Greater Yellowstone Ecosystem Lynx Study

Abstract:

The Canada Lynx (Lynx Canadensis) was listed as a threatened species by the USFWS in March of 2000. (US Fish and Wildlife Service 2000) A subsequent Lynx Conservation Agreement was made between the Forest Service and the Fish and Wildlife Service in 2001 in order to determine a strategy for lynx management in the Northern Rockies. Believed by many to no longer inhabit significant parts of its historical range, recently confirmed DNA evidence has renewed the need for information on several ecological aspects of lynx populations throughout the Greater Yellowstone Ecosystem. In an effort to documentlynx presence / absence in the GYE, Endeavor Wildlife Research conducedt a preliminary survey of lynx throughout northwest Wyoming, northeast Idaho, and the very southern portions of Montana. These surveys, which were conducted in the winter of 2008-2009 covered twenty eight hundred miles of snow covered roads and trails. Ten lynx tracks were found during this period mostly clustered around the Togwotee Pass area on the northern Bridger-Teton National Forest, with two additional possible tracks found in Yellowstone National Park and one possible track found on the Beartooth Plateau.

Introduction:

Canada lynx have been documented in Wyoming prehistorically (Kurten and Anderson 1980), historically (Reeve et al. 1986, McKelvey 2000) and throughout the last decade (Squires et al. 2003, Murphy et al. 2004, Berg et al. 2005). Lynx are of particular interest in this region because of their potential genetic significance, juxtaposition between occupied habitat in northwestern Montana and Colorado and due to their use of specific habitat types. Additionally, lynx may be viewed as an indicator species (due to low population numbers) for gauging human impacts on the environment. The recent documentation of lynx in northwestern Wyoming led to a preliminary investigation to first identify lynx presence, and second to document habitat use and the influence of related prey and predators on lynx distribution in the southern Greater Yellowstone Ecosystem (SGYE) by Endeavor Wildlife Research Foundation. The Greater Yellowstone Lynx Study was initiated by EWR to address several areas of study which are currently lacking. The goals were to (1) document the occurrence, distribution, and demographic characteristics of lynx in relation to habitat and forest structure in the Greater Yellowstone Ecosystem (2) further design and evaluate standardized survey methods applicable to the GYE through previous lynx research and our own region- specific research, (3) investigate habitat and forest structure as it relates to the lynx's primary food source, the snowshoe hare, and (4) investigate the effects of snow compaction and competition with coyotes as it relates to lynx. Ultimately, EWR is actively working to understand the intricate role lynx play and how this species contributes to the overall function of the Greater Yellowstone Ecosystem.

The purpose of the 2008-09 effort was to better understand the distribution of lynx within the GYE. Our study used historic and current data to determine the best areas to search for lynx, relying heavily on past observations and the best available habitat /prey information. Our goal was to reconfirm the presence of individuals formerly identified during previous years within the Greater Yellowstone Ecosystem, and to confirm the presence of new individuals through the use of backtracking techniques to gather genetic samples.

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Study Area:

Our surveys encompassed potential lynx habitat from 5800 to 11000 ft in elevation. We focused our efforts in young regenerating lodgepole pine forests and mature multi-storied forests with a significant spruce/sub-alpine fir component. The 2008-09 winter was an average precipitation year with 108 percent of normal snowfall on Togwottee Pass.

The study area consisted of several large blocks of habitat all within federal lands. We broke up our study area into seven major regions. Our first study area was the northern Bridger-Teton / Southern Shoshone which consisted of appropriate habitat from the east border of Grand-Teton National Park to northeastern portion of the Wind River Range; the heart of this region being Togwotee Pass. Our second study area was Grand-Teton National Park, with a large emphasis on the northwestern side of Jackson Lake and the eastern portion of the park just to the north and south of Moran Junction. Our third study area was Yellowstone National Park with an emphasis on the east side of Yellowstone Lake. Our fourth study area consisted of the Wyoming Range and the southern Salt River Range on the Bridger-Teton NF and adjacent BLM lands. Our fifth study area consisted of the Big Hole Range and northern Snake River Range; this study area was managed by the Caribou-Targhee National Forest. Our sixth study area consisted of the northern Shoshone NF but also included small portions of the Gallatin and Custer National Forests; the focus being the Cooke City area in the Beartooth Range. The last study area was the southern portion of the Wind River Range. This area was located south of the Bridger Wilderness and Popo Aggie Wilderness on the BTNF and SNF respectively (See maps).

All surveys were located on federal land; no surveys were conducted on private and/or State property. BLM lands adjacent to the Wyoming Range were surveyed extensively in order to record track indices of snowshoe hare abundance within specified timber treatments (See maps).

Methods:

We focused our search efforts in two ways. First, we identified focal areas by researching historic accounts of lynx occurrence, and by following up on reliable observations that had occurred within the past 15 years. Second, we identified focal areas with “prime” lynx habitat based on prey abundance and habitat type; the latter consisting of relatively large blocks of multi-storied spruce-fir and lodgepole pine forests with broken canopies. During the study we also focused our efforts on early successional stands of Lodgepole pine (30-70 years old). These were target areas due to relatively high snowshoe hare abundance found within and around these stands.

All surveys were conducted using transects which began and ended in the aforementioned habitats. Snow tracking surveys were patterned after those used in the Yellowstone National Park Lynx Study (Murphy et al. 2004). Start points for these transects were not predetermined. The sites were evaluated for lynx suitability and then transects were established to maximize coverage within individual stands. Transects had to be altered frequently in the field due to obstacles such as cliff bands, avalanche slopes, or other constraints that would prevent winter backcountry travel. Surveys were conducted on snow machines (front country) and/or skis/snowshoes (wilderness and National Parks)

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depending on proximity to existing roads and trails.

Two full-time technicians and one part-time technician conducted all lynx surveys during winter of 2008-2009. A large percentage (approx 75%) of our surveys were conducted using snow machines on compacted and uncompacted trails. All snow machine surveys were conducted at a speed where it was easy to detect and identify tracks that crossed or paralleled transects (approx 10 to 15mph). All ski-based surveys were conducted in locations where terrain, vegetation, or travel restrictions would not allow snow machine access.

Survey routes and transects were recorded using GPS technology and were subsequently stored in a GIS database. Surveys were conducted at least 12hrs after the most recent snowfall in order to allow sufficient time for lynx and prey tracks to accumulate. Due to time and logistical constraints there were a few instances when we tracked prior to 12 hours after a snowfall; but only if less than 2 inches of snow had accumulated allowing technicians to locate tracks and then identify to species upon closer inspection. Each survey area was attempted at least two times during the winter season unless an area was deemed unsuitable habitat during the initial survey, in which case those areas were not re-surveyed. We also made every attempt to survey multiple times high probability areas and locations where lynx tracks had been previously located.

All possible feline tracks were measured for track size, depth stride and straddle. Snow compaction was closely inspected to determine surface penetrability of the snow pack. When possible lynx tracks were detected we backtracked the snow trail in an effort to collect biological samples in the form of scat and/or hair. All genetic samples were analyzed by the Rocky Mountain Research Station in Missoula, Montana.

In addition, the tracks of other carnivore species of interest were recorded. All surveys were rated for snowshoe hare track abundance on a scale of 1 to 4, with one indicating no hare activity at all, two indicating 1-2 tracks per 100 meters, three indicating 3-10 tracks per 100 meters, and four indicating >10 tracks per 100 meters surveyed..

In addition to lynx surveys, we conducted snowshoe hare surveys on the eastern border of the Wyoming Range on three parcels of land within the Pinedale BLM District. The purpose of this study was to investigate snowshoe hare track abundance indices within areas where sub-alpine fir and other conifer species had been recently removed from aspen stands. During this study we used snowshoes or skis to walk transects across both treated and untreated parcels. We stopped approximately every 100 meters to record snowshoe hare track abundance using the aforementioned 1-4 scale.

Results:

This study was conducted from December 1 through April 24, totaling 145 possible tracking days during our field season. Of those 145 days, 104 days were spent out in the field conducting surveys. During those 104 days of formal surveys 28 of those days had a total snowfall of 2 in or more or had a sun crust making effective snow tracking difficult. At the end of the season we had 76 formal tracking days with favorable tracking conditions during the 2008-2009 season.

During these 76 days, technicians used skis / snowshoes exclusively for 14 days. All other tracking days were either on snow machines or a combination of skis/snowshoe and snow machines. During the 2008-2009 season unique individual transects covered

2854.34 miles. (Figures 3-10 etc…???) Due to a number of factors (i.e. time and personnel constraints, poor snow conditions, and lack of appropriate habitat structure) only 60% of our surveys were repeated two times. Only our northern Bridger-Teton NF sites were surveyed more than two times due to our tracking success in that area.

Lynx tracks were located in the Togwottee Pass vicinity on six separate occasions within the northern Bridger-Teton National Forest (See maps). On one occasion two members of our team were simultaneously tracking the same Individual in two different locations. These tracks were later found to connect, however it is marked, as two separate locations. Two additional possible lynx tracks were documented in Yellowstone National Park (See maps). One possible lynx track was located on the Beartooth Plateau within the Shoshone National Forest (See maps).

A total of six genetic samples were collected in the form of scat and hair during winter 2008/09. All samples were collected in the Togwotee Pass region within the BTNF. No samples amplified to lynx. Due to the number of wolf tracks in the Togwotee Pass area it was sometimes difficult to determine which scats belonged to lynx and which belonged to wolves, as we frequently had overlapping wolf and lynx tracks throughout this area. On one occasion we documented a lynx being chased by a pack of five wolves for approximately 1500 meters; we collected three scats along this chase all of which amplified to wolf.

Our cooperative effort with the BLM to determine snowshoe hare track abundance indices within areas treated to promote aspen regeneration in the central Wyoming Range was very effective. Our results clearly revealed that seral aspen stands with a significant spruce/sub-alpine fir component in the understory and/or overstory contained higher snowshoe hare track abundance than did seral aspen stands with few to no spruce/sub-alpine fir in the understory and/or overstory. Pure aspen stands were basically devoid of snowshoe hare tracks except for those stands that bordered spruce/fir areas. We did however document that recently treated aspen/conifer stands (i.e. all conifers cut within the last year) still contained high numbers of snowshoe hare tracks. This was likely due to the large volume of downed conifer trees with green needles on the forest floor which provided an abundance of foraging and hiding opportunities for snowshoe hares. (See attached density maps)

Discussion:

The 2008-2009 winter field season marked the fifth year in which EWR has successfully documented lynx presence in the BTNF. Although lynx continue to persist in the northern portion of the Bridger-Teton NF, it has become evident that more intensive searches should be conducted elsewhere within the Greater Yellowstone Ecosystem. Specific areas that deserve more attention based on prey abundance and habitat structure include portions of Grand-Teton National Park, Yellowstone National Park, Shoshone National Forest, Gallatin National Forest, Custer National Forest, and the southern end of the Bridger-Teton National Forest; habitat on the Caribou-Targhee National Forest appeared to be very limited; the one exception being the Big Holes. In addition it is critical to spend a considerable amount of time in the areas surrounding our lynx locations on the northern BTNF, including the Teton and Gros Ventre Wilderness areas. These two wilderness areas may support additional lynx. Surveying the Teton Wilderness in particular during the winter months would likely prove to be arduous and

logistically difficult; however, this wilderness is immediately adjacent to the Togwotee Pass area where lynx have been consistently documented over multiple consecutive years. Surveying the Teton Wilderness and adjacent remote habitat on the Shoshone National Forest should be a top priority.

It has also become apparent that more information is needed on the specific movement patterns, habitat and prey choices of the GYE's resident lynx. To acquire this information we would need to put forth an effort aimed at collaring resident lynx with GPS/VHF collars in order to be able to more closely monitor their movements and habits. This collaring effort would be critical to lynx such as those on the northern BTNF, which are surrounded by wilderness areas that are essentially inaccessible to trackers during the winter months.

This effort is essential in determining the dynamics of lynx in the GYA and to better understand to what extent this area acts as an important corridor for lynx throughout the the Rocky Mountains. Over the past 8-10 years researchers have been able to identify relatively self-sustaining lynx populations in the Northern Rockies (Montana). During the same time period researchers have reintroduced a population of lynx to the Southern Rockies that may prove to be viable. The GYA likely plays a critically important role in allowing lynx to successfully move between and interact with other source populations of lynx throughout the Greater Rocky Mountain region. For this reason healthy habitat supporting abundant prey and a stable lynx population within the GYA may be critical to the present health and future sustainability of lynx throughout much of the Rocky Mountains within the Continental United States.

Future field seasons must focus on specific areas believed to harbor lynx as opposed to all areas that have suitable habitat within the GYE. By focusing our efforts on such areas we will be able to better determine if a viable lynx population continues to exist in the GYA.

Due to the large areas that lynx occupy and extreme distances that they are capable of traveling, winter snowmobile surveys have been and continue to be the most successful lynx detection method in the GYA. This method has allowed us to cover large tracts of land in relatively short periods of time and has resulted in almost all of our lynx track detections. However, ski surveys have enabled us to access remote areas and are an essential part of facilitating our understanding of habitat and prey preferences. Ski surveys will be an important tool in the future for surveying remote areas such as the Teton Wilderness, GTNP, and YNP.

Due to the habitat and prey preferences of lynx EWR is able to use our detection efforts to support a number of associated carnivore projects/studies. Through our search effort in the winter of 2008-2009 we were able to detect the presence and behavior of numerous large carnivores in the GYE. These include but are not limited to wolverine, cougar, wolf, grizzly bear, and badger. In addition we were able to observe a significant lynx-wolf interaction this winter where wolves actively pursued a solitary lynx (See attached Report). All of these incidental reports are integral to better understanding the GYE as a whole.

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Without the help of a number of people and organizations this study would never have materialized. Most importantly this study would have never happened without the dedicated work of biologists Brad Buckley, Jennifer Burghardt, Rachel Gray, and Boone Smith. Endeavor Wildlife Research is deeply indebted to a number of organizations that contributed logistically as well as financially. Thanks to Terry Hershey, Joe Neil, Steve Cain and Kerry Murphy and many others for all their support and wealth of knowledge concerning the Greater Yellowstone Ecosystem.

Thanks also to all the State and Federal employees who provided support throughout the 2008-2009 season in the form of housing, equipment, and general knowledge. These individuals include but are not limited to Lisa Solberg (BLM) Diane Probasco (USFS) Christie Hendrix (NPS) Cindy O'Neil (NPS) Greg Clark (USFS) Bob Oakleaf (WG&F) Susan Patla (WG&F) Andy Pills (USFS) Ray Spencer (USFS)

Funding for this project was procured through the United States Forest Service with the help of the National Park Service and Bureau of Land Management. We would also like to extend our deep gratitude to all of those in kind donations to Endeavor Wildlife Research that we received over the last year.

We would also like to thank all of the outdoor equipment companies who made this winter field season a little more comfortable. These include Black Diamond, 22 Designs, Smith Optics, and Cloudveil.

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Lynx Tracking Report
Grizzly Creek/Grouse Mountain Area
January 17 and 18, 2009
Endeavor Wildlife Research (EWR)

On Saturday January 17, 2009, I was snowmobiling in the Togwotee Trail system looking for lynx tracks. The weather was warm and clear. It had been at least 5 days since the last substantial snow fall. Near the V trail between Flagstaff Creek and Grizzly Creek, where an un-named creek confluences with the North Fork of Spread Creek in a large flat mostly open area, I found a two cat tracks within a half kilometer of each other. One was a Lynx track and the other was probably a young cougar track. The cougar track was measured with the width 2.5" - 2.87"; stride 24"; straddle 9". The small cougar track was found off of a spur road heading north up this drainage ~250 meters north on the spur on a south face with thin snow cover. The track came down from the slope, followed the snowmobile tracks for 75 meters, and then went up the slope again. There was a hard crust under the last couple remaining inches of the most recent snow. The short stride may have been single steps on the hard surfaces, but interestingly never changed to a typical cougar stride. Possibly a large bobcat but the wide straddle makes that unlikely.

Directly south a lynx track weaved through the edge of the forest and meadow. I cut the lynx track southeast of the confluence of the mentioned creeks. I was exploring the edges of a finger of the opening. Where the V trail begins to rise above this flat meadow (southeast corner), a lynx track cut through this finger of an opening about 125 meters wide. It crossed many snowmobile tracks and would follow them to get across. I parked my snowmobile and set out on skis to follow the tracks. I figured the age of the tracks was at least 10 hours old but probably not more than 24 hours. They typically were 2 inches deep. I forward tracked for the first half kilometer to see if they might meet up with the young cougar tracks, in case it might possibly be a juvenile lynx track. No intersections of the two tracks were ever found in 9 hours of tracking over two days. This lynx track did hunt along the edge of the large meadow, at one point after a short bed, on the edge of meadow and snowmobile use area the cat walked out into the opening 15 meters to a SM track and followed that for ~40 meters, it then changed directions and walked back to the west even farther then back in to the forest. It continued along the edge about 150 meters more then went deeper into the forest stand. The forest is a mix of Lodgepole pine, Spruce and White Fir with variable age classes and compositions. Here I stopped forward tracking and from the original start point, started back tracking. Here the cat was hunting through various mature mixed conifer stands and regenerating stands of lodgepole pine 15-30 feet tall. Lodgepole mortality was common among mature trees. The lynx crossed the groomed snowmobile twice in areas of medium density regenerating LP pine. It also crossed a number of snowmobile tracks in small openings or logging roads. In three hours of tracking I found two beds but no quality hair samples or scats.

On Sunday January 18, I returned to continue on the forward track until I could find a good DNA sample or two. Again the weather was warm and clear and the track did not age much, just a slight bit of hoar frost added to the tracks.

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As the lynx reached a low angle, wide rounded ridge, it followed the ridge down hill, then suddenly bounded 90 degrees to its right and fled, while, from 20 meters away, a pack of at least three wolves began bounding down the cats trail. The chase went for a total of approximately 400 meters. It started in a pure mixed age lodgepole pine stand, in the first 150 meters it led into a mixed conifer stand. Many of the mature lodgepoles were dead. The lynx might have felt safer with easier climbing, low branched spruce and fir trees nearby, although the need to climb did not occur. For most of the chase at least one wolf was tracing the lynx bounding tracks. On occasion the lynx would make a turn that the wolves could not or would not trace, and I could observe a pure lynx bound track only sinking half as much as the pursuers. On one occasion about 200 meters into the chase the Lynx slowed its pace and took a few walking steps, presumably taking a glance back at the widening lead on the pack, then resumed with the bounding escape. About 75 meters later the pack seemed to have lost the trail of the fast cat. They regrouped in a spot where a 2 by 2.5 meter area was trampled with solid wolf tracks. I at first thought the cat may have treed but the lynx track was 15 meters away and the matted wolf tracks were next to a tree but did not surround it. Then the pack continued up the nearly level ridge till they soon found the lynx track again and continued bounding after the lynx. At least one wolf would be directly on the track most of the time while the others might weaving off to the left and right and back again. This continued another 120 meters to a steep short slope. The cat track jumped a half dozen bounds down the lighter deeper snow and then curved back up as the slope curved around to the left. The wolves did not make the plunge down the slope but stayed on the ridge. I continued on the lynx track but did not see this pursuit continue or where the wolves went.

Later at least a kilometer down the track wolf tracks crossed the lynx again, this time just a few meters of walking lynx tracks cat were followed by one of the wolves, then all went their separate ways. The lynx may have been in a hurry to get out of the area-- most of the day the cat kept an asymmetrical two-two cat gait, a few inches longer stride than the typical walk. I expected to see a long bed, a big rest after such a long race but only two short term beds were found. The lynx continued angling up the slopes through drainages towards the south the rest of the tracking day (4.5 more hours). It used old clear cuts where young lodgepole pine was regenerating. No attempt on prey was observed all day. I ended my tracking as the lynx crossed over the peak onto soft sun baked snow, into the South Fork of Spread Creek watershed, west of Grouse Mountain.

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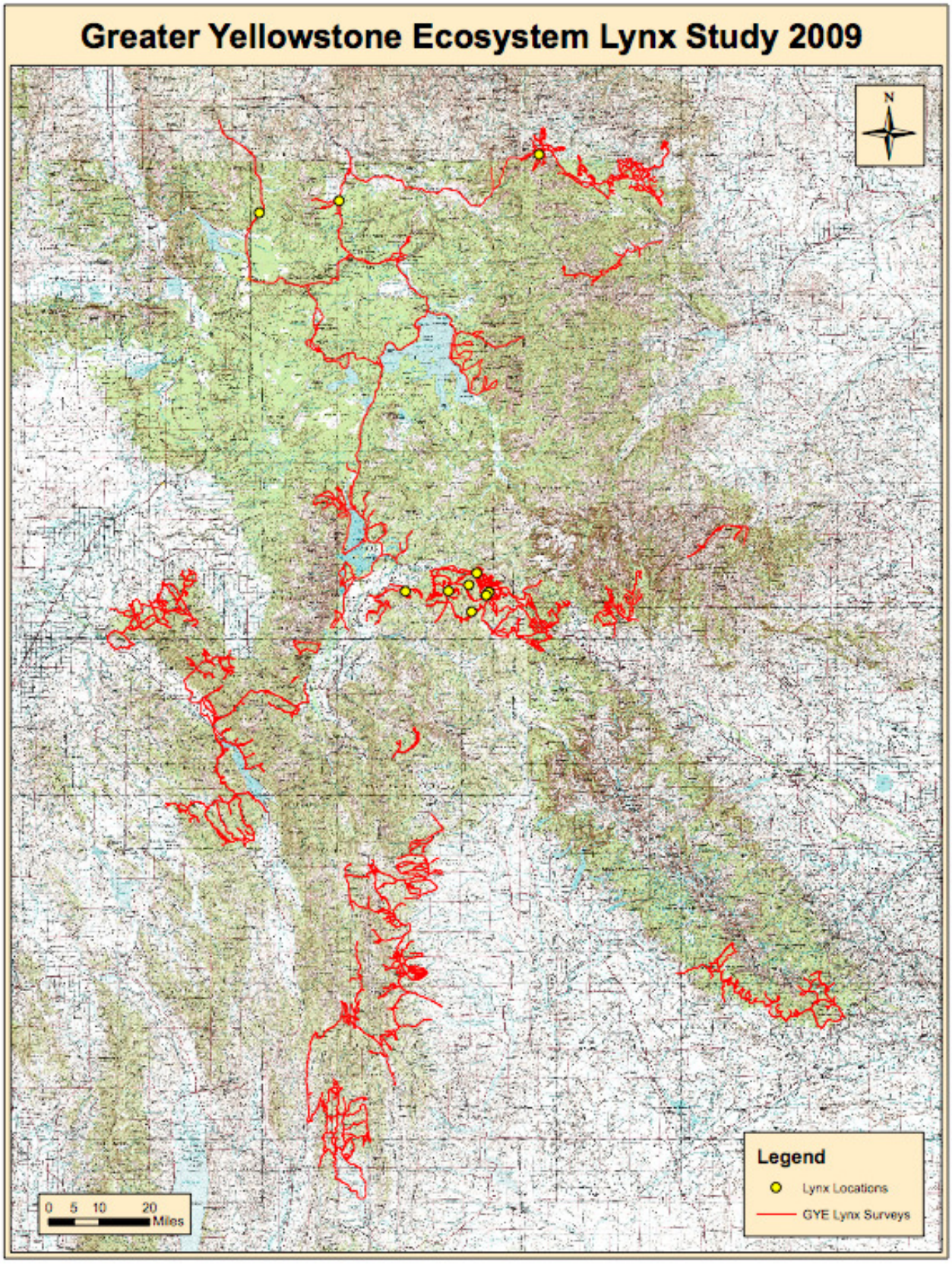

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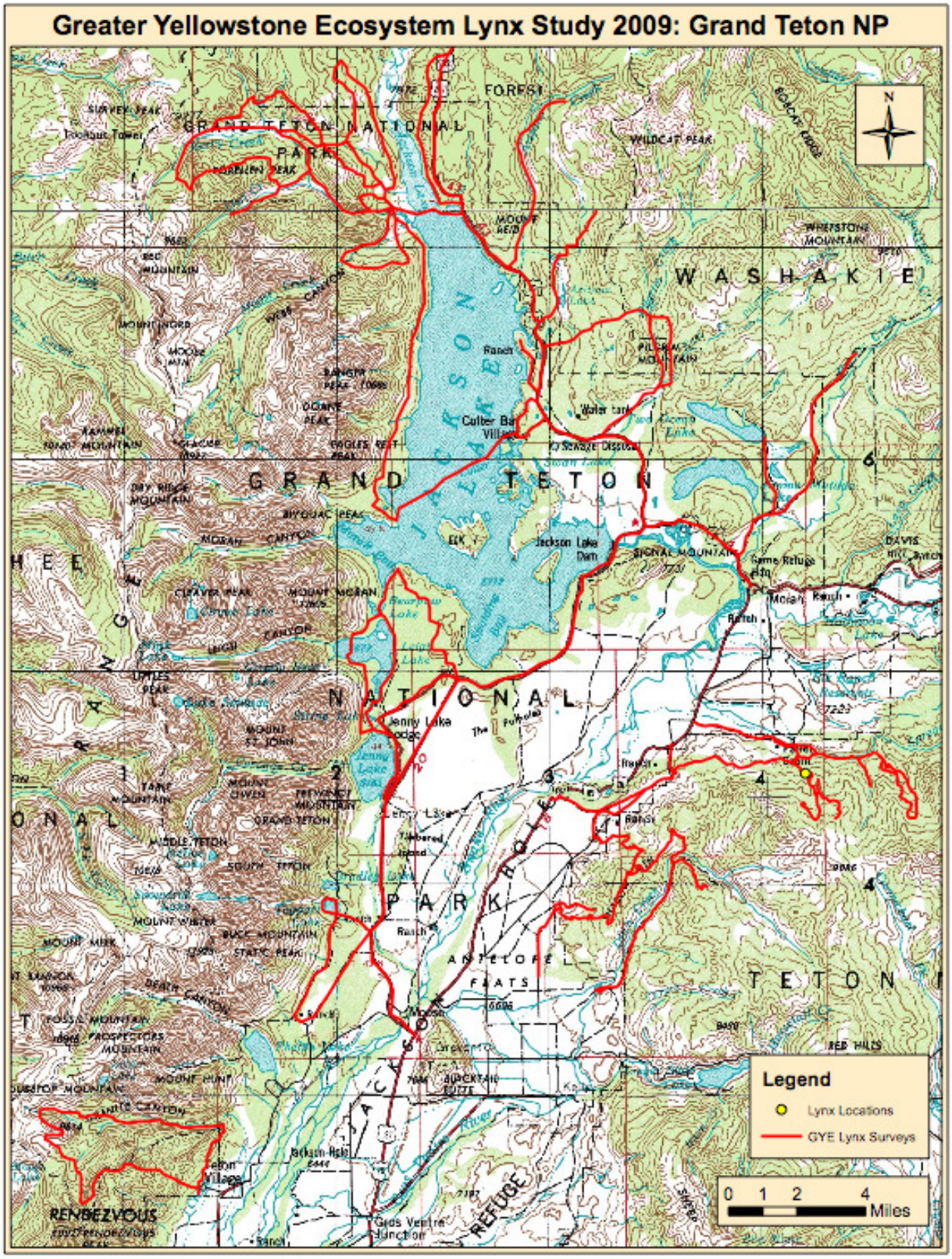

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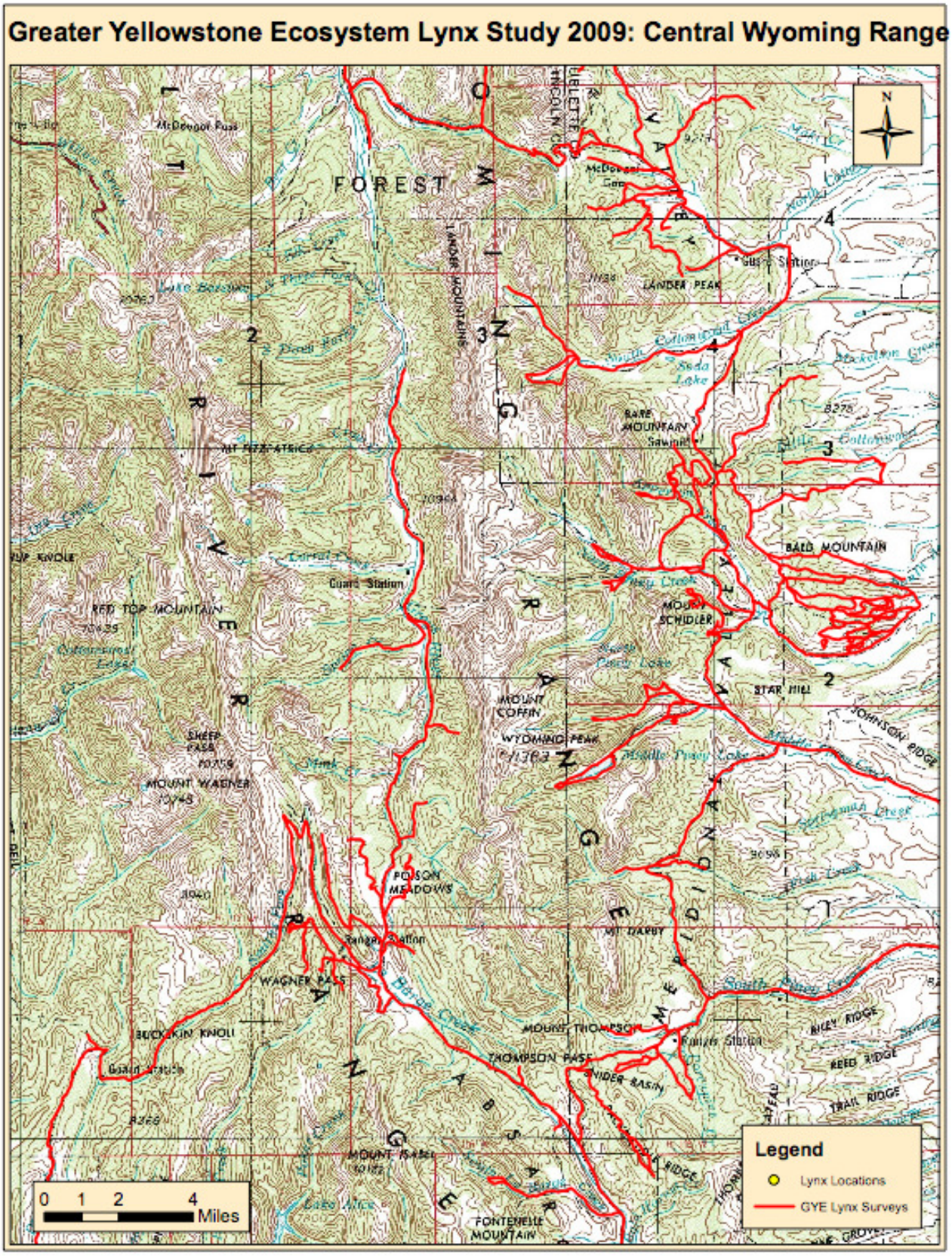

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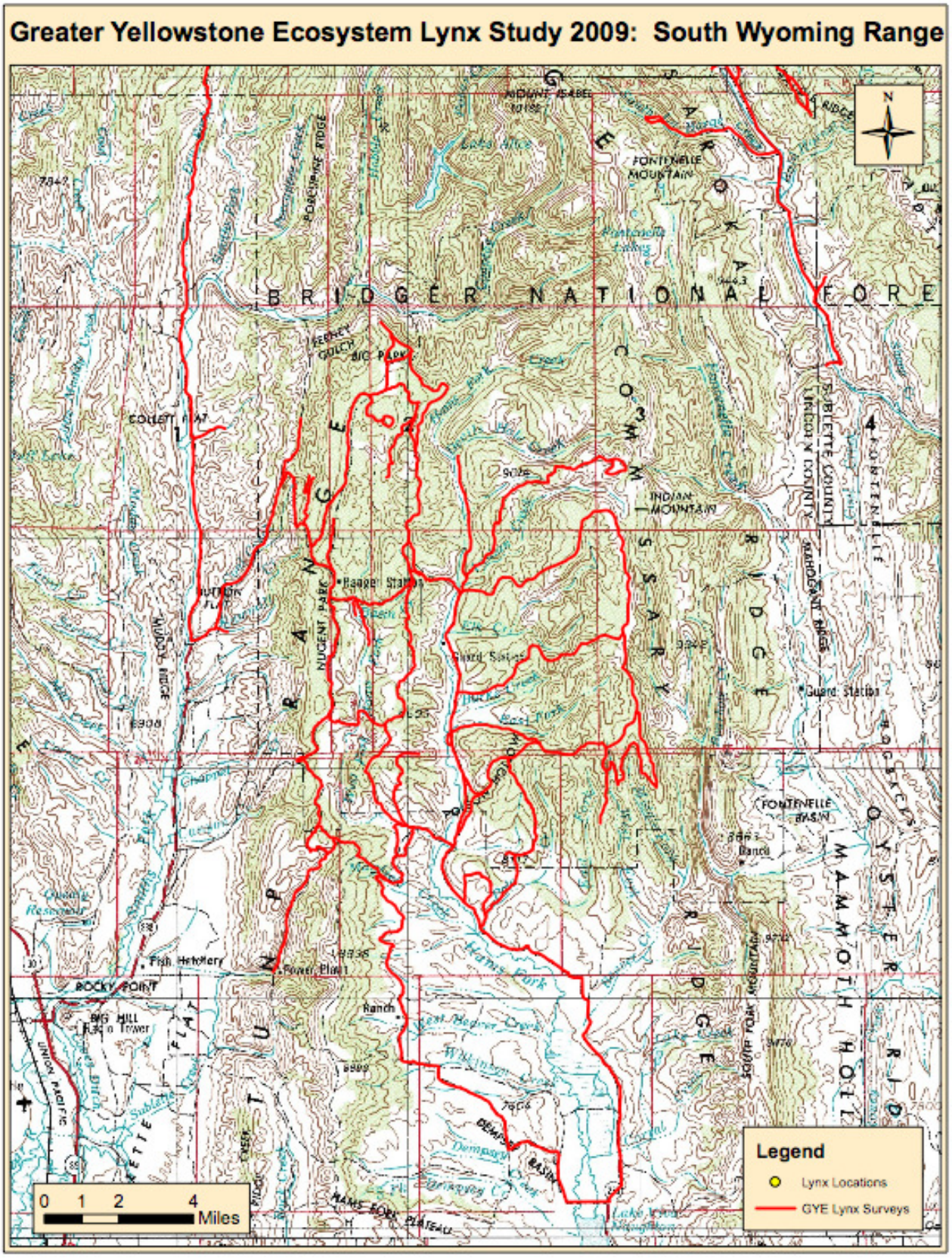

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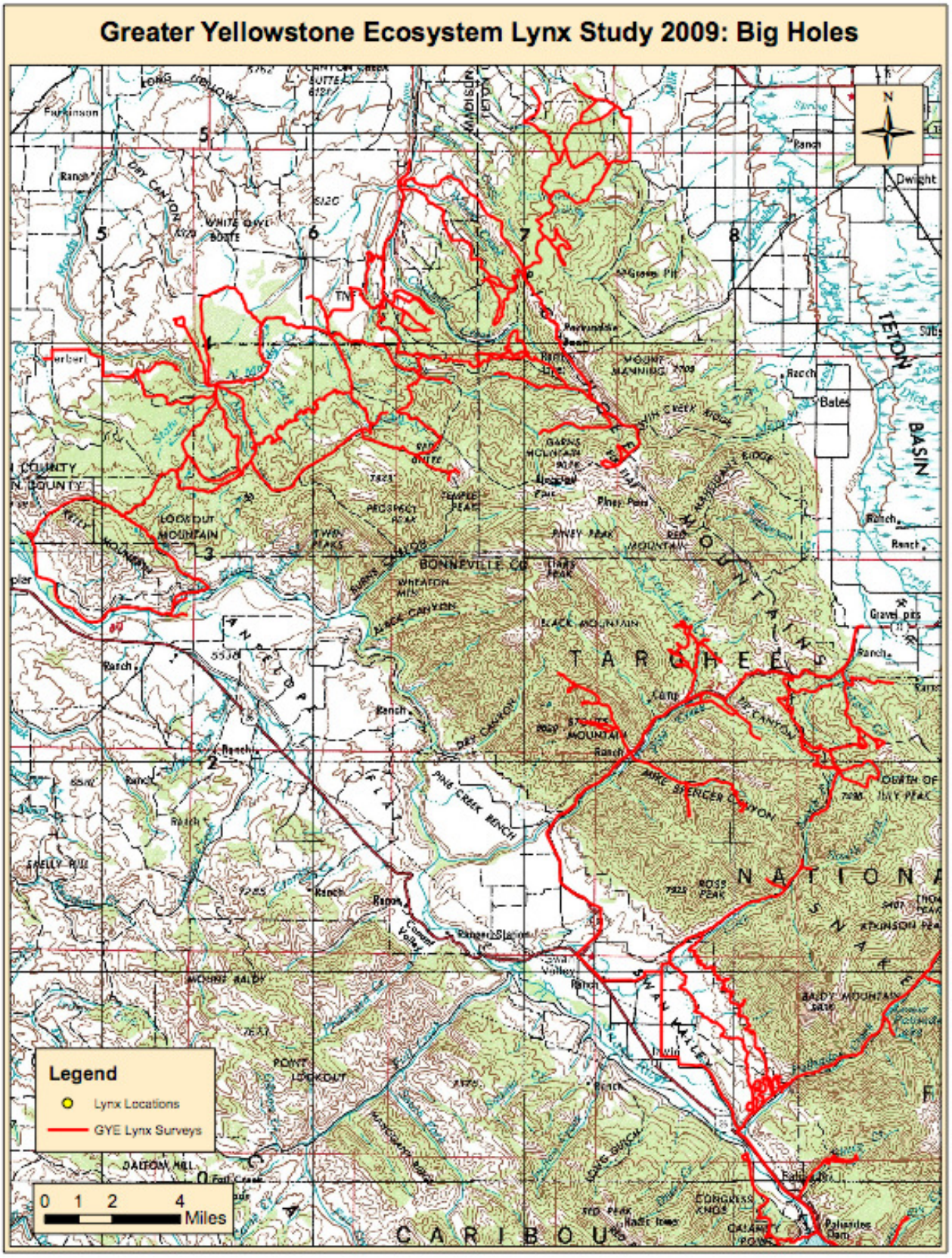

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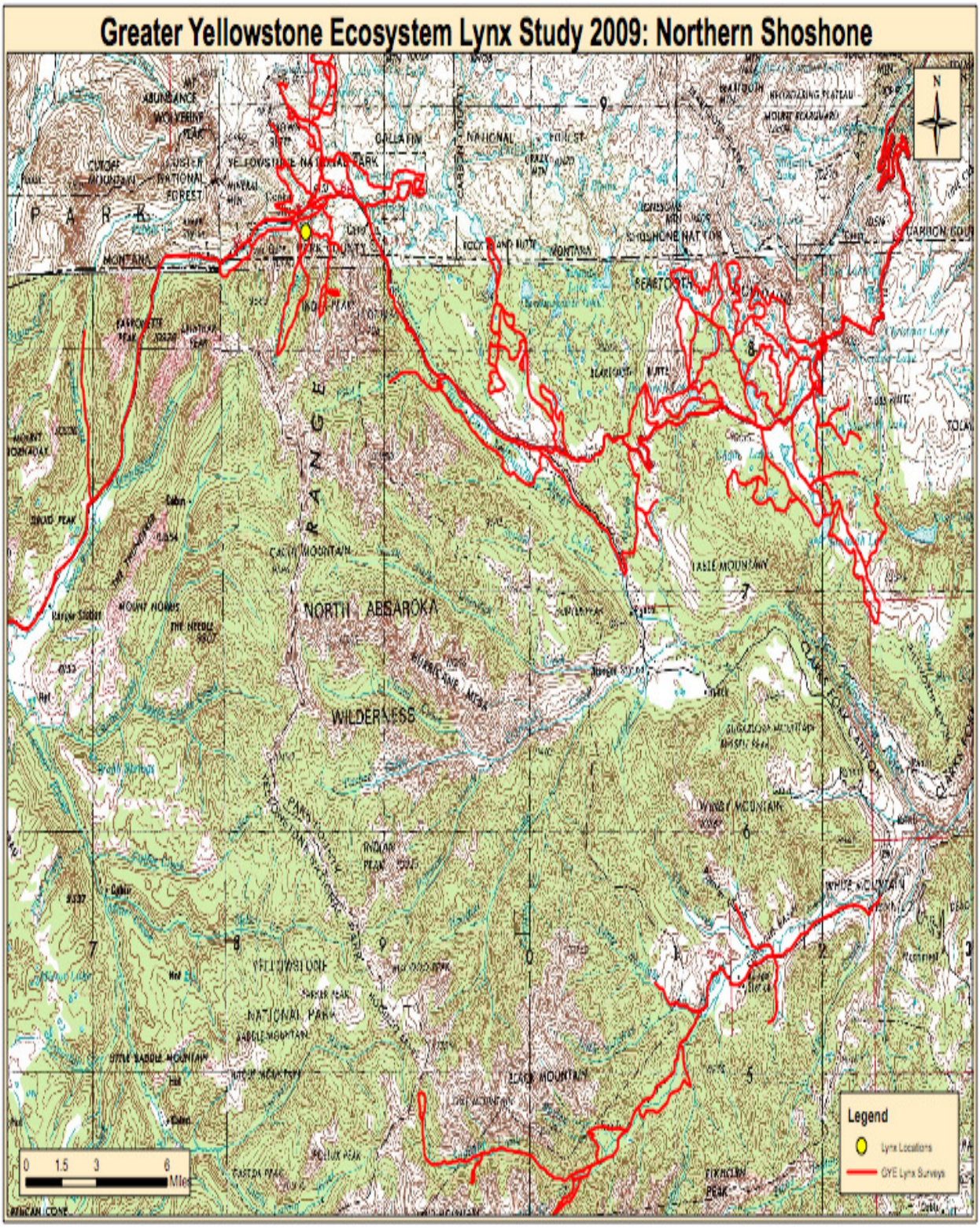

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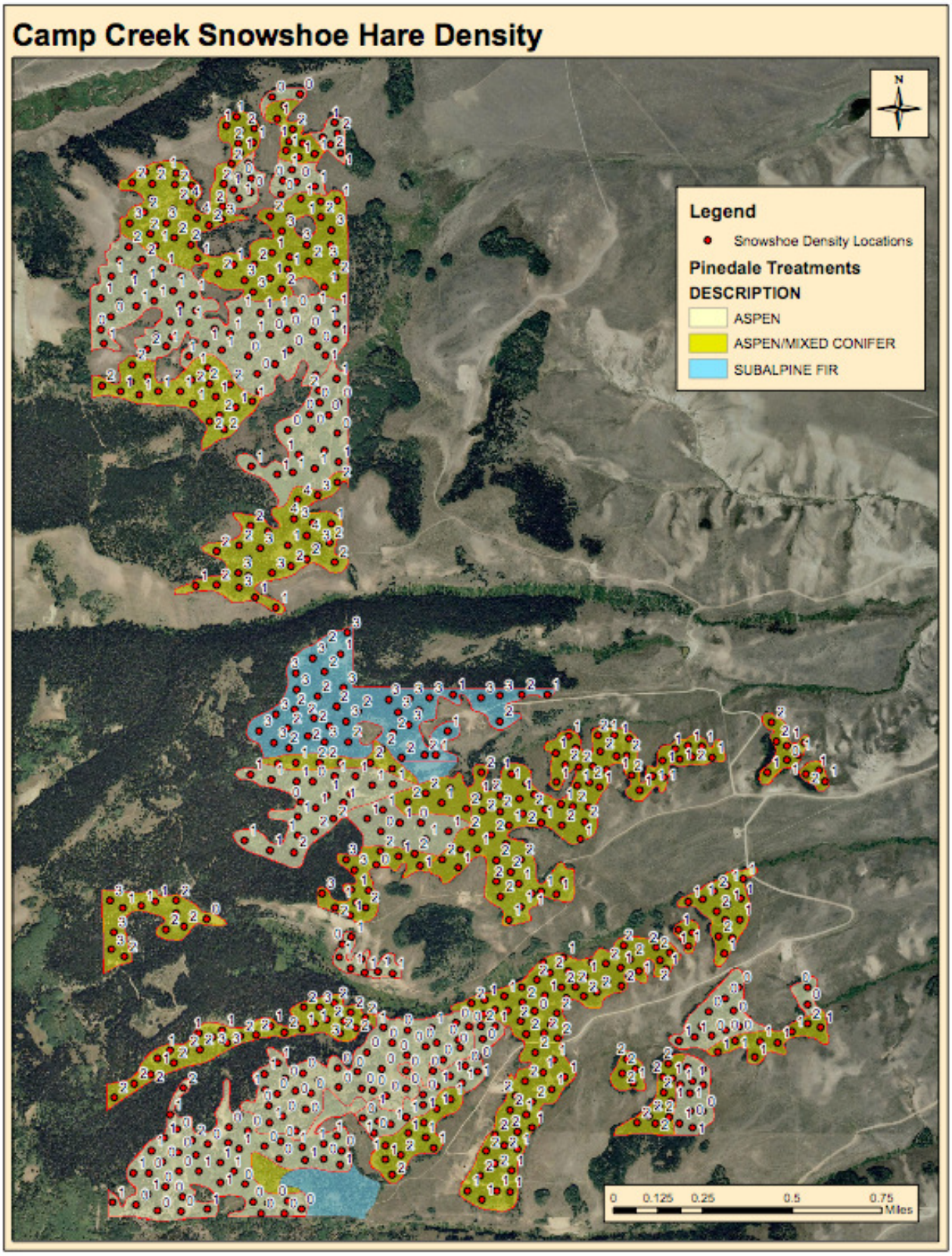

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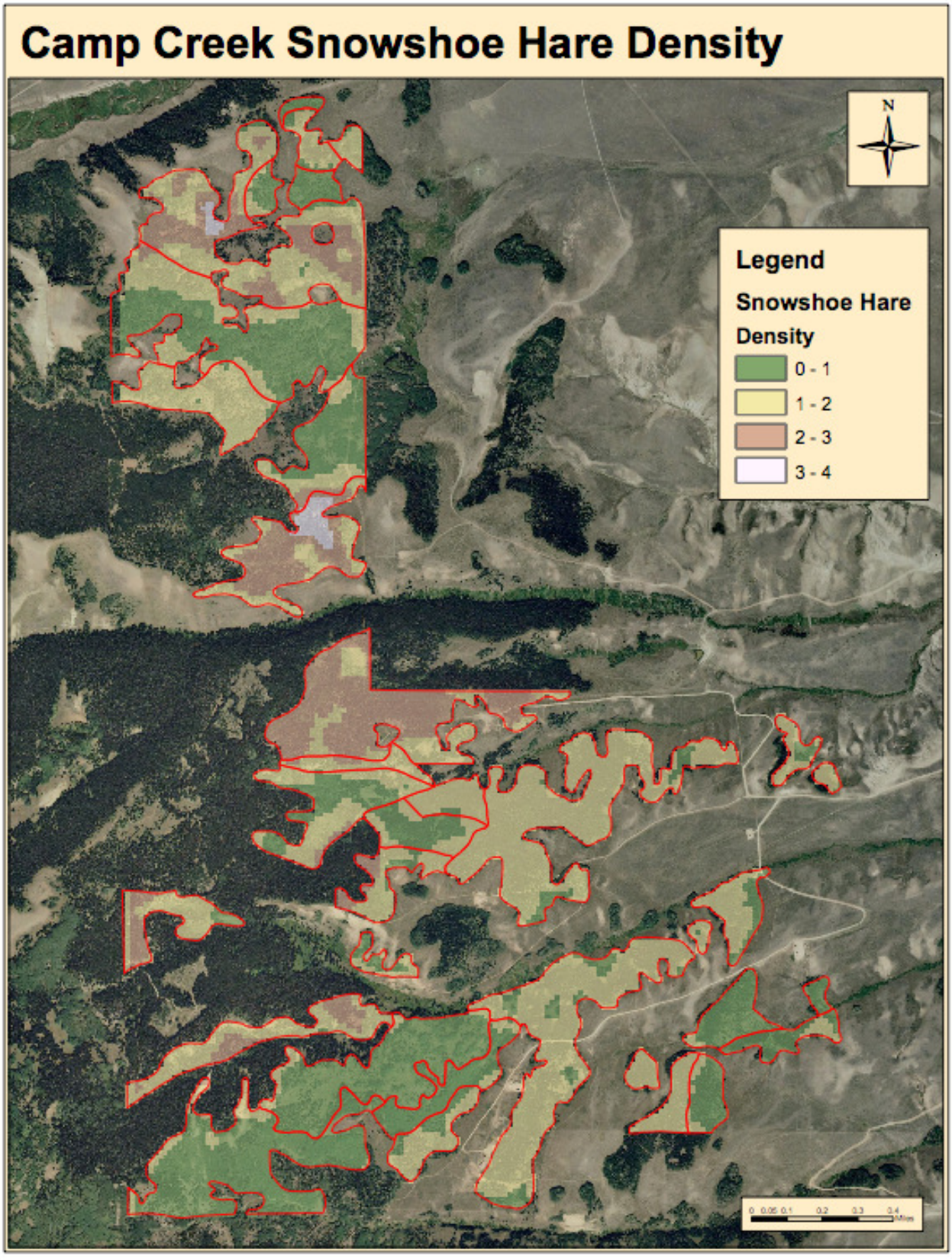

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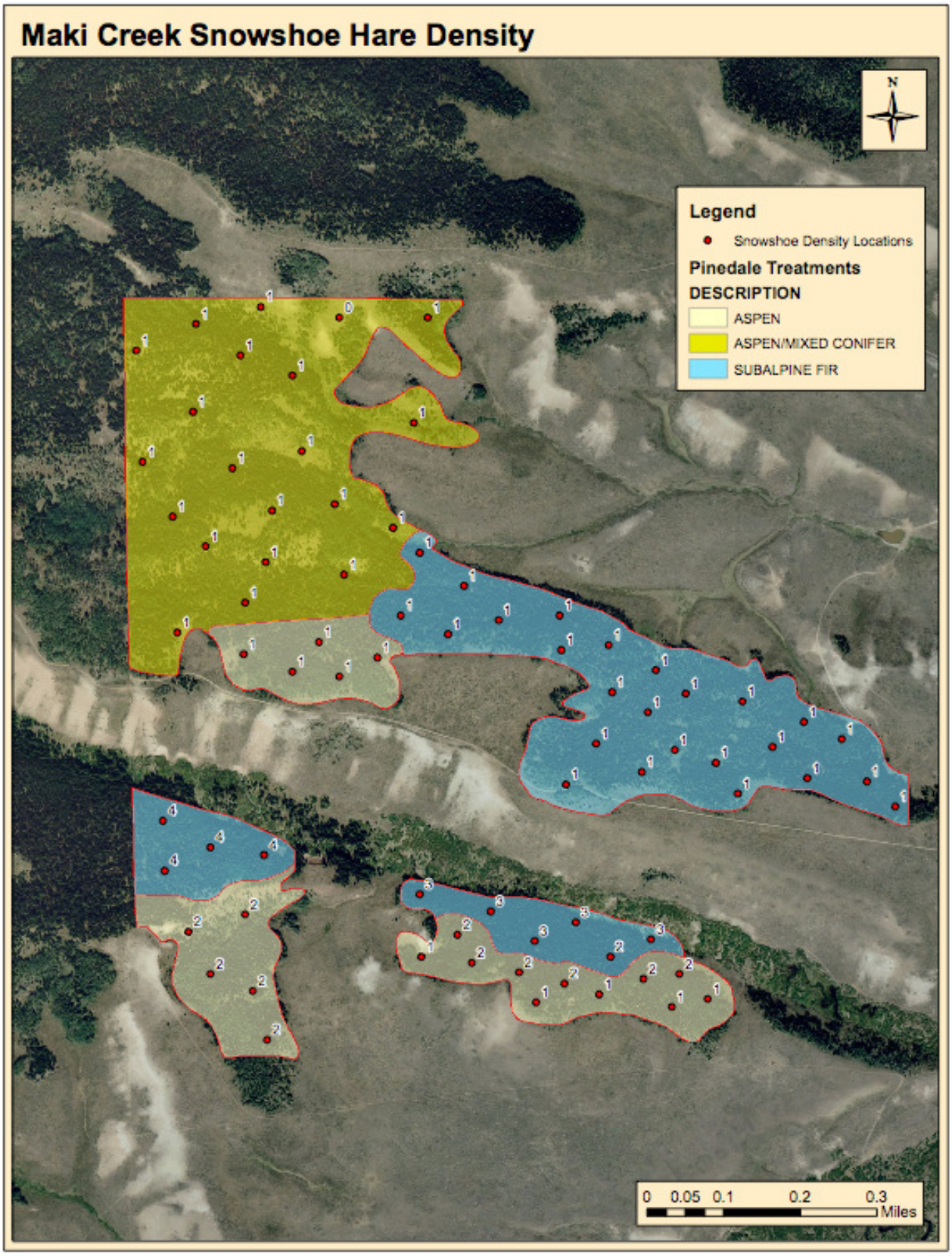

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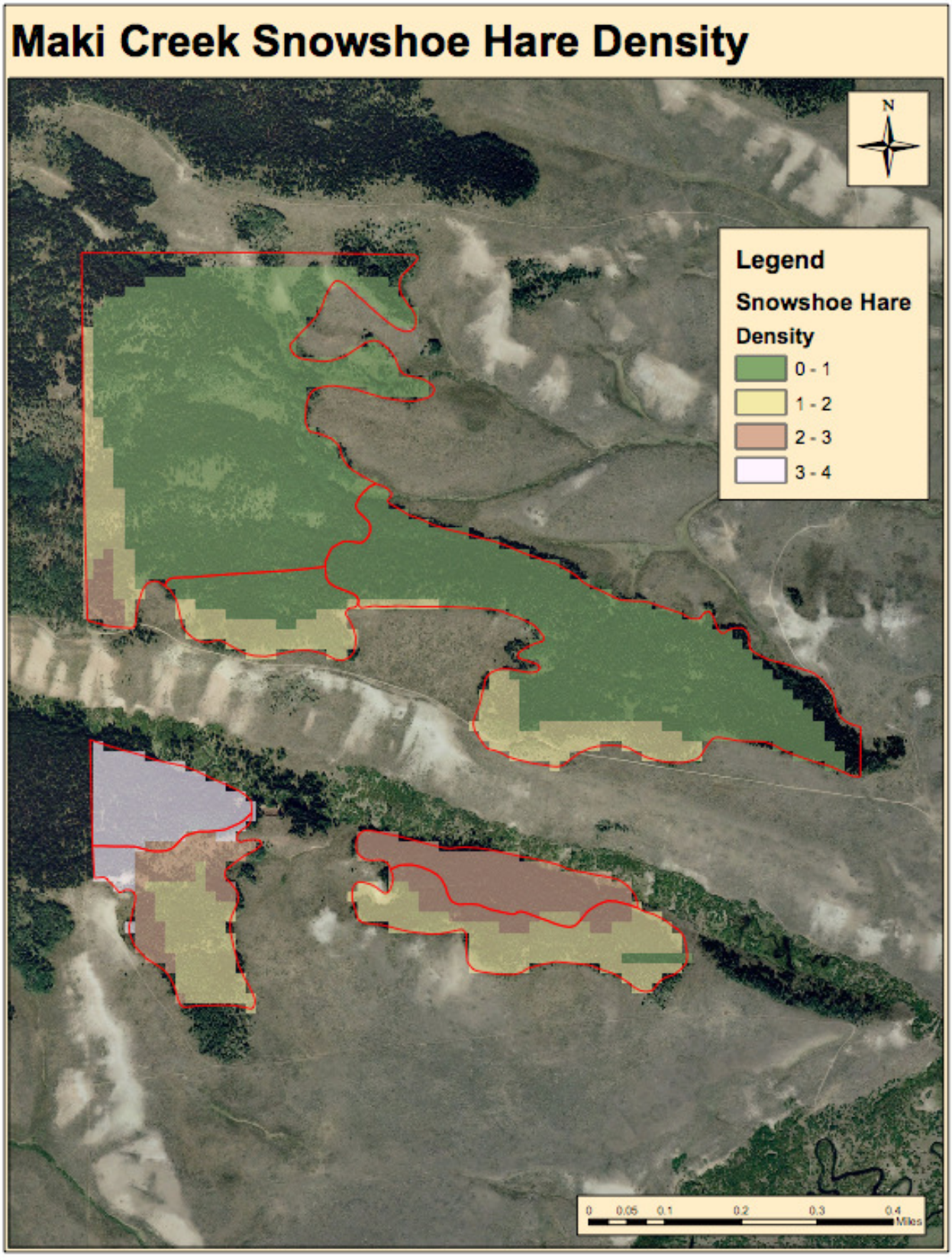

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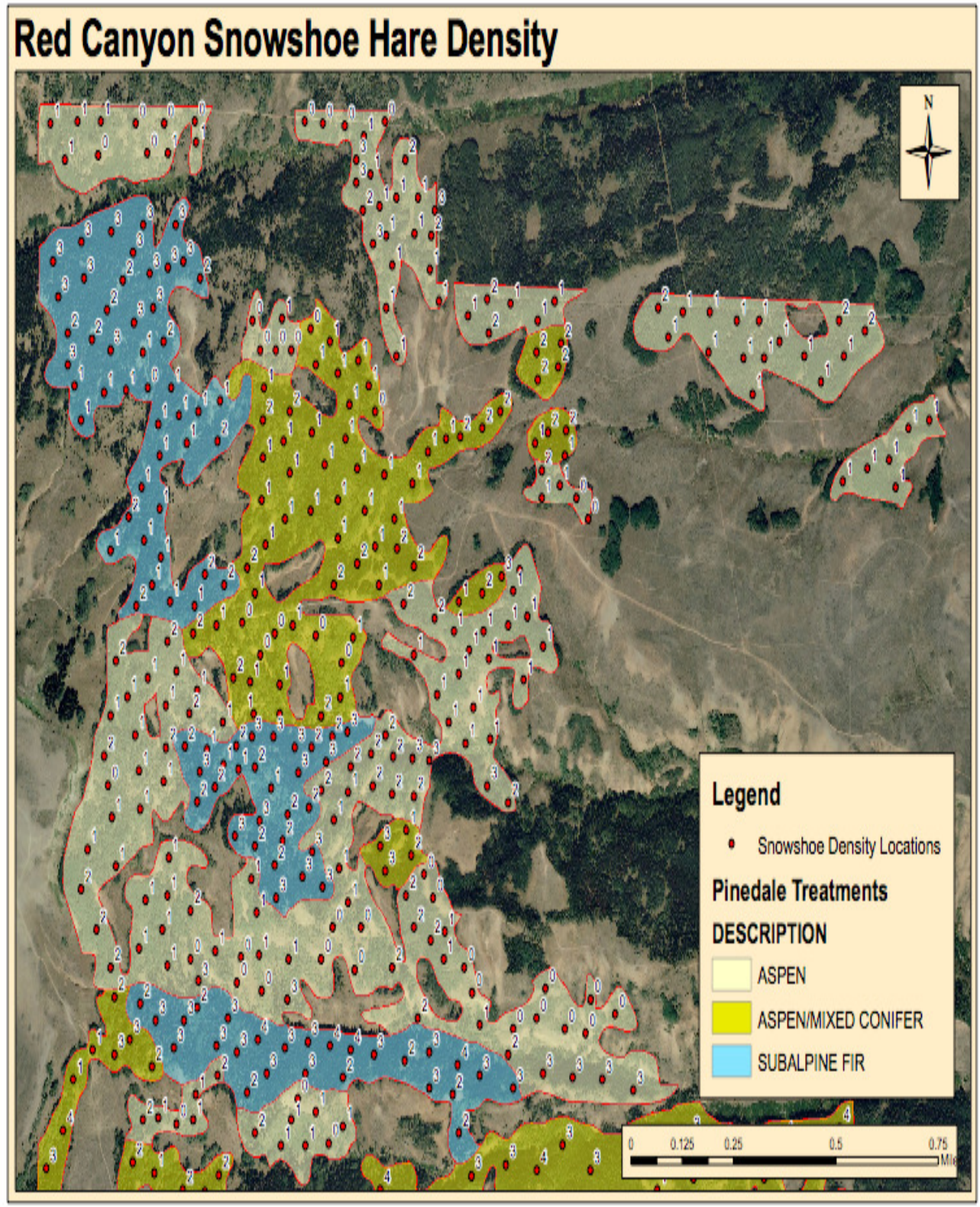

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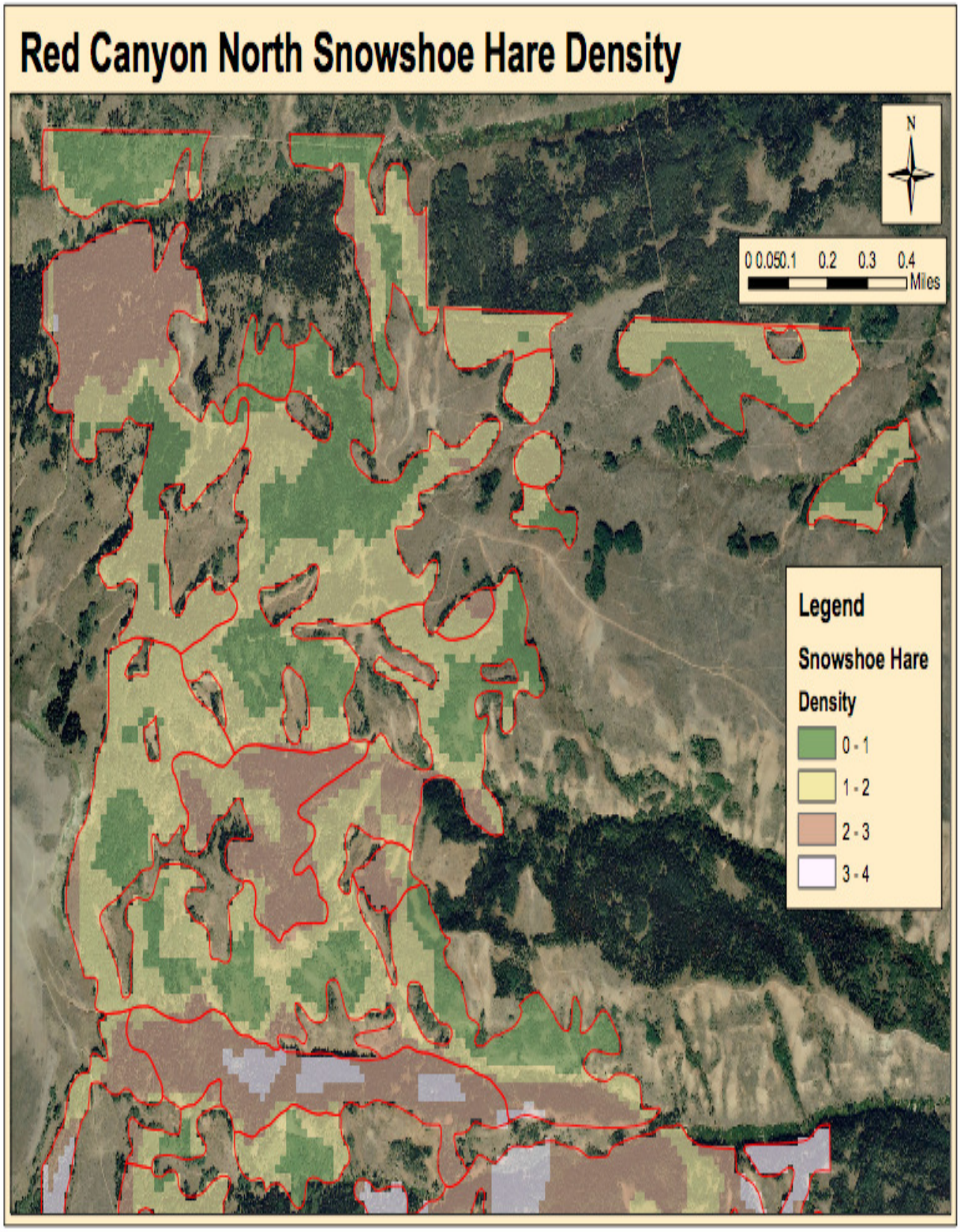

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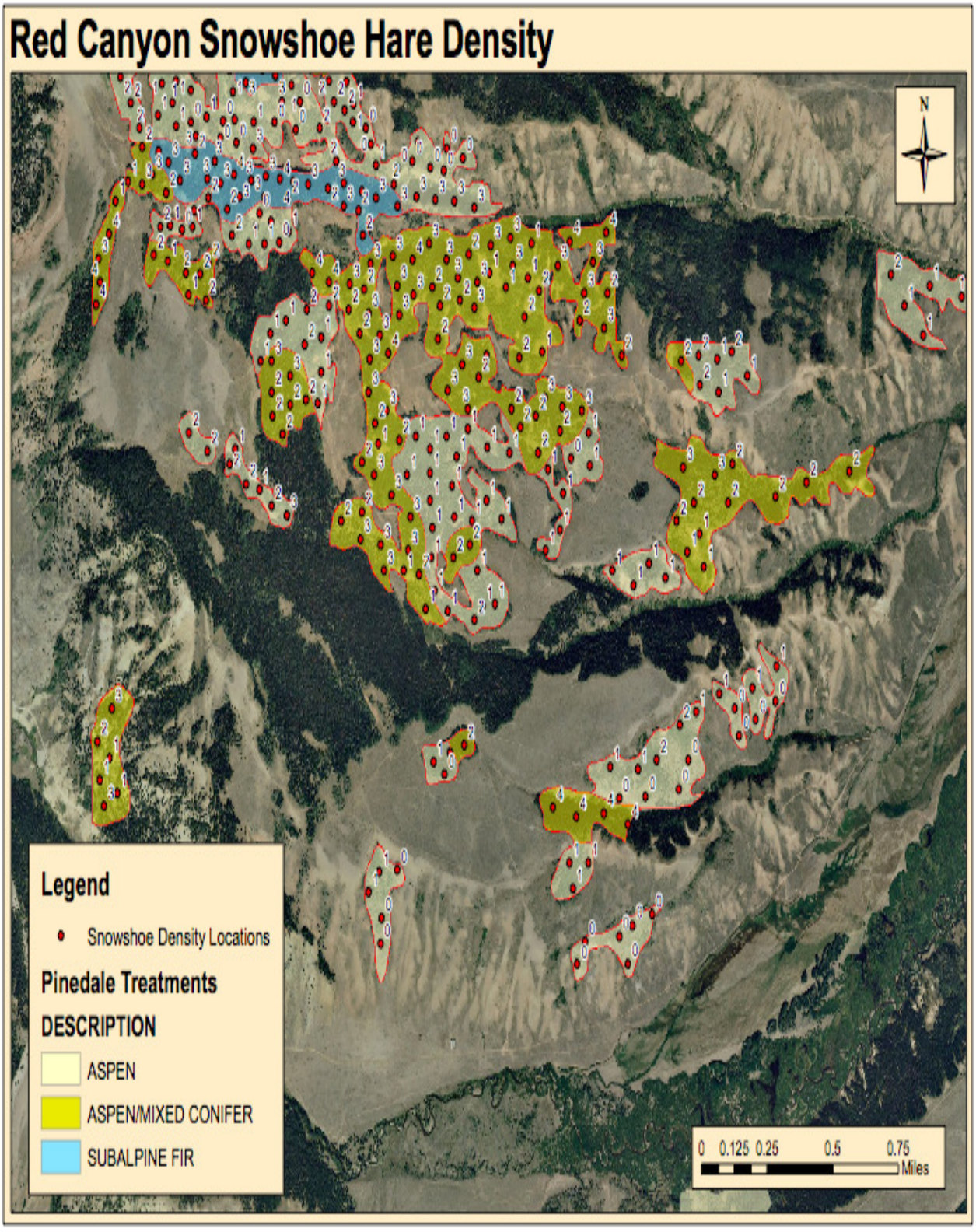

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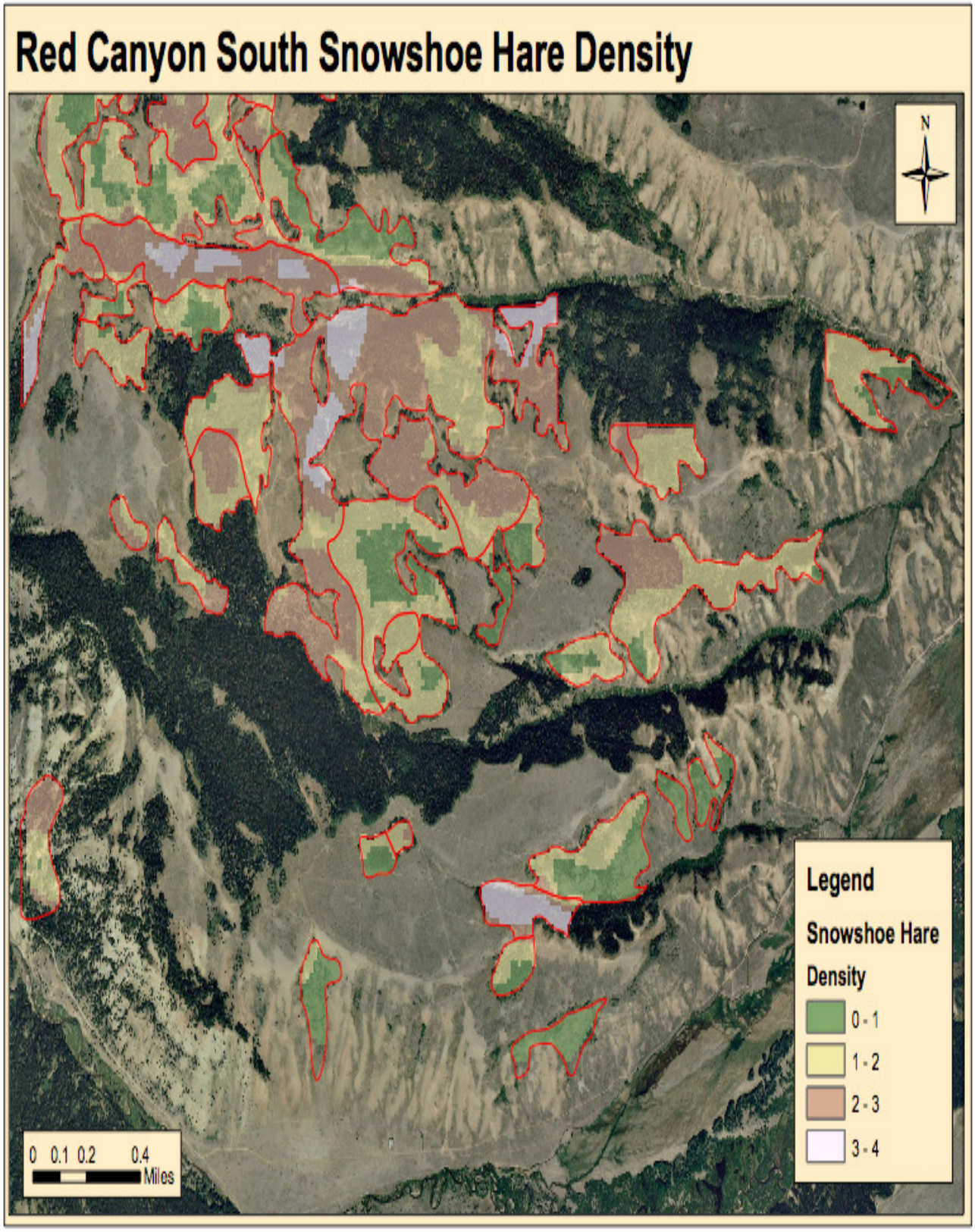

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