

TECHNICAL MEMORANDUM

SUBJECT: Green River Basin Plan II
Basin Water Use Profile-Recreation

DATE: April 2009

PREPARED BY: ERO Resources Corporation

Introduction

Water-based recreational uses in the Green River Basin include fishing, boating, skiing, and waterfowl hunting. Some of these activities, such as boating and fishing, are clearly water based, while others such as hunting depend on water to support waterfowl habitat. Streams and lakes also provide an indirect amenity that enhances the recreation experience for activities like camping, hiking, other recreation facilities located near open water. Although golf is not a water-dependent recreation activity, a reliable supply of water is needed for irrigation and maintenance. Most water-based recreation activities do not directly result in the consumptive use of water, with the exception of park and golf course irrigation.

A. Approach

The objective of this evaluation is to identify the types and locations of water-based recreation in the Green River Basin as part of the spectrum of economic and leisure activities that rely on the presence or use of water. The water requirements to meet non-consumptive recreational needs are not readily quantifiable; therefore, this assessment focuses on identifying import recreation uses in the Green River Basin, where they occur, and the value and potential conflict with other water uses.

Information in this report was obtained from state and federal land management agencies, existing documentation, and other sources. Public agency data sources included the Wyoming Game and Fish Department (WGFD), the Wyoming Department of State Parks and Cultural Resources, the Bureau of Land Management (BLM), U.S. Forest Service – Bridger-Teton National Forest, U.S. Fish and Wildlife Service (Service) – Seedskaadee National Wildlife Refuge (NWR), and the Bureau of Reclamation (USBR). Existing documents that were used include BLM Resource Management Plans, data and reports from the Wyoming Game and Fish Department (WGFD), and other sources.

Personal communications and web-based information about recreation opportunities in the Green River Basin provided by local communities, guides, and outfitters with intimate knowledge of the area were also used.

Recreation Destinations and Facilities

A. National Forest Facilities

Most of the headwaters of the Green River Basin are located within the Bridger-Teton National Forest, administered by the U.S. Forest Service (USFS). These areas support a variety of developed and undeveloped facilities that are either dependent on (e.g., boating and fishing access) or compatible with (e.g., camping areas) water-based recreation. USFS lands and recreation sites are managed by the Pinedale District (north and northeast areas), the Big Piney District (northwest areas), and the Kemmerer District (west areas). Recreation sites and facilities include the following:

- 17 developed campgrounds;
- Numerous unimproved camping sites; and
- Key destinations including Green River Lakes, the Green River, Fremont Lake, Middle and North Piney Lakes, and the Hams Fork River.

A small portion of the far southeast reaches of Wyoming's Green River Basin (Little Snake River drainage) is located within the Medicine Bow National Forest. This area generally supports dispersed fishing and camping opportunities, along with two developed campgrounds. Flaming Gorge National Recreation Area (described below) is administered by Ashley National Forest. A small portion of the Wasatch-Cache National Forest lies in Wyoming, and includes Meeks Cabin and Stateline Reservoirs.

B. Bureau of Land Management Facilities

Much of the Green River Basin consists of public lands administered by the BLM, under the Pinedale, Rock Springs, Kemmerer, and Rawlins Field Offices. Most water-based recreation on BLM lands occurs along larger rivers such as the Green River, New Fork River, and Big Sandy River. Key water-related recreation sites administered by the BLM include the following:

- Upper Green River/Warren Bridge – Northwest of Pinedale. Includes 12 designated river access and camping sites, as well as a developed campground at Warren Bridge.
- Boulder Lake – East of Pinedale. Includes two campgrounds (North Boulder Lake and Stokes Crossing) that support boating, fishing, and other recreation activities.
- CCC Ponds – East of Pinedale. Includes a series of ponds and trails that provide fishing opportunities as well as hiking, biking, and cross-country skiing trails.
- New Fork Campground – Near Farson. Includes a rustic campground and river access for boating and fishing.

1. Fontenelle Reservoir

Located about 50 miles northwest of the town of Green River, Fontenelle Reservoir is a USBR facility, completed as part of the Seedskaadee Project in 1964. The primary recreational use of the reservoir is fishing. Recreation facilities include four campgrounds, two boat ramps, and several picnic sites (USBR 2008a).

2. Seedskaadee National Wildlife Refuge

Seedskaadee NWR is located along about 35 miles of the Green River downstream of Fontenelle Reservoir. The 22,000-acre refuge was established as part of USBR's Seedskaadee

Project, and is managed by the Service (USBR 2008a). The refuge does not allow camping, but it does support a high-quality sport fishery. Fishing, hunting, boating, and sightseeing are common recreation activities at this refuge.

3. Big Sandy Reservoir

About 10 miles north of Farson along the Big Sandy River, the Big Sandy Reservoir provides a boat ramp, primitive camping, and picnicking facilities. The reservoir is administered by the USBR. Fishing is a common activity, although overall use is low (USBR 2008b; Wildernet 2008).

4. Flaming Gorge National Recreation Area

Flaming Gorge Reservoir, which straddles the Wyoming-Utah state line along 91 miles of the Green River, was completed by the USBR in 1962 as part of the Seedskaadee Project. The reservoir and surrounding lands are included in the Flaming Gorge National Recreation Area and are administered by Ashley National Forest (USBR 2008a; USFS 2008). The reservoir is a popular destination for boating, fishing, and camping. Within Wyoming, the USFS maintains three boat ramps at Firehole, Buckboard Crossing, and Anvil Draw (USFS 2008).

5. Wildlife Habitat Management Areas

The WGFD manages two Wildlife Habitat Management Areas (WHMA) within the Green River Basin, both near Pinedale. Half Moon WHMA offers restroom facilities and a camping area, while the Soda Lake WHMA offers multiple camping areas around Soda Lake. Both of these areas provide hunting, fishing, and other outdoor recreation opportunities (WGFD 2008a).

Existing Water-Based Recreation

A. Fishing

The Green River Basin provides numerous fishing opportunities, including backcountry lakes, numerous small streams, the New Fork River, and the mainstem of the Green River. Wade and float fishing are the most prominent recreation activities along the upper Green River (BLM 2008). Recreational fish species in these waters include native Colorado cutthroat, brown trout, golden trout, brook trout, lake trout, and mountain whitefish (SCJTPB 2008).

The main fishing resources in the Basin are the Green River and the New Fork River. These streams are popular for drift boat fishing as well as fishing from the bank. While land along the river corridors are mostly privately owned, fishing access is available on public lands, and at a series of designated river access points. In addition, the WGFD has established two walk-in fishing access areas on private lands under its Private Lands Public Wildlife Access Program (WGFD 2008b).

Seedskaadee NWR contains a high-quality cold water fishery that is sustained by flows from the Fontenelle Dam, upstream of the refuge. Primary game species on the refuge include rainbow trout, brown trout, and two species of cutthroat trout (Service 2008). Flaming Gorge Reservoir, at the southern edge of Wyoming's Green River Basin, supports a fishery that includes lake trout, Kokanee salmon, rainbow trout, brown trout, smallmouth bass, and channel catfish (USFS 2008).

The State of Wyoming has established the following classifications for trout streams (WGFD 2000):

- Class 1 (blue) – Premium trout waters – Fisheries of national importance
- Class 2 (red) – Very good trout waters – Fisheries of statewide importance
- Class 3 (yellow) – Important trout waters – Fisheries of regional importance
- Class 4 (brown) – Low production trout waters – Fisheries frequently of local importance, but generally incapable of sustaining substantial fishing pressures
- Class 5 (no color) – Very low production waters – Often incapable of sustaining a trout fishery

Trout stream classifications in the Green River Basin are shown in Figure 1, and are summarized in Table 1. While no streams are considered Class 1, and only a few reaches are considered Class 2, a large extent of the Green River Basin's streams are considered Class 3 fisheries of regional importance.

Table 1 - Trout Stream Classifications in the Green River Basin

Classification	Stream Miles	Examples
Class 1	0	NA
Class 2	560	Green River, Hams Fork, Blacks Fork
Class 3	1,420	Green River, New Fork River, Middle Piney Creek, Smiths Fork, LaBarge Creek
Class 4	1,187	Muddy Creek, Dry Piney Creek, Big Sandy River, Little Sandy Creek, Henry's Fork, Muddy Creek
Class 5	0	NA

Source: WGFD 2000.

As noted in the 2000 Green River Basin Plan, WGFD has moved away from quantifying fishing utilization numbers (SWWRC 2000). No comprehensive creel surveys have been conducted since the mid-1990s (Amadio, pers. comm. 2008).

Outfitters from throughout the region offer guided fishing and float-fishing trips in the Green River Basin. Several outfitters operate out of Pinedale and other towns in the Basin, while many others bring clients from nearby Jackson, a regional recreation hub. The upper Green River (primarily between Warren Bridge and Highway 351) is one of the most popular destinations for both outfitters and private float fishers, primarily due to the quality of the resource and relatively easy river access (Kaul, pers. comm. 2008; BLM 2008).

Commercial outfitters must obtain permits from the USFS or the BLM to use their facilities (river access points). The agencies do not currently limit the number of commercial permits available (Kaul, pers. comm. 2008).

B. Boating

The streams, rivers, and lakes of the Green River Basin provide numerous opportunities for boating. These opportunities include canoeing on lakes, flatwater streams, and rivers; whitewater kayaking on small streams; float fishing; and long-distance river trips. The most popular boating destinations are located along the mainstem Green River and the New Fork River.

The most popular boating use is float fishing along the Green and New Fork rivers and in the large and small reservoirs in the system. Overnight river trips are increasing in popularity along the Green River, particularly in the northern reaches where public river access is available (BLM 2008; Kaul, pers. comm. 2008). While opportunities exist for whitewater kayaking on small tributary streams (Stafford and McCutchen 2007), the Green River Basin is not a major destination for kayakers (Kaul, pers. comm. 2008).

Boating opportunities are generally dependent on streamflow, which is influenced by winter snowpack and reservoir releases, which are usually dictated by other water uses.

C. Waterfowl Hunting

Stable waterfowl populations are dependent on reliable open water and wetland habitat, and, therefore, are affected by hydrological changes that could influence the quality and availability of those areas. As a recreation activity, waterfowl hunting is, therefore, dependent on suitable water supplies, habitat, and waterfowl populations. While waterfowl hunting occurs throughout the Green River Basin where suitable habitat exists, some of the primary destinations for this activity include the Farson area and Seedskadee NWR (SWWRC 2000).

The Green River Basin is considered to be within the Pacific Flyway. Waterfowl hunting regulations are developed each year by Flyway Councils, individual states, and the Service, based on population surveys and hunter questionnaires (Flyways.us 2008).

D. Golfing

The Green River Basin has four golf courses that provide a recreation amenity to both residents and visitors. These courses are briefly described in Table 2.

Table 2 - Golf Courses

Golf Course	Description	Water Supply	Estimated Water Use	Estimated (Rounds per Year)
Rendezvous Meadows Golf Course, Pinedale	9-hole public course	Pine Creek via Colorado Ditch	NA	16,000–20,000
Fossil Island Golf Club, Kemmerer	9-hole public course	NA	NA	NA
White Mountain, Rock Springs	18-hole public course (to be expanded in 2009)	Two on-site wells	185–225 million gallons/year	40,000
Rolling Green Country Club, Green River	9-hole private course	NA	NA	NA

Source: Christensen, pers. comm. 2008; Keller, pers. comm. 2008.

E. Winter Sports

White Pine Ski Resort, located about 10 miles northeast of Pinedale, is the only lift-serviced downhill ski area in the Green River Basin. White Pine offers two triple chair lifts, about 25 trails, and a vertical drop of 1,100 feet (White Pine Resort 2008).

The resort has a limited snowmaking system, which draws water from a small reservoir in the Surveyor Park drainage. An extensive plan is in place to expand snowmaking throughout most of the ski area. Actual water use of White Pine is not known. Based on USFS estimates, White Pine Ski Resort has about 30,000 skier days per year (Thompson, pers. comm. 2008).

Several locations offer designated and groomed cross-country ski trails, including White Pine Resort, Skyline Drive, Kelly Park, and CCC Ponds areas near Pinedale. In addition, many ungroomed cross-country and backcountry ski routes are available on National Forest lands (Pinedale Online 2008). A recent study found that Nordic use in the Pinedale area is similar to alpine use at the ski area, making it a significant winter recreation attraction in the area (Thompson, pers. comm. 2008).

F. Local Parks and Recreation Facilities

Most of the medium- to larger-sized communities in the Green River Basin have public parks and recreation facilities (such as ball fields and swimming pools) that use water for irrigation, maintenance, and public use. The number, size, and water use of local parks and recreation facilities varies by community.

Recreation Trends, Benefits, and Conflicts

A. Recreation Trends

Recreation water uses in the Green River Basin primarily occur on public lands administered by the USFS and BLM. The WGFD has responsibility for fishing and hunting activities on

public and private lands. Trends indicate an increase in demand for recreation activity in the Green River Basin as evidenced by recent BLM and WGFD reports.

In their recent Resource Management Plan for the Pinedale District, the BLM assumed the following trends related to recreation and visitation in the area (BLM 2008):

- The demand for fishing, floating, camping, off highway vehicle (OHV) use, and new technology-based recreation is expected to increase.
- Visitation throughout the planning area will continue to increase as resource availability and conditions allow.
- As the population of neighboring states and the local area continues to grow, the desire for less crowded or more remote recreation opportunities will continue to bring more people to the public lands in Wyoming.

The WGFD identified some of the following long-term trends related to hunting and fishing in their Draft Strategic Plan (WGFD 2007):

- Access for hunting and fishing has become a problem as access to private lands has become more restrictive.
- The loss of family ranches and the threat of subdivision may both degrade habitat and decrease recreation opportunities for hunters and anglers on private land. As the state's population grows, it is likely these conditions will intensify.
- With a larger percentage of hunters and anglers being forced to use public lands, crowding at public access sites could become heavy, especially those close to out-of-state urban centers.
- It is possible that negative social attitudes toward hunting and fishing may grow, and it is also possible that the commercialization of hunting and fishing may increase.

The Wyoming Business Council tracks recreation and tourism trends throughout the state. Based on the most recent visitor surveys (2008), 11 of the 15 top outdoor recreation activities in Wyoming are either water-based (boating, fishing, skiing) or water-related (hunting, camping, birdwatching). The top outdoor recreational activities in Wyoming are listed below (SMRI 2008). Water-dependent or water-related activities are in **bold**:

	Outdoor Activity	Percent Participation
1.	Wildlife watching	39.5%
2.	Hiking or backpacking	21.4%
3.	Camping	15.1%
4.	Bird watching	11.9%
5.	Fishing	10.8%
6.	Bicycling	8.0%
7.	River rafting	7.7%
8.	Snow skiing/snowboarding	5.8%
9.	Boating	5.1%
10.	Canoeing or kayaking	4.5%
11.	Hunting	3.8%
12.	Mountain climbing	3.7%
13.	Snowmobiling	3.4%
14.	Golfing	2.7%
15.	Rock climbing	2.2%

B. Economic Impacts of Recreation

The general economic impacts of recreational water uses in the Green River Basin can be estimated by looking at overall travel and tourism impacts for each county within the Basin. These data are tracked by the Wyoming Business Council. As noted above, most of the top 15 outdoor recreation activities in Wyoming are either directly dependent on water (e.g., fishing and boating) or are related to water as an amenity or wildlife habitat component (e.g., wildlife watching, camping, and hunting). Therefore, it can be assumed that most outdoor recreation and travel within the Green River Basin is either water-dependent or water-related. The economic impacts of travel in the five counties that comprise the Green River Basin are summarized in Table 3. Based on these data, travel and recreation within the Green River Basin generated more than \$550 million in spending in 2007, contributing to about 5,750 jobs. The Green River Basin contributes about 20% of the travel and recreation income and jobs in the State of Wyoming. Over the 10-year period from 1997 to 2007, travel-related spending in the Green River Basin has grown at a rate of 8.4%, while employment has grown at 2.9%. Growth in spending and employment in the Green River Basin has outpaced statewide trends (Table 3).

Table 3 - Economic Impacts of Travel by Green River Basin County, 2007

County	Travel Spending (\$ million)	Travel Spending Change 1997–2007	Earnings (\$ million)	Employment (Jobs)	Employment Change 1997–2007
Carbon	159.6	8.5%	33.1	1,580	3.8%
Lincoln	62.4	7.3%	12.2	630	1.2%
Sublette	50.5	10.1%	17.2	510	3.3%
Sweetwater	176.5	7.9%	39.3	2,010	3.4%
Uinta	101.2	8.2%	19.7	1,020	2.6%
Green River Basin Total or Average	550.2	Avg = 8.4%	121.5	5,750	Avg = 2.9%
State Total	2,687.7	6.5%	675.9	30,330	1.6%
Percent of State Total	20%	n/a	18%	19%	n/a

Figures are in 2007 dollars

Travel Spending = Purchases by travelers during their trip, including lodging taxes and other applicable local and state taxes paid by the traveler at the point of sale. Travel spending includes ground transportation, accommodations, food and beverages, retail sales, recreation, food stores, and air transportation.

Earnings = Wage and salary disbursements, earned benefits of employees, and proprietor income of business owners who work in travel-related businesses. Only the earnings that are attributed to travel expenditures are included.

Source: State Office of Travel and Tourism, Wyoming Business Council, 2008.

Limited data exists for the economic impact of individual recreation activities. The U.S. Fish and Wildlife Service and U.S. Census Bureau track economic trends and impacts from fishing, hunting, and other wildlife-associated recreation activities. These data show that

angler spending in Wyoming increased from \$225 million in 1996 to \$521 million in 2006, while wildlife-watcher spending increased from \$302 million to \$395 million in the same time period (USFWS-USCB 2006). These data, however, are not broken out by the Green River Basin or county.

C. Benefits of Recreation

As described above, one of the greatest benefits of recreation in the Green River Basin is its contribution to the local economy. Other less-tangible benefits include the lifestyle benefits that recreation opportunities provide to both residents and visitors. These intangible benefits vary by activity and individual, but generally include exercise and relaxation, as well as opportunities to spend time with friends and family.

D. Competition with Other Uses

Other economic activities in the Green River Basin could adversely impact recreational uses and opportunities. In general, these impacts usually stem from competing uses for surface water supplies (rivers, streams, and lakes). In some cases, the physical development of water-related facilities could impact the quality or availability of recreation opportunities in that area. Examples of these and other competing uses are described below.

Stream Diversions – The diversion and use of surface water supplies for agricultural, industrial, or municipal uses could impact the quality and availability of fishing and boating on the Green River and other major streams and rivers. Impacts to fishing typically stem from reductions in water flows that can reduce the quality of the fishery, or may limit access or availability for anglers. Boating opportunities may be impacted by reduced or altered water flows, which can reduce the availability and enjoyment of boating in a particular area, can alter the timing of favorable flows, or can change the safety or navigability of a particular stream reach.

Reservoir Levels – Major reductions or fluctuations in surface water levels on reservoirs can impact fishing and boating opportunities by isolating or inundating boat ramps and other facilities, reducing the overall size of the reservoir, altering the quality of the fishery, or reducing overall aesthetics.

Facility Development – The physical development of new water facilities can impact recreation opportunities by either altering or eliminating the recreation site altogether, or by reducing the access to or aesthetic quality of the recreational resource.

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Figure 1. Greater Green River Basin Trout Stream Classification.

