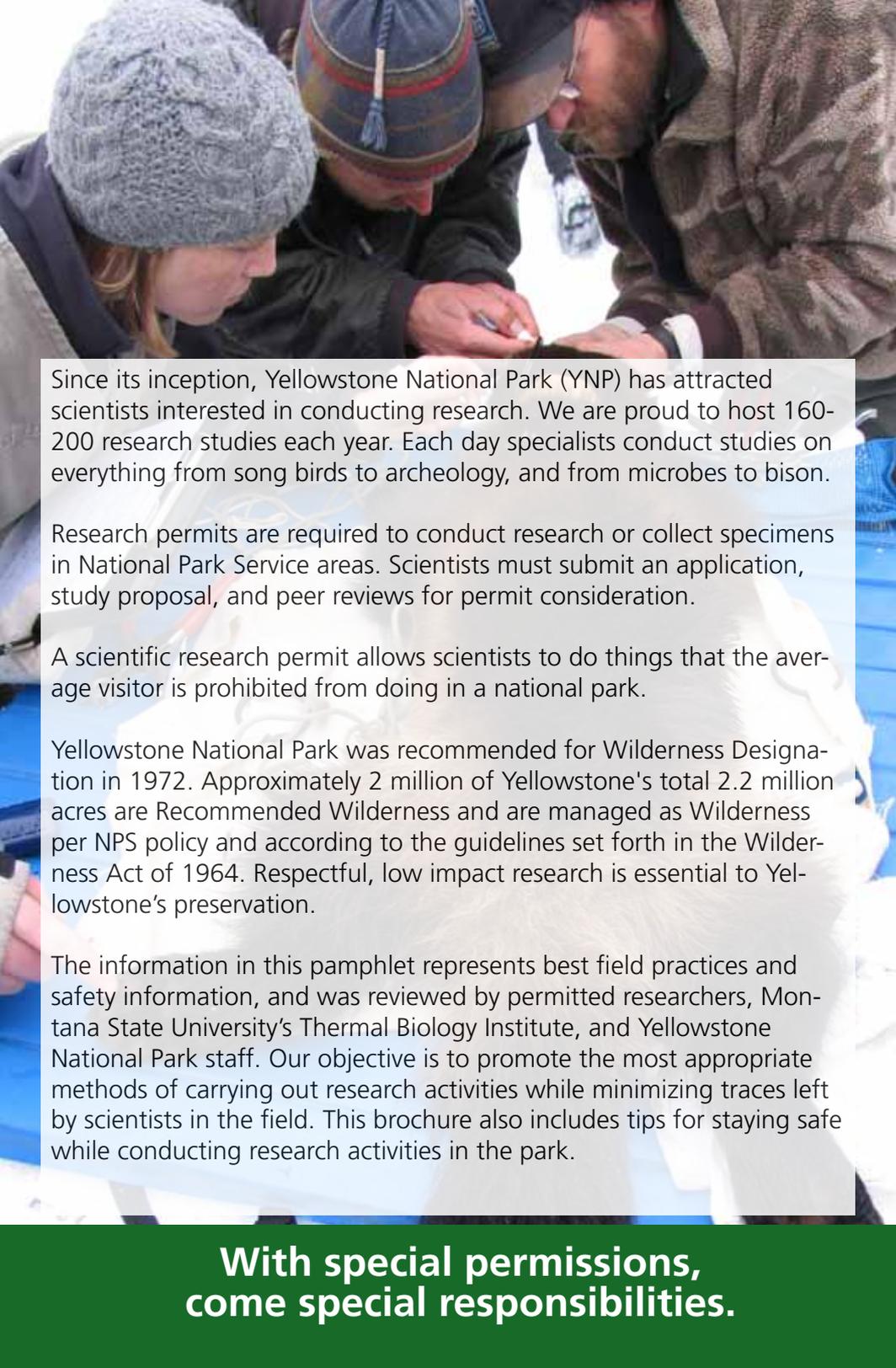




A Guide for Research Scientists

Resource Protection and Safety Considerations in Yellowstone National Park



A photograph showing three people in winter clothing, including hats and jackets, looking down at a document or map they are holding together. The background is a snowy, outdoor setting.

Since its inception, Yellowstone National Park (YNP) has attracted scientists interested in conducting research. We are proud to host 160-200 research studies each year. Each day specialists conduct studies on everything from song birds to archeology, and from microbes to bison.

Research permits are required to conduct research or collect specimens in National Park Service areas. Scientists must submit an application, study proposal, and peer reviews for permit consideration.

A scientific research permit allows scientists to do things that the average visitor is prohibited from doing in a national park.

Yellowstone National Park was recommended for Wilderness Designation in 1972. Approximately 2 million of Yellowstone's total 2.2 million acres are Recommended Wilderness and are managed as Wilderness per NPS policy and according to the guidelines set forth in the Wilderness Act of 1964. Respectful, low impact research is essential to Yellowstone's preservation.

The information in this pamphlet represents best field practices and safety information, and was reviewed by permitted researchers, Montana State University's Thermal Biology Institute, and Yellowstone National Park staff. Our objective is to promote the most appropriate methods of carrying out research activities while minimizing traces left by scientists in the field. This brochure also includes tips for staying safe while conducting research activities in the park.

**With special permissions,
come special responsibilities.**

BEST FIELD PRACTICES: LEAVE NO TRACE PRINCIPLES

- **Be prepared.** Excessive trips between your car and your study site can create unwanted social trails. Make sure you have all necessary field gear before heading to your study site.
- **Take care to not trample plants or soils** at your work site. Some researchers use wooden planks or tarps to lessen impacts to the site.
- **Leave what you find.** Do not collect any items unless your research permit specifically authorizes you to do so, and collect no more than authorized. Take a GPS point to document the location of any interesting or unusual finds to park staff.
- **Respect others** by collecting samples in a manner not obvious to visitors. If you do encounter visitors, take the time to explain what you are doing.
- **Use of mechanized/motorized/wireless equipment is prohibited** without permission from the park's Wilderness and/or Wireless Committee.
- **Do not leave equipment in the field** overnight or for extended periods of time without explicit permission from the Research Permit Office. Any equipment approved for extended deployment must be removed at the end of the study.
- **Do not approach or harass wildlife.** If you cause an animal to change its behavior you are too close.
- **Pack out what you pack in.** When leaving your field site, be sure to check the area for garbage.

For more information about Leave No Trace principles visit www.lnt.org

GENERAL SAFETY

Personal safety and preservation of park resources always take priority over your research. It is important to plan ahead and be prepared for emergencies.

It is a condition of every research permit to notify area rangers via the on-line researcher check-in system before starting work and to leave a Dashboard Display in your car. This will aid park staff in the event you are reported overdue.

Park your vehicle in a designated pull-out and make sure all tires are completely off the road way.

Do not disturb wildlife in your effort to reach your study site. At a minimum, 100 yards must be maintained from bears and wolves and 25 yards from all other wildlife. Bison, moose and elk can be especially dangerous during breeding and calving seasons. You should schedule extra time to conduct research due to the presence of wildlife.

If wildlife enter your work area, it is your responsibility to stop work and leave the area. It is important to keep watch while at field sites as animals may travel through at any time. Keep your gear and bear spray close at hand.

When travelling to and from study sites, exercise good situational awareness to determine if animals are in the area. If you encounter animals you should carefully select your route to ensure your safety as well as minimizing wildlife disturbance.

Bison injure more people in Yellowstone each year than any other wildlife species. While bison may look slow and docile, they can and will react quickly when disturbed. Remember, if the tail goes up it means the bison is either defecating OR that he/she is agitated. Give them plenty of room (25 yards at minimum) when you encounter them in the field.

For more information visit the [go.nps.gov/ycr](https://www.nps.gov/ycr) and watch the winter safety related video [here](#). The Research Permit Office can recommend winter safety related gear and supplies.

LOGISTICAL GUIDELINES

When considering communication plans, keep in mind that there is limited cell phone coverage in YNP. You may want to consider bringing a satellite phone or personal locator beacon (e.g., Spot© device).

Be prepared for environmental conditions that could cause exposure, hypothermia, dehydration or injury. In Yellowstone, weather conditions can change very rapidly. In addition to bear spray, always carry the “10 essentials” when working in the backcountry:

1. Navigation (map, compass and GPS)
2. Sun protection (sunglasses and sunscreen)
3. Insulation (extra clothing)
4. Illumination (headlamp/flashlight)
5. First-aid supplies
6. Fire (waterproof matches/lighter/candles)
7. Repair kit and tools
8. Nutrition (extra food)
9. Hydration (extra water) and/or water purifier
10. Emergency shelter

Working in winter poses additional hazards. Cold weather, snowmobile operation, poor driving conditions, parking to allow for safe snow plow operation, avalanches, and frozen stream crossings are all concerns.

Remember the cold cutoff! Yellowstone National Park prohibits all staff and researchers from working outdoors when temperatures are at or below -20°F.

TO REDUCE THE CHANCE OF A NEGATIVE ENCOUNTER WITH A BEAR

BE ALERT: See the bear before you surprise it. Watch for bear sign such as tracks, scat, and feeding sites.

AVOID WORKING AT DAWN, DUSK, OR AT NIGHT: During the hot summer season these are the periods when grizzly bears are most active.

WORK CLOSE TOGETHER OR IN GROUPS: Space yourselves close together (50 feet or closer) or in groups of 3 or more people when working and hiking.

DON'T EXPECT BEARS TO NOTICE YOU FIRST: A bear with its head down feeding may not see you as quickly as you would think. Pay attention, see the bear before it sees you and before you surprise it.

MAKE NOISE, ALERT BEARS TO YOUR PRESENCE: When hiking, periodically yell "Hey Bear" especially when walking through dense vegetation or blind spots, when traveling upwind, near loud streams, or on windy days. Avoid thick brush whenever possible.

AVOID CARCASSES: Ungulate carcasses are a highly preferred food source that bears will guard and defend against other scavengers or humans. Dead ungulates will attract and hold many bears near the carcass site. It is risky to approach a carcass; many bears may be bedded nearby just out of sight. If you find a carcass leave the immediate area by the same route you approached the carcass.

STAY WITH YOUR GEAR: Don't leave your packs, lunches, food, or beverages unattended as they may attract and hold bears at the site.

CLOSE ENCOUNTERS WITH BEARS IN YELLOWSTONE HAVE RESULTED IN DEATH AND INJURY TO BOTH HUMANS AND BEARS.

BEAR SAFETY

THE BASICS OF BEAR PEPPER SPRAY

PROVEN EFFECTIVE: In a study in Alaska, bear pepper spray was effective in stopping aggressive behavior in grizzly bears in 92% of the incidents where it was used.

EASY TO USE: Unlike a firearm, you don't have to be a good shot with bear spray. All you need to do is put up a cloud of bear spray between you and the charging bear. Precise aim is not necessary.

PRACTICE: Use inert bear spray to practice quick drawing bear spray from its holster, removing the safety tab with your thumb, and firing. Practice firing inert bear spray with the wind at your back, into a head wind, and with a cross-wind so that you understand how bear spray is affected by the wind.

KEEP IT READILY ACCESSIBLE: Bear spray must be immediately accessible in a quick draw holster, not stored in your pack.

WHEN TO SPRAY: Start to spray the charging bear when it is about 40 - 50 feet away.



Bear Spray is NOT a substitute for common sense - use bear safety protocols as your first line of defense!

WORKING IN GEOTHERMAL AREAS

Thermal areas in Yellowstone are as dangerous as they look. At least 18 people have died and many have been injured from thermal burns.

THERMAL AREA SAFETY

Never work alone or in areas unfamiliar to you. Ask for help from a knowledgeable colleague or request park assistance.

Always carry a first aid kit equipped for treating thermal or chemical burns.

Thermal areas can have unpredictably high levels of dangerous gases. Exposure to such gases may be greater on windfree days. Researchers should consider using gas monitors and paying careful attention to any changes in mental status while in the field.

Always wear personal protective equipment such as safety glasses and heat-resistant gloves.

To avoid ruining clothing, do not kneel or sit in acidic thermal areas. Always wear sturdy closed-toed boots in thermal areas. Gaiters or tall boots may offer some protection from thermal burns if you accidentally break through a thin-crust area.

To avoid standing on the edge of a thermal pool, or to sample beyond your reach, use an extendable pole or other specialized sampling equipment.

It is critical that you make personal safety your

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en severely injured as a result

BEST FIELD PRACTICES IN THERMAL AREAS

Be discrete when hiking to sites. Do not leave designated trails in the presence of visitors; if they see you going off trail, they may assume that they can leave the trail.

Avoid cross-contamination! Sterilize all equipment, including pH and temperature meters, between thermal features.

When use of chemicals in the field is necessary, it is better to measure chemicals and place them in sampling vials prior to transport. Dispose of all chemicals properly outside of the park.

NEVER release any chemicals into thermal pools, outflow channels, or any watershed.

Use planks or boards when working in mucky geothermal areas. In areas where excessive walking or standing has occurred, use a whiskbroom to brush out any footprints.

When sampling from microbial mats, collect small amounts, such as straw-sized cores. Spread out sample locations across features so sampling does not harm mats and is not visibly obvious.

r first priority when working in thermal areas.

BACKCOUNTRY CAMPING

Camping in Yellowstone's backcountry requires a backcountry permit and use of a designated campsite. To obtain a permit, you will be required to go through an orientation each year.



For more information on backcountry camping: <http://www.nps.gov/backcountry>
OR contact the Central Backcountry Office

BACKCOUNTRY CAMPING BASICS

Keep a clean camp and pack out all garbage. A food storage pole is provided at most campsites, suspend all food and other attractants:

- Provide your own rope (35 feet recommended).
- Suspend items 10 feet above ground and 4 feet out from up-rights.
- In addition to food and garbage, suspend all odorous items including toothpaste, deodorant and lotion.
- Approved IGBC bear resistant food storage containers may be used in Yellowstone. For more information on the types of containers/panniers that may be used please contact the Central Backcountry Office at 307-344-2160.
- Don't sleep in the same clothes worn while cooking.
- Store food in airtight containers.
- Where possible, keep your sleeping area 100 yards from your cooking and food-storage area.
- Strain food particles from dishwater and pack out with trash. Scatter dishwater at least 100 yards from tent site.
- Line your pack or panniers with plastic bags.
- Never eat or store food in your tent.
- Sleep in a tent, not under the stars.
- Avoid placing your tent near dead standing trees.
- Fires are only allowed in established fire rings at designated campsites. You must use only dead and downed wood.

This brochure was produced as a collaborative effort between Montana State University's Thermal Biology Institute, the Yellowstone Park Foundation and Yellowstone National Park. Our organizations share a common goal to preserve park resources, encourage safe field practices, and promote scientific discovery. For additional information about the Thermal Biology Institute and ongoing thermal biology research, visit the TBI website at www.tbi.montana.edu. For information about the Yellowstone Park Foundation, visit the YPF website at www.ypf.org.



For additional copies of this brochure contact the Research Permit Office at 307-344-2239.

go.nps.gov/yellowstoneresearch