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Peregrine Falcon Monitoring in Central Alberta, 2003



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Peregrine Falcon Monitoring in Central
Alberta, 2003

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EXECUTIVE SUMMARY

Previous to the 1950s, peregrine falcons (Falco peregrinus anatum) nested on cliffs along many Alberta rivers. Indiscriminate use of the pesticide DDT in the 1950s and 1960s caused a worldwide decline in populations and the near extirpation of peregrines in Alberta. As a result, peregrines were listed as endangered in Alberta and Canada in 1971. Intensive management and the ban on the use of DDT in many countries have facilitated the recovery of peregrine populations, including those in Alberta.

This document reports the results of summer monitoring of 12 peregrine falcon nest sites in central Alberta between 2000 and 2003. Of the 12 nest sites, seven were located on cliffs in the North Saskatchewan River valley, two on power generation stations, and one within the municipal limits of the city of Red Deer. All 12 sites were visited in 2003 to: i) determine nest site/territory occupancy, ii) quantify breeding success and productivity of nesting pairs, and iii) provide an opportunity to band young-of-the-year peregrine falcons.

Peregrine Falcons were observed at 10 of the 12 monitored sites in central Alberta, with nine breeding pairs producing clutches. Unoccupied territories were located at the Silent Springs and Rocky Mountain House sites. Seven successful pairs produced 19 fledged young while two pairs failed to produce any chicks of fledging age.

Data from annual monitoring showed that peregrine falcons in Central Alberta decreased from a high of 10 breeding pairs in 2000 to eight in 2002 and 2003. While the production of 19 young in 2003 is considerably lower than that in 2000 (33 young), it represents the third highest production of young in the last 13 years. Reproductive success, measured as the number of young per territorial pair, was 2.11 in 2003, which is higher than the overall longer-term average of 1.63 over the 1991 to 2002 period.

Declines in peregrine falcon populations in central Alberta in 2002 and 2003 compared to 2002 and 2001 is noteworthy and suggests that populations should be monitored annually to determine if these observations reflect variance within an increasing population trend or an early indication of a declining trend. Continued monitoring of key central Alberta sites can provide information to prevent a future decline.

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1.0 INTRODUCTION

1.1 General introduction

Peregrine falcons (*Falco peregrinus anatum*) have historically nested in numerous river basins throughout central Alberta, where suitable habitat was available (Court 1993a). Densities of peregrine falcons in Alberta and elsewhere have been well documented and declines throughout the 1950s and 1960s are broadly attributed to pesticide residues from DDT and DDE that interfere with reproduction (Peakall et al. 1990, Court 1993b). In 1971, peregrine falcons were officially listed as "endangered" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2000) due to this drastic population decline. By 1975, Alberta's peregrine falcons were reduced to a small population in the Canadian Shield region of Northeastern Alberta (Corrigan 2000).

1.2 Previous management

Efforts to halt the decline of peregrine falcons in Canada began in 1969 when Canada banned the use of pesticides containing DDT followed by the development of a captive breeding program to provide peregrines for release into the wild. Releases began in 1976, and in 1986 two reintroduced breeding pairs successfully fledged young (Murphy 1990). Pesticide levels in eggs declined substantially after the ban on the use of DDT and by 1992 pesticide contamination of eggs had fallen to levels below that which inhibits reproductive success (Court 1993b). The Southern Alberta Peregrine Falcon Reintroduction Project was initiated in 1992 and subsequently has resulted in the release of between thirty-nine and fifty captive-raised peregrines per year for five years (Stepnisky 1996).

1.3 Study rationale

Monitoring of continental peregrine falcon populations is an essential component of the peregrine falcon recovery plan and the overall efforts to conserve this species. Results from initial monitoring efforts in Alberta in 1970 identified three occupied territories; two located in central Alberta and a third in southern Alberta (Cade and Fyfe 1970).

Alberta currently supports a total of 48 peregrine falcons, including 23 in southern Alberta and the remaining birds in central Alberta (Corrigan 2000). This marked increase in peregrine numbers has resulted in the species being down-listed from “endangered” to “threatened” in Alberta (ESCC 2000). While populations of peregrine falcons have increased substantially since 1970, they are still considered “threatened” due to the possibility of a renewed decline. Regular monitoring is required to ensure population recovery continues, and to allow for swift action if declines are detected.

1.4 Study objectives

The objectives of this report are three fold:

1. Describe the results of peregrine falcon population monitoring in central Alberta in 2003. These data were used to quantify: i) nest site characteristics and ii) territorial occupancy.
2. Determine breeding success and productivity of nesting pairs. We also took advantage of monitoring efforts to band young-of-the-year peregrine falcons for future identification.
3. Integrate these data into historical records to describe longer-term trends (1991 to 2003) in numbers of: i) occupied territories, ii) breeding pairs and iii) total number of young fledged from sites in central Alberta.

2.0 STUDY AREA

2.1 Description

The study area consists of twelve nesting territories located along the Red Deer River, the North Saskatchewan River, and at three sites classified as urban or industrial in central Alberta. The sites are mainly located within the Aspen Parkland eco-region. To protect the nest locations and to maintain landowner privacy, exact locations of nesting sites are not included in this report. Site names and locations are maintained in the Biological Species Observation Database (BSOD) held by the Province of Alberta (Fish and Wildlife Division, Alberta Sustainable Resource Development).

2.2 General description of survey sites

Natural peregrine falcon nesting sites are generally located on steep banks and cliffs along river valleys that provide ledges or hollows large enough for egg laying, incubation and brood rearing. Sites are identified by the presence of whitewash where peregrine falcons perch. Urban and industrial sites typically have a high tower or building ledge sufficiently large enough to support nests.

3.0 MATERIALS AND METHODS

3.1 Site selection

All sites that were monitored had a recent history of use by peregrine falcons, had been surveyed and monitored since 2000 and had been occupied for at least two of three years prior to 2003. While surveys were not specifically designed to identify new nesting sites, new sites were recorded if they were encountered.

3.2 Monitoring

Nests and territories were initially checked for occupancy between April 29 and May 22, 2003. At this time, peregrines are courting and actively defending nesting territories; as a result, detection by trained observers is both effective and time efficient. If a known site (i.e., occupied since 2000) appeared to be unoccupied it was checked at least one more time to confirm that birds were not nesting at that location. Initial occupancy checks were conducted by approaching historical nesting areas on foot. Sites were initially observed from a distance that would not disturb territorial adults. If, after a suitable observation period (> 1 hour), no peregrines were observed, observers approached the nest site to confirm its occupancy status. At these close distances, peregrines will actively defend the site, which increases their visibility and, hence detection. Once the presence of peregrines had been confirmed at a site, observers monitored the locations from a distance to minimize disturbance. Terminology describing the occupancy and productivity of peregrines can be found in Table 1.

Table 1. Summary of survey and monitoring terminology and definitions. Modified from Murphy (1990).

Term	Definition
Occupied nest or territory	A nest site or territory that is occupied by at least one territorial adult during some part of the breeding season.
Breeding pair	A pair that has laid at least one egg during the breeding season.
Productive pair	A pair that successfully raised at least one chick to an advanced stage of development from which the chick was assumed to have fledged. Chicks that reached an age suitable for banding are considered to be of advanced age.
Historical nest site	Site that has been documented to have been occupied by breeding adults prior to the decline of the peregrine falcon population in southern Alberta, as identified by Court (1993a).
Known nest site	Site that has been documented to have been occupied by breeding adults in any prior year (includes historic sites plus new sites that have been occupied since the 1970's).

Occupied sites were monitored between three and six times during the breeding and fledging season (April through July) to determine nesting chronology and success. Observations of nests took place from several hundred metres away, using a 15 to 45× or 20 to 60× Bausch and Lomb Elite® spotting scope, to minimize disturbance to nests. Coloured identification bands on legs of peregrines were recorded opportunistically when conditions for clear viewing existed. Most viewpoints of nests did not allow the observer to see nest contents but nest chronology could be determined through observation of adult behaviour. Common indicators of nest chronology were incubating females, adults bringing food to the nest, or other activities indicating an active nest site.

If incubating females were disturbed from a nest by observation activity, observers moved back to a distance where the birds did not appear to be agitated. Nests thought to have failed were visited to determine the possible cause of nest failure. Addled eggs were collected to be sent for pesticide analysis or to determine reasons for hatch failure. Monitoring of occupied territories continued until July 14, 2003.

3.3 Banding

Attempts to band birds were completed only at sites where banding efforts did not endanger the safety of the birds or the banding crew. We specifically avoided banding of very young birds because it can increase the risk of premature flight and can result in the death of birds. Young-of-the-year peregrines were banded with a United States Fish and Wildlife (USFWS) aluminium band on the right leg (applied with pliers) and a black alphanumeric band on the left leg (applied with rivets). The orientation of symbols on alphanumeric bands was recorded (either horizontal [H] or vertical [V]) as well as whether there was a horizontal line separating the symbols. Banding was conducted under an Alberta Sustainable Resource Development collection licence (#285 CN) and research permit (#11252).

3.4 Data entry

Data from all occupied peregrine falcon nest sites, including breeding and identification information were entered into BSOD.

4.0 RESULTS

4.1 Site occupancy and productivity

Ten occupied territories were observed in the central Alberta study area during the 2003 breeding season. Breeding pairs were present at nine of the ten sites and the one occupied site that did not support a breeding pair was located at Morrin (Table 2). A single adult male was observed at this site on May 20 but no birds were observed during subsequent visits. Of the nine breeding pairs, seven were productive and successfully fledged 19 young in total. Average reproductive success in 2003 was 1.9 fledglings per occupied territory or 2.11 fledglings per breeding pair.

Table 2. Numbers of occupied territories, nesting success and productivity of peregrine falcons in the central Alberta in 2003.

Site name	Occupied	Breeding pair	Productive pair	Number of fledged young
Morrin	Yes	No	No	0
Tolman	Yes	Yes	No	0
Trenville Park	Yes	Yes	Yes	2
Ardley	Yes	Yes	Yes	3
Silent Springs	No	No	No	0
Twin Cliffs	Yes	Yes	Yes	3
Fred's Place	Yes	Yes	No	0
Telus Tower	Yes	Yes	Yes	2
Forestburg	Yes	Yes	Yes	2
Rocky Mountain House	No	No	No	0
Brazeau	Yes	Yes	Yes	3
Genesee	Yes	Yes	Yes	4
Total	10	9	7	19

4.2 Young-of-the-year

Five of the 19 successfully fledged young were banded (Table 3). Banding of two chicks at Trenville and three at Twin Cliffs took place on June 30. We attempted to band young at the Ardley site on June 30 but were unsuccessful due to the presence of an aggressive female peregrine at the site. However, we did remove sticks in the nesting box left from previous nesting attempts by ravens in order to increase the mobility of young inside the nest box. An addled egg was collected at Trenville and the nest at Fred's Place was checked for evidence of the cause of nest failure. Eggshell fragments were found at the latter site, but no clear indication of what caused the nest to fail was found. The failed nest at Tolman was inaccessible; as a result, the reason for its failure could not be determined.

Table 3. Summary of peregrine falcon young banded in the central Alberta study area in 2003.

Site name	Alpha-numeric band	USFWS band	Comments
Ardley	Unbanded	Unbanded	Young were not banded due to agitated female. Sticks were removed from nest box.
	Unbanded	Unbanded	
	Unbanded	Unbanded	
Trenville Park	B K/3 (HV)	816-34850	Male
	B 7/W (HV)	987-29813	Female
Twin Cliffs	B X/3 (HV)	816-16797	Male
	B Y/3 (HV)	816-34198	Male
	B 7/3 (HV)	987-29815	Female

4.3 Summary

Our comparisons of historical data showed that use of monitored sites by breeding pairs increased from one pair in 1991 to seven in 1998, and ranged from eight to ten between 1999 and 2003 (Figure 1). The apparent levelling off of the number of occupied sites in recent years suggests that the population may be approaching the local carrying capacity in central Alberta (Corrigan 2002). Site occupancy by a breeding pair in 2003 was the same or higher than all other years except 2000 (Table 4). However, the lack of pre-decline data makes it difficult to determine how many breeding pairs can be supported in the central Alberta study area (Corrigan 2002). Overall productivity in 2003 (19 chicks) was the third highest since 1991 and predictably, appears to follow the general trend in increasing numbers of breeding pairs (Figure 1). Nest occupancy and productivity in 2003 is comparable to 2001, when nine breeding pairs produced 20 chicks (Table 4).

For peregrine falcon populations to grow, it is estimated that the average number of young per territorial pair required is 2.0 (Court 1994). Between 1996 and 2002, only in the year 2000 did the peregrine falcon population have greater than 2.0 young per territorial pair. By continuing annual monitoring of the central Alberta study area, recommendations can be made regarding additional management activities that could increase the annual productivity threshold from < 2.0 young per territorial pair.

Monitoring through the breeding season also provides the opportunity to foster captive raised young into wild nests. Without continual monitoring through the breeding season suitable nest sites would not be identified and the option of fostering captive young would not be feasible.

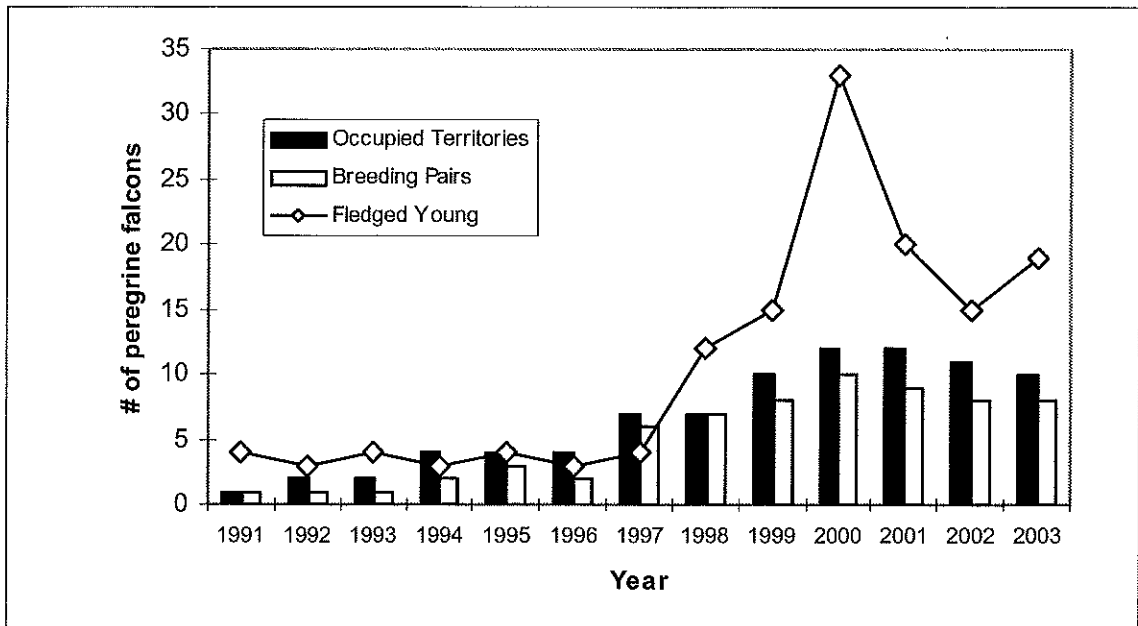


Figure 1. Number of occupied territories, breeding pairs and total number of young fledged from sites in central Alberta, 1991 to 2003.

While the official status of peregrine falcons has been lowered from “endangered” to “threatened”, the possibility of a significant population decline still exists. We strongly recommend that monitoring continue. The continued monitoring of the 12 sites in this study could provide a reliable and cost-effective understanding of peregrine falcon populations in central Alberta. We also suggest that provincial monitoring efforts continue to be completed at five-year intervals as a component of the National Peregrine Falcon Survey to identify new nesting territories and more accurate population estimates.

Table 4. Occupancy and productivity of peregrine falcons in the central Alberta study area, 1991 to 2003.

Reproductive measure	Year												
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Occupied sites/territories	1	2	2	3	3	3	7	7	10	12	12	11	10
Breeding pairs	1	1	1	2	3	2	6	7	8	10	9	8	9
Productive pairs	1	1	1	1	1	1	1	4	7	10	6	6	7
Total young	4	3	4	3	4	3	4	12	15	33	20	15	19
Young/territorial pair	4	1.5	2	0.75	1	0.75	0.57	1.71	1.5	2.75	1.67	1.36	1.9
Young/breeding pair	4	3	4	1.5	1.33	1.5	0.67	1.71	1.88	3.3	2.22	1.88	2.11

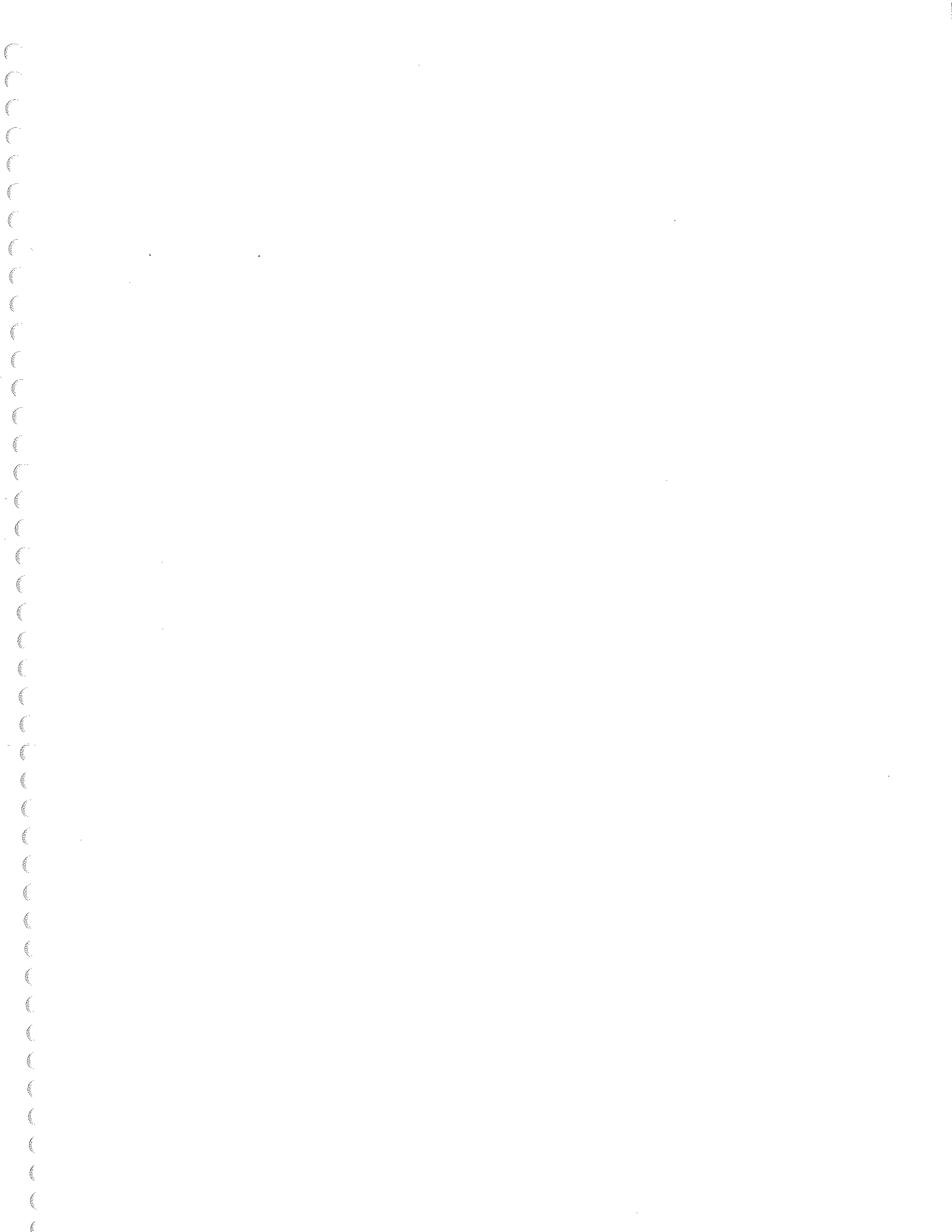
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