UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

# PINGREE PARK QUADRANGLE
COLORADO-LARIMER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4865 I I NW (KINNIKINNIK)

4865 I I NE (RUSTIC)

4865 I I NW (BIG NARROWS)

COMANCHE RESERVOIR 1 MI

4865 I I SW (COMANCHE PEAK)

BOX PRAIRIE 2 MI

4865 I I SW (CRYSTAL MOUNTAIN)

(TRAIL RIDGE) 4864 I V NW

(GLEN HAVEN) 4864 I V NW

(ESTES PARK) 4864 I NE

7 MI. TO COLO. 14

CLARK HOMESTEAD 5 MI.

NORTH FORK RANGER STA. 15 MI.

ROOSEVELT NATIONAL FOREST

ROCKY MOUNTAIN NATIONAL

Little Beaver Creek
Fish Creek
Cache la Poudre River
Fall Creek
Pingree Park
Park Creek
Beaver Creek
South Fork Cache la Poudre River
Pennock Mountain
Elk Creek
Lake Louise
Lake Husted
Lost Lake
North Fork Big Thompson River
Lake Dunraven
Twin Lake Reservoir
Lost Falls
Sugarloaf Mountain
Stormy Peaks
Stormy Peaks Pass
Ramsey Peak
Signal Mountain
South Signal Mountain
Bulwark Ridge
White Rock Quarry
Fish Creek Campground
Tom Bennett Campground
Colorado State University (Pingree Park Campus)
Lazy D Ranch
Koenig Ranch
Gaging Sta
Mine
BM 8012
BM 8310
BR 8120
BR 8188
FLOWERS ROAD
TRAIL
PACK TRAIL
STORMY PEAKS TRAIL
SIGNAL MOUNTAIN TRAIL
R. 73 W.
R. 72 W.
T. 8 N.
T. 7 N.
T. 6 N.

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS / NOAA

Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1962

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue

Certain land lines are omitted because of insufficient data

Revisions shown in purple compiled from aerial photographs taken 1976. Map edited 1977. This information not field checked

UTM GRID AND 1977 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
GN MN
0°22' 7 MILS
13° 231 MILS

SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
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CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

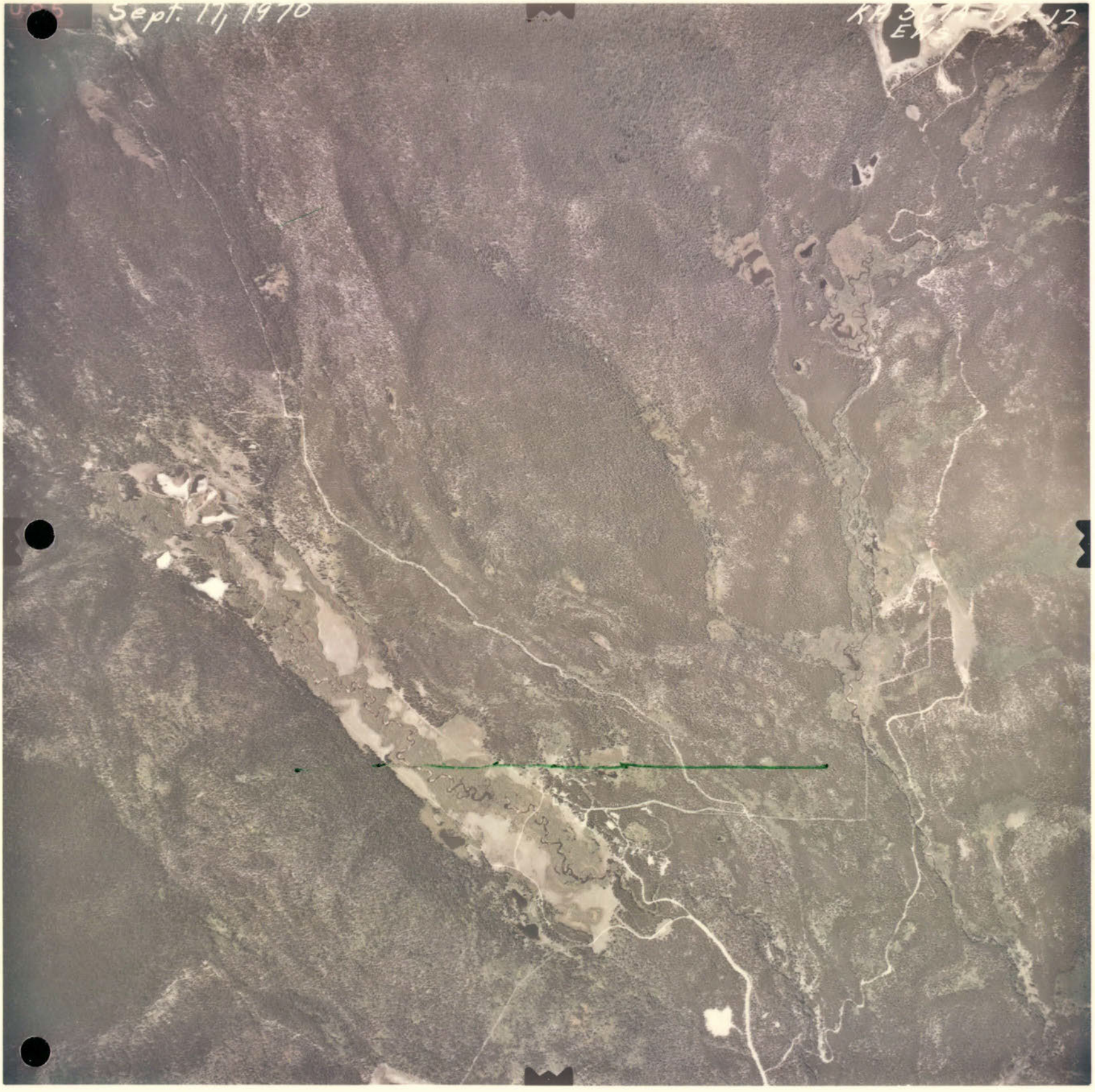
COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Light-duty ——— Unimproved dirt - - - - - -

PINGREE PARK, COLO.
N4030-W10530/7.5

1962
PHOTOREVISED 1977
AMS 4865 II SE-SERIES V877

● ☆ INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978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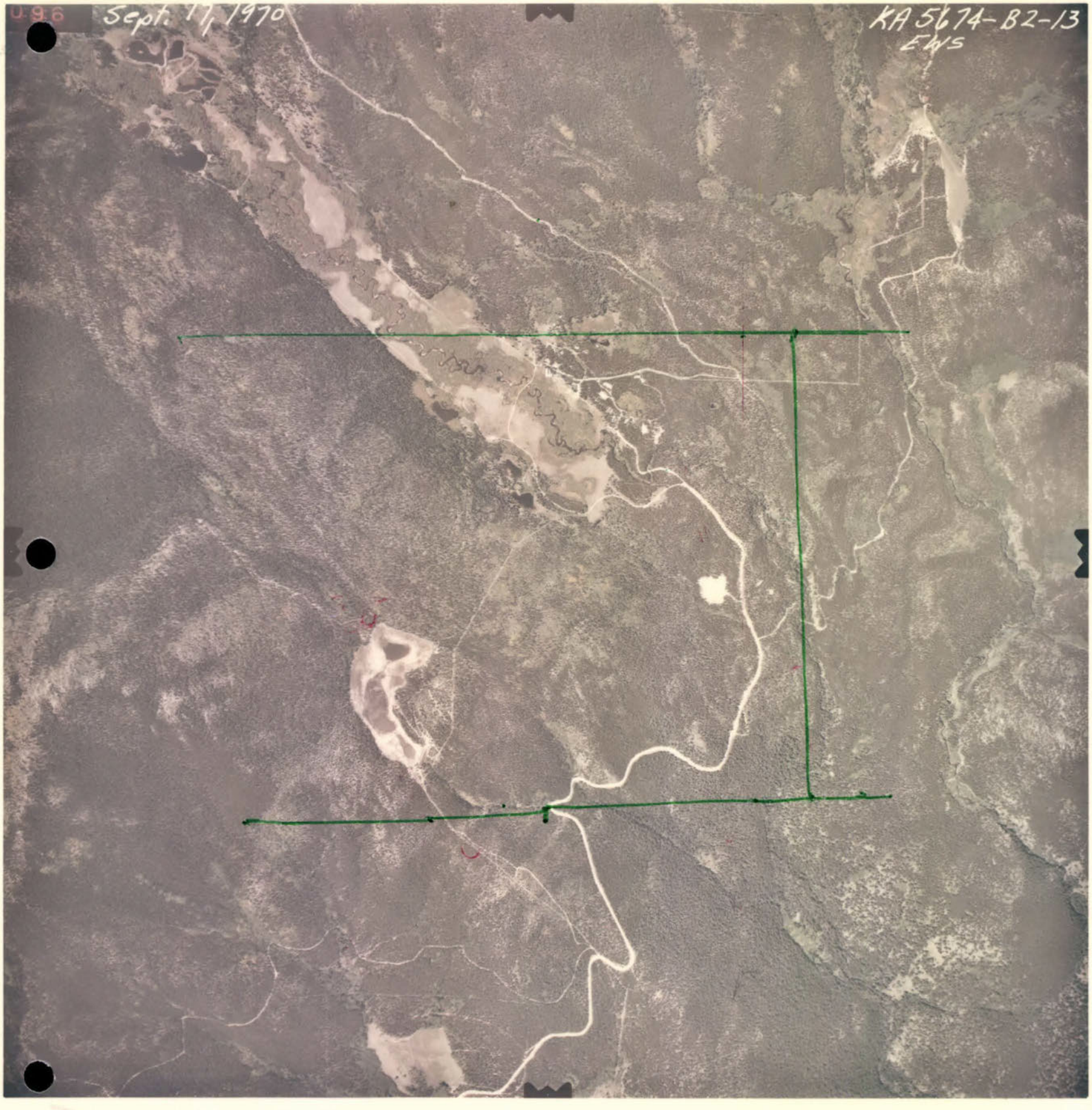
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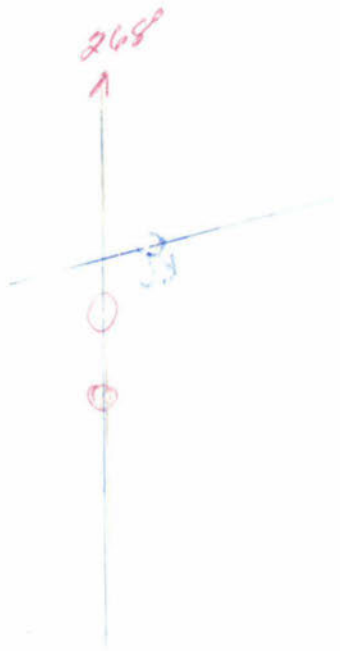
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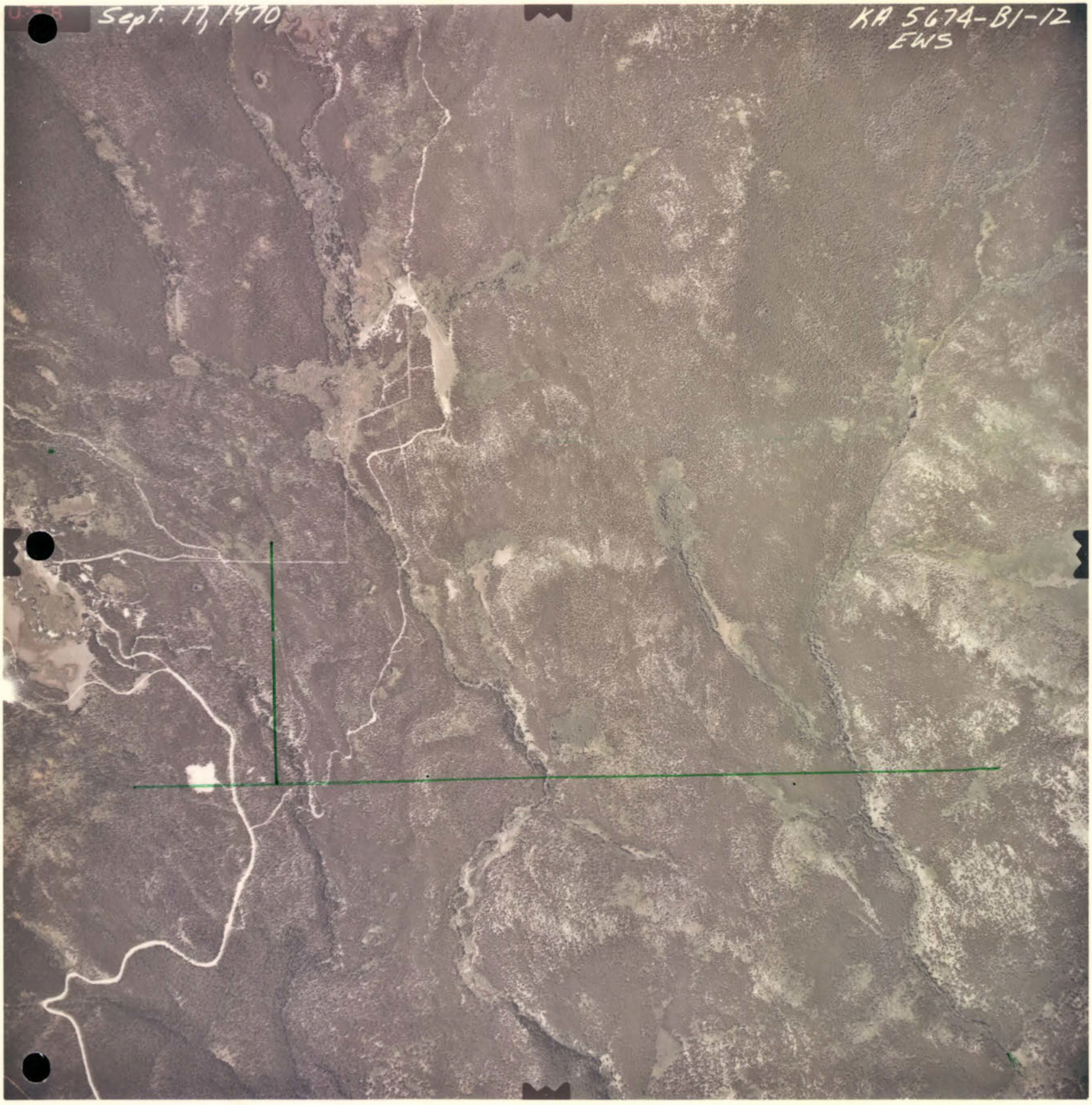
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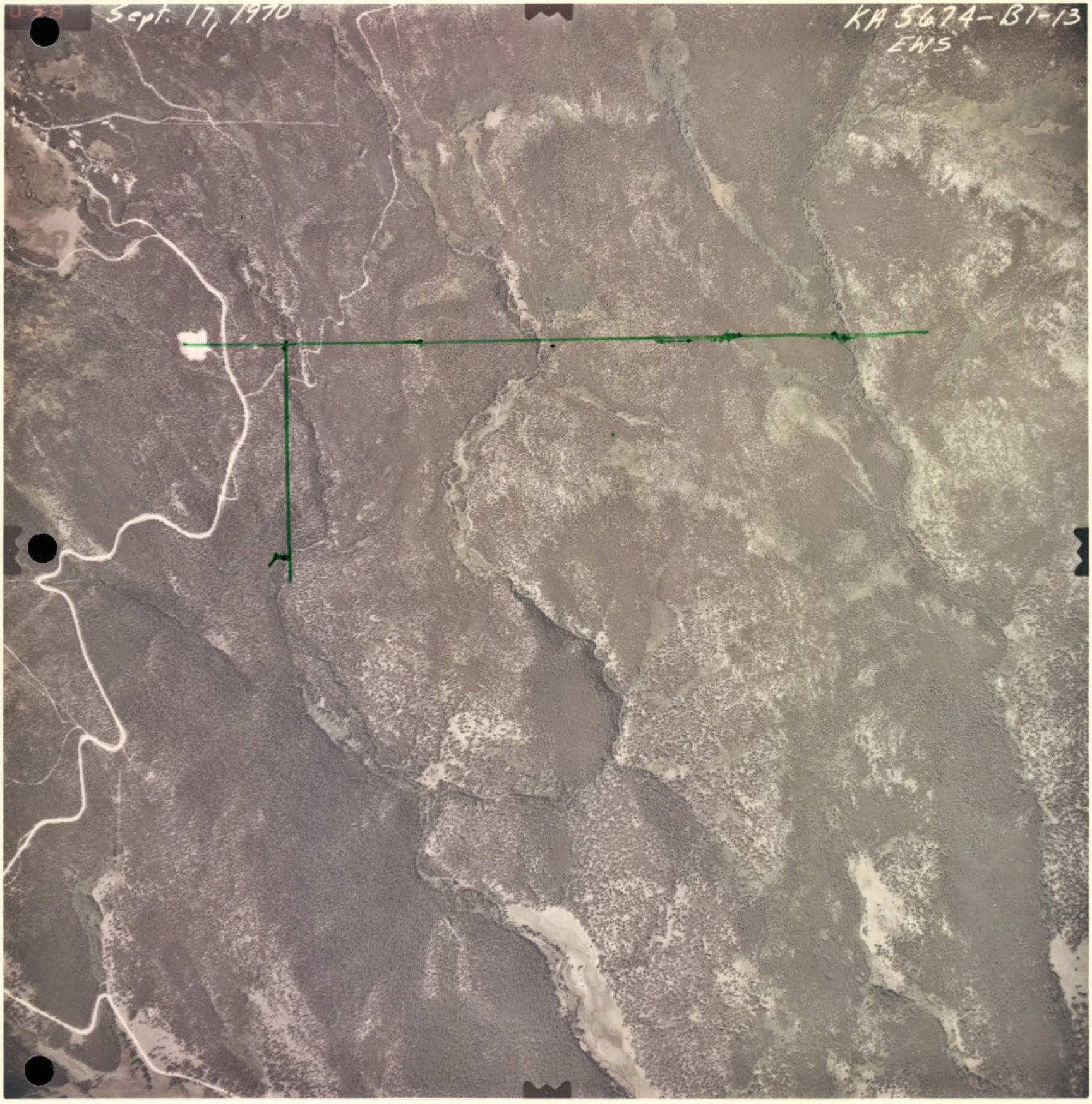
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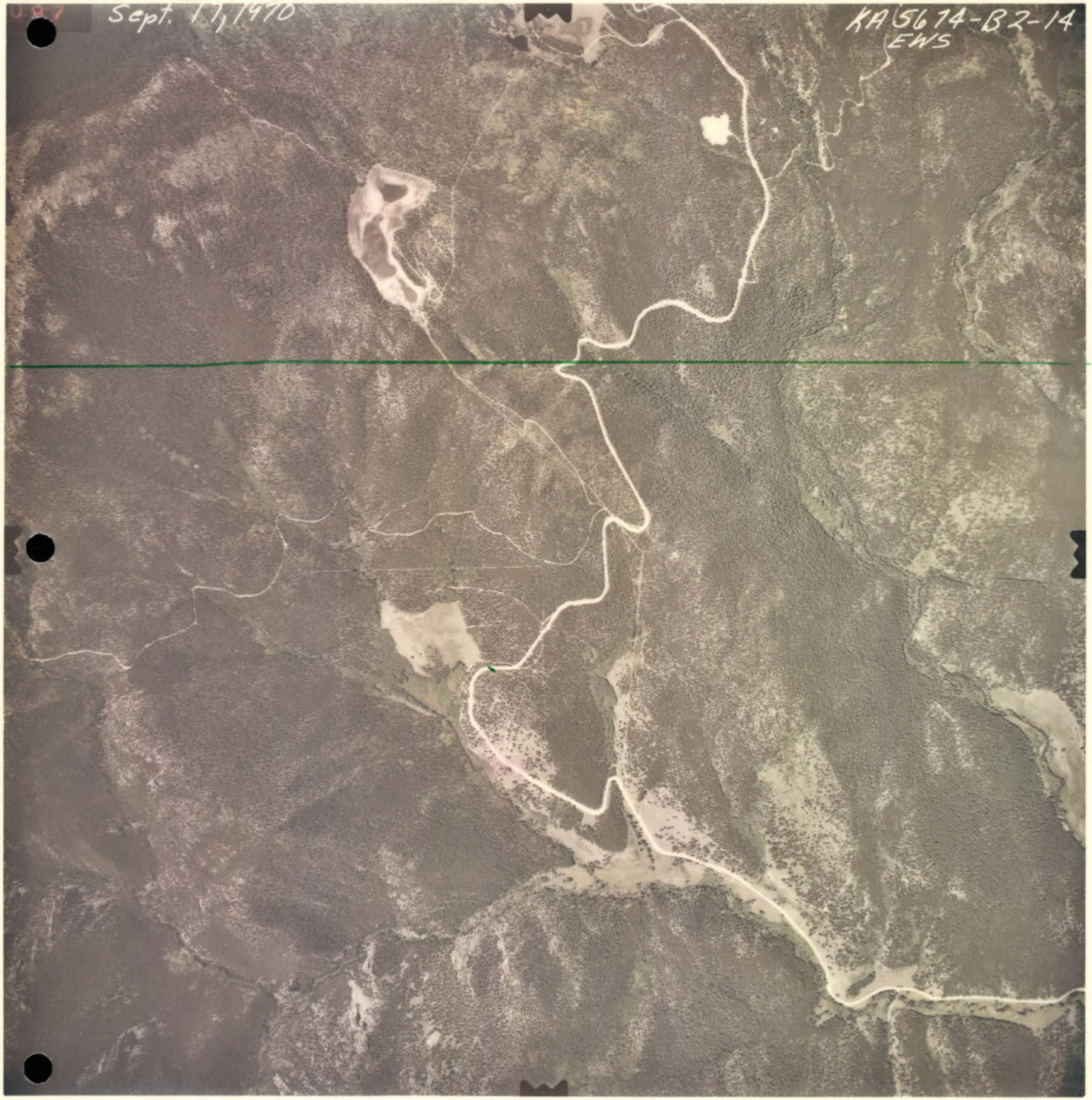
Sept. 17, 1970
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EWS

CLIP OR COPY

## *Make history and win a night on the town*

Give us your name, address and phone number and complete one or both of the following phrases:

Name _____

Address _____

_____

Phone Number _____

My best memory of Colorado State is: _____

_____

_____

_____

_____

AND/OR:

My prediction for the university's future is: _____

_____

_____

_____

_____

One lucky entry will be picked Sat., Feb. 11 at a special Colorado State University birthday party at Foothills Fashion Mall. Enjoy free Subway sandwiches and Safeway birthday cake.

The winner gets a night on the town Feb. 16, which includes:

- chauffeur service by Finer Times Limousine,
- a $30 gift certificate to Sundance Steakhouse and Country Club and
- two tickets to the Colorado State men's basketball game against New Mexico.

Send your entry to Colorado State University Public Relations Department, Fort Collins, CO 80523, fax it to 491-6433 or send via e-mail to jbolick@vines.colostate.edu. Deadline for receipt of mailed or faxed entries is 5 p.m. tomorrow, or enter at the Foothills Fashion Mall before the 3 p.m. drawing Feb. 11. One entry per person, please.

Photocopies of this entry form are acceptable. You need not be present to win.

All entries will be placed in the special Colorado State University 125th anniversary time capsule. Come to Foothills Fashion Mall 11 a.m.-3 p.m. this Saturday and join in the birthday party!

We wish to thank our sponsors: Finer Times Limousine, Foothills Fashion Mall, Safeway, Subway, Sundance Steakhouse and Country Club and the university's athletic department. ■

## Campus Events

### Ongoing Exhibits and Events

- "Bitter Water: Conversations from the Land," Mary Fish's exhibit of words and images of traditional Diné women, shows through Feb. 25 in the LSC Curfman Gallery. The featured women, who belong to a Navajo tribe moved to a reservation, express their resignation, anger, sorrow, loss and lack of a Navajo word for "relocate."
- "Notes," 12 original lithographs by pop-artist Claes Oldenburg and 13 pages of text he wrote to accompany the images, will be on display in the Clara Hatton Gallery of the Visual Arts Building through Feb. 24. Examples of Oldenburg's sculptural works will be included in the exhibit.
- University Theatre presents "The Bourgeois Gentleman," a classic comedy involving the adventures of Monsieur Jourdain as he tries moving from the middle class to the gentry, at 8 p.m. Feb. 16, 17, 18, 23, 24 and 25 on the Johnson Hall Mainstage. Call 491-5116 for ticket information.

### Thurs., Feb. 9

- Cindy Wedel, education director for Consumer Credit Counseling of Northern Colorado, discusses "50 Ways To Keep Your Money" from 3:30-5:30 p.m. in Room 220-222 LSC. The talk is part of Transitions Week activities.
- Black History Month organizers host a "Cupid Connection Dating Game" from 7-9 p.m. in the Durrell Center cafeteria.
- The women's basketball team plays Brigham Young University at 7 p.m. in Moby Arena.

### Fri., Feb. 10

- University Village staff members sponsor "Knowing Your World – Egypt," food, costumes and demonstrations presented by community members from Egypt, 7-9 p.m. at the University Village Center, 1600 W. Plum St. The event is open to the public.
- Aggie Village staff members sponsor "Tastes and Sights From Around the World," ethnic food served in the homes of international community members, 7-9 p.m. beginning at the Aggie Village Center Building 24, 500 W. Prospect Road. The event is open to the public.
- Science fiction author and Cybercon VI guest of honor Roger Zelazny speaks at 7 p.m. in Room 228 LSC.

*This image of a Navajo woman is part of Mary Fish's exhibit in the LSC Curfman Gallery on display through Feb. 25.*

- Cinema CSU presents "32 Short Films About Glenn Gould" at 7 p.m. and 9:30 p.m. in the LSC Theatre. Tickets cost $2.50.

### Sat., Feb. 11

- Colorado State University celebrates its 125th anniversary with "Colorado State University Day" 11 a.m.-3 p.m. at Foothills Fashion Mall. The celebration features food, prizes and drawings and is open to the public.
- University Health Service sponsors a health fair for women and children and a children's dental prevention fair from 10 a.m.-1 p.m. at University Village, 1600 W. Plum St. Call 491-1702 for further information.
- The women's basketball team hosts Utah at 3 p.m. in Moby Arena.
- Black History Month organizers sponsor the play "1001 Black Inventions" at 3:30 p.m. in the LSC Theatre.

### Mon., Feb. 13

- Percussionist David Johnson performs at 7:30 p.m. in Room 203 Music Building. Tickets are $3 for non-students and $2 for students.
- Associated Students of Colorado State University sponsors San Francisco resident and model Gregg Cassin in a discussion titled "AIDS, Life, Love... and Having Fun" at 7:30 p.m. in the LSC Main Ballroom. A $2 donation for non-students is requested.

### Tues., Feb. 14

- The Desktop Publishers Group meets 11:45 a.m.-1:15 p.m. in Room 207 Weber Building for productivity tips and tricks using Aldus PageMaker 5.0.
- Friends of Traditional Dance and CSU Lifestyle Classes sponsor the second of five ballroom-basics classes at 7 p.m. and the first of four Lindy-hop classes at 8:30 p.m. in the LSC North Ballroom. Call 491-6359 or 493-8277 for registration information.

### Wed., Feb. 15

- The movie "Car Wash" shows at 9 p.m. in the Durrell Center as part of Black History Month activities.

### Thurs., Feb. 16

- The men's basketball team hosts the University of New Mexico at 7:05 p.m. in Moby Arena. ■

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COMMENT

Feb. 9, 1995 Volume 25, Number 19

Public Relations Department
Aylesworth Hall
Colorado State University
Fort Collins, CO 80523

DAVID A. FARMER
COLORADO STATE FOREST SERVICE
BUILDING 1052-FOOTHILLS

COMMENT

News for and about Colorado State's faculty and staff

Feb. 9, 1995 Volume 25, Number 19

# Officials proclaim Colorado State University Day

Colorado Gov. Roy Romer, City of Fort Collins officials and the Colorado Legislature have proclaimed Feb. 11 "Colorado State University Day" in recognition of the university's 125th birthday.

On Feb. 11, 1870, the territorial government of Colorado officially established the Agricultural College of Colorado in Fort Collins. The school was later designated as the state's only land-grant college and renamed Colorado State University in 1957.

Colorado State Vice President for Administrative Services Gerry Bomotti accepted the Fort Collins proclamation Feb. 7 in a short ceremony prior to the regularly scheduled City Council meeting.

The university will celebrate Colorado State University Day Feb. 11 at the Foothills Fashion Mall in Fort Collins. From 11 a.m. to 3 p.m., university volunteers will give out 125th anniversary balloons, memorabilia, Safeway birthday cake and sandwiches courtesy of Subway. People are encouraged to wear green and gold that day as part of the celebration.

A drawing also will be held at the mall from entries submitted by individuals who recalled their fondest university memory and/or predicted how Colorado State will look in 25 years. (See entry form on Page 4.) The winner receives a free ride from Finer Times Limousine Service, dinner at the Sundance Steakhouse and Country Club and two tickets to the Feb. 16 Colorado State men's basketball game. ■

*– Lisa Helme*

### HONORARY PROCLAMATION

Colorado State University Day
February 11, 1995

*WHEREAS, the territorial government of Colorado in 1870 created the Agricultural College of Colorado, which was later designated as the state's only land-grant college; and*

*WHEREAS, that early agricultural campus has evolved into the internationally known university – Colorado State University; and*

*WHEREAS, the university has tirelessly served the needs of the people of Colorado through its land-grant mission of teaching, research and service; and*

*WHEREAS, the university has developed first-rate educational and research programs in fields ranging from irrigation management to tourism that each day benefit this state and its citizens; and*

*WHEREAS, Colorado State University has fulfilled its mission with distinction for 125 years and promises to bring further honor to the state for centuries to come;*

*NOW, THEREFORE, I, Roy Romer, Governor of Colorado, proclaim February 11, 1995, as*

*COLORADO STATE UNIVERSITY DAY*

*in the State of Colorado.*

*GIVEN under my hand and the Executive Seal of the State of Colorado, this first day of February, 1995*

*(signed)*

*Roy Romer*
*Governor*

## University honors president emeritus

Colorado State University President Albert Yates presented a special 125th Anniversary Award to President Emeritus William Morgan earlier this week.

Morgan, who served as Colorado State's president from 1949-1969, received the award as part of a convocation held Tuesday on campus to celebrate the university's 125th anniversary.

The award recognizes Morgan for his singular contributions to the university. He is credited with turning a small agricultural college into a major university: In 1949, the college's enrollment was 3,898; by 1969, it had grown to 16,252.

Significant university developments that took place during Morgan's tenure as president include:

- construction of a new Veterinary Teaching Hospital, chemistry annex, addition to the student union, faculty apartments and a residence hall for women;
- establishment of the university's Graduate School;
- an institutional commitment made to international education through a contract with the federal government that later led to the establishment of the Office of International Programs;
- a change in the college's name from Colorado Agricultural and Mechanical College to Colorado State University to reflect the school's expansion;
- designation of Colorado State as one of two higher-education institutions in the state to offer doctoral research programs; and
- establishment of the Colorado Water Resources Research Institute and the Institute for Rural Environmental Health.

*President Emeritus William Morgan*

Additionally, under Morgan's leadership the curricular offerings of the university expanded greatly. In 1949, the college offered majors in 41 academic areas. At the time of Morgan's retirement, the university had more than doubled its academic offerings to 90 majors.

Morgan was born May 30, 1909, in Fort Worth, Texas, the eighth of nine children. During World War II, he served in the U.S. Army Air Corps, first in Washington, D.C., and then in the China-India-Burma Theater. He was appointed president of Arkansas A&M College in 1946. In 1948, he left Arkansas when asked to serve as the deputy chief, Food and Agriculture Division, of the Marshall Plan in Paris. His combination of education and war experience made him uniquely qualified to help in Europe's post-war recovery.

Yates presented Morgan with a framed limited-edition print of the 125th anniversary poster created for Colorado State by alumnus and internationally renowned poster designer Bob Coonts.

The convocation officially kicks off a yearlong celebration at the university. ■

*– Lisa Helme*

1870 • 1995 125 YEARS Colorado State University It's Working

# *Professor runs environmentally friendly farm*

George Wallace runs an unusual farm.

While his 180-acre spread north of Fort Collins contains the standard assortment of crops and livestock, visitors also may glimpse an occasional weasel, coyote, deer or rabbit on the property.

When the Colorado State natural resources professor purchased his farm 23 years ago, the land supported only some semi-wild horses that traveled the flat, overgrazed acres in search of forage. Now, the property has become a wildlife oasis situated among irrigated fields.

*"I teach natural-resource management classes at Colorado State. It's important to me that I practice on my farm what I preach in class."*

Wallace's farm enables him to combine his teaching and academic research at Colorado State with the pragmatics of daily farming.

"I grew up hunting and fishing and wanted to create a working farm in which wildlife and native plants could co-exist with domestic crops and animals," Wallace explained. "I wanted to create a healthy, balanced landscape where what was taken from the land through farming was given back through other land-management practices."

For Wallace, such practices included the planting of several thousand trees and shrubs that act as both windbreaks and wildlife sanctuaries. In what he calls, "habitat patches," Wallace has cultivated such native species as wild plum, buffalo berry and golden willow and rooted out non-native plants. He estimates 25 percent of his Northern Colorado property is uncultivated.

Wallace raises about 20 head of cattle each year and rotates alfalfa hay with corn, barley and pinto beans. He uses a minimal amount of agricultural chemicals to control weeds and insect infestations. After planting his crops, Wallace frequently leaves some of the grain unharvested to feed the numerous pheasants, songbirds and water fowl that frequent his property.

Wallace uses fencing to confine livestock to certain watering and forage areas to avoid erosion problems and to protect wetlands and wildlife habitat. He also is working to restore a stream through the property by using ditch diversion structures and has constructed and improved several ponds to increase their value as wildlife habitat.

"I teach natural-resource management classes at Colorado State. It's important to me that I practice on my farm what I preach in class," Wallace said.

A land-use planning class Wallace teaches at Colorado State includes a student tour to see firsthand how conservation-management practices work on his and several other producing farms. Wallace also has frequent visitors to the property who enjoy the mix of natural and cultivated areas.

Wallace and his wife, Nancy, recently were recognized by the Colorado Division of Wildlife as runner-up 1994 Landowners of the Year, an annual award given to landowners who have put into effect wildlife-friendly management practices and who allow public access to their property.

"We must keep farmers and ranchers on the land if we want to achieve biological diversity. Both full and part-time farmers and ranchers can help preserve natural areas important for keeping wildlife populations intact and undeveloped," he said.

Wallace's future plans include working with his neighbors to create a three-mile wildlife corridor that would range from the foothills to a nearby reservoir. He also researches issues related to grazing on public lands and hopes to demonstrate personally how grazing can be well-managed on a forest allotment. ■

*– Lisa Helme*

# Faculty reaction sought

Faculty reaction to curricular proposals submitted recently by the Commission on the Undergraduate Experience will be sought at an open forum sponsored by the University Curriculum Committee Feb. 16

The forum is scheduled from noon until 2 p.m. in Room 224 of the Lory Student Center.

The UCC's purpose is to gather faculty suggestions and views on any aspect of the proposals, especially on proposed changes to the University Studies Program and on three new initiatives, said Tom Sneider, UCC chair.

Changes include dropping "B" list courses from the University Studies Program and requiring a university orientation course for new students, a public speaking course and some form of experiential learning. New initiatives seek to tighten the focus in certain upper-division credits taken outside a major, to integrate more writing and speaking into advanced coursework and to require a senior "capstone" course.

The full proposals are available in department and college offices and on CSU Gopher under the "On Campus Academic" listing. ■

# Business Forum Day to focus on changing work force

Over the past decade, economic experts have acknowledged that hiring flexibility is a must if U.S. companies are to compete.

On Feb. 16, an expert on the subject from Manpower Inc., the nation's largest employer, will be at Colorado State to discuss temporary hiring and how it is changing American business.

Terry Hueneke, executive vice president with Milwaukee-based Manpower, is just one of the attractions at the Colorado State Graduate Business Council's fourth annual Business Forum Day. The forum will be in the Lory Student Center's East Ballroom.

Morning panels will focus on financing in international business and marketing and social responsibility in the brewing industry. In the afternoon, panels will focus on business and the environment and the information superhighway.

Jennifer Beccard, faculty adviser to the Business Council, said she is glad the conference was able to attract Hueneke and such a diverse group of panelists. Manpower is paying Hueneke's travel expenses.

"No job is secure these days," Beccard said. "You're going to have to change employers many times in your career. This can be a good thing.

"Sometimes you're getting more experience, and that can make you more marketable."

Hueneke is responsible for Manpower's network of 1,100 offices in the United States and Canada. Earlier this month, the company issued 740,000 W-2s for people it employed in 1994.

Temporary hiring companies no longer are devoted mainly to placing clerical and low-skill workers. These days, temporary firms place laid-off executives, students seeking summer employment and others looking to change careers.

All seminars are free and open to the public. Luncheon tickets are $7.95.

The conference is 9 a.m. - 5:30 p.m. The luncheon is 11:30 a.m.-12:45 p.m. People seeking more information may call Sarah Mace at 491-2994.

A complete lists of panels follows. All meetings are in the Lory Student Center Ballroom.

- "Financing in International Business," 9-10 a.m., with panelists Margie Florentin of 1st Interstate Bank, Joe Beal of Storage Technology of Boulder and Robert G. Spagnola, assistant professor of management at Colorado State.
- "Marketing and Social Responsibility of the Brewing Industry," 10:15-11:15 a.m., with panelists Roger Harvey of American Eagle Distributing, Mark Sluss of Coopersmith's Brewing Co. and Ed Menges of Coors Marshall Distributing Co.
- "Business and the Environment," 2:15-3:15 p.m., with panelists Mike Brown of Patagonia Inc., Richard Williams of the American Plastics Council and Damon Judd of Rust International.
- "Information Superhighway," 3:30-4:30 p.m., with panelists Marla Meehl of the National Center for Atmospheric Research, Richard Artz of Hewlett-Packard and Larry Buchanan of the Poudre R-1 School District.
- Slide presentation on the environment, 4:30-5:30 p.m., by Patagonia. ■

*– Chris Burnett*

## FYI

### Ceremony on TV

Colorado State's Feb. 7 convocation ceremony has been videotaped and will be aired from 5-6 p.m. Feb. 10, 11 and 12 on Poudre R-1 Channel 10; 6-7 p.m. Feb. 11 and 12 on Colorado State University Channel 25; and at 5 p.m. Feb. 11 and 12 on City of Fort Collins Channel 27.

### Graduation deadlines set for grad students

Deadline dates are approaching for graduate students to apply for spring semester graduation.

Graduate students must complete GS Form 25 (Application for Graduation) and GS Form 25A (Diploma Name Form) by Feb. 24.

A Final Examination Form and a copy of the thesis or dissertation must be submitted by April 5.

Further information: Gary Kraft in the purchasing department at 491-1521.

### Israel-Colorado luncheon

The agricultural and economic relationship between Israel and the United States will be the topic of a luncheon Feb. 13 in Fort Lupton.

The luncheon is scheduled from noon to 2 p.m. at the Branding Iron restaurant, 11 First St. The luncheon is free, but reservations must be made by Feb. 10. To register for the luncheon, call the Colorado Wheat Administrative Committee at (303) 740-4343. ■

### Office supplies contract

The university's purchasing department reminds campus units that office-supply purchases should be made from Eastman Inc., which currently holds the state office-supply contract. Office Depot no longer accepts university purchasing documents.

All items in the Office Depot store in Fort Collins are available at the same price through the Eastman catalog. Eastman will deliver any size order within one day at no additional charge.

A new state contract for office supplies is being evaluated. Results of that evaluation will be announced March 1.

Further information: Gary Kraft in the purchasing department at 491-1521.

## Open Positions

The following list of positions is provided by the Office of Equal Opportunity. However, the list may not be all inclusive because positions are announced in *Comment* only once. Check with OEO, Room 21 Spruce Hall, or Human Resource Services, Room 120 Student Services Building, for a complete listing.

**Research Associate - Natural Resource Ecology Laboratory**
**Deadline: March 10**
Contact: Arlene Boaman, 491-1982

**Assistant Director - Colorado State University Denver Center**
Deadline: March 24
Contact: Ralph Campbell, 436-9712

**Assistant Director - Asian/Pacific American Student Services**
Deadline: March 31
Contact: Blanche Hughes, 491-5781 ■


COMMENT

*Comment is published and produced by the Public Relations Department for the general faculty and state-classified personnel at Colorado State University. Publication dates are every Thursday – except during holiday breaks – during the academic year and three times during the summer.*

*All material for publication should be sent to* Comment *editor, Room 271 Aylesworth Hall, or COMMENT@vines.colostate.edu by 9 a.m. Wednesday the week prior to intended publication. Questions should be directed to the editor, 491-6432.*

*Comment is edited to conform to Associated Press news style.*

*Editor: Jim Bolick*




# Art department visionary retires

Perry Ragouzis' primary goal during his 29-year tenure at Colorado State was to give art a home on campus.

Colorado State's Visual Arts Building and the core art curriculum are ongoing testaments to his success in achieving that goal.

Ragouzis, department chairman from 1966-75, retired New Year's Eve from Colorado State. A reception honoring his contributions to the art department was held earlier this week.

One of Ragouzis' first goals as chairman was to establish a home for Colorado State art students. When he began his tenure, art classes were scattered across campus, with many courses taught in Old Main.

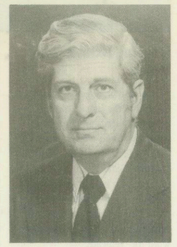
"Art was taught in every attic and basement from Lake to Laurel streets," recalled Phil Risbeck, current art department chairman.

"When I came to Colorado State, I expressed my concern at the arrangement of the department and was assured that finding a permanent home for the department was a priority," Ragouzis said.

Before Ragouzis could make a new building a reality, he had to make sure the department's foundation – its curriculum – was sound.

"At that time, the curriculum did not meet r. ional standards for accreditation," he said. "The art faculty needed to update and expand the curriculum before planning the new building."

Ragouzis involved faculty and students at all levels for a restructuring of the department's curriculum. In addition to the bachelor's of art degree, the department established a bachelor's of fine arts and a master's of fine arts.



*Perry Ragouzis*

With the curriculum in place and with support from the Colorado Citizen's Committee for Art, the department began planning and fund-raising for the Visual Arts Building.

The building, constructed in two phases, was completed in 1975. With 14 separate wings and courtyards, the Visual Arts Building celebrates its 20th anniversary this year.

"Perry has been a very articulate spokesperson for the visual arts on campus, in the community and around the state, and he continues to be," Risbeck said.

"He wanted to give art students a functional building, a place where art could be produced without worrying about messing things up," Risbeck continued. "He played a key role in shaping the department as we know it, and we want to recognize that." ■

*– Christine Westphal*

# *Campus group requesting award nominations*

The Committee for the Minority Distinguished Services Award is accepting nominations for the 1995 Minority Faculty Distinguished Services Award.

Purpose of the award is to honor ethnically diverse individuals who have made outstanding contributions to their professions and to the minority community. Each year, an administrative professional and an academic faculty member are honored.

The committee is asking for nominations of any ethnically diverse academic faculty member and/or administrative professional faculty member by March 10.

Nomination forms have been mailed to general faculty. Further information or additional forms can be obtained from Teresa Neely, committee chairwoman, 116 Morgan Library.

Nomination material should outline a person's service within the university and community that has served to:

- enhance the awareness and status of individuals and groups that are ethnically diverse;
- foster acceptance and understanding between the majority population and persons of color; and/or
- strengthen multicultural and inclusion efforts for underrepresented people.

Awards will be presented at a luncheon April 19. ■

# Paper shortage looms

High paper costs and scarce paper supplies might provide hard-copy users the impetus to move into the realm of electronic communications, said Larry Bauer, Colorado State University purchasing agent.

Purchasing department agents are scrambling to fill paper orders in the face of open-market increases between 25 percent and 50 percent, Bauer said.

Deliveries that formerly took two or three days are now taking two to five weeks, said John Schneider, purchasing department director.

Virgin copying paper, the largest type used on campus, will increase from $1.67 to between $2.40-$3.30 per ream, Schneider said. Every department that uses paper will absorb the increased cost.

Bauer sent a request over the university's electronic mail system for users to look for ways to decrease consumption of paper, such as copying on both sides of the sheet or questioning whether copies must be made at all. ■

*– Paul Miller*

# Committee approves higher-education reform bill

The House Education Committee on Jan. 30 approved the higher-education reform bill, HB 1191, which proposes to accommodate increases in enrollment and establish a mechanism to increase the accountability of higher-education institutions.

The committee offered 10 amendments to the bill, some of which are substantive changes. For example, one amendment allows for each institution's role and mission to be taken into account when determining the goals and objectives that must be met to secure additional funding.

Danny Tomlinson, lobbyist for the Colorado State University System, described the bill as a step in the right direction.

"We're encouraged by the progress that's been made with the bill, and we will continue to work with the sponsors on this issue," he said.

HB 1191 now goes to the House floor for second reading.

Also Jan. 30, a floor amendment was offered to HB 1196. HB 1196, sponsored by Rep. Tim Foster, R-Grand Junction, establishes the five higher-education policy areas for fiscal year 1995-96. All but one of the areas are carryovers from 1994. Development and the use of technology is the new policy area.

The floor amendment raises Colorado State University's admissions "window" to 25 percent for incoming and transfer students, which means those students could be admitted with an index below 103, the normal requirement, if they demonstrate a strong probability of success at the university. This amendment would apply only to Colorado State.

That amendment was needed, Tomlinson explained, because of Colorado State's unique land-grant mission.

"Since we're the 'people's college' of Colorado, this amendment is consistent and helpful in meeting the university's statutory mission," Tomlinson said.

Additionally, Sen. Bill Thiebaut, D-Pueblo, got his "free tuition bill" out of the Senate Education Committee. Feb. 1, the committee approved SB 23, Thiebaut's "first step toward providing free higher education to all." The bill proposes to grant free college tuition to qualified Colorado students who graduate in the top 10 percent of their high school classes.

While committee members applauded Thiebaut's effort, several expressed concerns about the bill's cost. Sen. Ben Alexander, R-Montrose, commented, "Nothing is really free."

SB 23 was approved on a 3-2 party line vote. The Republicans hold a 4-3 majority on the committee, but two Republicans missed the vote. Because of its multimillion dollar fiscal note, the bill must pass through the Appropriations Committee before it can be sent to the floor. ■

*– Amy Mueller*

# *Pingree Park losses set at $2.4 million*

Revised estimates of damage caused by a forest fire last year at Pingree Park total $2.4 million to date, said Bill Bertschy, Pingree Park director.

The Hourglass Fire of July 1994 destroyed 13 buildings and burned more than 1,200 acres of forest in the area. The fire started after lightning hit near the Hourglass Reservoir west of the Pingree Park campus. No injuries were reported, but 190 people were evacuated and most of the 60 conferences scheduled for the summer were canceled.

The revised estimate includes $1.8 million for lost and damaged structures; $344,571 for building contents; $241,745 for facilities, housing, supplies and Pingree staff labor; $190,785 for 1994 net business loss; $12,000 for computer systems; and $1,968 for food inventory. An additional settlement will be made to bring the buildings up to current code standards.

Original estimates placed damage at about $3 million, which included an estimated $500,000 in lost business.

"Depending on the weather, we could start rebuilding in April," said Pat Rastall, Pingree Park associate director. The completion date for construction tentatively is set for December.

"This summer, we'll have only a third of the normal number of groups using the campus, and that's an optimistic estimate," Rastall added.

*The Hourglass Fire created a buffer around half the campus and reduced the danger of future fire hazards to the buildings.*

Water, sewer and food service facilities are fully operational, but the number of beds available for guests is limited, Rastall said.

"We lost nearly 200 beds from the fire, 120 from the Conference Center buildings and 70 from the North Dorm. We can comfortably accommodate about 70 people right now, but many of those beds are in student cabins and can best be described as 'rustic.' They're normally used for natural-resources students who come up for 10 weeks in the summer.

"Rebuilding our housing facilities is obviously one of our highest priorities."

The Hourglass Fire created a buffer around half the campus and reduced the danger of future fire hazards to the buildings, Rastall said.

While mild winter weather means rebuilding efforts could begin early, Rastall said the disadvantage of mild weather is the lack of moisture.

"It would be nice to start construction as early as possible, but we'd really rather have the snow to build up moisture. Otherwise, the fire danger could get out of hand again in a hurry."

With luck, the Pingree Park campus should resume a full schedule of classes and conferences by spring 1996, Bertschy said. ■

*– Paul Miller*

# PREFACE

This document presents both an environmental impact analysis and suggestions for mitigating adverse impacts for expansion of the Pingree Park Campus, Colorado State University. Preparation of this report was requested by the CSU Physical Plant.

The chapters in the report focus on (1) the purpose of this analysis, (2) a description of planned expansion, analysis of specific environmental components, and potential environmental impacts. A concise summary of potential impacts is provided beginning on page 129-133 of the report.

The following persons contributed to either the content or review of this report: A. A. Dyer, co-project coordinator; P. J. Brown, co-project coordinator; W. E. Lautenbach, co-principal author; M. D. McAnelly, co-principal author; T. L. Trembly, co-principal author; O. A. Parsons, soils and archeological reconnaissance and review; R. B. Johnson, geology and physiography review; J. A. Hayward, hydrology review; F. W. Mogren, vegetation review; J. S. Barrows, fire hazard review; D. Hein, wildlife review; W. E. Marlatt, climate and air quality review; G. J. Coutant, visual review.

CONTENTS

## REVIEW COMMENTS

The following comments were submitted by reviewers of the draft EIA. Where they made recommendations for specific changes in the text and tables, changes were made in the document. Other comments reflective of the concern of reviewers over development of the Pingree Park Campus are below. These comments and suggestions should be viewed as an integral part of this EIA.

### Description of Development Program

General Planning Assumptions - page 5.

The "reason for being" of the campus stated in item number six on page five of the analysis should be the key in planning development of the Pingree Park Campus. The mountain setting which makes the area a valuable educational resource also presents critical constraints which should be recognized if the value is to be preserved and enhanced.

Planning for use and development of the campus should be coordinated with the preparation of a master plan for the facility considering not only immediate expansion plans, but the long range development and use of the area. (G. J. Coutant)

Current Plans - Roads, Traffic and Parking - page 12.

The existing road system is very poor, confusing and needs to be improved. The campus needs a good arrival point where the public and users can get information; this needs to be provided with a good turnaround. A complete study of the campus circulation patterns (existing and proposed) needs to be prepared. This is especially true with regard to the proposed conference center. The center is very generally located on the map; this is not enough considering the development that is now underway.

The parking lots create a large open space on the landscape which does not relate to existing development. Smaller lots that relate to land form would be much better. This will reduce the

total impact. Large parking areas prove concentrated runoff in an area where there is considerable rain during the season of greatest use.

Pedestrian traffic channeled along the established routes sounds very good, but experience has shown us that the people will take the shortest route or line of least resistance. A study should help to give us this information. The surface of the major pedestrian routes should be surfaced to prevent erosion. (G. J. Coutant)

## Analysis of Environmental Components

Soils - Lodgepole Pine Woodland - page 38.

With development of the area, increasing traffic by pedestrians will cause compaction in this unit that can become a major problem resulting in the death of the vegetation. From the studies done by Herrington and Beardsley in Northern Central Idaho, some additional management considerations should be given this area in as much as the growth season is very short.[1]

[1]Herrington, Roscoe B. and Wendell Beardsley. 1970. Improvement and Maintenance of Campground Vegetation in Central Idaho. USDA F.S. Res. Paper INT-87, 9 p. illus. (G. J. Coutant)

Vegetation and Fire Hazard - Revegetation of Disturbed Areas - page 72.

If it is at all possible, the existing duff and surface soil should be stockpiled and replaced since there will be a seed source in the parent materials. Additional seed of indigenous species is necessary to complete revegetation.

The use of rock in the disturbed areas should be encouraged. Large boulders are located throughout the area. The retention of a natural appearance is necessary to the site. (G. J. Coutant)

Vegetation and Fire Hazard - Regulation of Campus Use - page 77.

This topic should be a major point under Specific Planning Assumptions. As use increases, the need for active play areas will increase. Considering the wide variety in user groups expressed on page seven, serious consideration will have to be given this topic. (G. J. Coutant)

Vegetation and Fire Hazard - Fire Hazard - page 77.

There is an opportunity to create firebreaks around the development on those sides not already developed. These breaks should be developed to relate to the landscape without any straight lines or tangents. Several techniques are currently being used by the Forest Service (USDA). (G. J. Coutant)

The following additional measures should be taken in order to reduce wildfire hazard severity at the Pingree Park Campus:

1. A standard fire weather station should be operated at Pingree during the fire season. With this weather data, the National Fire Danger Rating System (NFDRS) can be utilized to prepare daily fire danger ratings, and in development of fire preparedness plans and actions coordinated with the U.S. Forest Service.

2. Fire weather forecasts should be obtained daily and used with the NFDRS.

3. Fire prevention and fire pre-attack plans should be prepared in coordination with the U.S. Forest Service using input from the NFDRS.

4. A fuel inventory should be performed for the fuel complex within and around the campus, rating fuels according to potential rate-of-fire spread and resistance to control using the NFDRS fuel model.

5. A fire behavior model should be prepared for specific fuels, topography, and fire danger ratings at Pingree. The model should be utilized in fire attack planning, coordinated with the U.S. Forest Service.

6. Installation of fuel breaks of aspen or other fire resistant vegetation should be considered as part of long-range vegetation and fire management programs. Such fuel breaks would reduce fire hazard while enhancing aesthetic values. (J. S. Barrows)

Wildlife - page 87.

The impacts of Pingree Park expansion on wildlife can be minimized by enforcing strict regulations for all campus visitors. These regulations should:

1. Prohibit the collection of natural objects such as wildflowers in the camp area,

2. Prohibit all pets,

3. Ban all firearms,

4. Prohibit picnic fires and littering in the area, and

5. Prohibit unnatural feeding of wildlife in the camp area by controlling garbage sites and banning bird feeders. (D. Hein)

Visual - Parking Lots - page 112

Any additional parking facilities should be developed in a new location to reduce the impact of such a large surfaced area. Small units would be more in keeping with the environment. (G. J. Coutant)

Visual - Future Conference Facility Location

The comments with regard to the future conference center (page 118-120) should be given a great deal of consideration. (G. J. Coutant)

Visual - Visual Summary - page 121.

A more complete visual analysis should be made of the site that includes the major and minor visual attractions, ecotones, and the best locations for use from a visual perspective. This would be helpful in determining the location of parking facilities, utilities, structures, and of elements. The work that has already been done is a very good start in this regard. (G. J. Coutant)

Historic and Archeologic - page 122.

References to "archeological evaluation" are based only on reports from various persons saying they did not know of any such sites. No actual field survey for location of such sites has been carried out. According to both state and federal law this needs to be done before any state and federal monies are used in construction. (O. A. Parsons)

## Alternatives

Alternatives - page 127.

Has adequate consideration been given to alternate sites for a year-round conference center? In particular, the Maxwell Ranch is owned by CSU, closer to Ft. Collins, accessible all year via paved highway, cheaper to provide utilities and construction, in a natural setting with attractive mountain views and cheaper to service and maintain. Why not develop Pingree for use only by groups who need that particular location and divert to Maxwell Ranch those developments and users who only need any pleasant, off-campus site. Retreats and conferences need not be held at Pingree. Why not hold environmental impact there to a minimum by developing only to serve users who must have a high mountain area for education and research. (D. Hein)

I support the recommendation that the University institute a use policy which will maintain the high natural quality of the Pingree Park Campus.

I did not see any alternative to the development of this facility discussed in the analysis. I think this is a mistake that must

be corrected before the analysis is released to the public. The University can be criticized quite severely for this shortcoming in the statement. (G. J. Coutant)

## General Comments

Development Plan should include special provisions for control of visitors. Much of the impact now is not from residents of the camp but from casual and official visitors (even CSU administrators) who visit the Pingree Campus and don't observe rules. They litter (I've observed this); they bring pets (against the rules) which I have observed chasing and even killing wildlife; they pick flowers, build fires, and drive on fragile vegetation. I expect this destructive impact of short-term visitors (officials, families and friends of camp residents, construction and maintenance workers, etc.) to be much more serious than increased number of faculty and students. So far there is no indication of adequate regulations in this respect. (D. Hein)

Too bad the impact study wasn't completed before the development proceeded. Same old story, even CSU. (D. Hein)

I have no additions to your treatment of the probable impacts of the construction aspects of the proposed expansion and improvement of the Pingree Park Campus.

I do strongly suggest that there will be significant induced impacts associated with the influx of additional people at the Pingree Park site. I strongly suggest that you note the need for an aggressive people management program aimed at mitigating induced impacts on vegetation, wildlife, and sensitive areas. (E. W. Mogren)

# PROBLEM STATEMENT

## Objectives

The charge given to the team conducting this environmental assessment was to evaluate the expected impacts on natural systems associated with construction and use of expanded facilities at the Pingree Park Campus of Colorado State University. The study has been undertaken in response to a request from the CSU Physical Plant and examines the impacts of development on several resource factors. Impact assessment has been accomplished in two phases: (1) an inventory of available information on the natural components of the Pingree Park environment, and (2) evaluation of the interaction of development plans with these natural components and assessment of foreseeable effects.

## Scope

The following natural components of the Park have been evaluated:

Geology and Physiography
Soils
Hydrology
Vegetation and Fire Hazard
Wildlife and Fish
Climate and Air Quality
Visual
Historic/Archeologic

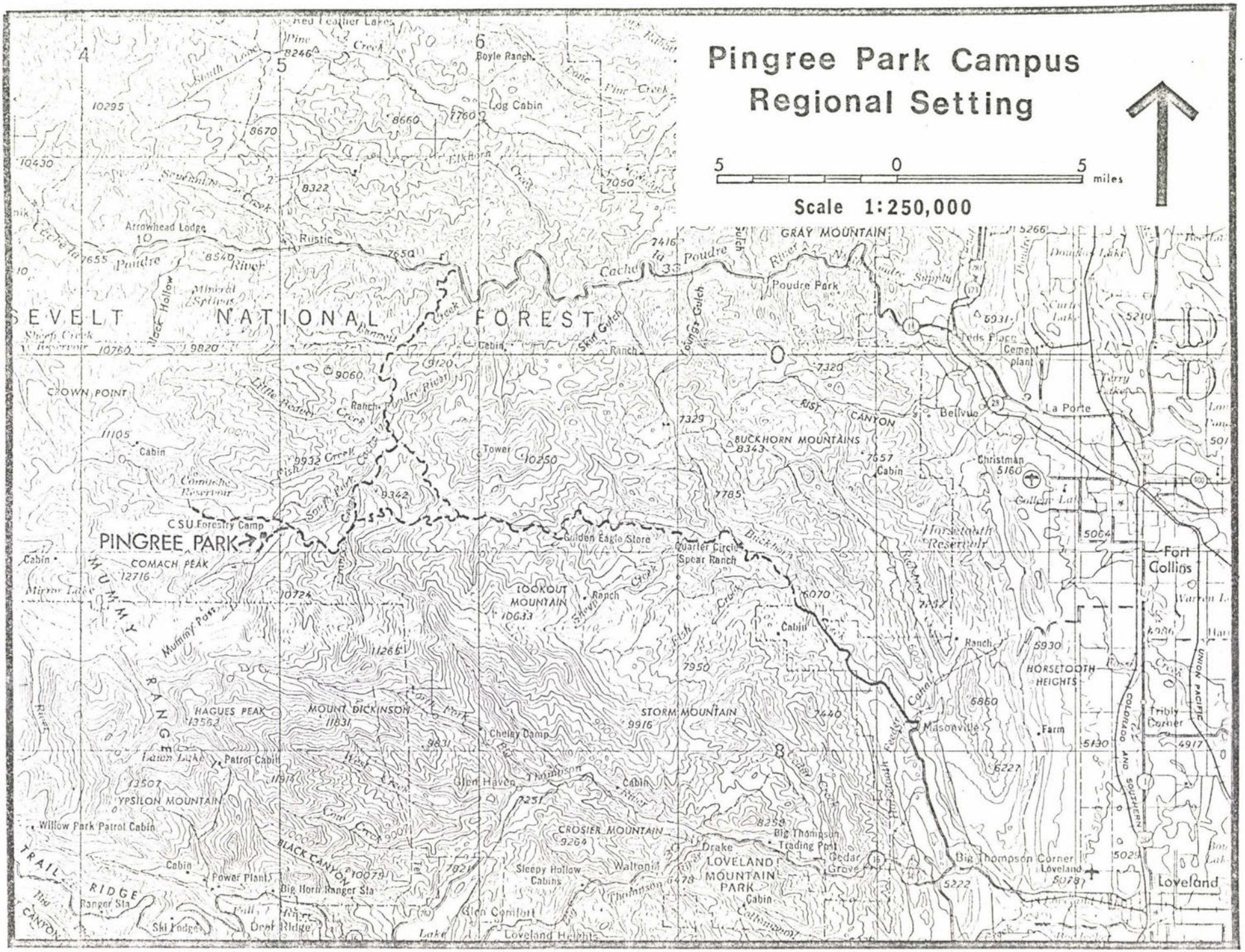
Geographic scope of the study is limited to the campus property owned by Colorado State University. However, the general information and recommendations are applicable not only to the existing campus but also the immediate surrounding area.

## Limitations

Assessment of impacts and recommendations in this report are based upon presently available information on natural resources at Pingree Park. Neither sufficient time nor funding was available to conduct basic detailed inventories of the site. There are only limited data available for some of the Park's resources. Even so, more information is available for the area than would commonly be known about most development sites. Augmentation of the natural resource data base can be accomplished by summer camp students and faculty or other researchers. This will improve our understanding of the interesting components of the campus' natural environment and increase our ability to assess the potential effects of future activities. The benefits of this information gathering effort are proportionately greater than the associated costs, particularly considering the practical experience in natural resource inventories gained by student participants.

## DESCRIPTION OF DEVELOPMENT PROGRAM

To establish an effective procedure for assessment of environmental impacts associated with operation and expansion of the Pingree Park Campus, it is necessary to fully understand the University's short- and long-term planning goals for the facility. This portion of the impact analysis brings together salient facts and information which have been discussed in other reports prepared since the inception of the facility expansion program. Duplication of information in this assessment is for the benefit of those who would otherwise be burdened with sorting through other miscellaneous reports on the proposed expansion.


Pingree Park Campus
Regional Setting
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Scale 1:250,000
PINGREE PARK
CSU Forestry Camp
COMACH PEAK
12716
CROWN POINT
11105
HAGUES PEAK
13562
MOUNT DICKINSON
11831
YPSILON MOUNTAIN
13507
LOOKOUT MOUNTAIN
10633
STORM MOUNTAIN
9916
CROSIER MOUNTAIN
9264
LOVELAND MOUNTAIN PARK
BUCKHORN MOUNTAINS
8343
GRAY MOUNTAIN
HORSETOOTH HEIGHTS
Arrowhead Lodge
Rustic
Poudre Park
Bellvue
La Porte
Christman
Fort Collins
Loveland
Big Thompson Corner
Big Thompson Trading Post
Golden Eagle Store
Quarter Circle Spear Ranch
Masonville
Glen Haven
Chelsy Camp
Sleepy Hollow Cabins
Big Horn Ranger Sta
Willow Park Patrol Cabin
Power Plant
Ski Lodge
Glen Comfort
Loveland Heights
Waltonia
Drake
Cedar Grove
Tribly Corner
Mirror Lake
Lawn Lake
Patrol Cabin
Mummy Pass
Mummy Range
Horsetooth Reservoir
Sheep Creek Reservoir
Comanche Reservoir
Mineral Springs
Red Feather Lakes
Boyle Ranch
Log Cabin
Elkhorn
Tower
Cabin
Ranch
Farm
Trail Ridge
Big Thompson Canyon
Black Canyon
Colorado and Southern
Union Pacific

## General Planning Assumptions

1. Pingree Park is destined, as a part of CSU's development plan, to become an important year-round mountain research facility and resource management training center. As such, it is an integral part of the University's educational complex for the study of plains, foothills, and high mountain ecosystems.

2. The unique geographical location of Pingree Park provides an optimal setting for academic research and mountain resource management training. The campus is located in a scenic mountain area at an elevation of over 9,000 feet, approximately 41 miles west of the main CSU campus in Fort Collins. It is bounded by Roosevelt National Forest and adjacent inholdings of private land which could conceivably be acquired for future campus expansion. Rocky Mountain National Park is close by, and a variety of mountain study areas are accessible from the campus. Expansion of the Pingree Park Campus will allow increased utilization of this unique educational facility.

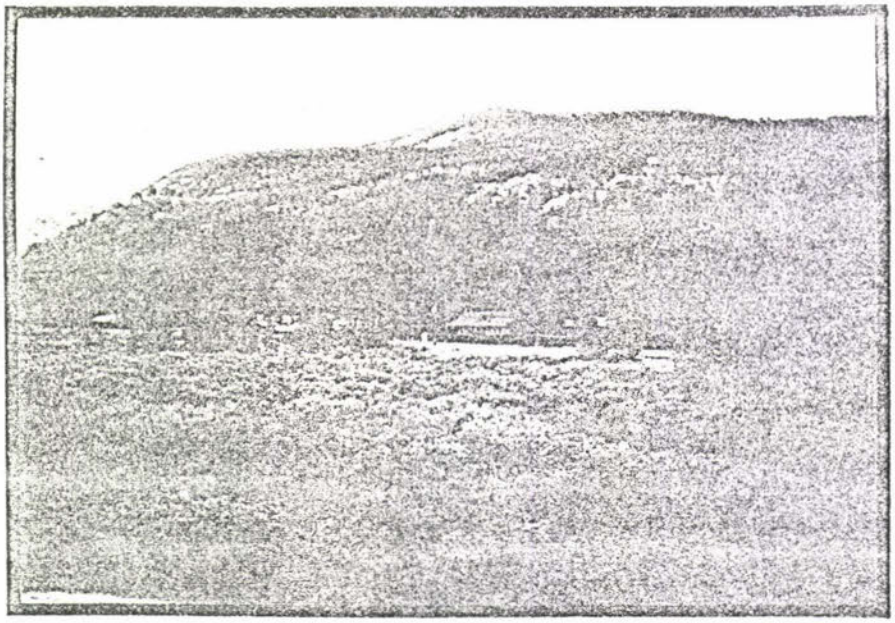
3. Man's growing urgency to know more about his environment has fostered consideration of the potential for developing Pingree Park into a High Altitude Conference Center. The possibility of developing the area into a self-contained interdisciplinary environmental research center with facilities for instruction and research in the fields of forestry, geology, geography, botany, zoology, atmospheric science

monitoring, hydrology, and high altitude physiological testing and education is very promising. Development of such a conference center at Pingree Park could make it an outstanding study center of its kind.

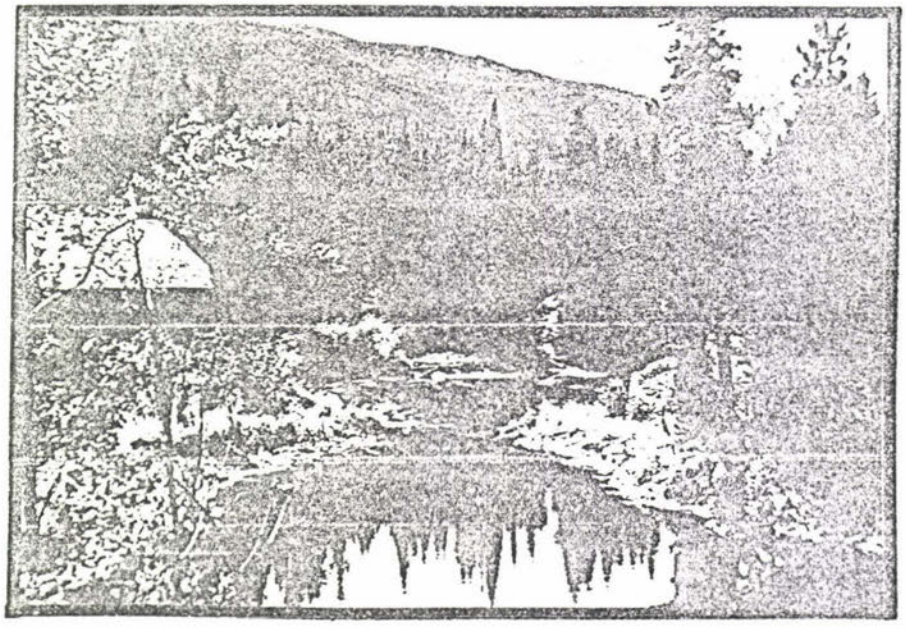
4. The psychological benefits of experiencing an environment isolated from the distractions of urbanized settings and enhanced by a pleasurable natural setting can stimulate creative thought. Such an aesthetic advantage complements the academic atmosphere present on the Pingree Campus.

5. The Pingree Park Campus has been an important facility for forestry-related educational programs since 1917 and has been increasingly used for field training of natural resource students.

6. A "reason for being" of the campus is the mountain resource setting. Current planning assumes continued use of adjacent lands as an adjunct to the campus but recognizes that the University must take steps to assure protection of key elements of the area through University ownership and restricted use of sensitive areas. Steps to insure continued high water quality and visual character of the setting are of utmost importance. The initiation of an aggressive land acquisition program and improvement of sewage disposal facilities on the campus demonstrate a responsible effort toward achieving this goal.



C.S.U.'s Pingree Park Campus provides a unique opportunity for academic training and research in a natural setting.



## Needs

In keeping with planning assumptions which are the basis for Pingree Park expansion, an increasing number and variety of groups are utilizing the campus. Expanded facilities are necessary to satisfy the needs of these groups. Past and present campus users include:

1. Forestry and Natural Resources Summer Camp.
2. Summer Institute in Field Biology for College Teachers.
3. Forest inventory groups (two-week training session).
4. Two three-week long programs for students and staff from the Cherry Creek School District of Denver.
5. Field Biology Camp conducted by Creighton College.
6. CSU College of Business Shortcourse.
7. Academy of Science Aero-Biology Group Plenery Session.
8. Youth Conservation Corps.
9. Natural Science Alumni Mini-College.
10. Poudre R-1 School District Science Camp.
11. Other short-term use by a number of small groups.

A questionnaire sent to the Deans of each College and comments expressed by past Pingree Park users indicate a great positive interest in continued utilization of the facilities. The season of desired general use indicated by this survey was from May 1 to December 1. Some research activities, however, will continue throughout the year.

## Specific Planning Assumptions

1. The Park, as a part of total University planning, is to become a major teaching, research, and conference center for those programs needing the environment of this unique setting.

2. Season of Use: The season for general use will be from May 1 to December 1, though some research activities will continue throughout the year.

3. Access: Roads to the Park must be kept open during the season of general use. Snowmobiles will be used during the off-season period when needed.

4. Location of Development: Except for the conference center (which is not included in the current phase of campus expansion), all facilities developed under this plan will be located on the west side of the Little South Fork of the Poudre.

5. Maximum Planned Capacity: The College of Forestry estimates Summer Camp attendance at 200 students for each of two sessions, with the overall period of use being mid-June to mid-August. This is also the period of greatest demand by other activities. The Natural Resource Summer Camp Program must continue to have priority of use. Ability to eventually accommodate 200 students in addition to the Resource Summer Camp students during this period is essential if the Park is to fulfill its potential. These additional facilities should be built as demand justifies. Therefore, the following capacities have been used as a basis for assessment of potential impacts:

   (1) Students (including research) -- 400

   (2) Faculty and Staff -- 60 with no more than 30 being provided family quarters. Assuming the average family size is 4, the total number involved is 150.

(3) Total planned campus capacity at any given time is 550.

At the present time 40 new bedrooms are being added. These dormitories will be winterized and will house between one and four persons per bedroom depending on the needs of user groups.

6. Type of New Construction: The short building season and the distance from Fort Collins make costs of conventional construction very high. Prefabricated or pre-cut buildings of a standard design are to be used. Care must be taken to see that the outside appearance of these buildings fits the setting. These are to be used for student housing, family quarters, classrooms, etc.

7. Traffic and Parking: Vehicular traffic and parking in the main campus area is to be eliminated or severely restricted except for service vehicles. Footpaths are to be developed.

8. Winterized Facilities: The extended season requires some winterized facilities which are to be grouped in a central core.

9. Conference Center: The facilities developed under this plan can accommodate conference activities for some time to come. If experience over the next few years shows sufficient demand, a self-contained conference center should be built to the east of the stream. The main campus can thus be freed for other activities. Details of this conference center are not included in this plan.


16-11-5
16-11-6
16-11-7
16-11-8
16-11-9
16-11-10

# PROPOSED EXPANSION OF FACILITIES

# PINGREE PARK

## CAMPUS PLAN

SCALE 1" = 200'

CAMPUS FACILITIES

| Existing | Proposed |
|---|---|
| 1 through 10 FACULTY CABINS | 64 SOUTH PARKING AREA |
| 11 TYCONDEROGA CABIN | 65 NORTH PARKING AREA |
| 12 through 35 STUDENT CABINS | 66A SEWAGE TREATMENT PLANT |
| 36A, B, C, and D WINTER RESEARCH LAB | 66B WATER TREATMENT PLANT |
| 37A and B DUPLEX CABIN | 66C MAINTENANCE SHOP |
| 48 SOUTH DORMITORY | 67A and B CENTER/CLASSROOM BUILDING |
| 49 NORTH DORMITORY | 68 LABORATORY WELL |
| 50 WATER TANKS | 69 FUTURE WELL |
| 51 FACULTY WASHHOUSE | 70 LIFT STATION |
| 52 SOUTH CLASSROOM | A1, 2, and 3 8-BDRM DORMS |
| 53 WATER PUMP | B1, 2, 3 and 4 4-BDRM DORMS |
| 54 THE CAVE | WATERLINES |
| 55 RESEARCH LABORATORY | FUTURE WATER LINES |
| 56 NORTH CLASSROOM | SEWER LINES |
| 57 OBSERVATION SHELTER | FUTURE SEWER LINES |
| 58 WEATHER STATION | RELOCATED POWERLINE |
| 59 DINING HALL | |
| 60 MAINTENANCE AND RECREATION HALL | |
| 61 POWER HOUSE | |
| 62 STUDENT WASHHOUSE | |
| 63 FUEL PUMP | |

PROPOSED CONFERENCE SITE

LITTLE SOUTH FORK OF THE POUDRE RIVER

ROENIG RANCH

## Current Plans

The following discussion covers each aspect of development in some detail, giving existing conditions and current plans for expansion.

1. Roads, Traffic and Parking: The existing road system will be retained. Traffic within the student area will be severely restricted. The main parking lots now located in the center of the student living area will continue to be used until parking lots adequate to handle the complete load are developed within the service area near the north entrance. These lots are currently being constructed. A new access road will be constructed to connect these lots with the main entry road. Footpaths are to be established and improved. This will channel pedestrian traffic along established routes and help preserve the natural environment.

2. Student Housing: Presently there are two relatively new dormitories with adequate lavoratory facilities. The North Dormitory has a capacity of 40 and South Dormitory has a capacity of 48. Both dormitories are in good condition.

There are also 24 four-student cabins. The 16 cabins between the research laboratory and the dining hall are in a state of disrepair and are scheduled to be renovated. Lavatory facilities near these cabins are inadequate and need to be replaced. The 8 four-student cabins south of the North Dormitory are in good condition and have adequate lavatory facilities available.

(7.)

The present total capacity of the dormitories and cabins is 184. The research laboratory has additional dormitory facilities for 20 research students, bringing the total present student housing capacity to 204. Dormitory space for 196 students must be added to reach the eventual planned capacity.

To help alleviate some of this need, seven new dormitories are being built north of the research lab. Four of these new units will be four-bedroom dorms and three will be eight-bedroom facilities. These new units will be winterized and able to accommodate from 40 to 160 additional persons.

3. Classrooms: Presently there are two classrooms. The North classroom will seat about 150 persons but is poorly suited for instructional purposes. This building was partially renovated several years ago. The South classroom has a seating capacity of 40 and has a small laboratory at one end. This building is in relatively good condition. There is a critical shortage of classroom space. To help meet this demand, a new classroom is being built near the research laboratory. This classroom will also hold about 150 persons. The new classroom will be winterized and designed as a multipurpose building. The classroom will be connected to a small lounge center where a fireplace will be located. Other classroom facilities may be built as demand justifies.

4. Dining Facilities: The present dining hall has a seating capacity of about 180. Although it is an old building, it

has been renovated and modernized during recent years and is in good condition. Kitchen facilities are excellent. By having two settings per meal this dining hall can easily accommodate 350 people. An addition to the seating area could increase this capacity still further. The main dining hall has been partially winterized for use in late spring and early fall.

5. Family Living Quarters: There are presently 13 family living units for general use, plus one family unit in the research laboratory. The duplex near the research laboratory is being winterized for extended use. Living quarters for the manager-maintenance attendant will eventually be located in the new maintenance area near the north entrance road. This facility will also be winterized.

6. Service and Maintenance Area: The present maintenance building is located near the dining hall in the heart of the student area. A site near the north entrance of the campus has been designated as the service area. A new maintenance building, sewage plant, water storage tank, parking lots and maintenance attendant's living quarters are being built in this area. This will eliminate much traffic in the student area and will provide some control of access to the Park. The buildings within this area are for use throughout the year and are being winterized.

7. Winterized Facilities: There is some demand for late spring and fall use. A major future use, particularly in the fall, would include conferences, workshops, etc. This use will

probably not involve large numbers of participants unless a number of these activities occur at the same time. In the past, the Park has been closed by the end of August so there is virtually no experience to rely on in predicting future demand for fall use. For this reason, it seems logical to start with facilities for a limited number, keeping open the possibility of increasing capacity as demand justifies. A campus planning committee recommended that winterized facilities with a capacity of 80 participants be developed initially. These facilities would include the multipurpose classroom, research laboratory, selected dormitories, and some faculty and staff housing. In addition, the maintenance building and manager-maintenance attendant's house will be winterized. The housing to be winterized includes the present duplex (Building 37) near the research laboratory and the newly constructed dormitory facilities nearby.

In effect, these improvements provide a conference center that can be used from late spring until December and research facilities that can be used throughout the year. For economy in development and efficiency in use, these facilities are grouped in a central core near the research laboratory.

The remaining buildings are to be partially winterized for late spring and fall use. There is ample evidence that these facilities could be used extensively by public schools and others. For example, Poudre R-1 School District is fully utilizing the present facilities during September and early October.

8. Water Supply: Presently the water supply for the Park Campus is not limited by the natural availability. Instead, it is restricted by the 7,600 gallon capacity of storage tanks and limitation of the surface pipelines. The water is conveyed to the facilities now by surface galvanized steel pipes running from the storage facilities located northwest of the beaver ponds. These pipes must be disconnected and drained at the end of each summer and reconnected each spring. The present system can only be used during the summer months which drastically reduces the period of possible campus use. Only the research laboratory has a year-round water supply. A winterized water supply must be developed if the period of use of the Park is to be extended as planned.

The water needs at Pingree Park are currently supplied by two wells. The river well which furnishes the major water supply to the campus has a pumping capacity of 42 gallons per minute. This well does not meet minimum health standards set forth by the Colorado Department of Health. Due to a spacing of less than 50 feet between the river and the well, there is insufficient margin between the well and stream for natural filtration and purification of the water. The well is being phased out for drinking purposes. Since water for fire protection on the campus must be obtained from a source other than laboratory well, it has been recommended that the river well be maintained for this purpose.

A second well at the research laboratory is considered adequate to meet the average daily demand of the expanded campus

in terms of quantity and quality for approximately 5 to 10 years. A backup well will be installed at a later date when either the water level in the first well is permanently lowered or when the need for an expanded capacity develops. The proposed location of the second well is further upstream to the south of the existing campus. This location has been selected to minimize potential pollution from the septic tank leach fields and other sources on the campus.

Other changes in the present water supply system include:

a. A 25,000 gallon water storage tank to be located in the service area next to the sewage treatment plant, but housed in a separate room.

b. A series of new distribution lines to all winterized facilities, wells, and storage tank will be constructed. These lines will be buried up to 8 feet below the surface of the ground with most of the excavation kept in existing roadways to minimize damage in the surrounding area.

In areas of the campus not proposed as a year-round facility, it has been recommended that the distribution lines be installed a foot below ground or covered with insulation so that service may be provided into the fall. These lines can be disconnected from the rest of the system during the winter months.

9. Sewage System: Septic tanks and leach fields are now being used throughout the Park but are inadequate to handle present sewage loads. The major problem with existing facilities

is that the septic tanks are undersized and the leach fields do not have an adequate percolation capacity. The operation of these systems results in surfacing of septic tank effluent in areas of the campus and unsanitary conditions characterized by foul odors.

Under the expansion program, sewage from the older facilities around the mess hall will be collected and pumped through a force main to the new sewage plant for treatment. The North Dormitory will also be tied in to the new sewage plant. The faculty cabins will not be included in this planned system. They are scheduled to remain on a septic tank system for an indefinite period.

The new sewage system includes an extended aeration treatment plant with a tertiary filter. This unit will be located in the proposed maintenance and shop area. An underground lift station and force main will deliver sewage to the treatment site and a leach field at the treatment site will be used to dispose of treated effluent from the plant. Collection lines will service most of the campus area. These lines will be buried three to eight feet beneath the surface to provide treatment service throughout the year.

10. Telephone and Powerlines: All phone lines have been placed underground within the last year. New powerlines on the campus are also being placed underground; however, older lines will remain above ground. In order to have one metering station on the campus and provide power for expanded facilities, a new

right-of-way is being proposed around the campus to the east. The present line cutting across the open meadow and stream will be removed. The new line will connect with the older lines serving the area at the northeast corner of the property.

## Summary

This plan calls for expansion of the Pingree Park Campus as a facility for general University and community use over an extended season of use, with research facilities open throughout the year.

The present planned capacity for late spring, summer, and early fall use is approximately 400 people including students, faculty, staff, and families. The winterized core for late fall and limited winter use will accommodate between 100 and 200 people.

Attempts have been made to safeguard the natural environment. Parking has been moved out of the main campus to a peripheral area and traffic will be greatly restricted. The planned development of buildings will utilize the area efficiently without overcrowding. In general the development is zoned into the student area, the family area, and the service area. The area east of the stream will be left undeveloped under the present plan, but a self-contained conference center may be built in the future. The remainder of the area should be left undeveloped permanently. If the demand in the years to come exceeds the planned capacity, additional development should be located in the area north of the service area which has been reserved for this purpose.

# ANALYSIS OF ENVIRONMENTAL COMPONENTS

## Geology and Physiography

### Geologic Setting

Pingree Park lies in a glaciated mountain valley of the Mummy Range, one of several ranges of mountains which make up the Front Range of the Rocky Mountains in Northern Colorado. The geology and physiography of the campus site are typical of many such high valleys in these mountains.

Information on the geology of the upper valley and nearby areas is presented in studies by Muscalo (1969), Beck (1969), Breckinridge (1969), and Kirst (1966). Analyses by Johnson (1962) and Nelson, Haley, Patterson, and Quirk, Inc. (1972) provide additional information on geology of the immediate campus site. Further detailed geologic investigation and mapping of the lower valley and campus site would be highly desirable. The paucity of information on the geology of the campus vicinity restricts the scope of this analysis.

The campus occupies meadows and waning slopes along either side of the Little South Fork of the Poudre River. Two or possibly three glaciations occurred in the valley during the Pleistocene Epoch, the earliest part of the Quaternary Period which began some two million years ago (Richmond, 1974). The surficial geology of the valley has been shaped by these glaciers and by the forces of erosion in the intervening years.

As the glaciers retreated they left lateral moraine deposits along the valley margins north and south of the campus. The meadow over which most of the property lies is thought to be a filled-in glacial lake (Johnson, 1962). The lake was created by morainal deposits which dammed the valley and trapped melt water from the retreating glacier. Over many hundreds of thousands of years the lake diminished in size and depth as the morainal dam eroded away and sediment washed from the surrounding mountains filled in the lake bed. Portions of the moraine are evident today east of the campus, while the lake has been reduced to a wet meadow along the meandering Little South Fork of the Poudre.

The surficial geologic materials of the valley consist of Quaternary alluvium of soil and sand along the stream, in elongated beds paralleling the stream, and in small coallescing alluvial fans resulting from stream deposition after spring thaws. The southern and easternmost portions of the campus lie on a glacial outwash deposit which forms the first terrace level and flood plain along the Little South Poudre. These glacial outwash materials are primarily sand and gravel with some coarse cobble (Nelson, Haley, Patterson, and Quirk, Inc., 1972).

The present buildings of the campus lie predominantly on a moraine of glacial till composed of clay, sand and gravel, and boulders, possibly with horizons of glacial outwash included in it (Nelson, Haley, Patterson, and Quirk, Inc., 1972).

The bedrock materials which underlie the surficial alluvium deposits consist of quartz-biotite schists, quartz-biotite-sillimanite schists, and a metamorphosed shale (Muscalo, 1969).

Potential Impacts and Recommendations

These surficial and bedrock geologic materials present both opportunities and certain constraints in planning development of the Pingree Park Campus. The ease of excavation and stability of materials underlying building sites are controlled by the texture and depth of the deposits. Movement of ground water is determined by fracturing in the bedrock, topography of the buried bedrock surface, and the thickness and permeability of the surficial materials.

Ease of Excavation. The glacial deposits contain a wide variety of particle sizes, ranging from fine silts and clays to large boulders. Because of the finer textured alluvial materials in the glacial outwash and lake deposits, excavation is less costly and time consuming along the first terrace level and flood plain of the stream. Substantially more difficulty may be encountered in excavating the coarser grained gravels and boulders of the moraine (Nelson, Haley, Patterson, and Quirk, Inc., 1972). Any excavation in bedrock would require drilling and blasting and should be avoided where possible.

The principal sewage collection lines and the lift station are located along the north periphery of the first terrace level, but the secondary collection lines running to the dormitories and other buildings extend into the moraine. Some excavation

in the moraine is unavoidable; however, locating the principal collection lines and lift station of the terrace has reduced the difficulty for a portion of the excavation required in the expansion program.

Differential Compaction and Settling. Artificial compaction of the surface of the morainal deposits may present some problems. Uniform compaction of the surface for foundations and any future pavement will be difficult. This is due to the boulders and larger rocks in the moraine which resist compaction efforts. After construction is completed some settling will occur and cracks may appear in foundations, walls, or pavement, allowing moisture to penetrate and possibly causing freeze-thaw damage and unwanted repair costs.

Two ways to moderate these problems of differential compaction are: (1) a layer of fill material consisting of uniform sand-sized particles can be spread over construction sites, permitting mechanical compaction and controlled drainage, and minimizing the effects of differential compaction, or (2) foundations can be designed to avoid settling altogether or withstand pressures caused by differential settling (Hill, 1974). A fill layer has been used at the site of the new package sewage treatment plant. Foundations for other new structures and the buried sewer lines which serve the buildings should be designed to accommodate subsequent settling.

Slope Stability and Erosion. Unconsolidated materials in the glacial deposits and alluvium are subject to minor creep when

natural slopes are steepened or otherwise modified to disturb their stability. Steep cut and fill banks may be prone to slope failure and gradual sloughing of material down the bank. Some of these materials may fail in a matter of days, while others may not collapse before several months have passed. In either case, eventual failure of even small banks can be expected if stabilization measures are not taken.

The unconsolidated materials are also susceptible to erosion when existing plant cover is removed or the surface is disturbed by grading. If stabilization measures are not taken, erosion can result in clogging and disruption of drainage channels, gullying, and reduced water quality in the Little South Poudre.

All of the planned new facilities are located on fairly level or gently sloping sites. A comparatively great amount of excavation and grading was required for clearing the north parking area site where the refuse dump was formerly located. Some shallow bank cutting and grading will also be required in construction of the south parking area and at the new dormitory sites.

Slope stability and erosion problems should be minimized by restricting the extent of cut and fill banks, graded areas, and heavily trafficked areas. Prompt stabilization of exposed banks and other disturbed areas with matting and revegetation or with rock coverings will prevent small gullies and rivulets from forming and hold exposed soil materials in place. Rock excavated during construction can be used to cover steep banks and other critical erosion areas. Construction vehicle traffic should be

confined to roadways and the minimal area needed for access to building sites. Only rubber-tired vehicles should be used, since tracked vehicles cause substantially more surface disturbance. Plant and soil disturbance should be restricted to those areas actually needed for construction.

Drainage should be planned so as to minimize runoff velocities and reduce erosion effects. Runoff should not be channeled down steeply sloping areas, but should be diverted onto level or gently sloping ground away from the stream where water will percolate into the soil or flow into natural drainage channels at low velocity. The steep bank above the Little South Poudre east of the north parking area is a particularly critical site in this regard.

Groundwater Pollution Potential. Very little is known about the nature of bedrock materials which underlie the campus site. Surficial deposits along the flood plain and the first terrace level are quite thick, ranging to at least 15-20 feet in some areas. Bedrock is much closer to the surface on the slopes above the first terrace level. The rock has low permeability and groundwater is transmitted along the interface between the rock and the more permeable surficial deposits, and through fractures and faults in the bedrock.

Pollution of this water can occur when inadequate septic tanks are placed in close proximity to the fractured rock strata. Ground water pollution potential is high where faults transmit water down-gradient from pollution sources and where permeability of the surficial materials is high (Waltz, 1972; Burns, et al., 1973).

Some pollution of ground water and surface flow in the Little South Poudre is very likely already occurring because of poorly functioning septic tank disposal systems on the campus. With proper maintenance, the new package sewage treatment plant will greatly relieve the situation. Sewage from all existing campus facilities and from other buildings constructed in the future should be treated at the plant. Sewage lines should have sealed joints to prevent effluent leakage as natural settling occurs after construction. Use of existing septic tanks should be ceased and the tanks sanitized to prevent further contamination of ground water by seepage of residual effluent.

Unique Landforms. The campus' geologic setting has obvious and significant educational value because of the presence of many classic erosional and depositional features typical of mountain terrain. Expansion and improvement of campus facilities will not detract from the value of these features and will allow exposure of greater numbers of students and other users of the campus to the educational setting. Trails and facilities should be designed to take advantage of vista points and provide convenient access to distinctive geologic features along the moraines and valley floor.

Geologic Summary

The combined glacial and alluvial deposits and metamorphic bedrock on which the Pingree Park Campus is situated pose limitations involving ease of excavation, differential settling, slope stability and erosion, and ground water pollution potential which must be considered in development plans. If the proposed expansion program is carried out in a manner which minimizes problems

of instability and erosion, associated negative geologic impacts should be minor. Foundations of new structures should be designed so as to accommodate subsequent settling of disturbed surface materials. The extent of bank cutting, grading, and heavy equipment traffic should be restricted. Disturbed areas should be promptly stabilized following construction with rock coverings or by matting and revegetation, and drainage plans should incorporate recommended erosion control measures.

If stabilization and erosion control practices are not incorporated in the expansion program during and after the construction phase, both short-term and long-term negative impacts may result. Sediment deposited on roadways and building sites by erosion and slope failure will require greater annual expenditures for maintenance, and differential settling of materials underlying structures may cause cracks to appear in foundations and walls. Water quality in the Little South Poudre and in the wet meadows and beaver ponds on the campus may be degraded by increased erosion and sedimentation.

Installation of the package sewage treatment plant will have the highly desirable effect of reducing potential pollution of surface and ground water in the Little South Poudre drainage. Expansion and improvement of facilities will also allow increased educational usage of the campus' geologic setting.

## Soils

Soils inventories for the Pingree Park Campus are virtually lacking. No thorough analyses for soils in the area have been conducted. General soils information for the mountain area in

which the campus is located is very general and non-specific (see Cooperative Watershed Management Unit, 1963: Mahoney, 1973). Although soils are frequently examined by natural resource students during the summer camp sessions, these investigations have not been catalogued for future reference.

A limited area of the campus was investigated by Empire Laboratories for structure location and foundation studies pursuant to the construction of new dormitory facilities north of the Research Duplex (Building 37). This study was quite detailed but confined to an area of less than 20,000 square feet (Empire Laboratories, 1974). For the proposed expansion (currently underway) the soils present pose little problem to construction activities provided proper care is taken in the selection of foundation materials and design. Soil textures, bearing properties, and water tables show little limitation for the proposed land uses. The Soil Textural classification used in this report differs from the U.S.D.A. textural classification utilized in the CSU reconnaissance survey. A chart comparing the two classification systems for both is shown on page 42.

The soils information prepared for this report is the result of a reconnaissance level survey of soils on the campus with the purpose of identifying important limitations of those soil areas for generalized land uses. No attempt has been made

to classify soils taxonomically or to determine chemical or physical characteristics by laboratory procedures. Generalized soil profiles for each of these areas are shown in the table on pages 43-46. The following materials are summarized descriptions of the sites and soil mapping units. These mapping units correspond to those shown on the Soils and Land Types Map on page 47.

A general description of the surficial geologic characteristics is discussed in the preceding section. The dominant features of the area include extensive morainal deposits of coarse to fine textured glacial outwash on the wet meadow and first terrace, coarse unsorted glacial tills above the first terrace and back under the woody vegetation. The depth to bedrock below these alluvially deposited materials is variable, but is generally considered deep for mountainous areas.

The soil areas may be considered under three major and three minor groups which have been identified by their dominant vegetative cover.

Major Units

1. Wet Mountain Meadow
   - Soil Unit A
2. Dry Mountain Grassland Benches
   - Soil Unit B
   - Soil Unit G
3. Lodgepole Pine Woodland
   - Soil Unit H
   - Soil Unit F

Minor Units

4. Pine Grassland Park

   Soil Unit C

5. Beaver Ponds

   Soil Unit D

6. Wet Aspen Grove

   Soil Unit E

Soils and Land Type Inventory

A. Wet Mountain Meadow. This area includes all of the Wet Meadow adjoining the Little South Poudre. It is poorly drained with dominant vegetative cover of willows and sedges (Salix and Carex). Water tables in this area are seasonally variable but are at or near the surface throughout the year. There are numerous old stream channels, small open ponds, and closed ponds filled with muck or peat. The soils are quite variable in depth of surface organic layers and depth to sands and gravels. Areas of dark colored (frequently mottled) silty clay loams and clays occur along old channel fill areas. These areas are usually bordered by bars of fine sands to fine gravels.

Many areas are also underlain by sands and muck having hydrologic characteristics of "quick sand."

High water table, organic matter content of the soils, and unstable soil conditions limit the use of this area to wildlife production and recreation. The area has historically been used for study and research of soils, hydrology, and vegetation.

This use may also be continued since the meadow is an excellent example of other high altitude wet meadow areas.

B. Dry Mountain Grassland Bench--West Side of the Little South. This area is located on the west side of the Little South and the wet meadow area. It is relatively flat to gently sloping. The vegetation of the area has been altered from past disturbances. Predominant plant materials include miscellaneous grasses and forbs. Heavy foot traffic and recent excavation for placement of the new buried sewage main has voided much of the area of vegetative cover.

Present use of the area is for recreation, including courts or field areas for volleyball and softball. The South Dormitory is also located here.

Soils are coarse textured gravelly or cobbly sandy loams and loamy sands. There are discontinuous lenses of very fine sands and silty sands. Flattened clay balls or lenses of up to four inches in thickness are also present locally.

The soils encountered in this reconnaissance investigation do not appear to have limitations for location of buildings. Proper engineering of foundations can conceivably overcome most problems.

On these soils there was no visible water table at the time of investigation. This would indicate that water tables are seasonally below 60 inches. Excavations for the sewage main through a portion of this area have altered subsurface water

drainage relationships (See Problem Area Map on page 58.) The seepage of septic tank system wastes to the east of the mess hall would seem to verify the existence of these discontinuous lenses of silty sands and clay materials which prevent adequate percolation rates for waste removal through the soil. According to local sources, the effectiveness of liquid waste removal has been reduced because of the installation of the new sewage main. The soil disturbance caused by the installation has blocked lateral movement of water and liquid waste materials from the septic tank filter field thereby increasing the effluent which has been surfacing between the mess hall and the sewage main pipeline.

C. Pine Grassland Park--Southwest Edge of Campus. This area is on the margin of the coarse morainal material near the southern part of the campus by Buildings 2 and 3. The site would probably be considered a dry mountain grassland. Soils here are somewhat similar to those in area "B" on the lower Bench except that there are a large number of gneiss, granites, and other glaciated igneous boulders of up to eight feet in diameter or larger. Presence of these coarse materials will hamper excavation work in this area. No test profiles were described for this area. Visual inspection of the area suggests that there are no significant drainage problems present.

D. Beaver Ponds. The beaver ponds on the western portion of the campus are the result of low spots which probably occurred between two morainal depositions. These low spots have been

filled with silts and clays to the extent that water is confined to the pond areas and drainage is greatly impeded. A number of small dikes and dams appear to have been constructed in the past as a result of attempts to enlarge or deepen the pond areas. These structures are in a state of disrepair and it would appear that they did not prove too successful.

No soil profile descriptions were made. It was not reasonably possible to get below the mucky peat fill of the pond areas. The area has many igneous boulders from two to six feet or larger in diameter.

It might be possible to drain these pond areas but the desirability of doing so would be questionable. Pond levels fluctuate through the year, the lowest levels being in the late fall through the winter. Any drainage efforts may prove unsatisfactory because the area would always be subject to surface runoff from adjoining slopes as well as some probable subsurface seepage from some of the upper slopes. Establishment of a drain through the surrounding boulder laden morinal deposits would be very difficult and costly.

At one point in the expansion plans for Pingree Park there was discussion of enlarging and deepening the beaver pond area to hold more water and reduce the fluctuation of pond levels. Subsequent planning documents have dismissed this planning alternative for unknown reasons. If this possibility is again given consideration, a thorough investigation of the physical

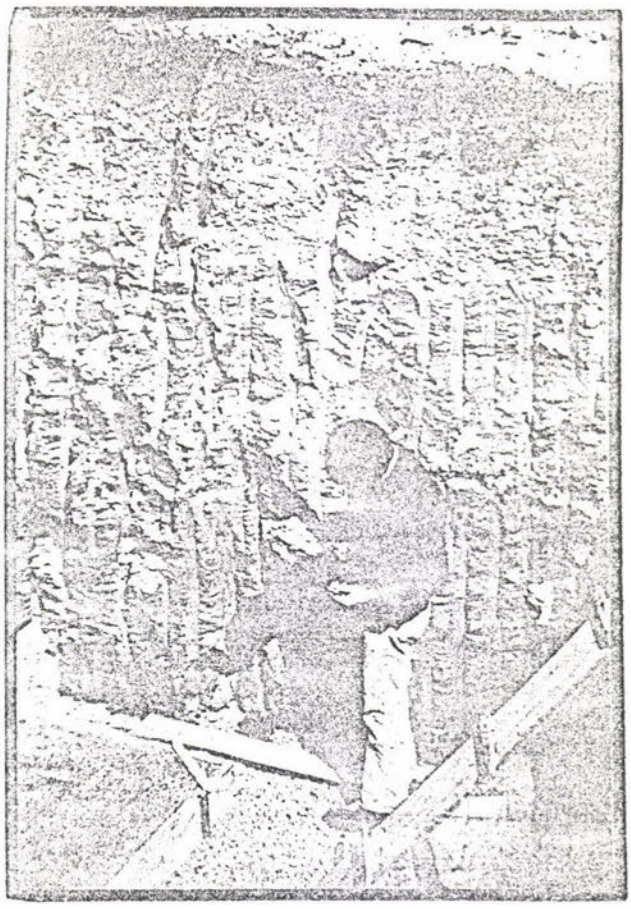
modifications required to accomplish this task should be conducted. As well, the objectives of modifying the area would also be in order.

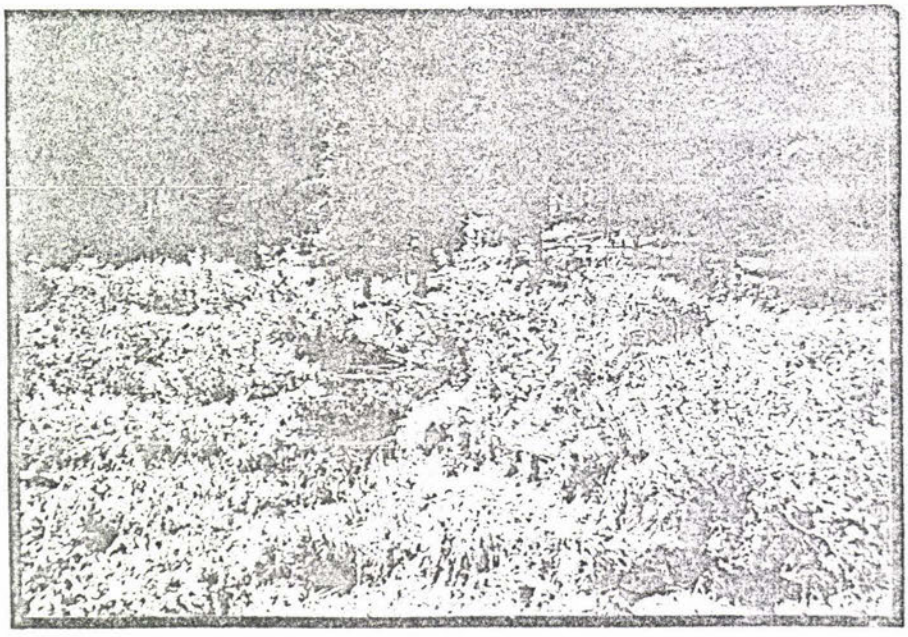
To enlarge the pond areas, there would be a great deal of excavation required. Fill of the pond bottoms would then be required to reduce subsurface seepage losses. Heavy textured soil materials would be required for sealing. Some of these materials are present on the site; however, it may be desirable to haul in montomorillinitic sealing clays (bentonite) specifically for this purpose.

Sources of water for filling and maintaining pond levels should also be explored as well as the season of availability of quantities of water.

In examining the objectives of any alteration of the beaver pond area, special attention should be given to results of modifying water regime, soil profiles, vegetation, and aquatic life. The excavation and fill required to accomplish enlargement and deepening of the ponds will significantly change ecological relationships which exist there now. The value of this area for study and research will be greatly changed by site modification. If present values of the area are to be maintained, the beaver pond area should remain in its present state. Land uses should be confined to wildlife production and a study area for ecology students.

Soil profile at the sewage lift station site shows sandy loam textured soil overlying silty clays with discontinuous lenses of clay.





High water table and high organic content characterize soils near the shallow ponds along lower slopes at the campus.

E. Wet Aspen. The wet aspen area is located in a low morainal pocket that has been partially filled with very fine sands, silts, and clays. At the time the area was investigated there was no water table present in test holes put down to five feet. However, reports from persons familiar with the area indicate a very wet condition in the spring and early summer as well as periods following large volume rainstorms. The mottled appearance of soils examined verify the existence of extremely moist conditions present through portions of the year.

Three side slopes feed the low aspen grove with surface drainage and the possibility for subsurface drainage from one or more of these areas is conceivable. Drainage of water from the low area is very slow and soil conditions are nearly always moist.

Artificial drainage of the area is possible; however, the geographic position occupied by the site will still limit land uses. Because it is a low area surface, runoff will still flow to this area and will require major site modification for restriction and removal of water.

The soils are not severely limiting for all land uses but would not be desirable for building foundations without major modification and introduction of fill materials. Closer site investigation will be required.

On the western edge of the wet aspen area there are remnants of an old garbage dump. This area should be cleaned up.

The area is an excellent plot for vegetation and soil sampling of wet aspen ecosystems. Without artificial drainage the area is best suited for research and wildlife production.

F. Lodgepole Pine Woodland--Small Parks North of the Wet Aspen. These small parks are on moderately sloping portions of the moraine and are comprised dominantly of boulder-laden cobbly and gravelly sandy loams. Numerous lenses or strata ranging in texture from silty sands and gravels to relatively clean gravels and cobbles are present. A few thin lenses of heavier textured sandy clay loams also occur. These areas are well drained and the water table is well below five feet.

Extensive test borings by Empire Laboratories have revealed a more detailed description of soil conditions here. There are no limitations for structures which cannot be overcome with minor engineering modifications.

G. Dry Mountain Grassland Bench--East Side of the Little South. This area extends along the eastern border of the camp complex. It is moderately sloping and is about ten to fifteen feet higher in elevation than the bench area to the west of the stream where the dining hall is located. This area would probably be considered a dry mountain loam range site by the Soil Conservation Service. Vegetation here shows much less disturbance from foot traffic and excavation than does area "B." Prominent vegetation are short grasses, pussytoes, and some mosses. Fringe sage is also present. Vegetative cover on this area is quite

abundant. Soils are typically gravelly and cobbly sandy loams and loamy sands. Extensive cobbles and some glaciated boulder horizons are present below depths of six feet. Fairly good exposures of these materials can be seen along the steep break slopes between the relatively flat bench and the lower wet meadow area.

The soils are well to excessively drained and should not have limitations from high water tables or surface runoff.

Limitations of this area from a soils and hydrologic viewpoint are few. However, the visual effects of placing structures on this area may limit its use for location of structures or service roads.

Any construction which occurs here should be carefully evaluated for the introduction of sediments from runoff into the Little South. Few problems should occur if runoff is not concentrated and if minimal vegetative removal occurs during the construction activities.

H. Lodgepole Pine Woodland. The area is composed largely of coarse morainal deposits. Large amounts of cobbles and large boulders are present over extensive portions of the area. Dominant vegetative cover is lodgepole pine. The soils are typically podsolized, showing horizonation of soil layers.

A generalized profile would include an organic mat of about two inches in depth. This would overlie a sandy loam to gravelly

sandy loam of about three inches in depth. Below this is found a leached $A_2$ horizon of sandy loam or gravelly sandy loam approximately nine inches in depth. Below this will be sandy loams with thin lenses of sandy clay loam. Coarse materials (gravels, cobbles, and boulders) will be present throughout the profile but more dominant at greater depths.

The leached $A_2$ horizon will be nearly void of organic matter and essential plant nutrients. Excavation which results in displacement of this subsoil to surface soil layers will result in increased revegetation problems as these soils are infertile. Care should be taken to recognize and deal with this problem in excavation and grading activities.

Most of this area under Lodgepole Pine is well drained. In areas where the accumulation of clay lenses may occur, the condition may not be evident until a particular land use adds excessive amounts of water to the soil. Such instances have occurred with the addition of septic tank sewage effluent to the soil near the North Dormitory.

Limitations for Land Uses

Many of the soil areas and land types represented on the campus are very limiting for many land uses. Without closer examination of the soils present and some laboratory analysis, the nature of these limitations can only be generalized. The following interpretations are intended for general planning purposes. More detailed study may reveal more compatible soil relationships for indicated land uses.

SOILS LIMITATIONS

A - Allowable Use  R - Restricted Use  P - Prohibited Use

Generalized Land Use

| Soil Unit or Land Type | Service Roads | Paths and Trails | Small Buildings | Intensive Play Areas |
|---|---|---|---|---|
| A | P1,2,3, | R1,2,3, | P1,2,3, | P1,2,3, |
| B | A6 | A | A6 | A6 |
| C | R4,7 | A | R4 | R4 |
| D | P1,2,3, | R1,2,3, | P1,2,3,4 | P1,2,3, |
| E | P1,2,3, | P1,2,3, | P1,2,3,4 | P1,2,3,5 |
| F | R4 | A | R4 | P4 |
| G | R4,6 | A | R4,6 | A6 |
| H | R4,7 | R4,6,7 | R4 | P4 |

Limiting Soil Factor

1. Seasonal high water table.
2. Subject to flooding or impeded drainage.
3. High organic content--undesirable under weight loading.
4. Presence of cobbles and boulders.
5. Undesirable texture for this particular land use.
6. A determination of potential for sediment reaching the adjoining stream course should be made.
7. Erosion potential will be great where this unit occurs on steep slopes.

Before major conversions of land use occur, the capability of the soil resource to accommodate that land use should be assessed. A qualified individual knowledgeable about the effects or proposed land use on the soil resource should be

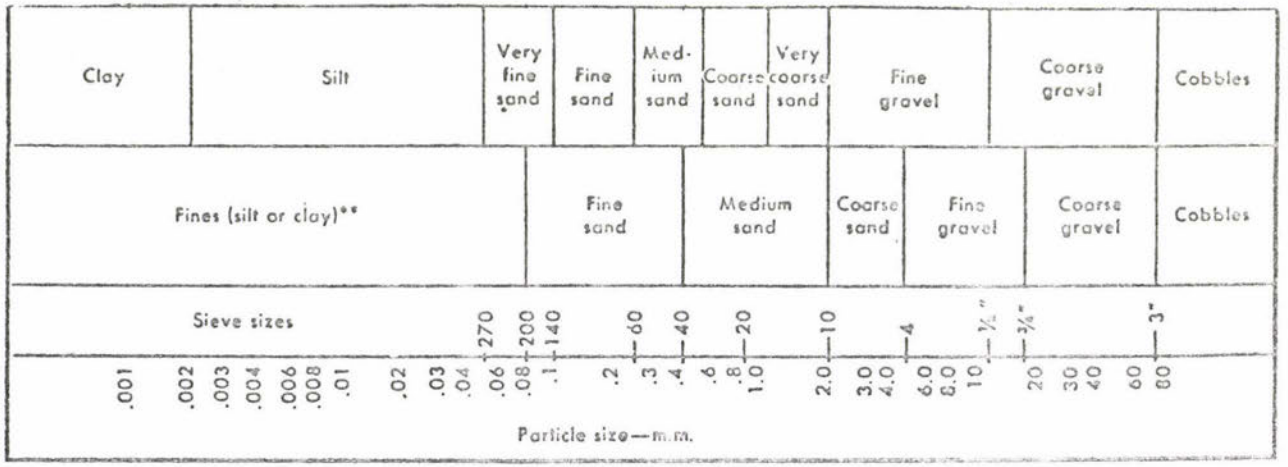
consulted. Test borings and laboratory analysis of soil samples should be required for location of roads, buildings, and pipeline installations.

# SOILS TEXTURAL CLASSIFICATIONS

## A COMPARISON OF GRAIN-SIZE LIMITS IN THE 2 CLASSIFICATION SYSTEMS.

CSU IMPACT ANALYSIS
RECONNAISSANCE SURVEY
U. S. Department of Agriculture
Soil Textural Classification

EMPIRE LABORATORIES
Unified Soil Classification




*Colloids included in clay fraction in test reports.

SOILS PROFILES: CSU IMPACT ANALYSIS RECONNAISSANCE SURVEY

| Soil Unit | Test Hole # | Soil Depth Inches | Description |
|---|---|---|---|
| A. Wet Meadow | P2 | 4-0 | Organic mat |
| | | 0-7 | Silt loam (orgaic layer with mica) |
| | | 7-11 | Silt loam (mica) |
| | | 11-30 | Silty sands--lenses of silty clay and coarse gravelly loamy sands |
| | | 30-45 | Fairly clean medium to fine granitic gravels |
| | | 45-60 | Muck with fine to medium gravels |
| | | | Water table at 14 inches |
| | P10 | 4-0 | Organic mat |
| | | 0-24 | Organic layers with silty loam and silty clay (fine gravel and sand lenses) |
| | | 24-48 | Sand materials with hydrologic properties of quick sands |
| | | | Water table at 14 inches |
| B. Dry Mountain Grassland Bench | P1 | 0-10 | Sandy loam 10% fine gravels |
| | | 10-17 | Sandy loam 20% fine gravels |

| Soil Unit | Test Hole # | Soil Depth Inches | Description |
|---|---|---|---|
| B. Dry Mountain Grassland Bench (cont.) | | 17-23 | Sandy loam 20% fine to medium gravels |
| | | 33-60 | Sandy loam 40% medium gravels and cobbles |
| | | | No water table present. Surface soil materials may have an organic mat and well-defined horizonation in undisturbed areas. |
| C. Pine Grassland Park | -- | -- | Similar to B. Presence of larger number of boulders. Water table is expected to be below 5 feet. |
| D. Beaver Ponds | -- | -- | Silt and clay materials in bottom of pond area. Presence of true aquatic plants and wet meadow vegetation provide a thick root mat over areas which are not completely inundated by water the year round. Organic content is very high. |
| E. Wet Aspen Grove | P6 | 2-0 | Organic mat |
| | | 0-4 | Silt loam |
| | | 4-21 | Silt loam (silty clay) strongly mottled |
| | | 21-45 | Silt loam (some very fine sands) |
| | | | Variable seasonal water table present from surface runoff and subsurface flow. No water table present 9-26-74. |

| Soil Unit | Test Hole # | Soil Depth Inches | Description |
|---|---|---|---|
| F. Lodgepole Pine Woodland | P7 | 2-0 | Organic mat, forest litter |
| | | 0-7 | Gravelly sandy loam |
| | | 7-20 | Sandy loam with thin discontinuous lenses of sandy clay loam, some staining present |
| | | 20-27 | Gravelly sandy loam |
| | | 27-60 | Gravelly sandy loam with sandy loam and cobble lenses |
| G. Dry Mountain Grassland Bench-East of the Little South | P8 | 2-0 | Organic mat, partly broken down |
| | | 0-18 | Gravelly sandy loam 10% cobbles |
| | | 18-27 | Gravelly sandy loam 25% cobbles |
| | P9 | 2-0 | Loose organic mat |
| | | 0-10 | Gravelly loamy sands and loams (mica) |
| | | 10-16 | |
| | | 16-60 | |
| H. Lodgepole Pine Woodland | Generalized Profile | 3-0 | Organic mat (forest litter) |
| | | 0-3 | Sandy loam |
| | | 3-12 | Sandy loam and fine sandy loam leached of nutrients |
| | | 12-24 | Sandy loam with stringers and lenses of sandy clay loam |

| Soil Unit | Test Hole # | Soil Depth Inches | Description |
|---|---|---|---|
| H. Lodgepole Pine Woodland (cont.) | | 24-60 | Coarse gravelly and cobbly sandy loam 25 to 40% cobbles and boulders<br><br>No water table present |
| | P7a | 2-0 | Organic mat |
| | | 0-10 | Gravelly cobbly sandy loam 25% cobbles |
| | | 10-30 | Gravelly cobbly sandy loam with lenses of sandy clay loam making up less than 20% of the horizon. |
| | | 30-72 | Gravelly cobbly sandy loam. Approximately 40% of the horizon is medium to coarse gravels and 30% is cobbles.<br><br>No continuous lenses of silty or sandy clay loam materials were noted.<br><br>No water table present |

# SOILS & LAND TYPES

# PINGREE PARK

## CAMPUS PLAN

SCALE 1" = 200'

SURVEY BOUNDARY

PROPOSED CONFERENCE SITE

KOENIG RANCH

LITTLE SOUTH FORK OF THE POUDRE RIVER

CAMPUS FACILITIES

| Existing | Proposed |
|---|---|
| 1 through 10 FACULTY CABINS | 64 SOUTH PARKING AREA |
| 11 TYCONDEROGA CABIN | 65 NORTH PARKING AREA |
| 12 through 35 STUDENT CABINS | 66A SEWAGE TREATMENT PLANT |
| 36A, B, C, and D WINTER RESEARCH LAB | 66B WATER TREATMENT PLANT |
| 37A and B DUPLEX CABIN | 66C MAINTENANCE SHOP |
| 48 SOUTH DORMITORY | 67A and B CENTER/CLASSROOM BUILDING |
| 49 NORTH DORMITORY | 68 LABORATORY WELL |
| 50 WATER TANKS | 69 FUTURE WELL |
| 51 FACULTY WASHHOUSE | 70 LIFT STATION |
| 52 SOUTH CLASSROOM | A1, 2, and 3 8-BDRM DORMS |
| 53 WATER PUMP | B1, 2, 3 and 4 4-BDRM DORMS |
| 54 THE CAVE | WATERLINES |
| 55 RESEARCH LABORATORY | FUTURE WATER LINES |
| 56 NORTH CLASSROOM | SEWER LINES |
| 57 OBSERVATION SHELTER | FUTURE SEWER LINES |
| 58 WEATHER STATION | RELOCATED POWERLINE |
| 59 DINING HALL | |
| 60 MAINTENANCE AND RECREATION HALL | |
| 61 POWER HOUSE | |
| 62 STUDENT WASHHOUSE | |

# Hydrology

## General Hydrology

The hydrology of the Little South Fork of the Cache La Poudre is typical of the hydrology of most mountain watersheds in Northern Colorado. The annual runoff is predominantly from snowmelt and is directly related to climatic variables (Meiman and Leavesley, 1974).

Hydrologic data on the watershed has been recorded since 1956 from U.S. Geological Survey and CSU gaging stations. About 75 percent of the annual yield in the period from 1961-1971 occurs during May through August. The largest stream flows are in June when approximately 45 percent of the average annual yield occurs.

Water quality of the Little South has been considered excellent bacteriologically and chemically by previous investigators (Kunkle and Meiman, 1967; Meyers, 1963).

The only large scale man-impacted land use occurring in the Little South before its confluence with Little Beaver Creek is the Pingree Park Campus and a few smaller surrounding summer cabins or ranches. The activities at Pingree Park have a greater influence on stream quality to this point than any other single land use. Maintenance of high quality water production is essential to the biological and aesthetic well-being of this high mountain watershed. Thus, land use activities at the Pingree Campus which would affect quantity and quality of

water of the Little South should be carefully assessed and monitored when conditions potentially detrimental to aquatic environments may occur.

The hydrologic characteristics of the Pingree Park Campus are of mixed complexity. Surface runoff is tempered by generally gentle slopes, coarse soil and rock materials, and fairly dense vegetative cover on undisturbed areas. On disturbed areas where vegetative cover has been removed and soils have been compacted, surface runoff is of greater magnitude.

Topographic drainage characteristics are poorly defined over much of the campus. No natural intermittent stream channels are present. General slope drainage is toward the Little South Fork from either side of the wet meadow stream course in the center of the campus. Localized low spots in the moraine to the east of the Little South are the only visible indications of imperfect drainage. These areas are characterized by vegetation communities with high moisture requirements and have been identified on the Soils and Land Types Map.

Little is presently known of the ground water hydrology of the area, other than that the morainal materials under lodgepole pine vegetative cover offer satisfactory infiltration of surface runoff and that the area is probably underlain by old glaciated stream channels. Coarse materials are generally dominant; however, discontinuous lenses or stratified layers with clay of over 10 percent or of clay plus silt of over 40 percent are

present. These fine textured substrata cause imperfect drainage and are the reason for perched water tables which are likely to be found in the area.

The glacial outwash areas on the first terrace above the wet meadow area are also generally well drained, but also exhibit localized poor drainage caused by these layers of fine soil materials.

The surface hydrology of the Park will be altered by nearly any disturbance of vegetative cover or soil. This includes site clearing, building and road construction, and any other disturbance which will affect infiltration of water into the soil or modify surface drainage patterns.

The concentration of surface runoff from parking areas and roads can increase erosion potential and possible sedimentation to the Little South. The proposed expansion activities and those currently in progress do not appear to be of significant magnitude to warrant alarm of extensive sedimentation at the present time. However, if large areas of land are denuded of vegetation cover for long periods of time, especially in the spring and summer when intense rainstorms may occur, there exists a potential for erosion and runoff problems.

There appears to be adequate filter margins of natural vegetative cover between proposed construction activities and nearby water courses. Potential sediments to the Little South should be filtered out by the grassy vegetation bordering the

stream provided runoff is not concentrated through excavation activities or landscaping.

A thorough analysis of the relative erodabilities of each soil type was not possible given the field time and financial constraints placed on the preparation of this document. Therefore, recommendations for development and maintenance of the Park facilities to minimize soil erosion and sedimentation are based on physical hydrologic principles. Consideration should be given to the following:

1. Do not remove excess vegetative cover. Only as much vegetation should be removed from a site as is absolutely necessary to complete that phase of the project.

2. Do not concentrate runoff in unprotected areas void of vegetative cover unless a channel is specifically designed to remove and transport water for disposal in another area. The natural drainage ways should be used in preference to creating artificial ones.

3. All surface runoff from disturbed sites must be controlled. Uncontrolled surface runoff removes light-weight organic materials and clay materials from the exposed soil areas. Removal of these materials reduces the stored nutrient value and nutrient holding ability of the soil.

Organic material like forest litter and conifer needles help to dissipate energy from raindrop impact and from water running over the surface of the soil. When these surface materials are removed from the soil, erosion can occur at a much faster rate.

Flood Plains

There are no readily defined flood plain areas on this portion of the Little South; however, the meandering nature of the stream and the presence of a wide strip of riparian type vegetation communities indicate the presence of high water table during most of the year. The soil type, vegetative cover, and presence of seasonal high water make the lower meadow areas undesirable for any construction activity or intensive land use requiring removal of vegetative cover, weight loading to the site, or alteration of existing hydrologic relationships.

Long-term records of spring flooding activities are not available; however, it may be concluded that any extension of the complex into the wet meadow should be emphatically prohibited to avoid any possible flood conditions. Encroachment of the developed parts of future proposed expansions should not be permitted down further than five vertical feet above mean stream flow.

This recommendation does not appear to violate any proposed expansions thus far made. If it is necessary to allow intrusion, precautions must be made to reduce impacts to both the land use proposed and the aquatic ecosystem.

Drainage and Erosion Problem Areas

There are several drainage and erosion problems on the campus which are directly affected by or are affecting man's use of the land. These problem areas are grouped in the hydrology section of this report because they are generally the result of the work of water. These areas are indicated on the map on page 58.

Area 1. The low area where the present septic tank box for the Dining Hall is located has historically been a wet area. Although much of the water presently accumulating here is a product of the improperly functioning septic system, persons familiar with the camp layout have indicated that during spring snow melt and intense summer rainstorms surface runoff tends to accumulate here.

Since installation of the new sewer trunk line there has been more water accumulating here than usual. This suggests that the pipeline excavation and installation has significantly altered lateral movement of water to the east of the Dining Hall and Classroom A. The effects of this condition in future snow melt seasons and heavy rainfall events is unknown.

Artificial drainage may be required to eliminate standing water. The magnitude of this problem will not be known until the present septic tank system for the Dining Hall is phased out.

Area 2. In the area between the south end of the Dining Hall and Classroom A there is a poorly drained area under lodgepole vegetation. The small depression here accumulates and retains water during heavy precipitation events and snow melt. There is no place where the impounded water could be drained to by surface means. However, a subsurface drain tile system or aeration of the soil may reduce seasonal standing water. Redirecting runoff away from this low area should also be explored.

Area 3. On the west side of the South Dormitory near the entrance to the building there is a low spot which is poorly drained. Given the extensive use of this facility the drainage problem should be remedied by subsurface drainage or addition of fill materials to the low area.

Area 4. The parking lot across from the South Dormitory is poorly drained. Remedial measures to install a subsurface drain will make the facility more useable.

The west side of the parking lot along the toe slope of the hillside into which the lot was cut has shown signs of soil wasting and soil erosion onto the parking lot. One means to reduce this erosion problem, stabilize the slope, and increase the effective useable area of the parking lot is to construct a short retaining wall along the side of the lot where this condition is occurring. The wall need not be elaborate.

Area 5. Subsurface drains have been constructed on this parking lot and the lot across the road by the washroom. However, there is extensive erosion along the cut bank into the slope from

which the lot was carved. Continual slumping is decreasing the size of the parking lot and increasing sediments to the existing drain structure. The area should be stabilized with a small retaining wall.

Area 6. The side slope to the east of the student cabin complex (Buildings 12-19) along the road which services the North Dormitory shows fairly extensive erosion. This area is expe-riencing heavy soil losses as a result of pedestrian traffic and surface runoff. Stabilization of this area may be justified.

Area 7. Behind the North Dormitory to the east, effluent from the septic tank system is surfacing, indicating improper operation of the system. Without extensive testing and monitoring there is no way to determine the extent to which these materials are moving through the filterfield. However, it is possible to infer that some of the effluent may be reaching ground water tables from which the well at the research lab draws water. The distance between the lab well and the septic system is approximately 750 feet. Although it may not appear to be a problem, it has been demonstrated that such contamination can occur (Waltz, 1973). Immediate phasing out of the North Dormitory septic system and service by the new treatment plant will remedy this problem.

Area 8. The filter margin between the expansion of the parking lot area and the Little South Poudre is very steep and narrow in terms of horizontal distance. Construction activities have

created areas of trees, debris, and soil materials which have been pushed over into the filter margin area and very near to the stream. Care should be taken to remove this piled debris without causing sedimentation to the stream.

Area 9. The septic tank leach field for Building 9 by the easternmost beaver pond may be allowing unfiltered wastes to reach this seasonal water body. The drainage characteristics of this area are very complex because of the coarse materials interspersed with fine textured impervious clay lenses. At first glance there does not appear to be a hazardous condition present. However, the possibility should be explored in more detail and the beaver pond monitored for sewage waste contaminants.

Septic Tank Sewage Disposal

The individual septic tank systems presently used for all buildings with sanitary facilities should eventually be phased out. All sewage produced should be directly processed through the new extended aeration system or should be held in buried sealed vaults which would service the individual cabin facilities not tied into the sewage main. These sealed vaults should be periodically emptied as need warrants and the materials processed through the aeration plant.

Discontinuation of the anaerobic septic tank method of waste disposal is justified on at least four major points.

1. Coarse poorly developed soils with local depositions of highly impermeable heavy textured clays and silts

do not provide satisfactory percolation rates for sewage filtration and removal. Large boulders, cobbles, and coarse glacial materials are present over much of the area. These materials, because of their large voids between soil and rock particles, may allow unfiltered sewage to travel to and contaminate ground water.

Local depositions of fine heavy textured soil materials such as clays are found as thin non-continuous lenses in the area. They act as a sealant in the soil prohibiting liquid wastes to percolate (infiltrate) through them with sufficient speed to prevent surface seepage at the septic tank and the accompanying filter field. Consequences of this phenomenon are evident in failures of the septic tank systems presently in use at the Dining Hall, the North Dormitory, and the washroom which services the student cabins north of the Dining Hall. Both of the above-described conditions create unpleasant health hazards which must be remedied.

2. Some of the septic tank systems presently in use were installed several decades ago. One can only speculate about the care with which these were installed and the materials used in their construction. The fact remains that many have outlived their intended use period and have not been properly maintained. Many are in need of cleaning (removal of solids) and repair

# EROSION & DRAINAGE PROBLEM AREAS

# PINGREE PARK

## CAMPUS PLAN

SCALE 1" = 200'

AREA 9

AREA 7

AREA 6

AREA 5

AREA 9

AREA 1

AREA 2

AREA 4

AREA 3

PROPOSED CONFERENCE SITE

KOENIG RANCH

LITTLE SOUTH FORK OF THE ROUGE RIVER

CAMPUS FACILITIES

| Existing | Proposed |
|---|---|
| 1 through 10 FACULTY CABINS | 64 SOUTH PARKING AREA |
| 11 TYCONDEROGA CABIN | 65 NORTH PARKING AREA |
| 12 through 35 STUDENT CABINS | 66A SEWAGE TREATMENT PLANT |
| 36A, B, C, and D WINTER RESEARCH LAB | 66B WATER TREATMENT PLANT |
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| 53 WATER PUMP | B1, 2, 3 and 4 4-BDRM DORMS |
| 54 THE CAVE | WATERLINES |
| 55 RESEARCH LABORATORY | FUTURE WATER LINES |
| 56 NORTH CLASSROOM | SEWER LINES |
| 57 OBSERVATION SHELTER | FUTURE SEWER LINES |
| 58 WEATHER STATION | ... RELOCATED POWERLINE |
| 59 DINING HALL | |
| 60 MAINTENANCE AND RECREATION HALL | |
| 61 POWER HOUSE | |
| 62 STUDENT WASHHOUSE | |
| 63 FUEL PUMP | |

or replacement (clogged filter fields and decaying tanks). Near the south end of the campus (close to Buildings 1, 2, and 3) there is evidence of a collapse of one of the septic tanks in past years.

These conditions create unsanitary conditions and add to the overall costs of maintaining the campus.

3. Below ground temperatures are very cold at the 9,000 foot elevation of the campus. Biological processes involved in aerobic reduction of sewage wastes are inhibited by these cold conditions. Consequently, the amount of time required for proper waste reduction is greater and the process is less efficient here than at lower elevations where ground temperatures are warmer and environmental conditions are more favorable.

Linked with this problem is the increased use of the systems caused by more people for longer time periods in campus facilities. Buildings served by the septic tanks will produce larger volumes of waste in a much shorter time period which must be broken down by the anaerobic bacteria. This can create "shock loading." Anaerobic bacteria are not as affected by this condition as aerobic bacteria, but since both processes rely on biological reduction of the wastes there must be time for the bacteria to multiply sufficiently to work on the waste materials. During this growth period, wastes

cannot be processed quickly and the efficiency of the disposal system is reduced and it does not function properly. The most serious problems occur in the spring when ground temperatures are low and bacterial populations are small or any other time that the system has not been used for a long period of time and then is expected to assimilate large quantities of waste in a relatively short period of time.

4. Even with the use of the new aeration plant, more people over a longer use period means more wastes to be disposed. Outlying buildings with sanitary facilities, which are not in current plans for inclusion in the aeration treatment, will be getting more use too. The simple problem of waste reduction demand placed on the components of the natural environment can easily be surpassed if too much waste is introduced. The consequences can be polluted ground and surface waters and general unsanitary conditions.

Alternatives to Septic Tanks. Extension of service lines to the individual cabins and other buildings outside the winterized core would be costly and involve extensive excavation and site alteration. Much vegetative cover and soil would be disturbed. An alternative to serving all buildings by this means would be installation of strategically located impervious holding containers or vaults to retain solid and liquid waste materials generated during the use period. These vaults could then be

emptied as needed and the wastes transported to and disposed of in the extended aeration plant. The feasibility of such an alternative should be explored from a cost standpoint as well as disturbance involved in excavation for vaults.

## Vegetation and Fire Hazard

### Vegetation

Expansion of the Pingree Park Campus will have both direct and indirect effects upon vegetation. Direct effects will include destruction of approximately 1.37 acres of lodgepole pine, aspen, and grassland, and extensive disturbance of another .49 acres. A much larger area will be indirectly affected by increased human population of the campus over longer periods through the year, resulting in more soil compaction, erosion, and damage to plant cover.

Pingree Park is located in the upper montane ecological zone in a valley of open to dense Douglas fir, ponderosa pine, lodgepole pine, and aspen trees. The broad valley floor, oriented roughly SW-NE, is covered by a wet meadow along the north side, with dense willows and sedges growing on banks and in marshy areas along the Little South Fork of the Poudre River. Areas along ridgetops and uplands with deep, well-drained soils support forest of mixed Douglas fir and ponderosa pine, with Douglas fir dominant on undisturbed, steeply sloping sites with shallower rocky soil. Deeper, fine textured soils on the lower slopes and terrace above the stream support dry grasslands.

Successional stands of lodgepole pine and aspen occur in areas which have been disturbed by logging or fire, and gently sloping depressions are occupied by shallow ponds and marshy areas with seasonally high water tables.

The immediate campus area is an historically disturbed site now covered with lodgepole pine and aspen, marshy depressions, ponds, grassy openings, and meadows on the terrace at the base of the slopes. Besides its visually aesthetic value, plant cover on the campus plays important roles in noise attenuation, screening, protection from winds, sun, and temperature extremes, atmospheric purification, biogeochemical cycling, and water cycling. Vegetation is particularly important as wildlife habitat and for soil stabilization.

Critical considerations in minimizing undesirable impacts of campus expansion upon vegetation are to restrict unnecessary destruction of plant cover, utilize existing plants for screening and soil stabilization, and establish new plant cover in areas disturbed during construction.

The following table shows estimated areas of direct disturbance to vegetation which will result from the expansion program:

DIRECT VEGETATION DISTURBANCE CAUSED BY
PLANNED EXPANSION OF THE PINGREE PARK CAMPUS

(Estimated Square Feet of Area Affected)

| Planned Facility | Affected Vegetative Community[1] | Area Destroyed[2] | Area Heavily Disturbed[3] (Long-term Impact) | Total Directly Impacted Area (Short-term Impact) |
|---|---|---|---|---|
| Classroom/Center | LP, AS | 1,800 | 1,800 | 3,600 |
| North Parking Area and Sewage Plant | LP | 33,750 | 5,100 | 38,850 |
| South Parking Area | LP | 10,940 | 2,700 | 13,640 |
| New Parking Area Access Road (15' roadway) | LP | 5,600 | | 5,600 |
| Principal Sewage Collection Line and Lift Station | LP<br>G | | 3,600<br>3,000 | 3,600<br>3,000 |
| A1 - 8-bdrm. Dorm | LP, AS | 1,350 | 1,050 | 2,400 |
| A2 - 8-bdrm. Dorm | LP | 1,350 | 1,050 | 2,400 |
| B1 - 4-bdrm. Dorm | LP, AS | 900 | 600 | 1,500 |
| B2 - 4-bdrm. Dorm | LP | 900 | 600 | 1,500 |
| A3 - 8-bdrm. Dorm | LP | 1,350 | 1,050 | 2,400 |
| B3 - 4-bdrm. Dorm | LP, AS | 900 | 600 | 1,500 |
| B4 - 4-bdrm. Dorm | LP | 900 | 600 | 1,500 |
| Totals (Sq. Ft.)<br>(Acres) | | 59,740<br>1.37 | 21,750<br>.49 | 81,490<br>1.86 |

[1]Predominant overstory cover: AS-Aspen, LP-Lodgepole, G-Grass. These areas also include grasses, forbs, brush, and other understory plants.

[2]Estimated areas to be cleared of all plant growth for construction.

[3]Estimated areas of heavy use around proposed sites during construction phase, based upon a 6-foot wide apron on all sides of each building site. These areas will presumably be revegetated after construction is completed, though not necessarily with the original plant cover type.

These areas are based upon estimates of disturbance which would result from construction with proper consideration for protecting existing plant cover. Substantially greater areas could be affected (particularly heavily disturbed areas) if construction crews work in a careless manner and damage vegetation outside of areas actually needed for construction.

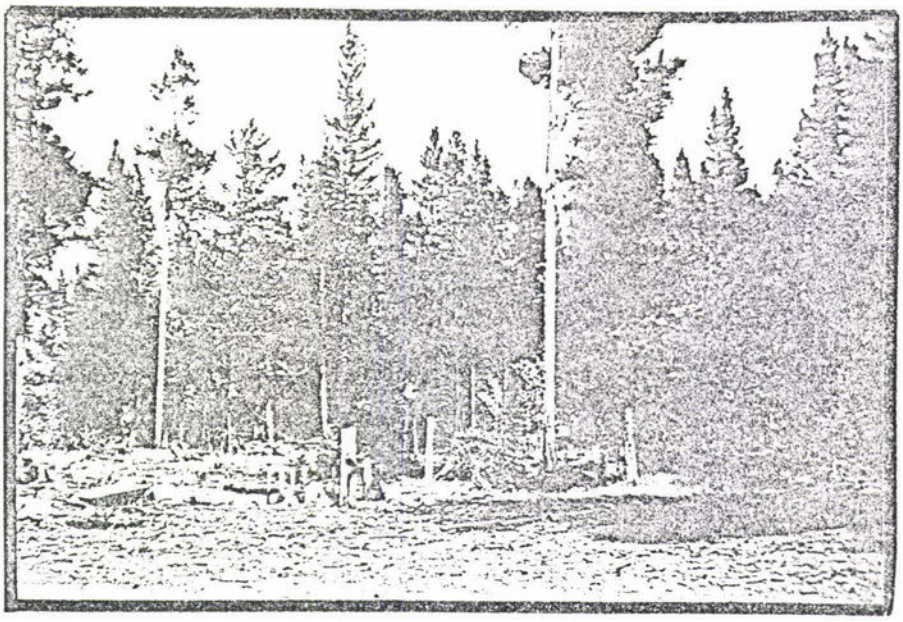
If construction plans incorporate prudent vegetation protection measures, direct destruction and disturbance of plant cover will occur on only a small area and have low negative impacts. The vegetation types which will be affected by the expansion occur widely within the Pingree Park vicinity and the limited extent of directly impacted areas will not significantly reduce total acreage of these vegetative communities.

Assessment of indirect effects of expansion of the campus is more difficult. The new winterized facilities will allow an extended season of campus use, and increased capacity will result in greater soil compaction and vegetation disturbance. Occasional periods of non-use, particularly during the spring and summer, are essential for natural recovery of vegetation in areas which receive heavy pedestrian traffic. Reduction or elimination of non-use periods may result in long-term degradation of the quality and quantity of plant cover in the immediate campus area. These indirect impacts would be likely to cause increased soil erosion, reduced water quality, alteration of wildlife habitat, reduction of visual and aesthetic quality, and other undesirable effects on related components of the

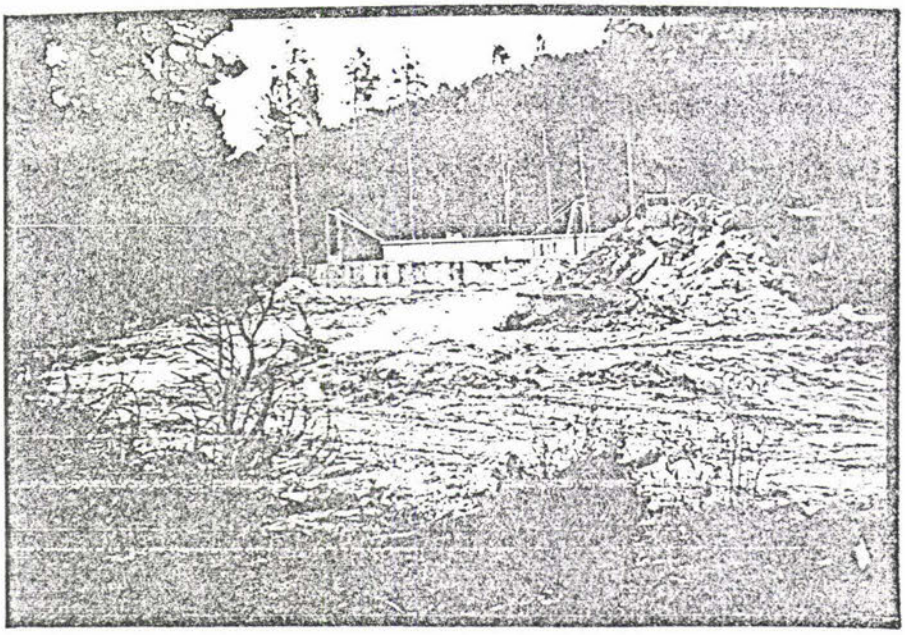
environment. The severity of indirect effects will depend to a large extent upon the manner in which future use of the expanded campus is regulated.

Recommendations. Clearing and grading for the north parking area and initial clearing of new dormitory sites which have already been accomplished seems to have been done in a highly desirable manner, with the notable exception of some practices in the north parking area. Trees along the periphery and entrance to the new parking area have not been protected from damage and several trees have been severely scarred by careless operation of heavy equipment. Also, soil, rocks, and vegetative debris cleared from the construction site have been pushed into a pile near the edge of the steep embankment over the Little South Poudre. Runoff from snow melt and early summer rains may carry soil from the debris piles down the bank and increase sediment loads along this segment of the stream.

Debris piles should be removed from the top of the bank and this critical area should be avoided during further construction. The margin of vegetation which stabilized the top of the bank and filtered sediment from surface runoff has already been damaged and additional stabilization and revegetation measures may be necessary at this location to preclude undesirable impact on water quality in the Little South Poudre. Recommendations for protecting trees intended to be retained around building sites are made further on in the impact analysis.



Initial clearing of vegetation for the new classroom center has preserved plant cover outside of the area actually needed for construction.



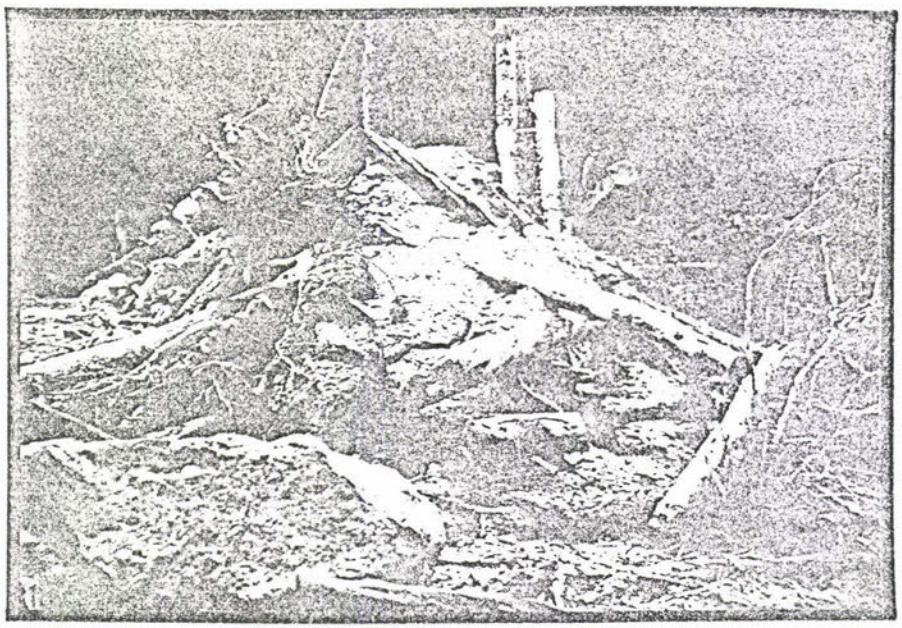
Early stage of clearing and construction for the new sewage treatment plant. Effluent filter field and north parking area will be in the foreground.

The following practices should be observed during construction of expanded campus facilities in order to minimize negative impacts on vegetation.

Land Clearing. Trees to be left standing around building sites should be protected. Trees and areas of vegetation within the immediate area where heavy equipment will be operated should be protected by a single-rail staked fence. Large trees adjacent to equipment operating areas should be protected by wrapping the trunk with burlap and strapping planks or split rails firmly against the trunk with wire or rope. No nails should be driven into the tree trunk.

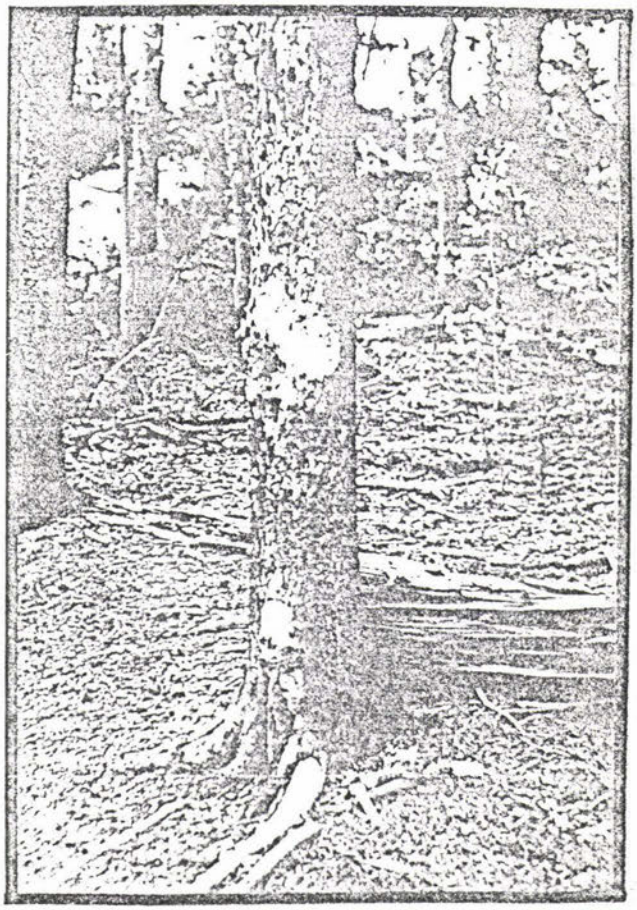
Bark wounds which do occur should be shaped into a vertical oblong cut and coated with tree paint. Damaged branches should be removed in a manner which will prevent further damage to the tree. Roots should not be cut for a distance equal to twice the breast height circumference of the tree expressed in feet. For example, a tree with a 10-inch circumference should have a "no root cut" zone extending for a radius of 20 feet from the tree. Where it is necessary to dig a trench near a tree, less damage will occur by tunneling under the root zone rather than cutting through it.

Trees removed in thinning or clearing should be cut to a stump height of not more than three inches on the high side. Brush and shrubs should be cut at the ground line. The border of cleared openings should generally be made to have a natural appearance.



Debris cleared from the sewage plant site has been pushed into a pile near a steep bank over the Little South Poudre.

Trees which are to be retained on building sites must be protected from scarring by heavy equipment.



Limbs which project too close to building spaces should be pruned by cutting or sawing them off flush with the bark of the trunk, without damaging the cambium layer under the bark. Lower dead branches may be carefully removed with a light-weight axe. The live crown height of any tree should not be reduced to less than one-half of the tree's total height.

Slash and other debris from clearing operations should be piled in locations where the piles will not pose any possible undesirable impact and be removed prior to completion of construction. Pruned limbs should be removed or scattered away from the base of trees. Small slash less than four inches in diameter can be lopped and scattered in adjacent understory away from wetland areas. Chipping of debris would be desirable. Chips could be utilized to stabilize bare soil and other critical erosion areas. Larger materials can be used as firewood and posts, etc.

Areas to be cleared should be designated and any machinery kept within those areas. Vegetation and soil disturbance should be restricted to within a six-foot margin of actual building sites and to a minimum access pad selected so as to limit destruction of vegetation which is desirable to retain.

Construction crews should be supervised by qualified individuals from the campus staff or the College of Forestry and Natural Resources during critical phases of clearing and construction.

The cleared right-of-way for the sewage force main from the lift pump to the treatment plant can be utilized as a foot trail from the new parking areas to B3 and B4 dormitories. Placing water lines along roadbeds will also minimize unnecessary clearing.

Grading and Drainage Plans. Cut banks and fill slopes should not be steeper than 3:1, with grades of 6:1 or less being most desirable. Grading or cut and fill activity should be restricted to minimum areas required for construction.

A margin of undisturbed vegetation should be maintained adjacent to ponds, marshy areas, stream banks, and other water areas. The margin should be at least fifty feet wide. Greater margins are required on steeply sloping areas or where natural ground cover is sparse. Dormitory A1 will be located near the north beaver pond, and the new sewage treatment plant is critically close to the Little South Poudre. The existing margins of vegetation between these sites and the water areas should be protected.

Clearing, grading, and excavation should be accomplished with rubber-tired vehicles, if possible, to avoid greater disturbance caused by tracked vehicles. Equipment should keep to established campus roads and parking areas outside of designated construction sites to minimize soil and vegetation disturbance.

Culverts and roadside ditches should provide adequate drainage of runoff along roads. Drainage ways should be provided to remove water from the roadside before water velocity can erode away road bank soil or underchannel the road.

Culvert outfall structures which cross beneath the roadbed should extend out beyond fill slopes, and soil at the base of outfalls should be protected with rock coverings. Settling pools can be used to reduce sediment loads of roadside runoff before releasing it into natural drainages.

Revegetation of Disturbed Areas. Soil areas disturbed during construction of expanded campus facilities should be promptly revegetated with suitable species. If possible, planting or seeding should be accomplished immediately after construction and final landscaping are completed. Revegetation in the fall is desirable because moisture for seed germination is plentiful through the winter and early spring. If revegetation must be delayed for a lengthy period, mulch or other temporary stabilization should be provided. Straw mulching will conserve soil moisture, prevent surface compaction and crusting, reduce runoff and erosion, and encourage natural revegetation.

In areas to be seeded, rocks, trash, and other debris should be removed from the soil surface, and fills and other loose soils should be packed. If seeding does not immediately follow soil disturbance, it is desirable to till the seedbed to a depth of four to six inches. A grass drill could be used to apply seed to pipeline fill and any other large disturbed

sites in the meadows, but broadcast seeding by hand is more practical for most of the campus expansion area. If broadcast, the seedbed should be firmed after seeding.

Desirable species for revegetation of mountain areas have been determined by W. M. Martin and by W. A. Berg and T. A. Colbert through experimental seeding of ski slopes near Aspen, Colorado and in revegetation of high elevation areas in other parts of the state. Many species of grass are commercially available which will become established at elevations below about 10,000 feet. They include smooth brome, intermediate wheatgrass, meadow foxtail, hard fescue, timothy, and pubescent wheatgrass. Planting of some forbs (all legumes) was also somewhat successful. Alfalfa was the most effective species, followed by red clover, birdsfoot trefoil, and cicer milkvetch.

The table on page 73 shows the grasses and legumes recommended by the Soil Conservation Service for seeding in the southern Rocky Mountains.

Revegetation of shrubs and trees might best be accomplished by taking wildings (native uncultivated plants grown in their natural habitat) from nearby National Forest areas, with approval of the Forest Service, and transplanting them in critical areas on the campus. Transplanting of bare rooted stock should be done as early in the spring as possible, before local trees and shrubs have started to leaf out. Transplant stock should be selected from areas where soils, exposure, and moisture conditions are similar to those at the intended new location.

GUIDE TO PLANTING
PERENNIAL GRASSES AND LEGUMES
FOR SPECIAL SOIL AND WATER CONSERVATION PURPOSES
ON AREAS RECEIVING OVER 15 INCHES ANNUAL PRECIPITATION
IN THE SOUTHERN ROCKY MOUNTAINS (E-48) IN COLORADO*

USDA-SCS
Colorado
June 1972

LRA E-47
LRA E-48
Sheet 3 of 3

| Species | Recommended Varieties | B-Bunch S-Sod-former | Mature Height (in.) | Soils 1/ and Exposure: Slopes over 6:1 North & East L | Slopes over 6:1 North & East C | Slopes over 6:1 South & West L | Slopes over 6:1 South & West C | Gently Sloping to Flat L | Gently Sloping to Flat C | Adaptability Ratings 2/: Ease of establishment | Rate of spread | Salt tolerance | Trampling resistance | Shade tolerance | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Western wheatgrass (Agropyron smithii) | Barton | S | 20 | X | X | X | X | X | X | 2 | 4 | 4 | 4 | 2 | |
| Fairway wheatgrass (Agropyron cristatum) | | B | 20 | X | X | X | X | X | X | 5 | 2 | 3 | 3 | 2 | |
| Crested wheatgrass (Agropyron desertorum) | Nordan | B | 24 | X | X | X | X | X | X | 5 | 2 | 3 | 3 | 2 | |
| Intermediate wheatgrass (Agropyron intermedium) | Amur | S | 30 | X | X | X | X | X | X | 5 | 3 | 3 | 3 | 2 | Not long lasting. |
| Pubescent wheatgrass (Agropyron trichophorum) | Luna | S | 30 | X | X | X | X | X | X | 5 | 4 | 3 | 3 | 2 | |
| Thickspike wheatgrass (Agropyron dasystachyum) | Critana | S | 20 | X | X | X | X | X | X | 2 | 4 | 4 | 4 | 2 | |
| Beardless wheatgrass (Agropyron inerme) | Whitmar | B | 20 | | | X | X | X | X | 2 | 2 | 2 | 2 | 1 | |
| Streambank wheatgrass (Agropyron riparium) | Sodar | S | 30 | | | | | X | X | 3 | 4 | 4 | 3 | 3 | |
| Tall wheatgrass (Agropyron elongatum) | Largo or Jose | B | 48 | | | | | X | X | 5 | 2 | 5 | 3 | 1 | Saline lowlands. |
| Slender wheatgrass (Agropyron trachycaulum) | Primar | B | 30 | X | X | | | X | X | 4 | 2 | 3 | 2 | 4 | |
| Kentucky bluegrass (Poa pratensis) | | S | 20 | X | X | | | X | X | 4 | 4 | 1 | 5 | 4 | |
| Russian wildrye (Elymus junceus) | Vinall | B | 24 | | | | | X | X | 4 | 1 | 4 | 3 | 2 | Sparse ground cover. |
| Orchard grass (Dactylis glomerata) | | B | 36 | X | X | | | X | X | 3 | 2 | 1 | 4 | 5 | |
| Smooth brome (Bromus inermis) | Lincoln or Manchar | S | 30 | X | X | X | X | X | X | 4 | 4 | 1 | 3 | 4 | |
| Hard fescue (Festuca ovina v. duriuscula) | Durar | B | 12 | X | X | X | X | X | X | 4 | 2 | 1 | 4 | 4 | |
| Tall fescue (Festuca arundinacea) | Alta | B | 36 | X | X | | | X | X | 4 | 3 | 4 | 4 | 4 | Low screening. |
| Reed canarygrass (Phalaris arundinacea) | | S | 48 | | | | | X | X | 3 | 4 | 3 | 3 | 3 | Moist lowlands |
| Timothy (Phleum pratense) | | B | 30 | X | X | | | X | X | 4 | 3 | 1 | 2 | 4 | |
| Redtop (Agrostis alba) | | B | 24 | | | | | X | X | 4 | 3 | 3 | 2 | 3 | Moist lowlands |
| Creeping foxtail (Alopecurus arundinaceus) | Garrison | S | 36 | | | | | X | X | 3 | 5 | 4 | 4 | 2 | Moist lowlands |
| Meadow brome (Bromus beibersteinni) | Regar | B | 24 | X | X | X | X | X | X | 5 | 4 | 3 | 4 | 4 | |
| Tall oatgrass (Arrhenatherum elatius) | Tualatin | B | 36 | | | | | X | X | 4 | 3 | 1 | 2 | 3 | Short-lived ornamental. |
| Green needlegrass (Stipa viridula) | Green stipagrass | B | 30 | | | | X | | X | 3 | 3 | 1 | 3 | 2 | |
| Alsike clover (Trifolium hybridum) | | | 10 | X | X | | | X | X | 4 | 4 | 3 | 3 | 2 | |
| Red clover (Trifolium pratense) | | | 12 | X | X | | | X | X | 4 | 4 | 3 | 3 | 2 | |
| Alfalfa (Medicago sativa) | | | 15 | X | X | X | X | X | X | 4 | 2 | 3 | 3 | 2 | |
| Yellow sweetclover (Melilotus officinalis) | | | 36 | X | X | X | X | X | X | 4 | 4 | 2 | 3 | 2 | |
| Hairy vetch (Vicia villosa) | Madison | | 24 | X | X | X | X | X | X | 3 | 2 | 1 | 3 | 3 | Showy ornamental. |

* Includes Land Resource Area E-47.
1/ Soils: L = Loamy, C = Clayey.
2/ Adaptability Ratings: 1-Poor; 2-Fair; 3-Moderate; 4-Good; 5-Excellent.

In addition to these SCS recommendations, the following species are recommended for revegetation of high altitude sites in a recently published study by the CSU Range Science Department.[1]

| Species | Seeding Rates | Species | Seeding Rates |
|---|---|---|---|
| Idaho fescue | 11.6 | Big bluestem | 1.4 |
| Chewings fescue | 2.6 | Canada bluegrass | -- |
| Creeping fescue | -- | Kentucky bluegrass | .6 |
| Hard fescue | 2.2 | Smooth brome | 8.5 |
| Meadow fescue | -- | Orchard grass | 2.3 |
| Red fescue | -- | Tall oatgrass | 8.2 |
| Tall fescue | 5.4 | Tufted hairgrass | -- |
| Bearded wheatgrass | 9.1 | Timothy | 1.0 |
| Intermediate wheatgrass | 13.2 | Western yarrow | -- |
| Slender wheatgrass | 7.7 | Russet buffaloberry | -- |
| Thickspike wheatgrass | -- | | |

Seeding rates are in pounds of pure live seed per acre. Broadcast seeding will require twice as much seed as drilling, and indicated quantities may also need to be increased on critical sites.

The topsoil material from disturbed areas must be stockpiled during construction and replaced over fills and other areas to be revegetated. The topsoil must be salvaged and reused because subsurface materials are likely to be too low in nutrients to provide an adequate plant growth medium.

The rate at which vegetation is reestablished will be greatly increased by the addition of 80 pounds of nitrogen fertilizer per acre after the first growing season.

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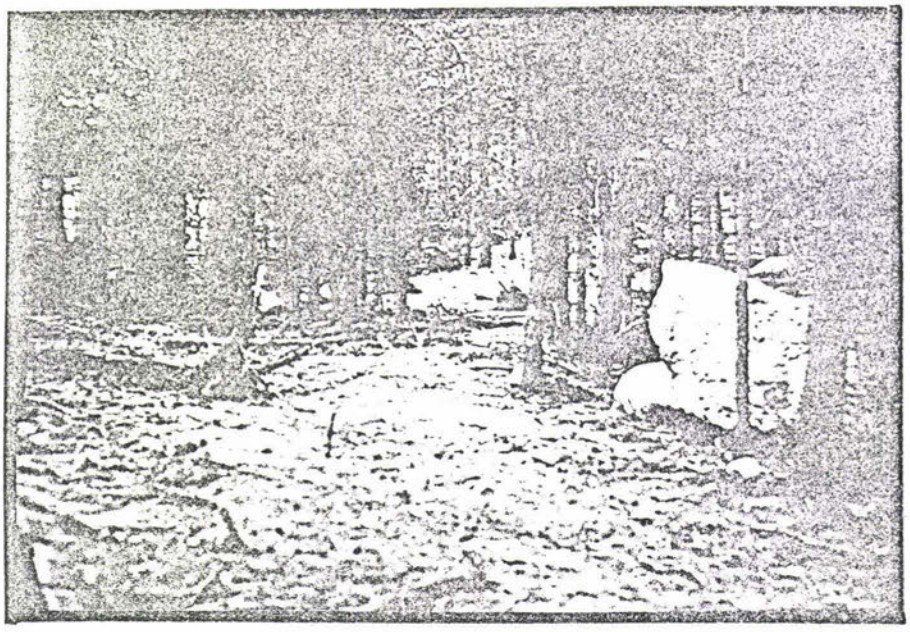
[1]Cook, D. W., R. M. Hyde, and P. L. Sims. 1974. Revegetation guidelines for surface mined areas. CSU Range Science Dept. Series No. 16.

MULCHING MATERIAL SUITABLE FOR CRITICAL AREAS STABILIZATION

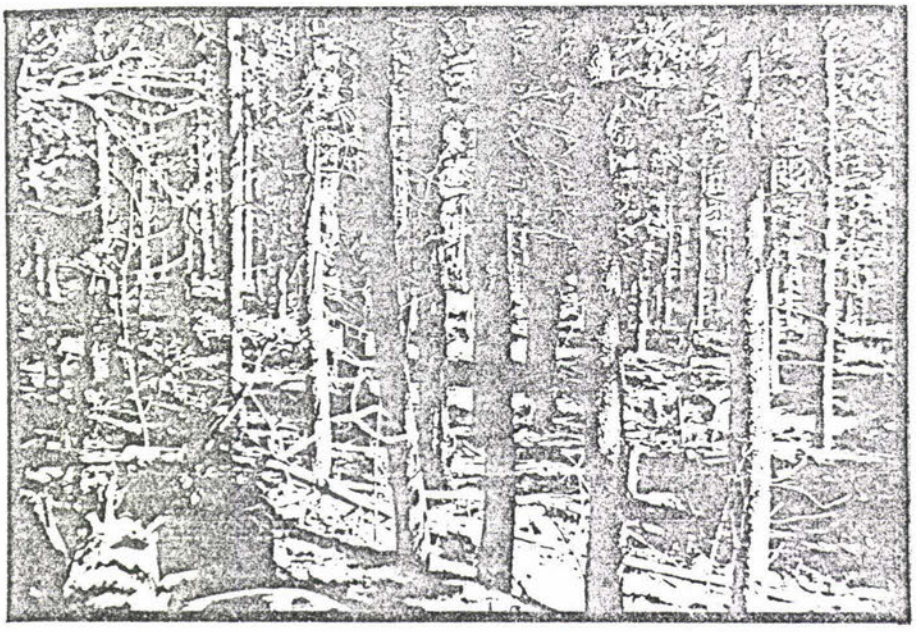
| Mulching Material | Rate and Method Application | Limitations | Advantages |
|---|---|---|---|
| Hay or straw | 2 tons/acre | Labor, availability, fire hazard | Most versatile* and efficient |
| Hay or straw | 1-2 tons/acre | Labor, availability, fire hazard | Most versatile* and efficient |
| Asphaltic emulsion | 200-800 gal. | | Reduce wind damage |
| Wood chips | Light application--3/4 to 1 1/2 tons/acre | High carbon, chip obstruction for grass | Longer lasting, available |
| Latex formulations | Spray | Easily ruptured, reduce percolation | Weed free |
| Excelsior matting | Mat | Labor, expense | Weed free, more fire retardant |
| Jute netting | Mat | Labor, expense | Weed free, more fire retardant |
| Petroleum resin-based | Spray 1/4 gal./sq. yd. | New product, lack evaluation | Stabilize sandy soils, protect from wind |
| Fiber glass | Compressed air gun | Difficult to anchor to slope, hazard to machinery | Very slow decomposition |
| Mulch (wood fiber) | 1 ton/ac. slope 1/2 ton/ac. level | Cost, less insulation | Wood free, more fire retardant |

*For wind and water erosion, protect seed, reduce temperature change, reduce evaporation, prevent soil crusting.

Adapted from: U.S. Forest Service. Undated. Soils Report: A tool for planning on ski slopes. With modifications.



The cleared right-of-way for the sewage force main can serve as a trail from the new parking areas to dormitories B3 and B4.



Dense lodgepole pine over much of the campus poses severe fire hazard during critical fire weather periods.

Planted areas must be protected from trampling, grazing, and vehicular traffic. Cut banks around the new parking areas should be revegetated, and the extent of the parking space delineated with poles or low railings to prevent vehicles being driven onto planted areas. Poles removed from the old utility line could be used for this purpose.

Regulation of Campus Use. Use of expanded campus facilities should be regulated in a manner which will minimize damage to plant cover in critical areas outside of designated athletic or play areas and major trails. Further investigation will be necessary to determine tolerance limits of vegetation in the campus area to increasing levels of use. Changes in the quality and quantity of vegetation should be monitored, and scheduling of campus utilization should be adjusted to provide necessary recovery periods.

Fire Hazard

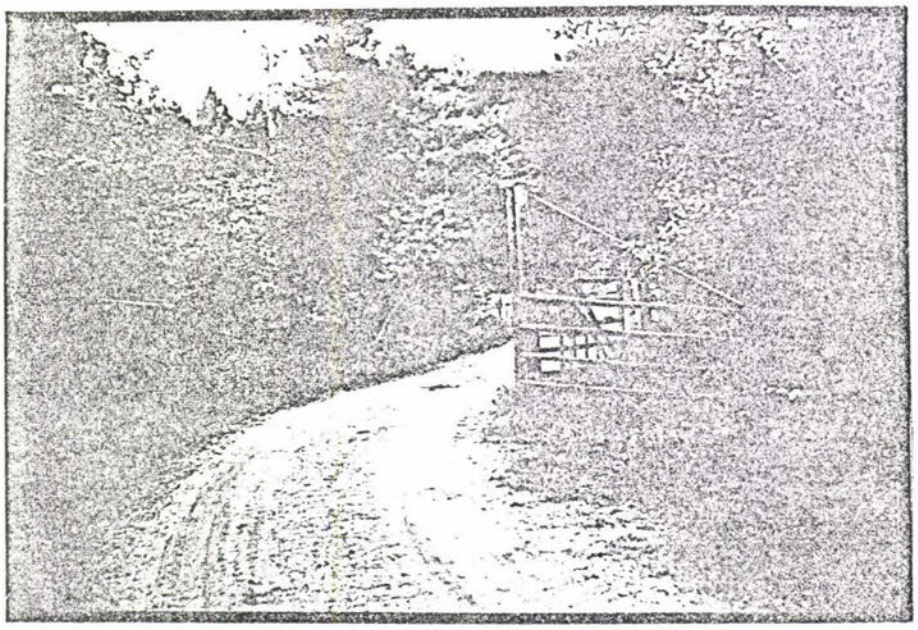
During critical fire weather periods, the Pingree Park Campus is exposed to severe wildfire hazard. According to the hazard severity rating system developed by the Colorado State Forest Service, areas of dense Douglas fir, lodgepole pine, and ponderosa pine with heavy understory fuel loadings such as those occurring in the valley are severely hazardous wildfire areas. If a fire should occur, initial suppression would have to be by occupants of the campus. Means for fighting a fire must be provided and, more importantly, a safe escape route for occupants and access road for outside firefighting forces must be available.

Fire danger on the campus can be reduced by implementation of fire safety precautions with regard to building design and density, roads, provision of adequate water supplies, and fuel reduction measures. These precautions are set forth in detail in Guidelines and Criteria for Wildfire Hazard Areas and Wildfire Safety Guidelines for Subdivisions and Developments available from the Colorado State Forest Service.

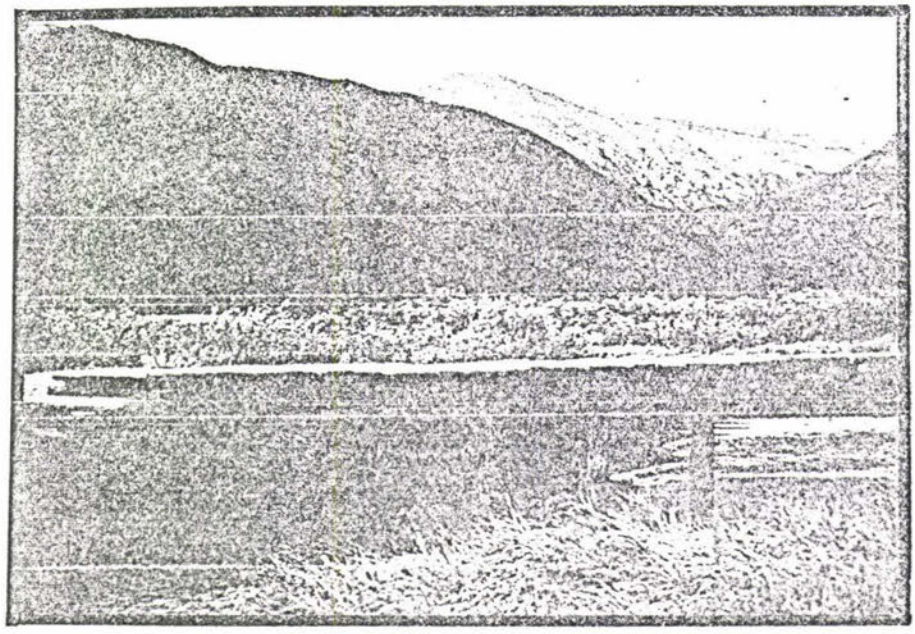
The threat of a fire disaster on the campus, particularly from a fire starting in one of the buildings and spreading to adjacent structures and wildland fuels, appears at present to be unduly high. Expansion of the campus will expose greater numbers of people to this danger and increase risk of man-caused fires occurring because more people will be exposed to wildland fuels.

On the other hand, improvement of the campus water distribution system upgrades the adequacy of fire protection water supplies. Also, new dormitory structures heated by electric baseboard radiation systems will be more fire safe than existing cabins with individual wood-burning stoves. The overall effect of campus expansion on the fire hazard situation depends upon other measures taken to reduce fire danger.

The gasoline-powered fire water pump and 300 feet of hose which the campus staff is acquiring will somewhat improve the fire suppression capability. Preventive measures should be incorporated in the expansion program to further reduce the fire threat.



The Koenig Ranch road on the east side of the Little South Poudre should be improved for use as an emergency ingress-egress route. The bridge over the Little South Poudre will have to be reinforced to bear heavier traffic.



Access. A second access road must be provided to allow an alternate escape route for occupants and additional access for fire-fighting forces. Expansion plans initially included a new road from the North Dormitory (Building 49) around the north side of the beaver pond connecting with the road in the faculty cabin area near Building 1, southwest of the beaver pond. This routing is undesirable because of rugged terrain and possible undesirable impacts on the beaver pond areas. It would also traverse an area of hazardous fuels along the ridge north of the campus.

A more desirable emergency ingress-egress route would be along the Koenig Ranch road, across the bridge over the Little South Poudre, connecting with the campus roads south of Classroom B (Building 52). This road would provide quick and easy escape to the opposite side of the valley across the fire-safe streamside area, and would only require strengthening of the bridge, construction of a short segment of new roadbed connecting the Koenig road with the existing campus road system, and widening of the right-of-way at a few points on the east side of the Little South Poudre.

Presently, there is a 10-foot wide roadbed in good condition. The right-of-way could be improved by clearing trees and tall brush from additional 10-foot strips along either side of the roadbed. Improvement of the road for access to the proposed conference center will also provide easier emergency access.

Campus occupants must be made aware of planned fire safety procedures and escape routes. Provision of emergency ingress-egress routes and fire suppression equipment may not reduce the potential for disaster unless capable of quickly being brought into use with a minimum of confusion should a fire occur.

Notices should be permanently posted in each of the campus buildings showing planned escape routes from structures and to a designated assembly point such as the volleyball court east of the Dining Hall or other fire-safe areas near the main entrance or Koenig Ranch road evacuation routes. A siren or other general alarm system which can be heard throughout the campus should be installed and periodically tested, and campus user groups should be informed of fire emergency procedures upon their arrival.

All members of the campus staff and faculty should be aware of the location of firefighting tools and equipment and familiar with its operation. Maintenance staff and other firefighting personnel should develop specific fire suppression plans for campus facilities, identifying water sources and locations for placing the pump unit should a fire occur in different areas of the campus.

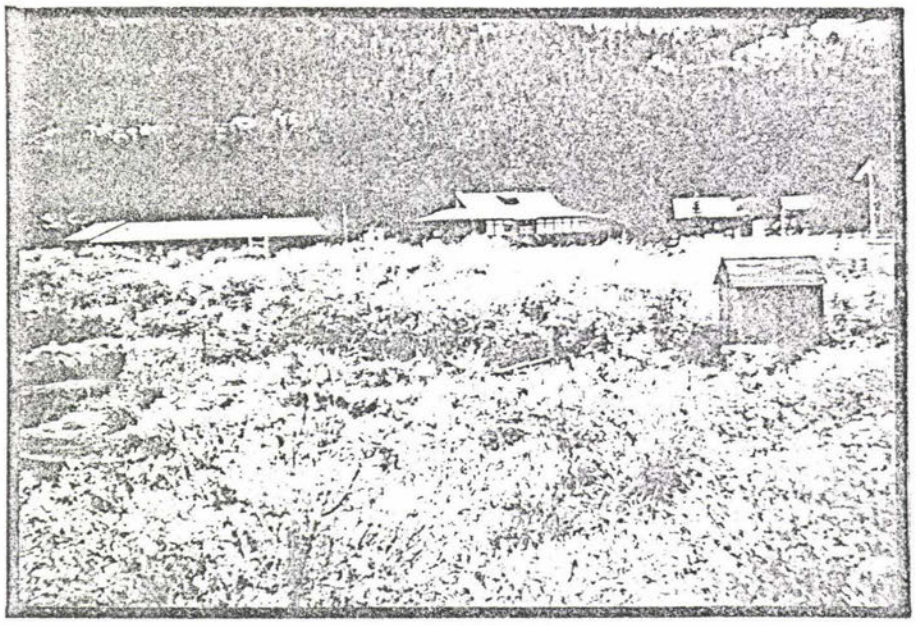
Fire Protection Water Supply. The campus' existing water distribution system pumps water from a well by the Little South Poudre (No. 53) to a cistern and three storage tanks west of

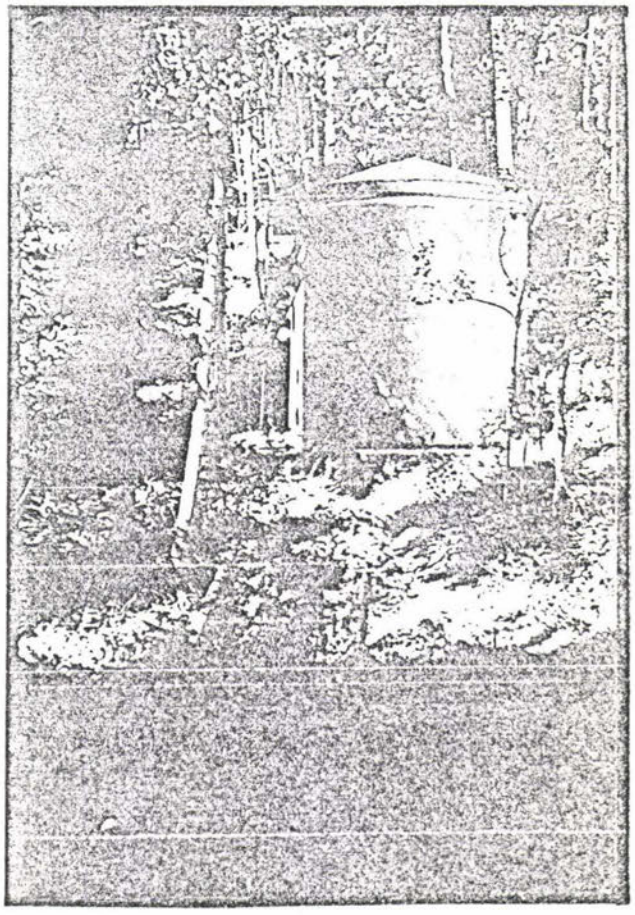
the campus area (No. 50). The cistern has a 2500-gallon capacity and each of the tanks holds 1700 gallons, for a total storage capacity of 7600 gallons. Distribution is by gravity feed through galvanized pipe laid on the surface. A separate well at the winter research lab (Building 36) provides water to that facility.

The new water system will pump water from the laboratory well (No. 68) to a new 25,000 gallon storage tank and treatment facility (No. 66B) located adjacent to the sewage plant at the north parking area. A new well located south of the South Dormitory (Building 48) is proposed to supplement the laboratory well. The supply line from the wells will parallel the principal sewage collection lines across the terrace and up to the new storage tank. Distribution lines will be circuitous, buried under roadbeds and along the terrace.

Engineering consultants for the expansion program have stated that the new distribution system will be inadequate for delivering water in sufficient quantities to meet fire protection needs (Leonard Rice Consulting Water Engineers, Inc., 1974). It will, however, provide a year-round water supply where the existing system has to be shut down and the lines drained during winter months to prevent freeze damage to the surface pipes. The new storage tank will also provide 17,400 gallons more capacity than the old cistern and tanks.

The old water system should be retained as an additional water supply for fire protection needs during summer and fall.





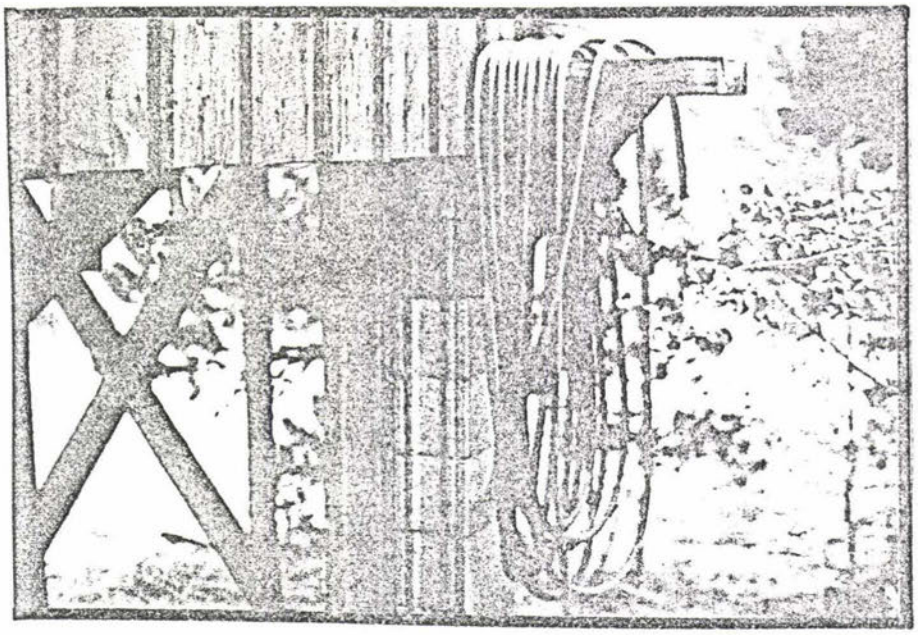
Existing water system pumps water from the river well (above) and stores 7600 gallons in three tanks and a cistern west of the campus.

Some of the surface distribution lines can be removed when no longer required as part of the domestic water system. Lines running to central locations in major campus areas might be retained and fitted with taps compatible with available hose for use as a quasi fire hydrant system. The river well should also be maintained as an emergency water source.

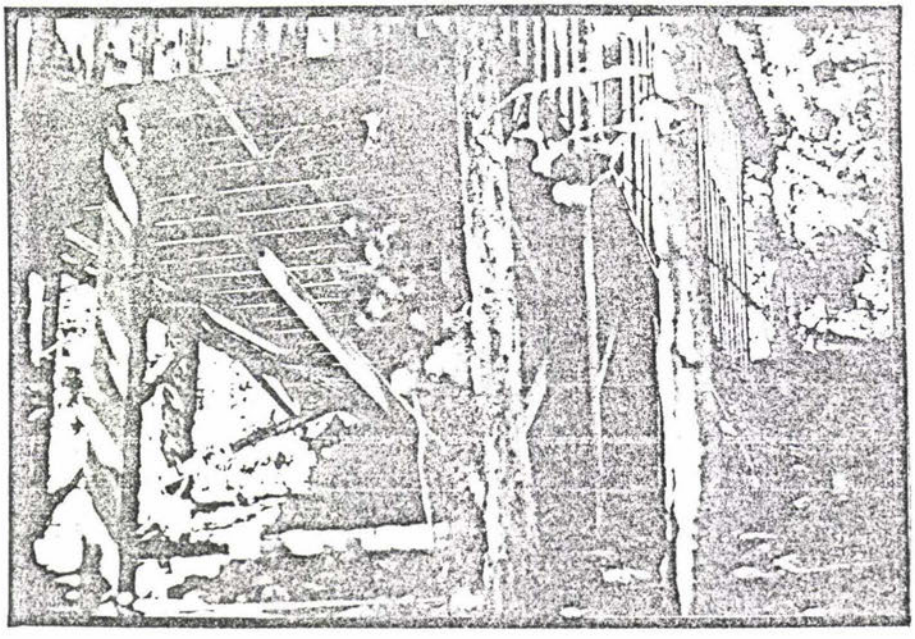
The new water storage tank and existing storage system should be kept filled to capacity, particularly during critical fire weather periods. A fire tank and pumper unit with hose should be acquired and installed in the bed of a 4-wheel drive campus pickup truck to provide additional fire suppression capability. Convenient access for filling the pumper tank should be provided at a point near the Koenig Road bridge over the Little South Poudre, at the existing cistern and storage tanks, and at the new storage tank. The existing river well might serve as a water source for filling the pumper tank at the Koenig Road bridge.

Outside hose taps and 100 feet of garden hose should be provided at each of the campus buildings, in addition to required fire extinguishers.

The electric service line to the laboratory well should run directly to the pump and be provided with adequate controls or switches so that a fire in the laboratory would not impair operation of the pump pressure system.



An outside hose tap and 100 feet of garden hose at each building will help to provide minimal fire suppression capability.



Exposed underfloor areas of older student cabins are potentially dangerous. A fire burning up the slope could quickly spread into these structures.

Building Design. A screen or other spark arresting device should be provided and maintained over the outlet of all fireplaces, stoves, or other devices burning solid or liquid fuels.

No other stilt-type or cantilevered structures with exposed underfloors such as the student cabins (Buildings 12 through 19) south of the North Dormitory should be constructed. Future buildings should have enclosed underfloor areas to prevent a fire burning up the slope from igniting the underside of the structure.

Fuel Reduction Measures. Slash and other debris from land clearing should be removed or chipped and scattered. No slash piles should be left after clearing and construction are completed.

Fuel reduction measures should be applied in areas of dense vegetation within 100 feet of campus buildings. Reduction measures should be planned to have a natural appearance, to enhance visual quality, and to improve access where possible, as well as providing increased fire safety. Consideration should be given to potential soil erosion problems and to visual quality.

Heavy concentrations of dry or dead ground fuels should be reduced in the immediate campus area. Portions of trees within ten feet of chimney or stovepipe outlets should be removed. Dead or dying wood should be trimmed from any trees adjacent to or overhanging buildings. Roofs should be kept free of leaves, needles, or other dead plant debris.

## Wildlife

The birds and mammals of the Pingree Park Campus include those typically found in high mountain meadows, mountain riparian areas, and aspen and lodgepole pine stands of the Canadian zone.

They include:

| Aves | | Habitat |
|---|---|---|
| Anas playrhynchos | Mallard | R |
| Aster atricapillus | Goshawk | LP,SF,H |
| Buteo borealis | Red-tailed Hawk | H,AS,SF |
| Dendrogapus obscurus | Blue Grouse | SF,AS,H |
| Capella gallinago | Common Snipe | R,H |
| Bubo virginianus | Great Horned Owl | SF,H,AS,R |
| Selasphorus platycercus | Broad-tailed Hummingbird | AS,SF,H,R |
| Colaptes cafer | Common Flicker | R,SF,LP,AS |
| Dryobates villosus | Hairy Woodpecker | R,AS,SF |
| Dryobates pubescens | Downy Woodpecker | R,AS,SF |
| Perisoreus canadensis | Gray Jay | SF,LP |
| Cyanocitta stelleri | Steller's Jay | SF,LP,R |
| Corvus corax | Raven | LP,SF,H,AS,R |
| Nucifraga columbiana | Clark's Nutcracker | LP,SF |
| Parus gambeli | Mountain Chickadee | SF,LP,AS |
| Sitta pygmaea | Pygmy Nuthatch | SF,R,LP |
| Certhia familiaris | Brown Creeper | LP,R,SF |
| Cinclus mexicanus unicolor | Dipper | R |
| Turdus migratorius | Robin | R,AS,H,SF |
| Hylocichla guttata | Hermit Thrush | R,SF |
| Sialia currocoides | Mountain Bluebird | R,H |
| Myadestes townsendi | Townsend's Solitaire | R,AS,SF |
| Corthylio calendula | Ruby-crowned Kinglet | SF |
| Dendrocia aestiva | Yellow Warbler | AS,R,H |
| Dendrocia auduboni | Yellow-rumped Warbler | AS,R,H |
| Wilsonia pusilla | Wilson's Warbler | R |
| Pinicola enucleator | Pine Grosbeak | SF |
| Spinus pinus | Pine Siskin | SF,LP,R,H |
| Junco caniceps | Gray-headed Junco | LP,SF,H |
| Zonotrichia leucophrys | White-crowned Sparrow | R,H |
| **Mammalia** | | |
| Sorex vagrens | Vagrent Shrew | R,H,SF |
| Ursus americana | Black Bear | R,AS,LP,SF |
| Mustela frenata | Longtail Weasel | SF,LP,H |
| Mephitis mephitis | Striped Skunk | R,H |
| Canis latrans | Coyote | H,R,SF,LP |
| Citellus franklini | Franklin Ground Squirrel | H |
| Citellus lateralis | Golden-mantled Ground Squirrel | H |
| Eutamias quadrivittatus | Colorado Chipmunk | SF,H |
| Tamiasciurus hudsonicus | Red Squirrel | LP,SF,R |
| Thomomys talpoides | Northern Pocket Gopher | R,H |

| | | |
|---|---|---|
| Castor canadensis | Beaver | R |
| Peromyscus maniculatus | Deer Mouse | H,AS,LP,SF |
| Clethrionomys gapperi | Boreal Redbacked Vole | R,LP,SF |
| Microtus montanus | Mountain Vole | H,R |
| Erethizon dorsatum | Porcupine | SF,LP,R |
| Lepus americanus | Snowshoe Hare | LP,SF,AS,R |
| Odocoileus hemionus | Mule Deer | R,AS,SF,H,LP |

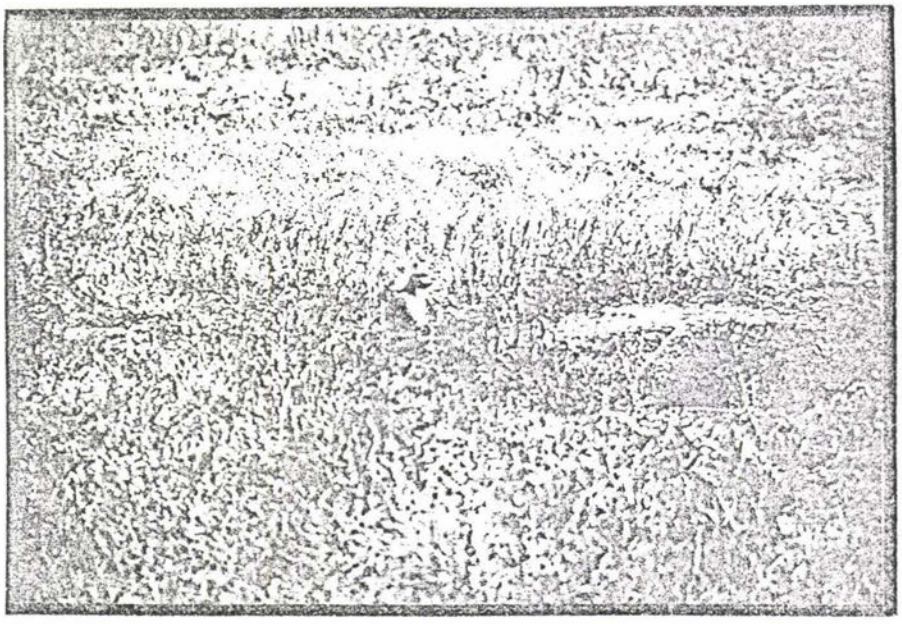
Herpetofauna

| | |
|---|---|
| Bufo boreas | Mountain Toad |
| Pseudacris triseriata | Boreal Chorus Frog |
| Thamnophis elegans | Western Garter Snake |

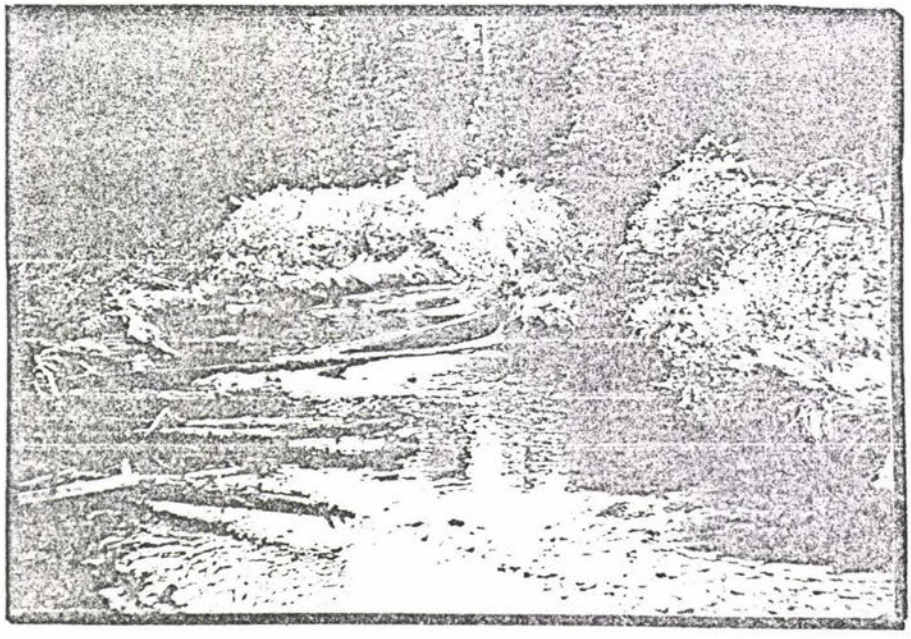
The letters accompanying the species list refer to the habitat types on the Pingree Park Campus in which that species is likely to be found (AS = Aspen, SF = Spruce-Fir, LP = Lodgepole Pine, R = Mountain Riparian Vegetation, and H = Mountain Meadows and other Herbaceous Vegetation). This is not a complete list of every mammal and bird which might occur on the property, but rather a representative selection of species which live or can be frequently seen in the area.

Elk are rarely seen on the campus. These mammal's migration routes and summer and winter feeding grounds are found north and west of the area. Mule deer, on the other hand, are found in the area at various times throughout the year.

Black bear also exist in the area and should receive special consideration. Currently bears are coming into the campus at night to scavenge for food at garbage sites. This practice should be discouraged at all garbage storage sites and at new garbage sites which will occur as a result of expansion. Garbage should be removed before it overflows cans, and cans should be designed and placed to seal tightly.



Franklin ground squirrels contribute to the diversity of wildlife found in the area. Similarly, the riparian area along the Little South adds to the diversity of habitat types located on the campus.



Beaver should also receive special treatment at the Park. One or possibly a pair of beavers inhabit the Little South near the pumphouse. Although some problems have resulted at the pumphouse due to the mischievous beaver, the present individuals should be maintained on campus unless the population outgrows their habitat because they also add to the species diversity of the area.

Although no known critical wildlife habitat areas or endangered species have been identified on the campus property, it is recommended that the old beaver ponds north of the faculty cabins and the small mature spruce-fir stand northwest of the beaver ponds be maintained. Each of these communities are small isolated ecosystems surrounded by more extensive stands of lodgepole pine. Each area adds another dimension to the campus and provides habitat for a wider range of wildlife in the area. The same is true about the riparian areas along the Little South Fork of the Poudre and any stands of ponderosa pine found at this elevation. By maintaining a variety of ecosystems in the campus vicinity, a wider diversity of species will inhabit the area and add to the number of wildlife species available for class studies.

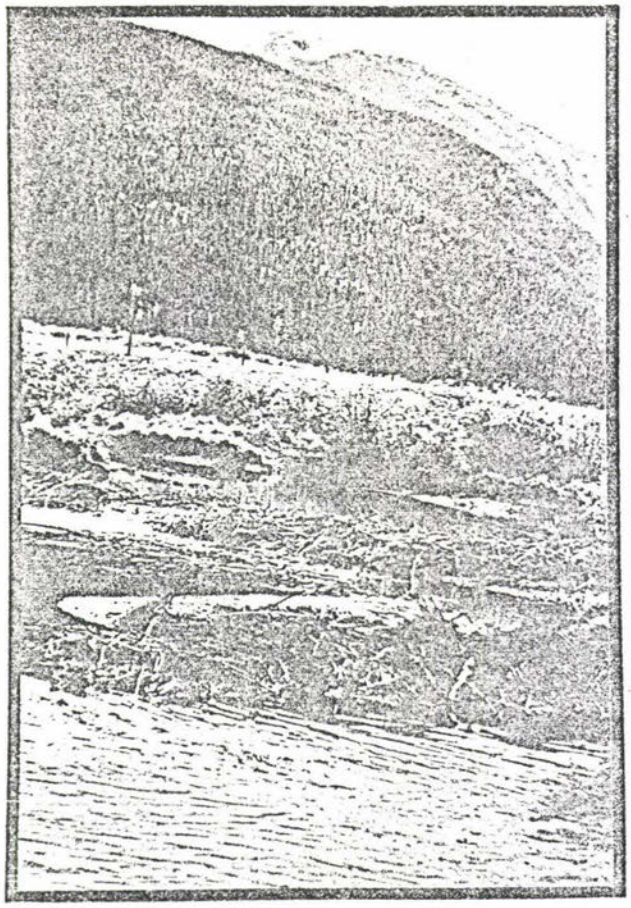
Impact on wildlife from the proposed campus expansion is limited essentially to two major categories. The first of these is a direct impact and involves the destruction of habitat due to development. The second impact is a spinoff of the first and involves an increase in the number of people roaming

the area as a result of increased housing capacity and an extended period of use.

The direct impact associated with initial development is long-term in nature. It involves the destruction of about two acres of lodgepole pine mixed with some aspen, and the construction of dormitories, parking facilities, and a classroom. Although two acres of wildlife habitat have been removed by construction, this represents a very minor change in the total amount of this type of habitat on the property since the area surrounding the development contains extensive acreage of lodgepole pine. For this reason, the area chosen for the project is one of the better locations on the campus for development from a wildlife standpoint.

Species of wildlife which formerly lived at these sites have either adjusted to the changes taking place, relocated nearby, or died out. The total number of dislocated species does not appear to be great because of the small size of the area involved in the expansion and the nature of the habitat.

Increasing noise levels and human activity in the area during the construction phase may cause some additional movement of wildlife further away from the construction site. It is difficult to estimate the total effect this will have on wildlife in the area. It is likely to have a moderate impact on those species living close to the site; however, the total impact on all wildlife in the area should remain relatively low.



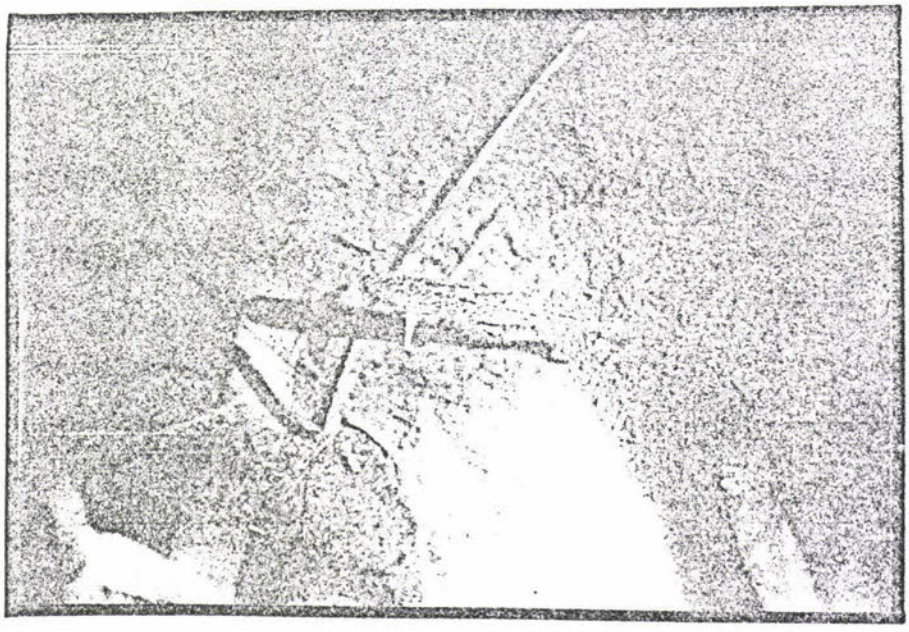
The identification of wildlife species, habitat areas, and wildlife signs such as these beaver dams and tracks are an important part of the education provided at Pingree Park. Any new development in this area should seek to preserve these values.

The wildlife impact associated with increased capacity and an extended period of use is harder to estimate but is likely to have a much greater affect on the wildlife of the area. By increasing the number of housing units and by winterizing the new cabins, the number of people possible in the area at any one time and the length of time they can now remain is greatly extended. This increase in the numbers of people at the Park has the potential to greatly affect wildlife numbers on the campus although the impact to wildlife in neighboring areas should only be slightly increased.

Increased numbers of people means increased human activity and noise throughout the area. This in turn leads to disruption of wildlife nesting, feeding, and roosting activities. Birds and mammals which are unable to tolerate increased activity levels will leave the area. Because most of the less tolerant species have already moved from the area, this type of impact will probably not reduce the kinds of species found throughout the area as much as the numbers of each of those species remaining on the property. This second category of wildlife impact will likely involve some displacement and relocation of species, some destruction of denning and burrowing sites, and increased disturbance from human activity. Increasing numbers of people at the Park and an extended season of use should have a moderate negative affect on the wildlife populations presently found in the area.

## Fisheries

Only one species of fish, brook trout (Salvelinus fontinalis), appears to inhabit the Little South Fork of the Cache La Poudre at Pingree Park. Brown and brook trout are found below the property intermixing to about the 8,900' level, and cutthroat trout are found about two miles upstream from the campus above the cataract area at 9,200'. Brook trout on the campus property are generally stunted in size due to the cold, small physical nature of the stream, a unispecies population of fish, and an overpopulation of fish in relation to the food supply (Miller, 1966).



Small brook trout on the campus property.

Expansion of the campus facility should not have a significant negative effect on the brook trout population of Pingree Park except in terms of increased fishing pressure. At the

present time the Little South comes under heavy fishing pressure from students at the campus during the summer months. By increasing the housing capacity at the campus and season of use, the University is also increasing the fishing pressure which can be anticipated. If fish populations are drastically depleted due to heavy fishing pressure, fishing regulations such as limited fishing, catch and release restrictions, or bait limitations may have to be instituted for the area. This is not likely to happen because consistent prolific reproduction and overpopulation of brook trout in this area should help to compensate for increased fishing pressures.

Since the willow riparian area and other streamside environments downstream are to remain in a natural condition, there should be adequate filter margins to maintain stream quality in terms of increased sediment runoff or stream pollutants generated by new facilities. The new sewage treatment facility should relieve the current problem of ponding sewage effluent which is presently a potential source of stream pollution. Increased human activity at the camp may cause additional impact in riparian areas in terms of vegetation trampling and streambank caving, but this should not become a significant problem. Stream quality and fish food supplies should remain virtually unaffected by campus expansion.

## Climate and Air Quality

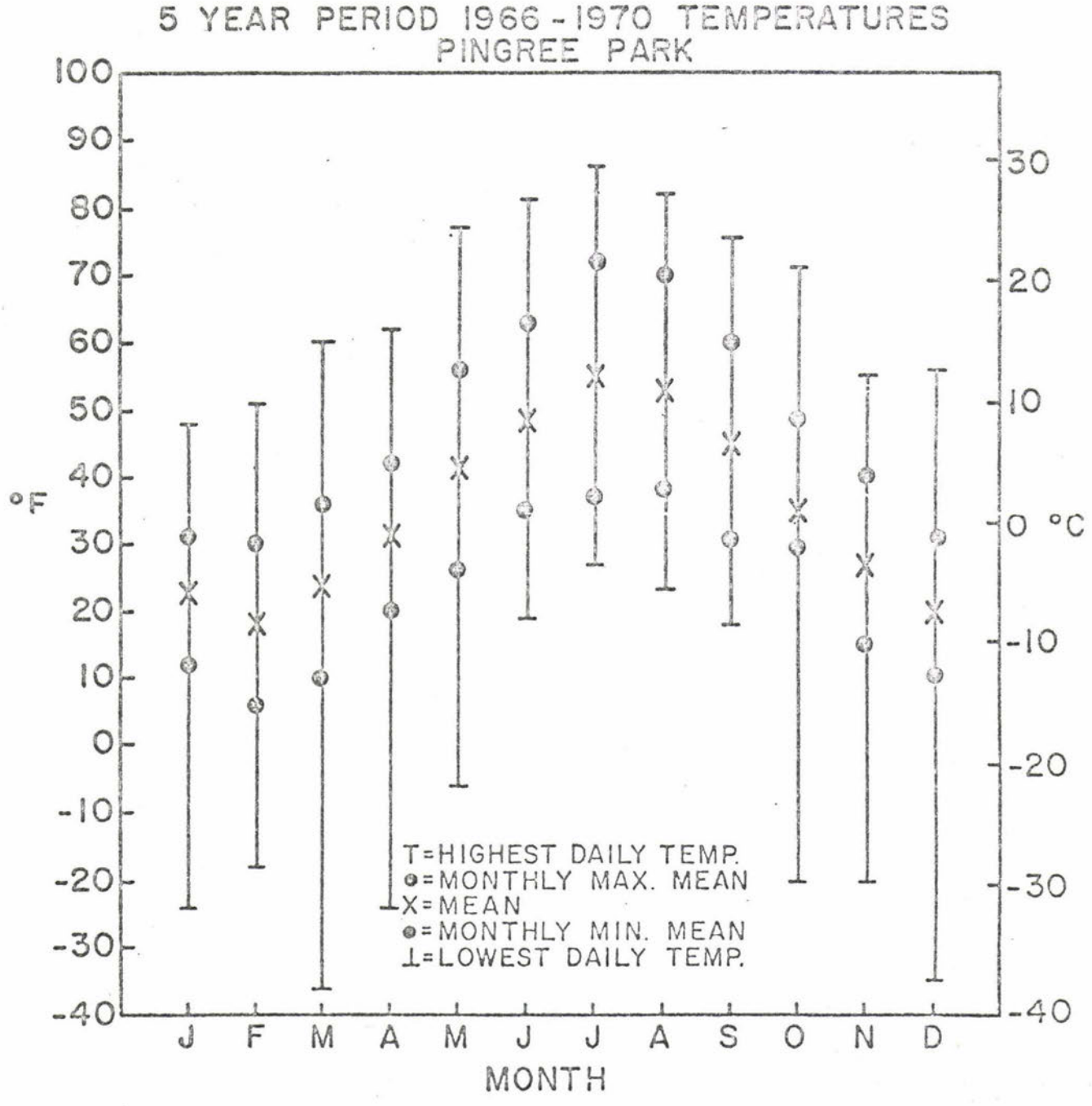
### Climatic Conditions

Relative to other locations in the mountains of Northern Colorado, climatic elements at Pingree Park have been intensely studied for more than a decade. Considerable information has been gathered on temperatures, precipitation, snowfall, and solar radiation.

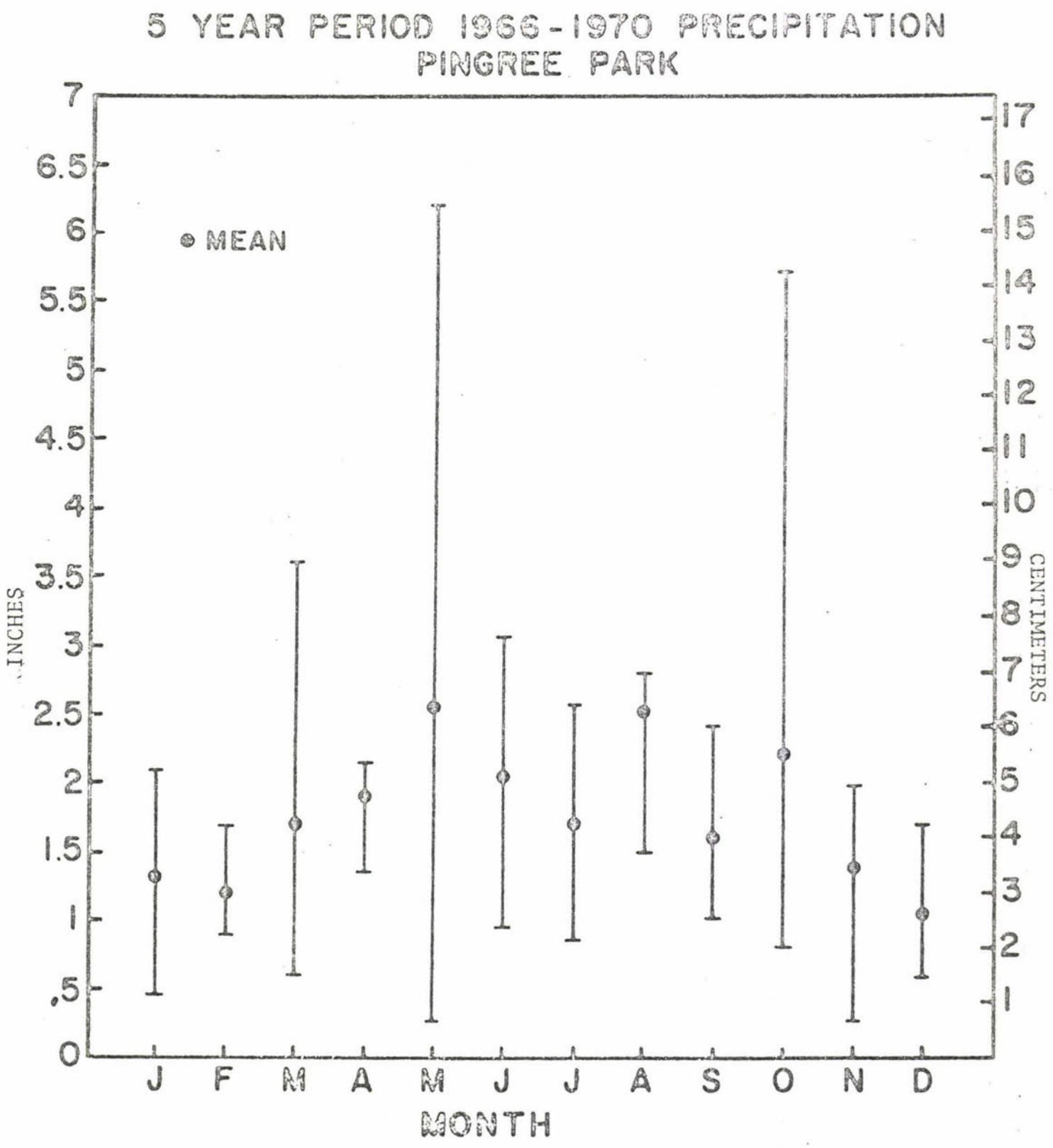
Observations at CSU's Pingree Park weather station, located south of the Dining Hall at an elevation of 9,000 feet, indicate a mean annual temperature of 35° F. Temperature extremes recorded since 1961 have ranged from a low of -45° F to a high of 83° F. Mean daily temperatures at the Park are below 40° F for about eight months of the year and below 32° F for almost six months (Meiman and Leavesley, 1974).

Mean annual precipitation is about 21 inches with approximately 60 percent of the annual precipitation occurring from October through May. Summer precipitation from June to September is usually in the form of thunderstorms of short duration, high intensity, and small areal coverage. Precipitation is usually in the form of snow from November through April (Meiman and Leavesley, 1974).

Snow depths and water content measured from 1961 to 1971 at a snow course situated in a lane through the timbered area south of the Faculty Washhouse (Building 51) are summarized in the table on page 99.




Source: Meiman and Leavesley, 1974




Source: Meiman and Leavesley, 1974

Pingree Park Snow Course Measurements, 1961-71

| Date | Snow Depth (Inches) | Water Content (Inches) |
|---|---|---|
| Jan. 1 | 12.72 | 2.14 |
| Feb. 1 | 15.05 | 3.25 |
| Mar. 1 | 19.95 | 4.73 |
| Apr. 1 | 18.04 | 5.20 |
| May 1 | 13.87 | 4.00 |

Source: Meiman and Leavesley, 1974.

Local winds are highly variable because of topographic effects and variations in air temperatures over different areas of the valley. Westerly winds are predominant in the upper air but surface winds vary greatly in speed and direction. Generally, shallow surface currents move up the valley and mountain slopes during the day and down at night. Cold winter winds accentuate the harsh temperatures in the valley.

Pingree Park receives a greater amount of direct solar radiation than areas further east along the edge of the Front Range because the sun's rays must pentrate through a thinner layer of atmosphere before reaching the surface. Only about 40 percent as much total radiation is received during winter months as in summer because the position of the sun is closer to the horizon and days are shorter.

Implications for Campus Expansion

Consideration of climatic influences in planning and construction of the expanded facilities at Pingree Park can lead to both direct and indirect economic, practical, and

environmental benefits. Summer conditions in the valley are mild and pleasant, but the harsh extremes of winter make it difficult to secure a small controlled environment suitable for human comfort. Buildings which are intended for winter use must be able to withstand temperature gradients of $90^{o}$ or more. In other words, winterized facilities must be able to efficiently maintain an indoor temperature of $65^{o}$ F when outdoor air temperatures occasionally fall to $-25^{o}$ F or below. Temperatures below $65^{o}$ F occur during at least part of the day throughout the year, so efficiently maintaining comfortable indoor temperatures requires additional heating on almost a year-round basis. Adequate ventilation and shading are desirable in late summer, but the winter climate is the critical consideration.

The campus location on lower south and southeast facing slopes is desirable from the standpoint of wind protection and maximum exposure to the warm winter sun. Most of the existing campus facilities and all of the proposed new building sites are located far enough above the valley floor to avoid cold night air which drains into lowlying areas at the base of the slopes. The campus is protected from winds because of its position on lower slopes of the ridge and the heavy forest cover over most of the area.

The dense tree cover also serves to reduce temperature extremes in the layer of air near the ground. On cold winter nights dense vegetation slows loss of heat from the ground, and the forested slopes are slightly warmer than more exposed areas.

The dormitories and classroom center to be constructed during the expansion program are arranged in a random layout and orientation, determined according to the topography of individual sites and relationships with the road system and other structures. The lodgepole pine stand in which the buildings will be located provides shade during the summer and protection from winter winds, but also reduces the warming effect of the winter sun. Consideration should be given to reducing shading from lodgepole pines on the south and southeast sides of the structures, particularly in selecting locations for construction access pads and other clearings around the building sites. Windows and major walls facing south and southeast will receive the most benefit from winter solar heating. Aspen trees retained on these sides of the buildings will provide summer shade but not block the winter sun after dropping their leaves.

The planned buildings are of fairly compact design which is favorable for winter heat retention. The new classroom center is a notable exception, with an octagonally-shaped fireplace room extending north from the main structure. Plans for the structure apparently incorporate a considerable area of window surface affording a vista up the valley from inside the center. These windows should be double glazed to reduce the substantial heat loss which will occur through the predominantly north- and northwest-facing openings. Provision should be made for closing the fireplace wing off from the classroom when desired.

The new dormitories and classroom will be heated by electrical baseboard radiation systems. Insulation will consist of 4-inch foam on reinforced concrete foundation walls, 3 1/2-inch batt in 2X4 stud and masonite/plywood walls, and 6-inch batt in the ceilings. Wood double-hung windows with storm windows will be installed, and roofs will be covered with gold-colored aluminum sheeting (Preliminary Investigation for the Pingree Park Campus, 1974).

The following table contrasts the insulating values of the planned construction design with FHA standards and recommended optimum insulation values. Values are expressed in "R" ratings of installed resistance to flow of heat, based upon the density, conductivity, thickness and airspaces, direction of heat flow, and type of surface for the various insulating materials.

COMPARISON OF PLANNED INSULATING VALUES
WITH FHA STANDARDS AND RECOMMENDED OPTIMUMS[1]

| Material | FHA Standard | Recommended Optimum | Planned Value for New Buildings |
|---|---|---|---|
| 4" foam on R.C. foundation walls | -- | R-11 | R-15.4 to R-18 |
| 3 1/2" batt in 2X4 stud and masonite/ plywood walls | R-7 to R-11 | R-11 to R-13 | R-9.8 to R-13.3 |
| 6" batt in ceilings | R-11 to R-19 | R-19 to R-24 | R-16.8 to R-22.8 |

Source: Arnold, M. G. Undated. Indoor climate control. Colorado State Univ. p. 40.

[1]Range of R values for different materials reflects possible variation in manufacturing and installation.

The planned insulation design for new structures should exceed FHA standards and fall within the range of recommended optimum insulating values. Fiber insulation batts used in the structure should be of the type surfaced with reflective foil to further supplement their regular insulating value.

Doors and windows should be weatherstripped and caulked to prevent cold air infiltration. The planned use of storm windows should reduce heat loss by more than one-half as compared to single-glazed windows, while the double-hung windows will allow adequate summer ventilation. Winter heat loss at night or during sunless periods can be further reduced by installing blinds or shutters on windows.

Plumbing which is exposed or located in the outside walls of structures should be insulated to prevent freezing and unwanted repair costs.

Sloping roofs on the existing campus structures and planned new buildings encourage natural snow removal by wind action. Simple roof formations are desirable to prevent moisture penetration and ice-filled gutters. Flat roofs should be avoided since they will not clear themselves of snow as rapidly as sloping roofs.

Presently available information on snow deposition patterns at the campus is not adequate for evaluating potential problems of heavy snow accumulation and drifting around buildings and on roads and trails. Snowpack buildup generally begins later

in the winter, accumulates to shallower depths, and is less persistent on south-facing slopes than on north exposures, so the campus is in a desirable location in this regard. Greater quantities of snow usually accumulate in grassy areas and in openings than under forest cover, but snow cover depletion in the spring is slower under trees than in open areas. Snow accumulation patterns should be investigated before selecting a site for the proposed conference center located on the eastside of the Little South Poudre.

Potential Climatic and Air Quality Impacts

Climate and air quality impacts associated with the planned campus expansion program will consist of minor alteration of microclimate conditions around building sites and periodic short-term degradation of air quality in the campus vicinity.

Removal of vegetation from construction sites will increase exposure to climatic extremes of wind, temperature, and precipitation. These effects will be long term but should not pose any significant negative impacts because of the small area affected (about two acres). Expansion of winterized facilities will provide greater comfort for a larger number of winter users of the campus.

Construction activity and traffic will increase emissions of gaseous and particulate air pollutants during the construction phase. Increased campus capacity and season of use will also result in periodic higher levels of air pollutant emissions,

particularly when numbers of vehicles are arriving or departing the campus. The pristene air quality of Pingree Park may be somewhat degraded because of the higher emission levels. Dust raised by construction activity and user traffic, and exhaust emissions from motor vehicles will reduce air quality in the immediate vicinity of construction sites, parking areas, roadways, and in lowlying areas along the Little South Poudre when polluted air is trapped by atmospheric inversions over the valley.

The magnitude of these negative effects on air quality should be slight and can probably be characterized as insignificant. Calculation of estimated pollution concentrations indicates that traffic associated with construction and use of the expanded facilities cannot feasibly result in pollution levels approaching even one-tenth of federal and state air quality standards for carbon monoxide. Calculations indicate that particulate concentrations may be more critical than CO, but because of the high soil moisture levels and limited scale of excavation and construction activity at Pingree Park, dust emissions sufficient to raise concentrations to one-tenth of the standard are improbable.

The table on the following page shows the pollutant emission conditions which would be necessary to raise concentrations to one-tenth of Standard maximum concentrations for CO and particulates.

POLLUTANT EMISSIONS NECESSARY FOR ESTIMATED CONCENTRATIONS TO EXCEED ONE-TENTH OF FEDERAL AND STATE AIR QUALITY STANDARDS FOR CARBON MONOXIDE AND PARTICULATES

Concentrations are estimated for the volume of air contained below a 300 foot inversion level over a 1/4 mile by 1/4 mile square area (15,681,600 $m^3$) with a 1 mph wind.[1]

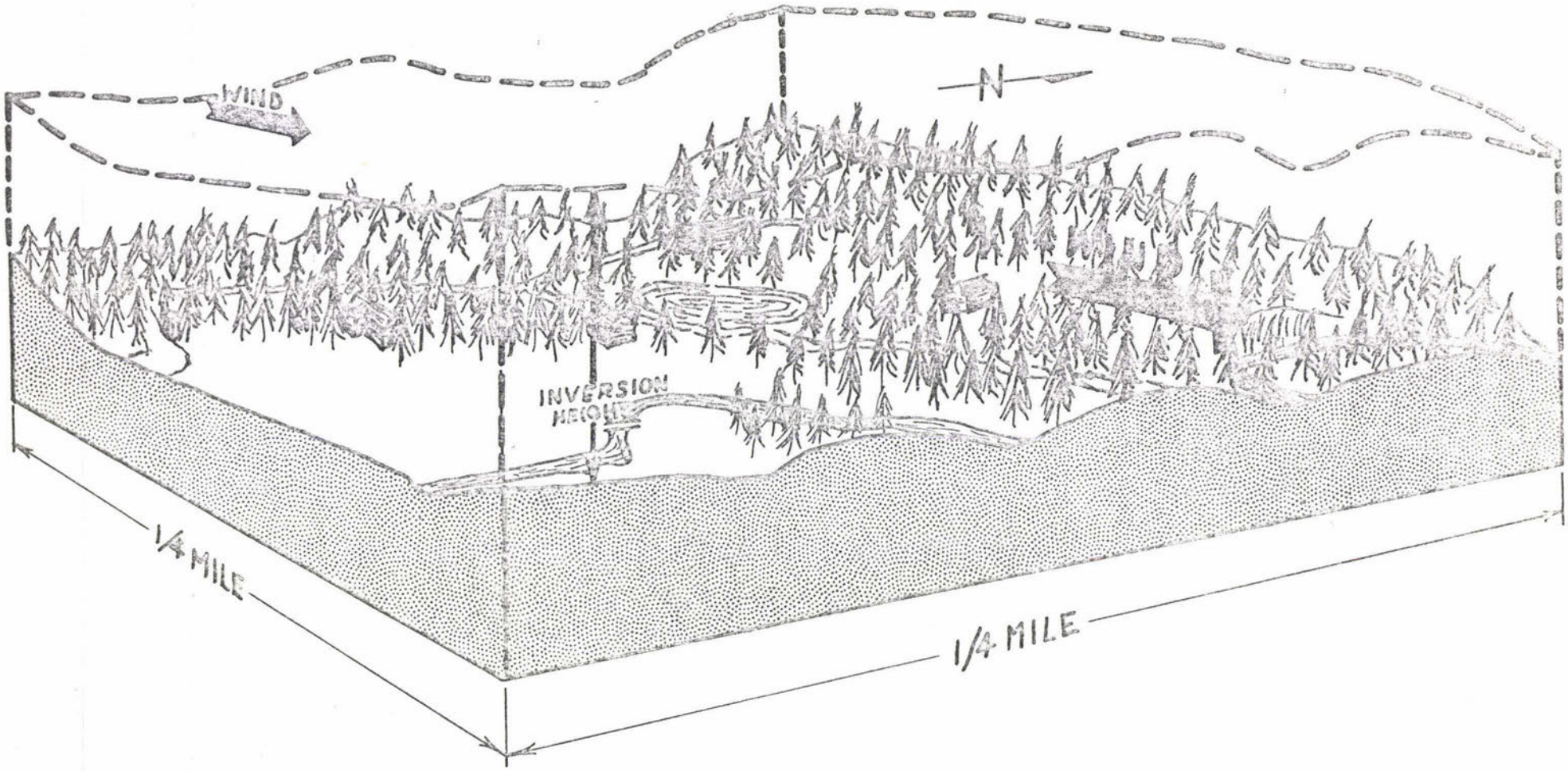
| Air Quality Standard | Conditions Necessary For Estimated Concentration to Exceed Standard |
|---|---|
| 4 $mg/m^3$ CO Max. 1 hr. Conc. (One-tenth of Federal Standard) | 2900 cars driving into and out of the campus each 15 minutes for a 1-hour period. This would be equivalent to 11,600 cars arriving and departing in one hour.[2] |
| 15 $\mu g/m^3$ Particulates Max. 24 hr. Conc. (One-tenth of State and Federal Standards) | .52 pounds of uniformly distributed dust or other particulate matter emitted each 15 minutes for a 24-hour period, equivalent to a total emission of 49.7 pounds in a day. |

[1]A 1 mph wind will completely change air in the 1/4 mile square volume each 15 minutes. This technique for estimating concentrations assumes that new air ventilated into the volume is pollution-free, and that pollutant emissions are instantaneously and uniformly distributed throughout the volume of air.

Calculated concentrations are strictly short-term estimates, valid only as long as actual atmospheric conditions approximate those assumed in calculations. Both inversion height and windspeed normally fluctuate throughout the day, so estimates are applicable for periods of a few hours or less. Assumed conditions are consistent with winter early morning air pollution episodes which might occur at Pingree Park.

Since instantaneous mixing does not occur, actual cocentrations at different points within the air volume will not be uniform. There will be some "hot spots" where concentrations exceed calculated levels, along with corresponding regions of lower concentrations. Also, photochemical reactions between pollutants and settling out of particulates are not considered.

[2]Approximately 21.6g of CO are emitted by each car traveling a total distance of 1/4 mile, based upon CO emission factors for automobiles traveling at 15 mph at an elevation of 5500 feet. Emission factors increase at higher elevations, but no data is available for higher levels.




SCHEMATIC DIAGRAM OF THE VENTILATED VALLEY DIFFUSION MODEL
USED IN CALCULATING AIR POLLUTION CONCENTRATIONS AT PINGREE PARK

Given the small scale of the construction operation, it is unlikely that more than one or two pieces of equipment will be operating at the same time, and natural ventilation of the air mass over the campus should adequately disperse pollutants. It is unlikely that concentrations will rise to unacceptable levels during the construction phase. However, emissions could be controlled, if necessary, by limiting the number of construction vehicles and heavy equipment which are operated simultaneously and by watering roadways during critical periods.

In future use of expanded campus facilities, it is highly unlikely that more than 200-300 automobiles will ever be in Pingree Park at one time. Campus parking areas cannot accommodate the number of vehicles which would be necessary for exhaust emissions to raise pollutant concentrations to significant levels.

The fireplace in the new classroom center will be an additional pollution source but will not significantly add to the level of emissions from fireplaces and woodburning stoves in existing structures. Should pollutant concentrations caused by fireplace emissions rise to unacceptable levels in the future, elimination of stoves in individual cabins, while providing fireplaces which can be simultaneously enjoyed by large numbers of campus occupants, would be a desirable air pollution control measure. The electric space heating systems used in the new dormitories and classroom are desirable because operation of the systems generates no on-site pollutant emissions.

## Visual

This visual analysis examines the impact of the proposed campus expansion on the visual character of the Pingree Park area. Each development site and the actual land use modification occurring there is studied in terms of the visual sensitivity of the site and the visual impact resulting from the proposed modification. In conducting this analysis, an underlying concern has been that the visual character of the Pingree Park Campus be retained. This requires that the site locations on which these alterations are occurring have the capacity to absorb these alterations without sacrificing the present visual character of the area. A general assessment of the visual impact follows.

### Site Analyses

Powerline Alterations. The proposed expansion of Pingree Park includes alterations in the existing powerline arrangement. The line that presently cuts across the southeast meadow onto the campus is to be removed. This will add significantly to the visual quality of that area since these overhead lines presently comprise a negative visual element and have an undesirable scenic effect. All new powerlines servicing campus facilities are being placed underground. This will alleviate visual degradation which would result from above-ground poles and wires strung throughout the area. In placing the power and phone lines underground, care should be taken to revegetate all disturbed sites after trenching has occurred.

Destruction of existing vegetation should be kept to a minimum. This can be accomplished by burying the line in or next to the road and trail system.

In providing power for any expanded campus, a new line will be rerouted along the east side of the property to connect with existing lines at the southeast corner and north side of the campus. This can be accomplished with minimum visual impact if the lines are run through the forest and restricted from any meadow areas along the route. The planned routing appears to meet this criteria. To further reduce the visual impact, powerline rights-of-way width should be kept at the absolute minimum. Poles should be dark colored to blend in with the trunks of the trees, rights-of-way edges should be feathered, and a long span used to cross the main entrance way so that poles and rights-of-way are less visible. Natural vegetation should be left in the rights-of-way near roadway crossing points, if possible, to further hide the rights-of-way from view.[1] If the rerouted rights-of-way are blended into the landscape as recommended, the visual impact on the area from this development should be minimal. Because the area in which these changes are occurring is relatively flat and forested, the visual sensitivity of this landscape is low. The site will be able to adequately absorb the new powerline and rights-of-way if proper planning is observed. The removal of aboveground lines from other locations will further improve the visual quality of those areas.

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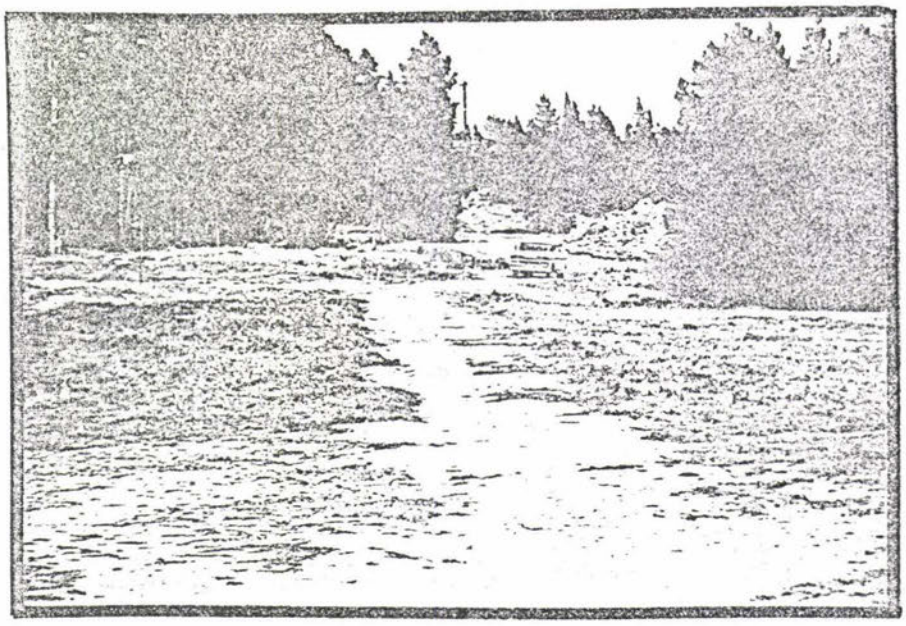
[1]See Environmental Criteria for Transmission Systems for further information.



The unvegetated scar left from sewer line installation across this meadow detracts from the visual quality of the area.

Sewer Facilities. Present sewer improvements include burying sewer lines from the main service facilities on campus to the lift pump station and sewage treatment plant. The area in which these improvements are located consists primarily of meadows and lodgepole pine. Since the lift station and sewer lines are being placed underground, little visual impact has resulted outside of the unvegetated scar left above the sewer line in the meadow areas. These backfilled areas should be revegetated with suitable grass species next summer. If this is accomplished, the visual impact of these improvements will be negligible; if not, these areas may eventually seed over naturally although some visual impact will remain for some time.

The sewage treatment plant should have little impact on the visual character of the landscape in the area. It is constructed within a dense lodgepole pine area and is presently well screened from view.

Water Facilities. The water improvement plan consists of burying distribution lines and installing a 25,000 gallon storage tank next to the sewage treatment plant. The storage tank is located in a level area within dense lodgepole pine and should be adequately hidden from major viewing locations. Natural colors and materials should be used in construction. Like the sewer improvements, the visual impact of this improvement should be negligible. If the new water lines are buried in the roadways as planned, little visual impact will occur. In locations where the lines are buried outside of the roadbeds, disturbed areas should be revegetated to minimize visual impact.

The present water distribution system detracts from the scenic quality of the area and will continue to do so because almost all of the water pipes are located above ground. These pipes should be better screened from view or painted a natural color to lessen the moderate visual impact they now have throughout the area. This would lessen the evidence of man's presence on the site by increasing the naturalness of the area.

Parking Lots. Two new parking facilities are planned in the proposed expansion. Both of these lots are located in forest openings surrounded by fairly dense lodgepole pine. The landscape

in which the lots are located should be able to absorb this type of development without adverse effects on the visual character of the area. Both of these locations are well screened from the rest of the Pingree Park Campus. The northern lot is further screened from the new dorm areas by topography which in effect forms a natural berm. To further minimize the visual impact of these lots, the surrounding vegetation and natural berms should be retained. If the parking capacity of the campus needs additional expansion in the future, one alternative is to extend the new north lot further into the lodgepole pine area on its north side. This addition would also be well screened from view. Access roads to both parking lots should be as narrow as possible and slightly curved to screen rights-of-way and parking lots from view. Vegetation screening is especially important around parking entries and should be preserved.

New Housing and Classroom Facilities. Seven new housing units, a classroom, and a center building are proposed in the campus expansion program. Since all of these buildings are well screened from the main entrance road and the rest of the campus by vegetation and topography, and because most of the proposed buildings are further screened by existing vegetation around them, the visual impact from these developments will be low if:

1. Existing natural vegetation and topography are utilized for screening. This appears to be occurring. In areas where vegetation is lacking, natural

vegetation compatible with the surroundings could be planted for screening purposes.

2. Natural colors and materials are utilized in the construction of these buildings. This will continue the rustic theme which the other buildings on the campus possess and blend the development further into the landscape. Sheet metal roofs should not be used unless they are painted a natural color to blend in with the landscape. The old maintenance building roof which is a dark green blends in very well with the surrounding pines; whereas, the unpainted sheet metal roofs are very reflective and accentuate the man-made impact on the area. At the present time, satin gold metal roofs are planned for. Although a dark green which matches the lodgepole canopy would be less obtrusive, the satin gold color should blend in better than the untreated metal roofs. Rustic exterior building materials which blend in with the surroundings are also included in present plans.

3. All utilities are placed underground and any trenching revegetated where applicable.

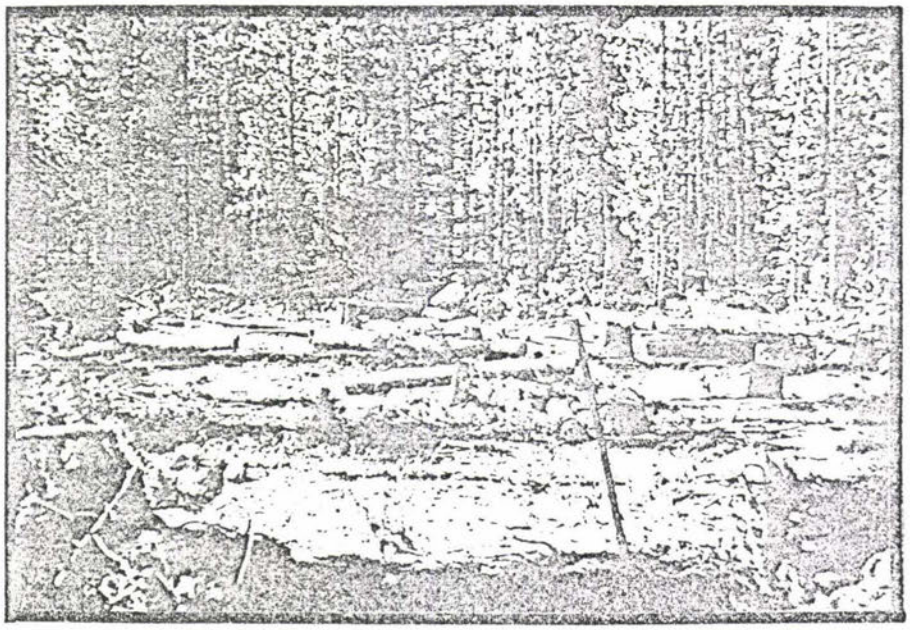
For a more complete visual analysis of the housing situation each building location is examined by site plan letter code (see the Historic and Visual Features Map).

1. Buildings $B_3$ and $B_4$ - four-bedroom dorms. Each of these sites is well screened by dense lodgepole pine from the main entrance road and surrounding area. The surrounding vegetation should not be destroyed during the construction phase. If this recommendation and the previous general recommendations are followed, the visual impact of this development will be very low.

2. Buildings $B_1$ and $B_2$ - four-bedroom dorms. Each of these buildings will have a low visual impact on the Pingree Park area. Once again this area is not noticeable from the main entrance road or other parts of the campus. The building sites have retained most of the surrounding vegetation for screening purposes. Natural colors and materials recommendations should be followed.

3. Buildings $A_1$, $A_2$, and $A_3$ - eight-bedroom dorms. The visual impact of these buildings should also be low. Natural colors and materials, screening, and underground utilities should be utilized. Building $A_3$ should have the least visual impact of the three structures and building $A_1$ the most. Building $A_1$

has the least screening potential of the three sites and borders along the access road. Care must be taken in the design of buildings $A_1$ and $A_2$ so that they do not block or detract from the mountain views attainable from the proposed classroom and center building.



Clearings for building site $A_3$ and other new housing facilities are well screened from the surrounding area by dense lodgepole pine.

4. Classroom and Center Building. The visual impact of this building on the area should also be low if natural screening and colors are utilized. Presently the building site is screened on two sides. Screening is less necessary on the other two sides since this structure will be a focal point

within this portion of the campus. For this reason a natural, attractive exterior is necessary to focus attention toward this building without undesirable effect on the natural setting. Screening, outside of shrubbery, is unnecessary on the west in order to capitalize on a very pleasing view of the mountains and surrounding hillsides. This view should be a focal point of the building's interior. To further lessen the visual impact of this structure, the roof material should be a natural color which blends into the landscape, and the reflective roof in the housing unit next door should be painted a dark green or other natural color which will blend in with the surrounding lodgepole pine.

5. Other Buildings in the Area. The maintenance shop, sewage treatment plant, and caretaker's cabin are all located in areas which have good potential for absorbing development without sacrificing visual quality. In each situation natural colors and materials and natural screening techniques should be utilized to further lessen the visual impact. The visual impact of these developments is expected to be low.

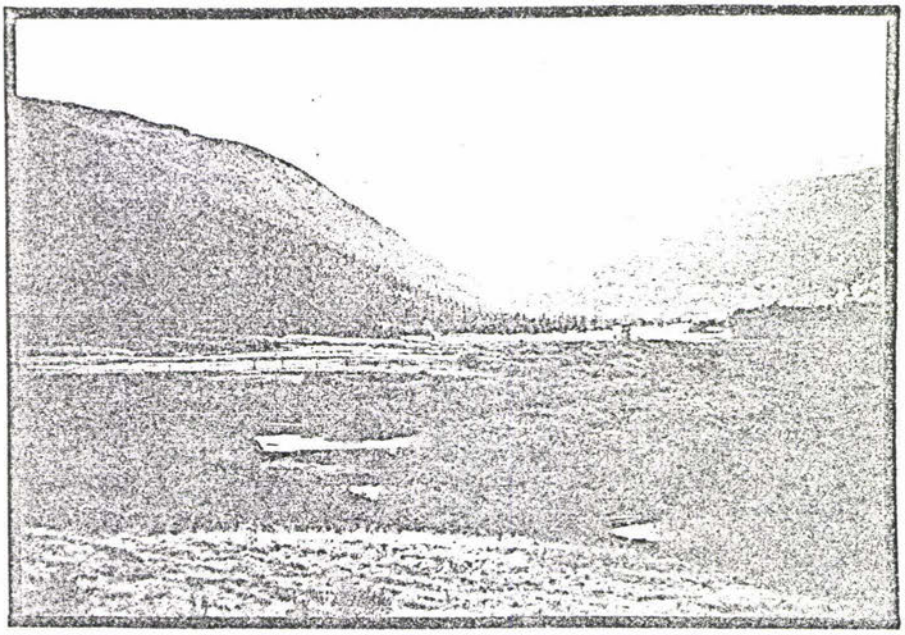
Future Conference Facility Location. To the east on a terrace above the Little South Fork of the Poudre lies the proposed location of a future conference facility. From this location

a superb panoramic view of the surrounding area can be obtained. Majestic peaks with year-round snowbanks form a pleasing backdrop. Sloping hillsides covered with conifer stands enclose the Pingree Park Valley and channel the view from the conference site toward the mountains. In the foreground the Little South Fork of the Poudre, willow-covered wet meadows, and campus facilities create a very pastoral scene. This area yields the best scenic vistas at Pingree Park and would be an outstanding location for a conference center from a scenic vista standpoint, if undesirable visual impacts of the conference center on the surrounding landscape can be minimized.

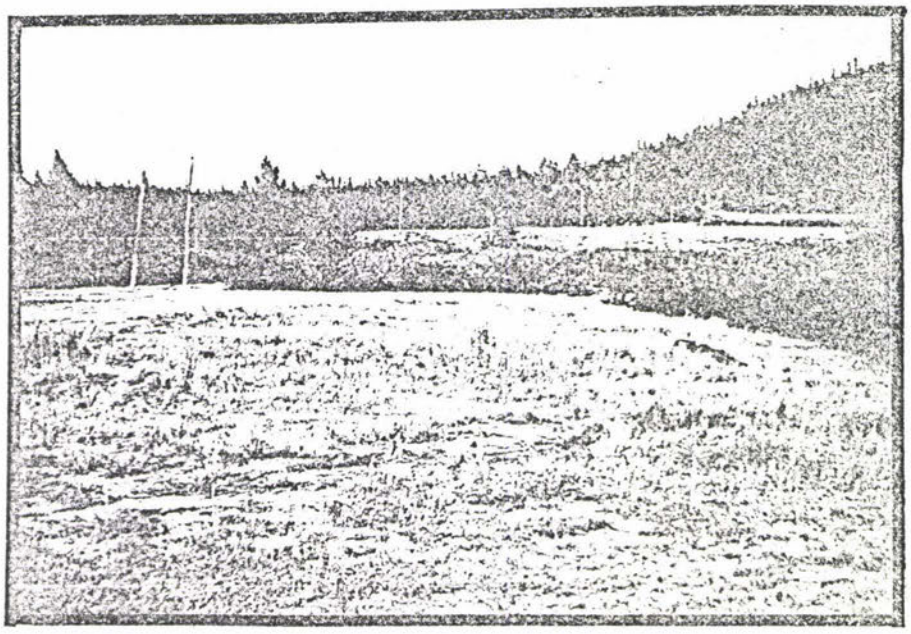
To insure that a future conference center does not detract from the visual quality of the area, the following items must be considered since the conference center will be located in a moderately vulnerable visual area:

1. The conference center should not be taller than the trees located east of the site. This implies a one-story building, possibly two at most.

2. The conference building should be set back at least 50-100 feet from the edge of the bluff above the stream in order to minimize the visual impact of the center as seen from the mess hall area. The higher the building, the greater the set back should be.



The proposed conference site on the east side of the Little South offers a superb view up the valley toward Comanche Peak which could be capitalized on; however, the conference site is also quite visible from the center of campus and must be carefully integrated into the landscape if visual quality within the area is to be maintained.



3. Natural colors and materials should be used on the exterior of the structure so that the building blends in with the surrounding landscape. This implies colors which blend in with the lodgepole pine and meadows surrounding the area, such as greens, yellows, and browns.

4. The roof of the building should also be a natural color. Unpainted steel sheeting which is very reflective and attracts attention should not be used.

5. The willow area along the Little South Fork should be preserved in a natural state if the character of the valley is to be preserved.

6. Parking facilities, utilities, and other ancillary items necessary in the use of this building must be screened from view if the visual impact is to be minimal. Parking could be accommodated in the main campus lots with a trail system leading to the conference center.

Each of these mitigating visual items must be considered because the area is moderate to highly visible from the main campus area. The visual effect of the center on the landscape should be low to moderate if the visual recommendations are followed and moderate to high if ignored. The vista that can be capitalized on by locating a center here should make a

visual trade-off acceptable if the proposed structure is carefully integrated into the landscape.

Visual Summary

The overall long-term visual impact of campus expansion north of the watershed research lab appears to be limited, since almost all the impact will be confined to the immediate area. Only the classroom building may have a slightly greater impact, if improperly designed, because it is visible from surrounding ridges. (Similarly, the visual impact of utility lines will also be low if these lines are placed underground, the soil revegetated, and rights-of-ways held to a minimum.) The visual effect of the proposed conference center, however, will be low to moderate if properly designed but moderate to high if improperly planned.

It is difficult to estimate or locate any secondary visual impacts which may result from this expansion. The increased camp capacity will add to the number of persons utilizing the area. This may lead to localized soil compaction, erosion, and vegetation destruction which could have an added visual impact in the area. It is not anticipated that this secondary impact will be a major problem.

In conclusion, it is recommended that view corridors up the valley may be utilized to maximize the scenic potential of the site. At the same time, the valley bottom should be preserved from development in order to retain views up the

valley and preserve the distinctive high value visual character of this foreground area. All future development, with the exception of the conference center, should occur on the west bank of the Little South Fork of the Poudre in the forested areas where it can be better absorbed visually. It is further recommended that existing negative visual elements in the area be corrected to minimize the man-made impact. This includes painting the highly visible metal roofs a natural color, screening or painting the aboveground water lines, revegetating scarred areas, and reclaiming the borrow pit between the two new parking lots.

. Historic and Archeologic

The history of man's activity at Pingree Park began essentially in 1867 with the establishment of a railroad lumbering operation which lasted several years. Nothing remains on the campus from these early days. In 1912 Colorado State University was granted the privilege of selecting a number of forest land tracts for use by the school. The Pingree Park Campus now occupies one of these tracts. In 1914 a lodge was built starting the campus and in 1915 the forestry camp was established. Today few historic sites remain on the property outside of the history which is tied to each existing structure and the stories of earlier grazing, lumbering, and trapping days. Historic sites which are present on the property include:

1. The Koenig Cabin which was homesteaded in 1880. Although this cabin is currently outside the

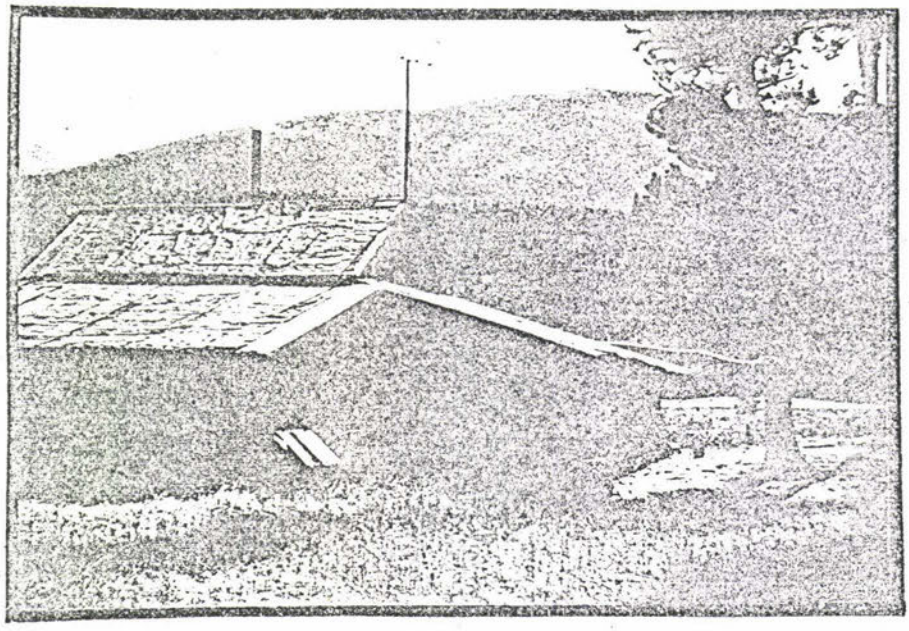
the boundaries of the campus, the University is acquiring the property to add to its present acreage. When this occurs, the Koenig Cabin should be preserved as an historic homestead site in the Pingree Park Valley.

2. The Koenig Family Cemetery. This cemetery has been and will continue to be used as the family burial plot. It also lies in the area that the University is purchasing and should be preserved.

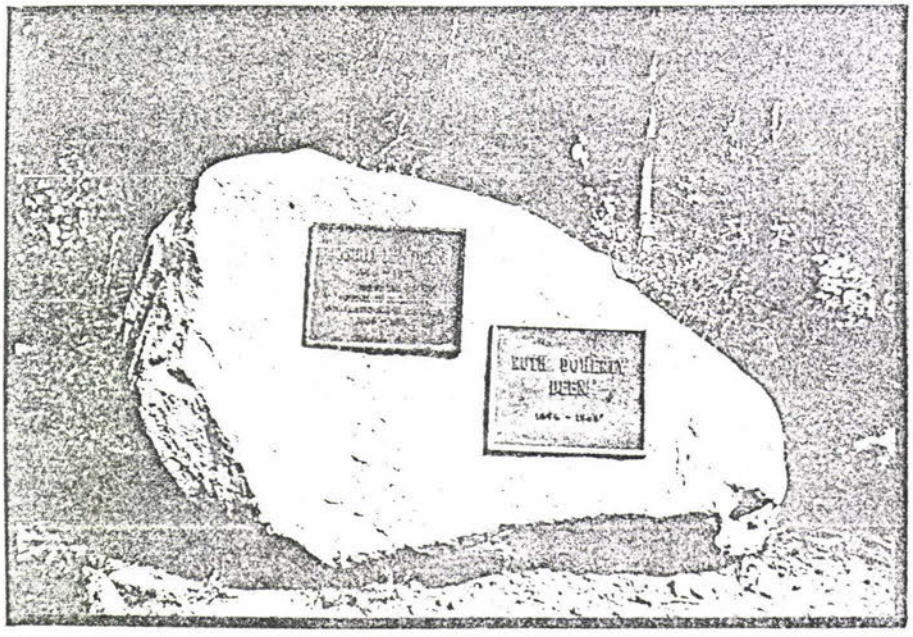
3. The lodge (Classroom A) built in 1914. This was the first building erected for use at the forestry camp.

4. The Memorial to Joshua Lee Deen, 1896-1951, first Dean of CSU's Forestry School. He and his wife were buried on the granite knoll between the two beaver ponds north of the faculty cabins.

5. Various antiques from the old Koenig Homestead and in various University buildings throughout the campus. These antiques should be preserved at the site, perhaps in a museum at the Koenig Homestead. Before any of the old buildings are remodeled, razed, or have furniture replaced, a check should be made as to the historic nature of the contents.



Historical sites on the campus include the Koenig Homestead (1880) and the memorial to Joshua Lee Deen.



The proposed construction activity at Pingree Park should not adversely affect the previously mentioned historic sites during the primary construction period. Construction activity will be a considerable distance from each of these areas. Some damage could occur to these sites and various antiques located throughout the campus as a result of increased campus housing capacity and use. To help mitigate any harmful effects resulting from theft, vandalism, mistreatment, or overuse, the University should monitor the condition of these sites and conduct an inventory of each building on the campus and determine which antiques are worth saving as historical items. Antique items should be protected or removed to safer locations such as a Pingree Park Museum.[1]

Although no actual archeological site survey has been conducted, there are presently no known archeological sites on the property. The bench or terrace areas could support sites which might be located by careful field investigation. This is based on information provided by Orville Parsons, archeology instructor at CSU, and Bill Bertschy, resident manager at Pingree Park.

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[1]The historic and archeologic information was compiled from "Historical facts relating to the establishment of a forestry camp at Pingree Park," from personal communication with Bill Bertschy, housing manager at Pingree Park, from Watershed Analysis of the Little South Fork of the Cache la Poudre River, and from personal communication with Orville Parsons, archeology instructor at CSU.

# HISTORIC AND VISUAL FEATURES

# PINGREE PARK

## CAMPUS PLAN

SCALE 1" = 200'

DENSE LODGEPOLE PINE

PROPOSED CONFERENCE SITE

SUPERB VIEW

ENCLOSED VIEW

DEEN MEMORIAL

THE LODGE

KOENIG FAMILY CEMETERY

KOENIG HOMESTEAD (1880)

KOENIG RANCH

LITTLE SOUTH FORK OF THE COLUMBIA RIVER

WILLOWS

WILLOWS

WILLOWS

CAMPUS FACILITIES

| Existing | Proposed |
|---|---|
| 1 through 10 FACULTY CABINS | 64 SOUTH PARKING AREA |
| 11 TYCONDEROGA CABIN | 65 NORTH PARKING AREA |
| 12 through 35 STUDENT CABINS | 66A SEWAGE TREATMENT PLANT |
| 36A, B, C, and D WINTER RESEARCH LAB | 66B WATER TREATMENT PLANT |
| 37A and B DUPLEX CABIN | 66C MAINTENANCE SHOP |
| 48 SOUTH DORMITORY | 67A and B CENTER/CLASSROOM BUILDING |
| 49 NORTH DORMITORY | 68 LABORATORY WELL |
| 50 WATER TANKS | 69 FUTURE WELL |
| 51 FACULTY WASHHOUSE | 70 LIFT STATION |
| 52 SOUTH CLASSROOM | A1, 2, and 3 8-BDRM DORMS |
| 53 WATER PUMP | B1, 2, 3 and 4 4-BDRM DORMS |
| 54 THE CAVE | WATERLINES |
| 55 RESEARCH LABORATORY | FUTURE WATER LINES |
| 56 NORTH CLASSROOM | SEWER LINES |
| 57 OBSERVATION SHELTER | FUTURE SEWER LINES |
| 58 WEATHER STATION | RELOCATED POWERLINE |
| 59 DINING HALL | |
| 60 MAINTENANCE AND RECREATION HALL | |
| 61 POWER HOUSE | |
| 62 STUDENT WASHHOUSE | |

## ALTERNATIVES

Because of the late stage in planning of the expansion program at which this environmental analysis was instituted, a thorough investigation of alternatives for the expanded facilities was not practical. However, based upon findings of this investigation, it appears that building sites, new roadways, and utility rights-of-way have been located in suitable areas from an environmental standpoint. It would be difficult to suggest more suitable locations for these improvements. Therefore, alternatives remaining focus upon controlling the impacts of an extended season of use and increased campus capacity.

It is recommended that the University institute a use policy which will maintain the high natural quality of the Pingree Park Campus. In order to accomplish this, the condition of natural resources present on the campus site should be monitored each year by natural resource summer camp sutdents and faculty as part of the academic training. Based upon trends in resource values indicated by these analyses, decisions should be made by the University regarding the level of impact due to increased use. If significant deterioration is occurring, damaged areas should be closed to all use or the amount and type of use restricted. The scheduling and size of groups utilizing the campus should also be determined by the condition of the site. Campus use levels should be reduced when conditions decline below critical levels and increased only after environmental recovery has taken place.

Since it is much more difficult to renew a site which has deteriorated than to maintain present conditions, every effort should be made to preserve the present high environmental quality of the campus site. The University should rely heavily upon the resource management knowledge of the faculty in mitigating harmful effects.

## SHORT-TERM IMPACTS, LONG-TERM IMPACTS AND IRREVERSIBLE COMMITMENTS OF RESOURCES

### Short-Term and Long-Term Impacts

Assessment of potential environmental impacts resulting from planned expansion and improvement of facilities at Pingree Park has been accomplished by considering various interacting natural components of the environment. The table on the following page presents a summary for each environmental component. Impacts and recommendations for mitigating undesirable effects are discussed in detail in previous sections of this report.

SHORT-TERM AND LONG-TERM ENVIRONMENTAL IMPACTS ASSOCIATED WITH EXPANSION OF THE PINGREE PARK CAMPUS

| Environmental Component | Short-Term Impacts | Long-Term Impacts |
|---|---|---|
| Geology and Physiography | Temporary surface disturbance on .49 acres, resulting in increased erosion from disturbed areas and higher sediment loads in runoff water. | Grading and construction on 1.37 acres. Possible long-term erosion and groundwater pollution impacts if protective measures are not taken. Some settling may occur due to differential compaction of surficial materials on construction sites, possibly causing damage to walls and foundations.<br><br>New sewage treatment plant will greatly reduce groundwater pollution potential. |
| Soils | Some soil erosion will occur on sites bared of natural vegetative cover and will continue until these areas are again stabilized.<br><br>Revegetation will be hampered in areas where the soil profile has been disturbed. This is especially true of soils under conifer tree cover.<br><br>Soil compaction from operation of mechanical equipment over vegetated and non-vegetated areas will reduce infiltration rates and hamper plant growth and re-establishment. | There will be no significant direct long-term impacts on the soil resource as a result of campus expansion, providing that recommended practices are utilized to mitigate potential erosion and disturbance effects. |

| Environmental Component | Short-Term Impacts | Long-Term Impacts |
|---|---|---|
| Hydrology | Sedimentation from disturbed soil areas during construction activities may temporarily affect water quality of the Little South Poudre.<br><br>Minor increases in surface runoff may be evident from areas denuded of vegetative cover and compacted by traffic or mechanical equipment.<br><br>Increases in surface runoff will become significant if future expansion plans include addition of impervious surfaces in the form of paved roadways and parking lots.<br><br>Continued soil erosion from areas disturbed by past construction activities (as indicated on the Erosion and Drainage Problem Areas Map) will cause continued maintenance problems if not alleviated by appropriate soil erosion control and slope stabilization measures.<br><br>Continued use of septic tank sewage systems will adversely affect water quality as more use pressure is placed upon facilities which are not serviced by the new extended aeration treatment plant. | If land uses on the Pingree Park Campus are not carefully assessed and monitored, future long-term decreases in water quality can be expected. If properly maintained, the extended aeration sewage treatment plant and tertiary filter system will adequately process sewage wastes so as to avoid undesirable impacts on the aquatic environment. |
| Vegetation and Fire Hazard | Plant cover on .49 acres will be removed or heavily disturbed during construction phase. Effects will be temporary if recommended revegetation measures are taken. | 1.37 acres of vegetation will be destroyed at sites of new buildings, roads, and parking areas. Increased disturbance and damage to plant cover in other areas will be caused by greater human presence for longer periods of the year. Campus use should be carefully regulated to minimize significant damage to vegetation in sensitive areas. |

| Environmental Component | Short-Term Impacts | Long-Term Impacts |
|---|---|---|
| Vegetation and Fire Hazard (cont.) | Risk of fire occurrence may increase periodically during the construction phase and in later use of expanded facilities because of presence of greater numbers of people over longer periods on the campus. | Quantity of water available for fire protection needs will be increased by 25,000 gallons if existing storage capacity is retained; or by 17,400 gallons if existing tanks and cistern are no longer used.<br><br>New water supply will be available year-round, whereas existing system must be drained in winter.<br><br>New facilities will be more fire safe than older cabins with woodburning stoves.<br><br>An emergency access and escape route will be provided if the Koenig Ranch road is joined to the campus road system and the bridge over the Little South Poudre is reinforced. |
| Wildlife | Increased noise levels and activity during the construction phase may negatively affect nearby wildlife. This is not expected to have a large impact.<br><br>Clearing and installation of utility lines will negatively affect wildlife in the immediate area by killing some individuals and driving others away from these sites. Once the utilities have been installed, wildlife will be able to again utilize these habitat areas. | Approximately two acres of wildlife habitat will be removed by expansion to accommodate new dormitories, classroom, parking areas, and sewage and water treatment facilities. This long-term habitat loss is comprised mostly of lodgepole pine, some aspen, and some grassland vegetation, and does not appear to be a signficant loss. Only a small number of wildlife species and individuals should be affected by this removal.<br><br>Increased activity on the campus due to larger capacity and an extended season of use will have long-term impact on wildlife. Increased periods of human activity are expected to cause a decrease in the numbers of wildlife found on the campus. Increased activity will have a moderate affect on wildlife. |

| Environmental Component | Short-Term Impacts | Long-Term Impacts |
|---|---|---|
| Wildlife (cont.) | | Wildlife species and numbers should be monitored by summer camp wildlife classes to determine the impact of increasing human presence. Non-use or limited use areas could be established if people impacts become significant. |
| Fisheries | Increased capacity and use will increase fishing pressure in the Little South Poudre. This may result in some bank caving, degradation of streamside environment, and a decline in fishing success. This impact can be controlled by limiting fishing or access if the problem becomes significant. | Increased capacity and an extended period of use will increase fishing pressure in the Little South Poudre. This may result in some bank caving, degradation of the streamside environment, and a decline in fishing success.<br><br>These impacts should be monitored by summer camp classes to determine the level of damage so that proper management and remedial actions can be taken if necessary. |
| Climate and Air Quality | Periodic minor increases in local atmospheric pollution concentrations will be caused by exhaust emissions and dust raised by construction vehicles and equipment, and by the larger number of vehicles on campus associated with increased-use capacity. Air pollution impacts will not be significant. Construction and use of the expanded facilities cannot feasibly result in pollution levels approaching even one-tenth of federal and state air quality standards. | Minor alteration of microclimatic conditions will occur at sites of new structures.<br><br>New winterized facilities will provide greater comfort for an increased number of campus users. Electric space heating system will not cause any on-site pollution emissions. Fireplace in the new classroom center will be an additional pollution source, but will not add significantly to the existing level of emissions. |

| Environmental Component | Short-Term Impacts | Long-Term Impacts |
|---|---|---|
| Visual | Short-term visual effects will be caused by removal of vegetation for sewer, water and powerline rights-of-way. Vegetation in these disturbed areas may require several summers in which to become re-established. Visual impact of these scars is low to moderate.<br><br>Increased activity and use will create visual scars in heavily used areas through compaction of soil and trampling of the vegetation. These areas should be rejuventated through proper management practices. | Clearing and installation of new powerline rights-of-way will have only a low long-term visual impact on the area since it is well screened from major viewing locations.<br><br>Clearing and construction of new dorms, classrooms, sewage and water treatment facilities, and parking areas should also have low visual impact on scenic quality of the area, largely due to the screening ability of surrounding vegetation.<br><br>This screening should be preserved to minimize visual impacts, and recommended visual protective measures should be taken. |
| Historic and Archeologic | There are no short-term historic or archeologic impacts associated with campus expansion. | There are no known historic or archeologic sites in the area which would be negatively impacted by campus expansion. |

## Permanent Impacts or Irreversible Commitments of Resources

Impacts on the campus' natural environment are not of an irreversible nature. Irreversible commitments of resources are limited to expenditure of the materials and energy used in construction, maintenance, and use of the new facilities. In a sense, this commitment of resources by the University implies a permanent policy of utilization and alteration of the campus' natural setting. Considering the fact that the campus is at 9,000 feet, future use as intensive and diverse as the proposed may cause some permanent impacts on campus ecosystems. In order to avoid any permanent changes from taking place, the University should carefully monitor its programs at the site on a yearly basis and reassess the campus situation regularly. Should University policy change, the natural environment would recover in time, although there is no guarantee that the exact natural conditions present at the site today will occur at some future date.

## Summary

The nature and magnitude of environmental impacts which will result from the planned expansion of facilities at Pingree Park will largely be determined by the extent to which precautions are taken during construction. If recommended practices for minimizing environmental degradation are implemented, both short-term and long-term impacts should be minor.

The ecological balance of natural elements of the Pingree Park environment must be maintained in future use and improvement of CSU's mountain campus. Continued use and development

of the Park to its full potential as a natural resources education and research facility requires careful evaluation and control of potential impacts for not only the present expansion program, but also in subsequent use and future improvements of the campus.

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