

III. Refuge and Resource Descriptions

3.1 Geographic / Ecosystem Setting

SeedsKadee NWR is 26,382 acres in size and located in southwestern Wyoming along the Green River (Map 1). The entire Refuge is within Sweetwater County in the heart of the Green River Basin. Geographically, the Refuge is long and narrow and bisected throughout its length by the Green River. Biogeographers have divided North America into provinces; natural regions that share similar climate, soils, topography, and vegetation. The Refuge is within the *Wyoming Basin* province—a high elevation Great Basin shrub dominated habitat.

The Service has adopted an ecosystem approach to national natural resource management and has identified 52 ecosystems within the United States. Within the U.S. Fish and Wildlife Service's ecosystem organization, the Refuge lies within the Upper Colorado River Ecosystem (Map 2). The Upper Colorado River Ecosystem incorporates the watersheds, headwaters, tributaries (including the Green River), and mainstem of the Colorado River in Wyoming, Utah, and Colorado. Browns Park National Wildlife Refuge in northwestern Colorado and Ouray National Wildlife Refuge in northeastern Utah are two other national wildlife refuges in the ecosystem. The three refuges share many similarities. All are located along the Green River, the primary tributary to the Colorado River system and have significant amounts of marsh and riparian habitat. Together, the three refuges form a valuable complex of wildlife habitat.

The proposed management priority issues and goals for the Upper Colorado River Ecosystem focus on national trust resources (endangered species, migratory birds, and wetlands). Further, recreation is recognized as a high priority where conflicts with native species and their habitats do not occur. The following are the priority resource issues and goals for the Upper Colorado River Ecosystem.

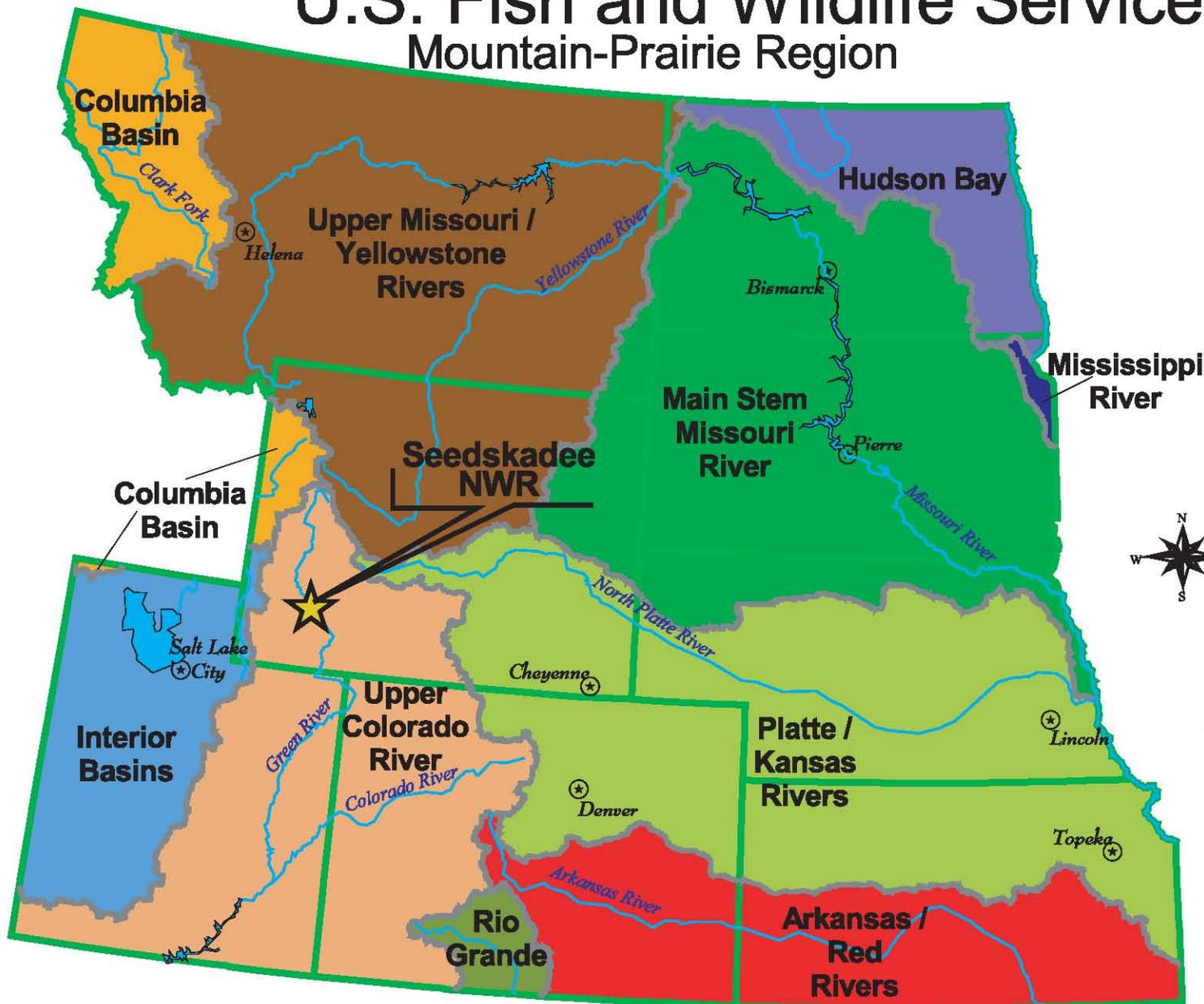
Priority Resource Issue: Decline of native aquatic communities due to construction of dams and reservoirs; and . . . recovery of native aquatics while recognizing competing demand for recreational use of nonnative sport fishing.

Goal: Restore and maintain an aquatic system capable of supporting the diversity of native aquatic communities to achieve recovery of listed and candidate species and prevent the need for future listings.

Priority Resource Issue: The quality and quantity of native wetland and riparian habitats continue to decline via floodplain development, intensive land use, and impoundments of water courses throughout the Upper Colorado River Ecosystem. Changes in flow regimes and channel manipulation result in significant management issues for continued health.

Goal: Reverse the trend; restore, maintain, and enhance the species composition, areal extent, and spatial distribution of wetland and riparian habitats.

U.S. Fish and Wildlife Service Mountain-Prairie Region



Draft

Map #2 Ecosystem Map

Priority Resource Issue: Terrestrial biological diversity within the Upper Colorado River Ecosystem has declined due to the degradation of terrestrial habitats. Range and forest land management practices, both public and private, have resulted in the fragmentation, degradation, and loss of terrestrial habitats.

Goal: Promote terrestrial biological diversity and ecosystem stability through sound land management practices thereby avoiding fragmentation, degradation and loss of terrestrial habitats.

3.1.1 Climate

The Refuge's climate is characterized by long, cold winters and short, warm summers with a growing season of about 90 days. Temperatures typically range from minus 30 degrees Fahrenheit to 90 degrees Fahrenheit with frost penetration to 50 inches. Most precipitation falls during spring and early summer. December and January are the driest months. Winds are predominately from the west-northwest and average 8 to 10 mph. Average annual precipitation is 6.48 inches.

3.1.2 Geological Resources

Beds of limestone, sandstone, and shale, ranging in age from Upper or Middle Cambrian to Upper Cretaceous, underlie the area. Overlying this are gently warped Tertiary sediments averaging several thousand feet in depth and extending up onto the flanks of the surrounding mountains from which they were derived. Upper Green River Basin formations contain rich deposits of coal, oil, natural gas, and soda ash (trona).

3.1.3 Soil Resources

The soils located within the Seedskadee NWR are described in the BLM Green River Resource Area Resource Management Plan (1992) to include the following four soil units:

- II Cambarge, Pepal, Huguston, Leckman soils (northern and western portion of the Refuge)
 - Deep, well drained, gravely sandy loam and fine sandy loam soils formed on nearly level or sloping stream terraces and alluvial fans. Elevations are from 6,200 to 6,500 feet. Precipitation ranges from 7 to 9 inches per year.

- II Teagulf, Huguston, Haterton, Wint, Tasselmann, Seedskadee, Leckman, Kandaly soils (eastern portion of the Refuge)
 - These soils are moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevations are from 6,100 to 6,700 feet. Precipitation ranges from 7 to 9 inches per year.

- II Kandaly, Westvaco, Haterton, Teagulf, Huguston soils (eastern portion of the Refuge)
 - Deep sand dunes intermingled with moderately deep to very shallow, well drained, strongly alkaline soils formed on rolling upland plains and fans. Included in this unit are some areas of badlands. Elevations are from 6,300 to 7,000 feet. Precipitation ranges from 7 to 9 inches per year.

- II Dines, Quealman, Chrisman soils (mid- to southern-portion of the Refuge, bottomlands)
 - Deep, poorly to well-drained soils formed on nearly level or sloping floodplains, bottomlands, and alluvial fans. Some soils in this unit are strongly saline and/or alkaline. Elevations are from 6,000 to 6,600 feet. Precipitation ranges from 7 to 9 inches per year.

Seedskadee NWR's sandy soils (Kandaly, Westvaco, Huguston) are very susceptible to wind erosion when the protective vegetative cover has been removed. Soluble salt levels in some soils affect management potentials due to toxicity, reduced infiltration rates, limits on nutrient availability, and reduction of water available to plants. Major causes of increased salinity contribution from public lands are irrigation, overgrazing, off-road vehicles, and energy exploration and extraction. These activities cause some compaction of the soil surface, with a reduction of plant cover, which in turn leads to increased runoff carrying salt laden sediments into drainages. Within the region, moderately saline soils can be found along major drainages such as the Green River, Big Sandy River, Bitter Creek, and Blacks Fork River. Soils especially susceptible to surface disturbing activities include unstable soils, sandy soils and erosive soils.

3.1.4 The Seedskadee Project and Mitigation - Early Proposals

Based upon Bureau of Reclamation feasibility studies completed in 1950, the Seedskadee Project was authorized for construction as one of the series of projects included in the 1956 Colorado River Storage Project Act. The original primary purposes of the Seedskadee Project were: 1) diversion of water from the Green River and delivery of irrigation water to 60,720 acres of previously undeveloped desert lands, and 2) development of a wildlife refuge as mitigation for losses of fish and wildlife habitat. The lands proposed for irrigation were to parallel the Green River on both sides and include 51,690 acres of family farm units and 9,030 acres of community pasture. The Refuge was to be located along the Green River surrounded by irrigated community pasture and privately-owned and operated farmlands.

Project feasibility studies continued after project authorization. By Act of Congress in 1958, authorization was provided for withdrawals of public lands and acquisition of privately-owned lands to achieve project purposes, namely, project works and canals, lands for agricultural use, and lands for mitigation developments. By 1959, it was determined that a dam and storage reservoir (Fontenelle), as opposed to the originally proposed diversion structure, would be necessary to regulate Green River flows and to deliver water to farm units, community pastures, and the Seedskadee NWR. The 1959 Definite Plan proposed an 18,000-acre refuge with water supplies from return irrigation flows, direct Green River flows, and storage releases from Fontenelle Reservoir.

By the mid-1960s, approximately 193,850 acres had been withdrawn or acquired by Reclamation for project purposes. Prior to dam and reservoir construction, the 1959 Definite Plan was modified to include a larger dam and reservoir to provide municipal and industrial water storage. The dam was completed in April 1964, creating a 20-mile-long reservoir upstream from Seedskadee NWR and with a total storage capacity of 345,000 acre-feet that at full pool, inundates almost 13 square miles. However, even prior to completion of the dam, the economic feasibility of the original Seedskadee Project concept began to unravel. A stop-order was issued by Reclamation in May 1962 to suspend construction of delivery canals and irrigation features until economic viability of the proposed high altitude farm units could be reasonably demonstrated.

In 1972, a revised Definite Plan for the Seedskadee Project was prepared that significantly scaled back and phased in the acreage which might be made available for irrigable farmland; increased commitments for downstream industrial and municipal water; planned a 34,000 acre-feet annual water supply for the Seedskadee National Wildlife Refuge; and continued to provide flood control and power generation purposes. The 1972 Reclamation Plan reported that \$430,000 had been spent-to-date on acquisition of Refuge lands and Refuge planning and construction.

Eventually, it was determined that irrigated farm units and community pastures, the original driving motivation for development of the Seedskadee Project, were not economically viable at this location and altitude, and that there could be conflicts between development of irrigated farmlands and the successful extraction of underlying and adjacent Green River Basin trona deposits. The development of the farm units and the farm irrigation water delivery systems was abandoned. Although the key element in the Seedskadee Project was never realized, the motivation and interest in successful mitigation for habitat loss continued.

3.1.5 Fontenelle Dam and Reservoir and River Hydrology

Today, Reclamation's Fontenelle Dam and Reservoir purposes include water storage and regulation of the flows of the Green River for:

- 1) power generation,
- 2) municipal and industrial use,
- 3) fish and wildlife, and
- 4) recreation.

Fontenelle Dam is an earthen filled structure with a crest of 4,820 feet and a height of 116 feet above riverbed. Fontenelle Reservoir has a total storage capacity of 345,000 acre-feet. A power plant is located adjacent to the toe of the dam consisting of a 12 megawatt generator and one 16,000-horsepower hydraulic turbine. Although it is not a specified purpose of the facility, the reservoir provides incidental flood control on the Green River from the dam downstream to Flaming Gorge Reservoir.

Recreation facilities have been developed at Fontenelle by Reclamation including picnic areas, campgrounds, and boat launch facilities. Three Reclamation developed campgrounds (Tailrace, Weeping Rock, and Slate Creek) are located on the Green River below Fontenelle Dam and just upstream from Seedskafee NWR. These recreation facilities are now managed by the Bureau of Land Management.

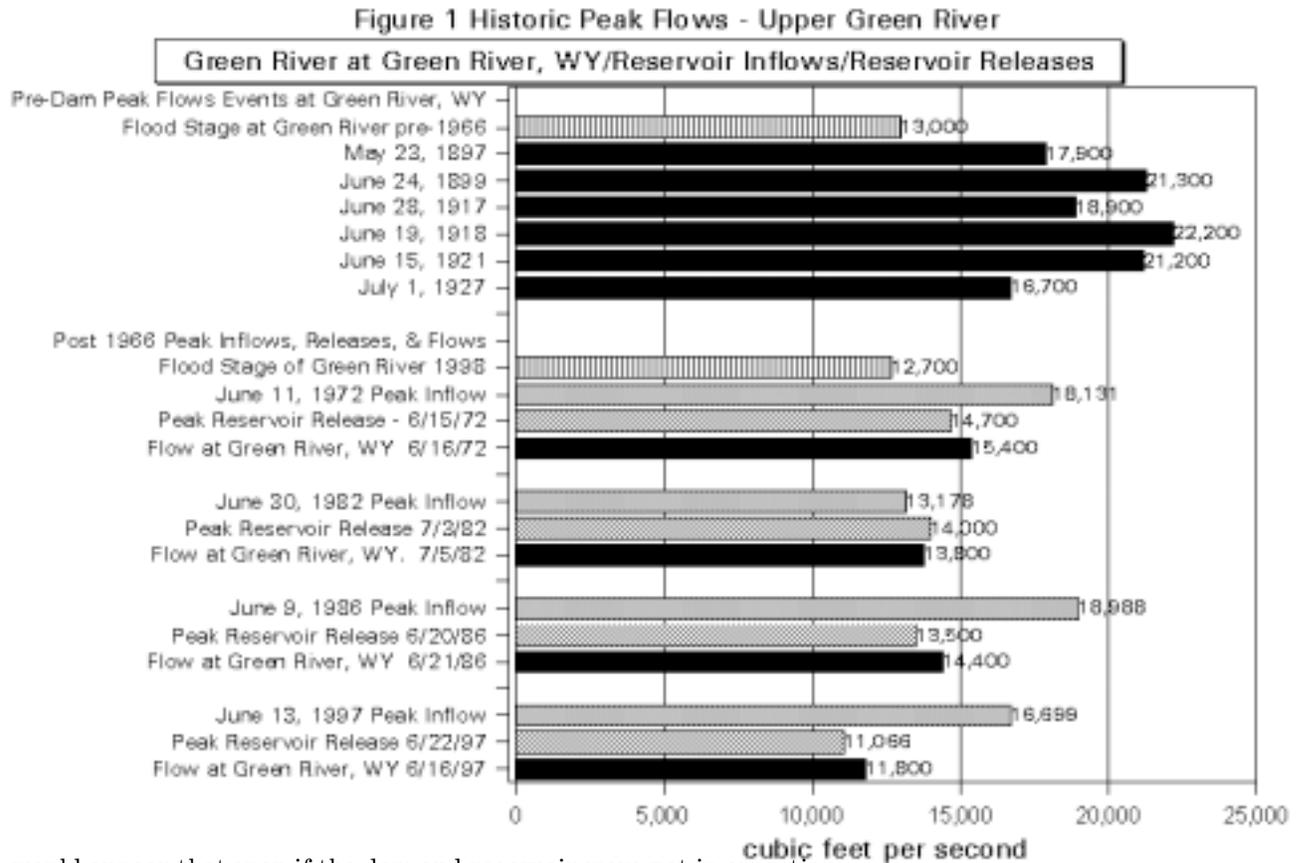
Operation of the dam and reservoir has moderated the historical downstream flows of the Green River. A number of factors guide operation of the reservoir and downstream releases. Among these are providing a marketable water yield from the reservoir to satisfy water commitments, providing minimum downstream flows for maintenance of the fishery and waterfowl habitat (a minimum flow of 300 cfs), power production, and dam safety.

Fontenelle Reservoir's storage capacity is small in relation to the inflows from the Upper Green River Basin (Ryan, 1998). Because the storage capacity is small compared to the inflow volume, there is limited operational flexibility available. In order to accommodate spring inflows, reservoir levels are dropped through the winter and early spring down to its minimum pool, 93,000 acre-feet, by April 1. This provides a runoff storage capacity of 252,000 acre-feet.

Flood control was not an original purpose of Fontenelle Dam and Reservoir. Outside of the City of Green River and its environs, few structures exist within the floodplain between Fontenelle Dam and Flaming Gorge Reservoir. The official flood stage at Green River, Wyoming is now set at 15,000 cfs; however, the National Weather Service would issue flood warnings to the City of Green River at 12,700 cfs (Ryan, 1998).

Because storage capacity is limited in relation to the river's flow volume, releases mimic natural river flow patterns but greatly moderate the highs and lows. These circumstances result in changes of the River hydrology downstream from the dam. Figure 1 displays some examples of changes in peak flow events. Historical flood event data (USDI, BOR 1959), showed periods of flows at the City of Green River exceeded 13,000 cfs between 1897 and 1921. These high flow events were of varying magnitude and duration (from two days in 1927 to nearly a month in 1899) and were of irregular frequency, but were substantially higher flows than those experienced at the City of Green River since 1966.

Figure 1 also displays flow data since 1966 and operation of the reservoir. Since 1966, there have been five flow events in which inflows into Fontenelle Reservoir have exceeded 13,000 cfs. The chart displays four of the five major flow events including the date and volume of peak reservoir inflow, the date and peak reservoir release, and the date and volume at the City of Green River for each event. An initial observation for these four events is that not only is the flow at the City of Green River substantially less than the historical peak flow events at the top of the chart, but the inflows into the reservoir are also less than three of the historical high flows at the City of Green River.



It would appear that even if the dam and reservoir were not in operation, flood events greater than 20,000 cfs, like those experienced in 1899, 1918, and 1921 would not have occurred on the Green River through Seedskafee and the City of Green River since 1966. However, the chart also displays that the peak flow volumes that were experienced on the Upper Green River since 1966 were substantially moderated with operation of the dam.

In three of the four peak flow events since 1966, peak flows below the dam and through the Refuge were substantially lower than the peak flows entering the reservoir. Note that for 1972, 1986, and 1997, flows at the City of Green River exceed the flow release from the reservoir reflecting downstream contributions from tributaries, notably the Big Sandy River.

In addition to moderating the peaks of high flows below the dam, reservoir operations have stabilized and raised winter low flows below the dam. Winter flows are maintained at higher than reservoir inflow rates to realize fishery and hydropower production benefits. Table 3.1 displays the range and average of inflows for December through February for each of the past four winters as well as the range and average of reservoir releases for the same time periods. Winter release rates are calculated to gradually and evenly drain the reservoir back down to its 93,000 acre-foot minimum pool by April 1 so that it has capacity to receive and store spring runoff. By gradually releasing the remaining storage pool, minimum flows and power production can be maintained throughout the winter season.

December, January and February	High Inflow	Low Inflow	Average Inflow	High Release	Low Release	Average Release
Winter 1994-1995	674	224	423.2	894	796	841.1
Winter 1995-1996	891	227	508.3	1332	1134	1,253.8
Winter 1996-1997	810	308	638.7	1321	1106	1,208.4
Winter 1997-1998	902	447	626.6	1469	1326	1,411.1

The relationship between inflows and releases at Fontenelle on the Green River are graphically depicted on consolidated hydrographs in Appendix H and provide a visual depiction and summary of the above discussions. The operation of Fontenelle Dam and Reservoir moderates flows of the Green River below the dam from what would be experienced if the dam were not in place. The high peaks of major high flow events are substantially reduced below the dam. The time between high peak inflows and high peak releases into the River below the dam is usually only a few days. Winter flow releases are fairly stable and substantially exceed inflows.

3.1.6 Area Socio-Economics

Prior to the mid-1800s, the region was populated by native Americans and occasional explorers, fur trappers, and traders. For several years, fur trappers and traders would travel long distances to annually swap goods, tales, and furs at rendezvous along the Green River. Starting with the 19th Century migration of settlers to the west coast and Utah, remote trading outposts and military posts were established, marking the first modern permanent settlement in the region. Hundreds of thousands of people and their livestock passed through southwestern Wyoming. They traveled the Mormon Trail, the Oregon Trail, the California Trail, and numerous cutoffs and shortcuts, all crossing the Green River and many passing through today's Seedskadee NWR.

The completion of the Union Pacific Railroad in May 1869 developed the first major Wyoming communities: Cheyenne, Laramie, Rawlins, Green River, and Evanston. Rock Springs, Superior, Frontier, Kemmerer, and other towns grew up where coal was successfully mined and used to fuel the rail engines.

Upon statehood, the Federal government retained lands that had not been converted to private ownership and the State of Wyoming was provided from those lands two sections in each township. Thus, by the end of the 19th Century, the landownership patterns were set. Privately-owned lands are primarily lowlands along streams and rivers, town sites, and the Union Pacific land grant. Generally, Wyoming owns two sections per township. But, most lands are Federally-owned being managed by the Bureau of Land Management, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Reclamation, or the National Park Service. Of the 6,773,340 acres in Sweetwater County, 1,828,641 acres are privately-owned, and they are held primarily by the railroad.

Rich natural resources underlie much of the Green River Basin and surrounding lands. Coal, trona, oil, and natural gas have been discovered and extracted in enormous quantities, often through lease of Federally-owned minerals. These mining operations and their processing operations and related coal-fired power plants have provided significant employment and growth opportunities for the region.

The region's economy is a product of history and environment. Principal sources of employment and income are mineral extraction and processing industries, tourism, service industries, government employment, and agricultural—primarily ranching, and transportation. The population density of Wyoming is low at 4.9 persons per square mile. People live in isolated ranches or relatively smaller cities and towns and are accustomed to traveling long distances for work, recreation, and shopping.

3.1.7 Population Growth

In 1950, the populations of the cities closest to Seedskadee NWR were 10,857 (Rock Springs), 3,187 (Green River), and 1,667 (Kemmerer). The 1990 census for these communities were 19,050, 12,711, and 3,020 respectively, establishing a net 121 percent growth. However, based on 2000 census data Rock Springs and Green River populations decreased to 18,708 and 11,805, respectively. Between 1990 and 2000, Sweetwater County's population decreased 3 percent while Lincoln County increased 15 percent. Wyoming's population in 2000 was 493,782 and is projected by the U.S. Bureau of Economic Analysis to grow slowly over the next 10 years.

3.1.8 Income

Per capita personal income for Wyoming in 1993 was \$15,415, 24th highest in the nation. However, with a higher percentage of its wage earners working in relatively higher wage paying production and extractive industries, per capita personal income for Sweetwater County in 1994 was \$20,666.

3.1.9 Economic Development Trends and Pressures

Employment over the past ten years in Sweetwater County peaked in 1994 at 19,935 jobs. This was up 2,599 jobs from 1989, or a 15 percent increase. By the first six months of 1998, employment in the county had declined to 18,594. In 1998, leading employment sectors were mining (3,668 jobs), retail trade (3,414), local government (3,320), services (2,629), transportation, communication, and public utilities (1,447), manufacturing (1,445), and construction (1,041), with other sectors having fewer than 1,000 workers in each. Retail trade and services are economic sectors which have grown over the past decade and can be expected to continue to grow with tourism, relative stable economies, and growth in leisure time and disposable income. Wyoming economic development efforts often credit the State's natural wonders and National Parks, recreational opportunities, abundance of open space and wildlife, and the absence of personal or corporate State income taxes.

3.1.10 Changes in Demand for Outdoor Recreation

Outdoor recreation continues to grow in popularity with over 70 percent of people 16 and over participating in some form of outdoor recreation. A U.S. Forest Service study (1989) projects significant continuing growth in participation in activities such as day hiking, backpacking, camping, canoeing, kayaking, rafting, cross-country skiing, bicycling, wildlife observation, and photography through the next several decades.

It is estimated that about 70 percent of visitors to Seedskafee NWR live within the region. With continuing higher than average per capita income, projections for statewide and regional population growth, and overall growth in participation in outdoor recreation, visitation to Seedskafee NWR will likely increase over the decades ahead.

3.2 Refuge Resources, Cultural Resources, and Public Uses

3.2.1 Water Rights

Wyoming water law dates back to territorial days and is based on the “doctrine of prior appropriation.” Under this doctrine, the first to put the water to beneficial use has the most senior right. When adequate water supplies are available for all users, the issue of senior water rights is minor. This has been the case for the use of water by the Refuge since it was established. As demands increase for the use of water from the Green River and the Colorado River and its tributaries, this will likely become an important issue for the Refuge in the future. Water rights held by the Refuge are summarized in Table 3.2.

Permit #	Cert. #	Name	Flow, Storage, Use	Priority Date
12202	15164	Hamp No. 1	1.54 cfs	1/9/1914
12203	15165	Hamp No. 2	1.67 cfs	1/9/1914
12203	15166	Hamp No. 2	4.04 cfs	1/9/1914
13463	24399	Rood Ditch	1.00 cfs	4/28/1913
15906	20188	Herman Ditch	0.17 of .99 cfs	12/9/1920
15907	20189	Otterson Ditch	1.18 cfs	12/9/1920
15907	20191	Otterson Ditch	0.19 cfs	12/9/1920
15907	20190	Otterson Ditch	1.35 cfs	12/9/1920
15907	20758	Otterson Ditch	2.27 cfs	12/9/1920
15907	21649	Otterson Ditch	2.65 cfs	12/9/1920
16985	22614	Tallman Ditch	1.30 cfs	6/13/1925
22364		Fontenelle Res	115.00 cfs; FW Use	4/26/1955
22365		Res Outlet, Canals	0.00 cfs	7/9/1962
22368		Fontenelle Res	0.00 cfs; FW Use	7/9/1962
3576E	36028	Superior Enl.	.13 cfs	4/6/1916
4006E	36029	Superior Enl.	1.04 cfs	5/19/1919
5330E	24400	Rood Ditch Enl.	0.14 cfs	4/29/1942
5402-E	26566	Hamp No. 2 Enlarge	0.56 cfs	6/26/1945
6629 RES		Fontenelle Res	5,000 acre-feet storage for FW Use	1/22/1962
U.W. 47679		Headquarters Well No 1	50 gpm; Domestic use	4/23/1979
U.W. 69131		Headquarters Well No 2	30 gpm; Fire Protection Use	12/14/1984

The Refuge staff believes it holds sufficient water rights to implement its goals and objectives based on the following reasons:

1. Irrigation water rights were attached to the agricultural lands acquired for the Refuge and are utilized to restore, enhance, or create wetlands and other habitats.
2. Under Contract No. 14-06-400-6193 with Reclamation, first priority to 5,000 acre-feet of Fontenelle Reservoir storage water is reserved to the United States for use on the Seedskaadee NWR.
3. The Refuge is allocated up to 28,000 acre-feet annually, at a rate of 115 cfs, deliverable under Reclamation’s Direct Flow Permit for wildlife refuge requirements.

3.2.2 Refuge River Jurisdiction

Navigability and jurisdiction on and under water bodies, including lakes, rivers, and streams, is a complex and confusing issue. Most states, including Wyoming, have chosen to rely on precedents set by court decisions rather than resolve those issues legislatively.

The only body of water in the State of Wyoming that is considered to be navigable by Federal agencies (Corps of Engineers [COE]) is the Flaming Gorge Reservoir to its high water mark. While the Wyoming Constitution declares all natural waters within the State the property of the State, the Supreme Court of Wyoming concluded in a 1961 decision (Platte River Boating Supreme Court Decision) that there are no navigable water bodies in the State. In that same decision, the Wyoming Supreme Court also declared the river bottoms to be the property of the adjacent landowners. In essence, according to the court's interpretation, a person may float on the publicly owned water, but could not anchor that boat nor wade on the river bottom.

Federal Courts have clarified these issues in regards to Federal agencies (i.e. National Parks, National Forests, National Wildlife Refuges) that own and manage lands that encompass portions of water bodies (lakes or rivers). The Federal Courts have consistently maintained that Federal agencies have jurisdiction over recreational uses on these water bodies when the water body is integral to the primary purposes for which the park, refuge, or forest were established.

For example, in the *U.S. v. Hells Canyon Guide Service* case, the District Court maintained that the Property Clause of the Constitution gave the government power "to regulate conduct on non-federal land {the Snake River that runs through the National Forest} when reasonably necessary to protect adjacent Federal property or navigable waters." In addition, this case stated "Congress' power over Federal lands includes the authority to regulate activities on non-federal waters in order to protect the archaeological, ecological, historical and recreational values on the lands" (*United States v. Hells Canyon Guide Service*; U.S. District Court of Oregon, Civil No. 79-743; 5-6; 1979).

In the court decision in *U.S. v. Brown*, the Circuit Court wrote, "... we view the congressional power over Federal lands to include the authority to regulate activities on non-federal public waters in order to protect wildlife and visitors on the lands" (*United States v. Brown*, 552 F.2d 822; 8th Cir. 1977).

Finally, in the *U.S. v. Armstrong* case, the Circuit Court upheld a conviction against Armstrong and Brown who were conducting a commercial business without a permit within a National Park. In this case, the Circuit Court relied on a U.S. Supreme Court precedent stating, "In *Kleppe v. New Mexico*, 426 U.S. 529, 546 (1976), the Supreme Court held that Congress may make those rules regarding non-federal lands as are necessary to accomplish its goals with respect to Federal lands" (*United States v. Armstrong*; No. 99-1190; 8th Cir. 1999).

The primary purposes of Seedskaadee National Wildlife Refuge were established in Section 8 of the Colorado River Storage Act of 1956. Pertinent sections of this act read:

In connection with the development of the Colorado River storage project . . . , the Secretary [of the Interior] is authorized and directed to investigate, plan, construct, operate, and maintain . . . (2) facilities to mitigate losses of, and improve conditions for, the propagation of fish and wildlife.

There is no question that the Green River played a critical role in the establishment of Seedska-dee Refuge and is a necessary component for the Refuge to meet its primary purposes. However, regardless of jurisdiction, the Refuge's first priority is to strive to work with appropriate departments within the State of Wyoming to meet Refuge management goals and objectives.

3.2.3 Reserved Rights and Privately-Owned Mineral Estate

Purchase of many tracts on the Refuge were subject to existing rights-of-way or granted in deeds at the time of purchase. Some of these existing rights-of-way include Sweetwater County Road near Big Island, a 200 foot highway right-of-way to the Wyoming Highway Department along State Highway 28, buried telephone and electric lines along Highway 28, and a high voltage power line through the south end of the Refuge.

Many tracts of land also contain outstanding reserved subsurface minerals. On these lands, oil and gas leasing is limited to those areas on which drainage is occurring from adjacent public land leases. Currently, there are active oil and gas leases on 2,390.4 ac of the Refuge although none are currently under development. According to the 1997 BLM Green River Resource Management Plan, there is an "oil shale withdrawal" extending over the entire Refuge, Farson, and Green River area to protect wildlife values of this area. However, the BLM lands surrounding the Refuge are completely leased for oil and gas (BLM Green River RMP, 1997). Minerals are privately owned on about 15,000 acres purchased from private parties and the State of Wyoming by Reclamation.

Because there are proven economic reserves of oil, gas, trona, and aggregates within and near the Refuge, the Refuge is experiencing, and will continue to experience, direct and indirect impacts from mineral exploration and developmental activities. Regulation of mineral activities can be grouped into one of three categories.

Locatables (Hardrock): Regulations for mining on refuges and the Mining Act of 1872, as amended, are contained within the Code of Federal Regulations at 43 CFR 3500 and 3800, and 50 CFR 27. On Seedska-dee NWR, where valid existing mineral rights are outstanding, the exercise of such rights will be permitted by a special use permit issued by the project leader. The permit does not affect the vested right of the mining claimant to reasonable access to the claim for prospecting and mining. The presence of locatable (hardrock) minerals within the Refuge is unknown.

Leasables: This category includes those minerals that are disposable only by leases issued under the authority of the Mineral Leasing Act of 1920 as amended. By Federal regulations, the Secretary of Interior has determined not to issue leases on lands within the contiguous 48 states that are in the Refuge System except where it is determined by the Service and BLM that a lease should be issued to prevent the loss of oil or gas underlying the Refuge by drainage or that the lands are needed for unitization and/or spacing requirements (43 CFR 3103.5). Although leases are issued by the BLM, they are subject to conditions recommended by the Service for reasonable access and the protection of Refuge resources.

Salables: Salables are common variety materials, which may be sold, or given away to other governmental units and nonprofit organizations, at the discretion of the Service, and with stipulations to protect refuge resources (Mineral Materials Act of 1947, 43 CFR 3600, and 50 CFR 29). Salable minerals within the authorized Refuge boundary potentially include sand, gravel, crushed stone, and rock. There is one abandoned gravel pit along the Green River in the southern portion of the Refuge.

The Fish and Wildlife Service Manual (612 FW1) goes into detail on the Service's responsibility in exploration and production activities, processing permit applications, and protecting wildlife and refuge resources. Basically, the Service has three distinct roles involving mineral activities on refuge lands:

1. Management of surface use operations to minimize adverse environmental consequences and to ensure proper reclamation of disturbed lands.
2. Validation of mining claims (the BLM administers United States mining laws).
3. Reviewing right-of-way applications for ancillary activities such as pipelines and railroad spurs crossing refuge lands.

The Bureau of Land Management is responsible for granting a right-of-way for off-lease facilities, and intra-service coordination on right-of-way applications is the responsibility of the service's Division of Ecological Services. The Service policy on rights-of-way is not oriented toward analyzing cost-effectiveness or social impacts, but to minimize impacts on wildlife.

Rights were reserved to water and roundup livestock according to Warranty Deeds with the Rock Springs Grazing Association and Crosson Ranches Inc. Specific rights are outlined in each Warranty Deed which are located in Refuge files. The construction of 17 water access lanes has fulfilled most livestock watering requirements. Crosson Ranches has access to specific Refuge lands for the purposes of calving and rounding up cattle. Other rights involve access to various ditches and headgates for the maintenance of irrigation systems.

Adjacent Land Use: Nearly all adjacent lands are federally-owned and managed by either the BLM or Reclamation. Use of these lands primarily consists of grazing by livestock (cattle, sheep, horses), extraction of oil and gas, and outdoor recreation. Several private ranches exist near the Refuge. Rock Springs Grazing Association also owns large tracts of land, primarily adjacent to the southern half of the Refuge and south of the Refuge. They also hold cooperative grazing leases with the BLM along much of this area.

Mining is the other principal economic use of the adjacent lands. Southwestern Wyoming produces approximately 90 percent of the world's soda ash. One trona mine is located immediately downstream of the south border. There is also a large natural gas processing plant near the north end of the Refuge (Shute Creek -Exxon plant).

3.2.4 Refuge Vegetation and Wildlife Habitats

SeedsKadee NWR is located on what is classified as a high desert plain. Native upland plant associations include sagebrush/grass, greasewood and shadscale. Bottomland plant associations include wet meadow riparian types with willows and cottonwoods dominating the overstory (Map 3).

Various agencies and consultants have worked with the Refuge staff in conducting past and current studies on vegetation and habitat at SeedsKadee NWR. Because the studies have been done for different purposes, they have not been consistent in their classifications of habitat types or vegetative communities. Information from these studies has been utilized in this section and in the preparation of vegetation maps. For vegetation community components and descriptions, the text primarily relies upon SeedsKadee National Wildlife Refuge Wildlife-Habitat Matrix and Species Accounts, prepared for the Refuge by Pioneer Environmental Services, December 22, 1997. A copy of the report is available for review at the Refuge.

While the broad habitat types may be consistent, there are variations in subgroupings. Therefore, in the discussions of the various groups and communities, the corresponding groups or classifications as mapped will be listed for cross referencing purposes.

Habitat on the Refuge can be separated into four broad types: riverine, wetlands (marsh and wet meadow), riparian (shrub and forested), and upland (sagebrush and mixed low stature shrublands).

The following text provides general information about each of these broad habitats that are displayed on Map 3. Table 3.3 provides acreage of each vegetation type (Berk 1998).

Table 3.3. Vegetation Type and Acreage on Seedskaadee NWR, July 1997 (Berk 1998)		
Category	Description	Acres
Wetland	Open/ponded Water	174
	Cattail Dominant	31
	Bulrush Dominant	54
	Short Emergents	32
	Mixed Tall Emergents	89
	Perennial Pepperweed	400
	Existing Managed Wetlands	335
Wetland Subtotal		1,115
Riparian	Grass/Herbaceous	1,629
	Buffaloberry Bush	4
	Willow	322
	Mixed Riparian Shrub	1,134
	Cottonwood Closed ¹ /grass understory	75
	Cottonwood Closed/shrub understory	188
	Cottonwood Moderate ² /grass understory	342
	Cottonwood Moderate/shrub understory	332
	Cottonwood Scattered ³ /grass understory	111
	Cottonwood Scattered/shrub understory	212
Riparian Subtotal		4,349
Upland	Sagebrush Dominant	15,874
	Greasewood Dominant	218
	Low Stature Shrub	3,120
Upland Subtotal		19,212
Riverine	Main River Channel	1,254
	Bare Ground/Sand Bars	140
Riverine Sub total		1,394
Total Acres Seedskaadee NWR ⁴		26,070

¹ Closed = greater than 70 percent canopy cover

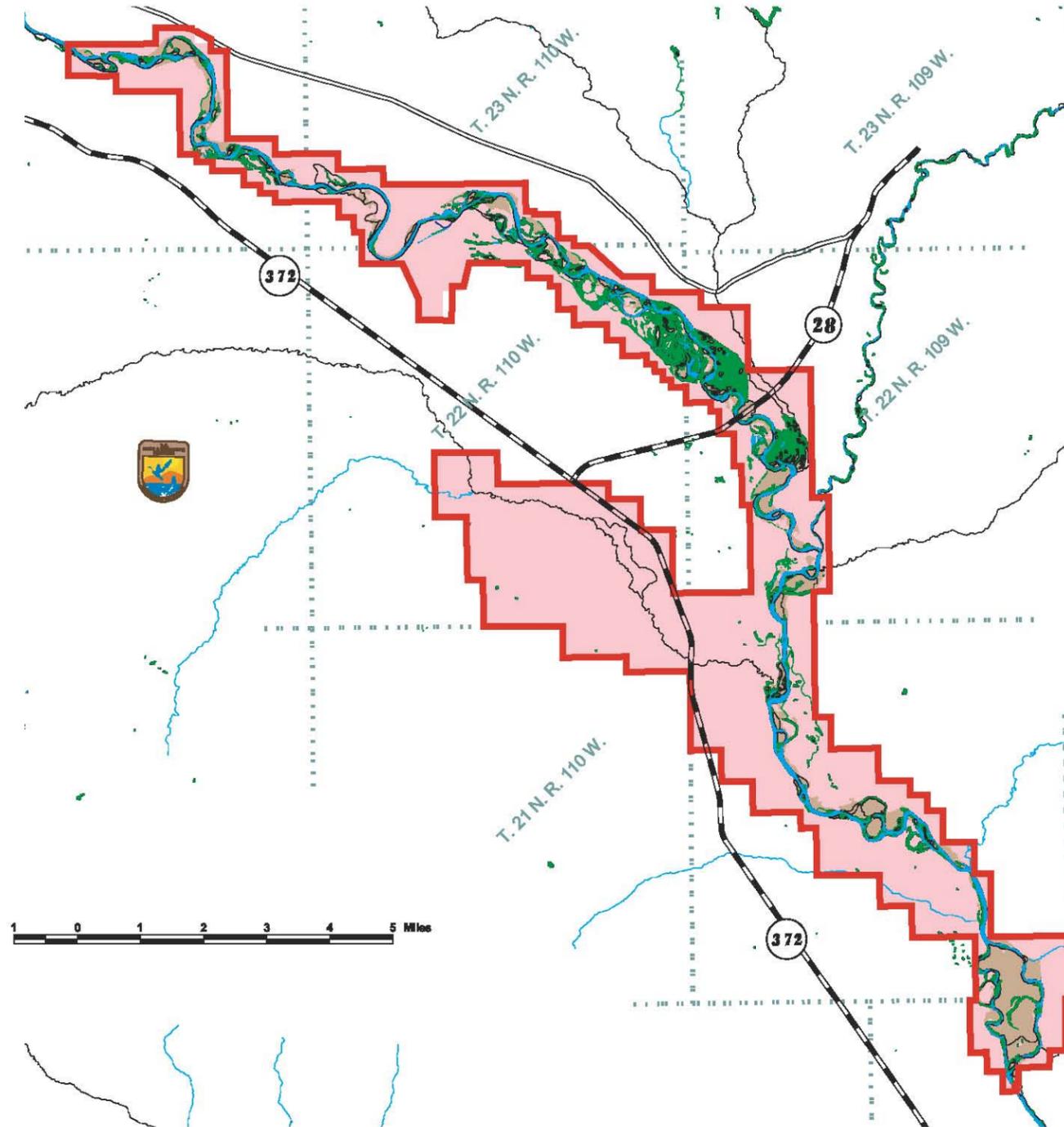
² Moderate = 30 to 70 percent canopy cover

³ Scattered = less than 30 percent canopy cover

⁴ Acreage does not include recent roundouts (current refuge acreage = 26,382)

Seedskadee National Wildlife Refuge

Sweetwater County, Wyoming



Legend

- Habitat Types
- Upland
 - Riparian
 - Wetland
 - Riverine/Palustrine Open Water



Refuge Location



State of Wyoming

Draft

Map #3 Dominant Habitat Types

3.2.4.1 Riverine

Riverine habitats encompass those sites occupied by the active river channel that are directly and dramatically influenced by the seasonal hydrology of the Green River. Riverine habitats are made up of two components denoting the presence or absence of flowing water. Permanent water sites (1,254 acres) encompass only the active river channel and feature flowing water. The remainder of the habitat (140 acres) is gravel bars, sandbars, mud flats, and other similar sites which occur within the active river channel, are not submerged, and which do not support permanent vegetation.

The river provides habitat for waterfowl, raptors, other birds such as gulls and shorebirds, and aquatic species including fish. Due to the influence of Fontenelle Dam, portions of the Green River remain ice-free, providing important wintering habitat for trumpeter swans, bald eagles, and waterfowl.

The vegetation map (Map 3) displays riverine habitat as riverine/palustrine open water. Riverine habitats include the main Green River channel and sandbars/ bare ground (Table 3.3).

3.2.4.2 Wetlands

Approximately 1,115 acres of wetland habitat exists on the Refuge including open water, marshes, and wet meadows (Map 3). Wetland development and management has been the primary focus at Seedskadee NWR since its creation. In the 1980s, approximately 300 acres of wetlands were created in the Hamp, Hawley, Lower Hawley, and Dunkle wetland management units (Map 4 Habitat Management Units). Water from the Green River is diverted through a series of ditches to fill seasonally and permanently flooded wetlands which provide habitat for waterfowl, shorebirds, and other marsh dependent wildlife. This flow-through system returns much of the diverted water back into the Green River.

Wetland management on the Refuge consists of controlling the timing and the extent of water delivery to the units, drawdown of some ponds to produce habitat for shorebird species, occasional dry-down of units to increase aquatic productivity, and prescribed burning to prevent excessive cattail encroachment into open water. A maximum of 50 percent encroachment is desired. Flooding begins in mid-March, after the thaw, and some of the ponds are kept full through the fall. This provides habitat for both spring and fall migrants and breeding waterfowl. Meadows are generally flooded for 2 to 3 weeks in the spring and fall to provide food for shorebirds, cranes, geese, and ducks. The ability to divert water into wetlands relies entirely on elevation of the Green River. During moderate to severe drought, it may be difficult to divert sufficient flows.

Some of the species that use this habitat for breeding include: trumpeter swan, Canada geese, numerous species of ducks, rail species, marsh wren, red-winged blackbird, yellow-headed blackbird, tiger salamander, boreal chorus frog, northern leopard frog, mink, and muskrat. Refuge wetland units are identified as important breeding areas for trumpeter swans in the draft Service "plan for enhancing the Rocky Mountain Population of trumpeter swans on units of the NWR system (2001)."

Seedskaadee NWR wetlands may be grouped and described as follows:

Open ponded water encompasses all ponds that are entirely free of permanent emergent vegetation. Open ponded water habitats may be flooded either year-round, seasonally, or according to some management schedule.

Open ponded water habitats provide cover for aquatic wildlife and protection from terrestrial predators for amphibious wildlife. Such habitat also provides herbaceous vegetation, tubers, roots, seeds, fruits, invertebrates, and vertebrate foods. On Seedskaadee, vegetative components probably include filamentous algae, coontails, mare's tail, and several species of pondweeds. Floating macrophytes are assumed to be insignificant. Where salinity is high, horned pondweed, widgeon grass, and fennel-leaf pondweed may predominate.

Tall emergent habitats are either cattail-dominant or bulrush-dominant. These marshes are typically flooded to an average depth of up to 2 meters year-round, although depth will vary seasonally. Site vigor depends on periodic drawdowns that oxidize the organic substrate. Vegetation is typically taller than 1 meter above the water surface.

Tall emergent cattail-dominant habitat provides herbaceous forage and tubers for a limited array of wildlife species, as well as, invertebrates and vertebrates. Tall emergent bulrush-dominant habitats provide herbaceous forage, tubers, and seeds, in addition to invertebrates and vertebrates. Both habitats provide dense cover for a variety of wildlife species.

Short emergent habitats are typically flooded to an average depth of less than 0.25 meter for at least three months, although the timing and duration of flooding may vary from year-to-year. Short emergent habitats are characterized by soils that are saturated year-round. Vegetation is generally less than 0.5 meter tall.

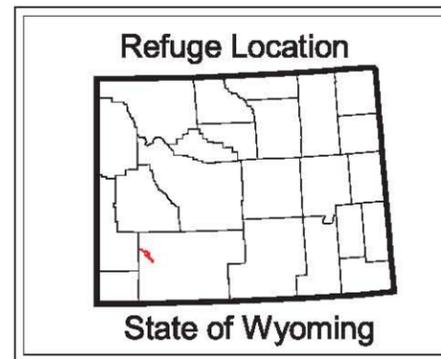
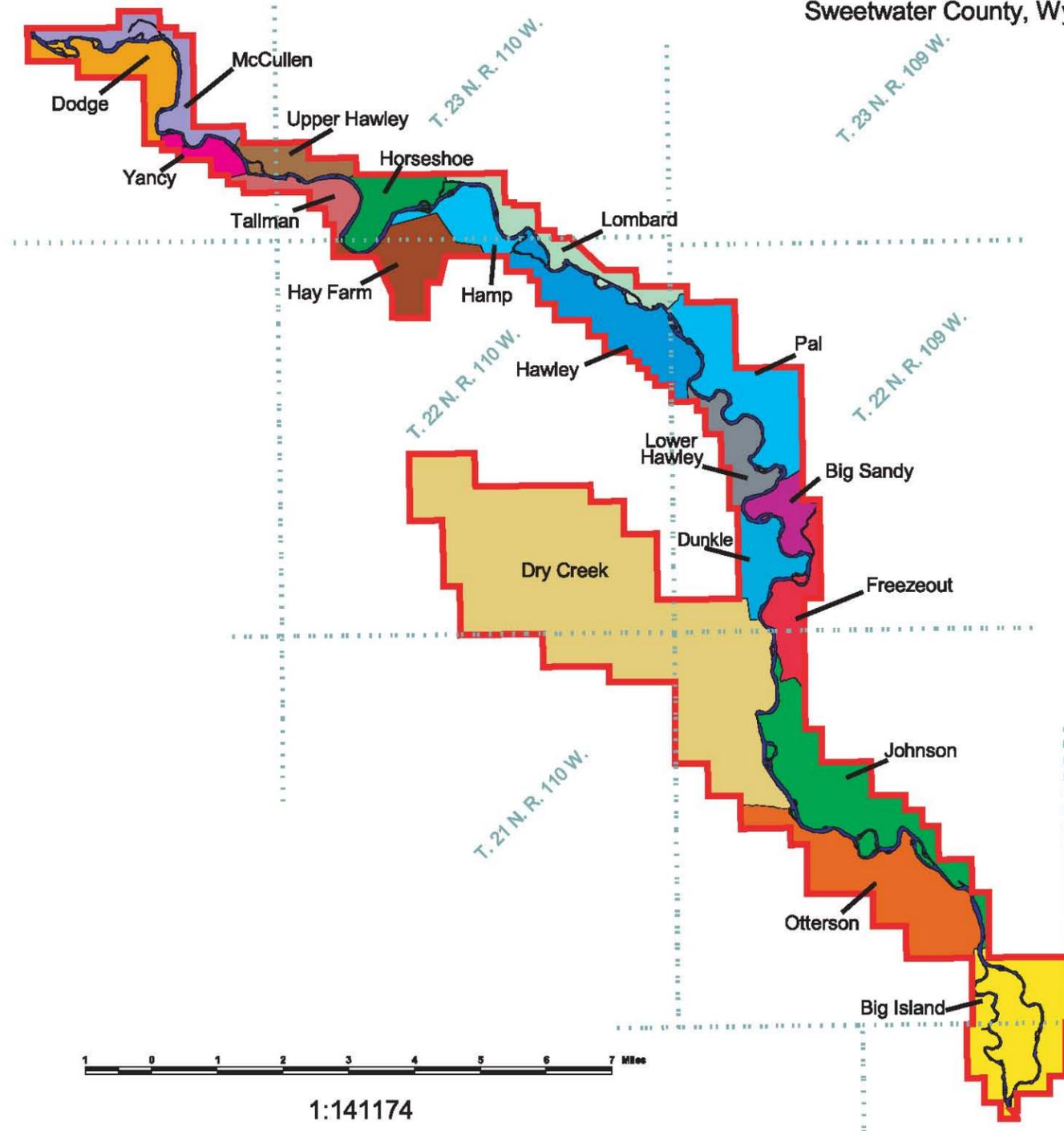
Probable associates in short emergent habitats include spikerush, Baltic rush, alkali bulrush, creeping foxtail, reed canarygrass, several sedges, and many others.

Dense, continuous short emergent habitats provide vertical and horizontal cover for many species of wildlife. When flooded, these sites provide herbaceous material, tubers, seeds, and abundant invertebrate foods. When standing water is absent, these sites continue to yield herbaceous and seed resources; however, invertebrates diminish somewhat and terrestrial vertebrates may become more abundant.

The above wetland communities are displayed as Wetlands on Map 3. Vegetation types include open/ponded water, cattail dominant, bulrush dominant, mixed tall emergents, short emergents, and perennial pepperweed vegetation types (Table 3.3).

Seedskaadee National Wildlife Refuge

Sweetwater County, Wyoming



Draft
Map #4 Habitat Management Units

3.2.4.3 Seedskadee Managed Wetland Units

3.2.4.3.1 Hamp Wetland Unit

The Hamp Wetland Unit is 55 acres and contains a wetland complex of short emergent, tall emergent, and open water determined largely by topography (Map 5). The unit is fed by the Hamp No. 1 headgate, and water gravity flows into the wetland. At flows of 2,000 cfs or greater, adequate water exists to maintain most of the unit at full pool. Pool depths at full pool range from 0.3 to 1.25 meters. Vegetation is dominated by creeping foxtail and perennial pepperweed. Areas of softstem bulrush and spikerush are found along the margins. Open water areas are found adjacent to the dikes and in the ditches. They provide little submerged aquatic vegetation except in the ditches. The unit contains a number of dikes with drop-board water control structures. In reality, this unit is managed together as a whole by adjusting the flow into and out of the wetland unit. Management of individual pools separately is difficult because of the water delivery system.

3.2.4.3.2 Hawley, Lower Hawley, and Dunkle Wetland Units

The Hawley (24 acres), Lower Hawley (147 acres) and Dunkle (36 acres) wetland units each contain a complex of short emergent, tall emergent, and open water (Map 5). The vegetative composition of each of these units is determined largely by the wetland units topography. The units are fed by the Hamp No. 2 headgate, and water flows by gravity into the Hawley Unit first, followed by Lower Hawley and Dunkle Units. At flows of 1,200 cfs or greater, adequate water exists to maintain most of the Hawley unit at full pool. At lower flows, water must be rotated between individual pools to maintain adequate head pressure. At flows less than 1,200 cfs, adequate water may not exist to maintain the Lower Hawley and Dunkle units at full pool. Vegetation in each wetland unit is comprised of a diverse mix of short emergents (spikerush and Baltic rush), tall emergent (cattail and softstem bulrush) and submerged aquatics. Open water areas are found throughout the Hawley unit and provide large amounts of submerged aquatic vegetation. Open water areas in the Lower Hawley and Dunkle Units exists adjacent to dikes and provides limited submerged aquatic vegetation. All wetlands contain a number of dikes with drop-board water control structures. Management of sub-unit pools is difficult because of the water delivery system. The Hawley Unit provides the best opportunity for managing sub-unit pools.

3.2.4.3.3 Pal Wetland Unit

The Pal Wetland Unit is 73 acres and contains a diverse mix of short emergent and tall emergent vegetation (Map 5). Little open water habitat is provided. The unit is fed at the Superior headgate and water gravity flows through the Superior Ditch system. There are no dikes created within the unit. Water flows over low depressions (3 small pools and 1 old river oxbow) within the unit creating a wet meadow habitat. Vegetation is comprised of a mix of short emergent (spikerush and Baltic rush) and tall emergent (cattail and softstem bulrush) vegetation. Water levels drop in the unit as river levels drop.

3.2.4.4 Riparian

Approximately 4,349 acres of riparian habitat (forest and shrub) exist on the Refuge (Map 3). The dominant plant species in this habitat are narrow-leaf cottonwood with an understory of shrubs and grasses. Areas of coyote willow also exist in the riparian corridor. Principal shrub species include: several willow species, Wood's rose, silver buffaloberry, silverberry, skunkbush, golden current, and gooseberry. The riparian habitat type is found predominately along the Green River. The Big Sandy River riparian corridor has no overstory tree habitat.

Several wildlife species that depend on this habitat for breeding include: great blue heron, bald eagle, red-tailed hawk, Swainson's hawk, merlin, kestrel, common merganser, eastern kingbird, willow flycatcher, house wren, yellow warbler, Bullock's oriole, mountain bluebird, northern flicker, moose, beaver, river otter, masked shrew, water shrew, vagrant shrew, and the little brown myotis.

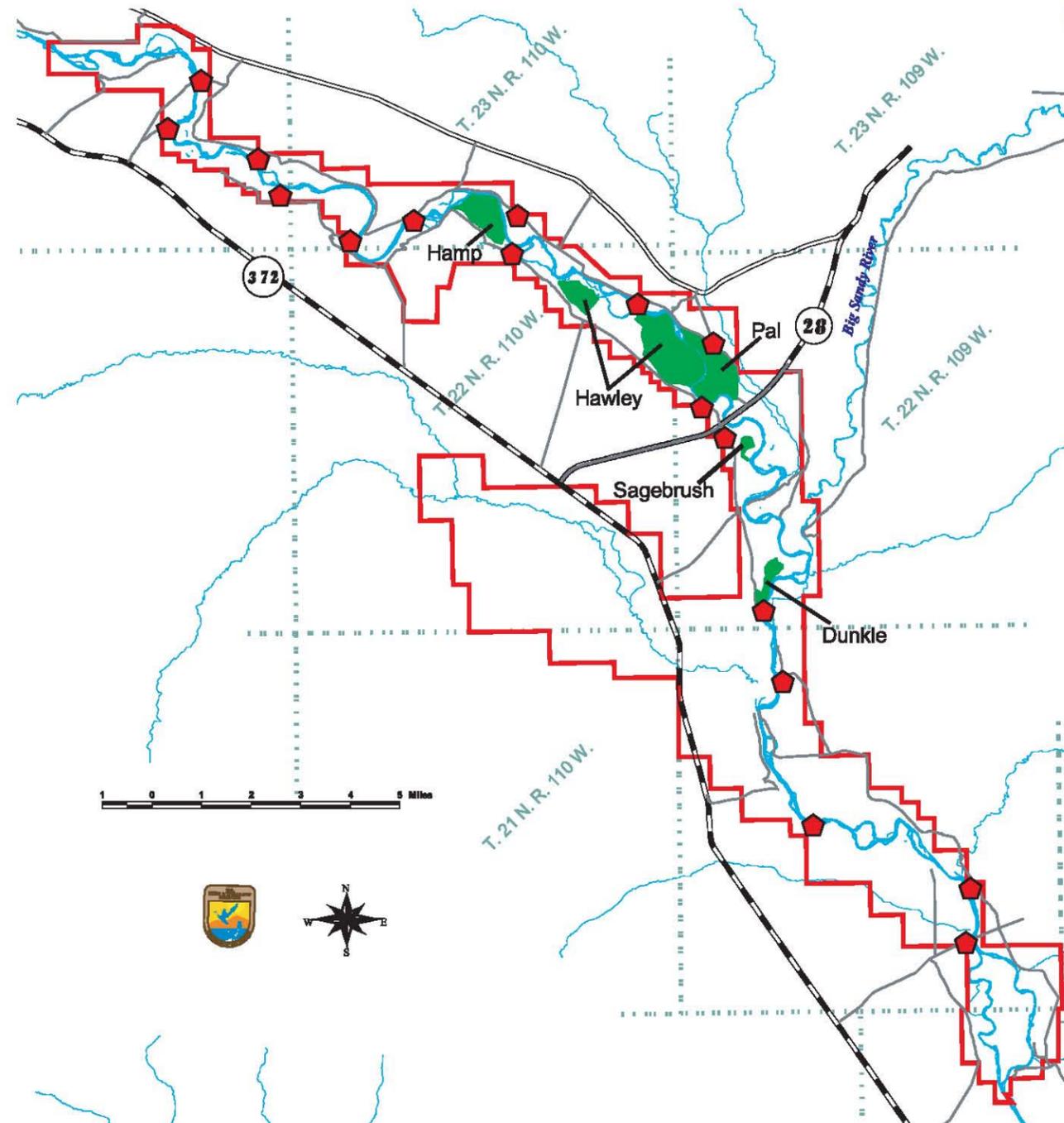
Riparian forests provide critical migrational and breeding habitat for approximately 150 bird species. Forest breeding birds that winter in Central and South America are known as neotropical migrants. Many neotropical migrants are not capable of migrating non-stop through the arid semidesert shrubland that predominates much of Utah, Colorado, and Wyoming. Over 50 neotropical migrant species rely on the north-south riparian forest corridors of the Colorado and Green rivers for feeding, resting or breeding.

Extensive stands of mature narrow-leaf cottonwood clearly distinguish the riparian forest from the surrounding landscape. Field research has confirmed that cottonwood forests are aging and mature trees are in poor health. A comparison of cottonwood forests above and below Fontenelle Reservoir showed forests below the dam had fewer seedlings and saplings, lower tree densities, and reduced tree vigor (Auble and Scott, 1998). Coring of mature cottonwoods in 1996 at two sites below Fontenelle Dam found that the vast majority of trees were well over 100 years in age and only a few were less than 50 years of age (USFWS, 1996 Refuge Narrative). Not only are the mature, aging trees exhibiting stress, but there is not sufficient regeneration to establish a new age class of cottonwoods. The age class diversity within cottonwood forests is not being sustained.

In a 1997 report on Green River refuges, Murray Laubhan of the USGS wrote, "Since construction of dams on the river, the natural extremes in seasonal high and low flows that historically maintained productivity have been lost. Although flows still differ among years, the extremes have been moderated to maintain more stable flows. Stabilization of river flows may have improved the ability to manage cold water fisheries, but there are also many detrimental effects to vegetation and associated wildlife. Obviously, the construction of dams has altered several functional aspects of river hydrology, including: flow regimes, sediment deposition patterns, and rates and types of channel movement. The most obvious impact of these changes has been decreased recruitment and lower vigor of existing riparian vegetation that, in combination, have changed the spatial and structural complexity of the riparian habitat." Additionally, Laubhan reported that stabilization of the river hydrology has reduced the dynamics of off-channel wetlands altering the hydro-periods of palustrine wetlands in the floodplain (Laubhan 1997).

Seedskadee National Wildlife Refuge

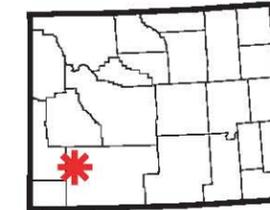
Sweetwater County, Wyoming



Legend

-  Water Gap - Location Where Livestock have Access to Water
-  Wetland Management Unit

Refuge Location



State of Wyoming

Draft

Map #5 Water Management Map

Auble and Scott (1998) presented several plausible explanations for the differences observed between cottonwood forests located above and below Fontenelle Dam. Sediment trapping in the reservoir eliminates deposition of new sediment in the downstream river channel and produces a “sediment hungry” downstream river which may have resulted in downcutting of the river channel. This would place the river surface at a lower than historic elevation and contribute to dewatering of mature trees established prior to dam construction. Field studies verify that maximum tree densities occur at a higher elevation relative to the river surface, below the dam, than above the dam (Auble and Scott, 1998).

Dam and reservoir operation have controlled and modified the natural flows of the Green River. The timing and volume of annual peak flows have changed and unusually high flow flood events have been significantly reduced. For successful natural cottonwood regeneration, high flows would establish a moist seedbed for the cottonwood seeds. High waters would then recede slowly from mid-June through July, the peak cottonwood germination window (see Appendix H). Since 1966, controlled flows peak and decline too rapidly. Under controlled management, peak flows are also lower than historical major runoff events. Current peak flows wet a fraction of the area saturated historically, do not raise water levels high enough to provide sufficient moisture to existing trees, and, absent sediment, do not result in the shifting of stream channels. Channels tend to stabilize. With similar volume peak flow events year-to-year, and no change in channels, subsequent peak flows and river ice tend to shear off those seedlings which have established (Auble and Scott, 1998).

This decreased cottonwood reproduction is further challenged by grazing pressure from native ungulates and rodents. The loss of reproduction will lead to the eventual replacement of multi-storied forested habitat by a much simpler vegetative structure and lower plant species diversity. This loss of plant structure and diversity will be echoed in a similar loss of wildlife diversity.

The invasion of several nonnative plants is a serious threat to Refuge wet meadows and adjoining riparian areas. Perennial pepperweed, Canada thistle, salt cedar, Russian knapweed, and musk thistle are the most troublesome species. Of these, pepperweed is the most widespread and difficult to control. Currently, the only practical method for controlling pepperweed is with the use of herbicides. Biological control through the release of beneficial insects is under development; however, its approval is not expected for another 10 years. Mechanical control through mowing or grazing can reduce the spread of seed; however, it does little to stress the plant which stores most of its energy underground. Likewise, fire does very little to control the plant. Fire often benefits the plant by reducing competition from the surrounding grasses and forbs. The other weed species are currently found only in isolated patches. They are aggressively controlled through a variety of methods including mechanical, and chemical.

Riparian habitat at Seedskadee NWR includes the following components:

Riparian grass/forb habitats are either regularly flooded in the spring (mid-May through mid-June) or sub-irrigated. Plant species include Rocky Mountain iris, wheatgrass, alkali sacaton, inland saltgrass, bluegrass, wildrye, horsetail, perennial pepperweed, aster, and groundsel.

Riparian shrub communities are characterized by annual flooding cycles (high water mid-May through mid-June) and mineral soils that are saturated for at least part of the year. Riparian shrub sites may include scattered trees so long as mature canopy trees comprise no more than 15 percent total areal coverage. While regenerating cottonwood and willow trees resemble shrub communities in structure, sites dominated by these species in the seedling/sapling stage are classified as riparian forest to reflect their distinct temporal dynamics.

Riparian shrub habitats are described by their species composition and shrub distribution. Willow-dominant habitat occurs where coyote willow dominates the shrub flora. The mixed shrub habitat occurs where other species, such as wild rose, gooseberries, basin big sagebrush, mountain silver sagebrush, redosier dogwood, skunkbrush, silver buffaloberry, and river birch, predominate. In addition, Riparian Shrub habitats may include scattered narrow-leaf cottonwood or peach-leaf willow trees.

Riparian forest habitats are floodplain sites characterized by woody vegetation (greater than 15 percent areal coverage) with the potential to grow greater than 6 meters tall. Like the riparian shrub class, these communities are characterized by historical annual flooding cycles and mineral soils that are saturated for at least part of the year. This habitat type is often dominated by either coyote willow or narrow-leaf cottonwood, which are ecologically similar. Riparian forest sites may include one or more mid-story layers and well-developed shrub or grass/forb layers.

Riparian forest habitats with a 15 to 30 percent canopy coverage in mature trees are described as scattered trees. Riparian forest habitats with greater than 30 percent canopy coverage in mature trees are described as Forest Overstory (closed). These canopied forest habitats may then be described as grass/forb under or shrub under, according to the composition of their understory.

Riparian vegetative communities are displayed as Riparian on Map 3. Vegetation types include grass/herbaceous, willow, mixed riparian shrub, cottonwood closed/grass, cottonwood closed/shrub, cottonwood moderate/grass, cottonwood moderate/shrub, cottonwood scattered/shrub, buffaloberry bush, and silverberry bush vegetation types (Table 3.3).

3.2.4.5 Upland

Approximately 19,212 acres of semi-desert upland habitats exist on the Refuge (Map 3). These habitat types are generally characterized by varying vegetation communities interspersed with large areas of bare ground, desert pavement, and rocks. The largest block of upland habitat on the Refuge is the Dry Creek Unit. Since 1983, the Dry Creek Unit has been fenced and free of grazing by domestic livestock. These lands are likely returning to an approximation of their condition prior to introduction of livestock.

Special status species utilizing these habitat types include the mountain plover and the burrowing owl. The burrowing owl was a former candidate for listing as endangered or threatened species. Burrowing owls are uncommon and are often associated with areas that have burrows created by white-tailed prairie dogs or some other fossorial species. Mountain plovers are currently proposed for listing as a threatened species and utilize areas that are characterized by short vegetation interspersed with bare ground.

Other wildlife species that rely on this habitat for breeding include: sage grouse, ferruginous hawk, sage thrasher, sage sparrow, loggerhead shrike, short-eared owl, Brewer's sparrow, great basin pocket mouse, and sagebrush vole.

Upland mixed-grass habitats are found in well-drained upland sites and are rarely flooded. Common grass associates include bottlebrush squirreltail, Indian ricegrass, needlegrasses, sandberg bluegrass, Junegrass, and wheatgrasses. Common forb associates include locoweeds, phloxes, lupines, globemallows, prickly pear cactus, and numerous composite species.

The invasion of several nonnative plant species is a serious threat to Refuge and surrounding upland habitats. Cheatgrass, halogeton, and Russian thistle are among the most troublesome. Cheatgrass, an annual, rapidly invades roadsides and disturbed areas because of its winter and early spring growth. When mature, it becomes a fire hazard. Fire favors the growth of cheatgrass, which out-competes native perennial shrubs and grasses after a burn.

Saltgrass habitats are found on mildly saline playas that are flooded for short periods in the spring (mid-April through mid-May). Saltgrass sites are characterized by a preponderance of saltgrass, with alkali sacaton, and whitetop as possible associates.

Upland Shrub habitats include those sites that are dominated by shrubs and have a subsurface water table. Upland Shrub habitats may support standing surface water for some portion of the year.

Four Upland Shrub habitats are described below. The Basin Big Sage community is dominated by basin big sagebrush, which typically grows in comparably moist, well-drained, undisturbed sites with relatively low salinities. These sites are typically confined to draws and arroyos. Woody associates include shadscale, spiny hopsage, rabbitbrush, and plains pricklypear. Common grass and forb associates include those described for Upland Grass/forb communities above. Additional vegetative associates may include desert paintbrush, milkvetch, penstemons, evening primrose, wild onions, and snakeweed. Basin Big Sage communities are characterized by shrubs greater than 1 meter in height covering up to 80 percent of the ground surface. Basin Big Sage often comprises 70 percent of the cover and 90 percent of the plant biomass within this habitat type. Nonnative annual weeds, including halogeton, Russian knapweed, tansy mustard, clasping pepperweed, filaree storksbill, and cheatgrass brome, may be found on disturbed sites.

The Wyoming Big Sage community is dominated by the Wyoming Big Sage, which typically grows in dry, well drained, undisturbed sites with relatively low salinities. Wyoming Big Sage communities may support many of the woody, grass, and herbaceous associates indicated in the Basin Big Sage community. Wyoming Big Sage communities are characterized by shrubs 0.5 to 1.0 meter tall with a lower areal coverage, rarely exceeding 75 percent. Inter-shrub spaces typically support grasses and forbs, although bare soil is also common. Additional vegetative associates include spiny horsebrush, littleleaf horsebrush, four-wing saltbush, spreading fleabane, and phlox. The Wyoming Big Sage community represents the dominant vegetative type in the uplands.

Short Shrub communities are characterized by a variety of widely spaced woody shrubs less than 0.5 meter (often less than 0.2 meter) tall. Areal shrub coverage is typically less than 50 percent and inter-shrub spaces are typically bare soil. This community typically occurs on dry upland sites with moderate to highly alkaline soils. Common shrubs include Wyoming big sage, black sagebrush, and shadscale. Species composition varies on a comparably small spatial scale. Sages, shadscale, and other similar shrubs dominate patches according to local soil conditions, thermal environment, hydrology, and disturbance. Grass and forbs are not abundant but may include needlegrasses and pussytoes.

The Greasewood community is dominated by greasewood, which dominates seasonally flooded lowlands where the water table is within 1 meter of the soil surface and where soils are moderately saline. The Greasewood community is characterized by widely spaced shrubs 0.5 to 1.0 meter tall, with a generally low areal coverage rarely exceeding 75 percent. This classification system assumes flooding occurs for a short period in April. Like the Short Shrub community, grass and forbs are uncommon and feature many of the same species. Additional associates also include saltgrass, Baltic rush, alkali sacaton, and possibly pickleweed on the most alkaline sites.

The upland communities are mapped as Upland on Map 3. Vegetation types include sagebrush Dominant, greasewood dominant, and low stature shrub (Table 3.3).

3.2.4.6 Other Habitat Features

A number of western wildlife species are associated with distinct landscape features. This classification system recognizes two geomorphic features: Bare Rock/Soil and Cliffs/Outcrops. Cliffs and Outcrops may be further subdivided as Bedrock or Unconsolidated to reflect their substrate stability. Some wildlife species associated with these features include various bat species, golden eagle, peregrine falcon, prairie falcon, bank swallow, and Northern rough-winged swallow. Four anthropogenic features merit attention: Fences, Roads, Powerlines and Buildings (including bridges).

3.2.4.7 Threatened, Endangered, Candidate or Wyoming Plant Species of Special Concern

Table 3.4 identifies federally threatened, endangered or candidate and Wyoming listed plant species of special concern which may occur on the Refuge because suitable habitat currently exists.

Table 3.4 Plant species which may occur on SeedsKadee National Wildlife Refuge which are Threatened, Endangered, Candidate or of Special Concern in Wyoming.			
Common Name	Latin Name	Heritage Rank Federal and/or State Status	Located on Refuge
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	USFWS Threatened G2/S1	None found
Rollins' cat-eye	<i>Cryptantha rollinsii</i>	G4/S1	No Record
Wilcox's woollystar	<i>Eriastrum wilcoxii</i>	G5/S1S2	No Record
Juniper prickly-pear	<i>Opuntia polyacantha</i> var. <i>juniperina</i>	G5T3?Q/S1	No Record
Nelson's milkvetch	<i>Astragalus nelsonianus</i>	G2/S2	No Record
Dwarf milkweed	<i>Asclepias uncialis</i>	G3?/SH	No Record

Several plant surveys by qualified botanists have been conducted to record the flora of SeedsKadee NWR. The Ute ladies'-tresses has been of specific interest. The distribution of this species is believed to be limited to wet meadow habitats and, to date, has not been found on the Refuge.

3.2.5 Wildlife Resources

SeedsKadee's habitat diversity is reflected in its broad diversity of wildlife. The Refuge's wetland and riparian habitats are unique to the surrounding predominantly dry upland habitat. This oasis-like setting is a valuable habitat for numerous resident and migratory species.

As part of the CCP planning process, a report was prepared, "SeedsKadee National Wildlife Refuge Wildlife - Habitat Matrix and Species Accounts" (Pioneer Environmental Services, 1997). The Pioneer (1997) report lists each of the species known or suspected to use the Refuge, and estimates what time of year specific habitat(s) are utilized by each species. The matrix is useful in understanding the wildlife value of each habitat type found on SeedsKadee National Wildlife Refuge.

Except for Threatened, Endangered and Candidate Species and Species of Special Concern, only those species that are residents or frequent visitors to SeedsKadee are discussed in the following text. Many other species, birds in particular, may infrequently inhabit or migrate through the Refuge. Species lists for birds, mammals, fish, amphibians, and reptiles are found in Appendix F. Additional information is available from the SeedsKadee National Wildlife Refuge Wildlife - Habitat Matrix and Species Accounts located in the Project File at SeedsKadee National Wildlife Refuge.

3.2.5.1 Avian

Waterfowl - ducks, geese, and swans: A great number of migratory water birds rely on the Refuge's wetland, riverine, and marsh habitats for foraging and resting during spring and fall migration. The habitats utilized depend upon the species, their life stage, and the time of year. The most common species of ducks breeding on the Refuge include mallard, gadwall, and cinnamon teal.

Most of the ducks common to the Refuge use all four broad habitat types; riverine, wetland/marsh, riparian, and upland. These ducks include the green-winged teal, mallard, northern pintail, blue-winged teal, cinnamon teal, northern shoveler, gadwall, and American wigeon.

The lesser scaup, canvasback, redhead, ruddy duck and bufflehead rely upon riverine habitats and open ponded water.

The Barrow's goldeneye, common goldeneye, and common merganser utilize riverine and wetland habitats along with the riparian forest and its tree cavities.

The Canada goose is an abundant year-round resident of Seedskadee NWR utilizing riverine, wetland/marsh, and grass/forb habitats.

The trumpeter swan uses open ponded water, marsh, and riverine habitats. Trumpeters use the Refuge for migration, breeding and as critical wintering habitat. During winter, the open river water that exists between Fontenelle Dam and Highway 28 provides good foraging and loafing habitat when all other wetland areas are frozen. As many as 36 trumpeter swans (2000) have been observed wintering on the Refuge in addition to numerous tundra swans. Trumpeter swans were reintroduced to the Green River drainage through the trumpeter swan range expansion program. A total of 70 cygnets and adults have been released on Seedskafee NWR from various capture sites (Table 3.5). The first successful nesting attempt occurred in 1997 and fledged five cygnets from Seedskafee NWR. One cygnet was fledged in 1998 and four were fledged in 1999 and 2000, respectively. Two pairs successfully nested on the Refuge for the first time in 2001 producing a total of five cygnets.

The Service has developed a draft plan for “Enhancing the Rocky Mountain Population of Trumpeter Swans on units of the National Wildlife Refuge System” (2001). Seedskafee NWR is included in the Plan and is recognized as an area providing suitable migration, breeding and wintering habitat. The plan, when finalized, will help to prioritize significant areas and projects relative to their importance for maintaining and improving the Rocky Mountain Trumpeter Swan Population.

Year	# Re-introduced	# Nests	# Cygnets Hatched	# Cygnets Fledged
1992 summer RRL ¹	5 Adults 5 Cygnets	0	0	0
1992-93 winter HSP	19 Adults 19 Cygnets	0	0	0
1993-94 winter HSP	5 Adults 11 Cygnets	0	0	0
1996 WYWS	4 Adults			
1997 WYWS	2 Juveniles	1	5	5
1998	0	1	4	1
1999	0	1	4	4
2000	0	1	4	4 ²
2001	0	2	5 ³	4
Totals	70	4	17	14

¹ Areas swans were introduced from:

RRL= Red Rock Lakes National Wildlife Refuge;

HSP= Harrim State Park;

WYWS= Wyoming Wetland Society Trumpeter Swan Fund.

² One cygnet lost in winter due to a fishing lure stuck in its bill.

³ One nest produced 4 cygnets and the other nest hatched 1 cygnet

⁴ Still evaluating - too early in season

Wading birds are water birds that usually do not swim or dive for their prey, but wade in shallow edges of lakes, ponds, creeks and other waters for food not available on shore. The great blue heron, white-faced ibis, and sandhill crane are wading birds common to Seedska dee NWR. The heron and ibis use the broad range of Refuge habitats, foraging in wetlands and shallow riverine areas and nesting over water in cottonwood trees or tall shrubs. Sandhill cranes utilize both wetland/marshy areas and grass/forb habitats for both foraging and nesting.

Shorebirds are most often found foraging for food along water margins. Shorebirds use the Refuge during migration and also for nesting. Shorebirds frequent open water areas, riverine, and wetland habitats on the Refuge. Common shorebird species utilizing Seedska dee NWR include: killdeer, spotted sandpiper, greater and lesser yellowlegs, willet, long-billed dowitcher, Wilson's phalarope, and common snipe.

Divers or swimmers are water birds that swim or dive for their prey. The common merganser, pied-billed grebe, and American coot use open water areas, tall emergent marshes, and nest on the Refuge. The double-crested cormorant and American white pelican subsist on a diet of fish and frequent riverine and open-water habitats. Exposed river rocks, cottonwood trees, and graveled shorelines provide roosting habitat.

Raptors consist of several families of hawks and owls. Raptors common to Seedska dee NWR include the northern harrier, Swainson's hawk, red-tailed hawk, rough-legged hawk, golden eagle, American kestrel, and the great horned owl. The bald eagle is a common year-round resident. Raptors utilize a variety of wetland, riparian, and upland habitats to forage and nest. The old growth cotton wood trees are heavily utilized by red-tailed hawks, bald eagles, American kestrel, and great horned owls. The abundant small mammal and fish populations supplied by the Refuge provide an excellent forage base for all raptors.

Upland bird species rely primarily on upland habitats. Several of the more common upland bird species include sage grouse, horned lark, and mourning dove. The sage grouse and horned lark are year-round resident species. The sage grouse prefers Wyoming Big Sagebrush communities. The mourning dove is a summer resident that nests in riparian or upland areas and forages primarily in moist riparian or upland grasslands.

Neotropical migrants are birds that breed in North America, but winter in Central and South America or the West Indies. The following species are those that are more commonly found on the Refuge during migration, but many nest on the Refuge as well. With only a few exceptions, these birds rely heavily upon riparian habitats, riparian shrub and/or forest, for cover, foraging, and roosting during their stay on the Refuge. Swallows on the Refuge use a combination of habitats including wetland/marsh, open water, riverine, riparian shrub, forest, and grass/forb communities. The tree swallow and violet-green swallow nest in trees and tree cavities. Northern rough-winged swallow, cliff swallow, and barn swallow, rely on cliffs, river banks or rock outcrops for nesting. The riparian shrub and forest habitats are the primary habitats utilized by the rufous hummingbird, cordilleran flycatcher, western kingbird, eastern kingbird, western wood-pewee, hermit thrush, warbling vireo, yellow warbler, yellow-rumped warbler, Wilson's warbler, northern oriole, house wren, Lincoln sparrow, common yellowthroat, and western tanager. A few of these species also use the grass/forb, upland shrub, or emergent marsh for foraging. The common nighthawk and brown-headed cowbird use a combination of almost all the habitats found at Seedskadee NWR. The marsh wren's habitat is tall emergent marsh; the vesper sparrow uses the grass/forb and upland shrub communities; and the savannah sparrow utilizes short emergent marsh and grass/forb communities. Primary nesting habitat for the belted kingfisher, rock wren, and Say's phoebe consists of cliffs and outcrops. The kingfisher forages in nearby open water, while the rock wren and phoebe tend to forage in upland shrub and grass communities.

Woodpeckers are small and medium sized insectivorous birds with stiff tails and specially adapted skulls and tongues. The northern flicker is the most common woodpecker. This species inhabits the riparian forest's large-diameter trees and standing dead wood. It also uses upland shrub and grass/forb habitats. Other less common woodpeckers include downy, and hairy woodpeckers and the red-naped sapsucker.

Resident and migrant songbirds breed in North America and migrate throughout a limited North American range. This group includes the mountain bluebird, American robin, dark-eyed junco, white-crowned sparrow, pine siskin, and American goldfinch that use both riparian and upland habitats. The western meadowlark, sage thrasher, Brewer's sparrow, and sage sparrow predominantly use upland habitats. Species like the ruby-crowned kinglet and the black-capped chickadee use primarily the riparian forest/shrub habitat. Three blackbirds (the red-winged, yellow-headed, and Brewer's) utilize dense wetland marsh for nesting and foraging. The Brewer's blackbird will also utilize riparian shrub/forest and upland shrub for foraging and migration habitat. The song sparrow often nests near permanent open-water, in dense riparian shrub, dense regenerating forest, or dense upland shrubs. Forage habitat for the song sparrow is in adjacent marsh and riparian meadows.

3.2.5.1.1 Predator Management and Nest Success

Seedskaadee NWR controls mammalian predators in most wetland units to enhance nesting success for ground-nesting birds. Predators targeted for trapping include red fox, skunk, and raccoon. Coyotes are not trapped as research indicates they are not as effective of nest predators as other predator species, and they tend to suppress or displace fox populations. Ground-nesting birds which benefit include waterfowl, shorebirds, sage grouse, meadowlarks, sparrows, colonial nesting birds, northern harriers, etc.

Nest success, with and without predator trapping, is a measure of success of the predator control program for waterfowl production and the production of other ground-nesting birds (Table 3.6). Apparent success is calculated as the number of successful nests observed divided by all nests observed. Mayfield nest success (found in row 1) takes into account the number of days the nest is exposed to predation and, therefore, is a more accurate measure of the actual nest success. The Mayfield index is almost always substantially less than apparent success.

Table 3.6 Nest Success Compared With Trap Effort on Seedskaadee National Wildlife Refuge (1987-1998)						
Nest Success	1987 ¹	1988	1989	1990	1993	1998
Mayfield Success	5%	45%	70%	51%	34%	25%
Apparent Success	14%	63%	84%	71%	58%	50%
Total Nests Observed	60	92	113	129	95	83
Trap Nights	0	5,679	5,919	5,292	4,710	3,100
Total Predators	0	97	65	63	59	36
Number of trap nights/predator captured	0	59	91	84	88	86

¹ No trapping conducted prior to 1987 - data for 1987 represents nest success prior to implementing a predator management program.

3.2.5.2 Mammals

Big game species common to the area are pronghorn, mule deer, and moose. Although less than 1 percent of Wyoming is classified as riparian, almost 80 percent of its wildlife require riparian areas for critical portions of their life cycle. The Refuge (with adjacent BLM lands) supports a herd of approximately 20 to 40 moose and 140 mule deer. Mule deer range throughout the area, but concentrate in greater numbers within the Refuge riparian zone. Moose forage extensively on willows and shrubs associated with the Refuge's riparian habitat and also utilize the Refuge for breeding and calving. Pronghorn range year-round throughout most of the areas below 7,000 feet. The Refuge lies within the range of the Sublette Antelope herd (approximately 49,000 animals), which is one of the largest migratory ungulate herds in the lower 48 states.

Many small mammals are present within the Refuge and utilize all habitat types depending on their life requisites. More common species include dusky shrew, little brown myotis, cottontail rabbit, white-tailed jackrabbit, least chipmunk, Wyoming ground squirrel, white-tailed prairie dog, Northern pocket gopher, deer mice, beaver, meadow vole, muskrat, porcupine, coyote, red fox, raccoon, badger, and striped skunk. Other small animals that may be found on the Refuge, but are less common, include the long and short (ermine) tailed weasels, otter, pygmy rabbit, marmot, mink, and bobcat (Appendix F).

3.2.5.3 Fish

Two main types of aquatic communities are present on Seedskaadee NWR: 1) those which occur in the Green River and its perennial tributaries, principally the Big Sandy River, and 2) those which occur in ponds along the lower terraces. The following fish are commonly found in the Green River and its tributaries: rainbow trout, Snake River cutthroat trout, Bonneville cutthroat trout, kokanee salmon, brown trout, mountain whitefish, mottled sculpin, white sucker, flannel-mouthed sucker, Utah chub, Bonneville redbreast shiner, and speckled dace. Other less common species are listed in Appendix F.

Prior to construction of Fontenelle Dam, the stretch of Green River included within the Refuge was characterized as a poor quality fishery with high turbidity and sediment filled streambeds. As a result of Fontenelle Dam, the Green River is now a clear, gravel bottomed River and provides excellent habitat for trout. The fishery resource on Seedskaadee NWR is managed jointly by the Refuge and the Wyoming Game and Fish Department (Map 6).

The chief limiting Refuge habitat factors for trout are the lack of deep pools, lack of bank cover, and the potential for rapidly fluctuating flows from Fontenelle Reservoir. These habitat factors are important to ensure over winter survival and successful spawning. Winter mortality is high. Small size fish suffer the highest mortality, especially stocked fish. For this reason, the Wyoming Game and Fish Department has reduced their expenditure and effort in stocking. Rainbow trout were stocked in May 1996 at a rate of 430 subcatchables per mile totaling 15,000 fish (average length of 6 inches). Cutthroat trout were stocked at a rate of 290 advanced fingerlings per mile for a total of 10,000 fish (average length 3 inches). In mid-June 1996, 6,000 advance fry cutthroat were stocked upstream and downstream from the McCullen Bluff sill. Recent research on the Wind River indicates that "frazil ice" forming below the dam is causing physical harm to trout and injuring the gills of fish. Deeper holes help fish to avoid this fine, free floating ice. The Wyoming Game and Fish Department continues to conduct spring electroshocking on the Refuge to determine population levels.

Brown trout were stocked in the Green River on Seedskaadee NWR until 1993. After 1993, brown trout stocking was discontinued after it was determined from electroshocking that natural reproduction was sustaining the fishery.

Wyoming Game and Fish records indicate that Kokanee salmon were first stocked in Flaming Gorge Reservoir in 1989 as a new forage species for lake trout. A small population likely existed in the Green River system before 1989 because of downstream drift from lakes in the Pinedale, Wyoming, area. The first Kokanee were stocked in the Green River in 1991. They now produce a reliable run through Seedskaadee NWR that terminates at Fontenelle Dam. Many of the Kokanee running the Green River were established from releases out of the hatching facility on Flume Creek. Since natural, successful spawning does not appear to be substantial the WYG&F spawns the Kokanee, hatches the eggs, and then restocks the Green River. Two different strains were stocked, and as a result, two different spawning runs were produced in September and late October/November.

3.2.5.4 Reptiles and Amphibians

Known species diversity of reptiles and amphibians is low. Amphibians include the tiger salamander, Great Basin spadefoot toad, northern leopard frog, and the boreal chorus frog. The tiger salamander and the spadefoot toad utilize a combination of habitats including marsh, wetland, and riverine areas as well as upland shrub communities near open water. The frogs are found along vegetated margins of riverine permanent water, open ponded water, and tall emergent marshes. Other wetland and riparian areas may be used when close to water or flooded.

Reptiles found at Seedskaadee NWR include the many-lined skink, northern sagebrush lizard, eastern short-horned lizard, and the wandering garter snake (Appendix F). The many-lined skink can be found in upland grasses with moist subsoils, riparian grass/forb, riparian shrub, riparian forest, basin big sagebrush, and Wyoming big sagebrush communities. The lizards are likely to be found in upland shrub and grass habitats and particularly in rock outcrops. The eastern yellowbelly racer and the gopher snake prefer upland grass/forb habitats, upland shrub, riparian meadows, and open riparian forests with rocky outcrops which are important for overwintering. The garter snake's habitat is similar, but also includes tall and short emergent marshes or upland habitats which are near to open water.

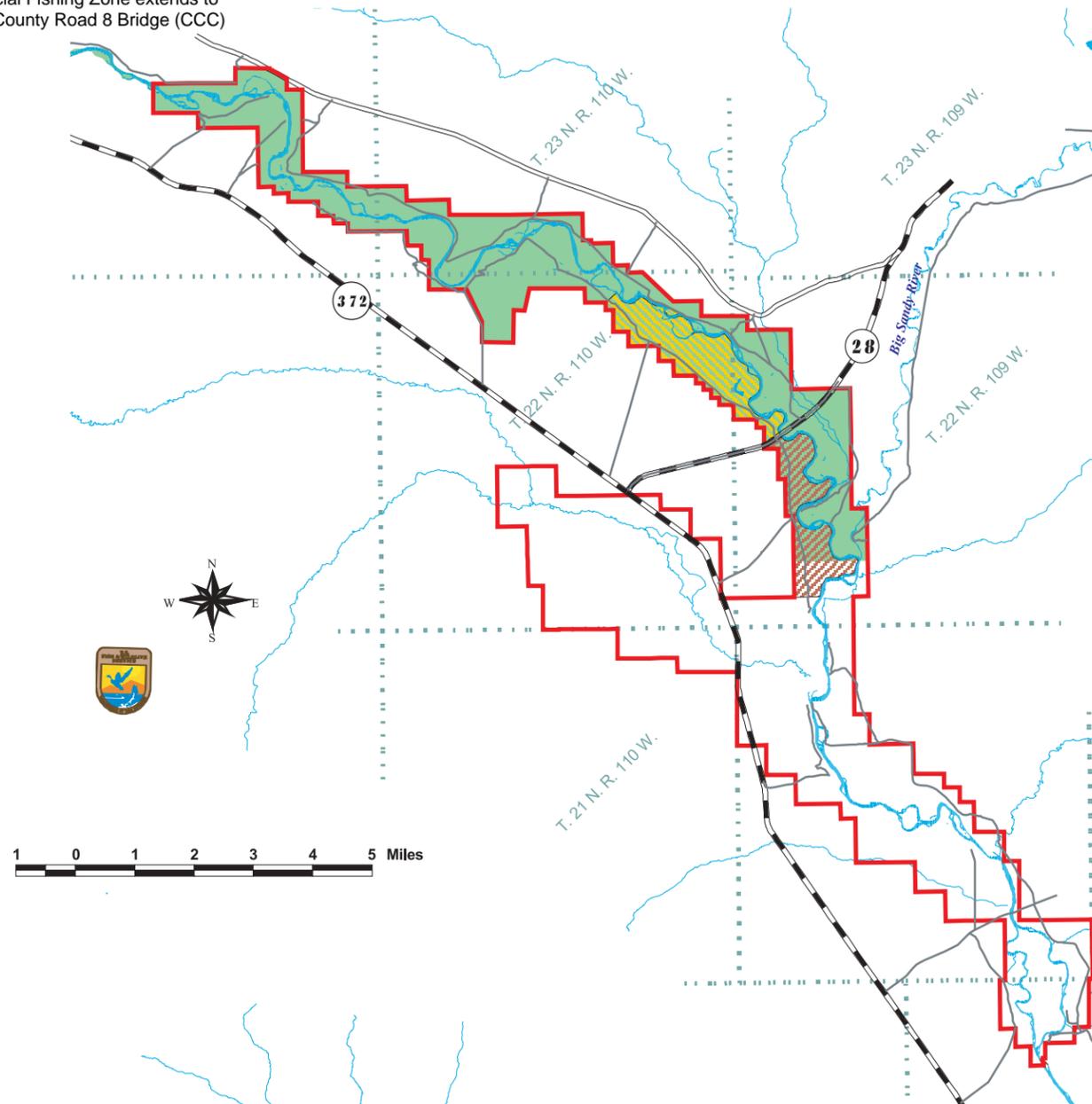
3.2.5.5 Invertebrates

Data has not been gathered on invertebrates. Incidental observations reveal that mosquito populations, though somewhat cyclical with drought cycles, can be extremely high on the Refuge. Aquatic and terrestrial invertebrates are an essential component in the food chain for Seedskaadee wildlife.

Seedskadee National Wildlife Refuge

Sweetwater County, Wyoming

Special Fishing Zone extends to the County Road 8 Bridge (CCC)

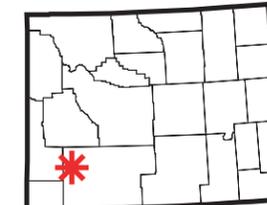


Legend

- Closed to Migratory Bird Hunting
- Closed to All Hunting
- Special Fishing Regulations

Please Consult Refuge and State Fishing and Hunting Regulations for Specific Guidance

Refuge Location



State of Wyoming

Draft

Map #6 Special Hunting and Fishing Zones

3.2.5.6 Threatened, Endangered and Candidate Species, and Other Wildlife Species of Special Concern:

Table 3.7 lists special status wildlife and fish species that are known to use habitat types which currently or formerly occurred at Seedskadee NWR. A special status species would be one that is listed as an Endangered Species, Threatened Species, Candidate Species, and Species of Special Concern (The Nature Conservancy, Wyoming Game and Fish Department, Wyoming Partner's In Flight).

Table 3.7 Special Status Wildlife and Fish Species Potentially Occurring on Seedskadee NWR					
Common Name	Seasonal Occurrence ¹	<i>Scientific Name</i>	Heritage Rank ²	Federal and State Status ²	Date Last Observed ³
BIRDS					
Clark's grebe	M	<i>Aechmophorus clarkii</i>	G5/S2B,SZN	WYGF SSC4 PIF-L1	WOL1998
Western grebe	M, SR	<i>Aechmophorus occidentalis</i>		WYGF SSC4 PIF-L1	WOL2001
American bittern	M, PB	<i>Botaurus lentiginosus</i>	G4/S2B,SZN	WYGF SSC3	WOL1990
Black-crowned night-heron	M	<i>Nycticorax nycticorax</i>		WYGF SSC3	WOL2000
Snowy egret	M	<i>Leucophoyx thula</i>		WYGF SSC3	WOL2000
White-faced ibis	SR, M, PB,	<i>Plegadis chihi</i>	G5/S1B,SZN	WYGF SSC3	WOL2001
Whooping crane	M	<i>Grus americana</i>	G1/S1N	USFWS Experimental	WOL1991
Trumpeter swan	B, YR	<i>Cygnus buccinator</i>	G4/S1B,S2N	WYGF SSC2 PIF-L1	WOL2001
Mountain plover	M, PB	<i>Charadrius montanus</i>	G2/S2B,SZN	USFWS Proposed Threatened WYGF SSC4 PIF-L1	WOL1995
Long-billed curlew	M, PB	<i>Numenius americanus</i>	G5/S3B,SZN	WYGF SSC3 PIF L-1	WOL1998
Wilson's phalarope	B, M	<i>Phalaropus tricolor</i>	G5/S3B,S3N	PIF-L1	WOL2001
Caspian tern	M, SR	<i>Sterna caspia</i>	G5/S1B,SZN	WYGF SSC3	WOL2000
Forster's tern	M	<i>Sterna forsteri</i>	G5/S1B,SZN	WYGF SSC3 PIF-L1	WOL1986
Black tern	M, PB	<i>Chlidonias niger</i>	G4/S1B,SZN	WYGF SSC3 PIF-L1	WOL1993
Bald eagle	B, YR	<i>Haliaeetus leucocephalus</i>	G4/S2B, S3N	USFWS Threatened (proposed delisting) WYGF SSC2 PIF-L1	WOL2001
Northern goshawk	M	<i>Accipiter gentilis</i>	G5/S23B,S4N	WYGF SSC4 PIF L-1	WOL1991
Swainson's hawk	B, M	<i>Buteo swainsoni</i>		PIF-L1	WOL2000
Ferruginous hawk	B, M	<i>Buteo regalis</i>		WYGF SSC3 PIF-L1	WOL2001
Merlin	M, PB	<i>Falco Columbarius</i>	G5/S2B,SZN	SSC3 PIF-L1	WOL1994
Peregrine falcon	M, PB	<i>Falco peregrinus anatum</i>	G4T3/S1B,S2 N	USFWS Delisted/ WYGF SSC3 PIF-L1	WOL2000

Table 3.7 Special Status Wildlife and Fish Species Potentially Occurring on Seedskaadee NWR

Common Name	Seasonal Occurrence ¹	Scientific Name	Heritage Rank ²	Federal and State Status ²	Date Last Observed ³
Sage grouse	B, YR	<i>Centrocercus urophasianus</i>		PIF-L1	WOL2000
Short-eared owl	B, YR	<i>Asio flammeus</i>	G5/S2S3	PIF-L1	WOL2001
Burrowing owl	PB, YR	<i>Athene cunicularia</i>	G4/S3B, SZN	WYGF SSC4	WOL1994
Lewis' woodpecker	M	<i>Asyndesmus lewis</i>	G5/S2B,SZN	WYGF SSC3 PIF-L1	WOL1986
Yellow-billed cuckoo	M, PB	<i>Coccyzus americanus</i>	G5/S2B,SZN	WYGF SSC2	WOL1994
Brewer's sparrow	B, M	<i>Spizella breweri</i>	G5/S3B, SZN	PIF-L1	WOL2001
Sage sparrow	B, M	<i>Amphispiza belli</i>	G5/S3B,SZN	PIF-L1	WOL2001
FISH					
Colorado Pikeminnow	No Record	<i>Ptychocheilus lucius</i>	G1/SX	USFWS Endangered	No Record
Humpback Chub	No Record	<i>Gila cypha</i>	G1/SX	USFWS Endangered	No Record
Bonytail Chub	No Record	<i>Gila elegans</i>	G1/SX	USFWS Endangered	No Record
Bluehead sucker	YR	<i>Catostomus discobolus</i>	G4/S2S3		No Record
Flannelmouth sucker	YR	<i>Catostomus latipinnis</i>	G3G4/S3		No Record
Razorback sucker	No Record	<i>Xyrauchen texanus</i>	G1/SX	USFWS Endangered	No Record
MAMMALS					
Long-eared myotis spotted bat	SR, M	<i>Myotis evotis</i>	G5/S1B,S1?N	WYGF SSC2	BMN1994
Townsend's big-eared bat	No records	<i>Corynorhinus townsendii</i>	G4/S1B,S2N	WYGF SSC2	No Records
Pallid bat	SR, M	<i>Antrozous pallidus</i>	G5/S1B,SZ?N	WYGF SSC2	BMN1994
Pygmy rabbit	B, YR	<i>Brachylagus idahoensis</i>	G4/S2	WYGF SSC3	WOL1991
Swift fox	No records	<i>Vulpes velox</i>	G3/S2S3	WYGF SSC3	No Records
Black-footed ferret	No records	<i>Mustela nigripes</i>	G1/S1	USFWS Endangered	1976-78
River otter	YR, PB	<i>Lontra canadensis</i>	G5/S3		WOL2001

¹ Seasonal occurrence: B = Breeding (assumes summer resident); PB = Possible or Potential Breeding (no confirmed records); SR = summer resident (no evidence of breeding); YR = year-round resident; M = Migrant

² See Glossary for special status definitions.

³ WOL = Refuge Wildlife Observation Log; BMN= Refuge bat mist netting records; WFS=Refuge waterfowl surveys. #'s indicate year last observed. Includes data through 2001.

Three federally-listed bird species have been observed on the Refuge. The bald eagle is a year-round resident and nests annually (Table 3.8). Bald eagles use riparian forest habitat on the Refuge year-round. Mature cottonwoods provide nest and perch sites for the bald eagles, where they hunt for fish, waterfowl, and carrion along the Green River. The fish and ducks in the river provide an important food source for the bald eagle. Approximately 25 eagles spend the winter on the Refuge each year.

Year	# Nests Active ¹	# Successful Nests	# of Young Hatched	# of Young Fledged
1992	1	1	2	2
1993	0	0	0	0
1994	1	0	0	0
1995	3	0	0	0
1996	2	0	0	0
1997	2	2	4	3
1998	2	2	4	4
1999	4	2	6 ²	2
2000	3	3	6	6
2001	3	3	7	7

¹ An active nest = birds initiated nest building, but may not have progressed further.

² One of the successful nests produced 3 young, but the nest and chicks were destroyed when the nest fell out of the tree.

The peregrine falcon and whooping crane have been observed on the Refuge infrequently during migration. For four consecutive years (1996 to 2000), one peregrine sighting was recorded in the Tallman, Hay Farm, and Hawley management units, respectively. Maintenance of migration habitat is important for these species. Whooping cranes have infrequently been observed on the Hawley wetland unit (1991). The birds are suspect migrants. The four federally-endangered fish species have not been recorded as occurring within the Refuge. Prior to Fontenelle Dam these fish may have occurred as far north as Green River, Wyoming. These native fish require turbulent rivers with great extremes of flow, temperature, and turbidity. Such conditions no longer exist below Fontenelle Dam.

The federally-endangered black-footed ferret has been observed on the Refuge historically. The current population of white-tailed prairie dogs that occurs on the Refuge is one of the ferret's preferred prey items but current prairie dog populations may not be big enough to sustain a ferret population. The Refuge staff continues to monitor for the presence of this species.

The white-faced ibis, black tern, and the American bittern are Species of Special Concern that have been observed utilizing Refuge wetland/marsh habitat. The white-faced ibis is now a common migrant seen in the spring and fall. The American bittern and black tern are infrequently observed in migration.

The northern goshawk is a former candidate species for consideration of listing as federally endangered or threatened. Northern goshawks are rare migrants on the Refuge. Numerous sightings on the Wind River and Wyoming mountain ranges indicate that the Green River may occasionally be used as a migration corridor between summer and winter range.

The Service (July 2001) has determined that the yellow-billed cuckoo in the western United States, roughly west of the Rocky Mountains, meets the criteria to qualify as a “distinct population segment” (DPS), and, as such, may be proposed for listing. As a result of this finding, the Service will add the western DPS of the yellow-billed cuckoo to the list of species that are candidates for listing under the Endangered Species Act. The cuckoo migrates through and breeds on the Refuge in small numbers. It breeds in willow and cottonwood forests along rivers and streams. Populations are in decline primarily as a result of destruction of their streamside habitat.

The merlin falcon is a Species of Special Concern. Some of the last recorded breeding territories for merlins on the Green River were located on the Refuge. Merlin nesting has not been documented on the Refuge since the late 1980s. A 1999 survey detected no sign of merlins during the breeding season.

The mountain plover, a proposed threatened species, is known to use Refuge lands or lands adjacent to the Refuge. The Refuge staff monitors the Dry Creek Unit annually to look for breeding or migrating birds.

State listed species known to use Refuge lands or lands adjacent to the Refuge include: pygmy rabbit, trumpeter swan, American white pelican, ferruginous hawk, burrowing owl, and long-billed curlew. Trumpeter swans now utilize the Refuge for breeding, migration, and as wintering habitat (Table 3.5).

Other state listed species that have a potential to occur on the Refuge include: long-eared myotis, Townsend’s big-eared bat, pallid bat, snowy egret, Clark’s grebe, western grebe, Caspian tern, Forester’s tern, black-crowned night-heron, and Lewis’ woodpecker.

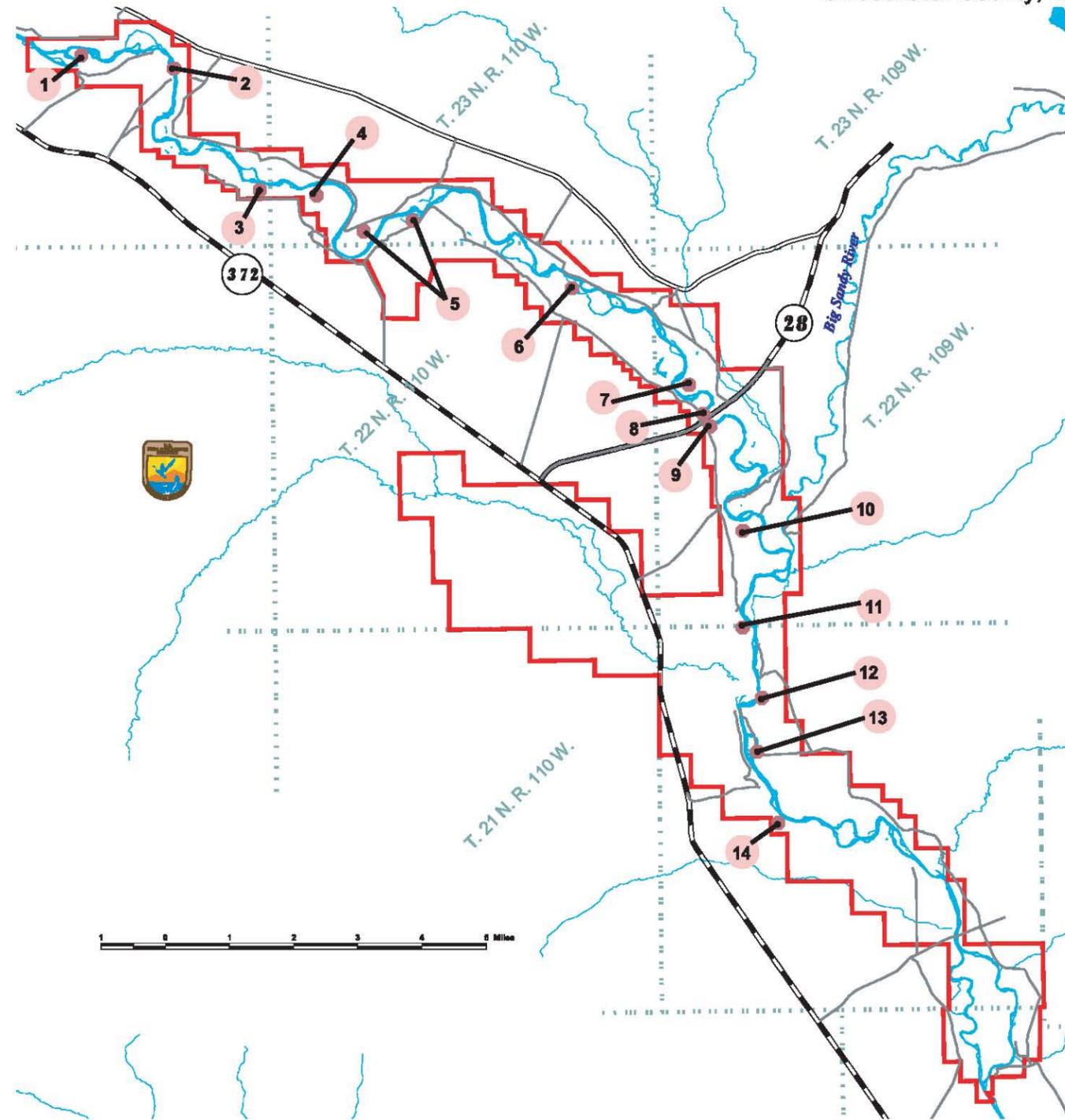
3.2.6 Cultural Resources Inventory

The western Wyoming Basin and the vicinity of today’s Seedskafee NWR has a sequence of uninterrupted human use, at least since the Folsom times (10400 to 10800 BP), and perhaps dating even further back. At least one surface find of Clovis (10600 to 11900 BP) is documented by Frison (1978) (Miller and Kornfeld, 1996). The people who passed through or used the resources of these lands over thousands of years left evidence of their occupation. Within the past 150 years, fur trade and pioneer migrations west brought European peoples through the region resulting in the eventual establishment of trading centers, private landownership, and communities. As with prehistoric occupation, these historic uses left behind evidence of their presence at Seedskafee, including trail remnants, old outposts, and ranch structures (Map 7). Seedskafee NWR’s dune formations are rich in artifacts from prehistoric use, and the Refuge has numerous historic sites.

These artifacts provide opportunities to add to the body of knowledge about prehistoric and historic peoples and to also learn more about how these lands and resources were utilized by both prehistoric and historic occupation.

Seedskadee National Wildlife Refuge

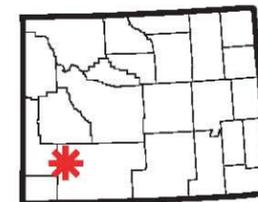
Sweetwater County, Wyoming



Legend

- 1 Teal Island Cabin
- 2 Dodge Homestead
- 3 Yancey Homestead
- 4 Tallman Ranch
- 5 Concrete houses
- 6 Barnhardt Wild Horse Ranch
- 7 Lombard Ranch
- 8,9 Oregon Trail Crossings
- 10 Green River Crossing, Ferry, Stage Station, Pony Express Station, Pony Express Station, and Transcontinental telegraph Office
- 11 Robinson Ferry
- 12 Rood/Branson Ranch
- 13 Rood/Branson/Johnson Ranch
- 14 Bridger-Fraeb Trading Post, Palmer/Mormon Crossing

Refuge Location



State of Wyoming

Draft

Map # 7 Historical Site Map

3.2.6.1 Prehistoric

The Wyoming Basin was occupied by small groups of hunter-gatherers at the band level of organization. They practiced seasonal movements which optimized the procurement of resources including food, water, shelter, and raw materials such as toolstone. Movement coincided with seasonal availability for critical resources. Aboriginal populations became more familiar with certain plant species through time and gradually incorporated them as part of their subsistence strategy.

Three broad cultural periods are recognized in the western Wyoming Basin, generally corresponding to those established for the Northwestern Plains by Frison (1978,1991): Paleoindian, Archaic, and Late Prehistoric. The Paleoindian Period (12000 to 8000 BP) sites are dominated by bison bone beds and the subsistence is interpreted as being dependent on big game (such as camel and mammoth), specifically on extinct species. The Archaic Period (8000 to 2000 BP) is characterized by a Pan-American broad-based subsistence strategy. The Archaic Period is subdivided into Early, Middle and Late subperiods based on differences in projectile point styles and associated with minor differences in subsistence. The Late Prehistoric Period (2000 to 250 BP) is defined by the introduction or innovation of the bow and arrow as well as the production and use of ceramics (Miller and Kornfeld, 1996).

During the Paleoindian Period, lush grasslands and savanna-like conditions existed with notably higher precipitation supporting large herbivores such as the mammoth, horse, and extinct forms of bison. This period is distinctive for its meticulous workmanship of projectile points. The point styles serve as chronological indicators within the period (Thompson and Pastor, 1995).

The Archaic Period is characterized by reduced precipitation and warmer than average temperatures. Megafauna (horse, camel, mammoth, and bison) became extinct or smaller. Hunters had to target smaller animals. The large stemmed lanceolate projectiles were replaced with smaller side and corner notches dart points. A greater use of vegetable foods occurred during this period. Summer occupation in the mountains, winter occupation in the foothills, and spring and fall movements utilized all available zones. Early Archaic subsistence strategies centered around pronghorn, rabbits, and other small animals. Late Archaic subsistence strategies included more bison, but still focused on pronghorn, rabbits, and other small animals. Ground stone is common in both periods (Thompson and Pastor 1995).

The Protohistoric Period began with the first European trade goods reaching the area (300 years BP) and ended with the development of the Rocky Mountain fur trade 150 years ago. Protohistoric sites often contain trade goods such as glass trade beads and metal artifacts. The most important impact on Native American cultures during this period was the introduction of the horse in the early 1700s. Hunting bison became more efficient and cultural material was easier to transport (Thompson and Pastor 1995).

Evidence of housepits or other types of living structures are present in the archaeological record since paleoindian times. Structures were identified at the Agate Basin sites in eastern Wyoming from the Folsom period (ca. 10,600 BP) and the use of housepits has been documented to the Early Archaic. Stone circle (tipi ring) sites date from the Middle Plains Archaic through the historic period.

3.2.6.2 Historic

It was the Shoshone Indians that gave the Green River its first name “sisk-a-dee-agie” or “River of the Prairie Chicken.” Fur traders later corrupted the Indian name to “Seedska-dee.” Shoshone Indians hunted “prairie chickens” (sage grouse), as well as deer, pronghorn, and other wildlife along the banks of the Green River. The River corridor contains many significant archaeological sites. Early explorers and mountain men trapped beavers extensively in the Seedska-dee area.

Thousands of pioneers crossed the Green River on what is now Seedska-dee NWR. The Oregon and Mormon Trails, which cross the Refuge, have been designated as National Historic Trails by Congress. Ruts from these trails are still visible on the Refuge today. The Pony Express Trail also crosses the Refuge. Jim Bridger and others operated ferries on the Green River in the 1840s and 1850s. Settlement of the area by stockman began with the arrival of the railroad in 1868. The remains of numerous homesteads are located along the River (Map 7).

Known cultural resources are fragile and highly susceptible to vandalism. Old homesteads are particularly susceptible to fire. The lack of adequate funding, existing and anticipated, precludes stabilizing these structures and sites. In compliance with current Federal legislation, it is necessary to document them as thoroughly as possible before they deteriorate further from natural and other causes.

3.2.6.3 Lombard Ferry

Lombard Ferry, named after William Lombard, who operated ferries at the site in 1889, was probably the main crossing of the Green River used by Oregon Trail emigrants and thus represented a landmark in many travel diaries as well as a difficult crossing site. During low water periods, wagons could ford the River on a shallow sand bar only 10 feet wide. Divergence from the shallow sand bar led to many a wet wagon and several watery graves. After the initial Mormon trek to the Salt Lake Valley in 1847, the Latter Day Saints quickly realized the importance of establishing a ferry operation for following Mormon trains, and the ensuing ferry capitalized upon the Oregon Trail emigrants by charging three to four dollars per wagon. Several other ferry operations followed in later years, and as late as 1943, the site was marked by the ruin of several stone buildings.

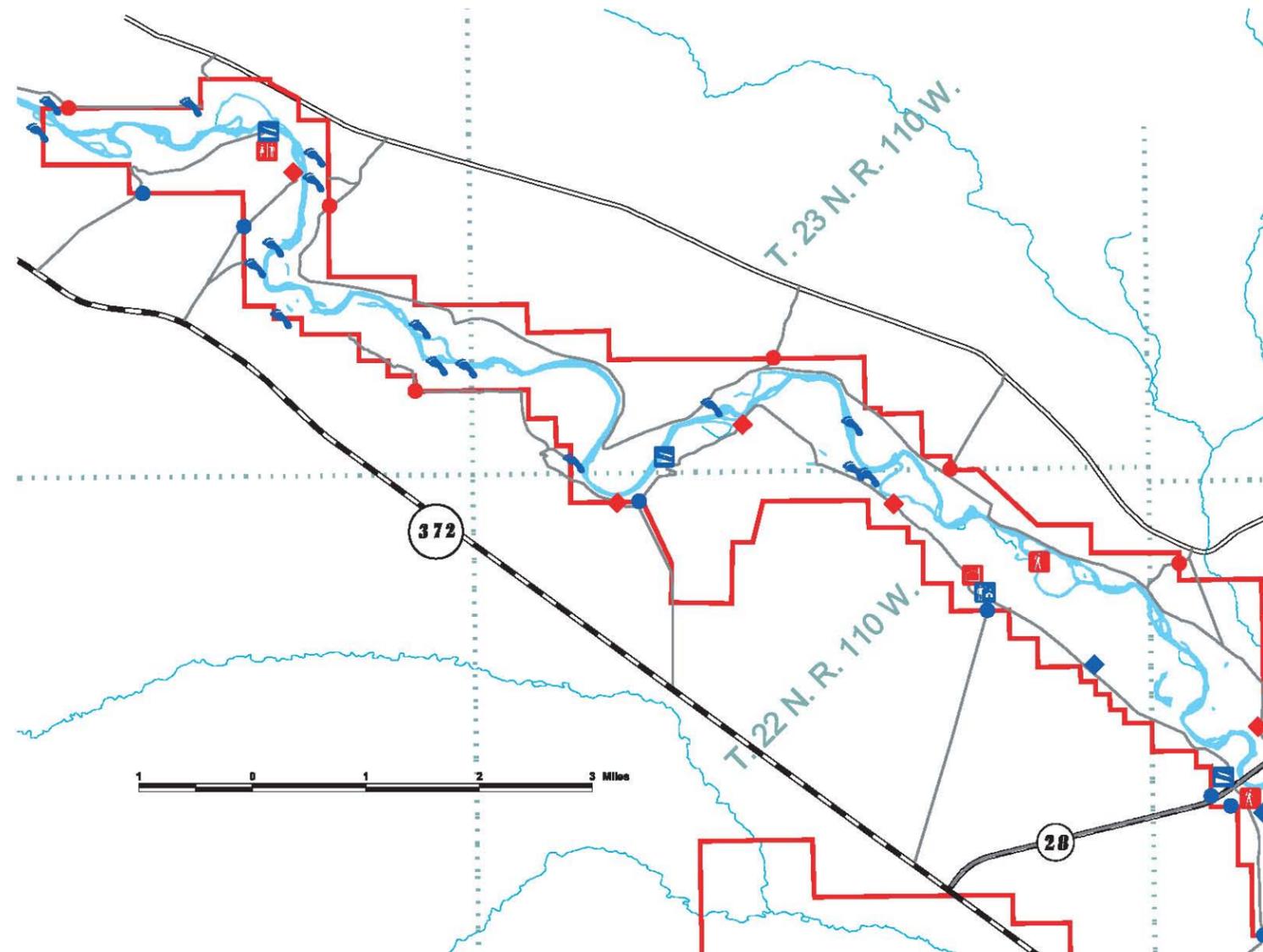
Today, the Lombard Ferry crossing, located 42 miles west of Parting-of-the-Ways is marked with five interpretive panels, a graveled parking area, and a paved pedestrian path (Map 7 and 8a). Access to the site is south of Highway 28. Interpretive panels describe the significance of the site. Lombard Ferry has been identified as a historic site for the Mormon Pioneer National Historic Trail.

Management plans and implementing actions have been prepared by the National Park Service (NPS) for both the Oregon and Mormon Pioneer National Historic Trails. The Fish and Wildlife Service Regional Historian has reviewed these plans and assured NPS that trail routes across the Refuge will be preserved and the Lombard Ferry Site would be preserved and interpreted.



SeedsKadee National Wildlife Refuge

Sweetwater County, Wyoming



Legend

Existing Sites

- Information Site
- ◆ Interpretive Site
- ↘ Walk Over
- 🏠 Refuge Headquarters
- 🚤 Boat Ramp

Proposed Sites

- Information Site
- ◆ Interpretive Site
- 🚶 Interpretive Trail
- 🚻 Rest Room
- 🏠 Education/Visitors Center



Information Site is a location where Refuge brochures are available.

Walk Over is a location where step ladders allow visitors to "walk over" the Refuge boundary fence.

Refuge Location

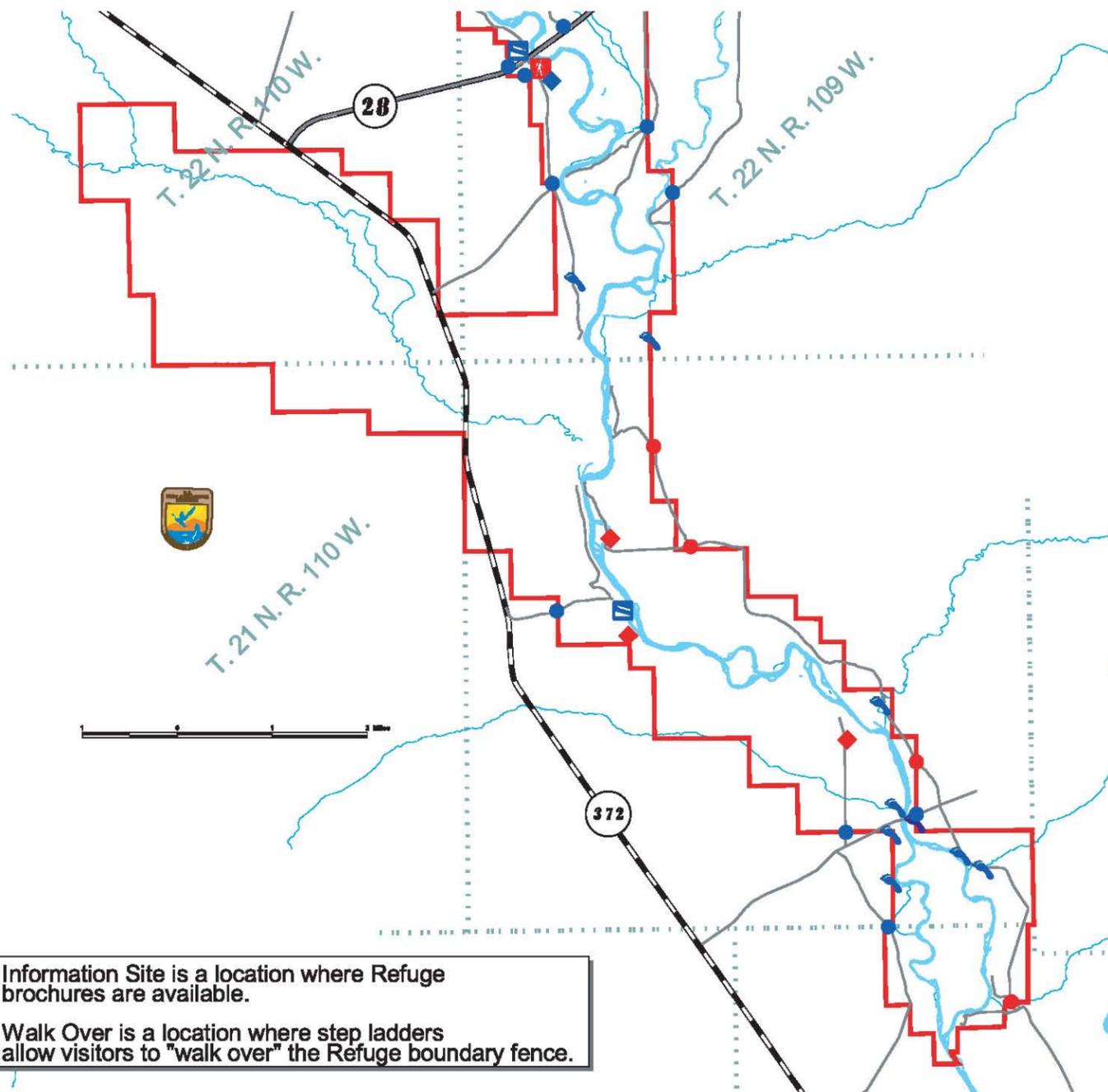
State of Wyoming

Draft

Map #8a Public Use Map - Northern Component

Seedskadee National Wildlife Refuge

Sweetwater County, Wyoming



Information Site is a location where Refuge brochures are available.

Walk Over is a location where step ladders allow visitors to "walk over" the Refuge boundary fence.

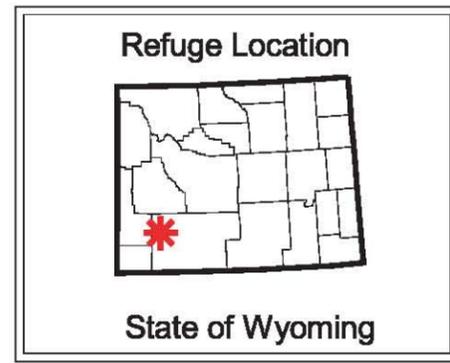
Legend

Existing Sites

- Information Site
- ◆ Interpretive Site
- ↘ Walk Over
- 🏠 Refuge Headquarters
- 🚤 Boat Ramp

Proposed Sites

- Information Site
- ◆ Interpretive Site
- 🚶 Interpretive Trail
- 🚻 Rest Room
- 🏢 Education/Visitors Center



Draft

Map #8b Public Use Map - Southern Component

3.2.6.4 Paleontological Resources

The Bridger and Green River formations are exposed geologic formations that are found on the Refuge. These formations have yielded paleontological resources at other locations. Table 3.9 summarizes the resources in the area.

Table 3.9. Summary of Surface Geologic Deposits and Paleontological Resources, Seedskaadee NWR Area (summarized from material provided by Gustav F. Winterfeld, Ph.D., who provided assistance with the paleontological resource review)					
Geologic Deposit	Geologic Age	Type of Deposit/ Environment of Deposition	Fossil Resources	Paleo Potential	Area Present
alluvial sediments (including alluvium and colluvium)	latest Holocene (500-1,000,000 mya) ¹	unconsolidated silts, sands of valleys and plains, Terrestrial- fluvial.	none	low	widespread
Bridger Formation	middle Eocene-- Bridgerian (37-58 mya)	tuffaceous sandstone and bentonitic mudstone, limestone. Terrestrial-fluvial, floodplain, accumulated after drying up of Lake Gosiute.	vertebrates, invertebrates, plants, trace fossils	high	widespread
Green River Formation Laney Shale Member	middle Eocene-- Bridgerian (37-58 mya)	chiefly oil shale, lesser algal limestone, sandstone, claystone and tuff. Lacustrine, accumulated during renewed expansion of Lake Gosiute.	vertebrates, invertebrates trace fossils	high	T23 N, R111W

¹ mya = million years ago

3.2.6.4.1 Bridger Formation

Exposures of the Bridger Formation comprise most of the surface of the Refuge area along the Green River. The Bridger Formation interfingers with the Laney Member of the Green River Formation described below and is divided into an upper and lower unit by a tongue of that member. Deposits above the tongue comprise the Main Body of the Bridger Formation and those below comprise the Whiskey Butte Bed (Sullivan, 1980).

Fossil vertebrates have been collected from the Bridger Formation for more than 120 years (Leidy, 1869, 1871; Matthew, 1909; West, 1976; Gunnell and Bartels, 1994) and collections of these specimens are housed at nearly every major paleontology museum in the world.

Recent work in the Bridger Formation has been conducted in the Moxa Arch area and documented the presence of 43 genera of fossil mammals, 18 genera of reptiles, and at least 2 genera of fish (Bartels, 1991; Gunnell and Bartels, 1994).

The most common fossil animals found in the Bridger Formation include *Lepisosteus* (gar pike), *A mia* (bowfin), *Echm atemys* (emydid- turtle), *Hybemys* (emydid -turtle), *Trionycid* (soft-shelled -turtle) and the crocodylian taxa *Diplocynodon* and *Crocodylus*.

3.2.6.4.2 Green River Formation

The Green River Formation is represented in the Seedskaadee NWR area by the Laney Shale Member of middle Eocene age. The Laney Member forms the top of the Green River Formation and records in its sediments the greatest expansion of ancient Lake Gosiute followed by its final restriction and desiccation. Lake Gosiute once occupied more than 75 percent of the Greater Green River Basin, or approximately 15,000 square miles (Roehler, 1992, 1993). In Seedskaadee NWR, the Laney overlies the Wasatch Formation of early Eocene age and consists of tan and brown silty algal limestone and ostracodal marlstone.

Significant fossils have been found in the Green River Formation for over 150 years (Grande, 1984). The first fish fossil (herring) was discovered in 1856 by Dr. John Evans, near Green River, Wyoming. The herring fossil was named *Knightia eoceaena*, and is now Wyoming's State fossil. Since 1856 numerous fossil fishes, other vertebrates, insects, and plants have been discovered in this formation.

The Laney Member of the formation produces fossils from four major localities that occur over wide parts of the Green River Basin (Grande, 1984). Plant and insect fossils are very common. The mosquito, *Culex* sp., comprises more than 98 percent of the known fauna. Other invertebrates include ostracodes, mollusks, and gastropods. Common plant fossils include the remains of *Plantanus* sp. (Sycamore) and *Equisetum* (scouring rush) (MacGinitie, 1969). The remains of algal mounds or stromatolites occur elsewhere in the member.

The most common vertebrates found in the locality are fish in the herring genera *Knightia* and *Gosiotichthys*. Birds, salamanders, turtles, and crocodilians are rare. At least one complete articulated turtle and two crocodilian skeletons are known from this locality. The remains of small perching birds, primobucconids, occur as primarily feather impressions.

3.2.7 Public Use Facilities and Program Inventory

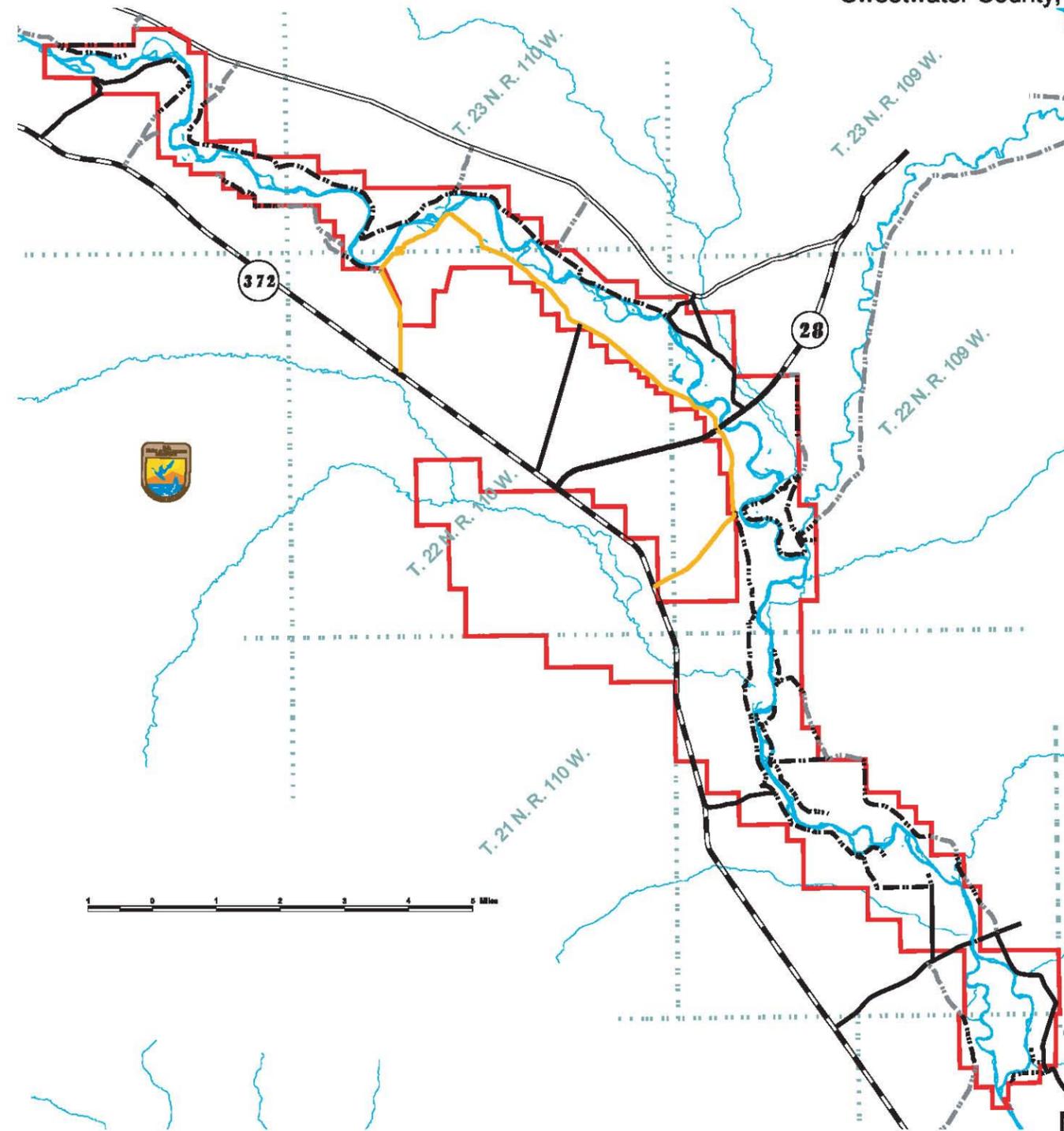
The current Refuge road system consists of 77 miles of designated roads within the Refuge boundary (Map 9). Twenty miles are classified as administrative roads and 57 miles are classified as open public roads. There are many two-tracks, trails, and roads created prior to the Refuge's establishment which are not official Refuge roads. Closed roads will eventually be restored by seeding with native vegetation.

One nine mile auto tour routes is located on the Refuge. This tour route is passable by passenger vehicles in the summer months, and often open in the winter. The 2.5 mile entrance road is an improved all-weather gravel road from State Highway 372 to the Refuge Headquarters.

All other designated roads are only seasonally passable and are not improved or maintained. Four-wheel drive and high-clearance vehicles are recommended. Seasonal closures are imposed. For the protection of habitat, vehicles are allowed only on established open roads and must be parked in designated locations (areas created for parking or signed as designated parking areas) or within 10 feet of the road.

Seedskafee National Wildlife Refuge

Sweetwater County, Wyoming

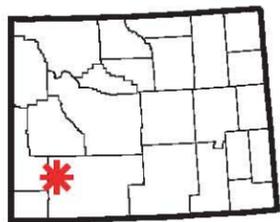


Legend

- Refuge Roads
- AutoTour
- Improved
- No Maintenance
- No Maintenance (Off Refuge)



Refuge Location



State of Wyoming

Draft
Map #9 Refuge Roads - Alternative 1

3.2.7.1 General Public Use

The Refuge has 21 road access points (Map 8a & 8b). The numerous access points make it difficult to accurately estimate the number of visitors. An estimated 11,000 visits were made in 1996, up slightly from 1994 and 1995. Visits jumped to 15,000 in 1997. The increase was likely a reflection of visits associated with the 1997 Mormon Pioneer Trail Sesquicentennial celebration. Table 3.10 summarizes estimated visitor use from 1990 to 1997.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total Estimated Visitors	3,757	4,264	5,12	6,009	8,327	10,355	12,017	15,000	13,000	15,500	16,500
Environmental Education**	107	214	762	1,045	642	605	592	700	762	850	400
Anglers	1,300	1,625	1,800	1,580	3,000	4,000	4,000	4,500	5,000	6,500	6,000
Hunters	450	700	850	1,525	1,185	1,250	1,925	2,500	5,000	6,500	5,000
Wildlife Observation	2,000	1,725	2,000	1,859	3,500	4,500	5,500	5,000	4,000	5,500	6,000

Note: Estimates are taken from Seedskadee NWR Annual Narrative Reports;
 * Includes Mormon Trail Sesquicentennial; ** Includes on-site environmental education only.

An estimated 50 to 70 percent of the Refuge's visitors are from southwestern Wyoming. The remaining out-of-state visitors are comprised of three primary groups: those who are visiting wildlife refuges in the west ; those who are passing by the Refuge on their way to Yellowstone or Grand Teton National Parks; and anglers/hunters from Utah and Colorado.

A recent survey of visitors to Sweetwater County found that one of the most popular recreation activities was viewing wildlife (88.1 percent). Eighty-five percent of those surveyed had Sweetwater County as one of their destinations (Taylor, 1996).

The Refuge Headquarters is open Monday-Friday (7:30 am to 4:30 pm). Information and universally accessible rest rooms are available at the Refuge headquarters seven days a week during daylight hours.

The Refuge has a general brochure/leaflet which contains a Refuge map, describes facilities, and states general Refuge regulations. Brochures are available at the Refuge Headquarters, 14 primary Refuge road access points (Map 8a & 8b), the Farson Information Center, Wyoming Game and Fish in Green River, BLM in Rock Springs, and at the Chambers of Commerce(s) in Rock Springs and Green River.

3.2.8 Compatible Wildlife-Dependent Recreation

Seedskadee NWR offers visitors a wide variety of self-guided and dispersed recreation opportunities. The Refuge Improvement Act (1997) states that public use of a refuge may be allowed only where the use is “compatible” with the Refuge System mission and the purpose of the individual refuge (see Legal and Policy Guidance section). The Act also sets forth a current standard by which the Secretary of the Interior shall determine whether such uses are compatible. The term “compatible use” means a proposed or existing “wildlife-dependent recreational use” or any other use of a refuge, that in the sound professional judgement of the Service, will not materially interfere with or detract from, the fulfillment of the Refuge System’s mission or the purpose of the refuge. Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are the six priority general public uses of the National Wildlife Refuge System.

Before a new use is allowed on a refuge, the Service must determine that the use is compatible and not inconsistent with public safety. To determine if a new use is compatible, a refuge must estimate the time frame, location, and purpose of each use. Furthermore, the refuge staff must identify the direct and indirect impacts of each use on refuge resources and evaluate the use relative to the Refuge’s purpose.

On lands added after 1996, the Service must identify, prior to acquisition, withdrawal, transfer, reclassification, or donation, which existing wildlife-dependent compatible recreational uses the Service will permit.

3.2.8.1 Wildlife Observation and Photography

Visitor estimates indicate that wildlife observation is the most popular public use on the Refuge (Table 3.10). Most wildlife observation activity occurs along the wildlife auto tour route and river corridor. The auto tour is on the west side of the River and passes by the Hawley wetland unit, Refuge headquarters, and Hamp wetland unit (Map 9). Much of the optimum wildlife watching opportunities occur in the River bottom, which is easily viewed from the auto tour route and many other open designated roads. Foot travel is permitted throughout the Refuge and affords exceptional opportunities for individuals wanting to hike and explore off-road areas (Map 8a & 8b).

3.2.8.2 Hunting

Hunting seasons usually occur between September 1 and mid- February. Hunting is permitted for select game species in accordance with State regulations. The most common species hunted are mule deer, pronghorn antelope, sage grouse, cottontail rabbit, ducks, and Canada geese. Other species which are open to hunting under State regulations include red fox, raccoon, white-tailed jackrabbit, coots, mourning doves, sora/Virginia rails, and snipe. A special hunt for moose occurs every 2 to 5 years to reduce populations and avoid habitat damage due to over browsing.

Certain areas are closed to hunting to protect Refuge facilities and to provide resting and feeding habitat for migratory birds (Map 6). Areas closed to hunting are clearly posted with signs. A voluntary avoidance program was instigated in 1997 to reduce hunter disturbance of wintering trumpeter swans. Hunters, as well as the non-hunting visiting public, are asked to stay at least 400 yards from swans. Winter is a critical time for swans which rely exclusively on food resources located in the open water (non-frozen) sections of the Green River to meet their energy demands. The River also provides a critical resting (loafing) area for winter waterfowl, especially swans. Less disturbance helps swans to reduce their overall energy demands.

3.2.8.3 Fishing

Fishing primarily focuses on four introduced cold water trout species (rainbow, brown, Snake River cutthroat, and Bonneville cutthroat). Lake trout are occasionally caught during the winter/spring and kokanee salmon are occasionally caught in the fall. Approximately half of the Refuge (north boundary of Refuge to the Green River and Big Sandy confluence) is a special regulations fishing area (Map 6). Only one fish over 20 inches may be taken and fishing is restricted to artificial lures and flies. The Green River within the Refuge is designated as a Red Ribbon trout stream, which means it supports a trout standing crop of between 500 and 900 pounds per mile. Fishing is the second most popular public use at Seedskaadee. Fishing on the Refuge is subject to State regulations. The Wyoming Game and Fish Department manages the fishery with assistance from the Refuge staff.

3.2.8.4 Non-Motorized Boating

More than 99 percent of all Refuge boating use is non-motorized. The lack of motorized boats provides solitude and excellent angling and wildlife viewing opportunities. Four improved boat ramps have been developed and are spaced to provide easy one day float trips.

3.2.8.5 Commercial Guiding

Commercial fishing guides started to guide clients on the Refuge before 1990. To comply with Refuge regulations, this activity was regulated via an annual permit system which was initiated in 1996. Eleven permits were issued in 1996. Commercial guides are charged fees to utilize the Refuge and are also required to meet strict Refuge regulations regarding the number of boats and anglers occurring in various River sections.

In 1997, the Service, BLM, Reclamation, and Forest Service agreed to issue a single commercial permit for the Green River stretch starting at Fontenelle Dam and ending at the beginning of Flaming Gorge Reservoir (Fire Hole). This joint permit for commercial guiding was discontinued after 1997 and is currently under review to determine its feasibility. A new Refuge draft commercial guide plan was developed and implemented in 2000. The new plan will eventually reduce (via attrition) the total number of permitted commercial outfitters to a maximum of four. Currently six commercial outfitters are permitted on the Refuge.

3.2.8.6 Environmental Education/Outreach

Environmental education is usually conducted while touring the Refuge with school, scout, and civic groups. Demand for these tours continues to increase. In 2001, over 680 people participated in tours that were provided to 16 different groups.

Since 1993, the Refuge, in cooperation with Trout Unlimited, Highland Desert Flies, and the Wyoming Game and Fish Department, has sponsored "Take A Kid Fishing Day." A local pond is stocked at the Rock Springs Fairgrounds with catchable trout, and refreshments are served. This event has attracted up to 300 people from local communities. The event provides an opportunity to inform young people and their parents about wildlife and the Refuge.

Seedskaadee NWR partners with the Wyoming Game and Fish and the Bureau of Land Management Green River Resource Area in providing seasonal wildlife updates for media outreach programs. In addition, Seedskaadee NWR conducts special programs for International Migratory Bird Day and National Wildlife Refuge Week.

3.2.8.7 Interpretation

Four interpretive areas occur on Seedskaadee NWR: Lombard Ferry, Wetlands Overlook, Headquarters Kiosk, and Headquarters visitor area (Map 8a & 8b). Current interpretive signs are limited to these areas. The Refuge Headquarters contains indoor space dedicated to interpretive exhibits. Interior exhibits include a wall-mounted map, a touch table, a children's board, three dimensional models of primitive cultures, and several bird and mammal mounts.

Currently, four Refuge brochures are published (General Information and Travel Map, Hunting and Fishing, Historical, and Wildlife Observation). The general information brochure describes basic regulations and provides suggestions for enjoying the Refuge. The brochure "Seedskaadee National Wildlife Refuge and Vicinity: A Historical Perspective" describes 14 of the historic sites existing on the Refuge, including numerous homesteads, trading posts, and ferry crossings.

Refuge staff conduct public outreach efforts by hosting display booths at the Green River Fly Swap, Casper Hunting and Fishing Expo, and Red Desert Sport Show.

3.2.9 Non Wildlife-Dependent Recreation

The Refuge staff is concerned with the non wildlife-dependent recreation activities occurring at the Refuge. These activities are a concern to management because they are unauthorized, conflict with Service policy, and create significant wildlife and habitat disturbance. These non wildlife-dependent recreational activities include, but are not limited to, camping, swimming and power boating, off-road vehicle use, etc.

3.2.9.1 Camping

It is Service policy that, "Camping will not be permitted when any other practical alternative is available and only when required to implement a planned and approved wildlife-wildlands oriented recreational activity (8 RM 9.5)." Camping is not necessary to enjoy the wildlife and fish resources on the Refuge. Practical alternatives are offered at the Bureau of Land Management operated campgrounds located just upstream from the Refuge (Slate Creek, Tailrace, and Weeping Rock). The Bureau of Land Management allows short-term (14 day) dispersed camping on lands which surround the Refuge.

No authorized general public overnight camping opportunities are provided on the Refuge. Currently, camping occurs on a limited permit basis for scout troops performing civic projects for Seedskaadee NWR.

3.2.9.2 Swimming and Power Boating

Swimming and power boating on the Green River are not encouraged at Seedskaadee. Opportunities exist for such recreational activities above and below the Refuge at Fontenelle and Flaming Gorge Reservoir, and downstream of the Refuge on the Green River.

3.2.9.3 Off-Road Vehicles

Off-road vehicle use is prohibited in any area which is not an established and designated roadway for public travel within the Refuge. Designated Refuge roads are shown in the Refuge General brochure. Non-designated two-track "roads" crisscross areas and result in habitat degradation. Eventually, all non-designated roads will be closed and restored by seeding with native vegetation. The number of roads are limited on the Refuge to protect wildlife habitat, reduce disturbance to wildlife, protect the beautiful views, and enhance the overall visitor experience.

3.2.10 Administrative Support

3.2.10.1 Current Facilities

Refuge buildings include:

- Headquarters building consisting of a small visitor information center, four offices and a conference room
- Maintenance shop
- Two equipment storage buildings
- Three older 3-bedroom homes (refuge staff residences)
- One 3-bedroom bunkhouse for multiple-occupancy of seasonal staff and volunteers
- One cold storage building located at the Hay Farm

The maintenance shop and storage facilities are relatively new and will meet the Refuge needs for the immediate future. Inadequate housing, however, could limit the capacity for the increasing Refuge's volunteer workforce. Demand currently exceeds supply in the summer months. Office space is at a premium and may need to be expanded if staffing increases.

The Refuge also has the following recreational facilities to orient visitors and provide for public use: 4 primitive boat launches; 24 walk-over and walk-through structures along the Refuge's perimeter fence; nine-mile auto tour road; one wetland interpretive overlook; the Lombard Ferry Historic Site (interpretive); 14 information sites; and an orientation kiosk at Refuge headquarters. Universally accessible rest rooms are available at the Refuge headquarters (Maps 8a & 8b)

3.2.10.2 Current Staffing

Seedskadee NWR staffing has always been limited, but has fluctuated significantly in the last six years. In 1993, the Refuge had a permanent staff of five full-time positions, including a refuge manager, a refuge operations specialist, two maintenance workers, and a biological technician/clerk. In 1994, the permanent staff was reduced by 1 full-time equivalency (FTE), and in 1995 the permanent staff was further reduced to 3 FTE's. Since 1995, various FTE's have been restored. Current (2000) staffing includes six permanent positions (Table 3.11).

FTE	Current Position
1	Refuge Manager/Project Leader, GS 12
1	Assistant Refuge Manager (ROS), GS 11
1	Administrative Support Assistant, GS 6
1	Biologist GS 9/11
1	Engineering Equipment Operator, WG 9
1	Biological Technician, GS 6
6	Total Current FTE

The Seedskadee staff also manages Cokeville Meadows NWR, currently about 8,000 acres, located two hours west near Cokeville, Wyoming. A CCP will be prepared for Cokeville Meadows NWR under separate cover.

3.3 Special Management Areas

3.3.1 Special Legislated Designations

No wilderness areas currently exist or are proposed for Seedskadee NWR. The Service has not pursued any formal review of Seedskadee lands for designation as wilderness. Portions of the Refuge may qualify for designation. Future Service policy may require the formal review of all lands within the Refuge System. A draft of the Service “Wilderness Stewardship Policy” is currently in review. Within the Rock Springs District of the Bureau of Land Management, a total of four wilderness areas and eight wilderness study areas have been proposed. The closest of these is 50 miles from the Refuge boundary.

The Refuge contains an abundance of historical/cultural resource sites and has four National Historic Trails which traverse through it (Map 7). Several historic sites and trail segments have been included in the National Register of Historic Places. The general Refuge setting provides landscape views which look much like they did in the early 19th century. Maintaining the current landscapes of the Refuge and surrounding area are important to maintaining the natural and historic nature of the area.

The American Bird Conservancy (ABC) has designated Seedskadee NWR, and the surrounding BLM lands, as a Globally Important Bird Area (IBA). To qualify for this designation an area must have significant ongoing efforts to conserve wild birds and their habitats. ABC’s IBA program, supported in part by The Nature Conservancy and the Disney Wildlife Conservation Fund, aims to identify and protect a network of key sites to further bird conservation efforts.

