0047

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DIVISION OF
OIL, GAS & MINING

CO-OP MINING CO.

ADDENDUM BEAR CANYON MINE

APPARENT COMPLETENESS REVIEW

July 29, 1983

(I) Topsoil Stockpile Consolidation

(A) Interum Seed Mix

(B) Estimate of Volume

(C) Cross Section

(II) Vegetation Analysis - Reference Area

(III) Seed List - Finale Reclamation

FILE IN expandable

Refer to Record No. 0047
in C/015/025, 1983, Incoming
for additional information

Jre 71.

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Dr. G. A. (Jim) Shirazi, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

July 28, 1983

CERTIFIED
RETURN RECEIPT REQUESTED
P 396 996 785

Mr. Mel Coonrod, Director
Permitting and Compliance
Co-op Mining Company
C/O Environmental Industrial Supply
P.O. Box 358
Elmo, Utah 84521

RE: Plans Submitted July 18, 1983
Bear Canyon Mine
ACT/015/025, #7

Dear Mr. Coonrod:

This letter is in response to questions which were raised in our meeting of July 19, 1983 concerning the status of the various violations which exist presently at the Co-op Mining Company, Bear Canyon Mine.

During our meeting, you requested that your submittal dated July 18, 1983 be considered for several violations which presently exist. After reviewing the material contained in your submittal, the following has been determined. The material is applicable to violations N83-5-7-1, N83-5-3-3 one and two of three (part one being only a clarification), and N83-5-8-3 three of three. Violation N83-5-2-2 two of two is really not dealt with in any measureable extent in your submittal, and therefore, will not be considered as abatement material for this violation.

During the meeting, you expressed concern about the violations which presently are on the books and the abatement of these occurring in a logical sequence. In examining the violations which exist, there appear to be only three which are related. Violation N83-5-8-3 two and three of three and violation N83-5-2-2 two of two are related in the area of hydrology. However, in a closer examination it appears that given a few simple assumptions, there is nothing which would impede the submission of complete and adequate plans to abate these violations. The drainage area of the disturbed portion of the upper pad substation and portal area can be sized and appropriately routed

through the disturbed area ditch which runs adjacent to the crusher pad. The sediment pond can be sized adequately with the information gained from the upper area drainage. The other violations which currently are on the books do not appear to be interrelated in such a fashion that would prevent in any way Co-op Mining Company from submitting complete and adequate plans or undertaking abatement measures.

Thank you for your cooperation and interest in this matter. Please feel free to contact me should you have any questions regarding any of the above matters.

Sincerely,

John J. Whitehead

JOHN J. WHITEHEAD
RECLAMATION HYDROLOGIST

JJW:gl

cc: Wendell Owen, Co-op Mining Company
Joe Helfrich, DOGM Field Supervisor

CO-OP MINING CO.
P.O. Box 15809
Salt Lake City, Utah 84115
Phone (801) 467 4003

June 24, 1983

TOPSOIL STOCKPILE CONSOLIDATION

Bear Canyon Mine

The following plan for handling of topsoil and consolidation of piles to one storage area has been prepared for Co-op Mining Company by Mel Coonrod. Please refer to the request made by Co-op Mining Company on June 1, 1983 and the subsequent visit to the minesite by Bv Hooper and John Whitehead to discuss possible storage sites.

Co-op Mining Company

Wendell Owen

SOILS, PHYSICAL AND CHEMICAL PROPERTIES OF SOILS; RESULTS OF ANALYSIS, TESTS, TRIALS AND INTERIM RECLAMATION PLAN.

The 1982 Co-op field investigations provided information on the physical and chemical properties of soils in the permit area. A Soils Legend will be included for each soil in a map unit [Attachment 3A]. A rating for topsoil is included on this form, as are some chemical properties. In studies during the 1982 field season an onsite sampling was analyzed for the required chemical properties in all horizons [see Attachment 1-A].

SOIL SUBSTITUTE OR SUPPLEMENT

Not applicable.

SOIL REMOVAL, HANDLING, STORAGE, AND PROTECTION PLANS

To prevent suitable topsoil from being wasted or contaminated by waste materials, topsoil was removed from all new construction areas as a separate operation. The topsoil was stockpiled and will be consolidated and protected from wind and water erosion and contamination which might lessen its capability to support vegetation. The following subsections deal specifically with the various phases of the topsoil and subsoil handling plan.

Topsoil Removal

At the start of the construction phase, topsoil was collected from the area. Existing vegetation was removed and topsoil was collected prior to excavation or other surface disturbance operations within the affected areas.

The depth of topsoil removal in each case depends on the amount of A and B horizon material as defined in OSM Regulation 30 CFR 783.21 and 783.22. The topsoil removed in these areas consists of A horizon quality material

and B horizon quality material with vertually no distinctive difference. The C horizon material was not removed since it was not sufficiently capable of supporting diverse vegetation do to the excessive rock.

The equipment used for topsoil removal consisted of bulldozers, front-end loaders, and dump trucks. The use of bulldozers requires pushing of the topsoil to a collection point for loading into dump trucks or other means of transportation to the designated stockpile. Adequate supervisory personnel were present at the time of topsoil removal to instruct the equipment operators in the proper techniques of topsoil removal and to ensure that required horizons were removed and stored.

Topsoil Stockpile

Topesoil is presently being stored within areas of the permit boundary [see Map 1]. It is the Co-op intent to consolidate Piles #3 with Pile #4; to utilize Pile #2 which is principally rock and unsuitable as a growth media as rip-rap where ever the need arises; and to relocate Pile #1 which is primarily rock to the site of Pile #4 to be used as a top dressing upon final reclamation.

Plans involving topsoil storage can be labeled as "short term" or "long term" depending on completion of activities in each area and the reclamation schedule presented. These piles should be considered "long term".

Short-Term Topsoil Storage Areas

Short-term stockpiles of topsoil will be for areas to be reclaimed almost immediately upon cutting and at final grade. Topsoil will be redistributed promptly to minimize natural degradation processes.

Long-Term Topsoil Storage Areas

During any new construction of areas that will be used for the duration

of the mining operation within the permit area, topsoil will be collected and stockpiled. The topsoil will be used later for post-mining reclamation of the abandonment areas.

Topsoil Protection

The short-term topsoil stockpile will be sprayed with water or temporarily vegetated to retard erosion. The long-term topsoil stockpile will be protected by the following operational steps:

A stable surface will be provided in an area outside the influence of active operations.

As a stockpile is completed, it will be left in a rough condition to minimize erosion.

Stockpiles will be situated out of drainages to prevent water erosion.

Storage piles will be vegetated with quick-growing, soil-stabilizing plants. Revegetation will involve the immediate seeding of stockpiles topsoil during the next planting season with the seed mixture recommended in a report on vegetation and plant community analysis [see Attachment 2A Seed List] in compliance with the requirements of the appropriate land management agency.

Signs will be posted to protect the stockpiles from accidental use as fill or from other inadvertent material contamination.

The establishment of noxious plant species will be prevented.

The stockpiled topsoil will not be removed or otherwise disturbed until required for the redistribution operation on a prepared, regraded disturbed area.

PLANS FOR REDISTRIBUTION OF SOILS

Prior to topsoil redistribution, regraded land will be scarified by a ripper-equipped tractor. The ground surface will be ripped to a suitable depth in order to reduce surface compaction, provide a roughened surface assuring topsoil adherence, and promote root penetration. Steep slope areas which must remain after abandonment will receive special ripping to create ledges, crevices, pockets, and screes. This will allow better soil retention and vegetation establishment.

Within a suitable time period prior to seeding, topsoil will be distributed on areas to be reclaimed. During this time, the topsoil will be allowed to settle and attain equilibrium with its natural environment. This procedure will be followed for areas in which facilities such as roadbeds, mine pads, and building sites are to be abandoned.

Topsoil redistribution procedures will ensure an approximate uniform thickness consistent with the proposed reclamation plan. Topsoil will be redistributed at a time of the year suitable for establishment of permanent vegetation.

To minimize compaction of the topsoil following redistribution, travel on reclaimed areas will be limited. After topsoil has been applied, surface compaction will be reduced by using appropriate equipment running at a suitable depth. This operation will also help prepare a proper seed bed and protect the redistributed topsoil from wind and water erosion.

Co-op Mining will exercise care to guard against erosion during and after application toptopsoil and will employ the necessary measures to ensure the stability of topsoil on graded slopes. The specific methods to be implemented will be defined in the attached Interim Plan. An example of the soil stabilization methodology that might be used includes the placement of crushed and heavier material at the toe of roadfill slopes, and the random placement of large rocks and boulders on the surface. This procedure will

enhance the microclimate as well as make the reclaimed area more asthetically compatible with the undisturbed surroundings.

Phosphorus
Nitrogen
Soil pH and salinity
Soil texture

Chemical analysis for micronutrients will be conducted by testing soil extracts from the redistributed material. All necessary fertilization or neutralization, as determined by soil testing, will be done according to the final Reclamation Plan.

EFFECTS OF MINING OPERATIONS ON TOPSOILS, NUTRIENTS, AND SOIL AMENDMENTS

Since the Co-op Mine is an underground mine, the impact of mining on soils will be minor overall. The impacts of surface operations and mining facilities on soil resources consist of coverage of soil by landfills and refuse, disturbance of soils during construction activities, erosion created by removing vegetation, reduced forage growth due to nutrient degradation, reduced livestock capacity, and particulate emissions to the air.

The areas in which soil has been disturbed to date within the permit area, includes the loadout area, future offices, shops and substations, roads, portal areas, and the topsoil storage areas. Additional acreage may be disturbed in the future if Co-op elects to proceed with certain projects it is considering.

MITIGATION AND CONTROL PLANS: SOILS TESTING PLAN

Detailed Interim Reclamation Plans [Attachment 4A] are attached and will be part of the Bear Canyon Mine Reclamation Plan in regard to stockpiling and long and short term plans and goals for final reclamation.

SOIL TEST REPORT

NO. 7404.0

AGRICULTURAL CONSULTANTS, INC.
P.O. DRAWER 507 — 240 S. FIRST AVENUE
BRIGHTON, COLORADO 80601
303/659-2313

DATE RCVD 11-12-82
REPORTED 11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN
BILL TO: SAME
GROWER: SAME
SAMPLE ID: BEAR UPPER PAD

TEXTURE si=silt, silty sn=sand, sandy lo=loam, loamy cl=clay	pH H_2O	pH Buf	CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1) NO_3	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
N LO	8.3	7.0	9.5	1.9	0.2	8.7	0.9	31.5	9	1	44	2700	250	58	0.2	0.4	1.5	1.1	0.3

CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE N	P_2O_5	K_2O	Elem Sulfer	Lime	Mg	SO_4-S	Boron	Zinc	Iron	Mn	Cu
DL Native Grasses	Average	-	0	50	50	50	0	0	0	0	0	0	0	0	0

1.ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P_2O_5 K x 1.2 = K_2O S x 3 =
Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Supervised by Diane Lynning

ATTACHMENT 1-A

SOIL TEST REPORT

NO. 7406.0

AGRICULTURAL CONSULTANTS, INC.
P.O. DRAWER 507 — 240 S. FIRST AVENUE
BRIGHTON, COLORADO 80601
303/659-2313

DATE RCVD 11-12-82
REPORTED 11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN
BILL TO: SAME
GROWER: SAME
SAMPLE ID: SCALES BEAR

TEXTURE (si=silt, silty; sa=sand, sandy; lo=loam, loamy; cl=clay)	pH		CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1)										
	H_2O	Buf							NO_3	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
LD	8.3	7.0	11.1	1.0	0.2	8.6	1.3	45.5	8	3	99	3400	210	31	0.6	0.6	3.8	2.0	0.3

CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE											
				N	P_2O_5	K_2O	Elem Sulfer	Lime	Mg	SO_4-S	Boron	Zinc	Iron	Mn	Cu
DL Native Grasses	Average	-	0	40	50	50	0	0	0	0	0	0	0	0	0

1.ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P_2O_5 K x 1.2 = K_2O S x 3 =
Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Supervised by Diane Lynning

ATTACHMENT 1-A

SOIL TEST REPORT

NO. 7405.0

AGRICULTURAL CONSULTANTS, INC.
P.O. DRAWER 507 — 240 S. FIRST AVENUE
BRIGHTON, COLORADO 80601
303/659-2313

DATE RCVD 11-12-82

REPORTED 11-23-82

REPORT TO: CO-OP MINING COMPANY ATTN: MR. OWEN

BILL TO: SAME

GROWER: SAME

SAMPLE ID: BEAR POWER POLE

TEXTURE si=silt, silty sn=sand, sandy lo=loam, loamy cl=clay	pH		CEC Meq /100g	SALT Mmhos /cm	Na Meq /100g	Lime %	OM %	Org N Lbs	AVAILABLE NUTRIENTS ppm (1)										
	H_2O	Buf							NO_3	P(2)	K(2)	Ca	Mg	S(2)	B	Zn	Fe	Mn	Cu
	8.0	7.0	38.7	4.6	0.3	9.1	1.8	45.0	6	1	90	9900	510	204	0.6	0.4	4.6	1.4	0.4

CROP	YIELD GOAL	CROP RESIDUE T/A	MNR T/A	RECOMMENDATIONS POUNDS PER ACRE											
				N	P_2O_5	K_2O	Elem Sulfer	Lime	Mg	SO_4-S	Boron	Zinc	Iron	Mn	Cu
DL Native Grasses	Average	-	0	50	50	90	0	0	0	0	0	0	0	0	0

1.ppm=parts per million or lbs element per million lbs soil. ppm x 2 = lbs/acre 6-7" depth. ppm x 3.5 = lbs/acre feet. 2. P x 2.3 = P_2O_5 K x 1.2 = K_2O S x 3 =

Values reported but without specific remarks are considered to be within growth range of intended crop.

If poor moisture conditions reduce fertilization accordingly.

Supervised by Diane Lynning

ATTACHMENT 1-A

ATTACHMENT 3-A

SOIL LEGEND

SOIL SYMBOL	SOIL MAPPING UNIT NAME
D2E	Datino bouldery fine sandy loam, 5 to 20 percent slopes
D1G	Datino very stony fine sandy loam, 55 to 70 percent slopes

DESCRIPTION OF THE SOILS

D2E Datino bouldery fine sandy loam, 5 to 20 percent slopes

This Datino soil is very deep and well drained. It occurs on moderately steep alluvial fans and some sloping flood plains at elevations of 7,100 to 7,140 feet [2,165 to 2,177 meters]. This soil formed in alluvium and colluvium derived mainly from sandstone and shale. The average annual percipitation is 14 to 16 inches [36 to 41 centimeters]. Mean annual air temperature is 42 to 45 degrees F. [5 to 7 degrees C.], mean annual soil temperature is 44 to 47 degrees F. [6 to 8 degrees C.], and the average greeze-free season is about 80 to 110 days.

Slopes are 5 to 20 percent and mostly East facing. They are short and concave-convex.

Vegetation is dominatly pinyon, Utah juniper, salina wildrye, squirreltail, big sagebrush, Douglas-fir, and Rocky Mountain juniper.

Included in mapping are small areas of a similar soil except with 20 percent gravel and cobbles in the surface layer.

In a typical profile the surface layer is brown, bouldery fine sandy loam and cobbly loam about 10 inches [25 centimeters] thick. The subsoil is light brown very stony loam about 28 inches [71 centimeters] thick. The substratum is light reddish brown cobbly fine sandy loam to a depth of 60 inches [1.5 meters] or more.

Permeability is moderate. Available water capacity is 6 inches [15 centimeters] to a depth of 60 inches [1.5 meters]. Organic matter content in the surface layer is 4 percent. Effective rooting depth is about 60 inches [1.5 meters]. Surface runoff is medium and erosion hazard is moderate under potential native vegetation and high if vegetation is removed and the soil is left bare. Erodibility is low. This soil is used for range, wildlife habitat and mining operations.

Taxonomic classification is loamy-skeletal, mixed Typic Haploboralls.

A typical pedon of Datino bouldery fine sandy loam, 5 to 20 percent was described on the cut about 200 feet East and 1,100 feet South of the NW corner of Section 25, T16S, R7E.

A11 - - 0 to 2 inches [0 to 5 centimeters] brown [10YR 5/3] bouldery fine sandy loam, dark brown [10YR 3/3] when moist; moderate fine granular structure; loose, very friable, slightly sticky, non-plastic; common very fine to medium, few coarse roots; 10 percent boulders, 10 percent stones, 5 percent cobbles, 10 percent gravel; slightly calcareous; moderately alkaline [8.0], abrupt smooth boundary.

A12 - - 2 to 10 inches [5 to 25 centimeters]; brown [10YR 5/3] cobbly loam, dark brown [10YR 3/3 when moist; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; common very fine to medium, few coarse roots; 10 percent cobble and 10 percent gravel; moderately calcareous; moderately alkaline [ph 8.2]; clear smooth boundary.

B2 - - 10 to 38 inches [25 to 96 centimeters]; light brown 7.5YR 6/4] very stony loam, brown [7.5YR 4/4] when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine to medium roots; 1 percent boulders, 30 percent stone, 10 percent cobbles, 20 percent gravel; moderately calcareous; strongly alkaline [ph 8.5]; abrupt wavy boundary.

C1 - - 38 to 60 inches [96 to 152 centimeters] light reddish brown [5YR 6/4] cobbly fine sandy loam, reddish brown [5YR 4/4] when moist; massive; soft, very friable, slightly sticky, non-plastic; few very fine and fine roots; 10 percent cobbles, 5 percent gravel; strongly calcareous; strongly alkaline [ph 8.6].

DIG <u>Datino - Rock Outcrop Complex, 55 to 70 percent slopes</u>

This map unit is on very steep canyon sideslopes. Slopes are short and concave-convex. Elevation is 7,140 to 7,600 feet [2,177 to 2,318 meters]. The average annual precipitation is 14 to 16 inches [36 to 41 centimeters]. Mean annual air temperature is 42 to 44 degrees F. [6 to 7 degree C.] and the average frost-freeze season is 80 to 110 degrees.

This unit is 75 percent Datino very stony fine sandy loam, 55 to 70 percent slopes in single and concave areas and 15 percent rock outcrop on ridges.

Included in this unit is about 10 percent of a shallow soil that is about 6 to 15 inches in depth, associated with the rock outcrop.

The Datino soil is very deep and well drained. This soil formed in colluvium derived mainly from sandstone and shale. Slopes are 55 to 70 percent and East facing. They are short and concave-convex. Vegetation is dominantly pinyon, Utah juniper, Rocky Mountain juniper, salina wildrye, Douglas-fir, curlleaf mountain mahogany.

In a typical profile the surface layer is brown or yellowish brown, very stony fine sandy loam about 16 inches [41 centimeters] thick. The subsoil is very pale brown, very stony sandy clay loam about 20 inches [51 centimeters] thick. The substratum is very pale brown, very stony silty clay loam to a depth of more than 60 inches [152 centimeters].

Permeability is moderate to 36 inches [91 centimeters] and moderately slow below 36 inches. Available water capacity is 6.5 inches [16 centimeters] to a depth of 60 inches [1.5 meters]. Organic matter content in the surface layer is about 4 percent. Effective rooting depth is about 60 inches [1.5 meters]. Surface runoff is rapid and erosion hazard is high under potential native vegetation and very high if vegetation is removed and the soil is left bare. Erodibility is low. This soil is used for range, wildlife habitat, and mining operation.

Taxonomic classification is loamy-skeletal, mixed Typic Haploboralls.

A typical pedon of Datino very stony fine sandy loam, 55 to 70 percent slopes was described on the bank about 150 feet North of the old mine portal about 300 feet North and 300 feet East of the SW corner of Section 24, T16S, R7E.

A11 - - 0 to 3 inches [0 to 8 centimeters]; brown [10YR 5/3] very stony fine sandy loam, dark brown [10YR 3/3] when moist; moderate fine granular structure; soft, very friable, non-sticky, non-plastic; many very fine, few medium and course roots; moderately calcareous; moderately alkaline [ph 8.4]; abrupt amooth boundary.

A12 - - 3 to 16 inches [8 to 41 centimeters]; yellowish brown [10YR 5/4] stony fine sandy loam, dark brown [10YR 3/3] when moist; weak medium granular structure; soft, friable, non-sticky, non-plastic; many very fine and fine, few medium and coarse roots; 2 percent boulders, 10 percent stones, 10 percent cobbles, 10 percent gravel; moderately calcareous; moderately alkaline [ph 8.4]; clear smooth boundary.

B2 - - 16 to 36 inches [41 to 91 centimeters] very pale brown [10YR 7/3] very stony sandy clay loam, pale brown [10YR 6/3] when moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; common very fine and fine roots; many fine pores; 2 percent boulders, 15 percent stones, 15 percent cobbles, 10 percent gravel; moderately calcareous; strongly alkaline [ph 8.6]; abrupt wavy boundary.

C1 - - 36 to 60 inches [91 to 152 centimeters] very pale brown [10YR 8/4] stony silty clay loam, light yellowish brown [10YR 6/4] when moist; moderate medium and coarse subangular blocky structure; hard, firm, sticky plastic; few very fine and fine roots, common fine pores; 2 percent boulders, 10 percent stones, 10 percent cobbles, 5 percent gravel; strongly calcareous; strongly alkaline [ph 8.9.].

ATTACHMENT 4-A

INTERIM RECLAMATION PLAN
BEAR CANYON MINE

The following procedures are designed to revegetate and control erosion. . They will satisfy the commitments made by the Co-op Mining Company in their permit application and all applicable portions under CFR 784.13. The area in question will be along and adjacent to the main mine access, the disturbance associated with topsoil relocation, and the slope apposing the proposed office and bathhouse areas. The reclamation will be of an interim nature [see Attachment #1-Map]. The actual ground involved comprises approximately 5 acres of disturbance. .

METHODOLOGY

The actual implementation of topsoil relocation and interim reclamation can be broken down into three major categories and classification of types of work needed.

1. Earth moving: relocation of topsoil and redistribution of slope material to approximate original contour of the surface.

2. Seeding and mulching to re-establish interim species and reduce erosion.

3. The berm construction around the topsoil pile - to contain any soil which may be inadvertently lost during the time necessary to establish vegetation.

PHASE #1 - EARTH MOVING

A. The slope area can be brought back to a reasonable configuration by implementation of a crawler tractor. The actual method will involve the redistribution of existing soil to approximately the original

configuration and contour prior to the disturbance. On completion of contouring, the area will be scarified and ripped to a depth of 1 foot to alleviate any compaction due to previous uses. This will be accomplished with a ripper bar mounted behind a crawler tractor. The ripping as well as the track configuration enhances the potential for revegetation. All work done both above and below the slope area will take into consideration; existing vegetation and all effort should be made to minimize disturbance and utilize existing vegetation. When there is no alternative other than disturbance, an effort can be made to relocate earth and maintain existing vegetation in place, attempting to relocate the vegetation in the proximity of the slope disturbance.

B. Topsoil Relocation

Presently the Co-op maintain 4 topsoil pile areas [labelled 1-4 on Map 1]. Through a joint effort with the Utah Division of Oil, Gas and Mining a decision to consolidate these 4 areas to one central pile was reached. It was further agreed that do to the excessive rock in Piles #1 and #2, that this material did not constitute a suitable growth media and would not be considered as topsoil for estimating soil requirements on future reclamation. Pile #3-3A, 3B and 3C will be relocated and consolidated with Pile #4 during July thru August of 1983. The total volume of soil can then be accurately determined and the Co-op will advise the Division of both volume and any additional needs.

Stockpile #2 is presently 85 to 90% rock and is ideally situated to be utilized as rip-rap both for the existing sediment pond and the reoccurring need in ditch maintainence. It is the Co-op's desire to leave this pile in place to be utilized for the above purpose until such time as the area can be reclaimed.

Pile #1 is also principally rock: this material is ideally suited to

be redistributed on the surface of reclaimed areas. This procedure will perform the following functions:

[1] To enhance the microclimate of the surface and help the re-establishment of vegetation.

[2] To provide cover and protection for wildlife during and after vegetation establishment.

[3] To make the area more asthetically compatible with the native undisturbed surrounding.

[4] Act as one additional parameter in soil stabilization.

Pile #1 will also be relocated and placed at the toe of the slope of Pile #4 until final reclamation commences.

CONCLUSIONS AND RECOMMENDATIONS

The advantages of this recommended procedure are as follows:

By utilizing a crawler tractor, associated disturbance will be kept minimal.

The hydro-seeding and mulching accomplishes all of the below:

Immediate ground cover.

Aesthetically pleasing upon completion.

Maximize potential for native species to establish.

Modify and enhance the micro-environment of the disturbed site.

The hydro-seeding, mulching, fertilization, and tackifying will virtually assure rapid establishment, thus minimizing wind and water erosion.

A cost effective methodology to address a common problem associated with mine disturbance.

The area will be monitored until such time as the 70% confidence level is achieved and the area is fully revegetated.

Attachment 4-A

ESTIMATE OF RECLAMATION COSTS ON BEAR CANYON MINE - INTERIM RECLAMATION

All costs are based on known costs - contract amount on work either in progress or completed in the preceeding 12 months.

TYPE OF ACTIVITY	COST PER ACRE
Hydromulching and Seeding	
Application of seed & tackifyer equipment and labor only	$ 175.00/acre
Application of mulch, fertilizer, and tac equipment and labor only	275.00/acre
Mobilization [Utah Area]	Job 500.00
Mulch	380.00/acre
Tac @ $1.60/# 140#/acre	224.00/acre
Fertilizer @ $23.00/100#	23.00/acre
Drill Seeding	240.00/acre
JD 450 crawler @ $45.00/hour estimate 8 hours/acre	360.00/acre
Seed	
Variable - current quote	165.00/acre
Planting and site preparation	93.00/acre
Nursery stock	.50 each

Attachment 4-A

ESTIMATE OF TOTAL COST ON RECLAMATION
APPROXIMATELY 5 ACRES

5 Acres Hydroseeding	$ 2,250.00
5 Acres Hydromulching and Fertilizing	3,250.00
Mobilization in Utah	500.00
Crawler Tractor	720.00
Seed [current bid - Maple Leaf Supply]	330.00
Planting and Site Preparation	186.00
Nursery Stock $1,500/acre	7,500.00
	$ 14,286.00

Cost comparables received from:

- U.S.F.S. Fishlake National Forest
- Plateau Mining Company - test plot data
- Kaiser Mining Company - Slaughter Canyon Road
- Getty Coal CV Ridge - reclamation
- B & R Reclamation Company - Kennelworth, Utah
  - Soldier Creek Sewage Pond
  - Trail Mountain Reclamation
  - Plateau - wildlife enhancement area
  - Mountain Resources - drill site reclamation

Total Estimate of Top Soil Stockpile in place as of 08-31-1983

Co-Op Mine - Bear Canyon Mine

Tentative estimate of soil on hand is 2600 cubic yards. (see Fig.1) Additional material is anticipated with the completion of the bathhouse and shop grading. Total estimate of material necessary to cover those areas with 6" of soil where there is no available growth media on site is 6.2 acres. The total amount of material needed is 5,000 cubic yards.

At present it appears that the mine is deficient approximately 2400 cubic yards. However, the majority of this material may be available on site. As the proposed facilities come on line, all reasonable efforts will be made to salvage what ever soil is available.

Co Op Mining Co

Bear Canyon Mine
Top Soil Stockpile

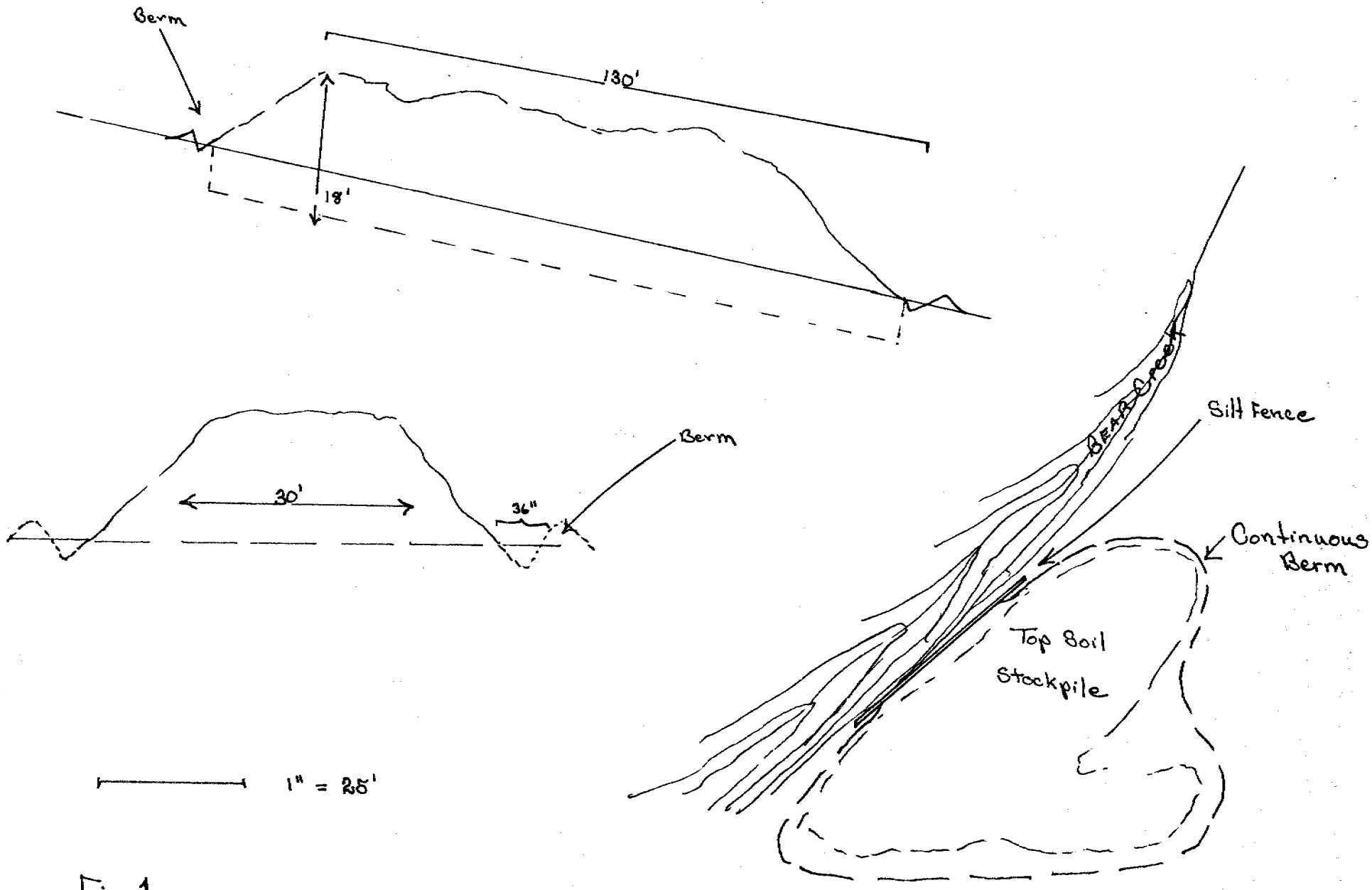

Fig. 1

VEGETATION ANALYSIS - REFERENCE AREA

Melvin A. Coonrod
Co-Op Mining Company
P.O. Box 1245
Huntington, Utah 84528

August 20, 1983

Utah Division of Oil, Gas & Mining
Mr. James Smith
4241 State Office Building
Salt Lake City, Utah 84114

REF: ACR Committment July 29th 1983
Vegetation Analysis-Reference Area
Co-Op Mining Co. Bear & Trail Canyon

Dear Jim:

Please find attached: The data, work sheets and Summation on the Vegetation Reference Area. The area was selected in cooperation with Mr. Lynn Kunzler of the Division, and myself. The work was completed during August 6-7, 1983, and appears to be very representative of those areas which were disturbed in conection with mining activities in both Trail and Bear canyons.

The commitment to do this work was referenced in the Bear Canyon Scale modification, Bear Canyon Pad modification, and the Bear Canyon Apparant Completeness submittal. It was also referenced in the various reclamation plans I have submitted relative to the Co-Op's activities.

In view of this, I have attached eight copies. I would appreciate your assistance in diseminating this data.

I would again wish to express the Co-Op's appreciation for the Divisions' assistance in helping establish these areas.

Sincerely,

Melvin A. Coonrod

Melvin A. Coonrod
Permitting & Compliance Director
Co-Op Mining Company

Attachments: dup 8

CO-OP MINE REFERENCE AREA - SUMMATION

AVERAGE COVER	% of VEGETATIVE COMPOSITION	GRASSES	SPECIES LIST	COMMON NAME
19.5	68.37	Agsp	Agropyron spicatum	blue bunch wheat grass
		Orhy	Oryzopsis hymenoides	indian rice grass
		FORBS		
.05	.18	Hyri	Hymenoxys spp.	
.05	.18	Stpi	Stanleya pinnata	prince's plume
.3	1.05	Arlu	Artemisia ludoviciana	louisiana sagewort
		Astra	Astragalus spp.	milkvetch
		Chdo	Chaenactis douglosii	false yarrow
		Erige	Erigeron spp.	fleabane
.05	.18	Haplo	Happlopappus spp.	goldenweed
.05	.18	Saka	Salsola kali	russian thistle
		SHRUBS		
.11	.39	Artr	Artemisia tridentata	big sagebrush
.5	1.75	Epvi	Ephedra viridis	mormon tea
5.4	18.93	Eriog	Eriogonum spp.	buckwheat
.9	3.16	Gusa	Gutierrezia spp.	snakeweed
1.4	4.91	Chna	Chrysothamnus nauseosus	rubber rabbit brush
.2	.71	Opun	Opuntia spp.	prickly pear
28.52	100	Roso	Rosa woodsii	woods rose
		Thtr	Rhus trilobata	skunk bush sumac
		Tape	Tamarix pentandra	tamarix
NUMBER ON SITE GREATER THAN 5 FEET TALL		TREES		
7		Juos	Juniperus osteosperma	Utah juniper
2		Jusc	Juniperus scopulorum	rocky mountain juniper
7		Pied	Pinus edulis	pinyon pine
0		Pipu	Picea purguns	blue spruce
0		Cemo	Cercocarpus montanenvs	true mountain mahogany

28.52	Total Vegetation
13.8	Bare ground
46	Rock
11.7	Litter
100.%	

* Riparian Bench (Co-Op Reference Area)

GRASSES	25%
Popr	3
Orhy	2
STCO	15
BRTE	5

FORBS	10%
ARLU	1
CLCO	5
TRDU	< 1
IPAG	<1
Castilleja spp.	<1
Circium spp.	<1
HAFL	<1
Arlemisia dracunculus	2

SHRUBS	20%
CHNA	5
ARTR	2
ARFR	1
GUSA	1
RUTR	10
EPVI	< 1
CHVI	1
OPUNT	<1
SYMPH spp.	< 1

TREES (overstory)

PIED

JUOS

JUSC

Total vegetative cover	55%
Bare ground	10%
Rock	20%
Litter	15%

* Riparian - Very narrow, steep slopes (Co-Op Reference Area)

GRASSES	2%
Juncus spp.	1
Brma	<1
Agrostis spp.	1
Popr	<1

FORBS	43%
Circium	2
Equisetum spp.	25
CLCO	5
Lathyrus spp.	2
TAOF	<1
Smiliacena spp.	1
Apocynum androsfe mifolum	8

SHRUBS	15%
Rowo	14
RHTR	1

TREES
Salix spp.
Pipu
Pien
Pofr
Alnux spp.

Vegetative total	60%
Bare ground	5%
Litter	20%
Rock	15%

* The Riparian zone is so small that a sample adequacy was impossible to obtain in that there was insufficient area to run the desired and or minimum number of plots.

BEAR CANYON SITE - SIMILARITY COMPARISON

GRASSES

Agsp	Agropyron spicatum

SHRUBS

Artr	Artemisia tridentata
Chna	Chrysothamnus nauseosus
Epvi	Ephedra viridis

TREES

Juos	Juniperus osteosperma
Jusc	Juniperus scopulorum
Pied	Pinus edulis

Bare ground
Rock (slightly more)
Litter

This area is very similar in coverage to the sampled reference area. The only difference is there is slightly more Artr and rock on this area.

All data and calculations were collected and compiled by Larry Germain, Paige Waldvogel in cooperation with Mel Coonrod.

NOTES ON SAMPLING METHODOLOGY

Plant Cover: 38-50 meter transects; using a ten point frame at every 10 meter interval.

Shrub Density: 24 - 1 x 50 meter transects, counting all shrubs rooted within the sampling area.

Formula for Sample Adequacy:

$$\left(\frac{s\ t}{(0.1)\ (\bar{x})}\right)^2 = \frac{s^2\ t^2}{[(0.1)(\bar{x})]^2} = \text{number of samples needed (n)}$$

where:
t= 1.96 at 90% confidence (from t table)
s= standard deviation of sample
$\bar{x}$= mean of sample

For Cover: (numbers from cover summary sheet)

$$= \left[\frac{(8.60)(1.96)}{(0.1)(28.52)}\right]^2 = \left[\frac{16.856}{2.852}\right]^2 = 34.93$$

For Shrub Density: (numbers from Density Summary sheet)

$$= \left[\frac{(4.05)(1.96)}{(0.1)(19.13)}\right]^2 = \left[\frac{7.938}{1.913}\right]^2 = 17.22$$

Example calculation for deriving % vegetative composition:

Agsp $\frac{742}{38 \text{ transects}} = 19.5$ $\frac{19.5}{* 28.52} \times 100 = 68.37\%$ Agsp

all species' averages + bare ground + rock + litter = 100%
* All species averages totaled = 28.52

Example calculation for % shrub composition:

Chna $\frac{73}{24 \text{ transects}} = 3.04$ $\frac{3.04}{* 19.13} = 15.89\%$ composition

* 19.13 derived by adding all species averages.

Shrub Density /ha= $\frac{N}{24 \text{ transects} \times 200}$

		% of shrub composition
Artr	16	.42
Chna	608	15.89
Epvi	566	14.79
Erioy	2108	55.10
Gusa	350	9.15
Juos	16	.42
Jusc	8	.21
Opunt	8	.21
Pied	75	1.96
Pipu	16	.42
Rowo	25	.78
Rhtr	16	.42
Tape	8	.21
		99.98%

Total shrubs /ha 3820

Location: Coop Reference Area **SUMMARY OF FIELD SHEETS**

VEGETATION TYPE: PJ - gross (Agsp) **FIELD DATE:** 8/6/85 + 8/7/83

PARAMETER: Cover (10-point frame) **UNITS:** _____ **COMMENTS:** page 1 of 2

TRANSECTS

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	AVERAGE	COMPOSITION
Grasses																							
Agsp	18	20	12	24	30	18	18	14	14	20	20	16	26	10	30	28	24	34	14	30			
Forbs																							
Arplu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	—			
Heplo	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—			
Hyri	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Soka	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—			
Stpi	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Shrubs																							
Artr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4			
Chna	—	—	—	—	—	—	—	2	—	4	—	2	—	2	—	—	—	—	—	—			
Epui	—	2	—	2	4	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—			
Sribg	6	—	6	10	10	—	4	4	16	8	6	6	8	8	8	2	—	—	—	8			
Gusq	—	—	2	—	—	—	—	—	—	—	6	—	4	4	—	—	—	—	—	—			
Rutr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Bare ground	16	8	16	16	12	10	24	28	4	18	10	14	14	12	22	8	18	20	12	22			
Rock	40	60	52	42	16	58	48	40	48	40	48	48	28	52	34	50	44	42	52	28			
Litter	20	10	12	6	28	14	6	12	18	10	10	14	18	12	6	10	14	4	8	8			
Average	24	22	20	36	44	18	22	20	30	32	32	24	40	24	38	32	24	34	28	42			

N= N90/10= X=

N80/10= S=

Summary By: _____

Summary Date: _____

LOCATION: Co-op Reference Area SUMMARY OF FIELD SHEETS

VEGETATION TYPE: PJ-gross (Agsp) FIELD DATE: 8-6+8-7/83

PARAMETER: Cover (10-point frame) UNITS: % COMMENTS: page 2 of 2

TRANSECTS

Species	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	19	20	TOTAL	AVERAGE	Percent composition
Grasses																							
Agsp	32	8	22	2	26	30	20	8	20	20	12	14	18	22	18	20	10	20			742	19.5	68.3
Forbs																							
Arlu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			12	.3	1.05
Hoplo	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			2	.05	.18
Hyhi	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—			2	.05	.18
Sokp	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			2	.05	.18
Stpi	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—			2	.05	.18
Shrubs																							
Artr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			4	.11	.37
Chna	—	—	4	2	—	8	—	8	—	4	8	—	4	—	—	—	4	—			52	1.4	4.91
Epui	—	—	2	—	—	—	—	—	2	—	—	—	4	—	2	—	—	—			20	.5	1.75
Ehlan	4	—	6	—	—	4	2	—	12	4	—	10	4	16	10	8	6	10			206	5.4	18.9
Gusa	—	4	—	—	—	—	—	—	6	—	—	4	—	—	—	—	—	4			34	.9	3.1
Rhtr	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			6	.2	.7
Bareground	12	6	4	8	18	6	22	20	24	10	0	22	18	16	8	8	8	12			526	13.7	
Rock	34	68	44	60	36	34	38	50	36	46	74	40	40	38	56	62	66	50			1742	46	
Litter	18	6	18	28	20	18	18	12	8	14	6	10	12	8	6	2	6	4			446	11	
Average	36	18	34	4	26	42	22	18	40	30	20	28	30	38	30	28	20	34			1084	28.52	99.9

N= N90/10= 34.89 $\bar{x}$= 28.52

N80/10= S= 8.60

Summary By: Germain K. [illegible]

Summary Date: 8/10/83

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 1	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
						Agsp			Agsp
R	R	B	B	R	R		L	L	
11	12	13	14	15	16	17	18	19	20
R	R	B	R	B	R	B	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp					Agsp	Agsp		
		R	R	R	R			L	R
31	32	33	34	35	36	37	38	39	40
		Eriog	Eriog	Eriog					
L	R				L	L	L	L	L
41	42	43	44	45	46	47	48	49	50
	Agsp	Agsp		Agsp					
L			R		R	B	B	R	B

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	9	18
SHRUBS		
ERIOG	3	6
TOTAL VEG	12	24
B	8	16
L	10	20
R	20	40
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame	
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel	
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 2	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Epvi									
	R	R	R	L	R	R	R	R	R

11	12	13	14	15	16	17	18	19	20
					Agsp	Agsp	Agsp	Agsp	Agsp
R	B	R	R	B					

21	22	23	24	25	26	27	28	29	30
Agsp						Agsp			
	R	L	R	R	R		R	R	R

31	32	33	34	35	36	37	38	39	40
							Agsp	Agsp	Agsp
R	R	L	L	R	R	R			

41	42	43	44	45	46	47	48	49	50
R	R	R	B	R	B	L	R	L	R

SUMMARY

Plant Symbols	Hits	% Cover
GRASSES		
Agsp	10	20
SHRUBS		
Epvi	1	2
TOTAL VEG	11	22
B	4	8
R	30	60
L	5	10
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES
- Stage 0 to 10 Leaf growth starts
- Stage 10 to 20 Flower stalks appear
- Stage 20 to 30 Heads full out
- Stage 30 to 40 Anthesis
- Stage 40 to 50 Dough
- Stage 50 to 60 Hard seed
- Stage 60 to 70 Dissemination starts
- Stage 70 to 80 Drying

SHRUBS
- Stage 0 to 10 Leaf growth starts
- Stage 10 to 20 Twig growth starts
- Stage 20 to 30 Flower buds appear
- Stage 30 to 40 First bloom
- Stage 40 to 50 Full bloom
- Stage 50 to 70 Bloom over
- Stage 60 to 70 Seed ripe
- Stage 72 to 80 Dissemination 1/2 over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 3 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
				Lupla	Lupla		Lupla		
B	B	B	R			L		L	R
11	12	13	14	15	16	17	18	19	20
R	L	B	R	R	B	R	R	R	R
21	22	23	24	25	26	27	28	29	30
				Agsp	Agsp	Agsp		Agsp	
B	L	L	R				L		R
31	32	33	34	35	36	37	38	39	40
			Gusa				Agsp		Agsp
R	R	R		R	R	B		L	
41	42	43	44	45	46	47	48	49	50
R	R	R	R	B	R	R	R	R	R

SUMMARY		
Plant Symbols	Hits	% Cov
Grasses		
Agsp	6	12
Shrubs		
Gusa	1	2
Lupla	3	6
Total Veg	10	20
B	8	16
R	26	52
L	6	12
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 4	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
									Agsp
R	R	R	L	L	R	B	B	R	
11	12	13	14	15	16	17	18	19	20
Erog	Erog	Erog			Agsp	Agsp	Agsp	Agsp	
			R	R					R
21	22	23	24	25	26	27	28	29	30
			Epvi						
R	R	R		R	R	B	B	B	B
31	32	33	34	35	36	37	38	39	40
Agsp	Agsp	Agsp						Erog	Erog
			R	R	R	R	L		
41	42	43	44	45	46	47	48	49	50
			Agsp	Agsp	Agsp	Agsp			
R	R	R					R	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	12	24
SHRUBS		
Epvi	1	2
Erog	5	10
TOTAL VEG	18	36
B	8	16
R	21	42
L	3	6
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 5	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			Agsp	Agsp	Agsp			Epvi	Epvi
B	B	R				R	R		
11	12	13	14	15	16	17	18	19	20
Eriog	Eriog					Eriog	Agsp	Agsp	Agsp
		R	B	B	B				
21	22	23	24	25	26	27	28	29	30
							Agsp	Agsp	Agsp
R	R	R	L	R	L	L			
31	32	33	34	35	36	37	38	39	40
						Agsp	Agsp	Agsp	
L	L	R	B	B	L				R
41	42	43	44	45	46	47	48	49	50
Eriog	Eriog	Agsp	Agsp		Agsp				
				R		L	L	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	15	30
Shrubs		
EPVI	2	4
ERIOG	5	10
TOTAL VEG	22	44
B	6	12
L	8	16
R	14	28
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 6	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
B	B	B	R	R	R	R	R	R	R
11	12	13	14	15	16	17	18	19	20
R	R	R	R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
		Agsp			Agsp			Agsp	
B	R		R	R		L	L		L
31	32	33	34	35	36	37	38	39	40
	Agsp								
L		B	R	R	R	R	R	R	R
41	42	43	44	45	46	47	48	49	50
	Agsp	Agsp				Agsp	Agsp	Agsp	
L			L	L	R				R

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	9	18
TOTAL VEG	9	18
B	5	10
R	29	58
L	7	14
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ-grass (Agsp) / TRANSECT NO. 7	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Agsp	Agsp						Agsp	Agsp	Agsp
		B	B	B	B	B			
11	12	13	14	15	16	17	18	19	20
R	R	R	R	B	B	R	B	B	B
21	22	23	24	25	26	27	28	29	30
L	R	R	R	R	R	B	B	R	R
31	32	33	34	35	36	37	38	39	40
		Agsp	Agsp	Agsp				Erig	Erig
L	R				L	R	R		
41	42	43	44	45	46	47	48	49	50
Agsp									
	R	R	R	R	R	L	R	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	9	18
SHRUBS		
Erig	2	4
TOTAL VEG	11	22
B	12	24
R	24	48
L	3	6
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Greening

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 8 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
	Agsp	Agsp							
R			R	R	R	R	B	B	B
11	12	13	14	15	16	17	18	19	20
Erlos	Erlos							Agsp	
		R	R	B	K	K	K		K
21	22	23	24	25	26	27	28	29	30
R	R	K	R	R	B	B	R	R	R
31	32	33	34	35	36	37	38	39	40
			Agsp	Agsp			Chna		
R	B	B			B	B		R	R
41	42	43	44	45	46	47	48	49	50
Agsp	Agsp								
		K	K	B	B	R	R	B	B

SUMMARY		
Plant Symbols	Hits	
GRASSES		
Agsp	7	14
Shrubs		
Chna	1	2
Erlog	2	4
TOTAL VEG	10	20
B	14	28
R	20	40
L	6	12
TOTAL	50	//////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 9	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
				Agsp	Agsp				
R	R	R	R			R	R	R	R
11	12	13	14	15	16	17	18	19	20
			Eriog	Eriog	Eriog	Eriog	Eriog		
L	R	R						R	R
21	22	23	24	25	26	27	28	29	30
			Agsp					Agsp	
R	L	L		L	R	R	R		L
31	32	33	34	35	36	37	38	39	40
Agsp					Agsp	Eriog	Eriog	Eriog	
	R	L	L	L					L
41	42	43	44	45	46	47	48	49	50
Agsp									
	R	L	L	R	R	R	R	R	R

SUMMARY

Plant Symbols	Hits	
GRASSES		
Agsp	7	14
SHRUBS		
ERIOG	8	16
TOTAL VEG	15	30
B	2	4
R	24	48
L	9	18
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 10	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
					Tarox	Tarox		Tarox	
B	B	B	L	R			B		R
11	12	13	14	15	16	17	18	19	20
Agsp	Agsp	Agsp			Agsp				
			L	L		R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp				Chna	Chna			Agsp	Agsp
	R	R	R			L	R		
31	32	33	34	35	36	37	38	39	40
						Agsp	Agsp	Agsp	
B	B	L	L	B	R				R
41	42	43	44	45	46	47	48	49	50
Tarox									
	R	R	R	R	R	B	B	R	R

SUMMARY		
Plant Symbols	Hits	
GRASSES		
Agsp	10	20
SHRUBS		
Chna	2	4
Erlog	4	8
TOTAL VEG	16	32
B	9	18
R	20	40
L	5	10
TOTAL	50	//////////

Symbol For Hits

Bare Soil — B
Rock — R
Litter — L
Live Plants — Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 11	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
		Erio				Agsp			
B	B		R	R			R	R	R
11	12	13	14	15	16	17	18	19	20
		Agsp	Agsp	Agsp	Agsp	Agsp			
R	R						R	R	R
21	22	23	24	25	26	27	28	29	30
				Erio	Erio				
R	R	R	R			B	R	R	R
31	32	33	34	35	36	37	38	39	40
			Gum		Gum	Gum			
R	R	R		R			R	R	R
41	42	43	44	45	46	47	48	49	50
		Agsp	Agsp				Ex.		
R	R			L	L	L		R	R

SUMMARY

Plant Symbols	Hits	% Cover
Grasses		
Agsp	10	20
Shrubs		
Gum	3	6
Erio	3	6
Total Hits	16	
B	5	10
R	24	48
L	5	10
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 12 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
					Agsp				
B	R	L	R	R		L	R	R	R
11	12	13	14	15	16	17	18	19	20
Eqpa	Eqpa	Eqpa							
			R	R	R	B	R	R	B
21	22	23	24	25	26	27	28	29	30
		Agsp	Agsp	Agsp	Agsp		Agsp		
R	R					L		L	L
31	32	33	34	35	36	37	38	39	40
B	B	R	B	R	R	R	R	R	R
41	42	43	44	45	46	47	48	49	50
			Agsp	Agsp				Chna	
B	L	L			R	R	R		R

SUMMARY		
Plant Symbols	Hits	
GRASSES		
Agsp	8	16
Shrubs		
Chna	1	2
Erio G	3	6
TOTAL VEG	12	24
B	7	14
R	24	48
L	7	14
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 13	DATE: 8/6 + 8/7 1983
COMMENTS: Record weekly phenology data in column at right side of summary.	

1	2	3	4	5	6	7	8	9	10
				Gusa	Gusa				Agsp
R	R	R	R			L	L	R	
11	12	13	14	15	16	17	18	19	20
			Agsp	Agsp			Agsp	Agsp	Agsp
R	L	L			L	L			
21	22	23	24	25	26	27	28	29	30
					~~Epvi~~	~~Epvi~~	~~Epvi~~		~~Epvi~~
R	R	R	B	B				R	
31	32	33	34	35	36	37	38	39	40
Agsp	Agsp	Agsp		Agsp					
			L		R	B	B	R	R
41	42	43	44	45	46	47	48	49	50
~~Epvi~~							Agsp	Agsp	Agsp
	R	R	R	L	L	R			

SUMMARY		
Plant Symbols	Hits	% Cover
Grasses		
Agsp	13	26
Shrubs		
Epvi	1	2
[illegible]	4	8
Gusa	2	4
[illegible]	20	40
[illegible]	7	14
[illegible]	14	28
[illegible]	9	18
TOTAL	50	//////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination / over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 14	DATE: 8/6 + 8/7 1983
COMMENTS: Record weekly phenology data in column at right side of summary.	

1	2	3	4	5	6	7	8	9	10
				Agsp			Agsp		
R	R	R	B		L	L		R	B
11	12	13	14	15	16	17	18	19	20
R	R	R	R	R	B	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Erio	Erio	Erio	Erio					Agsp	
				L	R	R	B		R
31	32	33	34	35	36	37	38	39	40
		Agsp	Agsp						Chna
L	L			R	R	B	R	R	
41	42	43	44	45	46	47	48	49	50
		Gusa		Gusa					
L	R		L		R	R	R	R	B

SUMMARY

Plant Symbols	Hits	% Cover
Grasses		
Agsp	5	10
Shrubs		
Chna	1	2
Erio	4	8
Gusa	2	4
TOTAL VEG	12	24
B	6	12
R	26	52
L	6	12
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 15 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
		Agsp		Agsp	Agsp	Eriog	Eriog		
B	B		L					R	L
11	12	13	14	15	16	17	18	19	20
Eriog	Agsp	Agsp						Eriog	Agsp
			B	R	R	R	R		
21	22	23	24	25	26	27	28	29	30
		Agsp	Agsp				Agsp		Agsp
R	R			L	R	R		R	
31	32	33	34	35	36	37	38	39	40
	Agsp	Agsp	Agsp	Agsp			Agsp		
R					R	R		B	B
41	42	43	44	45	46	47	48	49	50
R	R	B	B	B	R	B	B	R	R

SUMMARY

Plant Symbols	Hits	% Cover
GRASSES		
Agsp	15	30
SHRUBS		
Eriog	4	8
TOTAL VEG	19	38
B	11	22
R	17	34
L	3	6
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ-grass (Agsp) / TRANSECT NO. 16	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
R	R	R	R	R	R	R	R	R	R
11	12	13	14	15	16	17	18	19	20
	Agsp	Agsp		Haplo					
L			L		R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp		Agsp	Agsp	Agsp				
		R				R	R	R	R
31	32	33	34	35	36	37	38	39	40
									Agsp
L	B	B	R	R	R	R	L	R	
41	42	43	44	45	46	47	48	49	50
Forb			Agsp	Agsp	Agsp	Agsp	Agsp	Agsp	
	B	B							L

SUMMARY		
Plant Symbols	Hits	
Grasses		
Agsp	14	28
Forbs		
Haplopappus	1	2
Shrubs		
Ericla	1	2
Total Veg	16	32
B	4	8
R	25	50
L	5	10
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 17	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
					Agsp			Agsp	Agsp
R	R	R	R	R		B	L		
11	12	13	14	15	16	17	18	19	20
Agsp	Agsp	Agsp		Agsp	Agsp		Agsp		Agsp
			L			L		R	
21	22	23	24	25	26	27	28	29	30
B	B	B	B	B	B	L	L	L	L
31	32	33	34	35	36	37	38	39	40
Agsp	Agsp								
		R	R	R	R	R	R	B	B
41	42	43	44	45	46	47	48	49	50
R	R	R	R	R	R	R	R	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
GRASSES		
Agsp	12	24
TOTAL VEG	12	24
B	9	18
R	22	44
L	7	14
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 18	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Agsp	Agsp	Agsp			Agsp				Agsp
			R	R		B	R	R	
11	12	13	14	15	16	17	18	19	20
R	L	R	B	R	B	B	R	R	R
21	22	23	24	25	26	27	28	29	30
			Agsp	Agsp	Agsp		Agsp	Agsp	Agsp
B	B	R				L			
31	32	33	34	35	36	37	38	39	40
				Agsp	Agsp	Agsp	Agsp	Agsp	
R	R	R	R						R
41	42	43	44	45	46	47	48	49	50
Agsp									
	R	B	R	R	R	R	B	B	B

SUMMARY

Plant Symbols	Hits	Cover %
Grasses	17	34
Agsp		
Tot Veg	17	34
B	10	20
R	21	42
L	2	4
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Dormancy

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination / Dormancy

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op. Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 19	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			Agsp				Saka		Arlu
R	R	R		L	L	R		R	
11	12	13	14	15	16	17	18	19	20
R	R	R	R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp	Agsp	Agsp	Agsp					
					B	B	R	R	R
31	32	33	34	35	36	37	38	39	40
				Arlu	Arlu	Arlu	Arlu	Arlu	
B	B	R	R						R
41	42	43	44	45	46	47	48	49	50
						Agsp			
R	R	R	B	R	R		L	B	L

SUMMARY

Plant Symbols	Hits	
Grasses		
Agsp	7	14
Forbs		
Arlu	6	12
Saka	1	2
Tot Veg	14	28
B	6	12
R	26	52
L	4	8
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 20 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			Erog	Agsp			Agsp	Agsp	Agsp
R	R	R			R	R			
11	12	13	14	15	16	17	18	19	20
					Antr	Antr			
R	L	L	B	B			B	B	B
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp	Agsp	Erog					Agsp	Agsp
				B	R	R	L		
31	32	33	34	35	36	37	38	39	40
						Agsp	Agsp	Agsp	
B	B	B	R	R	L				R
41	42	43	44	45	46	47	48	49	50
Erog	Erog	Agsp				Agsp	Agsp		
			B	B	R			R	R

SUMMARY		
Plant Symbols	Hits	% cover
Grasses		
Agsp	15	30
Shrubs		
Antr	2	4
Erog	4	8
Total veg	21	42
B	11	22
R	14	28
L	4	8
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 21	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
				Erio	Erio				
R	L	R	L			L	B	R	R
11	12	13	14	15	16	17	18	19	20
R	R	R	R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp					Agsp	Agsp		Agsp
		B	B	B	L			L	
31	32	33	34	35	36	37	38	39	40
Agsp	Agsp	Agsp	Agsp	Agsp					
					B	R	R	R	R
41	42	43	44	45	46	47	48	49	50
	Agsp	Agsp		Agsp	Agsp	Agsp		Agsp	
L			L				L		L

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	16	32
Shrubs		
Erio	2	4
Tot Veg	18	36
B	6	12
R	17	34
L	9	18
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Empty

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 22	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
R	R	R	B	B	L	R	R	R	R
11	12	13	14	15	16	17	18	19	20
Gusa		Gusa							
	R		R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp					Rutr	Rutr		Rutr	
	R	R	B	R			R		R
31	32	33	34	35	36	37	38	39	40
Agsp									
	R	R	R	R	R	R	R	R	R
41	42	43	44	45	46	47	48	49	50
						Agsp	Agsp		
R	R	R	R	R	L			L	L

SUMMARY		
Plant Symbols	Hits	% Cover
Grasses		
Agsp	4	8
Shrubs		
Gusa	2	4
Rutr	3	6
Tot Veg	9	18
B	3	6
R	34	68
L	4	8
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 23	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Chna	Chna				Agsp	Agsp			
		R	R	R			L	L	L
11	12	13	14	15	16	17	18	19	20
Agsp	Agsp				Agsp				
		R	R	L		L	L	L	R
21	22	23	24	25	26	27	28	29	30
					Epui				
R	R	B	B	R		R	R	R	R
31	32	33	34	35	36	37	38	39	40
Eriog	Eriog	Eriog				Agsp	Agsp	Agsp	
			R	R	L				L
41	42	43	44	45	46	47	48	49	50
				Agsp	Agsp	Agsp			
R	R	R	R				R	R	R

SUMMARY		
Plant Symbols	Hits	% cover
Grasses		
Agsp	11	22
Shrubs		
Chna	2	4
Epui	1	2
Eriog	3	6
	6	12
Tot Veg	17	34
B	2	4
R	22	44
L	9	18
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Dormancy

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination Over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 24	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
R	R	R	R	R	R	R	R	L	L
11	12	13	14	15	16	17	18	19	20
Chng									
	L	R	R	L	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
R	R	R	L	L	L	R	R	R	R
31	32	33	34	35	36	37	38	39	40
	Agsp								
B		R	R	R	L	B	L	B	B
41	42	43	44	45	46	47	48	49	50
R	L	L	L	L	R	R	R	R	L

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	1	2
Shrubs		
Chng	1	2
Tot Veg	2	4
B	4	8
R	30	60
L	14	28
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 25 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Agsp	Agsp				Agsp	Agsp		Agsp	
		L	B	L			L		L
11	12	13	14	15	16	17	18	19	20
			Agsp		Agsp		Agsp	Agsp	
B	R	R		B		L			L
21	22	23	24	25	26	27	28	29	30
Agsp		Agsp					Agsp	Agsp	
	L		L	L	R	L			R
31	32	33	34	35	36	37	38	39	40
R	R	R	R	R	B	B	B	B	B
41	42	43	44	45	46	47	48	49	50
R	R	B	R	R	R	R	R	R	R

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	13	26
Tot Veg	13	26
B	9	18
R	18	36
L	10	20
TOTAL	50	//////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Curing

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 26	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
Chna	Chna								
		L	L	L	L	L	R	R	R
11	12	13	14	15	16	17	18	19	20
	Agsp	Agsp	Agsp			Agsp	Eriog	Agsp	Agsp
R				L	R				
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp	Agsp	Agsp		Agsp	Agsp	Agsp	Agsp	
				L					R
31	32	33	34	35	36	37	38	39	40
								Agsp	
R	R	R	R	R	R	R	R		L
41	42	43	44	45	46	47	48	49	50
Chna	Chna								Eriog
		L	R	B	B	R	R	R	

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	15	30
Shrubs		
Chna	4	8
Eriog	2	4
TOT Veg	21	42
B	3	6
R	17	34
L	9	18
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 27 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
					Agsp		Agsp	Agsp	
R	R	R	R	R		L			L
11	12	13	14	15	16	17	18	19	20
				Agsp				Agsp	
B	B	B	R		L	B	B		L
21	22	23	24	25	26	27	28	29	30
Agsp			Agsp		Agsp			Agsp	Eriog
	B	R		L		B	B		
31	32	33	34	35	36	37	38	39	40
									Agsp
B	R	B	B	R	L	L	L	L	
41	42	43	44	45	46	47	48	49	50
R	R	R	R	R	R	R	R	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
Grasses		
Agsp	10	20
Shrubs		
Eriog	1	2
Tot Veg	11	22
B	11	22
R	19	38
L	9	18
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 28 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
						Stpi			
B	B	R	R	B	R		R	R	R
11	12	13	14	15	16	17	18	19	20
Chna	Chna	Chna		Chna					
			L		R	B	B	B	B
21	22	23	24	25	26	27	28	29	30
R	R	R	R	R	R	R	R	R	R
31	32	33	34	35	36	37	38	39	40
								Agsp	
R	R	B	B	L	B	R	B		L
41	42	43	44	45	46	47	48	49	50
Agsp				Agsp	Agsp				
	L	L	L			R	R	R	R

SUMMARY		
Plant Symbols	Hits	% cover
Grasses		
Agsp	4	8
Forbs		
Stpi	1	2
Shrubs		
Chna	4	8
Litter	3	[illegible]
B	10	20
R	25	[illegible]
L	6	[illegible]
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 [illegible]

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 29	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
				Agsp	Epvi			Agsp	Agsp
R	R	R	B			R	R		
11	12	13	14	15	16	17	18	19	20
					Gusa	Eriog			
R	R	R	R	R			R	R	R
21	22	23	24	25	26	27	28	29	30
				Agsp	Agsp				
B	B	R	R			R	R	R	R
31	32	33	34	35	36	37	38	39	40
Eriog	Eriog			Agsp	Agsp	Agsp			
		R	R				R	R	R
41	42	43	44	45	46	47	48	49	50
Gusa	Gusa			Agsp	Agsp	Eriog	Eriog	Eriog	
		R	R						R

SUMMARY		
Plant Symbols	Hits	
Grasses		
Agsp	10	20
Shrubs		
Epvi	1	2
Eriog	6	12
Gusa	3	6
Tot Veg	20	40
B	12	24
R	18	36
L	0	0
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Dry [illegible]

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 30 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			Erio	Erio	Agsp				
R	R	B				L	L	L	L
11	12	13	14	15	16	17	18	19	20
Agsp	Agsp	Agsp							
			L	L	L	L	L	L	L
21	22	23	24	25	26	27	28	29	30
Chna	Chna				Agsp	Agsp			
		R	R	L			L	L	L
31	32	33	34	35	36	37	38	39	40
Hyri						Agsp	Agsp	Agsp	
	R	R	L	L	L				L
41	42	43	44	45	46	47	48	49	50
							Agsp		
R	L	L	L	L	B	L		L	L

SUMMARY

Plant Symbols	Hits	% Cover
Grasses		
Agsp	10	20
Forbs		
Hyri	1	2
Shrubs		
Chna	2	4
Erio	2	4
Total Veg	15	30
B	5	10
R	23	46
L	7	14
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination Over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 31 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
		Agsp	Agsp						
R	R			R	R	R	R	R	R
11	12	13	14	15	16	17	18	19	20
R	R	R	R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
	Agsp	Agsp	Agsp			Agsp			
L				L	L		R	R	R
31	32	33	34	35	36	37	38	39	40
					Chna	Chna	Chna	Chna	
R	R	R	R	R					R
41	42	43	44	45	46	47	48	49	50
R	R	R	R	R	R	R	R	R	R

SUMMARY

Plant Symbols	Hits	% Cover
Grasses		
Agsp	6	12
Shrubs		
Chna	4	8
To Veg	10	20
B	0	0
R	37	74
L	3	6
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination Over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 32	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
					Eriog				
R	R	B	R	R		R	R	R	R
11	12	13	14	15	16	17	18	19	20
		Agsp			Agsp	Agsp	Agsp	Agsp	
B	B		L	L					R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp						Gusa	Gusa	
		L	R	R	R	R			R
31	32	33	34	35	36	37	38	39	40
B	B	R	B	B	B	R	R	R	R
41	42	43	44	45	46	47	48	49	50
Eriog	Eriog	Eriog	Eriog						
				L	L	R	B	B	B

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	7	14
Shrubs		
Eriog	5	10
Gusa	2	4
Tot Veg	14	28
B	11	22
R	20	40
L	5	10
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Dormant

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel

RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 33	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
R	R	R	R	R	B	R	B	R	R
11	12	13	14	15	16	17	18	19	20
		Agsp	Agsp	Agsp		Agsp		Agsp	Agsp
R	R				L		L		
21	22	23	24	25	26	27	28	29	30
Enog	Enog								
		L	B	R	R	B	R	R	R
31	32	33	34	35	36	37	38	39	40
			Chna	Chna			Agsp	Agsp	
R	R	B			B	B			L
41	42	43	44	45	46	47	48	49	50
			Epui		Epui			Agsp	
R	R	B		L		R	L		B

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	9	18
Shrubs		
Chna	2	4
Epui	2	4
Enog	2	4
Tot Veg	15	30
B	9	18
R	20	40
L	6	12
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 34	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
R	R	R	R	R	B	R	R	R	R
11	12	13	14	15	16	17	18	19	20
Eriog	Eriog				Agsp		Agsp	Agsp	
		R	B	B		R			L
21	22	23	24	25	26	27	28	29	30
		Agsp	Agsp		Agsp				
R	R			R		R	R	R	R
31	32	33	34	35	36	37	38	39	40
		Agsp	Agsp		Agsp				
B	B			L		B	B	L	B
41	42	43	44	45	46	47	48	49	50
	Eriog	Eriog	Eriog	Eriog	Eriog	Eriog		Agsp	Agsp
R							L		

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	11	22
Shrubs		
Eriog	8	16
Tot Veg	19	38
B	8	16
R	19	38
L	4	8
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 [illegible]

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 35 DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			ERDG	ERSS				Epvi	
B	R	R			R	R	R		R
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
		Agsp	Agsp	Agsp	Agsp				
R	R					B	L	L	R
21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
ERNA	ERIOG					Agsp	Agsp		
		R	R	R	L			R	R
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
R	R	R	R	R	B	B	R	R	R
41	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
	Eriog	Agsp	Agsp	Agsp					
R					R	R	R	R	R

SUMMARY

Plant Symbols	Hits	% Cover
GRASSES		
Agsp	9	18
Shrubs		
C pui	1	2
Eriosp	5	10
TOTAL VEG	15	30
TOTAL	50	//////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES
- Stage 0 to 10 Leaf growth starts
- Stage 10 to 20 Flower stalks appear
- Stage 20 to 30 Heads full out
- Stage 30 to 40 Anthesis
- Stage 40 to 50 Dough
- Stage 50 to 60 Hard seed
- Stage 60 to 70 Dissemination starts
- Stage 70 to 80 Drying

SHRUBS
- Stage 0 to 10 Leaf growth starts
- Stage 10 to 20 Twig growth starts
- Stage 20 to 30 Flower buds appear
- Stage 30 to 40 First bloom
- Stage 40 to 50 Full bloom
- Stage 50 to 70 Bloom over
- Stage 60 to 70 Seed ripe
- Stage 70 to 80 Dissemination [illegible]

PARAMETER: Plant Cover	METHOD: 10-Point Frame	
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel	
RANGE SITE: PJ-grass (Agsp)	TRANSECT NO. 3C	DATE: 8/6 + 8/7 1983
COMMENTS: Record weekly phenology data in column at right side of summary.		

1	2	3	4	5	6	7	8	9	10
		[illegible]	[illegible]	Agsp					
R	R				L	R	R	R	R
11	12	13	14	15	16	17	18	19	20
Emog	Emog								
		R	R	R	R	R	R	R	R
21	22	23	24	25	26	27	28	29	30
Agsp	Agsp	Agsp	Agsp			Agsp	Agsp		
				R	R			R	R
31	32	33	34	35	36	37	38	39	40
					Agsp	Emog	Emog		
R	R	R	B	B				R	R
41	42	43	44	45	46	47	48	49	50
R	R	R	R	B	R	R	B	R	R

SUMMARY		
Plant Symbols	Hits	% Cover
Grasses		
Agsp	10	20
Shrubs		
Emog	4	8
TOTAL VEG	14	28
B	4	8
R	31	62
L	1	2
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES
Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS
Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp)	TRANSECT NO. 37 / DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
			Agsp	Agsp					
R	R	R			R	R	R	R	R
11	12	13	14	15	16	17	18	19	20
Chna	Chna							Agsp	Agsp
		R	R	R	R	R	R		
21	22	23	24	25	26	27	28	29	30
					Agsp				
B	B	R	R	R		R	R	R	R
31	32	33	34	35	36	37	38	39	40
							Eriog	Eriog	Eriog
L	L	B	B	R	R	R			
41	42	43	44	45	46	47	48	49	50
L	R	R	R	R	R	R	R	R	R

SUMMARY

Plant Symbols	Hits	% cover
Grasses		
Agsp	5	10
Shrubs		
Chna	2	4
Eriog	3	6
Tot Veg	10	20
B	4	8
R	33	66
L	3	6
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Drying

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 70 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination & over

PARAMETER: Plant Cover	METHOD: 10-Point Frame
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO. 38	DATE: 8/6 + 8/7 1983

COMMENTS: Record weekly phenology data in column at right side of summary.

1	2	3	4	5	6	7	8	9	10
				Agsp	Agsp	Agsp			
R	R	R	B				R	R	R
11	12	13	14	15	16	17	18	19	20
				Erio	Erio	Erio			Agsp
B	B	L	L				R	R	
21	22	23	24	25	26	27	28	29	30
					Gusa	Gusa			
R	B	R	B	R			R	R	R
31	32	33	34	35	36	37	38	39	40
Agsp	Agsp	Agsp							
			R	R	R	B	B	R	R
41	42	43	44	45	46	47	48	49	50
			Erio	Erio	Agsp	Agsp	Agsp		
R	R	R						R	R

SUMMARY		
Plant Symbols	Hits	% Cover
Grasses		
Agsp	10	20
Shrubs		
Erio	5	10
Gusa	2	4
Tot Veg	17	34
B	6	12
R	25	50
L	2	4
TOTAL	50	////////

Symbol For Hits

Bare Soil	B
Rock	R
Litter	L
Live Plants	Plant Symbol

Phenology Record

GRASSES

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Flower stalks appear
Stage 20 to 30 Heads full out
Stage 30 to 40 Anthesis
Stage 40 to 50 Dough
Stage 50 to 60 Hard seed
Stage 60 to 70 Dissemination starts
Stage 70 to 80 Greenup

SHRUBS

Stage 0 to 10 Leaf growth starts
Stage 10 to 20 Twig growth starts
Stage 20 to 30 Flower buds appear
Stage 30 to 40 First bloom
Stage 40 to 50 Full bloom
Stage 50 to 60 Bloom over
Stage 60 to 70 Seed ripe
Stage 70 to 80 Dissemination Over

LOCATION: [illegible]

VEGETATION TYPE: PJ- grass (Agsp)

FIELD DATE: 8/6 & 8/7 -83

PARAMETER: Shrub density

UNITS: 50 m²

COMMENTS: p 1 of 2

TRANSECTS

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	AVERAGE	COMPOSITION
Artr	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—			
Chna	3	2	4	—	7	—	1	1	3	6	4	4	2	6	1	1	3	2	9	3			
Epvi	—	3	2	3	3	1	3	3	1	1	1	2	2	4	3	2	4	8	5	—			
Hiog	11	12	15	16	1	—	5	13	17	8	9	15	10	6	16	20	8	7	5	16			
Gusa	1	—	3	—	—	13	3	—	—	1	2	3	—	1	1	8	—	—	—	—			
Juos	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—			
Jusc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Opunt.	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Pied	—	1	—	—	2	—	1	—	—	1	—	—	—	—	—	—	1	—	—	1			
Pipu	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—			
Rowo	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Phir	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1			
Tape	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
Average	15	18	24	20	13	19	13	17	21	18	18	24	14	18	21	31	16	17	19	21			

N=

N90/10=

X=

S=

Summary By: _____

Summary Date: _____

LOCATION: Coop Reference Area **SUMMARY OF FIELD SHEETS**

VEGETATION TYPE: AJ - gross (Coop)

FIELD DATE: 8-6 + 8-7/83

PARAMETER: shrub density UNITS: 50 m² COMMENTS: p 2 of 2

TRANSECTS

Species	21	22	23	24	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	AVERAGE	% Shrub COMPOSITION
Chr	—	—	—	—																	2	.08	[illegible]
Ann	3	3	2	3																	73	3.04	15
Jun	3	1	5	8																	68	2.83	14
Hog	12	6	15	10																	253	10.54	55
Gus	—	6	—	—																	42	1.75	9.
Tuos	—	—	—	1																	2	.08	.4
Tusc	—	1	—	—																	1	.04	.
Opunt.	—	—	—	—																	1	.04	.
Pied	1	—	1	—																	9	.375	1.9
Pipu	—	—	—	—																	2	.08	.4
Rowo	—	—	—	—																	3	.125	.7
Rhtr	—	—	—	1																	2	.08	.4
Tapl	—	—	—	—																	1	.04	.2
Average	19	17	23	23																	459	19.13	9

N= N90/10= 17.22 X= 19.13

N90/10= S= 4.05

Summary By: Germain Waldron

Summary Date: 8-10-83

PARAMETER: Plant Density	METHOD: 1x50 m
LOCATION: Co-op Reference Area	EXAMINER: Germain + Waldvogel
RANGE SITE: PJ grass (Agsp)	TRANSECT NO. / DATE: 8/6 1983
COMMENTS: Shrub Density	

Transect ~~Plot No.~~	Species	DISTANCES Pt.-Quarter	50m² NUMBERS m² Quadrat	Plot No.	Species	50m² ~~DISTANCES Pt.-Quarter~~	NUMBERS m² Quadrat
1	Chna		III	5	Chna	~~IIII~~ II	
	Gusa		I		Epvi	III	
	Eriog		~~IIII~~ ~~IIII~~ I		Eriog	I	
			15		Pied	II	
						13	
2	Chna		II				
	Epvi		III	6	Epvi	I	
	Eriog		~~IIII~~ ~~IIII~~ II		Gusa	~~IIII~~ ~~IIII~~ III	
	Pied		I		Pipu	I	
			18		Tamarix	I	
					Rowo	III	
3	Chna		IIII			19	
	Epvi		II				
	Eriog		~~IIII~~ ~~IIII~~ ~~IIII~~	7	Chna	I	
	Gusa		III		Eriog	~~IIII~~	
			24		Gusa	III	
					Epvi	III	
4					Pied	I	
	Epvi		III			13	
	Eriog		~~IIII~~ ~~IIII~~ ~~IIII~~ I	8	Eriog	~~IIII~~ ~~IIII~~ III	
	Opunt.		I		Epvi	III	
			20		Chna	I	
						17	

PARAMETER: Plant Density	METHOD: 1X 50 m
LOCATION: Co-op Reference Area	EXAMINER: Germain & Willvoyd
RANGE SITE: PJ-gross (Agsp)	TRANSECT NO. / DATE: 8/6 1983
COMMENTS:	

50 m²

Plot No.	Species	DISTANCES Pt.-Quarter	NUMBERS m² Quadrat	Plot No.	Species	DISTANCES Pt.-Quarter	NUMBERS m² Quadrat
9	CHNA		|||	13	CHNA		||
	EPUI		|		EPUI		||
	ERIOG		卌 卌 卌 ||		ERIOG		卌 卌
			21				14
10	CHNA		卌 |	14	CHNA		卌 |
	ERIOG		卌 |||		GUSA		|
	GUSA		|		EPUI		||||
	EPUI		|		ERIOG		卌 |
	PESO		|		JUOS		|
	IPU		| / 18				/ 18
				15	CHNA		|
11	CHNA		||||		GUSA		|
	Artr		||		Epui		|||
	Erioz		卌 ||||		Erioz		卌 卌 卌 |
	EPUI		|				21
	GUSA		|| / 18				
				16	CHNA		|
12	Erioz		卌 卌 卌		GUSA		卌 |||
	CHNA		||||		Epui		||
	Epui		||		Erioz		卌 卌 卌 卌
	GUSA		||| / 24				21

PARAMETER: Plant Density	METHOD: 1 x 50 m
LOCATION: Co-op Reference Area	EXAMINER: Germain & Wellwood
RANGE SITE: PJ - grass (Agsp) / TRANSECT NO.	DATE: 8/7 198 3
COMMENTS:	

Plot No.	Species	DISTANCES Pt.-Quarter	NUMBERS m^2 Quadrat	Plot No.	Species	DISTANCES Pt.-Quarter	NUMBERS m^2 Quadrat
17	Epui		IIII	21	Epui		III
	Erioz		~~IIII~~ III		Erioz		~~IIII~~ ~~IIII~~ II
	Pied		I		Pied		I
	Chna		III / 16		Chna		III
							/ 19
18	Epui		~~IIII~~ III	22	Erioz		~~IIII~~ I
	Erioz		~~IIII~~ II		Gusa		~~IIII~~ I
	Chna		II / 17		Josc		I
					Chna		III
					Epui		I
19	Epui		~~IIII~~				/ 17
	Erioz		~~IIII~~				
	Chna		~~IIII~~ IIII	23	Erioz		~~IIII~~ ~~IIII~~ ~~IIII~~
			/ 19		Chna		II
					Epui		~~IIII~~
20	Erioz		~~IIII~~ ~~IIII~~ ~~IIII~~ I		Pied		I
	Chna		III				/ 23
	Rutr		I	24	Chna		III
	Pied		I		Epui		~~IIII~~ III
			/ 21		Erioz		~~IIII~~ ~~IIII~~
					Rutr		I
					Josc		I
							/ 2[illegible]

Table
PLANT SPECIES IDENTIFIED ON OR ADJACENT TO
THE PERMIT AREA (7/82)

PLANT SYMBOL	SCIENTIFIC NAME	COMMON NAME
GRASSES		
Agsm	Agropyron smithii	western wheatgrass
Agtr	Agropyron trachycaulum	slender wheatgrass
Agin	Agropyron intermedium	intermediate wheatgrass
Agex	Agrostis exarata	red top
Avba	Avena barbata	wild oats
Bogr	Bouteloua gracilis	blue grama
Brma	Bromus marginatus	mountain brome
Brte	Bromus tectorum	cheat grass
Calam	Calamagrostis spp.	reed grass
Dagl	Dactylis glomerata	orchard grass
Elci	Elymus cinereus	basin wildrye
Elsa	Elymus salina	salina wildrye
Elgl	Elymus glaucus	blue wildrye
Hoju	Hordeum jubatum	foxtail
Hovu	Hordeum vulgare	barley
Kocr	Koeleria cristata	June grass
Orhy	Oryzopsis hymenoides	Indian ricegrass
Poa	Poa spp.	blue grass
Sihy	Sitanion hystrix	squirreltail
Stco	Stipa comata	needle and thread
GRASS LIKE		
Carex	Carex spp.	sedge
Scirp	Scirpus maritimus	bulrush
FORBS		
Anten	Antennaria spp.	pussy toes
Arco	Arnica cordifolia	heartleaf arnica
Ascle	Asclepias spp.	milkweed
Astra	Astragalus spp.	locoweed
Asco	Astragalus convallarius	narrowleaf vetch
Casti	Castilleja spp.	Indian paint brush
Ceras	Cerastium spp.	chickweed
Chdo	Chaenactis douglasii	false yarrow
Cirs	Cirsium spp.	thistle
Clco	Clematis columbiana	clematis
Coar	Convolvulus arvense	bindweed
Cora	Cordylanthus ramosus	bird's beak
Erum	Eriogonum umbellatum	buckwheat
Erysi	Erysimum spp.	wallflower
Fraga	Fragaria spp.	strawberry
Galiu	Galium spp.	bedstraw
Grsq	Grindelia squarrosa	gumweed
Hafl	Hackelia floribunda	false forget-me-not

FORBS CON'T

Hebo	Hedysarum boreale	sweet vetch
Heuch	Heuchera spp.	alum root
Hepa	Heuchera parvifolia	alum root
Ipag	Ipomopsis aggregata	scarlet gilia
Kosc	Kochia scoparia	summer cypress
Lala	Lathyrus lanzwertii	peavine
Lathy	Lathyrus spp.	peavine
Lygr	Lygodesmia grandiflora	skeleton weed
Meci	Mertensia ciliata	bluebells
Meof	Melilotus officinalis	sweet clover
Orfa	Orobanche fasciculata	broomrape
Osoc	Osmorhiza occidentalis	sweetanice
Oxytr	Oxytropis spp.	locoweed
Oxla	Oxytropis lambertii	locoweed
Penst	Penstemon spp.	penstemon
Peea	Penstemon eatonii	firecracker penstemon
Phace	Phacelia spp.	scorpion weed
Phid	Phacelia idahoensis	scorpion weed
Phau	Physaria australis	bladderpod
Saib	Salsola iberica	Russian thistle
Sedum	Sedum spp.	stonecrop
Sela	Sedum lanceolatum	stonecrop
Senec	Senecio spp.	oldman
Smst	Smilacina stellata	false soloman seal
Spco	Sphaeralcea coccinea	mallow
Stpi	Stanleya pinnata	prince's plume
Taof	Taraxacum officinale	dandelion
Thfe	Thalictrum fendleri	meadow rue
Trdu	Tragopogon dubius	oster plant
Vicia	Vicia spp.	vetch
Viola	Viola spp.	violet
Yucca	Yucca spp.	Yucca
Yuha	Yucca harrimaniae	Yucca

HALF-SHRUBS

Arfr	Artemisia frigida	fringe sagebrush
Atcu	Atriplex cuneata	mat saltbrush
Bere	Berberis repens	Oregon grape
Xasa	Xanthocephalum sarothrae (Gutierrezia sarothrae)	snake weed

SHRUBS

Amut	Amelanchier utahensis	service berry
Amal	Amelanchier alnifolia	serivce berry
Artr	Artemisia tridentata	sagebrush
Atco	Atriplex confertifolia	shadscale
Atcu	Atriplex cuneata	mat saltbush
Cela	Ceratoides lanata	winterfat
Chna	Chrysothamnus nauseosus	rubber rabbitbrush
Chvi	Chrysothamnus viscidiflorus	green rabbitbrush

SHRUBS CON'T

Epvi	Ephedra viridis	green mormon tea
Eriog	Eriogonum spp.	buckwheat
Opunt	Opuntia spp.	prickly pear
Phmo	Physocarpus monogynus	nine bark
Putr	Purshia tridentata	bitterbrush
Rimo	Ribes montegeum	currant
Rowo	Rosa woodsii	wild rose
Sambu	Sambucus spp.	elderberry
Same	Sambucus melanocarpa	elderberry
Save	Sarcobatus vermiculatus	greasewood
Syva	Symphoricarpos vaccinoides	snowberry
Syal	Symphoricarpos albus	snowberry
Tape	Tamarix pentandra	tamarix

TREES

Acgr	Acer grandidentatum	maple
Abla	Abies lasiocarpa	subapline fir
Cele	Cercocarpus ledifolius	curlleaf mountain mahogany
Cemo	Cercocarpus montanus	true mountain mahogan
Jusc	Juniperus scopulorum	rocky mountain juniper
Juos	Juniperus osteosperma	Utah juniper
Pied	Pinus edulis	pinyon pine
Pofr	Populus fremontii	cottonwood
Potr	Populus tremuloides	aspen
Psme	Pseudotsuga menziesii	Douglas fir
Salix	Salix spp.	willow
Tape	Tamarix pentandra	tamarix

SEED LIST - FINALE RECLAMATION

RECOMMENDED SEED MIX FOR INTERUM RECLAMATION

BEAR CREEK MINE

CO-OP MINING COMPANY

SPECIES	RATE PER ACRE DRILLSEED	RATE PER ACRE HYDROSEED
GRASSES		
Agropyron dasystachyum Thickspike Wheatgrass	6	12
A. spicatum Bluebunch wheatgrass	8	16
Elymus Salina Salina wildrye	1.5	3
Oryzopsis hymenoides Indian ricegrass	3	6
Poa secunda Sandberg bluegrass	2	4
FORBS		
Ladak alfalfa	2	4
Yellow sweet clover	2	4
COVER CROP		
Oats	10	20

ATTACHMENT #2-A

RECOMMENDED SEED MIX
BEAR CREEK MINE
CO-OP MINING COMPANY

SPECIES	RATE* PER ACRE	APPROXIMATE NO. SEEDS/FT^2
GRASSES		
Agropyron dasystachyum Thickspike wheatgrass	3	12
A. spicatum Bluebunch wheatgrass	8	22
Elymus Salina Salina wildrye	1.5	15
Oryzopsis hymenoides Indian ricegrass	3	12
Poa secunda Sandberg bluegrass	1	21
FORBS		
Achillea millifolium Western yarrow	.15	10
Aster chilensis Pacific aster	.15	9
Hedysarum boreale Northern sweetvetch	9	[illegible]
Lupinus sericeus Silky sweetvetch	20	[illegible]
Penstemon Palmeri Palmer penstemon or		
P. Strictus Rocky Mountain Penstemon	.5	7

Attachment #2-A

SHRUBS

Amelanchier Utahensis Utah serviceberry	4	4
Artemisia tridentata ssp. vaseyana Big sagebrush	.15	9
Cercocarpus ledifolius Curlleaf Mountain mahogany	6	7
Chrysothamnus nauseosus var. albicaulus Whitestem rubber rabbitbrush	.5	5
Sambucus cerulea Blue elderberry	.8	4
For hydroseeding	59.75	159
1/2 application for drill seeded areas	30.00	

* Rate is pure live seed to be broadcast and lightly covered.