

II.1 Introduction

(See Section 1 of the current Nomination Form and Section 1, 2 and 3 of the original Nomination Forms)

1a) State Party:
USA

1b) Name of World Heritage property:
Yellowstone

1c) Please provide geographical coordinates for the site to the nearest second. (In the case of large sites, please give three sets of geographical coordinates.)

Geographical coordinate: Long. 109°10' - 111°W

Geographical coordinate: Lat. 44°08' - 45°07' N

1d) Give date of inscription on the World Heritage List.

date (dd/mm/yyyy): 09/08/1978

1e) Give date of subsequent extension(s), if any.

1f) List organization(s) responsible for the preparation of this site report.

Organization #1

Organization Name: National Park Service, Department of the Interior
Last Name: Lewis
First Name: Suzanne
Title: Superintendent
Address: P.O. Box 168
City: Yellowstone Park
State/Prov: Wyoming
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II.2 Statement of Significance (see Section 2 of the current Nomination Form and Section 5 of the original Form)

2a) When a State Party nominates a property for inscription on the World Heritage List, it describes the heritage values of the property which it believes justifies the inscription of the property on the World Heritage List. Please summarize the justification for inscription as it appears in the original nomination of the property.

The original nomination provided a justification for inscription containing a cultural component and a series of natural components. The park was inscribed on the basis of the natural components, but not the cultural component.

The cultural component focused on Yellowstone National Park as a (if not "the") point of origin for the world park movement. Citing scholarship that called the national parks an "American invention," the nomination summarized the rise of the national park movement from this halting beginning (Yellowstone National Park was created on March 1, 1872) to a world-wide system of parks and similar preserves in more than 100 nations. In this sense, the justification implied, even the modern effort toward protection represented by the World Heritage List is itself part of the historic legacy of Yellowstone National Park.

Yellowstone was nominated under all four of the natural-area criteria for inclusion on the World Heritage List:

(i) Evolutionary history of the earth. Yellowstone is the site of extraordinary volcanic activity. Evidence of numerous periods of extensive volcanism centered around the world's largest identified caldera; Yellowstone is one of the world's premier textbook sites for the study and appreciation of such activity. The justification cited visible evidence of 55 million years of volcanism; volcanic depositions preserving 27 layers of fossilized forests; the world's largest known volcanic caldera; a variety of lava flows; the world's foremost collection of active geysers and hot springs; and intense continuing earthquake activity.

(ii) An area of ongoing geological and biological evolution. The park's geyser and hot spring basins, which include the majority of the world's active geysers, were cited not only for their own qualities but as further evidence of the significance of the region's volcanism and as geological agents of change. As "an area for biological evolution," the park hosts its entire native plant assemblage, and, as of the date of the nomination, almost all of its native animal species, in an 898,349 ha (approx. 2,219,859 acre) wildland in which ecological processes are given free rein to a greater extent than in most parts of the U.S. In this context, the park's designation (June 1976) as an International Biosphere Reserve was offered as additional evidence of the area's ecological integrity and value.

(iii) An area containing unique, rare, or superlative natural phenomena. Rather as early Yellowstone supporters emphasized the weirdness of the landscape, this criteria focused on the unique collection of geysers in the park, but also emphasized the monumental landscape and scenic values. The volcanic history of the region has left its legacy in an incised and topographically irregular landscape; the criteria cited the 41 waterfalls known in the park as indication of the rugged topography (subsequent study has raised this total to nearly 300).

(iv) Habitats where populations of rare or endangered species of animals still survive. As much as emphasizing the individual species, the criteria concentrated on the park's protection of "ecosystem components necessary for the continuity" of such life forms. Part of the value in this criteria was seen to be the extensive wildlands surrounding the park, which allow for a much more expansive and secure home for rare species than would be provided by the park alone.

2b) *At the time of initial inscription of a property on the World Heritage List, the World Heritage Committee indicates the property's outstanding universal value(s) (or World Heritage value(s)) by agreeing on the criteria for which the property deserves to be included on the World Heritage List. Please consult the report of the World Heritage Committee meeting when the property was listed and indicate the criteria for which the Committee inscribed the property on the World Heritage List. (Choose one or more boxes.)*

Cultural Criteria

- i
- ii
- iii
- iv
- v
- vi

Natural Criteria

- i
- ii
- iii
- iv

2c) *At the time of initial inscription, did the World Heritage Committee agree upon a Statement of Significance for the WHS? (Consult the report or minutes of the World Heritage Committee meeting when the property was listed.*

NO

2c1) *If YES, please cite it here.*

2c2) *If NO please propose a Statement of Significance for the World Heritage Site based on the consideration given the property by the Committee when it inscribed the property on the World Heritage List. (Note: Following the completion of the Periodic Report exercise, the State Party, in consultation with appropriate authorities, will determine whether to proceed with seeking a Committee decision to approve any proposed Statement of Significance. The Committee must approve any proposed Statement of Significance through a separate, formal process. See 7g.)*

i. Yellowstone National Park is one of the world's foremost sites for the study and appreciation of the evolutionary history of the earth, an open natural textbook on fundamental earth-shaping processes.

ii. Yellowstone National Park's globally unparalleled assemblage of surficial geothermal activity, including thousands of hot springs and fumaroles, and between half and ninety percent of the world's active geysers have established Yellowstone National Park as one of the world's most remarkable landscapes. As the site of one of the few remaining intact large ecosystems in the northern temperate zone of earth, Yellowstone's ecological communities provide unparalleled opportunities for conservation, study, and enjoyment of large-scale wildland ecosystem processes. Just as important, the park is recognized as the core of a far larger ecological entity, the Greater Yellowstone Ecosystem.

iii. The cumulative value of Yellowstone's great variety of unique, rare, and superlative natural phenomena, from geothermal activity to extraordinary scenic treasures, has created a whole greater than the sum of its parts. This special value is revealed in such chains of consequence as the violent volcanic history of the landscape which created numerous deeply incised watersheds, whose hundreds of waterfalls form barriers that have created hundreds of distinctive aquatic communities.

iv. Yellowstone National Park has become one of North America's foremost refuges for rare plant and animal species, and also functions as a refuge for ecosystem processes that are rarely allowed such free expression elsewhere. Largely because of this leadership in ecosystem management, Yellowstone has become a world center for dialogue about natural-area conservation and is recognized as perhaps the world's leading laboratory for experimentation in the values and ideas that drive modern conservation.

2d) Since the original inscription of the property on the World Heritage List, has the World Heritage Committee agreed with a proposal by the State Party that the property be recognized for additional World Heritage values and added additional criteria to the inscription as a result of a re-nomination and/or extension of the property?

NO

*2d1) If YES, please indicate which new criteria were added and the date.
(dd/mm/yyyy)*

II.3 Statement of Authenticity / Integrity (See Section 2 of the current Nomination Form and Section 4 of the original Form)

3a) In addition to meeting one or more of the criteria, which justify inscription on the World Heritage List, a natural or cultural property must meet the appropriate conditions of authenticity and/or integrity, as defined in clauses 24b and 44b of the Operational Guidelines for Implementing the World Heritage Convention. If at the time of inscribing the property on the World Heritage list, the State Party and the International Council on Monuments and Sites, ICOMOS and/or the International Union for Conservation of Nature and Natural Resources, IUCN, evaluated the authenticity and integrity of the property, please cite those evaluations here. (Please quote directly from the nomination, Committee minutes and the Advisory Body's evaluation.)

The nomination for the site, and the original designation (see minutes, cited in 2c), did not specifically or separately address issues of authenticity and integrity. On numerous occasions in the text of the nomination, however, authenticity and integrity are implicitly discussed.

Under "Flora and Fauna," the listing of native plant and animal species indicates an almost completely present native ecological community, a point further buttressed by the statement that Yellowstone's "bison herd includes the only continuously wild free-ranging bison in the United States whose numbers are naturally regulated."

Under "Diagnosis," the discussion is, in good part, about integrity, e.g.: ". . . the major purpose of present management is to maintain natural conditions with minimum influence by man. . ." and "[n]o species of mammals have been extirpated from the park since its establishment. Except for the wolf, all other endemic species are present in numbers naturally regulated by environmental conditions. Migratory birds and ungulates cannot be totally protected by the park. For many other species of wildlife, however, Yellowstone provides habitats that are ecologically complete. Buffer zones in the form of National Forests surround Yellowstone National Park for added protection."

These same points are reinforced and elaborated on under the headings of "Criteria 2: As an Area for Biological Evolution," and Criteria 4: Habitats Where Populations of Rare or Endangered Species of Animals Still Survive." The latter especially emphasizes the worth of intact ecosystems, long protected in the national park, and the advantage that Yellowstone National Park was afforded by being given national park status before Euro-Americans had significantly manipulated the landscape through resource extraction, construction of buildings, or other developments. The latter also emphasizes the role played in ecosystem integrity by federal lands beyond the park's boundary in all directions: "Yellowstone National Park is the fully protected core of a larger area of Federal lands surrounding it. Grand Teton National Park nearly adjoins Yellowstone on the south, while 5 national forests surround them as controlled buffer zones." This statement continued in a vein that reveals one relatively optimistic viewpoint among many held by the public over the condition and direction of national forest management when it says, "[t]he national forests are managed by the Federal government under multiple-use policies that are generally compatible with the preservation management of the National Park Service." But optimistic or not, this is yet another statement dealing with the issue of authenticity and integrity.

3b) Have there been significant changes in the authenticity or integrity of the property since inscription?

YES

3b1) If YES, please describe the changes to the authenticity or integrity and name the main causes.

Since 1995, important issues of authenticity and integrity have been addressed for the World Heritage Committee in a series of annual or semi-annual reports by Yellowstone National Park to the World Heritage Committee, when the park was placed on the World Heritage Convention Parks in Danger List. At the time that the site was listed, several issues were at hand that raised questions of the fate of the park's ecological integrity. A large gold and silver mine was proposed for near the northeast corner of Yellowstone National Park, with risk of pollution in the park and impacts upon both social and ecological values in and near the park. The bison population of Yellowstone National Park is host to the organism *Brucella*, which causes brucellosis in livestock; the bison population has for some years been under threat of slaughter by state and federal livestock agencies. The Yellowstone cutthroat trout, whose largest remaining population occupies Yellowstone Lake in Yellowstone National Park, is at risk from recent illegal introductions of non-native lake trout; the native cutthroat is a key species in supporting populations of more than 40 other species of native birds and mammals, and also provides the primary sport fishery in Yellowstone National Park. Yellowstone National Park water treatment infrastructure was outdated, threatening water quality in park lakes and streams through system failure. Yellowstone National Park road system upkeep lagged behind increasing visitor use, to the point that the road conditions were poor to hazardous. Increasingly intense park visitation, including the growth of a winter season that originated about 1970, placed undue pressures on park resources, with continued debate over what level of use was appropriate or sustainable if park resources were to be preserved. The reports mentioned above, submitted to the World Heritage Committee since 1995, document efforts to resolve these important questions. In 2002, sufficient progress was judged to have been made that Yellowstone National Park was removed from the list.

A significant improvement in ecological integrity was accomplished by the restoration of gray wolves to Yellowstone National Park. The original nomination stated that "research has not established that wolves are present in sufficient numbers to interact socially and breed successfully." Subsequent research did establish that wolves were, by the 1990s, either extremely rare or extinct, with little or no promise that a population would re-establish itself through emigration from remote northern populations. Following an extensive national debate and legal process, a wolf population was successfully re-established beginning in 1995, and is now thriving in and near the park. Additional values of this new element are associated with its cultural and social significance; the recovery process, both its political mechanics and its on-the-ground execution and biology, were subjects of international attention and wide scientific interest. Yellowstone National Park has become North America's foremost site for the viewing of predator-prey interactions of large native mammals, an interpretive opportunity not available at the time of the original listing.

In 1992, a land exchange involving the National Park Service, the Bureau of Land Management (U.S. Department of the Interior), and the State of Montana, allowed Yellowstone National Park to acquire clear title to 16.4 acres, formerly owned by the State of Montana as part of an abandoned railroad right-of-way. This land is near the north boundary of the park, just west of the North Entrance and the Montana community of Gardiner. The land is part of a much larger tract of critical ungulate winter range.

II.4 Management

(See Section 4 of the current Nomination Form and Section 2 and 4 of the original Form)

Management Regime

4a) How can the ownership/management of the property best be described? (Select all that apply.)

- management under protective legislation
- management under contractual agreement(s) between State Party and a third party
- management under traditional protective measures
- other

Please describe.

Yellowstone National Park is owned by the United States Government on behalf of the American public. It is managed by the National Park Service, a federal agency. As a National Park (or unit of the National Park System), it receives the highest level of conservation protection afforded by federal law in the United States.

4b) Please indicate under which level of authority the property is managed

National

Please describe

See 4a

4c) Please describe the legal status of the property. For example, is it a national, provincial or territorial park? A national or provincial historic site?

See 4a

Yellowstone National Park was long thought of solely as a large natural area-park, but it contains a variety of internationally significant cultural features, many of which enjoy formal federal designations as historic or prehistoric sites.

4d) Please provide the full name, address and phone/fax/e-mail of the agency(ies) directly responsible for the management of the property.

Contact #1

Agency Name: National Park Service
First Name: Suzanne
Last Name: Lewis
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State/Prov: Wyoming
Postal Code: 82190
Telephone: 1-307-344-2002
Fax: 1-307-344-2005
Email: yell_superintendent@nps.gov

4e) Please provide a list of key laws and regulations, which govern the protection and management of the cultural and natural resources of the property.

Hundreds of acts, public laws, and executive orders have been enacted to provide for the management of Yellowstone National Park since it was created by Act of Congress, March 1, 1872. The Sundry Civil Act of March 3, 1883, provided for leases to concessioners and for protection of the park by the U.S. Army, while the Act of May 7, 1894, provided legislative "teeth" to enforce park regulations against public hunting and to manage sport fishing. The National Park Service Organic Act, August 25, 1916, added clarification and definition to the management direction of the national parks then in existence, and elevated the protection of natural and cultural resources to an equal footing with public recreation as a goal of the parks. A series of Congressional Acts in the 1920s and 1930s brought Yellowstone National Park boundaries to their present locations. The National Historic Preservation Act of 1966 provided the procedural equipment and mandates to protect historically significant structures and other sites of human activity in the park. The National Environmental Policy Act of 1969 developed a national policy for technical and public review of planning processes in parks. The Endangered Species Act of 1973 provided for the conservation of endangered and threatened species, several of which inhabit Yellowstone National Park. The Archeological and Historical Preservation Act of 1974 and the Native American Graves Protection and Repatriation Act of 1990 both clarified and reinforced National Park Service responsibilities toward Native American cultural objects and associations.

The key legislative and policy documents are summarized in the document, "Statement for Management, Yellowstone National Park," National Park Service, Yellowstone National Park, 1991, and in the legislative history sections of the following documents.

General legislative background on wildlife management and related natural resource management is available in
<http://www.planning.nps.gov/document/yellbisonrod%2Epdf>, pp. 8-10.

An additional summary of key resource-related legislation is provided in a recent book on Yellowstone's northern range,
<http://www.nps.gov/yell/nature/northernrange/ch1.htm>.

4f) Please describe the administrative and management arrangements that are in place for the property concerned, making special mention of the institutions and organizations that have management authority over the property and the arrangements that are in place for any necessary coordination of their actions. Make special reference, if appropriate, to the role of First Nations in managing the property.

Yellowstone National Park is managed on a day-to-day basis by the park superintendent, currently with one deputy superintendent. The park's operational structure is arranged around a group of "divisions," including Administration, Business Management, Interpretation, Maintenance, Resource Management & Visitor Protection, and Yellowstone Center for Resources.

The superintendent's immediate supervisor is the regional director for the Intermountain Regional Office, Denver, Colorado. Regional directors are responsible to the Director of the National Park Service, Washington, D.C.

Though the National Park Service retains exclusive jurisdiction over management within the boundaries of the park, Yellowstone National Park management is related in a variety of ways with management of public and private lands in all directions from the park itself. Depending upon the issue or resource, this inter-related system involves these federal agencies: the National Park Service, the U.S. Forest Service, the U.S. Fish and Wildlife Service, and the Bureau of Land Management. In recent years, the National Park Service in Yellowstone National Park has inaugurated regular intergovernmental meetings and consultations with many Native American tribes with interests or traditional associations with Yellowstone National Park. A host of Native-American-related issues are involved in these meetings, including archeological resource issues, fee exemption for Native Americans wishing to use the park for traditional purposes, and bison management (this last is the special province of the Intertribal Bison Cooperative, which includes representatives from more than 50 tribes). The inter-related system of agencies and groups also involves a variety of state management agencies, including their fish and game departments, livestock departments, and state historic preservation offices of Idaho, Wyoming, and Montana, and a great variety of municipal and county governments. These many entities may become involved in coordinated management of physical facilities (such as planning for snow-plowing on roads that pass through numerous jurisdictions as they cross the greater Yellowstone ecosystem), native natural resources (such as resources including trumpeter swans, elk, and many other migratory species), and non-native natural resources (such as noxious weeds and mountain goats), and large-scale events (such as wildfires that cross jurisdictional boundaries, or earthquakes that pose safety threats in and beyond park boundaries). Yellowstone National Park maintains mutual aid agreements with neighboring communities to facilitate cooperation and coordination of emergency and law enforcement services.

For an overview of key park issues and their current status, including the interplay of various interested institutional and governmental parties, see the National Park Service's official reference book of Yellowstone resources and issues, at <http://www.nps.gov/yell/publications/pdfs/handbook/2003/issues.pdf>

For examples and specifics of the process by which park planners develop or modify management direction, see documentation on the many cases underway at the Yellowstone National Park website, at <http://www.nps.gov/yell/technical/planning/index.htm>

For a summary of ongoing archeological/Native American-related resource projects in Yellowstone, and examples of how they are addressed by management, see <http://www.nps.gov/yell/history/archeology/index.html>, and again, in the official reference book on Yellowstone resources and issues, at <http://www.nps.gov/yell/publications/pdfs/handbook/2003/cultural.pdf>

4g) Please also note whether there have been any significant changes in the ownership, legal status, contractual or traditional protective measures, or management regime for the World Heritage Site since the time of inscription.

No. Though in numerous instances administrative structures (such as National Park Service or U.S Fish and Wildlife Service bureaucratic organizations) or policy guidelines have been revised, these have not significantly altered the overall spirit or practice of management in Yellowstone National Park.

4h) Is there a management plan for the property?

YES

4h1) If YES, please summarize the plan, indicating if the plan is being implemented and since when, and the URL where the plan can be located, if available. (A copy of the plan should be submitted in December 2004. See Section 8)

The initial park management plans of interest in this context include the Yellowstone National Park "Master Plan, Yellowstone" (National Park Service, 1973, submitted with the original nomination) and "Statement for Management, Yellowstone National Park," National Park Service, Yellowstone National Park, November, 1991. Neither of these documents are available electronically, though many elements of them have been expanded upon or considered in later planning documents, as listed at the various website addresses given in 4e and 4f.

Rather than compress all of the park's diverse planning needs into a single document for management, Yellowstone National Park staff have developed an interlocking series of more specialized planning documents that focus on specific aspects of Yellowstone National Park management operations. Examples are provided below, following a summary of the Statement for Management.

The Statement for Management (November 1991) has two major segments that describe management process: 1) "Influences: Inventory and Analysis," provides legislative and administrative requirements of management, describes natural and cultural resources, describes current uses and trends, summarizes inventories of facilities and concession operations, and describes the current status of planning and zoning. 2) "Management Objectives and Major Issues" first summarizes the wide variety of natural resource objectives and issues (including wildlife, vegetation, ecosystem issues, air quality, exotic species, and fire), then discusses a variety of adjacent-lands issues, objectives of visitor use management (including major visitor areas, interpretation, backcountry use, special-needs visitors, and winter use). This is followed by a discussion of cultural resource objectives and issues (including both historic and prehistoric resource management, as well as object and document storage), and park operations and planning objectives and issues, including employee housing, infrastructure and waste management, and rehabilitation of facilities.

The Statement for Management is complemented and supported by numerous other specialized plans and reports. The Resource Management Plan (1995) provided detailed guidelines for the management of Natural and Cultural Resources in Yellowstone National Park. As an overall guide to the park's purposes and functions, the State of the Park Report (1999) provides a detailed appraisal of the state of Yellowstone National Park's natural and cultural resources, and the programs in place to care for them and make them available for public enjoyment.

Among the more tightly focused plans is the Bison Management Plan (2000), which is designed to ensure the genetic integrity of the bison herd in a wild, free-ranging condition, providing for bison to play their historic ecological role in the Yellowstone setting while reducing the risk of the transmission of a disease that some bison carry (brucellosis) to regional livestock. The Grizzly Bear Recovery Plan (1993) will achieve population recovery goals in the greater Yellowstone ecosystem in terms of numbers of females with cubs, distribution of females with young throughout the ecosystem, and human-caused mortality of grizzly bears.

As the park's developed areas have required modification or partial replacement, park staff have created a series of Development Concept Plans (DCP), which define each development's needs and planned modifications.

Like other U.S. national parks, Yellowstone National Park has been required to develop a formal business plan. The Business Plan (2003) provides the park and its constituents with a synopsis of Yellowstone's funding history, a detailed account of the state of current park operations and funding, and an outline of park priorities and funding strategies.

For National Park Service administrative policies, which apply to all units in the national park system, see the official National Park Service agency information site, www.nps.gov/refdesk. Several specific current Yellowstone National Park management plans are available for examination at <http://www.nps.gov/yell/technical/planning/index.htm>. A detailed description of the management process is provided in the Yellowstone National Park handbook of resources and issues at <http://www.nps.gov/yell/publications/pdfs/handbook/2003/index.htm>, especially pages 123-162. Bison management is outlined at <http://www.planning.nps.gov/document/yellbisonrod%2Epdf>. The Yellowstone National Park Business Plan may be viewed at <http://www.nps.gov/yell/publications/businessplan/index.htm>. See also the guidance provided by legislation and policy, as cited in 4e and 4f.

4h2) If NO, is a management plan under preparation or is preparation of such a plan foreseen for the future?

Not applicable; see above.

Financial Resources

4i) What is the annual operating budget for the property in the current fiscal year? (For sites consisting of more than one property provide the budgets of constituent parts.)

\$27, 445,700 USD

Sources of Expertise and Training in Conservation and Management Techniques

4k) Please describe any sources of specialized expertise, training, and services that come from sources off-site (e.g., training centers, museum conservation facilities).

Yellowstone National Park staff and managers have available to them a full array of professional training opportunities and facilities. These include National Park Service training centers at Harpers Ferry, West Virginia, and Grand Canyon, Arizona; a variety of law-enforcement training facilities; a wide range of academic, technical, and other professional training and conference opportunities provided to specialists in many fields; and corresponding support services in all these areas as well.

Yellowstone National Park training record-keeping is not designed to easily facilitate separation of off-site facilities, or of training provided at Yellowstone by off-site contractors. For a general idea of the scope of the training operation, however, a few general observations can be made. In fiscal year 2003, individuals on the park staff received training on 1048 occasions, involving a total of 150 different training courses, some given repeatedly. Some park staff attended more than one course. These courses included the full array of training needed for operation of a large, complex national park: representative examples include horsemanship, workzone traffic control and flagging, basic aviation, taser instruction, aerial capture, eradication, and tagging of animals, asbestos management, wastewater management, leave administration, bear safety, retirement planning, computer software program training of many kinds, conflict resolution, survival training, crime analysis, M-15 rifle instructor course, publication design, and conflict resolution.

4j) Please provide information about the number of staff working at the World Heritage Site (enter figures).

Full Time: 300 (Value must be a number)
Part Time: 450 (Value must be a number)
Seasonal: (Value must be a number)
Other: Yellowstone Association – cooperating association
Permanent: 16
Seasonal: 44
Yellowstone Park Foundation - cooperating association
Permanent: 7
Part-time: 2

Concessioners:
Yellowstone General Stores: 28 permanent, 675 seasonal (or less than full time)
Medcore (medical service): 2 permanent, 26 seasonal (or less than full time)
Yellowstone Park Service Stations: 4 permanent, 67 seasonal (or less than full time)
Xanterra (all park lodging and restaurants) 125 permanent and 2,600 seasonal (or less than full time) (Value must be a number)

Please list the job categories of these staff (e.g., Park Superintendent, Historian, Ecologist, Interpreter, General Works/Maintenance Manager) and describe the specialized skills and expertise of the World Heritage Site's staff members.

Following the format used in the NPS business plan reporting system, there are five categories of staff in five formally defined "Functional Areas and Programs." The first is Resource Protection, which involves about 127 full-time equivalent (FTE) staff involved in cultural resource management, information integration and analysis, resource protection management and administration, and natural resource management. The second is Visitor Experience and Enjoyment, which involves about 160 FTE and includes concessions, education, fee collection, interpretation, visitor center operations, visitor safety, and visitor use services. Third is Facility Operations, 123 FTE, including operations of campgrounds, buildings, grounds, janitorial services, roads, trails, transportation systems, and utilities. Fourth is Maintenance, 76 FTE, which includes maintenance of buildings, trails, roads, fleet, and utilities. Fifth is Management and Administration, 108 FTE, which includes communications, external affairs, financial management, general administration, general management, parkwide safety, partnerships, and planning.

Divided among this administrative structure are the staff of the park's more traditionally defined "divisions:" Administration, Business Management, Interpretation, Maintenance, Resource Management & Visitor Protection, and Yellowstone Center for Resources. Each division has a chief and deputy chief. The division chiefs constitute the "management team" that meets regularly with the superintendent and deputy superintendent to guide the day-to-day management process.

Visitation

41) Are there any visitor statistics for the site?

YES

411) If YES, please provide the annual visitation for the most recent year it is available, indicating what year that is, a brief summary of the methodology for counting visitors, and briefly describe the trends in visitation. (In describing these trends, please use the year of inscription as a baseline.)

Visitation for 2003 was 3,019,376.

Visitation is compiled by park staff at entrance stations and calculated based on a certain number of persons per vehicle. Surveys conducted at entrance stations have allowed the creation of formulas for calculating average persons-per-vehicle rates, which vary from entrance to entrance and season to season, ranging from a low of 2.2 to a high of 3.07.

Visitation in 1979 was 1,892,908, which represented a fifteen-year low. Typically in the late 1960s and through the 1970s, visitation was between 2,000,000 and 2,200,000. This gradually increased through the 1980s, reaching 2,644,442 in 1989. It continued to increase through the 1990s, reaching 3,000,000 for the first time in 1992 and averaging more than 3,000,000 for the rest of the decade.

Visitor statistics have been maintained since the 1870s, though the first decade's records are regarded as the least precise. For a summary of visitation statistics and trends, see <http://www.nps.gov/yell/sotp/six/intro6.pdf>. For detailed statistics, see <http://www.nps.gov/yell/stats/index.htm>

4m) Please briefly describe the visitor facilities at the property.

The National Park Service operates 5 primary Visitor Education Centers, each with facilities for sales of books and related educational materials. These are supplemented by four information stations, and, during winter, four warming huts/winter contact stations. The park contains eight major lodging facilities with 2,238 guest rooms. The park contains 28 food and beverage operations, 21 gift shops, 11 grocery stores, 3 medical clinics, 7 vehicle service stations, a marina, livery operations at several locations, 4 public showers and laundries, and other specialized services. Total of paved and unpaved road mileage is 466 miles. There are 15 miles of front-country boardwalks, mostly in geothermal areas. There are 1,000 miles of backcountry trails connected by 96 trailheads, and 13 self-guiding interpretive frontcountry trails. There are 7 NPS campgrounds with 454 sites, 5 concessioner-operated campgrounds with 1,747 sites, and smaller employee camping areas. There are 52 picnic areas.

Yellowstone National Park visitor facilities are described in detail on the Yellowstone National Park/National Park Service website:

<http://www.nps.gov/yell/pphtml/facilities.html> and

<http://www.nps.gov/yell/pphtml/camping.html>

4n) Is there tourism/visitor management plan for the property?

NO

4n1) If YES, please briefly summarize the plan, and provide a URL where the plan can be located.

The answer to 4n is both yes and no. There is no plan specifically focusing on tourism/visitor management. But tourism and visitor management are dealt with as integral parts of many other plans, including the Business Plan, Strategic Plan, 1991 Statement for Management, and Long-Range Interpretive Plan. Yellowstone's visitors have been surveyed regarding their primary interests, which include seeing Old Faithful, viewing wildlife, visiting the Grand Canyon of the Yellowstone, hiking, and enjoying winter activities. Visitor Management accommodates and enhances these activities in several ways. Business Management develops and administers 194 concessions authorizations to provide many facility services (see 4m) as well as other specialized opportunities, such as backcountry outfitting and a variety of frontcountry guide services. Educational programs abound, and include 8 different programs ranging from extended-stay "Expedition Yellowstone" experiences to "Windows Into Wonderland," an electronic field-trip experience enjoyed through the internet. A massive interpretive effort includes 500 existing and planned outdoor exhibits, 41,000 feet of existing and planned indoor exhibits, 100 publications, audiovisual systems in 7 campground amphitheatres and all visitor centers, and a large library of images, video, and other technical support. Interpretive activities include nightly slide presentations in most campgrounds and a varying array of nature and history walks, roving interpreters, wildlife-induced traffic jam contacts, and junior ranger programs. The five primary visitor centers in the park host more than two million visits annually, or about 70 percent of the total of park visitors. Visitor Use Services provides assistance to visitors preparing for backcountry trips.

Visitor safety services are extensive. In 2002, emergency medical services included 275 ambulance transports, 66 search-and-rescue operations, 450 fire alarms and 10 fires, and many more law enforcement incidents. Because the park has exclusive federal jurisdiction, the National Park Service has sole authority for all law enforcement, including many aspects of visitor experience, including fishing, boating, hiking, and so on, as well as monitoring the condition of natural resources enjoyed as part of these activities. Wildland fire management is likewise an integral part of visitor management.

More information is incorporated into website information cited in 4f and 4h. See also the Yellowstone National Park business plan, at <http://www.nps.gov/yell/publications/businessplan/index.htm> and the strategic plan at <http://www.nps.gov/yell/publications/strategicplan.pdf>. The Long-Range Interpretive Plan is available at <http://www.nps.gov/yell/publications/pdfs/lripweb.pdg>.

Scientific Studies

4o) Please list key scientific studies and research programs that have been conducted concerning the site. (Please use the year of inscription as a baseline.)

Yellowstone National Park has been a focus of scientific research in many disciplines since its establishment in 1872. Research efforts, which have resulted in many thousands of publications, defy brief summary, but some comments about modern research effort and emphasis might be helpful. Typically, more than 250 research permits are active in the park annually, involving several times that many actual field workers. These research projects include geological and geothermal processes, large-scale wildland ecology, predator-prey systems, fire ecology, aquatic ecology, environmental and ecological history, archeology, sociology, and other disciplines. Yellowstone National Park is one of the most studied such sites in the world.

An initiative that suggests the breadth of this research concentration is the biennial scientific conference series. Beginning in 1991, Yellowstone National Park has sponsored and hosted a series of seven scientific conferences on the greater Yellowstone ecosystem. These conferences have involved many co-sponsors, including regional universities, other federal and state agencies, and many professional scientific societies. Co-sponsorship has varied depending upon the emphasis of the conference. The series has so far produced five published proceedings volumes and one book (totalling more than 1,400 pages of scientific papers), with two more proceedings in press. Topics have included fire, vegetation, predators, humans in the ecosystem, exotics, Yellowstone Lake, and Yellowstone/East African parallels. The conferences have been well attended and have routinely attracted some of the world's leading figures in parks and conservation to present keynote speeches, including Michael Soule, founder of the discipline of conservation biology, and Richard Leakey, noted Kenyan paleoanthropologist and conservationist. With a very strong interdisciplinary emphasis, the conferences have showcased many of the current research projects underway in Yellowstone National Park. For more information on these conferences, as well as on the proceedings published by them, see <http://www.nps.gov/yell/technical/conference.htm>

Another very fruitful initiative has grown out of the wolf recovery effort underway in Yellowstone National Park. Preparations for wolf recovery required the completion of numerous studies, conducted by a consortium of researchers from the university community and management agencies, and relating to the ecological, historical, and economic issues relating to wolf recovery. This work has resulted in numerous scientific publications, including four volumes (more than 1,200 pages) of peer-reviewed research findings presented to Congress as part of the pre-translocation phase of recovery. Since wolves were placed in the park, numerous researchers have launched studies relating to wolf effects, not only on prey, but also on ecosystem processes.

For details on all currently and recently authorized permitted research projects, see <http://www.nps.gov/yell/publications/pdfs/investigatorsindex.htm>

For information on the process by which research permit applications are reviewed, see <http://www.nps.gov/yell/technical/researchpermits/index.htm>

For information on Yellowstone National Park's spatial analysis capabilities and services, see <http://www.nps.gov/yell/technical/gis/index.html>

Last, for a database of about 10,000 scientific publications relating to Yellowstone National Park, see <http://www.wsulibs.wsu.edu/yellowstone/>

4o1) Please describe how the results of these studies and research programs have been used in managing the World Heritage Site.

Mission-oriented research has been a primary characteristic of management decisions in Yellowstone National Park since the 1960s, and, in some cases, was key in earlier management. The intensity and volume of research has increased many-fold since the 1960s, as has the relationship between scientific research findings and management direction.

As mentioned above, research preparatory to wolf recovery established much baseline information on prey populations, livestock conflict potential, and possible competition or overlap between wolves and other native predators. Thirty years of grizzly bear-related research by the Interagency Grizzly Bear Study Team, a multi-agency project, provides essential baselines and updates for management use in complying with endangered species requirements in managing this complicated and elusive predator. Numerous studies of historical architecture, road construction, and other related infrastructure topics enables park planners better to monitor and anticipate management needs of the park's many facilities. A fisheries research and monitoring effort dating continually back to 1948, and intermittently almost to the establishment of the park, enables managers to track long-term changes in the character of many of the park's hundreds of distinct aquatic resources.

For numerous practical examples of how research and resource management relate in Yellowstone National Park, see especially the annual reports of the Yellowstone Center for Resources at:

<http://www.nps.gov/yell/publications/pdfs/ycrar98.pdf>,

<http://www.nps.gov/yell/publications/pdfs/ycrar99.pdf>,

<http://www.nps.gov/yell/publications/pdfs/ycrar00.pdf>,

<http://www.nps.gov/yell/publications/pdfs/ycrar01.pdf>, and

<http://www.nps.gov/yell/publications/pdfs/ycrar02.pdf>. For an in-depth scholarly analysis of the history of science and resource management in Yellowstone National Park, see historian James Pritchard's detailed study, *Preserving Yellowstone's Natural Conditions*, at <http://www.nps.gov/yell/nature/pritchard/index.htm>

4o2) What role, if any, has the property's designation as a World Heritage Site played in the design of these scientific studies and research programs? For example, has there been a specific effort in these programs to focus on the recognized World Heritage values of the property?

World Heritage site designation has not been a significant factor in these programs.

Education, Information and Awareness Building

4p) Is there a plaque at the property indicating that it is a designated World Heritage Site?

YES

4q) *Is the World Heritage Convention logo used on all of the publications for the property?*

NO

4r) *Are there educational programs concerning the property's World Heritage values aimed at schools?*

YES

4r1) *If YES, please briefly describe these programs.*

The World Heritage logo has been used intermittently on park publications. The World Heritage status of Yellowstone National Park is not routinely emphasized in interpretive programs, in part because the values of the National Park Service so often overlap with those of the World Heritage program. This is to say that the values are being taught, but are not routinely ascribed solely or specifically to the World Heritage program specifically. However, many park interpreters do make mention of the designation in their programs.

A brief summary of the scope of the education and interpretation programs in Yellowstone National park is offered in 4n1. Programs emphasize all major aspects of the parks accepted natural criteria for site selection, and also provide heavy coverage of a variety of cultural issues. The heart of the interpretive program, as far as the park's direct contact with park interpreters, is of two parts: (1) the more than two million visits made annually to the park's visitor centers, as mentioned above, and (2) the busy schedule of interpretive programs offered not only at campground amphitheatres nightly, but at many other locations, where visitors are invited to participate in talks, walks, and other interpretive efforts (such as roving interpretation in the geyser basins).

For full details on interpretive planning, direction, and program content, see <http://www.nps.gov/yell/publications/pdfs/lripweb.pdf>. National Park Service education programs in Yellowstone, which reach many hundreds of school-age children with in-depth activities in the park, do routinely refer to the World Heritage Site designation. Plans to further emphasize the designation, including on park educational website presentations, are underway.

The National Park Service educational programs are extensively complemented by the programs of the Yellowstone Association, the non-profit cooperating association that has worked with the National Park Service since 1933 and now provides a grand array of services and opportunities to visitors. See also 4t.

4s) *Are there special events and exhibitions concerning the property's World Heritage values?*

NO

4s1) *If YES, please briefly describe them.*

Not applicable

4t) *Please briefly describe the facilities, visitor center, site museum, trails, guides and information material that are available to visitors to the World Heritage Site.*

This question has also been addressed in 4n1 and 4r1.

An indication of the educational reach of the park's website is the extent to which it has been referenced throughout this report. Yellowstone National Park's website features a large variety of educational material, formal management plans and related documents, scientific reports, books, and many other informational resources of interest to the public. The Yellowstone website is the most visited in the U.S. national park system, and, on this website, the Old Faithful webcam is the most popular page, recording 49,800,000 page loads in 2003.

An additional element of the interpretive program involves a very aggressive publications program. Yellowstone National Park interpretive and resource-management staff work closely with the Yellowstone Association, a non-profit cooperating association, to develop and distribute (or sell, depending upon the publication) dozens of brochures, booklets, books, and other informational forms to visitors. Among these are a park newspaper--seasonally revised--given to all visitors upon entering the park.

At the next level of informational depth, park staff produce a quarterly magazine, *Yellowstone Science*, written almost entirely by researchers from many universities and institutions, explaining or "translating" their highly technical research findings for a larger audience. *Yellowstone Science*, partly funded by public donation and partly by the Yellowstone Association, is distributed to more than a 2,600 people, including all permitted researchers, park staff, general readers, university departments, organizations, congressional staffs, and other outlets, primarily in the greater Yellowstone region but internationally as well. Most issues, besides containing two or more articles, contain a lengthy interview with a researcher of note, several shorter resource- and research-related news items, and occasional book reviews. Recent issues have been devoted to timely single topics, such as the National Academy of Sciences review of ungulate research in the park and the centennial of the Roosevelt Arch at the North Entrance of Yellowstone National Park.

An especially important element of interpretation is educating ourselves. Besides widely distributing *Yellowstone Science* to park staff, we produce a less formal quarterly resource newsletter, *The Buffalo Chip*, which contains shorter and more short-turnaround notes and reports on many topics, ranging from changes in geothermal features to the latest archeological dig.

In 2004, the National Park Service will complete construction and installation of the Yellowstone Heritage and Research Center, a professional facility to house library, archives, and museum collections, as well as the work space for cultural resource staff. This state-of-the-art facility will be an important supporting resource in many educational and scientific programs.

Another important aspect of museum services in Yellowstone National Park is the park's involvement with the Yellowstone Area Museum Partnership, a consortium of more than a dozen regional museums of greatly varying scope and theme that works together on a variety of preservation and interpretation missions.

The Yellowstone Association is a membership organization, among its many other functions. As of 2004, 13,690 members received the association's highly informative newsletter devoted to natural and cultural resource topics, research, and educational opportunities. The association also offers a wide variety of field courses, tours, and other activities--many for college credit--through the Yellowstone Association Institute. About 3,000 people attend one or more of the 400 such courses offered annually.

The Yellowstone Park Foundation, a partner organization specializing in fund-raising for many Yellowstone projects, has supported numerous educational programs, including the construction of a new Old Faithful Visitor Education Center

A fourth partner organization is the Yellowstone National Art Trust, recently launched to promote Yellowstone-related art and art education.

See <http://www.nps.gov/yell/publications/pdfs/Iripweb.pdf> for overall interpretive plan and facility concepts. For planning for the new Heritage and Research Center, see

<http://www.nps.gov/yell/technical/planning/scoping/heritage.htm>. For the Yellowstone Association and Yellowstone Institute, visit www.yellowstoneassociation.org; for the Yellowstone National Art Trust, visit www.ynat.org.

For specific information on facilities, see 4m, above.

For publications made available to park visitors, see <http://www.nps.gov/cgi-bin/intercept?http://www.yellowstoneassociation.org/store>

For activities made available to visitors, see <http://www.nps.gov/yell/pphtml/activities.html>

For visit planning, see <http://www.nps.gov/yell/planvisit/index.htm>

For on-line touring, see <http://www.nps.gov/yell/tours/index.htm>

4u) What role, if any, has the property's designation as a World Heritage Site played with respect to the education, information and awareness building activities described above? For example, has the World Heritage designation been used as a marketing, promotional, or educational tool?

The uses of World Heritage designation, as an educational tool, are addressed above, section 4r. Park concessioners occasionally make some use of the designation. Overall, Yellowstone National Park's global prominence is the primary reason for international awareness. World Heritage Site designation is a minor factor.

II.5 Factors Affecting the Property (See Section 5 of the current Nomination Form)

5) Please briefly identify factors affecting the property under the following headings: Development Pressures, Environmental Pressures, Natural Disasters and Preparedness, Visitor and Tourism Pressures, Number of Inhabitants Within Property and Buffer Zone and Other - major factors likely to affect the World Heritage values of the property. First discuss those that were identified in the original nomination, in the same order in which they were presented there, then those that have been discussed in reports to the World Heritage Committee since inscription, and then other identified factors.

This section should provide information on all the factors which are likely to affect a property. It should also relate those threats to measures taken to deal with them, whether by application of the protection described in Section 4e or otherwise.

Not all of the factors suggested in this section are appropriate for all properties. The list provided is indicative and is intended to assist the State Party in identifying the factors that are relevant to each specific property.

(In describing these trends, please use the year of inscription as a baseline.)

For EACH Factor, please specify the following:

key actions taken to address factor

any plans that have been prepared to deal with factor in the future

whether the impacts of factor appears to be increasing or decreasing, and the timeframe for which the comparison is being made.

Development Pressures

5a) Provide information about Development Pressures on the following: demolitions or rebuilding; the adaptation of existing buildings for new uses which would harm their authenticity or integrity; habitat modification or destruction following encroaching agriculture, forestry or grazing, or through poorly managed tourism or other uses; inappropriate or unsustainable natural resource exploitation; damage caused by mining; and the introduction of invasive nonnative species likely to disrupt natural ecological processes, creating new centers of population on or near properties so as to harm them or their settings.

The human "footprint" on the landscape in Yellowstone National Park has declined significantly over the course of the past eighty years, though there are still great differences of opinion over the extent to which the park should appropriately be developed. Only one major new hotel, the Old Faithful Snow Lodge, has been constructed in the park in almost ninety years, and this new structure was placed on the site of an earlier facility. On the other hand, many smaller developments that existed before 1920 are now reduced or gone. Road mileage, both public and administrative, has declined significantly since the 1920s as well.

Demolitions and rebuilding: The most significant current remodeling project in Yellowstone National Park is the restoration and stabilization of the historic Old Faithful Inn, constructed in 1904. This does not threaten the integrity of the historic structure, and will enhance its values as a cultural site.

Adaptation of existing buildings: No such adaptations are underway, with the possible exception of a smaller general store in the Upper Geyser Basin, which may be completely redesigned and relocated elsewhere in the Upper Geyser Basin as an arts center. Most adaptations of older structures already occurred, the most notable example being the historic Fort Yellowstone complex, originally built by the U.S. Army between 1891 and 1915. Since the National Park Service assumed management of the park, these buildings have undergone many appropriate adaptations to serve administrative, housing, and other functions.

Habitat modification or destruction following encroaching agriculture, forestry or grazing, or through poorly managed tourism or other uses: The only noteworthy example of this may be the case of the Boundary Line Area north and West of the town of Gardiner, Montana, along the park's north boundary. This 12,108-acre (4,899 hectare) area was added to Yellowstone National Park in 1932 following more than three decades of overgrazing and other agricultural modification while in private hands. Efforts at vegetation restoration have so far been unsuccessful; because of its unusual land-use history, the area remains a controversial element in ongoing dialogues about the effects of ungulate grazing and browsing on vegetation in northern Yellowstone.

Inappropriate or unsustainable natural resource exploitation: In this context we assume this refers to extractive exploitation. Yellowstone National Park resources are not available for commercial extraction of this sort. Natural resources are, in some cases, being affected by other factors, as described below.

damage caused by mining: Mining, except for very local coal mining in the park's earliest years for employee use, has not been permitted in Yellowstone National Park since its creation. A small historic coal mine near park headquarters, Mammoth Hot Springs, has been reclaimed since designation of the park as a World Heritage Site. However, Soda Butte Creek, a tributary of the Lamar River in northeastern Yellowstone National Park, has suffered at times from pollution due to mining activities outside the park. More recently, research has indicated that in about 1950, a flash flood northeast of the park caused the failure of a tailings impoundment, and allowed the distributing of heavily polluted sediments in the creek, including at least 11 stream miles (18 km) in Yellowstone National Park. These sediments, with concentrations of copper, lead, and iron, remain embedded in the stream channel, causing adverse effects on local vegetation and posing future risks.

Invasive nonnative species likely to disrupt natural ecological processes, creating new centers of population on or near properties so as to harm them or their settings: Non-native species invasions are seen by some as the most serious threat to the ecological integrity of Yellowstone National Park. Diseases may be the most pressing issue, and certainly have the greatest impact on resource-management budgeting. Brucellosis, caused by the bacterium *Brucella abortus*, was first identified in Yellowstone National Park in 1917. It can cause domestic cattle to abort their calves, and has been the target of a decades-long federal eradication. Some Yellowstone bison and greater Yellowstone elk test positive for exposure to the disease, and a smaller number actually carry the disease. Because of risks to commercial stockmen in surrounding communities, bison management has for years been focused on either keeping bison in the park or preventing them from having any contact with livestock if they leave the park. No brucellosis management is conducted with the far more numerous and widespread elk. Bison management, driven primarily by the brucellosis issue, has been one of Yellowstone's most visible and management-intensive issues since the 1980s. White pine blister rust, caused by the fungus *Cronartium ribicola*, was accidentally introduced to the U.S. from Europe about a century ago. In the 1940s, concern over its discovery in Yellowstone National Park led to a three-decade-long control effort involving both the mechanical removal of infected plants and the spraying of herbicides. This effort was unsuccessful. Blister rust seems to thrive and spread in Yellowstone depending upon climatic conditions, and has shown signs of flourishing in recent years. The causative agent of salmonid whirling disease, *Myxobolus cerebralis*, a European organism, was identified in Yellowstone Lake in 1998. Though it is too early to determine what effects this invasion will have on park fisheries, the discovery has generated alarm because whirling disease has decimated wild trout populations in many other regions. Considering the problems already facing the trout of Yellowstone Lake (see below), an additional stress on these fishes cannot be taken lightly. Numerous other non-native diseases have also affected various species of plants and animals in Yellowstone, either permanently or episodically.

Yellowstone National Park currently hosts more than 200 nonnative plant species. Intermittent but intensive efforts have been made to control some of the few that are of greatest concern. These few, which include Dalmatian toadflax, spotted knapweed, Canada thistle, ox-eye daisy, houndstongue, and leafy spurge, are generally known to displace native plants, including those species that are important wildlife foods. Some progress has been made in monitoring, mapping, and controlling some species. Using integrated pest management (a combination of chemical, biological, sociological, and mechanical means), and cooperating with adjacent state and county weed control boards, invasions may be slowed (in the case of spotted knapweed), contained (ox-eye daisy), or even eradicated (leafy spurge). But some of the most important (i.e. threatening) species are already too well-established and widespread for expectations of success in controlling them, much less eliminating them; they continue to spread. Managers continue efforts to target controllable species (e.g. spotted knapweed), communicate with other land managers about possible new approaches, and educate both staff and park visitors about the importance of preventing further introductions. The most pressing nonnative animal issue in Yellowstone National Park was mentioned in 3b1: the clandestine establishment of nonnative lake trout in Yellowstone Lake, where they pose a catastrophic threat to native cutthroat trout. Adult lake trout may consume 50 to 60 cutthroat trout per year; a special panel of lake trout biologists and managers convened to study this issue has predicted dramatic decline and eventual collapse of the cutthroat trout population if the lake trout are not controlled. Loss of this robust cutthroat trout population would "ripple" through the lake ecosystem with

significant effects on dozens of other species of animals. Control measures have been aggressive, focused on locating seasonal concentrations of lake trout and removing many thousands of them by industrial-scale gillnetting. Park fishing regulations have been adjusted to encourage the sport harvest of lake trout and eliminate the sport harvest of cutthroat trout. It has been decisively demonstrated that this combined approach can greatly reduce lake trout numbers; the program must continue for several more years, with ongoing refinement, before its effectiveness can be fully measured and until the extent to which lake trout will effect the long-term prospects of the cutthroat trout can be determined.

A general overview of all the key management issues related to development pressures can be found in

<http://www.nps.gov/yell/publications/pdfs/handbook/2003/index.htm>. Further detail, as well as status of amelioration plans and needs, is available in

<http://www.nps.gov/yell/stateofthepark.htm>. Additional procedural and policy information on these issues is available in

<http://www.nps.gov/yell/publications/pdfs/strategicplan.pdf>. See also the Yellowstone National Park business plan, at

<http://www.nps.gov/yell/publications/businessplan/index.htm>.

Environmental Pressures

5b) Environmental pressures can affect all types of property. Air pollution can have a serious effect on stone buildings and monuments as well as on fauna and flora. Desertification can lead to erosion by sand and wind. What is needed in this section is an indication of those pressures which are presenting a current threat to the property, or may do so in the future, rather than a historical account of such pressures in the past.

Yellowstone National Park's ecological health is dependent upon many factors originating beyond park boundaries. Occasional episodes of acid rain are indicative of changing air quality in western North America. Historic patterns of lead pollution in Yellowstone, which originated from leaded gasoline and from smelting operations elsewhere in the West, resulted in lead concentrations in a park lake that were 7 times natural levels by 1930. After smelting ceased and leaded gasoline use declined, a slow reversal of this pollution level was measured in the late 1980s.

Global climate change is perhaps the broadest type of environmental pressure that may affect Yellowstone National Park in the future. While numerous possible alternative scenarios have been envisioned for what effects global warming may have on the environment of Yellowstone National Park, only continued monitoring and research will indicate actual effects. Some early signs are revealing, however. Since its introduction into the western United States in 1910, white pine blister rust has had enormous effects on many North American forests. Until recently, it was believed that blister rust, though it thrived elsewhere in the Northern Rockies, blister rust seemed to find the climate of Yellowstone National Park inhospitable enough that its distribution and impact on local trees was relatively limited. Between about 1970 and 1996, however, blister rust's infection rate in white pine in the park has increased significantly, consistent with warmer, drier climatic conditions. White pine provide an important food source for grizzly bears. Whether white pine numbers in Yellowstone National Park decline through blister rust infection, or because global climate changes the park environment, the change constitutes a threat. No management action or plan is in place to deal with the increase in blister rust in Yellowstone National Park.

For an overview of key management issues relating to this question, see <http://www.nps.gov/yell/stateofthepark.htm>. For concerns relating to cultural issues, see <http://www.nps.gov/yell/stateofthepark.htm> and <http://www.nps.gov/yell/sotp/four/histstructures.pdf>. For air-pollution concerns relating to winter use, see http://www2.nature.nps.gov/ard/pubs/snowmobile_report.htm. For topics relating to global climate change see the heading "climate" in <http://www.nps.gov/yell/publications/yellsciweb/subject.html>.

Natural Disasters and Preparedness

5c) This section should indicate those disasters which present a foreseeable threat to the property and what steps have been taken to draw up contingency plans for dealing with them, whether by physical protection measures or staff training. (In considering physical measures for the protection of monuments and buildings it is important to respect the integrity of the construction.)

Wildland fire is not seen as a threat to the natural resources of Yellowstone National Park; fire is--and for millennia has been--an important functional component of major vegetation community processes. Both natural and human-caused fires are, however, a threat to human life and property in and around the park. Yellowstone National Park's current fire management plan was completed in 1992, and is supplemented by the National Fire Plan of 2000. Both documents emphasize the need for such safety practices as hazard fuel reduction near developed areas, safety of fire fighters and the public, and community assistance programs.

Yellowstone National Park is in one of the most seismically active regions of the Earth, and experiences thousands of earthquakes annually. Geothermal activity is typically the "surficial evidence" that remains during quiet periods in areas where volcanic activity can be expected at some time in the future. Volcanic activity and earthquakes are all part of the same suite of geological processes. The U.S. Geological Service maintains a monitoring system in Yellowstone National Park, advising management. Planning is underway for the development of volcano and earthquake hazard plans.

For information on fire safety and property protection issues relating to wildland fire, see <http://www.nps.gov/yell/technical/fire/FirePlan/fireplan.htm>. For information on the Yellowstone Volcano Observatory monitoring system, an advanced scientific system for monitoring and studying both volcanic process and hazard, see the U.S. Geological Service site at <http://volcanoes.usgs.gov/yvo/>.

Visitor and Tourism Pressures

5d) In completing this section what is required is an indication of whether the property can absorb the current or likely number of visitors without adverse effects (i.e., its carrying capacity). An indication should also be given of the steps taken to manage visitors and tourists. Possible impacts from visitation that could be considered include the following:

- i. damage by wear on stone, timber, grass or other ground surfaces ;*
- ii. damage by increases in heat or humidity levels;*
- iii. damage by disturbance to the habitat of living or growing things; and*
- iv. damage by the disruption of traditional cultures or ways of life.*

Management of Yellowstone National Park's natural and cultural features, and of the facilities that provide the public with opportunities to enjoy those features, are monitored in many ways to contain or reduce such damages as described above. According to the 1991 Statement for Management, Yellowstone National Park's internal management zoning recognizes the existence of a large "natural zone" that includes all lands that were recommended for wilderness classification in 1972, roughly 90% of the park. The park "development zone" includes both park developed areas (such as the small villages at Old Faithful, Mammoth Hot Springs, Lake/Fishing Bridge, and the Grand Canyon of the Yellowstone) and transportation corridors. Approximately 1% of the park is actually developed to the extent of being covered by roads or human structures, parking areas, and related infrastructure. Virtually all of the "damages" outlined above (items i-iv) occur in this 1%.

- i. Damage by wear on stone, timber, grass, or other ground surfaces.*

Natural areas of heaviest foot traffic in Yellowstone National Park are in the park's several major hydrothermal areas, especially the geyser basins along the Firehole River, the Norris Geyser Basin, and Mammoth Hot Springs. The fragile mineral depositions that cover much of these areas are always at risk from trampling and simple overuse. This threat has been real and substantial for a century, though increasing numbers of visitors over time likewise increase the threat. The current system of controlling foot traffic, by routing it on paved pathways or raised boardwalks is largely very successful, but requires constant vigilance. Because the geysers, springs, and other features are often ephemeral or shifting, boardwalks and trails are frequently rebuilt or rerouted. The passive guidance provided by a boardwalk enforces (in most visitors) a respectful distance from the feature to be enjoyed. Law enforcement and interpretive staff presence, interpretive and safety signing, and other educational efforts complement this effort.

- iii. Damage by disturbance to the habitat of living or growing things.*

The success of grizzly bear and wolf recovery had effects that apply to this set of issues. As bears and wolves became more visible in the 1980s, and especially after wolves arrived in 1995, a new visitor activity emerged: visitors began to gather at key lookouts, especially in northern Yellowstone National Park, from which they could use powerful optics to view and photograph the park's famous predators. Social parking lots and trails soon appeared, as small parking lots were informally enlarged and growing numbers of visitors sought to enjoy this new activity. Trampling of roadside vegetation, even its complete destruction, resulted in these areas. In one case, wolf watchers seeking a better vantage on a distant wolf den were thought to have contributed to the failure of a trumpeter swan nest on a traditionally isolated pond that was now along a new social trail. Commercial ecotourism groups flourished, bringing larger vehicles and concentrations of clients to limited parking sites. Management response has included the enlargement of certain key parking areas

whose size was then controlled (and further growth eliminated) by railings; intensive NPS staff presence in well-known bear- and wolf-viewing areas, including dedicated staff positions (i.e., "bear rangers") to educate visitors of the rights and wrongs of this new kind of wildlife watching; and communication with educational and ecotourism groups has fostered a higher awareness of the delicacy of the situation, in which growing use puts the very resource--so in demand--at risk.

iv. Damage by the disruption of traditional cultures or ways of life. While no increase in this damage has been reported since the designation of the site, significant progress has been made in re-establishing communication and ties between many regional Native American tribes and their historic access to the park.

In general, park management plans and National Park Service policies contain specific guidelines in many categories to address these concerns. For numerous examples of how such concerns are incorporated into the planning process, see <http://www.nps.gov/yell/technical/planning/index.htm>. For an overview of these issues, and of management's current judgment on the various resources at risk, see especially <http://www.nps.gov/yell/stateofthepark.htm>.

Number of Inhabitants Within Property and Buffer Zone

5e) Include the best available statistics or estimate of the number of inhabitants, if any, within the property and any buffer zone and describe any activities they undertake which affect the property.

Yellowstone National Park's human population is described under 4j. Because a varying number of park staff live in communities directly adjacent to Yellowstone National Park (the towns of Gardiner, West Yellowstone, Silver Gate, and Cooke City, Montana), the degree of precision offered in 4j will have to serve as a general estimation of the park's population. It might be suggested that the number of permanent staff actually living in residences in the park is lower than the total number of permanent staff, but on the other hand those staff usually share their residences with their families. Calculating the number of staff and family members living in the park would have to be done on a weekly basis because of personnel changes.

There is no formal or even informally identified buffer zone around the park. The national forests that border on various parts of the park are seen by some observers and advocates as buffers, but there is no legislative or policy recognition of this classification. For purposes of certain kinds of management, however, key ecological boundaries or zones are recognized. Grizzly bear management has required the designation of a system of management zones in and around Yellowstone National Park that is a useful example of such zoning. See <http://www.nps.gov/yell/publications/pdfs/handbook/2003/issues.pdf>, pages 145-149, for a summary of grizzly bear management zones in the greater Yellowstone ecosystem. See, for another example, <http://www.planning.nps.gov/document/yellbisonrod%2Epdf>, which delineates bison management zones in and near Yellowstone National Park.

In seeking to describe a reasonable "zone" of any kind around Yellowstone National Park, where no buffer zone is designated, the next logical set of boundaries beyond the park may be the edges of the greater Yellowstone ecosystem, a vaguely defined entity that occupies roughly 20 counties in the states of Wyoming, Montana, and Idaho (about 18 to 20 million acres / 7 to 8 million hectares). The human population of this area, which contains several dozen small and medium-size communities, is about 200,000. A minimum of 11 million acres in this region is considered roadless. For the purposes of their potential effect on Yellowstone National Park, there is not always a meaningful distinction between those towns that are directly on the park's boundary (i.e, the gateway communities) and those that are an hour or more away. The communities of the greater Yellowstone ecosystem are diverse; some are primarily supported by traditional extractive or agricultural industries, some are to a surprisingly large extent economically independent of the region's natural resources, and yet others depend almost entirely upon tourism. It is generally agreed that this array of community personalities and types exercise a disproportionate influence on the management direction of the public lands in the greater Yellowstone ecosystem, compared to more distant communities. It is also agreed that they are for the most part excellent neighbors, supporting the park and providing many services and recreational opportunities to tourists that the park could not. The communities maintain a large and successful system of local, regional, and even international airports, hundreds of independent accommodations, stores, restaurants, and other services required by the millions of tourists who pass through greater Yellowstone annually. The residents of these communities are also themselves significant users of the recreational opportunities of Yellowstone National Park.

An alternative approach to describing a buffer zone around Yellowstone National Park employs the boundaries of the several national forests and other federal lands, including Bureau of Land Management (BLM) units and U.S. Fish and Wildlife Service (USFWS) refuges that either border the park or occupy other areas of the greater Yellowstone ecosystem. These lands, especially the national forests, administered for differing but sometimes parallel purposes, are often the area where disputes over conservation are played out. Because, as mentioned above, large portions of these public lands are roadless (including more than 4 million acres of national forest lands that are designated wilderness or special management areas), they are widely perceived to have a de facto "buffer" function. But current management policies do not formally designate them as such, in NPS, USFS, BLM, or USFWS views.

For more on the greater Yellowstone ecosystem, see <http://www.nps.gov/yell/publications/pdfs/handbook/2003/geology.pdf>, pages 31-52.

5f) List Other Factors

II.6 Monitoring **(See Section 6 of the current Nomination Form)**

Administrative Arrangements for Monitoring Property

6a) Is there a formal monitoring program established for the site? In this case, "monitoring" means the repeated and systematic observation and collection of data on one or more defined factors or variables over a period of time.

YES

6a1) If YES, please describe the monitoring program, indicating what factors or variables are being monitored and which partners, if any, are or will be involved in the program.

Yellowstone National Park enjoys many overlapping monitoring efforts, conducted by a variety of resource management staff, interagency groups, and others. These include, for examples: 1) a grizzly bear population monitoring effort which has been underway for thirty years, conducted by the Interagency Grizzly Bear Study Team, representing the three surrounding states, the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the National Park Service (similar monitoring is conducted for wolves and mountain lions, each with its own set of participants; 2) annual monitoring by a variety of informal interagency working groups of the nesting success and other activities of several bird species of special interest, including trumpeter swans, bald eagles, osprey, and peregrine falcons; 3) monitoring spawning populations of cutthroat trout in key Yellowstone National Park spawning waters by the National Park Service; 4) annual population census, by cooperative federal/state teams, of key ungulate species in greater Yellowstone, including elk, bison, and mountain goats; 5) ongoing accumulation of a variety of climate and fire-history data. Most of these and other monitoring efforts are enhanced by application of GIS mapping and interpretation, much of it conducted by the Yellowstone Center for Resources Spatial Analysis Center.

Yellowstone National Park managers continue to refine and improve monitoring, which has in some instances gone on for several decades. It is recognized that there are significant gaps in current monitoring of some key ecological elements; see for example the National Academy of Science's recommendations on research and monitoring needs for Yellowstone's northern ungulate winter range at http://www.nap.edu/catalog/10328.html?se_side.

In 2001, an ambitious comprehensive monitoring system, the Greater Yellowstone Inventory and Monitoring Network (GRYN), was approved by charter, under the direction of the National Parks Omnibus Management Act of 1998. This network focuses its efforts in three primary areas: data management, inventories, and long-term monitoring. To obtain detailed information on this network, as well as access to the data, see <http://www1.nature.nps.gov/im/units/gryn/index.shtml>.

However, ongoing monitoring of many key elements of the Yellowstone landscape are underway. For more information on grizzly bear population status and trend (see <http://www.nps.gov/yell/nature/animals/bear/index.htm>), wolf population status and trend (see <http://www.nps.gov/yell/nature/animals/wolf/wolfrpt02.pdf>), population status and trend of numerous bird species (see <http://www.nps.gov/yell/nature/animals/birds/birdar02.pdf>), wetland resources (see

<http://www.nps.gov/yell/publications/pdfs/wetlands/index.htm>), fisheries and aquatic resources of many kinds (see <http://www.nps.gov/yell/planvisit/todo/fishing/anreport02.pdf>), angler effort, harvest, and effects on fish species (see <http://www.nps.gov/yell/planvisit/todo/fishing/var/98fishrp.pdf>), and many other topics. For an overview of scientific research in Yellowstone National Park, much of which relates to monitoring of specific resources, again see <http://www.nps.gov/yell/publications/pdfs/investigatorsindex.htm>.

Key Indicators for Measuring State of Conservation

6b) At the time of inscription of the property on the World Heritage list, or while in the process of reviewing the status of the property at subsequent meetings, have the World Heritage Committee and the State Party identified and agreed upon key indicators for monitoring the state of conservation of the property's World Heritage values?

YES

6b1) If YES, please list and describe these key indicators, provide up-to-date data with respect to each of them, and also indicate actions taken by the State Party in response to each indicator.

Paragraphs 2a and 2b, above describe the values being protected, as defined by the World Heritage Committee. None were specifically identified by any party for monitoring.

When the World Heritage Committee placed Yellowstone National Park on its list of sites in danger, it was expressing concern over six issues. These are by no means the only potential indicators of the state of the site, but they serve as examples of critical issues. The series of reports summarized in 3b1 provided the World Heritage Committee with updates on the status of these six issues. As of 2003, the following summary applies:

1. Mining activities: The threat of a large gold and silver mine near the northeast boundary of Yellowstone National Park was responded to through an arrangement between the U.S. government and the mining company, by which the mining company agreed not to develop the mine and Congress appropriated funds for cleanup of a century's worth of accumulated tailings and other toxic overburden.

2. Threat to bison from brucellosis: In 2000, the various state and federal agencies involved in managing this disease and/or bison reached an agreement on a bison management plan that is aimed at maintaining wild bison populations and managing risk of the transmission of brucellosis.

3. Threat to cutthroat trout: Expert opinion is that risk of functional extinction of the native trout was real, but that lake trout could not be totally eradicated from the lake. An aggressive, "industrial-strength gillnetting" effort has been put in place to control the lake trout. It is believed that this, along with a no-release, no-limit sport fishery, will contain the lake trout and preserve a robust, though somewhat diminished, cutthroat trout population.

4. Water quality problems: Substantial but conclusive progress has been made by replacing all the park's fuel storage tanks. Congressional appropriations will replace some development's sewage treatment plants, and other outdated technology has been replaced at many park locations.

5. Road system: A long-term program is now in place to update and replace all road beds or surfaces by 2017.

6. Increasing visitor use: Only the winter portion of visitor use has yet been addressed in a substantial way. A series of court hearings and lawsuits over the direction of winter use management in Yellowstone National Park are still underway, so the ultimate course of this use is still unresolved.

6b2) If NO key indicators were identified by the World Heritage Committee and used so far, please indicate whether the World Heritage Site management authority is developing or plans to develop key indicators for monitoring the state of conservation of the property's World Heritage Values.

This question has been addressed in 6a, 6a1, 6b, and 6b1, above.

Results of Previous Reporting Exercises

6c) Please describe briefly the current status of actions the State Party has taken in response to recommendations from the World Heritage Committee at the time of inscription or afterwards, through the process known as "reactive reporting." (Note: The answer to this question will be "not applicable" for many sites.)

See 3b, above, for history of reporting and World Heritage Committee response

II.7 Conclusions

World Heritage Values

7a) Please summarize the main conclusions regarding the state of the World Heritage values of the property (see items II.2. and II.3. above).

The World Heritage Site continues to protect and celebrate the unique assemblage of geological, geothermal, biological, ecological, cultural, and scenic wonders it contained when established in 1872. All wildlife species, all plant species, and all primary geological and geothermal resources protected within the boundaries of the national park have survived, and in several key cases are currently thriving better than they did through much of the previous century. The world public has enjoyed and benefited from this site in the tens of millions, and continues to receive professional care of the highest standards when they visit. As would be expected in the face of growing world population and increasing demand for recreational opportunities, Yellowstone National Park routinely faces serious challenges in maintaining the ecological integrity and high quality of human experience for which it is so justly famous. The park's ecological unity with surrounding federal, state, and private lands seems to be at the center of most modern controversies and debates over the best way to maintain the park in the condition it was when designated as a World Heritage Site.

Management and Factors Affecting Site

7b) Please summarize the main conclusions regarding the management of and factors affecting the property (see items II.4. and II.5. above).

Yellowstone National Park is managed to achieve the highest professional standards of resource protection and visitor enjoyment. The U.S. public's investment in proper stewardship for this site is both formidable and well directed. A system of recreational developments in the park, supported by an infrastructure rare if not unique among national parks, provides excellent services of all kinds, including an aggressive educational program, to about three million visitors annually. One of the largest research efforts in any national park, involving hundreds of field researchers from many institutions annually, provides park managers with a constant flow of new information relating to a host of resource-management issues. The responsibilities of protection and celebration have broadened enormously since the park was created, and even since World Heritage Site designation. Yellowstone's role as the center of a far larger ecological unit, now universally recognized as the greater Yellowstone ecosystem, has complicated and challenged traditional conservation directions, and provided the NPS with a singular opportunity for further world leadership in defining natural resource protection. Yellowstone National Park is now recognized worldwide as a barometer of planetary health; though now removed from the World Heritage Committee's list of endangered sites, Yellowstone's fate will continue to be the subject of close scrutiny by many interests in the world conservation movement.

Proposed Future Action(s)

7c) Please describe briefly future actions that the State Party has approved to ensure the conservation of the World Heritage values of the property.

These sample headings can be used as a checklist.

Modification of legal or administrative structure

Changes to financial arrangements

Increases to staffing level

Provision of training

Modification of visitor facilities

Preparation of a visitor management plan

Studies of public knowledge of the World Heritage Site

Emergency preparedness

Establishment or improvement of a monitoring program.

Modification of legal or administrative structure. No plans are in preparation for this type of change.

Changes to financial arrangements: Other than ongoing refinement of routine accounting and other managerial procedures, no plans are in preparation for changes.

Increases to staffing level: No significant increases in staffing level are anticipated, though in some instances such increases are seen as desirable, if not essential. Again, see sites listed in previous heading. See <http://www.nps.gov/yell/publications/pdfs/strategicplan.pdf> and <http://www.nps.gov/yell/publications/businessplan/> for specifics.

Provision of Training: More than 1,000 training opportunities, in about 150 categories, were provided to park staff in the last fiscal year.

Modification of Visitor Facilities: Yellowstone National Park contains more than 1,000 historic structures and many other facilities for the purpose of visitor use and enjoyment. These are constantly monitored, and at any given time some are being upgraded, maintained, or modified. For example, the Canyon Visitor Education Center is currently undergoing a complete remodeling, and plans are underway to replace the Old Faithful Visitor Education Center with a larger and more satisfactory building in the near future. Ongoing work in this area does not include any significant change in direction of the management or use of such facilities. See the park's interpretive plan, <http://www.nps.gov/yell/publications/pdfs/Iripweb.pdf>, and Heritage Center information at <http://www.nps.gov/yell/technical/planning/scoping/heritage.htm>.

Preparation of a visitor management plan: A series of management documents, as described earlier, along with existing legislative mandates and National Park Service policies, dictate the purpose and direction of visitor management in Yellowstone National Park. Such purposes and direction are always under review not only by park staff but also by special-interest constituency groups and indeed by the American public in general. This process has been ongoing throughout the history of Yellowstone National Park, and no abrupt changes in direction are anticipated.

Studies of public knowledge of the World Heritage Site: No studies are proposed or anticipated, though they would be desirable.

Emergency Preparedness: Continued work in this area is anticipated and underway, especially for earthquake hazards. Yellowstone National Park is among the most seismically active regions of the world. For more on this topic, see <http://volcanoes.usgs.gov/yvo/>

Establishment or improvement of a monitoring program: With the endorsement of the scientific community, Yellowstone National Park continues to seek ways to refine and enlarge its already very sizeable monitoring efforts in several scientific and social fields.

Responsible Implementing Agency(ies)

7d) Please identify the agency(ies) responsible for implementation of these actions described in 7c, if different from those listed in Section II.4.

Timeframe for Implementation

7e) If known, or predictable, please provide a timeline for the implementation of the actions described in 7c.

We regard this question as NA because our response would necessarily involve dozens if not hundreds of specific dates, many of which are provided under the various headings above. We assume that this question is directed primarily at smaller sites with a relatively small number of issues being dealt with. As far as the most pressing management issues that have received great attention from the World Heritage Committee in recent years, we refer to the series of reports and other documents listed in 3b.

Needs for International Assistance

7f) Is it anticipated that International Assistance, through the World Heritage Fund, will be requested for any of the planned actions described above?

NO

7f1) If YES, please state the nature of the request and when it will be requested, if known.

Potential Decisions for the World Heritage Committee

7g) Please indicate if the World Heritage Site management authority has preliminarily identified, as a result of this reporting exercise, an apparent need to seek a World Heritage Committee decision to change any of the following:

(Note: Following completion of the Periodic Report exercise, the State Party, in consultation with appropriate authorities, will determine whether to proceed with seeking a Committee decision on these changes. To request such changes, the State Party will need to follow a separate, formal process, subsequent to submitting the report.)

- change to criteria for inscription
- change to Statement of Significance
- proposed new Statement of Significance, where previously missing
- change boundaries or buffer zone

II.8 Documentation

(See Section 7 of the current Nomination Form and Section 3 of the original Nomination Form)

8a) Please review the original nomination for the property to determine whether it is necessary or advisable to supply, update or amend any of the following documentation for the World Heritage Site. Indicate what documentation will be supplied to supplement the information found in this report. (This documentation should be supplied at the time the Periodic Report is submitted to the World Heritage Centre, in December 2004.)

- a) Photographs, slides and, where available, film. This material should be accompanied by a duly signed authorization granting, free of charge to UNESCO, the non-exclusive right for the legal term of copyright to reproduce and use it in accordance with the terms of the authorization attached.
- b) Topographic or other map or site plan which locates the WHS and its boundaries, showing scale, orientation, projection, datum, site name, date and graticule.
- c) A copy of the property management plan.
- d) A Bibliography consisting of references to all the main published sources on the World Heritage Site, compiled to international standards.

URL: <http://www.nps.gov/yell/safetyvideos.htm> and
<http://www.nps.gov/yell/press/images/index.htm>.

Description:

URL: http://www.nps.gov/gis/park_gisdata/wyoming/yell.htm.

Description:

URL: <http://www.wsulibs.wsu.edu/yellowstone/>.
Description:

8b) Do you have a digital map of the WHS, showing its location and boundaries?

YES

8bi) If yes, in what format(s) is the map?

Format and other related matters are explained at
http://www.nps.gov/gis/park_gisdata/wyoming/yell.htm.

8bii) Is it published on a publicly-accessible website?

YES

8biii) If yes, please provide the URL of the site where the map can be found. Must be a valid URL.

http://www.nps.gov/gis/park_gisdata/wyoming/yell.htm.