

LAND & RESOURCE USE

Native grasses range from a mere presence of grass to an abundance of grass, depending on the history of the site and beneficial soil/water relations. Native perennial bunchgrasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), Great Basin wildrye (*Leymus cinereus*), junegrass (*Koeleria macrantha*), needle and thread grass (*Achnatherum comata*), Thurber's needlegrass (*Achnatherum thurberiana*), and in more disturbed situations, bottlebrush squirrel tail (*Elymus elimoides*). Introduced grasses are primarily cheatgrass (*Bromus tectorum*) and crested wheatgrass (*Agropyron cristatum*).

SILVER SAGEBRUSH/GRASSLAND COMMUNITIES: The silver sagebrush (*Artemisia cana*) grassland community is usually found in valley bottomlands. Silver sage is the dominant and characteristic shrub of this community. This tall shrub community is moderately to widely spaced. It grows in areas that have been deflated (eroded by wind) and subsequently partially filled with ingrained sediments. Although species such as creeping wildrye (*Elymus triticoides*) occasionally occur, the understory can be dominated by widely spaced, often robust bunchgrasses such as Nevada bluegrass (*Poa nevadensis*).

LOW SAGEBRUSH/GRASSLAND COMMUNITIES: Low sagebrush (*Artemisia arbuscula*) communities are found throughout eastern Oregon, generally on areas with shallow basalt soils. Low sagebrush is the primary dominant and often the only shrub in the stand; however, Sandberg's bluegrass is also commonly found, as well as western juniper. Other associated grasses are bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, Nevada bluegrass, and cheat grass. The low sagebrush plant communities usually occur on soils where rooting depth is restricted by bedrock or a heavy clay layer. The restricted rooting profile lowers the site productivity. Low sagebrush occupies some large areas of land, especially on the southern end of Steens Mountain. In other areas, low sagebrush plant communities are found in a complex mosaic with other sagebrush plant communities such as Wyoming and mountain big sagebrush. The sites have extensive areas of exposed rock and often do not have enough vegetation to support wildland fires. Low sagebrush can also occur within an aspen mosaic. After the snow melts and soil warms in the spring, these areas are rich with colorful and diverse perennial and annual wildflowers.

MOUNTAIN BIG SAGEBRUSH/GRASSLAND COMMUNITIES: At higher elevations in the Great Basin Province, mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) communities occur on plateaus and rocky flats with minimal soil development. Sandberg's bluegrass, bluebunch wheatgrass, Idaho fescue, Nevada bluegrass, cheatgrass, bitterbrush, wax currant, snowberry, and grey rabbitbrush are common in this community type. This medium to medium-tall shrub land varies from widely spaced to fairly dense shrubs occurring on deep-soiled to stony flats, ridges and mountain slopes, and usually in cool moist areas with some snow. In this community, Idaho fescue is the most common and diagnostic grass. Mountain big sagebrush is usually the dominant shrub.

MOUNTAIN SHRUB LAND COMMUNITIES: Mountain shrub land is found on the steep rocky slopes of mountains in southeastern Oregon. It usually appears as a minor component within the western juniper woodland types or it grades in and out of sagebrush steppe. This cover type is commonly encountered but generally exists as units that are too small to be mapped. This widely dispersed tall shrub land grows in rock talus and rock outcrops, in soil pockets within rocky slopes, and along with big sagebrush. It can be the dominant overstory vegetation with occasional western juniper and low sage or bitterbrush, and some grasses such as bluebunch wheatgrass, Idaho fescue, and Columbia needlegrass (*Stipa columbiana*). Bitterbrush communities are found in a medium-tall shrub land steppe with bunchgrass or cheatgrass understory. Bitterbrush can be dominant or co-dominant with big sagebrush. Idaho fescue is the characteristic native bunchgrass, with bluebunch wheatgrass co-dominant at lower elevations. Western needlegrass is dominant at the higher elevations and where soils are more sandy. Snowberry communities are found on steep slopes between alpine habitats and riparian or sagebrush steppe. Many forbs grow in the area with snowberry, such as mountain mahogany, aspen, and mountain big sagebrush. Juniper can be found with these shrubs at lower elevations.

JUNIPER WOODLANDS: Trees of pre-settlement age (over 150 years) develop characteristic rounded canopies, which begin to senesce as the trees approach 500 years old. The majority of the western juniper woodlands in the sub-basin area, including the Steens Mountain CMPA, are post-settlement

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stands that are less than 120 years old. These trees and the associated plant communities vary substantially from the pre-settlement stands. Density and cover is much higher than the pre-settlement stands, and the tree canopies are cone-shaped. Juniper woodlands in the Steens Mountain area occur between 5,500 to 6,700 feet in elevation and are dominated by western juniper. Mountain big sagebrush, Idaho fescue, needlegrass, and low sagebrush occupy drier sites in this community. Mountain mahogany, bitterbrush, wax currant, and Lemmon's needlegrass dominate the rimrock areas. Seasonally moist depressions, vernal pools, clay barrens, riparian meadows, seeps, gorge-bottom woodlands, and mesic north-facing quaking aspen dominated slopes all contribute to the habitat diversity in this community.

QUAKING ASPEN/ALPINE BUNCHGRASS COMMUNITIES: The aspen community in the Steens Mountain area occurs between 6,700 and 8,000 feet in elevation. The sub alpine elevations are a mosaic of aspen stand, sagebrush grasslands, rimrock/talus and riparian meadow. Aspen groves dominate sheltered and mesic sites between approximately 6,000 and 7,700 feet in elevation. Snowberry and wax currant are also dominant shrubs at this elevation. The more exposed and dry sites are frequently dominated by mountain big sagebrush and a variety of forbs and grasses, including sneezeweed, Steens thistle, paintbrush, lupine, squirreltail and Cusick's bluegrass. Meadows and springs are dominated by species such as sedges, rushes, hellebore, pussytoes, and cinquefoil.

ALPINE BUNCHGRASS COMMUNITY: The Alpine Bunchgrass community on Steens Mountain occurs at elevations greater than 8,000 feet. The highest vegetation zones are referred to as either sub alpine grassland or true alpine tundra. The dry, gravelly, windswept summit ridges have a characteristic xeric flora including cut-leaf daisy, sulfur-flowered buckwheat, balloon-pod milk vetch, prairie smoke, Steens paintbrush, and needle-leaf sandwort. Sandberg's bluegrass, sheep fescue and sedges dominate dry bunchgrass communities below the ridge crests. A complex assortment of alpine wet and mesic meadows occurs in cirques and pockets where snow accumulates and provides perennial water in the form of springs or a high water table. Common species in this area include American bistort, cinquefoil, monkeyflower, speedwell, buttercup, elephant's head, sedges, rushes, and redtop.

RIPARIAN AND WETLAND COMMUNITIES: The sub-basin includes wetlands and marshes that are reasonably perpetual. Vegetation on these bottomlands varies according to frequency, duration and depth of inundation. Included in these plant communities are the willow floodplain riparian areas of tall shrub communities with dense cover of willows, occasionally interspersed with wetlands, sedge meadows, or moist, forb-rich grassland. This community occurs in broad valley floors, narrow riparian canyons, and along rivers and streams. Cottonwood, several willow species, wormwood, gooseberry, rose, snowberry, red osier dogwood, serviceberry, alder and chokecherry are usually found along the rivers. In the past, cottonwood was probably more prevalent. Stinging nettle and cow parsnip are often present. Hardstem bulrush-cattail marshes form open to dense, nearly monotypic stands of bulrush wherever standing water is found throughout much of the growing season. Patches of cattail, burred and several species of *Scirpus* are the most important graminoids. *Carex* species occur in and around this type, along with *Eleocharis* and *Juncus* species. In some areas, spike rush forms a monotypic community along wetland channels. Scattered throughout the area are sedge montane meadows and wetlands, also tall sedge meadows and wetlands, where dense rhizomatous or tufted sedges dominate the meadows. Usually these areas are forb-poor. Hairgrass is the most important grass, occurring at the dryer margins. Many forbes are also present. *Salix* species dominate streams which run through these meadows. Tufted hairgrass montane meadows and valley prairie occur in a few areas of the sub-basin. These tall montane meadow grasslands with dense tufted grasses range from forb-rich to grass-sedge dominated areas. Occasionally, willows, silver sagebrush, or black greasewood are present. Tufted hairgrass is the most important and dominant species.

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Table #6:

Special Status Species Plants in the Donner und Blitzen Sub-Basin

Common Name	Scientific Name	BLM Status	ONHP Status
alpine fescue	<i>Festuca brachyphylla</i>	T	L3
Alpine lily	<i>Lloydia serotina</i>	T	L3
Awned sedge	<i>Carex atherodes</i>	T	L3
Back's sedge	<i>Carex backii</i>	A	L2
Bellard's kobresia	<i>Kobresia bellardii</i>	T	L3
capitate sedge	<i>Carex capitata</i>	A	L2
Cusick's hyssop	<i>Agastache cusickii</i>	A	L2
Cusicks's draba	<i>Draba sphaeroides var cusickii</i>	T	L4
dark alpine sedge	<i>Carex subnigricans</i>	A	L2
Davidson's penstemon	<i>Penstemon davidsonii var. praeteritus</i>	T	L4
discoïd goldenweed	<i>Ericameria discoidea var discoidea</i>	T	L4
Drummond willow	<i>Salix drummondiana</i>	T	L4
dwarf evening primrose	<i>Camissonia pygmaea</i>	S	L1
ephemeral monkey flower	<i>Mimulus evanescens</i>	S	L1
flowering quillwort	<i>Lilaea scilloides</i>	T	L3
foetid sedge	<i>Carex foetida var. vernacular</i>	A	L2
four-wing milkvetch	<i>Astragalus tetrapterus</i>	A	L4
gray moonwort	<i>Botrychium minganese</i>	A	L2
hairstemmed rush	<i>Juncus capillaris</i>	T	L3
Hayden's cymopterus	<i>Cymopterus nivalis</i>	A	L2
Hayden's sedge	<i>Carex haydeniana</i>	T	L4
Kruckeberg's holly fern	<i>Polystichum kruckebergii</i>	T	L4
lance-leaved grapefern	<i>Botrychium lanceolatum</i>	A	L2
least rush	<i>Juncus hemiendytus var. abjectus</i>	T	L3
Least snapdragon	<i>Antirrhinum kingii</i>	T	L3
Lowland rotala	<i>Rotala ramosior</i>	A	L2
Malheur wirelettuce	<i>Stephanomeria malheurensis</i>	E	L1
moonwort	<i>Botrychium minganense</i>	A	L2
moss gentian	<i>Gentiana prostata</i>	A	L2
mosslike dwarf rush	<i>Juncus bryoides</i>	T	L3
new sedge	<i>Carex nova</i>	T	L3
nodding melic	<i>Melica stricta</i>	T	L4
Pinewoods cryptantha	<i>Cryptantha simulans</i>	T	L3
pinnate grapefern	<i>Botrychium pinnatum</i>	A	L2

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Common Name	Scientific Name	BLM Status	ONHP Status
Rafinesque's pondweed	<i>Potamogeton diversifolius</i>	A	L2
raven's biscuitroot	<i>Lomatium ravenii</i>	A	L2
Rocky Mtn. Helianthella	<i>Helianthella uniflora var. uniflora</i>	T	L3
short-fruited willow	<i>Salix brachycarpa var brachycarpa</i>	T	L4
short-lobed penstemon	<i>Penstemon seorsus</i>	T	L3
Sierra willow	<i>Salix orestera</i>	T	L3
Sierran springbeauty	<i>Claytonia nevadensis</i>	T	L4
sky pilot	<i>Polemonium viscosum</i>	T	L4
slender gentian	<i>Gentianella tenella</i>	A	L2
Steens Mountain paint brush	<i>Castilleja pilosa var. steenensis</i>	S	L3
teacher's sedge	<i>Carex praeceptorum</i>	T	L4
Thinleaf goldenhead	<i>Pyrocomma linearis</i>	T	L4
Tiehm's rush	<i>Juncus tiehmii</i>	T	L3
two-stemmed onion	<i>Allium bisceptrum</i>	T	L4
weak-stemmed stonecrop	<i>Sedum debile</i>	T	L3
wedge-leaf saxifrage	<i>Saxifraga adscendens var. oregonensis</i>	A	L2
Wheat sedge	<i>Carex antherodes</i>	T	L3

BLM Status

S=Sensitive - species that could easily become endangered or extinct in a state, are restricted in range, and have natural or human-caused threats to survival.

A=Assessment - species not presently eligible for official federal or state status but are still of concern and need protection or mitigation in BLM activities.

T=Tracking - species that may become of concern in the future, but more information is needed to determine status for management purposes.

E=Endangered – federally listed under the Endangered Species Act.

ONHP(Oregon Natural Heritage Program) Status

L1 - taxa threatened with extinction or presumed to be extinct throughout their range.

L2 - taxa threatened with extirpation or presumed to be extirpated from the State of Oregon.

L3 - taxa of conservation concern that need more information to determine status.

Source: Burns District, BLM, 2003.

NOXIOUS WEEDS

Noxious weeds are spreading so rapidly in Oregon that they have been declared a menace to public welfare (ORS 570.505). In some instances, such invasion is hazardous to human health and welfare, as emphasized in the Federal Noxious Weed Act (PL 93-629). Some weed species pose a significant threat to multiple-use management of public land. See Appendix D. The Carlson-Foley Act (PL 90-583), as well as state and county laws, make the federal government responsible for control of weeds on federal land and provide direction for their control.

The Oregon Department of Agriculture (ODA) developed "Oregon's Noxious Weed Strategic Plan" in January, 2001, and updated the classification system in 2002. The classification system provides guidelines for implementing and prioritizing noxious weed control programs, assists in the distribution of limited funds, and serves as a model for other weed classification systems. Harney County has listed and classified the noxious weeds currently present in the county, or in neighboring counties that pose an immediate threat. The weeds are rated as A, B, or C pests. (See Appendix D for definitions.)

The Harney County Weed Board and Soil Conservation District are very active in recruiting weed control partners. In 1998 the county received a grant of \$95,500 for a weed control coordinator and equipment. The Harney County Weed Management Partnership was formed through a Memorandum of Agreement signed by most of the agencies in the area, including BLM, USFS, ODA, ODFW, ODOT, OSU Extension, Harney County, Harney SWCD, City of Burns, and the Malheur National Wildlife Refuge.

The Burns District of the BLM operates under the weed protocols set forth in the following documents: Vegetation Treatment on BLM Lands in Thirteen Western States (Feis and Rod, 1991), Supplement to the Northwest Area Noxious Weed Control Program (Feis and Rod, 1987), and the Noxious Weed Management Program Environmental Assessment (OR-020-98-05, 1998). Over 800 acres of noxious weeds have been mapped on BLM lands in the sub-basin (Analysis of the Management Situation and Subbasin Review, Andrews Management Unit/Steens Mountain Cooperative Management and Protection Area Resource Management Plan, July, 2002). Canada Thistle is the most common offender with over 76% of the acreage. (See Map #24, and Table #7.)

The MNWR views invasive species as a threat to the refuge and its mission by causing habitat degradation and competition with native species. MNWR has placed priorities on several invasive species for control such as Canada thistle, perennial pepperweed, poison hemlock, Russian olive and saltcedar. Priorities have been identified for weeds that are (1) known to have economic importance and are in small enough infestations to make eradication practicable, (2) in a general distribution or abundance that is detrimental to refuge key management species, and (3) interfering with refuge objectives and legal obligations. There are a variety of other invasive species that can reasonably be anticipated to arrive on the refuge in the coming years from adjacent areas, or via other common routes on the refuge. Those invasive species will be considered for control when time warrants.

The refuge has recognized undesirable encroachment of invasive species as far back as the 1900's and has been actively involved in invasive species management. Records have not been reported on how and when invasive plant species became established on the refuge, but can be speculated and correlated with invasive species management. Consideration of invasive plant species management for Canada thistle, morning glory and whitetop was recorded in 1972. Chemical control was used to attempt to control Canada thistle in 1975. Whitetop was addressed in 1977, perennial pepperweed in 1981, poison hemlock and Russian knapweed in 1984. Noxious weeds on the refuge have been inventoried, but the data have not been entered for GIS mapping (Roy, April, 2003).

Vehicles, equipment, animals, and water are the primary vectors for invasive plant species. The refuge is adjacent to highway 205, a main route for travelers to California, Idaho, Nevada and other parts of Oregon. Many of those travelers take the opportunity to enjoy the refuge, which brings in approximately over 60,000 visitors, hunters, and students annually. Management practices on the refuge utilize equipment to promote habitat for fish and wildlife. Wildlife and livestock can import weeds; wool samples from sheep were collected by refuge staff and found numerous invasive seeds. Water is also a big

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influence on the refuge as the refuge is located on the bottom of all watersheds. Tributaries originating above the refuge may have invasive species present.

Major control efforts have been targeted around hay fields, waterways, roadsides, satellite and small infestations to prevent the spread of invasive seeds. The refuge utilizes a variety of mechanical, cultural, biological and chemical controls to manipulate the environment to the disadvantage of invasive species. The refuge is also establishing a rest-rotation system that is intended to inhibit spread of invasive weeds. The rest-rotation system will consist of drying up blocks of refuge land to (1) incorporate management practices, such as fire, to enhance control of invasive plant species; (2) control invasive plant species at the recommended application timing; and (3) allow treatment for invasive plant species continually for several years. The refuge has been working cooperatively with other agencies and private landowners to enhance invasive species management throughout Harney County.

Table # 7:

Noxious Weeds on BLM Lands in the Sub-basin

Common Name	Code	Acres
Russian knapweed	ACRE3	0.003
White top	CADR	1.395
Spotted knapweed	CEB12	5.266
Diffuse knapweed	CED13	1.948
Yellow starthistle	CES03	0.001
Canada thistle	CIAR4	640.366
Bull thistle	CIVU	37.833
Halogeton	HAGL	0.170
St. Johnswort	HYPE	0.007
Perennial pepperweed	LELA2	75.451
Dalmation toadflax	LIDA	0.098
Yellow toadflax	LIVU2	0.001
Scotch thistle	ONAC	65.337
Mediterranean sage	SAAE	0.086
Tansy ragwort	SEJA	0.009
Medusahead rye	TACA8	11.529
Puncture vine	TRTE	0.003
		Total 839.501

Source: Burns District, BLM, 2003

JUNIPER ENCROACHMENT

Western juniper (*Juniperus occidentalis* Hook var. *occidentalis* Vasek) is found in eastern Oregon, southwest Idaho, northwest Nevada and northeastern California. It is long lived and seems to have no boundaries with regard to soils or environmental conditions. Researchers from Rangeland Resources Oregon State University and the USDA Agriculture Research Service, Eastern Oregon Agriculture Research Center, Burns, Oregon, have found evidence that indicates that about 95% of the western juniper is less than 100 years old. Western juniper occupies about 5 million acres in eastern Oregon.

Juniper has an impact on most woody species, such as sagebrush, mountain mahogany, bitterbrush, and aspen. As juniper dominance increases there is a decline in the shrub species and the herbaceous vegetation as well. Competition among junipers reduces recruitment, leader growth and berry production. The amount of juniper cover and stems per acre will vary according to site conditions as a stand moves toward full closure.

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For example, Low sagebrush/sandberg bluegrass association had cover ranging from 19 to 24 % and 64 to 111 trees per acre. Closed stands of mountain big sagebrush had a range of cover 25 to 41% and 222 to 481 trees per acre. The bluebunch wheatgrass and Idaho fescue type had about the same for cover with the fescue having more stems per acre (Wall, et. al., 2000).

The percent juniper cover for the aspen stands ranged from 78 to 90% and 906 to 1,731 stems per acre. Ninety-one aspen stands were sampled in southeastern Oregon for juniper encroachment. Encroachment reached a peak between 1900 and 1939. Seventy-seven percent of all trees sampled were established during that period. Three-fourths of the stands had established juniper; 12% of the stands were completely replaced by juniper. Juniper was dominant in 23% of the stands. Average density was 1,573 juniper trees per acre. Seventy percent of the aspen stands had no recruitment and the average age for the aspen was 98 years. The absence of pre-settlement juniper suggests that fire was the primary stand replacement disturbance (Wall, et al., 2000).

During woodland succession plant community structure changes cross an ecological threshold that results in a significant reduction in the role of fire. Crossing this threshold may result in the loss of some species and loss of soil from the site. During the early stages of woodland development fire can change or reverse succession. By mid to late succession a threshold is crossed that makes going back to shrub steppe unlikely with fire. Once the ecological threshold is created, the woody shrubs are gone and bare ground abundant, the only option for restoration is mechanical treatment. This treatment should be applied to the more productive sites. The response to cutting will vary based on site conditions prior to cutting. A lot will depend on the soil seed bank, soil conditions and the weather. Monitoring the results may require two or three years before one can judge success. So far, studies indicate that the debris sites are favorable zones for perennial grasses, and slash burning should be delayed 5 to 15 years. Cutting of juniper can be expensive, but the results are increased forage production, improved ground cover and a reduction of soil movement (Bates, et al., 2000).

WILDLIFE

The Donner and Blitzen Sub-basin is located in the high desert steppe with its higher perimeter having desert-type vegetation and an arid climate, which contrasts with the lower closed basin with its marshes, meadows and wetlands. The weather is characterized by hot, dry summers and cold winters. Because of the dry climate, water plays an important role in determining species distribution and populations during extreme conditions. Wildlife species unique to the area evolved as water distribution and geographical isolation lent to their development. Redband trout and Malheur shrew are examples of such species.

Many birds and waterfowl inhabit the area seasonally or year round. Elk, deer, bighorn sheep and antelope are the primary big game species found in the sub-basin. Coyotes are common within the sub-basin and are often seen in all vegetative types and topography, including the open meadows. Bobcats and cougar are secretive and seldom seen, however their population, range and habitat have expanded.

The following narrative highlights some of these populations, and is not intended to be comprehensive. (See Map #8 for more detail on big game habitats, Map #13 for redband trout, Maps 14-22 for bird use areas, Appendix A for Special Animal Status Species, Appendix C for Fish Species, and Appendix G for detailed listing of Terrestrial Species in the sub-basin.)

UPLAND GAME BIRDS: There are a variety of upland game birds in the assessment area. Pheasant numbers are limited as they do not thrive well due to the area's cold, wet springs and lack of grain crops for feed. Some hunting takes place on private agricultural lands and the Malheur National Wildlife Refuge. Quail inhabit many of the same areas as pheasants, although in much greater numbers. Chukar are scattered throughout the sagebrush and rimrock areas with populations varying according to weather and food supply. Sage grouse, the largest of the native upland game birds are declining in numbers, and can be found in the sagebrush areas of the upper foothills. Mourning doves are common throughout the sub-basin during the summer nesting season, but gather in large numbers when the first hard frosts come. Mourning doves are considered migratory and are therefore regulated by the federal government.

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WATERFOWL: The Harney-Malheur Lakes and Donner und Blitzen sub-basins are two of the most important waterfowl and lesser sandhill crane migratory use areas in the Pacific Flyway. The sub-basin also provides nesting habitat for a number of waterfowl, shorebird and marsh bird species, and greater sandhill cranes. Large numbers of longbilled curlews nest on the alkali flats around Harney Lake. Malheur National Wildlife Refuge supports a population of snowy plovers, one of the largest in North America.

A surface area of about 50,000 acres is needed on Malheur Lake to create the minimum desirable level of use of refuge by waterfowl. Harney Lake, the final destination of the basin's water, is valuable as a nesting area for waterfowl and acts as a collection area for undesirable alkaline water periodically flushed from Malheur Lake. Of the two lakes, Malheur Lake is primary for the production of waterfowl and provides the major and preferred waterfowl food, sego pondweed (Thompson, et. al., 1968).

Tundra swans use the refuge during both spring and fall migration. Snow geese also use the Harney Valley and the refuge on their spring and fall migrations. Most use occurs at Double O, Harney and Malheur Lakes, and the Silvies River Floodplain.

Pintail ducks are one of the most abundant species that use the sub-basin with Malheur Lake and the Silvies Floodplain supporting the largest populations. Pintails feed in short meadow vegetation, as do snow geese. The fluctuation of the water level of Malheur Lake is necessary to provide the growth of submergent vegetation (mainly sego pondweed) as feed for these ducks and other waterfowl species.

About 1,500 pairs of Canada geese nest in the basin with most use on the refuge. However, fewer egg predators exist on the Silvies River Floodplain and Canada geese usually have fair success even when nest concealment is poor in early spring.

Hunting for ducks and geese is popular during the fall and winter hunting seasons. Hunting takes place on private lands as well as certain areas of refuge. Some ranchers supplement their income by leasing hunting privileges on their lands to hunters.

Lesser sandhill cranes concentrate in the meadows east and south of Burns. The Greater Sandhill cranes prefer the grainfields on or near the refuge, but also use the Silvies Floodplain to feed and nest.

Many species of marshbirds come to the sub-basin to feed and most remain to nest. Most nesting occurs on refuge. However, a colony of California and ring-billed gulls use an area about 5 miles southeast of Burns and Franklin's gulls and Forster's terns nest in colonies in the north-central portion of Malheur Lake. White pelicans use Malheur Lake as they feed on large numbers of small carp.

Maps #14 through 22 show principal use areas during the three-year period, 1975-1978, for waterfowl, shorebirds, marshbirds and raptors.

MULE DEER: Mule deer were scarce in the late 1800's and early 1900's. The population increased from 1930 to 1950, in part due to hunting restrictions and to extensive predator control during the same period. Mule deer populations peaked about 1950 to 1960. Poor fawn survival from 1970 to the present has kept numbers lower than desired. Also, the severe winters of 1983-85 and again in 1992-93 reduced the population and recovery has not occurred. Current Steens management unit mule deer numbers are estimated to be fewer than 5,000 deer. The management objective is 11,000 deer (Lemos, 2002). Mule deer winter range in the Donner und Blitzen Sub-basin is along the western edge of Steens Mountain and adjacent to Catlow Valley, along Picket Rim, and Malheur National Wildlife Refuge.

ROCKY MOUNTAIN ELK: Elk were first observed on Steens Mountain in the 1970's. The population gradually increased as more elk dispersed from the north. By the early 1990's the Steens Mountain management unit had about 400 elk. Regulated hunting has kept the herd numbers fairly stable. Existing habitat provides plenty of water, cover, and good forage, which makes for excellent habitat when

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combined with low levels of human disturbance during most of the year (Lemos, 2002). Elk winter around the rock rims of the Blitzen River and the mid-elevation slopes on the north end of Steens Mountain.

PRONGHORN ANTELOPE: Pronghorn antelope herd numbers were low in the early 1900's, but with protection and regulated hunting the population recovered. Since 1950 the Steens Mountain Unit population has been excellent, except for the winters of 1983-85 and 1992-93. The current numbers for this management unit are good, with the herd at about 2,300 antelope (Lemos, 2002). Antelope winter range in the sub-basin is along the west side of Steens Mountain from Mud Creek to Riddle Mountain (Ron Garner, 2003).

BIGHORN SHEEP: The California subspecies of bighorn sheep was extirpated from Steens Mountain in 1915 by uncontrolled hunting and diseases carried by domestic sheep. The subspecies was successfully re-introduced in 1960-61. The population grew to about 300 bighorn sheep by the mid-1980's. Lamb survival has been low in recently causing the population to decline. However, range extension through new releases by ODFW have greatly increased the habitat now occupied by bighorn sheep, and populations are increasing.

COUGAR: Cougars are a native species to the Donner and Blitzen sub-basin, however little is known about their abundance prior to European settlement in the area. Unlimited hunting and a statewide bounty for cougars caused their numbers to decline from the late 1800's through the mid-1900's. By 1961 it was estimated that only 200 cougars remained in the state. Public concern regarding declining cougar populations led to their designation as a game animal in 1967 and subsequent laws restricting their harvest. Since that time populations have increased throughout the state to an estimated 4,000 animals in 2002. Cougar numbers in the sub-basin have followed the statewide trend, however in this area most of the increase has been in the last 10 to 12 years (Garner, 2003).

BIG GAME MANAGEMENT: The majority of the Donner und Blitzen Sub-basin is within ODF&W Wildlife Management Unit 69 (Steens). The part of the sub-basin that is west of Highway 205 is within Units 71 (Juniper), and 70 (Beatty's Butte). Neither of these units have flowing streams in the sub-basin.

SPECIAL STATUS ANIMAL SPECIES IN SOUTHEASTERN OREGON: Special status designations are assigned for many reasons including limited distribution, habitat loss resulting from environmental impacts, suspected or documented population declines, or some combination of these factors. These are priority species for various surveys to determine their distributions, abundance, and habitat preferences. (See Appendix A for listing.)

RANGE MANAGEMENT

Three laws provide a nationwide legal context for the management of grazing on public lands. The Taylor Grazing Act, passed on June 28, 1934, protects public land resources from degradation and provides orderly use and improvement/development of public rangelands. Following various homestead acts, the Taylor Grazing Act established a system for the allotment of grazing privileges to livestock operators based on grazing capacity and priority of use, and for the delineation of allotment boundaries. It also established standards for rangeland improvements and implemented grazing fees. Approximately 142 million acres of land in the western United States were placed under the jurisdiction of the Grazing Service, which became the BLM in 1946. The Federal Land Policy and Management Act (FLPMA) of 1976, and the Public Rangelands Improvement Act (PRIA) of 1978, also provide authority for the management of livestock grazing on public lands.

The rangeland reform process starting in 1996 modified the grazing regulations identified in 43 CFR part 4100. A new regulation was developed and is being implemented throughout the BLM. The regulation, 43 CFR 4180, addresses the basics of rangeland health. The Standards for Rangeland Health and Guidelines for Livestock Grazing Management provide the basis for assessing rangeland conditions and trends. In August, 1997, the standards and guidelines developed in consultation with the Southeast Oregon Resource Advisory Council (RAC), Provincial Advisory Committees, Native Americans, and others, were approved by the Oregon State Director for Oregon and Washington. Livestock grazing will

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continue in the Steens Mountain CMPA where allowed under the Act and will conform to applicable laws, policy, and BLM regulations including the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (August, 1997). Grazing management will be guided by the Act, current land use plans, Andrews Management Framework Plan (1982), the Three Rivers Resource Management Plan (1992), and the pending Andrews/Steens Resource Management Plan.

Recent land use plans have developed and implemented grazing systems primarily through Allotment Management Plans (AMPs) and agreements with permittees. An AMP is a documented program that directs grazing management on specified public land toward reaching goals regarding resource conditions, sustained yield, multiple use, and ranch economics. AMP's are considered to be implemented when incorporated into term grazing permits or leases and when accepted by the permittee or lessee. The Resource Management Plan/Environmental Impact Statement will reestablish resource objectives which all allotments must meet. Specific management prescriptions will still be made on an allotment or watershed basis.

The Steens Mountain CMPA designated 97,671 acres as a No Livestock Grazing Area. This required land exchanges and amendments to allotment boundaries, A.U.M. allocation, changes to 10-year grazing permits, and range improvements, including fencing and water developments, mostly within the Donner und Blitzen Sub-basin. (See Map #23.)

FIRE AND FIRE MANAGEMENT

(Analysis of the Management Situation and Sub-basin Review, Andrews Management Unit/Steens Mountain Cooperative Management and Protection Area Resource Management Plan, July, 2002)

Fire has played a role in the development of most plant communities in the western United States. Fire changes plant community structure and species composition, and alters site nutrient cycles. The Donner und Blitzen Sub-basin has a variety of plant communities with varied fire histories. Sagebrush fire return intervals are difficult to determine because the plants are typically entirely consumed by fire and do not leave fire scars as evidence. Until recently, the extent and dates of fires have not been recorded and post-fire succession has not been studied in detail.

Site productivity affects the fire behavior and frequency in sagebrush stands. Sites with higher productivity ignite easily and burn more often than sites with sparse production. Fire histories are difficult to determine in juniper woodland. Ancient western juniper stands are located in rocky areas where fire return intervals are in excess of 150 years. The location of these stands provides insufficient understory vegetation to carry fire. If fires did occur, they were often limited to one or two trees and areas of less than one acre. Under certain circumstances, large fires did move across these stands, but such events were rare. The mountain big sagebrush fire regime, where much juniper has encroached today, typically burned every 15 to 25 years. This is a return interval similar to other shrub communities in the arid West (Miller and Rose, 1999). Young western juniper trees have thin bark and are readily killed by surface fires. Fire will carry through juniper stands with grass and shrub understory. As trees mature, they displace shrub and grass vegetation, leaving little vegetation. The stand then becomes more susceptible to erosion. Older stands become resistant to fire because low productivity limits available ground fuel.

Cheatgrass is an invasive non-native annual grass that creates a fire hazard in parts of the sub-basin. Cheatgrass thrives in disturbed environments, especially with fine-textured soils. Over-grazing and/or wildland fires provide conditions that are more favorable for cheatgrass than for native species. Cheatgrass often out-competes native grasses, forbs, and shrubs in disturbed areas, dominating large expanses with other weeds. Cheatgrass dominated areas tend to burn more frequently compared with the native shrub lands and grassland. Fire does not increase cheatgrass production, but it does eliminate other plants and increases the area dominated by cheatgrass.

FIRE MANAGEMENT: The BLM Andrews Management Unit fire management strategy spotlight is on wildland fire suppression and prescribed fire. The wildland fire season generally runs from mid-May through mid-September. The prescribed fires are usually planned for periods before and after the wildland fire season, depending on weather conditions. Prescribed burning can be used to meet resource and fire management objectives such as stimulation of plant growth, changes in species composition, or reduction in amounts of fuels and slash. Generalized policy and procedures for fire planning, assessment, and response are provided by the Interagency Wild Land and Prescribed Fire Management Policy, 1998.

USF&W policy also allows prescribed fires to be used to achieve agency land or resource management objectives, including (a) to preserve, restore and enhance animal or plant species in their natural ecosystems; (b) to perpetuate the migratory bird resource; and (c) to preserve a natural diversity and abundance of fauna and flora. The MNWR Master Plan (1985) states that livestock grazing, haying, and prescribed burning may be used to meet certain management needs, and that habitat management will emphasize the use of natural ecological processes such as drought-flood cycles, prescribed fire and grazing rather than other intensive management practices such as storage reservoirs, irrigation wells and pesticides. For example, prescribed burning is used to maintain open marshes and meadows needed by sandhill cranes, Trumpeter Swans, geese and other waterfowl and water birds for feeding, loafing and brood rearing sites (Blitzen Valley Management Plan, 1990).

ENERGY AND MINERAL RESOURCES

The potential is low for leasable energy resources in the sub-basin. Leasable energy resources include gas, oil, and coal. Most of the locatable minerals such as gold, uranium, mercury, copper and sunstones are on the eastside of Steens Mountain, outside of the sub-basin. Precious metal exploration has been conducted on some portions of the north Steens Mountain area. Both developed and undeveloped sand and gravel resources exist in the sub-basin. Industrial mineral (zeolite) deposits occur in the northwest portion of the sub-basin.

STEENS MOUNTAIN COOPERATIVE MANAGEMENT AND PROTECTION AREA (CMPA): The Mineral Withdrawal Area designated by the Act encompasses the entire Steens Mountain CMPA. No claims or leases exist within the Steens Mountain CMPA. (See Map #23.)

MINERAL RESOURCES OF THE HIGH STEENS AND LITTLE BLITZEN GORGE WILDERNESS

STUDY AREAS: These WSA's were studied between 1983 and 1985. About 500 claims and prospects were found in the High Steens study area, of which 52 were still active. No mining claims or prospects had been recorded for the Little Blitzen Gorge. Perlite was the only resource identified in the High Steens Study Area. No identified resource was found in the Little Blitzen Gorge Study Area. The area of known mineral resource potential is along the east escarpment of Steens Mountain, outside of the sub-basin. The entire High Steens WSA and Little Blitzen Gorge WSA have a low potential for oil and gas resources. The potential for gold, mercury, and uranium in the Little Blitzen Gorge WSA is unknown. Field work was done on the Blitzen River WSA in 1986 and 1987. No mineral resources were identified in the study area. There is no potential for oil and gas in the sub-basin. The Act allows for development of saleable mineral resources for road maintenance only, at locations identified in the Act. Within the CMPA are three designated rock aggregate sources and one sand and gravel source that may be developed. No state right-of-way (ROW) sites exist in the Steens Mountain CMPA.

LAND AND RESOURCE USE ISSUES

Potential Issues:

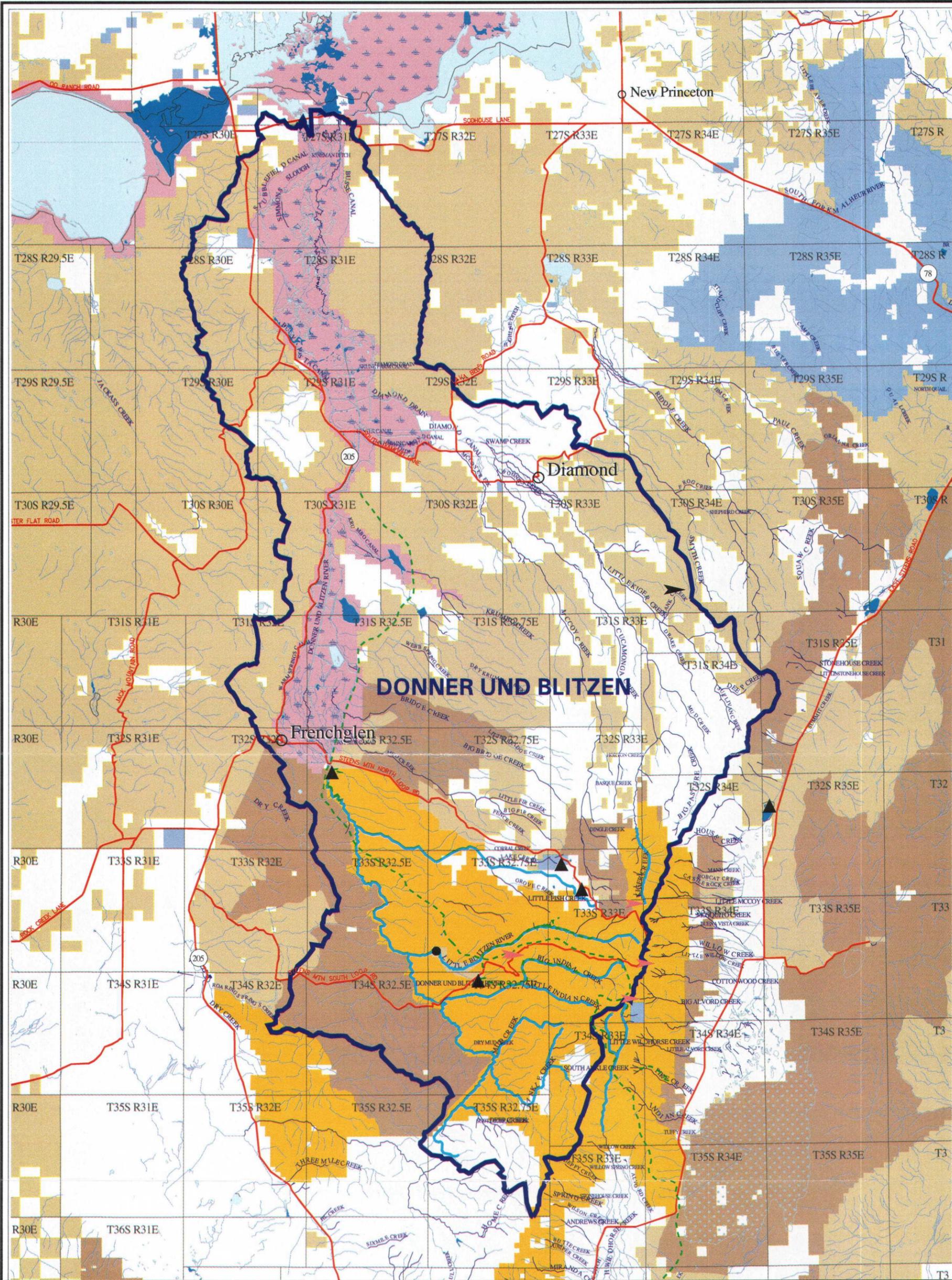
- Juniper encroachment may negatively impact range quality by decreasing forage, and impacts hydrology by increasing run off, and decreasing water availability.

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- Noxious weed encroachment may negatively impact range quality.
- Lack of consistent, sustainable, long-term public/private cooperation to implement noxious weed controls.
- Lack of adequate funding for noxious weed control.
- Predator Control. An increase in predators (cougar, coyote, bobcat, skunk, weasel, fox, crow, raven, magpie, etc.) impacts the viability of livestock and wildlife management, as well as the survival of various bird and mammal species.
- Squirrels, gophers and badgers impact ranch and farm operations, and have impacts on hydrology.
- Endangered/sensitive species (sage grouse, pygmy rabbit, redband trout).
- Management practices and policies are slow to change.
- Private and public land management practices need to accommodate best management practices.

Missing or Incomplete Data:

- Hard research on nature and extent of the impacts of noxious weeds.
- Incomplete research on juniper encroachment and effects on ground and surface water.
- Hard research on nature and extent of the relative impacts of predation on habitat quality and wildlife populations
- Impact of loss of use of public lands on economy, and private lands (restricted access to public land increases demand on private land).

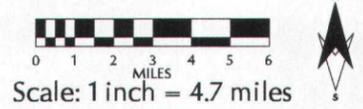


MAP #7 - Donner und Blitzen Sub-Basin - RECREATION

- Private Lands
- State Lands
- USFWS Lands
- BLM Lands
- BLM Wilderness Study Areas
- BLM Wilderness

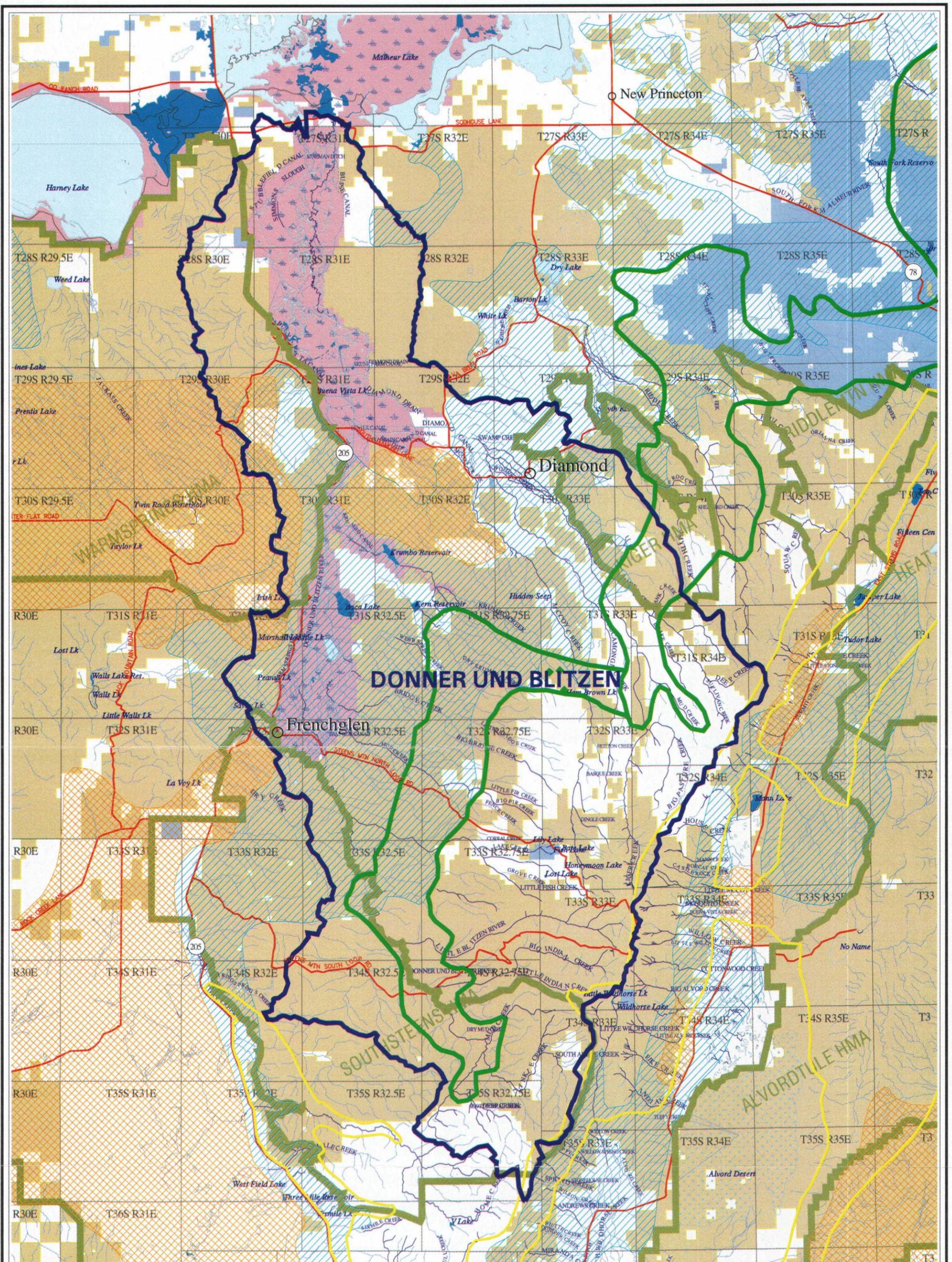
- Subbasin Boundary
- Major Roads
- Perennial Streams
- Intermittent Streams
- Wild & Scenic Rivers
- Trails

- Campgrounds
- Riddle Brothers Ranch Hist. Dist.
- Interpretive Overlooks
- Kiger Wildhorse Viewing Area



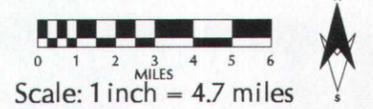
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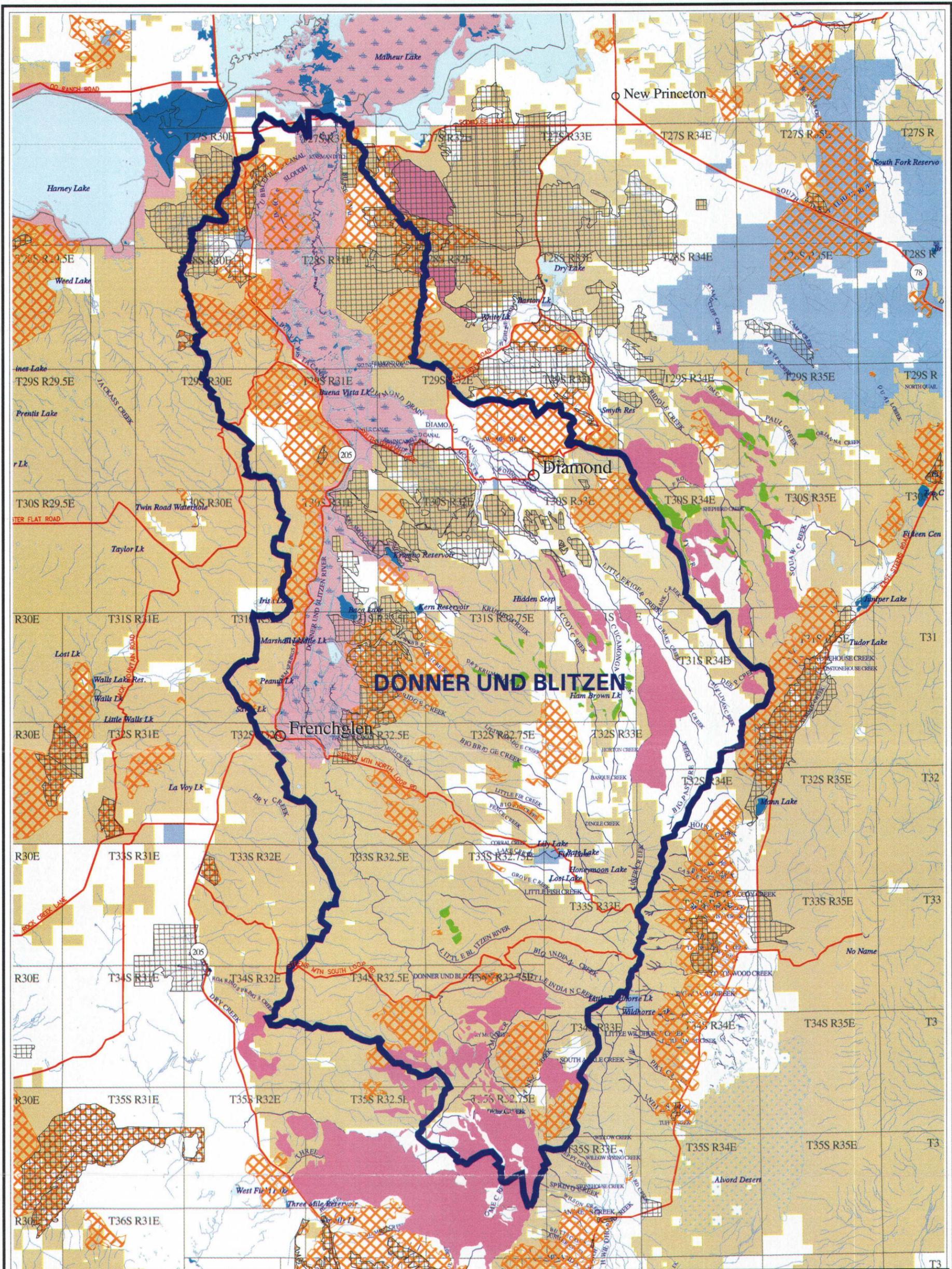
MAP #8 - Donner und Blitzen Sub-Basin - BIG GAME WINTER RANGE

-  Mule Deer
-  Antelope
-  Elk
-  Bighorn Sheep
-  Active Wild Horse & Burro Herd Management Areas
-  Subbasin Boundary
-  Major Roads
-  Perennial Streams
-  Intermittent Streams

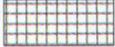


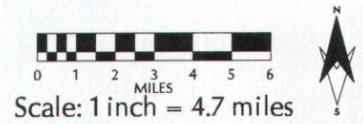
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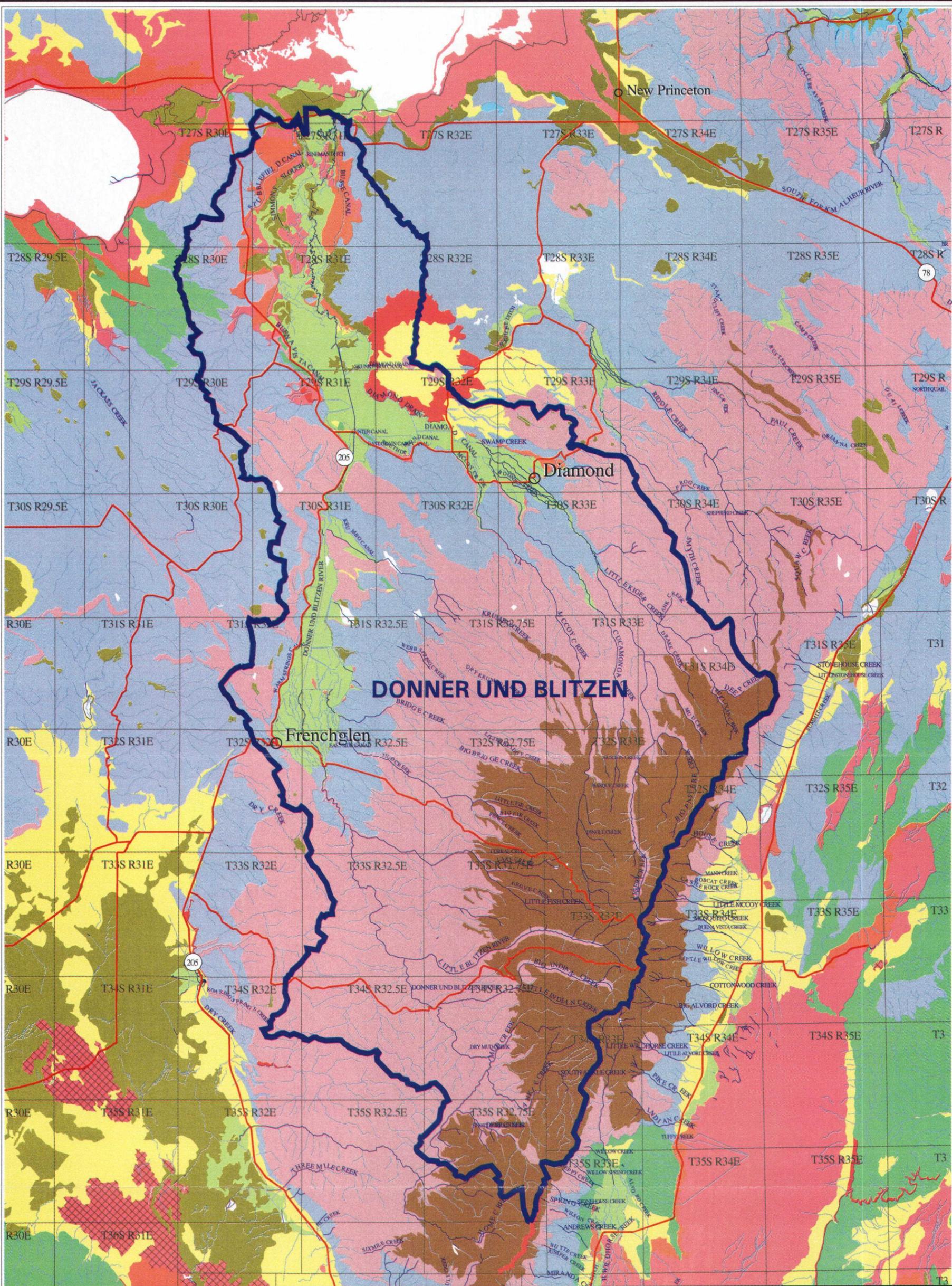


MAP #9 - Donner und Blitzen Sub-Basin - VEGETATION MANAGEMENT

-  Wild Fire
-  Prescribed Fire
-  Juniper Cutting
-  Seedings
-  Subbasin Boundary
-  Major Roads
-  Perennial Streams
-  Intermittent Streams

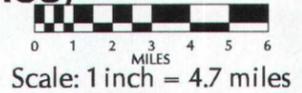


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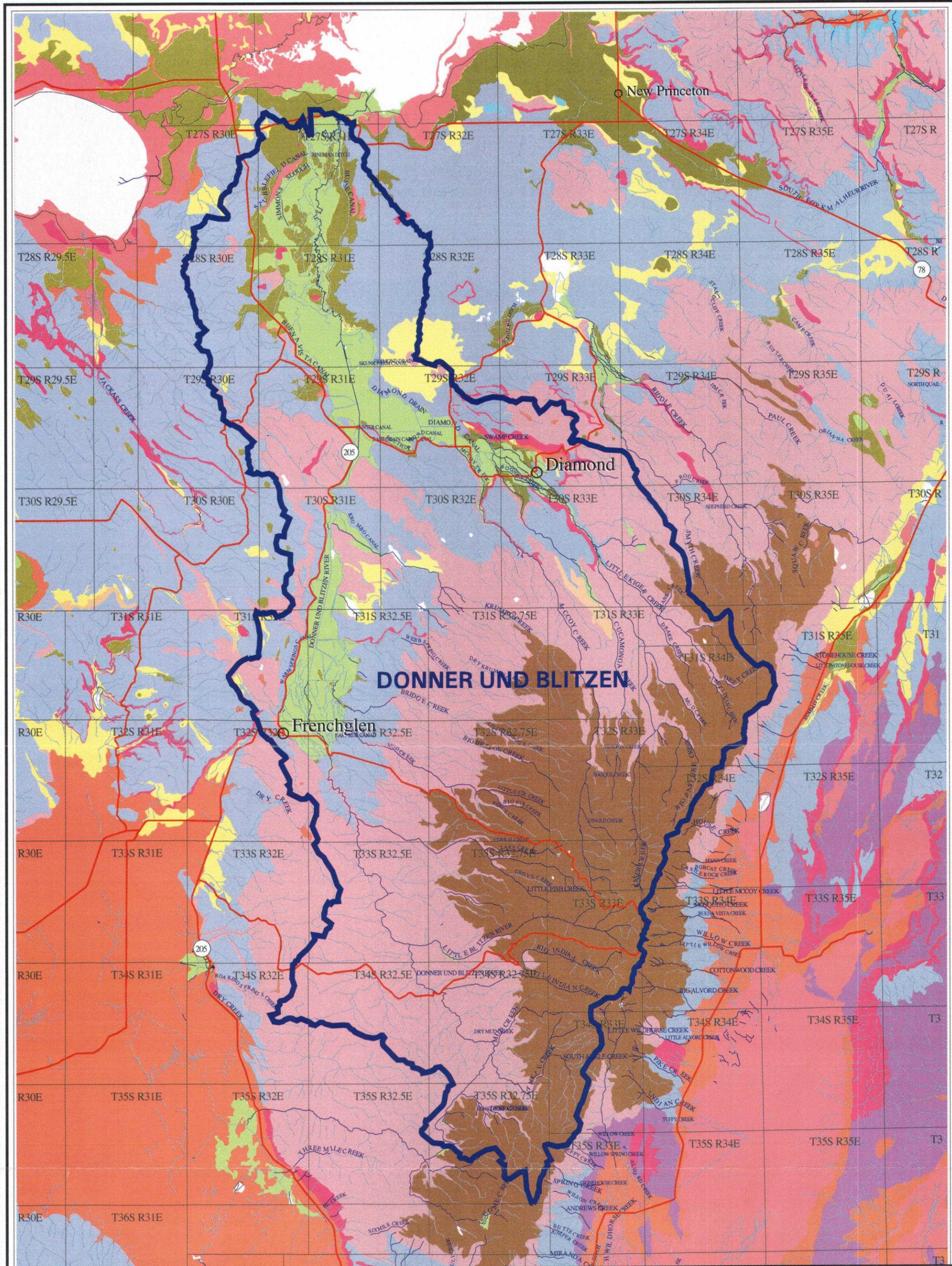
MAP #10 - Donner und Blitzen Sub-Basin - HISTORIC PLANT ASSOCIATIONS (NRCS)

- | | | | |
|--|--|--|--------------------------------|
| | 1 Saline-Sodic Lake Basins & Playas | | 8 Warm Foothills |
| | 2 Saline-Sodic Lake Terraces & Fans | | 9 Cold Plateaus & Uplands |
| | 3 Marshes, Meadows & Bottomlands | | 10 Cold High Plateaus & Buttes |
| | 4 Seasonal Floodplains, Dry Basins, Playas | | 12 Cold High Mountains |
| | 5 Silty Dry Lake Terraces | | Rock outcrop and rubble land |
| | 6 Sandy Lake Terraces | | |
| | 7 Warm Shallow Terraces & Plateaus | | |



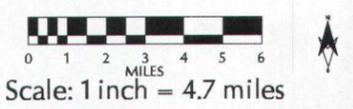
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MAP #11 - DONNER UND BLITZEN SUBBASIN - GENERAL SOILS (NRCS)

- | | |
|--|---|
|  1 Alvodest-Droval-Playas |  8 Reallis-Vergas-Lawen |
|  2 Spangenburg-Enko-Catlow |  9 Baconcamp-Clamp-Rock outcrop |
|  3 Atlow-Tumtum-Deppy |  10 Raz-Brace-Anawalt |
|  4 Gumble-Risley-Mahoon |  11 Ninemile-Westbutte-Carryback |
|  5 Felcher-Skedaddle | |
|  6 Fury-Skunkfarm-Housefield | |
|  7 Poujade-Ausmus-Swalesilver | |



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