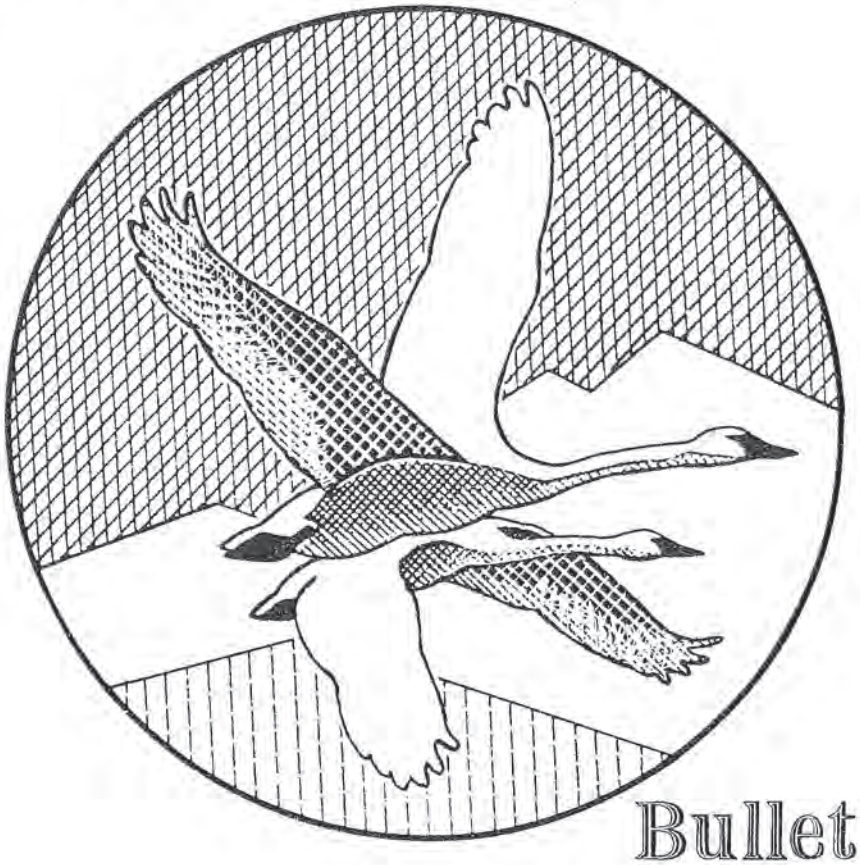
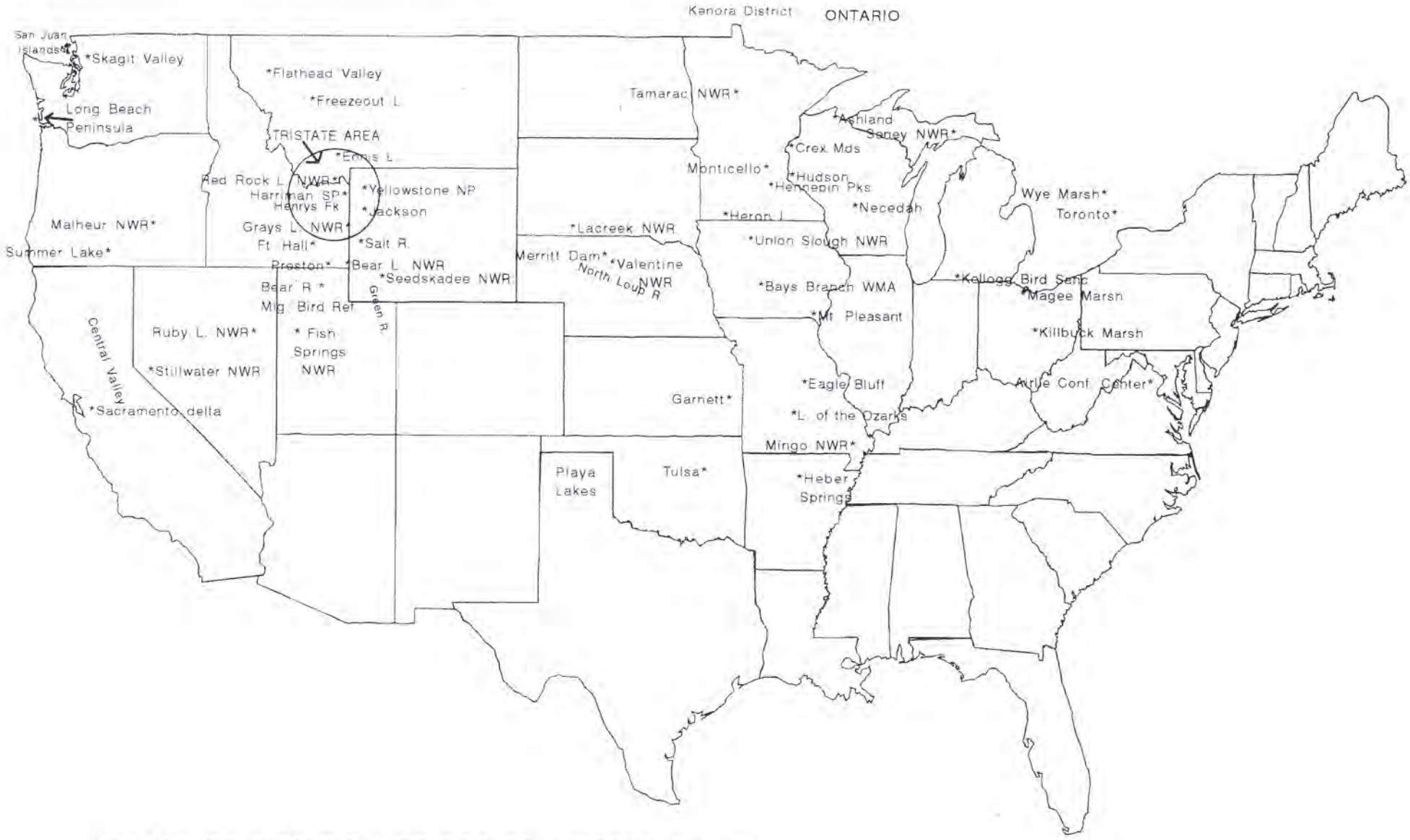
North American Swans



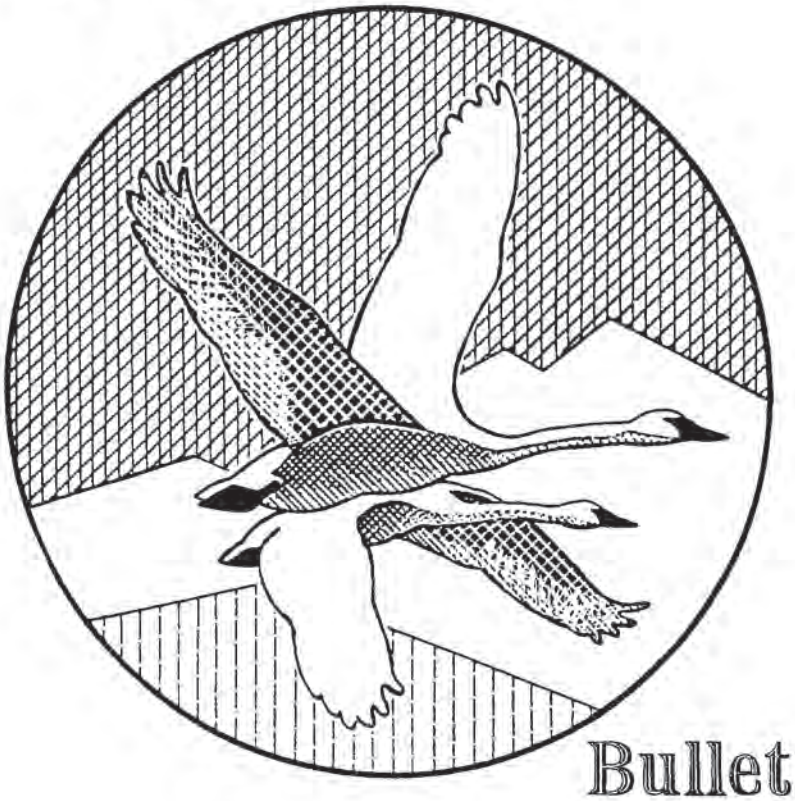
Bulletin of The Trumpeter Swan Society

Volume 28, No. 1 - December 1999



AREAS OF SIGNIFICANCE FOR TRUMPETER SWANS

North American Swans



Bulletin of The Trumpeter Swan Society

Volume 28, No. 1 - December 1999

Editors
Madeleine H. Linck
Harvey K. Nelson

Editor's Note: *North American Swans* replaces *The Trumpeter Swan Society Newsletter*. We will preserve the same system of numbering volumes and issues so that historical information available from the *Newsletters* will not be lost. Our intent is to cover topics in depth, have regional information in each edition and publish reports of research and management that would otherwise be unavailable. We will include articles and research on other species of swans as the information is pertinent to Trumpeter Swans. Publication schedule will be determined by the Editorial Board.

Please feel free to submit reports or articles for publication at any time. Submit articles to: The Trumpeter Swan Society, 3800 County Road 24, Maple Plain, Minnesota 55359. Diskettes can be accepted. Please format in Microsoft Word if possible. Clearly label diskette and send a hard copy as well.

Published by The Trumpeter Swan Society. For more information please contact: The Trumpeter Swan Society, 3800 County Road 24, Maple Plain, MN 55359, (612-476-4663; E-mail: ttss@hennepinparks.org).

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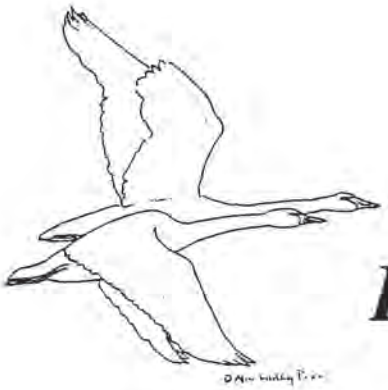

From the President

Harvey K. Nelson

I feel privileged to serve as the President of The Trumpeter Swan Society for the next 2 years. Having been a member of the Society since its creation in 1968, and serving as a Director since 1992, I have been encouraged by the continuous program growth, including an increase in most populations of trumpeters accompanied by range expansion. Although we are still a relatively small organization, our efforts on behalf of swans and their habitats are magnified greatly by the dedicated members and volunteers. I will do my best to help maintain that level of enthusiasm and, hopefully, continue to achieve further increases in program scope, range expansion of trumpeters, and build a stronger financial base for the Society.

During the past 2 years it became evident that the Society program had increased in scope and complexity to the extent that the services of an administrative director and program coordinator were required. In November 1998, the Board established a part-time position of Executive Director on a trial basis during 1999, that was assumed by Ruth Shea, then Society President. Ruth's admirable performance as Executive Director was convincing and the Board has granted Ruth a 3-year contract beginning in January 2000. This will strengthen our capabilities at the program level, together with part-time administrative services available through arrangements with Hennepin Parks at the Maple Plain, Minnesota, office. It will also permit more direct attention to fundraising efforts and liaison with our many cooperators in the federal, state and provincial agencies, private conservation organizations and individuals. I am confident that this increased capability will provide added benefits to the future welfare of Trumpeter Swans and help us achieve program goals and objectives.

The results of the 1999 Board meetings, and accomplishments of the 17th Society Conference held in Idaho Falls, Idaho, are reported separately by Ruth Shea in this issue of *North American Swans* and the November 1999 *Trumpetings*. I want to take this opportunity to thank those who helped arrange a most successful Conference, and the more than 100 members and other interested parties who participated.

Many challenges confront expanded Trumpeter Swan research and management programs in the states and provinces most directly involved. The need to reestablish southward migration traditions and to provide secure wintering habitats are the most obvious challenges. It will be equally important to provide adequate protection to present and new breeding habitats and migration areas as these populations increase. At the same time, we must seek more immediate resolution of recruitment and distribution problems confronting segments of the Rocky Mountain Population. We must also assure that accomplishments to date remain secure and that we continue to extend our best cooperative capabilities to our many partners. Preparation of a Society Strategic Plan will be an important step in providing guidance for future actions.

Plans are underway to hold the 18th Trumpeter Swan Society Conference during February 2001, at Airlie, Virginia, in conjunction with the Fourth International Swan Symposium. A call for papers and registration procedures will be announced in early 2000. Dr. Bill Sladen is coordinating arrangements for the joint meeting at the Airlie Center. I urge you to begin planning now to attend the 2001 Conference and participate in this significant international symposium.

My sincere thanks to retiring Board members Bruce Conant, Alaska; John Cornely, Colorado; and Graeme Fowler, British Columbia, who were recognized at the 17th Conference for their service to the Society and years of work on behalf of trumpeters. I also want to welcome our new Board members Ron Cordes, Idaho; Mary Maj, Montana; Gary Ivey, Oregon; and Sally Shanks, California. I am looking forward to getting better acquainted with you and working with the Board of Directors during the months ahead. My special thanks to all of you and the entire membership for your continued interest and strong support!

Harvey K. Nelson, TTSS President, USFWS Retired,
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Bloomington, Minnesota 55437

Board of Directors Meetings Highlights

Ruth Shea

The Board met via teleconference on March 18 and April 14, 1999, and at the 17th Conference, Idaho Falls, on September 14 and 19th. In March and April, much of the Board's usual business was set aside so that time could be spent focusing on the issues at Hines Marsh on the State of Washington's Long Beach Peninsula.

Long Beach Peninsula

For a number of years, TTSS has worked with other regional partners to improve the function and management of Hines Marsh, which once was a wintering area for Trumpeter Swans in western Washington. In 1997, property that TTSS owns at the marsh was vandalized with a backhoe in an attempt to illegally drain the wetland. The alleged instigator of this crime was scheduled to face a trial in early July. Coincident with this prosecution and investigation, TTSS was named as a codefendant (along with Washington State and Pacific County) in a lawsuit concerning another nearby property that TTSS briefly owned a decade ago and sold to Washington State Parks. TTSS believed that the lawsuit was without merit and was designed to intimidate us into abandoning efforts to improve the management of this wetland.

During the past spring, much of the Board's attention was focused on responding effectively to these legal challenges. Seattle-based attorney Jeff Eustis has very ably assisted us. Martha Jordan has written an update under Regional News.

Greater Yellowstone Trumpeter Swan Initiative

The Board supported Ruth Shea's proposal for a TTSS Initiative that would bring together numerous partners from agencies and the private sector to solve Trumpeter Swan problems in the Greater Yellowstone Area. The intent of the Initiative is to find ways to efficiently accomplish the short-term (Year 2002) population and distribution objectives for the Rocky Mountain Population (RMP), which the Pacific Flyway adopted in 1998. The five objectives are:

1. Redistribute wintering swans to wintering areas outside of the core Tristate Area, reducing the number of wintering swans in the core Tristate Area to a maximum of 1, 500.
2. Rebuild U. S. breeding flocks by year 2002 to at least 131 nesting pairs (594 adults and subadults) that use natural, diverse habitats and winter predominately outside the core Tristate Area.
3. Encourage growth of Canadian flocks.
4. Increase the abundance of most desirable submerged macrophytes in the Henry's Fork of the Snake River in and near Harriman State Park, Idaho.
5. Monitor the population.

At the same time, the Initiative would create a broad and knowledgeable group of partners who share common objectives, can bring additional new resources to the effort, and can help develop and accomplish longer-term (10+ year) objectives.

The Initiative will focus on improving the precarious status of the swans that nest in the Greater Yellowstone (Tristate) Region by increasing their numbers and restoring them to more diverse habitats. As called for in the Pacific Flyway Management Plan, part of this effort will involve developing effective ways to encourage both the Greater Yellowstone and Canadian breeding flocks to rebuild southward migrations and winter predominately outside of the Greater Yellowstone Region.

Planned actions included: 1) bringing potential partners together at TTSS' 17th Conference, 2) helping USFWS develop a refuge-based program to restore the U. S. nesting trumpeters and to allow increased numbers of U.S. and Canadian trumpeters to winter safely in Utah, 3) working with Idaho's Congressional delegation to increase USFWS funding for RMP management; 4) working with US Forest Service, USFWS and Idaho Department of Fish and Game to develop an effective nest territory conservation program; 5) conducting inventories of potential Trumpeter Swan nesting and wintering habitat on private and public lands in Idaho's Bear River drainage; and 6) increasing public awareness of

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Trumpeter Swan restoration efforts and habitat protection needs.

Board actions

Election of Board members and Officers was held at the TTSS Business Meeting, September 16, 1999. A mail-in ballot was sent out for those who could not attend the membership meeting. Nominations were solicited from the membership and a Board nominating committee composed of Larry Gillette, Graeme Fowler, and Harry Lumsden was established. The Committee assessed anticipated Board vacancies, assessed the needs for new Board members with particular skills and geographic representation, reviewed potential candidates and submitted a slate of candidates. Harvey Nelson was elected President and Larry Gillette Vice President. New Board members elected were Ron Cordes, Mary Maj, Gary Ivey, and Sally Shanks. Returning to the Board were Jim Hawkings, Martha Jordan, Jim King, Harry Lumsden, and Dave Weaver. Dave Lockman and John Turner will remain as Directors-At-Large.

The major topics of the September 14 and 19 Board meetings were: 1) final 17th Conference details; 2) RMP management problems and swan hunting conflicts; 3) the Executive Director position; 4) Long Beach Peninsula update; 5) strategic plan development; 6) plans for 18th Conference in Airlie, Virginia.

The upcoming U.S. Fish and Wildlife Service decisions regarding the future of RMP restoration efforts, the experimental harvest of Trumpeter Swans in the Pacific Flyway, and future swan hunting frameworks received much discussion. Board concerns on these issues were synthesized in a statement presented at the Conference by Larry Gillette. The Board also decided to send a letter to USFWS emphasizing that there should be an Environmental Assessment with a public review process, and that swans nesting in the Greater Yellowstone (Tristate) region should be considered a distinct subpopulation and have an effective management plan for their restoration. Resolution of these issues will be a major program focus in the coming year.

The Board also decided to hire Ruth Shea as part-time Executive Director of TTSS on a 3-year contract that will begin January 1, 2000. Until then, she will continue working on an interim contract and TTSS will also reimburse her for expenses.

A committee was appointed to identify key components of a Strategic Plan and how best to involve our members and Board in the process. The committee will report back at the spring Board meeting. Ruth Shea and Rod Drewien will edit the 17th Conference *Proceedings* to be published in the Summer 2000 issue of *North American Swans*, contingent upon financial feasibility. Ruth Shea and Director Dave Weaver will begin lining up papers for the 18th Conference and coordinating details with Dr. Bill Sladen of Environmental Studies at Airlie, Virginia.

Regional News

Pacific Coast Population

Alaska

The *Alaska Conservation Digest* (No. 47 – November 18, 1999) reported that the Golden Valley Electric Association's Tanana Intertie Project was put on hold again. For additional background on this controversial power line issue see *North American Swans* Vol. 26, Nos. 1 and 2 and The Trumpeter Swan Society *Newsletter*, Vol. 24, No. 1. On November 4, 1999, the Northern Alaska Environmental Center and the Sierra Club were granted a stay by the Alaska Supreme Court to delay the start of construction of the 97-mile long power line from Healy to Fairbanks across the Tanana Flats and Alaska Range foothills. The issue is not so much the concept of a new line, but rather the planned location. Golden Valley Electric wants to run the power line, called the Northern Intertie, across a vast roadless area of interior Alaska. Besides being a popular hunting and recreational area, half of America's Sandhill Cranes and 40 % of the Pacific Coast Population of Trumpeter Swans migrate through Tanana Flats to rest and feed. The Tanana River is swan nesting habitat as well. Conservationists believe that the developed corridor along the Parks Highway already used by the Alaska Railroad and an existing power line would make a much better location. Jim King, TTSS Director from Juneau, has monitored this issue since 1994 and has submitted comments concerning the impact of the proposed power line on behalf of TTSS. In November 1998, TTSS joined with other conservationists in an appeal against an earlier decision by the Bureau of Land Management. Due to weather constraints, the stay will now effectively delay construction and thus, hopefully, allow time to select a more acceptable route.

Washington State

Martha Jordan

Over the past six months, most of our time has been spent in preparation for the criminal trial resulting from the vandalism of our property at Hines Marsh on Washington's Long Beach Peninsula and responding to the harassing lawsuit that was filed against TTSS in March. Fortunately, by early July both issues appeared to have been almost resolved in our favor. The lawsuit was dismissed and our Attorney, Jeff Eustis of Seattle, was given $1,500 in Attorneys fees by the plaintiffs. We are very grateful to Mr. Eustis for his very capable defense of TTSS. The criminal case moved close to final resolution in early July, when a local developer and former County Planning Commissioner pled guilty to "Conspiracy to Commit a Hydraulic Permit Violation", which is a misdemeanor. The plea hearing and restitution hearing were held on 7 July 1999 in Superior Court, South Bend, Washington. Director Martha Jordan was the only witness for the Prosecution. In the sentencing phase, the guilty party received the maximum penalty of 90 days in jail, suspended provided he pay courts costs and a $1,000 fine within 12 months. In the restitution hearing, we sought a judgement for full restitution for our expenses. During the testimony, there was an excellent opportunity to educate the court on the value and importance of this wetland for a variety of biological, social and economic reasons. The Judge obviously was convinced about the environmental and economic significance of the damage to the marsh as TTSS was awarded a substantial portion of its legal fees and the court ordered restitution for almost all costs to restore the dune. Although both these issues have been stressful, expensive, and time consuming, we hope that efforts to improve the management of Hines Marsh can now move forward.

Martha Jordan, TTSS Director,
Chair, Washington State Working Group
14112 1st Avenue West, Everett, WA 98208

Rocky Mountain Population

Ruth Shea

Pacific Flyway Meeting March 8-12, 1999

The Pacific Flyway Study Committee met in Monterey, California, March 8-12. I attended sessions on March 9-11. Meetings of the Subcommittees for Pacific Coast Population of Trumpeter Swans and Western Tundra Swans were cancelled due to lack of pressing issues and the very full week-long schedule. The RMP Trumpeter Swan Subcommittee met March 11 for approximately 2 hours.

The main items of discussion in the RMP meeting were: 1) a summary of the 1998-99 winter swan management activities in eastern Idaho; 2) partial results of the Midwinter Survey of the RMP; 3) funding for future management efforts; 4) the new USFWS RMP Swan Coordinator, and 5) evaluation of efforts in 1986-97 to redistribute the RMP.

Summary of 1998-99 winter swan management activities in eastern Idaho

Steve Bouffard, USFWS Biologist for the Southeast Idaho Refuge Complex, has been the Acting Swan Coordinator since last November. Steve reported that three temporary employees (two provided by Idaho Department of Fish and Game) and one provided by USFWS) were based at Harriman State Park (HSP) during the winter. They were responsible for hazing at HSP to keep swans from congregating during November and December and they also searched for neck-banded trumpeters in much of the Tristate area. Swan numbers at HSP varied between about 150-450 for most of November–January.

Hazing caused some brief declines in swan abundance at HSP, but merely displaced swans to other nearby locations from which they rapidly returned to the Park. Hazing ceased after January 5, when it was judged that few additional swans were likely to leave. Fall/winter swan use in the Harriman vicinity is less than a decade ago, but still remains higher than desired. Outside the Tristate area, monitoring by various agencies and private observers provided only a few reports of marked and unmarked trumpeters. It is apparent that hazing is not able to achieve the Flyway objectives of reducing numbers at HSP and establishing secure migrations to new areas outside the Tristate region.

Ruth Shea, TTSS Executive Director, 3346 East 200 North, Rigby, ID 83442

Results of the Midwinter Survey of the RMP

The Midwinter Survey counted 3,527 Trumpeter Swans, including 2,745 adults and 782 cygnets. This total represented an increase of 61% from the 2,189 counted in February 1998. Over 3,400 wintered in the Tristate area, where Flyway objectives are to winter no more than 1,500. Relatively high water levels and mild winter temperatures allowed many swans to survive at sites that will freeze during more severe winters.

During the past 5 years, at least a half dozen neck-banded trumpeters from the Pacific Coast Population (PCP) have been identified within what has traditionally been considered to be the range of the RMP. The proportion of marked trumpeters in the PCP is quite low and we currently have no idea how many PCP swans may be wintering in the Tristate region. If substantial numbers of PCP trumpeters come to the Tristate area and fail to continue southward, their presence will further compound the bottleneck of migrants that currently exists in this region and further complicate interpretation of the Midwinter Survey results.

Funding for future management efforts

Steve Bouffard expressed concerned that USFWS has reduced funding for RMP management efforts and that funds contributed by Idaho and by the Bureau of Reclamation in recent winters may also be unavailable in the future. Gary Will (Idaho Dept. of Fish and Game) echoed these concerns and discussed his efforts to contact Idaho's Governor, Congressional delegation, and the Bureau of Reclamation to seek additional funding. TTSS was asked to assist in fundraising efforts.

Gary requested that the Subcommittee identify their priority management actions so that he could talk about specific items when seeking support for new funding. The Subcommittee discussed the possibility of funding a satellite telemetry project but did not have time to consider their management priorities and agreed to provide ideas to Gary at a later date.

RMP Trumpeter Swan Coordinator

Steve Bouffard announced that Dick Munoz will be the new Project Leader for Southeast Idaho Refuge Complex and will be the next RMP Trumpeter Swan Coordinator for the USFWS.

Evaluation of 1986-97 efforts to redistribute the RMP

During the past 2 years, I was contracted by the Office of Migratory Bird Management to summarize and evaluate efforts in 1986-97 to redistribute the RMP. Rod Drewien assisted in this effort. I presented the main conclusions of our report to the RMP Subcommittee:

- Redistribution efforts have broadened the distribution of US nesting flocks, but their

numbers have declined since feeding at Red Rock Lakes NWR ended and they have not been successfully re-established at alternate secure wintering sites. They remain highly vulnerable due to low numbers, dependence upon inadequate wintering sites, and reproductive isolation from the Canadian nesting flocks. Those that nest in the Tristate area show no evidence of interbreeding with the Canadian trumpeters and should be managed as a distinct subpopulation.

- Winter surveys have been unable to adequately document the abundance and trend of the RMP and revised survey methods are needed. Winter surveys have found no evidence that RMP trumpeters are wintering consistently outside the Tristate area.
- Efforts to break open the bottleneck of wintering trumpeters in the Tristate area and rebuild migrations out of the area have not succeeded. Winter numbers are currently almost double Flyway objectives and over 2,000 swans are wintering at sites where they will not be able to survive in a severe winter.
- The success of redistribution efforts was greatly diminished by the use of marginal release sites that frequently lacked adequate security.
- The strategy of attempting to divert migrant trumpeters to the east, west, and north of Tundra Swan hunts in Utah and Nevada, and the lack of effort to rebuild a migration southward was fundamentally flawed.
- To build a secure migration out of the Tristate area, a shift in management priorities is needed to encourage trumpeters to migrate southward to Bear River Migratory Bird Refuge in northern Utah and to other key refuge habitats in Nevada and California. A coordinated program is needed on National Wildlife Refuges along this primary waterfowl migration route to increase use by migrant trumpeters and provide adequate food and security. If Trumpeter Swan migrations cannot be developed to National Wildlife Refuges, there is little hope for success elsewhere.

Interior Population

Report on the Swan Subcommittee Meeting of the Central Flyway Technical Section

Larry Gillette

I attended the Central Flyway Swan Subcommittee meeting in Lawton, Oklahoma, on March 5, 1999, for The Trumpeter Swan Society. Discussion was split between the two swan species native to North America.

Tundra Swans

This winter's Tundra Swan survey counted 109,043 swans. This is higher than the population objective set in the management plan for the eastern population of Tundra Swans. The 3-year average was 97,236 Tundra Swans.

Montana reported it had 500 permits available for the eastern part of the state. They issued 429, which is the first time they issued more than 400. The harvest was 79 birds retrieved for an estimated kill of 86. This retrieved harvest is high for Montana.

The number of permit requests in North Dakota exceeded the number of permits available (2,000) for the first time. In the past, surplus permits were issued over the counter so all were eventually used. Harvest of Tundra Swans was the lowest recorded since North Dakota began issuing 2,000 permits. Continuous high water, which has destroyed sago pondweed beds on many marshes, and warm weather, which changed the dates of migration, were reasons for the low harvest. However, Mike Johnson, Waterfowl Supervisor, North Dakota Game & Fish Department, said the birds were also adapting to hunting, making them harder to shoot. The total corrected harvest was 618 birds.

This is the third year in a row that South Dakota did not sell all of the permits available (1,216 out of 1,500). Harvest was 233, which was very low. The reasons were the same as they were for North Dakota.

Mike Johnson said he thought interest in these hunts may be declining slightly among resident hunters as more and more people have harvested a bird or two. However, interest continues to grow among non-resident hunters.

Trumpeter Swans

I gave the subcommittee an update on the status of the Interior Population (IP) using a table prepared by Joe Johnson for the Mississippi Flyway. There were 1,920 trumpeters this fall, which is very close to the goal of

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2,000 swans by the year 2001. I also presented an update on the winter distribution of trumpeters in the High Plains Flock using an article prepared by TTSS members Harold and Ruth Burgess.

Most of the discussion centered on what it would take to change the current Tundra Swan hunts to general swan hunts in the Central Flyway. Trumpeters are still absent from areas open to Tundra Swan hunting in the Dakotas and eastern Montana as far as we know. However, as range expansion continues, trumpeters will begin to appear, and some will likely be shot. The IP plan for trumpeters suggests considering a general swan season as a way to address hunter liability if no other solution is found. Dave Sharp, Central Flyway Representative, said he thought the USFWS may also favor this concept as the most practical solution.

I suggested that the only way TTSS could support such a proposal would be if it were part of individual state management plans that addressed the management of both species of swans. We would expect each state to assess the harvest of tundra swans on a county by county basis, and consider the potential for restoration of trumpeters at the same level. The states should consider closing counties with no significant tundra swan harvest if there was a good potential for trumpeter restoration.. This is an opportunity to evaluate which activity, hunting or restoration, will provide the greatest benefit to the citizens in the states involved.

This idea was not received well by some managers who do not want to see any reduction in the number of counties open to tundra swan hunting. It was suggested that decisions of this type can not be made at the Technical Section level, because all the stakeholders in each state are not represented. If we want to encourage preparation of management plans that consider both species, it will have to be done at a higher level with more participation. At the same time, however, TTSS must be sure that we continue to promote trumpeter restoration in the Central Flyway in a way that does not jeopardize existing significant Tundra Swan hunting areas. No action was required by the Flyway Council, because there is no proposal for a general swan season at this time.

I alerted them about the potential of using the temporary shutdown of the Monticello Nuclear Power Plant in Wright County, Minnesota, as a way to stimulate migration next winter. There may be as many as 450 trumpeters there next winter. State waterfowl managers were asked to put out press releases next fall to alert the public about the possibility of observing trumpeters and to ask them to report sightings to our office in Maple Plain.

I proposed using captive trumpeters as decoys at a few potential wintering sites. In addition, supplemental food would be used as the primary means of holding birds at sites, which were considered to be safe for swans. My idea is to make the migration destinations as attractive as possible, so the birds will return in subsequent years, even when the power plant at Monticello is back in operation. If trumpeters return to any of these sites for a second year, the sites would be evaluated to determine their suitability for swans or their proximity to suitable sites. This information would be presented to the swan committees in the Central and Mississippi Flyways, so they can be involved in decisions for future management. The committee members had very few comments. I did not ask for an endorsement. Since they did not object, we will be proceeding with this proposal.

Report on attendance at Mississippi Flyway Technical Section Meeting

Harvey K. Nelson

In my memorandum of January 31, 1999, to the Chairs of the Mississippi and Central Flyway Technical Sections and the Swan Committee, I indicated that Larry Gillette and I planned to attend their winter meetings to discuss concerns about further implementation of the Interior Population Management Plan (IPMP) to increase movement of trumpeters to additional suitable wintering areas. We also called attention to the situation that will occur in Minnesota in January 2000, when the Monticello Nuclear Power Plant will be shut down for 5-6 weeks, and will likely force trumpeters to move south at that late date.

At the meeting of the Swan Committee of the Mississippi Flyway Technical Section, I also reviewed Larry Gillette's proposal to encourage greater southward migration and related management techniques. The Committee supported Objective 2 of the IPMP regarding encouragement of the development of migratory behavior, and the general distribution objectives. Some Committee members, however, did not endorse supplemental feeding as a management technique to attract and hold trumpeters at selected wintering sites, but suggested this decision should be left up to the individual state. They recommended that a systematic monitoring and evaluation protocol be developed to enhance survival and track the trumpeters that may be forced to leave the traditional Monticello, Minnesota, wintering site in January 2000. The protocol should include current population data, provision for marking additional swans during 1999, development of an information alert system for reporting sightings, and the use of special management techniques, including supplemental feeding when necessary, in areas where the swans may appear. We should pursue development of the protocol further with the principal states.

Harvey K. Nelson, TTSS President, USFWS Retired, 10515 Kell Avenue, Bloomington, MN 55437

News from Minnesota, Iowa and Wisconsin

Madeleine Linck

In 1999, Trumpeter Swans were reported from 24 counties in Minnesota. The Nongame Program of the Minnesota Department of Natural Resources (DNR) and Hennepin Parks counted a known minimum of 75 nesting pairs throughout Minnesota. This translates to a hatch of more than 200 cygnets. More broods will no doubt be identified as they arrive at traditional wintering locations including the Mississippi, Otter Tail and St. Croix rivers. Hennepin Parks had nine pairs of free-flying trumpeters fledging 27 cygnets in five of its park reserves. Other pairs nested successfully on private lands in Hennepin County and in neighboring Wright County.

Steve Kittelson, Minnesota DNR Nongame Program, reports that trumpeters continue to expand into the northeast part of the state and are, in fact, right at the edge of the Boundary Waters Canoe Area. The 1999 nesting season saw the first successful Trumpeter Swan nest in Sibley County. (The last historical nesting pair of trumpeters in Minnesota was in nearby Meeker County in 1884.) The adults were birds released at Heron Lake, Jackson County, just north of the Iowa/Minnesota border. Swan releases at Heron Lake are a cooperative effort of the Minnesota DNR, North Heron Lake Game Producers Association and the Minnesota Zoo, and will continue for the next several years. Releases by the Iowa DNR are taking place approximately 20 miles south in the Spirit Lake, Iowa, area.

A coordinated survey of trumpeters on Minnesota wintering locations is being planned for early January. The Monticello, Minnesota, nuclear power plant that keeps 10 miles of the Mississippi River open is scheduled to shut down on January 6, 2000, for 35-39 days. If the river freezes over, there may be a forced migration involving more swans than ever before. The Trumpeter Swan Society and Joe Johnson, Chair of the Swan Committee of the Mississippi Flyway Technical Section, are coordinating a monitoring program.

Two inexperienced waterfowl hunters who thought they were shooting at Snow Geese pleaded guilty to shooting five trumpeter cygnets near Watertown, (Carver County) Minnesota, in November. Each man will pay fines and restitution totaling $3,200 and both men are required to complete an advanced hunter education class. Minnesota DNR law enforcement is also investigating several other swan shootings in Minnesota. Local television and newspaper coverage of the shootings was extensive. Minnesota experienced a mild fall with many wetlands remaining ice-free well in to December.

At least six Trumpeter Swans released by the Iowa Trumpeter Swan Restoration Program moved north to Minnesota in 1999 where several successfully reared broods. At the same time, Minnesota donated several trumpeters rescued from the wild with serious wing injuries to Iowa's captive breeding program. Ron Andrews, coordinator of Iowa restoration, reports that while the state only had one successful wild nesting pair (fledging one cygnet on a farm pond in Dubuque County), they did have eight known young pairs in five counties in central and southern Iowa. Partnership pairs (swans held in captivity by private cooperators) hatched 101 cygnets in 1999. There will be at least 75 swans to release into the wild over the next 2 years. Thus, while wild nesting in Iowa has been slower than hoped for, there is reason to be optimistic that next breeding season will bring increased production in the wild.

Sumner Matteson, coordinator of Wisconsin DNR recovery efforts, reports that 32 wild-nesting pairs of Trumpeter Swans were documented with 30 nests located in 10 Wisconsin counties. This represents an increase of 78 percent, up from 18 nests in 1998. Pat Manthey, Avian Ecologist for the Wisconsin DNR, supervised two full time summer seasonals who spent the summer field season monitoring nests and banding cygnets. Corporate and private donations provided funding for the nest monitoring that included aerial swan surveys, follow-up ground checks plus additional coverage from Bald Eagle surveys. Now with 10 years of restoration data accumulated, a population viability model will be developed to determine a revised recovery goal for the swan population. Wisconsin's initial restoration goal was a minimum of 20 breeding pairs in Wisconsin by year 2000.

A satellite-tracking project is currently underway involving 10 adult trumpeters. The birds were captured in Wisconsin last summer on breeding territories and equipped with 40-gram transmitters. This migration monitoring project is a combined effort of the Riverbanks Zoological Park and Botanical Garden, the Wisconsin DNR and Wildlife Preservation Trust International. So far, some of the swans have been followed to Illinois, Indiana, Minnesota, and Missouri. For a current update and interesting review of the project visit Wisconsin's web site at www.wildtracks.org.

Madeleine Linck, TTSS Administrative Assistant,
Wildlife Technician, Hennepin Parks
3800 County Road 24, Maple Plain, MN 55359

Ohio Trumpeter Swans
Dave Sherman

We made two releases of Trumpeter Swans this spring: Fourteen were released at Mallard Club Wildlife Area, Lucas County, on 30 April 1999 and 15 were released at Mosquito Creek Wildlife Area on 7 May 1999. One bird at each release site had a satellite transmitter attached to its back. The swans' locations can be monitored through the Cleveland Zoo's website: www.clemetzoo.com/rttw/swan/.

We have had two successful nests in Ohio this year. One nest at Magee Marsh Wildlife Area in Ottawa County has successfully hatched cygnets for the third year in a row. The swans hatched two cygnets, but only one was still alive a month after hatching. We also had a successful trumpeter nest in southeastern Ohio. We do not know where this pair of trumpeters came from since they just showed up this year and are neither banded or collared. They did, however, add four more cygnets to Ohio's population, so we welcome both adults and cygnets into Ohio's flock.

Since the program started in 1996, Ohio has released 83 swans and hatched 13 cygnets for a total of 96 birds. We currently know the whereabouts of 64 of these birds, and 21 birds have died, leaving 11 birds unaccounted for. Next year will be our last release of approximately 40 birds. Hopefully we will get a few more breeding pairs next year and our program will really take off.

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Some thoughts on the Trumpeter Swan Plan for the Atlantic Flyway
Harry Lumsden

The sixth draft of the Atlantic Flyway Management Plan for the Atlantic Coast Population of Trumpeter Swans lays great stress on identification of suitable nesting and non-breeding habitats and wintering range for the birds. It cites an objective of developing a dispersed breeding population of at least 25 breeding pairs, while minimizing conflict with other interests and maximizing aesthetic and recreational benefits to the public. As far as it goes this has the potential to be an excellent plan, but is not clear what the potential sources of birds may be.

If the Atlantic Flyway is serious about restoration of Trumpeter Swans, the initial breeding birds must be produced for release, rather than relying on pioneering. One or more states must develop a production program adequate to reach the target of 25 breeding pairs by the year 2010. Currently, the plan contains no provision for a breeding program.

There are various ways of producing swans for release.

1. Eggs may be collected in Alaska [as done by several states in the Midwest], incubated in a hatchery and the cygnets artificially raised. When released as cygnets only about half survive to breeding age. When released at 2-years of age survival is much better. A holding pen is therefore needed to hold the swans until they reach 2-years of age.
2. Breeding pairs can be acquired from private breeders, placed with cooperators who are prepared to provide adequate facilities. Such facilities should include open water throughout the winter either naturally or with a bubbler or aerator, a fenced enclosure to prevent the swans from wandering, artificial food as required, and a nesting raft or small island where secure incubation and roosting can take place.

The latter approach has many advantages. The stock for release is raised by their own parents. Most of the costs are carried by the cooperator. The public is directly involved in a worthy conservation project. The Trumpeter Swan also can be a "flagship" species for promoting wetland conservation.

The Atlantic Flyway Plan stresses the production of a migratory population. The Ontario experience has been that the trumpeters will do as they please. Most of our population moves a short distance from the breeding or release site to open water and only a few travel long distances. Only one group of birds has established a true migratory pattern with a traditional movement to the same wintering ground each winter and return to its traditional breeding area. Inducing migration with an ultra-lite aircraft is immensely expensive and is still in its experimental stage.

In the Atlantic Flyway, the isotherms run north-east to south-west which means that trumpeters can winter, and probably will, as far north as Nova Scotia and even Newfoundland. It is likely that trumpeters released where there is open water year round will choose to be resident and will undertake only local movements.

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Selected Papers

1999 Midwinter Trumpeter Swan survey

Daniel Gomez

Introduction

The Mid-Winter Trumpeter Swan Survey is an annual survey conducted in late January or early February. The survey is a cooperative effort between Red Rock Lakes National Wildlife Refuge (RRLNWR), Southeast Idaho Refuge Complex (SEIRC), National Elk Refuge, Harriman State Park (HSP), Idaho Department of Fish and Game, Grand Teton National Park, Yellowstone National Park (YNP), Wyoming Game and Fish Department (WYG&F), Malheur National Wildlife Refuge, Summer Lake Wildlife Area, Oregon Department of Fish and Wildlife (ODFW), Ruby Lake National Wildlife Refuge, and Shoshone-Bannock Tribes. This year, we also included data collected by staff at the Bear River Migratory Bird Refuge, Utah.

The survey is intended to provide a total count of the entire Rocky Mountain Population (RMP) of Trumpeter Swans (*Cygnus buccinator*). The trends are depicted in graphs shown as figures included in the full survey report. The RMP is comprised of two distinct sub-populations: the U.S. flocks, which nest in the northern Rocky Mountains, and Canadian flocks. The Canadian flocks summer in Canada and share common wintering areas with the U.S. flocks in the "core" Tristate area within the Greater Yellowstone Ecosystem (Figure 1). The Mid-Winter Survey is the best way to census and determine the distribution of the entire wintering population. It provides essential data for waterfowl managers in three provinces of Canada and five states in the U. S., as well as numerous other parties.

This winter, we first attempted to conduct the survey in January to coincide closely with annual midwinter waterfowl counts. However, mountain weather was not suitable for safe flying and clear observation. The aerial portion of the survey could not be initiated until 1 February 1999. Poor weather precluded flying on consecutive days and the survey was spread out over a 2-week period as follows: Yellowstone 1 February, Wyoming 5 February, Idaho 11-12 February, Montana 13 February.

I contacted observers to get their best sense as to whether trumpeters had moved about during the intermittent surveys. Observers believed there had not been any large scale movement between Wyoming and Idaho. This belief was generally supported by ground observations and in Wyoming by polling Wyoming Game and Fish staff (S. Patla, pers. comm.). Given the large increase in swans over last year's survey, it is possible that about 100 trumpeters moved between YNP and the Madison Valley in Montana in between those counts and may have been double counted. During mild temperatures in early February, T. McEneaney found 345 trumpeters in YNP. Recurring ground observations by S. O'Brien found less than that number, especially along the Madison River. By the time we flew the Madison River portion in Montana, temperatures had cooled and open water in the park had frozen. This likely caused some swans to move to Hebgen Lake and Ennis Lake, as I found about 100 more swans than last year. Trumpeters wintering in YNP also move into the Henry's Fork area when the park freezes. However, even with this theoretical deduction, the increase in trumpeters counted this year remains large.

The Pacific Flyway Management Plan (1998) for the RMP of Trumpeter Swans directs aggressive actions to broaden distribution. The management goal is to restore the Rocky Mountain trumpeters as a secure and primarily migratory population, sustained by naturally occurring food sources in diverse historical breeding and wintering sites within former range.

Recent efforts to restore Trumpeter Swans to historical range resulted in the translocation of 1,477 swans from the RMP in the Tristate area of southeast Idaho, southwestern Montana and northwestern Wyoming to sites in Oregon, southern Idaho, Utah, and southwestern Wyoming. Tristate swans have been relocated during both summer and winter range expansion programs and Canadian swans during the winter program. In response to these range expansion

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efforts, the Fall (U.S. Flocks) and Mid-Winter Surveys have been expanded to include Gray's Lake NWR area and the Snake River from Idaho Falls to Bruneau Dunes State Park, and the Bear River (Idaho); the Salt River, Wind River, and Green River (Wyoming); Malheur NWR and Summer Lake WA (southeast Oregon), and Ruby Lake NWR (Nevada).

In the early 1990s, winter feeding of Trumpeter Swans at Red Rock Lake Refuge was attracting increasing numbers of swans into inadequate winter habitat, subjecting the RMP to increased disease risk and reducing the effectiveness of winter range expansion efforts. Beginning in the winter of 1992/93, actions were taken to end the winter feeding program, disperse swans to natural winter habitat, and begin restructuring the Centennial Valley flock so that summer residents would migrate out of the valley to suitable wintering sites.

Some limited mixing of RMP and Pacific Coast Population Trumpeter Swans may occur as well. In the winter of 1997/98, a trumpeter banded with collar 75T at Tetlin NWR in Alaska was observed in the Teton Basin of southeast Idaho. Marked RMP trumpeters have also been observed in the Skagit Valley of Washington State (S. Bouffard, pers. comm.). The extent to which Rocky Mountain and Pacific Coast Trumpeter Swans may mix in the Yukon Territory of Canada is largely unknown.

Hazing was conducted at Harriman State Park on 11 occasions from 19 November 1998 to 5 January 1999. Hazing is intended to minimize the congregation of Trumpeter Swans in the limited winter habitats of the Upper Henry's Fork areas and to encourage them to continue moving south. According to ground survey data provided by S. Bouffard and ground observers, the range of swan numbers went from 456 swans (including 61 tundras) before hazing on 19 November 1998 to a low of 152 after hazing on 25 November. Numbers then ranged from 249 to a high of 444 trumpeters on 5 January 1999 (no Tundra Swans) during the hazing period. Hazing appeared less effective later in the winter as 412 trumpeters were observed on 14 January 1999 after hazing ended on 5 January. Trumpeter use held at about 360 trumpeters through January and early February and then declined to about 27 trumpeters on 21 February 1999.

To the south, the Bear River MBR and Utah Division of Wildlife in Utah conducted frequent ground surveys to search for Trumpeter Swans with a full-time technician hired to conduct observations. Their data was not available at the time of this report. However, S. Bouffard states that few trumpeters were observed in southern Idaho, leading to the conclusion that a large scale movement into Utah did not occur this year. This lack of movement was likely due to a mild winter where the bulk of the trumpeters remained in southeastern Idaho and western Wyoming, with some in Montana and YNP.

The National Wildlife Refuges and other areas in the Rocky Mountain region are receiving more wintering use by Trumpeter Swans. For example, at Seedskadee NWR on the Green River in western Wyoming, Trumpeter Swan use peaked at 17 adults and five cygnets on 1 January 1999. Four adults and four cygnets were also seen on the Big Sandy River, northeast of Seedskadee (A. Halvorson, pers. comm.). S. Patla (WYG&F) recorded 12 adults and four cygnets on Seedskadee and four adults on the Big Sandy/Green River junction on 5 February 1999. Wintering trumpeters may be expanding into adjacent areas as indicated by their fluctuating numbers. Four adults and two cygnets were counted on Seedskadee NWR during the fall survey, indicating limited summer nesting continues to occur.

At Red Rock Lakes NWR, the historical swan grain-feeding ponds (Culver and Macdonald Ponds), are now used as roosting sites through the winter. A few swans remain on the ponds and are believed to fly to nearby areas, such as Ennis Lake in the Madison Valley or the Henry's Fork in Idaho, to feed with migrant Canadian Trumpeter Swans. Where the ponds used to hold about 200 trumpeters, they now have about 15 - 25. This winter, we observed those numbers through most of the winter, with a high of 62 adults and six cygnets on 11 March 1999. This pattern and numbers of birds is similar to that seen in 1998.

The swans will use other waters on the Refuge as they freeze and thaw with temperature fluctuations. Shambow Pond, a small spring-fed pond near the Upper Red Rock Lake, is typically used as a roosting and feeding site as it opens early in spring before other Refuge waters are ice free. During this short early spring period, up to 90 Trumpeter Swans can be seen feeding on submerged aquatic plants exposed by receding ice. As other streams and lakes begin to open, the swans disperse.

Methods

The objective is to conduct the survey in as short a time period as possible, to reduce the chance of swans moving and being missed or counted more than once. Data for the Mid-Winter Survey are collected by fixed-wing aircraft (Cessna Turbo 210) and ground surveys. Flying altitude varies according to terrain and surface winds, but generally averages 30-60 m AGL, at 135-155 kph. A pilot-observer and one to two other observers count and classify swans as adults (white birds) or cygnets (gray birds). New aerial observers are encouraged to join the experienced crew to increase the pool of observers who can identify white birds against snowy backgrounds. Ground surveys are used to verify species composition of swan flocks (tundra/trumpeters) and provide data for isolated pockets of swans that are not covered by aerial surveys. After the survey is complete, data are assembled and tabulated at RRLNWR. A summary report is prepared

and distributed to cooperating agencies and interested individuals.

The traditional Tristate portion (MT, WY, ID) of the 1999 Mid-Winter Survey was flown over a 2-week period due to inclement weather. YNP was flown on 1 February 1999, Wyoming 5 February, Idaho 11-12 February, and Montana 13 February. Surveys of Malheur NWR, Summer Lake, Washington (5 February 1999), and other southeast Oregon habitat were conducted on or about 20 January. The Ruby Lake NWR survey was conducted on 4 February 1999.

Since the U.S. Fish and Wildlife Service (Service) standard software is the Word Perfect Suite, including Quattro Pro, I have attempted to make the data sets electronically accessible and consistent within Service and cooperator capabilities. Service personnel in Idaho now enter their data directly onto a Quattro Pro spreadsheet, reducing transcription and addition errors. The Flyway Management Plan, however, is prepared using Excel spreadsheets and graphics. This creates difficulty in adapting graphs to work under the Excel format used in that plan. I am working with G. Will of Idaho Fish and Game to resolve the software inconsistencies. In the interim, I adjusted the order of the graphs [in the full report] to coincide with the order used in the Flyway Management Plan so the figures can be readily used to update that plan. The footnotes in the figures reference the previous figure number from past midwinter surveys.

Results and Discussion

In 1998, the Mid-Winter Survey found 2,189 swans, a decrease of 510 from 1997 (Gomez 1998). This year, the survey found 3,527 Trumpeter Swans, an increase of 1,338 swans from 1998 (Table 1). As stated in the Introduction, the large increase in swans over last year's survey may include some "double-counting" due to swans moving throughout the area. This is a risk in a survey that was spread over 2 weeks. It is possible that about 100 trumpeters moved between Yellowstone National Park (YNP) and the Madison Valley in Montana, or in and out of the Henry's Fork areas. However, this movement is deemed minimal.

The mild winter resulted in much open water during the first week of the survey. During the second week, a cold spell may have caused some congregation into smaller waters. Because of recent mild winters, it was difficult to conclude a downward trend given the amount of open water and possible dispersal outside of the survey area. Recent surveys may have missed some birds, while in 1998, we were unable to survey YNP.

The size of the Canadian flock is determined indirectly by subtracting the Fall Survey (U.S. flock) results from the midwinter totals, when the Canadian flock is in the area. This midwinter survey may have counted some of the birds missing from the last two surveys. Secondly, the Canadian flock experienced higher cygnet production. Subadult survival may be up as well due to the mild winters.

Even with the possibility of some double counting this year or the presence of some birds from the Alaskan flock, we can conclude that an increase has occurred or been underway, especially in the Canadian flock segment. Red Rock Lakes experienced significant cygnet production this summer, only to have about half of the cygnets disappear during a 3 day cold snap with hail storms in late June.

Based on the 1998 Fall Survey (Gomez 1998), the number of swans in the U.S. flocks increased 36 birds, while the Canadian flocks increased by 1,302 swans. The 1998 midwinter total was lower than it should have been since YNP was not counted. While we cannot assume that the 1,302 additional swans are one year's increase in the Canadian segment, it does appear the RMP continues to increase, consistent with the trend observed since about 1971 (Figure 6).

The state by state tables at the end of the full report represent the number of swans counted in specific areas. The RMP continues to be comprised largely of Canadian birds.

From 1998 to 1999, the total number of adults/subadults increased. Cygnet production decreased in 1996, 1997, and 1998, but increased in 1999. This increase may be due to milder springs and warmer summers. However, the percentage composition of cygnets in the total RMP changed only slightly. This may indicate a higher survival of subadults, counted as white birds, thereby showing only a slight increase in percent cygnets in spite of higher cygnet production, i.e. the number of white birds increased as well.

Over 1,500 RMP Trumpeter Swans have been collared since the mid 1980s. A wide variety of collars are on the RMP. Most RMP swans collared in the U.S. have green collars, however a small number have red or white collars. A few swans collared in the early 1980s in Wyoming or at RRLNWR have red collars. Canadian swans marked in the Yukon and Northwest Territories have red collars. Swans transplanted to Canada's Elk Island National Park have yellow collars. Collars are not always recorded during aerial surveys.

In summary, 6 years after intensive relocation and the end of artificial feeding, the RMP's Canadian Trumpeter Swan flock continues to increase and the U.S. Flock numbers are flat to slightly increasing. The degree to which migration patterns have been established is less certain. The mild winter this year favors good over-winter survival with subadults forming breeding pairs. The Tristate area saw high snowpack in the mountains, but relatively dry valleys. The higher runoff in the mountains of the Tristate Region favor adequate water for this summer's cygnet production at the higher elevations, but drier conditions in the lower elevations could result in lower production in other areas.

Acknowledgments

All cooperators and contributors deserve a thanks for working around inclement weather and other survey difficulties and for helping to acquire and summarize the data. Pilot B. Twist and observer D. Gomez (FWS) completed the Montana portion of the survey. In Idaho, pilot B. Twist and observers M. Fisher and S. Bouffard (FWS) conducted aerial surveys; ground surveys in the vicinity of Harriman State Park were conducted by S. O'Brien, A. Noson, D. Milek and volunteers. Portions of Wyoming, excluding Yellowstone National Park, were flown by Mountain Air Research of Driggs, Idaho, and observer S. Patla of WY G & F. YNP was surveyed by pilot B. Twist and observer T. McEneaney of the NPS. J. Mackay (FWS) conducted the ground survey at Ruby Lake NWR, Nevada. Oregon Trumpeter Swans were counted by M. St. Louis (OR DFW). A few isolated swan sightings were sent to me by other contributors as noted on the tables [in the full report]. D. Gomez compiled and completed this report; J. Vann and R. Gomez completed production and distribution of the report.

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Editor's Note: A copy of the full report is available from Red Rock Lakes NWR, Monida Star Rt., Box 15, Lima, MT 59739. Figure numbers in this paper reflect numbering in full report.

Table 1. RMP Trumpeter Swans counted during the 1998 Midwinter Survey in respective States.

State	Ad/subadult	Cygnets	Total
Montana	335	153	488
Idaho	1754	500	2254
Wyoming	609	119	728
Tri-State Subtotal	2698	772	3470
Utah	2	0	2
Colorado			0
Nevada	29	8	37
Oregon	16	2	18
Washington			0
California			0
Subtotal for other States	47	10	57
RMP, U.S. Flocks	**2745**	**782**	**3527**

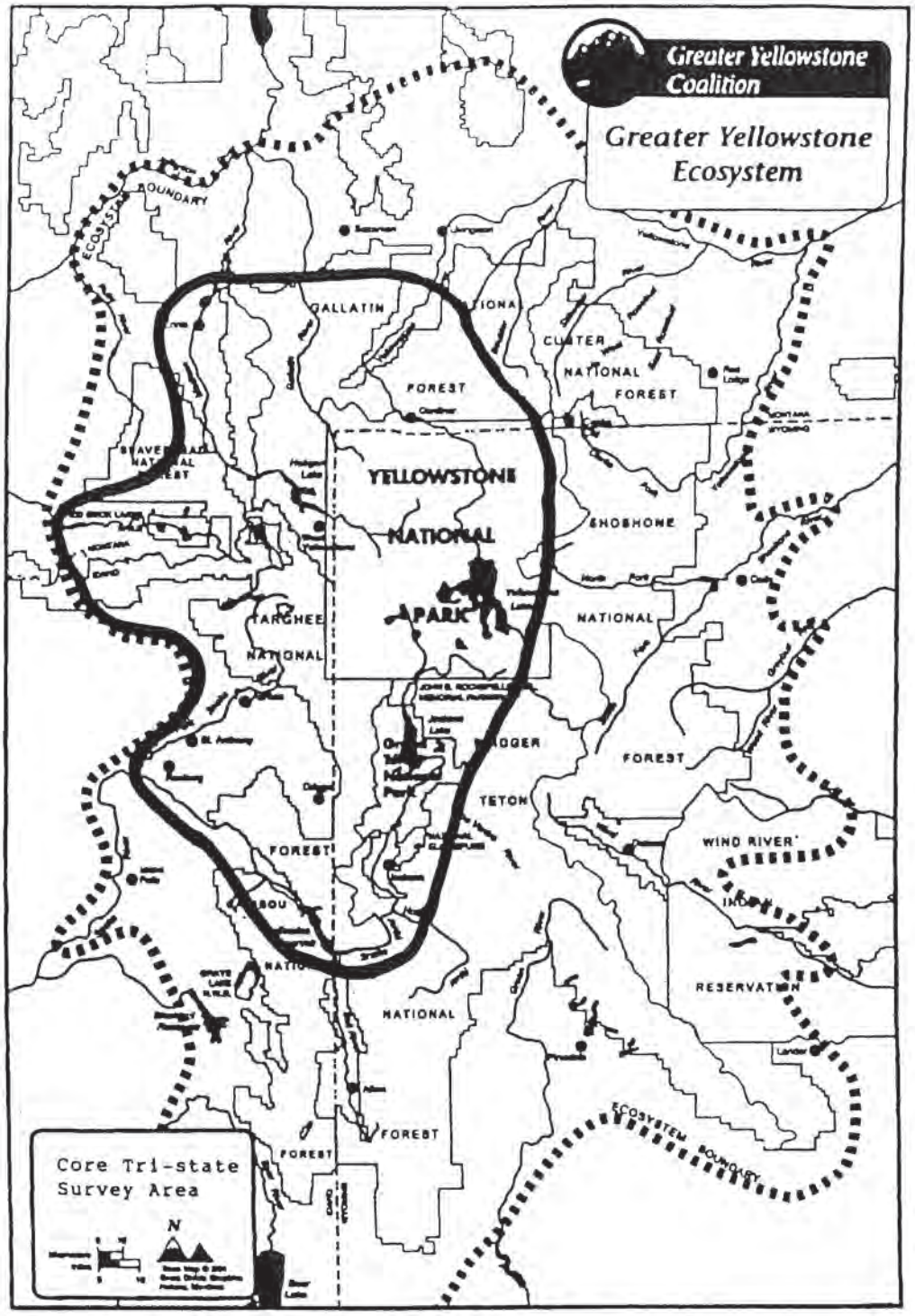
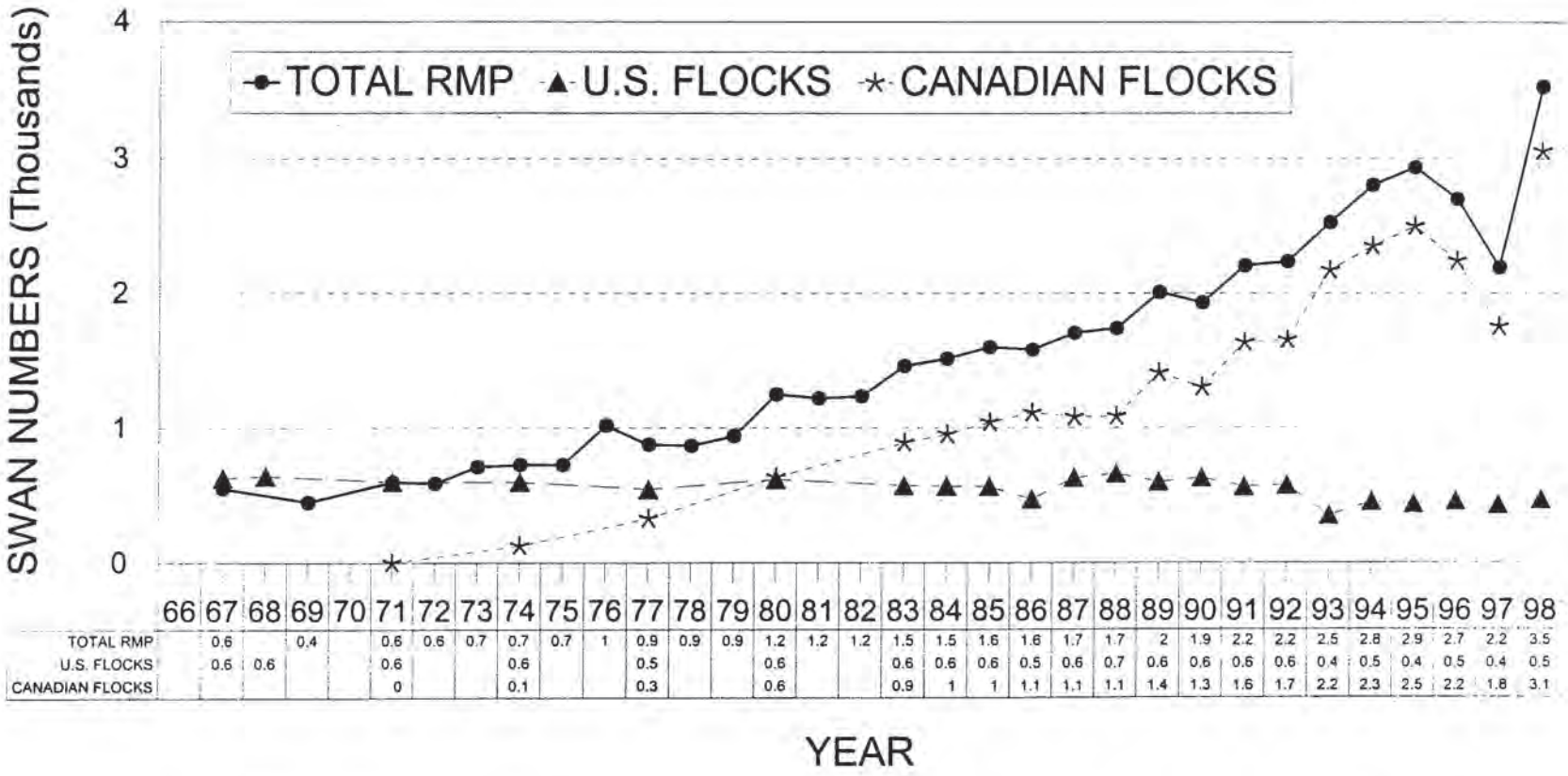


Figure 1. Map showing the "core" Tri-state Area of southeast Idaho, southwest Montana, and northwest Wyoming for the Rocky Mountain Population of trumpeter swans. (Provided by the Greater Yellowstone Coalition, Bozeman, Montana).



	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
TOTAL RMP		0.6		0.4		0.6	0.6	0.7	0.7	0.7	1	0.9	0.9	0.9	1.2	1.2	1.2	1.5	1.5	1.6	1.6	1.7	1.7	2	1.9	2.2	2.2	2.5	2.8	2.9	2.7	2.2	3.5
U.S. FLOCKS		0.6	0.6			0.6			0.6			0.5			0.6			0.6	0.6	0.6	0.5	0.6	0.7	0.6	0.6	0.6	0.6	0.4	0.5	0.4	0.5	0.4	0.5
CANADIAN FLOCKS						0			0.1			0.3			0.6			0.9	1	1	1.1	1.1	1.1	1.4	1.3	1.6	1.7	2.2	2.3	2.5	2.2	1.8	3.1

Figure 6. Trends of Rocky Mountain Poplation of trumpeter swans (white birds, cygnets, and unknown age), U.S. and Canadian flocks, 1967-98. The Canadian flock size is derived indirectly by subtracting the U.S. Flock (from Fall Survey) from the total midwinter count. (From 1999 Midwinter Survey: Rocky Mountain Population of trumpeter swans, February 1999, Red Rock Lakes National Wildlife Refuge, USFWS). Survey not flown on consecutive days due to weather, potential double counting of an estimated 100 swans between Yellowstone NP and the Madison River Valley, MT, or other locations is possible. This graph was formerly Figure 4 in previous midwinter survey editions.

Trumpeter Swan surveys on the Chugach National Forest 1998 – an update

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Abstract

Trumpeter Swan (*Cygnus buccinator*) aerial surveys were conducted during May and August 1998 on the Copper River Delta and surrounding areas of the Chugach National Forest in south central Alaska. The surveys were accomplished through cooperation between the U.S. Fish and Wildlife Service (USFWS) and the U.S. Forest Service (USFS). In May, 612 white (adult and subadult) swans and 137 nests were counted. In August, 650 white swans and 66 broods were counted. Production was above average. Nest success was 0.48, average brood size was 3.3, and young made up 25% of the early fall population. The fall white swan population was up 9% from 1997 and was 1% above the 23-year average. There are now 43 comparable swan surveys in 23 different years for this area. A continued standardized Trumpeter Swan survey program is recommended.

Introduction

The Copper River Delta and surrounding coastal wetlands in the Chugach National Forest support a large and dense nesting and summering population of Trumpeter Swans (*Cygnus buccinator*). Aerial surveys were conducted in this area as part of USFWS statewide trumpeter censuses in 1968, 1975, 1980, 1985, 1990, and 1995 (Hansen *et al.* 1971, King 1976, King and Conant 1981, Conant *et al.* 1985, Conant *et al.* 1991, Conant *et al.* 1996). The USFS initiated aerial surveys in 1978, and annual swan surveys have been jointly accomplished under a formal agreement between the USFWS and USFS since 1981.

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Results

Population Trend

In May 1998, 612 white swans (adults and subadults) were counted, up 18% from spring 1997 and nearly identical to the 20-year average. The number of single and paired birds in spring increased 16% from last year and was 13% above the average. The number of flocked birds increased 31% from 1997 and was 35% below the average.

In August 1998, 650 white swans were counted, up 9% from August 1997 and similar to (+1%) the 23-year average (Figure 2). The number of single and paired birds increased 5% from last year and was 6% above the average. The number of flocked birds increased 18% from 1997 and was 10% below the average.

Productivity

The proportion of pairs with nests in late May was 0.57, up 4% from 1997 and 6% above the 20-year average. One hundred thirty seven nests observed in May produced 66 broods still present in August, resulting in a nest success of 0.48 (Figure 3). Nest success increased 4% from 1997 and was similar (+2%) to the 20-year average. Although the percentage of nests that succeeded was near the average, the number of nests was 18% above average and was the third highest number recorded in the history of the surveys. Accordingly, the number of broods was also high: 25% above the long-term average. It is interesting to note that the majority of the increase in nests occurred on the western portion of the survey area (defined as the west delta in Figure 4). The number of nests observed there was 52, 68% above the average of 31 nests for that area (data from 1980, 1983, and 1993 were excluded from the average; see below) and 33% above the previous high of 39 nests observed in 1997. The number of young per occupied nest, a productivity statistic based on the number of known territorial pairs (as evidenced by the presence of a nest), was 1.6 for the entire survey area (average = 1.6), and average brood size was 3.3 (average = 3.3). The proportion of young in the early fall population was 0.25, up 9% from 1997 and 14% above the 23-year average.

Discussion

The population of white swans on the study area increased steadily between 1978 and 1985, in response to several years of good to excellent reproductive success during the early 1980s. The population leveled off in Fall 1985 at 898 white swans and began a reverse trend, declining to a low of 526 white swans in Fall 1991. Since then, the number of white swans has increased somewhat and seems to have stabilized. Reproductive success has fluctuated over the years, likely due in large part to weather conditions during the breeding season.

Production in 1998 was above average, so unless conditions on the wintering grounds prove to be abnormally adverse, we should see good recruitment of young swans into the population.

The database for the Copper River Delta Trumpeter Swan surveys has been incorporated into an ARCVIEW geographic information system, which allows us to look at the data in new and interesting ways. For example, when we started in 1996 to plot the distribution of nest and brood locations within the survey area, we noticed that nest success on the western portion was substantially higher than on the eastern portion in both 1996 and 1997 (Groves *et al.* 1997, Groves *et al.* 1998). This year we compared productivity over time between the western Copper River delta (west delta), eastern Copper River delta (east delta), and the Controller Bay drainage (Figure 4).

Data from the 1980 surveys were not included in the analysis because data from the spring 1980 survey were only accessible from the written report and could not be analyzed spatially. Data from the 1983 and 1993 surveys were also excluded because more broods were found than occupied nests (within the entire survey area or within one delineated portion), suggesting a survey timing problem.

Mean nest success for all years examined was 0.57, 0.41, and 0.34 on the west delta, east delta, and Controller Bay drainage, respectively. The west delta had the highest nest success of the three areas in 11 out of 17 years (65%). Nest success was highest on the east delta in 4 out of 17 years (23%) and was highest in the Controller Bay drainage in 2 out of 17 years (12%). Productivity was thus somewhat variable and was not always highest on the west delta. However, paired t-tests showed that overall, nest success was significantly higher on the west delta than on either the east delta ($p=0.012$) or the Controller Bay drainage ($p=0.0004$). There was not a significant difference in nest success between the east delta and the Controller Bay drainage ($p>0.10$).

The mean number of young per occupied nest was 1.82, 1.36, and 1.09 on the west delta, east delta, and Controller Bay drainage, respectively. The number of young per occupied nest gives a better indication of actual production than nest success since it also incorporates how many young each nest produced. Again, the west delta usually, but not always (71% of the time), produced the highest number of young per occupied nest. Overall, the west delta produced significantly more young per occupied nest than either the east delta ($p=0.033$) or the Controller Bay drainage ($p=0.0009$). There was not a significant difference between the east delta and Controller Bay drainage ($p>0.10$).

Simple linear regressions were performed on the number of nests, the number of broods, and nest success over time for each of the three areas to determine whether significant changes have occurred in swan productivity. Trends were not found to be significant on the east delta or the Controller Bay drainage ($p>0.10$). On the west delta, the number of nests has increased significantly since 1978 ($p=0.013$). (A significant increase was still evident [$p=0.054$] when the extremely high data point from 1998 was excluded.) The number of broods has also increased on the west delta, though the significance is only slight ($p=0.086$).

Differences in productivity on the three parts of the survey area are most likely due to differences in habitat quality and microclimate. The east delta, for example, is more heavily influenced by cold air coming down the Copper River from the interior of Alaska, often slowing the phenology of spring breakup relative to that of the west delta. The fact that productivity on the east delta and Controller Bay drainage has not declined over time reassures us that the lower productivity there relative to the west delta is not a recent phenomenon and is probably not cause for concern.

Bias

Possible sources of bias in these data come from using different pilots and observers with variable levels of experience and training, using more than one type of aircraft, and surveying in variable weather conditions. However, by using a standardized system, comparable sets of data were collected as evidenced by comparable recorded flight paths and mileage flown.

Recommendations

We now have 43 comparable Trumpeter Swan surveys (20 spring and 23 fall) on the Copper River Delta, one of the most complete records for any swan population in Alaska. We recommend continuing a cooperative program of two surveys per year. Information acquired from both the early and late phases of the breeding season has greatly enhanced our ability to understand the factors influencing the population's reproductive success. Long term, standardized data sets such as these are an invaluable tool for evaluating population dynamics and properly managing Trumpeter Swan breeding populations.

Acknowledgments

For years 1968 – 1997, please refer to the acknowledgments given in *North American Swans* 27(1) (December 1998). B. Conant, W. Larned, J. King (USFWS) are gratefully acknowledged for their participation in the 1998 swan surveys.

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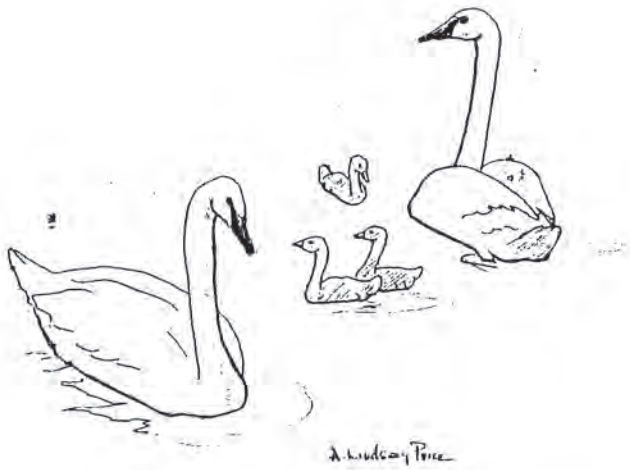
Editor's Note: See *North American Swans* Vol. 27, No. 1 (December 1998) for details on survey area, methods, previous results and discussion with supporting figures and tables. The information presented here updates that report. Figure numbers in this paper reflect numbering in full report.



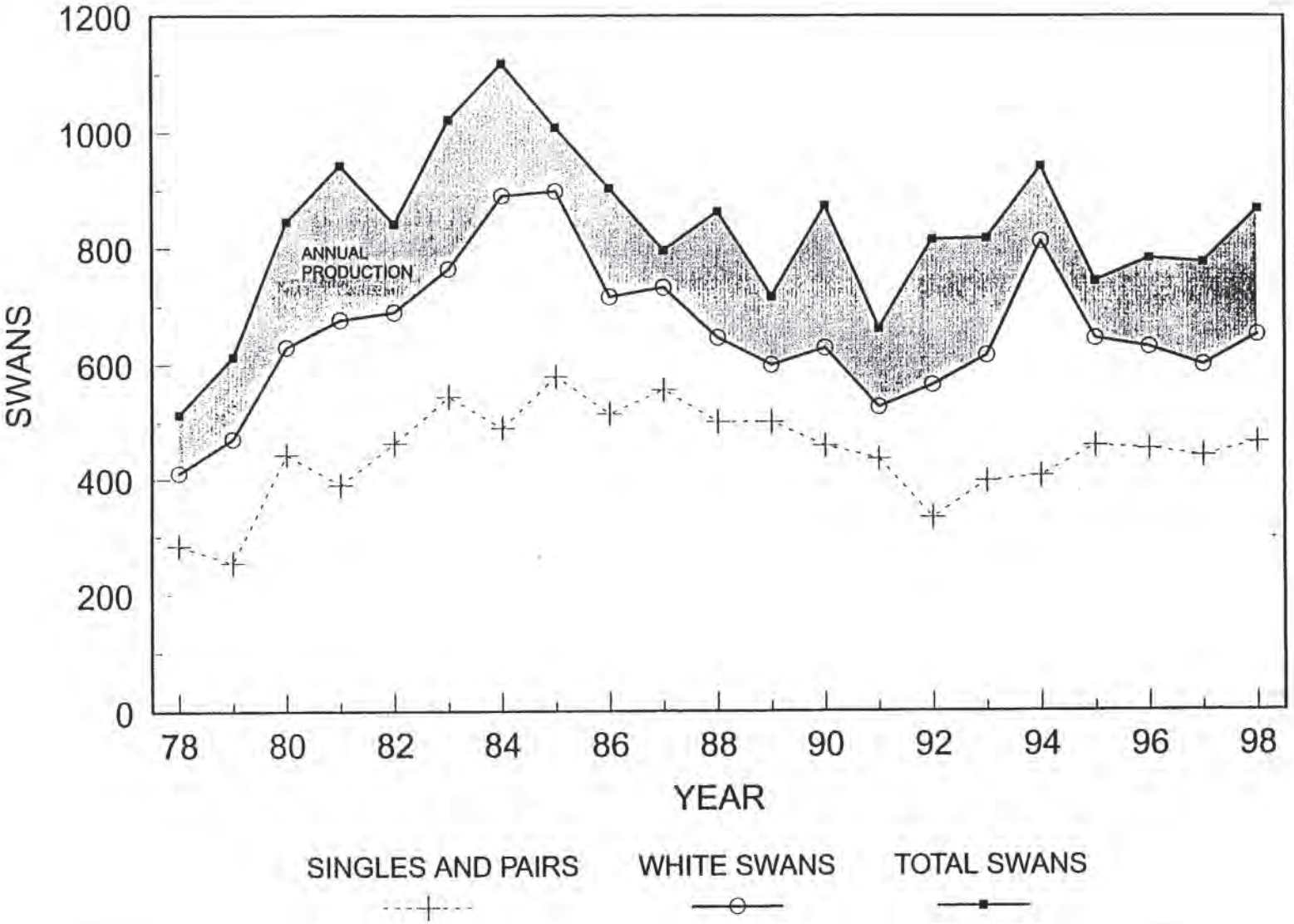


Figure 2. Population trend of trumpeter swans on the Copper River Delta study area, 1978-1998.

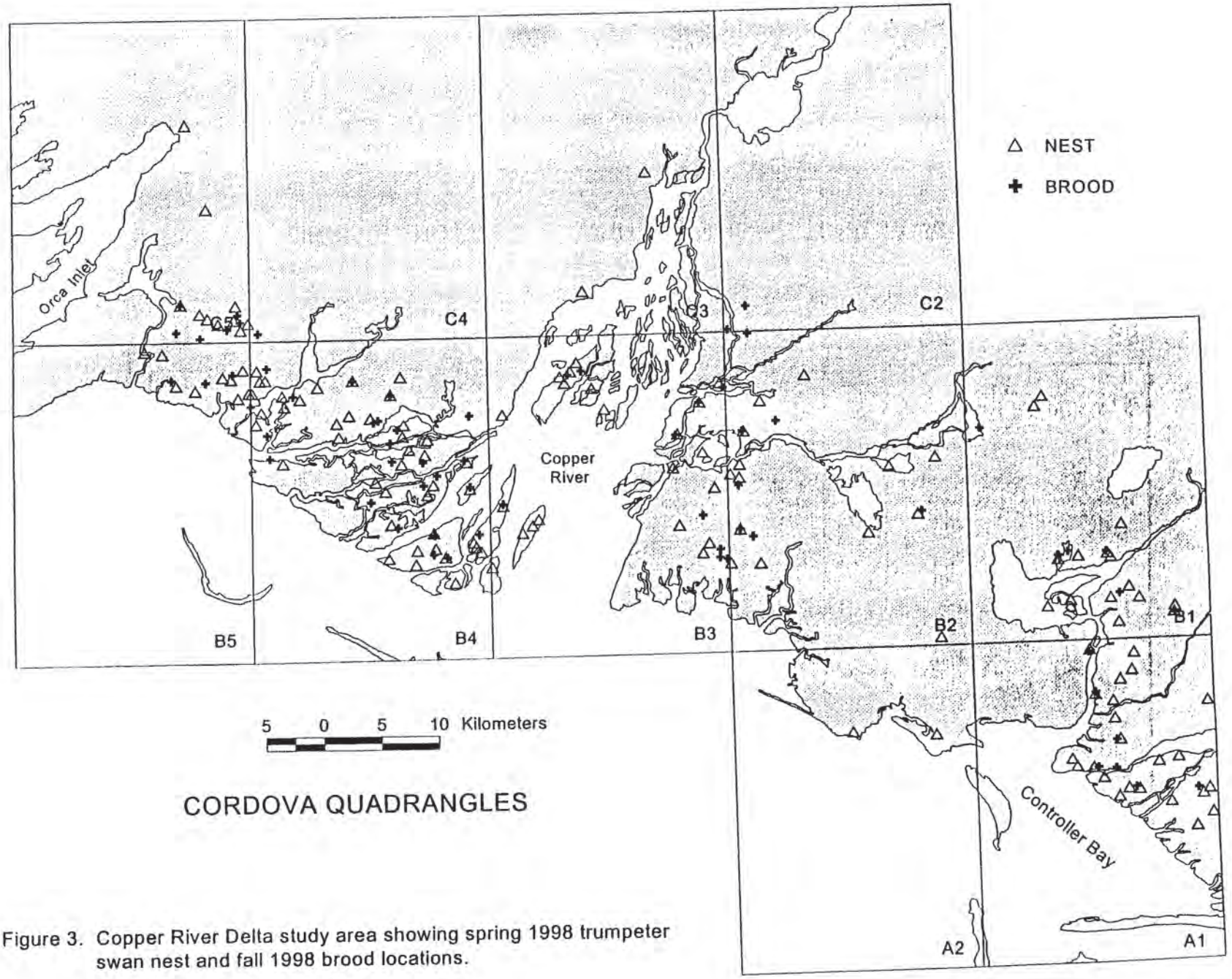


Figure 3. Copper River Delta study area showing spring 1998 trumpeter swan nest and fall 1998 brood locations.

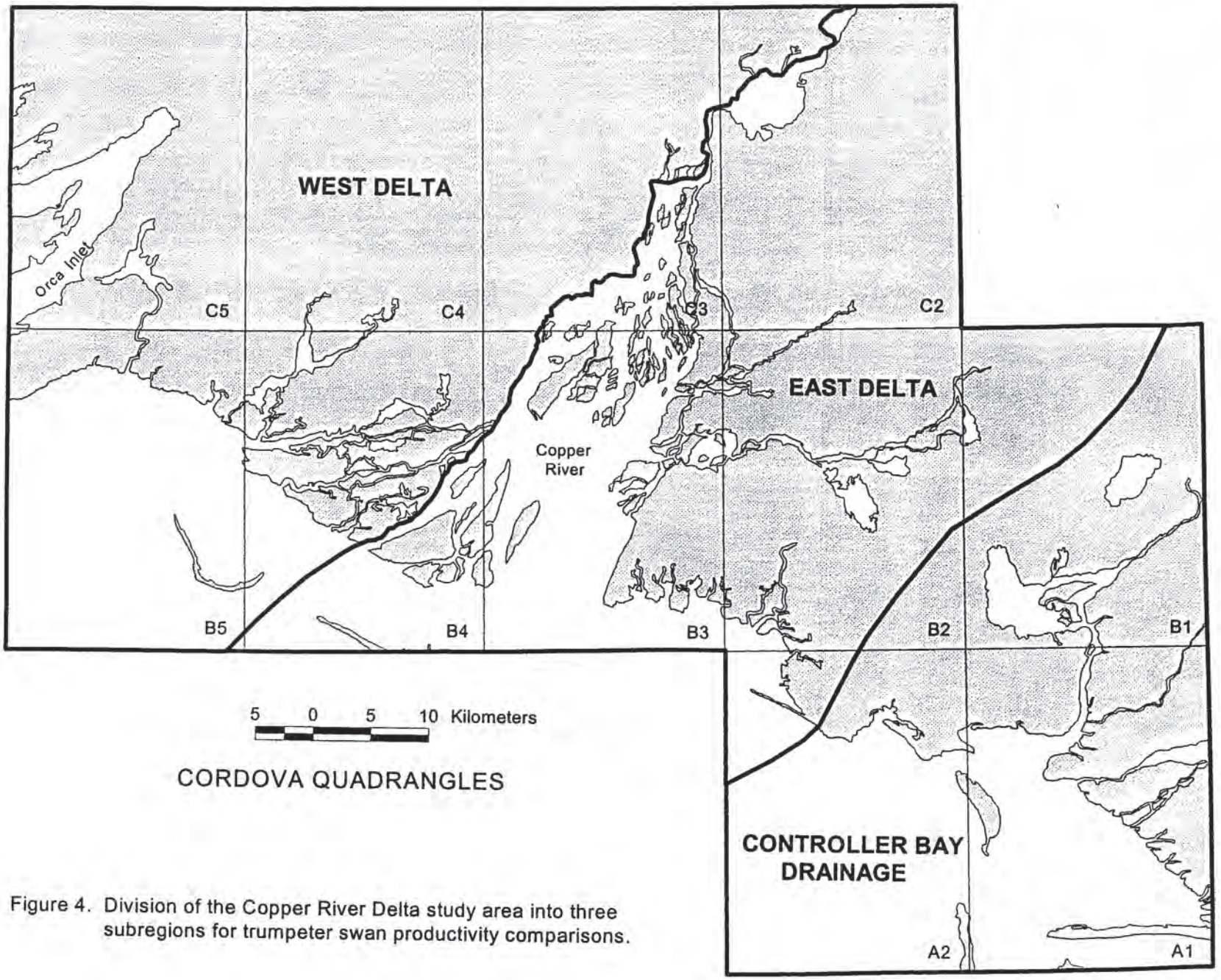


Figure 4. Division of the Copper River Delta study area into three subregions for trumpeter swan productivity comparisons.

Trumpeter Swan restoration in Ontario 1998

Harry G. Lumsden

Introduction

It has been the goal of the Ontario Trumpeter Swan Restoration Group since its formation in 1982 to bring back the Trumpeter Swan as a self-sustaining species to its former breeding range. In 1998 the program exceeded its first goal of 15 wild breeding pairs of Trumpeter Swans 1 year ahead of schedule.

The captive nesting stock and wild breeders in 1998 both produced a record number of cygnets while the annual loss was about average. It will take a few more years to achieve a self-sustaining population, but success is in sight because of the dedication of the cooperators who care for the breeding stock.

Winter 1997-98

The wild trumpeters in southern Ontario experienced a mild winter in 1997-98. We have only one record of swans moving to the United States. Swan No. 308 was last seen at Wye Marsh Wildlife Centre (Midland, Ontario) on 31 December 1997 and was reported at Rochester, New York, on 3 January 1998 accompanied by two unmarked trumpeters. They were last reported at Irondequoit Bay near Rochester in April and were back at Victoria Harbour near Wye Marsh on 16 April.

Since 1990, Swan No. 100 has wintered on the shore of Lake Ontario, except in the winters of 1990-91 and 1996-97 when she had no cygnets. In 1997, she raised five cygnets and moved with her mate (No. 206) and cygnets from Wye Marsh to Bronte on 1 January 1998. She was accompanied by No. 283, one of her 1994 brood, and two other untagged adults. They were last seen on the shore of Lake Ontario on 22 February and were back at Wye Marsh on 28 February.

No. 276, which normally summers on the shore of Lake Simcoe, left Duclos Point on 21 December 1997 and spent most of the winter on the shore of Lake Ontario at Sunnyside. On 29 March she was back on Lake Simcoe at Beaverton.

About 44 free-flying trumpeters wintered at Metro Toronto Zoo and over 50 spent the winter at Wye Marsh and vicinity. Seventeen wintered at various sites on the shore of Lake Ontario and more on Lake Erie. Some remained with captive trumpeters where open water was maintained with an ice-away [aerator].

Captive breeding stock

In 1998, two new cooperators joined the program. Al Dunford, near Uxbridge, received his pair on 28 June, and Mrs. McColl, of Campbellville, received a pair donated by TTSS member Bill Carrick on 19 June. These pairs were transferred too late in 1998 to breed.

Losses of breeding stock during the year were very light. Male No. 728 at Ancaster was killed by a coyote and its mate was moved to Aurora to find a new mate among the other bereaved swans there. The 12-year-old breeding male at Wye Marsh died in September 1997. His mate was also moved to Aurora and was seen copulating twice with an 11-month-old male on 4 and 6 May 1998, but no permanent pair bond seems to have resulted.

1998 Production by captive trumpeters

There was a total of 23 pairs of potentially breeding trumpeters in the care of cooperators and contributors in 1998. Eighteen of these pairs nested and produced 109 eggs, most of which were incubated by their parents. Mean clutch size was 6.0 eggs. A total of 71 (65%) cygnets hatched and 56 (79%) survived to 1 September. Some of these cygnets have been wing clipped, tagged and banded and have been left with their parents for the coming winter. The success rate of these captive pairs was similar to that of 1997 when 72 percent of the cygnets hatched and 78 percent survived to 1 September.

Survival and losses of wild trumpeters

An estimate of 143 wild trumpeters entered the year starting 1 September 1997. We estimate that 25 (17%) were lost up to 1 September 1998. Of these, eight are assumed to be dead because their tag numbers had not been recorded for over a year. It is possible that some had lost their tags and are still alive. Lead poisoning claimed five of those for whom we know the cause of death. Three flew into hydro lines and four died from disease. One suffered a broken wing and was euthanized. One was killed by a territorial Mute Swan and a vandal cut the head off another.

Cooperators and bird watchers read the tag numbers on 85 birds. Their efforts are much appreciated. Not only does this information help to

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estimate survival, but also allows us to track movements. The leg bands of 11 additional birds that had lost their tags were read and are known to be alive. We know of the whereabouts of 16 swans, mostly yearlings hatched in 1997 that have never been caught for banding. To these must be added 38 birds which were released during the year. The wild production of 41 1998 hatched cygnets brings the total for 1 September 1998 to 191 Trumpeter Swans.

Production of wild trumpeters

Since 1993 when the first trumpeters released into the wild nested, we have had 31 free-flying pairs breeding. Their offspring have survived well and some of them are now reproducing. In 1997, 12 pairs nested. Sixteen pairs nested in 1998. In the spring, several pairs dispersed and disappeared and did not return to their usual haunts until October when they reappeared with cygnets. We have not yet learned where one of these pairs nested. It is possible that more pairs will show up with offspring before winter.

Of the 16 pairs that nested, three failed to raise any cygnets. The successful pairs raised 41 cygnets. Brood size ranged from three to eight cygnets. The average brood size was 2.6 cygnets on 1 September 1998. Nine pairs, all successful, nested in the Wye Marsh area. Of the seven pairs that nested near the Lake Ontario shore, two were unsuccessful in hatching any cygnets while one pair lost their cygnets soon after hatching.

Age at first breeding of wild trumpeters

Trumpeters have been raised in Ontario using a variety of methods. Early in the program, trumpeter eggs were placed in wild Mute Swan nests. The cygnets were raised by mutes. Ten cygnets reached the age of 2 and one of them, afflicted with paddle wing and taken into captivity, bred with a female trumpeter at 7 years of age. None of the birds remaining in the wild nested with either trumpeters or mutes.

The second technique consisted of placing trumpeter eggs in an incubator for hatching. The cygnets were then penned at night and were imprinted to their keepers with whom they spent most of the day. There were 36 swans in this category which reached the age of 2 years or more. Of these, eight (22%) bred at 3 (4), 4 (2), and 5 (1) and 6 (1) years of age.

The third method was to leave the eggs with the captive pair that laid them to incubate, hatch, and raise the cygnets. There were 61 swans treated in this way which reached the age of 2 of which 18 (30%) nested. These nested at age 2 (1), 3 (9), 4 (5), 5 (1), 6 (1) and 7 (1). The mean age at first breeding for all these birds is 3.8 years. Of the four wild swans which bred, the age at first nesting was 2(1), 3 (1) and 4 (2) years of age.

Trumpeter Swans in the Kenora District

Due to a logging strike in 1998, we received limited information on breeding in the swan nesting range in Kenora. One brood of two was reported on the usual nesting lake. In the spring, Lil Anderson, a resident, saw 18 trumpeters over Silver Lake.

Induced migration

The fact that Canada Geese, Sandhill Cranes and Trumpeter Swans can be induced to follow an ultralight aircraft on achieving flight has been well publicized. Trumpeter Swans are not as easy to work with as Canada Geese. Trumpeters hatch later, take much longer to mature and are more independent minded. In December 1998, four cygnets followed an ultralight aircraft from Ontario to the Muskatatuk National Wildlife Refuge in Indiana. Please see the May 1999 issue of *Trumpetings* or visit TTSS' web site for more complete details on this experiment. We need to learn more about the following behaviour of trumpeters and, ultimately, we would like to develop a technique for inducing migration to traditional wintering grounds in the southern United States.

Acknowledgments

The Federation of Anglers and Hunters are sponsors of the Trumpeter Swan Restoration Program of Ontario.

Bev and Ray Kingdon fed and watched over the trumpeters wintering in the Burlington area of Lake Ontario with food supplied by David and Eleanor Wood of Wild Birds Unlimited. Food for the captive cygnets at Fair Lake was provided by the Corbit Seed Company. Ron Bauman and his family fed and watched over the birds. We are grateful to the Grand River Conservation Authority for the use of their pen facilities at Fair Lake.

Many people and organizations helped to fund the program. Welcome donations were received from Frank Smith of the Art and Fantasy Daycamp in Aurora, the Pickering Horticultural Society, the Aurora Garden and Horticultural Society, Pamela Green, Molly Henderson, Marsha Barnes, Harold Taylor, Kathleen Clausen, and the many anonymous gardeners who came to see the trumpeters of Aurora. The Lake Erie Steel Company again made a generous contribution through the help of Norman Jamison.

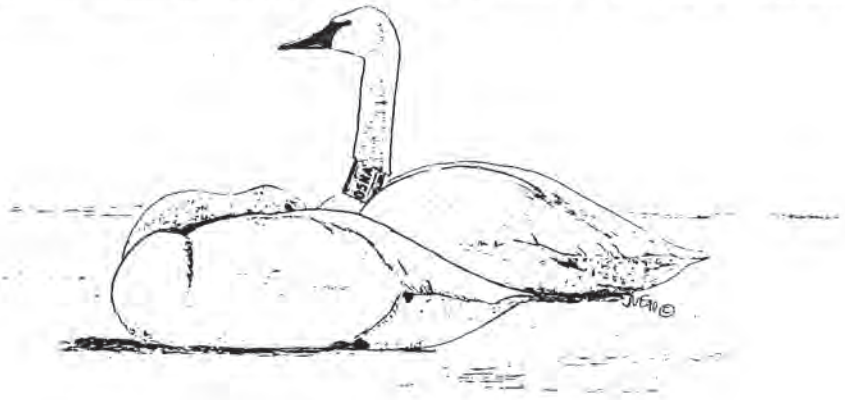
Bill Carrick made significant contributions both in funds as well as swans and help on every aspect of the program. Harry Hewick provided an ultralight machine and servicing facilities. Michelle Knegt has been most conscientious in carrying out daily inventories of the swans at Wye Marsh and in caring for them. The Aurora (north) IGA supplied lettuce all winter, keeping the Aurora swans in good condition.

Veterinary services have been supplied by Metro Toronto Zoo and the Wild Bird Clinic at the University of Guelph. We particularly thank Dr. Kay Mehren and Dr. Graham Crawshaw at the Zoo and Dr. Michael Taylor and Becky Atkinson at Guelph. Dr. Campbell and Dr. Brojer of the Canadian Cooperative Wildlife Health Centre carried out necropsies and provided

valuable diagnostic information. The North Simcoe Veterinary Service in Midland run by Dr. Joel Rumney treated sick swans. Without the skill of these veterinarians our losses would have been much higher.

We thank Dick Rogers of Arbrux Ltd. for his servicing of ice-away equipment and donation to Wye Marsh. We are most grateful to Mrs. Myrna Wagner of the Amherst Wildlife Foundation who accepted donations, kept accounts and paid bills for the program.

Above all, we thank the cooperators who look after the captive breeding stock. Without their conscientious care the program could not function.



Trumpeter Swan collar icing documented at Lacreek National Wildlife Refuge

Charles A. Pelizza

Mild temperatures in western South Dakota during the early winter of 1998-99 ended abruptly during the week of December 20. A radical drop in temperature precipitated a mortality and debilitating event for Trumpeter Swans at Lacreek National Wildlife Refuge (NWR) in Martin, South Dakota. Significant ice accumulation was noted on nine collared Trumpeter Swans, of which three were captured and released and two were collected as carcasses. Other local, state and federal offices that were experiencing similar climatic conditions were notified immediately of the potential for weather related swan mortality and were asked to report any additional mortality or debilitation. No further reports were received.

Until December 19, temperatures that had been well above freezing at Lacreek NWR plummeted to below zero along with strong northerly winds. Abundant open water before this rapid drop in temperature froze almost completely within a 24-hour period. Ten collared Trumpeter Swans were known to be in the vicinity of Lacreek during this time period. One bird, number S36, was seen on December 19 and December 21 with an ice-free collar. S36 was not seen on Dec. 20, but was assumed to have been ice-free. The remaining nine collared birds were reported to have collars with substantial ice buildup by evening on December 20. On December 21, staff from Lacreek NWR, Trumpeter Swan research technicians Amy Quick and Chris Nicolai, local ranchers and myself conducted a reconnaissance of the wetlands and fields in the vicinity of the refuge to look for swans unable to fly due to the ice accumulation was removed from these collars. The birds were weighed, measured. Blood samples were taken and the birds were then subsequently released. Two swans were collected as carcasses.

The ice build-up from each collar was also measured and weighed. The weights of the ice accumulation ranged from 0.80 kg. to 2.10 kg. (1.77 lb. to 4.64 lb.). The measurements of the ice accumulation were generally 8" x 8" x 4". Conversations with past Lacreek NWR employees indicated that a similar event occurred during the past 10 years. At that time, two birds were collected as carcasses and two additional birds were captured, deiced and released. Anecdotal information suggests that similar climatic conditions were present during this earlier event. A formal and more complete report is in draft form and will be published once laboratory, climate, and historic data are analyzed.

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Observations of Trumpeter Swans in Manitoba

Harold H. Burgess and Mary E. Bote

Since 1984, we have been recording significant observations of Trumpeter Swans (*Cygnus buccinator*) chronologically by states and provinces as we became aware of such. We hope that these listings might help planners, biologists, and managers restore and manage trumpeters.

Due to our lack of access to Manitoba references and to the distances involved, we had not attempted to list observations there. Recently, it became important to list the trumpeters of Saskatchewan and to publish, "Significant Observations of Trumpeter Swans in Saskatchewan" (Burgess 1997). In doing this paper, we became aware of a number of swan observations in Manitoba which are now presented in this paper.

Historically the first records of Trumpeter Swans, in what is now the Hudson Bay portion of Manitoba, were by James Isham in 1743-49. He wrote, "Swans we have great and small, a fine Noble Lofty bird swimming in the water.--seeing morning and Evening some Hundreds at a time in the water,--amongst the Islands, but are Very shy, their is no Killing them but as they fly by when setting in a stand. [T]hey are larger than the English swan [Mute Swan, *Cygnus olor*] and fatter, the old swans are but coarse food, the flesh turning black soon after Dres'd but a young swan is Reckon'd tollerable good Eating;...." (Rich and Johnson 1949: 127).

In his account, Isham recognizes two separate swan species. The greater being described later as the Trumpeter Swan and the lesser described as the Whistling Swan and even later as the Tundra Swan (*Cygnus columbianus*). Isham describes the trumpeter as bigger and fatter than the Mute Swan.

In his journal of his "Journey from Prince of Wales Fort in Hudson's Bay To The Northern Ocean, 1769-72" (Glover 1958), Samuel Hearne describes the swans of Hudson's Bay as two separate species, only differing in size. The smaller were more frequently seen near the seacoast and more frequently seen in pairs. "In the interior of the country the larger swan precedes every other species of water-fowl, and in some years arrive so early as the month of March, long before the ice of the rivers is broken up. At these times they always frequent the open waters of falls and rapids, where they are frequently shot by the Indians in considerable numbers. ... Mr. Lawson, who, as Mr. Pennant justly remarks, was no inaccurate observer, properly enough calls the larger species Trumpeters, and the lesser, Hoopers". In this quotation, Hearne refers to John Lawson, Surveyor General of North Carolina (Lawson 1714 in Banko 1960).

Thereafter, most of the explorers' references were merely to swans. The reader must interpret their identity based on the explorers' other ecological notes and the reader's knowledge of the differences in swan biology, ecology and behavior. Observers have noticed that the smaller species of northern swans (and geese) prefer the open seacoastal plains, but shun the wooded areas even during migrations. The smaller Tundra Swan breeds and molts on a narrow coastal fringe along Hudson Bay and north along the coastal bays and arctic seas.

Trumpeter Swans tolerate the woody areas and often nest on beaver ponds and open fresh water swamps and marshes. Once they start incubating, the adults are very wary and slip away from their nests as soon as a threatening intruder approaches. The pen hides the cygnets in undisturbed rank vegetated marshes or swamps, where she begins her molt and emerges in late summer when the cygnets begin to fly. This accounts for explorers seeing few trumpeter families in Canada in summer. Nonbreeding trumpeters sometimes fly far north of their normal breeding grounds to molt in undisturbed wetlands as described by Samuel Hearne and Dr. Harold Hanson for Barren Geese (*Branta canadensis maxima*) in Houston and Houston (1987).

In our opinion, the several swans taken by Samuel Hearne's party on July 5, 1774, on a small marshy lake, 13 days out and about 150 miles (240 km) from York Fort were nonbreeding trumpeters during their summer molt. Productive trumpeters would not have molted this early at North Latitude 56°. These swans were taken more than 100 miles inland from the Tundra Swan Hudson Bay breeding and molting range. On July 7, Hearne's party took several more molting swan, at least 20 miles farther inland. By July 9, 1774, they

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had traveled about 45 miles farther inland, crossing etc." By this time they had been canoeing and portaging their loads for 18 days and for about 220 miles (352 km) (Hearne and Turnor 1934).

David Thompson was engaged as a fur trader and surveyor by the Hudson's Bay Company from 1785 to 1797. He spent most of that time in present day Manitoba and Saskatchewan. Thompson described the Trumpeter Swans nesting in the "Musk Rat Country," an area of the Canadian Shield that extended from the Hudson Bay Lowlands to Lake Winnipeg, across north Manitoba and northeast Saskatchewan. It appears that where muskrats could find sufficient aquatic foods (*Equisetum*, *Carex*, *Potamogeton*) to survive year-around, scattered trumpeter families could find enough foods to rear their young during the summers. Thompson apparently saw few Tundra Swans in interior Canada, because he recorded his first taking of lesser swans on the Columbia River in 1809 (David Thompson in Tyrell 1916). The common dominant breeding trumpeters would prevent the subdominant Tundra Swans from nesting in the preferred trumpeter nesting areas at that time in history. Tomison's party caught a few swans between Cedar Lake and The Pas on July 30, 1798 (Johnson 1967). (Few probably means more than two.) They may have been a family of trumpeters. They likely were breeders since nonbreeding trumpeters would have been flying by July 30.

Alexander Henry saw a swan flock at his winter headquarters on Riviere Terre Blanche [White Mud River] near the Riding Mountains in southwest Manitoba, on March 13, 1800 (Coues 1897). These had to be trumpeters as it was too early for Tundra Swans which would normally arrive in Manitoba in late April or early May (Bent 1925). Henry saw a large flock of swans rise in alarm out of the Red River on September 9, 1800. This was in current North Dakota, about 40 miles (64 km) south of Manitoba. These must have been local Trumpeter Swan families staging on the Red River as it was too early for migrants despite Coues' note. Henry killed a "fat" swan while walking from his Park River Camp to Panbian [Pembina] River on October 11, 1800. "Fat" indicates large, probably a Trumpeter Swan. He killed another "fat" swan on October 16 on the Panbian River. Henry saw a swan on March 11, 1801, and six more on March 16, 1801, at Park River Camp (Coues 1897). These were probably trumpeters based on the early dates.

The type specimen was collected by the Second Franklin Expedition in Hudson's Bay Territory. It was described and named Trumpeter Swan (*Olor buccinator*) by John Richardson in Fauna Borealis-Americana, Part 2 "The Birds." "This was the most common swan in the fur country. Its [spring] migration generally preceded the geese a few days. The Trumpeter provided the bulk of the swans skins imported by the Hudson's Bay Company." (Richardson some lakes and "killing some swans, geese, (1832) in Houston and Street 1959). The swan skin and quill trade was enormous. H. M. Reeves reported nearly 8,000 swan skins shipped to Britain and listed for sale in 1834 (in Houston *et al.* 1997).

George Barnston reported that two swan eggs taken from a lake bank near Norway House were given to him 1851-58. This was in David Thompson's "Musk Rat Country", about 325 miles (520 km) from the nearest Tundra Swan nesting area.

Elliot Coues saw and heard swans on the Manitoba-North Dakota boundary in September and early October 1873. These were probably local trumpeter families on training and feeding flights, as it was too early for northern migrants (Coues 1881).

Both Trumpeter and Tundra Swans can now be found in Manitoba during the summer. But the historical and potential Trumpeter Swan recovery range in the temperate south Manitoba plains is quite different from the cold Tundra Swan summer range in the Hudson Bay Lowlands. Growing Degree Days is a cumulative measure of the duration and warmth of the growing season. Across the prairie this value drops from 1,775 degree days south of Winnipeg to 625 (degree days) near Hudson Bay (Simpson-Lewis *et al.* 1982).

The eastern fifth of south Manitoba overlies the rocky Canadian Shield. It has many clear lakes and streams and is not as vegetated as farther west, but it has fewer people to interact with Trumpeter Swans. Trumpeters have recovered in the adjacent Kenora, Ontario District, with somewhat similar conditions.

The Manitoba Lowlands in south central Manitoba have large rush-bordered lakes and rich marshes filled with aquatic food and rush-covered islands. This is ideal summer habitat for trumpeters, but unfortunately for them, there are more people who have altered the landscape which adversely affects waterfowl.

The higher Saskatchewan Plains in southwest Manitoba were the historical area of abundant beaver ponds and lodges where trumpeters nested (David Thompson in Tyrell 1916). Trumpeters have recovered in the adjacent Saskatchewan Porcupine Hills. They should recover similarly in Manitoba with adequate protection.

The breeding range of the Tundra Swan in Manitoba is restricted to a narrow fringe along Hudson Bay in the Hudson Bay Lowlands. This area is cold most of the year with a short growing season, but sufficiently long for the rapid-growing Tundra Swan cygnets to attain flight. The Hudson Bay Lowlands have a thin layer of viable soil over permafrost or rock. Low-growing plants with a few stunted trees cover the ground. Any trumpeters in this area are probably molting or migrating through.

We believe that most of the swans reported in the interior in the 1700s and early 1800s were Trumpeter Swans based on the observations of Hearne,

Thompson, Richardson and others' observations. It is likely that most of the swans observed summering in southwest Manitoba were trumpeters probably originating from releases by the Delta Waterfowl Research Station. There may be some co-mingling with trumpeters from the High Plains Flock on the Saskatchewan Border. The trumpeters recently observed in southeast Manitoba probably originated from Trumpeter Swans recently restored in the Great Lake States.

In some cases we referred to trumpeters in nearby provinces and states that may use Manitoba habitats. A chronological annotated listing of observations follows.

1743-1749	Both Trumpeter and Tundra Swans were common around Hudson's Bay (James Isham in Rich and Johnson 1949:127).
1774 July 5 - 9	Samuel Hearne's canoe party took several molting swans 13 to 18 days, 150 to 220 miles, journey inland from Fort York (Hearne and Turnor 1934).
1785-1797	David Thompson described the Trumpeter Swan nest and eggs in the "Musk Rat Country" (Thompson in Tyrell 1916).
1798 30 July	Tomison's party caught a few swans between Cedar Lake and The Pas.
1800 13 March	Alexander Henry saw a flocks of swans near his winter camp on Riviere Terre Blanche [White Mud River] near Riding Mountains in southwest Manitoba (Coues 1874).
1800 9 September	Henry saw a large flock of swans arise in alarm from the Red River near his camp on the Park River about 40 miles (64 km) south of the present Manitoba border (ibid.).
1800 11 October	Henry killed a fat swan, while walking from camp toward the Panbian River [Pembina?].
1800 16 October	Henry killed a fat swan at Panbian River (ibid.)
1801 11 March	Henry saw a swan from Park River Camp.
1801 16 March	Henry saw six swans flying north (ibid.).
1831	The type specimen was collected by the Second Franklin Expedition in Hudson Bay Territory. It was described and named Trumpeter Swan (*Olor buccinator*) by Sir John Richardson.
1874	Trumpeter Swans in North Dakota on Manitoba border in late September - early October (Coues 1874).
1884 4 May	Oak Point, Manitoba. [Trumpeter] Swans arrived (Small in Thompson 1891).
1886 April	The Trumpeter Swan "doubtless occurs as a migrant" (Seton 1886).
1886 6-10 May	"Swamp Island [first] 8 Trumpeter arrived, bulk arrived May 6, last seen May 10, 1886. Tolerable common this year" (Plunkett in Thompson 1891).
1887	A trumpeter specimen in the Government Museum, Banff, Alberta, Canada, collected in Manitoba 1887 (Dr. N. B. Sanson in Coale 1915 and Bent 1925).
1891	"Transient Visitors; rare (at Winnipeg, Wm. Hine). Rare migrant; observed in late September - early October (near North Dakota boundary) said to breed in Minnesota" (Coues in Thompson 1891). Trumpeters on the North Dakota boundary in late September - early October were probably local families on training flight.
1893 and 1894	Trumpeters breeding on Shoal Lake, Manitoba. (Frank Ward Sr. to Taverner 1919).
1904	A trumpeter weighing 32 pounds shot at Shoal Lake (Frank Ward Jr. to Taverner 1919).
1917 Spring	Two trumpeters observed at Shoal Lake (Taverner 1919).
1954	Three Grande Prairie, Alberta, trumpeters received at Delta Waterfowl Research Station (WRS) (The Trumpeter Swan Society (TTSS) *Newsletter* No. 9 January 1976).
1955	Nine Red Rock Lakes, Montana, trumpeters received at Delta, WRS, Delta, Manitoba (ibid.).
1959 2 May	Trumpeter Swan at West Shoal Lake Game Bird Sanctuary Mossop. (Chickadee Notes, Winnipeg Free Press 29 May 1959). The bird was seen at a distance and identified by voice.
1959 - 1974	Three Red Rock pairs produced 81 trumpeters at Delta WRS (TTSS *Newsletter* No. 9 1976).
Prior to 1972	Three trumpeters escaped and migrated at Delta WRS (ibid.).
1967 4 November	Distinctive calls of the trumpeters heard in flock of 50 swans on Alkaline Lake in Kidder County, North Dakota, by Cowardin and Bartonek [originally noted in 1968, Prairie Naturalist 1(1):15]. These birds were probably escapees from Delta WRS or from another Canadian remnant population.
1972 5 April	Six 10-month old trumpeters released in center of Delta Marsh (TTSS *Newsletter* No. 9).
1972 19 November	Five Delta cygnets migrated south (ibid.).
1973 Spring	Up to four cygnets may have returned to Delta Marsh. One returned to Station (ibid.).
1973 6 November	Four Delta cygnets migrated south (ibid.).
1974 April	Three confirmed trumpeters seen in Delta Marsh area (ibid.).
1975 Fall	Lacreek National Wildlife Refuge sent Delta WRS a replacement cob (ibid.).
1976 Summer	New Delta pair produced two cygnets (TTSS *Newsletter* No. 18).

1976 24 October	One cygnet and two adult trumpeters called and flew south over trumpeter research student Jim Leach (University of S. Dakota) in Lake Traverse on Minnesota – South Dakota border (TTSS *Newsletter* No. 11: 4-5:4-5). Perhaps these were from Delta WRS pioneers since Trumpeter Swans were not restored to western Minnesota until 1987.
1977 11 September	Hennepin Parks (Minnesota) sent a pen to Delta WRS (TTSS *Newsletter* No. 18).
1977 31 October-1 November	Two Trumpeter Swans heard and seen at Oak Lake by David Hatch (Manitoba Ornithology Record Committee (MORC) files).
1978 1 July-2 August	Trumpeter Swan on Delta Marsh. (R. Knapton, R. Koes, *et al.* MORC files.)
1981 25-27 May	Five Trumpeter Swans on Delta Marsh. (Roger Titman) American Birds 35(5):834. Gollop, B. 1981. The Spring Migration, Prairie Provinces Region.
1981 25 October	Two adult Trumpeter Swans and a cygnet flew by Winnipeg. Seen and heard by Rudolf Koes and family. (American Birds, Wedgwood, J. A. 1982. The Autumn Migration. Prairie Provinces Region.)
1981-1982	Probable trumpeters breeding on Swan Lake near Swan River, Manitoba. (Brian Hart, Minitonas, Manitoba, to R.D. Van Deusen 1982, pers. comm.).
1986 10 May-1 June	A subadult Trumpeter Swan on Oak Hammock Marsh Wildlife Management Area. Many observers. MORC Files.
1987 Spring	Five trumpeters staged in Porcupine Hills, Saskatchewan, near Manitoba border (Beaulieu 1992).
1987 July	Summering swans on Cul de Sac Lake, Manitoba, 53° 37' N; 101° 47' W and Murray Lake, Manitoba, 53° 42' N; 101° 47' W for past several years (Cam Leuken, pers. comm. 1987).
1987 Fall	Trumpeter Swan observed at Steel, North Dakota (Kulischtal in TTSS *Newsletter* (16)4, (1988). This bird may have been a migrant from a Manitoba remnant population.
1991 16 July	A Trumpeter Swan on Delta Marsh (R. Jones; R. Bazin 1995).
1992 6-7 July	A Trumpeter Swan photographed near Churchill, Manitoba, by R. Koes (American Birds. December 1992).
1992 Summer	Twelve adults, seven cygnets in Saskatchewan Porcupine Provincial Forest near Manitoba border. (Rhys Beaulieu in TTSS *Newsletter* (21)2.
1993 3 May	A Trumpeter Swan in a sand quarry near Steinbach. It died in late May. (Vic Reimer *et al.* in R. F. Koes and P. Taylor. 1993. The Spring Season. Prairie Region. American Birds 47(3):423).
1993 10 June	A Trumpeter Swan on Oak Hammock Marsh Wildlife Management Area observed by Robert Parsons et al. (R. F. Koes and P. Taylor 1993, The Summer Season Prairie Provinces Region. American Birds 47(5):1118).
1993 23 August	Fifteen adult, five cygnets in Saskatchewan Porcupine Provincial Forest near Manitoba (Rhys Beaulieu in TTSS *Newsletter* (23)1 (Winter 1994)).
1993 Summer	Two adult; three cygnet trumpeters at Oak Lake, West of Kenora, Ontario; about 20 miles east of Manitoba. (Lumsden in TTSS *Newsletter* 24(1)).
1994 30 August	Two adults; three cygnet trumpeters at Kenora, Ontario. One had orange wingtag #125 (banded by Minnesota DNR, ibid.).
1994 Summer	Twenty-one adults; 11 cygnets in East Central Saskatchewan near Manitoba border. (D. Duncan in *Trumpetings* 4(3)).
1995 Summer	Twenty-one adults and five cygnets in East Central Saskatchewan near Manitoba border. (Gerald Beyersbergen in *Trumpetings* 5(4)).
1995 Summer	Two adult; five cygnet trumpeters in Kenora District, Ontario. (Lumsden in *Trumpetings* 5(3)).
1995 1 August	Subadult trumpeter in Lake Francis Wildlife Management Area (Ric Nash 1995).
1996 29 May	A Trumpeter Swan near Giroux, Manitoba.(Dennis Fast, MORC Files).
1996 Summer	Swan family near Grandview, MB (Dan Soprovich 1996).
1996 Summer	Trumpeter Swan family on pond, middle of Indian Reserve #63 (Tootinaowaziibeen Anishinabe Reserve, 51° 15' N; 101° 00' W [Ilene Lynxleg to Robert Jones, pers. comm. 1996]). Although the evidence was good that these were Trumpeter Swans, the Manitoba Game Branch was unable to confirm that they were trumpeters.
1997 June	Trumpeter pair and a cygnet on nesting lake, Kenora District, Ontario.
1997 Summer	18 Trumpeter Swans on Silver Lake, Kenora District, Ontario.
1997 27 July	Trumpeter pair and 5 cygnets on different nesting lake, Kenora Dist., Ontario. (Lumsden in *North American Swans 26(2)*).
1998 10 May -7 June	Two Trumpeter Swans on Pinawa Channel. Peter Taylor and Manitoba Naturalists Society. (Well seen and heard. Robert Jones, pers. comm.).

1998 20 May - 1 June	Three subadult Trumpeter Swans, Band #619-3145, 452, and 453. Banded and released at Kellogg Bird Sanctuary, Hickory Corners, Michigan by W. C. Johnson as cygnets in 1997, observed on Echo Bay, Lake Manitoba near St. Laurent by A. Hebel (Robert Jones, pers. comm.).

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History and status of the Trumpeter Swan in the Nebraska Sand Hills

J.E. Ducey

Wetlands in the Sand Hills of north central Nebraska and extreme south central South Dakota provide the primary habitat for the High Plains subpopulation of Trumpeter Swans (*Cygnus buccinator).* This biotic region of grass-covered dunes with its mosaic of wetlands provides an undisturbed setting and many suitable places for breeding swans. This magnificent swan is known from this region from the lore of Native Americans and in written history since the first explorations and as men drove cattle into the grass-covered hills to establish ranches.

Historic Nebraska records

For early explorers and naturalists, Trumpeter Swans were also known as the American white swan and were native residents of the region. The first record for breeding birds in the Central Plains was along the Middle Missouri River, where cygnets were seen on 6 July 1804 by the Lewis and Clark Expedition in what became Holt County, in the northwest part of Missouri (Burgess 1980). Most of the remaining records in Nebraska for the next 75 years were for migratory birds (Swenk 1937). South of the Sand Hills, a few swans were seen on 27 March 1813 along the North Platte River, eastern Garden County or western Keith County; and, three swans were killed later the same day at Cedar Point near the present site of Keystone, also in Keith County. Down river, on the central Platte, on 5 April 1813, members of the Stuart Party killed two swans, one south of Elm Creek, Buffalo County, and the other west of Newark, Kearney County (Swenk 1937).

The Missouri River, a travel-route for many early explorers, has several records for the mid-1800s. They were noted flying up the Missouri River on 9 February 1820, locality uncertain (James 1972:120). Two prominent naturalists of the Missouri River each had a record. On 12 May 1834, Prince Maximilian made a note that there were swans along the Missouri River, in central Washington County (Orr and Porter 1983). John James Audubon's date of record was 3 October 1840 along the Missouri River near the Little Sioux River, Burt County (Audubon 1960). Migratory birds were seen at certain seasons of the year in large flocks throughout the Northwest (Hayden 1863), who traveled through the Sand Hills on the Warren Expedition in the 1850s. Swans present in the central Plains wintered south from Iowa and the Dakota Territory where they were known to breed (Coues 1874). Migratory swans were noted in the Dakota Territory " late in September and during the first half of October migrating southward with great numbers of Canada Geese (*Branta canadensis*), Snow Geese (*Chen caerulescens*) and various wild ducks," (Coues 1874:544).

Other historic site records for Trumpeter Swans in Nebraska include the Platte River, Cherry County, Grant County and Omaha where it was a "rare migrant" (Bruner 1896). The "rare" swans were migratory, arriving in April and leaving in October.

Historic records from the Sand Hills

There are few records from early history for this region due to its remoteness and general lack of settlement. The large swan with its distinctive call would have been readily known by Indians who probably hunted these birds. Tribal members may have simply known them as swans without any specific identifier. For the Omaha Tribe, the swan was known as Mi'xaco^{n}, or the white goose that was present in the Omaha Tribal area, centered in Thurston County on the Missouri River and westward during hunting trips (Fletcher and La Flesche 1972). The Pawnee occupied the eastern Sand Hills and hunted westward in the region. There is an indication that "swan's down" was used in making ceremonial clothing (Dunbar 1880). Swans, however, are a prominent character in the mythology of these tribes, as well as the Sioux nation.

The first official documented record of the Trumpeter Swan in the Sand Hills was in the southwest portion of the region during a United States Army

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expedition in 1873. Dr. Maghee, the physician, wrote on June 22: "Arrived and camped at Upton Lake a large deep lake edged by tool and specked with 40 or 60 islands containing Swan ducks & [and ample] Mosquitoes. We all fired a volley at the swan 300 yds." (Maghee 1929). This lake was in the northeast corner of the current Grant County, possibly the historic Foley and Center Lake, or in that vicinity. Phipps Lake has some current records of swans and is in the same area.

His notes, transcribed here as written in his journal, have additional information on swans at a second lake in southwest Cherry County:

> June 24th. My goodness what a terrible storm is now in progress. Lake R is lashed into a white capped fury. Peal on peal of thunder now hoarsely growling in the distance now startling deafening appalling, it shakes the earth. While the forked lightning rends the skies lights them with a lurid glare or in one terrific sheet of flame threatens to sweep the heavens away. Now it luls, all is quiet as the chamber of death. The storm breaks upon us with renewed fury. Rain in torrents. The Wind is a perfect tornado. Every moment we look for the tents to go though doubly secured with lariats. Hail replaces the rain. With Superhuman efforts alone is the stock prevented from stampeeding. The storm as do all storms passes away growling muttering in spent wrath. See the wild swan cruising about trying to reorganize their homes. (Maghee 1929).

The reference to "homes" probably indicates that the swans were nesting, making this possibly the first record of breeding in the region. The expedition map shows a Raymond Lake on this date, west of the headwaters of the North Loup River. The Doctor's narrative does not include any further mention of swans, even though the exploration party went through the lake district south of Valentine, with Red Deer and Marsh Lake also indicated on the map published with the journal.

In 1877, two pairs of nesting "American Swans", a group of young and adults were seen at a lake near the headwaters of the Dismal River, probably in southwest Hooker County (Grinnell 1877). George Bird Grinnell wrote:

> I learned that two pairs of swans (*Cygnus Americanus*) bred on its shores during the past summer. Of this fact there can be no doubt, as both the old and young were seen daily for more than a month.

This sighting was made by a party of cattlemen looking for a site to establish a ranch, which came to be known as the Cody-North Ranch, with one ranch headquarters at historic Cody Lake (now called Jefford Lake), in extreme southwest Hooker County. This was among the first settlements in the Sand Hills into what had been a remote, wild country for many decades. Indian access was limited and they were excluded from their historic hunting grounds. Luther North wrote extensively about swans seen at the Cody Lake near the ranch house, and provided the first detailed documentation of young in the region:

> One of our ranch houses was on the shore of a small lake west of the head of the South Dismal River. The lake was about a quarter mile in diameter, and at the upper end was a thick growth of canes or cattails. There were many muskrats in the lake, and they built their houses of these cattails. Some of them there three or four feet above the water, and the spring after we built our house there, a pair of trumpeter swans nested on top of one of the muskrat houses.
>
> The nest was in a bayou, and on three sides was surrounded by the canes, with a narrow opening to the lake on the east. It was out of sight from the shore, but we had a skiff and by roaring out to the middle of the lake we could see the female swan on the nest. After she had been sitting for a Week or so, I took some pieces of bread, and rowing to where I could see her, put the bread on the water and left it. The wind was in the east and it soon drifted up near the nest, and the mother bird came down from her nest and got it. I had rowed out of sight but was watching her.
>
> I took out food of some kind every day, and left it for her, and in a week or ten days as soon as I came in sight she would come down off her nest and swim out to meet me. She hatched two of the four eggs that were in the nest, and she and the young ones got so tame they would follow me all around the lake every time I went in the boat, and would come so close I could touch them with the oars. The male bird never came quite so close, but would come within twenty feet of the boat.
>
> In the fall when the young ones were almost big enough to fly, we were away from the ranch for a few days on the beef roundup, leaving one man at the ranch, and while we were gone a cowboy from the ranch of the Rankin Cattle Co. on the Middle Loup came to the ranch. He told our man that if they caught the young swan and took the end joint off their wing, so they couldn't fly, we could keep them all winter. They did that, and, of course, the young ones could not fly. The old mother bird tried to teach them and stayed on the lake long after the other wild fowl had gone south.
>
> Then one evening, ashen it was snowing and blowing, we heard her after dark flying over the house on her way south. The next morning the young ones were gone. A few days after one of the men found where they had been torn to pieces by the coyotes about three miles south of the ranch. They had started to walk south and the coyotes had caught them.

> Now comes the strangest part of the story. In December when the lake was frozen over solid, except a hole about twenty feet in diameter where there was a spring, the mother sultan came back and stayed three days looking for her young. She would fly around and around the lake through the day, calling for them, and at night would come to the open crater to sleep I fed her every day. On the third day it turned cold and she flew away. The same pair came back the next spring and stayed for two or three weeks. They inspected their old nest on the muskrat house, and came to me to be fed but after a while they flew away to the north and that was the last I ever saw of them. (North 1961)

One of the last historic records from the Sand Hills provides an interesting view of how birds were being hunted in the spring. Two hunters from the Hyannis area, Grant County, shot a swan in mid-March of 1898, then took it into town for display:

> Harlie Mason and E.M. Sibbitt were duck hunting, from Saturday till Tuesday. As to the number of ducks they secured we cannot say, but we do know they captured a swan which measured 7 feet from tip to tip, and 4 feet in length. Its skinned carcass hangs on the lamp post in front of the Sibbitt restaurant as evidence of the truth of this statement. (Grant County Tribune 9(52): 1)

A Cherry County record from the turn-of-the-century is a second site record that also helps extend the known historic range. Prior to 1900, swans used to breed on Watt's Lake in the lake district of east central Cherry County, when the ranches were new and few (Bates 1899). It was "probably once a breeder about many of the lakes of the sand-hill region," (Bruner 1904). There is a record of a swan from the spring of 1900 on the Niobrara River near Gordon:

> Fad Haywood killed a fine specimen of white swan on the river last Monday. He is having it mounted by a local taxidermist. (April 13, 1900, Gordon Journal 11(49): 3).

The last known historic site record for the Sand Hills was of one bird killed 7 November 1929 at Swan Lake, Holt County (Nebraska Ornithologists' Union Letters of Information 45:2). There are no more known records for Trumpeter Swans in the region for nearly 30 years.

The next records are about 3 decades later, when on 26 October 1956, two young swans were killed in Cherry County. One cygnet was killed at Schoolhouse Lake north of Doughboy, and the other nearby at Shoup [Shaup] Lake (Banko 1960, pp. 36-37). These two birds had been banded in Alberta, Canada, and were among a family that visited Nebraska, of which three were killed and two were injured and later captured (Banko 1960).

Restoration efforts

Birds from Red Rocks Lake National Wildlife Refuge (NWR) in Montana were the source of birds restored at Lacreek National Wildlife Refuge (NWR) at the northwest edge of the Sand Hills. The Lacreek NWR flock was started in 1960 (Monnie 1966). The first wild birds nested in 1963 when nine cygnets were hatched in two nests.

The first recent record of a Trumpeter Swan in the Nebraska region of the Sand Hills was one at Goodrich Lake, 5 miles east of Eli on April 19, 1965 (Nebraska Game and Parks wildlife report card). The first pair of swans seen in the region was at Valentine NWR, on the Marsh Lakes in May 1966 (Peabody 1973; 1977 Robert Ellis, pers. comm.). Other records are:

- Schoolhouse Lake, Heath Valley Quadrangle, 20 miles southwest of Nenzel on 19 November 1966 (ZM 11760, State Museum, University of Nebraska-Lincoln);
- Ballards Marsh WMA, 21 miles southwest of Valentine, on 30 March 1967 (Nebraska Bird Review 36:67);
- Valentine NWR. In the summer of 1967, 11 Trumpeter Swans spent the summer and underwent molt (Peabody 1973; 1977 Robert Ellis, pers. comm.); and
- Lake George, 21 miles southwest of Bassett, on 14 November 1967 (Nebraska Game and Parks wildlife report card).

In 1968, the first successful nesting for swans pioneering into the Sand Hills was at Hoover Lake, about 40 miles southwest of Lacreek NWR, near Gordon in Sheridan County (Peabody 1973). A pair raised two cygnets. One cygnet was raised here in 1969. By 1971, additional pairs had moved to nearby South Twin Lake and Alkali Lake near Irwin. There was successful nesting at both of these lakes in 1972.
The first successful nesting attempts at Valentine NWR, which is about 90 miles from Lacreek NWR, was in 1969 (The Trumpeter Swan Society (TTSS) *Newsletter* No. 2:2, July 1969). A pair with two cygnets was seen on 19 June on Lake 21. A pair nested and raised four cygnets at Lake 21 in 1970 (TTSS *Newsletter* No. 4:4, October 1970). But, in 1971, that pair nested unsuccessfully (Peabody 1973). Birds nested on this refuge again in 1973. Two pairs nested on Valentine NWR in 1975 and 1976 with four cygnets raised in 1976 (R. E. Ellis, pers. comm. 1977). In 1970, during a wetlands reconnaissance, a pair of Trumpeter Swans was observed nesting in Adamson Meadow, just west of the southwest entrance to McKelvie Forest (Hietikko 1970).

In 1973, trumpeters nested in extreme northern Cherry County (Clubhouse Lake area), southwest Cherry County and very northeast Sheridan County (Alkali Lake and Hoover Lake area) and in the sandhills of southeast Bennett County, South Dakota (unpublished U.S. Fish and Wildlife Service map). An aerial survey recorded 28 adult and nine cygnet Trumpeter Swans on the Nebraska Sandhills border on 20 June 1974.

Trumpeter Swans were reintroduced at Crescent Lake NWR in September 1974 when three cygnets were transferred from Lacreek NWR (1977: R.L. Perry, pers. comm.). Two additional female cygnets were transferred from Hennepin Parks, Minnesota, in February 1975. Three more cygnets were transferred from Lacreek NWR in 1975. Two died. These birds, plus five other from Red Rock Lakes NWR, Montana, were released to the wild in the summer of 1977 to provide the start for a breeding population.

Summer surveys continued to show the success of nesting trumpeters. In a 1981 aerial survey, 13 pairs and 33 cygnets were found in Cherry County. Three additional pairs with six cygnets were reported at Valentine NWR, east of Highway 83. From these initial nesting efforts, the swans extended their range in the Sand Hills. Wintering areas, besides the main flock at Lacreek NWR, included Merritt Reservoir. The Trumpeter Swan can currently be found in many of the counties of the region.

Habitat

The primary habitat needs of Trumpeter Swans are areas of shallow water (1 to 2.5 feet) for production of emergent vegetation, and areas where birds can feed on the bottom (Robinson 1975). Open water is essential for birds to attain flight and for landing. Once the open water minimum is provided, the greater the percentage of marsh vegetation, the better the habitat for breeding swans (Robinson 1975).

In the early 1980s, Trumpeter Swans were recorded at lakes in Garden, Sheridan, Cherry and Brown counties. The lakes where these swans were observed ranged in size from 12 hectare to 253 hectare. The average size was 72 hectares. All of the lakes had greater than 56 percent open water with the water slightly alkaline at a majority of the lakes where Trumpeter Swans were noted (Ducey 1984). The extent of vegetative cover can vary. At Threemile Lake in Arthur County and Whitewater Lake in McPherson County, they are mostly cattail wetlands. At Sand Beach Lake, where five young were raised in 1989, there is a lesser amount of marsh vegetation and open water is predominant. Birds in the eastern Sand Hills of Rock County were at a wetland that was predominantly marsh vegetation (Blake 1990). The isolated and hill-sheltered conditions of the lakes with rich aquatic habitat are given as the basic reasons for Trumpeter Swans finding a haven in the Sand Hills (Burgess 1998).

Records of occurrence

There are many references with information on the occurrence of the Trumpeter Swan in Nebraska, and specifically in the Sand Hills. Documentation includes records from historic journals, notes in ornithological literature, National Wildlife Refuge records such as Crescent Lake NWR's biweekly bird count and, more recently, special interest species form; Valentine NWR annual breeding pair counts and the annual Lacreek NWR Trumpeter Swan Survey, Nebraska Game and Parks wildlife report cards, and unpublished field notes.

Most of the records of swan occurrence in the Sand Hills have been entered into a computer database that provides a means for analyzing records of the species. Each record provides the location, date, reference and other notes that pertain to the birds seen. Each record is attributed to a specific locality to ensure that a precise geographic location is designated. This method of record keeping also has an influence on the site-specific usefulness of records from the aerial surveys of breeding and wintering swans. During these counts, sightings may not be attributed to a specific location as defined in the database. It would be useful to designate specific sites. For example, during the 1998 winter survey, the swans seen on the Snake River west of Merritt, could have a site designation of Snake River, McKelvie Sector as has been suggested (Harold H. Burgess, pers. comm.).

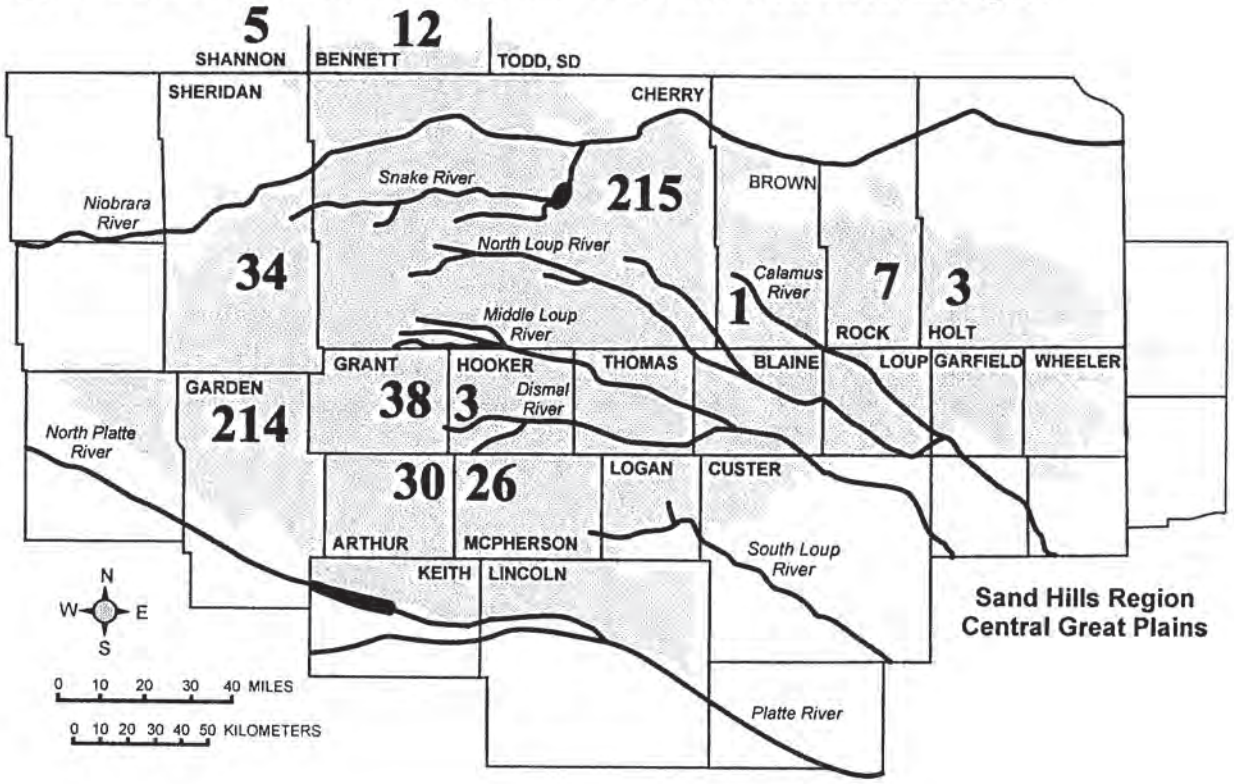
Swan status

Trumpeter Swans are present throughout the entire year in the Sand Hills, with records from dates of 3 January to 28 December and nearly every week of the year. This species is a locally uncommon summer resident and occasional winter resident based on an analysis of the nearly 600 records available in the Database of the Sandhills. Trumpeter Swans occur predominantly in the western two-thirds of the Sand Hills. Of the available records, all but 11 are from the eastern Cherry County line and westward (Figure 1).

Several lakes are notable for their many records of swans (Table 1). Some of the larger lakes in the eastern Sand Hills, especially in southwest Brown County in the Lakeland region and other lakes with suitable marsh habitat only occasionally have birds. An occurrence of a nesting pair and another fall record were unusual enough to elicit a special note in the Nebraska Bird Review (Blake 1990).

The locations with the higher number of counts are from the western lakes of the Sand Hills. Crescent Lake NWR has the greatest number of counts because of the many biweekly bird counts conducted in the latter 1970s and early 1980s. More recently, refuge

Figure 1. Number of Trumpeter Swan records in counties of the Sand Hills region.



personnel have kept records using special interest species forms that provide many lake-specific records.

Most of the available records (nearly 70%, more than 400 records) for the Trumpeter Swan are from April to the end of September. There are only a few winter records. In 1974, several sightings were made in northern Cherry County in early spring, (late February through mid-March) at the Horseshoe Drainage Ditch area in northwest Cherry County and on the lower Snake River. The next record of mid-winter occurrence was in late December 1977 at Valentine NWR. Other records of winter-season birds did not occur in the region until the early 1980s. Refuge records from Crescent Lake NWR 1980, 1983, 1987, 1990, 1993 to date are the only ones available from January-February. Most of the December records are also from Crescent Lake NWR, although other observations from scattered sites were made by independent field observers. There are some November records from the mid-1960s.

The period for the greatest number of birds counted is typically from the fall and winter surveys. Of the 23 counts shown (Table 2), only five are from the breeding period at Round Lake, Sand Beach Lake and Clubhouse Lake. Mud Lake at the west end of the North Loup River in central Cherry County is especially prominent for its use by swans throughout the year. Other sites with high counts of swans are Goose Lake and other lakes at Crescent Lake NWR.

The greatest number of Trumpeter Swans noted at a single location was recently documented at Mud Lake. In the early afternoon of 6 March 1998, during blizzard conditions with strong winds and blowing snow, 58 swans were counted. Multiple counts were made to ensure an accurate number. One bird had a green collar, but the codes were not readable from the viewing point. There was less than an acre of open water. The next highest count has been at Sandbeach Lake in northwest Garden County, Nebraska.

The highest group counts during winter surveys by region have been the North Loup River (Kraft 1998) and Snake River (Nebraska Game and Parks Commission). These surveys are now an important part of the record system for the swans. The counts for three or more birds comprise less than half of the nearly 600 records available in the database. The rest are for one to two birds. Many reports do not have information on the number of birds seen.

There are more than 160 records of nesting or breeding activity from about 85 sites. There are 16 lakes where three or more records of breeding or nesting activity have been documented (adult on nest, nesting, pair, cygnets). All are Nebraska except where noted:

- Alkali Lake, Irwin Quadrangle; 18 miles northeast of Gordon
- Clear Lake, South Dakota; 7 miles north, 6 miles west of Cody
- Cogill Lake; 18 miles southeast of Hyannis
- Deer Lake, Crescent Lake NWR
- Frye Lake, Hog Island Quadrangle; 15 miles northeast of Gordon
- Gimlet Lake, Crescent Lake NWR
- Hoover Lake; 16 miles northeast of Gordon
- Leander Marsh; 7 miles northeast of Irwin
- North Cody Lake; 6 miles north of Cody
- School Section Lake, Camp Valley Quadrangle; 15 miles northwest of Ashby
- South Twin Lake, Irwin Quadrangle; 2 miles northwest of Irwin
- Threemile Lake; 14 miles northeast of Arthur
- Turpin Lake; 32 miles north of Ashby
- Twentyone Lake, Valentine NWR
- Vaughn Lake; 26 miles north of Hyannis
- Winslow Lake; 3 miles northeast of Eli

Based on an analysis of more than 130 records of breeding activity (nesting, eggs, cygnets) on a specific date, the breeding/rearing season in the Sand Hills is from about 28 April to September 4. This is a period of about 129 days. The Trumpeter Swan is known to have a 100-day breeding period, from hatching of the eggs to fledging (Kraft 1960).

Some of the prominent lakes of the western Sand Hills apparently do not have the habitat suitable for migratory or breeding swans. There have been numerous summer surveys at Mother Lake, southwest Cherry County, and throughout the year at George Lake, Grant County, but trumpeters were not observed. There are not any records for Blue Lake, at Crescent Lake NWR, even though birds have been observed on Blue Creek. Other examples of lakes surveyed with no swans recorded are Ashburger Lake and Schoonover Lake in Garden County. These are large open water lakes, thus the swans may avoid them. At Swan Lake, south of Crescent Lake NWR there is only one record from November 1989, but many field observations have been made in this region by refuge staff.

Some lakes with suitable habitat in the eastern part of the region have not yet been used by nesting or migrating Trumpeter Swans. The Lakeland district of southwest Brown County has many lakes within a concentrated area that provide a great diversity of wetland habitat for waterfowl. There is a single record of two swans at AGA Marsh WMA in June 1979 (Nebraska Game and Parks Wildlife Report Card). There are few records for the lakes in Rock County where there are also many marshes and wetlands. Carson Lake is an example where there is an extensive amount of suitable habitat but there are no reports of swans from any of 25 surveys during 1990-95 (J.E. Ducey, unpublished records). At Swan Lake in southeast Holt County, one Trumpeter Swan was seen in November 1929 (Nebraska Ornithologists' Union *Letters of Information* 45:2).

Summary

The Trumpeter Swan is well established and flourishing in the Sand Hills. The swans use many different lakes and marshes throughout the region. As conditions have changed for the High Plains Sub-population, the birds have adapted to find suitable wintering habitat on the rivers and lakes with open water. Continued systematic surveys will help indicate future population trends. With the extensive number of lakes and wetlands, and the apparent site selection by Trumpeter Swans (consistently avoiding some lakes while consistently using others), it is important to have a better understanding of the habitat features that attract the birds.

Although there are many records for trumpeters in the region, the records have not been organized in a systematic manner to provide a central source for analyzing annual breeding results. A consistent method for naming the sites where birds are recorded would greatly improve the database. It is also important that surveys not be limited to the breeding and winter seasons, since observations from throughout the year would increase knowledge of seasonal patterns of swan behavior and habitat utilization. This information could provide important details that could help ensure the stability of this population of Trumpeter Swans.

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Editor's note: Rolf Kraft, Manager at Lacreek NWR, presented a current update of aerial surveys of the High Plains Flock at the 17th TTSS Conference, September 1999. His results will be published in the next *North American Swans.*

Table 1. Sites with ten or more counts.

Site Name	Count at Site Name
Gimlet Lake, Crescent Lake NWR	57
Goose Lake, Crescent Lake NWR	38
Deer Lake, Crescent Lake NWR	31
Twentyone Lake, Valentine NWR	20
Sand Beach Lake	16
Crane Lake, Crescent Lake NWR	13
Swan Lake, Triangle Ranch	11
Clubhouse Lake	11
Crescent Lake NWR	11
Leander Marsh	11
Mallard Arm, Crescent Lake NWR	10
Threemile Lake	10
Island Lake, Crescent Lake NWR	10

Table 2. Count records of ten or more Trumpeter Swans at a distinct site.

Site Name	Date	Number	Reference	Breeding
Mud Lake	03/06/1998	58	J.E. Ducey record	
Sand Beach Lake	10/26/1991	29	R.C. Rosche notes	
Blue Creek	02/11/1990	24	Crescent Lake NWR spec. interest species form	
Gimlet Lake, Crescent Lake NWR	12/07/1991	20	Crescent Lake NWR spec. interest species form	
Triangle Lake	10/23/1992	19	J.E. Ducey record	
Sand Beach Lake	10/12/1990	18	R.C. Rosche notes	
Blue Creek	01/03/1993	16	Crescent Lake NWR spec. interest species form	juvenile
Round Lake, Merriman NE Quadrangle	08/08/1980	15	Lacreek Trumpeter Swan Survey 1980	
Mud Lake	10/30/1997	15	J.E. Ducey record	
Clubhouse Lake	06/14/1989	15	J.E. Ducey record	
Roundup Lake, Crescent Lake NWR	12/28/1988	14	Crescent Lake NWR bird chronology form	
Doc Lake	03/07/1998	14	J.E. Ducey record	
Mud Lake	04/07/1997	14	J.E. Ducey record	
Crane Lake, Crescent Lake NWR	11/18/1989	13	Crescent Lake NWR spec. interest species form	
Sand Beach Lake	09/04/1991	13	Lacreek Trumpeter Swan Survey 1991	young
Swan Lake, Triangle Ranch	03/17/1990	12	R.C. Rosche notes	
Clubhouse Lake	08/04/1985	12	Lacreek Trumpeter Swan Survey 1985	young
Doc Lake	11/30/1996	12	J.E. Ducey record	
Mud Lake	06/16/1996	11	J.E. Ducey record	pair
Goose Lake, Crescent Lake NWR	12/07/1991	11	Crescent Lake NWR spec. interest species form	
SB Lake	10/25/1992	10	J.E. Ducey record	
Goose Lake, Crescent Lake NWR	11/07/1991	10	Crescent Lake NWR spec. interest species form	
Hill Meadow		10	NE Heritage Program	

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The Trumpeter Swan Society (TTSS) is a private, non-profit organization dedicated to assuring the vitality and welfare of wild Trumpeter Swan populations, and to restoring the species to as much of its former range as possible.

Since its founding in 1968, TTSS has provided the vision, knowledge and advocacy to move restoration efforts forward and improve management of Trumpeter Swans across North America. Our 480 members in the U. S. and Canada include interested private citizens and waterfowl propagators, plus most of the professional waterfowl biologists and managers who have guided Trumpeter restoration and management in recent decades. Most of our accomplishments result from the work of our members and Board of Directors in their professional roles and through their countless hours of volunteer effort.

The Society is run by a President, Vice President, Board of Directors and a part time Executive Director and administrative assistant. The Society headquarters is located at Hennepin Parks, Maple Plain, Minnesota. We publish *Trumpetings* four times per year and *North American Swans*, schedule determined by the Editorial Board. We are a nonprofit, tax exempt corporation under Section 501(c)(3) of the Internal Revenue Code. Contributions are tax deductible. TTSS's Web Page may be located at www.taiga.net/swans/index.html

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