

PLATE C1  
 SEPT. 1988

THIRTES

FOURTH SOUTH

NEST #98  
CLUSTER

Proposed Project  
STICK NEST

Proposed Project

NEST #100

RIPARIAN  
HABITAT

Proposed Project

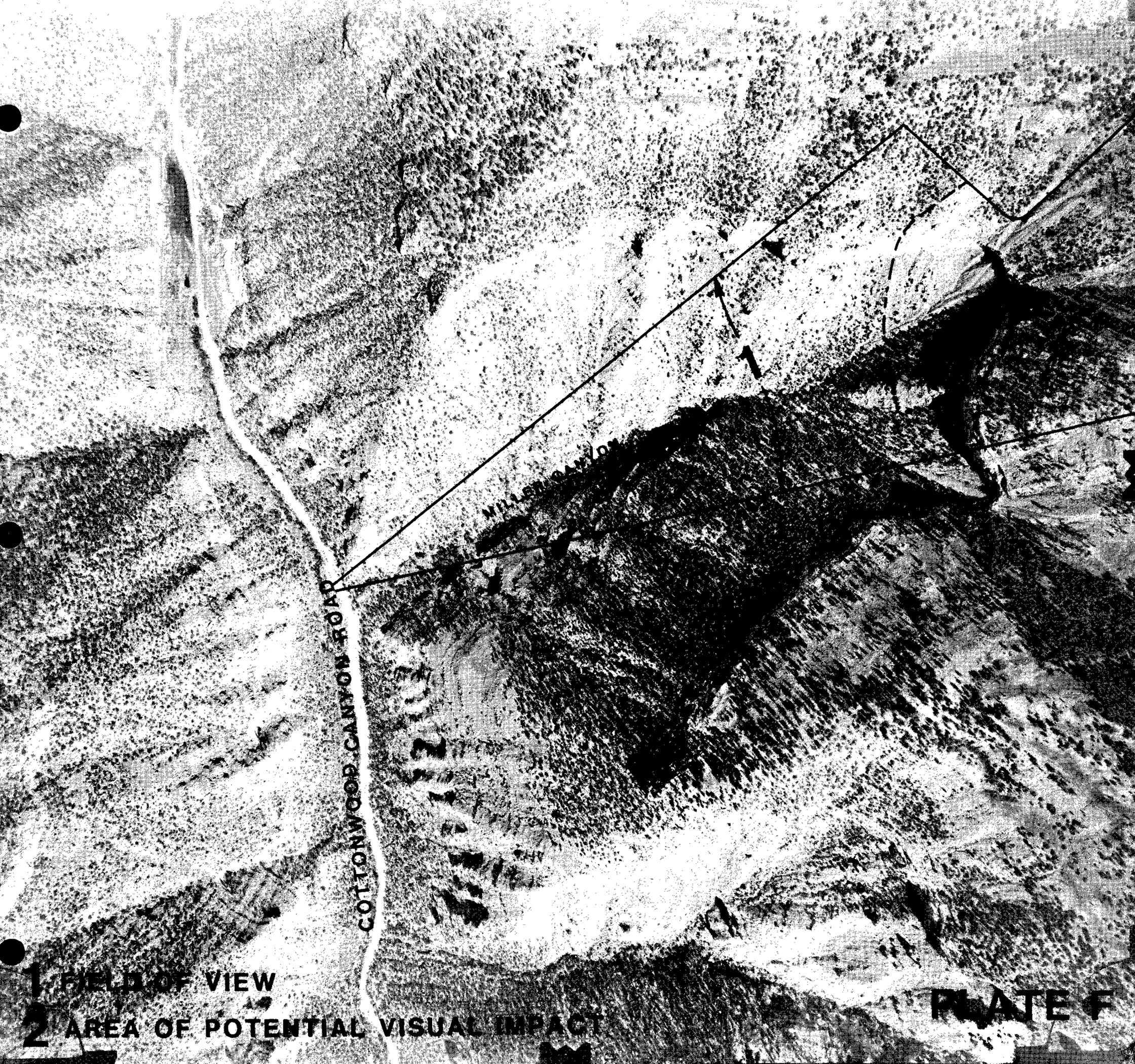
SARRE

PLATE D

HEOC POPULATION LIMITS - 1987

MILLER CANYON

LATE E



COTTONWOOD CANYON ROAD

MILLER CANYON

1. FIELD OF VIEW

2. AREA OF POTENTIAL VISUAL IMPACT

PLATE F

# MAPS

**APPENDIX A**  
**COTTONWOOD MINE**  
**Cliff Subsidence & Eagle Monitoring**  
**REPORT**  
**1986**

**COTTONWOOD MINE**  
**CLIFF SUBSIDENCE & EAGLE MONITORING**  
**REPORT**  
**1986**

**PREPARED FOR**  
**UTAH POWER & LIGHT COMPANY**  
**MINING DIVISION**

**BY**  
**VAL PAYNE**



DEPARTMENT OF THE INTERIOR  
U.S. FISH AND WILDLIFE SERVICE

Special Agent in Charge  
U. S. Fish & Wildlife Service  
P. O. Box 25486, DFC  
Denver, Colorado 80225

3-201  
(2/76)

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

UTAH POWER AND LIGHT COMPANY  
P.O. BOX 899  
SALT LAKE CITY UT 84110

2. AUTHORITY-STATUTES

16 USC 668(a)

REGULATIONS (Attached)

50 CFR part 13  
50 CFR 22.21

3. NUMBER

PRT-708354

4. RENEWABLE

YES  
 NO

5. MAY COPY

YES  
 NO

6. EFFECTIVE

5/28/86

7. EXPIRES

12/31/88

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)

CHRISTIAN E. SHINGLETON

9. TYPE OF PERMIT

EAGLE SCIENTIFIC COLLECTING

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

SECTION 27 & 28, T17S, R7E, SLM, UTAH.

11. CONDITIONS AND AUTHORIZATIONS:

- A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.
- B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.
- C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

and any other person(s) under the direct control of, employed by, or under contract to the permittee only to the extent necessary in accomplishing the purpose authorized below.

D. Permittee is authorized to remove any INACTIVE eagle nest(s) either through direct or indirect methods.

E. Permittee, and any other person(s), shall carry a copy of this permit whenever exercising its authority.

F. In the event an active eagle nest or other active bird of prey nest is discovered in the possible direct subsidence impact area, permittee shall contact Bob McCue or his representative (801) 524-5630 immediately.

G. In the event any active eagle or any active bird of prey nest and/or young, in the interests of their self preservation, must be removed, Utah Power and Light Co. will provide

ADDITIONAL CONDITIONS AND AUTHORIZATIONS ON REVERSE ALSO APPLY

12. REPORTING REQUIREMENTS

FIRST ANNUAL REPORT DUE 1/10/87  
ANNUALLY BY JANUARY 10 FOR PRECEDING CALENDAR YEAR ENDING  
DECEMBER 31 OUTLINED IN 50 CFR 13.45.

ISSUED BY

TITLE

SAC, TERRY L. GROSZ

DATE

6/ 3/86

ORIGINAL

those resources necessary to effect this removal. This removal shall be in concert with expertise supplied by the U.S. Fish and Wildlife Service and the amount of costs associated with this removal shall be borne by the company. The determination of reasonableness will be determined by C.E. Shingleton or his representative and Special Agent in Charge, Terry L. Grosz, or his representative.

H. Subsidence monitoring will be conducted as outlined in the monitoring plan supplied by Utah Power & Light Company.

I. Permittee shall maintain records as required in 50 CFR 13.46.

J. Annual reports are required under any professionally recognizable format by January 10, 1987.

Abstract: The effects of underground longwall coal mining on Golden Eagle (Aquila chrysaetos) cliff nesting sites was studied at the Utah Power & Light Company, Cottonwood Mine, in 1986. Cliff subsidence, cliff face spalling, and the nesting activities of the local Golden Eagle population were monitored. Subsidence and spalling occurred but an assessment of the impact on eagle nesting cannot be made until subsequent nesting seasons occur. Continued monitoring will further define the longwall mining/cliff subsidence/eagle nesting relationship.

Active Golden Eagle nests have been located by the Fish and Wildlife Service (FWS) within the boundaries of Utah Power & Light Company's (UP&L) coal mining properties (see Map #1). Several nest clusters are situated on vertical sandstone cliffs which overlie the longwall panels in the Cottonwood Mine (see Map #3).

As a requisite to longwall mining, a permit to "take" inactive eagle nest(s) was obtained from the U.S. Fish and Wildlife Service. The permit requires implementation of the subsidence monitoring plan, submitted to USFWS. This report summarizes the results of the monitoring program for 1986.

#### STUDY AREA

The study area is located in Newberry Canyon, on the eastern edge of the Wasatch Plateau, in northwestern Emery County, Utah. The area is characterized by vertical sandstone cliffs and tallus slopes.

The associated vegetation community is pinyon (Pinus edulis) - juniper (Juniperus osteosperma). The area overlies the Sixth and Seventh East longwall panels in the Cottonwood Mine.

Additionally, a baseline raptor nesting survey was conducted within a ten-mile radius area, centered at Newberry Canyon.

## METHODS

The size and distribution of the resident Golden Eagle population within the ten-mile radius area was determined by searching potential nesting habitats from the air using a Lama helicopter. Raptor biologists from U.S. Fish and Wildlife Services (USFWS) and Utah Division of Wildlife Resources (UDWR) conducted the nest survey, accompanied by a Utah Power & Light Company (UP&LCO) representatives. This survey was completed May 19, 20, and 21, 1986.

Subsidence monitoring was conducted using standard surveying practices to achieve approximately 1:20,000 accuracy. Lietz triple prisms were mounted on two-inch diameter steel pipes, four feet in length, with 6"x6"x $\frac{1}{2}$ " steel mounting plates welded on both ends of the pipes. Each prism unit was then anchored to the tops of the nest supporting cliffs with four (4) 7/16"x6" lag bolts and expansion shells. A permanent control station (Newberry Canyon Control-NCC) was installed from which all prism units are visible. Prism observations were made using a Zeiss RSM-3 Total Station and a Top-Con DM-C2 distance meter with a Wilde T-2 theodolite. Observations were made monthly beginning in September. However, the Zeiss instrument proved to be unreliable for distance measurement beyond 4,000 feet. Therefore, this unit was replaced with the Top-Con distance meter and Wilde theodolite.

Photo documentation of the cliff faces and nest sites was accomplished with Olympus OM-1N and Mamy/sekor 35 MM, SLR cameras and Olympus 1,000 MM and Vivitar 75-260 MM telephoto lenses.

Ground observations of eagle activity were made using a Bausch and Lomb 15-60X spotting scope. Beginning February 28, 1986, eagle pairs, in the vicinity of Newberry Canyon, were monitored each month to determine nest selection and the approximate location of their home ranges and nesting territories. Ground surveys, of active nests, were also conducted, following the aerial nest inventory, to attempt to verify fledging.

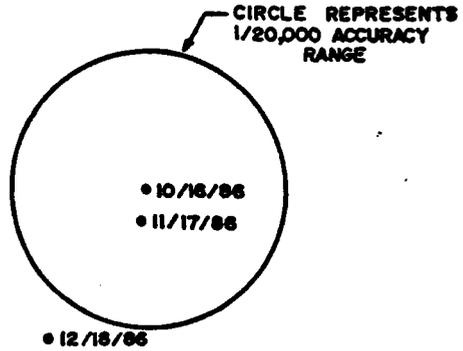
#### RESULTS AND DISCUSSION

The 1986 aerial survey indicated a change in the status of the local Golden Eagle population as determined by USFWS surveys in 1981 and 1982. Seven (7) nesting pairs, with six (6) young, were observed in 1986. Data for 1981 and 1982 indicated eleven (11) pairs with five (5) young and eight (8) pairs with seven (7) young (see Table 1). Fledging was verified by ground observations at three (3) of the 1986 active nests. No nests in Newberry Canyon were active in 1986. The only eagle activity observed was limited to over-flights and occasional perching in a Tree Perch, by the pair of eagles associated with nest 98 (see Maps 1 and 2).

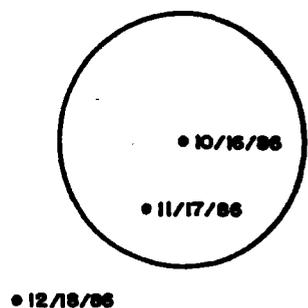
Baseline subsidence monitoring was begun in August and September using a Zeiss RSM-3 Total Station. However, the instrument proved to be unreliable for distance measurement beyond 4,000 feet. Angular and distance data were obtained for prism PR4; however, only angular data could be obtained for the remaining prisms. Therefore, a Top-Con DM-C2 distance meter and a Wilde T-2 theodolite were substituted. Data established using the Zeiss instrument was verified with the Top-Con and Wilde instruments on October 16, indicating that no movement in any prisms had occurred from September to October 16.

Subsequent monitoring indicated both horizontal and vertical movement in the monitoring prisms. Data indicates that the maximum total horizontal and vertical movement occurred at prism 3 (see Fig. 1 and 2). Limits of accuracy in measuring both horizontal and vertical movement are affected by a number of factors including, instrument accuracy, atmospheric conditions and operator ability. The surveying accuracy achieved is approximately 1/20,000. Only data which indicates movement beyond the established accuracy is interpreted as indicating actual movement. Photo documentation revealed an area of cliff spalling which corresponds to the movement measured at prism 3 (see photo 8). However, no nests have been affected by spalling to date. Position of the longwall face at the time of subsidence monitoring is indicated on Map 3.

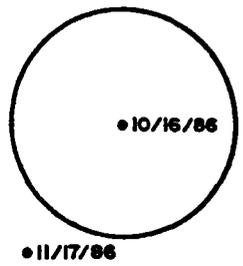
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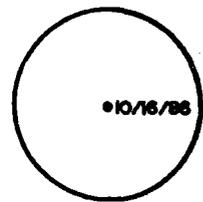
**PRISM 2**



**PRISM 3**



**PRISM 4**



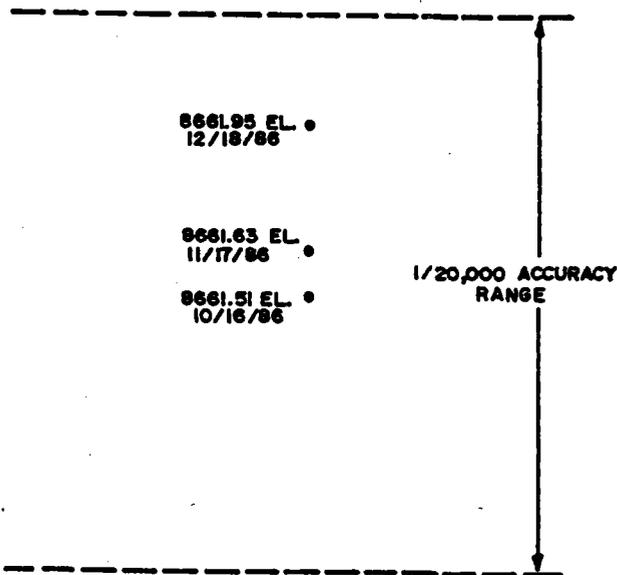
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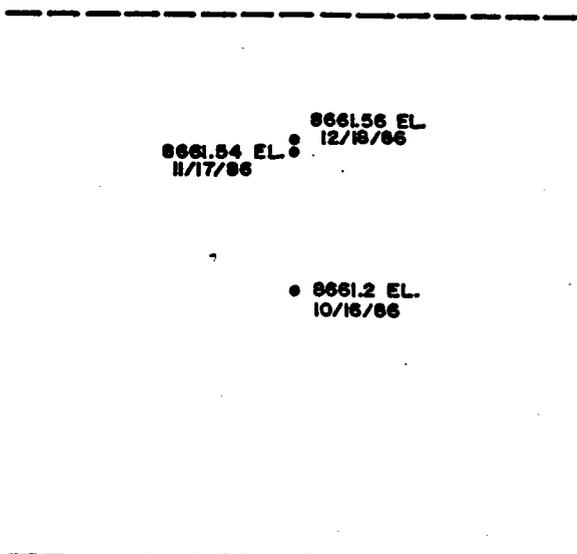


<b>COTTONWOOD COAL MINE</b> EMERY COUNTY, UTAH	
<b>NEWBERRY CANYON</b> <b>SUBSIDENCE MONITORING</b> <b>HORIZONTAL MOVEMENT</b>	
<b>UTAH POWER &amp; LIGHT COMPANY</b> MINING DIVISION - SALT LAKE CITY, UTAH 84110	
DATE: JANUARY 8, 1987	BY: LJ HANSEN
SCALE: 1" = 0.5'	FIGURE 1

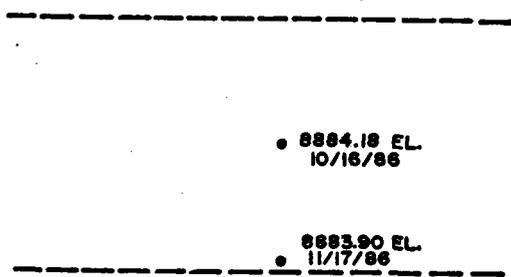
**PRISM 1**



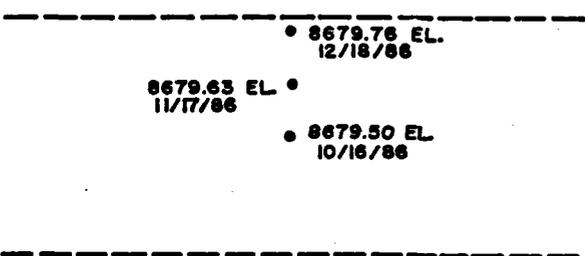
**PRISM 2**



**PRISM 3**



**PRISM 4**



8883.05 EL.  
12/18/86

**COTTONWOOD COAL MINE**  
EMERY COUNTY, UTAH

**NEWBERRY CANYON**  
**SUBSIDENCE MONITORING**  
**VERTICAL MOVEMENT**

**UTAH POWER & LIGHT COMPANY**

MINING DIVISION - SALT LAKE CITY, UTAH 84110

DATE: JANUARY 9, 1987

BY: LJ HANSEN

SCALE: 1" = 0.5'

FIGURE 2

The approximate territories and favored perch sites associated with the eagles in the Newberry Canyon vicinity are indicated on Maps 1 and 2. This information was obtained from random ground observations conducted from February 28 through December 31, 1986 (approximately 75 hours). Raptor field observation forms were also completed for the active nests (see Appendix A and Photos 1-7).

During the 1986 study, two (2) eagles were involved in collisions with vehicles. The locations of these incidents are indicated on Map 2. The first collision occurred on September 19 and involved a sub-adult male which was feeding on a rabbit road-kill. The bird was recovered by UDWR personnel but rehabilitation was not possible. The second collision occurred November 14 at a deer road-kill. The incident was reported but the eagle was not recovered and no injured eagle was observed in the area.

#### MANAGEMENT IMPLICATIONS

Current data is insufficient, at this time, to support any conclusions concerning the amount of subsidence related to longwall mining under the cliff escarpment or its impact on eagle nesting. Therefore, continued monitoring will be conducted to develop such data.

TABLE I  
 UTAH POWER & LIGHT COMPANY  
 MINING DIVISION  
 COTTONWOOD MINE - GOLDEN EAGLE STUDY  
 (10 Mile Radius Area)  
 (The 1981 and 1982 Surveys Conducted by U.S.F.&W.S.)  
 (1986 Survey Conducted by UP&LCO and USFWS)

<u>Nest No.</u>	<u>1981</u>	<u>1982</u>	<u>1986</u>
4	1 GE active (no count)	Inactive	Inactive
5 A,B	2 GE; 1 active (2 young), 1 inactive	1 active (2 young), 1 inactive	Inactive
6	1 GE inactive	Inactive/old	Inactive
7	1 GE inactive/old	Not located	Not observed
8	1 GE inactive/old	Inactive	Inactive
16 A,B	2 Inactive Buteo	2 Inactive (probably eagle)	Inactive
18 A,B,C	3 GE, all tended, well established	1 Active (2 young), 2 inactive	2 Inactive/1 tended
19 A,B	2 Lrg. inactive stick nests (probably eagles)	2 Inactive	2 Tended
22 A,B	2 GE inactive	Inactive, 1 not found	Inactive
26 A,B,C,D	4 GE: 1 active (1 young - no count)	4 inactive	Inactive
27 A,B,C	3 GE; 1 active (1 young -	1 active (1 young), 2 inactive	Inactive
27 D	-  no count)	-	New nest 1 GE; active (1 young)
30 A,B,C	3 GE; 1 tended, 2 inactive	3 inactive	2 Inactive, 1 tended

<u>Nest No.</u>	<u>1981</u>	<u>1982</u>	<u>1986</u>
34	1 GE inactive	Inactive	Not observed
36 A,B	2 GE inactive	1 active (2 young), 1 inactive	Not observed
37 A,B	2 GE inactive	1 inactive, 1 not found	Not observed
50	2 GE; 1 active (1 young - no count) 1 inactive	1 inactive, 1 inactive tended	Inactive
53	1 GE active - fledged	Not located	Not observed
54 A,B	2 GE inactive	2 inactive	Not observed
55	1 GE active - fledged	Inactive tended	Inactive
56	1 GE inactive	Inactive	Not observed
57	1 GE inactive	Inactive	Inactive
59	1 GE inactive	Not checked - windy	Not found
61 A,B,C	1 GE inactive	Inactive	2 Tended, 1 inactive
62	1 GE inactive	Active (2 young)	Tended
63 A,B	2 GE tended	Not located - windy	Not found
67 A,B	2 GE; inactive, 1 tended	2 inactive	1 Active (1 young), 1 inactive
68 A,B	2 GE; inactive, 1 tended	2 inactive (1 tended)	Inactive, 1 tended
70	1 GE active - fledged	Active/fledged	Tended
72 A,B	1 GE inactive	Not found	1 Active (1 young), 1 inactive
74 A,B,C	3 GE; 1 active/fledged, 2 tended	3 inactive (1 tended)	Not observed
75	1 GE inactive	Inactive	Not observed

<u>Nest No.</u>	<u>1981</u>	<u>1982</u>	<u>1986</u>
78	1 GE tended	Not found	Not observed
80	1 GE active/fledged	Inactive/tended	Not observed
87 A	-	-	1 GE; active (1 young) new nest
87 B	1 GE inactive	Not found	Not observed (#87 old survey)
88 A,B	2 GE, both inactive	1 inactive/tended, 1 not checked	1 Tended, inactive
91	1 GE inactive	Not checked	Active (1 young)
95	1 GE inactive	1 active (2 young), 1 inactive	Not observed
97 A,B	2 GE tended	Both inactive/tended	Inactive
98 A,B,C,D,E	4 GE inactive	5 inactive/tended	1 Active (incubating adult), 4 inactive
99 A,B	1 GE inactive, 1 inactive stick nest	2 inactive/tended 1 inactive stick nest	Inactive
100	1 GE active (fledged/no count)	Inactive/tended	Inactive
103	1 GE tended	Inactive/tended	Inactive
107	1 GE inactive	Inactive	Inactive
109 A,B	1 GE inactive/ 1 large inactive stick nest	Inactive, 1 active (1 young)	Inactive
111 A,B	2 GE inactive	Both not found	Not observed, 1 inactive
113	1 GE inactive	No data	Inactive
114 A,B,C	3 GE (1 tended, 2 inactive)	No data	Inactive
115	1 GE tended	No data	Inactive
116	1 GE inactive	No data	Inactive

<u>Nest No.</u>	<u>1981</u>	<u>1982</u>	<u>1986</u>
119	1 GE inactive - good condition	No data	Inactive
120	1 GE tended - occupied	No data	Not observed
121	1 GE inactive	No data	Not observed
123 A,B	1 GE inactive, 1 large inactive stick nest	No data	Not observed
124 A,B,C	3 GE; 1 active, 2 inactive	No data	Not observed
190	1 GE inactive - old	No data	Inactive
191	1 GE inactive - old	No data	Not observed
SW <sup>1</sup> / <sub>4</sub> Sec. 35 T16S, R8E	-	-	1 GE; active (1 young) new nest

APPENDIX A  
RAPTOR FIELD OBSERVATION FORM\*

- |   |   |
|---|---|
| 1. Nest ID# - SEC 35  | 1. Nest ID# - 67B   |
| 2. Common Name - GOEA   | 2. Common Name - GOEA   |
| 3. Substrate - CLF  | 3. Substrate - CLF  |
| 4. Exposure - NO  | 4. Exposure - NE  |
| 5. Elevation - 6,450  | 5. Elevation - 8,000  |
| 6. Biome - 711  | 6. Biome - 820  |
| 7. Habitat Assc. - 634  | 7. Habitat Assc. - 820  |
| 8. Status - ACTI  | 8. Status - ACTI  |
| 9. Productivity - 1   | 9. Productivity - $\emptyset$                                 |
| 10. Disturbance Y (N)   | 10. Disturbance Y (N)   |
| 11. Photo # - 1   | 11. Photo # - 3   |
| 12. Comments - Fledging verified by ground survey.            | 12. Comments - 1 downy young observed, fledging not verified. |
| 1. Nest ID# - 27D   | 1. Nest ID# - 72A   |
| 2. Common Name - GOEA   | 2. Common Name - GOEA   |
| 3. Substrate - CLF  | 3. Substrate - CLF  |
| 4. Exposure - SO  | 4. Exposure - SW  |
| 5. Elevation - 7,600  | 5. Elevation - 8,400  |
| 6. Biome - 711  | 6. Biome - 823  |
| 7. Habitat Assc. - 711  | 7. Habitat Assc. - 823  |
| 8. Status - ACTI  | 8. Status - ACTI  |
| 9. Productivity - $\emptyset$                                 | 9. Productivity - $\emptyset$                                 |
| 10. Disturbance Y (N)   | 10. Disturbance Y (N)   |
| 11. Photo # - 2   | 11. Photo # - 4   |
| 12. Comments - 1 downy young observed, fledging not verified. | 12. Comments - 1 downy young observed, fledging not verified. |

\* Standard Raptor codes from USFWS publication, Raptor Nest Information Management System.

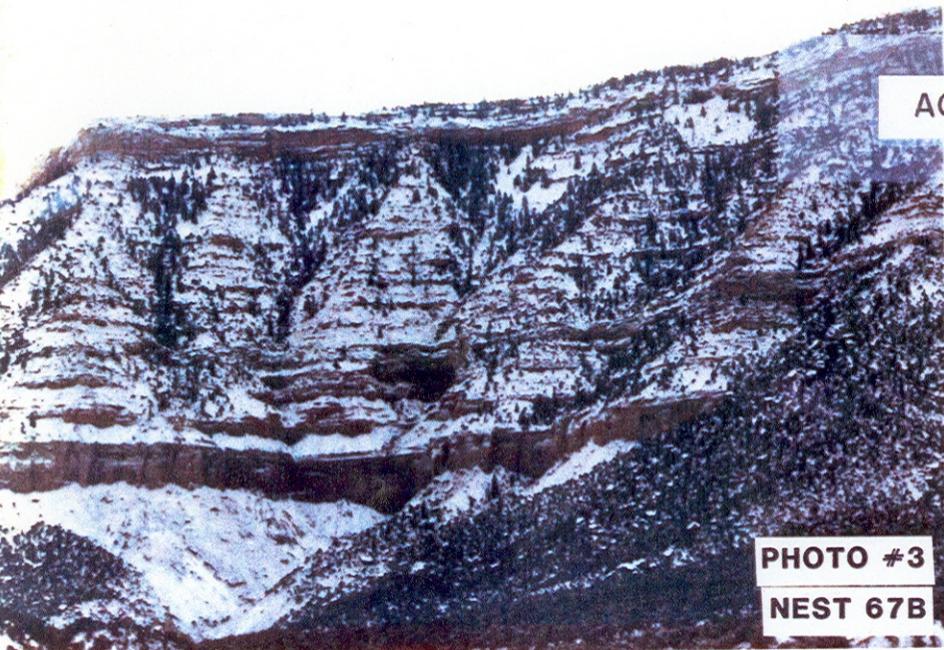
APPENDIX A  
RAPTOR FIELD OBSERVATION FORM\*

1. Nest ID# - 87A
2. Common Name - GOEA
3. Substrate - CLF
4. Exposure - SE
5. Elevation - 7,250
6. Biome - 320
7. Habitat Assc. - 320
8. Status - ACTI
9. Productivity - 1
10. Disturbance (Y) (N)
11. Photo # - 5
12. Comments - Fledging verified by ground survey. Potential disturbance due to proximity of road.

1. Nest ID# - 91
2. Common Name - GOEA
3. Substrate - REP
4. Exposure - NE
5. Elevation - 6,400
6. Biome - 634
7. Habitat Assc. - 632
8. Status - ACTI
9. Productivity - 1
10. Disturbance Y (N)
11. Photo # - 6
12. Comments - Fledging verified by ground survey.

1. Nest ID# - 98
2. Common Name - GOEA
3. Substrate - CLF
4. Exposure - SW
5. Elevation - 8,400
6. Biome - 823
7. Habitat Assc. - 823
8. Status - ACTI
9. Productivity -  $\emptyset$
10. Disturbance Y (N)
11. Photo # - 7
12. Comments - Incubating adults observed fledging not verified.

1. Nest ID# -
2. Common Name -
3. Substrate -
4. Exposure -
5. Elevation -
6. Biome -
7. Habitat Assc. -
8. Status -
9. Productivity -
10. Disturbance Y N
11. Photo # -
12. Comments -



ACTIVE NESTS

PHOTO #3  
NEST 67B

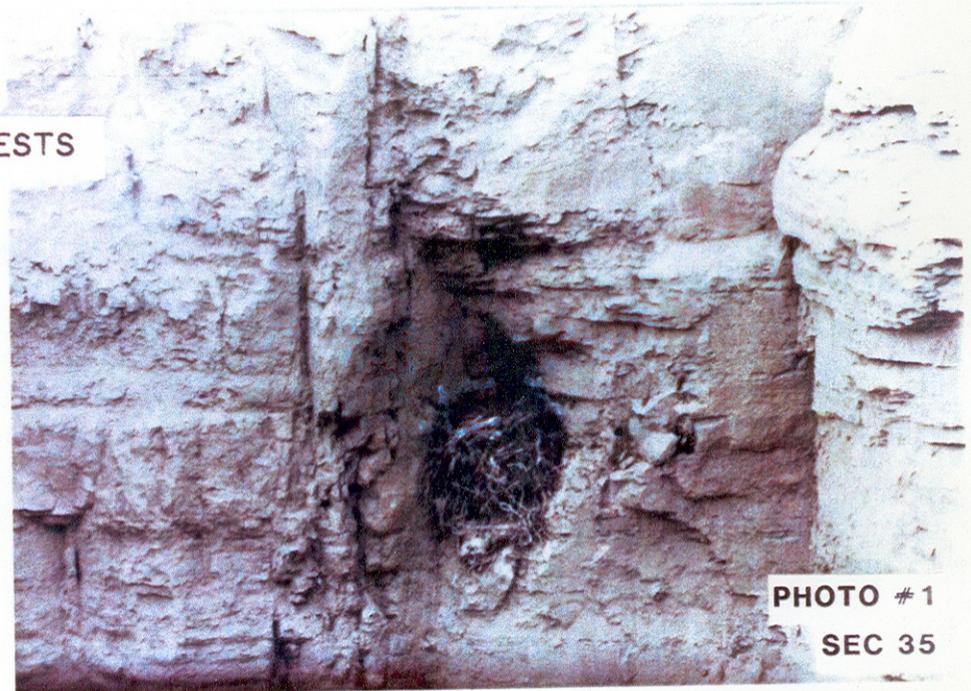


PHOTO #1  
SEC 35

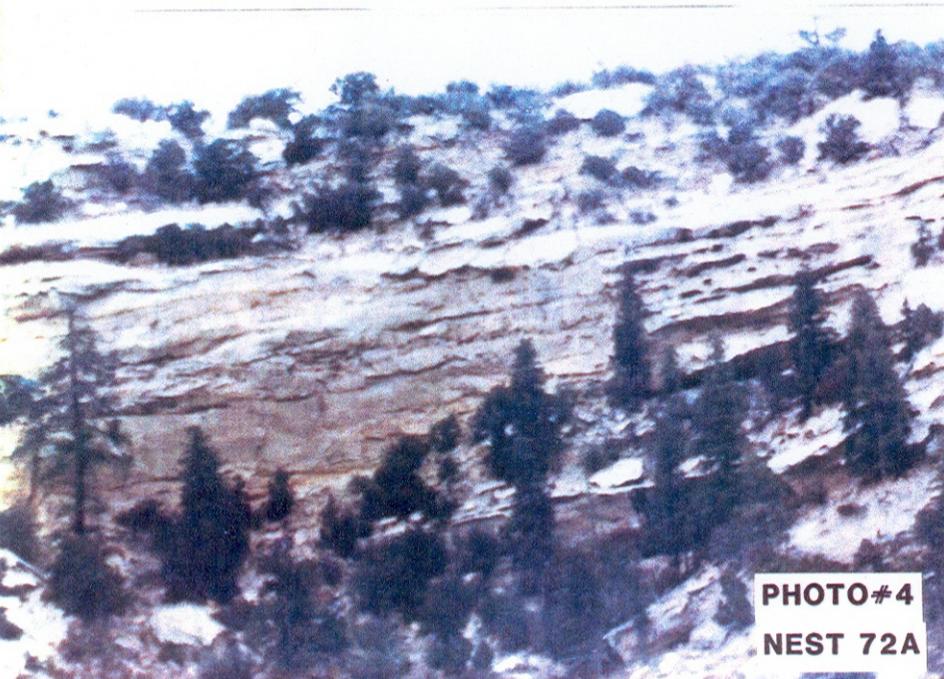


PHOTO #4  
NEST 72A

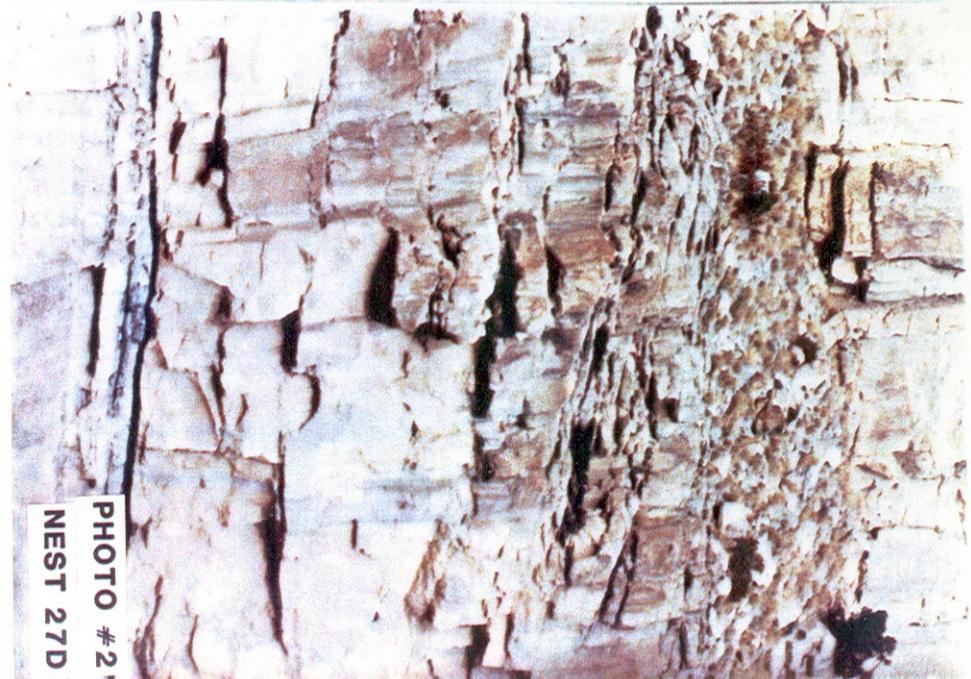


PHOTO #2  
NEST 27D



PHOTO #6  
NEST 91

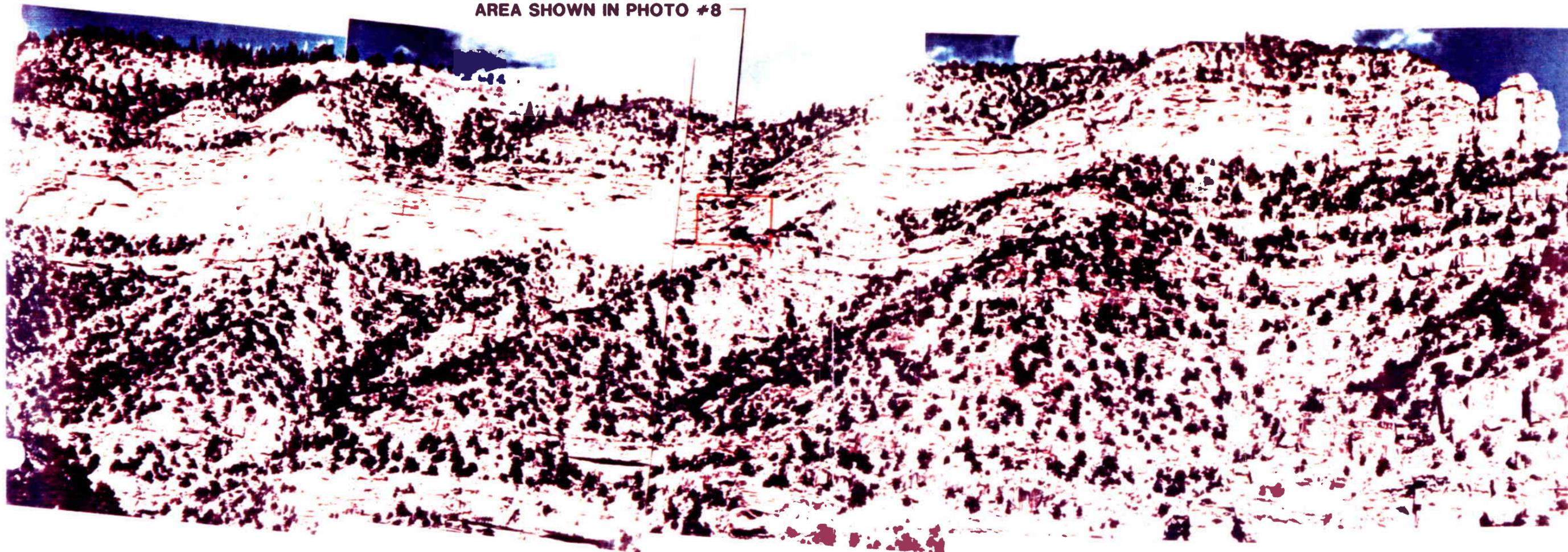


PHOTO #5  
NEST 87A



PHOTO #7  
NEST 98

AREA SHOWN IN PHOTO #8



**NEWBERRY CANYON PANORAMA**

NEST #62

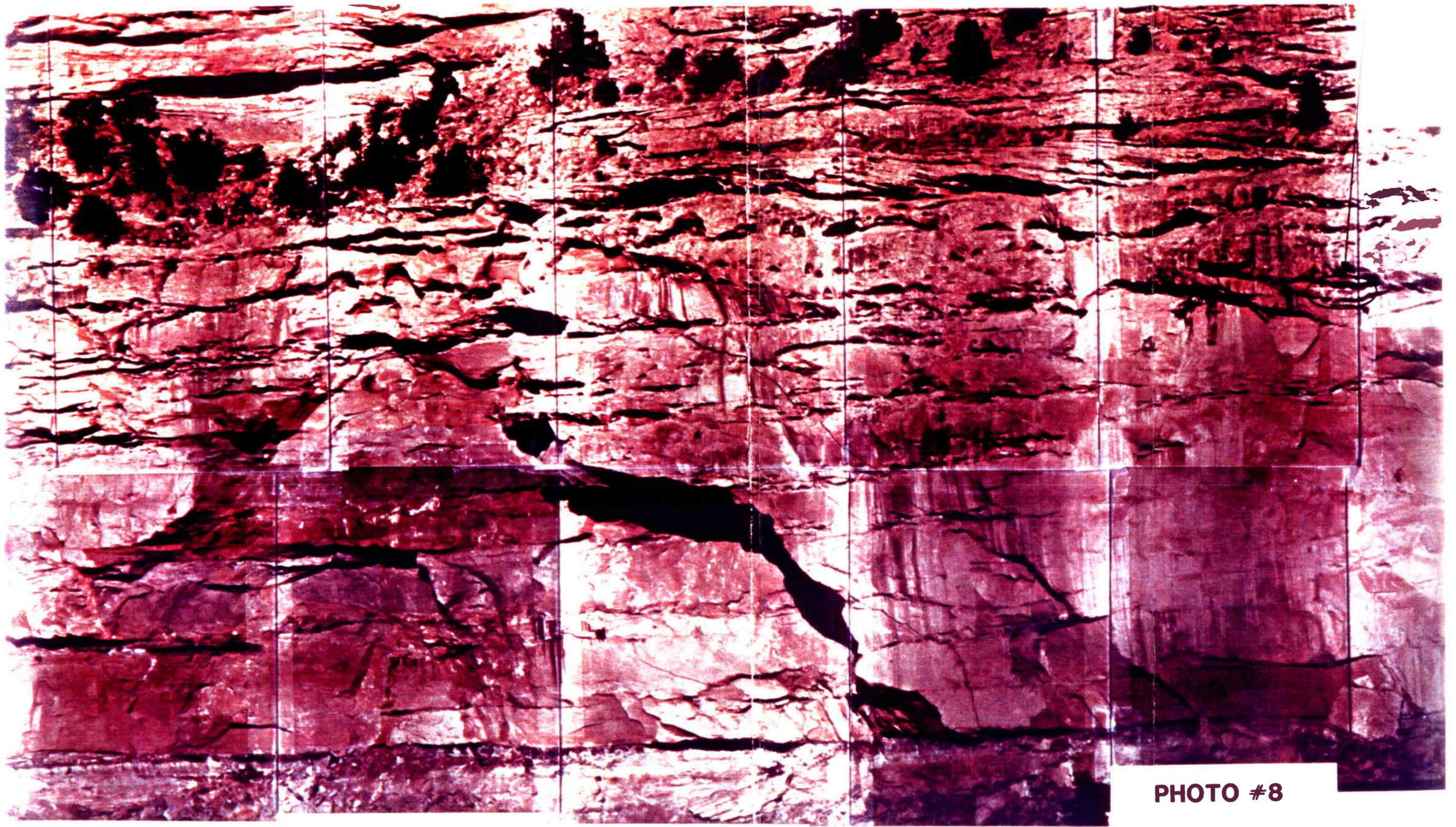
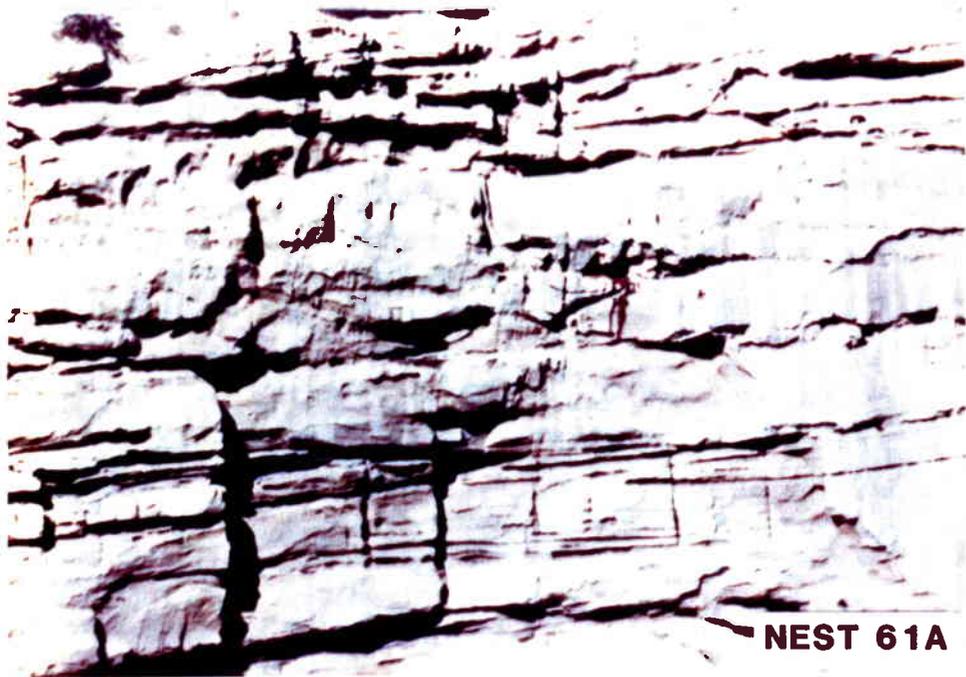
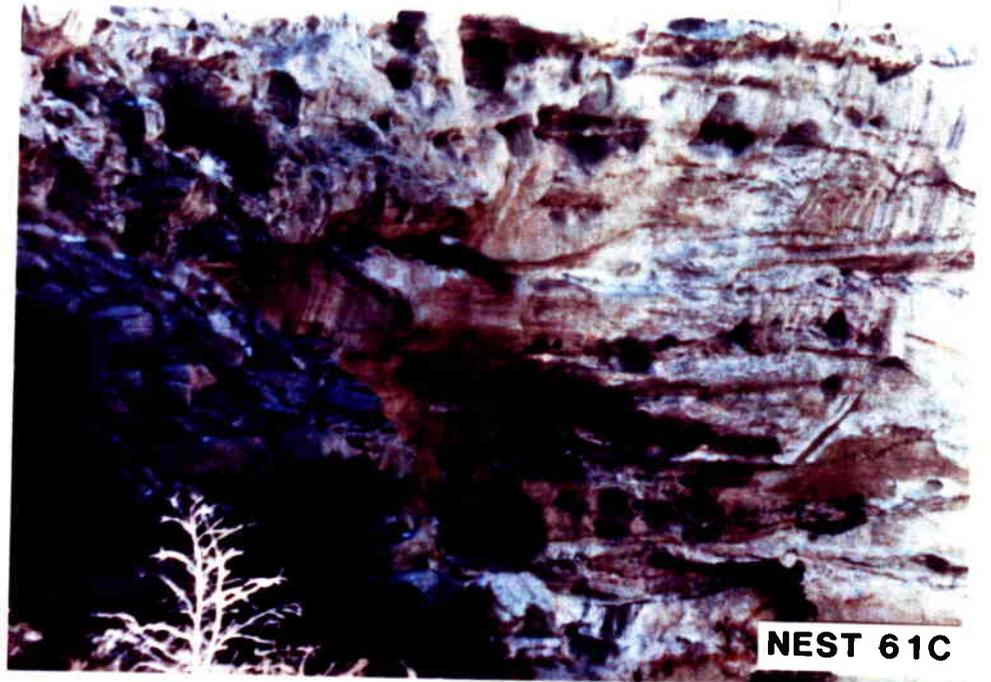


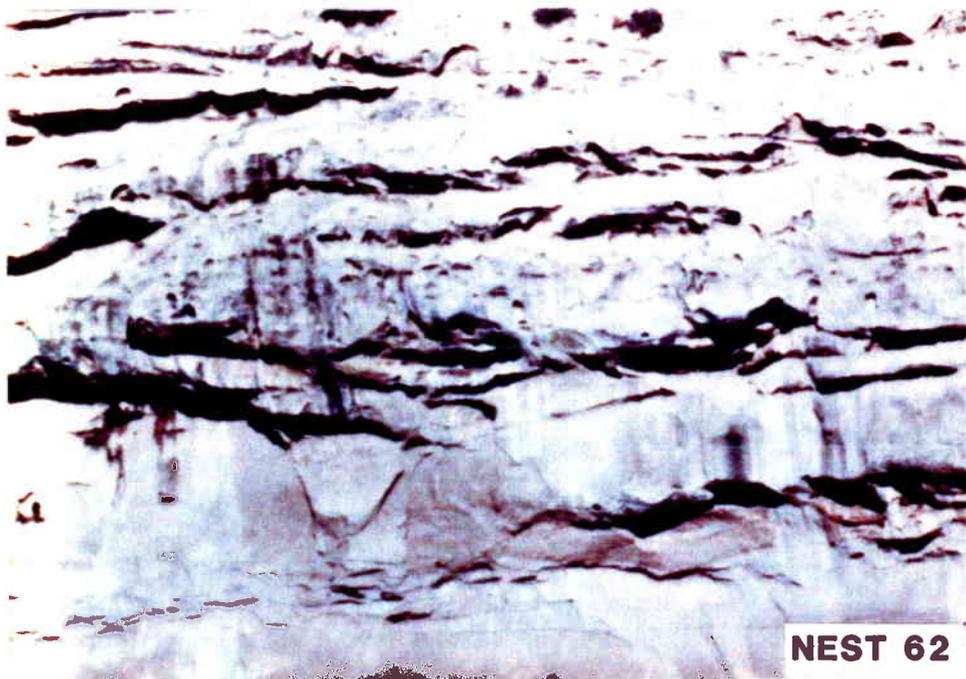
PHOTO #8



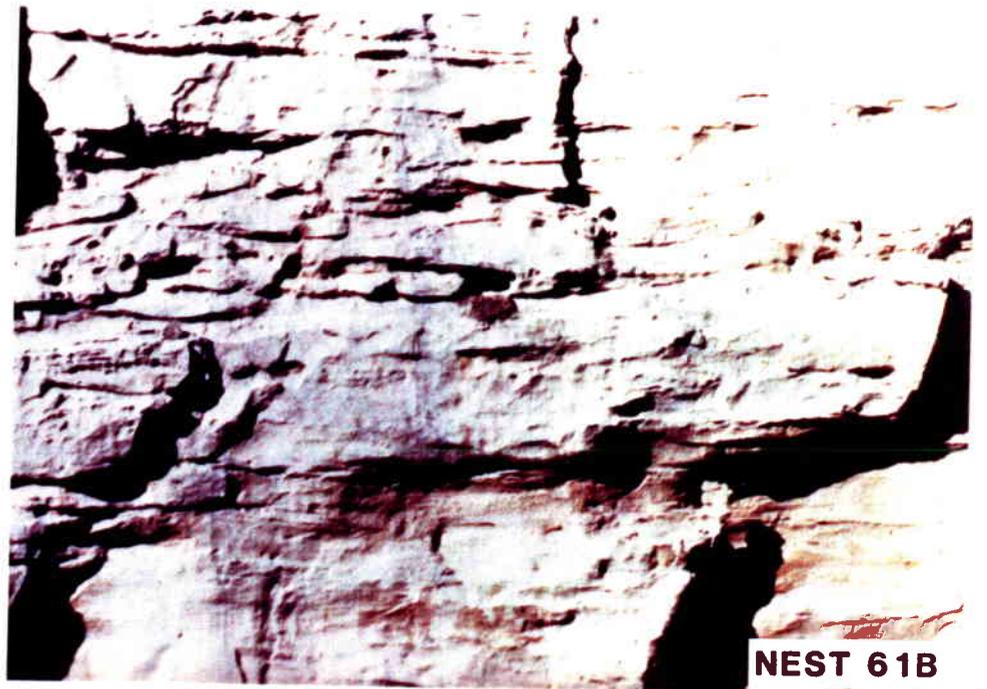
NEST 61A



NEST 61C



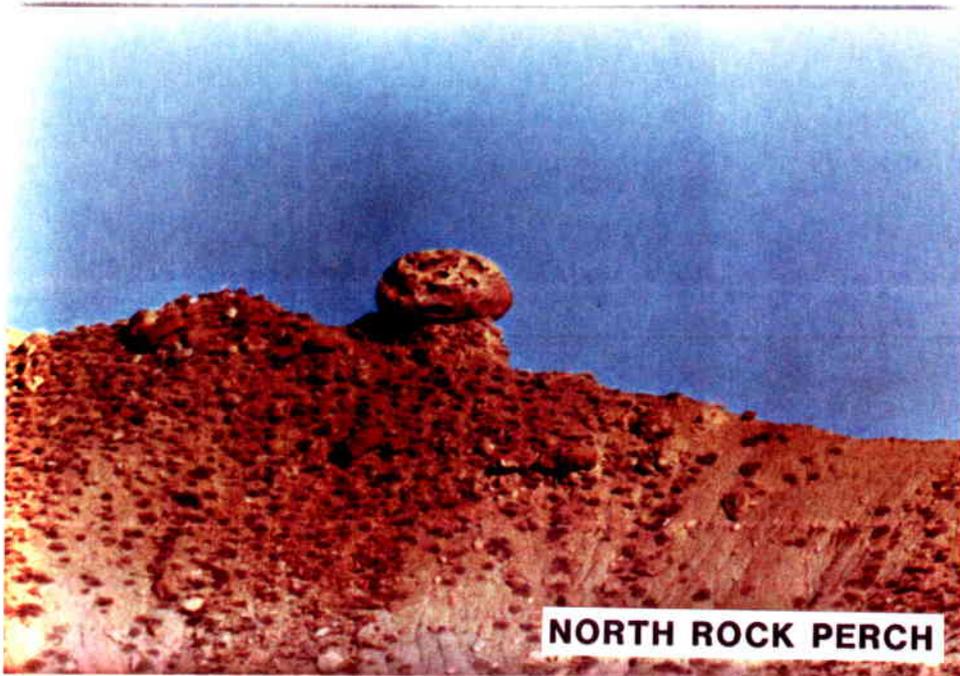
NEST 62



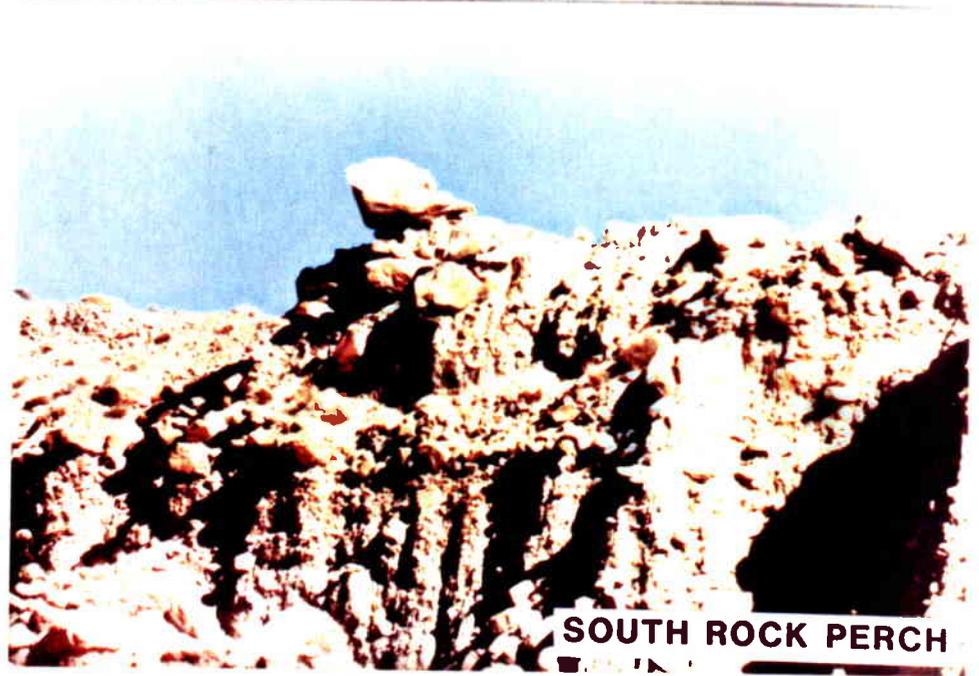
NEST 61B

**NEWBERRY CANYON NESTS**

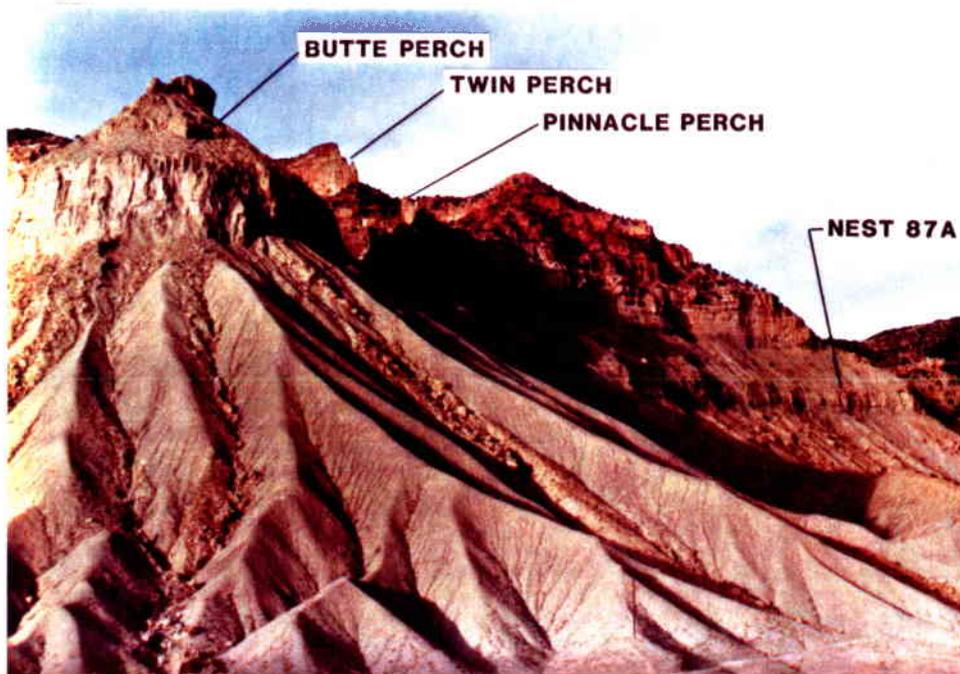




**NORTH ROCK PERCH**



**SOUTH ROCK PERCH**



**BUTTE PERCH**

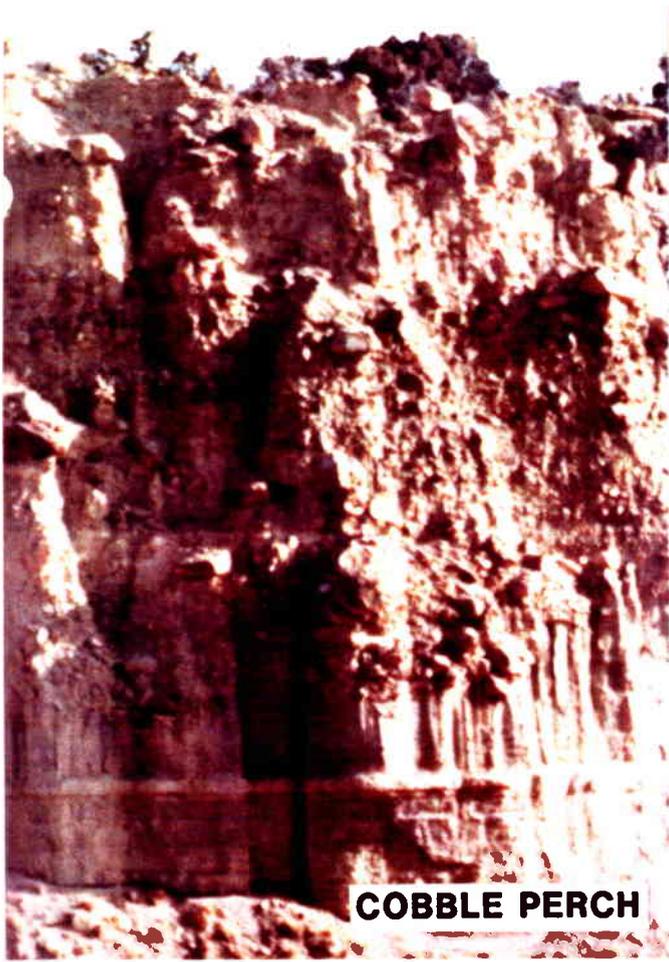
**TWIN PERCH**

**PINNACLE PERCH**

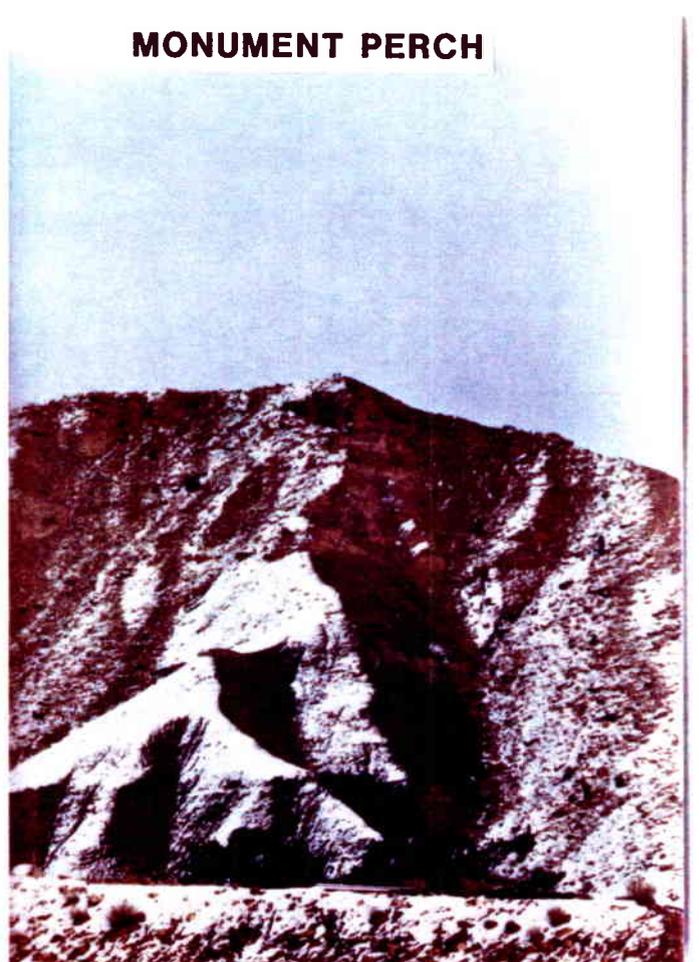
**NEST 87A**



**TREE PERCH**



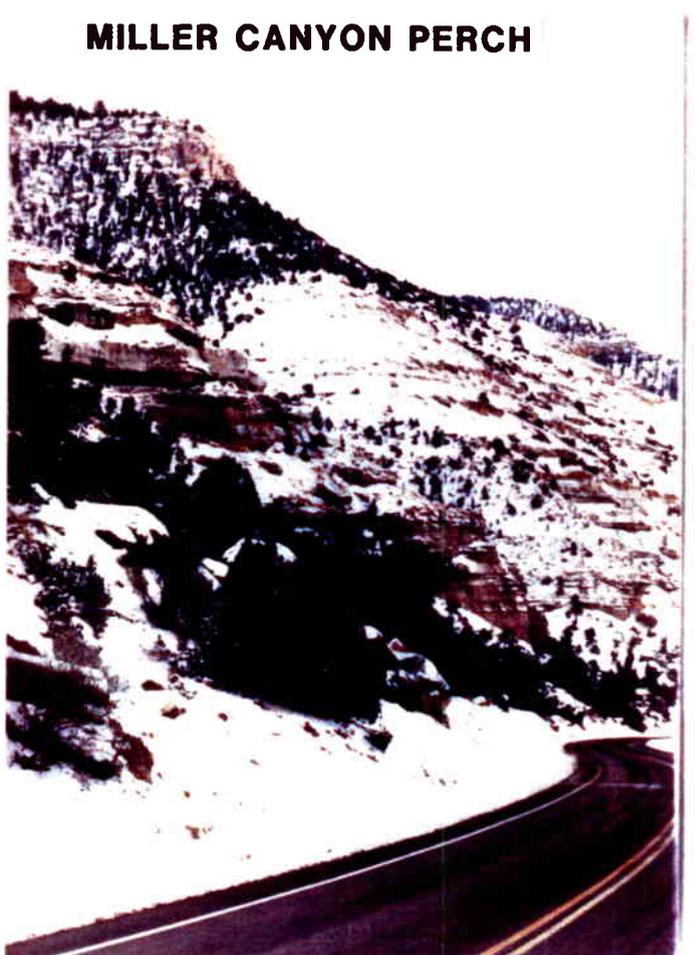
**COBBLE PERCH**



**MONUMENT PERCH**



**91 PERCH**



**MILLER CANYON PERCH**