

CASPER REGION

HABITAT PROJECTS

Miracle Mile Spawning Enhancement

The spawning enhancement structure developed in 2004 was evaluated to determine if deposition of fine sediments was smothering trout eggs. Freeze-coring was used to evaluate fine sediments in the structure and predict egg mortality about two weeks after egg deposition. These estimates were compared to sediment measures from redds in a downstream area known as Rainbow Hole which had abundant redds. Four different measures of gravel quality were assessed. All four indices predicted significant egg mortality at the reference site (Rainbow Hole), and very good survival at the spawning structure. The percentage of fine sediments was predictably highest at the part of the structure farthest from the weir where velocity was lowest. There was dense egg deposition at the structure with three of four sites interpreted as egg pockets yielding as many as 52 eggs in a core. Eggs were also found in two random freeze cores. At the reference site no eggs whatsoever were found in the very best looking redds, so longitudinal profiles of two redds were cored for assurance the egg pocket was not missed; no eggs were found. A final core was taken in a run below several dozen redds to test the possibility that eggs were not entering the gravel upon release, but were being carried downstream until lower velocities allowed them to settle into the sediment. No eggs were found in this core either. The conclusion is that no eggs were laid in the redds located at the reference reach. These data in combination with the 2006 population estimate in the Miracle Mile finding a record year class of two year old fish indicate the spawning enhancement has been a great success despite being constructed higher than designed which is resulting in some fine sediment deposition at the head of the gravel pad. The structure will be cored again in March 2008 to determine fine sediment accumulation prior to brown trout egg hatching.

Aggregate used to construct the downstream approach ramp to the structure was much smaller than designed. As a result, much of it has washed away. The increased slope and higher velocities have developed a partial barrier to smaller salmonids.

Ideally the structure would be modified to fit the original design, but until the WGFD can either rent or acquire an excavator, this solution is cost prohibitive. Given the apparent success of the structure in spite of the fine sediment deposition at its margins, we will replace the approach ramp where it has washed away with suitably large substrate at a passable slope, and supplement gravel above the weir where velocities will create additional spawning habitat.

Bates Creek Watershed Restoration Project Phase IV (CY2007)

The project was initiated in the spring of 2004 to set back succession in aspen communities allowing for recruitment of young plants, creating uneven-aged stands across the landscape, and improving hydrologic conditions. To date, we have treated 321 acres of aspen, and 868 acres of big sagebrush at a cost of approximately \$306 per acre.

- GyroTrac equipment used to mechanically treat aspen stands.
- North Laramie Range true mountain mahogany mean annual growth.
- Prescribed burn in dense sagebrush, Muddy Mountain.
- Range and wildlife inventories on 2 ranches.
- Riparian buffer on North Platte River.
- The Bates Hole Basin Management Plan was completed.
- At Mac's 40, a total of 3 acres of food plots were planted with proso millet.

During 2007, we used the GyroTrac to mechanically treat 158 acres of conifer invaded aspen stands, which increased our productivity and is safer than treating these stands with sawyers (Figure 1). We intend to use this machine in 2008 because it leaves a relatively thick layer of wood chips that we believe will benefit aspen regeneration by retaining moisture during the drought (Figure 2). But, we are also aware that without prescribed burning these aspen stands we may be reducing our regeneration capabilities. We will compare aspen regeneration (stems/acre) between mechanically treated stands and prescribed burned stands during our 2008 monitoring efforts (Figure 3).



Figure 1. GyroTrac equipment used to mechanically treat aspen stands.

The next phase is implementing a 700-acre prescribed burn during the spring and/or fall of 2008.

In addition to the prescribed burn, we intend to treat 200 acres of conifer invaded aspen stands. Our goal is to treat approximately 5,000 acres of aspen and as many, if not more, big sagebrush communities within the Bates Creek watershed to restore hydrology and natural vegetative processes which have been interrupted primarily through fire suppression. It will take approximately 16 years to completely treat what is currently delineated.



Figure 2. Mechanically treated aspen stand using the GyroTrac.



Figure 3. Aspen response following mechanical treatment using the GyroTrac.

Bates Hole Big Sagebrush Restoration Project Phase I (CY 2007)

This restoration was initiated during 2007 to reduce prickly-pear cactus and cheatgrass infestations in favor of native perennial grass and forbs and to improve big sagebrush plant vigor and health. We are investigating several different improvement techniques, but the past and present weather patterns and existing big sagebrush community condition does not lend itself to easy decisions. Therefore, we are going to research additional techniques prior to implementation. Moreover, we intend to restore portions of the Stinking Creek riparian corridor through mechanical and prescribed fire treatments. It is the landowner's and our goal to increase water yield, increase cottonwood and willow regeneration, and improve riparian area functionality. We are presently working with landowners on a livestock grazing management system that promotes flexibility, adaptive management, and achievement of vegetative goals. Currently, one landowner has agreed to defer livestock grazing on the treatment area for 2 growing seasons, and he is working on dividing a few large pastures into several smaller pastures to facilitate improvements in season of use, duration, frequency and intensity.

During 2007, we chemically treated both prickly-pear cactus and cheatgrass infestations on 560 acres. (Figures 4 and 5). As of October 2007, prickly-pear cactus was showing signs of chemical control. We estimate that it will take between 2 and 3 years before the prickly-pear is completely dead because of the low application rate used. A lower rate was used to reduce the impact to desirable native perennial plant species. In 2008 we propose to chemically treat 560 acres of prickly-pear and cheatgrass, and prescribe burn 580 acres of basin big sagebrush within the Stinking Creek riparian corridor.



Figure 4. Prickly-pear cactus and cheatgrass infestations.



Figure 5. Prickly-pear cactus and cheatgrass chemical application.

Fish Contaminants Program

The Department of Health issued a fish advisory in 2007 as a result of the fish contaminants program to help Wyoming anglers, and those who consume commercially caught fish, make informed choices about their fish consumption. Results of mercury and selenium analyses showed that no measured trout or salmon populations in the state were of concern for human consumption. Additionally, all species of fish in Glendo Reservoir have low levels of mercury contamination; they are safe for consumption. Walleye in Pathfinder and Seminoe Reservoirs contain mercury at sufficient concentrations to warrant measured consumption of even small fish. A blanket advisory was also issued for Bighorn Reservoir sauger, walleye, and catfish.

Analysis and modeling of Keyhole Reservoir, Flaming Gorge Reservoir, and Boysen Reservoir fish is awaiting the return of those samples from the laboratory. Mercury screening study and Seminoe Reservoir advisory level data were presented at the U.S. Environmental Protection Agency Fish Forum in Maine. Results of all fish contaminants investigations will be presented in a completion report currently underway.

Thunder Basin Big Sagebrush Restoration Project Phase I (CY2007)

Restoration was initiated during 2007 to reduce prickly-pear cactus and cheatgrass infestations in favor of native perennial grass and forbs. We also intend to improve big sagebrush vigor and health. We are investigating several different improvement techniques, but the past and present weather patterns and existing big sagebrush community condition does not lend itself to easy decisions. Therefore, we are going to research additional techniques prior to implementation. Moreover, we intend to restore portions of the Antelope Creek/Cheyenne River riparian corridor through mechanical and chemical treatments. It is the landowner's, USFS and our goal to increase water yield, increase cottonwood and willow regeneration, and improve riparian area functionality. An essential component of this project is changing livestock grazing management. Currently, the landowner has agreed to defer livestock grazing on the treatment area for 2 growing seasons. In addition to deferment, we will be working with the landowner(s) and the USFS on a livestock grazing management system that promotes changes in season of use, duration, frequency (the number of times plants are grazed), intensity (the amount of leaf material removed), and opportunity (amount of time plants have to grow before

grazing or to regrow after grazing). During 2007, we chemically treated 819 acres of cactus and 512 acres of cheatgrass infestations within the 819-acre prickly-pear treatment area (Figures 6 and 7). As of October 2007, prickly-pear cactus was showing signs of chemical control. We estimate that it will take between 2 and 3 years before the cactus is completely dead. We selected this lower rate to minimize impacts to the desirable native perennial plant species present. We propose to chemically treat 13,000 acres of prickly-pear and cheatgrass in 2008 on areas when an adequate grazing plan is developed.



Figure 6. Prickly-pear cactus and cheatgrass infestations.



Figure 7. Prickly-pear cactus and cheatgrass chemical application.

North Laramie Habitat Restoration Project Phase I (CY2007)

Initiated in 2007 the goal is to set back succession in aspen communities allowing for recruitment of young plants, creating uneven-aged stands across the landscape, and improving hydrologic conditions within the Deer Creek watershed. Restoration efforts focus on aspen, big sagebrush and mountain shrub communities, primarily true mountain mahogany. The true mountain mahogany community is very important to mule deer as a winter food source. Prescribed burns will be conducted within this community to improve quality for wintering mule deer and other wildlife species that utilize this plant throughout the year.

In 2007, we treated 31 acres of aspen in extremely steep topography using the GyroTrac (Figure 8). All total, we have treated 51 acres, which includes 20 acres treated by Habitat and Access Maintenance personnel. The next phase is to contract Fire Trax, LLC to prescribe burn 1,703 acres of true mountain mahogany during the fall of 2008. In addition to the prescribed burn, we intend to treat 200 acres of conifer invaded aspen stands. Our goal is to treat approximately 6,500 acres of aspen and as many, if not more, big sagebrush communities. It will take approximately 20 years to completely treat what is currently delineated.



Figure 8. Mechanically treated aspen stand using the GyroTrac.

North Laramie Range Habitat Inventory and Evaluation Area

True mountain mahogany annual growth averaged 2.80 inches during 2007, with a range from 2.41 to 3.24 inches. Annual growth was 28 percent greater in 2007 than 2006, and has decreased 22 percent since we began monitoring efforts in 2000 (Figure 9). This downward trend may be contributing to the mule deer population declines documented over the past several years. Spring precipitation plays a vital role in true mountain mahogany annual growth and contributed plant health, condition and vigor. With this in mind, we intend to prescribe burn 1,700 acres of true mountain mahogany during the fall of 2008.

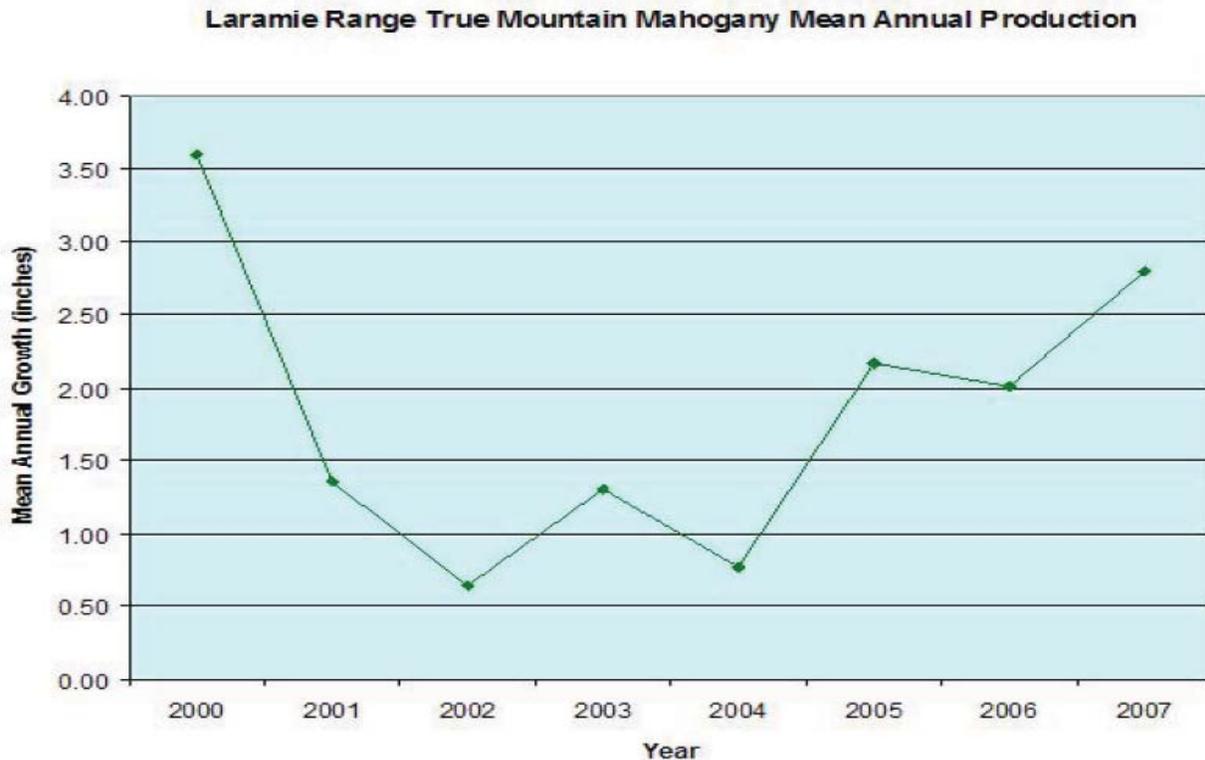


Figure 9. North Laramie Range true mountain mahogany mean annual growth.

Bates Hole Landcover Classification Project Phase I (CY2007)

Bates Hole remote sensing landcover modifications continued in 2007 with a total of 374,228 acres complete out of 771,347 acres, which is 49 percent. Brandon Weaver, habitat biologist intern, worked 56 percent of 560 hours on modifying the landcover. The intern program has been instrumental in helping modify the landcover classification so we have the most accurate data available when planning habitat improvement projects, preparing wildlife environmental comments, and determining how many acres of a vegetative type exists within the Bates Hole area. With continued assistance from the intern program, we anticipate the Bates Hole area being close to complete, if not complete, during 2008. Once Bates Hole is complete, it is our intention to start modifying the North Natrona remote sensing landcover in late 2008 or in 2009.

To date, we have mapped 23,186 acres of annual grassland, which is predominantly cheatgrass (Figure 10). These acres will likely increase as we continue to modify the remaining areas. Sparse big sagebrush containing 5 to 15% canopy cover is by far the most representative vegetative community within Bates Hole. The next most dominant cover type is juniper, with about 40,694 acres. This cover type is primarily found in the Alcova Lake area and a band below Shirley Rim. Urban area makes up 7 percent of the acreage modified to date. Casper continues to expand to the east and north, and has now reached the Hat Six and Coal Creek Roads. In addition to this expansion, there are housing developments springing up in various places outside the city limits.

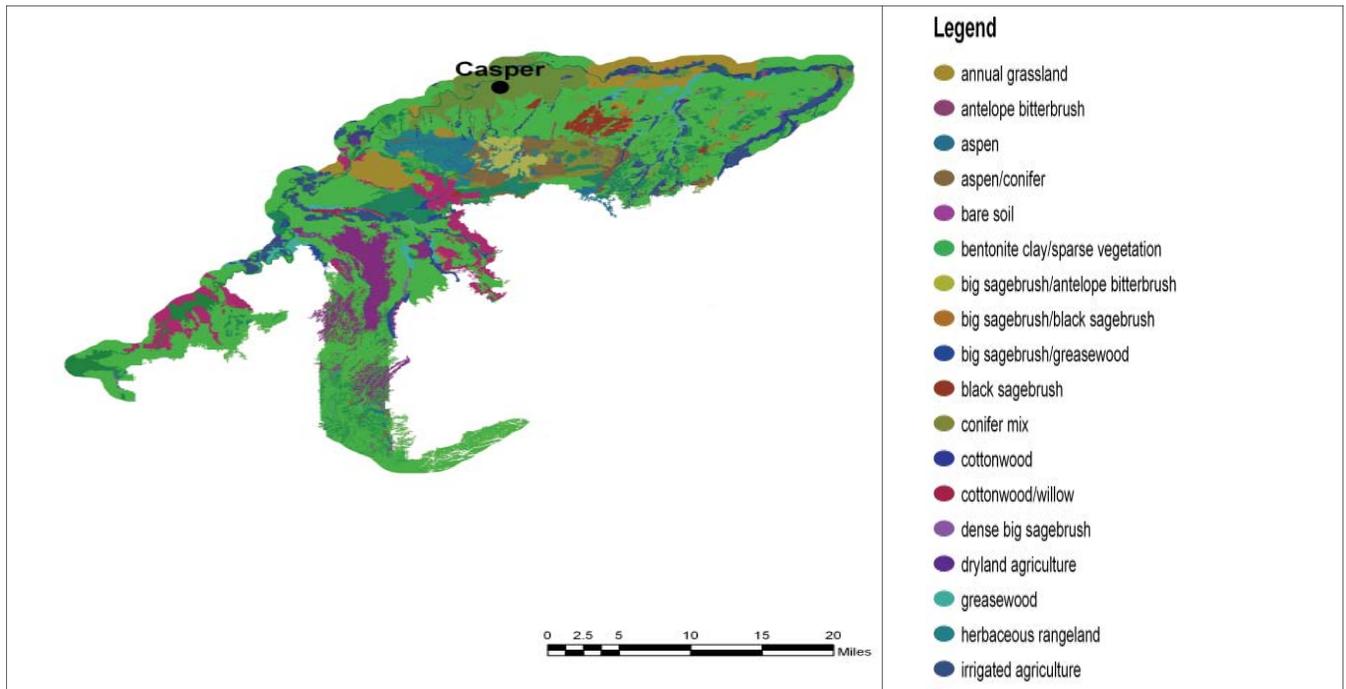


Figure 10. Bates Hole landcover classification.

Bates Hole Habitat Inventory and Evaluation Area

Casper Region personnel wanted to convey to the public how production and utilization was affecting the big sagebrush community; hence we developed a use index. The use index continues to depict an upward trend, which indicates poor big sagebrush production and relatively high utilization. It is our goal to move the trend line downward, which will indicate big sagebrush production has increased and utilization is relatively light. Furthermore, this trend indicates detrimental impacts are occurring to the big sagebrush community (Figure11).

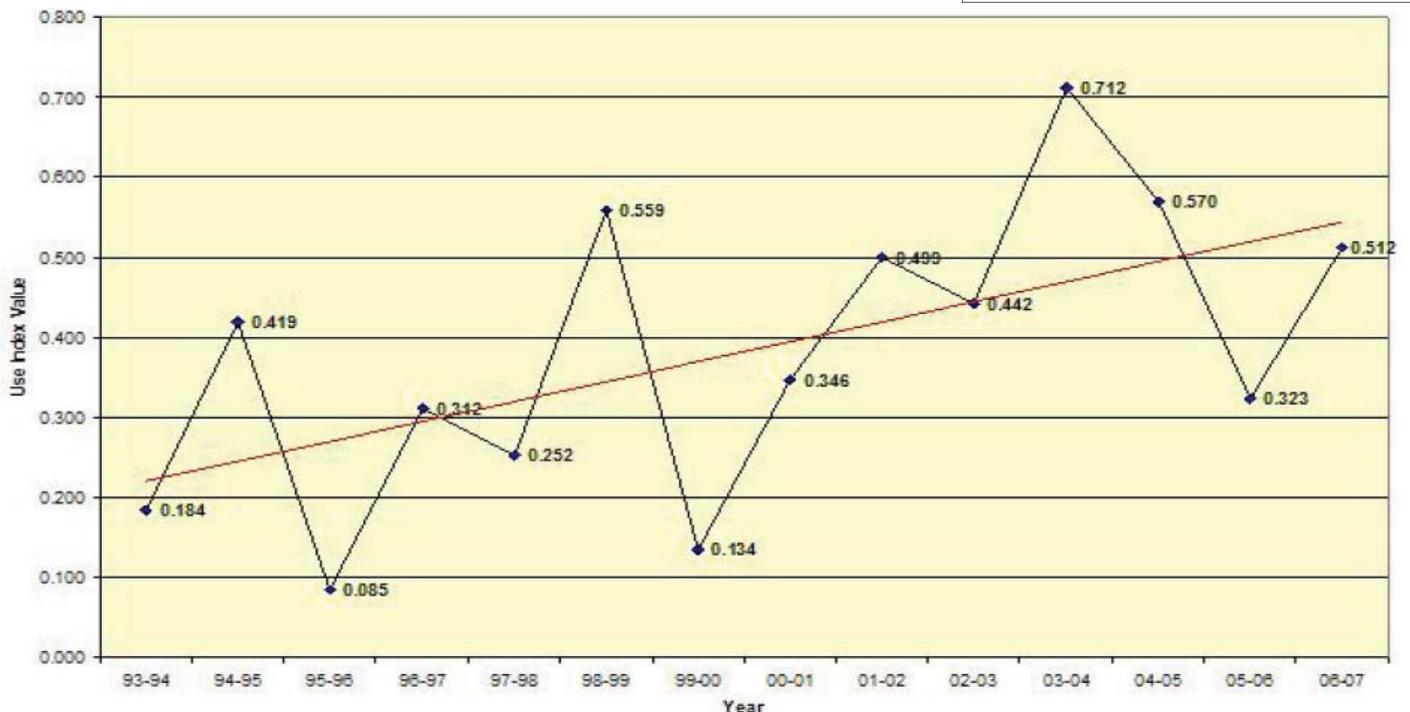


Figure 11. Bates Hole big sagebrush use index with trend line.

These impacts include, but are not limited to, decline in plant vigor, poor seed production, increased plant mortality and reduced annual growth. In 2003, we documented the highest level ever recorded on the use index, which was the result of poor production (0.51 inches) and an average utilization level of 38 percent. We are modifying the use index and trying to make it a component of the season setting process. Its value is how it portrays to our constituents the impacts we are observing in the big sagebrush community.

Big sagebrush annual growth averaged 1.42 inches in 2007, which is 58 percent greater than 2006, and 64 percent greater than 2004. We have documented a 13 percent decline in big sagebrush production between 1995 and 2007 (Figure 12).

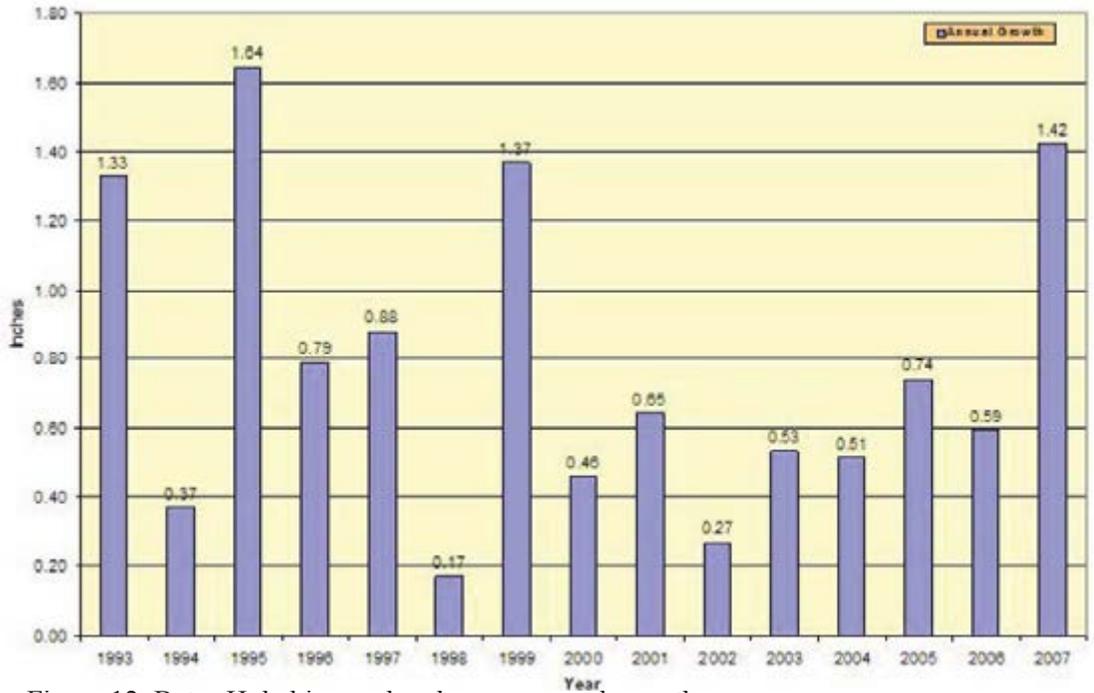


Figure 12. Bates Hole big sagebrush mean annual growth.

Rattlesnake Hills Habitat

Inventory and Evaluation Area

Big sagebrush annual growth in the Rattlesnake Hills area averaged 1.47 inches, a 72 percent increase since 2006 (Figure 13).

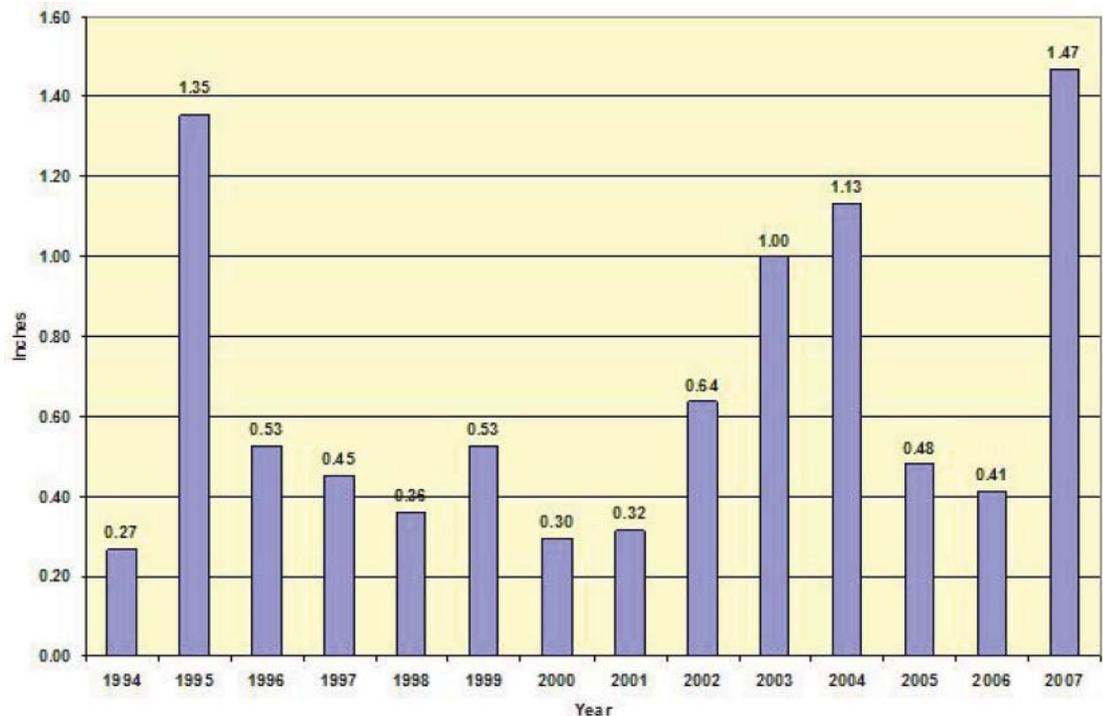


Figure 13. Rattlesnake Hills big sagebrush mean annual growth.

We have documented an upward trend in big sagebrush production since 2000, whereas in Bates Hole the trend is downward. Since monitoring efforts began, there has been a 82 percent increase in big sagebrush production. Big sagebrush utilization has been well within acceptable parameters, which may be attributed to pronghorn shifting their winter concentration areas further to the south and east. Secondly, we have not encountered a severe winter season for almost a decade in this area, and as a result, the pronghorn are scattered throughout their range and not concentrated on the designated winter range.

Newcastle Area Big Sagebrush Inventory

Big sagebrush production in the Newcastle area increased 62 percent in 2007 as compared to 2006. The increase in annual growth is due to the increase in spring precipitation. Since monitoring efforts began in 2001, we have documented an upward trend in annual growth, even though 2003 was below average and 2004 was well below average (Figure 14). The big sagebrush annual growth difference between the three sites can be attributed to big sagebrush plant condition at Frog Creek and 6-mile Basin. The plants at these two sites are more decadent, and heavily hedged, whereas the plants at the Highway 85 site are mature, more vigorous and are not as heavily hedged.

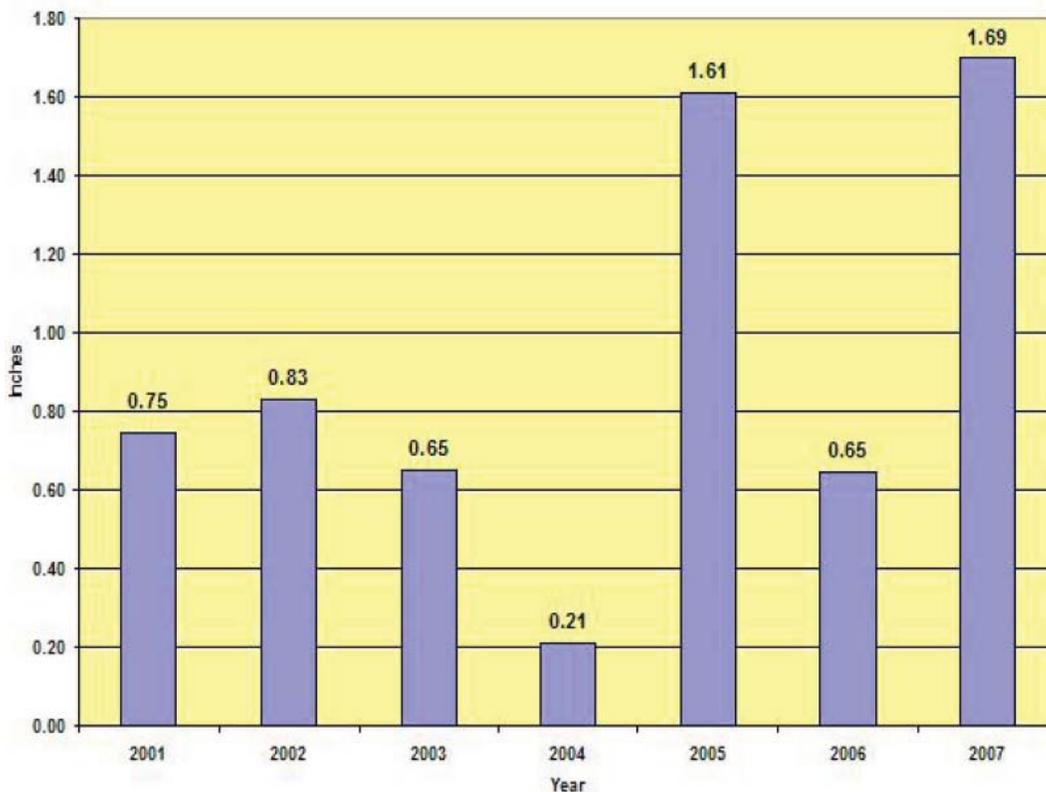


Figure14. Newcastle area big sagebrush mean annual growth.

HABITAT EXTENSION SERVICES

Martin Ranch Range Improvement

In the spring of 2007, 40-60% of dense Wyoming big sagebrush stand in a 350 acre area was burned and 9,000 ft. of 3-wire electric fence was constructed to better control livestock (Figure 15). This followed a 130 acre burn and 23,000 ft. of fence constructed in 2006. Post-treatment monitoring indicates more than three times the herbaceous productivity and heavy wildlife use by mule deer, elk, and sage-grouse (Figure 16). The project was funded through NRCS - Environmental Quality Incentive Program (EQIP) funds and the Bates Hole/Shirley Basin sage grouse local working group. Future plans include treating adjacent aspen stands as has been done through the Bates Creek Watershed Restoration Project.



Figure 15. Spring 2007 sagebrush prescribed burn.



Figure 16. Use transect 14 months after 2006 prescribed burn.

M&D Land Company and R.B. Keith Ranch Range and Wildlife Inventories

This project is patterned after the work of the Lake DeSmet Conservation District sagebrush/grassland habitat restoration program to improve sagebrush/grasslands using an aerator, seeding degraded areas and developing grazing management strategies. This will enhance rangeland health and habitat for sagebrush and grassland dependent wildlife species.

This program was initiated by conducting inventories on 2 ranches totaling approximately 43,000 acres in western Natrona and eastern Fremont Counties to develop conservation strategies and infrastructure needs. The goal is to develop land management plans that benefit livestock, sage grouse, and other wildlife. The project is funded through the NRCS Grazing Lands Initiative (GLI) and the Bates Hole/Shirley Basin and Wind River/Sweetwater River sage grouse local working groups.

WILDLIFE HABITAT MANAGEMENT AREAS (WHMA)

Springer/Bump Sullivan/Mac's 40 WHMA Food Plots

The Casper Region Habitat & Access crew planted 0.5 acre of dove blend sunflowers (Figure 17), 5 acres of sorghum/sudangrass hybrid, 2 acres of corn, 1 acre of buckwheat at Springer WHMA for wildlife food plots and 10 acres of tall wheatgrass for dense nesting cover. At Bump Sullivan a food plot of 10 acres was planted with buckwheat. At Mac's 40, a total of 3 acres of food plots were planted with proso millet. Success with the sorghum/sudangrass hybrid continues, and the sunflowers grew well. However, buckwheat, which provides an outstanding wildlife food source, is also not very frost tolerant. An unusual June 6 frost stunted most of the buckwheat planted. Goshen County continues to suffer under extreme drought conditions, but the food plots were planted in moist locations to give the plantings a greater chance for success.



Figure 17. Dove blend sunflowers on Springer/Bump Sullivan WHMA.

Table Mountain WHMA food plots

The Casper Habitat and Access crew planted 7.5 acres of sorghum/sudangrass hybrid, 18 acres of dove blend sunflowers, 3 acres of corn, 3 acres of buckwheat (Figure 18), 8 acres of proso millet (Figure 19), 2 acres of alfalfa/timothy mix in wildlife food plots and 10 acres of tall wheatgrass for dense nesting cover. Table Mountain did not seem to suffer from the late June 6 frost, and most of these food plots are planted on irrigated land, so the drought does not impact these food plots, and we continue to enjoy success here.



Figure 18. Buckwheat grows exhibits dense growth and prolific seed production on Table Mountain WHMA.



Figure 19. Proso millet on Table Mountain WHMA.

The sorghum/sudangrass hybrid features the tall growth aspects of sudangrass, with a fuller seed head reminiscent of sorghum. Sudangrass provides excellent cover, and in winter tends to “lodge” (the stalks fall over or break over) (Figure 20). The lodging characteristics provide tunnels for upland and waterfowl species to feed in and find cover under the snow.



Figure 20. Exhibiting the tall growth characteristics of the sorghum/sudan hybrid.

In most areas, the food plots were planted in strips, which often follow natural contours. This is a method recommended by the NRCS for food plot development. This method provides greater “edge effect.” (Figure 21)



Figure 21. “Edge effect” of sunflowers and sorghum/sudan grown in strips.

Rawhide WHMA food plots

The Casper Habitat and Access crew planted 3 acres of millet at Rawhide WHMA. This was the first year food plots were attempted at Rawhide and the extreme drought conditions stunted the crops.

OTHER SIGNIFICANT ACCOMPLISHMENTS

- Participated in WGFD Leadership Development Program.
- Lawn Creek photographic monitoring: The sheet-piling structures installed at Lawn Creek in 2000 were revisited as part of the planning for a similar project on Middle Fork Casper Creek. Structures in intermittent and perennial segments of stream performed as anticipated developing a single channel, improving sediment conveyance, and supporting much denser riparian vegetation than the pre-project scenario.
- Flying A Ranch Easement aspen monitoring: Monitoring of two-tiered exclosures protecting a rare riparian aspen habitat was completed. Growth of aspen suckers was as much as two feet and densities were high inside exclosures, but no suckers escaped browsing outside exclosures. Elk browsed suckers in all months. WHAM surveys were completed on three miles of Sanchez Creek.
- Temperature data from the North Platte River were collected to continue an evaluation of the relationship between flow, location and temperature; 87 miles of stream were evaluated.
- Preliminary work was begun on Middle Fork Casper Creek to improve riparian production and reestablish woody vegetation on crucial deer and antelope winter range and among six sage grouse leks. Work included: landowner coordination, preliminary bankfull measurements, preliminary project design and conception, and WHAM survey of seven miles of stream.
- Spawning habitat evaluation of the Cardwell Easement was completed and materials and cost estimates generated for enhancement works.
- Management Basins were reprioritized for Strategic Habitat Plan implementation.
- The Bates Hole Basin Management Plan was completed.
- Fish passage potential at Orin Weir was assessed. Hydraulic measurements identified Orin Weir on the mainstem of the North Platte River as a migration barrier to walleye, and natives: quillback, redhorse, and channel catfish. Subsequent electrofishing in April above and below Orin Weir confirmed modeling. Twelve miles of river was evaluated.
- Bankfull estimates were evaluated for the Gray Reef reach of the North Platte River for a sediment movement study.
- Evaluation of beaver reintroduction into Bolton Creek indicated persistence, but no growth. Plans for riparian grazing exclosures and further beaver stocking were formulated with landowner.
- Poison Spring Exclosure monitoring: The exclosure fence at Poison Spring was constructed two years ago. A monumental vegetation transect was read and surveyed for comparison with pre-project data.
- Served as the WGFD representative on the state's Silviculture Best Management Practices Audit Review Team.
- Served as the WGFD representative on the North Platte River Revival Committee.
- Provided meaningful (data collected and interpreted, recommendations and cost estimates offered) extension to six private land stream and pond projects.
- Coordinated a grazing management workshop with Roy Roath for WGFD and NRCS.
- Assisted with sage grouse trapping and habitat evaluation in the Hat-Six Region and planning for a sage grouse research project in the Rattlesnake Hills.