

[http://en.wikipedia.org/wiki/Snake\\_River](http://en.wikipedia.org/wiki/Snake_River)

## Snake River

River



[Perrine Bridge](#) spanning the Snake River Canyon at Twin Falls, Idaho

**Country**  [United States](#)

**States**  [Wyoming](#),  [Idaho](#),  [Oregon](#),  
 [Washington](#)

### Tributaries

- left [Salt River](#), [Portneuf River](#), [Owyhee River](#), [Malheur River](#), [Powder River](#), [Grande Ronde River](#)

- right [Henrys Fork](#), [Boise River](#), [Salmon River](#), [Clearwater River](#), [Palouse River](#)

**Cities** [Idaho Falls](#), [Twin Falls](#), [Lewiston](#), [Tri-Cities](#)

**Source** [Rocky Mountains](#)

- location [Yellowstone National Park](#), [Wyoming](#)

- elevation [8,927 ft](#) ([2,721 m](#)) <sup>[1]</sup>

- coordinates  [44°7′49″N 110°13′10″W](#) <sup>[2]</sup>

**Mouth** [Columbia River](#)

- location [Tri-Cities](#), [Washington](#)

- elevation [358 ft](#) ([109 m](#)) <sup>[3]</sup>

- coordinates  [46°11′10″N 119°1′43″W](#) <sup>[2]</sup>

**Length** [1,040 mi](#) ([1,674 km](#)) <sup>[4]</sup>

**Basin** [108,000 sq mi](#) ([280,000 km²](#)) <sup>[4]</sup>

**Discharge** [mouth](#)

- average [56,900 cu ft/s](#) ([1,610 m³/s](#)) <sup>[4]</sup>

Snake River watershed

The Snake River is a major [tributary](#) of the [Columbia River](#) in the [U.S. states](#) of [Wyoming](#), [Idaho](#), [Oregon](#), and [Washington](#). The river's length is 1,040 miles (1,670 km), its [watershed](#) drains 108,000 square miles (280,000 km<sup>2</sup>), and the average discharge at its mouth is 56,900 cubic feet per second (1,610 m<sup>3</sup>/s). The river flows from its source in [Yellowstone National Park](#) through a series of mountain ranges, canyons, and plains.

## Geography

### [\[edit\]](#) Basin overview

Snake River's drainage basin includes a diversity of landscapes. Its upper reaches lie in the [Rocky Mountains](#). In central Idaho the river flows through the broad [Snake River Plain](#). Along the Idaho-Oregon border the river flows through [Hells Canyon](#), part of a larger physiographic region called the [Columbia River Plateau](#), through which the Snake River flows through Washington to its confluence with the Columbia River. Parts of the river's basin lie within the [Basin and Range](#) province, though it is itself a physiographic section of the [Columbia Plateau](#) province, which in turn is part of the larger [Intermontane Plateaus](#) physiographic division.

The Snake is the largest tributary of the Columbia River, with a mean discharge of 50,000 cubic feet per second (1,400 m<sup>3</sup>/s),<sup>[5]</sup> or 56,900 cubic feet per second (1,610 m<sup>3</sup>/s) according to the [USGS](#), the 12th largest in the United States.<sup>[4]</sup>

### [\[edit\]](#) Geology



 The Lower Snake 10 miles above its confluence with the Columbia River.

For much of its course the Snake River flows through the [Snake River Plain](#), a [physiographic province](#) extending from eastern Oregon through western and central Idaho into northwest Wyoming. Much of the Snake River Plain is high desert and semi-desert at elevations averaging around 5,000 feet (1,500 m). Many of the rivers in this region have cut deep and meandering canyons. West of Twin Falls, the plain is mainly covered with stream and lake sediments. During the [Miocene](#), lava dams created Lake Idaho, which covered a large portion of the Snake River Plain between Twin Falls and Hells Canyon. This large lake expanded and contracted several times before finally

receding in the early [Pleistocene](#). In more recent geologic time, about 14,500 years ago, glacial [Lake Bonneville](#) spilled catastrophically into the Snake River Plain. The flood carved deep into the land along the Snake River, leaving deposits of gravel, sand, and boulders, as well as a scabland topography in places. Results of this flood include the falls and rapids from Twin Falls and Shoshone Falls to Crane Falls and Swan Falls, as well as the many "potholes" areas.<sup>[6]</sup>

The Snake River Aquifer, one of the most productive [aquifers](#) in the world, underlies an area of about 10,000 square miles (26,000 km<sup>2</sup>) in the Snake River Plain. Differences in elevation and rock permeability result in many dramatic [springs](#), some of which are [artesian](#). The [groundwater](#) comes from the Snake River itself as well as other streams in the region. Some streams on the northern side of the Snake River Plain, such as the [Lost River](#) are completely absorbed into the ground, recharging the aquifer and emerging as springs that flow into the Snake River in the western part of the plain. The [hydraulic conductivity](#) of the basalt rocks that make up the aquifer is very high. In places water exits the Snake and Lost rivers into ground conduits at rates of nearly 600 cubic feet per second (17 m<sup>3</sup>/s).<sup>[7]</sup> Due to stream modifications and large-scale irrigation, most of the water that used to recharge the aquifer directly now does so in the form of irrigation water drainage.<sup>[8]</sup>

## **[edit]** Upper course

The Snake originates near the [Continental Divide](#) in [Yellowstone National Park](#) in northwest [Wyoming](#) and flows south into [Jackson Lake](#) in [Grand Teton National Park](#), then south through [Jackson Hole](#) and past the town of [Jackson](#). The river then flows west through Wyoming's [Snake River Canyon](#) and exits Wyoming at [Alpine Junction](#), where it enters [Idaho](#) at the [Palisades Reservoir](#).

Below the Palisades Reservoir, the Snake River flows northwest through [Swan Valley](#) to its confluence with [Henrys Fork](#) near [Rigby](#). The region around the confluence is a large [inland delta](#). Above the juncture, the Snake River is locally called the South Fork of the Snake River, since Henrys Fork is sometimes called the North Fork of the Snake River.

The Snake River then swings south and west in an arc across southern-central Idaho, following the Snake River Plain. It passes through the city of [Idaho Falls](#) and by [Blackfoot](#) in a region of irrigated agriculture. North of the [Fort Hall Indian Reservation](#) the river is impounded by the [American Falls Dam](#). The dam and reservoir are part of the Minidoka Irrigation Project managed by the [United States Bureau of Reclamation](#). The [Portneuf River](#) joins the Snake at the reservoir. Downriver from the dam is [Massacre Rocks State Park](#), a site on the path of the old [Oregon Trail](#).

After receiving the waters of [Raft River](#), the Snake River enters another reservoir, [Lake Walcott](#), impounded by [Minidoka Dam](#), run by the Bureau of Reclamation mainly for irrigation purposes. Another dam, [Milner Dam](#) and its reservoir, Milner Reservoir, lie just downriver from Minidoka Dam. Below that is the city of [Twin Falls](#), after which the river

flows into Idaho's [Snake River Canyon](#) (the site of [Evel Knievel](#)'s stunt) over [Shoshone Falls](#) and under the [Perrine Bridge](#).

## [\[edit\]](#) Lower course

After exiting the Snake River Canyon, the Snake receives the waters of more tributaries, the [Bruneau River](#) and the [Malad River](#). After passing the [Snake River Birds of Prey National Conservation Area](#), the Snake flows toward [Boise](#) and the Idaho-Oregon border. After receiving numerous tributaries such as the [Boise River](#), [Owyhee River](#), [Malheur River](#), [Payette River](#), [Weiser River](#), and [Powder River](#), the Snake enters [Hells Canyon](#).



 Rafting the Wild and Scenic Snake in Hells Canyon Wilderness.

In Hells Canyon the Snake River is impounded by three dams, [Brownlee Dam](#), [Oxbow Dam](#), and [Hells Canyon Dam](#) (which completely blocks the migration of [anadromous fish](#)<sup>[9]</sup>), after which the river is designated a [National Wild and Scenic River](#) as it flows through [Hells Canyon Wilderness](#). In this section of the river, the [Salmon River](#), one of the largest tributaries of the Snake, joins. Just across the Washington state line, another large tributary, the [Grande Ronde River](#) joins the Snake.

As the Snake flows north out of Hells Canyon, it passed the cities of [Lewiston, Idaho](#) and [Clarkston, Washington](#), where it receives the [Clearwater River](#). From there the Snake River swings north, then south, through southeast Washington's [Palouse](#) region, before joining the [Columbia River](#) near the Tri-Cities. In this final river reach there are four large dams, [Lower Granite Lock and Dam](#), [Little Goose Lock and Dam](#), [Lower Monumental Lock and Dam](#), and [Ice Harbor Lock and Dam](#). These dams, built by the [United States Army Corps of Engineers](#) serve as hydroelectric power sources as well as ensuring barge traffic navigation to Lewiston, Idaho.

## [\[edit\]](#) History

### [\[edit\]](#) Name

The name "Snake" possibly derived from an S-shaped (snake) sign which the Shoshone Indians made with their hands to mimic swimming salmon.

Variant names of the river have included: Great Snake River, Lewis Fork, Lewis River, Mad River, Saptin River, Shoshone River, and Yam-pah-pa.

## [\[edit\]](#) Early inhabitants



*The Tetons - Snake River* (1942) by Ansel Adams

People have been living along the Snake River for at least 11,000 years. Daniel S. Meette divides the prehistory of the western Snake River Basin into three main phases or "adaptive systems". The first he calls "Broad Spectrum Foraging", dating from 11,500 to 4,200 years before present. During this period people drew upon a wide variety of food resources. The second period, "Semisedentary Foraging", dates from 4,200 250 years before present and is distinctive for an increased reliance upon fish, especially salmon, as well as food preservation and storage. The third phase, from 250 to 100 years before present, he calls "Equestrian Foragers". It is characterized by large horse-mounted tribes that spent long amounts of time away from their local foraging range hunting bison.<sup>[10]</sup> In the eastern Snake River Plain there is some evidence of [Clovis](#), [Folsom](#), and [Plano cultures](#) dating back over 10,000 years ago. By the protohistoric and historic era, the eastern Snake River Plain was dominated by [Shoshone](#) and other "Plateau" culture tribes.<sup>[11]</sup>

Early fur traders and explorers noted regional trading centers, and archaeological evidence has shown some to be of considerable antiquity. One such trading center in the [Weiser](#) area existed as early as 4,500 years ago. The [Fremont culture](#) may have contributed to the historic [Shoshones](#), but it is not well understood. Another poorly understood early cultural hearth is called the Midvale Complex. The introduction of the horse to the Snake River Plain around 1700 helped in establishing the Shoshone and Northern [Paiute](#) cultures.<sup>[12]</sup>

On the Snake River in southeastern Washington there are several ancient sites. One of the oldest and most well-known is called the Marmes Rockshelter, which was used from over

11,000 years ago to relatively recent times. The [Marmes Rockshelter](#) was flooded in 1968 by [Lake Herbert G. West](#), the Lower Monumental Dam's reservoir.<sup>[13]</sup>

Other cultures of the Snake River's basin's protohistoric and historic periods include the [Nez Perce](#), [Cayuse](#), [Walla Walla](#), [Palus](#), [Bannock](#), and many others.

## **[[edit](#)] Exploration**

The [Lewis and Clark Expedition](#) of 1804-1806 was the first major U.S. exploration of the lower portion of the Snake River, and the Snake was once known as the Lewis River. Later American exploratory expeditions, which explored much of the length of the Snake River, included the [Astor Expedition](#) of 1810-1812, [John C. Frémont](#) in 1832, and [Benjamin Bonneville](#) in 1833-1834. The British [North West Company](#) and, after 1821, [Hudson's Bay Company](#) sent large trapping and trading expeditions to the upper Snake River and its tributaries. These annual expeditions began in 1817 and continued for about 30 years. They ranged widely throughout today's southern Idaho, western Wyoming, and northern Utah, in the process exploring the region. Many of the rivers and mountains have French names, reflecting the employment of French-Canadian [voyageur](#) by the British companies. The policy of the Hudson's Bay Company's was to deplete the region of fur bearing animals as quickly as possible, so as to make it impossible for American traders to operate there. This goal was largely successful. American traders could not compete in the Snake River country. In contrast, the Hudson's Bay Company found the Snake River expeditions very profitable.<sup>[14]</sup>

By the middle 19th century, the [Oregon Trail](#) had been established, generally following much of the Snake River.

## **River modifications**

### **[[edit](#)] Dams**



 Lower Granite Dam

Many [dams](#) have been built on the Snake River and its tributaries, mainly for purposes of providing [irrigation](#) water and [hydroelectric](#) power and ranging in size from small [diversion dams](#) to major high dams.

Large dams include four on the lower Snake, in Washington, built and operated by the [U.S. Army Corps of Engineers](#): [Ice Harbor](#), [Lower Monumental](#), [Little Goose](#), and [Lower Granite](#). These dams were built from 1962 to 1975 for hydroelectric power and navigation. They are equipped with locks, making the river as far as Lewiston an extension of the Columbia River's barge navigation system.<sup>[15]</sup> The four dams were modified in the 1980s to better accommodate fish passage.<sup>[16]</sup>

Upriver, in the Hells Canyon region, there are three large hydroelectric dams, operated by [Idaho Power](#), a private utility company. Collectively named the Hells Canyon Project, the three dams are, in upriver order: [Hells Canyon Dam](#), [Oxbow Dam](#), and [Brownlee Dam](#). Not having fish ladders, they are the first total barrier to upriver fish migration.

In southwestern Idaho there are several large dams. [Swan Falls Dam](#), built in 1901, was the first hydroelectric dam on the Snake as well as the first total barrier to upriver fish migration. It was rebuilt in the 1990s by Idaho Power. Upriver from Swan Falls is another hydroelectric dam operated by Idaho Power, the [C. J. Strike Dam](#), built in 1952. This dam also serves irrigation purposes. Continuing upriver, Idaho Power operates a set of three hydroelectric dam projects collectively called the Mid-Snake Projects, all built in the 1940s and 1950s. They are: [Bliss Dam](#), [Lower Salmon Falls Dam](#), and the two dams of the Upper Salmon Falls Project, [Upper Salmon Falls Dam A](#) and [Upper Salmon Falls Dam B](#).

Near the city of Twin Falls two waterfalls have been modified for hydropower, Shoshone Falls and Twin Falls. Collectively called the Shoshone Falls Project, they are old and relatively small dams, currently operated by Idaho Power. Above Twin Falls is [Milner Dam](#), built in 1905 for irrigation and rebuilt in 1992 with hydroelectric production added. The dam and irrigation works are owned by Milner Dam, Inc, while the powerplant is owned by Idaho Power.

Above Milner Dam, most of the large dams are projects of the [U.S. Bureau of Reclamation](#), built mainly for irrigation, some are hydroelectric as well. All part of the Bureau's Minidoka Project, the dams are: [Minidoka Dam](#) (built 1909), [American Falls Dam](#) (1927), [Palisades Dam](#) (1957), and [Jackson Lake Dam](#) on [Jackson Lake](#) (1911). These dams, along with two others and numerous irrigation canals, supply water to about 1.1 million acres (4,500 km<sup>2</sup>) in southern Idaho.<sup>[17]</sup>

The city of [Idaho Falls](#) operates the remaining large dam on the Snake River, [Gem State Dam](#), along with several smaller associated dams, for hydroelectric and irrigation purposes.

There are many other dams on the tributaries of the Snake River, built mainly for irrigation. They are mainly operated by the Bureau of Reclamation or local government and private owners.

While the many dams in the Snake River basin have transformed the region's economy, they have also had an adverse [environmental](#) effect on wildlife, most notably on wild [salmon](#) migrations. Since the 1990s, some conservation organizations and fishermen are seeking to restore the lower Snake River and Snake River salmon and steelhead by removing four federally-owned dams on the lower Snake River.<sup>[18][19]</sup>



Looking toward the [Idaho](#) side from the [Oregon](#) side with the [Oxbow Dam](#) in the background.

## [\[edit\]](#) Navigation

In the 1960s and 1970s the U.S. Army Corps of Engineers built four dams and locks on the lower Snake River to facilitate shipping. The lower Columbia River has likewise been dammed for navigation. Thus a deep [shipping channel](#) through locks and slackwater reservoirs for heavy [barges](#) exists from the Pacific Ocean to Lewiston, Idaho. Most barge traffic originating on the Snake River goes to deep-water ports on the lower Columbia River, such as [Portland](#). [Grain](#), mostly [wheat](#), is the main product shipped from the Snake, and nearly all of it is exported internationally from the lower Columbia River ports.

The shipping channel is authorized to be at least 14 feet (4.3 m) deep and 250 feet (76 m) wide. Where river depths were less than 14 feet (4 m), the shipping channel has been [dredged](#) in most places. Dredging and redredging work is ongoing and actual depths vary over time.<sup>[20]</sup>

With a channel about 5 feet (1.5 m) deeper than the [Mississippi River System](#), the Columbia and Snake rivers can float barges twice as heavy.<sup>[21]</sup>

Agricultural products from Idaho and eastern Washington are among the main goods transported by barge on the Snake and Columbia rivers. Grain, mainly wheat, accounts for more than 85% of the cargo barged on the lower Snake River. In 1998, over 123,000,000 US bushels ( $4.3 \times 10^9$  1/9.8E+8 US dry gal/950,000,000 imp gal) of grain were barged on the Snake. Before the completion of the lower Snake dams, grain from the region was transported by truck or rail to Columbia River ports around the Tri-Cities. Other products barged on the lower Snake River include peas, lentils, forest products, and petroleum. <sup>[20]</sup>

Among the negative consequences of the lower Snake River's navigational slackwater reservoirs are the flooding of historic and archaeological sites, the stiling of once famous rapids, the slowing of currents and an associated rising of water temperature, and a general decline in the ability of wild fish to migrate up and down the river.



 [Shoshone Falls](#) near [Twin Falls, Idaho](#)



 Columbia River Basin

**[[edit](#)] See also**

- [Snake River Plain \(ecoregion\)](#)
- [Lost River \(Idaho\)](#)

- [Angling in Yellowstone National Park](#)
- [List of crossings of the Snake River](#)
- [Snake River Plain](#)
- [List of Idaho rivers](#)
- [List of Oregon rivers](#)
- [List of Washington rivers](#)
- [List of Wyoming rivers](#)
- [List of National Wild and Scenic Rivers](#)

## **[[edit](#)] References**

1. <sup>^</sup> [Google Earth](#) elevation for [GNIS](#) source coordinates. Retrieved on April 29, 2007
2. <sup>^</sup> <sup>*a*</sup> <sup>*b*</sup> [USGS GNIS: Snake River](#), USGS GNIS
3. <sup>^</sup> [Google Earth](#) elevation for [GNIS](#) mouth coordinates. Retrieved on April 29, 2007
4. <sup>^</sup> <sup>*a*</sup> <sup>*b*</sup> <sup>*c*</sup> <sup>*d*</sup> Kammerer, J.C. (May 1990). "[Largest Rivers in the United States](#)". U.S. Geological Survey. Retrieved on [2008-01-26](#).
5. <sup>^</sup> <http://www.idahohistory.net/Reference%20Series/0294.pdf>
6. <sup>^</sup> Snake River Plain geology from Orr, Elizabeth L.; William N. Orr (1996). "Snake River Plain and Owyhee Uplands", *Geology of the Pacific Northwest*. [McGraw-Hill](#). ISBN 0-07-048018-4.
7. <sup>^</sup> Snake River Plain aquifer information from Orr, Elizabeth L.; William N. Orr (1996). *Geology of the Pacific Northwest*. [McGraw-Hill](#), 248-249. ISBN 0-07-048018-4.
8. <sup>^</sup> [Upper Snake River Basin NAWQA Fact Sheet](#), USGS Water Resources of Idaho
9. <sup>^</sup> [Snake River](#)
10. <sup>^</sup> [Summary of Western Snake River Prehistory](#), Digital Atlas of Idaho
11. <sup>^</sup> [Southeastern Snake River Basin Prehistory](#), Digital Atlas of Idaho
12. <sup>^</sup> [Western Snake River Prehistory](#), Digital Atlas of Idaho
13. <sup>^</sup> [Marmes Rockshelter](#), HistoryLink
14. <sup>^</sup> Mackie, Richard Somerset (1997). *Trading Beyond the Mountains: The British Fur Trade on the Pacific 1793-1843*. Vancouver: University of British Columbia (UBC) Press, pp. 21, 64. ISBN 0-7748-0613-3.
15. <sup>^</sup> Erik Robinson (April 15, 2007). "[Pressure builds on Snake River dams](#)", *The Columbian*.
16. <sup>^</sup> [20 Years of Progress: Hydropower](#)
17. <sup>^</sup> [Minidoka Project](#), USBR
18. <sup>^</sup> Robinson, Erik (October 7, 2006). "[Breach Snake River dams, says ex-Secretary Babbitt](#)", *The Columbian*.
19. <sup>^</sup> Lynda V. Mapes (March 5, 2006). "[Changing currents - In the endless fray over fish, dreams and decisions drift](#)", *The Seattle Times*.
20. <sup>^</sup> <sup>*a*</sup> <sup>*b*</sup> [Lower Snake River Transportation Study Final Report](#), American Rivers
21. <sup>^</sup> Harden, Blaine (1996) *A River Lost: The Life and Death of the Columbia*, W.W. Norton & Company. ISBN 0-393-31690-4

## **[[edit](#)] External links**