

## TRUMPETER SWAN RANGE RESTORATION IN WYOMING

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### ABSTRACT

Historically, remnant populations of Trumpeter Swans (*Cygnus buccinator*) existed in and near Jackson Lake, as reported by the Hayden expedition in September 1872. With the security offered by the Red Rock Lakes National Wildlife Refuge and Yellowstone National Park, the Tristate Subpopulation of swans began a slow increase. The Wyoming flock numbered 125 birds in September of 1995. That same year, 22 territories were occupied, with 12 pairs of swans actually nesting. Typically, the Wyoming flock produces 19 cygnets annually, and at that level apparently is providing stability to this flock. In an effort to increase nesting pairs and wintering birds in the state, Wyoming established a management plan and objectives. That plan states a goal of 70 territorial pairs by the year 2005, up from 30 occupied territories in 1995. Wild swans captured at Harriman State Park on the Henrys Fork River, Idaho, were transplanted to Wyoming beginning in 1990. Some 119 adults and cygnets were released on potential wintering sites in the state. In years to follow, a summer trapping effort at Red Rock Lakes National Wildlife Refuge captured 25 adults and cygnets and moved them to the Green River at Seedskaadee National Wildlife Refuge in an effort to reestablish nesting pairs. By 1994, no nesting pairs had been established, and little winter range fidelity occurred as a result of the previous releases. Captive breeding and release of 80-day-old cygnets over the 3-year period from 1994 through 1996 created higher summer occupancy of territories than any previous release. An increased number of Trumpeters were observed on the Green River by the summer of 1996. Captive-reared cygnets of Red Rock Lakes origin have migrated as far as 600 miles and returned the following spring. Each year, the cygnets released as part of the Wyoming program have migrated outside the current range of the Tristate flock and the Rocky Mountain Population.

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### INTRODUCTION

The Hayden party, while exploring the Snake River in northwestern Wyoming, reported the presence of many beaver ponds and of Trumpeter Swans (*Cygnus buccinator*) on the Snake River near Jackson Lake (Bennett 1998). Many early explorers did not report Trumpeter Swans elsewhere in Wyoming in the late 1800s, and only a remnant population existed in the Yellowstone region, as noted by Hayden in 1875. This population of swans was labeled the Tristate population because it inhabited the area of northwestern Wyoming, eastern Idaho, and southern Montana. These birds were tied to the area around Yellowstone National Park (YNP) and survived the market hunting era by living in this remote and often harsh environment.

The harshness of the region resulted in few people using the area, thus providing a refuge for the last of the Trumpeter Swans. With the increased protection offered by Yellowstone National Park and the establishment of Red Rock Lakes National Wildlife

Refuge, swan numbers began increasing in the Tristate Region.

The average number of Trumpeter Swans in the Tristate Subpopulation averaged 532 total birds for the period 1954-93 (Shea 1995). The Wyoming flock consisted of 105 adults and 17 cygnets in September of 1995, making up 23 percent of the Tristate Subpopulation. Yellowstone National Park summers 28 percent of the Wyoming flock, and the remaining 72 percent of the Wyoming flock summer in territories in Grand Teton National Park (GTNP), adjacent national forest, and private land in northwestern Wyoming. Cygnet production follows a similar trend with a larger number of young produced on territories outside YNP than within the park, 88 percent compared to 12 percent. Production for the entire Wyoming flock averages 19 cygnets annually.

In 1995, 22 pairs of swans occupied territories outside YNP, and 12 laid clutches. Of the pairs that laid clutches, five incubated but failed to hatch any eggs, two hatched eggs but failed to fledge any young, and five successfully hatched and fledged young (Stevenson 1996). The number of occupied

territories in 1995 was slightly less than the 7-year average of 23, and the number of total nesting pairs was average. The number of young fledged averaged 0.89 young per nesting pair over the period 1989-95. By 1995, the number of young increased to 1.25 young per pair.

The Wyoming flock is plagued with low productivity, yet the population is relatively stable. Population numbers stabilized by 1988. Surveys in 1985 indicated 70 adult birds, and by 1995 the population numbered over 100. Cygnet production continues to be low, but, in years with moderate winters, good water years, and mild springs, cygnets are produced and recruited into the population. The Wyoming flock is primarily sedentary, nesting in harsh mountain environments and wintering in lower elevation warm spring complexes often less than 50 miles apart.

In 1990, managers implemented a two-prong plan directed at increasing numbers of swans in the Wyoming flock. The plan stated two objectives, the first being to expand wintering areas and second to increase numbers of nesting birds wintering on winter ranges outside the current range of the Wyoming flock. Population goals were first established in 1994. Population estimates that same year suggested some 30 occupied territories existed in the current population, and a goal was established of 70 occupied territories by the year 2005.

## **HISTORICAL PERSPECTIVE**

Efforts to increase winter distribution of swans was first initiated in 1990 with releases of a limited number of winter trapped and transplanted swans onto potential wintering sites in the Salt River drainage. These transplanted birds used the Salt River winter habitats but migrated out of Wyoming and used nesting areas in eastern Idaho.

In December of 1990, some 12 adults and 30 cygnets were released in a hard release on the Salt River. None of the adults were observed in later years, and 84 percent were never observed in Wyoming again. Of the cygnets released, four of the 30 (13 percent) were observed back on the Salt River in later years. Winter trapping and transplants to Wyoming winter ranges created consistent winter use patterns in 10 percent of the released birds but did not establish Wyoming nesting pairs linked to those Wyoming winter ranges. Seventy-eight percent of all released birds were not seen in Wyoming after the year of release.

In July of 1991, a group of 23 molting adults (7 males and 16 females) captured in Idaho were transplanted to Grays Lake National Wildlife Refuge (NWR), Idaho. The following winter, 74 percent of the released birds were observed on the Salt River in Wyoming. Those same birds appeared to have established a link between Grays Lake NWR summer habitats and winter habitat in Wyoming. These birds planted on suitable nesting areas discovered and utilized available winter range habitat that lay less than 20 miles from the summer habitat. Some 32 neck banded swans were observed wintering on the Salt River during surveys in November 1995.

A winter release of cygnets in December of 1990 showed the greatest success, as indicated by returning birds. The adult summer release on suitable nesting areas in Idaho, in proximity to a winter range in Wyoming, did result in almost immediate and consistent use of that winter range. The method, however, did not establish nesting birds in Wyoming associated with these Wyoming winter habitats even though suitable nesting habitat was available in Wyoming adjacent to these winter ranges.

In November of 1992, the same technique was used to increase swan use of other wintering sites in Wyoming. Some 36 birds (17 adults and 19 cygnets) were hard released on the Green River. A total of nine birds that were hard released in 1992 were observed in later years. Four were repeat users of Seedskaadee National Wildlife Refuge (SNWR) in following winters. Two of these birds developed a summer use pattern and were observed between 1992 and 1994 on the Green River. These two birds were apparently summering and wintering in the state through 1995, some 3 years following the release. One of these birds remained in the area during later years, and the other was observed in the area near Jackson, Wyoming, in May of 1995. These two birds were adults when released on the Green River in July of 1992. A total of 95 percent of the adults were not seen in years following the release. The cygnets, however, did apparently create a use pattern, and 31 percent were observed again on the Green River at SNWR. Three of the four cygnets using the area were observed summering in Canada the year following the release, suggesting they were originally Canadian stock.

Early Wyoming releases utilized wild trapped and transplanted birds of both adult and cygnet age classes. Of the releases through 1992, 119 birds were released, of which 33 were adults and 86 cygnets. Of

these, only 12 birds (10 percent) were observed in later years, and the greatest proportion were not observed in Wyoming again. Of the 12 birds observed, 11 (92 percent) were released as cygnets in the initial release. A total of 8 cygnets (9 percent) remained true to the release site, returning to that site in following winters.

Winter range use has been established in two of the Wyoming wintering areas. The Salt River has had the greatest increase in birds and the Green River at SNWR to a lesser degree. Only two of the 119 released birds ever remained in Wyoming as a result of hard releases of wild birds during the summer or winter.

In 1994, Wyoming developed a management plan establishing management goals at a desired level of 70 territorial pairs by the year 2005. Techniques utilized to date have attempted to increase distribution of wintering birds, hoping that some birds would nest in Wyoming and, thereby, expand summer distribution.

Early releases established some winter use patterns for birds transplanted to the new locations. Some 3-4 years later, transplanted birds had not established nesting pairs in Wyoming associated with the available winter ranges. Essentially, the birds using the Wyoming winter ranges were Idaho birds transplanted to Grays Lake NWR or Canadian stock that was transplanted during the winter trap and removal of birds from the Henrys Fork. Adults transplanted to SNWR showed little winter range fidelity to the new winter range in later years. Cygnets were apparently the birds that established fidelity to their winter transplant site and used that site in successive winters. It is logical to assume that cygnets and adults trapped on wintering areas had already completed one leg of the migration to the Henrys Fork when captured. These birds were trapped and moved further south by vehicle. Knowledge of the natal site and the partial migration from that site to the wintering area may have resulted in many of the cygnets leaving the wintering area and attempting to return to the natal area. Adults that are highly traditional probably returned to their original migration patterns. Few of those birds were seen in following years on the wintering sites to which they had been transplanted.

In attempts to create winter use of Wyoming winter range sites by Wyoming birds, an effort was initiated in 1993 to develop a captive flock, hatch captive eggs and/or salvage eggs, and release the cygnets on

suitable summer nesting areas in Wyoming. Using cygnets imprinted on summer natal areas, in this case the release sites, might assure that those birds returned there to nest after migrating to wintering areas. The assumptions were premised on earlier studies of waterfowl nesting fidelity.

Much of the waterfowl literature discusses female Anatidae returning to natal areas, yet no similar summaries have been established for natal fidelity in *Cygnus*. In the Genus *Anser*, information suggests that last year's young return with the adults to the natal areas the following spring, thereby learning and perpetuating traditional migration routes (Bellrose 1976). Plans were formulated to test the use of cygnets to reestablish migrations in the Tristate Subpopulation.

Wyoming embarked on a captive-rearing program in an effort to provide cygnets for this project to reestablish migration. This effort addressed the second objective by establishing nesting swans outside of the current Tristate Subpopulation boundaries that were migratory to wintering areas outside of the current winter distribution of the Tristate Subpopulation.

#### **CAPTIVE BREEDING**

In cooperation with a private nonprofit group, the Wyoming Wetland Society (WWS), a fund was established for the propagation and release of captive-reared cygnets. Salvaged wild eggs were also used, and the young raised from these eggs were reared in captivity then released into the wild. The effort was patterned after work done earlier in the Minnesota swan restoration program.

Instead of releasing 2-year-old birds (18-20 months), as was typical of early release programs in Minnesota and other eastern states, a release program of entirely cygnets was implemented. The idea was to release only cygnets to the upper Green River and allow the birds to drift down drainage to wintering areas that they might discover, either in Wyoming or more southern states along the Green River corridor. This down-drainage drift would create a migratory tradition and become the seed for future migrations.

#### **RELEASE SITE SELECTION**

The Green River was selected as the potential release site because it was an open-ended valley that would allow the unsupervised cygnets to drift down the drainage as winter ice-up conditions forced migration.

The upper Green River has no winter habitat, so the birds would be forced to migrate.

Earlier work by Lockman *et al.* (1985) described the Green River as suitable nesting habitat with little winter habitat. The Green River drainage and the Snake River drainage are separated by the Gros Ventre mountain range. That mountain range is the separation line between the current range of the sedentary Tristate flock and unoccupied summer and winter habitat to the south. The two flocks, newly established birds in the Green River drainage and those already in the Snake River valley, would be adjacent and could possibly be linked once the southern migration was established using the Green River corridor.

The Green River flows southerly from its headwaters in the Wind River Mountains. The drainage opens towards the great basin area known as the Colorado Plateau. That plateau extends into southern Utah, Colorado, Arizona, and New Mexico and would offer more moderate climate and suitable wintering areas.

## METHODOLOGY

Inventoried wetlands in the Green River drainage were checked for a suitable soft-release site. A release site was considered suitable if it had ponds with a loafing area with good visibility, a pond small enough to fence but large enough to provide room for flight, and a site with adequate aquatics for foraging. An ideal release site would be a core wetland associated with other wetlands in close proximity. Wetlands on private, national forest, and Bureau of Land Management land were also checked for suitability (Stevenson 1995, 1996). Various sites were inventoried, and a site on Bureau of Land Management lands in the New Fork Pothole area was selected. The New Fork Potholes region is part of an ongoing North American Waterfowl Joint Ventures project initiated in 1993.

Cygnets were hatched and raised at a captive breeding facility operated by the Trumpeter Swan Fund (TSF) working under the nonprofit WWS. Eggs were also salvaged from sites which had failed historically or which were threatened by flooding.

In 1994, a pair produced and raised the first four cygnets to be released. In 1995 and 1996, pairs were manipulated to increase clutches. The first five eggs laid were removed, a wooden egg left in the nest, and the eggs moved to incubating Mute Swans (*C. olor*). In an effort to increase hatching success, these

Trumpeter Swan eggs were incubated by Mute Swans for the first 10 days before being placed in incubators. No eggs were incubated full-term and hatched by Mute Swans.

Cygnets that hatched in incubators were imprinted at hatch on a puppet combined with vocalizations taped from adult Trumpeter Swans with cygnets. At 10 days of age, cygnets were placed in 8' x 8' brooder boxes, manufactured using 1" chicken wire and a small loafing platform. These pens were placed inside a larger pen occupied by a lone adult or a nonproductive pair. This method allowed the cygnets to bond to an adult that would later be used as a foster bird in the soft-release pen.

The cygnets were held in the brooder box pen until 3-weeks of age and then released into the larger pen with the adult or pair. All adults accepted or tolerated the cygnets. Cygnets were held in these pens until 70-80 days of age, at which time they had achieved a weight of between 12-15 lb. Weight was critical because smaller birds tended to go through the hog panels that were used in the soft-release pens.

Cygnets were captured on the day they were to be taken to the release site and banded with the USFWS leg band and a second split-design color-coded leg band. These color-coded leg bands, used in 1994, lost their anodizing after one year and/or birds lost the band. Later in the program, that design band was replaced with a new, riveted design. Color coding allowed birds to be monitored as to year of release to determine survivability.

Cygnets were also marked on the right wing, using a red Rhodamine B base diluted with ethyl alcohol. That dye, when dry, appeared dark pink and was noticeable on free flying birds from over half-a-mile away. Early released birds, when sitting on water, were hard to identify, so dye was brought up onto the shoulder of the bird to facilitate observation of marked birds. The dye remained on the birds until the following year wing feather molt, and, on some birds, the dye was retained for a second year. The dye was visible on the yearlings on the underwing coverts at the wrist joint. Numerous reports were received from waterfowl hunters of marked birds along the migration path simply because of the color markings.

Cygnets were released into the soft-release pen without an adult in 1994, then with clipped or pinioned foster adults in 1995 and 1996. Cygnets became flighted between 110- to 120-days-old, and they often flew out of the fenced area before it was

opened. Cygnets were provided pellet turkey feed in garbage can feeders, which provided a transition to the diet of primarily aquatic plants by 100-days of age.

Once flighted, the birds practiced flights inside the pen and later began to explore wetlands in proximity to the release site. When an adult was placed with the cygnets, as was done in 1995 and 1996, the adult was removed when the cygnets began leaving the adult and exploring on their own. Cygnets generally stayed in the area of the release site and began exploring at greater and greater distances as shallower ponds began freezing in the area. Freezing conditions reduced foraging options, and the birds initiated migration.

Migrations occurred in mid-November of 1994, mid-December of 1995, and early December of 1996. The 1994 birds left the area without adults, whereas the 1995 and 1996 cygnets grouped with some other birds during migration. Migrations were into southwest Utah in 1994, accomplishing a 600-mile migration, and released birds returned to the release area the following summer. The 1995 migration was a shorter migration, to SNWR, where some of the older birds left the cygnets and migrated to wintering areas used in 1994 and 1995. In 1996, some of the released cygnets were observed at SNWR, on the Green River, at Ouray National Wildlife Refuge in Utah, and some wintered elsewhere. The 1995 birds were also observed back on the summer release site when three of those birds molted on the release pond.

Monitoring of survival and migration is by means of the colored wing mark when the birds are cygnets and later using the color-coded leg bands. The color-coded leg bands allow monitoring of the age class of birds, not individuals. Only one of the birds was neck banded after it returned during molt the following summer. No cygnets were marked with neck bands in an effort to reduce any possible mortality that might result from the collar or ice-up of the collar on wintering areas.

## **SUMMARY**

Several release techniques were used in Wyoming in an effort to establish, or reestablish, migrations from the Tristate Region and to create new nesting populations not associated with the core wintering areas. These efforts were initiated to give some depth to the Wyoming flock to prevent loss of the flock as a result of a single catastrophic event.

Early releases utilized birds captured on wintering areas in Idaho comprised of adults and cygnets (119), summer molting groups comprised of adults and cygnets (25) and summer release of captive-raised cygnets (23). All released birds migrated to and wintered in areas not previously used by the Rocky Mountain Population. No known nesting occurred nor were any territories established by wild stock transplanted to other locations. Captive-reared cygnets released in potential nesting habitats not only imprinted on those sites, but also apparently created links to wintering areas outside the Tristate Subpopulation range and then returned to the release sites as if they were natal areas. Wild birds caught and released on summer and winter sites showed little site fidelity.

As a result of the 23 cygnets released in the program, an increase in Trumpeters summering in the Green River drainage was noticed by 1996. Several generations of birds were apparent, and preliminary pair bonding was occurring. Three cygnets migrated and returned to summer and to molt on a nearby wetland. Apparent strong site fidelity was established by captive-reared Red Rock Lakes stock. These swans linked wintering areas outside the Tristate Region with summer nesting sites also outside the range of the Tristate Subpopulation.

Wyoming continues to strive to increase numbers of swans nesting and wintering outside the Tristate Subpopulation core range. The population objectives stated in the 1994 planning documents are a goal that appears attainable once breeding pairs establish and begin producing young, but over a longer period of time than first stated. Over time, linking the sedentary population in the Snake River drainage with the more migratory flock in the Green River area will help provide stability to this subpopulation. This effort will insure Trumpeter Swans are always a part of Wyoming's avifauna.

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