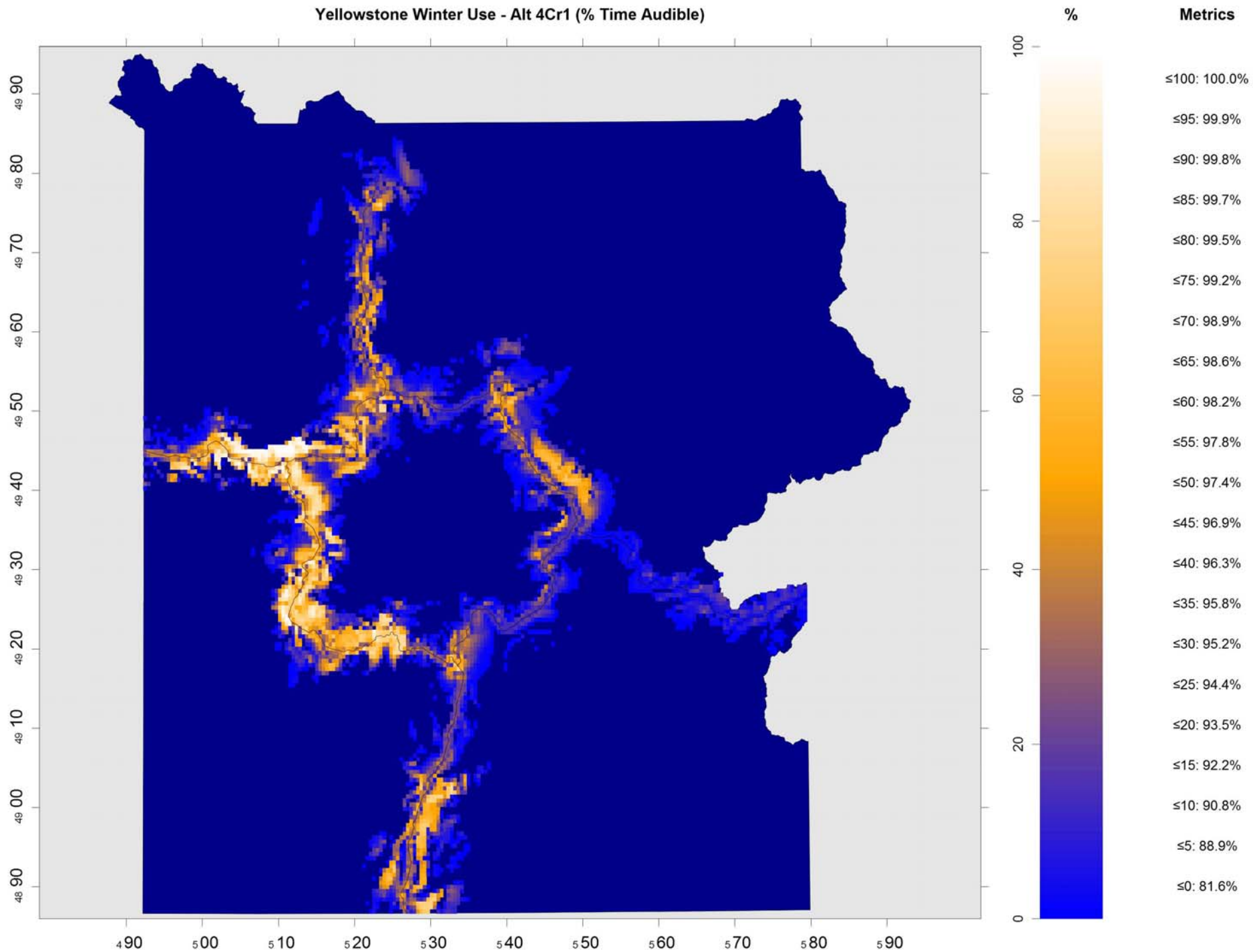
Yellowstone Winter Use - Alt 4Br1 (% Time Audible)



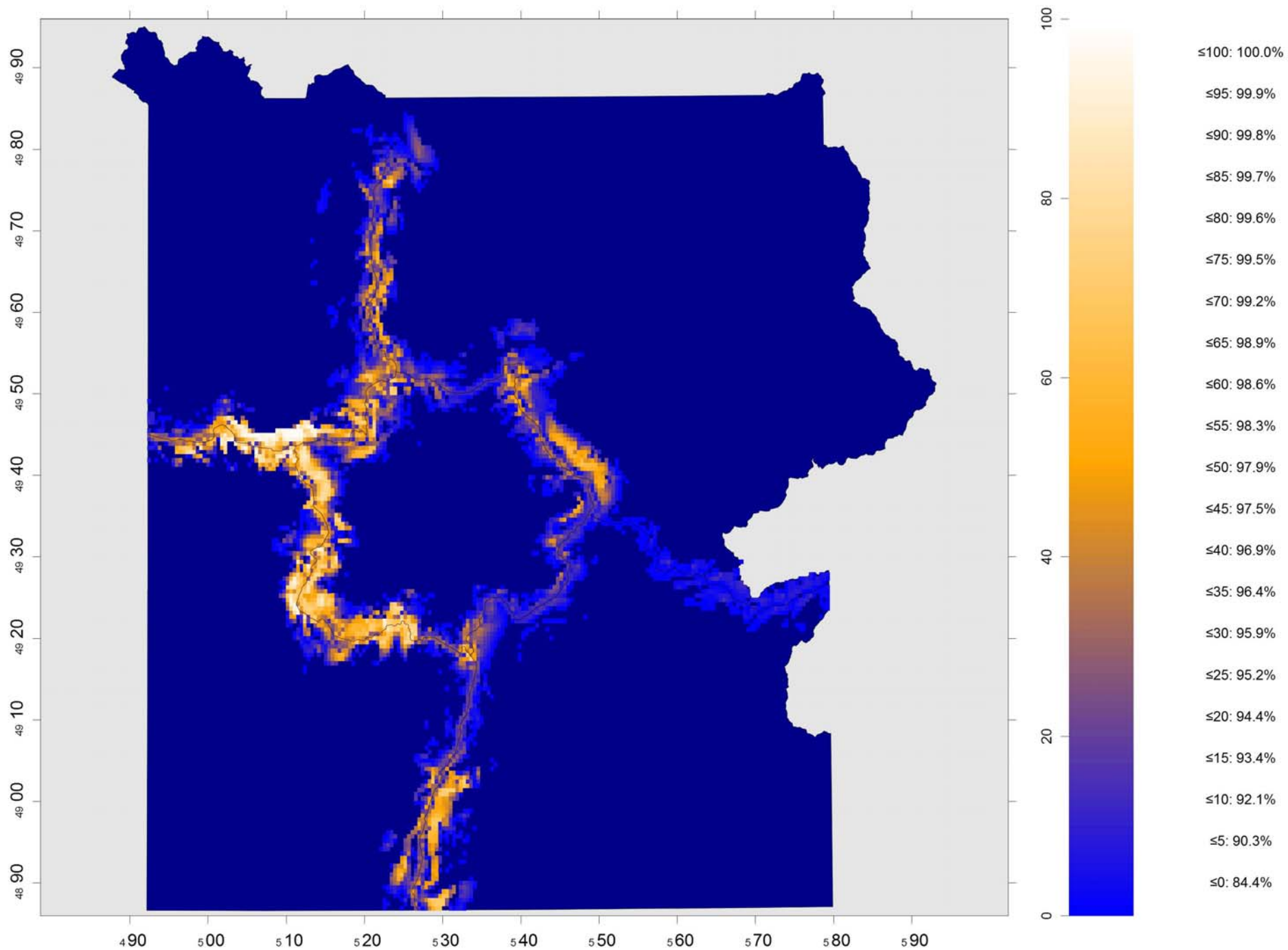
Yellowstone Winter Use - Alt 4Br2 (% Time Audible)



Yellowstone Winter Use - Alt 4Cr1 (% Time Audible)

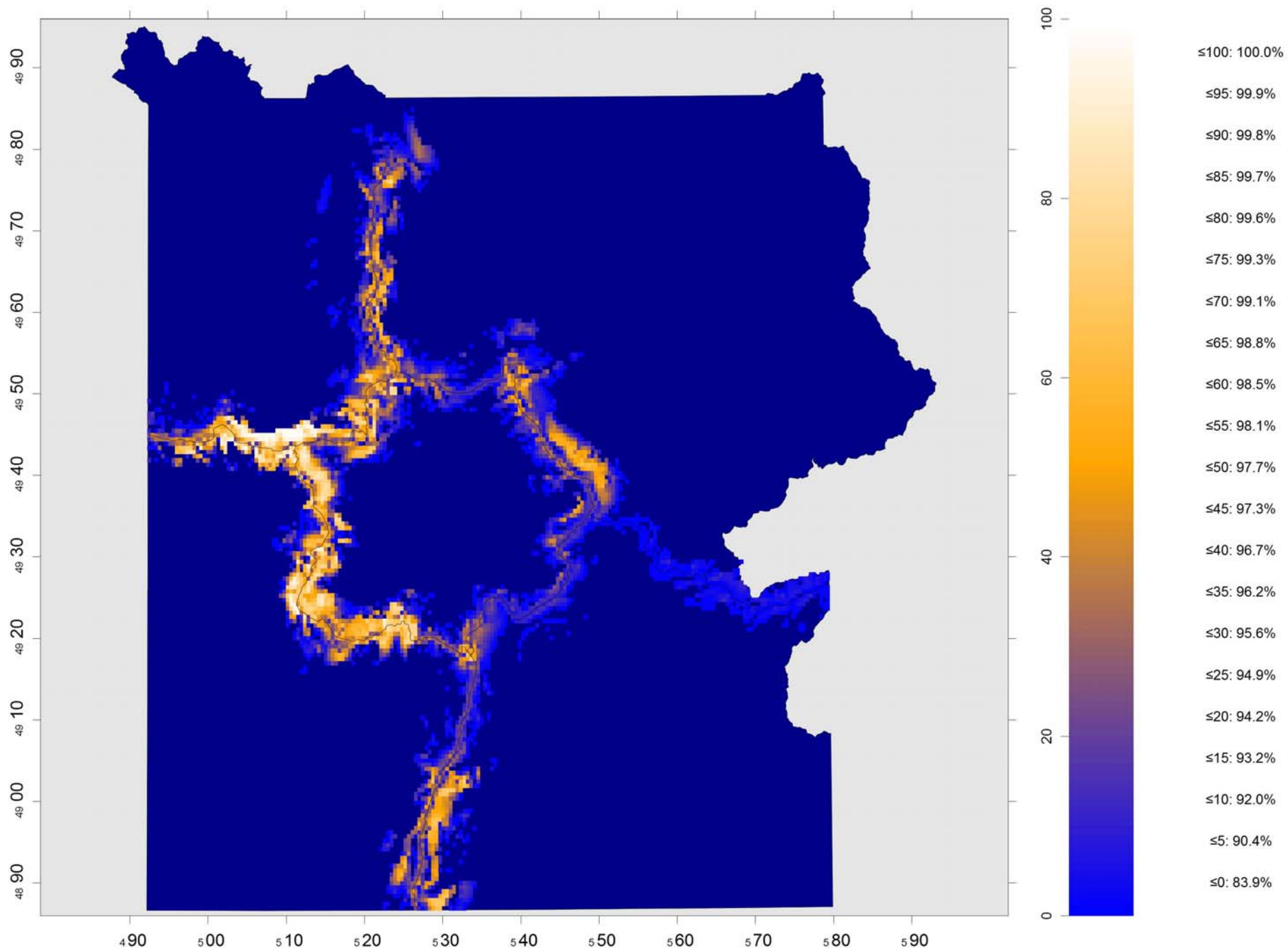


Yellowstone Winter Use - Alt 4Cr2 (% Time Audible)

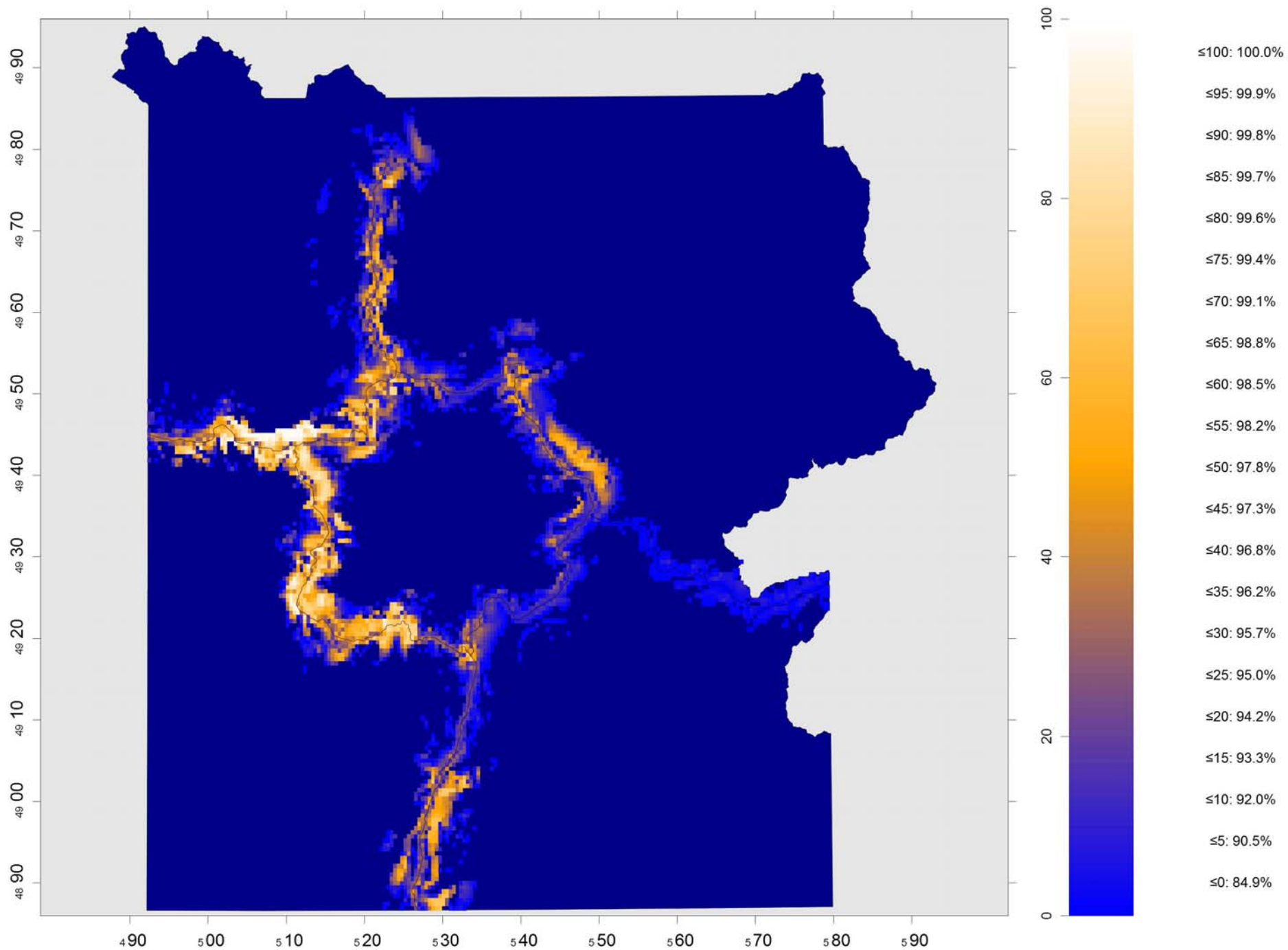




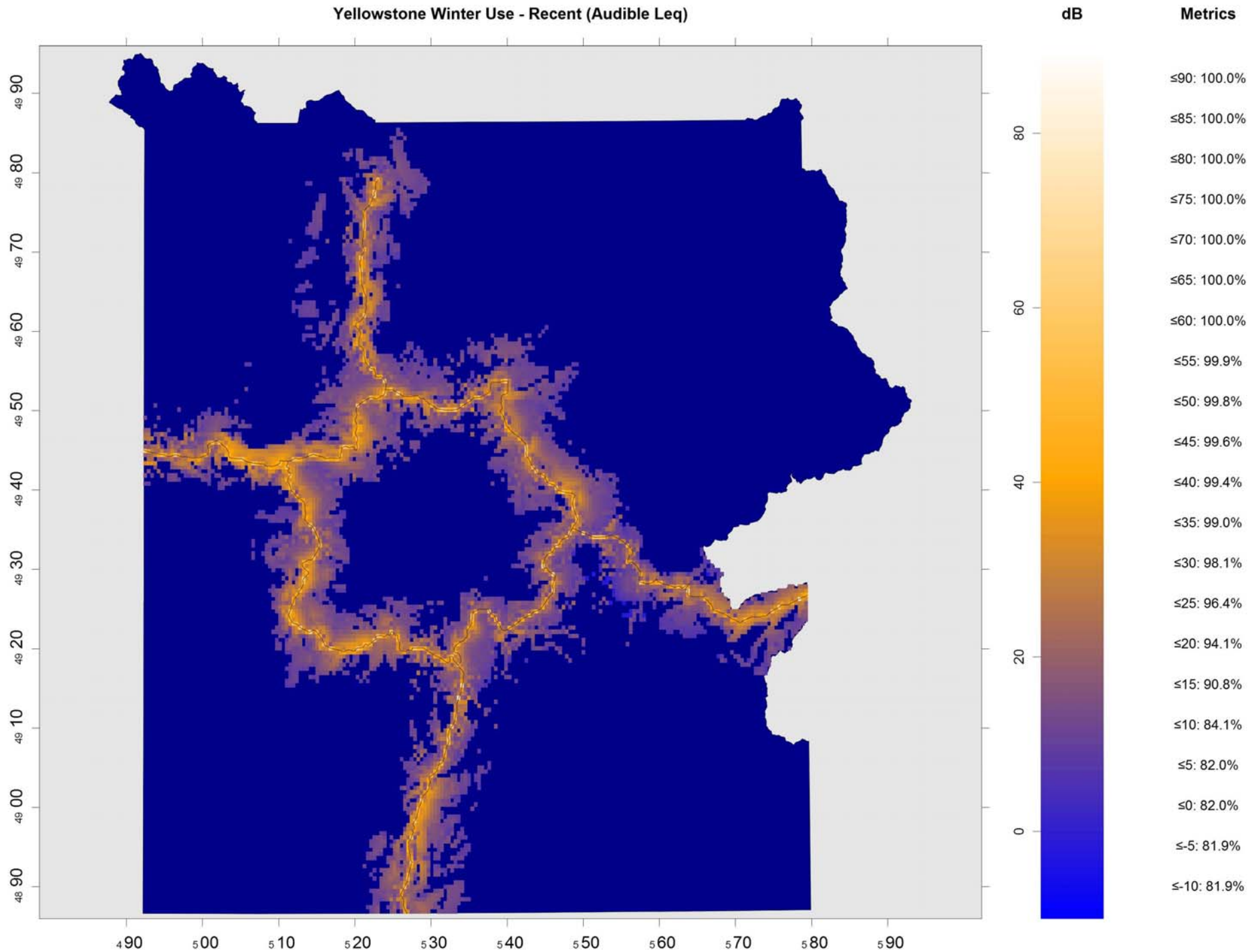
Yellowstone Winter Use - Alt 4Dr1 (% Time Audible)



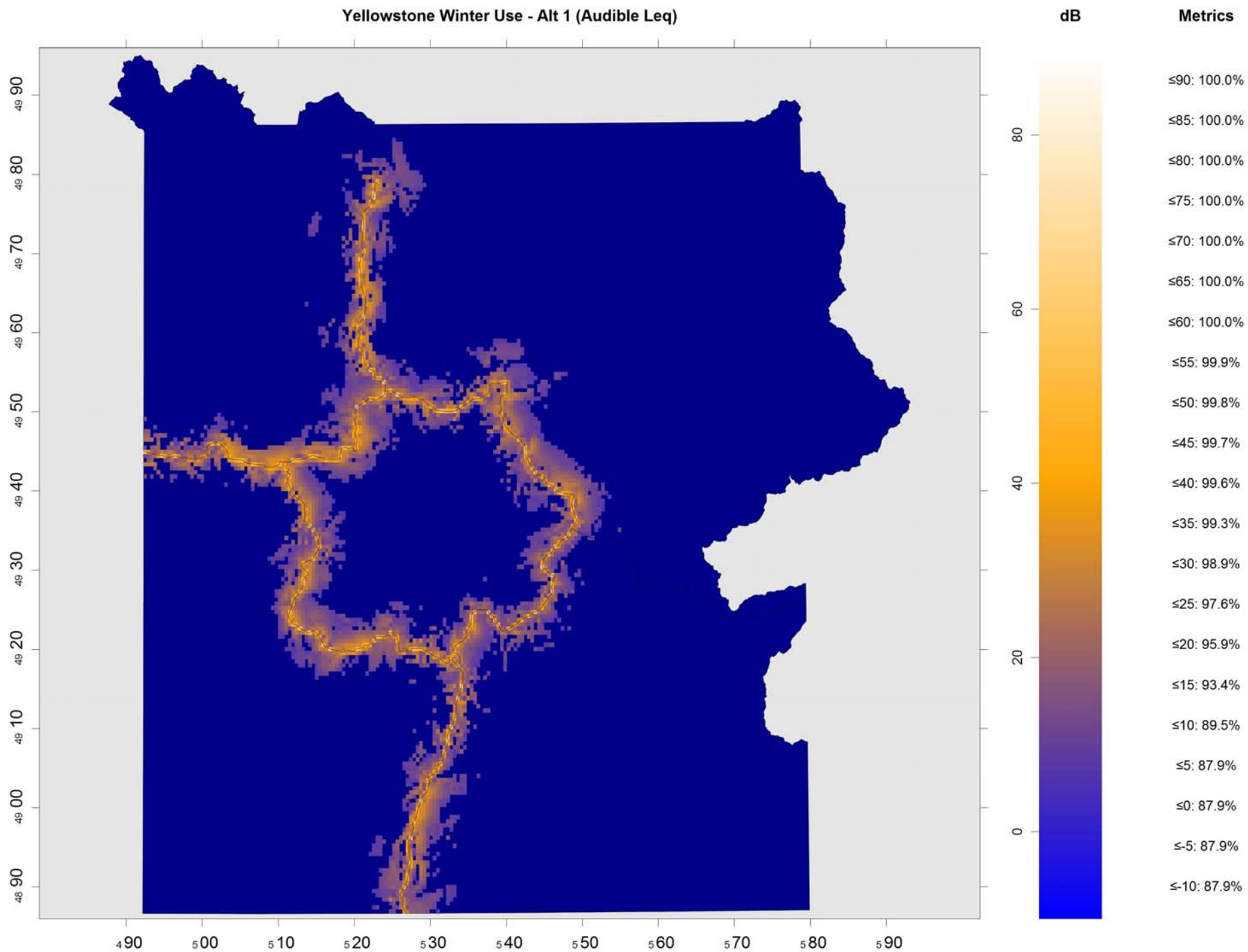
Yellowstone Winter Use - Alt 4Dr2 (% Time Audible)



Yellowstone Winter Use - Recent (Audible Leq)

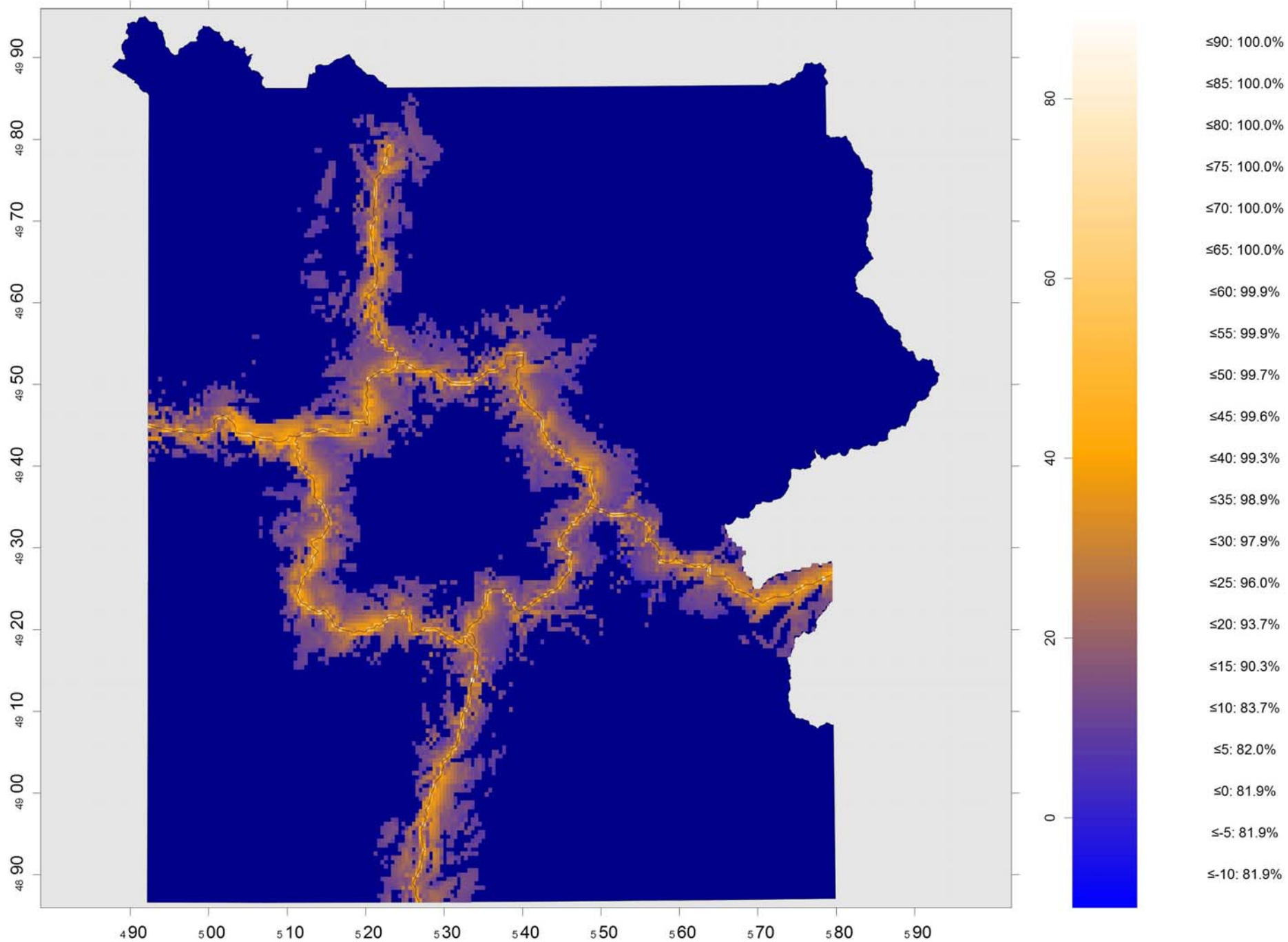


Yellowstone Winter Use - Alt 1 (Audible Leq)

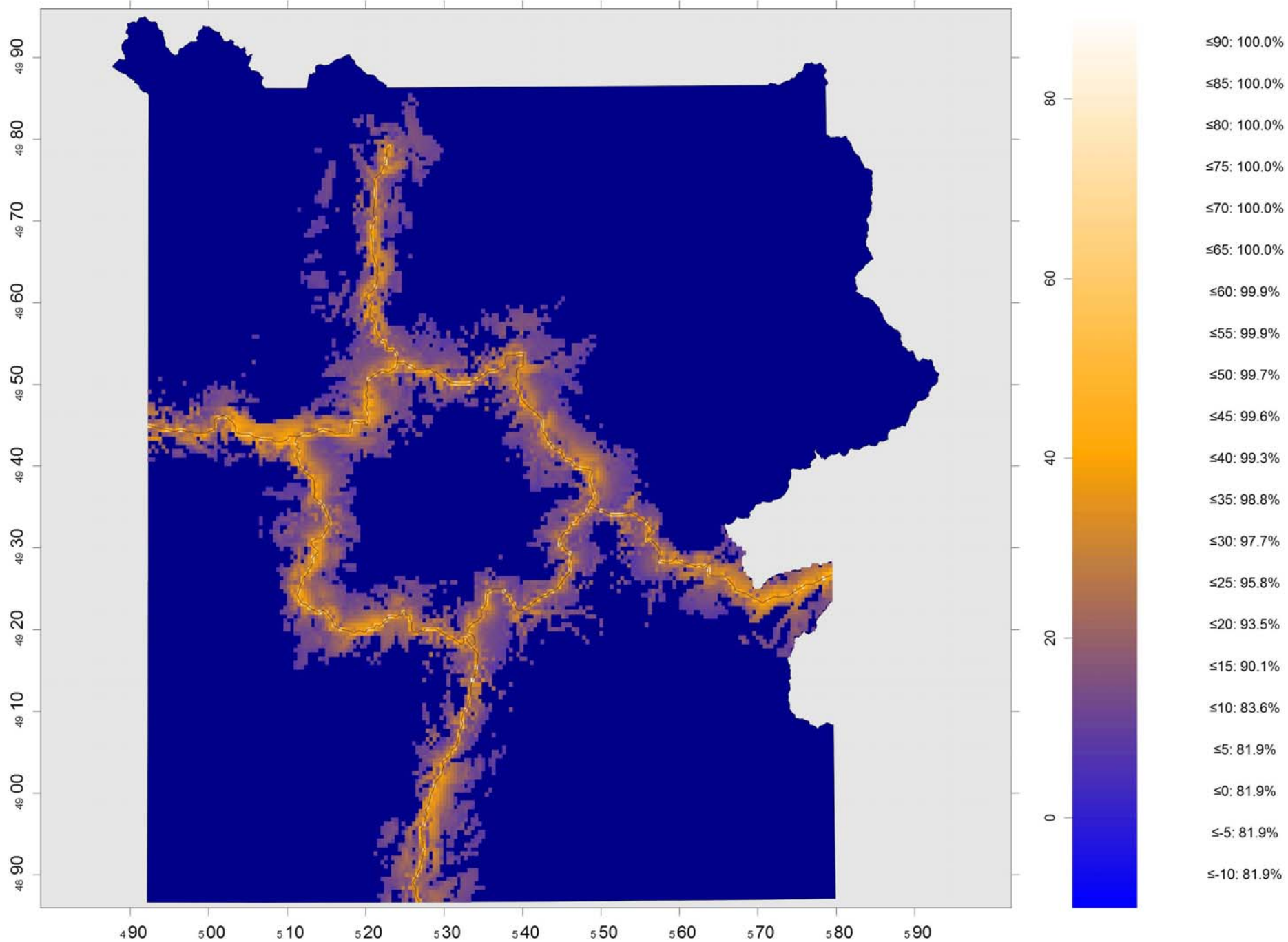




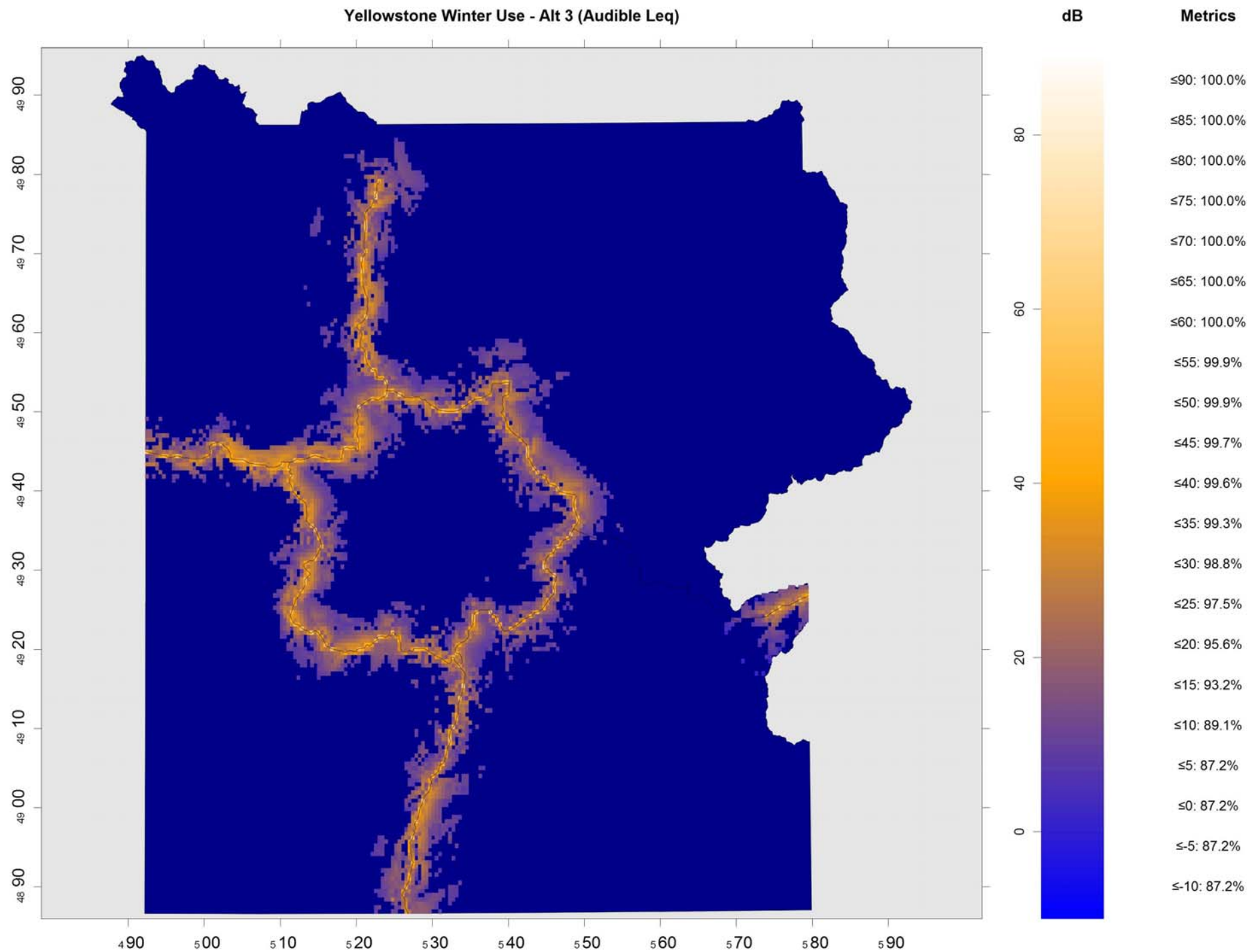
Yellowstone Winter Use - Alt 2r1 (Audible Leq)



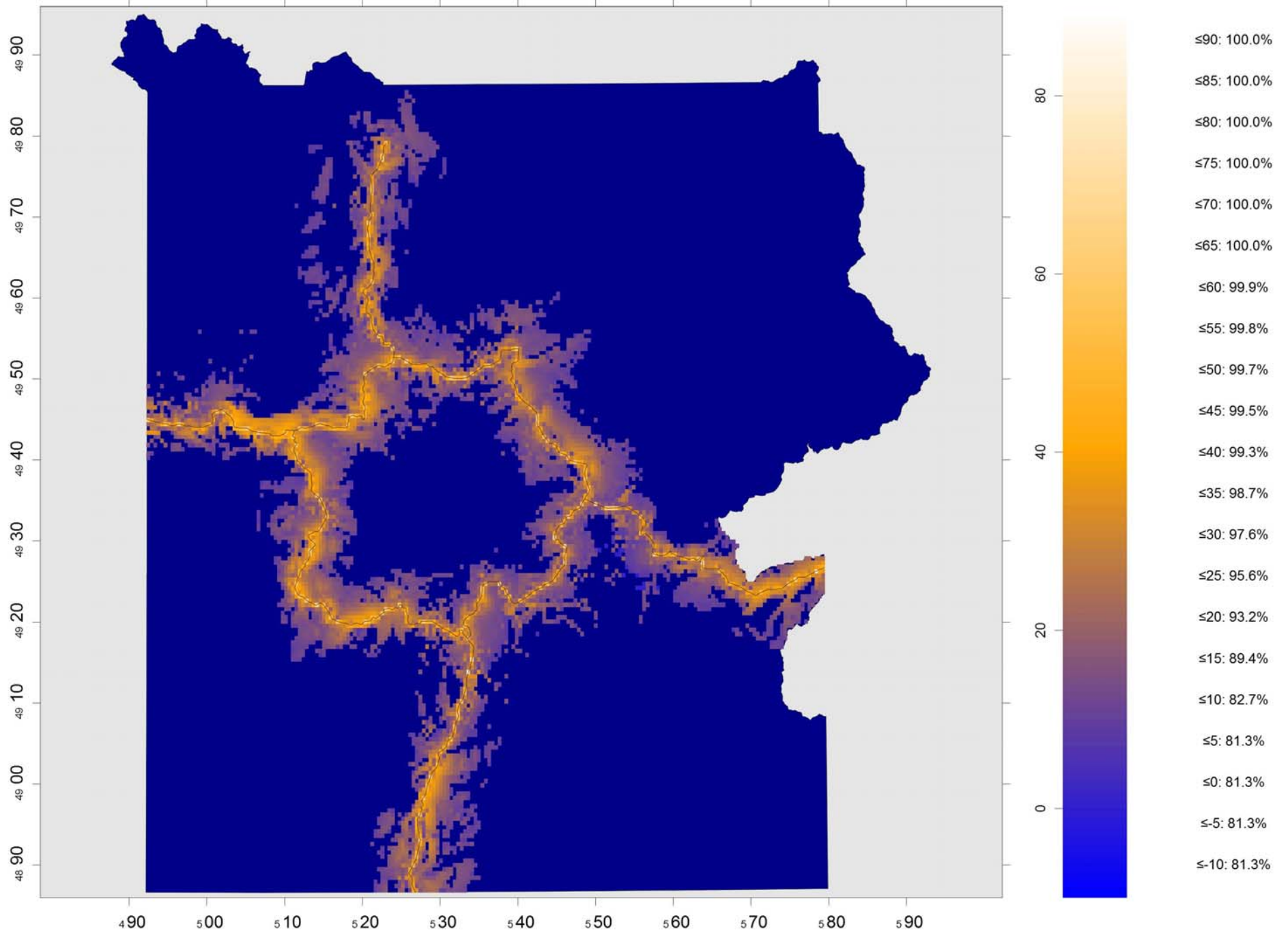
Yellowstone Winter Use - Alt 2r2 (Audible Leq)



Yellowstone Winter Use - Alt 3 (Audible Leq)

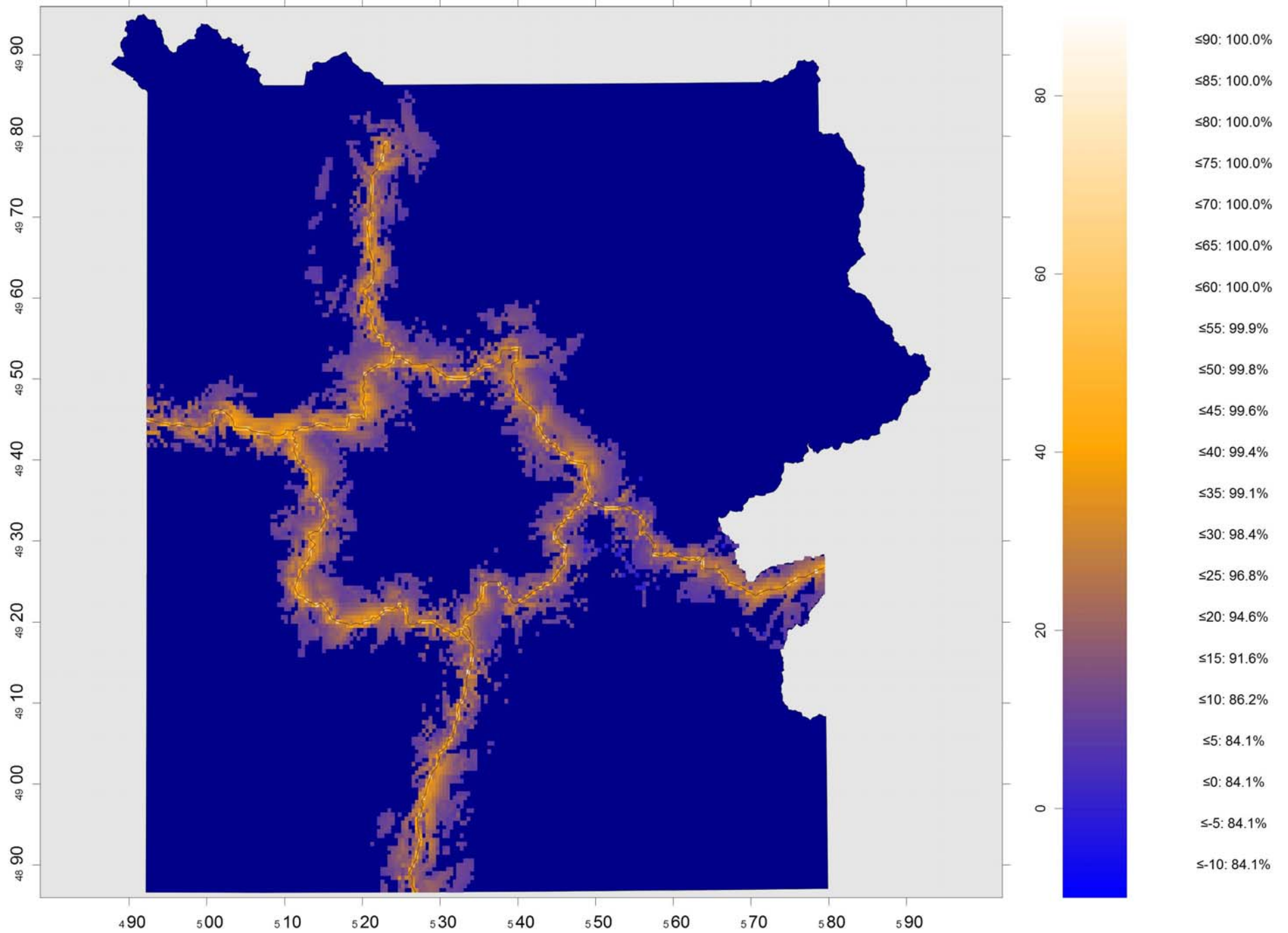


Yellowstone Winter Use - Alt 4Ar1 (Audible Leq)

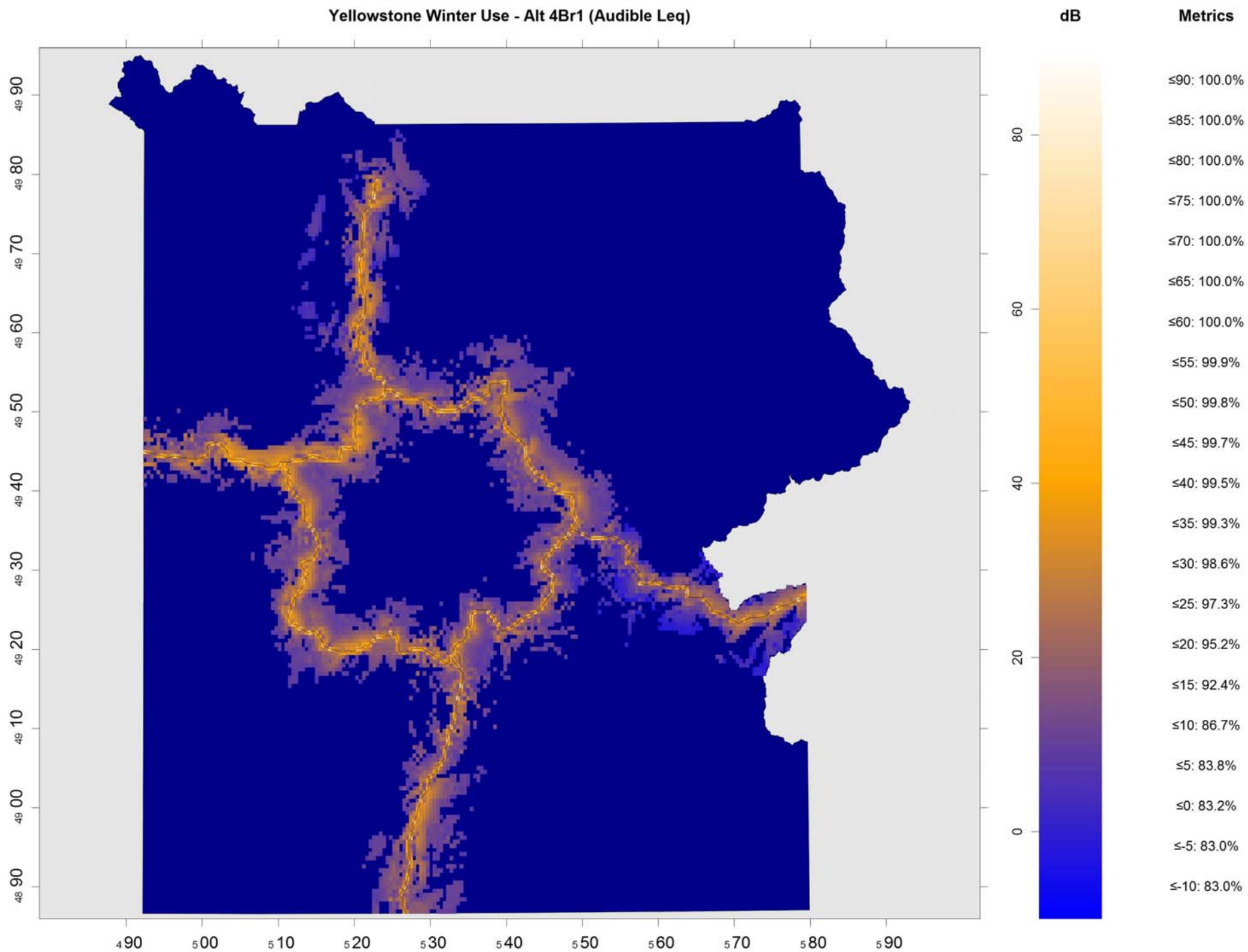




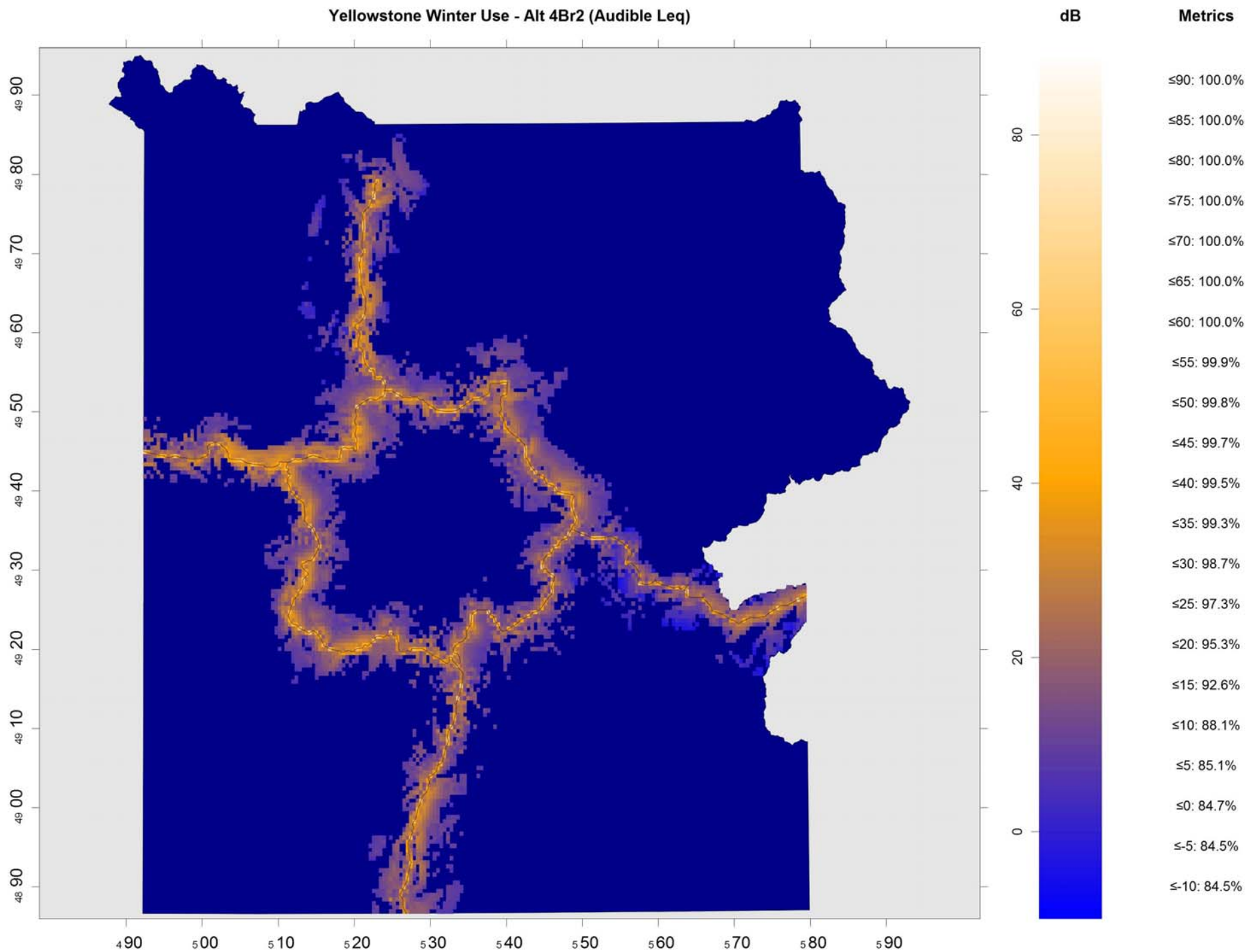
Yellowstone Winter Use - Alt 4Ar2 (Audible Leq)



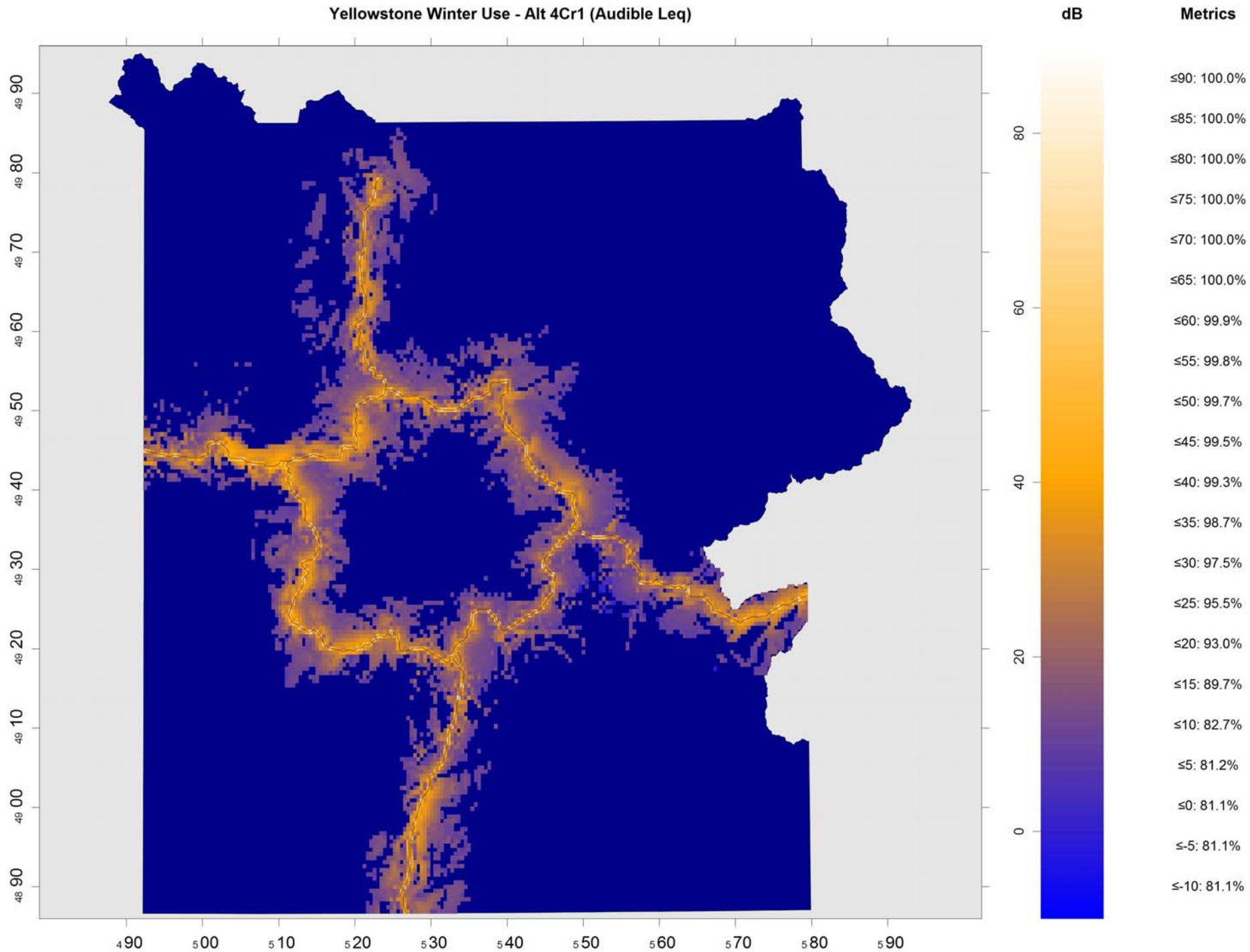
Yellowstone Winter Use - Alt 4Br1 (Audible Leq)



Yellowstone Winter Use - Alt 4Br2 (Audible Leq)

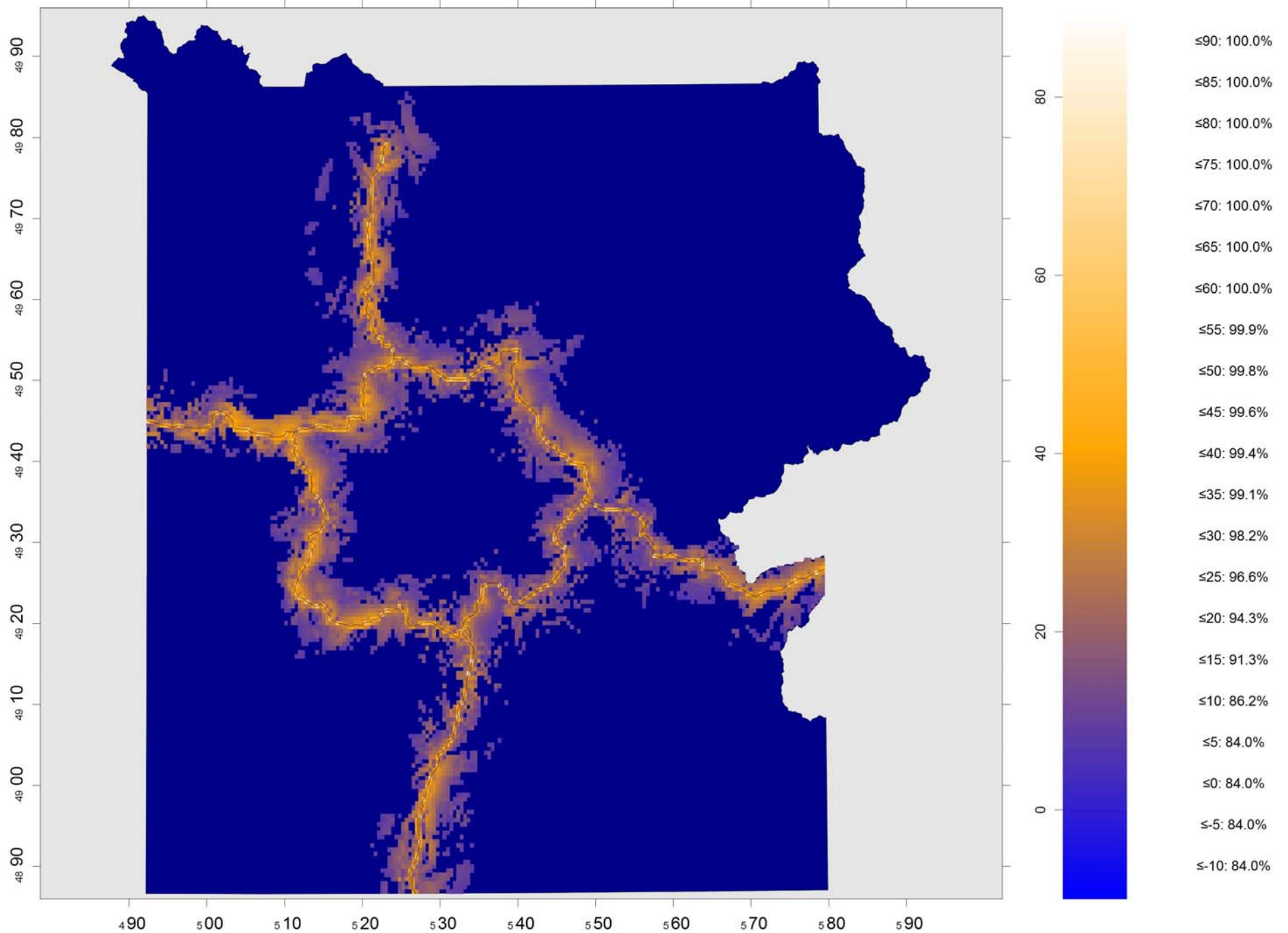


Yellowstone Winter Use - Alt 4Cr1 (Audible Leq)

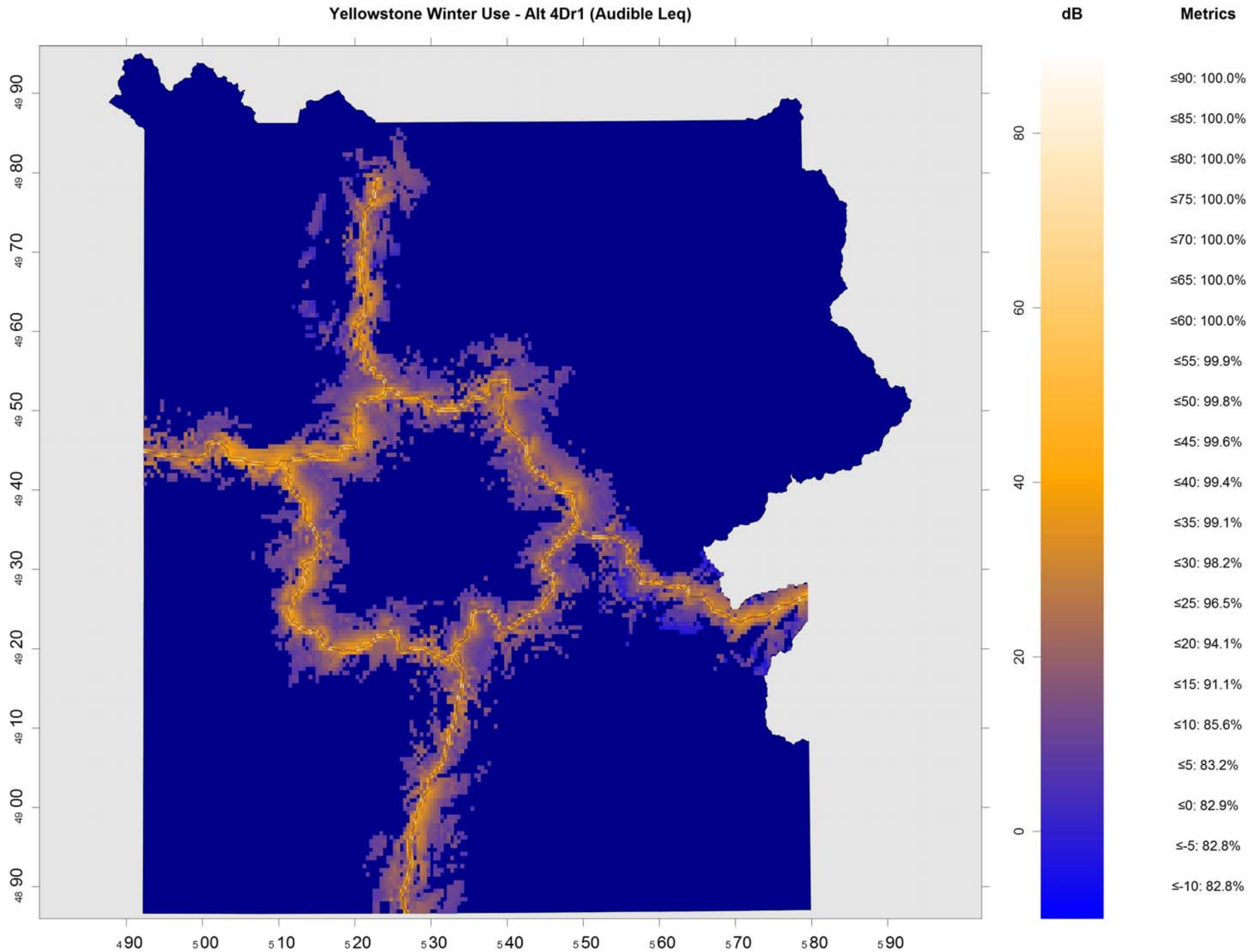




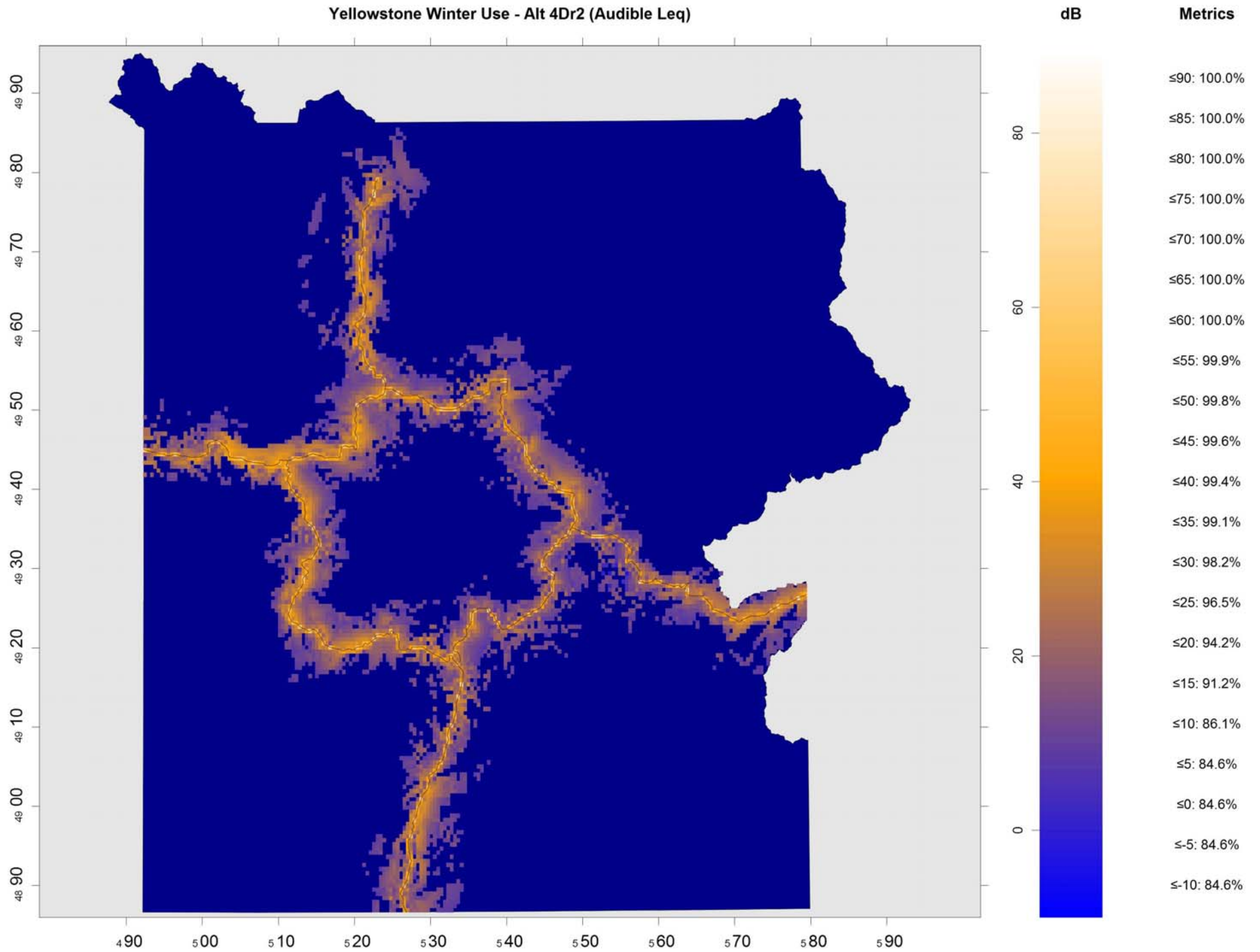
Yellowstone Winter Use - Alt 4Cr2 (Audible Leq)



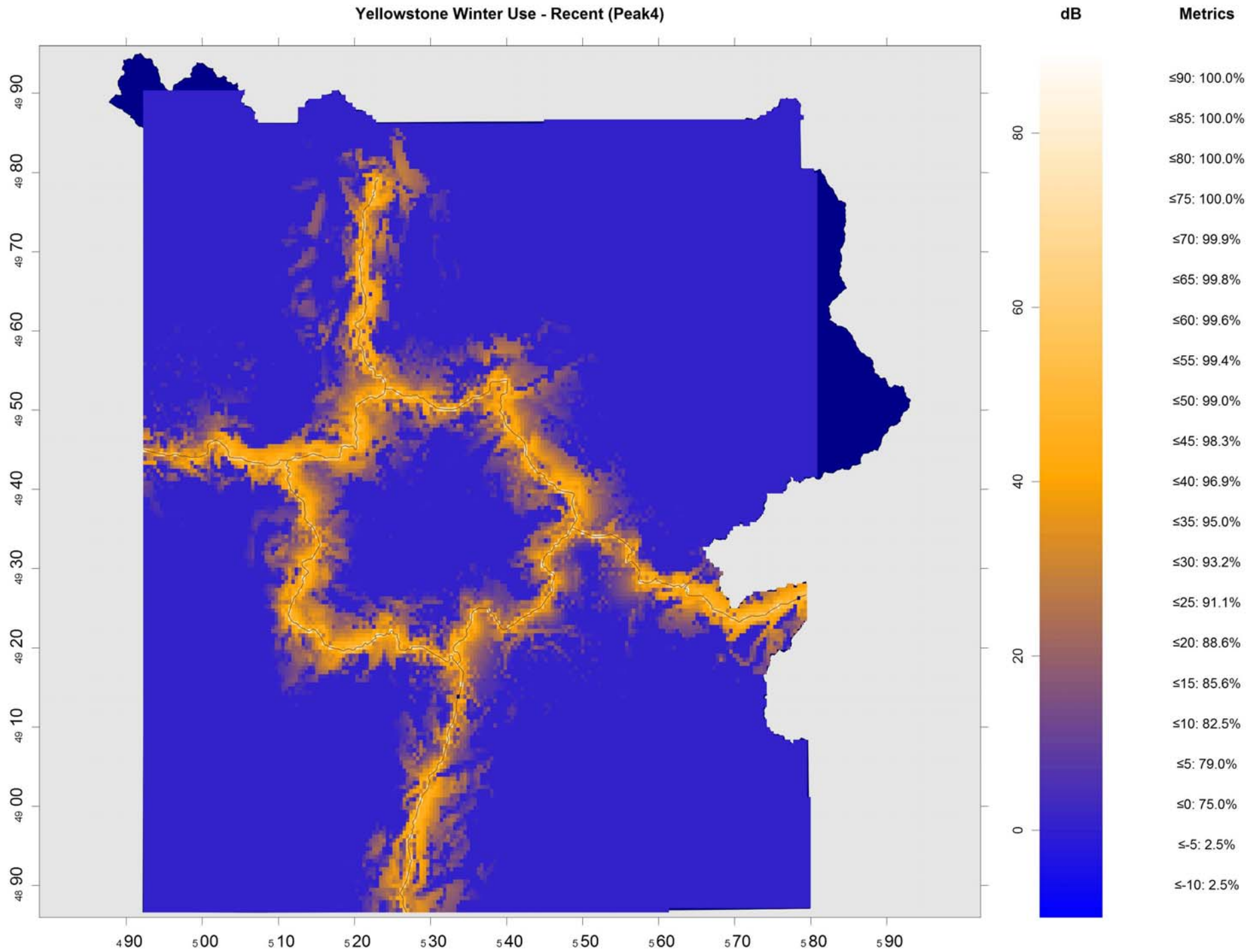
Yellowstone Winter Use - Alt 4Dr1 (Audible Leq)



Yellowstone Winter Use - Alt 4Dr2 (Audible Leq)

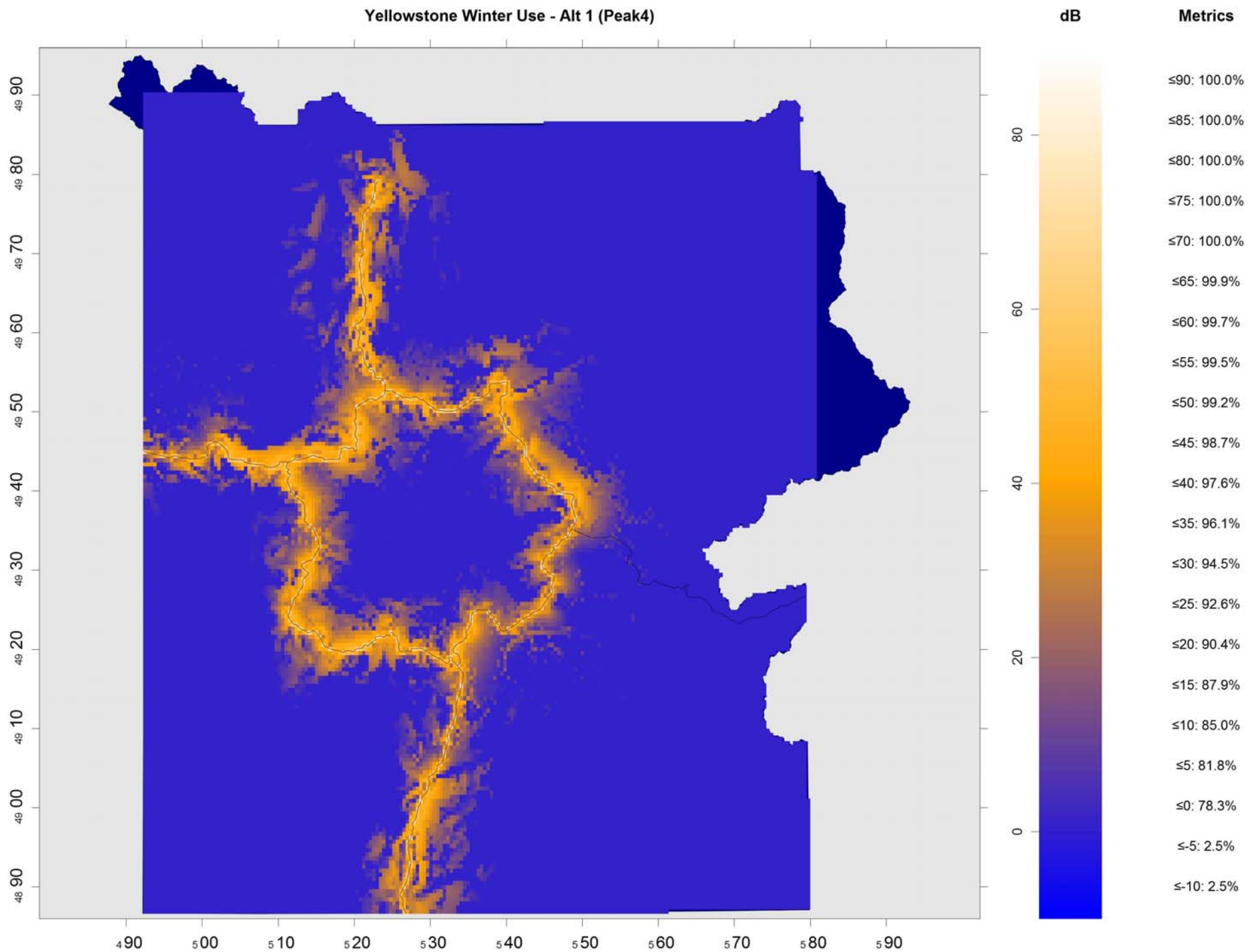


Yellowstone Winter Use - Recent (Peak4)

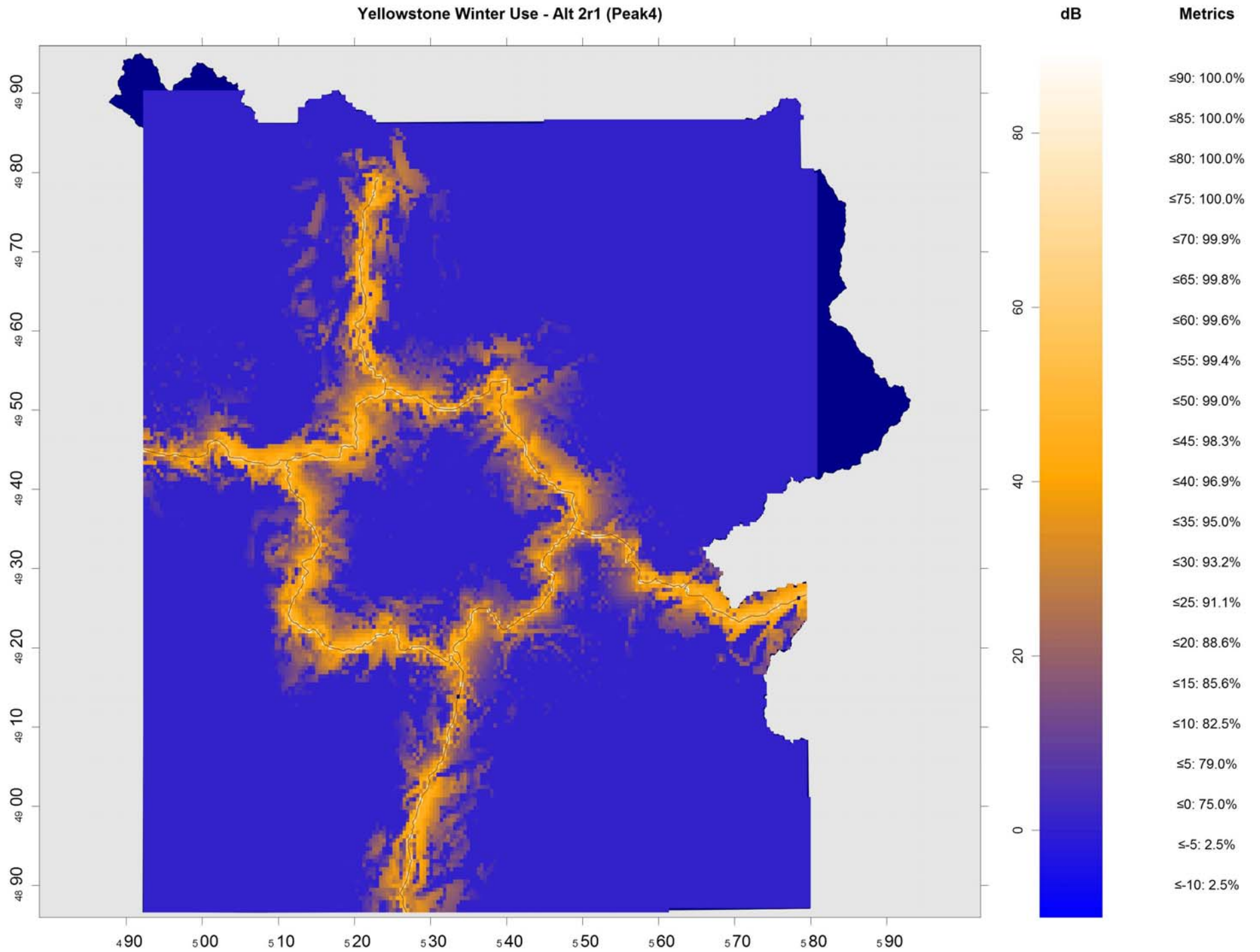




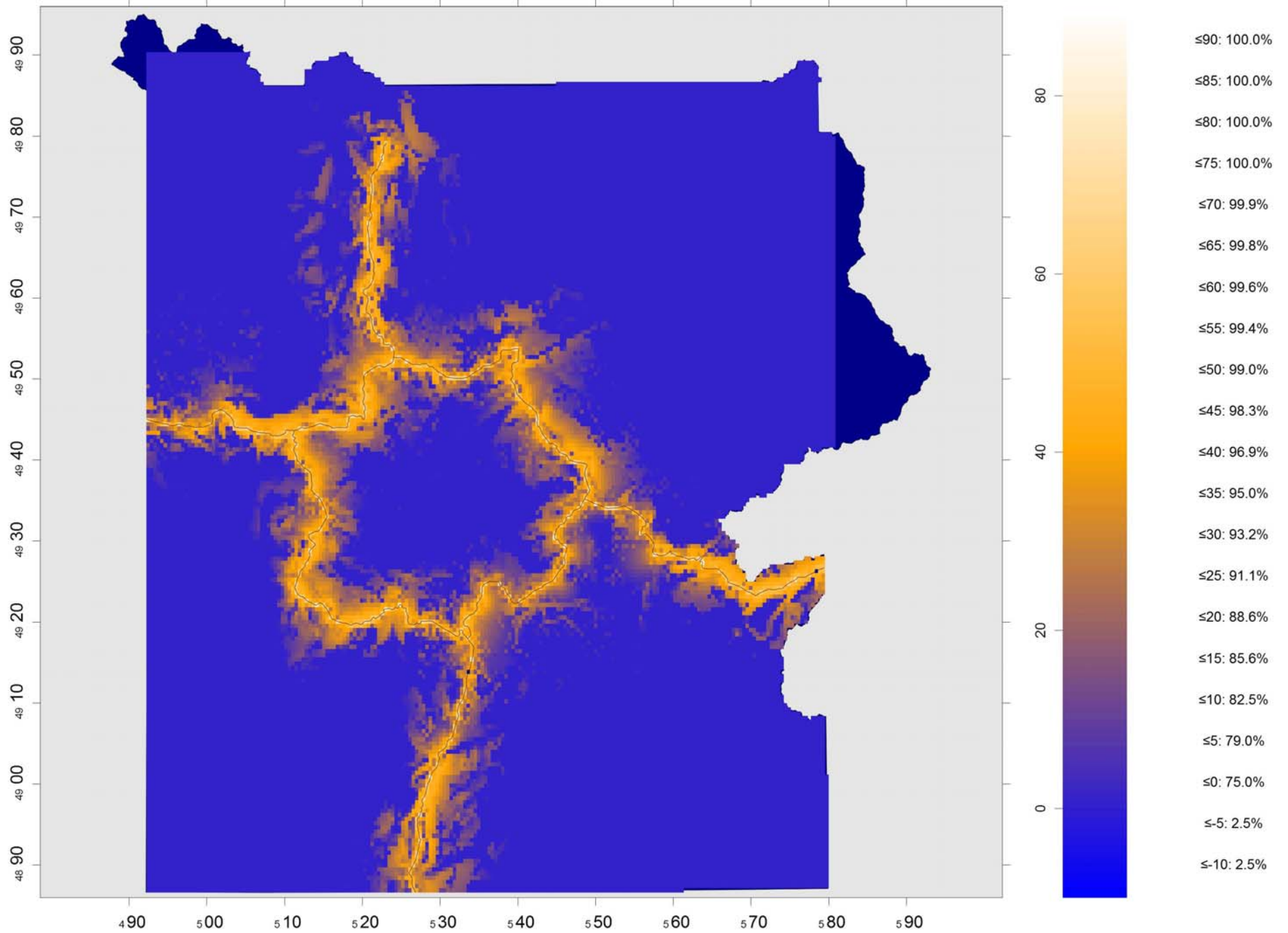
Yellowstone Winter Use - Alt 1 (Peak4)



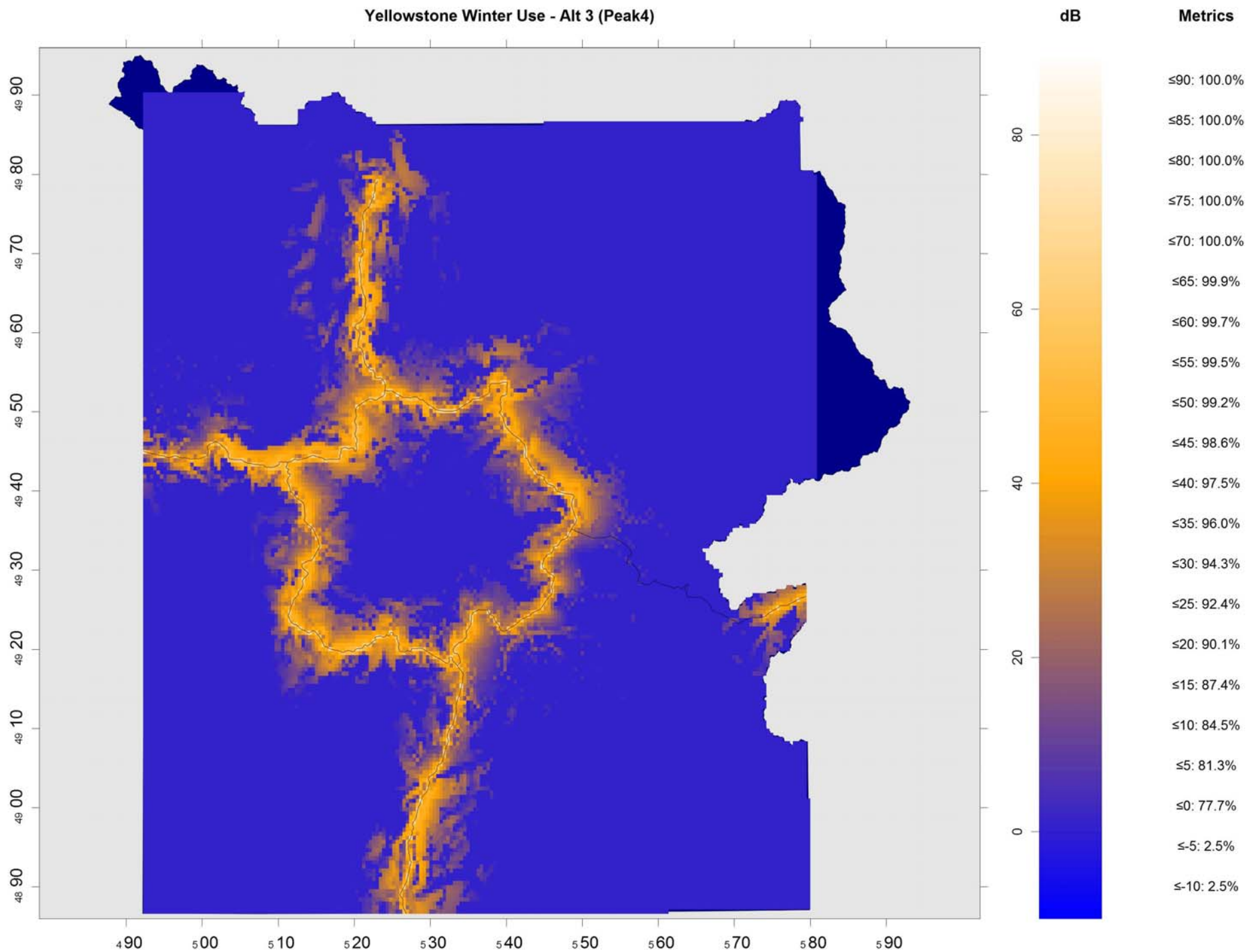
Yellowstone Winter Use - Alt 2r1 (Peak4)



Yellowstone Winter Use - Alt 2r2 (Peak4)

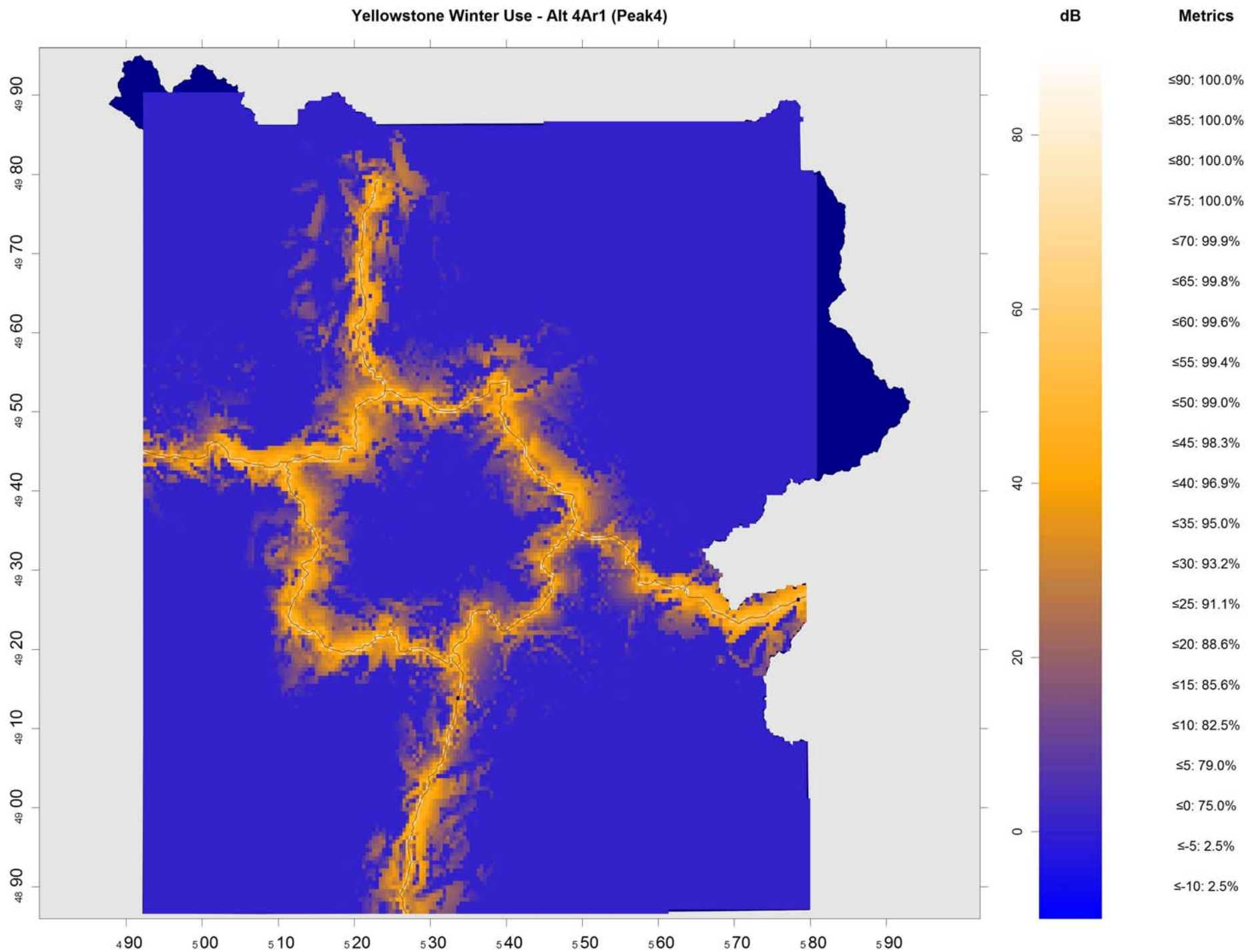


Yellowstone Winter Use - Alt 3 (Peak4)

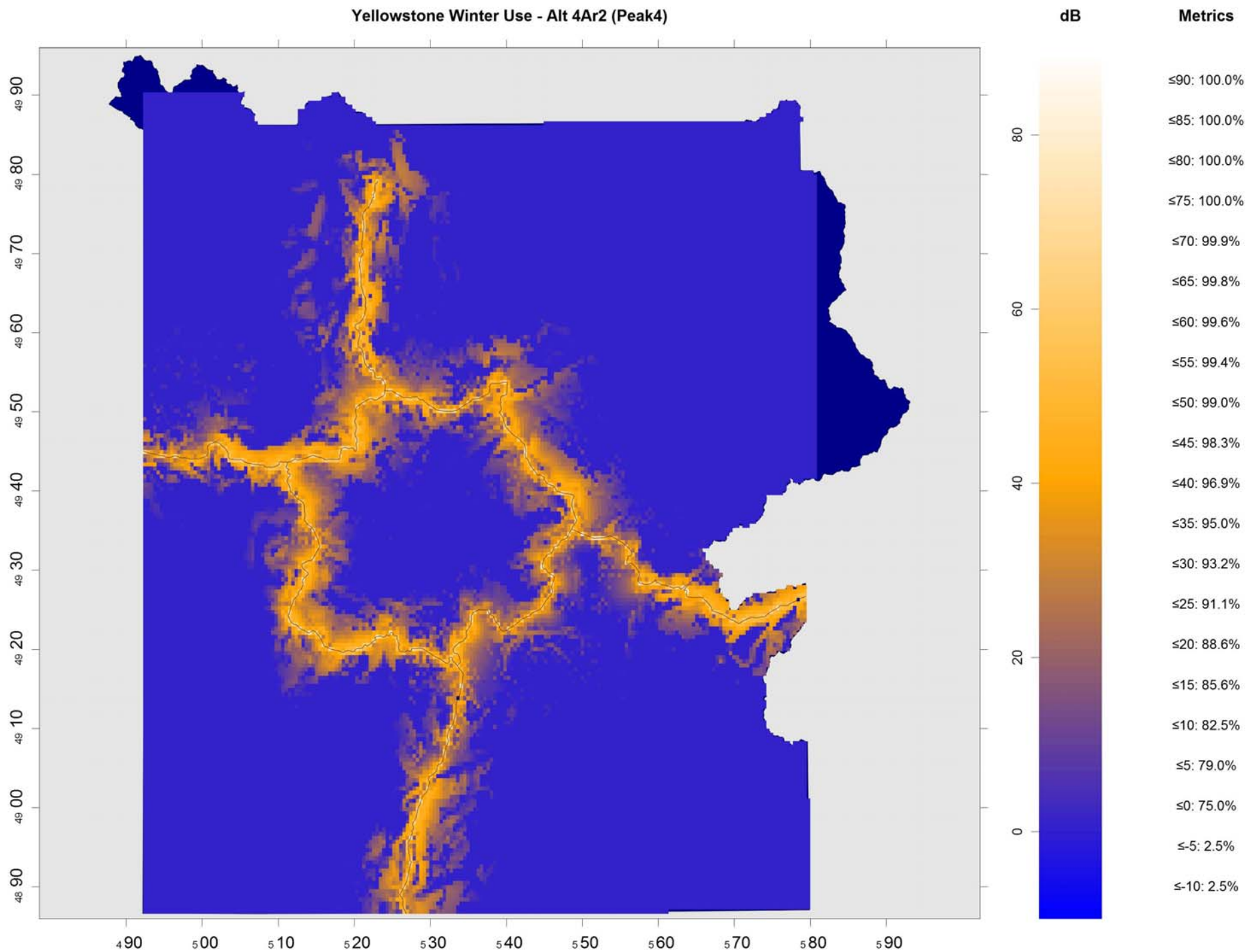




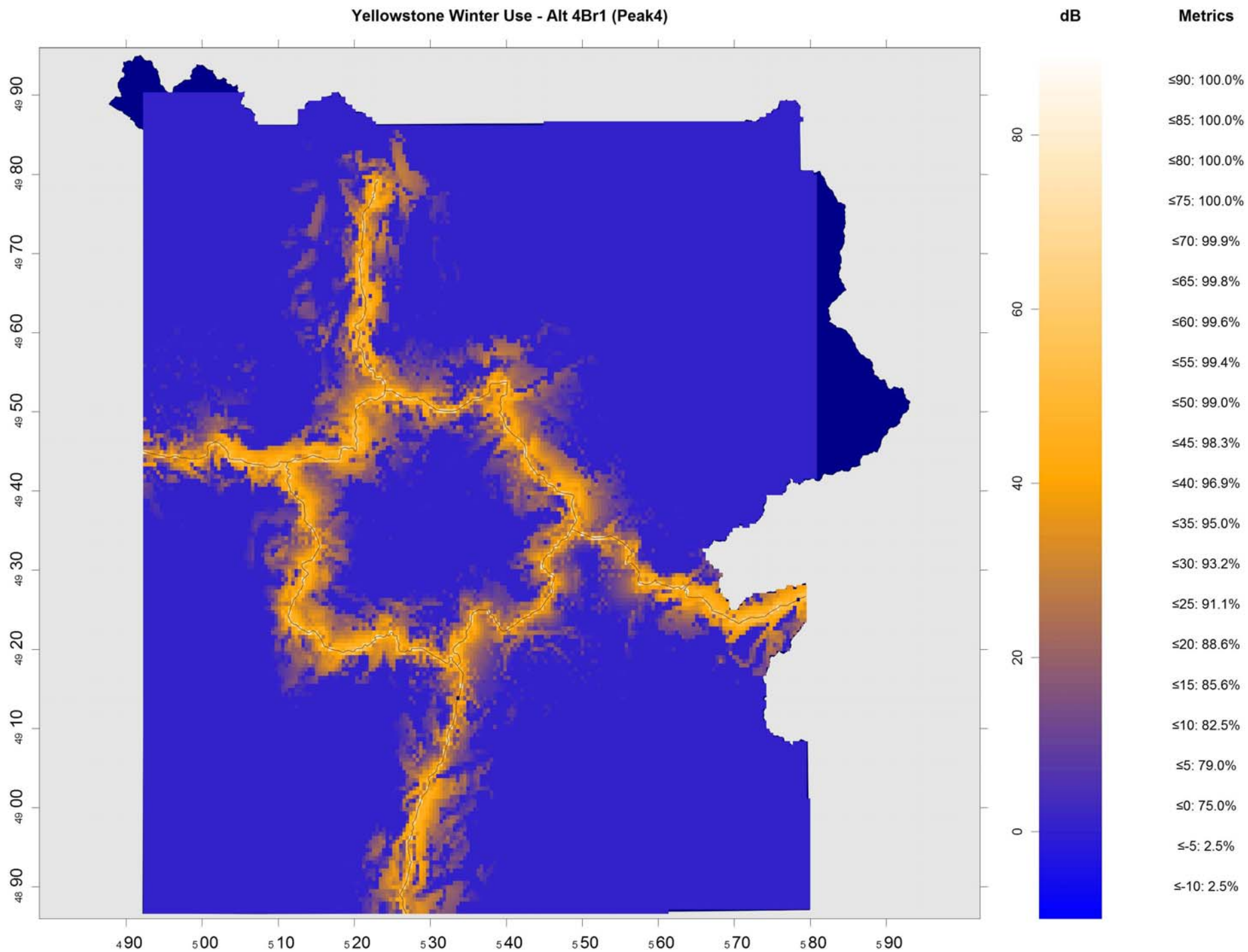
Yellowstone Winter Use - Alt 4Ar1 (Peak4)



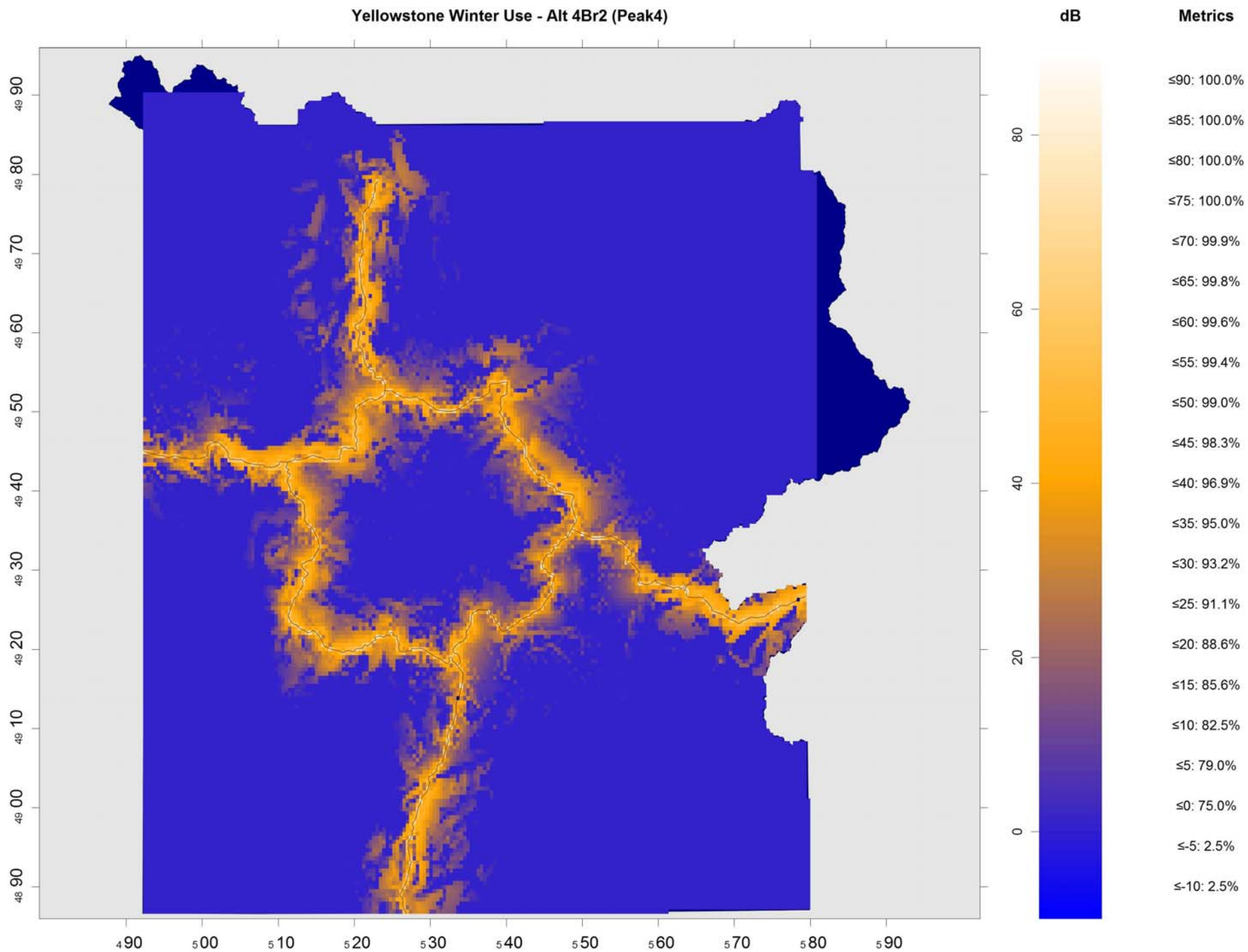
Yellowstone Winter Use - Alt 4Ar2 (Peak4)



Yellowstone Winter Use - Alt 4Br1 (Peak4)

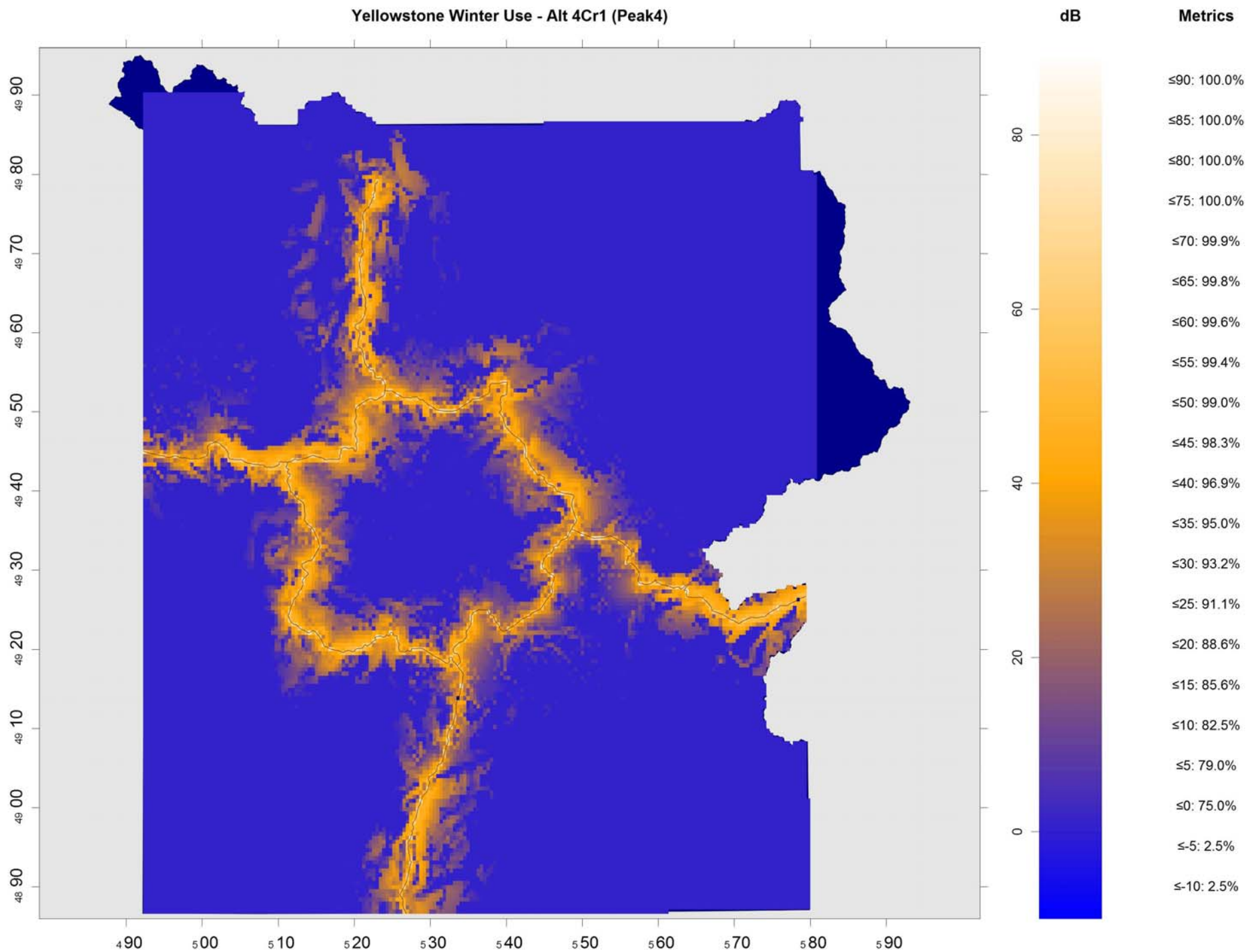


Yellowstone Winter Use - Alt 4Br2 (Peak4)

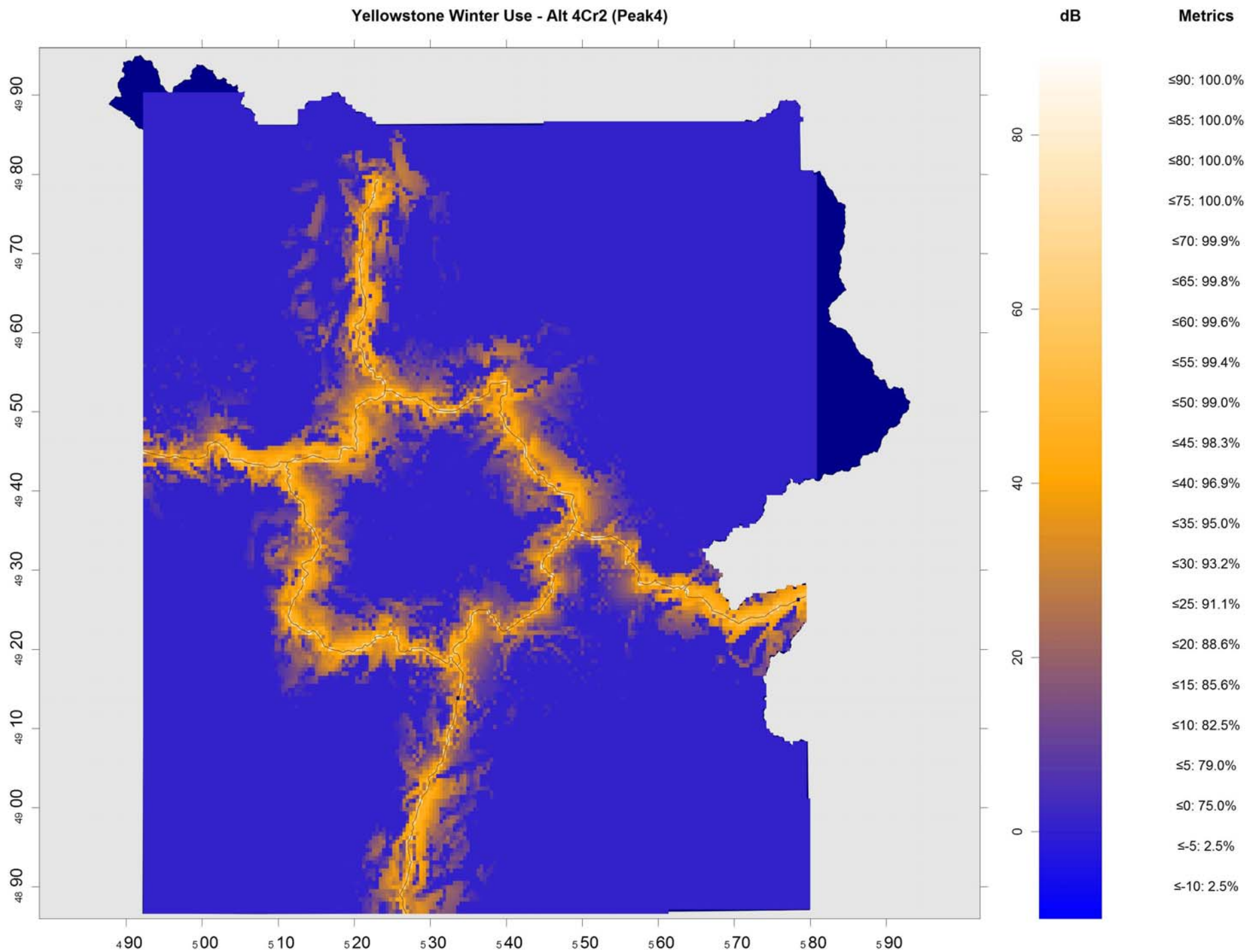




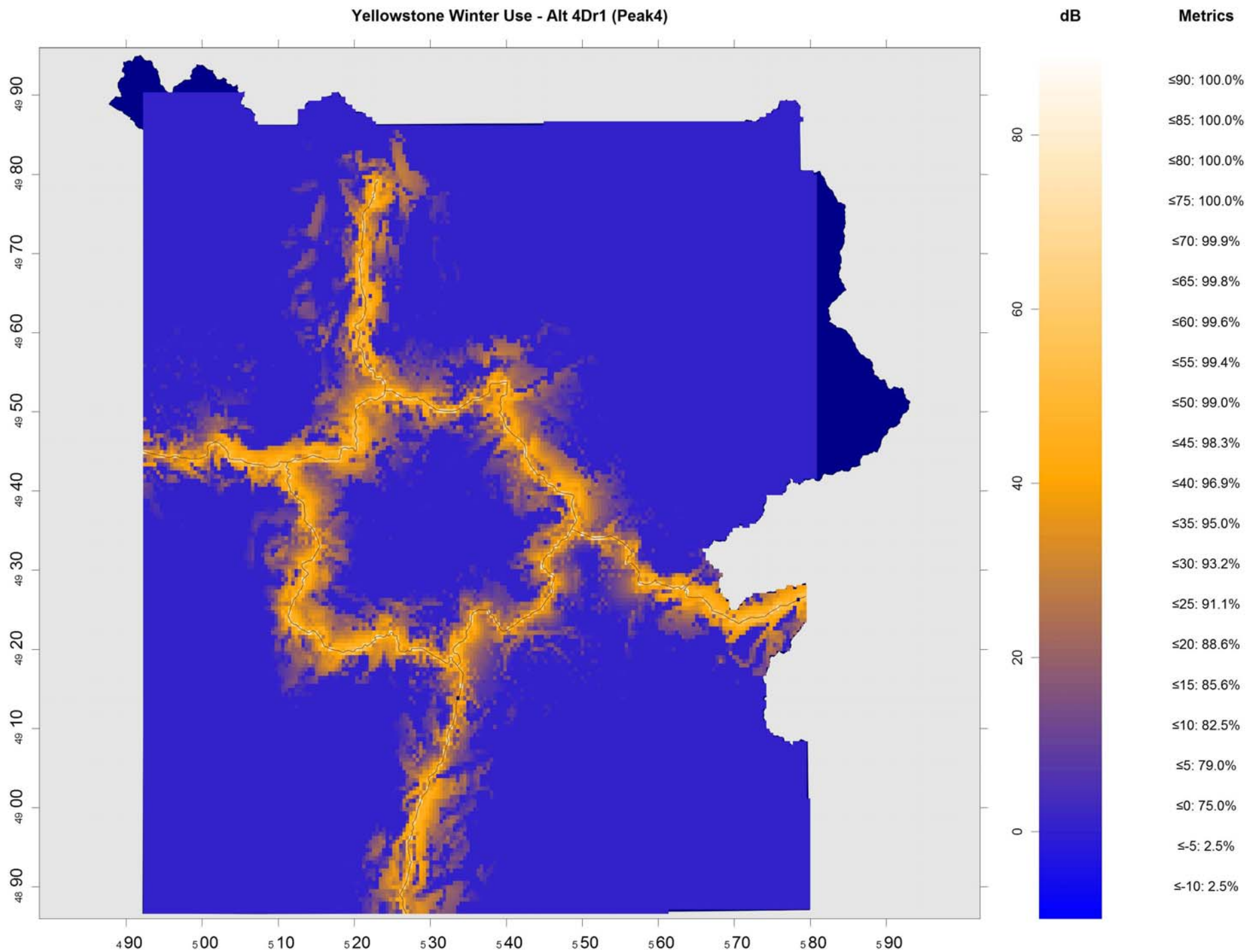
Yellowstone Winter Use - Alt 4Cr1 (Peak4)



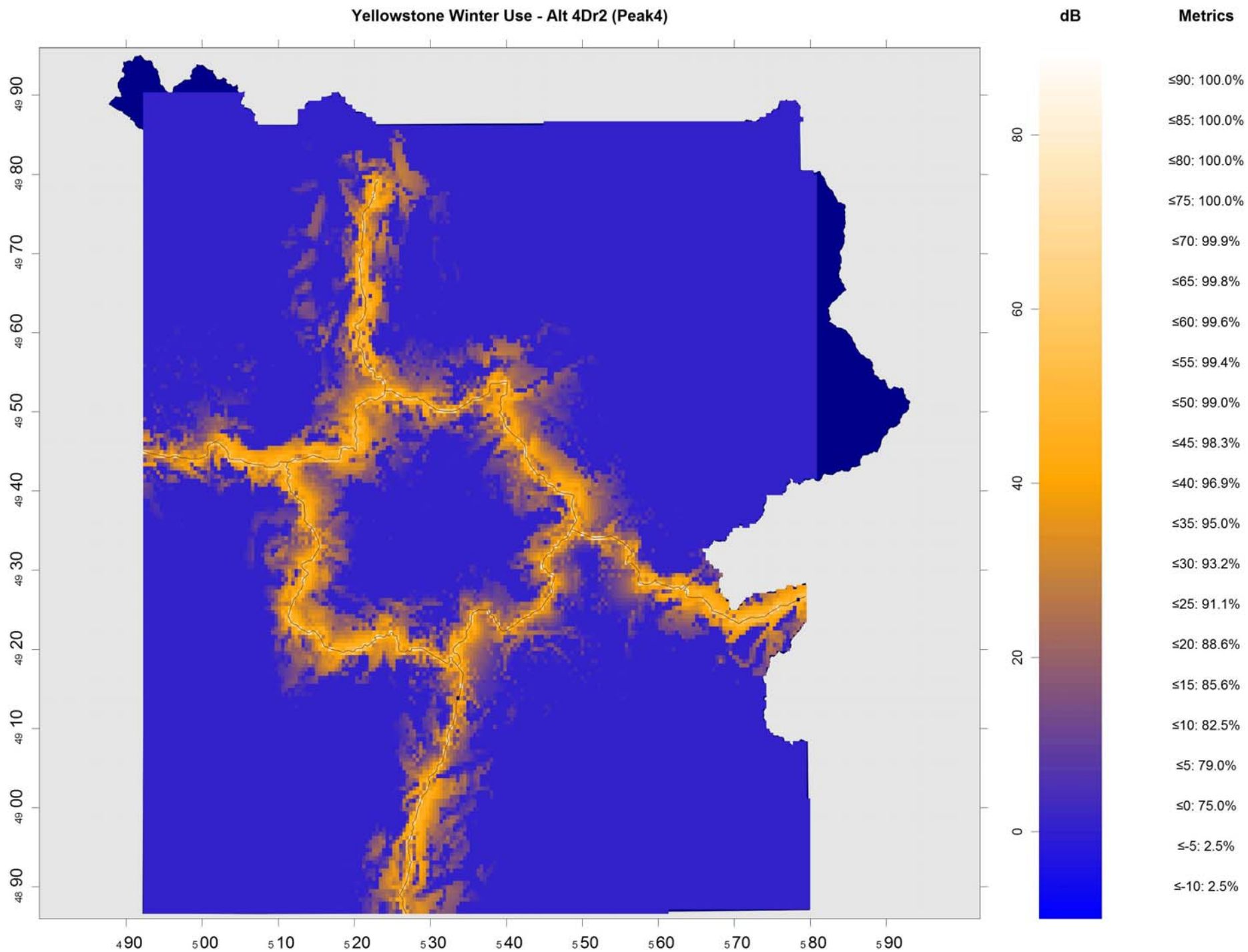
Yellowstone Winter Use - Alt 4Cr2 (Peak4)



Yellowstone Winter Use - Alt 4Dr1 (Peak4)

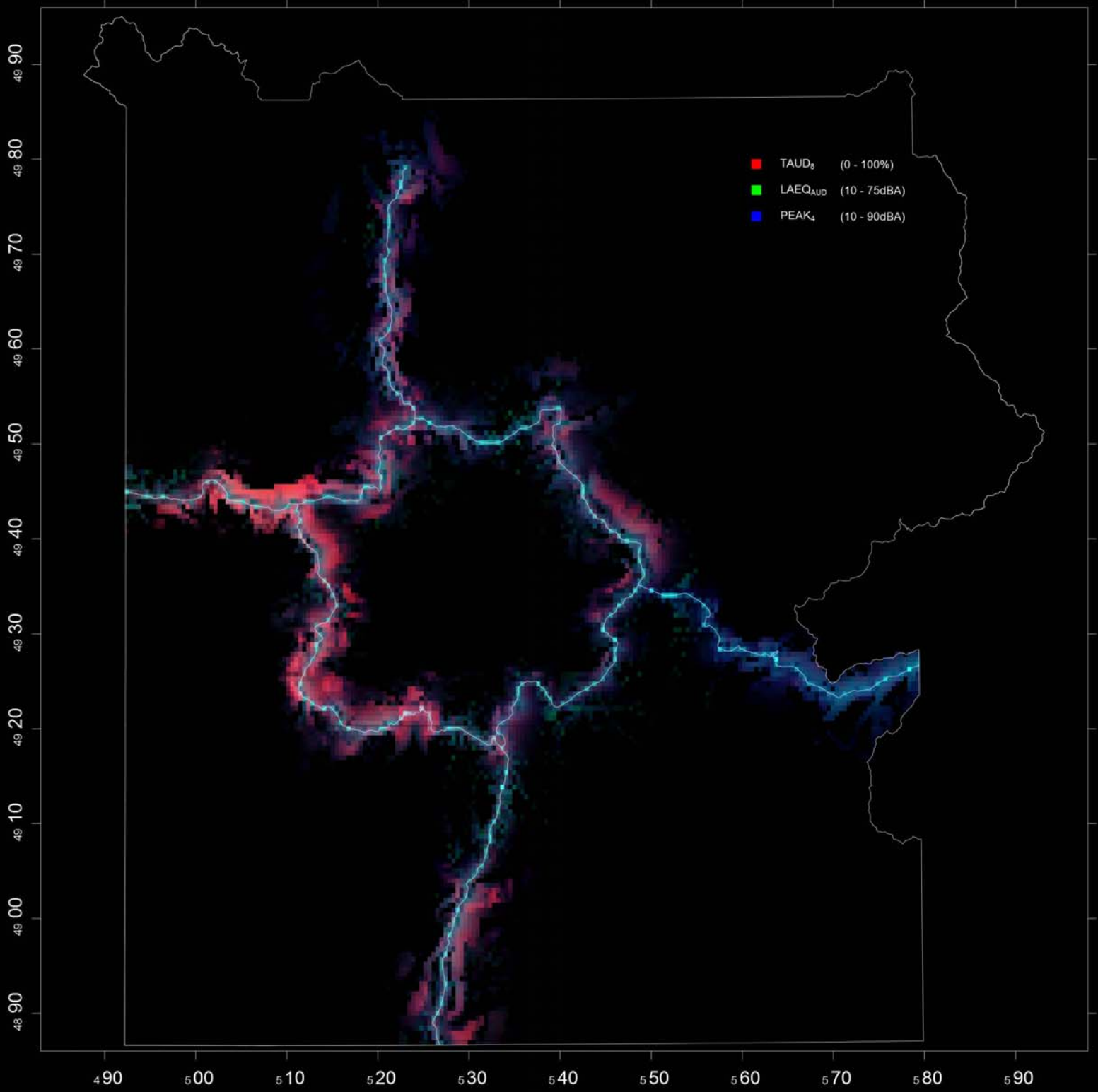


Yellowstone Winter Use - Alt 4Dr2 (Peak4)

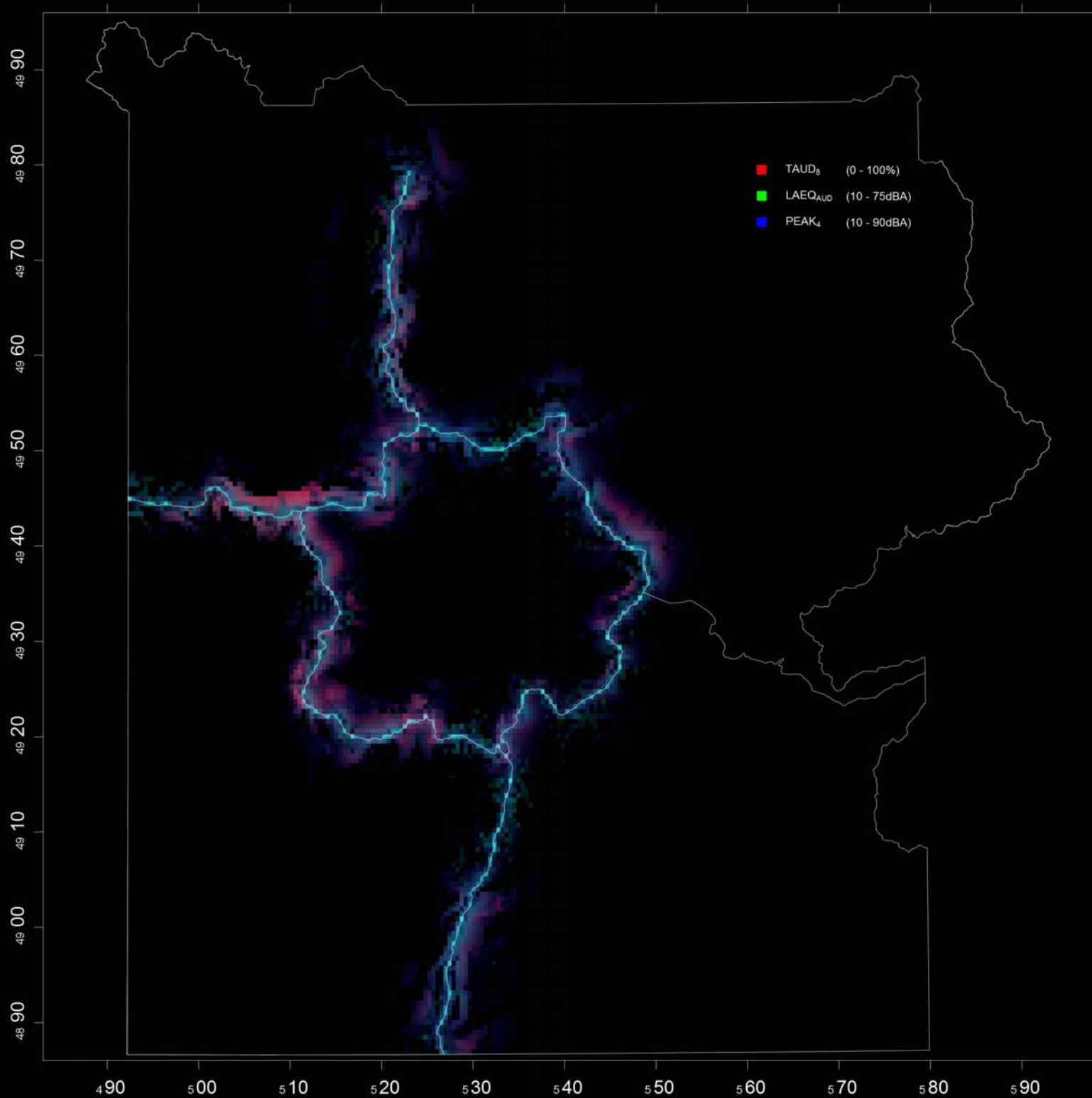




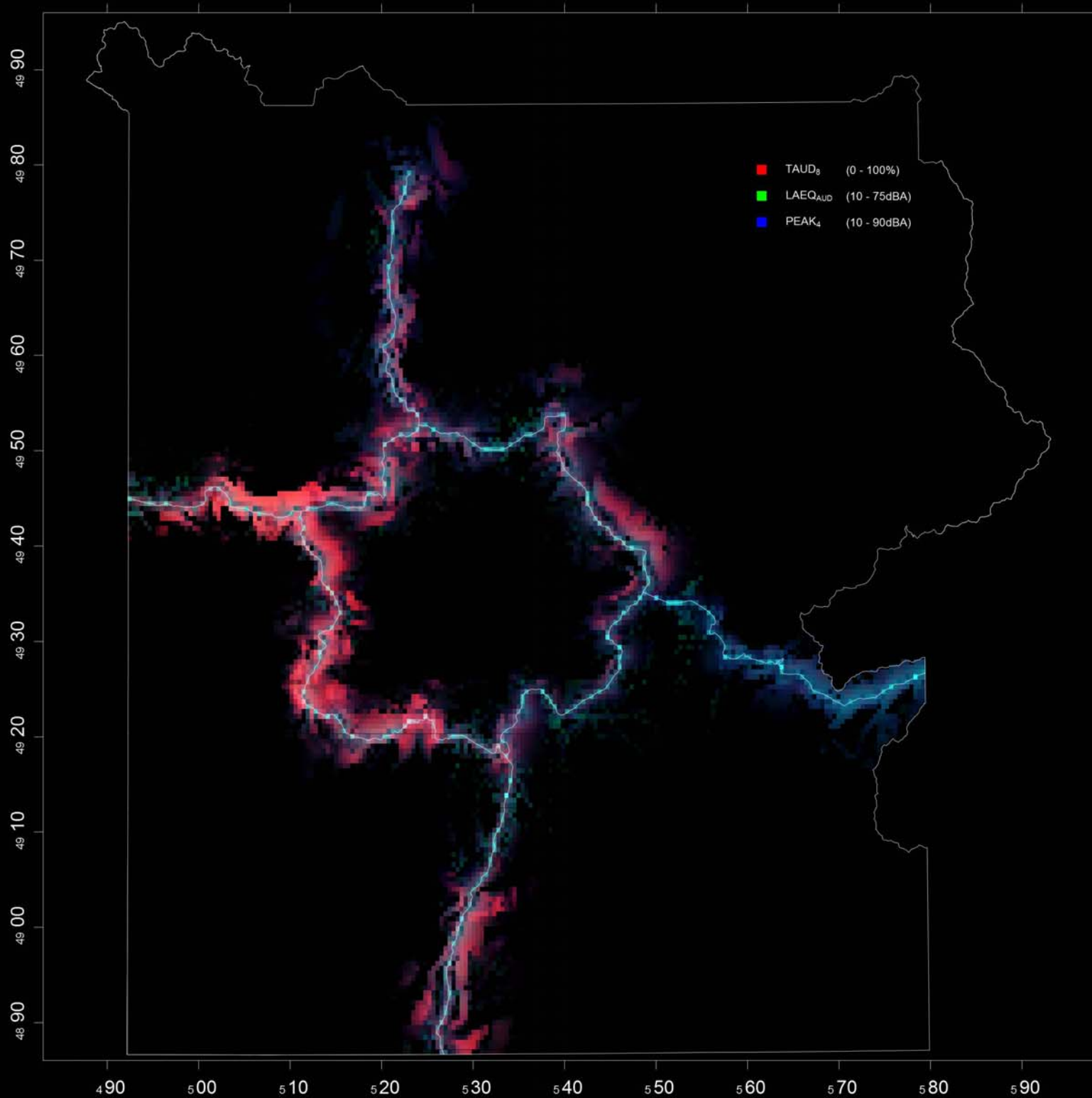
# Yellowstone Winter Use - Recent (All Metrics)



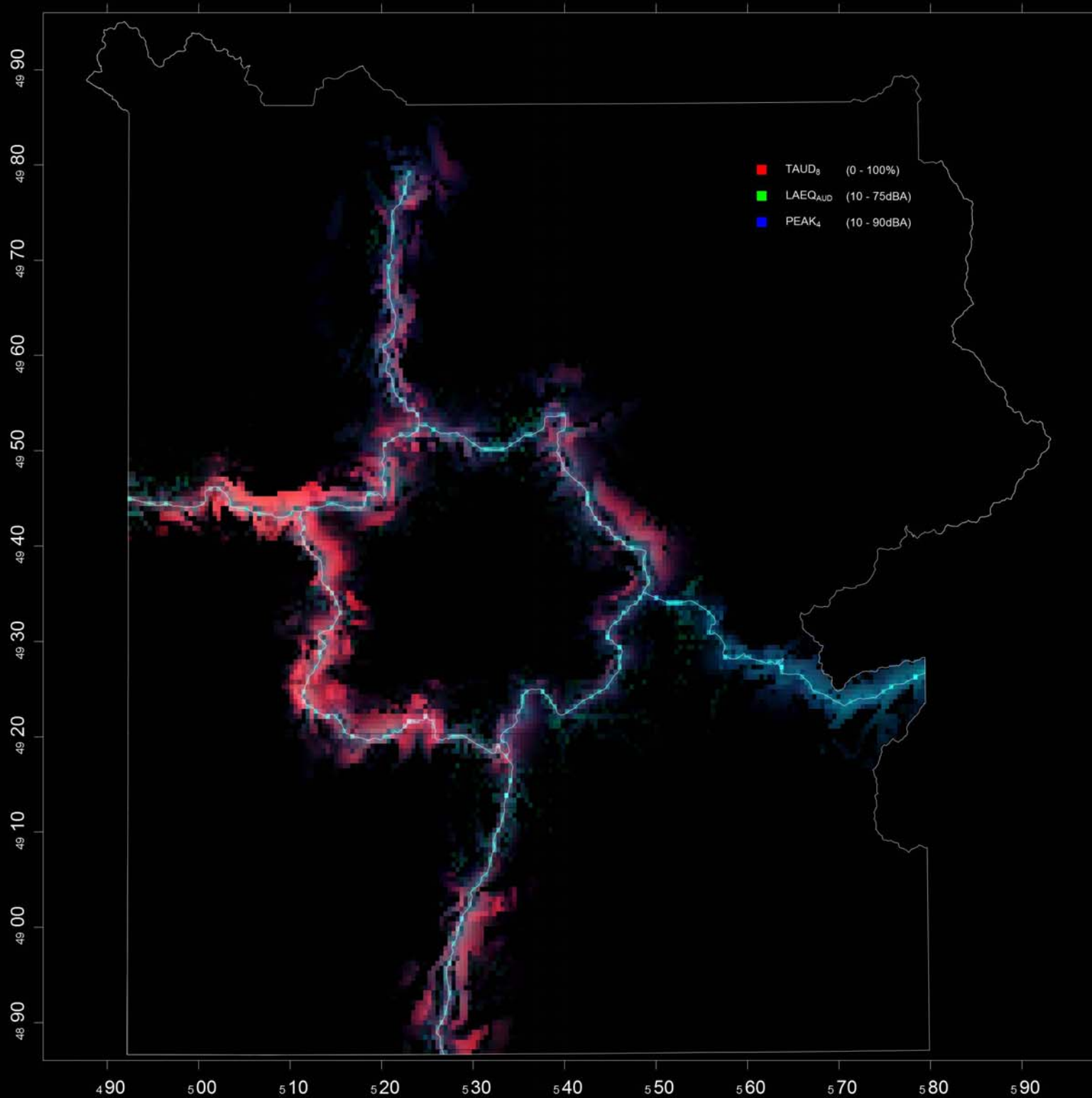
# Yellowstone Winter Use - Alt 1 (All Metrics)



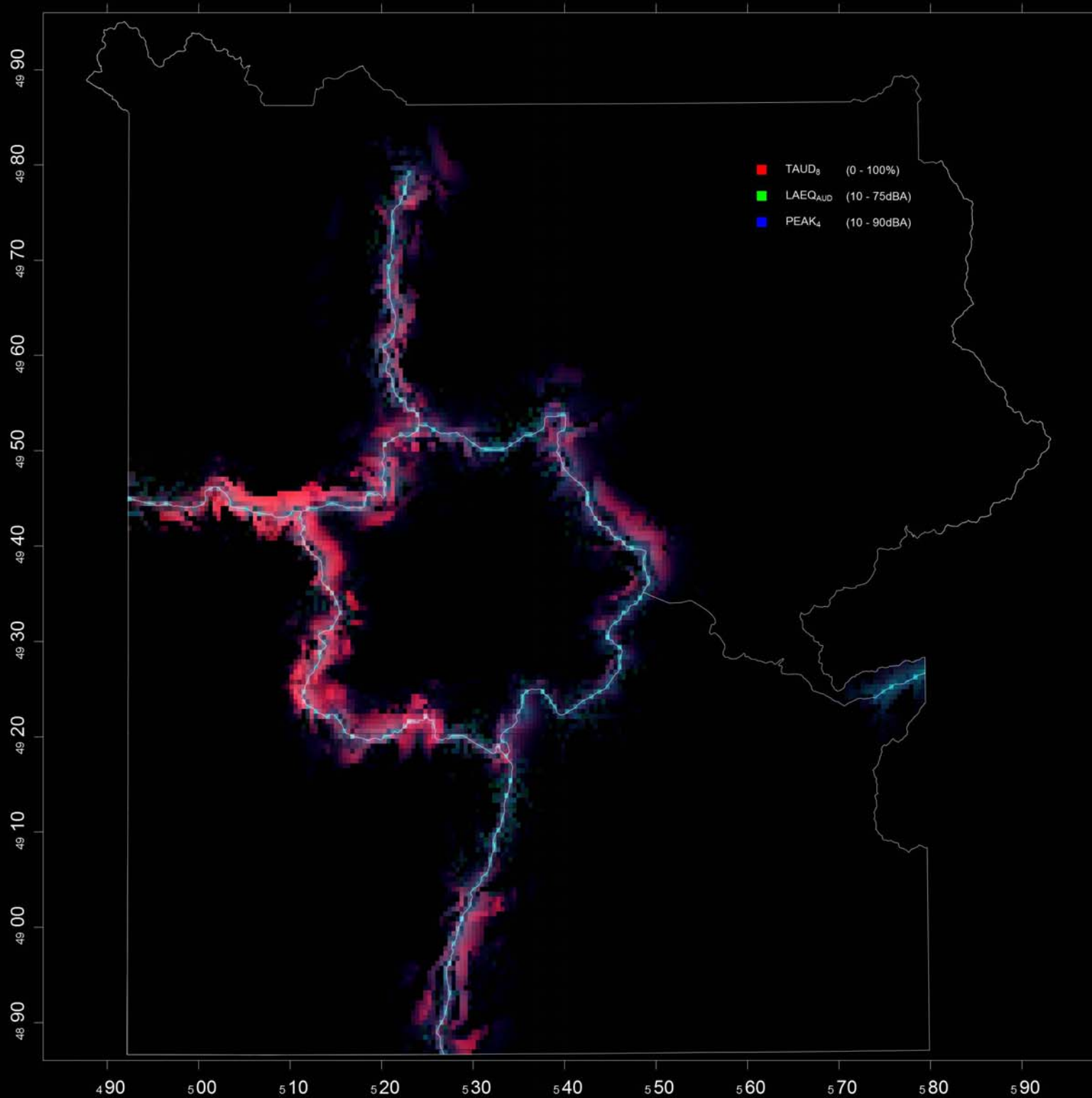
Yellowstone Winter Use - Alt 2r1 (All Metrics)



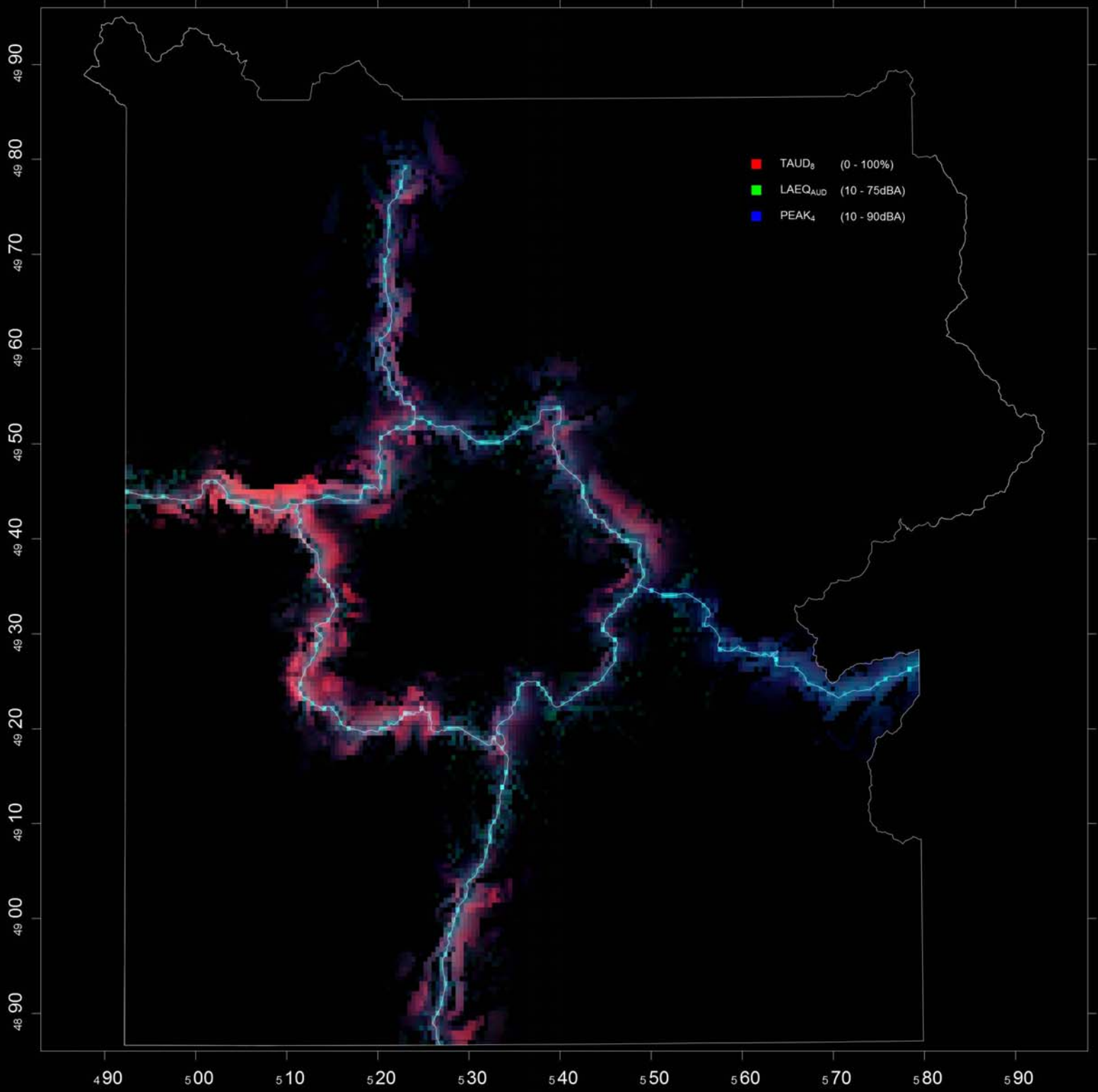
Yellowstone Winter Use - Alt 2r2 (All Metrics)



### Yellowstone Winter Use - Alt 3 (All Metrics)

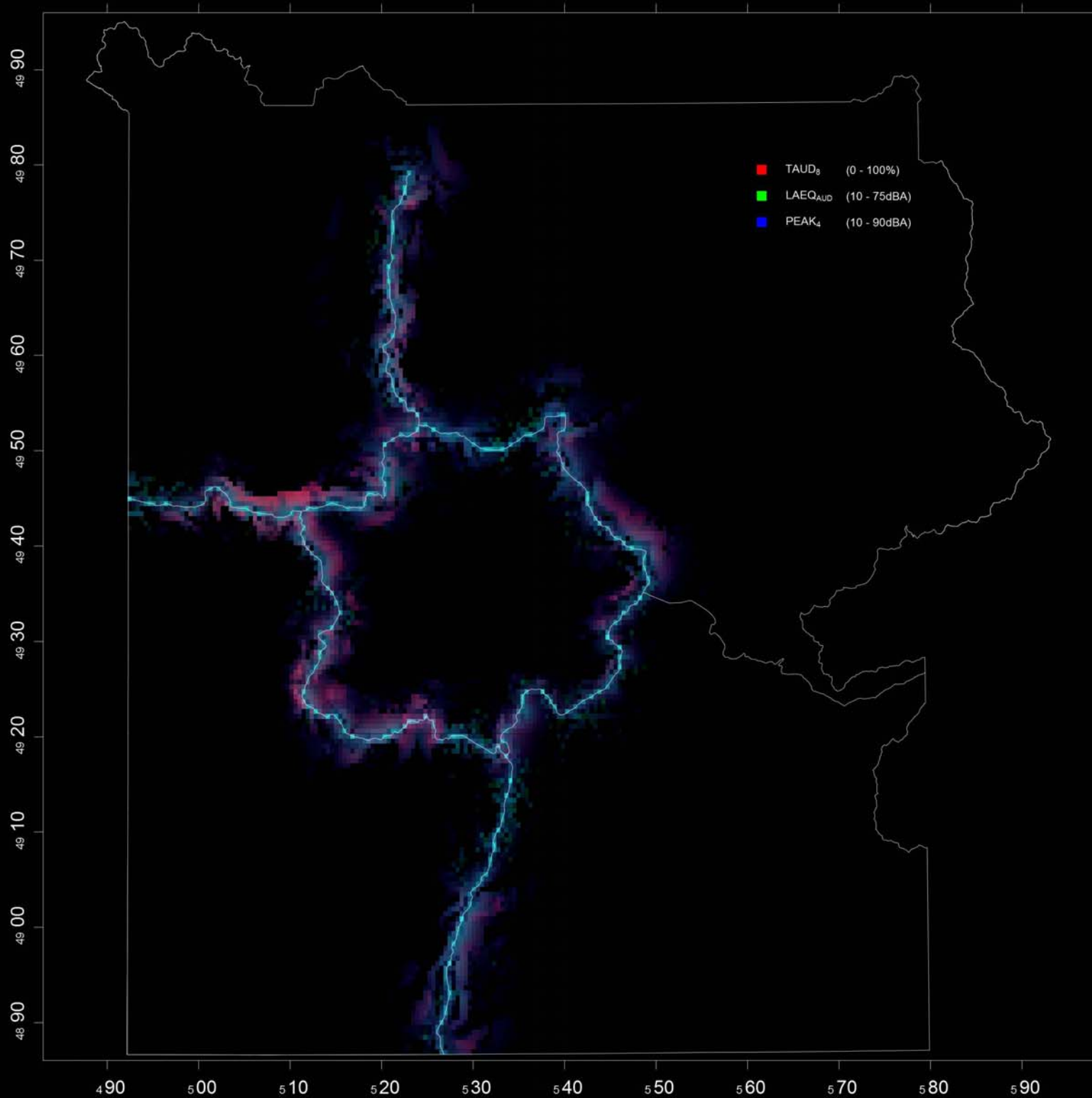


# Yellowstone Winter Use - Recent (All Metrics)

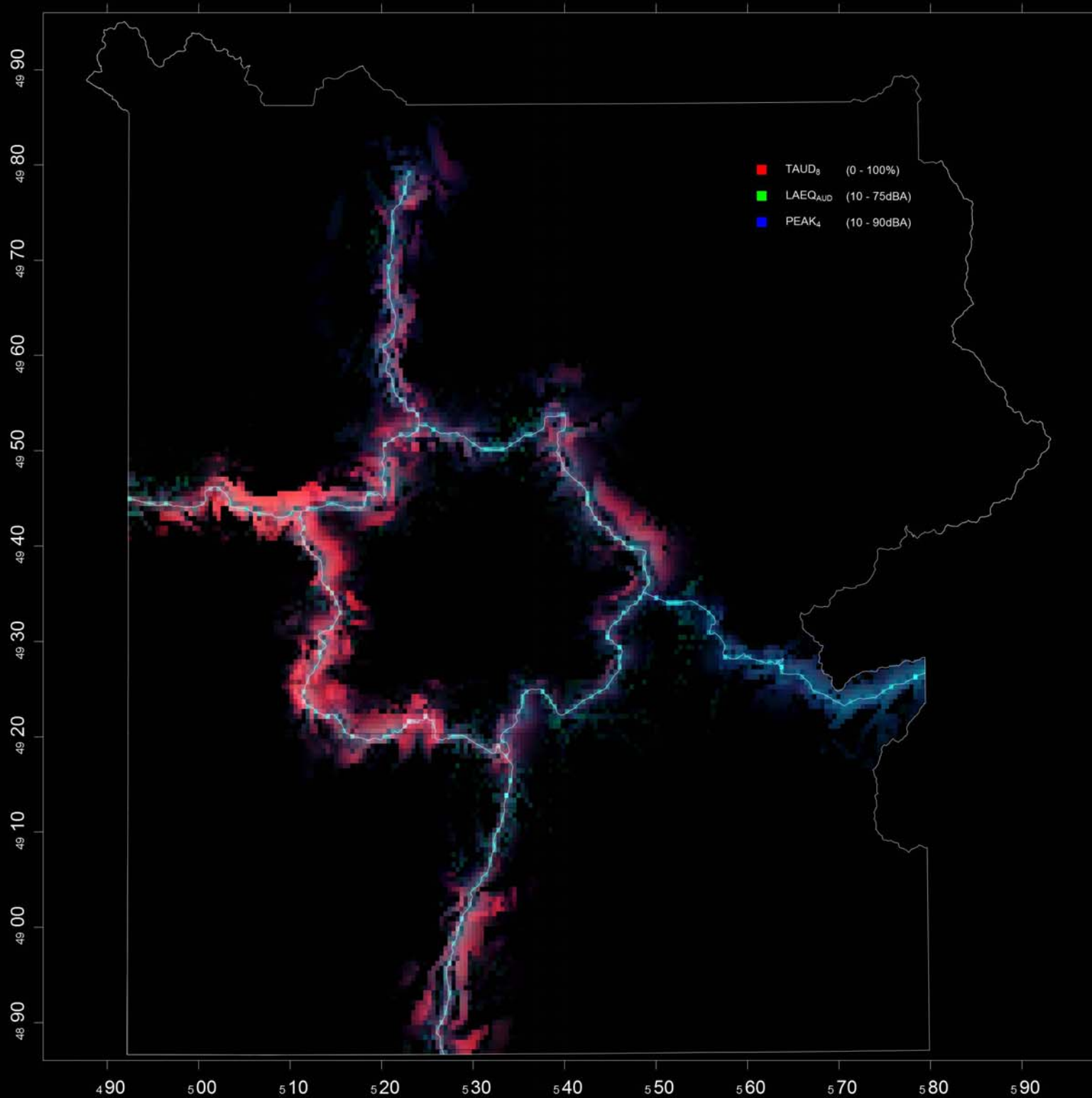




# Yellowstone Winter Use - Alt 1 (All Metrics)

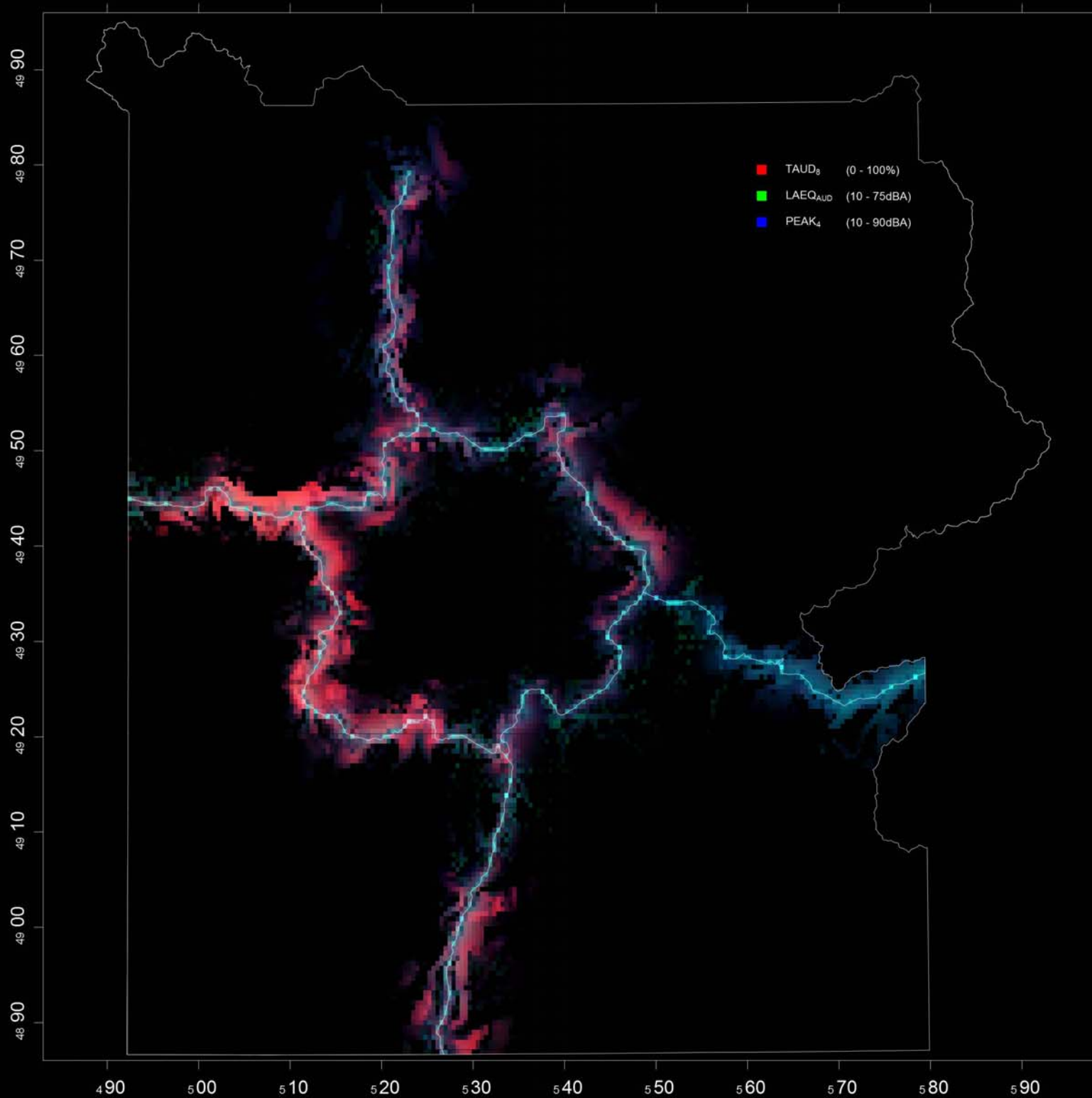


Yellowstone Winter Use - Alt 2r1 (All Metrics)

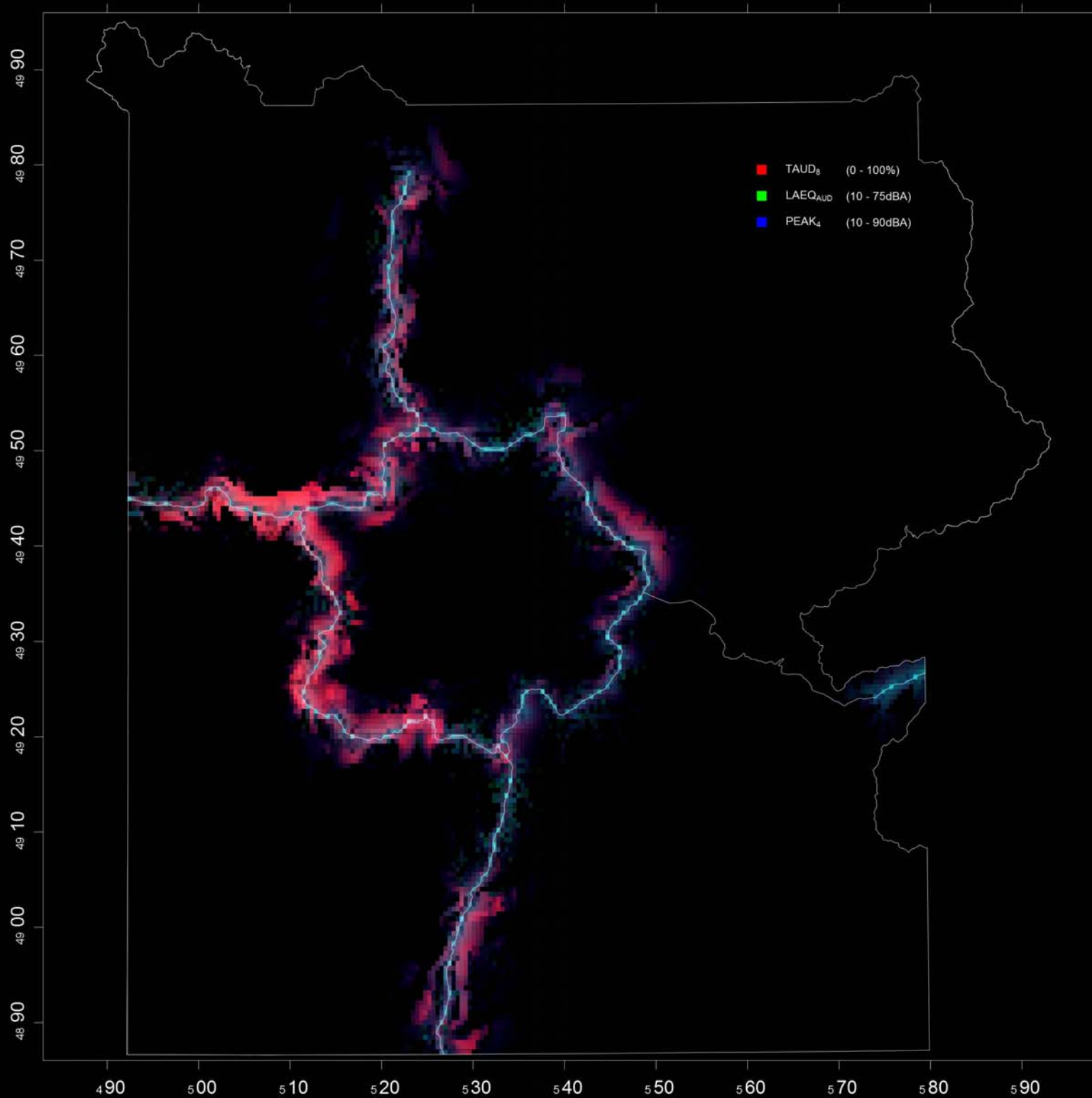




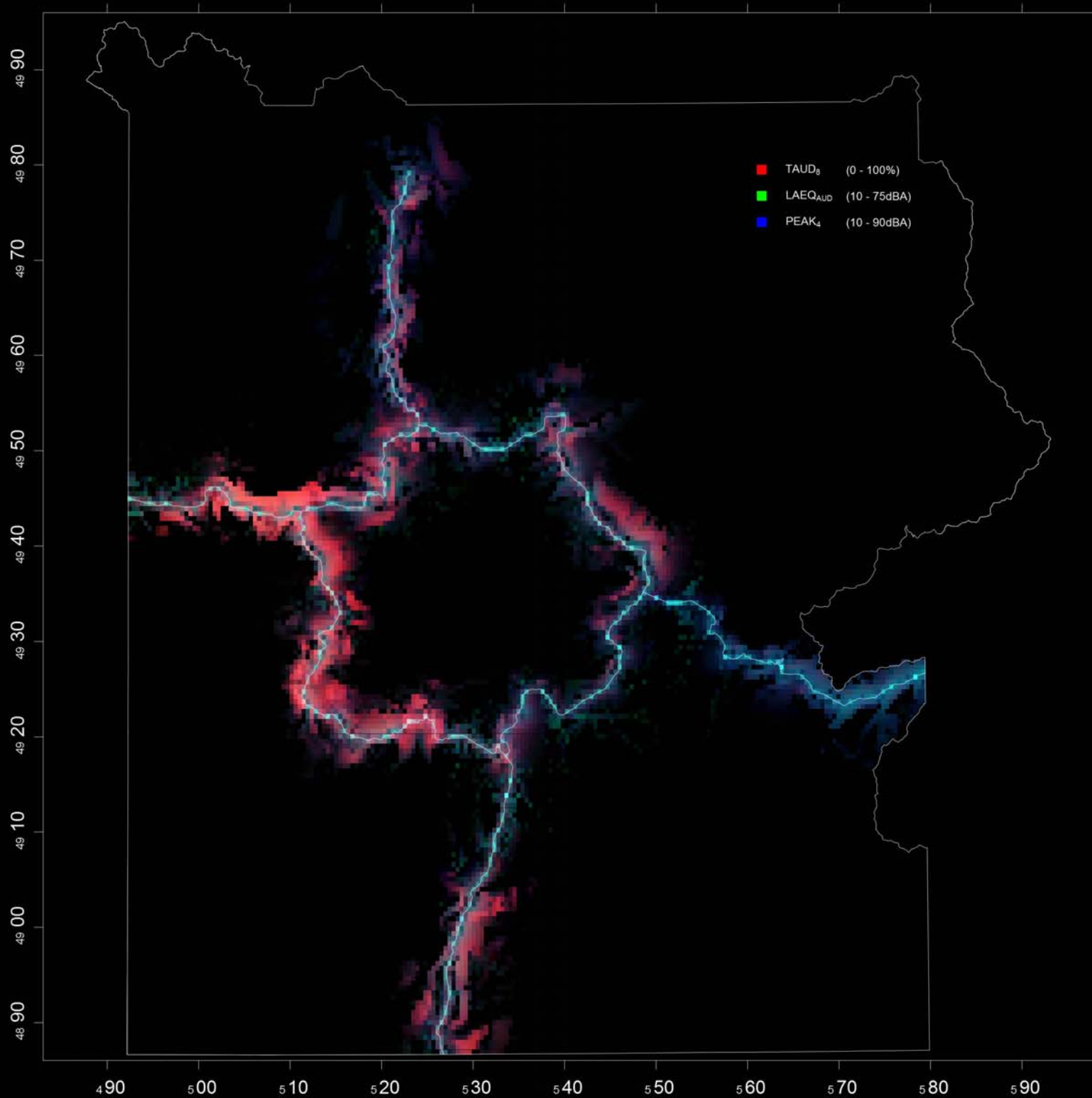
Yellowstone Winter Use - Alt 2r2 (All Metrics)



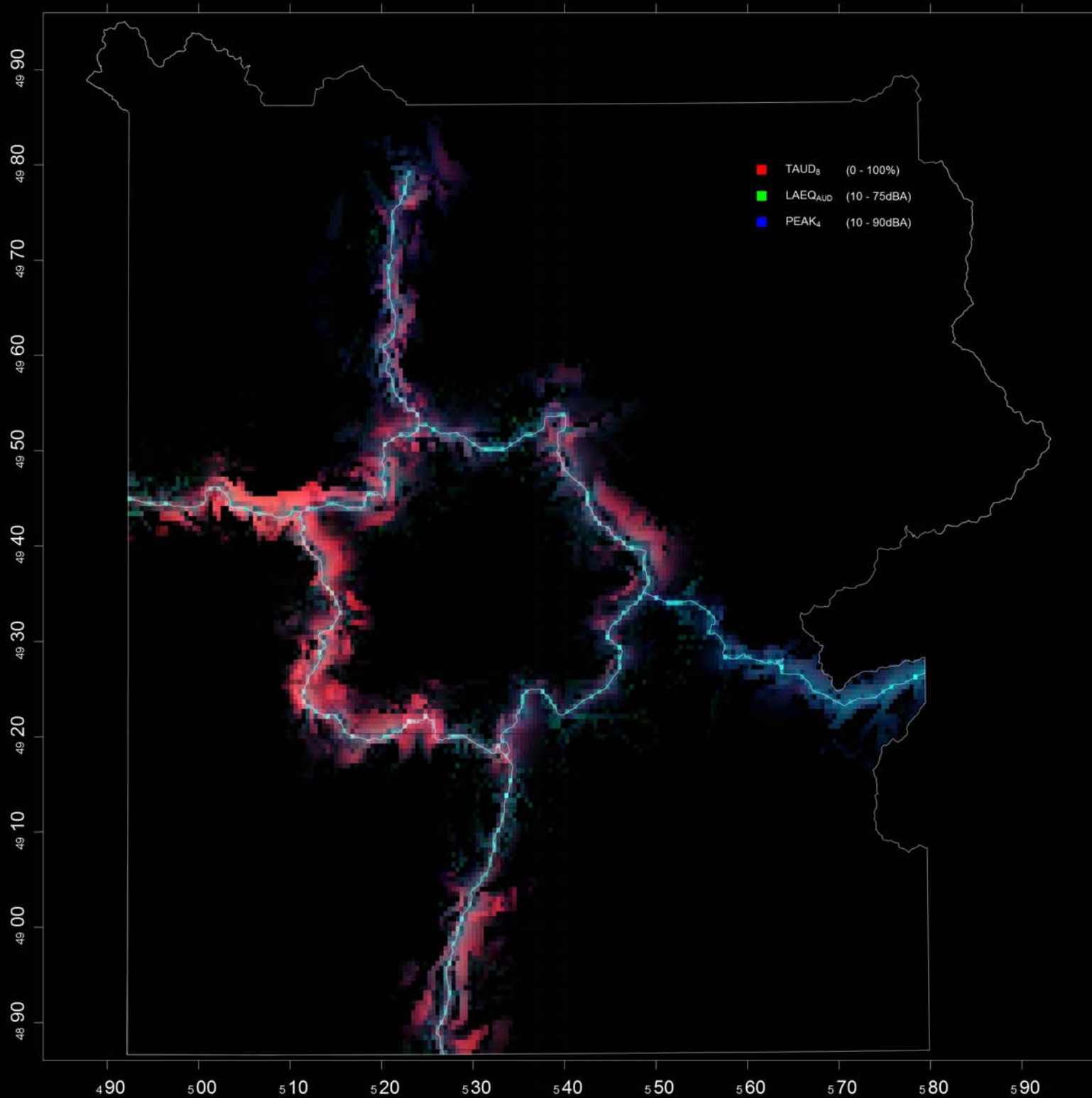
### Yellowstone Winter Use - Alt 3 (All Metrics)



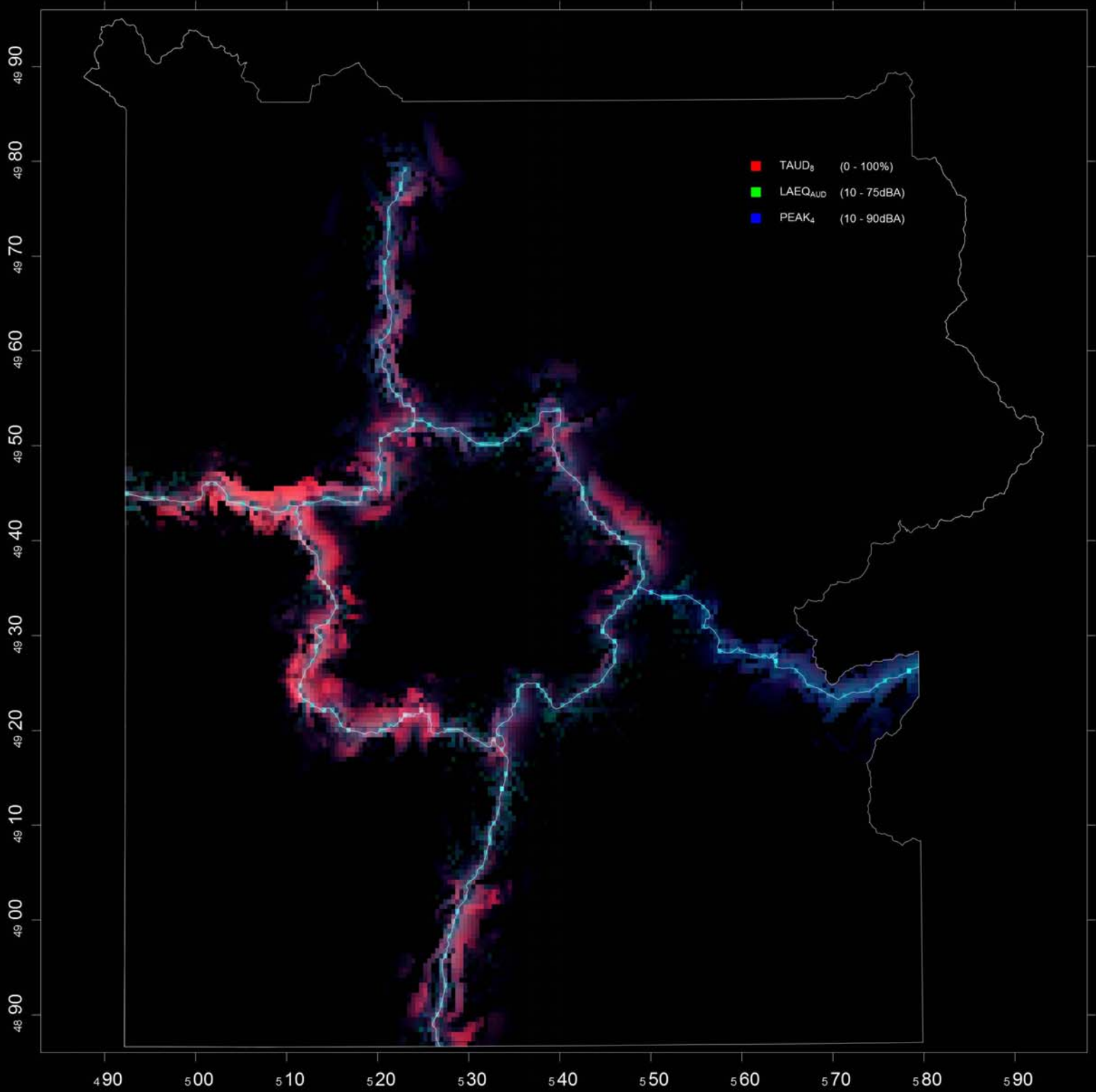
Yellowstone Winter Use - Alt 4Ar1 (All Metrics)



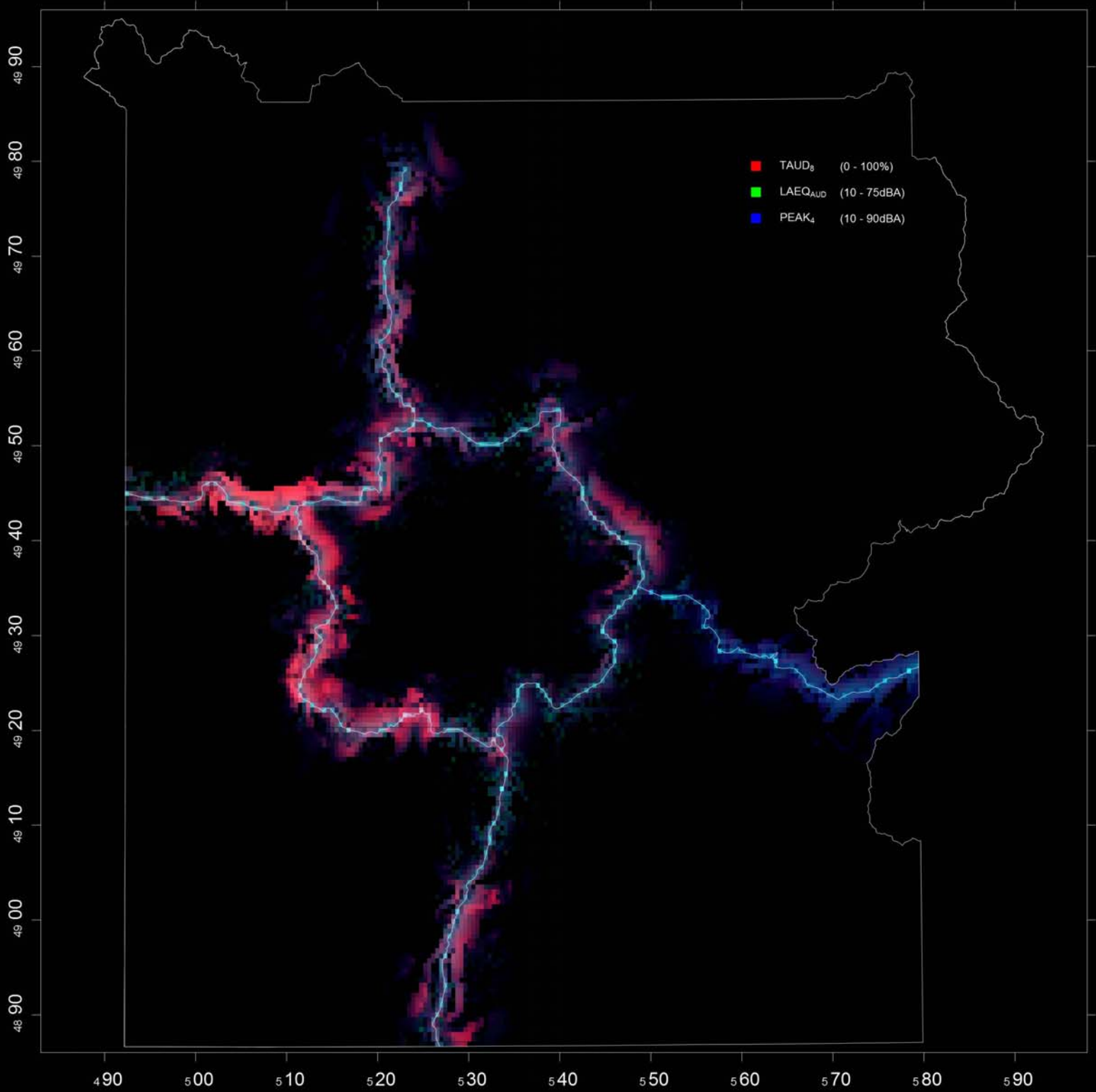
Yellowstone Winter Use - Alt 4Ar1 (All Metrics)



Yellowstone Winter Use - Alt 4Ar2 (All Metrics)

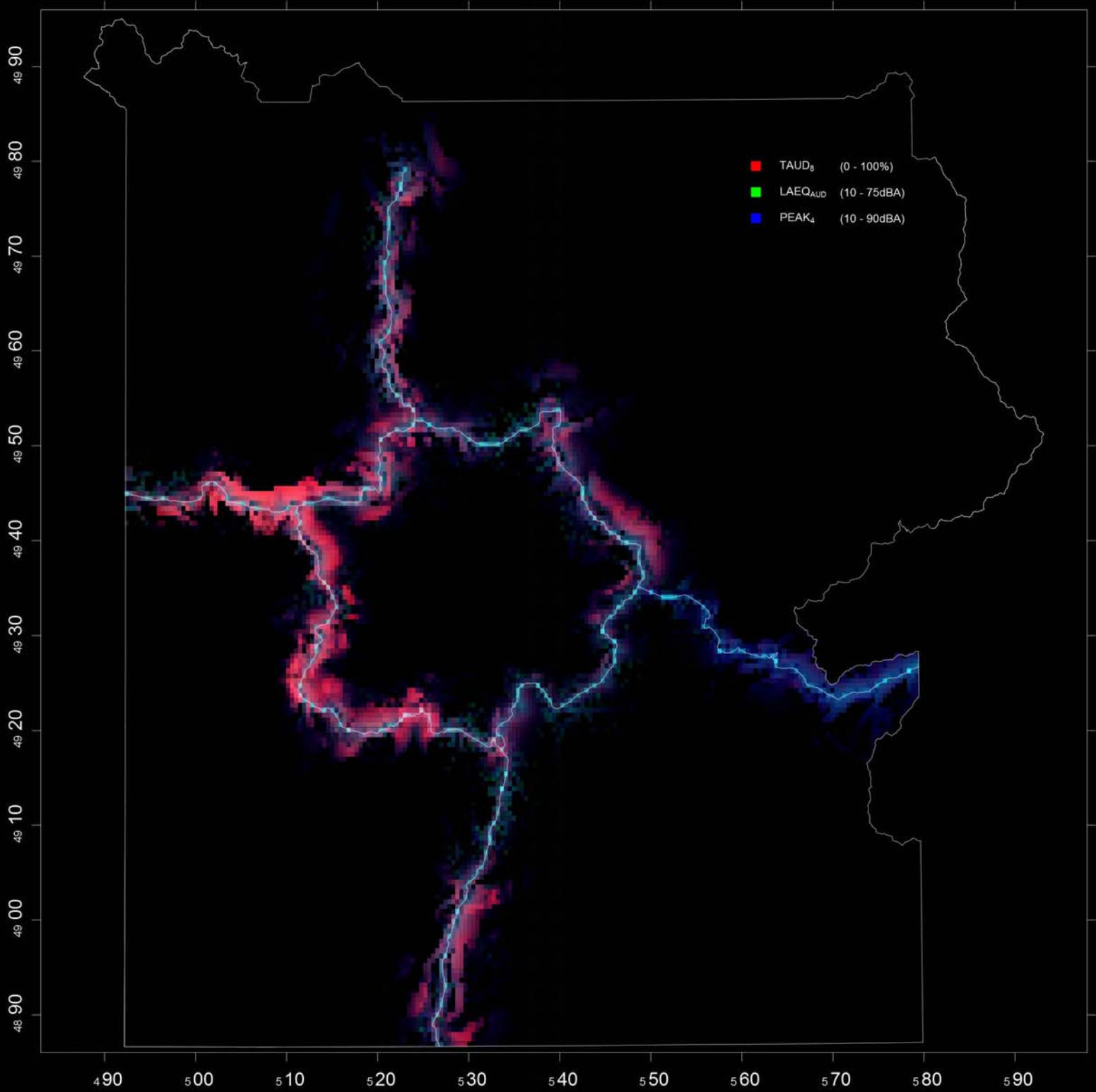


Yellowstone Winter Use - Alt 4Br1 (All Metrics)

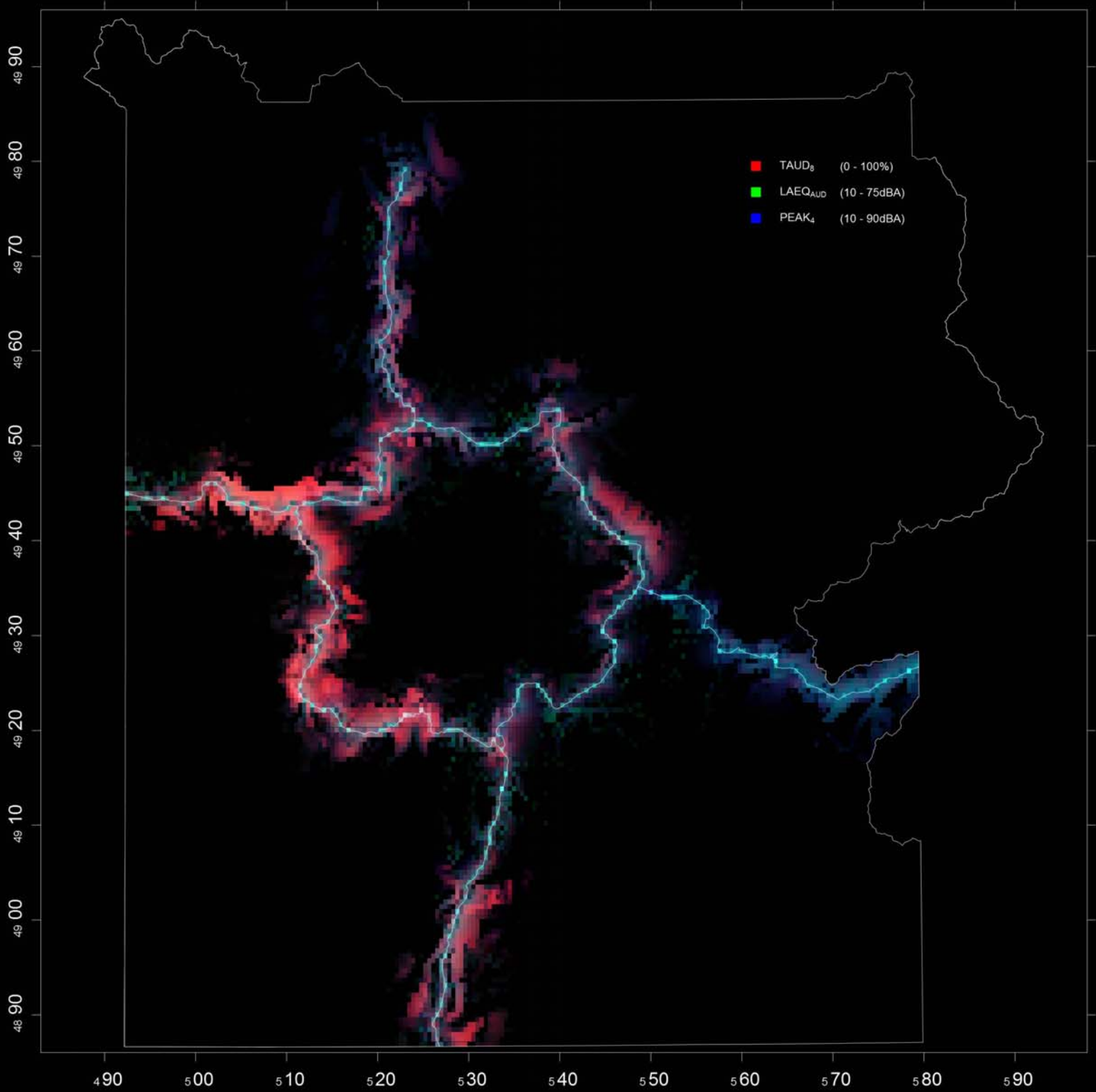




# Yellowstone Winter Use - Alt 4Br2 (All Metrics)

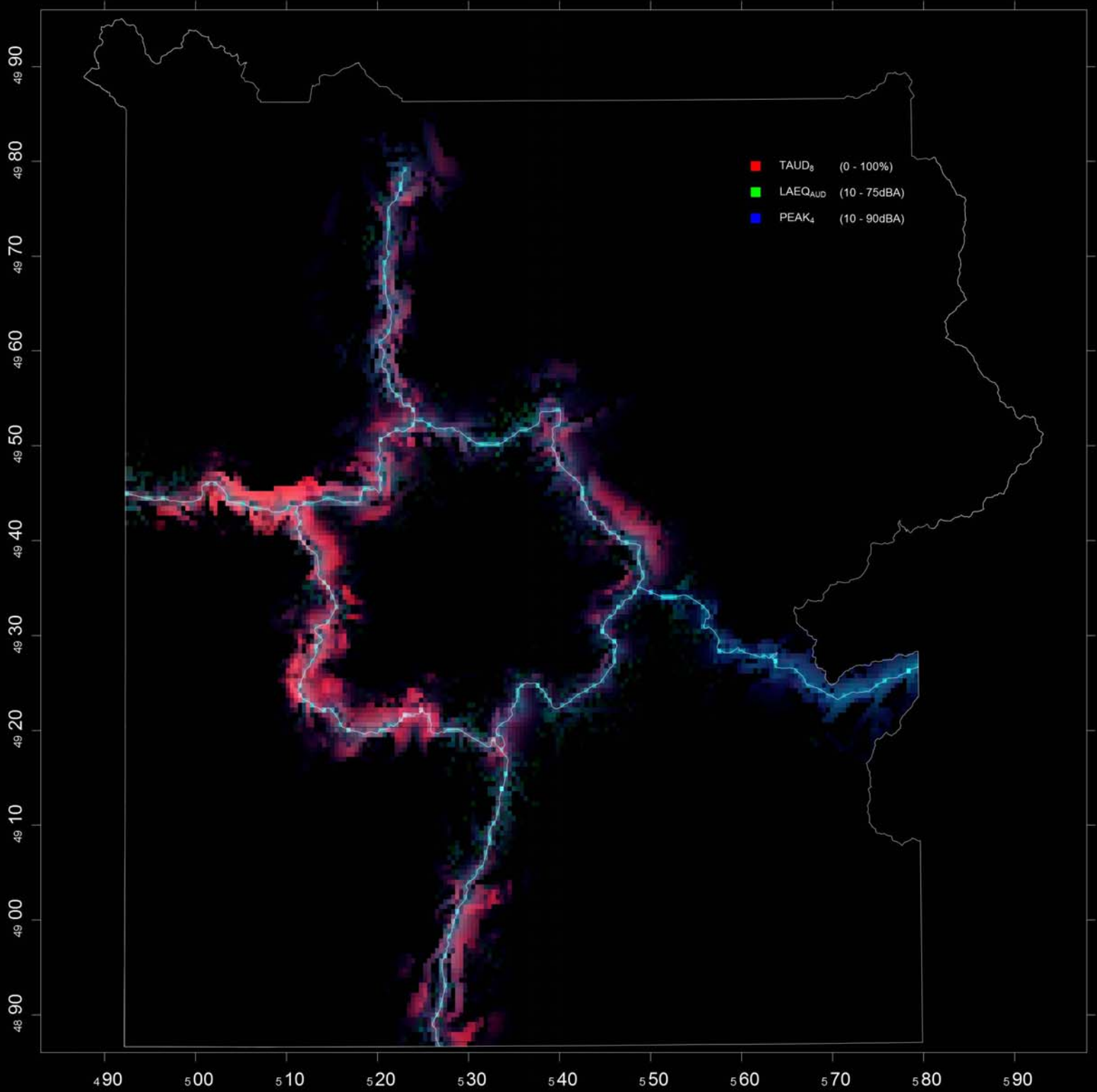


Yellowstone Winter Use - Alt 4Cr1 (All Metrics)

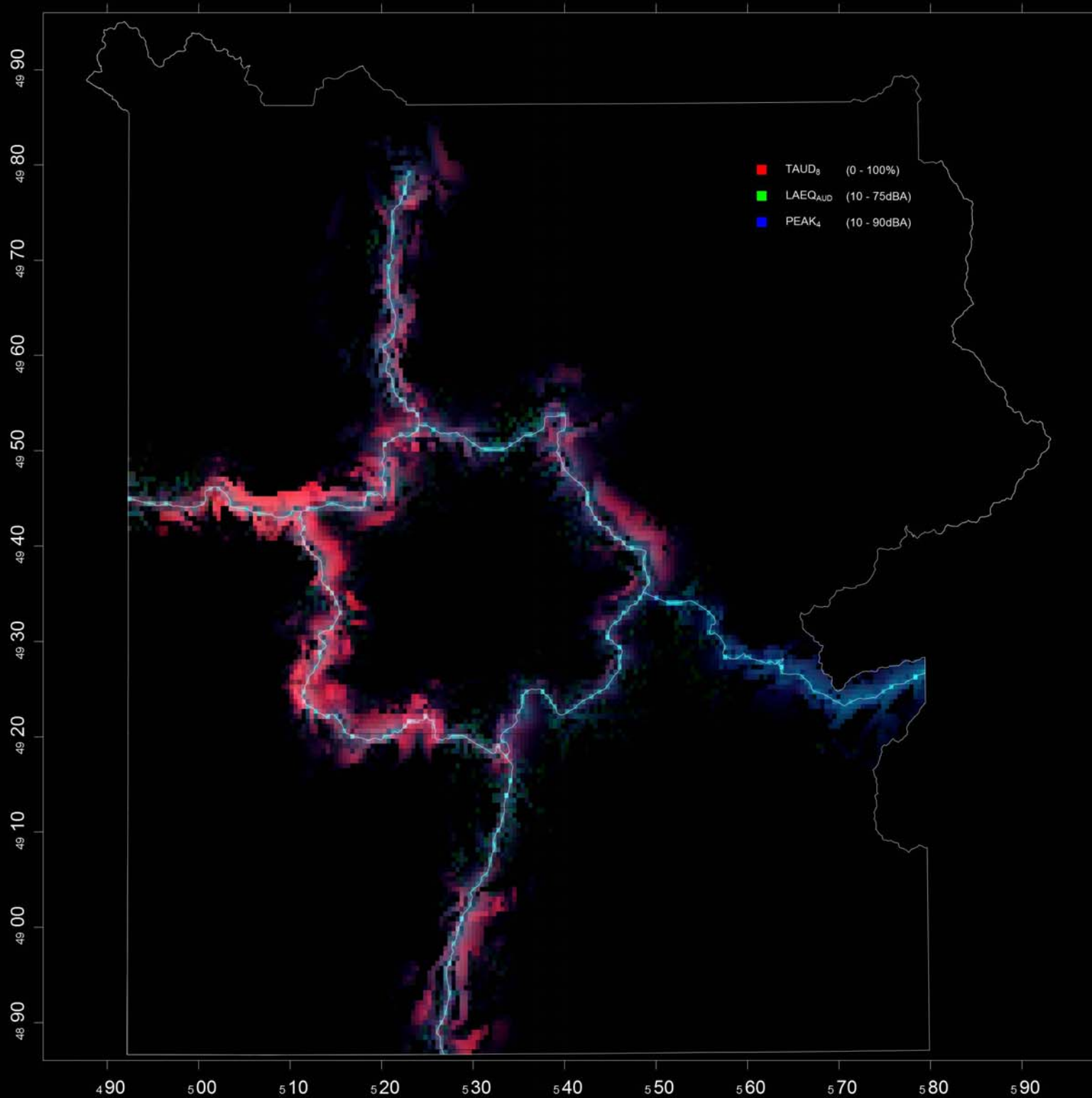




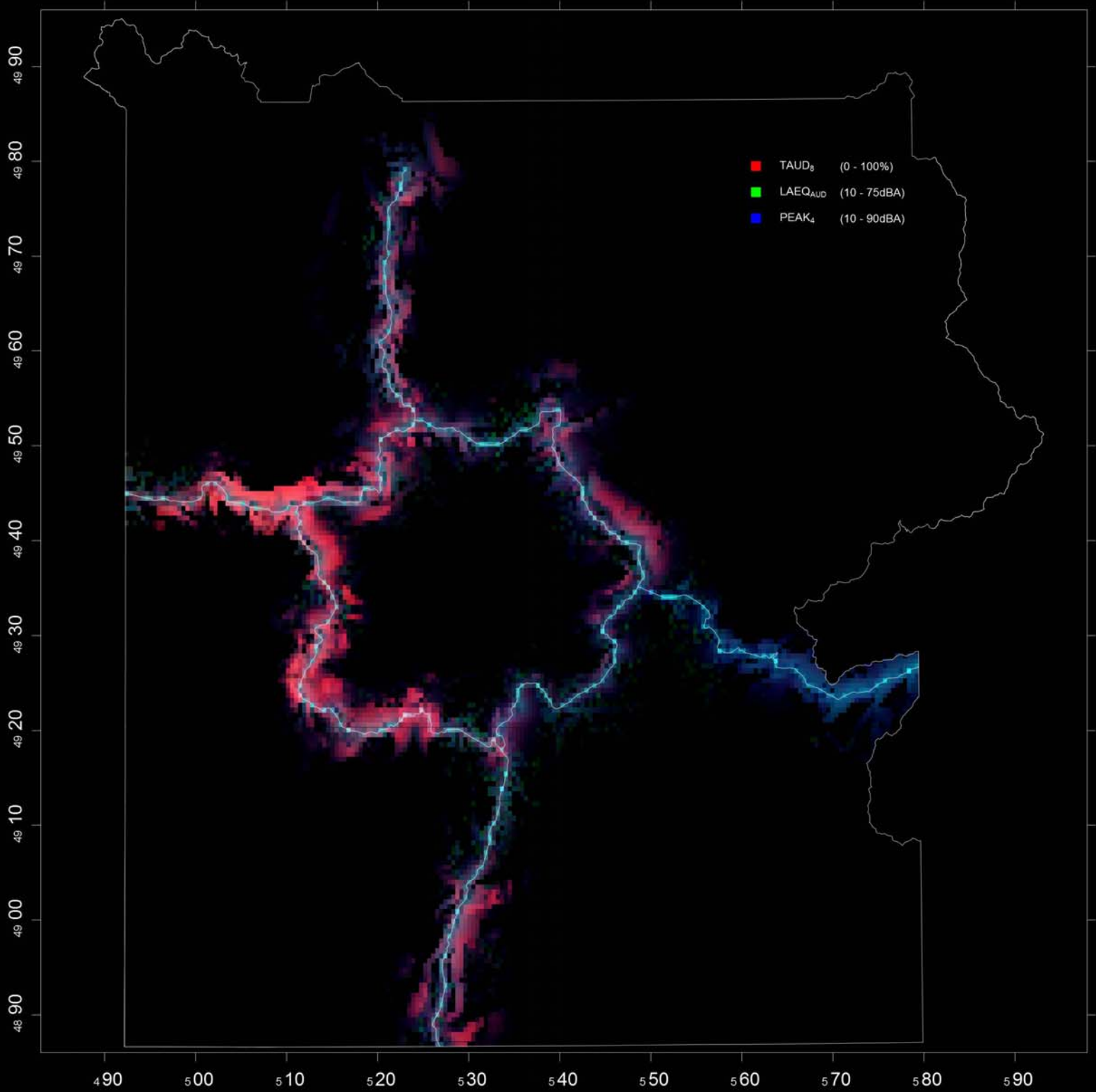
# Yellowstone Winter Use - Alt 4Cr2 (All Metrics)



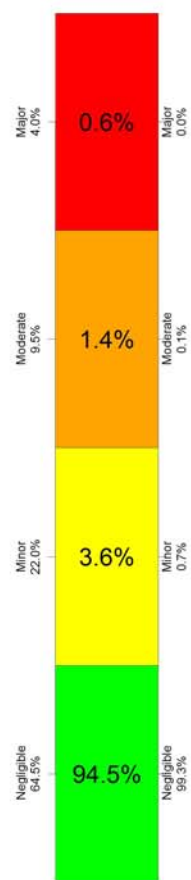
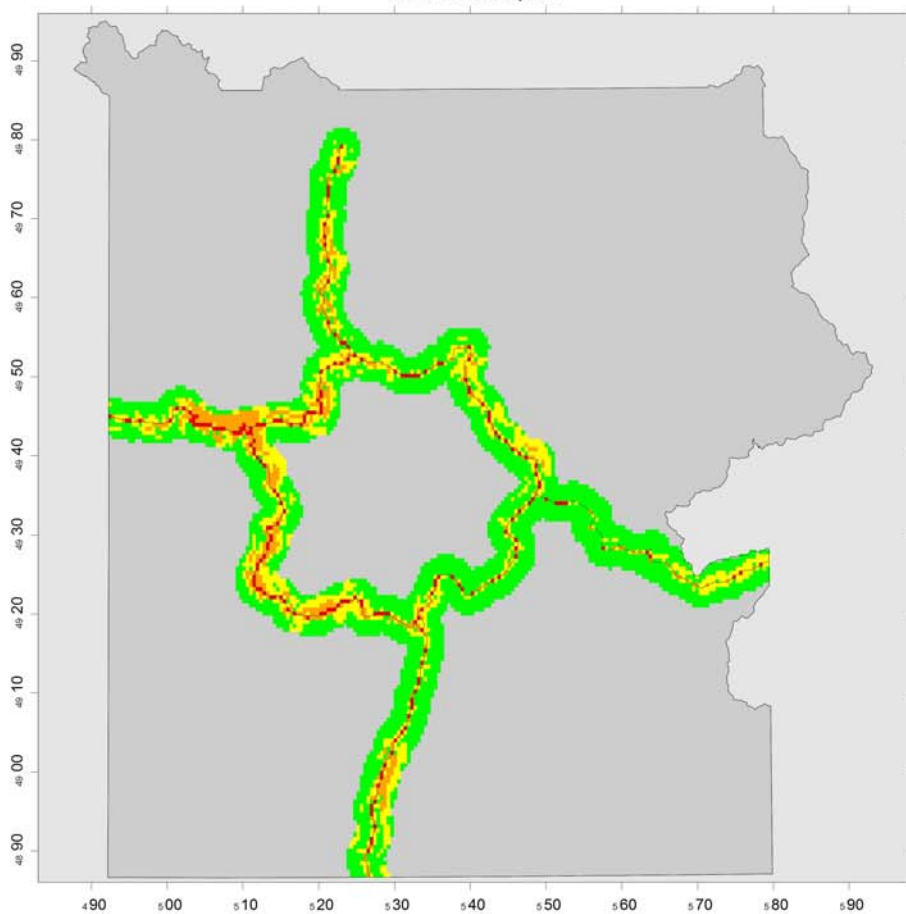
Yellowstone Winter Use - Alt 4Dr1 (All Metrics)



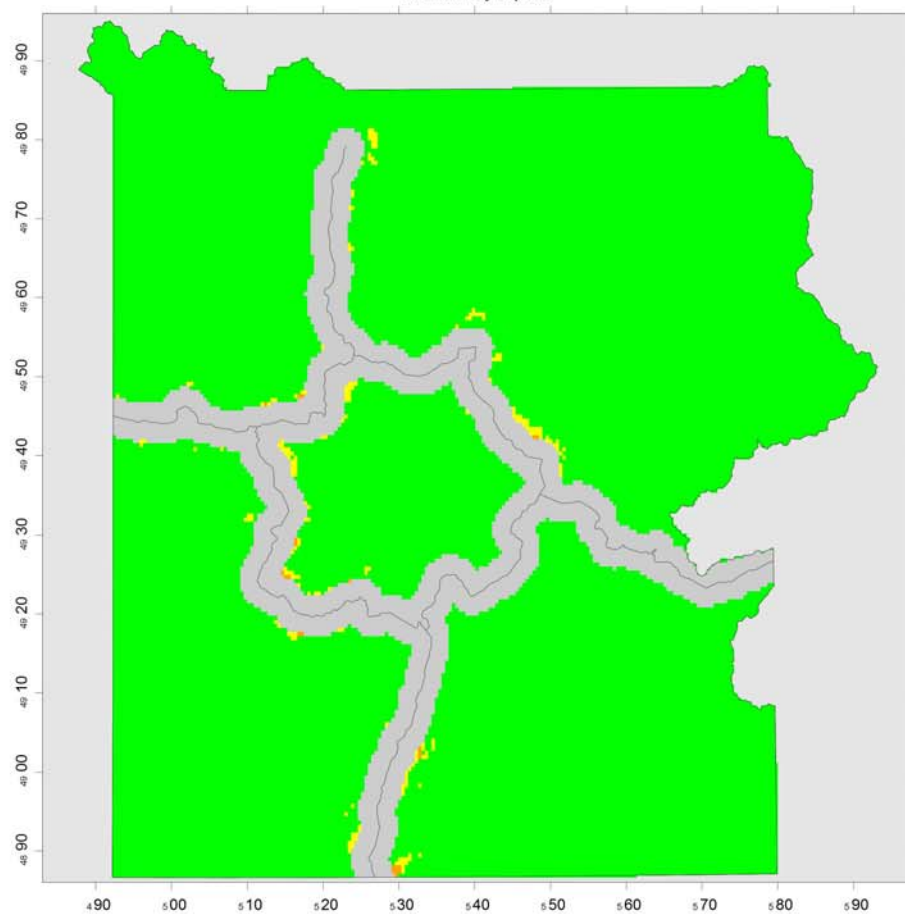
Yellowstone Winter Use - Alt 4Dr2 (All Metrics)



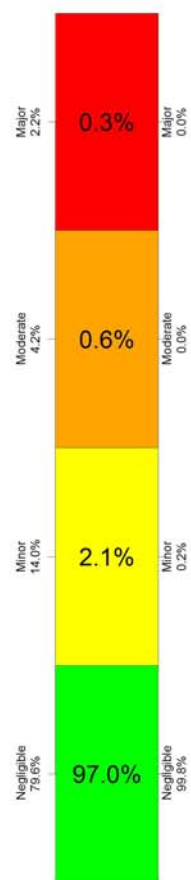
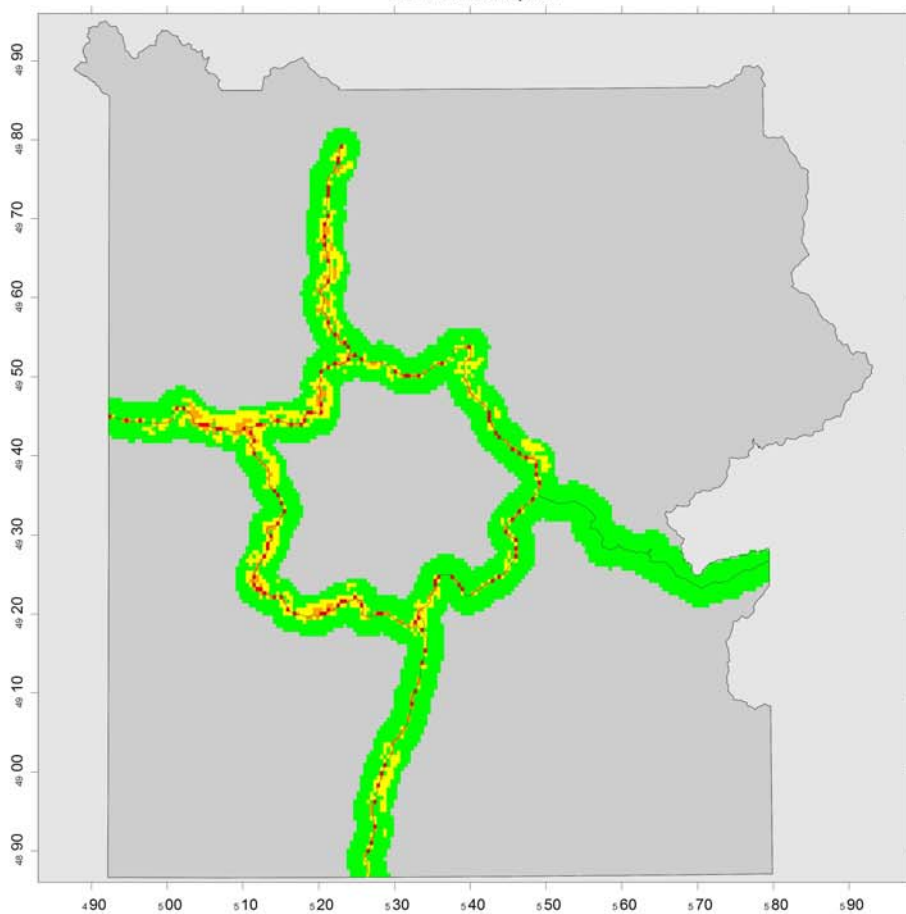
Yellowstone Winter Use - Recent  
Travel Corridor Impacts



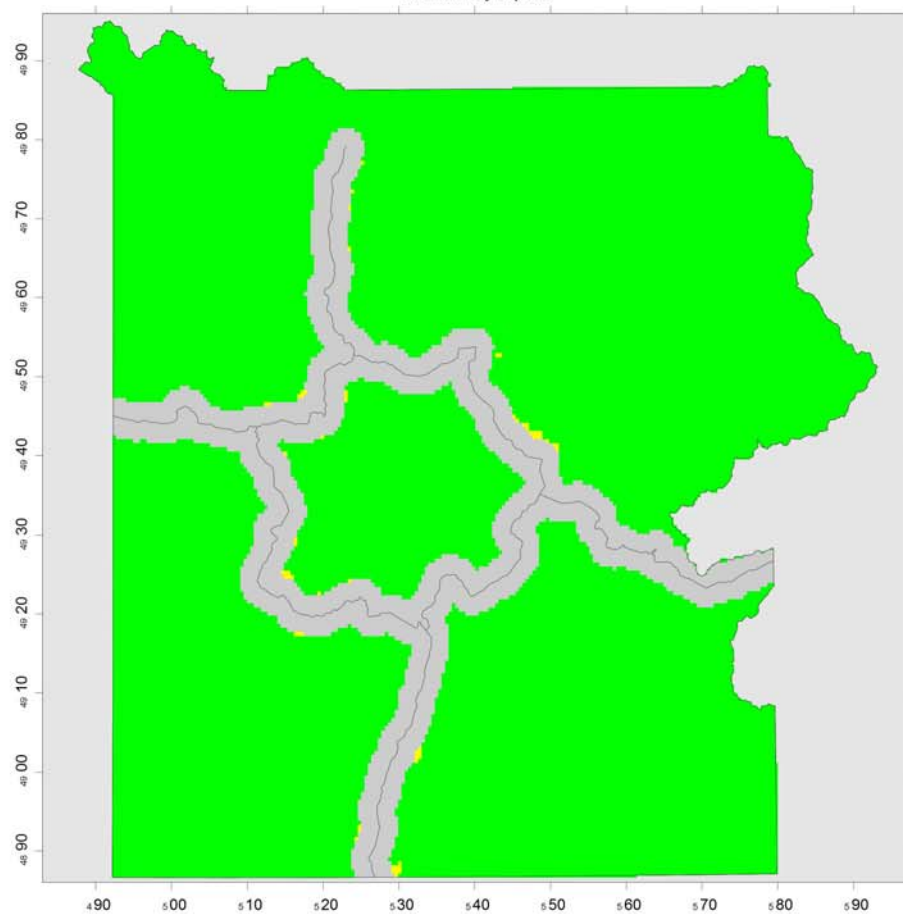
Yellowstone Winter Use - Recent  
Backcountry Impacts



Yellowstone Winter Use - Alt 1  
Travel Corridor Impacts

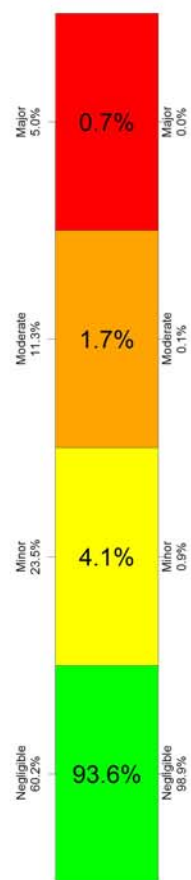
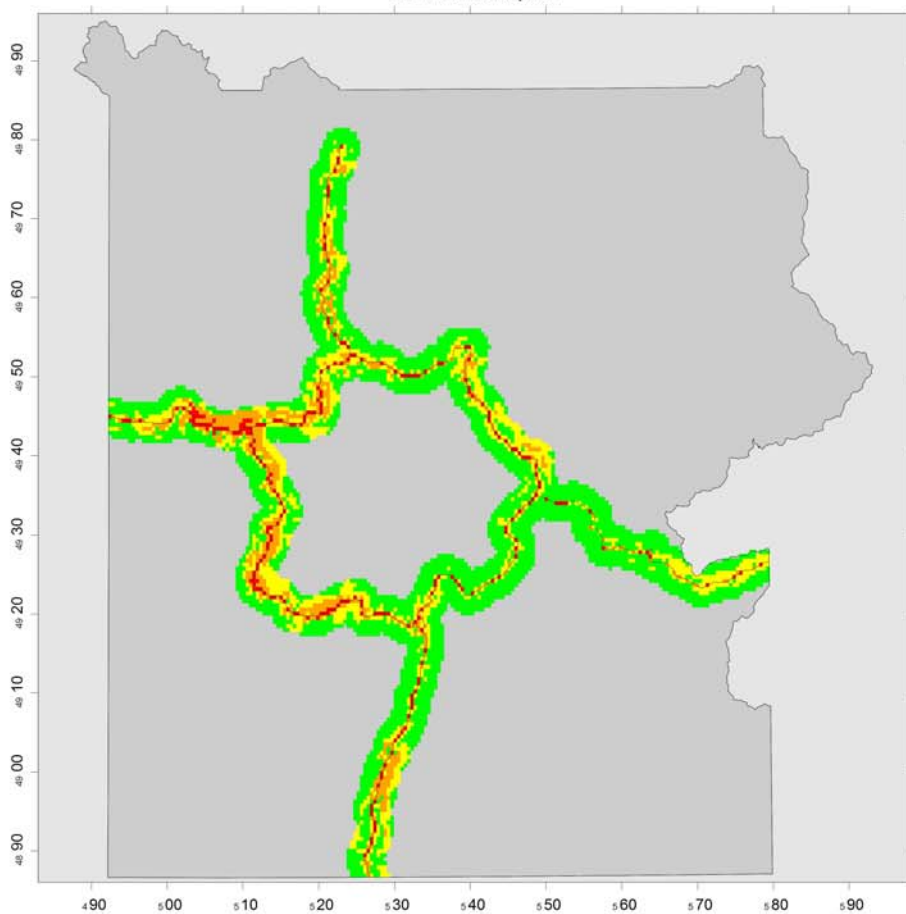


Yellowstone Winter Use - Alt 1  
Backcountry Impacts

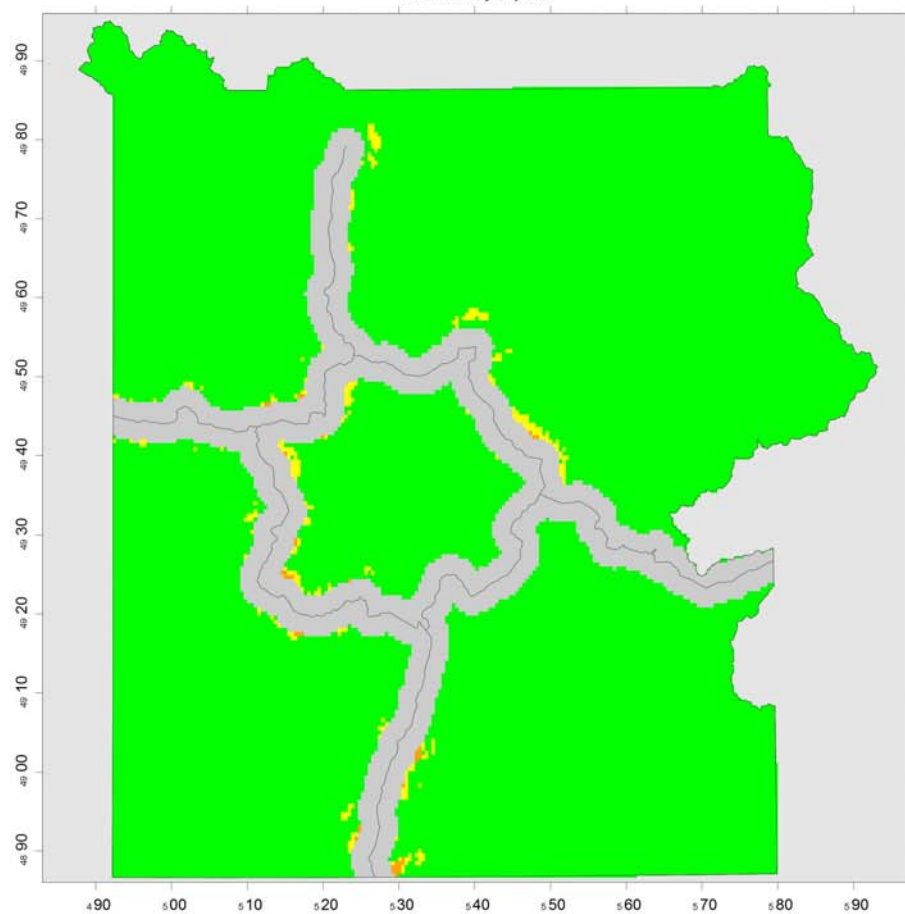




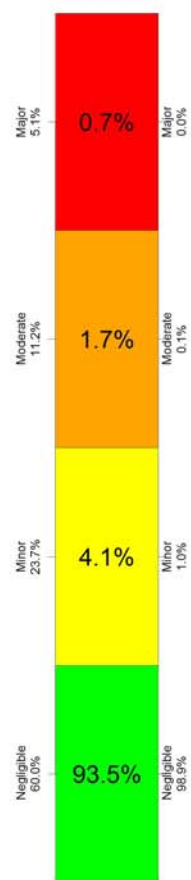
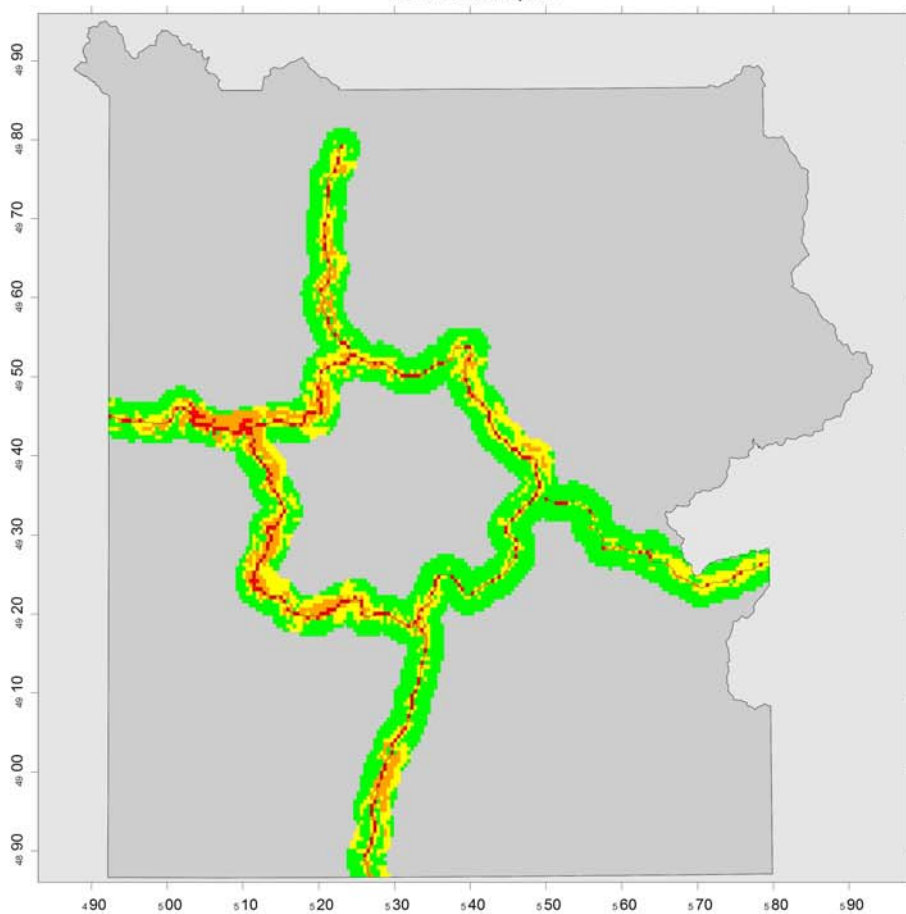
Yellowstone Winter Use - Alt 2r1  
Travel Corridor Impacts



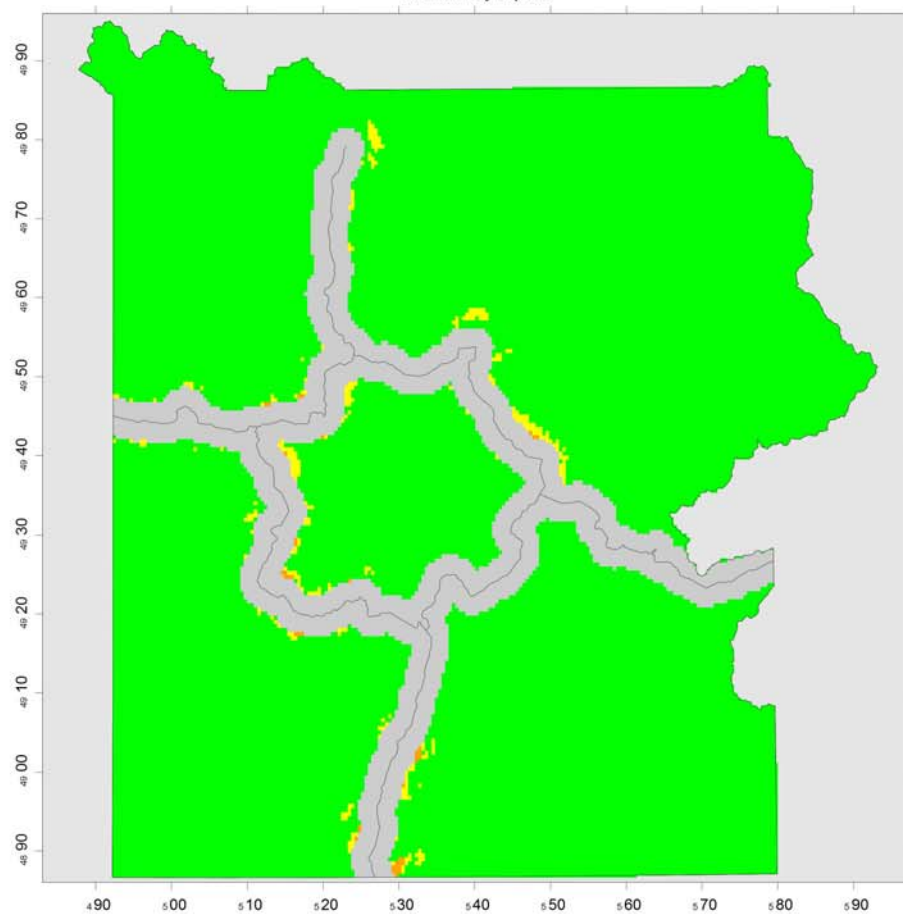
Yellowstone Winter Use - Alt 2r1  
Backcountry Impacts



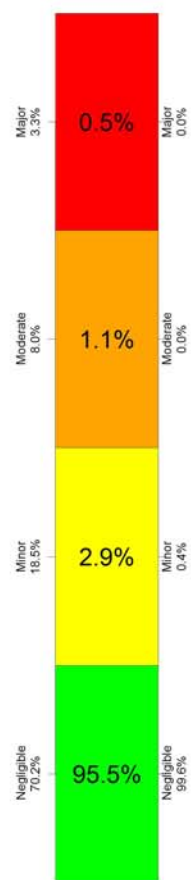
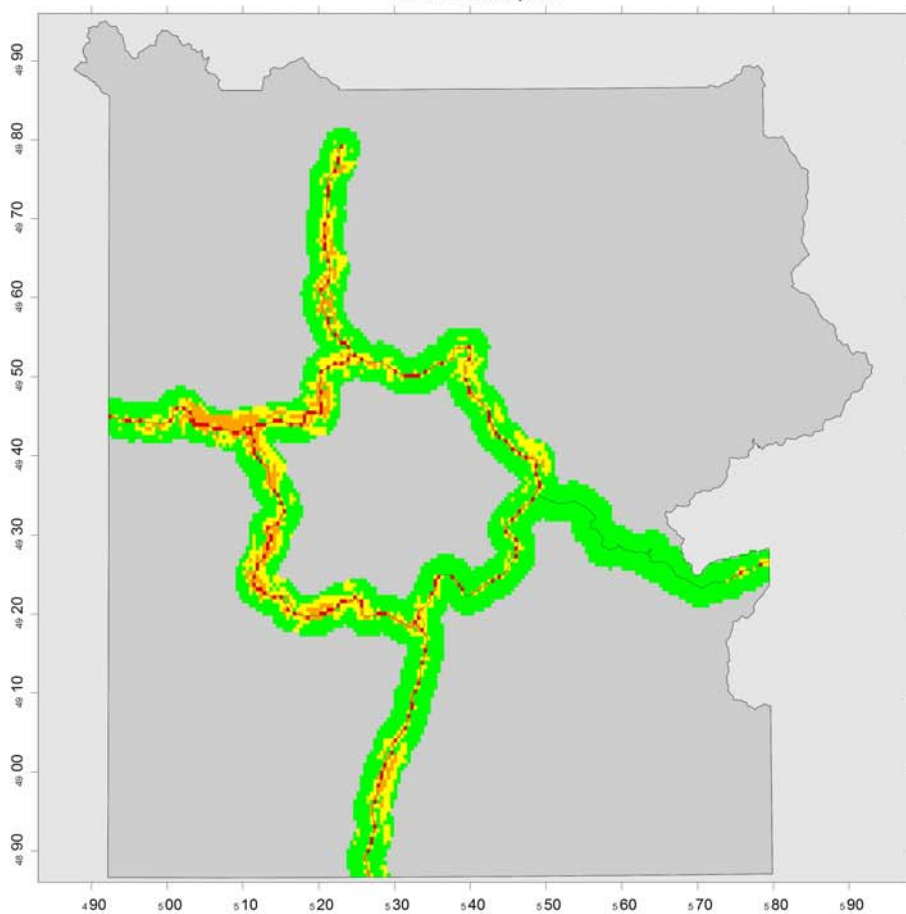
Yellowstone Winter Use - Alt 2r2  
Travel Corridor Impacts



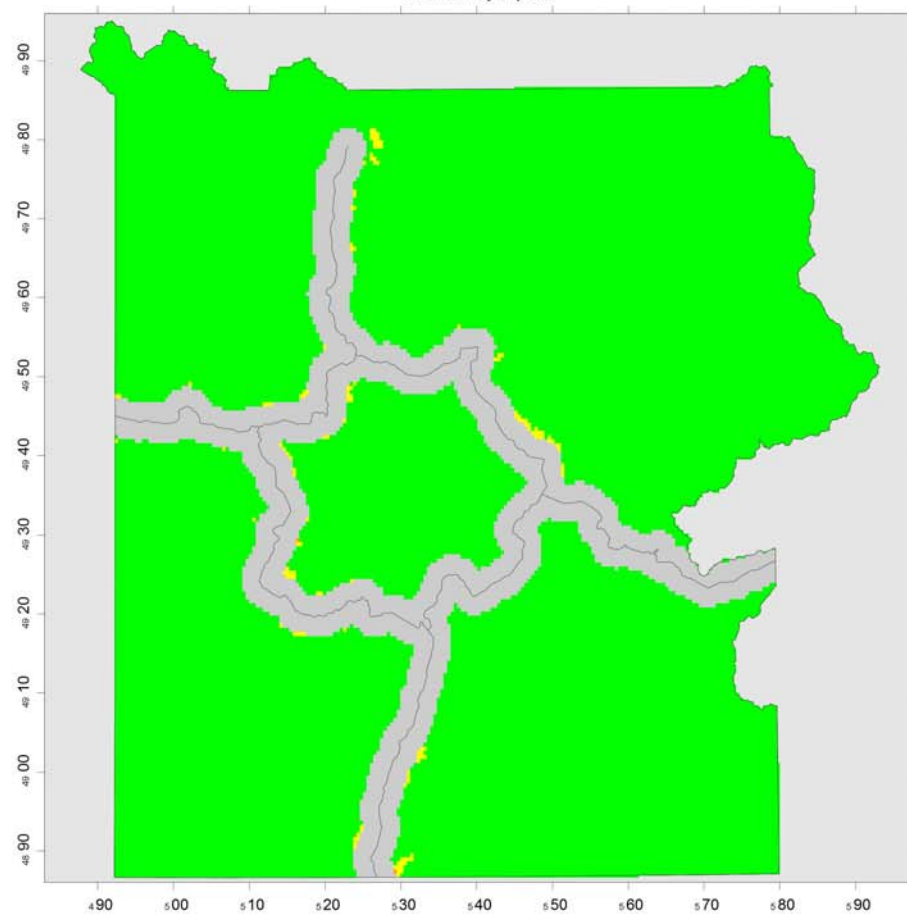
Yellowstone Winter Use - Alt 2r2  
Backcountry Impacts



Yellowstone Winter Use - Alt 3  
Travel Corridor Impacts

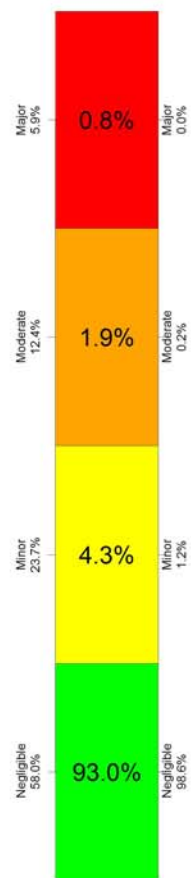
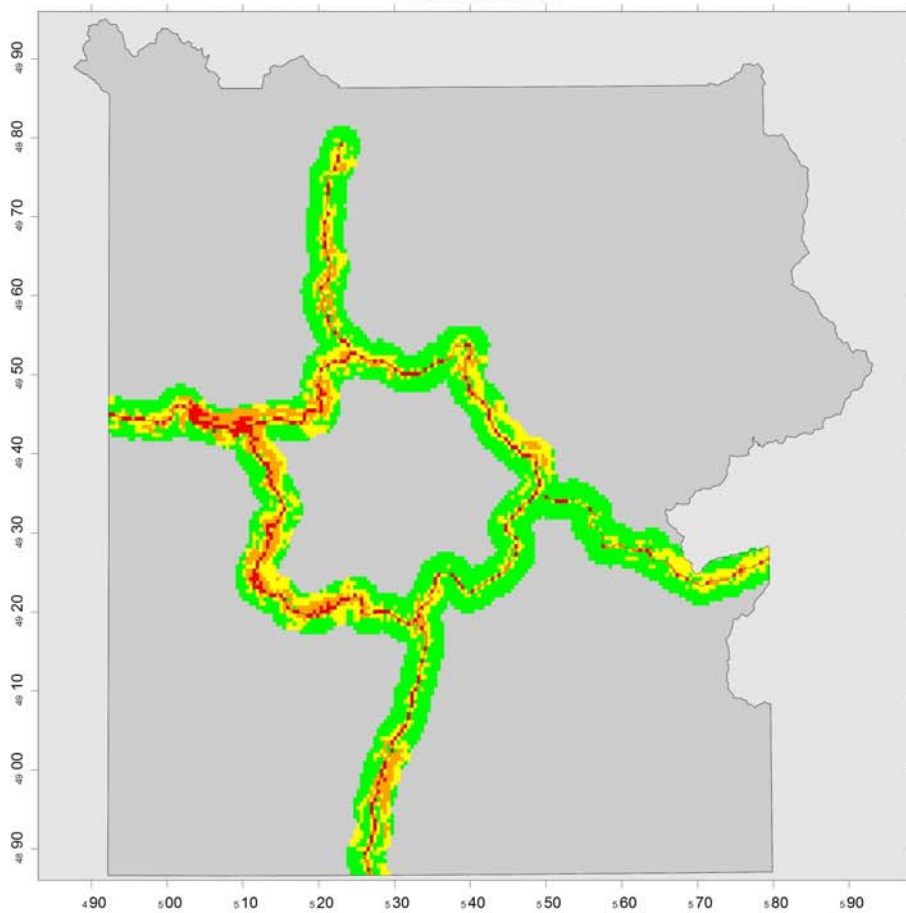


Yellowstone Winter Use - Alt 3  
Backcountry Impacts

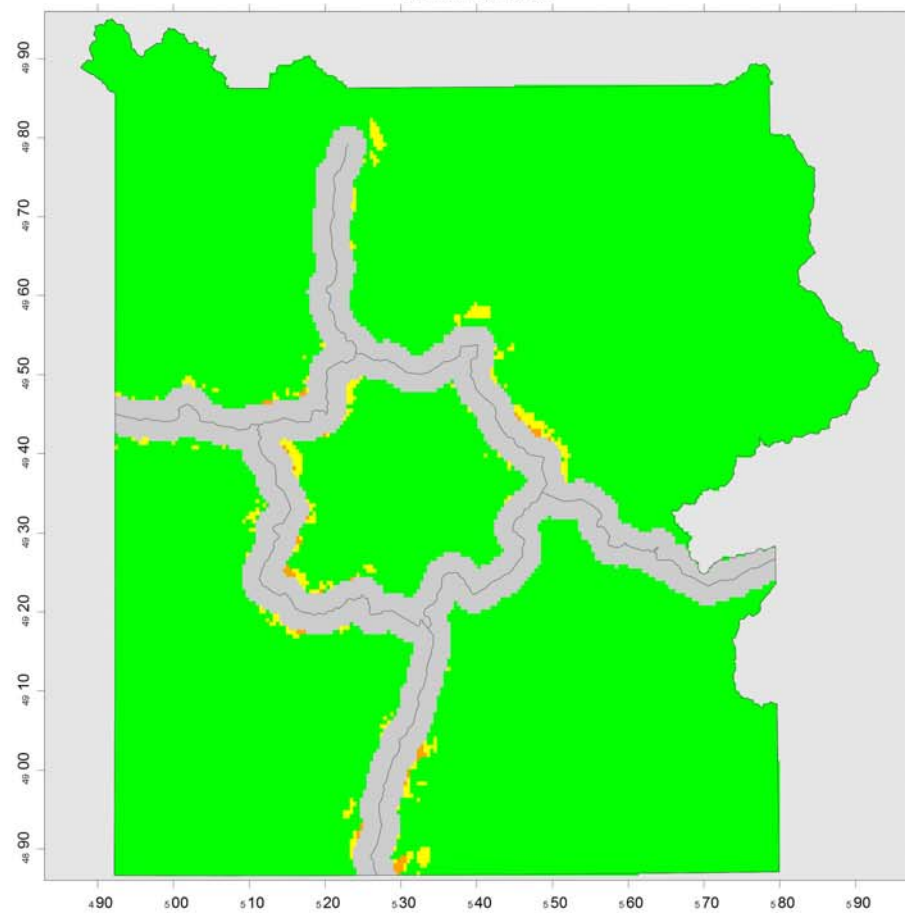




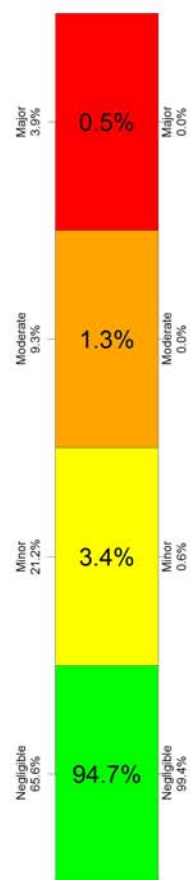
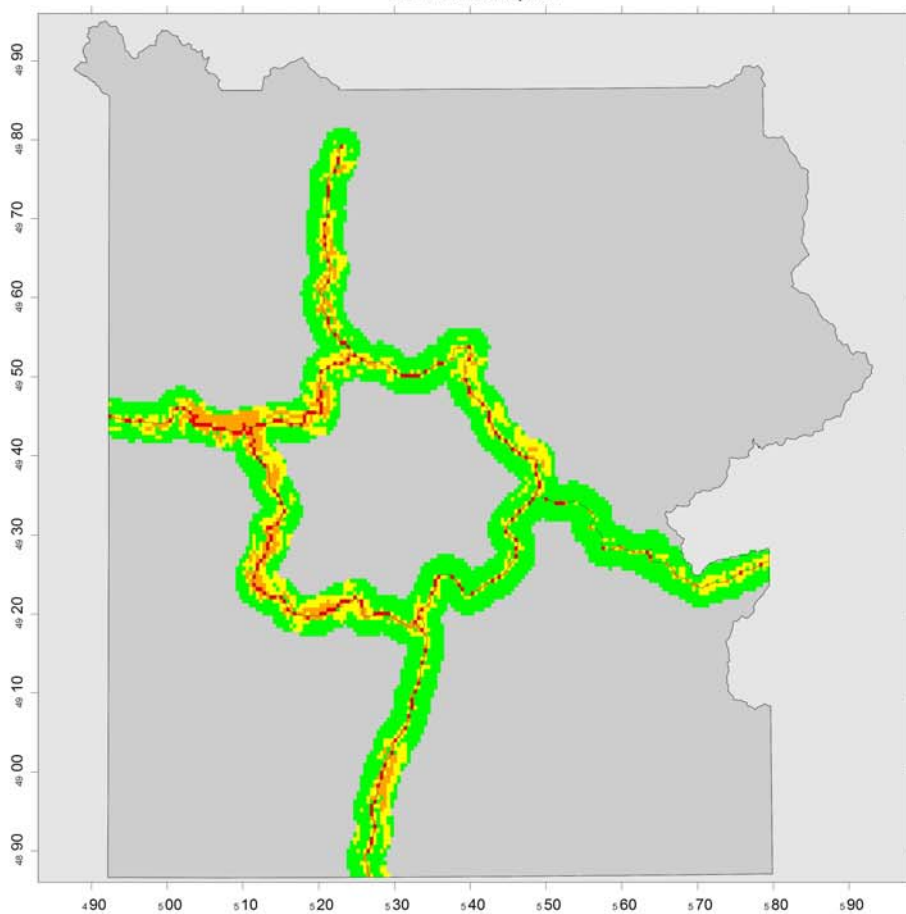
Yellowstone Winter Use - Alt 4Ar1  
Travel Corridor Impacts



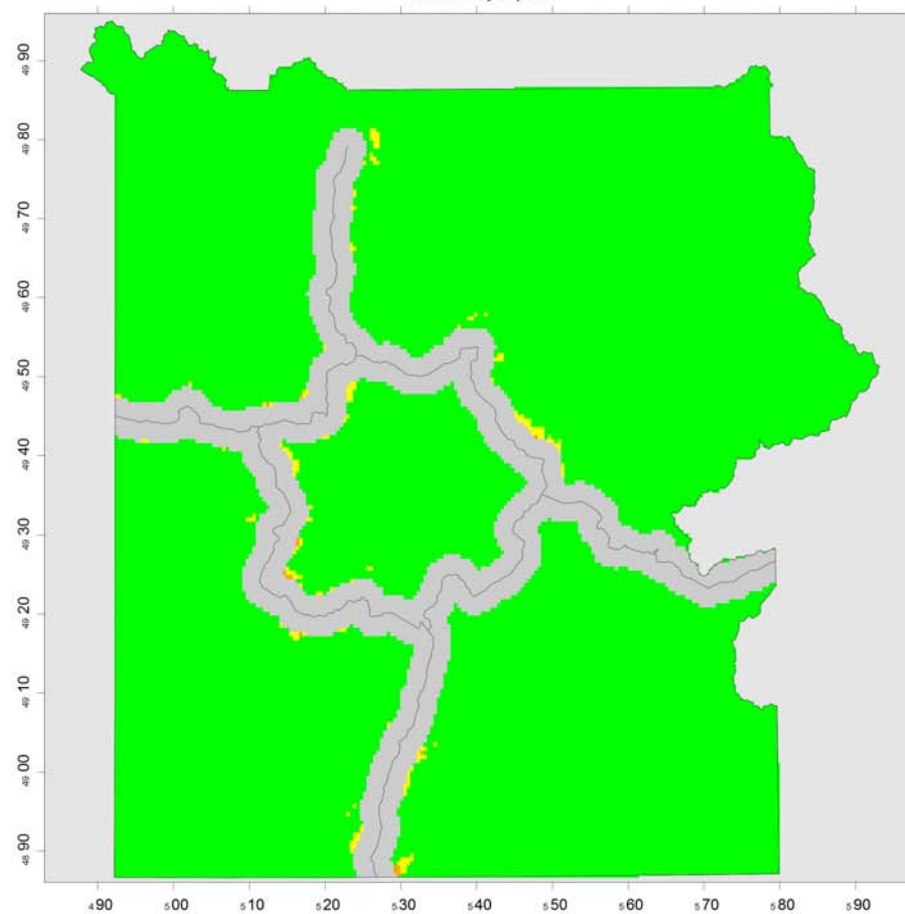
Yellowstone Winter Use - Alt 4Ar1  
Backcountry Impacts



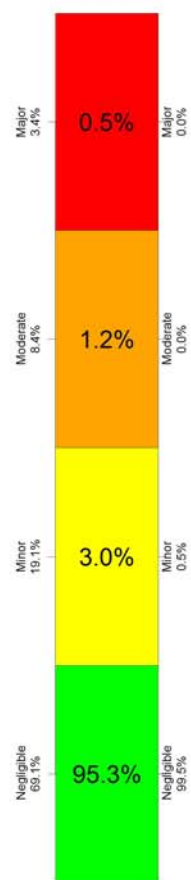
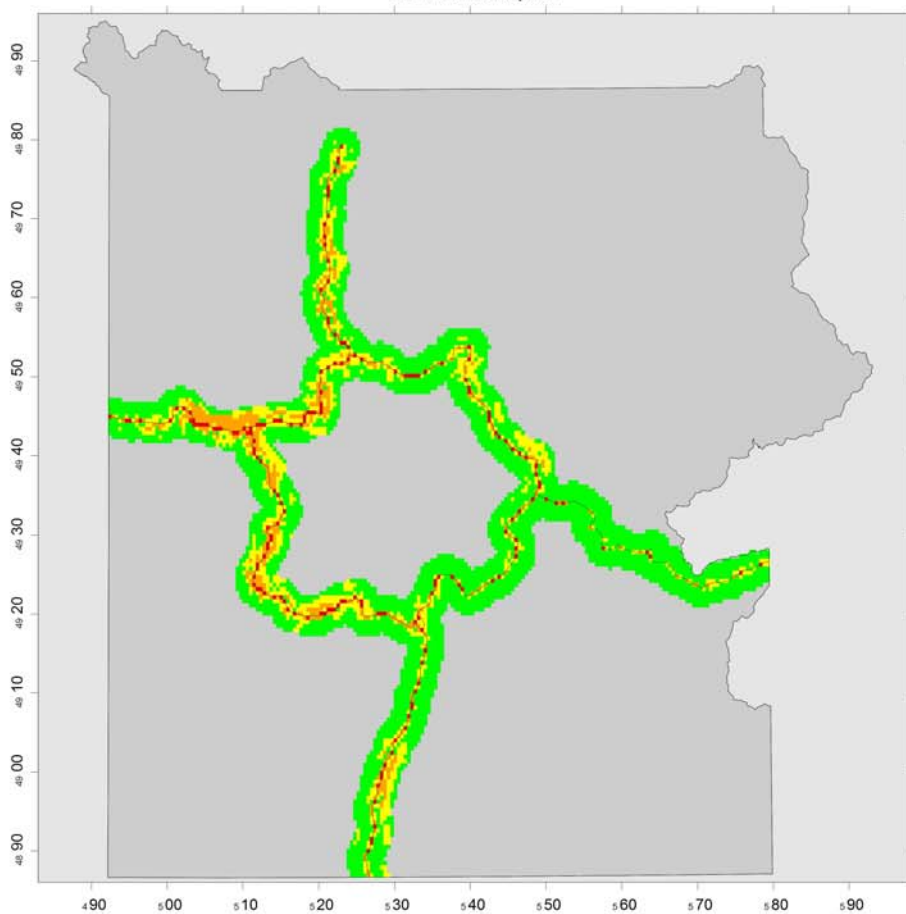
Yellowstone Winter Use - Alt 4Ar2  
Travel Corridor Impacts



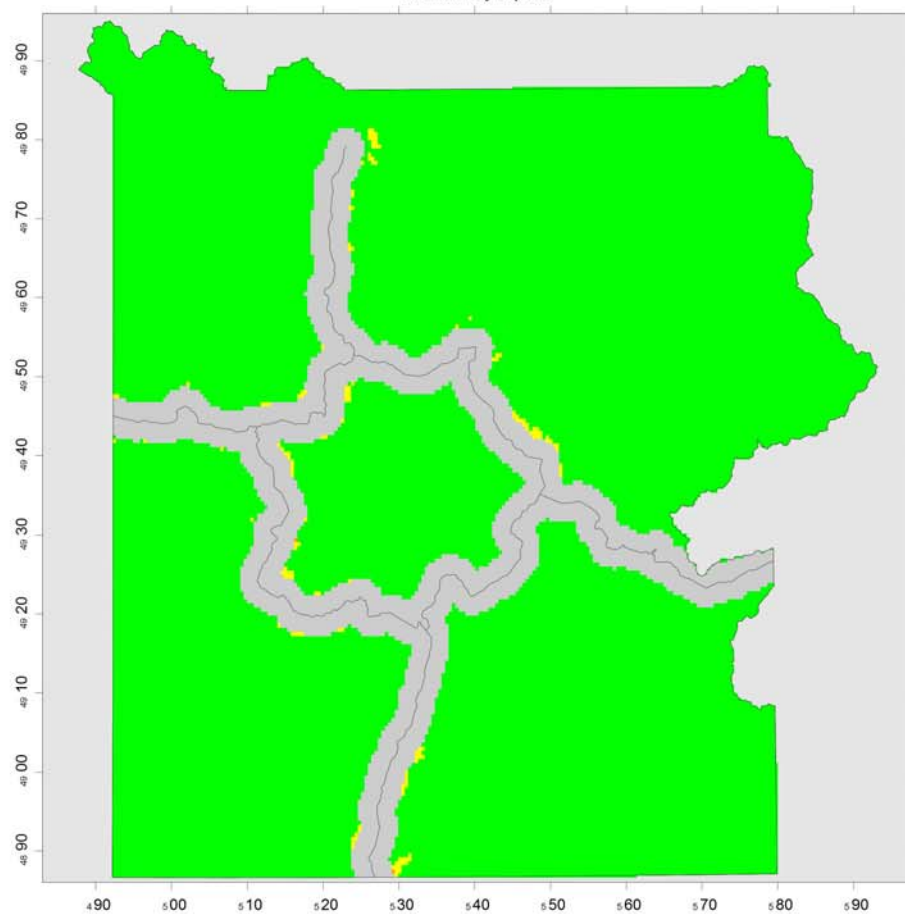
Yellowstone Winter Use - Alt 4Ar2  
Backcountry Impacts



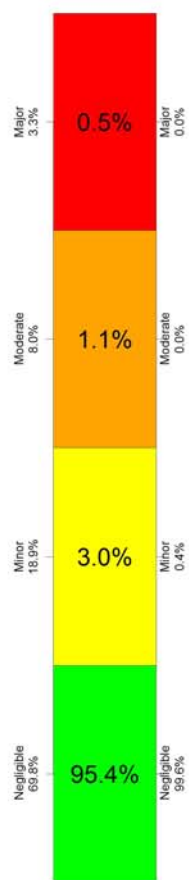
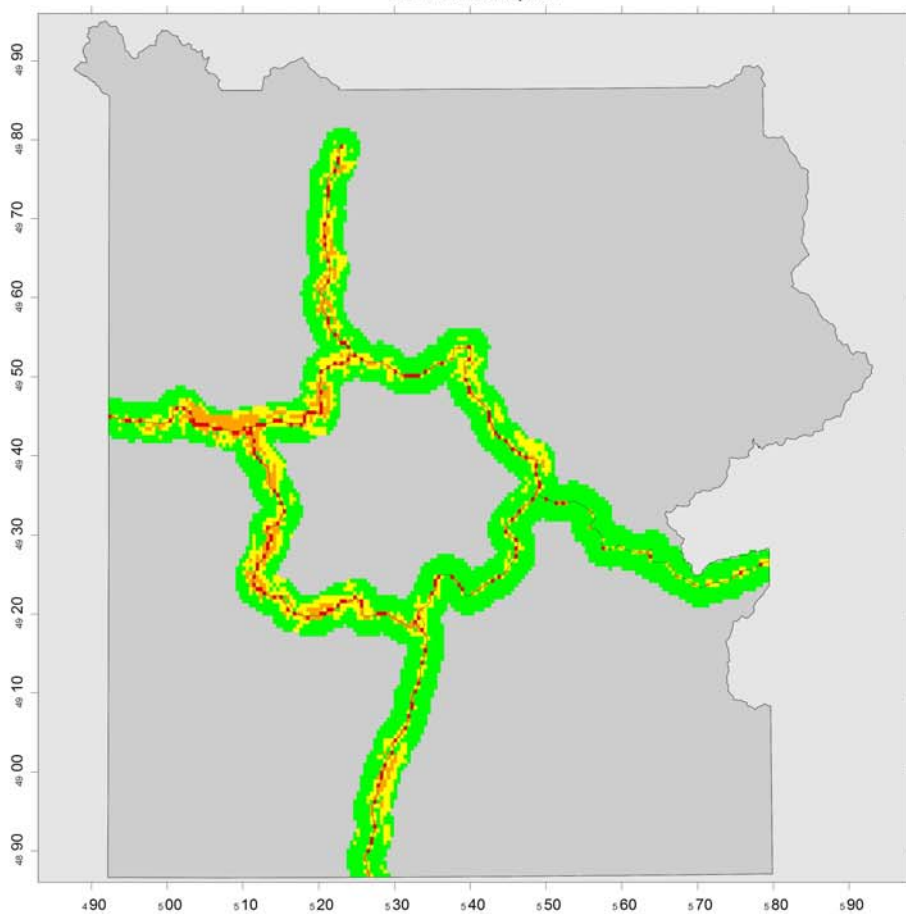
Yellowstone Winter Use - Alt 4Br1  
Travel Corridor Impacts



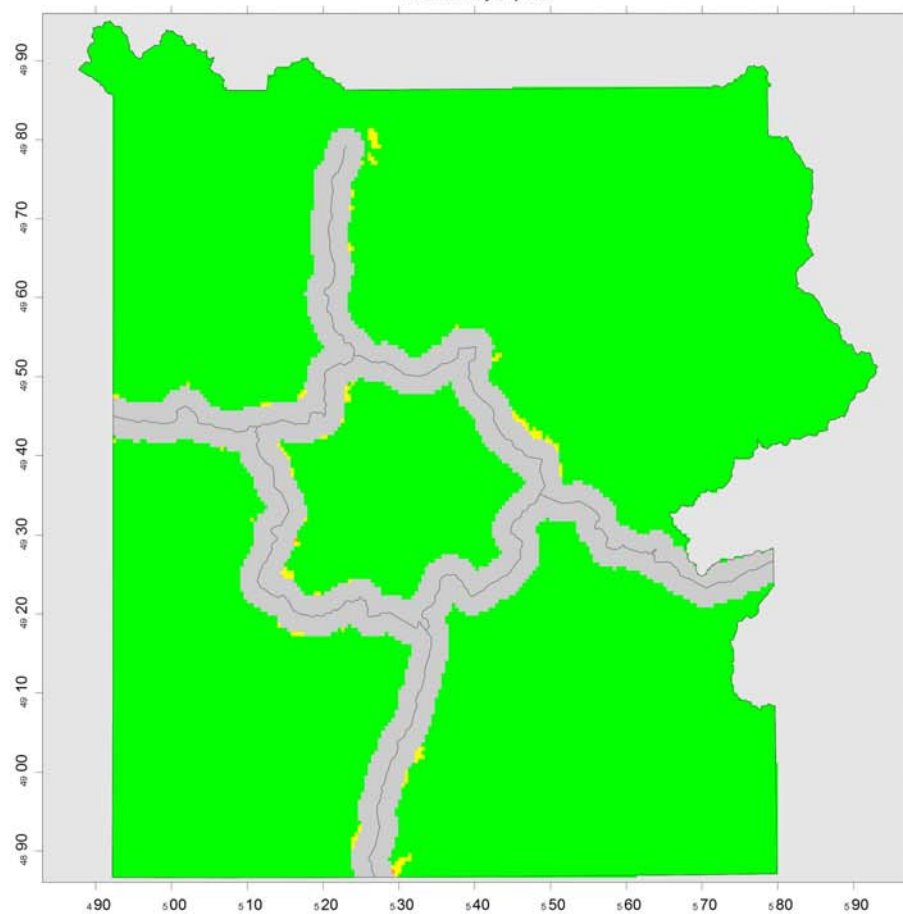
Yellowstone Winter Use - Alt 4Br1  
Backcountry Impacts



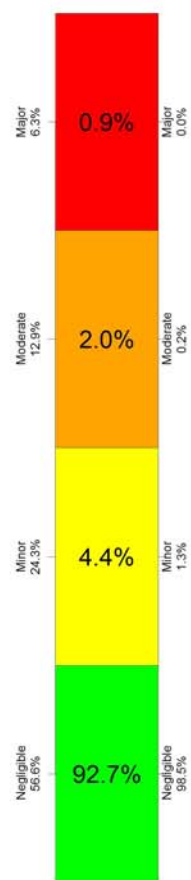
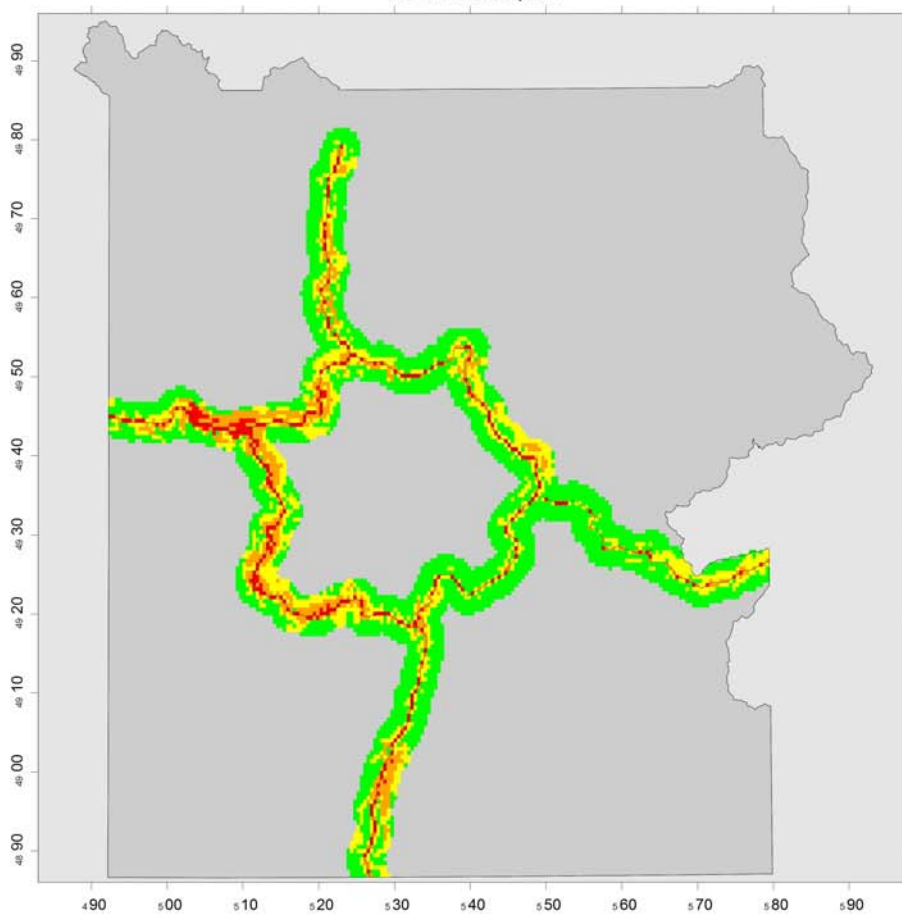
Yellowstone Winter Use - Alt 4Br2  
Travel Corridor Impacts



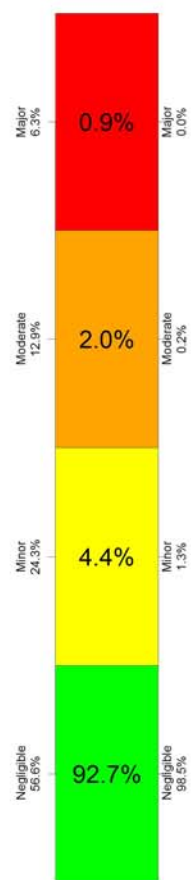
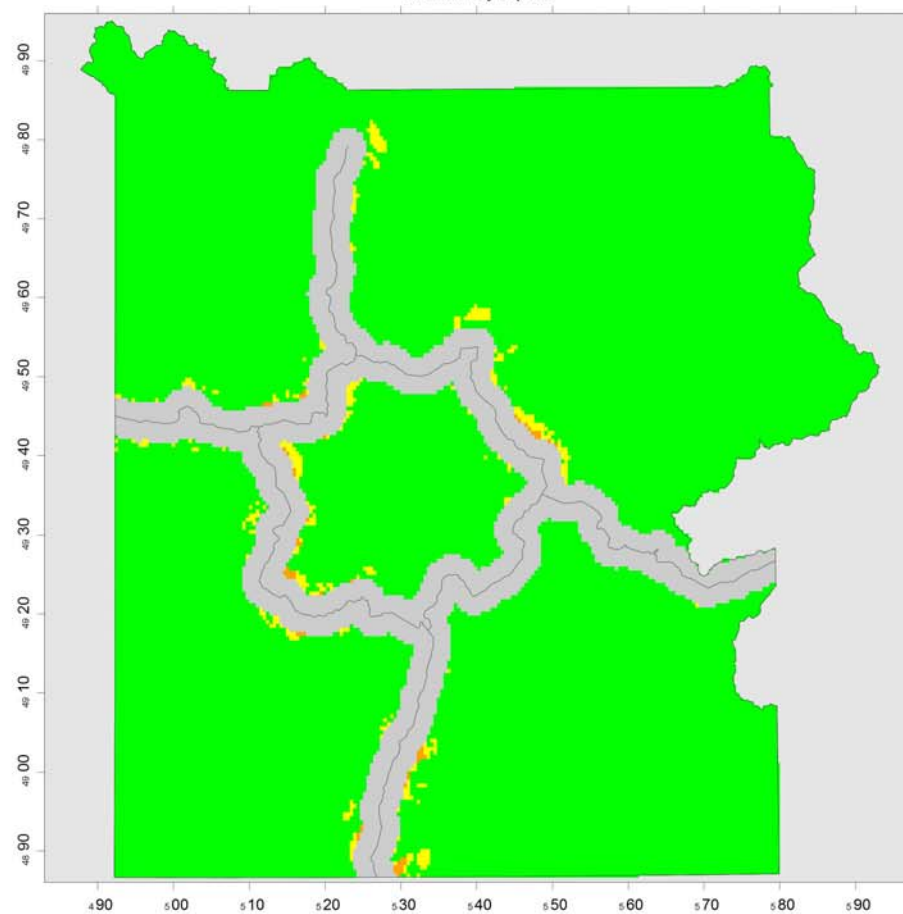
Yellowstone Winter Use - Alt 4Br2  
Backcountry Impacts



Yellowstone Winter Use - Alt 4Cr1  
Travel Corridor Impacts

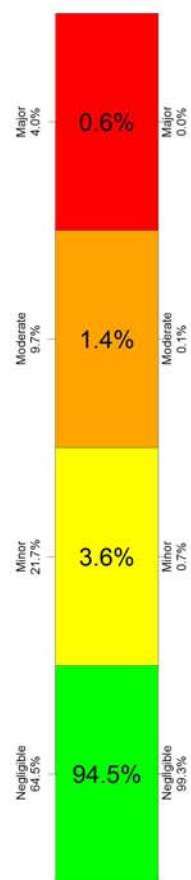
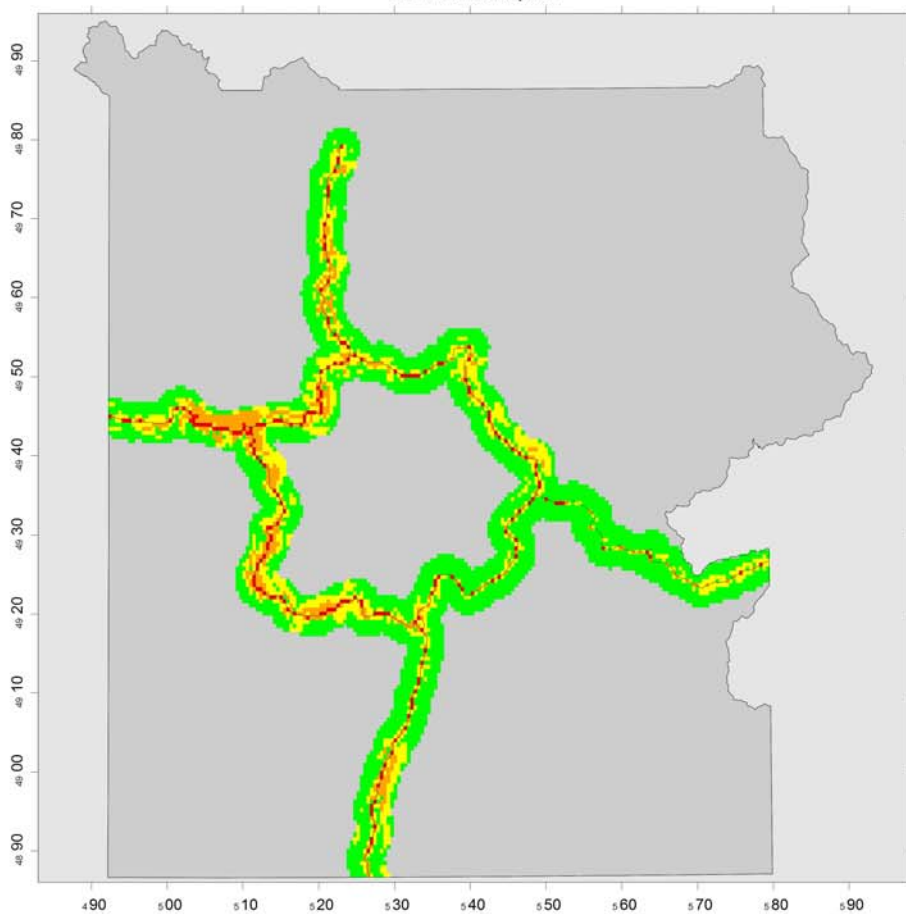


Yellowstone Winter Use - Alt 4Cr1  
Backcountry Impacts

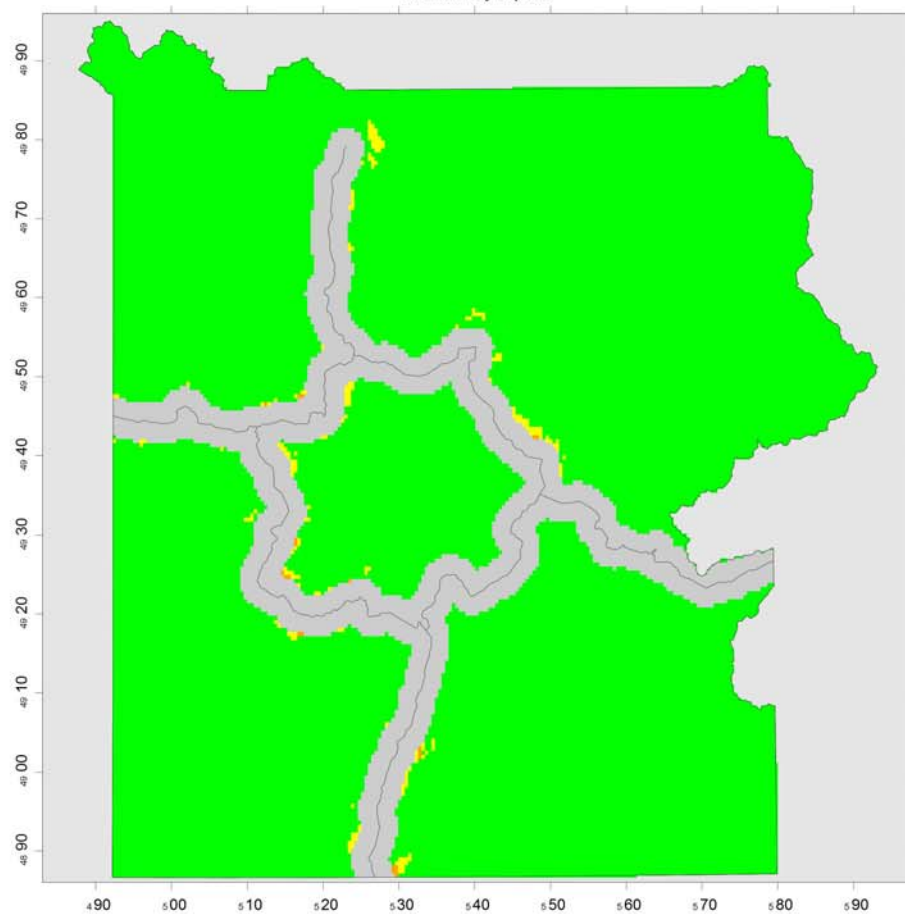




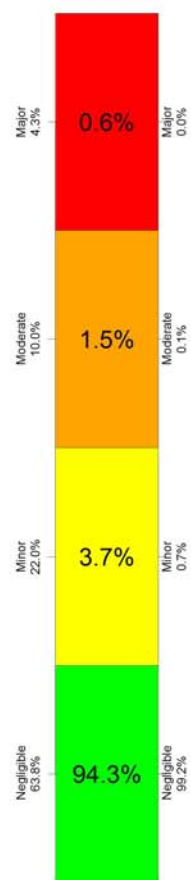
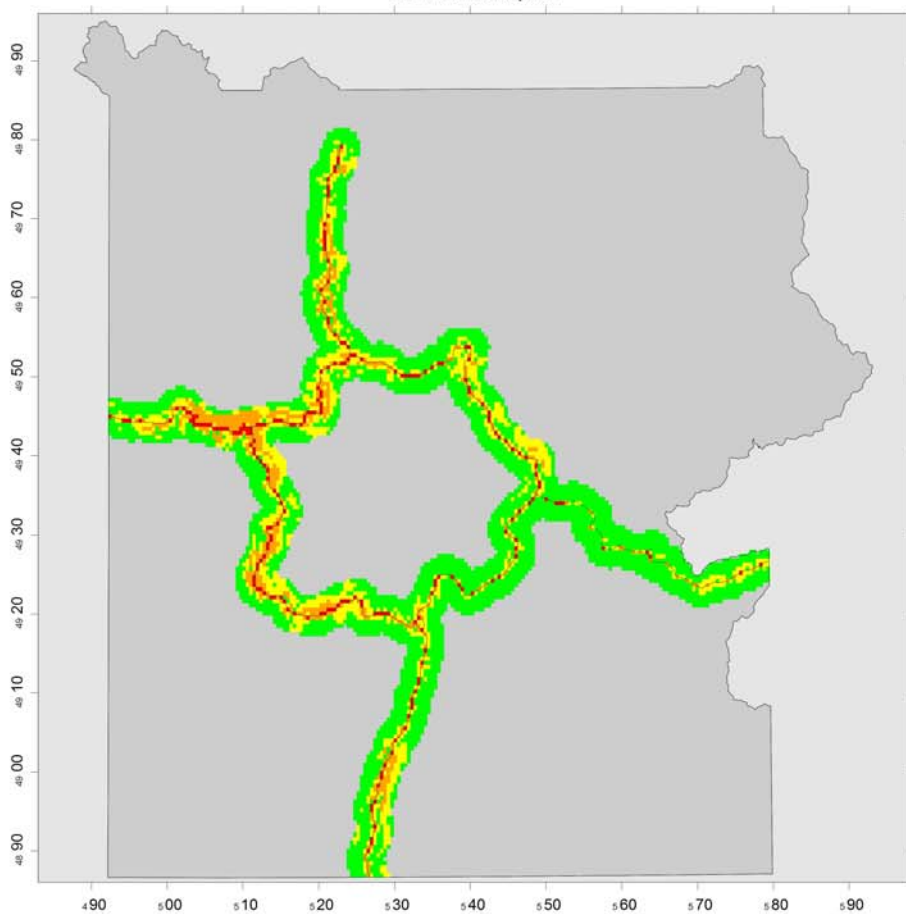
Yellowstone Winter Use - Alt 4Cr2  
Travel Corridor Impacts



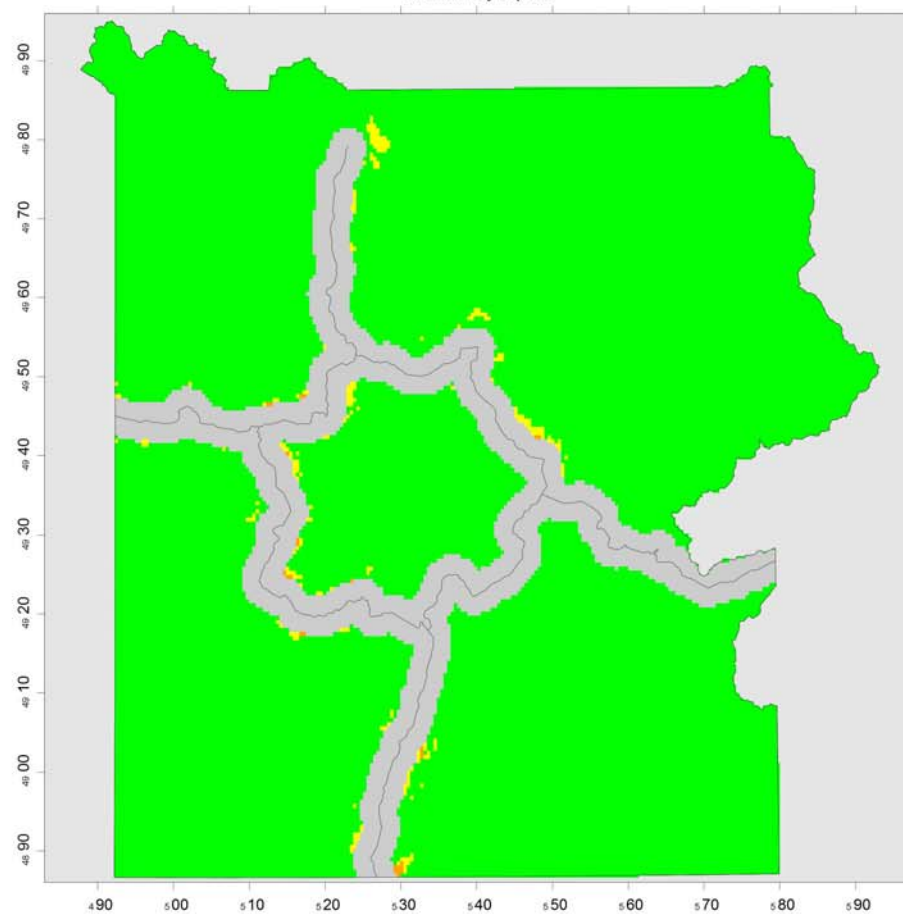
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Yellowstone Winter Use - Alt 4Dr1  
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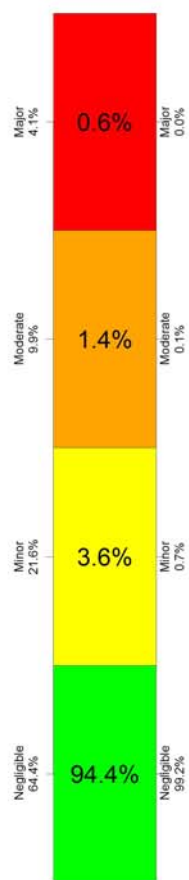
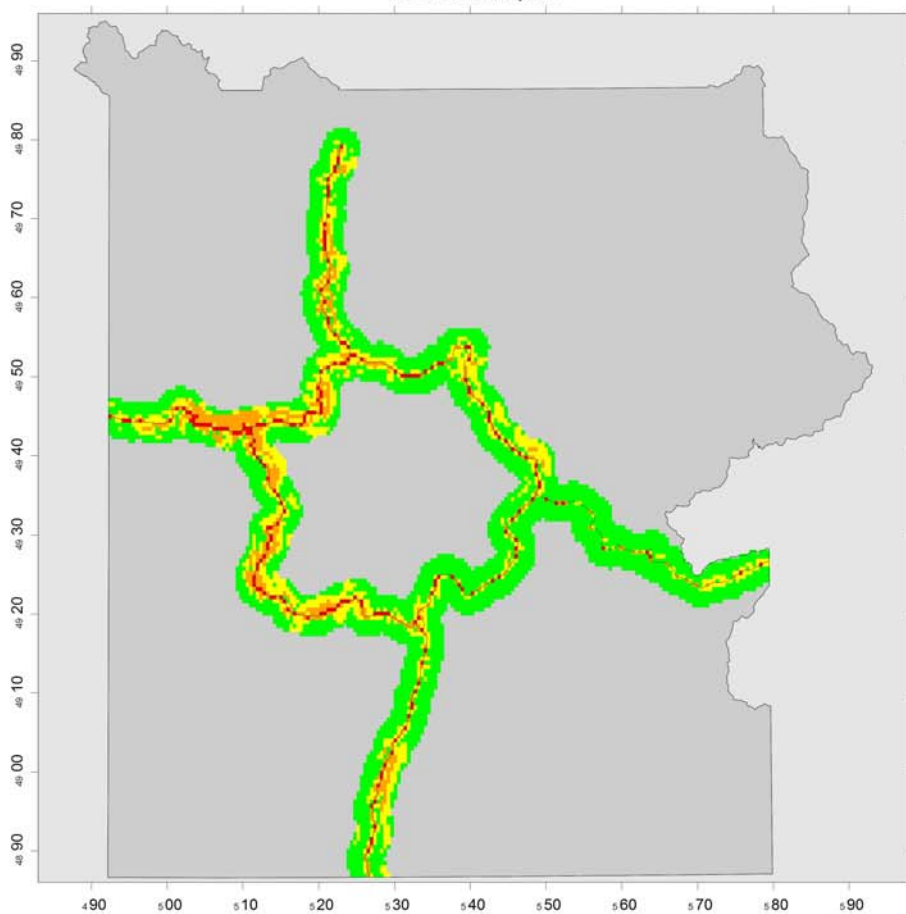


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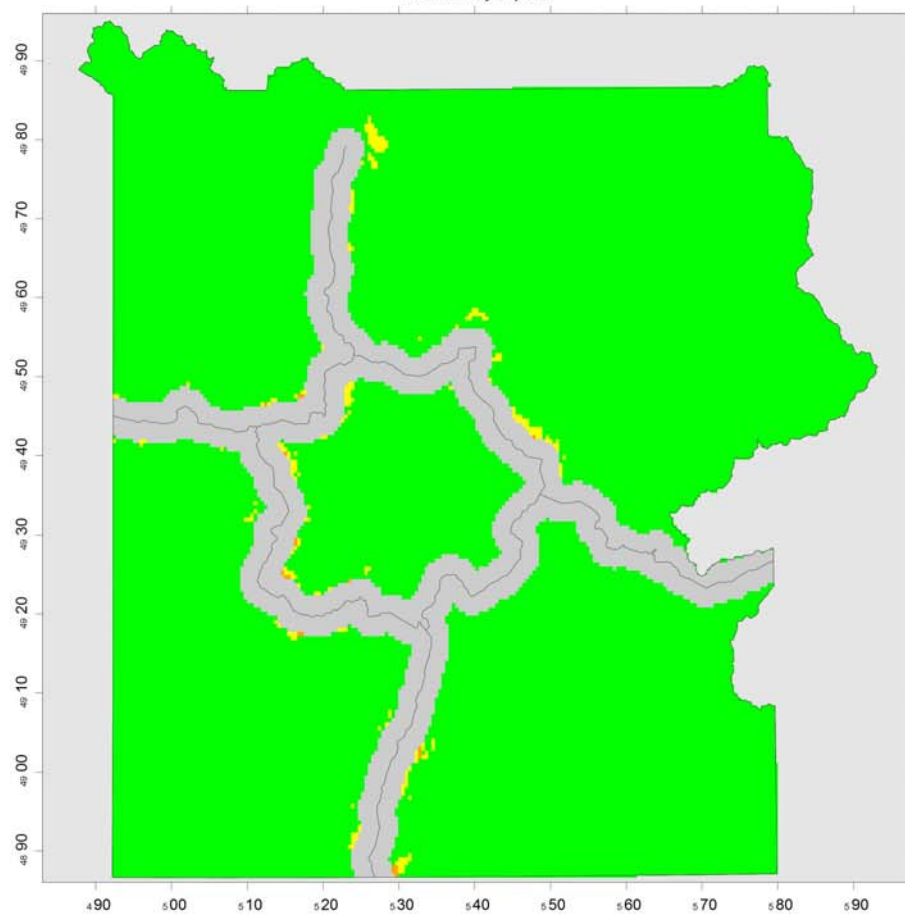




Yellowstone Winter Use - Alt 4Dr2  
Travel Corridor Impacts



Yellowstone Winter Use - Alt 4Dr2  
Backcountry Impacts



## **APPENDIX F: YELLOWSTONE WINTER USE NOISE MODELING FOR THE 2011 EIS AND 2013 SEIS**

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One of the most spatially extensive environmental effects of any transportation system is noise. Noise models are routinely used in airport and road projects to compare the effects of different alternatives. Accordingly, acoustical modeling has played an important role in previous winter use planning for Yellowstone and Grand Teton National Parks. Perhaps the most significant challenge for noise modeling at Yellowstone is the requirement that the audibility of oversnow vehicle (OSV) noise be predicted, in terms of spatial extent and duration of effects. The challenge arises from two causes: the extremely low background sound levels that occur during winter in the park, and uncertainties regarding the attenuation of noise energy at very long ranges. This report describes the methods that were used to model OSV noise to support the next winter use plan.

There are two noise propagation models available to the National Park Service (NPS) that can model audibility: the Integrated Noise Model (INM) developed by the John A. Volpe National Transportation Systems Center (Volpe: Cambridge, MA), and the Noise Simulation Model (NMSim) developed by Wyle Laboratories (Arlington, VA). NMSim was derived from the Noisemap model used by the U.S. Air Force. Both models were developed to address aircraft noise, but they are readily adaptable to ground noise sources. INM and NMSim take slightly different approaches to noise modeling. INM integrates noise exposure from route segments for each vehicle using the time required to transit that segment and the vehicle noise output. NMSim simulates the noise radiated by each vehicle at closely spaced points along each route. NMSim can explicitly simulate the scheduling of multiple vehicle movements, and can produce noise map animations to illustrate its results.

In 1998 an interagency, multidisciplinary noise model validation study was initiated to empirically test the ability of four noise models to predict the audibility of aircraft noise at Grand Canyon. Forty-seven scientists and engineers from ten federal agencies and engineering companies participated in the study design, execution, and review of the results. The final report (Miller et al. 2003) concluded: “Overall, NMSim proved to be the best model for computing aircraft audibility, because it is shown to have the most consistent combination of low error, low bias, and low scatter for virtually all comparisons.” A subsequent review by the Federal Interagency Committee on Aircraft Noise (Fleming et al. 2005) included the following statements comparing INM and NMSim:

The components of both INM Version 6.2 and NMSim are based on well-established physics, and have been field validated.

Substantial gains have been made with regard to understanding model-to-model differences; and many of those differences have been reduced or eliminated. However, when comparing INM Version 6.2 and NMSim, there still remain some differences, particularly with point-to-point comparisons.

Both INM Version 6.2 and NMSim are performing equally well, on average, when compared with the “gold standard” audibility data measured in the GCNP MVS.

GCNP MVS refers to Miller et al. 2003.

INM was used in the OSV noise study conducted by Volpe in support of the 2007 Yellowstone Environmental Impact Statement (EIS) (Hastings et al. 2006). The report found that the percent of the park area in which any OSV noise would be audible varied from 10-15% for the modeled alternatives. However, the 2007 EIS noted that INM underestimated the measured sound level of OSVs at eight of twelve monitoring sites in the park and underestimated the percent time audible at seven of twelve sites (and overestimated audibility at one site).

INM and NMSim take slightly different approaches to noise modeling, but they should generate comparable results (Fleming et al. 2005). Continued use of INM offers the strongest basis of comparison between any forthcoming alternatives modeling and the previous results, because differences in model outputs will be entirely due to differences in model inputs. Use of NMSim offers an opportunity to broadly cross-validate the results of the different noise models, and to identify modeling results that are contingent on the model used. Stated differently, INM offers more precise comparisons between future noise model results and the 2006 studies, while NMSim modeling would explore how strongly the noise mapping results depend upon the model used.

Given the systematic underestimation of noise exposure in the previous INM model results, we were inclined to use NMSim to see if a different model would produce better agreement with the monitoring data. Two additional considerations further tipped the balance of this choice towards NMSim. NMSim's capability to produce animated maps showing the temporal and spatial dynamics of noise exposure will be valuable for public outreach and interpretation. In addition, NSNS is working with one of the developers of NMSim to integrate sound propagation code that can account for some effects of wind and temperature inversions into NMSim. Previous winter use National Environmental Policy Act (NEPA) documents have acknowledged the substantial effects of these atmospheric conditions on noise propagation in the park. For example, temperature inversions will cause OSV noise to be audible at greater distances than would be predicted under neutral atmospheric conditions (when sound travels along straight ray paths). NMSim will provide the capacity to evaluate these effects quantitatively in the near future.

## **NMSIM PARAMETERS**

We used NMSim (Noise Model Simulation; Wyle Laboratories) to simulate OSVs and potential wheeled vehicle traffic in Yellowstone National Park. These models were based on data from several sources. A topographic raster file of the study area was ingested from the U.S. Geological Survey (USGS) Seamless Data Warehouse ([www.seamless.usgs.gov](http://www.seamless.usgs.gov)). To realize compatibility with NMSim, this file was converted into an ASCII file using ArcCatalog version 9.3. The acoustic ground impedance was set to 40 Rayls, corresponding to snow-covered terrain. The air temperature and relative humidity were set to -8.4°C and 73.9% respectively, the seasonal averages for Yellowstone (Hastings et al. 2006). NMSim, like INM, can calculate several summary metrics of noise exposure at sites of interest. Thirteen sites were specified (*ibid.*, Figure 28), with a receiver height of four feet above ground level (AGL). All of these choices conformed to the values used for the previous INM modeling (*ibid.*). One difference between the NMSim modeling and the previous INM models was the ambient sound level specification. The INM models designated two zones of ambient; these NMSim runs simplified the analysis by applying the 1/3 octave spectra data from the "Forested Area Acoustic Zone" (*ibid.* Table 1) throughout the park.

The NMSim simulations utilized a grid size of 200×200 points to evaluate noise exposure throughout Yellowstone. This corresponded to a spatial resolution of approximately 500 m. The full grid and receiver location data for every run were both saved to text files. The full grid data provided the raw material for subsequent evaluations of the aggregate noise exposure due to the full complement of OSV traffic on each route for each of the proposed management alternatives. The receiver location data provided convenient summaries of noise exposure at specific locations. The full grid output is a text file containing all of the 1/3 octave band data at each time step for every grid point. The receiver output is a text file that contains all of the 1/3 octave band data at each time step for every point of interest and some additional summary metrics.

Each NMS simulation required a trajectory file for the modeled vehicle. This trajectory file incorporated vehicle type, speed, direction of travel, and noise source height as parameters. The snow roads in the park were split into modeled road segments and saved as shape files using ArcGIS 9.3. Each segment shape file was imported into NMSim as a base layer. This base layer was used as a frame of reference to digitize each trajectory. OSV noise source heights were 0.47 m AGL for snowmobiles and 0.91 m AGL for snowcoaches. Wheeled vehicles source heights were 0.47 m AGL for the car and 0.61 m AGL for the bus and medium truck sources.

The road segments that make up the West Entrance to Old Faithful route were modeled at 40 kph (25 mph) and 56 kph (35 mph) for the snowmobile and 40 kph (25 mph) for the snowcoaches. Every other route in the park was modeled using 56 kph (35 mph) and 72 kph (45 mph) for the snowmobile and 40 kph (25 mph) for the snowcoaches. All wheeled vehicles were modeled at 56 kph (35 mph). These speeds were based on local speed limits and park expert observations regarding typical operating speeds. A 5-second time step was used for these simulations, resulting in an approximate spatial resolution of 100 m.

The noise source spectra for the simulations were obtained from the U.S. Department of Transportation (DOT) Volpe Transportation Center. These source data were obtained at a standard measurement distance of 15 m (50 ft). They were transformed for use in NMSim by changing the levels to correspond to a reference distance of 305 m (1000 ft). This transformation utilized instructions provided by the developers of NMSim.

## **INTERACTIVE MAPPING FRAMEWORK**

Noise modeling is a computationally intensive process. Modeling a full alternative can require more than one week of continuous processing on several computers. This delay inhibits an iterative, interactive process of alternative development and evaluation. In order to remove this obstacle, NSNS developed a software framework to separate the computationally intensive effort from the assessment of composite noise impacts. The isolated noise impacts of each component of all planned alternatives were computed in advance. Subsequently, an interactive program was used to add the individual noise contributions together to calculate the composite noise exposure from all operations.

The first step was to identify all of the unique combinations of vehicle type, operating parameters, and route segment that might be evaluated in the alternatives development process. For Yellowstone, this involved identifying the segments of the snow road network that could have different traffic levels. The following table lists the junctions that defined the endpoints of the road segments that were modeled:

Location	Vehicles modeled
Upper Terrace, Mammoth Hot Springs	Snowcoaches, Snowmobiles, wheeled vehicles
Norris Junction	Snowcoaches, Snowmobiles, wheeled vehicles
Canyon Village	Snowcoaches, Snowmobiles
West Entrance	Snowcoaches, Snowmobiles, wheeled vehicles
Madison Junction	Snowcoaches, Snowmobiles, wheeled vehicles
Fishing Bridge	Snowcoaches, Snowmobiles
East Entrance	Snowcoaches, Snowmobiles
Old Faithful	Snowcoaches, Snowmobiles, wheeled vehicles
West Thumb	Snowcoaches, Snowmobiles
South Entrance	Snowcoaches, Snowmobiles

Note that typical routes involved a combination of two or more segments. A trip from Mammoth Hot Springs to Old Faithful would involve a combination of the Mammoth-Norris, Norris-Madison, and Madison-Old Faithful segments. For the winter use analysis, ten road segments were modeled.

Each segment was modeled in both directions of travel. NMSim accounts for the change in engine loading with the slope of the road, as well as the speed of the vehicle. Seven vehicle types were modeled to support evaluation of the Yellowstone winter use alternatives: three types of snowcoaches, three types of wheeled vehicles, and a 4-stroke snowmobile. The wheeled vehicles were modeled for two routes: West Entrance to Old Faithful and Mammoth/Upper Terrace to Old Faithful (totaling four road segments). OSVs were modeled for all ten road segments.

More than 200 NMSim simulations were computed; 84 of these were used to evaluate the EIS alternatives (the EIS analysis was simplified by selecting a single snowcoach type). The simulations took more than a week, with several machines running continuously. They generated nearly one terabyte of output data. These data were processed by software developed by NSNS to compress and index the data for faster loading by a subsequent program. This compression required about one day of continuous processing time.

The interactive software developed by NSNS ingests two files: a comma separated value file containing the traffic levels for each vehicle, operating condition, and route segment, and the large data file with the NMSim noise data for each operation. This program generates several maps that graphically summarize the spatial extent of noise exposure, as well as tables providing numerical summaries of noise.

The NSNS iterative mapping framework has several benefits. New kinds of noise maps and tabular summaries can be rapidly implemented, thanks to the flexible structure of this software. All of the NSNS code was implemented in R, an open source software environment that is available for free (R Development Core Team 2010). More importantly, the consequences of revised alternatives can be evaluated in a few minutes, or about 1000 times quicker than would be possible if the revised alternative had to be modeled by computing a full set of noise models.

The computations in this iterative framework utilize the exact same computations that the models would employ if they were used to process the composite alternatives. For peak noise exposure levels, the iterative framework simply identifies the component of the local traffic that generated the loudest event. Aggregate noise energy is very simple to compute, as noise energy from multiple sources can be summed. This simple approach to summing noise energy assumes that the noise signals of different sources are uncorrelated, an assumption that will rarely be violated. For temporal metrics, like the duration of audibility, this framework uses a statistical formula that accounts for the probable overlap of adjacent

noise events. This formula is adapted from Tanner (1951). Tests of this formula by the U.S. DOT Volpe Transportation Center using data from the interagency model validation study at Grand Canyon (Miller et al. 2003) have proven this formula to provide the most accurate fit to the field data of the methods tested thus far.

## NOISE METRICS

The choice of noise metrics was motivated by three considerations: sustaining connections to previous noise impact analyses for Yellowstone and other NPS park units, incorporating knowledge gained from recent research and engineering developments, and improving the robustness of the results by diminishing the potential effects of modeling idiosyncrasies.

The percent time that vehicle noise is audible was retained; it has been the foundation of all NPS noise impact assessments. Peak noise levels were modeled by Hastings et al. (2006), and a very similar metric was retained in this modeling effort. Instead of using the peak noise level, this analysis used the energy average ( $L_{eq}$ ) of the four loudest noise levels (“peak 4”). This slight modification offered two benefits. First, it reduced the variation in estimated peak level that results from the precise locations that the model happened to select when projecting vehicle noise along a road. Second, it provides an indication of the duration of this high noise level: 15 seconds. The third metric modeled was audibility  $L_{eq}$ .

$L_{eq}$  metrics have been extensively studied for more than four decades in relation to transportation noise. The World Health Organization (WHO 1999) recommends that: “Where there are no clear reasons for using other measures, it is recommended that  $LA_{eq,T}$  be used to evaluate more-or-less continuous environmental noises.” In the quoted text, the “A” refers to A-weighted integration of acoustic power spectra, and the “T” refers to the interval over which energy is averaged. FICON (1992) noted that criticism of  $L_{dn}$  (and other  $L_{eq}$  metrics) often stems from “lack of understanding of the basis for the measurement, calculation, and application of that metric.” Many people have difficulty relating an aggregate of perceived noise events to an average noise level, especially when the time interval for averaging extends over long periods. Hourly, daily, and even annual  $LA_{eq}$  metrics have been used by some U.S. Federal Agencies.

The noise models predict when the noise will be audible, so the  $LA_{eq,T}$  metric used to support the winter use planning was  $LA_{eq,audible}$ . Instead of dividing the integrated noise energy by the entire modeling interval (0800-1600), this formula divides the energy by the total time audible. This summary noise level is more readily interpreted: it is the average noise level when the sound can be heard.  $LA_{eq,audible}$  does not discount the average level because there are intervals of silence in the modeled day. Therefore,  $LA_{eq,audible}$  is logically and statistically independent of percent time audible. One metric addresses noise intensity when present; the other addresses how often noise is present. This approach addresses the recommendations of Miller (1999) for NPS noise analyses.

Note that  $LA_{eq,8h}$  can be calculated from percent time audible and  $LA_{eq,audible}$ :

$$LA_{eq,T} = LA_{eq,audible} + 10 \cdot \log_{10}(\text{time audible}/T)$$

## SCIENTIFIC RATIONALE FOR THE SELECTION OF ACOUSTICAL METRICS FOR WINTER USE ANALYSES

Section 4.9 of the NPS *Management Policies 2006* (NPS 2006) states that the NPS will preserve, to the greatest extent possible, the natural soundscapes of the park, both biological and physical. Natural sounds are intrinsic elements of the environment that are vital to the functioning of ecosystems and can be used to determine the diversity and interactions of species within communities. Soundscapes are often associated with parks and are considered important components of the visitor experience as well as the natural wildlife interactions.

Sound is an intrinsically variable phenomenon that is often described by some basic properties: loudness, timing, pitch. However, the number of potential descriptors is quite large. For example, more than 40,000 measurements per second are required to fully capture the range of sounds audible to humans. The model used to predict noise exposure from winter use in this EIS (NMSim) generates a more compact summary of OSV sounds – 36 measurements per second – but these summaries are still far too complex for NEPA impact analysis. For management purposes, the time history of each OSV noise event is not pertinent. Instead, metrics are needed to concisely represent the aggregate noise exposure generated by each alternative.

In previous NEPA documents, OSV noise has been evaluated in terms of three metrics: the percent time that OSVs are audible, the maximum OSV noise level, and the percent of the park area in which OSV noise was audible. The present analysis retains part of this framework, and extends it to provide additional information. Percent time audible is used, as it has been in the past, to evaluate how often noise intrudes in the natural soundscape. This can be measured by an attentive listener with normal hearing, and it was modeled for this EIS using the NMSim software package. This measure of duration was complimented by a measure of the average loudness of OSV noise when it was audible: “Audible  $L_{eq}$ .”

$L_{eq}$  metrics have been the primary means of evaluating community noise since the 1970s (EPA 550/9-94-004: “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety”). Virtually all of these metrics, including the metric used here, utilizes an A-weighted filter to sum up all the sound energy across the audible spectrum. The purpose of A-weighting is to add together sound energy across the entire audible spectrum to produce an aggregate measure of perceived loudness.  $L_{eq}$  stands for the A-weighted, average squared sound pressure deviations (the sound energy). Many forms of  $L_{eq}$  have been used, with one distinguishing feature being the time span over which sound energy is averaged. For the Federal Aviation Administration, the primary noise impact metric is DNL (or  $L_{DN}$ ), which is a 24 hour  $L_{eq}$  with a 10 dBA penalty for noises at night. For Federal Highways, the primary metric is the hourly  $L_{eq}$ .

Studies of noise impacts in parks included  $L_{eq}$  as one of the metrics used to predict impacts (Anderson et al. 1993; Miller 1999; Rapoza et al. 2005). In the “dose-response” studies conducted at Grand Canyon, Bryce Canyon, Haleakala, and Hawai’i Volcanoes National Parks,  $L_{eq}$  referred to the sound energy averaged over the duration of a visit; observers recorded when each visitor entered and exited the study sites. A comprehensive reanalysis of these data (Anderson 2010) revealed that  $L_{eq}$  was the most consistent and accurate predictor of annoyance or perceived interference with natural quiet in these surveys. Percent time audible and several other metrics were evaluated in the reanalysis, but they did not perform quite as well across all conditions. A notable feature of the new statistical model is that the magnitudes of park-specific coefficients were dramatically reduced. In contrast to the earlier models (Anderson et al. 1993; Miller 1999; Rapoza et al. 2005), this suggests that the new analysis has revealed a generic predictor of visitor responses, which are much less contingent on the local context.



One difficulty with  $L_{eq}$ , especially when it refers to long intervals of time, is that it averages noise energy across the entire interval, which may include substantial periods when no noise is present. In order to address this issue, and produce a summary metric that is more readily interpreted, this EIS uses “Audible  $L_{eq}$ .” Audible  $L_{eq}$  measures the average noise level when the noise can be perceived by an attentive listener. Intervals of time when no noise is audible are omitted from the calculation. Collectively, Percent Time Audible and Audible  $L_{eq}$  provide a direct link to previous  $L_{eq}$  metrics:  $L_{eq} = \text{Audible } L_{eq} + 10 \cdot \log_{10}(\text{Percent Time Audible})$ . This equation provides an opportunity to relate winter use noise impact criteria to the research and standards that addressed community noise impacts.

Combining Percent Time Audible and  $L_{eq}$  to analyze noise impacts was recommended more than ten years ago by a noise control expert with extensive experience working in national park settings (Miller 1999). Miller’s paper utilized  $L_{eq}$  (aircraft)-  $L_{eq}$  (background) in combination with Percent Time Audible, where the averaging time for  $L_{eq}$  spanned the duration of a visit. In recent discussions with the Natural Sounds and Night Skies Division, Miller has acknowledged that Audible  $L_{eq}$  may be better. Audible  $L_{eq}$  is more readily interpreted, because it represents the average level of the noise when it is perceptible. Second, Audible  $L_{eq}$  is statistically independent of Percent Time Audible because it is unaffected by periods of silence.

In addition to Percent Time Audible and Audible  $L_{eq}$ , one more metric was computed and analyzed for this EIS. Previous analyses used the peak noise level –  $L_{max}$  – to assess the most acute noise conditions. The current analysis utilized a very similar metric – Peak 4 – which summarized the  $L_{eq}$  of the four loudest noise levels. Peak 4 has two advantages over  $L_{max}$ . First, this measurement is highly repeatable in modeling, because it is not sensitive to the timing of a vehicle’s movement along a route or the location of the modeled receiver points. Second, this metric also indicates the minimum duration of the loud event. Successive time steps in the Winter Use models were about five seconds apart, so a Peak 4 event had to be at least 15 seconds long.

## SCIENTIFIC BASES FOR TRANSLATING METRIC VALUES INTO PLAUSIBLE LEVELS OF IMPACT

Each metric focuses on a particular aspect of noise exposure, deemphasizing or neglecting others. Peak 4 measures the loudest noise events, but does not indicate how often they occur. Peak 4 will not vary among alternatives unless the loudest vehicles in one alternative are completely eliminated from other alternatives; it is insensitive to changes in daily traffic levels. Audible  $L_{eq}$  measures how loud noise is on average (when it can be heard), but does not indicate how often it occurs. Audible  $L_{eq}$  will not vary among alternatives if the traffic mix does not vary, even if overall traffic levels change. Percent Time Audible measures how often noise is detectable, and it provides a measure of one effect of changing traffic levels. However, it provides no information about how loud the noise is.

$L_{eq}$ , the metric that has been used for most community noise studies, measures total noise energy, regardless of when it occurs and from what source. The numeric value of  $L_{eq}$  is difficult to interpret in a park setting, where there are long intervals of silence, but comparisons among  $L_{eq}$  values for different alternatives can be readily translated into changes in effective traffic level. Accordingly, NPS has decided to utilize  $L_{eq}$  as an aggregate measure of the effects of OSV traffic as measured by noise level.

For this EIS, an  $L_{eq}$  of 35 dB has been selected as the criterion corresponding to a major impact to travel corridor acoustical environments. A variety of authoritative and scientific sources point to 35 dBA as a pertinent sound level criterion for quiet environments. ANSI Standard 12.2 – Criteria for Evaluating Room Noise – specifies 35 dBA as the desired background condition for many indoor spaces where quiet and outstanding listening conditions are important (bedrooms, auditoria, theatres, conference rooms).

ANSI 12.60 – Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools – specifies 35 dBA as the background criterion for empty classrooms, recognizing that children are demonstrably less capable of distinguishing speech in noise and that noise affects attention. Note that an  $L_{eq}$  of 35 dB can be realized by several combinations of Percent Time Audible and Audible  $L_{eq}$ : 50% and 38 dB, 25% and 41 dB, 10% and 45 dB, 1% and 55 dB. Higher intensity exposures can be evaluated as having equivalent impacts to the acoustical environment if the duration of the exposure is shortened sufficiently.

The lesser impact criteria of moderate and minor have been chosen by successive decrements of 10 dB from the major impact criterion: moderate impacts when  $L_{eq}$  is greater than 25 dB, minor impacts when  $L_{eq}$  is greater than 15 dB. For backcountry settings, the impact criteria are equal to the travel corridor values minus 10 dB: major impacts when  $L_{eq}$  is greater than 25 dB, moderate impacts when  $L_{eq}$  is greater than 15 dB, and minor impacts when  $L_{eq}$  is greater than 5 dB. Note that a 10 dB decrease in noise exposure is equivalent to a tenfold decrease in traffic or a tenfold increase in distance from a straight segment of road. In accordance with recommendations in the NPS Visitor Experience and Resource Protection Handbook (NPS 1997) and other management guidance, the overall impact determinations for the park incorporate provisions for exceptions. If less than 10 percent of the travel corridor or backcountry was within a given category, the overall conclusion for the alternative would drop to the next lower category. For example, if 5 percent of the travel corridor was in the major impact category and 6 percent was in the moderate impact category, the overall conclusion would be moderate impacts in the travel corridor.

Although these impact criteria do not specify pristine acoustical conditions, they are highly protective. The major impact criterion for the travel corridor corresponds to recommendations for quiet indoor environments where good listening conditions are important. For backcountry sites, the major impact criterion would correspond to requirements for recording studios and other indoor settings demanding the lowest possible sound levels (at significant expense). These criteria should also be protective for wildlife. Landon et al. (2003) found that Sonoran pronghorn antelope avoid areas with  $L_{eq} > 55$  dB and preferred areas with  $L_{eq} < 45$  dB.

Audible  $L_{eq}$  provides an additional basis for relating these impact criteria to a peer-reviewed study. Aasvang and Engdahl (1999) conducted two days of surveys in a park setting near a large airport. On day 1, 10 of 20 subjects found sounds exceeding 60 dBA to be unacceptable in the park setting. On the second day, 9 of 16 subjects found sounds above 50 dBA to be unacceptable. In the travel corridor, events exceeding 60 dBA would have been limited to less than 0.3% of the day, or about one and half minutes in total. Events exceeding 50 dBA would have been limited to less than 3% of the day, or about fifteen minutes in total. In backcountry sites the allowable durations would be one tenth of these values.

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## **Appendix G**

# **Yellowstone National Park Draft Winter Use Plan / Supplemental Environmental Impact Statement**

## **Comment Response Report**

**February 2013**

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# INTRODUCTION AND GUIDE

## INTRODUCTION

Pursuant to the National Environmental Policy Act (NEPA), its implementing regulations, and National Park Service (NPS) guidance on meeting the NEPA obligations, Yellowstone National Park (Yellowstone or the park) invited the public to submit comments on the Draft Winter Use Plan/Supplemental Environmental Impact Statement (draft plan/SEIS). This report describes how the NPS considered public comments and provides responses to those comments.

After the Environmental Protection Agency's (EPA's) release of the Notice of Availability to prepare the draft plan/SEIS, a 45-day public comment period was open between June 29, 2012, and August 20, 2012. This public comment period was announced on the park website ([www.nps.gov/yell](http://www.nps.gov/yell)); in a newsletter sent to interested parties, elected officials, and appropriate local and state agencies; and through press releases.

The park opened an additional comment period starting on August 31, 2012, the day the EPA published its notice in the Federal Register. The new 30-day comment period was open between August 31, 2012, and October 7, 2012. The second public comment period allowed the park an additional opportunity to address public and cooperating agency comments on the draft plan/SEIS. The additional comment period was announced on the park website and through a press release.

The draft plan/SEIS was made available through several outlets, including the NPS Planning, Environment, and Public Comment (PEPC) website at <http://parkplanning.nps.gov/>, hardcopies at the parks headquarters and visitor centers, and by request to receive a copy through the mail. After reviewing the draft plan/SEIS, the public was encouraged to submit comments about the draft plan/SEIS through the NPS PEPC website, by postal mail sent directly to the park, or delivered in person directly to the park. Oral statements and written comments were accepted during the public comment meetings.

## PUBLIC MEETINGS

The draft plan/SEIS was available for public review and comment between June 29, 2012, and August 20, 2012, and August 31, 2012, and October 7, 2012. Four public meetings were held in July 2012. Public meetings were held to describe the plan, continue the public involvement process, and obtain input on the draft plan/SEIS for winter use and Yellowstone National Park. The public meetings held during the public comment period for the draft plan/SEIS are listed below:

- July 16, 2012: The Virginian in Jackson, Wyoming
- July 17, 2012: Holiday Inn in West Yellowstone, Montana
- July 18, 2012: Wingate by Wyndham in Bozeman, Montana
- July 19, 2012: Holiday Inn in Cody, Wyoming

A total of 144 meeting attendees signed in during the four meetings. The meetings began with an open house where displays were stationed around the room and the public was able to ask questions to Yellowstone and NPS personnel. Next, a presentation was given about the draft plan/SEIS, followed by a question-and-answer period and an opportunity to provide oral comment. Following the comment portion of the meeting, as time allowed, the open-house portion of the meeting resumed. Those attending the meeting received a handout that described the NEPA process, detailed the alternatives, and listed additional opportunities to comment on the project, such as providing comments on the NPS PEPC website at <http://parkplanning.nps.gov/>. Public comments received are categorized in the following sections of this report.

Park staff were available at the meetings to answer questions and provide additional information to open house participants. During the public comment period, 11,989 pieces of correspondence were entered into the PEPC website. Some comments were entered directly by the commenter. The NPS or the NPS contractor uploaded hard copy letters, emails, and comment forms sent to the NPS by the public.

## **THE COMMENT ANALYSIS PROCESS**

Comment analysis is a process used to compile and correlate similar public comments into a format that can be used by decision makers and the interdisciplinary team. Comment analysis assists the team in organizing, clarifying, and addressing technical information pursuant to NEPA regulations. It also aids in identifying the topics and issues to be evaluated and considered throughout the planning process.

The process includes five main components:

- Developing a coding structure
- Employing a comment database for comment management
- Reading and coding public comments
- Interpreting and analyzing the comments to identify issues and themes
- Preparing a comment summary

A coding structure was developed to help sort comments into logical groups by topics and issues. The coding structure was derived by analyzing the range of topics discussed during internal NPS scoping, past planning documents, and the comments themselves. The coding structure was designed to capture all comment content rather than to restrict or exclude any ideas.

The NPS PEPC database was used for managing the comments. The database stores the full text of all correspondence and allows each comment to be coded by topic and issue. Outputs from the database include the total number of correspondence and comments received, sorting and reporting of comments by a particular topic or issue, and demographic information for the sources of the comments.

Analysis of the public comments involved assigning codes to statements made by the public in their letters, email messages, and written comment forms. All comments were read and analyzed, including those of a technical nature; opinions, feelings, and preferences of one element or one potential alternative over another; and comments of a personal or philosophical nature.

During coding, comments were classified as substantive or non-substantive. As stated in Director's Order 12, substantive comments "raise, debate, or question a point of fact or policy." Comments that suggested changes to the preliminary range of draft alternatives or suggested new alternatives or alternative elements were also considered substantive. Comments in favor of or against the preliminary range of draft alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive. All comments were read and considered and were used to help create the final plan/SEIS; however, only those determined to be substantive were used to develop concern statements.

Although the analysis process attempts to capture the full range of public concerns, this report should be used with caution. Comments from people who chose to respond do not necessarily represent the sentiments of all members of the public. Furthermore, comment analysis is not a vote counting process; comment analysis emphasizes the content of the comment rather than the number of times a comment is received.

## DEFINITION OF TERMS

Primary terms used in the document are defined below.

**Correspondence:** An item of correspondence is the entire document received from a commenter. It can be in the form of a letter, email, written comment form, note card, open house or webinar transcript, or petition.

**Comment:** A comment is a portion of the text within an item of correspondence that addresses a single subject. A comment could include such information as an expression of support or opposition to the use of a potential management tool, additional data regarding the existing condition, or an opinion debating the adequacy of an analysis.

**Code:** A code is a grouping centered on a common subject. Codes were developed during the public comment process and were used to track major subjects.

**Concern:** A concern summarizes the issues identified by each code. Each code is further characterized by concern statements that focus on the content of comments. Some codes require multiple concern statements. In cases where no comments were received about an issue, the issue was not identified or discussed in this report.

All public comments were considered important as useful guidance and input to the public comment process, but only substantive comments were analyzed in the Concern Response Report.

## GUIDE TO THIS DOCUMENT

This report is organized as follows.

**Content Analysis Report:** This basic report generated by PEPC provides information about the numbers and types of comments received, organized by code. Table 1 summarizes the number of comments that were coded under each topic. Tables 2–5 show general demographic information, such as the states where commenters live and the number of letters received from different organizations.

**Correspondence by Organization Type:** This table lists all groups that submitted comments, arranged by the following organization types as defined by PEPC (and in this order): businesses; churches and religious groups; civic groups; conservation/preservation groups; federal government; NPS employees; non-governmental groups; recreational groups; state government; town or city government; tribal government; unaffiliated individuals; university/professional society. Each item of correspondence was assigned a unique identification number upon entry into PEPC. This number can be used to assist the public in identifying how the NPS addressed their comments.

**Concern Response Report:** This report summarizes the substantive comments received during the scoping process. These comments are organized by codes and further organized into concern statements. Below each concern statement is a response to that concern.

## CONTENT ANALYSIS REPORT

**Table 1: Comment Distribution**

Note: Each comment may have multiple codes. As a result, the total number of comments may be different than the actual comment totals.

Code	Description	# of Comments (# of signatures if different)	% of Comments
AE1000	Affected Environment - General (Substantive)	2	Less than 1%
AE1005	Affected Environment - General (Non-Sub)	16	Less than 1%
AE12000	Affected Environment: Wildlife And Wildlife Habitat	7	Less than 1%
AE120010	Affected Environment: Wildlife And Wildlife Habitat (Non-Sub)	281	Less than 1%
AE21010	Affected Environment: Socioeconomics (Non-Sub)	19	Less than 1%
AE22500	Affected Environment: Visitor Use and Experience	1	Less than 1%
AE22510	Affected Environment: Visitor Use and Experience (Non-Sub)	386	1.01%
AE30000	Affected Environment: Health and Safety	3	Less than 1%
AE30010	Affected Environment: Health and Safety (Non-Sub)	19	Less than 1%
AE7000	Affected Environment: Air Quality	3	Less than 1%
AE7010	Affected Environment: Air Quality (Non-Sub)	109	Less than 1%
AE9500	Affected Environment: Soundscapes	2	Less than 1%
AE9510	Affected Environment: Soundscapes (Non-Sub)	275	Less than 1%
AL1000	Alternatives: Elements Common To All Alternatives	3,242 (4,519)*	8.52%
AL1005	Alternatives: Elements Common To All Alternatives (Non-Sub)	33 (35)	Less than 1%
AL1100	Alternatives: Alternative 1	4	Less than 1%
AL1200	Alternatives: Support Alternative 1	18	Less than 1%
AL1300	Alternatives: Oppose Alternative 1	107 (1,382)	Less than 1%
AL2100	Alternatives: Alternative 2	5	Less than 1%
AL2200	Alternatives: Support Alternative 2	77 (584)	Less than 1%
AL2300	Alternatives: Oppose Alternative 2	55 (824)	Less than 1%
AL3100	Alternatives: Alternative 3	10	Less than 1%
AL3200	Alternatives: Support Alternative 3	5,375*	14.13%

<b>Code</b>	<b>Description</b>	<b># of Comments (# of signatures if different)</b>	<b>% of Comments</b>
AL3300	Alternatives: Oppose Alternative 3	108 (1,383)	Less than 1%
AL4100	Alternatives: Alternative 4	3,101 (3,606)*	8.15%
AL4200	Alternatives: Support Alternative 4	270 (1,041)	Less than 1%
AL4300	Alternatives: Oppose Alternative 4	1,035*	2.72%
AL9000	Alternatives: New Alternatives or Elements	238	Less than 1%
AL9005	Alternatives: Alternatives or Elements	123	Less than 1%
AL9020	Alternatives: Support More OSVs	16	Less than 1%
AL9030	Alternatives: Support Less OSVs	813 (815)	2.14%
AL9040	Alternatives: Support Snowcoach Only	453	1.19%
AL9050	Alternatives: Support OSV Access	64 (66)	Less than 1%
AL9100	Alternatives: Support No OSV Access	1,337*	3.52%
AL9110	Alternatives: General Access to the Park (Non-Substantive)	54	Less than 1%
AL9115	Alternatives: Non-Guided OSV Use	4	Less than 1%
AL9120	Alternatives: Non-Guided OSV Use (Non-Substantive)	13	Less than 1%
AL9150	Alternatives: Non-commercially guided OSV Use	3,434 (4,709)*	9.03%
AL9200	Alternatives: Non-commercially guided OSV Use (Non-Substantive)	789	2.10%
AL9210	Alternatives: Non-commercially guided OSV Use: BAT	3	Less than 1%
AL9250	Alternatives: Support Snowmobiles Using Sylvan Pass and East Entrance	126 (1,400)	Less than 1%
AL9300	Alternatives: Oppose Snowmobiles Using Sylvan Pass and East Entrance	66	Less than 1%
AL9350	Alternatives: Sylvan Pass	3,442*	9.05%
AL9360	Alternatives: Sylvan Pass (Non-Substantive)	2,507 (2,510)*	6.59%
AL9400	Alternatives: Best Available Technology (BAT)	3,808 (5,085)*	10.01%
AL9500	Alternatives: Best Available Technology (BAT) (Non-Substantive)	1,384*	3.64%
AL9600	Alternatives: Summer Use	11	Less than 1%
AL9650	Alternatives: Summer Use (Non-Substantive)	27	Less than 1%
AL9700	Alternatives Dismissed: Allow use of personal, wheeled vehicles on plowed roads	5	Less than 1%
AL9750	Alternatives Dismissed: General (Non-Substantive)	14	Less than 1%

<b>Code</b>	<b>Description</b>	<b># of Comments (# of signatures if different)</b>	<b>% of Comments</b>
AL9800	Alternatives Dismissed: Snowbikes	136	Less than 1%
AM1000	Adaptive Management	7	Less than 1%
AQ2000	Air Quality: Methodology And Assumptions	6	Less than 1%
AQ4000	Air Quality: Impact Of Proposal And Alternatives	7	Less than 1%
AQ4005	Air Quality: Impact Of Proposal And Alternatives	37	Less than 1%
CC1000	Consultation and Coordination: General Comments	10	Less than 1%
GA1000	Impact Analysis: Impact Analyses	11	Less than 1%
GA1010	Impact Analysis: Impact Analyses (Non-Sub)	89	Less than 1%
GA1500	General: Methodology and Assumptions	1	Less than 1%
HS2000	Health and Safety: Impact Of Proposal And Alternatives	1	Less than 1%
MT1000	Miscellaneous Topics: General Comments	1,987*	522%
PN2000	Purpose And Need: Park Purpose And Significance	1,326*	3.49%
PN2005	Purpose And Need: Park Purpose And Significance (Non-Sub)	133	Less than 1%
PN3000	Purpose And Need: Scope Of The Analysis	3	Less than 1%
PN4000	Purpose And Need: Park Legislation/Authority	10	Less than 1%
PN8000	Purpose And Need: Objectives In Taking Action	7	Less than 1%
PN8005	Purpose And Need: Objectives In Taking Action	3 (4)	Less than 1%
PR1000	Comments on the Proposed Rule	6 (10)	Less than 1%
SE2000	Socioeconomics: Methodology And Assumptions	2	Less than 1%
SE4000	Socioeconomics: Impact Of Proposal And Alternatives	14	Less than 1%
SE4005	Socioeconomics: Impact Of Proposal And Alternatives	13	Less than 1%
SS1000	Soundscapes: Methodology And Assumptions	8	Less than 1%
SS2000	Soundscapes: Impact Of Proposal And Alternatives	9	Less than 1%
SS2005	Soundscapes: Impact Of Proposal And Alternatives	135	Less than 1%
VE4000	Visitor Experience: Impact Of Proposal And Alternatives	58 (827)	Less than 1%



<b>Code</b>	<b>Description</b>	<b># of Comments (# of signatures if different)</b>	<b>% of Comments</b>
VE4005	Visitor Experience: Impact Of Proposal And Alternatives	115	Less than 1%
WH2000	Wildlife And Wildlife Habitat: Methodology And Assumptions	3	Less than 1%
WH4000	Wildlife And Wildlife Habitat: Impact Of Proposal And Alternatives	16	Less than 1%
WH4005	Wildlife And Wildlife Habitat: Impact Of Proposal And Alternatives	228	Less than 1%
XX1000	Duplicate Correspondence/Duplicate Comment	30	Less than 1%
XX2000	Spam Email	318	Less than 1%
<b>Total</b>		<b>38,032</b>	

\*denotes code for which form letters were received; 23 total form letters were received

**Table 2: Correspondence by Type**

<b>Type</b>	<b># of Items of Correspondence</b>
Web Form*	11,882
Letter	86
Transcript	21
<b>Total</b>	<b>11,989</b>

\*The letter and web form categories include 23 form letters, totaling 11,675 items of correspondence.

**Table 3: Correspondence by Organization Type**

<b>Organization Type</b>	<b># of Items of Correspondence (# of signatures, if different)</b>
Business	6
Conservation/Preservation	4
Federal Government	1
Non-Governmental	2
Recreational Groups	10
State Government	7
County Government	4 (8)
Town or City Government	4
Unaffiliated Individual	11,949 (13,233)
University/Professional Society	2
<b>Total</b>	<b>11,989 (13,277)</b>

Note: This table includes 23 form letters, totaling 11,675 items of correspondence

**Table 4: Correspondence Distribution by State, Territory, or Country**

<b>State</b>	<b>Percentage</b>	<b># of Correspondence</b>
AK	Less than 1%	60
AL	Less than 1%	44
AR	Less than 1%	57
AZ	2.8 %	339
CA	11.7 %	1,397
CO	4.1 %	496
CT	1.3 %	153
DC	Less than 1%	36
DE	Less than 1%	34
FL	5.9 %	713
GA	1.4 %	168
HI	Less than 1%	68
IA	1.0 %	119
ID	1.7 %	198
IL	5.3 %	630
IN	1.4 %	171
KS	Less than 1%	87
KY	Less than 1%	83

State	Percentage	# of Correspondence
LA	Less than 1%	62
MA	2.2 %	264
MD	2.4 %	287
ME	Less than 1%	88
MI	2.8 %	341
MN	2.5 %	296
MO	1.6 %	195
MS	Less than 1%	29
MT	2.5 %	304
NC	2.6 %	317
ND	Less than 1%	18
NE	Less than 1%	40
NH	1.0 %	116
NJ	2.0 %	240
NM	1.7 %	204
NV	Less than 1%	87
NY	4.2 %	501
OH	2.0 %	236
OK	Less than 1%	45
OR	3.5 %	421
PA	2.8 %	332
PR	Less than 1%	11
RI	Less than 1%	27
SC	Less than 1%	85
SD	Less than 1%	34
TN	1.2 %	146
TX	4.4 %	522
UT	1.3 %	153
VA	2.0 %	235
VT	Less than 1%	71
WA	3.6 %	426
WI	2.4 %	291
WV	Less than 1%	42
WY	1.3 %	158
Unknown or Outside the USA	4.3%	512
<b>Total</b>		<b>11,989</b>

**Table 5: Correspondence Distribution by Country**

<b>Country</b>	<b>Percent</b>	<b># of Items of Correspondence</b>
United States of America	95.8%	11,489
Canada	Less than 1%	19
Germany	Less than 1%	16
Great Britain	Less than 1%	12
France	Less than 1%	10
Australia	Less than 1%	8
Puerto Rico	Less than 1%	7
Spain	Less than 1%	7
Azerbaijan	Less than 1%	6
Ecuador	Less than 1%	6
Cape Verde	Less than 1%	6
Mexico	Less than 1%	6
Netherlands	Less than 1%	6
Republic of Congo	Less than 1%	6
Additional Countries, all making up less than 1%, with five correspondence or less	3.2%	385
<b>Total</b>		<b>11,989</b>

**YELLOWSTONE NATIONAL PARK  
2012 DRAFT WINTER USE PLAN / SUPPLEMENTAL EIS  
CONCERN RESPONSE REPORT**

**Report Date:** 02/12/2013

***AE1000 - Affected Environment - General (Substantive)***

**Concern ID:** 40263

**CONCERN  
STATEMENT:**

Commenters noted that the “Affected Environment” chapter of the draft plan/SEIS indicates that recreational oversnow vehicle (OSV) use is currently allowed, while the no-action alternative (which is supposed to be a continuation of current management) indicates that recreational OSV use is prohibited. Another commenter indicated that because the no-action alternative is no OSV use, the “Affected Environment” chapter should note that audibility of OSVs has been eliminated (not reduced), that the number of OSVs and groups of OSVs has been eliminated (not limited), and that motorized access to park roads and travel corridors has been eliminated (not limited, as stated in the draft plan/SEIS).

**Response:**

Per the Director’s Order 12 Handbook, the “affected environment” is a description of the resources that are expected to experience environmental impacts. Chapter 3 of the plan/SEIS describes the state of these resources based on available data. Because OSV use has been allowed for decades, the resources are described in a context where OSV use has affected the resources. In contrast to the “affected environment,” the no-action alternative describes what would happen if the NPS were to take no action at all, which would result in no public OSV use. Therefore, the impacts of no-action appropriately predict what park resources would look like if there were no public OSV use.

***AE12000 - Affected Environment: Wildlife And Wildlife Habitat***

**Concern ID:** 40264

**CONCERN  
STATEMENT:**

One commenter asked if the number of elk and bison presently in Yellowstone during the winter is down (with the implementation of Best Available Technology (BAT) restrictions) as compared to years before the restrictions.

**Response:**

Population trends for bison and elk in the park are discussed in chapter 3 of the plan/SEIS. Bison and elk numbers in the park have fluctuated over time; however, population trends are attributed to drought, severe winter weather, hunting, and predation. Motorized winter use in the park has not been cited as a major reason for population or demographic trends.

**CONCERN  
STATEMENT:**

One commenter suggested that the draft plan/SEIS affected environment is misleading in regard to wolverines, given their current U.S. Fish and Wildlife Service (USFWS) status, and that the role of climate change should be discussed as a potential threat. Another commenter suggested that the draft plan/SEIS does not incorporate the current status of wolverines, because the USFWS, on July 12, 2011, entered into a settlement agreement to accelerate a final listing determination and publish a proposed listing rule for wolverines.

**Response:**

At this time, wolverines have been proposed for listing under the Endangered Species Act, but are not listed under the Endangered Species Act. Procedurally, it is not feasible to examine impacts or manage for species that are not yet listed. Should wolverines come under the protection of the Endangered Species Act, the NPS will

consult with the USFWS and, if necessary, make adjustments to the winter-use management framework. Additional information has been added to “Chapter 3: Affected Environment” of the plan/SEIS regarding current threats to wolverines, including climate change.

**Concern ID:** 40268

**CONCERN STATEMENT:** One commenter asked how many animals are killed by cars and snowmobiles.

**Response:** The scope of the plan/SEIS is limited to the winter season; the document does not examine the number of vehicle-caused mortalities during summer months. During the winter, twenty-four individuals of six mammal species are recorded as having been killed by OSVs in the park from 1989-2003. However, these documented cases of vehicle-caused mortality all occurred before the 2004/2005 winter season when the requirement that all oversnow vehicles entering the park be guided was first put in place. No OSV related vehicle-caused mortalities were reported from the 2004/2005 season through the 2012/2013 season.

### ***AE7000 - Affected Environment: Air Quality***

**Concern ID:** 40260

**CONCERN STATEMENT:** One commenter noted that the draft plan/SEIS states that the NPS will “continue to monitor NO<sub>2</sub> to better understand trends in concentrations and the relationship between NO<sub>2</sub> concentrations and specific OSV types,” but questioned whether NPS has the ability to better understand the relationship between OSV types and NO<sub>2</sub>.

**Response:** The NPS has collected data on nitrogen oxides from tailpipe emissions of OSVs and expects to conduct additional research regarding nitrogen oxides in the future. Fixed-site air monitoring stations in the park also collect data regarding nitrogen oxides. Where possible, the NPS will correlate this data to individual vehicle types in order to better understand the issues and impacts related to emission of NO<sub>2</sub> by OSVs.

**Concern ID:** 40261

**CONCERN STATEMENT:** Commenters stated that while the “Affected Environment” chapter of the draft plan/SEIS addresses air quality from 2003 to 2009, it should also address the air quality (particularly at Old Faithful) from 2007 to 2009, noting that the air quality during this time period has not remained stable.

**Response:** The NPS has updated the air quality sections of the plan/SEIS in chapters 3 and 4 to include the most recent data available, including data specific to air quality at Old Faithful.

**Concern ID:** 40262

**CONCERN STATEMENT:** One commenter suggested that a reduction of noise and air pollution in Yellowstone should be addressed in the draft plan/SEIS.

**Response:** The NPS has addressed the need to reduce air and sound emissions. Under the preferred alternative, the NPS would implement new sound and air quality emission (BAT) requirements for both snowmobiles and snowcoaches in order reduce the impacts of OSVs to both air quality and the park’s soundscapes.

***AL1000 - Alternatives: Elements Common To All Alternatives***

**Concern ID:** 40271

**CONCERN  
STATEMENT:**

Commenters made suggestions for elements related to speed limits. Some commenters stated that decreasing the speed limit from 35 mph to 25 mph in sensitive wildlife corridors is a step in the right direction, but that lower speed limits are also warranted. Other commenters opposed the 25 mph and 35 mph limits, in favor of higher speed limits, particularly at the section between Norris Junction and Canyon, and the section from Lake Hotel to near West Thumb. Other commenters suggested keeping the speed limits as they currently are.

**Response:**

Under the preferred alternative, the speed limit for snowmobiles would be 35 mph and the speed limit for snowcoaches would be 25 mph. These speeds represent the typical maximum cruising speed of each type of vehicle, respectively. The NPS believes these speed limits are appropriate to protect visitor safety and to limit impacts to park resources, including the minimization of OSV-caused noise. Under the preferred alternative, the NPS would have the authority to reduce speed limits in any area should concerns over impacts to park resources arise.

**Concern ID:** 40272

**CONCERN  
STATEMENT:**

One commenter suggested that a one-year transition period should be implemented instead of the proposed two-year transition period, so that non-commercial use can begin earlier.

**Response:**

Under the preferred alternative, there would be a one-year transition period for the 2013/2014 season, during which OSV use would be allowed at the same levels and with the same restrictions as have been in place under the interim regulations in effect from the 2009/2010 season through the 2012/2013 season. The NPS intends to use this time to work with stakeholders to develop the non-commercially guided access program so that it can be implemented beginning in the 2014/2015 season.

**Concern ID:** 40274

**CONCERN  
STATEMENT:**

Commenters suggested that all snowmobiles should be registered by the state in which the owner resides. They also suggested that having driver's licenses should be a requirement, but that other requirements (particularly requiring snowmobilers to carry avalanche equipment) could be overbearing, unnecessary, and discourage visitation.

**Response:**

Under the preferred alternative, all OSV drivers must possess and carry a valid state-issued motor vehicle driver's license at all times. Snowmobiles and snowcoaches must be properly registered and display a valid registration from a state or province in the United States or Canada, respectively. As stated in chapter 2 of the SEIS under "Elements Common to all Action Alternatives," personal protective equipment including avalanche rescue gear (shovel, probe, and transceiver) is encouraged but not required.

**Concern ID:** 40276

**CONCERN  
STATEMENT:**

One commenter suggested that snowmobiles in Yellowstone should be confined to existing paved roads, and no further efforts to improve access to remote areas should be sought.

**Response:**

Consistent with 36 CFR 2.18 (c), under the preferred alternative, all OSV use would be confined to groomed routes over existing paved roads. No new OSV routes that have not been used in the past, including new routes accessing remote areas, are proposed.



***ALI100 - Alternatives: Alternative 1***

**Concern ID:** 40279

**CONCERN STATEMENT:** One commenter questioned whether Table 37 in the draft plan/SEIS is correct.

**Response:** The table referred to by the commenter includes only public OSV use, not administrative OSV use. Under alternative 1, there would not be a regulation allowing public OSV use, therefore the numbers of zero snowmobiles and zero snowcoaches used for the analysis is correct.

**Concern ID:** 40280

**CONCERN STATEMENT:** One commenter stated that the impacts of administrative OSV use are only analyzed for alternative 1, which provides an incorrect bias against alternative 1.

**Response:** Because administrative use is the only OSV use that would occur under alternative 1, the impacts of administrative use are specifically called out. The impacts of administrative use would be the same across all action alternatives (110 administrative snowmobiles and 13 administrative snowcoaches in the park per day), which all allow for public OSV use. Therefore, while the impact analysis takes into account administrative use and the results of the modeling for air and soundscapes include the emissions expected from administrative use, the discussion of the impacts of each alternative focuses on public OSV use.

**Concern ID:** 40281

**CONCERN STATEMENT:** One commenter stated that the description of alternative 1 is unfocused and unclear. They state that the draft plan/SEIS indicates that alternative 1 would be responsible for an OSV ban in Yellowstone, but that it would be more precise to state that alternative 1 would result in a continuation of the ban and its impacts.

**Response:** Under alternative 1, the current interim regulation would expire in March of 2013 and the NPS would not promulgate a new regulation allowing OSV use. Therefore, no OSV use by park visitors would be allowed in the future. OSV use has been allowed in the park every season for five decades, and therefore the ban on OSVs would begin under the first year of implementation of alternative 1, if that alternative were ultimately selected for implementation.

**Concern ID:** 40282

**CONCERN STATEMENT:** One commenter stated that Yellowstone needs to balance the Congressional mandate to “promote” and “provide for the use and enjoyment” of park resources, and “leave unimpaired for the enjoyment of future generations” implying that alternative 1 is not consistent with this.

**Response:** While NPS agrees that public use and enjoyment is part of the fundamental mandate of Yellowstone and the entire national park system, the suggestion that the Yellowstone statute or the NPS Organic Act mandate some particular level or type of snowmobile use is incorrect.

**Concern ID:** 40283

**CONCERN STATEMENT:** Commenters suggested that the draft plan/SEIS should base the analysis on no previous use of snowmobiles/snowcoaches in the park, rather than evaluating alternative 1 by assessing what would be lost in regard to visitor use and experience if Yellowstone were to remain closed to oversnow motorized vehicle use.

**Response:** Pursuant to 43 CFR 46.415 (b)(1), the analysis of the effects of the no-action alternative may be documented by contrasting the current condition and expected future condition should the proposed action not be undertaken with the impacts of the proposed action and any reasonable alternatives. Chapter 3 of the SEIS describes the current state of park resources based on available data. Because OSV use has been allowed for five decades, the resources are described in a context where OSV use has affected them. In contrast to the “affected environment,” the no-action alternative describes what would happen if the NPS were to take no action at all, which would result in no public OSV use. The impacts of no-action appropriately predict what park resources would look like if there were no public OSV use, compared to the description of the “affected environment.”

**Concern ID:** 40285

**CONCERN STATEMENT:** One commenter suggested that alternative 1 be modified to prohibit the packing/grooming of snow roads (even for administrative use) and must delay any preparations for spring opening of the park to wheeled vehicle use by at least one month, in order to fully protect the wildlife in Yellowstone.

**Response:** Even if no public OSV use is allowed, administrative use would still be necessary to protect park resources and values and such use would necessitate road grooming. Most park facilities are closed through the winter and require extensive preparation during the winter season for visitors in the spring. Delaying access to wheeled vehicles by a month would not allow enough time for park facilities to be ready for the spring opening date each year. Furthermore, employees living in the park’s interior need groomed roads to have access to their homes and to allow access to groceries, supplies, and medical care.

#### ***AL2100 - Alternatives: Alternative 2***

**Concern ID:** 40259

**CONCERN STATEMENT:** Commenters stated that alternative 2 does not allow for reasonable access to the park based on historic OSV use.

**Response:** The park’s enabling legislation and the Organic Act reserve ample discretion to the NPS to determine how best to promote the enjoyment of the park while protecting park resources. The suggestion that the NPS must provide access to the park based on historic use levels is incorrect.

#### ***AL3100 - Alternatives: Alternative 3***

**Concern ID:** 40289

**CONCERN STATEMENT:** One commenter suggested that education and interpretation components are critical for public support of the program, adding that using snowmobiles do not offer education or interpretation opportunities (whereas snowcoaches do).

**Response:** There is no NPS policy that requires a continuous opportunity for education or interpretation. The data in chapter 3 demonstrates that even inside a snowcoach, unamplified spoken communication is difficult. The NPS recognizes the value of providing visitors with a variety of interpretative experiences that cater to differing preferences. Both snowmobile and snowcoach guides stop at features of interest in the park, which allow for both educational and interpretive experiences.

<b>Concern ID:</b>	40292
<b>CONCERN STATEMENT:</b>	One commenter questioned whether it would be economically feasible for the park to transition to snowcoaches only.
<b>Response:</b>	Based on the cost assumptions for alternative 3 in the SEIS, the NPS believes a transition to BAT snowcoaches is feasible, but whether a specific operator can afford the transition would depend on cash flow, available financing, and other business specific characteristics.
<b>Concern ID:</b>	40293
<b>CONCERN STATEMENT:</b>	Commenters supported alternative 3 because they believe it would provide the most access while resulting in the least impacts to park resources.
<b>Response:</b>	Based on the analysis in the SEIS, the NPS believes that with implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and the concept of voluntary E-BAT standards for both snowmobiles and snowcoaches, alternative 4 has the potential to allow the most number of visitors while resulting in the least overall impact to park resources.
<b>Concern ID:</b>	40294
<b>CONCERN STATEMENT:</b>	One commenter, while stating support for alternative 3, suggested that Yellowstone implement a reduction in the number of snowmobile trips permitted during the phase-out period, and that commercial guiding should be required for all snowmobile parties. Other commenters suggested that there be no phase-out period (that snowmobiles should simply be banned), and that the number of snowcoaches be reduced.
<b>Response:</b>	The NPS believes that in order to meet visitor demand, a phase-out period for snowmobiles would be necessary and the number of snowmobile trips permitted during the phaseout should remain as currently proposed in alternative 3. The NPS also believes that the number of snowcoaches permitted under alternative 3 should remain at 120 per day in order to meet visitor demand. Under alternative 3, all snowmobile use would be 100 percent commercially guided.
<b>Concern ID:</b>	40296
<b>CONCERN STATEMENT:</b>	One commenter stated opposition to alternative 3, because it takes away visitors' freedom of choice as to the mode of authorized transportation they choose and would reduce the opportunity for an educational experience by the public.
<b>Response:</b>	The NPS agrees with the commenter that eliminating one mode of transportation would affect visitors' choices regarding how to access and experience the park's unique winter resources.

#### ***AL4100 - Alternatives: Alternative 4***

<b>Concern ID:</b>	40215
<b>CONCERN STATEMENT:</b>	One commenter provided suggestions for allocating transportation events between commercial operators and also requested flexibility by allowing events to be used at any entrance.
<b>Response:</b>	The contracting process for allocating transportation events to commercial tour operators is beyond the scope of the SEIS. However, the NPS will take the commenter's suggestions into account when determining the contract terms for allocating transportation events. Under alternative 4, exchanging transportation events would be allowed within entrances, but would not be allowed to be

exchanged between entrances. Tracking exchanges between entrances would add a layer of complexity for park managers and the majority of operators indicated they would not take advantage of such an option.

**Concern ID:**

40352

**CONCERN  
STATEMENT:**

Commenters had questions regarding the definition of a “transportation event” and how the number of transportation events was established. Specifically, commenters wanted to know if an event covers multiple short trips, or if they are each separate events and how the total number of events as well as 10 snowmobiles per event was established. They also felt that more information was needed to demonstrate how one snowcoach and a group of snowmobiles are comparable. One commenter asked how snowmobile specific and snowcoach specific operators would be able to split their daily allotments.

**Response:**

The transportation event definition was established based upon the recent average use of approximately 7 snowmobiles per group and based on the premise that a group of 7 New BAT snowmobiles has comparable impacts to park resources and the visitor experience to one BAT snowcoach. Appendix A of the plan/SEIS has been developed to assess the comparability of snowmobile and snowcoach transportation events.

Under alternative 4, any snowmobile transportation event can have a maximum of 10 snowmobiles on any day, as long as each operator averages 7 snowmobiles per group over the season (provided the transportation event is composed of all New BAT snowmobiles; 8 per group over the season if E-BAT standards are met). Allowing a maximum of 10 snowmobiles per group is intended to allow operators to meet demand on peak days.

A maximum group size of 10 snowmobiles per transportation event was specified for logistical and safety reasons.

The impact analysis of alternative 4 in the SEIS is based on the maximum of 10 snowmobiles per group.

In regard to the maximum of 110 transportation events, starting from the premise that the NPS was comfortable with the impacts expected under the interim regulation which has allowed an average of 123 transportation events per day (78 snowcoaches and 45 snowmobile groups (318 snowmobiles/7 per group), the idea was to slightly reduce the total number of transportation events in order to reduce impacts to park resources. Because humans and animals experience OSV impacts as combined events when OSV groups pass, rather than experiencing the impacts of individual vehicles, the goal was to reduce these impacts by reducing the overall number of transportation events. Further, in comments on the 2011 draft EIS, some environmental groups advocated for the NPS to select the alternative that would phase out snowmobiles and allow 120 snowcoaches per day, which would equal 120 transportation events. The 110 events allowed under alternative 4 represents fewer events than would be expected under both alternatives 2 and 3.

Each group entering the park, no matter how small, would count as use of one transportation event. Under alternative 4, operators would be able to exchange transportation events among each other, as long as both transportation events are specified for the same entrance.

**Concern ID:**

40353

**CONCERN  
STATEMENT:**

One commenter had concerns regarding snowcoach restrictions under alternative 4, specifically the gross vehicle weight rating of the snowcoaches, which includes the track system. The commenter objected to considering the track system as part of the gross vehicle weight rating.

**Response:**

Neither maximum vehicle weight nor width for snowcoaches is included under the preferred alternative. In the past, the NPS proposed specifying a maximum size and weight limit for snowcoaches in order to address issues related to rutting. Without detailed study that evaluates variables including pounds per square inch, snow conditions such as density, snow-water equivalency, and other factors such as grooming practices and equipment, snowcoach track design and configuration, etc., it is difficult to determine what specific requirements would lessen the potential for rutting of snow roads. The NPS acknowledges that some snowcoaches leave ruts on the roads and that these ruts negatively affect the visitor experience and present a potential safety hazard to other users. To address this concern, the NPS is currently studying this issue and is working to develop mitigation strategies once the determinants of rutting are positively identified. After further study, should any size, weight, or weight displacement restrictions for snowcoaches be necessary, these restrictions will be incorporated in the concessioners' annual operating plans.

**Concern ID:**

40354

**CONCERN  
STATEMENT:**

Commenters stated opposition to alternative 4, for reasons such as: allowing more snowmobiles per day (up to 480) than has been allowed in the last decade, which will contribute to adverse air, sound, wildlife, and visitor experience impacts; it is contrary to the court decision regarding the 2007 Winter Use Plan; current operators will not have the flexibility in arranging their trips into the park; the vagueness of alternative 4 would generate confusion, disagreement, and frustration among concessionaires, guide services, NPS personnel, enforcement official, gateway community business people, and the public; and the BAT requirements are too restrictive.

**Response:**

The NPS acknowledges that alternative 4 would allow more snowmobiles in the park per day than have been allowed since the 2008/2009 season. However, the impact analysis in the SEIS demonstrates that with implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, these higher number of vehicles would result in less overall impacts to park resources while allowing more visitors to access the park than have been allowed in recent years.

In the past, the NPS and interested parties have focused on the total number of vehicles authorized to access the park. However, this emphasis is misleading because impacts to wildlife and soundscapes stem from groups of vehicles, not individual vehicles. By packaging traffic into transportation events and capping the total daily number of transportation events, the park proactively reduces the amount of time vehicles are audible, therefore reducing impacts to natural soundscapes. By limiting the number of daily transportation events in the park, wildlife would be disrupted fewer times. These steps, in combination with continued 100 percent guiding requirements, BAT standards for snowcoaches, and New BAT standards for snowmobiles, will limit impacts on the park's flora, fauna, soundscape, and air quality into the future.

The NPS is committed to implementing alternative 4 should it be selected, and believes that any confusion that currently exists regarding transportation event management would fade over time. The NPS acknowledges that the snowmobile BAT requirements under alternative 4 are more restrictive than past snowmobile BAT requirements, but believes that they are attainable and necessary in order to reduce impacts to park resources.

**Concern ID:** 40355

**CONCERN STATEMENT:** One commenter suggested that under alternative 4 the park should determine fixed daily-use limits for snowmobiles and snowcoaches during the transition, rather than the variable limits proposed.

**Response:** Under alternative 4, daily numbers during the first year of the transition period (2013/2014) are fixed at 318 snowmobiles per day and 78 snowcoaches per day. Phase II (2014/2015 through 2016/2017) continues to implement transportation event management and has been modified for the final SEIS and now mandates that increases in OSV numbers could not occur until machines meet New BAT standards. A full discussion of how OSVs would be managed during Phase II is provided in chapter 2.

**Concern ID:** 40356

**CONCERN STATEMENT:** Commenters questioned the assumption that seven snowmobiles are comparable to one snowcoach, as is described under alternative 4.

**Response:** Appendix A was prepared in response to requests made during the public comment period on the Draft Supplemental Environmental Impact Statement/Winter Use Plan that a standalone section of the Final Supplemental Environmental Impact Statement/Winter Use Plan (plan/SEIS) be dedicated to discussing the comparability of snowmobile and snowcoach transportation events in terms of their relative impacts to park resources and values and visitor experience.

**Concern ID:** 40357

**CONCERN STATEMENT:** Commenters expressed concerns related to available park staff to manage the additional snowmobiles allowed under alternative 4.

**Response:** As described in the plan/SEIS, alternative 4 would not require any additional staff to implement beyond what is required today.

**Concern ID:** 40358

**CONCERN STATEMENT:** Commenters provided suggestions on ways in which to modify alternative 4, such as: re-defining “transportation events” to be split between commercial, private groups, addressing Old Faithful overnight lodging, and “banked” commercial events.

**Response:** As currently proposed, alternative 4 allows a maximum of 46 commercially guided snowmobiles events and 4 non-commercially guided transportation events and a minimum of 60 snowcoach transportation events per day. The plan/SEIS clarifies that overnight trips would count as one transportation event for each day in the park (an overnight trip would count as one transportation event on the day the group enters the park and another transportation event for the following day when the group exits the park). Transportation events cannot be “banked,” but each operator’s unused transportation events would count towards lowering their seasonal average number of snowmobiles (if an operator has a group of 10 one day and the next day does not use their transportation event, at that point their seasonal average would be 5 snowmobiles per group).

**Concern ID:** 40359

**CONCERN STATEMENT:** One commenter stated that using averages for snowmobiling numbers can be manipulated, which is not taken into account in the analysis.

**Response:** The concessions contracts will have mandatory reporting requirements so that the NPS can accurately track actual and average use. Operators who did not meet the daily and seasonal use limits would be penalized through the terms and conditions spelled out in their concession contract.

**Concern ID:** 40360

**CONCERN STATEMENT:** Commenters suggested that the maximum number allowed per transportation event should be 11, not 10, including the guide.

**Response:** Based on the impact analysis in chapter 4 of the plan/SEIS, the NPS believes that capping the maximum snowmobile group size at 10 will allow operators flexibility to meet demand on peak days, while minimizing impacts to park resources and ensuring the impacts of snowmobile and snowcoach transportation events remain at a comparable level. Comments from commercial operators have also indicated that 10 is an adequate maximum group size number based on logistical and safety concerns.

**Concern ID:** 40361

**CONCERN STATEMENT:** One commenter suggested that alternative 4 does not meet national ambient air quality standards.

**Response:** The impact analysis in chapter 4 demonstrates that all applicable pollutant levels under alternative 4 would remain well under the National Ambient Air Quality Standards (NAAQS), with CO and PM<sub>2.5</sub> levels remaining at well less than 50 percent of the NAAQS and NO<sub>2</sub>, remaining at less than 70 percent of NAAQS under a worst-case scenario.

**Concern ID:** 40362

**CONCERN STATEMENT:** One commenter expressed concern that administrative use is not accounted for in the soundscape analysis for alternative 4, stating that the impacts would be double and that the administrative use negates the benefits from packaging transportation events.

**Response:** Administrative use is included in the modeling and impact assessment in chapter 4, for all alternatives. Text has been added to the plan/SEIS to clarify this.

### ***AL9000 - Alternatives: New Alternatives or Elements***

**Concern ID:** 40218

**CONCERN STATEMENT:** Commenters suggested that snowmobile use be limited to certain areas of the park, such as those areas with less wildlife activity, an open area blocked off from other areas, high-standard highways, and how often someone can use a snowmobile annually. Some commenters suggested working with the national forest system to encourage use there. Commenters also suggested if snowmobile use is permitted, there should be an increased fee for the use, a fee for carbon emissions, or a fee to cover avalanche control.

**Response:** The availability of areas outside the park (such as national forests) for snowmobiling is outside the scope of the plan/SEIS. The purpose of this plan/SEIS is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park, not to provide recreational snowmobile experiences. The NPS believes that providing visitor access to areas such as the Grand Canyon of the Yellowstone, Norris Geyser Basin, Gibbon Falls, Roaring Mountain, Mud Volcano, and other attractions is important for visitor enjoyment of Yellowstone in winter. This could not be achieved by allowing access to specific, limited areas of the park. Funding for avalanche control



activities is provided through base funding. However, all park visitors are required to pay entrance fees, which are used for various purposes throughout the park.

**Concern ID:** 40219

**CONCERN  
STATEMENT:**

Commenters suggested implementing a bus, raised electric train, light rail, tram or other mass transit system (not specifically a snowcoach), pointing to other national parks, such as Zion, as an example. One commenter suggested a shuttle system from the park to the gateway communities that does not count against the allocation of transportation events.

**Response:**

The NPS considered but dismissed from detailed analysis, alternatives that would have employed mass-transit such as a monorail or buses. Reasons for dismissal are included in chapter 2 of the plan/SEIS. The NPS believes the suggestion for a shuttle system from the park to gateway communities would result in substantially similar environmental effects as allowing snowcoaches in the park, with the only difference being that the shuttle system would be run by the park rather than private operators.

**Concern ID:** 40220

**CONCERN  
STATEMENT:**

One commenter suggested that the NPS close the park for the winter, from October 21 to April 21.

**Response:**

The NPS has defined the public visitation winter season as taking place from December 15 to March 15. The NPS believes that closing the park from October 21 to April 21 would unnecessarily deprive members of the public of the opportunity to experience the park's unique resources and values. Closure of the park to public OSV use in the winter is evaluated as part of the plan/SEIS, under alternative 1.

**Concern ID:** 40222

**CONCERN  
STATEMENT:**

Commenters suggested that certain days have limited number of snowmobiles in order to create a different visitor experience. To achieve this commenters provided suggestions such as having certain weekends for snowmobile use and using a lottery system.

**Response:**

The 2011 Winter Use Plan/EIS considered two alternatives that looked at variable use levels throughout the winter season. These alternatives were initially proposed to provide a range of experiences throughout the winter season, including high, low, and no motorized use days. Public comment on these concepts was received during the comment period on the 2011 draft Winter Use Plan/EIS as well as during public scoping for this plan/SEIS.

Public comments stated that variability was not desirable for operators or visitors. From the operators' view, it was too complex to implement and too difficult to maintain needed infrastructure. For example, commenters stated that it would not be economically feasible to buy the number of machines needed to take advantage of high use days, when those machines would not be used during other parts of the season. Operators also noted that visitors seeking multi-day trips may not be able to get the visitor experience they were looking for throughout their trip if the level of use changed from day to day. Variability was also viewed as too complex by visitors, who were looking for more certainty when planning their trip. Some commenters felt that the low and high use days were not equitably distributed, and that such an alternative would manage the park to different standards on different days. For the NPS, this alternative would result in unexpected impacts to park operations since the concept of variability was difficult to communicate and complex in implementation. Based on these comments, the NPS reconsidered the idea of variable use against its objectives and determined that, due to the complexity of the alternatives and concerns evident in public comment, this concept



would not meet the objectives of the plan. Because the idea of variable use would not meet the objectives of the plan, and would be difficult to implement technically and logistically for both the NPS and operators, alternatives 6 and 7 from the 2011 Winter Use Plan/EIS were not carried forward for detailed analysis in the plan/SEIS.

**Concern ID:**

40223

**CONCERN  
STATEMENT:**

Commenters provided suggestions for different levels of OSV use that should be permitted, including reducing the number of snowmobiles by 50 percent, less than 200, 250 a day, 50 a day, 10 a day, no more than use levels of the past five seasons, and no snowmobiles. Commenters also suggested allowing certain days with higher levels of use, such as around holidays.

**Response:**

The NPS considered but dismissed from detailed analysis, an alternative that would have allowed a maximum of 191 snowmobiles and 36 snowcoaches per day, which reflected the average use levels seen under the interim regulations in place since the 2009/2010 season. Based on visitation data from the 2004/2005 season through the present, the NPS believes that an alternative with those levels of authorized use would be very likely to result in significantly lower actual numbers, and based on those predicted numbers, commercial tour operators would not be able to maintain viable businesses. In the absence of a viable business model, commercial tour operators would likely cease to exist. Without commercial tour operators, visitors would not have the opportunity to visit the interior of the park via oversnow vehicles and therefore such an alternative could not be implemented. An alternative under which visitors would not have access to the interior of the park, where many of the park's unique winter resources are located, would not meet the purpose and need of this plan/EIS. This same argument applies to the numbers of authorized use suggested by commenters that would allow less use than the interim regulations.

The NPS did consider and carry forward for detailed analysis, an alternative that would allow no public OSV use (alternative 1), an alternative that would keep OSV use at the levels authorized during the past four seasons (alternative 2) and an alternative that would phase out snowmobiles completely (alternative 3). Alternative 4, the preferred alternative, does allow for days of higher use in terms of absolute vehicle numbers (operators must average 7 snowmobiles per group over the season but may allow up to 10 per group on any day) but proactively limits the number of transportation events at 110 (10 less transportation events than alternative 3 and 13 less transportation events than alternative 2).

**Concern ID:**

40224

**CONCERN  
STATEMENT:**

Commenters suggested that only electric or battery operated snowmobiles be permitted, with some commenters suggesting that snowcoaches should also be electric. Commenters also suggested the requirement to use E-10 fuels.

**Response:**

At this time, there are no fully electric snowmobiles or snowcoaches on the market, and therefore such technology could not be evaluated as part of the plan/SEIS. The NPS considered mandating the use of E-10 fuels, but dismissed this element from detailed analysis in chapter 2 of the plan/SEIS because E-10 fuel is not readily available in certain areas and is not proven to significantly reduce emissions in modern fuel injected engines.

**Concern ID:**

40225

**CONCERN  
STATEMENT:**

Commenters suggested that snowmobile use only be allowed by park personal (including for research and management), those that are mobility challenged, and for emergencies. One commenter suggested the NPS use sled dogs for patrol purposes.

<b>Response:</b>	Limiting OSV use to administrative purposes only is evaluated in under alternative 1. The use of sled dogs for patrol purposes would not be practical in Yellowstone due to the large area of the park that must be covered, the time it would take to cover this area with non-motorized transportation, and the potential for disruption of wildlife by sled dogs.
<b>Concern ID:</b>	40226
<b>CONCERN STATEMENT:</b>	Commenters suggested that the park focus on non-motorized winter uses, including cross country skiing and snow shoeing, as well as a skier yurt system, stating that there is demand for these uses and that these uses would meet the goals of the plan. One commenter suggested that the NPS groom areas for non-motorized uses, suggesting that the current practice of paying for grooming of motorized uses is bias against non-motorized uses and is contrary to NPS Management Policies. They suggested increases be provided in base funding to groom non-motorized areas. The commenter also suggested the addition of 15 km of groomed trails within the park that connect to West Yellowstone, with suggestions for improvements to existing trails.
<b>Response:</b>	The purpose of the plan/SEIS is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park. The plan/SEIS will be used to determine whether motorized winter use in the interior of the park is appropriate, and if so, the type, extent, and location of this use. While the NPS did evaluate an alternative that would cease to allow OSV use, solely focusing on non-motorized use would not meet the purpose of the plan/SEIS. As proposed, under the preferred alternative, approximately 35 miles of road would continue to be groomed for cross-country skiing and other non-motorized use in the park. In the future, the stakeholder driven adaptive management framework proposed under the preferred alternative would allow the park to further explore additional opportunities for non-motorized winter recreation at Yellowstone.
<b>Concern ID:</b>	40228
<b>CONCERN STATEMENT:</b>	Commenters suggested including penalties if snowmobile use damages the park, such as eliminating OSV use and increased law enforcement.
<b>Response:</b>	Violations of the regulation authorizing OSV use would be enforced through issuance of citations by NPS law enforcement personnel. The NPS would maintain the option of closing certain routes or reducing OSV numbers should damages to resources occur.
<b>Concern ID:</b>	40229
<b>CONCERN STATEMENT:</b>	Commenters suggested that snowmobiles be required to have mufflers or that they be required to meet the same noise and pollution requirements for cars. Another commenter suggested that air quality could be improved if groups pre-registered so they did not have to wait in line to enter the park.
<b>Response:</b>	All snowmobiles have some type of muffler system. Snowmobiles and snowcoaches have different emissions characteristics than on-road vehicles due to the fact that they are tracked vehicles running over snow, rather than wheeled vehicles running over pavement. Data has shown that a wheeled vehicle, converted into a snowcoach, does not have the same emission output and that emissions increase dramatically when the vehicle is operated as a snowcoach. The NPS believes that the BAT standards called for under the preferred alternative will ensure protection of park resources and values and recognizes that there are a number of ways to meet the BAT standards. For snowcoaches, the NPS has not prescribed specific devices to meet BAT standards, such as requiring catalytic

converters or mufflers and instead will require that snowcoaches meet EPA Tier 2 technical standards. Under the preferred alternative, idling time for oversnow vehicles is limited to 3 minutes, in order to reduce vehicle emissions. As part of the adaptive management and monitoring framework, the park may consider allowing pre-registration or other implement other methods for reducing idling at entrance stations, if such actions are deemed necessary.

**Concern ID:**

40230

**CONCERN  
STATEMENT:**

Commenters suggested alternatives that allowed access from only specific gates. One commenter stated that the NPS improperly eliminated an alternative to look at OSV use from the South Entrance to Old Faithful only, and felt this alternative should be reexamined. Another commenter suggested snowcoach only through the East Entrance while another suggested a modification of alternative 4 that allowed access through Gardiner and West Yellowstone only, and reduced the number of transportation events. Access from West Yellowstone to Old Faithful only was also suggested. Use of a single entrance to reduce costs was suggested for low visitation days.

**Response:**

The 2011 Final EIS considered OSV use from the South Entrance only, however this alternative was dismissed from detailed analysis. The NPS has reexamined the dismissal of this alternative and believes the rationale for the dismissal is still valid. Based on existing data, it does not appear that bison population dynamics and distribution patterns are affected by OSV use; therefore this is not a basis to limit visitation to the South Entrance only. Limiting access to other entrances without a valid basis would not meet the purpose of this plan/SEIS, since limiting motorized use to one entrance deprive many potential visitors the opportunity to experience the park's unique winter resources.

In general, the NPS believes that providing visitor access from each of the entrances provides a benefit to visitors. Prohibiting access from specific entrances could limit access to areas such as the Grand Canyon of the Yellowstone, Norris Geyser Basin, Gibbon Falls, Roaring Mountain, Mud Volcano, and other attractions are important for visitor enjoyment of Yellowstone in winter. Therefore, in the absence of compelling evidence that closure of specific entrances is necessary, the NPS has dismissed these suggested alternative elements from detailed analysis.

**Concern ID:**

40231

**CONCERN  
STATEMENT:**

Commenters suggested alternative elements related to special use and concession permits. One commenter requested that winter concessioners still be permitted to run summer-based tours as part of their contracts while another asked that there be a process to transfer permits if one concessionaire goes out of business. One commenter requested that non-motorized uses not count toward allocations. One commenter also suggested that park employees be able to use their own snowmobiles, to reduce costs to the park. One commenter requested that NPS not use a single vendor for snowmobile rental/access to the park.

**Response:**

These comments pertain to specific contracting mechanisms and conditions that are beyond the scope of the plan/SEIS. However, the NPS will take these comments into consideration when it implements the selected alternative and begins the contracting process. Under the preferred alternative, NPS employees may use their own snowmobiles as long as they meet BAT requirements.

**Concern ID:**

40232

**CONCERN  
STATEMENT:**

Commenters requested that the NPS pursue Wyoming's offer to help fund trail maintenance and grooming.

**Response:** The NPS is willing to work with the State of Wyoming and other willing parties in order to explore ways to help fund trail maintenance and grooming.

**Concern ID:** 40233

**CONCERN STATEMENT:** Commenters suggested elements related to education and interpretation including encouraging use of the Grange for a visitor education facility, and conducting low-cost educational tours.

**Response:** Education and interpretation is provided at warming huts, entrance stations, visitor centers, and by guides. Other informational material may be found in the park newspaper and on the park webpage.

**Concern ID:** 40234

**CONCERN STATEMENT:** One commenter requested that an alternative be developed to address a future possibility of permanent insufficient snow for OSV use.

**Response:** Under the preferred alternative, OSV use would not be allowed unless there is sufficient snow to allow OSVs to operate safely. The assertion that there may not be enough snow in the future to allow any level of OSV use is speculative; however, the NPS did evaluate an alternative (alternative 1) under which no public OSV use would be allowed.

**Concern ID:** 40235

**CONCERN STATEMENT:** One commenter requested that NPS install more air quality monitoring at the entrances.

**Response:** The NPs believes the current air monitoring sites are sufficient to collect any necessary data. However, the park may add additional sites in the future should they be deemed necessary.

### ***AL9115 - Alternatives: Non-Guided OSV Use***

**Concern ID:** 40236

**CONCERN STATEMENT:** Commenters requested that personal OSV use, without a guide, be permitted. They suggested requiring them to have a tracking devise and also suggested allowing two stroke machines that met all standards.

**Response:** The NPS believes the 100 percent guiding requirements implemented in recent years have helped to minimize impacts to park resources and values and have increased visitor safety. Data shows that the introduction of guided snowmobile tours has also reduced the number of law enforcement incidents. While unguided use was dismissed from detailed analysis in the plan/SEIS, the preferred alternative does allow for limited numbers of non-commercially guided transportation events each day. Under the preferred alternative, if vehicles with two-stroke engines meet BAT standards, they would be allowed to enter the park.

### ***AL9150 - Alternatives: Non-commercially guided OSV Use***

**Concern ID:** 40237

**CONCERN STATEMENT:** Commenters requested that the requirement for a commercial guide be maintained, stating that it has contributed to minimizing impacts to park resources. Some commenters expressed concern about the assumption that impacts from non-commercially guided trips would be similar to those of commercially guided trips.

**Response:** Available data demonstrates that unguided use could have greater adverse impacts to park resources than guided use, but this data does not distinguish between commercial guides and non-commercial guides. The NPS believes that with appropriate training and enforcement, there would be no difference in impacts from commercially guided groups versus non-commercially guided groups. The NPS will develop a non-commercial guide training program and will monitor non-commercially guided groups through its adaptive management and monitoring program. If non-commercially guided groups are determined to have a greater impact to park resources and values than commercially guided groups, non-commercially guided use would be reduced or discontinued.

**Concern ID:** 40238

**CONCERN STATEMENT:** Commenters requested that the group size of non-commercially guided groups, as proposed under alternative 4, be modified. One suggestion was to have an even number group size to accommodate couples, with group sizes of between 6 and 10. Another commenter suggested increasing the number of groups permitted per day, and stated that if the allocations for commercially guided trips are not met, that non-commercially guided trips be able to fill those allocations. Commenters also suggested expanding the program by allocating a minimum number of entrance allocations for residents to use and also that the guide should not count in the total number for the group.

**Response:** The NPS believes non-commercially guided groups should be limited to 5 snowmobiles in order to ensure the non-commercial guide can successfully manage the number of vehicles and visitors in the group.

While the NPS acknowledges the commenters' concerns, other public comments on the proposed non-commercially guided snowmobile program indicated that four daily non-commercially guided snowmobile events is reasonable, consistent with anticipated demand, and that group size restrictions would not suppress public utilization of this proposed program.

**Concern ID:** 40239

**CONCERN STATEMENT:** Commenters provided suggestions related to the operation of the non-commercially guided program. These suggestions centered around details of how to execute the program and included how the lottery should be conducted, requirements for non-commercial guides, equipment requirements for non-commercially guided trips, suggestions for the non-commercial guide certification process, language regarding permits and cost equalization, points of origin, and logistics for entering the park.

**Response:** As discussed in appendix C of the plan/SEIS, the NPS intends to develop a non-commercially guided access program with stakeholder input. The NPS will consider these comments when developing that program.

**Concern ID:** 40241

**CONCERN STATEMENT:** Commenters asked how overnight stays will be factored into the non-commercially guided program, and how many events does would an overnight stay require. One commenter suggested that two events be available each day for overnight stays.

**Response:** Under the preferred alternative, all overnight trips would count as one transportation event for each day in the park (one transportation event on the day the group enters the park and another transportation event for the following day when the group exits the park).

**Concern ID:** 40245

**CONCERN  
STATEMENT:**

Commenters requested that the NPS work with stakeholders and affected groups in further developing the non-commercial guide program, and offered possible assistance for this effort. Also in looking at metrics for the program, they requested that positive indicators also be included and that the indicators look at corrective actions at gates where there are issues, rather than park-wide. Other Commenters stated that they had concerns with the proposed non-commercially guided program, including that it is overly complicated and overly restrictive, and that the required safety equipment for non-commercially guided trips may be cost prohibitive and unnecessary.

**Response:**

As discussed in appendix C of the plan/SEIS, the NPS intends to develop a non-commercially guided access program with stakeholder input. The NPS intends for the program to be as simple and easily understandable as possible and for the restrictions associated with the program to be limited to what is necessary for resource protection and visitor safety. The NPS will work with stakeholders to ensure this is the case.

**Concern ID:** 40246

**CONCERN  
STATEMENT:**

One commenter expressed concern that the non-commercial guide program would take business away from commercial guides. They further suggested that the program be tried as a pilot and a market evaluation performed after 3 years.

**Response:**

Under the preferred alternative, no more than 4 non-commercially guided snowmobile transportation events would be allowed in the park per day, while 46 allocations would be available for commercially guided snowmobile events. Under the adaptive management and monitoring program, non-commercial use would be monitored and reduced or eliminate if such use is determined to result in greater impacts than predicted in the plan/SEIS.

**Concern ID:** 40250

**CONCERN  
STATEMENT:**

One commenter asked for clarification that allocations of non-commercially guided snowmobiles allowed for two riders per snowmobile, for a total of 10 people per entrance each day.

**Response:**

Under preferred alternative, the number of visitors on each snowmobile would not be part of the entry requirements. One- or two-passenger snowmobiles would be allowed as long as they meet the necessary BAT requirements. Therefore, a group of 5 snowmobiles that are each two-passenger (for a total of 10 passengers) would be allowed.

**Concern ID:** 40253

**CONCERN  
STATEMENT:**

One commenter asked why OSVs are considered “off-road” vehicles.

**Response:**

Snowmobiles are described as off-road vehicles, pursuant to Executive Order 11644 and NPS regulation (36 CFR 2.18).

**AL9210 - Alternatives: Non-commercially guided OSV Use: BAT**

**Concern ID:** 40254

**CONCERN  
STATEMENT:**

Some commenters requested that non-commercially guided trips allow non-BAT machines, while others felt this requirement should be included.



**Response:** The NPS believes that BAT requirements, as proposed under the preferred alternative, are necessary in order to protect park resources and values and that exempting snowmobiles used for non-commercially guided access would unnecessarily allow greater impacts to park resources than the use of BAT-compliant vehicles. The NPS intends to require all snowmobiles entering the park, including those used for non-commercially guided access, to meet BAT requirements.

### ***AL9350 - Alternatives: Sylvan Pass***

**Concern ID:** 40297

**CONCERN  
STATEMENT:**

Commenters provided input on the future of Sylvan Pass operations and whether the areas should be opened or closed. Some commenters provided reasons why Sylvan Pass should be closed during the winter, specifically referring to safety of park employees; protecting critical habitat for lynx and wolverine; costs of the avalanche mitigation program; and the low number of visitors who use the pass.

Other commenters provided reasons to keep Sylvan Pass open during the winter, specifically referring to the importance of the pass to the economy of Cody; funding already appropriated by the Wyoming Legislature; the slight impact on the winter operating budget; allowing backcountry skiers to access the area; and the importance of road access through the pass in the spring.

**Response:**

The plan/SEIS assesses the impacts of both maintaining operations at Sylvan Pass (alternatives 2 and 4) and closing Sylvan Pass (alternatives 1 and 3). The preferred alternative would maintain the operation of Sylvan Pass, in accordance with the Sylvan Pass Working Group Agreement. Costs, impacts to park employee health and safety, and the use of explosives are included in the plan/SEIS analysis. As part of this analysis, the findings from two previous Operational Risk Management Assessments (ORMAs) were taken into consideration (conducted in 2007 and 2010). During the August 2010 meeting, a panel of experts evaluated the risks to employee and visitor safety as reflected by the existing operations that were initiated in 2007. The ORMA also reviewed the potential benefits (for visitor access, agency cost, resource protection, and effectiveness of avalanche control) of several new avalanche control options that stress avoiding negative avalanche-human contact. Procedures used by the park, and reviewed in the ORMA process include howitzer training, avalanche forecasting, additional staff for the unique conditions of the area, and additional weather equipment. Based on the result of the ORMA, the NPS believes that the procedures are in place to operate Sylvan Pass safely. In addition, in accordance with the Sylvan Pass Working Group Agreement, the pass is only open when specific safety considerations are met.

Regarding concerns about the use of explosives, the ORMA process evaluated the range of management options available at Sylvan Pass, including the use of helicopters and the use of howitzers (explosives). As stated on page 15 of the ORMA report, both of these methods have their advantages and disadvantages. For the howitzer, access to the platform can be problematic and require travelling below several avalanche chutes. Use of helicopters can be problematic during harsh winter conditions that change frequently; helicopters were used only two times in 2009 due to weather conditions. Each method has limitations, but the ORMA showed that using a combination of methods, rather than relying on one, provides management options that reduce the level of risk to NPS employees.

Although concerns were expressed about the impacts to lynx and wolverine habitat, data indicates that the pass is not frequently used by these species, and the potential for impact is minimal. Furthermore, wolverines feed primarily on winter-killed



ungulates (deer, elk, bison) which are not present in the Sylvan Pass area in winter. Overall, avalanche mitigation in Sylvan Pass affects less than .1 percent of wolverine habitat. Additional discussion of the impacts of avalanche control to lynx and wolverine has been added to the plan/SEIS.

The NPS understands that the public is concerned with the cost of Sylvan Pass operations and the costs of winter operations as a whole. Winter use is a costly operation. If cost were the primary or only concern, the park would not be open to winter visitors.

**Concern ID:** 40300

**CONCERN  
STATEMENT:**

One commenter suggested that grooming and maintenance of the East Entrance should be scheduled with equal priority to other entrances, and that Sylvan Pass should be maintained to increase safety issues. Another commenter suggested setting a guaranteed opening date for the East Entrance of Yellowstone, as this would have long-term beneficial economic impacts on Cody's business owners throughout the tourist season.

**Response:**

Management decisions for frequency of road grooming and maintenance are based on traffic volume, road conditions, and administrative need. In recent years, the rate of traffic from the East Entrance has been significantly lower than traffic from the other entrances. Last year the entrance averaged approximately one commercial snowmobile per day. If use patterns change, the park may choose to alter its grooming schedule.

Historically, the park has opened the East Entrance to public wheeled travel the first Friday in May. This date is dependent upon the ability to clear the massive amounts of snow that accumulate in the Sylvan Pass area, which has infrequently delayed opening of this road segment.

**Concern ID:** 40301

**CONCERN  
STATEMENT:**

Commenters stated that the draft plan/SEIS does not completely analyze the impacts associated with the avalanche mitigation program at Yellowstone. One commenter disagreed with the cumulative impact analysis for wolverines and lynx under alternatives 3 and 4, with regard to the effects of leaving Sylvan Pass open (alternative 4) versus closing Sylvan Pass (alternative 3).

**Response:**

Although concerns were expressed about the impacts to lynx and wolverine habitat, data indicates that the pass is not frequently used by these species, and the potential for impact is minimal. Furthermore, wolverines feed primarily on winter-killed ungulates (deer, elk, bison) which are not present in the Sylvan Pass area in winter. Overall, Avalanche mitigation in Sylvan Pass affects less than .1 percent of wolverine habitat. Additional discussion of the impacts of avalanche control to lynx and wolverine has been added to the final plan/SEIS.

The cumulative impact analyses for lynx and wolverine are the same under alternatives 3 and 4 because the actions occurring as part of the alternatives make up a small part of the cumulative impacts, and therefore, do not change the overall assessment of impacts. The impact analysis for the Selected Alternative (and all alternatives) does show these differences. As noted above, the analysis for these species has been amended to more specifically discuss the impacts of Sylvan Pass operations.

***AL9400 - Alternatives: Best Available Technology (BAT)***

**Concern ID:** 40436

**CONCERN  
STATEMENT:**

Commenters suggested that under the preferred alternative, BAT requirements should be implemented as soon as possible, as opposed to waiting 5 years, as proposed. Commenters also suggested that snowmobile manufacturers have broken their promise to make their machines cleaner and quieter, while several manufacturers have stopped making Yellowstone-compliant machines altogether.

**Response:**

The NPS recognizes that for several models, snowmobile performance has regressed with respect to certain air and sound metrics over the past several years. The NPS notes, however, that one manufacturer is currently offering a machine that is considerably cleaner (in terms of carbon monoxide emissions) than any previous BAT-compliant snowmobile. The New BAT requirements proposed under the preferred alternative are designed to ensure better environmental performance from both snowmobiles and snowcoaches.

Although the requirement for BAT implementation no later than the 2017/2018 season was retained as part of the preferred alternative, the preferred alternative has been modified so that increases in OSV numbers could not occur until machines meet the New BAT standards.

**Concern ID:** 40437

**CONCERN  
STATEMENT:**

One commenter suggested that the plan/SEIS include exceptions for the 6-year life of BAT snowmobiles allowed to operate within the park by employees and full time residents working within the park. Another commenter suggested that the park should implement a phase-in plan for non-current model year snowmobiles so that in 2017-2018, those snowmobiles five years old and newer can be phased into the new requirements.

**Response:**

Under the preferred alternative, employee-owned BAT snowmobiles may be used for up to six model years or 6,000 miles (whichever is later).

Operators have indicated that snowmobiles are typically leased for a two to three year period. A final regulation implementing the preferred alternative is expected to be promulgated in the summer of 2013. Therefore, the NPS believes that commercial tour operators will have sufficient notice in order to plan for the implementation of New BAT for snowmobiles by the 2017/2018 season and to amortize existing vehicles.

**Concern ID:** 40438

**CONCERN  
STATEMENT:**

One commenter suggested that the park should simultaneously increase the number of snowmobiles in the park and require stricter BAT standards, while other commenters suggested that the park should not increase the number of daily-use snowmobiles until the New BAT standards are required.

**Response:**

The preferred alternative has been modified so that increases in OSV numbers could not occur until machines meet New BAT standards.

**Concern ID:** 40439

**CONCERN  
STATEMENT:**

Commenters suggested that sound and engine emission testing procedures for snowmobiles should be conducted at conditions similar to those found at Yellowstone, as opposed to full-throttle.

**Response:**

Under the preferred alternative, the NPS is proposing that both snowmobiles and snowcoaches would be tested in typical winter conditions seen in the park, at their typical cruising speeds of 35 mph and 25 mph, respectively.

**Concern ID:** 40440

**CONCERN STATEMENT:** One commenter stated that the Gross Vehicle Weight Rating and the width requirement in the proposed definition of a snowcoach would prohibit today's best snowcoaches and those that Yellowstone proposes under the Best Available Technology standard included in alternatives 2, 3 and 4.

**Response:** Neither maximum vehicle weight nor width for snowcoaches is included under the preferred alternative as described above under concern statement 40353.

**Concern ID:** 40441

**CONCERN STATEMENT:** Commenters stated that the BAT requirements should be stricter than what is proposed.

**Response:** The proposed BAT requirements under the preferred alternative are stricter than those that have been in place since the 2004/2005 season. The NPS believes that the New BAT requirements under the preferred alternative will result in better protection of park resources and values, while also ensuring that manufacturers can produce vehicles that will meet the standards. In addition to the required New BAT standards for snowmobiles and snowcoaches, the preferred alternative includes voluntary E-BAT (enhanced) standards that would reward innovations in vehicle technology and would further reduce impacts to air and soundscapes.

**Concern ID:** 40442

**CONCERN STATEMENT:** Commenters suggested that the proposed BAT requirements are too strict, and would preclude snowmobiles from entering the park.

**Response:** The preferred alternative calls for New BAT standards to be implemented no later than the 2017/2018 season. Industry representatives have indicated this is a reasonable timeframe for research and product development. Earlier BAT-compliant snowmobiles nearly met the New BAT standards (model year 2004 to 2007), but more recent offerings have regressed in terms of environmental performance. The NPS believes that the proposed implementation date of December 2017 allows ample time for manufacturers to develop machines that meet the New BAT standards. Currently, one of the two snowmobile manufacturers that build BAT-compliant snowmobiles offers a snowmobile that meets the New BAT air emission standards.

**Concern ID:** 40443

**CONCERN STATEMENT:** One commenter suggested implementing a pilot program for testing the success of BAT requirements in the park, such as a cost/benefit analysis of limiting nitrogen oxide emissions from OSVs.

**Response:** As part of the adaptive management and monitoring program, the NPS will continue to monitor air and sound emissions from OSVs and evaluate their impact on park resources. It is possible that based on new data, the NPS may seek to revise the proposed BAT standards in future years. If this is the case, additional NEPA compliance and changes to the winter use regulation would likely be required.

**Concern ID:** 40444

**CONCERN STATEMENT:** One commenter suggested that incentives be given to snowmobile manufacturers to invest in new snowmobile technology. Other commenters suggested that flexibility should be considered regarding the BAT requirements, specifically that machines bought in 2016 should have some time limit where that machine would still be usable in 2017, and that there should be flexibility regarding the two-decibel rating requirement.

**Response:** Under the preferred alternative, the New BAT requirements for snowmobiles would be implemented no later than the 2017/2018 season. The new winter use regulation is expected to be promulgated prior to the 2013/2014 season. Therefore, the NPS believes that operators will have enough notice to plan accordingly when leasing vehicles for seasons prior to 2017/2018 and will be able to meet the NPS deadlines by turning over vehicles as part of their regular business cycle.

The SAE J1161 test procedures allow for a tolerance of 2 dBA over the noise level limit (New BAT requirement would be 67 dBA) to provide for variations in test sites, temperature gradients, wind velocity gradients, test equipment, and inherent differences in nominally identical vehicles. This means that in order to operate in the park after March 15, 2017, a sample of noise emission measurements for a specific snowmobile make and model may not exceed a mean (average) noise output of 67 dBA at 35 MPH at 50' and no single measurement from the sample may exceed 69 dBA, using the J1161 test procedures at typical cruising speed.

The voluntary E-BAT standards included under the preferred alternative, which would allow operators to increase the number of visitors per transportation event, are designed to provide incentives to operators to invest in cleaner and quieter snowmobile and snowcoach technology.

**Concern ID:** 40445

**CONCERN STATEMENT:** One commenter suggested that restrictions on 4-stroke machines should not be included in the BAT requirements, but rather have the requirements based on decibel levels, carbon monoxide levels, particulate matter levels, hydrocarbon emission standards, nitrogen oxide levels, and nitrogen dioxide levels. Further, one commenter suggested that if a 2-stroke machine is compliant with the BAT standards, the NPS should not treat it any different from a 4-stroke machine.

**Response:** The BAT requirements proposed under any of the action alternatives, including the preferred alternative, are limits on noise and air emissions, not engine design per se. If a 2- stroke snowmobile meets BAT standards, it would be allowed into the park.

**Concern ID:** 40446

**CONCERN STATEMENT:** One commenter suggested that the nitrogen oxide emission standards should be dropped since nitrogen oxide was subsequently removed from the EPA through judicial action.

**Response:** Nitrogen oxide emission standards are not included as part of the preferred alternative.

**Concern ID:** 40447

**CONCERN STATEMENT:** One commenter asked for clarification regarding carbon monoxide limitation for the 2014/2015 season.

**Response:** For the 2014/2015 season, the maximum allowable CO for snowmobiles would remain the same as it has been since the 2014/2005 season, at 120 g/kW-HR. However, in order to take advantage of the increased average group size for snowmobiles allowed under the preferred alternative, operators would need to voluntarily meet the New BAT standard of 90 g/kW-HR. All snowmobiles would be required to meet the New BAT standard of 90 g/kW-HR no later than the 2017/2018 season.

***AL9600 - Alternatives: Summer Use***

**Concern ID:** 40255

***CONCERN  
STATEMENT:***

Commenters felt that the number of vehicles in the summer should be taken into consideration, stating that their impact is more than those in the winter. One commenter requested that the document include numbers related to summer use. Another commenter compared snowmobile use to off-road vehicle use in the summer and questioned why it is permitted.

***Response:***

Oversnow vehicles typically are not allowed in parks. 36 CFR 2.18 prohibits snowmobile use absent a specific regulation authorizing such use. No similar regulation prohibiting summer use exists. The purpose of this plan/SEIS is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park. This plan/SEIS is being used to determine whether motorized winter use in the interior of the park is appropriate, and if so, the type, extent, and location of this use.

Issues regarding summer use are beyond the scope of this plan/SEIS.

***AL9800 - Alternatives Dismissed: Snowbikes***

**Concern ID:** 40256

***CONCERN  
STATEMENT:***

Commenters requested that the NPS consider the use of snowbikes in Yellowstone in the winter. They stated that they have similar impacts to other non-motorized uses, such as skiing, and create no pollution. Commenters felt that recent NPS rules for bicycle use in the parks should result in NPS reexamining this issue for the winter use process. Commenters also felt that disallowing snowbikes is contrary to the stated goal of the plan/SEIS.

***Response:***

As stated in chapter 2 of the plan/SEIS, under “Alternatives and Actions Considered but Dismissed from Further Consideration,” the NPS believes that the use of snowbikes could conflict with and/or create safety hazards along routes on which substantial numbers of snowmobiles and snowcoaches operate, such as the groomed roads in Yellowstone, and therefore would not meet the health and safety objectives of this plan/SEIS.

Snowbikes may create conflicts with visitors, would have unknown impacts to park wildlife, and would not meet natural resource objectives. Opportunities for snowbiking and kite skiing do exist in the area, outside of the park.

The NPS may reconsider the use of snowbikes through a separate planning process in the future.

***AM1000 - Adaptive Management***

**Concern ID:** 40257

***CONCERN  
STATEMENT:***

Commenters stated that an adaptive management plan is needed because of the dynamic nature of Yellowstone in the winter. One commenter asked that the plan be further developed before the final plan/SEIS to included resource protection goals and desired environmental conditions.

***Response:***

An adaptive management and monitoring framework is included as appendix D to the plan/SEIS. The long-term adaptive management strategy described in this appendix will provide a structured process, involving the public and interested stakeholders, to continually evaluate the effectiveness of the winter use plan and

seek to provide information to inform uncertainties and improve management over time. One of the stated goals of the framework is to ensure that the impacts of oversnow vehicle use remain within the range predicted for the preferred alternative in this plan/SEIS.

**Concern ID:** 40258

**CONCERN STATEMENT:** Commenters asked how stakeholders for the adaptive management process would be selected. One commenter offered technical expertise during this process.

**Response:** The NPS intends to hold a public meeting in the summer of 2013 to kick off the collaborative adaptive management process. All interested parties are welcome to participate.

### ***AQ2000 - Air Quality: Methodology And Assumptions***

**Concern ID:** 40328

**CONCERN STATEMENT:** One commenter suggested using three 2011 model snowcoaches (Ford E350, Ford F450, and Ford F550) to define Class II BAT instead of the current model 2008 Chevy Express, noting that the 2008 Chevy Express has significantly increased emissions, especially carbon monoxide, when compared to the 2011 Ford E350, 2011 Ford F450, and 2011 Ford F550. The commenter also suggested consulting the EPA for assistance.

**Response:** The 2008 Chevy Express van meets the BAT standards for snowcoaches under the preferred alternative, and its performance was measured in the park under normal operating conditions. There is no rational basis to exclude that vehicle from the modeling dataset. The EPA worked closely with NPS on the development of the snowcoach BAT standard and fully supported using the Tier 2 requirements to define snowcoach BAT. The EPA has concurred with the NPS that the Chevy Express van should continue to be included as part of the plan/SEIS analysis.

**Concern ID:** 40329

**CONCERN STATEMENT:** One commenter expressed that the “EPA Emissions Standards Table 4-1” did not present actual emission standards and that a footnote be added for clarification to read, “For 2012 and later model year snowmobiles, the snowmobile HC and CO emissions standards are combined in the form of a manufacturer fleet average equation which allows for a trade-off between IIC and CO emissions to account for the use of different control technologies. For the sake of simplicity, the HC and CO values in this table represent nominal values that might be expected under that equation, rather than actual emission standards.”

**Response:** A footnote has been added to the air quality modeling report to address this comment.

**Concern ID:** 40330

**CONCERN STATEMENT:** One commenter stated that under the preferred alternative, air emissions would reach EPA “warning” levels and carbon monoxide would increase greatly from BAT. The commenter also expressed that in 2013, the EPA will revisit making changes to the current NAAQ standard for ozone to 60-70 parts per billion. The park will be close to violating this proposed standard based on current monitoring data.

**Response:** The impact analysis in chapter 4 demonstrates that all applicable pollutant levels under the preferred alternative would remain well under the National Ambient Air Quality Standards (NAAQS), with CO and PM<sub>2.5</sub> levels remaining at well less than 50 percent of the NAAQS and NO<sub>2</sub> remaining at less than 70 percent of NAAQS under a worst-case scenario.

The NPS is not in a position to speculate regarding the changes EPA may make in the future to NAAQS standards. The NPS would address any future changes to the NAAQS through the adaptive management and monitoring program, if necessary.

## ***AQ4000 - Air Quality: Impact Of Proposal And Alternatives***

**Concern ID:** 40338

**CONCERN STATEMENT:** One commenter recommended additional discussion over model inputs for the current snowmobile fleet and including the number of vehicles by model type of the current snowmobile rental fleet in the final plan/SEIS. The commenter suggested the NPS research, with the manufacturer, whether the emission factors for the 2011 Arctic Cat TZ I are representative and why. If not, it was suggested to remodel the alternatives using revised, accurate emission factors. Another option would be to include an explanation of the likely effect that the inaccurate emission estimates have on the original model results and conclusions. The commenter offered assisting in the drafting of the explanation. They also questioned the elevated emission factors for the current fleet, stating that they may not accurately compare the impacts of the alternatives to existing conditions.

**Response:** NPS staff traveled to Arctic Cat headquarters in Thief River Falls, MN, to discuss the emission performance of the tested Arctic Cat TZ1. Arctic Cat engineers were unable to provide any evidence that the measured emission values were somehow abnormally high.

The NPS has re-evaluated the air quality modeling emission factors and new modeling was conducted for the plan/SEIS to give a higher level of specificity to emission factors by management scenario (alternative). A full discussion of these emission factors can be found in Ray, 2012. The new emissions factors were calculated to provide better estimates of expected emissions from OSV use. Detailed reports concerning the modeling conducted for the plan/SEIS and the emissions factors used for modeling are available on the park's website at <http://www.nps.gov/yell/planyourvisit/winteruse.htm>.

Language has been added to the plan/SEIS to clarify that modeling results are never expected to be 100 percent accurate, however the results are within expected ranges and are reliable for purposes of comparing the impacts of the different alternatives.

**Concern ID:** 40339

**CONCERN STATEMENT:** One commenter questioned the "minor" designation of OSV impacts to air quality under the NAAQS for various pollutants under the preferred alternative. Additionally, the commenter questioned the "moderate" reading for 8-hour carbon monoxide and 1-hour nitrous oxide concentrations.

**Response:** The intensity definitions for air quality impacts are based on guidance from NPS air quality experts. The specific document recommending these definitions is Technical Guidance on Assessing Impacts to Air Quality in NEPA and Planning Documents (NPS 2011a). The values given in chapter 4 are based on air quality modeling conducted specifically for this plan/SEIS. This modeling was revised for the final plan/SEIS, and now predicts that under the preferred alternative, CO and PM<sub>2.5</sub> emissions would result in a minor impact and NO<sub>2</sub> emissions would result in a



moderate impact. The NPS will continue to monitor air quality and if necessary, will make changes to OSV use as part of the adaptive management and monitoring plan.

**Concern ID:** 40340

**CONCERN  
STATEMENT:**

Commenters questioned the air emission analysis stating that data should be presented in the emissions per passenger-mile, not in grams/mile. This failed to account for the number of passengers on a snowmobile versus a snowcoach. One commenter converted air emissions to units of grams per passenger mile for snowmobiles and snowcoaches. The findings showed that per passenger mile, the snowcoach is several multiples cleaner than compared to the snowmobile. The commenter also expressed that studies intentionally or unintentionally masked the severity of pollution produced by snowmobiles.

**Response:**

Impacts to air quality at the “per person” and “per transportation event” levels are discussed in appendix A of the plan/SEIS. The analysis in appendix A reveals that snowmobiles emit less CO at the “per person” and “per transportation event” levels, but that snowcoaches generally emit less hydrocarbons and NO<sub>2</sub>. Without making a value judgment as to which pollutants (CO, hydrocarbons, NO<sub>2</sub>) warrant more concern relative to others, it is not possible to determine that one mode of transportation is cleaner or more desirable than the other, or more protective of the park’s air quality.

**Concern ID:** 40341

**CONCERN  
STATEMENT:**

Commenters questioned how the levels of 8-hour CO concentrations under alternative 1 are above background levels as alternative 1 represents current conditions.

**Response:**

Alternative 1 represents the no action alternative, which would still include a minimal amount of administrative OSV use but no public OSV use. This minimal administrative use would result in levels above background.

**Concern ID:** 40342

**CONCERN  
STATEMENT:**

One commenter stated that according to a new report by the NPS, snowmobiles used in 2012 have higher emissions than those used in 2006. The report also found that new snowmobile models emitted 20 times more CO and increased levels of nitrous oxides and hydrocarbons than those tested in 2006. The commenter stated that these findings indicate that snowcoaches are a cleaner option than current snowmobile use. They also pointed to past findings in this planning process to support this argument.

**Response:**

The NPS recognizes that for some snowmobile models, performance has regressed with respect to certain air and sound metrics over the past several years. However, for others such as the Ski Doo ACE 600, exhaust emissions have improved over earlier models. The BAT requirements proposed under the preferred alternative are designed to ensure better environmental performance from both snowmobiles and snowcoaches in the future. The analysis in appendix A of the plan/SEIS reveals that snowmobiles emit less CO at the “per person” and “per transportation event” levels, but that snowcoaches generally emit less hydrocarbons and NO<sub>2</sub>. Without making a value judgment as to which pollutants (CO, hydrocarbons, NO<sub>2</sub>) warrant more concern relative to others, it is not possible to ascertain that one mode of transportation is cleaner or more desirable than the other or more protective of the park’s air quality.

## ***CC1000 - Consultation and Coordination: General Comments***

**Concern ID:** 40334

***CONCERN  
STATEMENT:***

Commenters questioned the shortened 45-day comment period based on the complex proposal involving scientific and technical data and requested an extended comment period. One commenter suggested that if a new final rule could not be implemented by December 15, the Service could extend the 2011/2012 plan with an interim rule for the winter season. One commenter expressed that the late release of air and sound emission reports compromised the public review opportunity and is inconsistent with the policy and requirements of NEPA.

***Response:***

The NPS extended the interim regulation for one additional season (2012/2013 season) and reopened the comment period on the draft plan/SEIS for an additional 30 days. In total, the comment period for the draft plan/SEIS was open 75 days.

**Concern ID:** 40335

***CONCERN  
STATEMENT:***

Commenters expressed disappointment that comments submitted during past Winter Use processes were not implemented. They felt that these comments included critical and relevant information describing the present and legal status and assessment of threats to wolverines. One commenter requested that their entire letter and attached comments be incorporated with other public comments in the final plan/SEIS.

***Response:***

Comments submitted on the previous NEPA processes, including the 2011 Draft EIS, were reviewed and considered as part of this SEIS planning process.

**Concern ID:** 40336

***CONCERN  
STATEMENT:***

One commenter was concerned that no Endangered Species Act (ESA) Section 7 consultation was mentioned for the draft plan/SEIS process and requested an explanation on how it will comply with the ESA in the final plan/SEIS. The commenter suggested the park publish a notice advising the public how it is complying with the ESA which would provide the public an opportunity to comment on analysis for consideration.

***Response:***

The NPS has held discussions with the USFWS regarding the preferred alternative and, consistent with the guidance found in the Director's Order 12 Handbook, will complete consultation with the USFWS for the alternative that is ultimately selected, prior to signing a Record of Decision.

**Concern ID:** 40337

***CONCERN  
STATEMENT:***

One commenter questioned whether EPA had approved a plan for the 2013 season.

***Response:***

Approval authority regarding OSV access to the park rests exclusively with the NPS. The EPA is a Cooperating Agency for purposes of this plan/SEIS and worked closely with the NPS in the development of the BAT standard for snowcoaches and development of emission factors for air quality modeling.

## ***GA1000 - Impact Analysis: Impact Analyses***

**Concern ID:** 40344

***CONCERN  
STATEMENT:***

Commenters asked that land use issues on adjacent lands be considered such as recognizing restrictions on snowmobile access in adjacent National Forests in the plan/SEIS and the desire for visitors to utilize Yellowstone, not surrounding areas.

**Response:** The purpose of this plan/SEIS is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park. Uses on adjacent lands outside of Yellowstone National Park are outside scope of analysis for this plan/SEIS.

**Concern ID:** 40345

**CONCERN STATEMENT:** Commenters suggested that emissions within the park should be monitored on a per person basis comparing (as recommended by the EPA in its March 2012 scoping letter) the emissions of an OSV user to the emissions of other user types within the park. They also felt that noise and pollution produced by OSVs should be compared to other user types. One commenter felt that the analysis should consider the relative extent to which OSV manufacturers have made reductions in noise and pollution compared to other forms of recreation/travel.

**Response:** Impacts to air quality at the “per person” and “per transportation event” level are discussed in appendix A to the plan/SEIS.

There is no scientific basis to compare emissions from OSVs to wheeled on-road vehicles. OSVs have markedly different emissions characteristics than wheeled on-road vehicles due to the fact that they are typically tracked vehicles running over snow, rather than wheeled vehicles running over pavement. An alternative that would have allowed wheeled vehicles on plowed roads was analyzed in detail in the 2011 Final EIS, but was considered and dismissed from detailed analysis for this plan/SEIS.

**Concern ID:** 40346

**CONCERN STATEMENT:** One commenter expressed concerned about what a decision allowing motorized vehicles off-road in Yellowstone will do to future policy decisions.

**Response:** OSVs are restricted to road corridors and are not allowed “off-road.” OSV use has been allowed in the park every season for five decades, and therefore the NPS does not believe that allowing OSV use in the park would set any new precedent for NPS management. Furthermore, allowing OSV use in the context of this plan/SEIS would not commit the NPS to any future policy decisions.

**Concern ID:** 40347

**CONCERN STATEMENT:** One commenter noted that the draft plan/SEIS fails to discuss the impact that avalanche control on Sylvan Pass will have on proposed wilderness areas that have been proposed under the Wilderness Act. This commenter cites the failure of the draft plan/SEIS to incorporate any discussion that explosives are being launched into recommended wilderness and that the draft plan/SEIS fails to contain a map of these proposed wilderness boundaries.

**Response:** The park contains recommended wilderness, not designated wilderness. For all major park roads, there is a buffer area around major roads and activities taking place there are not considered to be within recommended wilderness. The existing boundaries used to designate the recommended wilderness areas are not exact and it is not clear that the Sylvan Pass avalanche chutes are inside the recommended wilderness areas. It is clear, however, that the location of the howitzer is not in recommended wilderness. The NPS has added text to chapter 1 addressing impacts to wilderness from avalanche mitigation activities. This text can be found under the “Wilderness” subsection of the “Issues and Impact Topics Considered but Dismissed From Further Analysis” section.

**Concern ID:** 40348

**CONCERN STATEMENT:** One commenter noted that, despite the small contribution that OSVs have to overall greenhouse gas emissions, the NPS has direct control over these emissions and felt this topic should have been evaluated fully in the SEIS.

**Response:** Greenhouse gas (GHG) emissions are considered in the SEIS under the heading “Natural or Depletable Resource Requirements and Conservation Potential.” The SEIS states that impacts from GHG emissions associated with motorized winter use would be expected to be negligible in comparison to local, regional, and national GHG emissions. Therefore, the impacts of OSV management and use activities contributing to climate change through GHG emissions under the alternatives considered in this plan were considered but dismissed from detailed analysis.

**Concern ID:** 40349

**CONCERN STATEMENT:** One commenter noted that the intensity definitions in the wildlife section of the draft plan/SEIS do not have metrics associated with them, stating that these definitions are meaningless, including for the purpose of adaptive management. They stated that the NPS must reissue a draft plan/SEIS that includes intensity definitions that are meaningful and measureable.

**Response:** The intensity definitions for wildlife contain qualitative metrics. The NPS believes that these intensity definitions provide an effective mechanism to distinguish the expected level of impact among alternatives, which is one purpose of including intensity definitions in NPS NEPA documents. Quantitative metrics are not required for intensity definitions. Furthermore, quantitative metrics are not well-suited for analyzing wildlife impacts. It would be extremely difficult to develop quantitative metrics that would be applicable across all wildlife species analyzed, and developing different quantitative metrics for each species would require an unreasonable amount of time, in light of the relatively low level of impacts caused by OSV use.

**Concern ID:** 40350

**CONCERN STATEMENT:** Commenters questioned the NPS insistence that OSV use continue in Yellowstone despite evidence demonstrating that such use “harms wildlife, air quality, natural soundscapes, compromises employee and visitor safety, and is a violation of federal law.” They also stated that the NPS studies go against their findings and requested that the NPS show the science supporting the use of OSVs prior to making a decision regarding winter use.

**Response:** The NPS disagrees that allowing OSV use violates federal law. NPS *Management Policies 2006*, Section 1.4.3 states, “NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values.” This means that NPS managers must take reasonable, affirmative steps toward avoiding or minimizing adverse impacts, but it does not constrain the NPS’s discretion to allow impacts that the NPS deems necessary and appropriate to promote the enjoyment or conservation of the park.

If the NPS is to provide for any reasonable visitor access to Yellowstone in the winter, motorized vehicle use is necessary, and the NPS believes that OSV use as proposed under the preferred alternative allows the agency to effectively protect park resources while providing for visitation. Based upon the impact analysis in the SEIS, the NPS believes OSV use, at the levels described in the preferred alternative, including the requirements and restrictions, is an appropriate use of the park.

Pursuant to the NPS Guidance for Non-Impairment Determinations and the NPS NEPA Process (NPS 2010d), a non-impairment determination for the selected alternative will be appended to the Record of Decision (ROD).

### ***GA1500 - General: Methodology and Assumptions***

**Concern ID:** 40302

**CONCERN  
STATEMENT:**

One commenter asked for clarification regarding the assumptions for administrative use of snowcoaches. Specifically, they wanted to know if they needed to meet BAT standards the same time as the rest of the fleet and if they are subject to the same time restrictions as other snowcoaches.

**Response:**

Administrative use of OSVs would generally be subject to the same BAT and other restrictions as commercial snowcoaches, including hours of operation. Limited exceptions to BAT and other requirements would be made for emergency circumstances and for other administrative purposes on a limited basis.

### ***HS2000 - Health and Safety: Impact Of Proposal And Alternatives***

**Concern ID:** 40303

**CONCERN  
STATEMENT:**

One commenter noted that the proposed action would result in an increase in visitor conflict incidents if guides are not required.

**Response:**

Under the preferred alternative, OSV use in the park will continue to be 100 percent guided. The NPS considered but dismissed allowing unguided use. While the preferred alternative would allow non-commercially guided use, there is no data to suggest such use would have greater impacts to park resources than commercially guided use or that non-commercially guided use would create additional visitor conflicts. The NPS will develop a non-commercial guide training program and will monitor non-commercially guided groups through its adaptive management and monitoring program. If non-commercially guided groups are determined to have a greater impact to park resources and values than commercially guided groups, non-commercially guided use could be reduced or eliminated.

### ***PN2000 - Purpose And Need: Park Purpose And Significance***

**Concern ID:** 40305

**CONCERN  
STATEMENT:**

Commenters stated that allowing snowmobile use is against the purpose for which the park was established as well as NPS Management Policies. One commenter stated that the statements of significance in the draft plan/SEIS do not mandate snowmobile use and noted that NPS is not obligated to provide accessibility to all.

**Response:**

The NPS recognizes that OSV use in Yellowstone is not mandated by law or policy. NPS *Management Policies 2006*, Section 1.4.3 states, “NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values.” This means that NPS managers must take reasonable, affirmative steps toward avoiding or minimizing adverse impacts, but it does not constrain the NPS’s discretion to allow impacts that the NPS deems necessary and appropriate to promote the enjoyment or conservation of the park.

If the NPS is to provide for any reasonable visitor access to Yellowstone in the winter, motorized vehicle use is necessary, and the NPS believes that OSV use as proposed under the preferred alternative allows the agency to effectively protect park resources while providing for visitation. Based upon the impact analysis in the SEIS, the NPS believes OSV use, at the levels described in the preferred

alternative, including the requirements and restrictions, is an appropriate use of the park.

**Concern ID:** 40306

**CONCERN STATEMENT:** Commenters noted that the NPS is to provide for the use and enjoyment of the parks, and asked for access to be maintained because of this mandate.

**Response:** Most national parks do not allow any motorized oversnow access; some close entirely in winter. The park's enabling legislation and the Organic Act reserve ample discretion to the NPS to determine how best to promote the enjoyment of the park while protecting park resources. The suggestion that the park's enabling legislation or Organic Act mandate some particular level or type of access is incorrect. However, under the preferred alternative, OSV use would be allowed to continue.

### ***PN3000 - Purpose And Need: Scope Of The Analysis***

**Concern ID:** 40307

**CONCERN STATEMENT:** Commenters stated that the plan should better include non-motorized uses, and that this would be consistent with the purpose of the plan. Commenters asked for more specific details regarding non-motorized uses in the park including enhancements.

**Response:** During the scoping process, the NPS received a number of comments regarding non-motorized winter use. The alternatives in the SEIS provide for a number of non-motorized uses such as skiing, hiking, and snowshoeing. Under the action alternatives, there are more than 35 miles of secondary park roads available for non-motorized recreation. Specific details regarding non-motorized uses can be found in chapter 2 of the SEIS.

### ***PN4000 - Purpose And Need: Park Legislation/Authority***

**Concern ID:** 40375

**CONCERN STATEMENT:** Commenters stated that under NPS *Management Policies 2006* a transition to snowcoaches is not only appropriate, it is required as the policies "seek to perpetuate the best possible air quality in the parks." One commenter also questioned the use of snowmobiles in the park as 36 CFR 2.18, 16 USC 1a-1, the 2000 ROD at page 12, the 2003 ROD at page 18, the 2004 EA at page 12, 2011 draft EIS, chapter 2, page 72, 2011 final EIS, chapter 1, page 25, NPS Management Policy 1.4.3; 2000 ROD, at 13; 2004 EA at pages 11-12; 2007 ROD, at page 30; 2011 final EIS, chapter 2, page 76 contain language which suggests snowmobiles would be inconsistent and a conflict between users and policy of the park.

**Response:** The impact analysis in the SEIS demonstrates that with implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, the preferred alternative would result in fewer overall impacts to the park's air quality than the other action alternatives.

In addition, data indicates that impacts for both modes of transportation (snowmobiles and snowcoaches) are low and that no one mode of transportation is clearly better, in terms of limiting environmental impacts and maximizing visitor experiences, than the other.

Based on the analysis in this SEIS, the NPS does not believe OSV use, as proposed under the preferred alternative, would be inconsistent with NPS policies.



**Concern ID:** 40376

**CONCERN  
STATEMENT:**

One commenter suggested that the preferred alternative would not comply with the court’s order stating, “at the very least, NPS is required to exercise its discretion in a manner that is calculated to protect park resources and genuinely seeks to minimize adverse impacts on park resources,” while the snowcoach alternative would comply.

**Response:**

The impact analysis in the SEIS demonstrates that with implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, the preferred alternative would result in fewer overall impacts to park resources and values than the other action alternatives, including alternative 3 (snowcoach-only alternative).

**Concern ID:** 40377

**CONCERN  
STATEMENT:**

Commenters stated that snowmobiles and OSV use should be banned as they are in violation of park legislation and would have adverse effects on air quality, soil, wildlife and habitat, and cultural or historic resources. Commenter stated that the use of snowmobiles under Executive Order 11644, Use of Off Road Vehicles on the Public Lands, (1972); the 2000 ROD, at page 12; 2003 ROD at page18; 2004 EA at page 11; 2007 ROD, at page 28; 2011 final EIS, chapter 1, pages 26-27, Executive Order 11989 (1978), the 1974 Yellowstone National Park Master Plan and draft SEIS at pages iii and 3 would be in violation of these mandates as off road vehicle use would be in locations that would adversely affect their natural, aesthetic or scenic values.

**Response:**

The NPS considered an alternative that would have banned public OSV use. However, the NPS believes it is important to provide access by the public to the park’s unique winter resources. Therefore, the NPS has identified a preferred alternative that would allow the public to use OSVs to access the interior of the park, while minimizing impacts to park resources and values.

The NPS believes that by implementing transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, the preferred alternative would minimize impacts to park resources and values and can be implemented in a manner consistent with applicable legislation, regulations, and policies.

**Concern ID:** 40378

**CONCERN  
STATEMENT:**

One commenter questioned the use of snowcoaches, as they are not currently permitted by regulation. Additionally, the commenter stated that the draft plan/SEIS at 27 states the park units are to, “maintain, as parts of the natural ecosystems of parks, all plants and animals native to the park ecosystems in part by minimizing human impact on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them” and that this is a conflict with NPS regulations as it includes the caveat of “minimizing” when the relevant regulations do not.

**Response:**

Snowcoach use has been authorized by previous winter use regulations, including the interim regulation that is currently in effect through the 2012/2013 season.

NPS *Management Policies 2006*, Section 1.4.3 states, “NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values.” This means that NPS managers must take reasonable, affirmative steps toward avoiding or minimizing adverse impacts, but it does not constrain the NPS’s discretion to allow impacts that the NPS deems necessary and appropriate to promote the enjoyment or conservation of the park.



**Concern ID:** 40379

**CONCERN STATEMENT:** One commenter stated that the draft plan/SEIS failed to discuss NPS regulations 36 CFR 2.2(a)(2) which prohibits, “the feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding, or other activities,” and 36 CFR 2.18(c).

**Response:** The regulations and restrictions on OSV use under the preferred alternative, including the 100 percent guiding requirement, are designed to prevent the situations referred to by the commenter. Under the preferred alternative, law enforcement personnel would issue citations to anyone observed feeding, touching, teasing, frightening, or intentionally disturbing wildlife.

***PN8000 - Purpose And Need: Objectives In Taking Action***

**Concern ID:** 40380

**CONCERN STATEMENT:** Commenters suggested that the Objectives should include non-motorized opportunities as well as throughout the document.

**Response:** The NPS believes that providing non-motorized opportunities fits under the purpose of the plan/SEIS, which is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park.

During the scoping process, the NPS received a number of comments regarding non-motorized winter use. The alternatives in the SEIS provide for a number of non-motorized uses such as skiing, hiking, and snowshoeing. Under the action alternatives, there are more than 35 miles of secondary park roads available for non-motorized recreation. Specific details regarding non-motorized uses can be found in chapter 2 of the SEIS.

**Concern ID:** 40381

**CONCERN STATEMENT:** One commenter stated that alternative 1 would not meet the objective to promote advances in vehicle technology. The commenter stated that this objective is preposterous since Yellowstone National Park/NPS has no obligation to promote or achieve any advancements in vehicle technology and must be removed from the document.

**Response:** The NPS acknowledges that it has no legal duty to promote advances of OSV technology, but has decided that such an objective should be included in the plan/SEIS. While this objective is better met by the action alternatives that would allow public OSV use, this objective could still be met under alternative 1, which would allow limited administrative OSV use.

**Concern ID:** 40382

**CONCERN STATEMENT:** One commenter suggested that the park has not appended or made available the Yellowstone National Park strategic plan, 1995 Natural Resource Management Plan, 1974 Master Plan, and other management guidance so the public can determine the veracity of the NPS objectives. The commenter further suggests that the documents do not mandate or suggest that OSVs must be permitted in the park.

**Response:** The strategic plan is available on the park’s website at <http://www.nps.gov/yell/planyourvisit/upload/strategicplan.pdf>. The other referenced documents are available for review at the park and can be requested by contacting the Superintendent’s Office.

**Concern ID:** 40383

**CONCERN STATEMENT:** One commenter suggested that an objective of the plan should be to eliminate further addition of particles to the air so the air will become cleaner.

**Response:** The plan/SEIS contains an objective to manage winter use to minimize impacts on resources that may be affected by air pollution, including visibility and aquatic systems. Under the preferred alternative, the NPS expects the overall amount of pollution to be reduced compared to what has been allowed during past winter seasons.

## ***SE2000 - Socioeconomics: Methodology And Assumptions***

**Concern ID:** 40309

**CONCERN STATEMENT:** One commenter stated the NPS had said the economic concerns were not considered, and the commenter felt they should be part of the analysis.

**Response:** The SEIS addresses socioeconomic impacts in “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences.”

**Concern ID:** 40310

**CONCERN STATEMENT:** The University of Wyoming provided excerpts from an ongoing study regarding snowmobiling in the state for consideration for incorporation into the final plan/SEIS.

**Response:** The NPS appreciates additional information and studies to consider in the SEIS process. However, the NPS cannot use the information provided because the study has not been completed. As provided, the excerpts are taken out of context of the full report. The NPS looks forward to reviewing these studies once they are completed and provided to the public.

## ***SE4000 - Socioeconomics: Impact Of Proposal And Alternatives***

**Concern ID:** 40311

**CONCERN STATEMENT:** Commenters questioned how much revenue increasing snowmobiles would generate, and if increasing revenue is a goal of the NPS. One commenter asked what the cost per transportation event would be.

**Response:** Decisions regarding the appropriate type of winter use and numbers of snowmobiles and snowcoaches are made without regard to revenue. Entrance fees related to winter use are a small part of the park’s overall budget and a small part of fee revenue that Yellowstone receives. Oversnow winter use accounts for ~50,000 of the approximately 3.5 million visits to Yellowstone each year. Cost per transportation event is difficult to ascertain, but generally it costs approximately \$100 to \$200 per person to enter the park during winter, depending on the type of OSV used.

**Concern ID:** 40312

**CONCERN STATEMENT:** One commenter stated while it agreed with the impacts, it felt that the impact analysis was incomplete because it did not take into consideration other costs, such as ecological values.

**Response:** Ecological values are difficult to quantify. However, the NPS takes into account ecological and other non-monetized values in its decision making process.

**Concern ID:** 40313

**CONCERN STATEMENT:** Commenters felt that the analysis for alternative 2 incorrectly identified it as continuing current management, when current management should be no OSV use.

**Response:** Text has been changed to refer to what has been allowed in “recent years,” (318 snowmobiles and 78 snowcoaches per day) rather than referring to “current management.”

**Concern ID:** 40314

**CONCERN STATEMENT:** In regard to the analysis of socioeconomic impacts, commenters requested the NPS acknowledge that none of the alternatives would restore previous visitation levels, and therefore have economic impacts. They also requested that NPS consider other aspects of economic impact, such as having to make up lost winter revenue for the rest of the year. One commenter expressed concern with the scope of the analysis, stating that the Big Horn Basin should be considered while another pointed out the market-driven process for manufacturing BAT snowmobiles.

**Response:** The NPS notes that the higher levels of OSV use allowed prior to the 2009/2010 have not been seen in a number of years. While the commenter is correct that the alternatives considered in the SEIS would not restore previous visitation, alternatives allowing such high levels of use (540 or 720 snowmobiles and 78 snowcoaches per day) were considered but dismissed from detailed analysis. The NPS does not believe it is appropriate to compare the impacts of the four alternatives carried forward in the SEIS against impacts of alternatives that were dismissed.

The economic analysis in the SEIS analysis looks at impacts for five geographic regions: the three state area (Idaho, Montana, and Wyoming), the five county area (Fremont County in Idaho, Gallatin and Park counties in Montana, and Park and Teton counties in Wyoming), and three individual communities (Cody and Jackson, Wyoming, and West Yellowstone, Montana). The community regions are approximated using zip code boundaries.

The impacts of the market-driven process proposed under the preferred alternative are included under the impacts of alternative 4.

**Concern ID:** 40315

**CONCERN STATEMENT:** Commenters expressed opinions on the gateway communities, stating that Cody and Jackson should not qualify as gateway communities due to their distance from the park, while another commenter felt that these communities should be less reliant on winter use.

**Response:** Although located at various distances to the park, the communities of Cody and Jackson are considered gateway communities to Yellowstone. This can be seen at the South Entrance, the entrance with the second-highest winter visitation for OSV use, with many of those visitors using the services in Jackson. Similarly, for those coming in the East Entrance, Cody provides goods and services to those visitors in the winter.

## ***SS1000 - Soundscapes: Methodology And Assumptions***

**Concern ID:** 40316

**CONCERN STATEMENT:** Commenters questioned the in the soundscapes analysis, with one commenter questioning why data for the 2011 plan is cited in the document. Another commenter noted that the emissions testing conducted was not included in the document, and further stated that Table 18 (page 119 of the draft plan/SEIS) is not consistent with the emissions testing data provided by the NPS.

<b>Response:</b>	<p>References to the 2011 plan under the soundscapes section should have read 2012 plan. This editorial error was corrected for the final plan/SEIS.</p> <p>2012 emissions testing informed the inputs to the air quality modeling of the alternatives. The methodology by which the emissions tests were incorporated in the emissions modeling is explained in greater technical detail in “Yellowstone Over-snow Vehicle Emission Tests” 2012 and the SEIS “Air Quality Modeling Report-Snowmobile and Snowcoach Emissions.” Both of these documents are available on the park’s website at <a href="http://www.nps.gov/yell/planyourvisit/winteruse.htm">http://www.nps.gov/yell/planyourvisit/winteruse.htm</a>. The commenter is correct that the air quality and soundscapes supporting technical documentation was not available at the time of the draft plan/SEIS release. The technical reports were made available on the website on August 8, 2012. To ensure commenters would have time to review the technical documents, the comment period was reopened for an additional 30 days.</p> <p>Table 18 (now Table 22 in the SEIS) has been replaced with the most up to date information from the National Institute on Deafness and Other Communicative Disorders.</p>
<b>Concern ID:</b>	40317
<b>CONCERN STATEMENT:</b>	One commenter stated that, in relation to soundscapes, the SEIS document should focus on the “two park” concept, acknowledging that impacts to soundscapes are different along roads and in developed areas compared to the backcountry.
<b>Response:</b>	While the NPS does not believe the commenter’s suggestions constitute a “two park” concept, the intensity definitions for soundscapes do acknowledge there are differences between travel corridors and backcountry areas.

## ***SS2000 - Soundscapes: Impact Of Proposal And Alternatives***

<b>Concern ID:</b>	40318
<b>CONCERN STATEMENT:</b>	<p>Commenters questioned the metrics and data used in the soundscape analysis, stating that perception of sound would be different (either more or less) compared to the sounds data presented in the draft plan/SEIS. They also felt that percent time audible was not an appropriate measure, as it did not account for the intensity of sound when the majority of visitation happens within a certain window of time. One commenter questioned if multiple snowcoaches had less of a sound impact than one snowmobile.</p>
<b>Response:</b>	<p>The perception of sound emitted from snowmobiles and snowcoaches depends on specific models, operating conditions, and distance from the vehicles. The NPS used A-weighted decibels to quantify and compare different sources in the SEIS. This is an accepted practice and is based on the frequencies humans are sensitive to. Based on the analysis in appendix A of the SEIS, data indicate that when measured at 50 feet at cruising speed, a group of up to 10 New BAT snowmobiles (each producing 67 dBA), measures 3 dBA lower than a single BAT snowcoach also at cruising speed. The two types of transportation events would have similar noise levels at distant locations.</p> <p>While percent time audible is provided in chapter 4, the intensity definitions are based on Leq, which better predicts how sound would actually be perceived than does percent time audible alone. A complete discussion of the sound metrics used in the SEIS is included in appendix F.</p> <p>Depending on the sound energy emitted from each vehicle, it would be possible for multiple snowcoaches to emit less sound energy than one snowmobile, and the opposite is also true. Based on monitoring data, the quietest and noisiest OSVs in</p>

the park were snowcoaches. The quietest snowcoach, a 1994 Dodge Van with Snowbuster Tracks, produced 64 dBA at cruising speed. The loudest snowcoach, a 1988 Prinoth Powder Cat TR, produced 83 dBA at cruising speed. To put this range in perspective, it would take 79 of the 1994 Dodge Van snowcoaches fitted with Snowbuster Tracks to radiate as much noise as a single 1988 Prinoth TR.

**Concern ID:** 40319

**CONCERN STATEMENT:** Commenters noted general impacts from noise, including vibration and wildlife disturbance. One commenter noted the emphasis NPS had put on soundscapes in past planning documents, stating that alternative 3 should be implemented to address this and to lessen soundscape impacts to visitors.

**Response:** The NPS agrees that protection of the natural soundscape is important. Based on the analysis in the SEIS, the NPS believes that with implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, the preferred alternative would result in less overall impacts to park resources and values than the other action alternatives, including alternative 3 (snowcoach-only alternative).

#### ***VE4000 - Visitor Experience: Impact Of Proposal And Alternatives***

**Concern ID:** 40320

**CONCERN STATEMENT:** Commenters expressed concern about the cost of snowmobiling, with one commenter stating that the cost of snowcoaches is actually less per person than a snowmobile. They also stated that the SEIS should look at profit, rather than revenue, in the economic impact analysis.

**Response:** The commenter is correct that the cost of entering the park on a snowcoach is generally less than entering the park on a snowmobile.

The economic analysis in the SEIS is based upon the IMPLAN model, which gives results based on output revenue. For IMPLAN, some of the additional revenue earned in one sector is used to pay for more inputs from other sectors, thus creating a multiplier effect. The IMPLAN results are the total impact (including the multiplier) that is created in the economy. The profit would be the leftover money that the owners of the capital (which may not be the same people as the employees) keep. Whether the NPS looks at revenue or profit the relative impacts would be the same. Figures on revenue (as opposed to profit) can be compared to state or county GDP to get a sense of the size of the impact relative to the overall economy.

**Concern ID:** 40321

**CONCERN STATEMENT:** Commenters suggested that snowmobile use should not be permitted in Yellowstone because there are other opportunities in the area for that type of recreation. They also stated that snowmobile use, in the current numbers, conflicts with other visitor uses in the park.

**Response:** The purpose of this plan/SEIS is to establish a management framework that allows the public to experience the unique winter resources and values at Yellowstone National Park. Therefore, the availability of OSV recreation outside of Yellowstone is outside of the scope of this plan/SEIS.

The NPS does not believe that OSV use, as proposed under the preferred alternative, would conflict with other visitor uses in the park. If OSV use were not allowed, as proposed under alternative 1, access to the park would be limited to the periphery and only a very few number of individuals would be in good enough physical shape to access the interior of the park.

<b>Concern ID:</b>	40323
<b>CONCERN STATEMENT:</b>	One commenter cited studies presented in the draft plan/SEIS to note that visitors create disturbance to wildlife, including bison.
<b>Response:</b>	The NPs acknowledges that OSV use has some adverse effects on wildlife. The regulations and restrictions on OSV use under the preferred alternative, including the 100 percent guiding requirement, are designed to reduce impacts to wildlife. Under the preferred alternative, law enforcement personnel would issue citations to anyone observed intentionally disturbing wildlife.
<b>Concern ID:</b>	40324
<b>CONCERN STATEMENT:</b>	One commenter stated that the analysis of visitor use and experience is biased and that they feel that NPS is allowing visitor use to trump conservation. As part of this, they felt that surveys used in the analysis were biased and deficient.
<b>Response:</b>	<p>The NPS does not believe it is allowing use to trump conservation, as the commenter has asserted. With implementation of transportation event management, BAT for snowcoaches, New BAT for snowmobiles, and voluntary E-BAT for both snowmobiles and snowcoaches, the preferred alternative would meet the NPS's conservation mandate, while allowing an appropriate number of visitors to experience the park's unique winter resources.</p> <p>The surveys cited in the SEIS used appropriate methodologies to help begin to understand the human dimensions of visitor use. The methods and draft instruments were made available for public review as part of the Paperwork Reduction Act process. Although the visitor use surveys were considered in the impact analysis, they were only one of multiple factors the NPS considered.</p>
<b>Concern ID:</b>	40325
<b>CONCERN STATEMENT:</b>	One commenter questioned if there was demand for snowmobiling.
<b>Response:</b>	The NPS believes there is demand for snowmobiling based on use levels seen in recent years, as well as public comment received during the multiple winter use planning processes.
<b>Concern ID:</b>	40326
<b>CONCERN STATEMENT:</b>	Commenters expressed concern with requiring group tours, stating that it is difficult to take different family members with various needs, you are restricted in time and place, and that non-motorized access may be difficult for some family members.
<b>Response:</b>	<p>The NPS requirement for guided tours has been effective at reducing impacts to park resources. The NPS believes that while the group/guided tours may create difficulties for some potential visitors, OSV use is only appropriate with certain restrictions.</p> <p>The NPS recognizes that visitors to Yellowstone in the winter have different abilities as well as different desires for their visitor experience. To address this, the preferred alternative allows for a range of experiences including commercially-guided snowmobile use, non-commercially guided snowmobile use, snowcoach use, and non-motorized uses.</p>



**WH2000 - Wildlife And Wildlife Habitat: Methodology And Assumptions**

**Concern ID:** 40243

**CONCERN  
STATEMENT:**

Commenters expressed concerns over the use of the Borkowski study (2006) instead of the White study, which was used in the 2007 SEIS, asserting that the White study is the definitive report on the impacts of OSVs on wildlife and that the Borkowski study was based on data collected prior to the “managed use era.”

One commenter expanded on this concern stating that the 480 snowmobiles a day described in NPS’s alternative 4 exceeds the recommendation of biologists and discounts the White study that was referenced by the district court in invalidating the 2007 Winter Use Plan proposal of allowing 540 snowmobiles a day.

**Response:**

The NPS considers both studies to be valid; however, each study looked at wildlife responses under different OSV use conditions, Borkowski looked at higher use levels while White looked at lower use levels. In the end, the conclusions were the same.

As discussed in previous planning processes, there have been some ambiguous and somewhat inconsistent statements in past papers on wildlife impacts. The NPS has determined, however, that the use levels proposed under the preferred alternative are consistent with the biologists’ actual recommendations.

The 2008 EA states, “White et al. erred in stating winter use should be limited to 50,000 oversnow visitors [emphasis in original]” (White 2008). White 2008 is a citation to a memo from Dr. White (available at [http://www.nps.gov/yell/parkmgmt/upload/correction\\_2006winuserpt.pdf](http://www.nps.gov/yell/parkmgmt/upload/correction_2006winuserpt.pdf)) which clarifies that the recommendation was to “[c]ontinue to conduct winter recreational activities in a predictable manner with OSV [over-snow vehicle] traffic levels at or below those observed during the last 3 years of our study.”

This memo has been interpreted by some to mean that snowmobile use should be limited to no more than approximately 260 per day and snowcoach use to no more than approximately 30 per day (which were the averages those years). Other papers by the same authors, however, discussed a wider time frame (1999-2006) and higher levels of use. The peer-reviewed scientific journal article, “Behavioral Responses of Bison and Elk in Yellowstone to Snowmobiles and Snow Coaches” by John J. Borkowski, P.J. White, Robert A. Garrott, Troy Davis, Amanda R. Hardy and Daniel J. Reinhart, *Ecological Applications* 16(5) (2006) (pp. 191- 1925) makes it clear that the monitoring period they are referring to is 1999 through 2004. Average daily OSV use ranged from 593 per day during the 2002 winter to 178 per day in 2004.

Maximum daily numbers ranged up to 1168 OSVs during the study. Cumulative OSV entries for the winter season for the West Entrance alone ranged up to 46,885 for the winter season (data are found on page 1915 of the paper). At the conclusion (p. 1924), the authors state:

“This study documented that winter visitors traveling on OSVs were essentially confined to the groomed roads, typically behaved appropriately when viewing wildlife, and rarely approached wildlife except when animals were on or immediately adjacent to the road. These attributes have allowed elk and bison in Yellowstone to habituate somewhat to OSV recreation, commonly demonstrating no observable response, and rarely displaying “fight or flight” responses when animals were off road. Further, available data provide no evidence that levels and patterns of OSV traffic during the past 35 years adversely affected the population dynamics or demography of elk and bison. Thus, we suggest regulations restricting the levels and travel routes of OSVs during our study were effective at reducing disturbance to bison and elk below a level that would cause measurable fitness effects. We acknowledge the potential for fitness effects to develop if OSVs or other stressors become more severe or prolonged. Thus, we recommend park managers consider maintaining OSV



traffic levels at or below those observed during our study [1999-2004]. Regardless, numerous studies have shown that scientific findings rarely persuade people to alter their values or beliefs (e.g., Meadow et al. 2005). Thus, we suspect that varying interpretations of the behavioral and physiological response data will continue to exist because of the diverse values and beliefs of the many constituencies of Yellowstone National Park.”

The preferred alternative maintains the restrictive regulations that reduced disturbances and maintains OSV traffic levels well below those observed from the 1999/1999 through 2003/2004 winter seasons (the public use season is from December 15 through March 15), and is thus fully consistent with the recommendations of this peer reviewed article and the biologists’ subsequent clarifications.

**Concern ID:** 40247

**CONCERN  
STATEMENT:**

One commenter, concerned over science supporting reduced number of snowmobiles due to animal stress and visitor solitude, requested that the NPS provide a comparison of elk and bison populations present in the park prior to restrictions and populations currently in the park.

**Response:**

Population trends for bison and elk in the park are discussed in chapter 3 of the SEIS. Bison and elk numbers in the park have fluctuated over time; however, population trends are attributed to drought, severe winter weather, hunting, and predation. Motorized winter use in the park has not been cited as a major reason for population or demographic trends.

**WH4000 - Wildlife And Wildlife Habitat: Impact Of Proposal And Alternatives**

**Concern ID:** 40363

**CONCERN  
STATEMENT:**

One commenter cited specific issues pertaining to impacts on wildlife and wildlife habitat that they were concerned about in the draft plan/SEIS including that impacts to bison and elk were overstated at moderate, when they should be negligible, minor or insignificant. They also noted that there is substantial habituation of bison and elk to vehicular travel on roads and there is therefore minimal stress caused to wildlife.

**Response:**

NPS agrees that for the most part that the preferred alternative would result in impacts to bison and elk at minor or negligible levels. However, due to the potential for individuals to respond in a negative way to OSV use, the NPS believes the impacts of alternative 4 best fit under the moderate intensity definition.

**Concern ID:** 40364

**CONCERN  
STATEMENT:**

Commenters expressed concern over adverse impacts to wildlife from OSV use. In general they stated that there is science demonstrating impacts from sound pollution on wildlife including stress and reduced natality, with one commenter specifically citing impacts to wolverines. One commenter suggested that the NPS look at research by Dr. Bernie Krause pertaining to the effects of manmade loud noise.

One commenter asked how much wildlife is lost from stress-induced death.

Specific impacts that commenters felt should be addressed were impacts to grizzly bears citing indirect impacts from groomed/packed roads as it related to the availability to winter-killed carcasses for emerging bears.

In addition, another commenter was concerned about impacts from compacted snow that would prevent air circulation beneath the surface resulting in the death of burrowing animals, and the effects of hibernation.

One commenter noted the NPS statement that it is difficult to determine how OSV use in Yellowstone would affect lynx and wolverine “habitat use, behavior, or distribution,” expressing concern that the NPS made the conclusion that impacts under alternative 4 would be same as the impacts under alternative 3 without evidence to support this finding.

**Response:**

The NPS has reviewed Dr. Krause’s papers, as well as hundreds of other articles on the subject of the effects of manmade noise.

The SEIS acknowledges that a number of factors, including noise, may adversely affect bison or elk heart rate, stress levels, habitat use, and foraging time. However, no comprehensive studies have analyzed the energetic effects of bison and elk behavioral responses to OSVs in Yellowstone, due in part to the difficulties associated with separating the energetic costs associated specifically with responses to OSVs from the total daily energy expenditure (Borkowski et al. 2006). Numerous assumptions are required when making energy analyses, and poorly defined parameter estimates can strongly affect research and outcomes. No data is available regarding how much, if any, wildlife is lost from stress-induced death, but available data on physiological responses of wildlife indicates stress-related mortality would be minimal, if at all.

Grizzly bears in Yellowstone generally den far from groomed park roads and areas used by recreationists, and are in hibernation for most of the winter months. Therefore, OSV use in the park as proposed under the preferred alternative has little potential to disturb them. In addition, the NPS designates bear management areas that result in recreation closures further reducing the potential for disturbance. As suggested by the commenter, winter kill is an important post-emergence food source for bears. However, it is not expected that OSV use would increase or decrease the level of winter kill in a meaningful way that could affect the park’s grizzly bear population.

In regard to issues related to the grooming and packed snow, all OSV routes take place on snow covered and unplowed roadways in the park. It is extremely unlikely that burrowing or hibernating animals would be using these areas. Burrowing animals may attempt to traverse these areas, though they would not be expected to be seeking food resources or shelter in these areas given the underlying road.

Chapter 4 of the SEIS provides clear distinctions between alternatives 3 and 4 regarding impacts to lynx and wolverines.

**Concern ID:**

40365

**CONCERN  
STATEMENT:**

One commenter stated that there is not a comprehensive assessment of bison energetics and noted that such an assessment is critical to providing an analysis of the impacts to bison. They further note that the NPS should not make suggestions about energy expenditures by bison moving through deep snow (draft plan/SEIS 196) being countered due to a lack of active movement responses.

**Response:**

NPS agrees that there has not been a comprehensive assessment of bison energetics at Yellowstone National Park. However, observations of bison, elk, trumpeter swans, and bald eagles, which evince awareness of passing OSVs but typically are not displaced, do not suggest substantial energetic costs. Therefore, NPS scientists have suggested, based on best professional judgment, that for the no-action alternative, although it is difficult to differentiate between the additional movement costs that may be associated with travel through deep snow and the energy savings due to lack of active movement responses, it is likely that costs and benefits would more or less balance out for bison.

<b>Concern ID:</b>	40366
<b>CONCERN STATEMENT:</b>	One commenter noted that the explanation of impacts to wolves in the park described in Table 10 (Impact Summaries) under alternative 2 would result in increased, not decreased, wolf encounters compared to current use noting that current use includes a ban on recreational vehicles.
<b>Response:</b>	The NPS agrees with the commenter and has changed the text in the table to reflect this.
<b>Concern ID:</b>	40367
<b>CONCERN STATEMENT:</b>	<p>Several commenters expressed concern about practices pertaining to Sylvan Pass and asked that the following issues be addressed:</p> <ul style="list-style-type: none"> <li>- Impacts of avalanche control on subnivean species such as pikas.</li> <li>- Impacts of avalanche control on the habitat of lynx and wolverine.</li> <li>- Explanation for allowing avalanche control in critical wolverine habitat.</li> <li>- Substantive discussion of environmental consequences on critical wolverine habitat.</li> <li>- Address the likelihood that USFWS will formally list wolverines for protection under the Endangered Species Act.</li> </ul>
<b>Response:</b>	<p>The NPS has added text to chapter 1 addressing impacts to pika. This text can be found under the “Subnivian Fauna” subsection of the “Issues and Impact Topics Considered but Dismissed From Further Analysis” section.</p> <p>Although concerns were expressed about the impacts to lynx and wolverine habitat, data indicates that the pass is not frequently used by these species, and the potential for impact is minimal. Furthermore, wolverines feed primarily on winter-killed ungulates (deer, elk, bison) which are not present in the Sylvan Pass area in winter. Overall, avalanche mitigation in Sylvan Pass affects less than 0.1 percent of wolverine habitat. The impacts of avalanche control on wolverine and lynx habitat have been added to chapter 4.</p> <p>At this time, wolverines have been proposed for listing under the Endangered Species Act, but are not listed under the Endangered Species Act. That listing process is outside the scope of this SEIS. The SEIS analyzes impacts to wolverines. Should wolverines come under the protection of the Endangered Species Act, the NPS will consult with the USFWS, and if necessary, make adjustments to the winter-use management framework.</p>
<b>Concern ID:</b>	40368
<b>CONCERN STATEMENT:</b>	One commenter noted that the winter transportation corridor over Sylvan Pass is at odds with the USFWS interpretation of the NPS Organic Act as a regulatory mechanism to protect wolverine habitat. They felt that since the SEIS did not analyze impacts to wolverine in the context of climate change, the USFWS presumption about the benefits of NPS units in wolverine conservation cannot be met. This commenter also stated that it is “neither prudent nor lawful” of the NPS not to analyze “reasonably predictable” consequences such as the effects to Sylvan Pass as a key habitat connection and the future reduction in habitat area in the Greater Yellowstone Ecosystem predicted by the USFWS.
<b>Response:</b>	Avalanche control at Sylvan Pass began in 1973 and its use by OSVs has occurred over various time periods since 1973. Activity in this area of the park during winter has been fairly consistent through the years.

The NPS disagrees that the USFWS presumption of conservation based on the NPS Organic Act is flawed. The USFWS concluded that “Where wolverines occur in National Parks, they and their habitats are protected from large-scale loss or degradation due to the Park Service’s mandate.” OSV use in Sylvan Pass would not result in the “large-scale loss or degradation” suggested by the commenter. In addition, the USFWS concluded that “Six of seven natal dens documented in the Yellowstone Ecosystem occurred where snowmobiles were not permitted...” and that wolverine den, foraging, and traveling areas have anecdotally been found to be spatially separated from snowmobile activity (Heinemeyer et al. 2001, p. 17) 75 FR 78051. The Sylvan Pass area is not the only area of the park that provides suitable denning habitat. In fact, the six dens mentioned above were all found in designated wilderness areas.

**Concern ID:**

40370

**CONCERN  
STATEMENT:**

One commenter expressed several concerns related to wildlife and groomed roads during the winter. This commenter stated that it is “impossible to determine after the fact, and in the absence of a control population, what precise impact, if any, road grooming and winter use have on bison winter range expansion and population growth.” With this in mind, and considering the NPS’s conservation mandate, the commenter stated that the NPS must use the precautionary principle and not allow OSVs in the park. Further concerns from this commenter included:

-Whether or not bison preferentially use packed/groomed roads, how bison travel patterns changed once the packed/groomed roads were discovered.

-The assertion that the presence of packed/groomed roads has a clear impact on the ecology and behavior of the bison.

- The assertion that analysis has shown that it is incorrect to stated that road grooming did not change the population growth rates of bison and that more long-term data would result in the NPS having substantially different conclusions.

- Population growth and range expansion would likely have occurred regardless of packed/groomed roads, the commenter noted that since the roads provided bison with an energy efficient means of travel, bison behavior would be both spatially and temporally different.

**Response:**

The NPS agrees that because there is no data available on bison populations and movements prior to OSV use, scientists will not be able to definitively determine the precise level of impact that groomed roads may have on bison and their movements. This does not, however, mean that NPS should close the park to visitors in the winter, as the comment suggests.

The NPS has disclosed the available information and evidence regarding the relationship between groomed roads and bison movements and population levels in the SEIS. Based on the available data, the NPS continues to believe that there is no data to suggest a preferential use of groomed roads by bison, and that other factors play a more integral role in bison populations. Using their best professional judgment, NPS managers have concluded that the NPS is not in conflict with its own management policies or conservation mandate. NPS *Management Policies 2006*, Section 1.4.3 states, “NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values.” This means that NPS managers must take reasonable, affirmative steps toward avoiding or minimizing adverse impacts, but it does not constrain the NPS’s discretion to allow impacts that the NPS deems necessary and appropriate to promote the enjoyment or conservation of the park. The NPS believes that the level of OSV use proposed under the preferred alternative is consistent with its mandate. The NPS will continue to monitor bison and other wildlife and if necessary, will

make changes to road grooming and OSV use as part of the adaptive management and monitoring plan.



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

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**AUG 22 2012**

**RECEIVED**  
**AUG 24 2012**  
**Superintendent's Office**

Ref: 8EPR-N

Dan Wenk, Superintendent  
Yellowstone National Park  
c/o Winter Use SEIS  
P.O. Box 168, Yellowstone National Park  
Wyoming 82190

Re: EPA Comments for the  
Yellowstone National Park Draft Winter  
Use Plan/Supplemental Environmental Impact  
Statement; CEQ # 20120214

Dear Superintendent Wenk:

The U.S. Environmental Protection Agency Region 8 (EPA) has reviewed the U.S. Department of Interior, National Park Service's (NPS) Summer 2012 Draft Winter Use Plan (Plan) Supplemental Environmental Impact Statement (SEIS) for Yellowstone National Park (Park). Our review was conducted in accordance with the EPA's responsibilities under section 102 of the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332(2)(c), and Section 309 of the Clean Air Act, 42 U.S.C. § 7609. Section 309 of the Clean Air Act directs the EPA to review and comment in writing on the environmental impacts of any major federal agency action. The EPA's comments include a rating of the environmental impact of the proposed action and the adequacy of the NEPA document.

**Summary of SEIS and Alternatives Analyzed**

The SEIS evaluated four alternatives including the No Action alternative (Alternative 1). Under all action alternatives, new best available technology (BAT) requirements would be developed and implemented for snowcoaches, and existing BAT requirements for snowmobiles for carbon monoxide (CO) emissions and noise would be strengthened. Alternative 2 is a continuation of snowmobile/snowcoach use at the 2011/2012 interim daily regulation limits of 318 and 78, respectively. Alternative 3 entails a transition to snowcoaches only. Snowmobiles would be completely phased out by the 2020/2021 winter season, and the east Park entrance (Sylvan Pass) would be seasonally closed. The Preferred Alternative, Alternative 4, proposes a new approach to managing oversnow vehicle (OSV) use by setting a maximum number of daily transportation events to access the park. The NPS defines a single transportation event as either a group of seven snowmobiles (on average) or one snowcoach. The transportation event approach is based on the concept that both types of transportation events present a comparable visitor experience and environmental impact. The Preferred Alternative would permit no more than 110 transportation events daily, of which up to 50 of those events could be allocated to groups of snowmobiles. New BAT standards for both snowcoaches and snowmobiles would be implemented in the 2017/2018 winter season, and four non-commercially guided snowmobile groups would be permitted daily. By managing Winter Use through transportation events in the Preferred Alternative, the

We appreciate the opportunity to participate in the review of this project. If we may provide further explanation of our comments during this stage of your planning process, please contact Phil Strobel, Deputy Director of our NEPA Compliance and Review Program at 303-312-6704, or your staff may contact Melanie Wasco, Lead NEPA Reviewer, at 303-312-6540.

Sincerely,



Suzanne J. Bohan  
Director, NEPA Compliance and Review Program  
Office of Ecosystems Protection and Remediation

Enclosures:

Detailed Comments  
Ratings Criteria



## **Snowcoaches**

The EPA notes that the March 2012 emissions testing included the following non-historic snowcoaches: 2008 Chevy Express (gasoline), 2011 Ford E350 (gasoline), 2011 Ford F450 (diesel), and 2011 Ford F550 (diesel). This information is contained in the March 2012 emissions testing report at: [http://www.nps.gov/yell/parkmgmt/upload/pem\\_of\\_snowcoaches-snowmobiles\\_3-2012.pdf](http://www.nps.gov/yell/parkmgmt/upload/pem_of_snowcoaches-snowmobiles_3-2012.pdf) Emissions from the 2008 Chevy Express significantly increase the BAT emissions for the modeled 2017-2018 winter season as compared to the 2011 vehicles, especially for carbon monoxide.

### *Recommendations:*

- Do not include the 2008 Chevy Express March 2012 test data in the representation of BAT. Instead, only consider emissions from the three 2011 model snowcoaches to represent snowcoach BAT for 2017-2018. Our recommendation is based on the following:
  - This 2008 snowcoach is underpowered, not allowing the snowcoach to operate above second gear, and therefore is not representative of desired BAT emission performance;
  - This 2008 snowcoach will be exiting the allowed snowcoach fleet as of 2018 (ten-year NPS BAT requirement); and
  - The three 2011 snowcoaches with March 2012 in-use measured emissions best represent the potential 2017-2018 snowcoach non-historic fleet for the air quality modeling work.
- The EPA notes that the emissions used in the Air Quality Report and Draft SEIS for modeled 2017-2018 snowcoach BAT would have produced significantly less emissions especially for carbon monoxide if NPS had excluded the 2008 Chevy Express from the emissions averaging for snowcoach BAT. We also note that the emissions data for the 2011 Ford E350 mentioned in the March 2012 testing report are considerably lower than the 2008 Chevy Express, although they are in the same vehicle class. For example, for the “low speed” test, the Chevy Express was 42 grams per mile (g/mile) for CO while the Ford E350 was 12.5 g/mile. For the “cruise speed” test, the Chevy Express was 396 g/mile for CO and the Ford E350 was only 16.1 g/mile. The BAT fleet actually produces more emissions than does the current fleet (see March 2012 emissions report, Table 7, Class II vs. Class IIB) because the modeled BAT Class II snowcoach fleet includes the Chevy Express.

In view of the above, we recommend seeking a way to define Class II BAT to assure that the BAT fleet produces an improvement over the current Class II fleet. The EPA is available to continue to assist with this matter.

## **EPA Emissions Standards**

Table 4-1 (page 11 of the air quality modeling report) includes EPA emission standards for snowmobiles. However the actual emissions standards are not presented. Instead, the table presents equations which allow higher hydrocarbons (HC) in return for lower CO or vice versa.

### *Recommendation:*

- For clarification, the EPA suggests a footnote be added to the 2012 standards line as follows:

recommend this issue be addressed in the description of the Preferred Alternative in Chapter 2 and reflected in the adaptive management plan.

# **U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements**

## **Definitions and Follow-Up Action\***

### **Environmental Impact of the Action**

**LO -- Lack of Objections:** The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

**EC -- Environmental Concerns:** The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

**EO -- Environmental Objections:** The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

**EU -- Environmentally Unsatisfactory:** The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

### **Adequacy of the Impact Statement**

**Category 1 -- Adequate:** EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

**Category 2 -- Insufficient Information:** The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new, reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

**Category 3 -- Inadequate:** EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

\* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

## Office of the Governor

August 20, 2012

Daniel Wenk, Superintendent  
Yellowstone National Park  
National Park Service  
P.O. Box 168  
Yellowstone National Park, WY 82190

Re: Yellowstone National Park Draft Winter Use Plan/  
Supplemental Environmental Impact Statement

Dear Superintendent Wenk:

I appreciate the opportunity to comment on the Yellowstone National Park Draft Winter Use Plan/Supplemental Environmental Impact Statement. Yellowstone is “dedicated and set apart” by the Yellowstone Park Act “for the benefit and enjoyment of the people.” The Yellowstone Park Act and the Organic Act require the National Park Service to allow public access to Yellowstone as long as public access does not cause unacceptable impact to its resources. Yellowstone’s Master Plan mandates management of the Park “for maximum enjoyment of the resources by the visitor” on a year-round basis.

Alternative 4 best advances the purposes of the Act and is the optimum choice for managing over-snow vehicle use in Yellowstone. This Alternative balances protection of Park resources and public access to Yellowstone. I support Alternative 4 as clarified by the attached comments.

Thank you for working with me and all of those interested in Yellowstone winter use management. Please contact me if I can be of assistance.

Sincerely,



Matthew H. Mead  
Governor

MHM:mdm

Superintendent Daniel Wenk

August 20, 2012

Re.: Yellowstone National Park Draft Winter Use Plan/  
Supplemental Environmental Impact Statement

Page 2

Encl.: Comments on Yellowstone National Park Draft Winter Use Plan/  
Supplemental Environmental Impact Statement (pp. 3 – 4)

cc: The Honorable Michael B. Enzi, U.S. Senate  
The Honorable John Barrasso, U.S. Senate  
The Honorable Cynthia Lummis, U.S. House of Representatives

Superintendent Daniel Wenk

August 20, 2012

Re.: Yellowstone National Park Draft Winter Use Plan/  
Supplemental Environmental Impact Statement

Page 3

## **Governor Mead's Comments on the Yellowstone National Park Draft Winter Use Plan/Supplemental Environmental Impact Statement**

### **Transition Period**

I support the two-season transition period outlined in Alternative 4 of the Yellowstone Draft Winter Use Plan/Supplemental Environmental Impact Statement (SEIS).

### **Non-Commercial Guided**

For nearly a decade, winter visitors to Yellowstone National Park (Yellowstone or Park) have not been allowed to enter the Park via snowmobile without a commercial guide. While I do not support unguided snowmobile access, a guided program for non-commercial snowmobile access should be an option. The preferred alternative includes this provision.

Appendix B establishes a framework for non-commercial guided snowmobile access. I am committed to working with the National Park Service (NPS) to build on that framework and develop a non-commercial guided snowmobile access program, including identification of resources required to ensure the program's success. If the NPS requires Wyoming snowmobile registration (similar to the requirement on Forest Service lands in Wyoming) for all over-snow vehicles (OSV) entering Yellowstone, then the Wyoming State Parks and Cultural Resources Department could participate financially in implementing non-commercial guided snowmobile access.

Non-commercial access to Yellowstone is opportunity that comes with responsibility. The Draft Winter Use Plan/SEIS states: "The decision to continue or terminate the noncommercially guided snowmobile access program, or to adjust group size limits, would be based upon predetermined metrics with fixed standards (triggers) to ensure continued protection of Park resources and visitor experiences." (p. 391). I ask the NPS to work with affected groups to develop metrics and an adaptive management, monitoring, and evaluation plan. These metrics should be flexible enough to both increase access in cases of appropriate compliance and to reduce or prohibit noncommercial use in cases of noncompliance.

### **Sylvan Pass**

OSV access through Yellowstone's east gateway is important. In the past, the NPS has received comments that the cost of maintaining access through Sylvan Pass is not justified by current winter use. Approximately two percent of the Yellowstone wintertime operational expenses are related to the operation of the east entrance, and one percent of the snowmobile entries into the Park come through the east entrance. This illustrates that the east entrance does not adversely impact the winter operating budget. The Sleeping Giant Ski Area near the east entrance will attract visitors to Yellowstone. The addition of non-commercial guided access assists Park County in year-round economic development.

Superintendent Daniel Wenk

August 20, 2012

Re.: Yellowstone National Park Draft Winter Use Plan/  
Supplemental Environmental Impact Statement

Page 4

The Sylvan Pass Study Group Agreement, as supported in Alternative 4, along with continued road grooming reflects the most thoughtful management alternative. The State of Wyoming is committed along with the City of Cody and Park County to working on safety and access improvements. In 2009, the Wyoming Legislature appropriated \$35,000 for a new howitzer and refurbishment of a second howitzer. Additionally, \$10,500 per biennium has been appropriated by the Wyoming Legislature to store and maintain both howitzers.

### **Best Available Technology**

NPS standards for best available technology for snowmobiles, implemented in 2002, are more stringent than EPA regulations. Those standards protect Park air quality and soundscapes. These standards should be maintained. However, the standards proposed for the 2017/2018 winter use season may be unattainable and have the potential to eliminate snowmobile use in Yellowstone. Snowmobile emission and sound testing procedures do not reflect Park parameters including: speed limits, throttle restrictions, fuels, snow conditions, elevation, and barometric factors. The NPS should coordinate with industry to revise its test parameters and perform additional testing and implement any new standards on a schedule geared toward achieving compliance within a reasonable time.

### **Adaptive Management**

Wyoming will provide its special expertise through technical assistance and advice in future adaptive management activities undertaken by the NPS consistent with the memorandum of understanding between the State of Wyoming and the National Park Service.



## Office of the Governor

October 4, 2012

Daniel Wenk, Superintendent  
Yellowstone National Park  
National Park Service  
P.O. Box 168  
Yellowstone National Park, WY 82190

Re Yellowstone National Park Draft Winter Use Plan/Supplemental Environmental Impact Statement and Proposed Rule for the 2012-2013 Winter Season

Dear Superintendent Wenk:

I appreciate the opportunity to provide additional comment on the Yellowstone National Park Draft Winter Use Plan/Supplemental Environmental Impact Statement (SEIS) and Proposed Rule for the 2012-2013 winter season. The following comments support the comments I made on August 20, 2012.

The National Park Service (NPS) received comments related to its testing and analysis of snowmobiles and snowcoaches. The NPS heard concerns that testing standards for both modes of transportation were not appropriate or reflective of their use in Yellowstone. I encourage the NPS to coordinate with industry, the Environmental Protection Agency, and the State of Wyoming to modify its test parameters and standards and perform additional testing. Visitors to Yellowstone deserve a variety of experiences. Snowmobiles and snowcoaches are reasonable means of transportation. Neither should be reduced in Yellowstone without adequate testing and analysis.

I am disappointed that a decision will not be made prior to the coming winter season. However, I support continued management under the parameters in place last season which have not shown impairment to Park resources. The additional time will give NPS opportunities to conduct

Superintendent Daneil Wenk

October 4, 2012

RE: Yellowstone National Park Draft Winter Use Plan/Supplemental Environmental Impact Statement and Proposed Rule for the 2012-2013 Winter Season

Page 2

adequate testing and analysis for future access of snowmobiles and snowcoaches into Yellowstone.

I remain committed to working with the NPS.

Sincerely,



Matthew H. Mead  
Governor

MHM:mdm

cc: The Honorable Michael B. Enzi, U.S. Senate  
The Honorable John Barrasso, U.S. Senate  
The Honorable Cynthia Lummis, U.S. House of Representatives



## WYOMING GAME AND FISH DEPARTMENT

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CHARLES PRICE

August 2, 2012

WER 6136.01  
National Park Service  
Supplemental Draft Environmental Impact Statement  
for the Winter Use Plan  
Yellowstone National Park

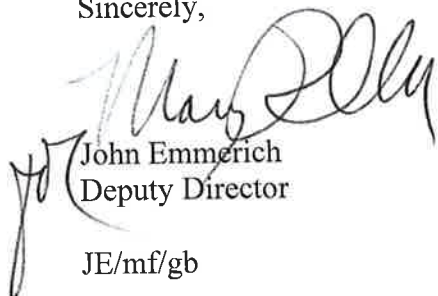
Yellowstone National Park  
Winter Use Supplemental Draft EIS  
PO Box 168  
Yellowstone National Park, WY 82190

Dear Sir/Madam:

The staff of the Wyoming Game and Fish Department has reviewed Draft Environmental Impact Statement for the Winter Use Plan within Yellowstone National Park. We offer the following comments for your consideration. We have no terrestrial wildlife or aquatic concerns pertaining to this Supplemental Draft Environmental Impact Statement.

Thank you for the opportunity to comment. If you have any questions or concerns, please contact Rick Huber, Staff Aquatic Biologist, at 307-777-4558.

Sincerely,



John Emmerich  
Deputy Director

JE/mf/gb

cc: USFWS  
Tim Fuchs, Jackson Region  
Doug Brimeyer, Jackson Region  
Rob Gipson, Jackson Region  
Tim Woolley, Cody Region  
Doug McWhirter, Cody Region  
Steve Yekel, Cody Region

# **PEPC Project ID: 40806, DocumentID: 48306**

## **Correspondence: 11204**

### **Author Information**

Keep Private: No  
Name: Domenic Bravo  
Organization: WY State Parks Historic Sites and Trails  
Organization Type: S - State Government  
Address:  
Cheyenne, WY 82009  
USA  
E-mail:

### **Correspondence Information**

Status: Reviewed	Park Correspondence Log:
Date Sent: 08/20/2012	Date Received: 08/20/2012
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

### **Correspondence Text**

Dear SEIS Planning Team:

The University of Wyoming Department of Agricultural and Applied Economics is currently finishing an analysis of snowmobiling in Wyoming. Since the final report from this study is not quite complete, we're forwarding a couple of preliminary pieces of information for your consideration in the Yellowstone Winter Use Plan / SEIS process. This information includes excerpts from some of the 2012 survey's sections as well as a preliminary economic impacts analysis report. We will send a final report as soon as it is complete later this summer.

Sincerely,  
Domenic

#### **Introduction**

This report summarizes the preliminary results of an economic analysis of the snowmobiling program in Wyoming. This analysis was conducted by the Department of Agricultural and Applied Economics at the University of Wyoming for the Wyoming Department of State Parks and Cultural Resources for the 2011-2012 snowmobile season. This report is an update of a previous study conducted for the Department of State Parks and Cultural Resources during the 2000-2001 season. A more detailed report with the final results of the analysis is forthcoming. The analysis is based on three surveys of snowmobilers in Wyoming during the 2011-2012 snowmobiling season including: 1) a survey of resident owners of snowmobiles registered in Wyoming; 2) a survey of nonresident owners of snowmobiles registered in Wyoming; and 3) a survey of snowmobile outfitter clients in Wyoming. The survey of resident and nonresident owners of registered snowmobiles was conducted by the Wyoming Survey and Analysis Center (WYSAC) at the University of Wyoming. These surveys were implemented through a combination of on-line and mail questionnaires with the sample drawn from a list of addresses for registered snowmobiles in Wyoming for

the 2010-2011 season provided by State Parks.

For the resident snowmobile owners, 1,073 valid addresses were sampled which resulted in 361 resident responses for a 33.6 percent response rate. For the nonresident snowmobile owners, 1,099 valid addresses were sampled which resulted in 414 nonresident responses for a 37.7 percent response rate. Eight-six percent of the resident respondents and 80 percent of the nonresident respondents indicated that they had snowmobiled in Wyoming during the 2011-2012 season.

For the snowmobile outfitter clients, outfitters were asked to have a sample of their clients fill out address cards during the 2011- 2012 season. These clients were then sent a mail questionnaire shortly after they returned home from their trip. A total of 180 addresses were collected through this process which resulted in 105 responses for a 58.3 percent response rate. The snowmobile outfitter client survey was conducted by the Department of Agricultural and Applied Economics.

BOARD OF COUNTY COMMISSIONERS:

*Tim A. French, Chairman  
Loren Grosskopf, Vice Chairman  
Joseph E. Tilden, Commissioner  
Dave Burke, Commissioner  
Bucky Hall, Commissioner*



PARK COUNTY, WYOMING  
ORGANIZED 1911

ORIGINAL PARK COUNTY COURTHOUSE  
CODY, WYOMING  
COMPLETED 1912

Yellowstone National Park  
Winter Use Plan-DEIS  
Box 168  
Yellowstone Park, WY 82190

**RE: ADDITIONAL COMMENTS**

**Board of County Commissioners for Park County, Wyoming  
Draft Winter Use Plan/Supplemental Environmental Impact Statement for  
Winter Use in Yellowstone National Park  
September 17, 2012**

**Planning Team:**

We support the action proposed to extend the existing "one-year rule" regarding the management of snowmobile and snowcoach activity in Yellowstone Park as outlined in the 8/31/2012 news release.

We agree that this proposal is the best and most reasonable option to pursue considering the short time remaining for the public and commercial operators to plan for this snow season.

We do not have additional substantive comments to offer beyond our previous submissions. We certainly iterate our desire for:

- Continued snowmobile use,
- With the addition of reasonable and affordable non-commercial use as quickly as possible hopefully truncating the two year period to one year,
- Changes in the BAT decibel measurement requirements for snowmobiles that can be supported by industry,
- Air and noise restrictions set at reasonable levels that don't significantly impact the natural resources of Yellowstone, and

- Support for the preferred alternative that includes keeping all entrances open, including the East entrance and Sylvan Pass.

We support and encourage public participation in this process and if necessary, the additional time necessary for the Park Service to carefully review and consider all comments.

Thank you for this opportunity.

**BOARD OF COUNTY COMMISSIONERS  
PARK COUNTY, WYOMING**



Tim A. French, Chairman



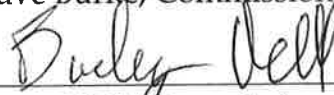
Loren Grosskopf, Vice Chairman



Joseph E. Tilden, Commissioner



Dave Burke, Commissioner



Bucky Hall, Commissioner



**PEPC Project ID: 40806, DocumentID: 48306**  
**Correspondence: 11070**

**Author Information**

Keep Private: No  
Name: N/A N/A  
Organization: Board of County Commissioners of Teton County, Wyoming  
Organization Type: C - County Government  
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jackson, WY 83001  
USA  
E-mail: commissioners@tetonwyo.org

**Correspondence Information**

Status: Reviewed Park Correspondence Log:  
Date Sent: 08/20/2012 Date Received: 08/20/2012  
Number of Signatures: 1 Form Letter: No  
Contains Request(s): No Type: Web Form  
Notes:

**Correspondence Text**

TETON COUNTY WYOMING  
www.tetonwyo.org  
Commissioners  
Benjamin Ellis. Chair  
Paul Vogeiheim. Vice Chair  
Andy Schwartz  
Hank Phihbs  
Paul Perry

County Commissioners' Administrator  
Stephen Foster  
Post Office Box 3594  
Jackson. Wyoming 83001  
Tel: (307) 733-8094  
Fax: (307)733-4451  
Email: commissioners@tetonwyo.org  
BOARD\_OF COMMISSIONERS  
August 20, 2012

Yellowstone National Park  
RE: Comments of Teton County Board of County Commissioners  
on the Yellowstone National Park Draft Winter Use Plan

The Board of County Commissioners of Teton County, Wyoming submit the following comments on the Yellowstone National Park Draft Winter Use Plan.

The Board thanks the leadership and staff of Yellowstone National Park on the extensive work they have completed to develop the Yellowstone National Park Winter Use Plan.

The Board supports Alternative 4, the preferred alternative. This alternative provides a realistic and reasonable alternative for the public to enjoy Yellowstone's extraordinary natural resources.

We encourage Yellowstone to continue the monitoring of different forms of access including non-guided snowmobile access to insure that different user groups have the opportunity to enjoy Yellowstone's winter wonders.

We thank you for the opportunity to comment on this important issue.

Sincerely,

Benjamin H. Ellis  
Chairman



# CODY COUNTRY CHAMBER OF COMMERCE

RECEIVED

AUG 01 2012

July 27, 2012

Superintendent's Office

Yellowstone National Park  
Winter Use SEIS  
PO Box 168  
Yellowstone National Park, WY 82190

Dear Superintendent Daniel Wenk,

The Cody Country Chamber of Commerce appreciates the opportunity to provide comments on the recently released draft of the Yellowstone Winter Use Plan/SEIS.

Overall, we support Alternative #4, and are pleased to see that issues that are important to Cody have been favorably addressed.

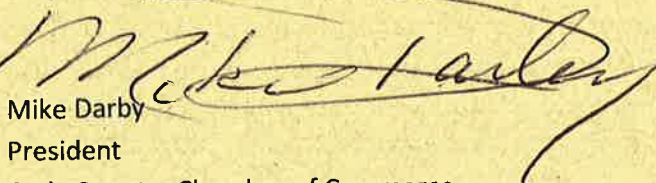
We support the continuation of avalanche control on Sylvan Pass and the preservation of motorized and non-motorized access via the East Gate during the winter. We are also pleased that Alternative #4 offers the opportunity for increased snowmobiling in Yellowstone National Park.

One area of concern that we have is the process that will be used to determine "transportation events" and hope that we can actively participate in your adaptive management system to make the registration, education, and lottery system as easy and visitor-friendly as it can be. We agree that a certain amount flexibility will be critical to adapt the program to the realities of providing our visitors and residents with the best Park experience possible.

Finally, while it falls outside the scope of the Winter Use Plan/SEIS (yet is still very much related), we strongly believe that having a set opening date for the East Gate each spring is of critical importance to our visitors, business owners and residents.

As always we appreciate the opportunity to provide comments on this important issue. We applaud the Park Service for being willing to listen and incorporate Cody and Park County's concerns into this updated Winter Use Plan. Should you have any questions regarding our comments, please don't hesitate to ask.

Respectfully,



Mike Darby  
President  
Cody Country Chamber of Commerce

# **PEPC Project ID: 40806, DocumentID: 48306**

## **Correspondence: 1496**

### **Author Information**

Keep Private: No  
Name: Nancy T. Brown  
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USA  
E-mail: jennir@cityofcody.com

### **Correspondence Information**

Status: Reviewed	Park Correspondence Log:
Date Sent: 08/09/2012	Date Received: 08/09/2012
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

### **Correspondence Text**

August 7, 2012

Yellowstone National Park  
Winter Use SEIS  
PO Box 168  
Yellowstone National Park, WY 82190

Dear Superintendent Wenk:

On behalf of the Cody City Council, please accept this letter of comment with regard to the Supplemental Environmental Impact Statement. The City of Cody supports the preferred Alternative 4, but would like to offer the following suggestions for modification of the alternative.

With regard to "transportation events", the City of Cody suggests the following:

Commercially Guided Transportation Events regarding snowmobiles:

1. The number of commercially guided snowmobiles should be changed to a higher number such as 7 instead of 5. This would allow for three couples or a family of six to enter along with a guide. The number of paying visitors should be even.
2. If an overnight stay is desired, there are questions that need to be addressed as to how that will affect the number of transportation events. Does this mean that a commercial operator from the East Gate who takes his clients to the West Entrance must use a transportation event from the West Entrance to get his clients back to their starting point at the East entrance?

Non-commercially guided Transportation Events regarding snowmobiles:

1. The number of visitors entering Yellowstone by non-commercially guided snowmobile should be changed from seven (5) snowmobiles to an even number of snowmobiles such as six (6) or eight (8). This would allow for families or couples to pair up in groups of two instead of having an odd number. In addition, the number of non-commercially guided snowmobile transportation events should be increased from only one per day per gate. We would prefer to see this managed so that if there the commercially guided trips into Yellowstone that are not completely booked each day, there is an opportunity for non-commercially guided trips to fill the unallocated trips. In addition, because there is no guarantee that Sylvan Pass will be open on any given day in which a visitor has a reservation, we would like to see additional options and opportunities for rescheduling their trip at a time that is convenient for the visitor and gives preference in the lottery reservation system. In addition, to a plan for weather day cancellations, we would like to see some kind of option for visitors to enter the park if visitors who have reserved a day do not show up on their given day. This would be another way to maximize the opportunity for visitors to enter Yellowstone, especially for the locals.
2. Once again, the question of overnight stays needs to be addressed. If there is only one transportation event allowed per gate per day, do reservations have to be made for two days and will there ever be a situation where this is possible? This situation needs to be further discussed and analyzed so that the public knows what their visitation opportunities are. In both situations of commercially guided and non-commercially guided, overnight stays have a vital economic impact to the gate communities and lodges.

Online and Onsite Training: We believe that there should be a provision that the online training certification program should be good for more than a period of one year. We suggest either a lifetime certification or at the very least a five year certification.

Best Available Technology Requirements (BAT): With regard to BAT requirements, we make the following suggestions for change:

1. Have a phase in plan for non-current model year snowmobiles so that in 2017-2018, those snowmobiles five years old and newer can be phased into the new requirements over time. If it is deemed that 2015 and 2016 snowmobiles are no longer eligible to enter Yellowstone in 2017, it will be very difficult economically for commercial operators to make a successful and viable business of guiding visitors into Yellowstone. If there was a phase in program such as by 2017-2018 that all sleds 2012 or newer may be used in the 2017-2018 winter season, and then all sleds 2013 and newer in 2018 and so on, would ensure a return on commercial operators' investment over the next few years.
2. Snowmobile manufacturers have come a long way with emissions and noise over the years and it is recommended that Yellowstone change the definition of Best Available Technology to remove the term four stroke snowmobile, and include the strict specifications that must be met involving decibel levels, carbon monoxide levels, particulate matter levels, hydrocarbon emission standards, nitrogen oxide levels, and nitrogen dioxide levels. If in the future two stroke snowmobiles meet the set criteria of standards, they should be allowed in Yellowstone as well. This will increase the visitation as it will be much more economical for non-commercially guided visitors.

Other suggestions we offer include setting a guaranteed opening date for the East Entrance of Yellowstone. This has huge long term economic impacts on Cody's business owners throughout the tourist season. It enables business owners to staff their stores, restaurants and lodging facilities adequately and appropriately which results in a better visitor experience. In addition, we would be very supportive if the Administration of Yellowstone included the stakeholders in some of the decision making processes of the unfinished details. It was mentioned in the public meetings that you have the framework of the house, but you need to construct the walls and finishes. There are a lot of knowledgeable and willing people within the Cody community who would be happy to assist in helping Yellowstone build the walls.

Thank you for all of your efforts in this Winter Use Planning Process. Although we cannot bring back everything

that we once knew and enjoyed with regard to winter use in Yellowstone, we are much closer through your efforts. Thank you for the opportunity to comment on this very important issue for the City of Cody and Park County.

Sincerely,

Nancy Tia Brown  
Mayor

# **PEPC Project ID: 40806, DocumentID: 48306 Correspondence: 11115**

## **Author Information**

Keep Private: No  
Name: Timothy K. O'Donoghue  
Organization: Jackson Hole Chamber of Commerce  
Organization Type: T - Town or City Government  
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112 Center Street  
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E-mail: timo@jacksonholechamber.com

## **Correspondence Information**

Status: Reviewed	Park Correspondence Log:
Date Sent: 08/20/2012	Date Received: 08/20/2012
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

## **Correspondence Text**

The Jackson Hole Chamber of Commerce believes that the Preferred Alternative described in the Yellowstone Winter Use Draft Plan is an encouraging step in the right direction of establishing a balanced approach to resource access and protection. As such, we support the Preferred Alternative identified in this Draft Plan. " Of all the options identified in the Draft Plan, the Preferred Alternative is consistent with our belief that a stable winter economy in Jackson Hole is aided by continued access in Yellowstone by visitors and businesses providing services.



***Fremont County  
Parks and Recreation Department***

125 North Bridge St.  
St. Anthony, ID 83445  
(208) 624-7266 (p) (208) 624-1320 (f)

Yellowstone National Park  
Supplemental Winter Use Plan EIS  
PO Box 168  
Yellowstone National Park, WY 82190

August 3, 2012

To Whom It May Concern,

I write this letter on behalf of the Fremont County Commissioners and the Fremont County Parks and Recreation Dept. asking for your consideration in the following matters.

Cave Falls – Thank you for including Idaho’s corner of Yellowstone in the new plan. Having the opportunity to continue utilizing this area without the BAT machines is appreciated.

Flagg Ranch – Please include the Flagg Ranch trail as it leaves Fremont County and travels into the John D. Rockefeller Corridor. In past alternatives continued access to Flagg Ranch has been clearly defined. Flagg Ranch, by way of Fremont County, continues to be a popular destination site for riders. The trail is regularly groomed by Fremont County at no cost to the State of Wyoming or National Park Service. Due to the distance, it is necessary for snowmobilers and trail grooming equipment, coming from Idaho, to refuel at Flagg Ranch. It would be difficult to continue access to the popular Grassy Lake Reservoir or Jack Ass Loop sites without the opportunity to refuel. Safety for snowmobilers would also come into question without access to the facilities at Flagg Ranch. Again, continued non-BAT snowmobile access to Flagg Ranch should be clearly defined in the finalized Winter Use Plan.



Vendors – NPS is encouraged to **not** use a single vendor for snowmobile rentals/access to YNP. Nor a single vendor for snow coach access to YNP. As per stated in a June, 2012 conference call with the cooperating agencies, NPS is conserving utilizing a single vendor for each of the two user groups. Fremont County believes this move will not be beneficial to user groups and will increase the overall cost of winter access. Please do not restrict users to a single vendor.

Thank you for your time and consideration in the matter.

Sincerely,

A handwritten signature in cursive script, reading "Tamra Cikařtoga". The signature is written in dark ink and is positioned above the printed name and title.

Tamra Cikařtoga, Director

Fremont County Parks and Recreation Dept.

# **PEPC Project ID: 40806, DocumentID: 48306**

## **Correspondence: 63**

### **Author Information**

Keep Private: No  
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Organization: Idaho Department of Parks and Recreation  
Organization Type: S - State Government  
Address: Idaho Department of Parks and Recreation  
P.O Box 83720  
Boise, ID 83720-0065  
USA  
E-mail: Jeff.Cook@idpr.idaho.gov

### **Correspondence Information**

Status: Reviewed	Park Correspondence Log:
Date Sent: 07/30/2012	Date Received: 07/30/2012
Number of Signatures: 1	Form Letter: No
Contains Request(s): No	Type: Web Form
Notes:	

### **Correspondence Text**

July 30, 2012

Dan Wenk, Superintendent  
Yellowstone National Park  
P.O Box 168  
Yellowstone National Park, WY 82190-0168

RE: Winter Use SEIS

Dear Superintendent Wenk:

The Idaho Department of Parks and Recreation (IDPR) staff reviewed the Yellowstone National Park (YNP) Winter Use Plan Supplement Environmental Impact Statement (SEIS). YNP is preparing this plan to regulate winter use.

The State of Idaho, with IDPR as the lead agency, is a cooperating agency with this plan. The IDPR staff has been involved in this planning process since 1996. Winter use in the YNP has greatly changed since that time. Idaho citizens and business are affected by this plan.

Without a plan decision, winter motorized use (except administrative use) would be prohibited. This would greatly impact winter visitor use.

The SEIS presents four different alternatives. Alternative 4 is identified as the preferred alternative.

Since the winter of 2004/2005, winter use visitation has been exclusively commercially guided. The State of Idaho has consistently advocated for some level of noncommercial use. Alternative 4 does provide for a very limited amount (4 groups per day) of noncommercial use. We believe that limited use will provide for the opportunity for visitors to experience Yellowstone's Winter Wonders with a sense of self discovery.

The IDPR staff has been presenting regional snowmobile operators training over the past year. We also provide online snowmobile safety training in conjunction with Fresh Air Educators. It is essential we work with the National Park Service on the development of the noncommercial guide training program. Each noncommercial visitor needs to know the safe operation along with the rules and regulations in YNP.

We are pleased to see that all action alternatives (2, 3, and 4) allow for non-BAT compliant and noncommercial guided snowmobile use into Cave Falls. This short remote route provides access to wonderful waterfalls that visitors can enjoy.

The preferred alternative 4 manages visitor use by sound events. Alternative 4 allows up 110 sound events a day for the winter use season. A single snowcoach or a group of seven snowmobiles comprises a snow event. This alternative permits a total of 50 events for snowmobiles and 60 events for snowcoaches. It gives commercial operators the choice on how to split their daily allotments of transportation events.

How snowmobile specific commercial operators and snowcoach specific commercial operators would be able to split their daily allotments? This question should be answered in the proposed regulation.

The IDPR staff concurs that preferred Alternative 4 allows for greater flexibility, a cleaner, quieter park, and could allow for more visitors (still less than historic levels) into the park. We appreciate the National Park Service listening to and addressing our concerns with this Winter Use Planning Process. It is our hope that this planning effort will lead a long term winter use plan for Yellowstone National Park.

Sincerely,

Jeff Cook, Outdoor Recreation Analyst  
Recreation Bureau



PO Box 458  
West Yellowstone, Montana 59758  
[destinationyellowstone.com](http://destinationyellowstone.com)

August 15, 2012

Yellowstone National Park  
SEIS Winter Use Plan  
PO Box 168  
Yellowstone National Park, WY 82190

Dear Superintendent Wenk,

The West Yellowstone Chamber of Commerce, on behalf of its businesses and members, would like to submit the following comments for your consideration in the Supplemental Environmental Impact Statement.

We fully support the continuation of winter access to Yellowstone National Park by means of snowmobile and snowcoach. Alternatives 1, 2 and 3 do not allow for a sustainable and long-term solution. We support Alternative 4 which allows for "transportation events" and we would like to add the following thoughts for your consideration.

There has been growing public support for a non-commercial guide option that would give more flexibility for access while making a Yellowstone visitor more affordable. Five people, however, from each entrance would not be enough fill the need of this otherwise great addition. Please consider adding more "events" through adaptive management for each entrance for the non-guided option to give the public more valid and cost effective options. We would not, however, want this to decrease commercially guided events.

We are also very concerned about including the guide in each "transportation event" for commercially guided snowmobile groups. Reducing the historic group size from ten to an average of seven, means that visitors will pay more for the Yellowstone winter experience.

Please keep the provision for a two-year transition to help in the planning and marketing of the new changes in Alternative 4. This will not only help our community and concessioners adapt to the changes it will also allow some much needed time to educate the general public.

We are very concerned about including the guide in each snowmobile "transportation event". Requiring a guide, then using that guide in the count will mean a virtual doubling of the guide cost to visitors.

Please leave the speed limits as they have been in recent years. There is neither science nor safety reasoning that would suggest that lowering the limits in other areas will have any positive impact. Lowering the speed limit will severely restrict the opportunity for many people to see more of Yellowstone in the winter.

Any and all testing of snowmobiles and snowcoaches for future BAT requirements and "transportation event" increases should be handled in a manner consistent with the use of those vehicles and under comparable conditions. BAT requirements should also be attainable and not result in a de facto elimination of either type of over-the-snow access. Current scientific evidence has shown that the BAT requirements now in place are doing the job of keeping noise and air concerns to acceptable levels.

An idea that has come up and we would like to see addressed is having the opportunity for a shuttle service to different locations within the park and to the gateway communities. Businesses could have the opportunity to provide and market this service without being penalized for using one of their allotted "transportation events." This would offer a more economically feasible and faster way for people to get around the park who may not be looking for a guided snowcoach service.

We appreciate the long hours and honest consideration to all alternatives that you have committed to this process. The public deserves the right to see Yellowstone in what many believe to be its best season and in a way that will also preserve it for future generations. Alternative 4 is the best solution offered in recent years. As a community that supplies the support services required for visitors and employees of Yellowstone National Park, we thank you for your time and consideration of the points we have presented.

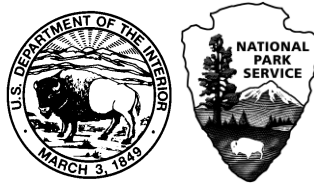
Sincerely,



Travis Watt, President  
West Yellowstone Chamber of Commerce







As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

(2013)

United States Department of the Interior · National Park Service